Operations and Intelligence Report
INSPIRA HEALTH NETWORK
August 2016

BEST IN CLASS – INFORMATION SECURITY
INTELLIGENCE AND OPERATIONS

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1. About This Report

The purpose of this document is to report on the "state" of security for your organization. It must be noted that GLESEC bases its information analysis on the systems under contract. The information generated by these systems is then aggregated, correlated and analyzed. The more complete the set of systems under contract the more accurate and complete the results will be. The report is organized to provide an executive summary with recommendations (as necessary or applicable) followed by more detailed information.

We at GLESEC believe information security is a holistic and dynamic process. This process requires on-going research and follow up. Holistic since no single "device" can provide the security necessary for an organization. Technology alone cannot provide the security necessary, but people that understand the operations and information generated by the security devices are a key to proper security. The process is dynamic since due to the nature of Internet security given the constant discovery of new security vulnerabilities and exploits, the proliferation of hacking tools that make it easier for script-kiddies with minimal knowledge to cause damage. The increase in malware, phishing, insider threats, espionage, organized crime, intellectual property theft, and hacktivism are the very cause of information security exposure and are most commonly driven by financial gain.

2. Confidentiality

GLESEC considers the confidentiality of client's information as a trade-secret. The information in this context is classified as:

a) Client name and contact information
b) System architecture, configuration, access methods and access control
c) Security content

All the above information is kept secure to the extent in which GLESEC secures its own confidential information.

3. Scope Of This Report

GLESEC Contracted Services

MSS: Managed Security Service (full outsourcing)

Service	Manufacturer	Model	Update Expiration	Service Expiration
MSS-APS	Radware	DefensePro 516 ODS2-S1(Bridgeton)	01/01/16	01/01/17
MSS-APS	Radware	DefensePro 516 ODS2-S1(Elmer)	01/01/16	01/01/17
MSS-VME			01/01/16	01/01/17

4. Executive Summary

This report corresponds to the period from August 1, 2016 to August 31, 2016.

This month we are seeing a decrease in overall attack activity from prior month however there was a significant increase of critical attacks than prior month. Most of the attacks are short in duration (less than a minute) and most are targeting multiple ports. A very large percentage of the attacks are coming from known threat sources that GLESEC gathers and correlates with the information produced by the protection systems (DefensePro). As usual most attacks originate from the US with Netherlands and China also showing large numbers. A significant number of attacks are scanning which can be considered reconnaissance and is what precedes further attacks. As usual for Inspira we see a high amount of attacks of 10 to 30 minute duration as well as a high amount of short duration. The latter can be explained as reconnaissance traffic.

Fifty-five (55) out of one hundred twenty five (125) of the hosts that are seen from the Internet have vulnerabilities. The total number of vulnerabilities are 192, 1 High, 28 medium and 163 low that should be addressed.

The systems have been operating normally with 100% uptime and good response time.

Risk Value

To provide a way to quantify the risk of a Company, GLESEC introduces a definition for a metric value to capture the exposure risk that allow to evaluate the objective vulnerabilities and also the record of change over time. This procedure to qualify can be used to evaluate the ROI in the security measures we have implemented.

It is important to mention that this metric considers a median value for the vulnerabilities classified as ¨high¨, ¨medium¨ and ¨low¨, given them a value of 100% 50% and 10% to each, so the factor of the total number of system that are vulnerable.

This takes into consideration all of the vulnerabilities, but is important to point out that this values (100, 50 and 10) are arbitrary chosen by us, so this measure can in time change as we understand more of the risk involved. We can use this metric to evaluate the progress in time and to compare one over the other using a common amount set.

Total IP's Scanned			IP's Vulnerable
125			55
Risk Distribution			
High	Medium	Low	Total
1	28	163	192
Risk Value		0.072	
Vulnerabilities Weighted Sum			0.163

According to the metrics:

RV= 0.072

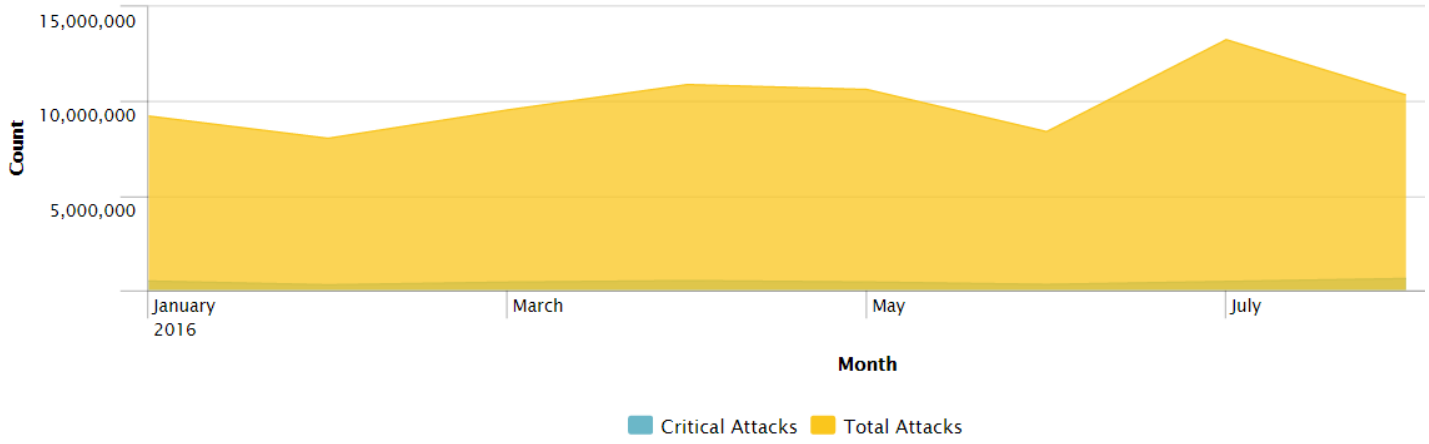
The following values are to clarify RV:
RV=1 Points to every IP address in the infrastructure that are susceptible to attacks
RV=0 Points to no IP address in the infrastructure are susceptible to attacks
RV=0.1 Point to 1/10 IP address in the infrastructure that are susceptible to attacks

Attack Summary

Based on the information gathered from the DefensePro during this period **10,336,692** attacks on INSPIRA HEALTH NETWORK, **624,809** of which were considered critical were all stopped by the Radware DefensePro 516.

INSPIRA HEALTH NETWORK receives an average of **10,036,607** YTD figure for total attacks and **445,333** YTD figure for critical attacks on a monthly basis which equates to an average of **343,132** YTD figure for total daily attacks and **15,225** YTD figure for critical daily attacks. As the graph illustrates total attack levels have decreased in relation to the previous report period which totaled **13,258,788** total attacks and critical attacks have also increased compared with a last period's total of **465,589**.

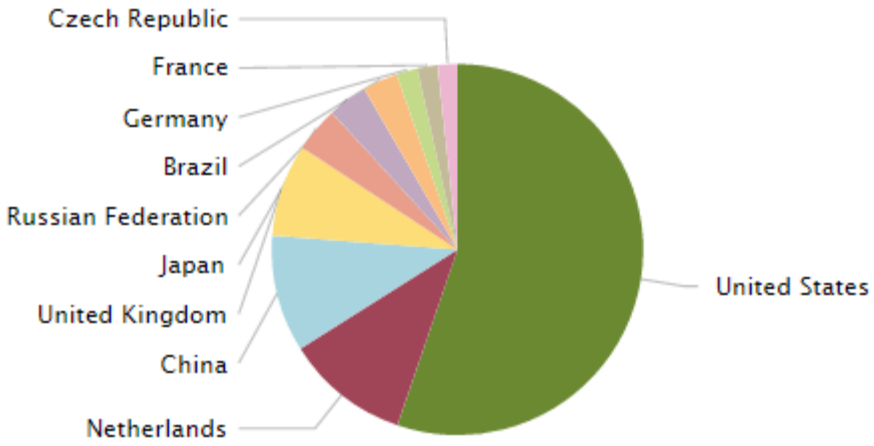
This statistical graph provides the count of critical and total attacks blocked per month calculated on a rolling 12 month period (Last 12 months)



Description	July	August
Total Attack	**13,258,788**	**10,336,692**
Critical Attacks	**465,589**	**624,809**
Monthly attack average	**9,997,738**	**10,036,607**
Daily Attack Average	**337,952**	**343,132**
Monthly Critical attack average	**419,694**	**445,333**
Daily Critical Attack Average	**14,193**	**15,225**

Geography

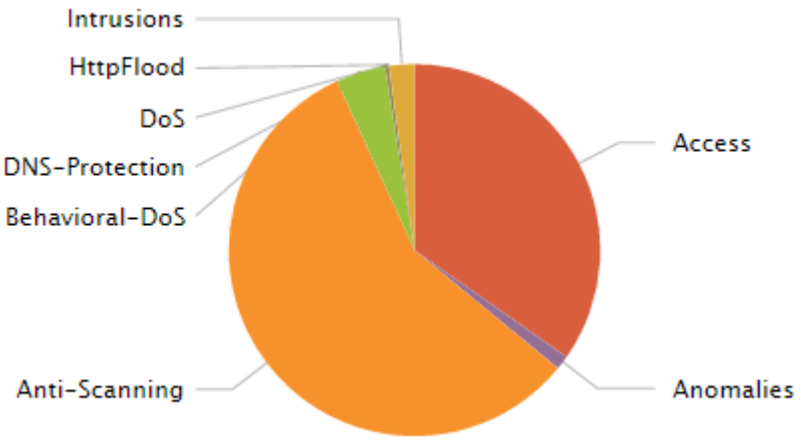
The vast majority of attacks on INSPIRA HEALTH NETWORK originated geographically from the following Top 10 countries: **United States, Netherlands, China, United Kingdom, Japan, Russian Federation, Brazil, Germany, France and Czech Republic** listed in order of frequency. The attacks that we observed are happening to companies all around the world. Geographic borders offer little or no protection against cyber attacks, in fact just the opposite is true offering more opportunity for anyone to carry out an attack.



*Please view the Maps, and **Graph: Top 10 Attacking Countries Blocked**, **Graph: Top 10 Attacking Countries Blocked by Attack Type**, **Graph: Top 10 Attacking Countries Blocked by Protocol** available in the Security Intelligence section of the report

Category Distribution

Category distribution for this report period is illustrated and detailed below.



Access accounted for 34.7% of attacks during this report period

Access category relates directly to blacklists configured by GLESEC on the DefensePros for known threat sources.

Intrusions accounted for 2.2% of attacks during this report period

These include vulnerability-based threats such as: Worms and Botnets; Trojan horses and the creation of backdoors; Vendor-specific exploitation vulnerabilities in products e.g., Microsoft, Oracle; Exploitation of vulnerabilities in applications such as web, mail, VoIP, DNS, SQL; Spyware, Phishing, anonymizers.

Scanning accounted for 57.1% of attacks during this report period

Network-wide Anti-Scanning protections dropped enumeration attempts which otherwise thwart any effort for threat modeling, commonplace after the information gathering phase of a targeted or planned attack.

Packet Anomalies accounted for 1.2% of attacks during this report period

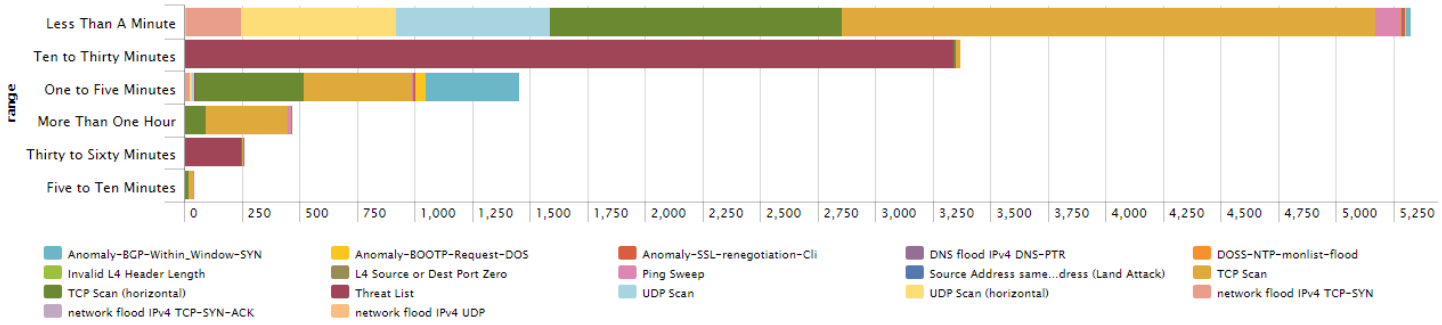
This anomalous traffic is usually caused by attacks or evasion tactics directed at the network devices such as firewalls in order to bypass their functions which if allowed to pass could permit scanning of the internal network or overloading the central processing unit of the device rendering it unusable and effectively causing a network bottleneck or DoS condition. They are also used as a method to collapse the underlying network infrastructure with packet crafting tools used by threat agents to interrupt services or distract security teams with volumetric attacks while more targeted attacks are directed at important assets to allow for data exfiltration. Packet Anomalies can also be caused by applications that do not adhere to RFC standards.

Denial of Service accounted for 4.3% of attacks during this report period

Denial of service (DoS) usually refers to an attack that attempts to make a computer resource unavailable to its intended users by flooding a network or server with requests and data. Depending on the nature of your enterprise, this can effectively disable your organization.

Duration

Attack duration for specific categories for this report period is illustrated below. We can observe extended attack campaigns from the Access category which consists of Blacklists for known threat sources.


range
Less Than A Minute
Ten to Thirty Minutes
One to Five Minutes
More Than One Hour
Thirty to Sixty Minutes
Five to Ten Minutes
0
250
500
750
1,000
1,250
1,500
1,750
2,000
2,250
2,500
2,750
3,000
3,250
3,500
3,750
4,000
4,250
4,500
4,750
5,000
5,250
Anomaly-BGP-Within_Window-SYN
Anomaly-BOOTP-Request-DOS
Anomaly-SSL-renegotiation-Cli
DNS flood IPv4 DNS-PTR
DOSS-NTP-monlist-flood
Invalid L4 Header Length
L4 Source or Dest Port Zero
Ping Sweep
Source Address same...dress (Land Attack)
TCP Scan
TCP Scan (horizontal)
Threat List
UDP Scan
UDP Scan (horizontal)
network flood IPv4 TCP-SYN
network flood IPv4 TCP-SYN-ACK
network flood IPv4 UDP

Bandwidth

Intrusion protection stopped peak hourly attack bandwidth of **25.32 Gbps**. Intrusion protection dropped **278.15 Gbps** of total traffic, Access (Blacklist) protection dropped **287.57 Gbps**, Anti-Scanning protection dropped **11.31 Gbps** of traffic, **2.58 Gbps** dropped by Packet Anomaly protection rules, and DoS protections dropped **214.30 Mbps**. A total of **580.53 Gbps** of malicious traffic was discarded this period.

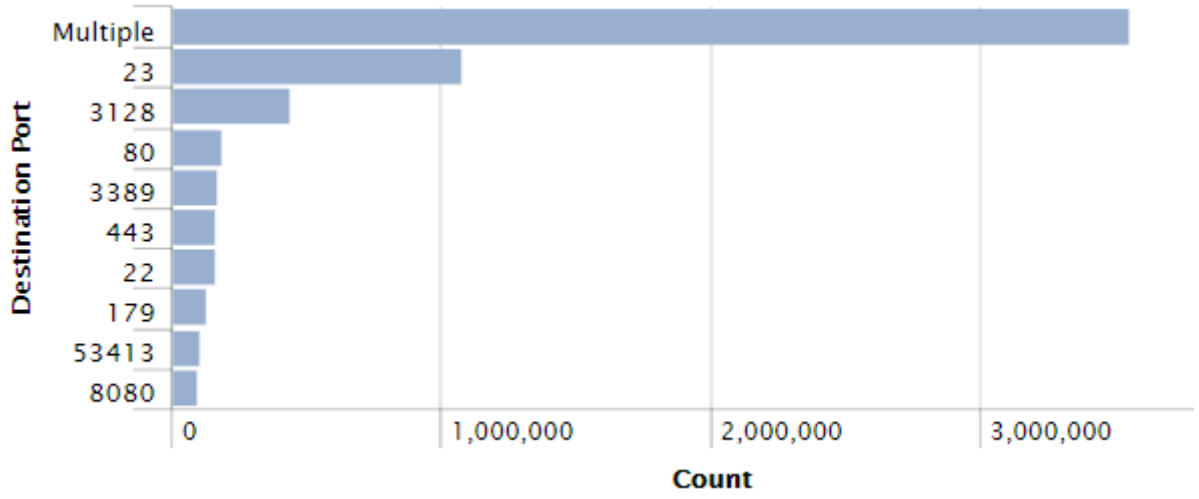
	Category	Gbps	Mbps
1	Access	8.24	8438.12
2	Anti-Scanning	1.80	1841.41
3	Intrusions	0.58	589.74
4	Behavioral-DoS	0.12	127.71
5	Anomalies	0.02	25.09
6	DNS-Protection	0.02	22.10
7	DoS	0.00	1.14
8	Total Bandwidth in Gbps/Mbps	10.78	11045.31

*Please view the **Bandwidth Information**, and **Graph: Bandwidth by Blocked Threat Category by Hour of Day** and **Graph: Top Attacks Blocked by Bandwidth** and **Graph: Attack Categories Blocked by Bandwidth** available in the Security Intelligence section of the report.

Port Activity

The advanced intrusion detection and prevention capabilities offered by the DefensePro IPS NBA, DoS and Reputation Service provides maximum protection for network elements, hosts and applications. It is composed of different application-level protection features to prevent intrusion attempts such as worms, Trojan horses and single-bullet attacks, facilitating complete and high-speed cleansing of all malicious intrusions.

The DefensePro assisted in preventing attacks directed at network and server level which were directed at well-known port numbers: **443** (https), **23** (telnet), **8080** (http-alt), **80** (http)**22** (ssh), **3389** (rdp), **22** (ssh), **53** (dns), **25** (smtp), **21** (ftp), **21320** (tcp/udp), **5900** (vnc) in order of frequency for this report period.

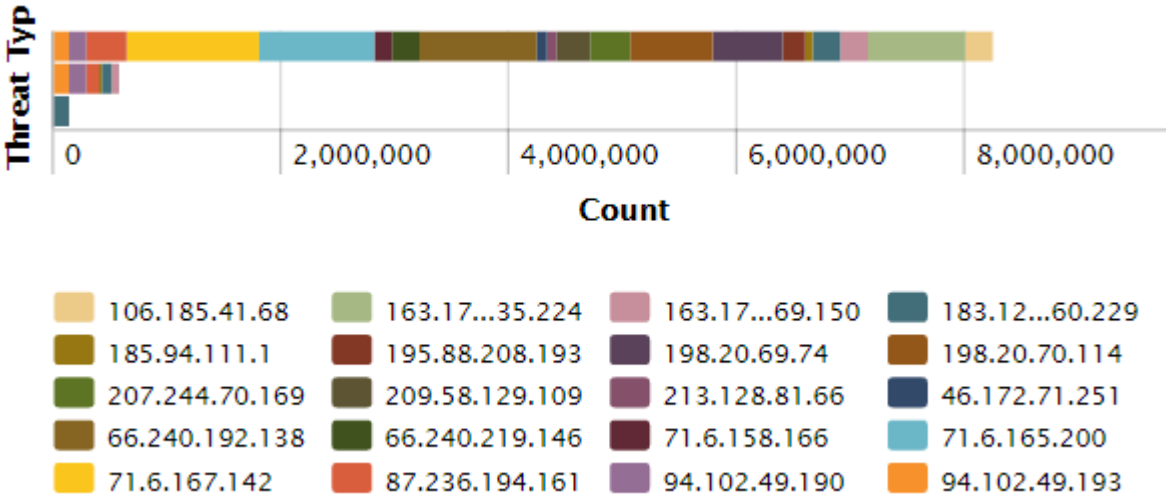


Port number information utilized is based on IANA Service Name and Transport Protocol Port Number Registry and additional outside sources are used to illustrate the relationship to commonly exploited attacks vectors.

*Please view the **Port Information**, and **Graph: Attacks Blocked by Destination Port** and **Graph: Top Probed Applications Blocked** available in the Security Intelligence section of the report.

Known Threat Sources

Attacks on INSPIRA HEALTH NETWORK are from known threat sources that have been compiled and correlated with attack source IPs gathered from the DefensePro attack logs and outside sources such honeypots, known malicious sources, vulnerability databases, relationships with CERT and CSIRT teams that GLESEC possesses, together with various other threat feeds.



*Please view the **Known Threat Source In formation**, Maps, and **Graph: Known Threat Sources by Threat Type** available in the Security Intelligence section of the report.

Vulnerability Summary

The following network ranges for INSPIRA HEALTH NETWORK were scanned for vulnerabilities:

170.75.32.0/20
170.75.48.0/20

A total of 125 live hosts responding to pings were scanned, **55** of which were found to be vulnerable. Vulnerabilities were detected for the following network IP range:

Vulnerabilities by Host and Risk Level				
Host	Total	High	Medium	Low
170.75.32.1	1	0	0	1
170.75.32.2	1	0	0	1
170.75.32.3	1	0	0	1
170.75.32.10	1	0	0	1
170.75.32.15	6	0	1	5
170.75.33.4 (ihnpps1.ihn.org)	2	0	1	1
170.75.33.35 (ipad.sjhs.com)	7	0	1	6
170.75.33.51 (secureftp.ihn.org)	8	0	3	5
170.75.33.53 (ihnppagent.ihn.org)	2	0	1	1
170.75.33.55	3	0	1	2
170.75.33.58 (workspace.ihn.org)	2	0	0	2
170.75.33.95	1	0	0	1
170.75.33.97 (activesync.ihn.org)	2	0	0	2
170.75.33.98 (email.ihn.org)	1	0	0	1
170.75.33.104 (careclockb.sjhs.com)	1	0	0	1
170.75.33.105 (careclocke.sjhs.com)	2	0	0	2
170.75.33.106 (careclockv.sjhs.com)	3	0	0	3
170.75.33.108 (paystub.ihn.org)	9	0	2	7
170.75.33.109 (lyncscheduler.ihn.org)	1	0	0	1
170.75.33.110 (ecwipad.ihn.org)	1	0	0	1

170.75.33.111 (evals.ihn.org)	4	0	0	4
170.75.33.112 (im.sjhs.com)	9	0	3	6
170.75.33.113 (isystoc.sjhs.com)	4	1	0	3
170.75.33.115 (pacs.sjhs.com)	1	0	0	1
170.75.33.116 (inspiraemployee.ihn.org)	4	0	0	4
170.75.33.117 (wacext.ihn.org)	3	0	0	3
170.75.33.118 (notifi-web.sjhs.com)	4	0	0	4
170.75.33.119 (pacs.ihn.org)	7	0	1	6
170.75.33.120 (password.ihn.org)	2	0	0	2
170.75.33.121 (mydesktop.ihn.org)	1	0	0	1
170.75.33.122 (policytech.sjhs.com)	8	0	1	7
170.75.33.123 (secureftp.sjhs.com)	8	0	3	5
170.75.33.124 (umhssl.ihn.org)	1	0	0	1
170.75.33.125 (vision1.sjhs.com)	10	0	1	9
170.75.33.127 (visualque.sjhs.com)	2	0	0	2
170.75.33.128 (webdocs.ihn.org)	4	0	0	4
170.75.33.129 (woodburywait.ihn.org)	2	0	0	2
170.75.33.130 (www.sjhs.com)	2	0	0	2
170.75.33.131 (autodiscover.sjhs.com)	7	0	1	6
170.75.33.132 (healthstreamvid.sjhs.com)	1	0	0	1
170.75.33.133 (survey.ihn.org)	3	0	0	3
170.75.33.134 (lync.sjhs.com)	3	0	1	2
170.75.33.135 (webcon.ihn.org)	3	0	1	2
170.75.33.137	3	0	1	2
170.75.33.138	1	0	0	1
170.75.33.140 (netilla.sjhs.com)	3	0	0	3
170.75.33.141 (nemoursdocs.ihn.org)	9	0	1	8
170.75.33.142 (sisweb.ihn.org)	9	0	1	8
170.75.33.162 (access.ihn.org)	4	0	0	4
170.75.33.163	6	0	1	5
170.75.33.216	3	0	1	2
170.75.33.217	3	0	1	2
170.75.48.1	1	0	0	1
170.75.48.2	1	0	0	1
170.75.48.3	1	0	0	1

Correlation Summary

We can observe that Intrusions, Anomalies (malformed packets), and HTTP Floods are targeting Web Servers and are being dropped by the DefensePros. We also can observe that several addresses placed on the DefensePro blacklist are being dropped with significant numbers of malicious events being discarded targeting Web servers. We can not be 100% sure but there is a high probability that these types of attacks are occurring and if the DefensePro was not in place, the attack might have been successfully carried out.

*Please view the **Vulnerability Information** section summary and **Graphs: Vulnerability Category (AVDS) by Attack Name (DefensePro)**, **Vulnerability Category (AVDS) by Attack Category (DefensePro)**, **Vulnerability Category (AVDS) by Attack Destination IP (DefensePro)** available in the Security Intelligence section of the report.

Risk Distribution

Category distribution for this report period is illustrated and detailed below.

Based on the information gathered from the GLESEC Automated Vulnerability Detection System (AVDS) a total of **192 Vulnerabilities** were found which consisted of **1 High Risk Vulnerability**, **28 Medium Risk Vulnerabilities** and **163 Low Risk Vulnerabilities** during this period.

Scan	Total	High	Medium	Low
Inspira Health Network Perimeter	192	1	28	163

Low risk vulnerabilities accounted for 85% of the discoveries during this report period

Low describes vulnerabilities that allow preliminary or sensitive information gathering for an attacker or pose risks that are not entirely security related but maybe used in social-engineering or similar attacks.

Medium risk vulnerabilities accounted for 14.58% of the discoveries during this report period

Medium describes vulnerabilities that either expose sensitive data, directory browsing and traversal, disclosure of security controls, facilitate unauthorized use of services or denial of service to an attacker.

Vulnerability Categories

Encryption and Authentication vulnerabilities are the most prevalent vulnerability category with **70** detected vulnerabilities followed by Preliminary Analysis with 58 detections, Web server with **51** detections, Server Side Scripts with **9** and Mail Servers and Simple Network Services with **2** detections each for the report period.

Vulnerabilities by Category				
Category	Total	High	Medium	Low
Encryption and Authentication	70	0	19	51
Simple Network services	2	0	0	2
Mail servers	2	0	0	2
Web servers	51	1	0	50
Server Side Scripts	9	0	9	0
Preliminary Analysis	58	0	0	58

Web Server vulnerabilities accounted for 27% of the discoveries during this report period

Various high-profile hacking attacks have proven that web security remains the most critical issue to any business that conducts its operations online. Web servers are one of the most targeted public faces of an organization, because of the sensitive data they usually host. Securing a web server is as important as securing the website or web application itself and the network around it. If you have a secure web application and an insecure web server, or vice versa, it still puts your business at a huge risk. Your company's security is as strong as its weakest point.

Encryption and Authentication vulnerabilities accounted for 36% of the discoveries during this report period

Authentication and encryption are two intertwined technologies that help to insure that your data remains secure. Authentication is the process of insuring that both ends of the connection are in fact who they say they are. This applies not only to the entity trying to access a service (such as an end user) but to the entity providing the service, as well (such as a file server or Web site). Encryption helps to insure that the information within a session is not compromised. This includes not only reading the information within a data stream, but altering it, as well.

While authentication and encryption each has its own responsibilities in securing a communication session, maximum protection can only be achieved when the two are combined. For this reason, many security protocols contain both authentication and encryption specifications.

Preliminary Analysis vulnerabilities accounted for 30% of the discoveries during this report period

Preliminary Analysis vulnerabilities are primarily information or service disclosures that can be gathered during footprinting/enumeration. Information disclosure is the unwanted exposure of private data. For example, a user views the contents of a table or file he or she is not authorized to open, or monitors data passed in plaintext over a network. Some examples of information disclosure vulnerabilities include the use of hidden form fields, comments embedded in Web pages that contain database connection strings and connection details, and weak exception handling that can lead to internal system level details being revealed to the client. Any of this information can be very useful to the attacker/threat agent.

5. Recommendations

GLESEC recommends for INSPIRA HEALTH NETWORK to address the following vulnerability assigned a High Risk by the GLESEC AVDS.

Description	Category
OBSOLETE WEB SERVER SOFTWARE DETECTION	Web servers

According to its version, the remote web server is obsolete and no longer maintained by its vendor or provider. A lack of support implies that no new security patches are being released for it.

Host(s) affected:

170.75.33.113 (isystoc.sjhs.com) : https (443/tcp)

Product: Microsoft IIS 6.0 Server response header: Microsoft-IIS/6.0

Support ended: 2015-07-14

Supported versions: Microsoft IIS 8.5 / 8.0 / 7.5 / 7.0 Additional information: http://support.microsoft.com/lifecycle/?p1=2097

GLESEC recommends for INSPIRA HEALTH NETWORK to address the following vulnerabilities assigned a Medium Risk by the GLESEC AVDS.

Description	Category
WEB APPLICATION COOKIES LACK HTTPONLY FLAG	Server Side Scripts

The remote web application sets various cookies throughout a user's unauthenticated and authenticated session. However, one or more of those cookies are not marked 'HttpOnly', meaning that a malicious client-side script, such as JavaScript, could read them. The HttpOnly flag is a security mechanism to protect against cross-site scripting attacks, which was proposed by Microsoft and initially implemented in Internet Explorer. All modern browsers now support it.

Host(s) affected:

170.75.32.15 : https (443/tcp)
The following cookies do do not have set the HttpOnly cookie flag:
- Cookie name: webvpnlogin, Path: /, HttpOnly Flag: 0
- Cookie name: webvpnc, Path: /, HttpOnly Flag: 0
- Cookie name: webvpnSharePoint, Path: /, HttpOnly Flag: 0
- Cookie name: webvpn, Path: /, HttpOnly Flag: 0
- Cookie name: webvpn_portal, Path: /, HttpOnly Flag: 0

170.75.33.51 : https (443/tcp)
The following cookies do do not have set the HttpOnly cookie flag:
- Cookie name: LongTermCookieExpireDate, Path: /, HttpOnly Flag: 0
- Cookie name: MIDMZLang, Path: /, HttpOnly Flag: 0
- Cookie name: NoWiz, Path: /, HttpOnly Flag: 0
- Cookie name: JavascriptTest, Path: /, HttpOnly Flag: 0
- Cookie name: DMZCookieTest, Path: /, HttpOnly Flag: 0
- Cookie name: siLockLongTermInstID, Path: /, HttpOnly Flag: 0
- Cookie name: DesignModeTest, Path: /, HttpOnly Flag: 0
- Cookie name: WizardVersions, Path: /, HttpOnly Flag: 0

170.75.33.112 : https (443/tcp)
The following cookie does do not have set the HttpOnly cookie flag:
- Cookie name: ASPSESSIONIDQSTTSRRD, Path: /, HttpOnly Flag: 0

170.75.33.123 : https (443/tcp)
The following cookies do do not have set the HttpOnly cookie flag:
- Cookie name: LongTermCookieExpireDate, Path: /, HttpOnly Flag: 0
- Cookie name: MIDMZLang, Path: /, HttpOnly Flag: 0
- Cookie name: NoWiz, Path: /, HttpOnly Flag: 0
- Cookie name: JavascriptTest, Path: /, HttpOnly Flag: 0
- Cookie name: DMZCookieTest, Path: /, HttpOnly Flag: 0

Cookie name: siLockLongTermInstID, Path: /, HttpOnly Flag: 0
Cookie name: DesignModeTest, Path: /, HttpOnly Flag: 0
Cookie name: WizardVersions, Path: /, HttpOnly Flag: 0

170.75.33.163 : https (443/tcp)
The following cookie does do not have set the HttpOnly cookie flag:
Cookie name: JSESSIONID, Path: /, HttpOnly Flag: 0

Possible Solution:

Each cookie should be carefully reviewed to determine if it contains sensitive data or is relied upon for a security decision. If possible, add the 'HttpOnly' attribute to all session cookies and any cookies containing sensitive data.

Description

SSL CERTIFICATE EXPIRY

Category

Encryption and Authentication

This test checks expiry dates of certificates associated with SSL-enabled services on the target and reports whether any have already expired or will expire within 60 days.

Host(s) affected:

170.75.33.4 (ihnpps1.ihn.org) : smtp (25/tcp)

The SSL certificate of the remote service expired Dec 6 23:59:59 2015 GMT.

170.75.33.53 (ihnpps1.ihn.org) : smtp (25/tcp)

The SSL certificate of the remote service expired Dec 6 23:59:59 2015 GMT.

Possible Solution:

Generate a new certificate for the server, expired certificates pose a security threat as they prevent the user accessing your site from being able to properly evaluate the safety of your SSL certificates

Description

DEPRECATED SSL PROTOCOL USAGE

Category

Encryption and Authentication

The remote service accepts connections encrypted using SSLv2 and/or SSLv3, which reportedly suffers from several cryptographic flaws and has been deprecated for several years. An attacker may be able to exploit these issues to conduct man-in-the-middle attacks or decrypt communications between the affected service and clients.

Host(s) affected:

170.75.33.35 (ipad.sjhs.com) : https (443/tcp)
170.75.33.51 (ipad.sjhs.com) : https (443/tcp)
170.75.33.108 (ipad.sjhs.com) : https (443/tcp)
170.75.33.112 (ipad.sjhs.com) : https (443/tcp)
170.75.33.119 (ipad.sjhs.com) : https (443/tcp)
170.75.33.122 (ipad.sjhs.com) : https (443/tcp)
170.75.33.123 (ipad.sjhs.com) : https (443/tcp)
170.75.33.125 (ipad.sjhs.com) : https (443/tcp)
170.75.33.131 (ipad.sjhs.com) : https (443/tcp)
170.75.33.134 (ipad.sjhs.com) : https (443/tcp)
170.75.33.135 (ipad.sjhs.com) : https (443/tcp)
170.75.33.137 (ipad.sjhs.com) : https (443/tcp)
170.75.33.141 (ipad.sjhs.com) : https (443/tcp)
170.75.33.142 (ipad.sjhs.com) : https (443/tcp)
170.75.33.216 (ipad.sjhs.com) : https (443/tcp)
170.75.33.217 (ipad.sjhs.com) : https (443/tcp)

Possible Solution:

Consult the application's documentation to disable SSL 2.0 and SSL 3.0, and use TLS 1.0 or newer

Description

WEB APPLICATION COOKIES LACK SECURE FLAG

Category

Server Side Scripts

The remote web application sets various cookies throughout a user's unauthenticated and authenticated session. However, there are instances where the application is running over unencrypted HTTP or the cookies are not marked 'secure', meaning the browser could send them back over an unencrypted link under certain circumstances. As a result, it may be possible for a remote attacker to intercept these cookies.

Host(s) affected:

170.75.33.51 (secureftp.ihn.org) : https (443/tcp)

170.75.33.108 (secureftp.ihn.org) : https (443/tcp)
170.75.33.112 (secureftp.ihn.org) : https (443/tcp)
170.75.33.123 (secureftp.ihn.org) : https (443/tcp)

Detail

170.75.33.51 : https (443/tcp)
The following cookie does do not have the Secure cookie flag:
Cookie name: LongTermCookieExpireDate, Path: /, Secure Flag: 0
Cookie name: MIDMZLang, Path: /, Secure Flag: 0
Cookie name: NoWiz, Path: /, Secure Flag: 0
Cookie name: JavascriptTest, Path: /, Secure Flag: 0
Cookie name: DMZCookieTest, Path: /, Secure Flag: 0
Cookie name: siLockLongTermInstID, Path: /, Secure Flag: 0
Cookie name: DesignModeTest, Path: /, Secure Flag: 0
Cookie name: WizardVersions, Path: /, Secure Flag: 0

170.75.33.112 : https (443/tcp)
The following cookie does do not have the Secure cookie flag:
Cookie name: ASPSESSIONIDQSTTSRRD, Path: /, Secure Flag: 0

170.75.33.123 : https (443/tcp)
The following cookie does do not have the Secure cookie flag:
Cookie name: LongTermCookieExpireDate, Path: /, Secure Flag: 0
Cookie name: MIDMZLang, Path: /, Secure Flag: 0
Cookie name: NoWiz, Path: /, Secure Flag: 0
Cookie name: JavascriptTest, Path: /, Secure Flag: 0
Cookie name: DMZCookieTest, Path: /, Secure Flag: 0
Cookie name: siLockLongTermInstID, Path: /, Secure Flag: 0
Cookie name: DesignModeTest, Path: /, Secure Flag: 0
Cookie name: WizardVersions, Path: /, Secure Flag: 0

Possible Solution:

Each cookie should be carefully reviewed to determine if it contains sensitive data or is relied upon for a security decision. If possible, ensure all communication occurs over an encrypted channel and add the 'secure' attribute to all session cookies or any cookies containing sensitive data.

Description

SSL SUITES WEAK CIPHERS

Category

Encryption and Authentication

The remote host supports the use of SSL ciphers that offer either weak encryption or no encryption at all.

Host(s) affected:

170.75.33.55 : https (443/tcp)

Here is the list of weak SSL ciphers supported by the remote server:
* Null Ciphers (no encryption)
* SSLv3 - NULL-SHA Kx=RSA Au=RSA Enc=None Mac=SHA1
* TLSv1 - NULL-SHA Kx=RSA Au=RSA Enc=None Mac=SHA1
The fields above are:
* {OpenSSL ciphername}
* Kx={key exchange} * Au={authentication}
* Enc={symmetric encryption method}
* Mac={message authentication code}
* {export flag}

Possible Solution:

Reconfigure your SSL package to reject the use of weak ciphers.

GLESEC recommends for INSPIRA HEALTH NETWORK to address the following vulnerability assigned a Low Risk by the GLESEC AVDS.

Description

ICMP Timestamp Request

Category

Preliminary Analysis

The remote host answers to an ICMP timestamp request. This allows an attacker to know the time and date on your host.

Impact

This may help attackers to defeat time based authentications schemes.

Host(s) affected:

170.75.32.1 : general (icmp)
170.75.32.2 : general (icmp)

170.75.32.3 : general (icmp)
170.75.32.10 : general (icmp)
170.75.48.1 : general (icmp)
170.75.48.2 : general (icmp)
170.75.48.3 : general (icmp)

Possible Solution

See solution provided at: http://www.beyondsecurity.com/faq/questions/54/how-can-imitigate-icmp-timestamp

Description	Category
IPSEC IKE DETECTION	Encryption and Authentication

The remote host seems to be enabled to do Internet Key Exchange (IKE). This is typically indicative of a VPN server. VPN servers are used to connect remote hosts into internal resources.

Host(s) affected:

170.75.32.15 : isakmp (500/udp)

Possible Solution:

You should ensure that:
1) The VPN is authorized for your Companies computing environment
2) The VPN utilizes strong encryption
3) The VPN utilizes strong authentication

Description	Category
SSL VERIFICATION TEST	Encryption and Authentication

This test connects to a SSL server, and checks its certificate and the available ciphers. Weak (export version) ciphers are reported as problematic

Host(s) affected:

170.75.32.15 : https (443/tcp)
170.75.33.35 : https (443/tcp)
170.75.33.51 : https (443/tcp)
170.75.33.108 : https (443/tcp)
170.75.33.112 : https (443/tcp)

170.75.33.119 : https (443/tcp)
170.75.33.122 : https (443/tcp)
170.75.33.123 : https (443/tcp)
170.75.33.125 : https (443/tcp)
170.75.33.131 : https (443/tcp)
170.75.33.134 : https (443/tcp)
170.75.33.135 : https (443/tcp)
170.75.33.137 : https (443/tcp)
170.75.33.141 : https (443/tcp)
170.75.33.142 : https (443/tcp)
170.75.33.163 : https (443/tcp)
170.75.33.216 : https (443/tcp)
170.75.33.217 : https (443/tcp).

Possible Solution:

Usage of weak ciphers should be avoided.

Description

SUPPORTED SSL CIPHERS SUITES

Category

Encryption and Authentication

This test detects which SSL ciphers are supported by remote service for encrypting communications.

Host(s) affected:

170.75.32.15 : https (443/tcp)
170.75.33.35 : https (443/tcp)
170.75.33.51 : https (443/tcp)
170.75.33.55 : https (443/tcp)
170.75.33.58 : https (443/tcp)
170.75.33.97 : https (443/tcp)
170.75.33.108 : https (443/tcp)
170.75.33.111 : https (443/tcp)
170.75.33.112 : https (443/tcp)
170.75.33.113 : https (443/tcp)
170.75.33.116 : https (443/tcp)
170.75.33.117 : https (443/tcp)
170.75.33.118 : https (443/tcp)
170.75.33.119 : https (443/tcp)
170.75.33.122 : https (443/tcp)
170.75.33.123 : https (443/tcp)

170.75.33.125 : https (443/tcp)
170.75.33.128 : https (443/tcp)
170.75.33.131 : https (443/tcp)
170.75.33.133 : https (443/tcp)
170.75.33.134 : https (443/tcp)
170.75.33.135 : https (443/tcp)
170.75.33.137 : https (443/tcp)
170.75.33.138 : https (443/tcp)
170.75.33.140 : https (443/tcp)
170.75.33.141 : https (443/tcp)
170.75.33.142 : https (443/tcp)
170.75.33.162 : https (443/tcp)
170.75.33.216 : https (443/tcp)
170.75.33.217 : https (443/tcp)

Description

HTTP PACKET INSPECTION

Category

Web servers

This test gives some information about the remote HTTP protocol - the version used, whether HTTP Keep-Alive and HTTP pipelining are enabled, etc.

Host(s) affected:

170.75.32.15 : https (443/tcp)
170.75.33.35 : http (80/tcp)https (443/tcp)
170.75.33.51 : https (443/tcp)
170.75.33.106 : http (80/tcp)
170.75.33.108 : http (80/tcp)https (443/tcp)
170.75.33.112 : https (443/tcp)
170.75.33.116 : http (80/tcp)
170.75.33.119 : https (443/tcp)
170.75.33.120 : http (80/tcp)
170.75.33.122 : https (443/tcp)
170.75.33.123 : https (443/tcp)
170.75.33.125 : http (80/tcp)https (443/tcp)
170.75.33.127 : http (80/tcp)
170.75.33.129 : http (80/tcp)
170.75.33.130 : http (80/tcp)
170.75.33.131 : https (443/tcp)
170.75.33.141 : https (443/tcp) - 2 occurrences
170.75.33.142 : http (80/tcp)https (443/tcp)

170.75.33.162 : http (80/tcp)
170.75.33.163 : http (80/tcp)https (443/tcp)

Description
CISCO ASA SSL VPN DETECTION

Category
Encryption and Authentication

The remote host is a Cisco Adaptive Security Appliance (ASA) running an SSL VPN server

Host(s) affected:
170.75.32.15 : https (443/tcp)

Possible Solution:
Make sure the use of this device is authorized by your company policy

Description
SMTP SERVICE STARTTLS COMMAND SUPPORT

Category
Mail servers

The remote SMTP service supports the use of the 'STARTTLS' command to switch from a plaintext to an encrypted communications channel.

Host(s) affected:
170.75.33.4 (ihnpps1.ihn.org) : smtp (25/tcp)
170.75.33.53 (ihnpps1.ihn.org) : smtp (25/tcp)

Description
IDENTIFY UNKNOWN SERVICES VIA GET REQUESTS

Category
Preliminary Analysis

This test is a complement of Service test, as it tries recognize more banners and use an HTTP request if necessary.

Host(s) affected:
170.75.33.35 : http (80/tcp) A web server is running on this port
170.75.33.35 : https (443/tcp) A web server is running on this port
170.75.33.51 : https (443/tcp) A web server is running on this port
170.75.33.55 : https (443/tcp) A web server is running on this port
170.75.33.58 : https (443/tcp) A web server is running on this port
170.75.33.95 : http (80/tcp) A web server is running on this port

170.75.33.97 : https (443/tcp) A web server is running on this port
170.75.33.98 : http (80/tcp) A web server is running on this port
170.75.33.104 : http (80/tcp) A web server is running on this port
170.75.33.105 : http (80/tcp) A web server is running on this port
170.75.33.106 : http (80/tcp) A web server is running on this port
170.75.33.108 : http (80/tcp) A web server is running on this port
170.75.33.108 : https (443/tcp) A web server is running on this port
170.75.33.109 : https (443/tcp) A web server is running on this port
170.75.33.110 : http (80/tcp) A web server is running on this port
170.75.33.111 : http (80/tcp) A web server is running on this port
170.75.33.111 : https (443/tcp) A web server is running on this port
170.75.33.112 : http (80/tcp) A web server is running on this port
170.75.33.112 : https (443/tcp) A web server is running on this port
170.75.33.113 : http (80/tcp) A web server is running on this port
170.75.33.113 : https (443/tcp) A web server is running on this port
170.75.33.115 : http (80/tcp) A web server is running on this port
170.75.33.116 : http (80/tcp) A web server is running on this port
170.75.33.116 : https (443/tcp) A web server is running on this port
170.75.33.117 : https (443/tcp) A web server is running on this port
170.75.33.118 : http (80/tcp) A web server is running on this port
170.75.33.118 : https (443/tcp) A web server is running on this port
170.75.33.119 : http (80/tcp) A web server is running on this port
170.75.33.119 : https (443/tcp) A web server is running on this port
170.75.33.120 : http (80/tcp) A web server is running on this port
170.75.33.121 : http (80/tcp) A web server is running on this port
170.75.33.122 : https (443/tcp) A web server is running on this port
170.75.33.123 : https (443/tcp) A web server is running on this port
170.75.33.124 : http (80/tcp) A web server is running on this port
170.75.33.125 : http (80/tcp) A web server is running on this port
170.75.33.125 : https (443/tcp) A web server is running on this port
170.75.33.127 : http (80/tcp) A web server is running on this port
170.75.33.128 : http (80/tcp) A web server is running on this port
170.75.33.128 : https (443/tcp) A web server is running on this port
170.75.33.129 : http (80/tcp) A web server is running on this port
170.75.33.130 : http (80/tcp) A web server is running on this port
170.75.33.131 : http (80/tcp) A web server is running on this port
170.75.33.131 : https (443/tcp) A web server is running on this port
170.75.33.132 : http (80/tcp) A web server is running on this port
170.75.33.133 : http (80/tcp) A web server is running on this port
170.75.33.133 : https (443/tcp) A web server is running on this port
170.75.33.140 : http (80/tcp) A web server is running on this port

170.75.33.140 : https (443/tcp) A web server is running on this port
170.75.33.141 : https (443/tcp) A web server is running on this port
170.75.33.142 : http (80/tcp) A web server is running on this port
170.75.33.142 : https (443/tcp) A web server is running on this port

Description	Category
DIRECTORY SCANNER	Web servers

We found some common directories on the web server:

Impact:

This is usually not a security vulnerability, only an information gathering. Nevertheless, you should manually inspect these directories to ensure that they are in compliance with accepted security standards.

Host(s) affected:
170.75.33.51 : https (443/tcp)
The following directories were discovered: /Templates, /images, /java, /templates

170.75.33.111 : https (443/tcp)
The following directories were discovered: /_notes, /documents, /upload

170.75.33.117 : https (443/tcp)
The following directories were discovered: /en-US

170.75.33.119 : https (443/tcp)
The following directories were discovered: /Log, /exec, /log, /scripts, /utils

170.75.33.122 : https (443/tcp)
The following directories were discovered: /obj

170.75.33.123 : https (443/tcp)
The following directories were discovered: /Templates, /images, /java, /templates

Possible Solution:

Check if those directories contain any sensitive information, if they do, prevent unauthorized access to them.

Description	Category
MICROSOFT IIS DEFAULT PAGE	Web servers

The remote server appears to be an unconfigured IIS Server.

Host(s) affected:

170.75.33.105 (careclocke.sjhs.com) : http (80/tcp)
170.75.33.106 (careclocke.sjhs.com) : http (80/tcp)
170.75.33.118 (careclocke.sjhs.com) : https (443/tcp)
170.75.33.125 (careclocke.sjhs.com) : https (443/tcp)

Description	Category
IIS CONTENT-LOCATION HTTP HEADER	Web servers

By default, in Internet Information Server (IIS), the Content-Location references the IP address of the server rather than the Fully Qualified Domain Name (FQDN) or Hostname. This header may expose internal IP addresses that are usually hidden or masked behind a Network Address Translation (NAT) Firewall or proxy server.

Impact:

If this contains internal IP address information, attackers may gain critical information about the host.

Host(s) affected:

170.75.33.108 (paystub.ihn.org) : http (80/tcp)
170.75.33.125 (paystub.ihn.org) : http (80/tcp)
170.75.33.142 (paystub.ihn.org) : http (80/tcp)

Possible Solution:

See solution provided at: http://support.microsoft.com/kb/218180

Description	Category
WEB APPLICATION FIREWALL DETECTION	Web servers

By analysing error codes and messages returned from some web queries, we are able to determine that the remote web server is protected by a web application firewall. Such protection may disrupt scan results. Countermeasures have been taken to make the scan as reliable as possible.

Host(s) affected:
170.75.33.112 (im.sjhs.com) : https (443/tcp)
170.75.33.131 (im.sjhs.com) : https (443/tcp)
170.75.33.141 (im.sjhs.com) : https (443/tcp)
170.75.33.112 : https (443/tcp)

The site im.sjhs.com is behind a F5 ASM 170.75.33.131 : https (443/tcp)
The site autodiscover.sjhs.com is behind a ISA-Server 170.75.33.141 : https (443/tcp)
The site nemoursdocs.ihn.org is behind a ISA-Server

Possible Solution:

To get a more comprehensive set of scan results, either whitelist the scanner's IP address or scan from an unprotected location.

Description

MICROSOFT .NET CUSTOM ERRORS NOT SET

Category

Web servers

The remote ASP.NET web server is configured to show verbose error messages, which might lead into the disclosure of potential sensitive information about the remote installation (such as the path under which the remote web server resides) or about the remote ASP.NET applications.

Host(s) affected:

170.75.33.122 (policytech.sjhs.com) : https (443/tcp)

Detail

[HttpException]: The file '/dZ9XRrKw.ashx' does not exist.

at System.Web.UI.Util.CheckVirtualFileExists(VirtualPath virtualPath)

at System.Web.Compilation.BuildManager.GetVPathBuildResultInternal(VirtualPath virtualPath, Boolean noBuild, Boolean allowCrossApp, Boolean allowBuildInPrecompile)

at System.Web.Compilation.BuildManager.GetVPathBuildResultWithNoAssert(HttpContext context, VirtualPath virtualPath, Boolean noBuild, Boolean allowCrossApp, Boolean allowBuildInPrecompile)

at System.Web.Compilation.BuildManager.GetVPathBuildResult(HttpContext context, VirtualPath virtualPath, Boolean noBuild, Boolean allowCrossApp, Boolean allowBuildInPrecompile)

at System.Web.UI.SimpleHandlerFactory.System.Web.IHttpHandlerFactory2.GetHandler(HttpContext context, String requestType, VirtualPath virtualPath, String physicalPath)

at System.Web.HttpApplication.MapHttpHandler(HttpContext context, String requestType, VirtualPath path, String pathTranslated, Boolean useAppConfig)

at
System.Web.HttpApplication.MapHandlerExecutionStep.System.Web.HttpApplication.IExecut
ionStep. Execute() at System.Web.HttpApplication.ExecuteStep(IExecutionStep step,
Boolean& completedSynchronously)

Possible Solution:

Configure your server such as the option 'customErrors mode' is set to 'On' instead of 'Off'.

Description	Category
MICROSOFT .NET HANDLERS ENUMERATION	Web servers

It is possible to obtain the list of handlers the remote ASP.NET web server supports.

Host(s) affected:

170.75.33.122 (policytech.sjhs.com) : https (443/tcp)
It is possible to obtain the list of handlers the remote ASP.NET web server supports.
- .ashx
- .aspx
- .asmx
- .rem
- .soap

Description	Category
OPENSSL DETECTION (NETWORK)	Encryption and Authentication

Based on its behavior, it seems that the remote service is using the OpenSSL library to encrypt traffic. Note that this plugin can only detect OpenSSL implementations that have enabled support for TLS extensions (RFC 4366).

Host(s) affected:

170.75.33.125 (vision1.sjhs.com) : https (443/tcp)

Description	Category
SHAREPOINT DETECTION	Simple Network services

The remote web server is running SharePoint, a web interface for document management. As this interface is likely to contain sensitive information, make sure only authorized personnel can log into this site.

Host(s) affected:
170.75.33.128 (webdocs.ihn.org) : https (443/tcp)
170.75.33.141 (webdocs.ihn.org) : https (443/tcp)

Description	Category
IIS ALLOWS BASIC AND/OR NTLM AUTHENTICATION	Web servers

The remote host appears to be running a version of IIS which allows remote users to determine which authentication schemes are required for confidential webpages. That is, by requesting valid webpages with purposely invalid credentials, you can ascertain whether or not the authentication scheme is in use. This can be used for brute-force attacks against known UserIDs.

Host(s) affected: 170.75.33.141 (nemoursdocs.ihn.org) : https (443/tcp)
- IIS Basic authentication is enabled
- IIS NTLM authentication is enabled

170.75.33.142 (nemoursdocs.ihn.org) : https (443/tcp)
- IIS Basic authentication is enabled
- IIS NTLM authentication is enabled

Possible Solution:
Follow this procedure:
1. Open Internet Information Service Manager
2. Choose the server
3. Choose master properties
4. Choose WWW Service
5. Choose Edit
6. Choose Directory Security
7. Under Anonymous access, choose edit
8. Deselect Integrated Windows Authentication

Description	Category
NON-COMPLIANT STRICT TRANSPORT SECURITY (STS)	Web servers

The remote web server implements Strict Transport Security. However, it does not respect all the requirements of the STS draft standard.

Host(s) affected:
170.75.33.162 (access.ihn.org) : https (443/tcp)

All connections to the HTTP site must be redirected to the HTTPS site.

170.75.33.163 (access.ihn.org) : https (443/tcp)
All connections to the HTTP site must be redirected to the HTTPS site.

Description	Category
19. STRICT TRANSPORT SECURITY (STS) DETECTION	Web servers

The remote web server implements Strict Transport Security (STS). The goal of STS is to make sure that a user does not accidentally downgrade the security of his or her browser. All unencrypted HTTP connections are redirected to HTTPS. The browser is expected to treat all cookies as 'secure' and to close the connection in the event of potentially insecure situations.

Host(s) affected:

170.75.33.162 (access.ihn.org) : https (443/tcp)
The STS header line is: Strict-Transport-Security: max-age=31536000

170.75.33.163 (access.ihn.org) : https (443/tcp)
The STS header line is: Strict-Transport-Security: max-age=31536000

GLESEC recommends “Implementing the First Five Quick Wins” based on the Twenty Critical Security Controls for Effective Cyber Defense, Version 4.1 that were formulated as a joint effort from the NSA, US Cert, DoD JTF-GNO, the Department of Energy Nuclear Laboratories, Department of State, DoD Cyber Crime Center plus the top commercial forensics experts and pen testers that serve the banking and critical infrastructure communities. These are readily available from GLESEC which has provided the following link: Top 20 Critical Security Controls

The Critical Controls represent the biggest bang for the buck to protect your organization against real security threats. Within Critical Controls 2-4 are five “quick wins.” These are subcontrols that have the most immediate impact on preventing the advanced targeted attacks that have penetrated existing controls and compromised critical systems at thousands of organizations.

The five quick wins are:

a) Application white listing (in CSC2)
b) Using common, secure configurations (in CSC3)
c) Patch application software within 48 hours (in CSC4)
d) Patch systems software within 48 hours (CSC4)
e) Reduce the number of users with administrative privileges (in CSC3 and CSC12)

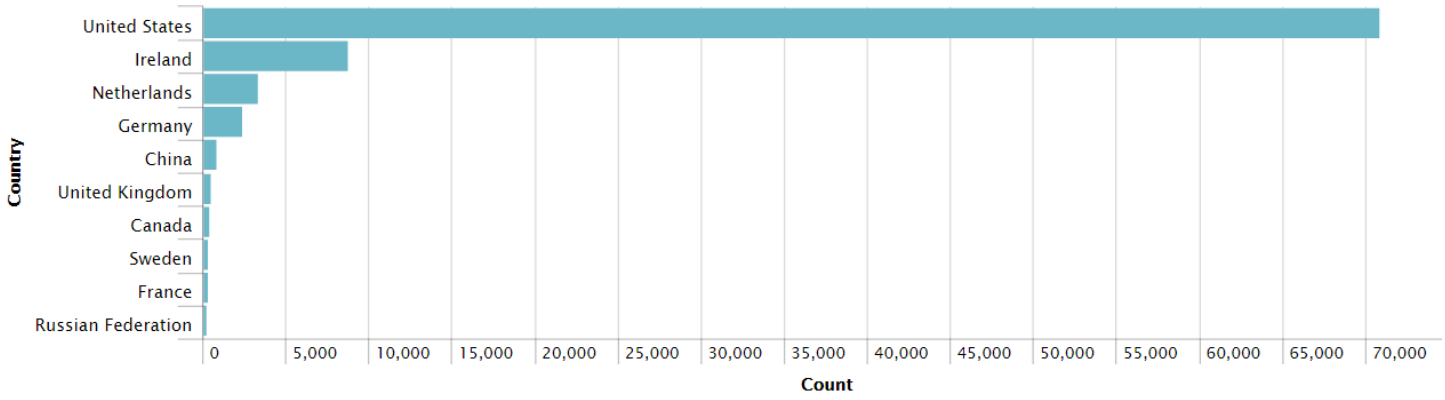
6. Security Intelligence

The purpose of this section is to highlight intelligence gathered from the devices under contract as well as outside sources such honeypots, known malicious sources, vulnerability databases, relationships with CERT and CSIRT teams that GLESEC possesses, together with various other threat feeds.

The vast majority of attacks on INSPIRA HEALTH NETWORK originated geographically from the following Top 10 countries: **United States, Ireland, Netherlands, Germany, China, United Kingdom, Canada, Sweeden, France** and **The Russian Federation** listed in order of frequency.

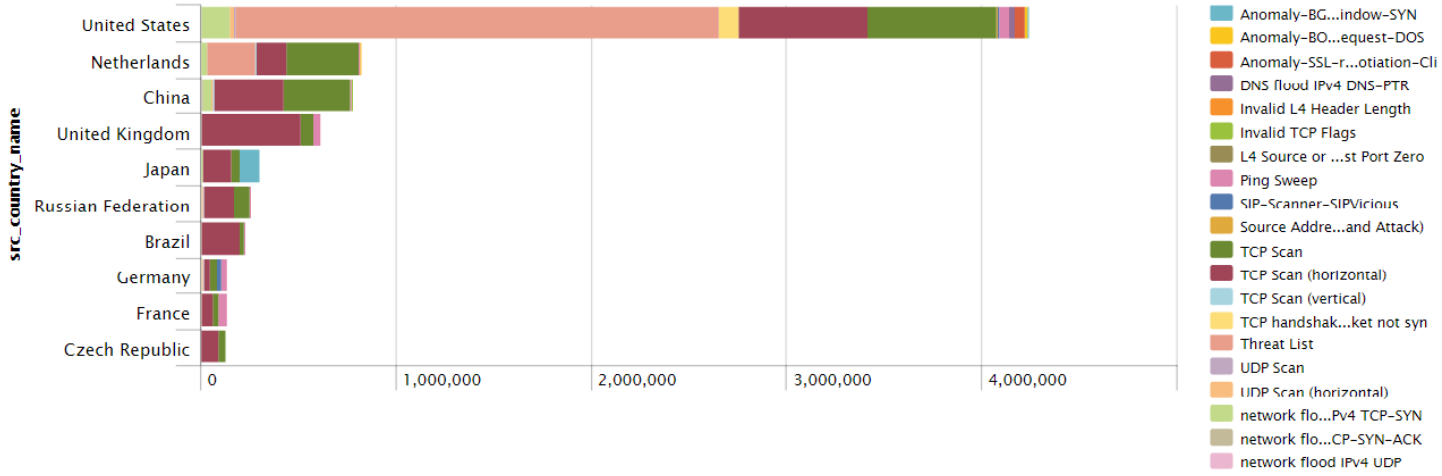
Graph: Top 10 Attacking Countries Blocked

This report provides the count of total attacks blocked by country



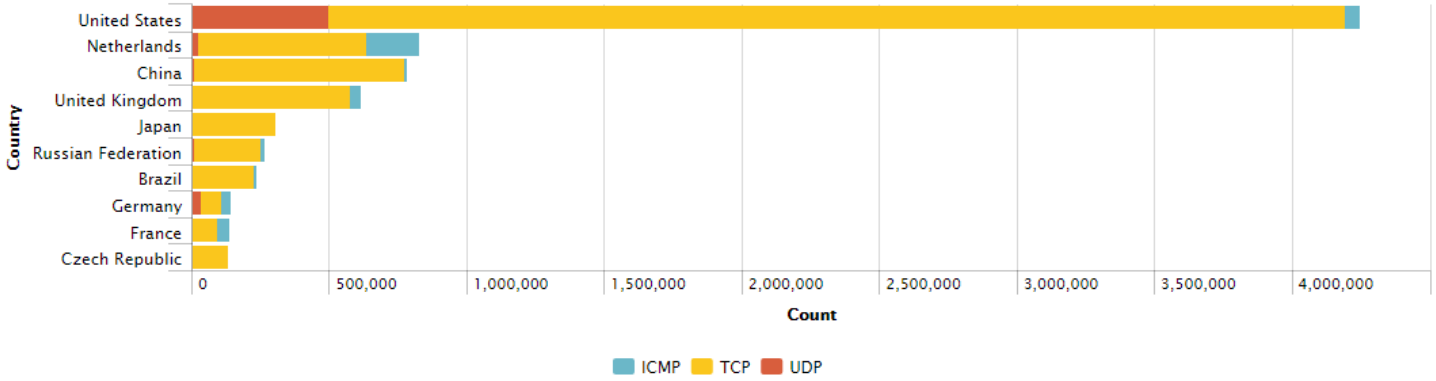
Graph: Top 10 Attacking Countries Blocked by Attack Type

This report provides the count of total attacks types blocked by country



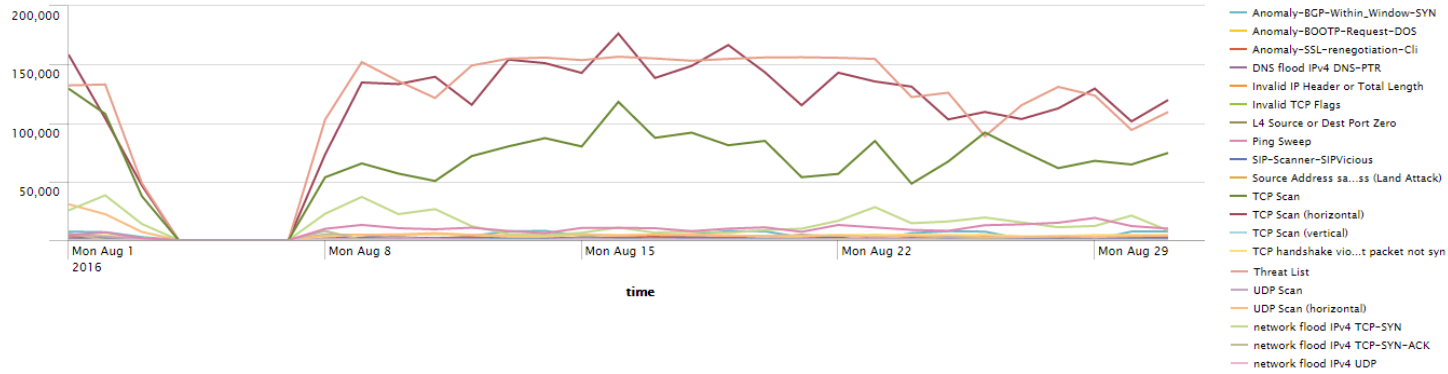
Graph: Top 10 Attacking Countries Blocked by Protocol

This report provides the count of attack protocols blocked by country



Graph: Attacks Types Blocked by Week

This report provides the count of attacks blocked by week

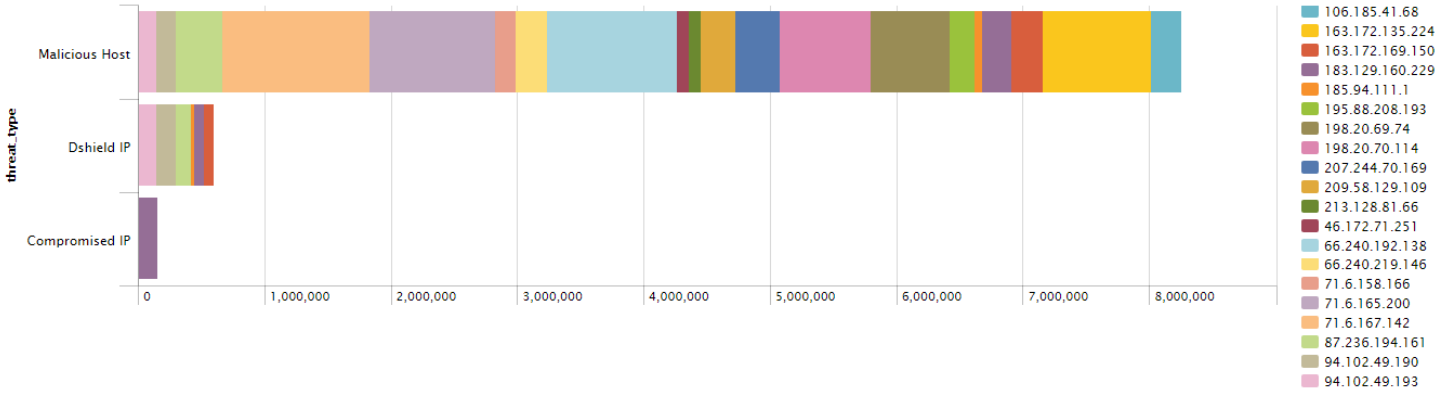


Known Threat Source Information

Attacks on INSPIRA HEALTH NETWORK that are from known threat sources that have been compiled and correlated with attack source IPs gathered from the DefensePro attack logs and outside sources such honeypots, known malicious sources, vulnerability databases, relationships with CERT and CSIRT teams that GLESEC possesses, together with various other threat feeds.

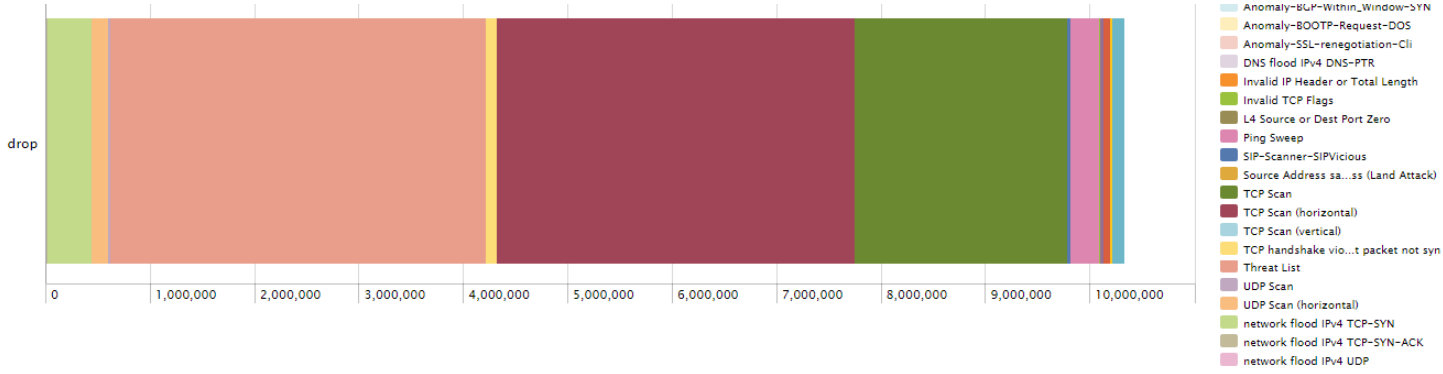
Graph: Known Threat Sources by Threat Type

This report provides the Top 20 known threat sources by IP and their respective infringing threat type.



Graph: Attacks Denied

This report provides the count of total denied attacks along with network security rule.



Port Information

Port Information: Port **443 (https)**

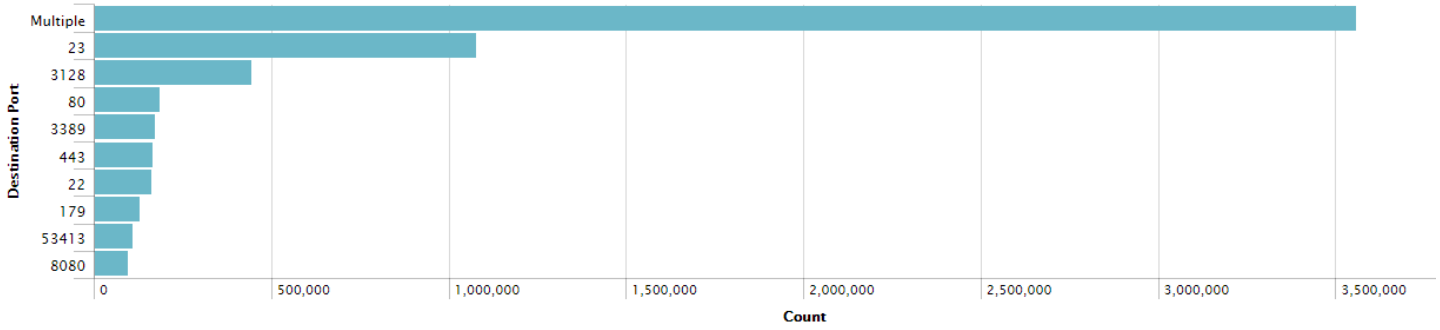
Used by online businesses for cryptographic protocols such as Transport Layer Security (TLS) and Secure Socket Layer (SSL) to provide encryption at the application layer to ensure secure end-to-end transit of data.

The main challenges that encrypted DDoS attacks present are:

- Decryption of encrypted data consumes more CPU resources than processing of a clear text. Thus, encrypted application DoS & DDoS attacks amplify the impact even at relatively low rates of requests per second.
- Encrypted DDoS attacks are simply passing "under the radar" of existing security solutions.

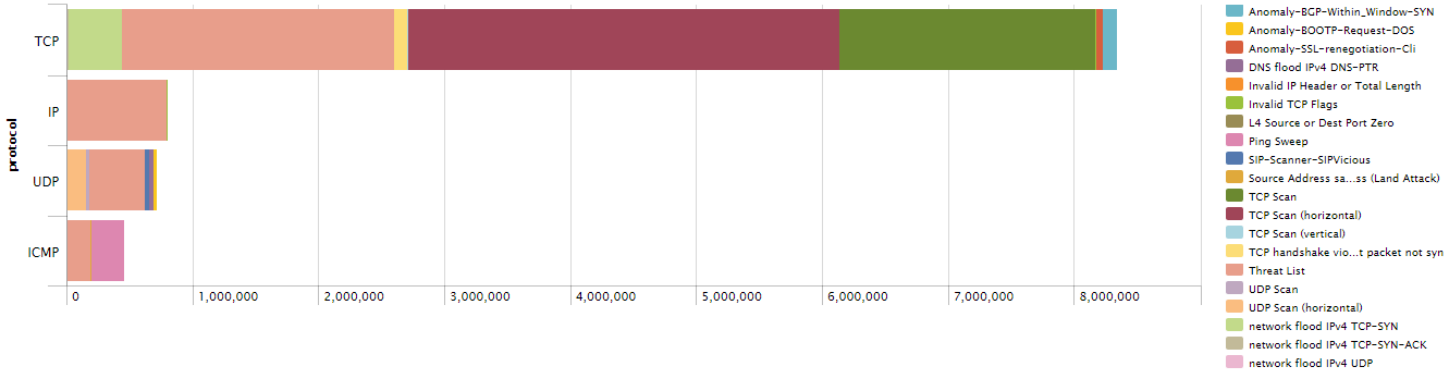
Graph: Attacks Blocked by Destination Port

This report provides information on the total number of attacks blocked that were attempted on which port and for how many times.



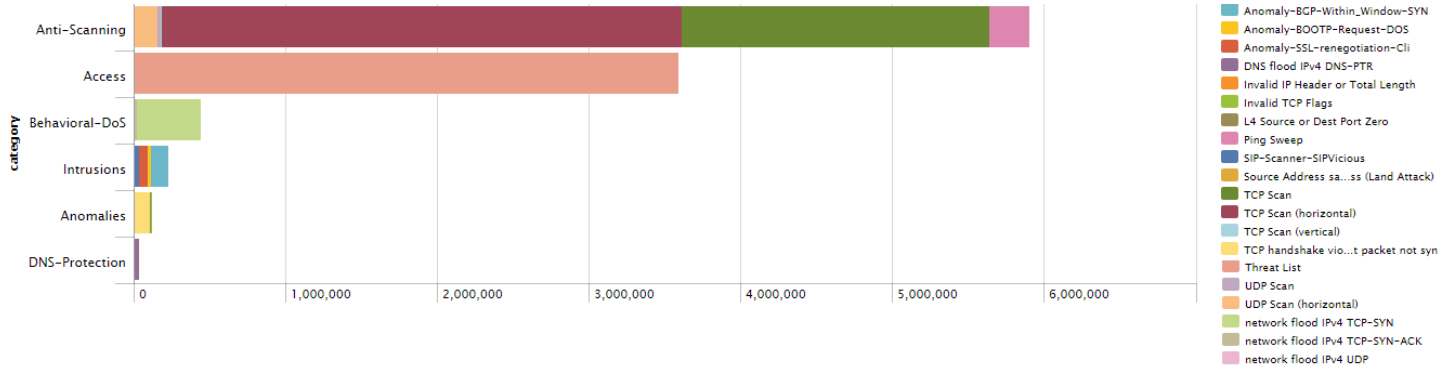
Graph: Attacks Blocked By Protocol

This report lists the attacks blocked by protocol, listing the attack name.



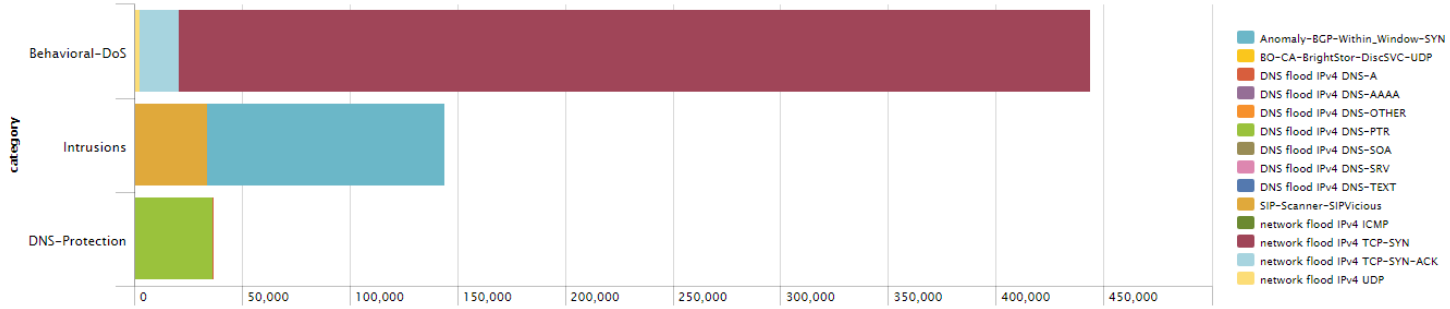
Graph: Attacks Blocked By Threat Category

This report lists the attacks blocked per Attack Category, listing the attack name.



Graph: Critical Attacks Blocked

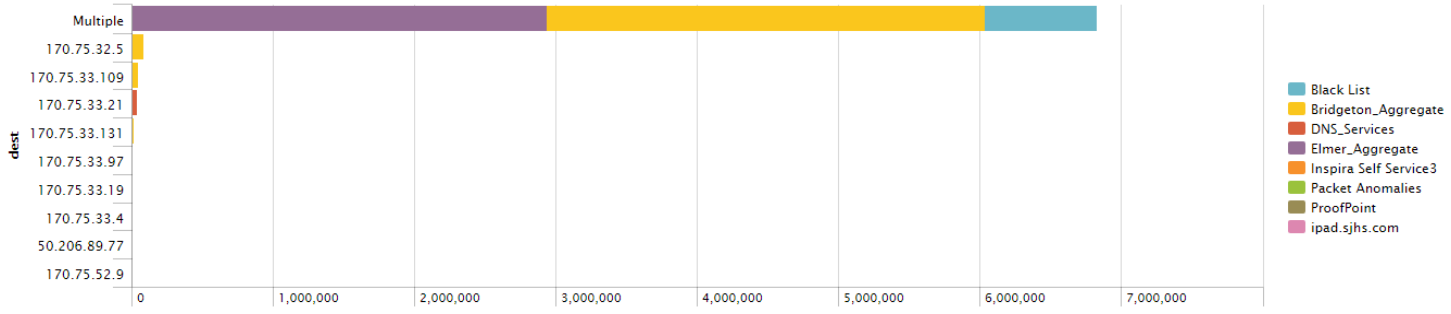
This report provides Critical Attacks information, attack name, network security rule along with the number of times the attack was launched.



NOTE: See Appendix 1 – Critical Attack Sources (WHOIS Information)

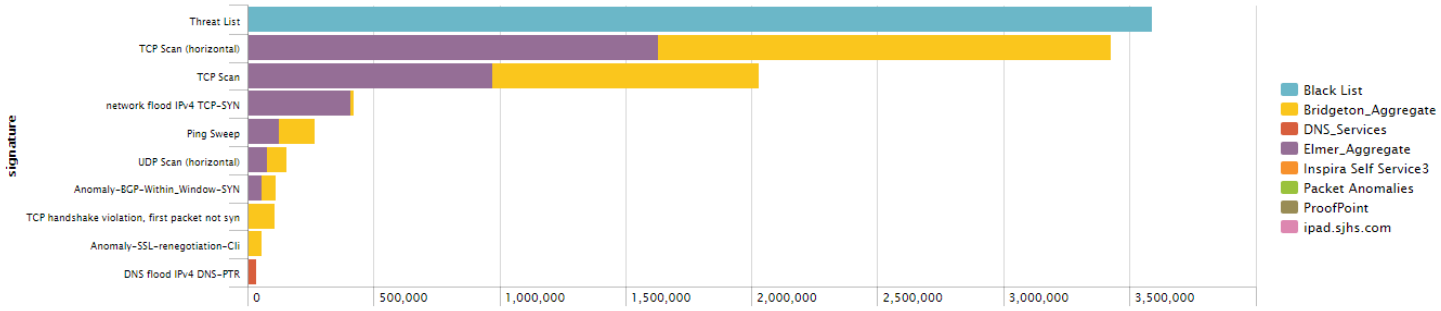
Graph: Top Attacked Destinations Blocked

This report provides information on the system IPs, which were the destination of the attacks for most number of times along with the network security rule.



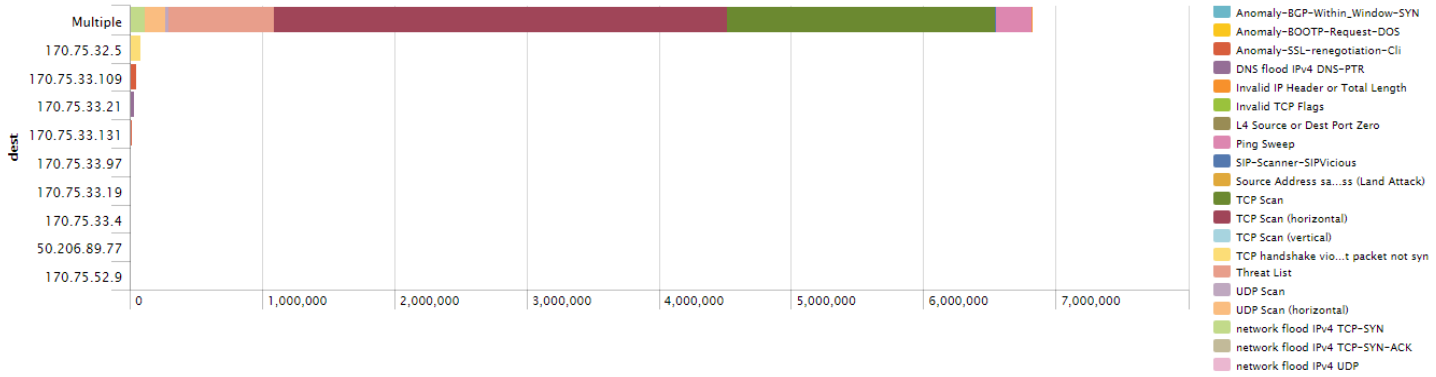
Graph: Top Attacks Blocked

This report provides information on the Top Attacks Blocked, the attack name, network security rule and the total number of attacks blocked with this combination.



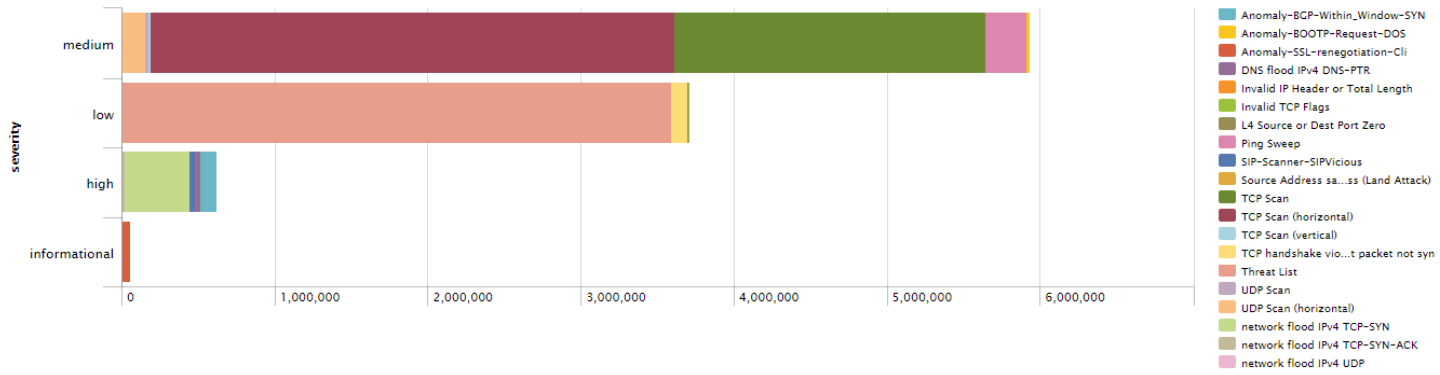
Graph: Top Attacks Blocked by Destination

This report provides information on the top attacks targeted at destinations that were blocked on the DP IPS. In this report the destination on which the attack was targeted, attack name, and count are shown.



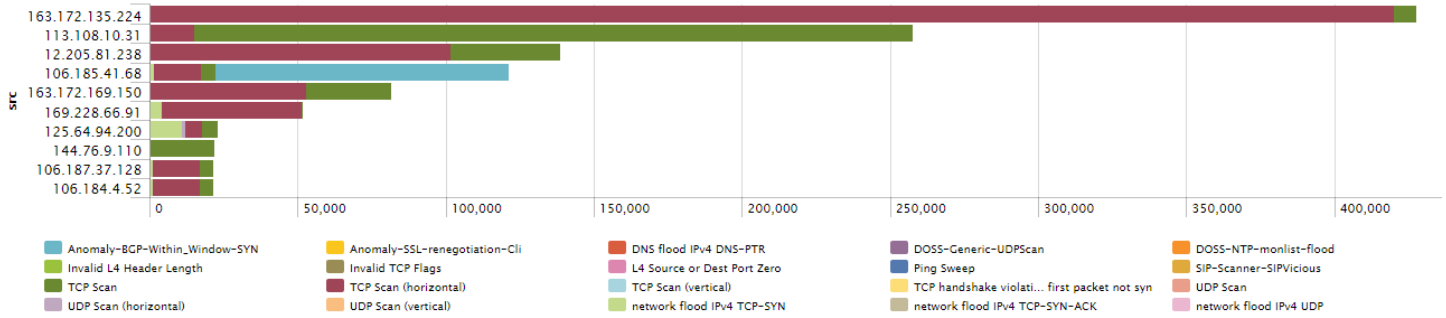
Graph: Top Attacks Blocked By Risk

This report provides information on the attacks, which were blocked on DP IPS based on their risk. In this report the risk of the attack and attack name are shown.



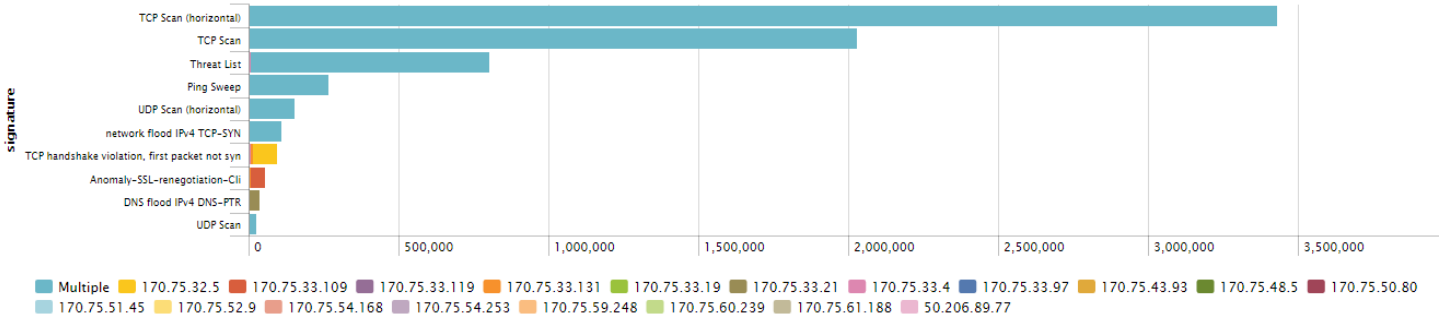
Graph: Top Attacks Blocked by Source

This report provides information on the top attacks blocked, categorized by attacks for each source that was the source of attacks along with the attack name and the number of attacks that triggered with this combination.



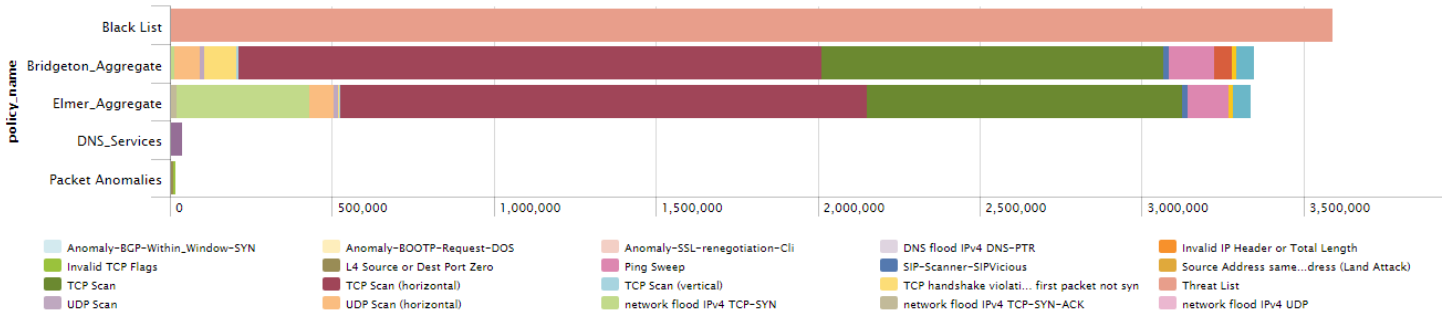
Graph: Top Destinations by Attacks Blocked

This report provides information on the attacks attempted for the most number of times on the destination protected system Ips.

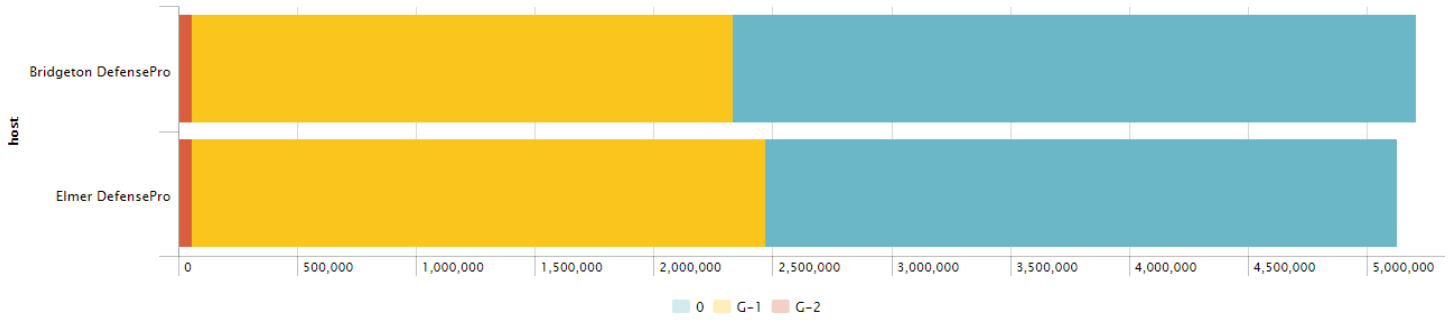


Graph: Attacks Blocked by Network Security Rule

This report lists the attacks per network security rule, listing the attack name.



Graph: Attacks Blocked by Physical Port (per single IPS device) This report lists the attacks per physical port.



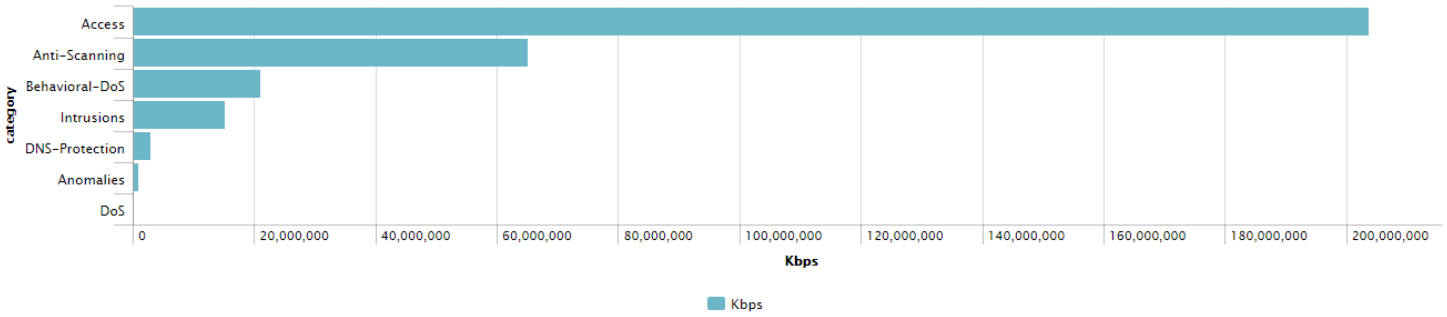
Bandwidth Information

Behavioral-DoS dropped **20.12 Gbps**, Access protection dropped **194.37 Gbps**, Intrusion protection dropped **14.51 Gbps** of total traffic, **0.87 Gbps** dropped by Packet Anomaly protection rules, Anti-Scanning protection dropped **62.15 Gbps**. A total of **294.95 Gbps** of malicious traffic was discarded this period.

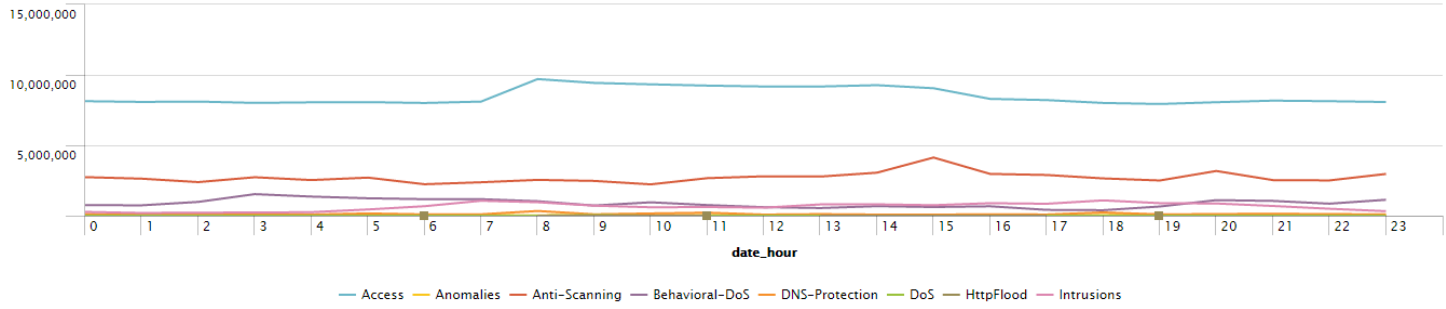
Category	Gbps	Mbps
Access	194.37	199035.29
Anti-Scanning	62.15	63641.41
Behavioral-DoS	20.12	20598.22
Intrusions	14.51	14856.65
DNS-Protection	2.87	2935.21
Anomalies	0.87	889.75
DoS	0.06	65.10
HttpFlood	0.00	0.00
Total Bandwidth in Gbps/Mbps	294.95	302021.63

Graph: Attack Categories Blocked by Bandwidth

This report shows the attack categories based on the BW of the attacks sharing the same category including Kbps.

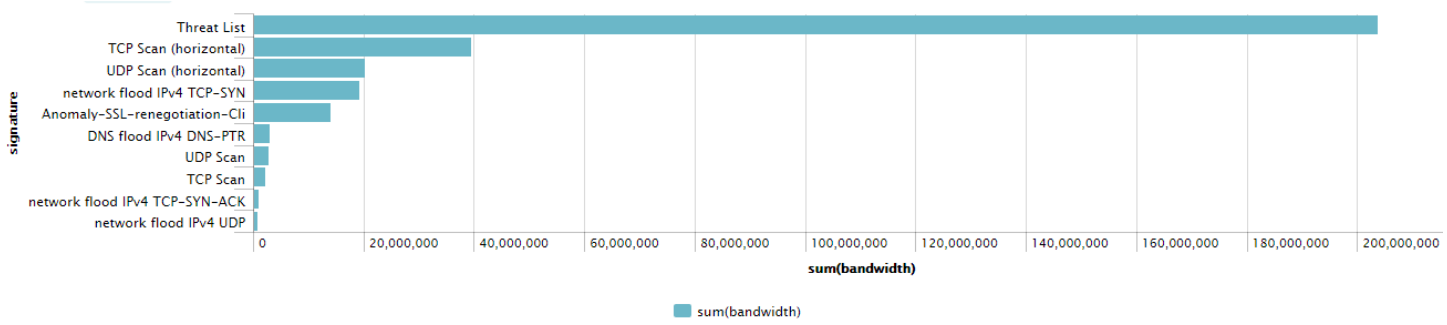


Graph: Bandwidth by Blocked Threat Category by Hour of Day This report shows the most bandwidth consuming threat categories based on the bandwidth of the attacks sharing the same threat category for each hour of day.



Graph: Top Attacks Blocked by Bandwidth

This report shows the most bandwidth consuming attacks based on the BW of the attack including Kbits.



Scanning Information

Network-wide Anti Scanning protections dropped enumeration attempts which otherwise thwart any effort for threat modeling, commonplace after the information gathering phase of a targeted or planned attack.

We have included some of the most important ports scanned this period which tend to be exploited frequently by attackers and included some of their related exploits simply to view INSPIRA HEALTH NETWORK through the eyes of an attacker.

Port Information: Port **80** (http), Port **443** (https), Port **8080** (https-alt)

Commonly scanned in order to attack web servers. SQL injection is currently the most common form of web site attack in that web forms are very common, often they are not coded properly and the hacking tools used to find weaknesses and take advantage of them are commonly available online. This kind of exploit is easy enough to accomplish that even inexperienced hackers can accomplish mischief. However, in the hands of the very skilled hacker, a web code weakness can reveal root level access of web servers and from there attacks on other networked servers can be accomplished. Structured Query Language (SQL) is the nearly universal language of databases that allows the storage, manipulation, and retrieval of data. Databases that use SQL include MS SQL Server, MySQL, Oracle, PostgreSQL, MongoDB, Access and Filemaker Pro and these databases are equally subject to SQL injection attack.

Web based forms must allow some access to your database to allow entry of data and a response, so this kind of attack bypasses firewalls and endpoint defenses. Any web form, even a simple logon form or search box, might provide access to your data by means of SQL injection if coded incorrectly.

OWASP Top 10 for 2013 lists A1-Injection as the greatest threat and defines this category as:

Injection flaws, such as SQL, OS, and LDAP injection occur when untrusted data is sent to an interpreter as part of a command or query. The attacker’s hostile data can trick the interpreter into executing unintended commands or accessing data without proper authorization.

A SQL injection attack consists of insertion or "injection" of a SQL query via the input data from the client to the application. A successful SQL injection exploit can read sensitive data from the database, modify database data (Insert/Update/Delete), execute administration operations on the database (such as shutdown the DBMS), recover the content of a given file

present on the DBMS file system and in some cases issue commands to the operating system. SQL injection attacks are a type of injection attack, in which SQL commands are injected into data-plane input in order to effect the execution of predefined SQL commands.
Port Information: Port **23** (telnet) Port **22** (ssh)

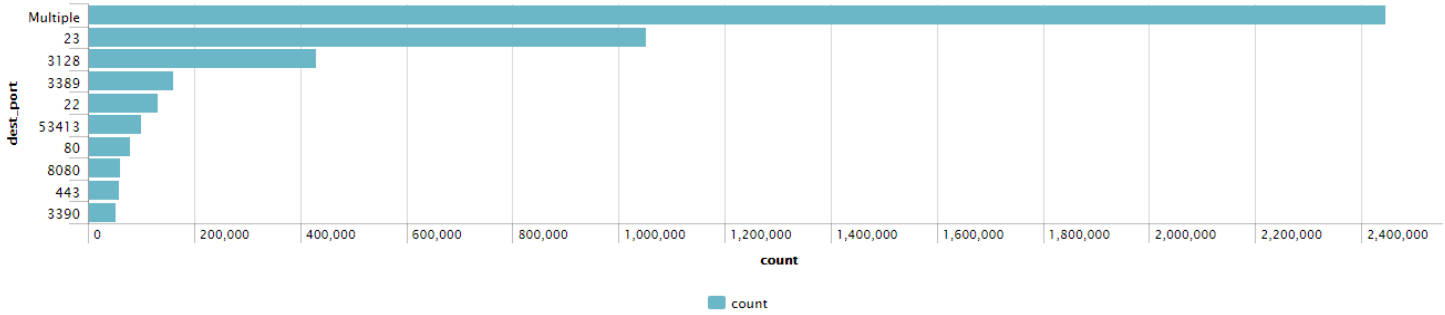
These ports are commonly bruteforced for default root and administrative accounts which usually provide access to servers, network and communications equipment.

Port Information: Port **3389** (ms-wbt-server)

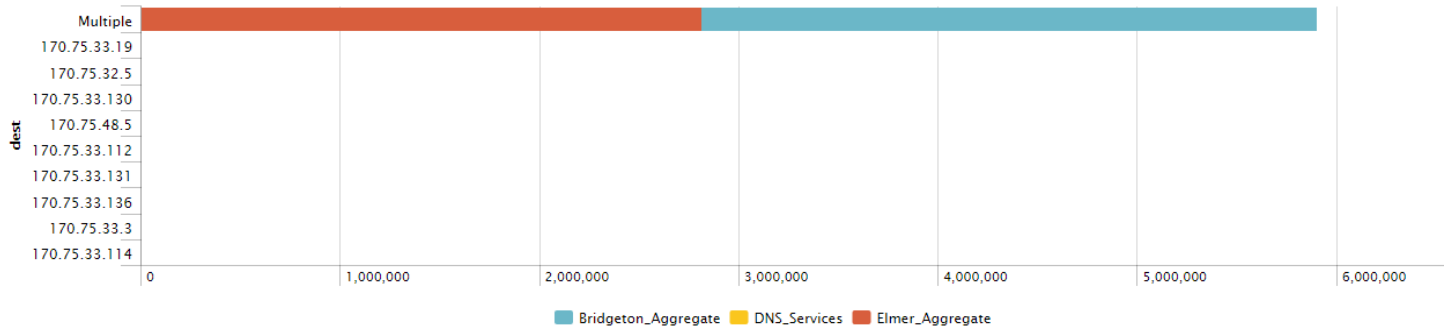
Commonly know as Remote Desktop Protocol (RDP). The Microsoft Remote Desktop Protocol (RDP) provides remote display and input capabilities over network connections for Windows-based applications running on a server. RDP is designed to support different types of network topologies and multiple LAN protocols.

Microsoft Security Bulletin MS12-020 and Microsoft Security Bulletin MS12-036 indicates that vulnerabilities in Remote Desktop Could Allow Remote Code Execution if an attacker sends a sequence of specially crafted RDP packets to an affected system. These are both considered Critical vulnerabilities that affect operating systems ranging from Windows XP through Windows 2008. More information available here and here.

Graph: Top Probed Applications Blocked
This report shows historical view of the Top probed L4 ports.

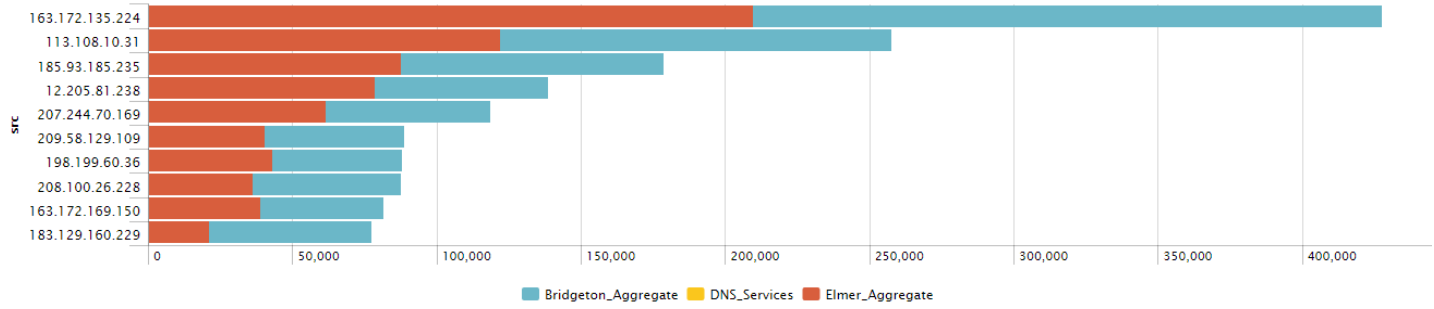


Graph: Top Probed IP Addresses Blocked
This report shows historical view of the Top probed IP addresses that were being scanned along with the network security rule.



Graph: Top Scanners Blocked (Source IP Addressed)

This report shows historical view of the Top source IP addresses that have scanned the network by network scanning activities along with the network security rule.



NOTE: See Appendix 2 – Top Scanners Blocked (Source IP Addressed)

Vulnerability Management

It is important to establish a vulnerability management program as part of the information security strategy because soon after new vulnerabilities are discovered and reported by security researchers or vendors, attackers engineer exploit code and then launch that code against targets of interest. Any significant delays in finding or fixing software with dangerous vulnerabilities provides ample opportunity for persistent attackers to break through, gaining control over the vulnerable machines and getting access to the sensitive data they contain. Organizations that do not scan for vulnerabilities and proactively address discovered flaws face a significant likelihood of having their systems compromised.

The GLESEC AVDS Management System platform performs a security mapping of your organization network, runs tests on everything that speaks IP, and accurately evaluates the presence of vulnerabilities.

Many of the vulnerabilities will provide CVE data. CVE (Common Vulnerabilities and Exposures) is a list of information security exposures and vulnerabilities sponsored by US-CERT and maintained by the MITRE Corporation. The CVE mission is to provide standard names for all publicly known security exposures as well as standard definitions for security terms. The CVE can be searched online at http://nvd.nist.gov/.

Vulnerability Score

The score of a vulnerability is determined by its risk factor; High, Medium or Low, as well as its value in the Common Vulnerability Scoring System (CVSS). The CVSS "base score" represents the innate risk characteristic of each vulnerability. CVSS is a vulnerability scoring system designed to provide an open and standardized method for rating IT vulnerabilities. CVSS helps organizations prioritize and coordinate a joint response to security vulnerabilities by communicating the base, temporal and environmental properties of each vulnerability. In addition to numeric scores, the CVSS provides severity rankings of High, Medium, and Low but these qualitative rankings are simply mapped from the numeric CVSS scores.

Vulnerabilities are labeled as:

a) Low risk if they have a CVSS base score of 0.0 – 3.9
b) Medium risk if they have a CVSS base score of 4.0 – 6.9
c) High risk if they have a CVSS base score of 7.0 – 10.0

Vulnerabilities in the report are classified into 3 risk categories: high, medium or low.

High Risk
Describes vulnerabilities that can allow an attacker to gain elevated privileges, remote command execution, full read/write access, or critical information disclosure (e.g. passwords, hashes) on a vulnerable machine and should be addressed as top priority.

Medium Risk
Describes vulnerabilities that either expose sensitive data, directory browsing and traversal, disclosure of security controls, facilitate unauthorized use of services or denial of service to an attacker.

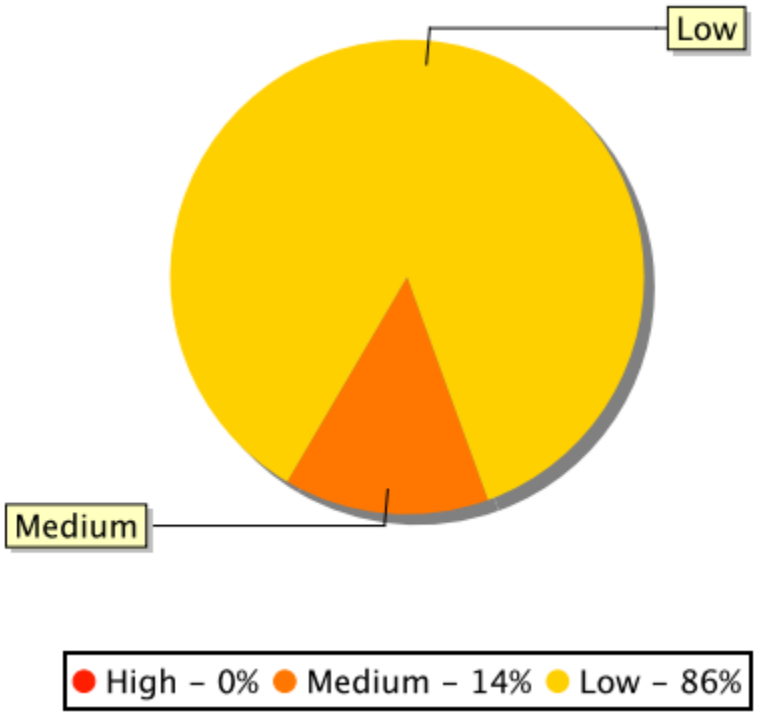
Low Risk
Describes vulnerabilities that allow preliminary or sensitive information gathering for an attacker or pose risks that are not entirely security related but maybe used in social-engineering or similar attacks.

Vulnerability Information

We can observe that Intrusions (known attack signatures), HTTP Flood and Web Scanning attempts are targeting Web Servers and are being dropped by the DefensePro. We cannot be 100% sure but there is a high probability that this type of attack is occurring and if the DefensePro was not in place, the attack might have been successfully carried out. The same is true for Mail servers which are frequently being scanned (Web Scanning).

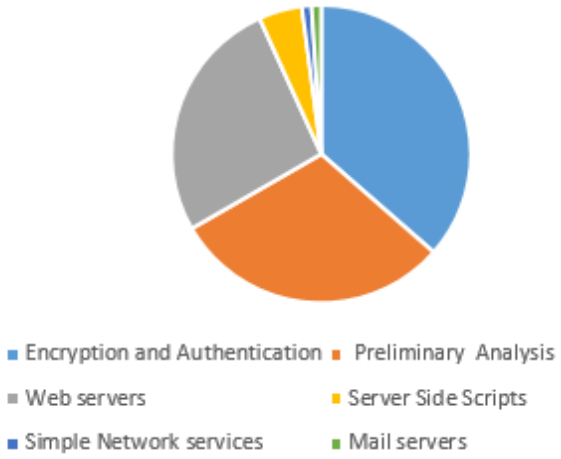
Graph: Risk Distribution

This report depicts the risk distribution of vulnerabilities discovered this report period



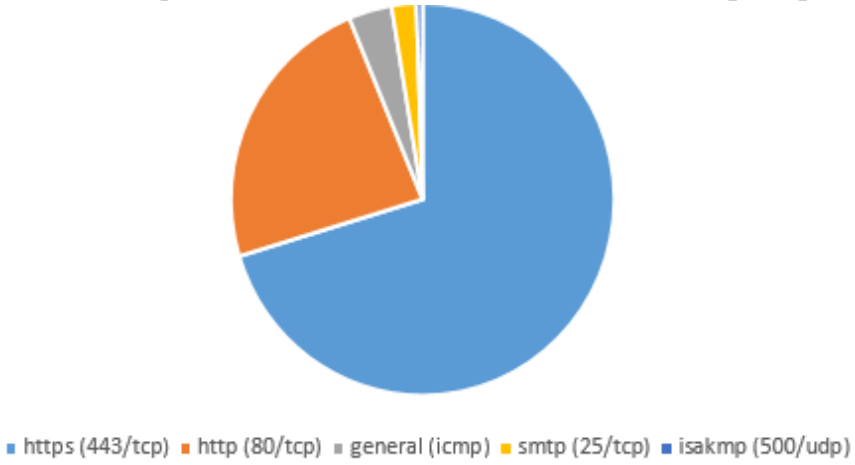
Graph: Most Frequent Vulnerability Category

This report depicts the most frequent vulnerabilities by category discovered this report period



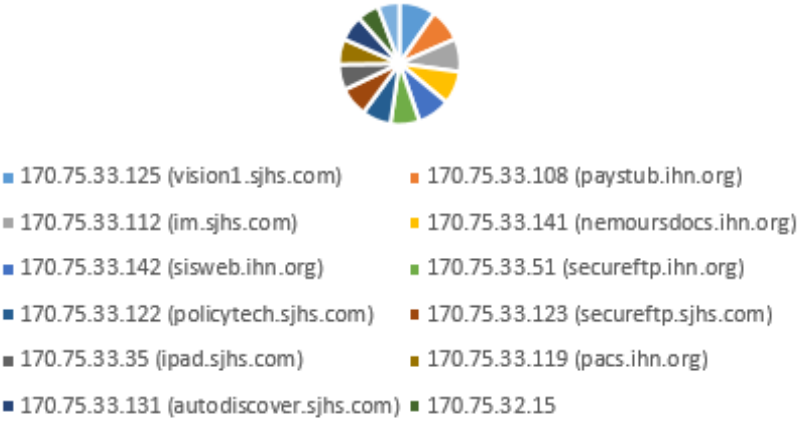
Graph: Most Frequent Vulnerability

This report depicts the most frequent vulnerabilities discovered this report period



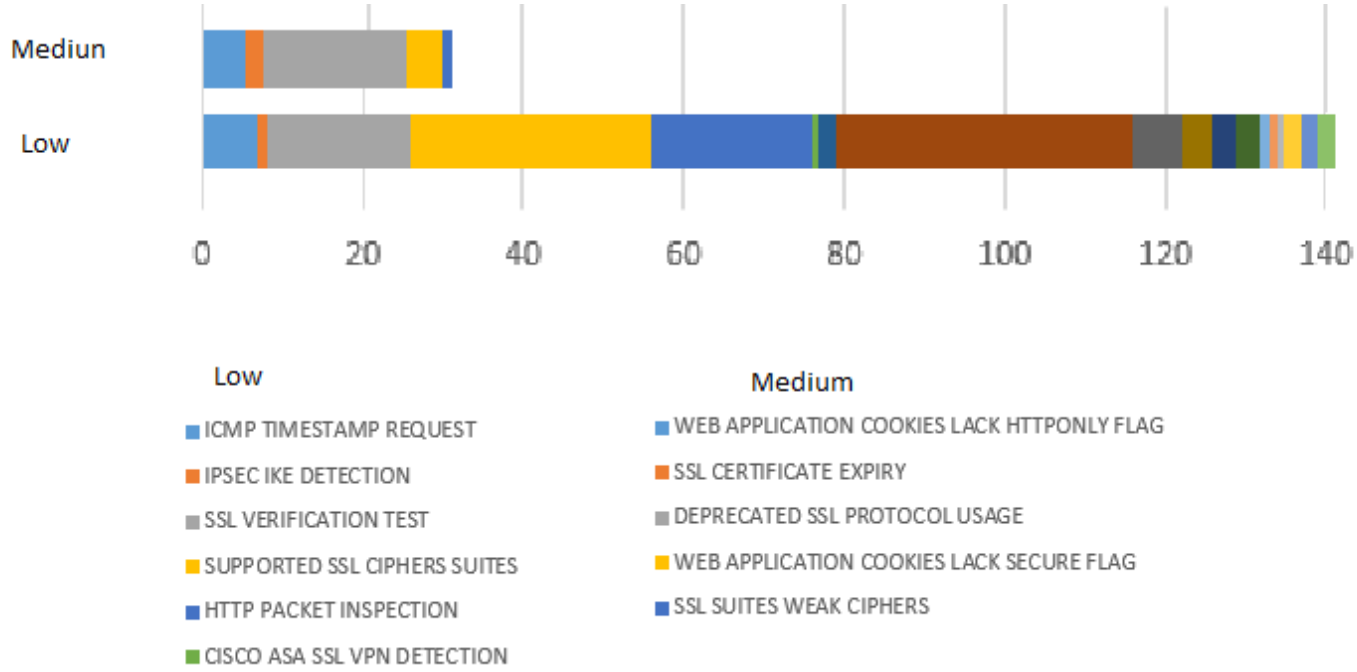
Graph: Most Vulnerable Host

This report depicts the most vulnerable hosts discovered this report period



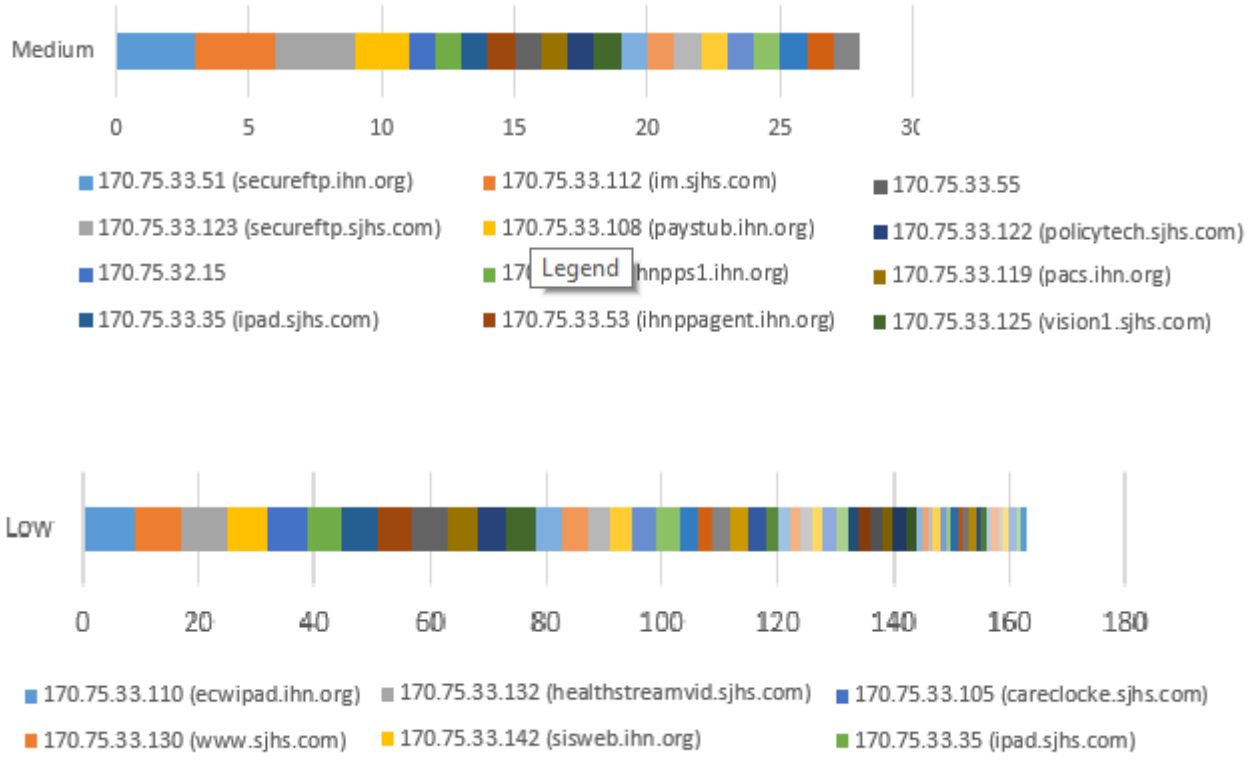
Graph: Vulnerability Risk by Vulnerability

This report illustrates the vulnerability risk and count by vulnerability name discovered this report period



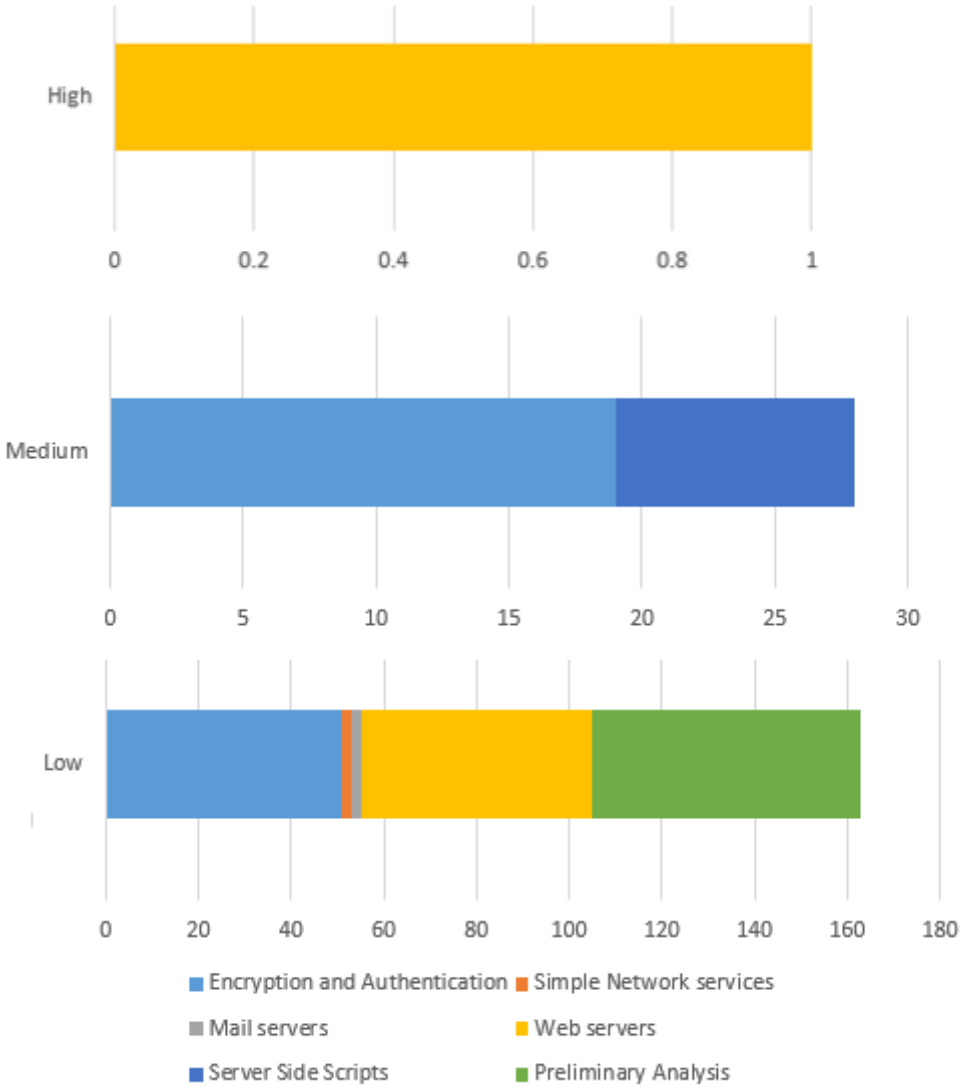
Graph: Vulnerability Risk by Host

This report illustrates the vulnerability risk and count by category discovered this report period



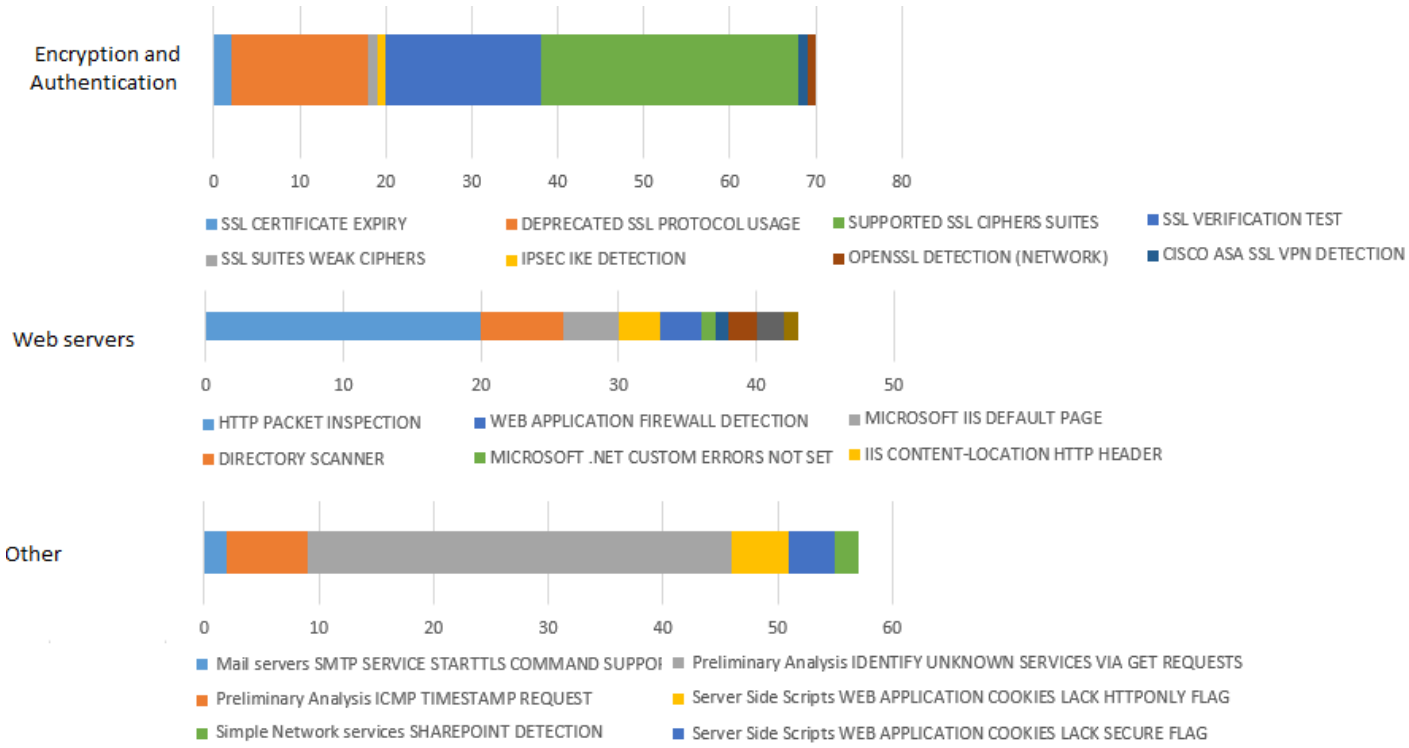
Graph: Vulnerability Risk by Category

This report illustrates the vulnerability risk and count by category discovered this report period



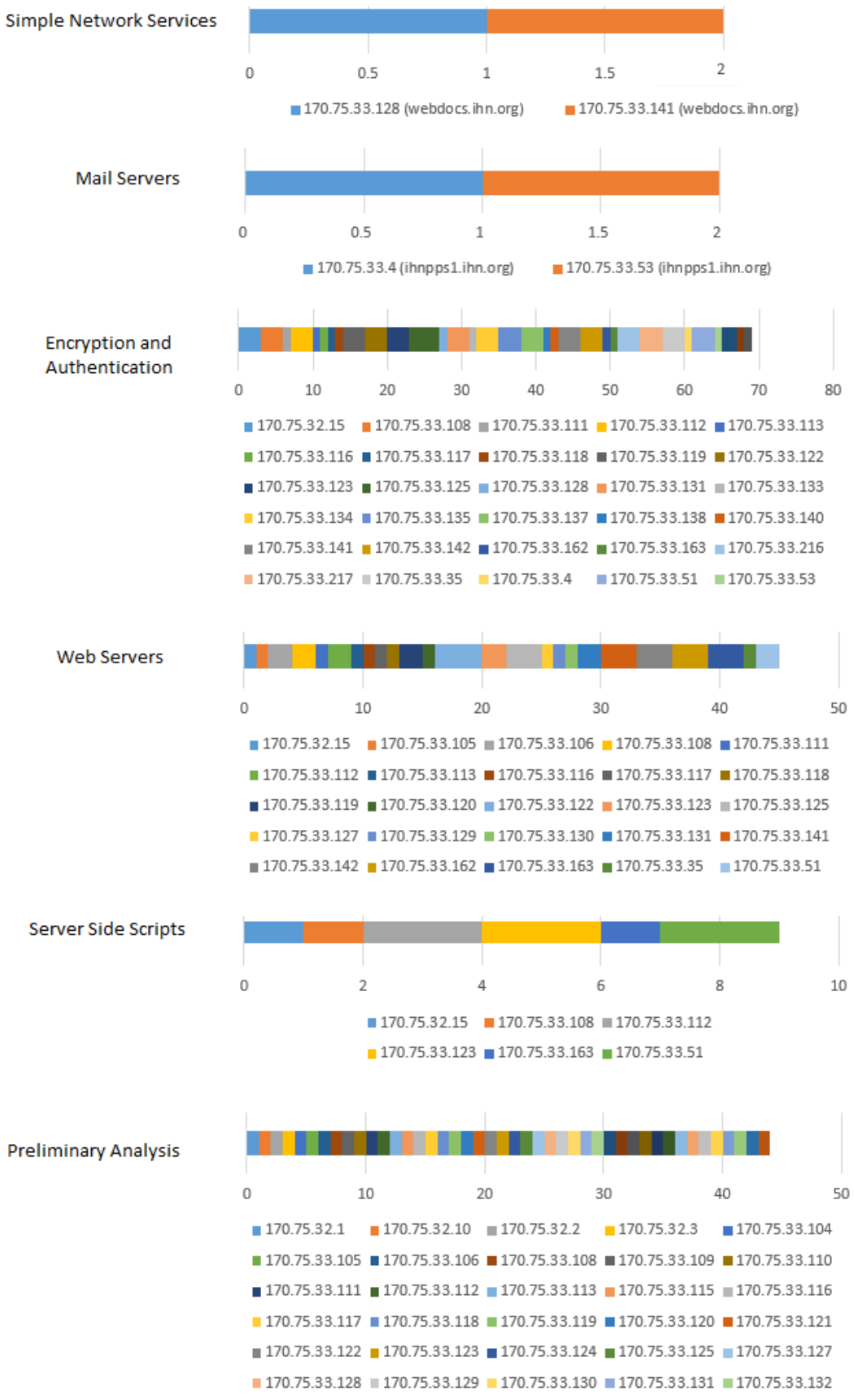
Graph: Vulnerability Category by Vulnerability

This report illustrates the vulnerability category and count by vulnerability name discovered this report period



Graph: Vulnerability Category by Host

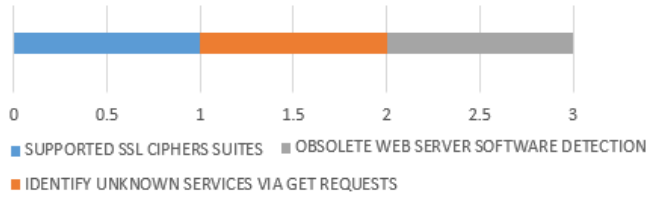
This report illustrates the vulnerability category and count by host discovered this report period


Simple Network Services
0
0.5
1
1.5
2
170.75.33.128 (webdocs.ihn.org)
170.75.33.141 (webdocs.ihn.org)
Mail Servers
0
0.5
1
1.5
2
170.75.33.4 (ihnpps1.ihn.org)
170.75.33.53 (ihnpps1.ihn.org)
Encryption and Authentication
0
10
20
30
40
50
60
70
80
170.75.32.15
170.75.33.108
170.75.33.111
170.75.33.112
170.75.33.113
170.75.33.116
170.75.33.117
170.75.33.118
170.75.33.119
170.75.33.122
170.75.33.123
170.75.33.125
170.75.33.128
170.75.33.131
170.75.33.133
170.75.33.134
170.75.33.135
170.75.33.137
170.75.33.138
170.75.33.140
170.75.33.141
170.75.33.142
170.75.33.162
170.75.33.163
170.75.33.216
170.75.33.217
170.75.33.35
170.75.33.4
170.75.33.51
170.75.33.53
Web Servers
0
10
20
30
40
50
170.75.32.15
170.75.33.105
170.75.33.106
170.75.33.108
170.75.33.111
170.75.33.112
170.75.33.113
170.75.33.116
170.75.33.117
170.75.33.118
170.75.33.119
170.75.33.120
170.75.33.122
170.75.33.123
170.75.33.125
170.75.33.127
170.75.33.129
170.75.33.130
170.75.33.131
170.75.33.141
170.75.33.142
170.75.33.162
170.75.33.163
170.75.33.35
170.75.33.51
Server Side Scripts
0
2
4
6
8
10
170.75.32.15
170.75.33.108
170.75.33.112
170.75.33.123
170.75.33.163
170.75.33.51
Preliminary Analysis
0
10
20
30
40
50
170.75.32.1
170.75.32.10
170.75.32.2
170.75.32.3
170.75.33.104
170.75.33.105
170.75.33.106
170.75.33.108
170.75.33.109
170.75.33.110
170.75.33.111
170.75.33.112
170.75.33.113
170.75.33.115
170.75.33.116
170.75.33.117
170.75.33.118
170.75.33.119
170.75.33.120
170.75.33.121
170.75.33.122
170.75.33.123
170.75.33.124
170.75.33.125
170.75.33.127
170.75.33.128
170.75.33.129
170.75.33.130
170.75.33.131
170.75.33.132

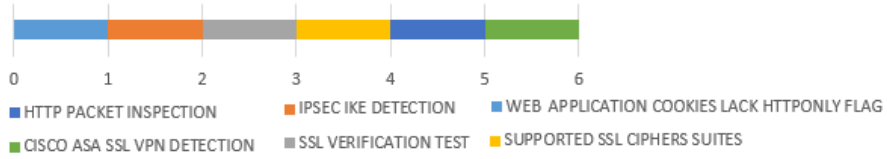
Graph: Host by Vulnerability Name

This report illustrates the vulnerability name and count by hosts discovered this report period

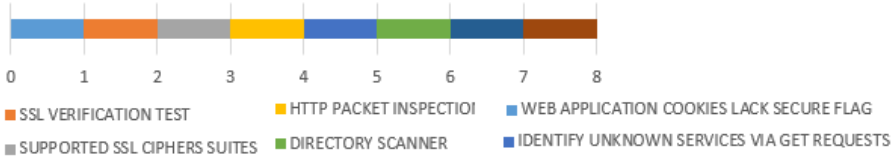
170.75.33.133



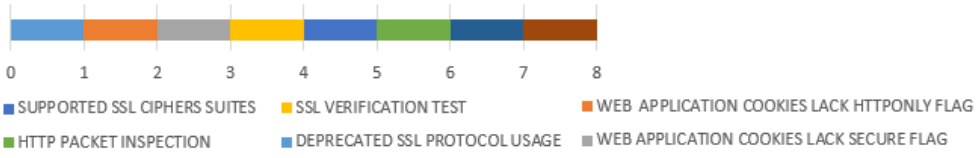
170.75.32.15



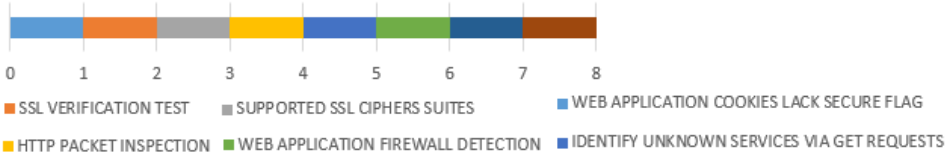
170.75.33.51



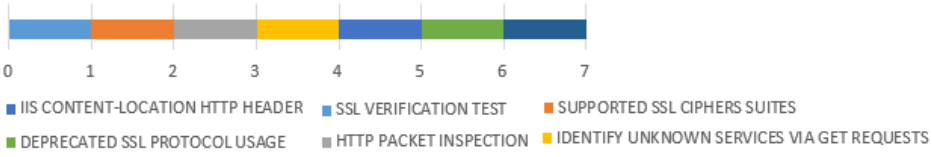
170.75.33.123



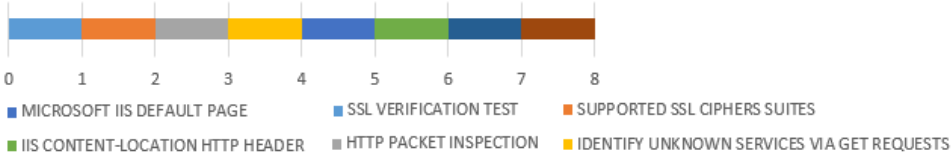
170.75.33.112



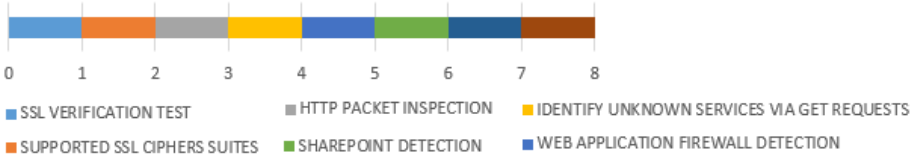
170.75.33.108



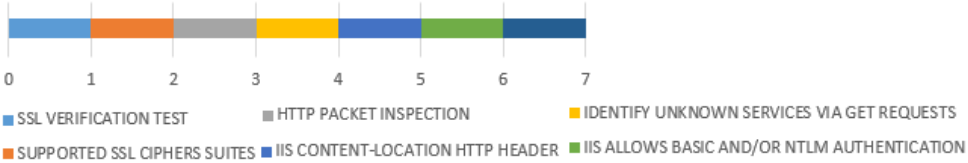
170.75.33.125



170.75.33.141

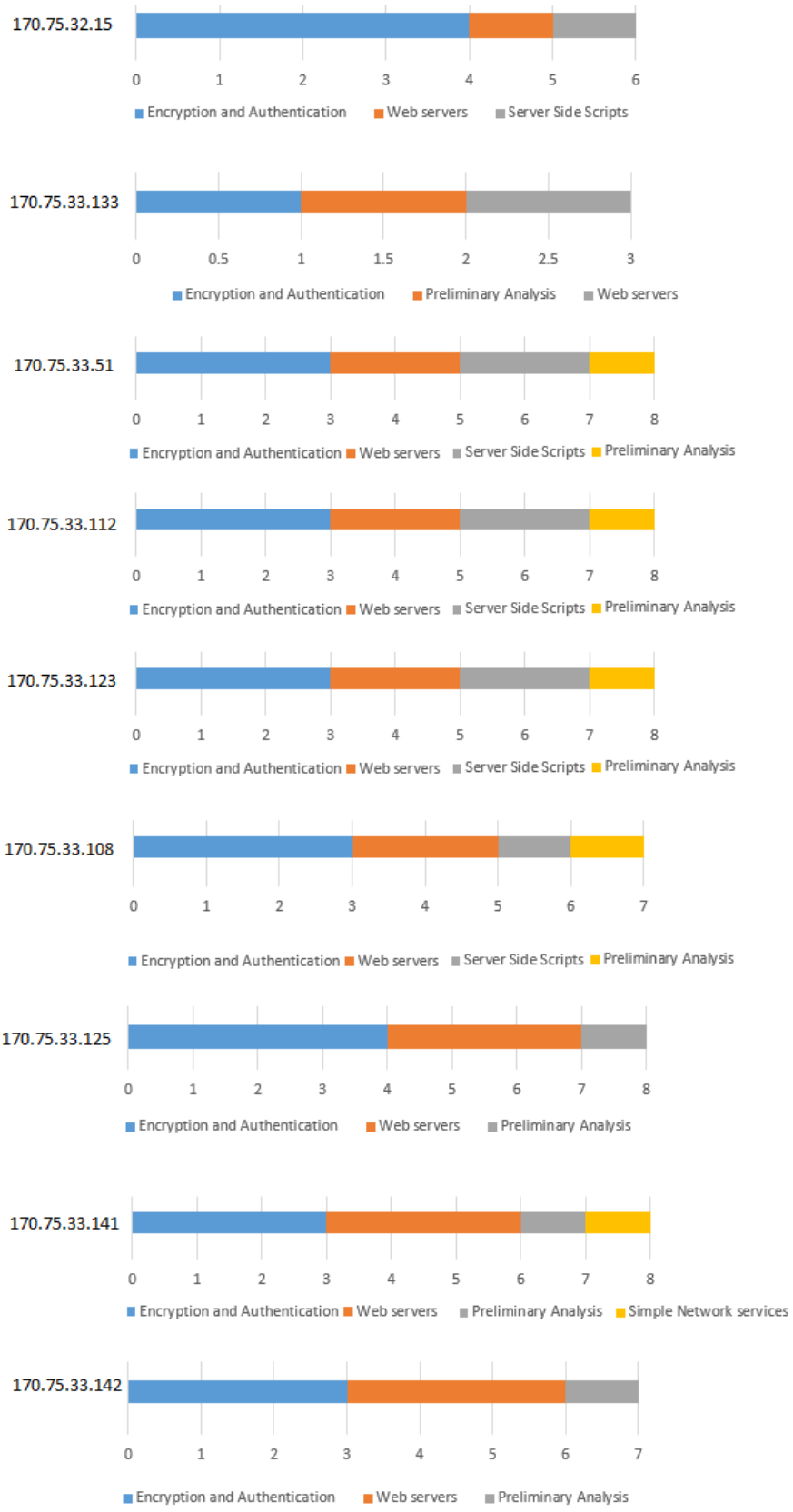


170.75.33.142



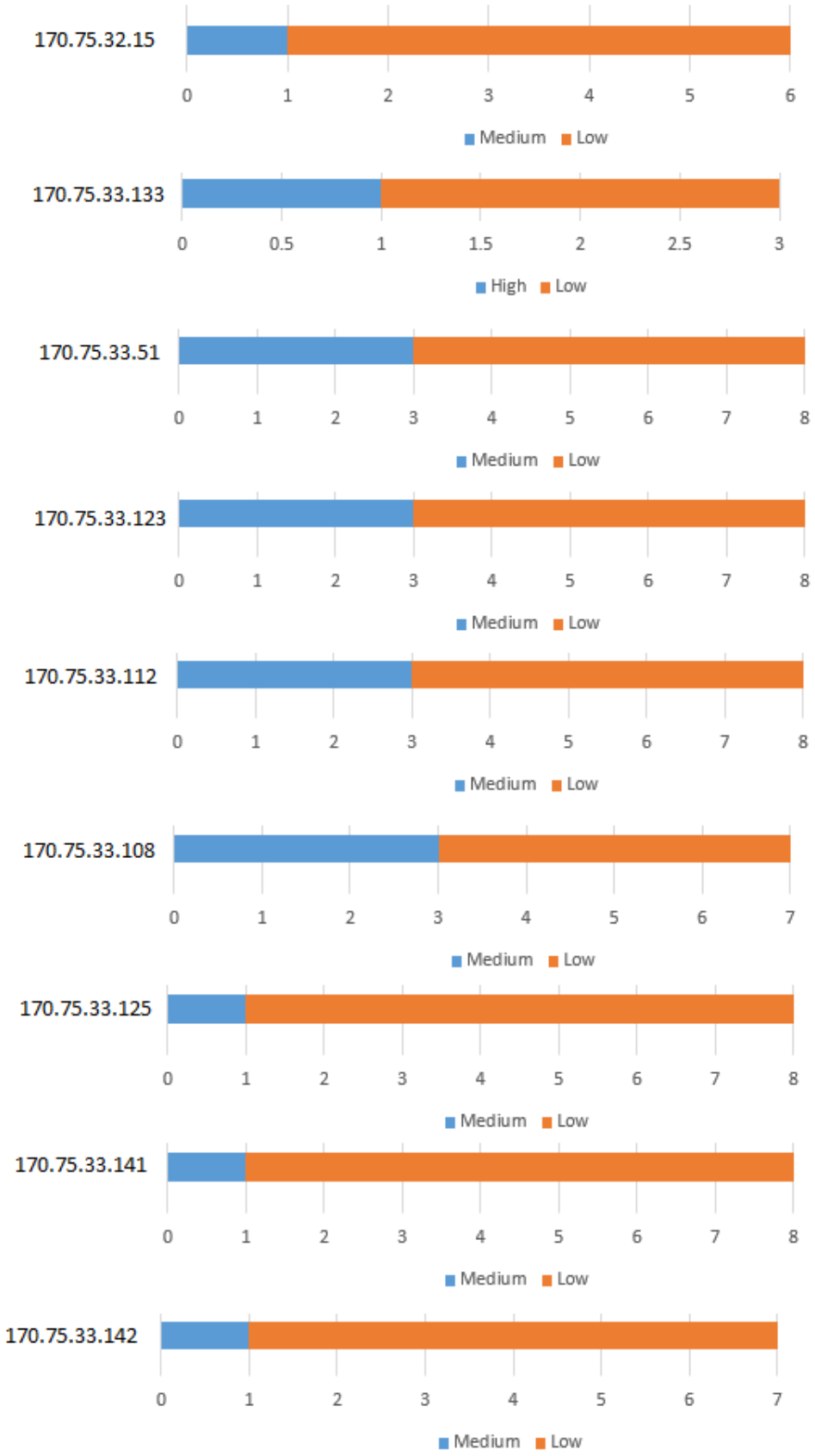
Graph: Host by Vulnerability Category

This report illustrates the vulnerability category and count by hosts discovered this report period


170.75.32.15
0 1 2 3 4 5 6
Encryption and Authentication
Web servers
Server Side Scripts
170.75.33.133
0 0.5 1 1.5 2 2.5 3
Encryption and Authentication
Preliminary Analysis
Web servers
170.75.33.51
0 1 2 3 4 5 6 7 8
Encryption and Authentication
Web servers
Server Side Scripts
Preliminary Analysis
170.75.33.112
0 1 2 3 4 5 6 7 8
Encryption and Authentication
Web servers
Server Side Scripts
Preliminary Analysis
170.75.33.123
0 1 2 3 4 5 6 7 8
Encryption and Authentication
Web servers
Server Side Scripts
Preliminary Analysis
170.75.33.108
0 1 2 3 4 5 6 7
Encryption and Authentication
Web servers
Server Side Scripts
Preliminary Analysis
170.75.33.125
0 1 2 3 4 5 6 7 8
Encryption and Authentication
Web servers
Preliminary Analysis
170.75.33.141
0 1 2 3 4 5 6 7 8
Encryption and Authentication
Web servers
Preliminary Analysis
Simple Network services
170.75.33.142
0 1 2 3 4 5 6 7
Encryption and Authentication
Web servers
Preliminary Analysis

Graph: Host by Vulnerability Risk

This report illustrates the vulnerability risk and count by hosts discovered this report period


170.75.32.15
0 1 2 3 4 5 6
Medium Low
170.75.33.133
0 0.5 1 1.5 2 2.5 3
High Low
170.75.33.51
0 1 2 3 4 5 6 7 8
Medium Low
170.75.33.123
0 1 2 3 4 5 6 7 8
Medium Low
170.75.33.112
0 1 2 3 4 5 6 7 8
Medium Low
170.75.33.108
0 1 2 3 4 5 6 7
Medium Low
170.75.33.125
0 1 2 3 4 5 6 7 8
Medium Low
170.75.33.141
0 1 2 3 4 5 6 7 8
Medium Low
170.75.33.142
0 1 2 3 4 5 6 7
Medium Low

7. Security Operations

The purpose of this section is to highlight the activities performed by GLESEC's Global Operations Center (GOC) including: monitoring availability and performance of equipment under contract, Change Management and Incident Response activities.

a)Monitoring System Availability

INSPIRA HEALTH NETWORK Bridgeton DefensePro Availability:

The DefensePro was considered up and available **100%** during this report period.

Host State Breakdowns:

State	Type / Reason	Time	% Total Time	% Known Time
UP	Unscheduled	31d 0h 0m 0s	100.000%	100.000%
	Scheduled	0d 0h 0m 0s	0.000%	0.000%
	Total	31d 0h 0m 0s	100.000%	100.000%
DOWN	Unscheduled	0d 0h 0m 0s	0.000%	0.000%
	Scheduled	0d 0h 0m 0s	0.000%	0.000%
	Total	0d 0h 0m 0s	0.000%	0.000%
UNREACHABLE	Unscheduled	0d 0h 0m 0s	0.000%	0.000%
	Scheduled	0d 0h 0m 0s	0.000%	0.000%
	Total	0d 0h 0m 0s	0.000%	0.000%
Undetermined	Nagios Not Running	0d 0h 0m 0s	0.000%	
	Insufficient Data	0d 0h 0m 0s	0.000%	
	Total	0d 0h 0m 0s	0.000%	
All	Total	31d 0h 0m 0s	100.000%	100.000%

State Breakdowns For Host Services:

Service	% Time OK	% Time Warning	% Time Unknown	% Time Critical	% Time Undetermined
PING	100.000% (100.000%)	0.000% (0.000%)	0.000% (0.000%)	0.000% (0.000%)	0.000%
Average	100.000% (100.000%)	0.000% (0.000%)	0.000% (0.000%)	0.000% (0.000%)	0.000%

INSPIRA HEALTH NETWORK Elmer DefensePro Availability:

The DefensePro was considered up and available **100%** during this report period.

Host State Breakdowns:

State	Type / Reason	Time	% Total Time	% Known Time
UP	Unscheduled	31d 0h 0m 0s	100.000%	100.000%
	Scheduled	0d 0h 0m 0s	0.000%	0.000%
	Total	31d 0h 0m 0s	100.000%	100.000%
DOWN	Unscheduled	0d 0h 0m 0s	0.000%	0.000%
	Scheduled	0d 0h 0m 0s	0.000%	0.000%
	Total	0d 0h 0m 0s	0.000%	0.000%
UNREACHABLE	Unscheduled	0d 0h 0m 0s	0.000%	0.000%
	Scheduled	0d 0h 0m 0s	0.000%	0.000%
	Total	0d 0h 0m 0s	0.000%	0.000%
Undetermined	Nagios Not Running	0d 0h 0m 0s	0.000%	
	Insufficient Data	0d 0h 0m 0s	0.000%	
	Total	0d 0h 0m 0s	0.000%	
All	Total	31d 0h 0m 0s	100.000%	100.000%

State Breakdowns For Host Services:

Service	% Time OK	% Time Warning	% Time Unknown	% Time Critical	% Time Undetermined
PING	99.989% (99.989%)	0.000% (0.000%)	0.000% (0.000%)	0.011% (0.011%)	0.000%
Average	99.989% (99.989%)	0.000% (0.000%)	0.000% (0.000%)	0.011% (0.011%)	0.000%

b)Monitoring system performance

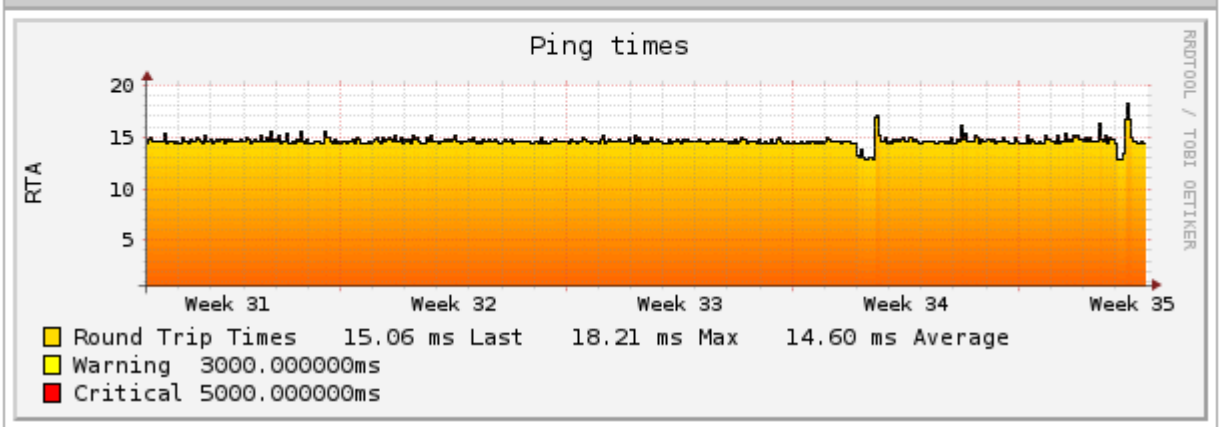
INSPIRA HEALTH NETWORK Bridgeton DefensePro Host Performance

Round trip ping times averaged **14.60** ms from the GLESEC GOC to INSPIRA HEALTH NETWORK with **0%** average packet loss.

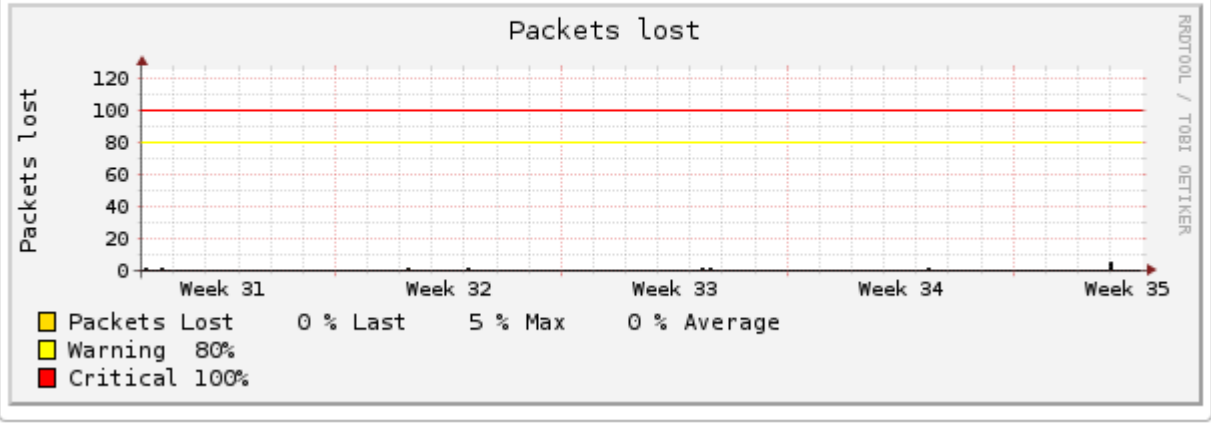
Host: Bridgeton DefensePro 516 **Service:** Host Perfdata

Custom time range 01.08.16 0:00 - 01.09.16 0:00

Datasource: Round Trip Times



Datasource: Packets Lost



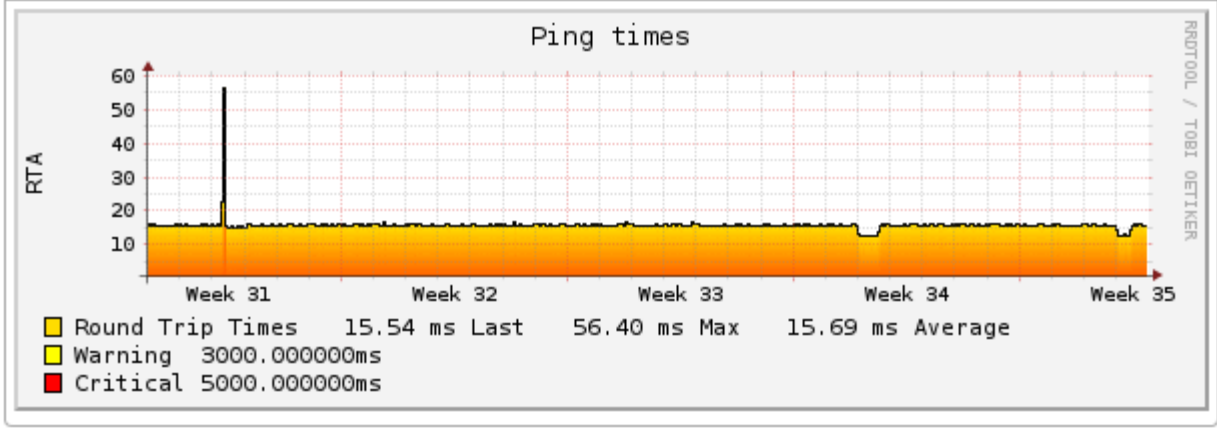
INSPIRA HEALTH NETWORK Elmer DefensePro Host Performance

Round trip ping times averaged **15.69** ms from the GLESEC GOC to INSPIRA HEALTH NETWORK with **0%** average packet loss.

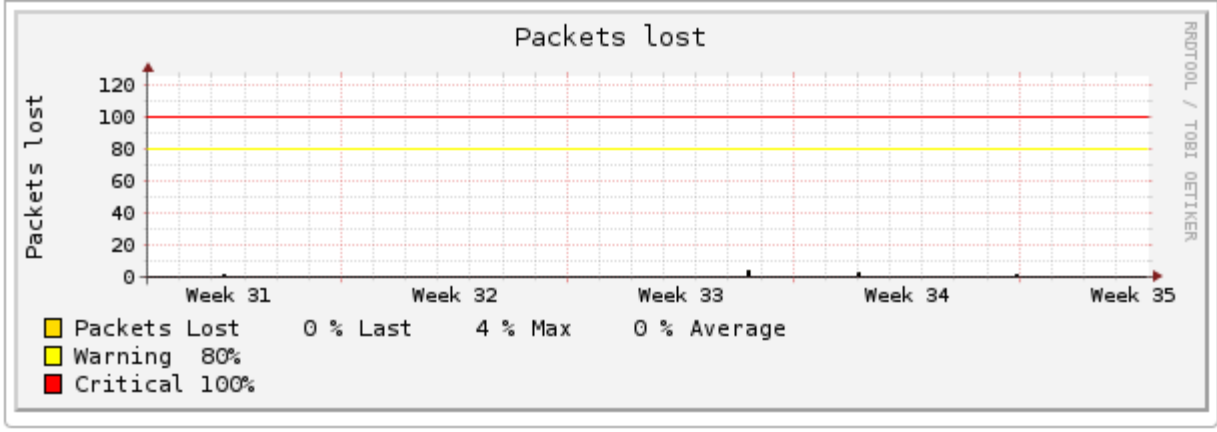
Host: Elmer DefensePro 516 **Service:** Host Perfdata

Custom time range 01.08.16 0:00 - 01.09.16 0:00

Datasource: Round Trip Times



Datasource: Packets Lost



c)Change Management Procedures

No change management activity during the month of August

d)Incident Response Procedures

No change incident response activity during the month of August

8. Appendix 1 – Critical Attack Sources (WHOIS Information)

This section provides additional WHOIS detail for the Graph: Critical Attacks

inetnum: 85.25.15.23 - 85.25.15.23 netname: ripe-85-25-15-23-32 descr: EvroHoster.ru subnet country: UA admin-c: ASB105-RIPE tech-c: ASB105-RIPE status: ASSIGNED PA mnt-by: BSB-SERVICE-MNT person: Andriy S Balytskyy address: Geroev UPA str. 31 50 80000 Sokal phone: +380 98 4571053 nic-hdl: ASB105-RIPE mnt-by: BSB-SERVICE-MNT route: 85.25.0.0/16 descr: PlusServer AG origin: AS8972 mnt-by: INTERGENIA-MNT

inetnum: 85.25.154.175 - 85.25.154.175 netname: ripe-85-25-154-175-32 descr: HHHHH country: EG admin-c: SA31746-RIPE tech-c: SA31746-RIPE

status: ASSIGNED PA mnt-by: BSB-SERVICE-MNT person: Sameer Ahmed address: 71 block - 31911 Tanta phone: +20 11 24822228 nic-hdl: SA31746-RIPE mnt-by: BSB-SERVICE-MNT route: 85.25.0.0/16 descr: PlusServer AG origin: AS8972 mnt-by: INTERGENIA-MNT
NetRange: 138.91.0.0 - 138.91.255.255 CIDR: 138.91.0.0/16 OriginAS:
NetName: MICROSOFT
NetHandle: NET-138-91-0-0-1
Parent: NET-138-0-0-0-0
NetType: Direct Assignment
RegDate: 2011-06-22
Updated: 2013-08-20
Ref: http://whois.arin.net/rest/net/NET-138-91-0-0-1
OrgName: Microsoft Corp
OrgId: MSFT-Z
Address: One Microsoft Way
City: Redmond
StateProv: WA
PostalCode: 98052
Country: US
RegDate: 2011-06-22
Updated: 2013-10-03
Comment: To report suspected security issues specific to
Comment: traffic emanating from Microsoft online services,
Comment: including the distribution of malicious content
Comment: or other illicit or illegal material through a Comment: Microsoft online service, please submit reports Comment: to:
Comment: * https://cert.microsoft.com.
Comment:
Comment: For SPAM and other abuse issues, such as Microsoft Comment: Accounts, please contact:
Comment: * abuse@microsoft.com.
Comment:
Comment: To report security vulnerabilities in Microsoft Comment: products and services, please contact:
Comment: * secure@microsoft.com.

Comment:
Comment: For legal and law enforcement-related requests, Comment: please contact:
Comment: * msndcc@microsoft.com Comment:
Comment: For routing, peering or DNS issues, please Comment: contact:
Comment: * IOC@microsoft.com
Ref: http://whois.arin.net/rest/org/MSFT-Z
OrgTechHandle: MRPD-ARIN
OrgTechName: Microsoft Routing, Peering, and DNS
OrgTechPhone: +1-425-882-8080
OrgTechEmail: IOC@microsoft.com
OrgTechRef: http://whois.arin.net/rest/poc/MRPD-ARIN
OrgAbuseHandle: MAC74-ARIN
OrgAbuseName: Microsoft Abuse Contact
OrgAbusePhone: +1-425-882-8080
OrgAbuseEmail: abuse@microsoft.com
OrgAbuseRef: http://whois.arin.net/rest/poc/MAC74-ARIN

inetnum: 113.16.0.0 - 113.17.255.255 netname: CHINANET-GX
descr: CHINANET GUANGXI PROVINCE NETWORK
descr: China Telecom descr: No.31,jingrong street descr: Beijing 100032 country: CN admin-c: CH93-AP tech-c: CR766-AP status: ALLOCATED PORTABLE changed: hm-changed@apnic.net 20080918 mnt-by: APNIC-HM mnt-lower: MAINT-CHINANET-GX
source: APNIC role: CHINANET GUANGXI
address: No.35,Minzhu Road,Nanning 530015 country: CN phone: +86-771-2815987 fax-no: +86-771-2839278 e-mail: hostmaster@gx163.net admin-c: CR76-AP tech-c: BD37-AP nic-hdl: CR766-AP notify: hostmaster@gx163.net mnt-by: MAINT-CHINANET-GX changed: hostmaster@gx163.net 20021024 source: APNIC
changed: hm-changed@apnic.net 20111114 person: Chinanet Hostmaster nic-hdl: CH93-AP

e-mail: anti-spam@ns.chinanet.cn.net address:
No.31 ,jingrong street,beijing address: 100032
phone: +86-10-58501724 fax-no: +86-10-
58501724 country: CN
changed: dingsy@cndata.com 20070416 changed:
zhengzm@gsta.com 20140227 mnt-by: MAINT-
CHINANET source: APNIC

inetnum: 113.16.0.0 - 113.17.255.255 netname: CHINANET-
GX
descr: CHINANET GUANGXI PROVINCE NETWORK
descr: China Telecom descr: No.31,jingrong
street descr: Beijing 100032 country: CN admin-c:
CH93-AP tech-c: CR766-AP status:
ALLOCATED PORTABLE changed: hm-
changed@apnic.net 20080918 mnt-by: APNIC-HM
mnt-lower: MAINT-CHINANET-GX
source: APNIC role:
CHINANET GUANGXI
address: No.35,Minzhu Road,Nanning 530015 country:
CN phone: +86-771-2815987 fax-no: +86-771-
2839278 e-mail: hostmaster@gx163.net admin-c:
CR76-AP tech-c: BD37-AP nic-hdl: CR766-AP
notify: hostmaster@gx163.net mnt-by: MAINT-
CHINANET-GX
changed: hostmaster@gx163.net 20021024
source: APNIC
changed: hm-changed@apnic.net 20111114 person:
Chinanet Hostmaster nic-hdl: CH93-AP
e-mail: anti-spam@ns.chinanet.cn.net address:
No.31 ,jingrong street,beijing address: 100032
phone: +86-10-58501724 fax-no: +86-10-
58501724 country: CN
changed: dingsy@cndata.com 20070416 changed:
zhengzm@gsta.com 20140227 mnt-by: MAINT-
CHINANET source: APNIC

inetnum: 113.16.0.0 - 113.17.255.255 netname: CHINANET-GX
descr: CHINANET GUANGXI PROVINCE NETWORK
descr: China Telecom descr: No.31,jingrong street descr: Beijing 100032 country: CN admin-c: CH93-AP tech-c: CR766-AP status: ALLOCATED PORTABLE changed: hm-changed@apnic.net 20080918 mnt-by: APNIC-HM mnt-lower: MAINT-CHINANET-GX
source: APNIC role: CHINANET GUANGXI
address: No.35,Minzhu Road,Nanning 530015 country: CN phone: +86-771-2815987 fax-no: +86-771-2839278 e-mail: hostmaster@gx163.net admin-c: CR76-AP tech-c: BD37-AP nic-hdl: CR766-AP notify: hostmaster@gx163.net
mnt-by: MAINT-CHINANET-GX changed: hostmaster@gx163.net 20021024
source: APNIC
changed: hm-changed@apnic.net 20111114 person: Chinanet Hostmaster nic-hdl: CH93-AP
e-mail: anti-spam@ns.chinanet.cn.net address: No.31 ,jingrong street,beijing address: 100032
phone: +86-10-58501724 fax-no: +86-10-58501724 country: CN
changed: dingsy@cndata.com 20070416 changed: zhengzm@gsta.com 20140227 mnt-by: MAINT-CHINANET source: APNIC

inetnum: 94.102.49.0 - 94.102.49.255 netname: NL-ECATEL descr: ECATEL LTD descr: Dedicated servers descr: http://www.ecatel.net/ country: NL admin-c: EL25-RIPE tech-c: EL25-RIPE status: ASSIGNED PA mnt-by: ECATEL-MNT mnt-lower: ECATEL-MNT mnt-routes: ECATEL-MNT role: Ecatel LTD address: P.O.Box 19533 address: 2521 CA The Hague address: Netherlands abuse-mailbox: abuse@ecatel.info admin-c: EL25-RIPE tech-c:

EL25-RIPE nic-hdl: EL25-RIPE mnt-by: ECATEL-MNT route: 94.102.49.0/24 descr: AS29073 Route object
origin: AS29073 mnt-by: ECATEL-MNT

NetRange: 216.168.32.0 - 216.168.63.255
CIDR: 216.168.32.0/19
OriginAS: AS11739, AS3361
NetName: DF216
NetHandle: NET-216-168-32-0-1
Parent: NET-216-0-0-0-0
NetType: Direct Allocation
RegDate: 1998-12-29
Updated: 2012-11-02
Ref: http://whois.arin.net/rest/net/NET-216-168-32-0-1 OrgName: Digital Fortress, Inc.
OrgId: DF-35
Address: 12101 Tukwila International Blvd, Suite 410
City: Seattle
StateProv: WA
PostalCode: 98168
Country: US
RegDate: 2012-09-06
Updated: 2013-10-31
Comment: http://www.dfcolo.com
Comment: NOC hours are 7x24
Ref: http://whois.arin.net/rest/org/DF-35
OrgNOCHandle: NOC13423-ARIN
OrgNOCName: NOC
OrgNOCPhone: +1-206-838-1630
OrgNOCEmail: support@dfcolo.com
OrgNOCRef: http://whois.arin.net/rest/poc/NOC13423-ARIN
OrgTechHandle: DAD109-ARIN
OrgTechName: desVoigne, David Andrew
OrgTechPhone: +1-206-948-7974
OrgTechEmail: david.desvoigne@dfcolo.com
OrgTechRef: http://whois.arin.net/rest/poc/DAD109-ARIN

OrgAbuseHandle: ABUSE3969-ARIN
OrgAbuseName: Abuse
OrgAbusePhone: +1-206-838-1630
OrgAbuseEmail: abuse@dfcolo.com
OrgAbuseRef: http://whois.arin.net/rest/poc/ABUSE3969-ARIN **NetRange: 74.125.0.0 - 74.125.255.255** CIDR: 74.125.0.0/16 OriginAS:
NetName: GOOGLE
NetHandle: NET-74-125-0-0-1
Parent: NET-74-0-0-0-0
NetType: Direct Allocation
RegDate: 2007-03-13
Updated: 2012-02-24
Ref: http://whois.arin.net/rest/net/NET-74-125-0-0-1 OrgName: Google Inc.
OrgId: GOGL
Address: 1600 Amphitheatre Parkway
City: Mountain View
StateProv: CA
PostalCode: 94043
Country: US
RegDate: 2000-03-30
Updated: 2013-08-07
Ref: http://whois.arin.net/rest/org/GOGL
OrgTechHandle: ZG39-ARIN
OrgTechName: Google Inc
OrgTechPhone: +1-650-253-0000
OrgTechEmail: arin-contact@google.com
OrgTechRef: http://whois.arin.net/rest/poc/ZG39-ARIN
OrgAbuseHandle: ZG39-ARIN
OrgAbuseName: Google Inc
OrgAbusePhone: +1-650-253-0000
OrgAbuseEmail: arin-contact@google.com
OrgAbuseRef: http://whois.arin.net/rest/poc/ZG39-ARIN

NetRange: 74.125.0.0 - 74.125.255.255 CIDR: 74.125.0.0/16 OriginAS:
NetName: GOOGLE
NetHandle: NET-74-125-0-0-1

Parent: NET-74-0-0-0-0
NetType: Direct Allocation
RegDate: 2007-03-13
Updated: 2012-02-24
Ref: http://whois.arin.net/rest/net/NET-74-125-0-0-1 OrgName: Google Inc.
OrgId: GOGL
Address: 1600 Amphitheatre Parkway
City: Mountain View
StateProv: CA
PostalCode: 94043
Country: US
RegDate: 2000-03-30
Updated: 2013-08-07
Ref: http://whois.arin.net/rest/org/GOGL
OrgTechHandle: ZG39-ARIN
OrgTechName: Google Inc
OrgTechPhone: +1-650-253-0000
OrgTechEmail: arin-contact@google.com
OrgTechRef: http://whois.arin.net/rest/poc/ZG39-ARIN
OrgAbuseHandle: ZG39-ARIN
OrgAbuseName: Google Inc
OrgAbusePhone: +1-650-253-0000
OrgAbuseEmail: arin-contact@google.com
OrgAbuseRef: http://whois.arin.net/rest/poc/ZG39-ARIN

9. Appendix 2 – Top Scanners Blocked (WHOIS Information)

This section provides additional WHOIS detail for the Graph: Top Scanners Blocked (Source IP Addressed)

inetnum: 85.25.15.23 - 85.25.15.23 netname: ripe-85-25-15-23-32 descr: EvroHoster.ru subnet country: UA admin-c: ASB105-RIPE tech-c: ASB105-RIPE status: ASSIGNED PA mnt-by: BSB-SERVICE-MNT person: Andriy S Balytskyy address: Geroev UPA str. 31 50 80000 Sokal phone: +380 98 4571053 nic-hdl: ASB105-RIPE mnt-by: BSB-SERVICE-MNT route: 85.25.0.0/16 descr: PlusServer AG origin: AS8972 mnt-by: INTERGENIA-MNT

inetnum: 85.25.154.175 - 85.25.154.175 netname: ripe-85-25-154-175-32 descr: HHHHH country: EG admin-c: SA31746-RIPE tech-c: SA31746-RIPE status: ASSIGNED PA mnt-by: BSB-SERVICE-MNT person: Sameer Ahmed address: 71 block - 31911 Tanta phone: +20 11 24822228 nic-hdl: SA31746-RIPE mnt-by: BSB-SERVICE-MNT route: 85.25.0.0/16 descr: PlusServer AG origin: AS8972 mnt-by: INTERGENIA-MNT

NetRange: 138.91.0.0 - 138.91.255.255 CIDR: 138.91.0.0/16 OriginAS:
NetName: MICROSOFT
NetHandle: NET-138-91-0-0-1
Parent: NET-138-0-0-0-0
NetType: Direct Assignment
RegDate: 2011-06-22
Updated: 2013-08-20
Ref: http://whois.arin.net/rest/net/NET-138-91-0-0-1
OrgName: Microsoft Corp
OrgId: MSFT-Z
Address: One Microsoft Way
City: Redmond
StateProv: WA

PostalCode: 98052
Country: US
RegDate: 2011-06-22
Updated: 2013-10-03
Comment: To report suspected security issues specific to
Comment: traffic emanating from Microsoft online services,
Comment: including the distribution of malicious content
Comment: or other illicit or illegal material through a Comment: Microsoft online service, please submit reports Comment: to:
Comment: * https://cert.microsoft.com.
Comment:
Comment: For SPAM and other abuse issues, such as Microsoft Comment: Accounts, please contact:
Comment: * abuse@microsoft.com.
Comment:
Comment: To report security vulnerabilities in Microsoft Comment: products and services, please contact:
Comment: * secure@microsoft.com.
Comment:
Comment: For legal and law enforcement-related requests, Comment: please contact:
Comment: * msndcc@microsoft.com Comment:
Comment: For routing, peering or DNS issues, please Comment: contact:
Comment: * IOC@microsoft.com
Ref: http://whois.arin.net/rest/org/MSFT-Z
OrgTechHandle: MRPD-ARIN
OrgTechName: Microsoft Routing, Peering, and DNS
OrgTechPhone: +1-425-882-8080
OrgTechEmail: IOC@microsoft.com
OrgTechRef: http://whois.arin.net/rest/poc/MRPD-ARIN
OrgAbuseHandle: MAC74-ARIN
OrgAbuseName: Microsoft Abuse Contact
OrgAbusePhone: +1-425-882-8080
OrgAbuseEmail: abuse@microsoft.com
OrgAbuseRef: http://whois.arin.net/rest/poc/MAC74-ARIN

inetnum: 113.16.0.0 - 113.17.255.255 netname: CHINANET-GX
descr: CHINANET GUANGXI PROVINCE NETWORK
descr: China Telecom descr: No.31,jingrong street descr: Beijing 100032 country: CN admin-c: CH93-AP tech-c: CR766-AP status: ALLOCATED PORTABLE changed: hm-changed@apnic.net 20080918 mnt-by: APNIC-HM mnt-lower: MAINT-CHINANET-GX
source: APNIC role: CHINANET GUANGXI
address: No.35,Minzhu Road,Nanning 530015 country: CN phone: +86-771-2815987 fax-no: +86-771-2839278 e-mail: hostmaster@gx163.net admin-c: CR76-AP tech-c: BD37-AP nic-hdl: CR766-AP notify: hostmaster@gx163.net mnt-by: MAINT-CHINANET-GX
changed: hostmaster@gx163.net 20021024
source: APNIC
changed: hm-changed@apnic.net 20111114 person: Chinanet Hostmaster nic-hdl: CH93-AP
e-mail: anti-spam@ns.chinanet.cn.net address: No.31 ,jingrong street,beijing address: 100032
phone: +86-10-58501724 fax-no: +86-10-58501724 country: CN
changed: dingsy@cndata.com 20070416 changed: zhengzm@gsta.com 20140227 mnt-by: MAINT-CHINANET source: APNIC

inetnum: 113.16.0.0 - 113.17.255.255 netname: CHINANET-GX
descr: CHINANET GUANGXI PROVINCE NETWORK
descr: China Telecom descr: No.31,jingrong street descr: Beijing 100032 country: CN admin-c: CH93-AP tech-c: CR766-AP status: ALLOCATED PORTABLE changed: hm-changed@apnic.net 20080918 mnt-by: APNIC-HM mnt-lower: MAINT-CHINANET-GX

source: APNIC role:
CHINANET GUANGXI
address: No.35,Minzhu Road,Nanning 530015 country:
CN phone: +86-771-2815987 fax-no: +86-771-
2839278 e-mail: hostmaster@gx163.net admin-c:
CR76-AP tech-c: BD37-AP nic-hdl: CR766-AP
notify: hostmaster@gx163.net
mnt-by: MAINT-CHINANET-GX changed:
hostmaster@gx163.net 20021024
source: APNIC
changed: hm-changed@apnic.net 20111114 person:
Chinanet Hostmaster nic-hdl: CH93-AP
e-mail: anti-spam@ns.chinanet.cn.net address:
No.31 ,jingrong street,beijing address: 100032
phone: +86-10-58501724 fax-no: +86-10-
58501724 country: CN
changed: dingsy@cndata.com 20070416 changed:
zhengzm@gsta.com 20140227 mnt-by: MAINT-
CHINANET source: APNIC

inetnum: 113.16.0.0 - 113.17.255.255 netname: CHINANET-
GX
descr: CHINANET GUANGXI PROVINCE NETWORK
descr: China Telecom descr: No.31,jingrong
street descr: Beijing 100032 country: CN admin-c:
CH93-AP tech-c: CR766-AP status:
ALLOCATED PORTABLE changed: hm-
changed@apnic.net 20080918 mnt-by: APNIC-HM
mnt-lower: MAINT-CHINANET-GX
source: APNIC role:
CHINANET GUANGXI
address: No.35,Minzhu Road,Nanning 530015 country:
CN phone: +86-771-2815987 fax-no: +86-771-
2839278 e-mail: hostmaster@gx163.net admin-c:
CR76-AP tech-c: BD37-AP nic-hdl: CR766-AP
notify: hostmaster@gx163.net mnt-by: MAINT-
CHINANET-GX changed: hostmaster@gx163.net
20021024
source: APNIC

changed: hm-changed@apnic.net 20111114 person: Chinanet Hostmaster nic-hdl: CH93-AP e-mail: anti-spam@ns.chinanet.cn.net address: No.31 ,jingrong street,beijing address: 100032 phone: +86-10-58501724 fax-no: +86-10-58501724 country: CN changed: dingsy@cndata.com 20070416 changed: zhengzm@gsta.com 20140227 mnt-by: MAINT-CHINANET source: APNIC

inetnum: 94.102.49.0 - 94.102.49.255 netname: NL-ECATEL descr: ECATEL LTD descr: Dedicated servers descr: http://www.ecatel.net/ country: NL admin-c: EL25-RIPE tech-c: EL25-RIPE status: ASSIGNED PA mnt-by: ECATEL-MNT mnt-lower: ECATEL-MNT mnt-routes: ECATEL-MNT role: Ecatel LTD address: P.O.Box 19533 address: 2521 CA The Hague address: Netherlands abuse-mailbox: abuse@ecatel.info admin-c: EL25-RIPE tech-c: EL25-RIPE nic-hdl: EL25-RIPE mnt-by: ECATEL-MNT route: 94.102.49.0/24 descr: AS29073 Route object origin: AS29073 mnt-by: ECATEL-MNT

NetRange: 216.168.32.0 - 216.168.63.255
CIDR: 216.168.32.0/19
OriginAS: AS11739, AS3361
NetName: DF216
NetHandle: NET-216-168-32-0-1
Parent: NET-216-0-0-0-0
NetType: Direct Allocation
RegDate: 1998-12-29
Updated: 2012-11-02
Ref: http://whois.arin.net/rest/net/NET-216-168-32-0-1 OrgName: Digital Fortress, Inc.
OrgId: DF-35
Address: 12101 Tukwila International Blvd, Suite 410
City: Seattle

StateProv: WA
PostalCode: 98168
Country: US
RegDate: 2012-09-06
Updated: 2013-10-31
Comment: http://www.dfcolo.com
Comment: NOC hours are 7x24
Ref: http://whois.arin.net/rest/org/DF-35
OrgNOCHandle: NOC13423-ARIN
OrgNOCName: NOC
OrgNOCPhone: +1-206-838-1630
OrgNOCEmail: support@dfcolo.com
OrgNOCRef: http://whois.arin.net/rest/poc/NOC13423-ARIN
OrgTechHandle: DAD109-ARIN
OrgTechName: desVoigne, David Andrew
OrgTechPhone: +1-206-948-7974
OrgTechEmail: david.desvoigne@dfcolo.com
OrgTechRef: http://whois.arin.net/rest/poc/DAD109-ARIN
OrgAbuseHandle: ABUSE3969-ARIN
OrgAbuseName: Abuse
OrgAbusePhone: +1-206-838-1630
OrgAbuseEmail: abuse@dfcolo.com
OrgAbuseRef: http://whois.arin.net/rest/poc/ABUSE3969-ARIN

NetRange: 74.125.0.0 - 74.125.255.255 CIDR:
74.125.0.0/16 OriginAS:
NetName: GOOGLE
NetHandle: NET-74-125-0-0-1
Parent: NET-74-0-0-0-0
NetType: Direct Allocation
RegDate: 2007-03-13
Updated: 2012-02-24
Ref: http://whois.arin.net/rest/net/NET-74-125-0-0-1 OrgName: Google Inc.
OrgId: GOGL
Address: 1600 Amphitheatre Parkway
City: Mountain View
StateProv: CA

PostalCode: 94043
Country: US
RegDate: 2000-03-30
Updated: 2013-08-07
Ref: http://whois.arin.net/rest/org/GOGL
OrgTechHandle: ZG39-ARIN
OrgTechName: Google Inc
OrgTechPhone: +1-650-253-0000
OrgTechEmail: arin-contact@google.com
OrgTechRef: http://whois.arin.net/rest/poc/ZG39-ARIN
OrgAbuseHandle: ZG39-ARIN
OrgAbuseName: Google Inc
OrgAbusePhone: +1-650-253-0000
OrgAbuseEmail: arin-contact@google.com
OrgAbuseRef: http://whois.arin.net/rest/poc/ZG39-ARIN

NetRange: 74.125.0.0 - 74.125.255.255 CIDR:
74.125.0.0/16 OriginAS:
NetName: GOOGLE
NetHandle: NET-74-125-0-0-1
Parent: NET-74-0-0-0-0
NetType: Direct Allocation
RegDate: 2007-03-13
Updated: 2012-02-24
Ref: http://whois.arin.net/rest/net/NET-74-125-0-0-1 OrgName: Google Inc.
OrgId: GOGL
Address: 1600 Amphitheatre Parkway
City: Mountain View
StateProv: CA
PostalCode: 94043
Country: US
RegDate: 2000-03-30
Updated: 2013-08-07
Ref: http://whois.arin.net/rest/org/GOGL
OrgTechHandle: ZG39-ARIN
OrgTechName: Google Inc
OrgTechPhone: +1-650-253-0000

OrgTechEmail: arin-contact@google.com
OrgTechRef: http://whois.arin.net/rest/poc/ZG39-ARIN
OrgAbuseHandle: ZG39-ARIN
OrgAbuseName: Google Inc
OrgAbusePhone: +1-650-253-0000
OrgAbuseEmail: arin-contact@google.com
OrgAbuseRef: http://whois.arin.net/rest/poc/ZG39-ARIN

NetRange: 198.20.64.0 - 198.20.127.255
CIDR: 198.20.64.0/18
OriginAS: AS32475
NetName: SINGLEHOP
NetHandle: NET-198-20-64-0-1
Parent: NET-198-0-0-0-0
NetType: Direct Allocation
RegDate: 2012-08-24
Updated: 2012-08-24
Ref: http://whois.arin.net/rest/net/NET-198-20-64-0-1 OrgName: SingleHop, Inc.
OrgId: SINGL-8
Address: 215 W. Ohio St.
Address: 5th Floor
City: Chicago
StateProv: IL
PostalCode: 60654
Country: US
RegDate: 2007-03-07
Updated: 2012-11-19
Comment: http://www.singlehop.com/
Ref: http://whois.arin.net/rest/org/SINGL-8
ReferralServer: rwhois://rwhois.singlehop.net:4321
OrgTechHandle: NETWO1546-ARIN
OrgTechName: Network Operations
OrgTechPhone: +1-866-817-2811
OrgTechEmail: netops@singlehop.com
OrgTechRef: http://whois.arin.net/rest/poc/NETWO1546-ARIN
OrgNOCHandle: NETWO1546-ARIN
OrgNOCName: Network Operations

OrgNOCPhone: +1-866-817-2811
OrgNOCEmail: netops@singlehop.com
OrgNOCRef: http://whois.arin.net/rest/poc/NETWO1546-ARIN
OrgAbuseHandle: ABUSE2492-ARIN
OrgAbuseName: Abuse Department
OrgAbusePhone: +1-866-817-2811
OrgAbuseEmail: abuse@singlehop.com
OrgAbuseRef: http://whois.arin.net/rest/poc/ABUSE2492-ARIN Found a referral to rwhois.singlehop.net:4321. network:Class-Name:network network:ID:ORG-SINGL-8.198-20-70-112/29 network:Auth-Area:198.20.64.0/18 network:IP-Network:198.20.70.112/29 network:Organization:Shodan LLC network:Street-Address:359 Avenida de las Rosas network:City:Encinitas network:State:Ca network:Postal-Code:92024 network:Country-Code:US network:Tech-Contact;I:NETWO1546-ARIN network:Admin-Contact;I:NETWO1546-ARIN network:Abuse-Contact;I:ABUSE2492-ARIN network:Created:20121210 network:Updated:20121210
inetnum: 82.221.105.0 - 82.221.105.255 netname: IS-ORANGEWEBSITE descr: OrangeWebsite.com country: IS org: ORG-OFO1-RIPE admin-c: OTD3-RIPE tech-c: OTD3-RIPE status: ASSIGNED PA mnt-by: MNT-ADVANIA organisation: ORG-OFO1-RIPE org-name: OrangeWebsite Finland Oy org-type: OTHER address: Hannikaisenkatu 14 abuse-c: OTD3-RIPE mnt-ref: MNT-ADVANIA mnt-by: MNT-ADVANIA role: OrangeWebsite.com Technical Department address: OrangeWebsite.com address: Klapparstigur 7 address: 101 Reykjavik address: Iceland abuse-mailbox: abuse@orangewebsite.com admin-c: AK12182-RIPE tech-c: AK12182-RIPE mnt-by: MNT-ADVANIA nic-hdl: OTD3-RIPE route: 82.221.96.0/19 descr: Thor DC origin: AS50613 mnt-by: THOR-MNT mnt-lower: THOR-MNT

NetRange: 71.6.167.128 - 71.6.167.191
CIDR: 71.6.167.128/26
OriginAS: AS10439
NetName: NET-26
NetHandle: NET-71-6-167-128-1
Parent: NET-71-6-128-0-1
NetType: Reassigned
RegDate: 2014-01-03
Updated: 2014-01-03
Ref: http://whois.arin.net/rest/net/NET-71-6-167-128-1 CustName: CariNet, Inc.
Address: 8929 Complex Drive
City: San Diego
StateProv: CA
PostalCode: 92123
Country: US
RegDate: 2014-01-03
Updated: 2014-01-03
Ref: http://whois.arin.net/rest/customer/C04837984
OrgAbuseHandle: ABUSE341-ARIN
OrgAbuseName: CariNet Abuse
OrgAbusePhone: +1-858-974-5080
OrgAbuseEmail: complaints@cari.net
OrgAbuseRef: http://whois.arin.net/rest/poc/ABUSE341-ARIN
OrgTechHandle: CARIN-ARIN
OrgTechName: CariNet Networking
OrgTechPhone: +1-858-974-5080
OrgTechEmail: network@cari.net
OrgTechRef: http://whois.arin.net/rest/poc/CARIN-ARIN

NetRange: 71.6.128.0 - 71.6.255.255
CIDR: 71.6.128.0/17
OriginAS: AS10439
NetName: CARINET-5
NetHandle: NET-71-6-128-0-1
Parent: NET-71-0-0-0-0
NetType: Direct Allocation
RegDate: 2006-02-01

Updated: 2012-03-02
Ref: http://whois.arin.net/rest/net/NET-71-6-128-0-1 OrgName: CariNet, Inc.
OrgId: CARIN-6
Address: 8929 COMPLEX DR
City: SAN DIEGO
StateProv: CA
PostalCode: 92123
Country: US
RegDate: 2009-11-17
Updated: 2014-01-06
Ref: http://whois.arin.net/rest/org/CARIN-6
OrgAbuseHandle: ABUSE341-ARIN
OrgAbuseName: CariNet Abuse
OrgAbusePhone: +1-858-974-5080
OrgAbuseEmail: complaints@cari.net
OrgAbuseRef: http://whois.arin.net/rest/poc/ABUSE341-ARIN
OrgTechHandle: CARIN-ARIN
OrgTechName: CariNet Networking
OrgTechPhone: +1-858-974-5080
OrgTechEmail: network@cari.net
OrgTechRef: http://whois.arin.net/rest/poc/CARIN-ARIN

NetRange: 71.6.165.192 - 71.6.165.255
CIDR: 71.6.165.192/26
OriginAS: AS10439
NetName: NET-26
NetHandle: NET-71-6-165-192-1
Parent: NET-71-6-128-0-1
NetType: Reassigned
RegDate: 2014-01-03
Updated: 2014-01-03
Ref: http://whois.arin.net/rest/net/NET-71-6-165-192-1 CustName: CariNet, Inc.
Address: 8929 Complex Drive
City: San Diego
StateProv: CA
PostalCode: 92123

Country: US
RegDate: 2014-01-03
Updated: 2014-01-03
Ref: http://whois.arin.net/rest/customer/C04837981
OrgTechHandle: CARIN-ARIN
OrgTechName: CariNet Networking
OrgTechPhone: +1-858-974-5080
OrgTechEmail: network@cari.net
OrgTechRef: http://whois.arin.net/rest/poc/CARIN-ARIN
OrgAbuseHandle: ABUSE341-ARIN
OrgAbuseName: CariNet Abuse
OrgAbusePhone: +1-858-974-5080
OrgAbuseEmail: complaints@cari.net
OrgAbuseRef: http://whois.arin.net/rest/poc/ABUSE341-ARIN

NetRange: 71.6.128.0 - 71.6.255.255
CIDR: 71.6.128.0/17
OriginAS: AS10439
NetName: CARINET-5
NetHandle: NET-71-6-128-0-1
Parent: NET-71-0-0-0-0
NetType: Direct Allocation
RegDate: 2006-02-01
Updated: 2012-03-02
Ref: http://whois.arin.net/rest/net/NET-71-6-128-0-1 OrgName: CariNet, Inc.
OrgId: CARIN-6
Address: 8929 COMPLEX DR
City: SAN DIEGO
StateProv: CA
PostalCode: 92123
Country: US
RegDate: 2009-11-17
Updated: 2014-01-06
Ref: http://whois.arin.net/rest/org/CARIN-6
OrgTechHandle: CARIN-ARIN
OrgTechName: CariNet Networking
OrgTechPhone: +1-858-974-5080

OrgTechEmail: network@cari.net
OrgTechRef: http://whois.arin.net/rest/poc/CARIN-ARIN
OrgAbuseHandle: ABUSE341-ARIN
OrgAbuseName: CariNet Abuse
OrgAbusePhone: +1-858-974-5080
OrgAbuseEmail: complaints@cari.net
OrgAbuseRef: http://whois.arin.net/rest/poc/ABUSE341-ARIN

NetRange: 198.20.64.0 - 198.20.127.255
CIDR: 198.20.64.0/18
OriginAS: AS32475
NetName: SINGLEHOP
NetHandle: NET-198-20-64-0-1
Parent: NET-198-0-0-0-0
NetType: Direct Allocation
RegDate: 2012-08-24
Updated: 2012-08-24
Ref: http://whois.arin.net/rest/net/NET-198-20-64-0-1 OrgName: SingleHop, Inc.
OrgId: SINGL-8
Address: 215 W. Ohio St.
Address: 5th Floor
City: Chicago
StateProv: IL
PostalCode: 60654
Country: US
RegDate: 2007-03-07
Updated: 2012-11-19
Comment: http://www.singlehop.com/
Ref: http://whois.arin.net/rest/org/SINGL-8
ReferralServer: rwhois://rwhois.singlehop.net:4321
OrgNOCHandle: NETWO1546-ARIN
OrgNOCName: Network Operations
OrgNOCPhone: +1-866-817-2811
OrgNOCEmail: netops@singlehop.com
OrgNOCRef: http://whois.arin.net/rest/poc/NETWO1546-ARIN
OrgTechHandle: NETWO1546-ARIN
OrgTechName: Network Operations

OrgTechPhone: +1-866-817-2811
OrgTechEmail: netops@singlehop.com
OrgTechRef: http://whois.arin.net/rest/poc/NETWO1546-ARIN
OrgAbuseHandle: ABUSE2492-ARIN
OrgAbuseName: Abuse Department
OrgAbusePhone: +1-866-817-2811
OrgAbuseEmail: abuse@singlehop.com
OrgAbuseRef: http://whois.arin.net/rest/poc/ABUSE2492-ARIN Found a referral to rwhois.singlehop.net:4321. network:Class-Name:network network:ID:ORG-SINGL-8.198-20-69-72/29 network:Auth-Area:198.20.64.0/18 network:IP-Network:198.20.69.72/29 network:Organization:Shodan LLC network:Street-Address:359 Avenida de las Rosas network:City:Encinitas network:State:Ca network:Postal-Code:92024 network:Country-Code:US network:Tech-Contact;I:NETWO1546-ARIN network:Admin-Contact;I:NETWO1546-ARIN network:Abuse-Contact;I:ABUSE2492-ARIN network:Created:20121108 network:Updated:20121108

NetRange: 198.20.64.0 - 198.20.127.255
CIDR: 198.20.64.0/18
OriginAS: AS32475
NetName: SINGLEHOP
NetHandle: NET-198-20-64-0-1
Parent: NET-198-0-0-0-0
NetType: Direct Allocation
RegDate: 2012-08-24
Updated: 2012-08-24
Ref: http://whois.arin.net/rest/net/NET-198-20-64-0-1 OrgName: SingleHop, Inc.
OrgId: SINGL-8
Address: 215 W. Ohio St.
Address: 5th Floor
City: Chicago
StateProv: IL
PostalCode: 60654
Country: US
RegDate: 2007-03-07
Updated: 2012-11-19

Comment: http://www.singlehop.com/
Ref: http://whois.arin.net/rest/org/SINGL-8
ReferralServer: rwhois://rwhois.singlehop.net:4321
OrgNOCHandle: NETWO1546-ARIN
OrgNOCName: Network Operations
OrgNOCPhone: +1-866-817-2811
OrgNOCEmail: netops@singlehop.com
OrgNOCRef: http://whois.arin.net/rest/poc/NETWO1546-ARIN
OrgTechHandle: NETWO1546-ARIN
OrgTechName: Network Operations
OrgTechPhone: +1-866-817-2811
OrgTechEmail: netops@singlehop.com
OrgTechRef: http://whois.arin.net/rest/poc/NETWO1546-ARIN
OrgAbuseHandle: ABUSE2492-ARIN
OrgAbuseName: Abuse Department
OrgAbusePhone: +1-866-817-2811
OrgAbuseEmail: abuse@singlehop.com
OrgAbuseRef: http://whois.arin.net/rest/poc/ABUSE2492-ARIN Found a referral to rwhois.singlehop.net:4321. network:Class-Name:network network:ID:ORG-SINGL-8.198-20-69-96/29 network:Auth-Area:198.20.64.0/18 network:IP-Network:198.20.69.96/29 network:Organization:Shodan LLC network:Street-Address:359 Avenida de las Rosas network:City:Encinitas network:State:Ca network:Postal-Code:92024 network:Country-Code:US network:Tech-Contact;I:NETWO1546-ARIN network:Admin-Contact;I:NETWO1546-ARIN network:Abuse-Contact;I:ABUSE2492-ARIN network:Created:20121108 network:Updated:20121108

NetRange: 198.20.64.0 - 198.20.127.255
CIDR: 198.20.64.0/18
OriginAS: AS32475
NetName: SINGLEHOP
NetHandle: NET-198-20-64-0-1
Parent: NET-198-0-0-0-0
NetType: Direct Allocation
RegDate: 2012-08-24
Updated: 2012-08-24

Ref: http://whois.arin.net/rest/net/NET-198-20-64-0-1 OrgName: SingleHop, Inc.
OrgId: SINGL-8
Address: 215 W. Ohio St.
Address: 5th Floor
City: Chicago
StateProv: IL
PostalCode: 60654
Country: US
RegDate: 2007-03-07
Updated: 2012-11-19
Comment: http://www.singlehop.com/
Ref: http://whois.arin.net/rest/org/SINGL-8
ReferralServer: rwhois://rwhois.singlehop.net:4321
OrgNOCHandle: NETWO1546-ARIN
OrgNOCName: Network Operations
OrgNOCPhone: +1-866-817-2811
OrgNOCEmail: netops@singlehop.com
OrgNOCRef: http://whois.arin.net/rest/poc/NETWO1546-ARIN
OrgAbuseHandle: ABUSE2492-ARIN
OrgAbuseName: Abuse Department
OrgAbusePhone: +1-866-817-2811
OrgAbuseEmail: abuse@singlehop.com
OrgAbuseRef: http://whois.arin.net/rest/poc/ABUSE2492-ARIN
OrgTechHandle: NETWO1546-ARIN
OrgTechName: Network Operations
OrgTechPhone: +1-866-817-2811
OrgTechEmail: netops@singlehop.com
OrgTechRef: http://whois.arin.net/rest/poc/NETWO1546-ARIN

NetRange: 198.20.96.0 - 198.20.111.255
CIDR: 198.20.96.0/20
OriginAS: AS32475
NetName: SINGLEHOP-BV
NetHandle: NET-198-20-96-0-1
Parent: NET-198-20-64-0-1
NetType: Reallocated
RegDate: 2013-05-16

Updated: 2013-05-16
Ref: http://whois.arin.net/rest/net/NET-198-20-96-0-1
OrgName: SingleHop BV
OrgId: SB-129
Address: Kabelweg 37
City: BA
StateProv: AMSTERDAM
PostalCode: 1014
Country: NL
RegDate: 2013-05-14
Updated: 2013-05-15
Comment: http://www.singlehop.com/
Ref: http://whois.arin.net/rest/org/SB-129
ReferralServer: rwhois://rwhois.singlehop.net:4321
OrgTechHandle: NETWO1546-ARIN
OrgTechName: Network Operations
OrgTechPhone: +1-866-817-2811
OrgTechEmail: netops@singlehop.com
OrgTechRef: http://whois.arin.net/rest/poc/NETWO1546-ARIN
OrgAbuseHandle: NETWO1546-ARIN
OrgAbuseName: Network Operations
OrgAbusePhone: +1-866-817-2811
OrgAbuseEmail: netops@singlehop.com
OrgAbuseRef: http://whois.arin.net/rest/poc/NETWO1546-ARIN Found a referral to rwhois.singlehop.net:4321.

inetnum: 82.221.105.0 - 82.221.105.255 netname: IS-ORANGEWEBSITE descr: OrangeWebsite.com country: IS org: ORG-OFO1-RIPE admin-c: OTD3-RIPE tech-c: OTD3-RIPE status: ASSIGNED PA mnt-by: MNT-ADVANIA organisation: ORG-OFO1-RIPE org-name: OrangeWebsite Finland Oy org-type: OTHER address: Hannikaisenkatu 14 abuse-c: OTD3-RIPE mnt-ref: MNT-ADVANIA mnt-by: MNT-ADVANIA

role: OrangeWebsite.com Technical Department address: OrangeWebsite.com address: Klapparstigur 7 address: 101 Reykjavik
address: Iceland
abuse-mailbox: abuse@orangewebsite.com admin-c: AK12182-RIPE
tech-c: AK12182-RIPE mnt-by: MNT-ADVANIA nic-hdl: OTD3-RIPE route: 82.221.96.0/19 descr: Thor DC origin: AS50613 mnt-by: THOR-MNT mnt-lower: THOR-MNT

NetRange: 71.6.135.0 - 71.6.135.255
CIDR: 71.6.135.0/24
OriginAS: AS10439
NetName: NET-24
NetHandle: NET-71-6-135-0-1
Parent: NET-71-6-128-0-1
NetType: Reassigned
RegDate: 2014-01-03
Updated: 2014-01-03
Ref: http://whois.arin.net/rest/net/NET-71-6-135-0-1 CustName: CariNet, Inc.
Address: 8929 Complex Drive
City: San Diego
StateProv: CA
PostalCode: 92123
Country: US
RegDate: 2014-01-03
Updated: 2014-01-03
Ref: http://whois.arin.net/rest/customer/C04837931
OrgAbuseHandle: ABUSE341-ARIN
OrgAbuseName: CariNet Abuse
OrgAbusePhone: +1-858-974-5080
OrgAbuseEmail: complaints@cari.net
OrgAbuseRef: http://whois.arin.net/rest/poc/ABUSE341-ARIN

OrgTechHandle: CARIN-ARIN
OrgTechName: CariNet Networking
OrgTechPhone: +1-858-974-5080
OrgTechEmail: network@cari.net
OrgTechRef: http://whois.arin.net/rest/poc/CARIN-ARIN **NetRange: 71.6.128.0 - 71.6.255.255**
CIDR: 71.6.128.0/17
OriginAS: AS10439
NetName: CARINET-5
NetHandle: NET-71-6-128-0-1
Parent: NET-71-0-0-0-0
NetType: Direct Allocation
RegDate: 2006-02-01
Updated: 2012-03-02
Ref: http://whois.arin.net/rest/net/NET-71-6-128-0-1 OrgName: CariNet, Inc.
OrgId: CARIN-6
Address: 8929 COMPLEX DR
City: SAN DIEGO
StateProv: CA
PostalCode: 92123
Country: US
RegDate: 2009-11-17
Updated: 2014-01-06
Ref: http://whois.arin.net/rest/org/CARIN-6
OrgAbuseHandle: ABUSE341-ARIN
OrgAbuseName: CariNet Abuse
OrgAbusePhone: +1-858-974-5080
OrgAbuseEmail: complaints@cari.net
OrgAbuseRef: http://whois.arin.net/rest/poc/ABUSE341-ARIN
OrgTechHandle: CARIN-ARIN
OrgTechName: CariNet Networking
OrgTechPhone: +1-858-974-5080
OrgTechEmail: network@cari.net
OrgTechRef: http://whois.arin.net/rest/poc/CARIN-ARIN query : 222.122.168.253

조 회 하 신 IPv4 주 소 는 한 국 인 터 넷 진 흥 원 으 로 부 터 아 래 의 관 리 대 행 자 에 게 할 당 되 었 으 며 , 할 당 정 보 는 다 음 과 같 습 니 다 .

[네트워크 할당 정 보]

IPv4 주 소 : 222.96.0.0 - 222.122.255.255 (/12+/13+/15+/16) 서 비 스 명 : KORNET 기 관 명 : 주 식 회 사 케 이 티 기 관 고 유 번 호 : ORG1600

주 소 : 경 기 도 성 남 시 분 당 구 불 정 로 90 (정 자 동) 한 국 통 신 e-Biz 본 부 기 획 팀

우 편 번 호 : 463-711 할 당 일 자 : 20031110 [IPv4 주 소 책 임 자 정 보]

이 름 : IP 주 소 관 리 자 전 화 번 호 : +82-2-500-6630

전자우 편 : kornet_ip@kt.com

[IPv4 주소 담당자 정 보]

이 름 : IP 주 소 담 당 자 전 화 번 호 : +82-2-500-6630

전자우 편 : kornet_ip@kt.com

[스팸 해킹 담당자 정 보]

이 름 : 스 팸 /해킹 담 당 전 화 번 호 : +82-2-100-0000

전자우 편 : abuse@kornet.net

조 회 하 신 IPv4 주 소 는 위 의 관 리 대 행 자 로 부 터 아 래 의 사 용 자 에 게 할 당 되 었 으 며 , 할 당 정 보 는 다 음 과 같 습 니 다 .

[네트워크 할당 정 보]

IPv4 주 소 : 222.122.168.0 - 222.122.168.255 (/24) 네 트 워 크 이 름 : KORNET-INFRA000001 기 관 명 : 주 식 회 사 케 이 티 기 관 고 유 번 호 : ORG1600 주 소 : 경 기 도 성 남 시 분 당 구 불 정 로 우 편 번 호 : 463-711 할 당 내 역 등 록 일 : 20100126

공개여 부 : N

[네트워크 담당자 정 보]

기관 명 : KORNET

주 소 : 경 기 도 성 남 시 분 당 구 불 정 로 우 편 번 호 : 463-711 전 자 우 편 : kornet_ip@kt.com

KRNIC is not an ISP but a National Internet Registry similar to APNIC.

[Network Information]

IPv4 Address : 222.96.0.0 - 222.122.255.255 (/12+/13+/15+/16)

Service Name : KORNET

Organization Name : Korea Telecom

Organization ID : ORG1600

Address : 206, Gyeonggi-do Bundang-gu, Seongnam-si Buljeong-ro

Zip Code : 463-711

Registration Date : 20031110

[Admin Contact Information]

Name : IP Administrator

Phone : +82-2-500-6630

E-Mail : kornet_ip@kt.com

[Tech Contact Information] Name
: IP Manager
Phone : +82-2-500-6630
E-Mail : kornet_ip@kt.com
[Network Abuse Contact Information]
Name : Network Abuse
Phone : +82-2-100-0000
E-Mail : abuse@kornet.net

More specific assignment information is as follows.
[Network Information]
IPv4 Address : 222.122.168.0 - 222.122.168.255 (/24)
Network Name : KORNET-INFRA000001
Organization Name : Korea Telecom
Organization ID : ORG1600
Address : Gyeonggi-do Bundang-gu, Seongnam-si Buljeong-ro
Zip Code : 463-711
Registration Date : 20100126
Publishes : N
[Technical Contact Information]
Organization Name : Korea Telecom
Address : Gyeonggi-do Bundang-gu, Seongnam-si Buljeong-ro
Zip Code : 463-711
E-Mail : kornet_ip@kt.com
- KISA/KRNIC Whois Service -

10. Appendix 3 – Glossary of Terms

Amplification Attack
An Amplification Attack is any attack where an attacker is able to use an amplification factor to multiply its power. Amplification attacks are “asymmetric”, meaning that a relatively small number or low level of resources is required by an attacker to cause a significantly greater number or higher level of target resources to malfunction or fail. Examples of amplification attacks include Smurf Attacks (ICMP amplification), Fraggle Attacks (UDP amplification), and DNS Amplification.

Botnet
A botnet is a collection of compromised computers often referred to as “zombies” infected with malware that allows an attacker to control them. Botnet owners or “herders” are able to control

the machines in their botnet by means of a covert channel such as IRC (Internet Relay Chat), issuing commands to perform malicious activities such as distributed denial-of-service (DDoS) attacks, the sending of spam mail, and information theft. As of 2006, the average size of any given botnet around the world was around 20,000 machines (as botnet owners attempted to scale down their networks to avoid detection), although some larger more advanced botnets such as BredoLab, Conficker, TDL-4, and Zeus have been estimated to contain millions of machines.

Computer Emergency Readiness Team Computer Emergency Response Team Computer Security Incident Response Team

Computer Emergency Response Team is a name given to expert groups that handle computer security incidents. Most groups append the abbreviation CERT or CSIRT to their designation where the latter stands for Computer Security Incident Response Team.

DDoS (Distributed Denial-of-Service) Attack

DDoS or Distributed Denial-of-Service attacks are a variant of Denial-of-Service DoS attacks where an attacker or a group of attackers employ multiple machines to carry out a DoS attack simultaneously, therefore increasing its effectiveness and strength. The “army” carrying out the attack is mostly often composed of innocent infected zombie computers manipulated as bots and being part of a botnet controlled by the attacker via a Command and Control Server. A botnet is powerful, well coordinated and could count millions of computers. It also insures the anonymity of the original attacker since the attack traffic originates from the bots’ IPs rather than the attacker’s. In some cases, mostly in ideological DDoS attacks, this “army” could also be composed of recruited hackers/hacktivits participating in large DDoS attack campaigns (Operation Blackout, Operation Payback etc.). DDoS attacks are hard to detect and block since the attack traffic is easily confused with legitimate traffic and difficult to trace.

There are many types of DDoS attacks targeting both the network and the application layers. They could be classified upon their impact on the targeted computing resources (saturating bandwidth, consuming server’s resources, exhausting an application) or upon the targeted resources as well:

- Attacks targeting Network Resources: UDP Floods, ICMP Floods, IGMP Floods.
- Attacks targeting Server Resources: the TCP/IP weaknesses –TCP SYN Floods, TCP RST attacks, TCP PSH+ACK attacks – but also Low and Slow attacks as Sockstress for example and SSL-based attacks, which detection is particularly challenging.
- Attacks targeting the Application Resources: HTTP Floods, DNS Floods and other Low and Slow attacks as Slow HTTP GET requests (Slowloris) and Slow HTTP POST requests (R-U-Dead-Yet).

A DDoS attack usually comprises more than three attack vectors thus increasing the attacker's chances to hit its target and escape basic DoS mitigation solutions.

DoS (Denial-of-Service) Attack

A Denial-of-Service DOS attack is an attack targeting the availability of web applications. Unlike other kinds of attacks, DoS attacks' primary goal is not to steal information but to slow or take down a web site. The attackers' motivations are diverse, ranging from simple fun, to financial gain and ideology (hacktivism). A DoS attack generates high or slow rate attack traffic exhausting computing resources of a target, therefore preventing legitimate users from accessing the website. DoS attacks affect enterprises from all sectors (e-gaming, Banking, Government etc.), all sizes (mid/big enterprises) and all locations. They target the network layer and up to the application layer, where attacks are more difficult to detect since they could easily get confused with legitimate traffic. There are several types of DoS attacks. A (non-distributed) DoS attack is when an attacker uses a single machine's resources to exhaust those of another machine, in order to prevent it from functioning normally. Large Web servers are usually robust enough to withstand a basic DoS attack from a single machine without suffering performance loss. A DoS attack famous variant is the DDoS or Distributed Denial of Service attack where the attack originates from multiple computers simultaneously, therefore causing the victim's resources exhaustion.

DNS Amplification Attack

DNS amplification attack is a sophisticated denial of service attack that takes advantage of DNS servers' behavior in order to amplify the attack. In order to launch a DNS amplification attack, the attacker performs two malicious tasks. First, the attacker spoofs the IP address of the DNS resolver and replaces it with the victim's IP address. This will cause all DNS replies from the DNS servers to be sent to the victim's servers. Second, the attacker finds an internet domain that is registered with many DNS records. During the attack, the attacker sends DNS queries that request the entire list of DNS records for that domain. This results in large replies from the DNS servers, usually so big that they need to be split over several packets. Using very few computers, the attacker sends a high rate of short DNS queries to the multiple DNS servers asking for the entire list of DNS records for the internet domain it chose earlier. The DNS servers look for the answer and provide it to the DNS resolver. However, because the attacker spoofed the IP address of the DNS resolver and set it to be the IP address of the victim, all the DNS replies from the servers are sent to the victim. The attacker achieves an amplification effect because for each short DNS query it sends, the DNS servers reply with a larger response, sometimes up to 100 times larger. Therefore, if the attacker generates 3 Mbps of DNS queries, it is actually amplified to 300Mbps of attack traffic on the victim. The victim is bombed with a high rate of large DNS replies where each reply is split over several packets. This requires the victim to reassemble the packet, which is a resource consuming task, and to attend to all of the

attack traffic. Soon enough, the victim's servers become so busy handling the attack traffic that they cannot service any other request from legitimate users and the attacker achieves a denial-of-service.

DNS Flood
A DNS Flood is an application-specific variant of a UDP flood. Since DNS servers use UDP traffic for name resolution, sending a massive number of DNS requests to a DNS server can consume its resources, resulting in a significantly slower response time for legitimate DNS requests.

Exploit
An exploit is an implementation of a vulnerability meant to allow one to actually compromise a target. Exploits can be difficult to develop, as most modern vulnerabilities are much more complex than older ones due to the existence of advanced security measures and complicated constructs in modern hardware and software. Exploits based on previously unknown vulnerabilities, known as "Zero-Day" exploits are highly sought after by hackers and developers and manufacturers alike. By using a zero-day exploit, a hacker can guarantee that his or her attempt to break into a particular computer or device that possesses such vulnerability that the exploit is based on will succeed. Zero-day exploits are traded on both the black market and through legitimate middlemen between legitimate parties from anywhere between $5,000 to $250,000 depending on the effects of the exploit and which system they target. Where a PDF exploit might only fetch a few thousand dollars, a severe exploit targeting the latest version of Apple's mobile operating system, iOS, might fetch $100,000 or more.

Flood
"Flood" is the generic term for a denial-of-service (DoS) attack in which the attacker attempts to constantly send traffic (often high volume of traffic) to a target server in an attempt to prevent legitimate users from accessing it by consuming its resources. Types of floods include (but are not limited to): HTTP floods, ICMP floods, SYN floods, and UDP floods.

Hacker
The term "hacker" has been used to mean various things in the world of computing: one who is able to subvert computer security (regardless of intentions), one who is a member of the open-source software community and subculture, and one who attempts to push the limits of computer software and hardware through home modifications. In the world of computer security, the term "hacker" is often portrayed as negative by mass media, despite the prevalence of "white hat hacking", or ethical hacking for the purpose of discovering potential security flaws and reporting them to the proper individuals or organizations so that the flaws may be patched. Black hat hacking, on the other hand, is the breaking into computer systems without

any intention of reporting discovered vulnerabilities, often with malicious or financial incentives. The hackers who fall somewhere on the spectrum between “white hats” and “black hats” are referred to as “grey hats”. Grey hat hackers will often perform mischievous activities with (usually non-malicious although at times questionably ethical) motivations. Additionally, grey hat hackers often choose not to report security flaws to the proper channels; rather, they report such information to the hacking community and the general public, enjoy watching the fallout as those with the security flaws scramble to fix them before they can be abused by black hat hackers. Within the open-source software and computer hobbyist communities, however, “hacker” usually has a less negative connotation. Within these cultures, hackers are often individuals regarded as intelligent and clever, and able to come up with creative solutions to existing problems that a software or hardware product developer may have not thought of or publicly released yet. These hackers often refer to “hackers” within the computer security world as “crackers” (as in safe-cracker) to emphasize their belief that calling such individuals “hackers” is incorrect. With the rise of hacker and “hacktivist" groups such as LulzSec (now LulzSec Reborn) and Anonymous, the mass media portrayal of the term “hacker” continues to lead the general public to believe “hacker” is synonymous with “cybercriminal”.

Hacktivist

“Hacktivist”, a portmanteau of “hack” and “activism”, was a term coined in 1996 by Omega, a member of the hacking coalition “Cult of the Dead Crow” (cDc). The term can be loosely defined as, “the ethically ambiguous use of computers and computer networks in order to affect the normal operation of other systems, motivated by a desire to protest or promote political ends.”Oftentimes these events take the form of web site defacements, denial-of-service attacks, information theft, web site parodies, virtual sit-ins, typo squatting, and virtual sabotage. The term has become popular among media outlets in recent years due to the rise of various politically motivated cyber attacks by groups such as Anonymous and LulzSec (now LulzSec Reborn) on governments and corporations across the world.

Honeypot

In computer security, a honeypot is a program or a server voluntarily made vulnerable in order to attract and lure hackers. The attackers who think they are targeting a real resource behave “normally”, using their attack techniques and tools against this lure site, which allow the defenders to observe and monitor their activities, analyze their attacking methods, learn and prepare the adequate defenses for the real resources. There are several kinds of honeypots, some used for research purposes only while others are actively acting as defenses for the real sites.

HTTP Flood

An HTTP flood is an attack method used by hackers to attack web servers and applications. It consists of seemingly legitimate session-based sets of HTTP GET or POST requests sent to a

target web server. These requests are specifically designed to consume a significant amount of the server's resources, and therefore can result in a denial-of-service condition (without necessarily requiring a high rate of network traffic). Such requests are often sent en masse by means of a botnet, increasing the attack's overall power. HTTP flood attacks may be one of the most advanced non-vulnerability threats facing web servers today. It is very hard for network security devices to distinguish between legitimate HTTP traffic and malicious HTTP traffic, and if not handled correctly, it could cause a high number of false-positive detections. Rate-based detection engines are also not successful at detecting HTTP flood attacks, as the traffic volume of HTTP floods may be under detection thresholds. Because of this, it is necessary to use several parameters detection including rate-based and rate-invariant.

I2P

I2P is an anonymous overlay network - a network within a network. It is intended to protect communication from dragnet surveillance and monitoring by third parties such as ISPs.

ICMP Flood

Internet Control Message Protocol (ICMP) is a connectionless protocol used for IP operations, diagnostics, and errors. An ICMP Flood - the sending of an abnormally large number of ICMP packets of any type (especially network latency testing "ping" packets) - can overwhelm a target server that attempts to process every incoming ICMP request, and this can result in a denial-of-service condition for the target server.

Internet pipe saturation

These attacks are volumetric floods and often involve flooding the target with an overwhelming bandwidth. Common attacks utilize UDP as it is easily spoofed and difficult to mitigate downstream. Out of state, SYN floods and malformed packets are also often seen. While many attacks aim at saturating inbound bandwidth, it's not uncommon for attackers to identify and pull large files from websites, ftp shares, etc. in order to saturate outbound bandwidth as well.

IP Address

An IP address is an identifier for a device connected to a network using TCP/IP - a protocol that routes network traffic based on the IP address of its destination. IP addresses can either be 32-bit IPv4 addresses consisting of four base-10 numbers separated by periods representing eight digit binary (base-2) numbers called "octets" (i.e. 0.0.0.0 to 255.255.255.255), or 128-bit IPv6 addresses consisting of eight hexadecimal (base-16) numbers separated by colons representing sixteen digit binary (base-2) numbers (i.e. 0000:0000:0000:0000:0000:0000:0000:0000 to FFFF:FFFF:FFFF:FFFF:FFFF:FFFF:FFFF:FFFF where consecutive groups of four zeroes are replaced by a double colon). When the Internet first became popular, IPv4, with its 32-bit

addresses, offered 232, or roughly 4.3 x 109 unique addresses. As the number of Internet-connected devices began to grow significantly, people worried that the IPv4 protocol would not contain enough addresses to meet the growing demand for new unique addresses this is why IPv4 will eventually be replaced by IPv6 on a large scale (IPv6 already officially launched in August 2012), which contains 2128 or roughly 3.4 x 1038 unique addresses. The Dynamic Host Configuration Protocol (DHCP), which runs on special devices (usually routers) allows for the assigning of IP addresses within a local area network (LAN). DHCP assigns IP addresses on a temporary "lease" basis; once a device's IP address lease expires, a DHCP server will assign it a new (potentially different) one. IP addresses automatically assigned by a DHCP server are therefore referred to as "dynamic IP addresses", as a device with a DHCP-assigned IP address may eventually receive an IP different from its original one.

DHCP servers will not assign devices just any IP address in the maximum range of IPv4 addresses (0.0.0.0 to 255.255.255.255), as certain IP addresses are reserved for special purposes. Such addresses include:

- 0.0.0.0 – Represents the "default" network, i.e. any connection
  255.255.255.255 – Represents the broadcast address, or place to route messages to be sent to every device within a network
- 127.0.0.1 – Represents "localhost" or the "loopback address", allowing a device to refer to itself, regardless of what network it is connected to
- 169.254.X.X – Represents a "self-assigned IP address", which a device will assign itself if it is unable to receive an IP address from a DHCP server

Users' DHCP-assigned IP addresses on a LAN are not the same as their "external" or Internet IP address. This address will be the same for all users connected to a DHCP server, which itself receives an IP address from the Internet Service Provider (ISP) it is connected to. As IP addresses can be used as unique identifiers for users' machines (and subsequently the users themselves), knowledge of a malicious user's external Internet IP address can allow law enforcement officials to block, locate, and eventually arrest him or her. As a result, the more advanced attack tools and hackers will employ anonymization techniques - such as the use of proxy servers, VPNs, or a routing network like Tor or I2P - that can make it seem like they are using a different IP address other than their own, located somewhere else in the world. An attack tool called Low Orbit Ion Cannon (LOIC) became infamous for not hiding its users' IP addresses; this resulted in the arrest of various LOIC users around the world for their participation in distributed denial-of-service (DDoS) attacks.

IP Spoofing

IP Spoofing is the act of creating an IP packet with a forged source IP address for the purpose of hiding the true source IP address, usually for the purpose of launching special types of distributed denial-of-service (DDoS attacks). By forging the source IP address of a packet; the

individual sending it can direct the target IP address' machine to send its reply packet somewhere other than the real IP address of the source machine. Those wishing to launch DDoS attacks without large botnets can therefore send packets with random spoofed source IP addresses in order to both conceal their own identity and make the attack harder to block (as it looks like it is originating from many sources).

IRC (Internet Relay Chat)

IRC (Internet Relay Chat) is a protocol for real-time text messaging between internet-connected computers created in 1988. It is mainly used for group discussion in chat rooms called "channels" although it supports private messages between two users, data transfer, and various server-side and client-side commands. As of April 2011, the top 100 IRC networks served over 500,000 users at a time on hundreds of thousands of channels. IRC is a popular method used by botnet owners to send commands to the individual computers in their botnet. This is done either on a specific channel, on a public IRC network, or on a separate IRC server. The IRC server containing the channel(s) that are used to control bots is referred to as a "command and control" or C2 server.

ISP (Internet Service Provider)

An Internet Service Provider (ISP) is a company that provides internet access for its customers. ISPs are required by law in many countries to provide a certain level of monitoring capabilities to aid government law enforcement and intelligence agencies, and are often asked by such officials to intervene during cyber attacks by cutting off internet service to the offending machines.

itsoknoproblembro

The 'itsoknoproblembro' tool was designed and implemented as a general purpose PHP script injected into a victim's machine allowing the attacker to upload and execute arbitrary Perl scripts on the target's machine. The 'itsoknoproblembro' script injects an encrypted payload, in order to bypass IPS and Malware gateways into the website main file index.php, allowing the attacker to upload new Perl scripts at any time. Initial server infection is usually done by using the well known Remote File Inclusion (RFI) technique. By uploading Perl scripts that run different DOS flood vectors, the server might act as a Bot in a DDOS Botnet army. Although originally designed for general purpose, some variants of this tool found in the wild were customized to act as a proprietary DDOS tool, implementing the flood vector logics inside without the need to upload additional scripts.

Malware

"Malware", short for "malicious software", is any program designed to help a hacker negatively affect the normal operation of a computer. Most forms of malware - including viruses, worms, Trojan horses, spyware, adware, and rootkits - are intended to allow hackers to gain

unauthorized access to a machine, without the knowledge of its owner, in order to perform criminal tasks including information theft and amassing botnets to perform distributed denial-of-service (DDoS) attacks. Computer users are often tricked into installing malware through social engineering techniques, or are unaware that a seemingly non-malware infected program they have installed was infected, containing additional code designed to stealthily perform malicious tasks.

MSSP

An MSSP (Managed Security Service Provider) is an organization which provides "Security as a Service" (Sec-aaS) and may include elaborate operations such as SOCs and NOCs, or something as simple as a cloud-based key management service. Generally speaking, an MSSP is considered an outsourced operation of what was an internal security device or process management function.

Network scan

Scanning is typically an automated process that is used to discover devices such as pc, server and peripherals that exist on a network. Results can include details of the discovered devices, including IP addresses, device names, operating systems, running applications/services, open shares, usernames and groups. Scanning is often related to pre -attack or reconnaissance activities. There are two types of scanning: Horizontal Scan in which the scanner scans for the same port on multiple IPs, and Vertical Scan in which the scanner scans multiple ports on one IP.

Packet

A packet is a formatted unit of data used to transmit information piece by piece across a packet switched network. Packets usually contain three sections: a header, the payload, and a trailer (also called “footer”). A packet header contains information such as the length of the packet (if the network does not use a predetermined fixed packet size), synchronization bits to help the packet match up with the network, a packet number to differentiate each packet from the others, the protocol (i.e. type of information contained within the packet), and the source and destination IP addresses. The “payload” of a packet contains the actual information being transmitted. The trailer or “footer” usually contains a series of bits signaling to the receiving device that it has reached the end of the packet, as well as some type of error-checking information to ensure that the packet was not modified in transit.

Port Scan

A port scanner is a technical leverage to identify available technical services (ports) on a server or application and may include logic to evaluate whether or not those services are vulnerable to common exploits or configuration issues. This is done by sending predetermined traffic to the

target and based on a response or lack of a response, the port scanner in use makes its own conclusions with regards to the functionality of the port being scanned.

Reflector/Reflective DoS attacks

Reflection Denial of Service attacks makes use of a potentially legitimate third party component to send the attack traffic to a victim, ultimately hiding the attackers' own identity. The attackers send packets to the reflector servers with a source IP address set to their victim's IP therefore indirectly overwhelming the victim with the response packets.

The reflector servers used for this purpose could be ordinary servers not obviously compromised, which makes this kind of attack particularly difficult to mitigate. A common example for this type of attack is Reflective DNS Response attack.

SIP Brute Force

SIP brute force is an adaptation of normal brute force attacks which attack SIP servers and attempt access to servers to make unauthorized outbound calls at another's expense.

SIP Client Call Flood

This is a flood technique focused on SIP application protocol which involves illegitimate call requests. The idea here is to flood the Session Boarder Control (SBC) and / or SIP / VOIP PBX with too many requests to handle and thus making the service unavailable.

SIP Malformed Attack

Application layer attack on the Session Initiation Protocol- SIP in use in VoIP services, targeted at causing denial of service to SIP servers. A SIP malformed attack consists of sending any kind of non-standard messages (malformed SIP Invite for ex) with an intentionally invalid input, therefore making the system unstable.

SIP Register flood

Application layer attack on the Session Initiation Protocol- SIP in use in VoIP services, targeted at causing denial of service to SIP servers. A SIP Register flood consists of sending a high volume of SIP REGISTER or INVITE packets to SIP servers (indifferently accepting endpoint requests as first step of an authentication process), therefore exhausting their bandwidth and resource

SIP Server Flood

Application layer attack on the Session Initiation Protocol- SIP (in use in VoIP services), targeted denial of service to SIP servers. Common attack vectors include SIP invite and register floods.

Scrubbing Center

A centralized data cleansing station where traffic is analyzed and malicious traffic (ddos, known vulnerabilities and exploits) is removed. Scrubbing centers are often used in large enterprises, such as ISP and Cloud providers, as they often prefer to off-ramp traffic to an out of path centralized data cleansing station. When under attack, the traffic is redirected (typically using DNS or BGP) to the scrubbing center where an attack mitigation system mitigates the attack traffic and passes clean traffic back to the network for delivery. The scrubbing center should be equipped to sustain high volumetric floods at the network and application layers, low and slow attacks, RFC Compliance checks, known vulnerabilities and zero day anomalies.

Social Engineering

Social Engineering (within the context of computer security) is the act of using psychological manipulation in order to gain access to sensitive information, computers, or computer networks. Many famous computer hackers (both white hat and black hat) have used social engineering in combination with computer-related methods in order to gain information; reformed cyber criminal Kevin Mitnick admitted that it's much easier to trick a person into giving up sensitive passwords or information than it is to obtain the same material solely through the use of computers. One example of a social engineering technique is "pretexting", or engaging the target subject in a specific manner with some form of background information that makes it more likely that he or she will divulge sensitive information. Pretexting often involves extensive research, as the social engineer will need to prepare answers to identifying questions that he or she may be asked during the process of obtaining information. This newly obtained information can often be used in further pretexting attempts, especially in scenarios where the social engineer wishes to gain even greater access to his or her target.

SQL Injection

SQL injection is an attack targeting web applications taking advantage of poor application coding where the inputs are not sanitized therefore exposing application vulnerabilities. SQL injection is the most famous type of injection attacks which also count LDAP or XML injections. The idea behind a sql injection is to modify an application SQL (database language) query in order to access or modify unauthorized data or run malicious programs. Most web applications indeed rely on databases where the application data is stored and being accessed by SQL queries and modifications of these queries could mean taking control of the application. An attacker would for example be able to access the application database

with administrator access, run remote commands on the server, drop or create objects in the database and more.

For instance, the sql query below, aiming at authenticating users, is common in web applications:

- myQuery= ”SELECT * FROM userstable WHERE username = 'userinput1' and password ='userinput2';”
- Replacing userinput1 by: ‘OR 1=1’); -- would result in granting the attacker access to the database without knowing the real username and password as the assertion “1=1” is always true and the rest of the query is being ignored by the comment character (- - in our case).
- Replacing the userinput1 by ' OR 1=1"); drop table users;-- would additionally drop the application users table.

SYN Flood

A SYN flood is a denial-of-service (DoS) attack that relies on abusing the standard way that a TCP connection is established. Typically, a client sends a SYN packet to an open port on a server asking for a TCP connection. The server then acknowledges the connection by sending SYN-ACK packet back to the client and populating the client’s information in its Transmission Control Block (TCB) table. The client then responds to the server with an ACK packet establishing the connection. This process is commonly known as a “three-way handshake”. A SYN flood overwhelms a target machine by sending thousands of connection requests to it using spoofed IP addresses. This causes the target machine to attempt to open a connection for each malicious request and subsequently wait for an ACK packet that never arrives. A server under a SYN flood attack will continue to wait for a SYN-ACK packet for each connection request, as the delay could be normal and related to network congestion. However, because a SYN-ACK packet never arrives for any of the connection requests; the massive number of half-open connections quickly fills up the server’s TCB table before it can time any connections out. This process continues for as long as the flood attack continues. Attackers will sometimes add legitimate information to their requests as well, such as sequence number or source port 0, as this increases a target server’s CPU usage on top of causing network congestion, and could more effectively cause a denial-of-service condition.

TCP Flood

TCP SYN floods are one of the oldest yet still very popular Denial of Service (DoS) attacks. The most common attack involves sending numerous SYN packets to the victim. The attack in many cases will spoof the SRC IP meaning that the reply (SYN+ACK packet) will not come back to it. The intention of this attack is overwhelm the session/connection tables of the

targeted server or one of the network entities on the way (typically the firewall). Servers need to open a state for each SYN packet that arrives and they store this state in tables that have limited size. As big as this table may be it is easy to send sufficient amount of SYN packets that will fill the table, and once this happens the server starts to drop a new request, including legitimate ones. Similar effects can happen on a firewall which also has to process and invest in each SYN packet. Unlike other TCP or application level attacks the attacker does not have to use a real IP; this is perhaps the biggest strength of the attack.

Tor

Tor is a network of virtual tunnels that allows people and groups to improve their privacy and security on the Internet. It also enables software developers to create new communication tools with built-in privacy features. Tor provides the foundation for a range of applications that allow organizations and individuals to share information over public networks without compromising their privacy.

UDP Flood

A UDP flood is a network flood and still one of the most common floods today. The attacker sends UDP packets, typically large ones, to single destination or to random ports. In most cases the attackers spoof the SRC IP which is easy to do since the UDP protocol is “connectionless” and does not have any type of handshake mechanism or session. The main intention of a UDP flood is to saturate the Internet pipe. Another impact of this attack is on the network and security elements on the way to the target server, and most typically the firewalls. Firewalls open a state for each UDP packet and will be overwhelmed by the UDP flood connections very fast.

Vulnerability

A vulnerability (in computer security) is any weakness in a computer system, network, software, or any device that allows one to circumvent security measures and perform actions not intended by its developers or manufacturers. Vulnerabilities range from minor to major, with the most significant allowing for privilege escalation (unauthorized administrator or root privileges) or code execution (the running of unsigned 3rd party software). New vulnerabilities can often be discovered by the process of “fuzzing”, or purposely trying to break something by attempting to give it unreasonable input values. Once some kind of crash occurs and can be analyzed, one can discover the existence of a vulnerability that may have not been previously documented. Previously unknown vulnerabilities, known as “Zero-Day” vulnerabilities are highly sought after by hackers and developers and manufacturers alike. By using an exploit based on zero-day vulnerability, a hacker can guarantee that his or her attempt to break into a particular computer or device that possesses such vulnerability will succeed. Zero-day exploits are traded on both the black market and through legitimate middlemen between parties for

anywhere from $5,000 to $250,000 depending on the effects of the exploit and which system they target. Where a PDF exploit might only fetch a few thousand dollars, a severe exploit targeting the latest version of Apple's mobile operating system, iOS, might fetch $100,000 or more.

Vulnerability Scanner

A vulnerability scanner is a type of computer program used to gather information on computers and systems on a network in order to find their weaknesses. By using a vulnerability scanner tool such as nmap or unicornscan, one can determine the number of clients attached to a particular network as well as various information regarding their addresses, ports, applications and services and potential exploits that can be used against them. Some scanners offer the ability to deploy payloads for the purpose of using a found exploit, and others simply display information on network topology. Types of vulnerability scanners include: port scanners, network enumerators, network vulnerability scanners, web application security scanners, database security scanners, ERP security scanners, and computer worms (which require scanning capabilities to spread within a network).

Wireshark

Wireshark is a free cross-platform open-source network traffic capture and analysis utility. It began as a project called "Ethereal" in the late 1990s, but its name was changed to "Wireshark" in 2006 due to trademark issues. The initial code was written by Gerald Combs, a computer science graduate of the University of Missouri-Kansas City, today the Wireshark website now lists over 600 contributors. The program is GUI-based and uses pcap to capture packets, although there is also a command-line version of Wireshark called TShark with the same functionality. Wireshark essentially "understands" the formats of various types of network packets, and is able to display the header and content information of captured packets in an easy-to-read format with various filtering options. Packets can be either captured directly with Wireshark, or captured with a separate utility and later viewed within Wireshark. As a powerful (and free) network analysis tool, Wireshark has become an industry standard utility for network traffic analysis.

Zeus

Zeus is a well-known Trojan Horse that steals financial information from a user's browser using man-in-the-browser key logging and form grabbing. Additionally, Zeus installs a backdoor on the machines it infects, so these machines can become part of a botnet used for distributed denial-of-service (DDoS) attacks and other malicious activities. Zeus was first detected in 2007 when it was used to attack the United States Department of Transportation, however, it did not become significantly widespread until March 2009. Attacks involving the use of Zeus occurred throughout 2010, including an October 2010 attack by a large organized

crime ring attempting to steal over $70M from individuals in the US with Zeus-infected computers. The FBI made over 90 arrests of suspected members in the US, and various others were arrested in the UK and Ukraine in connection with the attack. In May 2011 the source code of the version used then of Zeus (v2) was leaked, leading to various customized Zeus-based bots being created. Some of the more advanced custom bots based on the leaked code (such as Ice IX) attempted to fix many of the existing issues with Zeus rendering it even harder to detect. However, many security researchers have discovered that even the most well-known custom versions are extremely similar to the original leaked Zeus source code, and are therefore not significantly more innovative or dangerous.

Zero-Day/Zero-Minute Attack

A Zero-Day (or Zero-Minute) Attack is a type of attack that uses a previously unknown vulnerability. Because the attack is occurring before "Day 1" of the vulnerability being publicly known, it is said that the attack occurred on "Day 0" - hence the name. Zero-Day exploits are highly sought after - often bought and sold by private firms anywhere from $5,000 to $250,000, depending on what applications and operating systems they target - as they almost guarantee that an attacker is able to stealthily circumvent the security measures of his or her target. Private security firms aside, software vendors will also usually offer a monetary reward among other incentives to report zero-day vulnerabilities in their own software directly to them.

Zombie

A "zombie" or "bot" is a compromised computer under the control of an attacker who often controls many other compromised machines that together make up a botnet. The term "zombie" was coined to describe such an infected computer because the computer's owner is often not aware that his or her computer is being used for malicious activities.

References

http://security.radware.com/knowledge-center/DDoSPedia/

Your Global e-Security Partner

www.glesec.com
info@glesec.com

United States

Worldwide Corporate HQ
Address. 66 Witherspoon Street
Princeton, NJ 08542
Tel. 609.651.4246

Panama

Central America HQ
Address. Edificio Century Tower
El Dorado, 12th Floor
Panama City, Panama
Tel. +507.836.5355

Argentina

South America HQ
+54.11.5917.6120

Brazil

+55.11.3711.5699

Chile

+56.2938.1496

Peru

+51.1708.7197

Mexico

+52.55.5018.1164