Intrusion Detection – 1.1

Building an IDS Solution Using Snort

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1. PROJECT OVERVIEW

1.1. Overview.

This document provides a step-by-step guide to building an intrusion detection system using open-source software, the process involves:

♦ Installing RedHat Linux 7.1
♦ Compiling/Installing and configuration of MySql/Apache/ACID/Snort
♦ Setup of Snort rules
♦ Hardening of Machine

The document assumes a basic level understanding of linux and computer technologies.

1.2. What is Snort ?.

http://www.snort.org/about.html

Snort is an open source network intrusion detection system, capable of performing real-time traffic analysis and packet logging on IP networks.

It can perform protocol analysis and content searching/matching in order to detect a variety of attacks and probes, such as buffer overflows, stealth port scans, CGI attacks, SMB probes, OS fingerprinting attempts, and much more. Snort uses a flexible rules language to describe traffic that it should collect or pass, as well as a detection engine that utilizes a modular plug-in architecture.

Snort has a real-time alerting capability as well, incorporating alerting mechanisms for syslog, user specified files, a UNIX socket, or WinPopup messages to Windows clients using Samba's smbclient.

Plug-ins allow the detection and reporting subsystems to be extended. Available plug-ins include database or XML logging, small fragment detection, portscan detection, and HTTP URI normalization, IP defragmentation, TCP stream reassembly and statistical anomaly detection.

1.3. What is Carnot+ ?.

Carnot+ is a methodology used by Entropy Ltd for the delivery of professional services, the methodology is used throughout the organisation from the R&D team, Sales team, Logistics, Engineering, Service Desk and Marketing.

This document is a summary of some of the information available to and designed by the different groups as per the Carnot+ process.

The full Carnot+ process is outside the scope of this document.
2. IDS DESIGN

2.1. Solution Design.

The following diagram shows a simple example of where to place a snort sensor. We will be using the information in the below network diagram during the configuration of our snort sensor.

In this example internet bound traffic i.e. web and email travels from the internal lan through the firewall out through the internet router and out to the respective destinations, inbound traffic passes back in the same way.

Network Diagram

The key points are

♦ The snort sensor is placed in a key position to monitor all internet based traffic in and out of the organisation.

♦ The firewall adds an extra layer of security to the solution, by placing the snort sensor in a dmz connected to the firewall.
The snort sensor machine has 2 network cards.

♦ The first interface (eth0) of the snort box is linked to an interface off the firewall, the firewall is configured to only allow the Administrators pc connect to the snort sensor for https and ssh services, all other traffic to and from the snort machine is silently dropped by the firewall.

♦ The second interface (eth1) watches all of the traffic passing between the firewall and the internet router. The network card is configure with no ip address and in our example were using a hub, if your using a switch then a mirror/span port needs to be setup and the snort sensor plugged into it. (See the relevant switch manuals)

Read-Only Interface Cable

See the following link on instructions to create a Read-only ethernet cable, used to connect the hub/switch to the second nic of the snort sensor. [http://www.silicondefense.com/techsupport/ro-ethernet.htm](http://www.silicondefense.com/techsupport/ro-ethernet.htm)

2.2. Further Reading.

The full complexities of network intrusion detection design are outside the scope of this document but the following book and document are recommended.


♦ Deployment of IDS in complex network environments.
  [http://www.snort.org/docs/iss-placement.pdf](http://www.snort.org/docs/iss-placement.pdf)
3. PRE-REQUISITES

3.1. Overview.

Before you begin make sure you have all of the below hardware requirements.

3.2. Hardware Requirements.

For this build, the server must have at least the following minimum specification.

♦ Pentium III 500mhz
♦ 128 MB of RAM
♦ 4 Gig Hard Disk or greater
♦ 2 PCI-based Network Interface Cards

All hardware must also be on the redhat hardware compatibility list. http://hardware.redhat.com/hcl/

3.3. Software Requirements.

This document uses particular versions of software, newer versions are generally available but the following versions have been tested so that they will work together.

**Basic Software**

Operating system for console and sensors.

Windows SSH Client, if the administrative workstation is windows based then the following client software is necessary, as by default OpenSSH is enabled on Redhat 7.1


Installation of this product is outside the scope of this document.
Software used for Snort

Before starting, put the binaries on cdrom or make them available on an ftp server.

Database to store alerts.

apache_1.3.23 - http://www.apache.org
Web server that will run the console and reporting software.

openssl-0.9.6c - http://www.openssl.org
Library that performs encryption/decryption for mod_ssl.

mod_ssl-2.8.7-1.3.23 - http://www.modssl.org
Enables Apache to provide SSL-secured web pages.

Acid-0.9.6b21 - http://www.cert.org/kb/acid
Analysis Console Engine for Intrusion Detection, a PHP-based analysis engine to search and process the data generated by the Snort sensor.

php-4.1.2 – http://www.php.net
PHP is a web based general-purpose scripting language, used by ACID.

adodb172 - http://phplens.com/lens/dl
This is database abstraction library used by ACID.

gd-1.8.4 - http://www.boutell.com/gd
A graphics library for fast image creation.

phplot-4.4.6 - http://www.sourceforge.net/phplot/
This routine is a class for creating scientific and business charts.

snort-1.8.6 - http://www.snort.org/dl/
Intrusion Detection software for the sensors, the core of the system.

The latest snort rules.

Libpcap version 0.7.1 - http://www.tcpdump.org/
Library that handles the actual capturing of packets from the network interface.

bastille 1.3.0-1.0 - http://bastille-linux.sourceforge.net/
Security hardening script for the Redhat Linux Operating System.
4. BUILD REDHAT

4.1. Overview.

Let’s start.


The following screenshots are based on this document.

4.2. Installation of Redhat.

Unpack the server, install the network cards, plug everything in, turn on the machine (You may need to change a BIOS setting to allow boot of cdrom).
Insert Redhat CD-Rom1 and boot away.

The following screen appears.

Hit Enter

The following screen appears

Choose English, Click Next.
set the Layout to be “United Kingdom"
Click Next.

Set mouse to be “2 button (PS2)” -
(This is dependant on your mouse hardware)
Click Next

Click on Next
The following screen appears

Click on the item “Custom System”

The following screen appears

Click on “Manually partition with Disk Druid”

The following screen appears
Partitions - Overview

Depending on the previous use of the machine e.g. Windows NT etc.
You will need to delete all the existing partitions.
To delete, highlight a partition, click on the Delete button, Click Yes.

Now create the following partitions, we have a 14GB disk, so the
breakdown would be as follows.

/boot - 31MB
/   - 1027MB - root partition
/usr - 1027MB - snort/acid/apache/mysql binaries.
<swap> - 258MB - swap partition
/var - 11976MB - log and database storage.

(Our linux installation size will be around 500MB, using the above
partition strategy and after installation /boot = 3.5MB, / = 54MB,
/usr=362MB, /var=7.8MB. If you have a larger or smaller disk, then use
the above partition strategy as a guideline, the /var partition is created
last and enabled with the “Use remaining space” option, see below. )

Create Partitions

To create a standard “Linux Native” Partitions, click on the ADD button.

In the above example we are creating a /boot partition.

♦ Enter the mount point as /boot
♦ Enter the Size = 31MB
♦ Partition Type “Linux Native”

Click OK
To create a swap file, which is necessary and usually around twice the size of available physical ram, click on the ADD button. The following screen appears.

- Change the Partition Type to “Linux Swap”
- Enter the Size = 256MB (2*128MB)

Click OK

When all of the above partitions have been created click Next

The following screen appears.

Accept the defaults, Click Next.

The following screen appears.

Untick “Create boot disk” (This will be created at a later stage)

Accept the defaults.

Click Next
The following screen appears

The snort sensor has 2 network cards. (referenced as eth0 and eth1)

**Network card - eth0**

Untick “Configure using DHCP” on the Tab – eth0

Enter the following information as per the above network diagram.
(or use your own information)

<table>
<thead>
<tr>
<th>Heading</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>IP Address</td>
<td>192.168.1.1</td>
</tr>
<tr>
<td>Netmask</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>Network</td>
<td>192.168.1.0</td>
</tr>
<tr>
<td>Broadcast</td>
<td>192.168.1.255</td>
</tr>
<tr>
<td>Hostname</td>
<td>entropy-snort</td>
</tr>
<tr>
<td>Gateway</td>
<td>192.168.1.254</td>
</tr>
<tr>
<td>Primary DNS</td>
<td>N/A - (Don't have one in our example)</td>
</tr>
<tr>
<td>Secondary DNS</td>
<td>&quot;</td>
</tr>
<tr>
<td>Ternary</td>
<td>&quot;</td>
</tr>
</tbody>
</table>

Click on the Tab eth1
Highlight the second Tab – eth1

Untick “Configure using DHCP” on the Tab – eth1
Untick “Activate on boot”
Click Next

The following screen appears

Click on “No firewall”
Click Next

The following screen appears
Untick – English (USA)
Tick - English (Ireland).
Click Next

The following screen appears

Change the “View” to Europe
Setup as “Europe/Dublin”
Click Next

The following screen appears

Enter the root password and again to confirm.
Click Next
The following screen appears

Accept the defaults and Click Next

The following screen appears

Disable all of the Package groups except the following.

- Networked Workstation
- Network Management Workstation
- Development.
- Utilities

Click Next
The following screen appears

Click Next

The following screen appears

The partitions are created/formatted and the packages are installed, all errors are put into /tmp/install.log

When prompted put in CD-ROM2, click OK.

Installation continues.

The final screen appears
Click Exit
The Server ejects the cdrom and reboots

After the reboot, login as root using the ssh client.

Change the Start-up Scripts.

Run the following commands, to reduce the number of services loaded during boot up of the server.

♦ cd /etc
♦ mv /etc/rc2.d /etc/rc2.d_bak
♦ mv /etc/rc3.d /etc/rc3.d_bak
♦ mkdir /etc/rc2.d
♦ mkdir /etc/rc3.d
♦ Reboot the server

Hosts file

A hosts entry for the snort server needs to be put into the hosts file, run the following commands (see the reference for use of the vi editor in the next section)

♦ cd /etc
♦ vi hosts
♦ Add the following line, without quotes below the “127.0.0.1” text.
“192.168.1.1 entropy-snort entropy-snort.entropy.ie”
♦ Save and exit
5. Building/Compiling

5.1. Overview.

Now that Linux has been installed we are going to compile the binaries.

The files used need to be copied onto our new server, from an existing FTP server or from a CDROM.

5.2. Setup.

Login into the server and create a directory for the files, using the following command:

```bash
mkdir /usr/local/acid_setup_files
```

Copy all the files into this directory from a CDROM or from an FTP server.

5.3. Compiling/Installing – GdGraph.

To compile and install the gd-graph package run the following commands:

```bash
cd /usr/local/acid_setup_files
tar -zxfv gd*
cd gd*
mkdir /usr/local/include
make && make install
```
5.4. Build, Install, Configure MySQL.

To compile and install the MySQL package run the following commands.

- cd /usr/local/acid_setup_files
- tar -zxvf mysql-3.23.42.tar.gz
- cd mysql-3.23.42
- ./configure --prefix=/usr/local/mysql --localstatedir=/var/mysql
- make && make install

After compilation and installation, run the following

- scripts/mysql_install_db
- echo /usr/local/mysql/lib/mysql >> /etc/ld.so.conf && ldconfig
- groupadd mysql
- useradd -g mysql mysql
- chown -R root:mysql /usr/local/mysql
- chown -R mysql /usr/local/mysql/bin
- chown -R mysql /var/mysql
- scripts/mysql_install_db

Run the following commands, make a note of the MySQL root password used, in our example its entropy1, VERY important that the password is surrounded by single quotes.

- cd /usr/local/mysql
- bin/safe_mysqld --user=mysql &
- bin/mysqladmin -u root password 'entropy1'

Edit the file /etc/profile using vi and put the following text before the line in the /etc/profile file and run the source command.

- vi /etc/profile
  Navigate to above the following line.
  "export PATH USER LOGNAME MAIL HOSTNAME HISTSIZE INPUTRC"
- Add the following line
  PATH=$PATH:/usr/local/mysql/bin:/usr/local/apache/bin
- Save and exit vi
- Run the following command
  source /etc/profile
Configure MySQL

Run the following commands to setup the MySQL tables.

♦ mysqladmin -u root -p drop test
   (Enter the MySQL-root password configured in the last section i.e. entropy1 and then confirm with y to delete)
♦ mysql -p
   (Enter the MySQL-root password configured in the last section i.e. entropy1)
♦ \u mysql
♦ DELETE FROM user WHERE User="";
   (Must be 2 single quotes)
♦ DELETE FROM user WHERE Password="";
   (Must be 2 single quotes)
♦ GRANT ALL PRIVILEGES ON *.* TO dba@localhost IDENTIFIED BY 'entropy1_dba' ;
   (Make a note of the password used, in our example its entropy1_dba, VERY important that the password is surrounded by single quotes.)
♦ CREATE DATABASE snort;
♦ GRANT INSERT,SELECT,DELETE,UPDATE ON snort.* to snort@localhost IDENTIFIED BY 'entropy1_snort';
   (Make a note of the snort password used, in our example its entropy1_snort, VERY important that the password is surrounded by single quotes.)
♦ Type “exit” - no quotes

Username and password table

<table>
<thead>
<tr>
<th>Username</th>
<th>Password</th>
</tr>
</thead>
<tbody>
<tr>
<td>root (MySql root)</td>
<td>entropy1</td>
</tr>
<tr>
<td>dba</td>
<td>entropy1_dba</td>
</tr>
<tr>
<td>snort</td>
<td>entropy1_snort</td>
</tr>
</tbody>
</table>

Setup the snort databases.

The snort files need to be extracted and the snort database tables need to be created. The above dba password will be prompted for during the setup.

♦ cd /usr/local/acid_setup_files
♦ tar -zxvf snort-1.8.6.tar.gz
♦ mysql -u dba -p snort < snort-1.8.6/contrib/create_mysql
   (Using the dba password - entropy1_dba)
♦ zcat snort-1.8.6/contrib/snortdb-extra.gz | mysql -u dba -p snort
   (Using the dba password - entropy1_dba)
5.5. Build/Install OpenSSL.

To compile and install the OpenSSL package run the following commands.

♦ cd /usr/local/acid_setup_files
♦ tar -zxvf openssl-0.9.6c.tar.gz
♦ cd openssl-0.9.6c
♦ sh config \ no-idea \ no-threads \ -fPIC & make & make install

5.6. Setup Mod_SSL.

Extract Apache package

Before setup of the Mod_SSL libraries, the apache files need to be extracted.

♦ cd /usr/local/acid_setup_files
♦ tar -zxvf apache_1.3.23.tar.gz

Now setup mod_ssl

♦ cd /usr/local/acid_setup_files
♦ tar -zxvf mod_ssl-2.8.7-1.3.23.tar.gz
♦ cd mod_ssl-2.8.7-1.3.23
♦ ./configure --with-apache=../apache_1.3.23/ --with-ssl=../openssl-0.9.6c/ --prefix=/usr/local/apache --enable-shared=ssl --enable-module=ssl --enable-rule=SSL_SDBM --enable-rule=SSL_EXPERIMENTAL --enable-rule=SSL_VENDOR --enable-rule=EAPI

(If you’re going to use a later version of apache or openssl, change the directory as appropriate in the above section i.e. “./apache_1.3.23” or “./openssl-0.9.6c”) - When pasting the above bit make sure it’s formatted for one line and spaces between the options e.g. “--enable-rule”

5.7. Build, Install, Configure Apache.

♦ cd /usr/local/acid_setup_files
♦ cd apache_1.3.23
♦ make && make certificate && make install

Setup of an X509 Certificate

During the installation a self signing X509 certificate needs to be created as we are going to be using a https connection for ACID.

During the install the following options are setup

Step 0 - Signature Algorithm ((R)SA or (D)SA) [R]: Choose R

Step 1 - Generating RSA private key (1024 bit) [server.key]
Step 2 – Generating X509, fill in the following details or use your own.

<table>
<thead>
<tr>
<th>Heading</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Country Name</td>
<td>IE</td>
</tr>
<tr>
<td>State or Province Name</td>
<td>Dublin</td>
</tr>
<tr>
<td>Locality Name</td>
<td>Sandyford</td>
</tr>
<tr>
<td>Organization Name</td>
<td>Entropy Ltd</td>
</tr>
<tr>
<td>Organizational Unit Name</td>
<td>Carnot+</td>
</tr>
<tr>
<td>Common Name</td>
<td>entropy-snort</td>
</tr>
<tr>
<td>Email Address</td>
<td>bobthebuilder@ie</td>
</tr>
<tr>
<td>Certificate</td>
<td>365</td>
</tr>
</tbody>
</table>

Step 3 - Certificate Version (1 or 3) [3]: Choose 3

Step 4 – Encrypt the private key now? [Y/n]: Choose n

**Configure Apache - Defaults**

First remove the default directories

- cd /usr/local/apache
- mv htdocs htdocs_old
- mkdir htdocs

Change the http.conf files

- cd /usr/local/apache/conf
- vi httpd.conf

Configure the following settings

<table>
<thead>
<tr>
<th>Setting</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>MinSpareServers</td>
<td>1</td>
</tr>
<tr>
<td>MaxSpareServers</td>
<td>3</td>
</tr>
<tr>
<td>StartServers</td>
<td>2</td>
</tr>
<tr>
<td>MaxClients</td>
<td>5</td>
</tr>
<tr>
<td>Port</td>
<td>443</td>
</tr>
<tr>
<td>ServerSignature</td>
<td>off</td>
</tr>
</tbody>
</table>

- Save and Exit httpd.conf

**Configure Apache - Extras**

- cd /usr/local/apache/conf
- vi httpd.conf
- Navigate to the section.
  <IfDefine SSL>
  Listen 80,
  Listen 443
  </IfDefine>
- Put a # in front of “Listen 80”
- Save and exit

- cd /usr/local/acid_setup_files
- tar -zxvf php-4.1.2.tar.gz
- cd php-4.1.2
- vi /usr/local/apache/conf/httpd.conf
- Navigate to after the line “AddType application/x-tar .tgz”
- Add the following lines.
  AddType application/x-httpd-php .php
  AddType application/x-httpd-php-source .phps
- Save and exit

5.9. Setup ACID and Dependencies.

The following files need to be extracted and then copied into the apache directory

- cd /usr/local/acid_setup_files
- tar -zxvf acid*
- mv acid /usr/local/apache/htdocs/acid
- tar -zxvf adodb*
- mv adodb /usr/local/apache/htdocs/adodb
- tar -zxvf phplot*
- mv phplot-4.4.6 /usr/local/apache/htdocs/phplot

Create ACID tables

Run the following command to create the Acid database tables.

- mysql -u dba -p snort <
  /usr/local/apache/htdocs/acid/create_acid_tbls_mysql.sql
  (Using the dba password - entropy1_dba)
Configure ACID

♦ cd /usr/local/apache/htdocs/acid/
♦ vi /usr/local/apache/htdocs/acid/acid_conf.php
♦ Make the following changes.

<table>
<thead>
<tr>
<th>Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>$Dblib_path=&quot;/usr/local/apache/htdocs/adodb&quot;;</td>
</tr>
<tr>
<td>$alert_dbname: “snort”;</td>
</tr>
<tr>
<td>$alert_host: “localhost”;</td>
</tr>
<tr>
<td>$alert_port: “3306”;</td>
</tr>
<tr>
<td>$alert_user: “snort”;</td>
</tr>
</tbody>
</table>
| $alert_password: “entropy1_snort”;
(See the password table from the previous MySql section) |
| $ChartLib_path="/usr/local/apache/htdocs/phplot"; |

♦ Save and exit

5.10. Setup of file permissions.

Set the following permissions.

♦ chmod 0755 /usr/local/apache/htdocs/acid
♦ chmod 0644 /usr/local/apache/htdocs/acid/*
♦ chmod 0755 /usr/local/apache/htdocs/adodb
♦ chmod 0644 /usr/local/apache/htdocs/adodb/*
♦ chmod 0755 /usr/local/apache/htdocs/phplot
♦ chmod 0644 /usr/local/apache/htdocs/phplot/*

♦ chown -R root:wheel /usr/local/apache/htdocs/acid/*
♦ chown -R root:wheel /usr/local/apache/htdocs/adodb/*
♦ chown -R root:wheel /usr/local/apache/htdocs/phplot/*
6. SNORT


Compile libpcap

The libpcap libraries need to be compiled before installing snort.

♦ cd /usr/local/acid_setup_files
♦ tar -zxvf libpcap-0.7.1.tar.gz
♦ cd libpcap-0.7.1
♦ ./configure && make && make install

Build Snort 1.8.6

♦ cd /usr/local/acid_setup_files
♦ cd snort-1.8.6 (the files were extracted earlier)
♦ ./configure --with-mysql=/usr/local/mysql --with-openssl=/usr/local/ssl
   && make && make install
♦ snort -v (quick test)

6.2. Configure Snort.

Directories

We are going to create directories for the logs and snort rules.

♦ cd /usr/local/acid_setup_files
♦ mkdir /var/snort_log_storage
♦ mkdir /usr/local/snort
♦ mv /usr/local/bin/snort /usr/local/snort
♦ groupadd snort
♦ useradd -g snort snort
♦ passwd -l snort
♦ chmod 700 -R /usr/local/snort
♦ chown -R snort.snort /usr/local/snort
♦ chmod 700 -R /var/snort_log_storage
♦ chown -R snort.snort /var/snort_log_storage
Setup up rules

We are going to extract the snort rules to the newly created directory.

- cd /usr/local/acid_setup_files
- tar -zxvf snortrules.tar.gz
- mv rules /usr/local/snort
- chmod 700 -R /usr/local/snort/rules
- chown -R snort.snort /usr/local/snort/rules

Setup snort.conf

We are going to make changes to the snort configuration file (snort.conf)

- cd /usr/local/snort/rules
- vi /usr/local/snort/rules/snort.conf

Change following variables.

<table>
<thead>
<tr>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>var HOME_NET 17.1.1.0/24</td>
</tr>
<tr>
<td>(using the network diagram from the IDS design section)</td>
</tr>
<tr>
<td>preprocessor portscan: $HOME_NET 4 3 /var/snort_log_storage/portscan.log</td>
</tr>
<tr>
<td>(Change the logfile of the above portscan preprocessor)</td>
</tr>
<tr>
<td>output database: log, mysql, user=snort password=entropy1_snort dbname=snort host=localhost</td>
</tr>
</tbody>
</table>

- Save and Exit

Quick Test

As a quick test, run the following commands...

- ifconfig eth1 up
  (Bring up the second interface)
- /usr/local/mysql/bin/safe_mysqld --user=mysql &
  (Start-up MySql)
- /usr/local/apache/bin/apachectl startssl
  (Start-up Apache)
- /usr/local/snort/snort -i eth1 -c /usr/local/snort/rules/snort.conf -u snort -g snort -b -I /var/snort_log_storage &
  (Start-up Snort)
6.3. Acid Usage.

After startup, open your browser and enter the following URL - https://192.168.1.1/ The following screen appears

Click on the ACID directory.

The following main menu screen appears

See the ACID homepage for usage instructions.
http://www.cert.org/kb/acid/
7. **FINISH UP**

7.1. **Boot-up configuration scripts.**

You will want to make some entries in the rc.local file to start up MySQL, Apache and Snort on boot-up.

### Start-up of MySQL

- **vi /etc/rc.local**
- Navigate to the bottom of the rc.local and enter the following text.
  
  ```
  echo "Starting up MySql."
  /usr/local/mysql/bin/safe_mysqld --user=mysql &
  echo "Starting up Apache."
  /usr/local/apache/bin/apachectl startssl
  echo "Starting up Snort."
  /usr/sbin/ifconfig eth1 up
  /usr/local/snort/snort -i eth1 -c /usr/local/snort/rules/snort.conf -u snort
  -g snort -b -l /var/snort_log_storage &
  ```
- **Save and Exit vi**
- **Reboot the server**
8. HARDENING, PATCHING AND SECURITY

8.1. Overview.

In this document we provide security for our snort machine by the following methods.

♦ Our network design, the firewall provides access control to and from the snort box over eth0 and the sniffing interface (eth1) does’nt have an ip address to route to it from the internet.

♦ Shutdown of non-essential services and setting up of the appropriate permissions/security for the newly installed software.

♦ Review of security advisors from Redhat for our installed packages.

♦ Running of the Bastille script.

The following links provide good references to building secure linux servers.

http://www.openenna.com/
Securing and Optimising Redhat linux servers

http://www.sans.org
Securing Linux Step-by-Step Guide (Generic linux hardening document)

http://www.hp.com/security/products/linux/
HP Secure OS Software for Linux (OS based on Redhat Linux)

http://www.linuxfromscratch.org
Building your own linux distribution from scratch.

8.2. Security Patches.

Check the following location for critical security patches that may need to be applied.

The following commands are used for package management.

- `rpm -qa` (Lists all of the currently installed packages)
- `rpm -qia` (Lists all the installed packages with a package description.)
- `rpm -e packagexyz` (Removes packagexyz)
- `rpm -i packagexyz` (Installs packagexyz)

There are 2 methods to updating the patches.

- Generate a list of installed packages using the above commands, cross-reference the installed packages with the Redhat security advisories, the advisors provide installation instructions and explanations of the issue. Install the relevant patches
- Redhat also provide the r2hnetwork service see the following link
  [https://rhn.redhat.com/help/basic/intro.html](https://rhn.redhat.com/help/basic/intro.html)

For a full list of Security Alerts, Bug Fix Alerts, and Enhancement Alerts see the following link.

8.3. Bastille.

Overview.

Bastille is a hardening script for Redhat and Mandrake distributions of linux.

The following packages need to be copied in "/usr/local/acid_setup_files" before installing Bastille.

- Bastille-1.3.0-1.0.i386.rpm
- Bastille-Curses-module-1.3.0-1.0.i386.rpm
- perl-Curses-1.05-10.i386.rpm

Install.

- cd /usr/local/acid_setup_files
- `rpm -ivh --nodeps perl-Curses-1.05-10.i386.rpm` (Install the perl Curses library)
- `rpm -ivh --nodeps Bastille-1.3.0-1.0.i386.rpm Bastille-Curses-module-1.3.0-1.0.i386.rpm` (Install the Bastille scripts)
- Interactive
  (Startup command, use the below values)
- Enter “accept” to accept the conditions
- Enter yes/no according the below “configure” section
- Make slight configuration changes (Post-Install Section)
- Reboot the server for full effect.
  (Don’t reboot until you have made the Post-Install changes)
Configure.

The following settings are a guide when running Bastille, you can make your own changes depending on your internal security policy.

<table>
<thead>
<tr>
<th>Bastille Question</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you like to set more restrictive permissions on the administration utilities?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to disable SUID status for mount/umount?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to disable SUID status for ping?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to disable SUID status for at?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to disable SUID status for the r-tools?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to disable SUID status for usernetctl?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to disable SUID status for traceroute?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to prohibit the clear-text r-protocols</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to enforce password aging?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to restrict the use of cron to administrative accounts?</td>
<td>Yes</td>
</tr>
<tr>
<td>Should we disallow root to login on tty's 1-6?</td>
<td>No</td>
</tr>
<tr>
<td>Would you like to password-protect the LILO prompt?</td>
<td>No</td>
</tr>
<tr>
<td>Would you like to reduce the LILO delay time to zero?</td>
<td>No</td>
</tr>
<tr>
<td>Do you ever boot Linux from the hard drive?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to write the LILO changes to a boot floppy?</td>
<td>No</td>
</tr>
<tr>
<td>Would you like to disable CTRL-ALT-DELETE rebooting?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to password protect single-user mode?</td>
<td>No</td>
</tr>
<tr>
<td>Would you like to set a default-deny on TCP Wrappers and xinetd?</td>
<td>Yes</td>
</tr>
<tr>
<td>Bastille Question</td>
<td>Values</td>
</tr>
<tr>
<td>---------------------------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Should Bastille ensure the telnet service does not run on this system?</td>
<td>Yes</td>
</tr>
<tr>
<td>Should Bastille ensure the FTP service does not run on this system?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to display &quot;Authorized Use&quot; messages at log-in time?</td>
<td>Yes</td>
</tr>
<tr>
<td>Please type in the name of the company, person, or other organization who owns or</td>
<td>Entropy Ltd</td>
</tr>
<tr>
<td>is responsible for this machine.</td>
<td></td>
</tr>
<tr>
<td>Would you like to disable the gcc compiler?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to put limits on system resource usage?</td>
<td>No</td>
</tr>
<tr>
<td>Should we restrict console access to a small group of user accounts?</td>
<td>Yes</td>
</tr>
<tr>
<td>Which accounts should be able to login at console?</td>
<td>root</td>
</tr>
<tr>
<td>Would you like to add additional logging?</td>
<td>Yes</td>
</tr>
<tr>
<td>Do you have a remote logging host?</td>
<td>No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Bastille Question</th>
<th>Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would you like to disable apmd?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to disable GPM?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to deactivate the routing daemons?</td>
<td>Yes</td>
</tr>
<tr>
<td>Do you want to stop sendmail from running in daemon mode?</td>
<td>Yes</td>
</tr>
<tr>
<td>Would you like to run sendmail via cron to process the queue?</td>
<td>Yes</td>
</tr>
</tbody>
</table>
**Bastille Question** | **Values**
--- | ---
Would you like to disable the VRFY and EXPN sendmail commands? | Yes
Would you like to disable printing? | Yes
Would you like to install TMPDIR/TMP scripts? | Yes
Would you like to run the packet filtering script? | No

**Post-Install changes.**

When running the Bastille script, if you chose the option to “Enable a default deny on TCP-wrapers” this will block ssh access after a reboot. To change this run through the following.

- cd /etc
- vi hosts.allow
- Navigate to above the following line “# Bastille: default deny”
- Insert the below text no quotes, above the “# Bastille ....” line.
  ```shell
  sshd: ALL
  ```
- Save and exit.

When running the Bastille script, if you chose the option to add an “Unauthorised Notice” then run through the following.

- cd /etc
- cp /etc/motd /etc/motd_bak
- cp -f /etc/issue /etc/motd
- vi /etc/rc.local
- Navigate to the bottom of the file.
- Insert the below text no quotes at the bottom of the rc.local file
  ```shell
  cp -f /etc/motd /etc/issue
  ```
- Save and Exit.
- Reboot the server
9. APPENDIX A

9.1. Further References.

Along with the URL references throughout this document the following
document was used.

Installation instructions for ACID
http://www.whitehats.ca/main/members/Chris/chris_acid/chris_acid.html

9.2. Entropy Ltd.

Entropy is a wholly owned Irish company that was set up in June 1993.
The company focus is to provide complete Internet Connectivity and
Security Solutions including TCP/IP network design and implementation,
email integration and e-mail virus scanning, firewall solutions, encryption
and digital signature facilities. http://www.entropy.ie

9.3. Disclaimer.

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9.4. **New Versions and Changelog.**

The current official version can always be found at [http://www.entropy.ie](http://www.entropy.ie)

**Changelog.**

Version 1.0 - This is the initial release of this document.

Version 1.1 - Using snort-1.8.6 and minor fixes.

**Todo List for ver 1.2**

Build with RedHat Linux 7.2, Apache 2.0.x with authentication, later versions of MySQL, PHP and ACID. Setup of SnortSnarf to process portscan.log file and SnortCenter to manage snort rules.

9.5. **Feedback.**

Any and all comments on this document are most welcomed. These can be sent to [snort@entropy.ie](mailto:snort@entropy.ie).