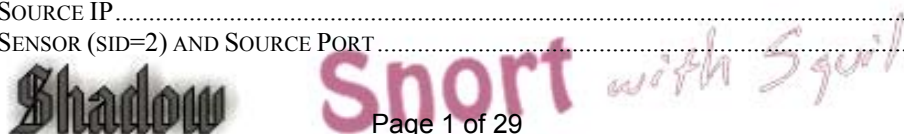


# Build Securely Snort with Sguil or Shadow Sensor Step-by-Step Powered by Slackware Linux

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Version 5.4 - 16 April 2006

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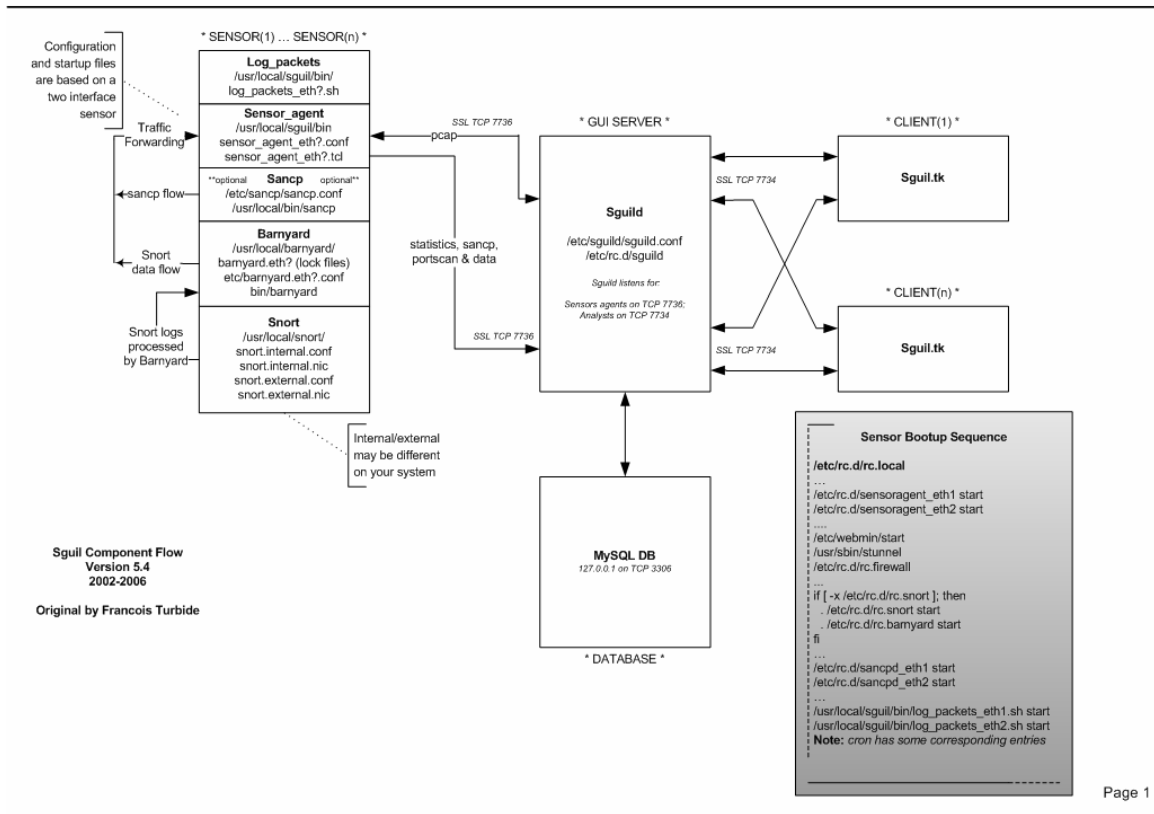
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February 19, 2006



## Introduction

This configuration process is used to deploy Snort with Sguil or Shadow sensors powered by the Slackware Linux (GNU) operating system. This setup was developed for sensors using IDE or SCSI drives. The full installation using this setup is ~225 MB in size and provides no remote services except through Secure Shell and Webmin for remote management of the sensor and the server. The Snort sensor logs are processed via **Barnyard** backend processing.

This process doesn't address how to setup a Shadow Analysis station. Additional information on the installation and configuration of a Shadow Analysis station is available at: <http://www.nswc.navy.mil/ISSEC/CID/>

This installation contains three separate and ready to use Sguil packages that contain all the necessary files to install Sguil as a sensor only, database only, or all-in-one systems. Sguil contains some very useful analysis functions such as the Security Analyst Network Connection Profiler (sancp) which collects statistical network traffic information, has a script to log all the packets, uses tcpflow and p0f to get TCP session transcripts, and can call Ethereal for in-depth packet analysis.

There are three packages on the CD: in the sguil directory you have a package to run all in one (database server and client), the sguildb for a central database installation only, and the sensguil only contains the sensor software to report to a central database. There is a sguil.pdf document that explains how to setup Sguil and the Sguil client on a Windows workstation. Additional information including console snapshots can be viewed at: <http://sguil.sourceforge.net>.

This installation has a web management tool called Webmin which is used to securely manage the MySQL database and Snort sensor via a SSL enabled web browser. Additional information about Webmin is available at: <http://www.webmin.com/>. In addition, a Snort plugin by MSB Networks (<http://msbnetworks.net/snort/>) has been adapted and included in Webmin to fully manage the Snort sensor (config file, plugins, oinkmaster, ruleset, etc.) to ease remote management of the sensor. See the Webmin section to correctly configure this package.

For those who would prefer using ACID instead of Sguil as their management console, the rel\_note section contains the instructions to build a complete Linux Apache/ACID/MySQL database on a separate server to process the events from several sensors. Mark Rupright also supplied a Windows equivalent for those who prefer using a Windows console.

This setup includes both Shadow and Snort IDS sensor as well as Network Grep (Ngrep) as an additional tool to be combined with Shadow or used in standalone mode for those who want additional analysis flexibility with this multipurpose platform. This can be combined with Shadow or used in standalone mode for those who want additional

analysis flexibility. **This package is built for a sensor that contains 2 NIC cards** (eth0 = control and eth1 = Shadow, Snort or Ngrep).

**Important:** If you decide to install Sguil (sensor, database or both), *Shadow will be automatically disabled* and will not be collecting anything because Sguil will then do the collection.

In order to make Snort signature updates more flexible, I have included the oinkmaster script written by Andreas Östling available at <http://oinkmaster.sourceforge.net/>.

The Snort sensor includes the Bleeding Edge Malware rules also updated daily via Oinkmaster. The rules are available at: <http://www.bleedingsnort.com/>.

The Shadow/Snort ISO image powered by the Slackware Linux OS can be downloaded at: <http://www.whitehats.ca/downloads/ids/shadow-slack/shadow.iso>.

The MD5 signature for the ISO image is available at: <http://www.whitehats.ca/downloads/ids/shadow-slack/shadow.md5>.

**Important:** Before you start, make sure you are disconnected from the network until the sensor has been securely configured.

## All-in-one Database/Sensor Summary Installation

- Boot from install CD with correct kernel
- Partition the drive(s) as per example
- Run setup and follow Install the Software
- After the installation completed, at the Slackware Linux Setup screen, select <Cancel>
- cd /cdrom/sguil
- Run **pkgtool**
- Select Current and install the package
- Remove CD (**eject**)
- Type **reboot** to restart system
- Review sguil.pdf documents for Sguil server/client installation
- Login system
- Change MySQL root password (default blank)
  - `mysqladmin -u root password 'your-new-password-for-sql_user-root'`
- Change Webmin admin password
- `/usr/local/webmin/changepass.pl /etc/webmin admin newpassword`
- Add a Sguil user for remote console access
  - `/etc/sguild/sguild -adduser guy [Enter]`
- Webmin access <https://systemIP:10000> (default is user: admin, password: admin)
- Configure TCP Wrappers for SSH access using Webmin (Servers, TCP Wrappers)
- Configure the sensor through Webmin (Servers, Sguil Sensor Controls, Barnyard)

**Shadow**

**Snort** with Sguil

- eth1 config) to change **shadow** to real sensor name and remove # output sgul.
- In Sguil Sensor Controls, *Restart all Sensor Services*
- See Client Configuration to access the database with a Windows workstation
- See Shadow Hourly Web Reports to configure Shadow like reports

## Database Summary Installation

- Boot from install CD with correct kernel
- Partition the drive(s) as per example
- Run setup and follow Install the Software
- After the installation completed, at the Slackware Linux Setup screen, select <Cancel>
- cd /cdrom/sguildb
- Run **pkgtool**
- Select Current and install the package
- Remove CD (**eject**)
- Type **reboot** to restart database server
- Review sgul.pdf documents for Sguil server/client installation
- Login system
- Change MySQL root password (default blank)
  - *mysqladmin -u root password 'your-new-password-for-sql\_user-root'*
- Change Webmin admin password
- */usr/local/webmin/changepass.pl /etc/webmin admin newpassword*
- Add a Sguil user for remote console access
  - */etc/sguild/sguild -adduser guy [Enter]*
- Webmin access <https://systemIP:10000> (default is user: admin, password: admin)
- Configure TCP Wrappers for SSH access using Webmin (Servers, TCP Wrappers)
- See Client Configuration to access the database with a Windows workstation

## Sensor Summary Installation

- Boot from install CD with correct kernel
- Partition the drive(s) as per example
- Run setup and follow Install the Software
- After the installation completed, at the Slackware Linux Setup screen, select <Cancel>
- cd /cdrom/sensguil
- Run **pkgtool**
- Select Current and install the package
- Remove CD (**eject**)
- Type **reboot** to restart sensor
- Review sgul.pdf documents for Sguil server/client installation
- Login system
- Change Webmin admin password
- */usr/local/webmin/changepass.pl /etc/webmin admin newpassword*

**Shadow**

**Snort** with Sguil

- Webmin access <https://systemIP:10000> (default is user: admin, password: admin)
- Configure TCP Wrappers for SSH access using Webmin (Servers, TCP Wrappers)
- Configure the sensor through Webmin (Servers, Sguil Sensor Controls, Barnyard eth1 config) to change **shadow** to real sensor name and remove # output sguil.
- Configure sensor to log data into MySQL as per “Configure SSL Between a Sensor and a Sguil Server section” (Servers, Sguil Sensor Controls, Sensor Agent eth1 config file) and change **127.0.0.1** to correct database server IP.
- In Sguil Sensor Controls, *Restart all Sensor Services* and *Restart sensoragent eth1*
- See Shadow Hourly Web Reports to configure Shadow like reports

## Client Configuration

Download the Windows Sguil client at:

[http://sourceforge.net/project/showfiles.php?group\\_id=71220](http://sourceforge.net/project/showfiles.php?group_id=71220)

Unpack in C:\sguil-0.6.1

Download Windows Active TCL at: <http://www.activestate.com/Products/ActiveTcl/>

Install at c:\tcl

Download Windows TLS libraries at: <http://tls.sourceforge.net>

Unpack in C:\tcl\lib

Download Ethereal for Windows at: <http://www.ethereal.com>

Install at C:\Ethereal

If you prefer Firefox instead of Explorer, download at: <http://www.mozilla.org/>

Install at C:\Firefox

## Sguil sguil.conf update

Edit c:\sguil-0.6.1\client\sguil.conf → Configure according to your Windows settings

```
# Change SERVERHOST to the correct IP or servername
```

```
set SERVERHOST 192.168.30.4
```

```
# Set up OpenSSL here (read ./doc/OPENSSL.README)
```

```
# 0=off 1=on
```

```
set OPENSSL 1
```

```
# win32 example
```

```
set ETHEREAL_PATH "c:/ethereal/ethereal.exe"
```

```
# win32 example (IE)
```

```
set BROWSER_PATH c:/progra~1/intern~1/iexplore.exe or
```

```
set BROWSER_PATH "c:/firefox/firefox.exe"
```

```
# Mailserver to use for emailing alerts
```

```
set MAILSERVER mail.example.com
```

```
# Default From: address for emailing
```

```
set EMAIL_FROM foo@example.com
```

**Shadow**

**Snort** with Sguil

Note: The TLS libraries are used to encrypt the session between the Windows client and the database server.

Create the C:\TMP directory to store Ethereal files if it doesn't already exist

## Client Access to Database

The client can access the database at this point by executing the sguil.tk. However, sguil.tk must be associated with the "wish application" before it will start.

c:\sguil-0.6.1\client\sguil.tk

## Partitioning the drive (example):

Drive partitioning can be done in multiple ways. This is an example that can be used if you have two drives and you are installing both the database and server on the same system:

### Database and Sensor

Drive One

/	Minimum of 750 MB	
swap	Minimum of 512 MB	
/var	Minimum of 25 MB	
/usr/local	Remainder of drive	(Contains MySQL DB and Snort)

Drive Two

/LOG	Whole drive	(Contains the tcpdump Sguil logs)
------	-------------	-----------------------------------

- Boot on the system using the Slackware CD-ROM.

To partition the drive, login as root and run **fdisk /dev/hda** (IDE drive), **fdisk /dev/sda** (SCSI drive) or **fdisk /dev/cciss/c0d0** (Raid drive). If this isn't a new drive, delete the old partitions before starting.

- hda1: / = 750 MB (Select new, select primary, size is 750, beginning, bootable)
- hda2: SWAP = 512 MB or same amount as the RAM (Select Pri/Log Free Space, new, primary, size is 512, beginning)
- Change hda2 to swap by selecting *type 82*
- hda3 (Select Pri/Log Free Space, new, primary, remainder of disk if you are going to only setup a Shadow sensor. *Otherwise, reserve at a minimum 500 MB for Snort for the hda4 partition*)
- hda4 (Select Pri/Log Free Space, new, primary, remainder of disk for Snort)
- Select Write to save the new settings to disk
- Select *Quit* to exit

**Shadow** **Snort** with Sguil

### Note on MySQL Drive size estimate:

Recommend no more than about 250GB for the MySQL data. To keep ~500,000,000 rows of SANCP data and ~2,500,000 alerts, a MySQL database will need ~180GB of disk space.

### Install the Software

Now that you have partitioned the drive, and saved your setting, you are ready to setup the Operating System.

- Run setup
  - Select addswap
  - Continue with installation: yes
  - Select Linux installation partition
    - /dev/hda1 (format, reiserfs - default)
    - /dev/hda3 (format, reiserfs - default)
  - Select mount point for /dev/hda3: /LOG → **Needed if using Shadow or Sguil**
  - /dev/hda4 (format, reiserfs - default) → **Optional if using Snort**
  - Select mount point for dev/hda4: /usr/local → **Needed if using Snort/MySQL**
    - Select add none and continue with setup
  - Select *continue* to go to the SOURCE section
  - Select *I* to install from a Slackware CD-ROM
  - Select *auto* to scan automatically for the CD-ROM
  - Make sure the CD is in the CD-ROM drive and select OK
  - Select *Yes* on continue
- Install Shadow/Snort installation CD which only shows 5 packages:

A, AP, D, N, TCL

- Select *OK* to continue and go to the *INSTALL* section
- Select install everything (full)
- Install a Linux kernel from the CD-Rom
- Select default kernel
- Select *bare.i* if using IDE or *scsi*. or other SCSI depending of your drive or *raid.s* for RAID drive.
- Make a boot disk for recovery (LILO)
- After the boot disk, choose continue with the configuration
- Skip modem configuration (*no modem*)
- Install LILO and select expert
  - Select Begin, at the blank prompt press enter, select *standard*, install to *MBR* confirm location to install lilo (select default @/dev/hda, /dev/sda or /dev/cciss/c0d0) and none
  - Add Linux and choose the root partition (i.e. /dev/hda1, /dev/sda1 or /dev/cciss/c0d0p1)

**Shadow**

**Snort** with Sguil



- Use *Linux* as a partition name
- Install LILO
- Configure the network with your settings
- Probe the network card
- When the network card has been probed, it will ask if the settings are correct
- Setup the hardware clock
- Setup the root password
- After the installation completed, at the Slackware Linux Setup screen, select <Cancel>
- cd /cdrom/sguil or sguilib or sensguil (depending of type of installation)
- Run **pkgtool**
- Select Current and install the package
- Remove CD (**eject**)
- Reboot (reboot at the prompt)
- Manually eject the CD-ROM
- Log back into the sensor as root
- Delete residual mail *rm /var/spool/mail/root*

## **TCP Wrapper - SSH**

**Configure SSH TCP Wrappers via Webmin or in the following way:**

- vi /etc/hosts.allow (Webmin, Servers, TCP Wrappers)
- Add in the TCP Wrappers file which host(s) are allowed to connect to the sensor

```
sshd: 192.168.3. \
      192.168.2.6 \
      .site.ca
```
- The /etc/hosts.deny has been configured to deny ALL (ALL: ALL) by default

## **IPTables Firewall**

**Configure iptables firewall (rc.firewall)**

Note: You need a firewall (iptables) to allow the sensor to be as invisible as possible. You can use the firewall supplied with this installation or create your own.

- O- Configure the firewall located in /etc/rc.d directory or create your own
- O- Edit the firewall script and change to variable according to your site
- O- *chmod 755 /etc/rc.d/rc.firewall* to enable the firewall
- O- To start the firewall at this time execute: */etc/rc.d/rc.firewall* at the prompt
- O- Check the firewall policy with the following command: *iptables -L*
- O- The firewall will start upon the next reboot

Setting up the NICs if undetected During the Installation

Note: A list of the NIC kernel modules is in the /etc/rc.d/rc.modules file. I recommend using an Intel PCI card for the Shadow/Snort packet collection. If the NIC card detection

**Shadow**

**Snort**

*with Sguil*

setup fails, the card can be manually added to this script. The cards will be loaded in the order they are listed in this configuration file.

### **Setting up NIC modules (example)**

If the sensor is using two different NICs, it will only detect the first one it sees and you will need to add the NIC module for the second one to the rc.netdevice file. You can look into the /etc/rc.d/rc.modules file for the NIC module and test it at the command line to see if it loads as follows:

```
modprobe eepr1000  
dmesg
```

After dmesg displays its output, you should see the card loaded at the end of the dmesg output. If it loaded correctly, then add it to the rc.netdevice file to ensure it loads when the sensor or server reboots. You should have two modules listed. The order they are listed is the order they will load.

```
vi /etc/rc.d/rc.netdevice  
# RealTek 8129/8139 to communicate with the Management station (eth0)  
/sbin/modprobe rtl8139oo  
  
# Intel EtherExpress Pro/100 PCI support used to collect packets (eth1):  
/sbin/modprobe eepr100
```

## Webmin Configuration

Webmin is a secure remote sensor and console manager. For example, the IDS can be remotely managed via an SSL enabled browser to manage MySQL, Sguil, the logs, the entire Snort IDS including its plugins, the rules, the configuration files, the restart the sensor services, view a daily Sguil report, etc. It is quite versatile and very easy to use for those who prefer using a GUI to manage their sensor.

After you log into Webmin, to manage the server and the Snort sensor is located in the **Servers** section. You then are going to see Snort IDS Admin eth1 to eth4, etc. The eth1 and eth2 are the only two-interface preconfigured in Webmin.

### Configuring Webmin

You need to change the default account password before making this system operational. The default account is **admin** and the default password is **admin**. Change the default admin account password the following manner. At the sensor command line console do:

```
/usr/local/webmin/changepass.pl /etc/webmin admin newpassword
```

The Webmin service can be started and stopped this way:

```
/etc/webmin/start  
/etc/webmin/stop
```

### Access is via SSL this way:

<https://yourIPaddress:10000>

### A FAQ is available on the Webmin site at:

<http://www.webmin.com/faq.html>

## Configuring Barnyard to send to Sguil database

Barnyard Version 0.2.0 (Build 32)  
6 December 2005

Barnyard unified logging output processor is used with this system to process all the data from the Snort sensor. The default scripts are setup to process the unified logs to binary logs format and can also be configured to process MySQL database logging as well as syslog. In order to use Barnyard with MySQL, you must configure the output process as per the instructions below.

This Barnyard binary has been pre-built with the following options:

--with-tcl                      Support for TCL

### **Configure Barnyard to Forward Data to Sguil Database**

The Snort output processor is enable with **log\_unified** filename `snort.log`, limit 128 in the **snort.external.conf** and **snort.internal.conf** (only if you are monitoring this interface) to log to the `/usr/local/snort/log/eth*` directory.

The default account is Sguil MySQL database account is *sguil* and the password is *password*. These can be changed if you desire but the whole sensor is configured to work with this account with the following minor configuration changes. These changes can be done at the command line or via Webmin in the Server tab. Configure Barnyard to forward data from a sensor to the Sguil database in the following manner:

```
vi /usr/local/barnyard/etc/barnyard.eth1.conf           (External interface)
vi /usr/local/barnyard/etc/barnyard.eth2.conf           (Internal interface)
```

```
# set the hostname (used for the sguil db output plugin)
config hostname: shadow
```

```
# Converts data from the dp_log plugin into standard pcap format
# Argument: <filename>
```

```
output log_pcap
```

### **Enable Data Insert into Sguil Database**

```
# Use this configuration if using Sguil
```

```
output sguil: agent_port 7735 (eth1) or output Sguil: agent_port 7745 (eth2)
```

- Save the file and restart Barnyard

**Note:** Barnyard connects to the database via the sensoragent\_eth1 or sensoragent\_eth2 startup scripts. The sensoragent configuration files are located in /usr/local/sguil/bin in the sensor\_agent\_eth1.conf and sensor\_agent\_eth2.conf files in the *SET BY\_PORT 7735* and require no other configurations.

```
/etc/rc.d/rc.barnyard restart
```

- Ensure the Barnyard processes are running

```
ps -aef |grep barnyard
```

## **Configure SSL between a Sensor and a Sguil Server**

If your configuration includes a sensor and a remote database server, you must configure the sensor to know where the database server is located. To allow the sensor to communicate with a Sguil database server, follow these steps:

- Log into Webmin
- Select the Server tab
- Select Sensor Controls
- Select Sensor Agent eth1 config file or Sensor Agent eth2 config file
- Modify “**set SERVER\_HOST 127.0.0.1**” and change the IP to the Sguil Server database IP and save changes
- Restart **Restart sensoragent\_eth1** or **Restart sensortagent\_eth2**

## **Local sid Rule Mapping**

Note: If you are going to create some local rules (i.e. local-eth1.rules) you **MUST** include the SID and the SID name in the /usr/local/snort/rules/local-sid.map and can be done via Webmin. These must match the information put in the rule file as follow:

```
9001 || Local task rule  
9002 || TCP connections to TCP 3127
```

## Shadow Hourly Web Reports

**Note: This should be configured only on an external sensor and the reports can only be viewed on the sensor.** For the log file to be processed, you need to enable the cronjobs under the Shadow account. To do so, do the following:

As shadow do (These cronjob must be enabled):

```
su - shadow
crontab -e
```

Uncomment the conjob time and for external (eth1 NIC) or internal (eth2 NIC) to run the hourly reports saved in Webmin, Servers/ Sguil Reports

```
# Process Sguil logs
3 * * * * /usr/local/SHADOW/fetchem.pl -l external
10 * * * * /usr/local/SHADOW/fetchem.pl -l internal
```

### **Now you will need to configure the Shadow filter for your site**

```
- cd /usr/local/SHADOW/filters
- cd external or internal
```

In Webmin, edit using vi the following filters (to configure see *ShadowFilters.pdf*):

```
ip.filter
icmp.filter
tcp.filter
udp.filter
```

Change the net 172.21 to the correct network address.

### **Test your configuration in debug mode**

1. su - shadow
2. cd /usr/local/SHADOW
3. ./fetchem.pl --loc external --debug (press enter to run the last hour log)
4. more /tmp/fetchem.log (This file will show whether there was any errors and where the error is)
5. If you had some errors fix them and run through steps 3 and 4
6. When it shows success go to the shadow website
7. [https://sensor\\_IP/reports/](https://sensor_IP/reports/)

## New procedures for Snort Oinkmaster Updates

### Oinkmaster

You should read the FAQ on how to configure oinkmaster to download the signature updates. <http://oinkmaster.sourceforge.net/>

### Register with Snort to get an account

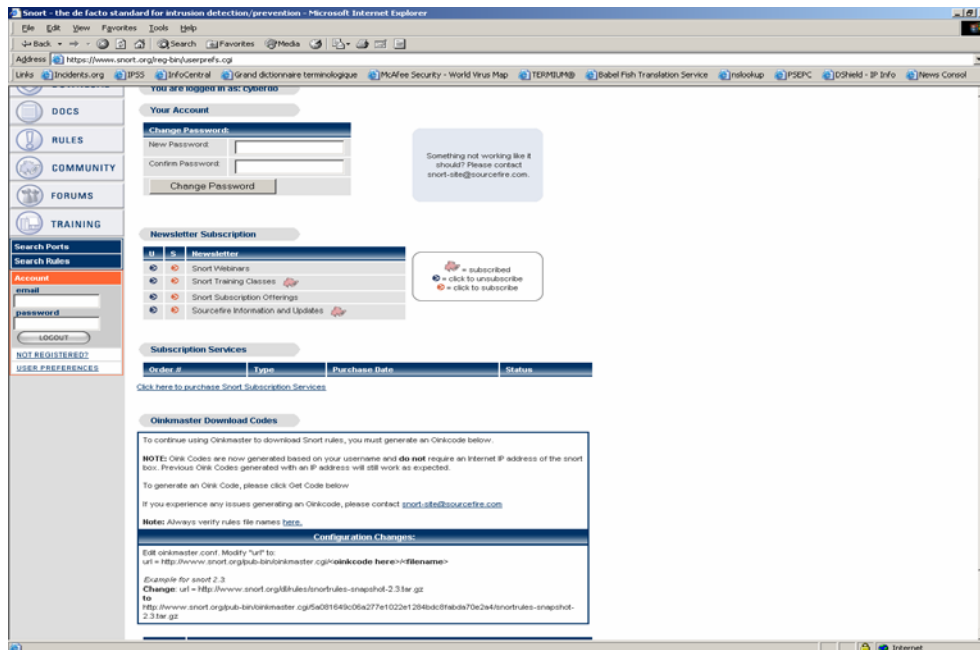
<https://www.snort.org/pub-bin/register.cgi>

You will receive your account information via e-mail

Login the site as per e-mail and password

Change your password if you want

In order for Oinkmaster to download the updated rules, you must generate a site string using the Get Code at the bottom of the page



As per the instructions at the bottom of the page, copy the new download path with your sting in it into oinkmaster.conf

**Old path:**

url = <http://www.snort.org/dl/rules/snortrules-snapshot-2.3.tar.gz>

**New path** (code is invalid, it is just an example):

url = <http://www.snort.org/pub-bin/oinkmaster.cgi/5a081649c06a277e1022e1284bdc8fabda70e2a4/snortrules-snapshot-2.3.tar.gz>

- The bold portion is where your code goes.
- The file is located at: /usr/local/snort
- The oinkmaster.conf file can be updated using vi or with Webmin
- If using Webmin, goto Servers, Snort IDS Admin eth1, select Oink
- Find url = <http://www.snort.org/dl/rules/snortrules-snapshot-2.3.tar.gz>

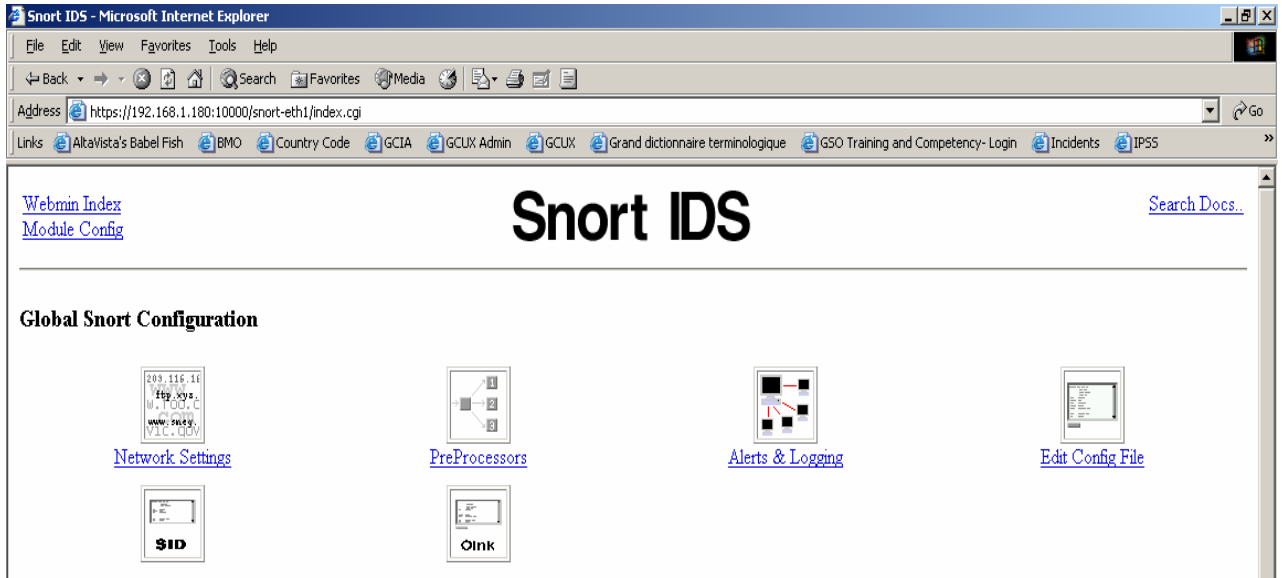
Change it to:

url = [http://www.snort.org/pub-bin/oinkmaster.cgi/INSERT\\_YOUR\\_ACCOUNT\\_HERE/snortrules-snapshot-2.3.tar.gz](http://www.snort.org/pub-bin/oinkmaster.cgi/INSERT_YOUR_ACCOUNT_HERE/snortrules-snapshot-2.3.tar.gz)

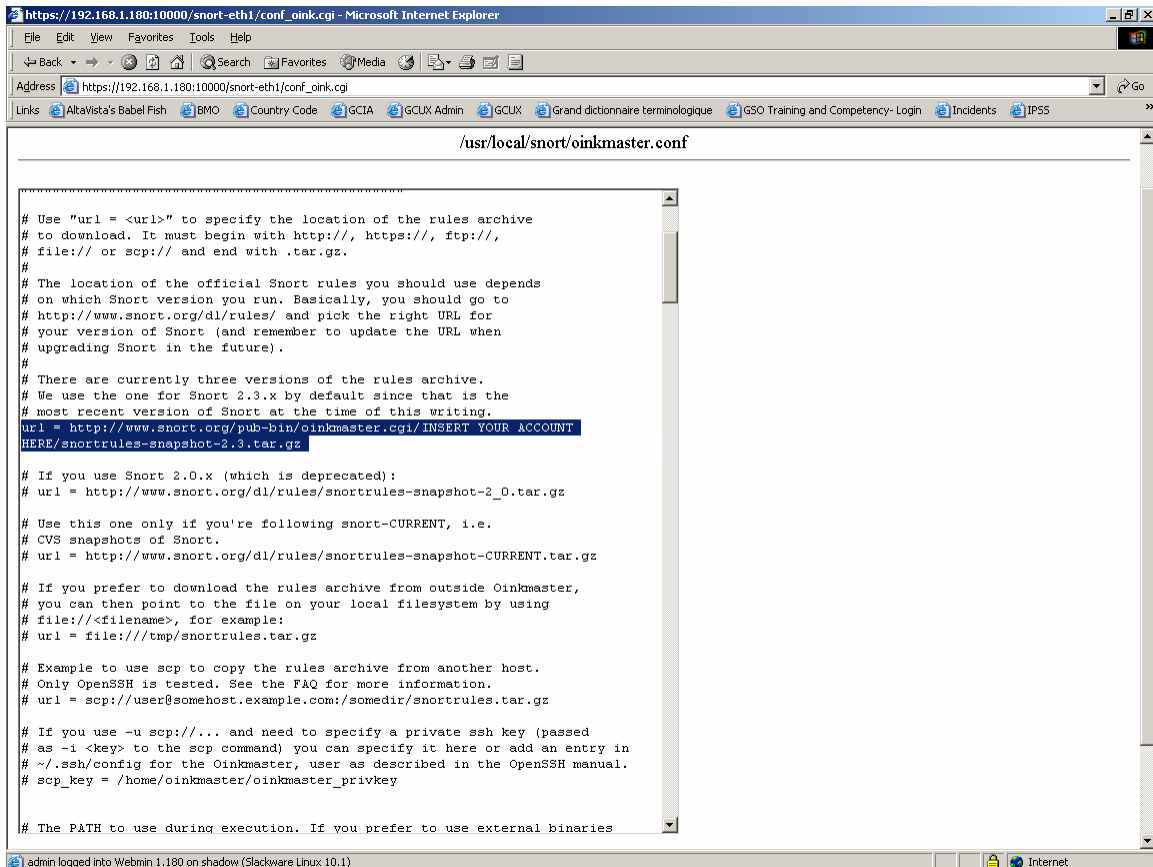
Webmin screenshots below



## Snort IDS Main Screen



## Edit Oinkmaster



## Shadow/Snort with Sguil Files and Scripts

/etc/rc.d	All system start/stop scripts
/etc/rc.d/rc.K	Kill all system script
/etc/rc.d/rc.S	Start up script for single-user mode
/etc/rc.d/rc.M	Start up script for multi-user mode
/etc/rc.d/rc.snort	Snort start/stop script
/etc/rc.d/rc.barnyard	Barnyard start/stop script
/etc/rc.d/rc.sguild	Sguil database start/stop script
/etc/rc.d/sancpd_eth1	sancp start/stop script for eth1
/etc/rc.d/sensoragent_eth1	Sensor Agent start/stop script to connect to database
/etc/rc.d/rc.mysql	MySQL database script
/etc/rc.d/rc.netdevice	NIC module loading script
/etc/rc.d/rc.local	Script for all other configuration
/etc/issue	Banner message
/etc/motd	Banner message
/etc/rc.d/rc.firewall	Setup firewall
/var/adm/messages	General log file
/var/adm/syslog	Syslog file
/var/run	Various server pid files
/usr/local/snort	Snort directory files
/usr/local/snort/etc	Snort configuration scripts
/usr/local/snort/rules	Snort rules
/usr/local/snort/log	Snort log directory
/usr/local/snort/bin	Snort sensor binary
/usr/local/barnyard	Barnyard directory files (including Barnyard lock file)
/usr/local/barnyard/etc	Barnyard configuration scripts
/usr/local/barnyard/log	Barnyard log directory
/usr/local/barnyard/bin	Barnyard binary
/etc/sguild	Sguil configuration scripts
/etc/sguild/incident_report.tcl	Daily Sguil web report output in Webmin/Servers
/usr/local/sguil/bin	Sguil logging scripts (log_packets_eth1.sh)
/LOG/external	Sguil log directory (eth1)
/LOG/external/dailylogs	Sguil daily logs collected by log_packets_eth1.sh
/LOG/external/portscans	Snort portscan dump directory
/LOG/external/sancp	sancp log dump directory
/LOG/internal	Sguil log directory (eth2)
/usr/local/mysql	MySQL database
/usr/local/SHADOW	Shadow directory files
/LOG/RAW/gmt	Shadow log files
/usr/local/NGREP	Network Grep sensor files
/root/sguil_pcap.sh	Sguil pcap files search script for /LOG/external/dailylogs
/root/shadow_save.sh	Shadow pcap files search script for /LOG/RAW/gmt
/root/epoch.pl	Convert Snort pcap files epoch time to YYYYMMDDHH

## sancp custom queries

SID 1 – shadow

SID 2 – Snort1

### **Source and Destination Port Search**

```
WHERE sancp.start_time > '2005-01-05' AND (sancp.src_port = '11768') OR  
(sancp.dst_port = '11768') LIMIT 500
```

### **Source and Destination Port Search for Only SID 2**

```
WHERE sancp.sid= 2 AND sancp.start_time > '2005-01-20' AND (sancp.src_port =  
'15118') OR (sancp.dst_port = '15118') LIMIT 500
```

### **Single Day Source and Destination IP Search for SID 2 only**

```
WHERE sancp.sid=2 AND sancp.start_time > '2005-01-15' AND sancp.end_time <  
'2005-01-16' AND (sancp.src_ip = INET_ATON('192.168.158.186') OR sancp.dst_ip =  
INET_ATON('192.168.158.186')) LIMIT 500
```

### **Specific Source IP**

```
WHERE sancp.start_time > '2005-03-15' AND (sancp.src_ip =  
INET_ATON('192.168.8.89')) LIMIT 500
```

### **Specific Sensor (sid=2) and Source Port**

```
WHERE sancp.sid=2 AND sancp.start_time > '2005-03-30' AND (sancp.src_port='53')  
LIMIT 500
```

## Snort IDS configuration

Snort Version 2.4.4 (Build 28)  
21 March 2006

If you are going to enable the firewall on the sensor, don't forget to add the IP of the Sguil database in the rc.firewall script if the sensor is going to be sending the events to a remote database.

**Note about Sguil:** You can install any of the 3 packages (sguil, sguildb and sensguil) available on the CD which has been expressly built to run on this sensor. Check the document called **sguil.pdf** in the rel\_note on how to configure each of the packages. Snort is configured to automatically use Barnyard through its output log\_unified function.

This Snort binary has been pre-built with the following options:

--with-mysql	Support for MySQL
--enable-smbalerts	SMB alerting capability via Samba
--enable-sourcefire	Enable Sourcefire specific build options
--enable-perfmonitor	Enable perfmonitor preprocessor
--enable-timestats	Enable TimeStats functionality
--enable-linux-smp-stats	Enable statistics reporting through proc

Both Sguil patches have been applied to Snort to support the Sguil database.

To uninstall Snort on the IDS platform do:

- Run pkgtool and select remove packages from other directories
- Select Snort to remove the package

The necessary files have been installed into the /usr/local/snort directory. This version contains the latest signature libraries from <http://www.snort.org> as of the above date.

The Snort binary is compiled with the “-static” option and the sensor runs in a charrooted jail by default in the /usr/local/snort. Thanks to GJ Hagenaars' contribution, the Snort sensor is now controlled by a startup script located in /etc/rc.d/rc.snort.

Snort configuration files for multiple interfaces are located in /usr/local/snort/etc and each interface has a snort.internal.conf or snort.external.conf. Edit each of these files to reflect your settings.

Snort configuration files for multiple interfaces are located in /usr/local/snort/etc and each interface should be listed in snort.internal.nic and snort.external.nic. The eth2 interface is configured by default to snort.internal.nic. Edit each of these files to reflect your settings.

- The Snort unified logs are saved in /usr/local/snort/log/eth(1-5). Default installation will contain eth0 and eth1 directory.
- Test the configuration by running the **./check\_snort\_eth1** and **check\_snort\_eth2** script. If this is successful, start the sensor
- **/etc/rc.d/rc.snort start** script to start the sensor

## Important Snort pass Rule Order

By default, the sensor will not process any pass rules. In order for the sensor to correctly process pass rules, you must add the **-o** switch in the /etc/rc.d/rc.snort script to change the rule order from Alert, Log, Pass to **Pass, Alert, Log**. Be very careful that your pass rules will not disable other rules in the ruleset.

Example

```
$$SNORTBIN/snort \  
-d \  
-o \  
-I \  
-g snort \  
-u snort \  
-i $NIC \  
-c $$SNORTETC/snort.${POLICY}.conf \  
-l $$SNORTLOG/$NIC \  
-D
```

## Shadow Command Line Pattern Search script

A new script is now in the /root called *pat\_search.pl* which can be used to search multiple days. The format is as follow:

```
./pat_search.pl -n -b YYYYMMDDHH -e YYYYMMDDHH -p PATTERN
```

- n Do not resolve addresses (faster)
- b Beginning day and hour
- e Ending day and hour
- p Pattern to search in BPF format. Ex: “tcp port 27374”

It is configured with the following tcpdump options:

- X Display HEX and ASCII data
- v Verbose
- s 0 Read back the maximum snaplen on each packets

The output can be redirected to a file by using > *filename*

If you would like to install the Shadow console, you should read the following document from the Shadow Team at:

<http://www.nswc.navy.mil/ISSEC/CID/SHADOW-1.8-Install.pdf>

## Background Information About this Setup

How to manually mount a CD-ROM or diskette

To manually mount the CD-ROM do:

```
mkdir /cdrom (create cdrom directory)
mount /dev/hdc /cdrom -t iso9660 (mount the cdrom)
umount /cdrom (un-mount the cdrom)
```

The cdrom maybe hdb, hdc or hdd depending where it has been installed in the computer. To find out which device is the CD-ROM, do *dmesg |more*

To manually mount the floppy do:

```
mkdir /floppy (create floppy directory)
mount /dev/fd0 /floppy -t vfat (mount the floppy)
umount /floppy (un-mount the floppy)
```

**Shadow**

**Snort**

## Operating System Patches

The Slackware web site should be monitored for any new patches that should be applied on the selected packages at Annex A. The site is <http://www.slackware.com>

The security list is available at:

<http://www.slackware.com/security/list.php?l=slackware-security&y=2005>

## Slackware Patch Maintenance Script

<http://128.173.184.249/slackupdate/>

Patches can be maintained and downloaded by running the /root/slackupdate.sh script. This script will check for any package that are available for update and saves them in /tmp/slackupdate. To install the patch updates as follow:

```
cd /tmp/slackupdate
telinit 1
upgradepkg <patch>.tgz
lilo (Must be run only if upgraded IDE kernel)
telinit 3
```

**Note with other kernels:** If you are using a kernel other than IDE, you must download the new kernel that is normally a bzImage and copy it to /boot/vmlinuz and run lilo before you reboot to ensure the new kernel will be used.

### Open Secure Shell (openssh) is part of the installation on this CD

Note: Secure Shell is normally used to transfer data between the monitoring station and the sensor. The instructions on how to setup an analysis station are available at the NSWC site. The site is at: <http://www.nswc.navy.mil/ISSEC/>

### Configure Shadow in the following way (Pre-configured with this installation):

- cd /usr/local/SHADOW/sensor and make the following changes:

- vi gmt.ph and verify the following settings:

- \* Decide whether you want to use local time or GMT (default GMT)
- \* \$LOGPROG = "/usr/sbin/tcpdump" (or its exact location)
- \* \$PROGPAR = "-i eth1" (or eth0 if using a single card as the traffic collector)
- \* \$GZIPPROG = "/bin/gzip" (or its exact location)
- \* \$LOGDIR = "/LOG/RAW/gmt" (if not using default, change it here)

**Note:** All of the Shadow files are owned by the shadow user and part of the shadow

**Shadow**

**Snort**

group. The account has been locked. In order to use this account, run “*passwd shadow*” to add your own user password.

**The message of the day changed to reflect more proactive security (Pre-configured with this installation):**

- vi /etc/motd

```
*****
This is a controlled access system.
This station is monitored at all times.
Only authorized users may connect
*****
- cp /etc/motd /etc/issue
```

**Update rc.local to start local applications:**

O- vi /etc/rc.d/rc.local and add the following services

```
#!/bin/sh
#
# /etc/rc.d/rc.local: Local system initialization script.
#
# Put any local setup commands in here:
# Starting eth1
echo "Fire up eth1 now to start Shadow collection..."
/sbin/ifconfig eth1 promisc -arp
/sbin/ifconfig eth1 up
#
echo "Starting mysql database..."
/usr/local/mysql/bin/mysqld_safe --user=mysql &
#
echo "Starting shadow sensor..."
/usr/local/SHADOW/sensor/start_logger.pl gmt
#
# Uncomment any of these to start Network Grep sensor
#
#echo "Starting Network Grep sensor..."
#/usr/local/NGREP/sensor/start_ngrep.pl kazaa
#/usr/local/NGREP/sensor/start_ngrep.pl gnutella
#/usr/local/NGREP/sensor/start_ngrep.pl dir_c
#
echo "Starting Webmin..."
/etc/webmin/start
#
echo "Starting firewall..."
/etc/rc.d/rc.firewall
```





```
#
echo "Starting Snort sensor..."

if [ -x /etc/rc.d/rc.snort ]; then
    . /etc/rc.d/rc.snort start
    . /etc/rc.d/rc.barnyard start
fi
#
# All done
```

### **Update cronjob to start Shadow, update time, and cut new logs each hour (Pre-configured on Shadow CD):**

#### *Crontab running as Root*

```
# Sync with a time server on a daily basis

17 23 * * * /usr/sbin/ntpdate time-a.nist.gov
18 23 * * * /sbin/hwclock --systohc

# Cut a new Shadow log on a hourly basis
0 * * * * /usr/local/logger/SHADOW/sensor_driver.pl gmt > /dev/null 2>1&

# Restart snort every night at midnight after updated Snort
# signatures have been downloaded
#
5 0 * * * /etc/rc.d/rc.snort restart > /dev/null 2>1&

# Cut a new ngrep log on a hourly basis
# You can uncomment any of these examples or create your own in the
# /usr/local/NGREP/sensor directory using the template.ph

#0 * * * * /usr/local/NGREP/sensor/ngrep_driver.pl kaza > /dev/null 2>1&
#0 * * * * /usr/local/NGREP/sensor/ngrep_driver.pl gnutella > /dev/null 2>1&
#0 * * * * /usr/local/NGREP/sensor/ngrep_driver.pl dir_c > /dev/null 2>1&
# Check that sshd is running

0,5,10,15,20,25,30,35,40,45,50,55 * * * * /usr/local/sbin/chk-sshd.pl

# Creates softlinks on the files located in /LOG/external/dailylogs/date

1 * * * * /root/epoch.pl > /dev/null 2>1&
```

#### *Crontab running as Snort*

```
# This crontab runs at 1 am to updated the Snort signatures using the oinkmaster.pl
# script and merge the new rules into the rules directory.
```

**Shadow**

**Snort** *with Squid*

```
#  
0 0 * * * /usr/local/snort/rc.snortupdate
```

**Note:** During the first reboot, you will notice some errors in directory /LOG/RAW/gmt with files sniff and sensor date. This is normal as those files do not exist yet and the sensor is creating them.

- O- Log in as root
- O- Run *ps -aef* and verify the services running. (See picture 1)
- O- Run *netstat -at* and verify the active connections (See picture 2). ssh should be the only service listening for remote login.
- O- Check Annex D for a NMAP port reconnaissance probe confirming ssh is the only available service.
- O- cd /LOG/RAW/gmt and verify the sensor is collecting. Do an *ls -l* and look for the hourly file that looks like this: tcp.20010312.gz with 0 bytes.
- O- The sensor is ready to be connected to the network.

## Network Grep (Ngrep) configuration

Ngrep Version 1.42  
5 January 2005

### Configure Ngrep in the following way (Pre-configured with this installation):

I would like to thank Alex Arndt for supplying the scripts in this section to make them part of this sensor. In this section, you can run ngrep in the same manner as a Shadow sensor in real-time to monitor as in the example below, someone successfully gaining access to a workstation and running Directory of C.

- cd /usr/local/NGREP/sensor and make the following changes:

- vi **template.ph** and verify the following settings:

```
$FILTER = "[C|c][+][D|d][I|i][R|r][+][C|c]Directory of [C|c]";
```

The start\_ngrep.pl and stop\_ngrep.pl scripts are used by cron to rollover a new file hourly. Check the rc.local section to start ngrep when the sensor start and the cron section to see the rollover configuration.

- cd /usr/local/NGREP

You can use **ngreppm.pl** to download the files to a remote analysis station.

Note: Adapt the filter to the keyword being searched.

### Ngrep Pattern Search script

A new script is now in the /root called **ngrep\_pat\_search.pl** which can be used to search multiple days. The format is as follow:

```
./ngrep_pat_search.pl -b YYYYMMDDHH -e YYYYMMDDHH -p PATTERN -i BPF  
filter
```

-b Beginning day and hour  
-e Ending day and hour  
-p Pattern to search. Ex: "kazaa"  
-i BPF Filter. Ex: "tcp port 80"

It is configured with the following ngrep options:

-t Print a timestamp in the form of YYYY/MM/DD HH:MM:SS.UUUUUU  
everytime a packet is matched

-I Ignore the case of the expression

-I Read pcap\_dump back into ngrep

This script match keywords and BPF filters. Here are some examples:

### **Print all the packets on TCP port 80 that contains http**

```
./ngrep_pat_search.pl -b YYYYMMDDHH -e YYYYMMDDHH -p "http" -i "tcp port 80"
```

### **Print all the packets on TCP port 80**

```
./ngrep_pat_search.pl -b YYYYMMDDHH -e YYYYMMDDHH -p "" -i "tcp port 80"
```

Print all the packets that contains the string http

```
./ngrep_pat_search.pl -b YYYYMMDDHH -e YYYYMMDDHH -p "http" -i ""
```

Note: The output can be redirected to a file by using > *filename*

## **References**

[Securing Linux – A Survival Guide for Linux Security](#)

SANS Institute

Intrusion Detection: Shadow Style step-by-step guide, Version 1.2.2

SANS Institute 1998

Installing Shadow

<http://www.nswc.navy.mil/ISSEC/CID/SHADOW-1.8-Install.pdf>

Shadow step-by-step Intrusion Detection using TCPdump

<http://www.nswc.navy.mil/ISSEC/CID/shadow.ppt>

Snort IDS

<http://www.snort.org>

Oinkmaster

<http://www.algonet.se/~nitzer/oinkmaster/>

Webmin

<http://www.webmin.com/>

MSB Networks

<http://msbnetworks.net/snort/>

SlackUpdate

**Shadow**

**Snort**

Guy Bruneau – seeker@whitehats.ca

<http://128.173.184.249/slackupdate/>

MySQL Windows Control Center

<http://www.mysql.com/downloads/mysqlcc.html>

Chaosreader to replay tcpdump traffic in HTML

<http://users.tpg.com.au/bdgcvb/chaosreader.html>