



Interested in learning  
more about security?

**SANS Institute**

**Security Consensus Operational Readiness Evaluation**

This checklist is from the SCORE Checklist Project. Reposting is not permitted without express, written permission.

# SCORE Security Checklist

## Unusual Accounts

Look in /etc/passwd for new accounts in sorted list by UID:

```
# sort -nk3 -t: /etc/passwd | less
```

Normal accounts will be there, but look for new, unexpected accounts, especially with UID < 500.

Also, look for unexpected UID 0 accounts:

```
# egrep ':0+:' /etc/passwd
```

On systems that use multiple authentication methods:

```
# getent passwd | egrep ':0+:'
```

Look for orphaned files, which could be a sign of an attacker's temporary account that has been deleted.

```
# find / -nouser -print
```

## Unusual Log Entries

Look through your system log files for suspicious events, including:

- "entered promiscuous mode"
- Large number of authentication or login failures from either local or remote access tools (e.g., telnetd, sshd, etc.)
- Remote Procedure Call (rpc) programs with a log entry that includes a large number (> 20) strange characters (such as ^PM-^PM-^PM-^PM-^PM-^PM-^PM-^PM-^PM)
- For systems running web servers: Larger than normal number of Apache logs saying "error"
- Reboots and/or application restarts

## Other Unusual Items

Sluggish system performance:

```
$ uptime - Look at "load average"
```

Excessive memory use: \$ free

Sudden decreases in available disk space:

```
$ df
```

## Additional Supporting Tools

The following tools are often not built into the Linux operating system, but can be used to analyze its security status in more detail. Each is available for free download at the listed web site.

**DISCLAIMER: The SANS Institute is not responsible for creating, distributing, warranting, or supporting any of the following tools.**

Chkrootkit looks for anomalies on systems introduced by user-mode and kernel-mode RootKits – [www.chkrootkit.org](http://www.chkrootkit.org)

Tripwire looks for changes to critical system files – [www.tripwire.org](http://www.tripwire.org) - free for Linux for non-commercial use

AIDE looks for changes to critical system files <http://www.cs.tut.fi/~rammer/aide.html>

The Center for Internet Security has released a Linux hardening guide for free at [www.cisecurity.org](http://www.cisecurity.org).

The free Bastille Script provides automated security hardening for Linux systems, available at [www.bastille-linux.org](http://www.bastille-linux.org).



## Intrusion Discovery

### Cheat Sheet v2.0

Linux

POCKET REFERENCE GUIDE

SANS Institute

[www.sans.org](http://www.sans.org) and [isc.sans.org](http://isc.sans.org)

Download the latest version of this sheet from <http://www.sans.org/resources/linsacheatsheet.pdf>

## Purpose

System Administrators are often on the front lines of computer security. This guide aims to support System Administrators in finding indications of a system compromise.

## What to use this sheet for

On a periodic basis (daily, weekly, or each time you logon to a system you manage,) run through these quick steps to look for anomalous behavior that might be caused by a computer intrusion. Each of these commands runs locally on a system.

***This sheet is split into these sections:***

- Unusual Processes and Services
- Unusual Files
- Unusual Network Usage
- Unusual Scheduled Tasks
- Unusual Accounts
- Unusual Log Entries
- Other Unusual Items
- Additional Supporting Tools

***If you spot anomalous behavior: DO NOT PANIC!***

Your system may or may not have come under attack. Please contact the Incident Handling Team immediately to report the activities and get further assistance.

## Unusual Processes and Services

Look at all running processes:

```
# ps -aux
```

Get familiar with "normal" processes for the machine. Look for unusual processes. Focus on processes with root (UID 0) privileges.

If you spot a process that is unfamiliar, investigate in more detail using:

```
# lsof -p [pid]
```

This command shows all files and ports used by the running process.

If your machine has it installed, run chkconfig to see which services are enabled at various runlevels:

```
# chkconfig --list
```

## Unusual Files

Look for unusual SUID root files:

```
# find / -uid 0 -perm -4000 -print
```

This requires knowledge of normal SUID files.

Look for unusual large files (greater than 10 MegaBytes):

```
# find / -size +10000k -print
```

This requires knowledge of normal large files.

Look for files named with dots and spaces ("...", ".. ", ". ", and " ") used to camouflage files:

```
# find / -name " " -print
# find / -name ".. " -print
# find / -name ". " -print
# find / -name " " -print
```

## Unusual Files Continued

Look for processes running out of or accessing files that have been unlinked (i.e., link count is zero). An attacker may be hiding data in or running a backdoor from such files:

```
# lsof +L1
```

On a Linux machine with RPM installed (RedHat, Mandrake, etc.), run the RPM tool to verify packages:

```
# rpm -Va | sort
```

This checks size, MD5 sum, permissions, type, owner, and group of each file with information from the RPM database to look for changes. Output includes:

```
S - File size differs
M - Mode differs (permissions)
5 - MD5 sum differs
D - Device number mismatch
L - readLink path mismatch
U - user ownership differs
G - group ownership differs
T - modification time differs
```

Pay special attention to changes associated with items in /sbin, /bin, /usr/sbin, and /usr/bin.

In some versions of Linux, this analysis is automated by the built-in `check-packages` script.

## Unusual Network Usage

Look for promiscuous mode, which might indicate a sniffer:

```
# ip link | grep PROMISC
```

Note that the `ifconfig` doesn't work reliably for detecting promiscuous mode on Linux kernel 2.4, so please use "ip link" for detecting it.

## Unusual Network Usage Continued

Look for unusual port listeners:

```
# netstat -nap
```

Get more details about running processes listening on ports:

```
# lsof -i
```

These commands require knowledge of which TCP and UDP ports are normally listening on your system. Look for deviations from the norm.

Look for unusual ARP entries, mapping IP address to MAC addresses that aren't correct for the LAN:

```
# arp -a
```

This analysis requires detailed knowledge of which addresses are supposed to be on the LAN. On a small and/or specialized LAN (such as a DMZ), look for unexpected IP addresses.

## Unusual Scheduled Tasks

Look for cron jobs scheduled by root and any other UID 0 accounts:

```
# crontab -u root -l
```

Look for unusual system-wide cron jobs:

```
# cat /etc/crontab
# ls /etc/cron.*
```



# Upcoming SANS Training

[Click Here for a full list of all Upcoming SANS Events by Location](#)

SANS Secure Japan 2018	Tokyo, JP	Feb 19, 2018 - Mar 03, 2018	Live Event
SANS Brussels February 2018	Brussels, BE	Feb 19, 2018 - Feb 24, 2018	Live Event
SANS Dallas 2018	Dallas, TXUS	Feb 19, 2018 - Feb 24, 2018	Live Event
SANS New York City Winter 2018	New York, NYUS	Feb 26, 2018 - Mar 03, 2018	Live Event
CyberThreat Summit 2018	London, GB	Feb 27, 2018 - Feb 28, 2018	Live Event
SANS London March 2018	London, GB	Mar 05, 2018 - Mar 10, 2018	Live Event
SANS Secure Osaka 2018	Osaka, JP	Mar 12, 2018 - Mar 17, 2018	Live Event
SANS San Francisco Spring 2018	San Francisco, CAUS	Mar 12, 2018 - Mar 17, 2018	Live Event
SANS Paris March 2018	Paris, FR	Mar 12, 2018 - Mar 17, 2018	Live Event
SANS Secure Singapore 2018	Singapore, SG	Mar 12, 2018 - Mar 24, 2018	Live Event
SANS Northern VA Spring - Tysons 2018	McLean, VAUS	Mar 17, 2018 - Mar 24, 2018	Live Event
ICS Security Summit & Training 2018	Orlando, FLUS	Mar 18, 2018 - Mar 26, 2018	Live Event
SANS Munich March 2018	Munich, DE	Mar 19, 2018 - Mar 24, 2018	Live Event
SEC487: Open-Source Intel Beta One	McLean, VAUS	Mar 19, 2018 - Mar 24, 2018	Live Event
SANS Secure Canberra 2018	Canberra, AU	Mar 19, 2018 - Mar 24, 2018	Live Event
SANS Pen Test Austin 2018	Austin, TXUS	Mar 19, 2018 - Mar 24, 2018	Live Event
SANS Boston Spring 2018	Boston, MAUS	Mar 25, 2018 - Mar 30, 2018	Live Event
SANS 2018	Orlando, FLUS	Apr 03, 2018 - Apr 10, 2018	Live Event
SANS Abu Dhabi 2018	Abu Dhabi, AE	Apr 07, 2018 - Apr 12, 2018	Live Event
Pre-RSA&reg; Conference Training	San Francisco, CAUS	Apr 11, 2018 - Apr 16, 2018	Live Event
SANS London April 2018	London, GB	Apr 16, 2018 - Apr 21, 2018	Live Event
SANS Zurich 2018	Zurich, CH	Apr 16, 2018 - Apr 21, 2018	Live Event
SANS Baltimore Spring 2018	Baltimore, MDUS	Apr 21, 2018 - Apr 28, 2018	Live Event
Blue Team Summit & Training 2018	Louisville, KYUS	Apr 23, 2018 - Apr 30, 2018	Live Event
SANS Seattle Spring 2018	Seattle, WAUS	Apr 23, 2018 - Apr 28, 2018	Live Event
SANS Riyadh April 2018	Riyadh, SA	Apr 28, 2018 - May 03, 2018	Live Event
SANS Doha 2018	Doha, QA	Apr 28, 2018 - May 03, 2018	Live Event
SANS SEC460: Enterprise Threat Beta Two	Crystal City, VAUS	Apr 30, 2018 - May 05, 2018	Live Event
Automotive Cybersecurity Summit & Training 2018	Chicago, ILUS	May 01, 2018 - May 08, 2018	Live Event
SANS SEC504 in Thai 2018	Bangkok, TH	May 07, 2018 - May 12, 2018	Live Event
SANS Security West 2018	San Diego, CAUS	May 11, 2018 - May 18, 2018	Live Event
SANS Melbourne 2018	Melbourne, AU	May 14, 2018 - May 26, 2018	Live Event
Cloud Security Summit & Training 2018	OnlineCAUS	Feb 19, 2018 - Feb 26, 2018	Live Event
SANS OnDemand	Books & MP3s OnlyUS	Anytime	Self Paced