

Solaris 8 Security Checklist

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The following is a recommended security checklist for Solaris 8 servers. This document should be used as a guide to the installation and configuration of Solaris 8 Servers in conjunction with an agreed security plan for the identified systems. The document is designed for use by experienced system administrators.

Some of the settings may be dependant on the patch levels of the components in use, and therefore differences may exist between this document and the actual file paths and access control settings on your machine.

1.0 Initial Installation

1.1 Install the Latest Patches

In most cases distribution vendors will provide an update facility for the distribution of patches. The latest system patches should be installed prior to operational deployment. Particular attention should be paid to those network services that the operating system makes available to remote clients (eg: Web (Apache), Mail (sendmail/postfix/imapd), and so on.

It is also recommended that the system be updated with newly released patches as soon as operational circumstances allow.

Bypassing the vendor, and installing patches directly from the application provider (eg: from apache.org) may also be appropriate in some circumstances, where the problem in question is significant, or the distribution vendor response to security issues is poor.

Latest Patches can be found at <http://sunsolve.sun.com/pub-cgi/show.pl?target=patches/patch-access>

In order to stay updated with latest vulnerabilities on Solaris systems and patches required for it Sun issues a security bulletin. To receive security bulletins directly from the Sun Security Coordination Team, send an email to security-alert@sun.com and include `subscribe cws [your email address]` in the **subject**. For example: `subscribe cws alex.smith@star21.de`

1.2 File Systems

Per default Solaris mounts remote or local filesystems are mounted with read-write privileges with possibility to have suid or sgid files.

In order to prevent that filesystems that don't require extra privileges should be limited.

In `/etc/rmmount.conf` there should be an entry `-o nosuid` for external devices like cdrom or filesystems.

1.3 Time Settings

All the servers should have the same time settings in order to be able to evaluate logs properly.

1. There should be a time-zone entry in `/etc/TIMEZONE` containing `tz=MET`.
2. There should be a NTP system installed with timeservers configured for synchronisation (fx. `/etc/ntp.conf` should contain `server a.b.c.d prefer`)

Timeservers in OssBss are 10.130.200.70 or 10.130.200.80

In Management network 10.10.8.70 or 10.10.8.80

In internet network there are official time servers from

1.4 Software Selection

If system should be freshly installed, there should be core installation used and only those packages added that are required for operation of the system.

All the external packages that can't be patched should be kept updated to the latest operational version (fx. SSH package should be version 3.4.1 or higher).

All the unnecessary modules should be also removed.

1.5 Minimize boot services or daemons

All the unnecessary daemons or services starting during boot time (/etc/rc.d) should be removed or disabled.

1.6 Message Text for users attempting to log on

/etc/default/telnetd

Add the following line at the end of this file. If there is another line for BANNER, it should be commented out. This line contains a message that will be displayed when a telnet connection occurs. This should be done, even if telnet is disabled.

```
BANNER="\r\nWARNING: Authorized use only. Usage may be monitored.\r\n\r\n"
```

/etc/default/ftpd

Add the following line at the end of this file. If there is another line for BANNER, it should be commented out. This line contains a message that will be displayed when a FTP connection occurs. This should be done, even if FTP is disabled.

```
BANNER="\r\nWARNING: Authorized use only. Usage may be monitored.\r\n\r\n"
```

/etc/motd

Place the following message (or a similar one) into this file. It contains a message that will be printed after a successful login.

```
This is a private computer facility. Access for any reason must be specifically authorized by the owner. Unless you are so authorized, your continued access and any other use may expose you to criminal and/or civil proceedings. Usage may be monitored.
```

/etc/issue

Place the following message (or a similar one) into this file. It contains a message that will be printed during the login process.

```
This is a private computer facility. Access for any reason must be specifically authorized by the owner. Unless you are so authorized, your continued access and any other use may expose you to criminal and/or civil proceedings. Usage may be monitored.
```

NOTE: The users may see both the /etc/motd and the /etc/issue messages when they login.

SSH daemon should be configured to display the message by putting this line into sshd_config: *Printmotd yes*

1.7 Privileged Account Login Source

In order to ensure security of the root account there should be limitations placed on the source of login.

Root should be able to log into the system only locally (via console or with su command).

This can be ensured by :

1. In */etc/default/login* uncomment line *console=/dev/console*
2. In *sshd_conf* put line *PermitRootLogin no*

1.10 Network driver configuration

Make the following adjustments to the **end** of */etc/init.d/inetinit* to protect the machine from SYN floods, ARP spoofs, smurf attacks and from being unwitting allies to DDoS attackers.

1. Append to */etc/init.d/inetinit*: **ndd -set /dev/tcp tcp_conn_req_max_q0 10240.**
2. Append to */etc/init.d/inetinit*: **ndd -set /dev/ip ip_ignore_redirect 1.**
3. Append to */etc/init.d/inetinit*: **ndd -set /dev/ip ip_send_redirects 0.**
4. Append to */etc/init.d/inetinit*: **ndd -set /dev/ip ip_ire_flush_interval 60000.**
5. Append to */etc/init.d/inetinit*: **ndd -set /dev/arp arp_cleanup_interval 60.**
6. Append to */etc/init.d/inetinit*: **ndd -set /dev/ip ip_forward_directed_broadcasts 0.**
7. Append to */etc/init.d/inetinit*: **ndd -set /dev/ip ip_forward_src_routed 0.**
8. Append to */etc/init.d/inetinit*: **ndd -set /dev/ip ip_forwarding 0.**
9. Append to */etc/init.d/inetinit*: **ndd -set /dev/ip ip_strict_dst_multihoming 1.**

Next you should modify */etc/init.d/inetsvc* to disable DHCP and inetd. (This will eliminate remote access until **ssh** is installed below.) There is only one section you need to keep: the *ifconfig* line which resets netmask and broadcast addresses.

Comment out every other line in the file except the one which says:

- ***/usr/sbin/ifconfig -auD netmask + broadcast +***

Disable multicasting:

Comment out of the */etc/rc2.d/S*inetsvc*

Make the system stack non-executable:

1. Append to */etc/system*: **set noexec_user_stack = 1.**
2. Append to */etc/system*: **set noexec_user_stack_log = 1.**

Disable routing for the system:

3. Create a file */etc/notrouter*

Use better TCP sequence numbers

`cd /etc/default`

```
awk '/^TCP_STRONG_ISS/ { $1 = "TCP_STRONG_ISS=2" };  
\ { print }' inetinit > inetinit.new  
mv inetinit.new inetinit  
chown root:sys inetinit  
chmod 444 inetinit
```

2.0 System Network Services

2.1 Network Services Summary

All the unnecessary network services should be switched off.

1. /etc/inetd.conf should not contain any entries unless specifically required by applications.

Here is a quick rundown of the risks associated with services started in /etc/inetd.conf:

ftp: enables an FTP server that introduces a variety of insecurities and is the cause of many intrusions. Disable this and use [SSH](#) instead to transfer files between systems.

telnet, shell, login, exec: allows users from other systems to log into and run commands on your machine. This is useful, but the more useful something is, the more likely it is that someone will find a way to exploit it. Disable these services and, if you do need to allow remote logins, use [SSH](#) instead.

comsat: a daemon which is used to notify users of newly arrived email. There are alternate means of doing the same thing, and there are occasional rumors of security problems with comsat. Unless you have some overwhelming need for this, turn it off.

talk: allows users to communicate by typing at each others' terminals. If you need to use this feature, restrict access to the service using TCPwrappers and [IPFilter/IPChains](#).

uucp: Nobody uses uucp anymore - disable this. While you are at it, you may as well turn off execute permission on the uucp-related shell commands.

tftp: FTP without any security. This should be needed only if your system will be used for booting workstations. If this is the case, you must invoke the daemon with the -s flag, as in:

```
tftp dgram udp wait root in.tftpd -s /tftpboot
```

If you don't, tftp can be used to retrieve any file from your system, anonymously. Also make all the files in the bootfile directory read-only. Finally, restrict access to the service using TCPwrappers and [IPFilter/IPChains](#).

finger: this gives out information on who is loggedin, or people's phone numbers and offices. Unfortunately this information can be used by a potential intruder to find accounts to attack. You may wish to disable this, run a custom finger daemon, or restrict access to it using TCPwrappers and [IPFilter/IPChains](#).

systat, netstat: these services give out information about your system. The comments for finger apply to these.

time: Gives out the system time to any remote host that asks for it. Probably safe but can be disabled without impacting the system.

echo, discard, daytime, chargen: these are used for testing, and are generally safe, though there have been reports of TCP packets with forged IP source addresses being used to trick a system into sending echo packets to itself, causing a packet storm on the local ethernet segment. Disable them and only turn them on while testing.

rexed - this is the Remote Procedure Call mechanism. It has minimal authentication, so disable it and use [SSH](#) instead.

walld: allows people to send messages to all logged in users. Useful, but easily abused. Disable this service or restrict access to it using TCPwrappers and [IPFilter/IPChains](#).

tttdserverd (tooltalk): used by some convenient desktop elements but not important from a system operation standpoint. Some versions of this service contain serious remote exploits and should be disabled (dsabling this service causes virtually no operational degradation).

rpc.cmsd (calendar manager): used to share calendar information over the network but not important from a system operation standpoint. Some versions of this service contain serious remote exploits and should be disabled.

others : Other services such as sadmind (once found to be vulnerabale to remote root exploit) and kerberos can be disabled without impacting the system.

2. There should not be any services listening on the network unless required by applications.

2.4 File Transfer

Ftp service should be disabled and secure ftp or secure copy should be used.

/etc/ftpusers should contain all the account names except those that should be allowed to access the system via FTP.

2.5 Electronic Mail

There should be no email service running on the system for local use (email servers have email agents installed as application and should follow the application security part of this document).

2.8 Domain Name Service

There should be no DNS servers running on the system (DNS servers should be treated as an application and should follow application security part of this document).

2.12 Remote shell / copy services

All the systems should have the latest SSH installed in order to allow remote administration of the server with encrypted interconnection.

Sshd_config should contain also these features:

```
Protocol 2
UsePrivilegeSeparation yes
ServerKeyBits 768
SyslogFacility AUTH
LogLevel INFO
LoginGraceTime 600
PermitRootLogin no
StrictModes yes
RSAAuthentication yes
PubkeyAuthentication yes
```

RhostsAuthentication no
IgnoreRhosts yes
RhostsRSAAuthentication no
HostbasedAuthentication no
PermitEmptyPasswords no
PasswordAuthentication yes
PrintMotd yes
PrintLastLog no
MaxStartups 10:30:60
ReverseMappingCheck yes

2.13 File Share Facilities

There should be no file sharing facilities, unless there is a application

Ignore NFS requests from non-privileged ports

Add the following line to the */etc/system* file to cause NFS to ignore requests originating on non-privileged ports (over 1024). This change should be made, even if NFS has been disabled.

```
set nfssrv:nfs_portmon=1
```

2.14 Firewall Selection

Every system should have a filtering capability at disposal for later use. Filtering capabilities should enable limitation of certain IP addresses to certain services.

1. On Solaris 8, the iPlanet CD#2 contains among other things, a restricted edition of the Sunscreen EFS *lite* firewall. It can also be download for free from Sun.
2. IPfilter <http://coombs.anu.edu.au/~avalon/ip-filter.html> can be used as an alternative solution.

3.0 System Accounts and User Rights

3.1 Account Characteristics

By default, Solaris operates on the assumption that all users are local users. Explicit package installation needs to be undertaken on most Solaris distributions in order to facilitate a distributed authentication framework such as LDAP.

Other features:

1. User home directories should be mode 755 or more restrictive
2. No user dot-files should be group/world writable
3. Standard Password policy should be put in /etc/default/passwd

3.2 Standard Accounts

Several of the accounts in */etc/passwd* are unnecessary. In order to secure them you should:

1. effectively disable them.
2. ensure these accounts cannot use **ftp**, **cron** or **at**.
3. remove valid shells from daemon accounts.

3.3 Unauthenticated Access

There should be no possible unauthenticated access enabled on the system.

1. */etc/hosts.equiv*, */.rhosts*, */.netrc* should be empty
2. No empty password fields in password files

3.4 Appropriate Administrative Authentication

Access to root account via *su* should be only possible from wheel group. All users that are system administrators should be in wheel group.

3.5 Authentication Configuration

In order to enforce system authentication to use standard unix authentication facility */etc/pam.conf* should contain these entries:

```
# PAM configuration
# Authentication management
login auth required /usr/lib/security/pam_unix.so.1
su auth required /usr/lib/security/pam_unix.so.1
dtlogin auth required /usr/lib/security/pam_unix.so.1
other auth required /usr/lib/security/pam_unix.so.1
#
# Account management
login account required /usr/lib/security/pam_unix.so.1
su account required /usr/lib/security/pam_unix.so.1
dtlogin account required /usr/lib/security/pam_unix.so.1
other account required /usr/lib/security/pam_unix.so.1
#
# Session management
su session required /usr/lib/security/pam_unix.so.1
other session required /usr/lib/security/pam_unix.so.1
```

```
#  
# Password management  
other password required /usr/lib/security/pam_unix.so.1
```

If http authentication is supposed to be used then there should be extra entries specifying http authentication facility.

4.0 File and Object Access

4.2 Umask settings

Set user file creation mask

In each of the files `/etc/.login`, `/etc/cshrc` and `/etc/profile`, there should be an invocation of the `umask` command. This invocation should be positioned immediately after the initial comments. The value passed to `umask` is an octal mask of the mode bits that are *not* set when a file is created. Acceptable values are 022, 026 (suggested) and 027. Each of these has advantages and disadvantages. Please read the `umask` manual page prior to selecting the value to be set.

Set FTP file creation mask

Add the following line at the end of the `/etc/default/ftpd` file. If there is another line for `UMASK`, it should be commented out. This line contains the default `umask` value that will be used by FTP when a file is created. The value shown here is for demonstration purposes only. The `umask` value chosen for the user file creation mask (above) should be used.

```
UMASK=026
```

4.4 Permissions tightening

Minimize file or object access to only groups or users that will access them (fx.

Oracle daemon should be executable by user oracle only)

Crontab access restrictions should be put into `/etc/cron.d/cron.allow` (permissions set to read).

At access restrictions should be put into `/etc/cron.d/at.allow` (permissions set to read).

4.5 SUID or SGID files.

Check for `setuid` files, and modify them, as appropriate. The command to check for these files is:

```
find / -local -type f -perm -4000 -exec ls -ld {} \;
```

Some files *must* be left unchanged (`/usr/bin/login`, `/usr/bin/passwd`). Other files may have their group set to the administrative group (*wheel*), and have their modes changed to 4750 (`/usr/sbin/ping`, `/usr/sbin/traceroute`). Still others may be removed.

NOTE: A server should be checked for `setuid` files after patches are updated, and after third-party packages (source or binary) are installed.

Fx. standard `setuid` files found on a system, and the action performed, is as follows:

<code>/bin/su</code>	set administrative group
<code>/sbin/su.static</code>	set administrative group
<code>/usr/bin/at</code>	set administrative group (1)
<code>/usr/bin/atq</code>	set administrative group (1)
<code>/usr/bin/atrm</code>	set administrative group (1)
<code>/usr/bin/crontab</code>	set administrative group (1)
<code>/usr/bin/eject</code>	set administrative group
<code>/usr/bin/fdformat</code>	set administrative group
<code>/usr/bin/login</code>	leave alone
<code>/usr/bin/newgrp</code>	leave alone
<code>/usr/bin/passwd</code>	leave alone

/usr/bin/pfexec	set administrative group (1)
/usr/bin/rcp	set administrative group (1)
/usr/bin/rdist	set administrative group
/usr/bin/rlogin	set administrative group (1)
/usr/bin/rsh	set administrative group (1)
/usr/bin/i86/ps	leave alone
/usr/bin/i86/uptime	leave alone
/usr/bin/i86/w	leave alone
/usr/bin/su	set administrative group
/usr/bin/tip	set administrative group (4)
/usr/bin/yppasswd	remove (2)
/usr/lib/acct/accton	set administrative group
/usr/lib/fs/ufs/quota	leave alone (4)
/usr/lib/fs/ufs/ufsdump	set 555 mode
/usr/lib/fs/ufs/ufsrestore	set 555 mode
/usr/lib/pt_chmod	leave alone
/usr/lib/sendmail	leave alone
/usr/lib/utmp_update	leave alone
/usr/local/bin/lpq	leave alone
/usr/local/bin/lprm	leave alone
/usr/local/bin/lpr	leave alone
/usr/local/bin/lpstat	leave alone
/usr/local/bin/ssh1	leave alone
/usr/local/bin/ssh-signer2	leave alone
/usr/local/sbin/lpc	leave alone
/usr/sbin/allocate	leave alone (4)
/usr/sbin/deallocate	leave alone (4)
/usr/sbin/list_devices	leave alone (4)
/usr/sbin/mkdevalloc	leave alone (4)
/usr/sbin/mkdevmaps	leave alone (4)
/usr/sbin/ping	set administrative group
/usr/sbin/sacadm	set administrative group
/usr/sbin/i86/whodo	leave alone
/usr/sbin/traceroute	set administrative group

Note 1: For these commands, it might be preferable to create another group (the privileged group), similar to the administrative group, but with more members. The members of the administrative group should also be members of this group.

Note 2: For some reason, SUN leaves this link to /bin/passwd around, even after all the NIS packages have been removed. If NIS isn't being used, this should be removed.

Note 4: For these commands, it might be preferable to place them into a privileged group (see Note 1) and change their mode to 4750, or remove them.

Check setgid files

Check for setgid files, and modify them, as appropriate. The command to check for these files is:

```
find / -local -type f -perm -2000 -exec ls -ld {} \;
```

NOTE: A server should be checked for setgid files after patches are updated, and after third-party packages (source or binary) are installed.

The setgid files found on my system, and the action performed, is as follows:

/usr/bin/mail	leave alone
/usr/bin/mailx	leave alone
/usr/bin/netstat	leave alone
/usr/bin/passwd	leave alone
/usr/bin/write	leave alone
/usr/bin/yppasswd	remove
/usr/platform/i86pc/sbin/eeeprom	set 2550 mode
/usr/sbin/i86/prtconf	set 2550 mode
/usr/sbin/i86/swap	set 2550 mode
/usr/sbin/i86/sysdef	set 2550 mode
/usr/sbin/wall	set 2550 mode
/usr/xpg4/bin/i86/ipcs	set 2550 mode

4.6 System access configuration files locked

In every user's directory there should be configuration files created (.rhosts or authorized_keys) with root as the owner and writable only by root.

5.0 System Auditing

5.1 Auditing Overview

All the messages and log information should be centrally processed on a remote log server.

In OSSBSS there is a syslog server at disposal. Syslog.conf entry should look like this:

```
*.* @10.130.200.40
```

or

```
*.* @10.10.8.40
```

5.2 Initial Installation

Syslog messages sent to a centralized log server

1. /etc/syslog.conf should contain this entry `*.* @logserver`

Turn on cron logging

2. /etc/default/cron should contain `CRONLOG=YES`

5.3 Protecting the audit configuration files

Integrity verification service should be done to a remote host.

Logs should be stored safely on a read only media or on a secured media not accessible by all the system users.

5.5 Monitoring User access.

Create a log for authentication information. It should contain all the necessary authentication information for access auditing.

```
echo "auth.info\t\t\t/var/log/authlog"  
>>/etc/syslog.conf  
touch /var/log/authlog  
chown root:root /var/log/authlog  
chmod 600 /var/log/authlog
```

In order to track also SU utility authentication there should be entries created in /etc/default/su:

```
SULOG=/var/adm/sulog  
SYSLOG=YES
```

And also /var/adm/sulog file created.

6.0 Application security

6.1 Patches

Install all the latest patches and fixes for the application. If possible upgrade application to the latest version.

6.2 Minimize services offered

Switch off or remove services that are not required to perform application's function in the system.

Fx. Apache web server with basic HTML functionality required doesn't need CGI, imap module or Java servlets configured.

6.3 Configure users and authentication

Every user should have his/her own login with proper authentication method used. Their permissions should not include more than necessary (read only user should have only read only access) and if necessary for every role a user has there should be an account with proper permissions for that role.

Fx. User XY ; role: application tester (read only access to data)

 User XY ; role application developer (read write to development environment)

 User XY ; role application administrator (full access to application configuration)

6.4 Auditing

If possible application should produce a log documenting its tasks that are performed as well as requests, queries or user input.

1. major or critical application errors
2. users login/logout
3. modification of application settings (security settings, logging settings, operational settings)
4. (optional) business data modifications

6.5 Object access, permissions

If possible application should have restrictions on objects (files, items or tables) so that only authorized sources can read, modify or delete them.

Fx. Access to SNMP system IDs in NetCool database should be limited to NetCool administrator only.

Oracle progressor database access granted only to progressor application.