Solaris Users Group

What is new & cool in Solaris 9?

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Anatomy of Solaris 9

* This is my method of explaining Solaris 9 - not Sun's.
SunOS 5.9

What is new?
- Security enhancements
- Solaris Logical Volume Manager
- Solaris Resource Manager
- 'Linux Compatibility' & more Freeware
- Kerberos V5 Server
- Sun ONE Directory Server - LDAP

What isn't in Solaris 9?
- Support for sun4d architecture (SS1000/SS2000)
- OpenWindows Environment (XView apps still run)
crlc

- crle is kind of like ld.so.conf under GNU/Linux
- This was in Solaris 8
- No need to mess with LD_LIBRARY_PATH.
- Don't forget there is a correct way to compile
- LD_LIBRARY_PATH is a kludge as is a long crle configuration.

Example: adding /usr/local/lib as a valid library search path

[jed@moonunit] ~ > crle -l /usr/local/lib -l /usr/lib -s /usr/local/lib
rbac

• Role based access control
• Allows users to assume new roles to run scripts or applications
• Included since Solaris 8
• Integrated support for many Solaris utilities and SMC applications.

Example use:
Root shouldn't be able to login, only su or single user-mode as root. Must be user jed to su:

```
/etc/user_attr
root::::::::type=role;auths=solaris.*,solaris.grant;profiles=All
jed::::::::type=normal;auths=solaris.system.dat;roles=root;profiles=All
```

[bob@moonunit] ~> su
Password:
Roles can only be assumed by authorized users
mdb

• Replacement for adb & crash (EOL)

• Valid targets are:
  • user processes
  • user process core files
  • Live Kernel
  • OS crash dump
  • user process images in OS crash
  • ELF objects
  • Raw data files

• Can execute adb macros (/usr/lib/adb)

• Many builtin dcmds (:::system)

# mdb -k
Loading modules: [ unix krtld genunix ip ufs_log nfs random ptm ipc logindmux ]
> $<msgbuf
SunOS Release 5.9 Version Generic 32-bit
0x7006f733: Copyright 1983-2002 Sun Microsystems, Inc. All rights reserved.
Use is subject to license terms.
Secure X Server

A new flag for Xsun prevents the X server from accepting connections (i.e, xhost + will no longer function)

You must use SSH to have remote applications display on your local Xserver. This will add an additional layer of security and prevent a someone from remotely watching the Xserver due to a misconfiguration.

# Xsun -nolisten tcp -nolisten pipe

IKE

• Internet Key Exchange (IKE) Protocol, automated key exchange for IPsec
• IKE manages keys and refreshes keys for IPV4
• in.iked daemon starts at boot time
Generic Log Rotation

- logadm is run automatically by root's crontab
- /var/log/syslog, /var/adm/messages, /var/cron/log, /var/lp/logs/lpsched, /var/adm/pacct are all rotated by logadm
- Configuration file is /etc/logadm.conf
- Use this to rotate Apache or ftplib logs

FTPD

- Sun's ftplib server has been replaced by Washington's wu-ftplib
- Configuration files live in /etc/ftplib
- ftpconfig $HOME/ftp configures chroot anonymous ftp
- default banner /etc/ftplib/banner.msg
Multi Page size support

- Sun hardware can support multiple page sizes
- Solaris 9 can handle any of them
- Dramatic improvement of large memory & memory intensive applications

```bash
E450 with Solaris 9
# pagesize -a
8192
65536
524288
4194304
```

E250 with Solaris 8

# pagesize -a
8192

MPO Kernel

- Solaris 9 09/02 update, Beta available now
- This will add memory locality information to the kernel
- Sun Fire 3800-15K system only
- Currently a Pseudo-round-robin policy setup at boot time
- Examine STREAM data for results of this (54.6GB/s)
UFS Snapshots

- Very useful feature, originally in Solaris 8
- Need backing store on *another* file system (tmpfs, ufs, nfs)

```
/usr/sbin/fssnap -o bf=/var/tmp /
mount -o ro /dev/fssnap/0 /mnt
```

- Use this for backups or testing
- Raw files available too! (for ufsdump, etc)
- Solaris 9 allows for on-line snaps of live FS
- Solaris uses COW; this requires the backing store
Secure LDAP Client

- Supports access over SSL and CRAM-MD5 encryption with new libraries
- Provides for strong encryption between LDAP server and client
- Fully secure replacement for NIS+ and NIS naming services

Pseudo-Random Number Generator

- Sun supplied /dev/random & /dev/urandom
- Kernel level driver protects entropy pool and collects data to produce randomness from kernel memory pages
- The PRNG provides standard interface for ISV's and users of crypto & scientific applications access to a highly random number generator
- No more extra prng packages (entropy gathering daemons)!
Kerberos 5

Kerberos V5 Server
• New GUI and CLI administration tools!
• KDC Integrated. Issues tickets for the clients
• Principle Database Replication system to duplicate KDC database to a backup server
• Enhanced DES operations - tuned for speed

Password interoperability
• Kerberos V5 passwords can be changed from a Solaris client to a MIT Kerberos server and Windows 2000

Other features
• The Solaris 9 Kerberos PAM module now supports password aging.
• Kerberos server is now included in the core Solaris release.
• Addressless tickets, tickets can be given without specifying addresses.
• NFS Services can be secured easily with Kerberos V5.
New threads library

• Solaris 9's multithreading libraries are much improved and faster.

• Solaris threads provide the ability to suspend and continue a suspended thread. Unique feature.

• This was the alternate libthread in Solaris 8

• Must link with -lthread

• This is not the POSIX thread library

• Solaris threads are *not* POSIX compliant.

• pthreads, of course, are still available with -lpthread
New Scheduling Classes

• Solaris has had TS/IA, SYS, and RT
• Solaris 9 adds FX & FSS
• FX is fixed priority – priorities do not change  * NEW *
• FSS is used by the Fair Share Scheduler  * NEW *
• Can change all threads to FSS class: dispadmin -d FSS
• Dispatch table is easily modified and compiled or imported as text
• A low priority thread can still use 100% of resources if only runnable thread on system
Solaris 9 Resource Manager

• One of the coolest features of Solaris 9
• Users, Groups and projects can be managed
• Integrated into SunOS via project system
• rctladm modifies and displays resource controls
• Tunable parameters:

  project.cpu-shares
  task.max-cpu-time
  task.max-lwps
  process.max-cpu-time
  process.max-file-descriptor
  process.max-file-size
  process.max-core-size
  process.max-data-size
  process.max-stack-size
  process.max-address-space
Fine-grained Partitioning

Share-based resource control

Multi-levels to manage
Solaris Logical Volume Manager

• Was Online DiskSuite, was Solstice Disk Suite, now SLVM
• Part of core OS, no longer EA packages
• DiskID support recognizes moved disks (moved controllers)
• 8,192 volumes per device
• No more Metatool; Use SMC or WBEM compliant app
• Can upgrade OS with metadevices intact!
• CLI is the same, locations are now standard (/etc/lvm)
• Daemon to monitor metadevices for failures

edit /etc/rc2.d/S95svm.sync and stop
and start service
from $MDMONITORD to $MDMONITORD -t 3600
Solaris Management Console

- SMC on an E450
- SPARC really is a FASTER CPU
Bundled {Soft,Free}ware

/usr/sfw
/opt/sfw

......
TCP Wrappers

• Solaris 9 has the best support for TCP Wrappers available.

• The Solaris Internet Super Server (inetd) has been linked against the libwrap library.

• No need to modify /etc/inetd.conf for each service all streams, nowait services will automatically be wrapped.

• To enable logging & wrapping of all incoming TCP services started from inetd, edit /etc/default/inetd:

  ENABLE_TCP_WRAPPERS=yes
  ENABLE_CONNECTION_LOGGING=yes

• Then SIG HUP inetd daemon (# pkill -HUP inetd)

• To configure TCP Wrapper rules consult man page on hosts_access.

Example fun TCP Wrapper rule (/etc/hosts.deny):

```
in.fingerd : ALL : spawn (echo "Finger detected from %h at `date`" | /usr/ucb/mail -s "Intruder Alert! Intruder Alert!" jed@wgtech.com)
```
Secure Shell (SSH)

- New for Solaris 9 & enabled by default
- Based on OpenSSH from OpenBSD (http://www.openssh.com)
- SSH v1 & 2 (1 disabled due to security)
- Linked against libwrap
- Can display banner when using compliant ssh clients! (/etc/issue)

What is it?
Drop in replacement for telnet, ftp, rcp and login services. Provides an encrypted remote access method to UNIX. Compiled with support for BSM and PAM. Sun modified to support internationalization, SOCKS and HTTP proxy support. Does not use UseLogin service

Cool features:
X Window tunneling
Local & Remote port forwarding

[jed@grover] ~ > mconnect -p 22 moonunit
connecting to host moonunit (10.10.203.10), port 22
connection open
SSH-2.0-Sun_SSH_1.0
Perl

• Perl is one of the most (if not THE most) popular scripting languages. Still.

• Sun is now including perl scripts with the OS.

• Kstat is a great example. This is provided as a perl script with an interface to a Perl module 'kstat.pm'. Use this to get kernel statistics right from the kernel.

• Solaris 8 included Perl version 5.00503

• Solaris 9 now has 5.6.1 and 5.00503 (/usr/bin/perl -> /usr/perl5/5.6.1/bin/perl)
Apache 1.3.22

• In Solaris 9 core
• Compiled in support for mod_perl, mod_java (Jakarta Tomcat), mod_rewrite, mod_imap, and many many more
• EAPI !! Drop in module support (no recompile)
• ServerRoot = /usr/apache

To run webserver:

```
cp /etc/apache/httpd.conf-sample /etc/apache/httpd.conf
/etc/init.d/apache start
```

/etc/apache -> configuration directory    /var/apache
/usr/apache -> binaries and docs

```
bin
htdocs
include
jserve
libexec
man
perl5
tomcat
cgi-bin
htdocs
icons
logs
proxy
erservlets
tomcat
```
To configure the Samba SMB server:

```bash
cp /etc/sfw/smb.conf-example /etc/sfw/smb.conf
/etc/init.d/samba start
```

- Init starts smbd and nmbd at run level 3
- `smbclient`, `smbstatus`, `smbtar`, etc are in `/usr/sfw/bin`
- `smbd` and `nmbd` are in `/usr/sfw/sbin`
- Swat is web-based system administration utility. To enable:

```bash
# echo "swat 901/tcp # SWAT server" >> /etc/services
# echo "# samba swat server" >> /etc/inetd.conf
# echo "swat stream tcp6 nowait root /usr/sfw/sbin/swat swat" >> /etc/inetd.conf
# pkill -HUP inetd
```
smpatch

• New utility to manage patches, part of SMC
• Must have smc services running (/etc/init.d/init.wbem)
• Must have PatchPro (www.sun.com/PatchPro) installed on the system and takes sometime to configure secure certificates for the Solaris Management Center
• Can create custom patchlists by analyzing each machine and downloading patches to local server.
• Security is handled via SMC and RBAC defined roles
• Specify names of servers with a file (-x mlist=hosts.txt)
# ./pprosvc -l

Assessing patches needed for your system...

..................................
Retrieved patch list...
Required patches.
112787-01 X11 6.6.1: twm patch

# ./pprosvc -i
Assessing patches needed for your system...

.............................
Retrieved patch list...
Downloading patches to /var/spool/pkg/patchpro...
112787-01 has been applied.
Purging /var/spool/pkg/patchpro/112787-01
/var/spool/pkg/patchpro/patchpro_dnld_2002.06.17@15:42:19:EDT.txt has been moved
to /var/spool/pkg/patchproSequester/patchpro_dnld_2002.06.17@15:42:19:EDT.txt
SunONE Directory Server

• The directory formerly known as iPlanet Directory Server

• idsconfig (/usr/lib/ldap/idsconfig) loads Solaris auth schema

• I found a bug! idsconfig script does not correctly quote password string.

• Tools are better than NIS+, still room for some work

• Scripts and utilities provided to convert from NIS+ to LDAP

• Only supports Solaris 8 & 9 as clients

• PAM module pam_ldap
Misc New Features
'Cool' features

- **CDRW**
  Was on Solaris 8 Supplemental Software CD
  use to write CD filesystems. Extract audio.

- **Audio Updates**
  Improved audio quality and performance.
  Audio demo files moved to
  `/usr/share/audio`

- **NCFTP**
  Popular FTP client

- **TrueType fonts**
  Provides a common appearance between multiple codesets.

- **gtar**
  GNU Tar provides 'better' Linux compatibility.
  Ability to gunzip at same time as extraction (tar -xZvf)
'Cool' Features cont.

• **Info**  
  Browser for many opensource/freeware package's documentation. Alternative to manual pages, (man)

• **du,df,ls**  
  Disk usage and file system sizes now display using "Human Readable" sizes.

```
[jed@moonunit] ~ > df -Kh
Filesystem            size  used   avail  capacity Mounted on
/dev/dsk/c0t0d0s0     6.3G  960M   5.3G   16%    /
...........
/dev/dsk/c0t0d0s3     1.6G  551K   1.5G   1%     /opt
swap                   658M  624K   658M   1%     /tmp
/dev/dsk/c0t0d0s7     15M   9K     14M   1%     /test
```

• **rpm2cpio**  
  Convert RPM files into cpio for easy extraction. Use with source rpms to recompile for Solaris.
'Cool' Features cont.

• **pargs and preap**
  New commands enable viewing of command arguments of a running process:

  ```bash
  [jed@moonunit] ~ > pargs 9735
  9735:  xterm -title home -fg green -bg black
  argv[ 0]: xterm
  argv[ 1]: <NULL>
  argv[ 2]: home
  argv[ 3]: -fg
  argv[ 4]: green
  argv[ 5]: -bg
  argv[ 6]: black
  ```

• **GNU-ified diff**
  Sun diff now supports GNU-style diff format (single printing of diffs. The same applies to sccs-sccsdiff

• **GNU patch**
  GNU patch is available as gpatch along side Sun patch for producing and apply source code patches.
Linux Compatibility

- GNU/Linux systems are popular due to incredible amount of cool OpenSource/freeware software
- Linux is just kernel and pretty small
- Sun has taken many OpenSource & freeware libraries, added functionality (posted patches *back to the community*) and added to Solaris 9 base!
- These libraries let thousands of GNU/Linux and other opensource/freeware applications run 'out of the tarball':
  - Glib
  - GTK+
  - JPEG
  - Libpng
  - TCL/TK
  - libtif
  - libxml2
  - Zlib
# Freeware included with Solaris 9

## Application/Editors
- emacs-20.7
- gawk-3.0.6
- joe-2.8
- sed-3.02 (GNU)
- vim-6.0.11
- xemacs-21.1.14

## Application/Networking
- fetchmail-5.8.0
- lynx-2.8.3
- mutt-1.2.5i
- nmap-2.53
- nmh-1.0.4
- pine-4.33
- procmail-3.15
- rsync-2.5.2
- slrn-0.9.6.2
- snort-1.8p1
- tcpdump-3.6.2
- w3-4.0pre46

## Application/Utilities
- a2ps-4.13
- afio-2.4.6
- cdrecord-1.9
- ctags-5.2.1
- diffutils-2.7
- enscript-1.6.1
- emacs-14.0
- emacspeak-1.7
- expect-5.31
- file-3.35
- fileutils-4.1
- findutils-4.1
- gcal-3.01
- gettext-0.10.35
- gnuplot-3.7.1
- gv-3.5.8
- imagemagick-5.3.3
- ispell-3.2.06
- mpack-1.5
- mpage-2.5.1
- mpg123-0.59r
- mySQL-3.23.43
- plotutils-2.4.1
- rpm-4.0
- screen-3.9.8
- sgrep-1.92a
- sh-utils-2.0
- sharutils-4.2.1
- sudo-1.6.5p2
- top-3.5beta12
- textutils-2.0
- unwindows-1.1.2
- uudeview-0.5.13
- workman-1.3.4

## Desktop/Environment
- KDE-2.2.2
- KOffice-1.1.1
- XFce-3.7.2

## Development/Languages
- aalib-1.2
- bison-1.28
- flex-2.5.4a
- gcc-2.95.3
- m4-1.4 (GNU)
- python-2.2
- ruby-1.6.4
- tclX-8.2.0
- audiofile-0.1.9
- esound-0.2.18

## Development/Tools
- autoconf-2.13
- automake-1.4
- binutils-2.11
- cvs-1.11
- ddd-3.3
- gdb-5.0
- global-4.3.1
- make-3.79.1 (GNU)
- fnlib-0.5
- freetype-1.3.1
- gtkengines-0.10
- guile-1.3.4
- imlib-1.9.8.1
- less-0.92.26
- libdb-3.0.55
- libmpeg-1.3.1
- libpcap-0.6.2
- libungif-4.1.0
- libXpm-3.4
- libxslt-1.0.8
- ncurses-5.2
- qt-2.3.2
- readline-4.2
- slang-1.4.0
- SDL-1.1.5
- Xaw3d-1.5

## X/Applications
- ascii-1.0
- etheereal-0.8.15
- ghostview-1.5
- gimp-1.2.1
- gphoto-0.4.3
- rxvt-2.6.3
- stardic-1.3.1
- vnc-3.3.3R2
- xmcd-3.1
- xmms-1.2.5
- xterm-1.46

## X/Desktop Managers
- afterstep-1.8.8
- fvwm2-2.4.3
- WindowMaker-0.80
 GNOME 1.4

• Download from web or on media kit
• Sawfish WM
• Pretty damn stable
GNOME 2.0 (B)

• Metacity window manager replaces Sawfish
• Supports multiple displays
• Nautilus
• GA for Solaris 9U1
• Will be default WM/Env
URLs of Interest

http://soldc.sun.com/tech_topics/sol_9/

http://docs.sun.com/?p=/prod/solaris.9

http://www.sun.com/software/star/gnome/beta/get

http://www.sunfreeware.com

http://www.sun.com/blueprints
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