Solaris For Linux Admins

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Why Is This Topic Worth Discussing?

- Solaris has lots of features for backwards compatibility that aren't immediately understandable
- Some things in Solaris are completely unlike anything in Linux
- Some Solaris tools, although they might have the same name as the GNU/Linux equivalent, don't work quite the same

Where to Start?

- How about the automounter?
  - The automounter automatically mounts remote filesystems
  - Linux has one, but it is rarely used
  - Solaris is designed with the assumption that your home directory is *NOT* on the local machine
  - Solaris gives you /home for remotely mounted home directories. /home is under the control of the automounter and isn't for local use unless you disable autofs (or at least autofs control of /home)

So What's /export?

- /export is kind of a general dumping ground
  - It's usually the largest file system
  - There might be an /export/home, under which are local user directories
  - This is where many (but not all) directories shared via NFS live
  - You might see zones created under here

What else does the automounter do?

- There's also a /net
  - Things under /net are mounted by machine name
  - If you want to see what server 'sol' is sharing, cd to /net/sol and you'll see its share automagically mounted
- You might see the automounter referred to in the context of 'autofs'

Other Differences

- /proc does roughly the same thing in Solaris as Linux – keep track of processes
    - Unlinke Linux, it is not something that you can use to tweak the kernel. It only relates to running processes
    - For kernel tuning, you probably want /etc/system (much like /etc/sysctl.conf) or the 'ndd' command
    - There's no way to re-read /etc/system on the fly. Changes won't take effect until the next reboot

What's All This Stuff Under /usr?

- /usr/5bin -> symlink to /usr/bin. Specifies System V binaries
- /usr/adm -> symlink to /var/adm (which is roughly like /var/log in Linux)
- /usr/aset -> 'Automated Security Enhancement Tool' root:root 700
- /usr/ccs -> Solaris development tools (but not a compiler). These are NOT the GNU tools you're used to
- /usr/dt -> Desktop stuff from CDE

What's the Rest of This Stuff Under /usr?

- /usr/kernel -> bits of stuff that's related to /kernel
- /usr/kvm -> ignore it. Historical interest only
- /usr/openwin -> OpenWindows files
- /usr/platform -> architecture-specific files and utilities. 'prtdiag' lives here
- /usr/proc -> symlinks to process tools under /bin
- /usr/sadm -> sysad-type files (really the only interesting one is smc (Solaris Management Console)

But Wait, There's More!

- /usr/sfw -> Sun Freeware (lots of GNU stuff. GNU tools are prefaced with a 'g', as in 'gtar')
- /usr/ucb -> BSD tools
- /usr/xpg4,/usr/xpg6 -> POSIX-compliant stuff
- /usr/X -> symlink to /usr/openwin
- /usr/X11R6 -> symlink to /usr/X11
- /usr/X11 -> xorg stuff
- /usr/local -> only if you create it

/tmp

- /tmp is carved out of swap space
  - The size of /tmp is defined in /etc/vfstab (which is the equivalent of /etc/fstab in Linux)
  - It is cleared out at every reboot

/root

- There is none
  - Root's home directory is /
  - You can create /root if you want

sudo

- It doesn't ship with Solaris
  - The preferred way to delegate power is via RBAC (role-based access control)
  - This is why lots of Sun docs say "Become root or assume an equivalent role"
  - RBAC can be confusing and many people ignore it, but it's powerful
- You can install sudo from source if you want, and it works

Miscellaneous Commands

- The 'ps' in your path is the System V 'ps'
- 'tar' doesn't support -z or -j
- 'awk' doesn't handle really large text files
- Most native Solaris commands don't support long ('--') option formats

NFS servers

- NFS shares are configured in /etc/dfs/dfstab
- Or you can use the 'share' command
- Or if you're sharing from a ZFS filesystem, you can set the 'sharenfs' property
- But you can't edit /etc/exports, because there is none

Monitoring Tools

- There's no 'top', but 'prstat' serves the same function
- There's also vmstat, netstat, iostat, and mpstat (mpstat is a per-processor vmstat)
- ZFS has its own iostat ('zpool iostat')
- No native 'lsof', but 'pfiles *pid*' will give you much the same information.
- There are lots of process-specific tools – do 'man pfiles' for information

Kernel and Kernel Modules

- Solaris has 'modinfo', 'modload', and 'modunload'
- Many drivers can be configured in files under /kernel/drv/

Software Packages

- Solaris uses filesystem packages and datastream packages
  - Filesystem packages are basically directories along with an instruction file saying what goes where
  - Datastream packages are basically an archived filesystem package placed into a single file
  - Either can be installed with 'pkgadd' and removed with 'pkgrm'
  - 'pkgtrans' converts between the two formats
  - Solaris does not have nearly the dependency checking of .deb or .rpm. Think 'Slackware' in terms of Solaris package complexity.

Patching

- Patches have the same layout as filesystem packages
- They are installed with 'patchadd' and removed with 'patchrm'
- Or you can install an entire patch cluster
- Patch information is saved under /var/sadm/ patch. This information is needed in the event you want to back out a patch
- There is an 'smpatch' tool which ships with Solaris, or 'pca' is a convenient third-party tool

Services/Processes

- Solaris 10 uses SMF (Service Management Facility)
    - You either enable something or disable it. If it's enabled, the system will make sure it stays running if at all possible
    - Errors preventing a service from running will result in that service being marked in a maintenance state. Fix the problem, clear the maintenance state, and the system will attempt a restart of the problem process

Services/Processes, Part II

- Services are configured in XML files under /var/svc/manifest
- The actual scripts manipulating the service are under /lib/svc/method
- Use 'svcs -av' to see all available services
- Use 'svcadm disable *svc*' to disable *svc*, and 'svcadm enable *svc'* to enable it
- 'refresh' is a third method of 'svcadm'. It is usually used to tell a daemon to re-read its config files.
- 'kill' won't permanently stop a process

Third-Party Repositories

- SunFreeware: http://www.sunfreeware.com
  - Not nearly as important now that Sun is shipping more open-source code (see /usr/sfw if you think you're missing something)
- BlastWave: http://www.blastwave.org
  - Gives you something resembling apt-get to install third-party packages. Lots of redundancy (you want to install pkg 'foo' which requires Perl? You'll get another copy of perl!)

Disks

- Labeled cXtXdX (controller,target,disk) for SCSI disks, or cXdX (controller, disk) for SATA disks
- Sliced (think partitions, more or less) with the 'format' command on SPARC. fdisk on x86 creates a MS-DOS slice
- 'newfs' creates a UFS filesystem
- ZFS doesn't need a 'newfs' step

Disks, Part II

- Disks have 'raw' (/dev/rdsk/*) and 'cooked' (/dev/dsk/*) device nodes...always format the raw node and mount the 'cooked' node
- Removable media is handled by vold, the removable volume management daemon.
- Run the 'volcheck' command if you think vold isn't seeing your media

Software RAID/Volume Management

- If you're using UFS, your only choice is the Solaris Volume Manager, which does RAID 1 and RAID 5
- SVM requires a small (20M or so) slice for state database replicas
- SVM is fairly complicated to administer
- ZFS can handle much more complex volume configuration, and is easier to adminster than Linux LVM
- Newer Solaris releases use ZFS by default

Hardware

- /usr/platform/*platform_name/*prtdiag
  - *platform_name* is likely i86pc, sun4u or sun4v. Check with 'uname -a'
- prtconf – difficult to read
- can get boot information from /var/adm/messages
- physical device paths are under /devices
- device nodes are under /dev. They are mostly symlinks to /devices/

Hardware, Part II

- device numbers can be changed in /etc/path_to_inst
- hot-plug with 'devfsadm' or 'cfgadm'

Network Configuration

- The hostname (not FQDN) goes in /etc/nodename
- hostname and IP address for each interface go in /etc/hosts
- netmasks for each network go in /etc/netmasks
- /etc/hostname.(interface) associates an interface with an IP address/hostname pair in /etc/hosts
- default router goes in /etc/defaultrouter

Network Configuration (part II)

- /etc/resolv.conf is exactly the same as on Linux
- There is an /etc/nsswitch.dns, an /etc/nsswitch.ldap, an /etc/nsswitch.files, etc. Copy the appropriate one to /etc/nsswitch.conf
- reboot, or 'svcadm refresh network/physical'
- dhcp: create /etc/dhcp.(interface)
- OpenSolaris uses network manager – much easier to use DHCP than static IPs

Network Configuration (part III)

- Use 'netstat -nrv' to see routes
- The syntax for the 'route' command is slightly different than in Linux
- Interfaces must be 'plumbed' with 'ifconfig' before they are even visible. 'unplumb' essentially removes the interface from the system

Questions?

References

- http://www.cuddletech.com/blog/pivot/entry.php?id=562
- http://www.cuddletech.com/blog/pivot/entry.php?id=573
- http://www.sun.com/software/solaris/sysadmin_guide.pdf