

SCO Forum 2006

MOBILITY EVERYWHERE >



Presentation Title: SCO UNIX diagnostics and troubleshooting
Presenter's Name: Alex Sack & Richard Harry
Session ID: 132

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 - Get your passport stamped
 - By breakout session instructors
 - By exhibitors in the exhibit hall
 - Turn in your Passport
 - After the last breakout session on Wednesday
 - Drawing for great prizes for Wrap-up Session
- Remember to complete the breakout session evaluation form, too

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SCO Forum 2006
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Turn in this card at the Registration and Information desk. Prize drawings will be held during the Closing Session of SCO Forum, at 4pm on Tuesday, August 9th. You must be present to win.

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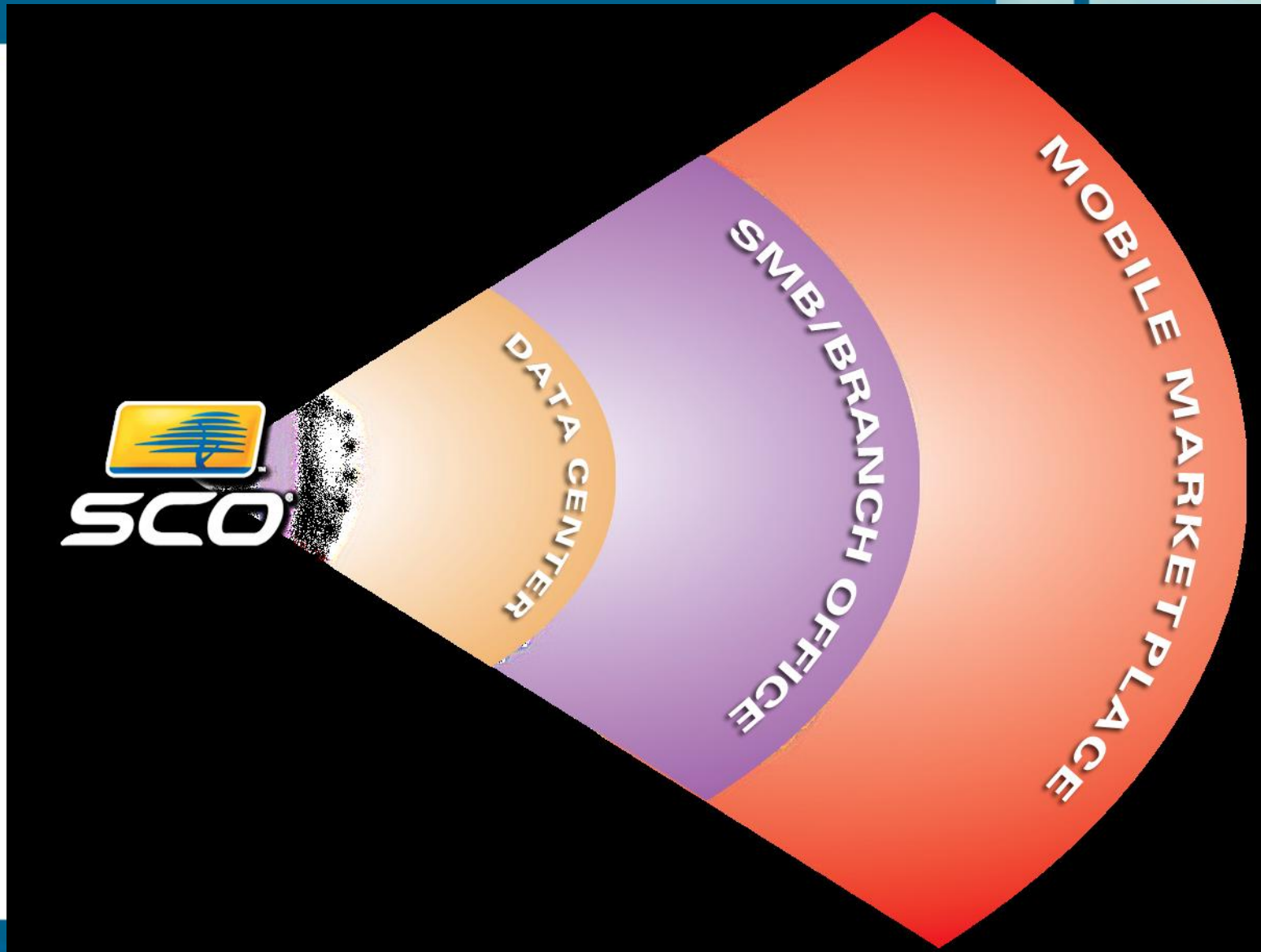
Breakout Sessions

Monday: ○ ○ ○
Tuesday: ○ ○ ○

Tradeshow

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SCO Automates Transactions



SCO UNIX Products



Agenda



- Initial System Load
- Common Hardware Issues
- Common Software Issues
- System Tuning
- Network Diagnostics
- Reporting Problems
- Q & A



- Understand the hardware specs of the system you are trying to deploy:
 - Has this system been certified by the OEM?
 - Will I need an HBA diskette during install?
 - Is my network card supported?
 - Does X support my graphics chipset?
 - Xorg 7 coming soon for both OSR6 & UW7
 - How much disk space do I need?
 - How do I want to layout my partitions and slices?
 - What software do I want installed?



- During ISL you can use the console to debug issues:
 - Press "Alt-SysReq-H" or "Alt-Cntrl-H" to enter the console
 - Press "Alt-SysReq-F1" or "Alt-Cntrl-F1" to proceed with ISL
 - Access to the resmgr
 - Access to ISL scripts in /isl/ui_modules
 - Record any console messages when reporting a problem
- **IVAR_DEBUG_ALL=1**
 - Enables ISL logging
 - Log files are dumped in /tmp/log
 - Transfer logs to a floppy disk using cpio:
 - "find /tmp/log/* | cpio -oc -O /dev/dsk/f03ht"
 - "cpio -ic -I /dev/dsk/f03ht"



- Root HBA not found after the DCU runs
 - Do you need a third-party diskette?
 - Are you using software based RAID?
 - Do you have valid media?
 - Did your USB floppy get recognized properly?
 - If you have very new hardware, try using the DCU to bind the driver to the HBA instance manually
 - Press "F8" to run the DCU
 - Go into "Hardware Device Configuration"
 - Press "F2" under "Device Name" and select appropriate driver
 - NOTE: If hardware is not supported, could result in panic!



- IDE hangs or fails to recognize my devices
 - Latest IDE driver supports Native PCI mode and Intel's Enhanced Mode on ICH flavor chipsets
 - Slave only configurations are not supported!
 - Check your jumpers
 - Cable Select is not always reliable
 - Check chipset mode in BIOS



- Red screen when ISL tries to mount CD-ROM
 - ATAPI_DMA_DISABLE=Y
 - Some drives claim they can do bus mastering (DMA) but really can't (e.g. some older Proliants)
 - Check the BIOS and make sure the device was properly enumerated and DMA is active
 - DMA depends on both the controller and ATAPI drive
 - Go with a native SATA chipset (e.g. AHCI).



- My NIC is not auto-detected
 - Is there a driver available for SCO on the OEM website? e.g. Marvell Yukon
 - If the NIC is a newer version of an existing chipset, it could be a board id issue? Check SCO website.
 - network drivers, pkgadd for both OSR6 & UW7
 - If you need a third-party driver, defer networking, install driver package after ISL completes, and use SCOadmin Network to configure card



- PANIC: `vfs_mountroot()` failure
 - This panic occurs when the kernel loads but the root disk is not detected
 - Check to see you installed to the right disk!
 - During ISL you can “Select alternate root disk” during the “Setting up your hard disks” screen.
 - Make sure the BIOS boot order is setup properly
 - A common reason for this failure is a lack of `$static` in the HBA driver’s System file
 - Make sure the BIOS enumerated the disk properly



- Screen goes blank after ISL kernel initially loads
 - Does your graphics chipset support VESA mode?
 - `USE_VESA_BIOS=Y`
 - Tells the kernel to use standard VESA BIOS calls instead of relying on the ECM tables on the card
 - Cards that use system memory for the framebuffer can cause issues (e.g. Intel Extreme Graphics chipsets)
 - Most modern graphic chipsets are supported by ISL

Common Hardware Issues Migrating Disks to OSR6



- To migrate a disk from OSR506, OSR507 or UnixWare to OSR6:
 - You MUST install the wd supplement on the OSR506 or OSR507 disk BEFORE migrating the disk!
 - OSR6 does not support UW style extended VTOC slices
 - Please administer the disk on the source system before moving the hardware to the target system
 - The divvy command can be used on OSR6 and OSR506 & OSR507 disks with the wd supplement installed
 - You can not convert a UW VTOC layout disk to an OSR6 VTOC/DIVVY dual format disk
 - Always backup your data!



- Multi-core support – OSR6/UW714
 - Multi-core CPUs require ACPI which is not in the mini-kernel during ISL
 - ISL using PSM=atup, add latest maintenance pack, rebuild, reboot. Support for both AMD & Intel multi-core.
 - 507 may work but could be licensing issues
 - ENABLE_JT=Y (to turn on logical processors)
 - MULTICORE=N (to turn off physical processors)
 - USE_XAPIC=Y (to use XAPIC on hardware that does not advertise itself properly – some IBM hardware)
 - psradm/psrinfo (to get status and turn on individual processors)



- Commands timing out or hang right after copyright displayed
 - Interrupt Routing
 - xapic ID, workaround patch coming soon ACPI=X
 - hybrid MPS/ACPI boot
 - PnP OS set to NO in the BIOS
 - Change PSM



- Root filesystem is left dirty on a soft reboot
 - BIOS Power Management settings
 - Turn off aggressive power management in BIOS
 - Check battery on RAID adapter
 - Check firmware revision
 - Check driver version – IHVVERSION field
 - Check target
 - Look for CHECK CONDITIONS and other messages in osmlog



- May not be a hardware problem
- OSR6 dirty filesystems not checked due to a bug with /etc/mountall and filesystem specific fsck code
 - The version specific fsck commands for vxfs and dosfs (under directory /etc/fscmd.d) have been changed to accept the -a flag.
 - OSS706B will contain this fix.



- Useful BOOT PARAMETERS:
 - ATAPI_DMA_DISABLE
 - AHCI_NCQ
 - ENABLE_PCI32
 - ACPI
 - ENABLE_JT
 - PSM
 - IVAR_DEBUG_ALL
 - MULTICORE
 - ASYC_EDGE
 - ENABLE_4GB_MEM



- debug for user level debugging
 - part of Development System
 - command line interface –ic or graphical interface
 - debug multi-threaded apps
 - compile app with –g
- OSR6 development system, only SVR5 ABI C compiler without development system license
 - Two ABIs (Application Binary Interface)
 - -Kosr -Kudk



- You've added a new card e.g. SCSI controller for a tape device and it's not working.
- All OSR6/UW7 HBA drivers are not installed by default.
 - Only hardware present at ISL has device drivers installed.
 - CD1 is also an HBA CD
 - `pkgadd -d cdrom1 <driver_pkg_name>`
 - How to know what driver to use?
 - `resmgr` to list the storage drivers
 - device IDs in the `Drvmap` file

Common Software Issues



The screenshot shows a desktop environment with a blue background. On the left side, there is a vertical column of icons: 3rd-Party Solutions, Trash, Account Manager, UNIX, Home, World Wide Web, License Manager, Printer, Product Information (SCO logo), SCO Edit, SCO Help, SCO Mail, SCOadmin, and Software Manager. In the center, a terminal window titled 'UNIX' is open, displaying the output of the command 'sdiconfig -l'. The output shows hardware configuration details for HBA, DISK, and CDROM. On the right side of the desktop, there is a large 'SCO OpenServer' logo. At the bottom, a taskbar shows a window titled 'UNIX' with a task number of 2, and a system tray with a clock showing 21:44. The text 'STABLE SE' is visible vertically on the right side of the terminal window.

```
UNIX
File Edit Options Help
# sdiconfig -l
0:0.4.0: HBA      : (ahci.1) AHCI SATA
0.0.0: DISK      : Maxtor 6B300S0   BANC
0.3.0: CDROM     : PLEXTOR DVDR    PX-716A  1.04
#
```

Common Software Issues



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```
UNIX
File Edit Options Help
# mount -r /dev/cdrom/cdrom0 /mnt
# ls /mnt
.extra.d          ahci          flashpt         opt
aacraid           amd           hpsas          qlc1020
adpu320           b1c           i2o0SM         qlc12160
adsa              boot.image    ida             qlc1280
adsb              c8xx         ide             qlc2100
adsc              ciss         iir            qlc2200
adse              cpqsc        info           qlc2300
adsl              dak          install.catalog readme.1st
adss              dpt          mega
adst170          etc          mpt
#
```

Common Software Issues



The image shows a UNIX desktop environment with a blue background. In the foreground, there are two terminal windows. The top window displays a file system listing with various entries like 'tun', 'm320', 'vtoc', 'usb_msto', 'net1', 'sd01', 'sc01', and several 'usbprobe' and 'usb_hub' entries. The bottom window shows a search command being executed: '# find /mnt -name Drvmap -exec grep 90048178 {} \; -print'. The search results show a path: '/mnt/adsl/root/tmp/adsl/Drvmap'. The desktop has several icons on the left: 'SCO Edit', 'SCO Help', 'SCO Mail', 'SCOadmin', and 'Software Manager'. The taskbar at the bottom shows the time as 2:48 and the date as 2/3/04.

Common Software Issues



```
UNIX
File Edit Options Help
# modadmin -l adsl

UNIX <2>
File Edit Options Help
/mnt/adsl/root/tmp/adsl/Drvmap
# pkgadd -d /mnt adsl

PROCESSING:
Package: Adaptec 7800 Family PCI SCSI IHV HBA (adsl) from </mnt>.

Adaptec 7800 Family PCI SCSI IHV HBA
(i386) 8.0.1
Using </> as the package base directory.
Copyright (c) 2000 Adaptec Inc.
## Processing package information.
## Processing system information.
## Verifying package dependencies.
## Verifying disk space requirements.

Installing Adaptec 7800 Family PCI SCSI IHV HBA as <adsl>

## Installing part 1 of 1.
/tmp/adsl/Drvmap
/tmp/adsl/Master
/tmp/adsl/System
[ verifying class <none> ]
[ verifying class <unw> ]
## Executing postinstall script.
UX:idbuild: INFO: The following loadable modules will be configured now:

    adsl

UX:idbuild: INFO: Module configuration is completed.

Installation of Adaptec 7800 Family PCI SCSI IHV HBA (adsl) was
successful.
#
```

Common Software Issues



```
# modadmin -l adsl
UX:modadmin: INFO: Module adsl loaded, ID = 73
# sdiconfig -l
0:0.4.0: HBA      : (ahci.1) AHCI SATA
0.0.0: DISK      : Maxtor 6B300S0      BANC
0.3.0: CDROM     : PLEXTOR DVD-R PX-716A 1.04
1:0.7.0: HBA      : (adsl.1) Adaptec PCI SCSI
0.6.0: DISK      : MAXTOR ATLASU320_18_WLSB430
#

.../Drvmap

Family PCI SCSI IHV HBA (adsl) from </mnt>.

[ SCSI IHV HBA

Using </> as the package base directory.
Copyright (c) 2000 Adaptec Inc.
### Processing package information.
### Processing system information.
### Verifying package dependencies.
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Installation of Adaptec 7800 Family PCI SCSI IHV HBA (adsl) was
successful.
#
```



- Migrating from OSR5 to OSR6? DO NOT blindly import OSR5 tunables to OSR6
 - e.g. buffer cache has a different use in the SVR5 kernel
 - What is the performance problem you're trying to solve
 - Measurement
- `/etc/conf/bin/idtune`



- Tuning for performance
 - Where is the bottleneck?
 - use rtpm, prfstat, sar
 - application level tools prof, lprof
 - CPU
 - sar -u
 - 00:00:00 %usr %sys %wio %idle %intr
 - 00:00:01 30 10 10 46 4
 - high usr, investigate with truss, prof
 - high sys, intr, investigate with prfstat
 - high wio, storage throughput

System Tuning



The screenshot shows a UNIX desktop with a blue background. A window titled 'UNIX' is open, displaying system performance data. The window has a menu bar with 'File', 'Edit', 'Options', and 'Help'. The main content area shows a progress bar at the top with a green bar indicating approximately 25% completion. Below the progress bar, there are several sections of data:

| CPU: | | CALLS/s: | IO/s: | QUEUE: | TTY/s: | ETHER: |
|---------|-----------|----------|---------|----------|----------|--------|
| 4 %cpu | 390 calls | 0 reads | 0 runq | 0 rcvs | 0 xpkt/s | |
| 1 %usr | 0 forks | 0 rdblk | 0 %run | 0 xmit | 0 rpkt/s | |
| 2 %sys | 0 execs | 0 wrtbs | 0 %prun | 0 mdms | 0 xoct/s | |
| 2 %int | 10 reads | 0 wrblk | 0 %prun | 0 canch | 0 roct/s | |
| 0 %wio | 5 wrtbs | 0 qlen | 0 swpq | 0 rauch | 0 xerrs | |
| 96 %idl | 4 Krwch | 0 %busy | 0 %swp | 209 outh | 0 rerrs | |

| MEMORY: | | PAGING/s: | FILESYS/s: | LWPS: | NETWARE: | TCP/IP: |
|--------------|---------|------------|------------|---------|----------|---------|
| 13373 kma | 0 pgins | 10 igets | 143 lwps | 0 spx/s | 0 tcp/s | |
| 84205 frmem | 0 pgots | 126 lkups | 1 run | 0 ipx/s | 0 udp/s | |
| 155481 frswp | 0 atchs | 24 dirbk | 141 sleep | 0 sap/s | 0 icmp/s | |
| 35 %mem | 0 pflts | 96 %dnlc | 0 zomb | 0 rip/s | 0 ip/s | |
| 36 %swp | 0 vflts | 5446 inode | 84 procs | 0 errs | 0 errs | |

At the bottom of the window, it shows 'SCO_SV scosysv 5 i386' and 'Tue Aug 8 21:19:01 2006 interval: 2 (2.00)'. The desktop has several icons on the left side, including '3rd-Party Solutions', 'UNIX', 'Account Manager', 'World Wide Web', 'Home', 'License Manager', 'Printer', 'Product Information', 'SCO Edit', 'SCO Help', 'SCO Mail', 'SCO admin', 'Software Manager', and 'Trash'. The taskbar at the bottom shows the SCO logo, a home icon, a globe, and a system tray with a clock showing 11:19.



System Tuning



The screenshot shows a UNIX terminal window titled 'UNIX' with a menu bar (File, Edit, Options, Help). The terminal displays the output of the 'top' command, showing system performance metrics. The CPU usage is 100% for %cpu and %sys. The terminal also shows memory usage, paging activity, file system activity, and network/TCP/IP statistics. At the bottom, it shows the user 'SC0_SV scosysv 5 i386' and the date 'Tue Aug 8 21:42:27 2006'. The terminal prompt is '# dd if=/dev/random of=/dev/null'.

```
total -----  
%s- %u- | 10| 20| 30| 40| 50| 60| 70| 80| 90| 100|  
  
CPU: 100 %cpu 40870 calls 0 reads 0 runq 0 rcvs 0 xpkt/s  
0 %usr 0 forks 0 rdbl 0 %run 0 xmit 0 rpkt/s  
100 %sys 0 execs 1 writs 0 prunq 0 mdms 0 xoct/s  
0 %int 20230 reads 16 wrblk 0 %prun 0 canch 0 roct/s  
0 %wio 20224 writs 0 qlen 0 swpq 0 rawch 0 xerrs  
0 %idl 20224 Kruch 0 %busy 0 %swp 123 outch 0 rerrs  
  
MEMORY: 13902 kma 0 pgins 10 igets 252 lwps 0 spx/s 0 tcp/s  
83421 frmem 0 pgots 126 lkups 1 run 0 ipx/s 0 udp/s  
155533 frswp 0 atchs 24 dirbk 250 sleep 0 sap/s 0 icmp/s  
36 %mem 0 pflts 96 %dnlc 0 zomb 0 rip/s 0 ip/s  
36 %swp 0 vflts 5541 inode 86 procs 0 errs 0 errs  
  
SC0_SV scosysv 5 i386 Tue Aug 8 21:42:27 2006 interval: 2 (2.00)  
#  
#  
#  
#  
#  
#  
#  
#  
#  
#  
# dd if=/dev/random of=/dev/null
```

System Tuning



The screenshot displays a UNIX desktop environment. A terminal window titled "UNIX" is open, showing the following commands and output:

```
bash-3.1# prfsnap /foo
bash-3.1# prfsnap /foo
bash-3.1# prfpr /foo
08/08/06 21:41:26
08/08/06 21:41:35
```

| | |
|----------|-------|
| randbyte | 1.38 |
| sys_call | 96.20 |

```
bash-3.1#
```

Below the terminal window, a system monitor window titled "UNIX <2>" is visible, showing a vertical list of hash symbols (#) and a command:

```
#
#
#
#
#
#
#
#
#
# dd if=/dev/random of=/dev/null
```

The desktop background is blue with a pattern of white dots and circles. The taskbar at the bottom shows icons for system settings, home, network, and a task switcher with two windows open: "UNIX" and "UNIX <2>". The system clock in the bottom right corner shows 01:42.



- Storage Performance
 - Hardware configuration
 - Device topology
 - don't connect slow devices and fast devices on the same bus e.g. put your slow tape drive on a separate controller
 - Cabling
 - ensure your cables are up to specifications
 - Hardware RAID
 - performance RAID 0 vs integrity RAID 1 RAID 5
 - Filesystem tuning
 - fsadm, block size, increase logsize (@ mkfs only)
 - mount options; tmplog
 - ODM dramatic performance boost for \$99



- SCSI
 - Tagged Command Queuing (TCQ) depth
 - PDI_TIMEOUT/pdi_timeout
- IDE
 - "atapi_timeout" – raise when blanking DVD/CD media
 - "ide_exceptions" – add INQUIRY data of non-conforming ATAPI drive
- AHCI
 - "ahci_ncq_max_queue_depth"
 - "ahci_timer_interval"
 - "ahci_hp_func_count"
- USB
 - Powered HUBs
 - Check cables
 - BIOS options and "pkgrm usb"



- Memory
 - avoid swapping
 - DEDICATED_MEMORY, use if using shared memory
 - mkdev dedicated
 - dedicated memory reserves physical
 - saves kernel virtual
 - reduces paging, uses large mappings (PSE)
 - SEGKMEM_PSE_BYTES
 - add more memory



- Tuning for largefile support
 - HDATLIM, SDATLIM, HVMMLIM, SVMMLIM, HFSZLIM, SFSZLIM set to 0x7fffffff (unlimited)
 - /etc/conf/bin/idbuild -B && init 6
 - fsadm /mountpoint or raw device
 - fsadm -o largefiles /
 - OSR6 defaults to largefiles, UW7 does not
- Building large file aware applications
 - -D_FILE_OFFSET_BITS=64



- Network configuration
 - netconfig
 - drivers installed in /etc/inst/nd/
 - bcfg files are parsed by ndcfg
 - /etc/confnet.d/inet/interface is configured
 - at boot /etc/tcp (c.f. S69inet on UW) is run to link the driver into dlpi. initialize -U
 - STREAMS based network stack
 - ndcfg
 - useful for displaying info about the system
 - geared toward network device driver writers



- Network monitoring & tuning tools
 - netstat
 - ifconfig
 - inconfig
 - ndstat
 - ndcfg
 - traceroute
 - ping
 - tcpdump
- Common issues
 - network responds to pings but can't login
 - are the daemons running ?
 - licensed ?



- Common Networking Problems
 - network is UP but can't connect to other systems
 - is DNS configured correctly?
 - netstat -rna
 - do you have a default route?
 - network performance is poor
 - check cabling
 - ndstat -l
 - collisions
 - inconfig
 - nfsstat



- multiple hosts with the same IP or MAC
 - `arp -an` (-n disable name resolution)
 - ? (132.147.103.1) at xx:xx:xx:xx:xx:xx (802.3)
 - ? (132.147.103.9) at xx:xx:xx:xx:xx:xx (802.3)
- stopping and starting the interface
 - `ifconfig net0 down`
 - `/etc/tcp stop` – daemons stopped, NIC is UP
 - `/etc/tcp shutdown` – everything down
 - `/etc/nd stop start`



- dlpid logging
 - `dlpid -l <logfile> /etc/inst/nd/dlpidPIPE`
 - or edit `/etc/default/dlpid`
 - `LOG=<logfile>`
- NIC failover
 - automatically and transparently switch to a backup NIC in the event of failure of the primary
 - Chains of backup NICs supported



- crash
 - primarily used for panic analysis
 - /var/spool/dump
 - dumpmemory to generate a crash dump on a live system
 - crash -a <dumpfile>; will produce a listing suitable for SCO support
 - provide dumpfile, /stand/unix, all of /etc/conf/mod.d, /usr/sbin/crash
 - useful crash commands
 - ps, as, trace, u, eng, od, addstruct, help
 - walk data structures using od
 - od -f
 - ksh style history buffer
 - lsof, can save hours of fun on a live system.

Reporting Problems



- When reporting problems to support:
 - Establish a reproducible case (if possible)
 - Save any crash related files
 - Note stack trace, crash -a
 - Save system log files
 - /var/adm/
 - Include hardware specs when filing a bug
 - run sysinfo
 - Be aware of changes made to /stand/boot
 - bootparam

SCO Implementation Services



- Assessment Service
 - Evaluate Migration requirements
- Porting Service
 - Port required application
- Deployment Service
 - Assist with roll out and deployment
- Education Service
- Customized training delivered by SCO Professionals

Support Bundles and SCO System Audit



- **Support Bundles:**
 - Six month unlimited technical support - openserver 6/unixware 7.1.4
 - Multitude of upgrade options to suit business requirements
 - Single registration for product and support
- **SCO System Audit:**
 - Proactive, non-disruptive system integrity check
 - Conveniently pre-scheduled or run ad-hoc
 - Deliverables - analysis and assessment report
 - Wide range of options available for corrective actions

Contact Us



- Support Services

North America

- Phone: (800)726-6561
- Email naisr@sco.com

International

- Phone: 44 8700 994 992
- Email: suppco@sco.com

On the web

www.sco.com/support/programs

- Professional Services

North America

- Phone: (831)430-4510
- Email: yasmink@sco.com

International

- Phone: 44 1707 22668
- Email: rsutton@sco.com

On the web

www.sco.com/consulting



- Online documentation and late news

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- Knowledge base

<http://wdb1.sco.com/kb/search>

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- Certified and compatible hardware
<http://www.sco.com/chwp>
- Skunkware packages
<http://www.sco.com/skunkware>
- UnixWare & OpenServer public mailing list
legend-subscribe@list.sco.com
- OSR6 upgrade issues
osr5to6@sco.com



- Q & A