



SCO

UnixWare® 7 System Administration II: Installation, Configuration, and Maintenance

Transparency Masters

Course Release: 2.0

For Software: UnixWare 7.1

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Installation Planning

- Identify UnixWare 7 hardware requirements
- Identify UnixWare 7 products
- Complete installation checklists
- Install UnixWare 7

Default Filesystem Types

Filesystems and Raw Disk Slices

Filesystem	Description	Type	Size	Disk
=====	=====	====	===	=====
/	Root File System	vxfs	1868	1
/stand	Boot File System	bfs	20	1
/dev/swap	Swap Slice	slice	118	1
/dev/dump	Dump Slice	off		1
/home	User File System	off		1
/home2	2nd User File System	off		1
/var	Add-ons File System	off		1
/tmp	Temporary File System	memfs	10	1
/var/tmp	Temporary File System	memfs	401	
/dev/volprivate	Private Volume	slice	11	
ALTS TABLE	Alt/Sector Slice	slice	401	
ALTS TABLE	Alt/Sector Slice	off		2

(memfs sizes are included in /dev/swap size)

Disk 1 Disk 2

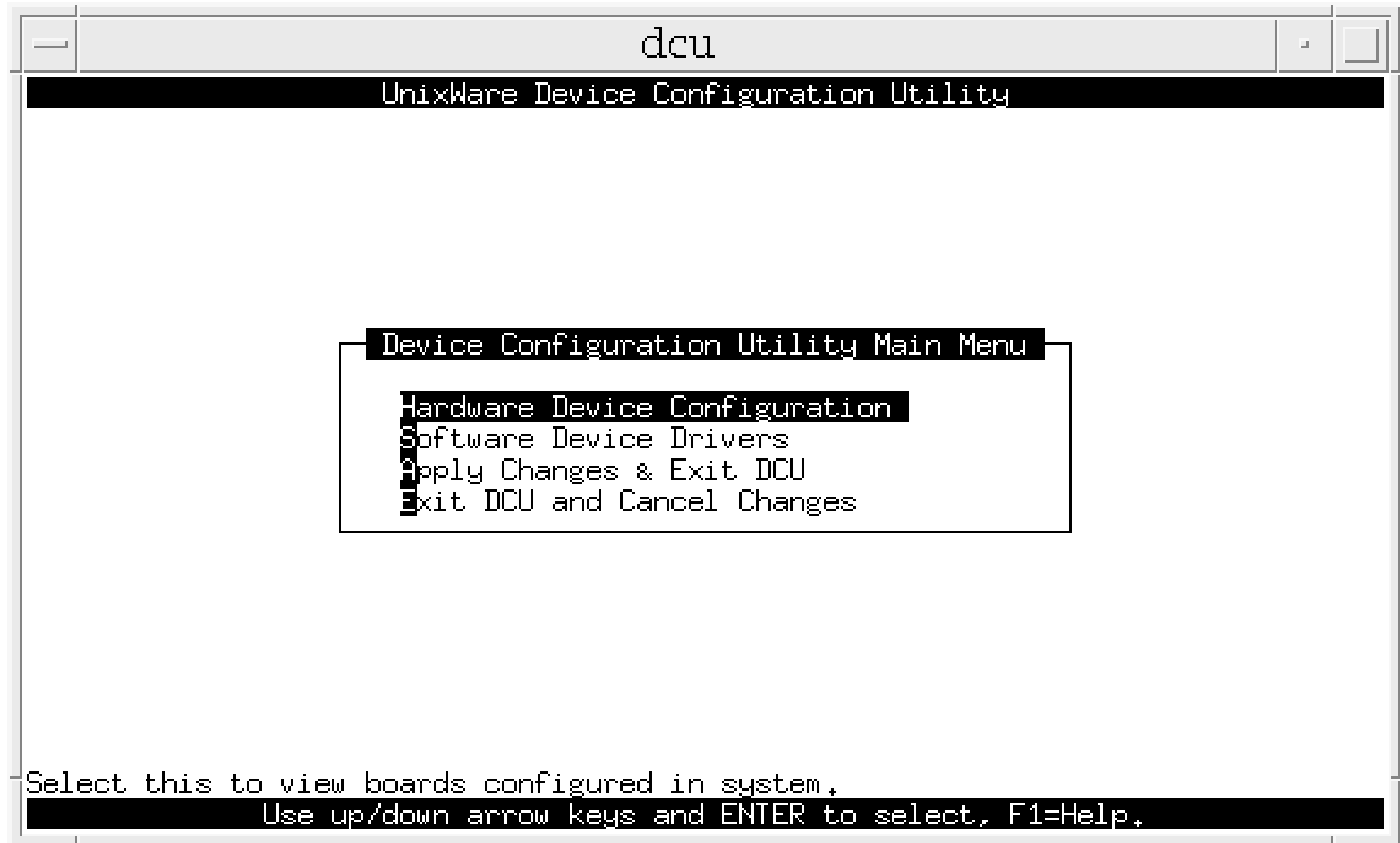
Available (MB)	2047	2078
Allocated(MB)	2047	0

<F1>=Help <F2>=Choices <F9>=Back <F10>=NextArrow keys, <Tab>=Move

Swap Space

Size of System	Size of Swap Space
16MB	32MB
64MB	75MB
256MB	200MB
1026MB	430MB
4096MB	1330MB

Device Configuration Utility (DCU)



Hardware Device Configuration

dcu

UnixWare Device Configuration Utility

Hardware Device Configuration

	Device Name	IRQ	IOStart	IOEnd	MemStart	MemEnd	DMA
=	=====	===	=====	=====	=====	=====	===
Y	UNKNOWN	-	-	-	-	-	-
Y	Parallel Port	7	378	37f	-	-	-
Y	Floppy Drive	6	3f0	3f7	-	-	2
Y	I20 IOP	-	-	-	-	-	-
Y	Real Time Clock	8	-	-	-	-	-
Y	Keyboard & Display	1	60	62	a0000	bffff	-
Y	Keyboard & Display	-	64	64	c0000	c7fff	-
Y	Direct Memory Access	-	0	1f	-	-	-
Y	Direct Memory Access	-	c0	df	-	-	0
Y	Direct Memory Access	-	80	9f	-	-	-
Y	CMOS RAM	-	70	7f	-	-	-
Y	AT Platform (UP)	-	-	-	-	-	-
Y	COM Port	4	3f8	3ff	-	-	-
Y	COM Port	3	2f8	2ff	-	-	-
Y	UNKNOWN	-	-	-	-	-	-
Y	Sym53c810	11	d100	d1ff	20000000	200000ff	-
Y	UNKNOWN	-	-	-	-	-	-

(Page Up/Page Down for more)

TAB/arrow=Move, F1=Help, F2=Choices, F4=Verify, F6=Info, F7=Adv, F10=Return

Advanced Parameters

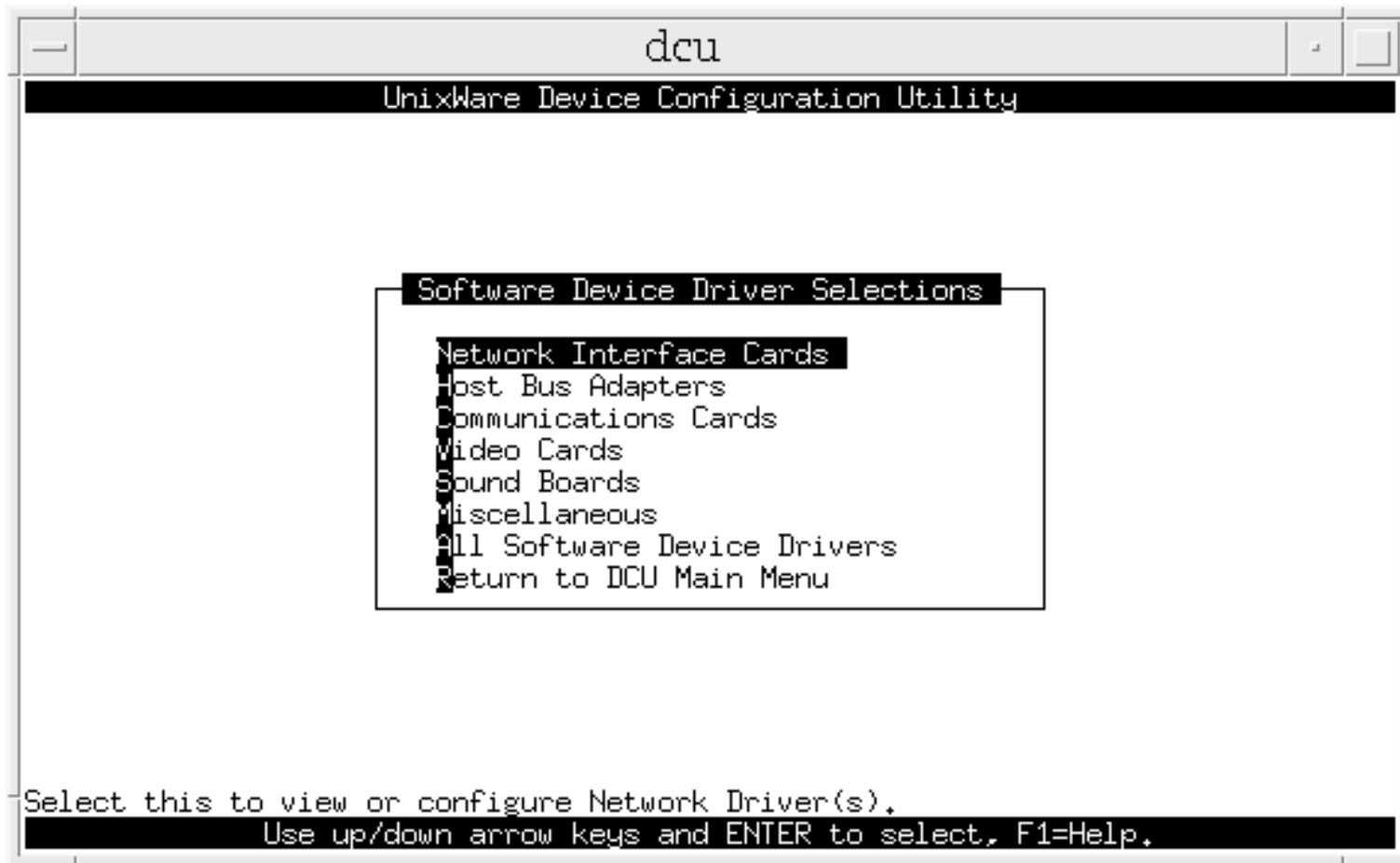
Advanced Parallel Port Parameters

The screenshot shows a window titled "dcu" with a menu bar containing "UnixWare Device Configuration Utility" and "Advanced Parameter Selection". The main area displays a list of parameters for a "Parallel Port" device:

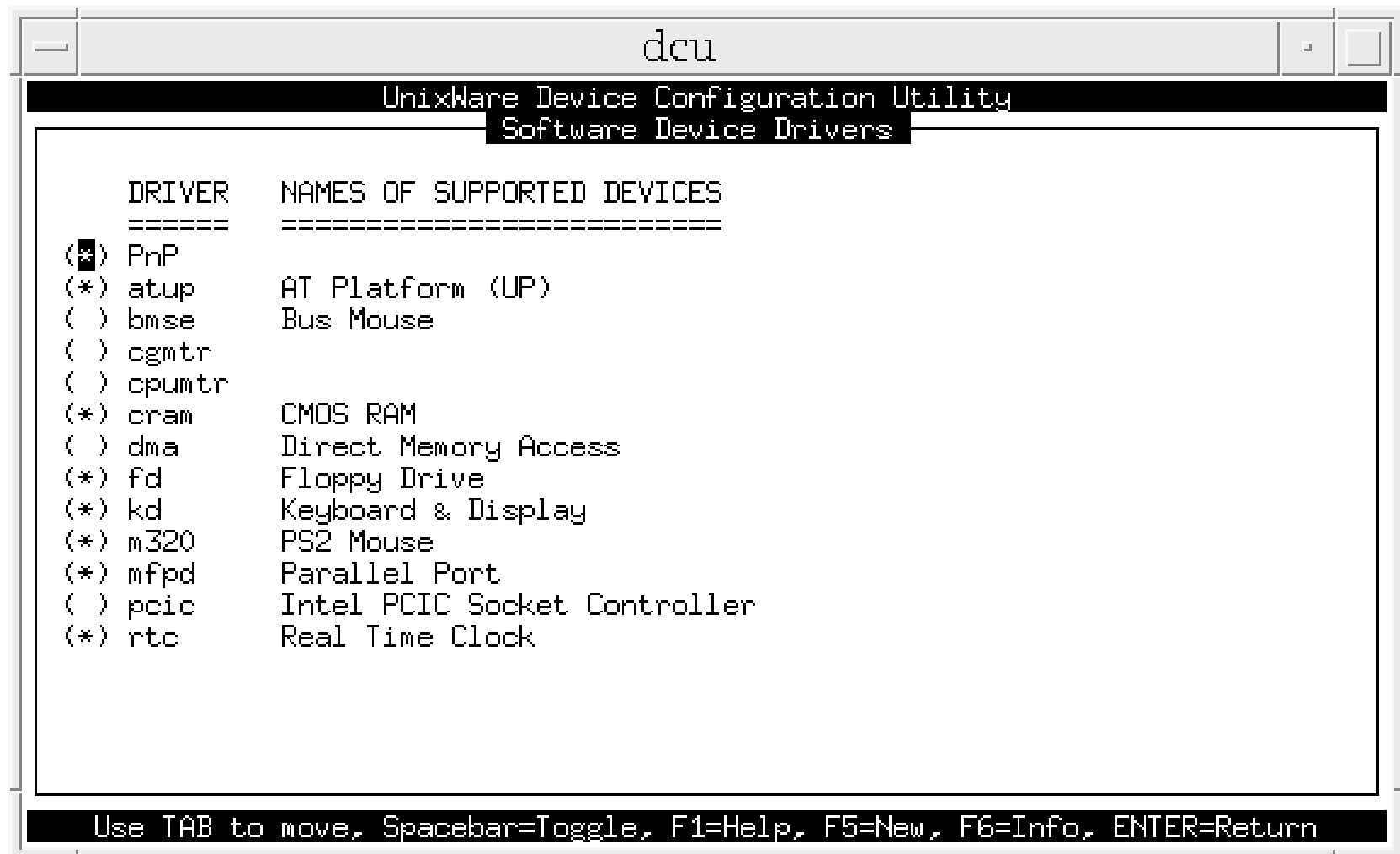
Device Name	Parallel Port
BindCPU	-
Unit	1
IPL	3
ITYPE	1

At the bottom of the window, a status bar indicates: "F1=Help, F2=Choices, F10=Return".

Software Device Driver Selections



Miscellaneous Selection



Disk Configuration

Disk No.	Character Node	Action
=====	=====	=====
1	/dev/rdisk/c0b0t0d0s0	Customize partitions
2	/dev/rdisk/c0b0t2d0s0	Do not modify

<F1>=Help <F2>=Choices <F9>=Back <F10>=NextArrow keys
or <Tab>=Move

Choose One

- () Use whole disk for UNIX
- (*) Customize partitions
- () Re-load partition information from disk

The Partition Table

	Type	Status	Start	End	%	Cylinders	Size (MB)
===	=====	=====	=====	=====	=	=====	=====
1	UNIX System	Active	0	268	50	261	2047
2	unused		0				
3	unused		0				
4	unused		0				

Number of Cylinders: 522 Currently used: 261

<F1>=Help <F2>=Choices <F9>=Back <F10>=NextArrow keys or
<Tab>=Select

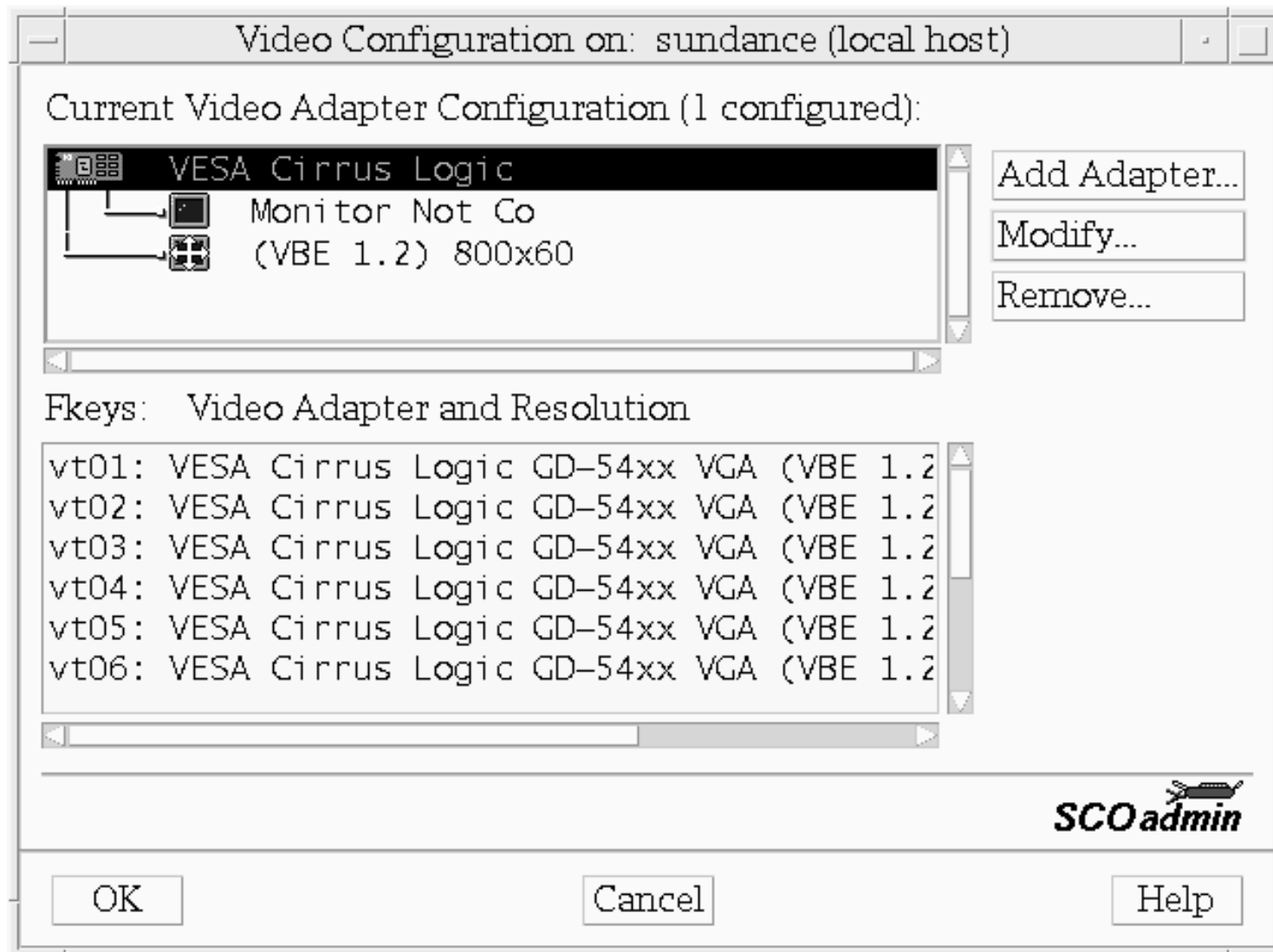
Responding to Prompts

To:	Press:
Get help	<F1>
Toggle or display choices	<F2>
Read/write to media	<F3>
Configure advanced parameters	<F6>
Defer configuration	<F8>
Move back one window	<F9>
Move forward one window	<F10>
Move down	↓(down arrow)
Move up	↑(up arrow)
Move through selections	<Tab>
Select items in a list	<Space>
Accept an item	<Enter>

Installation Troubleshooting

- Troubleshoot problems during installation
- Troubleshoot problems after installation

Video Configuration Manager



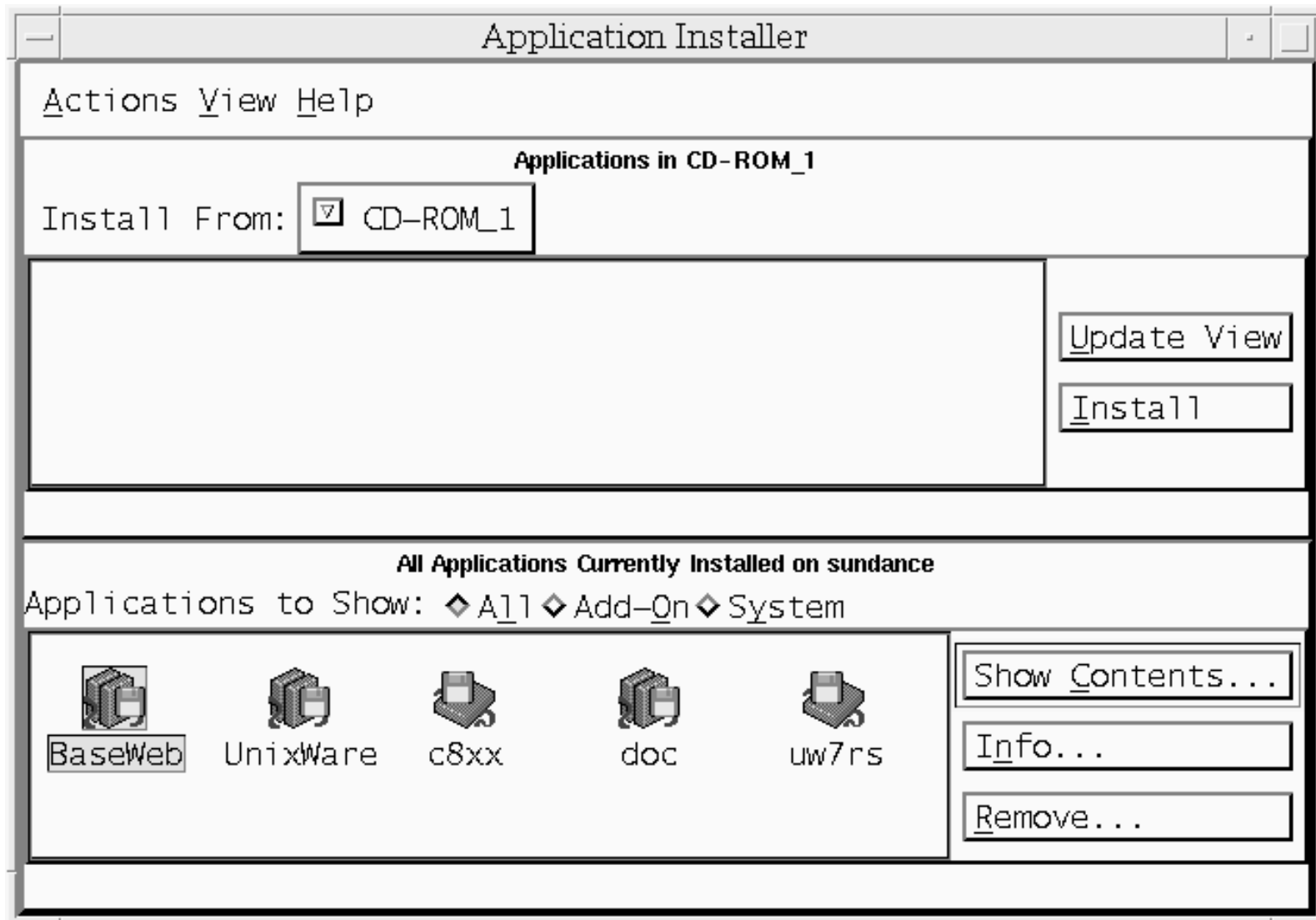
Memory Requirements

		Colors				
		16 (4 bits)	256 (8 bits)	32K/64K (15/16 bits)	16M (24 bits)	16M (32 bits)
Resolutions						
1600 x 1200	N/A	2MB	4MB	6MB	8MB	
1280 x 1024	1MB	2MB	4MB	4MB	6MB	
1024 x 768	.5MB	1MB	2MB	4MB	4MB	
800 x 600	.5MB	5MB	1MB	2MB	2MB	
640 x 480	.5MB	5MB	1MB	1MB	2MB	

Post-installation Administration

- Create emergency recovery diskettes and tapes
- Manage software applications
- Use the **scoadmin(1M) Application Installer**
- License and register your UnixWare 7 products
- Create the **SCOhelp** documentation indexes

Application Installer

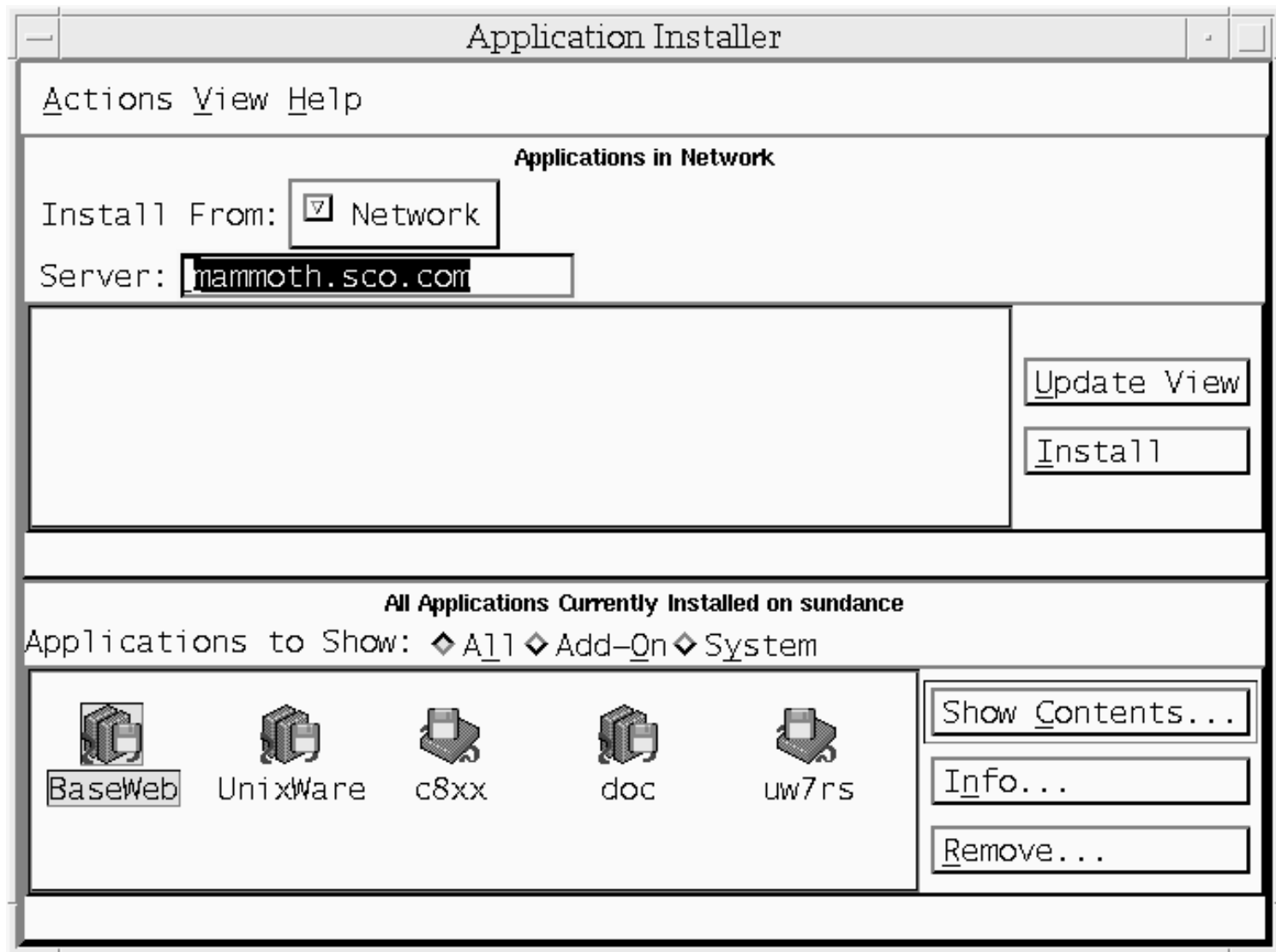


The Set Installation Package (SIP)

Example output of `pkginfo -c set`

set	Merge411	SCO Merge 4.1.1 for SCO UnixWare 7
set	NScomm4	Netscape Communicator 4.08 for UnixWare 7
set	NSfast2	Netscape FastTrack server 2.01a for UnixWare 7
set	RNbasic5	RealNetworks Basic Server Plus 5.0 for UnixWare 7
set	RNenc31	RealNetworks RealAudio 3.1 Encoder for UnixWare 7
set	RNplayer5	RealNetworks Player 5.0 for UnixWare 7
set	UnixWare	Core Systems Services
set	VisionFS3	SCO VisionFS 3.0 for UnixWare 7
set	arcserve6	ARCserveIT v6.6 From Computer Associates (Build 812)
set	doc	Documentation Services

Application Installer



The System ID

Register License on sundance.pdev.sco.com

You have selected to register the following product:

UnixWare 7 Enterprise Edition

To register this product, please follow the instructions printed on your SCO Software Registration Booklet and enter the Registration Key given back to you.

License Number: SCO000000
SCO System ID: rggrzwttjs

Registration Key:

OK Cancel Help

Managing System Startup and Shutdown

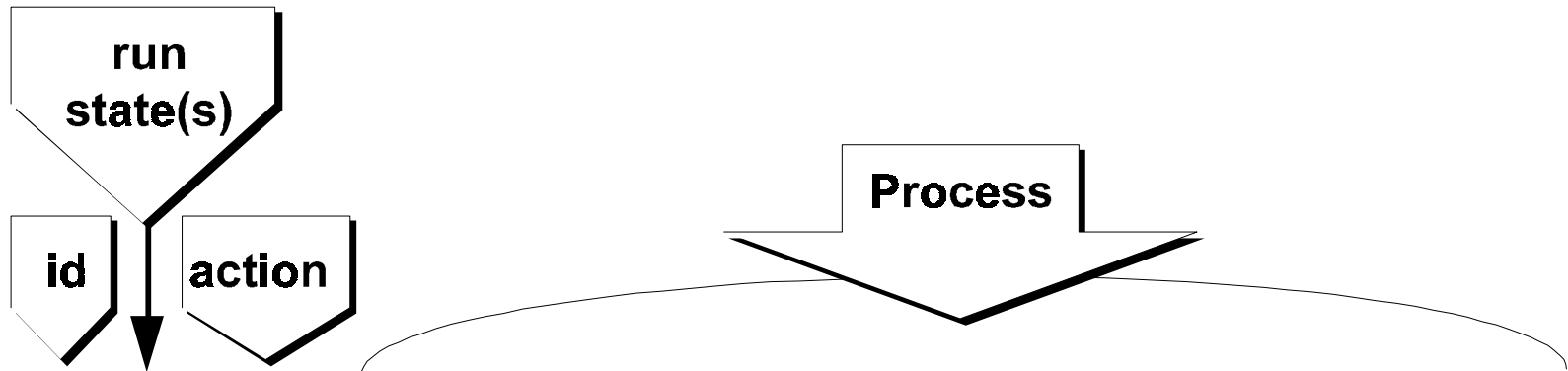
- Describe the default UnixWare 7 boot process
- Initiate the Boot Command Processor (BCP)
- Describe early initialization
- Initialize the multiuser and networking states
- Customize multiuser initialization
- Troubleshoot system startup
- Analyze system shutdown

Other Bootable Operating Systems

DOS	Matches any DOS filesystem
DOS_12	DOS 12-bit FAT
DOS_16	DOS 16-bit FAT
DOS_32	DOS 32-bit FAT
DOS_EXT	DOS extended partition
NT	NT™
OS2	OS/2
UNIX	UnixWare 7
XENIX	XENIX operating system

Initialization of Run-Levels

An /etc/inittab File



```
is:3:initdefault:
r0:0:wait:/sbin/rc0 off >/dev/console 2>&1 </dev/console
r1:1:wait:/sbin/rc1 >/dev/console 2>&1 </dev/console
r2:23:wait:/sbin/rc2 >/dev/console 2>&1 </dev/console
r3:3:wait:/sbin/rc3 >/dev/console 2>&1 </dev/console
r5:5:wait:/sbin/rc0 firm >/dev/console 2>&1 </dev/console
r6:6:wait:/sbin/rc0 reboot >/dev/console 2>&1 </dev/console
```

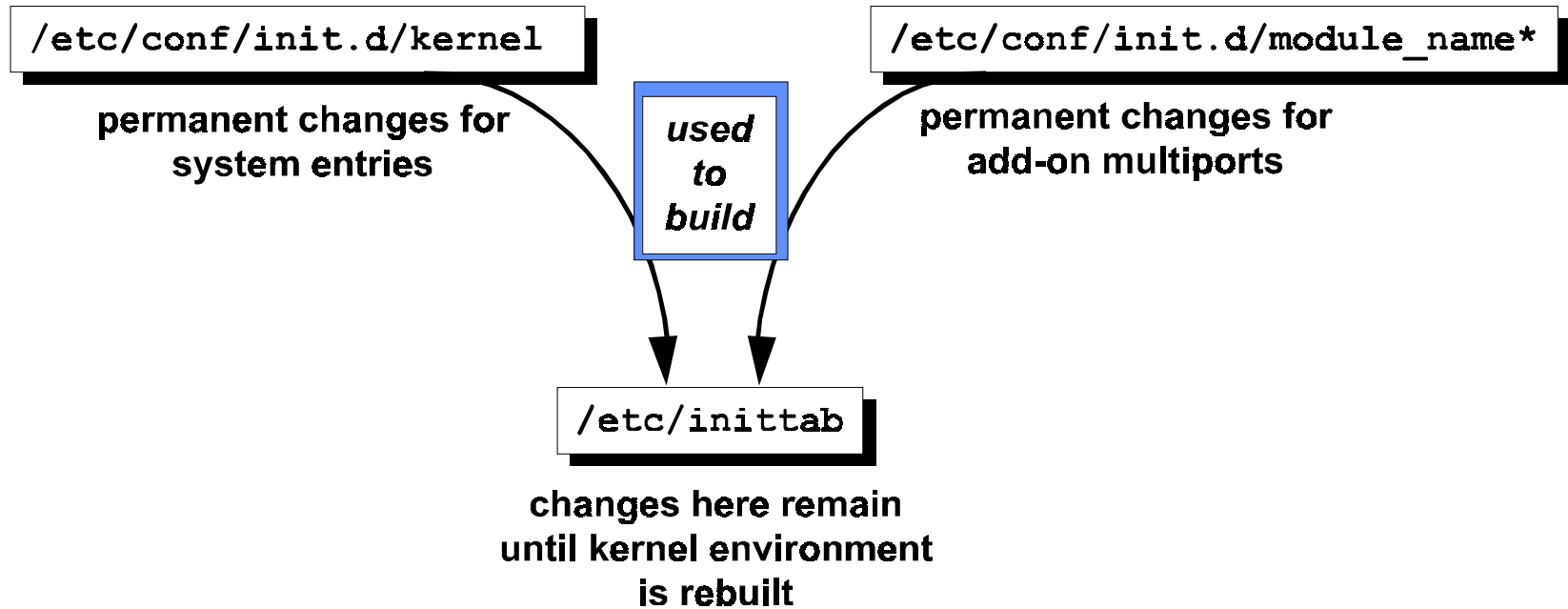
Inittab(4) Action Definitions

respawn	If the process does not exist, start the process, and when it dies restart the process.
wait	Upon entering the matching run-level, start the process and wait for its termination.
once	Upon entering the matching run-level, start the process; do not wait for its termination. When it dies, do not restart the process.
boot	The entry is to be processed only at boot-time read of the file.
bootwait	The entry is to be processed the first time when the system goes from single-user to multiuser state after the system is booted.

More Inittab(4) Action Definitions

powerfail	Execute the process associated with this entry only when it receives a power fail signal.
powerwait	Execute the process associated with this entry only when it receives a power fail signal and wait until it terminates before continuing.
off	Ignore this process.
ondemand	This is the same as respawn, used with run-levels a, b, c and e.
initdefault	This is used to determine the run-level.
sysinit	Entries are executed before init(1) accesses the console.

Changing */etc/inittab*



The /etc/rc2.d Directory

```
total 136
-r--r--r--  5 root    sys      2668 Feb  3 13:23 K20nfs
-r--r--r--  3 root    sys      873 Feb  3 13:20 S01MOUNTFSYS
-r--r--r--  2 root    sys      222 Feb  3 13:20 S02PRESERVE
-r--r--r--  3 root    audit    1137 Feb  3 13:22 S02audit
-r--r--r--  4 root    sys      879 Feb  3 13:20 S02mse
-r--r--r--  2 root    sys     1795 Feb  3 13:20 S05RMTMPFILES
-rwxr-xr-x  1 root    sys      757 Feb  3 13:20 S15mkdtab
-r-xr-xr-x  5 root    sys     5392 Feb  3 13:19 S15nd
-rw-r--r--  3 bin     bin      206 Feb  3 13:21 S42ls
-r--r--r--  2 root    sys      282 Feb  3 13:19 S65loopback
-r--r----- 1 bin     bin      667 Dec  5 15:17 S69ARCserve@
-r--r--r--  4 root    sys     4381 Feb  3 13:23 S69inet
-r--r--r--  4 root    sys      462 Feb  3 13:25 S70Nnwip
-r--r--r--  4 root    sys     8279 Feb  3 13:25 S70Pnw
-r--r--r--  4 root    sys     2764 Feb  3 13:25 S70Rnuc
-rwxr-xr-x  1 root    sys     1260 Feb  3 13:20 S70pf
-r--r--r--  2 root    sys      939 Feb 10 05:09 S70unixtsa
-rwxr-xr-x  1 root    sys      193 Feb  3 13:23 S71ppp@
-r-x-----  3 root    sys     2847 Feb  3 13:25 S73snmp
-r--r--r--  2 root    sys     1450 Feb  3 13:19 S75rpc
-r-xr--r--  2 root    sys      574 Feb  3 13:19 S79sr
-r--r--r--  4 root    sys     2064 Feb  3 13:22 S80nis
-r-xr-xr-x  1 bin     bin     1460 Feb  3 13:20 S81sendmail@
-rwxrwxr-x  4 root    sys      408 Feb  3 13:25 S88ldap
-rwxr-xr-x  2 root    sys     1576 Jan 16 21:12 S90sysinfo2html
-rwxr-xr-x  1 root    bin      855 Feb  3 12:33 S93scohelphttp
-r-xr-xr-x  2 root    sys     2494 Feb  3 13:21 S95vxvm-recover
-r-xr-xr-x  4 root    sys     3486 Feb 10 05:19 S99dtlogin
```

The /etc/rc0.d Directory

The /etc/rc0.d Directory

total 68

-r--r--r--	3	root	sys	761	Feb	3	10:20	K00ANNOUNCE
-r--r--r--	3	root	audit	1137	Feb	3	10:22	K02audit
-r--r--r--	4	root	sys	879	Feb	3	10:20	K02mse
-r-xr-xr-x	4	root	sys	3486	Mar	5	07:12	K10dtlogin
---x-----	4	root	sys	562	Feb	3	10:20	K20lp
-r--r--r--	5	root	sys	2668	Feb	3	10:23	K40nfs
-rwxr-xr-x	1	root	sys	193	Feb	3	10:23	K40ppp@
-rwxrwxr-x	4	root	sys	408	Feb	3	10:25	K44ldap
-r-xr--r--	4	root	sys	3121	Feb	3	10:19	K68netbios
-r-xr-xr-x	1	bin	bin	1460	Feb	3	10:20	K68sendmail@
-r--r--r--	4	root	sys	4381	Feb	3	10:23	K69inet
-r--r--r--	4	root	sys	2064	Feb	3	10:22	K80nis
-r-xr-xr-x	5	root	sys	5392	Feb	3	10:19	K85nd

Filesystem Configuration and Disk Management

- Describe the UNIX filesystem structure
- Manage the `/dev` directory
- Describe important vxfs filesystem features
- Prepare the filesystem for access
- Manage filesystems
- Add large file support
- Check and repair filesystems
- Configure additional hard disks
- Manage the Volume Table of Contents (VTOC)
- Troubleshoot hard disks

Structure of an Inode

File type and permissions

Link count

Owner UID

File GID

File Size

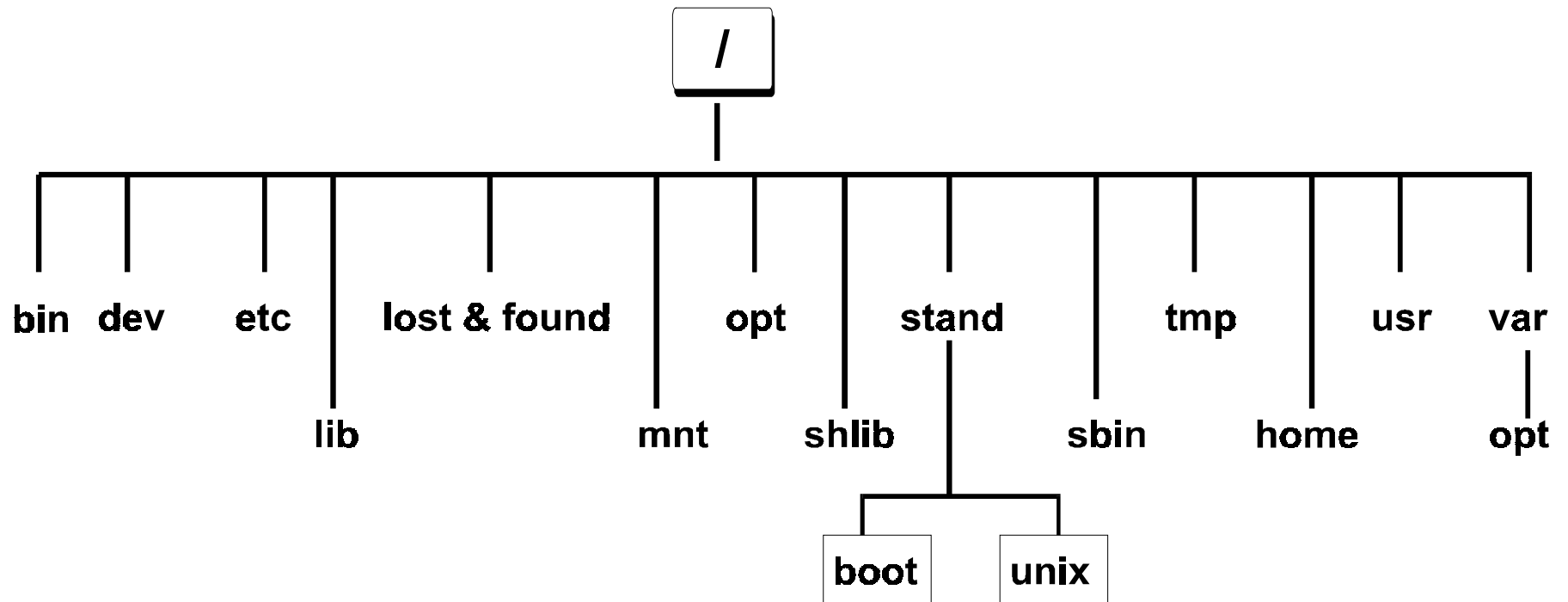
Data block addresses or major, minor #'s

File last access time

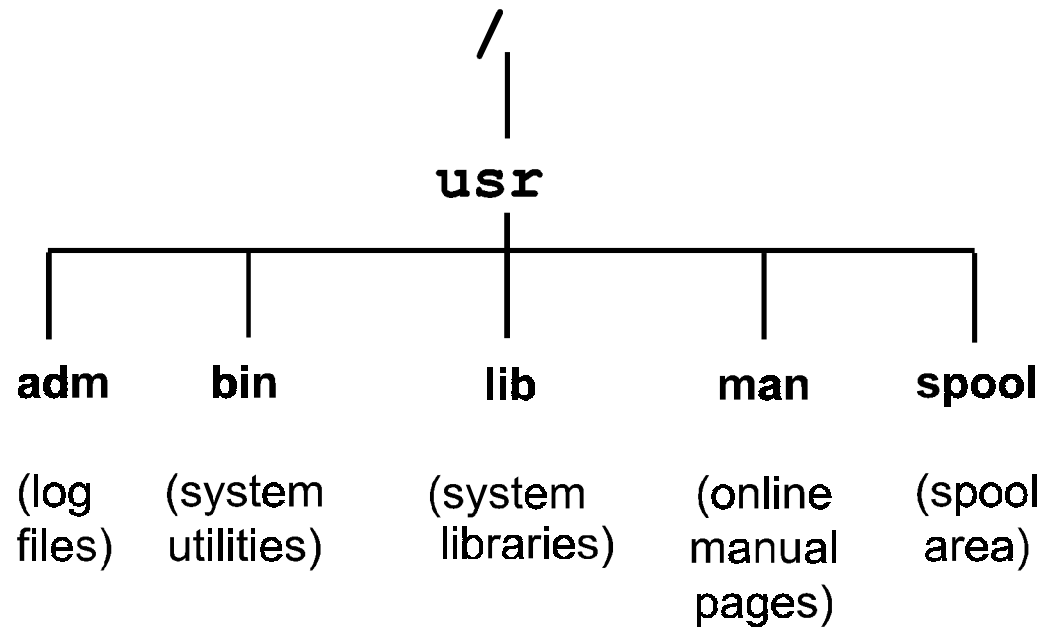
File modification time

Inode modification time

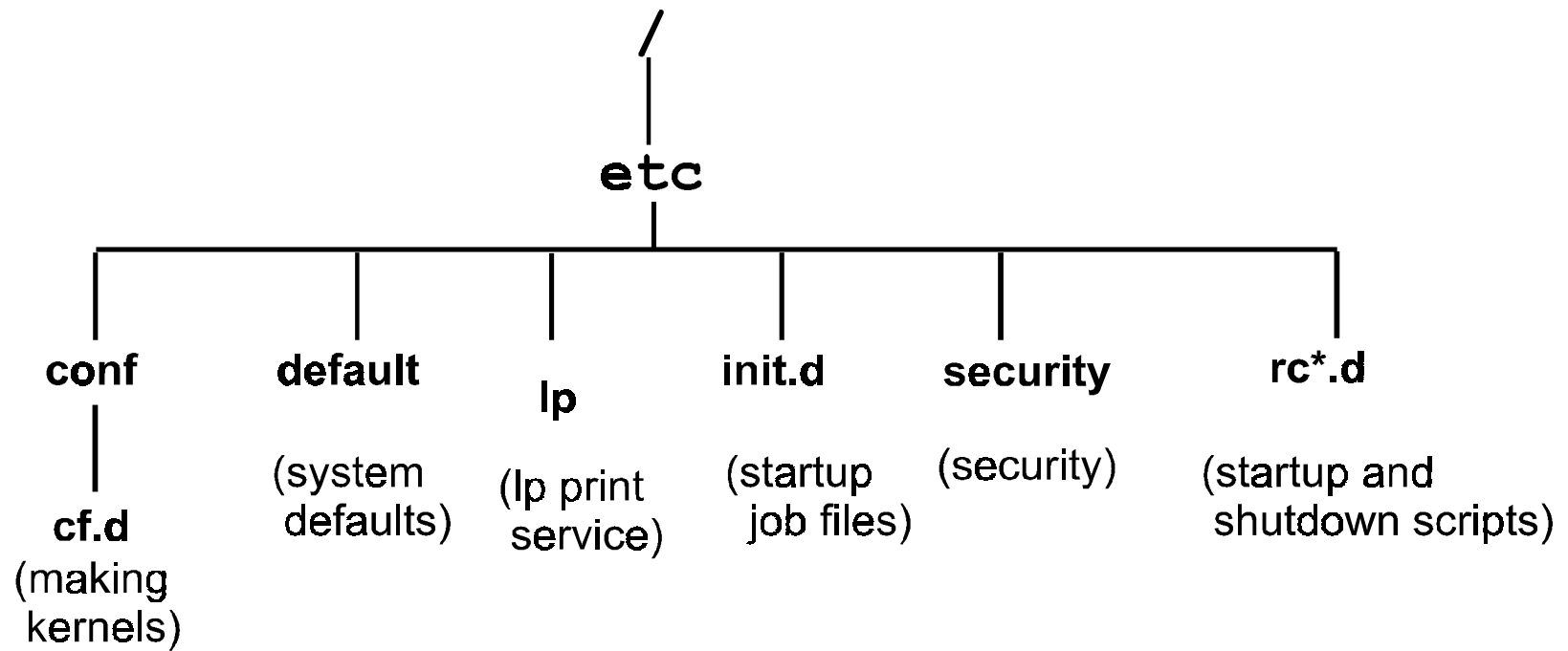
Root (/) Directory Structure



/usr Directory Structure



/etc Directory Structure



Special Device Files

Example of block, character, and raw devices for a 3.5 floppy

files in /dev/dsk

brw-rw-rw-	1	root	sys	1,180	Apr	7	1998	/dev/dsk/f03c
brw-rw-rw-	1	root	sys	1,176	Apr	7	1998	/dev/dsk/f03ct
brw-rw-rw-	1	root	sys	1,100	Apr	7	1998	/dev/dsk/f03d
brw-rw-rw-	4	root	sys	1, 96	Apr	7	1998	/dev/dsk/f03dt



files in /dev/rdsk

crw-rw-rw-	1	root	sys	1,180	Apr	7	1998	/dev/dsk/f03c
crw-rw-rw-	1	root	sys	1,176	Apr	7	1998	/dev/dsk/f03ct
crw-rw-rw-	1	root	sys	1,100	Apr	7	1998	/dev/dsk/f03d
crw-rw-rw-	4	root	sys	1, 96	Apr	7	1998	/dev/dsk/f03dt



Major and Minor Device Numbers

				Major	Minor				
brw-rw-rw-	1	root	sys	1,180	Apr	7	1998	/dev/dsk/f03c	
brw-rw-rw-	1	root	sys	1,176	Apr	7	1998	/dev/dsk/f03ct	
brw-rw-rw-	1	root	sys	1,100	Apr	7	1998	/dev/dsk/f03d	
brw-rw-rw-	4	root	sys	1, 96	Apr	7	1998	/dev/dsk/f03dt	
crw-rw-rw-	1	root	sys	1,180	Apr	7	1998	/dev/dsk/f03c	
crw-rw-rw-	1	root	sys	1,176	Apr	7	1998	/dev/dsk/f03ct	
crw-rw-rw-	1	root	sys	1,100	Apr	7	1998	/dev/dsk/f03d	
crw-rw-rw-	4	root	sys	1, 96	Apr	7	1998	/dev/dsk/f03dt	

The Disk1 VTOC

#SLICE	TAG	FLAGS	START	SIZE
0	0x5	0x201	61	1044198
1	0x2	0x200	237473	785009
2	0x3	0x201	42517	194956
3	0x0	0x0	0	0
4	0x0	0x0	0	0
5	0x0	0x0	0	0
6	0x0	0x0	0	0
7	0x1	0x201	61	34
8	0xd	0x201	95	942
9	0x0	0x0 0	0	
10	0x9	0x200	1037	41480
11	0x0	0x0 0	0	
12	0x0	0x0 0	0	
13	0x0	0x0 0	0	
14	0x0	0x0 0	0	
15	0xf	0x201	1022482	2074

Description of the VTOC

/* Slice tags */

V_BOOT	0x01	/* Boot slice */
V_ROOT	0x02	/* Root filesystem */
V_SWAP	0x03	/* Swap filesystem */
V_USR	0x04	/* Usr filesystem */
V_BACKUP	0x05	/* full disk */
V_ALTS	0x06	/* alternate sector space */
V_OTHER	0x07	/* non-unix space */
V_ALTTRK	0x08	/* alternate track space */
V_STAND	0x09	/* Stand slice */
V_VAR	0x0a	/* Var slice */
V_HOME	0x0b	/* Home slice */
V_DUMP	0x0c	/* dump slice */
V_ALTSCTR	0x0d	/* Alternate sector/track */
V_MANAGED1	0x0e	/* Volume management public slice */
V_MANAGED2	0x0f	/* Volume management private slice */

/* Slice permission flags */

#define V_UNMNT	0x01	/* Unmountable partition */
#define V_RDONLY	0x10	/* Read only */
#define V_VALID	0x200	/* Partition is valid to use */

The */etc/default/vxfs* File

```
BLKSIZE=1024,2048,4096,8192  
MNTOPT=mincache=closesync  
MKFSTYP=4  
LABELIT=YES  
MAXSIZE=2147483648
```

The Filesystem Manager

— Modify Mount Configuration on sunda

Host:	localhost
Filesystem:	/dev/root
Mount Point:	/
Description (optional)	
Filesystem Type:	VXFS
Access Mode:	Read-write
When to Mount:	☒ Now ☐ At System Startup
Advanced Options:	Set More Options...

Advanced Options

Advanced Options for Mounting VXFS Fil

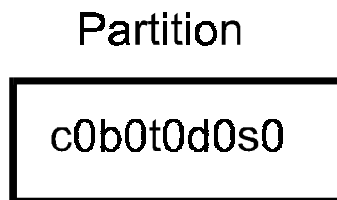
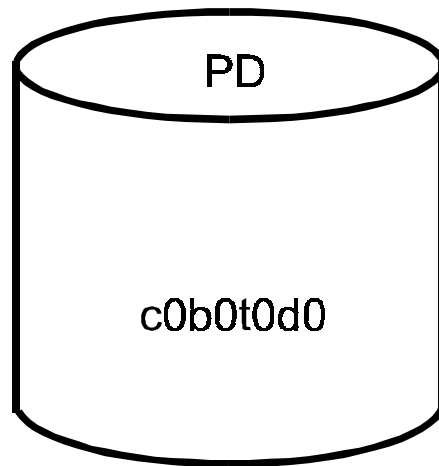
Mode of Intent Logging:

Clear Blocks before allocating to a file?

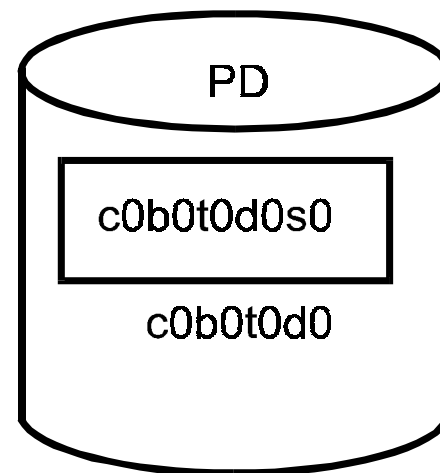
Online Data Manager

- Identify the components of the ODM
- Describe the licensing requirements for the ODM features
- Define the terminology and basic concepts of how the ODM works
- Initialize the ODM
- Create a concatenated ODM volume

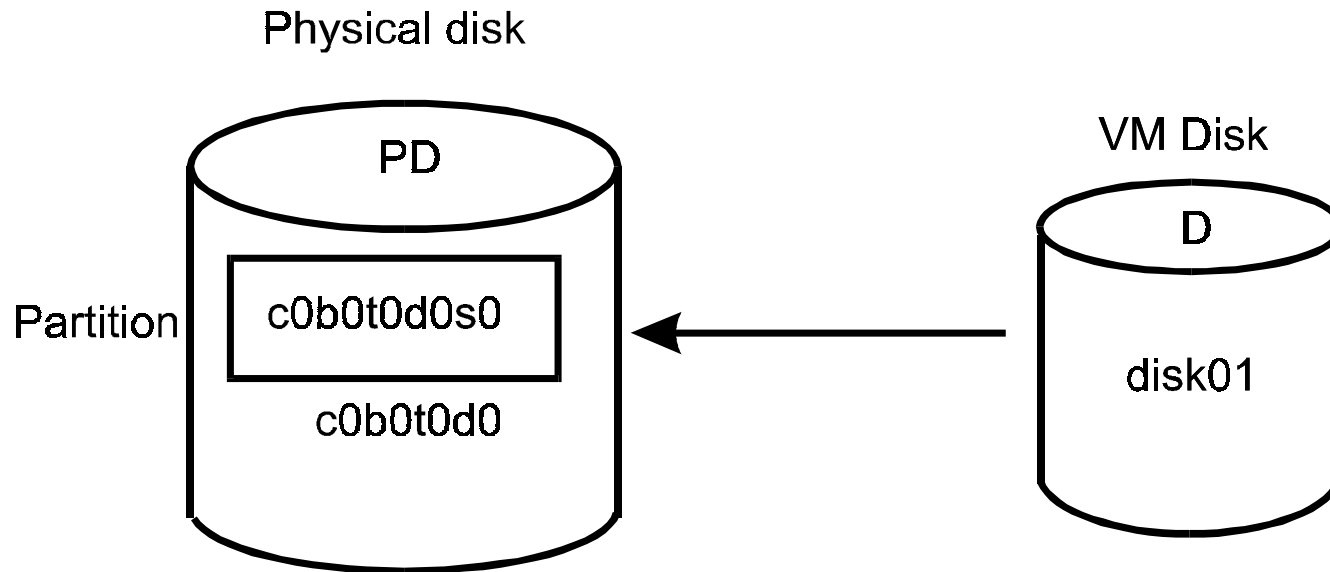
Physical Disk Characteristics



Physical disk with one partition



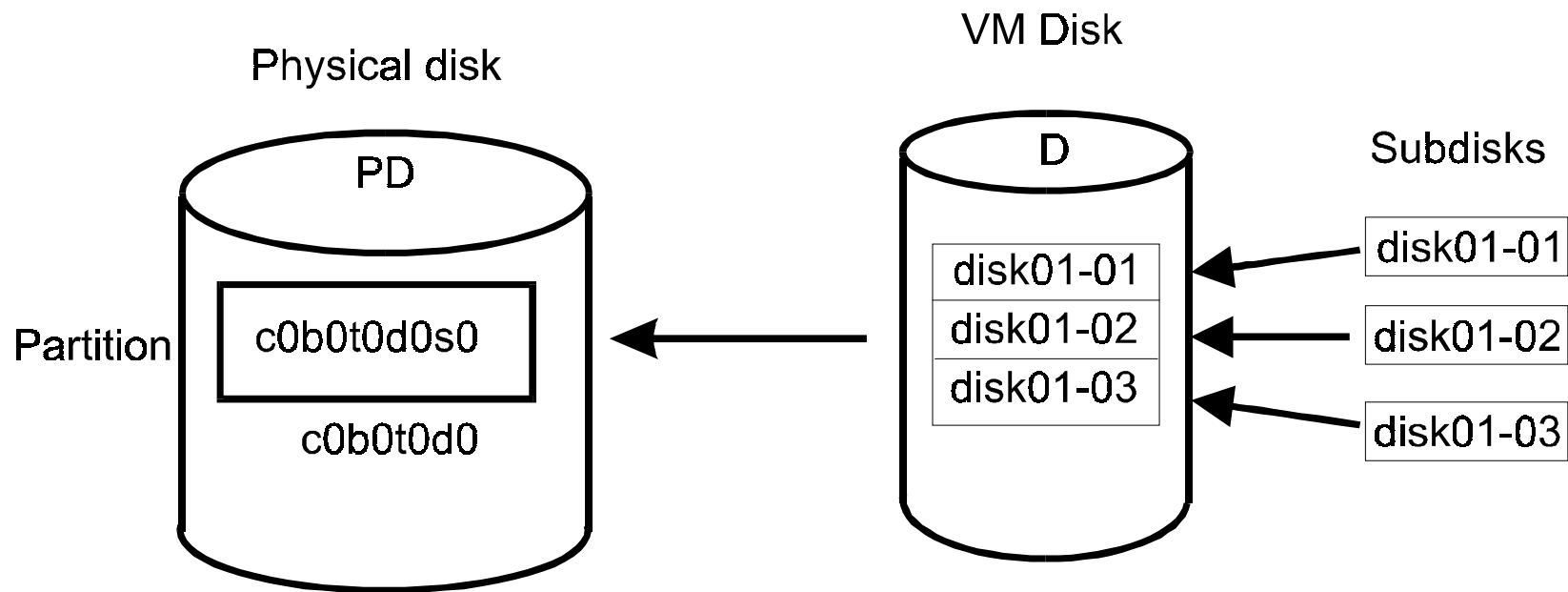
Virtual Disks and Subdisks



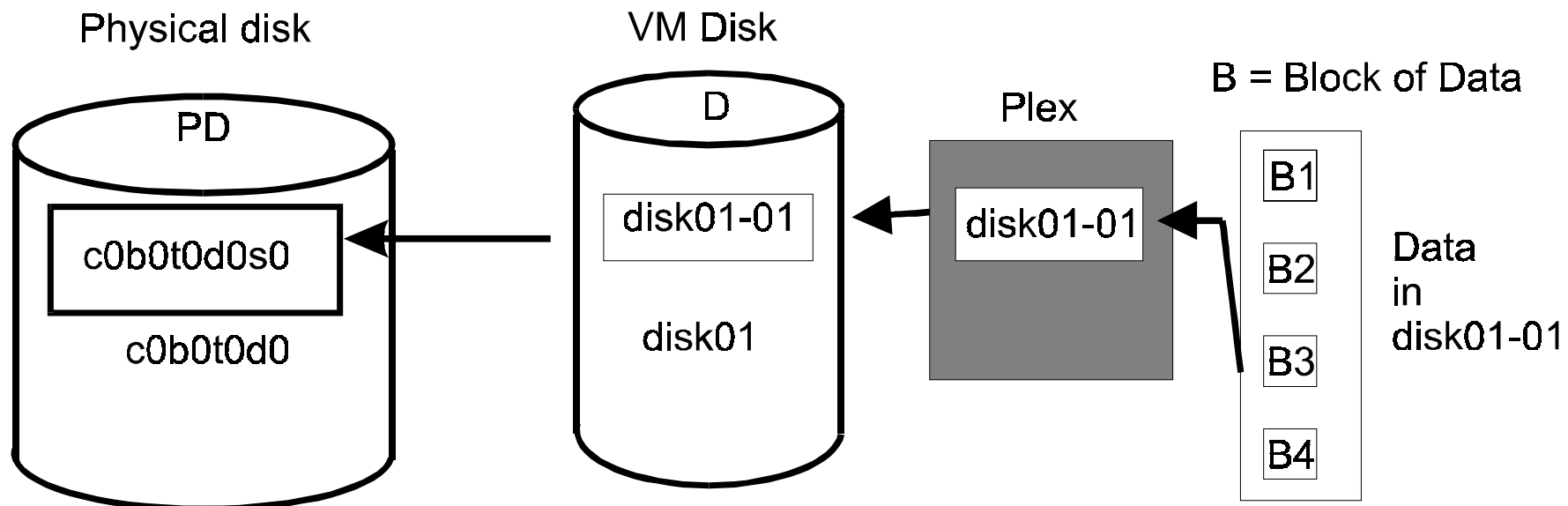
VM Disk with One Subdisk



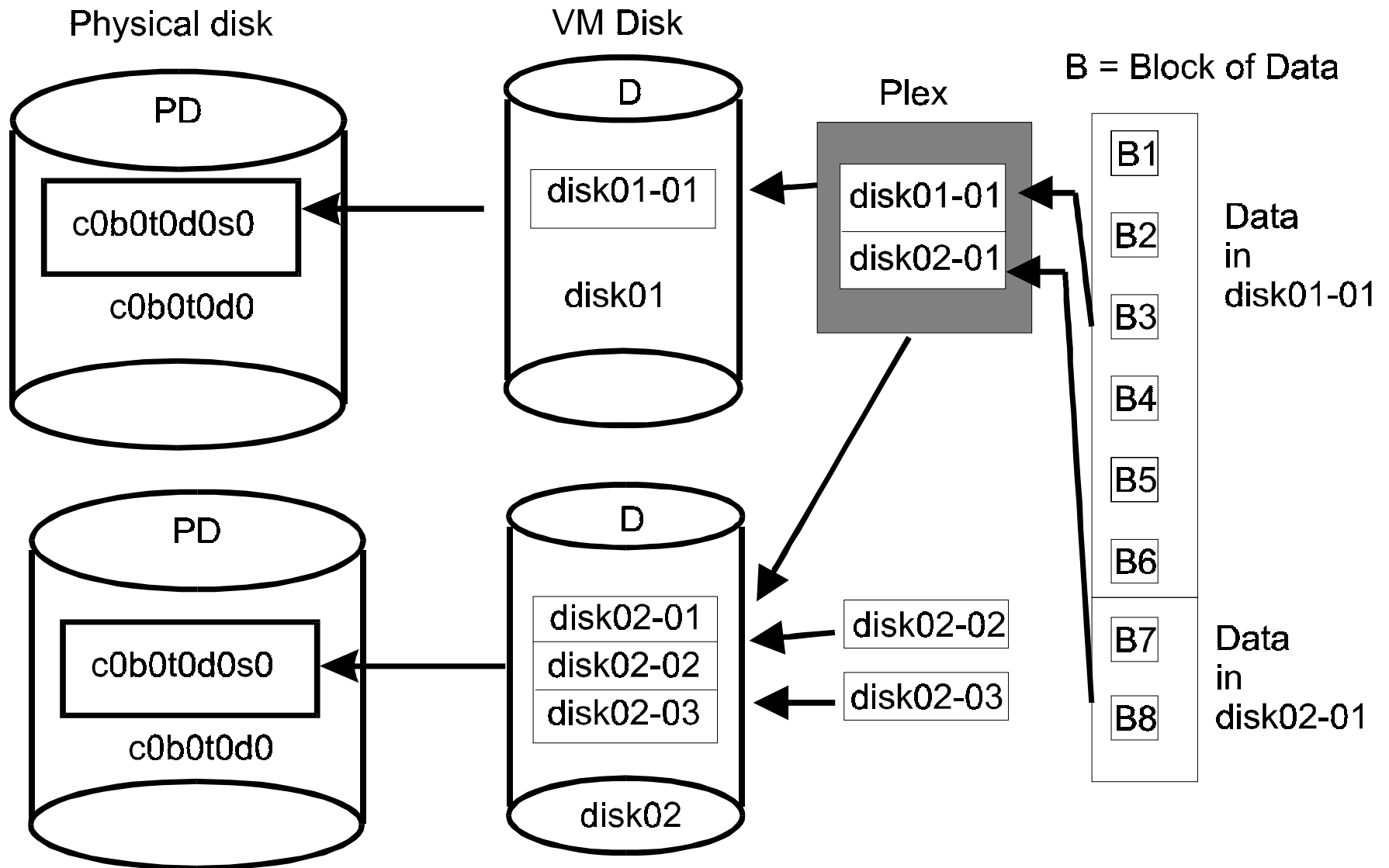
Example of Three Subdisks Assigned to One Partition



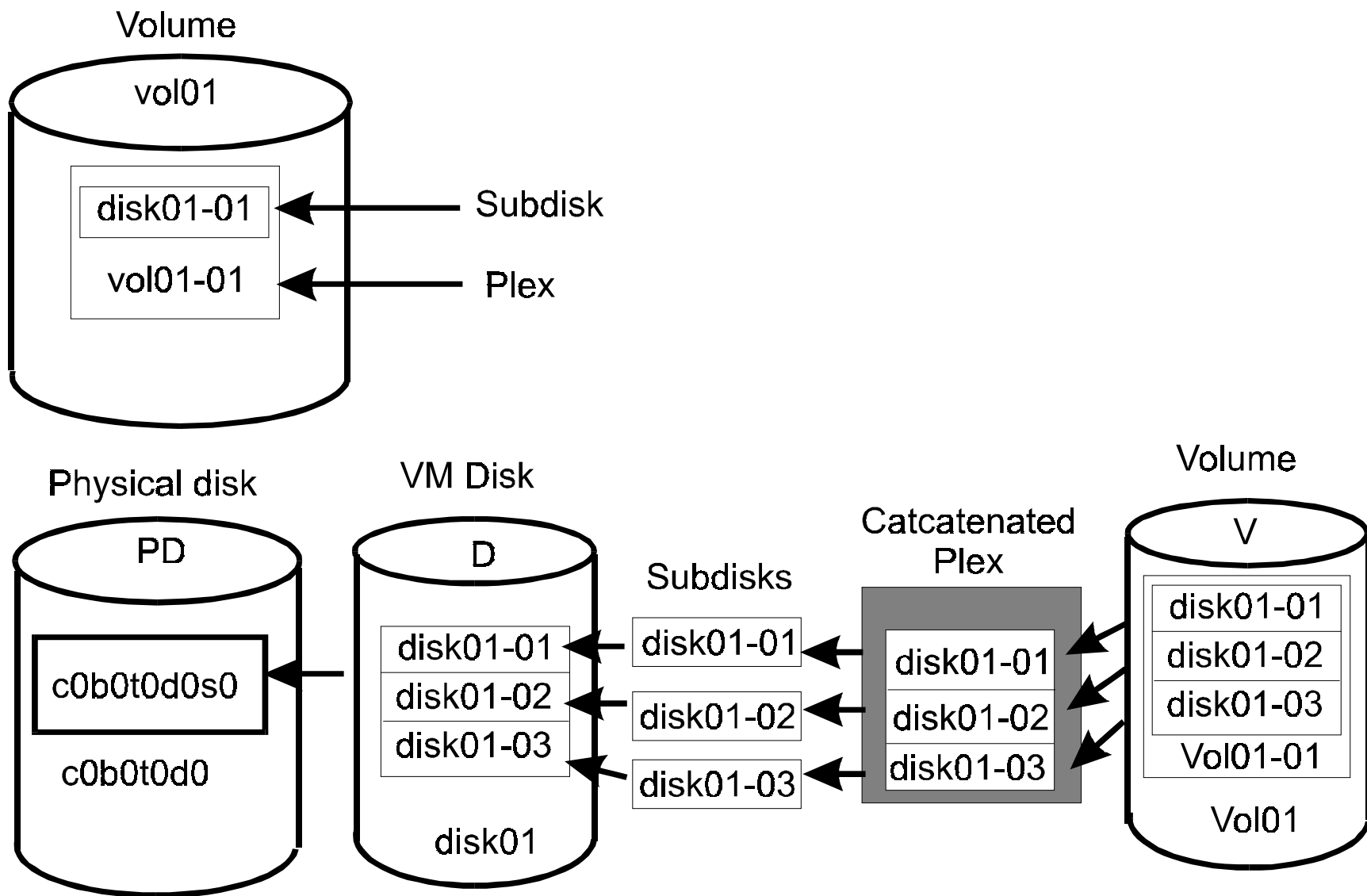
Example of Concatenation



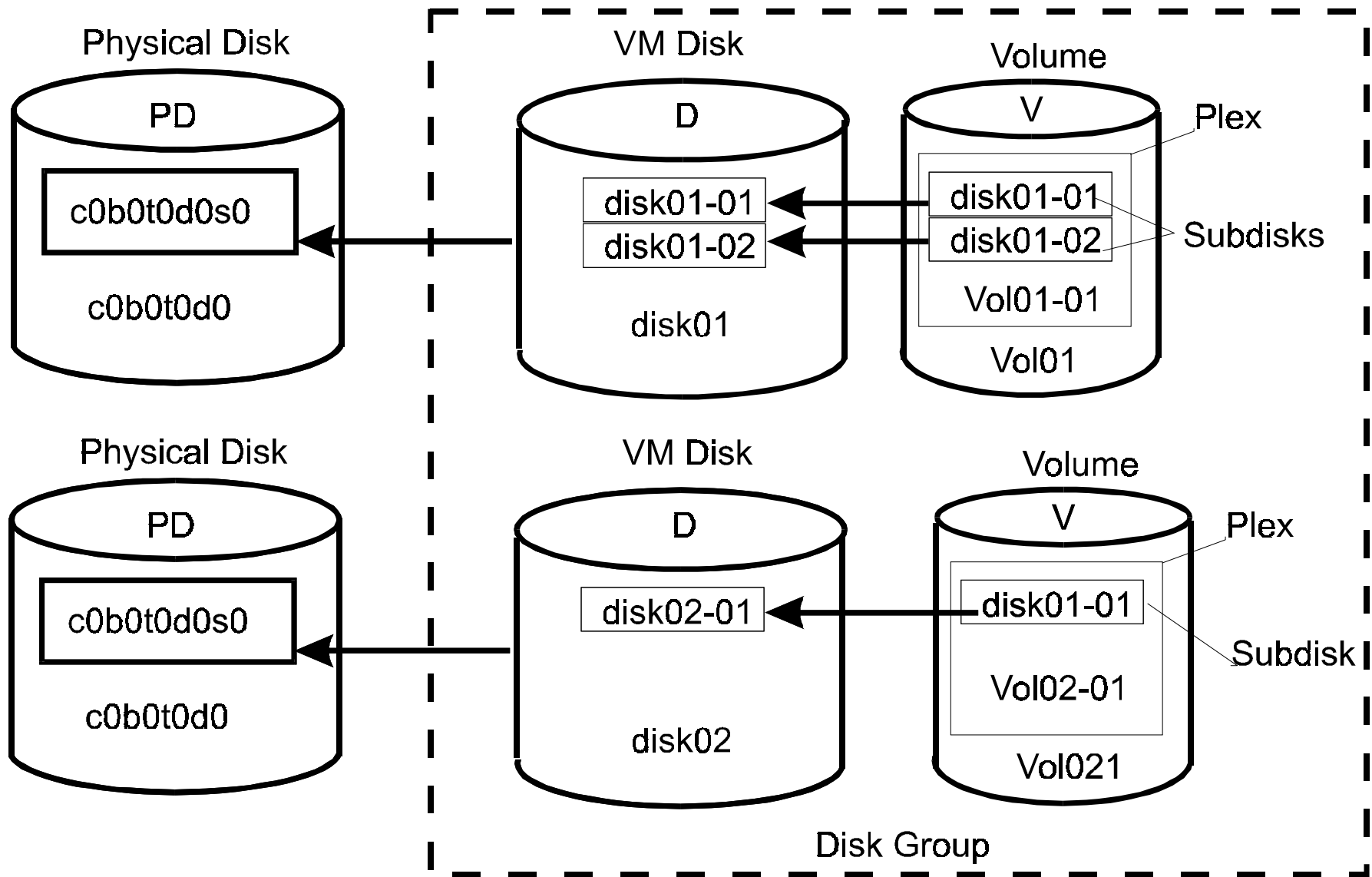
Example of Spanning



Volume Examples



Relationship Between VxVM Objects



Installing and Managing Serial Ports

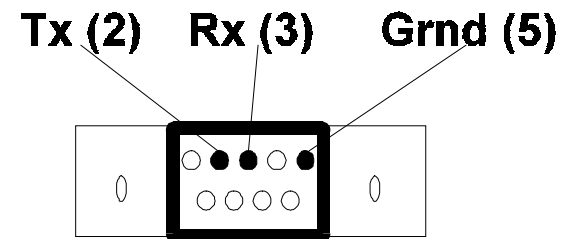
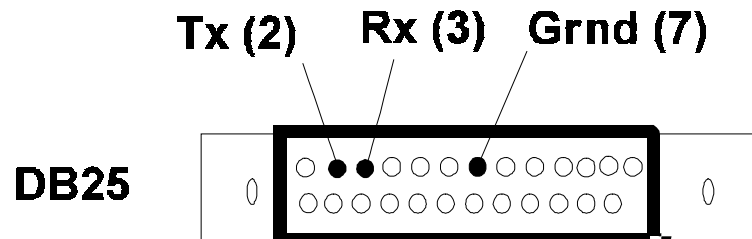
- Identify standard serial ports
- Install a serial card
- Use multiscreens
- Describe the Service Access Facility (SAF)
- Configure serial ports
- Install serial terminals
- Manage logins
- Troubleshoot terminals

Standard Serial Port Naming Conventions

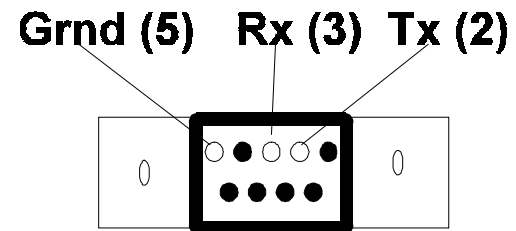
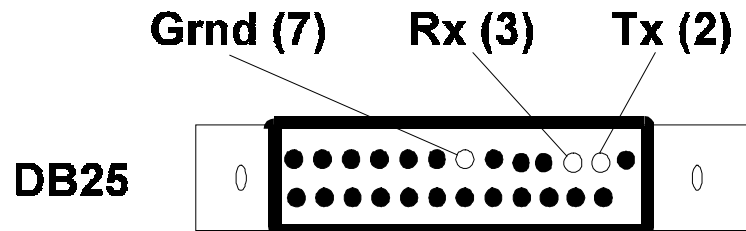
	UnixWare 7	UnixWare2	OpenServer Release 5
COM1	/dev/term/00	/dev/term/00	/dev/tty1a
COM2	/dev/term/01	/dev/term/01	/dev/tty2a
COM3	/dev/term/02	/dev/term/02	/dev/tty3a
COM4	/dev/term/03	/dev/term/03	/dev/tty4a

DTE and DCE

DTE Data Terminal Equipment (male)



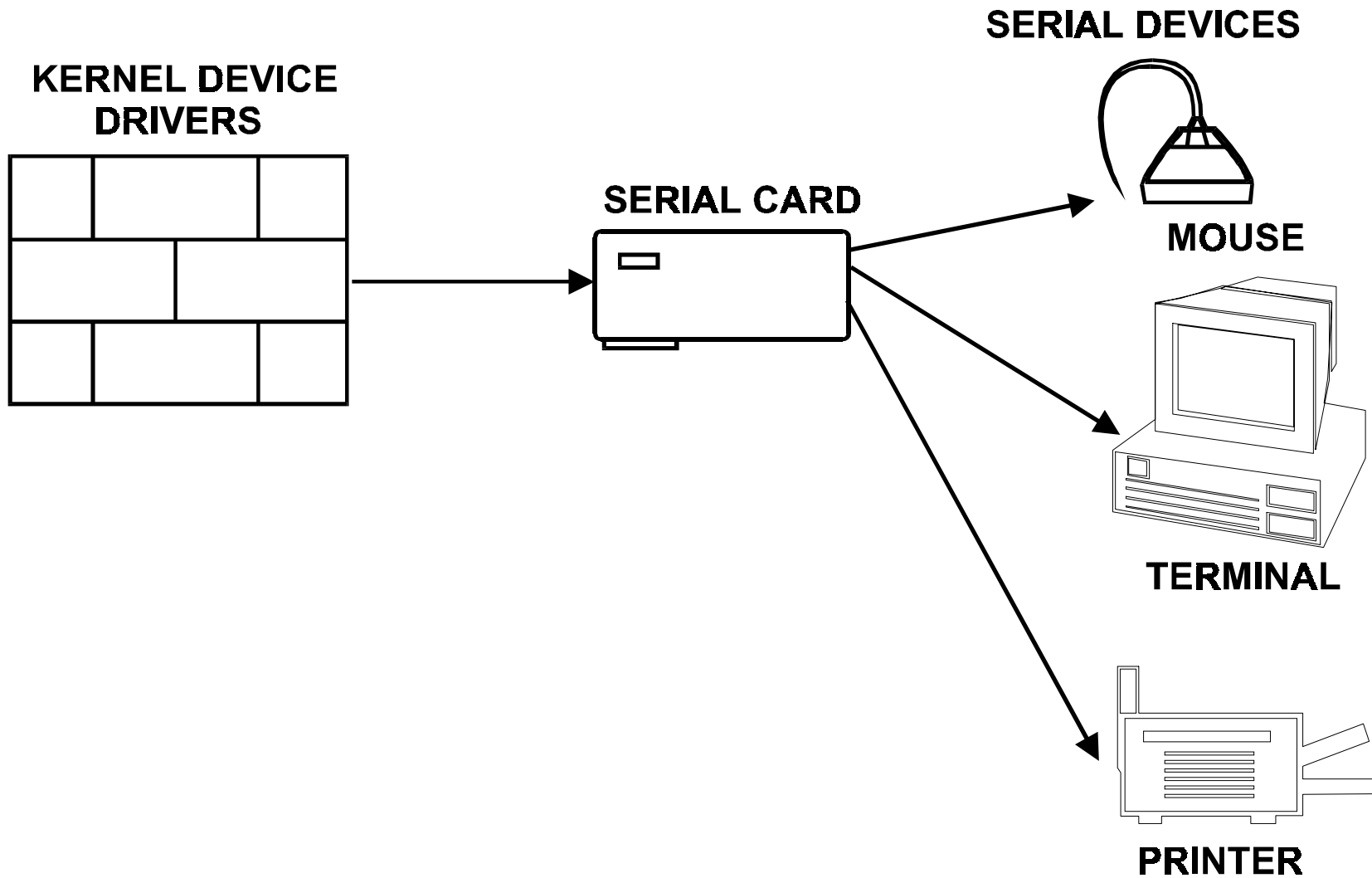
DCE Data Communication Equipment (female)



Serial Port Speeds and UARTs

300	
1200	
2400	
4800	
9600	Highest speed for 8250
19200	Highest speed for 16450 when used with fast modems
38400	
57600	
115200	Highest speed for 16550
9600	Highest speed for 8250
19200	Highest speed for 16450 when used with fast modems
38400	
57600	
115200	Highest speed for 16550

Installing a Serial Card

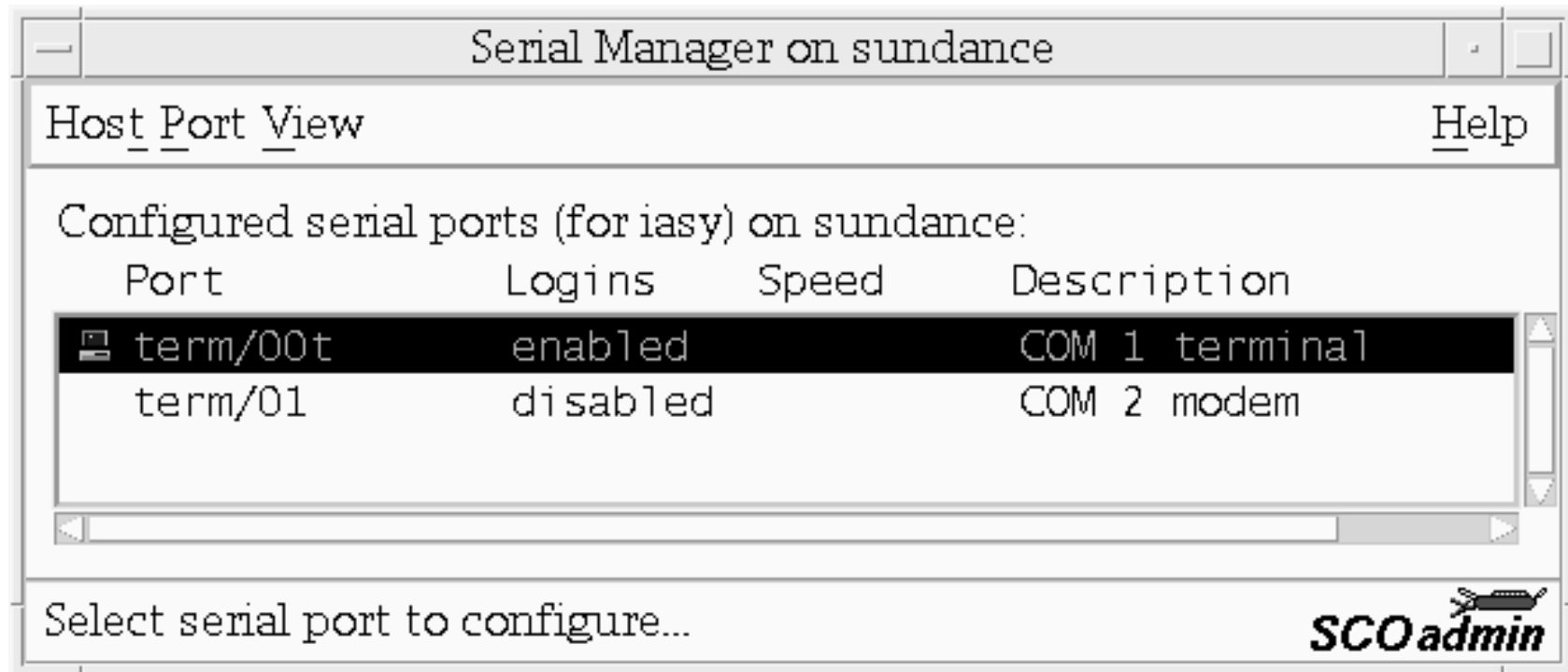


The */etc/saf/_sactab* File (Partial Extraction)

An extraction from the */etc/saf/_sactab* file:

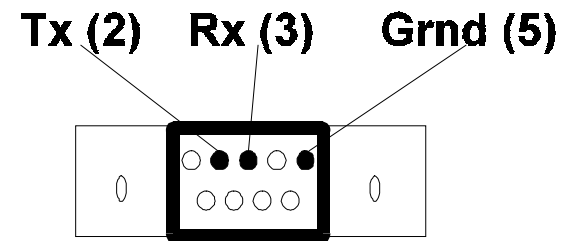
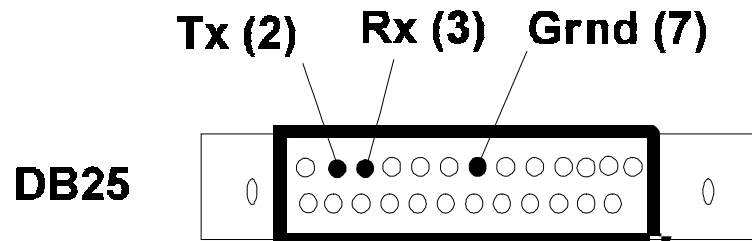
```
tcp:listen::3:/usr/lib/saf/listen -m inet/tcp0 tcp 2>/dev/null#  
inetd:inetd::0:/usr/sbin/inetd  
contty:ttymon::0:/usr/lib/saf/ttymon
```

Serial Manager

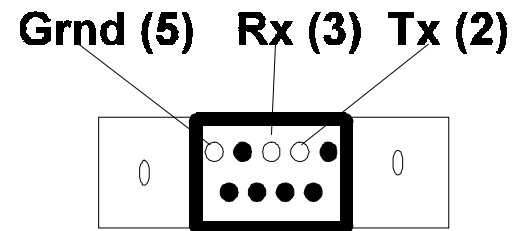
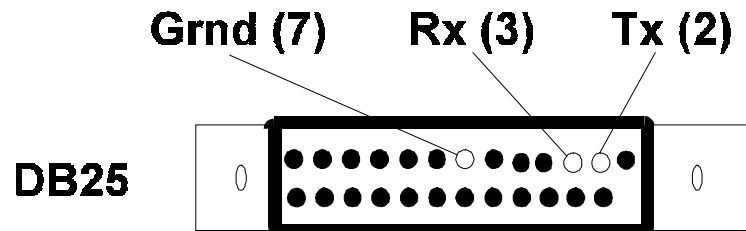


Physical Terminal Connections

DTE Data Terminal Equipment (male)



DCE Data Communication Equipment (female)



Example Terminal Setup Screen

F10 - TOP LEVEL

ARROWS - NEW FIELDS

SPACE - NEXT CHOICE

BAUD RATE=9600

DATA/STOP BITS=8/1

PARITY=NONE

RCV HNDSHAKE=XON/XOFF

XMT HNDSHAKE=XON/XOFF

XPC HNDSHAKE=OFF

AUX BAUD RATE=9600

AUX DATA/STOP BITS=8/1

AUX PARITY=NONE

AUX RCV HNDSHAKE=DSR

AUX XMT HNDSHAKE=NONE

F1
DISP

F2
GENERL

F3
KEYBRD

F4
COMM

F5
MISC

F6
TABS

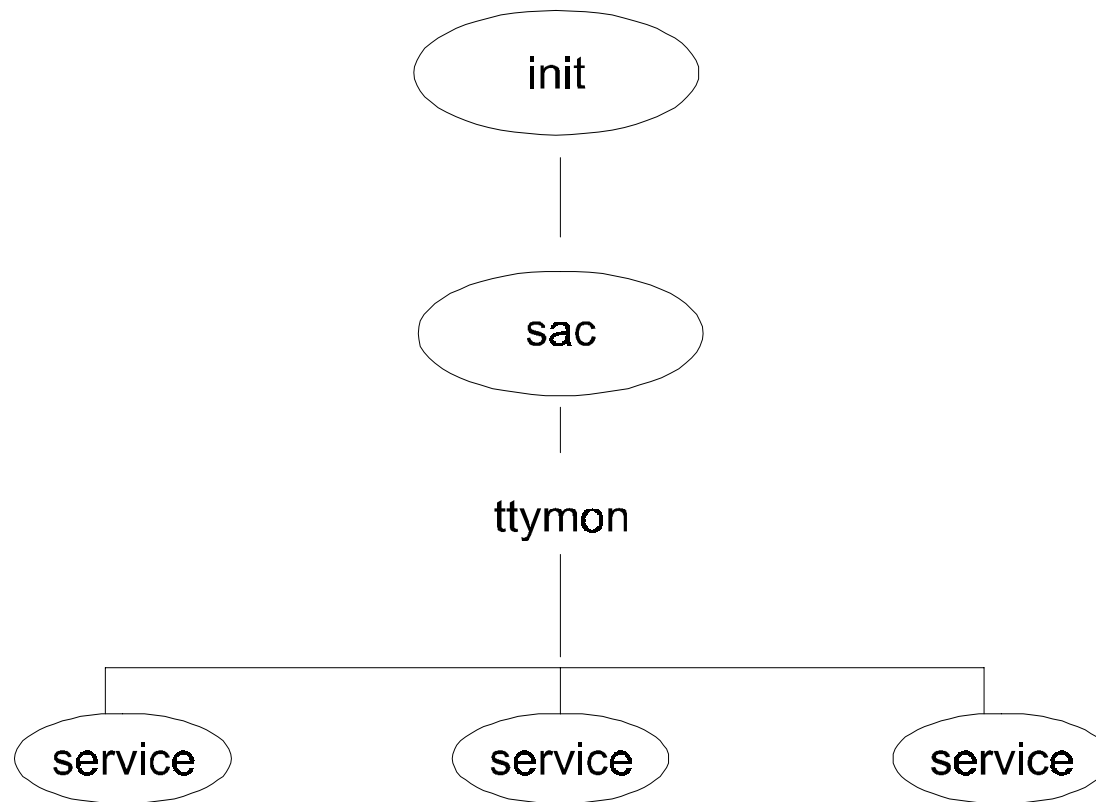
F7
A/BACK

F8
F/KEYS

F9
LABELS

F10
EXIT

TTY Service Invocation



Hung or Scrambled Terminal

Hung Terminal	Scrambled Terminal
1. Check physical connections. 2. Type CTRL q 3. Press DEL or CTRL \ 4. Kill process. 5. Turn off and on. 6. Check terminal configuration. 7. . Type CTRL jstty sane CTRL j	1. Log out and log back in. 2. Check terminal type. 3. Check terminal setup. 4. Type CTRL jstty sane CTRL j.

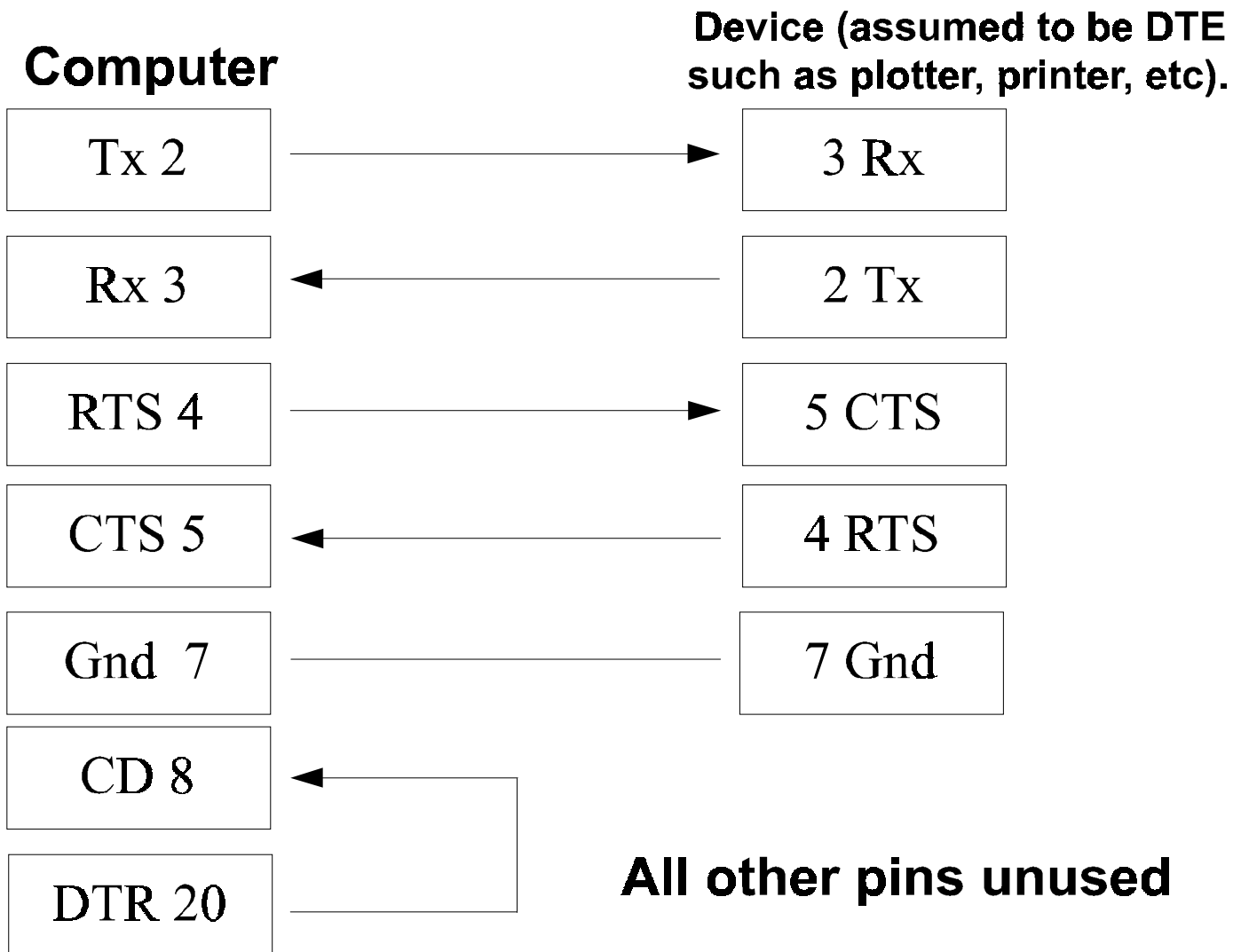
Configuring Modems

- Add a modem to your computer
- Test the connection

Installing and Managing Printers

- Install a parallel card
- Install parallel and serial printers
- Add local and remote printers
- Describe the UNIX print service
- Manage print request directories
- Set print request priorities
- Manage printer interface scripts
- Troubleshoot the UNIX print service

RTS/CTS Handshaking for 25 Pin Connector



Parallel Port Settings

dcu

UnixWare Device Configuration Utility

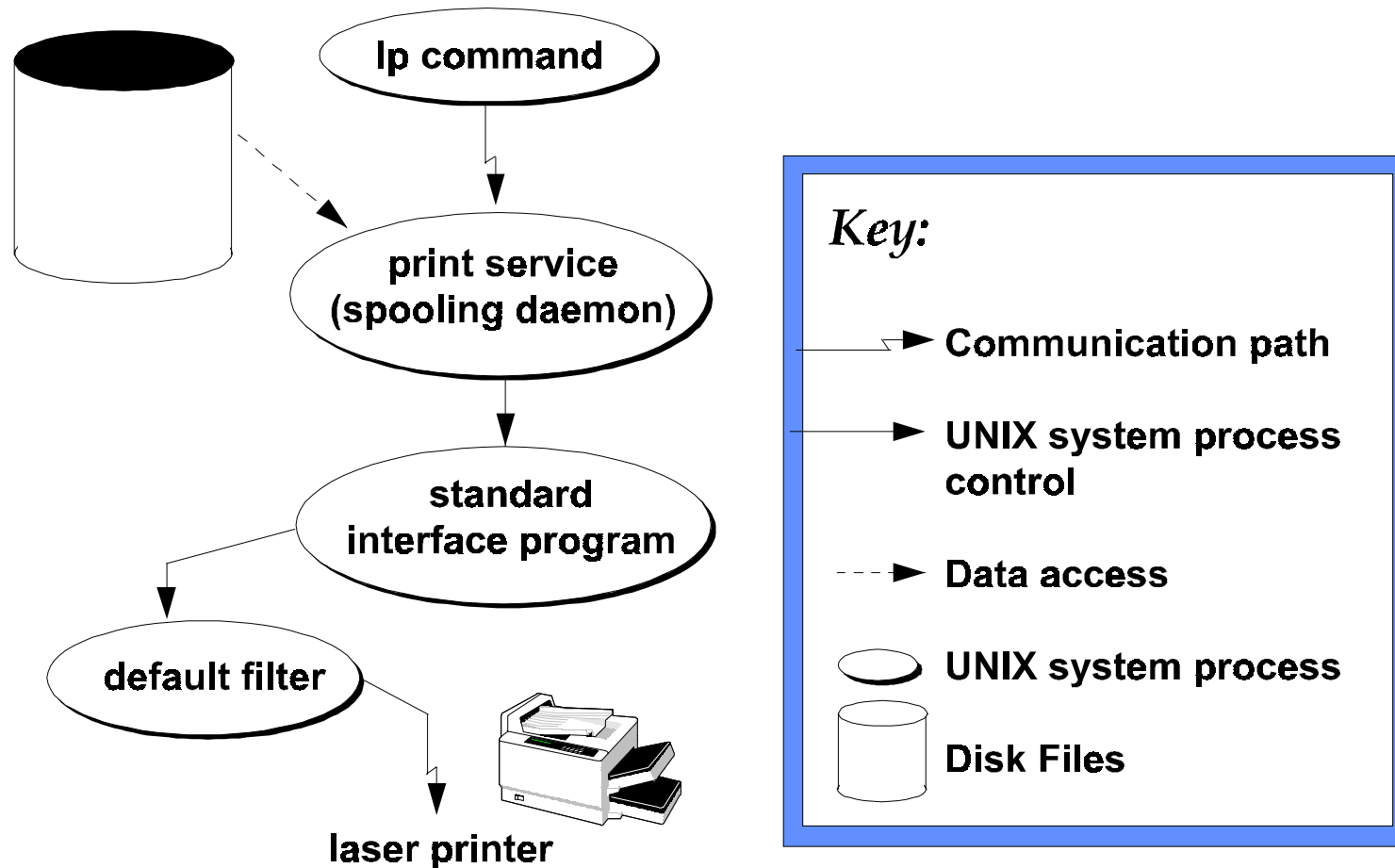
Hardware Device Configuration

	Device Name	IRQ	IOStart	IOEnd	MemStart	MemEnd	DMA
=	=====	===	=====	=====	=====	=====	===
Y	UNKNOWN	-	-	-	-	-	-
Y	Parallel Port	7	378	37f	-	-	-
Y	Floppy Drive	6	3f0	3f7	-	-	2
Y	I2O IOP	-	-	-	-	-	-
Y	Real Time Clock	8	-	-	-	-	-
Y	Keyboard & Display	1	60	62	a0000	bffff	-
Y	Keyboard & Display	-	64	64	c0000	e7fff	-
Y	Direct Memory Access	-	0	1f	-	-	-
Y	Direct Memory Access	-	c0	df	-	-	0
Y	Direct Memory Access	-	80	9f	-	-	-
Y	CMOS RAM	-	70	7f	-	-	-
Y	AT Platform (UP)	-	-	-	-	-	-
Y	COM Port	4	3f8	3ff	-	-	-
Y	COM Port	3	2f8	2ff	-	-	-
Y	UNKNOWN	-	-	-	-	-	-
Y	Sym53c810	11	d100	d1ff	20000000	200000ff	-
Y	UNKNOWN	-	-	-	-	-	-

(Page Up/Page Down for more)

TAB/arrow=Move, F1=Help, F2=Choices, F4=Verify, F6=Info, F7=Adv, F10=Return

Print Request Processing



Overview of print request processing

Viewing the Status of the Print Scheduler with `lpstat -t`

```
scheduler is running
system default destination: laser
device for printer: /dev/lp0
laser accepting requests since Fri Feb 3 13:12:22 1995
printer laser enabled since Wed Feb 8 08:16:29 1995. available.
```

laser-5	root	1246	Feb 8 08:16	on laser
laser-6	johnsp	1246	Feb 8 08:16	
laser-7	aaronm	1246	Feb 8 08:17	

Partial Request Log Entries

Letter	Content of line
C	Number of copies printed
D	Printer or class destination or the word "any"
F	Filename in <i>/user/spool/lp/temp</i> printed. This line repeated for each file printed, and files are printed in the order given.
N	How the print service notified the user after printing the file. • M by an electronic mail message • W by a message written to the user's terminal
O	Any -o options given to lp(C)
P	Priority of the print request
s	Outcome of the job, expressed as a combination of individual bits in hexadecimal form. The important bits used internally by the spooler are: 0x0004 Slow filtering finished successfully. 0x0010 Printing finished successfully. 0x0040 Request was cancelled. 0x0100 Request failed filtering or printing.
U	Name of the user who submitted the print request.

Installing Tape Drives and CD-ROM Drives

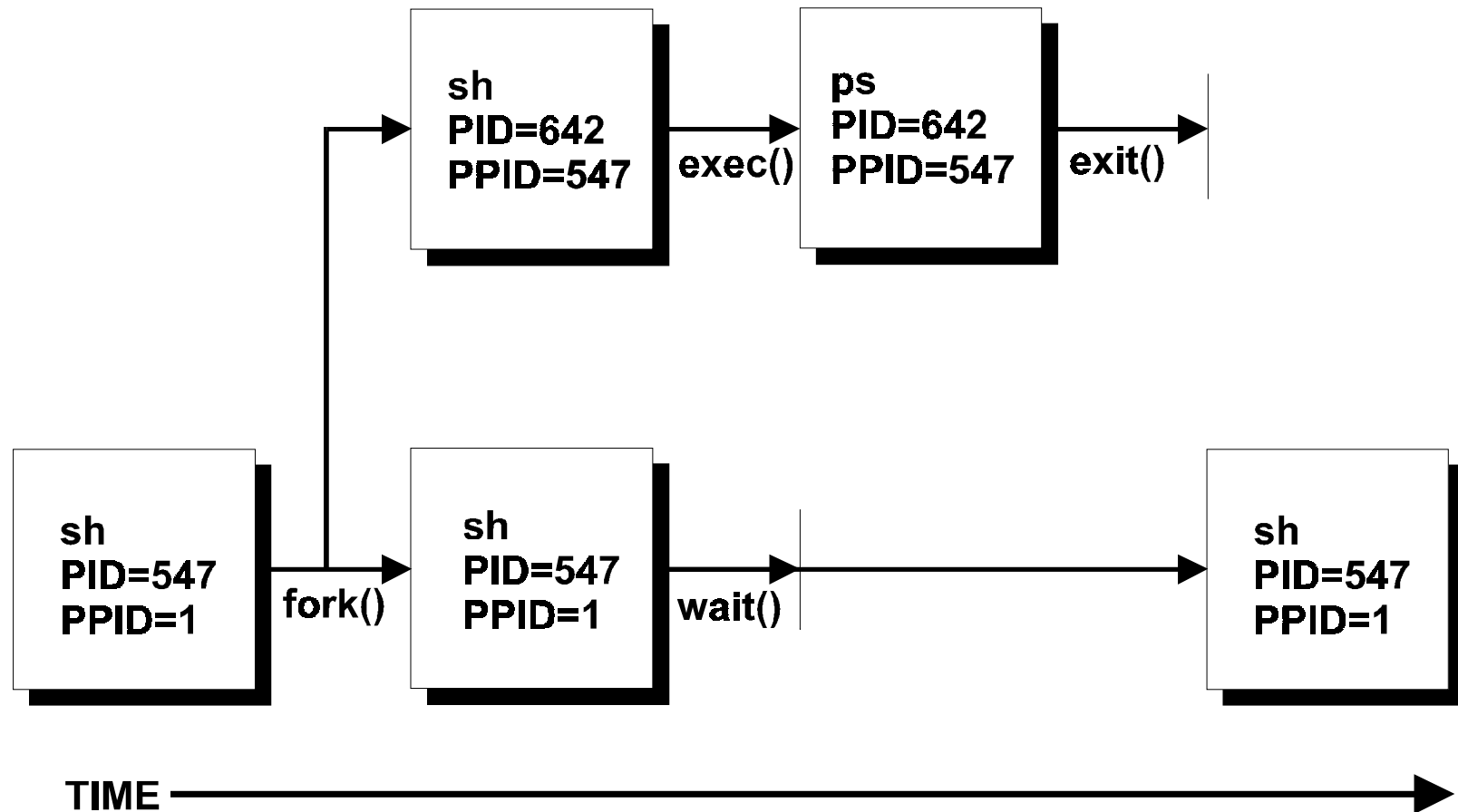
- Install a tape drive
- Install a CD-ROM drive

Controlling System and User Processes

- Describe how processes are created
- Distinguish between user- and system-generated processes
- Check process activity
- Manage process scheduling
- Manage process accounting

Command Execution

\$ ps



System Processes

UID	PID	PPID	CLS	PRI	C	STIME	TTY	TIME	COMD
root	0	0	SYS	79	0	13:12:53	?	0:04	sysproc
root	1	0	TS	70	0	13:12:54	?	0:01	/sbin/init
root	74	73	TS	80	0	13:13:09	?	0:00	/etc/ifor_pmd
root	76	74	TS	80	0	13:13:10	?	0:00	/etc/ifor_sld
root	73	1	TS	70	0	13:13:09	?	0:00	/etc/ifor_pmd
root	75	74	TS	80	0	13:13:09	?	0:00	/etc/sco_cpd
root	96	1	TS	88	0	13:13:12	?	0:00	/usr/lib/mousemgr
root	458	1	TS	70	0	13:13:37	pts/0	0:00	/usr/sbin/pppd
root	734	720	TS	80	0	13:13:55	?	0:00	/usr/sbin/inetd
root	729	720	TS	80	0	13:13:55	?	0:00	/usr/lib/saf/ttymon

Process States

F	S	UID	PID	PPID	CLS	PRI	NI	C	TIME	COMD
3	S	0	0	0	SYS	79	0	0	0:04	sysproc
42	S	0	1	0	TS	70	0	0	0:01	init
2	S	0	74	73	TS	80	0	0	0:00	ifor_pmd
42	S	0	76	74	TS	80	0	0	0:00	ifor_sld
2	S	0	458	1	TS	70	0	0	0:00	pppd

CPU Activity **sar -u(1M)**

```
UnixWare      sosco 5 7 i80386      04/28/98

10:36:49      %usr   %sys   %wio   %idle
10:36:53      21     18    13     48
10:36:57      1      1     0     97
10:37:01      1      4     1     94
10:37:05      1      2     0     97

Average       6      7     4     84
```

Examining the Run Queue **sar -q(1M)**

UnixWare honey 5 7.1.0 i386 03/26/99

	prunq	%prunocc	runq	%runocc	swpq	%swpocc
00:00:00			2.0	100		
01:00:00			2.0	100		
02:00:00	1.0	0	2.0	100		
03:00:00	1.0	0	2.0	100		
04:00:00	1.0	0	2.0	100		
05:00:00	1.0	0	2.0	100		
Average	1.0	0	2.0	100		

Managing System Security

- Describe trusted system concepts
- Describe and select a security profile
- Change your system's security profile
- Review the account database files
- Delegate system administration responsibilities
- Configure a user account to execute **root** commands
- Manage Access Control Lists (ACLs)
- Use advanced protection bits
- Configure additional security measures

System Security Profiles - Logins

Security Parameters	Low	Traditional	Improved	High
Logins				
Maximum unsuccessful attempts (account/terminal)	99	99	5	3
Delay between login attempts (secs) - terminal only	0	10	20	20
Time to complete login (terminal only)	300	60	60	60
System Security Profiles (Other)				
Default umask	022	022	027	077
UIDs reusable	yes	yes	no	no
Home directory permissions	755	755	750	700
Remote printing allowed	yes	yes	no	no

System Security Profiles - Passwords

Security Parameters	Low	Traditional	Improved	High
Passwords				
Minimum days between changes	0	0	0	2
Expiration time (days)	Infinite	Infinite	1	6
Lifetime (days)	Infinite	Infinite	24	12
Minimum Length	1	3	6	8
Checked for obviousness	-	No	No	Yes
Password required to login	No	Yes	Yes	Yes
Single User Password required	Yes	Yes	Yes	Yes

System Security Profiles - Logins

Security Parameters	Low	Traditional	Improved	High
Logins				
Maximum unsuccessful attempts (account/terminal)	99	99	5	3
Delay between login attempts (secs) - terminal only	0	10	20	20
Time to complete login (terminal only)	300	60	60	60
System Security Profiles (Other)				
Default umask	022	022	027	077
UIDs reusable	yes	yes	no	no
Home directory permissions	755	755	750	700
Remote printing allowed	yes	yes	no	no

System Security Profiles - Passwords

Security Parameters	Low	Traditional	Improved	High
Passwords				
Minimum days between changes	0	0	0	2
Expiration time (days)	Infinite	Infinite	1	6
Lifetime (days)	Infinite	Infinite	24	12
Minimum Length	1	3	6	8
Checked for obviousness	-	No	No	Yes
Password required to login	No	Yes	Yes	Yes
Single User Password required	Yes	Yes	Yes	Yes

Access Control Lists

total 8

-rw-r--r--	1	suees	training	9	Mar	30	14:22	curriculum
drwxr-xr-x+	2	suees	training	96	Mar	30	14:05	myprojects
-rw-r--r--+	1	suees	training	27	Mar	30	13:46	proposal
drwxr-xr-x	2	suees	training	96	Mar	30	14:21	sales
drwxr-xr-x	2	suees	training	96	Mar	30	14:21	training

ACL Entries

Before: ACL

```
# file: proposal
# owner: suees
# group: training
user::rw-
group::r--
class:r--
other:r--
```

After: ACL

```
# file: proposal
# owner: suees
# group: training
user::rw-
user:jamesb:rw- #effective:r--
group::r--
class:r--
other:r--
```

Default ACLS

Before:

```
# file: myprojects  
# owner: suees  
# group: training  
user::rwx  
group::r-xclass:r-x  
other:r-x
```

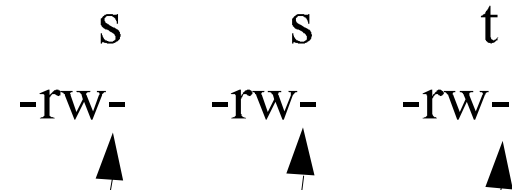
After:

```
# file: myprojects  
# owner: suees  
# group: training  
user::rwx  
group::r-xclass:r-x  
other:r-x  
default:user:jamesb:rw-
```

Extended Discretionary Access Control

File Permissions:

s s t
-rW- -rW- -rW-



Set User ID (SUID)

Set Group ID (SGID)

Sticky Bit

chmod 7666 filename

Extended



Default Discretionary Access Control

Effect on Files:

Unrestricted permissions:

(6)(6)(6)
-rw-rw-rw-

umask 022

0 2 2

Permissions of new files:

-rw-r--r--
(6)(4)(4)

Effect on Directories:

Unrestricted permissions:

(7)(7)(7)
drwxrwxrwx

umask 022

0 2 2

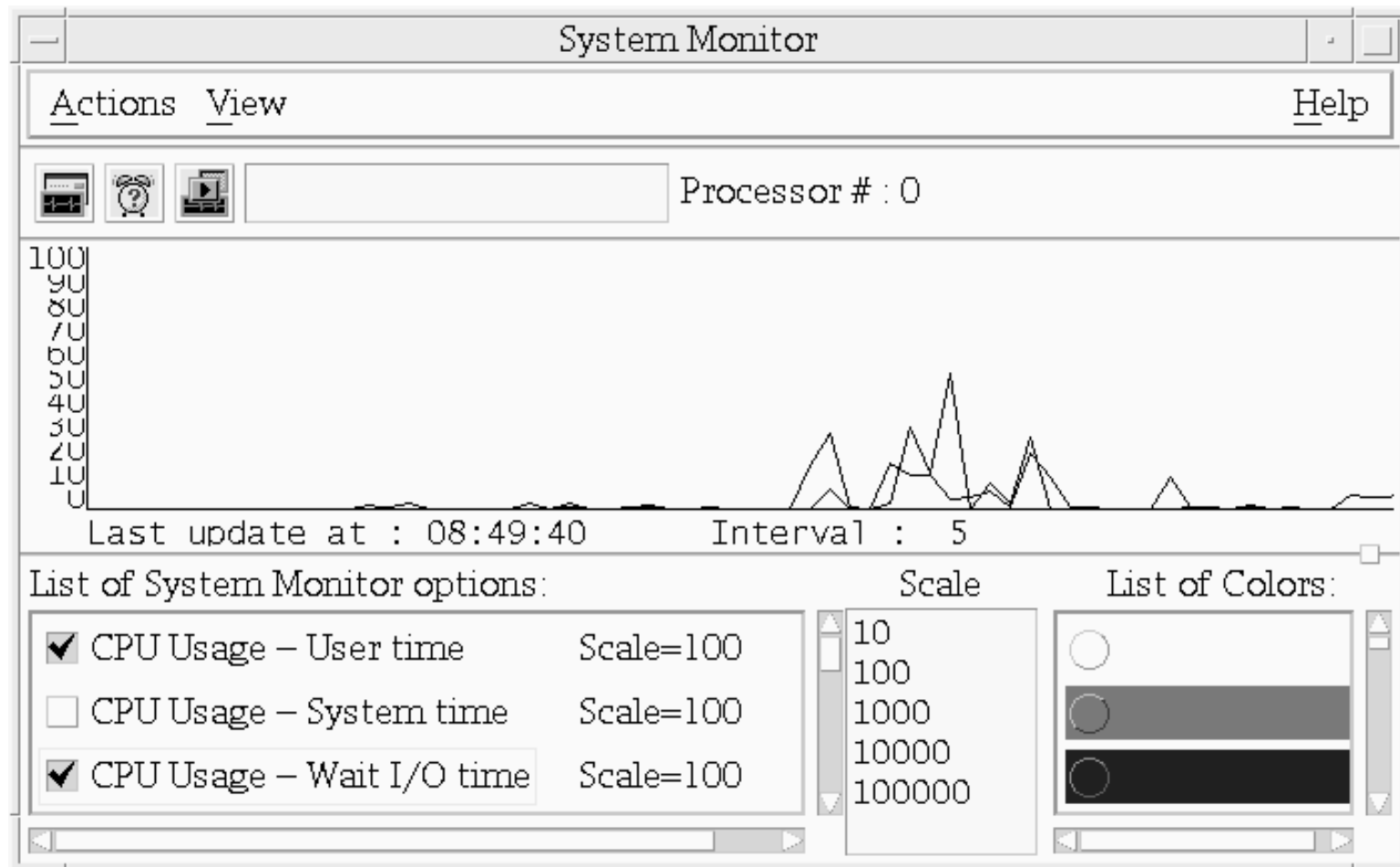
Permissions of new directories:

drwxr-xr-x
(7)(5)(5)

Performance Tuning

- Describe factors that influence performance
- Set performance goals
- Collect performance data
- Run the **scoadmin**(1M) System Monitor
- Configure the **scoadmin**(1M) System Monitor
- Autotune kernel parameters
- Interpret kernel error messages
- Configure kernel parameters

System Monitor



Autotuning Parameters

	1.	2.	3.	4.	5.
VXFS	NINODE	DEF	LINEAR	64	7000
VXFS	NINODE	MIN	LINEAR	4	150
VXFS	NINODE	MAX	LINEAR	64	28000

- 1: Name of Tunable
- 2: The default, min, or max
- 3: Linearly or as a step function
- 4: The amount of memory
- 5: The value of the tunable at that amount of memory

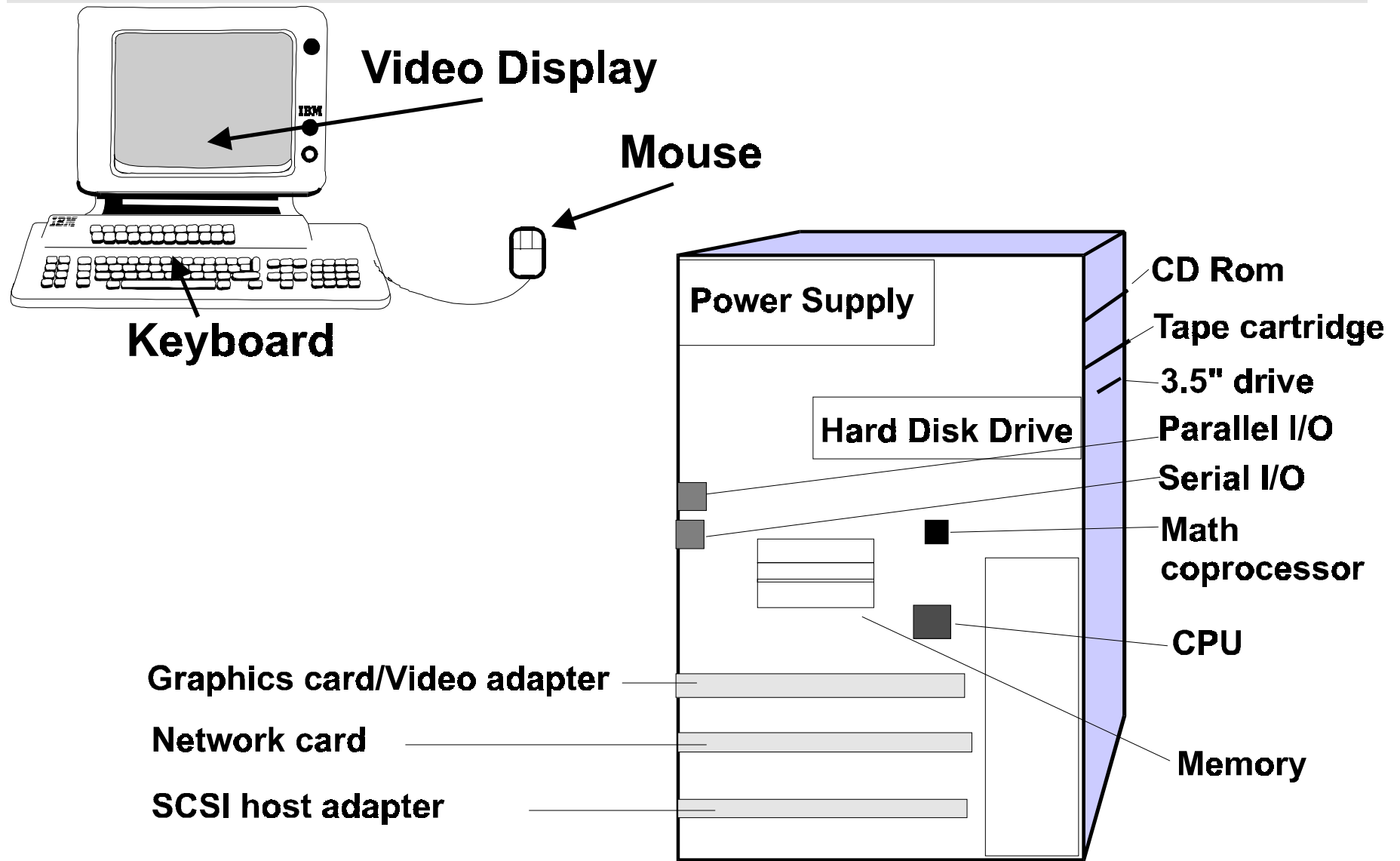
Disaster Recovery

- Prepare for recovery
- Restore a non-root filesystem
- Recover an unusable system

Basic Hardware Configuration

- Identify the major components of a typical system
- Describe the functions of microprocessors and memory
- Describe the bus architectures supported by SCO
- Describe the functions of SCSI host adapters
- Describe supported hard disk configurations
- Identify general compatibility issues
- Maintain a sample administration log book

Major Hardware Components of a Typical System



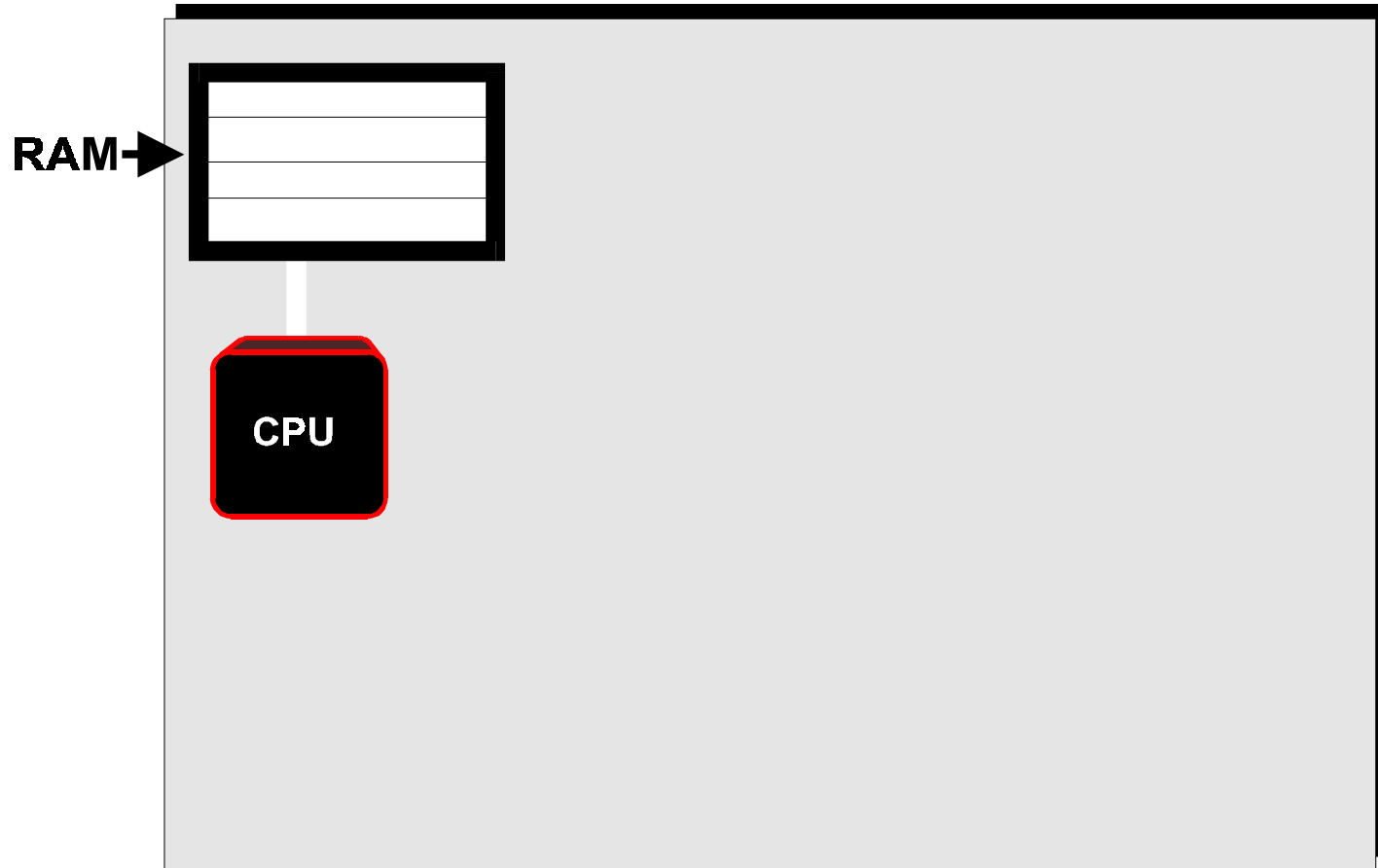
The Motherboard with CPU

Motherboard

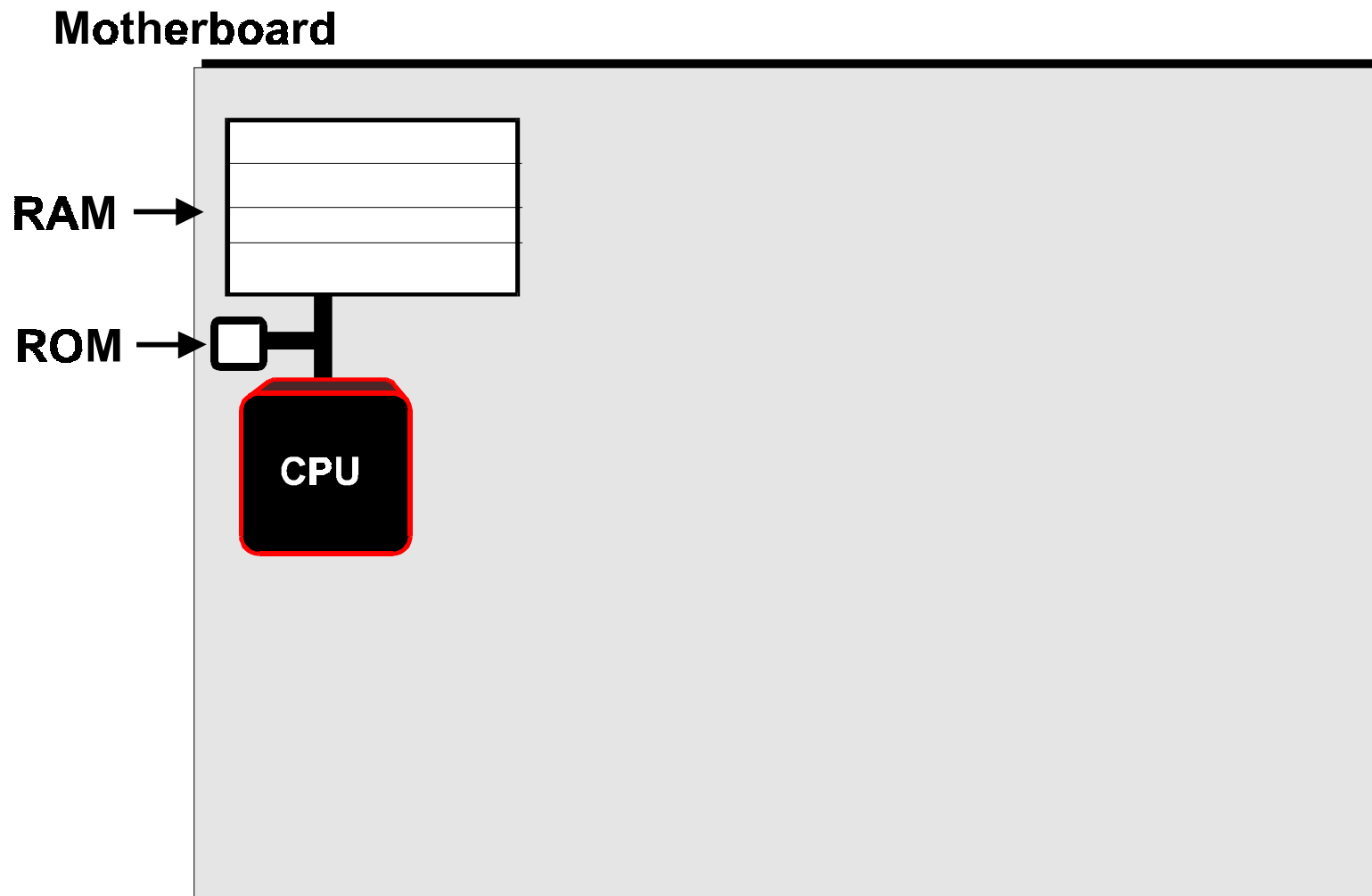


Random Access Memory (RAM)

Motherboard

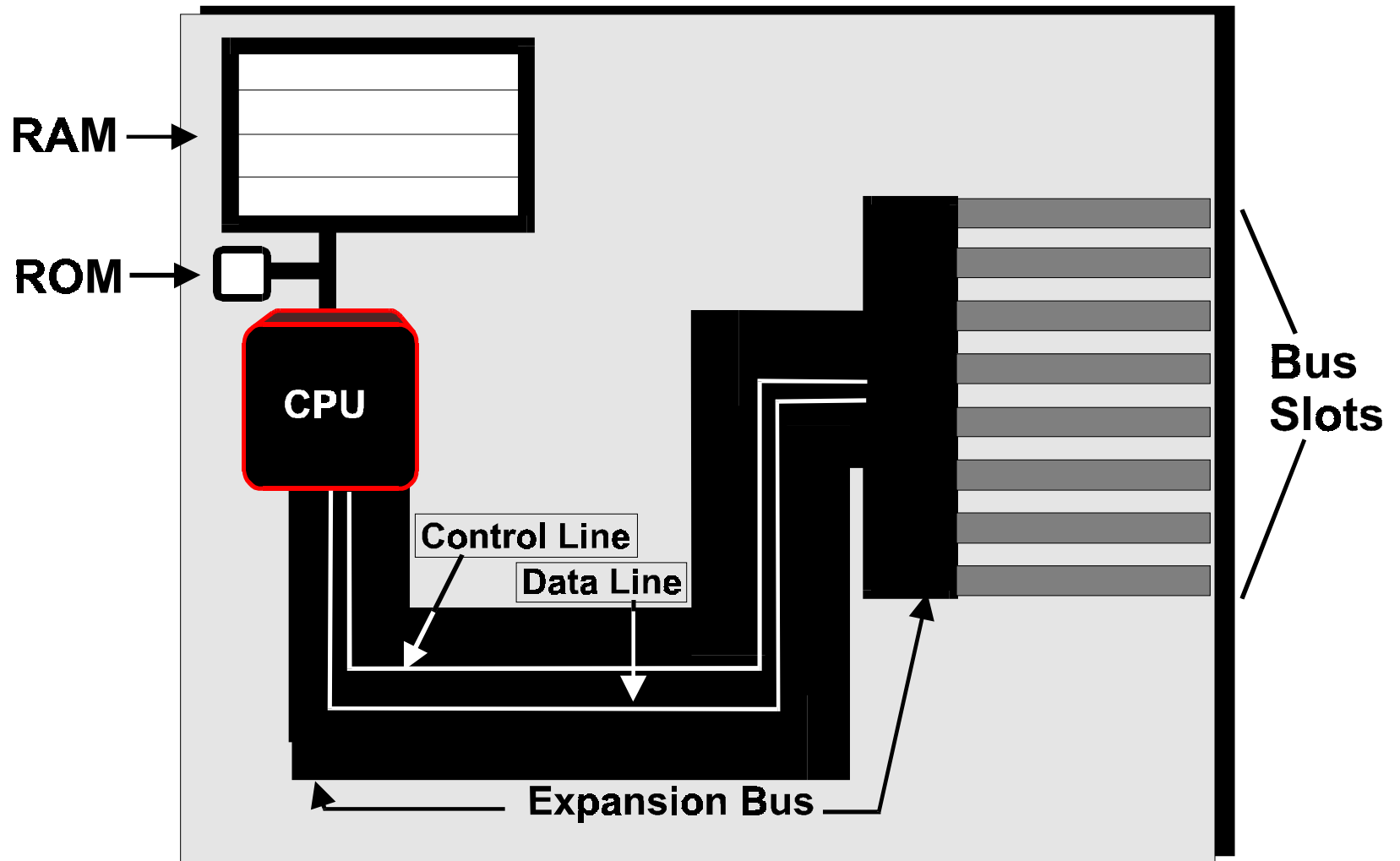


Read-Only Memory (ROM)

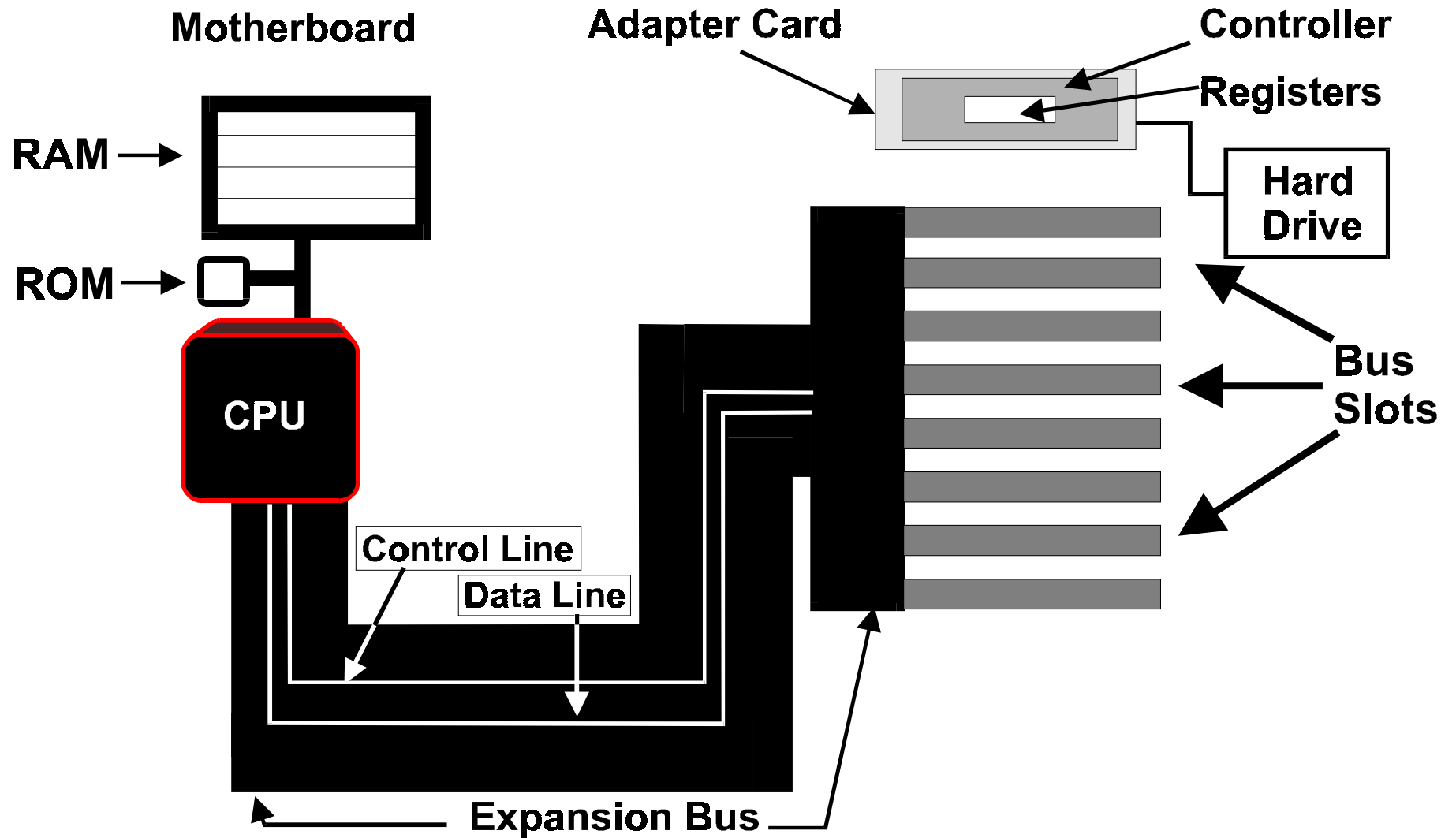


Expansion Bus

Motherboard



Adapter Card and Controller

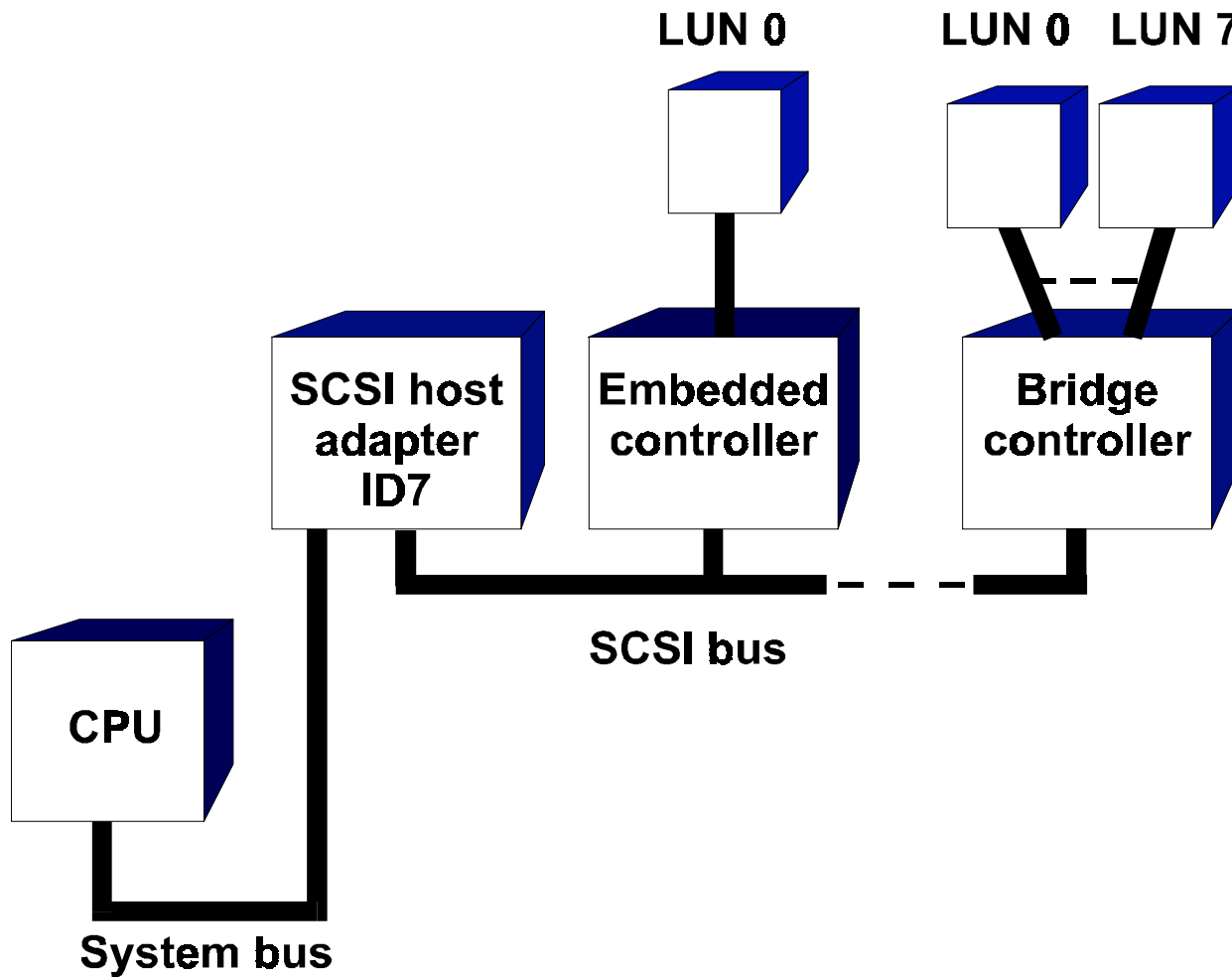


Typical Device Interrupts

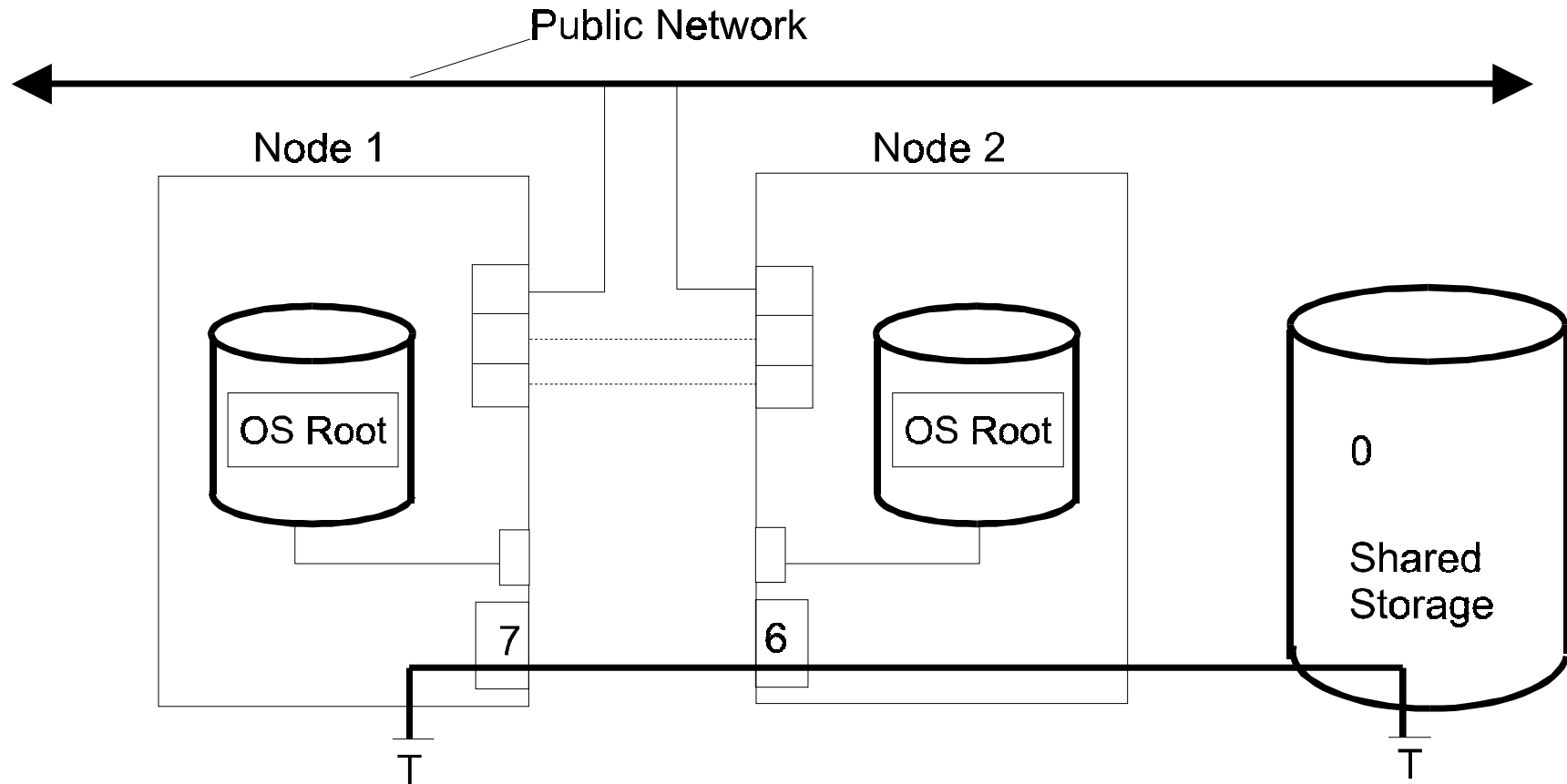
Interrupt	Octal	Device
0*	0	Clock
1*	1	Console
2	2	Networks, tapes and others
3	3	Serial COM2
4	4	Serial COM1
5	5	Alternate parallel port (1p2)
6*	6	Floppy disk
7	7	Main parallel port (1p0 or 1p1)
9*	11	Chain from IRQ2
10	12	
11*	13	SCSI host adapter 1
12	14	SCSI host adapter 1
13*	15	FPU
14*	16	ST506/ESDI/IDE controller 0
15	17	ST506/ESDI/IDE controller 1

*Do not attempt to use these interrupts for any other purpose.

SCSI Bus Addressing



Generic Two-Node Cluster Example



0, 6, and 7- SCSI IDs

T- External SCSI termination

..... Private Network