第一章 概述

本章目的

- 定义RISC System/6000 的技术和概念
- 列出RISC System/6000 通常的配置
- 描述系统管理员的责任

RS/6000家族谱

大规模并行处理机

SP

高端企业级服务器

S7A

S80

中级企业级服务器

F50

H50

H70

高性能工作站

43P

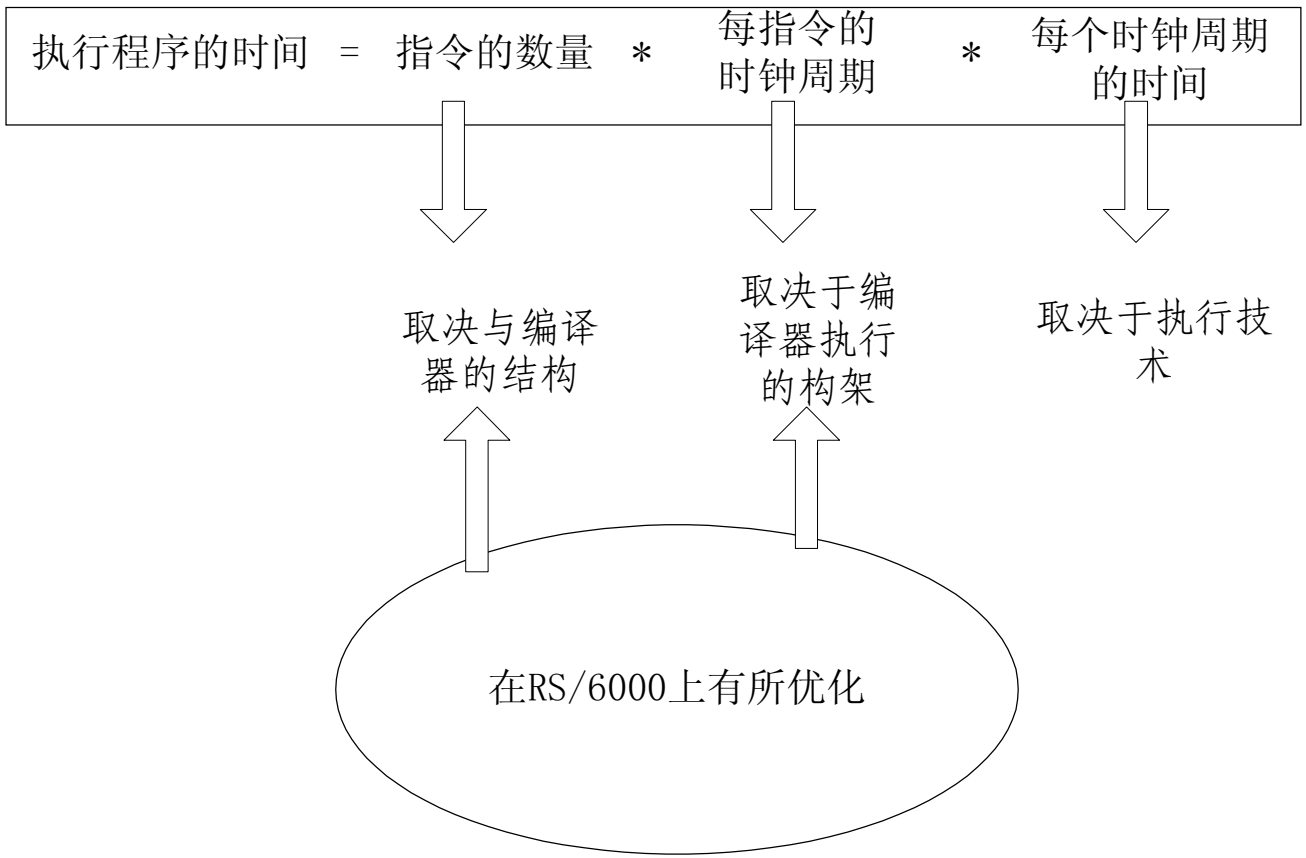
44P

F40

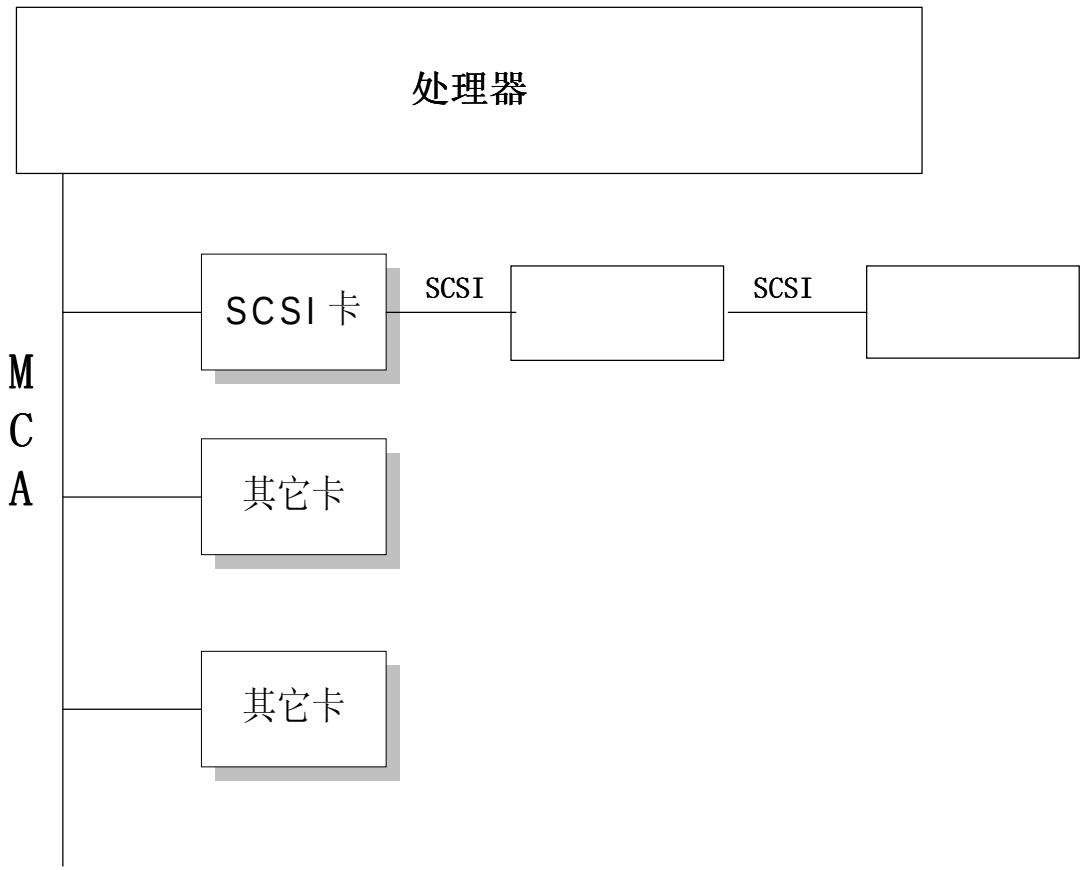
RISC的概念

- Reduced Instruction Set Cycles processors:
  - 在硬件中最常用的指令
  - 每周期执行多条指令
  - 在软件和硬件提供配合

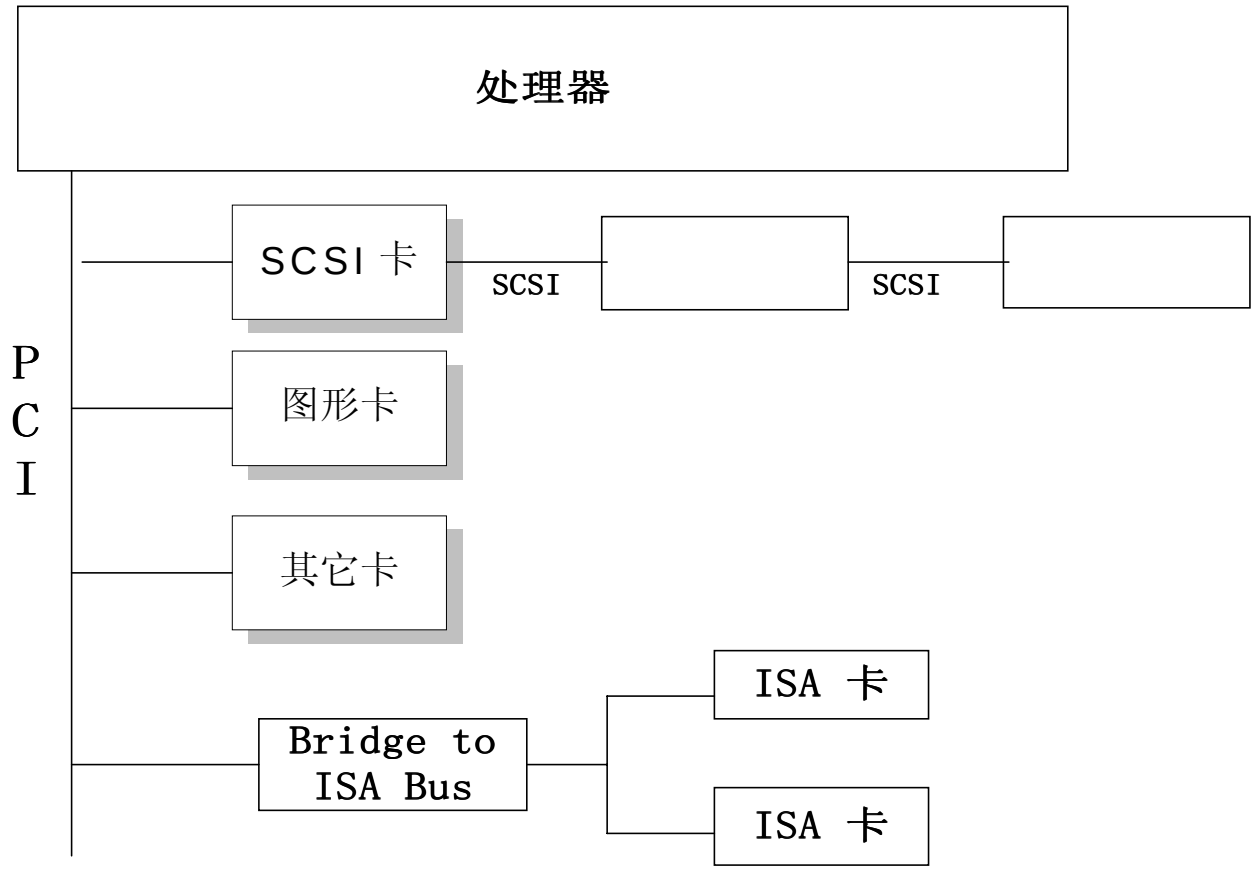
RISC的概念（图）


执行程序的时间 = 指令的数量 * 每指令的时钟周期 * 每个时钟周期的时间
取决与编译器的结构
取决于编译器执行的构架
取决于执行技术
在RS/6000上有所优化

传统的RS/6000：MCA&SCSI



PCI & ISA：基于PCI的RS/6000



其他问题

- 存储设备
- I/O设备
- 图形工作站
- 服务器
- 无盘与无数据工作站

关于64位系统

- 操作系统支持64位处理器
- 操作系统支持大型文件和存储格式
- 操作系统能够管理大型物理内存
- 应用程序能运行在64位寻址空间、并能充分利用低层硬件和操作系统提供的性能改进时，就能够获得最高级别的64位规范顺应性

系统管理目的

- 在系统的管理上花费最少的时间和资源
- 最大的生产率、可靠性、性能
- 提供多种系统管理方案

第二章 安装AIX 4

本章目的

- 列出可用的不同安装介质
- 确定不同的AIX软件包
- 安装基本操作系统(BOS）的步骤
- 通过安装助手(Installation Assistant)确定能够执行的任务

安装方法

- 磁带
- CD-ROM
- 预安装
- 网络安装

安装过程——第一步

- 打开外部设备电源
- 插入安装介质
- 打开电源或按动两次reset键
- 在显示设备查看图标时按F5键

安装过程——第二步

******* Please Define the System Console******

Tpe a 1 at this terminal and press

If you want this display to be the System Console

- 这个屏幕将以多种语言显示。显示方位在：
  - 所有本地显示器
  - 第一个串口

安装过程——第二步(续)和第三步

- S1的特性：
  - Terminal Type = dumb
  - speed = 9600
  - parity = none
  - Bits per character = 8
  - Stop bits = 1
  - Line Control = IPRTS
  - Operating mode = echo
  - turnaround character = CR

第三步：选择在安装过程中使用的语言

安装过程——第四步

- 安装与维护菜单

Welcome to Base Operatating System

Installation and Maintenance

Type the number of your choice and press Enter. Choice indicated by >>>

1Start Install now with Default Settings

2Change/Show Installation Settings and Install

3Start Maintenance Mide for System Recovery

88 Help ?

>>>Choice [1]: 2

安装设置

Installation Settings

Either type 0 or press Enter to install with current settings,or type the number of the setting you want to change and press Enter.

1 System Settings

method of installation…….New and Complete Overwrite

Disk where you want to Install……..hdisk0

2 Primary Language Environment Settings(AFTER install)

Cultural Convention …….C(POSIX)

Language …….C(POSIX)

Keyboard …….C(POSIX)

3 Install Trusted Computing Base …….No

0 Install with the settings listed above

88 Help ?

99 Previous Menu

>>>Choice [1]:

中文环境安装设置

Cultural Convention.....Chinese(Simplified EUC Chinese)
Language ..... Chinese(Simplified EUC Chinese)
Keyboard ..... Chinese(Simplified EUC Chinese)
Keyboard Type.....Default

安装方法

Change Method of Installation

Type the number of your choice and press Enter

1 New and Complete Overwrite

……...

2 Preservation Install

……...

3 Migration Install

…….

88 Help ?

99 Previous Menu

>>>Choice [3]:1

New and complete Overwrite 安装

- 当有一台新的机器时
- 当rootvg被严重损坏，修复比较困难，且没有备份磁带时。
- 你需要重新规划硬盘，使rootvg变小时

Migration 安装

- 大版本之间的升级
- 保留除了/tmp之外内容所有的文件系统（以前版本所有配置文件都将保存）
- 保留非IBM软件产品
- 当从AIX 3.2升级时，/usr/lib/drivers /usr/lib/microcode /usr/lib/mothods /dev 中所有文件将被删除。因此，非IBM设备驱动程序要重新安装

Preservation 安装

- /etc/preserve.list文件指出在保存安装时需要保存的文件系统
- 确认有足够的空间存储保存的系统
- 默认情况下，/usr /tmp /var / 文件系统的数据将丢失

安装系统的磁盘

Change Disks Where You Want to Install

Type one or more numbers for the disks to be used for installation and press Enter.

…….

	Name	Location Code	Size (MB)	VG Status	Bootable
1	hdisk0	00-01-00-0,0	305	rootvg	yes
2	hdisk1	00-01-00-1,0	305	rootvg	no

>>>0 Continue with choices indicated above

66 Disks not known to Base Operating System Installation

88 Help ?

99 Previous Menu

>>>Choice [0]:

开始安装

Installing Base Operating System

Please wait

Approximate
% task completed
16

Elapsed time
(in minutes)
1

安装内容

- 构建AIX目录结构
- 从安装介质重建BOS、现场和文件组
- 安装连接和打开电源设备的驱动程序

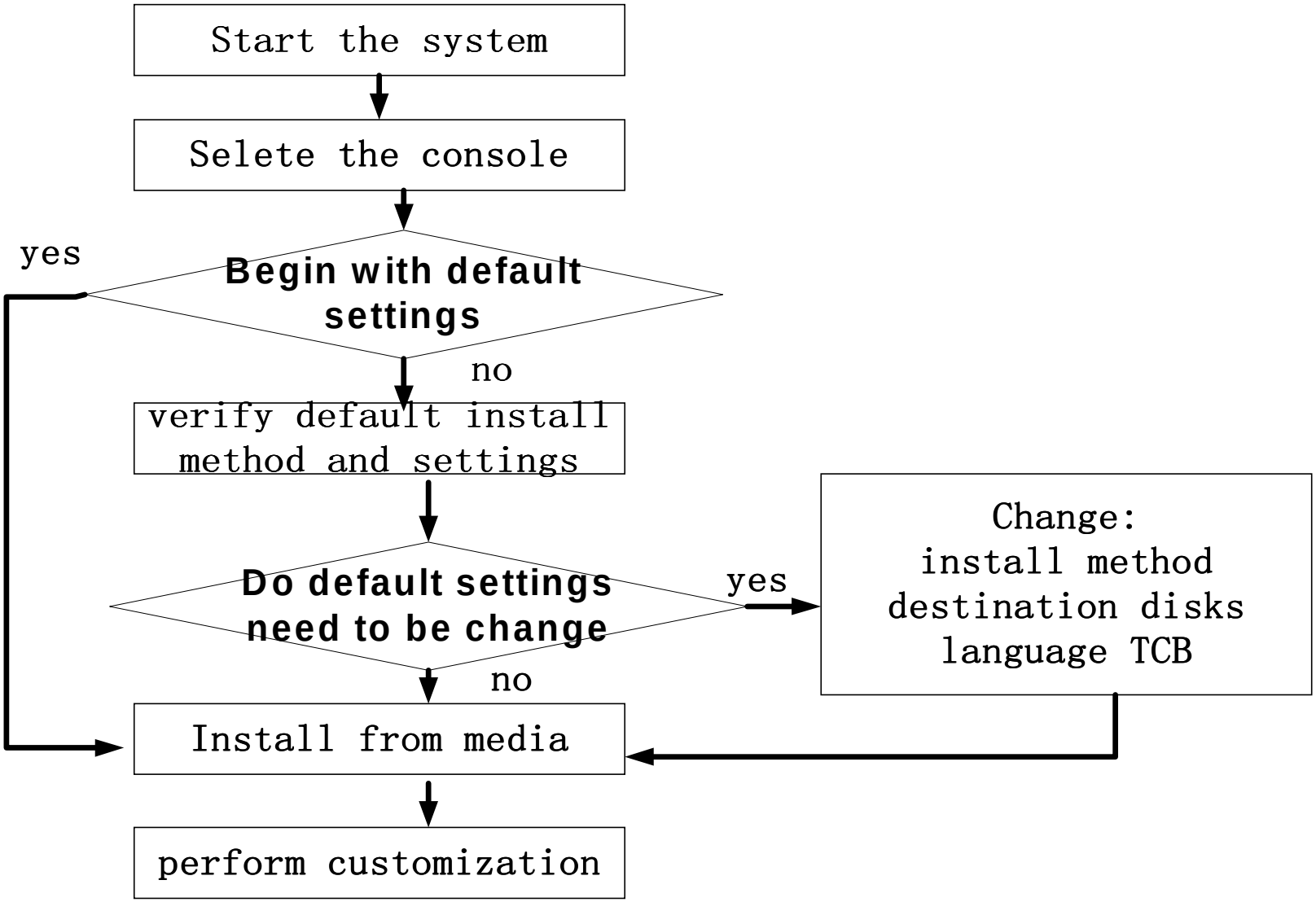
安装结束

Base Operating System installation is complete

Please perform the following step to activate
.....the changes made during the installation

……1.Remove the installation media
…….2. Press the ENTER key to restart (reboot) the system

安装流程图


Start the system
Selete the console
Begin with default settings
yes
no
verify default install method and settings
Do default settings need to be change
yes
Change:
install method
destination disks
language TCB
no
Install from media
perform customization

安装助手主要内容

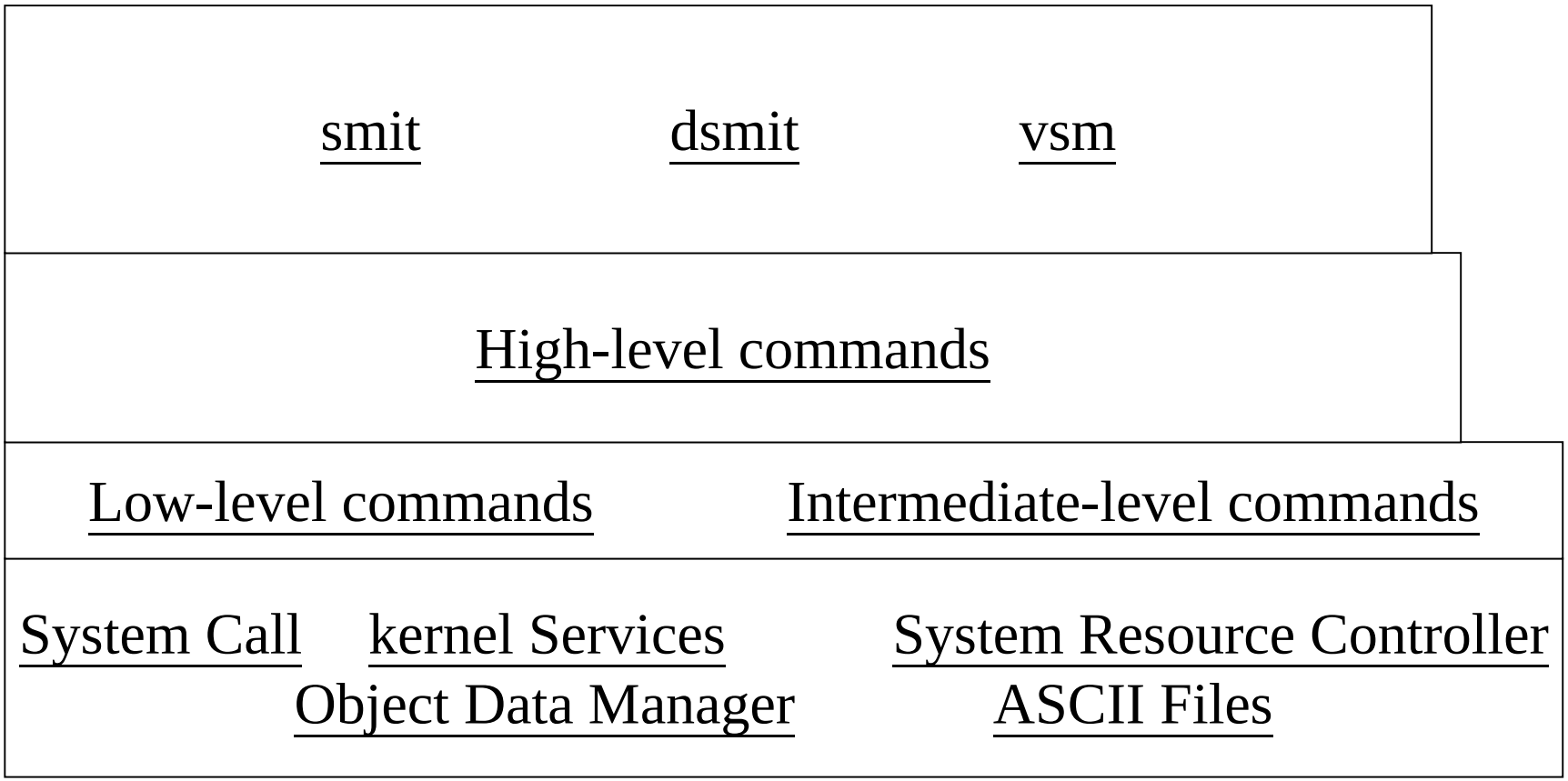
- 设置系统时间与时区
- 设置虚拟内存的配置
- 设置TCP/IP
- 安装附加软件

第三章 系统管理工具

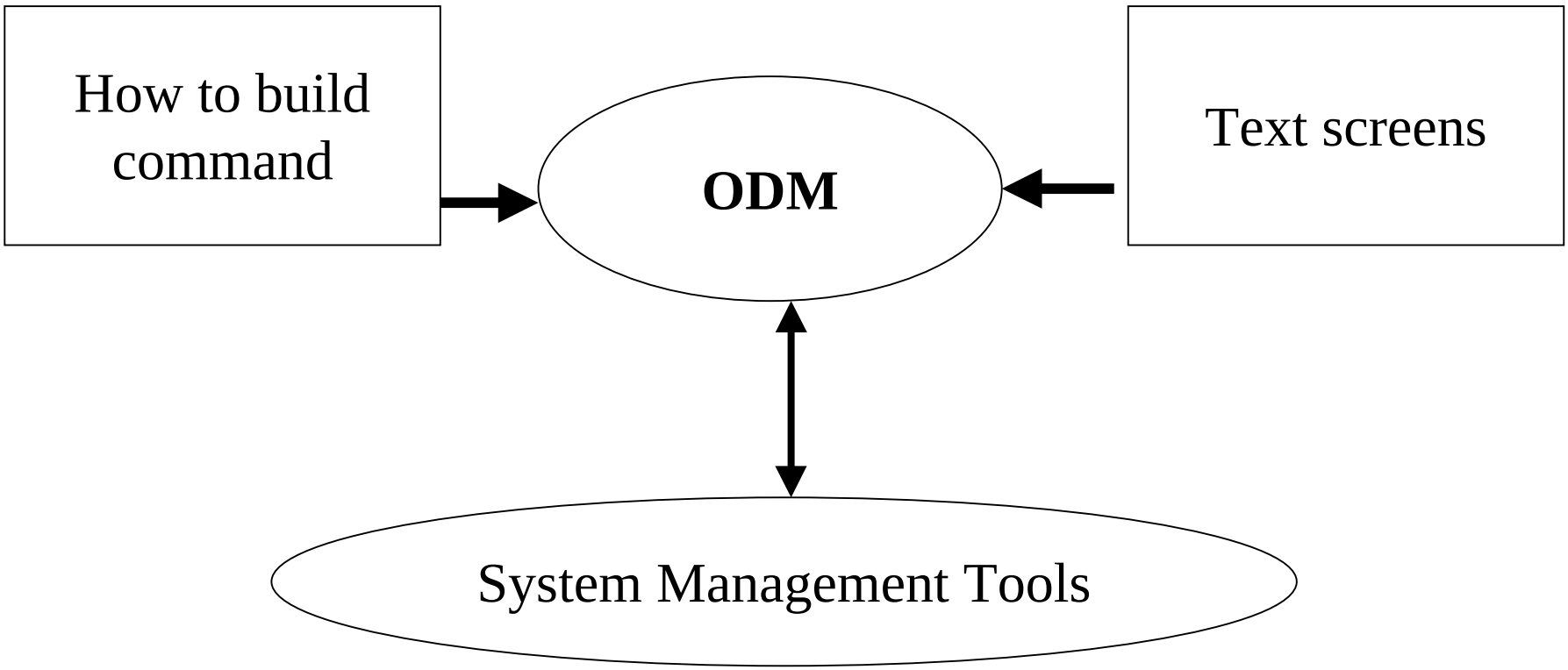
本章目的

- 略述系统管理工具的优势
- 定义smit 的功能，和不同的屏幕类型
- 了解smit 的日志

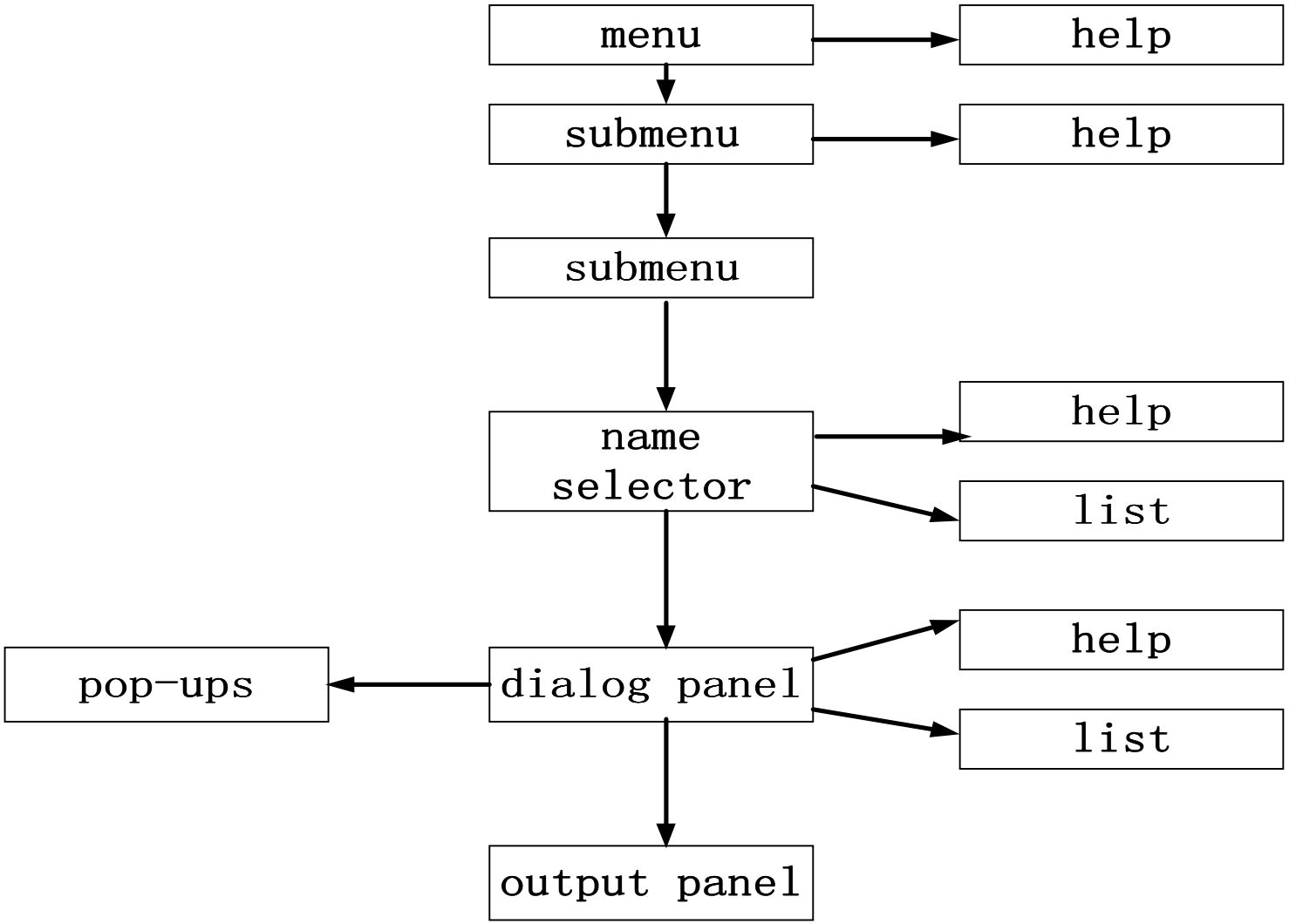
AIX 4 的管理


smit
dsmit
vsm
High-level commands
Low-level commands
Intermediate-level commands
System Call
kernel Services
System Resource Controller
Object Data Manager
ASCII Files

系统管理工具


How to build command
ODM
Text screens
System Management Tools

smit 的用户界面


menu
help
submenu
help
submenu
name
selector
help
list
pop-ups
dialog panel
help
list
output panel

Smit 主菜单

System Management

Move cursor to desired item and press Enter

Software Installation and Maintenance
Software License Management
Devices
System Storage Management(Physical and Logical Storage)
Security & Users
Communication Application and Services
Print Spooling
Problem Determination
Performance & Resource Scheduling
System Environment

F1=Help	F2=Refresh	F3=Cancel	F8=Image
F9=Shell	F10=Exit	Enter=Do	

对话窗口

Schedule a Job

Type or select values in entry fields.

Press Enter AFTER making all desired change

	[ENTRY Fields]
YEAR	[95]
MONTH	[Jul]
DAY(1-31)	[12]
*HOUR(0-23)	[10]
*MINUTES(0-59)	[23]
SHELL to use for job execution	Korn(ksh)
*COMMAND or SHELL SCRIPT	[ ] /

F1=Help	F2=Refresh	F3=Cancel	F4=List
F5=Reset	F6= Command	F7=Edit	F8=Image
F9=Shell	F10=Exit	Enter=Do	

Output screen

COMMAND STATUS

Command:OK stdout: yes stderr:no

Before command completion, additional instructions may append below.

[TOP]

UID	PID	PPID	C	STIME	TTY	TIME	CMD
root	1	0	4	20:15:04	-	1:49	/etc/init
root	1719	1	0	20:16:14	-	0:10	/etc/syncd 60
root	2003	1	0	20:16:19	-	0:00	/etc/srcmstr

……

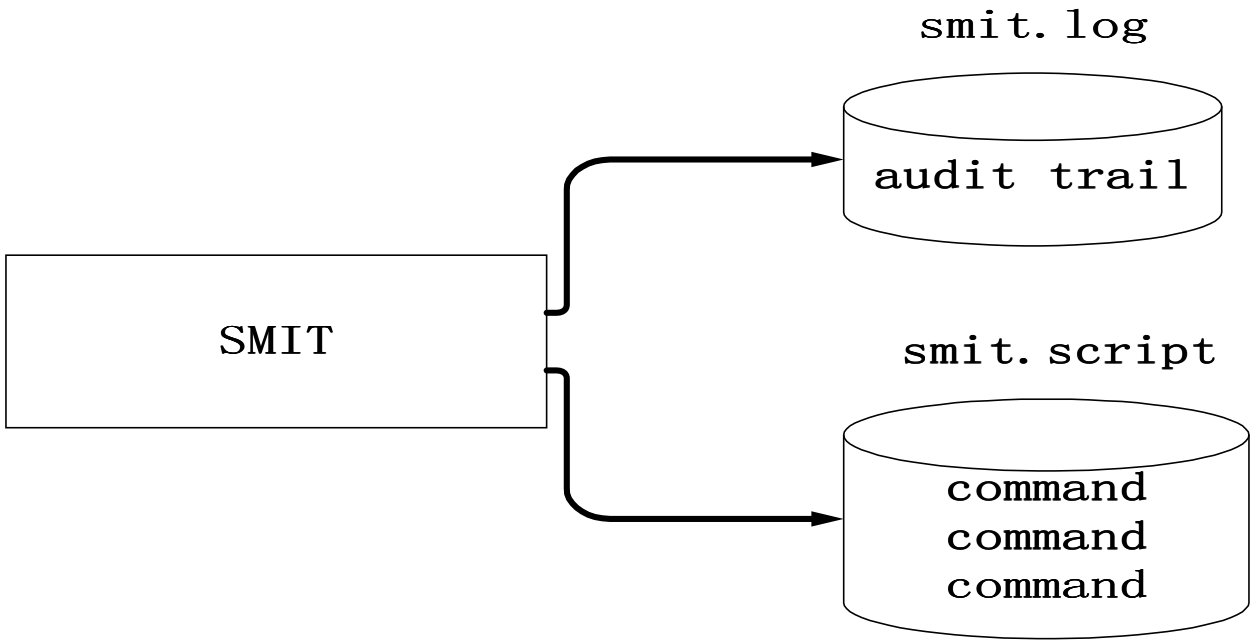
[MORE…6]

F1=Help F2=Refresh F3=Cancel F6= Command

F8=Image F9=Shell F10=Exit /=Find

n=Find Next

Smit Log & Script File



- $HOME/smit.log

  记录了所有经过的菜单和对话窗口的日志，所有执行的命令和其输出，并记录了SMIT 对话的错误信息

- $HOME/smit.script

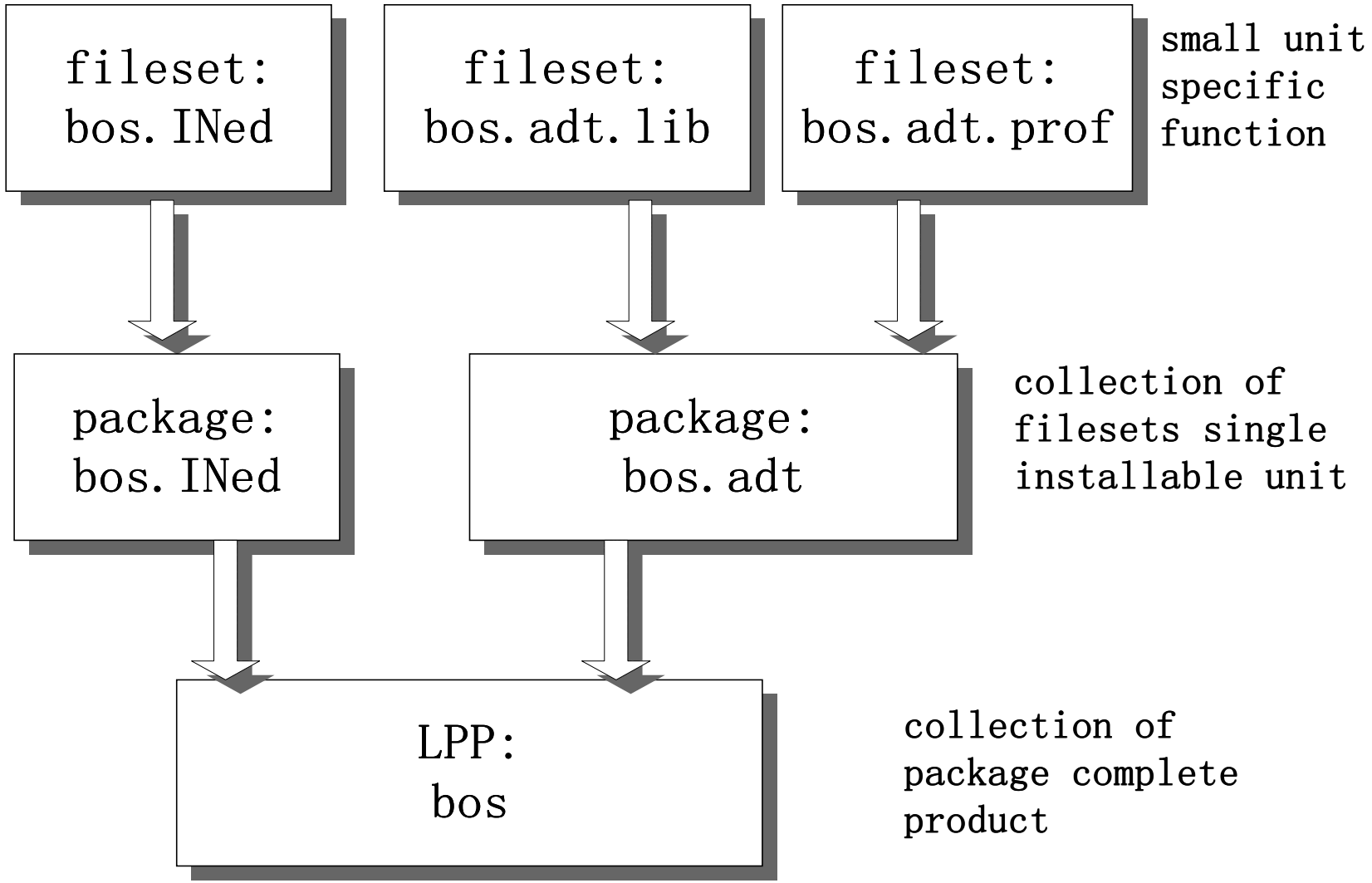
  通过SMIT执行的AIX 命令

第四章
软件的安装与维护

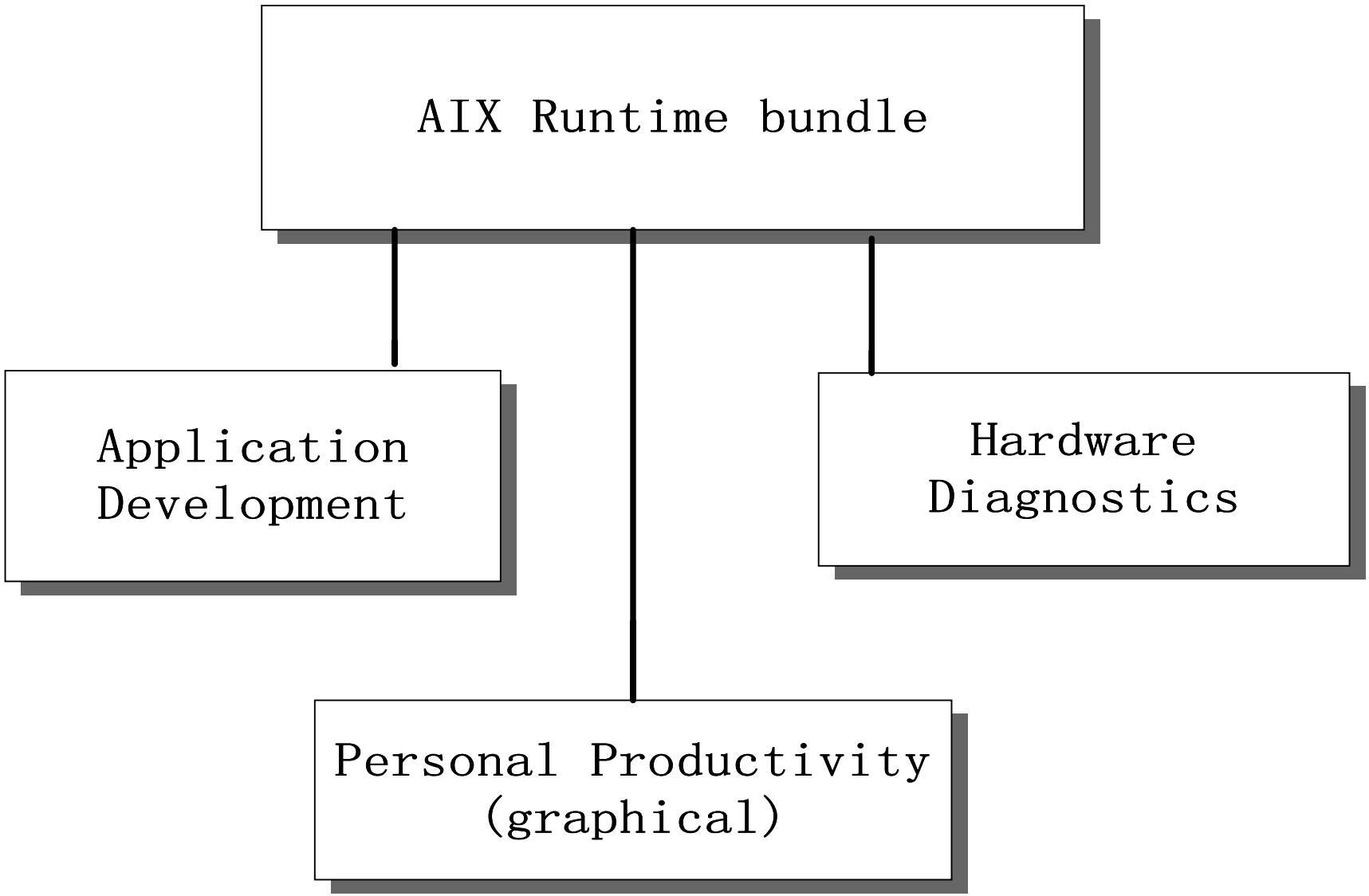
本章目的

- 详细说明package的定义和AIX4的命名习惯
- 了解软件产品的管理和升级

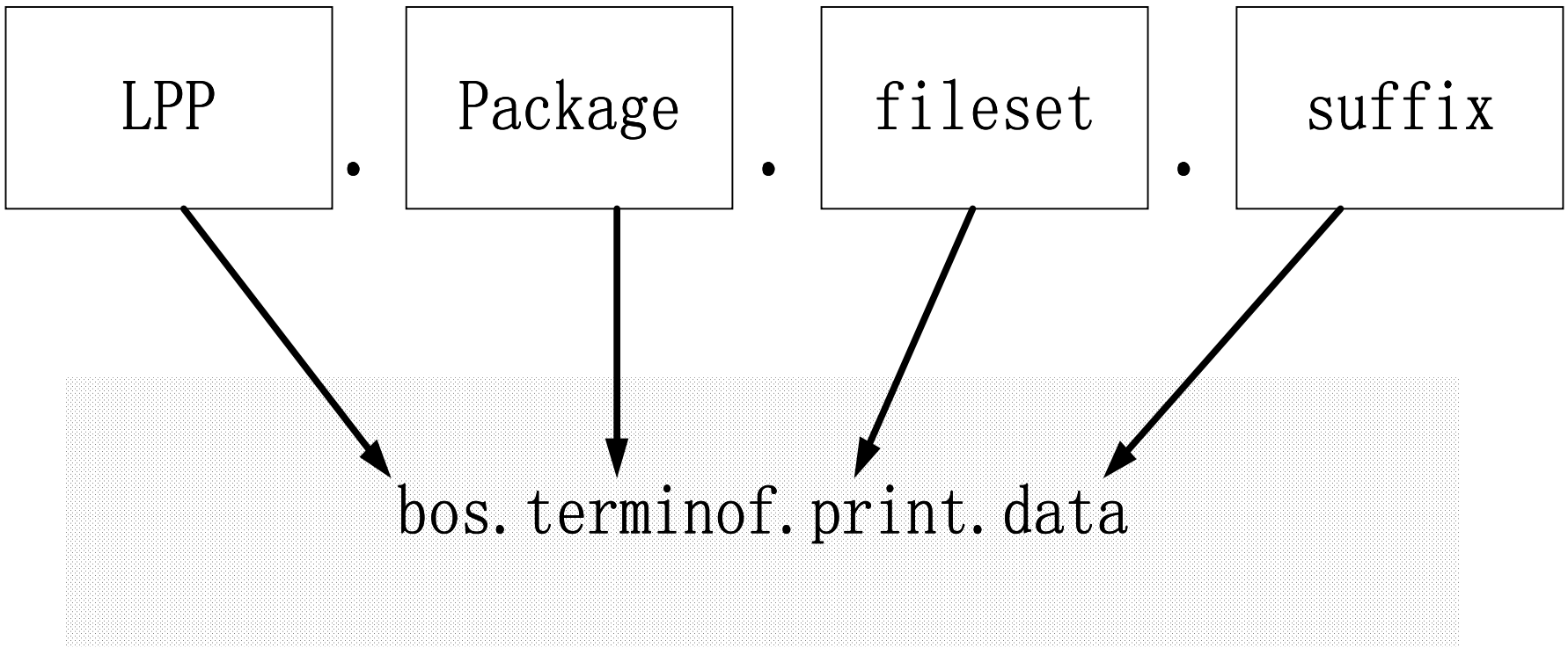
Package 的定义


fileset:
bos.INed
fileset:
bos.adt.lib
fileset:
bos.adt.prof
small unit
specific
function
package:
bos.INed
package:
bos.adt
collection of
filesets single
installable unit
LPP:
bos
collection of
package complete
product

Bundles


AIX Runtime bundle
Application Development
Hardware Diagnostics
Personal Productivity (graphical)

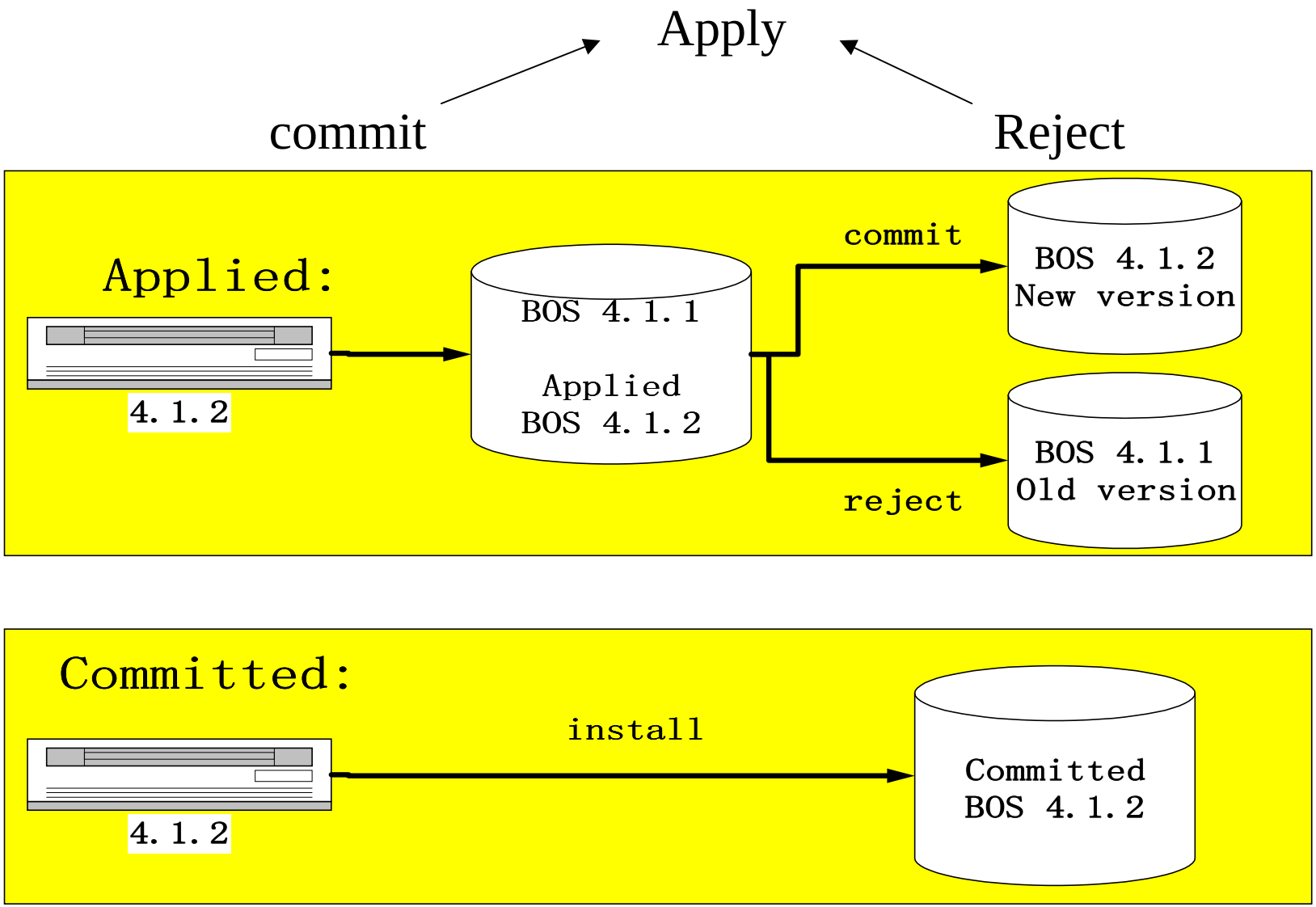
AIX 4 的Package 的命名



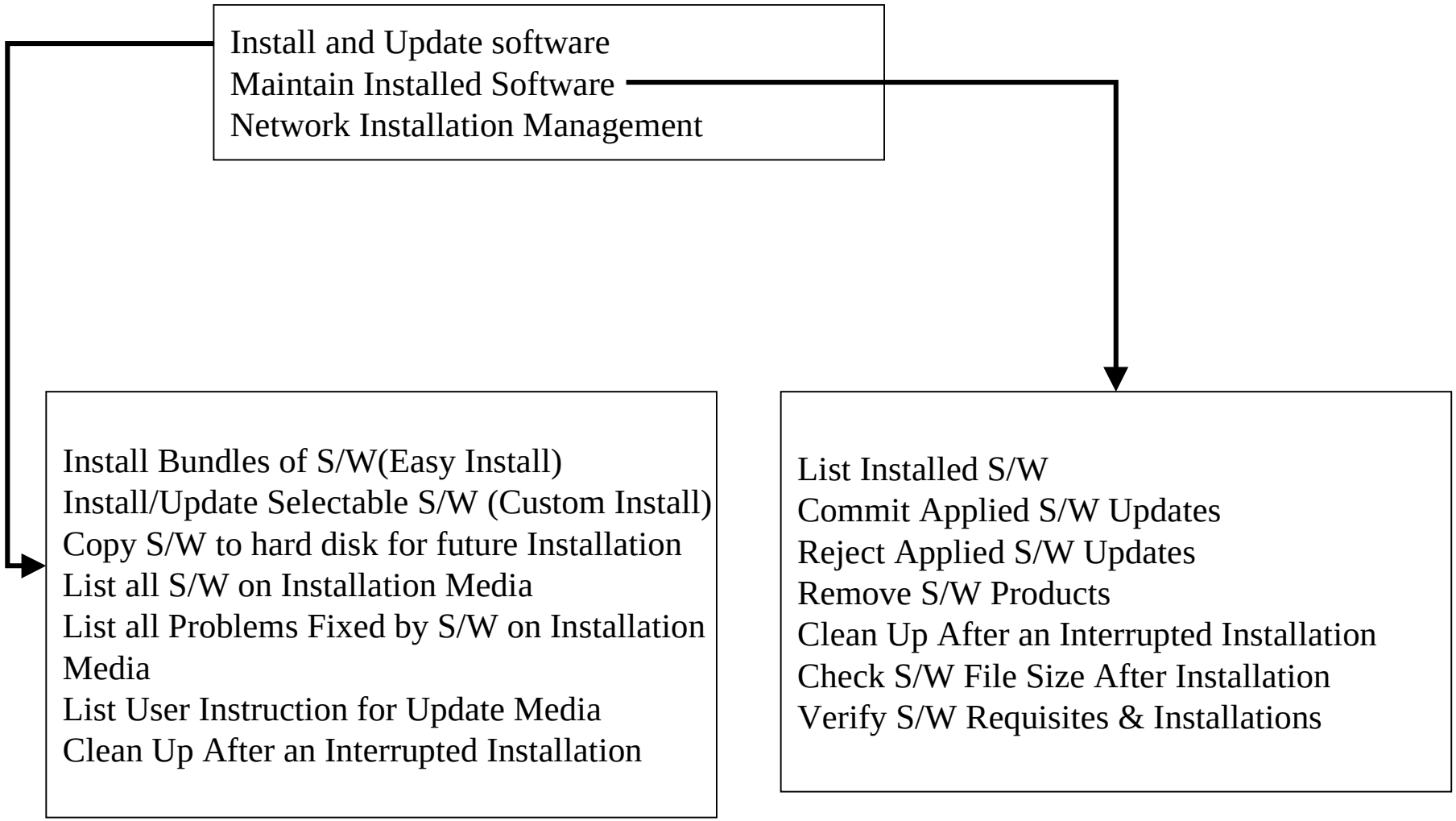
AIX 4 的软件升级

- 修复一个已知的系统问题
- 增加设备驱动程序
- 增加功能

Fix states


Apply
commit
Reject
Applied:
4.1.2
BOS 4.1.1
Applied
BOS 4.1.2
commit
BOS 4.1.2
New version
reject
BOS 4.1.1
Old version
Committed:
4.1.2
install
Committed
BOS 4.1.2

软件的安装与维护菜单


Install and Update software
Maintain Installed Software
Network Installation Management
Install Bundles of S/W(Easy Install)
Install/Update Selectable S/W (Custom Install)
Copy S/W to hard disk for future Installation
List all S/W on Installation Media
List all Problems Fixed by S/W on Installation Media
List User Instruction for Update Media
Clean Up After an Interrupted Installation
List Installed S/W
Commit Applied S/W Updates
Reject Applied S/W Updates
Remove S/W Products
Clean Up After an Interrupted Installation
Check S/W File Size After Installation
Verify S/W Requisites & Installations

客户化安装菜单

smit install_selectable

Install/Update Selectable Software(Custom Install)

Move cursor to desired item and press Enter

Install Software Products at Latest Level

Install Bundles of Software

Install Maintenance Levels

Install Fileset Updates by fix

Install Additional Printer/Plotter Software

Install Additional Device Software

Install /Update From All Available Software

F1=Help	F2=Refresh	F3=Cancel	F8=Image
F9=Shell	F10=Exit	Enter=Do	

软件安装屏幕

Install Software Products at Latest Level

Type or Select values in entry fields.

Press Enter AFTER making all desired changes

	[Entry Fields]	
*INPUT device/directory for software	/dev/cd0	
*SOFTWARE to install	[all_licensed]	
PREVIEW only?(install operation will not occur)	no	+
COMMIT software updates?	Yes	+
SAVE replaced files?	No	+
ALTERNATE save directory	[]	
AUTOMATICALLY install requisite software?	Yes	+
EXTEND filesystem if space needed?	Yes	+
OVERWRITE same or newer versions?	Yes	+

……...

F1=Help	F2=Refresh	F3=Cancel	F4=List
F5=Reset	F6=Command	F7=Edit	F8=Image
F9=Shell	F10=Exit	Enter=Do	

软件详细目录-smit

List Installed Software

Move cursor to desired item and press Enter

List the Installed Software
List All Applied but not Committed Software Updates
List Maintenance Level of a Software Product
Show History of a Software Product
List Requisites of a Software Product
List Dependents of a Software Product
List Files Included in a Softeware

F1=Help	F2=Refresh	F3=Cancel	F8=Image
F9=Shell	F10=Exit	Enter=Do	

软件详细目录--行命令

lslpp命令

-l list the installed software(separates usr,share and root part information)

-L list the installed software(consolidates usr,share and root part information)

-h shows the history of a software product

列出安装的软件

lslpp -L bos.*

Fileset	Level	State	Description
bos.iconv.com	4.1.0.0.	C	Common Language to Language Converters
bos.ifor_ls.client	4.1.0.0	C	iFOR/LS License System Client Utilities
bos.rte.aio	4.1.0.0	C	Asynchronous I/O Extensions
bos.rte.console	4.1.0.0	C	Console

……...

已安装软件的删除

smit remove

```
                                Remove Installed Software

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
* SOFTWARE name                                        []                      +
  PREVIEW only? (remove operation will NOT occur)       yes                     +
  REMOVE dependent software?                            no                      +
  EXTEND file systems if space needed?                  no                      +
  DETAILED output?                                      no                      +

F1=Help          F2=Refresh       F3=Cancel        F4=List
Esc+5=Reset      Esc+6=Command    Esc+7=Edit       Esc+8=Image
Esc+9=Shell      Esc+0=Exit       Enter=Do
```

查看命令的版本

 # whence nfsd
/usr/sbin/nfsd
 # lslpp -w /usr/sbin/nfsd
File Fileset Type

/usr/sbin/nfsd bos.net.nfs.client File
 # lslpp -l bos.net.nfs.client
Fileset Level State Description

Path: /usr/lib/objrepos
bos.net.nfs.client 4.3.2.0 COMMITTED Network File System Client
Path: /etc/objrepos
bos.net.nfs.client 4.3.2.0 COMMITTED Network File System Client
#

软件的校验

smit lppchk

Verify Software Requistites and Installations

Type or Select values in entry fields.

Press Enter AFTER making all desired changes

	[Entry Fields]	
SOFTWARE name	[ ]	+

F1=Help	F2=Refresh	F3=Cancel	F4=List
F5=Reset	F6=Command	F7=Edit	F8=Image
F9=Shell	F10=Exit	Enter=Do	

lppchk -c

lppchk -v

lppchk -l

oslevel

oslevel命令

- 4.3.2.7——vv.rr.mmmm.ffff
  - vv: version number
  - rr: release number
  - mmmm: modidication level
  - ffff：fix level

命令lppchk

- The lppchk command verifies that file for an installable software product match the es Software Vital Product Data(SWVPD) database information for file size,checksum values, or symbolic links

命令lppchk示例

```
# lppchk -v

lppchk: The following filesets need to be installed or corrected to
bring the system to a consistent state:

   bos.dosutil 4.3.0.0                          (APPLYING)

# lppchk -C

installp:  Cleaning up software for:

              bos.dosutil 4.3.0.0

Installation Summary
--------------------------------------------------------------------------
Name                Level           Part        Event       Result
--------------------------------------------------------------------------
bos.dosutil         4.3.0.0         USR         CLEANUP     SUCCESS

# lppchk -v

#
```

Alternate Disk Installation(一)

smit alt_install

```
                        Alternate Disk Installation

Move cursor to desired item and press Enter.

  Install mksysb on an Alternate Disk
  Clone the rootvg to an Alternate Disk

F1=Help          F2=Refresh       F3=Cancel        Esc+8=Image
Esc+9=Shell      Esc+0=Exit       Enter=Do
```

Alternate Disk Installation(二)

- **mksysb image**
  - Installing a mksysb requires a 4.3 mksysb image or 4.3 mksysb tape. The alt_disk_install command is called, specifying a disk or disks that are installed in the system but are not currently in use. The mksysb is restored to those disks, such that, if the user chooses, the next reboot will boot the system on a 4.3 system.

Alternate Disk Installation(三)

- Cloning
  - Cloning allows the user to create a backup copy of the root volume group. Once created, the copy may be used either as a back up, or it can be modified by installing additional updates. One possible use might be to clone a running production system, then install updates to bring the cloned rootvg to a later maintenance level. This would update the cloned rootvg while the system was still in production. Rebooting from the new rootvg would then bring the level of the running system up to the newly installed maintenance level. If there was a problem with this level, simply changing the bootlist back to the original disk and rebooting would bring the system back to the old level.

第五章
系统的启动与关闭

本章目的

- 启动模式
- 略述在系统关闭时进程的处理
- 详细说明/etc/inittab的内容
- 常用命令
- System Resource Controller

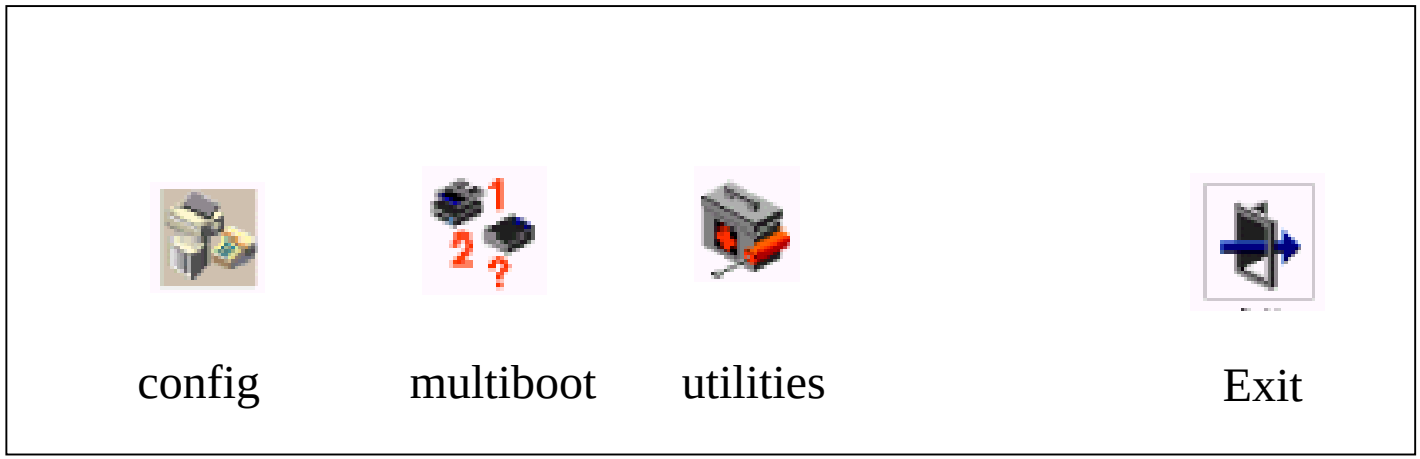
系统启动模式

- Normal mode
  - 程序、进程的运行
  - 终端开启
  - 存取系统文件
  - 通讯启动
  - 多用户模式

系统启动模式

- Standalone Mode
  - System Management Services diskette
  - 系统程序
    - 显示和改变系统的设置
    - 显示和改变设备启动的顺序
    - 执行硬件诊断
    - 执行系统工具
- 在启动出现第一个画面时，按F1键

System Management Services 主菜单



- config:查看系统设置
- multiboot:显示和设置boot sequence,access the open firmware command prompt
- utilities:set and remove passwords,network booting

命令alog

- 用于维护和管理logs。
- 如果文件满，新的自动覆盖以前的信息
- 通过观察rc.boot文件看出，先把信息放在/tmp/boot_log中，在结束后移到/var/adm/ras/bootlog中保存
- 常用命令
  - # alog -L
  - # alog -o -t boot

命令last

- 用于以反向年代顺序显示记录在/var/adm/wtmp 文件中login and log off的记录
- # last root console
- # last | grep shutdown

命令bootlist

- 命令bootlist用于显示和改变启动设备
- # bootlist -m normal hdisk0 hdisk1

命令uptime

- 显示系统启动了多长时间

```
# uptime
  03:41AM   up 1 day, 15 mins,  4 users,  load average: 0.03, 0.04, 0.02
```

文件/etc/inittab

```
init:2:initdefault:
brc::sysinit:/sbin/rc.boot 3 >/dev/console 2>&1 # Phase 3 of system boot
powerfail::powerfail:/etc/rc.powerfail 2>&1 | alog -tboot > /dev/console # Power Failure Detection
rc:2:wait:/etc/rc 2>&1 | alog -tboot > /dev/console # Multi-User checks
fbcheck:2:wait:/usr/sbin/fbcheck 2>&1 | alog -tboot > /dev/console # run /etc/firstboot
srcmstr:2:respawn:/usr/sbin/srcmstr # System Resource Controller
rctcpip:2:wait:/etc/rc.tcpip > /dev/console 2>&1 # Start TCP/IP daemons
cron:2:respawn:/usr/sbin/cron
piobe:2:wait:/usr/lib/lpd/pio/etc/pioinit >/dev/null 2>&1  # pb cleanup
writesrv:2:wait:/usr/bin/startsrc -swritesrv
uprintfd:2:respawn:/usr/sbin/uprintfd
logsymp:2:once:/usr/lib/ras/logsymptom # for system dumps
pmd:2:wait:/usr/bin/pmd > /dev/console 2>&1 # Start PM daemon
diagd:2:once:/usr/lpp/diagnostics/bin/diagd >/dev/console 2>&1
cons:0123456789:respawn:/usr/sbin/getty /dev/console
```

文件/etc/inittab详解

- 标识：标记进程。
- 运行等级
- 行为
  - respawn:If the process does not exist,start it
  - wait:Start the process and wait for it to stop
  - once:start the process and do not restart it if it stop
  - sysinit:commands to be run to start the process
- 命令行

修改文件/etc/inittab的相关命令

- # chitab
- # lsitab
- # mkitab
- # rmitab
- # telinit q

System Resource Controller(SRC)

- 包含启动、停止和状态查询的用户接口
- 记录子系统(subsystems)的异常终止
- 跟踪subsystem,a group subsystem or a subserver
- 支持远程系统控制
- subsystem的刷新功能

SRC语法

- # startsrc -s qdaemon
- # stopsrc -g nfs
- # refresh -s qdaemon
- # lssrc -a

系统的关闭

- # shutdown [-options] [+time message]
- /etc/rc.shutdown 文件

系统进入维护状态

Welcome to Base Operating System
Installation and Maintenance
Type the number of your choice and press Enter.
>>> 1 Start Installation Now with Default Settings
2 Change/Show Installation Settings and Install
3 Start Maintenance Mode for System Recovery

88 Help ?
99 Previous Menu

Choice [1]:

系统进入维护状态

Maintenance

Type the number of your choice and press Enter.

>>> 1 Access a Root Volume Group

2 Copy a System Dump to Removable Media

3 Access Advanced Maintenance Functions

4 Install from a System Backup

88 Help ?

99 Previous Menu

>>> Choice [1]:

系统进入维护状态

Warning

If you choose to access a root volume group, you will not be able to return to the Base Operating System Installation menus without rebooting.

Type the number of your choice and press Enter

0 Continue

88 Help ?
>>> 99 Previous Menu
>>> Choice [99]:

系统进入维护状态

Access a Root Volume Group

Type the number for a volume group to display logical volume information and press Enter.

1) Volume Group 00615147b27f2b40 contains these disks:
    hdisk0 958 04-B0-00-2,0
2) Volume Group 00615247b27c2b41 contains these disks:
    hdisk1 2063 04-B0-00-6,0

Choice:

系统进入维护状态

Volume Group Information
Volume Group ID 00615147b27f2b40 includes following logical volumes:

hd5 hd6 hd8 hd4 hd2 hd9var
hd3 hd1 lv00 lv01

Type the number of your choice and press Enter.
1) Access this Volume Group and start a shell
2) Access this Volume Group and start a shell before mounting file systems

99) Previous Menu
Choice [99]:

第六章 设备

设备术语

- 物理设备
- 端口号
- 设备驱动
- 逻辑设备
- /dev 目录

/dev目录下的内容

- 设备类型
  - 块设备
  - 裸设备（字符流设备）
- 第五个域的含义
  - 第一个数字代表内核处理语柄
  - 第二个数字代表设备的指定类型

Device Configuration Database

- The predefine and customized databases are parts of the ODM that store information about all of the logical devices in the system and their attributes
  - The predefined database contains configuration data for supported devices based on your system configuration
  - The customized database contains configuration data for all currently defined and configured(available) devices

列出所有support的设备

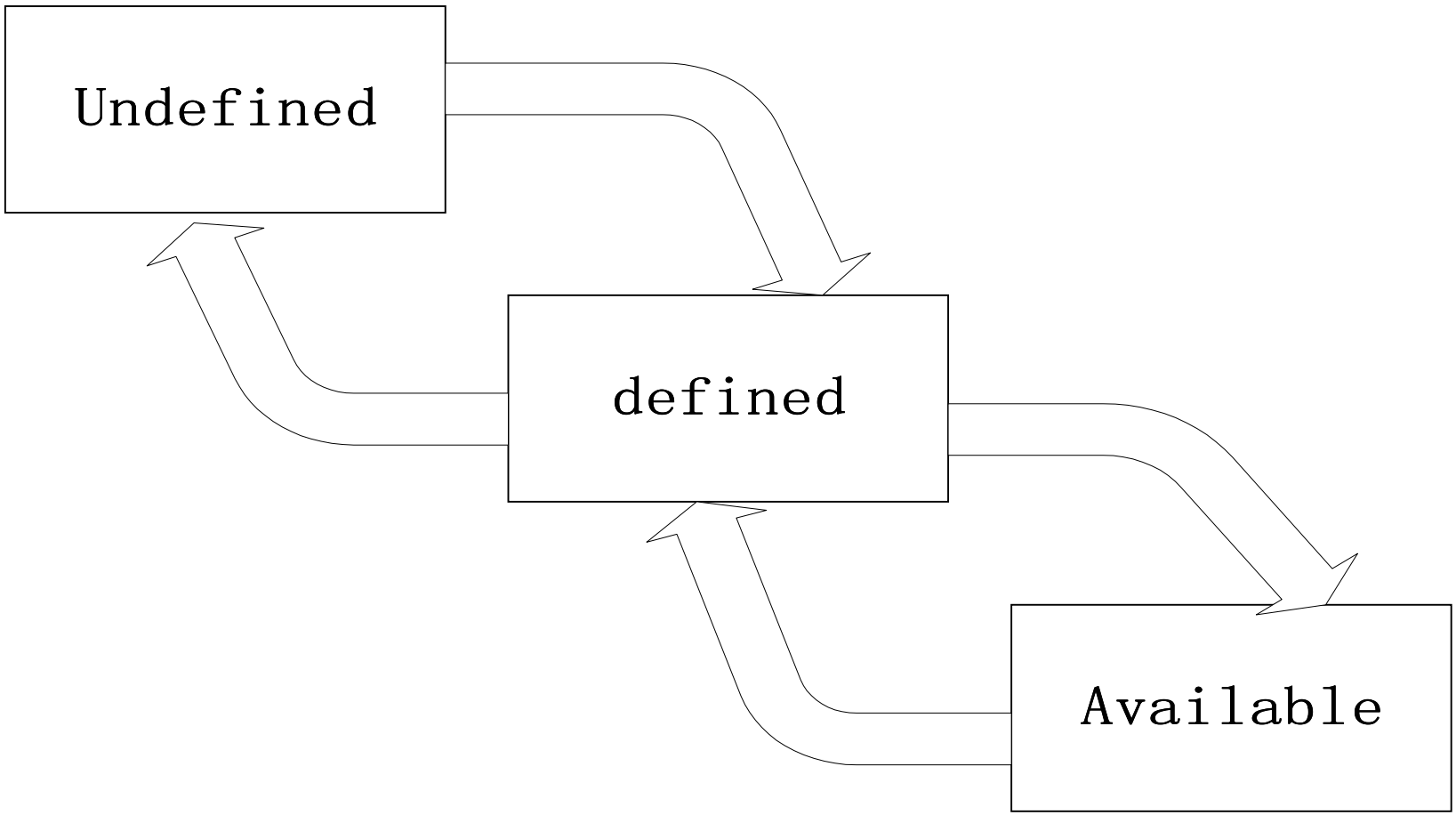
lsdev -PH

Class	type	subclass	description
memory	L2cache_rspc	sys	L2 Cache
memory	totmem	sys	Memory
planar	sysplanar_rspc	sys	System Planar
processor	proc_rspc	sys	Processor
adapter	baud4232	isa_sio	Ultimedia Integrated Audio
bus	pci	sys	PCI Bus
tape	1200mb-c	scsi	1.2 GB 1/4-Inch Tape Drive
tape	150mb	scsi	150 MB 1/4-Inch Tape Drive
tape	3490e	scsi	3490E Autoloading Tape Drive
cdrom	enhcdrom2	scsi	Multimedia CD-ROM Drive
cdrom	enhcdrom4	scsi	Multimedia CD-ROM Drive
disk	1000mb2	scsi	1.0 GB SCSI Disk Drive
disk	1080mb	scsi	1.0 GB SCSI Disk Drive

列出系统现有的设备

```
# lsdev -Cc adapter

sa0      Available 01-C0 Standard I/O Serial Port 1
sa1      Available 01-D0 Standard I/O Serial Port 2
sioka0   Available 01-F0 Keyboard Adapter
sioma0   Available 01-G0 Mouse Adapter
fda0     Available 01-H0 Standard I/O Diskette Adapter
pmc0     Available 01-I0 Power Management Controller
scsi0    Available 04-C0 Wide SCSI I/O Controller
bl0      Available 04-02 GXT250P Graphics Adapter
siota0   Available 01-A0 Tablet Adapter
ppa0     Available 01-B0 Standard I/O Parallel Port Adapter
paud0    Available 01-E0 Ultimedia Integrated Audio
ent0     Available 04-B0 IBM PCI Ethernet Adapter (22100020)
```

设备状态

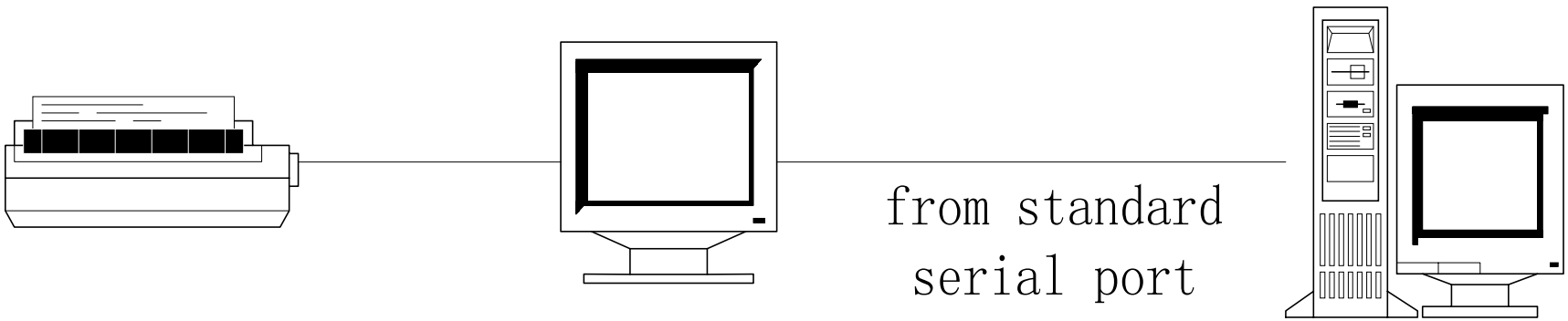


常用设备命令

- # mkdev -l rmt0
- # rmdev -l rmt0
- # rmdev -dl rmt0
- # cfgmgr -vi [device]
- # lsattr -El [设备名]

非及插及用的设备

- ISA卡
- ASCII终端
- 打印机



增加一个tty

Add a TTY

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]	
[TOP]		
TTY type	tty	
TTY interface	rs232	
Description	Asynchronous Terminal	
Parent adapter	sa0	
* PORT number	[]	+
Enable LOGIN	disable	+
BAUD rate	[9600]	+
PARITY	[none]	+
BITS per character	[8]	+
Number of STOP BITS	[1]	+
TIME before advancing to next port setting	[0]	+#
TERMINAL type	[dumb]	
FLOW CONTROL to be used	[xon]	+
[MORE...29]		

F1=Help	F2=Refresh	F3=Cancel	F4=List
Esc+5=Reset	Esc+6=Command	Esc+7=Edit	Esc+8=Image
Esc+9=Shell	Esc+0=Exit	Enter=Do	

列出tty的属性

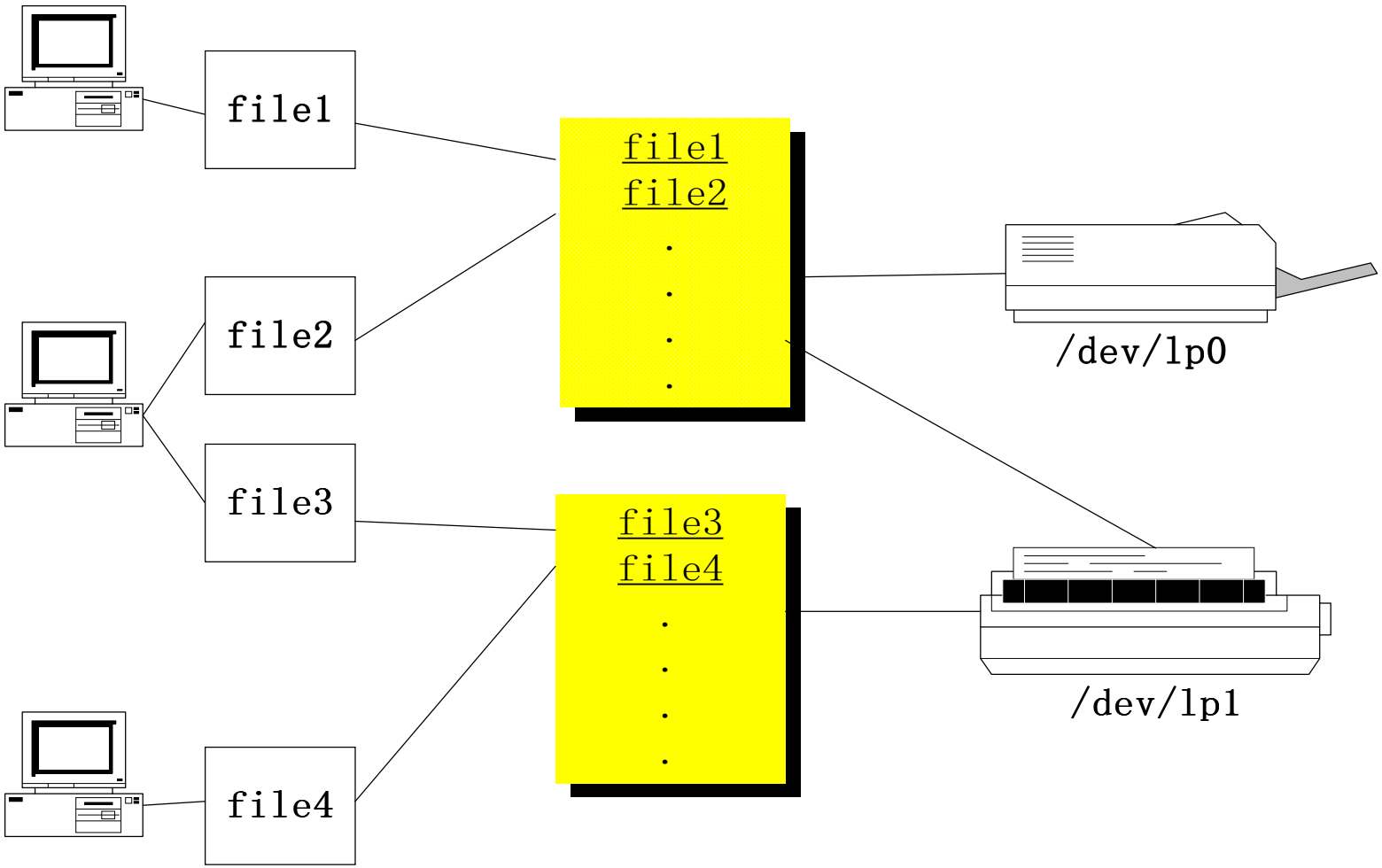
```
# lsattr -l tty0 -a login -R
enable
disable
share
delay
hold
```

第七章 打印机和队列

本章目的

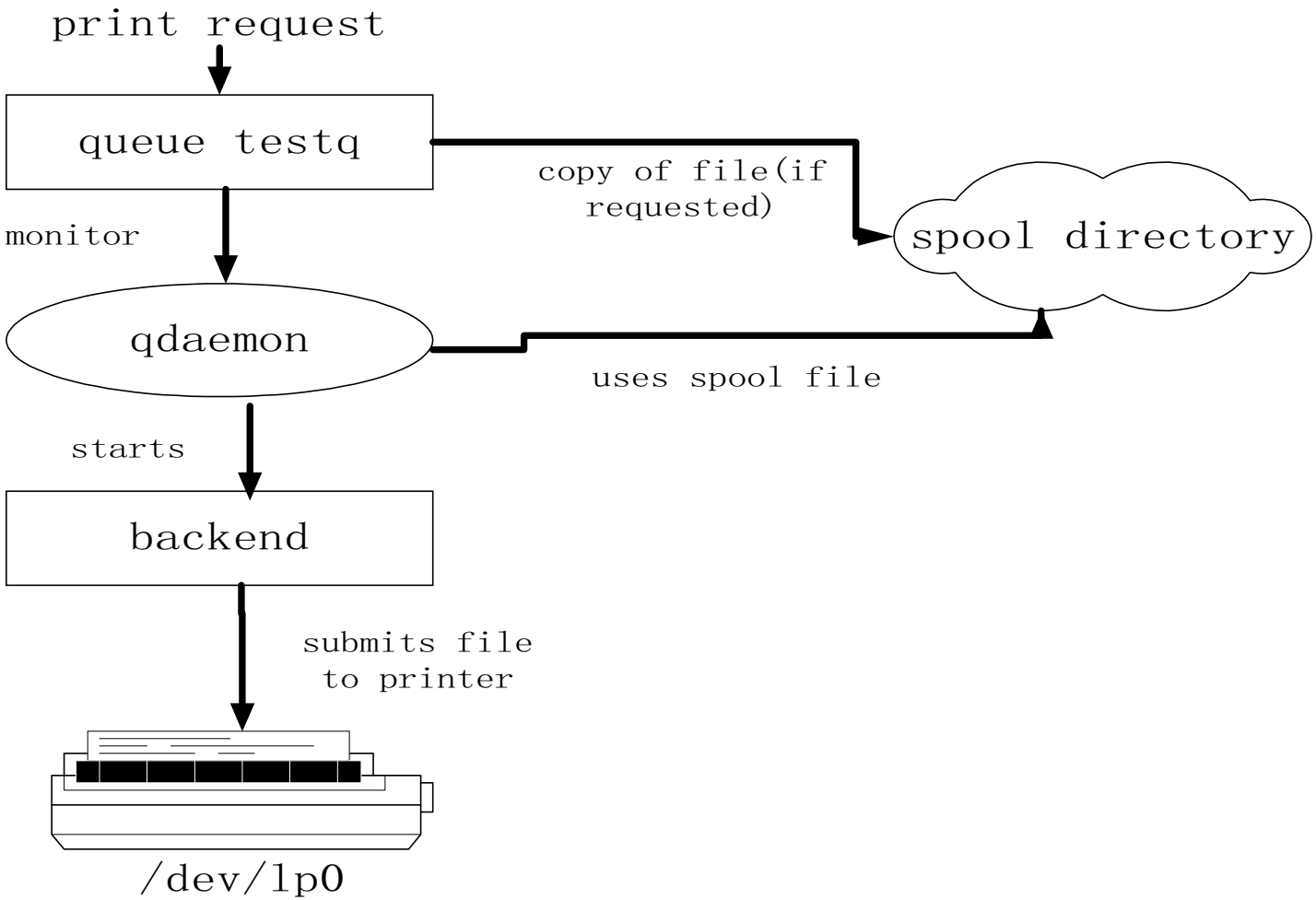
- 定义队列系统目的和优点
- 了解处理答应请求的主要过程
- 在不同的环境中打印机和打印队列的设置

队列的概念


file1
file2
file3
file4
file1
file2
file3
file4
/dev/lp0
/dev/lp1

打印数据流

qprt -Ptestq -c file



守护进程qdaemon

- 在系统中qdaemon是一个用于管理队列的进程
- 在初始化时启动
- 调用后台进程
- 可以选择记录数据
- 管理输出请求

文件/etc/qconfig

```
testq:
        device = lp0
lp0:
        file = /dev/lp0
        header = newer
        trailer = newer
        access = both
        backend = /usr/lib/lpd/piobe
```

和打印相关的系统文件

- /var/spool/lpd/qdir/* 打印请求
- /etc/qconfig 队列配置
- /var/spool/qdaemon/* 临时在队列中的文件
- /var/spool/* 目录池
- /var/spool/lpd/stat/* 打印机状态信息

Printer menu

Print Spooling

Move cursor to desired item and press Enter.

Start a Print Job
Manage Print Jobs
List All Print Queues
Manage Print Queues
Add a Print Queue
Add an Additional Printer to an Existing Print Queue
Change / Show Print Queue Characteristics
Change / Show Printer Connection Characteristics
Remove a Print Queue
Manage Print Server
Programming Tools

F1=Help F2=Refresh F3=Cancel Esc+8=Image
Esc+9=Shell Esc+0=Exit Enter=Do

Configuring a printer with a queue

Printer Type

Move cursor to desired item and press Enter.

Bull
Canon
Dataproducts
Hewlett-Packard
IBM
Lexmark
OKI
Printronix
QMS
Texas Instruments
Other (Select this if your printer type is not listed above)

F1=Help F2=Refresh F3=Cancel Esc+8=Image
Esc+0=Exit Enter=Do /=Find n=Find Next

Printer Type

Printer Type

Move cursor to desired item and press Enter.

generic Generic Printer

F1=Help F2=Refresh F3=Cancel
Esc+8=Image Esc+0=Exit Enter=Do
/=Find n=Find Next

Printer Interface

Printer Interface

Move cursor to desired item and press Enter.

parallel
rs232
rs422

F1=Help	F2=Refresh	F3=Cancel
Esc+8=Image	Esc+0=Exit	Enter=Do
/=Find	n=Find Next	

Parent Adapter

Parent Adapter

Move cursor to desired item and press Enter.

ppa0 Available 01-B0 Standard I/O Parallel Port Adapter

F1=Help	F2=Refresh	F3=Cancel
Esc+8=Image	Esc+0=Exit	Enter=Do
/=Find	n=Find Next	

Add a Print Queue

Add a Print Queue

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]
Description	Generic Printer
Names of NEW print queues to add	
ASCII	[]
GL Emulation	[]
PCL Emulation	[]
PostScript	[]
Printer connection characteristics	
* PORT number	[p] +
Type of PARALLEL INTERFACE	[standard] +
Printer TIME OUT period (seconds)	[60] +#
STATE to be configured at boot time	available +

F1=Help F2=Refresh F3=Cancel F4=List
Esc+5=Reset Esc+6=Command Esc+7=Edit Esc+8=Image
Esc+9=Shell Esc+0=Exit Enter=Do

删除队列

smit rmpq

Remove a Print Queue

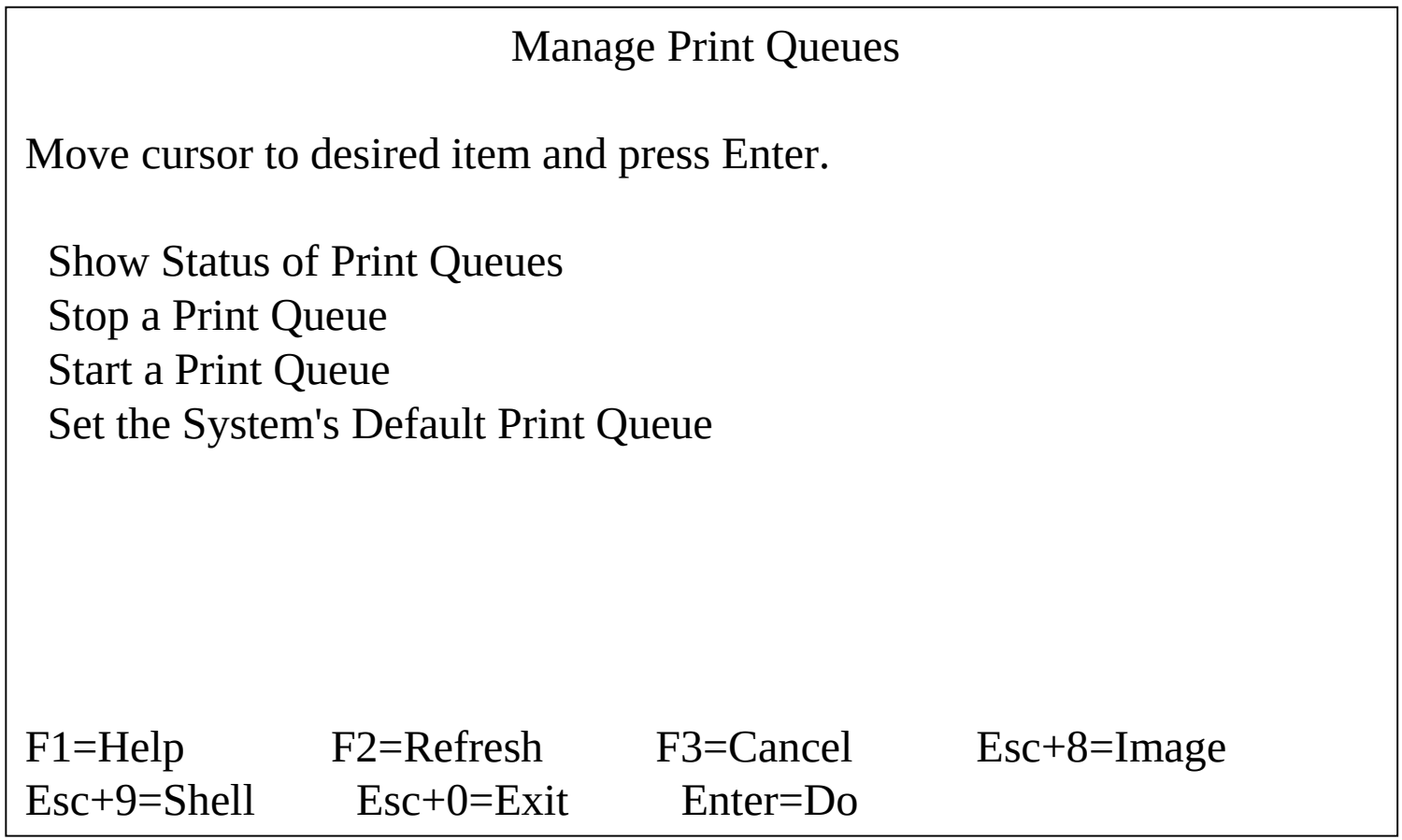
Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]	
Print queue to remove	testq:lp0	
Local printer device	/dev/lp0	
KEEP the local printer device?	no	+

F1=Help	F2=Refresh	F3=Cancel	F4=List
Esc+5=Reset	Esc+6=Command	Esc+7=Edit	Esc+8=Image
Esc+9=Shell	Esc+0=Exit	Enter=Do	

Managing queues

smit pqmanage



相关命令

	System V	BSD	AIX
列出作业	lpstat	lpq	qchk
取消作业	cancel	lprm	qcan
提交作业	lp	lpr	qprt

监控目录

- /var/spool/lpd/qdir/*
  - 包含队列请求
- /var/spool/qdaemon/*
  - 临时拷贝目录
- /var/spool/*
  - 缓冲池目录

第八章 系统存储概况

本章目的

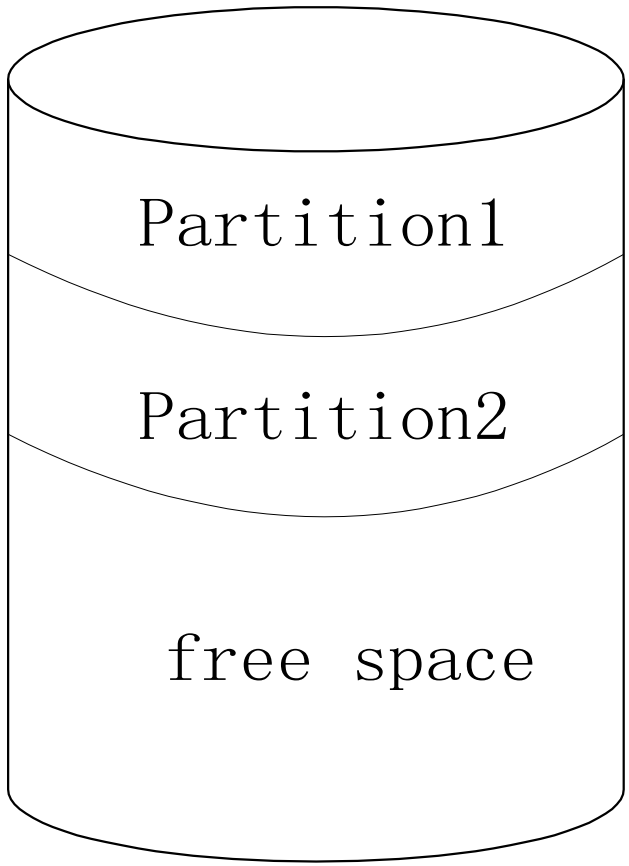
- 逻辑卷管理的技术和概念
- 文件系统和逻辑卷的关系

AIX 4版本存储的组成部分

- 文件
- 目录
- 文件系统
- 逻辑卷
- 物理存储
- 逻辑存储
- 逻辑卷的管理

传统的UNIX磁盘存储

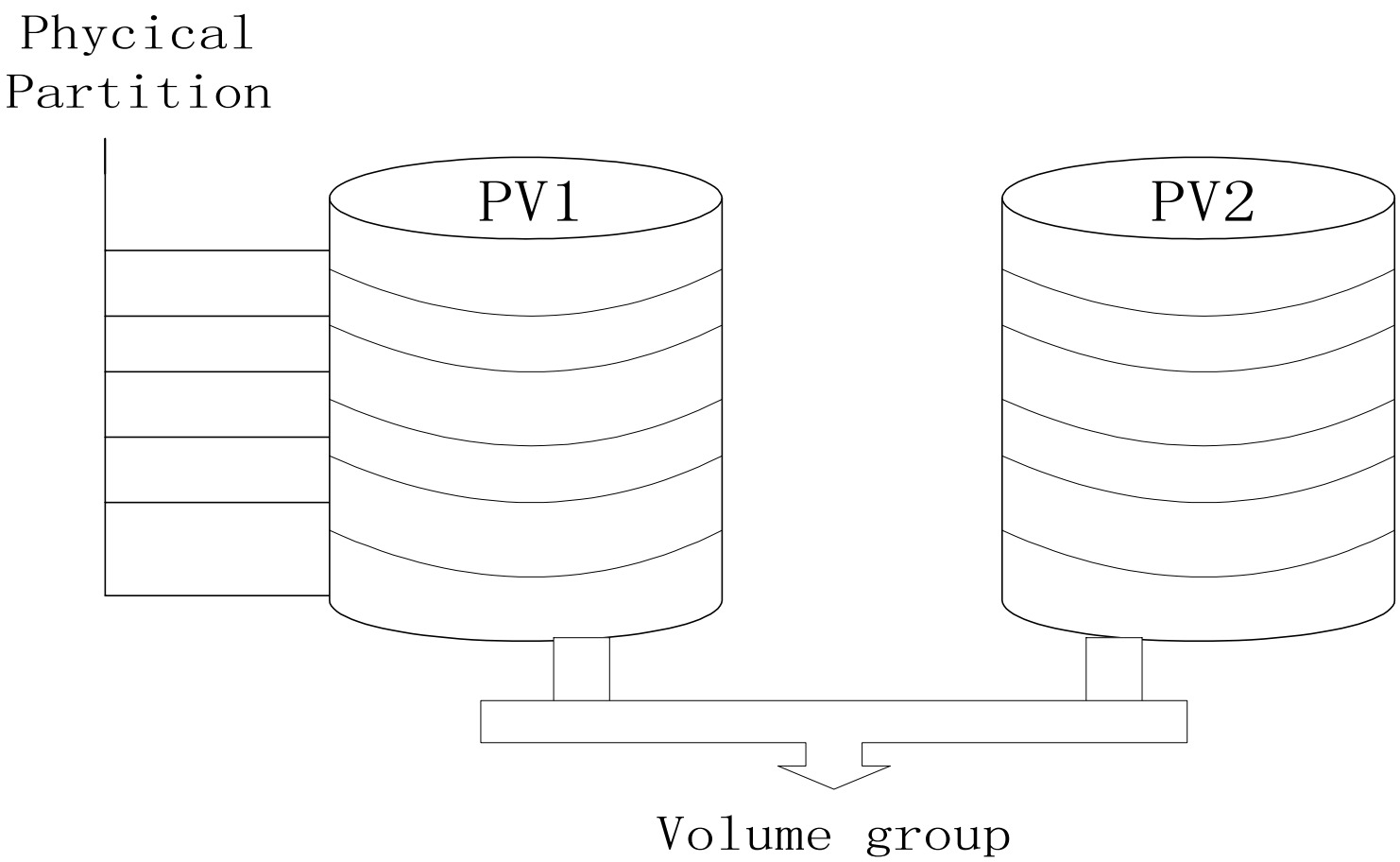
- 问题：
  - 固定的分区
  - 扩展分区的大小
  - 在文件和文件系统大小方面的限制
  - 需要连续数据
  - 需要事先计划



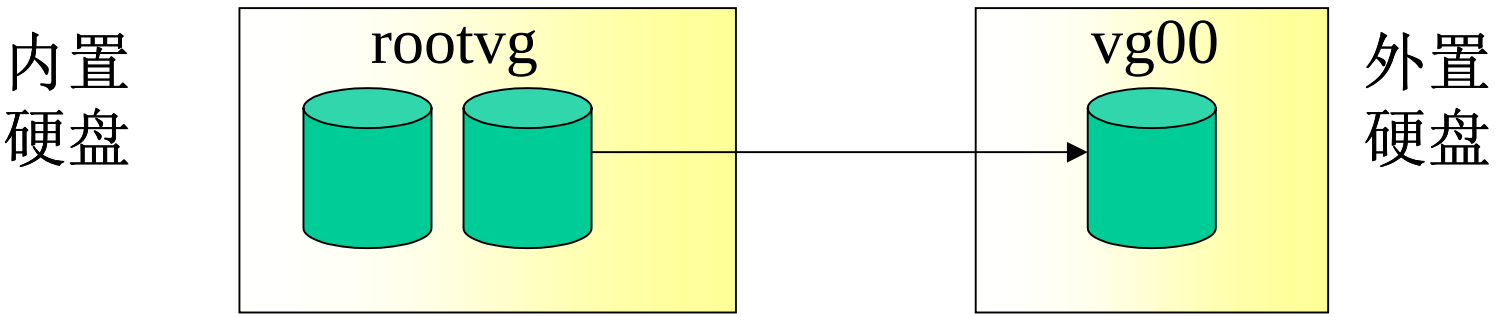
LVM的优势

- 逻辑卷可以使用非相连的空间
- 逻辑卷可以跨硬盘使用
- 逻辑卷可以动态增长
- 逻辑卷可以做镜向
- 硬盘可以轻松的添加到系统中
- 逻辑卷可以重新定位

物理存储



Volume Group



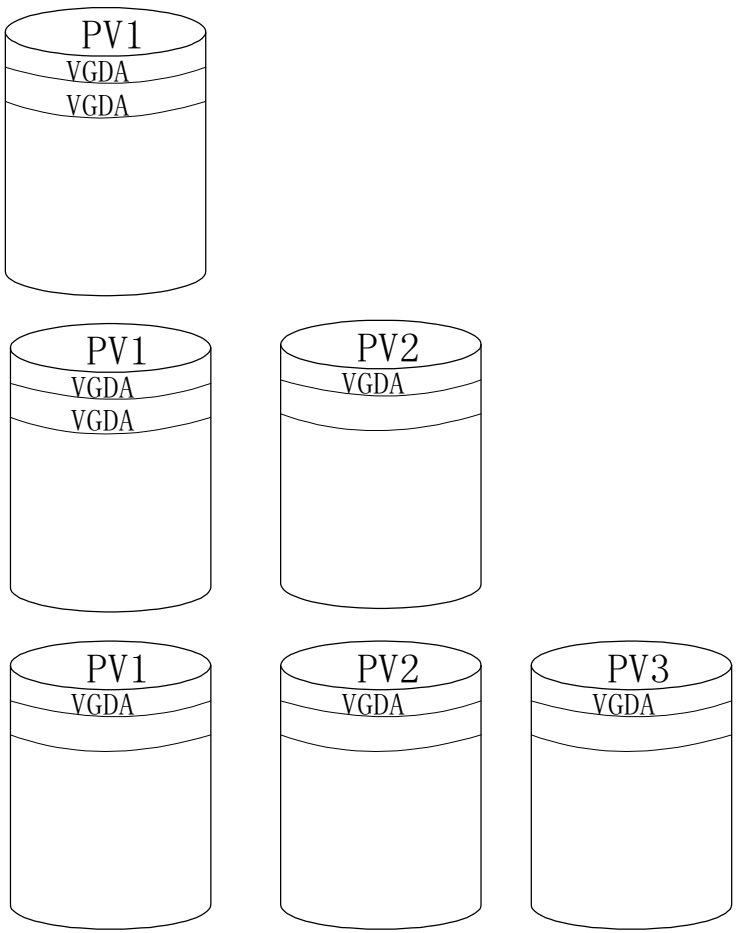
- 添加一个新的硬盘到rootvg
- 按照需求创建一个新的VG

创建新VG的原因

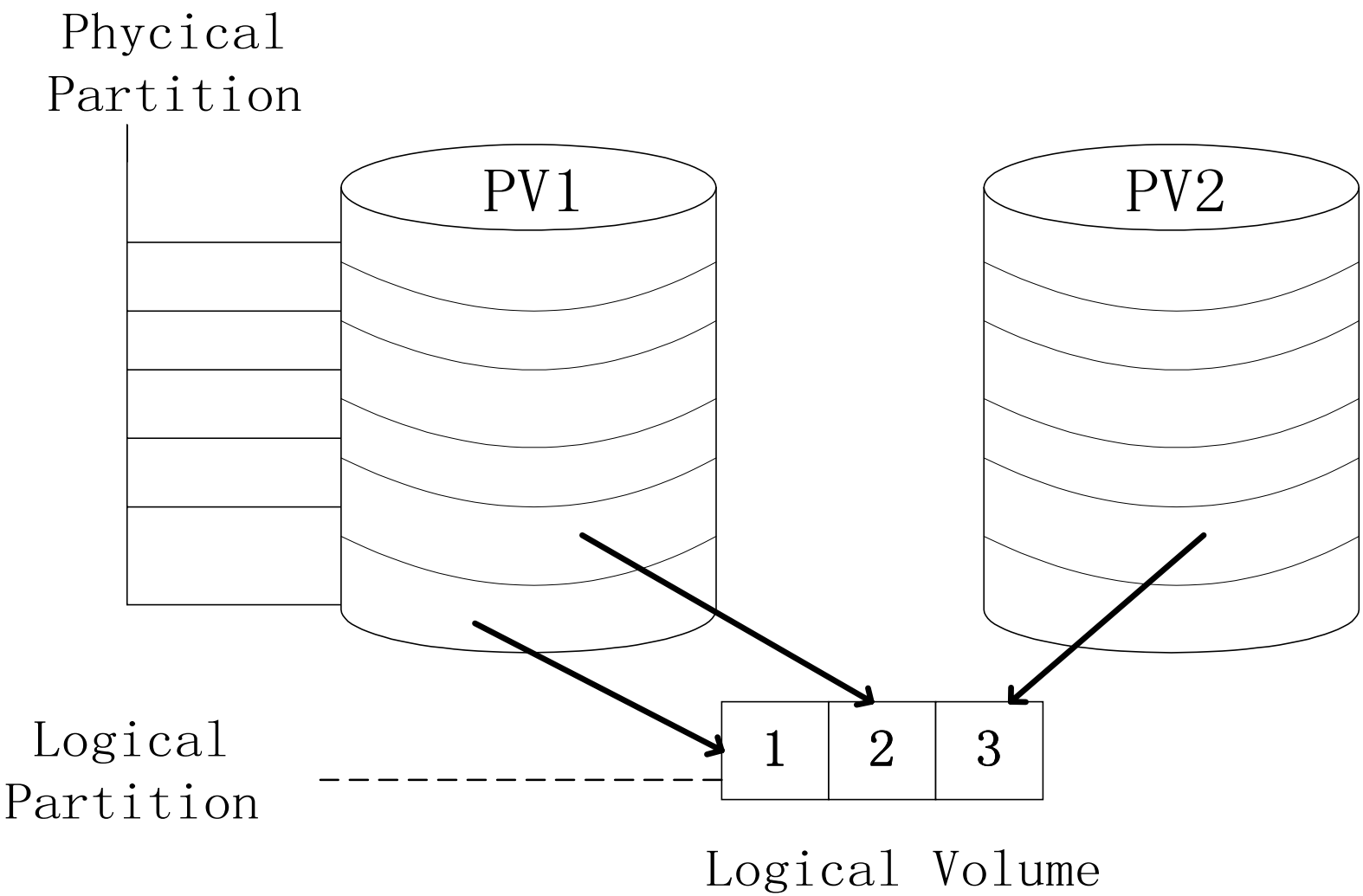
- 把用户的文件系统从OS中分离出来
- 已经有三个以上的硬盘在一个VG中
- 安全考虑
- 维护原因
- 数据的灵活存放性

Volume Group Descriptor Area (VGDA)

- VGDA is an area of disk,at least one per PV, containing information for the entire VG
- quorum specifies the number of VGDA that must be available in order to activate the VG (varyonvg)



逻辑存储


Phycical
Partition
PV1
PV2
Logical
Partition
1
2
3
Logical Volume

LVM的限制

Volume group	**255 /system**
Physical volume	**32 / volume group**
Physical partition	**1016/PV up to 256M size**
Logical volume	**256/VG**
Logical partition	**32512 per logical volume**

逻辑卷的用途

- Journaled file system(/dev/hd4)
- paging space(/dev/hd6)
- journal log(/dev/hd8)
- boot logical volume(/dev/hd5)
- nothing(raw device)

系统自动生成的LV

- hd5：启动代码存放处
- hd6：默认的paging space
- hd8：rootvg 默认的jfslog
- hd4 ⟷ /
- hd2 ⟷ /usr
- hd9var ⟷ /var
- hd3 ⟷ /tmp
- hd1 ⟷ /home

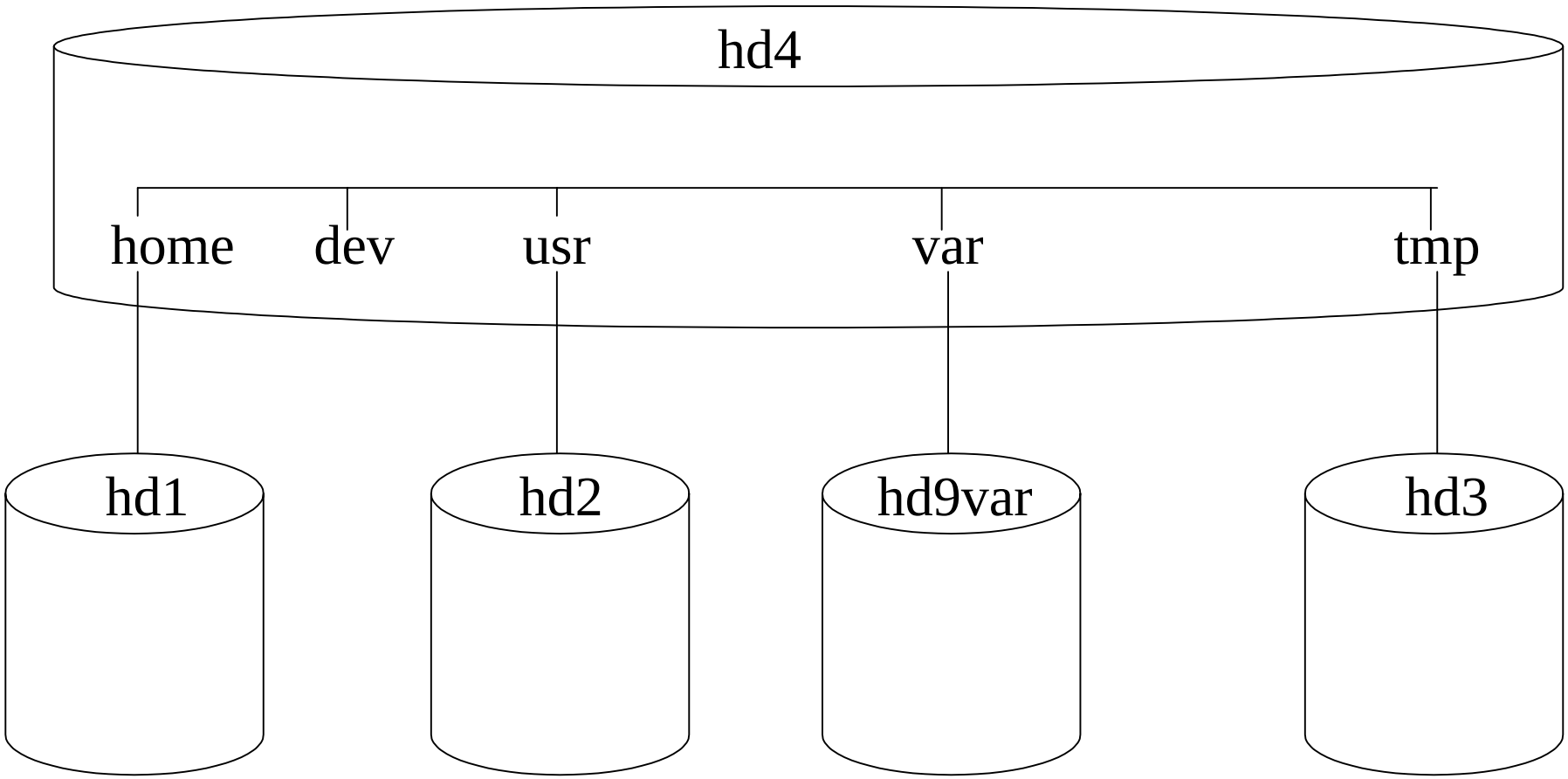
What is a file system

- A file system is:
  - Method of storing data
  - Hierarchy of directories
- Three type supported
  - Journaled File system(jfs)
  - CD-ROM File system(cdrfs)
  - Network File system(nfs)
- Different file systems are connected together via directories to from the view of files users see

Why have file system

- Can place it anywhere on disk(performance)
- 更加有效的执行一些操作
- 限制用户的磁盘使用
- 若一个FS出现故障，不会影响到其他FS
- 安全性更高

标准的文件系统



/etc/filesystems

```
/cdrom:
        dev             = /dev/cd0
        vfs             = cdrfs
        mount           = false
        options         = ro
        account         = false

/test:
        dev             = /dev/lv00
        vfs             = jfs
        log             = /dev/loglv00
        mount           = false
        options         = rw
        account         = false
```

Mount的概念

- Mount: the glue that logically connects file systems to the directory hierarchy
- file systems are associated with devices represented by special tiles in /dev - the logical volume
- when a file system is mounted, the logical volume and its contents are connected to a directory in the hierarchical tree structure

列出文件系统

```
# lsfs
Name            Nodename   Mount Pt        VFS   Size    Options    Auto
Accounting
/dev/hd4        --         /               jfs   622592  --         yes
no
/dev/hd1        --         /home           jfs   16384   --         yes
no
/dev/hd2        --         /usr            jfs   2752512 --         yes
no
/dev/hd9var     --         /var            jfs   8192    --         yes
no
/dev/hd3        --         /tmp            jfs   24576   --         yes
no
/dev/cd0        --         /cdrom          cdrfs --      ro         no
no
/dev/lv00       --         /testlv         jfs   8192    rw         no
no
```

列出逻辑卷的信息

lsvg -l rootvg

```
rootvg:
LV NAME             TYPE       LPs   PPs   PVs  LV STATE      MOUNT PT
hd6                 paging     64    64    1    open/syncd    N/A
hd5                 boot       1     1     1    closed/syncd  N/A
hd8                 jfslog     1     1     1    open/syncd    N/A
hd4                 jfs        76    76    1    open/syncd    /
hd2                 jfs        336   336   1    open/syncd    /usr
hd9var              jfs        1     1     1    open/syncd    /var
hd3                 jfs        3     3     1    open/syncd    /tmp
hd1                 jfs        2     2     1    open/syncd    /home
lv00                jfs        1     1     1    open/syncd    /testlv
```

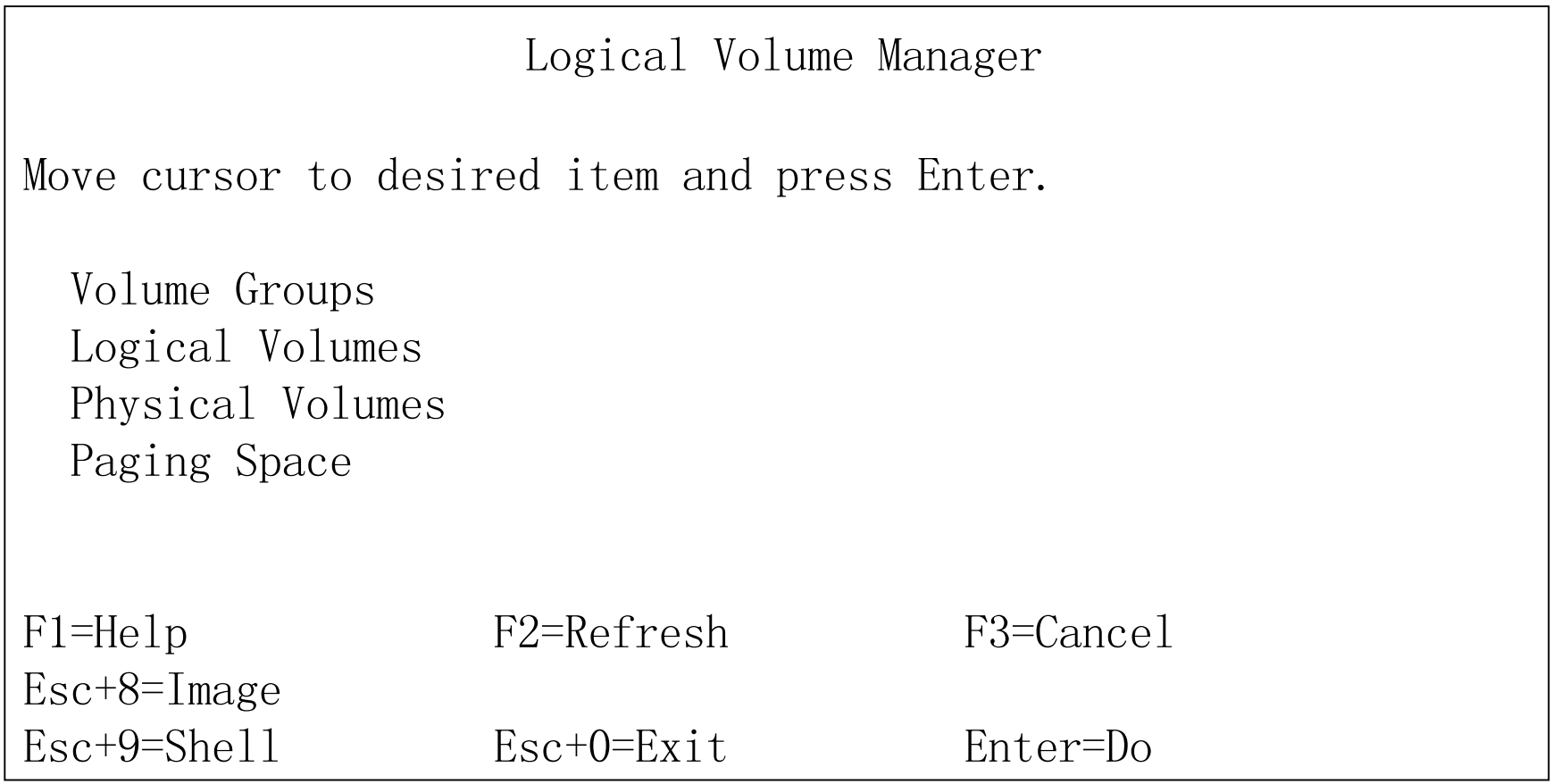
第九章 LVM的管理

本章目的

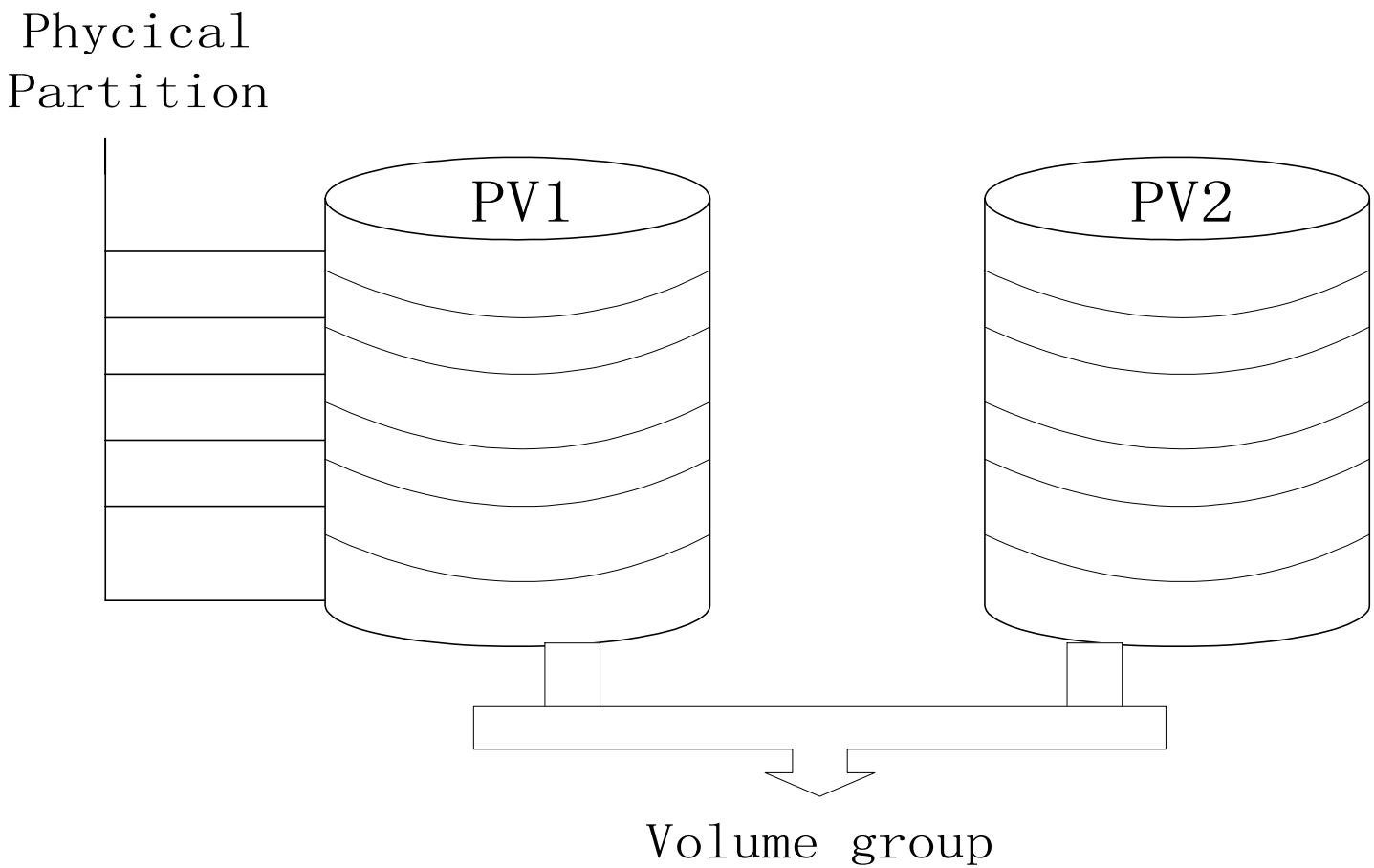
- 了解镜向
- 了解条带分割
- 添加/改变/删除 卷组（VG）
- 添加/改变/删除 物理卷（PV）
- 添加/改变/删除 逻辑卷（LV）

Logical Volume Manager

smit lvm



Volume Group



Smit 卷组菜单

Volume Groups

Move cursor to desired item and press Enter.

- List All Volume Groups
- Add a Volume Group
- Set Characteristics of a Volume Group
- List Contents of a Volume Group
- Remove a Volume Group
- Activate a Volume Group
- Deactivate a Volume Group
- Import a Volume Group
- Export a Volume Group
- Mirror a Volume Group
- Unmirror a Volume Group
- Synchronize LVM Mirrors
- Back Up a Volume Group
- Remake a Volume Group
- List Files in a Volume Group Backup
- Restore Files in a Volume Group Backup

列出VG的信息

- 列出所有VG
  - # lsvg
  - rootvg
  - sharevg
- 列出所有online的VG
  - # lsvg -o
  - rootvg

列出VG的信息（续）

- 列出VG的内容

```
# lsvg rootvg
VOLUME GROUP:   rootvg                  VG IDENTIFIER:  001000b7ae15a0af
VG STATE:       active                  PP SIZE:        4 megabyte(s)
VG PERMISSION:  read/write              TOTAL PPs:      515 (2060 megabytes)
MAX LVs:        256                     FREE PPs:       29 (116 megabytes)
LVs:            10                      USED PPs:       486 (1944 megabytes)
OPEN LVs:       8                       QUORUM:         2
TOTAL PVs:      1                       VG DESCRIPTORS: 2
STALE PVs:      0                       STALE PPs:      0
ACTIVE PVs:     1                       AUTO ON:        yes
MAX PPs per PV: 1016                    MAX PVs:        32
```

列出VG的信息（续）

```
# lsvg -p rootvg
rootvg:
PV_NAME     PV STATE    TOTAL PPs   FREE PPs    FREE DISTRIBUTION
hdisk1      active      515         29          00..00..00..00..29

# lsvg -l rootvg
rootvg:
LV NAME     TYPE        LPs   PPs   PVs  LV STATE      MOUNT POINT
hd6         paging      64    64    1    open/syncd    N/A
hd5         boot        1     1     1    closed/syncd  N/A
hd8         jfslog      1     1     1    open/syncd    N/A
hd4         jfs         76    76    1    open/syncd    /
hd2         jfs         336   336   1    open/syncd    /usr
hd9var      jfs         1     1     1    open/syncd    /var
hd3         jfs         3     3     1    open/syncd    /tmp
hd1         jfs         2     2     1    open/syncd    /home
```

添加一个VG

smitty mkvg

```
                                Add a Volume Group

Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                                      [Entry Fields]
  VOLUME GROUP name                                   []
  Physical partition SIZE in megabytes                4                  +
* PHYSICAL VOLUME names                               []                  +
  Activate volume group AUTOMATICALLY                 yes                 +
    at system restart?
  Volume Group MAJOR NUMBER                           []                  +#
  Create VG Concurrent Capable?                       no                  +
  Auto-varyon in Concurrent Mode?                     no                  +


F1=Help        F2=Refresh       F3=Cancel        F4=List
Esc+5=Reset    Esc+6=Command    Esc+7=Edit       Esc+8=Image
Esc+9=Shell    Esc+0=Exit       Enter=Do
```

删除卷组

- 当VG中最后一个PV被移走时，VG即被删除。其中的LV和JFS一同被删除。

设置VG的特性

smit chvg

```
                        Change a Volume Group

Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                                      [Entry Fields]
* VOLUME GROUP name                                   rootvg
* Activate volume group AUTOMATICALLY                 yes              +
    at system restart?
* A QUORUM of disks required to keep the volume       yes              +
   group on-line ?
  Convert this VG to Concurrent Capable?              no               +
* Autovaryon VG in Concurrent Mode?                   no               +

F1=Help          F2=Refresh       F3=Cancel          F4=Lis
Esc+5=Reset      Esc+6=Command    Esc+7=Edit         Esc+8=Image
Esc+9=Shell      Esc+0=Exit       Enter=Do
```

设置VG相关的属性

smit vgsc

```
                    Set Characteristics of a Volume Group

Move cursor to desired item and press Enter.

  Change a Volume Group
  Add a Physical Volume to a Volume Group
  Remove a Physical Volume from a Volume Group
  Reorganize a Volume Group



F1=Help                 F2=Refresh              F3=Cancel
Esc+8=Image
Esc+9=Shell             Esc+0=Exit              Enter=Do
```

VG状态的改变

- 激活一个VG
  - varyonvg testvg
- 卸载一个VG
  - varyoffvg testvg

Export 一个 VG

#smit exportvg

```
                                Export a Volume Group

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
* VOLUME GROUP name                                    [rootvg]                +

F1=Help              F2=Refresh           F3=Cancel            F4=List
Esc+5=Reset          Esc+6=Command        Esc+7=Edit           Esc+8=Image
Esc+9=Shell          Esc+0=Exit           Enter=Do
```

输入一个VG

smit importvg

```
                                Import a Volume Group

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                      [Entry Fields]
  VOLUME GROUP name                                   []
* PHYSICAL VOLUME name                                []                      +
  Volume Group MAJOR NUMBER                           []                      +#
  Make this VG Concurrent Capable?                     no                     +
  Make default varyon of VG Concurrent?                no                     +


F1=Help              F2=Refresh           F3=Cancel            F4=List
Esc+5=Reset          Esc+6=Command        Esc+7=Edit           Esc+8=Image
Esc+9=Shell          Esc+0=Exit           Enter=Do
```

Export/Import VG 注意事项

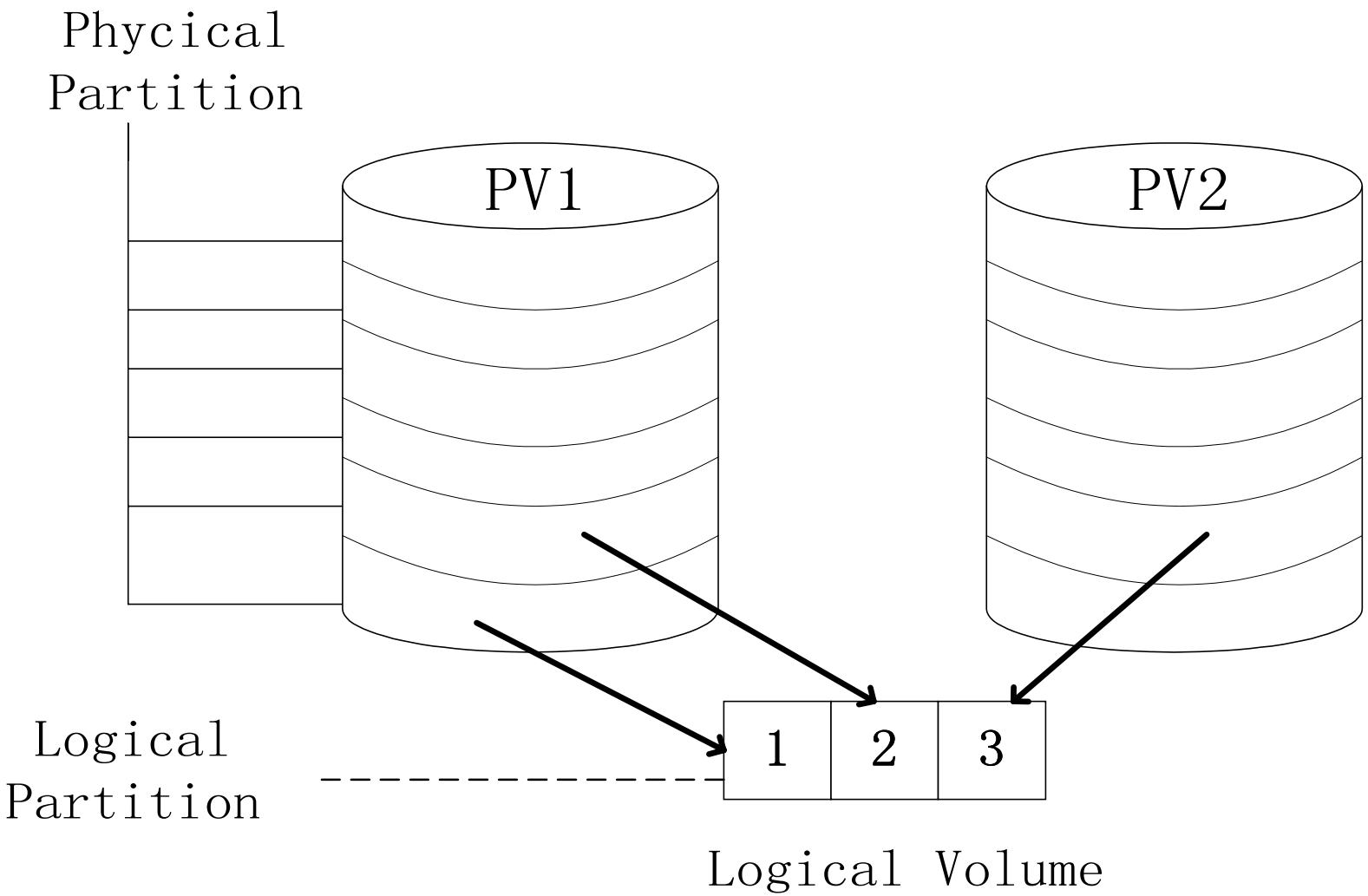
- 当import VG中所含的LV与现有的LV名字冲突时，改变import VG中LV 的名字
- 当一个VG中含有处于Active状态的Paging Space 时，不能export VG。
- Import VG后，应使用fsck命令检查文件系统
- Export VG后，/etc/filesystems文件中相关信息将被删除，但是mount points仍然存在

增加PV到VG中

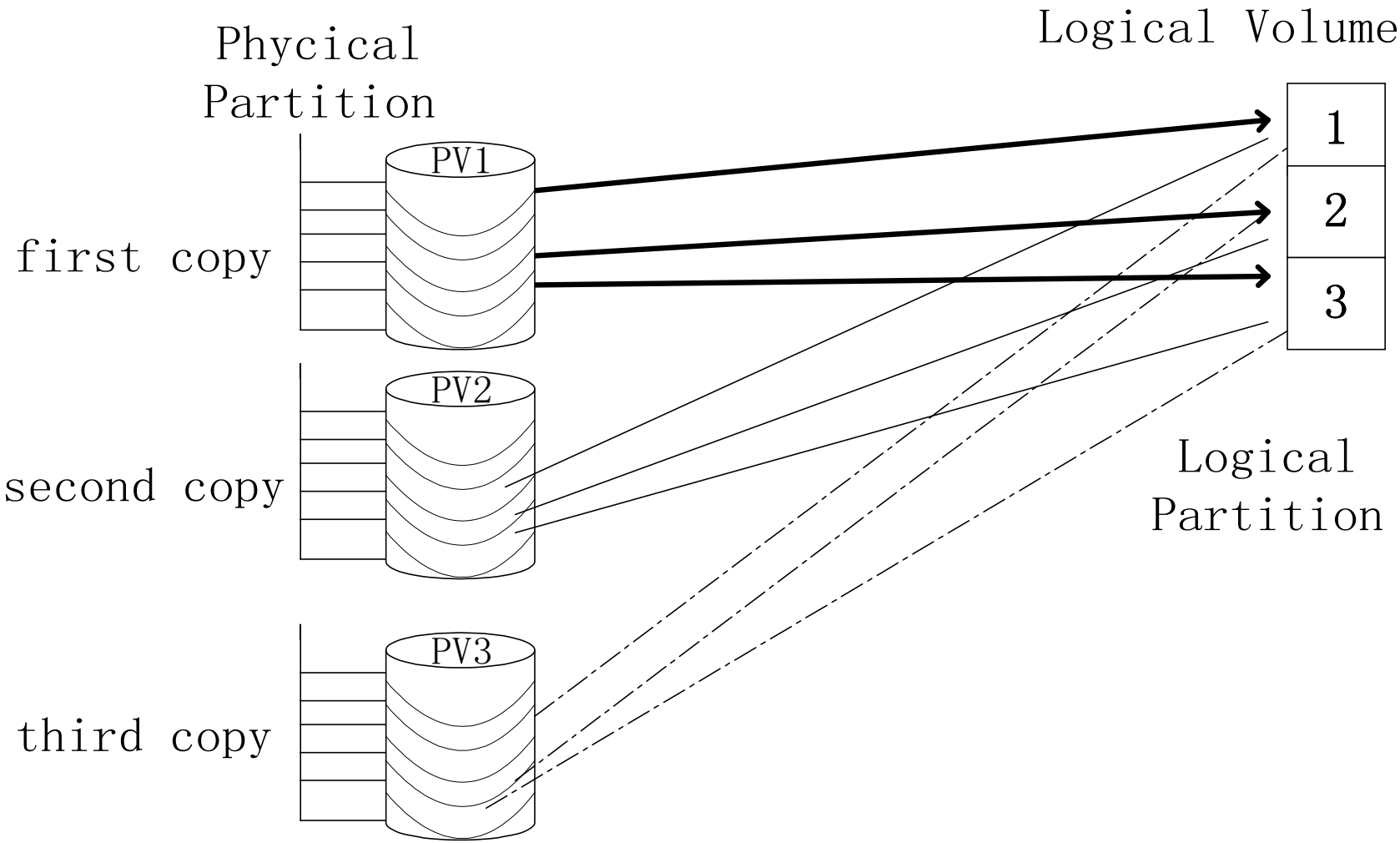
smit extendvg

```
                Add a Physical Volume to a Volume Group

Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                                [Entry Fields]
* VOLUME GROUP name                             []
* PHYSICAL VOLUME names                         []




F1=Help          F2=Refresh       F3=Cancel      F4=List
Esc+5=Reset      Esc+6=Command    Esc+7=Edit     Esc+8=Image
Esc+9=Shell      Esc+0=Exit       Enter=Do
```

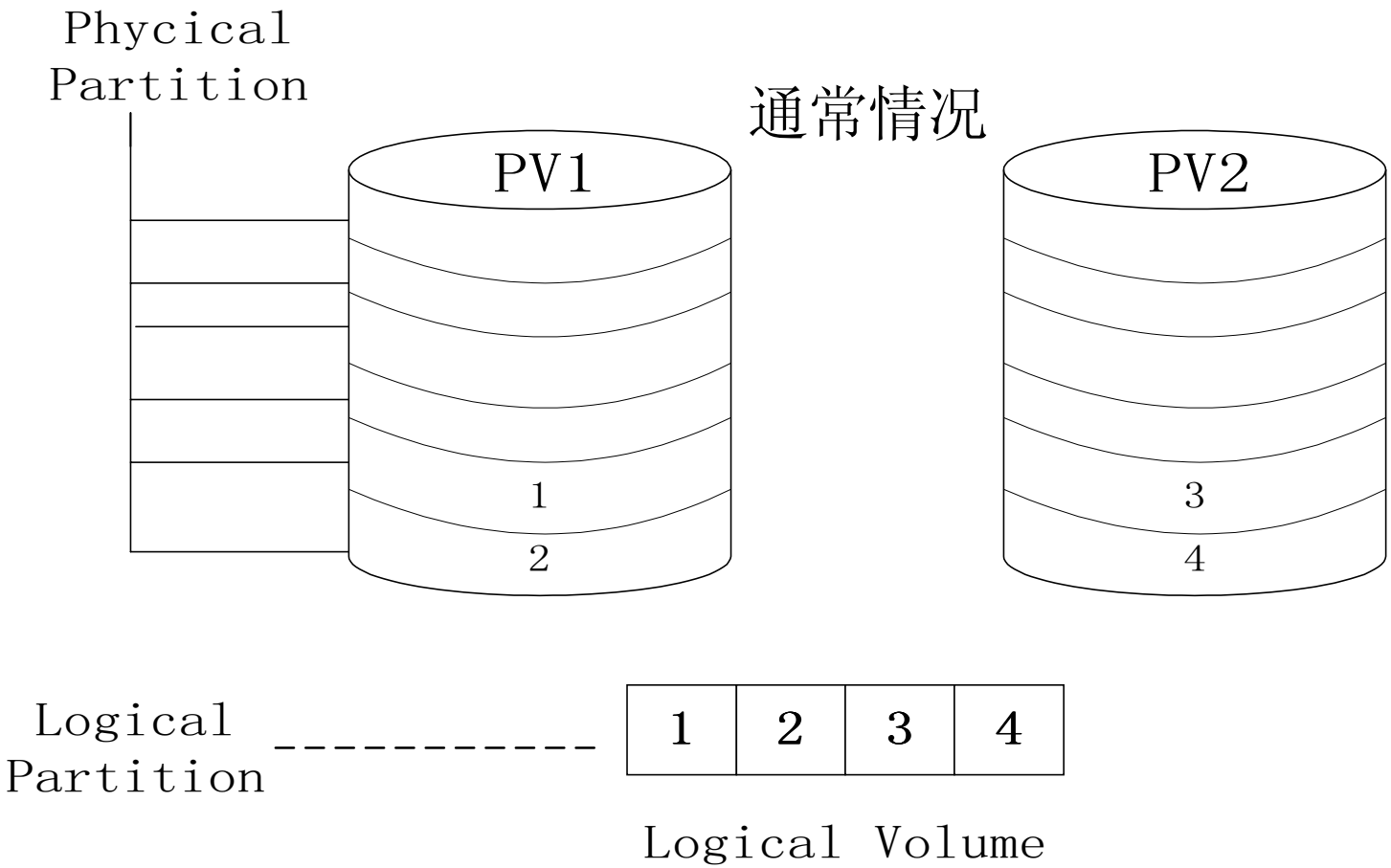
逻辑存储


Phycical
Partition
PV1
PV2
Logical
Partition
1
2
3
Logical Volume

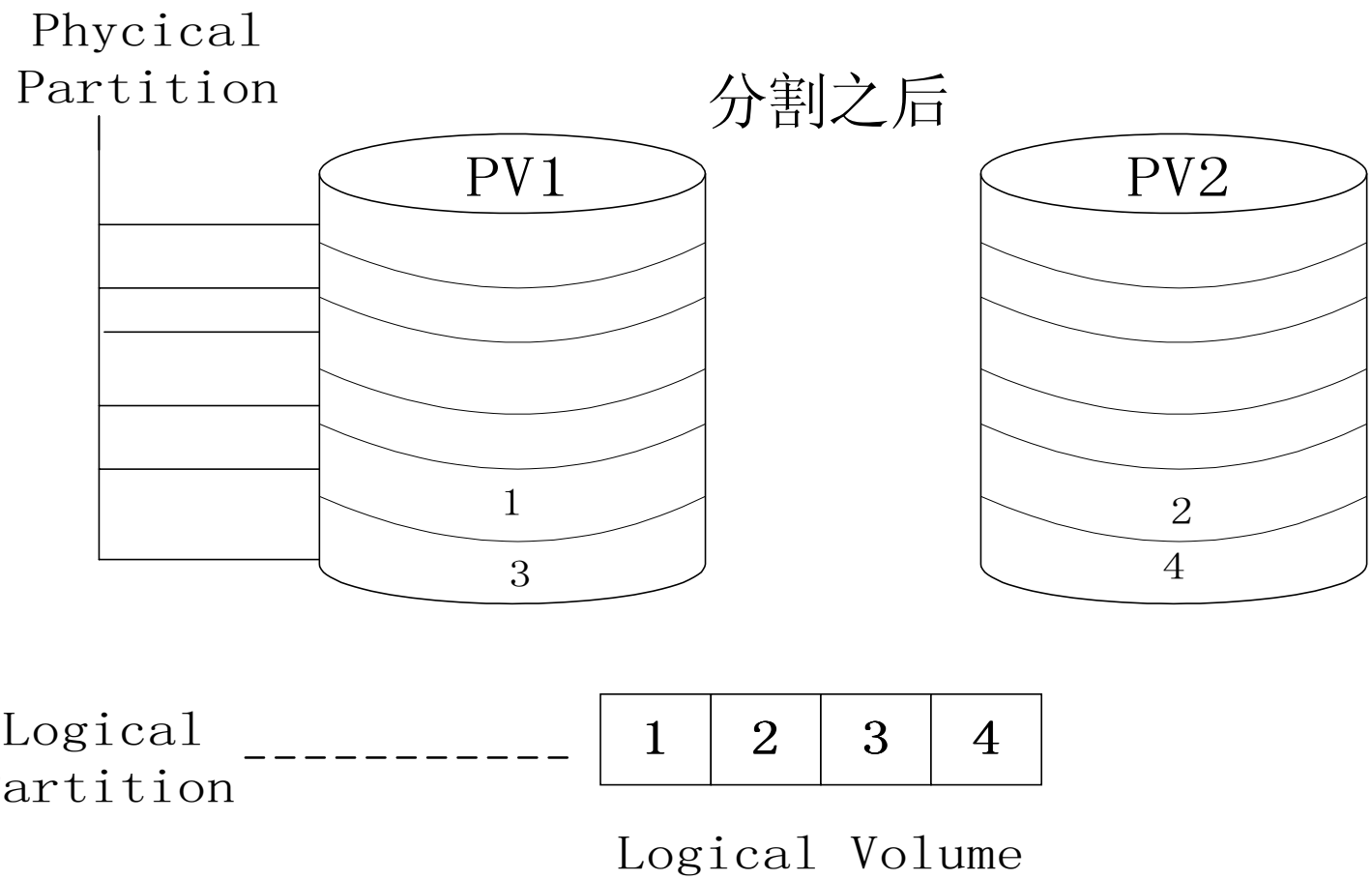
镜向的概念


Phycical
Partition
Logical Volume
PV1
PV2
PV3
first copy
second copy
third copy
1
2
3
Logical
Partition

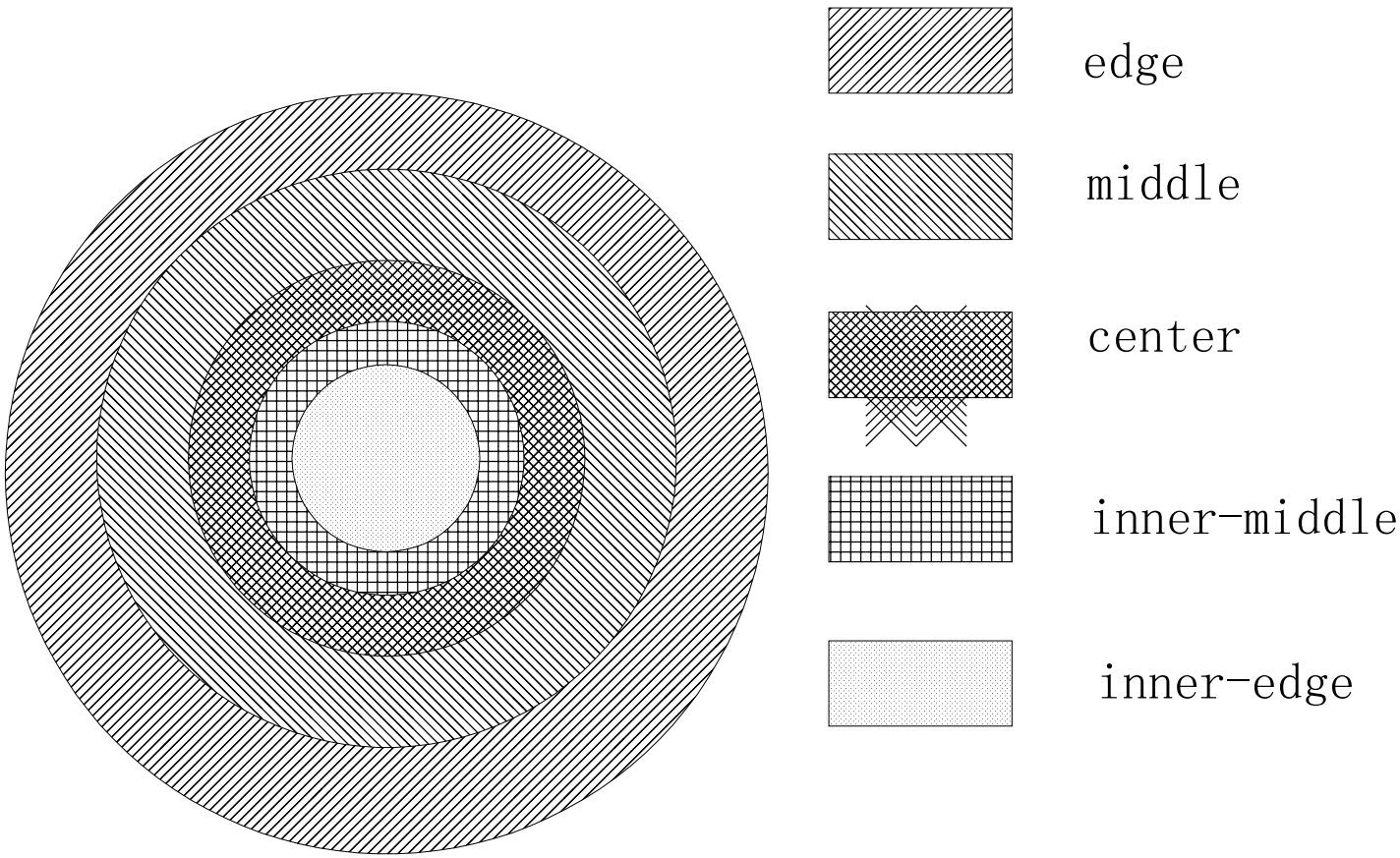
条带分割（一）


Phycical
Partition
通常情况
PV1
PV2
1
2
3
4
Logical
Partition
1
2
3
4
Logical Volume

条带分割（二）


Phycical
Partition
分割之后
PV1
PV2
1
3
2
4
Logical
Partition
1
2
3
4
Logical Volume

逻辑卷内部分配策略



关于逻辑卷的菜单

smit lv

```
                                Logical Volumes

Move cursor to desired item and press Enter.

  List All Logical Volumes by Volume Group
  Add a Logical Volume
  Set Characteristic of a Logical Volume
  Show Characteristics of a Logical Volume
  Remove a Logical Volume
  Copy a Logical Volume



F1=Help                 F2=Refresh              F3=Cancel
Esc+8=Image
Esc+9=Shell             Esc+0=Exit              Enter=Do
```

列出LV的信息

```
# lsvg -o | lsvg -il
sharevg:
LV NAME     TYPE       LPs   PPs   PVs  LV STATE      MOUNT POINT

rootvg:
LV NAME     TYPE       LPs   PPs   PVs  LV STATE      MOUNT POINT
hd6         paging     64    64    1    open/syncd    N/A
hd5         boot       1     1     1    closed/syncd  N/A
hd8         jfslog     1     1     1    open/syncd    N/A
hd4         jfs        76    76    1    open/syncd    /
hd2         jfs        336   336   1    open/syncd    /usr
hd9var      jfs        1     1     1    open/syncd    /var
hd3         jfs        3     3     1    open/syncd    /tmp
hd1         jfs        2     2     1    open/syncd    /home
```

列出LV的信息（续）

```
# lslv hd1
LOGICAL VOLUME:  hd1                    VOLUME GROUP:   rootvg
LV IDENTIFIER:   001000b7ae15a0af.8     PERMISSION:     read/write
VG STATE:        active/complete        LV STATE:       opened/syncd
TYPE:            jfs                    WRITE VERIFY:   off
MAX LPs:         512                    PP SIZE:        4 megabyte(s)
COPIES:          1                      SCHED POLICY:   parallel
LPs:             2                      PPs:            2
STALE PPs:       0                      BB POLICY:      relocatable
INTER-POLICY:    minimum                RELOCATABLE:    yes
INTRA-POLICY:    center                 UPPER BOUND:    32
MOUNT POINT:     /home                  LABEL:          /home
MIRROR WRITE CONSISTENCY: on
EACH LP COPY ON A SEPARATE PV ?: yes
```

列出LV的信息(续)

```
# lslv -m hd3
hd3:/tmp
LP    PP1  PV1               PP2  PV2               PP3  PV3
0001  0100 hdisk1
0002  0101 hdisk1
0003  0102 hdisk1
#
# lslv -m hd5
hd5:N/A
LP    PP1  PV1               PP2  PV2               PP3  PV3
0001  0001 hdisk1
```

添加一个LV

smit mklv

```
                                Add a Logical Volume
Type or select values in entry fields.
Press Enter AFTER making all desired changes.
[TOP]                                          [Entry Fields]
  Logical volume NAME                          []
* VOLUME GROUP name                            rootvg
* Number of LOGICAL PARTITIONS                 []                  #
  PHYSICAL VOLUME names                        []                +
  Logical volume TYPE                          []
  POSITION on physical volume                  middle            +
  RANGE of physical volumes                    minimum           +
  MAXIMUM NUMBER of PHYSICAL VOLUMES           []                  #
    to use for allocation
  Number of COPIES of each logical             1                 +
    partition
  Mirror Write Consistency?                    yes               +
  Allocate each logical partition copy         yes               +
[MORE...11]
```

删除一个LV

smit rmlv

```
                        Remove a Logical Volume

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                [Entry Fields]
  LOGICAL VOLUME name                           [ ]                +



F1=Help          F2=Refresh       F3=Cancel        F4=List
Esc+5=Reset      Esc+6=Command    Esc+7=Edit       Esc+8=Image
Esc+9=Shell      Esc+0=Exit       Enter=Do
```

设置LV的特性

smit lvsc

```
                Set Characteristic of a Logical Volume

Move cursor to desired item and press Enter.

  Change a Logical Volume
  Rename a Logical Volume
  Increase the Size of a Logical Volume
  Add a Copy to a Logical Volume
  Remove a Copy from a Logical Volume




F1=Help          F2=Refresh       F3=Cancel        Esc+8=Image
Esc+9=Shell      Esc+0=Exit       Enter=Do
```

为LV添加一个镜向

smit mklvcopy

```
                    Add Copies to a Logical Volume
Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                                      [Entry Fields]
* LOGICAL VOLUME name                                 lv00
* NEW TOTAL number of logical partition               2              +
    copies
  PHYSICAL VOLUME names                               []             +
  POSITION on physical volume                         middle         +
  RANGE of physical volumes                           minimum        +
  MAXIMUM NUMBER of PHYSICAL VOLUMES                  [32]             #
    to use for allocation
  Allocate each logical partition copy                yes            +
    on a SEPARATE physical volume?
  File containing ALLOCATION MAP                      []
  SYNCHRONIZE the data in the new                     no             +
    logical partition copies?
```

减小LV的大小

- 备份LV的数据
- 删除LV
- 重新创建小一些的LV
- 恢复数据

拷贝 LV

- 通过smit cplv可以实现对逻辑卷的拷贝
- 目标逻辑卷的三种方法
  - new logical volume name
  - overwrite existing logical volume
  - system assigned logical volume name

关于物理卷（PV）的菜单

smit pv

```
                                Physical Volumes

Move cursor to desired item and press Enter.

  List All Physical Volumes in System
  Add a Disk
  Change Characteristics of a Physical Volume
  List Contents of a Physical Volume
  Move Contents of a Physical Volume




F1=Help          F2=Refresh       F3=Cancel        Esc+8=Image
Esc+9=Shell      Esc+0=Exit       Enter=Do
```

列出PV 的信息

```
# lspv
hdisk0          000720333d25b9c6    sharevg
hdisk1          0007206cf7ab2e3c    rootvg
#
# lspv hdisk1
PHYSICAL VOLUME:    hdisk1                  VOLUME GROUP:     rootvg
PV IDENTIFIER:      0007206cf7ab2e3c        VG IDENTIFIER
001000b7ae15a0af
PV STATE:           active
STALE PARTITIONS:   0                       ALLOCATABLE:      yes
PP SIZE:            4 megabyte(s)           LOGICAL VOLUMES:  10
TOTAL PPs:          515 (2060 megabytes)    VG DESCRIPTORS:   2
FREE PPs:           29 (116 megabytes)
USED PPs:           486 (1944 megabytes)
FREE DISTRIBUTION:  00..00..00..00..29
USED DISTRIBUTION:  103..103..103..103..74
```

列出PV 的信息（续一）

```
# lspv -l hdisk1
hdisk1:
LV NAME         LPs   PPs   DISTRIBUTION          MOUNT POINT
hd5             1     1     01..00..00..00..00    N/A
hd2             336   336   94..39..26..103..74   /usr
hd1             2     2     02..00..00..00..00    /home
lv00            1     1     01..00..00..00..00    /gwd1
gwdlv           1     1     01..00..00..00..00    N/A
hd3             3     3     03..00..00..00..00    /tmp
hd9var          1     1     01..00..00..00..00    /var
hd6             64    64    00..64..00..00..00    N/A
hd8             1     1     00..00..01..00..00    N/A
hd4             76    76    00..00..76..00..00    /
```

列出PV 的信息（续二）

```
# lspv -p hdisk1
hdisk1:
PP RANGE  STATE   REGION        LV NAME     TYPE       MOUNT POINT
   1-1    used    outer edge    hd5         boot       N/A
   2-95   used    outer edge    hd2         jfs        /usr
  96-96   used    outer edge    hd1         jfs        /home
  97-97   used    outer edge    lv00        jfs        /gwd1
  98-98   used    outer edge    gwdlv       jfs        N/A
  99-99   used    outer edge    hd1         jfs        /home
 100-102  used    outer edge    hd3         jfs        /tmp
 103-103  used    outer edge    hd9var      jfs        /var
 104-167  used    outer middle  hd6         paging     N/A
 168-206  used    outer middle  hd2         jfs        /usr
 207-207  used    center        hd8         jfslog     N/A
 208-283  used    center        hd4         jfs        /
 284-309  used    center        hd2         jfs        /usr
 310-412  used    inner middle  hd2         jfs        /usr
 413-486  used    inner edge    hd2         jfs        /usr
 487-515  free    inner edge
```

添加/改变物理卷

- 添加一个硬盘
- 移动PV上的内容
  - # migrativepv -l lv01 hdisk1 hdisk0

设置在VG中PV的可用性

- # chpv -v r pvname
  - 使PV在VG中处于unavailable状态，但在PV上保留所有的VGDA和VGSA的copies，在varyonvg quorum检查时不在check该PV
- # chpv -v a pvname
  - 使PV在VG中处于available状态

删除PV

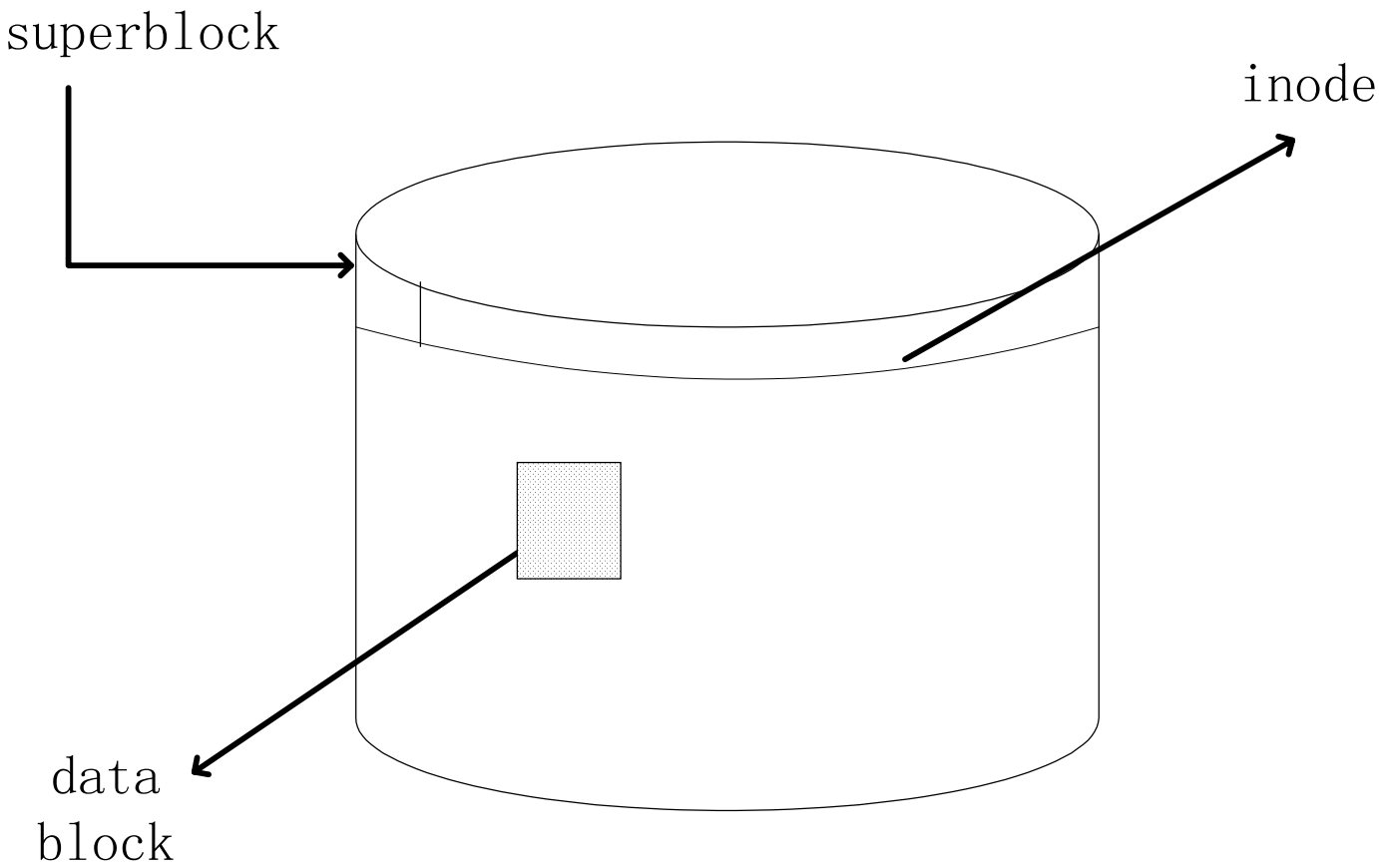
- 从VG中删除PV
- # rmdev -l pvname

第十章 文件系统

本章目的

- 了解AIX 文件系统的组成
- 增加一个JFS
- 改变文件系统的特性

JFS的结构



Logincal Block

- The Journaled File System (JFS) divides the logical volume into a number of fixed size units called logical blocks. The logical blocks in the file system are organized as follows:
  - Logical Block 0:
  - Superblock
  - Allocation Groups

Inode 的内容

- 权限
- 连接数目
- 文件类型
- 用户的ID，组ID
- 文件大小
- 创建及修改时间
- 存取控制信息

Inode 的数目

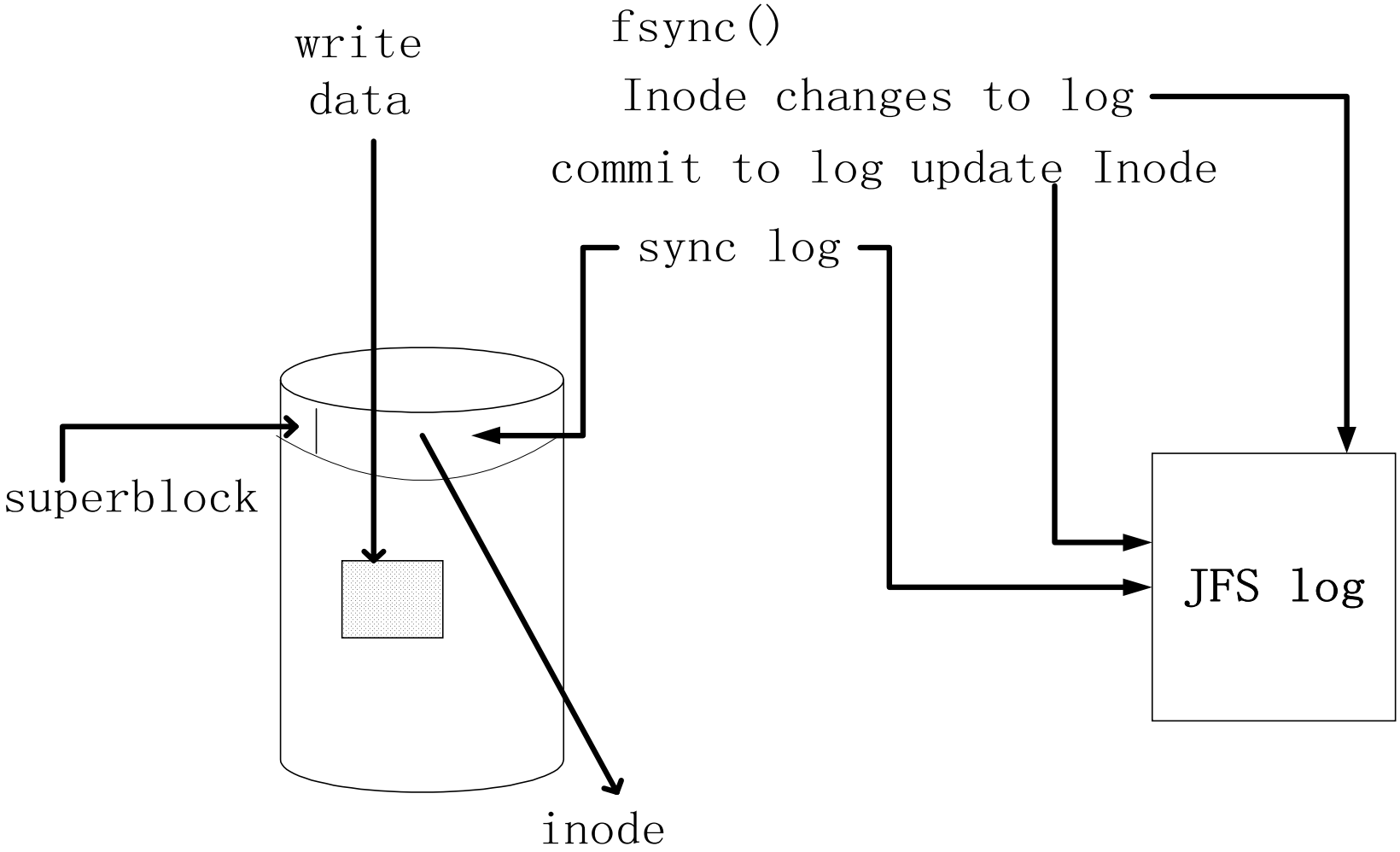
- Fragment:文件存放的逻辑块大小。
- NBPI(number of bytes per inode)
- Allocation Group Size

Allocation Group size	Maximun number of Inode
8	512——16384
16	1024——32768
32	2048——65536
64	4096——131072

JFS 中 的文件数目

- 文件数目= Allocation Group Size / nbpi
- 例：文件系统的nbpi值为4K，即每个文件Inode的大小为4K，创建文件系统时指定Allocation Group Size 的大小为8M，则该文件系统中最多可以存放2048个文件

Journaled Log



文件系统菜单

smit fs

File Systems

Move cursor to desired item and press Enter.

List All File Systems
List All Mounted File Systems
Add / Change / Show / Delete File Systems
Mount a File System
Mount a Group of File Systems
Unmount a File System
Unmount a Group of File Systems
Verify a File System
Backup a File System
Restore a File System
List Contents of a Backup

列出文件系统

```
# lsfs
Name            Nodename   Mount Pt      VFS   Size    Options    Auto
Accounting
/dev/hd4        --         /             jfs   622592  --         yes
no
/dev/hd1        --         /home         jfs   16384   --         yes
no
/dev/hd2        --         /usr          jfs   2752512 --         yes
no
/dev/hd9var     --         /var          jfs   8192    --         yes
no
/dev/hd3        --         /tmp          jfs   24576   --         yes
no
/dev/cd0        --         /cdrom        cdrfs --      ro         no
no
/dev/lv00       --         /gwd1         jfs   8192    rw         no
no
/dev/lv00       --         /home/xb      jfs   8192    rw         yes
no
```

列出所有mount的FS

```
# mount
  node       mounted          mounted over    vfs       date          options
------ ---------------  ---------------  ------ ------------ ---------------
         /dev/hd4         /                jfs    Jan 23 03:25 rw,log=/dev/hd8
         /dev/hd2         /usr             jfs    Jan 23 03:25 rw,log=/dev/hd8
         /dev/hd9var      /var             jfs    Jan 23 03:25 rw,log=/dev/hd8
         /dev/hd3         /tmp             jfs    Jan 23 03:25 rw,log=/dev/hd8
         /dev/hd1         /home            jfs    Jan 23 03:26 rw,log=/dev/hd8
         /dev/lv00        /home/xb         jfs    Jan 23 03:26 rw,log=/dev/hd8
```

在已经定义的LV上添加FS

smit crjfslv

```
                    Add a Standard Journaled File System

Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                                      [Entry Fields]
* LOGICAL VOLUME name                                                +
* MOUNT POINT                                        []
  Mount AUTOMATICALLY at system restart?             no               +
  PERMISSIONS                                        read/write       +
  Mount OPTIONS                                      []               +
  Start Disk Accounting?                             no               +
  Fragment Size (bytes)                              4096             +
  Number of bytes per inode                          4096             +
  Allocation Group Size (MBytes)                     8                +
```

添加一个FS

smit crjfs

```
                        Add a Standard Journaled File System

Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                                      [Entry Fields]
  Volume group name                                   sharevg
* SIZE of file system (in 512-byte blocks)            []                #
* MOUNT POINT                                        []
  Mount AUTOMATICALLY at system restart?              no                +
  PERMISSIONS                                         read/write        +
  Mount OPTIONS                                       []                +
  Start Disk Accounting?                              no                +
  Fragment Size (bytes)                               4096              +
  Number of bytes per inode                           4096              +
  Allocation Group Size (MBytes)                      8                 +
```

文件/etc/filesystems

```
/home:
        dev             = /dev/hd1
        vfs             = jfs
        log             = /dev/hd8
        mount           = true
        check           = true
        vol             = /home
        free            = false
/usr:
        dev             = /dev/hd2
        vfs             = jfs
        log             = /dev/hd8
        mount           = automatic
        check           = false
        type            = bootfs
        vol             = /usr
        free            = false
```

Mount/umount filesystems

Mount a File System

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]	
FILE SYSTEM name	[/dev/cd0]	+
DIRECTORY over which to mount	[/cdrom]	+
TYPE of file system	cdrfs	+
FORCE the mount?	no	+
REMOTE NODE containing the file system to mount	[]	
Mount as a REMOVABLE file system?	no	+
Mount as a READ-ONLY system?	no	+
Disallow DEVICE access via this mount?	no	+
Disallow execution of SUID and sgid programs in this file system?	no	+

显示/改变文件系统

smit chjfs

Change / Show Characteristics of a Journaled File System

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

	[Entry Fields]	
File system name	/test	
NEW mount point	[/test]	
SIZE of file system (in 512-byte blocks)	[8192]	
Mount GROUP	[]	
Mount AUTOMATICALLY at system restart?	no	+
PERMISSIONS	read/write	+
Mount OPTIONS	[]	+
Start Disk Accounting?	no	+
Fragment Size (bytes)	4096	
Number of bytes per inode	4096	
Compression algorithm	no	
Large File Enabled	false	
Allocation Group Size (MBytes)	4	

删除文件系统

smit rmjfs

```
Remove a Journaled File System

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                [Entry Fields]
* FILE SYSTEM name                                              +
  Remove Mount Point                             no             +



F1=Help          F2=Refresh       F3=Cancel        F4=List
Esc+5=Reset      Esc+6=Command    Esc+7=Edit       Esc+8=Image
Esc+9=Shell      Esc+0=Exit       Enter=Do
```

空间管理

- 文件系统不能自动增长

- 注意以下问题：
  - 监测文件系统增长
  - 控制文件增长
  - 控制用户磁盘使用

列出文件系统中空闲空间

```
# df
Filesystem    512-blocks      Free %Used    Iused %Iused Mounted on
/dev/hd4          622592    364304   42%     2109     2% /
/dev/hd2         2752512    270672   91%    41249    12% /usr
/dev/hd9var         8192      2928   65%      519    51% /var
/dev/hd3           24576     23048    7%       62     2% /tmp
/dev/hd1           16384       680   96%      116     6% /home
#
#
# df -k
```

控制增长的文件

- /var/adm/wtmp
- /var/spool/*/*
- $HOME/smit.log
- $HOME/smit.script
- /etc/security/failedlogin
- /var/adm/sulog

列出disk的使用情况

- 命令du用来列出文件和目录的大小。

```
# du /home|sort -r -n
624     /home
392     /home/fred
98      /home/torm
54      /home/liz
```

Fragmentation 策略

- 磁盘空间分配
- 磁盘空间利用
- I/O处理过程
- 没使用的空间
- fragmentation 分配表

验效文件系统

- 行命令：fsck [-p|-y|-n][-f][file system]
- 效验Journal Log
- 效验Inode,indirect block,data blocks,free lists
- 如果没有文件系统被指定，fsck命令查看所有/etc/filesystems中属性check=true的文件系统
- 问题报告记录在/lost+found目录

第十一章 Paging Space

本章目的

- 了解AIX需要Paging Space的原因
- 列出和监测Paging Space
- 执行正确的操作来调整过大或过小的Paging Space

Paging Space的概念

- 为了给有限的内存提供更大的空间，系统将正在工作的程序调入内存，而将处于inactive状态的应用放入磁盘。这块磁盘空间叫做系统的Paging Space。
- 并非内存的替代品

需要Paging Space的原因

- 当内存容量不够时，用做第二内存
- 只是处于active状态的应用和程序才需要存在与内存中
- 系统对Paging Space的需求和应用有密切的关系
- 行命令lsps -a查看Paging Space大于70%时，需要增加内存空间
- 当Paging Space 过小时，提示信息显示在console上。新的进程无法启动，系统可能停止工作

Paging Space在磁盘中的位置

- Paging Space是attribute=paging的逻辑卷
- 为了获得更好的性能
  - 放置在disk中部
  - 使用多个Paging Space，每个Paging Space 在不同的pv上
  - 移动Paging Space到一个不频繁使用的PV上

相关信息

```
# lsps -a
Page Space Physical Volume Volume Group Size  %Used Active Auto Type
paging00   hdisk0          sharevg      100MB     1    yes  yes   lv
hd6        hdisk1          rootvg       256MB    21    yes  yes   lv

# pg /etc/swapspaces

hd6:
        dev = /dev/hd6

paging00:
        dev = /dev/paging00

# lsattr -El sys0 -a realmem
realmem 131072 Amount of usable physical memory in Kbytes False
#
```

添加Paging Space

smit mkps

```
                        Add Another Paging Space

Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                                      [Entry Fields]
  Volume group name                                     sharevg
  SIZE of paging space (in logical partitions)        [ ]          #
  PHYSICAL VOLUME name                                             +
  Start using this paging space NOW?                    no         +
  Use this paging space each time the system is         no         +
         RESTARTED?
```

Paging Space 的计算

- 当内存小于256M时， Paging Space大小是内存的两倍。
- 当内存小于256M时
  - 512M+(memory-256M)*1.25

改变Paging Space

smit chps

```
Change / Show Characteristics of a Paging Space

Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                                [Entry Fields]
  Paging space name                              paging00
  Volume group name                              sharevg
  Physical volume name                           hdisk0
  NUMBER of additional logical partitions        []              #
  Use this paging space each time the system is   yes            +
         RESTARTED?
```

swapon -a

删除Paging Space

- 处于active状态的Paging Space不能被删除。
  - # chps -a ‘n’ paging00
  - # shutdown -Fr
  - # rmps paging00
- 第一个Paging Space不能用这种方法（默认为hd6）

第十二章 备份与恢复

本章目的

- 了解备份的原则
- 列出smit或行命令支持的不同的备份方法
- 创建系统备份

备份的类型

- SYSTEM
- FULL
- Incremental

备份设备——磁盘

	Drive	
	1.44M	2.88M
/dev/fdxl	720k	720k
/dev/fdxh	1.44M	2.88M
/dev/fdx.9	720k	720k
/dev/fdx.18	1.44M	1.44M
/dev/fdx.36	--	2.88M

备份设备——磁带机

	Low capacity	Retention on open	Rewind on close
/dev/rmtx	no	no	yes
/dev/rmtx.1	no	no	no
/dev/rmtx.2	no	yes	yes
/dev/rmtx.3	no	yes	no
/dev/rmtx.4	yes	no	Yes
/dev/rmtx.5	Yes	no	no
/dev/rmtx.6	Yes	Yes	Yes
/dev/rmtx.7	Yes	yes	no

备份rootvg - mksysb

- 只备份rootvg
- 只有mounted的JFS被备份
- 可以引导的TAPE被创建（MCA 机器）
- 保存Paging Space的定义
- 保存LV 的存储原则
- 最好没有应用和用户在使用

mksysb相关文件

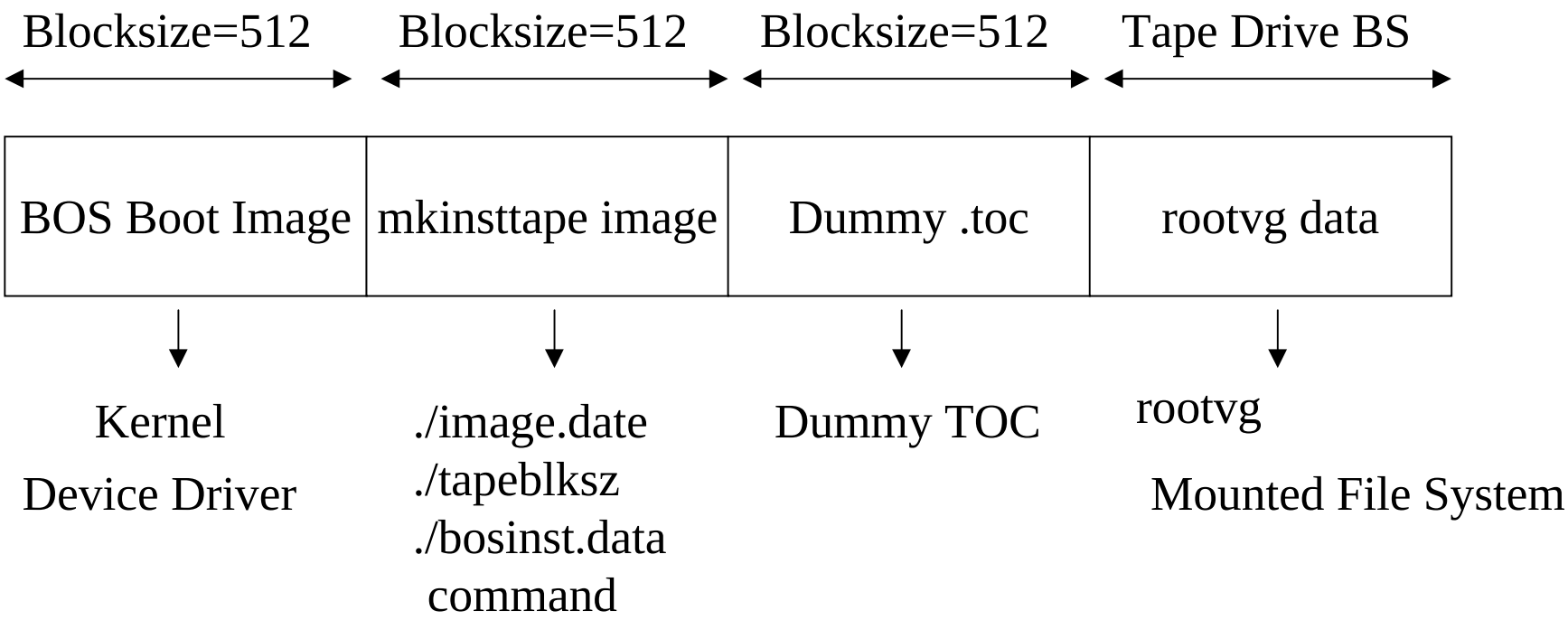
- /image.data文件包含bos安装进程所用到的信息
- /bosinst.data文件包含了一些目标系统的需求信息，还包含了目标系统的用户接口。

mksysb的菜单

smit mksysb

```
                                Back Up the System
Type or select values in entry fields.
Press Enter AFTER making all desired changes.
[TOP]                                                   [Entry Fields]
    WARNING:  Execution of the mksysb command will
              result in the loss of all material
              previously stored on the selected
              output medium. This command backs
              up only rootvg volume group.
* Backup DEVICE or FILE                                 []              +/
  Create MAP files?                                      no              +
  EXCLUDE files?                                         no              +
  List files as they are backed up?                      no              +
  Generate new /image.data file?                         yes             +
  EXPAND /tmp if needed?                                 no              +
  Disable software packing of backup?                    no              +
[MORE...2]
```

mksysb流带的格式



mksysb流带的详解

- BOS Boot Image 部分：
  - 包含系统内核和启动所需要的设备驱动
  - 通过bosboot命令生成
- mkinsttape image 部分：
  - ./image.data
    - 包含在BOS安装过程中的信息（rootvg中LV和JFS的大小、名字、map、mount point）
    - mkszfile命令生成
  - ./tapeblksz
    - 磁带的块大小
  - ./bosinst.data
    - 包含安装BOS过程客户化信息说明BOS安装过程

mksysb流带的详解（续）

- Dummy .toc
  - 假的 .toc文件
  - 包含BOS install tape中相同位置的信息
- 用户数据
  - image.data文件中信息的内容

验效mksysb磁带

smit mksysb

```
                                List Files in a System Image

Type or select values in entry fields.
Press Enter AFTER making all desired changes.

                                                        [Entry Fields]
* DEVICE or FILE                                       [/dev/rmt0]                +/
  Number of BLOCKS to read in a single input           []                          #
     (Leave blank to use a system default)



F1=Help              F2=Refresh           F3=Cancel            F4=List
Esc+5=Reset          Esc+6=Command        Esc+7=Edit           Esc+8=Image
Esc+9=Shell          Esc+0=Exit           Enter=Do
```

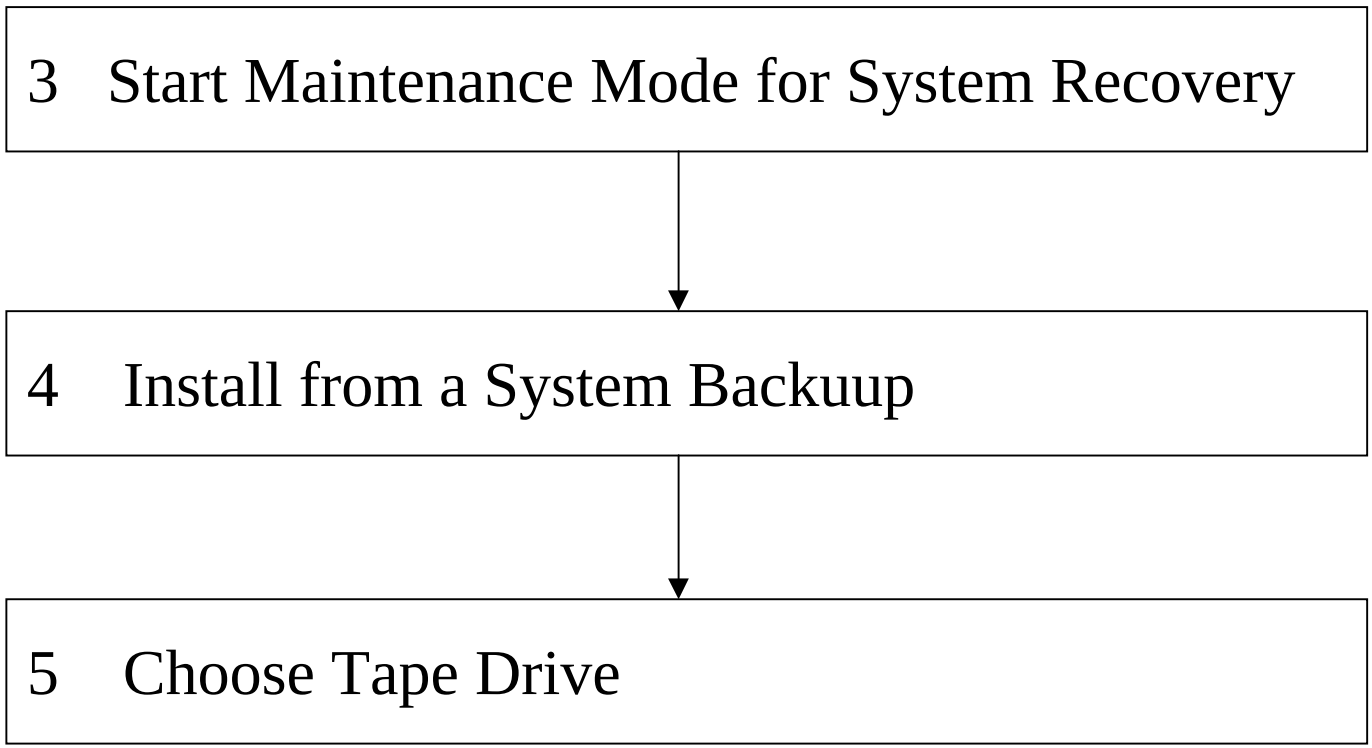
非rootvg的备份

smit savevg

```
                        Back Up a Volume Group
Type or select values in entry fields.
Press Enter AFTER making all desired changes.
[TOP]                                                 [Entry Fields]
    WARNING:  Execution of the savevg command will
              result in the loss of all material
              previously stored on the selected
              output medium.

* Backup DEVICE or FILE                              []              +/
* VOLUME GROUP to back up                            []              +
  List files as they are backed up?                   no             +
  Generate new vg.data file?                          yes            +
  Create MAP files?                                   no             +
  EXCLUDE files?                                      no             +
  EXPAND /tmp if needed?                              no             +
  Disable software packing of backup?                 no             +
[MORE...2]
```

mksysb备份带的恢复

- 以维护模式启动系统（F5键）



查看备份磁带的块大小

 # tcopy /dev/rmtxx

tcopy : Tape File: 1; Records: 1 to 7179 ; size:512

tcopy : Tape File: 1; End of file after :7179 records;
3675648 bytes

tcopy : Tape File: 2; Records: 1 to 2900 ; size:512

tcopy : Tape File: 2; End of file after 2900 records,
76890 bytes

...

非rootvg的恢复

smit restvg

```
                                Remake a Volume Group

Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                                      [Entry Fields]
* Restore DEVICE or FILE                              [/dev/rmt0]    +/
  SHRINK the filesystems?                              no            +
  PHYSICAL VOLUME names                               []             +
     (Leave blank to use the PHYSICAL VOLUMES listed
      in the vgname.data file in the backup image)
  Use existing MAP files?                              yes            +
  Physical partition SIZE in megabytes                []             +#
     (Leave blank to have the SIZE determined
      based on disk size)
  Number of BLOCKS to read in a single input          []              #
     (Leave blank to use a system default)
```

以目录文件结构备份文件

- 命令形式
  - # backup -i[-q][-p][-v][-f device] < listfile
    - -q:介质已经准备好
    - -p:压缩文件
    - -v:在备份时显示文件名
- 从标准输入读入文件名
- 可以使用相对路径或全路径
- 可以和find命令一同使用

通过smit备份文件和目录

smit backfile

```
                        Backup a File or Directory

Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                                [Entry Fields]
  This option will perform a backup by name.
* Backup DEVICE                                 [/dev/fd0]        +/
* FILE or DIRECTORY to backup                   [.]
  Current working DIRECTORY                     []
/
  Backup LOCAL files only?                       yes              +
  VERBOSE output?                                no               +
  PACK files?                                    no               +
```

以Inode文件结构备份文件

- 命令形式
  - # backup -u [-level] [-f device] [filesystem]
- 可以进行增长形备份
  - -0　　全备份
  - -1，-2 从以前的-0，-1开始备份
- 可以用来备份文件系统

命令backup实例

- # find $HOME -print | backup -ivf /dev/rmt0
- # find . -newer /etc/last_full_backup -print | backup -if /dev/rmt0
- # backup -1uf /dev/rmt0 /tmp

通过smit以Inode结构备份文件

smit backfilesys

```
                                Backup a File System

Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                                      [Entry Fields]
  This option will perform a backup by inode.
* FILESYSTEM to backup                                []                +/
* Backup DEVICE                                       [/dev/fd0]        +/
  Backup LEVEL (0 for a full backup)                  [0]                #
  RECORD backup in /etc/dumpdates?                     no                +
```

命令restore

- 列出在介质上的文件
  - # restore -T[-q][-v][-f device]
  - # resotre -Tvf /dev/rmt0
- 恢复单独的文件。
  - # restore -x[-q][-v][-f /device][file1 file2…]
  - # restore -xvf /dev/rmt0 /home/mike/alog
- 恢复完整的文件系统
  - # restore -r[-q][-v][-f device] filesystem

通过smit恢复文件

smit restfile

```
 Restore a File or Directory

Type or select values in entry fields.
Press Enter AFTER making all desired changes.
                                                  [Entry Fields]
* Restore DEVICE                                  [/dev/fd0]      +/
* Target DIRECTORY                                [.]              /
  FILE or DIRECTORY to restore                    []
  (Leave blank to restore entire archive.)
  VERBOSE output?                                  no             +
  Number of BLOCKS to read in a single input      []               #
    operation
```

命令tar和cpio

- 传统的UNIX(**t**ape **ar**chive) 命令
  - # tar -cvf device files
  - # tar -xvf device [files]
  - # tar -tvf device
- 命令cpio 经常在其他地方使用
  - # find /home -print|cpio -ov > /dev/rmt0
  - # cpio idv < /dev/fd0
  - # cpio -itv < /dev/rmt0

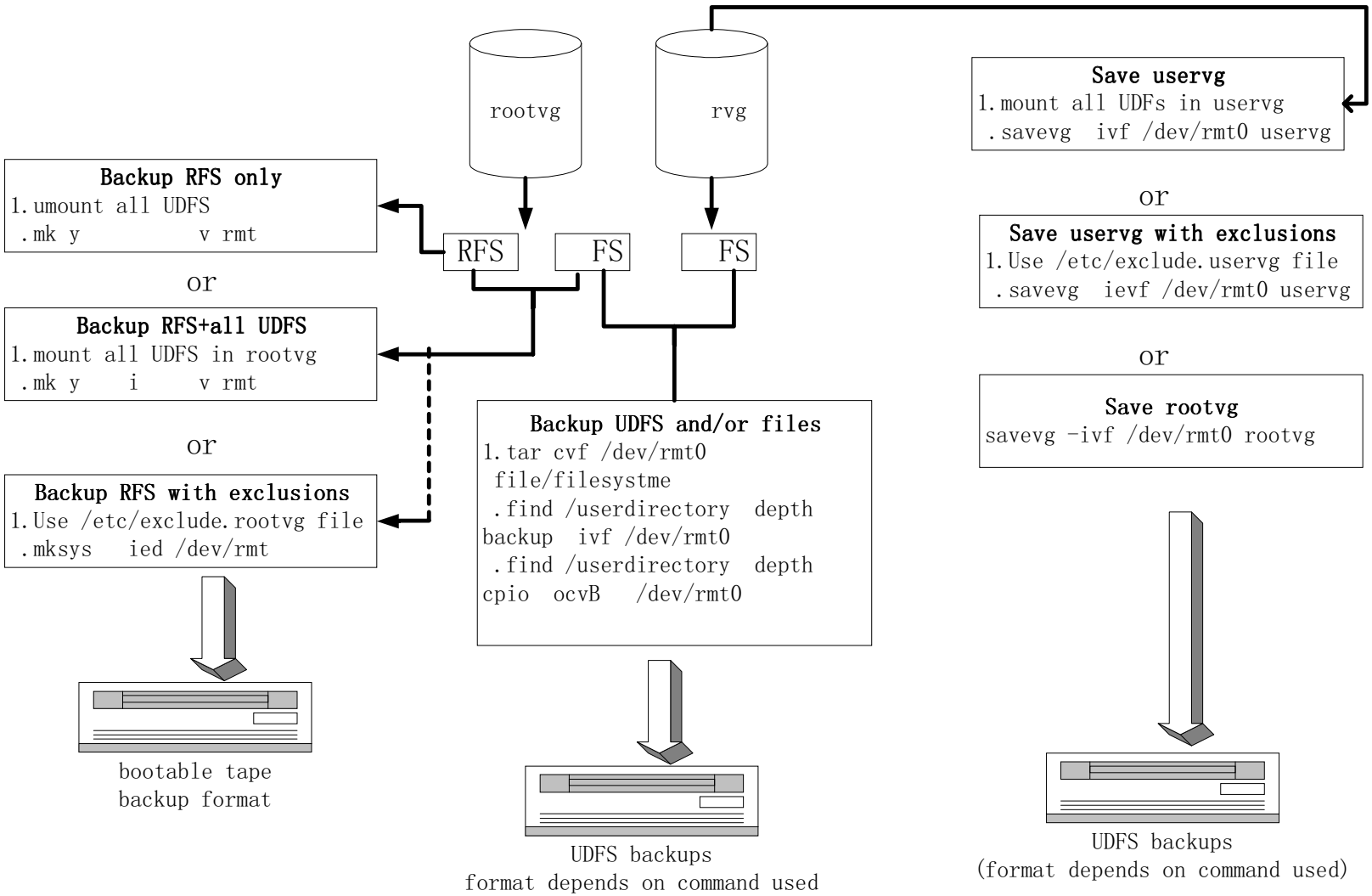
命令dd

- 语法结构：
  - dd [option=value] [if=infile][of=outfile]
- 实例：
  - # dd if=/etc/inittab of=/dev/rfd0
  - # dd if=test.ascii of=test.ebcdic conv=ebcdic
  - # ls -l |dd conv=ucase

其他有用的命令

- 命令tctl用来控制磁带机的驱动
  - fsf :将磁带向前移动指定的文件
    - # tctl fsf 2 -f /dev/rmt0.1
  - bsf:将磁带向前移动指定的文件
    - # tctl bsf 2 -f /dev/rmt0.1
  - rewind:回倒磁带
    - # tctl -f /dev/rmt0 rewind
- 命令tcopy拷贝磁带
  - # tcopy /dev/rmt0 /dev/rmt1
- 命令flcopy用来磁盘拷贝

备份策略


rootvg
rvg
RFS
FS
FS
Backup RFS only
1.umount all UDFS
.mk y v rmt
or
Backup RFS+all UDFS
1.mount all UDFS in rootvg
.mk y i v rmt
or
Backup RFS with exclusions
1.Use /etc/exclude.rootvg file
.mksys ied /dev/rmt
bootable tape
backup format
Backup UDFS and/or files
1.tar cvf /dev/rmt0
file/filesystme
.find /userdirectory depth
backup ivf /dev/rmt0
.find /userdirectory depth
cpio ocvB /dev/rmt0
UDFS backups
format depends on command used
Save uservg
1.mount all UDFs in uservg
.savevg ivf /dev/rmt0 uservg
or
Save uservg with exclusions
1.Use /etc/exclude.uservg file
.savevg ievf /dev/rmt0 uservg
or
Save rootvg
savevg -ivf /dev/rmt0 rootvg
UDFS backups
(format depends on command used)

第十三章 系统安全性

本章目的

- 定义组和用户的概念
- 了解用户相关的数据文件

安全性概念——用户

- 用户帐户
  - 每个用户有独立的用户名，ID和PASSWORD
  - 文件的所有权由用户的ID来确定
  - 文件的创建者通常亦是文件的所有者，但是其所有者可以被root用户转换
  - 默认的用户
    - 超级用户：root
    - 系统使用的用户（不可以login）:adm,sys,bin

安全性概念——组

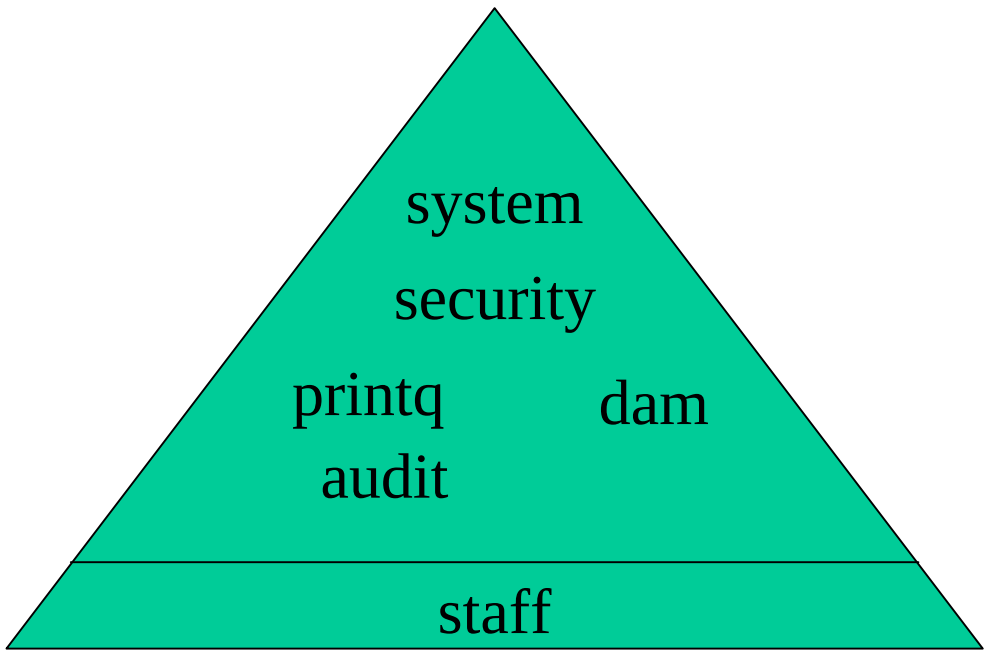
- 组帐户
  - 需要存取一组相同的文件的用户被归纳为一组
  - 组ID给定了一些文件权限
  - 默认的组：
    - 管理组：system
    - 普通用户组：staff

组(group)

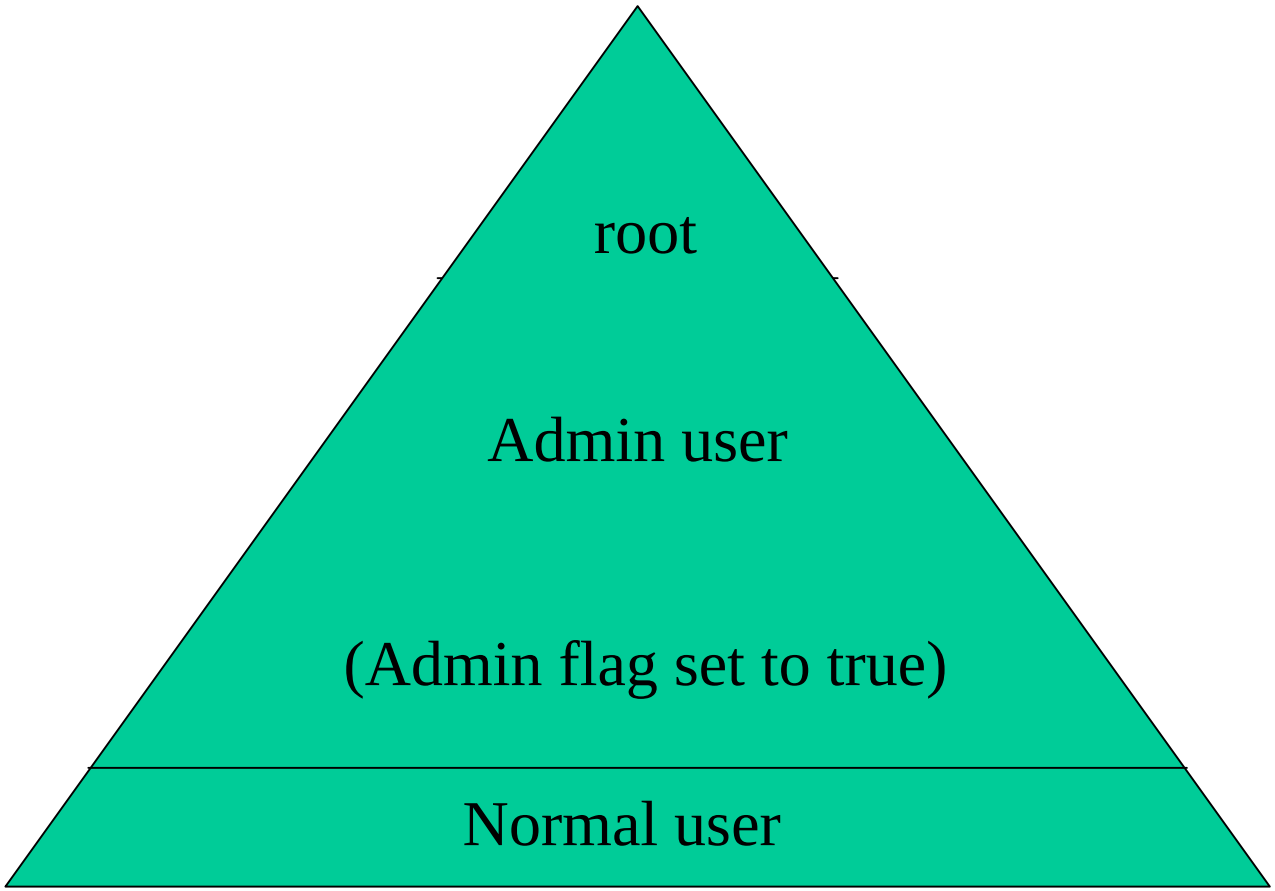
- 需要存取相同的一组文件被归纳为一组
- 每一个用户至少需要属于一个组
- 用户可以属于多个组

组结构

- 任何属于system adm security…组的用户都可以使用相应的功能



用户结构图



用户结构说明

- AIX中security组不能管理admin用户和admin组
- 只有root用户可以增加/删除/修改admin用户和admin组
- 任何用户都可以在/etc/security/user中定义为admin用户和admin组
  - user1:
    - admin=true

命令su

- 命令su可以用来从一个用户切换到另一个用户（包括root用户）。将生成一个新的对话。
- 如果在用户前面加上符号-，则环境变量可以改变为新的用户设置。

安全日志

- /var/adm/sulog
  - 使用pg,more,cat来显示
- /var/adm/wtmp
  - 曾经login 成功的用户，使用who来显示
- /etc/utmp
  - 正在login的用户，使用who来显示
- /etc/security/failedlogin
  - 曾经login 失败的用户，使用who来显示

命令umask

- 命令umask用于控制新生成的文件和目录的权限。
- 文件/etc/security/user指定了默认的和每个特殊用户的umask值。
- 系统默认的umask值为022，建议改为027
- 如果umask值为022。则
  - 新文件的权限为：rw-r--r--
  - 新目录的权限为：rwxr-xr-x

安全文件

- /etc/passwd　　注册的用户
- /etc/group　　注册的用户
- /etc/security　　该目录不能被其他用户存取
- /etc/security/passwd　　用户的密码
- /etc/security/user　　用户的属性，密码限制
- /etc/security/limits　　用户的限制
- /etc/security/environ　　用户环境设定
- /etc/security/login.cfg　　login 设定
- /etc/security/ group　　组特性

文件/etc/passwd

- # cat /etc/passwd

```
root:!:0:0::/:/bin/ksh
daemon:!:1:1::/etc:
bin:!:2:2::/bin:
sys:!:3:3::/usr/sys:
adm:!:4:4::/var/adm:
uucp:!:5:5::/usr/lib/uucp:
guest:!:100:100::/home/guest:
nobody:!:4294967294:4294967294::/:
lpd:!:9:4294967294::/:
nuucp:*:6:5:uucp login
user:/var/spool/uucppublic:/usr/sbin/uucp/uucico
        ......
```

文件/etc/security/passwd

- #cat /etc/security/passwd

root:

password = 35TYABp0eK/D2
lastupdate = 952154741
flags =

test:

password = uj6HYyRkH3166
lastupdate = 947893498
flags = ADMCHG

……

文件/etc/security/user

```
default:
        admin = false
        login = true
        su = true
        daemon = true
        rlogin = true
        sugroups = ALL
        admgroups =
        ttys = ALL
        auth1 = SYSTEM
        auth2 = NONE
        tpath = nosak
        umask = 022
        expires = 0
        ......
```

文件/etc/group

```
system:!:0:root,xb
staff:!:1:netinst,notes,jiang,ftp,anonymou,team02,team04
bin:!:2:root,bin
sys:!:3:root,bin,sys
adm:!:4:bin,adm
uucp:!:5:nuucp,uucp
mail:!:6:
security:!:7:root
cron:!:8:root
printq:!:9:
audit:!:10:root
ecs:!:28:
nobody:!:4294967294:nobody,lpd
usr:!:100:guest
perf:!:20:
shutdown:!:21:
imnadm:!:200:imnadm
```

文件/etc/security/group

```
system:
        admin = true

staff:
        admin = false

bin:
        admin = true

sys:
        admin = true

......
```

文件/etc/security/login.cfg

```
default:
        sak_enabled = false
        logintimes =
        logindisable = 0
        logininterval = 0
        loginreenable = 0
        logindelay = 0

......

usw:
        shells = /bin/sh,/bin/bsh,/bin/csh,/bin/ksh
        maxlogins = 2
        logintimeout = 60
```

第十四章 用户管理

本章目的

- 添加，改变和删除用户
- 添加，改变和删除组
- 管理用户密码
- 和用户通信

用户初始化过程

- /etc/profile
  - 系统方面的默认变量(TERM,MAILMSG...)
- /etc/environment
  - 系统运行进程的基本环境(HOME,LANG…)
- $HOME/.profile
  - 客户化的profile，可以替代/etc/profile中的命令和变量

Security and uers

smit security

```
                                Security & Users

Move cursor to desired item and press Enter.

  Users
  Groups
  Passwords
  Login Controls
  Roles




F1=Help          F2=Refresh       F3=Cancel        Esc+8=Image
Esc+9=Shell      Esc+0=Exit       Enter=Do
```

smit user

smit users

Users

Move cursor to desired item and press Enter.

Add a User
Change a User's Password
Change / Show Characteristics of a User
Lock / Unlock a User's Account
Reset User's Failed Login Count
Remove a User
List All Users

列出用户的属性

 # lsuser [-c|-f][-a attribute..]{ALL|username…}

例：

```
# lsuser -c -a id home groups xb
   name:id:home:groups
   xb:201:/home/xb:staff
```

通过smit添加用户

smit mkuser

```
                                  Add a User

Type or select values in entry fields.
Press Enter AFTER making all desired changes.
[TOP]                                                   [Entry Fields]
* User NAME                                            []
  User ID                                              []
  ADMINISTRATIVE USER?                                  false
  Primary GROUP                                        []
  Group SET                                            []
  ADMINISTRATIVE GROUPS                                []
  ROLES                                                []
  Another user can SU TO USER?                          true
  SU GROUPS                                            [ALL]
  HOME directory                                       []
  Initial PROGRAM                                      []
  User INFORMATION                                     []
  EXPIRATION date (MMDDhhmmyy)                         [0]
[MORE...37]
```

添加用户时的相关文件

- 默认的ID
  - /etc/security/.ids
- shell脚本的ID：
  - /etc/lib/security/mkuser.sys
- 默认的特性：
  - /usr/lib/security/mkuser.default
  - /etc/security/user
- 默认的 .profile
  - /etc/security/.profile

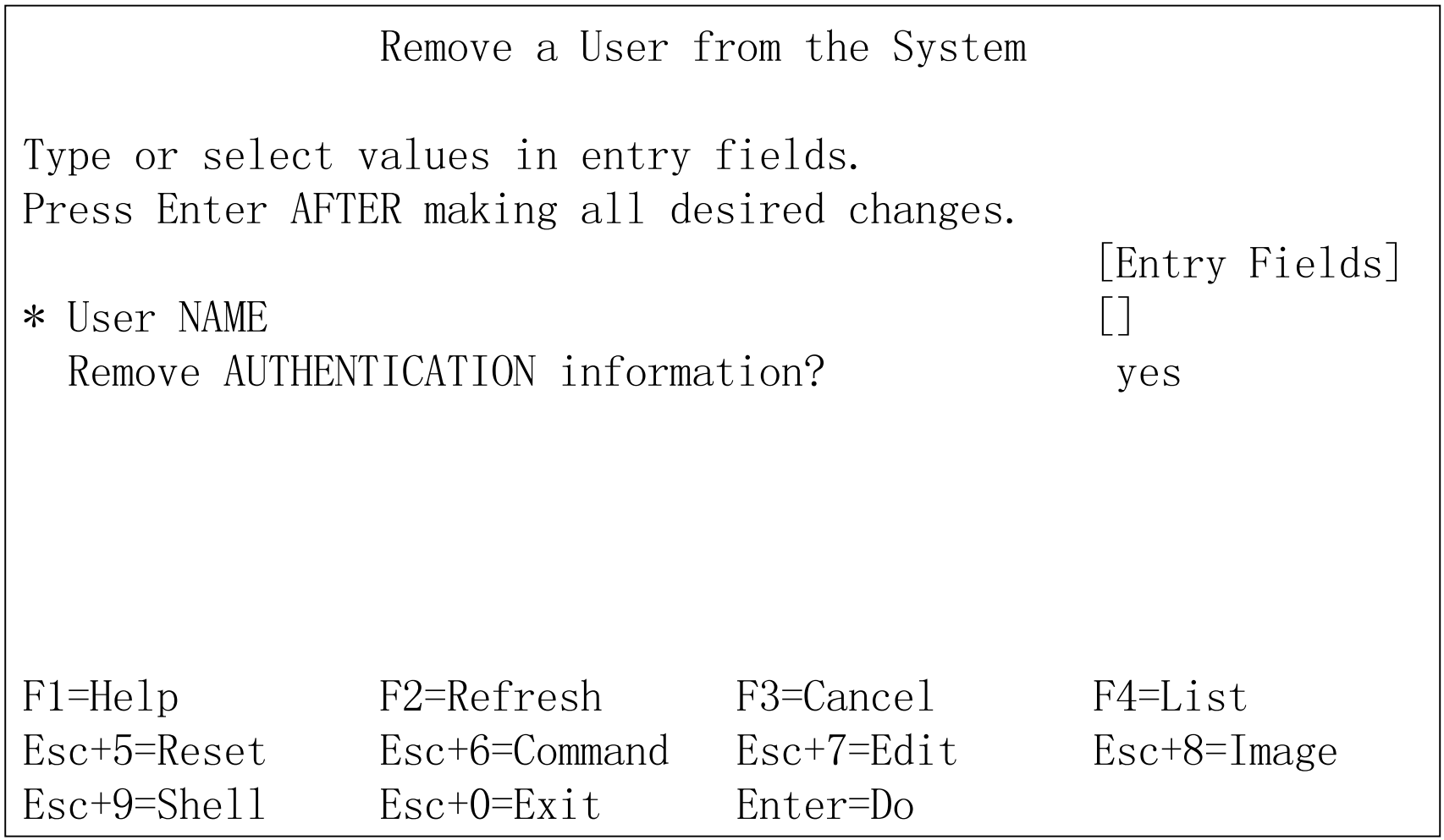
显示/改变用户的特性

smit chuser

```
                    Change / Show Characteristics of a User
Type or select values in entry fields.
Press Enter AFTER making all desired changes.
[TOP]                                                  [Entry Fields]
* User NAME                                            root
  User ID                                              [0]
  ADMINISTRATIVE USER?                                  true
  Primary GROUP                                 [system]
  Group SET                                            [system,bin,sys,securit>
  ADMINISTRATIVE GROUPS                                []
  ROLES                                                []
  Another user can SU TO USER?                          true
  SU GROUPS                                            [ALL]
  HOME directory                                       [/]
  Initial PROGRAM                                      [/bin/ksh]
  User INFORMATION                                     []
  EXPIRATION date (MMDDhhmmyy)                         [0]
[MORE...37]
```

通过smit删除用户

smit rmuser



命令passwd

- 普通用户只可以修改自己的密码
- security组的用户可以修改非admin用户的密码
- root用户可以修改任何用户的密码
- 进入维护模式后可以修改root用户的密码

组的概念和分类

- Group are collections of users who can share access permissions for protected resources.
- 组的类型
  - User Group: 一组需要共享文件的用户
  - System Admin. Group: 需要执行一些系统维护任务的组
  - System-Defined Group

SMIT GROUP

smit group

```
                                    Groups

Move cursor to desired item and press Enter.

  List All Groups
  Add a Group
  Change / Show Characteristics of a Group
  Remove a Group




F1=Help          F2=Refresh       F3=Cancel        Esc+8=Image
Esc+9=Shell      Esc+0=Exit       Enter=Do
```

Login 的信息

- 文件/etc/motd包含每次login时的信息
- 如果$HOME/.hushlogin文件存在，则/etc/motd的内容不会显示

相关文件（一）

- /etc/security/environ :包含用户环境的信息
- /etc/security/lastlog: 包含最后login的用户信息
- /etc/security/limits：包含用户进程资源的限制信息
- /etc/security/user: 包含用户扩展特性
- /etc/lib/security/mkuser.default:创建新用户的默认属性

相关文件（二）

- /etc/passwd: 用户基本特性
- /etc/security/passwd:密码信息（加密）
- /etc/secirity/login.cfg: login和用户认证的配置信息
- /etc/utmp:用户login的信息
- /etc/adm/wtmp：用户连接帐户的的信息
- /etc/security/failedlogin 记录所有失败login的信息

相关文件（三）

- /etc/motd:每次login时显示的信息
- /etc/environment:所有进程的环境变量
- /etc/group: 组的基本信息
- /etc/security/group：组的附加属性

第十五章 计划安排

本章目的

- 使用cron文件安排定期的工作
- 使用at命令安排将来某一时刻的工作

cron

- 守护进程cron启动之后，才可以在指定的时间进行指定的操作
- 某一用户相关的操作存放在/var/spool/cron/crotabs/*user*中
- 相关文件：
  - /var/adm/cron/cron.deny 不能够使用cron的用户
  - /var/and/cron/cron.allow 可以使用cron的用户
- crontab的格式
  - 分 小时 天 月 星期 命令

相关操作cron

- 显示cron表
  - # crontab -l
- 编辑cron表
  - # crontab -e
- 清空cron表
  - # crontab -d

命令at

- 命令at提交某一时刻的某一操作
- 例：
  - # at now+2 mins
    - banner hello > /dev/console
    - <ctrl - d >

通过smit完成操作

smit at

```
                                Schedule Jobs

Move cursor to desired item and press Enter.

  List All Jobs Scheduled
  Schedule a Job
  Remove a Job from the Schedule




F1=Help                 F2=Refresh              F3=Cancel
Esc+8=Image
Esc+9=Shell             Esc+0=Exit              Enter=Do
```

第十六章
单机系统的可用性

本章目的

- AIX的可用性
- RS/6000硬件的可用性
- rootvg的镜像

AIX的可用性

- smit工具
- LVM的管理
  - 磁盘镜像
  - bad block relocation
- 日志文件系统JFS(Journaled Filesystem)
  - AIX将所有文件系统的改变记录在jfslog中
  - 在系统重启时，fsck命令自动快速的检查并修复文件系统

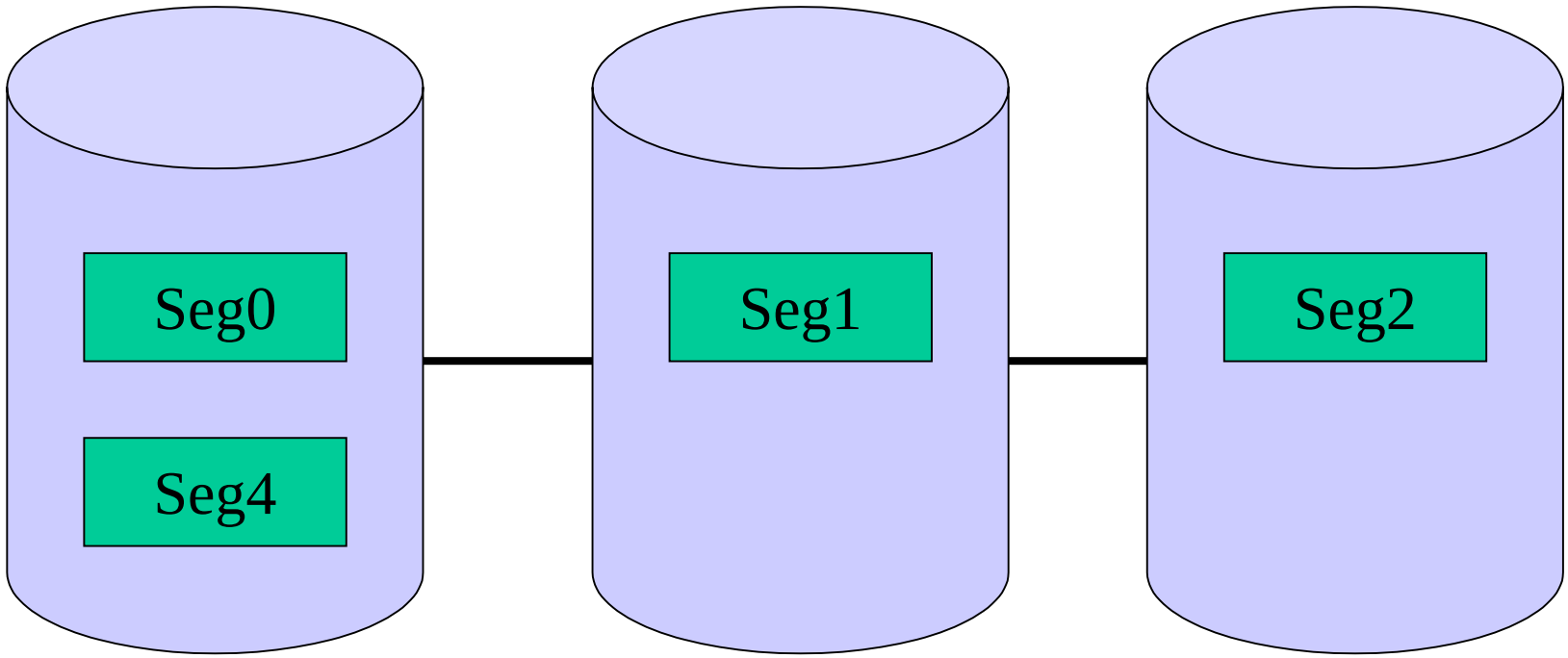
AIX的可用性（续）

- 动态内核调整，无需重启机器
- 系统资源控制(SRC)
- 设备配置动态管理
- AIX升级工具
  - 允许升级软件处于试用测试状态(applied)

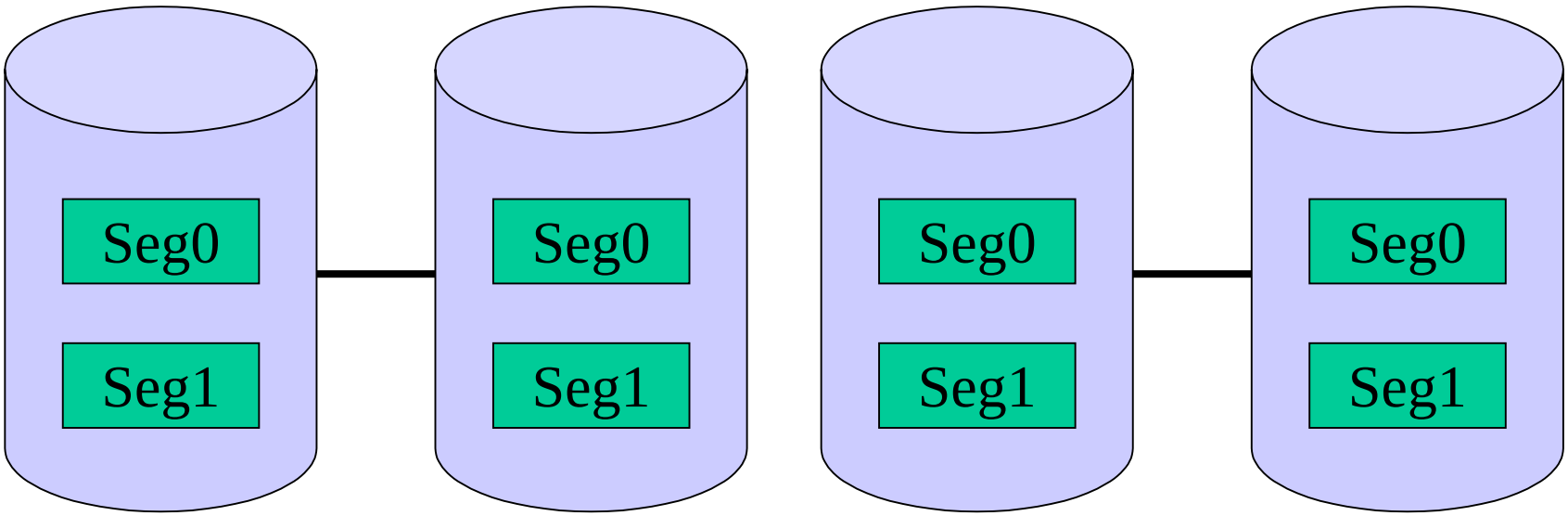
RS/6000硬件的可用性

- 内置的纠错和检错功能
- 备份电源支持
  - 备份电池
  - 备份电源供电
- 电源调节设备
- 备份磁盘
- 热插拔磁盘
- 共享卷组
- RAID磁盘阵列

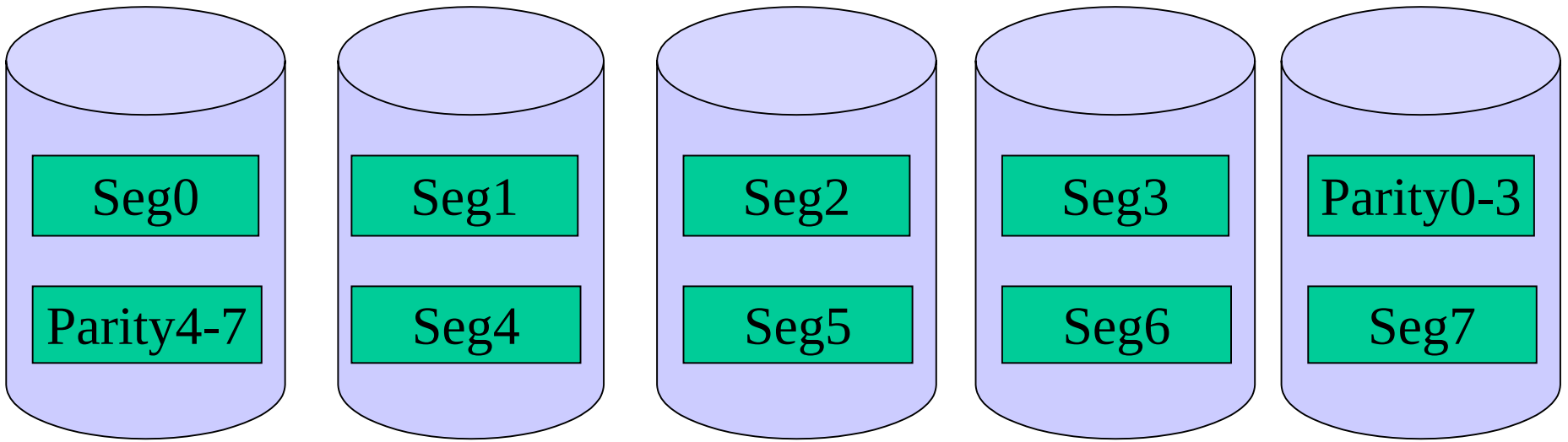
RAID-0方式



RAID-1方式



RAID-5方式



rootvg的镜像

- 镜像所有rootvg的lv
  - #extendvg rootvg hdisk1
  - #chvg -Qn rootvg
  - 镜像所有LV
- 创建一个增加的boot logical volume(blv)
  - #bosboot -ad /dev/hdisk1
- 创建第二dump设备（可选）
  - #sysdumpdev [-P] -s device
- 重新定义bootlist table
  - #bootlist -m normal hdisk0 hdisk1