



System Initialization Part 1

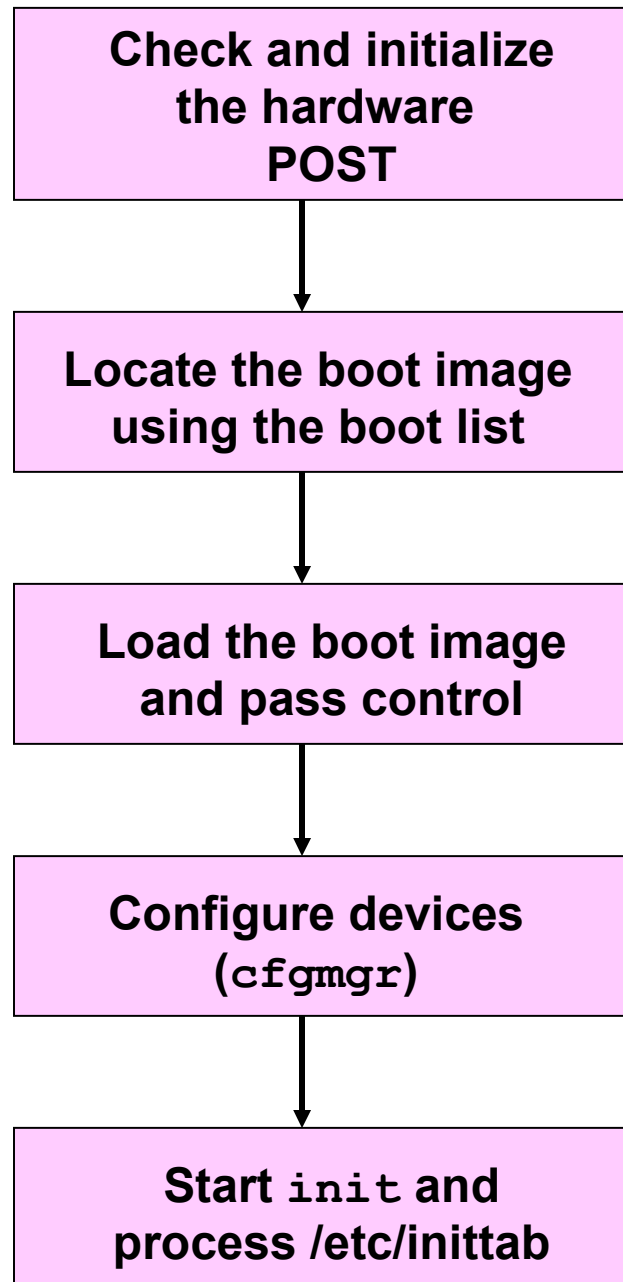


Unit Objectives

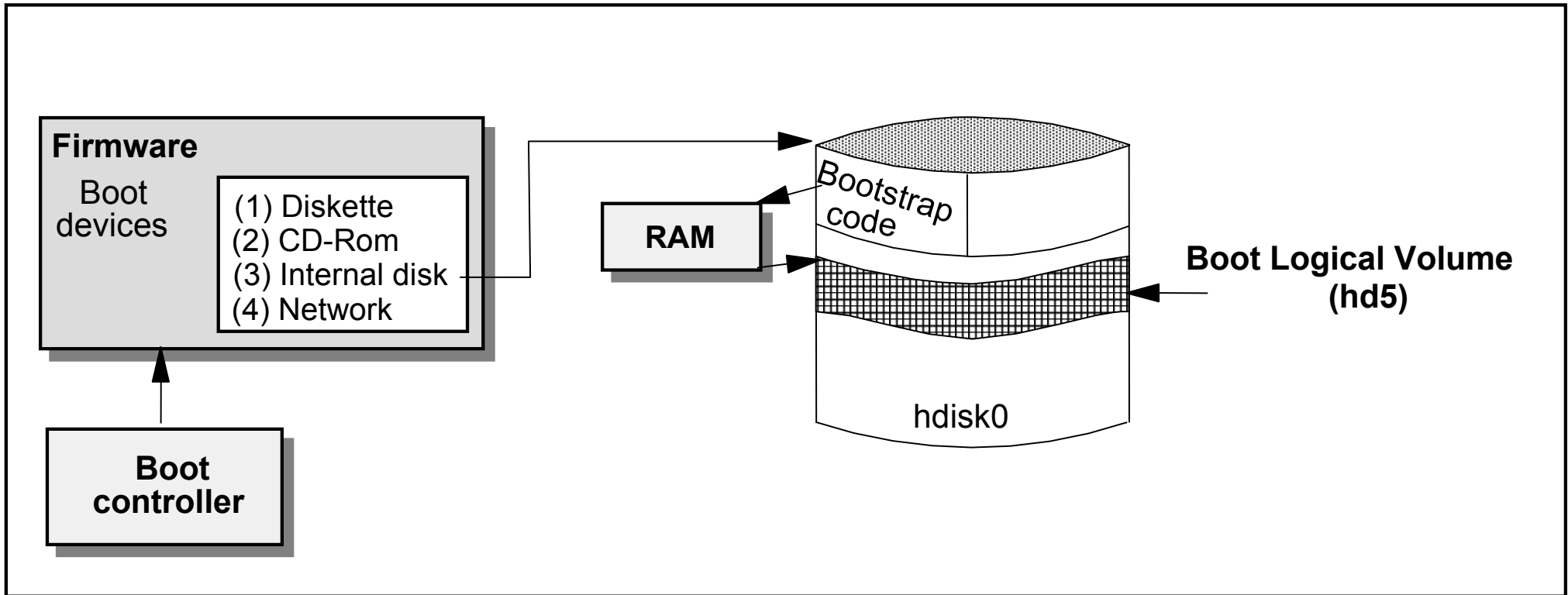
After completing this unit, you should be able to:

- Describe the boot process through to the loading the boot logical volume
- Describe the contents of the boot logical volume
- Interpret LED codes displayed during boot and at system halt
- Re-create the boot logical volume on a system which is failing to boot
- Describe the features of a service processor

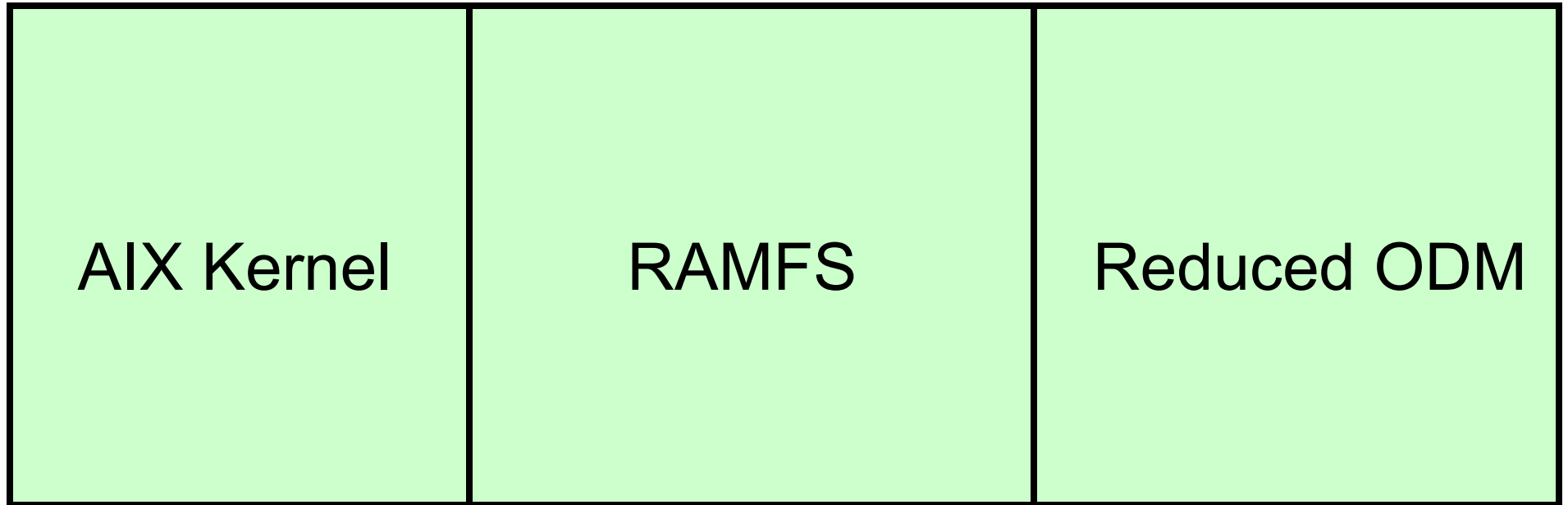
How Does An AIX System Boot?



Loading of a Boot Image



Contents of the Boot Logical Volume (hd5)



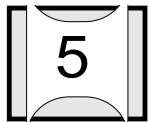
Boot Device Alternatives

- Boot device is first one found with a boot image in bootlist
- If boot device is removable media (CD, DVD, Tape) – boots to the Install and Maintenance m7enu
- If the boot device is a network adapter – boot result depends on NIM configuration for client machine:
 - `nim -o bos_inst` : Install and Maintenance menu
 - `nim -o maint_boot` : Maintenance menu
 - `nim -o diag` : Diagnostic menu
- *If boot device is a disk – boot depends on “service key” usage*
 - Normal mode boot – boot to multi-user
 - Service mode boot – Diagnostic menu
 - Two types of service mode boots:
 - Requesting default service bootlist (key 5 or F5)
 - Requesting customized service bootlist (key 6 or F6)
 - HMC advanced boot options support both of the above options

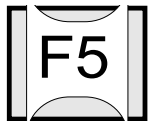
How to Fix a Corrupted BLV

Boot from bootable
media:
CD, tape or NIM

Select volume group
that contains **hd5**



or



or

HMC boot option
Diagnostic with
default bootlist
or

(**F1** or **#1**
to set SMS
options)



Maintenance

1 Access a Root Volume Group

```
# bosboot -ad /dev/hdisk0
```

```
# shutdown -Fr
```

Working with Bootlists

- Normal Mode:

```
# bootlist -m normal hdisk0 hdisk1
# bootlist -m normal -o
hdisk0 blv=hd5
hdisk1 blv=hd5
```

- Service Mode:

```
# bootlist -m service -o
cd0
hdisk0 blv=hd5
ent0
```

diag

TASK SELECTION LIST

```
Display Service Hints
Display Software Product Data
Display or Change Bootlist
Gather System Information
```



Starting System Management Services

- Reboot or power on the system
- Press **F1** or numeric **1** or specify SMS on HMC activate

[illegible]

1 = SMS Menu
8 = Open Firmware Prompt

```
5 = Default Boot List
6 = Stored Boot List
```

Memory

Keyboard

Network

SCSI

• • •

Working with Bootlists in SMS (1 of 2)

System Management Services
Main Menu

3. Select Language
4. Setup Remote IPL
(Initial Program Load)
5. Change SCSI Settings
6. Select Console
7. Select Boot Options

Multiboot

1. Select Install/Boot Device
2. Configure Boot Device Order
3. Multiboot Startup <OFF>

==> 2

Configure Boot Device Order

1. Select 1st Boot Device
2. Select 2nd Boot Device
3. Select 3rd Boot Device
4. Select 4th Boot Device
5. Select 5th Boot Device
6. Display Current Setting
7. Restore Default Setting

Select Device Type

1. Diskette
2. Tape
3. CD/DVD

4. IDE

Working with Bootlists in SMS (2 of 2)

Select Device

Device	Current	Device
--------	---------	--------

Number	Position	Name
--------	----------	------

1.	-	IBM 10/100/1000 Base-TX PCI-X Adapter (loc=U789D.001.DQDWAYT-P1-C5-T1)
----	---	---

2.	-	Select Task
----	---	-------------

3.	1	SAS 73407 MB Harddisk, part=2 (AIX 6.1.0) (loc=U789D.001.DQDWAYT-P3-D1)
----	---	--

4.	None	
----	------	--

==> 2

1. Inform

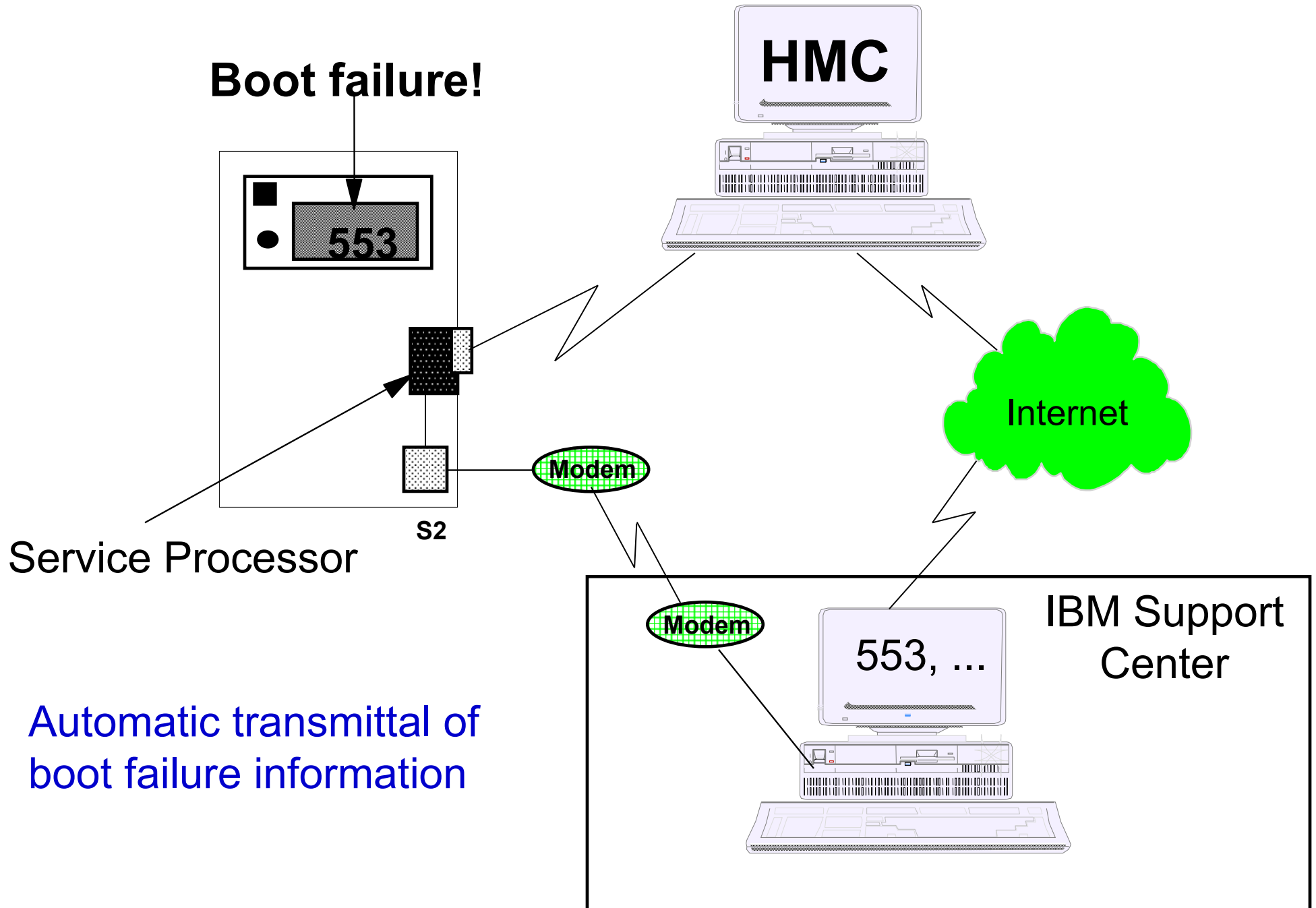
2. Set Bo

Current Boot Sequence

1.	SAS 73407 MB Harddisk, part=2 (AIX 6.1.0) (loc=U789D.001.DQDWAYT-P3-D1)
----	--

2.	None
----	------

Service Processors and Boot Failures



Let's Review

- True or False? You must have AIX loaded on your system to use the System Management Services programs.
 - Your AIX system is currently powered off. AIX is installed on **hdisk1** but the bootlist is set to boot from **hdisk0**. How can you fix the problem and make the machine boot from **hdisk1**?
-
-

3. Your machine is booted and at the # prompt.
- What is the command that will display the bootlist?

b) How could you change the bootlist?

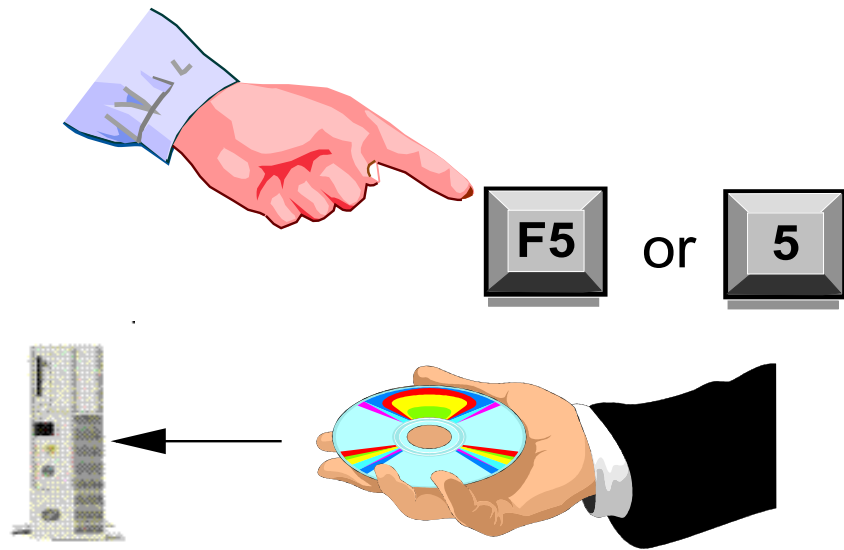
4. What command is used to build a new boot image and write it to the boot logical volume?
-

5. What script controls the boot sequence? _____

Let's Review Solutions

- True or False? You must have AIX loaded on your system to use the System Management Services programs. False. SMS is part of the built-in firmware.
- 2. Your AIX system is currently powered off. AIX is installed on **hdisk1** but the bootlist is set to boot from **hdisk0**. How can you fix the problem and make the machine boot from **hdisk1**? You need to boot the SMS programs. Press **F1** or **1** when the logos appear at boot time and set the new boot list to include **hdisk1**.
- 3. Your machine is booted and at the **#** prompt.
 - What is the command that will display the bootlist? **bootlist -om normal.**
 - How could you change the bootlist? **bootlist -m normal device1 device2**
- What command is used to build a new boot image and write it to the boot logical volume? **bosboot -ad /dev/hdiskx**
- What script controls the boot sequence? **rc.boot**

Accessing a System That Will Not Boot



**Boot the system from
the BOS CD-ROM, tape
or
network device (NIM)**

Select maintenance mode

Maintenance

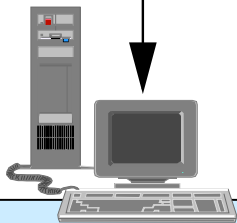
- **Access a Root Volume Group**
- Copy a System Dump to Media
- Access Advanced Maintenance
- **Install from a System Backup**

Perform corrective actions

Recover data

Booting in Maintenance Mode

Define the System Console



Maintenance

Type the number of your choice and press Enter

>>> **1 Access a Root Volume Group**

>>> Choice [1]: 3

2 Copy a System Dump to Removable Media

3 Access Advanced Maintenance Functions

4 Erase Disks

Welcome to Base Operating System
Installation and Maintenance

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

>>> 1 Start Install Now with Default Settings

2 Change/Show Installation Settings and Install

3 Start Maintenance Mode for System Recovery

4 Configure Network Disks (iSCSI)

Working in Maintenance Mode

Access a Root Volume Group

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

1) Volume Group 00c35ba000004c00000001153ce1c4b0 contains these disks:

hdisk1 70006 02-08-00 hdisk0 70006 02-08-00

Choice: 1

Volume Group Information

Volume Group ID 00c35ba000004c00000001153ce1c4b0 includes the following logical volumes:

hd5	hd6	hd8	hd4	hd2	hd9var
hd3	hd1	hd10opt			

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 filesystems

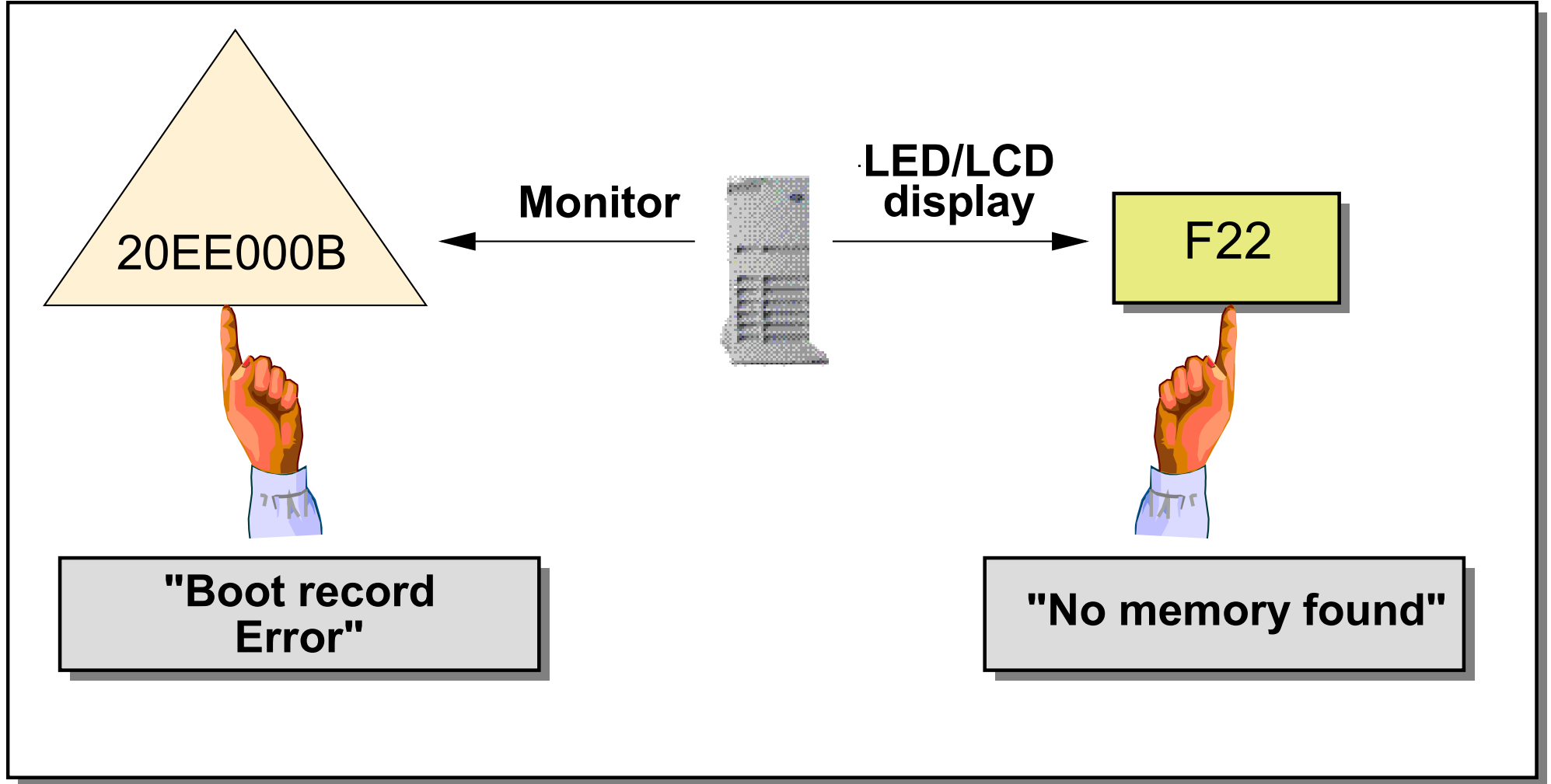
99) Previous Menu

Choice [99]: 1

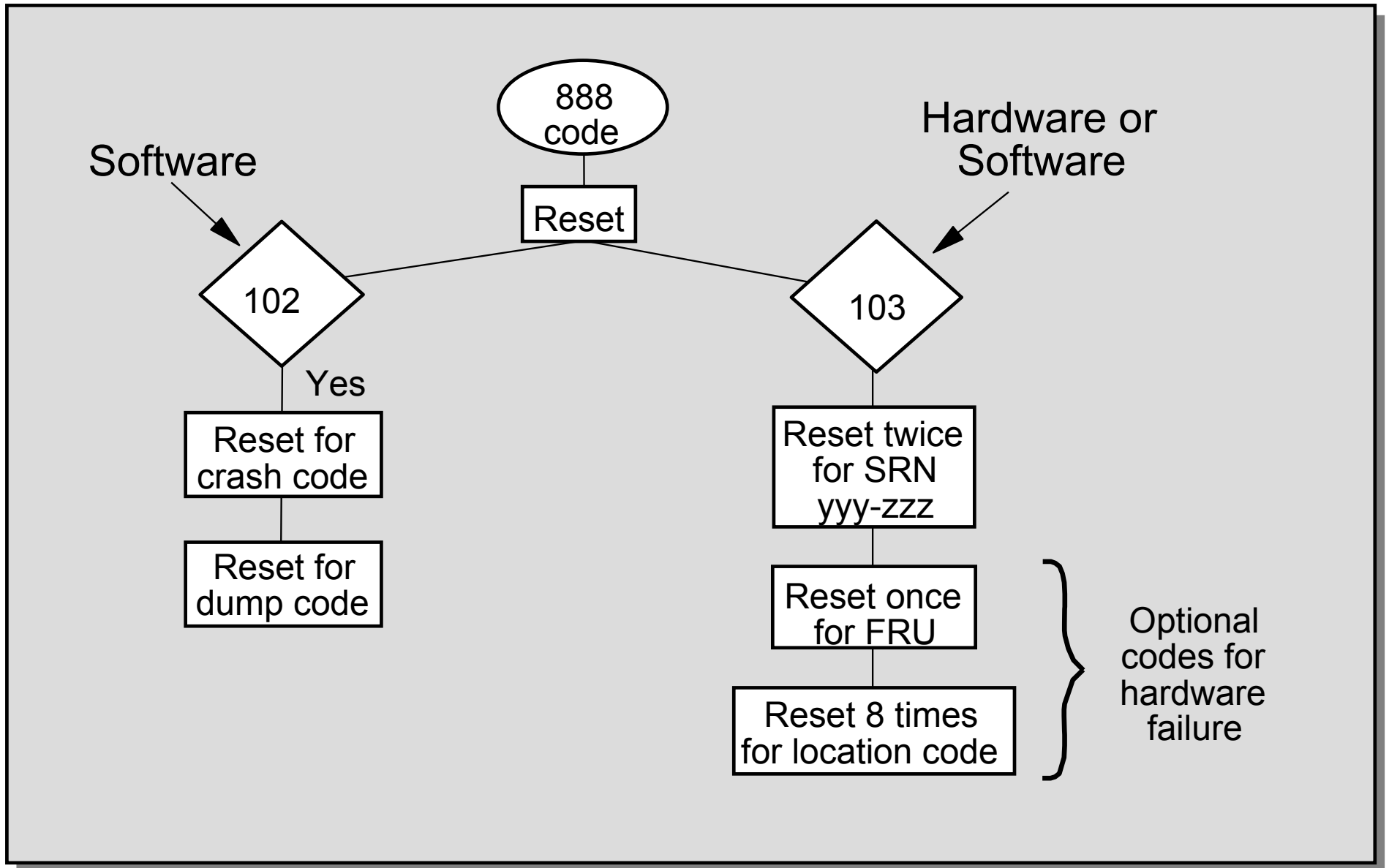
Progress and Reference Codes

- Progress Codes
- System Reference Codes (SRCs)
- Service Request Numbers (SRNs)
- Obtained from:
 - Front panel of system enclosure
 - HMC or IVM (for logically partitioned systems)
 - Operator console message or diagnostics (diag utility)
- Online hardware and AIX documentation available at:
<http://publib.boulder.ibm.com/infocenter/systems>
 - Search for: “**service support troubleshooting**”
 - Customer Service, Support, and Troubleshooting manual
 - Covers procedures and lists of reference codes
 - For AIX progress codes, search for “**AIX Progress Codes**”
 - For AIX message codes, click on **Message Center**
- *RS/6000 Eserver pSeries Diagnostic Information for Multiple Bus Systems (SA38-0509)*

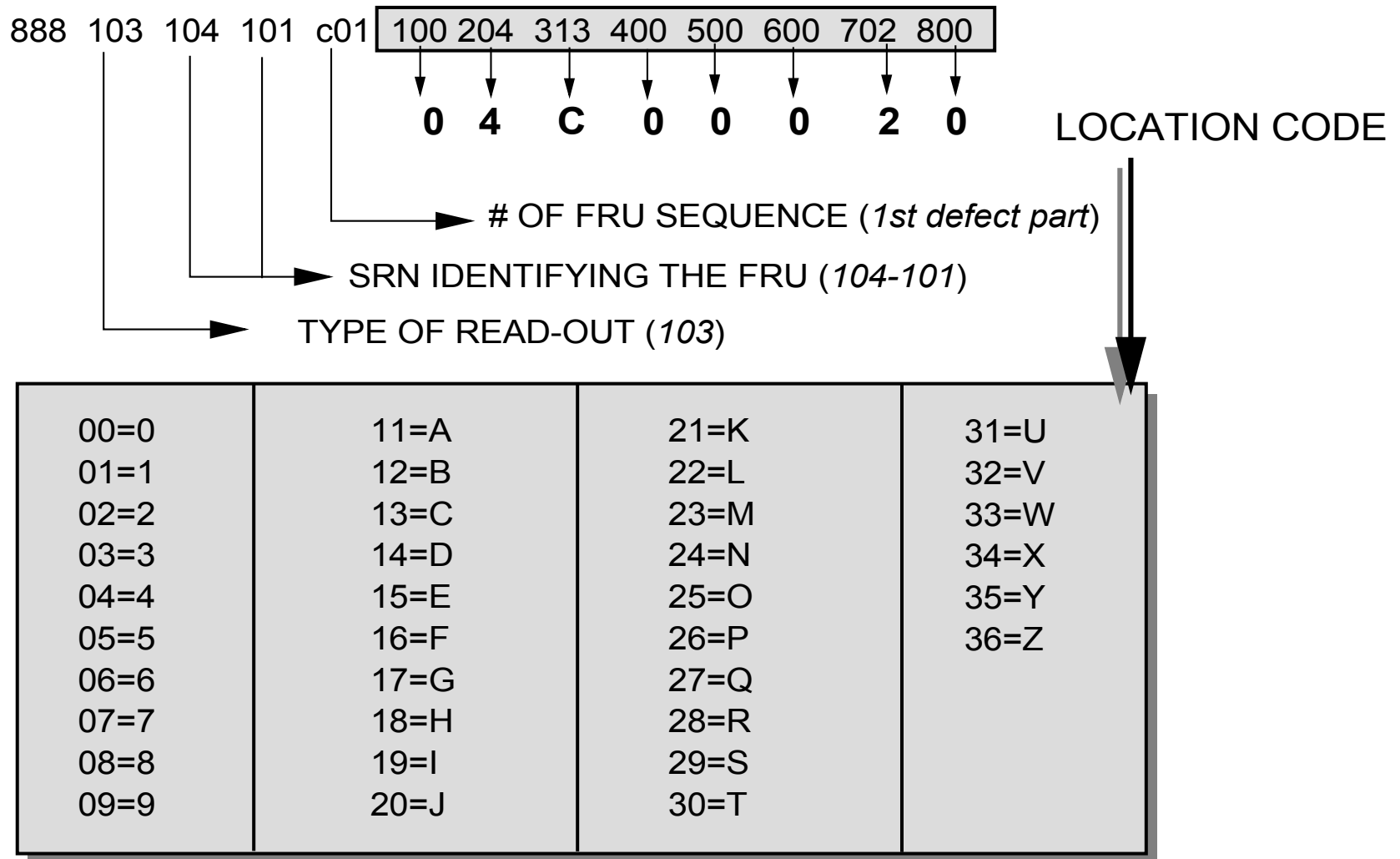
Firmware Checkpoints and Error Codes



LED 888 Code



Understanding the 103 Message



FRU = Field Replaceable Unit

SRN = Service Request Number

Problem Reporting Form (1 of 2)

- Search for “Problem Reporting Form” at information center
- Items to fill in:
 - Your name, Mailing address, Telephone number, Fax number
 - IBM customer number, if available
 - Date and time that the problem occurred
 - Description of the problem
 - Machine type, Model, Serial number
 - Logical partition state, Logical partition ID
 - Logical partition operating system, version, and release
 - IPL type, IPL mode
 - Message ID, Message text
 - From/send program, Instruction number
 - To/receive program, Instruction number
 - Service request number (SRN) SRN:
 - In what mode were AIX hardware diagnostics run?
Online? Stand-alone? Service mode? Concurrent mode?
 - Go to the HMC or control panel and indicate whether the following lights are on: Power On. System Attention

(continued on next page)

Problem Reporting Form (2 of 2)

- Using the HMC (reference code history) or control panel (using increment button), find and record the values for functions 11 through 19.

(See *Collecting reference codes and system information* for step-by-step instructions on finding reference codes.)

- Use the grid to record the characters shown on the HMC.

11 _

12 _

...

19 _

20 (if you use the control panel – use increment button) _ _ _ _ _ _

20 (if you use the HMC) Machine type: Model: Processor feature code: IPL
type:

Note: For item 20:

if HMCv7: Use Serviceability ... Control Panel Functions

if pre HMCv7: Use Service Focal Point ... Service Utilities... Operator Panel
Service Functions

Firmware Fixes

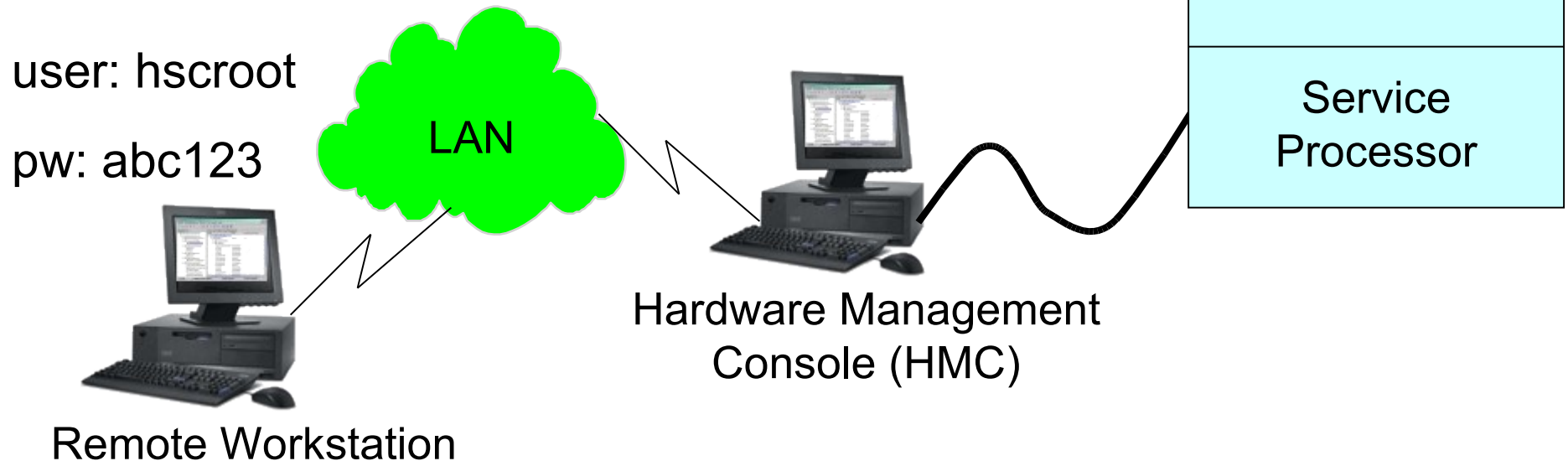
- The following types of firmware (Licensed Internal Code) fixes are available:
 - Server firmware
 - Power subsystem firmware
 - I/O adapter and device firmware
- Types of firmware maintenance:
 - Disruptive (always for upgrades to new version/release)
 - Concurrent (only if using HMC interface for service pack)
- Firmware maintenance can be done:
 - Using the HMC
 - Through the operating system (service partition)
- Systems with an HMC should normally use the HMC
- Firmware maintenance through the operating system is always disruptive

Getting Firmware Updates from the Internet

- Get firmware updates from IBM at:
<http://techsupport.services.ibm.com/server/mdownload>
- Update firmware through:
 - Hardware Management Console
- For more information, go to the online *Performing Licensed Internal Code Maintenance* course:
 - *<http://www-1.ibm.com/servers/resourcelink>*
 - Select **Education**
 - Select **eServer i5 and eServer p5**
or **System p POWER6 hardware**
 - Select **Performing Licensed Internal Code Maintenance**

HMC Remote Access

- HMCv6 – Use WebSM client
- HMCv7 – Use Web Browser with SSL



HMCv6: Server Management

Web-based System Manager - /home/hscroot/WebSM.pref: /Management Environment/el9-91-70.er

Console Server Management Selected View Window Help

Navigation Area

- Management Environment
 - el9-91-70.ent.beaverton.ibm
 - Server and Partition
 - Server Management
 - Information Center and S
 - Licensed Internal Code I
 - HMC Management
 - Service Applications
 - 9.47.91.70

Server and Partition: Server Management

Name	State	Operator Panel Value
[-] [Warning] Server-9111-520-SN10F19...	Operating	
[-] [Warning] Partitions		
[+] [Warning] el9-91-73	Running	
[+] [Warning] LPAR2_el9-91-68	Not Activated	00000000
[+] [Warning] WaynesWorld	Open Firmware	AA00E1A9
[-] [Warning] System Profiles		
[-] [Warning] Server-9111-520-SN10F19...	Operating	
[-] [Warning] Partitions		
[+] [Warning] el9-91-68	Running	
[+] [Warning] el9-91-71	Not Activated	00000000
[+] [Warning] VIOserver1	Running	
[+] [Warning] vlpar1	Not Activated	00000000
[-] [Warning] System Profiles		

HMCv6: Activate a Partition

- Partition must be in the *Not Activated* state
- Select the partition profile name and right-click Activate

Server and Partition: Server Management

Name	State	Operator Panel Value
Server-9111-520-SN10F19... Operating	Operating	
+ Partitions		
System Profiles		
Server-9111-520-SN10F19... Operating	Operating	
- Partitions		
+ el9-91-68	Running	
- el9-91-71	Not Activated	
def		
sms boot		
with dvdram drive		
+ VIOserver1	Running	
+ vlpar1	Not Activated	00000000
System Profiles		

Properties

Define Delete Delete

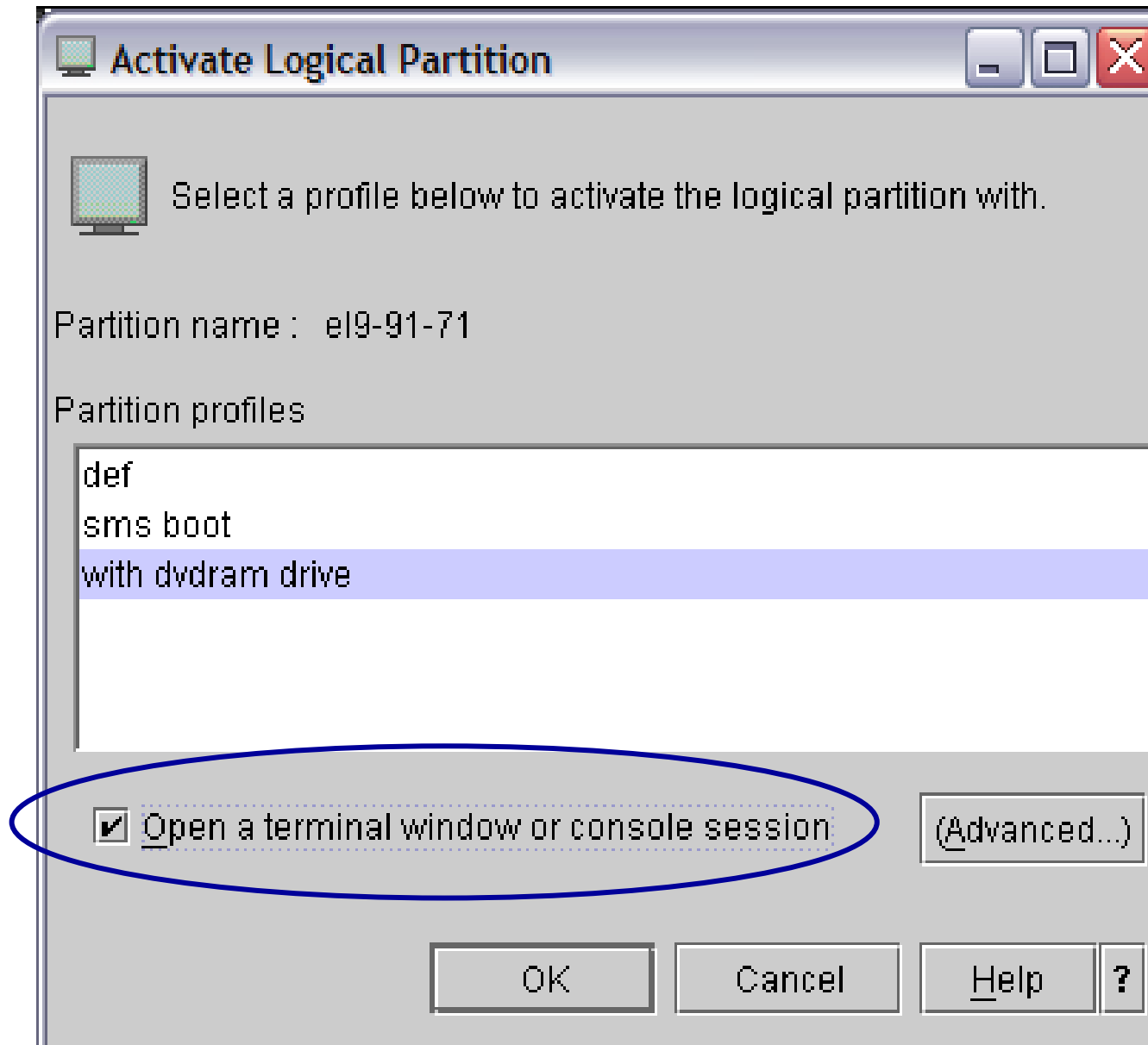
Copy Ctrl-C

Activate

Add Managed System(s)

HMCv6: Activating Partition with Console

- Select the profile and check the terminal window check box



HMCv7: Server Management

The screenshot shows the Hardware Management Console (HMC) v7 interface running in a Microsoft Internet Explorer browser window. The address bar displays the URL: `https://10.31.198.151 - rt1s3hmc: Hardware Management Console Workplace (V7R310.0) - Microsoft Internet E...`. The browser window title is "Hardware Management Console".

The interface features a navigation pane on the left with the following items:

- Welcome
- Systems Management
 - Servers
 - rt1s3fsp** (highlighted with a red circle)
 - Custom Groups
- System Plans
- HMC Management
- Service Management
- Updates

The main content area displays a "Welcome (HMC Version)" message and a list of management tasks:

- Systems Management**: Manage servers, logical partitions, managed systems, and frames; set up, configure, view current status, troubleshoot, and apply solutions.
- System Plans**: Import, deploy, and manage system plans on the HMC.
- HMC Management**: Perform management tasks to set up, configure, and customize operations associated with this HMC.
- Service Management**: Perform service tasks to create, customize and manage services associated with this HMC.
- Updates**: Perform and manage updates on your system.
- Status Bar**: View details of status and messages.
- Additional Resources**
 - Guided Setup Wizard**: Provides a step-by-step process to configure your HMC.

At the bottom of the navigation pane, there is a "Status: Open Serviceable Events" section with four icons: a document, a crossed-out circle, a warning triangle, and a wrench.

The status bar at the bottom of the browser window shows the message: "Applet com.ibm.hwmca.fw.servlet.taskcontroller.applet.TaskControllerApplet started".

HMCv7: Activate Partition Operation

https://10.31.198.151 - rt1s3hmc: Hardware Management Console Workplace (V7R310.0) - Microsoft Internet Ex...

Hardware Management Console

hscroot | Help | Logoff

Welcome

Systems Management

- Servers
 - rt1s3fsp
- Custom Groups

System Plans

HMC Management

Service Management

Updates

Contents of: rt1s3fsp

Sel...	Name	Status	Proces... Units	Mem... (GB)	Act... Pro...	Environm...	Refere... Code
<input type="checkbox"/>	atlnim02			2	2	Default	AIX or Linux
<input type="checkbox"/>	rt1s3vio				1	default	Virtual I/O Se...
<input type="checkbox"/>	Teds_pla				.75	default	AIX or Linux
<input checked="" type="checkbox"/>	vlpar2				1	default	AIX or Linux 00000000

Tasks: vlpar2 [Expand All | Collapse All]

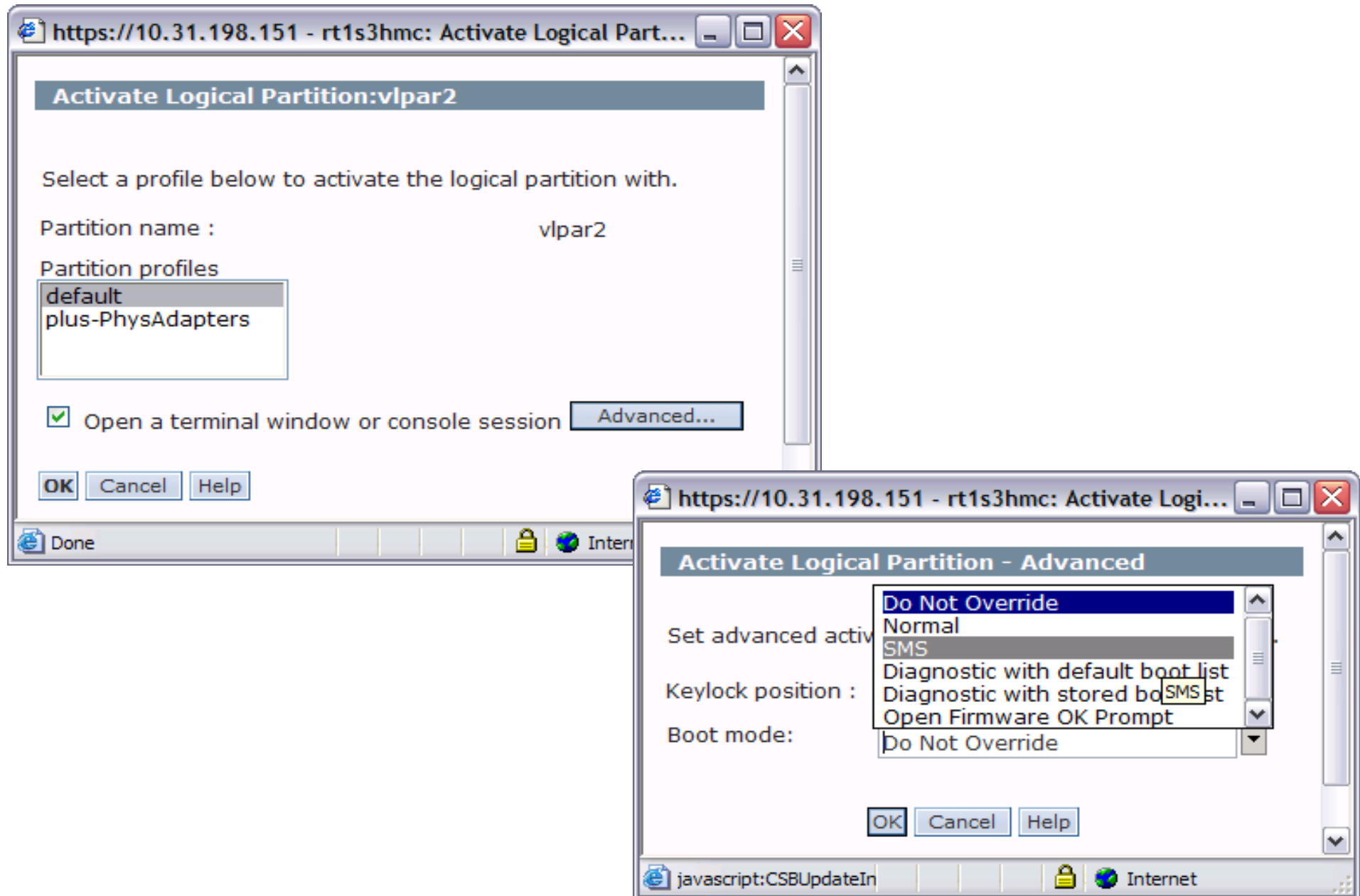
- Properties
- Change Default Profile
- Operations
- Configuration
- Hardware Information
- Console Window
- Serviceability

Status: Open Serviceable Ev

Applet com.ibm.hwmca.fw.servlet.taskcontroller.applet.TaskControllerApplet started

Internet

HMCv7: Activate Partition Options



Checkpoint

- True or False? During the AIX boot process, the AIX kernel is loaded from the **root** file system.
- True or False? A service processor allows actions to occur even when the regular processors are down.

5. How do you boot an AIX machine in maintenance mode?

6. Your machine keeps rebooting and repeating the POST. What can be the reason for this?

Checkpoint Solutions

- True or False? During the AIX boot process, the AIX kernel is loaded from the **root** file system.

False. The AIX kernel is loaded from **hd5**.

- True or False? A service processor allows actions to occur even when the regular processors are down.

- How do you boot an AIX machine in maintenance mode?

You need to boot from an AIX CD, **mksysb**, or NIM server.

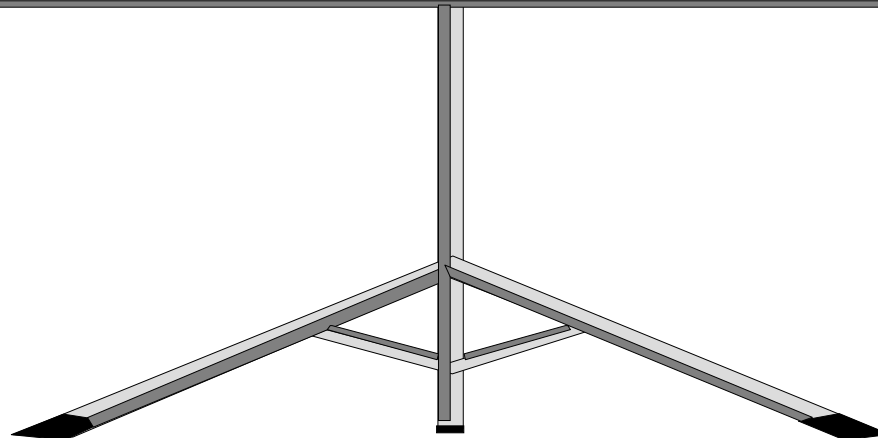
6. Your machine keeps rebooting and repeating the POST. What can be the reason for this?

Invalid boot list, corrupted boot logical volume, or hardware failures of boot device.

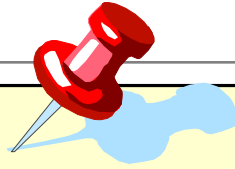
Exercise 3: System Initialization Part I



- Work with bootlists and identify information on your system
- Identify LVM information from your system
- Repair a corrupted boot logical volume



Unit Summary



- During the boot process, the kernel from the boot image is loaded into memory.
- Boot devices and sequences can be updated using the **bootlist** command, the **diag** command, and SMS.
- The boot logical volume contains an AIX kernel, an ODM, and a RAM file system (that contains the boot script **rc.boot** that controls the AIX boot process).
- The boot logical volume can be re-created using the **bosboot** command.
- LED codes produced during the boot process can be used to diagnose boot problems.