How to use Oracle Solaris for Linux users

October, 2014 (Revision 1.0)

Fujitsu Limited

Introduction

FUJITSU

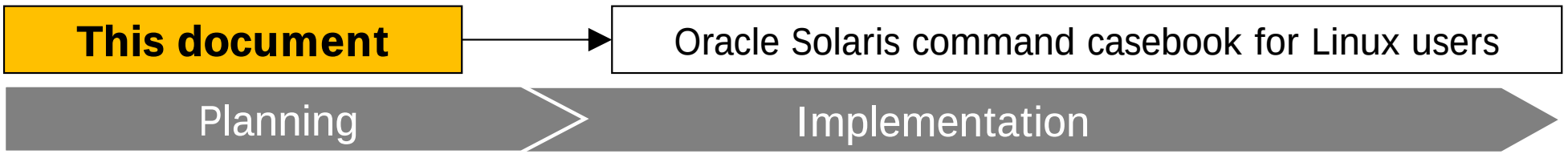
Overview

- This document is explained about the operation and the management of Oracle Solaris for Linux users.

Notes

- Oracle Solaris is sometimes referred to as 'Solaris'.
- Oracle VM Server for SPARC is sometimes referred to as ‘Oracle VM’ or 'OVM'.
- The commands explained in this document are based on the following system environments:
  - Linux : Red Hat Enterprise Linux 6.5
  - Solaris : Oracle Solaris 11.1, SRU14031 (11.1.17.5.0), ESF5.1
- Slide that has the Solaris mark explains the Solaris functions: Solaris

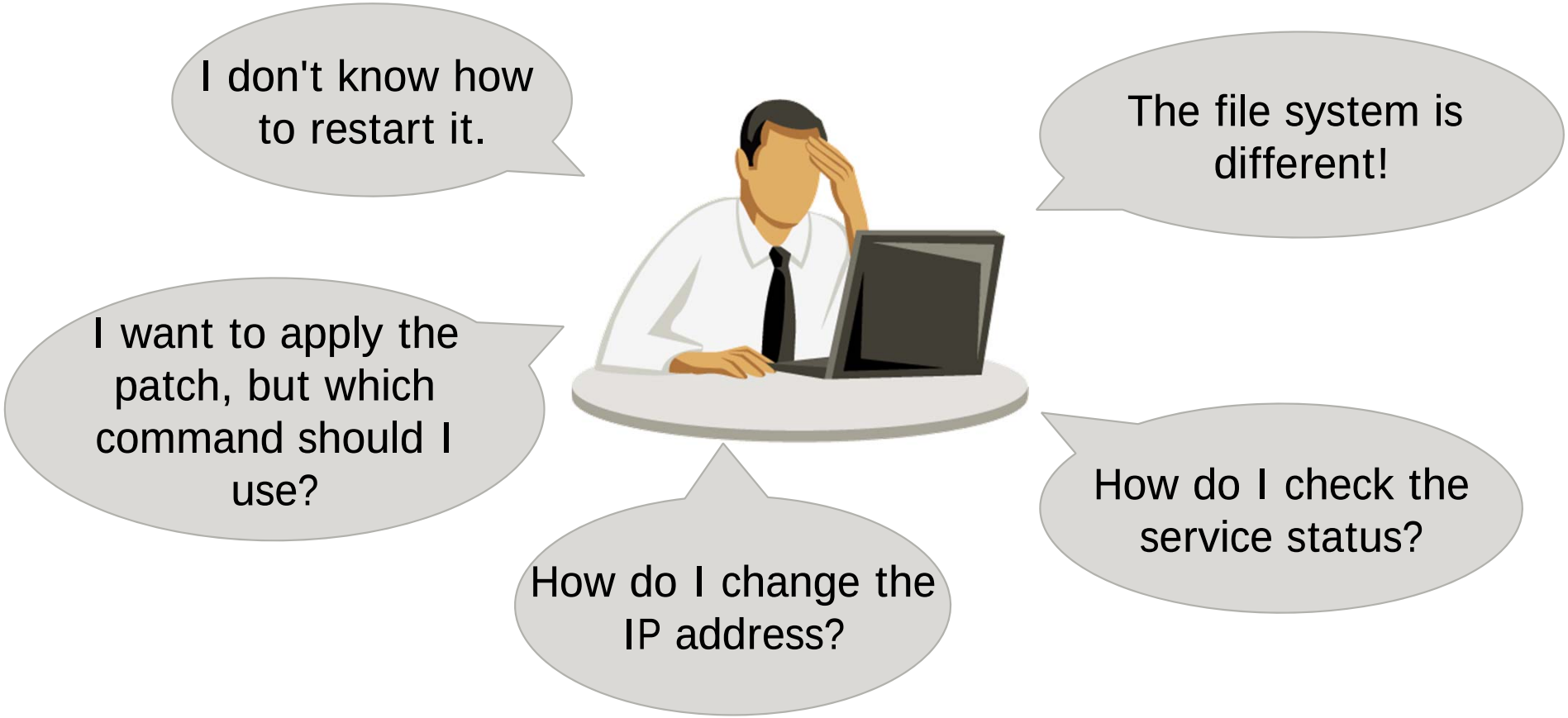
Position



When Linux Administrators use Solaris

FUJITSU

- Linux and Solaris have similar command lines, but ...



This document is for Linux users who need help to operate Solaris

Contents

FUJITSU

1. Starting up and Shutting down the OS Environment

From Switching on the Server to Booting the OS

Fujitsu M10 servers are operated using XSCF

XSCF (eXtended System Control Facility):

- PRIMERGY's iRMC (Remote Management Controller).
- XSCF runs on a dedicated processor that is independent of the main unit. It has a notification mechanism and monitors the status of the hardware and OS.
- It can be connected remotely via (XSCF-LAN) and the physical partition power can be switched on or off.

Booting the OS from the network

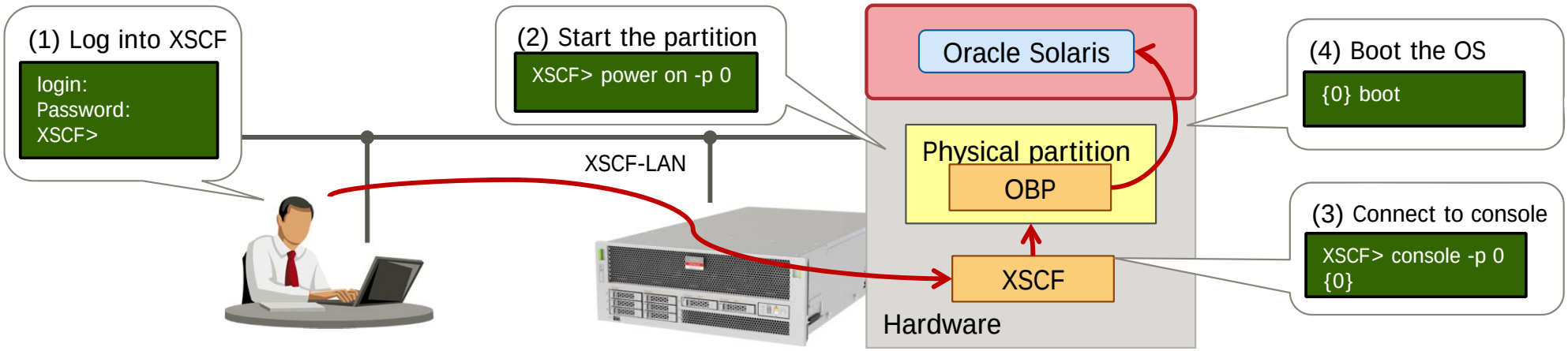
(1) Using the terminal software, log into XSCF.

(2) Use XSCF commands to start the physical partition.

(3) Using XSCF commands, log into the console.

(4) Use OBP commands to boot the Solaris OS. (*)

* :If the OBP parameter (auto-boot?) is false then proceed.
If the parameter is true, then the OS will boot automatically after the power goes on.



Run Level of Linux and Solaris

FUJITSU

Run level comparison

- Just like Linux, Solaris has run levels from 0 to 6. However, there are slight differences in their meaning.

Run Level	Red Hat Enterprise Linux	Oracle Solaris	Remarks
0	Power off	OS off (*1)	* 1: OBP is on
s (S)	-	Single user	
1	Single user	System Admin	
2	Unused	Multiple users (no NFS)	
3	Multiple users	Multiple users (*2)	*2: Solaris default
4	Unused	Multiple users (*3)	*3: Usable when necessary
5	X Window (*4)	Power off	* 4: Linux Default
6	Restart OS	Restart OS	

- Run levels that are important to remember are: 0 (OS off), s (Single User), 3 (Multiple users), 5 (Power Off), 6 (Restart OS).
- For more information about the changes to the service boot based on the run level, please see: Section 5. Service Administration.

Booting the OS

FUJITSU

Linux and Solaris OS booting

Linux

- Switch on the hardware and select the boot kernel from the GRUB environment.
- Choose boot in single user mode by modifying the GRUB options.

Solaris

- Switch the hardware power on, boot via the OBP (Open Boot PROM).
- The OBP is a similar environment to the PC server BIOS or Linux GRUB.
- Use the exclusive command displayed as ok (referred to as the ok prompt).

Example

✓ Solaris OS boot

```
{0} ok boot
```

- The OBP environment allows you to choose the boot disk and boot options (single user mode, etc.). In addition, you can check all of the connected devices and the settings of the OBP parameters.

Booting the Desktop GUI

Booting the Solaris desktop GUI

Example

1. Solaris-desktop package installation.

```
# pkg install solaris-desktop
```

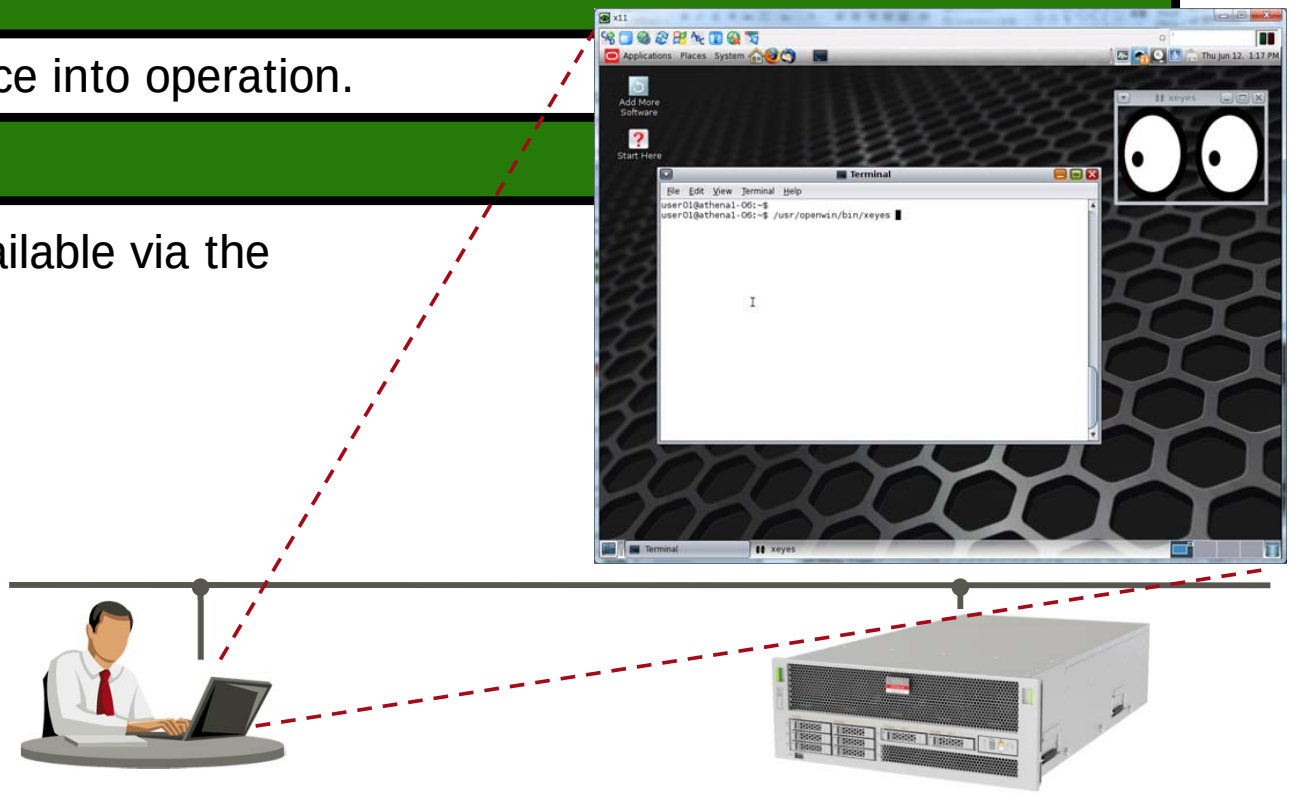
2. Edit the /etc/gdm/custom.conf file.
3. Restart the gdm service.

```
# svcadm restart gdm
```

4. Put the xvnc inetd service into operation.

```
# inetadm -e xvnc-inetd
```

5. Make the VNC client available via the PC and log in.



Shutting down the OS

FUJITSU

Shutting down Linux and Solaris

Both Linux and Solaris can be shutdown using a command.

- In options you can choose the shutdown or restart times.
- Solaris and Linux options are a little different, so be careful.

Example

✓ Terminating Solaris OS

```
# shutdown -y -g0 -i0
```

✓ Terminating Solaris OS (including hardware power off)

```
# shutdown -y -g0 -i5
```

✓ Restarting Solaris OS

```
# shutdown -y -g0 -i6
```

- Whereas the Linux OS shutdown command is specified using options, such as -r (Restart) or -h (Shutdown), the Solaris OS shutdown command uses –i qualified with a run level.

Linux and Solaris Command Comparison (1)

FUJITSU

Essential OS boot/shutdown commands

Operation	Red Hat Enterprise Linux	Oracle Solaris
Boot OS	Boot via GRUB menu	Boot via OBP (Open Boot PROM) command {0} ok boot
Boot in single user mode	Specify run level via GRUB command kernel /vmlinuz-... root=... 1	From the OBP (Open Boot PROM), boot in single user mode {0} ok boot –s
OS shutdown	Use shutdown command and –h to specify termination options # shutdown -h now	Use shutdown command and–i5 to specify termination options # shutdown -y -g0 -i5
OS restart	Use shutdown command and –r to specify restart options # shutdown -r now	Use shutdown command and –i6 to specify restart options # shutdown -y -g0 -i6
Other Examples	-Terminate at 10:00 # shutdown -h 10:00 -Terminate in 5 minutes # shutdown -h +5	-Boot via the network {0} ok boot net:dhcp -Restart in 30 seconds # shutdown -y -g30 -i6

For more details please see: Oracle Solaris command casebook for Linux users.

Reference: Solaris System Locale

- Solaris standard locale (character encoding) UTF-8
  - The system locale can be set via the following services property:

    svc:/system/environment:init
  - System locale modification

Locale (character encoding)	Settings
English	C
Japanese (EUC)	ja_JP.eucJP ,ja
Japanese (Shit-JIS)	ja_JP.PCK
Japanese (UTF-8)	ja_JP.UTF-8

Example

1. system/locale/extra package installation.
   * Only when using anything other than the standard locale.

```
# pkg install system/locale/extra
```

2. svccfg command modifies the locale (set it to LANG=C).

```
# svccfg -s system/environment:init setprop environment/LANG = astring: C
```

3. Refresh the service properties.

```
# svcadm refresh system/environment:init
```

4. Check the settings.

```
# svcprop system/environment:init | grep environment/LANG
environment/LANG astring C
```

- Locale settings can be confirmed using the locale –a command.

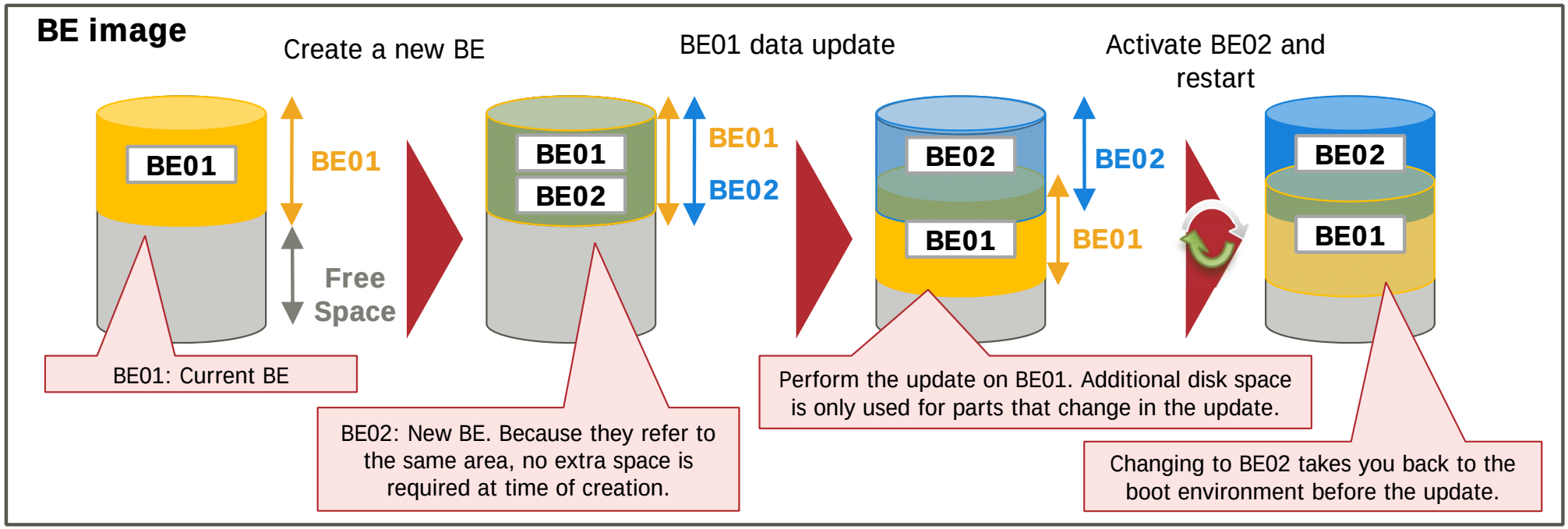
Reference: Boot Environment (BE)

Solaris FUJITSU

Boot administration

Boot Environment (BE) allows you to create/delete/multiply BEs.

- You can create a new BE using 'snapshots' acquired through the current BE.
- Select the BE and restart the OS and you will be able to change to a new BE.
- The use of snapshots means only a small amount of disk space is required.
- Linux allows you to use GRUB to select booting of the pre-update kernel. In Solaris, this can be achieved using the BE functions.



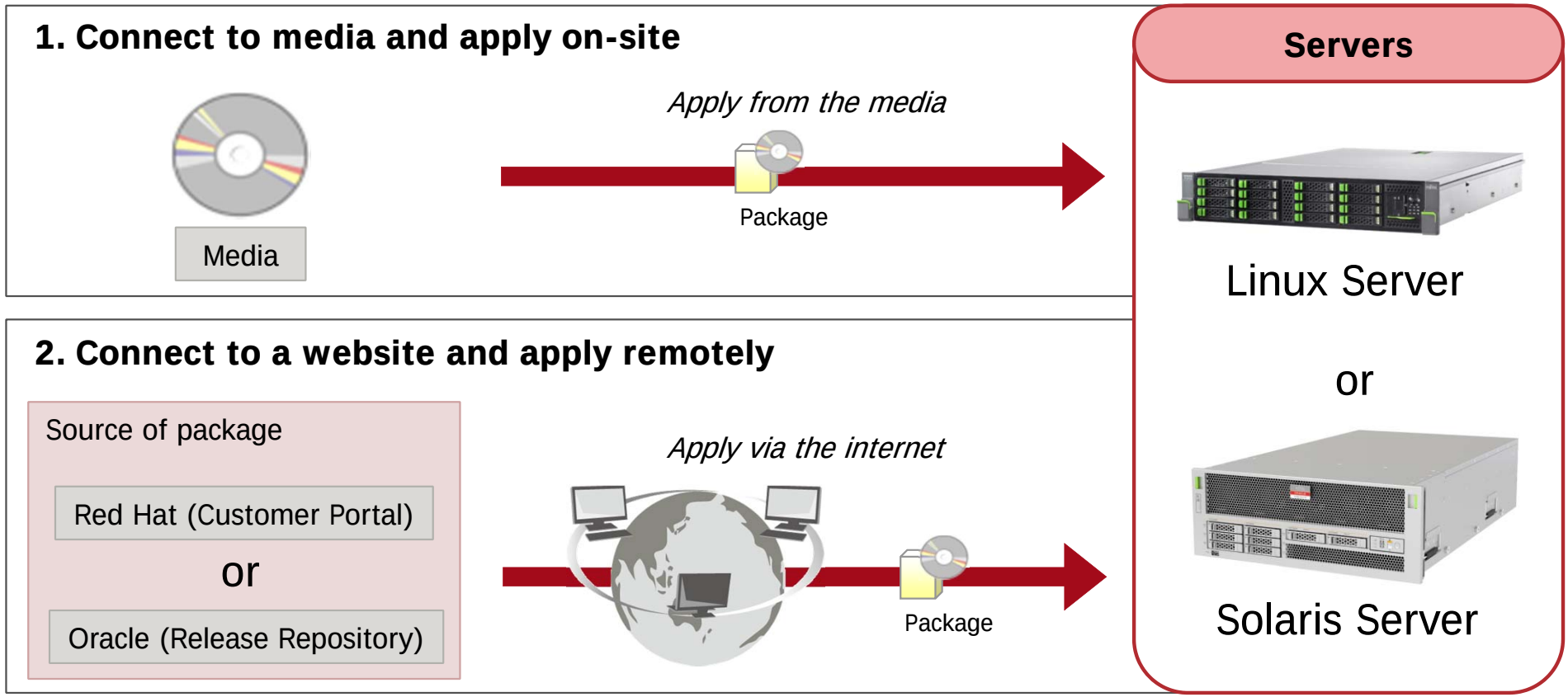
FUJITSU

2. Package Administration

Package Application Method

FUJITSU

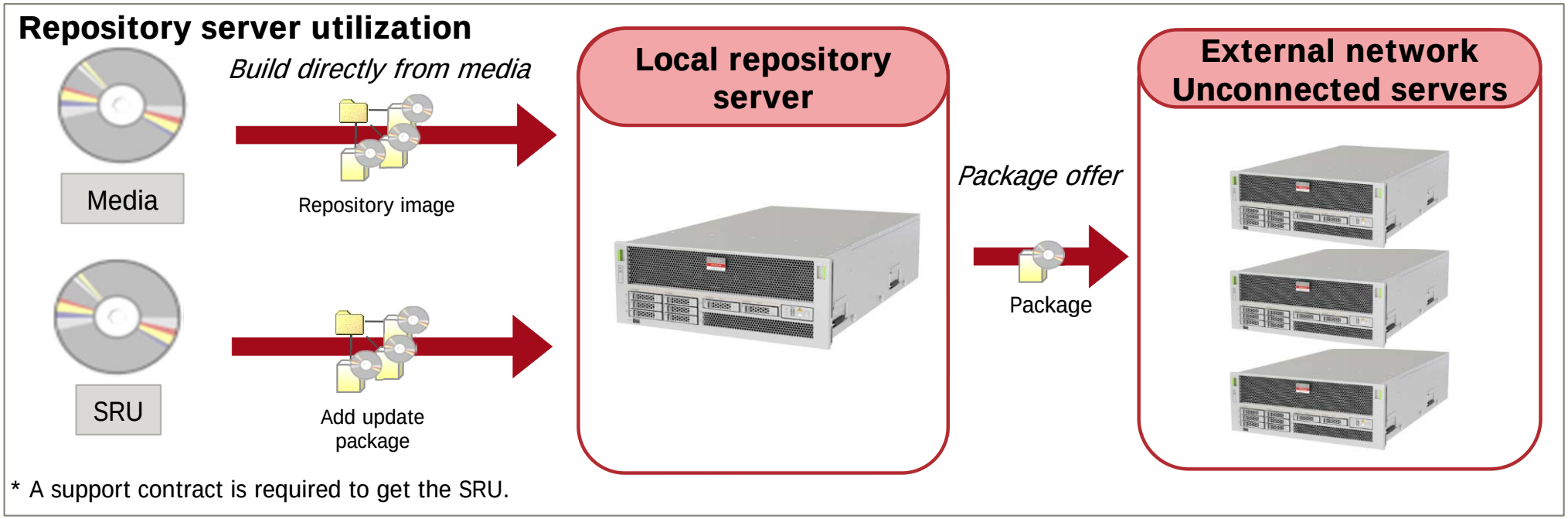
- Linux and Solaris package application method
  - The package application methods are essentially the same, but with two approaches.
    - Connect the server to media resource and apply on-site.
    - Connect to a specified website on the internet and apply remotely.



Solaris Package Application

- Local package designated server (local repository server)
  - When using local repository server
    - Used for servers that cannot be connected to an external network (release repository).
    - It is not necessary to use media on each server, as centralized management of the package is enabled.
    - Apply the SRU (support repository update) to the local repository server and update the specified package.

* Release repository**:** a package to update is provided for every release of Oracle Solaris.



Linux and Solaris Command Comparison (2)

FUJITSU

- Essential package administration commands

Operation	Red Hat Enterprise Linux	Oracle Solaris
Update confirmation	yum check-update	pkg update -nv
Package update	yum update <package name>	pkg update <package name>
All package updates	yum update	pkg update
Install	yum install <package name>	pkg install <package name>
Search	yum search <search item>	pkg search <search item>
Installed items list	yum list all	pkg list
Package info display	yum info <package name>	pkg info <package name>

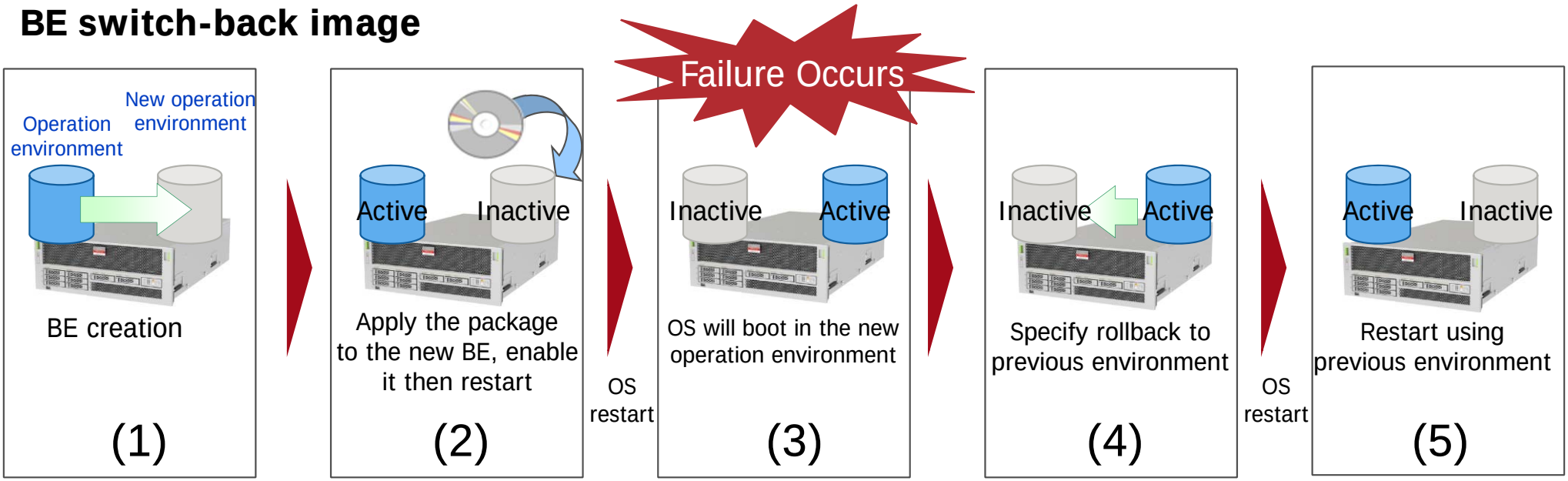
For more details please see: Oracle Solaris command casebook for Linux users.

Reference: Restore Previous Environment 1/2

Restoring using Boot Environment (BE)

- You can restore to a previous application environment via Solaris BE.
- If the OS cannot be restarted after applying a package, select the BE from prior to the package being applied on the OBP and restart.

BE switch-back image



- The BE is not a system backup. System back ups are still needed to deal with disk or other failures.

Reference: Restore Previous Environment 2/2

Using BE for OS restoration

Example (When you specify a BE in your OS)

1. Confirm the BE name from the list.

```
# beadm list
BE        Active Mountpoint Space  Policy Created
--        ------ ---------- ------ ------- -------
solaris-1     -   -     9.67M  static 2012-11-06 15:08
solaris-2     NR  /     3.82G  static 2012-11-06 15:30
```

Active Status
N: Current BE
R: Next BE

2. Enable the previous environment and restart the OS.

```
# beadm activate solaris-1
# shutdown -y -g0 -i6
```

Example (When you specify a BE on your OBP)

1. Specify the BE to be booted by its number in the list (boot –L run)

```
{0} ok boot -L
Boot device: /virtual-devices@100/channel-devices@200/disk@1 File and args: -L
1 solaris-1
2 solaris-2
Select environment to boot: [ 1 - 2 ]:1
```

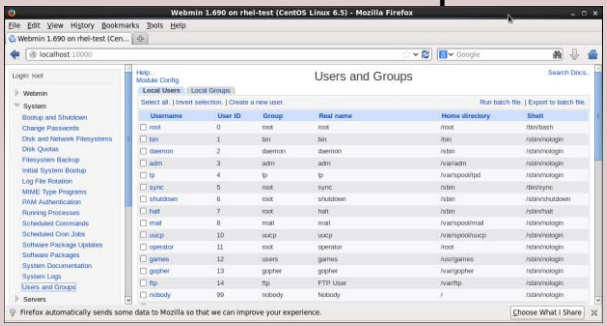
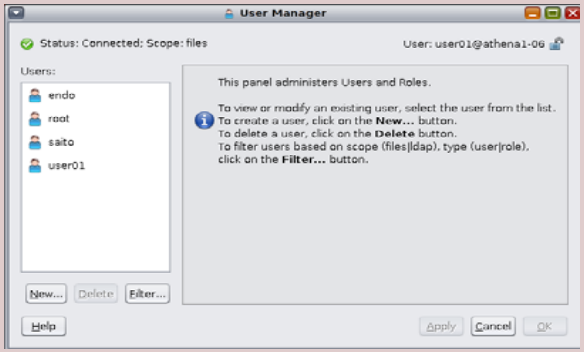
2. Run the restart command given below.

```
{0} ok boot -Z rpool/ROOT/solaris-1
```

FUJITSU

3. User Administration

User Administration Outline

	Red Hat Enterprise Linux	Oracle Solaris
Operations	Administration by CLI is standard * GUI admin is also possible 	Administration by CLI is standard * GUI admin is also possible 
Root User/Role	• User • All users can become root users	• Role (can make into user) • Specifically designated users only can take on the role of a root user.
Group	• By default, users belong to the same group as their name.	• In addition to the group, the user belongs to a project and this is used as a unit of resource control for IPC parameters and so on.

- User administration commands (useradd, usermod, userdel, etc.) are the same as in Linux, but care is required as the Solaris meanings and options may be different.

User Verification During Login

- File for local verification
  - Account information is stored at /etc/passwd.
  - Password information is stored at /etc/shadow.
    - Encryption method:Hash (Solaris:SHA-256, Linux:SHA-512)
- Login parameters
  - Login parameter settings are stored at /etc/default/login.

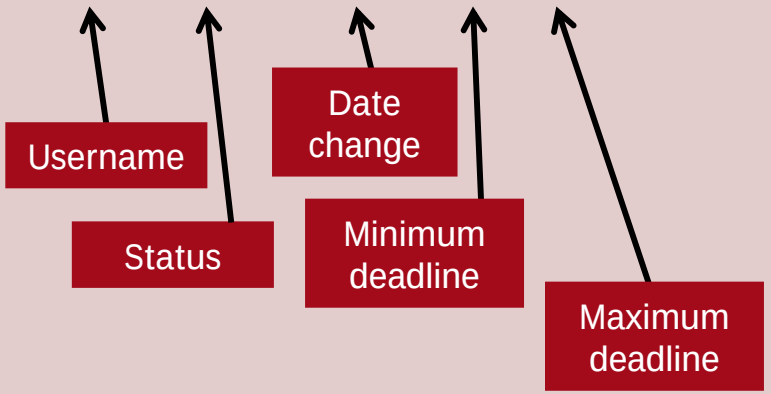
Variable	Explanation
CONSOLE	Once set, only a super user can login through this device
PATH	The initial shell PATH variable
SUPATH	The initial shell PATH variable for super user
TIMEOUT	Amount of time in seconds until the current session times out
SLEEPTIME	Amount of time in seconds until the login failure message is displayed on screen
RETRIES	Number of times you can attempt login

- There is no need to edit the files (/etc/passwd or /etc/shadow) every time an account or password is changed. Instead, this is done through the (usermod, passwd) commands.
- The encryption method (Hash) is a default setting, but can be changed.

User Password Expiry

FUJITSU

- User password expiry settings
  - Linux uses the command 'chage' to set password expiry, whereas Solaris uses the command passwd.

Operation	Red Hat Enterprise Linux	Oracle Solaris
Maximum deadline	# chage -M 90 <username>	# passwd -x 90 <username>
Minimum deadline	# chage -m 30 <username>	# passwd -n 30 <username>
Display password expiry information	# chage –l <username> Last password change : May 17, 2014 Password expires : never Password inactive : never Account expires : never Minimum number of days between password change : 30 Maximum number of days between password change : 90 Number of days of warning before password expires : 7	# passwd -s <username> admin PS 05/27/14 30 90 

- User password expiration settings in Linux are also available in Solaris. However, the commands and options are different.

Linux and Solaris Command Comparison (3)

FUJITSU

Essential User Administration Commands

Operation	Red Hat Enterprise Linux	Oracle Solaris
Add	useradd <username>	useradd <username>
Update	usermod -u <new UID> <username>	usermod -u <new UID> <username>
Delete	userdel <username>	userdel <username>
Display password expiration	chage -l <username>	passwd -s <username>
Set password expiration	chage -m 60 <username>	passwd -x 60 <username>
Change account information (full name etc)	chfn	passwd -g

For more details please see: Oracle Solaris command casebook for Linux users.

- Basic user administration commands such as add/update/delete are available in Solaris too but other similar commands might not be.

Reference: Default Shell at Login

FUJITSU

Changing the login default shell

The default shell in both Linux and Solaris is 'bash'.

Linux uses the chsh command

Example

1. Changing the default shell of a User (user01)

```
# chsh user01
user01 change shell
new shell [/bin/bash]: /bin/sh
shell has been changed.
```

Solaris uses the passwd command

Example

1. Changing the default shell of a User (user01)

```
# passwd -e user01
Old shell: /usr/bin/bash
New shell: /bin/sh
passwd: password information changed for user01
```

Reference: Solaris Projects

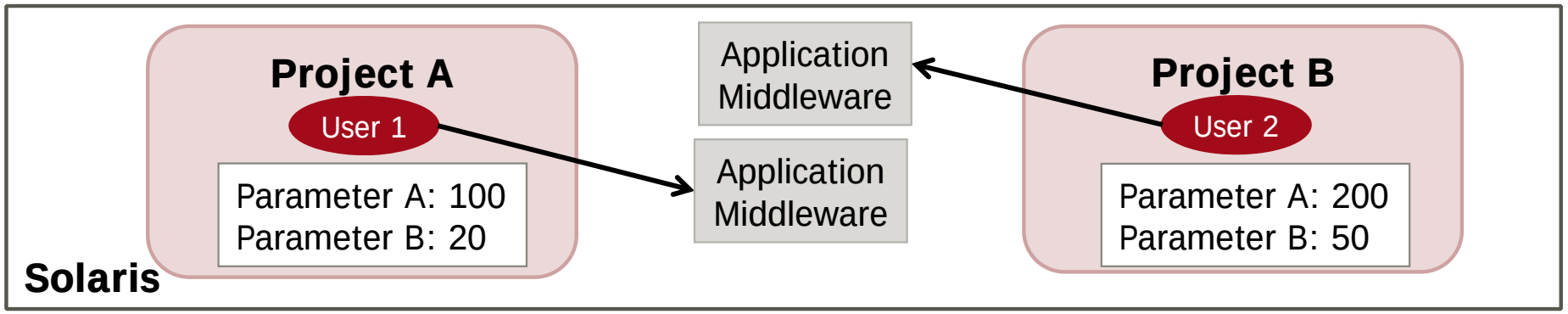
Project resource control

Project contents

- Solaris is based on the concept of controlling resource by project.
- Each user belongs to a project. When a user runs an application or process, resource control is performed based on the project to which they belong.

Resource control units

- Because settings are specified by project, resource control can be managed independently for each user of an application or middleware.



- Resources include: CPU run time for processes, core file sizes, maximum heap size and IPC parameters. Project parameter settings can be changed while the OS is running.

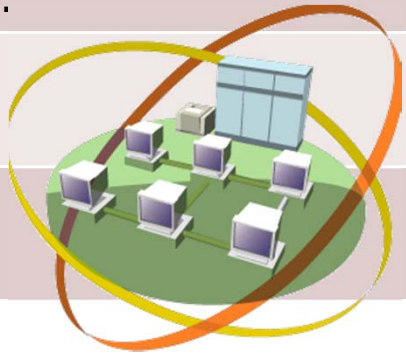
FUJITSU

4. Network Administration

Network Administration Outline

FUJITSU

	Red Hat Enterprise Linux	Oracle Solaris
Set IP address	• Edit the settings file, restart the network service.	• Set via ipadm command • File is automatically updated after setting.
Network interface name	• ethXX • e.g.: eth0, eth1	• Logical device name that was created based on the physical device name (netXX) • e.g.: net0, net1
Datalink layer admin	• ethtool command	• dladm command • It is possible to create a virtual NIC at the datalink layer via the network virtualization function.
IP layer admin	• ifconfig command	• ipadm command
Redundancy function	• Bonding	• IPMP



- The Solaris network management system and command mechanisms have changed significantly since Solaris 11. Network redundancy configuration via standard OS functions and network virtualization is now possible.

Network Administration Commands

FUJITSU

Solaris dladm and ipadm commands

dladm

- Datalink layer administration command.
- Create virtual interfaces and set redundancy in networks.

ipadm

- IP layer administration command.
- IP addresses are administrated, set and deleted as address objects in the form of an 'interface name/character string'.

Linux ifconfig command comparison

1. Interface creation and IP address setting

Linux	Solaris
# ifconfig <interface> <addr> netmask <netmask>	# ipadm create-ip <interface> # ipadm create-addr -T static -a local=<addr>/<prefixlen> <interface>/<string>

2. IP address information confirmation

Linux	Solaris
# ifconfig	# ipadm show-addr

- Linux: After setup using ifconfig, a definition file must be created to continue using the interface.
- Solaris: The file is automatically updated by the ipadm command.

Setting the IP Address

Solaris network settings

Example

Interface status check

```
# dladm show-link
LINK        CLASS    MTU  STATE  OVER
net0        phys     1500 up     --
net1        phys     1500 up     --
```

STATE: status
up: link up
down: link down

Network interface creation

(Format: ipadm create-ip <interface name>)

```
# ipadm create-ip net1
```

IP address setting

(Format: ipadm create-addr -T static -a local=<IP address>/<netmask> <length> <interface> <name>/<string>)

```
# ipadm create-addr -T static -a local=192.168.1.10/24 net1/v4
```

IP address confirmation

```
# ipadm show-addr
```

Linux and Solaris Command Comparison (4)

FUJITSU

Essential network administration commands

Operation	Red Hat Enterprise Linux	Oracle Solaris

Setting IP address	# vi /etc/sysconfig/network-scripts/ifcfg-<device>
	IPADDR=<IP address>
	# service network restart
		# ipadm create-addr -T static -a local=<IP address>/<mask> <device>

Setting DHCP	# vi /etc/sysconfig/network-scripts/ifcfg-<device>
	BOOTPROTO=dhcp
	# service network restart
		# ipadm create-addr -T dhcp <device>

Confirming IP address	# ifconfig	# ipadm show-addr

Gateway settings	# vi /etc/sysconfig/network
	GATEWAY=<IP address>
	# service network restart
		# route -p add <Network address> <IP address>

Gateway information confirmation	# netstat -rn	# netstat -rn
Display network devices	# ethtool eth0	# dladm show-link # dladm show-phys (Physical NIC)

For more details please see: Oracle Solaris command casebook for Linux users.

Reference: Network Redundancy

- Solaris IP network multi-pass (IPMP)
  - A standard function on Solaris for configuring NIC redundancy to improve network reliability
    - Equivalent of Linux Bonding function.
  - IPMP
    - Fault detection
      - Communication routes are automatically redirected if an NIC fault is detected.
    - Recovery detection
      - The communication routes automatically revert to the previous routes when the NIC fault recovers.
    - Load balancing
      - The load is balanced across several NICs to avoid data bottlenecks.

Oracle Solaris Manual:
Managing Oracle Solaris 11.1 Network Performance
http://docs.oracle.com/cd/E37932_01/html/E36607/gfkcy.html#scrolltoc

Reference: Network Redundancy

IPMP setting procedure

Example

IPMP (probe-based) settings

1. Creating the interface

```
# ipadm create-ip net0
# ipadm create-ip net1
```

Create (net0, net1) for redundant interfaces

2. IPMP interface settings

```
# ipadm create-ipmp ipmp0
# ipadm add-ipmp -i net0 -i net1 ipmp0
# ipadm create-addr -T static -a local=192.168.1.10/24 ipmp0/v4
```

Create the IPMP interface with the ipadm command

3. Standby interface setting

```
# ipadm set-ifprop -p standby=on -m ip net1
```

Set it to run in standby mode

- As above, you can use the ipadm command to set all the IPMP settings. By using sub-commands you can carry out further setting changes.

FUJITSU

5. Service Administration

Service Administration

FUJITSU

Linux and Solaris service administration mechanism

Linux

- During OS booting, the service startup scripts (rc scripts) in the /etc/init.d directory are executed in order, in accordance with the run level, as the OS is booting.
- The dependencies between services need to be managed on a per-service basis (controlled using the startup scripts).

Solaris

- SMF (Service Management Facility) manages all the service inter-dependencies. When a service starts up or shuts down, the interdependent services can be started or shut down beforehand.
- If a service stops due to a system fault or failure, it will restart automatically (self-healing).
- You can check the reason for a system shutdown and whether any other services are affected.
- rc scripts are called a legacy scripts, and this old service management mechanism is kept for compatibility.

- Linux service administration is equivalent to that on Solaris 9 and prior versions.
- The Solaris SMF is not just a boot service. It monitors the status of running services and can be used to check the cause and identify the consequences if a service stops due to a fault.

Automatic Service Booting

FUJITSU

- Differences between automatic service booting on Linux and Solaris
  - Linux
    - The settings for booting services and automatic booting of services are configured using different commands.

Example

```
# service httpd start        - - -start service
# service httpd stop         - - -stop service
# chkconfig httpd on         - - -Enable automatic service start
# chkconfig httpd off        - - -Disable automatic service start
```

  - Solaris
    - svcadm manages everything.
    - The configuration of services remains unchanged after OS shutdown. When the OS is next booted the previous settings resume.

Example

```
# svcadm enable -t httpd      - - - start service
# svcadm disable -t httpd     - - -stop service
# svcadm enable httpd         - -Enable automatic service start/service start
# svcadm disable httpd        - -Disable automatic service start/service stop
```

- On Solaris, the start/stop setting for a service is retained when the OS is next booted.
- To change the start/stop setting for a service temporarily (until next OS shutdown), use the -t option.

Linux and Solaris Command Comparison (5)

FUJITSU

Essential service administration commands

Operations	Red Hat Enterprise Linux	Oracle Solaris
Service start	service <service name> start	svcadm enable -t <service name> (FMRI)
Enabling service start and automatic start	service <service name> start chkconfig <service name> on	svcadm enable <service name> (FMRI)
Service stop	service <service name> stop	svcadm disable -t <service name> (FMRI)
Disabling service start and automatic start	service <service name> stop chkconfig <service name> off	svcadm disable <service name> (FMRI)
Display services	chkconfig --list	svcs –a
Display service status	service <service name> status	svcs <service name> (FMRI)

* FMRI (Fault Managed Resource Identifier)

For more details please see: Oracle Solaris command casebook for Linux users.

- FMRI is a method for describing services in terms of category, service name and instance name.

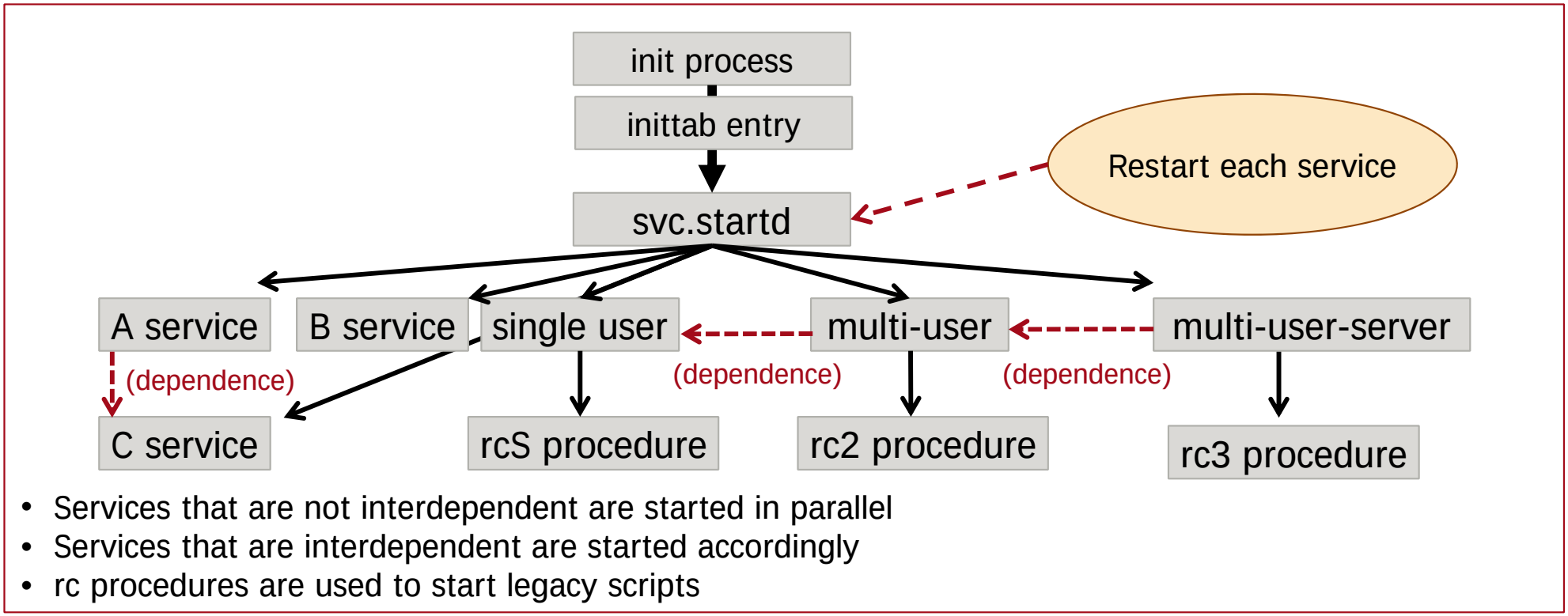
svc:/network/http:apache22

- Category: network
- Service name: http
- Instance name: apache22

Reference: Solaris Service Administration

SMF (Service Management Facility)

- The startup script for a service managed by the SMF resides in the /lib/svc/method directory, and is controlled by svc.startd (Master restarter daemon).
- The manifest file that defines interdependencies between services can be found in the /var/svc/manifest directory under different groups, and can be viewed/changed with the svc.configd (repository daemon).
- Management logs from the SMF are exported to /var/svc/log for each service respectively.



- Services that are not interdependent are started in parallel
- Services that are interdependent are started accordingly
- rc procedures are used to start legacy scripts

FUJITSU

6. File System and Storage Administration

File System and Storage Administration Outline

FUJITSU

	Red Hat Enterprise Linux	Oracle Solaris
Storage volume administration	• LVM (Logical Volume Manager)	• ZFS (Zettabyte File System) • zpool command
File system	• ext3 (recommended), ext4	• ZFS • zfs command
Maximum file system size	• 16TB	• 256 quadrillion ZB
Maximum file size	• 2TB (ext3), 16TB (ext4)	• 256 quadrillion ZB
Redundancy creation	• RAID is used on the server itself and external storage devices. * RAID card is installed as standard equipment on the Fujitsu PRIMERGY series, SVOM (Server View Operations Manager) used to monitor the system.	• Either soft RAID depending on the ZFS or external hard RAID is used. * Hard RAID is supported as a standard function even on the Fujitsu M10.

- Solaris system volume is formatted by the ZFS.
- The UFS (UNIX File System) from Solaris 10 and prior is useable in the user volume area.

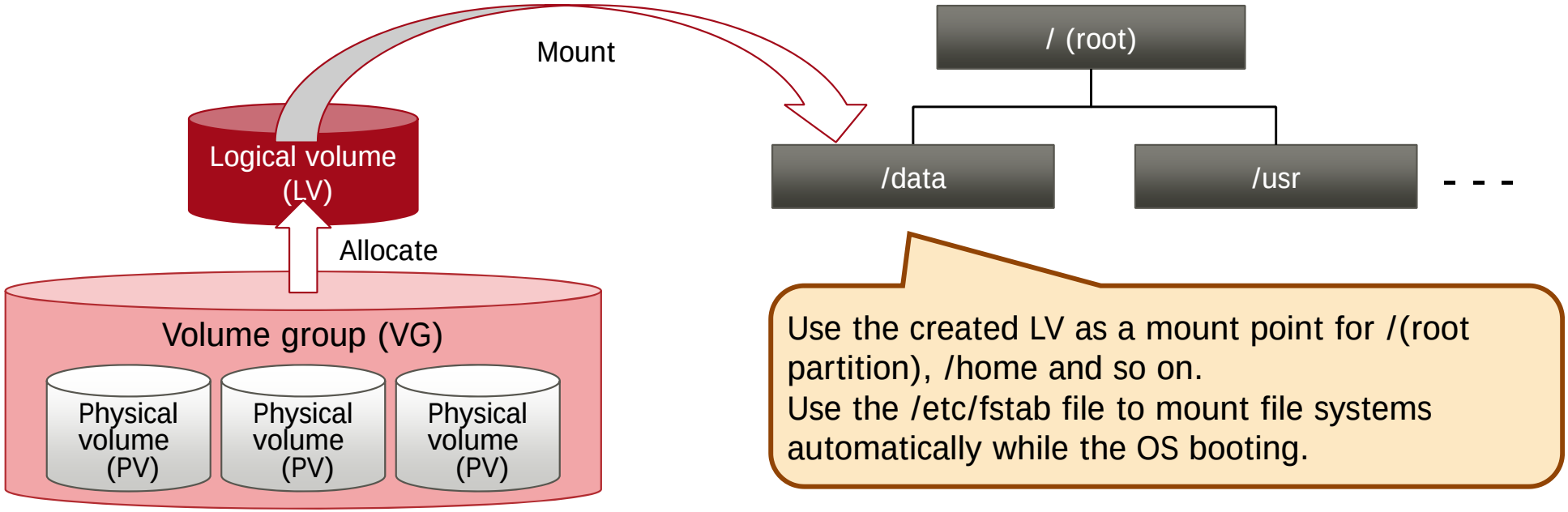
FUJITSU

LVM (Logical Volume Manager)

Features

- Several physical disks (PV) can be combined into one volume group (VG).
- Separation of logical volumes (LVs) from volume group (VG).
  It is possible to add or expand LVs while the OS is running.
- LVs are mounted after the file system is created.
- Backups can be acquired using the snapshot function while the OS is running.

File system mounting process

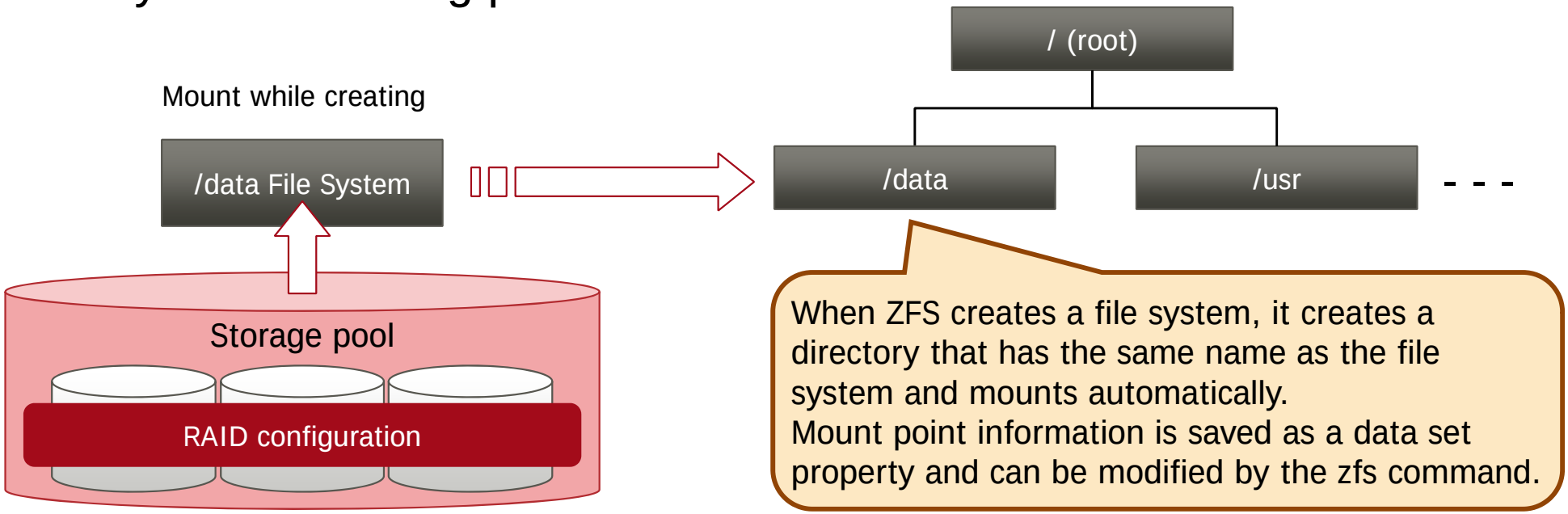


ZFS (Zettabyte File System)

Features

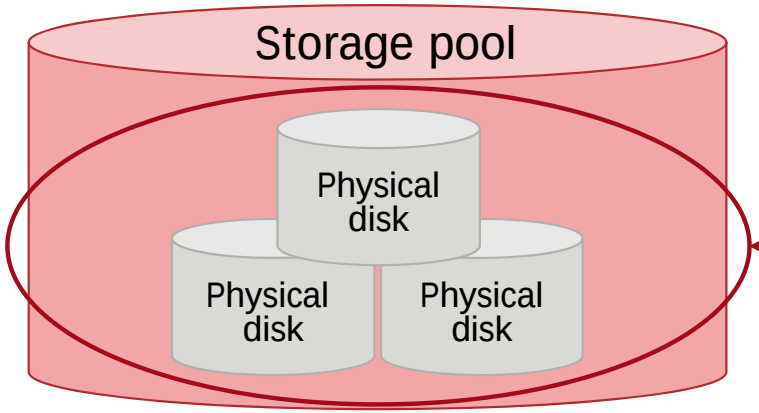
- Creates a single storage pool out of several physical devices.
The storage pool can be made into a RAID group.
- Areas of the storage pool can be allocated as data sets.
- When a data set is created, it is mounted as a ZFS file system.
The file system automatically expands up to the available storage pool capacity.
- Backups are possible via the snapshot function while the OS is running.

File system mounting process



RAID Configuration Using ZFS

- Disk redundancy provided using standard functions



Select the RAID configuration function when the disks are registered to the pool.

* RAID1+0 configuration possible

RAID configuration on ZFS

Non-redundant
- Striping (RAID-0)

mirror
- Multiple mirrors possible (RAID-1)

RAID-Z
- Single parity (similar to RAID-5)

RAID-Z2
- Double parity (similar to RAID-6)

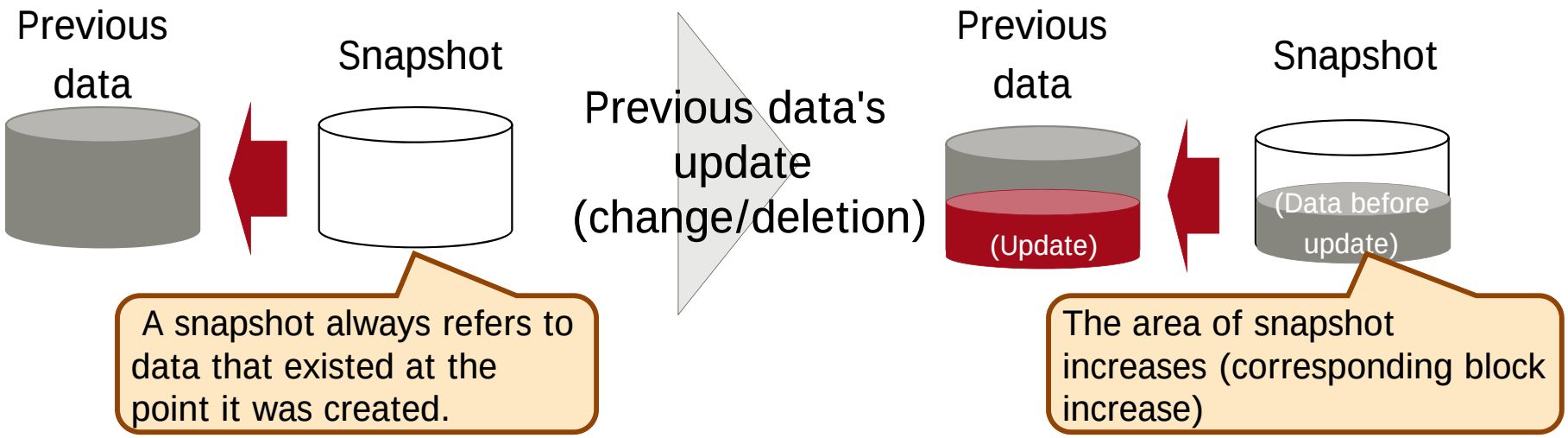
RAID-Z3
- Triple parity

- The Solaris storage pool can improve the file system performance and reliability by forming a RAID and registering the physical disks.

ZFS Snapshot

Solaris FUJITSU

ZFS snapshot mechanism



* When a snapshot is created, note that the whole disk area does not decrease even if the original data is deleted.

ZFS snapshot features

- No need to designate a snapshot area as it is done automatically.
- When data is updated, only the corresponding disk block is copied. Therefore data usage is low.
- Possible to return to the point where the snapshot was created (Rollback function).
- File systems can be backed up based on ZFS snapshots (Backup function).
- File systems can be cloned using snapshots (Clone function).

Solaris Backup/Restore

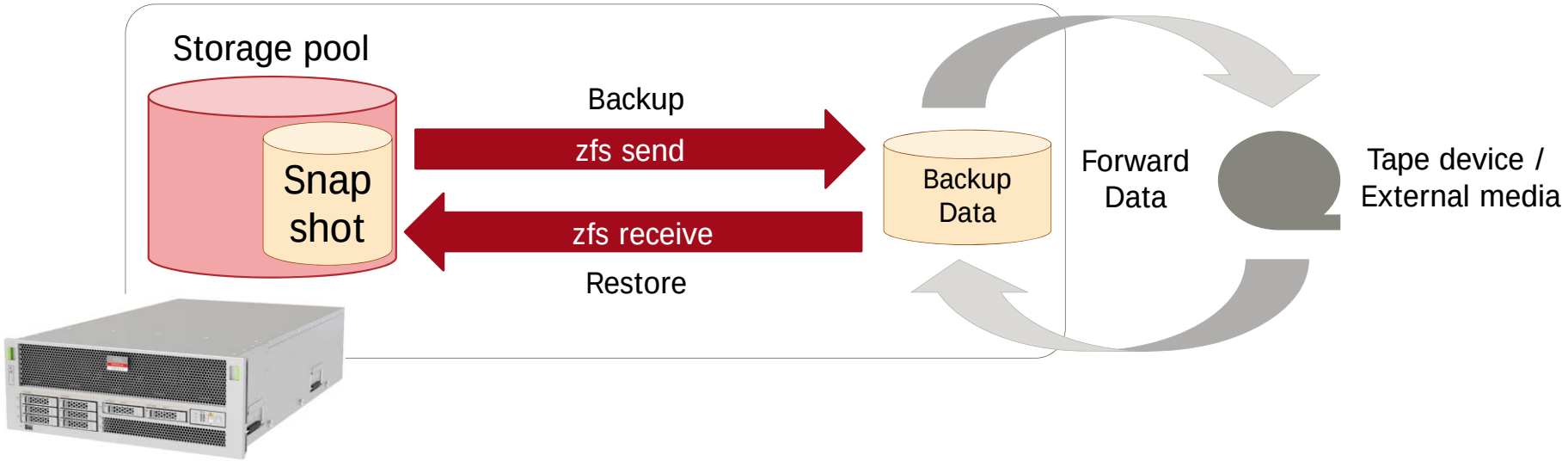
Backup/restore with the ZFS command

Backup: 'zfs send'

- Snapshots written to standard output using the zfs send command can be used as backup data.
- There is no need to stop the OS.

Restore: 'zfs receive'

- File system restore is done by reading the back up data from standard input.
- No need to stop the OS, except when restoring the system volume (root pool).



Linux and Solaris Command Comparison (6)

FUJITSU

- Essential file system and storage management commands

Operation	Red Hat Enterprise Linux	Oracle Solaris
Linux: Volume Group creation Solaris: Storage Pool creation	vgcreate <volume group name> <device name>	zpool create <pool name> <RAID> <device name>
Linux: Create logical volume Solaris: Create ZFS file system	lvcreate -L <size> -n <physical volume name> <volume group name>	zfs create <file system name>
Snapshot creation	lvcreate -s –L <size> -n <snapshot name> <previous device>	zfs snapshot <snapshot name>
Rollback via snapshot	lvconvert --merge <snapshot name>	zfs rollback <snapshot name>
File system backup	dump -0u -f <backup file> <snapshot name>	zfs send <snapshot name>
File system restore	restore -r -f <backup file>	zfs receive <snapshot stream>
Partition operation	parted (recommended), fdisk	format

For more details please see: Oracle Solaris command casebook for Linux users.

Reference: Disk Label, Device Path

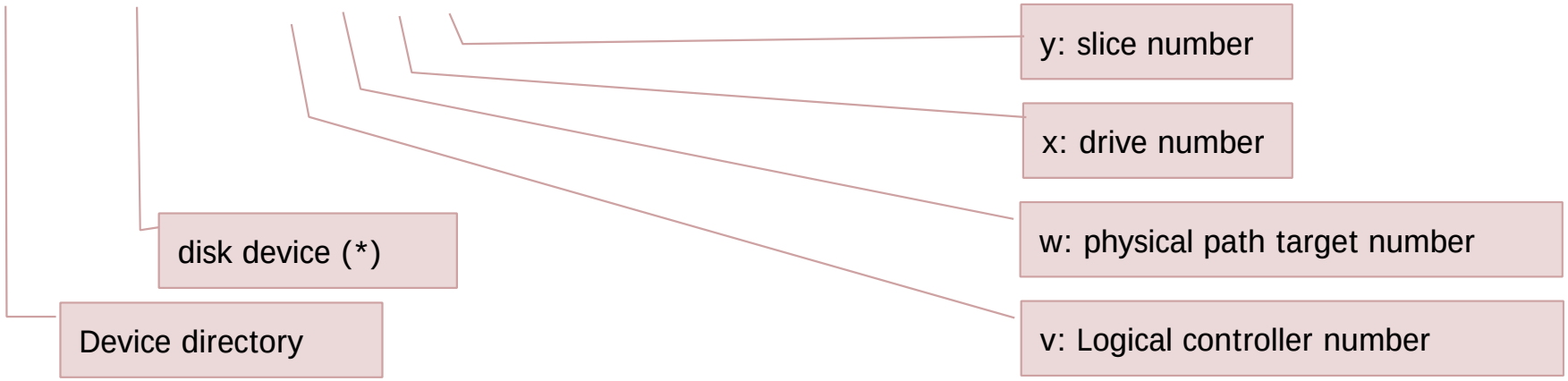
Solaris disk label

- Solaris supports the following two disk labels.
  - SMI (Sun Microsystems Inc.)
    - Disk label for System Volume - for disks that are less than 2TB in size.
  - EFI (GPT) (Extensible Firmware Interface GUID Partition Table)
    - It is a disk label for ZFS other than the system volume.

Solaris device path

- A pathname in the /dev/(r)dsk directory specifying the controller, disk and slice.

/dev/(r)dsk/cvtwdxsy



*: dsk indicates block device and rdsk character device (raw device)

Reference: Disk Partition

FUJITSU

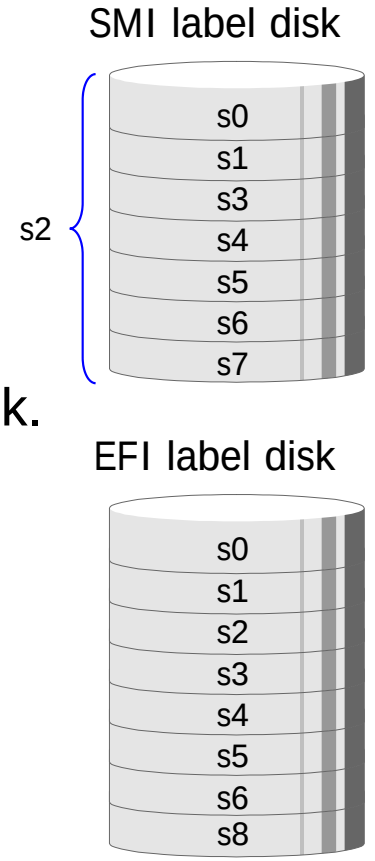
Linux and Solaris disk partition differences

Linux

- Divides a disk into multiple partitions that can be used as a file system or raw device.
- Partition settings are set with the fdisk command.

Solaris

- A Solaris partition is also known as a ‘slice'.
- The number of slices created depends upon the disk label.
- Put s0-s7 after the device name to specify a device path (e.g :/dev/rdsk/c2t0d1s0).
- The SMI label s2 is a special slice that represents the entire disk.
- Slice settings are set with the format command.



Reference: ISO Image File Mount

FUJITSU

Linux and Solaris ISO image file format

Linux

- Specify iso9660 as file system format.

Example

/ISO/media.iso mounted to the /mnt directory

```
# mount -o loop -t iso9660 /ISO/media.iso /mnt          - - - ISO file mounted to /mnt
```

Solaris

- Specify hsfs as file system format.

Example

/ISO/media.iso mounted to the /mnt directory

```
# mount -F hsfs /ISO/media.iso /mnt                     - - - ISO file mounted to /mnt
```

Reference: File System Organization

- Solaris file system organization
  - File systems other than ZFS are automatically mounted during booting based on the /etc/vfstab file.

Name	Summary
/dev	Directory including special device files
/devices	devfs file system mount point directory
/etc	Directory including system specific managing and configuration files
/bin	Directory including files executable by ordinary users
/sbin	Directory including boot processes and manual system recovery files
/usr/lib	System libraries used by various programs when they are executing
/proc	Process file system mount point directory
/tmp	Directory for temporary file use. tmpfs used for file systems on memory.

- Swap and dump devices created by the ZFS volume.
- Files placed in /tmp use physical memory. These files are lost upon restart.

FUJITSU

7. Monitoring

System Monitoring

FUJITSU

Linux and Solaris log monitoring

Linux

- System message log output is defined in /etc/rsyslog.conf.

Solaris

- System message log outputs is defined in /etc/syslog.conf.
- As under Linux, the system message is displayed to the login user and administrator and is transferable to other servers.
- As under Linux, OS commands are provided for checking the system performance information (CPU and memory use, etc.).
- Some monitoring commands are available only on Solaris.

- In the case of on-site monitoring, the most common method is to install specialized software and an operation monitoring system.

System Monitoring Log

FUJITSU

Linux and Solaris log output differences

Log output address

Log	Red Hat Enterprise Linux	Oracle Solaris
System log output	/var/log/messages	/var/adm/messages
Mail send/receive data log	/var/log/maillog	/var/log/syslog
cron execution log	/var/log/cron	/var/cron/log

Log rotation

- As with Linux, Solaris will set items for each log file and is periodically executed by cron.

Red Hat Enterprise Linux	Oracle Solaris

-/etc/logrotate.conf defined by file
weekly - - -1 week unit
rotate 4 - - -4 generations
compress - - -compress
/var/log/messages {
sharedscripts
postrotate
/bin/kill -HUP 'cat /var/run/syslogd.pid 2> /dev/null'
2> /dev/null || true
endscript
}
	Settings for each log file to be rotated are set in -/etc/logadm.conf
	
	/var/adm/messages -C 4 -a '/usr/sbin/svccfg -s svc:/system/system-log refresh '
	
	-C : Generation to be saved
	-a : After changing the log file name, execute command enclosed in ' '.

System Monitoring Commands

FUJITSU

Examples of commands used to check current resources

Item to be checked	Red Hat Enterprise Linux	Oracle Solaris
CPU, memory, expansion card confirmation	cat /proc/cpuinfo cat /proc/meminfo lspci	prtdiag

Examples of commands to check anomalies

Confirmation item	Red Hat Enterprise Linux	Oracle Solaris
Network status	ethtool, ping	dladm, ping
Service status	service	svcs
Process status	pstree, ps	ptree, ps
Process trace	strace	truss

Commands to check resource use

Confirmation item	Red Hat Enterprise Linux	Oracle Solaris
System uptime	uptime	uptime
CPU, memory, I/O load	mpstat, vmstat iostat, iotop, netstat	mpstat, pgstat, vmstat, iostat, fsstat, netstat, flowstat, dlstat, ipmpstat
Process unit usage	top, pidstat	top, prstat

Linux and Solaris Command Comparison(7)

FUJITSU

Essential monitoring commands

Operation	Red Hat Enterprise Linux	Oracle Solaris
CPU, memory, I/O load check	mpstat vmstat iostat	mpstat vmstat iostat
CPU, memory, expansion card check	cat /proc/cpuinfo cat /proc/meminfo lspci	prtdiag
Network communications check	ping	ping
Process status check	ps -ef	ps -ef

For more details please see: Oracle Solaris command casebook for Linux users.

- Commands such as the top command used to monitor process status are also usable in Solaris.

Reference: Solaris cron

About cron

Cron editing

- cron editing is done via the crontab command.

```
# crontab -e
10 3 * * * /usr/sbin/logadm                    - - - format
 m  h dd mm day command
```

Display settings

- To display the cron settings, use the crontab command.

```
# crontab -l
10 3 *  *  *  /usr/sbin/logadm
```

Sending the results

- The results of a cron check are sent to the specified users via email.

Reference: URL

FUJITSU

Oracle company manual

Oracle Solaris 11.1 Information Library
http://docs.oracle.com/cd/E37932_01/
- Command Reference and Manual is available to administrators and developers.

Server manual

Fujitsu M10/SPARC M10 Systems System Operation and Administration Guide
http://jp.fujitsu.com/platform/server/sparc/manual/en/c120-e679-06en/index.html
- The manual illustrates necessary basic operations for system deployment and administration.

Revision History

FUJITSU

Revision	Release date	Update page	Update contents
1.0	October, 2014		First Edition

Trademarks and Copyright

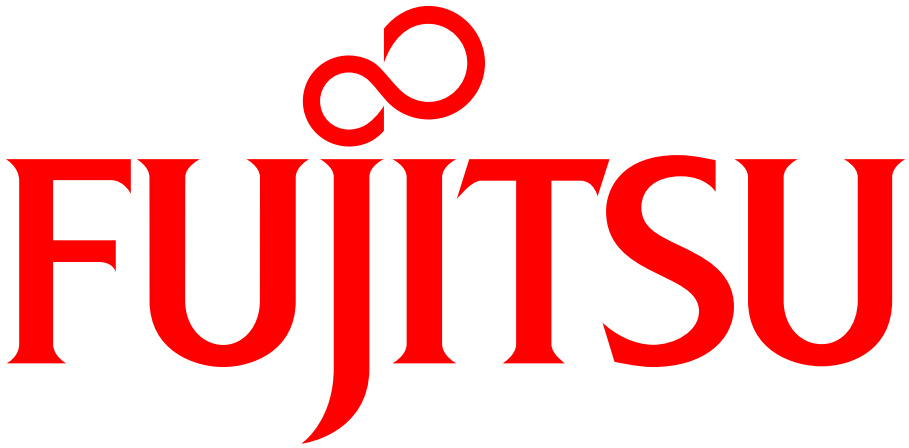
FUJITSU

Terms of use

- Intellectual property rights, copyright, trademark rights etc.
  The contents of this document (images, audio and documents) are protected by intellectual property rights, copyright, trademark rights, etc. It can be downloaded and printed out for personal use. However, for other uses (for example, posting on personal websites or uploading to a server) the permission of the copyright holder or Fujitsu will be required.
- Warranty limits
  The company will not assume any legal responsibilities that arise from the use of the contents and does not guarantee compatibility, accuracy, merchantability to purpose of use. Contents may be changed or discontinued without notice.

Trademarks

- UNIX is an open group registered trademark in the United States and other countries.
- SPARC Enterprise, SPARC64, SPARC64 Logo and all other SPARC trademarks, are used under the United Sates SPARC International Inc. license, and are registered trademarks in the United States and other countries.
- Oracle and Java are registered trademarks of the Oracle Corporation and its subsidiaries in the United States and other countries.
- All other trademarks and trade names are properties of their respective owners. All rights reserved.



shaping tomorrow with you