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Oracle Solaris Command Reference for Linux Users

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Fujitsu Limited

- Revision History

Edition	Date	Updated Page	Description
First	December 2016		First edition created

- Contents

- Preface

- The commands, etc. explained in this document are based on the following environments.

Linux: Red Hat Enterprise Linux 6.5, Red Hat Enterprise Linux 7.1
Solaris: Oracle Solaris 11.3, ESF 5.1

- Method of reference in Solaris online documentation

man *commandname* (or *configuration_file_name*)

- Environment setting to enable browsing of online documentation

```
# env
MANPATH=:/usr/share/man
LANG=en_US.UTF-8
```

- Examples for reference

The reference examples on these pages are written as examples executing Solaris commands.

- Reference URLs

Manuals from Oracle

Oracle Solaris 11.3 Information Library
http://docs.oracle.com/cd/E53394_01/

Server manuals

Fujitsu M10/SPARC M10 Systems System Operation and Administration Guide
http://www.fujitsu.com/global/products/computing/servers/unix/sparc/downloads/manuals/m10-1/en/index.html

Fujitsu SPARC servers Documentations - Technical Information

http://www.fujitsu.com/global/products/computing/servers/unix/sparc/downloads/documents/

- Notes

Fujitsu M10 is sold as SPARC M10 Systems by Fujitsu in Japan. Fujitsu M10 and SPARC M10 Systems are identical products.

1. Starting and Stopping the OS Environment

(1) Starting the server from the XSCF

Command / Intended Use	Linux RHEL 6	Linux RHEL 7	Solaris	Comparison
	-	-	**poweron**	Solaris only
Intended Use	**Option Details**			
Start system of specified PPAR_ID	-	-	**poweron -p PPAR_ID**	Solaris only
Respond with "yes" to confirmation prompt	-	-	**poweron -y**	Solaris only

Execution example 1
Start the server from the XSCF.

Linux	Solaris
-	XSCF> poweron -p 0 PPAR-IDs to power on :00 Continue? [y|n] :y 00 : Powering on *Note* This command only issues the instruction to power-on. The result of the instruction can be checked by the "showlogs power". XSCF>

(2) Starting the OS

Command / Intended Use	Linux RHEL 6	Linux RHEL 7	Solaris	Comparison
	grub	**grub2**	**boot**	Different
Intended Use	**Option Details**			
Start OS	**Start from GRUB menu**	**Start from GRUB 2 menu**	**boot**	Different commands
Start OS in single user mode	**kernel /... root=... 1**	**linux /… "systemd.unit=rescue.target"**	**boot -s**	Different commands
Display bootable OS list	**Display from GRUB menu**	**Display from GRUB 2 menu**	**boot -L**	Different commands
Select kernel and start OS	**Select from GRUB menu**	**Select from GRUB 2 menu**	**boot *-Z data_set_name***	Different commands
Start OS from specified device	**Select device in BIOS**		**boot *device_name***	Different commands
Configuration file	**/boot/grub/menu.lst**	**/boot/grub2/grub.cfg**	**- (Save to EEPROM with OBP command)**	Different

Execution example 1
Start the OS.

Linux	Solaris
-	{0} ok boot Boot device: /pci@8000/pci@4/pci@0/pci@0/scsi@0...,0:a File and args: zfs-file-system Loading: /platform/sun4v/boot_archive ramdisk-root hsfs-file-system Loading: /platform/sun4v/kernel/sparcv9/unix SunOS Release 5.11 Version 11.3 64-bit Copyright (c) 1983, 2015, Oracle and/or its affiliates. All rights reserved. Hostname: solaris solaris console login:

Execution example 2
Start the OS from installation media.

Linux	Solaris
-	{0} ok boot cdrom

Execution example 3
Start the OS from the saved BE.

Linux	Solaris
-	{0} ok boot -L Boot device: /virtual-devices@100/channel-devices@200/disk@0 File and args: -L 1 Oracle Solaris 11.3 SPARC 2 be01 Select environment to boot: [1 - 2]: To boot the selected entry, invoke: boot [<root-device>] -Z rpool/ROOT/be01 Program terminated {0} ok boot -Z rpool/ROOT/be01

(3) Stopping the OS

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
Intended Use	**shutdown**	**shutdown, systemctl**	**shutdown**	Same
Intended Use	**Option Details**			
Stopping OS	**shutdown -h**	**systemctl poweroff**	**shutdown -i5**	Different options
Restart OS	**shutdown -r**	**systemctl reboot**	**shutdown -i6**	Different options
Go to single user	**shutdown**	**systemctl isolate rescue.target**	**shutdown**	Same
Go to BIOS	**shutdown -r**	**systemctl reboot**	**-**	Linux only
Go to OBP	**-**		**shutdown -i0**	Solaris only
Shut down after specified duration	**shutdown +*<minutes>***		**shutdown -g*<seconds>***	Different options
Specify time for shutdown	**shutdown hh:ss**		**-**	Linux only
Respond with "yes" to confirmation prompt	**-**		**shutdown -y**	Solaris only

Execution example 1
Stop the OS.

Linux	Solaris
<<RHEL 6>> # shutdown -h now Shutting down...Shutting dow[FAILED]tchdog: Stopping certmonger: [OK] Can't connect to default. Skipping. Stopping rhsmcertd… [OK] Stopping atd: [OK] Stopping cups: [OK] Stopping abrt daemon:… [OK] Stopping sshd:... [OK] Shutting down sm-client:... [OK] Shutting down sendmail:… [OK] Turning off swap: [OK] Turning off quotas: [OK] Unmounting file systems: [OK] init: Re-executing /sbin/init Halting system... **<<RHEL 7>>** # systemctl poweroff	# shutdown -y -g0 -i5 Shutdown started. Tuesday, November 8, 2016 12:14:32 AM EST Changing to init state 5 - please wait Broadcast Message from root (console) on t5220-01 Monday October 5 16:25:38... THE SYSTEM sol IS BEING SHUT DOWN NOW ! ! ! Log off now or risk your files being damaged showmount: sol: RPC: Program not registered root@sol:~# svc.startd: The system is coming down. Please wait. svc.startd: 125 system services are now being stopped. Oct 5 16:25:49 sol last message repeated 26 times Oct 5 16:25:50 sol syslogd: going down on signal 15 svc.startd: Killing user processes. Oct 5 16:25:56 The system is down. Shutdown took 9 seconds. syncing file systems... done

Execution example 2
Restart the OS.

Linux

<<RHEL 6>>

```
# shutdown -r now

The system is going down for reboot NOW!
#
                    Shutting down...Shutting dow[FAILED]tchdog:
Stopping certmonger:                                       [  OK  ]

Can't connect to default. Skipping.
Stopping rhsmcertd…                                        [  OK  ]
Stopping atd:                                              [  OK  ]
Stopping cups:                                             [  OK  ]
Stopping abrt daemon:...                                   [  OK  ]
Stopping sshd:...                                          [  OK  ]
Shutting down sm-client:…                                  [  OK  ]
Shutting down sendmail:...                                 [  OK  ]
Stopping mcelog
Stopping xinetd:...                                        [  OK  ]
Stopping crond:...                                         [  OK  ]
Turning off swap:                                          [  OK  ]
Turning off quotas:                                        [  OK  ]
Unmounting file systems:                                   [  OK  ]
init: Re-executing /sbin/init
Please stand by while rebooting the system…
Restarting system.

Red hat Enterprise Linux Server release 6.5 (Santiago)
Kernel 2.6.32-431.el6.x86_64 on an x86_64

rhel6 login:
```

<<RHEL 7>>

```
# systemctl reboot

Red Hat Enterprise Linux Server 7.1 (Maipo)
Kernel 3.10.0-229.el7.x86_64 on an x86_64

rhel7 login:
```

Solaris

```
# shutdown -y -g0 -i6

Shutdown started.    Tuesday, November 8, 2016 01:46:03 AM EST

Changing to init state 6 - please wait
Broadcast Message from root (console) on sol Monday October  5 16:25:38...
THE SYSTEM sol IS BEING SHUT DOWN NOW ! ! !
Log off now or risk your files being damaged

root@sol:~# svc.startd: The system is coming down.  Please wait.
svc.startd: 132 system services are now being stopped.
syncing file systems... done
rebooting...
Resetting...

SPARC M10-4S, No Keyboard
Copyright (c) 1998, 2013, Oracle and/or its affiliates. All rights
 reserved.
OpenBoot 4.34.0, 16384 MB memory available, Serial #268894486.
[ 1.24.0 ]
Ethernet address b0:99:28:a0:58:16, Host ID: 90070116.

Boot device: disk  File and args:
SunOS Release 5.11 Version 11.3 64-bit
Copyright (c) 1983, 2015, Oracle and/or its affiliates. All rights
 reserved.
Hostname: sol

sol console login:
```

Execution example 3
Go to single user mode.

Linux

<<RHEL 6>>

```
# shutdown now

                    Shutting down...Shutting dow[FAILED]tchdog:
Stopping certmonger:                                       [  OK  ]

Can't connect to default. Skipping.
Stopping rhsmcertd...                                      [  OK  ]
Stopping atd:                                              [  OK  ]
Stopping cups:                                             [  OK  ]
Stopping abrt daemon:…                                     [  OK  ]
Stopping sshd:...                                          [  OK  ]
Shutting down sm-client:...                                [  OK  ]
Shutting down sendmail:...                                 [  OK  ]
Stopping mcelog
Stopping xinetd:...                                        [  OK  ]
Stopping crond:...                                         [  OK  ]
Turning off swap:                                          [  OK  ]
Turning off quotas:                                        [  OK  ]
Unmounting file systems:                                   [  OK  ]

Telling INIT to go to single user mode.
init: rc main process (2903) killed by TERM signal
#
```

<<RHEL 7>>

```
# systemctl isolate rescue.target

Welcome to rescue mode! Type "systemctl default" or ^D to enter default
mode.
Type "journalctl -xb" to view system logs. Type "systemctl reboot" to
 reboot.
Give root password for maintenance
(or type Control-D to continue):
#
```

Solaris

```
# shutdown -y -g0

Shutdown started.    Tuesday, November 8, 2016 02:05:02 AM EST

Changing to init state s - please wait
Broadcast Message from root (console) on sol Monday October 5,
5 16:36:14...
THE SYSTEM hostname IS BEING SHUT DOWN NOW ! ! !
Log off now or risk your files being damaged

svc.startd: The system is coming down for administration.  Please wait.
#
Enter user name for system maintenance (control-d to bypass): xxxxx
Enter xxxxx password (control-d to bypass):
single-user privilege assigned to user01 on /dev/console.
Entering System Maintenance Mode

Oracle Corporation      SunOS 5.11      11.3    June 2015
#
```

(4) Checking the runlevel

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
	who, runlevel	systemctl, runlevel	who	Same
Intended Use	**Option Details**			
Display runlevel	**who -r**	**systemctl get-default**	**who -r**	Same
Display current and previous runlevels	**runlevel**		**who -r**	Different commands

Execution example 1
Check the runlevel.

Linux	Solaris
<<RHEL 6>> # who -r run-level 5 2014-05-30 11:38 # **<<RHEL 7>>** # systemctl get-default graphical.target #	# who -r . run-level 3 Nov 7 23:50 3 0 S #

Execution example 2
Check the current and previous runlevels.

Linux	Solaris
# runlevel N 5 #	# who -r . run-level 3 Nov 7 23:50 3 0 S #

2. Package Management

(1) Managing packages

Command / Intended Use	Linux RHEL 6	Linux RHEL 7	Solaris	Comparison
	yum, rpm		pkg	Different
Intended Use	**Option Details**			
Install new package	**yum install *package_name***		**pkg install *package_name***	Different commands
Update all packages	**yum update**		**pkg update**	Different commands
Update individual package	**yum update *package_name***		**pkg update *package_name***	Different commands
Check for update package	**yum check-update**		**pkg update -nv**	Different commands
Search installed packages	**yum search *search_string***		**pkg search *search_string***	Different commands
Find package that file belongs to	**rpm -qf *file_name***		**pkg search *file_name***	Different commands
Display files included in package	**rpm -ql *package_name***		**pkg contents *package_name***	Different commands
Display list of installed packages	**yum list all**		**pkg list**	Different commands
Installed package information	**yum info *package_name***		**pkg info *package_name***	Different commands
Delete package	**yum remove *package_name***		**pkg uninstall *package_name***	Different commands

Execution example 1
Install a new package.

Linux

```
# yum install telnet
Loaded plugins: fastestmirror, refresh-packagekit, security
Loading mirror speeds from cached hostfile
 * base: xxxx.com
 * extras: xxxx.com
 * updates: xxxx.com
Setting up Install Process
Resolving Dependencies
--> Running transaction check
---> Package telnet.i686 1:0.17-47.el6_3.1 will be installed
--> Finished Dependency Resolution

Dependencies Resolved

================================================
 Package         Arch         Version                    Repository   Size
================================================
Installing:
 telnet          i686         1:0.17-47.el6_3.1          base         57 k

Transaction Summary
================================================
Install       1 Package(s)

Total download size: 57 k
Installed size: 102 k
Is this ok [y/N]: y
Downloading Packages:
telnet-0.17-47.el6_3.1.i686.rpm                          |  57 kB     00:00
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Installing : 1:telnet-0.17-47.el6_3.1.i686                              1/1
  Verifying  : 1:telnet-0.17-47.el6_3.1.i686                              1/1

Installed:
  telnet.i686 1:0.17-47.el6_3.1

Complete!
#
```

Solaris

```
# pkg install pkg://solaris/network/telnet
           Packages to install        :  1
       Create boot environment        : No
Create backup boot environment        : No

DOWNLOAD                PKGS       FILES    XFER (MB)   SPEED
Completed               1/1        8/8      0.1/0.1     3.4M/s

PHASE                                        ITEMS
Installing new actions                       23/23
Updating package state database              Done
Updating image state                         Done
Creating fast lookup database                Done
#
```

Execution example 2
Update all packages.

Linux

```
# yum update
Loaded plugins: fastestmirror, refresh-packagekit, security
Loading mirror speeds from cached hostfile
 * base: xxxxx.com
 * extras: xxxx.com
 * updates: xxxx.com
Setting up Update Process
Resolving Dependencies
--> Running transaction check
---> Package audit.i686 0:2.2-2.el6 will be updated

---> Package yum-utils.noarch 0:1.1.30-17.el6_5 will be an update
--> Finished Dependency Resolution

Dependencies Resolved

=========================================
 Package         Arch         Version                    Repository  Size
=========================================
Installing:
 kernel          i686      2.6.32-431.17.1.el6           updates     26 M
 kernel-devel    i686      2.6.32-431.17.1.el6           updates     8.7 M
Updating:
 audit           i686      2.2-4.el6_5                   updates     225 k

Transaction Summary
=========================================
Install       3 Package(s)
Upgrade     133 Package(s)

Total download size: 308 M
Is this ok [y/N]:
Downloading Packages:
(1/136): audit-2.2-4.el6_5.i686.rpm                    | 225 kB     00:00
(2/136): audit-libs-2.2-4.el6_5.i686.rpm               |  61 kB     00:00

(136/136): yum-utils-1.1.30-17.el6_5.noarch.rpm        | 102 kB     00:00
-----------------------------------------------------------------------------
Total                                       279 kB/s | 308 MB     18:51
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Updating   : tzdata-java-2014d-1.el6.noarch                    1/270

  Cleanup    : 1:qt-sqlite-4.6.2-26.el6_4.i686                 174/270

  Verifying  : nss-softokn-3.14.3-10.el6_5.i686                  9/270

Installed:
  kernel.i686 0:2.6.32-431.17.1.el6
  kernel-devel.i686 0:2.6.32-431.17.1.el6

Updated:
  audit.i686 0:2.2-4.el6_5
  audit-libs.i686 0:2.2-4.el6_5

  yum-utils.noarch 0:1.1.30-17.el6_5

Complete!
#
```

Solaris

```
# pkg update
Packages to remove:               1
Packages to install:              2
Packages to update:             180
Mediators to change:              1
Create boot environment:        Yes
Create backup boot environment:  No
DOWNLOAD        PKGS         FILES      XFER (MB)   SPEED
Completed     183/183   12578/12578   427.1/427.1   1.1M/s
PHASE ITEMS
Removing old actions 1126/1126
Installing new actions 2669/2669
Updating modified actions 13699/13699
Updating package state database Done
Updating package cache 181/181
Updating image state Done
Creating fast lookup database Done
#
```

Execution example 3
Delete a package.

Linux

```
# yum remove telnet
Loaded plugins: fastestmirror, refresh-packagekit, security
Setting up Remove Process
Resolving Dependencies
--> Running transaction check
---> Package telnet.i686 1:0.17-47.el6_3.1 will be erased
--> Finished Dependency Resolution

Dependencies Resolved

================================================
 Package         Arch         Version                     Repository  Size
================================================
Removing:
 telnet          i686         1:0.17-47.el6_3.1           @base       102 k

Transaction Summary
================================================
Remove        1 Package(s)

Installed size: 102 k
Is this ok [y/N]: y
Downloading Packages:
Running rpm_check_debug
Running Transaction Test
Transaction Test Succeeded
Running Transaction
  Erasing    : 1:telnet-0.17-47.el6_3.1.i686                  1/1
  Verifying  : 1:telnet-0.17-47.el6_3.1.i686                  1/1

Removed:
  telnet.i686 1:0.17-47.el6_3.1

Complete!
#
```

Solaris

```
# pkg uninstall pkg://solaris/network/telnet
            Packages to remove     :  1
        Create boot environment    : No
Create backup boot environment: No

PHASE                                        ITEMS
Removing old actions                         19/19
Updating package state database              Done
Updating package cache                       1/1
Updating image state                         Done
Creating fast lookup database                Done
#
```

Execution example 4
Check the update package.

Linux

```
# yum check-update
Loaded plugins: fastestmirror, refresh-packagekit, security
Determining fastest mirrors
 * base: xxxx.com
 * extras: xxxxx.com
 * updates: xxxx.com
base                                     | 3.7 kB     00:00
base/primary_db                          | 3.5 MB     00:01
extras                                   | 3.4 kB     00:00
extras/primary_db                        |  18 kB     00:00
updates                                  | 3.4 kB     00:00
updates/primary_db                       | 3.0 MB     00:07

audit.i686                               2.2-4.el6_5                 updates
audit-libs.i686                          2.2-4.el6_5                 updates
autofs.i686                              1:5.0.5-89.el6_5.2          updates
bind-libs.i686                           32:9.8.2-0.23.rc1.el6_5.1   updates
bind-utils.i686                          32:9.8.2-0.23.rc1.el6_5.1   updates
ca-certificates.noarch                   2013.1.95-65.1.el6_5        updates
coreutils.i686                           8.4-31.el6_5.1              updates
coreutils-libs.i686                      8.4-31.el6_5.1              updates
curl.i686                                7.19.7-37.el6_5.3           updates
device-mapper-persistent-data.i686       0.2.8-4.el6_5               updates
dmidecode.i686                           1:2.12-5.el6_5              updates
dracut.noarch                            004-336.el6_5.2             updates
dracut-kernel.noarch                     004-336.el6_5.2             updates
ethtool.i686                             2:3.5-1.4.el6_5             updates

#
```

Solaris

```
# pkg update -nv
              Packages to remove:      1
              Packages to install:     2
              Packages to update:    180
              Mediators to change:     1
           Estimated space available:  20.14 GB
Estimated space to be consumed:        1.95 GB
          Create boot environment:     Yes
        Activate boot environment:     Yes
   Create backup boot environment:     No
          Rebuild boot archive:        Yes

Changed mediators:
  mediator perl:
       version: None -> 5.12 (vendor default)
 "
Changed packages:
solaris
  consolidation/vpanels/vpanels-incorporation
    0.5.11,5.11-0.175.1.0.0.17.0:20120529T220223Z -> None
  library/libedit
    None -> 3.0,5.11-0.175.1.0.0.24.0:20120904T172539Z
  system/library/mmheap
    None -> 0.5.11,5.11-0.175.1.13.0.4.0:20131028T165001Z

#
```

Execution example 5
List the installed packages.

Linux

```
# yum list all
Loaded plugins: product-id, refresh-packagekit, security, subscription-
manager
This system is not registered to Red Hat Subscription Management. You
can use subscription-manager to register.
Installed Packages
389-ds-base.x86_64          1.2.11.15-29.el6  @anaconda-Red…
389-ds-base-libs.x86_64     1.2.11.15-29.el6  @anaconda-Red…
ConsoleKit.x86_64           0.4.1-3.el6       @anaconda-Red…
ConsoleKit-libs.x86_64      0.4.1-3.el6       @anaconda-Red…
ConsoleKit-x11.x86_64       0.4.1-3.el6       @anaconda-Red…


yum-rhn-plugin.noarch       0.9.1-48.el6      @anaconda-Red…
yum-utils.noarch            1.1.30-14.el6     @anaconda-Red…
zd1211-firmware.noarch      1.4-4.el6         @anaconda-Red…
zenity.x86_64               2.28.0-1.el6      @anaconda-Red…
zip.x86_64                  3.0-1.el6         @anaconda-Red…
zlib.x86_64                 1.2.3-29.el6      @anaconda-Red…
zlib-devel.x86_64           1.2.3-29.el6      @anaconda-Red…
#
```

Solaris

```
# pkg list
NAME (PUBLISHER)                VERSION                    IFO
archiver/gnu-tar                1.26-0.175.1.0.0.24.0      i--
compress/bzip2                  1.0.6-0.175.1.0.0.24.0     i--
compress/gzip                   1.5-0.175.1.15.0.2.0       i--
compress/p7zip                  9.20.1-0.175.1.0.0.24.0    i--
compress/unzip                  6.0-0.175.1.0.0.24.0       i--
compress/xz                     5.0.1-0.175.1.0.0.24.0     i--
compress/zip                    3.0-0.175.1.0.0.24.0       i--
system/xopen/xcu4               0.5.11-0.175.1.13.0.4.2    i--
system/xopen/xcu6               0.5.11-0.175.1.0.0.24.2    i--


text/gnu-grep                   2.14-0.175.1.7.0.2.0       i--
text/gnu-patch                  2.5.9-0.175.1.0.0.24.0     i--
text/gnu-sed                    4.2.1-0.175.1.0.0.24.0     i--
text/groff                      1.19.2-0.175.0.0.0.0.0     i--
text/groff/groff-core           1.19.2-0.175.0.0.0.0.0     i--
text/less                       436-0.175.1.0.0.24.0       i--
text/spelling-utilities         0.5.11-0.175.1.0.0.24.2    i--
#
```

Execution example 6
Search the installed packages.

Linux

```
# yum search apache
Loaded plugins: product-id, refresh-packagekit, security, subscription-
This system is not registered to Red Hat Subscription Management. You
 can use subscription-manager to register.
======================================== N/S Matched
: apache ========================================
apache-tomcat-apis.noarch : Tomcat Servlet and JSP APIs
apr.x86_64 : Apache Portable Runtime library
apr-util.x86_64 : Apache Portable Runtime Utility library
httpd.x86_64 : Apache HTTP Server
httpd-manual.noarch : Documentation for the Apache HTTP server
httpd-tools.x86_64 : Tools for use with the Apache HTTP Server
mod_nss.x86_64 : SSL/TLS module for the Apache HTTP server
mod_ssl.x86_64 : SSL/TLS module for the Apache HTTP Server
  Name and summary matches only, use "search all" for everything.
#
```

Solaris

```
# pkg search apache
INDEX          ACTION VALUE
   PACKAGE
basename       dir    usr/apache2/2.2/lib/perl/Apache
   pkg:/web/server/apache-22/module/apache-perl@2.0.4-0.175.1.0.0.24.0
pkg.description set    Apache Ant is a Java-based build tool
   pkg:/developer/build/ant@1.8.4-0.175.1.3.0.1.0
pkg.description set    FastCGI plugin for Apache Web Server Version 2.2
   pkg:/web/server/apache-22/module/apache-fcgid@2.3.6-0.175.1.0.0.24.0
pkg.description set    Mod Security plugin for Apache Web Server Version
   pkg:/web/server/apache-22/module/apache-security@2.5.9-0.175.1.0…
pkg.description set    Perl plugin for Apache Web Server Version 2.2
   pkg:/web/server/apache-22/module/apache-perl@2.0.4-0.175.1.0.0.24.0


basename       dir    usr/share/doc/ant/manual/api/org/apache
      pkg:/developer/build/ant@1.8.4-0.175.1.3.0.1.0
#
```

Execution example 7
Display package information.

Linux

```
# yum info httpd
Loaded plugins: product-id, refresh-packagekit, security, subscription-
This system is not registered to Red Hat Subscription Management. You
 can use subscription-manager to register.
Installed Packages
Name        : httpd
Arch        : x86_64
Version     : 2.2.15
Release     : 29.el6_4
Size        : 2.9 M
Repo        : installed
From repo   : anaconda-RedHatEnterpriseLinux-201311111358.x86_
64
Summary     : Apache HTTP Server
URL         : http://httpd.apache.org/
License     : ASL 2.0
Description : The Apache HTTP Server is a powerful, efficient, and exte
nsible
            : web server.
#
```

Solaris

```
# pkg info apache-22
          Name: web/server/apache-22
       Summary: Apache Web Server V2.2
   Description: The Apache HTTP Server Version 2.2
      Category: Web Services/Application and Web Servers
         State: Installed
     Publisher: solaris
       Version: 2.2.25
 Build Release: 5.11
        Branch: 0.175.1.11.0.4.0
Packaging Date: Thu Sep 05 16:06:32 2013
          Size: 8.68 MB
          FMRI: pkg://solaris/web/server/apache-22@2.2.25,5.11-0.175.…
#
```

Execution example 8
Find the package that a file belongs to.

Linux

```
# rpm -qf /usr/sbin/httpd
httpd-2.2.15-29.el6_4.x86_64
#
```

Solaris

```
# pkg search /usr/apache2/2.2/bin/httpd
INDEX   ACTION   VALUE                       PACKAGE
path    file     usr/apache2/2.2/bin/httpd   pkg:/web/server/apache-22@2.2....
```

Execution example 9
Display files included in the package.

Linux

```
# rpm -ql httpd
/etc/httpd
/etc/httpd/conf
/etc/httpd/conf.d
/etc/httpd/conf.d/README
/etc/httpd/conf.d/welcome.conf
/etc/httpd/conf/httpd.conf
/etc/httpd/conf/magic
/etc/httpd/logs
/etc/httpd/modules
/etc/httpd/run
/etc/logrotate.d/httpd
/etc/rc.d/init.d/htcacheclean

/var/www/icons/world2.gif
/var/www/icons/world2.png
#
```

Solaris

```
# pkg contents apache-22
PATH
etc
etc/apache2
etc/apache2/2.2
etc/apache2/2.2/conf.d
etc/apache2/2.2/conf.d/modules-32.load
etc/apache2/2.2/conf.d/modules-64.load
etc/apache2/2.2/envvars
etc/apache2/2.2/httpd.conf
etc/apache2/2.2/magic
etc/apache2/2.2/mime.types
etc/apache2/2.2/original

var/apache2/2.2/logs
var/apache2/2.2/proxy
#
```

3. User Management

(1) Adding a new user

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
	useradd		**useradd**	Same
Intended Use	**Option Details**			
Specify user comment	**useradd -c *comment***		**useradd -c *comment***	Same
Specify user home directory	**useradd -d *directory***		**useradd -d *directory***	Same
Display default parameters	**useradd -D**		**useradd -D**	Same
Specify last date that login is allowed	**useradd -e YYYY-MM-DD**		**useradd -e mm/dd/yy**	Specified in different ways
Specify how many days to permit login activity after password expires	**useradd -f *number_of_days***		**useradd -f *number_of_days***	Same
Specify group that user belongs to	**useradd -g *group_name***		**useradd -g *group_name***	Same
Specify group when user belongs to multiple groups	**useradd -G *group_name***		**useradd -G *group_name***	Same
Specify skeleton directory	**useradd -k *directory***		**useradd -k *directory***	Same
Automatically create home directory	**useradd -m**		**useradd -m**	Same
Allow duplicated UID	**useradd -o**		**useradd -o**	Same
Specify password	**useradd -p *encrypted_password***		-	Same option but different meaning
Specify user-related project name	-		**useradd -p *project***	
Specify user-related profile name	-		**useradd -P *profile***	Solaris only
Specify role	-		**useradd -R *role***	Solaris only
Specify user login shell	**useradd -s *shell***		**useradd -s *shell***	Same
Specify user ID of user	**useradd -u *user_ID***		**useradd -u *user_ID***	Same
Configuration file	**/etc/passwd**		**/etc/passwd**	Same

Execution example 1
Display default parameters.

Linux	Solaris

# useradd -D 	
GROUP=100
HOME=/home
INACTIVE=-1
EXPIRE=
SHELL=/bin/bash
SKEL=/etc/skel
CREATE_MAIL_SPOOL=yes
#
	# useradd -D
	group=staff,10 project=default,3 basedir=/export/home
	skel=/etc/skel shell=/usr/bin/bash inactive=0
	expire= auths= profiles= roles= limitpriv=
	defaultpriv= lock_after_retries=
	#

Execution example 2
Specify parameters and add a user.

Linux	Solaris
# useradd -u 1001 -g 1001 -m -d /home/user1/ -s /bin/sh user01 #	# useradd -u 1001 -g 1001 -m -d /home/user1/ -s /bin/sh user01 #

Execution example 3
Specify a date regarding allowed login, and add a user.

Linux	Solaris
# useradd -e 2014-06-03 user01 #	# useradd -e 06/03/14 user01 #

(2) Updating user information

Command / Intended Use	Linux RHEL 6	Linux RHEL 7	Solaris	Comparison
	usermod		**usermod**	Same
Intended Use	**Option Details**			
Specify user comment	**usermod -c *comment***		**usermod -c *comment***	Same
Specify user home directory	**usermod -d *directory***		**usermod -d *directory***	Same
Specify last date that login is allowed	**usermod -e YYYY-MM-DD**		**usermod -e mm/dd/yy**	Specified in different ways
Specify how many days to permit login activity after password expires	**usermod -f *number_of_days***		**usermod -f *number_of_days***	Same
Specify group that user belongs to	**usermod -g *group_name***		**usermod -g *group_name***	Same
Specify group when user belongs to multiple groups	**usermod -G *group_name***		**usermod -G *group_name***	Same
Change login name of user	**usermod -l *new_user_name***		**usermod -l *new_user_name***	Same
Lock user password	**usermod -L**		**passwd -l**	Different commands
Move user home directory to new directory specified by -d option	-		**usermod -m**	Solaris only
Specify password	**usermod -p *encrypted_password***		-	Linux only
Specify user-related profile name	-		**usermod -P *profile***	Solaris only
Specify role	-		**usermod -R *role***	Solaris only
Specify user login shell	**usermod -s *shell***		**usermod -s *shell***	Same
Specify user ID of user	**usermod -u *user_ID***		**usermod -u *user_ID***	Same
Unlock user password	**usermod -U**		**passwd -u**	Different commands
Change account information (full name, etc.)	**chfn**		**passwd -g**	Different commands
Configuration file	**/etc/passwd**		**/etc/passwd**	Same

Execution example 1
Change a user ID.

Linux	Solaris
# usermod -u 10001 user01 #	# usermod -u 10001 user01 #

Execution example 2
Set the expiration of allowed login.

Linux	Solaris
# usermod -e 2014-06-03 user01 #	# usermod -e 06/03/14 user01 #

Execution example 3
Lock a user password.

Linux	Solaris
# usermod -L user01	# passwd -l user01

(3) Deleting a user

Command / Intended Use	Linux RHEL 6	Linux RHEL 7	Solaris	Comparison
	userdel		**userdel**	Same
Intended Use	**Option Details**			
Delete files in home directory	**userdel -r**		**userdel -r**	Same
Configuration file	**/etc/passwd**		**/etc/passwd**	Same

Execution example 1
Delete a user.

Linux	Solaris
# userdel user01 #	# userdel user01 #

Execution example 2
Delete a user, including files in the home directory.

Linux	Solaris
# userdel -r user01 #	# userdel -r user01 #

(4) Changing user password expiration information

Command / Intended Use	Linux RHEL 6 / RHEL 7	Solaris	Comparison
	chage	**passwd**	Different
Intended Use	**Option Details**		
Set date of last password update	**chage -d YYYY-MM-DD**	-	Linux only
Set date on which account becomes inaccessible	**chage -E YYYY-MM-DD**	-	Linux only
Number of days until account is locked after password expires	**chage -I *number_of_days***	-	Linux only
Display expiration information	**chage -l**	**passwd -s**	Different commands
Specify minimum number of days between password changes	**chage -m *number_of_days***	**passwd -n *number_of_days***	Different commands
Specify maximum number of days that password is valid	**chage -M *number_of_days***	**passwd -x *number_of_days***	Different commands
Specify number of days in warning period	**chage -W *number_of_days***	**passwd -w *number_of_days***	Different commands
Configuration file	**/etc/shadow**	**/etc/shadow**	Same

Execution example 1
Set 90 days later as the expiration time.

Linux	Solaris
# chage -M 90 user01 #	# passwd -x 90 user01 #

Execution example 2
Set 30 days as the minimum number of days.

Linux	Solaris
# chage -m 30 user01 #	# passwd -n 30 user01 #

Execution example 3
Display password expiration information.

Linux	Solaris
# chage -l user01 Last password change : Jun 02, 2014 Password expires : never Password inactive : never Account expires : never Minimum number of days between password change : 0 Maximum number of days between password change : 99999 Number of days of warning before password expires : 7 #	# passwd -s user01 user01 PS #

(5) Changing the default shell

Command / Intended Use	Linux RHEL 6 / RHEL 7	Solaris	Comparison
	chsh	**passwd**	Different
Intended Use	**Option Details**		
Configure shell non-interactively	**chsh -s /bin/bash user01**		Linux only
Configure shell interactively	**chsh /bin/bash user01**	**passwd -e user01**	Different commands

Execution example 1
Configure the shell non-interactively.

Linux	Solaris
# chsh -s /bin/bash user01 #	-

Execution example 2
Configure the shell interactively.

Linux	Solaris
# chsh user01 Changing shell for user01. New shell [/bin/bash]: /bin/sh Shell changed. #	# passwd -e user01 Old shell: /usr/bin/bash New shell: /bin/sh passwd: password information changed for user01 #

4. Network Management

(1) Setting an IP address

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
	ifconfig	ip, nmcli	ipadm	Different
Intended Use	**Option Details**			
Set IP address for specified interface	-	**nmcli connection mod**	**ipadm create-addr -T static**	Different commands
Set temporary IP address	**ifconfig**	**ip address add**	**ipadm create-addr -t**	Different commands
Configure DHCP for specified interface	-	**nmcli connection mod** ***device*** **ipv4.method auto**	**ipadm create-addr -T dhcp**	Different commands
Create IP interface	-	**nmcli connection add**	**ipadm create-ip**	Different commands
Delete IP interface from active configuration	-	**nmcli connection del**	**ipadm delete-ip**	Different commands
Refer to IP address of interface	**ifconfig**	**ip address**	**ipadm show-addr**	Different commands
Delete IP address of interface	-	**nmcli connection modify** ***device*** **ipv4.addresses ""**	**ipadm delete-addr**	Different commands

Execution example 1
Set an IP address.

Linux

<<RHEL 6>>

```
# vi /etc/sysconfig/network-scripts/ifcfg-eth0

IPADDR=192.168.0.1          <- Modify IP address.

# /etc/init.d/network restart
#
```

<<RHEL 7>>

```
# nmcli c add type eth ifname eth0 con-name eth0
Connection 'eth0' (783805c6-7ae2-43af-8a2e-e34b04016bb8) successfully
 added.
# nmcli c mod eth0 ipv4.method manual ipv4.addresses 192.168.0.1/24
 ipv4.gateway 192.168.0.254
# nmcli c down eth0
# nmcli c up eth0
```

Solaris

```
# ipadm create-ip net0
# ipadm create-addr -T static -a 192.168.0.1/24 net0/v4
#
```

Execution example 2
Refer to an IP address.

Linux

<<RHEL 6>>

```
# ifconfig
eth0      Link encap:Ethernet  HWaddr 00:0C:29:1C:23:B9
          inet addr:192.168.0.1  Bcast:192.168.0.255  Mask:255.255.255.0
          inet6 addr: fe80::20c:29ff:fe1c:23b9/64 Scope:Link
          UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
          RX packets:962955 errors:0 dropped:0 overruns:0 frame:0
          TX packets:14995 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:101308564 (96.6 MiB)  TX bytes:1488900 (1.4 MiB)

lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          inet6 addr: ::1/128 Scope:Host
          UP LOOPBACK RUNNING  MTU:16436  Metric:1
          RX packets:4 errors:0 dropped:0 overruns:0 frame:0
          TX packets:4 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:0
          RX bytes:240 (240.0 b)  TX bytes:240 (240.0 b)
#
```

<<RHEL 7>>

```
# ip address
1: lo: <LOOPBACK,UP,LOWER_UP> mtu 65536 qdisc noqueue state UNKNOWN
    link/loopback 00:00:00:00:00:00 brd 00:00:00:00:00:00
    inet 127.0.0.1/8 scope host lo
       valid_lft forever preferred_lft forever
    inet6 ::1/128 scope host
       valid_lft forever preferred_lft forever
2: ens192: <BROADCAST,MULTICAST,UP,LOWER_UP> mtu 1500 qdisc mq state UP
     qlen 1000
    link/ether 00:0c:29:31:af:5d brd ff:ff:ff:ff:ff:ff
    inet 192.168.0.1/24 brd 192.168.0.255 scope global ens192
       valid_lft forever preferred_lft forever
    inet6 fe80::20c:29ff:fe31:af5d/64 scope link
       valid_lft forever preferred_lft forever
#
```

Solaris

```
# ipadm show-addr
DDROBJ          TYPE    STATE       ADDR
lo0/v4          static  ok          127.0.0.1/8
net0/v4         static  ok          192.168.0.1/24
lo0/v6          static  ok          ::1/128
#
```

(2) Configuring the gateway

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
	route	**ip, nmcli**	**route**	Different
Intended Use	**Option Details**			
Add route	**route add**	**ip route add**	**route add**	Same
Delete route	**route del**	**ip route del**	**route delete**	Different options
Delete all entries from routing table	**-**	**ip route flush**	**route flush**	Different commands
Display routes applied at system startup	**-**	**-**	**route show**	Solaris only
Make changes persistent after system restart	**-**	**nmcli con mod** *device* **ipv4.gateway** *IP_address*	**route -p**	Different commands
Continuously report information based on routing information	**-**	**-**	**route monitor**	Solaris only
Set route to block	**route reject**	**ip route add prohibit**	**-**	Linux only
Specify network or host as target	**route target**	**-**	**-**	Linux only

Execution example 1
Change the gateway (enable at the next system startup).

Linux

```
# vi /etc/sysconfig/network

GATEWAY=192.168.0.254    <- Modify IP address.

# /etc/init.d/network restart
```

Solaris

```
# route -p add default 192.168.0.254
#
```

Execution example 2
Display gateway information.

Linux

<<RHEL 6>>

```
# netstat -rn
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
192.168.0.0     0.0.0.0         255.255.255.0   U         0 0          0 eth0
169.254.0.0     0.0.0.0         255.255.0.0     U         0 0          0 eth0
0.0.0.0         192.168.0.254 0.0.0.0         UG        0 0          0 eth0
#
```

<<RHEL 7>>

```
# ip route
default via 10.20.66.1 dev ens192  proto static  metric 100
192.168.0.0/24 dev ens192  proto kernel  scope link  src 192.168.0.20
metric 100
#
```

Solaris

```
# netstat -rn

Routing Table: IPv4
  Destination           Gateway           Flags  Ref     Use     Interface
-------------------- -------------------- ----- ------ --------- ---------
default              192.168.0.254        UG        6     827272
192.168.0.0          192.168.0.1          U         8    9315985   net7
127.0.0.1            127.0.0.1            UH       14     292702   lo0

Routing Table: IPv6
  Destination/Mask            Gateway                 Flags     Ref     Use    If
--------------------------- --------------------- --------- ------ --------- -----
::1                         ::1                   UH            2         80 lo0
#
```

(3) Checking the network status

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
	netstat	**ss, ip**	**netstat**	Different
Intended Use	**Option Details**			
Display status of all physical and logical interfaces	**netstat -a**	**ss -a**	**netstat -a**	Different commands
Display network addresses by number	**netstat -n**	**ss -n**	**netstat -n**	Different commands
Display routing table	**netstat -r**	**ip route**	**netstat -r**	Different commands
Display status of interfaces configured by DHCP	-	-	**netstat -D**	Solaris only

Execution example 1
Check the network status.

Linux

<<RHEL 6>>

```
# netstat -rn
Kernel IP routing table
Destination     Gateway         Genmask         Flags   MSS Window  irtt Iface
192.168.0.0     0.0.0.0         255.255.255.0   U         0 0          0 eth0
169.254.0.0     0.0.0.0         255.255.0.0     U         0 0          0 eth0
0.0.0.0         192.168.0.254 0.0.0.0         UG        0 0          0 eth0
#
```

<<RHEL 7>>

```
# ip route
default via 10.20.66.1 dev ens192  proto static  metric 100
192.168.0.0/24 dev ens192  proto kernel  scope link  src 192.168.0.20
  metric 100
#
```

Solaris

```
# netstat -rn

Routing Table: IPv4
  Destination           Gateway           Flags    Ref     Use     Interface
-------------------- -------------------- --------- ------ ---------- ---------
default              10.20.66.1           UG            1          0 net0
10.20.66.0           10.20.66.134         U            15        104 net0
127.0.0.1            127.0.0.1            UH            2        242 lo0
192.168.1.0          192.168.1.250        U             2          0 net1

Routing Table: IPv6
  Destination/Mask     Gateway                   Flags     Ref   Use    If
--------------------------- --------------------------- --------- ------ ---------- ------
::1                         ::1                         UH        2      8 lo0
fe80::/10                   fe80::214:4fff:fef8:18f1    U         2      0 net0
#
```

Reference example 1
Check traffic flow statistical information.

```
# flowstat -i 5

FLOW         IPKTS     RBYTES     IDROPS     OPKTS     OBYTES     ODROPS
vnic0_flow   40.16K    59.87M         75    12.21K    807.72K          0
vnic0_flow   28.85K    43.01M        221    14.59K    968.18K          0
vnic0_flow   30.82K    45.94M        205    15.57K     1.03M           0
vnic0_flow   33.58K    50.06M         88    16.80K     1.11M           0
vnic0_flow   43.21K    64.41M        362    21.92K     1.45M           0
^C
#
```

Reference example 2
Report runtime statistical information related to the data link.

```
# dlstat
      LINK   IPKTS   RBYTES   OPKTS   OBYTES
      net1       0        0       3      126
      net3       0        0       0        0
      net0       0        0       0        0
      net2       0        0       0        0
#
```

Reference example 3
Check the IPMP subsystem status.

```
# ipmpstat -a
ADDRESS               STATE    GROUP    INBOUND   OUTBOUND
::                    down     ipmp0    --        --
ldom0                 up       ipmp0    net0      net0
#
```

(4) Checking the network device status

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
	ethtool	**ethtool, ip**	**dladm**	Different
Intended Use	**Option Details**			
Display driver information	**ethtool -i**		**-**	Linux only
Execute test on interface card	**ethtool -t**		**-**	Linux only
Display all data link configuration information	**-**	**ip link**	**dladm show-link**	Different commands
Display physical device and physical link attributes	**ethtool *device_name***		**dladm show-phys**	Different commands

Execution example 1
Check the network device status.

Linux

```
# ethtool eth0
Settings for eth0:
        Supported ports: [ TP ]
        Supported link modes:   1000baseT/Full
                                10000baseT/Full
        Supported pause frame use: No
        Supports auto-negotiation: No
        Advertised link modes:  Not reported
        Advertised pause frame use: No
        Advertised auto-negotiation: No
        Speed: 10000Mb/s
        Duplex: Full
        Port: Twisted Pair
        PHYAD: 0
        Transceiver: internal
        Auto-negotiation: off
        MDI-X: Unknown
        Supports Wake-on: uag
        Wake-on: d
        Link detected: yes
#
```

Solaris

```
# dladm show-phys
LINK         MEDIA        STATE      SPEED  DUPLEX    DEVICE
net1         Ethernet     down       0      unknown   igb1
net3         Ethernet     unknown    0      unknown   igb3
net0         Ethernet     up         1000   full      igb0
net2         Ethernet     unknown    0      unknown   igb2
#
```

5. Service Management

(1) Managing services

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
	service, chkconfig	systemctl	svcadm	Different
Intended Use	**Option Details**			
Start service	**service *service* start**	**systemctl start *service***	**svcadm -t enable *service***	Different commands
Stop service	**service *service* stop**	**systemctl stop *service***	**svcadm -t disable *service***	Different commands
Start service and then enable automatic startup	**service *service* start** **chkconfig *service* on**	**systemctl start *service*** **systemctl enable *service***	**svcadm enable *service***	Different commands
Stop service and then disable automatic startup	**service *service* stop** **chkconfig *service* off**	**systemctl stop *service*** **systemctl disable *service***	**svcadm disable *service***	Different commands
Restart service	**service *service* restart**	**systemctl restart *service***	**svcadm restart *service***	Different commands
Reload service configuration information	**service *service* reload**	**systemctl reload *service***	**svcadm refresh *service***	Different commands
Clear error and restart service	-	-	**svcadm clear *service***	Solaris only

Execution example 1
Start service.

Linux	Solaris
<<RHEL 6>> # service httpd start # **<<RHEL 7>>** # systemctl start httpd.service #	# svcadm enable -t apache22 #

Execution example 2
Stop service.

Linux	Solaris
<<RHEL 6>> # service httpd stop # **<<RHEL 7>>** # systemctl stop httpd.service #	# svcadm disable apache22 #

Execution example 3
Start service and enable automatic startup.

Linux	Solaris
<<RHEL 6>> # service httpd start # chkconfig httpd on # **<<RHEL 7>>** # systemctl start httpd.service # systemctl enable httpd.service #	# svcadm enable apache22 #

Execution example 4
Stop service and disable automatic startup.

Linux	Solaris
<<RHEL 6>> # service httpd stop # chkconfig httpd off # **<<RHEL 7>>** # systemctl stop httpd.service # systemctl disable httpd.service #	# svcadm disable apache22 #

(2) Displaying the service status

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
	service, chkconfig	**systemctl**	**svcs**	Different
Intended Use	**Option Details**			
Display service status	**service *service* state**	**systemctl status *service***	**svcs *service***	Different commands
Display list of services	**chkconfig --list**	**systemctl list-unit-files --type service**	**svcs -a**	Different commands
Display all information that can be shown	-	**systemctl show *service***	**svcs -l *service***	Different commands
Output report parameters for service state changes	-	-	**svcs -n *service***	Solaris only
Display list of related processes	-	**systemctl status *service***	**svcs -p *service***	Different commands

Execution example 1
Display the service status.

Linux

```
<<RHEL 6>>
# service httpd status
httpd is stopped
#

<<RHEL 7>>
# systemctl status httpd.service
httpd.service - The Apache HTTP Server
   Loaded: loaded (/usr/lib/systemd/system/httpd.service; disabled)
   Active: inactive (dead)
```

Solaris

```
# svcs svc:/ldoms/vntsd:default
STATE          STIME    FMRI
online         0:00:50  svc:/ldoms/vntsd:default
#
```

Execution example 2
Display a list of services.

Linux

```
<<RHEL 6>>
# chkconfig --list
NetworkManager  0:off  1:off  2:on   3:on   4:on   5:on   6:off
abrt-ccpp       0:off  1:off  2:off  3:on   4:off  5:on   6:off
abrtd           0:off  1:off  2:off  3:on   4:off  5:on   6:off
acpid           0:off  1:off  2:on   3:on   4:on   5:on   6:off
atd             0:off  1:off  2:off  3:on   4:on   5:on   6:off
auditd          0:off  1:off  2:on   3:on   4:on   5:on   6:off
autofs          0:off  1:off  2:off  3:on   4:on   5:on   6:off
blk-availability 0:off 1:on   2:on   3:on   4:on   5:on   6:off
bluetooth       0:off  1:off  2:off  3:on   4:on   5:on   6:off
bmc-watchdog    0:off  1:off  2:off  3:on   4:off  5:on   6:off
certmonger      0:off  1:off  2:off  3:on   4:on   5:on   6:off

xinetd based services:
        chargen-dgram:  off
        chargen-stream: off
        daytime-dgram:  off
        daytime-stream: off
        discard-dgram:  off
        discard-stream: off
        echo-dgram:     off
        echo-stream:    off
        rsync:          off
        tcpmux-server:  off
        time-dgram:     off
        time-stream:    off

#

<<RHEL 7>>
# systemctl list-unit-files --type service
UNIT FILE                              STATE
abrt-ccpp.service                      enabled
abrt-oops.service                      enabled
abrt-pstoreoops.service                disabled
abrt-vmcore.service                    enabled
abrt-xorg.service                      enabled
abrtd.service                          enabled
accounts-daemon.service                enabled
alsa-restore.service                   static
alsa-state.service                     static
(Omitted)
#
```

Solaris

```
# svcs -a
STATE          STIME    FMRI
legacy_run     2:15:53  lrc:/etc/rc2_d/S47pppd
legacy_run     2:15:53  lrc:/etc/rc2_d/S81dodatadm_udaplt
legacy_run     2:15:53  lrc:/etc/rc2_d/S89PRESERVE
disabled       2:13:23  svc:/system/device/mpxio-upgrade:default
disabled       2:13:24  svc:/network/ipsec/manual-key:default
disabled       2:13:24  svc:/network/ipsec/ike:default
disabled       2:13:24  svc:/network/ipsec/ike:ikev2
disabled       2:13:24  svc:/network/nis/domain:default
disabled       2:13:24  svc:/network/ipfilter:default
disabled       2:13:24  svc:/system/name-service-cache:default
online         2:13:23  svc:/system/early-manifest-import:default
online         2:13:23  svc:/system/svc/restarter:default
online         2:13:26  svc:/network/connectx/unified-driver-post-
                        upgrade:default
online         2:13:26  svc:/network/netcfg:default
online         2:13:26  svc:/network/sctp/congestion-control:newreno
online         2:13:26  svc:/network/socket-config:default
online         2:13:26  svc:/network/tcp/congestion-control:cubic
online         2:13:26  svc:/network/sctp/congestion-control:cubic
online         2:13:26  svc:/network/sctp/congestion-control:highspeed
offline        2:13:29  svc:/system/fm/smtp-notify:default
#
```

Execution example 3
Display all the information that can be shown.

Linux	Solaris
<<RHEL 7>>	# svcs -l svc:/ldoms/vntsd:default
# systemctl show httpd.service	fmri svc:/ldoms/vntsd:default
Id=httpd.service	name virtual network terminal server
Names=httpd.service	enabled true
Requires=basic.target	state online
Wants=system.slice	next_state none
Conflicts=shutdown.target	state_time November 8, 2016 12:00:50 AM EST
Before=shutdown.target	logfile /var/svc/log/ldoms-vntsd:default.log
After=network.target remote-fs.target nss-lookup.target	restarter svc:/system/svc/restarter:default
Description=The Apache HTTP Server	contract_id 147
LoadState=loaded	manifest /lib/svc/manifest/platform/sun4v/vntsd.xml
ActiveState=active	dependency optional_all/error svc:/milestone/network (online)
(Omitted)	dependency optional_all/none svc:/system/system-log (online)
#	#

6. File System and Storage Management

(1) Managing the file system

Command / Intended Use	Linux RHEL 6	Linux RHEL 7	Solaris	Comparison
	vgcreate, lvcreate, mkfs, mount, pvscan, vgscan, lvscan		zpool, zfs	Different
Intended Use	**Option Details**			
Create volume group	**vgcreate *volume_group_name device_name***		-	Different names but same purpose
Create storage pool	-		**zpool create *pool_name* RAID *device_name***	
Create logical volume	**lvcreate -L *size* -n *logical_volume_name volume_group_name***		-	Different names but same purpose
Create file system	**mkfs -t *file_system_type logical_volume_name***		**zfs create *file_system_name***	
Mount file system	**mount *logical_volume_name mount_point***		**zfs mount *file_system_name***	Different commands
Display volume group (ZFS pool) configuration	**pvscan**		**zpool status**	Different commands
Display list of volume groups (ZFS pools)	**vgscan**		**zpool list**	Different commands
Display list of logical volume groups (ZFS data sets)	**lvscan**		**zfs list**	Different commands
Change mount point of OS startup	**Edit /etc/fstab**		**zfs set mountpoint=*mount_point file_system_name***	Different commands

Execution example 1
Create a storage pool (create a volume group).

Linux	Solaris
# vgcreate Volume00 /dev/sda1 /dev/sda2 #	# zpool create mirpool mirror c2d3 c2d4 #

Execution example 2
Create a file system.

Linux	Solaris
# lvcreate -L 128M -n LogVol00 Volume00 # mkfs -t ext4 /dev/Volume00/LogVol00 # mount /dev/Volume00/LogVol00 /data #	# zfs create mirpool/data # zfs get mountpoint mirpool/data NAME PROPERTY VALUE SOURCE mirpool/data mountpoint /mirpool/data default # zfs set mountpoint=/data mirpool/data #

(2) Obtaining a snapshot

Command / Intended Use	Linux RHEL 6	Linux RHEL 7	Solaris	Comparison
	lvcreate, lvscan, lvrename, lvconvert		zfs	Different
Intended Use	**Option Details**			
Create snapshot	**lvcreate -s -L *size* -n *snapshot_name original_device***		**zfs snapshot *snapshot_name***	Different commands
Display list of snapshots	**lvscan**		**zfs list -t *snapshot_name***	Different commands
Delete snapshot	**lvrename *snapshot_name***		**zfs destroy *snapshot_name***	Different commands
Roll back from snapshot	**lvconvert --merge *snapshot_name***		**zfs rollback *snapshot_name***	Different commands

Execution example 1
Create a snapshot.

Linux	Solaris
# lvcreate -s -L 50M -n LogVol_snap /dev/Volume00/LogVol00 #	# zfs snapshot mirpool/data@snap #

Execution example 2
Display a snapshot.

Linux	Solaris
# lvscan ACTIVE Original '/dev/Volume00/LogVol00' [3.00 GiB] inherit ACTIVE Snapshot '/dev/Volume00/LogVol_snap' [52.00 MiB] inherit #	# zfs list -t snapshot NAME USED AVAIL REFER MOUNTPOINT mirpool/data@snap 0 - 31K - #

Execution example 3
Roll back a snapshot.

Linux	Solaris
# lvconvert --merge /dev/Volume00/LogVol_snap #	# zfs rollback mirpool/data@snap #

Execution example 4
Delete a snapshot.

Linux	Solaris
# lvremove /dev/Volume00/LogVol_snap #	# zfs destroy mirpool/data@snap #

(3) Backing up the file system by using a snapshot

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
	dump, restore	**xfsdump, xfsrestore**	**zfs**	Different
Intended Use	**Option Details**			
Back up file system	**dump -0u -f *backup_file snapshot_name***	**xfsdump -l 0 -f *backup_file snapshot_name***	**zfs send *snapshot_name***	Different commands
Restore file system	**restore -r -f *backup_file***	**xfsrestore -f *backup_file* -s *session_ID recovery_destination***	**zfs receive *snapshot_stream***	Different commands

Execution example 1
Back up the file system.

Linux	Solaris
<<RHEL 6>> # dump -0 -f /backup/LogVol00.dump /dev/Volume00/LogVol_snap # **<<RHEL 7>>** # xfsdump -l 0 -f /backup/LogVol00.dump /dev/Volume00/LogVol_snap xfsdump: using file dump (drive_simple) strategy xfsdump: version 3.1.4 (dump format 3.0) - type ^C for status and control ====================== dump label dialog ====================== please enter label for this dump session (timeout in 300 sec) ->(Omitted) xfsdump: Dump Summary: xfsdump: stream 0 /var/tmp/boot.dump OK (success) xfsdump: Dump Status: SUCCESS #	# zfs send -vR mirpool/data@snap > /backup/data.snap #

Execution example 2
Restore the file system.

Linux	Solaris
<<RHEL 6>> # restore -r -f /backup/LogVol00.dump # **<<RHEL 7>>** # xfsrestore -f /backup/LogVol00.dump -s snap /var/tmp #	# zfs receive -vF mirpool/data < /backup/data.snap #

(4) Managing partitions

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
	parted, fdisk		**format**	Different
Intended Use	**Option Details**			
Display partition	**parted *device_name* fdisk *device_name***		**format**	Different commands

Execution example 1
Display a partition.

Linux

```
# parted /dev/xvda
GNU Parted 2.1
Using /dev/xvda
Welcome to GNU Parted! Type 'help' to view a list of commands.
(parted) print
Model: Xen Virtual Block Device (xvd)
Disk /dev/xvda: 21.5GB
Sector size (logical/physical): 512B/512B
Partition Table: msdos

Number  Start   End     Size    Type      File system  Flags
 1      1049kB  525MB   524MB   primary   ext4         boot
 2      525MB   21.5GB  20.9GB  primary                lvm

(parted) quit
#
# fdisk /dev/xvda

WARNING: DOS-compatible mode is deprecated. It's strongly recommended
         to switch off the mode (command 'c') and change display
         units to sectors (command 'u').

Command (m for help): p

Disk /dev/xvda: 21.5 GB, 21474836480 bytes
255 heads, 63 sectors/track, 2610 cylinders
Units = cylinders of 16065 * 512 = 8225280 bytes
Sector size (logical/physical): 512 bytes / 512 bytes
I/O size (minimum/optimal): 512 bytes / 512 bytes
Disk identifier: 0x000d5779

Device Boot      Start         End      Blocks   Id  System
/dev/xvda1   *           1          64      512000   83  Linux
Partition 1 does not end on cylinder boundary.
/dev/xvda2              64        2611    20458496  8e  Linux LVM

Command (m for help): q

#
```

Solaris

```
# format
Searching for disks...done


AVAILABLE DISK SELECTIONS:
       0. c0t50000394281A8EBCd0 <TOSHIBA-MBF2600RC-3706 cyl
 64986 alt 2 hd 27 sec 668>  hoge
          /scsi_vhci/disk@g50000394281a8ebc
          /dev/chassis/SYS/HDD00/disk
       1. c0t50000394281AA200d0 <TOSHIBA-MBF2600RC-3706-
558.91GB>  testvol1
          /scsi_vhci/disk@g50000394281aa200
          /dev/chassis/SYS/HDD01/disk
       2. c5d0 <SUN-DiskImage-137GB cyl 3900 alt 2 hd 96 sec 768>
          /virtual-devices@100/channel-devices@200/disk@0
Specify disk (enter its number): 0
selecting c0t50000394281A8EBCd0: hoge
[disk formatted]
/dev/dsk/c0t50000394281A8EBCd0s0 is part of active ZFS pool rpo
ol. Pleas
e see zpool(1M).

FORMAT MENU:
        disk       - select a disk
        type       - select (define) a disk type
        partition  - select (define) a partition table
        current    - describe the current disk
        format     - format and analyze the disk
        repair     - repair a defective sector
        label      - write label to the disk
        analyze    - surface analysis
        defect     - defect list management
        backup     - search for backup labels
        verify     - read and display labels
        save       - save new disk/partition definitions
        inquiry    - show disk ID
        volname    - set 8-character volume name
        !<cmd>     - execute <cmd>, then return
        quit
format> partition

--<Continued on next page>--
```

```
PARTITION MENU:
      0      - change `0' partition
      1      - change `1' partition
      2      - change `2' partition
      3      - change `3' partition
      4      - change `4' partition
      5      - change `5' partition
      6      - change `6' partition
      7      - change `7' partition
    select   - select a predefined table
    modify   - modify a predefined partition table
    name     - name the current table
    print    - display the current table
    label    - write partition map and label to the disk
    !<cmd>   - execute <cmd>, then return
    quit
partition> print
Volume:  hoge
Current partition table (original):
Total disk cylinders available: 64986 + 2 (reserved cylinders)

Part      Tag    Flag     Cylinders         Size            Blocks
  0       root    wm       1 - 64985       558.89GB    (64985/0/0) 1172
069460
  1 unassigned    wm       0                   0         (0/0/0)           0
  2     backup    wu       0 - 64985       558.89GB    (64986/0/0) 1172
087496
  3 unassigned    wm       0                   0         (0/0/0)           0
  4 unassigned    wm       0                   0         (0/0/0)           0
  5 unassigned    wm       0                   0         (0/0/0)           0
  6 unassigned    wm       0                   0         (0/0/0)           0
  7 unassigned    wm       0                   0         (0/0/0)           0

partition> quit
#
```

7. Monitoring

(1) Checking I/O load

Command / Intended Use	Linux RHEL 6	Linux RHEL 7	Solaris	Comparison
	iostat		**iostat**	Same
Intended Use	**Option Details**			
Check I/O load	**iostat *interval count***		**iostat *interval count***	Same

Execution example 1
Check I/O load.

Linux

```
# iostat 10 60
Linux 2.6.32-431.el6.x86_64 (REL6.5)    11/08/2016    _x86_64_   (1 CPU)

avg-cpu:  %user   %nice %system %iowait  %steal   %idle
           0.39    0.23    0.71    3.08    0.00   95.59

Device:            tps   Blk_read/s   Blk_wrtn/s   Blk_read   Blk_wrtn
xvda             20.14       112.72       1145.6     792222    8051452
scd0              0.01         0.05         0.00        352          0
dm-0            147.76       111.28       1145.57     782106    8051424
dm-1              0.05         0.38         0.00       2680          0

#
```

Solaris

```
# iostat 10 60
     tty          lofi1          sd0            sd1            vdc0           cpu
tin tout kps tps serv kps tps serv kps tps serv kps tps serv us sy wt id
  0    2   1   1    0  20   3    5  50   6    8   0   0    0  0  1  0 99
(Omitted)
#
```

(2) Checking CPU load

Command / Intended Use	Linux RHEL 6	Linux RHEL 7	Solaris	Comparison
	mpstat		**mpstat**	Same
Intended Use	**Option Details**			
Check CPU load	**mpstat *interval count***		**mpstat *interval count***	Same

Execution example 1
Check CPU load.

Linux

```
# mpstat 10 60
Linux 2.6.32-431.el6.x86_64 (REL6.5)    11/08/2016    _x86_64_    (1 CPU)

10:08:14 AM  CPU    %usr   %nice    %sys %iowait    %irq   %soft  %steal  %guest   %idle
10:08:24 AM  all    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00  100.00
10:08:34 AM  all    0.00    0.00    0.00    0.00    0.00    0.00    0.00    0.00  100.00
(Omitted)
#
```

Solaris

```
# mpstat 10 60
CPU minf mjf xcal  intr ithr  csw icsw migr smtx  srw  syscl  usr sys wt idl
  0    0   0   11   228   15   10    0    0    0    0      0    0   0  0 100
  1    0   0    4     8    7    0    0    0    0    0      0    0   0  0 100
  2  182   0   84   254   47  323    4   16   16    1    585    1   1  0  98
  3  176   0   82   251   42  320    4   16   17    1    565    1   2  0  98
  4    5   0    4     7    0   25    0    0   10    3     50    0   1  0  99
  5    1   0    1     3    1    6    0    0    2    0     30    0   0  0 100
  6    0   0    2     3    2    0    0    0    0    0      0    0   0  0 100
  7    0   0   17    19   18    0    0    0    0    0      0    0   0  0 100
(Omitted)
#
```

Reference example 1
Display usage status statistical information related to processor groups (PGs).

```
# pgstat 10 60
PG  RELATIONSHIP                HW          SW      CPUS
 0  System                       -       0.4%    0-7
 3   Data_Pipe_to_memory         -       0.4%    0-7
 2    Floating_Point_Unit        -       1.5%    0 1
 1     Integer_Pipeline        2.3%       1.5%    0 1
 5    Floating_Point_Unit        -       0.5%    2 3
 4     Integer_Pipeline        0.2%       0.5%    2 3
 7    Floating_Point_Unit        -       0.0%    4 5
 6     Integer_Pipeline        0.1%       0.0%    4 5
 9    Floating_Point_Unit        -       0.0%    6 7
 8     Integer_Pipeline        0.1%       0.0%    6 7
(Omitted)
#
```

(3) Checking memory load

Command / Intended Use	Linux RHEL 6	Linux RHEL 7	Solaris	Comparison
	vmstat		**vmstat**	Same
Intended Use	**Option Details**			
Check memory load	**vmstat *interval count***		**vmstat *interval count***	Same
Display total number of system events since boot	**vmstat -s**		**vmstat -s**	Same
Report detailed paging activity	**-**		**vmstat -p**	Solaris only

Execution example 1
Check memory load.

Linux

```
# vmstat 10 60
procs -----------memory---------- -swap- ------io----- -system- ---------cpu---------
 r    b   swpd   free      buff     cache   si   so    bi    bo   in   cs us sy id wa st
 0    0      0 936616  165184    501244    0    0     0     0   13    4  0  0 100  0  0
(Omitted)
#
```

Solaris

```
# vmstat 10 60
 kthr      memory            page            disk          faults      cpu
 r b w   swap     free      re  mf  pi  po fr de sr  lf  s0  s1  vc  in  sy  cs us sy id
 0 0 0 38598880 7483328  149 365 0    0  0  0  0   0   1   3   6   0 774 1231
  685  0  1 99
(Omitted)
#
```

(4) Setting the log output destination

Command / Intended Use	Linux RHEL 6	Linux RHEL 7	Solaris	Comparison
	rsyslogd		**syslogd**	Different
Intended Use	**Option Details**			
Service	**rsyslog**		**system-log**	Different
Configuration file	**/etc/rsyslog.conf**		**/etc/syslog.conf**	Different

Execution example 1
Change the output file.

Linux

```
# vi /etc/rsyslog.conf
*.info;mail.none;authpriv.none;cron.none        /var/log/messages
                    v
*.info;mail.none;authpriv.none;cron.none        /var/log/syslog

# service rsyslog restart
#
```

Solaris

```
# vi /etc/syslog.conf
*.err;kern.debug;daemon.notice;mail.crit        /var/adm/messages
                    v
*.err;kern.debug;daemon.notice;mail.crit        /var/adm/syslog

# svcadm refresh system-log
#
```

Execution example 2
Change the output destination host.

Linux	Solaris
# vi /etc/rsyslog.conf *.info;mail.none;authpriv.none;cron.none /var/log/messages v *.info;mail.none;authpriv.none;cron.none @192.168.0.1 # service rsyslogd restart #	# vi /etc/syslog.conf *.err;kern.debug;daemon.notice;mail.crit /var/adm/messages v *.err;kern.debug;daemon.notice;mail.crit @192.168.0.1 # svcadm refresh system-log #

(5) Executing log rotation

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
	logrotate		**logadm**	Different
Intended Use	**Option Details**			
Execute log rotation	**logrotate *configuration_file***		**logadm**	Different
Configuration file	**/etc/logrotate.conf**		**/etc/logadm.conf**	Different

Execution example 2
Configure system log rotation.

Linux	Solaris

# vi /etc/logrotate.d/syslog 	
/var/log/cron
/var/log/maillog
/var/log/messages
/var/log/secure
/var/log/spooler
{
sharedscripts
postrotate
/bin/kill -HUP `cat /var/run/syslogd.pid 2> /dev/null` 2>
/dev/null || true
endscript
}
#
	# vi /etc/logadm.conf
	/var/adm/messages -C 4 -a '/usr/sbin/svccfg -s svc:/system/system-log
	refresh'
	
	#
	#

Execution example 2
Execute log rotation.

Linux	Solaris
# logrotate /etc/logrotate.conf #	# logadm #

(6) Confirming network communication

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
	ping		**ping**	Same
Intended Use	**Option Details**			
Send ICMP ECHO_REQUEST packet	**ping *host***		**ping -s *host***	Different options
Specify interval of consecutive transmissions	**ping -i *seconds host***		**ping -I *seconds host***	Different options
Do not try to search for host name	**ping -n *host***		**ping -s -n *host***	Different options
Specify data size of transmission packet	**ping -s *bytes host***		**ping -s *host bytes***	Different arrangement of options

Execution example 1
Confirm communication.

Linux

```
# ping 192.168.0.1
PING 192.168.0.1 (192.168.0.1) 56(84) bytes of data.
64 bytes from 192.168.0.1: icmp_seq=1 ttl=255 time=0.161 ms
64 bytes from 192.168.0.1: icmp_seq=2 ttl=255 time=0.363 ms
64 bytes from 192.168.0.1: icmp_seq=3 ttl=255 time=0.409 ms
64 bytes from 192.168.0.1: icmp_seq=4 ttl=255 time=0.260 ms
^C
--- 192.168.0.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3289ms
rtt min/avg/max/mdev = 0.161/0.298/0.409/0.096 ms
#
```

Solaris

```
# ping 192.168.0.1
192.168.0.1 is alive
#
# ping -s 192.168.0.1
64 bytes from 192.168.0.1: icmp_seq=0. time=0.324 ms
64 bytes from 192.168.0.1: icmp_seq=1. time=0.272 ms
64 bytes from 192.168.0.1: icmp_seq=2. time=0.128 ms
^C
----192.168.0.1 PING Statistics----
3 packets transmitted, 3 packets received, 0% packet loss
round-trip (ms)  min/avg/max/stddev = 0.128/0.241/0.324/0.102
#
```

Execution example 2
Specify the transmission interval and confirm communication.

Linux

```
# ping -i 5 192.168.0.1
PING 192.168.0.1 (192.168.0.1) 56(84) bytes of data.
64 bytes from 192.168.0.1: icmp_seq=1 ttl=255 time=0.161 ms
64 bytes from 192.168.0.1: icmp_seq=2 ttl=255 time=0.363 ms
64 bytes from 192.168.0.1: icmp_seq=3 ttl=255 time=0.409 ms
64 bytes from 192.168.0.1: icmp_seq=4 ttl=255 time=0.260 ms
^C
--- 192.168.0.1 ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3289ms
rtt min/avg/max/mdev = 0.161/0.298/0.409/0.096 ms
#
```

Solaris

```
# ping -s -I 5 192.168.0.1
PING 192.168.0.1: 56 data bytes
64 bytes from 192.168.0.1: icmp_seq=0. time=0.546 ms
64 bytes from 192.168.0.1: icmp_seq=1. time=0.393 ms
64 bytes from 192.168.0.1: icmp_seq=2. time=0.302 ms
64 bytes from 192.168.0.1: icmp_seq=3. time=0.414 ms
^C
----192.168.0.1 PING Statistics----
4 packets transmitted, 4 packets received, 0% packet loss
round-trip (ms)  min/avg/max/stddev = 0.302/0.414/0.546/0.123
#
```

(7) Checking the process state

Command / Intended Use	Linux RHEL 6	Linux RHEL 7	Solaris	Comparison
	ps		**ps**	Same
Intended Use	**Option Details**			
Display in full format	**ps -f**		**ps -f**	Same
Display all processes	**ps -e**		**ps -e**	Same

Execution example 1
Check the process state.

Linux

```
# ps -ef
UID        PID  PPID  C STIME TTY          TIME CMD
root         1     0  0 May30 ?        00:00:01 /sbin/init
root         2     0  0 May30 ?        00:00:00 [kthreadd]
root         3     2  0 May30 ?        00:00:00 [migration/0]
root         4     2  0 May30 ?        00:00:00 [ksoftirqd/0]
root         5     2  0 May30 ?        00:00:00 [migration/0]
root         6     2  0 May30 ?        00:00:01 [watchdog/0]
root         7     2  0 May30 ?        00:00:00 [migration/1]
root         8     2  0 May30 ?        00:00:00 [migration/1]
root         9     2  0 May30 ?        00:00:00 [ksoftirqd/1]
root         #     2  0 May30 ?        00:00:00 [watchdog/1]
root         #     2  0 May30 ?        00:00:22 [events/0]
root         #     2  0 May30 ?        00:00:26 [events/1]
root         #     2  0 May30 ?        00:00:00 [cgroup]
root         #     2  0 May30 ?        00:00:00 [khelper]
root         #     2  0 May30 ?        00:00:00 [netns]
(Omitted)
#
```

Solaris

```
# ps -ef
  UID   PID  PPID  C   STIME TTY         TIME CMD
    root     0     0   0   June 03 ?       0:08 sched
    root     5     0   0   June 03 ?      10:15 zpool-rpool
    root     7     0   0   June 03 ?      13:39 zpool-upool
    root     8     0   0   June 03 ?       0:25 kmem_task
    root     1     0   0   June 03 ?       0:04 /usr/sbin/init
    root     2     0   0   June 03 ?       0:00 pageout
    root     3     0   0   June 03 ?       4:58 fsflush
    root     9     0   0   June 03 ?       0:05 intrd
    root    10     0   0   June 03 ?       0:58 vmtasks
    root    13     1   0   June 03 ?       0:08 /lib/svc/bin/svc.startd
    root    15     1   0   June 03 ?       6:28 /lib/svc/bin/svc.configd
    root   117     1   0   June 03 ?       0:06 /lib/inet/in.mpathd
  dladm     #     1   0   June 03 ?       2:43 /usr/sbin/dlmgmtd
 netcfg     #     1   0   June 03 ?       0:06 /lib/inet/netcfgd
(Omitted)
#
```

Reference example 1
Repeatedly display all the active processes on the system.

```
# prstat 10 60
   PID USERNAME  SIZE   RSS STATE   PRI NICE      TIME  CPU PROCESS/NLWP
  3168 root     239M  223M sleep    57    0   5:01:55 0.2% java/93
  1027 root      22M 9008K sleep     1    0   0:51:03 0.0% ldmd/23
  2875 root      32M 9880K sleep     1    0   0:09:25 0.0% pkg.depotd/64
    60 root    5072K 1896K sleep    29    0   0:02:42 0.0% dlmgmtd/15
     5 root       0K    0K sleep    99  -20   0:10:15 0.0% zpool-rpool/142
  2890 root      15M 6184K sleep     1    0   0:03:24 0.0% snmpd/1
 24379 root    5440K 3248K cpu5      1    0   0:00:00 0.0% prstat/1
    15 root      23M   18M sleep    29    0   0:06:27 0.0% svc.configd/22
   644 netadm  5312K 2160K sleep    56    0   0:00:00 0.0% nwamd/7
   335 root    3744K  408K sleep    29    0   0:00:00 0.0% dbus-daemon/1
   242 root    3608K 1256K sleep    29    0   0:00:00 0.0% ldmad/5
   254 root    3032K   80K sleep    60  -20   0:00:00 0.0% zonestatd/5
   864 daemon  3376K   56K sleep    59    0   0:00:00 0.0% statd/1
   103 daemon  8888K 3056K sleep    29    0   0:00:00 0.0% kcfd/3
  1113 root    2888K   72K sleep    59    0   0:00:00 0.0% evhandsd/1
  5119 user01  3408K 2456K sleep    59    0   0:00:00 0.0% bash/1
   128 root    2528K  720K sleep    29    0   0:00:06 0.0% pfexecd/5
  3167 root    2464K  128K sleep    59    0   0:00:00 0.0% launch/2
    76 netadm  5072K 1376K sleep    29    0   0:00:01 0.0% ipmgmtd/8
  1115 root    3288K   72K sleep    58    0   0:00:00 0.0% evmond/1
    43 netcfg  4136K 1520K sleep    29    0   0:00:06 0.0% netcfgd/4
   117 root    3136K 1016K sleep     1    0   0:00:05 0.0% in.mpathd/1
  5118 root    6928K 3328K sleep    59    0   0:00:00 0.0% login/1
    13 root      43M 7752K sleep    59    0   0:00:08 0.0% svc.startd/16
   793 root    1992K    8K sleep    57    0   0:00:00 0.0% efdaemon/1
    10 root       0K    0K sleep    60    -   0:00:58 0.0% vmtasks/9
     9 root       0K    0K sleep    60    -   0:00:04 0.0% intrd/1
Total: 82 processes, 801 lwps, load averages: 0.04, 0.05, 0.05

#
```

Reference example 2
Track system calls and signals.

```
# truss find . -print >find.out
execve("/usr/bin/find", 0xF8275EA4, 0xF8275EB4)  argc = 3
sysinfo(SI_MACHINE, "sun4v", 257)               = 6
mmap(0x00000000, 32, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANON, -1, 0) = 0xF2070000
mmap(0x00000000, 8192, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANON, -1, 0) = 0xF2060000
memcntl(0xF2080000, 38496, MC_ADVISE, MADV_WILLNEED, 0, 0) = 0
memcntl(0x00010000, 6932, MC_ADVISE, MADV_WILLNEED, 0, 0) = 0
resolvepath("/usr/lib/ld.so.1", "/lib/ld.so.1", 1023) = 12
resolvepath("/usr/bin/find", "/usr/bin/find", 1023) = 13
stat64("/usr/bin/find", 0xF82759C0)             = 0
open("/var/ld/ld.config", O_RDONLY)             Err#2 ENOENT
stat64("/lib/libc.so.1", 0xF8275128)            = 0
resolvepath("/lib/libc.so.1", "/lib/libc.so.1", 1023) = 14
open("/lib/libc.so.1", O_RDONLY)                = 3
mmapobj(3, MMOBJ_INTERPRET, 0xF2060BF8, 0xF82751BC, 0x00000000) = 0
close(3)                                        = 0
mmap(0x00000000, 16384, PROT_READ|PROT_WRITE, MAP_PRIVATE|MAP_ANON, -1, 0) = 0xF1EC0000
memcntl(0xF1ED0000, 253204, MC_ADVISE, MADV_WILLNEED, 0, 0) = 0
mmap(0x00010000, 24576, PROT_READ|PROT_WRITE|PROT_EXEC, MAP_PRIVATE|MAP_ANON|MAP_ALIGN, -1, 0) = 0xF1EB0000
getcontext(0xF8275838)
getrlimit(RLIMIT_STACK, 0xF8275828)             = 0
getpid()                                          = 24965 [24964]
setustack(0xF1EB2AC8)
brk(0x00000000)                                   = 0x00B3A380
brk(0x00B3A380)                                   = 0x00000000
brk(0x00B3C380)                                   = 0x00000000
stat("/usr/lib/locale/en_US.UTF-8/sparcv9/en_US.UTF-8.so.3", 0xFFFFFDEED7A960B0) = 0


#
```

Reference example 3
Display the process tree.

```
# ptree -a `pgrep ssh`
1     /usr/sbin/init
  1053  /usr/lib/ssh/sshd
#
```

(8) Checking the power usage status

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
	powertop		**powertop**	Same
Intended Use	**Option Details**			
Specify CPU that tool should monitor	**-**		**powertop -c CPUID**	Solaris only
Interval for system analysis by tool	**powertop --time *interval***		**powertop -t *interval***	Different options
Detailed mode	**-**		**powertop -v**	Solaris only

Execution example 1
Check the power usage status.

Linux

```
# powertop
PowerTOP 2.3     Overview   Idle stats   Frequency stats   Device stats
  Tunables
Summary: 8.9 wakeups/second,  0.0 GPU ops/seconds, 0.0 VFS ops/sec
 and 0.1% CPU use

    Usage      Events/s     Category      Description
  19.9 µs/s      3.0        Process       [events/0]
 154.8 µs/s      2.0        Process       powertop
  67.2 µs/s      1.0        Process       lldpad -d
  44.8 µs/s      1.0        Process       /usr/sbin/fcoemon --syslog
  13.0 µs/s      1.0        Process       [vmmemctl]
 103.8 µs/s      0.00       Process       sshd: root@pts/0
  60.8 µs/s      0.00       Interrupt     [3] net_rx(softirq)
  34.6 µs/s      0.00       Timer         tick_sched_timer
  25.0 µs/s      0.00       Timer         hrtimer_wakeup
  17.8 µs/s      0.00       Process       /sbin/dmeventd
  15.8 µs/s      0.00       Interrupt     [9] RCU(softirq)
   9.5 µs/s      0.00       Timer         delayed_work_timer_fn
   4.7 µs/s      0.00       Interrupt     [57] eth0-rxtx-0
   4.5 µs/s      0.00       Interrupt     [7] sched(softirq)
   1.9 µs/s      0.00       Timer         ipmi_timeout
   1.8 µs/s      0.00       Timer         sched_rt_period_timer
   1.5 µs/s      0.00       Interrupt     [58] eth0-rxtx-1
   1.3 µs/s      0.00       Timer         tcp_write_timer
   1.3 µs/s      0.00       Interrupt     [1] timer(softirq)

#
```

Solaris

```
# powertop
                Solaris PowerTOP version 1.3

Idle Power States      Avg          Residency     Frequency Levels
C0 (cpu running)                    (14.1%)       2800 Mhz        100.0%
C1                     3.4ms        (85.9%)


Wakeups-from-idle per second: 692.8     interval: 5.0s
no power usage estimate availableMay  2 15:47:11 sol11 last message
 repeated 1 time

Top causes for wakeups:
28.9% (200.2)          sched :  <xcalls> unix`dtrace_sync_func
14.5% (100.2)       <kernel> :  genunix`clock
 9.8% (  67.8)      <kernel> :  genunix`cv_wakeup
 7.2% (  50.0)      <kernel> :  SDC`sysdc_update
 5.7% (  39.2)          sched :  <xcalls> unix`setsoftint_tl1
 0.7% (   5.0)      <kernel> :  vnet`vgen_tx_watchdog
 0.7% (   5.0)      <kernel> :  c2audit`au_queue_kick
 0.1% (   1.0)          sched :  <xcalls> unix`cbe_xcall_handler
 0.1% (   1.0)      <kernel> :  TS`ts_update


Q - Quit R - Refresh

#
```

(9) Solaris-specific commands

Intended Use	Command
Check CPUs, memory, and expansion cards	**prtdiag**

Reference example 1
Check CPUs, memory, and expansion cards.

```
# prtdiag
System Configuration:  Oracle Corporation  sun4v SPARC M10-1
Memory size: 12288 Megabytes

================================ Virtual CPUs ================================
CPU ID   Frequency   Implementation         Status
-------  ----------  ---------------------  ----------
0          2800 MHz    SPARC64-X            on-line
1          2800 MHz    SPARC64-X            on-line
2          2800 MHz    SPARC64-X            on-line
3          2800 MHz    SPARC64-X            on-line
4          2800 MHz    SPARC64-X            on-line
5          2800 MHz    SPARC64-X            on-line
6          2800 MHz    SPARC64-X            on-line
7          2800 MHz    SPARC64-X            on-line
====================== Physical Memory Configuration ========================
Segment Table:
--------------------------------------------------------------------------
Base          Segment  Interleave  Bank    Contains
Address       Size     Factor      Size    Modules
--------------------------------------------------------------------------
0x7e0000000000 64 GB   4           16 GB   /SYS/MBU/CMP0/MEM00A
                                           /SYS/MBU/CMP0/MEM01A
                                   16 GB   /SYS/MBU/CMP0/MEM02A
                                           /SYS/MBU/CMP0/MEM03A
                                   16 GB   /SYS/MBU/CMP0/MEM10A
                                           /SYS/MBU/CMP0/MEM11A
                                   16 GB   /SYS/MBU/CMP0/MEM12A
                                           /SYS/MBU/CMP0/MEM13A
======================================== IO Devices ========================================
Slot +                  Bus     Name +                                  Model           Max Speed   Cur Speed
Status                  Type    Path                                                    /Width      /Width
------------------------------------------------------------------------------------------------------------------------
/SYS/MBU/SASHBA         PCIE    scsi-pciex1000,87                       LSI,2308_2      5.0GT/x8    5.0GT/x8
                                /pci@8000/pci@4/pci@0/pci@0/scsi@0
/SYS/MBU/NET0           PCIE    network-pciex8086,10c9                                  2.5GT/x2    2.5GT/x2
                                /pci@8000/pci@4/pci@0/pci@1/network@0
/SYS/MBU/NET1           PCIE    network-pciex8086,10c9                                  2.5GT/x2    2.5GT/x2
                                /pci@8000/pci@4/pci@0/pci@1/network@0,1
/SYS/PCI0               PCIE    network-pciex108e,abcd          SUNW,pcie-qgc   2.5GT/x8    2.5GT/x8
                                /pci@8000/pci@4/pci@0/pci@8/network@0
/SYS/PCI0               PCIE    network-pciex108e,abcd          SUNW,pcie-qgc   2.5GT/x8    2.5GT/x8
                                /pci@8000/pci@4/pci@0/pci@8/network@0,1
/SYS/MBU/NET2           PCIE    network-pciex8086,10c9                                  2.5GT/x2    2.5GT/x2
                                /pci@8100/pci@4/pci@0/pci@0/network@0
/SYS/MBU/NET3           PCIE    network-pciex8086,10c9                                  2.5GT/x2    2.5GT/x2
                                /pci@8100/pci@4/pci@0/pci@0/network@0,1
/SYS/PCI2               PCIE    QLGC,qlc-pciex1077,2532         QLE2562         5.0GT/x8    2.5GT/x8
                                /pci@8100/pci@4/pci@0/pci@9/QLGC,qlc@0
/SYS/PCI2               PCIE    QLGC,qlc-pciex1077,2532         QLE2562         5.0GT/x8    2.5GT/x8
                                /pci@8100/pci@4/pci@0/pci@9/QLGC,qlc@0,1
MB                      PCIX    usb-pciclass,0c0310                             --          --
                                /pci@8000/pci@4/pci@0/pci@2/pci@0/usb@4
MB                      PCIX    usb-pciclass,0c0320                             --          --
                                /pci@8000/pci@4/pci@0/pci@2/pci@0/usb@4,1
============================ Environmental Status ============================
============================== FRU Status ==============================
All FRUs are enabled.
#
```

8. Virtual Environment

(1) Managing containers/zones

Command / Intended Use	Linux RHEL 6	Linux RHEL 7	Solaris	Comparison
	docker		**zonecfg, zoneadm, zlogin**	Different
Intended Use	**Option Details**			
Create zone configuration	**-**		**zonecfg -z *zone_name* create**	Solaris only
Obtain container image/Install zone	**docker pull *image_name*:*version***		**zoneadm -z *zone_name* install**	Different commands
Start container/zone	**docker run -d *container_name***		**zoneadm -z *zone_name* boot**	Different commands
Start container by host name	**docker run -it -h *host_name container_name***		**-**	Linux only
Check container/zone state	**docker images**		**zoneadm list**	Different commands
Connect to container/zone	**docker attach *container_name***		**zlogin *zone_name***	Different commands
Connect to console of zone	**-**		**zlogin -C *zone_name***	Solaris only
Stop container/zone	**docker stop *container_name***		**zoneadm -z *zone_name* shutdown**	Different commands
Uninstall zone	**-**		**zoneadm -z *zone_name* uninstall**	Solaris only
Delete container/zone	**docker rm *container_name***		**zoneadm -z *zone_name* delete**	Different commands
Change container name	**docker commit *container_name image_name***		**-**	Linux only

Execution example 1
Create a zone configuration.

Linux	Solaris
	# zonecfg -z zone01 create #

Execution example 2
Obtain a container image. / Install a zone.

Linux	Solaris
# docker pull rhel Pulling repository rhel e5d11a2bec55: Download complete Status: Downloaded newer image for rhel:latest #	# zoneadm -z zone01 install Progress being logged to /var/log/zones/zoneadm.2015T065Z.zone01.install Image: Preparing at /zones/zone01/root. Install Log: /system/volatile/install.11902/install_log (Omitted) Log saved in non-global zone as /zones/zone01/root/var/log/zones/zoneadm .2015T065Z.zone01.install #

Execution example 3
Start a container/zone.

Linux	Solaris
# docker run -d rhel /bin/sh #	# zoneadm -z zone01 boot #

Execution example 4
Connect to a container/zone.

Linux	Solaris
# docker attach rhel #	# zlogin -C zone01 [Connected to zone 'zone01' console] zone01#

Execution example 5
Stop a container/zone.

Linux	Solaris
# docker stop rhel #	# zoneadm -z zone01 shutdown #

Execution example 6
Delete a container/zone.

Linux	Solaris
# docker rm rhel #	# zoneadm -z zone01 uninstall Are you sure you want to uninstall zone zone01 (y/[n])? y Progress being logged to /var/log/zones/zoneadm.2015T065Z.zone01.unin stall # zonecfg -z zone01 delete Are you sure you want to delete zone zone01 (y/[n])? y #

(2) Managing KVM/OVM

Command / Intended Use	Linux		Solaris	Comparison
	RHEL 6	RHEL 7		
	virt-install, virsh		ldm, telnet	Different
Intended Use	**Option Details**			
Configure guest and install	**virt-install**		**-**	Linux only
Create guest	**virsh create *guest_name***		**ldm add-domain *guest_name***	Solaris only
Configure guest CPU	**-**		**ldm set-core *cores guest_name***	Solaris only
Configure guest memory	**-**		**ldm set-memory *memory_capacity guest_name***	Solaris only
Allocate set resource to guest	**-**		**ldm bind *guest_name***	Solaris only
Start guest	**virsh start *guest_name***		**ldm start *guest_name***	Different commands
Connect to guest	**virsh console *guest_name***		**telnet localhost *port_number***	Different commands
Deallocate set resource from guest	**-**		**ldm unbind *guest_name***	Solaris only
Stop guest	**virsh shutdown *guest_name***		**ldm stop *guest_name***	Different commands
Delete guest	**virsh undefine *guest_name***		**ldm delete *guest_name***	Different commands
Guest list	**virsh list**		**ldm list**	Different commands

Execution example 1
Create a guest.

Linux	Solaris
# virsh create guest01 #	# ldm add-domain ldom1 #

Execution example 2
Start a guest.

Linux	Solaris
# virsh start guest01 #	# ldm bind ldom1 # ldm start ldom1 LDom ldom1 started #

Execution example 3
Connect to a guest.

Linux	Solaris
# virsh console guest01 Connected to domain guest01 Escape character is ^] Red Hat Enterprise Linux Server 7.1 (Maopo) Kernel 3.10.0-229.el7.x86_64 on an x86_64 guest01 login:	# telnet localhost 5001 Trying ::1... telnet: connect to address ::1: Connection refused Trying 127.0.0.1... Connected to localhost. Escape character is '^]'. Connecting to console "ldom1" in group "ldom1" .... Press ~? for control options .. ldom1 console login:

Execution example 4
Stop a guest.

Linux	Solaris
# virsh shutdown guest01 #	# ldm stop ldom1 LDom ldom1 stopped #

Execution example 5
Delete a guest.

Linux	Solaris
# virsh undefine guest01 #	# ldm unbind ldom1 # ldm destroy ldom1