

Moving from Solaris 10 to Solaris 11

Presentation

Objectives : Master Solaris 11 administration tasks.

Who can benefit : Oracle 10 System Administrators.

Prerequisites : Extensive experience in administering a Solaris 10 system.

Learning technique : Clear, theoretical course content divided into lessons and extensive LABS available on-line 24/24 7/7.

Student Progression : Student progression is monitored both in terms of effective course duration and in terms of student comprehension using self-assessment tests.

Operating Systems covered by this course : Oracle Solaris 11.

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Sample Course Material

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The Solaris 11 Image Packaging System (IPS)

Introduction

Although still present as shown above, use of the Solaris 10 package management commands has been replaced in Solaris 11 by the **Solaris Image Packaging System**.

Solaris 11 uses the **new Image Packaging System** technology combined with the Service Management Facility ( [SMF](#)), the Zettabyte File System ( [ZFS](#)) technologies to greatly simplify **both** package management **and** patch management.

The **IPS pkg** command and its subcommands work much like their Linux counterparts  [yum](#),  [apt-get](#) and  [zypper](#), relying on a **repository** which contains available packages.

pkg Subcommands

The pkg subcommands are as follows:

Subcommand	Description
publisher	Lists current and disabled repositories "published" by publishers
set-publisher	Adds a publisher
unset-publisher	Removes a publisher
list	Lists installed packages
search	Searches for a package in the system's active publishers and returns the first match found
install	Installs/Updates packages
uninstall	Uninstalls packages
refresh	Updates the cached list of available packages
update	Updates all or certain packages to their latest versions
info	Displays information about packages
contents	Displays files installed by a package
verify	Validates the installation and digital signature packages
history	Displays the pkg history
help	Lists the above and advanced subcommands and their switches

LAB #1 - Using IPS

Basic pkg subcommands

Firstly, check which publishers are installed on the system:

```
root@solaris:~# pkg publisher
PUBLISHER          TYPE      STATUS P LOCATION
solaris            origin   online F http://pkg.oracle.com/solaris/release/
```

You can display additional information about a publisher as follows:

```
root@solaris:~# pkg publisher solaris
```

```
Publisher: solaris
Alias:
Origin URI: http://pkg.oracle.com/solaris/release/
SSL Key: None
SSL Cert: None
Client UUID: ddee2130-0292-11e2-b9e5-80144f013e20
Catalog Updated: October 16, 2012 09:25:04 PM
Enabled: Yes
```

Now add the **OpenIndiana** publisher:

```
root@solaris:~# pkg set-publisher -g http://pkg.openindiana.org/sfe sfe
root@solaris:~# pkg publisher
PUBLISHER          TYPE      STATUS P LOCATION
solaris            origin   online F http://pkg.oracle.com/solaris/release/
sfe                origin   online F http://pkg.openindiana.org/sfe/
```

To understand the use of the **-g** switch, use the built-in help function:

```
root@solaris:~# pkg help set-publisher
Usage:
  pkg set-publisher [-Ped] [-k ssl_key] [-c ssl_cert]
  [-g origin_to_add|--add-origin=origin_to_add ...]
  [-G origin_to_remove|--remove-origin=origin_to_remove ...]
  [-m mirror_to_add|--add-mirror=mirror_to_add ...]
  [-M mirror_to_remove|--remove-mirror=mirror_to_remove ...]
  [-p repo_uri] [--enable] [--disable] [--no-refresh]
  [--reset-uuid] [--non-sticky] [--sticky]
  [--search-after=publisher]
  [--search-before=publisher]
  [--search-first]
  [--approve-ca-cert=path_to_CA]
  [--revoke-ca-cert=hash_of_CA_to_revoke]
  [--unset-ca-cert=hash_of_CA_to_unset]
```

```
[--set-property name_of_property=value]
[--add-property-value name_of_property=value_to_add]
[--remove-property-value name_of_property=value_to_remove]
[--unset-property name_of_property_to_delete]
[--proxy proxy to use]
[publisher]
```

Display additional information about the publisher:

```
root@solaris:~# pkg publisher sfe

Publisher: sfe
Alias:
Origin URI: http://pkg.openindiana.org/sfe/
SSL Key: None
SSL Cert: None
Client UUID: e873ddf6-3fba-11e2-8b21-880027ed6b01
Catalog Updated: December 5, 2012 08:40:30 PM
Enabled: Yes
```

Now remove the **OpenIndiana** publisher:

```
root@solaris:~# pkg unset-publisher sfe
root@solaris:~# pkg publisher
PUBLISHER          TYPE      STATUS P LOCATION
solaris            origin   online F http://pkg.oracle.com/solaris/release/
```

List all available packages on the system:

```
root@solaris:~# pkg list | more
NAME (PUBLISHER)          VERSION          IFO
archiver/gnu-tar         1.26-0.175.1.0.0.24.0  i--
audio/audio-utilities    0.5.11-0.175.1.0.0.24.2  i--
codec/flac                1.2.1-0.175.0.0.0.0.0  i--
```

codec/libtheora	1.1.1-0.175.1.0.0.15.0	i--
codec/ogg-vorbis	2.30.0-0.175.1.0.0.12.0	i--
codec/speex	1.2-0.175.1.0.0.15.0	i--
communication/im/pidgin	2.10.5-0.175.1.0.0.24.0	i--
compress/bzip2	1.0.6-0.175.1.0.0.24.0	i--
compress/gzip	1.4-0.175.1.0.0.24.0	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--
consolidation/SunVTS/SunVTS-incorporation	0.5.11-0.175.1.0.0.14.0	i--
consolidation/X/X-incorporation	0.5.11-0.175.1.0.0.24.1317	i--
consolidation/admin/admin-incorporation	0.5.11-0.175.1.0.0.5.0	i--
consolidation/cacao/cacao-incorporation	0.5.11-0.175.1.0.0.11.0	i--
consolidation/cde/cde-incorporation	0.5.11-0.175.0.0.0.0.0	i--
consolidation/cns/cns-incorporation	0.5.11-0.175.1.0.0.23.0	i--
consolidation/dbtg/dbtg-incorporation	0.5.11-0.175.1.0.0.15.0	i--
consolidation/desktop/desktop-incorporation	0.5.11-0.175.1.0.0.24.2	i--
consolidation/desktop/gnome-incorporation	0.5.11-0.175.1.0.0.22.0	i--
consolidation/gfx/gfx-incorporation	0.5.11-0.175.1.0.0.5.0	i--
consolidation/install/install-incorporation	0.5.11-0.175.1.0.0.24.1736	i--
consolidation/ips/ips-incorporation	0.5.11-0.175.1.0.0.24.0	i--
consolidation/java/java-incorporation	0.5.11-0.175.1.0.0.24.0	i--
consolidation/jdmk/jdmk-incorporation	0.5.11-0.173.0.0.0.0.0	i--
consolidation/ll0n/ll0n-incorporation	0.5.11-0.175.1.0.0.23.1134	i--
consolidation/man/man-incorporation	0.5.11-0.175.1.0.0.21.0	i--
consolidation/nspg/nspg-incorporation	0.5.11-0.175.1.0.0.5.0	i--
consolidation/nvidia/nvidia-incorporation	0.5.11-0.175.1.0.0.22.0	i--
consolidation/osnet/osnet-incorporation	0.5.11-0.175.1.0.0.24.2	i--
consolidation/sfw/sfw-incorporation	0.5.11-0.175.1.0.0.5.0	i--
consolidation/sic_team/sic_team-incorporation	0.5.11-0.175.1.0.0.5.0	i--
consolidation/solaris_re/solaris_re-incorporation	0.5.11-0.175.1.0.0.24.3	i--
consolidation/sunpro/sunpro-incorporation	0.5.11-0.175.1.0.0.19.0	i--
consolidation/ub_javavm/ub_javavm-incorporation	0.5.11-0.175.1.0.0.24.1	i--

```
consolidation/userland/userland-incorporation    0.5.11-0.175.1.0.0.24.0    i--
consolidation/vpanels/vpanels-incorporation      0.5.11-0.175.1.0.0.17.0    i-r
consolidation/xvm/xvm-incorporation              0.5.11-0.175.1.0.0.5.0     i--
crypto/ca-certificates                          0.5.11-0.175.1.0.0.24.2    i--
```

Note the IFO column:

Letter	Description
i	The package is installed
f	The package is <i>frozen</i> and cannot be updated
o	The package is obsolete

To understand the **r** in the third column of the **vpanels-incorporation** package, use the **info** subcommand:

```
root@solaris:~# pkg info vpanels-incorporation
  Name: consolidation/vpanels/vpanels-incorporation
  Summary:
  State: Installed (Renamed)
  Renamed to: pkg:/consolidation/userland/userland-incorporation
              pkg:/consolidation/osnet/osnet-incorporation
  Publisher: solaris
  Version: 0.5.11
  Build Release: 5.11
  Branch: 0.175.1.0.0.17.0
  Packaging Date: May 29, 2012 10:02:23 PM
  Size: 5.46 kB
  FMRI: pkg://solaris/consolidation/vpanels/vpanels-
incorporation@0.5.11,5.11-0.175.1.0.0.17.0:20120529T220223Z
```

Use the **list** subcommand to easily identify the package version number of a single package:

```
root@solaris:~# pkg list vpanels-incorporation
NAME (PUBLISHER)                                VERSION                                IFO
```

```
consolidation/vpanels/vpanels-incorporation      0.5.11-0.175.1.0.0.17.0      i-r
```

To identify the package creation timestamp, use the **-v** switch of the **list** subcommand:

```
root@solaris:~# pkg list -v vpanels-incorporation
FMRI                                                    IFO
pkg://solaris/consolidation/vpanels/vpanels-incorporation@0.5.11,5.11-0.175.1.0.0.17.0:20120529T220223Z i-r
```



The output of this command shows a line of the following format:

FMRI Scheme://Publisher/Package Name@Version,Build Release-Branch:Package Creation Timestamp IFO

The name **FMRI** means **Fault Managed Resource Identifier**. FMRI's are covered in the **Service Administration** lesson of this course.

Wildcards can be used to list packages available, either installed or not:

```
root@solaris:~# pkg list -a compress*
NAME (PUBLISHER)          VERSION          IFO
compress/bzip2           1.0.6-0.175.1.0.0.24.0      i--
compress/gzip            1.4-0.175.1.0.0.24.0        i--
compress/lcab (sfe)      1.0.12-0.151.1.5           ---
compress/lcab/src (sfe) 1.0.12-0.151.1.5           ---
compress/lha (sfe)       1.14.9.1-0.151.1.5         ---
compress/lha/src (sfe)   1.14.9.1-0.151.1.5         ---
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/unzoo (sfe)     4.4-0.151.1.5              ---
compress/unzoo/src (sfe) 4.4-0.151.1.5              ---
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--
```

To display the number of installed packages, use the following command:

```
root@solaris:~# pkg list | wc -l
873
```

To display the number of installed and available packages, use the **-a** switch:

```
root@solaris:~# pkg list -a | wc -l
2615
```

Installing a Package

You are now going to install the ClamAV anti-virus package. This package is available from the **OpenIndiana** publisher. In order to use that publisher you need to add it once more:

```
root@solaris:~# pkg set-publisher -g http://pkg.openindiana.org/sfe sfe
root@solaris:~# pkg publisher
PUBLISHER          TYPE      STATUS P LOCATION
solaris            origin   online F http://pkg.oracle.com/solaris/release/
sfe                origin   online F http://pkg.openindiana.org/sfe/
```

There are two ways to identify the package name before being able to install it, either by using the **list** subcommand:

```
root@solaris:~# pkg list -a | grep clamav
antivirus/clamav (sfe)          0.97.6-0.151.1.6      ---
antivirus/clamav/src (sfe)     0.97.6-0.151.1.6      ---
security/clamav (sfe)         0.97.3-0.151.1        --r
```

or, alternatively by using the **search** subcommand:

```
root@solaris:~# pkg search antivirus/clamav
INDEX      ACTION VALUE                                PACKAGE
```

```
require depend pkg:/antivirus/clamav@0.97.5,5.11-0.151.1.5 pkg:/security/clamav@0.97.3-0.151.1
pkg.fmri set sfe/antivirus/clamav pkg:/antivirus/clamav@0.97.5-0.151.1.5
```

Installing ClamAV is now very simple:

```
root@solaris:~# pkg install antivirus/clamav
      Packages to install: 3
      Create boot environment: No
      Create backup boot environment: No

DOWNLOAD          PKGS          FILES          XFER (MB)   SPEED
Completed          3/3           55/55           1.7/1.7    458k/s

PHASE              ITEMS
Installing new actions 110/110
Updating package state database Done
Updating image state   Done
Creating fast lookup database Done
```

To check whether the package is now installed, use the **list** subcommand:

```
root@solaris:~# pkg list clamav
NAME (PUBLISHER)          VERSION          IFO
antivirus/clamav (sfe)   0.97.6-0.151.1.6  i--
```

or the **verify** subcommand:

```
root@solaris:~# pkg verify -v clamav
PACKAGE                      STATUS
pkg://sfe/antivirus/clamav   OK
```

Remember that for more information about the installed package, you can use the **info** subcommand:

```
root@solaris:~# pkg info clamav
```

```
Name: antivirus/clamav
Summary: Unix anti-virus scanner
Category: Applications/System Utilities
State: Installed
Publisher: sfe
Version: 0.97.6
Build Release: 5.11
Branch: 0.151.1.6
Packaging Date: October 1, 2012 08:13:32 PM
Size: 3.95 MB
FMRI: pkg://sfe/antivirus/clamav@0.97.6,5.11-0.151.1.6:20121001T201332Z
```

By using the **which** command, you will notice that there is no clamav program in **/bin** or **/usr/bin**:

```
root@solaris:~# which clamav
no clamav in /usr/bin /usr/sbin
```

So, either the program is not called clamav or it is elsewhere in the filesystem. In order to see which files the package installed, use the **contents** subcommand:

```
root@solaris:~# pkg contents antivirus/clamav
PATH
etc
etc/clamav-milter.conf
etc/clamd.conf
etc/freshclam.conf
usr
usr/bin
usr/bin/clamav-config
usr/bin/clambc
usr/bin/clamconf
usr/bin/clamdscan
usr/bin/clamdtop
usr/bin/clamscan
```

```
usr/bin/freshclam
usr/bin/sigtool
usr/include
usr/include/clamav.h
usr/lib
usr/lib/libclamav.so
usr/lib/libclamav.so.6
usr/lib/libclamav.so.6.1.15
usr/lib/libclamunrar.so
usr/lib/libclamunrar.so.6
usr/lib/libclamunrar.so.6.1.15
usr/lib/libclamunrar_iface.so
usr/lib/libclamunrar_iface.so.6
usr/lib/libclamunrar_iface.so.6.1.15
usr/lib/pkgconfig
usr/lib/pkgconfig/libclamav.pc
usr/sbin
usr/sbin/clamav-milter
usr/sbin/clamd
usr/share
usr/share/doc
usr/share/doc/clamav
usr/share/doc/clamav/COPYING
usr/share/doc/clamav/COPYING.LGPL
usr/share/doc/clamav/COPYING.bzip2
usr/share/doc/clamav/COPYING.file
usr/share/doc/clamav/COPYING.getopt
usr/share/doc/clamav/COPYING.llvm
usr/share/doc/clamav/COPYING.lzma
usr/share/doc/clamav/COPYING.regex
usr/share/doc/clamav/COPYING.sha256
usr/share/doc/clamav/COPYING.unrar
usr/share/doc/clamav/COPYING.zlib
usr/share/doc/clamav/ChangeLog
```

```
usr/share/doc/clamav/FAQ
usr/share/doc/clamav/README
usr/share/doc/clamav/clamav-mirror-howto.pdf
usr/share/doc/clamav/clamdoc.pdf
usr/share/doc/clamav/phishsig_howto.pdf
usr/share/doc/clamav/signatures.pdf
usr/share/man
usr/share/man/man1
usr/share/man/man1/clambc.1
usr/share/man/man1/clamconf.1
usr/share/man/man1/clamdscan.1
usr/share/man/man1/clamdtop.1
usr/share/man/man1/clamscan.1
usr/share/man/man1/freshclam.1
usr/share/man/man1/sigtool.1
usr/share/man/man5
usr/share/man/man5/clamav-milter.conf.5
usr/share/man/man5/clamd.conf.5
usr/share/man/man5/freshclam.conf.5
usr/share/man/man8
usr/share/man/man8/clamav-milter.8
usr/share/man/man8/clamd.8
var
var/clamav
```

As you can see, the package installed the following programs:

```
usr/bin/clamav-config
usr/bin/clambc
usr/bin/clamconf
usr/bin/clamdscan
usr/bin/clamdtop
usr/bin/clamscan
usr/bin/freshclam
```

```
usr/bin/sigtool
usr/sbin/clamav-milter
usr/sbin/clamd
```

Uninstalling a Package

Uninstalling the package is now as simple as installing it:

```
root@solaris:~# pkg uninstall clamav
      Packages to remove: 3
      Create boot environment: No
      Create backup boot environment: No

PHASE                                ITEMS
Removing old actions                  101/101
Updating package state database       Done
Updating package cache                3/3
Updating image state                  Done
Creating fast lookup database         Done
```



The **uninstall** subcommand removes all files installed by a package, **except** those that are dependencies of another installed package.

Searching for a Package containing a specific Program

You can also search for a package that contains a specific program:

```
root@solaris:~# pkg search /usr/bin/clamscan
INDEX      ACTION VALUE          PACKAGE
```

```
path      file  usr/bin/clamscan pkg:/antivirus/clamav@0.97.5-0.151.1.5
path      file  usr/bin/clamscan pkg:/security/clamav@0.97.3-0.151.1
```

Updating Packages

The `pkg` command can also be used to update installed packages:

```
root@solaris:~# pkg update
No updates available for this image.
```



If you wish to update a specific package to the latest available version, use the following syntax : `pkg update package@latest`.

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