Image Packaging System

James MacFarlane
Chris Ridd
Image Packaging System - IPS

• System V Packages
  > Dependency aware / Manual resolution
  > Requires local copy or NFS access
  > Limited functionality
    > Leads to the nightmare of patching ...
  > Custom packages possible but not easy
  > Various add-on GUls over the years
  > Problem finding a package or version
Image Packaging System - IPS

- IPS Packages
  - Dependency aware / Automatic resolution
  - Package collections
  - Network-based system
  - Upgrades built in
  - Single command for all package operations
  - New GUI for most operations
  - Repositories compatible with SYSV packages
IPS Glossary

• Package
  > A collection of files, directories, links etc with all dependencies in a pre-defined format
  > Identified by its FMRI name

• Image
  > A location for installing a set of packages

• Repository
  > A location where packages can be downloaded from
  > Also called a package depot server
IPS Glossary

• Consolidation
  > A collection of source files and the resulting binaries that are built together as a group

• Incorporation
  > A package containing dependencies that constrains the upgrades of the dependent packages

• Authority
  > A location containing one or more repositories
  > Accessed via a URL
IPS Packages – The User's View

- **pkg install**
  - Add new packages to an image
- **pkg uninstall**
  - Remove a package from the image
- **pkg search**
  - Search for packages on the image or repository
- **pkg list**
  - Show information about packages in the image
- **pkg image-update**
  - Update all packages in the image
IPS Packages – The User's View

- pkg install
  -bash-3.2# pkg install openoffice
  
<table>
<thead>
<tr>
<th>DOWNLOAD</th>
<th>PKGS</th>
<th>FILES</th>
<th>XFER (MB)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completed</td>
<td>1/1</td>
<td>4220/4220</td>
<td>420.64/420.64</td>
</tr>
</tbody>
</table>

  PHASE   ACTIONS
  Install Phase    4798/4798

- pkg uninstall
  -bash-3.2# pkg uninstall SUNWless
  
  PHASE      ACTIONS
  Removal Phase 17/17
IPS Packages – The User's View

- pkg search

-bash-3.2$ pkg search vnc
INDEX   ACTION   VALUE                     PACKAGE
basename dir   usr/share/vnc                         pkg:/SUNWxvnc@4.1.2-0.86

-bash-3.2$ pkg search cdrw

-bash-3.2$ pkg search -r cdrw
INDEX   ACTION   VALUE                     PACKAGE
basename file  usr/bin/cdrw                         pkg:/SUNWcdrw@0.5.11-0.86
basename file  usr/bin/cdrw                         pkg:/SUNWcdrw@0.5.11-0.79
basename file  usr/bin/cdrw                         pkg:/SUNWcdrw@0.5.11-0.75
basename file  usr/bin/cdrw                         pkg:/SUNWcdrw@0.5.11-0.86
IPS Packages – The User's View

• pkg list

   -bash-3.2# pkg list SUNWxvnc
   NAME (AUTHORITY)      VERSION         STATE       UFIX
   SUNWxvnc              4.1.2-0.86        installed    ----

• pkg verify

   -bash-3.2$ pkg verify -v SUNWxvnc
   PACKAGE                      STATUS
   pkg:/SUNWxvnc                OK
IPS Packages – The User's View

- pkg image-update
  > Equivalent to applying all patches available for an image
  > Uses zfs clones to apply updates to an off-line copy

```
-bash-3.2# pkg image-update
PHASE          ACTIONS
Update Phase    28/28
Install Phase   3/3
```

A clone of opensolaris exists and has been updated and activated. On next boot the Boot Environment opensolaris-1 will be mounted on '/'. Reboot when ready to switch to this updated BE.
ZFS Boot Environments

- Managed with the `beadm(1M)` command
  - `beadm list`
  - `beadm mount / unmount`
  - `beadm rename`
  - `beadm activate`
  - `beadm destroy`

- Similar to Live Upgrade
  - Uses ZFS clones instead of a new copy
  - Can snapshot BEs

- Automatically created with `pkg image-update`
The Package Manager GUI
IPS Repositories

• A collection of packages available for download
• Hosted on an authority
  > One authority can have multiple repositories
• Served by the pkg.depotd daemon
• Example repositories include
  > pkg.opensolaris.org
  > pkg.sunfreeware.com:9000
IPS Repositories

Copyright 2008, Sun Microsystems Inc.
Adding a Repository to a Client

- Add the authority if required
  > pkg set-authority -O {URL} {name}

- Retrieve the catalogue from the authority
  > pkg refresh

- Get packages using their FMRI
  > pkg install pkg://{name}/{package}

- Can make the new repository the default
  > pkg set-authority -P {name}
Creating a New Repository

• Enable the smf service
  > svcadm enable pkg/server

• Some default settings
  > Lives in /var/pkg/repo
  > Listens on port 80
  > Anyone can add a package

• Repositories are still being developed
  > Cannot currently remove a package
  > Mirroring of repositories being worked on
Creating a New Repository

-bash-3.2# svcadm enable pkg/server

-bash-3.2# ps -ef | grep pkg.depotd

    root  689     7  0 14:59:11 ?           0:00 /usr/bin/python2.4 /usr/lib/pkg.depotd -p 80 -d
    /var/pkg/repo -t 60 -s 10

-bash-3.2# pkg set-authority -O http://localhost:80/ case

-bash-3.2# pkg authority

<table>
<thead>
<tr>
<th>AUTHORITY</th>
<th>URL</th>
</tr>
</thead>
<tbody>
<tr>
<td>case</td>
<td><a href="http://localhost:80/">http://localhost:80/</a></td>
</tr>
<tr>
<td>opensolaris.org (preferred)</td>
<td><a href="http://pkg.opensolaris.org:80/">http://pkg.opensolaris.org:80/</a></td>
</tr>
</tbody>
</table>
IPS for Developers

• Creating a package
  > Use the pkgsend command
  > Can script most of the work in a manifest file

• Three stage process
  > Open the transaction
  > Add the elements of the package
  > Close the transaction
IPS for Developers

set name=Description value="Xrisk for OpenSolaris"
dir group=sys mode=0755 owner=root path=/opt/xrisk
dir group=sys mode=0755 owner=root path=/opt/xrisk/lib
file /opt/xrisk/xrisk owner=root group=sys mode=0755 path=/opt/xrisk/xrisk
file /opt/xrisk/lib/#100_Afghanistan.xras owner=root group=sys mode=0444 path=/
  opt/xrisk/lib/#100_Afghanistan.xras

...

depend type=require fmri=pkg:/SUNWcsl@0.5.11,5.11-0.93:20080708T160950Z
depend type=require fmri=pkg:/SUNWxwplt@0.5.11,5.11-0.93:20080708T174703Z
IPS for Developers

rpeuser@case:~$ export PKG_REPO=http://localhost:80/

rpeuser@case:~$ eval `pkgsend open xrisk@1.0`
rpeuser@case:~$ echo $PKG_TRANS_ID
1216736963_pkg%3A%2Fxrisk%401.0%2C5.11%3A20080722T152923Z

rpeuser@case:~$ pkgsend include xrisk.files

rpeuser@case:~$ pkgsend close
PUBLISHED
pkg:/xrisk@1.0,5.11:20080722T152923Z
IPS for Developers

-bash-3.2# pkg search -r xrisk
INDEX ACTION VALUE PACKAGE
basename file opt/xrisk/xrisk pkg:/xrisk@1.0

-bash-3.2# pkg install pkg://case/xrisk
DOWNLOAD PKGS FILES XFER (MB)
Completed 1/1 53/53 0.26/0.26

PHASE ACTIONS
Install Phase 62/62
IPS and SYSV Packages

- Can add existing SYSV packages to an IPS repository
  - Just use “pkgsend send pkg”

```
-bash-3.2$ pkgsend send SFWlynx
-bash-3.2$ pkg search -r lynx
```

<table>
<thead>
<tr>
<th>INDEX</th>
<th>ACTION</th>
<th>VALUE</th>
<th>PACKAGE</th>
</tr>
</thead>
<tbody>
<tr>
<td>basename</td>
<td>file</td>
<td>opt/sfw/bin/lynx</td>
<td>pkg:/SFWlynx@0-1</td>
</tr>
</tbody>
</table>

```
-bash-3.2$ pfexec pkg refresh
-bash-3.2$ pfexec pkg install pkg://case/SFWlynx
```

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<tr>
<td>Completed</td>
<td>1/1</td>
<td>63/63</td>
<td>2.27/2.27</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PHASE</th>
<th>ACTIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Install Phase</td>
<td>79/79</td>
</tr>
</tbody>
</table>
# Migration From SYSV Packages

- **Rough command translation:**

<table>
<thead>
<tr>
<th>Command</th>
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</tr>
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<tbody>
<tr>
<td>pkgadd</td>
<td>pkg install</td>
</tr>
<tr>
<td>pkgrm</td>
<td>pkg uninstall</td>
</tr>
<tr>
<td>pkginfo</td>
<td>pkg list</td>
</tr>
<tr>
<td></td>
<td>pkg info</td>
</tr>
<tr>
<td>pkgchk</td>
<td>pkg verify</td>
</tr>
<tr>
<td>patchadd</td>
<td>pkg image-update</td>
</tr>
<tr>
<td>grep /var/sadm/install/contents</td>
<td>pkg search</td>
</tr>
</tbody>
</table>
More Information

• IPS Project site
  > http://opensolaris.org/os/project/pkg

• OpenSolaris 2008.05 Docs
  > http://www.opensolaris.com/learn/

• pkg-discuss alias
  > http://mail.opensolaris.org/mailman/listinfo/pkg-discuss
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