

The following is intended to outline our general product direction. It is intended for information purposes only, and may not be incorporated into any contract. It is not a commitment to deliver any material, code, or functionality, and should not be relied upon in making purchasing decisions. The development, release, and timing of any features or functionality described for Oracle's products remains at the sole discretion of Oracle.



ORACLE®

Oracle Solaris 11 - Best Practices

Detlef Drewanz

Principal Sales Consultant

Know the source

- See „Evaluating Oracle Solaris 11“

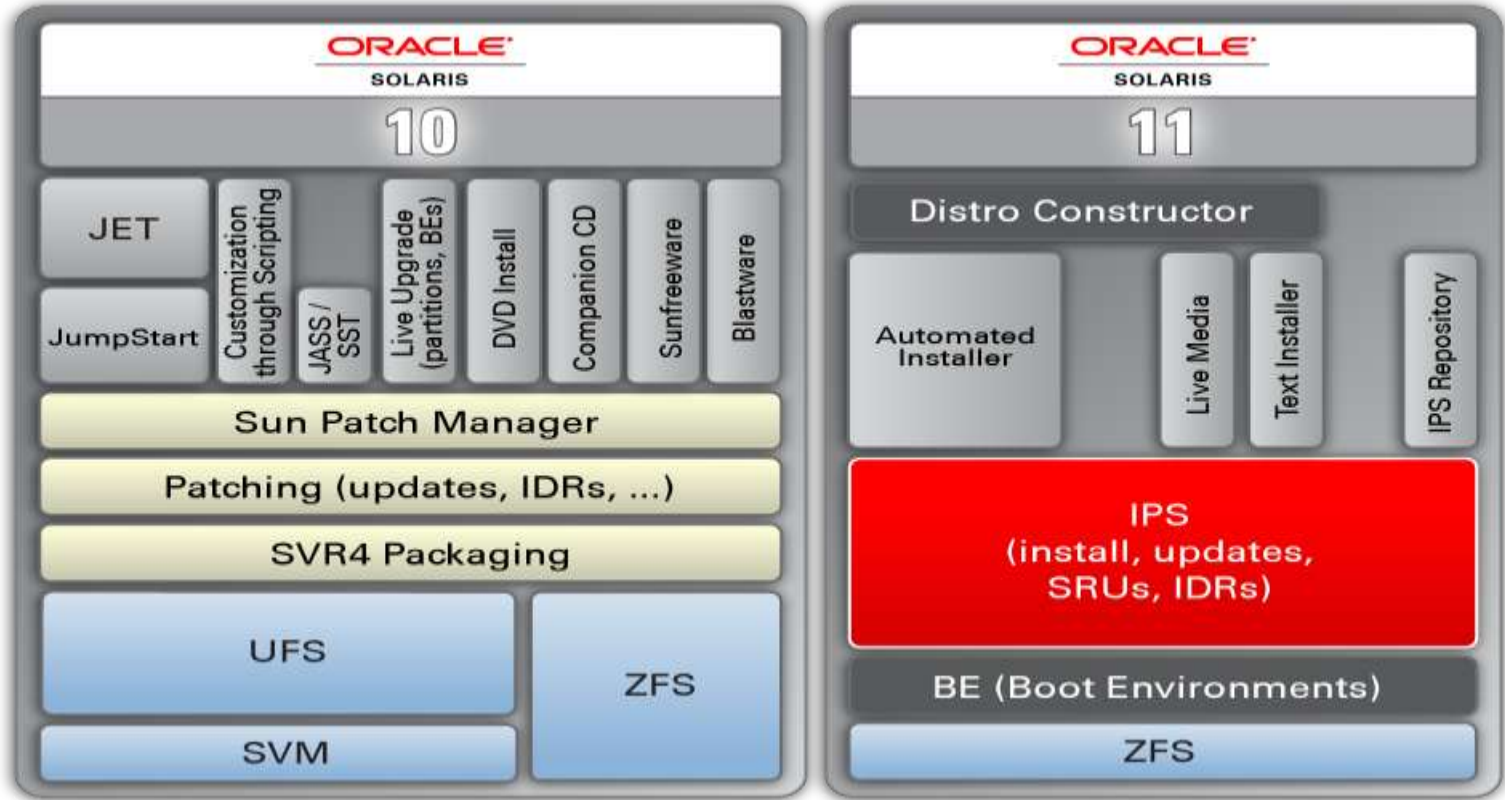
<http://www.oracle.com/technetwork/server-storage/solaris11/overview/evaluate-1530234.html>

- With
 - Howto Documents
 - Cheat Sheets
 - ... and much more ...

Agenda for Today

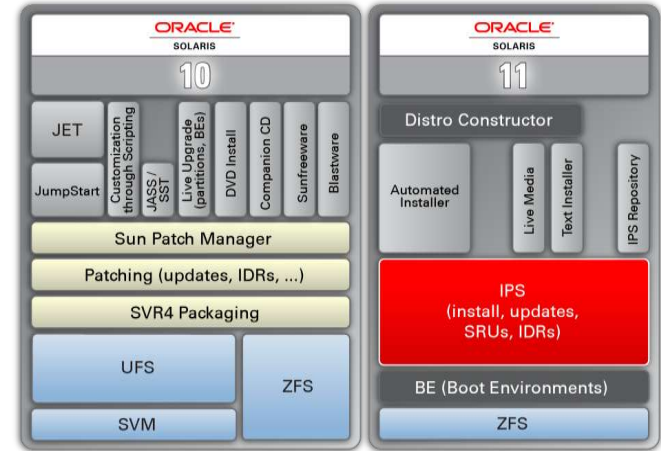
- OS Lifecycle management
 - About IPS Packages, Repositories and Boot Environments
 - (Automated Installer)
- Networking
 - Configuring Network Interfaces and Services
- Zones
 - What's new
- Deployment of Oracle Solaris 11

Oracle Solaris 11 Lifecycle Management News



Oracle Solaris 11 Lifecycle Management News

- Simplify architecture
- Reduce the size of install images
- Clean-up and restructure the Oracle Solaris 11 installer
- ZFS as root-filesystem
- Boot Environments
- Image Packaging System
- Automated Installer
- Distribution Constructor (DC)

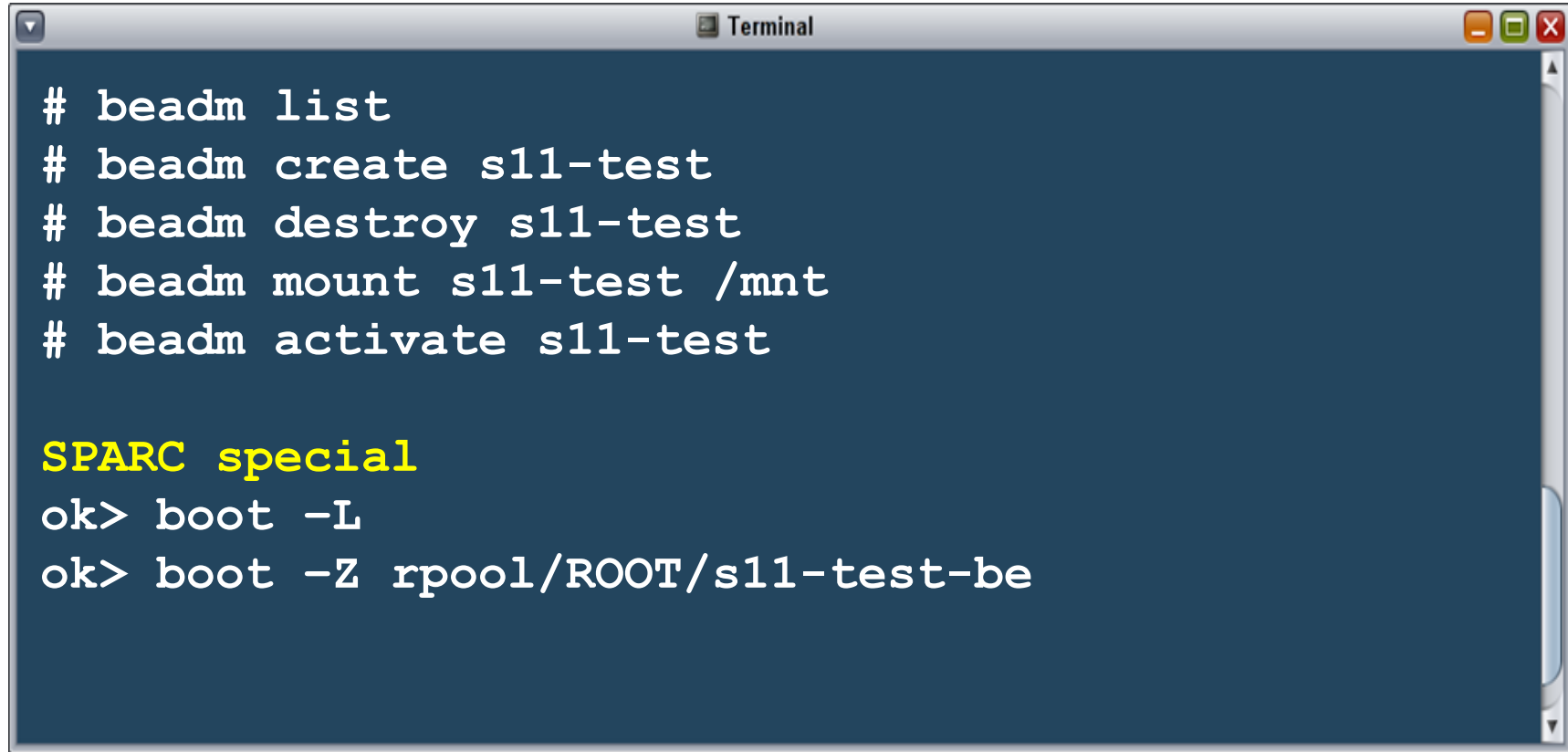


Oracle Solaris 11 Boot Environments

```
root@cantaloup # zfs list
```

NAME	USED	AVAIL	REFER	MOUNTPOINT
rpool	6.84G	8.79G	39.5K	/rpool
rpool/ROOT	3.96G	8.79G	31K	legacy
rpool/ROOT/solaris11-1111-fcs	3.96G	8.79G	3.50G	/
rpool/ROOT/solaris11-1111-fcs/var	368M	8.79G	183M	/var
rpool/dump	1.56G	8.84G	1.51G	-
rpool/export	290M	8.79G	283M	/export
rpool/export/home	6.82M	8.79G	32K	/export/home
rpool/export/home/detlefd	6.79M	8.79G	6.79M	/export/home/detlefd
rpool/swap	1.03G	8.82G	1.00G	-

Managing Bootenvironments



```
Terminal
# beadm list
# beadm create s11-test
# beadm destroy s11-test
# beadm mount s11-test /mnt
# beadm activate s11-test

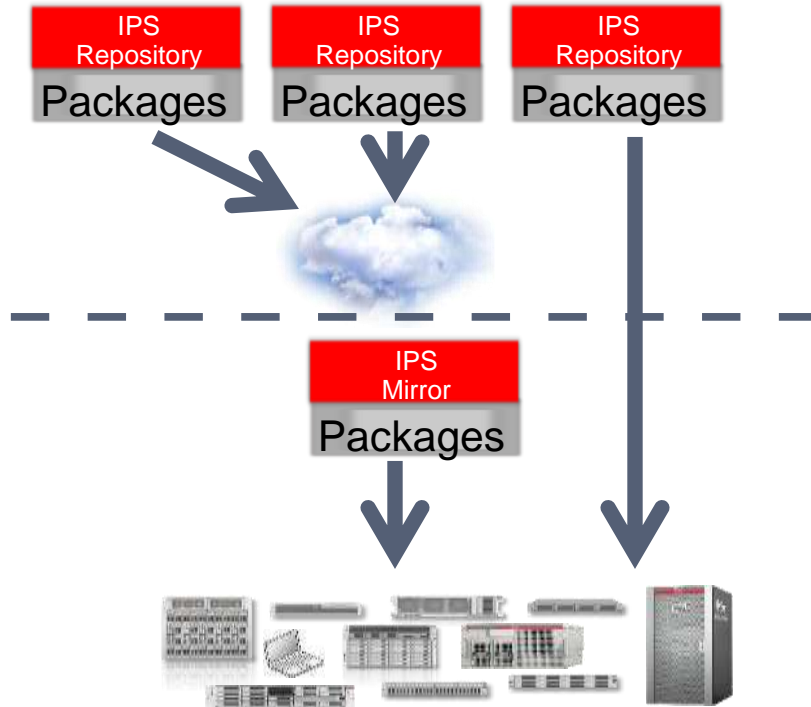
SPARC special
ok> boot -L
ok> boot -Z rpool/ROOT/s11-test-be
```

The Image Packaging System (IPS)

- Network-centric Package Management
 - Manifests and package content files (combined x86 and SPARC)
 - Access Repositories in filesystem or by http://...
 - Efficient use of available bandwidth
- Package versioning
 - e.g. `pkg://solaris/entire@0.5.11,5.11-0.175.0.3.0.4.0:20111229T191505Z`
- Follow package dependencies
- Execute actions but not generic scripts on pkg installation

The Image Packaging System (IPS)

Network-Architecture and repositories

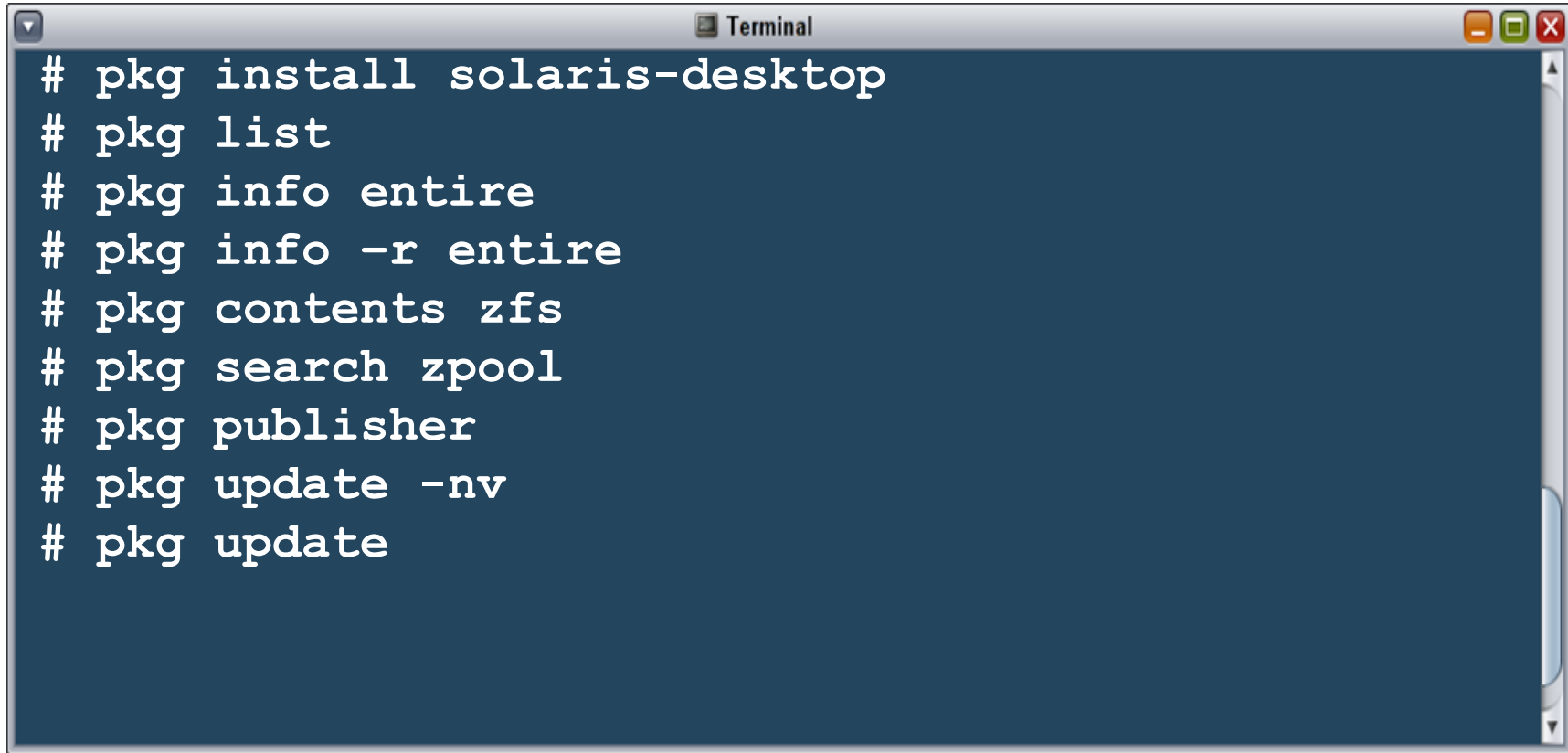


- One or more repositories
- Mirror, copy, access via proxy
 - Be aware of: `$http_proxy`
- Updates to Repositories
 - Support Repository Updates (SRU)*
- Package tools
 - CLI `pkg(1)`
 - GUI `updatemanager`
 - GUI `packagemanager(1)`

Oracle Solaris 11 Repositories

- Package version numbering explained
 - My Oracle Support [ID 1378134.1]
- <http://pkg.oracle.com/solaris/release/en/index.shtml>
 - Default repository for Oracle Solaris 11

Working with IPS Packages

A terminal window titled "Terminal" with a dark blue background and white text. The window contains a list of nine pkg commands. The window has standard OS window controls (minimize, maximize, close) in the top right corner.

```
# pkg install solaris-desktop
# pkg list
# pkg info entire
# pkg info -r entire
# pkg contents zfs
# pkg search zpool
# pkg publisher
# pkg update -nv
# pkg update
```

Setting up the Oracle Solaris 11 Repository Server

```
Terminal
# zfs create -o mountpoint=/repo -o compression=on \
  -o atime=off    rpool/repo
# zfs create rpool/repo/s11
... mount the Repository ISO Image ...
# cd /media/SOL11REPO_FULL/repo
# tar cf - . | (cd /repo/s11;tar xfp -)
# pkgrepo -s /repo/s11 refresh
# svccfg -s pkg/server setprop pkg/inst_root=/repo/s11
# svccfg -s pkg/server setprop pkg/readonly=true
# svcadm refresh pkg/server
# svcadm enable pkg/server
# pkg set-publisher -G 'http://pkg.oracle.com/solaris/release/' \
  -g http://localhost solaris
# pkgrepo info -s http://localhost
```

If proxies are needed

```
# export http_proxy = http://<proxy>:<port>
# pkg ...
```

For Zones to work with proxies

```
# svccfg -s pkg/system-repository \
    setprop config/http_proxy = \
    astring:"http://<proxy>:<port>"
# svcadm refresh pkg/system-repository
```

Support Repository Updates (SRU)

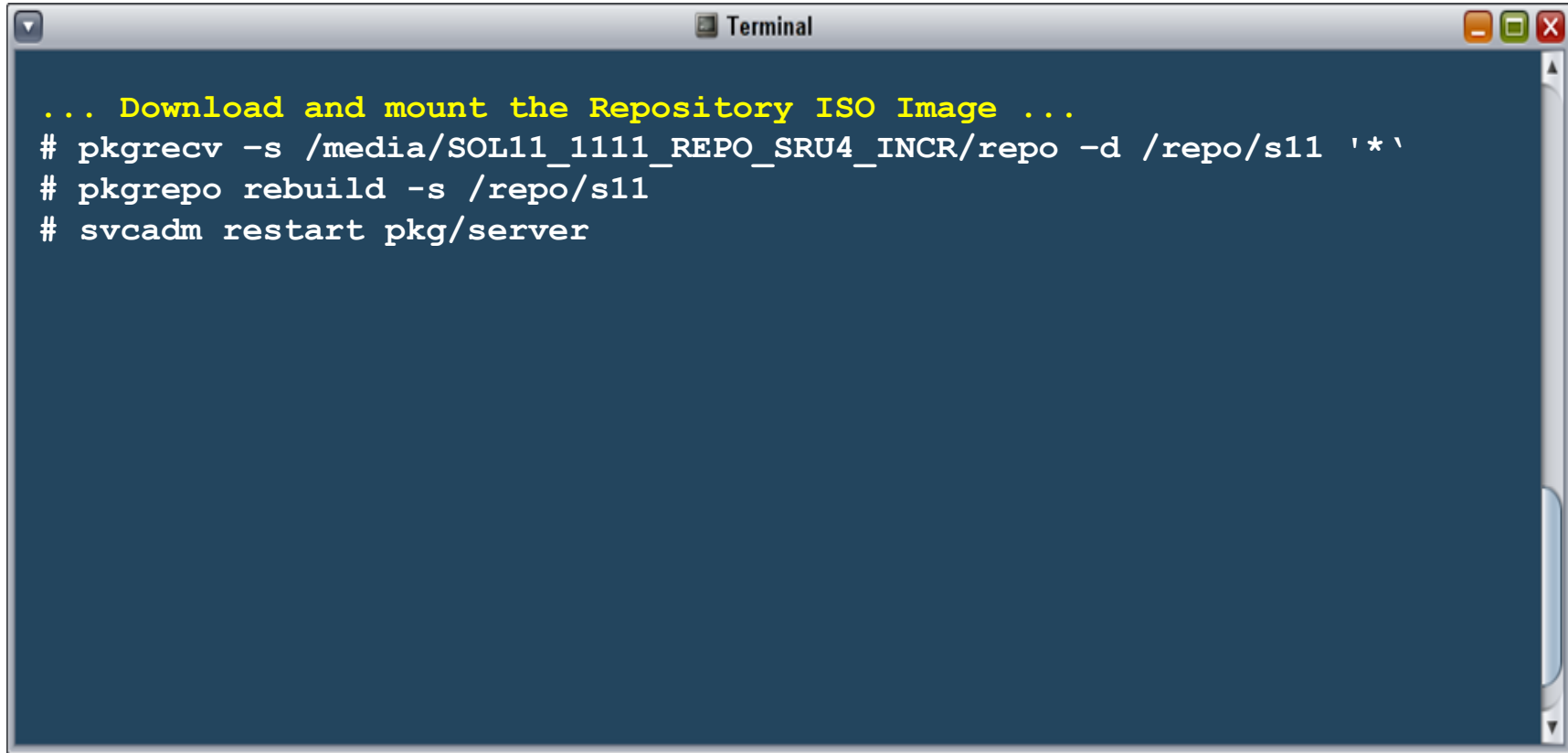
- Monthly updates
 - Service Updates for Customers with Service contract
- Synchronize online from <https://pkg.oracle.com/solaris/support/>
 - Request certificate at <https://pkg-register.oracle.com/>
 - See „Support Repositories Explained [ID 1021281.1]“
- Download offline from <http://support.oracle.com>
 - See Oracle Solaris 11 SRU Index [ID 1372094.1]

SRU Explained

- SRU are cumulative
 - Holds the latest package update of a package
 - See the following easy Example:

Packagename	Bundled Version with FCS	Bundled Version with SRU 1	Bundled Version with SRU 2	Bundled Version with SRU 3	Bundled Version with SRU 4
pkgA	1.0	1.1 (updated)	1.1 (cumulative)	1.2 (new)	1.3 (new)
pkgB	2.7	-	2.7.1 (new)	2.7.2 (new)	2.7.2 (cumulative)
pkgC	3.4	-	3.5 (new)	4.0 (new)	4.0 (cumulative)
entire	1.0	1.0.1 (new)	1.0.2 (new)	1.0.3 (new)	1.0.4 (new)

Merging-in an offline SRU Image

A terminal window titled "Terminal" with a dark blue background and white text. The window has standard OS window controls (minimize, maximize, close) in the top right corner. The text inside the terminal is as follows:

```
... Download and mount the Repository ISO Image ...  
# pkgrecv -s /media/SOL11_1111_REPO_SRU4_INCR/repo -d /repo/s11 '*`'  
# pkgrepo rebuild -s /repo/s11  
# svcadm restart pkg/server
```

Working with Repositories

- Keep your Repository up-to-date by automatically syncing in the SRU
- Only keep one Repository, that holds the Release bits and the SRU
- Create one central Repo Server and access via http or nfs

Oracle Solaris 11 SRU Update

```
Terminal
root@cantaloup # beadm list
BE                Active Mountpoint Space Policy Created
--                -
solaris11-1111-fcs NR      /          4.60G static 2011-11-15 01:00
root@cantaloup # pkg update --be-name solaris11-1111-sru1
Packages to update:  11
Create boot environment: Yes
Create backup boot environment:  No
DOWNLOAD
Completed          PKGS      FILES      XFER (MB)
                   11/11      347/347    13.0/13.0
PHASE
Removal Phase      ACTIONS
Install Phase      106/106
Update Phase       97/97
                   946/946
PHASE
Package State Update Phase      ITEMS
Package Cache Update Phase      22/22
Image State Update Phase         11/11
                                2/2
A clone of solaris11-1111-fcs exists and has been updated and activated.
On the next boot the Boot Environment solaris11-1111-sru1 will be
mounted on '/'. Reboot when ready to switch to this updated BE.
```

How is a System Updated ?

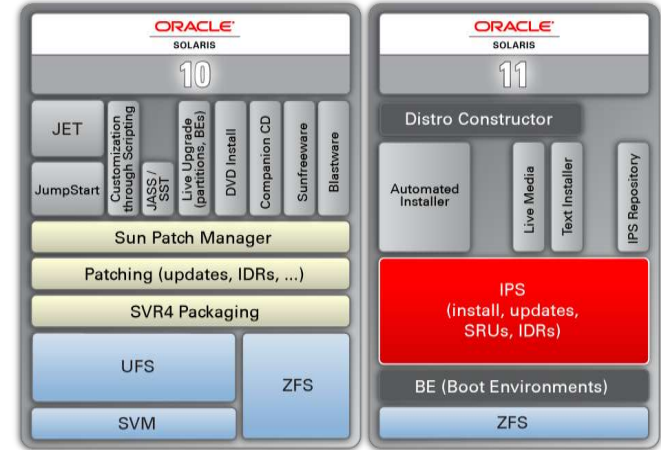
1. Find the **installed** packages
2. If no option has been specified, find the newest version of *entire* in the configured IPS-repository
3. Install the package versions, required in entire

Create your own package groups ?

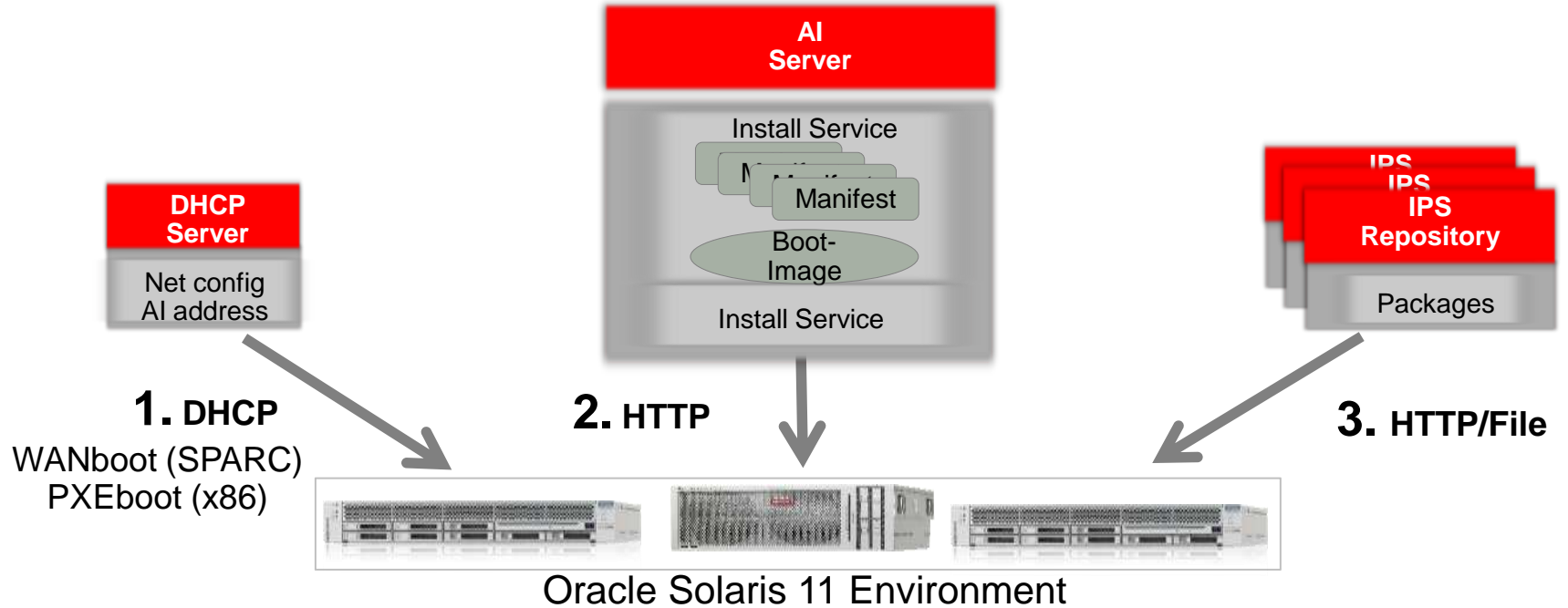
- Extend the existing group packages
 - solaris-small-server
 - solaris-large-server
 - solaris-desktop
 - ...
- Create an own group package, that depends on the upper
- The next *pkg update* will just update, what is installed

Oracle Solaris 11 Lifecycle Management News

- Simplify architecture
- Reduce the size of install images
- Clean-up and restructure the Oracle Solaris 11 installer
- ZFS as root-filesystem
- Boot Environments
- Image Packaging System
- **Automated Installer**
- Distribution Constructor (DC)



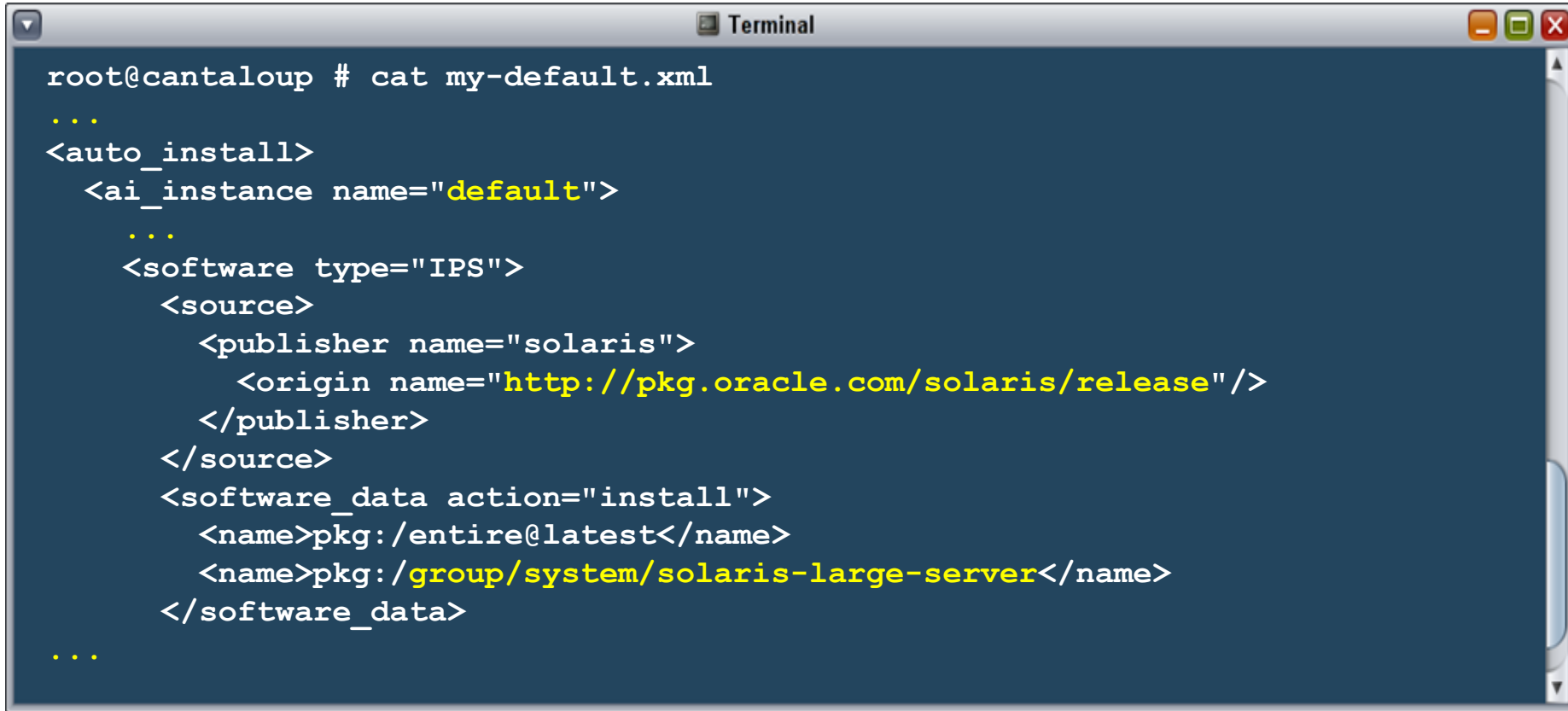
Basic Flow of Automated Installation



Administering the Automated Installer

```
Terminal
# installadm create-service -n s11-0-i386 -y
    -i 192.168.175.100 -c 10
# installadm list
# installadm -m list
# installadm export -n s11-0-i386 \
    -m orig_default > my-default.xml
... customize my-default.xml ...
# installadm create-manifest -n s11-0-i386 -n default-i386 \
    -f my-default.xml -d
# installadm list -p
# sysconfig create-profile -o my-profile.xml
# installadm create-profile -n s11-0-i386 -f my-profile.xml \
    -p sc-profile
# installadm create-client -e 01:02:03:04:05:06 -n s11-0-i386
```

Customize AI Manifest

A terminal window titled "Terminal" with a dark blue background and white text. The window shows the command "cat my-default.xml" being executed. The output is XML code for an AI manifest. The code includes an <auto_install> block containing an <ai_instance name="default"> block. Inside this block, there is a <software type="IPS"> block with a <source> block. The <source> block contains a <publisher name="solaris"> block with an <origin name="http://pkg.oracle.com/solaris/release"/> block. Below the <source> block is a <software_data action="install"> block with two <name> blocks: one for "pkg:/entire@latest" and another for "pkg:/group/system/solaris-large-server". The terminal window has standard window controls (minimize, maximize, close) in the top right corner.

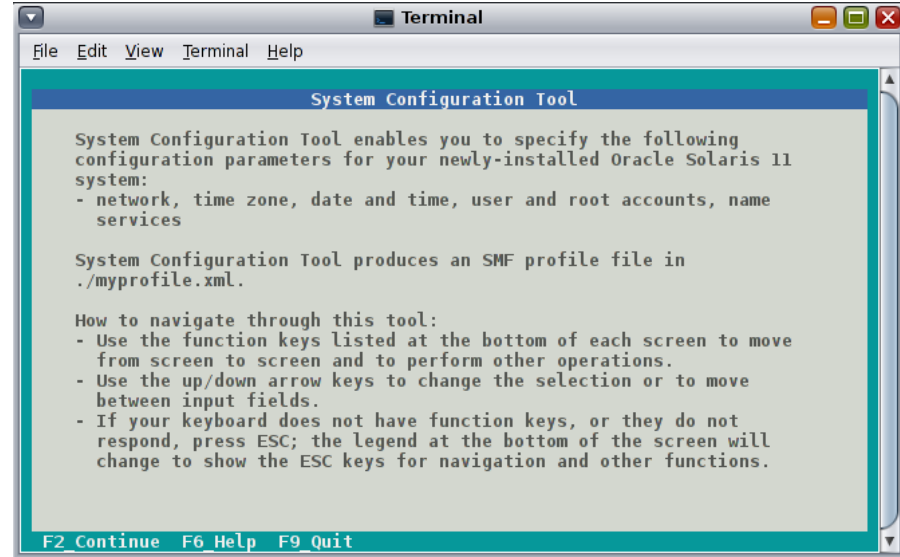
```
root@cantaloup # cat my-default.xml
...
<auto_install>
  <ai_instance name="default">
    ...
    <software type="IPS">
      <source>
        <publisher name="solaris">
          <origin name="http://pkg.oracle.com/solaris/release"/>
        </publisher>
      </source>
      <software_data action="install">
        <name>pkg:/entire@latest</name>
        <name>pkg:/group/system/solaris-large-server</name>
      </software_data>
    ...
  </ai_instance>
</auto_install>
```

Agenda for Today

- OS Lifecycle management
 - About IPS Packages, Repositories and Boot Environments
 - (Automated Installer)
- **Networking**
 - Configuring Network Interfaces and Services
- Zones
 - What's new
- Deployment of Oracle Solaris 11

Configuring a System with sysconfig

- Easiest starting point
 - # `sysconfig configure`
- Hostname, Network, User, Keyboard, Name Service, Timezone,



Working with networks

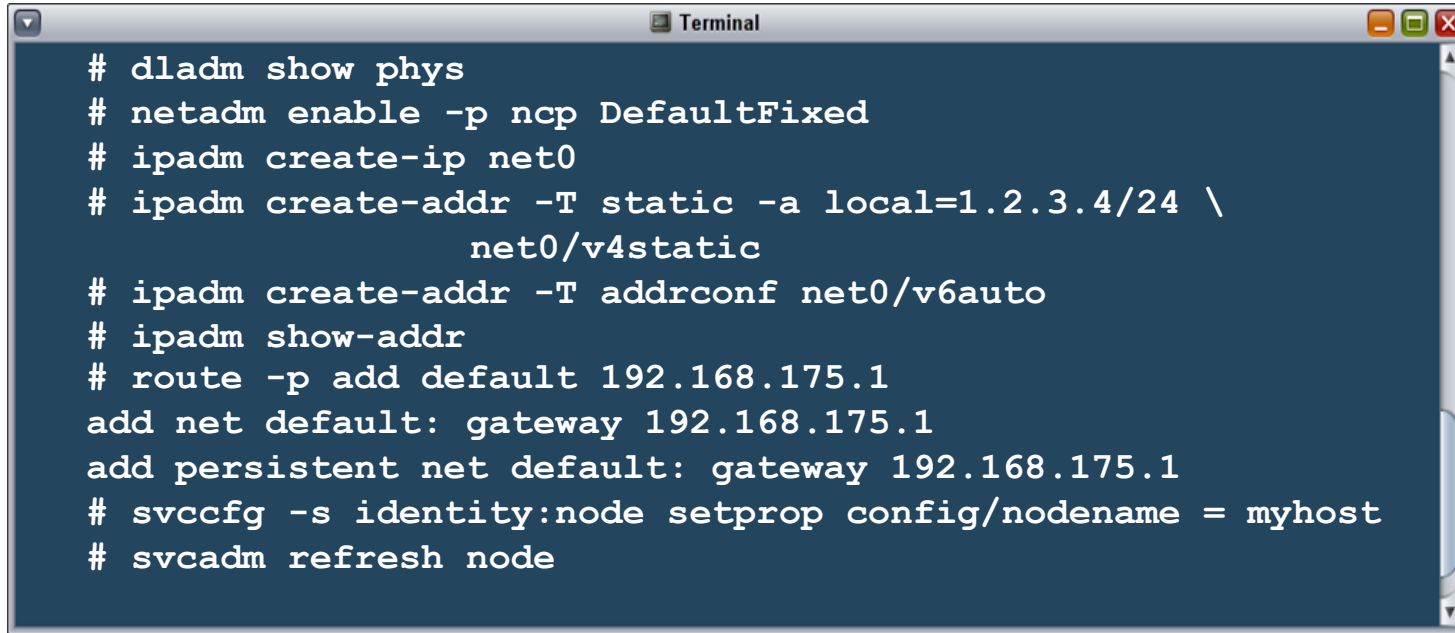


```
# dladm show phys
root@cantaloup:~# dladm show-phys
LINK          MEDIA          STATE          SPEED  DUPLEX  DEVICE
net0          Ethernet      up             1000   full    e1000g0
# ipadm show-if
root@cantaloup:~# ipadm show-if
IFNAME      CLASS      STATE      ACTIVE OVER
lo0         loopback  ok         yes   --
net0        ip         ok         yes   --
# ipadm show-addr
root@cantaloup:~# ipadm show-addr
ADDROBJ      TYPE      STATE      ADDR
lo0/v4       static   ok         127.0.0.1/8
net0/_b      dhcp     ok         10.0.2.15/24
lo0/v6       static   ok         ::1/128
net0/_a      addrconf ok         fe80::a00:27ff:fe8f:f3e8/10
```

Configuring a System

Network Configuration Profiles (NCP)

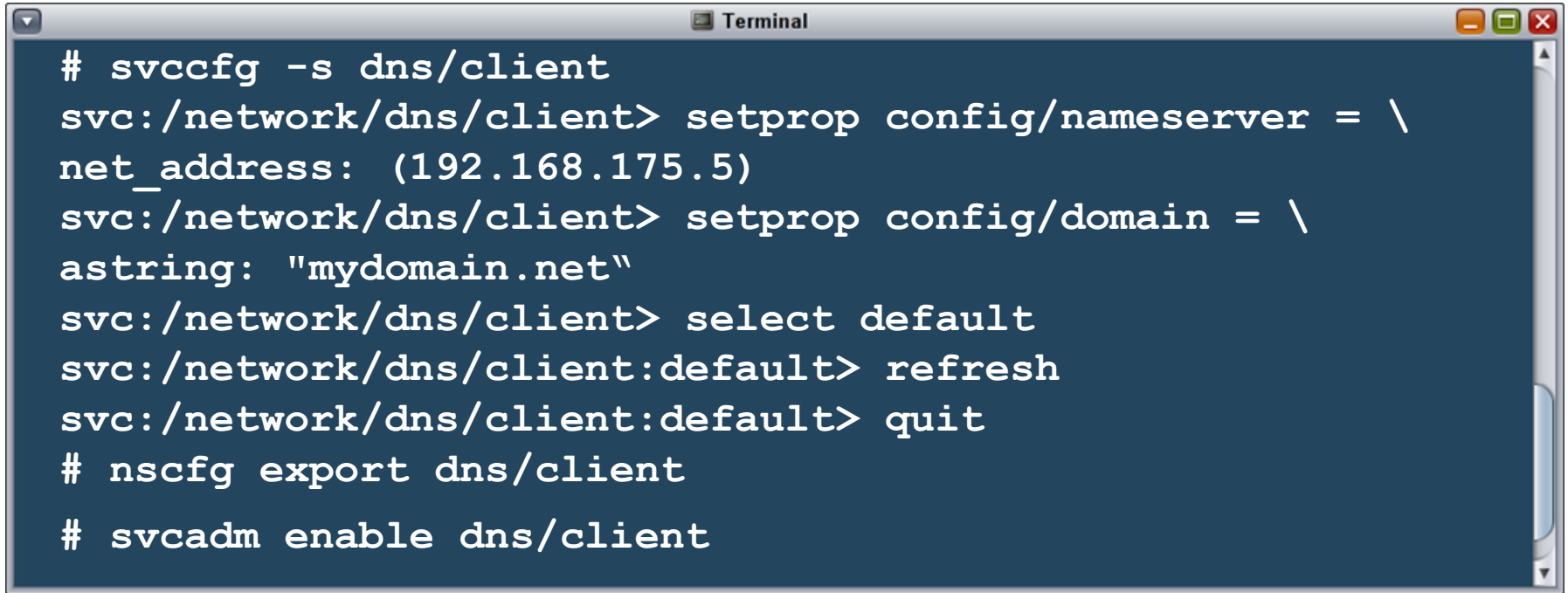
- Automatic **or** Manual (DefaultFixed)

A terminal window titled "Terminal" with standard window controls (minimize, maximize, close) in the top right corner. The terminal displays a series of shell commands and their outputs for configuring a network profile. The commands include enabling the NCP, creating an IP address pool, setting up static and auto IP addresses, adding a default gateway, and refreshing the node configuration.

```
# dladm show phys
# netadm enable -p ncp DefaultFixed
# ipadm create-ip net0
# ipadm create-addr -T static -a local=1.2.3.4/24 \
                    net0/v4static
# ipadm create-addr -T addrconf net0/v6auto
# ipadm show-addr
# route -p add default 192.168.175.1
add net default: gateway 192.168.175.1
add persistent net default: gateway 192.168.175.1
# svccfg -s identity:node setprop config/nodename = myhost
# svcadm refresh node
```

Configuring a System

The DNS configuration

A terminal window titled "Terminal" with a dark blue background and white text. The window contains a series of commands and their outputs for configuring a DNS client. The commands are: 1. # svccfg -s dns/client, which leads to the svc:/network/dns/client prompt. 2. svc:/network/dns/client> setprop config/nameserver = \ net_address: (192.168.175.5), which sets the nameserver. 3. svc:/network/dns/client> setprop config/domain = \ astring: "mydomain.net", which sets the domain. 4. svc:/network/dns/client> select default, which moves the prompt to svc:/network/dns/client:default. 5. svc:/network/dns/client:default> refresh, which refreshes the configuration. 6. svc:/network/dns/client:default> quit, which returns to the svc:/network/dns/client prompt. 7. # nscfg export dns/client, which exports the configuration. 8. # svcadm enable dns/client, which enables the service.

```
# svccfg -s dns/client
svc:/network/dns/client> setprop config/nameserver = \
net_address: (192.168.175.5)
svc:/network/dns/client> setprop config/domain = \
astring: "mydomain.net"
svc:/network/dns/client> select default
svc:/network/dns/client:default> refresh
svc:/network/dns/client:default> quit
# nscfg export dns/client
# svcadm enable dns/client
```

Configuring a System

The DNS configuration - The easier Alternative

- Edit `/etc/resolv.conf` as known
- Import the config and make active
 - `nscfg import dns/client`
 - `svcadm enable dns/client`

Configuring a System

Setup name service switch

```
Terminal
# svccfg -s name-service/switch
svc:/system/name-service/switch> setprop config/host = \
astring: "files dns"
svc:/system/name-service/switch> select default
svc:/system/name-service/switch:default> refresh
svc:/system/name-service/switch:default> quit
# nscfg export name-service/switch

# svcadm enable name-service/switch
```

Configuring a System

Setup name service switch - The easier Alternative

- Edit `/etc/nsswitch.conf` as known
- Import the config and make active
 - `nscfg import name-service/switch`
 - `svcadm enable name-service/switch`

Configuring a System

The alternatives

- Use `sysconfig`
- Edit `/etc/resolv.conf`, `/etc/nsswitch.conf` and use *netcfg import*

Agenda for Today

- OS Lifecycle management
 - About IPS Packages, Repositories and Boot Environments
 - (Automated Installer)
- Networking
 - Configuring Network Interfaces and Services
- **Zones**
 - What's new
- Deployment for Oracle Solaris 11

Terminology

- One **Global Zone** per System
 - Installed directly on bare metal or into VM
- Multiple **Non-global Zones** sharing one global Zone
 - Virtualized Environment
- A **Branded Zone** emulates a non-native OS Environment
 - **Solaris 10 Zone**
 - A branded Zone used to run a Solaris 10 user space
 - **Solaris Legacy Container**
 - A branded Zone used to run a Solaris 8 or Solaris 9 user space

Solaris 11 Zone Installation

- Zone root by Default on own ZFS Dataset (compressed)
- One Zones model (no more to distinguish sparse/whole)
- Zones Minimization
 - Install by default `pkg://solaris/group/solaris-small-server`
- Zone Installation
 - Automatic: with profiles and Automated Installer (AI)
 - Interactive: similar to AI based install
 - Automatic Zone upgrade from global zone
 - `pkg update`
 - `zoneadm attach -u/-U`

Zone installation (2)

- Need IPS Repository to Install Packages in a Zone
 - Set `http_proxy` or `https_proxy` for GZ if behind a firewall
- Zones inherit Publishers from Global Zone
 - No need to manage repositories in the zones
- IPS proxy to global zone
 - Allows zones to install pkg regardless of network config

Solaris 11 Zones Deployment

- AI is also used when installing zones interactive

- Default manifest

```
/usr/share/auto_install/manifest/zone_default.xml
```

- Default profile enables interactive system configuration

- Provide alternate manifest and/or profile with

```
zoneadm -z <zone> install -m <manifest> -c <profile>.xml
```

- Create profile with

```
sysconfig create-profile -o <profile>.xml
```


Resource Management

Helps organizations meet service level agreements



CPU cap



CPU shares



Memory Cap



Swap Cap

New for
Oracle
Solaris 11:



Bandwidth Cap



CPUs for
Networking



Max Processes
per Zone

Zones Resource Management

- Balance
 - Faire Share Resources through rules
 - Assigned based on shares in the event of 100% utilization (no limit below 100%)
- Capping
 - Cap Resources on a Limit
- Partitioning
 - Assign and use Resources Exclusively

Agenda for Today

- OS Lifecycle management
 - About IPS Packages, Repositories and Boot Environments
 - (Automated Installer)
- Networking
 - Configuring Network Interfaces and Services
- Zones
 - What's new
- **Deployment of Oracle Solaris 11**

Planning for Oracle Solaris 11

- Start now
 - Learn about new functionalities
 - Check your Applications
 - Ask your ISV
- Create your internal Repository
- Check your JumpStart Server and plan to migrate to Automated Installer
- Start with new projects

Know the source

- See „Evaluating Oracle Solaris 11“

<http://www.oracle.com/technetwork/server-storage/solaris11/overview/evaluate-1530234.html>

- With
 - Howto Documents
 - Cheat Sheets
 - ... and much more ...

Q&A

Detlef.Drewanz@oracle.com

ORACLE®