Creating and Using Oracle Solaris 10 Zones

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Contents

Using This Documentation

- **Overview** – Describes how to administer Oracle Solaris 10 Zones in the Oracle Solaris 11.2 release.
- **Audience** – Technicians, system administrators, and authorized service providers
- **Required knowledge** – Experience administering Oracle Solaris environments. Experience with virtualized environments is a plus.

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1

Introduction to Oracle Solaris 10 Zones

BrandZ provides the framework to create branded zones, which are used to run applications that cannot be run in an Oracle™ Solaris 11 environment. The brand described here is the `solaris10` brand, Oracle Solaris 10 Zones. Workloads running within these `solaris10` branded zones can take advantage of the enhancements made to the Oracle Solaris kernel and utilize some of the innovative technologies available only on the Oracle Solaris 11 release, such as virtual NICs (VNICs) and ZFS deduplication.

Note - If you want to create a `solaris10` branded zone now, go to Chapter 2, "Assessing an Oracle Solaris 10 System and Creating an Archive".

About the `solaris10` Brand

The `solaris10` branded zone, described in the solaris10(5) man page, is a complete runtime environment for Oracle Solaris 10 applications on SPARC and x86 machines running the Oracle Solaris 10 9/10 operating system or later released update. If you are running an Oracle Solaris 10 release earlier than Oracle Solaris 10 9/10, it is possible to use the earlier update release if you first install the kernel patch 142909-17 (SPARC) or 142910-17 (x86/x64), or later version, on the original system. You must install the patch before you create the archive that will be used to install the zone. It is the kernel patch of the release that is the prerequisite for migration to Oracle Solaris 10 Zones, not the full Oracle Solaris 10 9/10 or later release. The software download site for patches is My Oracle Support (https://support.oracle.com). Click on the "Patches & Updates" tab. On that site, you can view the download instructions and download the images. Contact your support provider for additional information regarding patches.

Non-global zones running within a single global zone instance are supported on all architectures that the Oracle Solaris 11.2 release has defined as supported platforms.

The brand includes the tools required to install an Oracle Solaris 10 system image into a non-global zone. You cannot install a `solaris10` brand zone directly from Oracle Solaris 10 media. A physical-to-virtual (P2V) capability is used to directly migrate an existing system into a non-global zone on a target system. The `zonep2vchk` tool is used to generate information needed for the P2V process and to output a template zonecfg command file for use on the target system.

The utility creates a zone that matches the source system's configuration. To use the utility on Oracle Solaris 10, download the unbundled package from the Oracle Technology Network (OTN). The unbundled package installs into `/opt/SUNWzonep2vchk`.

The brand also supports the tools used to migrate an Oracle Solaris 10 `native` zone into a `solaris10` brand non-global zone. The virtual-to-virtual (V2V) process for migrating an Oracle Solaris 10 `native` non-global zone into a `solaris10` branded zone supports the same archive formats as P2V. See Chapter 3, "Migrating an Oracle Solaris 10 `native` Non-Global Zone Into an Oracle Solaris 10 Zone" for more information.

FIGURE 1-1 Oracle Solaris 10 Containers Transition to Oracle Solaris 10 Zones
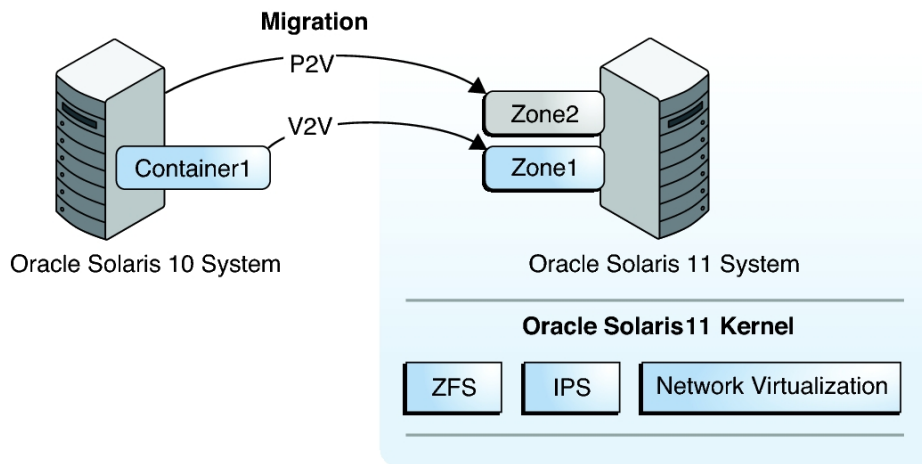
`solaris10` Zone Support

The `solaris10` brand zone supports the whole root non-global zone model. All of the required Oracle Solaris 10 software and any additional packages are installed into the private file systems of the zone.

The non-global zone must reside on its own ZFS dataset; only ZFS is supported. The ZFS dataset will be created automatically when the zone is installed or attached. If a ZFS dataset cannot be created, the zone will not install or attach. Note that the parent directory of the zone path must also be a ZFS dataset, or the file system creation will fail.

Any application or program that executes in a `native` Oracle Solaris 10 non-global zone should also work in a `solaris10` branded zone.

Note that zones do not support statically linked binaries.

Note - You can create and install `solaris10` branded zones on an Oracle Solaris Trusted Extensions system that has labels enabled, but you can only boot branded zones on this system configuration *if* the brand being booted is the `labeled` brand. Customers using Oracle Solaris Trusted Extensions on Oracle Solaris 10 systems must transition to a certified Oracle Solaris system configuration.

SVR4 Packaging and Patching in Oracle Solaris 10 Zones

About Using Packaging and Patching in `solaris10` Branded Zones

The SVR4 package metadata is available inside the zone, and the package and patch commands work correctly. For proper operation, note that you *must* install patches 119254-75 (SPARC) or 119255-75 (x86/x64), or later versions, on your Oracle Solaris 10 system *before* the archive is created. The software download site for patches is My Oracle Support (https://support.oracle.com). Click on the "Patches & Updates" tab to view the download instructions and download the images. Contact your support provider for additional information regarding patches.

Because the `solaris10` brand zones are whole root zones, all packaging and patch operations work as described in the man pages and other documentation. Note that the kernel components of the package or patch are not used for the installation. SVR4 packages are only installed into the current zone. For information about SVR4 packaging used in `solaris10` and `native` zones, see "Chapter 25, About Packages on an Solaris System With Zones Installed (Overview)" and "Chapter 26, Adding and Removing Packages and Patches on a Solaris System With Zones Installed (Tasks)" in "System Administration Guide: Oracle Solaris Containers-Resource Management and Oracle Solaris Zones ". This is the Oracle Solaris 10 version of the guide.

For information on system release level, see Chapter 1, "Introduction to Oracle Solaris 10 Zones".

About Performing Package and Patch Operations Remotely

For patch operations initiated from within Oracle Solaris 10 Zones, if the remote system is another `solaris10` zone, the patching operation works correctly. However, if the remote system

is a miniroot or an Oracle Solaris 10 system that is not a `solaris10` zone, the operation will produce undefined results. Similarly, the patch tools will produce undefined results if used to patch Oracle Solaris 10 Zones from miniroots or physical systems instead of Oracle Solaris 10 Zones.

Note that in general, the `patchadd` and `patchrm` tools allow administrators to specify alternate roots when running patch operations. This capability allows administrators to patch remote systems, such as Oracle Solaris 10 miniroots and Oracle Solaris 10 physical systems, which have `root` directories visible over NFS. For example, if the root directory of an Oracle Solaris 10 system is NFS-mounted onto a local system's `/net/a-system` directory, then the remote Oracle Solaris 10 system could be patched from the local system.

To install patch 142900-04 (or later version) on the remote system:

```
# patchadd -R /net/a-system 142900-04
```

For more information, see the following man pages in the "man pages section 1M: System Administration Commands ":

- `patchadd`(1M), the `-R` and `-C` options
- `patchrm`(1M)

Non-Global Zones as NFS Clients

Zones can be NFS clients. Version 2, version 3, and version 4 protocols are supported. For information on these NFS versions, see "Features of the NFS Service" in "Managing Network File Systems in Oracle Solaris 11.2 ".

The default version is NFS version 4. You can enable other NFS versions on a client by using one of the following methods:

- You can edit `/etc/default/nfs` to set `NFS_CLIENT_VERSMAX=`*number* so that the zone uses the specified version by default. See "Setting Up the NFS Service" in "Managing Network File Systems in Oracle Solaris 11.2 ". Use the procedure "How to Select Different Versions of NFS on a Client by Modifying the `/etc/default/nfs` File" from the task map.
- You can manually create a version mount. This method overrides the contents of `/etc/default/nfs`. See "Setting Up the NFS Service" in "Managing Network File Systems in Oracle Solaris 11.2 ". Use the procedure How to Use the Command Line to Select Different Versions of NFS on a Client from the task map.

General Zones Concepts

You should be familiar with the following resource management and zones concepts, which are discussed in "Administering Resource Management in Oracle Solaris 11.2 " and in "Creating and Using Oracle Solaris Zones ".

- zonep2vchk tool
- Supported and unsupported features
- Resource controls that enable the administrator to control how applications use available system resources
- Commands used to configure, install, and administer zones, primarily zonecfg, zoneadm, and zlogin
- zonecfg resources and property types
- The global zone and the non-global zone
- The whole-root non-global zone model
- Authorizations granted through the zonecfg utility
- The global administrator and the zone administrator
- The zone state model
- The zone isolation characteristics
- Privileges
- Networking
- Using the anet resource to configure IPoIB
- Zone shared-IP and exclusive-IP types
- The use of resource management features, such as resource pools, with zones
- The fair share scheduler (FSS), a scheduling class that enables you to allocate CPU time based on shares
- The resource capping daemon (rcapd), which can be used from the global zone to control resident set size (RSS) usage of branded zones

About Oracle Solaris 10 Zones in This Release

Operating Limitations

A /dev/sound device cannot be configured into the solaris10 branded zone.

The file-mac-profile property used to create read-only zones is not available.

The quota command documented in quota(1M) cannot be used to retrieve quota information for UFS file systems being used inside the solaris10 branded zone.

A `solaris10` branded zone cannot be an NFS server.

Networking in Oracle Solaris 10 Zones

The following sections identify Oracle Solaris 10 networking components that are either not available in Oracle Solaris 10 Zones or that are different in Oracle Solaris 10 Zones.

Networking Components That Are Not Supported

- Automatic tunnels using the `atun` STREAMS module are not supported.
- The following `ndd` tunable parameters are not supported in a `solaris10` branded zone:
    - `ip_squeue_fanout`
    - `ip_soft_rings_cnt`
    - `ip_ire_pathmtu_interval`
    - `tcp_mdt_max_pbufs`

Networking Features That Are Different

In a `solaris10` branded zone with an exclusive-IP configuration, the following features are different from a physical Oracle Solaris 10 system:

- Mobile IP is not available because it is not available in the Oracle Solaris 11 release.
- In a `solaris10` branded zone, an `autopush` configuration will be ignored when the `tcp`, `udp`, or `icmp` sockets are open. These sockets are mapped to modules instead of STREAMS devices by default. To use `autopush`, explicitly map these sockets to STREAMS-based devices by using the `soconfig` and `sock2path.d` utilities described in the soconfig(1M) and sock2path.d(4) man pages.
- In a `solaris10` branded zone archived from a physical system running Oracle Solaris 10 9/10 or an earlier update, `/dev/net` links, such as VNICs, are not supported by the Data Link Provider Interface library (`libdlpi`). These links are supported on Oracle Solaris 10 8/11. The library is described in the libdlpi(3LIB) man page.

    Applications that do not use either the `libdlpi` library in Oracle Solaris 10 8/11 or `libpcap` versions 1.0.0 or higher libraries will not be able to access `/dev/net` links, such as VNICs.
- Because IP Network Multipathing (IPMP) in Oracle Solaris 10 Zones is based on the Oracle Solaris 11 release, there are differences in the output of the `ifconfig` command when compared to the command output in the Oracle Solaris 10 operating system. However, the documented features of the `ifconfig` command and IPMP have not changed. Therefore, Oracle Solaris 10 applications that use the documented interfaces will continue

to work in Oracle Solaris 10 Zones without modification. All of the standard Oracle Solaris 10 networking facilities, such as `ifconfig` and `/etc/hostname.`*name*, should be used to configure and use IPMP and perform all other network configuration.

The following example shows `ifconfig` command output in a `solaris10` branded zone for an IPMP group `ipmp0` with data address `192.168.1.3` and the underlying interfaces `e1000g1` and `e1000g2`, with test addresses `192.168.1.1` and `192.168.1.2`, respectively.

```
% ifconfig -a
e1000g1:
flags=9040843<UP,BROADCAST,RUNNING,MULTICAST,DEPRECATED,IPv4,NOFAILOVER>
mtu 1500 index 8
        inet 192.168.1.1 netmask ffffff00 broadcast 192.168.1.255
        ether 0:11:22:45:40:a0
e1000g2:
flags=9040843<UP,BROADCAST,RUNNING,MULTICAST,DEPRECATED,IPv4,NOFAILOVER>
mtu 1500 index 9
        inet 192.162.1.2 broadcast 192.162.1.255
        ether 0:11:22:45:40:a1
ipmp0: flags=8011000803<UP,BROADCAST,MULTICAST,IPv4,FAILED,IPMP> mtu 68
index 10
        inet 192.168.1.3 netmask ffffff00 broadcast 192.168.1.255
        groupname ipmp0
```

- Unlike the display produced on an Oracle Solaris 10 system, the `ifconfig` command in an Oracle Solaris 10 Container does not show the binding of the underlying interfaces to IP addresses. This information can be obtained by using the `arp` command with the `-an` options.

- If an interface is plumbed for IPv6 and address configuration succeeds, then the interface is given its own global address. In an Oracle Solaris 10 system, each physical interface in an IPMP group will have its own global address, and the IPMP group will have as many global addresses as there are interfaces. In a Oracle Solaris 10 Zones, only the IPMP interface will have its own global address. The underlying interfaces will not have their own global addresses.

- Unlike the Oracle Solaris 10 operating system, if there is only one interface in an IPMP group, then its test address and its data address cannot be the same.

- For information on configuring an IPMP group in a `solaris10` zone in an Oracle Solaris Zones cluster, refer to the Oracle Solaris Cluster 4.1 Release Notes.

See the `arp`(1M) and `ifconfig`(1M) man pages, and "IP Network Multipathing in Exclusive-IP Zones" in "Creating and Using Oracle Solaris Zones ".

If `native` Non-Global Zones Are Installed

An additional step in the P2V process occurs when there are `native` zones on the Oracle Solaris 10 9/10 (or later released update) source physical system. Because zones do not nest, the P2V process on these systems makes the existing zones unusable inside the branded zone. The existing zones are detected when the zone is installed, and a warning is issued indicating that any nested zones will not be usable and that the disk space could be recovered. Those zones can be migrated first using the V2V process described in Chapter 3, "Migrating an Oracle Solaris 10 `native` Non-Global Zone Into an Oracle Solaris 10 Zone".

If you apply the kernel patch on a system running an earlier release, apply the patch before you migrate the existing zones.

2

Assessing an Oracle Solaris 10 System and Creating an Archive

This chapter discusses obtaining information about the Oracle Solaris 10 10/09 (or later released update) system and creating the archive of the system. A physical-to-virtual (P2V) capability is used to directly migrate an existing Oracle Solaris system into a non-global zone on a target system. Information on required packages on the target system is also provided.

Source and Target System Prerequisites

Enabling Oracle Solaris 10 Package and Patch Tools

To use the Oracle Solaris 10 package and patch tools in Oracle Solaris 10 Zones, install the following patches for your architecture on your source system *before* the image is created.

- 119254-75, 119534-24, and 140914-02 (SPARC)
- 119255-75, 119535-24 and 140915-02 (x86/x64)

The P2V process will work without the patches, but the package and patch tools will not work properly within the `solaris10` branded zone.

Installing the Required Oracle Solaris Package on the Target System

To use Oracle Solaris 10 Zones on your system, `pkg:/system/zones/brand/brand-solaris10` must be installed on the system running Oracle Solaris 11.

For more information on the repository, see "Adding and Updating Software in Oracle Solaris 11.2 ".

For package installation instructions, see Chapter 3, "Installing and Updating Software Packages," in "Adding and Updating Software in Oracle Solaris 11.2 ".

Assess the System To Be Migrated By Using the `zonep2vchk` Utility

An existing Oracle Solaris 10 9/10 system (or later released Solaris 10 update) can be directly migrated into a `solaris10` branded zone on an Oracle Solaris 11 system.

To begin, examine the source system and collect needed information by using the `zonep2vchk` tool documented in `zonep2vchk`(1M) and Chapter 7, "About Zone Migrations and the zonep2vchk Tool," in "Creating and Using Oracle Solaris Zones ". This tool is used to assess the system to be migrated and to produce a `zonecfg` template that includes a networking configuration.

Depending on the services performed by the original system, the global administrator or a user granted the appropriate authorizations might need to manually customize the zone after it has been installed. For example, the privileges assigned to the zone might need to be modified. This is not done automatically. Also, because not all system services work inside zones, not every Oracle Solaris 10 system is a good candidate for migration into a zone.

Note - If there are any `native` non-global zones on the system to be migrated, these zones must either be deleted, or be archived and moved into zones on the new target system first. For a sparse root zone, the archive must be made with the zone in the ready state. For additional information on migration, see Chapter 3, "Migrating an Oracle Solaris 10 `native` Non-Global Zone Into an Oracle Solaris 10 Zone". For additional information on sparse root zones, see "Zones Overview" in "System Administration Guide: Oracle Solaris Containers-Resource Management and Oracle Solaris Zones " in the Oracle Solaris 10 documentation.

Oracle Solaris 10 Systems Only: Obtaining the `zonep2vchk` Utility

To use the utility on the Oracle Solaris 10 system, you can download the unbundled package from the Oracle Technology Network (OTN). The unbundled package installs into `/opt/SUNWzonep2vchk`.

Creating the Image for Directly Migrating Oracle Solaris 10 Systems Into Zones

You can use the Oracle Solaris Flash archiving tools to create an image of an installed system that can be migrated into a zone.

Note - Oracle Solaris Flash archiving tools are supported only with `solaris10` branded zones. As of Oracle Solaris 11.2, Unified Archives are the only supported archiving file type for `solaris` and `solaris-kz` branded zones. See Chapter 8, "Migrating Oracle Solaris Systems and Migrating Non-Global Zones," in "Creating and Using Oracle Solaris Zones " and "Using Unified Archives for System Recovery and Cloning in Oracle Solaris 11.2 " for information on working with Unified Archives.

The system can be fully configured with all of the software that will be run in the zone before the image is created. This image is then used by the installer when the zone is installed.

▼ How to Use `flarcreate` to Create the Image

On a system with a ZFS root, you can use the `flarcreate` command described in the `flarcreate`(1M) Oracle Solaris 10 man page to create the system image. By default, the `flar` created is a ZFS send stream as described in "Sending and Receiving ZFS Data" in "Managing ZFS File Systems in Oracle Solaris 11.2 ".

This example procedure uses NFS to place the flash archive on the target Oracle Solaris 11 system, but you could use any method to move the files.

You must be the global administrator or a user with the required rights profile in the global zone to perform this procedure.

1. **Become an administrator.**

   For more information, see "Using Your Assigned Administrative Rights" in "Securing Users and Processes in Oracle Solaris 11.2 ".

2. **Log into the source Oracle Solaris 10 system to be archived.**

3. **Change directories to the root directory.**

   ```
   # cd /
   ```

4. **Use `flarcreate` to create a flash archive image file named `s10-system` on the source system, and place the archive onto the target Oracle Solaris 11 system:**

```
source-system # flarcreate -n s10-system /net/target/export/archives/s10-system.flar
```

▼ How to Use `flarcreate` to Exclude Certain Data

To exclude data that is not on a ZFS dataset boundary from the archive, you must use `cpio` or `pax` with `flarcreate`. You can use the `-L archiver` option to specify `cpio` or `pax` as the method to archive the files.

This example procedure uses NFS to place the flash archive on the target Oracle Solaris 11 system, but you could use any method to move the files.

You must be the global administrator or a user with the required rights profile in the global zone to perform this procedure.

1. Become an administrator.

For more information, see "Using Your Assigned Administrative Rights" in "Securing Users and Processes in Oracle Solaris 11.2 ".

2. Log in to the source Oracle Solaris 10 system to be archived.

3. Change directories to the root directory.

```
# cd /
```

4. Use `flarcreate` to create a flash archive image file named `s10-system` on the source system, and place the archive onto the target Oracle Solaris 11 system:

```
source-system # flarcreate -S -n s10-system -x /path/to/exclude -L cpio /net/target/
export/archives/s10-system.flar
Determining which filesystems will be included in the archive...
Creating the archive...
cpio: File size of "etc/mnttab" has
increased by 435
2068650 blocks
1 error(s)
Archive creation complete.
```

Tip - In some cases, `flarcreate` can display errors from the `cpio` command. Most commonly, these are messages such as `File size of etc/mnttab has increased by 33`. When these messages pertain to log files or files that reflect system state, they can be ignored. Be sure to review all error messages thoroughly.

Other Archive Creation Methods

You can use alternate methods for creating the archive. The installer can accept the following archive formats:

- `cpio` archives
- `gzip` compressed `cpio` archives
- `bzip2` compressed `cpio` archives
- `pax` archives created with the `-x xustar` (`XUSTAR`) format
- `ufsdump` level zero (full) backups

Additionally, the installer can only accept a directory of files created by using an archiving utility that saves and restores file permissions, ownership, and links.

For more information, see the `cpio`(1), `pax`(1), `bzip2`(1), `gzip`(1), and `ufsdump`(1M) man pages.

Note - If you use a method other than flash archive for creating an archive for P2V, you must unmount the processor-dependent `libc.so.1` `lofs`-mounted hardware capabilities (`hwcap`) library on the source system before you create the archive. Otherwise, the zone installed with the archive might not boot on the target system. After you have created the archive, you can remount the proper hardware capabilities library on top of `/lib/libc.so.1` by using `lofs` and the mount `-O` option.

```
source-system# umount /lib/libc.so.1
source-system# mount -O -F lofs /lib/libc.so.1
```

Host ID Emulation

When applications are migrated from a standalone Oracle Solaris system into a zone on a new system, the `hostid` changes to be the `hostid` of the new machine.

In some cases, applications depend on the original `hostid`, and it is not possible to update the application configuration. In these cases, the zone can be configured to use the `hostid` of the original system. This is done by setting a `zonecfg` property to specify the `hostid`, as described in "How to Configure the Zone" in "Creating and Using Oracle Solaris Zones ". The value used should be the output of the `hostid` command as run on the original system. To view the `hostid` in an installed zone, also use the `hostid` command.

For more information about host IDs, see `hostid`(1).

3

♦ ♦ ♦ **C H A P T E R 3**

Migrating an Oracle Solaris 10 `native` Non-Global Zone Into an Oracle Solaris 10 Zone

This chapter describes migrating `native` non-global zones on an Oracle Solaris 10 9/10 (or later released update) system into Oracle Solaris 10 Zones on a system running the Oracle Solaris 11 release.

Only read this chapter if there are any `native` non-global zones on the system that you want to migrate. These zones must be archived and moved into branded zones on the new target system first.

Archive Considerations

A sparse root zone on an Oracle Solaris 10 system is converted by the system to a whole root model for the `solaris10` branded zone migration. A sparse root zone must be in the ready state on the source system before the V2V process occurs. This will mount any `inherited-pkg-dir` resources before the archive is created. See "Zones Overview" in "System Administration Guide: Oracle Solaris Containers-Resource Management and Oracle Solaris Zones " in the Oracle Solaris 10 version of this guide for more information on these concepts.

The zone's brand will be changed as part of the process.

Overview of the `solaris10` Zone Migration Process

The virtual-to-virtual (V2V) process for migrating an Oracle Solaris 10 `native` zone to a `solaris10` branded zone supports the same archive formats as P2V. This process uses the `zoneadm install` subcommand. The `solaris10` brand `install` subcommand uses the following options, which correspond to the same options in the `attach` subcommand.

Note - Use of the `install` subcommand is recommended.

Option	Description
-a *path*	Specifies a path to an archive to unpack into the zone. Full flash archive and `pax`, `cpio`, `gzip` compressed `cpio`, `bzip` compressed `cpio`, and level 0 `ufsdump` are supported.
-d *path*	Specifies a path to a tree of files as the source for the installation.
-d —	Use the -d option with the dash parameter to direct that the existing directory layout be used in the `zonepath`. Thus, if the administrator manually sets up the `zonepath` directory before the installation, the -d – option can be used to indicate that the directory already exists.

About Detaching and Attaching the `solaris10` Zone

A `solaris10` zone can be migrated to an Oracle Solaris host by configuring the zone on the target system, then using the `zoneadm` command with the `detach` and `attach` subcommands and either the -a option to attach an archive or the -d option to specify a `zonepath`. This process is described in "About Migrating a Zone" in "Creating and Using Oracle Solaris Zones " and in "How to Migrate A Non-Global Zone Using ZFS Archives" in "Creating and Using Oracle Solaris Zones ".

Note - Use of the `install` subcommand is recommended.

Migrating a `solaris10` Branded Zone

The `zonecfg` and `zoneadm` commands can be used to migrate an existing non-global zone from one system to another. The zone is halted and detached from its current host. The `zonepath` is moved to the target host, where it is attached.

The `zoneadm detach` process creates the information necessary to attach the zone on a different system. The `zoneadm attach` process verifies that the target machine has the correct configuration to host the zone.

Because there are several ways to make the `zonepath` available on the new host, the actual movement of the `zonepath` from one system to another is a manual process that is performed by the global administrator.

When attached to the new system, the zone is in the installed state.

EXAMPLE   3-1   Sample `attach` Command

```
host2# zoneadm -z zonename attach -a /net/machine_name/s10-system.flar
```

Migrating an Existing Zone on an Oracle Solaris 10 System

Before a physical system can be migrated, any existing non-global zones on the system must be archived and moved into zones on the new target system first.

▼ How to Migrate an Existing `native` Non-Global Zone

Use the V2V process to migrate an existing zone on your Solaris 10 system to a `solaris10` brand zone on a system running the Oracle Solaris 11 release.

1. **Become an administrator.**

   For more information, see "Using Your Assigned Administrative Rights" in "Securing Users and Processes in Oracle Solaris 11.2 ".

2. **Print the existing zone's configuration. You will need this information to recreate the zone on the destination system:**

   ```
   source# zonecfg -z my-zone info
   zonename: my-zone
   zonepath: /zones/my-zone
   brand: native
   autoboot: false
   bootargs:
   pool:
   limitpriv:
   scheduling-class:
   ip-type: shared
   hostid: 1337833f
   inherit-pkg-dir:
           dir: /lib
   inherit-pkg-dir:
           dir: /platform
   inherit-pkg-dir:
           dir: /sbin
   inherit-pkg-dir:
           dir: /usr
   net:
           address: 192.168.0.90
           physical: bge0
   ```

3. **Halt the zone:**

```
source# zoneadm -z my-zone halt
```

You should not archive a running zone because the application or system data within the zone might be captured in an inconsistent state.

4. **(Optional) If the zone is a sparse root zone that has `inherit-pkg-dir` settings, then first `ready` the zone so that the inherited directories will be archived:**

```
source# zoneadm -s my-zone ready
```

5. **Archive the zone with the `zonepath /zones/my-zone.`**

    ■   **Create a `gzip` compressed `cpio` archive named `my-zone.cpio.gz` for the zone, which will still be named `my-zone` on the target system:**

```
source# cd /zones
source# find my-zone -print | cpio -oP@ | gzip >/zones/my-zone.cpio.gz
```

    ■   **Create the archive from within the `zonepath` if you intend to rename the zone on the target system:**

```
source# cd /zones/my-zone
source# find root -print | cpio -oP@ | gzip >/zones/my-zone.cpio.gz
```

6. **Transfer the archive to the target Oracle Solaris 11.2 system, using any file transfer mechanism to copy the file, such as:**

    ■   The sftp command described in the [sftp(1)](sftp) man page
    ■   NFS mounts
    ■   Any other file transfer mechanism to copy the file.

7. **On the target system, recreate the zone.**

```
target# zonecfg -z my-zone
my-zone: No such zone configured
Use 'create' to begin configuring a new zone.
zonecfg:my-zone> create -t SYSsolaris10
zonecfg:my-zone> set zonepath=/zones/my-zone
...
```

Note - The zone's brand must be `solaris10` and the zone cannot use any `inherit-pkg-dir` settings, even if the original zone was configured as a sparse root zone. See Part II, "Zones," in "System Administration Guide: Oracle Solaris Containers-Resource Management and Oracle Solaris Zones " for information on `inherit-pkg-dir` resources.

If the destination system has different hardware, different network interfaces, or other devices or file systems that must be configured on the zone, you must update the zone's configuration. See Chapter 2, "Non-Global Zone Configuration Overview," in "Introduction to Oracle Solaris Zones " , "About Migrating a Zone" in "Creating and Using Oracle Solaris Zones ", and Chapter 1, "How to Plan and Configure Non-Global Zones," in "Creating and Using Oracle Solaris Zones ".

---

8. **Display the zone's configuration:**

```
target# zonecfg -z my-zone info
zonename: my-zone
zonepath: /zones/my-zone
brand: solaris10
autoboot: false
bootargs:
pool:
limitpriv:
scheduling-class:
ip-type: shared
hostid: 1337833f
net:
        address: 192.168.0.90
        physical: net0
```

9. **Install the zone from the archive that was created on the source system, with the archive transferred into the `/zones` directory on the destination system:**

```
target# zoneadm -z my-zone install -a /zones/my-zone.cpio.gz
```

Once the zone installation has completed successfully, the zone is ready to boot.

You can save the zone's archive for possible later use, or remove it from the system.

To remove the archive from the destination system:

```
target# rm /zones/myzone.cpio.gz
```

♦♦♦ **C H A P T E R 4**

4

Configuring the `solaris10` Branded Zone

This chapter discusses configuring the `solaris10` branded zone.

Preconfiguration Tasks

You will need the following:

- A supported SPARC or x86 system running the Oracle Solaris 11 release.
- The default is the exclusive-IP type with an `anet` resource. For a shared-IP zone that requires network connectivity, you will need to provide one or more unique IPv4 addresses for each zone you want to create. You must also specify the physical interface.
- A machine running the Oracle Solaris 10 10/09 (or later released update) operating system that you want to migrate into a `solaris10` container. An earlier update can be migrated with the appropriate kernel patch. You can generate your own images from existing systems. The process is described in "Creating the Image for Directly Migrating Oracle Solaris 10 Systems Into Zones" on page 17.

Resources Included in the Configuration by Default

Devices, file systems, and privileges in a branded zone are included in the configuration by default.

Configured Devices in `solaris10` Branded Zones

The devices supported by each zone are documented in the man pages and other documentation for that brand. The `solaris10` zone does not allow the addition of any unsupported or unrecognized devices. The framework detects any attempt to add an unsupported device. An error message is issued that indicates the zone configuration cannot be verified.

To learn more about device considerations in non-global zones, see "Device Use in Non-Global Zones" in "Creating and Using Oracle Solaris Zones ".

Privileges Defined in `solaris10` Branded Zones

Processes are restricted to a subset of privileges. Privilege restriction prevents a zone from performing operations that might affect other zones. The set of privileges limits the capabilities of privileged users within the zone.

Default, required default, optional, and prohibited privileges are defined by each brand. You can also add or remove certain privileges by using the `limitpriv` property as shown in Step 8 of "How to Configure the Zone" in "Creating and Using Oracle Solaris Zones ". See "Privileges in a Non-Global Zone" in "Creating and Using Oracle Solaris Zones " for a list of Solaris privileges and the status of each with respect to zones.

For more information about privileges, see the `ppriv`(1) man page and "Securing Users and Processes in Oracle Solaris 11.2 ".

`solaris10` Branded Zone Configuration Process

The `zonecfg` command is used to do the following:

- Set the brand for the zone.
- Create the configuration for the `solaris10` zone.
- Verify the configuration to determine whether the specified resources and properties are allowed and internally consistent on a hypothetical system.
- Perform a brand-specific verification.

You can create the zone configuration by using the `zonep2vchk` utility.

The check performed by the `zonecfg verify` command for a given configuration verifies the following:

- Ensures that a zone path is specified
- Ensures that all of the required properties for each resource are specified
- Ensures that brand requirements are met

For more information about the `zonecfg` command, see the `zonecfg`(1M) man page.

Configuring the Target Zone

The following must be installed on your Oracle Solaris 11 system: `pkg:/system/zones/brand/brand-solaris10`.

Create the new zone configuration on the target system by using the `zonecfg` command.

The `zonecfg` prompt is of the following form:

`zonecfg:`*`zonename`*`>`

When you are configuring a specific resource type, such as a file system, that resource type is also included in the prompt:

`zonecfg:`*`zonename`*`:fs>`

Tip - If you know you will be using CDs or DVDs to install applications in a `solaris10` branded zone, use add `fs` to add read-only access to CD or DVD media in the global zone when you initially configure the branded zone. A CD or DVD can then be used to install a product in the branded zone. See "How to Add Access to CD or DVD Media in a Non-Global Zone" in "Creating and Using Oracle Solaris Zones " for more information.

▼ How to Configure an Exclusive-IP `solaris10` Branded Zone

You must be the global administrator or a user with the appropriate authorizations in the global zone to perform this procedure.

1. **Become an administrator.**

    For more information, see "Using Your Assigned Administrative Rights" in "Securing Users and Processes in Oracle Solaris 11.2 ".

2. **Create an exclusive-IP `solaris10` zone with the zone name `s10-zone`.**

    `global# `**`zonecfg -z s10-zone`**

    If this is the first time you have configured this zone, you will see the following system message:

    ```
    s10-zone: No such zone configured
    Use 'create' to begin configuring a new zone.
    ```

3. **Create the new `solaris10` zone configuration by using the `SYSsolaris10` template.**

    `zonecfg:s10-zone> `**`create -t SYSsolaris10`**

    The `SYSsolaris10` profile creates an exclusive-IP zone that includes an automatic `anet` resource by default.

4. **Set the zone path, `/zones/s10-zone` in this procedure.**

    `zonecfg:s10-zone> `**`set zonepath=/zones/s10-zone`**

5. Set the autoboot value.

```
zonecfg:s10-zone> set autoboot=true
```

If set to `true`, the zone is automatically booted when the global zone is booted. The default value is `false`. Note that for the zones to autoboot, the zones service `svc:/system/zones:default` must also be enabled. You can enable the zones service with the `svcadm` command.

6. Add a ZFS file system shared with the global zone.

```
zonecfg:s10-zone> add fs
```

a. Set the type to `zfs`.

```
zonecfg:s10-zone:fs> set type=zfs
```

b. Set the directory to mount from the global zone.

```
zonecfg:s10-zone:fs> set special=share/zone/s10-zone
```

c. Specify the mount point.

```
zonecfg:s10-zone:fs> set dir=/opt/shared
```

d. End the specification.

```
zonecfg:s10-zone:fs> end
```

This step can be performed more than once to add more than one file system.

7. Delegate a ZFS dataset named *sales* in the storage pool *tank*.

```
zonecfg:my-zone> add dataset
```

a. Specify the path to the ZFS dataset *sales*.

```
zonecfg:my-zone> set name=tank/sales
```

b. End the dataset specification.

```
zonecfg:my-zone> end
```

8. Set the `hostid` to be the `hostid` of the source system.

```
zonecfg:my-zone> set hostid=80f0c086
```

9. Verify the zone configuration for the zone.

```
zonecfg:s10-zone> verify
```

10. **Commit the zone configuration for the zone.**

```
zonecfg:s10-zone> commit
```

11. **Exit the `zonecfg` command.**

```
zonecfg:s10-zone> exit
```

Note that even if you did not explicitly type commit at the prompt, a commit is automatically attempted when you type exit or an EOF occurs.

12. **Use the `info` subcommand to verify that the brand is set to `solaris10`.**

```
global# zonecfg -z s10-zone info
```

13. **(Optional) Use the `info` subcommand to check the `hostid`:**

```
global# zonecfg -z s10-zone info hostid
```

Next Steps

Tip - After you have configured the zone, it is a good idea to make a copy of the zone's configuration. You can use this backup to recreate the zone in the future. As root or an administrator with the correct profile, print the configuration for the zone *s10-zone* to a file. This example uses a file named s10-zone.config.

```
global# zonecfg -z s10-zone export > s10-zone.config
```

See Also For additional components that can be configured using zonecfg, see Chapter 2, "Non-Global Zone Configuration Overview," in "Introduction to Oracle Solaris Zones ". This guide also provides information on using the zonecfg command in either command-line or command-file mode. Note that for shared-IP zones, a static address must be assigned in a zonecfg net resource. For more information about adding ZFS file systems, see "Adding ZFS File Systems to a Non-Global Zone" in "Managing ZFS File Systems in Oracle Solaris 11.2 ".

▼ How to Configure a Shared-IP `solaris10` Branded Zone

You must be the global administrator or a user with the appropriate authorizations in the global zone to perform this procedure.

1. **Become an administrator.**

For more information, see "Using Your Assigned Administrative Rights" in "Securing Users and Processes in Oracle Solaris 11.2 ".

2.   Create a shared-IP `solaris10` zone with the zone name `s10-zone`.

```
global# zonecfg -z s10-zone
```

If this is the first time you have configured this zone, you will see the following system message:

```
s10-zone: No such zone configured
Use 'create' to begin configuring a new zone.
```

3.   Create the new `solaris10` zone configuration.

```
zonecfg:s10-zone> create -b
set brand=solaris10
```

Note - Do **not** use `create -t SYSsolaris10-shared-ip` to set the IP type.

---

4.   Set the zone path, `/zones/s10-zone` in this procedure.

```
zonecfg:s10-zone> set zonepath=/zones/s10-zone
```

5.   Set the autoboot value.

If set to `true`, the zone is automatically booted when the global zone is booted. Note that for the zones to autoboot, the zones service `svc:/system/zones:default` must also be enabled. The default value is `false`.

```
zonecfg:s10-zone> set autoboot=true
```

6.   Create a shared-IP zone with a network virtual interface.

```
zonecfg:my-zone> set ip-type=shared
```

```
zonecfg:my-zone> add net
```

a.   Set the `physical` device type for the network interface, the `net` device in this procedure.

```
zonecfg:my-zone:net> Set physical=net0
```

b.   Set the IP address, *10.6.10.233/24* in this procedure.

```
zonecfg:my-zone:net> Set address=10.6.10.233/24
```

c.   End the specification.

```
zonecfg:my-zone:net> end
```

This step can be performed more than once to add more than one network interface.

7. **Add a ZFS file system shared with the global zone.**

    ```
    zonecfg:s10-zone> add fs
    ```

    a. **Set the type to `zfs`.**

        ```
        zonecfg:s10-zone:fs> set type=zfs
        ```

    b. **Set the directory to be mounted from the global zone.**

        ```
        zonecfg:s10-zone:fs> set special=share/zone/s10-zone
        ```

    c. **Specify the mount point.**

        ```
        zonecfg:s10-zone:fs> set dir=/opt/shared
        ```

    d. **End the specification.**

        ```
        zonecfg:s10-zone:fs> end
        ```

    This step can be performed more than once to add more than one file system.

8. **Delegate a ZFS dataset named** *sales* **in the storage pool** *tank***.**

    ```
    zonecfg:my-zone> add dataset
    ```

    a. **Specify the path to the ZFS dataset** *sales***.**

        ```
        zonecfg:my-zone> set name=tank/sales
        ```

    b. **End the dataset specification.**

        ```
        zonecfg:my-zone> end
        ```

9. **Set the `hostid` to be the `hostid` of the source system.**

    ```
    zonecfg:my-zone> set hostid=80f0c086
    ```

10. **Verify the zone configuration for the zone.**

    ```
    zonecfg:s10-zone> verify
    ```

11. **Commit the zone configuration for the zone.**

    ```
    zonecfg:s10-zone> commit
    ```

12. **Exit the `zonecfg` command.**

    ```
    zonecfg:s10-zone> exit
    ```

Note that even if you did not explicitly type `commit` at the prompt, a `commit` is automatically attempted when you type `exit` or an EOF occurs.

13. **Use the `info` subcommand to verify that the brand is set to `solaris10`.**

    ```
    global# zonecfg -z s10-zone info
    ```

14. **(Optional) Use the `info` subcommand to check the `hostid`:**

    ```
    global# zonecfg -z s10-zone info hostid
    ```

Next Steps

Tip - After you have configured the zone, it is a good idea to make a copy of the zone's configuration. You can use this backup to recreate the zone in the future. As root or an administrator with the correct profile, print the configuration for the zone *s10-zone* to a file. This example uses a file named `s10-zone.config`.

```
global# zonecfg -z s10-zone export > s10-zone.config
```

See Also

For additional components that can be configured using `zonecfg`, see Chapter 2, "Non-Global Zone Configuration Overview," in "Introduction to Oracle Solaris Zones ". This guide also provides information on using the `zonecfg` command in either command-line or command-file mode. Note that for shared-IP zones, a static address must be assigned in a `zonecfg` net resource. For more information about adding ZFS file systems, see "Adding ZFS File Systems to a Non-Global Zone" in "Managing ZFS File Systems in Oracle Solaris 11.2 ".

5

Installing the `solaris10` Branded Zone

This chapter covers installing a `solaris10` branded zone.

Zone Installation Images

Types of System Images

- You can use an image of an Oracle Solaris system that has been fully configured with all of the software that will be run in the zone. See "Creating the Image for Directly Migrating Oracle Solaris 10 Systems Into Zones" on page 17. The `zoneadm install -a` command takes an archive of a physical system.

- You can use an image of an existing Oracle Solaris 10 `native` zone instead of an image from a physical system. See Chapter 3, "Migrating an Oracle Solaris 10 `native` Non-Global Zone Into an Oracle Solaris 10 Zone". The `zoneadm install -a` commands take an archive of a zone or an archive of a physical system. and the `zoneadm attach -a` command takes an archive of a zone.

Image `sysidcfg` Status

The `-c` can be used to pass a `sysidcfg` file to use in configuring the zone after the installation completes.

If you created an Oracle Solaris 10 system archive from an existing system and use the `-p` (preserve `sysidcfg`) option when you install the zone, then the zone will have the same identity as the system used to create the image.

If you use the `-u` (`sys-unconfig`) and `-c`options when you install the target zone, the zone produced will not have a hostname or name service configured.

Install the `solaris10` Branded Zone

The `zoneadm` command described in "Installing and Booting Zones" in "Creating and Using Oracle Solaris Zones " and in the `zoneadm`(1M) man page is the primary tool used to install and administer non-global zones. Operations using the `zoneadm` command must be run from the global zone on the target system.

In addition to unpacking files from the archive, the install process performs checks, required postprocessing, and other functions to ensure that the zone is optimized to run on the host.

If you created an Oracle Solaris system archive from an existing system and use the -p (preserve `sysidcfg`) option when you install the zone, then the zone will have the same identity as the system used to create the image.

If you use the -u (`sys-unconfig`) option when you install the target zone, the zone produced will not have a hostname or name service configured.

⚠️ **Caution -** You *must* use either the -p option or the -u option. If you do not specify one of these two options, an error results.

Installer Options

Option	Description
-a	Location of archive from which to copy system image. Full flash archive and `pax`, `cpio`, `gzip` compressed `cpio`, `bzip` compressed `cpio`, and level 0 `ufsdump` are supported.
-c *path*	Pass a `sysidcfg` file to use in configuring the zone after the install completes.
-d *path*	Location of directory from which to copy system image.
-d —	Use the -d option with the dash parameter to direct that the existing directory layout be used in the `zonepath`. Thus, if the administrator manually sets up the `zonepath` directory before the installation, the -d – option can be used to indicate that the directory already exists.
-p	Preserve system identity. Either the -p or the -u must be used.
-s	Install silently.
-u	`sys-unconfig` the zone. Either the -p or the -u must be used.

Option	Description
	The -c can be used in addition to the -u option, to pass in a `sysidcfg` file to use in configuring the zone after the installation completes.
-v	Verbose output.

The -a and -d options are mutually exclusive.

▼ How to Install the `solaris10` Branded Zone

A configured `solaris10` branded zone is installed by using the `zoneadm` command with the `install` subcommand.

For information about creating images of Oracle Solaris 10 systems, see "Creating the Image for Directly Migrating Oracle Solaris 10 Systems Into Zones" on page 17. To retain the `sysidcfg` identity from a system image that you created, without altering the image, use the -p option after the `install` subcommand. To remove the system identity from a system image that you created, without altering the image, use the -u option. The `sys-unconfig` occurs to the target zone. The -c option can be used to include a `sysidcfg` file that contains the information used to configure the zone after the install completes.

The example procedure shows how to use the -a option with the created archive image of a physical installed Oracle Solaris 10 system.

You must be the global administrator or a user with the appropriate authorizations in the global zone to perform this procedure.

1. **Become an administrator.**

    For more information, see "Using Your Assigned Administrative Rights" in "Securing Users and Processes in Oracle Solaris 11.2 ".

2. **Install the configured zone `s10-zone` by using the `zoneadm install` command with the `-p` and `-a` options and the path to the archive:**

    ```
    global# zoneadm -z s10sepvar install -a /net/data13/tmp/s10u10_sparc_sepvar.flar -p
    ```

    You will see various messages as the installation completes. This can take some time.

3. **(Optional) If an error message is displayed and the zone fails to install, use the `zoneadm list` command and the `-c` and `-v` options to get the zone state:**

    ```
    global# zoneadm list -civ

    ID  NAME     STATUS      PATH                          BRAND     IP
    ```

```
0  global   running     /                                solaris    shared
-  s10-zone configured   /zones/s10-zone                  solaris10  shared
```

- If the state is listed as configured, make the corrections specified in the message and try the zoneadm install command again.
- If the state is listed as incomplete, first execute this command:

  global# **zoneadm -z my-zone uninstall**

  Then, make the corrections specified in the message and try the zoneadm install command again.

4. **When the installation completes, use the `list` subcommand with the `-i` and `-v` options to list the installed zones and verify the status.**

   global# **zoneadm list -iv**

   You will see a display that is similar to the following:

   ```
   ID  NAME      STATUS      PATH                      BRAND      IP
    0  global    running     /                         solaris    shared
    -  s10-zone  installed   /zones/s10-zone           solaris10  shared
   ```

Example 5-1   `solaris10` Zone Installation

```
# zoneadm -z s10sepvar install -p -a /net/data13/tmp/s10u10_sparc_sepvar.flar -u
The following ZFS file system(s) have been created:
    rpool/zones/s10sepvar
Progress being logged to /var/log/zones/zoneadm.20120519T151123Z.s10sepvar.install
    Installing: This may take several minutes...
```

Troubleshooting   If an installation fails, review the log file. On success, the log file is in /var/log inside the zone. On failure, the log file is in /var/log/zones in the global zone.

If a zone installation is interrupted or fails, the zone is left in the incomplete state. Use the uninstall command with the -F option to reset the zone to the configured state.

6
♦♦♦ **C H A P T E R 6**

Booting a Zone, Logging Into a Zone, and Zone Migration

This chapter describes how to boot the installed zone and use `zlogin` to complete the internal zone configuration. The chapter also discusses how to migrate the zone to another machine.

About Booting the `solaris10` Branded Zone

Booting a zone places the zone in the running state. A zone can be booted from the ready state or from the installed state. A zone in the installed state that is booted transparently transitions through the ready state to the running state. Zone login is allowed for zones in the running state.

Note that you perform the internal zone configuration when you log in to the unconfigured zone for the first time after the initial boot.

Image `sysidcfg` Profile

If you created an Oracle Solaris 10 system archive from an existing system and use the -p (preserve `sysidcfg`) option when you install the zone, then the zone will have the same identity as the system used to create the image.

The -c option can be used to include a `sysidcfg` file to use in configuring the zone after the installation completes. To install a `solaris10` zone, use a `sysidcfg` file in the command line. Note that a full path to the file must be supplied.

```
# zoneadm -z s10-zone install -a /net/machine_name/s10-system.flar -u -c /path_to/
sysidcfg
```

The following sample `sysidcfg` file uses the `net0` network name and `timezone` to configure an exclusive-IP zone with a static-IP configuration:

```
system_locale=C
 terminal=xterm
```

```
network_interface=net0 {
    hostname=test7
    ip_address=192.168.0.101
    netmask=255.255.255.0
    default_route=NONE
    protocol_ipv6=no
}
name_service=NONE
security_policy=NONE
timezone=US/Pacific
timeserver=localhost
nfs4_domain=dynamic
root_password=FSPXl81aZ7Vyo
auto_reg=disable
```

The following sample `sysidcfg` file is used to configure a shared-IP zone:

```
system_locale=C
terminal=dtterm
network_interface=primary {
hostname=my-zone
}
security_policy=NONE
name_service=NIS {
domain_name=special.example.com
name_server=bird(192.168.112.3)
}
nfs4_domain=domain.com
timezone=US/Central
root_password=m4qtoWN
```

The following sample `sysidcfg` file is used to configure an exclusive-IP zone with a static IP configuration:

```
system_locale=C
terminal=dtterm
network_interface=primary {
hostname=my-zone
default_route=10.10.10.1
ip_address=10.10.10.13
netmask=255.255.255.0
}
nfs4_domain=domain.com
timezone=US/Central
root_password=m4qtoWN
```

The following sample `sysidcfg` file is used to configure an exclusive-IP zone with the DHCP and IPv6 option:

```
system_locale=C
terminal=dtterm
network_interface=primary {
dhcp protocol_ipv6=yes
}
security_policy=NONE
name_service=DNS {
```

```
domain_name=example.net
name_server=192.168.224.11,192.168.224.33
}
nfs4_domain=domain.com
timezone=US/Central
root_password=m4qtoWN
```

▼ `solaris10` Branded Zone Internal Configuration

When no profile is given, then the configuration tool will start on the first use of `zlogin -C`.

The name of the zone in this procedure is `s10-zone`.

1. Become an administrator.

For more information, see "Using Your Assigned Administrative Rights" in "Securing Users and Processes in Oracle Solaris 11.2 ".

2. In one terminal window, connect to the zone console, `s10-zone` in this procedure, before booting the zone by using the command:

```
# zlogin -C s10-zone
```

3. In a second window, boot the zone as described in "How to Boot the `solaris10` Branded Zone" on page 41.

▼ How to Boot the `solaris10` Branded Zone

You must be the global administrator or a user with the appropriate authorizations in the global zone to perform this procedure.

1. Become an administrator.

For more information, see "Using Your Assigned Administrative Rights" in "Securing Users and Processes in Oracle Solaris 11.2 ".

2. Use the `zoneadm` command with the `-z` option, the name of the zone, which is `s10-zone`, and the `boot` subcommand to boot the zone.

```
global# zoneadm -z s10-zone boot
```

3. When the boot completes, use the `list` subcommand with the `-v` option to verify the status.

```
global# zoneadm list -v
```

You will see a display that is similar to the following:

```
ID  NAME      STATUS      PATH                        BRAND      IP
 0  global    running     /                           solaris    shared
 1  s10-zone  running     /zone/s10-zone              solaris10  shared
```

About Multiple Boot Environments On `solaris10` Zones

Multiple boot environments enable administrators to switch between one or more boot environments on an as-needed basis. You can manage multiple boot environments on a `solaris10` zone. For example, from a `solaris10` zone, you can create and upgrade packages on an alternate boot environment. You can then activate and boot to the upgraded boot environment to perform administration tasks.

You activate an alternate boot environment by using ZFS commands. Set the `zfs` property `com.oracle.zones.solaris10:activebe` on the zone's ROOT dataset. Reboot the zone to have the new `zfs` property take effect.

▼ How to Create and Activate Multiple Boot Environments on a `solaris10` Branded Zone

1. **Become an administrator.**

   For more information, see "Using Your Assigned Administrative Rights" in "Securing Users and Processes in Oracle Solaris 11.2 ".

2. **Configure the `solaris10` zone.**

   In this procedure, the zone `s10_zone` with the configuration file `/zones/S10_ZONE.cfg` is used on the global zone, `global`.

   ```
   global# zonecfg -z S10_zone -f /zones/S10_ZONE.cfg
   ```

3. **Install the `solaris10` zone.**

   The flash archive image file `/zones/s10-system.flar` is used in this procedure.

   ```
   global# zoneadm -z S10_zone install -u -v -a /zones/s10-system.flar
   ```

4. **Boot the solaris10 zone.**

   ```
   global# zoneadm -z S10_zone boot
   ```

5. **On the `solaris10` zone, create a new boot environment using ZFS commands.**

   a. **Create a ZFS snapshot.**

      The snapshot `rpool/ROOT/zbe-0@snap` is used in this procedure.

      `S10_zone# ` **`zfs snapshot rpool/ROOT/zbe-0@snap`**

   b. **Clone and mount the new ZFS snapshot.**

      In this case, the ZFS snapshot `rpool/ROOT/zbe-0@snap` is mounted to `/` and cloned to a new ZFS snapshot,`rpool/ROOT/zbe-1` :

      `S10_zone# ` **`zfs clone -o mountpoint=/ -o canmount=noauto rpool/ROOT/zbe-0@snap rpool/`**
      `ROOT/zbe-1`

   c. **Promote the new ZFS snapshot.**

      `S10_zone# ` **`zfs promote rpool/ROOT/zbe-1`**

6. **Patch the new boot environment.**

   a. **Mount the new ZFS snapshot.**

      `S10_zone# ` **`zfs mount -o mountpoint=/mnt rpool/ROOT/zbe-1`**

   b. **Run the `patchadd` command on the snapshot mount point.**

      `S10_zone# ` **`# patchadd -R /mnt -d /var/tmp`**
      `S10_zone# ` **`zfs unmount rpool/ROOT/zbe-1`**

   c. **Unmount the new ZFS snapshot.**

   `S10_zone# ` **`zfs unmount rpool/ROOT/zbe-1`**

7. **Activate the new boot environment.**

   `S10_zone# ` **`zfs set com.oracle.zones.solaris10:activebe=zbe-1 rpool/ROOT`**
   `S10_zone# ` **`shutdown -y -g 0 -r`**

8. **Boot the zone to have the changes take effect.**

   `global# ` **`zoneadm -z S10_zone boot`**

See Also   For further information about the `zfs` command and ZFS administration, refer to "Managing ZFS File Systems in Oracle Solaris 11.2 ".

Migrating a `solaris10` Branded Zone to Another Host

A `solaris10` zone can be migrated to another host by using the `zoneadm` command with the `detach` and `attach` subcommands. This process is described in "About Migrating a Zone" in "Creating and Using Oracle Solaris Zones " and in "How to Migrate A Non-Global Zone Using ZFS Archives" in "Creating and Using Oracle Solaris Zones ".

Note that the `zoneadm attach -a` command takes an archive of a zone, *not* an archive of a physical system.

Index

S

`solaris10` brand, 7
   SVR4 packaging, 9
`solaris10` brand installations, 35
`solaris10` branded zone, 7
   attaching, 22, 44
   boot procedure, 39
   configuration overview, 28
   configuring, 29, 31
   defined privileges, 28
   supported devices, 27
   V2V, 21
`solaris10` native zone
   migration, 35
SVR4 packaging
   in `solaris10` brand, 9
system evaluation for P2V, 16

Z

zone
   branded, 7
   migrate, 22
   upgrade on attach, 22
zone adminstration, 42
`zonecfg`
   `solaris10` branded zone process, 28
`zonep2vchk` utility
   obtaining on Oracle Solaris 10, 16