InfoScale Deployment within Solaris 10 Branded Zones in Solaris 11 Global Zone Environments

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Introduction

Oracle Solaris zones let you import the working environment from an older generation SPARC server running older releases of Solaris operating systems (OSs). Previously, this technology was referred to as *branded zones*. Branded zones run on a global zone installed with Solaris 11 which, through added packages, can simulate a Solaris 10 environment for the zone image to operate within. Solaris 10 environments can be hosted on a Solaris 11 global zone.

Overview of InfoScale Enterprise

Veritas InfoScale Enterprise provides an end-to-end solution for enterprise storage management and application high availability (HA). InfoScale Enterprise virtualizes heterogeneous storage over heterogeneous servers into logical objects. In case of branded zones, only VxFS is supported on non-global zones. InfoScale Enterprise includes the following components and features:

- **Veritas Volume Manager (VxVM)** virtualizes any storage that is exposed to the system. You can then choose a desired resiliency level with the software RAID of VxVM. The Veritas Volume Replication (VVR) feature of VxVM also lets you replicate data across remote sites. Volume Manager features—such as Dynamic Multi-Pathing (DMP), snapshots, Fast Mirror Resync (FMR), and SmartMove migration—provide further resiliency and faster recovery of data.

- **Veritas File System (VxFS)** was the first commercial journaling file system. With journaling, metadata changes are first written to a log (or journal) and then written to disk. The changes do not need to be written in multiple places and the metadata is written asynchronously, so the throughput is much faster. VxFS is also an extent-based, intent logging file system. VxFS is designed for use on operating environments that require high performance and availability and deal with large amounts of data.

- **Veritas Cluster Server (VCS)** lets you create clusters with many servers and always maintains cluster membership information. VCS seamlessly fails over applications between servers, so you can count on it to support business continuity and avoid downtime of services during failure or maintenance of servers.

Overview of Solaris branded zones (non-global zones)

Zones are an isolation mechanism for applications in which the application is executed within the confines of a zone. From an application view, the zone appears to be an independent system, where the application gets exclusive use of system resources, including processor and memory, as well as access to specific file systems without risk of interfering with other applications. From an implementation view, a local zone does not instantiate a separate OS kernel as is done with virtual machines (VMs) or para-virtualization; but rather zones operate as resource *containers* with independent user control and file systems. In effect, zones themselves are an instance of the user space portion of the OS. Zones allow the system administrator to isolate an application and manage system resource allocation between applications running in other zones. Zones extend the concepts of resource management from simply controlling resource allocations between applications to more robust isolation, where one application cannot affect the operation of another. One feature that Solaris zones do share with the VM concept is the notion of representing

not only multiple instances but versions of the same OS. However, this is achieved by using branded zones, as opposed to individual kernel isolation.

Recommended setup
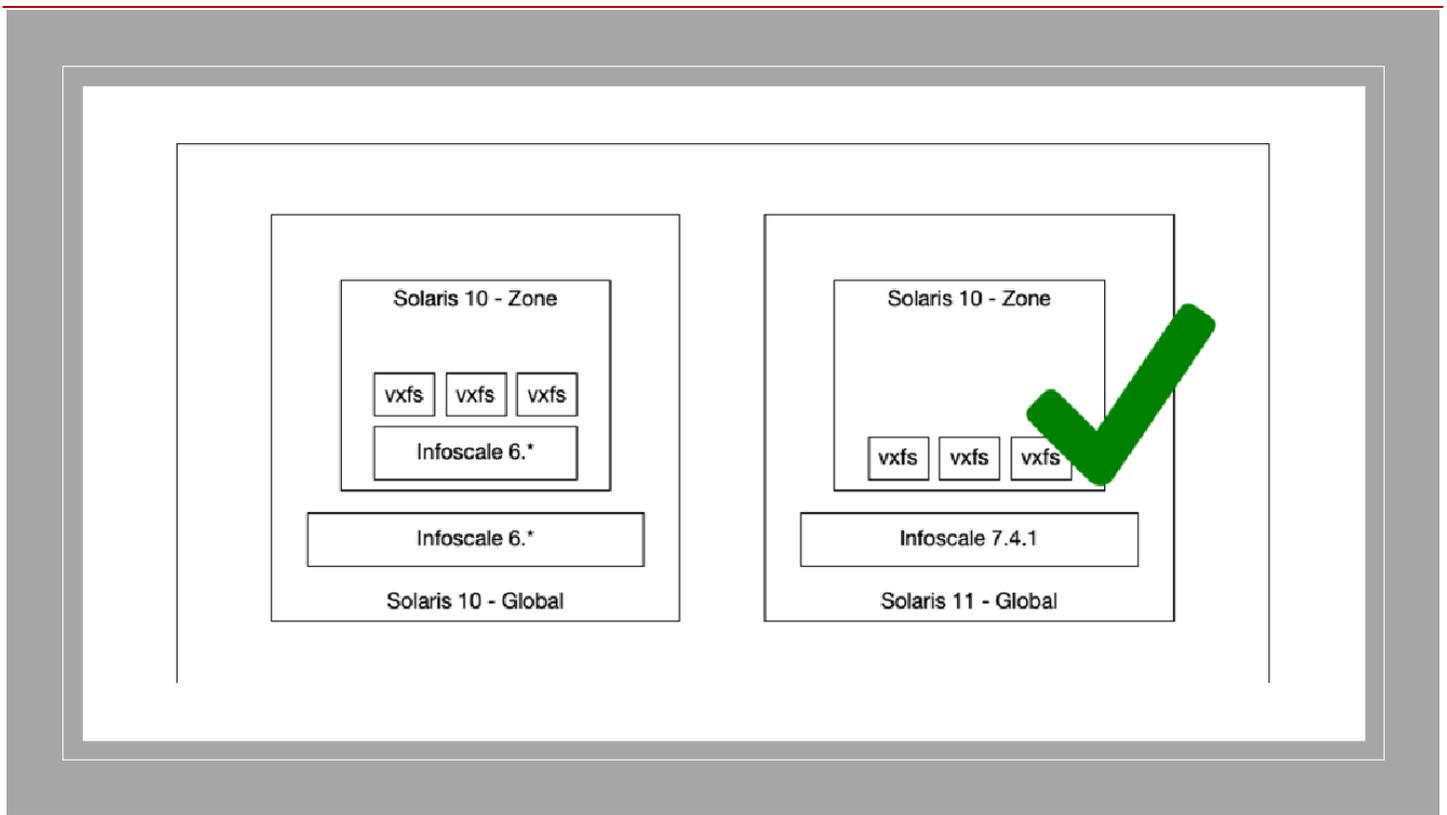
Hardware configuration

- Solaris T5 server running Solaris 11.4 SPARC

Software configuration

- Global zone: Solaris 11.4 SPARC

- Branded zone: s10s_u11wos_24a

- Branded zone creation utility downloaded from OTN (Solaris-10u11-sparc.bin)

- InfoScale version installed on global zone: InfoScale 7.4.1

Creation of a branded zone in Solaris 11.4 global zone

Download the template for the hardware platform that you want (SPARC or x86) and the corresponding README file location:

https://www.oracle.com/technetwork/server-storage/solaris11/downloads/virtual-machines-1355605.html

The README file instructs you to install the prerequisite Solaris 11 package that implements the Solaris 10 brand.

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The following snippet depicts a successfully created **sample branded zone** and its log location:

```
solaris-10u11-sparc.bin -p /zone1 -a 10.209.112.9 -i vnic1 -z zone1

      This is an Oracle VM Template for Oracle Solaris Zones.
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 protected by intellectual property laws.   Except as expressly
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 disassembly, or decompilation of this software, unless required by
 law for interoperability, is prohibited.

Mon Jun 17 11:11:26 UTC 2019
IMAGE:        ./solaris-10u11-sparc.bin
ZONE:         zone1
ZONEPATH:     /zone1/zone1
VNIC:         vnic1
IP ADDR:      10.209.112.9
NETMASK:      255.0.0.0
DEFROUTER:    10.209.112.1
TIMEZONE:     UTC

Checking disk-space for extraction
  Ok
Extracting in //bootimage.nwzD6d ...
100% [===============================>]^M

Checking data integrity
  Ok
Checking platform compatibility
      The host and the image do not have the same Solaris release:
        host Solaris release:   5.11
        image Solaris release:   5.10
      Will create a Solaris 10 branded zone.
```

```
Checking disk-space for installation
  Ok
Installing in /zone1/zone1 ...
100% [==============================>]^M

Attaching zone1
Progress being logged to /var/log/zones/zoneadm.20190617T111320Z.zone1.attach
Log File: /var/log/zones/zoneadm.20190617T111320Z.zone1.attach

Converting detached zone boot environment 'zbe-0'.
    Installing: Using existing zone boot environment
        Zone BE root dataset: rpool/zone1/zone1/rpool/ROOT/zbe-0
Attach complete.

Log saved in non-global zone as
/zone1/zone1/root/var/log/zones/zoneadm.20190617T111320Z.zone1.attach
  Ok
Booting zone1
  waiting for boot to complete
  local file systems mounted
  booting...
  booting...
  booting...

Mon Jun 17 11:16:12 UTC 2019
Zone zone1 booted

The zone's root password has been set with the one of the global zones.
To harden the zone's security, you can change this password: being root,
connect to the zone from the global zone with the command
'zlogin zone1'.

Once logged in, change the root password with the command 'passwd'.
```

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The following snippet depicts a **sample zone configuration** after configuring VxFS filesystem as LOFS inside a branded zone:

```
root@pegorat52-03-v02:/# zonecfg -z zone1 info
zonename: zone1
zonepath: /zone1/zone1
brand: solaris10
autoboot: true
fs-allowed: vxfs,odm
fs:
        dir: /dir_mnt
        special: /dev/vx/dsk/zone_dg/zone_vol
        raw: /dev/vx/rdsk/zone_dg/zone_vol
        type: vxfs
        options: []
fs:
        dir: /etc/vx/licenses/lic
        special: /etc/vx/licenses/lic/
        type: lofs
        options: []
net:
        physical: vnic1
device:
        match: /dev/vxportal
device:
        match: /dev/fdd
```

The different ways in which you can configure VxFS as LOFS are described in the *Adding VxFS file systems to a non-global zone* topic of the *Veritas InfoScale Virtualization Guide* at:

https://www.veritas.com/content/support/en_US/doc/79557381-79557385-0/v93616067-79557385

The following snippet depicts a sample set of steps to configure VxFS as LOFS:

```
root@pegorat52-03-v02:/#zonecfg -z s10_zone
zonecfg:s10_zone> add fs
zonecfg:s10_zone:fs> set type=lofs
zonecfg:s10_zone:fs> set special=/myfs----(directory from the global zone)
zonecfg:s10_zone:fs> set dir=/mytest1-----(directory of the non-global zone)
zonecfg:s10_zone:fs> set options=rw
zonecfg:s10_zone:fs> end
zonecfg:s10_zone> exit
root@pegorat52-03-v02:/#
```

Test cases

The following tests were run to qualify branded zones with the supported InfoScale Enterprise version:

Scenario	Remarks
Installation and configuration of InfoScale Enterprise (SFCFSHA) 7.4.1 on global/physical server	Install and configure InfoScale Enterprise using the Common Product Installer (CPI).
Creation of Solaris 10 branded zone using zone template provided by Oracle	Follow the instructions mentioned in the README that is available in the Solaris 10 branded zone template.
Configuration of VxFS mount points as LOFS inside Solaris 10 branded zone	Configure the VxVM block device and the VxFS mount points as zonecfg parameters to mount VxFS as LOFS.
Global zone up-down test	Test physical server, global zone reboot, or shutdown scenario to check whether the non-global zones come online properly after the global zone comes online.
Branded zone up-down tests	Test the branded zone restart or shutdown scenario to check if the non-global zones come online with all the VxFS mounts mounted properly.

Conclusion

This qualification testing is to demonstrate that InfoScale supports branded zones.

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