Solaris 10 SPARC Boot from SAN with Dell Compellent Storage Center

Dell Compellent Technical Tip
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General syntax

Table 1. Document syntax

<table>
<thead>
<tr>
<th>Item</th>
<th>Convention</th>
</tr>
</thead>
<tbody>
<tr>
<td>Menu items, dialog box titles, field names, keys</td>
<td>Bold</td>
</tr>
<tr>
<td>Mouse click required</td>
<td>Click:</td>
</tr>
<tr>
<td>User Input</td>
<td>Monospace Font</td>
</tr>
<tr>
<td>User typing required</td>
<td>Type:</td>
</tr>
<tr>
<td>Website addresses</td>
<td><a href="http://www.compellent.com">http://www.compellent.com</a></td>
</tr>
<tr>
<td>Email addresses</td>
<td><a href="mailto:info@compellent.com">info@compellent.com</a></td>
</tr>
</tbody>
</table>

Conventions

Note

Notes are used to convey special information or instructions.

Timesaver

Timesavers are tips specifically designed to save time or reduce the number of steps.

Caution

Caution indicates the potential for risk including system or data damage.

Warning

Warning indicates that failure to follow directions could result in bodily harm.
Preface

Audience
This document is intended for experienced System Administrators who are responsible for installing the Solaris 10 OS onto a SPARC based system.

Purpose
This step by step guide will walk through the process of installing Solaris 10 Update 08/11 to a SPARC based server in a boot from SAN environment based on Dell Compellent Storage Center. This walkthrough uses a SPARC T1 based server running OpenBoot 4.2. Some of the steps may change depending on the specific hardware or software versions.

As with most UNIX technologies, there is more than one way to accomplish any task, the steps outlined are merely an example of one way to do it. It is also suggested that this document be used in conjunction with the Dell Compellent Storage Center Solaris 10 Best Practices document. For Solaris Best Practices and additional Technical Tips, download these from: http://knowledgecenter.compellent.com.

Customer support
Dell Compellent provides live support 1-866-EZSTORE (866.397.8673), 24 hours a day, 7 days a week, 365 days a year. For additional support, email Dell Compellent at support@compellent.com. Dell Compellent responds to emails during normal business hours.
**Introduction**

Often the Solaris Operating System is installed to local (internal) hard drives present on the server. However, the option to install the OS in a Boot from SAN configuration can provide some additional benefits over a locally installed configuration.

By installing the OS on a LUN presented from a Dell Compellent Storage Center SAN, the customer can take advantage of advanced features available such as Data Progression and Data Instant Replay. The leveraging of these features can lead to a more flexible and available OS configuration. For example, Replays can be used to restore to an earlier state if a software installation or patch update process were to introduce a less stable installation without having to go through the process of manually removing the software.

**Test Bed Environment**

In the examples detailed below, the environment utilized was composed of the hardware and software versions listed below.

**Dell Compellent SAN**

- **Model:** SC030
- **Storage Center OS:** 5.4.5
- **Description:** Dual-controller, with Legacy Port Mode. Each controller contained a quad-port QLogic QLE2464 HBA.
- **Enclosure:** 1 x FC SBOD
- **HDD:** 16 x Seagate ST3400755FC

**Fiber Channel Switches**

- **Model:** 2 x Cisco 9134
- **Firmware:** 4.1(3a)
- **Connectivity between switches provided via Cisco DS9513 director.**

**Server**

- **Make/Model:** Oracle SunFire T2000
- **Operating System:** Solaris 10 08/11
- **Multipath Software:** Solaris SAN Foundation Suite w/MPxIO (native)
- **HBA**
  - **Make/Model:** Emulex LPe12002-M8
  - **Firmware:** 1.10a5
  - **FCode/BIOS Version:** Boot:5.03a2 Fcode:3.01a1
  - **Driver:** emlx
  - **Driver Version:** 2.500 (2010.01.08.09.45)

This document assumes physical connectivity has been established and the fabric has been zoned as appropriate to allow the Volume from the Dell Compellent Storage Center to be mapped to both HBA ports on the SPARC server.
Mapping a Boot Volume

Generally it is considered best practice to only have the volume which is intended to be the boot volume mapped to the server during the OS installation process, this both simplifies the installation process and helps prevent accidental data loss by overwriting data on a secondary volume.

In order for Storage Center to be aware of the server, the server needs to be instructed to scan its Fiber Channel cards. The OpenBoot `probe-scsi-all` command can be used to tell each HBA or other storage card in the server to rescan and return with any available storage objects:

```
{0} ok probe-scsi-all
   /pci@7c0/pci@0/pci@9/emlx@0,1
   Device PortID 963f00 WWPN 5000d310000670b
   Device PortID 964000 WWPN 5000d3100000670c
   Device PortID 964100 WWPN 5000d310000671b
   Device PortID 964200 WWPN 5000d310000671c

   /pci@7c0/pci@0/pci@9/emlx@0
   Device PortID 963f00 WWPN 5000d310000670b
   Device PortID 964000 WWPN 5000d3100000670c
   Device PortID 964100 WWPN 5000d310000671b
   Device PortID 964200 WWPN 5000d310000671c
```

The WWNs for the servers HBA ports should now be identified and available for selection in the Storage Center interface. In order to confirm this, we need to verify with the server what it believes the WWN for its adapters are. From the OpenBoot prompt, use the `show-devs` command to show a list of devices the server is aware of; this will include Fiber Channel HBAs:

```
{0} ok show-devs
   /pci@7c0
   /pci@780
   /cpu@1f
   /cpu@1e
   ...
   /pci@7c0/pci@0
   /pci@7c0/pci@0/pci@9
   /pci@7c0/pci@0/pci@8
   /pci@7c0/pci@0/pci@2
   /pci@7c0/pci@0/pci@1
   /pci@7c0/pci@0/pci@9/emlx@0,1
   /pci@7c0/pci@0/pci@9/emlx@0
   ...
   /pci@7c0/pci@0/pci@8/QLGC,qlc@0,1
   /pci@7c0/pci@0/pci@8/QLGC,qlc@0
```

In this case we have identified the OpenBoot device-name, unit-address and any device-arguments associated with the HBAs attached to the server. In order to view the WWN of the active HBA, the HBA device path needs to be selected to become the current OpenBoot node object:

```
{0} ok dev /pci@7c0/pci@0/pci@9/emlx@0
```

Once the HBA is the active node object, the `.properties` command will return with all the data relevant to that node object, in this case, the HBA:
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For Multipath Boot from SAN, you may also need to confirm the WWN of the other port on the HBA:

```
[0] ok dev /pci@7c0/pci@0/pci@9/emlx@0,1
[0] ok .properties
scsi-initiator-id 00e73d00
...
port_wwn 10 00 00 00 c9 90 bc 4f
node_wwn 20 00 00 00 c9 90 bc 4f
```

The port_wwn and node_wwn should match the observed Server Port and Port Information tables visible in Storage Center. Create the Server object in Storage Center using the discovered WWNs, and map that server object to a volume with the lun0 option specified in the mapping.

From the Storage Center Management GUI, a volume can be created of sufficient size to contain the Operating System. The size required will depend on the package installation selections made during the installation process. Once the volume is created, it can be mapped to the server object created for the SPARC system.

Once the mapping has been completed, return to the OpenBoot prompt on the SPARC system. Executing another `probe-scsi-all` command will now reveal the newly mapped volume:

```
[0] ok probe-scsi-all
pci@7c0/pci@0/pci@9/emlx@0,1
Device PortID 963f00 WWPN 5000d3100000670b
LUN 0 Disk COMPELNT Compellent Vol 0504
Device PortID 964000 WWPN 5000d3100000670c
Device PortID 964100 WWPN 5000d3100000671b
Device PortID 964200 WWPN 5000d3100000671c
pci@7c0/pci@0/pci@9/emlx@0
Device PortID 963f00 WWPN 5000d3100000670b
LUN 0 Disk COMPELNT Compellent Vol 0504
Device PortID 964000 WWPN 5000d3100000670c
Device PortID 964100 WWPN 5000d3100000671b
Device PortID 964200 WWPN 5000d3100000671c
<SNIP>
```

**Installing Solaris**

Oracle Solaris supports multiple methods for installing the Solaris Operating System. For this document a local install media (DVD) was used to perform the installation. Other methods, such as Jumpstart, are also available for OS installation.

With the Solaris install media in the server, instruct OpenBoot to boot from the media.

```
[0] ok boot cdrom
```
When prompted for a language, please choose your language of choice.

When prompted for a terminal type, choose the type you are using to connect to the SPARC server.

Continue through the Solaris installation menus filling out the specified items with the needed entries specific to your environment.

After all the environment specific choices have been made, the Solaris installer will present a warning claiming that it can find disks available, but they are unformatted:

![Warning](image)

**Figure 1. Solaris Installation Disk Failure Message**

The Solaris 10 installer will only interact with disks that have been formatted with the Solaris disk label. Because the attached volume is a fresh, never-before-formatted volume, it has not yet had the Solaris label written to it. This is easily resolved. Select the “OK” option to proceed to the next step. This will cause the installer to halt, and present the Solaris Interactive Installer CLI prompt.

From within this environment, the *format* command can be used to label the volume with the Solaris disk label. Execute the steps exampled below to continue with the installation:

```
Solaris installation program exited.

# format
Searching for disks...done

c1t5000D3100000670Bd0: configured with capacity of 32.00GB

c2t5000D3100000670Bd0: configured with capacity of 32.00GB
```
AVAILABLE DISK SELECTIONS:
0. c1t5000D3100000670Bd0 <COMPELNT-CompellentVol-0504 cyl 49930 alt 2 hd 8 sec 168>
   /pci@7c0/pci@0/pci@9/emlx@0/fp@0,0/ssd@w5000d310000670b,0
1. c2t5000D3100000670Bd0 <COMPELNT-CompellentVol-0504 cyl 49930 alt 2 hd 8 sec 168>
   /pci@7c0/pci@0/pci@9/emlx@0,1/fp@0,0/ssd@w5000d310000670b,0
Specify disk (enter its number): 0

selecting c1t5000D3100000670Bd0

[disk formatted]
Disk not labeled. Label it now? Y

Quit the format utility by typing “q”. At the CLI prompt type `suninstall` and hit enter. This will resume the Solaris Interactive Installer.

Complete the OS installation by selecting the desired file system, slice/partition layout, and selecting the packages to be installed.

The installer may warn that the default boot device is going to be updated. This is due to the new boot-device location changing to the SAN volume. Be sure to accept this option.

**Summary**

The above procedure is one method by which a Solaris 10 SPARC based system can be installed into a Boot-from-SAN configuration using Dell Compellent Storage Center as the SAN containing the OS bits. Once the above is completed, a Solaris 10 host exists that boots from a volume presented to the SPARC system over the Fibre Channel Fabric from a Dell Compellent Storage Center SAN.

Additional steps should be taken to enable multipath (if desired), and to configure the Solaris OS to survive Storage Center controller maintenance and failure events.