

Configuring SAN Boot on HPE Superdome Flex Servers

Configuration Guide

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Executive summary

This document establishes a uniform procedure for configuring SAN Boot on HPE Superdome Flex Server using Emulex or Qlogic-based Fibre Channel HBAs.

Prerequisites

- **1.1** Fibre Channel HBAs must be inserted in bootable slots. By default PCIe slot #3, and #5 of primary Base IO chassis are enabled for booting.
- **1.2** Physical installation of the server with power-on verification testing must be completed and verified by HPE prior to the delivery of this service.
- **1.3** Physical cabling for SAN and Ethernet network must be completed and verified.
- **1.4** Installed storage LUNs available for connection to server.
- **1.5** Ensure presented LUNs are of sufficient size to allow installation of operating system.
- **1.6** Fibre Channel HBA is connected to storage array.
- 1.7 A working knowledge of configuring FC SAN Networks. Reference "HPE Boot from SAN Configuration Guide" located here.

Procedure to Configure Emulex Based Fibre Channel HBA

1. Log into the Rack Management Controller (RMC) as the administrator user and provide the administrator password.

For the password, enter the current RMC password for the administrator user, and press **<Enter>**. If a site-specific RMC password is specified during installation and configuration (recommended by HPE), then use the site-specific password. The factory-default RMC password appears on a sticker with bar code on the RMC.

- From the RMC prompt, use the power on command to power-on the server. For example: RMC cli> power
- Wait for the system to reset.
 The reset is complete when the RMC prompt appears.
- At the RMC prompt, enter the following command to open a console to the shell: RMC cli> connect npar pnum=#
- 5. When the following BIOS boot menu appears, press **<F2>** to enter setup and select boot option Menu:

Press [Enter] to directly boot. Press [F2] to enter setup and select boot options. Copyright (c) 2006-2016, Intel Corporation 6. On the boot manager screen, use the arrow keys to highlight > Device Manager, and press **<Enter>.**

```
Superdome Flex
Intel(R) Xeon(R) Platinum 8180 CPU @ 2.50GHz
IP147.006.000.137.000.1711022001
Copyright (c) 2006-2016, Intel Corporation

> Device Manager
> Device Manager
> Boot Manager Menu
> Boot Maintance Manager
Continue
Reset
```

7. From the list of devices select desired Emulex HBA Port for enabling SAN Boot and then press < Enter>.



8. Use arrow keys and select Set Emulex Adapter to Default Settings and press <Enter>



9. Use arrow keys and select **Set Adapter to Defaults** and press **<Enter>**. It is recommended to restore defaults before configuring new SAN boot.



10. Use arrow keys and select Set Boot from SAN and change to <Enable>.



11. Use arrow keys and select Configure HBA and Boot Parameters and press <Enter>.



- 12. Use arrow keys and select Boot Target Scan Method and then change to desired Target Scan Method by pressing <Enter>. There are couple of options.
 - A. Discover only selected LUNs. Select Boot Path from NVRAM.
 - B. Discover all the LUNs that are on the SAN. Select **Boot Path Discovered Targets.** Note system may take longer to boot.

In the example below we have selected "Boot Path From NVRAM Targets" to scan only selected LUNs that are attached to the FC Port.

Configure HBA and Boot Parameters		
SN1200E2P Node Name : 200070106F761716 > Discard Changes > Commit Changes	Selects the method to use to scan for Boot Targets NVRAM Targets -	
Topology / PLOGI Retry Tim Boot Path From NVRAM Targets Force Link Spee Boot Path Discovered Targets Do Not Create Boot Path Configure Boot EFI FC Scan Level: NVRAM Targets EFI FC Scan Level: Discovered Targ Maximum Luns/Ta	vers only LUNS are saved to the er Non-Volatile m Access Memory M). ets vered Targets -	
Boot Target Scan Method <boot from="" nvram<br="" path="">Targets></boot>	that are attached to the FC port. Discovery can take a Nore (D/d)	
v=Move Highlight <enter>=Complete Entry Es</enter>	c=Exit Entry	

In the example below we have selected **Boot Path Discovered Targets** to scan discover all the devices that are attached to the FC Port.

Configure HBA and Boot Parameters		
SN1200E2P Node N	Jame : 200070106F761716	Selects the method to use to scan for Boot
> Discard Changes		Targets
> Commit Changes		NVRAM Targets -
Topology	′·	\vers only LUNS
PLOGI Retry Tim	Boot Path From NVRAM Targets	are saved to the
Force Link Spee	Boot Path Discovered Targets	er Non-Volatile
	Do Not Create Boot Path	m Access Memory
Configure Boot	EFI FC Scan Level: NVRAM Targets	M).
	EFI FC Scan Level: Discovered Targe	ts vered Targets -
Maximum Luns/Ta		/ <mark>v</mark> ers all devices
Boot Target Scar	h Method <boot from="" nvram<="" path="" th=""><th>that are attached to</th></boot>	that are attached to
	Targets>	the FC port.
		Discovery can take a
,		
/		
 ^rr-Worro Highlight	· · · · · · · · · · · · · · · · · · ·	- Frit Fatan
V-MOVE Highlight	Conversion to 2006 2016 Intel Corport	-Exic Encly
((opyright (c) 2006-2016, incer corpor:	ac1011

- **13.** Press **<Enter>** to select and return to previous screen.
- 14. Use arrow keys and select Commit Changes, press <Enter>

/Confi Confi \	gure HBA and Boot Paramete	
SN1200E2P Node Name : 200	070106F761716	Commit Changes and Go to the Previous Page
<pre>> Discard Changes > Commit Changes Topology PLOGI Retry Timer Force Link Speed</pre>	<point point="" to=""> <disable -="" default=""> <auto -="" defaul<br="" negotiate="">></auto></disable></point>	t
Configure Boot Parameters		
Maximum Luns/Target Boot Target Scan Method	[256] <boot discovered<br="" path="">Targets></boot>	
· · · · · · · · · · · · · · · · · · ·		
F9 ^v=Move Highlight <e< th=""><td>=Reset to Defaults F1 nter>=Select Entry Es (c) 2006-2016 Intel Corpo</td><td>O=Save c=Exit ration</td></e<>	=Reset to Defaults F1 nter>=Select Entry Es (c) 2006-2016 Intel Corpo	O=Save c=Exit ration

- **15.** If you have chosen to discover all the LUNs then skip steps **16-22**.
- **16.** Select **Add Boot Device** and wait for the adapter to scan and find the bootable targets available on the fabric.

HPE	SN1200E2P 16Gb 2p FC HB	A - FC
001: SN1200E2P P SN1200E2P Node Name : Seg#: 00 Bus#: C5 Dev# Set Boot from SAN > Scan for Fibre Devices > Add Boot Device > Delete Boot Device > Change Boot Device Ord > Configure HBA and Boot > Set Emulex Adapter to > Display Adapter Info > Legacy Only Configurat > Request RESET or RECON > Emulex Firmware Update	CIe8.0Gb/s , x8 200070106F761716 : 00 Func#: 00 <enable> er Parameters Default Settings ion Settings NECT to Make Changes Act Utility</enable>	Adding & Boot Device May Take Up To 30 Seconds
′ ^v=Move Highlight	F9=Reset to Defaults <enter>=Select Entry bt (c) 2006-2016 Intel</enter>	F10=Save Esc=Exit Corporation

17. From the list of discovered targets select desired target, press <Enter>

/ SAN Dis \	covery Target	List	 /
SN1200E2P Node Name : 200070106 Here are the discovered targets > Go to Configuration Main Menu > <u>D001: HP MSA 2040 SAN G</u> > 0002: HP MSA 2040 SAN G	F761716 : 22x 22x	WWN: Port	217000C0 FF28BC31 ID: 011000
/			\
 ^v=Move Highlight <enter>=</enter>	Select Entry	Esc=Exit	

18. From the list of discovered LUNs select desired LUN, press <Enter>



19. Use arrow keys and select Commit Changes, press <Enter>



- 20. Select **<ESC>** to exit
- 21. Repeat above two steps in order add more boot LUNs.

22. To change boot order of the LUNs, go to **Change Boot Order menu**, change Boot Device Order, **Commit Changes** and exit.

/ HPE \	SN1200E2P 16Gb 2p FC HE	3A - FC
001: SN1200E2P P SN1200E2P Node Name : Seg#: 00 Bus#: C5 Dev#	Cle8.0Gb/s , x8 200070106F761716 : 00 Func#: 00	Change Boot Device Order
Set Boot from SAN > Scan for Fibre Devices > Add Boot Device > Delete Boot Device > Change Boot Device Ord > Configure HBA and Boot > Set Emulex Adapter to > Display Adapter Info > Legacy Only Configurat > Request RESET or RECON > Emulex Firmware Update	<enable> Parameters Default Settings ion Settings NECT to Make Changes Act Utility</enable>	:ive
/		
 ^v=Move Highlight Convrig	F9=Reset to Defaults <enter>=Select Entry</enter>	F10=Save Esc=Exit Corporation

23. Press F10 to save settings.



- **24.** Press "Y" to confirm changes.
- **25.** Press **<ESC>** to exit the Device Manager menu; if and when prompted, select **Y** to save changes and exit. This prompt may appear only if changes are not saved. Press **<ESC>** to exit.



26. Use arrow keys and Select 'Reset' and press **<Enter>** to reboot the system. Note: Reboot is needed to take effect the changes.

- 27. Boot the system to UEFI shell.
- 28. When the system boots to the UEFI shell, use UEFI commands to verify.Make sure Emulex FC driver is listed in the drivers output (See highlighted below).

Shell> drivers ΤD YCI PFA DRV VERSION E G G #D #C DRIVER NAME **IMAGE NAME** ----Data is Skipped----16A B226600F B N Y 2 1 Emulex FC SLI4 SCSI Pass Thru Drive PciRoot(0x3)/Pci(0x2,0x0)/Pci(0x0,0x0)/Offset(0x24E00,0x52DFF) Shell> dh -d 16A Handle 16A (784D4ED8) LoadedImage(LoadedImage) ImageDevicePath(..0x0)/Offset(0x24E00,0x52DFF)) Driver Binding DriverDiagnostics2 ComponentName2 SupportedEfiSpecVersion(0x0002000A) Dr iverHealth Driver Name : Emulex FC SLI4 SCSI Pass Thru Driver Driver Image Name : Offset(0x24E00,0x52DFF) Driver Version : B226600F Driver Type : Bus Configuration : NO : YES Diagnostics Managing : Ctrl[165] : HPE SN1200E2P 16Gb 2p FC HBA - FC Child[1DD] : PciRoot(0x3)/Pci(0x2,0x0)/Pci(0x0,0x0)/Fibre(0x217000C 0FF28BC31,0x400000000000) : HPE SN1200E2P 16Gb 2p FC HBA - FC Ctrl[166] Shell> map -r Device mapping table ----Data is Skipped----BLK18: Alias(s): PciRoot(0x3)/Pci(0x2,0x0)/Pci(0x0,0x0)/Fibre(0x217000C0FF28BC31,0x4000 00000000)/HD(2,GPT,A3E40D58-05A1-4FEB-A794-EE15355709F0,0xFA800,0xFA000)

Procedure to Configure Qlogic Based Fibre Channel HBA

1. Log into the Rack Management Controller (RMC) as the administrator user and provide the administrator password.

For the password, enter the current RMC password for the administrator user, and press <Enter>.

If a site-specific RMC password is specified during installation and configuration (recommended by HPE), then use the site-specific password. The factory-default RMC password appears on a sticker with bar code on the RMC.

- From the RMC prompt, use the power on command to power-on the server. For example: RMC cli> power
- Wait for the system to reset. The reset is complete when the RMC prompt appears.
- At the RMC prompt, enter the following command to open a console to the shell: RMC cli> connect npar pnum=#
- 5. When the following BIOS boot menu appears, press **<F2>** to enter setup and select boot option Menu:

Press [Enter] to directly boot. Press [F2] to enter setup and select boot options. Copyright (c) 2006-2016, Intel Corporation On the boot manager screen, use the arrow keys to highlight > Device Manager, and press <Enter>.

```
Superdome Flex
Intel(R) Xeon(R) Platinum 8180 CPU @ 2.50GHz
IP147.006.000.137.000.1711022001
Copyright (c) 2006-2016, Intel Corporation
2.50 GHz
262144 MB RAM

> Device Manager

This selection will
take you to the
Device Manager menu

> Boot Maintance Manager

Continue
Reset
```

7. From the list of devices select desired Qlogic HBA Port for enabling SAN Boot and then press < Enter>.



8. Use arrow keys and select **Boot Settings**, and then press < Enter>.



9. There are Couple of options, choose one as desired.

9.1. Discover only selected LUNs.

- 9.1.1. Select Adapter Driver, and then press Enter. Set it to <Enabled> and then press <Enter>.
- 9.1.2. Select Selective Login and set it to <Enabled>.
- 9.1.3. Select Selective LUN Login and set it to <Enabled>.
- 9.1.4. Select FCScanLevel Variable and set it to <Variable Undefined>.
- 9.1.5. Select World Login and set it to <Disabled>.

/ \ <u></u>	Boot Settings	,
Selective Login Selective Lun Login FCScanLevel Variable Fabric Assigned Boot LUN Legacy BIOS Selectable Boot World Login Adapter Driver	<enabled> <enabled> <variable undefined<br=""><disabled> <disabled> <cisabled> <enabled></enabled></cisabled></disabled></disabled></variable></enabled></enabled>	Used to enable the adapter driver. The driver must be enabled to boot from a Fibre Channel disk. The system will boot faster when the driver is disabled.
/F9 	=Reset to Defaults nter>=Select Entry (c) 2006-2016, Intel	F10=Save Esc=Exit Corporation

9.1.6.Select Save Changes (F10), and then press <Enter>.

/\ Boot Settings \/		
Selective Login Selective Lun Login FCScanLevel Variable Fabric Assigned Boot L	<enabled> <enabled> <variable undefine<br="">UN <mark><disabled></disabled></mark></variable></enabled></enabled>	Used to obtain the Boot LUN from the ed> fabric.
Legacy BIOS Sel/ Boot World Login Adapter Driver Press	Save configuration cl 'Y' to confirm, 'N'/'E:	hanges? 3C' to ignore.
/		
│ ^v=Move Highlight	F9=Reset to Defaults <enter>=Select Entry</enter>	F10=Save Esc=Exit
\Copyrig	ht (c) 2006-2016, Inte.	1 Corporation/

9.1.7. Press "Y" to confirm Changes

9.1.8. Press **<ESC>** to return to Main Configuration Page

9.1.9.Select WWN Database, and then press <Enter>.



9.1.10. In WWN Database Page, one can select up to 4 Target-LUNs. For Drive 0/1 UEFI driver dynamically detects connected Targets and LUNs. Whereas Drive 2/3 is used for manual entry of both Target WWPN and LUN number.

9.1.10.1.1. For Drive 0/1 and use the pull down menu to select WWPN and LUN

9.1.10.1.2. For Drive 2 and 3 manually enter Target WWPN and LUN number

/ \	WWN Database	\ /
Drive O WWPN Drive O LUN	<207000C0FF28BC31:-> <0000:->	Selective Login WWPN. Suffix '+' implies target is online '-'
Drive 1 WWPN Drive 1 LUN	<000000000000000:-> <0000:->	implies target is offline.
Drive 2 WWPN Drive 2 LUN	[247000C0FF28BC31] [30]	
Drive 3 WWPN Drive 3 LUN	[0] [0]	
/		
 ^v=Move Highlight \Copyr	F9=Reset to Defaults F <enter>=Select Entry E ight (c) 2006-2016, Intel Corp</enter>	10=Save sc=Exit oration/



9.1.11. Select Save Changes (F10), and then press <Enter>.

9.1.12. Press "Y" to confirm Changes

9.1.13. Press **<ESC>** to return to Main Configuration Page

- 9.2. Discover all the LUNs that are on the SAN. Note system may take longer to boot
 - 9.2.1.Select Adapter Driver, and then press Enter. Set it to <Enabled> and then press <Enter>.
 - 9.2.2. Select Selective Login and set it to <Enabled>.
 - 9.2.3. Select Selective LUN Login and set it to <Enabled>.
 - 9.2.4. Select FCScanLevel Variable and set it to <Variable Undefined>.
 - 9.2.5. Select World Login and set it to <Disabled>.

/ \	Boot Settings	\ /
Selective Login Selective Lun Login FCScanLevel Variable Fabric Assigned Boot LUN Legacy BIOS Selectable Boot World Login Adapter Driver	<disabled> <disabled> <variable undefined:<br=""><disabled> <disabled> <<u>CDisabled></u> <enabled></enabled></disabled></disabled></variable></disabled></disabled>	Specifies that the driver will login to all devices. When enabled, this option will override all of the other Boot Settings. World Login can significantly increase the boot time if there are many devices connected to the adapter.
/F9= ^v=Move Highlight <e1< td=""><td>Reset to Defaults hter>=Select Entry</td><td>F10=Save Esc=Exit</td></e1<>	Reset to Defaults hter>=Select Entry	F10=Save Esc=Exit
Copyright	(C) 2000-20 10, INCEL (Configuration changed

9.2.6.Select Save Changes (F10), and then press <Enter>.

9.2.7.Press "Y" to confirm Changes

\ Boot Settings /			
Selective Login Selective Lun Login FCScanLevel Variable Fabric Assigned Boot L Legacy BIOS Sel Boot World Login Adapter Driver Press	<disabled> <disabled> <variable undefined=""> UN <disabled> Save configuration changes? 'Y' to confirm, 'N'/'ESC' to :</disabled></variable></disabled></disabled>	Specifies that the driver will login to all devices. When enabled, this option override all of ther Boot ngs. World Login ignore. ignificantly ase the boot /if there are many devices connected to the adapter.	
/ ^v=Move Highlight Copyrig	F9=Reset to Defaults F10 <enter>=Select Entry Eso ht (c) 2006-2016, Intel Corpor</enter>	D=Save c=Exit ration/	

9.2.8.Press **<ESC>** to return to the HBAs HII configuration menu.

- **10.** Press **<ESC>** to exit the Device Manager menu.
- 11. Use arrow keys and Select 'Reset' and press <Enter> to reboot the system. Note: Reboot is needed to take effect the changes.

- 12. Boot the system to UEFI shell.
- **13.** When the system boots to the UEFI shell, use UEFI commands to verify.

Make sure Qlogic FC driver(HPE Fibre Channel Driver) is listed in the drivers output (See highlighted below).

Shell> drivers ΤD YCI PFA DRV VERSION E G G #D #C DRIVER NAME IMAGE NAME ----Data is Skipped----168 00000636 B Y Y 4 3 HPE Fibre Channel Driver PciRoot(0x2)/Pci(0x0,0x0)/Pci(0x0,0x0)/Offset(0x1BA00,0x389FF) Shell> dh -d 168 Handle 168 (784BFED8) LoadedImage(LoadedImage) ImageDevicePath(..0x0)/Offset(0x1BA00,0x389FF)) Driver Binding DriverDiagnostics2 ComponentName ComponentName2 SupportedEfiSpecVersion(0x0002003C) DriverConfiguration DriverConfiguration2 DriverHealth Driver Name : HPE Fibre Channel Driver Driver Image Name : Offset(0x1BA00,0x389FF) Driver Version : 00000636 Driver Type : Bus Configuration : YES Diagnostics : YES Managing : Ctrl[15C] : HPE SN1100Q 16Gb 2p FC HBA Child[185] : Fibre(WWN:207000C0FF28BC31,LUN:000000000000000)/(HP MSA 2040 SAN G22x) Child[186] : Fibre(WWN:247000C0FF28BC31,LUN:000000000000000F)/(HP MSA 2040 SAN G22x) Child[187] : Fibre(WWN:247000C0FF28BC31,LUN:0000000000000030)/(HP MSA 2040 SAN G22x) Ctrl[15D] : HPE SN1100Q 16Gb 2p FC HBA : Fibre(WWN:247000C0FF28BC31,LUN:000000000000000F)/(HP Ctrl[186] MSA 2040 SAN G22x) Ctrl[187] : Fibre(WWN:247000C0FF28BC31,LUN:0000000000000000)/(HP MSA 2040 SAN G22x) Shell> map -r Device mapping table ---Data is Skipped----BLK17: Alias(s): PciRoot(0x2)/Pci(0x0,0x0)/Pci(0x0,0x0)/Fibre(0x247000C0FF28BC31,0xF000 00000000) BLK16: Alias(s): PciRoot(0x2)/Pci(0x0,0x0)/Pci(0x0,0x0)/Fibre(0x247000C0FF28BC31,0x3000 000000000)

Resources

HPE Superdome Flex QuickSpecs : <u>https://www.hpe.com/h20195/v2/gethtml.aspx?docname=a00026242enw</u>

Learn more at

hpe.com/servers/superdomeflex



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