

Chelsio Unified Boot

Installation and User's Guide



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I. Unified Boot Option ROM

1. Introduction

Thank you for choosing Chelsio Unified Wire adapters. These high speed, single chip, single firmware cards provide enterprises and data centers with high performance solutions for various Network and Storage related requirements.

The **Terminator** series is Chelsio's next generation of highly integrated, hyper-virtualized 1/10/25/40/50/100GbE controllers. The adapters are built around a programmable protocolprocessing engine, with full offload of a complete Unified Wire solution comprising NIC, TOE, iWARP RDMA, iSCSI, FCoE and NAT support. It scales to true 40Gb line rate operation from a single TCP connection to thousands of connections and allows simultaneous low latency and high bandwidth operation thanks to multiple physical channels through the ASIC.

Ideal for all data, storage and high-performance clustering applications, the Unified Wire adapters enable a unified fabric over a single wire by simultaneously running all unmodified IP sockets, Fibre Channel and InfiniBand applications over Ethernet at line rate.

Designed for deployment in virtualized data centers, cloud service installations and highperformance computing environments, Chelsio adapters bring a new level of performance metrics and functional capabilities to the computer networking industry.

PXE is short for Preboot eXecution Environment and is used for booting computers over an Ethernet network using a Network Interface Card (NIC). FCoE SAN boot process involves installation of an operating system (OS) to an FC/FCoE disk and then booting from it. iSCSI SAN boot process involves installation of an OS to an iSCSI disk and then booting from it.

This section of the guide explains how to configure and use Chelsio Unified Boot Option ROM which flashes PXE, iSCSI and FCoE Option ROM onto Chelsio's adapters. It adds functionalities like PXE, FCoE and iSCSI SAN boot.

1.1. Hardware Requirements

1.1.1. Supported Adapters

The following are the Chelsio Adapters that are supported:

- T62100-CR
- T62100-LP-CR
- T62100-SO-CR*
- T6425-CR
- T6225-CR
- T6225-LL-CR
- T6225-SO-CR*
- T580-CR
- T580-LP-CR
- T580-SO-CR*

- T540-CR
- T540-LP-CR
- T520-CR
- T520-LL-CR
- T520-SO-CR*
- T520-BT
- T540-BT

* Only PXE supported

1.1.2. Supported Hardware

The following hardware platforms are supported by Chelsio Unified Boot Option ROM software:

- DELL PowerEdge R610
- Supermicro X10DRi
- Supermicro X11SSL-CF
- * If system BIOS version is lower than 1.5 and both Legacy and uEFI are enabled, system will hang during POST. Please upgrade the BIOS version to 1.5 or higher to avoid this issue.

1.1.3. Supported Switches

The following switches are supported by Chelsio Unified Boot Option ROM software:

- Cisco Nexus 5010 with 5.1(3) N1 (1a) firmware.
- Arista DCS-7124S-F
- Mellanox SX_PPC_M460EX

Other platforms/switches have not been tested and are not guaranteed to work.

1.2. Software Requirements

Chelsio Unified Boot Option ROM software requires Disk Operating System to flash Option ROM onto Chelsio adapters.

The installation of the following Linux distributions is supported using Chelsio inbox drivers.

Linux Distribution	Drivers
RHEL 9.1, 5.14.0-162.6.1.el9_1.x86_64	
RHEL 9.0, 5.14.0-70.13.1.el9_0.x86_64	
RHEL 8.7, 4.18.0-425.3.1.el8.x86_64	PXE, FCoE, iSCSI
RHEL 8.6, 4.18.0-372.9.1.el8.x86_64	
RHEL 7.9, 3.10.0-1160.el7.x86_64	

1 Note Other kernel versions have not been tested and are not guaranteed to work.

1.3. Pre-requisites

- A DOS bootable USB flash drive or Floppy Disk is required for updating firmware, Option ROM etc.
- Secure Boot option should be disabled in the system BIOS.

1.4. Package Contents

Chelsio Unified Boot Option ROM package contains the following:

- **OptionROM**: This directory contains Unified Boot Option ROM image (*cubt4.bin*), uEFI driver (*ChelsioUD.efi*), default boot configuration file (*boot.cfg*) and a flash utility (*cfut4.exe*), which can be used to flash the Option ROM onto Chelsio adapters. It also contains Firmware files.
- **WindowsDrivers:** This directory contains driver packages to be added to WDS server and boot images.
- **ESXiDrivers:** This directory contains Chelsio driver component to be added to the ESXi installation ISO image.
- **EULA:** Chelsio's End User License Agreement.
- **docs:** The docs directory contains support documents README, Release Notes and User's Guide (this document) for the software package.

2. Hardware Installation

- i. Shutdown/power off your system.
- ii. Power off all remaining peripherals attached to your system.
- iii. Unpack the Chelsio adapter and place it on an anti-static surface.
- iv. Remove the system case cover as per the system manufacturer's instructions.
- v. Remove the PCI filler plate from the slot where you will install the Ethernet adapter.
- vi. For maximum performance, it is highly recommended to install the adapter into a PCIe x8/x16 slot.

Note

All 4-ports of T6425-CR adapter will be functional only if PCIe x8 -> 2x PCIe x4 slot bifurcation is supported by the system and enabled in BIOS. Otherwise, only 2ports will be functional.

- vii. Holding the Chelsio adapter by the edges, align the edge connector with the PCI connector on the motherboard. Apply even pressure on both edges until the card is firmly seated. It may be necessary to remove the SFP (transceiver) modules prior to inserting the adapter.
- viii. Secure the Chelsio adapter with a screw, or other securing mechanism, as described by the system manufacturer's instructions. Replace the case cover.
- ix. After securing the card, ensure that the card is still fully seated in the PCIE x8/x16 slot as sometimes the process of securing the card causes the card to become unseated.
- x. Connect a fiber/twinax cable, multi-mode for short range (SR) optics or single-mode for long range (LR) optics, to the Ethernet adapter or regular Ethernet cable for the 1Gb Ethernet adapter.
- xi. Power on your system.
- xii. On Linux systems, run update-pciids command to download the current version of PCI ID list

[roo	ot@	i a Riya	~]# upda	te	-pciids						
do	Total	dło	Received	*	Xferd	Average	e Speed	Time	Time	Time	Current
						Dload	Upload	Total	Spent	Left	Speed
100	227k	100	227k	0	0	68592	0	0:00:03	0:00:03	::	- 68610
Done	e.										

xiii. Verify if the adapter was installed successfully:

• On Linux and ESXi systems, run Ispci command and you should see a similar output:

[root@	root@ ~]# lspci grep -i Chelsio									
81:00.0	Ethernet	controller:	Chelsio	Communications	Inc	T62100-LP-CR	Unified	Wire	Ethernet	Controller
81:00.1	Ethernet	controller:	Chelsio	Communications	Inc	T62100-LP-CR	Unified	Wire	Ethernet	Controller
81:00.2	Ethernet	controller:	Chelsio	Communications	Inc	T62100-LP-CR	Unified	Wire	Ethernet	Controller
81:00.3	Ethernet	controller:	Chelsio	Communications	Inc	T62100-LP-CR	Unified	Wire	Ethernet	Controller
81:00.4	Ethernet	controller:	Chelsio	Communications	Inc	T62100-LP-CR	Unified	Wire	Ethernet	Controller
81:00.5	SCSI stor	rage control!	ler: Chel	lsio Communicati	lons	Inc T62100-LE	P-CR Unit	fied N	Wire Stora	age Controller
81:00.6	Fibre Cha	annel: Chels:	io Commun	nications Inc Te	52100	D-LP-CR Unifie	ed Wire S	Stora	ge Control	ller

- On Windows systems, follow these steps:
 - a. Open Device Manager in Control Panel.
 - b. Under **Other devices** section, Chelsio adapter should be listed as **Ethernet Controller.** If the adapter is not listed, right-click on the system name or click on the **Actions** menu and select **Scan for hardware changes.**

For Chelsio adapters, the physical functions are currently assigned as:

- Physical functions 0 3: for the SR-IOV functions of the adapter
- Physical function 4: for all NIC functions of the adapter
- Physical function 5: for iSCSI
- Physical function 6: for FCoE
- Physical function 7: Currently not assigned

xiv. Based on the operating system, install the appropriate network driver. Install and load *cxgb4* for Linux systems, *VBD* and *NDIS* for Windows systems, and *cxI* for ESXi systems.

- xv. Finally, verify if the card is discovered:
 - For Linux systems, examine the output of *dmesg* and you should see a similar output:

[1119.854346]	cxgb4 0000:81	:00.4: C	helsio T62100-LP-CR rev 0
[1119.854347]	cxgb4 0000:81	:00.4: S	/N: RE41160042, P/N: 11012106003
[1119.854348]	cxgb4 0000:81	:00.4: F	irmware version:
[1119.854349]	cxgb4 0000:81	:00.4: B	ootstrap version: 255.255.255.255
[1119.854350]	cxgb4 0000:81	:00.4: T	'P Microcode version: 0.1.23.2
[1119.854351]	cxgb4 0000:81	:00.4: N	o Expansion ROM loaded
[1119.854351]	cxgb4 0000:81	:00.4: S	erial Configuration version: 0x7002000
[1119.854352]	cxgb4 0000:81	:00.4: V	PD version: 0x52
[1119.854354]	cxgb4 0000:81	:00.4: C	Configuration: NIC MSI-X, non-Offload capable
[1119.854355]	eth0: Chelsio	T62100-	LP-CR (eth0) 100GBASE-CR4 QSFP

The above output indicates the hardware configuration of the adapters as well as the Serial numbers.

- For Windows systems, open **Device Manager** again. Expand **Network adapters** section and now Chelsio adapter should be listed.
- For ESXi systems, examine the output of *dmesg* and you should see a similar output:

2017-09-26T04:09:20.207Z cpu6:66032)cxll.0: cxl_port_init:874: mbox 0 pf 0 chan 0 viid c0
2017-09-26T04:09:20.209Z cpu6:66032)DMA: 646: DMA Engine 'cxl-0000:04:00.0' created using mapper 'DMANull'.
2017-09-26T04:09:20.209Z cpu6:66032)cxl1.0: cxl_config_queues:1091: max_filters 120
2017-09-26T04:09:20.209Z cpu6:66032)VMK_PCI: 765: device 0000:04:00.0 allocated 32 MSIX interrupts
2017-09-26T04:09:20.209Z cpu6:66032)cx11.0: cx1_intr_alloc_msix:2581: net q 14 rss q 16 non rss q 13 tx q 8
2017-09-26T04:09:20.211z cpu6:66032)cxl1.0: cxl_rss_do_init:5221: pool 0 rss viid c1
2017-09-26T04:09:20.212Z cpu6:66032)cxl1.0: <u>cx</u> l_rss_init:2501: pool 0 rss mode 31
2017-09-26T04:09:20.212Z cpu6:66032)Chelsio T6225-CR rev 0 25G NIC PCIe 8 GT/s x8 MSI-X S/N: RE35160002, P/N: 11012096002

Note

Network device names for Chelsio's physical ports are assigned using the following convention: the port farthest from the motherboard will appear as the first network interface. However, for T5 40G adapters, the association of physical Ethernet ports and their corresponding network device names is opposite. For these adapters, the port nearest to the motherboard will appear as the first network interface.

3. Secure Boot

Secure Boot, a high-performance computing software solution is a method to restrict which binaries can be executed to boot the system. With Secure Boot, the system BIOS will only allow the execution of boot loaders that carry the cryptographic signature of trusted entities. In other words, anything run in the BIOS must be "signed" with a key that the system knows is trustworthy. With each reboot of the server, every executed component is verified.

The Chelsio Drivers are in-boxed in major Linux Distributions mentioned in the Software Requirements. These Linux in-boxed drivers and WHQL Certified Windows Drivers (provided in the package) can be used for OS installation after enabling Secure Boot in System BIOS.

1 Note Secure Boot is not supported in the current release.

4. Flashing Firmware and Option ROM

Depending on the boot mode selected, Chelsio Unified Boot provides the following methods to flash Firmware, Option ROM, and boot configuration onto Chelsio adapters:

- Legacy mode:
 - o cfut4
 - uEFI mode:
 - o HII
 - o drvcfg
 - Firmware Manager Protocol (FMP)

These methods also provide the functionality to update/erase Hardware configuration and Phy Firmware files.

```
Important
```

It is highly recommended to use the same Option ROM (type and version) on all the Chelsio adapters present in the system.

4.1. Preparing USB flash drive

This document assumes that you are using a USB flash drive as a storage media for the necessary files. Follow the steps below to prepare the drive:

- i. Create a DOS bootable USB flash drive. (Click here for instructions)
- ii. Create a directory CHELSIO on the USB flash drive.
- iii. If you haven't done already, download *Chelsio-Uboot-x.x.x.x.zip* from Chelsio Download Center
- iv. Unzip the downloaded package and change your working directory to OptionROM directory.

```
[root@host~]# unzip Chelsio-Uboot-x.x.x.zip
[root@host~]# cd Chelsio-Uboot-x.x.x.x/OptionROM
```

- v. Copy all the files and place them in the CHELSIO directory created on the USB flash drive.
- vi. Plug-in the USB flash drive in the system on which the Chelsio adapter is installed.
- vii. Reboot the system.

4.2. Legacy

i. In BIOS, configure the system having Chelsio adapter to boot in Legacy mode.

Advanced		
PCIe/PCI/PnP Configuration		Controls the execution of UEFI and Legacy
Launch Storage OpROM policy	[UEFI only]	Storage OpROM
PCI Latency Timer	[64 PCI Bus Clocks]	
PERR# Generation	[Disabled]	
SERR# Generation	[Disabled]	
Maximum Payload	[Auto]	
Maximum Read Request	[Auto]	
ASPM Support	[Disabled]	
Above 4G Decoding	[Disabled]	
Slot 1 & 2 PCI–X 133/100MHZ —— Launch	n Storage OpROM policy ————————————————————————————————————	
Slot 3 PCI-X 133/100MHZ Cloc UEFI only	9	
Slot 1 PCI-X 133/100MHZ OPRO Legacy or	11y	· · · · · · · · · · · · · · · · · · ·
Slot 2 PCI-X 133/100MHZ OPRO		++: Select Screen
Slot 3 PCI-X 133/100MHZ OPROM		↑↓: Select Item
CPU1 Slot 4 PCI-E 3.0 x8 OPROM	[Enabled]	Enter: Select
PCH Slot 5 PCI-E 3.0 x4 OPROM	[Enabled]	+/-: Change Opt.
CPU1 Slot 6 PCI-E 3.0 x16 OPROM	[Enabled]	F1: General Help
Onboard LAN Option ROM Select	[PXE]	F2: Previous Values
Load Onboard SAS Option ROM	[Enabled]	F3: Optimized Defaults
VGA Priority	[Onboard]	F4: Save & Exit
Network stack	[Enabled]	ESC: Exit
IPv4 PXE Support	[Enabled]	

ii. Boot the system from the plugged in USB flash drive and change your working directory to CHELSIO directory.

C:\>cd CHELSIO

iii. Run the following command to list all Chelsio adapters present on the system. The list displays a unique index for each adapter found.

C:\CHELSIO>cfut4 -1



iv. Delete any previous version of Option ROM flashed on the adapter.

C:\CHELSIO>cfut4 -d <idx> -xb

Here, idx is the adapter index found in step iii (0 in this case).

C:NCHELSIO>cfut4 -d 0 -xb

Chelsio T5/T6 Flash Utility v1.5 Erasing serial flash sector(s) ... Done Reboot machine for changes to take effect

v. Delete any previous firmware using the following command.

C:\CHELSIO>cfut4 -d <idx> -xh -xf

C:NCHELSIO>cfut4 -d 0 -xh -xf

Chelsio T5/T6 Flash Utility v1.5 Erasing serial flash sector(s) ... Done Erasing serial flash sector(s) ... Done Reboot machine for changes to take effect

vi. Delete any previous Option ROM settings.

C:\CHELSIO>cfut4 -d <idx> -xc

```
C:NCHELSIO>cfut4 -d 0 -xc
```

```
Chelsio T5/T6 Flash Utility v1.5
Erasing serial flash sector(s) ... Done
Reboot machine for changes to take effect
```

vii. Run the following command to flash the appropriate firmware.

C:\CHELSIO>cfut4 -d <idx> -uf <firmware file>.bin

Here, firmware file is the firmware image file present in the CHELSIO directory.

C:NCHELSIO>cfut4 -d 0 -uf T6FW-1~1.BIN	
Chelsio T5/T6 Flash Utility v1.5	
Erasing serial flash sector(s) Do	ne
Writing Image at Base 00080000 Do	ne
Writing Image at Base 00088000 Do	ne
Writing Image at Base 00090000 Do	ne
Writing Image at Base 00098000 Do	ne
Writing Image at Base 000a0000 Do	ne
Writing Image at Base 000a8000 Do	ne
Writing Image at Base 000b0000 Do	ne
Writing Image at Base 000b8000 Do	ne
Writing Image at Base 000c0000 Do	ne
Writing Image at Base 000c8000 Do	ne
Writing Image at Base 000d0000 Do	ne
Writing Image at Base 000d8000 Do	ne
Writing Image at Base 000e0000 Do	ne
Writing Image at Base 000e8000 Do	ne
Writing Image at Base 000f0000 Do	ne
Writing Image at Base 000f8000 Do	ne
Reboot machine for changes to take eff	fect
3	

viii. Flash the Unified Boot Option ROM using the following command.

```
C:\CHELSIO>cfut4 -d <idx> -ub cubt4.bin
```

Here, cubt4.bin is the Unified Boot Option ROM image file present in the CHELSIO directory.

C:NCHELSIO>cfut4 -d 0 -ub cubt4.bin	
Chelsio T5/T6 Flash Utility v1.5	
Erasing serial flash sector(s)	Done
Writing Image at Base 00000000	Done
Writing Image at Base 00008000	Done
Writing Image at Base 00010000	Done
Writing Image at Base 00018000	Done
Writing Image at Base 00020000	Done
Writing Image at Base 00028000	Done
Writing Image at Base 00030000	Done
Writing Image at Base 00038000	Done
Writing Image at Base 00040000	Done
Writing Image at Base 00048000	Done
Writing Image at Base 00050000	Done
Writing Image at Base 00058000	Done
Writing Image at Base 00060000	Done
Writing Image at Base 00068000	Done
Erasing serial flash sector(s)	Done
Writing Image at Base 00070000	Done
Reboot machine for changes to take	effect

ix. Flash the boot configuration setting which will enable PXE and disable iSCSI and FCoE.

C:\CHELSIO>cfut4 -d <idx> -uc boot.cfg

C:NCHELS	10>cfut4 -d 0 -uc boot.cfg
Chelsio	T5∕T6 Flash Utility v1.5
Erasing Writing	serial flash sector(s) Done Image at Base 00070000 Done

- x. In case of multiple adapters in the system, please repeat the steps from iv. to ix. to update/flash the firmware, Option ROM, and boot configuration on all of them.
- xi. To configure the base MAC address (optional), use the below command.

C:\CHELSIO>cfut4 -d <idx> -um <Hex MAC Address>

Example:

C:\CHELSIO>cfut4 -d 0 -um 000743000123

xii. Reboot the system for changes to take effect.

4.3. uEFI

4.3.1. Loading uEFI driver

i. In BIOS, configure the system having Chelsio adapter to boot in uEFI mode.

Aptio Setup Utility – Copyri Advanced	ight (C) 2012 American Meg	atrends, Inc.
PCIe/PCI/PnP Configuration		Controls the execution
Launch Storage OnROM nolicu	[legary onlu]	Storage OnROM
PCI Latency Timer	[64 PCI Bus Clocks]	
PERR# Generation	[Disabled]	
SERR# Generation	[Disabled]	
Maximum Payload	[Auto]	
Maximum Read Request	[Auto]	
ASPM Support	[Disabled]	
Above 4G Decoding	[Disabled]	
Slot 1 & 2 PCI-X 133/100MHZ Launch St	torage OpROM policy ——————————	_
Slot 3 PCI-X 133/100MHZ Cloc UEFI only		
Slot 1 PCI-X 133/100MHZ OPRO Legacy only		
Slot 2 PCI-X 133/100MHZ OPRO		++: Select Screen
Slot 3 PCI-X 133/100MHZ OPROM		T+: Select Item
CPU1 SIOT 4 PCI-E 3.0 X8 UPRUM	[Enabled]	Enter: Select
PCH SIDT 5 PCI-E 3.0 X4 UPRUM	[Enabled]	+/-: Unange Upt.
Opheand LON Option ROW Solast	[EUGDIEU]	F1: General Help
Load Opboard SAS Option ROM	[FAC] [Enabled]	F2: Previous values
VGA Prioritu	[Onboard]	F4: Save & Exit
Network stack	[Enabled]	ESC: Exit
IPv4 PXE Support	[Enabled]	
Version 2.15.1236. Copyrigh	nt (C) 2012 American Megat	rends, Inc.

- 1 Note For Supermicro systems, enable Network Stack as well before proceeding.
- ii. Boot to EFI Shell.



iii. Issue command drivers to determine if Chelsio uEFI driver is already loaded. The below image shows that the driver is loaded.

A4	00000001						<unknown></unknown>	SBDXE
96	00000010	В					AMI Console Splitter Driver	ConSplitter
99	00000010	D					<unknown></unknown>	GraphicsConsole
AA	0000000A	D					Generic Disk I/O Driver	DiskIoDxe
٩B	0000000B	В					Partition Driver(MBR/GPT/El Torito)	PartitionDxe
ЧC	00000010	D					PCH Serial ATA Controller Initializ	SataController
٩E	00000010	В					AMI Generic LPC Super I/O Driver	GenericSio
30	00000001						AMI IDE BUS Driver	IdeBusSrc
32	00000010						AMI PS/2 Driver	PS2Main
34	00A50105	В				72	<unknown></unknown>	PciBus
36	00000010	В					<unknown></unknown>	TerminalSrc
37	00000010	В					<unknown></unknown>	TerminalSrc
38	0000000A	D					Simple Network Protocol Driver	SnpDxe
39	0000000A	В					MNP Network Service Driver	MnpDxe
ЗA	0000000A	В					ARP Network Service Driver	ArpDxe
3B	0000000A	В					DHCP Protocol Driver	Dhcp4Dxe
BC	0000000A	D					IP4 CONFIG Network Service Driver	Ip4ConfigDxe
ЗD	0000000A	В				18	IP4 Network Service Driver	Ip4Dxe
ЗE	0000000A	В				4	MTFTP4 Network Service	Mtftp4Dxe
ЗF	0000000A	В			12	20	UDP Network Service Driver	Udp4Dxe
20	0000000A	D					FAT File System Driver	Fat
31	0000000A	D					iSCSI Driver	IScsiDxe
22	0000000A	D					iSCSI Driver	IScsiDxe
24	0000000A						SCSI Bus Driver	ScsiBus
25	0000000A						Scsi Disk Driver	ScsiDisk
ĒA	00000010						AMI CSM Block I/O Driver	CsmBlockIo
FΒ	00000024	В					BIOS[INT10] Video Driver	CsmVideo
FC	00000010	?	3	\overline{a}	\overline{a}	3	<unknown></unknown>	<unknown></unknown>
158	8 01000058	Ξ	3 >	(X	3	3 3	3 Chelsio Unified Driver	Offset(0x3834,0x1D

If the driver is not loaded, continue to step (v)

iv. Note the handle and unload the driver.

```
fs0:\CHELSIO\> unload -n <driver handle>
```

Example:

FS1:\CHELSIO\> unload -n 1A1 Unload - Handle [72892A18] Result Success.

v. Load the uEFI driver (ChelsioUD.efi) present in the CHELSIO directory.



4.3.2. drvcfg

- i. Please ensure that Chelsio uEFI driver is loaded correctly as mentioned in Loading uEFI driver section.
- ii. Run the following command to launch the Unified Boot Setup utility.



iii. Choose the Chelsio adapter which needs to be configured.



iv. Highlight Enter flash utility and press [Enter].



v. Highlight **Option ROM** and press [Enter].



vi. Highlight **Update** and press [Enter].

Chelsio Unified BOOT Setup Utility v2.0.0.17							
Ctrl Bios	: T6225-CR : v2.0.0.17	FW : v1.21.5.0 Bus : AF	DevId : 0x6 Device : 0	001 Ports : 2 Function : 0			
		Choose an onera	tion				
	Uncose an operation						
	2. Erase						
	<†∕∔> to hi	ghlight, <enter≻ s<="" th="" to=""><th>elect, ≺Esc> to</th><th>go back</th></enter≻>	elect, ≺Esc> to	go back			

vii. Enter the path to the Option ROM file and press [Enter].

Chelsio Unified BOOT Setup Utility v2.0.0.17								
Ctrl Bios	: T6225-CR : v2.0.0.17	FW : v1.21.5.0 Bus : AF	DevId Device	: 0x6001 : 0	Ports : 2 Function : 0			
	B loom							
	Please	e enter the full path	to the f	116				
	signed_	2.0.0.17\cubt4.bin						
Processing, please wait								
	SULLESS, Flease reboot the system for the changes to take effect							
<enter> to process, <esc> to go back</esc></enter>								

- viii. Similarly, you can use the above method to update firmware (*t6fw-x.xx.x.s.bin/t5fw-x.xx.x.x.bin*) and boot configuration (*boot.cfg*) present in the *CHELSIO* directory.
- ix. In case of multiple adapters in the system, please repeat the above steps to update/flash the firmware, Option ROM, and boot configuration on all of them.
- x. Reboot the machine for changes to take effect.

4.3.3. HII

- i. Go into the BIOS setup.
- ii. Chelsio HII should be listed as Chelsio T5/T6 as shown below. Highlight it and press [Enter].

If Chelsio T5/T6 is not listed,

- Load the Chelsio uEFI driver as mentioned in Loading uEFI driver section.
- Flash the Option ROM and Firmware as mentioned in drvcfg section.

Aptio Setup Utility – Copyright (C) 2015 Americar Main Advanced Event Logs IPMI Security Boot Save & Exit) Megatrends, Inc.
 Boot Feature CPU Configuration Chipset Configuration SATA Configuration SATA Configuration Server ME Information PCIe/PCI/PNP Configuration Super IO Configuration Serial Port Console Redirection ACPI Settings iSCSI Configuration Chelsio T5/T6 Intel(R) I350 Gigabit Network Connection - 0C:C4:7A:6C:44:CC Intel(R) I350 Gigabit Network Connection - 0C:C4:7A:6C:44:CD 	Configure Chelsio T5/T6 Unified BOOT PXE, FCOE & iSCSI parameters. ++: Select Screen fl: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

iii. Highlight the Chelsio adapter to be configured and press [Enter].

Aptio setup utility – copyright (c) 2015 American Chelsio T5/T6	Megatrends, Inc.
Chelsio T5/T6	Set the CNA parameters on T6225-CR @ PCI Bus:81 Dev:0 ++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit F4: Save & Exit
	ESC: EXIL
Version 2.17.1245. Copyright (C) 2015 American M	egatrends, Inc.

iv. Highlight Flash Utility and press [Enter].



v. Erase or update firmware using the methods explained below:

a. Erase existing firmware

- i. Select [Erase] as Flash Operation
- ii. Select [FW File] as Flash File Type
- iii. Select Update/Erase
- iv. Press [Y] to confirm

b. Update firmware

- i. Select [Update] as Flash Operation
- ii. Select [FW File] as Flash File Type
- iii. Enter full path to the firmware file for Enter File Name, e.g., CHELSIO\t6fw-1.26.6.0.bin.
- iv. Press [Enter]
- v. Select Update/Erase
- vi. Press [Y] to confirm
- vi. Similarly, you can use the above method to update/erase Option ROM (*cubt4.bin*) and boot configuration (*boot.cfg*) present in the *CHELSIO* directory.
- vii. In case of multiple adapters in the system, please repeat the above steps to update/flash the firmware, Option ROM, and boot configuration on all of them.
- viii. Reboot the machine for changes to take effect.

4.3.4. Firmware Management Protocol (FMP)

HP machines support Firmware Management Protocol (FMP) interface, in addition to HII. This can be used to update the Option ROM on Chelsio adapters.

• Enabling FMP

- Please ensure that Chelsio uEFI driver is loaded correctly as mentioned in Loading uEFI driver section
- ii. Run the command fwupdate -1 and Chelsio T6 adapter should be listed as shown below:

```
FS1:\CHELSIO\> fwupdate -1
* [BIOS] System ROM - U20 v2.20 (05/05/2016)
* [RAID.Slot.2.1]Slot 2 : Smart HBA H240 Controller - V2.52_B0
* [NIC.LOM.1.3]Embedded LOM 1 : HP Ethernet 1Gb 2-port 361i Adapter - NIC - 1.1067.0
* [NIC.Slot.3.1]Slot_3 : Chelsio T6 Controller - NIC -
```

- Upgrading Firmware
- Using CLI
- i. Use the adapter's device name to update the firmware:

FS1:\CHELSIO\> fwupdate -d <device name> -f cubt4.bin

Example:

```
FS1:\CHELSIO\> fwupdate -d NIC.Slot.3.1 -f cubt4.bin
Loading firmware file 'cubt4.bin'. It might take several minutes.
Current Firmware Version is .
Continue with firmware update? (y/n):y
Firmware update completed successfully.
```

- ii. Reboot machine for changes to take effect.
- Using FMP
- i. Reboot system and press F9 to access System Utilities
- ii. Go to Embedded Applications -> Firmware Update -> Chelsio T6 Controller



- iii. Highlight Select a firmware file option and hit [Enter].
- iv. Select the USB flash drive which contains the latest Option ROM and hit [Enter].



v. Select Option ROM file cubt4.bin and hit [Enter].



The file should show up in the Selected firmware file field.



vi. Select Start firmware update and hit [Enter].



vii. After **Firmware update completed successfully** prompt appears, reboot the machine for changes to take effect.



4.4. Default Option ROM Settings

If you wish to restore Option ROM settings to their default values, i.e., PXE enabled, iSCSI and FCoE disabled, use any of the methods mentioned below:

4.4.1. Using Option ROM (boot level)

• Legacy PXE

Boot system into Chelsio's Unified Boot Setup utility and press F8.



• uEFI PXE

Boot system into uEFI mode and press F3.

Main Advanced Event Logs IPMI Boot Security Save & Exit	
 Boot Feature CPU Configuration Chipset Configuration SATA Configuration SCU Configuration PCIe/PCI/PNP Configuration Super IO Configuration Serial Port Console Redirection ACPI Settings ME Subsystem 	Configure Chelsio T4/T5 Unified BOOT PXE, FCOE & iSCSI parameters.
 iSCSI Configuration Intel RSTe SCU Controller Intel(R) I350 Gigabit Network Connection - 00:25:90:AD:DF:62 Intel(R) I350 Gigabit Network Connection - 00:25:90:AD:DF:63 Chelsio T4/T5 	<pre>++: Select Screen f4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

5. Configuring PXE Server

The following components are required to configure a server as PXE Server:

- DHCP Server
- TFTP Server

PXE server configuration steps for different operating systems can be found in following links:

Note

Chelsio Communications does not take any responsibility regarding contents given in below mentioned links. They are given for example purposes only.

Linux

 https://access.redhat.com/documentation/enus/red_hat_enterprise_linux/7/html/installation_guide/chap-installation-server-setup

• Windows

- http://technet.microsoft.com/en-us/library/cc771670%28WS.10%29.aspx
- http://tftpd32.jounin.net/ (Use port # 67, set PXE option and provide bootable file name in settings)
- http://unattended.sourceforge.net/pxe-win2k.html

• VMware

- http://www.vstellar.com/2017/07/25/automating-esxi-deployment-using-pxe-boot-and-kickstart/
- http://fdo-workspace.blogspot.in/2016/11/building-tftp-dhcp-for-pxe-esxi-65.html

6. PXE boot process

Before proceeding, please ensure that the Chelsio adapter has been flashed with the provided firmware, Option ROM, and boot configuration (See Flashing Firmware and Option ROM).

6.1. Legacy PXE boot

- i. Configure the PXE server and make sure it works. Reboot the client machine.
- ii. Press [Alt+C] when the message to configure Chelsio adapters appears on the screen.

Chelsio Unified Boot BIOS Copyright (C) 2003-2016 Chelsio Communications Press <Alt-C> to Configure T5/T6 Card(s). Press <Alt-S> to skip BIOS.

iii. The configuration utility will appear as below.



Choose the adapter on which you flashed the Option ROM image. Hit [Enter].

iv. Enable the adapter BIOS using arrow keys if not already enabled. Hit [Enter].



1 Note Use the default values for Boot Mode, EDD and EBDA Relocation parameters, unless instructed otherwise.

v. Choose **PXE** from the list to configure. Hit [Enter].



vi. Use the arrow keys to highlight the appropriate function among the supported NIC functions and hit [Enter] to select.



vii. Enable NIC function bios if not already enabled.

Ctrl Bios	: T6225-CR :	FV : Bus: 81	DevId Device	: 0x6001 : 00	Ports : 2 Function : 0
		BIOS : ENABLE			
		Vlan ID : Ø			

Choose the boot port to try the PXE boot. It is recommended to only enable functions and ports which are going to be used. Please note that enabling NIC Func 00 will enable port 0 for PXE, enabling NIC Func 01 will enable port 1 and so on for NIC function.

viii. Hit [F10] or [Esc] and then [Y] to save configuration changes.



- ix. Reboot the system.
- x. Allow the Chelsio Option ROM to initialize and setup PXE devices. DO NOT PRESS ALT-S to skip Chelsio Option ROM.



xi. In the system setup, choose any of the Chelsio PXE devices as the first boot device.



xii. Reboot. DO NOT PRESS ALT-S to skip Chelsio Option ROM, during POST.

xiii. Hit [F12] key when prompted to start PXE boot.

6.2. uEFI PXE Boot

Important

- Only uEFI v2.3.1, v2.4 and v2.5 supported.
- Any other uEFI version is NOT SUPPORTED and may render your system unusable.

6.2.1. HII

This section describes the method to configure and use Chelsio uEFI PXE interfaces using HII.

- i. Reboot the system and go into the BIOS setup.
- ii. Chelsio HII should be listed as Chelsio T5/T6. Highlight it and press [Enter].

Main Advanced Event Logs IPMI Security Boot Save & Exit	
 Boot Feature CPU Configuration Chipset Configuration SATA Configuration SSATA Configuration Server ME Information PCIe/PCI/PnP Configuration Super IO Configuration Serial Port Console Redirection ACPI Settings 	Configure Chelsio T5/T6 Unified BOOT PXE, FCOE & iSCSI parameters.
 iSCSI Configuration Chelsio T5/T6 Intel(R) I350 Gigabit Network Connection - 0C:C4:7A:6C:44:CC Intel(R) I350 Gigabit Network Connection - 0C:C4:7A:6C:44:CD 	<pre>++: Select Screen t4: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit</pre>

O Note Please ensure that Chelsio uEFI driver is loaded correctly as mentioned in Loading uEFI driver section.

iii. Select the Chelsio adapter to be configured and press [Enter].

Chelsio T5/T6	
▶ 001: PCI Bus:81 Device:00 T6225-CR	Set the CNA parameters on T6225-CR @ PCI Bus:81 Dev:0

iv. Select Configuration Utility and press [Enter].

Chelsio Unified BOOT Utility	
▶ Card Information	To Configure Boot Parameters for PXE, FCoE and iSCSI.
▶ Boot Information	
▶ Flash Utility	
▶ Configuration Utility	

v. Enable adapter BIOS if not already enabled.

Chelsio Unified BOOT Configuration Utility		
▶ Save Changes ▶ Load CNA defaults.		To Enable/Disable this CNA
CNA Parameters Bios Platform	[Enabled] [Both]	
▶ Chelsio Protocol Selectio	n	
▶ Blink Port0 ▶ Blink Port1		

1 Note It is highly recommended that you use the **Save Changes** option every time a parameter/option is changed.

vi. Select Chelsio Protocol Selection and press [Enter].

Chelsio Unified BOOT Configuration Utility		
 Save Changes Load CNA defaults. 		Configure PXE/FCOE/ISCSI Parameters
CNA Parameters Bios Platform	[Enabled] [Both]	
▶ Chelsio Protocol Selection		
▶ Blink Port0 ▶ Blink Port1		

vii. Select **PXE** and press [Enter].

Chelsio Unified BOOT Configuration Utility	
Chelsio Protocol Selection	Configure PXE Parameters
► PXE	
▶ FCoE	
▶ iscsi	

viii. Choose the boot port to try PXE boot. It is recommended to enable only those functions and ports which are going to be used. Please note that enabling PXE Function 0 will enable port 0 for PXE, enabling PXE Function 1 will enable port 1 and so on, for NIC function.

Save Changes		To Enable/Disable this PXE
Load PXE defaults.		function
PXE Function 0		
Bios	[Enabled]	
Vlan ID	0	
PXE Function 1		
Bios	[Enabled]	
Vlan ID	0	

ix. Select Save Changes and press [Enter].

Chelsio Unified BOOT Configuration Utility			
▶ Save Changes ▶ Load PXE defaults.		Save Changes	
PXE Function O Bios Vlan ID	[Enabled] 0		
PXE Function 1 Bios Vlan ID	[Enabled] 0		

x. Reboot the system and in BIOS, choose any of the available Chelsio PXE devices.

Main Advanced Event	Logs IPMI Security Boot Save & Exit	
Boot Mode Select	[UEFI]	Sets the system boot order
FIXED BOOT ORDER Prior.	ities	
Boot Option #1	[UEFI AP:UEFI: Built]	
Boot Option #2	[UEFI CD/DVD]	
Boot Option #3	[UEFI USB Hard Disk]	
Boot Option #4	Boot Option #1	
Boot Option #5	UEFI Hard Disk	
Boot Option #6	UEFI CD/DVD	
Boot Option #7	UEFI USB Hard Disk	
Boot Option #8	UEFI USB CD/DVD	
	UEFI USB Key	
Delete Boot Option	UEFI USB Floppy	Screen
lease and the second	UEFI Network:UEFI: IP4 Chelsio T6 PXE T	6225-CR Item
Delete Driver Option	UEFI AP:UEFI: Built-in EFI Shell	ect
	Disabled	e Opt.
UEFI NETWORK Drive BBS		1 Help
UEFI Application Boot R	Ph	us Values
		F3: Optimized Defaults
		F4: Save & Exit
		ESC: EXIT

xi. Reboot and hit [F12] key when prompted to start PXE boot.

6.2.2. drvcfg

This section describes the method to configure and use Chelsio uEFI PXE interfaces using drvcfg.

- i. Boot the system into EFI shell.
- ii. Run the following command to launch the Unified Boot Setup utility.



iii. Choose the Chelsio adapter which needs to be configured.

Chelsio Unified BOOT Setup Utility v2.0.0.17
Chelsio adapters in the system
1. Bus:AF Dev:00 T6225-CR
<page-up page-down=""> to scroll pages. <↑/↓> to highlight</page-up>
<pre></pre>

iv. Highlight Enter config utility and press [Enter].



v. Further configuration steps are similar from step (iv) of Legacy PXE Boot section.
7. FCoE boot process

Before proceeding, please ensure that the Chelsio adapter has been flashed with the provided firmware, Option ROM, and boot configuration (See Flashing firmware and Option ROM).

7.1. Legacy FCoE boot

- i. Reboot the system.
- ii. Press [Alt+C] when the message to configure Chelsio adapters appears on the screen.

Chelsio Unified Boot BIOS Copyright (C) 2003-2016 Chelsio Communications Press <Alt-C> to Configure T5/T6 Card(s). Press <Alt-S> to skip BIOS.

iii. The configuration utility will appear as below.



Choose the adapter on which you flashed the Option ROM image. Hit [Enter].

iv. Enable the adapter BIOS if not already enabled. Hit [ENTER].



ONOTE Use the default values for Boot Mode, EDD and EBDA Relocation parameters, unless instructed otherwise. v. Choose FCoE from the list to configure and hit [Enter].



vi. Choose the first option, **Configure function parameters**, from the list of parameter type and hit [Enter].

Ctrl Bios	: T520-CR :	FW : Bus : 04	Devld : 0x5601 Device : 00	Ports : 2 Function : 6			
	Choose the parameter type to configure						
1. Configure function parameters 2. Configure boot parameters 3. Show port WWPN							

vii. Enable FCoE BIOS if not already enabled.

Ctrl Bios	: T520−CR FW : : Bus : 04		DevId Device	: 0×5601 : 00	Ports : 2 Function : 6
	Bios	: ENABLED			
	Port order for boot retry	: 00 1	IONE		
	Discovery Timeout	: 30			

viii. Choose the order of the ports to discover FCoE targets.



ix. Set discovery timeout to a suitable value. Recommended value is >= 30.

Ctrl Bios	: T520-CR FW : : Bus : 04		DevId Device	:	0×5601 00	Ports Function	:	2 6
	Bios	: ENABLED						
	Port order for boot retry	: 00 0	1					
	Discovery Timeout	: 30						

x. Hit [F10] or [Esc] and then [Y] to save the configuration.



xi. Choose Configure boot parameters.



xii. Select the first boot device and hit [Enter] to discover FC/FCoE targets connected to the switch. Wait till all reachable targets are discovered.

Ctrl Bios	: T520-CI :	R FW Bus	: : 04	DevId : 0x5601 Device : 00	Ports : 2 Function : 6
			Saved boot devi	се	
	1. U	nused WWPN:	000000000000000000	LUN:0000000000000	000
	2. U	nused WWPN:	00000000000000000	LUN:000000000000	0000
	3. Ui	nused WWPN:	00000000000000000	LUN:0000000000000	0000
	4. Ui	nused WWPN:	00000000000000000	LUN:0000000000000	0000

xiii. List of discovered targets will be displayed. Highlight a target using the arrow keys and hit [Enter] to select.



xiv. From the list of LUNs displayed for the selected target, choose one on which operating system has to be installed. Hit [Enter].

List of LUNs present on the target 1. LUN: 00020000000000 NETAPP 35.0003 GB 2. LUN: 000200000000000 NETAPP 1.0035 GB 3. LUN: 000300000000000 NETAPP 1.0035 GB 4. LUN: 000400000000000 NETAPP 1.0035 GB 5. LUN: 000500000000000 NETAPP 1.0035 GB 6. LUN: 00060000000000 NETAPP 1.0035 GB 7. LUN: 000700000000000 NETAPP 1.0035 GB 8. LUN: 00080000000000 NETAPP 1.0035 GB					
1. LUN: 0002000000000000 NETAPP 1.0035 GB 2. LUN: 000200000000000 NETAPP 1.0035 GB 3. LUN: 00030000000000 NETAPP 1.0035 GB 4. LUN: 0004000000000 NETAPP 1.0035 GB 5. LUN: 000500000000000 NETAPP 1.0035 GB 5. LUN: 0005000000000000 NETAPP 1.0035 GB 6. LUN: 0005000000000000 NETAPP 1.0035 GB 7. LUN: 00070000000000000 NETAPP 1.0035 GB 8. LUN: 00080000000000000 NETAPP 1.0035 GB					
7. LUN: 000700000000000 NETAPP 1.0035 GB 8. LUN: 00080000000000 NETAPP 1.0035 GB					
Ctrl: T520-CRFW:DevId: 0x5601Ports: 2Bios:Bus: 04Device: 00Function: 6					
Saved boot device 1. Used WWPN: 500A098289A87CA8 LUN:000000000000000 2. Unused WWPN: 0000000000000 LUN:00000000000000 3. Unused WWPN: 00000000000000 LUN:00000000000000 4. Unused WWPN: 0000000000000 LUN:000000000000000000000000000000000000					

xv. Hit [F10] or [Esc] and then [Y] to save the configuration.



xvi. Reboot the machine.

xvii. During POST, allow the Chelsio Option ROM to discover FCoE targets.

Installing Chelsio T5 Storage FCoE BIOS PCI BIOSv3.0 PCI FWv2.1 PnP BIOS: YES PMM Entry is passed by BIOS Bringing up link on PCI:04:00:6 Port 0 ... Done Discovering FCoE Target(s) on PCI:04:00:6 Port 0 ... Done sd(1): T520-CR PCI:04:00:6 P(0) WWPN:500A098289AB7CAB Lun(00) NETAPP LUN 8030 35.0003 GB Storage FCoE BIOS Installed Successfully!

xviii.Enter BIOS setup and choose FCoE disk discovered via Chelsio adapter as the first boot device.



xix. Reboot and boot from the FCoE disk or install the required OS using PXE.

uEFI FCoE Boot 7.2. Only uEFI v2.3.1, v2.4 and v2.5 supported. •

Any other uEFI version is NOT SUPPORTED and may render your • system unusable.

7.2.1. HII

Important

This section describes the method to configure and use Chelsio uEFI FCoE interfaces using HII.

- Reboot the system and go into BIOS setup. i.
- ii. Select Chelsio T5/T6 and press [Enter]

Aptio Setup Utility – Copyright (C) 2015 American Megatrends, Inc. Main <mark>Advanced</mark> Event Logs IPMI Security Boot Save & Exit				
 Boot Feature CPU Configuration Chipset Configuration SATA Configuration SSATA Configuration Server ME Information PCIe/PCI/PnP Configuration Super IO Configuration Serial Port Console Redirection ACPI Settings 	Configure Chelsio T5/T6 Unified BOOT PXE, FCOE & iSCSI parameters.			
 ISCSI Configuration Chelsio T5/T6 Intel(R) I350 Gigabit Network Connection - 0C:C4:7A:6C:44:CC Intel(R) I350 Gigabit Network Connection - 0C:C4:7A:6C:44:CD 	++: Select Screen f1: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit			

Please ensure that Chelsio uEFI driver is loaded correctly as mentioned in Note Loading uEFI driver section.

iii. Select the Chelsio adapter to be configured and press [Enter].



iv. Select Configuration Utility and press [Enter].



v. Enable adapter BIOS if not already enabled.

▶ Save Changes ▶ Load CNA defaults.		To Enable/Disable this CNA
CNA Parameters Bios	[Enabled]	
Platform	[Both]	

1 Note It is highly recommended that you use the **Save Changes** option every time a parameter/option is changed.

vi. Select Chelsio Protocol Selection and press [Enter].

Advanced		
▶ Save Changes ▶ Load CNA defaults.		Configure PXE/FCOE/ISCSI Parameters
CNA Parameters Bios Platform	[Enabled] [Both]	
▶ Chelsio Protocol Selection		
 Blink Port0 Blink Port1 Blink Port2 Blink Port3 		

vii. Select FCoE and press [Enter].

	Advanced	
Γ	Chelsio Protocol Selection	Configure FCoE Parameteters
Þ	PXE	T di dillo co cor o
Þ	FCoE	
•	ISCSI	

viii. Under Function Parameters, enable FCoE BIOS, if not already enabled.

Advanced		
Save Changes		▲ To Enable/Disable FCoE
▶ Load FCOE defaults.		boot for thisfunction
▶ Delete Boot Device		
Function Parameters		
Bios	[Enabled]	
Discovery Timeout	30	
1st Port for Boot retry	[0]	
2nd Port for Boot retry	[NONE]	
3rd Port for Boot retry	[NONE]	
4th Port for Boot retry	[NONE]	

ix. Set discovery timeout to a suitable value. Recommended value is >= 30



x. Choose the order of the ports to discover FCoE targets.



xi. Under the first boot device, select **Discover Target** and press [Enter] to discover FC/FCoE targets connected to the switch. Wait till all reachable targets are discovered.

Advanced		
▶ Save Changes ▶ Load FCOE defaults. ▶ Delete Boot Device		 Discover FCoE Target(s)this may take 30 seconds
Function Parameters Bios Discovery Timeout 1st Port for Boot retry 2nd Port for Boot retry 3rd Port for Boot retry 4th Port for Boot retry	[Enabled] 30 [0] [NONE] [NONE] [NONE]	
Boot Parameters		
Boot Device 1 WWPN[0] LUN [0] Port Discover Target	0 0 [NONE]	<pre>++: Select Screen f↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults</pre>
Boot Device 2 WWPN[1] LUN [1] Port Discover Target	0 0 [NONE]	F4: Save & Exit ESC: Exit ▼

xii. List of discovered targets will be displayed. Highlight a target to select it and hit [Enter].

	Advanced	
▶ 001: 5 ▶ 002: 5	500A0982992BB831 5000743115564080	

xiii. List of LUNs for the selected target will be displayed. Highlight a LUN to select it and hit [Enter].

	Advanced					
	LUN 0001: 00000000000000000	NETAPP	40.0039	GB		
×.	LUN 0002: 000100000000000	NETAPP	50.0000	GB		
	LUN 0003: 0002000000000000	NETAPP	60.0000			
	LUN 0004: 0003000000000000	NETAPP	70.0068	GB		
	LUN 0005: 000400000000000	NETAPP	80.0058	GB		
	LUN 0006: 000500000000000	NETAPP	90.0000	GB		

xiv. Select Save Changes and press [Enter].

Advanced		
 Save Changes Load FCOE defaults. Delete Boot Device 		▲ Save Changes
Function Parameters Bios Discovery Timeout 1st Port for Boot retry 2nd Port for Boot retry 3rd Port for Boot retry 4th Port for Boot retry	[Enabled] 30 [0] [NONE] [NONE] [NONE]	
Boot Parameters		

- xv. Reboot the system for changes to take effect.
- xvi. The discovered LUN should appear in the **Boot Configuration** section and system BIOS section.

Advanced	
PXE Boot Port : O–[Enabled] 1–[Enabled] 2–[Enabled] Storage Boot : iSCSI [ENABLED] FCoE [ENABLED] Discovered Target : iqn.2004–05.com.chelsio.target	
Discovered WWPN : [500A-0982-992B-B831]	
Initiator WWPN Port-0 : 5000–7432–8FB0–6080 Initiator WWPN Port–1 : 5000–7432–8FB0–E180 Initiator WWPN Port–2 : 5000–7432–8FB1–6280 Initiator WWPN Port–3 : 5000–7432–8FB1–E380	
Main Advanced Event Logs IPMI Boot Security Save & Exit	
Main Advanced Event Logs IPMI Boot Security Save & Exit Discard Changes and Exit Save Changes and Reset	Exit system setup without saving any changes
Main Advanced Event Logs IPMI Boot Security Save & Exit Discard Changes and Exit Save Changes and Reset Save Options Save Changes Discard Changes Discard Changes Discard Changes Save Changes Save Changes	Exit system setup without saving any changes.

xvii. Select the LUN as the first boot device and exit from BIOS. xviii.Either boot from the LUN or install the required OS.

7.2.2. drvcfg

This section describes the method to configure and use Chelsio uEFI FCoE interfaces using drvcfg.

- i. Boot the system into EFI shell.
- ii. Run the following command to launch the configuration utility.



iii. Choose the Chelsio adapter on which needs to be configured.



iv. Highlight Enter config utility and press [Enter].



v. Further configuration steps are similar from step (iv) of Legacy FCoE Boot section.

8. iSCSI boot process

Before proceeding, please ensure that the Chelsio adapter has been flashed with the provided firmware, Option ROM, and boot configuration (See Flashing Firmware and Option ROM).

8.1. Legacy iSCSI boot

- i. Reboot the system.
- ii. Press [Alt+C] when the message to configure Chelsio adapters appears on the screen.

```
Chelsio Unified Boot BIOS
Copyright (C) 2003–2016 Chelsio Communications
Press <Alt-C> to Configure T5/T6 Card(s). Press <Alt-S> to skip BIOS.
```

iii. The configuration utility will appear as below:



Choose the adapter on which you flashed the Option ROM image. Hit [Enter].

iv. Enable the adapter BIOS if not already enabled. Hit [Enter].



Note Use the default values for Boot Mode, EDD and EBDA Relocation parameters, unless instructed otherwise. v. Choose iSCSI from the list to configure and hit [Enter].



vi. Choose the first option, **Configure Function Parameters**, from the list of parameter type and hit [Enter].

Chelsio Unified BOOT Setup Utility								
Ctrl Bios	: T6225-CR :	FW : Bus: 81	DevId Device	: 0x6501 : 00	Ports : 2 Function : 5			
	Choo	Se the parameter type	e to confi	igure				
	2. 3.	Configure Initiator Configure CHAP Para	Parameter neters	'S				
	4. 5.	Configure Network Pa Configure Target Pa	arameters rameters					
	6.	Discover iSCSI Targe	et(s)					

- vii. Enable iSCSI BIOS if not already enabled. Select the iSCSI OS Initiator based on the OS you are installing. iBFT (iSCSI Boot Firmware Table) will be selected by default.
 - Linux: Only iBFT is supported.
 - Windows: Select CBFT to use Chelsio iSCSI Initiator, *cht4iscsi* during OS installation. If iBFT is selected, MS iSCSI Initiator will be used.
 - ESX: Select CBFT to use Chelsio iSCSI Initiator, *cheiscsi* during OS installation. If iBFT is selected, ESXi iSCSI Initiator will be used.



You can also configure the number of iSCSI login attempts (retries) in case the network is unreachable or slow.

viii. Choose the order of the ports to discover iSCSI targets.



ix. Set discovery timeout to a suitable value. Recommended value is >= 30.

Ctrl Bios	: T6225-CR :	FW : Bus: 81	•			DevId Device	14 AN	0x6501 00	Ports Function	: 2 : 5
		Bios		ENABLI	ED					
	Port order for b	oot retry		00	01					
	Discover	y Timeout		30						
	iSCSI OS	Initiator		iBFT						
	iSCSI Login Retry	(Slow NW)	2	0						

x. Hit [Esc] and then [Y] to save the configuration.



xi. Go back and choose **Configure Initiator Parameters** to configure initiator related properties.

: T6225-CR :	FW : Bus: 81	Devld Device	: 0x6501 : 00	Ports Function	: 2 : 5
Choo	se the parameter type	e to confi	gure		
1.	Configure Function 1	Parameters			
<mark>4.</mark> 3.	Configure Initiator Configure CHAP Para	Parameter neters	S		
4. 5.	Configure Network Pa Configure Target Pa	arameters rameters			
	: T6225-CR : Choo 1. 2. 3. 4. 5.	: T6225-CR FW : Bus: 81 Choose the parameter type 1. Configure Function D 2. Configure Initiator 3. Configure CHAP Param 4. Configure Network Pa 5. Configure Target Pap	: T6225-CR FW : Devid Bus: 81 Device Choose the parameter type to confi 1. Configure Function Parameters 2. Configure Initiator Parameters 3. Configure CHAP Parameters 4. Configure Network Parameters 5. Configure Target Parameters	: T6225-CR FW : Devid : 0x6501 Bus: 81 Device : 00 Choose the parameter type to configure 1. Configure Function Parameters 2. Configure Initiator Parameters 3. Configure CHAP Parameters 4. Configure Network Parameters 5. Configure Target Parameters	: T6225-CR FW : Devid : 0x6501 Ports Bus: 81 Device : 00 Function Choose the parameter type to configure 1. Configure Function Parameters 2. Configure Initiator Parameters 3. Configure CHAP Parameters 4. Configure Network Parameters 5. Configure Target Parameters

xii. Initiator properties like IQN, Header Digest, Data Digest, etc. will be displayed. Change the values appropriately or continue with the default values. Hit [F10] to save.

Initiator IQN	.com.chelsio.boot:00074304B160
Header Digest	None
Data Digest	None
InitialR2T	No
ImmediateData	Yes
MaxOutstandingR2T	1
DefaultTime2Wait	20
DefaultTime2Retain	20
FirstBurstLength	65536
MaxBurstLength	262144

O Note MaxBurstLength and FirstBurstLength range from 512 to 16777215 bytes.

xiii. CHAP authentication is disabled by default. To enable and configure, go back and choose **Configure CHAP Parameters**

Ctrl Bios	: T6225-CR :	FW : Bus: 81	DevId Device	: 0x6501 : 00	Ports : 2 Function : 5
	Choo	ee the non-meter ture	to confi	<i></i>	
	GIUG	se the parameter type	CO COM 1	ցաւշ	
	1.	Configure Function P	arameters		
	2.	Configure Initiator	Parameter	S	
	З.	Configure CHAP Param	eters		
	4.	Configure Network Pa	rameters		
	5.	Configure Target Par	ameters		
	6.	Discover iSCSI Targe	t(s)		

xiv. Enable CHAP authentication by selecting ONE-WAY or MUTUAL in the **CHAP Policy** field. Next, choose the CHAP method. Finally, provide Initiator and Target CHAP credentials as per the authentication method selected. Hit [F10] to save.

Ctrl Bios	: T6225-CR :	FV : Bus: 81	-	DevId Device	: 0x6501 : 00	Ports : 2 Function : 5
		CHAP Policy	:	MUTUAL		
		CHAP Method	: 1	None, CHAP		
	Initiator	CHAP Username		init2x		
	Initiator	CHAP Password		chelinit65		
	Target	CHAP Username		tar12x		
	Target	CHAP Password		cheltar65_		

xv. Go back and choose **Configure Network Parameters** to configure iSCSI Network related properties.

Ctrl Bios	: T6225-CR :	FW : Bus: 81	Devld Device	: 0x6501 : 00	Ports : 2 Function : 5
	Chas	co the non-motor ture	to confi	<i>6</i> 1176	
	Chuc	se the parameter type	CO CONT 1	yure	
	1.	Configure Function P	arameters		
	2.	Configure Initiator	Parameter	s	
	3.	Configure CHAP Param	eters		
	4.	Configure Network Pa	rameters		
	5.	Configure Target Par	ameters		
	6.	Discover iSCSI Targe	t(s)		

xvi. Select the port using which you want to connect to the target. Hit [Enter].

Ctrl Bios	: T6225-CR :	F¥ : Bus: 81	DevId Device	: 0x6501 : 00	Ports : 2 Function : 5
		Choose a port to co	mfigure		
		<mark>1. Port 0</mark> 2. Port 1			

xvii. Select Yes in the **Enable DHCP** field to configure port using DHCP or *No* to manually configure the port. Hit [F10] to save.

Ctrl Bios	: T6225-CR :	FW : Bus: 81	DevId Device	: 0x6501 : 00	Ports Function	: 2 : 5
	Port	0 network parameter	conf igura	tion		
	P	VLAN ID : 0 IP Version : IPV4 Enable DHCP : No IP address : 102. Subnet mask : 255. Gateway : 0.0. ing IP address :0.0.	80.80.92 255.255.0 0.0 0.0			

xviii.Go back and choose **Configure Target Parameters** to configure iSCSI target related properties.

Ctrl Bios	: T6225-CR :	FV : Bus: 81	Devld Device	: 0x6501 : 00	Ports Function	: 2 : 5
	Cho	ose the parameter type	to confi	gure		
	1	. Configure Function P	arameters			
	2	. Configure Initiator	Parameter	s		
	3	. Configure CHAP Param	eters			
	4	. Configure Network Pa	rameters			
	5	. Configure Target Par	ameters			
	6	. Discover iSCSI Targe	t(s)			

xix. If you want to discover target using DHCP, select Yes in the **Discover Boot Target via DHCP** field. To discover target via static IP, select *No* and provide the target IP and Hit [F10] to save. The default TCP port selected is 3260.

Ctrl Bios	: T6225-CR :	FV : Bus: 81	Devld : Device :	0x6501 00	Ports : 2 Function : 5
	Discover Boot Ta	rget via DHCP : No			
	Targ	et IP Version : IPV4			
	Targ	et IP address : <mark>102.</mark>	80.80.186_		
	Ta	rget TCP port : 3260			

xx. Go back and choose **Discover iSCSI Target (s)** to connect to a target.

Ctrl Bios	: T6225-CR :	FW : Bus: 81	Devld Device	: 0x6501 : 00	Ports : 2 Function : 5
				Protect.	
	Choc	use the parameter type	to confi	gure	
	1.	Configure Function F	arameters		
	2.	Configure Initiator	Parameter	S	
	3.	Configure CHAP Param	ieters		
	4.	Configure Network Pa	rameters		
	5.	Configure Target Par	ameters		
	6.	Discover iSCSI Targe	t(s)		

xxi. Select the portal group on which iSCSI service is provided by the target.

Ctrl Bios	: T6225-CR :	F₩ : Bus: 81	DevId Device	: 0x6501 : 00	Ports : 2 Function : 5
		Saved boot	device		
		Portal	T.UN		
	102.	80.80.186:3260	8		

xxii. A list of available targets will be displayed. Select the target you wish to connect to and hit [Enter].



xxiii.A list of LUNs configured on the selected target will be displayed. Select the LUN you wish to connect to and hit [Enter].

Ctrl : T6225-CR Bios : CurPort: 0	F₩ : Bus: 81 IP : 102.80.80.9	DevId : 0x6501 Device : 00 2 BootDev#: 0	Ports : 2 Function : 5 Target# : 1
	List of LUNs presen	t on the target	
	LUN: 00000000000000000	0 L10-ORG 60.0000 GI	9

xxiv. Hit [Esc] and then [Y] to save the configuration.

Ctrl Bios	: T6225-CR :	FW : Bus: 81	Devld Device	: 0x6501 : 00	Ports : 2 Function : 5
		WARN ING !			
		Do you want to save the <y>=Yes, <n>=No, <</n></y>	conf igur (C>=Cance l	ation?	
	j.				

xxv. Reboot the machine.

xxvi. During POST, allow the Chelsio Option ROM to discover iSCSI targets.

```
Chelsio Unified Boot BIOS

Copyright (C) 2003-2016 Chelsio Communications

Press <Alt-C> to Configure T5/T6 Card(s). Press <Alt-S> to skip BIOS.

Installing Chelsio T6 Storage iSCSI BIOS

PCI BIOS v3.0 , PCI FW v3.0 , PnP BIOS : YES PMM Entry is passed by BIOS

Bringing up link on PCI:81:00:5 Port 0 ... Done

Waiting for LLDP negotiation ... Done

Discovering iSCSI Target(s) on PCI:81:00:5 Port 0 ... Done

sd(1): T6225-CR PCI:81:00:5 P(0) MAC:00:07:43:04:B3:F0 Host:102.80.80.92

iqn.2003-15.com.chelsio.boot: Target:102.80.80.186:3260 iqn.2017-18.com.chl.targ

et2 Lun(00) LIO-ORG vol1 4.0 60.0000 GB

Storage iSCSI BIOS Installed Successfully!
```

xxvii. Enter BIOS setup and choose iSCSI target LUN discovered via Chelsio adapter as the first boot device.

Main Advanced Event Logs IPMI Security Boot Save & Exit	
Boot Option #3 [USB Hard Disk] A Boot Option #4 [USB CD/DVD] Boot Option #5 [USB Key]	boot order
Boot Option # Boot Option #15	
Boot Option # UEFI Hard Disk:Suse Boot Manager	
Boot Option # UEFI CD/DVD	
Boot Option # UEFI USB Hard Disk	
Boot Option # UEFI USB CD/DVD	
Boot Option # UEFI USB Key	
Boot Option # UEFI USB Floppy	
Boot Option # UEFI Network:UEFI: IP4 Intel(R) I350 Gigabit Network Connection	
Boot Option # UEFI AP:UEFI: Built-in EFI Shell	
Boot Option # Hard Disk:LIO-ORG vol1 4.0	
CD/DVD	
▶ Add New Boot USB Hard Disk	
▶ Delete Boot U USB CD/DVD	
USB Key	
Fidd New Driver USB Floppy N Delete Deiver Network, CheleieTCEVERD1:00:0	-
Delete Driver Network:Cheisiu/Brx2001:00:0	5
Hand Dick Dri	UIIS
NETWORK Drive B	
▶ UEET Hard Disk Drive BBS Priorities	
► UEET NETWORK Drive BBS Priorities	
▶ UEFI Application Boot Priorities	

xxviii. Reboot and boot from the iSCSI Target LUN or install the required OS using PXE.

8.2. uEFI iSCSI Boot

•

Important

- Only uEFI v2.3.1, v2.4 and v2.5 supported.
- Any other uEFI version is NOT SUPPORTED and may render your system unusable.

8.2.1. HII

This section describes the method to configure and use Chelsio uEFI iSCSI interfaces using HII.

- i. Reboot the system and go into BIOS setup.
- ii. Select Chelsio T5/T6 and press [Enter]

Aptio Setup Utility – Copyright (C) 2015 Americar Main Advanced Event Logs IPMI Security Boot Save & Exit	Megatrends, Inc.
 Boot Feature CPU Configuration Chipset Configuration SATA Configuration SSATA Configuration Server ME Information PCIe/PCI/PnP Configuration Super IO Configuration Serial Port Console Redirection ACPI Settings iSCSI Configuration 	Configure Chelsio T5/T6 Unified BOOT PXE, FCOE & iSCSI parameters.
 Chelsio T5/T6 Intel(R) I350 Gigabit Network Connection - 0C:C4:7A:6C:44:CC Intel(R) I350 Gigabit Network Connection - 0C:C4:7A:6C:44:CD 	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

- **1** Note Please ensure that Chelsio uEFI driver is loaded correctly as mentioned in Loading uEFI driver section.
- iii. Select the Chelsio adapter to be configured and press [Enter].

Advanced			
▶ 001: PCI Bus:07	Device:00 T522-CR	Set the CNA para on T522–CR Bus:7 Dev:0	meters @ PCI

iv. Select Configuration Utility and press [Enter].



v. Enable adapter BIOS if not already enabled.

Advanced		
Save Changes		To Enable/Disable this
▶ Load CNA defaults.		CNA
CNA Parameters		
Bios	[Enabled]	
Platform	[Both]	
▶ Chelsio Protocol Selection		

1 Note It is highly recommended that you use the **Save Changes** option every time a parameter/option is changed.

vi. Select Chelsio Protocol Selection and press [Enter].

Save Changes		Configure PXE/FCOE/ISCSI
▶ Load CNA defaults.		Parameters
CNA Parameters		
Bios	[Enabled]	
Platform	[Both]	

vii. Select iSCSI and press [Enter].



viii. Under Function Parameters, enable iSCSI BIOS, if not already enabled.

Chelsio Unified BOOT Con	figurationUtility	- ISCSI
 Save Changes Load ISCSI defaults. Delete Boot Device 		▲ To Enable/Disable iSCSI boot for this function
Function Parameters Bios Discovery Timeout Discovery Retry Count 1st Port for Boot retry 2nd Port for Boot retry	[Enabled] 30 0 [0] [1]	

ix. Set discovery timeout to a suitable value. Recommended value is >= 30



x. Choose the order of the ports to discover iSCSI targets.

Chelsio Unified BOOT (Configuration Utility	- ISCSI
▶ Save Changes ▶ Load ISCSI defaults. ▶ Delete Boot Device		^
Function Parameters Bios Discovery Timeout Discovery Retry Count 1st Port for Boot retry 2nd Port for Boot retry	[Enabled] 30 0 [0] [1]	
Initiator Parameters iSCSI Initiator Type Initiator IQN Header Digest Data Digest InitialR2T	0 1 NONE	Select Screen Select Item er: Select +/-: Change Opt.

xi. Under **Initiator Parameters**, iSCSI Initiator properties like IQN, Header Digest, Data Digest, etc will be displayed. Change the values appropriately or continue with the default values.

ave Changes		A Save Changes
oad ISCSI defaults.		
elete Boot Device		
unction Parameters		
Bios	[Enabled]	
Discovery Timeout	30	
Discovery Retry Count	0	
1st Port for Boot retry	[0]	
2nd Port for Boot retry	[NONE]	
nitiator Parameters		
iSCSI Initiator Type	[Disabled]	
Initiator IQN	iqn.2020-06.com.chel	++: Select Screen
Header Digest	[None]	↑↓: Select Item
Data Digest	[None]	Enter: Select
InitialR2T	[No]	+/-: Change Opt.
ImmediateData	[Yes]	F1: General Help
MaxOutstandingR2T	1	F2: Previous Values
DefaultTime2Wait	20	F3: Optimized Defaults
DefaultTime2Retain	20	F4: Save & Exit
FirstBurstLength	65536	ESC: Exit
MaxBurstLength	262144	

O Note MaxBurstLength and FirstBurstLength range from 512 to 16777215 bytes.

xii. Under the first port, select **Enable DHCP** field, hit [Enter] and select **Enabled**. This will configure port using DHCP. Select **Disabled** to manually configure the port.

Chelsio Unified BOOT Con	figurationUtility	- ISCSI
Function Parameters		Enable DHCP
Bios	[Enabled]	
Discovery Timeout	30	
Discovery Retry Count	0	
1st Port for Boot retry	[0]	
2nd Port for Boot retry	[1]	
Initiator Parameters		
iSCSI Initiator Type	[Disabled]	
Initiator IQN	Enable DHCP ——	
Header Digest	Disabled	
Data Digest	Enabled	
InitialR2T		→++: Select Screen
ImmediateData		↑↓: Select Item
MaxOutstandingR2T	1	Enter: Select
DefaultTime2Wait	20	+/-: Change Opt.

xiii. Under **Target Parameters**, select **Enabled** for the **Boot Target via DHCP** parameter to discover target using DHCP.



To discover target via static IP, select **Disabled** and provide the target IP.

Advanced		
IP Version Enable DHCP	[IPv4] [Enabled]	▲ Discover Boot Target via DHCP
Port2 Vlan ID IP Version Enable DHCP	0 [IPv4] [Enabled]	
Vlan ID IP Version Enable DHCP	0 [IPv4] [Enabled]	
Target Parameters Boot Target via DHCP IP Version Target IP Address Target Port Target IQN Boot LUN Boot LUN Boot Initiator Port	[Disabled] [IPv4] 102.60.60.7 3260 iqn.2001-04.com 0 [0] [None]	++: Select Screen 14: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
▶ Discover Target		•

xiv. CHAP authentication is disabled by default. To enable and configure, highlight **CHAP Policy** and hit [Enter]. Select the policy type from the corresponding pop-up and hit [Enter] again.



xv. Provide Initiator and Target CHAP credentials as per the CHAP policy selected.

Subnet Mask Gateway Ping IPV4 Address Ping IP	255.255.255.0 0.0.0.0	▲ The minimum length is 12 Characters and the maximum length is 16 Characters.
Port1		
Vlan ID	0	
IP Version	[IPV4]	
Enable DHCP	[Enabled]	
aboloisten207	rai Soc onni Tassaora	
cheisiotan so 7_		
Ta Target IQN	iqn.2017-18.com.chl	Enter: Select
Ta Taget IQN Boot LUN	iqn.2017-18.com.chl 0	Enter: Select +/-: Change Opt.
Ta Taget IQN Boot LUN Boot Initiator Port	iqn.2017-18.com.chl 0 [0]	Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values
Ta Ta Target IQN Boot LUN Boot Initiator Port CHAP Policy	iqn.2017–18.com.chl 0 [0] [Mutual]	Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults
Ta Ta Target IQN Boot LUN Boot Initiator Port CHAP Policy CHAP Method	iqn.2017–18.com.chl 0 [0] [Mutual] [None]	Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit
Ta Target IQN Boot LUN Boot Initiator Port CHAP Policy CHAP Method Initiator CHAP Username	iqn.2017–18.com.chl 0 [0] [Mutual] [None]	Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Ta Taget IQN Boot LUN Boot Initiator Port CHAP Policy CHAP Method Initiator CHAP Username Initiator CHAP Password	iqn.2017–18.com.chl 0 [0] [Mutual] [None]	Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Ta Taget IQN Boot LUN Boot Initiator Port CHAP Policy CHAP Method Initiator CHAP Username Initiator CHAP Password Target CHAP Username Target CHAP Password	iqn.2017–18.com.chl 0 [0] [Mutual] [None]	Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit

xvi. Select **Discover Target** and press [Enter] to discover iSCSI targets connected to the switch. Wait till all reachable targets are discovered.

Ping IPV4 Address Discover Ping IP 0 Port1 0 Vlan ID 0 IP Version [IPv4] Enable DHCP [Enabled] Target Parameters 0 Boot Target via DHCP [Disabled] IP Version [IPv4] Target IP Address 102.80.80.186 Target Port 3260 Target IQN iqn.2017-18.com.chl Boot LUN 0 Boot Initiator Port [0] CHAP Policy [Mutual] CHAP Nethod [None] Target CHAP Username [Sopt LAP Password] Target CHAP Password [Sopt LAP Password] Discover Target V	
Port1 0 Vlan ID 0 IP Version [IPv4] Enable DHCP [Enabled] Target Parameters 0 Boot Target via DHCP [Disabled] IP Version [IPv4] Target IP Address 102.80.80.186 Target IP Address 102.80.80.186 Target IQN ign.2017-18.com.chl Boot LUN 0 Boot LUN 0 Boot Initiator Port [0] CHAP Policy [Mutual] CHAP Method [None] Target CHAP Dessword [Souther Possword] Target CHAP Password Version Discover Target V	r iSCSI Target(s)this ∋ 30 seconds
Vian ID0IP Version[IPv4]Enable DHCP[Enabled]Target ParametersBoot Target via DHCP[Disabled]IP Version[IPv4]Target IP Address102.80.80.186Target IP Address102.80.60.186Target IQNiqn.2017-18.com.chlBoot LUN0Boot Initiator Port[0]CHAP Policy[Mutual]CHAP Method[None]Initiator CHAP Username[None]Target CHAP Password-Discover Target-	
IP Version [IPv4] Enable DHCP [Enabled] Target Parameters Boot Target via DHCP [Disabled] IP Version [IPv4] Target IP Address 102.80.80.186 Target IP Address 102.80.80.186 Target IQN ign.2017-18.com.chl Boot LUN 0 Boot Initiator Port [0] CHAP Policy [Mutual] CHAP Method [None] F1: Gene F2: Prev Initiator CHAP Username [None] Target CHAP Password F4: Save ESC: EX. Discover Target	
Enable DHCP[Enabled]Target ParametersBoot Target via DHCP[Disabled]IP Version[IPv4]Target IP Address102.80.60.186Target Port3260Target IQNign.2017-18.com.chlBoot LUN0Boot Initiator Port[0]CHAP Policy[Mutual]Initiator CHAP Username[None]Target CHAP PasswordF4: SaveTarget CHAP PasswordVernameTarget CHAP PasswordVername </td <td></td>	
Target ParametersBoot Target via DHCP[Disabled]IP Version[IPv4]Target IP Address102.80.80.186Target Port3260Target IQNign.2017-18.com.chlBoot LUN0Boot Initiator Port[0]CHAP Policy[Mutual]CHAP Method[None]Initiator CHAP Vsername[None]Target CHAP VsernameF4: SaveTarget CHAP PasswordJiscover TargetDiscover TargetImage CHAP Password	
Boot Target via DHCP[Disabled]IP Version[IPv4]Target IP Address102.80.80.186Target Port3260Target IQNign.2017-18.com.chlBoot LUN0Boot Initiator Port[0]CHAP Policy[Mutual]CHAP Method[None]Initiator CHAP Username[None]Target CHAP PasswordF4: SaveTarget CHAP PasswordJoscover TargetOiscover TargetI	
IP Version[IPv4]Target IP Address102.80.80.186Target Port3260Target IQNign.2017-18.com.ch1Boot LUN0Boot Initiator Port[0]CHAP Policy[Mutual]CHAP Method[None]Initiator CHAP UsernameF1: GendTarget CHAP PasswordF4: SaveTarget CHAP PasswordF4: SaveDiscover TargetV	
Target IP Address102.80.80.186Target Port3260Target IQNiqn.2017-18.com.chlBoot LUN0Boot Initiator Port[0]CHAP Policy[Mutual]CHAP Method[None]Initiator CHAP Username[None]Target CHAP VernameTarget CHAP PasswordTarget CHAP PasswordVernameTarget CHAP PasswordVernameDiscover TargetVername	
Target Port3260Target IQNiqn.2017-18.com.chlBoot LUN0Boot Initiator Port[0]CHAP Policy[Mutual]CHAP Method[None]Initiator CHAP Username[None]Initiator CHAP UsernameTarget CHAP PasswordTarget CHAP Password[Science]Discover TargetImage Chap Password	
Target IQNiqn.2017-18.com.chlBoot LUN0Boot Initiator Port[0]CHAP Policy[Mutual]CHAP Method[None]Initiator CHAP UsernameF3: Opt.Initiator CHAP UsernameF4: SaveTarget CHAP UsernameESC: Ex.Target CHAP PasswordInitiatorDiscover TargetImage	
Boot LUN 0 Boot Initiator Port [0] CHAP Policy [Mutual] CHAP Method [None] F1: Gene F2: Prev Initiator CHAP Username F3: Opt. Initiator CHAP Password F4: Save Target CHAP Username ESC: Ex. Target CHAP Password F4: Save Discover Target T	act Screen
Boot Initiator Port[0]Enter: 1CHAP Policy[Mutual]F1: GendCHAP Method[None]F2: PrevInitiator CHAP UsernameF3: Opt.Initiator CHAP PasswordF4: SaveTarget CHAP UsernameESC: EX.Target CHAP PasswordF3: Opt.Discover TargetImage	ect Item
CHAP Policy [Mutual] CHAP Method [None] Discover Target [None]	Select
CHAP Policy [Mutual] F1: Gen CHAP Method [None] F2: Pre Initiator CHAP Username F3: Opt F4: Save Target CHAP Username Target CHAP Password ESC: Ex. Oiscover Target Image: Chap Password Image: Chap Password	ange Opt.
CHAP Method [None] F2: Prei Initiator CHAP Username F3: Opt Initiator CHAP Password F4: Save Target CHAP Username ESC: Ex. Target CHAP Password F3: Opt Discover Target T	eral Help
Initiator CHAP Username Initiator CHAP Password Target CHAP Username Target CHAP Password Discover Target	vious Values
Initiator CHAP Password Target CHAP Username Target CHAP Password Discover Target Target Target	imized Defaults
Target CHAP Username Target CHAP Password Discover Target	e & Exit
Target CHAP Password Discover Target	it
Discover Target	
Discover Target	

xvii. A list of available targets will be displayed. Select the target you wish to connect to and hit [Enter].



xviii.A list of LUNs configured on the selected target will be displayed. Select the LUN you wish to connect to and hit [Enter].

LUN List iSCSI			
▶ LUN 0001: 0000000000000000	LIO-ORG	60.0000 GB	

xix. Select Save Changes and press [Enter]

Chelsio Unified BOOT Con	figurationUtility	- ISCSI	
▶ Save Changes		Save Changes	
Load ISCSI defaults.			
▶ Delete Boot Device			
Function Parameters			
Bios	[Enabled]		
Discovery Timeout	30		
Discovery Retry Count	0		
1st Port for Boot retry	[0]		
2nd Port for Boot retry	[1]		

- xx. Reboot the system for changes to take effect.
- xxi. The discovered LUN should appear in the Boot Configuration/ Boot Information section

and system BIOS.



- xxii. Select the LUN as the first boot device and exit from BIOS.
- xxiii. Either boot from the LUN or install the required OS.

8.2.2. drvcfg

This section describes the method to configure and use Chelsio uEFI iSCSI interfaces using drvcfg.

- i. Boot the system into EFI shell.
- ii. Run the following command to launch the configuration utility.



iii. Choose the Chelsio adapter on which needs to be configured.



iv. Highlight Enter config utility and press [Enter].



v. Further configuration steps are similar from step (iv) of Legacy iSCSI Boot section.

II. PXE-WDS Driver For Windows

1. Introduction

This section describes the use and configuration of Chelsio's PXE-WDS driver package for Chelsio's adapters. The driver package consists of drivers needed to install Windows operating system on iSCSI or FCoE LUN using WDS server for Chelsio adapters.

Windows Deployment Services can be used to add driver packages to boot image on the server and configure them to be deployed to client computers along with the install image. This can be used to PXE boot to the supported operating systems.

Chelsio is providing Network driver to be used during the PXE installation process from WDS server.

1.1. Hardware Requirements

1.1.1. Supported Adapters

The following are the Chelsio adapters that are supported:

- T62100-CR
- T62100-LP-CR
- T62100-SO-CR*
- T6425-CR
- T6225-CR
- T6225-LL-CR
- T6225-SO-CR*
- T580-CR
- T580-LP-CR
- T580-SO-CR*
- T540-CR
- T540-LP-CR
- T520-CR
- T520-LL-CR
- T520-SO-CR*
- T520-BT
- T540-BT
- * Only PXE supported

1.2. Software Requirements

1.2.1. Windows Requirements

The Chelsio PXE-WDS driver package has been developed to run on Windows platform. Currently the driver is WHQL certified and available for following versions:

- Server 2022
- Server 2019
- 11 Client
- 10 Client

Other versions have not been tested and are not guaranteed to work.

(i) Note Boot image from above mentioned operating systems is supported. You can find the image (boot.wim) in \Sources folder in the installation CD/DVD.

2. PXE- WDS driver configuration

You can use Windows Deployment Services to add driver packages (such as network adapter drivers, mass storage drivers, and bus drivers) to Windows boot images. This means that you do not have to export the image, use the tools in the Windows Automated Installation Kit to add driver packages manually- and then add the updated boot image.

2.1. Windows Deployment Services

Please refer to Microsoft documentation to setup WDS server. Additional information is available in the Windows Deployment Services Getting Started Guide.

2.2. Adding Driver Packages to WDS Server

First add VBD, followed by NDIS and then iSCSI/FCoE drivers. For more information, see Managing and Deploying Driver Packages.

Before proceeding, download *Chelsio-Uboot-x.x.x.x.zip* from Chelsio Download Center, and unzip the contents of the package to a desired location.

2.2.1. Adding VBD

i. Open the **Windows Deployment Services** MMC snap-in. Expand the **Servers** node and the node for your Windows Deployment Services server. Right-click the **Drivers** node and select **Add Driver Package**.

*	Windows Deployment Services	_ D X
File Action View Help		
🗢 🏟 🙇 📰 🔒 📱 🖬		
 Windows Deployment Services Servers WHQL1 Install Images Boot Images Pending Devices Prestaged Devices Multicast Transmissions Drivers Active Diri Add Driver Package View Export List Help 	Drivers 1 Driver Group(s) Driver Group Name All Packages DriverGroup1 e ver Packages ages	
Add Driver &Package		

ii. Select the Select driver package from an .inf file option and click Browse.

\$	Add Driver Package Wizard
Driv	ver Package Location
	This wizard adds driver packages to your server. Once the packages are on your server, you can define which client computers will install them using driver groups and you can add them to boot images.
	Enter the location of the driver package you want to add. The package must be extracted. It cannot be an .msi or .exe file.
	 Select driver packages from an .inf file
	○ Select all driver packages from a folder
	Location: Browse More about obtaining and extracting driver packages
	< Back Next > Cancel

- iii. Locate the VBD driver (*chvbdx64.inf*) from below location and click **Open**.
- Chelsio-Uboot-x.x.x.X/WindowsDrivers/win19 for Server 2022, 2019 and 11 Client.
- Chelsio-Uboot-x.x.x.X\WindowsDrivers\win10 for Server 2016 and 10 Client.

Ope	en		x
letworkDriver 🕨 amd64	∀ Ċ Se	earch amd64	Q,
,		•== •	
Name		Date modified	Туре
🗿 chnetx64		7/1/2013 12:57 PM	Setup Info
🛍 chnulx64		7/1/2013 12:57 PM	Setup Info
Chvbdx64		7/1/2013 12:57 PM	Setup Info
< name: chvbdx64	III • P	Packages (*.inf) Open I▼ Ca	> v ncel
	Ope letworkDriver amd64 Name Chnetx64 Chulx64 Chvbdx64 <	Open letworkDriver ▶ amd64 ℃ Sa Name ② chnetx64 ③ chvbdx64 ③ chvbdx64 ▲ III name: chvbdx64 ♥ [Open letworkDriver > amd64 Mame Date modified Name Date modified Chnetx64 7/1/2013 12:57 PM Chvbdx64 7/1/2013 12:57 PM Chvbdx64 7/1/2013 12:57 PM Chvbdx64 7/1/2013 12:57 PM Chvbdx64 7/1/2013 12:57 PM

iv. Please ensure that the checkbox for *chvbdx64[x64]* is selected and click **Next**.

\$	Add Driver Package Wizard					
4	vailable	e Driver Packages				6
	The lepacka To vie Pack	ocation that you specifier ages that you want to ad ew or edit information ab age Details	d contains the following Id to the server. out a package, double	g driver package -click it.	s. Select the	
	-	Package Name	File Name	Architecture	Enabled]
		chvbdx64 [x64]	chvbdx64.inf	x64	Yes	
	< III >					
	Packa	ages found: 1				
			< Ba	ck Next :	> Ca	ncel

v. To add the selected VBD driver, click **Next** or to change click **Back**.

4	Add Driver Package Wizard					
Summary						
You have selected the following driver packages. To view more information about a package, double-click it.						
	Package Details Package Name	File Name	Architecture	Enabled	Class	
	chvbdx64 [x64]	chvbdx64.inf	x64	Yes	System	
	<	Ш			>	
To change your selection, click Back. To add the selected packages to the server, click Next.						
< Back Next > Cancel						
vi. The selected driver will now be added to the server. After the task is complete, click **Next**.

\$	Add Driver Package Wizard	x
Та	ask Progress	
	Adding driver package 1 of 1	
	Current Driver Package Progress	_
	The selected driver packages were successfully added to the server. To add these drivers to a driver group, which makes them available to clients, click Next.	
	< Back Next > C	Cancel

- vii. When asked which driver group to add the packages to, select *Select an existing driver group*, and ensure that *DriverGroup1* is selected. This driver group (by default) is configured as follows:
 - a) It has no filters so all clients will have access to the packages in this group, and
 - b) Only packages that match the client's hardware will be installed.

\$	Add Driver Package Wizard
Dı	iver Groups
	A driver group is a collection of driver packages that are available to a select group of clients. In order to deploy these packages to clients, you must add them to a driver group. A package can be in many driver groups, but it must be in at least one group in order to be available to clients. Enter the driver group for the packages you have added: Select an existing driver group: DriverGroup1 Create a new driver group named: Do not put the driver packages in a driver group at this time
	< Back Next > Cancel

viii. On the last page of the wizard, make sure that the check box for *Modify the filters for the group now* is unselected, and click **Finish**.

¥	Add Driver Package Wizard
	Task Complete!
	You have successfully added the selected driver packages to the server. If you added these packages to a driver group, you can modify the filters that determine which clients get the drivers. To do this, select the following check box. To do this later, right-click the driver group in the MMC snap-in and click Modify Filters for this Group. Modify the filters for this group now. If you did not add these packages to a group, then you must add them to a group in order for them to be available to clients. To do this, do one of the following: > Right-click a group and click Add Drivers to this Group > Right-click a driver package and click Add or Remove from Groups
	< Back Finish Cancel

2.2.2. Adding NDIS (chnetx64.inf)

The procedure for adding NDIS driver to the WDS server is similar to VBD as explained in the previous section. In step (iii), locate and use the file *chnetx64.inf* and in step (iv), ensure that only *chnetx64*[*x64*] is selected.

2.2.3. Adding iSCSI (cht4iscsi.inf)

In case of installing Windows OS on an iSCSI LUN, the iSCSI Storport Miniport driver needs to be added to the WDS server. The procedure is similar to adding VBD. In step (iii), locate and use the file *cht4iscsi.inf* and in step (iv), ensure that only *cht4iscsi[x64]* is selected.

2.2.4. Adding FCoE (csiofcoe.inf)

In case of installing Windows OS on an FCoE LUN, the FCoE Storport Miniport driver needs to be added to the WDS server. The procedure is similar to adding VBD. In step (iii), locate and use the file *csiofcoe.inf* and in step (iv), ensure that only *csiofcoe[x64]* is selected.

2.3. Adding Driver Packages to Boot Images

Please ensure that the VBD, NDIS and iSCSI/FCoE drivers are added to the WDS server before proceeding (See Adding Driver Packages to WDS Server). Also, add VBD first followed by NDIS and iSCSI/FCoE drivers to the boot image. For more information, see Managing and Deploying Driver Packages.

2.3.1. Adding VBD driver

- i. Open the **Windows Deployment Services** MMC snap-in. Expand the **Servers** node and then **Boot Images** node.
- ii. Right-click on the boot image that you want to add the driver to, and select **Add Driver Packages to Image**.



iii. If required, back up the boot image by following the instruction on the screen or click **Next** to continue.



iv. Click **Search for Packages**. Then in the **Search results** section, select the checkbox for *chvbdx64[x64]* only and click **Next**.

		A	dd Driver Packages	to Boot Im	age Wizard		2
elect Dr	iver Packages						-
Search Seard will ap	h for the driver p pear in the result	ackages that you v	vant by adding one or more	search attribu	ites. Only packages	that match all of the attributes	;
Attri	bute Type	Operator	Values			Add	
Pack	age Architect	Equal to	"x64"			Georg	_
Pade	age Class	Equal to	"Net", "System", "Diski	vive","hdc","S	CSIAdapter*	Edit	
						Remove	
Search r	esults						
Search n Clear	esults the check box for	r packages that yo	u do not want to add, and i	hen dick Next			
Search r Clear	esults the check box for Package Name	r packages that yo File Nar	u do not want to add, and in a do not want to add, and in a do not want to add, and in a do not want to add a d	then click Next Enabled	Class		
Search ro Clear	esults the check box for Package Name chnetx64 [x64] chvbdx64 [x64]	File Nar chnetxt chvbdx	u do not want to add, and i ne Architecture 54.inf x64 64.inf x64	Enabled Yes Yes	Class Net System		

v. To add the selected VBD driver, click **Next** or to change click **Back**.

4		Add	Driver Packa	ges to Boo	t Image Wizard			1. X .,
Se	lected Driver Package	5						
	You have selected the fr Back. To add the selecte	ollowing driver package d driver packages to t	es to add to this l he image, click N	boot image. En: ext.	sure that this is corre	ct. To change	these packages	, dick
	The selected packages v	vil be added to: Micro	isoft Windows Se	tup (x64)				
	Package Name	File Name	Architecture	Enabled	Class			
					-,			
						10-4		
					_	< <u>B</u> ack	Next >	Cancel

vi. The VBD driver will now be added to the boot image.

塔	Add Driver Packages to Boot Image Wizard	X
Task Progress		
Adding drivers		
Overall Progress		
Saving changes to the mounted image		
	< <u>B</u> ad	< Next > Cancel

vii. Once the task is completed, click **Finish** to close the wizard.

<u>é</u>		Add	Driver Packa	ges to Boo	t Image Wi	zard		x
Operati	on Complete							
You h	nave successfully a	dded the following driv	ers to this boot ir	nage:				
Pac	kage Name	File Name	Architecture	Enabled	Class			
chv	bdx64 [x64]	chvbdx64.inf	х64	Yes	System			
						< <u>B</u> ack	Finish	Cancel

2.3.2. Adding NDIS driver (chnetx64.inf) to Windows boot image

The procedure for adding NDIS driver to Windows boot image is similar to VBD as explained in the previous section. In step (iv), select the checkbox for *chnetx64[x64]* only and click **Next**.

2.3.3. Adding iSCSI driver (cht4iscsi.inf) to Windows boot image

In case of installing Windows OS on an iSCSI LUN, the iSCSI Storport Miniport driver needs to be added to Windows Boot Image. The procedure is similar to VBD. In step (iv), select the checkbox for *cht4iscsi[x64]* only and click **Next**.

2.3.4. Adding FCoE driver (csiofcoe.inf) to Windows boot image

In case of installing Windows OS on an FCoE LUN, the FCoE Storport Miniport driver needs to be added to Windows Boot Image. The procedure is similar to VBD. In step (iv), select the checkbox for *csiofcoe[x64]* only and click **Next**.



If the image you are updating is currently being downloaded to a client when you perform this procedure, Windows Deployment Services will ensure that the client receives a consistent copy of the file.

3. OS Installation

This is the recommended method for installing Windows OS on iSCSI or FCoE LUN using Chelsio PXE boot. Please ensure that the necessary driver packages have been added to Windows boot image (*boot.wim*) as mentioned in the previous section before proceeding.



3.1.1. Using PXE-WDS Server

i. Reboot the machine. In the boot menu, choose the port which was used to connect to the Target LUN during iSCSI boot.

Please select boot device:
PO: ST500DM002-1BD142 UEFI: IP4 Chelsio T5 PXE T520-LL UEFI: IP4 Chelsio T5 PXE T520-LL UEFI: Built-in EFI Shell UEFI: IP4 Intel(R) I350 Gigabit Network Connection UEFI: IP4 Intel(R) I350 Gigabit Network Connection Enter Setup
↑ and ↓ to move selection ENTER to select boot device ESC to boot using defaults

ii. On successful connection, Windows boot image will load from the PXE-WDS server.



iii. Next, the Windows Setup window will appear. Select the System Locale (language) and Keyboard/input method. Click **Next**.

🔏 Windows Setup	×
Windows Deployment Services	
Locale: English (United States)	
© 2013 Microsoft Corporation. All rights reserved.	Next

- iv. Enter server credentials and click OK.
- v. Select the operating system to be installed and click **Next**.

Windows Server 2012 SERVERSTANDARD en-US x64 7/4/2013 Windows Server 2012 SERVERSTANDARD en-US x64 7/4/2013 Windows Server 2012 SERVERDATACENT en-US x64 7/4/2013 Windows Server 2012 SERVERDATACENT en-US x64 7/4/2013 Windows Server 2012 SERVERDATACENT en-US x64 5/31/2013 Windows Server 2008 R2 SERVERENTERPR en-US x64 5/31/2013 Windows Server 2008 R2 SERVERDATACE en-US x64 5/31/2013 Windows Server 2008 R2 SERVERDATACE en-US x64 5/31/2013 Windows Server 2008 R2 SERVERSTANDA en-US x64 5/31/2013 Windows Server 2008 R2 SERVERSTANDA en-US x64 5/31/2013 Windows Server 2008 R2 SERVERSTANDA en-US x64 5/31/2013 Windows 8 en-US x64 5/31/2013 v escription: indows Server 2012 SERVERSTANDARDCORE RTM 5/31/2013 v	operating system	Language	Architecture	Date modified	
Windows Server 2012 SERVERSTANDARD en-US x64 7/4/2013 Windows Server 2012 SERVERDATACENT en-US x64 7/4/2013 Windows Server 2012 SERVERDATACENT en-US x64 7/4/2013 Windows Server 2008 R2 SERVERDATACENT en-US x64 5/31/2013 Windows Server 2008 R2 SERVERDATACE en-US x64 5/31/2013 Windows Server 2008 R2 SERVERDATACE en-US x64 5/31/2013 Windows Server 2008 R2 SERVERSTANDA en-US x64 5/31/2013 Windows Server 2008 R2 SERVERSTANDA en-US x64 5/31/2013 Windows Server 2012 SERVERSTANDARDCORE RTM x64 5/31/2013	Windows Server 2012 SERVERSTANDARD	en-US	x64	7/4/2013	
Windows Server 2012 SERVERDATACENTen-USx647/4/2013Windows Server 2012 SERVERDATACENTen-USx647/4/2013Windows Server 2008 R2 SERVERDATACEen-USx645/31/2013Windows Server 2008 R2 SERVERDATACEen-USx645/31/2013Windows Server 2008 R2 SERVERSTANDAen-USx645/31/2013Windows Server 2008 R2 SERVERSTANDAen-USx645/31/2013Windows Server 2008 R2 SERVERSTANDAen-USx645/24/2013Windows Server 2012 SERVERSTANDARDCORE RTMvvv	Windows Server 2012 SERVERSTANDARD	en-US	хб4	7/4/2013	
Windows Server 2012 SERVERDATACENT en-US x64 7/4/2013 Windows Server 2008 R2 SERVERENTERPR en-US x64 5/31/2013 Windows Server 2008 R2 SERVERDATACE en-US x64 5/31/2013 Windows Server 2008 R2 SERVERDATACE en-US x64 5/31/2013 Windows Server 2008 R2 SERVERSTANDA en-US x64 5/31/2013 Windows 7 PROFESSIONAL 64 bit en-US x64 5/24/2013 Windows 8 en-US x64 5/31/2013 v escription: indows Server 2012 SERVERSTANDARDCORE RTM indows <	Windows Server 2012 SERVERDATACENT	en-US	хб4	7/4/2013	
Windows Server 2008 R2 SERVERENTERPR en-US x64 5/31/2013 Windows Server 2008 R2 SERVERDATACE en-US x64 5/31/2013 Windows Server 2008 R2 SERVERSTANDA en-US x64 5/31/2013 Windows 7 PROFESSIONAL 64 bit en-US x64 5/24/2013 Windows 8 en-US x64 5/31/2013	Windows Server 2012 SERVERDATACENT	en-US	хб4	7/4/2013	
Windows Server 2008 R2 SERVERDATACE en-US x64 5/31/2013 Windows Server 2008 R2 SERVERSTANDA en-US x64 5/31/2013 Windows 7 PROFESSIONAL 64 bit en-US x64 5/24/2013 Windows 8 en-US x64 5/31/2013	Windows Server 2008 R2 SERVERENTERPR	en-US	x64	5/31/2013	
Windows Server 2008 R2 SERVERSTANDA en-US x64 5/31/2013 Windows 7 PROFESSIONAL 64 bit en-US x64 5/24/2013 Windows 8 en-US x64 5/31/2013 v escription: /indows Server 2012 SERVERSTANDARDCORE RTM	Windows Server 2008 R2 SERVERDATACE	en-US	x64	5/31/2013	
Windows / PROFESSIONAL 64 bit en-US x64 5/24/2013 Windows 8 en-US x64 5/31/2013 v escription: /indows Server 2012 SERVERSTANDARDCORE RTM	Windows Server 2008 K2 SERVERSTANDA	en-US	x64	5/31/2013	
escription: findows Server 2012 SERVERSTANDARDCORE RTM	Windows / PKUFESSIONAL 64 bit	en-US	X04	5/24/2013	
	escription: Vindows Server 2012 SERVERSTANDARDCO	RE RTM			

- vi. Select the Target LUN discovered using iSCSI or FCoE Initiator and click **Next**.
 - Chelsio iSCSI Initiator will be used if CBFT is configured in Option ROM.
 - MS iSCSI Initiator will be used if IBFT is configured in Option ROM.

-		Total size	Free space	Туре
🕜 Driv	e 0 Unallocated Space	60.0 GB	60.0 GB	
Refresh			Drive opti	ons (advanced)

vii. Proceed with installation as usual.

4. Windows Update on iSCSI/FCoE LUN

The Chelsio Boot Drivers added to the WDS Server and the Boot Images in the above steps cannot be updated using *Windows Update*. Instead, they should be downloaded and updated to the latest version available from Chelsio Microsoft Download Center <u>before</u> running any Windows Update operation on the OS installed in iSCSI/FCoE LUN.

Important

Using Windows Update without updating to the latest available Chelsio Boot drivers will render your system unusable.

- a) Download the latest **Chelsio Unified Boot Option ROM and Flash Utility** package from the Chelsio Microsoft Download Center.
- b) If the Unified Boot package has Windows drivers with version higher than the ones installed, please update the driver components strictly in the below order. The driver files should be manually picked from:

Chelsio-Uboot-x.x.x.x\WindowsDrivers\win19 for Server 2022, 2019 and 11 Client. *Chelsio-Uboot-x.x.x.x\WindowsDrivers\win10* for Server 2016 and 10 Client.

• Virtual Bus Driver

- Open Device Manager (Control Panel -> System & Security-> System -> Device Manager), click on System Devices, right click on Chelsio Bus Enumerator and select Update Driver Software.
- ii. Select Browse my computer for driver software.
- iii. Select Let me pick from a list of device drivers on my computer and click Next.
- iv. Click on **Have Disk** Button and on the next screen browse for **chvbdx64.inf** file and click **Open** and then **OK**.
- v. Click **Next** and driver installation will progress. Click **Close** once the installation is complete.

• NDIS Miniport driver

- Open Device Manager (Control Panel -> System & Security-> System -> Device Manager), click on Network Adapters, right click on the Chelsio network adapter and select Update Driver Software.
- ii. Select Browse my computer for driver software.
- iii. Select Let me pick from a list of device drivers on my computer.
- iv. Click on **Have Disk** Button and on the next screen browse for **chnetx64.inf** and click **Open** and then **OK**.
- v. Click **Next** and driver installation will progress. Click **Close** once the installation is complete.

Repeat the above steps for the other adapters.

• iSCSI Storport Miniport driver (iSCSI Boot)

- Open Device Manager (Control Panel -> System & Security-> System -> Device Manager), click on System Devices, right click on the Chelsio Bus Enumerator and select Properties.
- ii. Under Advanced tab, select iSCSI Instances and set the Value to default. Click OK.
- iii. Under Other Devices, select Chelsio iScsi Function on Port#00, right-click and select Update Driver Software.
- iv. Select Browse my computer for driver software.
- v. Select Let me pick from a list of device drivers on my computer and click Next.
- vi. Click on **Have Disk** Button and on the next screen, browse for **cht4iscsi.inf** file and click **Open** and then **OK**.
- vii. Click **Next** and driver installation will progress. Click **Close** once the installation is complete.

Repeat the same procedure for other ports.

• FCoE Storport Miniport driver (FCoE Boot)

i. Open Device Manager (Control Panel -> System & Security-> System -> Device Manager), click on System Devices, right click on Chelsio Generic function with *function 6* and select Properties. In case the adapter is not listed, it may appear as Fibre Channel Controller under Other devices.

helsio T	6225-CF	₹25G Ge	neric fun	ction Prop	erties	×
General	Driver	Details	Events	Resources	3	
	Chelsic) T6225-C	R 25G G	eneric funct	ion	
	Device	e type:	Syster	m devices		
	Manufa	acturer:	Chelsi	o		
	Locatio	on:	PCI b	us 8, device	0, function 6	;
						*
						*

- ii. Under Driver tab, select Update Driver...
- iii. Select Browse my computer for driver software.
- iv. Select Let me pick from a list of device drivers on my computer and click Next.
- v. Click on **Have Disk** Button and on the next screen, browse for **csiofcoe.inf** file in the zip package. Click **Open** and then **OK**.
- vi. Click **Next** and driver installation will progress. Click **Close** once the installation is complete.

Generic Function

- Open Device Manager (Control Panel -> System & Security-> System -> Device Manager), click on System Devices, right click on Chelsio Generic Function and select Update Driver Software.
- ii. Select Browse my computer for driver software.
- iii. Select Let me pick from a list of device drivers on my computer.
- iv. Click on **Have Disk** Button and on the next screen browse for **chnulx64.inf** file and click **Open** and then **OK**.
- v. Click **Next** and driver installation will progress. Click **Close** once the installation is complete.
- c) Once the Chelsio drivers are updated, *Windows Update* can be run to update the other software and hardware in the system.
- d) It is also advisable to update the Boot drivers in the WDS Server and Boot images for future OS installations using the detailed steps in Adding Driver Packages to WDS Server and Adding Driver Packages to Boot Images sections.

III. ESXi

1. Introduction

The following section describes the procedure to PXE boot ESXi OS using Chelsio adapters.

1.1. Hardware Requirements

1.1.1. Supported Adapters

The following are the Chelsio adapters that are supported:

- T62100-CR
- T62100-LP-CR
- T62100-SO-CR*
- T6425-CR
- T6225-CR
- T6225-LL-CR
- T6225-SO-CR*
- T580-CR
- T580-LP-CR
- T580-SO-CR*
- T540-CR
- T540-LP-CR
- T520-CR
- T520-LL-CR
- T520-SO-CR*
- T520-BT
- T540-BT

* Only PXE supported

1.2. Software Requirements

1.2.1. ESXi Requirements

The Chelsio Native Network driver has been developed to run on ESXi platforms. Currently the driver is available for the following versions:

• ESXi 7.0

1 Note Other versions have not been tested and are not guaranteed to work.

1.3. Pre-requisites

Secure Boot should be disabled in the system BIOS.

2. Customized ISO

2.1. Adding Chelsio Drivers

Follow the below steps to add Chelsio driver component to ESXi installation ISO image.

Requirements

- Install Windows 2012 R2 on the system used to create the ISO image.
- Download and install the latest vCenter Server and PowerCLI from VMware website.
- Download the required ESXi standard software depot from VMware website.
- i. If you haven't done already, download *Chelsio-Uboot-x.x.x.x.zip* from Chelsio Download Center.
- ii. Extract the package. The Chelsio driver component will be in Chelsio-Uboot-x.x.x.x ESXiDrivers
- iii. Copy Chelsio driver component and the ESXi software depot to a desired location.
- iv. Launch PowerCLI and add both the ESXi depot and driver component as software depots.

PowerCLI C:\> Add-EsxSoftwareDepot -DepotUrl <esxi_dev_depot>.zip, <driver component>.zip

PowerCLI C:\> Add-EsxSoftwareDepot -DepotUrl .\UMware-ESXi-7.0.0-15843807-dev-depot.zip,.\ UMW-esx-7.0.0-Chelsio-Drivers-5.3.0.23-10EM.700.1.0.15843807.zip Depot Upl

Depot Url

zip:C:\UMware-ESXi-7.0.0-15843807-dev-depot.zip?index.xml zip:C:\UMW-esx-7.0.0-Chelsio-Drivers-5.3.0.23-10EM.700.1.0.15843807.zip?index.xml

v. Verify that the drivers are now available as software packages.

PowerCLI C:\> Get-EsxSoftwarePackage | findstr /I Chelsio

 PowerCLI
 C:\> Get-EsxSoftwarePackage
 findstr
 /I
 Chelsio

 cheiwarp
 5.3.0.23-10EM.700.1.0.15843807
 6/22/2020
 4:5...

 cxl
 5.3.0.23-10EM.700.1.0.15843807
 6/22/2020
 4:5...

 cheiscsi
 5.3.0.23-10EM.700.1.0.15843807
 Chelsio
 6/22/2020
 4:5...

vi. List all the image profiles available and note the name of ESXi image.

PowerCLI C:\> Get-EsxImageProfile|select Name

PowerCLI C:\> Get-EsxImageProfile¦select Name Name ----ESXi-7.0.0-15843807-standard-with-test-certs ESXi-7.0.0-15843807-rollback-testing-plugin-crash ESXi-7.0.0-15843807-dev ESXi-7.0.0-15843807-dev-no-tools

vii. By default, the ESXi image is read-only. Hence, using the profile name obtained in the previous step, clone the image.

PowerCLI C:\> New-EsxImageProfile -CloneProfile "<image_profile_name>" -name
"<new_profile_name>" -Vendor "<vendor_name>"



viii. Add the Chelsio drivers to the new image profile, specifying the package names obtained in step (v).

PowerCLI C:\> Add-EsxSoftwarePackage -ImageProfile "<new_profile_name>" SoftwarePackage <driver1>,<driver2>,<driver3>

PowerCLI C:\> Add-EsxSoftwareF cheiscsi,cheiwarp	Package -ImagePro	file "NewAsyncPr	ofile" -SoftwarePackage cxl,
Name	Vendor	Last Modified	Acceptance Level
 NewAsyncProfile	Chelsio	3/10/2020 10	PartnerSupported

ix. Finally, export the new image profile as an ISO.

```
PowerCLI C:\> Export-EsxImageProfile -ImageProfile "<new_profile_name>" -
ExportToISO -filepath <path>.iso
```

As the Chelsio drivers are unsigned currently, use the above command with *-NoSignatureCheck* option.

PowerCLI C:\> Export-EsxImageProfile -ImageProfile "NewAsyncProfile" -ExportToISO -filepat h ISO-with-drivers.iso -NoSignatureCheck PowerCLI C:\>

2.2. PXE Server Configuration

The customized ISO with Chelsio driver component can be deployed in the PXE Server.

2.3. OS Installation

The client machine can now connect to the PXE Server over Chelsio network. ESXi 7.0 image (with Chelsio driver component) will start loading on the client machine. Select the Target LUN discovered using iSCSI Initiator on the *Select a Disk* screen and proceed with the installation.

- Chelsio iSCSI Initiator, cheiscsi will be used if CBFT is configured in Option ROM.
- ESXi iSCSI Initiator will be used if IBFT is configured in Option ROM.

1 Note In case the desired target LUN is not visible, press Alt+F1 to switch to shell console and execute the below command to rescan the LUNs.

esxcfg-rescan -A

Press Alt+F2 to switch to Select a Disk screen.

IV. Appendix

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Installation and use of the driver/software implies acceptance of the terms in the Chelsio End-User License Agreement (EULA).

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