

Chelsio Unified Wire for VMware ESXi 6.7

Installation and User's Guide



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I. Chelsio Unified Wire

1. Introduction

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

The **Terminator** series of adapters is Chelsio's next generation of highly integrated, hypervirtualized 1/10/25/40/50/100GbE controllers. The adapters are built around a programmable protocol-processing engine, with full offload of a complete Unified Wire solution comprising NIC, TOE, iWARP RDMA, iSCSI, FCoE and NAT support. It scales to true 100Gb 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, Chelsio 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 datacenters, cloud service installations and highperformance computing environments, Chelsio adapters bring a new level of performance metrics and functional capabilities to the computer networking industry.

This document describes the installation, use and maintenance of Unified Wire software for VMware ESXi and its various components.

1.1. Features

The Chelsio Unified Wire package installs various drivers and utilities and consists of the following software:

- Native Network (NIC) driver with SR-IOV support
- iSCSI/iSER Offload Initiator Driver

O Note Drivers are not VMware certified.

For detailed instructions on loading, unloading and configuring the drivers/tools please refer to their respective sections.

1.2. Hardware Requirements

The Chelsio Unified Wire software supports Chelsio Terminator series of Unified Wire adapters. To know more about the list of adapters supported by each driver, please refer to their respective sections.

1.3. Software Requirements

The Chelsio Unified Wire software has been developed to run on 64-bit ESXi based platforms and therefore it is a base requirement for running the driver. To know more about the complete list of operating systems supported by each driver, please refer to their respective sections.

1.4. Package Contents

The Chelsio Unified Wire driver package consists of the following files/directories:

- **cxl-*.vib**: Native Network driver VIB file.
- cheiscsi-*.vib: iSCSI/iSER Offload Initiator driver VIB file.
- chelsio-esx-libcheiscsi-ima.so-*.vib: IMA driver file.
- **docs:** This directory contains support documents README, Release Notes and User's Guide (this document) for the software.
- EULA: Chelsio's End User License Agreement.

2. Hardware Installation

Follow these steps to install Chelsio adapter in your system:

- 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 according to 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.



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 2-ports 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 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. Verify if the adapter was installed successfully by using the Ispci command

[root@	~]# :	lspci grep	-i Chels	sio						
06:00.0	Ethernet	controller:	Chelsio	Communications	Inc	T6225-CR	Unified	Wire	Ethernet	Controller
06:00.1	Ethernet	controller:	Chelsio	Communications	Inc	T6225-CR	Unified	Wire	Ethernet	Controller
06:00.2	Ethernet	controller:	Chelsio	Communications	Inc	T6225-CR	Unified	Wire	Ethernet	Controller
06:00.3	Ethernet	controller:	Chelsio	Communications	Inc	T6225-CR	Unified	Wire	Ethernet	Controller
06:00.4	Ethernet	controller:	Chelsio	Communications	Inc	T6225-CR	Unified	Wire	Ethernet	Controller
06:00.5	SCSI sto	rage controll	ler: Chel	lsio Communicati	ions	Inc T622	5-CR Unif	fied W	Nire Stora	ige Controller
06:00.6	Fibre Cha	annel: Chelsi	io Commur	nications Inc Te	6225	-CR Unifie	ed Wire S	Stora	ge Control	ller

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

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

Once native network driver (*cxl*) is installed and loaded, examine the output of dmesg to see if the card is discovered. You should see a similar output:

Chapter I. Chelsio Unified Wire

2017-09-26T04:09:20.207Z cpu6:66032)cxl1.0: 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)cxll.0: cxl 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: cxl 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

The above outputs indicate the hardware configuration of the adapter as well as serial number.

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. Software/Driver Update

For any distribution specific problems, please check README and Release Notes included in the release for possible workaround.

Please visit Chelsio Download Center for regular updates on various software/drivers. You can also subscribe to our newsletter for the latest software updates.

II. Native Network Driver with SR-IOV Support

1. Introduction

Chelsio's Unified Wire adapters provide extensive support for NIC operation. A high performance fully offloaded and fully featured TCP/IP stack meets or exceeds software implementations in RFC compliance. Chelsio's Terminator engine provides unparalleled performance through a specialized data flow processor implementation and a host of features designed for high throughput and low latency in demanding conditions and networking environments.

1.1. Hardware Requirements

1.1.1. Supported Adapters

The following are the currently shipping Chelsio adapters that are compatible with Chelsio native network driver:

- T62100-CR
- T62100-LP-CR
- T62100-SO-CR
- T61100-OCP
- T6425-CR
- T6225-CR
- T6225-LL-CR
- T6225-SO-CR
- T580-SO-CR
- T580-LP-CR
- T580-CR
- T540-CR
- T540-LP-CR
- T540-SO-CR
- T520-SO-CR
- T520-CR
- T520-LL-CR
- T520-BT
- T540-BT

1.2. Software Requirements

1.2.1. ESXi Requirements

The Chelsio native network driver has been developed to run on following 64-bit ESXi platforms:

- Host:
 - ESXi 6.7
 - ESXi 6.7 U1

- Virtual Machine (with VFs):
 - RHEL 7.6, 3.10.0-957.el7
 - RHEL 7.5, 3.10.0-862.el7
 - RHEL 6.10, 2.6.32-754.el6
 - RHEL 6.9, 2.6.32-696.el6
 - SLES 15, 4.12.14-23-default
 - SLES 12 SP4, 4.12.14-94.41-default
 - Ubuntu 18.04.1, 4.15.0-29-generic
 - Ubuntu 16.04.5, 4.4.0-131-generic
 - Kernel.org linux-4.9 (minimum 4.9 kernel version supported is 4.9.13)
 - Kernel.org linux-4.14.105
 - Kernel.org linux-4.19.27

Windows Guest is not supported with SR-IOV.

1.2.2. SR-IOV Requirements

- SR-IOV should be enabled in the BIOS.
- Intel Virtualization Technology for Directed I/O (VT-d) should be enabled in the BIOS.
- PCI Express Slot should be ARI capable.

2. Software/Driver Installation

- i. Download the driver package from Chelsio Download Center.
- ii. Unzip the driver package:

```
[root@host:~] unzip <driver_package>.zip
```

iii. Put the host in maintenance mode using the vSphere (desktop or web) Client.



iv. Install the Native Network driver (cxl):

```
[root@host:~] cp cxl-*.vib /productLocker/
[root@host:~] cp cxl-*.vib /var/log/vmware/
[root@host:~] esxcli software vib install -v /productLocker/cxl-*.vib --no-
sig-check
```

10 Note If there is an older version of the driver installed, use update instead of install.

```
[root@host:~] esxcli software vib update -v /productLocker/cxl-*.vib
--no-sig-check
```

v. After installation/update completes successfully, exit from maintenance mode and reboot the host.

3. Software/Driver Loading

After rebooting the ESXi Host, the driver will load automatically. However, it is possible to manually load the driver by using the command below:

```
[root@host:~] vmkload_mod cxl
```

Execute the below command so that device manager performs a rescan:

[root@host:~] kill -SIGHUP \$(cat /var/run/vmware/vmkdevmgr.pid)

4. Software/Driver Configuration and Fine-tuning

4.1. cxgbtool

The *cxgbtool* command queries or sets various aspects of Chelsio network interface cards. It complements standard tools used to configure network settings and provides functionality not available through such tools. Some of the commands provided can be used to query running statistics to aid in debugging. The tool will be installed by default on installing the driver VIB.

Syntax & Usage

To use cxgbtool, use the syntax:

[root@host:~] /opt/chelsio/bin/cxgbtool <options>



For information on available parameters and their usage, refer to cxgbtool help by running the /opt/chelsio/bin/cxgbtool -h command.

4.2. Adapter Configuration

The adapter's configuration should be updated for optimal performance in ESXi environment. Follow the steps mentioned below:

i. Run the following *cxgbtool* command:

[root@host:~] /opt/chelsio/bin/cxgbtool -c esxcfg -set

i Not supported on T6 adapters.

ii. Reboot the system for changes to take effect.

4.3. Firmware Update

The driver will auto-load the firmware if an update is required. The version can be verified using:

```
[root@host:~] /opt/chelsio/bin/cxgbtool -c version
```

4.4. Connecting a Virtual Machine

Follow the steps mentioned below to connect Chelsio adapter to a virtual machine:

i. Create a new virtual switch:

```
[root@host:~] esxcfg-vswitch -a vSwitchN
```

ii. Link a Chelsio adapter to the newly created virtual switch:

```
[root@host:~] esxcfg-vswitch -L vmnicN vSwitchN
```

iii. Create a new port group on the vSwitch:

```
[root@host:~] esxcfg-vswitch -A <port group name> vSwitchN
```

iv. From the vSphere client, right-click on the virtual machine, select the virtual network adapter to be used, and attach the newly created port group.

4.5. Tuning vMotion for vSAN

While creating a vSAN you may encounter out of memory issues, resulting in vMotion timing out. To avoid this, follow the steps mentioned below on all ESXi hosts in the vSAN:

i. Set the low-memory packet heap value to the maximum supported value of 512:

```
[root@host:~] esxcli system settings kernel set -s netPktHeapMaxMBPerGB -v
512
```

ii. Set the networking packet buffer pool size to the maximum supported value of 200:

```
[root@host:~] esxcli system settings kernel set -s netPktPoolMaxMBPerGB -v
200
```

iii. Reboot the host.

iv. Enable maximum RSS queues:

```
[root@host:~] vmkload mod cxl rss q=1
```

4.6. Virtual Functions (SR-IOV)

4.6.1. Instantiate VFs

Follow the steps mentioned below to instantiate virtual functions:

i. *max_vfs* is a comma separated module parameter that specifies the maximum number of VFs per port. Load the Native Network driver (cxl) with *max_vfs* parameter and set it to a non-zero value. In case of multiple adapters, use ',,' to separate the number of VFs per adapter:

[root@host:~] esxcfg-module cxl -s max vfs=W,X,,Y,Z

Where,

W: Number of VFs per port 0 of adapter 0.

- X: Number of VFs per port 1 of adapter 0.
- Y: Number of VFs per port 0 of adapter 1.
- Z: Number of VFs per port 1 of adapter 1.

1 Note A maximum of 16 VFs can be instantiated per port.

E.g. - To instantiate 3 VFs for port 1 of adapter 0 & 4 VFs for port 0 of adapter 1:

[root@host:~] esxcfg-module cxl -s max vfs=0,3,,4,0

ii. Verify *max_vfs* setting using the *-g* option:

[root@host:~] esxcfg-module -g cxl

E.g.:

```
[root@host:~] esxcfg-module -g cxl
cxl enabled = 1 options = 'max_vfs=2,2'
```

- iii. Reboot the ESXi host for changes to take effect.
- iv. Check if VFs were instantiated successfully on the PCI bus by either using the shell prompt (using *lspci*) or vSphere GUI (under *Host* > *Configuration*>*Advanced setting*)

[root@	~] lspci	grep Chel	lsio								
0000:05:00.0	Network	controller:	Chelsio	Communications	Inc.	T580-LP-CR	Unified	Wire	Ethernet	Controller	[vmnic4]
0000:05:00.1	Network	controller:	Chelsio	Communications	Inc.	T580-LP-CR	Unified	Wire	Ethernet	Controller	[vmnic5]
0000:05:00.2	Network	controller:	Chelsio	Communications	Inc.	T580-LP-CR	Unified	Wire	Ethernet	Controller	[vmnic6]
0000:05:00.3	Network	controller:	Chelsio	Communications	Inc.	T580-LP-CR	Unified	Wire	Ethernet	Controller	[vmnic7]
0000:05:00.4	Network	controller:	Chelsio	Communications	Inc '	T580-LP-CR U	Unified W	Wire H	Ethernet	Controller	
0000:05:00.5	Mass sto	orage control	ller: Che	elsio Communicat	ions	Inc T580-LI	P-CR Unit	fied W	Wire Stor	age Control	ler
0000.05.00 6	Serial h	uus controlle	er. Chel	<u>sio Communicatio</u>	ng T	nc_T580-LP-(<u>"R Unifi</u>	ed Wij	re storag	e Controlle	r
0000:05:00 6	Serial k Network	controller:	Chelsio	communications	Inc '	<u>PC_T580-LP-(</u> T580-LP-CR (<u>CR Unific</u> Unified W	Wire H	r <u>e Storag</u> Ethernet	e Controlle Controller	r [PF_0.5.0_VF_0]
0000:05:00 6 0000:05:01.0 0000:05:01.1	Serial k Network Network	controller: controller:	Chelsio Chelsio Chelsio	Communications Communications Communications	Inc ' Inc '	DC T580-LP-(T580-LP-CR (T580-LP-CR (TR Unified W Unified W Unified W	ed Wire H Wire H Wire H	re Storag Ethernet Ethernet	e Controlle Controller Controller	r [PF_0.5.0_VF_0] [PF_0.5.1_VF_0]
0000:05:01.0 0000:05:01.0 0000:05:01.1 0000:05:01.4	Serial k Network Network Network	controller: controller: controller: controller:	Chelsio Chelsio Chelsio Chelsio	Communications Communications Communications Communications	Inc Inc Inc Inc	n <u>c T580-LP-(</u> T580-LP-CR (T580-LP-CR (T580-LP-CR (Unified N Unified N Unified N	Wire H Wire H Wire H	r <u>e Storag</u> Ethernet Ethernet Ethernet	Controller Controller Controller Controller	r [PF_0.5.0_VF_0] [PF_0.5.1_VF_0] [PF_0.5.0_VF_1]

6.0.0, 2494585	Evaluation (45 days remaining)	
Resource Allocati	on Performance Configuration Users Events Permissions	
)irectPath I/O Co	nfiguration	
Warning: Config a device needed	uring host hardware without special virtualization features for virtual machine passthrough will make it unavaila I for normal host boot or operation can make normal host boot impossible and may require significant effort to u	ble for use exce Indo. See the on
ch listed device is a	vailable for direct access by the virtual machines on this host.	
0000:05:01	0 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller	
	1 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller 4 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller 5 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller	
0000:05:01.	1 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller 4 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller 5 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller	
0000:05:01. 0000:05:01. 0000:05:01. 0000:05:01. Device Details Device Name	1 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller 4 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller 5 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller Vendor Name	
O000:05:01. 0000:05:01. 0000:05:01. 0000:05:01. Device Details Device Name ID	1 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller 4 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller 5 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller Vendor Name Class ID	-
Device Details Device ID Device ID	1 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller 4 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller 5 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller Vendor Name Class ID Subdevice ID	-
Device Details Device ID Vendor ID Device ID Vendor ID	1 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller 4 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller 5 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller Vendor Name Class ID Subdevice ID Subdevice ID	
Device Details Device ID Vendor ID Function	1 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller 4 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller 5 Chelsio Communications Inc T580-LP-CR Unified Wire Ethernet Controller Vendor Name Class ID Subdevice ID Subdevice ID Subvendor ID Subvendor ID	



- Unloading driver when VFs are attached to VMs is not supported by VMware.
- VMs with SRIOV interface might not power on with "out of MSI-X vectors" message in vmkernel.log. To resolve this issue, you need to add "pciPassthru<VF_ID>.maxMSIXvectors" parameter to VMs configuration file. Maximum value allowed for this param is 31. It is recommended to set the value according to the following equation:

pciPassthru<VF_ID>.maxMSIXvectors = <Number of CPUs in Win VM> + 2

For more information refer to VMware documentation.

• Windows Guest is not supported with SR-IOV.

4.6.2. Assigning VFs to VMs

Once the VFs are instantiated successfully, it's time to attach them to the virtual machine. For instructions on how to assign virtual functions to a virtual machine, please refer to VMware's official documentation.

4.6.3. Using VFs in Linux VM

To use the newly attached VFs in a virtual machine, follow the steps mentioned below:

- i. Power-on the Virtual Machine with VF attached to it.
- ii. Verify that the Chelsio VF shows up in the VM using the *lspci* command. You should see a similar output:

```
[root@host~]# lspci | grep Chelsio
00:08:0 Ethernet controller: Chelsio Communications Inc T580-LP-CR Unified
Wire Ethernet Controller [VF]
```

- iii. Download the latest *Chelsio Unified Wire for Linux* driver package, from Chelsio Download Center.
- iv. Untar the tarball using the following command:

[root@host~]# tar zxvf ChelsioUwire-x.xx.x.tar.gz

v. Change you current working directory to *ChelsioUwire-x.xx.x.x* directory and install the VF driver using the following command:

[root@host~]# make vnic_install

vi. Load the VF driver in the VM using the below command:

[root@host~]# modprobe cxgb4vf



To know more about Chelsio Virtual Function driver, please refer Chelsio Unified Wire for Linux User's Guide.

4.6.4. Example

i. In this example, 2 VFs are instantiated per port, hence a total of 4 VFs instantiated on the host. The host is then rebooted.

```
[root@host:~] esxcfg-module cxl -s max_vfs=2,2
[root@host:~] reboot
```

- ii. 4 VMs are setup in the following combination:
 - VF0 of PF0 (VF marked with the bus-id <PCIslot.01.0>) is assigned to VM1
 - VF1 of PF0 (VF marked with the bus-id <PCIslot.01.4>) is assigned to VM2
 - VF0 of PF1 (VF marked with the bus-id <PCIslot.01.1>) is assigned to VM3
 - VF1 of PF1 (VF marked with the bus-id <PCIslot.01.5>) is assigned to VM4
- iii. VMs are powered up one after another.
- iv. VF driver (cxgb4vf) is installed and loaded in all the VMs.

The above configuration will result in the following connectivity:

- VFs of the same port can communicate with each other. i.e. VM1 can communicate with VM2, and VM3 can communicate with VM4.
- VFs of port 0 (VM1 and VM2) will be able to communicate with any peer connected to port 0 of the network adapter.
- VFs of port 1 (VM3 and VM4) will be able to communicate with any peer connected to port 1 of the network adapter.

4.7. VXLAN

Virtual Extensible LAN (VXLAN) is a network virtualization technique that uses overlay encapsulation protocol to provide Ethernet Layer 2 network services with extended scalability and flexibility. VXLAN extends the virtual LAN (VLAN) address space by adding a 24-bit segment ID and increasing the number of available logical networks from 4096 to 16 million, thereby addressing the scalability and network segmentation issues associated with large cloud computing deployments. Furthermore, VXLAN provides a cost-effective software-defined networking (SDN) solution for migration of a large number of VMs over large distances using existing hardware and software resources.

The following sections describe the method to setup a VXLAN using Chelsio adapter:

4.7.1. ESXi 6.7

• Configuring Adapters

For T6 adapters, VXLAN offload is enabled by default on loading the driver.

• Creating Cluster

i. Log in to vCenter Server through vSphere Web Client using a web browser.

🕗 vSphere Web Client	× +		Ū,	0 		×
🗲 🛈 🏛 💊 https://10.19	93.208.42/vsphere-client/?csp	C Q Search	☆ 自 ♥	∔	A	≡
vm ware [.]						
User name: Password:	example@domain.local	VMware⁼vCenter [≞] Single	Sign-On			
Download Enhanced Au	thentication Plugin					

ii. Click on **Hosts and Clusters** tab in the **Object Navigator**. Right-click on your vCenter server and select **New Datacenter**.



iii. Provide a name for the new datacenter and click **OK**.

1 New Datacenter	• • •
Datacenter name: Location:	Datacenter-1
	OK Cancel

iv. Right-click on the newly created datacenter and select New Cluster.



v. Enter a name for the new cluster and select options for cluster features. Click OK.

New Cluster		? *
Name	cl1	
Location	Datacenter-1	
▶ DRS	Turn ON	
▶ vSphere HA	Turn ON	
▶ EVC	Disable	•
 Virtual SAN 	Turn ON	
		OK Cancel

vi. The newly created cluster will appear in the inventory. Repeat the above step to add more clusters to the datacenter.



vii. Right-click on the newly created cluster and select **Add Host**. This will invoke the **Add Host Wizard** allowing you to add host(s) to the newly created cluster.



viii. Provide name or IP address of the host, username and password, and other configuration details. Click **Next**.

Add Host		0	*
 Name and location Connection settings Host summary Ready to complete 	Enter the name or IP address Host name or IP address: Location: Type:	ss of the host to add to vCenter Server. 10.193.184.69 C d1 ESX]
		Back Next Finish Cancel	<u>)</u> .

ix. Review the information provided and click Finish.

• Creating Distributed Switch

- i. Log in to vCenter Server through vSphere Web Client using a web browser.
- ii. Click on Networking tab.
- iii. Right-click on your datacenter and select **Distributed Switch > New Distributed Switch**.



iv. Enter a name for the switch and click **Next**.

造 New Distributed Switch		(?	(4 (
1 Name and location	Name and Specify dist	location tributed switch name and location.	
 Select version Edit settings Ready to complete 	Name: Location:	DSwitch Datacenter-1	
		Back Next Finish Cance	я

v. Select the required switch version and click **Next**.

En New Distributed Switch		- ? >
 1 Name and location 2 Select version 	Select version Specify a distributed switch version.	
3 Edit settings 4 Ready to complete	 Distributed switch: 6.5.0 This version is compatible with VMware ESXi version 6.5 and later. The following new features are available: Port Mirroring Enhancements. 	
	Distributed switch: 6.0.0 This version is compatible with VMware ESXi version 6.0 and later. The following new features are available: Network I/O Control version 3, and IGMP/MLD snooping.	
	 Distributed switch: 5.5.0 This version is compatible with VMware ESXi version 5.5 and later. The following new features are available: Traffic Filtering and Marking, and enhanced LACP support. 	
	Distributed switch: 5.1.0 This version is compatible with VMware ESXi version 5.1 and later. The following new features are available: Management Network Rollback and Recovery, Health Check, Enhanced Port Mirroring, and LACP.	
	Distributed switch: 5.0.0 This version is compatible with VMware ESXi version 5.0 and later. The following new features are available: User-defined network resource pools in Network I/O Control, NetFlow, and Port Mirroring.	
	Back Next Finish C	Cancel

vi. Select the required number of uplinks for your setup. Please note that the number of uplinks must be equal or less than the number of adapters to be used for each host. Click **Next**.

🔚 New Distributed Switch		(?)
 1 Name and location 2 Select version 3 Edit settings 	Edit settings Specify number of uplink	x ports, resource allocation and default port group.
4 Ready to complete	Network I/O Control: Default port group: Port group name:	Enabled Create a default port group DPortGroup
		Back Next Finish Cancel

vii. Review the settings and click **Finish**.

🔚 New Distributed Switch				(? ₩
 1 Name and location 2 Select version 	Ready to complete Review your settings selections before	pre finishing the wizard.		
 2 Select version 3 Edit settings 4 Ready to complete 	Review your settings selections beform Name: Version: Number of uplinks: Network I/O Control: Suggested next actions New Distributed Port Group Add and Manage Hosts These actions will be availad	ore finishing the wizard. DSwitch2 6.5.0 2 Enabled ble in the Actions menu of the new distribu	ited switch.	
			Back Next	Finish Cancel

viii. The newly created switch will appear in the inventory.



ix. Right-click on the switch and select Add and Manage Hosts.



x. Select Manage host networking and click Next.

🕼 Add and Manage Hosts	?
Add and Manage Hosts Select task Select nots Select network adapter tasks Manage physical network adapters Manage VMkernel network adapters Analyze impact Ready to complete	 Select task Select a task to perform on this distributed switch. Add hosts Add new hosts to this distributed switch. Manage host networking Manage networking of hosts attached to this distributed switch. Remove hosts Remove hosts from this distributed switch. Add host and manage host networking (advanced)
	Add host and manage host networking (advanced) Add new hosts and manage networking of hosts already attached to this distributed switch. Use this option to unify the network configuration of new and existing hosts.
	Book Next Fields Concel
	Back Next Finish Cancel

xi. Click + Attached hosts. Select member hosts to add and click OK.

Select member hosts			
			Q Filter
Host	Host State	VDS Status	Cluster
10.193.184.169	Connected	🕑 Up	🗊 cl1
10.193.185.247	Connected	🕑 Up	🗊 cl2
M Q Find	•		2 items 🖺 Copy ▾
			OK Cancel

xii. Click Next and select the appropriate network adapters tasks to perform. Click Next.



xiii. Here you can add physical network adapters to the switch. Select the adapter and click **Assign uplink**.

Add and Manage Hosts					
 1 Select task 2 Select hosts 	Manage physical network adapters Add or remove physical network adapters to	this distributed switch.			
 Select network adapter tasks 	network adapter 📾 Assign uplink 💥 Unassign adapter 🝙 Reset changes 🚯 View settings				
4 Manage physical network	Host/Physical Network Adapters	1 🛦 In Use by Switch	Uplink	Uplink Port Group	
- Manage VMkernel network	- 10.193.184.169				*
⁵ adapters	✓ On this switch				
6 Analyze impact	vmnic3 (Assigned)	-	Uplink 1	DSwitch-qa-2-DVUplin	nk
7 Ready to complete	 On other switches/unclaimed 				
	vmnic0	vSwitch0	-		
	💌 vmnic1		-		
	💌 vmnic2	-	-		
	飅 vmnic6	vSwitch1	-		
	飅 vmnic7		-		
	- 10.193.185.247				
	On this switch				
	 On other switches/unclaimed 				
	飅 vmnic0	vSwitch0	-		
	飅 vmnic1		-		
	飅 vmnic2		-		
	飅 vmnic3		-		
	飅 vmnic4		-		
	vmnic5				*
			Back	Next Finish C	ancel

xiv. Select an uplink for the adapter and click OK and then Next .	xiv.	Select an uplink for the adapter and click OK and then Next .
--	------	---

Select an Uplink for vmnic2	×
Uplink	Assigned Adapter
Uplink 1	vmnic3
Uplink 2	
(Auto-assign)	
	OK Cancel

xv. In this step, you can view the VMkernel adapters automatically added to the hosts. If VXLAN modules are already installed using NSX Manager, you can also view the VXLAN Port group associated to the respective host in distributed switch. Click **Next**.

🕞 Add and Manage Hosts				
✓ 1 Select task	Manage VMkernel network adapters Manage and assign VMkernel network adap	ters to the distributed switch.		
 2 Select hosts 				
 3 Select network adapter tasks 	🐣 Assign port group 🚦 New adapter 🥒 Edit adapter 💢 Remove 🖃 Reset changes 🚯 View settings			igs
 4 Manage physical network adapters 	Host/VMkernel Network Adapters	1 🛦 In Use by Switch	Source Port Group	Destination Port Group
5 Manage VMkernel network	- 10.193.184.169			
adapters	 On this switch 			
6 Analyze impact	pm vmk1	DSwitch	vxw-vmknicPg-dvs-41-0	Do not migrate
7 Ready to complete	 On other switches 			
	pm vmk0	vSwitch0	Management Network	Do not migrate
	On this switch			
	vmk0	vSwitch0	Management Network	Do not migrate
			Back Next	Finish Cancel

xvi. Review the impact status of the configuration. Click **Next**.

Add and Manage Hosts				
 1 Select task 2 Select hosts 	Analyze impact Review the impact this configuration change might have on some network dependent services.			
 Select network adapter tasks 	Overall impact status: 🔮 No impact			
✓ 4 Manage physical network adapters	Host / Impact Analysis per Service	1 🛦 Status		
✓ 5 Manage VMkernel network adapters	✓ ■ 10.193.184.169 iSCSI	No impact		
6 Analyze impact				
7 Ready to complete	iscsi	No impact		
	No items selected			
	NO Itellis selected			
		Back Next	Finish Cancel	

xvii. Review the settings and click **Finish**.

🕼 Add and Manage Hosts	0
 ✓ 1 Select task ✓ 2 Select back 	Ready to complete Review your settings selections before finishing the wizard.
2 Select nosts 3 Select network adapter tasks	Number of managed bosts
 4 Manage physical network adapters 	Hosts to update: 2
✓ 5 Manage VMkernel network adapters	Number of network adapters for update Physical network adapters: 2
6 Analyze impact 7 Ready to complete	
	Back Next Finish Cancel

• Setting up VXLAN

- i. Follow the steps mentioned in VMware's NSX installation guide to install and configure NSX Manager.
- ii. Make certain that vCenter Server is registered with NSX manager successfully. Networking
 & Security link should appear in both Home and Navigator panes. Click on the link in any of the two panes.



iii. In the **Navigator** pane, click on **Installation** and then **Host Preparation** tab. Select the IP of the required NSX manager from the drop-down menu.

Navigator I	Installation
Back	Management Host Preparation Logical Network Preparation
Networking & Security	
🚟 NSX Home	NSX Manager: 10.193.187.113
🚱 Dashboard	# 10.193.187.113
🔅 Installation	NSX Component instanation on Hosts
(In Lonicel Quitebox	

iv. In the *Installation Status* column for the required cluster, click on options (^(®)) and select **Install**.

Installation	Installation			
Management Host Preparation Log	jical Network Preparation Service Deplo	yments		
NSX Manager: 10.193.187.113				
NSX Component Installation on Hosts				
🔯 Actions				
Clusters & Hosts	Installation Status	Firewall	VXLAN	
▶ ∰ici1	Not Installed	Vot Configured	Not Configured	
▶ ∰ cl2	Not Installed	Install igured	Not Configured	
			2 items	

v. Click Yes to confirm. Installation progress will be shown in the Recent Tasks pane.

cl1 - Install								
Are you su	Are you sure you want to continue with the install?							
	Yes	No						

vi. In the *VXLAN* column for the required cluster, click on options (^(®)) and select **Configure VXLAN**.

🔯 Actions				
Clusters & Hosts	Installation Status	Firewall	VXLAN	
▶ ∰ld1	✓ 6.3.0.5007049	✓ Enabled	Not Configured	@-
▶ 山 ct2	Not Installed	Not Configured	Not Configured	Force Sync Services Change IP Detection Type Change Locale ID Disable Firewall Configure VXLAN Uninstall Communication Channel Health datastore1 (1)

vii. Select the distributed switch created previously from the drop-down menu. Provide details like VLAN ID, IP addressing and Teaming policy and click **OK**.

cl1 - Configure VXLAN Ne	tw	orking ? 🕨
Switch:	*	DSwitch 🔹
VLAN:	*	0
MTU:	*	1600
VMKNic IP Addressing:	*	Use DHCP
		● Use IP Pool vxlan-ip-pool ▼
VMKNic Teaming Policy:	*	Fail Over 🔹
VTEP:	*	1
		OK Cancel

viii. Click on the Logical Network Preparation tab and then Segment ID. Set the range for Segment ID pool and Multicast addresses. Click OK.

Edit Segment IDs and Multicast Address Allocation				
Provide a Segment ID p	ool and Multicast range unique to this NSX Manager.			
Segment ID pool: *	5000-5900]		
	(In the range of 5000-16777215)			
🗹 Enable Multicast add	ressing			
Multicast addresses are	required only for Hybrid and Multicast control plane modes.			
Multicast addresses: *	239.0.0239.255.255.255]		
	(Recommended range - 239.0.0.0-239.255.255.255)			
	OK Cance			

ix. Click on **Transport Zones** and then + link.

Installation						
Management Host Preparation Logical Network Preparation	Service Deployments	3				
NSX Manager: 10.193.187.113						
VXLAN Transport Segment ID Transport Zones						
+				ter 👻		
Name 1 Description	Scope	Control Plane Mode	CDO Mode	Logical Switches		
	This list is emp	ty.				
I				4		
AA.			0 Objects	🔒 Export 👔 Copy 🗸		

x. Provide a name for the transport zone. Select the replication mode and clusters that will be part of the transport zone. Click **OK**.

	Transport Zor	10		(1) H
Nam	e:	transport1			
Desc	ription:				
Replication mode: Multicast					
		Multicast on Physic	al network used for VXLAN	control plane.	
		 Unicast 			
		VXLAN control plar	ne handled by NSX Control	er Cluster.	
		Hybrid			
		Optimized Unicast	mode. Offloads local traffic	replication to physical network.	
Select cl	lusters that will	l be part of the Transpo	rt Zone NSX vSwitch	Status	
Select cl	Name	l be part of the Transpo	rt Zone NSX vSwitch	Status	
Select cl	Name	l be part of the Transpo	nt Zone NSX vSwitch	Status Normal	
Select cl	Name	l be part of the Transpo	nt Zone NSX vSwitch DSwitch	Status	
Select cl	Name	l be part of the Transpo	rt Zone NSX vSwitch	Status O Normal	
Select cl	Name	l be part of the Transpo	rt Zone NSX vSwitch DSwitch	Status © Normal	
Select cl	Name	l be part of the Transpo	NSX vSwitch	Status Normal	
Select cl	Name	l be part of the Transpo	nsx vswitch	Status Normal	
Select cl	Name	I be part of the Transpo	nt Zone NSX vSwitch	Status Normal	

xi. In the **Navigator** pane, select **Logical Switches** under **Networking & Security** and then + link.

Navigator	Logical Switches					
Back	NSX Manager: 10.193.187.113	•				
Networking & Security	+	_			😵 🔍 Filter	-
📲 NSX Home	Virtual Wire ID	Segment ID	Name 1	Status	Transport Zone	Hardware
🚱 Dashboard			This list is empty.			
🙀 Installation						
💁 Logical Switches						
NSX Edges						
👸 Firewall						
Kanal SpoolGuard						
뿾 Service Definitions						
Service Composer						
🔣 Flow Monitoring						
Activity Monitoring						
Endpoint Monitoring						
😫 Traceflow						
✓ Networking & Security Inventory						
🔠 NSX Managers 🔋 🔉						
	4	:				Þ
	м				0 Objects 📑 Export	Сору 🗸

xii. Provide a name for the logical switch and select the transport zone that was previously created. Change the replication mode if required and Click **OK**.

🖄 New Logical Swite	ch		?)	•
Name:	* wire1			
Description:			7	
Transport Zone:	* transport1	Change Remov	е	
Replication mode:	 Multicast 			
	Multicast on Physical network used for VXLAN control pla	ane.		
	🔘 Unicast			
	VXLAN control plane handled by NSX Controller Cluster	r.		
	O Hybrid			
	Optimized Unicast mode. Offloads local traffic replication	n to physical network	C.	
🗹 Enable IP Disco	very			
Enable MAC Lea	arning			
		OK Can	cel)

xiii. Using the main menu (or shortcut Ctrl+Alt+2), access the Hosts and Clusters section.



xiv. Select VM under Datacenter > Cluster, right-click and select Edit Settings.



xv. In the **New device** drop-down menu, select **Network** and then click **Add**. This will add a **New Network** entry under **Virtual Hardware** tab.

💼 rhel-6.8 - Edit Settin	igs	? ▶
Virtual Hardware VM	Options SDRS Rules vApp Options	
▶ 🔲 CPU		
• Memory	2048 v MB v	
▶ 🛄 Hard disk 1	20 A GB V	
► 🛃 SCSI controller 0	VMware Paravirtual	\otimes
▶ ▶ ● CD/DVD drive 1 	Datastore ISO File	
🕨 📻 Floppy drive 1	Client Device	
▶ 🛄 Video card	Specify custom settings	
▶ ∰ VMCI device		
 Other Devices 		
▶ Upgrade	Schedule VM Compatibility Upgrade	
New device	e: Metwork 🗸 Add	
Compatibility: ESXi 6.0 a	and later (VM version 11) OK Ca	ncel

xvi. In the **New Network** drop-down menu, select *Show more networks*. Add the logical switch created previously. Click **OK** and then **OK** again.

💼 rhel-6.8 - Edit Setting	gs	e (5
Virtual Hardware VM	Options SDRS Rules vApp Options	
► 🔲 CPU	1 •	
Memory	2048 V MB V	
▶ 🚐 Hard disk 1	20 GB V	
► 🛃 SCSI controller 0	VMware Paravirtual	
▶ ▶ ♥ CD/DVD drive 1 	Datastore ISO File	
Floppy drive 1	Client Device	
▶ 🛄 Video card	Specify custom settings	
VMCI device		
 Other Devices 		
▶ Upgrade	Schedule VM Compatibility Upgrade	
▶ I New Network	VM Network	
	VM Network	
	nic-standard	
	DSwitch	
	Show more networks	
New device	E Network	
Compatibility: ESXi 6.0 a	and later (VM version 11) OK Canc	el

Select Network			×
Show all columns			
G	(Q Filter	•
Name	Distributed Switch		
2 DPortGroup	DSwitch		
& vxw-vmknicPg-dvs-41-0-34c	DSwitch		
🚨 vxw-dvs-41-virtualwire-4-sid	DSwitch		
🧕 VM Network	-		
🧕 nic-standard	-		
M Q Find -		5 items	🎦 Сору 🗸
		ОК	Cancel

xvii. Repeat the above step for all the VMs in the cluster. All the VMs added to the VXLAN will now be able to communicate successfully.

5. Software/Driver Unloading

Execute the command below to unload the Native Network driver:

[root@host:~] vmkload_mod -u cxl



If iSCSI/iSER Offload Initiator Driver (cheiscsi) is loaded, it needs to be unloaded before unloading the native network driver.

6. Software/Driver Uninstallation

Follow the steps mentioned below to uninstall the driver:

i. Put the host in maintenance mode using the vSphere (desktop or web) Client:



ii. Uninstall the driver:

```
[root@host:~] esxcli software vib remove -n cxl
```



te If iSCSI/iSER Offload Initiator Driver (cheiscsi) is installed, it needs to be uninstalled before uninstalling the native network driver.

iii. Reboot the host:

[root@host:~] reboot

III. iSCSI/iSER Offload Initiator Driver

1. Introduction

The Chelsio Unified Wire series of adapters are Independent Hardware iSCSI adapters. They support iSCSI acceleration and iSCSI Direct Data Placement (DDP) where the hardware handles the expensive byte touching operations, such as CRC computation and verification, and direct DMA to the final host memory destination:

• iSCSI PDU digest generation and verification

On transmit -side, Chelsio hardware computes and inserts the Header and Data digest into the PDUs. On receive-side, Chelsio hardware computes and verifies the Header and Data digest of the PDUs.

• Direct Data Placement (DDP)

Chelsio hardware can directly place the iSCSI Data-In or Data-Out PDU's payload into preposted destination host-memory buffers based on the Initiator Task Tag (ITT) in Data-In or Target Task Tag (TTT) in Data-Out PDUs.

PDU Transmit and Recovery

On transmit-side, Chelsio hardware accepts the complete PDU (header + data) from the host driver, computes and inserts the digests, decomposes the PDU into multiple TCP segments if necessary, and transmit all the TCP segments onto the wire. It handles TCP retransmission if needed.

On receive-side, Chelsio hardware recovers the iSCSI PDU by reassembling TCP segments, separating the header and data, calculating and verifying the digests, then forwarding the header to the host. The payload data, if possible, will be directly placed into the pre-posted host DDP buffer. Otherwise, the data will be sent to the host too.

The iSCSI Extensions for RDMA (iSER) protocol is a translation layer for operating iSCSI over RDMA transports, such as iWARP RDMA. Chelsio Unified Wire adapters supporting iWARP provide the higher bandwidth and lower latency required for block storage transfers. iSER is stable and provides benefits of the iSCSI protocol like security and high availability.

1.1. Hardware Requirements

1.1.1. Supported Adapters

The following are the currently shipping Chelsio adapters that are compatible with Chelsio iSCSI/iSER Offload Initiator driver:

- T62100-CR
- T62100-LP-CR
- T6225-CR
- T6225-LL-CR
- T6225-SO-CR (Memory Free; 256 IPv4/128 IPv6 offload connections supported)

- T6425-CR
- T580-LP-CR
- T580-CR
- T540-CR
- T540-LP-CR
- T520-LL-CR
- T520-CR
- T520-BT
- T540-BT

1.2. Software Requirements

1.2.1. ESXi Requirements

The Chelsio iSCSI/iSER Offload Initiator driver has been developed to run on 64-bit ESXi platforms. Currently the driver is available for the following version(s):

- ESXi 6.7
- ESXi 6.7 U1

2. Software/Driver Installation

Native Network driver (cxl) is required for iSCSI/iSER Offload Initiator driver to work. Hence, ensure that the driver is installed and loaded as described in the Native Network Driver chapter before proceeding.

i. Put the host in maintenance mode using the vSphere (desktop or web) Client.



ii. Install the iSCSI/iSER driver components cheiscsi and chelsio-esx-libcheiscsi-ima.so:

```
[root@host:~] cp *.vib /productLocker/
[root@host:~] cp *.vib /var/log/vmware/
[root@host:~] esxcli software vib install -v /productLocker/cheiscsi-*.vib --
no-sig-check
[root@host:~] esxcli software vib install -v /productLocker/chelsio-esx-
libcheiscsi-ima.so-*.vib --no-sig-check
```

Note

If there is an older version of the driver installed, use the below commands to "update" so that persistent values like IP address, target lists etc. can be retained.

```
[root@host:~] esxcli software vib update -v /productLocker/cxl-*.vib
--no-sig-check
[root@host:~] esxcli software vib update -v /productLocker/cheiscsi-
*.vib --no-sig-check
[root@host:~] esxcli software vib install -v /productLocker/chelsio-
esx-libcheiscsi-ima.so-*.vib --no-sig-check
[root@host:~] esxcli software vib remove -n chelsio-esx-
libcheiscsi_ima.so
```

iii. After installation/update completes successfully, exit from maintenance mode and reboot the host.

3. Software/Driver Loading

After rebooting the ESXi Host, the driver will load automatically. However, it is possible to manually load the driver.

```
[root@host:~] vmkload mod cheiscsi
```

Execute the below command so that device manager performs a rescan:

```
[root@host:~] kill -SIGHUP $(cat /var/run/vmware/vmkdevmgr.pid)
```

iSCSI or iSER Offload Initiator will be used automatically based on the target configuration (iSCSI or iSER mode).

4. Software/Driver Configuration and Fine-tuning

The following sections describe the method to configure Chelsio iSCSI/iSER Offload Initiator and connect to target.

4.1. Configuring Initiator

- i. Log in to vCenter Server through vSphere Web Client using a web browser.
- ii. If you have already created and configured the host intended to be used as initiator, skip to step (iii)
 - a. Under **Hosts and Clusters**, right-click and click **New Datacenter...** Provide a name and Click **OK**.
 - b. Right-click on the newly created datacenter and click **Add Host...** Follow onscreen instructions and provide information to add the host. Click **Finish**.
- iii. Select the host and under the **Configure** tab, select **Storage Adapters**. This will display the list of available Chelsio iSCSI/iSER adapters.

Getting Started Summary Monitor	Configure Permissio	ns VMs Resource Poo	s Datastores	Networks				
	Storage Adapters							
	+ 🔂 🗓 🖸	*						Q Filter
Storage Adapters	Adapter	1 ▲ Type	Status	Identifier	Targets	Devices	Paths	
Storage Devices	T6225-LL-CR Chelsic	iscsl/iseR offload initiat	or (PT4316036	:1)				
Datastores	🚱 vmhba66	iSCSI	Online	Port0(iqn.2017-07.com.eg0)	16	16	16	
Host Cache Configuration	🚱 vmhba67	iSCSI	Online	Port1(iqn.2017-07.com.eg1)	0	0	0	···
Protocol Endpoints				=				
I/O Filters ::	Adapter Details							
	Properties Device	s Paths Targets Net	work Settings	Advanced Options				
Virtual switches	Troperado							
VMkernel adapters	General							Edit
Physical adapters	Name	vmhba66						
TCP/IP configuration	Model	T6225-LL-CR Chelsio iSC	SI/iSER offload	1 initiator (PT43160361)				
Advanced	iSCSI Name	ign.2017-07.com.eg0						
	iSCSI Alias	Port0						
VM Startup/Shutdown	Target Discovery	Send Targets, Static Targ	ats					
Agent VM Settings	ranget bioterery	conta rangeno, citato rang						
Swap file location	Network Interface							
Default VM Compatibility	Current/Maximum S	Speed 1500 Mb/9600 Mi)					
✓ System	MAC Address	00:07:43:39:84:e	1					
Licensing								
Time Configuration	Authentication							Edit
Authentication Services	Method None							×

You can also view the list in CLI using:

```
[root@host:~] esxcli iscsi adapter list
[root@rattletrap:~] esxcli iscsi adapter list
Adapter Driver
                  State
                         UID
                                        Description
        cheiscsi
                         iscsi.vmhba66
                                        T6225-LL-CR Chelsio iSCSI/iSER offload initiator
                                                                                        (PT43160361)
mhba66
                         iscsi.vmhba67
                                        T6225-LL-CR Chelsio iSCSI/iSER offload initiator
        cheiscsi
                  online
                                                                                         (PT43160361
```

- iv. In the Adapter Details section, click Network Settings tab and then Edit.
- v. Configure IP for the adapter and click **OK**. You can configure either IPv4 or IPv6 or both.

wmhba64 - Edit IP and DNS Config	uration			(?
IPv6 settings DNS settings	 No IPv4 settings Obtain IPv4 settings aut Use static IPv4 settings IPv4 address: Subnet mask for IPv4: Default gateway for IPv4 	tomatically 102 . 1 . 1 . 222 255 . 255 . 255 . 0 4: 102 . 1 . 1 . 1		
Adapter Details				OK Cancel
Properties Devices	Paths Targets	Network Settings	Advanced Options	
IP Address and DNS (Configuration	-		Edit
IPv4 address	102.1.1.222 (s	static)		
Subnet mask for IPv	4 255.255.255.0)		
Default gateway for I	Pv4 102.1.1.1			
IPv6 settings	Not enabled			
Preferred DNS serve	r Not supported	i		
Alternate DNS serve	Not supported	1		

vi. For changes to take effect, rescan the iSCSI/iSER adapter using Rescan.

Configure Permissions VMs	Resource Pools	Datastores	Network	ks	
Storage Adapters					
+ 6 100				Q Filter	•
Adapter Rescans the	e host's storag	e adapter to			A
Chelsio iSCSI offload discover ne	wly added sto	rage devices			
🚱 vmhba64	iSCSI (Online	initiator0(iq	In.2017-07.com.eg0)	
🚱 vmhba65	iSCSI	Online	initiator1(iq	n.2017-07.com.eg1)	Ŧ
4					•

4.2. Connecting to Target

There are two methods to discover and connect to targets:

- Dynamic Discovery: Discovers all the available targets for a given target server.
- **Static Discovery:** Discovers a specific target by manually entering target information.

4.2.1. Dynamic Discovery

- Adding Target Server
- i. Select the iSCSI/iSER adapter to connect to the target and under the **Targets** tab, select **Dynamic Discovery.**

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Configure Permissions vivis	Resource Fou	is Datastore	S Networks				
Storage Adapters							
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Adapter	Туре	Status	Identifier				
Chelsio iSCSI offload initiator							
🚱 vmhba64	iSCSI	Online	initiator0(iqn.2017-07.com.eg0)				
🔄 vmhba65	iSCSI	Online	initiator1(iqn.2017-07.com.eg1)				
4			•				
		_					
Adapter Details							
Properties Devices Paths	Targets Net	work Settings	Advanced Options				
Dynamic Discovery Static Disc	coverv						
		Add	Remove Authentication Advanced				
iSCSI server							
	т	his list is empt	y.				

ii. Click Add and provide the target server IP. Click OK.

	vmhba64 - Add	Send Target Server		?
agi agi agi	iSCSI Server: Port:	102.1.1.18 3260		
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- iii. For changes to take effect, rescan the iSCSI/iSER adapter using **Rescan**.
- iv. All the available LUNs discovered on the given target server will be displayed in the **Devices** tab. You can perform various tasks like detach, rename, erase partitions, etc.

dapter Details					
Properties Devices Paths Targets Network Settings Advanced Options					
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Name	LUN	Туре	Capacity	Operational	Hardware Accelera
IET iSCSI Disk (t10.945445000	0	disk	104.91 GB	Attached	Unknown
IET iSCSI Disk (t10.945445000	1	disk	40.06 GB	Attached	Unknown
4	::				•

The **Paths** tab displays LUN status and allows you to enable or disable them.

Adapter Details

Properties Devices Pa	ths Targets Network Settings	Advance	d Options
Enable Disable			
Runtime Name	Target	LUN	Status
vmhba64:C0:T0:L0		0	 Active (I/O)
vmhba64:C0:T0:L1		1	 Active (I/O)

These LUNs can now be attached to VMs or can be used to store VMs.

• Removing Target Server

- i. Under Targets tab, select Dynamic Discovery.
- ii. Select the target server, click **Remove** and then **Yes** to confirm.
- iii. The iSCSI/iSER server will also be listed as static target under **Static Discovery**, hence needs to be removed from here as well. Select the server, click **Remove** and then **Yes** to confirm.

Adapter Details				
Properties Devices Paths Tar	rgets Network Settings Advanced Options			
Dynamic Discovery Static Discov	rery			
	Add Remove Authentication Advanced			
iSCSI server	Target Name			
102.1.1.18:3260	iqn.2001-04.com.example:storage.disk2.sys1.xyz			

iv. For changes to take effect, rescan the iSCSI/iSER adapter using Rescan.

• Static Discovery

• Adding Target Server

i. Select the iSCSI/iSER interface to connect to the target and under the **Targets** tab, select **Static Discovery.**

Configure Permissions VMs	Resource Poo	ls Datastore	s Networks	
Storage Adapters				
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Adapter	Туре	Status	Identifier	A
Chelsio iSCSI offload initiator				
🚱 vmhba64	iSCSI	Online	initiator0(iqn.2017-07.com.eg0)	
🔄 vmhba65	iSCSI	Online	initiator1(iqn.2017-07.com.eg1)	*
•				Þ
Properties Devices Paths Dynamic Discovery Static Disc	Targets Net	work Settings	Advanced Options	
		Add	Remove Authentication	Advanced
iSCSI server Targe	t Name			

ii.	Click Add	and provide the	e target server IP	and target IQN. Click OK .	
			0	0	

	vmhba64 - Add Static	Target Server	?	
9	iSCSI Server:	102.1.1.18		
g	Port:	3260		
t	iSCSI Target Name:	iqn.2001-04.com.example:storage.disk2.sys1.xyz)(i
C	Authentication Setting	gs		(i
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- iii. For changes to take effect, rescan the iSCSI/iSER adapter using **Rescan**.
- iv. All the available LUNs discovered on the given target server will be displayed in the **Devices** tab. You can perform various tasks like detach, rename, erase partitions, etc.

dapter Details					
Properties Devices Paths Targets Network Settings Advanced Options					
i i i i i i i i i i i i i i i i i i i	🌄 🔯 All	Actions 👻 👔	•	Q Filter	•
Name	LUN	Туре	Capacity	Operational	Hardware Accelera
IET iSCSI Disk (t10.945445000	0	disk	104.91 GB	Attached	Unknown
IET iSCSI Disk (t10.945445000	1	disk	40.06 GB	Attached	Unknown
4					•

The **Paths** tab displays LUN status and allows you to enable or disable them.

Adapter Details

Properties Devices Pa	ths Targets Network Settings	Advance	d Options
Enable Disable			
Runtime Name	Target	LUN	Status
vmhba64:C0:T0:L0		0	 Active (I/O)
vmhba64:C0:T0:L1		1	 Active (I/O)

These LUNs can now be attached to VMs or can be used to store VMs.

• Removing Target Server

- i. Under Targets tab, select Static Discovery.
- ii. Select the target server, click **Remove** and then **Yes** to confirm.

Adapter Details	
Properties Devices Paths Ta	rgets Network Settings Advanced Options
Dynamic Discovery Static Discovery	
Add Remove Authentication Advanced	
iSCSI server T	arget Name
102.1.1.18:3260 i	qn.2001-04.com.example:storage.disk2.sys1.xyz

iii. For changes to take effect, rescan the iSCSI/iSER adapter using **Rescan**.

4.3. Configurable Options

The option to edit general initiator properties like alias and name is available under the **Properties** tab, whereas advanced parameters like Digest, MTU, etc., can be changed in the **Advanced Options** tab.

To change target server's advanced parameters, use the **Advanced** option under the **Targets** tab.

5. Software/Driver Unloading

Logout all the existing iSCSI/iSER sessions. Execute the command below to unload the iSCSI/iSER Offload Initiator driver:

[root@host:~] vmkload_mod -u cheiscsi

6. Software/Driver Uninstallation

Note Before proceeding, please ensure that no iSCSI/iSER session or connection is active and running.

Follow the steps mentioned below to uninstall the iSCSI/iSER Offload Initiator driver:

i. Put the host in maintenance mode using the vSphere (desktop or web) Client:



ii. Uninstall the driver:

[root@host:~] esxcli software vib remove -n cheiscsi
[root@host:~] esxcli software vib remove -n chelsio-esx-libcheiscsi-ima.so

iii. Reboot the host:

[root@host:~] reboot

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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