

Chelsio T5/T4 Unified Wire for Windows

Installation and User's Guide



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I. Chelsio Unified Wire

1. Introduction

Thank you for choosing Chelsio T5/T4 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 5 (T5) is Chelsio's next generation of highly integrated, hyper-virtualized 40/10GbE controllers. The T5 is 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 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.

The T4 adapters can fully offload TCP, UDP, iSCSI, iWARP and FCoE over a single Unified Wire. The adapters also fully support SR-IOV, EVB/VNTag, DCB, Traffic Management and Filtering.

Ideal for all data, storage and high performance clustering applications, the T5/T4 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 high performance computing environments, Chelsio T5/T4 adapters bring a new level of performance metrics and functional capabilities to the computer networking industry.

1.1. Features

Chelsio Unified Wire for Windows is an easy to use utility developed to provide installation of 64bit Windows based drivers and tools for Chelsio's T5 and T4 Unified Wire Adapters. The package provides an interactive installer to install various drivers and utilities.

It consists of the following components:

- NDIS Function driver (NIC)
- NVGRE Offload
- VXLAN Task Offload
- PacketDirect (Kernel Mode and ARM Moderation)
- SMB Direct
- RDMA/NVGRE concurrent (Mode 2)
- NDIS SR-IOV
- Virtual RSS (vRSS)
- iSCSI Storport Miniport
- Data Center Bridging (DCB)
- Unified Wire Manager (UM)
- UM for Win PE

1.2. Hardware Requirements

The Chelsio T5/T4 Unified Wire supports all x64 architectures supporting PCIE (x4, x8) slots.

- AMD CPUs, 64-bit (x86_64/amd64)
- Intel CPUs, 64-bit (x86_64)

The Chelsio Unified Wire supports 3.3v PCI bus only. Running an adapter on a PCI x4 slot is not recommended as performance will be significantly reduced by the limitations of PCI.

1.3. Software Requirements

The Chelsio T5/T4 Unified Wire software has been developed to run on Windows based platforms. To know more about the complete list of versions supported by each driver/software, please refer their respective sections.

1.4. Package Contents

Chelsio T5/T4 Unified Wire Software package comes with an interactive installer and support documentation. The documentation, consisting of README, Release Notes and User's Guide (this document), can be found in the <system_drive>\ChelsioT4\docs\ directory after installing Chelsio Unified Wire.

[🕖] Note

2. Hardware Installation

- 1. Shutdown/power off your system.
- 2. Power off all remaining peripherals attached to your system.
- 3. Unpack the Chelsio adapter and place it on an anti-static surface.
- 4. Remove the system case cover according to the system manufacturer's instructions.
- 5. Remove the PCI filler plate from the slot where you will install the Ethernet adapter.
- 6. For maximum performance, it is highly recommended to install the adapter into a PCIE x8 slot.
- 7. 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.
- 8. Secure the Chelsio adapter with a screw, or other securing mechanism, as described by the system manufacturer's instructions. Replace the case cover.
- 9. After securing the card, ensure that the card is still fully seated in the PCIE x8 slot as sometimes the process of securing the card causes the card to become unseated.
- 10. Connect a fiber cable, multi-mode for short range (SR) optics or single-mode for long range (LR) optics, to the 10Gb Ethernet adapter or regular Ethernet cable for the 1Gb Ethernet adapter.
- 11. Power on your system.
- 12. Verify if the adapter was installed successfully. To do so, open **Device Manager** in **Control Panel**.
- 13. 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
- Physical function 4: for all NIC functions of the card
- Physical function 5: for iSCSI
- Physical function 6: for FCoE
- Physical function 7: Currently not assigned
- 14. Once the Unified Wire package is installed, open **Device Manager** again. Expand **Network adapters** section and now Chelsio adapter should be listed.
- 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 Ethernet interface. However, for T5 40G and T420-BT 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 Installation

Chelsio Unified Wire Installer provides two methods of installation: GUI and CLI mode. GUI mode provides an interactive GUI installer with customizable options. Whereas, CLI mode enables unattended installation of Chelsio drivers and software thereby relieving the user from monitoring the installation process and providing input via dialog boxes.

3.1. Pre-requisites

3.1.1. Unified Wire Installer

Please download and install the latest Microsoft Visual C++ Redistributable Packages for Visual Studio (x86 and x64) before running the installer.

3.1.2. NDIS SR-IOV

SR-IOV should be enabled in the machine.

3.1.3. Unified Wire Manager

Chelsio Unified Wire Installer has been designed to install Unified Wire Manager (UM) along with other drivers by default. Based on the Windows version running on the system, the three UM components, i.e. Management Agent, Client and Station, will be installed and hence no separate installation is required. If an older version of UM exists, the Installer will upgrade it to the current version.

Please ensure that the following requirements are met, before proceeding with the installation.

3.1.4. Management Agent

If you wish to install Management Agent, please make sure that **Microsoft** .Net Framework 3.5 is installed before proceeding with the installation.

3.1.5. Management Station

If you wish to install Management Station, please make sure that the following requirements are met before proceeding with the installation:

- 1. Install Python 2.6.6 (32-bit). (Download from here)
- 2. Ensure that the path to python binary (typically "C:\Python26"), is added to PATH system variable.
- 3. Install Apache HTTP Server 2.2 with SSL. (Download from here)
- 4. If the Apache Server is running, it should be stopped before starting the installation process.

3.2. Installing Unified Wire

3.2.1. GUI mode (Installer)

- 1. Run the **ChelsioUwire-x.x.x.exe** installer application.
- 2. Click the Next button for the Chelsio End User License Agreement Window.

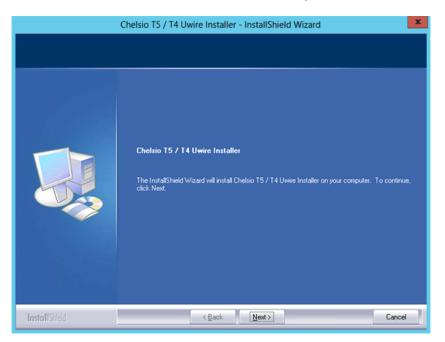


Figure 1 - Unified Wire Installer welcome window

3. Select the radio button I accept the terms of the license agreement and click Next.

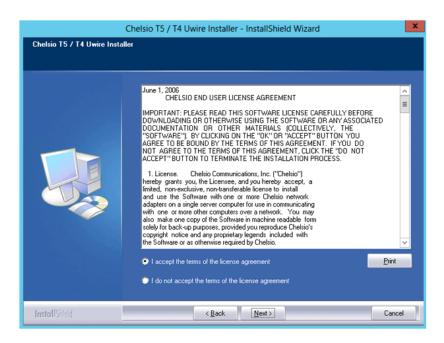


Figure 2 - Chelsio EULA window

4. Now, either select **Complete** for complete package installation or else select **Custom** radio button to customize the installation.

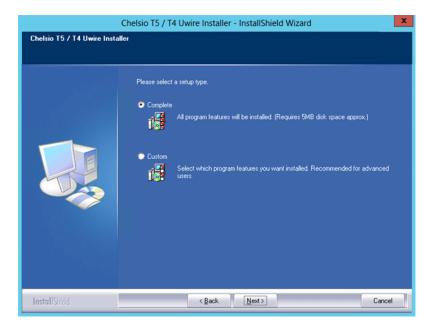


Figure 3 - Select setup (installation) type

() Note Selecting **Complete** will not install iSCSI Storport Miniport driver. To install the driver, select **Custom.**

i. If you select **Custom**, you can choose whether to install iSCSI Storport Miniport driver or not. Please note that Chelsio Ethernet Driver (NIC and VBD) is required for iSCSI Storport Miniport to work.

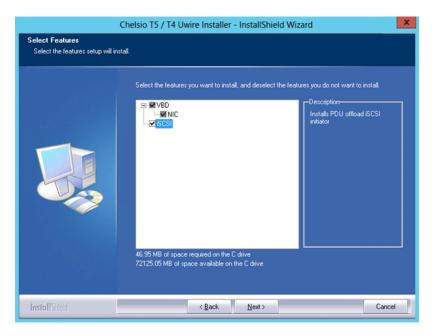


Figure 4 - Customizing the installation

5. Click Install to start the installation.

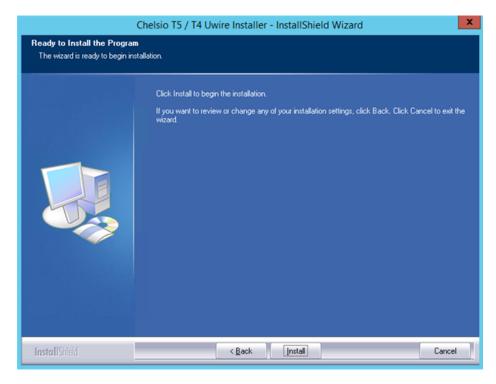
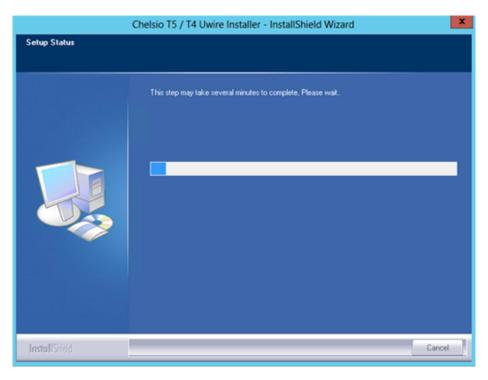


Figure 5 - Start Installation

6. Selected drivers will now be installed.





7. After successful installation of driver(s), the Unified Wire Manager installer will be invoked. Click the **Next** button for the Chelsio End User License Agreement Window.

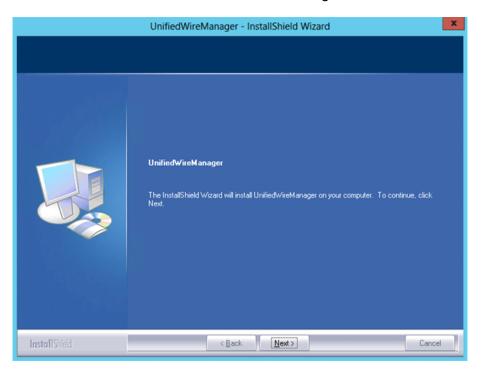


Figure 7 - UM installer welcome window

8. Select the radio button I accept the terms of the license agreement and click Next.

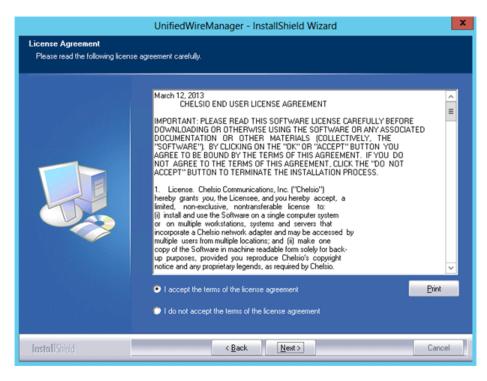


Figure 8 - Chelsio EULA window

9. The next window will display the pre-requisites for various UM components. Ensure that they are met before proceeding. Click Next.

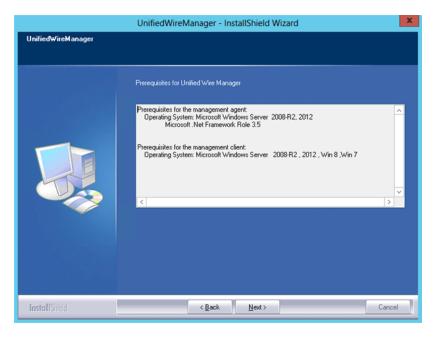


Figure 9 - UM prerequisites window



If prerequisites mentioned are not met, installation of UM will fail. Driver installation will however continue.

10. Now, either select **Complete** for complete package installation or else select **Custom** radio button to customize the installation. Click **Next.**



Figure 10 - Select setup (installation) type

i. If you selected **Custom**, the next window will display the location where UM will be installed by default. You can change the location by using the **Change** button or click **Next** to continue with the default path.

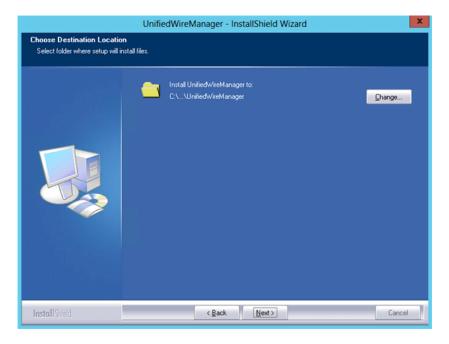


Figure 11 - Changing UM installation path

ii. Next, you can choose the UM components you wish to install. Deselect the components you don't wish to install and click **Next.**

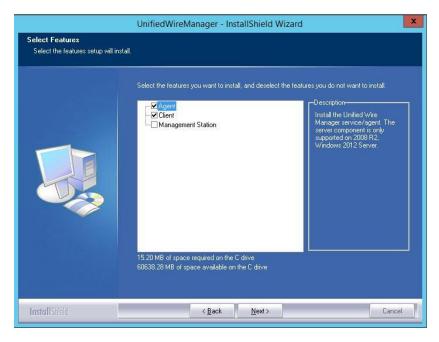


Figure 12 - Selecting UM components to install

If Management Station is selected, please make sure that all related prerequisites are met before proceeding (See Pre-requisites) or else the component will be skipped during installation. 11. Click **Install** to start the installation. Unified Wire Manager will now be installed with the selected options.

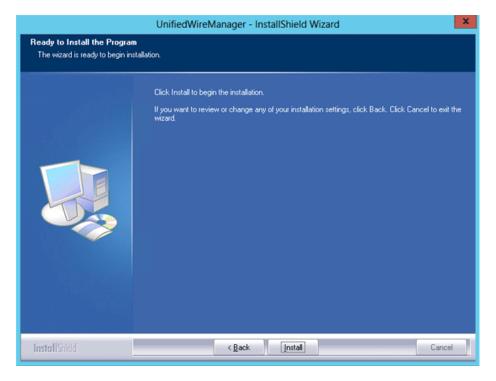


Figure 13 - Starting UM installation

12. Select Finish to exit the UM Installer.

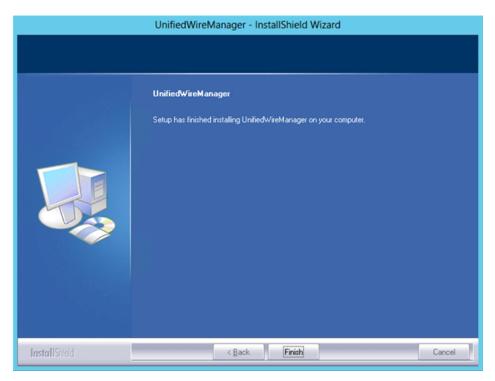


Figure 14 - Finishing UM installation

13. Click **Finish** to exit from the Unified Wire Installer.

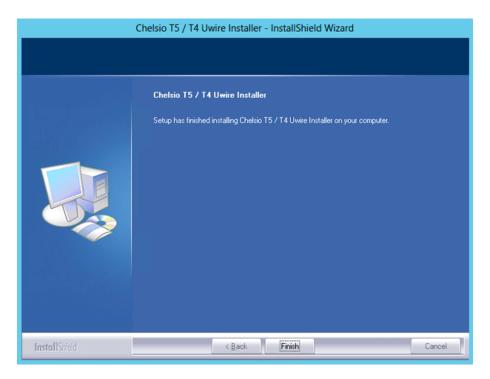


Figure 15 - Finishing Unified Wire installation

3.2.2. CLI mode (Silent Installation)

To install drivers/software using this feature, open **command prompt** and execute the following command:

```
C:\Users\Administrator>ChelsioUwire-x.x.x.xx.exe -in <driver(s)>
```

E.g.:

```
C:\Users\Administrator>ChelsioUwire-x.x.x.xx.exe -in all
```

The above command will install all the drivers and UM Agent.

To add a driver to an existing list of already installed drivers, use the following command:

C:\Users\Administrator>ChelsioUwire-x.x.x.exe -add <driver(s)>

E.g.:

C:\Users\Administrator>ChelsioUwire-x.x.x.exe -add iSCSI

The above command will add iSCSI Storport Miniport driver.

To know more about other parameters and options, execute the following command:

C:\Users\Administrator>ChelsioUwire-x.x.x.xx.exe -help

The above command will create a help file, ChelsioUwire-x.x.x.xx_help.txt, in the present working directory which contains the complete list of command line syntax required for performing all the necessary CLI operations.



O Note A log file, ChelsioUwire-x.x.x.log, is created in the same directory which keeps a record of all the commands executed and their results.

4. Configuring Chelsio Network Interfaces

In order to test Chelsio adapters' features, it is required to use at least two machines, each with Chelsio's network adapters (T5, T4 or both). These machines can be connected directly (back-to-back) or with a switch.

4.1. Configuring 40G adapters

Chelsio T5 40G adapters can be configured in the following three operational modes:

- DEFAULT (2X40G): This is the default mode of operation where each port functions as 40Gbps link. The port nearest to the motherboard will appear as the first network interface (Port 0).
- ii. **SPIDER (4X10G)**: In this mode, port 0 functions as 4 10Gbps links and port 1 is disabled.
- iii. QSA (2X10G): This mode adds support for QSA (QSFP to SFP+) modules, enabling smooth, cost-effective, connections between 40 Gigabit Ethernet adapters and 1 or 10 Gigabit Ethernet networks using existing SFP+ based cabling. The port farthest from the motherboard will appear as the first network interface (Port 0).

To configure Chelsio adapter in any of the three modes mentioned above, use the *chelsio_adapter_config.ps1* configuration script. The script will be present in *<system_drive>\Windows\system32* folder. Follow the steps mentioned below:

- i. Open PowerShell with administrative privileges.
- ii. Run the adapter configuration script and select *Windows Technical Preview GUI* (option 1) as the Windows version. Hit [Enter].

PS	::\Users\Administrator> chelsio_adapter_config.ps1
Inp	1. Windows Technical Preview GUI 2. Windows Technical Preview Nano Server ut: 1
che	lsio_adapter_config Version 2.0
Ple	

iii. Enter the index of the 40G adapter for which the configuration needs to be updated. Hit [Enter].



Figure 17 - Selecting adapter

iv. Select Port settings (option 3) as the configuration type. Hit [Enter].

1.	configuration type: NON-SRIOV (Default) SRIOV
	Port settings
Input : 3	

Figure 18 - Port Settings

v. Select the operation mode and then enter *y* to confirm.

Choose	the type: 1. DEFAULT (2 x 40G)	
	2. SPIDER (4 x 10G)	
_	3. QSA (2 x 10G)	
Input	: 2 want to continue (y/n): y	
Success	sfully updated the selected configuration type.	
Verifi	cation: Passed	

Figure 19 - Operation mode

- vi. Open **Device Manager**, click on **System Devices** and right-click on the 40G Chelsio Adapter selected in step (iii).
- vii. Select **Disable** and then **Enable**, for changes to take effect.

4.2. Assigning IP address

- i. Double click on the Network Connections icon and choose the Chelsio card entry and double click it.
- ii. Click on the Properties button from the Local Area Connection X Status.
- iii. Select "Internet Protocol (TCP/IP)" from the list and click on Properties button below it.
- iv. From the Internet Protocol (TCP/IP) Properties window, assign an IP Address (e.g. 192.169.1.10) and subnet mask (e.g. 255.255.255.0).
- v. Click on Ok and close on the other window.
- vi. Check to see if you can ping to some other address on this subnet.

5. Mass Deployment

Using Unified Wire Installer's **Mass Deployment** feature, you can flash or erase Option ROM on multiple systems (nodes) simultaneously. The Installer utilizes **Unified Wire Manager's** Agent and Client components to implement this feature. The Client component has to be installed on the host machine and the Agent component on the remote nodes.

5.1. Pre-deployment Configuration

A configuration file containing directives is required by the Installer during installation, flashing and erasing option ROM. Follow the steps mentioned below to generate and configure the file:

- 1. Copy the Unified Wire Installer (ChelsioUwire-x.x.x.xx.exe) to a shared location accessible to all the nodes.
- 2. Open Windows PowerShell with administrative privileges (*right-click and select Run as Administrator*) and run the following command:

PS C:\Users\Administrator> .\ChelsioUwire-x.x.x.xx.exe -sampleconfig

The above command will generate a sample configuration file, *RemoteMachineconfig.txt*. It contains the following directives:

```
StartShareMachineInfo
ExecutablePath:\\<Machine-IP>\<Shared directory>\ChelsioUwire-x.x.x.xx.exe
User:<user>
Password:<password>
EndShareMachineInfo

StartOfCluster
<user>:<Password>
<IPAddress1>
<IPAddress2>
<IPAddress3>
<IPAddressN>
EndOfCluster
```

StartOfNonCluster
<ipaddress1>:<user1>:<password1></password1></user1></ipaddress1>
<ipaddress2>:<user2>:<password2></password2></user2></ipaddress2>
<ipaddress3>:<user3>:<password3></password3></user3></ipaddress3>
<ipaddressn>:<usern>:<passwordn></passwordn></usern></ipaddressn>
EndOfNonCluster

- 3. Open the configuration file and provide the following values:
 - a. Enter absolute path of the shared location where installer is copied to, for the ExecutablePath parameter.
 - b. Provide user credentials for the User and Password parameters of the machine where Installer was copied to.
 - c. Provide IP addresses of remote nodes between the StartOfCluster and EndOfCluster tags. Enter each node's IP address per line. If same user credentials are set for all the nodes, enter them after the StartOfCluster tag, separated by a colon.

E.g.:

StartOfCluster admin:pass123 10.193.184.63 10.193.184.62

EndOfCluster

For machines with different user credentials, enter each node's IP address and corresponding user credentials per line between the StartOfNonCluster and EndOfNonCluster tags in the following format.

E.g.:

10.193.184.76:admin:pass789 10.193.184.78:admin:pass_456

4. Save the file to a desired location.



10 Note For successful deployment of UM components and flashing/erasing option ROM, please ensure that the host machine and remote nodes are in the same domain.

5.2. Flashing Option ROM

Important

Unified Wire Installer will flash Option ROM onto the first Chelsio adapter present in remote node (Adapter with index 0. See **Configuring using UM CLI** to determine adapter index). Hence, ensure that you either use a non-Chelsio adapter for corporate/private network or ensure that the Chelsio adapter used is not installed as first on remote nodes.

Option ROM can be flashed using two methods. Both methods involve deployment of UM components.

- Deploying components and Flashing Option ROM together.
- Deploying components and Flashing Option ROM separately.
- ONOTE Both methods mentioned above will flash option ROM only onto the first Chelsio adapter present in the remote node. If you plan to flash more adapters in the same node or add new nodes to the cluster, they will have to be added as members to a group and flashed using UM's CLI component. See Configuring using UM CLI for instructions.
 - Flashing option ROM on remote nodes with inbox NDIS drivers will fail. Hence, please ensure that all nodes are updated to the latest version using the Unified Wire Installer.

5.2.1. Deploying UM components and Flashing Option ROM together

1. Run the following command to invoke the UM installer.

```
PS C:\Users\Administrator> .\ChelsioUwire-x.x.x.exe -action
flashoptionrom -config <config_file.txt>
```

2. Click the Next button for the Chelsio End User License Agreement Window.

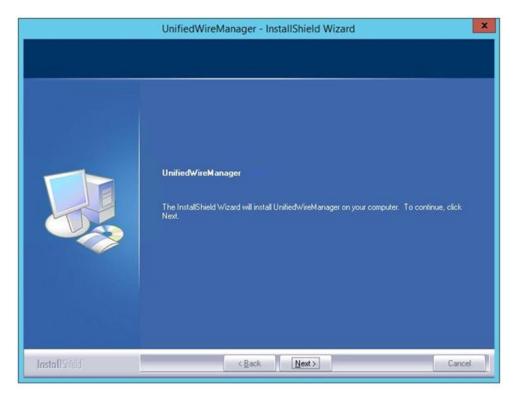


Figure 20 - UM Installer welcome window

3. Select the radio button I accept the terms of the license agreement and click Next.

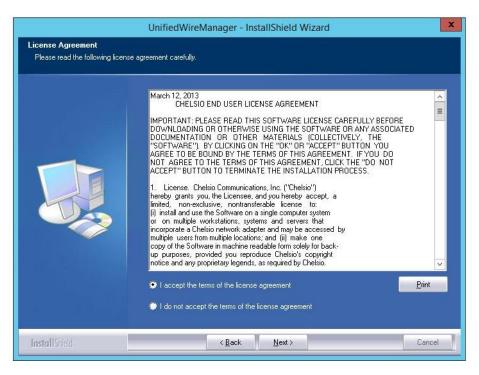


Figure 21 - Chelsio EULA Window

4. The next window will display the pre-requisites for various UM components. Ensure that they are met before proceeding. Click **Next**.

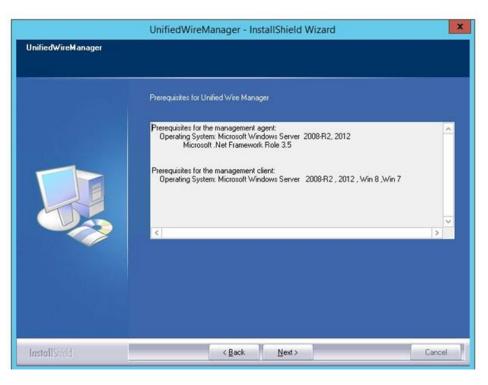


Figure 22 - UM prerequisites window

5. Now, select Custom radio button to customize the installation. Click Next.

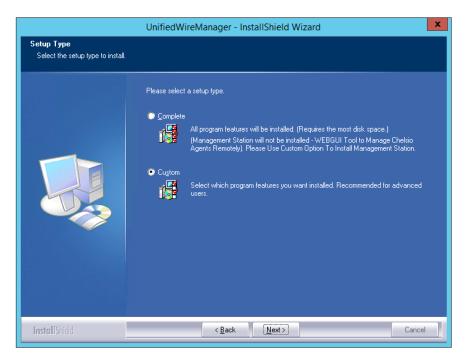


Figure 23 - UM prerequisites window

i. The next window will display the location where UM will be installed by default. You can change the location by using the **Change** button or click **Next** to continue with the default path.

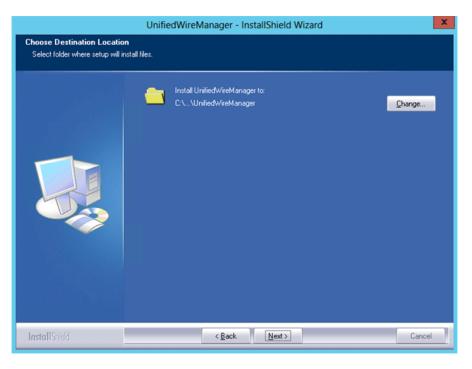


Figure 24 - Changing UM installation path

ii. Next, ensure that only **Client** is selected under features to be installed. Click **Next**.

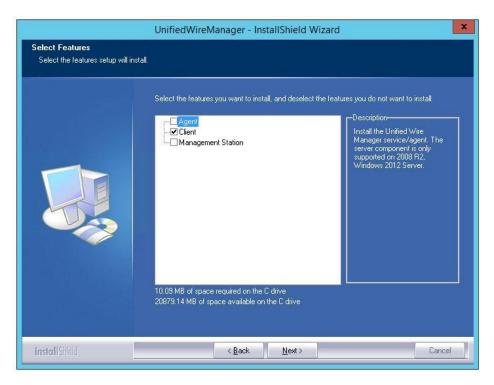


Figure 25 - Selecting UM components to install

6. Click **Finish** to complete Client installation.

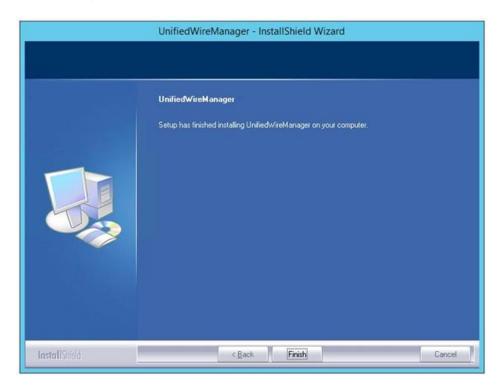


Figure 26 - Finishing UM installation

7. Now, installation of UM Agent component on remote nodes will commence.

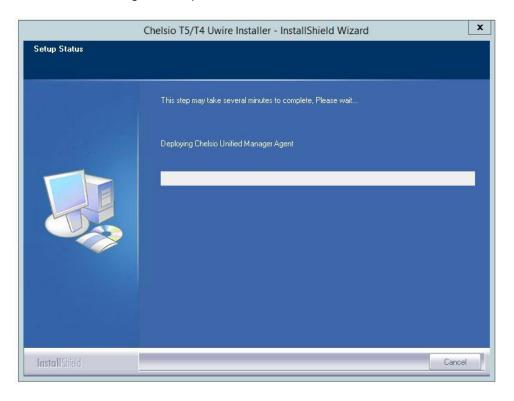


Figure 27 - Starting Agent installation

8. Click **Agree** on the **PsExec License Agreement** Window that appears. This window will appear only during first installation.



Figure 28 - PsEXec License Agreement

9. UM Agents will now be installed on remote nodes. A default group **OptionROM** will be created and all the nodes on which UM Agent was successfully installed, will be added to it as *members*.



Figure 29 - Agent installation on remote nodes

- Important Please ensure that the **OptionROM** group created here is not deleted. Also, UM Client component should not be un-installed. Doing so will cause flashing/erasing Option ROM to fail on remote nodes. UM components will have to be deployed again to fix this issue.
- 10. Option ROM will now be flashed onto adapters on remote nodes present in the **OptionROM** group.



11. After completion, a log file *MassDeploy.log* containing the summary of the process will be created. Click **OK** on the dialog box that appears to exit the installer and view the log.



Figure 31 - Finishing option ROM flashing

5.2.2. Deploying UM components and Flashing Option ROM separately

Deploying UM Components

1. Run the following command to invoke the Unified Wire Installer.

```
PS C:\Users\Administrator> .\ChelsioUwire-x.x.x.xx.exe -action deployagent
-config <config file.txt>
```

- Follow steps 2-9 in the Deploying UM components and Flashing Option ROM together section.
- 3. After completion, a log file *MassDeploy.log* containing the summary of the process will be created. Click **OK** on the dialog box that appears to exit the installer and view the log.

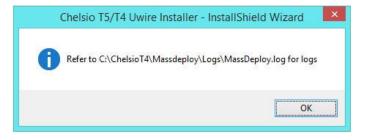


Figure 32 - Finishing UM components deployment

• Flashing Option ROM

1. Run the following command to flash Option ROM:

```
PS C:\Users\Administrator> .\ChelsioUwire-x.x.x.xx.exe -action
flashoptionrom
```

2. Flashing Option ROM is possible only if UM Agents were installed on nodes using this installer. Click **Yes** to continue.



Figure 33 - Starting option ROM flashing

- 3. Follow steps 10 and 11 in the **Deploying UM components and Flashing Option ROM** together section.
- **()** Note Flashing option ROM on remote nodes with inbox NDIS drivers will fail. Hence, please ensure that all nodes are updated to the latest version using the Unified Wire Installer.

5.3. Erasing Option ROM

- O Note Unified Wire Installer will erase option ROM only from the first Chelsio adapter present in the remote node. If you plan to erase from more adapters in the same node or add new nodes to the cluster, they will have to be added as members to a group and erased using UM's CLI component. See Configuring using UM CLI for instructions.
- 1. To erase Option ROM from adapters on all the nodes, run the following command:

```
PS C:\Users\Administrator> .\ChelsioUwire-x.x.x.xx.exe -action
eraseoptionrom
```

2. Erasing Option ROM is possible only if the adapters were flashed using this installer. Click **Yes** to continue.



Figure 34 - Starting option ROM erasing

3. Option ROM will now be erased from adapters on nodes present in the **OptionROM** group.



Figure 35 - Erasing option ROM on remote nodes

4. After completion, a log file *MassDeploy.log* containing the summary of the process will be created. Click **OK** on the dialog box that appears to exit the installer and view the log.

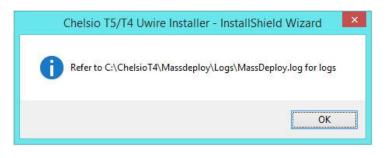


Figure 36 - Finishing option ROM erasing

5.4. Configuring using UM CLI

5.4.1. Configuring groups and members

You can manage multiple groups and members using Unified Wire Manager's CLI component, **chelsio_uwcli.**

To use the CLI component, you will have to change your working directory to the location where UM Client is installed. Typically, this will be C:\Program Files (x86)\Chelsio Communications\UnifiedWireManager\client. To avoid this and run the command from any path, you will need to reboot the host. The following examples assume that the host machine was rebooted before running commands.

• Create Group

To create a new group, run the following command:

PS C:\Users\Administrator> chelsio_uwcli.exe -m creategroup grpname=<new group name> OSType=windows GroupType=t4adapter

E.g.

PS C:\Users\Administrator> chelsio_uwcli.exe -m creategroup grpname=flash OSType=windows GroupType=t4adapter

PS C:\Users\Administrator> chelsio_uwcli.exe -m creategroup grpname=flash OSType=windows GroupType=t4adapter lachine Group created successfully

Figure 37 - Creating group

• Add member to group

To add a member to a group, run the following command:

```
PS C:\Users\Administrator> chelsio_uwcli.exe -m addmember
grpname=<group_name>
details="<IP address>;<user id>;<password>;*;*,*,<adapter index>,*,*,*,*,*/"
```

E.g.

```
PS C:\Users\Administrator> chelsio_uwcli.exe -m addmember grpname=OptionROM
details="10.193.185.107;administrator;cdrom888;*;*,*,0,*,*,*,*,*,*"
```

PS C:\Users\Administrator> chelsio_uwcli.exe -m addmember grpname=OptionROM details="10.193.185.107;administrator;cdrom@888;";";";";";";";" Machine added to group successfully

Figure 38 - Adding member to group

• View group and member details

To view details of all the groups and members created, run the following command:

PS C:\Users\Administrator> chelsio uwcli.exe -m list

```
S C:\Users\Administrator> chelsio_uwcli.exe -m list
achine Group Details
roup Name
SType
roup Type
                          : OptionROM
: windows
: t4adapter
          Member details
          index
hostname/IP address
                                            0
10.193.184.62
administrator
cdrom@888
           user
           assword
              rt instance
          Member details
          index : 1
hostname/IP address : 10.193.184.78
user : administrator
password : cdrom&888
                id
                                            * * 0 *
              rt instance
             dapte
                       no
```



Delete member from a group

To delete a member from a group, run the following command:

```
PS C:\Users\Administrator> chelsio_uwcli.exe -m deletemember
grpname=<group name> index=<member index>
```

E.g.

```
PS C:\Users\Administrator> chelsio_uwcli.exe -m deletemember
grpname=OptionROM index=1
```

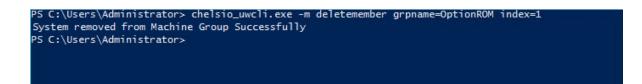


Figure 40 - Deleting member from group

• Delete Group

To delete a group, run the following command:

```
PS C:\Users\Administrator> chelsio_uwcli.exe -m deletegroup
grpname=<group_name>
```

E.g.

```
PS C:\Users\Administrator> chelsio_uwcli.exe -m deletegroup
grpname=OptionROM
```

PS C:\Users\Administrator> chelsio_uwcli.exe -m deleteqroup grpname=OptionROM Machine Group deleted successfully



5.4.2. Flashing/Erasing Option ROM

Apart from Unified Wire Installer, you can also use Unified Wire Manager's CLI component (*chelsio_uwcli*) to flash or erase Option ROM on multiple nodes. This is particularly useful when you need to flash/erase Option ROM on groups other than the default **OptionROM** group.

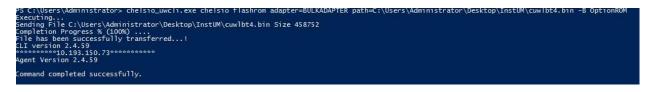
• Flashing Option ROM

To flash Option ROM using UM, run the following command:

```
PS C:\Users\Administrator> chelsio_uwcli.exe chelsio flashrom
adapter=BULKADAPTER path=<path to optionrom image file> -B <group name>
```

E.g.

```
PS C:\Users\Administrator> chelsio_uwcli.exe chelsio flashrom
adapter=BULKADAPTER path=C:\Users\Administrator\Desktop\cuwlbt4.bin -B
OptionROM
```





In the second second

• Viewing status

You can list the adapters on local host and verify if Option ROM was successfully flashed using the following command:

```
PS C:\Users\Administrator> chelsio_uwcli.exe chelsio listadapters -B
<group_name>
```

E.g.

PS C:\Users\Administrator> chelsio_uwcli.exe chelsio listadapters -B OptionROM

<pre>weak and the second secon</pre>	
gene version 2.4.35	
and the second second	
dapter information:	
dapter #	: 0
odel	: T440-LP-CR
erial Number	: NB15110005
onnector	: 10G FIBER_XFI
HY	: No Phy / No information Available
CI Vendor ID:Device ID	: 1425:01b8
CI Location	: 08:00:04
actory MAC address	: 00:07:43:04:75:01
PROM	: Present
PROM Bios Version	: 1.0.4.57
ios Version	: 1.0.4.57
ios Version *********10.193.184.78**** gent Version 2.4.59 dapter information:	: 1.0.4.57
ios Version *********10.193.184.78**** gent Version 2.4.59 dapter information: dapter #	: 0
ios Version ************************************	: 1.0.4.57
ios Version *********10.193.184.78**** gent Version 2.4.59 dapter information: dapter # ode1 erial Number	: 1.0.4.57 ******* : 0 : T404-BT : PT12110700
ios Version *********10.193.184.78**** gent Version 2.4.59 dapter information: dapter # odel erial Number onnector	: 1.0.4.57 : 0 : T404-BT : PTI2110700 : 1G/100M BT_SGMII/RJ-45
ios Version ************************************	: 1.0.4.57 ******* : 0 : T404-BT : PT12110700
ios Version mathematical gent Version 2.4.59 dapter information: dapter # odel erial Number onnector HY CI Vendor ID:Device ID	: 1.0.4.57 ******* : 0 : T404-BT : PT12110700 : 1G/100M BT_SGMII/RJ-45 : VCS8634
ios Version *********10.193.184.78**** gent Version 2.4.59 dapter information: dapter # odel erial Number onnector HY CI Vendor ID:Device ID CI Location	: 1.0.4.57 : 0 : T404-BT : PT12110700 : 1G/100M BT_SGMII/RJ-45 : VCS8634 : 1425:01b8
ios Version *********10.193.184.78**** gent Version 2.4.59	: 1.0.4.57 : 0 : T404-BT : PT12110700 : 1G/100M BT_SGMII/RJ-45 : VCS8634 : 1425:01b8 : 02:00:04

Figure 43 - Viewing status

• Erasing Option ROM

To erase Option ROM using UM, run the following command:

```
PS C:\Users\Administrator> chelsio_uwcli.exe chelsio eraserom
adapter=BULKADAPTER force=1 -B <group name>
```

In addition to flashing and erasing Option ROM, you can perform additional bulk operations on remote nodes like setting MTU and VLAN ID, changing adapter and port parameters, etc. To know more about these options available, run the following command:

```
PS C:\Users\Administrator> chelsio_uwcli.exe -
PS C:\Users\Administrator> chelsio_uwcli.exe chelsio eraserom adapter=BULKADAPTER force=1 -B OptionROM
Executing...
CLI version 2.4.59
********10.193.150.73********
Agent Version 2.4.59
Command completed successfully.
Figure 44 - Erasing option ROM using UM CLI
```

5.4.3. Help

To view Unified Wire Manager's CLI help, run the following command:

PS C:\Users\Administrator> chelsio_uwcli.exe -m

6. cxgbtool help

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.

Definitions

[nicInterface] is the name of the network device to work on, given in the format "nic[0,1,..n]"

[*vbdInterface*] is the name of the Chelsio Bus Enumerator instance to work on, given in the format "vbd[0,1,...n]"

Syntax

cxgbtool [vbdInterface|nicInterface][parameters][(optionalParameters)]

• -h

Description: Displays help

Syntax: cxgbtool -h

• cim_la

Decription: Displays results of logic analyzer trace.

Syntax: cxbtool [vbdInterface] cim_la

ontext

Description: Shows an SGE context.

Syntax: cxgbtool [vbdInterface] context [contextType] [queueld]

Context Type Parameters:

Egress: Egress queue context. *fl:* Free list manager context. *response:* Response queue context. *ingress:* Ingress queue context. *cq:* RDMA completion queue context. *cong:* Congestion context.

Example:

```
C:\Users\Administrator>cxgbtool vbd0 context egress 0
Response Data:
00000010 0000000 0000006 0000074 0000000
00000020 0000001 00000050 00000000 0000000

        00000030
        0000000
        0000000
        0000000
        0000000

        00000040
        0000000
        0000000
        0000000
        0000000

        00000050
        0000000
        0000000
        0000000
        0000000

In show t4 ctxt: p->mem id = 0
StatusPgNS: 0
StatusPgRO:
                   0
FetchNS:
                    0
FetchRO:
                   0
Valid:
                    1
PCIeDataChannel: 0
                    0
DCAEgrQEn:
DCACPUID:
                     0
FCThreshOverride: 0
```

• filter

Description: Displays list of configured hardware filters

Syntax: cxgbtool [nicInterface] filter

```
C:\Users\Administrator>cxgbtool nic0 filter
Ftid Prot FPORT LPORT Type Que_Id DMAC_Idx Locked Hits
```

Ioadfw

Description: Loads firmware image.

Syntax: cxgbtool [vbdInterface] loadfw [firmwareImage]

1 Note The Firmware input file used must be a binary and not a header file.

Example:

C:\Users\Administrator>cxgbtool vbd0 loadfw t5fw-1.11.18.0.bin

Ioadcfg

Description: Loads firmware configuration file or clears configuration flash region.

1 Note The configuration file used must be in text format and not a header file.

Syntax: cxgbtool [vbdInterface] loadcfg [[firmwareConfigurationFile]|clear]

Example:

Loading T5 firmware configuration file:

```
C:\Users\Administrator>cxgbtool vbd0 loadcfg t5-config.txt
Flashing configuration file C:\Users\Administrator\Desktop\t5-config.txt
of size 22607 ...
```

Clearing the configuration file region in flash

```
C:\Users\Administrator>cxgbtool vbd0 loadcfg clear
Clearing configuration file in flash...
```

Ioadphy

Description: Loads phy firmware.

Syntax: cxgbtool [vbdInterface] loadphy [phyFile]

Example:

C:\Users\Administrator>cxgbtool vbd0 loadphy .\Firmware_1.25.c1.Chelsio.cld

Ioadboot

Description: Flashes the Option ROM image.

Syntax: cxgbtool [vbdInterface] loadboot [bootImageFile] [pf {0|1|2|...|7}|offset {val}|clear]

Parameters:

pf{val}: Flash Option ROM image to the offset defined by the PFs EXPROM_OFST in the serial configuration.

offset {val}: Flash Option ROM image to the offset specified by the user.

clear: The flash area reserved for Option ROM image will be cleared.

Example:

Flashing Option ROM image to the offset defined by the PFs EXPROM_OFST:

C:\Users\Administrator>cxgbtool vbd0 loadboot cuwlbt4.bin pf 0

Flashing Option ROM image to user specified offset:

C:\Users\Administrator>cxgbtool vbd0 loadboot cuwlbt4.bin offset 0x100

Ioadboot-cfg

Description: Loads boot configuration file.

Syntax: cxgbtool [vbdInterface] loadboot-cfg [[bootConfigImageFile]|clear]

Parameters:

clear: The flash area reserved for boot configuration file will be cleared.

```
C:\Users\Administrator>cxgbtool vbd0 loadboot-cfg .\boot-config.bin cxgb_CmdLoadBootCfg: BootROM length: 1664, value2add:0
```

• mdio

Description: Reads/writes MDIO register.

```
Syntax: cxgbtool [vbdInterface] mdio
[physicalAddress][manageableDevicesAddress][registerAddress] [(writeValue)]
```

Example

Read MDIO register

```
C:\Users\Administrator>cxgbtool vbd0 mdio 0 0 0
```

Write MDIO register

```
C:\Users\Administrator>cxgbtool vbd0 mdio 0 0 0 0
```

• meminfo

Description: Displays memory info.

Syntax: cxgbtool [vbdInterface] meminfo

```
C:\Users\Administrator>cxgbtool vbd0 meminfo
EDC0: 0-0x2fffff [3.00 MiB]
EDC1: 0x300000-0x5fffff [3.00 MiB]
RQUDP region: 0xfffffff-0xfffffffe [0 B]
iSCSI region: 0xfffffff-0xfffffffe [0 B]
Tx payload: 0-0x17ffffff [384 MiB]
Rx payload: 0-0x7afffff [123 MiB]
IMSG contexts: 0x17b280-0x23b27f [768 KiB]
ULPTX state: 0x23b280-0x2443bf [36.3 KiB]
ULPRX state: 0x2443c0-0x248bbf [18.0 KiB]
Pstructs: 0x248bc0-0x2c9e3f [511 KiB]
Rx FL: 0x2c89c0-0x2c9e3f [5.12 KiB]
.
```

• mtus

Description: Prints hardware MTU table.

Syntax: cxgtool [vbdInterface] mtus

Example:

```
C:\Users\Administrator>cxgbtool vbd0 mtus
Path mtus : 88 256 512 576 808 1024 1280 1488 1500 2002 2048 4096 4352 8192
9000 9600
```

• qsets

Description: Reads # of qsets

Syntax: cxgbtool [nicInterface] qsets

Example:

C:\Users\Administrator>cxgbtool nic0 qsets							
QueType	AbsId	RelId	Fl0Id	Fl1Id	Msix	QDepth	
TxEth	8	8	n/a	n/a	n/a	1024	
TxEth	9	9	n/a	n/a	n/a	1024	
TxEth	10	10	n/a	n/a	n/a	1024	
TxEth	11	11	n/a	n/a	n/a	1024	
TxCtrl	12	12	n/a	n/a	n/a	1024	
TxRdma	13	13	n/a	n/a	n/a	1024	
RxIng	1	1	0	0	6	1023	
RxEth	2	2	0	0	8	3071	
RxEth	3	3	1	0	2	3071	
RxEth	4	4	2	0	4	3071	
RxEth	5	5	3	0	14	3071	
RxRdma	6	6	4	0	16	511	
RxRdma	7	7	5	0	10	511	
RxRdma	8	8	6	0	12	511	
RxRdma	9	9	7	0	22	511	

• qstats

Description: Displays statistics for each Tx & Rx queue.

Syntax: cxgbtool [nicInterface] qstats [queueType [(clr)]]

Queue Type parameters:

txeth: Tx tunnel queue statistics.

rxeth: Rx tunnel queue statistics. txvmq: Tx VM queue statistics. rxvmq: Rx VM queue statistics. txtoe: Chimney Tx queue statistics. rxtoe: Chimney Rx queue statistics. txrdma: RDMA Tx queue statistics. txrdma: RDMA Rx queue statistics. txctrl: Chimney control queue statistics. txfwd: Chimney forwarding queue statistics. txnvgre: Tx NVGRE statistics. rxnvgre: Rx NVGRE statistics. clr: Clear Queue statistics.

Example of rxeth qstats:

C:\Users\Administrator>cxgbtool nic0 qstats rxeth				
StatsType	RxEth#2	RxEth#3	RxEth#4	RxEth#5
UcPkts	31	27	81	0
UcBytes	2980	3216	10860	0
McPkts	579	612	543	0
McBytes	43866	45371	42950	0
BcPkts	29	102	1422	0
BcBytes	2472	24786	131544	0
CoalPkts	0	0	0	0
CoalBytes	0	0	0	0
DropPkts	0	0	0	0
RecvNbls	639	741	2046	0
RxCsumGood	600	735	2025	0
VLANex	0	0	0	0
RssProc	1	2	3	1
RssGroup	0	0	0	0

reg

Description: Reads/writes register.

Syntax:

Register Read: cxgbtool [vbdInterface] reg [readAddress]

Register Write: cxgbtool [vbdInterface] reg [[writeAddress] = {val}]

Register read:

```
C:\Users\Administrator>cxgbtool vbd0 reg 0x19428
00000008 [8]
```

Register write:

```
C:\Users\Administrator>cxgbtool vbd0 reg 0x19428 = 0x3
```

• regdump

Description: Displays registers of a hardware module. Not specifying any parameter will display registers for all the modules. Not all modules are available on all adapters.

Syntax:

Display registers for all available modules: cxgbtool [vbdInterface] regdump

Display registers for specific module: cxgbtool [vbdInterface] regdump [registerModule]

Register module parameters:

Module parameter	Description
sge	Scatter-Gather DMA Engine common register set.
pci	PCI Express Interface common register set. This module implements the PCI-Express SR-IOV physical logical, data link, and transaction layers.
dbg	Debug Engine Common register set.
тс0	Memory controller 0 common register set. This module implements the memory controller for the optional external DDR-II/DDR-III SDRAM.
mc1	Memory controller 1 common register set. This module implements the memory controller for the optional external DDR-II/DDR-III SDRAM.
ma	Memory Arbiter common register set. This module implements the arbitration of memory requests from the various on-chip sources to the memory hierarchy consisting of on-chip eDRAM, external DDR2/DDR3 memory, and host memory that is accessed through the PCIe.
edc0	eDRAM and Controller 0 common register set. This is the on-chip eDRAM and controller.
edc1	eDRAM and Controller 1 common register set. This is the on-chip eDRAM and controller.
cim	CIM common register set. This module implements the CPU interface and μ P is the embedded microprocessor. The CIM incorporates functions to improve the performance of CPU accesses to external memory.
tp	Transport Protocol Engine common register set. This module implements the main packet processing pipeline.
ulp_rx	Ingress Upper Layer Protocol common register set. This module implements the upper layer protocol processing in the ingress direction for protocols that are layered on top of TCP, such as iSCSI and RDMA.

ulp_tx	Egress Upper Layer Protocol common register set. This module provides Upper Layer support for RDMA and iSCSI offload in the			
	transmit direction, and also implements LSO/TSO functionality.			
pmrx	Ingress Payload Manager common register set. These modules implement the payload manager for receive/ingress.			
pmtx	Egress Payload Manager common register set. These modules implement the payload manager for transmit/egress.			
mps	Multi-port support common register set. This module implements the multi-port support for T4, and switches egress packets to the ingress path when their Ethernet DA (Destination Address) matches an address in the exact match Ethernet Address database, or if the outer-VLAN indicates that the packet is destined to another virtual machine connected to the T4, or if another virtual machine is subscribing to an L2 multicast group that is the MAC destination address of the packet.			
cplsw	CPL Switch common register set. This module implements a configurable switch for ingress CPL messages to the SGE and/or CIM. The embedded μP is assigned a receive queue number and can be assigned one or more MAC addresses and IP addresses, and any of these can be used to switch ingress packets to the μP for processing.			
smb	System Management Bus common register set. This module implements an SMBus Master/Slave for system management.			
i2c	I2C-Bus Master common register set. This module implements an I2C- Bus Master for PHY management and I/O expansion.			
mi	MI common register set. This module implements an MDIO Master for PHY management.			
uart				
рти	Power Management Unit common register set. Power management unit.			
sf	Serial Flash controller common register set. This module implements the serial flash controller. It interfaces to the external serial flash device.			
pl	PIO Local Bus controller common register set. This module implements the PIO Local Bus controller. It is physically distributed across T4/T5.			
le	Lookup Engine Common register set. The Lookup Engine implements the connection, filter and ACL databases. This module includes a TCAM Memory controller that interfaces with the on-chip TCAM memory array, and it implements the interface to the external memory that is used to scale the support of the connection database to 1M connections. The LE stores ACL rules, it stores routing information to handle routing for SYN-cookie mode offloaded listening servers, and it stores tuple information for offloaded connections, and FCoE exchanges.			
ncsi	Network Controller sideband Interface common register set. The module implements the NCSI (Network Controller Sideband Interface) protocol.			
xgmac				
mac	MAC common register set.			
hma				

T4 Register Modules	T5 Register Modules
sge	sge
рсі	pci
dbg	dbg
mc	mc0
ma	mc1
edc0	ma
edc1	edc0
cim	edc1
tp	cim
ulp_rx	tp
ulp_tx	ulp_rx
pmrx	ulp_tx
pmtx	pmrx
mps	pmtx
cplsw	mps
smb	cplsw
i2c	smb
mi	i2c
uart	mi
pmu	uart
sf	pmu
pl	sf
le	pl
ncsi	le
xgmac	ncsi
	mac
	hma

Displaying all available module registers:

C:\Users\Administrator>cxgbtool vbd0 regdump		
[0x1e000] SGE_PF_KDOORBELL	0	0
31:15 QID	0	0
14:14 Priority	0	0
13:13 Type	0	0
12:0 PIDX	0	0
[0x1e004] SGE_PF_GTS	0	0
31:16 IngressQID	0	0
15:13 TimerReg	0	0
12:12 SEIntArm	0	0
11:0 CIDXInc	0	0
•		
•		
•		

Displaying specific (mps) module registers:

C:\Users\Administrator>cxgbtool vbd0 regdump mps		
[0x9000] MPS_CMN_CTL	0x1	1
4:4 LpbkCrdtCtrl	0	0
3:3 Detect8023	0	0
2:2 VFDirectAccess	0	0
1:0 NumPorts	0x1	1
•		

• tcb

Description: Reads hardware TCP Control Block, which contains details regarding all offloaded connections.

Syntax: cxgbtool [nicInterface] tcb [tid]

```
C:\Users\Administrator>cxgbtool nic0 tcb 5070
HW TCB
ulp_type
            : 0x7
ulp raw
                   : 0x0
l2t ix
                   : 0xf40
smac_sel
                 : 0x36
tf suspend
                   : 0x0
tf_non_offload
                   : 0x0
tf lock tid
                   : 0x0
tf keepalive
                   : 0x0
tf dack
                   : 0x0
tf_dack_mss
                   : 0x0
tf_dack_not_acked : 0x0
tf nagle
                 : 0x0
•
.
```

• tpi

Description: Displays TP indirect registers.

Syntax: cxgbtool [vbdInterface] tpi

Example:

C:\Users\Administrator>cxgbtool vbd0 tpi					
TP_1	TP_PIO				
[0x20] TP_RX_SCHED_MAP	0x55555555	1431655765		
	31:24 S_RXMAPCHANNEL3	0x55	85		
	23:16 S_RXMAPCHANNEL2	0x55	85		
	15:8 S_RXMAPCHANNEL1	0x55	85		
	7:0 S_RXMAPCHANNEL0	0x55	85		
[0x21] TP_RX_SCHED_SGE	0xf	15		
	15:12 S_RXSGEMOD1	0	0		
	11:8 S_RXSGEMOD0	0	0		
	3:3 S_RXSGECHANNEL3	0x1	1		
•					
•					
•					
l					

sgedbg

Description: Displays sge debug indirect registers.

Syntax: cxgbtool [vbdInterface] sgedbg

C:\Users\Administrator>cxgbtool vbd0 sgedbg		
SGE DEBUG DATA HIGH00	0x3000000	50331648
SGE_DEBUG_DATA_HIGH01	0	0
SGE_DEBUG_DATA_HIGH02	0	0
SGE_DEBUG_DATA_HIGH03	0	0
SGE_DEBUG_DATA_HIGH04	0	0
SGE_DEBUG_DATA_HIGH05	0	0
SGE_DEBUG_DATA_HIGH06	0	0
SGE_DEBUG_DATA_HIGH07	0	0
SGE_DEBUG_DATA_HIGH08	0x26020000	637665280
SGE_DEBUG_DATA_HIGH09	0	0
SGE_DEBUG_DATA_HIGH10	0x3	3
SGE_DEBUG_DATA_HIGH11	0	0
•		

o dumpctx

Description: Displays Adapter Context.

Syntax: cxgbtool [nicInterface] dumpctx

Example:

```
C:\Users\Administrator>cxgbtool nic0 dumpctx

Type Value

Link State Connected

Link Speed 10 Gbps

Hw Addr 00:07:43:04:7d:60

Cur Addr 00:07:43:04:7d:60

Port No 0

NetIfIdx 18

Mtu 1500

.

.
```

• version

Description: Displays the Adapter Part Number, Serial Number, Device ID, Firmware Version, TP, NDIS Driver version, and VBD version.

Syntax: cxgbtool [vbdInterface] version

Example:

```
C:\Users\Administrator>cxgbtool vbd0 version
P/N: 11011605002
S/N: RE14130227
NIC DeviceID 5401 (T520-CR)
NIC FW Version 1.14.4.0
NIC TP Version 0.1.4.8
Ndis Driver Version 5.5.11.0
VBD Version 5.5.11.0
```

• fwtoc

Description: Converts Firmware binary file to source file header.

Syntax: cxgbtool [vbdInterface] fwtoc [firmwareFile] filename= [CFileName].bin

```
C:\Users\Administrator>cxgbtool vbd0 fwtoc .\Chelsio-Uboot-
1.0.0.68\t4fw- 1.12.14.0.bin filename=t4fw-1.12.14.0.bin
```

• inst

Description: Installs driver package specified in the setup information file (.inf).

Syntax: cxgbtool [vbdInterface] inst [infFilePath]

Example:

```
C:\Users\Administrator>cxgbtool vbd0 inst .\chnetx64.inf
ENTER: DriverPackageInstallA
ENTER: DriverPackageInstallW
Installing INF file '.\chnetx64.inf' (Plug and Play).
Looking for Model Section [Chelsio.NTamd64.6.2]...
Installing devices with Id "CHT5BUS\chnet" using
INF "C:\Windows\System32\DriverStore\FileRepository\chnetx64.inf_amd64_
dd8d3a55aa5c4536\chnetx64.inf".
Installation did not occur because the current driver on the device is
the same or better.
No drivers installed. Drivers contained
in 'C:\Windows\System32\DriverStore\FileRepository\chnetx64.inf_amd64_dd8d3
a55a a5c4536\chnetx64.inf' are not better than current one's.
RETURN: DriverPackageInstallW (0x103)
RETURN: DriverPackageInstallA (0x103)
```

• uninst

Description: Uninstalls driver package specified in the setup information file (.inf).

Syntax: cxgbtool [vbdInterface] uninst [infFile]

Example:

```
C:\Users\Administrator>cxgbtool vbd0 uninst .\chnetx64.inf
Removing device instance CHT<4|5>BUS\CHNET\5&39B01C76&1&0000
```

update

Description: Updates driver package.

Syntax: cxgbtool update [infFile]

```
C:\Users\Administrator>cxgbtool update C:\ChelsioT4\driver\2k12\amd64\
Driver for HwId:CHT5BUS\CHNET updated successfully!!!
Driver for HwId:PCI\VEN_1425&DEV_5610&SUBSYS_00001425&REV_00 updated
successfully!!!
Driver update for HwId:PCI\VEN_1425&DEV_5409&SUBSYS_00001425&REV_00 failed
No more data is available.
```

rescan all

Description: Scans for hardware changes in the device manager.

Syntax: cxgbtool [vbdInterface] rescan all

Example:

```
C:\Users\Administrator>cxgbtool vbd0 rescan all
```

• trace

Description: Enables driver debug prints.

Syntax: trace [nicInterface|vbdInterface] trace [nic|vbd] [(flags)][(level)]

Example:

```
C:\Users\Administrator>cxgbtool vbd0 trace vbd 8 7
Tracing vbd flags=0x8 level=7
Press 'q' to quit tracing:
```

seeprom

Description: Reads/Writes SEEPROM (init+VPD) data.

Syntax:

Read SEEPROM data to a bin file: cxgbtool [vbdInterface] seeprom read

Display SEEPROM data in console: cxgbtool [vbdInterface] seeprom dump

Write SEEPROM data: cxgbtool [vbdInterface] seeprom write [seepromFile]

Verify SEEPROM data: cxgbtool [vbdInterface] seeprom verify [seepromFile]

Read SEEPROM data:

```
C:\Users\Administrator>cxgbtool.exe vbd0 seeprom read
Reading Seeprom data to seeprom.bin
```

Write SEEPROM data:

C:\Users\Administrator>cxgbtool.exe vbd0 seeprom write seeprom.bin Changing the init/vpd can cause the card to become inaccessible if the operation is interrupted Do you want to flash your T580-LP-CR (SN:PT02141264,PN:110116450B0,NA:000743291420) card? (y/n) : y Hardware configuration changed successfully. Please reboot for the changes to take effect

Verify SEEPROM data:

```
C:\Users\Administrator>cxgbtool.exe vbd0 seeprom verify seeprom.bin
Verifying seeprom data against seeprom.bin
verification started
Verification : PASSED
```

serialinit

Description: Reads/Writes serialinit data.

Syntax:

Read serialinit data to a bin file: cxgbtool [vbdInterface] serialinit read

Display serialinit data in console: cxgbtool [vbdInterface] serialinit dump

Write serialinit data: cxgbtool [vbdInterface] serialinit write [initdataFile]

Verify serialinit data: cxgbtool [vbdInterface] serialinit verify [initdataFile]

Read serialinit data

```
C:\Users\Administrator>cxgbtool vbd0 serialinit read
Reading Serial Init data to seeprom init.bin
```

Write serialinit data

```
C:\Users\Administrator>cxgbtool vbd0 serialinit write C:\ChelsioT4\Adapter
Configuration\SRIOV\t520_cr_init_gen3_250_825_Pf4vf.bin
Changing the init/vpd can cause the card to become inaccessible if the
operation is interrupted
Do you want to flash your T520-CR
(SN:PT05140526,PN:110116050D0,NA:0007432962F0) card? (y/n): y
Hardware configuration changed successfully.
```

Verify serialinit data

```
C:\Users\Administrator>cxgbtool vbd0 serialinit verify C:\ChelsioT4\Adapter
Configuration\SRIOV\t520_cr_init_gen3_250_825_Pf4vf.bin
Verifying Serial Init data against C:\ChelsioT4\Adapter
Configuration\t520_cr_init_gen3_250_825_Pf4vf.bin
verification started
Verification: PASSED
```

vpd

Description: Reads/writes VPD data.

Syntax:

Read VPD data: cxgbtool [vpdInterface] vpd

Write VPD data to serial EEPROM on chip: cxgbtool [vpdInterface] vpd [vpdFile]

Example:

Read VPD Data:

C:\Users\Administrator>cxgbtool vbd0 vpd

Write VPD Data:

C:\Users\Administrator>cxgbtool vbd0 vpd vpd.bin

• vpdparams

Description: Displays the adapters Serial Number, Device ID, EC, Core Clock, Part Number, and Network Address (MAC).

Syntax: cxgbtool [vbdInterface] vpdparams

```
C:\Users\Administrator>cxgbtool vbd0 vpdparams
Serial Number : RE14130227
Id : T520-CR
Ec : 00000000000000
Core Clock : 250000
Pn : 11011605002
Network Addr : 000743047D60
```

• wtp

Description: Traces the Ingress and Egress path of a packet through the Chelsio adapter.

Syntax: cxgbtool [vbdInterface] wtp

C:\Use:	rs\Administrator>cxgbtool vbd0 wtp
LOW	0x0000000
HIGH	0x00aa0000
LOW	0x0003f000
HIGH	0x00660022
LOW	0x0000000
HIGH	0x0000eeee
LOW	0x0000000
HIGH	0x0000eeee
LOW	0x0000000
HIGH	0x00aa00aa
LOW	0x0070000b
HIGH	0x0000eeee
LOW	0x0000008
HIGH	0x0000eeee
LOW	0x0000013
HIGH	0x00550033
LOW	0x0000016
HIGH	0x0002006e
LOW	dx000000b
HIGH	0x00880022
LOW	0x00c00001
HIGH	0x000000
LOW	0x0000001
HIGH	0x000000
LOW	0x000000
HIGH	0x0000000
LOW	0x0000000
HIGH	0x0000000
LOW	0x01534745 0x45475301
HIGH LOW	0x45475501 0xfeacb8ba
HIGH	0xbab8acfe
	= nic0 nic1

	core>PCIE>SGE<- #Ring Doorbell
SOP	? ???
EOP	? ???
	-core <pcie<sge<- #request="" request<="" td="" work=""></pcie<sge<- >
SOP	
EOP	
	>core>PCIE>SGE>CIM/uP-> #Work Request to uP

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```
SOP
       1fe
                      0
                а
                                   EOP
       1fe
                      0
                а
                                   MOD |<-core<----PCIE<----SGE<-----UTX<----|
                                      #Request DATA
SOP | 3fc
               2
                     1c
               2
EOP |
       ?
                     1c
MOD |->core-->PCIE-->SGE-->UTX---->TPC---->TPE---->MPS---->XGMAC--->wire
SOP
       3fc 1c 1c 19 (19) 19 ff 12 (182) 182 3fc fffffffc
       3fc
                                                3fc
EOP
            1c
                  1c
                       19 (19) 19
                                 ff 12 (182) 182
                                                       ffffffc
DROP: ???
            ???
                   ???
                           ???
                                  0
                                          0
                                                 ???
core<-PCIE<---SGE<--CSW<----TPC<-URX<--TPE<----MPS<----XGMAC<---wire
MOD
          3fc1c65193fc1c6519
SOP
                                2
                                     2
                                         2 92 92
                                                   3fc
                                                         ffffc
EOP
                               2
                                     2
                                          2 92 92
                                                   3fc
          ???
                  ???
                        0(mib) 0(err) 0(oflow) f8(cls)
DROP: ???
INTS: f \leftarrow e f \leftarrow 6 f \leftarrow 0 f \leftarrow 0 (PCIE \leftarrow SGE, channels 0 to 3)
```

stats

Description: Prints MAC statistics for a given port or TP MIB statistics.

Syntax: cxgbtool [vbdInterface] stats [mac{portInstance}|mib]

C:\Use	ers\Administrator>cxgbtool vbd0 stats mac0
LOW	0x0000000
HIGH	0x0000066
LOW	0x0003f000
HIGH	0x00aa00ee
LOW	0x0000000
HIGH	0x0000eeee
LOW	0x0000000
HIGH	0x0000eeee
LOW	0x0000000
HIGH	0x0000000
LOW	0x0070000b
HIGH	0x0000eeee
LOW	0x0000013
HIGH	0x0000eeee
LOW	0x0000013
HIGH	0x001199cc
LOW	0x0000016
HIGH	0x00020491
LOW	d000000b
•	
•	
•	

opl_stats

Description: Displays CPL Request and Response Statistics for all channels.

Syntax: cxgbtool [vbdInterface] cpl_stats

Example:

```
C:\Users\Administrator>cxgbtool vbd0 cpl_stats
channel 0 channel 1 channel 2 channel 3
CPL requests: 4 3 0 0
CPL responses: 3 3 0 0
```

• debugfs

Description: When used in conjunction with other options, *debugfs* displays useful information regarding Chelsio adapters.

Syntax: cxgbtool [vbdInterface] debugfs [option]

debugfs options:

cctrl

Description: Displays congestion control table.

Syntax: cxgbtool [vbdInterface] debugfs cctrl

```
C:\Users\Administrator>cxgbtool vbd0 debugfs cctrl
0: 24 108 236 268 384 492 620 724
730 981 1004 2028 2156 4076 4480 4780 1 0.5
1: 8 36 78 89 128 164 206 241
243 327 334 676 718 1358 1493 1593 1 0.5
.
```

• cim_pif_la

Description: Displays CIM PIF logic analyzer trace.

Syntax: cxgbtool [vbdInterface] debugfs cim_pif_la

Example:

```
C:\Users\Administrator>cxgbtool vbd0 debugfs cim_pif_la

Cntl ID DataBE Addr Data

01 01 f000 e1003060 40004044400040444000404440004044

81 00 f000 e1003060 00004044000040440000404440004044

81 00 f000 e1003060 4000304440003044400030444

.

.
```

• cim_ma_la

Description: Displays results of CIM MA logic analyzer trace.

Syntax: cxgbtool [vbdInterface] debugfs cim_ma_la

```
C:\Users\Administrator>cxgbtool vbd0 debugfs cim ma la
.
Cnt ID Tag UE
            Data RDY VLD
  0 0 0 0 0000000000000 0 0
  0 0 0 00000000000000 0
                        0
  0 0 0
       0 00000000000000 0
                        0
  0 0 0 0 0000000000000 0 0
  0 0 0 00000000000000 0 0
  0 0 0
        0 0000000000000 0 0
```

• cim_qcfg

Description: Displays CIM queue configuration details.

Syntax: cxgbtool [vbdInterface] debugfs cim_qcfg

Example:

C:\Users\	Administr	ator>cxg	btool vbd	0 debugf	s cim_qcf	a		
Queue	Base	Size	Thres	RdPtr	WrPtr	SOP	EOP	Avail
TPO	0	2048	0	40	40	2	2	2048
TP1	800	2048	0	0	0	0	0	2048
ULP	1000	2048	0	0	0	0	0	2048
SGE0	1800	2048	0	7e0	7e0	476	476	2048
SGE1	2000	2048	0	0	0	0	0	2048
NC-SI	2800	2048	0	0	0	0	0	2048
ULP0	0	2048		130	130	805	805	2048
ULP1	800	2048		80	80	648	648	2048
ULP2	1000	2048		0	0	0	0	2048
ULP3	1800	2048		0	0	0	0	2048
SGE	2000	2048		340	340	136	136	2048
NC-SI	2800	2048		0	0	0	0	2048

clk

Description: Displays the core clock.

Syntax: cxgbtool [vbdInterface] debugfs clk

```
C:\Users\Administrator>cxgbtool vbd0 debugfs clk
Core clock period: 4 ns
TP timer tick: 32.768 us
TCP timestamp tick: 1048.576 us
DACK tick: 8.192 us
DACK timer: 488 us
Retransmit min: 960 us
Retransmit max: 9765440 us
Persist timer min: 960 us
Persist timer max: 9765440 us
Keepalive idle timer: 7031116800 us
Keepalive interval: 73240800 us
Initial SRTT: 137437100448 us
FINWAIT2 timer: 9765440 us
```

ddp_stats

Description: Displays DDP(Direct Data Placement) statistics.

Syntax: cxgbtool [vbdInterface] debugfs ddp_stats

Example:

```
C:\Users\Administrator>cxgbtool vbd0 debugfs ddp_stats
Frames: 0
Octets: 0
Drops: 0
```

cudbg

Description: Redirects all hardware debug logs to a file.

Syntax: cxgbtool [vbdInterface] debugfs cudbg [fileName]

Example:

```
C:\Users\Administrator>cxgbtool vbd0 debugfs cudbg cudbg_debug
cxgbtool: This may take a while. Please be patient
cxgbtool: Writing cudbg block to file cudbg_debug... size: 12006043 bytes
cxgbtool: Done writing cudbg data to file cudbg debug
```

• edc0

Description: Redirects EDC0 memory details to a file.

Syntax: cxgbtool [vbdInterface] debugfs edc0 [fileName]

1 It is recommended that the fileName should be provided without any extension.

```
C:\Users\Administrator>cxgbtool vbd0 debugfs edc0 edc0
cxgbtool: This may take a while. Please be patient
cxgbtool: Reading MEM_EDC0 (0) memory of size 3145728 bytes
cxgbtool: Writing memory block to file edc...
cxgbtool: Done writing memory block to file edc0
```

edc1

Description: Redirects EDC1 memory details to a file.

Syntax: cxgbtool [vbdInterface] debugfs edc1 [fileName]

1 It is recommended that the fileName should be provided without any extension.

Example:

```
C:\Users\Administrator>cxgbtool vbd0 debugfs edc1 edc1
cxgbtool: This may take a while. Please be patient
cxgbtool: Reading MEM_EDC1 (1) memory of size 3145728 bytes
cxgbtool: Writing memory block to file edc1...
cxgbtool: Done writing memory block to file edc1
```

flash

Description: Redirects Flash memory details to a file.

Syntax: cxgbtool [vbdInterface] debugfs flash [fileName]

Note It is recommended that the fileName should be provided without any extension.

Example:

```
C:\Users\Administrator>cxgbtool vbd0 debugfs flash flash
cxgbtool: This may take a while. Please be patient
cxgbtool: Reading Flash memory of size 4194304 bytes
cxgbtool: Writing memory block of size 4194304 bytes to file flash...
cxgbtool: Done writing memory block to file flash
```

ibq_tp

Description: Displays CIM TP inbound queue.

Syntax: cxgbtool [*vbdInterface*] debugfs ibq_tp[{0|1}]

```
C:\Users\Administrator>cxgbtool vbd0 debugfs ibq_tp0
000000: 078003ff ffc04102 2e8003ff 0000000
0x0010: 2effc041 0000000 0000000 0000000
0x0020: 078103ff ffc04202 2e8103ff 0000000
0x0030: 2effc042 0000000 0000000 0000000
.
```

ibq_ulp

Description: Displays CIM ULP inbound queue.

```
Syntax: cxgbtool [vbdInterface] debugfs ibq_ulp
```

Example:

ibq_sge

Description: Displays CIM SGE inbound queue.

Syntax: cxgbtool [vbdInterface] debugfs ibq_sge[{0|1}]

Example:

```
C:\Users\Administrator>cxgbtool vbd0 debugfs ibq_sge0
000000: 82000003 0000002a 00000001 2eae1676
0x0010: 00000052 00000077 00000001 29acd250
0x0020: 00000001 29acd2b4 00000000 00000000
0x0030: 08000010 c0901005 01ca01ca 00000000
.
```

ibq_ncsi

Description: Displays CIM NCSI inbound queue.

Syntax: cxgbtool [vbdInterface] debugfs ibq_ncsi

• mc

Description: Displays MC memory.

Syntax: cxgbtool [vbdInterface] debugfs mc[{0|1}] [dumpFileName]

Example:

C:\Users\Administrator>cxgbtool vbd0 debugfs mc1 mc1 cxgbtool: This may take a while. Please be patient cxgbtool: Reading MEM_MC1 (3) memory of size 1073741824 bytes cxgbtool: Writing memory block to file mc1... cxgbtool: Done writing memory block to file mc1

1 It is recommended that the dumpFileName should be provided without any extension.

mps_tcam

Description: Displays MPS TCAM configuration.

Syntax: cxgbtool [vbdInterface] debugfs mps_tcam

Example:

```
C:\Users\Administrator>cxqbtool vbd0 debuqfs mps tcam
Idx Ethernet address Mask Vld Ports PF VF Repl P0 P1 P2 P3
                                                        ML
 0 01:80:c2:00:00:0e ffffffffff Y 0x3 7
                                       92 Y
                                               0 0 0 0
                                                        0
 1 00:07:43:29:0a:b0 ffffffffff Y 0x1 4 65
                                           Ν
                                               0 0 0 0
                                                        0
 2 33:33:00:00:00:01 fffffffff Y 0x1 4 65 N
                                               0 0 0 0
                                                        0
 3 01:00:5e:00:00:01 ffffffffff Y 0x1 4 65 N
                                               0 0 0 0
                                                        0
 4 33:33:00:01:00:03 ffffffffff Y 0x1 4 65 N
                                              0 0 0 0
                                                        0
 5 33:33:00:00:00:0c ffffffffff Y 0x1 4 65 N
                                              0 0 0 0
                                                        0
 6 33:33:ff:00:00:11 ffffffffff Y 0x1 4 65 N 0 0 0 0 0
 7 33:33:ff:b8:3f:b8 ffffffffff Y 0x1 4 65 N
                                              0 0 0 0
                                                        0
 8 01:00:5e:7f:ff:fa fffffffff Y 0x1 4 65 N 0 0 0 0
 9 01:00:5e:00:00:fc ffffffffff Y 0x1 4 65 N
                                               0 0 0 0 0
10
11
12
13
```

mps_trc_rd trace

Description: Reads MPS trace filter.

Syntax: cxgbtool [vbdInterface] debugfs mps_trc_rd trace[traceQueueld]

mps_trc_wr trace

Description: Sets MPS trace filter.

Syntax:

cxgbtool [vbdInterface] debugfs mps_trc_wr trace[0|1|2|3] [tx[portInstance]|rx[portInstance]]

Example:

```
Setting up trace0 with tx0 (tx0 is port0 Tx path)
```

```
C:\Users\Administrator>cxgbtool vbd0 debugfs mps trc wr trace0 tx0
```

mbox

Description: Displays the last command in each mailbox.

```
Syntax: cxgbtool [vbdInterface] debugfs mbox[{0|1|2|...|7}]
```

obq_ulp

Description: Displays ULP outbound queue.

Syntax: cxgbtool [vbdInterface] debugfs obq_ulp[{0|1|2|3}]

Example:

```
C:\Users\Administrator>cxgbtool vbd0 debugfs obq_ulp0
000000: 00000000 00000000 00000000
0x0010: 82000002 00000022 00000001 09119152
0x0020: 00000134 0000000 00000001 168966c0
.
```

obq_sge

Description: Displays SGE outbound queue.

Syntax: cxgbtool [vbdInterface] debugfs obq_sge

Example:

```
C:\Users\Administrator>cxgbtool vbd0 debugfs obq_sge
000000: 0000020 00000801 00000000 0000000
0x0010: 00000020 00001301 00010000 67400052
0x0020: 00001020 00001301 0000037f e0800606
0x0030: 00000020 00000801 01fd206d 00907803
.
.
```

obq_ncsi

Description: Displays NCSI outbound queue.

Syntax: cxgbtool [vbdInterface] debugfs obq_ncsi

```
C:\Users\Administrator>cxgbtool vbd0 debugfs obq_ncsi
000000: 0000000 0000000 0000000 0000000
0x0010: 0000000 0000000 0000000 0000000
0x0020: 0000000 0000000 0000000 0000000
0x0030: 0000000 0000000 0000000 0000000
.
.
```

obq_sge_rx_q

Description: Displays CIM SGE outbound queue.

```
Syntax: cxgbtool [vbdInterface] debugfs obq_sge_rx_q[{0|1}]
```

Example:

```
C:\Users\Administrator>cxgbtool vbd0 debugfs obq_sge_rx_q0
000000: 00000000 00000000 00000000
0x0010: 00000000 00000000 00000000
0x0020: 00000000 00000000 00000000
0x0030: 00000000 00000000 00000000
.
.
```

• pm_stats

Description: Displays page memory statistics.

Syntax: cxgbtool [vbdInterface] debugfs pm_stats

Example:

C:\Users\Administrator>cxgbtool vbd0 debugfs pm_stats							
		Tx cycles	Tx bytes				
	Read:	0	0				
	Write bypass:	53350	396				
	Write mem:	0	0				
	Bypass + mem:	0	0				
		Rx cycles	Rx bytes				
	Read:	0	0				
	Write bypass:	20820	242				
	Write mem:	0	0				
	Flush:	0	0				

tcp_stats

Description: Displays IPv4/IPv6 TCP statistics.

Syntax: cxgbtool [vbdInterface] debugfs tcp_stats

C:\Users\Administrator>cxgbtool vbd0 debugfs tcp_stats						
	IP	IPv6				
OutRsts:	0	0				
InSegs:	0	0				
OutSegs:	0	0				
RetransSegs:	0	0				

• tp_err_stats

Description: Displays TP error statistics for channel 0-3.

Syntax: cxgbtool [vbdInterface] debugfs tp_err_stats

Example:

C:\Users\Administrator>cxgbtool vbd0 debugfs tp_err_stats					
	channel 0	channel 1	channel 2	channel 3	
macInErrs:	0	0	0	0	
hdrInErrs:	0	0	0	0	
tcpInErrs:	0	0	0	0	
tcp6InErrs:	0	0	0	0	
tnlCongDrops:	0	0	0	0	
tnlTxDrops:	0	0	0	0	
ofldVlanDrops:	0	0	0	0	
ofldChanDrops:	0	0	0	0	
ofldNoNeigh:	0				
ofldCongDefer:	0				

• tp_la

Description: Dumps TP Ia.

Syntax:

cxgbtool [vbdInterface] debugfs tp_la

```
cxgbtool [vbdInterface] debugfs tp_la [{2|3}]
```

```
C:\Users\Administrator>cxgbtool vbd0 debugfs tp la
TP LA Debug Mode: 3
RcfOpCodeOut: 4 State: 0 WcfState: 0 RcfOpcSrcOut: 1 CRxError: 0 ERxError: 0
        SanityFailed: 0 SpuriousMsg: 1 FlushInputMsg: 0 FlushInputCpl: 0
       RssUpBit: 0 RssFilterHit: 0 Tid: 0 InitTcb: 0 LineNumber: 0 Emsg: 0
       EdataOut: 0 Cmsg: 0 CdataOut: 0 EreadPdu: 0 CreadPdu: 0 TunnelPkt: 1
        RcfPeerFin: 0 RcfReasonOut: 0 TxCchannel: 0 RcfTxChannel: 0
       RxEchannel: 2 RcfRxChannel:0 RcfDataOutSrdy: 0 RxDvld: 0 RxOoDvld: 0
        RxCongestion: 0 TxCongestion: 0
CplCmdIn: 238 MpsVfVld: 0 MpsPf: 0 MpsVf: 0 SynIn: 0 AckIn: 0 FinIn: 0
        RstIn: 0 DataIn: 0 DataInVld: 0 PadIn: 0 RxBufEmpty: 1 RxDdp: 0
       RxFbCongestion: 0 TxFbCongestion: 0 TxPktSumSrdy: 1 RcfUlpType: 0
        Eread: 0 Ebypass: 1 Esave: 0 Static0: 1 Cread: 0 Cbypass: 1 Csave: 0
       CPktOut: 0 RxPagePoolFull: 2 RxLpbkPkt: 0 TxLpbkPkt: 0 RxVfValid: 1
        SynLearned: 0 SetDelEntry: 0 SetInvEntry: 0 CpcmdDvld: 1 CpcmdSave: 0
       RxPstructsFull: 0 EpcmdDvld: 0 EpcmdFlush: 0 EpcmdTrimPrefix: 0
        EpcmdTrimPostfix: 0 ERssIp4Pkt: 0 ERssIp6Pkt: 0 ERssTcpUdpPkt: 0
       ERssFceFipPkt: 0
RcfOpCodeOut: 14 State:14 WcfState:0 RcfOpcSrcOut: 0 CRxError: 0 ERxError: 0
        SanityFailed: 0 SpuriousMsg: 0 FlushInputMsg: 0 FlushInputCpl: 0
       RssUpBit: 0 RssFilterHit: 0 Tid: 17 InitTcb: 0 LineNumber: 5 Emsq: 0
       EdataOut: 1 Cmsg: 0 CdataOut: 0 EreadPdu: 1 CreadPdu: 0 TunnelPkt: 0
        RcfPeerFin: 0 RcfReasonOut: 8 TxCchannel: 2 RcfTxChannel: 0
       RxEchannel: 0 RcfRxChannel:0 RcfDataOutSrdy: 0 RxDvld: 0 RxOoDvld: 0
        RxCongestion: 0 TxCongestion: 0
```

tid_info

Description: Displays TID info.

Syntax: cxgbtool [nicInterface] debugfs tid_info

```
C:\Users\Administrator>cxgbtool nic0 debugfs tid_info
TID range: 0..1919/2048..18431, in use: 0
STID range: 1920..1951, in use: 4
ATID range: 0..4095, in use: 0
FTID range: 1952..1967
HW TID usage: 0 IP users, 0 IPv6 users
```

• tx_rate

Description: Displays TX rate for NIC and offload traffic.

Syntax: cxgbtool [*vbdInterface*] debugfs tx_rate

Example:

C:\Users\Admin	nistrator	:>cx	gbtool vbd0	debugfs tx_r	ate
	channel	0	channel 1	channel 2	channel 3
NIC B/s:		0	0	0	0
Offload B/s:		0	0	0	0

• ulprx_la

Description: Dumps ULP RX LA.

Syntax: cxgbtool [vbdInterface] debugfs ulprx_la

Example:

C:\Users\Administrator>cxgbtool vbd0 debugfs ulprx_la								
Pcmd	Туре	Message	Data					
000000000000000000000000000000000000000	0	00000000	000000000000000000000000000000000000000					
000000000000000000000000000000000000000	0	00000000	000000000000000000000000000000000000000					
000000000000000000000000000000000000000	0	00000000	000000000000000000000000000000000000000					

• devlog

Description: Prints firmware device log information.

Syntax: cxgbtool [vbdInterface] devlog

C:\Users\Administrator>cxgbtool vbd0 devlog							
- "	Tstamp	Level	Facility	Message			
Seq#							
0	318517	INFO	CORE	log initialized @ 0x20084000 size 32768 (128 entries) fwrev 0x00000000pcie_fw 0x0014cc10			
1	388309	INFO	CORE	bootstrap firmware took 27 msecs to run			

• rss

Description: Prints RSS info.

Syntax: cxgbtool [vbdInterface] rss

Example:

C:\U	sers\Ad	ministr	ator>c	xgbtool	vbd0	rss		
0:	1023	0	0	0	0	0	0	0
8:	0	0	0	0	0	0	0	0
16:	1023	0	0	0	0	0	0	0
24:	0	0	0	0	0	0	0	0
•								
•								
•								

rss_config

Description: Prints RSS Configuration.

Syntax: cxgbtool [vbdInterface] rss_config

Example:

```
C:\Users\Administrator>cxgbtool vbd0 rss config
TP RSS CONFIG: 0x300003c
   Tnl4TupEnIpv6: no
   Tnl2TupEnIpv6: no
   Tnl4TupEnIpv4: no
   Tnl2TupEnIpv4: no
   TnlTcpSel: no
   TnlIp6Sel: no
TnlVrtSel: yes
   TnlMapEn:
                 yes
   OfdHashSave: no
   OfdVrtSel:
                 no
   OfdMapEn: no
OfdLkpEn: no
   Syn4TupEnIpv6: no
   Syn2TupEnIpv6: no
   Syn4TupEnIpv4: no
   Syn2TupEnIpv4: no
•
```

• rss_key

Description: Prints RSS Key.

Syntax: cxgbtool [vbdInterface] rss_key

Example:

```
C:\Users\Administrator>cxgbtool vbd0 rss_key
c62ee59b4b9d292c2c8e195c582f8fd032568e579f03cdeb1b66ed910dab1d414c5516e6bdb1
9289
```

rss_pf_config

Description: Prints RSS PF Configuration

Syntax: cxgbtool [vbdInterface] rss_pf_config

Example:

```
C:\Users\Administrator>cxgbtool vbd0 rss_pf_config

PF Map Index Size = 0

RSS PF VF Hash Tuple Enable Default

Enable IPF Mask Mask IPv6 IPv4 UDP Queue

PF Map Chn Prt Map Size Size Four Two Four Two Four Ch1 Ch0

1 yes no no 1 4 7 no no no no no 0 0

2 yes no no 2 4 7 no no no no no 0 0

3 yes no no 3 4 7 no no no no no 0 0

4 yes no no 4 4 7 no no no no no 0 0

5 yes no no 5 4 7 no no no no no 0 0

5 yes no no 6 4 7 no no no no no 0 0

7 yes yes no 7 4 7 yes yes yes no 0 0
```

rss_vf_config

Description: Prints RSS VF Configuration.

Syntax: cxgbtool [vbdInterface] rss_vf_config

Example:

C:\Users\Administrator>cxgbtool vbd0 rss vf config RSS Hash Tuple Enable Enable IVF Dis Enb IPv6 IPv4 UDP Def Secret Key VF Chn Prt Map VLAN uP Four Two Four Two Four Que Idx Hash 0 0 0 no no no no no no 0 1 no no 2 no no O no 0 0 0 no no no no no no no 0 0 no no 0 no no no no no 3 0 • •

coalesce

Description: Changes the coalescing settings for tunnel Rx queues of the specified Ethernet device.

Syntax: cxgbtool [nicInterface] coalesce [rx-usecs-irq {val}] [rx-frames-irq {val}] [(persistent)]

Parameters

rx-usecs-irq: Rx Coalescing Timer. Number of microseconds after which interrupt will be sent. *rx-frames-irq*: Rx Coalescing Threshold Packets. Number of packets after which interrupt will be sent.

Example:

Setting Rx Coalescing Timer:

C:\Users\Administrator>cxgbtool nic0 coalesce rx-usecs-irq 5

Setting Rx Coalescing Threshold Packets

C:\Users\Administrator>cxgbtool nic0 coalesce rx-frames-irq 20

eps

Description: Prints endpoints (eps) if NDK/ND is enabled.

Syntax: cxgbtool [nicInterface] eps

Example:

```
C:\Users\Administrator>cxgbtool nic0 eps
ep FFFFE00005734AE0 cm_id FFFFE000071C0250 state 1 flags 0x0 stid
1920 backlog 1024 fe80:0000:0000:2c51:690a:9289:f 543:5445
ep FFFFE00004822810 cm_id FFFFE000049261C0 state 1 flags 0x0 stid
1928 backlog 1024 169.254.245.67:5445
```

• qps

Description: Prints queue paris (qps) if NDK/ND is enabled.

Syntax: cxgbtool [nicInterface] qps

Example:

```
C:\Users\Administrator>cxgbtool nic0 qps

rc qp sq id 1026 in_use 0 rq id 1180 in_use 176 state 1 onchip 0 ep tid

152 state 7 0.0.0.0:4341->0.0.0.0:5445

rc qp sq id 1027 in_use 0 rq id 1393 in_use 256 state 1 onchip 0 ep tid

114 state 7 0.0.0.0:4322->0.0.0.0:5445

rc qp sq id 1039 in_use 0 rq id 1823 in_use 256 state 1 onchip 0 ep tid

414 state 7 0.0.0.0:4884->0.0.0.0:5445

rc qp sq id 1044 in_use 0 rq id 1374 in_use 256 state 1 onchip 0 ep tid

136 state 7 0.0.0.0:4333->0.0.0.0:5445

rc qp sq id 1048 in_use 0 rq id 2169 in_use 256 state 1 onchip 0 ep tid

78 state 7 0.0.0.0:4304->0.0.0.0:5445
```

rdma_stats

Description: Prints RDMA statistics if NDK/ND is enabled

Syntax: cxgbtool [vbdInterface] rdma_stats

Example:

C:\Users\	Administrato	r>cxgbtool	vbd0 rdma_s	tats	
Object:	Total	Current	Max	Fail	
PDID:	65536	0	0	0	
QID:	31744	0	0	0	
TPTMEM:	40265280	0	0	0	
PBLMEM:	273804160	0	0	0	
RQTMEM:	80530624	0	0	0	
OCQPMEM:	0	0	0	0	
DB FULL:	0				
DB EMPTY:	0				
DB DROP:	0				
DB State:	NORMAL Tran	sitions 0			
TCAM_FULL:	0				
ACT_OFLD_C	ONN_FAILS:	0			
PAS_OFLD_C	ONN_FAILS:	0			
AVATLABLE	TRD: 589	824			

stags

Description: Prints STAG contents if NDK/ND is enabled.

Syntax: cxgbtool [nicInterface] stags

Example:

```
C:\Users\Administrator>cxgbtool nic0 stags
Staq(0): 0x600
0x083ae200: (inactive): stag idx 0x0600 key 0x00 state INV type NSMR pdid
0 \ge 0
                perms none rem inv dis 0 addr type ZBTO
                bind enable 0 pg size 4096 qpid 0x0 pbl off 0x0000
                pbl addr 0x0b414780 len 0 va
bind cnt 0
Staq(1):0x900
0x083ae260: (inactive): stag idx 0x0900 key 0x00 state INV type NSMR pdid
0x0
                perms none rem inv dis 0 addr type ZBTO
                bind enable 0 pg size 4096 qpid 0x0 pbl off 0x0000
                pbl addr 0x0b414780 len 0 va
bind cnt 0
Stag(2):0xf00
```

```
0x083ae320: (inactive): stag idx 0x0f00 key 0x00 state INV type NSMR pdid
0x0
perms none rem_inv_dis 0 addr_type ZBTO
bind_enable 0 pg_size 4096 qpid 0x0 pbl_off 0x0000
pbl_addr 0x0b414780 len 0 va
0000000000000 bind_cnt 0
```

• chim_sock

Description: Prints chimney statistics.

Syntax: cxgbtool [nicInterface] chim [tcb {tid}|sock]

tcb: Prints Hardware TCB information for given tid of an offloaded connection. *sock*: Prints driver per socket statistics.

Example:

Print Hardware TCB information

```
C:\Users\Administrator>cxgbtool nic0 chim tcb 9210
HW TCB
                     : 0x5
ulp type
                     : 0x0
ulp_raw
l2t ix
                    : 0x1
smac_sel
                     : 0x82
tf_suspend
                     : 0x0
tf non_offload
                    : 0x0
tf lock tid
                     : 0x1
```

Print driver per socket statistics:

• I2t

Description: Displays I2t table contents.

Syntax: cxgbtool [nicInterface] l2t

Example:

C:\Users\Administrator>cxgbtool nic0 l2t IDX REF_COUNT MTU DEST_ADDR DEST_MAC

• hw_sched

Description: Displays hardware schedule information

Syntax: cxgbtool [vbdInterface] hw_sched

Example:

C:\Users\Administrator>cxgbtool vbd0 hw_sched							
Scheduler	Mode	Channel	Rate (Kbps)	Class IPG(0.1 ns)	Flow IPG(us)		
0	class	0	29640261	disabled	disabled		
1	class	1	29640261	disabled	disabled		
2	class	2	29640261	disabled	disabled		
3	class	3	29640261	disabled	disabled		
4	class	0	29640261	disabled	disabled		
5	class	0	29640261	disabled	disabled		
6	class	0	29640261	disabled	disabled		
7	class	0	29640261	disabled	disabled		

• mbox_log

Description: Prints firmware mailbox command/reply log information.

Syntax: cxgbtool [vbdInterface] mbox_log

Example:

7. Firmware Update

The driver will auto-load the T5 and T4 firmwares if an update is required. The firmware version can be verified using *cxgbtool*:

```
C:\Users\Administrator>cxgbtool nic0 version
```

The Firmware binaries are copied to <*system_drive*>*ChelsioT4**Firmware*\ directory during Unified Wire installation.

8. Software/Driver Uninstallation

Similar to installation, Chelsio Unified Wire can be uninstalled using two methods: GUI and CLI mode. GUI mode requires user interaction and uninstallation occurs with options specified by the user. Whereas, CLI mode does not require any user input.

8.1.1. GUI mode (Installer)

- 1. Run the ChelsioUwire-x.x.x.xx.exe application.
- Select Modify to add or remove features. Select Repair to repair the previous installation. Select Remove to uninstall the application. After you have selected the appropriate option, click Next.

	Chelsio T5 / T4 Uwire Installer - InstallShield Wizard	×
Chelsio T5 / T4 Uwire Inst	taller	
	Welcome to the Chelsio T4 / T5 Uwire Installer Setup Maintenance program. This program lets modify the current installation. Click one of the options below.	you
	Modify Select new program features to add or select currently installed features to removing the select currentl	8.
	 Repair Reinstall all program features installed by the previous setup. 	
	Remove Remove all installed features.	
InstallShield	< <u>B</u> ack <u>N</u> ext > Cance	ł

Figure 45 - Selecting maintenance option

3. Click on the **Finish** button to exit from the installer.

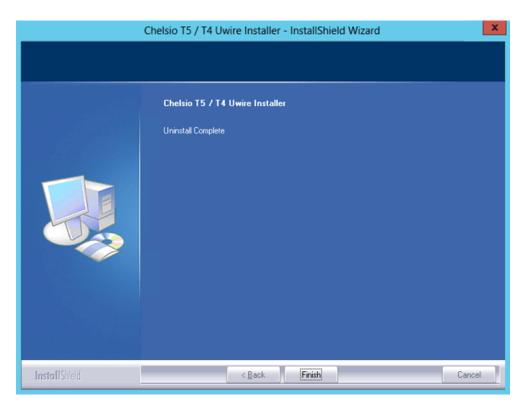


Figure 46 - Finishing uninstallation

- This method of uninstallation is possible only if the drivers were installed using Unified Wire Installer.
 - Uninstalling Unified Wire package using the above method will not uninstall Unified Wire Manager. You will have to manually uninstall it using "Programs and Features" in the Control Panel.

8.1.2. CLI Mode

To uninstall all the drivers, execute the following command:

C:\Users\Administrator>ChelsioUwire-x.x.x.xx.exe -un all

To uninstall a particular driver, execute the following command:

C:\Users\Administrator>ChelsioUwire-x.x.x.exe -rm <driver(s)>

E.g.:

C:\Users\Administrator>ChelsioUwire-x.x.x.x.exe -rm iSCSI

The above command will uninstall iSCSI Storport Miniport driver.



10 Note Uninstalling Unified Wire package using the above method will not uninstall Unified Wire Manager. You will have to manually uninstall it using "Programs and Features" in the Control Panel.

9. Software/Driver Update

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

Please visit Chelsio support web site http://service.chelsio.com/ for regular updates on various software/drivers. You can also subscribe to our newsletter for the latest software updates.

II. NDIS Function

1. Introduction

Chelsio's T5/T4 series of Unified Wire Adapters provide extensive support for NIC operation, including all stateless offload mechanisms for both IPv4 and IPv6 (IP, TCP and UDP checksum offload, LSO - Large Send Offload aka TSO - TCP Segmentation Offload, Network Direct and assist mechanisms for accelerating LRO - Large Receive Offload).

1.1. Hardware Requirements

1.1.1. Supported Adapters

Chelsio Adapter	NDIS components
Г520-BT	NIC, NVGRE, VXLAN, vRSS
T520-CR	NIC, NVGRE, VXLAN, PacketDirect, vRSS
T580-CR	NIC, NVGRE, VXLAN, PacketDirect, vRSS
T580-LP-CR	NIC, NVGRE, VXLAN, PacketDirect, vRSS
T580-SO-CR	NIC, NVGRE, VXLAN, vRSS
T520-LL-CR	NIC, NVGRE, VXLAN, vRSS
T520-SO-CR	NIC, NVGRE, VXLAN, vRSS
T540-CR	NIC, NVGRE, VXLAN, vRSS
T420-CR	NIC
T440-CR	NIC
T422-CR	NIC
T420-LL-CR	NIC
T440-LP-CR	NIC
T420-CX	NIC
T420-BT	NIC
T404-BT	NIC

Following is the list of NDIS components and supported Chelsio adapters:

1.2. Software Requirements

1.2.1. Windows Requirement

Currently Chelsio T5/T4 NDIS Function driver is available for the following Windows versions:

- Server 2016 Technical Preview
- 2016 Client
- Nano Server
- 10 Client
- Server 2012 R2

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

2. Software/Driver Configuration and Fine-tuning

2.1. Advanced Configuration

The Chelsio Network driver provides advanced configuration options under the Device Properties. In the Network Connections window, select the Chelsio Adapter's Local Area Connection interface (right-click -> properties). Click the **Configure** button.

2.1.1. VBD Driver Parameters

To see all tunable VBD driver parameters, open the **Device Manager**, click on the **System Devices**, double click on the **Chelsio T5/T4 40G/10G Bus Enumerator**, and then click the **Advanced** tab.

• iSCSI Instances

- Description: Specify the number of iSCSI instances.
- Value: 0-2 | default
- Default: 0

• Nic Instances:

- Description: Specify the number of NIC instances.
- Value: 0-8 | default
- Default: default

2.1.2. NDIS Miniport Driver Parameters

To see all tunable NDIS Miniport Driver parameters, open the **Device Manager**, click on the **Network adapters**, double click on any **Chelsio Network Adapter**, and then click the **Advanced** tab.

Encapsulated Task Offload

- *Description*: Enable or disable the stateless offloads (checksums, LSO, VMQ and filtering) of encapsulated traffic.
- Value: Disabled | Enabled
- Default: Enabled

Note

This parameter is available only for T5 adapters.

• Encapsulation Overhead

- *Description*: Specify the amount of overhead required in Ethernet frames due to virtual network overlay encapsulation such as VXLAN and NVGRE.
- Value: 0-256
- Default: 0

1 Note This parameter is available only for T5 adapters.

• Flow Control

- Description: Enable or disable the receipt or transmission of PAUSE frames. If Rx is enabled, all incoming PAUSE frames will be honored. If Tx is enabled, the HW will send PAUSE frames when its MAC Rx FIFO usage is beyond a high-watermark. If Disabled option is selected, no PAUSE will be sent. When Rx MAC FIFO gets full, further ingress packets will be dropped. If Rx & Tx Enabled is selected, both Rx and Tx options will be enabled.
- Value:
 - o Disabled
 - o Rx & Tx Enabled
 - $\circ \quad \text{Rx Enabled}$
 - o Tx Enabled
- Default: Rx & Tx Enabled

Interrupt Moderation

- Description: Control the interrupts generated by NIC hardware.
- Value: Disabled | Enabled
- Default: Enabled

Interrupt Moderation Rate

- Description: Set the interrupt rate.
- Value:
 - o Extreme
 - o High
 - \circ Low
 - o Minimal
 - o Moderate
- Default: Low

• IPv4 Checksum Offload

- Description: Allow the checksum to be computed by the adapter for IPV4 packets.
- Value:
 - Disabled
 - o Rx & Tx Enabled
 - o Rx Enabled

- o Tx Enabled
- Default: Rx & Tx Enabled

Jumbo Packet (Maximum Transmission Unit)

- Description: Specify the Maximum Transmission Unit (MTU) value.
- Value:
 - o 4088 Bytes
 - o 9014 Bytes
 - o Disabled
- Default: Disabled

Large Send Offload V2 (IPv4)

- Description: Allow for configuring Large Send Offload (LSO) using version 2 for the IPv4 traffic.
- Value: Disabled | Enabled
- Default: Enabled

Large Send Offload V2 (IPv6)

- Description: Allow for configuring Large Send Offload (LSO) using version 2 for the IPv6 traffic.
- Value: Disabled | Enabled
- Default: Enabled

Locally Administered Address

- Description: Specify a new MAC address for the port. If Not Present, the default MAC from EEPROM is used. If specified, the new MAC overwrites the default MAC. This specified MAC is persistent across machine reboot.
- Value: Not Present | Any legal 6-byte MAC address
- Default: Not Present

Maximum Number of RSS Processors

- Description: Change the number of RSS Processors.
- Value: 1 | 2 | 4 | 8
- Default: 8

Maximum Number of RSS Queues

- Description: Change the number of RSS Queues.
- Value: 1-8
- Default: 4

• Maximum RSS Processor Number

- *Description*: Set the number of RSS processors to help the overall performance of the computer.
- Value: 0-63
- Default: 63

• NDIS QoS

- Description: Enable or disable NDIS Quality of Service for DCB interface.
- Value: Disabled | Enabled
- Default: Disabled

NetworkDirect Functionality

- Description: Enable or disable Network Direct Functionality.
- Value: Disabled | Enabled
- Default: Enabled

NetworkDirect Interrupt Moderation

- Description: Control the interrupts generated during NDK traffic.
- Value: Disabled | Enabled
- Default: Enabled

For more information, refer http://msdn.microsoft.com/enus/library/windows/hardware/ff556017%28v=vs.85%29.aspx

• Nvgre Task Offload

- Description: Enable or disable offloading processing of NVGRE encapsulated frames.
- Value: Disabled | Enabled
- Default: Enabled

• Packet Direct

- Description: Enable or disable PacketDirect feature.
- Value: Disabled | Enabled
- Default: Enabled

Receive Side Scaling (RSS)

- *Description*: Control the RSS functions. If on, the Microsoft RSS function is enabled. If off, the Chelsio RSS function is enabled.
- Value: Disabled | Enabled
- Default: Enabled

Recv Segment Coalescing (IPv4)

• Description: Enable or disable the Receive Segment Coalescing feature for IPv4 traffic. This is a receiver packets aggregating feature which helps reduce the receive host CPU load and improve throughput in a 40/10Gb network environment where CPU can be the bottleneck.

- Value: Disabled | Enabled
- Default: Enabled

Recv Segment Coalescing (IPv6)

- *Description*: Enable or disable the Receive Segment Coalescing feature for IPv6 traffic. This is a receiver packets aggregating feature which helps reduce the receive host CPU load and improve throughput in a 40/10Gb network environment where CPU can be the bottleneck.
- Value: Disabled | Enabled
- Default: Enabled

• RSS Base processor

- Description: Specify the number of the base RSS processors.
- Value: 0-16
- Default: 0

• RSS load balancing profile

- Description: Control the RSS load balancing profile.
- Value: Closest Processor | Closest Processor Static | Conservative Scaling | NUMA Scaling | NUMA Scaling Static
- Default: NUMA Scaling Static

For more information, refer http://technet.microsoft.com/en-us/library/hh997036.aspx

• Rx Ethernet Queue Size

- Description: Set different Rx Queue sizes. Driver ships with reasonable defaults.
- Value: 512-4096
- Default: 2048

• Rx Offload Queue Size

- Description: Set different Offload Rx Queue sizes. Driver ships with reasonable defaults.
- Value: 256-2048
- Default: 512

Ø Note

e This feature is not fully tested and available for experimental usage only.

SR-IOV

- Description: Enable or disable SR-IOV feature.
- Value: Disabled | Enabled
- Default: Enabled

• TCP Checksum Offload (IPv4):

- *Description*: Enable or disable computation of TCP checksum by the adapter for IPv4 packets.
- Value:
 - o Disabled
 - o Rx & Tx Enabled
 - o Rx Enabled
 - Tx Enabled
- Default: Rx & Tx Enabled

• TCP Checksum Offload (IPv6):

- *Description*: Enable or disable computation of TCP checksum by the adapter for IPv6 packets.
- Value:
 - o Disabled
 - o Rx & Tx Enabled
 - o Rx Enabled
 - o Tx Enabled
- Default: Rx & Tx Enabled

• Tx Ethernet Queue Size

- Description: Set different Tx Queue sizes. Driver ships with reasonable defaults.
- Value: 512-4096
- Default: 1024

Tx Offload Queue Size

- Description: Set different Offload Tx Queue sizes. Driver ships with reasonable defaults.
- Value: 256-4096
- Default: 512

te This feature is not fully tested and available for experimental usage only.

• UDP Checksum Offload (IPv4)

- *Description*: Enable or disable computation of UDP checksum by the adapter for IPv4 packets.
- Value:
 - o Disabled
 - Rx & Tx Enabled
 - o Rx Enabled
 - o Tx Enabled
- Default: Rx & Tx Enabled

Note

• UDP Checksum Offload (IPv6)

- Description: Enable or disable computation of UDP checksum by the adapter for IPv6 packets.
- Value:
 - o Disabled
 - o Rx & Tx Enabled
 - o Rx Enabled
 - o Tx Enabled
- Default: Rx & Tx Enabled

User Mode NetworkDirect

- *Description*: Enable or disable Microsoft's Remote Direct memory Access (RDMA) interface for high speed, low latency networks.
- Value: Disabled | Enabled
- Default: Enabled

• Virtual Machine Queues

- Description: Enable or disable the virtual machine queue feature on the interface.
- Value: Disabled | Enabled
- Default: Enabled

• Virtual Switch RSS

- Description: Enable or disable Virtual Receive Side Scaling.
- Value: Disabled | Enabled
- Default: Disabled

• VLAN Identifier

- Description: Specify the VLAN ID to be inserted.
- Value: 0-4095
- Default: 0

• VMQ LookAhead Split

- *Description*: Enable or disable the ability to split receive buffers into lookahead and post-lookahead buffers.
- Value: Disabled | Enabled
- Default: Enabled

• VMQ VLAN ID Filtering

- *Description*: Enable or disable the ability to filter network packets by using the VLAN identifier in the media access control (MAC) header.
- Value: Disabled | Enabled
- Default: Enabled

• Vxlan Task Offload

- Description: Enable or disable offloading processing of VXLAN encapsulated frames.
- Value: Disabled | Enabled
- Default: Enabled

• Vxlan UDP Port Number

- *Description*: Specify the current VXLAN UDP destination port number that is currently operational in the NIC.
- Value: 1-65535
- Default: 4789

i Note This parameter is available only for T5 adapters.

2.2. NVGRE Offload

Chelsio's T5 based adapters are uniquely capable of offloading the processing of NVGRE encapsulated frames such that all stateless offloads (checksums, LSO, VMQ, RSS and filtering) are preserved, resulting in significant performance benefits. This feature is enabled by default. Configure the relevant customer and provider network settings on the host.

2.3. VXLAN Task Offload

Virtual Extensible LAN (VXLAN), an extension of the existing VLAN protocol, is an encapsulation protocol which creates an overlay network on the existing Layer 3 infrastructure. VXLAN not only extends VLAN's Ethernet Layer 2 network services but also provides more extensibility, flexibility and scalability for large scale cloud deployments than VLAN.

Chelsio's T5 based adapters are capable of offloading the processing of VXLAN encapsulated frames such that all stateless offloads (checksums, LSO, VMQ, RSS and filtering) are preserved, resulting in significant performance benefits. This feature is enabled by default.

2.4. PacketDirect

PacketDirect Provider Interface (PDPI), an extension to the existing NDIS miniport driver model, gives applications complete control over buffers, poll processors, and sending and receiving packets over a miniport adapter.

Chelsio's T5 based adapters offer extensive support for this feature leading to a higher throughput performance. This feature is enabled by default.

2.1. Virtual RSS (vRSS)

Network throughput of a multi-core virtual machine is limited by the processing power of a single virtual processor, since only one processor handles all the interrupts from a virtual network adapter. Virtual RSS or vRSS solves this bottleneck by distributing the network traffic across multiple virtual processors. This feature is disabled by default and can be enabled using the Device Manager.

III. SMB Direct

1. Introduction

SMB Direct is an extension of the Server Message Block (SMB) technology by Microsoft used for file operations. The *Direct* part implies the use of various high speed Remote Data Memory Access (RDMA) methods to transfer large amounts of data with little CPU intervention. By using RDMA as a transport medium for SMB, unprecedented levels of performance and efficiency can be achieved. With fully offloaded RDMA support, Terminator 5 based adapters deliver large performance and efficiency gains to Windows users in a seamless, plug and play fashion.

1.1. Hardware Requirements

1.1.1. Supported Adapters

The following are the currently shipping Chelsio adapters that are compatible with Chelsio SMB Direct driver:

- T520-BT
- T580-CR
- T580-LP-CR
- T520-LL-CR
- T540-CR
- T520-CR
- T420-CR
- T440-CR
- T422-CR
- T404-BT
- T440-LP-CR
- T420-BT
- T420-LL-CR
- T420-CX

1.2. Software Requirements

1.2.1. Windows Requirement

Currently Chelsio T5/T4 SMB Direct driver is available for the following Windows versions:

- Server 2016 Technical Preview
- 2016 Client
- Nano Server
- Server 2012 R2

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

2. Software/Driver Configuration and Fine-tuning

2.1. Enabling SMB Direct

SMB Direct is installed and enabled by default. RDMA functionality on Chelsio adapters will be enabled after installing the driver from the package.

You can use the PowerShell command Get-NetAdapterRdma to get a list of RDMA capable interfaces in your system. At least one adapter should indicate "RDMA Capable" true to take advantage of SMB RDMA capability.

The next step is to configure your network so that SMB server and client machines can communicate with each other. Please configure the Microsoft firewall to allow traffic between the SMB clients and server.

2.2. Verifying RDMA

There are number of ways to verify if RDMA is working:

2.2.1. Verify active connections using PowerShell

Open PowerShell window and execute the command Get-SmbConnection

2.2.2. Use Event Viewer

You can use Event Viewer to view SMB connection events. To do this:

- i. Open Event Viewer
- ii. In the console tree, expand Event Viewer.
- iii. Navigate to Application and Service Logs-> Microsoft->Windows->SMBClient ->Operational

2.3. RDMA/NVGRE concurrent (Mode 2)

In this mode, you can run RDMA traffic using a virtual switch. This feature is enabled by default in the driver, but must be enabled on the Hyper-V Virtual Ethernet adapter. Follow the steps mentioned below to enable the feature:

i. If you haven't done already, run the Chelsio Unified Wire Installer which will install NDIS function driver.

ii. Verify if the driver is installed and loaded using the *Get-NetAdapter* command. The *InterfaceDescription* field should list Chelsio adapter as shown in the image below:

ame	InterfaceDescription	ifIndex	Status	MacAddress	LinkSpeed
thernet 6	Chelsio Network Adapter #2	16	Up	00-07-43-29-14-28	40 Gbps
thernet 4	Chelsio Network Adapter	15	Up	00-07-43-29-14-20	40 Gbps
orporate	QLogic BCM5709C Gigabit Ethernet#38	6	Up	D4-BE-D9-AC-7C-6A	100 Mbps
ocal Area Connec	ction* 1 Microsoft Kernel Debug Network Adapter	2	Up	D4-BE-D9-AC-7C-6C	1 Gbps

Figure 47 - Verifying Chelsio driver

iii. Next, create a virtual switch using the following syntax:

```
PS C:\Users\Administrator> New-VMSwitch -Name <virtual_switch> -
NetAdapterName <chelsio_interface>
```

PS C:\Us	sers> New-VM	1Switch -Name switch0 -NetAdapterName "Ethernet 4"
Name	SwitchType	NetAdapterInterfaceDescription
switch0	External	Chelsio Network Adapter

Figure 48 - Creating virtual switch

iv. Using *Get-NetAdapter* command, verify if the virtual switch is created successfully. The Mac address of the switch and the port on which the switch was created, should be same.

lame	InterfaceDescription	ifIndex Status	MacAddress	LinkSpeed
Ethernet (switch0)	Hyper-V Virtual Ethernet Adapter #2	29 Up	00-07-43-29-14-20	40 Gbps
thernet 6	Chelsio Network Adapter #2	16 Up	00-07-43-29-14-28	40 Gbps
thernet 4	Chelsio Network Adapter	15 Up	00-07-43-29-14-20	40 Gbps
orporate	QLogic BCM5709C Gigabit Ethernet#38	6 Up	D4-BE-D9-AC-7C-6A	100 Mbps
ocal Area Connection*	Microsoft Kernel Debug Network Adapter	2 Up	D4-BE-D9-AC-7C-6C	1 Gbps

Figure 49 - Verifying virtual switch

v. Enable RDMA on the virtual switch using *Enable-NetAdapterRdma* command.



Figure 50 - Enabling RDMA on virtual switch

vi. Run Get-NetAdapterRdma command to verify if RDMA is enabled on the switch.

PS C:\Users> Get-NetAdap	oterRdma		
Name vEthernet (chel_p0) Ethernet 6 Ethernet 4	InterfaceDescription Hyper-V Virtual Ethernet Adapter #2 Chelsio Network Adapter #2 Chelsio Network Adapter	Enabled True True	



2.4. Troubleshooting

If RDMA is not working in your system, please check for the following:

- Operating system version should be Windows Server Technical Preview (and Client) or Server 2012 R2.
- Verify network interface configurations on both sides.
- Please ensure that the interfaces are reachable using *ping* command.
- In the Event Viewer (on the client side), please ensure that the traffic running is not over TCP.
- Verify that SMB driver is loaded and working. Open PowerShell window and execute the following command:

C:\Users\Administrator>driverquery.exe | findstr /I smb

• Verify that Chelsio driver is loaded and working. Open PowerShell window and execute the following command:

C:\Users\Administrator>driverquery.exe | findstr /I chel

- Confirm that traffic is running over Chelsio adapter.
- Look for potential errors in Event Log.

IV. NDIS SR-IOV

1. Introduction

The ever increasing network infrastructure of IT enterprises has led to a phenomenal increase in maintenance and operational costs. IT managers are forced to acquire more physical servers and other data center resources to satisfy storage and network demands. To solve the Network and I/O overhead, users are opting for server virtualization which consolidates I/O workloads onto lesser physical servers thus resulting in efficient, dynamic and economic data center environments. Other benefits of Virtualization include improved disaster recovery, server portability, cloud computing, Virtual Desktop Infrastructure (VDI), etc.

Chelsio's T5 and T4 Unified Wire family of Adapters deliver increased bandwidth, lower latency and lower power with virtualization features to maximize cloud scaling and utilization. The adapters also provide full support for PCI-SIG SR-IOV to improve I/O performance on a virtualized system.

1.1. Hardware Requirements

1.1.1. Supported Adapters

The following are the currently shipping Chelsio Adapters that are compatible with the Chelsio NDIS SR-IOV driver:

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

1.2. Software Requirements

1.2.1. Windows Requirements

Currently, the NDIS SR-IOV driver is available for the following Windows versions:

- Server 2016 Technical Preview
- Nano Server
- Server 2012 R2

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

2. Software/Driver Configuration and Fine-tuning

Please ensure that Unified Wire is installed on the host before proceeding. Refer **Software/Driver Installation** section of the **Chelsio Unified Wire** chapter for step-by-step instructions.



The adapter's configuration should be updated to make use of the SR-IOV feature. You can do this by running the *chelsio_adapter_config.ps1* configuration script. The script will be copied to <*system_drive>\Windows\system32* folder during Unified Wire installation. Open PowerShell with administrative privileges and follow the steps mentioned below:

i. Check if the machine is SR-IOV capable using the following command:

```
PS C:\Users\Administrator> Get-VMHost | fl *iov*
```

The *lovSupport* field should display "True" as shown in the image below:



Figure 52 - Checking SR-IOV capability

ii. Run the adapter configuration script and select *Windows Technical Preview GUI* (option 1) as the Windows version. Hit [Enter].

PS C:\Users\Administrator> chelsio adapter config.ps1



Figure 53 - Adapter Configuration Utility

iii. Enter the index of the adapter for which the configuration needs to be updated. Hit [Enter].

1.T580-LP-CR	S/N:PT02141246	
2.T520-CR	S/N:PT28140315	
3.T580-S0-CR	S/N:PT03140038	
4.T580-CR	S/N:PT13140096	

Figure 54 - Selecting adapter

iv. Select SRIOV (option 2) as the configuration type and enter y to confirm. Hit [Enter].

Choose the configuration type: 1. NON-SRIOV (Default) 2. SRIOV Input : 2	
Do you want to continue (y/n): y Successfully updated the selected configuration type.	
Verification: Passed	
Please reboot the machine for changes to take effect. PS C:\Users\Administrator> _	

Figure 55 - Setting the configuration type

v. Reboot system for changes to take effect.

2.2. vSwitch Configuration

- i. Create a vSwitch with SR-IOV enabled using Chelsio adapter.
- ii. Assign a virtual network adapter with SR-IOV enabled to the VM.
- iii. Bring up the VM.

2.3. Guest (VM) Configuration

Please ensure that Unified Wire is installed on the guest before proceeding. Refer **Software/Driver Installation** section of the **Chelsio Unified Wire** chapter for step-by-step instructions.

0 Note

Custom installation not supported on VM.

To uninstall Unified Wire, please refer **Software/Driver Uninstallation** section of the **Chelsio Unified Wire** chapter for step-by-step instructions.

V. iSCSI Storport Miniport

1. Introduction

The Chelsio Terminator series of Adapters 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 transmitting, Chelsio h/w computes and inserts the Header and Data digest into the PDUs. On receiving, Chelsio h/w computes and verifies the Header and Data digest of the PDUs.

• Direct Data Placement (DDP)

Chelsio h/w can directly place the iSCSI Data-In or Data-Out PDU's payload into pre-posted final 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 transmitting, Chelsio h/w 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 receiving, Chelsio h/w 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 payload data will be sent to the host too.

1.1. Hardware Requirements

1.1.1. Supported Adapters

The following are the currently shipping Chelsio Adapters that are compatible with the iSCSI Storport Miniport:

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

1.2. Software Requirements

1.2.1. Windows Requirement

Currently iSCSI Storport Miniport driver is available for Windows versions.

- Server 2016 Technical Preview
- 2016 Client
- 10 Client
- Server 2012 R2

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

2. Software/Driver Configuration and Fine-tuning

2.1. Configuring iSCSI Initiator

Follow the steps mentioned below to assign IP, Subnet Mask, Default Gateway and VLAN IDs on port 0.

1. Open Device Manager, right click on Chelsio T5 iSCSI Initiator and click on Properties.

🛔 Device Manager	
File Action View Help	
Þ 🔿 🔤 🗐 😰 🖬 🖳 🖡	X 🖲
✓ ♣ electron	
> 💻 Computer	
🗸 🕳 Disk drives	
HP LOGICAL VOLUME SC	SI Disk Device
> 🏣 Display adapters	
> DVD/CD-ROM drives	
> 🖓 Human Interface Devices	
> 📷 IDE ATA/ATAPI controllers	
> 🔤 Keyboards	
> Mice and other pointing devi	ces
> Contors	
> Potwork adapters	
> 10 Other devices	
> Ports (COM & LPT)	
> 🚍 Print queues	
> Processors	
✓ Storage controllers	
Sa Chelsio T5 iSCSI Initiator	
Sa Chelsio T5 iSCSI Initiat	Update Driver Software
Sa Microsoft ClusPort HB	Disable
Sa Microsoft iSCSI Initiato	Uninstall
🍇 Microsoft Multi-Path B	
🍇 Microsoft Storage Spac	Scan for hardware changes
Smart Array P420 Cont	Properties
> 🏣 System devices 📃	rispendes
> Universal Serial Bus controller	S

Figure 56 - Device Manager

Chelsio T	5 iSCSI Initia	ator Pro	perties		×
General	Advanced	Driver	Details	Events	
	Chelsio T5	iSCSI In	itiator		
	Device typ	e:	Storage of	controllers	
	Manufactu	rer:	Chelsio		
	Location:		Location	0 (B:13 D:00 F:04 1:00)	
Devic	e status				_
This	device is wo	king pro	perly.		^
					~
				ОК	Cancel

Figure 57 - Chelsio T5 physical port properties

2. Click on **Advanced** tab and select IP option and add IP. Similarly add subnet mask and default gateway.

Chelsio T5 iSCSI Initiator Properties	×
General Advanced Driver Details Events	
Centeral Porteness Driver Density Density Events The following properties are available for this network adapter. Click the property you want to change on the left, and then select its value on the right. Value: Property: Value: Boot Support (IBFT) Default IPv6 gateway Default IPv6 address IPv6 address MTU Subnet mask Subnet metk length Van Insertion VanID VanID	
OK Cance	

Figure 58 - Assigning IPv4 address

Chelsio T	5 iSCSI Initia	ator Pro	perties				Х
General	Advanced	Driver	Details	Events	3		
	erty you wan				etwork adapter. Id then select its		
Property	·			1	/alue:		
Defau Defau IPv4 a IPv6 a MTU Subne	Support (iBFT It IPv4 gatew It IPv6 gatew iddress iddress it mask it prefix length sertion)	ay ay			255.255.255.0		
				[OK	Cance	I

Figure 59 - Adding Subnet mask

Chelsio T	5 iSCSI Initia	ator Pro	perties				×
General	Advanced	Driver	Details	Events	5		
	perty you wan				etwork adapte id then select i		
Property	y:			١	/alue:		
Defau Defau IPv4 a IPv6 a MTU Subne Subne	Support (iBFT) It IPv4 gatew address address address et mask et prefix length nsertion)	ay ay			102.30.30.1		
				[OK	Cance	ł

Figure 60 - Adding Default IPv4 gateway

Chelsio T	5 iSCSI Initia	ator Pro	perties				\times
General	Advanced	Driver	Details	Events			
	perty you wan				etwork adapter d then select it		
Property	y:			V	alue:		
Defau Defau IPv4 a IPv6 a MTU Subne Subne	Support (iBFT It IPv6 gatew It IPv6 gatew address address et mask et mask et prefix length nsertion	ay ay ay			2001::42		
				[ОК	Cance	4

Figure 61 - Assigning IPv6 address

Chelsio T	5 iSCSI Initia	ator Pro	perties		×
General	Advanced	Driver	Details	Events	
	perty you wan			or this network ada e left, and then sele	
Property	y:			Value:	
Defau Defau IPv4 a IPv6 a MTU Subne	Support (iBFT, It IPv4 gatew address address address at mask at mask at prefix length insertion	ay ay		64	
				OK	Cancel

Figure 62 - Adding Subnet prefix length

Chelsio T	5 iSCSI Initia	ator Pro	perties			×
General	Advanced	Driver	Details	Events	5	
	erty you wan				etwork adapter ad then select it	
Property	<i>r</i> :			١	/alue:	
Defau IPv4 a IPv6 a MTU Subne Subne	Support (iBFT, It IPv6 gatew it IPv6 gatew iddress iddres iddres iddress iddress iddress iddress iddress iddress iddre	ay ay			2001::1	
				[OK	Cancel

Figure 63 - Adding Default IPv6 gateway

3. Select MTU and assign value as per requirement.

Chelsio T	5 iSCSI Initia	ator Pro	perties			×
General	Advanced	Driver	Details	Events		
	erty you wan				twork adapter. I then select its	
Property	<i>r</i> :			V	alue:	
Defau Defau IPv4 a IPv6 a MTU Subne Subne	Support (IBFT It IPv4 gatew It IPv6 gatew address addr	ay ay		ſ	1500	<u>*</u>
				E	ОК	Cancel

Figure 64 - Setting MTU

4. VLAN is disabled by default, so to enable, click on "Vlan Insertion" and select value as "Enabled".

Chelsio T	5 iSCSI Initia	ator Pro	perties			×
General	Advanced	Driver	Details	Events		
	perty you wan				etwork adapter. d then select it:	
Defau Defau IPv4 a IPv6 a MTU Subre Subre	Support (iBFT) It IPv4 gatew It IPv6 gatew address address et mask et prefix length nsertion	ay ay			falue: Enabled	T
				[OK	Cancel

Figure 65 - Enabling VLAN

5. Assign the required VLAN ID and click OK.

Chelsio T	5 iSCSI Initia	ator Pro	perties			×
General	Advanced	Driver	Details	Events		
	erty you war				work adapter. then select its	
Property	<i>r</i> :			Va	lue:	
Defau Defau IPv4 a IPv6 a MTU Subne Subne	Support (iBFT It IPv4 gatew It IPv6 gatew address address at mask at prefix length section	ay ay		1	o	<u>.</u>
					ОК	Cancel

Figure 66 - Assigning VLAN Id

Repeat the above mentioned steps to assign these driver properties on other ports.

2.2. iSCSI Target Discovery and Login

Before target discovery, make sure a static IP address is assigned in the Device Manager to the respective Chelsio T5 iSCSI node.

Following are the set of instructions to discover the target and login to it using the Chelsio T5 iSCSI interface:

1. To start the Initiator configuration, go to Control Panel and click on the **iSCSI Initiator** option.

Quick C	onnect		Volumes and Devices			
-		on to a target usin	g a basic connection, t	the TD	address or	
		arget and then click		type ute th	0001233 01	
Target				0	uick Connect	II.
Discove	ered targets			-		
					Refresh	
Name				Status		1
, turric				- totos		
To con	nect using a	dvanced ontions, si	elert a target and then	_		
	nect using a	dvanced options, so	elect a target and then	_	Connect	
click Co	onnect.			_	Connect	
click Co To com	onnect. Ipletely disco	onnect a target, sel			Connect	
click Co To com	onnect.	onnect a target, sel				
click Co To com then cl	onnect. Ipletely disco ick Disconne	onnect a target, sel ct.	ect the target and		Disconnect	
click Co To com then cl For tar	onnect. Ipletely disco ick Disconne get properti	onnect a target, sel ct.				
click Co To com then d For tar select	onnect. Ipletely disco ick Disconne get properti the target a	onnect a target, sel ct. es, including config nd click Properties.	ect the target and uration of sessions,		Disconnect	
click Co To com then d For tar select	onnect. Ipletely disco ick Disconne get properti the target an infiguration o	onnect a target, sel ct. es, including configi nd click Properties. f devices associate	ect the target and		Disconnect	
click Co To com then d For tar select	onnect. Ipletely disco ick Disconne get properti the target an infiguration o	onnect a target, sel ct. es, including config nd click Properties.	ect the target and uration of sessions,		Disconnect Properties	
click Co To com then d For tar select	onnect. Ipletely disco ick Disconne get properti the target an infiguration o	onnect a target, sel ct. es, including configi nd click Properties. f devices associate	ect the target and uration of sessions,		Disconnect Properties	
click Co To com then d For tar select	onnect. Ipletely disco ick Disconne get properti the target an infiguration o	onnect a target, sel ct. es, including configi nd click Properties. f devices associate	ect the target and uration of sessions,		Disconnect Properties	
click Co To com then d For tar select	onnect. Ipletely disco ick Disconne get properti the target an infiguration o	onnect a target, sel ct. es, including configi nd click Properties. f devices associate	ect the target and uration of sessions,		Disconnect Properties	
click Co To com then d For tar select	onnect. Ipletely disco ick Disconne get properti the target an infiguration o	onnect a target, sel ct. es, including configi nd click Properties. f devices associate	ect the target and uration of sessions,		Disconnect Properties	
click Co To com then d For tar select	onnect. Ipletely disco ick Disconne get properti the target an infiguration o	onnect a target, sel ct. es, including configi nd click Properties. f devices associate	ect the target and uration of sessions,		Disconnect Properties	
click Co To com then d For tar select	onnect. Ipletely disco ick Disconne get properti the target an infiguration o	onnect a target, sel ct. es, including configi nd click Properties. f devices associate	ect the target and uration of sessions,		Disconnect Properties	
click Co To com then d For tar select	onnect. Ipletely disco ick Disconne get properti the target an infiguration o	onnect a target, sel ct. es, including configi nd click Properties. f devices associate	ect the target and uration of sessions,		Disconnect Properties	

Figure 67 - iSCSI Initiator Properties: Targets tab

2. Choose the **Discovery** tab and click on **Discover Portal**.

	Discovery	Favorite Targets	Volumes and Devices	RADIUS	Configuration	
	t portals	ok for Targets on fo	llowing portals:		Refresh	
Addr		Port	Adapter	I	P address	
To ad	dd a target p	ortal, dick Discover	Portal.	Disco	over Portal	
	move a targ click Remove		address above and		Remove	
		istered on the follow	wing iSNS servers:		Refresh	
	-					
To re	dd an iSNS se	erver, dick Add Serv IS server, select the e.			d Server Remove	
To re	dd an iSNS se move an iSN	S server, select the				

Figure 68 - iSCSI Initiator Properties: Discovery tab

3. Click on the Advanced button.

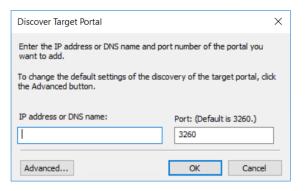


Figure 69 - Discovery Target Portal window

4. In the Advanced Settings window, select Chelsio iSCSI interface as the local adapter.

Connect using	
-	
Local adapter:	Default ~
Initiator IP:	Default Chelsio T5 iSCSI Initiator on B: 13 D:00 F:04 I:01 Chelsio T5 iSCSI Initiator on B: 13 D:00 F:04 I:00
Target portal IP:	Microsoft iSCSI Initiator
CRC / Checksum	
Data digest	Header digest
Enable CHAP log o	
CHAP Log on inform	
CHAP Log on inform CHAP helps ensure of an initiator. To use, specify the s	nation
CHAP Log on inform CHAP helps ensure of an initiator. To use, specify the s initiator. The name v	nation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this
CHAP Log on inform CHAP helps ensure of an initiator. To use, specify the s initiator. The name v specified.	nation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this vill default to the Initiator Name of the system unless another name is
CHAP Log on inform CHAP helps ensure of an initiator. To use, specify the s initiator. The name v specified. Name:	ation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn.2015-12.com.microsoft:iscsi
CHAP Log on inform CHAP helps ensure of an initiator. To use, specify the s initiator. The name v specified. Name: Target secret: Perform mutual au	ation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn.2015-12.com.microsoft:iscsi
CHAP Log on inform CHAP helps ensure of an initiator. To use, specify the s initiator. The name v specified. Name: Target secret: Perform mutual au To use mutual CHAP, RADIUS.	ation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this will default to the Initiator Name of the system unless another name is iqn.2015-12.com.microsoft:iscsi

Figure 70 - Discovery Target Portal Advanced Settings: Selecting Local adapter

5. Select the corresponding Chelsio iSCSI Interface IP as the Initiator IP and click **OK**.

neral IPsec	
Connect using	
Local adapter:	Chelsio T5 iSCSI Initiator on B: 13 D:00 F:04 I:01 $$\sim$$
Initiator IP:	Default 🗸
Target portal IP:	Default 102.30.30.41
CRC / Checksum	
_	Header digest
Enable CHAP log o CHAP log on inform CHAP helps ensure co an initiator. Fo use, specify the sa nitiator. The name w	n
CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the sa	n ation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this
Enable CHAP log o CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the sa nitiator. The name w specified.	n ation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this ill default to the Initiator Name of the system unless another name is
Enable CHAP log o CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the se nitiator. The name w specified.	In ation
Enable CHAP log o CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the sa nitiator. The name w specified. Vame: Target secret: Perform mutual au	In ation
Enable CHAP log o CHAP Log on inform CHAP helps ensure co an initiator. To use, specify the se nitiator. The name w specified. Vame: Target secret: Perform mutual au To use mutual CHAP, RADIUS.	ation onnection security by providing authentication between a target and ame name and CHAP secret that was configured on the target for this ill default to the Initiator Name of the system unless another name is iqn.2015-12.com.microsoft:iscsi

Figure 71 - Discovery Target Portal Advanced Settings: Specifying Target portal IP

6. Enter the IP address (DNS name not supported) of the target machine and the corresponding port number and click **OK** on the **Discover Target Portal** Window. Note that the default port number for iSCSI traffic is 3260.

Discover Target Portal	×
Enter the IP address or DNS name and want to add.	d port number of the portal you
To change the default settings of the the Advanced button.	discovery of the target portal, dick
IP address or DNS name:	Port: (Default is 3260.)
102.30.30.185	3260
Advanced	OK Cancel

Figure 72 - Adding Target portal

7. Once target portal is added, details like target and initiator machine IP, Port number and Chelsio iSCSI interface IP will be displayed.

rgets	Discovery	Favorite Targets	Volumes and Devices	RADIUS Configuration
Targe	t portals			
The s	ystem will lo	ok for Targets on fo	ollowing portals:	Refresh
Addr		Port	Adapter	IP address
102.	30.30.185	3260	Chelsio T5 iSCSI Initia	ator 102.30.30.41
To ac	ld a target p	ortal, click Discover	Portal.	Discover Portal
	move a targ click Remove		address above and	Remove
	ervers			Refresh
Name		istered on the follow		
To ac	ld an iSNS se	erver, click Add Serv	ver.	Add Server
To re		S server, select the	server above and	Remove

Figure 73 - Target portal added

8. Click on the **Targets** tab to see the list of targets available, choose a particular target and click on **Connect**.

i <mark>SCSI Init</mark>	iator Prope	rties				×
Targets	Discovery	Favorite Targets	Volumes and Devices	RADIUS	Configuration	
Quick C	Connect					
		g on to a target usin arget and then click	ng a basic connection, t Quick Connect.	ype the IP	address or	
Target	:			Q	uick Connect	
Discove	ered targets					
					Refresh	
Name				Status		
ign.20	004-05.com.	chelsio.target1		Inactive		
ign.20	004-05.com.	chelsio.target2		Inactive		
ign.20	004-05.com.	chelsio.target3		Inactive		
ign.20	004-05.com.	chelsio.target4		Inactive		
ign.20	004-05.com.	chelsio.target5		Inactive		
ign.20	004-05.com.	chelsio.target6		Inactive		
ign.20	004-05.com.	chelsio.target7		Inactive		
ign.20	004-05.com.	chelsio.target8		Inactive		
dick Co To com then d For tar select For cor	onnect. npletely disco ick Disconne get properti the target an nfiguration o	onnect a target, sel ct. es, including configu nd click Properties.	elect a target and then ect the target and uration of sessions, d with a target, select		Connect Disconnect Properties Devices	
			ОК	Cance	Apply	¢.

Figure 74 - Targets tab displaying list of available targets

9. A window pops up showing the Target Name, Click OK.

Connect To Target	×
Target name:	
Add this connection to the list of Favorite Targets. This will make the system automatically attempt to restore the connection every time this computer restarts.	
Enable multi-path	
Advanced OK	Cancel

Figure 75 - Connecting to Target

10. After logging in to the target, the state of the target will change from Inactive to Connected.

rgets	Discovery	Favorite Targets	Volumes and Devices	RADIUS	Configuration
-	Connect				
		on to a target usin arget and then click	ig a basic connection, t Quick Connect.	ype the IP	address or
Target	:			Q	uick Connect
Discove	ered targets				
					Refresh
Name	1			Status	
ign.20	004-05.com.	chelsio.target1		Connecte	d
ign.20	004-05.com.	chelsio.target2		Inactive	
iqn.20	004-05.com.	chelsio.target3		Inactive	
ign.20	004-05.com.	chelsio.target4		Inactive	
ign.20	004-05.com.	chelsio.target5		Inactive	
ign. 20	004-05.com.	chelsio.target6		Inactive	
ign. 20	004-05.com.	chelsio.target7		Inactive	
iqn.2	004-05.com.	chelsio.target8		Inactive	
	nect using a onnect.	dvanced options, se	elect a target and then		Connect
	npletely disco lick Disconne	onnect a target, sel ct.	ect the target and		Disconnect
		es, including configu nd click Properties.	uration of sessions,		Properties
		f devices associated n dick Devices.	d with a target, select		Devices

Figure 76 - iSCSI target connected

11. After successful login, go to Disk Management and make the respective volume online.

	iew Help										
	i 🖬 🗩 🗹 🗵	1									
olume	-		Ella Custana	Status	Constitu	Free Car	% Free			 	
olume (C:)	Layout Simple	Type Basic	File System	Healthy (B	Capacity 97.85 GB	Free Spa 23.02 GB	24 %				_
• (C.) • (E:)	Simple	Basic	NTFS	Healthy (P		96.47 GB	99 %				
(F:)	Simple	Basic	NTFS	Healthy (P		53.50 GB	55 %				
System Reserve		Basic	NTFS	Healthy (S		177 MB	35 %				
- Disk 0					1						
Basic	System Reserve				(F:)			(C:)			
Basic 931.48 GB	500 MB NTFS	97.17 0	5B NTFS	tion)	97.66 GB NTFS			97.85 GB NTFS	638.32 GB		
Basic 931.48 GB		97.17 0	38 NTFS y (Primary Parti	tion)					638.32 GB Unallocated		
Basic 931.48 GB Doline *O Disk 1	500 MB NTFS	97.17 0		tion)	97.66 GB NTFS			97.85 GB NTFS			
Basic 031,48 GB Dolline *O Disk 1 Basic	500 MB NTFS Healthy (System,	97.17 0		tion)	97.66 GB NTFS			97.85 GB NTFS			
Online ODisk 1 Basic 023 MB	500 MB NTFS Healthy (System, 1021 MB	97.17 0		tion)	97.66 GB NTFS			97.85 GB NTFS			
Basic 931.48 GB Online	500 MB NTFS Healthy (System, 1021 MB Online	97.17 0		tion)	97.66 GB NTFS			97.85 GB NTFS			
online ODisk 1 asic 023 MB	500 MB NTFS Healthy (System, 1021 MB	97.17 0		tion)	97.66 GB NTFS			97.85 GB NTFS			

Figure 77 - Disk Management: making volume online

VI. Data Center Bridging (DCB)

1. Introduction

Data Center Bridging (DCB) refers to a set of bridge specification standards, aimed to create a converged Ethernet network infrastructure shared by all storage, data networking and traffic management services. An improvement to the existing specification, DCB uses priority-based flow control to provide hardware-based bandwidth allocation and enhances transport reliability.

One of DCB's many benefits includes low operational cost, due to consolidated storage, server and networking resources, reduced heat and noise, and less power consumption. Administration is simplified since the specifications enable transport of storage and networking traffic over a single unified Ethernet network.

1.1. Hardware Requirements

1.1.1. Supported Adapters

The following are the currently shipping Chelsio Adapters that are compatible with Chelsio's DCB feature:

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

1.2. Software Requirements

1.2.1. Windows Requirements

Currently Chelsio's DCB feature is available for the following Windows versions:

- Server 2016 Technical Preview
- 2016 Client
- Nano Server
- Server 2012 R2

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

2. Software/Driver Configuration and Fine-tuning

2.1. Installing DCB

To install DCB on the host machine, open PowerShell with administrative privileges and run the following command:

```
PS C:\Users\Administrator> Install-WindowsFeature -Name "Data-Center-
Bridging" -IncludeAllSubFeature -IncludeManagementTools
```

Although not mandatory, it is recommended to reboot the machine after installation.

2.2. Quality of Service (QoS)

Quality of Service (QoS) is an advanced Windows feature used to prioritize and manage the outgoing network traffic. The feature ensures efficient usage of resources and minimizes the impact of bandwidth congestion.

2.2.1. Enabling QoS

QoS can be enabled by using either Device Manager or PowerShell:

• Using Device Manager

- i. Open the Device Manager (Start > Control Panel -> System & Security-> System -> Device Manager), click on the Network adapters, double click on any Chelsio Network Adapter, and then click the Advanced tab.
- ii. Select the NDIS QoS property and change the value to Enabled.

• Using PowerShell

Open PowerShell with administrative privileges and run the following command:

```
PS C:\Users\Administrator> Get-NetAdapterRdma | where
{$_.InterfaceDescription -like "Chelsio*"} | Enable-NetAdapterQos'
```

2.2.2. Verifying QoS

To verify if QoS is enabled, use the PowerShell command *Get-NetAdapterQos* and observe the results. You should see a similar output:

```
PS C:\Users\Administrator> Get-NetAdpterQos
Name : Chelsio_p1
Enabled : True
Capabilities : Hardware Current
----- -----
MacSecBypass : NotSupported NotSupported
DcbxSupport : IEEE IEEE
NumTCs (Max/ETS/PFC) : 8/8/8 8/8/8
```

2.3. Configuring Dell Force10 Switch

2.3.1. Enabling DCB

To enable DCB functions on a Dell Force10 switch, follow the steps mentioned below:

i. Log in to the switch and enter the configuration mode:

```
Login: admin
Password:
Force10#enable
Force10#configure
```

ii. Enable DCB and LLDP:

```
Force10(conf)#enable dcb
Force10(conf)#protocol lldp
Force10(conf-lldp)#no disable
```

iii. Set DCBx version to auto:

Force10(conf-lldp)#dcbx version auto

iv. Specify the intervals between hello packets:

```
Force10(conf-lldp)#hello 5
```

- v. Create a DCB map. For example, here we are configuring 2 groups/classes:
 - Group 0 has BW of 80% with *pfc* enabled.
 - Group 1 had BW of 20% with *pfc* disabled.
 - Assigning priority groups: Priority 5-7 are under group 0 and 0-4 are under group 1.

```
Force10(conf)#dcb-map win_dcb
Force10(conf-dcbmap-win_dcb)# priority-group 0 bandwidth 80 pfc on
Force10(conf-dcbmap-win_dcb)# priority-group 1 bandwidth 20 pfc off
Force10(conf-dcbmap-win dcb)# priority-pgid 1 1 1 1 0 0 0
```

vi. Enter interface configuration mode and configure protocol LLDP:

```
Force10(conf)#interface tengigabitethernet 0/17
Force10(conf-if-te-0/17)#protocol lldp
Force10(conf-if-te-0/17-lldp)#no disable
```

vii. Set DCBx version to auto:

Force10(conf-if-te-0/17-lldp)#dcbx version auto

viii. Apply the DCB-MAP created:

```
Force10(conf-if-te-0/17)#dcb-map win_dcb
```

2.3.2. Verifying

To verify remote and operational QoS configurational parameters, run the *Get-NetAdapterQos* command on the host machine. You should see a similar output:

```
PS C:\Users\Administrator> Get-NetAdapterQos
Name
                       : Chelsio pl
Enabled
                        : True
                                           Hardware Current
Capabilities
                       :
                                            _____
                                                        _____
                         MacSecBypass: NotSupported NotSupportedDcbxSupport: IEEE
                         NumTCs (Max/ETS/PFC) : 8/8/8
                                                       8/8/8
OperationalTrafficClasses : TC TSA Bandwidth Priorities
                         __ ___
                                  _____ ____
                          0 ETS 80% 5-7
                          1 ETS 20%
                                          0-4
OperationalFlowControl : Priorities 5-7 Enabled
OperationalClassifications : Not Available
RemoteTrafficClasses : TC TSA Bandwidth Priorities
                         __ ___
                                  _____
                          0 ETS 80% 5-7
1 ETS 20% 0-4
                      : Priorities 5-7 Enabled
RemoteFlowControl
RemoteClassifications : Not Available
```

VII. Unified Wire Manager (UM)

1. Introduction

Chelsio's Unified Wire Manager is a powerful management software tool, allowing you to view and configure different aspects of the system, including Chelsio hardware installed in the system. The software includes a command line interface (CLI) tool and a web management interface (Web GUI) to help you manage all Chelsio network adapter cards on the network across multiple operating systems.

Unified Wire Manager enables the management of all aspects of the client side of the iSCSI SAN in two main areas. The ability to configure Chelsio adapter's boot option ROM without entering each individual adapter's configuration screen and manage group of iSCSI initiators remotely from a common user interface saves administrator's time considerably. Unified Wire Manager fully supports Microsoft iSCSI initiator. All supported Chelsio FCoE initiators available on Linux can be managed.

Users can manage Option ROM (PXE and FCoE) capability for Chelsio cards using various tools available in the software.

Additionally, Unified Wire Manager allows for Chelsio adapter NIC and TOE parameters to be centrally managed through the same easy-to-use user interface. It can bring interfaces up or down, tune parameters for optimal performance, and any number of administrative tasks normally done at each individual machine.

Chelsio's Unified Wire Manager is an indispensable tool for saving administrator's time for managing the network and SAN. Chelsio's high performance network adapters with its Unified Wire approach to networking can now be managed centrally in a simple and fast way!

1.1. Features

Chelsio's Unified Wire Manager is designed to provide the following features to the end-user:

- Remotely manage Chelsio adapters and various related tasks like driver installation from a single application.
- Single tool with CLI and Web interface that works across Storage, Networking and Hardware.
- Manage all Chelsio adapters installed on the system.
- Tool for FAE to debug issues on the Customer front.
- Freedom to choose various modes of management i.e. CLI or Web GUI.

1.2. Reference Architecture

Chelsio's Web GUI is a web-based management interface that lets you remotely manage several Chelsio CNAs from anywhere, at any time on the network using a web browser. The Web GUI provides a great amount of flexibility, efficiency and accessibility to system administrators in managing the Network and SAN. The users have the freedom to access the interface using any of the major browsers available, based on individual preferences and corporate policy.

System performance degradation issues will not be observed when using the Web GUI, since it's lightweight and utilizes very less system resources.

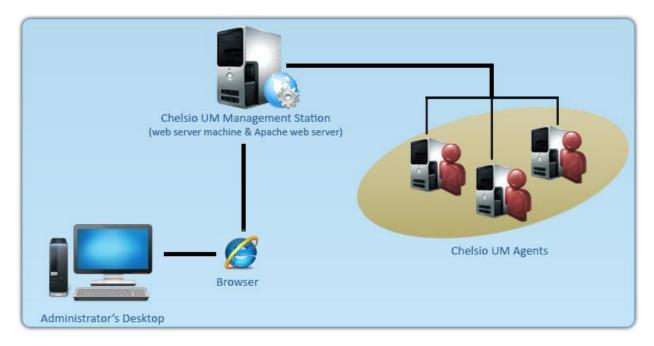


Figure 78 - Chelsio Unified Wire Manager with web interface (Web GUI)

1.3. Unified Wire Manager Components

1.3.1. Management Agent

The Management Agent is a binary executable, which runs as a service on the system that has at least one Chelsio card installed. It is installed along with libraries that can manage various components of the system and enabled during system startup.

1.3.2. Management Client

The Management Client can be used to connect to agents and manage them. Once connected you can view and configure Chelsio CNAs and related networking, storage and hardware properties. You can use either the CLI or Web GUI client to manage agents based on your preference. It makes service requests based on the command issued by the user and returns the appropriate information.

• CLI Client

The **CLI Client** (*chelsio_uwcli*) is an executable binary which allows you to manage and configure agents using the command-line interface. It is not a command shell with a prompt; it accepts all command parameters as arguments when launching it, making it script-friendly.

• Web GUI Client

The **Web Management Interface** (Web GUI) client is a web-based management interface which allows you to securely manage agents from anywhere using a web browser. The management interface uses a secure 256-bit encrypted HTTP connection, ensuring that authentication and configuration data are protected during transmission from the web browser to the system and vice versa. Many agents can be accessed on single interface making it very efficient & user-friendly.

Currently supported browsers are **Internet Explorer 9+**, **Mozilla Firefox 3.6.9+**, **Google Chrome 5+** and **Apple Safari 5+**.

1.4. Authentication and encryption

The Unified Wire Manager requires user authentication to manage a system. A user must have administrative privileges to manage a system. The authentication credentials, as well as all data exchanged between the CLI client or the Web GUI and the agent, are encrypted using SSL. This ensures that the data cannot be accessed when it is being transmitted over the network.

2. Hardware and Software

2.1. Supported Adapters

Following are the currently shipping Chelsio Adapters that are compatible with Chelsio Unified Wire Manager:

- T5 Adapters
 - T520-CR
 - T580-CR
 - T580-LP-CR
 - T580-SO-CR
 - T520-LL-CR
 - T520-SO-CR
 - T540-CR
- T4 Adapters
 - T420-CR
 - T440-CR
 - T422-CR
 - T404-BT
 - T420-BT
 - T420-LL-CR
 - T440-LP-CR
 - T420-CX

2.2. Platform/Component Matrix

The table below lists the Windows versions and the supported UM components.

Version/Distribution	Supported UM Components
Windows Server 2012 R2	Management Agent, Management Client, Management Station

2.3. Platform/Driver Matrix

The table below lists the Chelsio T5/T4 driver(s) and their supported versions:

Chelsio driver	Version
NIC	6.1.17.0

3. Installing Unified Wire Manager

3.1. Pre-requisites

Please ensure that the following requirements are met, before proceeding with the installation.

3.1.1. Management Agent

If you wish to install Management Agent, please make sure that **Microsoft** .Net Framework 3.5 is installed before proceeding with the installation

3.1.2. Management Station

If you wish to install Management Station, please make sure that the following requirements are met before proceeding with the installation:

- 5. Install Python 2.6.6 (32-bit). (Download from here)
- 6. Ensure that the path to python binary (typically "C:\Python26"), is added to PATH system variable.
- 7. Install Apache HTTP Server 2.2 with SSL. (Download from here)
- 8. If the Apache Server is running, it should be stopped before starting the installation process.

3.2. Installation

The following section describes the procedure to install UM. If an older version of the software exists, the Installer will upgrade it to the current version.

- 1. Run the UnifiedWireManager-x.x.xx-x64 installer application.
- 2. Click the **Next** button for the Chelsio End User License Agreement Window.

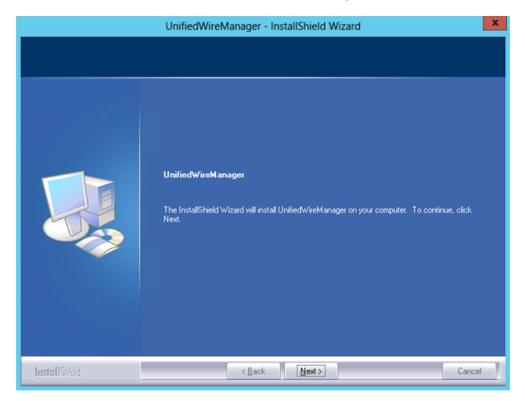


Figure 79 - UM installer welcome window

3. Select the radio button I accept the terms of the license agreement and click Next.

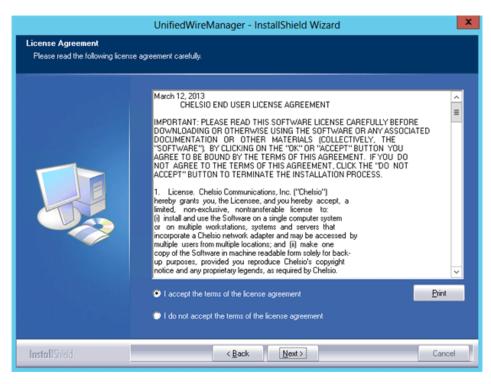


Figure 80 - Chelsio EULA window

4. The next window will display the pre-requisites for various UM components. Ensure that they are met before proceeding. Click **Next**.

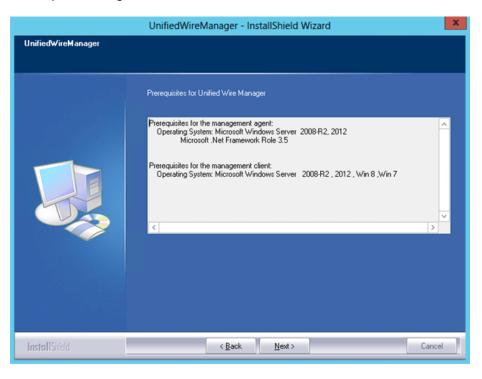


Figure 81 - UM prerequisites window

5. Now, either select **Complete** for complete package installation or else select **Custom** radio button to customize the installation. Click **Next.**

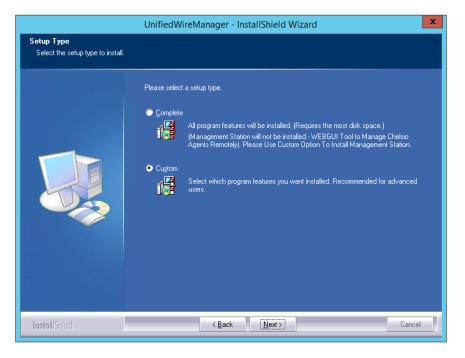


Figure 82 - Select setup (installation) type

iii. If you selected **Custom**, the next window will display the location where UM will be installed by default. You can change the location by using the **Change** button or click **Next** to continue with the default path.

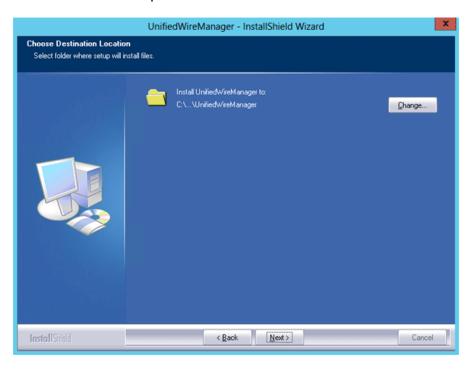


Figure 83 - Changing UM installation path

iv. Next, you can choose the UM components you wish to install. Deselect the components you don't wish to install and click **Next.**

	UnifiedWireManager - InstallShield W	izard
Select Features Select the features setup will in	stall,	
	Select the features you want to install, and deselect t	he features you do not want to install. Description Install the Unified Wire Manager service/agent. The server component is only supported on 2008 R2, Windows 2012 Server.
InstallShield	15.20 MB of space required on the C drive 60638.28 MB of space available on the C drive KBack	Cancel

Figure 84 - Selecting UM components to install

- Note If Management Station is selected, please make sure that all related prerequisites are met before proceeding (See Pre-requisites) or else the component will be skipped during installation.
- 6. Click **Install** to start the installation. Unified Wire Manager will now be installed with the selected options.

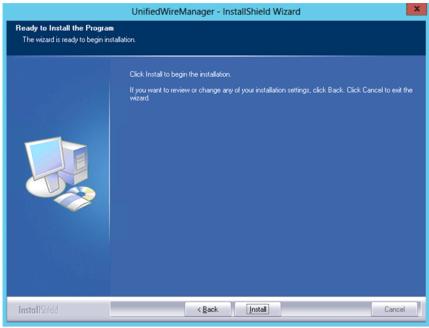


Figure 85 - Starting UM installation

7. Select Finish to exit the UM Installer.

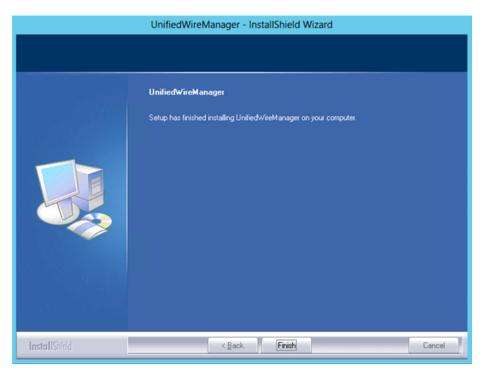


Figure 86 - Finishing UM installation

4. Configuring Unified Wire Manager

4.1. Configuring Management Station

Follow the steps mentioned below to configure Apache Server and SSL certificate.

4.1.1. Apache HTTP Server

1. Assuming that Apache HTTP Server 2.2 is installed at the default location, append the following lines in C:\Program Files (x86)\Apache Software Foundation\Apache2.2\Conf\httpd.conf

```
ScriptAlias /python/ "C:/Program Files (x86)/Apache Software
Foundation/Apache2.2/htdocs/chelsio/python/"

C:/Program Files (x86)/Apache Software
Foundation/Apache2.2/htdocs/chelsio/python/">
    PythonPath "['C:/Program Files (x86)/Apache
Software Foundation/Apache2.2/htdocs/chelsio/python']+sys.path"
    SetHandler mod_python
    PythonHandler mod_python.publisher
    PythonDebug on

LoadModule python_module modules/mod_python.so
ThreadStackSize 8388608
```

- 2. Perform the following tasks in C:\Program Files (x86)\Apache Software Foundation\Apache2.2\Conf\httpd.conf file
 - i. Change "DocumentRoot" to "C:/Program Files (x86)/Apache Software Foundation/Apache2.2/htdocs/chelsio"
 - ii. Uncomment "LoadModule rewrite_module modules/mod_rewrite.so"
 - iii. Uncomment "Include conf/extra/httpd-ssl.conf"
 - iv. Uncomment "LoadModule ssl_module modules/mod_ssl.so"
 - v. Add the following lines: RewriteEngine On RewriteCond %{HTTPS} !=on RewriteRule ^/?(.*) https://%{SERVER_NAME}/\$1 [R,L]

4.1.2. SSL Certificate

1. Execute the following lines in command prompt and provide info to generate OpenSSL certificate and keys:

cd "C:\Program Files (x86)\Apache Software Foundation\Apache2.2\conf"
..\bin\openssl req -config openssl.cnf -new -out blarg.csr -keyout blarg.pem
..\bin\openssl rsa -in blarg.pem -out blarg.key
..\bin\openssl x509 -in blarg.csr -out blarg.crt -req -signkey blarg.key days 365

- 2. Browse to the following location: C:\Program Files (x86)\Apache Software Foundation\Apache2.2\conf\extra\
- 3. Open the file *httpd-ssl.conf* and make the following modifications:
 - i. Modify "SSLCertificateFile" to "C:\Program Files (x86)\Apache Software Foundation\Apache2.2\conf\blarg.crt"
 - ii. Modify "SSLCertificateKeyFile" to "C:\Program Files (x86)\Apache Software Foundation\Apache2.2\conf\blarg.key"

Note
 On some installation, Apache is seen to report problems regarding SSL cache. In
 such a case, do the following in C:\Program Files (x86)\Apache Software
 Foundation\Apache2.2\conf\extra\httpd-ssl.conf

- i. Uncomment the following line SSLSessionCache "dbm:C:/Program Files (x86)/Apache Software Foundation/Apache2.2/logs/ssl_scache"
- ii. Comment the following line SSLSessionCache "shmcb:C:/Program Files (x86)/Apache Software Foundation/Apache2.2/logs/ssl_scache(512000)"
- **1** Note Use the Windows Event Log (Event Viewer) for troubleshooting any installation related issues.

5. Verifying UM components status

The following section explains how to verify status of various UM components.

5.1. Verifying Management Agent

1. On the system running Management Agent, launch **Services** from the Control Panel. You can also type services.msc in the **Run** command. This will open the **Services** window.

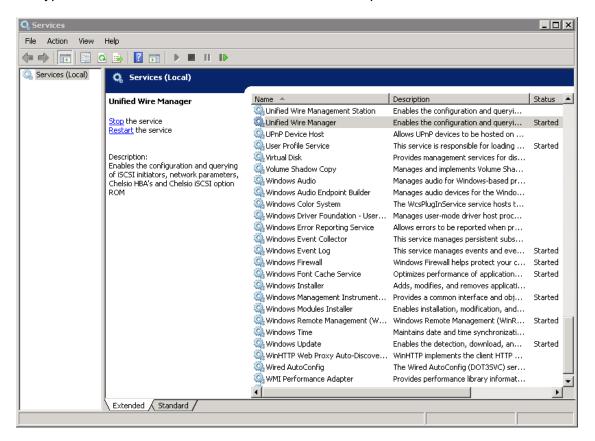


Figure 87 - Windows Services

2. Search for *Unified Wire Manager* in the list of services. You should get the options to stop and restart in the *Actions* menu on the left side, indicating that Management Agent is already running.





5.2. Verifying Management Client

Execute the following query command to determine if Management Client is installed:

```
C:\Users Administrator>chelsio uwcli.exe -V
```

The above query should confirm that Management Client is installed by displaying a similar result:

Unified Manager client CLI version : 2.x.yy

5.3. Verifying Management Station

- 1. Launch **Services** from the Control Panel. You can also type services.msc in the **Run** command. This will open the **Services** window.
- 2. Search for *Unified Wire Management Station* in the list of services. You should get the options to stop,start and restart the service in the *Actions* menu on the left side.

🔍 Services (Local)					
Unified Wire Management Station	Name 🔺	Description	Status	Startup Type	Log On As
	🧠 TCP/IP NetBIOS Helper	Provides s	Started	Automatic	Local Service
<u>Stop</u> the service <u>Restart</u> the service	🎑 Telephony	Provides T		Manual	Network S
	🎑 Thread Ordering Server	Provides or		Manual	Local Service
	🎑 TPM Base Services	Enables ac		Manual	Local Service
Description: Advocates apache to communicate with Chelsio Unified Manager agents	🌼 Unified Wire Management Station	Advocates	Started	Automatic	Local System
	🎑 Unified Wire Manager	Enables th	Started	Automatic	Local System
	🎑 UPnP Device Host	Allows UPn		Disabled	Local Service
	🎑 User Profile Service	This servic	Started	Automatic	Local System

Figure 89 - Verifying Management Station service status



While accessing the Web Management Interface, if an error "Management Station is not running" is displayed at the log-in page, follow the above steps to restart Management Station and try again.

6. Management Agent

6.1. Communication

The agent uses a TCP connection over IP to communicate with the client. After the connection is established, SSL (Secure Sockets Layer) encryption is enabled using the Open SSL libraries. The agent listens on a TCP port for new incoming connections from clients. This port is set to 35001 by default.

6.2. Service configuration

The agent is installed as a service on the system, and enabled to start on boot. The following sections will describe the procedure to configure service startup manually:

6.2.1. Service startup configuration

The service name on Windows is *Unified Wire Manager* and the service startup configuration can be changed by following these steps:

- 1. Launch **Services** from the Control Panel. You can also type s*ervices.msc* in the **Run** command. This will open the **Services** window.
- 2. Scroll and highlight the "Unified Wire Manager" service, and double-click on it.
- 3. Select the startup type, either "Automatic (Delayed Start)", "Automatic", "Manual", or "Disabled".

6.2.2. Service start/stop/restart

- 1. Launch **Services** from the Control Panel. You can also type s*ervices.msc* in the **Run** command. This will open the **Services** window.
- 2. Scroll and highlight the "Unified Wire Manager" service.
- 3. Click on **Start/Stop/Restart** to carry out the respective tasks in the Description section on the left.

6.3. Firewall

If the system has a firewall configured, it should be configured to allow traffic to the management agent's default TCP port configured i.e. 35001. Review the firewall documentation and configure it appropriately. If there is a firewall appliance / software protecting the network that the system is on, and you wish to connect to the system from a different network, using the client, the firewall appliance also needs to be configured appropriately.

7. CLI client

7.1. CLI Help system

A detailed help and usage documentation is built into the CLI, and is accessible through its help system. The help can be invoked by the usual argument of /? or --help.

7.1.1. Viewing help

- 1. Open command prompt by typing *cmd* in the **Run** command.
- 2. Type *chelsio_uwcli.exe --help*. Press enter to view the built-in help.

7.2. Client conflict resolution

The CLI and Web GUI cannot manage the same system at the same time by default. This is to ensure that configuration changes being applied by one client are not interrupted by another client. Also, two different Web GUI or CLI clients cannot connect to a management agent at the same time. There is no mechanism to allow this scenario.

8. Web GUI client

8.1. Management Station

In order to access the Web Management Interface, start the Apache HTTP server, if it's not running already. Also, Cookies and Javascript must be enabled in the browser.

8.1.1. Running Management Station

- 1. Launch **Services** from the Control Panel. You can also type services.msc in the **Run** command. This will open the **Services** window.
- 2. Search for "Apachex.x" in the list of services and click Start in the Action menu on the left.

🔕 Services (Local)					
Apache2.2	Name 🔺	Description	Status	Startup Type	Log On As
•	🤹 Adobe Flash Player Update Service	This servic		Manual	Local System
<u>Start</u> the service	🗛 Apache2.2	Apache/2		Automatic	Local System
	Application Experience	Processes		Manual	Local System
Description: Apache/2.2.21 (Win32) mod_ssl/2.2.21 OpenSSL/0.9.8r	🎑 Application Host Helper Service	Provides a	Started	Automatic	Local System
	🎑 Application Identity	Determines		Manual	Local Service
	Application Information	Facilitates		Manual	Local System
	Application Layer Gateway Service	Provides s		Manual	Local Service
	Application Management	Processes i		Manual	Local System

Figure 90 - Starting Apache HTTP server

3. Search for "Unified Wire Management Station" and click Start in the Action menu on the left.

🔍 Services (Local)					
Unified Wire Management Station	Name 🔺	Description	Status	Startup Type	Log On As
2	🧠 TCP/IP NetBIOS Helper	Provides s	Started	Automatic	Local Service
<u>Start</u> the service	🎑 Telephony	Provides T		Manual	Network S
	🎑 Thread Ordering Server	Provides or		Manual	Local Service
Description:	🎑 TPM Base Services	Enables ac		Manual	Local Service
Advocates apache to communicate with Chelsio Unified Manager agents	🍓 Unified Wire Management Station 🛛	Advocates		Automatic	Local System
	🎑 Unified Wire Manager	Enables th	Started	Automatic	Local System
	🎑 UPnP Device Host	Allows UPn		Disabled	Local Service
	🎑 User Profile Service	This servic	Started	Automatic	Local System

Figure 91 - Starting Management Station service

8.2. Accessing Web Management Interface

- 1. To access the Web GUI, type in the URL https://<management station IP address> in a web browser.
- 2. The security certificate used by the web server is a generic one. It may cause the following types of prompts in different browsers. You will need to select the correct option to continue.

8	There is a problem with this website's security certificate.
	The security certificate presented by this website was not issued by a trusted certificate authority. The security certificate presented by this website was issued for a different website's address.
	Security certificate problems may indicate an attempt to fool you or intercept any data you send to the server.
	We recommend that you close this webpage and do not continue to this website.
	Click here to close this webpage.
\leq	Secontinue to this website (not recommended).
	More information



	This Connection is Untrusted
YZ	You have asked Firefox to connect securely to 10.193.184.237 , but we can't confirm that your connection is secure.
	Normally, when you try to connect securely, sites will present trusted identification to prove that you are going to the right place. However, this site's identity can't be verified.
	What Should I Do?
	If you usually connect to this site without problems, this error could mean that someone is trying to impersonate the site, and you shouldn't continue.
	Get me out of here!
	Technical Details
<	I Understand the Risks
	▼ I Understand the Risks
	I Understand the Risks
	If you understand what's going on, you can tell Firefox to start trusting this site's identification. Even if you trust the site, this error could mean that someone is tampering with your connection.
	Don't add an exception unless you know there's a good reason why this site doesn't use trusted
	identification.

Figure 93 - Security Certificate prompt in Mozilla Firefox

	Safari can't verify the identity of the website "10.193.184.237". The certificate for this website is invalid. You might be connecting to a website that is pretending to be "10.193.184.237", which could put your confidential information at risk. Would you like to connect to the website anyway?	
?	Show Certificate	Cancel Continue

Figure 94 - Security Certificate prompt in Apple Safari

The site's	security certificate is not trusted!
	ach 10.193.184.237, but the server presented a certificate issued by
	trusted by your computer's operating system. This may mean that the
-	d its own security credentials, which Google Chrome cannot rely on on, or an attacker may be trying to intercept your communications.
	eed, especially if you have never seen this warning before for this
site.	eed, especially if you have never seen this warning before for this
Proceed anyway	Back to safety

Figure 95 - Security Certificate prompt in Google Chrome

3. The web interface requires password authorization to be accessed. Enter the administrator/root credentials that were set up on the management station system and click on the *Login* button.

Login		
Username		
user1		
Password		
••••••		
Login		

Figure 96 - Web GUI Login page



Not performing any operation/action for 5 minutes will result in session timeout. You will have to re-login and connect to the Agents again.

8.3. Layout and Navigation

The Web Management Interface consists of the following:

- **Title bar** displaying the username on the left, Unified Wire Manager logo and name in the centre; and a Logout button on the right.
- Menu Bar consisting of the Home, Add System, Remove System, Refresh, Subscribe and Bulk Configuration buttons.
- The **Navigation Pane** with a cascading tree of links to various configuration modules for a UM Agent. You can navigate between connected agents and various sections of the managed agent's interface. You can view and hide the configuration modules for each Agent by clicking on the "+"and "-"links respectively
- The **Details Pane** on the right displaying panels associated with the tree menu item selected in the **Navigation Pane.** The panels can be expanded and collapsed by clicking on the panel heading.
- The Bottom bar has the About link on the right and copyright details on the left.

Welcome, root	Nelsio Unified Wire Manager 2.4	E- Logout
Menu	📅 HOME 🔰 😡 Add System 🛛 🔜 Remove System 🛛 🎫 Refresh 🛛 🖾 Subscribe 🛛 🗙 Bulk Configura	ation
torpedo 🕞	Bookmarks and History	2
🗄 📩 Network	Service Discovery	2
± ■ Storage ± ₩ Hardware Features	Bulk Driver Installation	2

Figure 97 - Web Management Interface

8.4. Home page

The home page is displayed by default on launching the Web GUI. It displays **Bookmarks and History**, **Service Discovery** and **Bulk Driver Installation** modules. Options to go back to home page, add/remove system, refresh and configure email alerts are also available.

8.4.1. Home

This option will display the home page.

Bookmarks and History

A history of the last 128 systems that were managed from this system, by the current user, will be shown here in a list. Each system's management IP address, TCP port, and Login details are also stored. This may be edited and saved. Any systems that are not required in the list may be deleted.

Important

Storing login passwords for the managed systems is inherently insecure. The passwords are encrypted, but it is still advisable to store passwords only if the system you are running the GUI client on, is secure.

Bookmarks and History	_		2
 10.193.185.107 - WIN-4HSMAGTHKC6 10.193.184.117 - HP-BLADE1 10.193.185.92 - throttle 10.193.186.196 - SPINEL 10.193.184.94 - munnar 10.193.184.71 - thor 10.193.186.188 - mahanadi 10.193.184.212 - doom 	System : IP : Port : Login Username : Login Password : Last Accessed : Total Connections :	throttle 10.193.185.92 35001 root 12-13-2012_22:30:53 2 Save Changes	
Connect Delete System			

Figure 98 - Bookmarks and history module

• Connecting to a system

Select the system from the Bookmark list and click *Connect.* Once successfully connected, the system will appear on the left pane with different related modules on the right to view and manage.

• Deleting a system

Select the system from the Bookmark list and click Delete system to remove it.

0 Note

Once removed, the system will no longer appear in the Bookmarks and History module. If you wish to manage that system again, you will have to use the "Add system" option.

Service Discovery

Using this module, all the Unified Wire Manager agents connected in the same or different subnet can be discovered. One can choose to discover agents based on OS type or search for a particular agent if the agent's IP or hostname is known. Select the appropriate discovery method and provide the relevant information. For example, to search using hostname, select *Hostname* as the **Input Type** and provide the agent's hostname in the **Search for Hostname/IP** field. Finally click **Discover Agents**.

The **Add Agents** button adds the selected system to the list of discovered agents in the **Bookmarks and History** module. The **Clear Agents** button resets the list of discovered agents.

9
Select the Subnet : Default Select OS : All Input Type: O Hostname IP Search for Hostname/IP : Discover Agents

Figure 99 - Services Discovery module

• Bulk Driver Installation

This module allows you to install drivers for multiple systems simultaneously. Drivers available for installation for a particular system may differ depending on the network adapter (T5, T4 or T3) and operating system selected.

• Installing Driver

- 1. In the **Choose the card** fields, select T3 or T4/T5 depending on the chip revision of the network card.
- 2. Select the operating system for which drivers are to be installed in the **Choose the OS Type** field. All the systems with the selected operating system will be displayed in the list below.
- 3. Select a system or systems from the list and choose the driver to be installed in the **Driver Installation** section.
- 4. Download the appropriate driver from Chelsio's Download Center, service.chelsio.com.
- 5. Locate the driver package.
- 6. Click **Install** button to install the driver.

Bulk Driver Installation	3
Choose card type: T4/T5 Choose Os type: Windows	
Select system for driver installation	Note:
* 10.193.184.62 - SHARK	 Systems from Bookmarks & History with stored login/password will appear here. Connected system will not be listed System that reports error will be automatically skipped Systems with incorrect login credentials will also be skipped
Chelsio Drivers	
VIC	
Team ChelsioUwire-5.0.0.7.e: Se	elect windows driver
FCoE Full Offload Initiator	
VNIC VIC	
ND (Available only for Chelsio Card T420-CR)	
Install Discard Changes	



O Note Agents that report errors or whose passwords are not stored, will be automatically skipped during the driver installation.

8.4.2. Add System

Use this option to connect to new Agents using their IP or Hostname. The TCP port for connection is by default 35001. You will have to provide correct user credentials for the agent in order to connect successfully.

After connecting to the Agent, the menu bar on the left will display the connected system and its related modules.

If you deselect the 'Remember Password' option, you will be asked to enter the password every time you try to connect to the system.

Add System	×
	◉ IP ◎ Hostname
IP address/Hostname	10.193.185.107
TCP Port	35001 Default
Administrative User	administrator
Password	•••••
	Remember Password
Co	nnect to system Cancel

Figure 101 - Adding a UM Agent

8.4.3. Remove System

Use this option to disconnect an Agent. To remove an agent, click on the name of the system in the tree menu in the left and click *Remove System*. Then click *Yes* to confirm.

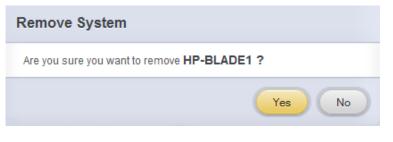


Figure 102 - Removing a UM Agent

8.4.4. Refresh

This option can be used to reload the Web GUI or UM Agent.

To reload the Web GUI, navigate to the Home page (by clicking on the "Home" button and click Refresh. You can use this option to refresh Home page panes (Bookmarks and History, Service Discovery and Bulk Driver Installation).

To reload an Agent, click on the name of the system in the tree menu in the left and click "Refresh". You can use this option to update any changes made to system settings like load/unload drivers.

8.4.5. Subscribe (Email Alerts)

This feature is available only on the Web Management Interface.

Using this option, you can receive email alerts regarding the link status of a Chelsio Network Interface Card. This feature sends email notifications regarding the port and the card, on which the link up/down event has occurred. Not only can you configure multiple email addresses to receive notifications, but also customize the email id of the sender for troubleshooting purposes.

To subscribe to **Email Alerts**, enter the sender's email address in the *Email address* field. It should be in the format of <name>@<domain>.<extension>. You can enter multiple email addresses for the *Recipients* field separated a comma. Enter Mail server details and ensure that the "Enable email Alerts" field is enabled. Select the Agent(s), for which you want to receive alerts and Click on **Save**.

Email Alert	
Email address:	email_id@abc.com
Recipients:	administrator1@chelsio.com,administrat
Mail Server:	mailserver.abc.com
SMTP Port:	25
Services:	Vetwork Services
Enable email alerts:	Enable
Select Systems:	
🍂 10.193.185.107 - V	VIN-4HSMAGTHKC6
🍠 10.193.184.117 - H	IP-BLADE1
👌 10.193.185.92 - thr	rottle
👌 10.193.186.196 - S	PINEL
👌 10.193.184.94 - mi	unnar
<mark>∆</mark> 10.193.184.211 - e	astend
€ 10.193.184.71 - the	pr
	Save Close

Figure 103 - Subscribing to Email Alerts

8.4.6. Bulk Configuration

The **Bulk Configuration** page allows you to execute common configuration changes to multiple agents and their network adapters simultaneously. You can conveniently perform bulk operations like installing option ROM, setting MTU and VLAN ID, changing adapter and port parameters on various devices, without having to access multiple modules and thus saving considerable amount of administration time.

Various configurable parameters have been categorized into several modules like **Boot Configuration** module to install and erase option ROM, **Network Configuration** module to set MTU and VLAN ID, **Card Configuration** module to change driver parameters, etc.

Before accessing these modules, you will have to create **groups** and then add **members** to that group. Once done, you can select the group in the modules and the new setting will be applied to all members of that particular group.

• Manage Groups

This is where you can add, delete and manage groups. Use the **Create a Group** section to create a group by specifying agent's platform and group type. There are various types of groups to choose from depending on the type of configuration setting you want to change. For example, to change the MTU size of a network interface (in the Network Configuration module), create a group with group type *Network*. To install or erase option ROM on a Chelsio T4 adapter (in the Boot Configuration module), create a group with group type *t4adapter*.

Here is a list of available configuration modules and corresponding group type:

- Boot Configuration:t3adapter,t4adapter,t5adapter
- Network Configuration:Network
- Card Configuration: t3adapter,t4adapter,t5adapter
- Port Configuration:t3port, t4port,t5port
- Bypass Configuration: Network

After the group has been created, add members to that group using the **Add a member row** button. Depending on the group type selected, you may be asked to provide additional details for the new member. Use the **Fetch Details** button to do so and finally click **Save a member** button to add the member to the group.

To delete a group, select it from the **Select a Group** drop-down list, and click **Delete Group**. To delete a member from a group, select the group to which the member belongs, select the radio button corresponding to the member to be deleted in the **SNO** field and finally click **Delete Member(s)**.

Create a Group	
Group Name:	group_t4adapter
Os Type :	Windows 💌
Group Type :	t4adapter 💌
	Create a Group

Figure 104 - Creating a group

OS Type: Group Ty	: WINDOWS			
SNO	HOSTNAME / IP	USERNAME	USERNAME	DETAILS
-	10.193.185.107	administrator	*********	Adpater Idx: 0 [T422;CR ; PCI Location: 01:00:04
© 1				

Figure 105 - Managing a group

Boot Configuration

Using this module, you can install option ROM or erase option ROM on Chelsio network devices. The **Set Default Boot Settings** button will reset the adapter to factory boot settings.

Boot Configuration	?
Refre:	sh
Boot Configuration	
Select a group: group_t4adapter 💌	
Chelsio-Uboot-1.0.0.46.zip Browse	
Write Option ROM Erase Option ROM Set Default Boot Settings	



Network Configuration

In the **Network Configuration** module, you can set Maximum Transfer Unit (MTU), Virtual LAN (VLAN) ID and change the IP address type for the members (network interfaces) of the *Network* group. MTU can be set between 1500-9000 bytes. VLAN id can be set for an adapter within the range 0-4094 (enter 0 to disable it). The IP type can be static or DHCP.

Net	work Configuration			?
			2 Refresh	
	Network Configuration			
	Select a group:	group_network		
	MTU:	1650	Set MTU	
	VLAN:	4	Set VLAN	
	IP Туре:	DHCP 💌	Set IP Type	

Figure 107 - Network Configuration module

• Card Configuration

The **Card Configuration** module allows you to set various adapter settings including TCP Offload. Offload settings are only available when using the TOE capable drivers (*t3_tom* and *toecore* for T3 cards; *t4_tom* and *toecore* for T4 cards).

ard Configuration	-	-	2 Refresh		3
Select a Group: Group Type: OS Type:	group_wi t4adapter WINDOWS	n_t4adapter 💌		lue a variable of type int ca alue a variable of type int c	
DES	CRIPTION	RAI	IGE	VALUE	
Max VM		[0,16]		4	
	ĺ	Set Card Properties	Discard Changes		

Figure 108 - Card Configuration module

• Port Configuration

In the **Port Configuration** module, you can set various port settings like enabling Tx checksum and TCP segmentation offload, setting Link speed and link duplex mode, etc. The settings depend on the device driver installed.

rt Configuration	_		_	
Select a Group: Group Type:	group_t4port		Refree Note: MIN = Minimun valu	sh e a variable of type int can assume
OS Type:	WINDOWS			ue a variable of type int can assume
DESCR	IPTION		RANGE	VALUE
Link speed and link dupl	ex	auto 100-f	ull 1000-full	auto
Enable Disable LSO IP v	4	0 1		1
Enable Disable LSO Ip v6	5	0 1		0
FlowControl		[0,3]		1
IP CheckSum Offload		[0,3]		2
Enable Disable Virtual Ma	achine Queue	0 1		
Enable Disable VMQLool	kAheadSplit	0 1		
Enable Disable VMQVLa	nFilter	0 1		
TCP CheckSum Offload	/4	[0,3]		
TCP CheckSum Offload	/6	[0,3]		
UDP CheckSum Offload	v4	[0,3]		
UDP CheckSum Offload	v6	[0,3]		
Max Number of Respons	e Queue	[1,8]		
RSS load balancing profi	le	[0,4]		

Figure 109 - Port Configuration module

• Bypass Configuration

Use the **Bypass Configuration** module to configure Chelsio's bypass adapters like B420-SR and B404-BT.

Bypass Configuration		?
	2 Refresh	
Modify bypass configurat	tion on the machines in the group	
Select a group:	group_network	
Select action:	Modify Current Mode	
Default bypass mode:	Bypass Mode 💌	
Current bypass mode:	Bypass Mode 🗨	
Watchdog:	Enable 💌	
Watchdog timeout:		
Upload config file:	Browse	
s	Bave Changes Discard Changes	

Figure 110 - Bypass Configuration module

8.5. System page

The system page is displayed, when the system hostname / IP address is selected in the tree menu on the left. On adding a system, this item is automatically selected, and this page is displayed. The system page contains generic system and support modules which are discussed below:

8.5.1. System summary

This module lists the system Hostname, Operating System, platform and also gives the count of the Chelsio cards found.

stem Summary	
PROPERTY	VALUE
Hostname	shambu-dc
Connected IP:Port	10.193.184.168:35001
Chelsio Cards	1
Operating system	Windows Server 2012
Platform	x86_64 (amd64 / x64)

Figure 111 - System Summary module

8.5.2. Drivers Installation

Using this module, one can install various Chelsio drivers for different operating systems.

rivers Installation		(
	Select the card type: T4 💌	
Chelsio D	rivers	
NIC		
🔲 Team	Select v	vindows Driver
FCoE Full Offload Ir	itiator	
	Install Discard Changes	

Figure 112 - Drivers Installation module connected to Windows Agent

8.5.3. Driver Details

A list of Chelsio device drivers with related information like driver description, version, current load status and installation date is shown in this module. To load or unload a particular driver, select the appropriate option (Yes to load, No to unload) in the corresponding cell of the *Loaded* column and click **Load/Unload Driver** button. Click **Refresh** if changes are not reflected immediately. To reject the load/unload option selected, click **Discard Changes**.

Driver Details	_	_	_	ē
		2 Refres	sh	
	Load / U	Jnload Driver	Discard Changes	
DRIVER	LOADED	VERSION	DATE	DESCRIPTION
ch_vbd	No	N/A	N/A	Chelsio T3 Ethernet Function Enumerator
cxge3	No	N/A	N/A	Chelsio T3 Ndis Function driver
chteamp	No	N/A	N/A	Chelsio NIC Teaming Driver
chiscsi	No	N/A	N/A	Chelsio T3 iSCSI Driver
chiwarp	No	N/A	N/A	Chelsio T3 iWarp interface Driver
ChelsioT4	Yes 💌	4.3.8.0	2-14-2013	Chelsio T4 Driver
cht4vbd	Yes 💌	4.3.8.0	2-14-2013	Chelsio T4 Virtual Bus Driver
csiofcoe	Yes	1.3.0.4	2-27-2013	Chelsio T4 FCoE Driver

Figure 113 - Driver Details module

8.5.4. System Diagnostics

Using this module, you can run various diagnostic tests on Chelsio adapters to troubleshoot adapter related issues. Select the adapter(s) from the list for which you want to run the test, select the operation (type of test; you can run more than one test at a time) and click **Run Test**. After the tests are completed, the results will be displayed in a tabular format.

Sys	System Diagnostics						?	
	Select the	card(s) for pe	rforming diagnostics					
	T420-C	R			Select	The Opera	tion(s)	
	T520-LL				V Te	est LED		
	1020 22				V Te	est Control F	Registers	
					V Te	est MII Regi	sters	
					🔽 Te	est EEPRON	N	
					V Te	est Internal I	Memory	
					Ru	ın Test		
				-				
(CARD	LED	CONTROL REGISTERS	MII REGI	STERS	EEPROM	INTERNAL MEM	ORY
T4	420-CR	Success	Success	Succ	ess	Success	Success	

Figure 114 - System Diagnostics module for a T4 CNA

8.5.5. Unified Wire Manager Component Versions

A list of the Unified Wire Manager agent components installed on the managed system is shown in this module. The versions of the components are useful in case of reporting an issue to support.

Inified Wire Manager Component Versions	
COMPONENT	VERSIONS
Server	2.4.29
msiscsi	1.1.6
winchiscsi	2.0.0
win_net	2.0.0
winteam	2.0.0
winhwlib	2.0.3
winosapi	2.0.0

Figure 115 - Unified Wire Manager Component Versions module

8.5.6. VM Configurations

The VM Configurations module allows you to view UUID and Power and Health state of Virtual Machines. You can perform various system power options like enable (start VM), disable (stop VM), reboot (restart VM), pause and suspend (save VM state).

You can perform similar actions on multiple virtual machines. To do so, click on the machine names in the list. The properties box will display the domain state of the machines selected. Now, click on any of the system power actions provided at the bottom.

VM Configurations		?
	Refresh	
	Virtual Machine Properties	
RHEL6.1	UUID: 77C5D36F-F482-4EAE-A7F9-420D956C82C0	
	Power State : Enabled	
	Health State : OK	
Enable	Disable Reboot Pause Suspend	

Figure 116 - VM Configurations module

8.5.7. Managed system application logs

The management agent logs its activities and any errors that occur, in */var/log/chelsio* in *Linux* and FreeBSD and in the Event log, in Windows. This log can be obtained in this module. Only 20 entries can be obtained and viewed at a time. Logs can be viewed by either choosing from a list of fixed range or by specifying a custom starting point.

Use the **Get Logs** button to retrieve, and **Hide Logs** button to clear the log entries. The **Delete Logs** button will remove the logs permanently from the agent.

Managed System Application Logs			
Fixed F	n Starting Point		
SNO	LOG ENTRY		
1	2/25/2013 01:12:55 257 Error in network library. DeviceloControl() failed with error 87.		
2	2/25/2013 00:53:48 261 Error in system library. Server is not licensed, cannot run commands.		
3	2/25/2013 00:51:50 261 Error in system library. Error reading from socket.error:00000006:lib(0);func(0):EVP lib.		
4	4 2/25/2013 00:51:43 261 Error in system library. OsApi::AuthenticateUser function failed, Reason: LogonUser function failed with error 1326, please check username and password.		
5	2/25/2013 00:47:25 261 Error in system library. Server is not licensed, cannot run commands.		
6	2/24/2013 22:07:30 261 Error in system library. Server is not licensed, cannot run commands.		
7	2/24/2013 22:07:22 261 Error in system library. OsApi::AuthenticateUser function failed, Reason: LogonUser function failed with error 1326, please check username and password.		

Figure 117 - Managed System Application Logs module for Windows Agent

8.6. Network page

8.6.1. Network summary

The **Network Summary** module provides the total number of Chelsio adapters present, including the number of T5, T4 and T3 adapters. It also provides the total number of Network interfaces including corporate and Chelsio interfaces and VLANs.

3
VALUE
2
1
1
7



8.6.2. Chelsio card page

When a Chelsio card is selected in the tree menu on the left, this page is displayed. It provides details of the card and associated settings. It also displays any card specific statistics that the hardware provides. The modules available on this page are as below:

Card summary

This module provides PCI, firmware and other details of the card. The card's serial number and factory MAC address are also provided for inventory purposes.

PRODUPTY	VALUE
PROPERTY	VALUE
PCI ID (Vendor : Device)	1425 : 4403
PCI bus location (Bus : Device : Function)	01:00:04
Card Serial Number	PT18111222
Factory MAC address	00:07:43:10:71:80
Firmware Version	1.8.3.0
Ethernet Ports	4
Offload Support	Chelsio T440-CR 10G Ethernet Function Enumerato
In maintenance mode	No
Hardware is TCP Chimney offload enabled	No
Connector	10G SEP+

Figure 119 - Card Summary module for a Windows Agent

• TCP Offload settings (Linux & FreeBSD)

The TCP offload settings applicable to the card are shown here. These settings are only available when using the TOE capable drivers (*t3_tom* and *toecore* for T3 cards; *t4_tom* and *toecore* for T4 cards). On changing the settings, the changed settings may not reflect immediately on refreshing the data. Highlight the system item in the tree menu on the left, and click "Refresh", to refresh data from the system, in case the updated settings are not being shown.

CP Offload Settings (Offload Card and Offload Summary Only)	ē
Save or Discard Driver Settings Changes: Save Changes	Discard Changes
DESCRIPTION	VALUE
TCP offload engine enabled (activated):	Yes
Direct data placement (ddp):	Yes
Soft listen backlog limit (soft_backlog_limit):	Yes
Max offloaded connections (max_conn):	40960 🗢
Delayed ACK (delack):	0
Max Tx payload size (mss):	-1 🗘
Max host send buffer per socket (max_host_sndbuf):	1 🗘
Threshold payload size in bytes for Tx (bt_hold_thres):	1048576 🗢
Min Rx credits for RX_DATA_ACK (rx_credit_thres):	0
Min Rx payload size in bytes for DDP activation (ddp_thres):	15360 🗢
DDP wait for push flag (ddp_push_wait):	Yes 💌
DDP receive coalescing (ddp_rcvcoalesce):	No

Figure 120 - TCP Offload Settings module for a FreeBSD Agent

• Device Driver settings (Windows)

The device driver settings applicable to the card are shown here. For Chelsio T5 and T4 adapters, only the *MaxVMQueues* field will be displayed. On changing the settings, the changed settings may not reflect immediately on refreshing the data. Highlight the system item in the tree menu on the left, and click **Refresh**, to refresh data from the system, in case the updated settings are not being shown.

Device Driver Settings	_	3
Save or Discard Driver Settings Changes:	Save Changes	Discard Changes
	DESCRIPTION	VALUE
MaxVMQueues:		10 \$

Figure 121 - Device Driver Settings module for a Windows Agent

• Card statistics

Certain statistics are maintained on a per card basis (instead of a per port basis), since the card has a TCP/IP offload capability. The statistics are for TCP and IP protocol processing done in the card's hardware. These statistics may only be applicable if the card is TOE enabled.

Card Statistics	?
STATISTIC	VALUE
OutRsts	0
In Segs	44
OutSegs	57
RetransSegs	0
Retrans Segs	U



8.6.2.1. Chelsio card's port

The port page is displayed on selecting a port of a Chelsio card listed in the tree menu on the left. It provides details of the port and port settings. It also displays any port specific statistics that the hardware provides. The modules available on this page are as below:

Port summary

The port details such as the Ethernet adapter name and link details are shown in this module.

Port Summary	3
PROPERTY	VALUE
Port Name	Local Area Connection 89
Link	Link up



• Port settings

Port settings such as MTU, Link speed and others can be set in this module. The settings depend on the device driver installed.

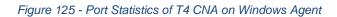
Port Settings	2
Save or Discard Port Settings Changes:	Save Changes Discard Changes
DESCRIPTION	VALUE
MTU (in bytes):	1500 🗢
Link speed and duplex operation:	10Gb/s Full duplex
Tx checksum offload enabled:	No
Rx checksum offload enabled:	No
Tx pause frame support enabled:	No
Rx pause frame support enabled:	No
Receive side scaling enabled:	Yes
VLAN ID:	0
Large segment offload V2 (IPv4):	Yes
Large segment offload V2 (IPv6):	Yes
Flow control:	Tx and Rx Enabled
IPv4 checksum offload:	Tx and Rx Enabled 💌
VMQ:	Yes
VMQ look ahead split:	Yes

Figure 124 - Port Settings of T4 CNA

Port statistics

Ethernet statistics and additional hardware statistics for the port are displayed in this module.

Port Statistics	3
STATISTIC	VALUE
tx_octets	0
tx_frames	0
tx_bcast_frames	0
tx_mcast_frames	0
tx_ucast_frames	0
tx_error_frames	0
tx_frames_64	0
tx_frames_65_127	0
tx_frames_128_255	0
tx_frames_256_511	0
tx_frames_512_1023	0
tx_frames_1024_1518	0
tx_frames_1519_max	0
tx_drop	0



8.6.3. Networking Management page

The system networking configurations are shown on this page. IP addresses, MTU, VLAN Ids, DNS and default gateway settings can be viewed and modified here. Network adapters can also be enabled or disabled as required. The modules available on this page are as below:

System Network configuration

The list of network adapters on the system is displayed in a list on the left. The icon for the adapter indicates whether it is administratively enabled and if it is connected to the network. The primary IP address (IPv4) can be set for the adapter, when it is selected. There is an option to add/modify/delete additional IP addresses or aliases for the specified adapter. Use the option to add additional IP addresses with caution, since multiple IP addresses configured on the same adapter, for the same network, may result in unpredictable behavior of the system's networking

stack. Maximum Transfer Unit (MTU) can be set between 1500-9000 bytes. VLAN id can also be set for an adapter within the range 0-4094 (enter 0 to disable it).

System Networking Configuration	_		?
 Ethernet [00:26:b9:87:26:02] Ethernet 10 [00:07:43:11:6c:48] Ethernet 11 [00:07:43:11:6c:50] Ethernet 12 [00:07:43:11:6c:40] Ethernet 13 [00:07:43:11:6c:58] 	Selected Interface : Description : Status : IP address type : Primary Ip address : Primary subnet mask : MTU : VLAN : Save Cl	Ethernet [00:26:b9:87:26:02] Broadcom NetXtreme Gigabit Ethernet Enabled Link Present Static IP 💽 10.193.185.107 255.255.252.0 1500 0 hanges Discard Changes	
Disable interface Delete VL		/iew/Set additional IP addresses	

Figure 126 - System network configuration module

Additional IP Address	Add IP Address IP 10.193.185.103 Mask 255.255.252.0 Add
	Modify Selected IP Address IP 10.193.185.105 Mask 255.255.252.0 Modify
	Delete Selected IP Address

Figure 127 - Managing IP aliases

• System network statistics

Using this module, one can generate reports based on Throughput pkts/sec and Throughput Mbs (Receive, Transmit, Bi-direction) in Table and Graph format for a network adapter. A report for hardware statistics can be generated based on different parameters, only in the Table view in the

Advanced NIC characteristics. The polling time field sets the average time (in seconds) based on which the table/graph updates the report.

em Networking Statistics		_
	C Throughput Pkts/sec	
Ethernet [00:18:e7:18:2e:85]		
Ethernet 2 [00:1e:8c:85:a4:c0]		
Ethernet 8 [00:07:43:10:cf:90]	Transmit Pkt/sec	
Fthernet 9 [00:07:43:10:cf:98]	Bi-directional Pkt/sec	
	Throughput Mbps	
	Recieve Mbps	
	✓ Transmit Mbps	
	Bi-directional Mbps	
	O Advanced NIC Statistics(Only for table)	ct None 🖃
	ifInDiscards	-
	ifInErrors	=
	ifInOctets	
	ifInUcastPkts	
	ifInMulticastPkts	
	ifInBroadcastPkts	-
	Select Table/Grid Table	
	Select a polling time 5 secs 💌	
	Show Statistics	

Figure 128 - System network statistics module

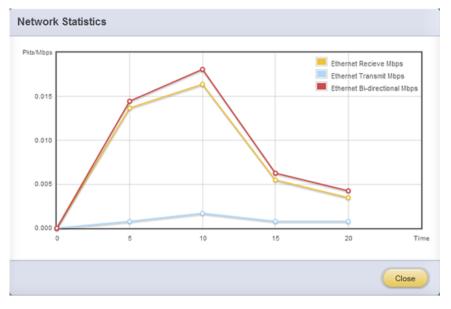


Figure 129 - Network Throughput Vs Time instant Graph

	Ethernet	^
Recieve Mbps	0.0023536	
Transmit Mbps	0.000912	
Bi-directional Mbps	0.0032656	_

Figure 130 - Network Throughput Vs Time instant Table

Default Gateway and DNS configuration

The DNS servers list can be set here. The default gateway for remote networks and the Internet can also be set here. On Linux and FreeBSD, only one default gateway is allowed. On Windows, you may set multiple default gateways. Use the option to set multiple default gateways with caution, since it may cause the system to stop communicating with external networks.

Default Gateway And DNS Configuration		?
Default Gateway Configuration		
© 10.193.184.1	Network Adapter - Ethernet	
	Modify the selected gateway	
	10.193.184.1 Modify Gateway	
	Add/Set Default gateway Gateway IP Address :	
	Network Adapter : Ethernet	
	Add Gateway	

Figure 131 - Default gateway and DNS configuration module for a Windows Agent

• Create a network team/bond device (Linux and FreeBSD)

A list of regular network adapters is provided here, to create a Network Team / Bond device. The available modes for the team depend on the OS teaming / bonding driver in use. On Linux the team may be created with a DHCP or Static IP address. Please check with the driver

documentation for the supported modes for creating a team / bond, with offload enabled Chelsio cards. All modes may not be available with all configurations / combinations. Also, the team members can only be 2 ports of a single offload-enabled card, and not across Chelsio cards. Do not mix third party cards and offload-enabled Chelsio cards in a single team.

Create a Newtork Team/Bond Device			?
Select Team Members	2 Refresh		
<pre> eth9 [00:07:43:ab:cd:ef]</pre>	Driver Status - Teamin	ng/bonding driver is offload-capable	
루 eth0 [00:30:48:b8:51:9a]	Team Name :		
🛹 eth1 [00:30:48:b8:51:9b]	Team Mode :	Round-Robin	
	Team Priority:	1. 🐙 eth0 2. ず eth1	
	IP Address Type :	-	
	Static IP Address :	DHCP	
	Static Subnet Mask :		
Ŧ		Create Team	

Figure 132 - Create a network team/bond device module for Linux Agent

Network troubleshooting

This module allows detecting and troubleshooting various network connectivity issues. The Ping utility helps to contact a system by specifying IP address, Number of ICMP packets to send and packet timeout. The result of the ping can be viewed by clicking on the **Ping Result** button.

Using **TraceRoute** one can determine the route taken by packets across an IP network.

Use the **GetConnections** utility to view currently active TCP/UDP connections. Offload status for each connection is also displayed if protocol offload hardware is available. This is useful for troubleshooting any connectivity issues for clients to various services.

Ping				
Destination :	10.193.190.140			
No. Of ICMP Packets to send :	4			
ICMP Packet timeout in seconds :	5			
Pkts Send: 4 , Pkts Recvd: 4 , AVgRtt: 5 ms Clear				

Destination :		www.chelsio.com	
Hop Count	Round Trip Time	lpv4 Address	
1	2 ms	10.193.184.1	
2	0 ms	10.193.177.3	
3	5 ms	111.93.129.157	
4	8 ms	121.241.196.101	
5	3 ms	121.240.1.242	
6	23 ms	172.29.250.33	
7	24 ms	180.87.38.5	
8	131 ms	80.231.217.17	
9	130 ms	80.231.217.6	
10	131 ms	80.231.154.17	
11	132 ms	208.178.58.109	
12	274 ms	208.178.63.114	
13	272 ms	72.13.84.18	

Figure 133 - Ping Utility

Figure 134 - TraceRoute Utility

GetConnections				
PROTOCOL	LOCAL ADDRESS	REMOTE ADDRESS	STATE	OFFLOAD
TCP	0.0.0.0:135	0.0.0.0:0	Listening	In host
TCP	0.0.0.0:445	0.0.0.0:0	Listening	In host
TCP	0.0.0.3389	0.0.0.0:0	Listening	In host
TCP	0.0.0.0:35001	0.0.0.0:0	Listening	In host
TCP	0.0.0.2:47001	0.0.0.0:0	Listening	In host
TCP	0.0.0.0:49152	0.0.0.0:0	Listening	In host
ТСР	0.0.0.0:49153	0.0.0.0:0	Listening	In host
TCP				

Figure 135 - GetConnections Utility

8.6.3.1. Hypervisor

• Virtual Network Manager

This module allows you to view and manage virtual networks. The left pane displays a list of different virtual networks created. Clicking on a virtual network name will display related properties on the right.

If a virtual network is added to a virtual machine, a "+" link appears. Expanding the link will display the virtual machines to which the network is attached. Click on the virtual machine names to view their properties on the right.

To delete a virtual network, click on the network name and then click "Delete Switch". If it is attached to a virtual machine, you will have to detach the virtual machine first. To do so, click on the virtual machine and click "Detach". Similarly, detach all the virtual machines and then use the "Delete Switch" to delete the virtual network.

Virtual Network Manager		_	3
<pre> intnet03 sLES11sp2 pvtnet044 </pre>	* 5 6 F	Switch Selected Virtual Switch : Guid : Port GUID: Port Type	intnet03 B4CAE840-5E3B-4C0D-AA38-175BB871DA75 {89AE17E0-0287-47CA-BA78-03F3F2DE839C} Internal
extnet01	F	Port Name: Delete Switch	{B4CAE840-5E3B-4C0D-AA38-175BB871DA75}
	Ŧ		

Figure 136 - Virtual Network Manager module

• Add Virtual Network Configuration

There are three kinds of virtual networks you can create using this module:

- External network: Using this type, you can provide virtual machines access to external networks and vice versa via a physical network adapter in the host system. The virtual machines can also communicate with each other on the same virtual network.
- Internal Network: This type allows communication between virtual machines in the same virtual network and also between the virtual machines and the host. This type of virtual network is not bound to any physical network adapter and no access to external networks is provided.

 Private Network: A Private Network is similar to Internal Network in that physical adapter is not required for setup and access to external networks is not provided. However, unlike Internal Network, guest operating systems can only communicate with guest operating systems in the same private network and not with the host. The host operating system cannot access the virtual machines on private network.

Once created, you can manage the virtual networks in the Virtual Network Manager module.

External network		
Name of virtual network :	extnet01	
Interface Name :		
intendee Hanne .	Chelsio T4 10GbE Adapter #10	
Add		

Figure 137 - Creating external virtual network

Internal Network		
Name of virtual network :	intnet03	
Add		

Figure 138 - Creating internal virtual network

Private Network		
Name of virtual network :	pvtnet044	
Add		

Figure 139 - Creating private virtual network

• Virtual Network Settings

To attach a virtual network to a virtual machine, select the virtual network from the **Virtual Network** list and the virtual machine from the **VM** list. Finally click *Attach*.

Attach Virtual Network to VM		_	2
		2 Refresh	
Attach Virtual Network to	VM		
Virtual network :	intnet03	•	
VM :	RHEL6.3		
Attach			

Figure 140 - Attaching Virtual Network to VM

8.6.4. iWARP

• iWARP Settings

On Linux Agents, iWARP parameter settings for Chelsio's RDMA capable NICs can be set using this module. These settings can be set only when iWARP driver (*iw_cxgb4* for T4 and T5; *iw_cxgb3* for T3) is loaded. If you set any parameter for a T5 adapter, it applies for all the T5 adapters present. Same applies for T4 and T3 adapters.

On Windows Agents, only T3 HBAs are supported currently. Parameters can be set per port.

On FreeBSD Agents, only T4 CNAs are supported. iWARP parameter settings can be set only when *iw_cxgbe* driver is loaded.

rp Settings	
Select a Driver: iw_cxgbe 💌	
Save Changes Discard Changes	
DESCRIPTION	VALUE
peer2peer	No
ep_timeout_secs	60 🗘
mpa_rev	1 🗘
markers_enabled	No
crc_enabled	Yes
rcv_win	262144
snd_win	131072 🗘
db_delay_usecs	1 🗘
ocqp_support	Yes
db_fc_threshold	2000 🗘
fastreg_support	No
dack_mode	1 🗘
c4iw_max_read_depth	8 🗘
enable_tcp_timestamps	No
enable_tcp_sack	No
enable_tcp_window_scaling	Yes 💌
c4iw_debug	Yes 💌
p2p_type	1

Figure 141 - iWARP settings for T4 CNA for FreeBSD Agent

iWarp Settings	2
Select a Driver: iw_cxgb4	
Save Changes Discard C	hanges
DESCRIPTION	VALUE
peer2peer	No
ep_timeout_secs	60 \$
mpa_rev	1 🗘
markers_enabled	No
crc_enabled	Yes 💌
rcv_win	262144
snd_win	32768
nocong	No
cong_flavor	1 🗘

Figure 142 - iWARP settings for T4 CNA for Linux Agent

8.7. Storage

• Storage Summary

The **Storage** module lists the status of configuration modules under Storage section, running on the agent.

Storage	3
PROPERTY	VALUE
FCoE service on server	Enabled
iSCSI Initiator service on server	Enabled
iSCSI Target service on server	Enabled



8.7.1. FCoE Initiator (Linux, Windows, XenServer)

All supported Chelsio FCoE initiators available on the operating system can be managed from this page. FCoE support is extended on Linux, Windows and XenServer platforms. Please refer Platform/Driver Matrix section on the list of operating systems that are supported.

• FCoE Initiator Summary

This module provides details about the driver installed; such as driver name and its version. The module also gives information about the number of FCoE enabled cards that are present on the machine.

FCoE Initiator Summary	3
PROPERTY	VALUE
FCoE Driver	csiostor (1.1.0.9)
No. of FCoE enabled cards	2
No. of FCoE Ports	6

Figure 144 - FCoE Initiator Summary module for Linux Agent

8.7.1.1. FCoE Initiator Card

• FCoE Card Summary

Details pertaining to the card used such as model, firmware/hardware version etc, are provided in this module.

E Card Summary	_
PROPERTY	VALUE
Vendor ID	1425
Card Serial Number	PT41110672
Number of FCoE Ports	4
Manufacturer	Chelsio T440-LP-CR 10G [FCoE]
Model	T440-LP-CR
Hardware Version	T440-LP-CR 10G
Firmware Version	1.7.0.0



• FCoE Attributes

Information such as Interrupt modes (MSI/MSI-X/INTx), SCSI mode and the card state are provided in this module.

FCoE Attributes	()
PROPERTY	VALUE
Interrupt Mode	MSI-X
SC SI Mode	Initiator
State	READY



8.7.1.2. FCoE Port

This is an actual N_Port which communicates with the fabric and performs FIP and FCoE device discovery. This page lets the user to retrieve all the FCoE specific port information and also extend NPIV management support. It contains the following sections:

• FCoE Port Summary

The SCSI adapter name and the underlying ENODE MAC address of the physical port can be found here.

FCoE Port Summary	0
PROPERTY	VALUE
Adapter Name	/dev/csiostor0
ENode MAC	00:07:43:04:63:9F

Figure 147 - FCoE Port Summary module for Linux Agent

• FCoE Port Attributes

This module provides details about link status and port identifiers such as WWPN, WWNN, FC ID and NPort MAC Address. The module also contains fabric information such as fabric name, VLAN on which the FCoE service is currently running and the number of SCSI targets that are being discovered by this port. Port speed being mentioned in this section varies on the card type

(10G/1G) being used. Note that only class 3 service is supported by the initiator for now and the frame size is fixed to 2128 bytes as per spec.

FCoE Port Attributes	0
PROPERTY	VALUE
State	Operational
NodeWWN	50:00:74:30:46:39:F0:00
PortWWN	50:00:74:30:46:39:F0:80
NPort MAC Address	0E:FC:03:53:00:23
Vlan ID	2
Fabric Name	20:02:00:05:73:D5:7A:C1
NPort ID	53:00:23
Туре	NPort
Supported Class of Service	3
OS Device Name	/sys/class/fc_host/host119
Speed	10 GBPS
Maximum Frame Size	2128
No. of SCSI Targets	0

Figure 148 - FCoE Port Attributes module for Linux Agent

• FCoE NPIV management

NPIV is a fibre channel facility allowing multiple N_Port IDs to share a single physical N_Port. This module allows the user to manage virtual ports on the corresponding FCoE Port.

To create a virtual port, select the option **Create** and the GUI allows two ways of creating a virtual port.

- i. Manual: Where the user can manually create a virtual port by providing a value to the WWPN and WWNN fields.
- ii. Auto-generate: Where the FCoE function auto-generates a WWPN and WWNN for the virtual port.

To delete a virtual port, select the option **Delete** and select the virtual port WWPN which you want to delete and click on **delete**.

FCoE NPIV N	lanagement	0
		Refresh
Create/Delete	e NPIV	
WWPN	50 00	74 30 46 39 F0 80
WWNN	50 00	74 30 46 39 F0 00
Actions	Oreate	© Delete
Create NPIV I	Port Manual	O Auto Generate
WWPN	50 00	74 30 46 39 F0
WWNN	50 00	74 30 46 39 F0
Create	Discard (Changes

Figure 149 - FCoE NPIV management module

8.7.1.3. FCoE Remote Port

Remote ports are the SCSI targets that are discovered by their respective N_port/virtual ports. The GUI conveys the same via a tree structure so that the end user knows the initiator-target mapping.

• FCoE Remote Port Attributes

This module provides details about the discovered target such as target's FC ID, WWPN and WWNN so that the user can identify the discovered target accordingly.

FCoE Remote Port Attributes	3
PROPERTY	VALUE
FC ID	54:00:53
State	Operational
NodeWWN	20:01:00:11:0D:56:29:00
PortWWN	20:01:00:11:0D:56:29:00



• FCoE Remote Port Lun Details

This module provides the LUN information such as size of the LUN, SCSI address, and LUN address. For Linux, the SCSI address is displayed in H:C:T:L (Host:Channel:Target:Lun) format and for Windows, it is displayed in P:B:T:L(SCSI Port:Bus:Target:Lun) format.

FCoE Remote Port Lun Details		_		?
		R efresh		
List of Luns		Details		
Lun 0	*	Lun :	2	
Lun 1		Capacity :	1.0 MB	
Lun 2		oupuony r	1.0 110	
Lun 3		SCSI Address :	18:0:0:2	
Lun 4	~	Lun ID :	0002000000000000	

Figure 151 - FCoE Remote Port Lun Details module

8.7.1.4. FCoE Virtual Port

A virtual port allows multiple Fibre Channel initiators to occupy a single physical port, easing hardware requirements in SAN design, especially where virtual SANs are called for. The virtual ports appear under their respective N_Ports after creation and the GUI conveys it via a tree structure so that the end user knows the N_port-VN_Port mapping. It contains the following modules:

• FCoE Virtual Port Summary

The SCSI adapter name and the underlying ENODE MAC address of the physical port can be found here.

FCoE Virtual Port Summary	() ()
PROPERTY	VALUE
Adapter Name	/dev/csiostor0
ENode MAC	00:07:43:04:63:A7



• FCoE Virtual Port Attributes

The module provides details about link status and port identifiers such as WWPN, WWNN, FC ID and Virtual NPort MAC Address. The module also contains fabric information such as fabric name, VLAN on which the FCoE service is currently running and the number of SCSI targets that are being discovered by this virtual port. Port speed being mentioned in this section varies on the card type (10G/1G) being used. Note that only class 3 service is supported by the initiator for now and the frame size is fixed to 2128 bytes as per spec.

FCoE Virtual Port Attributes	0
PROPERTY	VALUE
State	Operational
NodeWWN	50:00:74:30:46:3A:71:09
PortWWN	50:00:74:30:46:3A:71:89
NPort MAC Address	0E:FC:03:77:00:1D
Vlan Id	5
Fabric Name	20:05:00:05:73:D5:7A:C1
Nport ID	77:00:1D
Туре	VN_Port
Supported Class Of Service	3
OS Device Name	/sys/class/fc_host/host127
Speed	10 GBPS
Maximum Frame Size	2128
No. of SCSI Targets	1

Figure 153 - FCoE Virtual Port Attributes module

• FCoE Remote Port Attributes

This module provides details about the discovered target for remote port associated with virtual port. Details such as target's FC ID, WWPN and WWNN are provided so that the user can identify the discovered target accordingly.

FCoE Remote Port Attributes		•
PROPERTY	VALUE	
FC ID	54:00:53	
State	Operational	
NodeWWN	20:01:00:11:0D:56:29:00	
PortWWN	20:01:00:11:0D:56:29:00	

Figure 154 - FCoE Remort Port Attributes module

• FCoE Remote Port Lun Details

This module provides LUN information for remote port associate with virtual port. Details such as size of the LUN, SCSI address, and LUN address are provided. For Linux, the SCSI address is displayed in H:C:T:L (Host:Channel:Target:Lun) format and for Windows, it is displayed in P:B:T:L(SCSI Port:Bus:Target:Lun) format.

				4
		2 Refresh		
List of Luns		Details		
Lun 0	*	Lun :	2	
Lun 1		Capacity :	1.0 MB	
Lun 2		capacity.	1.0 MD	
Lun 3		SCSI Address :	18:0:0:2	
Lun 4		Lun ID :	0002000000000000	
	Ψ.			

Figure 155 - FCoE Remote Port Lun Details module

8.7.2. iSCSI initiator (Linux, Windows)

All supported iSCSI initiators can be managed from this page. The supported initiators on Windows are Microsoft and Chelsio iSCSI initiator (T4 adapters). On Linux, Open iSCSI initiator is supported. The modules available on this page are:

• Initiator nodes

This module lists the initiator nodes / virtual adapters configured in the initiator stack. The node can be enabled or disabled (Chelsio node cannot be disabled in Windows), and its properties can be viewed and edited in this module. In the Chelsio Linux stack, new initiator nodes can be created too. Disabling the initiator causes it to log out of any iSCSI targets that it is connected to, thus removing any disks provided by the iSCSI targets that were connected. Use the **Disable** option with caution. The CHAP authentication secret should be between 12 and 16 characters in length, and the initiator's IQN name should start with "iqn.".

Initiator Nodes ?
Refresh
Open iSCSI: iqn.1994-05.com.redhat:bcc3b894649e
Status - Disabled
Enable Disable Delete
Save Changes Discard Changes

Figure 156 - Open iSCSI initiator

Microsoft iSCSI: iqn.chelsioone.com	*
Chelsio iSCSI: Chelsio Terminator 3 iSCSI interfac Chelsio iSCSI: Chelsio Terminator 3 iSCSI interfac	
Status - Enabled	
[Delete
Enable Disable	
Enable Disable Save Change	

Figure 157 - Microsoft iSCSI initiator

Initiator Nodes	2
Refresh	
Initiators	
Microsoft iSCSI: iqn.chelsioone.com	^
Chelsio iSCSI: Chelsio Terminator 3 iSCSI interface [00:07	
Chelsio iSCSI: Chelsio Terminator 3 iSCSI interface [00:07	:43:05:11:0d]
Status - Ena	bled
Enable Disable De	elete
Save Changes Discard Cha	nges
DESCRIPTION	VALUE
IpAddress	102.192.182.11
SubnetMask	255.255.255.0
Gateway	0.0.0.0
iBFT	Yes
VlanInsertion	No
VIanID	777 \$
TCPAck	0

Figure 158 - Chelsio iSCSI initiator

Discover targets

iSCSI targets can be discovered by providing the IP address and TCP port (usually 3260) of the target. The discovery operation fetches the targets found at that Portal (combination of IP address and TCP port). The discovery operation also fetches all the other Portals that the target(s) are listening on. The discovered target can be deleted if required. Please note that all the Portals that the target sent are listed. The delete operation will not work on all the portals, only on the original discovery portal (the IP address and TCP Port specified when discovering the target).



If there are any pre-existing iSCSI sessions established to the target, deletion of the target Portal from the discovered targets list will fail.

Discover Targets	9
	2 Refresh
Discovery Portals	
Portal :	Targets :
Target - 102.11.11.155 : 3260	iqn.2004-05.com.kapil.chelsio.target
	Ψ
	Delete
Discover an iSCSI traget	
Choose the initiator stack	Open iSCSI
Target Ip address : Port	102.11.11.155 : 3260
Discover Target	



• Targets

The iSCSI targets that have been discovered, or are currently connected, are listed here. You may login, logout and delete the target from the initiator's configuration. If a target is connected, the sessions and connections to the target, and the disks provided by the target will be listed.

0-00-01-37-00-00-30-00-00-00-00-00-00-00-00-00	^	Initiator: 10.193,185.81:30400 -> Target: 10.193.185.72:3260 ; CID: 01-00	*
	-		Ŧ
Logout Session		Delete Connection	
rget Disks / LUNs			
	helsio.b	blackhole	
rget IQN name - iqn.2004-05.com.cl	helsio.b	SCSI ID: 0:0:0:0	
	helsio.b	SCSIID: 0:0:0:0 Vendor: ven_chiscsi	
rrget Disks / LUNs rrget IQN name - iqn.2004-05.com.cl \\\PhysicalDrive1 [15.000 MB]	helsio.b	CSIID: 0:0:0:0	丗1

Figure 160 - Targets module after logging in

8.7.3. FO iSCSI Initiator (Linux)

• Full Offload iSCSI Hardware Information

PCI, firmware and other adapter related details are provided in this module. Select the Chelsio adapter for which you want to view properties from the **Select a T4 Card** drop-down list and the module will expand to display related properties. You can also view details like link id, status, enode mac, etc of all the ports of the selected adapter.

Full Offload iSCSI Hardware Information		
Refresh		
Select a T4 C	Card: T404-BT	
DESCRIPTION	VALUE	
Adapter index	0	
Path	/dev/csiostor0	
Name	Chelsio T404-BT 1G [iSCSI]	
Model	T404-BT	
Serial Number	PT20110722	
Hardware Version	T404-BT 1G	
Driver Version	1.0.0.0	
PCI Vendor Id	1425	
PCI Device Id	450a	
Option Rom Version	0	
Chip rev	2	

Figure 161 - Full Offload iSCSI Hardware Information module

• FO iSCSI Manage Ports

Here you can configure various port settings like VLAN id, Maximum Transmission Unit (MTU) and IP. Select a Chelsio adapter from **Select a T4 Card** drop-down list and then select the port for which you want set any of the aforementioned properties. MTU can be set between 1500-9000 bytes. VLAN id can be set within the range 0-4094 (enter 0 to disable it). The IP type can be *IPV4* (static) or *DHCP*.

The **Port Up** and **Port Down** buttons will enable and disable the selected port respectively. The **Clear IP** button deletes values set for the IP Type, IP, Subnet Mask and Gateway properties and resets them.

FO	iSCSI Manage Ports		0
			2 Refresh
	Manage Ports		
	Select a T4 Card :	T440-CR 💌	
	Select a Port :	Ports #1	
	Vlan :	4	
	MTU :	1500 \$	
	IP Type :	IPV4	
	IP :	10.193.184.88	
	Subnet Mask :	255.255.252.0	
	Gateway :	10.193.184.1	
	Save Changes Port U	Jp Port Down Clear	IP

Figure 162 - FO iSCSI Manage Ports module

• FO iSCSI Initiator Properties

In the **FO iSCSI Initiator Properties** module, you can configure FO iSCSI Initiator by setting different properties like enabling/disabling CHAP authentication, setting Header and Data digest, etc.

FO iSCSI Initiator Properties	2
2 Refresh	
Save or Discard Changes: Save Changes	Discard Changes
DESCRIPTION	VALUE
DataSequenceInOrder	Yes
DataPDUInOrder	Yes
ImmediateData	No
InitialR2T	Yes 💌
ErrorRecoveryLevel	0 \$
MaxConnections	1
DefaultTime2Wait	20
DefaultTime2Retain	20 🗢
MaxBurstLength	8192
FirstBurstLength	8192
HeaderDigest	None,CRC32C
DataDigest	None,CRC32C
MaxRecvDataSegmentLength	8192
PingTimeout	15 🗢
AuthPolicy	Mutual
AuthMethod	None



• FO iSCSI Manage Instances

The FO iSCSI Initiator service maintains multiple instances of a target depending on the discovery method. In this module, you can set upto 8 instances. Configurable parameters include initiator node name (IQN), alias (friendly) name, Initiator (CHAP) Username and password.

FO iSCSI Manage Instances	_	2
Manage Instances		2 Refresh
Select a T4 Card :	T440-CR 💌	
Instances :	6	
Initiator Node Name :	iqn.2013-03.um01	
Alias Name :	UM-01	
Initiator Username :	root	
Initiator Secret :	um097init	
Save	Clear Discard	

Figure 164 - FO iSCSI Manage Instances module

• FO iSCSI Discover Details

iSCSI Targets can be discovered using this module. Select a Chelsio adapter and initiator instance using which you want to discover targets. Next, provide the source (initiator) and destination (target) IP. Finally, click **Discover**. After successful discovery, all the discovered targets will appear in the **Discovered Targets** section. To view more details, click on the Target name.

	2 Refresh	
iscovered Targets		
arget Name :	Target Address :	
TargetName=iqn.2004-05.com.chelsio.target	TargetAddress=102.11.11.12.3260,1	
Select a T4 Card :	T440-CR	
Instance :	1	
Source IP Address :	102.11.11.11	
Destination IP Address :	102.11.11.12	
Destination Port :	3260	

Figure 165 - FO iSCSI Discover Details module

• FO iSCSI Session Details

The FO iSCSI Session Details module can be used to log onto targets and view details of established iSCSI sessions. You can also logout from a target

Use the **Login** section to connect to a target. *Adapter*, *(initiator) instance*, *Target Name*, *Source (Initiator) IP*, *Destination (Target)* IP and *Destination Port* are mandatory. After providing values for these fields, click **Login**.

By default, no authentication mechanism is used while connecting to a target. You can however configure CHAP for a secure iSCSI connection. **One-way** (target authenticates the initiator) and **Mutual** (target and initiator authenticate each other) authentication methods are supported.

Login	
Select a T4 Card :	T440-CR 💌
Instances :	1
Target Name :	2004-05.com.chelsio.target
Source IP :	102.11.11.11
Destination IP :	102.11.11.12
Destination Port :	3260
Auth Type :	None
Policy :	Select One
Target Username :	
Target Secret :	
Login	

Figure 166 - FO iSCSI Session Details module: Login

After successful login, details of the established iSCSI session will be displayed under the **Established sessions** section. Select the Adapter and session id. Details of the selected session will be displayed. To end the session, click **Logout**.

Established Sessions	
Select a T4 Card :	T440-CR 💌
Session Id :	1
Node Id :	
Source IP :	102.11.11.11
Target IP :	102.11.11.12
Target TCP Port :	3260
Target Portal Group Tag :	0
Port :	0
State :	1
Target Name :	iqn.2004-05.com.chelsio.target
Target Alias :	
Logout	

Figure 167 - FO iSCSI Session Details module: Established Sessions

8.7.4. iSCSI Target page (Linux)

This page allows to create new Targets and manage them (add/delete portals, add/delete LUNs, add/delete ACLs). It also provides information on Session details. Viewing and modifying Target properties is also available. The modules available on this page are as below:

• Target Stack Globals

This module displays various global properties of a currently connected iSCSI target. Authentication priority between CHAP and ACL can be set here.

Target Stack Globals	3
Save Changes	Discard Changes
DESCRIPTION	VALUE
Offload Mode	AUTO 💌
Auth Order	CHAP
ACL Order	CONFIG 💌

Figure 168 - Target Stack Globals module

• Target properties

Properties such as Target name and Alias, Max Data Receive Length, Authentication mode related to a specific iSCSI target can be viewed and modified here. iSCSI targets can be started/stopped or deleted.

Target Properties			?
iSCSI Targets :		DTO V RTED op Delete Discard Changes	
	PROPERTY	VALUE	
Target Name		iqn.2004-05.com.chelsio.ROTO	
Target Alias		iscsitarget1	
Max Receive Data Segmi	ent Length (in Bytes)	8192	
Header Digest/CheckSu	m	None,CRC32C 💌	
Data Digest/Checksum		None,CRC32C 💌	
Send Immediate Data / U	Insolicited Data	Yes 💌	
Initial Ready To Transmit	(InitialR2T)	No 💌	
Maximum Outstanding R	eady To Transmits (MaxR2T)	1	
Max Connections in a se	ssion	4	
Target CHAP		"target_id1":"target_secret1"	
Initiator CHAP		"initiator_id1":"initiator_sec1"	

Figure 169 - Target properties module

• Session details

Details including Session ID, Initiator IQN and Connections List of all discovered and currently connected iSCSI targets are listed here.

Session Details		-	2
iSCSI Targets :	iqn.2004-05.com.chelsio.kapil		
	3-64-30-31-30-30-30-30-32-00-00-00	^	
		÷	
Initiator IQN :	qn.1994-05.com.redhat:3e2c6b28906e		
Initiator: 0.0.0.0:	32563 -> Target: 0.0.0.0:0 ; CID: 01-00	*	
		-	
Offload : Auto	Mode		
Header Digest :	Auto Offload		
Data Digest :	Auto Offload		

Figure 170 - Session Details module

• New Target Creation

New iSCSI target can be created here by specifying the Target IQN and Target Alias name.

New Target Creation	_	3
Session Details		
Target IRQ Name	iqn.chelsio.com	
Traget Alias	iscsitarget2	
	Save	

Figure 171 - New Target Creation module

8.7.5. LUNs

Various Logical Units created in an iSCSI Target can be managed here. The modules available on this page are as below:

• View/Edit iSCSI Target LUNs

This module displays various Logical Units created in an iSCSI Target. Selected LUNs can be deleted.

CSI Targets :	iqn.2004-0	5.com.chelsio.kapil 💌	2 Refresh		
rget Status : LUN Li	STARTED				
/dev/sda5		Edit LUN List			
100110000		Move Up	Move Dowr	n De	lete LUN
		Edit Selected LUN			
		LUN Name :	/dev/sda5		
		RAM Disk Size :	12288		
		Permissions :	O RO	RW	
		Device Type :	O FILE	🖱 МЕМ	@ BLK
		Options :	SYNC	© NULLRW	© NONEXC

Figure 172 - View/Edit iSCSI Target LUNs module

• Add LUN

New LUNs can be added here by providing various parameters like Target Name, Target Device and RAM Disk Size etc. RW (Read-Write) and RO (Read Only) are the two kinds of permissions that can be set. If Ram Disk is selected, then a minimum of 16 MB should be provided.

Add LUN		3
		2 Refresh
iSCSI Targets :	iqn.2004-05.com.chelsio.kapil 💌	
Devices :	Ram Disk	
Туре:	MEM	
RAM Disk Size(in MB) :	16	
Save L	un Discard Changes	

Figure 173 - Adding a new LUN

8.7.6. Portal Groups

Portal details for currently connected iSCSI Targets can be viewed and added here. The modules available on this page are as below:

• View/Edit iSCSI Target Portals

Portal List on the left displays details of the portal group on which an iSCSI target is listening and the related info is displayed on the right under Portal Details. Selected portals can be deleted.

			3
iSCSI Targets :	iqn.2004-0	5.com.chelsio.kapil 💌	2 Refresh
Target Status : Portal Lis	STARTED		
		Edit Portal List	
1@102.44.44.15	5:3260	Move Up	Move Down Delete Portal
		Portal Details	
		Ip Address :	102.44.44.155
		TimeOut in mSecs :	0
		Redirect Tag :	1
			Use default iSCSI service TCP Port
		TCP Port:	3260
		Update List	
Save Changes	; Dis	card Changes	

Figure 174 - View/Edit iSCSI Target Portals module

• Add Portal

New Portals can be added here by choosing the specific target and Portal IP address. The Port number should be 3260.

	2 Refresh
iSCSI Targets :	iqn.2004-05.com.chelsio.kapil 💌
IP Address :	102.44.44.155
Port:	3260
Redirect Tag :	
Save	Portal Discard Changes

Figure 175 - Adding a new Portal

8.7.7. ACLs

ACLs configured for currently connected iSCSI Targets can be managed here. The modules available on this page are as below:

• View/Edit iSCSI Target ACLs

This module displays details for all the ACLs configured for an iSCSI Target. Selected ACLs can be deleted.

'iew/Edit iSCSI ⁻	Farget ACLs		
SCSI Targets :	iqn.2004-05.com.chelsio.kapil 💌	2 Refresh	
Target Status :	STARTED ACL List		
	ACELIST	ACL List	
iname=iqn.1994-05.com.redhat:KAPIL;sip=102.4 dip=102.44.44.155;lun=ALL:RW		IQN Name :	Ign. 1994-05.com.redhat:KAPIL
		Source IP Address :	102.44.44.193
		Destination IP Address :	102.44.44.155
		LUN Permissions :	ALL:RW

Figure 176 - Target ACL operations module

• Add ACL

New ACLs can be configured by specifying Target name, initiator IQN name, IP address and permission type.

	Refresh
SC SI Targets :	iqn.2004-05.com.chelsio.kapil 💌
QN Name :	ign.1994-05.com.redhat:KAPIL
ource IP Address :	Enter Initiator IGN Name 102.44.44.193
estination IP Address :	Enter Initiator source IPs separated by commas
	Enter Initiator destination IPs separated by commas
UN Permisssions :	ALL:RW

Figure 177 - Adding new ACL

8.8. Hardware Features

The **Hardware** module lists the status of configuration modules under Hardware Features section, running on the agent.

Hardware	0
PROPERTY	VALUE
Boot service on server	Enabled
Filter service on server	Disabled
Traffic mgmt service on server	Disabled



8.8.1. Filtering (Linux)

Using this page, one can control the traffic from a specific IP. The module available on this page is as below:

• T3 Filtering configuration

T3 Filtering options can be set only when offload driver (*t3_tom*) is not loaded.

This module lists the various parameters which can be set while determining filtering options for a system IP. You can set the maximum number of filters and also add/delete filters. A filter with default values (the Action field set to pass; the Protocol field set to any) is created at the time of configuring the filtering module. To remove the default filter, enter 0 in the Set Maximum Filters field and click on Set Filters. The fields IfName and FilterId are mandatory. The Action field is set to pass and the Protocol field is set to any by default. Other possible values for the Protocol field are tcp, udp and frag. The Priority field can be used to determine the priority of a filter when Vlan ids are same. Insert at position features allows user to add a filter at a specified position.

T3 Filtering Co	onfiguration		_		_					0
			Select a Card : Set Maximum Fi Insert at positio	Iters : 1	310E-CX-Q 💌	Set Filters	5			
			Save Changes	Discard	l Changes	Add	Delete Selected			
FILTERID	SRCIP	DESTIP	SRCPORT	DESTPORT	VLAN	PRIORITY	MACIDX	ACTION	PROTO	QUEUE
10	0.0.0.0/0	0.0.0.0	0	0	0 \$	0 💌	0 💌	Pass 💌	Any 💌	0 💌

Figure 179 - T3 Filtering Configuration module

Note Results for actions like adding a new filter or setting maximum filters make some time to reflect. Highlight the system item in the tree menu on the left, and click "Refresh system", to refresh data from the system, in case the updated settings are not being shown.

• T4 Filtering configuration

T4 Filtering options can be set only when offload driver (*t4_tom*) is not loaded.

A list of pre-defined filter selection combinations is displayed. The combination *fragmentation, mpshittype, protocol, vlan, port, fcoe* is active by default. To select a different combination, highlight it in the **Combinations** list by clicking and click "Set Active Combination".

You can create filter rules for any combination in the list. However, filter rule created only for the Active Combination will apply. To create a new rule, select a combination and click "Add a filter rule". The **FILTERID** and **T4 CARD** fields are mandatory. After providing appropriate values for the parameters click "Save Changes".

Note

For a detailed explanation regarding different fields, please refer **cxgbtool** manual by running man cxgbtool command on Management Agent CLI.

T4 Filtering Configur	ation	_	_	_	_	_	2
			Re Re	efresh			
Active Combinatio	n : fragmentation, m	pshittype, macmatch,	vlan, port, fcoe				
Combinations							
fragmentation, i ethertype, vlan,	mpshittype, ethertype, pro port	tocol, tos					
fragmentation, i	mpshittype, macmatch, vl	an, port, fcoe - Active C	ombination				
	mpshittype, macmatch, p mpshittype, macmatch, e						
fragmentation, i	mpshittype, macmatch, vi	nic_id, port, fcoe					
fragmentation, i	mpshittype, ethertype, pro	tocol, port, fcoe		-			
FILTERID	T4 CARD	FRAGMENTATION	MPSHITTYPE	MACMATCH	VLAN	PORT	FCOE
7	T420-SO-CR 💌	1	1	005 🗢	0000 \$	0 💌	0 💌
•	III						۴.
	Set Active Comb	ination Save (Changes Disc	ard Changes	Add a Filter row	Delete a Filter	

Figure 180 - T4 Filtering Configuration module

8.8.2. Traffic Management (Linux)

Using this page, one can add/delete/modify offload policies only in the presence of offload driver (*t3_tom* for T3 adapters; *t4_tom* for T4 adapters).

8.8.3. Traffic Management configuration

The **Chelsio Card** section on the left displays all the cards available in the server and their corresponding policies on the right. Policies can be added and deleted. Policy Details displays the primitives (maximum 8) and actions which can be modified. For more details on creating policies, please refer to COP man pages.

Traffic Management Co	nfiguration	_	_	_	_	_		?
Policy List Chelsio Cards :			efresh TM Policies :					
➡ T404-BT ➡ T420-CR			src port 22 => !offle	oad !ddp			^	
k T302E-CU								
		~					-	
	Add New Pol	icy			Delete			
Policy Details Rules		I	Rule Details					
src port 22		^	Primary Expression	119	port 💌			
			Qualifier :		src 💌			
			Value :		22			
		Ŧ	Modify Rule	Select to				
Actions								
Offload	DDP	Time Stamp	Sack	Bind	Class	Congestion		
Disable 💌	Disable 👻	Enable 💌	Enable 💌	random 💌	0 💌	reno 💌		
		Save Changes	Discard Ch	anges				

Figure 181 - Traffic Management Configuration module

8.8.4. Boot

• T4 Save Config File (Linux)

This module displays the current T4 configuration tuning option selected. You can also change the tuning option by selecting the config file for each option located in /*ChelsioUwire-x.x.xx/src/network/firmware*. For instance, to select *Low latency Networking*, locate the file, *t4-config.txt*, *in /ChelsioUwire-x.x.xx/src/network/firmware/low_latency_config* directory.

T4 Save Config File		2
Save Config file to a T4 card		
Select a card:	T422-CR	
Config File Type:	Unified Wire Config (Default)	
t4-config.txt	Browse Save Config File	

Figure 182 - T4 Save Config File module

8.8.5. T3 iSCSI / T3 PXE Boot Option Rom Management (Linux)

The Chelsio T3 card may be used for PXE or iSCSI boot. This module allows managing the boot capability. The Option ROM (PXE/iSCSI) may be installed to the card, or erased from the card. iSCSI boot Option ROM settings can be configured for the card here. Enable the iSCSI Option ROM only if you are planning to boot the system via iSCSI. Refer the iSCSI boot documentation for more details about its configuration.

T3 iSCSI / T3 PXE Boot Option Rom Management		?
Select a card: S320E-SR-X		
Option ROM Status - iSCSI option rom is installed [2.0 build 202] & iSCS	l option rom settings are	e valid.
Write iSCSI or PXE Option ROM to the card		
Browse		
Write Option ROM		
Erase iSCSI or PXE Option ROM or Settings		
Erase Option ROM Erase iSCSI boot settings		
Save Changes Discard Chan	nges	
DESCRIPTION	VALUE	
Card is enabled for iSCSI boot	No	•
Chelsio OS initiator is used for boot	No	•
Boot initiator IQN name		
Prefer header digests if available	No	•
Prefer data digests if available	No	Ŧ
CHAP authentication Policy	none	-



8.8.6. T5/T4 Boot Option ROM management

This module allows managing the PXE and FCoE boot capability for Chelsio T5 and T4 cards. The Option ROM (PXE and FCoE) may be installed to or erased from the card. The version of Option ROM flashed can be viewed here.

	m Management		
Write Option RO	M to the card		
Select a card:	T420-CR -	1	
Option ROM Stat	tus: Option Rom is	s installed [1.0.0.66]	
option ROM Stat	us: Option Rom is	s installed [1.0.0.66] Browse	
Option ROM Stat	tus: Option Rom is		
Option ROM Stat			

Figure 184 - T5/T4 Option ROM Management module

8.8.7. T5/T4 Boot Configuration

This module can be used to view and configure PXE and FCoE Option ROM settings for Chelsio T5 and T4 cards.

PXE physical functions and order of ports for PXE boot can be selected here. The same module can be used to configure FCoE Option ROM. Here port order for target discovery and discovery timeout can be set. Under the Boot section, LUN can be configured as boot device from the discovered FCoE targets.

Enable the Option ROM only if you are planning to boot the system via PXE or install the operating system on FCoE LUN.

T5 / T4 Boot Configuration			?
Select a T4 / T5 card	Select a card: T420-CR 💌		
Adapter Configuration			
PCI BUS :	01		
PCI Device :	00		
Initialization Platform :	Both		
Adapter Bios Status :	© Enable ◉ Disable		
Boot mode:	Compatibility 💌		
EDD:	2.1		
EBDA Relocation:	Permitted		
Default :	🔲 (Load Boot Default Settings)		
	Save Changes Discard Changes		
	Choose Options to configure: $ extbf{@}$ PXE $ extbf{@}$ FCOE $ extbf{@}$ iSCSI		
PXE Configuration		Details	
Select Physical Function:	00 💌	BIOS: 1.0.0.66	
BIOS:	Disable	Ports: 2	
		Device Id: 1131	
Vlan Id:	0	FW: 1.8.24.242	
	Save Changes Discard Changes	MAC: 00:07:43:11:F9:D0	
		Func: 00	
		Controller Name: T420-CR	

Figure 185 - PXE Boot configuration for T4 CNAs

FCoE Configuration	Options to configure: O PXE O FCOE O ISCSI	
Choose Paramter Type :	● Function ◎ Boot ◎ Show WWPN	
BIOS:	Enable Disable	
Port Order :	00 • 01 • 02 • 03 •	
Discovery Time Out :	20 💌	
	Save Changes Discard Changes	

Figure 186 - FCoE Boot configuration for T4 CNAs

	tions to configure: © PXE © FCOE	ISCSI
iSCSI Configuration		
Choose Paramter Type :	Function Initiator	Network Boot Devices
BIOS:	Enable 💌	
Port Order :	00 🔹 01 💌 02	• 03 •
Discovery Time Out :	0 💌	
CHAP Method:	None 💌	
	Save Changes Discard Char	nges

Figure 187 - iSCSI Boot configuration for T4 CNAs

8.8.8. Bypass (Linux)

You can use the **Bypass** page to configure various settings for Chelsio's bypass adapters like setting bypass operation mode, creating rules (filters), starting/stopping BA server, etc. There are two modules available: **Bypass Configuration** and **Redirect Configuration**.

Bypass Configuration

In the **Bypass Configuration** module, you can view the status and start/stop the BA server accordingly. The adapter will redirect packets using the mode specified in the **Default bypass mode** field unless otherwise specified in the **Current bypass mode**.

The **Watchdog** timer is used to ensure that if there is a software failure, the switch will enter the default state. The **Watchdog timeout** value should be provided in milliseconds.

Bypass Config	uration	2
Select a T	4 card	Select a T4 card: B420-SR
Bypass Co	onfiguration	
BA Server	r status:	Running on eth3 Stop Server
Default by	pass mode:	Disconnect Mode 💌
Current by	ypass mode:	Disconnect Mode 💌
Watchdog	j:	Disable 💌
Watchdog) timeout:	0
		Save Changes Discard Changes

Figure 188 - Bypass Configuration module

• Redirect Configuration

In the **Redirect Configuration** module, you can set **rules** (filters), based on which the bypass adapter will redirect packets. You can group **rules** into **tables**. You can save the currently configured tables and rules for a bypass adapter into a shell script using the **Download Configuration** button.

The **Table Configuration** tab displays BA server status and the number of tables created. You can create new tables or perform various actions on the existing ones.

- Delete table: Delete the selected table and all the rules present in it.
- **Purge table**: Delete all the rules present in the selected table. This action will not delete the table.
- Activate table: Enable the selected table.
- **Deactivate table**: Disable the selected table.
- **Create table**: Create a new table. The new table created will be inactive by default. Use the **Activate table** option to enable it. You can cretate upto 5 tables.

In the **Rules Configuration** tab, you can add, delete and configure rules. Use the **Add a Filter row** button to add a new rule by specifying the rule id in the *INDEX* field and providing the required parameters. Finally, click **Save** Changes.

To edit an existing rule, select the corresponding checkbox, change the desired paremeters and click **Save Changes**.

To delete a rule, select the corresponding checkbox and click **Delete a Filter.** Finally, click **Save** Changes. You can delete multiple rules using this method.

Redirect Configuration		?
Select a T4 card: B420	-SR 💽 Download Configuration	
Table Configuration	Rules Configuration	
BA server status:	Running on eth14	
Number of tables:	2	
Settings:	Create table	
Select table:	Select action Delete table Purge table	
New table ID:	Activate table Deactivate table Create table	
Save Chang		

Figure 189 - Redirect Configuration module: Table configuration tab

Select a T4 card: B	420-SR 💌	Download	Configuration	n						
Table Configura	tion	Rules Conf	iguration							
Select a table :	Tab	le 1 (active) [•							
INDEX	ACTIC	N	PO	RT	IPV6		PROTO	COL	SOURCE ADDRESS	S
1	drop	•	0	•	disable	-	udp	•	102.22.22.155	255.
2	forward	•	0	•	disable	•	udp	•	102.22.22.155	255.
3	input	•	0	•	disable	-	udp	•	102.22.22.155	255.
4	drop	•	0	•	disable	•	tcp	•	102.22.22.155	255.2
5	forward	•	0	•	disable	-	tcp	•	102.22.22.155	255.2
6	input	•	0	•	disable	•	tcp	•	102.22.22.155	255.2
7	forward	•	0	•	disable	•	icmp	•		
8	drop	•	0	•	disable	•	icmp	-		
9	input	•	0	•	disable	•	icmp	•		
•										

Figure 190 - Redirect Configuration module: Rules configuration tab

8.8.9. T4 Egress Class Schedulers (Linux)

Schedulers can be set only when T5/T4 network driver (cxgb4) is loaded.

• Egress Queue Map

Using this module, you can bind (map) NIC (non-offloaded) Tx queues to Tx Scheduler classes.

			2 Refresh
INTERFACE NAME	CLASS ID	TX QUEUE ID	ACTION
th13 💌	0	0	Мар
terface Name : eth12 >	>> Class ld : 2 >> Tx Queue	ld : 1	

Figure 191 - Egress Queue Map module

• Egress Packet Scheduler

Using this module you can configure different scheduler hierarchy levels (i.e.Class Rate Limiting, Class Weighted Round Robin and Channel Rate Limiting). Based on the parameters specified, different scheduler levels can be configured.

					2 Refresh				
Tx Schedulers									
SCHEDULER	CHANNEL ID	INTERFACE	MODE	RATE MODE	RATE UNIT	MIN RATE	MAX RATE	PACKET SIZE	WEIGHT
0	1	eth12	Flow	Absolute	Bits (in kbps)	0	9000	0	-

Figure 192 - Egress Packet Scheduler module

VIII. UM for Win PE

1. Introduction

Chelsio **UM for Win PE** is a light-weight management tool developed for Windows PE (Windows Preinstallation Environment) platform and provides features to view and configure different aspects of the system, including Chelsio adapter installed.

The tool provides command-line options to view system related information like list of drivers installed, Chelsio adapters present, etc. You can also view and configure Chelsio adapter settings like card and port properties, flash and erase option ROM, etc. To view the complete list of commands available, invoke the help by typing chelsio uwlite.exe in the command prompt.

The tool is copied to *<system_drive>\ChelsioT4\docs* during Unified Wire installation. In order to use the tool, you will have to add it to boot image when creating bootable Windows PE media.

For more information, visit the following link: http://technet.microsoft.com/enus/library/cc749312%28v=ws.10%29.aspx



Only local systems can be managed currently using this tool.

1.1. Hardware Requirements

1.1.1. Supported Adapters

The following are the currently shipping Chelsio Adapters that are compatible with Chelsio UM for Win PE:

- T520-CR
- T580-CR
- T580-LP-CR
- T580-SO-CR
- T520-LL-CR
- T520-SO-CR
- T540-CR
- T420-CR
- T440-CR
- T422-CR
- T420-LL-CR
- T440-LP-CR
- T420-CX
- T420-BT
- T404-BT

1.2. Software Requirements

1.2.1. Windows Requirement

Currently Chelsio UM for Win PE is available for the following Windows version(s):

• Server 2012 R2

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

1.3. Examples

1.3.1. Viewing help

• Run the following command to view the list of commands available under a service.

X:\windows\system32>chelsio_uwlite.exe <service-name>

E.g.

To view commands available under the chelsio service:

X:\windows\system32>chelsio uwlite.exe Chelsio

X:\windo	ows\system32≻chelsio_uwlite.exe	chelsio
	-Usage	
chelsio ₋ Where	_uwlite <service-name> [StackName] <command/></service-name>	[SubCommand] [Arguments]
wnere		SYSTEM¦CHELSIO A command supported by the service (see service help for a list of commands)
Note:	Arguments :	Arguments expected by the command (see command help for more details)
Note:	All arguments should be in the eg: <ip=192.168.1.1> Required parameters are enclos Optional parameters are enclos</ip=192.168.1.1>	ed within <> brackets
Service	CHELSIO	
Commands	3	
	ListAdapterS ListAdapterProps ListPorts GetCardStats SetCardAroperty SetPortProperty GetProperty SetProperty FlashRom EraseRom EraseSettings Defaultconfig	

Figure 193 – 'chelsio' service commands syntax and usage

• Run the following command to view syntax and usage for a sub-command:

X:\windows\system32>chelsio_uwlite.exe chelsio <sub-command> /?

E.g. To view syntax and usage of *EraseSettings* sub-command under *chelsio* service:

X:\windows\system32>chelsio_uwlite.exe chelsio erasesettings /?

X:\windo	ows\system32≻chelsio_uwlite.e	xe chelsio erasesettings /?		
This cor	nmand not supported			
	-Usage			
	_uwlite <service-name> [StackName] <command< td=""><td>> [SubCommand] [Arguments]</td></command<></service-name>	> [SubCommand] [Arguments]		
Where	Service-Name Command Arguments	: SYSTEM:CHELSIO : A command supported by the service (see service help for a list of commands) : Arguments expected by the command (see command help for more details)		
Note:	Note: All arguments should be in the <key=value> format eg: <ip=192.168.1.1> Required parameters are enclosed within <> brackets Optional parameters are enclosed within [] brackets</ip=192.168.1.1></key=value>			
Service: CHELSIO				
Note:	≺adapter=adapter index> is t	he Adapter # obtained from the ListAdapters command		
chelsio	_uwlite Chelsio EraseSettings <adapter=adapter ind<br=""><force=boolean></force=boolean></adapter=adapter>	ex≻		

Figure 194 - 'EraseSettings' sub-command syntax and usage

1.3.2. Flashing Option ROM

i. Run the following command to list all Chelsio CNAs present in the system. The list displays a unique index for each CNA found.

```
X:\windows\system32>chelsio_uwlite.exe chelsio listadapters

X:\windows\system32>chelsio_uwlite.exe chelsio listadapters

Adapter information:

Adapter # : 0

Model : 1440-CR

Serial Number : PT04111342

PCI Vendor ID:Device ID : 1425:1133

PCI Location : 02:00:04

Factory MAC address : 00:07:43:AB:CD:EF

Connector : 10G BP4_AP

PHY : No Phy / No information Available

OPROM : Not Present
```

Figure 195 - Listing Chelsio Adapters

ii. Now, run the following command to flash option ROM onto the adapter:

```
X:\windows\system32>chelsio_uwlite.exe chelsio flashrom adapter=<idx> path=<option rom image>
```

Here, idx is the CNA index found in step i (0 in this case) and <code>option_rom_image</code> is the path to Option ROM image file, *cuwlbt4.bin*



Success: Boot operation completed sucessfully

Figure 196 - Flashing option ROM

1.3.3. Erasing Option ROM

i. Run the following command to list all Chelsio CNAs present on the system. The list displays a unique index for each CNA found.

X:\windows\system32>chelsio_uwlite.exe chelsio listadapters

X:\windows\system32>chelsio_uwlite.exe chelsio listadapters				
Adapter information:				
Adapter # Model Serial Number PCI Vendor ID:Device PCI Location Factory MAC address Connector PHY OPROM Bios Version	ID	0 T440-CR PT04111342 1425:1133 02:00:04 00:07:43:AB:CD:EF 10G BP4_AP No Phy / No information Available Present 1.0.3.57		

Figure 197 - Listing Chelsio Adapters

ii. Now, run the following command to erase option ROM from the adapter:

X:\windows\system32>chelsio uwlite.exe chelsio eraserom adapter=0 force=1

Here, idx is the CNA index found in step i (0 in this case)

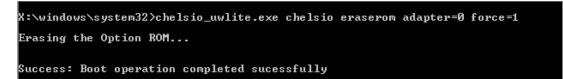


Figure 198 - Erasing option ROM

IX. Appendix

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