



Broadcom NetXtreme Controller 5741x(Wh+) /5750x (Thor) /5760x (Thor2)

NICCLI User Guide

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Revision History

Rev.	Date	Notes
01	09/16/2024	Initial release
02	07/01/2025	Updated the niccli command syntax and added outputs.
03	08/19/2025	Updated niccli VMware plugin command mapping table

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1. Introduction

The NICCLI configuration utility sets the nonvolatile configuration elements of the Broadcom Ethernet network adapter, such as enabling or disabling RoCE, SR-IOV, and other options. The NICCLI configuration utility can also perform firmware upgrades. The NICCLI configuration utility uses the L2 driver in Linux, VMWare and FreeBSD and Windows. In the UEFI environment, the NICCLI configuration interacts with the PCIe hardware. The NICCLI configuration utility supports both the BCM9574XX, BCM95750X, and BCM957608 family of devices.

2. Supported OSes

Architecture	Linux	Windows	Esxi 8	Esxi9	FreeBSD	UEFI
x86_64	x	x	x	x	x	x
aarch64	x					x

3. Installing the NICCLI Configuration Utility

This section provides information on installing/executing the NICCLI configuration Utility:

3.1 Installing the NICCLI package in Linux

- Using NICCLI RPM:

```
sudo rpm -i niccli -<version>.rpm
```
- Using the NICCLI deb package:

```
sudo dpkg -i niccli-<version>.deb
```

3.1.1 Executing the NICCLI package in Linux

- Users can execute the niccli binary by using the `niccli-<release_version>-linux_<arch>.tar.gz` package without installing the rpms/deb packages. The user has to unzip the file and execute the `niccli.<arch>` on the OS.

3.2 Executing the NICCLI Configuration Utility in Windows

To execute the NICCLI configuration utility, unzip the provided Windows package file and use the `niccli_x64.exe` file to run it on Windows OS.

3.3 Installing the NICCLI Configuration Utility in VMware

To install the NICCLI configuration utility using a vib package:

```
esxcli software vib install -v <VIB package> --no-sig-check
```

NOTE:

The vib packaging is under the process of VMware signing.

To install the NICCLI configuration utility using a signed .zip bundle:

```
esxcli software vib install -d <zip package>
```

3.4 Executing the NICCLI Configuration Utility in FreeBSD

To execute the NICCLI configuration Utility, unzip the provided FreeBSD package file and use the `niccli.freebsd` executable to run it on FreeBSD OS.

3.5 Executing the NICCLI Configuration Utility in UEFI

To execute the NICCLI configuration utility, unzip the provided uefi package file in the uefi environment and use the `niccli<arch>.efi` executable file to run on the UEFI shell.

4. NICCLI Configuration Utility Usage and Commands

Provides information on PCI and operational inband communication using NICCLI. The NICCLI Configuration Utility is a management tool that is used to perform operations on Broadcom Ethernet network adapters. This utility provides support for PCI and operational inband communication. The utility also accepts arguments to select the communication interface or the specified device in which to communicate from the device list.

4.1 NICCLI Configuration Utility Interface and Usage

The NICCLI configuration utilities provide three different types of interfaces. By default, the utility starts with the interactive interface. The utility accepts three groups of command arguments based on the existing CLI standards.

<niccli> <HW i/f argument> [util arguments] [Target command]

4.1.1 NICCLI Configuration and Usage on VMWare 8.x onwards

The following syntax is used when the signed bundle of NICCLI is installed:

esxcli niccli <command> <connection_type> -v <connection_type_value> [command options]

connection_type : The value assigned to the connection type, which can be one of the following <--dev | -c i | --pci>.

-v : Specifies the connection type value.

connection_type_value : Acceptable values include index number, MAC Address, or PCI address

Examples:

1. esxcli niccli list
2. esxcli niccli debug -c i -v 1 --coredump
3. esxcli niccli link --dev -v BC:97:E1:70:14:10 --status
4. esxcli niccli debug --pci -v 0000:86:00.00 --coredump

4.2 Hardware Interface Group of Arguments

The interface arguments depend on the hardware connection type and its specified dependent arguments. The NICCLI configuration utility supports the --pci interface which takes the PCI Bus/Device/Location of the device. Alternatively, the utility also offers to list all the available Ethernet network adapter PCI devices in the system along with the appropriate Ethernet/Network interface names.

The NICCLI configuration utility has the -i/--dev index support which can select when more than one device is found within the host.

NICCLI Configuration Utility Arguments

The utility arguments are optional. These are specific to the NICCLI configuration utility itself. E.g. convert all the output into JSON or increase the logger verbosity, and so forth.

Target Command

The target is nothing but the NICCLI configuration utility connected device. These targets offer a specific set of commands depending on the connected interface/device. The target-specific commands are executed upon acquiring the connection with the target.

4.3 NICCLI Configuration Utility Commands

All the commands that are provided are case-sensitive and operate with any of the interface modes. The following rules are for the newly defined NICCLI configuration utility syntax. The commands use a specific syntax as follows:

- < > mandates user to specify the value
- [] is an optional parameter.
- Parameter syntaxes can also be combined such as [-i <index value>] optional -i index argument but mandatory index value, if -i switch specified.
- The NICCLI configuration utility provides "help" commands with brief information for every command.
- The NICCLI configuration utility shall accept combinations such as -h, -?, '--help' to display the help.
- Every command also has a detailed help description.
- The NICCLI configuration utility also displays the supported commands and/or valid command syntax when the user executes an invalid command. The NICCLI configuration supports the user command line argument as follows:

```
./niccli -i <index> <command line>
```

```
./niccli --pci <domain:bus:device.function> <command line>
```

NICCLI Configuration Utility Help

To access the NICCLI configuration utility help, use the following command:

```
./niccli [--help | help | -h]
```

Example:

```
./niccli -h
```

The utility provides three modes of execution:

4.3.1 Oneline Mode

Execute the NICCLI configuration utility on a per-target command basis. In this mode, specify the hardware interface and target command with appropriate arguments. The NICCLI configuration utility connects to the target, executes the target command, and exits from the application. The return status of the command is the exit status of the NICCLI configuration utility.

To list the available targets for Oneline mode use the following command:

```
niccli --list
```

Use the following command to display the list of available commands for Oneline Mode:

```
niccli [-i <index of the target> | --pci <NIC pci address>] --help
```

Use the following command to display the help for a specific command:

```
niccli [-i [<index of the target> | <mac addr> | <NIC pci address>]] --help  
      <command>
```

Example:

```
niccli -i 1 --help nvm
```

4.3.2 Interactive Mode

The NICCLI configuration utility starts in interactive console mode if no target command is provided. The interface starts with the target prompt upon a successful connection with the target.

This mode is best suited for connecting to the target and executing multiple operations/commands without having to disconnect from the target. This improves performance and time in establishing a connection with the target each time while executing a command. This is only for interactive usage and is not designed or meant for the scripting.

To launch in Interactive Mode, use the following command:

```
<NIC CLI executable> [-i <index of the target> | --pci <NIC pci address>]
```

4.3.3 Batch Mode

Write the list of commands into a flat text file and execute them in the NICCLI configuration utility without disconnecting. This combines Interactive and OneLine modes without disconnecting the target. If any one of the commands fails, the NICCLI configuration utility exits and shall not continue to execute the rest of the commands from the script.

To launch in Batch Mode, use the following command:

```
<NIC CLI executable> [-i <index of the target> | --pci <NIC pci address>] --batch
<batch file>
```

Batch mode requires a flat text file with utility-supported commands. Supported commands can be listed using OneLine mode or Interactive mode. Upon failure of any commands, the utility exits without continuing with other commands.

5. NICCLI Logging

1. By default, the logging will be done in the following locations :

Linux, FreeBSD	: /var/log
Windows	: C:\ProgramData\Broadcom\logs
EFI	: Current location

2. The niccli logging is not supported in the VMWare operating system, when a signed niccli plugin file is installed.
3. Users can disable the default logging by assigning the value 0 to DEBUG_LOG_LEVEL_ALL in the "nicclilog.ini" file.
4. In the UEFI environment, continuous file write calls are synchronous and blocks execution until all data is transmitted.
5. If the system is still in early boot or pre-OS state, there's no buffering or optimization. This is a limitation from the Preboot environment itself.

Sample nicclilog.ini file.

```
-----
; Configuration file for NICCLI/NICCLID/NICCLIF/NICCLILOM
; Created: 2025-03-21
```

```
; Logging Level 0(OFF) 1(DEBUG), 2(VERBOSE), 4(FUNC)
; Logging level can be combined. For E.g.
; DEBUG_LOG_LEVEL_ALL = 3 (1(DEBUG), 2(VERBOSE))
```

```
[Logging Level]
DEBUG_LOG_LEVEL_ALL=3
```

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```
; Logging type can either NULL, DEFAULT, Log_file
;     NULL : Displays the debug prints on the terminal
;           or command prompt.
;     DEFAULT : Log in default location. (For Eg. /var/log)
;           Default file name : <utility_name>_d_<time_stamp>.log
;     Log_file : Provided file name will be logged.
```

[Logging Type]

```
DEBUG_LOG_FILE=DEFAULT
```

6. Enabling NICCLI Commands Autocompletion

- 1) User has to copy the niccli-autocomplete file to
"/usr/share/bash-completion/completions/".
- 2) Then run "source /usr/share/bash-completion/completions/niccli-autocomplete" to
enable the NICCLI command autocompletion.
- 3) The user has to run "niccli <tab> <tab>" to see auto-completion commands.

7. Known Limitations/issues & usage guidelines

- 1) NICCLI framework does not support running multiple instances in parallel,
Sometimes it may lead to a system crash and this scenario should be avoided.
- 2) White space characters other than plain space like tab etc. are not supported as
argument separators in the interactive mode.
- 3) Interrupting niccli during the middle of some operations may result in
unknown/undefined/unexpected behavior.
- 4) QOS commands i.e. pfc, apptlv, up2tc, getqos, ets, listmap, dscp2prio and tcrlmt to
work, user has to disable the following nvm options "lldp_nearest_bridge",
"lldp_nearest_non_tpmr_bridge" and "dcbx_mode".
- 5) The error codes will be supported only for the online mode, the interactive mode and
The batch mode will not have error codes displayed.

- 6) Unless --all option is explicitly specified, resmgmt command works based on its default mode (for a selected single PF or for all PFs/entire NIC device) which is printed when it's executed or its help is displayed. -all option performs the given command/operation for all the PFs of the given NIC device.
- 7) In FreeBSD for DCB commands to work, user has to make sure logical link of the interface should be UP. This is BSD layer2 driver (if_bnxt.ko) limitation.
- 8) NICCLI in the Linux secure boot environment displays the "Firmware Reset Counter" and "Error Recovery Counter" fields in the show command always as zero as the mmap fails due to security considerations.
- 9) For Blade Servers, the Network Interface Card on these servers remains powered during a server reboot. To ensure proper recovery of the card, particularly after a fastboot followed by NVM programming, it is essential to completely disconnect the power cables to the server. Failure to perform this step may result in the card returning in an unknown or bad condition.
- 10) If the user updates certain parameter values on the NIC controller via niccli, the user can query the updated status from niccli. However the change may or may not get reflected if queried from any other utility till reboot or L2 driver unload/load.

7.1 VMWare Limitations

- 1) In interactive mode, editing the command by moving the cursor using the left/right arrow will not work. The user has to re-issue the command.
- 2) Interactive mode will not be supported in the niccli Plugin model.
- 3) The user has to provide an option "-s" (silent mode) for the command named "restorefactorydefaults" which requires user confirmation 'Yes/No'.
- 4) VMware ESXCLI plugin does not support underscore (_) to be included as part of niccli command name. The command names can only contain lower-case alphanumeric characters, numbers and '-'. Because of VMWare ESXCLI Plugin limitation, the esxcli niccli json format has the discrepancy in the command executed and the command displayed in the json output.

7.2 Linux inbox limitations in secure kernel

- 1) In Linux OS, When the secure boot is enabled the adapter configuration/query

commands using niccli will not work as the mapping to the PCI BAR is not allowed by the OS.

- 2) Running multiple instances of niccli at the same time can result in the unexpected outputs and command timeouts.
- 3) In a multihost environment, race conditions can occur if more than one host attempts to utilize the USHI channel at the same time and this can result in the corruption of the control and data registers, timeouts, etc.
- 4) When the kernel configuration parameter CONFIG_IO_STRICT_DEVMEM=y is enabled and the inbox bnxt_en driver is loaded, niccli adapter configuration/query commands will not work. This is because from the user space niccli cannot map the PCI BAR to access the hardware. Below are the two work-arounds for this issue.
 - A) Unbind the L2 driver from the PF.
 - B) Enable the iomem=relaxed in the grub and reboot the server.
- 5) niccli adapter configuration/query commands in the guest OS or VM can cause the unexpected outputs and command timeouts when the guest OS is loaded with the inbox bnxt_en driver and the PF is binded to the vfio-pci driver in the hypervisor and is attached to the guest OS or VM. In this case, guest OS or VM should be loaded with the out-of-box bnxt_en driver.

8. Command Line Options

To get a current list of supported commands by the niccli utility, use the niccli help option.

NAME

niccli

DESCRIPTION

Broadcom NetXtreme-C/E/S Firmware update, Configuration and Debug utility.
It supports 3 modes of execution. Interactive mode, Online Mode and Batch Mode.

SYNOPSIS

niccli [OPTIONS] <COMMAND> [Params]

Options

Command	Description
-i --index	Index of the target

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--search	Search for a keyword(s) to match the relevant Commands
--pci	NIC PCI address
--dev	Index or MAC or NIC PCI address or NIC interface
-j --json	List the output in JSON format

Generic commands (Interface/device not required)

Command	Description
-v --version	Shows the version of the utility
-h --help	Lists the available commands
-l --list	Lists all the supported devices with target indexes
-d --list_devices	Lists all the supported devices with basic information
-e --list_ethernet	Lists all the supported device interface names
--batch	Enter into batch mode
devid	Query Broadcom device id's.
quit	Quits from the application (Applicable in interactive mode only)

Command categories (require specifying device - index or PCIe BDF or MAC)

show	Shows NIC specific device information
nvm	Query or Configure device NVM
fw	Firmware manager
qos	Query or configure device QOS parameters
linkdiag	Link Diagnostics
serdes	Plots the SERDES eyes values
vf	Performs VF operations
udcc	User defined congestion control operations
cable	Display the cable information

link	Link Operations
timesync	Peer to Peer related operations
counters	Display and clear the PCIe port counters
tunnel	Performs Custom, GRE Tunnel and RSS(receive side scaling) operations
msix	Query or configure MSIX vector of VF's for each PF
mh	Modify and retrieve the PF count for each PCIe endpoint
resmgmt	Query and Configure resources of the device
ccparams	Query or configure the congestion control(cc) parameters for RoCE.
debug	Dumps device internal configuration registers
pcie	Query and configure the PCIe operations

fw Command

=====

DESCRIPTION :

Performs Firmware operations

- 1) The online option is supported only on Linux and Windows operating systems.
- 2) recovery option is supported only in Linux operating system and UEFI Platform.
- 3) reset --immediate option is supported only on Linux operating systems.

SYNTAX :

```
fw <-u|--update> -f <package file> [--force] [-y|--yes]
fw <-u|--update> <--online> [--force] [-y|--yes]
fw <-u|--update> -f <package file> <-r|--recovery> [--force] [-y|--yes]
fw <--reset> [--immediate]
fw <-l|--livepatch> <--show>
fw <-l|--livepatch> <-a|--activate> [target_fw]
fw <-l|--livepatch> <-d|--deactivate> [target_fw]
fw <-l|--livepatch> <-p|--patch_update> [target_fw] -f <patch file>
```

OPTIONS :

```
-u|--update      : Perform the firmware install/update.
-f|--file       : This option is to provide the package file.
--force         : Forces the installation of the package file. This option can
                  also be used with the --recovery option to erase the complete NVM.
--reset         : This option is to perform the reset operations.
-y|--yes        : Answer as "yes" in prompts.
--immediate     : This option is to reset the device without reloading the drivers.
-l|--livepatch  : Perform the firmware live patch operations.
```

--show : Show the livepatch target firmware versions.
-a|--activate : Activate the firmware livepatch from the NVM.
-d|--deactivate : Deactivate the firmware livepatch from the NVM.
-p|--patch_update : Update the patch file directly to the device i.e. without installing it in NVM
target_fw : Target firmware is an optional parameter to activate/deactivate the Livepatch. By default the tool updates all the supported target firmwares. target_fw strings supported are "common_fw" or "secure_fw" on BCM95750x devices. "chimp_fw" string is supported on BCM9574x devices.
--online : Fetch firmware image online from Broadcom web server & perform update.
-r|--recovery : Recovers the adapter and updates the package file.

EXAMPLES :

To perform the firmware update

1) `niccli -i 1 fw --update -f FW.pkg --yes`

WARNING : Don't perform power cycle or reboot the system while firmware update is in progress as the device may become inoperable.

Active Package Version - 235.1.30.0 : Package Version on NVM - 235.1.30.0

```

NetXtreme-E Controller at PCI Domain 0000:1e:00:0
Device 0000:1e:00:0 : Installing package file
BCM957608-P2200GQF00.pkg
Device 0000:1e:00:0 : will be updated to package version 235.1.41.0
Firmware Update is in progress. Please wait ...
#####
  
```

Firmware update is completed.

A system reboot or device reset is needed for the firmware update to take effect.

2) `niccli -i 1 fw --update --online --yes`

WARNING : Don't perform power cycle or reboot the system while firmware update is in progress as the device may become inoperable.

Active Package Version - 235.1.44.0 : Package Version on NVM - 235.1.44.0

```

NetXtreme-E Controller at PCI Domain 0000:1e:00:0
Device 0000:1e:00:0 : Installing package file BCM14e41760.pkg
Device 0000:1e:00:0 : will be updated to package version 233.1.135.7
  
```

Firmware Update is in progress. Please wait ...

#####

Firmware update is completed.

A system reboot or device reset is needed for the firmware update to take effect.

3) niccli -i 1 fw --update -f FW.pkg --recovery

WARNING : Don't perform power cycle or reboot the system while firmware update is in progress as the device may become inoperable.

Performing recovery...

- Initializing fastboot registers.
- Reading RPB populated by SBL.
 - Board is ABPROD
- CRID Value = 0x1
- Performing SBI based fastboot.
- Verifying fastboot/CFB image header.
- Starting fastboot image download to SRAM.
- Downloading at Offset [0x180064], Len [0x65970], Addr [0x20000000]
- Fastboot image download finished.
- Enabling fastboot mode ...OK
- Waiting for SBI to boot up ...SBI ready!.
- Downloading firmware image. Please wait !
- Downloading at Offset [0x64], Len [0x87400], Addr [0x20000000]
- Download firmware image done.
 - Waiting for firmware to become ready ...Firmware READY.
 - Firmware is up and running.

NVM Defragmentation might take a few minutes to finish. Please wait ...

NVM Defragmentation completed successfully.

Active Package Version - 233.1.135.7 : Package Version on NVM - 233.1.135.7

NetXtreme-E Controller at PCI Domain 0000:1e:00:0

Device 0000:1e:00:0 : Installing package file
BCM957608-P2200GQF00.pkg

Device 0000:1e:00:0 : will be updated to package version 235.1.41.0

Firmware Update is in progress. Please wait ...

```
#####
```

Firmware update is completed.

PCI Device 0000:1e:00.0 recovered successfully.

A system cold boot is needed for recovery to take effect.

4) niccli -i 1 fw --update -f FW.pkg --recovery --force

WARNING : Don't perform power cycle or reboot the system while firmware update is in progress as the device may become inoperable.

Performing recovery...

- Initializing fastboot registers.
- Reading RPB populated by SBL.
- Board is ABPROD
- CRID Value = 0x1
- Performing SBI based fastboot.
- Verifying fastboot/CFB image header.
- Starting fastboot image download to SRAM.
- Downloading at Offset [0x180064], Len [0x65970], Addr [0x20000000]
- Fastboot image download finished.
- Enabling fastboot mode ...OK
- Waiting for SBI to boot up ...SBI ready!.
- Downloading firmware image. Please wait !
- Downloading at Offset [0x64], Len [0x87400], Addr [0x20000000]
- Download firmware image done.
- Waiting for firmware to become ready ...Firmware READY.
- Firmware is up and running.

NVM Defragmentation might take a few minutes to finish. Please wait

...

NVM Defragmentation completed successfully.

Active Package Version - 235.1.41.0 : Package Version on NVM - 235.1.41.0

NetXtreme-E Controller at PCI Domain 0000:1e:00:0

Device 0000:1e:00:0 : Installing package file
BCM957608-P2200GQF00.pkg

Device 0000:1e:00:0 : will be updated to package version 235.1.41.0

Firmware Update is in progress. Please wait ...

```
#####
```

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Firmware update is completed.
 PCI Device 0000:1e:00.0 recovered successfully.

To reset the device

1) `niccli -i 1 fw --reset`

Device reset issued successfully.
 Please reload the NetXtreme drivers for reset to take effect

2) `niccli -i 1 fw --reset --immediate`

```
Sending device reset command to the firmware - Done
- Unbinding all the active interfaces related to PCI device
0000:61:00 - Done
-Checking the firmware status -
Done
- Firmware is up and running -Done
- Firmware reset counter updated.
- Binding all the PCI functions related to PCI device 0000:61:00
- Done
- Device reset was successful
- Done
- States of NIC resources including rings, filters, and flows need to
be reinstated
- Syncing the primary and secondary images
```

To query the livepatch firmware versions

1) `niccli -i 1 fw --livepatch --show`

```
Common Firmware livepatch versions :
Active livepatch version : N/A
livepatch version on NVM : N/A
```

```
Secure Firmware livepatch versions :
Active livepatch version : N/A
livepatch version on NVM : N/A
```

To activate the livepatch firmware from NVM

1) `niccli -i 1 fw --livepatch --activate`

```
"Common Firmware" livepatch activated successfully.
"Secure Firmware" livepatch activated successfully.
```

To deactivate the livepatch firmware from NVM

1) `niccli -i 1 fw --livepatch --deactivate`

"Common Firmware" livepatch deactivated successfully.

"Secure Firmware" livepatch deactivated successfully.

To update the patch file directly to the device

1) `niccli -i 1 fw --livepatch --patch_update -f patch.pkg`

WARNING : Don't perform power cycle or reboot the system while firmware update is in progress as the device may become inoperable.

Active Package Version - 232.1.76.0 : Package Version on NVM - 232.1.76.0

NetXtreme-E Controller at PCI Domain 0000:39:00:0

Device 0000:39:00:0 : Installing package file thor_patch.pkg

Do you want to continue (y/n)?y

Firmware Update is in progress. Please wait ...

#

Firmware update is completed.

FW package update SUCCESS!

nvm Command

=====

DESCRIPTION :

NVM configuration option of a device

This command provides :

- Display the current settings of the NVM configuration.
- Configure the current settings of the NVM configuration.
- Save the current settings of the NVM configuration.

Note: While writing the VPD .txt file using `--dir_write` command, the user has to add the comment section with required VPD tags. If not, the command will fail to write the VPD .txt file.

- 1) The view option is supported on Linux, Windows, VMWare and FreeBSD operating systems.
- 2) The backup `--cfg` option is supported on Linux, Windows, VMWare OS and UEFI Platform.
- 3) The `nvm --dir_read` and `--dir_write` options are supported on Linux, Windows, VMWare and FreeBSD operating systems.

- 4) The `nvm --dump` option is supported on Linux, Windows, VMWare and FreeBSD operating systems.

SYNTAX :

```
nvm --view [-V] [-f <firmware package file name>] [-t|--type <nvm directory name>]
nvm -l|--list [-V] [-f <firmware package file name>]
nvm --verify [-V] [-f <firmware package file name>]
nvm -n|--sync
nvm -F|--restore_factory_defaults [--silent]
nvm -r|--dir_read -f <file name> -t|--type <nvm directory name>
nvm -w|--dir_write -f <file name> -t|--type <nvm directory name>
nvm -S|--saveoptions -f <file name>
nvm -O|--optionhelp <option name>
nvm -g|--getoption <option name> [--scope <scope index>]
nvm -s|--setoption <option names with comma separated>
    -v|--value <option value with comma separated> [--scope <scope index>]
nvm -L|--listoptions --diff
nvm --dump <--cfg | <-o|--offset> <val> <--length> <val> > -f <filename>
```

OPTIONS :

```
--view           : View the NVM item data.
-l|--list        : Display the NVM components and its associated version details.
--verify        : Verify packages & NVM.
-F|--restore_factory_defaults : Restores NVM configuration to factory defaults.
-n|--sync        : Synchronize SBI, SRT and CRT Primary and Secondary FW images.
                  Supported on BCM9575xxx and BCM9576xxx devices.
-r|--dir_read    : Read the NVM item data and write its contents to a file.
-w|--dir_write   : Create or overwrite NVM data item with a file.
-S|--saveoptions : Save NVM configuration options on the device to a file.
                  Only the end user access NVM configuration options are saved.
-O|--optionhelp  : Detailed help for the NVM configuration option.
-g|--getoption   : Get NVM configuration option of a device.
--setoption      : Set NVM configuration option of a device.
-v|--value       : The value for the specified option. Value can be in hex or decimal
                  format
--scope          : The scope can be either of 'function' or 'port' index.
-L|--listoptions : Displays current and default NVM configuration options of a device.
--diff           : Displays the difference between current and default NVM
                  configuration options of a device.
--silent         : Silent option. Do not prompt for user messages.
-o|--offset      : Offset value in hex.
--length        : Number of bytes (in hex) to dump (multiple of 4).
--dump           : This command extracts the NVRAM content and performs a raw
                  dump into the file specified by the user.
```

-V : Verbosity.
 -f : Input file name.
 -t|--type : Input NVM directory name string.

EXAMPLE :

To view the NVM directory entries in detail:

1) niccli -i 1 nvm --view

Device Interface Name: ens6f0np0

type	ord.ext	data/length	attr	version
CertChain	0.0	4144/8192	0001	
type	ord.ext	data/length	attr	version
SRTImage	0.0	542112/544768	0000	235.1.41.0
type	ord.ext	data/length	attr	version
MBA	1.0	352544/356352	0010	235.1.42.0
type	ord.ext	data/length	attr	version
update	0.0	3501848/3506176	0001	
type	ord.ext	data/length	attr	version
SBIImage	0.0	449168/524288	0000	232.0.7.0
type	ord.ext	data/length	attr	version
SRTImage	1.0	542112/544768	0000	235.1.41.0
type	ord.ext	data/length	attr	version
CRTImage	1.0	2118912/2121728	0000	235.1.41.0
type	ord.ext	data/length	attr	version
systemCfg	0.0	36864/36864	0001	
type	ord.ext	data/length	attr	version
VPD	0.0	176/4096	0000	

VPD Image Version: 1

VPD Resource Tag ID "Broadcom BCM57608 2x200G PCIe Ethernet NIC"

VPD Resource Tag VPD-R

PN: "BCM957608-P2200GQF00"

MN: "14E41"

SN: "P2200YYWWXXXXXFG"

V0: "235.1.41.0"

V1: "235.1.41.0"

V3: "235.1.41.0"

VC: "232.0.7.0"

VPD Resource Tag END

type	ord.ext	data/length	attr	version
manufacturing	0.0	36864/36864	0001	
type	ord.ext	data/length	attr	version
MBA	0.0	353056/356352	0010	235.1.41.0
type	ord.ext	data/length	attr	version
CRTImage	0.0	2118912/2121728	0000	235.1.41.0

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type	ord.ext	data/length	attr	version
pkgLog	0.0	1660/4096	0000	235.1.41.0
2024-12-19 07:56:37Z Broadcom BCM57608 2x200G PCIe				
Ethernet NIC	233.1.57.0	2024-12-02 21:42:52Z	Success	
79B488F0	7 fe 0	cfw Nov 18 2024	0	
2025-02-03 06:30:35Z Broadcom BCM57608 2x200G PCIe				
Ethernet NIC	234.1.8.0	2025-01-26 21:21:17Z	Success	
CD05C22C	6 be 0	cfw Dec 2 2024	0	
2025-03-19 09:17:22Z Broadcom BCM57608 2x200G PCIe				
Ethernet NIC	234.0.81.0	2025-03-18 14:52:43Z	Success	
65D5FFD9	6 be 0	cfw Jan 25 2025	0	
2025-04-08 10:10:50Z Broadcom BCM57608 2x200G PCIe				
Ethernet NIC	234.1.66.0	2025-04-07 16:30:41Z	Success	
3618AA93	6 be 0	cfw Mar 18 2025	0	
2025-04-22 06:34:45Z Broadcom BCM57608 2x200G PCIe				
Ethernet NIC	235.1.35.0	2025-04-21 14:46:52Z	Success	
FEEC314B	6 be 0	cfw Apr 7 2025	0	
2025-04-22 06:45:11Z Broadcom BCM57608 2x200G PCIe				
Ethernet NIC	235.1.30.0	2025-04-15 15:02:28Z	Success	
71F2DE8E	6 be 0	cfw Apr 21 2025	0	
2025-04-22 06:51:24Z Broadcom BCM57608 2x200G PCIe				
Ethernet NIC	235.1.30.0	2025-04-15 15:02:28Z	Success	
71F2DE8E	6 be 0	cfw Apr 15 2025	0	
2025-04-30 08:59:53Z Broadcom BCM57608 2x200G PCIe				
Ethernet NIC	235.1.41.0	2025-04-28 15:02:51Z	Success	
6B7BB128	6 be 0	cfw Apr 15 2025	0	
2025-05-02 07:40:39Z Broadcom BCM57608 2x200G PCIe				
Ethernet NIC	235.1.44.0	2025-05-01 14:53:57Z	Success	
3BBC42BC	6 be 0	cfw Apr 28 2025	0	
2025-05-06 07:05:17Z Broadcom BCM57608 2x200G PCIe				
Ethernet NIC	233.1.135.7	2025-04-04 01:27:04Z	Success	
EB573541	6 be 0	cfw May 1 2025	0	
2025-05-06 07:12:14Z Broadcom BCM57608 2x200G PCIe				
Ethernet NIC	235.1.41.0	2025-04-28 15:02:51Z	Success	
6B7BB128	6 be 0	cfw Nov 18 2024	0	
2025-05-06 07:26:07Z Broadcom BCM57608 2x200G PCIe				
Ethernet NIC	235.1.41.0	2025-04-28 15:02:51Z	Success	
6B7BB128	6 be 0	cfw Nov 18 2024	0	
type	ord.ext	data/length	attr	version
CfgCRCs	0.0	8192/8192	0001	
type	ord.ext	data/length	attr	version
CrashDmpData	0.0	1048576/1048576	0001	
type	ord.ext	data/length	attr	version
CrashDmpData	1.0	1048576/1048576	0001	

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type	ord.ext	data/length	attr	version
SBIImage	1.0	449168/524288	0000	232.0.7.0
type	ord.ext	data/length	attr	version
factoryCfg	2.0	36864/36864	0001	
type	ord.ext	data/length	attr	version
systemCfg	2.0	36864/36864	0001	
type	ord.ext	data/length	attr	version
factoryCfg	0.0	36864/36864	0001	

To list the NVM directory entries:

1) `niccli -i 1 nvm -l -f BCM957608-P2200GQF00.pkg`

```
Package File: BCM957608-P2200GQF00.pkg
```

	item type	ord.ext	data/length	attr	version
	1 update	0.0	0/2826240	0000	
235.1.41.0	2 CRTImage	0.0	2118912/2118912	0000	
	3 SRTImage	0.0	542112/542112	0000	
235.1.41.0					
	4 SBIImage	0.0	449168/449168	0000	232.0.7.0
	5 MBA	0.0	353056/353056	0010	
235.1.41.0					
	6 factoryCfg	0.0	36864/36864	0001	
	7 VPD	0.0	324/324	0000	
	8 VPD	0.0	160/160	0000	

Device Interface Name: ens6f0np0

	item type	ord.ext	data/length	attr	version
	1 CertChain	0.0	4144/8192	0001	
	2 SRTImage	0.0	542112/544768	0000	235.1.41.0
	3 MBA	1.0	352544/356352	0010	235.1.42.0
	4 update	0.0	3501848/3506176	0001	
	5 SBIImage	0.0	449168/524288	0000	232.0.7.0
	6 SRTImage	1.0	542112/544768	0000	235.1.41.0
	7 CRTImage	1.0	2118912/2121728	0000	235.1.41.0
	8 systemCfg	0.0	36864/36864	0001	
	9 VPD	0.0	176/4096	0000	
	10 manufacturing	0.0	36864/36864	0001	
	11 MBA	0.0	353056/356352	0010	235.1.41.0
	12 CRTImage	0.0	2118912/2121728	0000	235.1.41.0
	13 pkgLog	0.0	1660/4096	0000	235.1.41.0
	14 CfgCRCs	0.0	8192/8192	0001	

```

15 CrashDmpData      0.0    1048576/1048576 0001
16 CrashDmpData      1.0    1048576/1048576 0001
17 SBIImage           1.0    449168/524288 0000 232.0.7.0
18 factoryCfg         2.0    36864/36864 0001
19 systemCfg          2.0    36864/36864 0001
20 factoryCfg         0.0    36864/36864 0001

```

To verify the NVM directory entries:

1) `niccli -i 1 nvm --verify`

```

Device Interface Name: ens6f0np0
All the NVM components are verified successfully

```

To Sync the primary and secondary firmware images:

1) `niccli -i 1 nvm -n`

```

Firmware sync is in progress. Please wait ...
Firmware images are already synchronized

```

To read NVM directory:

1) `niccli -i 1 nvm -r -t pkglog -f data.txt`

```

Saving contents of NVM item pkgLog to a file data.txt

```

To write NVM directory:

1) `niccli -i 1 nvm -w -f data.txt -t pkglog`

```

Command Executed Successfully

```

To restore the config to factory defaults:

1) `niccli -i 1 nvm --restore_factory_defaults --silent`

```

- WARNING : User has enabled silent flag. Continuing
            the NVM restore factory defaults operation
            without confirmation.
Restored NVM Factory Defaults. A system reboot is needed to take
effect.

```

To save the NVM config to a file:

1) `niccli -i 1 nvm --saveoptions -f output.txt`

```

All NVM options are saved to output.txt

```

To display the current settings for the NVM option:

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1) `niccli -i 1 nvm --getoption mac_address --scope 0`

```
mac_address = 8c-84-74-01-a5-c2
```

To configure the current settings of the NVM configuration:

1) `niccli -i 1 nvm --setoption an_protocol --value 1 --scope 0`

```
an_protocol is set successfully
Please reboot the system to apply the configuration
```

2) `niccli -i 1 nvm -s 1,1 --scope 0,1 -v B0:26:28:99:88:14,B0:26:28:99:88:15`

```
mac_address is set successfully
Please cold boot the system to apply the configuration
mac_address is set successfully
Please cold boot the system to apply the configuration
```

To list the current and default config settings:

1) `niccli -i 1 nvm -L --diff`

NVM Option Name	Current Configuration	Default Configuration
mac_address	b0-26-28-99-88-14	00-00-00-00-00-00

To get the help of each NVM config:

1) `niccli -i 1 nvm --optionhelp an_protocol`

```
Name          : an_protocol
Description    : This per-port option configures the link
AN
                protocol. The device can support various
                combinations of IEEE standard 802.3 AN
                protocol, Consortium AN protocol, or
                Broadcom
                proprietary Auto Negotiation protocol.
Option Type    : Multi Instance Type
Instance Indexes : 0 to 15
Valid values   :
0 (IEEE802.3by and BAM)
1 (IEEE802.3by and Consortium)
2 (IEEE802.3by)
3 (BAM only)
4 (Consortium only)
```

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To extract the NVRAM content and perform a raw dump:

1) `niccli -i 1 nvm --dump --cfg -f cfg.txt`

```
BNX_DIR_TYPE_FUNC_CFG -----> {1 = 8c-84-74-01-a5-c2}
BNX_DIR_TYPE_PORT_CFG -----> {4 = 14e4}
BNX_DIR_TYPE_PORT_CFG -----> {5 = 1760}
BNX_DIR_TYPE_PORT_CFG -----> {6 = 14e4}
BNX_DIR_TYPE_PORT_CFG -----> {7 = 9120}
BNX_DIR_TYPE_SHARED_CFG -----> {10 = 30}
...
BNX_DIR_TYPE_PORT_CFG -----> {1465 = 0}
NVM dump operation successful
```

```
#-----
-
#Dir Type           : FUNCTION
#Option             : 1
#Name               : mac_address
#Description        :
#
#                   This per-PF option configures the MAC
address to be used by the PF. It is
#                   typically programmed at manufacturing time
and does not need to be configured
#                   by the user.
#Valid values       :
#                   0 to 0
#-----
-#Dir Type          : PORT
#Option            : 4
#Name              : vendor_id
#Description       :
#                   PCI Vendor ID
#Valid values      :
#                   0 to 0
#-----
-
#Dir Type          : PORT
#Option            : 5
#Name              : vendor_device_id
#Description       :
#                   PCI Device ID
#Valid values      :
#                   0 to 0
```

```
#-----
-
#Dir Type           : PORT
#Option             : 6
#Name               : subsystem_vendor_id
#Description        :
#                   : PCI Subsystem Vendor ID
#Valid values       :
#                   : 0 to 0
#-----
-
#Dir Type           : PORT
#Option             : 7
#Name               : subsystem_device_id
#Description        :
#                   : PCI Subsystem Device ID
#Valid values       :
#                   : 0 to 0
```

2) niccli -i 1 nvm --dump -f nvmdump.bin

```
Executing nvmdump. Please wait...
NVM dump operation successful
```

3) niccli -i 1 nvm --dump -o 0x0 --length 0x10 -f nvmdump.bin

```
Executing nvmdump. Please wait...
NVM dump operation successful
```

qos Command

=====

DESCRIPTION :

This command can be used to query and configure the various QOS parameters such as ETS, priority to traffic class, application TLV's, receive rate control, tx and rx rate limits, transmit(egress) and receive(ingress) buffer threshold input parameters.

- 1) This command is supported on Linux, Windows, VMWare and FreeBSD operating systems.
- 2) The following options ets, pfc, up2tc, apptlv, dscp2prio, listma, tc, rx_port_rate_limit, rx_rate_limit, rx_ep_rate_limit, tx_partition_rate_limit, tx_port_rate_limit and

tx_ep_rate_limit are supported only in Linux and FreeBSD operating systems.

SYNTAX :

```

qos <-E|--ets> --show
qos <-E|--ets --tsa <tc[0-7]:[ets|strict], ...> --up2tc <priority[0-7]:tc>, ...> --tcbw <list>
qos --pfc --enable <pfc list>
qos --up2tc --pri <priority[0-7]:tc, ...>
qos --apptlv <-a|--add> [<-d|--del>] --app <priority,selector,protocol>
qos <-D|--dscp2prio>
qos <-l|--listmap> --pri2cos
qos --tc --set <-T|--rate_limit> <list of rate limit>
qos <-r|--rx_port_rate_limit> --set --max <value> [-p]---persistent]
qos <-R|--rx_rate_limit> --show [-p]--persistent]
qos <-X|--rx_ep_rate_limit> --set --ep0 <value> [--ep1 <value>] [--ep2 <value>] [--ep3
    <value>] [-p]---persistent]
qos <-t|--tx_partition_rate_limit> --show [-p]--persistent]
qos <-t|--tx_partition_rate_limit> --set --max <value> [-p]--persistent]
qos <-P|--tx_port_rate_limit> --show
qos <-P|--tx_port_rate_limit> --set -max <value>
qos <-x|--tx_ep_rate_limit> --show
qos <-x|--tx_ep_rate_limit> --set <--port> <port number> --ep0 <value> [--ep1 <value>] [--ep2
    <value>] [--ep3 <value>] [-p]--persistent]
qos <-n|--ingress> --cosq --show [-p]--persistent]
qos <-n|--ingress> --cosq --set --state <value> [--mode <value>] [-p]--persistent]
qos <-e|--egress> --cosq --show [-p]--persistent]
qos <-e|--egress> --cosq --set --state <value> [-p]--persistent]
qos -g|--timed_tx_pacing_rate_profile --show

```

OPTIONS :

-E --ets	: Query or Configure enhanced transmission selection, priority to traffic class, traffic class bandwidths and the list of configured application tlvs.
--tsa	: Transmission selection algorithm, sets a comma separated list of traffic classes to the corresponding selection algorithm. Valid algorithms include "ets" and "strict".
--up2tc	: Comma separated list mapping user priorities to traffic classes.
--tcbw	: Comma separated list of bandwidths for each traffic class the first value being assigned to traffic class 0 and the second to traffic class 1 and so on.
--pfc	: Enable priority based flow control on a given priority.
-apptlv	: Configure the priority of the application TLV.
-a --add	: Add the priority of the application TLV.

- d|--del : Delete the priority of the application TLV.
- app : Key to provide the priority, selector, protocol for configuring the application TLV.
- D|--dscp2prio : query the dscp to priority mapping.
- l|--listmap : List the priority mapping and related queue id for a given physical function.
- pri2cos : List the priority to traffic class mapping.
- tc : Command to set the rate limit for each traffic class.
- T|--rate_limit : Option to provide the comma separated percentage limit for each TC.
- r|--rx_port_rate_limit : Configure the receive side port rate limit
- max : The max option specifies an 8-bit rate limit as a percentage of total link bandwidth with a range of 0 to 100 percent. A value of 0 indicates no rate limit and deletes the previously configured rate limit.
- p|--persistent : Option to write the configuration to NVRAM, but it does not take effect immediately.
- R|--rx_rate_limit : Query the configured receive side rate control parameters.
- X|--rx_ep_rate_limit : Configure the receive side rate control parameters for a given endpoint.
- t|--tx_partition_rate_limit : Query and Configure the transmit side partition. Rate limit applies to traffic sent from a partition, which is one PF and all of its child VFs.
- P|--tx_port_rate_limit : Query and Configure the transmit side port rate limit.
- port : Specify the index of the external port of the device.
- ep(x) : Specify the Tx or Rx endpoints rate limit values.
- x|--tx_ep_rate_limit : Query and Configure the PCIe endpoint transmit rate control.
- n|--ingress : Query and configure the QoS dynamically to receive buffer thresholds by configuring different input parameters.
- e|--egress : Query and configure the QoS dynamically at transmit buffer thresholds by configuring different input parameters.
- cosq : This option is used to query or set the cosq parameter i.e. cosq state and the mode.

- state** : Bitmask field indicating which traffic classes are enabled or disabled. Each bit represents a specific traffic class, where bit 0 represents traffic class 0 and so on. A value of 0 indicates that the traffic class is not enabled.
- mode** : Bitmask field indicating which traffic class is lossy or lossless. Each bit represents a specific traffic class, where bit 0 represents traffic class 0 and so on. A value of 0 indicates that the traffic class is lossy and value 1 indicates that the traffic class is lossless.
- g|--timed_tx_pacing_rate_profile** : Query the timed tx pacing rate profile.

EXAMPLES :

To show the ETS(enhanced transmission selection) configuration

1) `niccli -i 1 qos --ets --show`

```
IEEE 8021QAZ ETS Configuration TLV:
PRIO_MAP: 0:0 1:0 2:0 3:0 4:0 5:0 6:0 7:0
TC Bandwidth: 0% 0% 0%
TSA_MAP: 0:strict 1:strict 2:strict
IEEE 8021QAZ PFC TLV:
PFC enabled: none
```

Below ets show command is observed only in VmWare OS.

`esxcli niccli qos --dev -v vmnic5 --ets --show`

```
DCBX Standard : IEEE
Queue Information
-----
MAX Configurable Queues : 3
MAX Configurable Lossless Queues : 3
MAX Configurable Lossy Queues : 0
ETS Information
-----
Willing : Yes
Max no. of TCs : 3
Traffic Class to BW and Scheduling algo map
-----
TCs BW Sched.Algo
--- --
0 50 2 (ETS Priority)
1 50 2 (ETS Priority)
```

2	N.A	255 (Vendor Specific
Priority)		
3	N.A	255 (Vendor Specific
Priority)		
4	N.A	255 (Vendor Specific
Priority)		
5	N.A	255 (Vendor Specific
Priority)		
6	N.A	255 (Vendor Specific
Priority)		
7	N.A	255 (Vendor Specific
Priority)		

Priorities to TC map

Pri. 0 is mapped to TC0

Pri. 1 is mapped to TC0

Pri. 2 is mapped to TC0

Pri. 3 is mapped to TC0

Pri. 4 is mapped to TC0

Pri. 5 is mapped to TC1

Pri. 6 is mapped to TC0

Pri. 7 is mapped to TC0

PFC Information

Max PFC TCs : 0

MAC security Bypass Capacity : 0

Priority bitmap : (0 0 0 0 0 0 0 0)

APP Information

Protocol ID: 0x12b7, Protocol Selector: 1, Priority: 3

To configure the ETS(enhanced transmission selection)

1) niccli -i 1 qos --ets --tsa 0:ets,1:ets,2:strict,3:strict,4:strict,5:strict,6:strict,7:strict --up2tc 0:0,1:0,2:0,3:0,4:0,5:1,6:0,7:0 --tcBW 70,30

Enhanced transmission selection (ets) configured successfully.

To enable priority based flow control on a given priority

1) niccli -i 1 qos --pfc --enable 5,6

pfc configured successfully.

2) `niccli -i 1 qos --pfc --enable 0xFF`

`pfc configured successfully.`

To set the user priorities to traffic classes

1) `niccli -i 1 qos --up2tc 0:0,1:0,2:0,3:0,4:0,5:1,6:0,7:0`

`User priority to traffic classes are configured successfully.`

To add the priority of the application TLV

1) `niccli -i 1 qos --apptlv --add --app 5,1,35093`

`AppTLV configured successfully.`

To delete the priority of the application TLV

1) `niccli -i 1 qos --apptlv --del --app 5,1,35093`

`AppTLV deleted successfully.`

To query the dscp to priority mapping

1) `niccli -i 1 qos --dscp2prio`

```
dscp2prio mapping:
priority:3 dscp:26
priority:7 dscp:48
```

To list the priority to traffic class mapping

1) `niccli -i 1 qos --listmap --pri2cos`

```
Base Queue is 0 for port 0
-----
Priority  TC    HW Queue ID
-----
0         0      4
1         0      4
2         0      4
3         1      0
4         0      4
5         0      4
6         0      4
7         2      5
RoCE Bi-Di Optimization : Disabled
```

To set the rate limit for each traffic class in units of percentage

1) `niccli -i 1 qos --tc --set --rate_limit 10,20,30`

Traffic class rate limit configured successfully

2) `niccli -i 1 qos --tc --set --rate_limit 10`

Traffic class rate limit configured successfully

To configure receive rate control that applies to all traffic in a receive CoS queue group

1) `niccli -i 1 qos --rx_port_rate_limit --set --max 40`

Rx Port rate limit configured successfully

2) `niccli -i 1 qos --rx_port_rate_limit --set --max 70 -persistent`

Rx Port rate limit configured successfully

Please reboot the system for changes to take effect.

To show the receive side rate limits

1) `niccli -i 1 qos --rx_rate_limit --show`

QueueGroup0 Max : 40%

QueueGroup1 Max : None

2) `niccli -i 1 qos --rx_rate_limit --show --persistent`

QueueGroup0 Max : 70%

QueueGroup1 Max : None

To configure endpoint rate limit for all endpoints from one host

1) `niccli -i 1 qos --rx_ep_rate_limit --set --ep0 0`

Configured receive endpoint rate limit successfully.

2) `niccli -i 1 qos --rx_ep_rate_limit --set --ep0 0 --persistent`

Configured receive endpoint rate limit successfully.

Please cold boot the system for changes to take effect.

To show the Tx partition rate limit

1) `niccli -i 1 qos --tx_partition_rate_limit --show`

Max : None

To configure the Tx partition rate limit

1) `niccli -i 1 qos --tx_partition_rate_limit --set --max 2`

Transmit partition rate limit configured successfully

To show the transmit side port rate limit

1) `niccli -i 1 qos --tx_port_rate_limit --show`

Tx Port Rate Limit: Not Applicable

To configure the transmit side port rate limit

1) `niccli -i 1 qos --tx_port_rate_limit --set --max 2`

Port rate limit configured successfully

To query the PCIe endpoint transmit rate control

1) `niccli -i 1 qos --tx_ep_rate_limit --port 0 --show`

No endpoint transmit rate limits are configured.

To configure the PCIe endpoint transmit rate control for two endpoints

1) `niccli -i 1 qos --tx_ep_rate_limit --set --port 0 --ep0 50 --ep2 40`

Endpoint transmit rate limit configured successfully.

To query the ingress cosq parameters

1) `niccli -i 1 qos --ingress --cosq --show`

TC	State	Mode
**	*****	*****
0	Enabled	Lossy
1	Disabled	Lossy
2	Disabled	Lossy
3	Disabled	Lossy
4	Disabled	Lossy
5	Disabled	Lossy
6	Disabled	Lossy
7	Disabled	Lossy

To enable all the 8 traffic classes and mode lossless(1) is configured on traffic class 4

1) `niccli -i 1 qos --ingress --cosq --set --state 255 --mode 16`

ingressqos parameters configured successfully

To query the egress cosq parameters

1) `niccli -i 1 qos --egress --cosq --show`

Transmit side CoSQ Information :

TC	State
**	*****
0	Enabled
1	Enabled
2	Enabled
3	Disabled
4	Disabled
5	Disabled
6	Disabled
7	Disabled

To configure the egress cosq parameters. Below example enables all the 8 queues

1) `niccli -i 1 qos --egress --cosq --set --state 255`

egressqos parameters configured successfully

To query the timed tx pacing rate profile.

1) `niccli -i 1 qos --timed_tx_pacing_rate_profile --show`

Active timed tx pacing rate profile : 60 Mbps

Below command is observed only in VmWare OS

`esxcli niccli qos --dev -v vmnic5 --roce-app-pri --set --pri 1`

Command executed successfully.

linkdiag Command

=====

DESCRIPTION :

This command is used to perform the link diagnostic tests like PRBS, loopback, DSCDump and TXFIR settings.

- 1) fdrstat options are supported on Linux, Windows, VMWare operating system
- 2) DSC Dump options are supported on Linux, VMWare and FreeBSD operating systems.
- 3) Loopback options are supported only on Linux operating systems.
- 4) PRBS Test options are supported only in the Linux operating system and UEFI Platform.
- 5) TxFir options are supported on Linux, Windows, VMWare and FreeBSD Platforms

SYNTAX :

```
linkdiag -T|--txfir --show <-M|--modulation_type> <mod_type> <-l|--lane> <lane_number>
linkdiag -T|--txfir --set <-M|--modulation_type> <mod_type> <-l|--lane> <lane_mask>
--pre1 <value> --pre2 <value> [--pre3 <value>] --main <value> --post1 <value>
--post2 <value> [--post3 <value> --amp <value> --nlcl <value> --nlcu <value>]
```

```
linkdiag -F|--fdrstat [--start] [--stop] [--clear] [--counters]
```

```
linkdiag -D|--dscdump -l|--lane <lane_number> [-a|--diag_level <level>]
```

```
linkdiag -L|--loopback --show
```

```
linkdiag -L|--loopback [<-R|--phy_remote> | <-P|--phy_remote> | <-p|--phy_local> |
<-m|--mac_local> | <-d|--disable>]
```

```
linkdiag -L|--loopback [--external] [--RJ45]
```

```
linkdiag -P|--prbs_test <-e|--enable | -d|--disable> [--mode <mode_value>]
[<-r|--rx_lane_mask> <value>] [<-t|--tx_lane_mask> <value>] [<-s|--duration>
<value in seconds>] [--tcode] [-b|--ber <value>]
```

OPTIONS :

- T|--txfir : This option is used to query and configure the TX FIR (transmitter finite impulse response)
- F|--fdrstat : This option is used for FDR(Flight Data Recorder) to collect the FEC Performance data.
- D|--dscdump : This option is used to retrieve DSC dump data from a device
- L|--loopback : This option is used to query and configure the different loopback Modes i.e. phy loopback, mac loopback and external loopback.
- P|--prbs_test : This option is used in port interface debugging to analyze the quality of the link. The test can be run on a port or per lane with a specific polynomial.

Note:

- 1) The interface(s) should be fully initialized prior to the testing.
- 2) During the testing, there should not be any queries or configs sent to the card. "ifdown" the interface(s) is recommended.

-M|--modulation_type : Modulation types of TxFIR. Supported values are

'NRZ','PAM4','C2MNRZ','C2MPAM4', 'PAM4-112','C2MPAM4-112G' and 'LPOPAM4-112G' of the device. The modulation types 'PAM4-112','C2MPAM4-112G' and 'LPOPAM4-112G' are only supported on BCM5760x devices.

The modulation types 'PAM4' and 'C2MPAM4' are supported on BCM5750x and BCM5760x devices.

- l|--lane : TXFIR show command takes the MRS lane number and lane mask for the TXFIR configuration. To collect the dsc dump on all the supported lanes, please provide a value of 65535. DSC dump on all lanes are supported only on BCM9576xx devices.
- pre1 : This is a mandatory parameter to configure the TXFIR settings. This parameter is supported for all the modulation types and the valid range is from -32768 to 32767.
- pre2 : This is a mandatory parameter to configure the TXFIR settings. This parameter is supported for all the modulation types and the valid range is from -32768 to 32767.
- main : This is a mandatory parameter to configure the TXFIR settings. This parameter is supported for all the modulation types and the valid range is from -32768 to 32767.
- post1 : This is a mandatory parameter to configure the TXFIR settings. This parameter is supported for all the modulation types and the valid range is from -32768 to 32767.
- post2 : This is a mandatory parameter to configure the TXFIR settings. This parameter is supported for all the modulation types and the valid range is from -32768 to 32767.
- pre3 : This is an optional parameter to configure the TXFIR settings. This parameter is supported on following modulation types i.e, 'LPOPAM4-112G', 'PAM4-112', 'C2MPAM4' and 'C2MPAM4-112G'. The valid range is from -32768 to 32767.
- post3 : This is an optional parameter to configure the TXFIR settings. This parameter is supported on the following modulation types i.e, 'NRZ','PAM4' and 'C2MNRZ'. The valid range is from -32768 to 32767.
- amp : This is an optional parameter to configure the TXFIR settings. This parameter is supported on following modulation types i.e,

'NRZ','PAM4','C2MNRZ','PAM4-112','C2MPAM4'
and 'C2MPAM4-112G'. The valid range is from -32768 to 32767.

- nlcu : This is an optional parameter to configure the TXFIR settings. This parameter is supported only on 'LPOPAM4-112G' modulation type. The valid range is from -100 to 100.
- nlcl : This is an optional parameter to configure the TXFIR settings. This parameter is supported only on 'LPOPAM4-112G' modulation type. The valid value is 0.
- start : This is an optional parameter to start the fdrstat.
- stop : This is an optional parameter to stop the fdrstat.
- clear : This is an optional parameter to clear the fdrstat.
- counters : This is an optional parameter to pull the fdrstat counters information.
- a|--diag_level : This is an optional parameter. If the user does not specify this parameter by default DSC dump will be collected on all the supported diag levels.

Supported diag levels are as follows:

- 0 = diag lane
- 1 = diag core
- 2 = diag event
- 3 = diag eye
- 4 = diag reg core
- 5 = diag reg lane
- 6 = diag uc core
- 7 = diag uc lane
- 8 = diag lane debug
- 9 = diag ber vert
- 10 = diag ber horz
- 11 = diag event safe
- 12 = diag timestamp

- R|--phy_remote : This option enables loopback of local PHY Rx to peer PHY Tx. The packets transmitted by peer are looped back to the peer at the PHY. No packets will reach the host. The host will see a link down.
- p|--phy_local : This option enables a loopback of local TX to local RX at the PHY. Any packets transmitted from the host are looped back to the host. No packets

will be transmitted on the line. If any peer is connected, the peer should ignore the link status from the host.

- m|--mac_local : This option enables a loopback of local TX to local RX at the MAC. Any packets transmitted from the host are looped back to the host. No packets will be transmitted on the line. If any peer is connected, the peer should ignore the link status from the host.
- d|--disable : This option disables the current loopback settings. In case of prbs_test this option disables the PRBS test.
- external : This option prepares the PHY from external loopback and suppresses NONCE generation for auto negotiation to work with an external loopback. This option should only be used if the same port external loopback dongle or equivalent is used. Without this option and AN enabled, the host may not see a link up.
- RJ45 : This test is designed for dual port 10GBase-T where the PRBS test is not applied. A compliant UTP cable is needed to connect between the two ports of the controller. Because auto-negotiation is required to establish a link, traffic is initiated from one port. The PHY of the other port is put into a remote loopback mode, essentially serving as a loopback plug, to bounce packets back to the initiating port. This test requires the production Linux driver (bnxt_en) to be loaded in order to execute. Packets are sent and received through the Linux OS network stack
- e|--enable : Enable the PRBS test
- mode : Specify the supported modes. And the supported modes are 'PRBS31','PRBS7','PRBS9','PRBS11','PRBS15','PRBS23','PRBS58','PRBS49','PRBS10','PRBS20' and 'PRBS13'. The default mode value is PRBS31
- r|--rx_lane_mask : Receiver lane mask value.
- t|--tx_lane_mask : Transmitter lane mask value.
- s|--duration : Duration to run the prbs test. Default time is 10 seconds
- tcode : If this option was provided. The prbs test will run on t-code project as well.

EXAMPLES :

To set the TXFIR settings

- 1) niccli -i 1 linkdiag -T --set --modulation_type LPOPAM4-112G --lane 1 --pre1 1 --pre2 -2 --pre3 10 --main 12 --post1 -10 --post2 15 --nlcl 0 --nlcu 1

Command executed successfully.

- 2) `niccli -i 1 linkdiag -T --set --modulation_type PAM4 --lane 1 --pre1 1 --pre2 -2 --main 12 --amp 10 --post1 -10 --post2 15 --post3 10`

Command executed successfully.

- 3) `niccli -i 1 linkdiag -T --set --modulation_type NRZ --lane 1 --pre1 1 --pre2 -2 --main 12 --amp 10 --post1 -10 --post2 15 --post3 10`

Command executed successfully.

- 4) `niccli -i 1 linkdiag -T --set --modulation_type PAM4-112 --lane 1 --pre1 1 --pre2 -2 --pre3 5 --main 12 --amp 10 --post1 -10 --post2 15`

Command executed successfully.

To get the TxFIR settings

- 5) `niccli -i 1 linkdiag -T --show --modulation_type LPOPAM4-112G --lane 0`

Transmit Finite Impulse Response (TxFIR):

```
Pre1    : 1
Pre2    : -2
Pre3    : 10
Main    : 12
Post1   : -10
Post2   : 15
Nlcl    : 0
Nlcu    : 1
```

- 6) `niccli -i 1 linkdiag -T --show --modulation_type PAM4 --lane 0`

Transmit Finite Impulse Response (TxFIR):

```
Pre1    : 1
Pre2    : -2
Main    : 12
Post1   : -10
Post2   : 15
Post3   : 10
Amp     : 10
```

- 7) `niccli -i 1 linkdiag -T --show --modulation_type NRZ --lane 0`

Transmit Finite Impulse Response (TxFIR):

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```

Pre1    : 0
Pre2    : 0
Main    : 127
Post1   : 0
Post2   : 0
Post3   : 0
Amp     : 10

```

8) niccli -i 1 linkdiag -T --show --modulation_type PAM4-112 --lane 0

```

Transmit Finite Impulse Response (TxFIR):
Pre1    : 0
Pre2    : 0
Pre3    : 0
Main    : 168
Post1   : 0
Post2   : 0
Amp     : 10

```

To Start the fdrstat

1) niccli -i 1 linkdiag --fdrstat --start

```
FDRSTAT started successfully.
```

To Stop the fdrstat

1) niccli -i 1 linkdiag --fdrstat --stop

```
FDRSTAT stopped successfully.
```

To Clear the fdrstat

1) niccli -i 1 linkdiag --fdrstat --clear

```
FDRSTAT cleared successfully.
```

To Pull the fdrstat counters

1) niccli -i 1 linkdiag --fdrstat --counters

```

Port mode type: PAM4
port 0: Collecting Data ...
FDR start to collect data timestamp : 0.000000000 sec
FDR end to collect data timestamp   : 0.000000000 sec

```

```

Accumulated  Last cycle
-----

```

Number of Uncorrected codewords:	0	0
Number of Corrected codewords:	0	0
Symbol errors:	0	0
Code words err S0:	0	0
Code words err S1:	0	0
Code words err S2:	0	0
Code words err S3:	0	0
Code words err S4:	0	0
Code words err S5:	0	0
Code words err S6:	0	0
Code words err S7:	0	0
Code words err S8:	0	0
Code words err S9:	0	0
Code words err S10:	0	0
Code words err S11:	0	0
Code words err S12:	0	0
Code words err S13:	0	0
Code words err S14:	0	0
Code words err S15:	0	0
Code words err S16:	0	0

To get the DSC Dump

1) `niccli -i 1 linkdiag -D --lane 0`

Note : While the dscdump operation is running, firmware does not service other commands that operate on the PHY
System logs may indicate command timeouts while the dscdump operation is in progress.

Retrieving dsc dump, please wait...

Generated dscdump file `dhcp-10-123-240-239_20250506_233430_374795.dmp` successfully

2) `niccli -i 1 linkdiag -D --lane 0 --diag_level 2`

Note : While the dscdump operation is running, firmware does not service other commands that operate on the PHY
System logs may indicate command timeouts while the dscdump operation is in progress.

Retrieving dsc dump, please wait...

Generated dscdump file `dhcp-10-123-240-239_20250506_233525_375367.dmp` successfully

To get loopback status

- 1) `niccli -i 1 linkdiag --loopback --show`

```
Configured LoopBack Mode : NA
```

To disable the loopback mode

- 1) `niccli -i 1 linkdiag --loopback --disable`

```
Command Executed Successfully
```

To enable the mac_local loopback mode

- 1) `niccli -i 1 linkdiag --loopback --mac_local`

```
Command Executed Successfully
```

To enable the phy_local loopback mode

- 1) `niccli -i 1 linkdiag --loopback --phy_local`

```
Command Executed Successfully
```

To enable the phy_remote loopback mode

- 1) `niccli -i 1 linkdiag --loopback --phy_remote`

```
Command Executed Successfully
```

To enable the external loopback mode

- 1) `niccli -i 1 linkdiag --loopback --external`

```
Command Executed Successfully
```

To enable the external RJ45 loopback mode

- 1) `niccli -i 1 linkdiag --loopback --external --RJ45`

```
Starting the loopback test with RJ45 connected.
```

```
Command Executed Successfully
```

To enable the PRBS Test with default

- 1) `niccli -i 1 linkdiag --prbs_test --enable`

```
PRBS Test is running. Please wait....
```

```
Stopping the PRBS Test....
```

```
PRBS DETAILED DISPLAY :
```

```

LN TX-Mode TX-PRBS-Inv TX-PMD-Inv RX-Mode RX-PRBS-Inv
RX-PMD-Inv Lck LL PRBS-Err-Cnt BER
(result) 3 PRBS_31 0 0 PRBS_31 0
0 0 1 0000000000 !Lock
PRBS loopback test report is generated successfully.

```

To disable the PRBS Test

- 1) `niccli -i 1 linkdiag --prbs_test --disable`

```

PRBS DETAILED DISPLAY :
LN TX-Mode TX-PRBS-Inv TX-PMD-Inv RX-Mode RX-PRBS-Inv
RX-PMD-Inv Lck LL PRBS-Err-Cnt BER
(result) 3 OFF - 0 OFF -
0 0 1 0000000000
!LPRBS loopback test report is generated successfully.

```

To run the PRBS Test with user provided params

- 1) `niccli -i 1 linkdiag --prbs_test --enable --mode PRBS31 --rx_lane_mask 255 --tx_lane_mask 255 --duration 10`

Stopping PRBS Test....

```

PRBS DETAILED DISPLAY :
LN TX-Mode TX-PRBS-Inv TX-PMD-Inv RX-Mode RX-PRBS-Inv
RX-PMD-Inv Lck LL PRBS-Err-Cnt BER
(result) 3 PRBS_31 0 0 PRBS_31 0
0 0 1 0000000000 !Lock
PRBS loopback test report is generated successfully.

```

serdes Command

=====

DESCRIPTION :

This command is used to plot the serdes ethernet eye, PCI eye scope and margin values of the eye. This command is supported only on Linux operating systems.

Note:

1. While plotting the serdes ethernet eye the link toggling is expected.
2. Serdes ethernet and pci eye shares the resources of the NIC. Therefore, these commands cannot be run concurrently. If pci eye is running and you attempt to run ethernet eye tool will return failure.

SYNTAX :

```

serdes --eye -e|--ethernet [-l|--lane <ethernet lane number>] [<-P|--plot>]
serdes --eye -p|--pci <-l|--lane> <pci_lane_number> [-P|--plot] [-t|--target_ber <value>]
serdes --eye -p|--pci -s|--stop

```

OPTIONS :

- `--eye` : This option is used to plot the serdes pci and ethernet eye.
- `-e|--ethernet` : This option is used to plot the serdes ethernet eye.
By default this options displays only horizontal and vertical margin values, including the test result.
- `-p|--pci` : This option is used to plot the serdes pci eye.
- `-l|--lane` : This option is used to specify the lane number. For pcie serdes test, the maximum value is the device pcie lane width minus 1. Valid values are from 0 to 15. For ethernet serdes test the valid range is from 0 to 7.
- `-P|--plot` : This is an optional parameter. When user specifies this option, will plot the eye and displays the horizontal and vertical margin values, including the test result.
- `-t|--targetber` : This option is used to specify the target bit error rate. By default serdes pci eye is plotted with BER "1e-8". This option is only supported on BCM9575xxx and above devices. The supported target BER values are "1e-8", "1e-9", "1e-10" and "1e-11"
- `-s|--stop` : This option is used to stop the running serdes pci eye plotting. This option is only supported on BCM9575xxx and above devices.

EXAMPLES :

To plot the ethernet serdes eye

- 1) `niccli -i 1 serdes --eye -e -P`
- 2) `niccli -i 1 serdes --eye --ethernet --plot`

Plotting serdes ethernet eye. This may take several minutes ...

Each character N represents approximate error rate 1e-N at that location

[illegible]

```

139mV : 11112222333344445555566767 7776777 767665555544444333322221111
137mV : 11112222333344445555556766 7      :      7 6676555555444433322221111
135mV : 11122222333344445555566666--7----7----7--666665555544433322222111
133mV : 112222233334444555556666      :      :      :      6666555554443332222211
131mV : 1122222333444455555566767      :      :      :      7676655555444332222211
129mV : 12222223344445556666677      7      :      7      7766666555444332222221
127mV : 2222223334445556666 7:      :      :      :      :7 666655544333222222
125mV : 22222233444455666666-77----+----+----+----77-6666665544433222222
123mV : 222222334455567 66      :      :      :      :      :      66 765554433222222
121mV : 222223334555666777      :      :      :      :      :      777666555433322222
119mV : 22222334445566777:      :      :      :      :      :      :7776655443322222
117mV : 22223334445666 777      :      :      :      :      :      777 6665443332222
115mV : 22223334556677--+-+----+----+----+----+----+----+----+---77665543332222
113mV : 222333345667      :      :      :      :      :      :      :      766543333222
111mV : 2223334456667      :      :      :      :      :      :      :      7666544333222
109mV : 2223334456677      :      :      :      :      :      :      :      7766544333222
107mV : 223333456677      :      :      :      :      :      :      :      776654333322
105mV : 22333445677+-+----+----+----+----+----+----+----+----+---77654433322
103mV : 23333445677:      :      :      :      :      :      :      :      :77654433332
101mV : 233344457      :      :      :      :      :      :      :      :      :754443332
 99mV : 33334456 7 :      :      :      :      :      :      :      :      :7 65443333
 97mV : 3333445677 :      :      :      :      :      :      :      :      :7765443333
 95mV : 333444567--+-+----+----+----+----+----+----+----+----+---765444333
 93mV : 333445567      :      :      :      :      :      :      :      :      :765544333
 91mV : 33344557      :      :      :      :      :      :      :      :      :75544333
 89mV : 33445567      :      :      :      :      :      :      :      :      :76554433
 87mV : 33445567      :      :      :      :      :      :      :      :      :76554433
 85mV : 3444567----+----+----+----+----+----+----+----+----+---7654443

```

[illegible]

```

27mV : : : : : : : : : : : : : :
25mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
23mV : : : : : : : : : : : : : : : :
21mV : : : : : : : : : : : : : : : :
19mV : : : : : : : : : : : : : : : :
17mV : : : : : : : : : : : : : : : :
15mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
13mV : : : : : : : : : : : : : : : :
11mV : : : : : : : : : : : : : : : :
9mV : : : : : : : : : : : : : : : :
7mV : : : : : : : : : : : : : : : :
5mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
3mV : : : : : : : : : : : : : : : :
1mV : : : : : : : : : : : : : : : :
-1mV : : : : : : : : : : : : : : : :
-3mV : : : : : : : : : : : : : : : :
-5mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
-7mV : : : : : : : : : : : : : : : :
-9mV : : : : : : : : : : : : : : : :
-11mV : : : : : : : : : : : : : : : :
-13mV : : : : : : : : : : : : : : : :
-15mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
-17mV : : : : : : : : : : : : : : : :
-19mV : : : : : : : : : : : : : : : :
-21mV : : : : : : : : : : : : : : : :
-23mV : : : : : : : : : : : : : : : :
-25mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
-27mV : : : : : : : : : : : : : : : :

```

```

-29mV : : : : : : : : : : : : : : :
-31mV : : : : : : : : : : : : : : :
-33mV : : : : : : : : : : : : : : :
-35mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
-37mV : : : : : : : : : : : : : : :
-39mV : : : : : : : : : : : : : : :
-41mV : : : : : : : : : : : : : : :
-43mV : : : : : : : : : : : : : : :
-45mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
-47mV : 7: : : : : : : : : : : : : : :7
-49mV : 66 : : : : : : : : : : : : : : 66
-51mV : 677 : : : : : : : : : : : : : : 776
-53mV : 67 : : : : : : : : : : : : : : 76
-55mV : 567---+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----765
-57mV : 567 : : : : : : : : : : : : : : 765
-59mV : 566 : : : : : : : : : : : : : : 665
-61mV : 5567 : : : : : : : : : : : : : : 7655
-63mV : 4566 : : : : : : : : : : : : : : 6654
-65mV : 45566-+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----66554
-67mV : 45566 : : : : : : : : : : : : : : 66554
-69mV : 445567: : : : : : : : : : : : : : :765544
-71mV : 445566: : : : : : : : : : : : : : :665544
-73mV : 444567: : : : : : : : : : : : : : :765444
-75mV : 4445567---+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----7655444
-77mV : 3445567 : : : : : : : : : : : : : : 7655443
-79mV : 3444566 : : : : : : : : : : : : : : 6654443
-81mV : 3444556 : : : : : : : : : : : : : : 6554443
-83mV : 33445566 : : : : : : : : : : : : : : 66554433

```

```

-85mV : 33444566---+----+----+----+----+----+----+----+----+----+----66544433
-87mV : 33344556 : : : : : : : : : : 65544333
-89mV : 33344556 : : : : : : : : : : 65544333
-91mV : 333344567 : : : : : : : : : : 765443333
-93mV : 3333445677 : : : : : : : : : : 7765443333
-95mV : 2333344567-+----+----+----+----+----+----+----+----+----+----7654433332
-97mV : 23333445667: : : : : : : : : : :76654433332
-99mV : 223334456777 7 : : : : : : : : : 7 777654433322
-101mV : 22333345567: : : : : : : : : : :76554333322
-103mV : 22333344567: 7 : : : : : : : : : 7 :76544333322
-105mV : 22233344556+7---+----+----+----+----+----+----+----+----7+65544333222
-107mV : 22233334556: 7 7: : : : : : : : :7 7 :65543333222
-109mV : 222233345566667 : : : : : : : : : : 766665543332222
-111mV : 222233344556667 :7 : : : : : : : 7: 766655443332222
-113mV : 2222233345566666: : : : : : : : : :6666655433322222
-115mV : 222223334455666767---+----+----+----+----+----+----767666554433322222
-117mV : 222222334455666677 : : : : : : 7766656554433222222
-119mV : 222222334445556667 67: : : : : : :76 766655544433222222
-121mV : 22222233444555666667:7 : : : : 7:76666555544433222222
-123mV : 1222222334455556666 777 : : : : 777 6666555544332222221
-125mV : 12222223344455556666+----+----+----+----+----+666655555444332222221
-127mV : 1122222333444555566667 : : : : 7666655555444332222211
-129mV : 111222223344444555566667 7 : : 7 76666555544444332222111
-131mV : 111222223334444455556677 77777:77777 776655555444443332222111
-133mV : 1111222233344444455556666:76 : 67:66665555544444433322221111
-135mV : 111122222333444444455566666767776766665655544444433322221111
-137mV : 111112222333334444445555666666766666655554444443333222211111
-139mV : 11111222223333344444455555666666666555554444443333222211111

```

-141mV : 111111222233333344444445555555555555555544444443333332222111111
-143mV : 111111222233333344444445555555555555555544444443333332222111111
-145mV : 111111122223333333444444444445555544444444444333333322221111111
-147mV : 11111112222233333333444444444444444444443333333222221111111
-149mV : 1111111122222333333333444444444444444444333333332222211111111
-151mV : 1111111122222223333333343444444444443433333332222222111111111
-153mV : 11111111122222223333333333333333333333322222221111111111
-155mV : 111111111122222222333333333333333333333222222211111111111
-157mV : 111111111112222222222333333333333333333222222221111111111
-159mV : 1111111111112222222222222333333333322222222222211111111111
-161mV : 1111111111111222222222222222222222222222222222111111111111
-163mV : 1111111111111122222222222222222222222222222222111111111111
-165mV : 1111111111111111222222222222222222222222222221111111111111
-167mV : 1111111111111111112222222222222222222222222111111111111111
-169mV : 111111111111111111111111211121111111111111111111111111111
-171mV : 11
-173mV : 11
-175mV : 11
-177mV : 11
-179mV : 11
-181mV : 11
-183mV : 11
-185mV : 11
-187mV : 11
-189mV : 11
-191mV : 11
: -|----|----|----|----|----|----|----|----|----|----|----|----|
UI/64 : -30 -25 -20 -15 -10 -5 0 5 10 15 20 25 30

To plot the ethernet serdes eye with specific lane number

- 1) `niccli -i 1 serdes --eye -e -l 0 -P`
- 2) `niccli -i 1 serdes --eye --ethernet --lane 0 --plot`

```
Warning: Link toggling is expected while executing serdes ethernet
command.
```

Plotting serdes ethernet eye. This may take several minutes ...

Each character N represents approximate error rate $1e^{-N}$ at that location

[illegible]

Broadcom NetXtreme - NICCLI Readme

[illegible]

```

95mV : 333344567--+-+---+---+---+---+---+---+---+---+---+---765443333
93mV : 33344557   :   :   :   :   :   :   :   :   :   :   :   75544333
91mV : 33344557   :   :   :   :   :   :   :   :   :   :   :   75544333
89mV : 33444567   :   :   :   :   :   :   :   :   :   :   :   76544433
87mV : 33445567   :   :   :   :   :   :   :   :   :   :   :   76554433
85mV : 3444556---+-+---+---+---+---+---+---+---+---+---6554443
83mV : 3444566    :   :   :   :   :   :   :   :   :   :   :   6654443
81mV : 4445567    :   :   :   :   :   :   :   :   :   :   :   7655444
79mV : 444566:    :   :   :   :   :   :   :   :   :   :   :   :665444
77mV : 445566:    :   :   :   :   :   :   :   :   :   :   :   :665544
75mV : 44556-+-+---+---+---+---+---+---+---+---+---+---65544
73mV : 45567 :    :   :   :   :   :   :   :   :   :   :   :   :76554
71mV : 455677:    :   :   :   :   :   :   :   :   :   :   :   :776554
69mV : 45567 :    :   :   :   :   :   :   :   :   :   :   :   :76554
67mV : 5566 :    :   :   :   :   :   :   :   :   :   :   :   :6655
65mV : 556777+-+---+---+---+---+---+---+---+---+---+---777655
63mV : 5667 :    :   :   :   :   :   :   :   :   :   :   :   :7665
61mV : 56 :    :   :   :   :   :   :   :   :   :   :   :   :65
59mV : 667 :    :   :   :   :   :   :   :   :   :   :   :   :766
57mV : 66 :    :   :   :   :   :   :   :   :   :   :   :   :66
55mV : 67---+-+---+---+---+---+---+---+---+---+---76
53mV : 6:    :   :   :   :   :   :   :   :   :   :   :   :6
51mV : 7:    :   :   :   :   :   :   :   :   :   :   :   :7
49mV : 6:    :   :   :   :   :   :   :   :   :   :   :   :6
47mV : 7:    :   :   :   :   :   :   :   :   :   :   :   :7
45mV : -+-+---+---+---+---+---+---+---+---+---+---+
43mV : :    :   :   :   :   :   :   :   :   :   :   :   :
41mV : :    :   :   :   :   :   :   :   :   :   :   :   :

```

```

39mV : : : : : : : : : : : : : :
37mV : : : : : : : : : : : : : :
35mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
33mV : : : : : : : : : : : : : :
31mV : : : : : : : : : : : : : :
29mV : : : : : : : : : : : : : :
27mV : : : : : : : : : : : : : :
25mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
23mV : : : : : : : : : : : : : :
21mV : : : : : : : : : : : : : :
19mV : : : : : : : : : : : : : :
17mV : : : : : : : : : : : : : :
15mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
13mV : : : : : : : : : : : : : :
11mV : : : : : : : : : : : : : :
9mV : : : : : : : : : : : : : :
7mV : : : : : : : : : : : : : :
5mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
3mV : : : : : : : : : : : : : :
1mV : : : : : : : : : : : : : :
-1mV : : : : : : : : : : : : : :
-3mV : : : : : : : : : : : : : :
-5mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
-7mV : : : : : : : : : : : : : :
-9mV : : : : : : : : : : : : : :
-11mV : : : : : : : : : : : : : :
-13mV : : : : : : : : : : : : : :
-15mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+

```

```

-17mV : : : : : : : : : : : : : :
-19mV : : : : : : : : : : : : : :
-21mV : : : : : : : : : : : : : :
-23mV : : : : : : : : : : : : : :
-25mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
-27mV : : : : : : : : : : : : : :
-29mV : : : : : : : : : : : : : :
-31mV : : : : : : : : : : : : : :
-33mV : : : : : : : : : : : : : :
-35mV : -+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+
-37mV : : : : : : : : : : : : : :
-39mV : 7: : : : : : : : : : : : : :7
-41mV : : : : : : : : : : : : : :
-43mV : : : : : : : : : : : : : :
-45mV : 77-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----77
-47mV : : : : : : : : : : : : : :
-49mV : 66 : : : : : : : : : : : : : 66
-51mV : 67 : : : : : : : : : : : : : 76
-53mV : 677 : : : : : : : : : : : : : 776
-55mV : 66-----+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----66
-57mV : 566 : : : : : : : : : : : : : 665
-59mV : 5577 : : : : : : : : : : : : : 7755
-61mV : 5567 : : : : : : : : : : : : : 7655
-63mV : 55677 : : : : : : : : : : : : : 77655
-65mV : 55567-+-----+-----+-----+-----+-----+-----+-----+-----+-----+-----76555
-67mV : 4556 : : : : : : : : : : : : : 6554
-69mV : 455566: : : : : : : : : : : : :66554
-71mV : 445566: : : : : : : : : : : : :665544

```

-73mV	:	4455667	:	:	:	:	:	:	:	:	:	766544
-75mV	:	444566+	----	+----	+----	+----	+----	+----	+----	+----	+----	665444
-77mV	:	444556:	:	:	:	:	:	:	:	:	:	:655444
-79mV	:	3444566	:	:	:	:	:	:	:	:	:	6654443
-81mV	:	3444557	:	:	:	:	:	:	:	:	:	7554443
-83mV	:	33445567	:	:	:	:	:	:	:	:	:	76554433
-85mV	:	33445567	----	+----	+----	+----	+----	+----	+----	+----	+----	76554433
-87mV	:	33344556	:	:	:	:	:	:	:	:	:	65544333
-89mV	:	333444567	:	:	:	:	:	:	:	:	:	765444333
-91mV	:	333344567	:	:	:	:	:	:	:	:	:	765443333
-93mV	:	3333445567	:	:	:	:	:	:	:	:	:	7655443333
-95mV	:	3333445567	+	----	+----	+----	+----	+----	+----	+----	+----	7655443333
-97mV	:	2333344577	:	:	:	:	:	:	:	:	:	7754433332
-99mV	:	23333445667:	:	:	:	:	:	:	:	:	:	:76654433332
-101mV	:	22333345667:7	:	:	:	:	:	:	:	:	:	7:76654333322
-103mV	:	22333344567:7	:	:	:	:	:	:	:	:	:	7:76544333322
-105mV	:	22233344556+6	----	+----	+----	+----	+----	+----	+----	+----	+----	6+65544333222
-107mV	:	2223334455676	:	:	:	:	:	:	:	:	:	6765544333222
-109mV	:	2222333445567	:	:	:	:	:	:	:	:	:	7655443332222
-111mV	:	2222333445567	:	7	:	:	:	:	:	7	:	7655443332222
-113mV	:	22223334455666	7:7	7	:	:	:	:	:	7	7:7	66655443332222
-115mV	:	2222233344565677777	--	+7	----	+----	+----	+----	+7	--	77777	765654433322222
-117mV	:	222222334455566	6777	:	:	:	:	:	:	7776	665554433222222	
-119mV	:	2222223344455666676	7:	:	:	:	:	:	:	7	6766665544433222222	
-121mV	:	222222334445556667676:	:	:	:	:	:	:	:	6767666655544433222222		
-123mV	:	222222233445555566677:	7	:	:	:	:	:	7	:	7766665555544332222222	
-125mV	:	12222223344455555666677	-77	+	----	+----	+77	-77	6666655555444332222221			
-127mV	:	112222233344445555566676	7	:	:	:	:	7	67666655555444333222221			

-129mV : 1122222333444455555556676 : 7 : 67665555554444333222211
-131mV : 11122222333444455555566666:77 : 77:666665555544443332222111
-133mV : 111122223334444455555666667 777:777 766666555554444433322221111
-135mV : 1111222223334444454555556666-77+77-6666555554544444333222221111
-137mV : 111112222333344444445555566676777676665555544444443333222211111
-139mV : 111112222233334444444555556666666666655555444444433332222211111
-141mV : 111111222233333344444455555565666565555554444443333332222111111
-143mV : 1111112222233333344444445555555555555444444433333322222111111
-145mV : 11111112222233333333444444455555555544444443333333222221111111
-147mV : 111111122222333333333344444445445445444444433333333222221111111
-149mV : 11111111222222333333333434444444444444443433333332222211111111
-151mV : 1111111122222233333333333344444444444333333333332222211111111
-153mV : 1111111112222222333333333344444444433333333332222222111111111
-155mV : 1111111112222222222333333333333333333332222222222111111111
-157mV : 11111111112222222222333333333333333333332222222221111111111
-159mV : 1111111111122222222222223333333333222222222222221111111111
-161mV : 11111111111122222222222222332232233222222222222211111111111
-163mV : 11111111111112222222222222222222222222222222222111111111111
-165mV : 11111111111111222222222222222222222222222222222111111111111
-167mV : 1111111111111111122222222222222222222222111111111111111111
-169mV : 1111111111111111111112221222122211111111111111111111111111
-171mV : 11
-173mV : 11
-175mV : 11
-177mV : 11
-179mV : 11
-181mV : 11
-183mV : 11

- 1) niccli -i 1 serdes --eye --pci --lane 0
- 2) niccli -i 1 serdes --eye -p -l 0

```
Result for PCI Lane 0      : Passed
Horizontal Eye Left       : 24/64 UI
Horizontal Eye Right      : 24/64 UI
Vertical Eye Top          : 391 (425 mV)
Vertical Eye Bottom       : 383 (417 mV)
```

```
Rx Settings:
iskew_signed           : 0
qskew_signed           : 0
irphase_signed         : -1
dlev00_signed          : -413
dlev01_signed          : 462
dlev10_signed          : -439
dlev11_signed          : 432
hlne                   : 18
hlno                   : 24
hlpe                   : -7
hlpo                   : -3
h2                     : -1
h3                     : 0
h4                     : 1
h5                     : 0
h6                     : 0
h7                     : 0
h8                     : 0
h9                     : 0
aeq                    : 240
vga                    : 53
appmd                  : 5
shd                    : 94
```

To plot the PCI serdes eye with specific lane number

- 1) `niccli -i 1 serdes --eye --pci --lane 0 --plot`
- 2) `niccli -i 1 serdes --eye -p -l 0 -P`

Retrieving Eye Scope data from hardware. Please wait several minutes...

100% completed

Plotting serdes pci eye diagram...

[illegible]

```

-44mV : 122334577 : : : : : : : : : 66443322
-65mV : 122224466 : : : : : : : : : 8856342222
-87mV : 12222335588: : : : : : : : : 7755332212
-109mV : 11222334577+----+----+----+----+----+----+----+----+6644232211
-131mV : 11222233466: : : : : : : : : 885534222211
-153mV : 1112222335588 : : : : : : : : : 774533221211
-175mV : 111122223446688 : : : : : : : : : 88564423221111
-197mV : 111122222335577 : : : : : : : : : 77453322121111
-218mV : 11111122233446688----+----+----+----+----+----+8856442322111111
-240mV : 11111122222335577 : : : : : : : : : 7745332222111111
-262mV : 1111111122223445688 : : : : : : : : : 885634232212111111
-284mV : 111111112222233446688: : : : : : : : : 88664433221211111111
-306mV : 11111111112222233456788 : : : : : : : : : 66453322221111111111
-328mV : 11111111111122222334566---+----+----+---886645332222111111111111
-350mV : 111111111111112222233446688 : 7766453323221211111111111111
-372mV : 111111111111111122222333556664322222111111111111111111111111
-393mV : 111111111111111111112222222221111111111111111111111111111111
-415mV : 111111111111111111111111111111111111111111111111111111111111
-437mV : 111111111111111111111111111111111111111111111111111111111111
-459mV : 111111111111111111111111111111111111111111111111111111111111

:
-|----|----|----|----|----|----|----|----|----|----|----|
UI/64 : -30 -25 -20 -15 -10 -5 0 5 10 15 20 25 30

Extrapolating BER at 1e-12...
=====
Extrapolation BER at 1e-12 is completed

```

<Test Result>:

Eye height and width margins are > 0.2UI and 15mV, test PASSED.

<Margins>:

Eye width margin at 1e-12 is 0.688129 UI
Eye height margin at 1e-12 is 677.184692 mV

To plot the PCI serdes eye with specific lane number and target BER

- 1) `niccli -i 1 serdes --eye --pci --lane 0 --plot --target_ber 1e-8`
- 2) `niccli -i 1 serdes --eye -p -l 0 -P -t 1e-8`

Retrieving Eye Scope data from hardware. Please wait several minutes...

100% completed

Plotting serdes pci eye diagram...

Each character N represents approximate error rate $1e-N$ at that location

[illegible]

```

-44mV : 122334577 : : : : : : : : : : 77443322
-65mV : 122234466 : : : : : : : : : : 8866342222
-87mV : 12222335588: : : : : : : : : : 7755332212
-109mV : 11222334577+----+----+----+----+----+----+----+----+6644232211
-131mV : 1122223446688 : : : : : : : : 885534222211
-153mV : 1112222335577 : : : : : : : : 664433221211
-175mV : 1111222334466 : : : : : : : : 88564423221111
-197mV : 111122222345588 : : : : : : : : 77453322121111
-218mV : 111111222334466-+----+----+----+----+----+----+----+8856442322121111
-240mV : 11111122222335577 : : : : : : : 7745332222111111
-262mV : 1111111222223446688 : : : : : : 885634232211111111
-284mV : 111111112222233446688: : : : : : 664433221211111111
-306mV : 11111111122222334566: : : : : : 66443322221111111111
-328mV : 1111111111122222334566---+----+----+---886645332222111111111111
-350mV : 11111111111112222233446688 : 7766443323221211111111111111
-372mV : 11111111111111122222233455663322212111111111111111111111
-393mV : 11111111111111111222222222111111111111111111111111111111
-415mV : 11111111111111111111111111111111111111111111111111111111
-437mV : 11111111111111111111111111111111111111111111111111111111
-459mV : 11111111111111111111111111111111111111111111111111111111
      : -|----|----|----|----|----|----|----|----|----|----|----|
UI/64 : -30 -25 -20 -15 -10 -5 0 5 10 15 20 25 30

```

Extrapolating BER at 1e-12...

=====

Extrapolation BER at 1e-12 is completed

<Test Result>:

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Eye height and width margins are > 0.2UI and 15mV, test PASSED.

<Margins>:

Eye width margin at 1e-12 is 0.687464 UI

Eye height margin at 1e-12 is 670.539307 mV

To stop the PCI serdes eye test

- 1) niccli -i 1 serdes --eye --pci --stop
- 2) niccli -i 1 serdes --eye -p -s

Stopping serdes pci eye scope test...

cable Command

=====

DESCRIPTION :

Query/Decode Module EEPROM information and optical diagnostics.

This command is supported on Linux, Windows, FreeBSD and VMWare operating systems.

SYNTAX :

```
cable -m|--module_info --show
cable -r|--read_module_eeprom [-p|--page_number <page number> -o|--offset <byte offset>
    -l|--length <number of bytes> -b|--bank <bank number> -i|--i2c_address <i2c addr>]
cable -w|--write_module_eeprom -p|--page_number <page number> -o|--offset <byte offset>
    -v|--value <bytes>
cable -M|--module_loopback -t|--loopback_type <type> [--lane <module_lane_number>]
```

OPTIONS:

-m --module_info	: Get the module information
-r --read_module_eeprom	: Read the module EEPROM in hex format
-w --write_module_eeprom	: Write the bytes into the module EEPROM
-i --i2c_address	: I2C address of a page. Value less than 0x7f expected Most of the EEPROMs use 0x50 or 0x51
-p --page_number	: The page number that is being accessed over I2C
-l --length	: Length of EEPROM data to read or write
-o --offset	: Offset within the page that is being accessed over I2C
-b --bank	: The bank number of the page that is being accessed over I2C
-v --value	: Bytes to write into module EEPROM
-M --module_loopback	: This option is used to perform the various module loopback. This operation is supported only on CMIS 4.0 and above supported modules.
-t --loopback_type	: This option is used to ran the module loopback on the specified loopback type.

The supported module loopback types are as below:

- 1 - Media Side Output Loopback
- 2 - Media Side Input Loopback
- 3 - Host Side Output Loopback
- 4 - Host Side Input Loopback

--lane : This is an optional parameter. If user specify this option with a valid lane number, then the module loopback will be run on the specified lane.

--show : Displays the information in detail.

EXAMPLES:

To show the module information

- 1) `niccli -i 1 cable -m --show`
- 2) `niccli -i 1 cable --module_info --show`

```

Identifier                : 0x11   (QSFP28)
Extended identifier       : 0x00
Extended identifier description : 1.5W max. Power
                               consumption
Extended identifier description : No CDR in TX, No
                               CDR in RX
Extended identifier description : High Power Class
                               (> 3.5 W) not enabled
Power set                 : Off
Power override            : Off
Connector                 : 0x23   (No separable
                               connector)
Transceiver codes         : 0x88 0x00 0x00 0x00
                               0x00 0x00 0x00 0x00
Transceiver type          : 40G Ethernet: 40G
                               Base-CR4
Transceiver type          : 50GBASE-CR,
                               100GBASE-CR2, or
                               200GBASE-CR4
Encoding                  : 0x08   (PAM4)
BR, Nominal                : 25500Mbps
Rate Identifier            : 0x00
Length (SMF, km)          : 0km
Length (OM3 50um)         : 0m
Length (OM2 50um)         : 0m
Length (OM1 62.5um)       : 0m
Length (Copper or Active cable) : 3m

```

```

Transmitter technology           : 0xf0 (Copper cable,
                                   linear active
                                   equalizers)
Attenuation at 2.5GHz           : 5db
Attenuation at 5.0GHz           : 7db
Attenuation at 7.0GHz           : 9db
Attenuation at 12.9GHz          : 14db
Vendor name                     : FS
Vendor OUI                     : 64:9d:99
Vendor PN                      : QSFP-200G-AC03
Vendor rev                     : A
Vendor SN                      : C2501289981-1
Date code                      : 250208
Revision Compliance             : Unallocated
Module temperature              : 0.00 degrees C /
                                   32.00 degrees F
Module voltage                  : 0.0000 V

```

To Read the module eeprom

- 1) `niccli -i 1 cable -r -p 0 -o 0 -l 128 -b 0 -i 0x50`
- 2) `niccli -i 1 cable --read_module_eeprom --page_number 0 --offset 0 --length 128 --bank 0 --i2c_address 0x50`

Offset	Values
-----	-----
0x0000:	11 08 06 00 00 00 00 00 00 00 00 00 00 00 00 00
0x0010:	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0x0020:	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0x0030:	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0x0040:	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0x0050:	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
0x0060:	00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 08
0x0070:	00 10 00 00 00 00 00 00 00 00 00 00 00 00 00 00

To Write to module eeprom

- 1) `niccli -i 1 cable -w -p 0 -o 0 -v 20`

- 2) `niccli -i 1 cable --write_module_eeprom --page_number 0 --offset 0 --value 20`

`Module eeprom write succeeded.`

To run the 'Media Side Output Loopback'

- 1) `niccli -i 1 cable -M -t 1 -l 0`
- 2) `niccli -i 1 cable --module_loopback --loopback_type 1 --lane 1`

`"Media Side OutPut" loopback enabled successfully.`

To run the 'Media Side Input Loopback'

- 1) `niccli -i 1 cable -M -t 2 -l 0`
- 2) `niccli -i 1 cable --module_loopback --loopback_type 2 --lane 1`

`"Media Side InPut" loopback enabled successfully.`

To run the 'Host Side Output Loopback'

- 1) `niccli -i 1 cable -M -t 3 -l 0`
- 2) `niccli -i 1 cable --module_loopback --loopback_type 3 --lane 1`

`"Host Side OutPut" loopback enabled successfully.`

To run the 'Host Side Input Loopback'

- 1) `niccli -i 1 cable -M -t 4 -l 0`
- 2) `niccli -i 1 cable --module_loopback --loopback_type 4 --lane 0`

`"Host Side InPut" loopback enabled successfully.`

link Command

=====

DESCRIPTION :

This command is used to query the link status, BER information, physical counters and configure the port state.

This command is supported on Linux, Windows, FreeBSD and VMWare operating systems.

Note:

- 1) As a prerequisite, user has to run the `"linkdiag --fdrstat --start"` command to query the link BER and physical counters on BCM576xxx devices.
- 2) All the counters are accumulated since board reset.
- 3) RS corrected errors, RS uncorrectable errors, and CRC Error Frames can be cleared by using the command `"link --counters --clear"`.
- 4) Effective Physical Errors and Raw Physical Errors can be restarted by cleared by using command `"linkdiag --fdrstat --stop"` on BCM576xxx devices.

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- 5) RS corrected errors refers to corrected errors from FEC.
- 6) RS uncorrectable errors refers to uncorrectable errors from FEC.
- 7) CRC Error Frames refers to error frames from CRC.
- 8) Effective Physical Errors refers to uncorrectable codewords from FDR on BCM576xxx devices.
- 9) Effective Physical BER refers to BER based on Effective Physical Errors on BCM576xxx devices.
- 10) Raw Physical Errors refers to symbol errors from FDR on BCM576xxx devices.
- 11) Raw Physical BER refers to BER based on Raw Physical Errors on BCM576xxx devices.
- 12) Precoding enable/disable operation will toggle the link. At this time firmware does not service other commands that operate on the PHY. System logs may indicate command timeouts.
- 13) When port is connected to BMC, firmware doesn't honour the link toggle via port_state option.
- 14) BER information and physical counters are only supported on BCM576xxx devices.
- 15) In the FreeBSD operating system, the "link --counters --show" command does not support the fields "RS corrected errors" and "RS uncorrectable errors."

SYNTAX :

```
link -s|--status
link -c|--counters --show
link -p|--port_state <port state value>
link -S|--port_speed [--speed <value>] [--lanes <number_of_lanes>] -a|--autoneg <on/off>
    [--fec <value>] [-t|--training <on/off>]
link -P|--precoding <enable/disable>
```

OPTIONS :

```
-s|--status      : Shows the link status and related information
-c|--counters    : Show physical counters and BER Info
-p|--port_state  : Configures the portstate. The valid values are 0(Down), 1(UP) and
                  2(Toggle)
-p|--port_state  : Configures the portstate. The valid values are 0(Down), 1(UP) and 2(Toggle)
-S|--port_speed : Configures the port speed for the number of lanes, Link training, Autoneg
                  and FEC.
--speed          : Option to provide the speed value in MB.
--lanes          : Option to provide the number of lanes. The valid values are 1,2,4 and 8
-a|--autoneg     : Option to on/off the autoneg speed. The valid values are "on", "off"
-t|--training    : Option to on/off the link training. The valid values are "on", "off"
--fec            : This option is to configure the provided FEC type. The valid values are:
                  1 - Autoneg
                  2 - CL74 Fire Code
                  3 - CL91 Reed Solomon
                  4 - RS544 1xN
```

- 5 - RS544 2xN
- 6 - RS272 1xN
- 7 - RS272 2xN

-p|--precoding : This option is used to forward transformation of data that helps mitigate channel-induced signal distortion. The valid values are "enable" and "disable"

EXAMPLES :

To get the link information

- 1) `niccli -i 1 link -s`
- 2) `niccli -i 1 link --status`

```
Physical link state           : Link Down
Supported link modes         : 25Gb 50Gb 100Gb 50Gb-PAM4-56
                              100Gb-PAM4-56 200Gb-PAM4-56
                              100Gb-PAM4-112 200Gb-PAM4-112
                              400Gb-PAM4-112
Current link speed           : Unknown
Duplex State                  : Half duplex
Auto Negotiation              : on
Active FEC Signal Mode        : NRZ Signaling
Loopback                      : None
Active Lanes                  : 0 (Link Down)
FEC Supported                  : Yes
Module Status                 : Transceiver module not
inserted
Preemphasis                   : 0
PHY Type                      : Unknown
Media Type                    : Unknown
Transceiver                   : Internal
Rx Lane Polarity              : 1:0:0:1:1:0:0:1
Tx Lane Polarity              : 0:0:0:1:0:1:0:1
Rx Lane Map to connector      : 3:2:0:1:4:5:7:6
Tx Lane Map to connector      : 3:1:0:2:7:6:5:4
```

To get the physical counters and BER information

- 1) `niccli -i 1 link -c --show`
- 2) `niccli -i 1 link --counters --show`

```
RS corrected errors          : 10403
RS uncorrectable errors      : 90
CRC Error Frames             : 0
Effective Physical Errors     : 0
```

```
Effective Physical BER           : 0
Raw Physical Errors              : 0
Raw Physical BER (Accumulated)  : 0
```

To configure the port state to down

- 1) `niccli -i 1 link -p 0`
- 2) `niccli -i 1 link --port_state 0`

```
Configuring port state (Down) ....
Port state configured successfully.
```

To configure the port state to up

- 1) `niccli -i 1 link -p 1`
- 2) `niccli -i 1 link --port_state 1`

```
Configuring port state (Up) ....
Port state configured successfully.
```

To toggle the port state

- 1) `niccli -i 1 link -p 2`
- 2) `niccli -i 1 link --port_state 2`

```
Toggling port state ....
Port state configured successfully.
```

To set the port link speed to autoneg

- 1) `niccli -i 1 link --port_speed --autoneg on`

```
Port speed configured successfully.
```

To set the port link speed to 100G on 4 lanes and associated params

- 1) `niccli -i 1 link --port_speed --autoneg off --speed 100000 --lanes 4 --fec 3 --training on`

```
Port speed configured successfully.
```

To enable the precoding

- 1) `niccli -i 1 link --precoding enable`

Note: Precoding enable/disable operation will toggle the link. At this time firmware does not service

other commands that operate on the PHY. System logs may indicate command timeouts.

Precoding enabled successfully.

timesync Command

=====

DESCRIPTION :

Timesync operations

Timesync command provides the user to:

- To set duty cycle on TSIO outgoing signal.
- To set the DLL source for PHC.
- Set PTP extended parameters operation. All the parameters are optional.
- Configure and display the synchronous ethernet frequency profile, primary and secondary clock state.
- TSIO operations for the requested PF/VF

This command is supported on Linux, Windows, FreeBSD and VMWare operating systems.

SYNTAX :

```
timesync < -d | --duty-cycle> <--period> <value> --up <value>
```

```
timesync <--dll> <-s | --source> <value> <-q | --frequency> <value>
```

```
timesync <--ptp> --show
```

```
timesync <--ptp> --set <-p | --primary_pf> <pid> [<-v | --primary_vf> <vfid>]
    [<-P | --secondary_pf> <pfid>] [<-V | --secondary_vf> <vfid>]
```

```
timesync <--synce> --show
```

```
timesync <--synce> --set <-Q | --frequency_profile> <value> [<-c | --primary_clock_state>
    <value>] [<-C | --secondary_clock_state> <value>]
```

```
timesync <--tsio> --show
```

```
timesync <--tsio> <-t | --tsio_function_pin> <idx> <-u | --pin_usage_string> <value>
    <--state> <value>
```

OPTIONS :

-d|--duty-cycle : To set duty cycle on TSIO outgoing signal.
 --period : value for period will be treated as in nanoseconds.
 --up : Up flag is used to set the duty cycle and should be less than the period value.

--dll : To set the DLL source for PHC.
 -s | --source : The valid values range from 0 to 4.
 -q | --frequency : The valid values range from 0 to 3
 -p | --ptp : PTP extended parameters operation.
 --show : Displays timesync operation.
 --set : Configures timesync operation.
 -p | --primary_pf : Primary physical function ID.

- v | --primary_vf : Primary virtual function ID belongs to primary PF ID.
- P | --secondary_pf : Secondary physical function ID.
- V | --secondary_vf : secondary virtual function ID belongs to secondary PF ID.

- syncce : Configure and display the synchronous ethernet frequency profile.
primary and secondary clock state. This command is supported only on
BCM9575xxx devices.

- Q | --frequency_profile : Frequency profile for SyncE recovered clock. Supported profiles are
"25MHz"
- c | --primary_clock_state : Enable or disable primary clock for PF or port, overriding previous
primary clock setting.

- C | --secondary_clock_state : Enable or disable secondary clock for PF or port, overriding
previous secondary clock setting.

- tsio : Displays or Configures tsio function capability on the pin

- t | --tsio_function_pin : Pin Index. Valid Index 0 to 3
- u | --pin_usage_string : Pin usage string.
- state : Enable/Disable function capability on the pin

EXAMPLES :

Setting duty cycle on TSIO outgoing signal

- 1) niccli -i 1 timesync -d --period 1 --up 0
- 2) niccli -i 1 timesync --dutycycle --period 1 --up 0

Command Executed Successfully

To configure the DLL source for PHC

- 1) niccli -i 1 timesync --dll -s 1 -q 3
- 2) niccli -i 1 timesync --dll --source 1 --frequency 3

Command Executed Successfully

To perform PTP extended parameters operation

- 1) niccli -i 1 timesync --syncce --show

```

Frequency Profile           : 25MHz
Primary clock state        : Enabled
Secondary clock state      : Enabled

```

- 2) niccli -i 1 timesync --syncce --set -Q 25MHz

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3) `niccli -i 1 timesync --synce --set --frequency_profile 25MHz`

Command Executed Successfully

To perform TSIO function capability on the pin

1) `niccli -i 1 timesync --tsio --show`

TSIO						

	PIN		STATE		USAGE	

	0		Disable		NONE	
	1		Disable		NONE	
	2		Disable		NONE	
	3		Disable		NONE	

2) `niccli -i 1 timesync --tsio -t 3 -u 1 --state 1`

3) `niccli -i 1 timesync --tsio --tsio_function_pin 3 --pin_usage_string 1 --state 1`

TSIO pin configured successfully.

TSIO						

	PIN		STATE		USAGE	

	0		Disable		NONE	
	1		Disable		NONE	
	2		Disable		NONE	
	3		Enable		NONE	

To perform PTP extended parameters operation.

1) `niccli -i 1 timesync --ptp --show`

PTP Extended Parameters Information:

```

PHC master function           : Not Available
PHC secondary function        : Not Available
Last non primary/secondary function : Not Available
Second Last non primary/secondary function : Not Available
Failover Timestamp            : Not Available
Failed over from master function : Not Available
Failed over to secondary function : Not Available

```

2) `niccli -i 1 timesync --ptp --set -p 1 -v 1`

3) `niccli -i 1 timesync --ptp --set --primary_pf 1 --secondary_pf 1`

PTP Extended parameters set succeed

counters Command

=====

DESCRIPTION :

This command is used to display the L2/RoCE, Port, PCIe counters and clear the port counters. This command is supported only on Linux, Windows, FreeBSD and VMWare operating systems.

SYNTAX :

```

counters -p | --pcie [-V]
counters -c | --clear
counters -P | --port [--dir <rx/tx>]
counters -r | --roce
counters --l2

```

OPTIONS :

```

-p | --pcie    : Display Pcie Counters.
-c | --clear    : Clear the port counters
-V             : Display the detailed information of the PCIe Counters.
-P | --port     : This option is used to get the port statistics. By default Tx statistics will be
                  collected.
-r | --roce     : This option is used to get the RoCE statistics.
--dir          : This is an optional parameter. This option is used to collect the port stats for
                  Rx/Tx direction.
--l2           : This option is used to get the L2 statistics.

```

EXAMPLES :

To display the PCIe port counters

1) `niccli -i 1 counters -p`

2) `niccli -i 1 counters --pcie`

Thor2 (BCM9576xxxx):

```

-----
PCIe Counters :
-----

```

```

Physical Layer Receiver Errors           : 0
DLLP CRC Errors                         : 0
TLP LCRC Sequence Number Errors         : 0
No of times LTSSM Entered Recovery State : 5
No of TLP Bytes Transmitted              : 0
No of TLP Bytes Received                 : 0
No of DLLP Bytes Transmitted             :
185900667560
No of DLLP Bytes Received                 :
254654814856
Equalization Time                        :
3098482337543421952
LTSSM Histogram (Low 8 Bytes)            :
0X120217227202122
LTSSM Histogram (High 8 Bytes)           :
0X2021220124252627
Recovery Histogram                       :
0XFFFFFFF580000000FF
No of posted packets sent to the PCI-e    :
1817066
No of non-posted packets sent to the PCI-e : 819
No of other packets sent to the PCI-e     : 34
No of blocked packets sent to the PCI-e   : 0
No of completion packets sent to the PCI-e : 629905
Longest read completion time (in micro secs) : 1
Shortest read completion time (in micro secs) : 0
Latest read completion time (Low 8 Bytes in micro secs) :
4294967297
Latest read completion time (High 8 Bytes in micro secs) :
4294967297
Longest read completion header for tag0 (Low 8 Bytes) :
0X000000009C705003
Longest read completion header for tag0 (High 8 Bytes) :
0X0000000000200601
Longest read completion header for tag1 (Low 8 Bytes) :
0X000000009C705003
Longest read completion header for tag1 (High 8 Bytes) :
0X0000000000200601

```

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```

Longest read completion header for tag2(Low 8 Bytes)      :
0X000000009C705003
Longest read completion header for tag2(High 8 Bytes)     :
2098689
Longest read completion header for tag3(Low 8 Bytes)      :
0X000000009C705003
Longest read completion header for tag3(High 8 Bytes)     :
0X0000000000200601
Shortest read completion header for tag0(Low 8 Bytes)     :
0X000000009AD79003
Shortest read completion header for tag0(High 8 Bytes)    :
0X0000000000A00601
Shortest read completion header for tag1(Low 8 Bytes)     :
0X000000009AD79003
Shortest read completion header for tag1(High 8 Bytes)    :
0X0000000000A00601
Shortest read completion header for tag2(Low 8 Bytes)     :
0X000000009AD79003
Shortest read completion header for tag2(High 8 Bytes)    :
0X0000000000A00601
Shortest read completion header for tag3(Low 8 Bytes)     :
0X000000009AD79003
Shortest read completion header for tag3(High 8 Bytes)    :
0X0000000000A00601
Latest read completion header for tag0(Low 8 Bytes)       :
0X0000000019E60000
Latest read completion header for tag0(High 8 Bytes)      :
0X0000000000200601
Latest read completion header for tag1(Low 8 Bytes)       :
0X000000008C813001
Latest read completion header for tag1(High 8 Bytes)      :
0X0000000000200600
Latest read completion header for tag2(Low 8 Bytes)       :
0X00000000D4AB1002
Latest read completion header for tag2(High 8 Bytes)      :
0X0000000000200600
Latest read completion header for tag3(Low 8 Bytes)       :
0X000000009C705003
Latest read completion header for tag3(High 8 Bytes)      :
0X0000000000200601
TL credit nph histogram counter for bucket0              : 0
TL credit nph histogram counter for bucket1              : 0
TL credit nph histogram counter for bucket2              : 0
TL credit nph histogram counter for bucket3              : 0
TL credit nph histogram counter for bucket4              : 0

```

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```

TL credit npb histogram counter for bucket5           : 0
TL credit npb histogram counter for bucket6           : 0
TL credit npb histogram counter for bucket7           :
4233784482
TL credit ph histogram counter for bucket0            : 0
TL credit ph histogram counter for bucket1            : 0
TL credit ph histogram counter for bucket2            : 0
TL credit ph histogram counter for bucket3            : 0
TL credit ph histogram counter for bucket4            : 0
TL credit ph histogram counter for bucket5            : 0
TL credit ph histogram counter for bucket6            : 0
TL credit ph histogram counter for bucket7            :
4233784482
TL credit pd histogram counter for bucket0            : 0
TL credit pd histogram counter for bucket1            : 0
TL credit pd histogram counter for bucket2            : 0
TL credit pd histogram counter for bucket3            : 0
TL credit pd histogram counter for bucket4            : 0
TL credit pd histogram counter for bucket5            : 0
TL credit pd histogram counter for bucket6            : 0
TL credit pd histogram counter for bucket7            :
4233784482
Write latency histogram data counter for bucket0      : 0
Write latency histogram data counter for bucket1      : 0
Write latency histogram data counter for bucket2      : 0
Write latency histogram data counter for bucket3      : 0
Write latency histogram data counter for bucket4      : 0
Write latency histogram data counter for bucket5      : 0
Write latency histogram data counter for bucket6      : 0
Write latency histogram data counter for bucket7      : 0
Write latency histogram minimum data value           : 65535
Write latency histogram maximum data value           : 0
Write latency histogram event counter value          : 0
Write latency histogram accumulator value            : 0
Write latency all normal count value                 :
1817066
Read latency histogram data counter for bucket0      : 0
Read latency histogram data counter for bucket1      : 0
Read latency histogram data counter for bucket2      : 0
Read latency histogram data counter for bucket3      : 0
Read latency histogram data counter for bucket4      : 0
Read latency histogram data counter for bucket5      : 0
Read latency histogram data counter for bucket6      : 0
Read latency histogram data counter for bucket7      : 0
Read latency histogram minimum data value           : 65535

```

```

Read latency histogram maximum data value      : 0
Read latency histogram event counter value     : 0
Read latency histogram accumulator value       : 0
Read latency all normal count value            : 819

```

Thor (BCM9575xxx) and Whitney+ (BCM9574xxx):

```

-----
PCIe Counters :
-----

Physical Layer Receiver Errors      : 0
DLLP CRC Errors                    : 0
TLP LCRC Sequence Number Errors    : 0
No of times LTSSM Entered Recovery State : 4
No of TLP Bytes Transmitted         : 0
No of TLP Bytes Received            : 0
No of DLLP Bytes Transmitted        : 1680
No of DLLP Bytes Received           : 1200
Equalization Time                   : 282043720575156240
LTSSM Histogram (Low 8 Bytes)       : 0X120212327202122
LTSSM Histogram (High 8 Bytes)     : 0X2021220124252627
Recovery Histogram                  : 0XFFFFFF58000000FF

```

To clear the port counters

- 1) niccli -i 1 counters -c
- 2) niccli -i 1 counters --clear

```

Clearing port counters...
Port counters cleared successfully.

```

To display the port counters

- 1) niccli -i 1 counters --port --dir rx

```

Link down events      : 0
Resume pause events   : 0
Continuous pause events : 0
Continuous roce pause events : 0

```

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```

Resume roce pause events           : 0
Rx Bytes cos0                      : 0
Rx Bytes cos1                      : 0
Rx Bytes cos2                      : 0
Rx Bytes cos3                      : 0
Rx Bytes cos4                      : 0
Rx Bytes cos5                      : 0
Rx Bytes cos6                      : 0
Rx Bytes cos7                      : 0
Rx packets cos0                    : 0
Rx packets cos1                    : 0
Rx packets cos2                    : 0
Rx packets cos3                    : 0
Rx packets cos4                    : 0
Rx packets cos5                    : 0
Rx packets cos6                    : 0
Rx packets cos7                    : 0
Rx pfc pri0 duration               : 0
Rx pfc pri0 transitions            : 0
Rx pfc pri1 duration               : 0
Rx pfc pri1 transitions            : 0
Rx pfc pri2 duration               : 0
Rx pfc pri2 transitions            : 0
Rx pfc pri3 duration               : 0
Rx pfc pri3 transitions            : 0
Rx pfc pri4 duration               : 0
Rx pfc pri4 transitions            : 0
Rx pfc pri5 duration               : 0
Rx pfc pri5 transitions            : 0
Rx pfc pri6 duration               : 0
Rx pfc pri6 transitions            : 0
Rx pfc pri7 duration               : 0
Rx pfc pri7 transitions            : 0
Total number of received bits      : 0
Rx buffer passed threshold         : 0
Uncorrected symbol errors post-FEC : 0
Corrected bit active FEC           : 0
Rx discards byte cos0              : 0
Rx discards byte cos1              : 0
Rx discards byte cos2              : 0
Rx discards byte cos3              : 0
Rx discards byte cos4              : 0
Rx discards byte cos5              : 0
Rx discards byte cos6              : 0
Rx discards byte cos7              : 0

```

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```

Rx discards packets cos0           : 0
Rx discards packets cos1           : 0
Rx discards packets cos2           : 0
Rx discards packets cos3           : 0
Rx discards packets cos4           : 0
Rx discards packets cos5           : 0
Rx discards packets cos6           : 0
Rx discards packets cos7           : 0
FEC corrected blocks                : 0
FEC uncorrectable blocks            : 0
Rx filter miss                      : 0
FEC symbol errors                   : 0
Rx shared pool memory (KiB)         : 3477.50
Rx total memory available (KiB)     : 4096.00
Cell size (bytes)                   : 128
Rx PFC Enabled COS0                 : 1
Rx RoCE Optimized COS0              : 1
Rx Reserved memory COS0 (KiB)       : 36.62
Rx Reserved memory COS4 (KiB)       : 18.38
Rx Reserved memory COS5 (KiB)       : 36.62
Rx Shared memory COS0 (KiB)         : 248.12
Rx Shared memory COS4 (KiB)         : 244.25
Rx Shared memory COS5 (KiB)         : 488.38
Rx Shared Combined memory COS0 (KiB) : 3609.62
Rx Shared Combined memory COS4 (KiB) : 3495.88
Rx Shared Combined memory COS5 (KiB) : 3514.12
Rx Headroom memory COS0 (KiB)       : 95.50
Rx Headroom memory COS4 (KiB)       : 0.00
Rx Headroom memory COS5 (KiB)       : 0.00
Rx Headroom Combined memory COS0 (KiB) : 95.50
Rx Headroom Combined memory COS4 (KiB) : 0.00
Rx Headroom Combined memory COS5 (KiB) : 0.00
Rx In-Use Memory COS0 (KiB)         : 8.00
Rx In-Use Memory COS4 (KiB)         : 8.00
Rx In-Use Memory COS5 (KiB)         : 8.00

```

To display the RoCE counters

1) niccli -i 1 counters --roce

```

Timeouts in retransmission          : 0
Sequence errors naks rcvd           : 0
Max retry exceeded                   : 0
Number of rnr naks rcvd             : 0
Missing response packets             : 0

```

```

Unrecoverable error                : 0
Bad response error                  : 0
local qp operational error          : 0
local protection error              : 0
Memory mgmt operational error       : 0
Remote invalid request error        : 0
Remote access error                 : 0
Remote operational error            : 0
duplicate request                   : 0
Resource exceed max                  : 0
Resource length mismatch            : 0
Resource exceeds wqe                : 0
Resource opcode error               : 0
Resource rx invalid rkey            : 0
Resource rx domain error            : 0
Resource rx no permission           : 0
Resource rx range error             : 0
Resource tx invalid rkey            : 0
Resource tx domain error            : 0
Resource tx no permission           : 0
Resource tx range error             : 0
Resource irrq overflow              : 0
Resource unsupported opcode         : 0
Resource unaligned atomic           : 0
Resource remote invalidate error     : 0
Resource memory error               : 0
Resource srq error                  : 0
Resource completion error           : 0
Resource invalid duplicate rkey      : 0
Resource wqe format error           : 0
Resource cq load error              : 0
Resource srq load error             : 0
Resource tx pci error               : 0
Resource rx pci error               : 0
Resource oos drop count             : 0
Active qp count p0                  : 0
Active qp count p1                  : 0
Active qp count p2                  : 0
Active qp count p3                  : 0
Xp sq overflow error                : 0
Xp rq overflow error                : 0
Tx atomic request packets           : 0
Tx read request packets             : 0
Tx read response packets            : 0
Tx write request packets            : 0

```

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```

Tx send request packets           : 0
Tx RoCE packets                   : 0
Tx RoCE header and payload bytes  : 0
Rx atomic request packets         : 0
Rx read request packets           : 0
Rx read response packets         : 0
Rx write request packets          : 0
Rx send request packets           : 0
Rx RoCE packets                   : 0
Rx RoCE bytes                     : 0
Rx RoCE good packets              : 0
Rx RoCE good bytes                : 0
Rx drops lack of buffers          : 0
Rx out of sequence packets        : 0
Tx cnp packets                    : 0
Rx cnp packets                    : 0
Rx ecn marked packets             : 0
Tx cnp bytes                      : 0
Rx cnp bytes                      : 0
HW sequence error naks rcvd       : 0
Rx dcn payload cut packets        : 0
Tx packets bypassed transmit engine : 0
HW rnr naks received              : 0
HW missing response packets       : 0
HW retransmission timeouts        : 0
HW duplicate read/atomic requests : 0
Tx dcn cnp packets                : 0
Rx dcn cnp packets                : 0
Rx payload cut packets            : 0
Rx payload cut packets ignored    : 0
Rx dcn cnp packets ignored        : 0
Tx unicast packets                : 0
Tx broadcast packets              : 0
Tx discard packets                : 0
Tx dropped packets                : 0
Tx bytes for unicast              : 0
Rx unicast packets                : 0
Rx discard packets                : 0
Rx dropped packets                : 0
Rx bytes for unicast              : 0
Clear sequence                    : 0

```

To display the L2 counters

1) `niccli -i 1counters --l2`

```

Tx unicast packets           : 0
Tx broadcast packets         : 0
Tx discard packets           : 0
Tx dropped packets           : 0
Tx bytes for unicast          : 0
Rx unicast packets           : 0
Rx discard packets           : 0
Rx dropped packets           : 0
Rx bytes for unicast          : 0
Clear sequence                : 0
Rx multicast packets         : 0
Rx broadcast packets         : 0
Rx packets with errors        : 0
Rx bytes for multicast        : 0
Rx bytes for broadcast        : 0
Rx TPA eligible packets      : 0
Rx TPA eligible bytes        : 0
Rx TPA packets               : 0
Rx TPA bytes                 : 0
Rx TPA errors                : 0
Rx TPA events                : 0
Tx multicast packets         : 0
Tx packets with errors        : 0
Tx bytes for multicast        : 0
Tx bytes for broadcast        : 0

```

vf Command

=====

DESCRIPTION :

Performs VF operations. This command is supported only on Linux operating system

SYNTAX :

```

vf <-t|--trust> --set <-v|--vf_index> <idx> <--state> <enable/disable>
vf <-t|--trust> --show <-v|--vf_index> <idx>
vf <-a|--add_ntuple_filter> <-m|--macaddress> <value> <-p|--dest_port> <value>
  <-P|--dst_port_mask> <value> <-v|--vf_index> <idx> <-T|--ip_type> <value>
vf <-d|--free_ntuple_filter> <-l|--filter_id> <value>
vf <-M|--peer_mem_map> <--hpa> <list of values> <--gpa> <list of values>
  <--size> <list of values> [<--ds_port> <value>]

```

OPTIONS :

-t|--trust : Perform the trusted VF operations.

- v|--vf_index : Provide the VF index.
- state : Option to enable or disable the trusted VF.
- a|--add_ntuple_filter : Option to add the ntuple flow filter.
- d|--free_ntuple_filter : Option to free the ntuple flow filter.
- m|--macaddress : MAC address in format xx:xx:xx:xx:xx:xx.
- p|--dest_port : Option to provide the destination port.
- P|--dst_port_mask : Option to provide the destination port mask.
- T|--ip_type : Option to provide the IP type. The valid values are:
1 - IPV4, 2 - IPV6, 3 - ARP-REPLY

- M|--peer_mem_map : Option to configure the GPU host and guest physical address mapping.

- hpa : This option is used to specify the list of host physical addresses.
Max 8 entries are supported. User has to provide the list with a comma separated for each host physical address. The value should be in the hex-decimal.

- gpa : This option is used to specify the list of guest physical addresses.
Max 8 entries are supported. User has to provide the list with a comma separated for each guest physical address. The value should be in the hex-decimal.

- size : This option is a comma separated list in kilobytes for each mapping.
Max 8 entries are supported. The value should be in the hex-decimal.

- ds_port : This is an optional parameter. And this option is to used to configure the PCI ID of the PCIe switch downstream port. The valid range is from 1 to 65535.

EXAMPLES :

To query trusted vf state

1) niccli -i 1 vf --trust --show --vf_index 0

```
Trusted VF : Disabled
Command Executed Successfully
```

To enable trusted vf state

1) niccli -i 1 vf --trust --set --vf_index 1 --state enable

```
Command Executed Successfully
```

To add ntuple flow filter for the specified MAC and destination port

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- 1) `niccli -i 1 vf --add_ntuple_filter --macaddress 00:01:02:03:04:a3 -p 1023 -P 0xFFFF -v 1 -T 1`

Successfully added N-tuple filter with
filterId=8016000000000414

To free ntuple flow filter for the specified filter id

- 1) `niccli -i 1 vf --free_ntuple_filter --filter_id F06C0000D6C22414`

Successfully freed the given N-Tuple filter F06C0000D6C22414

To configure the GPU host and guest physical address mapping

- 1) `niccli -i 1 vf --peer_mem_map --hpa
0x1FFFFFFFF,0x2FFFFFFFF,0x3FFFFFFFF,0x4FFFFFFFF
--gpa 0x9FFFFFFFF,0xAFFFFFFFF,0xBFFFFFFFF,0xCFFFFFFFF
--size 0x10000,0x10000,0x8000,0x8000`

host/guest physical address mapping configured successfully.

- 2) `niccli -i 1 vf --peer_mem_map --hpa
0x1FFFFFFFF,0x2FFFFFFFF,0x3FFFFFFFF,0x4FFFFFFFF --gpa
0x9FFFFFFFF,0xAFFFFFFFF,0xBFFFFFFFF,0xCFFFFFFFF --size
0x10000,0x10000,0x8000,0x8000 --ds_port 20`

host/guest physical address mapping configured successfully.

cfgtunnel commands

=====

DESCRIPTION :

Performs Custom, GRE Tunnel and RSS(receive side scaling) operations.

This command is supported on Linux, Windows, FreeBSD and VMWare operating systems.

SYNTAX :

```
tunnel --cfg --vxlan <-t|--type> <ipv4|ipv6> --show
tunnel --cfg --vxlan <--add> <-t|--type> <ipv4|ipv6> <-p|--dest_port> <value>
tunnel --cfg --vxlan <--del> <-t|--type> <ipv4|ipv6> <-p|--dest_port> <value>
tunnel --cfg <--rss> --show
tunnel --cfg <--rss> --set <--mode> <inner/outer>
tunnel --cfg <-g|--gre_tunnel_offload> --show
tunnel --cfg <-g|--gre_tunnel_offload> --set --state <enable/disable>
```

OPTIONS :

`--cfg` : Perform Custom, GRE Tunnel and RSS(receive side scaling) operations.
`--vxlan` : Option to query or configure vxlan type.

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- t|--type : Option to provide the IP type. The valid values are "ipv4" and "ipv6".
- p|--dest_port : Option to provide the destination port. Valid range is 0-65535.
- rss : Option to query and configure RSS(receive side scaling).
- mode : Option to configure the RSS mode. The valid values are "inner" and "outer".
- g|--gre_tunnel_offload : Option to query and configure the custom GRE tunnel offload.
- state : Option to enable or disable the non udp port based GRE tunnel offload.

EXAMPLES :

To show the custom tunnel configuration

- 1) `niccli -i 1 tunnel --cfg --vxlan --type ipv4 --show`

```
Custom Tunnel Destination Port : 0
```

To add the custom tunnel configuration on destination port

- 1) `niccli -i 1 tunnel --cfg --vxlan --add --type ipv4 --dest_port 1024`

```
Command Executed Successfully.
```

To delete the custom tunnel configuration on destination port

- 1) `niccli -i 1 tunnel --cfg --vxlan --del --type ipv4 --dest_port 1024`

```
Command Executed Successfully.
```

To show the RSS mode configuration

- 1) `niccli -i 1 tunnel --cfg --rss --show`

```
RSS Hashing Mode : inner
```

To configure the RSS inner mode

- 1) `niccli -i 1 tunnel --cfg --rss --set --mode inner`

```
Command Executed Successfully.
```

To show the state of GRE tunnel offload

- 1) `niccli -i 1 tunnel --cfg --gre_tunnel_offload --show`

```
Device Level Tunnel Parsing is disabled.
On this function tunnel parsing is disabled.
```

To enable the non udp port based GRE tunnel offload

- 1) `niccli -i 1 tunnel --cfg --gre_tunnel_offload --set --state enable`

GRE tunnel configuration enabled on chip level. This configuration is not persistent across reboots.

msix Command

=====

DESCRIPTION :

Query and configure the number of MSI-X max vectors values for VF's per each PF.
This command is supported only on Linux and Windows operating systems.

SYNTAX :

```
msix -m|--max_vectors --show [--all | --pf <pf number>]
msix -m|--max_vectors --set [--pf <pf number>]
```

OPTIONS :

`-m|--max_vectors` : Retrieves the register dump and crashdump from the firmware.
`--pf` : PF Number to query the table of 8 rows for msix max vectors.
`--show` : Get the msix max vectors for PF.
`--set` : Configure the msix max vectors for PF.
`--all` : Displays msix max vectors for all the PF's.

EXAMPLES :

To display the MSI-X max vectors values

1) `niccli -i 1 msix --max_vectors --show --pf 0`

MSI-X Vector Table for PF 0 :

	ROW		START VF	

	0		0	
	1		0	
	2		0	
	3		0	
	4		0	
	5		0	
	6		0	
	7		0	

To display all the values of MSI-X max vectors

1) `niccli -i 1 msix --max_vectors --show --all`

MSI-X Vector Table for PF 0 :

ROW	START VF	MSI-X
0	0	0
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0

MSI-X Vector Table for PF 1 :

ROW	START VF	MSI-X
0	0	0
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0

MSI-X Vector Table for PF 2 :

ROW	START VF	MSI-X
0	0	0
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0

MSI-X Vector Table for PF 3 :

ROW	START VF	MSI-X
0	0	0
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0

To configure the MSI-X max vectors values for PF 0

1) niccli -i 1 msix --max_vectors --set --pf 0

Currently configured MSI-X Vector Table for PF 0 :

ROW	START VF	MSI-X
0	0	0
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0

Configuring MSI-X Vector Table for PF 0 :

```
Enter the number of row to change [1 to 8, ENTER=Exit] : 8
Enter Start VF Value of Row 0 [ENTER=Do not change] : 1
Enter MSI-X Vector Value of Row 0 [ENTER=Do not change] : 1
Enter Start VF Value of Row 1 [ENTER=Do not change] : 1
```

```

Enter MSI-X Vector Value of Row 1 [ENTER=Do not change] : 1
Enter Start VF Value of Row 2 [ENTER=Do not change] : 1
Enter MSI-X Vector Value of Row 2 [ENTER=Do not change] : 1
Enter Start VF Value of Row 3 [ENTER=Do not change] : 1
Enter MSI-X Vector Value of Row 3 [ENTER=Do not change] : 1
Enter Start VF Value of Row 4 [ENTER=Do not change] : 1
Enter MSI-X Vector Value of Row 4 [ENTER=Do not change] : 1
Enter Start VF Value of Row 5 [ENTER=Do not change] : 1
Enter MSI-X Vector Value of Row 5 [ENTER=Do not change] : 1
Enter Start VF Value of Row 6 [ENTER=Do not change] : 1
Enter MSI-X Vector Value of Row 6 [ENTER=Do not change] : 1
Enter Start VF Value of Row 7 [ENTER=Do not change] : 1
Enter MSI-X Vector Value of Row 7 [ENTER=Do not change] : 1

```

mh Command

=====

DESCRIPTION :

Query and configure the Broadcom Multi-Host PF information. This command is supported only on Linux, FreeBSD and windows operating systems.

SYNTAX :

```

mh -p|--pf_alloc --show
mh -p|--pf_alloc --set --ep0 <pf_cnt> --ep1 <pf_cnt> --ep2 <pf_cnt> --ep3 <pf_cnt>

```

OPTIONS :

```

-p|--pf_alloc : PF Number to query Multi-Host PF information
--show       : Query Multi-Host PF information
--set        : Configure the Multi-Host PF information
--ep0        : number of PF to be written on EP0
--ep1        : number of PF to be written on EP1
--ep2        : number of PF to be written on EP2
--ep3        : number of PF to be written on EP3

```

NOTE: The number of non-zero values can be for 2 endpoints or 4 endpoints.

NOTE: The sum of all the endpoints should be less than or equal to 16.

EXAMPLES :

To display the Multi-Host PF information

1) niccli -i 1 mh --pf_alloc --show

```

EP 1 = 0
EP 2 = 0
EP 3 = 0
EP 4 = 0

```

To configure the Multi-Host PF information

1) `niccli -i 1 mh --pf_alloc --set --ep0 0 --ep1 0 --ep2 0 --ep3 0`

Multi-host PF allocation applied successfully.

A cold boot is required for new allocation to take effect.

resmgmt Command

=====

DESCRIPTION :

Query and Configure resources of the device.

This command is supported on Linux, Windows, FreeBSD and VMWare operating systems.

SYNTAX :

```
resmgmt [--pf/--all] [<-p|--profile> | < --min > | < --max > | <-r | --roce_max> | < -m |
--max_completion_rings> | < -s | --strategy >] --show
```

```
resmgmt [--pf/--all] --set [<-p|--profile> | < --min > | < --max > | <-r | --roce_max> | < -m |
--max_completion_rings>] [< --bw <bandwidth of each pf with comma separated>] [< -s |
--strategy > < minimal/maximal/minimal-static>]
```

OPTIONS :

- p|--profile : Active profile of the device
- r|--roce_max : RoCE enabled PF's on the device(supported only for Stratus & Cumulus-B/WHP)
- m|--max_completion_rings : maximum completion rings for each active PF
- s|--strategy : strategy associated with each active PF.
- min : Minimum bandwidth associated with each active PF
- max : Maximum bandwidth associated with each active PF
- show : Displays resources of the device
- set : Configures resources of the device
- bw : Bandwidth to configure for PF N. This is applicable for min, max, roce_max and max_cmpl

EXAMPLES :

To query resources of the device

1) `niccli -i 1 resmgmt --all --profile --show`

```
resmgmt mode: Entire NIC device
Number of PFs in the NIC device: 8
Profile Type : Asymmetric
```

To configure resources of the device

1) `niccli -i 1 resmgmt --pf --set --bw 1,2,3 --strategy minimal`

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resmgmt mode: only for the selected PF

A system cold boot is needed for configuration package update to take effect.

Resource management settings are applied Successfully

ccparams Command

=====

DESCRIPTION :

This command is used to query and configure the congestion control(cc) parameters for RoCE. This command is supported on Linux, Windows, FreeBSD and VMWare operating systems.

SYNTAX :

```
ccparams -d|--dump
ccparams --set -f <configuration file>
```

OPTIONS :

```
-d|--dump    : Dumps the congestion control parameters into a configuration <xxx>.CFG file.
               The file will be generated in the same directory where the executable is
               running.
--set        : To configure the congestion control parameters using a <xxx>.CFG file.
-f           : Configuration file to configure the congestion control (cc) parameters.
```

EXAMPLES :

To dump the congestion control params

- 1) niccli -i 1 ccparams -d
- 2) niccli -i 1 ccparams --dump

Generated congestion control file

```
"BCM957608-P2200GQF00"_congestion_control_20250508_231306_85634.CFG
```

To configure the congestion control params

- 1) niccli -i 1 ccparams --set -f
BCM957608-P2200GQF00_congestion_control_20250210_025627_19427.CFG

CC parameter	value	status
abs_max_quota	1	Success

debug Command

=====

DESCRIPTION :

Dumps device internal configuration registers. The dump file can be used by the Broadcom Support for hardware troubleshooting.

- 1) Snapdump option is supported on Linux, Windows, FreeBSD and VMWare operating systems.
- 2) Debug --token options are supported on Linux, Windows and FreeBSD operating systems.

SYNTAX :

```
debug -c|--coredump [-d|--ddr] [-l|--l1cc] [-f <file name>]
debug -s|--snapdump [-f <file name>]
debug -D|--drv_dbg_mask --show -T|--drv_type <value>
debug -D|--drv_dbg_mask --value <value> -T|--drv_type <value>
debug -K|--token -a|--supported_claims [--show | -f <output_filename>]
debug -K|--token -A|--active_claims> [--show | -f <output_filename>]
debug -K|--token -G|--generate -f|--file <claims_file> [-o|--output_file <unsigned_CBOR_file>]
debug -K|--token -I|--insert -N|--signature_file <signature file> -f|--file <claims_file>
    [-o|--output_file <signed_CBOR_file>]
debug -K|--token -E|--enable -f|--file <signed_CBOR_file>
debug -K|--token -B|--disable
```

OPTIONS :

- c|--coredump : Retrieves the register dump and crashdump from the firmware.
- s|--snapdump : Retrieves the register dump, crashdump, firmware log, driver logs and host tool logs.
- d|--ddr : Retrieves crashdump from the DDR if available and this option is only applicable to the coredump command.
- l|--l1cc : Retrieves the context l1 cache and this option is only applicable to coredump command.
- f|--file : File name to dump the coredump/snapdump. This is an optional parameter.
- D|--drv_dbg_mask : This option is used to set the driver debug mask value.
- T|--drv_type : This option is used to set the driver debug mask for a given driver type.
The valid values for this option are:
0 - Bnxtnet
1 - RoCE
- K|--token : Perform debug token operations.
- a|--supported_claims : Retrieves the supported debug tokens. Below are the supported

tokens.

`fwcli` : Provides access to the production firmware command list. The valid values are from 0 to 2.

`diagrw_en` : Enable or disable the GRC register access. The valid values are 0 and 1.

`persist` : Persist the token until expired. The valid values are 0 and 1.

`exp` : Expiration time to indicate when the token expires. Value is an epoch based 64-bit integer value. The value indicates the number of seconds relative to 1970-01-01T00:00Z in UTC time.

`-A|--active_claims` : Retrieves the active debug tokens.

`-G|--generate` : Generate the unsigned debug token binary for the provided debug claims.

`-I|--insert` : Insert the signature into the unsigned debug token binary for the provided debug claims.

Note: The debug tokens in the claims file for the generate and insert command should match.

`-N|--signature_file` : Option to provide the signature file.

`-E|--enable` : Enable the debug token.

`-B|--disable` : Disable the debug token.

EXAMPLES :

To collect the coredump

1) `niccli -i 1 debug -c`

2) `niccli -i 1 debug --coredump`

Retrieving CoreDump, please wait...

Generated CoreDump file

`dhcp-10-123-240-239_20250512_204028_121995.core`

3) `niccli -i 1 debug --coredump -f test.core`

Retrieving CoreDump, please wait...

Generated CoreDump file `test.core`

To collect the crashdump from the DDR

1) `niccli -i 1 debug --coredump --ddr`

Retrieving CoreDump, please wait...

Generated CoreDump file `roce-auto-1_20240830_164241_70201.core`

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To collect the coredump with L1 context cache

- 1) `niccli -i 1 debug --coredump --l1cc`

```
Retrieving CoreDump, please wait...
Generated CoreDump file
dhcp-10-123-240-239_20250512_204215_122024.core
```

To collect the snapdump

- 1) `niccli -i 1 debug -s`
- 2) `niccli -i 1 debug --snapdump`

```
Retrieving SnapDump, please wait...
Generated SnapDump file
dhcp-10-123-240-239_20250512_204509_122065.core
```

To retrieve the firmware supported debug token claims and dump into JSON file

- 1) `niccli -i 1 debug --token --supported_claims --file supported_claims.json`

```
Operation completed successfully.
```

To retrieve the active debug token claims configured by the firmware and dump into JSON file

- 1) `niccli -i 1 debug --token --active_claims --file active_claims.json`

```
Operation completed successfully.
```

To generate the unsigned debug token binary file for the provided debug claims

- 1) `niccli -i 1 debug --token --generate --file supported_claims.json --output_file niccwt_P2200_unsigned.cbor`

```
Successfully created unsigned CBOR debug token file
"niccwt_P2200_unsigned.cbor"
```

To insert the signature into the unsigned debug token binary file

- 1) `niccli -i 1 debug --token --insert --signature_file sig.txt --file active_claims.json --output_file niccwt_P2200_signed.cbor`

```
Successfully created signed CBOR debug token file
"niccwt_P2200_signed.cbor"
```

To enable the debug token using signed debug token binary file

- 1) `niccli -i 1 debug --token --enable --file niccwt_P2200_signed.cbor`

```
Debug token enabled successfully.
```

To disable the debug token

- 1) `niccli -i 1 debug --token --disable`

```
Debug token disabled successfully.
```

Below commands are supported only in ESXI 8.0 onwards

- 1) `esxcli niccli debug --dev -v vmnic5 --drv-dbg-mask --show --drv-type 1`

```
Debug mask = 0x0
```

- 2) `esxcli niccli debug --dev -v vmnic5 --drv-dbg-mask --value 0x1 --drv-type 1`

```
Command executed successfully.
```

show command

=====

DESCRIPTION :

This command will display all the basic details of the device

- 1) `pcb_gen2_otp` option is supported only on Linux operating systems.
- 2) `recommendations` options are supported only on Linux, Windows, VMWare and FreeBSD operating systems.
- 3) `list_ethernet` command is supported only on Linux, Windows, VMWare and FreeBSD operating systems.

SYNTAX :

```
show [-d | --device_info]
show -p | --pkg_ver [-f <firmware package file(s)>]
show -D | --device_pci_ids [-f <firmware package file(s)>]
show -c | --certificate [-s | --slot <number>]
show -n | --nvm_measurement
show --all
show --health
show -g | --pcb_gen2_otp
show -r | --recommendations [--nvm [-f <firmware package>]] [--pcie] [-V]
```

OPTIONS :

- p | --pkg_ver : Display firmware package version installed on the device or in the package file.
- f : Display firmware package file information.
- D | --device_pci_ids : Display Broadcom device id information.
- d | --device_info : Display the basic details of the device
- all : Display all the details of the device.
- c | --certificate : Display the imported certificate chain on the device.
This command is supported on BCM9575xxx and BCM9576xxx devices.
- s | --slot : Slot number is where the certificate chain on the device is imported. The valid values are from 0 to 7. The default value is 0.
- n | --nvm_measurement : Display whether the NVM configuration that is active in the system has been changed or not. To facilitate this, a hash is generated based on nvm configuration. The hash represents the measurement of the configuration. This command is supported on BCM9575xxx and BCM9576xxx devices.
- health : Display the device health.
- r | --recommendations : Display the self debug recommendations to the user.
This option is only supported on BCM9575xxx and BCM9576xxx devices.
- pcie : This option is used to show the PCIe self debug recommendations to the user. This option is only supported on BCM9575xxx and BCM9576xxx devices.
- nvm : This option is used to show the nvm self debug recommendations to the user. This option is only supported on BCM9575xxx and BCM9576xxx devices.
- V : Verbosity, shows the detailed information.
- g | --pcb_gen2_otp : Display the PCB gen2 device OTP. This command is supported on BCM9574xxx devices.

EXAMPLES :

To display firmware package version installed on the device or in the package file

1) `niccli -i 1 show -p -f BCM957508-N2100G.pkg`

```

Package File           : BCM957608-P2200GQF00.pkg
Package Version        : 235.1.41.0
Timestamp              : 2025-04-28 15:02:51Z
Checksum               : 0x6B7BB128
Description             : Broadcom BCM57608 2x200G PCIe
                        Ethernet NIC
SBI Revision ID        : 0x0
SRT Revision ID        : 0x0
CRT Revision ID        : 0x0

```

Package Information :

```

Active Package Version : 235.1.41.0
Package Version on NVM : 235.1.41.0
Primary SBI Version    : 232.0.7.0
Secondary SBI Version  : 232.0.7.0
Primary SRT Version    : 235.1.41.0
Secondary SRT Version  : 235.1.41.0
Primary CRT Version    : 235.1.41.0
Secondary CRT Version  : 235.1.41.0
SBI Revision ID        : 0x0
RT Revision ID         : 0x0
CRT Revision ID        : 0x0

```

2) `niccli -i 1 show --pkg_ver`

Package Information :

```

Active Package Version : 235.1.41.0
Package Version on NVM : 235.1.41.0
Primary SBI Version    : 232.0.7.0
Secondary SBI Version  : 232.0.7.0
Primary SRT Version    : 235.1.41.0
Secondary SRT Version  : 235.1.41.0
Primary CRT Version    : 235.1.41.0
Secondary CRT Version  : 235.1.41.0
SBI Revision ID        : 0x0
SRT Revision ID        : 0x0
CRT Revision ID        : 0x0

```

To display the basic details of the device

1) `niccli -i 1 show -d`

2) niccli -i 1 show --device_info

```

NIC State : Down
Device Type : THOR2
PCI Vendor ID : 0x14E4
PCI Device ID : 0x1760
PCI Revision ID : 0x11
PCI Subsys Vendor ID : 0x14E4
PCI Subsys Device ID : 0x9120
Device Interface Name : ens6f0np0
MAC Address : 8C:84:74:01:A5:C2
Base MAC Address : 8C:84:74:01:A5:C2
Serial Number : "P2200YYWWXXXXXFG"
Part Number : "BCM957608-P2200GQF00"
PCI Address : 0000:1e:00.0
Chip Number : BCM57608
Chip Name : THOR2
Description : Broadcom BCM57608

2x200G

PCIE Ethernet NIC
Firmware Name : PRIMATE_FW
Firmware Version : 235.1.41.0
RoCE Firmware Version : 235.1.41.0
HWRM Interface Spec : 1.10.3
Kong mailbox channel : Not Applicable
  Active Package Version : 235.1.41.0
  Package Version on NVM : 235.1.41.0
  Active NVM config version : 234.0.48
  NVM config version : 0.0.48
  Reboot Required : No
  Firmware Reset Counter : 1
  Error Recovery Counter : 0
  Crash Dump Timestamp : Not Available
  Secure Boot : Enabled
  Secure Firmware Update : Enabled
  FW Image Status : Operational
  Crash Dump Available in DDR : No
  Device Temperature : 41 Celsius
  PHY Temperature : Not Available
  Optical Module Temperature : Not Available
  Device Health : Good

```

Below show command is observed only in VmWare OS.

```
esxcli niccli show --dev -v vmnic8
```

```

NIC State                               : Down
Device Type                             : THOR
PCI Vendor ID                           : 0x14E4
PCI Device ID                           : 0x1751
PCI Revision ID                         : 0x12
PCI Subsys Vendor ID                    : 0x14E4
PCI Subsys Device ID                    : 0x4250
Device Interface Name                   : vmnic24
MAC Address                             : 8C:84:74:C4:8E:72
Base MAC Address                        : 8C:84:74:C4:8E:70
Serial Number                           : P425G25030001BFG
Part Number                             : BCM957504-P425G
PCI Address                             : 0000:61:00.2
Chip Number                             : BCM57504
Chip Name                               : THOR
Description                             : Broadcom NetXtreme
                                         E-Series Quad-port 25Gb
                                         SFP28 PCIe Ethernet
                                         Adapter
Firmware Name                           : PRIMATE_FW
Firmware Version                         : 235.1.73.0
RoCE Firmware Version                   : 235.1.73.0
HWRM Interface Spec                     : 1.10.3
Kong mailbox channel                     : Not Applicable
Trusted VFs                             : Supported
Active Package Version                  : 235.1.74.0
Package Version on NVM                   : 235.1.74.0
Active NVM config version                : 0.0.30
NVM config version                      : 0.0.30
Reboot Required                         : No
Firmware Reset Counter                  : 0
Error Recovery Counter                  : 0
Crash Dump Timestamp                    : Not Available
Secure Boot                             : Enabled
Secure Firmware Update                  : Enabled
FW Image Status                         : Operational
Crash Dump Available in DDR              : No
Device Temperature                      : 46 Celsius
PHY Temperature                         : 46 Celsius
Optical Module Temperature              : Not Available
Device Health                           : Good
MTU                                      : 1500
Number of VFs configured                 : 0

```

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```

Bridge mode                : (1)VEB is configured
Driver Name                 : bnxtnet
Driver Version              : 236.1.3.6
RoCE Driver Name            : bnxtroce
RoCE Driver Version         : 236.1.3.6
RoCE V2                     : Enabled
L2 Driver module interface : native
L2 Driver HWRM IF           : 1.10.3.96
Chip Metal                  : 2
Chip Bondid                 : 0

```

To display the device health of the interface

1) `niccli -i 1 show --health`

```

Device Health Information :
SBI Mismatch Check        : OK
SBI Booted Check           : OK
SRT Mismatch Check        : OK
SRT Booted Check           : OK
CRT Mismatch Check        : OK
CRT Booted Check           : OK
Second RT Image            : CRT Image
Second RT Image Redundancy : Good
Image Fastbooted Check     : OK
Directory Header Booted Check : OK
Directory Header Mismatch Check : OK
MBR Corrupt Check          : OK
NVM Configuration         : OK
FRU Configuration         : OK
-----
Overall Device Health      : Healthy

```

To display the imported certificate chain on the device

1) `niccli -i 1 show -c -s 1`

2) `niccli -i 1 show --certificate --slot 0`

Cert Provision State : The attestation agent has not yet initialized and not completed verification of the provisioned certificate chain.

To display whether the NVM configuration that is active in the system

1) `niccli -i 1 show -n`

2) `niccli -i 1 show --nvmmeasurement`

```

NVM Measurement Calculated Time      : BootUp
NVM Configuration HMAC SHA384
HASH :
67206532f220d9c113438db3b8b58316721d76797d78effa026c35ca5be0b6a62016f
e15e933723fc293ddabb88c2ef8

```

To display Broadcom device id information

- 1) `niccli -i 1 show -D -f BCM957608-P2200GQF00.pkg`
- 2) `niccli -i 1 show --device_pci_ids -f BCM957608-P2200GQF00.pkg`

```

Target Device Package Information :
Package File   : BCM957608-P2200GQF00.pkg
Target PCI-ID  : 0x14E4:0x1760:0x14E4:0x9120

```

```

Adapter #1 :
-----
Device Interface Name      : ens6f0np0
PCI Vendor ID              : 0x14E4
PCI Device ID              : 0x1760
PCI Revision ID            : 0x11
PCI Subsys Vendor ID       : 0x14E4
PCI Subsys Device ID       : 0x9120
PCI Address                : 0000:1e:00.0

```

To display all the details of the device

- 1) `niccli -i 1 show --all`

```

NIC State                  : Down
Device Type                : THOR2
PCI Vendor ID              : 0x14E4
PCI Device ID              : 0x1760
PCI Revision ID            : 0x11
PCI Subsys Vendor ID       : 0x14E4
PCI Subsys Device ID       : 0x9120
Device Interface Name      : ens6f0np0
MAC Address                : 8C:84:74:01:A5:C2
Base MAC Address           : 8C:84:74:01:A5:C2
Serial Number              : "P2200YYWWXXXXXFG"
Part Number                : "BCM957608-P2200GQF00"
PCI Address                : 0000:1e:00.0
Chip Number                : BCM57608
Chip Name                  : THOR2
Description                 : Broadcom BCM57608
                           2x200G PCIe Ethernet

```

NIC

Firmware Name	: PRIMATE_FW
Firmware Version	: 235.1.41.0
RoCE Firmware Version	: 235.1.41.0
HWRM Interface Spec	: 1.10.3
Kong mailbox channel	: Not Applicable
Active Package Version	: 235.1.41.0
Package Version on NVM	: 235.1.41.0
Active NVM config version	: 234.0.48
NVM config version	: 0.0.48
Reboot Required	: No
Firmware Reset Counter	: 1
Error Recovery Counter	: 0
Crash Dump Timestamp	: Not Available
Secure Boot	: Enabled
Secure Firmware Update	: Enabled
FW Image Status	: Operational
Crash Dump Available in DDR	: No
Device Temperature	: 43 Celsius
PHY Temperature	: Not Available
Optical Module Temperature	: Not Available
Device Health	: Good
Primate Firmware Livepatch Versions	
Common Active Livepatch Version	: Not Available
Common Livepatch Version on NVM	: Not Available
Secure Active Livepatch Version	: Not Available
Secure Livepatch Version on NVM	: Not Available
Backup Power Info Version	: Not Supported
Backup Power Load	: Not Supported
Backup Time	: Not Supported
Platform Backup Power Count	: Not Supported
Backup Power Status	: Not Supported
Backup Power Charge Time	: Not Supported

To display the recommendation for self debug.

- 1) niccli -i 1 show -r
- 2) niccli -i 1 show --recommendations

Checking NIC status...

Checker #1: Link detected

Condition #1: The Ethernet link is down or the cable is not detected.

Recommendation for condition #1:

The Ethernet link is down. If the link is expected to be up:

1) If the port has a SFP or QSFP cage, ensure that the module is detected properly and there are no faults reported for the module. The 'recommendations' command will determine if a module is absent or otherwise reporting a fault.

2) Do some characterization to rule out whether the module and cable are a factor:

a) Try connecting two switch ports with the cable and see if link comes up on the switch

b) Try connecting two NIC ports with the cable and see if link comes up. Disable autodetect on at least one NIC port using following niccli command. 'niccli --dev <device_name> --setoption media_auto_detect --scope <port_num> --value <mode>'

c) Try a different instance of the same cable brand/type

d) Try a different cable brand/type

e) Use one of the cables that are verified by Broadcom. See the following link for the list of verified cables:

<https://techdocs.broadcom.com/us/en/storage-and-ethernet-connectivity/ethernet-nic-controllers/bcm957xxx/adapters/installation/connecting-the-network-cables/interconnect-compatibility-for-brcm9575xx--bcm9574xx--and-earlier-adapters-.html>

3) Check the switch status for the port connected to the NIC. Some switches will disable the port if the link has toggled too frequently. If the switch disables the link then the NIC will be unable to get a link until the switch reenables the port.

4) Some higher power class modules come up in a lower power class so that the user has an option to switch to a higher power class, if the board has the ability to support this power. The NIC firmware has the capability to detect and configure these modules to higher power class automatically. The switch may not be capable of this automatic configuration and may need manual intervention to support higher power class modules.

5) Run the 'niccli --dev <device_name> linkdiag --dsdump --lane <X> --diag_level 0' command on each of the SERDES lanes associated with the port. The output for SD indicates if a signal is detected on that lane. The output for LCK indicates if the PMD has locked on that lane. For example, the following indicates that both signal is detected and PMD has locked on lane 0:

```
LN .... SD LCK ...
0 .... 1* 1* ...
```

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Condition #2: The NIC port is configured to use 'autodetect' mode

Recommendation for condition #2:

The NIC port is configured to use 'autodetect' mode. When 'autodetect' is enabled, the NIC attempts to get a link on all valid combinations of speed, NRZ/PAM4 signaling, FEC, and link training configurations. The 'niccli --dev <device_name> link --status' command shows the supported link modes for this device. Check to ensure that the link partner supports at least one of the NIC's supported link modes. If the NIC is configured to use 'autodetect' mode, ensure that the link partner is not using 'autodetect' mode. If the NIC is connected to a switch, then the switch is not using 'autodetect' mode. If the NIC is connected directly to another NIC port, then disable 'autodetect' on at least one of the NIC ports. 'autodetect' mode can be configured using the 'niccli --dev <device_name> nvm --setoption media_auto_detect --scope <port_num> --value <mode>' command.

Checker #2: Module detected

Condition #1: Module is inserted and accepted

Recommendation for condition #1:

No recommendation.

Checker #3: Link Toggling

Condition #1: Link down events are nominal.

Recommendation for condition #1:

No recommendation.

Checker #4: MAC and PHY Counters

Condition #1: The NIC has no receive side corrected blocks, uncorrectable FEC blocks and FCS errors

Recommendation for condition #1:

No recommendation.

Checker #5: mbuf discards

Condition #1: The NIC has no receive discards

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Recommendation for condition #1:

No recommendation.

Checker #6: ring discards

Condition #1: The NIC has no receive discard packets

Recommendation for condition #1:

No recommendation.

Checker #7: Firmware operational status

Condition #1: Firmware is healthy

Recommendation for condition #1:

No recommendation.

Checker #8: Firmware synchronization status

Condition #1: All the actively running firmware images are synchronized with the backup slot

Recommendation for condition #1:

No recommendation.

Checker #9: Firmware error recovery count

Condition #1: The NIC firmware error recovery counter is zero.

Recommendation for condition #1:

No recommendation.

Checker #10: Firmware errors

Condition #1: The NIC active firmware has no errors.

Recommendation for condition #1:

No recommendation.

Checker #11: Non Default nvram configuration

Condition #1: The current NIC nvram configuration is a default configuration.

Recommendation for condition #1:

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No recommendation.

Checker #12: PCIe Lanes used

Condition #1: PCIe link width is optimal

Recommendation for condition #1:

No recommendation.

Checker #13: PCIe Link speed

Condition #1: PCIe link speed is downgraded

Recommendation for condition #1:

The NIC is capable of linking at 32GT/s per lane but has only linked at 16GT/s per lane.

This impacts the total bandwidth available to the NIC.
Consider moving the NIC to a different
PCIe slot that can support the NIC's maximum link speed.

Checker #14: PCIe Errors

Condition #1: There is no PCIe errors.

Recommendation for condition #1:

No recommendation.

Checker #15: PCIe Flow Control Credits

Condition #1: PCIe flow control credits are below a certain threshold

Recommendation for condition #1:

No recommendation.

Checker #16: Context Cache Misses

Condition #1: The Context cache memory utilized by the NIC indicates no cache misses

Recommendation for condition #1:

No recommendation.

3) niccli -i 1 show --recommendations --pcie

Checking NIC status...

Checker #1: PCIe Lanes used

Condition #1: PCIe link width is downgraded

Recommendation for condition #1:

The NIC is capable of linking at 16 lanes but has only linked at 8 lanes. This impacts the total bandwidth available to the NIC. Consider moving the NIC to a different PCIe slot with a matching number of lanes.

Checker #2: PCIe Link speed

Condition #1: PCIe link speed is downgraded

Recommendation for condition #1: The NIC is capable of linking at 32GT/s per lane but has only linked at 16GT/s per lane. This impacts the total bandwidth available to the NIC. Consider moving the NIC to a different PCIe slot that can support the NIC's maximum link speed.

Checker #3: PCIe Errors

Condition #1: There is no PCIe errors.

Recommendation for condition #1:

No recommendation.

Checker #4: PCIe Flow Control Credits

Condition #1: PCIe flow control credits are below a certain threshold

Recommendation for condition #1:

No recommendation.

Checker #5: Context Cache Misses

Condition #1: The Context cache memory utilized by the NIC indicates no cache misses

Recommendation for condition #1:

No recommendation.

4) niccli -i 1 show --recommendations -V

Checking NIC status...

Checker #1: Link detected

Condition #1: The ethernet link is up and the active link speed is the maximum supported link speed.

Recommendation for condition #1:

No recommendation.

Condition #2: The NIC port is configured to use 'autodetect' mode

Recommendation for condition #2:

The NIC port is configured to use 'autodetect' mode. When 'autodetect' is enabled, the NIC attempts to get a link on all valid combinations of speed, NRZ/PAM4 signaling, FEC, and link training configurations.

The 'niccli --dev <device_name> link --status' command shows the supported link modes for this device. Check to ensure that the link partner supports at least one of the NIC's supported link modes.

If the NIC is configured to use 'autodetect' mode, ensure that the link partner is not using 'autodetect' mode.

If the NIC is connected to a switch, then the switch is not using 'autodetect' mode. If the NIC is connected directly to another NIC port, then disable 'autodetect' on at least one of the NIC ports.

'autodetect' mode can be configured using the 'niccli --dev <device_name> nvm --setoption media_auto_detect --scope <port_num> --value <mode>' command.

Checker #2: Module detected

Condition #1: Module is inserted and accepted

- a) Media Type : Direct Attached Copper
- b) Module Status : Transceiver module inserted and accepted.

Recommendation for condition #1:

No recommendation.

Checker #3: Link Toggling

Condition #1: Link down events are nominal.

- a) link_down_events : 3

Recommendation for condition #1:

No recommendation.

Checker #4: MAC and PHY Counters

Condition #1: The NIC has 0 FCS errors and 1 uncorrectable FEC blocks

```
a) rx_fcs_err_frames      : 0
b) rx_fec_uncorrectable_blocks : 1
```

Recommendation for condition #1:

The NIC has 0 FCS errors and 1 uncorrectable FEC blocks.

A non-zero count indicates that the NIC is dropping packets because there is an issue with signal integrity on the physical link.

1) Consider running the `prbs_test`, `serdes`, and `dscdump` commands to further analyze the link quality

2) Consider using a different cable (e.g. a shorter cable, or different manufacturer)

Consider tuning the Tx FIR (finite impulse response) settings. The Tx FIR settings can be tuned via the '`niccli --dev <device_name> linkdiag --txfir`' command.

Checker #5: mbuf discards

Condition #1: The NIC has no receive discards

```
a) rx_stat_discard : 0
```

Recommendation for condition #1:

No recommendation.

Checker #6: ring discards

Condition #1: The NIC has no receive discard packets

```
a) rx_discard_pkts : 0
```

Recommendation for condition #1:

No recommendation.

Checker #7: Firmware operational status

Condition #1: Firmware is healthy

```
a) Firmware health status register value : 0x8000
```

Recommendation for condition #1:

No recommendation.

Checker #8: Firmware synchronization status

Condition #1: All the actively running firmware images are

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synchronized with the backup slot

a) Firmware health status register value : 0x0

Recommendation for condition #1:

No recommendation.

Checker #9: Firmware error recovery count

Condition #1: The firmware has crashed and collected debug information.

a) error_recovery_counter : 0

b) Error recovery timeStamp : 04/13/2025 16:54:38 IST

Recommendation for condition #1:

The firmware has crashed and collected debug information.
Retrieve a coredump using niccli command

'niccli --dev <device_name> debug --coredump' and provide it to your support contact.

Checker #10: Firmware errors

Condition #1: The NIC active firmware has no errors.

Recommendation for condition #1:

No recommendation.

Checker #11: Non Default nvm configuration

Condition #1: The current NIC nvm configuration has non default configuration.

a) There are 3 nvm configuration options which have non default configuration.

Recommendation for condition #1:

Some of the NVM configurations differ from the default values and may affect the functionality of the NIC. Review the differences by running the 'niccli --dev <device_name> nvm --listoptions --diff' command.

Restore the configuration to factory defaults by running the 'niccli --dev <device_name> nvm --restore_factory_defaults' command.

Checker #12: PCIe Lanes used

Condition #1: PCIe link width is downgraded

a) NIC is capable of 16 lanes but only 8 lanes are used

Recommendation for condition #1:

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The NIC is capable of linking at 16 lanes but has only linked at 8 lanes.

This impacts the total bandwidth available to the NIC. Consider moving the NIC to a different PCIe slot with a matching number of lanes.

Checker #13: PCIe Link speed

Condition #1: PCIe link speed is downgraded

a) NIC is capable of 32GT/s per lane but only 16GT/s per lanes are used

Recommendation for condition #1:

The NIC is capable of linking at 32GT/s per lane but has only linked at 16GT/s per lane. This impacts the total bandwidth available to the NIC. Consider moving the NIC to a different

PCIe slot that can support the NIC's maximum link speed.

Checker #14: PCIe Errors

Condition #1: There are no PCIe errors.

a) pcie_pl_signal_integrity = 0

b) pcie_dl_signal_integrity = 0

c) pcie_tl_signal_integrity = 0

Recommendation for condition #1:

No recommendation.

Checker #15: PCIe Flow Control Credits

Condition #1: PCIe flow control credits are below a certain threshold

PCIe credits:

a) pcie_credit_fc_hdr_posted = 127

b) pcie_credit_fc_hdr_nonposted = 127

c) pcie_credit_fc_hdr_cmpl = 255

d) pcie_credit_fc_data_posted = 863

e) pcie_credit_fc_data_nonposted = 96

f) pcie_credit_fc_data_cmpl = 4095

PCIe TL credits:

a) pcie_tl_credit_nph_htg[0] = 0

b) pcie_tl_credit_nph_htg[1] = 0

c) pcie_tl_credit_nph_htg[2] = 0

d) pcie_tl_credit_ph_htg[0] = 0

e) pcie_tl_credit_ph_htg[1] = 0

f) pcie_tl_credit_ph_htg[2] = 0

g) pcie_tl_credit_pd_htg[0] = 0

h) pcie_tl_credit_pd_htg[1] = 0

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```
i) pcie_tl_credit_pd_htg[2]          = 0
```

Recommendation for condition #1:

No recommendation.

Checker #16: Context Cache Misses

Condition #1: The Context cache memory utilized by the NIC indicates no cache misses

```
a) cache_miss_count_cfcq = 0
```

```
b) cache_miss_count_cfcs = 0
```

```
c) cache_miss_count_cfcc = 0
```

```
d) cache_miss_count_cfcf = 0
```

Recommendation for condition #1:

No recommendation.

5) niccli -i 1 show --recommendations --nvm

Checking NIC status...

Checker #1: NVM fragmentation status

Condition #1: Check the NVM unused block size. The NVM has unused

block size of 20037632 bytes

Recommendation for condition #1:

To update the firmware, the firmware package file should be less than the unused block size of the nvm.

6) niccli -i 1 show --recommendations --nvm -f BCM957508-N2100G.pkg

Checking NIC status...

Checker #1: NVM fragmentation status

Condition #1: Check the NVM unused block size. The NVM has unused

block size of 20037632 bytes

Recommendation for condition #1:

No recommendation. Sufficient NVM space available for the firmware package installation.

7) niccli -i 1 show --recommendations --nvm -f BCM957508-N2100G.pkg -V

Checking NIC status...

DirectoryBlockHeader:

```
0000: DirectoryBlockHeader.sig          = 0x30726944 (812804420)
0004: DirectoryBlockHeader.length       = 0x20 (32)
0008: DirectoryBlockHeader.entries      = 0x16 (22)
000C: DirectoryBlockHeader.entry_length = 0x18 (24)
```

Directory Table:

Entry	Type	Ord	Ext	Attr	Location
Length	DataLen	CRC			
[00]	(0x50)CertChain	00	0x0000	0x0001	
0x01fe0000	0x00002000	0x00001030	0x00000000		
[01]	(0x02)update	00	0x0000	0x0001	
0x00103000	0x00383000	0x00382b98	0x00000000		
[02]	(0x3f)CRTImage	00	0x0000	0x0000	
0x00486000	0x0021d000	0x0021c7d0	0x3bc0b9a1		
[03]	(0x3e)SRTImage	00	0x0000	0x0000	
0x006a3000	0x00099000	0x00098550	0xe21f3200		
[04]	(0x3d)SBIIImage	00	0x0000	0x0000	
0x00000000	0x00080000	0x0006da90	0x2144df1c		
[05]	(0x06)MBA	00	0x0000	0x0010	
0x0073c000	0x00057000	0x00056d20	0x2144df1c		
[06]	(0x2f)factoryCfg	00	0x0000	0x0001	
0x00793000	0x00009000	0x00009000	0x00000000		
[07]	(0x2e)systemCfg	00	0x0000	0x0001	
0x0079c000	0x00009000	0x00009000	0x00000000		
[08]	(0x00)unused	02	0x0000	0x0001	
0x007a5000	0x00009000	0x00009000	0x00000000		
[09]	(0x59)manufacturing	00	0x0000	0x0001	
0x01ff0014	0x00009000	0x00009000	0x00000000		
[10]	(0x2f)factoryCfg	02	0x0000	0x0001	
0x007ae000	0x00009000	0x00009000	0x00000000		
[11]	(0x05)VPD	00	0x0000	0x0000	
0x007b7000	0x00001000	0x00000144	0xcaa75ccf		
[12]	(0x01)pkgLog	00	0x0000	0x0000	
0x007b8000	0x00001000	0x0000008c	0x85cf357b		
[13]	(0x56)CfgCRCs	00	0x0000	0x0001	
0x007b9000	0x00002000	0x00002000	0x00000000		
[14]	(0x43)CrashDmpData	00	0x0000	0x0001	
0x007bb000	0x00100000	0x00100000	0x00000000		
[15]	(0x43)CrashDmpData	01	0x0000	0x0001	
0x008bb000	0x00100000	0x00100000	0x00000000		
[16]	(0x6e)(null)	00	0x0000	0x0000	
0x009bb000	0x00025000	0x00000000	0x00000000		

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```

[17]  (0x6f) (null)                                00  0x0000 0x0000
0x009e0000 0x00025000 0x00000000 0x00000000
[18]  (0x3d) SBIImage                               01  0x0000 0x0000
0x00080000 0x00080000 0x0006da90 0x2144df1c
[19]  (0x3e) SRTImage                               01  0x0000 0x0000
0x00a05000 0x00099000 0x00098550 0xe21f3200
[20]  (0x3f) CRTImage                               01  0x0000 0x0000
0x00a9e000 0x0021d000 0x0021c7d0 0x3bc0b9a1
[21]  (0x2e) systemCfg                             02  0x0000 0x0001
0x00cbb000 0x00009000 0x00009000 0x00000000

```

NVM memory layout:

Address	Type	Ord	Size
0x00000000	SBIImage	00	512KB
0x00080000	SBIImage	01	512KB
0x00103000	Unused		3596KB
0x00486000	CRTImage	00	2164KB
0x006a3000	SRTImage	00	612KB
0x0073c000	MBA	00	348KB
0x00793000	factoryCfg	00	36KB
0x0079c000	systemCfg	00	36KB
0x007a5000	Unused		36KB
0x007ae000	factoryCfg	02	36KB
0x007b7000	VPD	00	4KB
0x007b8000	pkgLog	00	4KB
0x007b9000	CfgCRCs	00	8KB
0x007bb000	CrashDmpData	00	1024KB
0x008bb000	CrashDmpData	01	1024KB
0x009bb000	(null)	00	148KB
0x009e0000	(null)	00	148KB
0x00a05000	SRTImage	01	612KB
0x00a9e000	CRTImage	01	2164KB
0x00cbb000	systemCfg	02	36KB
0x00cc4000	Unused		19568KB
0x01fe0000	CertChain	00	8KB
0x01fe2000	Unused		56KB
0x01ff0014	manufacturing	00	36KB

Checker #1: NVM fragmentation status

Condition #1: Check the NVM unused block size. The NVM has unused block size of 20037632 bytes

a) The nvm is 16% fragmented. The largest unused block size is 20037632 bytes and total unused size is 23814144 bytes

Recommendation for condition #1:

No recommendation. Sufficient NVM space available for the firmware package installation.

To display the PCB gen2 device OTP.

- 1) `niccli -i 1 show -g`
- 2) `) niccli -i 1 show --pcb_gen2_otp`

```
PCB Gen2 OTP Bit           : Not configured
```

pcie Command

=====

DESCRIPTION :

Query and configure the PCIe operations. This command is supported on Linux, Windows, VMWare and FreeBSD operating systems.

SYNTAX :

```
pcie <-c|--compliance> --state <0/1>
pcie <-c|--compliance> --show
```

OPTIONS :

```
-c|--compliance : This option is used to query or configure the pcie compliance operations.
--state         : This option is used to configure the pcie compliance state to
                  enable/disable.
                  The valid values for this option are:
                  0 - Disable
                  1 - Enable
--show          : This option is used to query the pcie compliance state.
```

EXAMPLES :

- 1) `niccli -i 1 pcie --compliance --show`

```
PCIe Compliance : Disabled
```

- 2) `niccli -i 1 pcie --compliance --state 0`

```
PCIe compliance disabled successfully.
```

```
A system reboot is needed for the PCIe compliance take to effect.
```

udcc Command

=====

DESCRIPTION :

This command is used to query and configure user defined congestion control of IFA 2.0 (In-band Flow Analyzer) to improve the accuracy of network congestion estimation using network telemetry such as network latency and/or destination port utilization.

This command is supported only on the linux operating system.

SYNTAX :

```
udcc <-a|--ifa> --show
```

```
udcc <-a|--ifa> --set [-p|--probe_pad_cnt <value>] [-t|--format <value>] [-g|--gns <value>]
    [-l|--hop_limit <value>] [-e|--req_vec <value>]
```

OPTIONS :

- show** : This option is used to show the udcc configuration details.
- set** : This option is used to configure the udcc parameters.
- p|--probe_pad_cnt** : This is an optional parameter used to configure the UDCC probe pad count.
The supported probe pad count values are as below :
 - 0 - No custom changes to probe packet.
 - 1 - The UDCC probe packet header's "PADCNT" field is set to 1
 - 2 - The UDCC probe packet header's "PADCNT" field is set to 2
 - 3 - The UDCC probe packet header's "PADCNT" field is set to 3
- t|--format** : This is an optional parameter used to configure the UDCC probe format type. The Supported UDCC probe format types are as below :
 - 0 - MAD (Management Datagram)
 - 1 - IFA 2.0 (Inband Flow Analyzer)
- g|--gns** : This is an optional parameter used to configure the global name space.
The valid range is from 0 to 15.
- l|--hop_limit** : This is an optional parameter used to configure the hop limit value.
The valid range is from 0 to 255.
- e|--req_vec** : This is an optional parameter used to configure the request vector value.
The valid range is from 0 to 255.

EXAMPLES :

To show the UDCC IFA 2.0 (Inband Flow Analyzer) details

```
1) niccli -i 1 udcc --ifa --show
```

```
Probe Packet Pad Count : 0
Probe Format : IFA 2.0
Global Name Space : 15
Hop Limit : 255
Request Vector : 255
```

To set the UDCC IFA 2.0 (Inband Flow Analyzer) parameters

- 1) `niccli -i 1 udcc --ifa --set --probe_pad_cnt 0 --format 1 --gns 15 --hop_limit 255 --req_vec 255`

```
UDCC In-band flow analyzer (IFA) parameters configured
successfully.
```

RoCE Command

=====

DESCRIPTION :

Query and configure the congestion notification and TOS DSCP parameters
This command is supported only in VmWare OS.

SYNTAX :

```
roce --cnp --show
roce --cnp --set [--state <0/1>] --dscp <value> -p|--priority <value> -E|--tos-ecn <value>
roce --stats --show
roce --set -T|--tos-dscp <value>
```

OPTIONS :

```
--show      : Gets parameters of the bnxtroce driver.
--set       : Sets congestion notification parameters for the bnxtroce driver.
--state     : congestion control Disable(0)/enable(1) setting
--dscp      : DSCP value for congestion notification packets (0-0x3F, default: 0).
-p|--priority : priority value for congestion notification packets.
-E|--tos-ecn : IP TOS ECN value settings 1 (0x1b) , 2(0x10b).
--stats     : Gets the stats for the NIC
-T|--tos-dscp : IP TOS DSCP value for RoCEv2 Traffic
```

EXAMPLES :

To display the cnp parameter

- 1) `esxcli niccli roce --dev -v vmnic4 --cnp --show`

```
Status      : Disabled
TOS ECN     : 0x1
TOS DSCP    : 0x0
Priority     : 0x0
```

To configure the cnp parameters

- 1) `esxcli niccli roce --dev -v vmnic4 --cnp --set --dscp 0 --state 0 -E 1`

Command executed successfully.

To display the stats of bnxtroce driver

1) esxccli niccli roce --dev -v vmnic4 --stats --show

```
port_id: 0
qp_cnt: 1
qp_reset_cnt: 0
qp_init_cnt: 0
qp_rtr_cnt: 0
qp_rts_cnt: 0
qp_sqd_cnt: 0
qp_sqe_cnt: 0
qp_err_cnt: 0
qp_event_cnt: 0
cq_cnt: 1
cq_event_cnt: 0
srq_cnt: 0
srq_event_cnt: 0
pd_cnt: 1
mr_cnt: 3
ah_cnt: 0
mw_cnt: 0
to_retransmits: 0
seq_err_naks_rcvd: 0
max_retry_exceeded: 0
rnr_naks_rcvd: 0
missing_resp: 0
unrecoverable_err: 0
bad_resp_err: 0
local_qp_op_err: 0
local_protection_err: 0
mem_mgmt_op_err: 0
remote_invalid_req_err: 0
remote_access_err: 0
remote_op_err: 0
dup_req: 0
res_exceed_max: 0
res_length_mismatch: 0
res_exceeds_wqe: 0
res_opcode_err: 0
```

```
res_rx_invalid_rkey: 0
res_rx_domain_err: 0
res_rx_no_perm: 0
res_rx_range_err: 0
res_tx_invalid_rkey: 0
res_tx_domain_err: 0
res_tx_no_perm: 0
res_tx_range_err: 0
res_irq_oflow: 0
res_unsup_opcode: 0
res_unaligned_atomic: 0
res_rem_inv_err: 0
res_mem_error: 0
res_srq_err: 0
res_cmp_err: 0
res_invalid_dup_rkey: 0
res_wqe_format_err: 0
res_cq_load_err: 0
res_srq_load_err: 0
res_tx_pci_err: 0
res_rx_pci_err: 0
tx_atomic_req_ext: 0
tx_read_req_ext: 0
tx_read_res_ext: 0
tx_write_req_ext: 0
tx_send_req_ext: 0
tx_roce_pkts_ext: 0
tx_roce_bytes_ext: 0
rx_atomic_req_ext: 0
rx_read_req_ext: 0
rx_read_res_ext: 0
rx_write_req_ext: 0
rx_send_req_ext: 0
rx_roce_pkts_ext: 0
rx_roce_bytes_ext: 0
rx_roce_good_pkts_ext: 0
rx_roce_good_bytes_ext: 0
rx_out_of_buffer_ext: 0
rx_out_of_sequence_ext: 0
tx_cnp_pkts_ext: 0
rx_cnp_pkts_ext: 0
tx_cnp_bytes_ext: 0
rx_cnp_bytes_ext: 0
rx_ecn_marked_ext: 0
ctx_tx_pkts_ext: 0
```

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```

ctx_tx_bytes_ext: 0
ctx_rx_pkts_ext: 0
ctx_rx_bytes_ext: 0
ctx_rx_ucast_pkts: 0
ctx_rx_mcast_pkts: 0
ctx_rx_bcast_pkts: 0
ctx_rx_discard_pkts: 0
ctx_rx_error_pkts: 0
ctx_rx_ucast_bytes: 0
ctx_rx_mcast_bytes: 0
ctx_rx_bcast_bytes: 0
ctx_tx_ucast_pkts: 0
ctx_tx_mcast_pkts: 0
ctx_tx_bcast_pkts: 0
ctx_tx_discard_pkts: 0
ctx_tx_error_pkts: 0
ctx_tx_ucast_bytes: 0
ctx_tx_mcast_bytes: 0
ctx_tx_bcast_bytes: 0
ctx_rx_tpa_eligible_pkt: 0
ctx_rx_tpa_eligible_bytes: 0
ctx_rx_tpa_pkt: 0
ctx_rx_tpa_bytes: 0
ctx_rx_tpa_errors: 0
[0] num_ints: 13402
[1] num_ints: 0
[2] num_ints: 0
[3] num_ints: 0
[4] num_ints: 0
[5] num_ints: 0
[6] num_ints: 0

```

To configure the information of bnxtroce driver

1) `esxcli niccli roce --dev -v vmnic4 --set --tos-dscp 0x1`

Command executed successfully.

9. VMware plugin command mapping table

From the VMWare version ESXi8.0 onwards niccli is signed to support the VMWare plugin standards in secure and non-secure mode. Below is the mapping table of niccli commands.

Category	Unsigned niccli commands	Signed niccli commands
Generic commands	niccli -v --version	esxcli niccli version
	niccli -l --list	esxcli niccli list
	niccli -d --list_devices	esxcli niccli listdevices
	niccli -e --list_ethernet	esxcli niccli listethernet
	niccli devid	esxcli niccli devid
config	niccli -i <index> nvm --view [-V] [-f <firmware package file name>] [-t --type <nvm directory name>]	esxcli niccli nvm -c i -v <index> --view [-y --verbosity] [-f --filename=<str>] [-t --type=<str>]
	niccli -i <index> nvm l --list [-V] [-f <firmware package file name>]	esxcli niccli nvm -c i -v <index> -l --list [-y --verbosity] [-f --filename=<str>]
	niccli -i <index> nvm --verify [-V] [-f <firmware package file name>]	esxcli niccli nvm -c i -v <index> --verify [-y --verbosity] [-f --filename=<str>]
	niccli -i <index> nvm -n --sync	esxcli niccli nvm -c i -v <index> -n --sync
	niccli -i <index> nvm -F --restore_factory_defaults [--silent]	esxcli niccli nvm -c i -v <index> -F --restore-factory-defaults
	niccli -i <index> nvm -r --dir_read -f <file name> -t --type <nvm directory name>	esxcli niccli nvm -c i -v <index> -r --dir-read -f --filename=<str> -t --type=<str>
	niccli -i <index> nvm w --dir_write -f <file name> -t --type <nvm directory name>	esxcli niccli nvm -c i -v <index> -w --dir-write -f --filename=<str> -t --type=<str>
	niccli -i <index> nvm -S --saveoptions -f <file name>	esxcli niccli nvm -c i -v <index> -d --saveoptions -f --filename=<str>
	niccli -i <index> nvm -O --optionhelp <option name>	esxcli niccli nvm -c i -v <index> -o --optionhelp=<str>
	niccli -i <index> nvm -g --getoption <option name> [--scope <scope index>]	esxcli niccli nvm -c i -v <index> -g --getoption -N --optionname=<str> [--scope=<str>]
	niccli -i <index> nvm -s --setoption <option names with comma seperated> -v --value <option value with comma seperated> [--scope <scope index>]	esxcli niccli nvm -c i -v <index> -s --setoption=<str> -u --value=<str> [--scope=<str>]

	niccli -i <index> nvm -b --backup [--cfg]	esxcli niccli nvm -c i -v <index> -b --backup [--cfg]
	niccli -i <index> nvm -L --listoptions --diff	esxcli niccli nvm -c i -v <index> -a --listoptions --diff
fwmanager	niccli -i <index> fw <-u --update> -f <package file> [--force] [-y --yes]	esxcli niccli fw -c i -v <index> -u --update -f --packagefile=<str> [--force] [-y --yes]
	niccli -i <index> fw --reset	esxcli niccli fw -c i -v <index> --reset
	niccli -i <index> fw <-l --livepatch> <--show>	esxcli niccli fw -c i -v <index> -p --livepatch --show
	niccli -i <index> fw <-l --livepatch> <-a --activate> [target_fw]	esxcli niccli fw -c i -v <index> -p --livepatch -a --activate [-w --targetfw=<str>]
	niccli -i <index> fw <-l --livepatch> <-d --deactivate> [target_fw]	esxcli niccli fw -c i -v <index> -p --livepatch -d --deactivate [-w --targetfw=<str>]
	niccli -i <index> fw <-l --livepatch> <-p --patch_update> [target_fw] -f <patch file>	esxcli niccli fw -c i -v <index> -p --livepatch -t --patchupdate [-w --targetfw=<str>] -f --packagefile=<str>
qos	niccli -i <index> qos <-E --ets> --show	esxcli niccli qos -c i -v <index> -E --ets --show
	niccli -i <index> qos <-n --ingress> --cosq --show [-p --persistent]	esxcli niccli qos -c i -v <index> -i --ingress --cosq --show [-p --persistent]
	niccli -i <index> qos <-n --ingress> --cosq --set --state <value> [--mode <value>] [-p --persistent]	esxcli niccli qos -c i -v <index> -i --ingress --cosq --set --state=<str> [--mode=<str>] [-p --persistent]
	niccli -i <index> qos <-e --egress> --cosq --show [-p --persistent]	esxcli niccli qos -c i -v <index> -r --egress --cosq --show [-p --persistent]
	niccli -i <index> qos <-e --egress> --cosq --set --state <value> [-p --persistent]	esxcli niccli qos -c i -v <index> -r --egress --cosq --set --state=<str> [-p --persistent]
	niccli -i <index> qos -g --timed_tx_pacing_rate_profile --show	esxcli niccli qos -c i -v <index> -g --timed-tx-pacing-rate-profile --show
	niccli -i <index> qos --roce_app_pri --set --pri <0-7>	esxcli niccli qos -c i -v <index> --roce-app-pri --set --pri=<str>

linkdiag	niccli -i <index> linkdiag -T --txfir --show <-M --modulation_type> <mod_type> <-l --lane> <lane_number>	esxcli niccli linkdiag -c i -v <index> -T --txfir --show -M --modulation-type=<str> -n --lane=<long>
	niccli -i <index> linkdiag -T --txfir --set <-M --modulation_type> <mod_type> <-l --lane> <lane_mask> --pre1 <value> --pre2 <value> [--pre3 <value>] --main <value> --post1 <value> --post2 <value> [--post3 <value> --amp <value> --nlcl <value> --nlcu <value>]	esxcli niccli linkdiag -c i -v <index> -T --txfir --set -M --modulation-type=<str> -n --lane=<long> --pre1=<str> --pre2=<str> [--pre3=<str>] --main=<str> --post1=<str> --post2=<str> [--post3=<str> --amp=<str> --nlcl=<str> --nlcu=<str>]
	niccli -i <index> linkdiag -F --fdrstat [--start] [--stop] [--clear] [--counters]	esxcli niccli linkdiag -c i -v <index> -F --fdrstat [--start] [--stop] [--clear] [--counters]
	niccli -i <index> linkdiag -D --dscdump -l --lane <lane_number> [-a --diag_level <level>]	esxcli niccli linkdiag -c i -v <index> -D --dscdump -n --lane=<long> [-a --diag-level=<long>]
cable	niccli -i <index> cable -m --module_info --show	esxcli niccli cable -c i -v <index> -m --module-info --show
	niccli -i <index> cable -r --read_module_eeprom [-p --page_number <page number> -o --offset <byte offset> -l --length <number of bytes> -b --bank <bank number> -i --i2c_address <i2c addr>]	esxcli niccli cable -c i -v <index> -r --read-module-eeprom -p --page-number=<str> -o --offset=<str> -n --length=<str> b --bank=<str> -i --i2c-address=<str>
	niccli -i <index> cable -w --write_module_eeprom -p --page_number <page number> -o --offset <byte offset> -v --value <bytes>	esxcli niccli cable -c i -v <index> -w --write-module-eeprom -p --page-number=<str> -o --offset=<str> -a --value=<str>
	niccli -i <index> cable -M --module_loopback -t --loopback_type <type> [--lane <module_lane_mask>]	esxcli niccli cable -c i -v <index> -M --module-loopback -t --loopback-type=<long> [--lane=<str>]
link	niccli -i <index> link -s --status	esxcli niccli link -c i -v <index> -s --status
	niccli -i <index> link -c --counters --show	esxcli niccli link -c i -v <index> -o --counters --show

	<pre>niccli -i <index> link -p --port_state <port state value></pre>	<pre>esxcli niccli link -c i -v <index> -p --portstate=<port state value></pre>
	<pre>niccli -i <index> link -S --port_speed [--speed <value>] [--lanes <number_of_lanes>] -a --autoneg <on/off> [--fec <value>] [-t --training <on/off>]</pre>	<pre>esxcli niccli link -c i -v <index> -S --port-speed [--speed=<str>] [--lanes=<str>] -a --autoneg=<str> [--fec=<str>] [-t --training=<str>]</pre>
	<pre>niccli -i <index> link -P --precoding <enable/disable></pre>	<pre>esxcli niccli link -c i -v <index> -P --precoding=<str></pre>
timesync	<pre>niccli -i <index> timesync <-d --dutycycle> <--period> <value> --up <value></pre>	<pre>esxcli niccli timesync -c i -v <index> -d --dutycycle --period=<str> --up=<str></pre>
	<pre>niccli -i <index> timesync <--dll> <-s --source> <value> <-q --frequency> <value></pre>	<pre>esxcli niccli timesync -c i -v <index> --dll -o --source=<value> -q --frequency=<value></pre>
	<pre>niccli -i <index> timesync <--ptp> --show</pre>	<pre>esxcli niccli timesync -c i -v <index> -p --ptp --show</pre>
	<pre>niccli -i <index> timesync <--ptp> --set <-p --primary_pf> <pid> [<-v --primary_vf> <vfid>] [<-P --secondary_pf> <pfid>] [<-V --secondary_vf> <vfid>]</pre>	<pre>esxcli niccli timesync -c i -v <index> -p --ptp --set -r --primarypf=<str> [-x --primaryvf=<str>] [-z --secondarypf=<str> -w --secondaryvf=<str>]</pre>
	<pre>niccli -i <index> timesync <--synce> --show</pre>	<pre>esxcli niccli timesync -c i -v <index> -y --synce --show</pre>
	<pre>niccli -i <index> timesync <--synce> --set <-Q --frequency_profile> <value> [<-c --primary_clock_state> <value>] [<-C --secondary_clock_state> <value>]</pre>	<pre>esxcli niccli timesync -c i -v <index> -y --synce --set -b --frequency-profile=<str> [-u --primary-clock-state=<str>] [-C --secondary-clock-state=<str>]</pre>
	<pre>niccli -i <index> timesync <--tsio> --show</pre>	<pre>esxcli niccli timesync -c i -v <index> --tsio --show</pre>
	<pre>niccli -i <index> timesync <--tsio> <-t --tsio_function_pin> <idx> <-u --pin_usage_string> <value> <--state> <value></pre>	<pre>esxcli niccli timesync -c i -v <index> --tsio -t --tsio-function-pin=<str> -k --pin-usage-string=<str> --state=<str></pre>

counters	niccli -i <index> counters -p --pcie [-V]	esxcli niccli counters -c i -v <index> -p --pcie -V --verbosity
	niccli -i <index> counters -c --clear	esxcli niccli counters -c i -v <index> -a --clear
	niccli -i <index> counters -P --port [--dir <rx/tx>]	esxcli niccli counters -c i -v <index> -P --port --dir=<str>
	niccli -i <index> counters -r --roce	esxcli niccli counters -c i -v <index> -r --roce
	niccli -i <index> counters --l2	esxcli niccli counters -c i -v <index> --l2
NIC Information	niccli -i <index> show [-d --device_info]	esxcli niccli show -c i -v <index> [-i --device-info]
	niccli -i <index> show -p --pkg_ver [-f <firmware package file(s)>]	esxcli niccli show -c i -v <index> -p --pkg-ver [-f --filename=<str>]
	niccli -i <index> show -D --device_pci_ids [-f <firmware package file(s)>]	esxcli niccli show -c i -v <index> -d --device-pci-ids [-f --filename=<str>]
	niccli -i <index> show -c --certificate [-s --slot <number>]	esxcli niccli show -c i -v <index> -R --certificate [s --slot=<value>]
	niccli -i <index> show -n --nvm_measurement	esxcli niccli show -c i -v <index> -n --nvm-measurement
	niccli -i <index> show --all	esxcli niccli show -c i -v <index> --all
	niccli -i <index> show --health	esxcli niccli show -c i -v <index> --health
	niccli -i <index> show -r --recommendations [--nvm [-f <firmware package>]] [--pcie] [-V]	esxcli niccli show -c i -v <index> -r --recommendations[--nvm [-f --filename=<str>]] [--pcie] [-y --verbosity]
tunnel	niccli -i <index> tunnel --cfg --vxlan <-t --type> <ipv4 ipv6> --show	esxcli niccli tunnel -c i -v <index> --cfg --vxlan -t --type=<str> --show
	niccli -i <index> tunnel --cfg --vxlan <--add> <-t --type> <ipv4 ipv6> <-p --dest_port> <value>	esxcli niccli tunnel -c i -v <index> --cfg --vxlan --add -t --type=<str> -p --destport=<long>
	niccli -i <index> tunnel --cfg --vxlan <--del> <-t --type> <ipv4 ipv6> <-p --dest_port> <value>	esxcli niccli tunnel -c i -v <index> --cfg --vxlan --del -t --type=<str> -p --destport=<long>
	niccli -i <index> tunnel --cfg <--rss>	esxcli niccli tunnel -c i -v <index> --cfg

	--show	--rss --show
	niccli -i <index> tunnel --cfg <--rss> --set <--mode> <inner/outer>	esxcli niccli tunnel -c i -v <index> --cfg --rss --set --mode=<str>
	niccli -i <index> tunnel --cfg <-g --gre_tunnel_offload> --show	esxcli niccli tunnel -c i -v <index> --cfg -g --gre-tunnel-offload --show
	niccli -i <index> tunnel --cfg <-g --gre_tunnel_offload> --set --state <enable/disable>	esxcli niccli tunnel -c i -v <index> --cfg -g --gre-tunnel-offload --set --state=<str>
ring resource configuration	niccli -i <index> resmgtmt [--pf/--all] [<-p --profile> <--min> <--max> <-r --roce_max> <-m --max_completion_rings> <-s --strategy>] --show	esxcli niccli resmgtmt -c i -v <index> [--pf/--all] [<-p --profile> --min --max <-r --roce-max> <m --max-completion-rings> <-s --strategy>] --show
	niccli -i <index> resmgtmt [--pf/--all] --set [<-p --profile> <--min> <--max> <-r --roce_max> <-m --max_completion_rings>] [<--bw <bandwidth of each pf with comma separated>] [<-s --strategy> < minimal/maximal/minimal-static>]	esxcli niccli resmgtmt -c i -v <index> [--pf/--all] --set [<-p --profile> --min --max <-r --roce-max> <m --max-completion-rings>] [-b --bw=<str>] [<-s --strategy> -y --strategyto=<str>]
Congestion Control Configuration	niccli -i <index> ccparams -d --dump	esxcli niccli ccparams -c i -v <index> -d --dump
	niccli -i <index> ccparams --set -f <configuration file>	esxcli niccli ccparams -c i -v <index> --set -f --configfile=<str>
debug	niccli -i <index> debug -c --coredump [-l --l1cc] [-f <file name>]	esxcli niccli debug -c i -v <index> -r --coredump [-L --l1cc] [-f --filename=<str>]
	niccli -i <index> debug -s --snapdump [-f <file name>]	esxcli niccli debug -c i -v <index> -s --snapdump [-f --filename=<str>]
	niccli -i <index> debug -D --drv_dbg_mask --show -T --drv_type <value>	esxcli niccli debug -c i -v <index> -D --drv-dbg-mask --show -T --drv-type=<str>
	niccli -i <index> debug -D --drv_dbg_mask --value <value> -T --drv_type <value>	esxcli niccli debug -c i -v <index> -D --drv-dbg-mask --value=<str> -T --drv-type=<str>

PCle operations command	niccli -i <index> pcie <-c --compliance> --state <0/1>	esxcli niccli pcie -c i -v <index> -C --compliance --state=<str>
	niccli -i <index> pcie <-c --compliance> --show	esxcli niccli pcie -c i -v <index> -C --compliance --show
RoCE commands	niccli -i <index> roce --cnp --show	esxcli niccli roce -c i -v <index> --cnp --show
	niccli -i <index> roce --cnp --set [--state <0/1>] --dscp <value> -p --priority <value> -E --tos_ecn <value>	esxcli niccli roce -c i -v <index> --cnp --set --dscp=<str> --priority=<str> --state=<str> -E --tos-ecn=<str>
	niccli -i <index> roce --stats --show	esxcli niccli roce -c i -v <index> --stats --show
	niccli -i <index> roce --set -T --tos_dscp <value>	esxcli niccli roce -c i -v <index> --set -T --tos-dscp=<str>

/* End of file */