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
04	03/10/2026	Updated VMware limitation for help
05	07/16/2026	Updated the copyright year

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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 the BCM9574XX, BCM95750X, and BCM957608 family of devices.

2. Supported OSes

Architecture	Linux	Windows	Esxi 8	Esxi9	FreeBSD	UEFI	Darwin (macOS)
x86_64	x	x	x	x	x	x	x (Intel)
aarch64	x					x	x (Apple Silicon)

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>

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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.

Prerequisites for Online Firmware Update:
The online firmware update feature (--online option) requires curl to be installed:
pkg install curl

Prerequisites for Adapter Recovery:
The adapter recovery feature (fw --update --recovery) loads the firmware fastboot.bin (repaving image) files that are shipped in the FreeBSD package. On FreeBSD these files are not installed to a system path, so the recovery command must be run from a directory that contains them. The recommended approach is to run niccli.freebsd from the directory where the package was extracted, as it contains both niccli.freebsd and the *.bin.fastboot files.

If niccli.freebsd is run through a copied binary or a symbolic link (for example, the binary copied to /usr/local/bin with a "niccli" symlink), the *.bin.fastboot files must also be present in the current working directory from which the recovery command is invoked; otherwise the recovery will fail because the firmware fastboot.bin (repaving image) files cannot be located.

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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.

3.6 Executing the NICCLI Configuration Utility in Darwin (macOS)

To execute the NICCLI Configuration Utility on Darwin (macOS), unzip the provided Darwin package file and use the `niccli` binary to run it on Broadcom Ethernet Network interface cards.

Note: Darwin support includes both arm64 (Apple Silicon) and x86_64 (Intel) architectures. The utility requires macOS 11.0 (Big Sur) or later.

Prerequisites for Online Firmware Update:

The online firmware update feature (--online option) requires curl to be installed.
curl is typically pre-installed on macOS. To verify:

```
which curl
```

If not available, install via Homebrew:

```
brew install curl
```

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 utility 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.

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<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

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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

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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 scripting.

To launch in Interactive Mode, use the following command:
<NIC CLI executable> [-i <index of the target> | --pci <NIC pci address>]

Use the following command to display the list of available commands for Interactive Mode:
'help'

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

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<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. VMware staging does not allow you to create or log files other than a datastore directory. So manually use the "nicclilog.ini" file.

3. Users can disable the default logging by removing or renaming 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 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

; 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)
```

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```
;                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.

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7) 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.

8) In XenServer 9.0 and above if the operating system kernel is in lockdown mode, then the user has to disable the secure boot and remove the lockdown for niccli to function properly.
Commands to remove the kernel lockdown in Xenserver 9.0:

```
# bootctl | grep Secure
# /opt/xensource/libexec/xen-cmdline --set-dom0 module.sig_enforce=0
# /opt/xensource/libexec/xen-cmdline --set-dom0 lockdown_disable
# reboot
```

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.

11) To perform recovery on Windows and VMware, the L2 driver must be loaded successfully and the PF interface must be available for the application to perform recovery.

12) A system cold boot is mandatory following a successful recovery. If a cold boot is not performed, any subsequent niccli commands may fail as expected.

13) On FreeBSD, adapter recovery (fw --update --recovery) requires the firmware fastboot.bin (repaving image) files shipped in the package to be available in the current working directory from which the command is run. The FreeBSD package is a tar.gz and does not install these files to a system path. If niccli.freebsd is run from a copied location or through a symbolic link, ensure the *.bin.fastboot files are present in the working directory, or run the recovery command from the extracted package directory.

7.1 VMWare Limitations

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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 command displayed in json output.

5) For firmware update and recovery, the esxcli plugin command prints all output at the end of the operation. The VMware ESXCLI plugin does not support streaming output to stdout during command execution.

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 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

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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.

6) The NICCLI command execution will be slow when inbox/upstream drivers are loaded.

7) In case of writing/reading huge amounts of data from the hardware to user space, users might notice the considerable delay in the command completion when inbox/upstream drivers are loaded.

8) When logging options such as --verbose, --debug and –log are specified with a filename, only the required and debug specific output is written to a specified file. These options need not redirect every output to the given file.

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, Oneline Mode and Batch Mode.

SYNOPSIS
niccli [OPTIONS] <COMMAND> [Params]

Options

Command	Description
-i|--index	Index of the target
--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)

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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

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pcie	Query and configure the PCIe operations

fw commands
==========

DESCRIPTION :
Performs Firmware operations

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

NOTE:
- Multi-card firmware update updates devices serially (one at a time) for stability.
- Devices without compatible firmware packages are automatically skipped.
- A summary is displayed after all devices have been processed.
- The update continues even if some devices fail or are skipped.
- Multi-card firmware update (using multiple -f options or shell wildcard expansion with *.pkg) is not supported on VMware. For VMware, use single-device firmware update by specifying the device index (-i) with a single -f option.

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.

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-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 ...
####################################
```

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```
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.
```

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```
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 ...

############################################################

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

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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

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```
        "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!
```

To update all cards with multiple packages (heterogeneous environment)

1) niccli -i 1 fw --update -f pkg1.pkg pkg2.pkg pkg3.pkg --yes
2) niccli -i 1 fw --update -f *.pkg --yes

```
Multi-card firmware update mode detected

================================================================
     MULTI-CARD FIRMWARE UPDATE - SERIAL MODE
================================================================
Total cards discovered: 3
Package files: 3
  [1] BCM957504-P425G.pkg
  [2] BCM957608-P2200GQF00.pkg
  [3] Th57414_2x25.pkg

NOTE: Each device will be matched with compatible package(s)

WARNING: Do not power cycle or reboot the system while firmware
         update is in progress as devices may become inoperable.

Updating firmware on all 3 discovered NIC device(s) ...
```

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```
================================================================
Updating Device 1: NIC [0000:1d:00.0]
================================================================
Active Package Version - 239.1.53.0 : Package Version on NVM -
239.1.53.0

NetXtreme-E Controller at PCI Domain 0000:1d:00:0
Device 0000:1d:00:0 : Installing package file
BCM957608-P2200GQF00.pkg
Device 0000:1d:00:0 : will be updated to package version 238.1.120.0
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.
Device 1: Firmware update completed successfully

================================================================
Updating Device 3: NIC [0000:38:00.0]
================================================================
Active Package Version - 39.10.45.00 : Package Version on NVM -
39.10.45.00

NetXtreme-E Controller at PCI Domain 0000:38:00:0
Device 0000:38:00:0 : Installing package file Th57414_2x25.pkg
Device 0000:38:00:0 : will be updated to package version 38.11.20.00
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.
Device 3: Firmware update completed successfully

================================================================
Updating Device 5: NIC [0000:39:00.0]
================================================================
Active Package Version - 239.1.44.0 : Package Version on NVM -
239.1.44.0

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

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```
Device 0000:39:00:0 : Installing package file BCM957504-P425G.pkg
Device 0000:39:00:0 : will be updated to package version 238.1.120.0
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.
Device 5: Firmware update completed successfully

================================================================
           MULTI-CARD FIRMWARE UPDATE SUMMARY
================================================================

[SUCCESS] Device 1: NIC [0000:1d:00.0]
[SUCCESS] Device 3: NIC [0000:38:00.0]
[SUCCESS] Device 5: NIC [0000:39:00.0]

----------------------------------------------------------------
Successful:    3
Failed:        0
================================================================

NOTE: A system reboot is required for the firmware updates to take
effect.


Total number of cards updated: 3
```

nvm commands
==========

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.

1) The view option is supported on Linux, Windows, VMWare, Darwin and FreeBSD operating systems.

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2) The backup [--cfg] option is supported on Linux, Windows, VMWare, Darwin operating systems and UEFI Platform.
3) The nvm --dir_read and --dir_write options are supported on Linux, Windows, VMWare, Darwin and FreeBSD operating systems.
4) The nvm --dump option is supported on Linux, Windows, VMWare, Darwin and FreeBSD operating systems.

Note:

1. 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.

2. "nvm --restore_factory_defaults --link" is only supported for BCM9575xxx and above devices.

3. "--default" is only supported for BCM9575xxx and above devices. This option is valid only when used with the "--getoption" and "--setoption" command options.

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 [-k |--link] [--silent]
nvm --remove_onboard_config
nvm -D|--defrag
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 <-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.
-k|--link                       : Restores link NVM configuration to factory defaults.
```

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--remove_onboard_config : Removes onboard and system configuration so default follow factory only.

-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.
-D|--defrag : This option is used to reduce the fragmentation of the nvm.
-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 message.
-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
```

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```
    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
    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
```

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```
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
 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
           2 CRTImage           0.0   2118912/2118912 0000
235.1.41.0
           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
```

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```
   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
```

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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:

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
```

1) 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 curent and default config settings:

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

```
 NVM Option Name      Current               Default
                      Configuration         Configuration
------------------  -----------------     ----------------
```

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```
  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)
```

To extracts the NVRAM content and performs 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.
```

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```
#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…
```

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```
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
```

To reduce the fragmentation of the NVM:

1) niccli -i 1 nvm --defrag

```
NVM defragmentation is in progress. Please wait for few minutes
to complete

NVM defragmention completed successfully
```

To remove onboard config:

1) niccli -i 1 nvm --remove_onboard_config

```
Removed onboard and system configuration. A system reboot is
needed to take effect.
```

qos commands

==========

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, Darwin 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 on Linux and FreeBSD operating systems.

3) –sch_grp , --virt_mhost and --ecn commands are supported only on the Linux operating system.

4) roce-app-pri option is supported only on the VmWare operating system.

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>

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```
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
qos --sch_grp -a|--add
qos --sch_grp --id <group id> -E|--ets --tsa <tc[0-7]:[ets|strict], ...> --tcbw <list>
qos --sch_grp --id <group id> --max_bw <max bandwidth value>
qos --sch_grp --id <group id> --fid_map [--pf <comma separated pf ids|range>]
   [--pf0_vf <comma separated vf ids|range>] [--pf1_vf <comma separated vf ids|range>]
qos --sch_grp --id <group id> --show
qos --sch_grp --id <group id> -d|--del
qos --sch_grp --list
qos --ecn -q|--traffic_class <tc value> --threshold <value>
qos --ecn -q|--traffic_class <tc value> --disable
qos --ecn -q|--traffic_class <tc value> --show
qos --virt_mhost --show
qos --virt_mhost --vf <vf_index> --show
qos --virt_mhost --vf <vf_index> --cosq_idx <cosq index> [--tx_rate <tx rate limit>] [--rx_rate
      <rx rate limit>]
qos --virt_mhost --vf <vf_index> --disable
```

OPTIONS :

-E|--ets : Query or Configure enhanced transmission selection, priority to traffic class, traffic class bandwidths and the list of configured application tlvs.

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--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.

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--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.

--sch_grp : This option is used to add, configure, query, or delete scheduler groups.

--id : This option is used for user to provide the valid scheduler group id.

--max_bw : This option is used to assign maximum bandwidth in units of Mbps to a scheduler group. Users can configure the max bandwidth for default (0) scheduler group ID.

--fid_map : This option is used to map the function ids to an existing scheduler group.

--list : This option is used to list all the available scheduler group.

--pf : This option is used to map the physical functions to an existing scheduler group. The input can be a comma separated list of physical function IDs or a range(x-y).

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--pf0_vf : This option is used to map PF0 virtual functions to an existing scheduler group. The input can be comma separated list of PF0 virtual function IDs or a range(x-y).

--pf1_vf : This option is used to map PF1 virtual functions to an existing scheduler group. The input can be comma separated list of PF0 virtual function IDs or a range(x-y).

--pf2_vf : This option is used to map PF2 virtual functions to an existing scheduler group. The input can be comma separated list of PF0 virtual function IDs or a range(x-y).

--pf3_vf : This option is used to map PF3 virtual functions to an existing scheduler group. The input can be comma separated list of PF0 virtual function IDs or a range(x-y).

--ecn : Configure or query ECN threshold on a specific traffic class.
-q|--traffic_class : This option can be used to specify traffic class from 0 to 7.
--threshold : This option is used to set the ECN threshold as a percentage from 1 to 100.
--disable : This option is used to disable the ECN threshold on the specified traffic class.

--show : This option is used to display the ECN configuration for the specified traffic class.

-E|--ets : Query enhanced transmission selection, priority to traffic class.

-D|--dscp2prio : Query the dscp to priority mapping.

--virt_mhost : Query and configure the virtual multi-host per-VF cosq tx/rx rate Limits.

--vf : Specifies the VF index for the virtual multi-mhost operation.

--cosq_idx : Enables RXP steering to cosq. The valid range is from 0 to 7.

--tx_rate : This option is used to configure Tx rate limit in units of Mbps for the cosq of the specified VF.

--rx_rate : This option is used to configure Rx rate limit in units of Mbps for the cosq of the specified VF.

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--disable : This option is used to disable all steering and shaping on a given VF index.

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)
```

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```
    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.
```

1) 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.
```

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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
```

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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

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```
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
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
**   ******
```

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```
        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
```

To query a scheduler group configuration

1) niccli -i 3 qos --sch_grp --id 1 --show

```
  Scheduler Group ID        : 1
  Max Bandwidth             : 200000 Mbps
  Number of FIDs Mapped     : 14
  Queue (TC) Configuration  :
  TC  TSA   Min BW (%)
  -  ---   ----------
   0  ETS      70
   1  ETS      20
   2  ETS      10
  Scheduler Group FID Mapping :
   Index  Description    FID
   -----  -----------    ---
       0  PF            0
       1  PF0 VF        0-3, 6-7
       2  PF1 VF        0-5, 7
```

To create a fid mapping to a scheduler group

2) niccli -i 3 qos --sch_grp --id 1 --fid_map --pf 0,1 --pf0_vf 0-5,7 --pf1_vf 0-2,4-7

```
Function IDs are mapped successfully to the given scheduler group ID.
```

Below command is observed only in VmWare OS

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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 and Darwin operating system
2) DSC Dump options are supported on Linux, VMWare, Darwin and FreeBSD operating systems.
3) Loopback options are supported only on Linux and Darwin operating systems.
4) PRBS Test options are supported on the Linux and Darwin operating system and UEFI Platform.
5) TxFir options are supported on Linux, Windows, Darwin, 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_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>][--speed <speed_value>] [--tcode] [-b|--ber
<value>]

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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 is 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

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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 range is from 0 to 100.

--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

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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

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'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 a t-code project as Well.
--speed : Specify the link speed (e.g., 100Gb-PAM4-56, 100Gb-PAM4-112, 100Gb). If not specified, maximum supported speed will be set automatically.

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

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

```
Transmit Finite Impulse Response (TxFIR):
Pre1   : 1
Pre2   : -2
Pre3   : 10
```

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```
 Main   : 12
 Post1  : -10
 Post2  : 15
 Nlcl   : 0
 Nlcu   : 1
```

2) 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
```

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

```
Transmit Finite Impulse Response (TxFIR):
Pre1   : 0
Pre2   : 0
Main   : 127
Post1  : 0
Post2  : 0
Post3  : 0
Amp    : 10
```

4) 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.
```

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To Stop the fdrstat
2) 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

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```
      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
```

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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 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
```

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```
      (result)  3 PRBS_31      0          0      PRBS_31      0
0       0   1  0000000000   !Lock
      PRBS loopback test report is generated successfully.
```

To run the PRBS Test with user specified speed

1) niccli -i 1 linkdiag --prbs_test --enable --mode PRBS31 --rx_lane_mask 255 --tx_lane_mask 255 --speed 100Gb-PAM4-56

```
PRBS Test is running. Please wait....
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)  0 PRBS_31      0          1      PRBS_31      0          1
0   1  0000000000   !Lock
(result)  1 PRBS_31      0          0      PRBS_31      0          0
0   1  0000000000   !Lock
(result)  2 PRBS_31      0          1      PRBS_31      0          0
0   1  0000000000   !Lock
(result)  3 PRBS_31      0          0      PRBS_31      0          1
0   1  0000000000   !Lock
DSC ready for command is not working; SerDes lane is probably reset!
DSC ready for command is not working; SerDes lane is probably reset!
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

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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 option 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 the user specifies this option, it will plot the eye and display 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
```

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```
UI/64  : -30  -25  -20  -15  -10  -5    0    5    10   15   20   25   30
       : -|----|----|----|----|----|----|----|----|----|----|----|----|-
 191mV : 11111111111111111111111111111111111111111111111111111111111111
 189mV : 11111111111111111111111111111111111111111111111111111111111111
 187mV : 11111111111111111111111111111111111111111111111111111111111111
 185mV : 11111111111111111111111111111111111111111111111111111111111111
 183mV : 11111111111111111111111111111111111111111111111111111111111111
 181mV : 11111111111111111111111111111111111111111111111111111111111111
 179mV : 11111111111111111111111111111111111111111111111111111111111111
 177mV : 11111111111111111111111111111111111111111111111111111111111111
 175mV : 11111111111111111111111111111111111111111111111111111111111111
 173mV : 11111111111111111111112122212222212221211111111111111111111111
 171mV : 11111111111111111222222222222222222222222221111111111111111111
 169mV : 11111111111111222222222222222222222222222222211111111111111111
 167mV : 11111111111112222222222222222222222222222222221111111111111111
 165mV : 11111111111122222222222223232323222222222222221111111111111111
 163mV : 11111111112222222222232333333333333332222222222211111111111111
 161mV : 11111111222222222232333333333333333333322222222221111111111111
 159mV : 11111111222222222333333333333333333333333322222222211111111111
 157mV : 11111111222222233333333343434444434343333333332222222211111111
 155mV : 11111111222223333333333444444444444444333333333322222211111111
 153mV : 11111112222223333333344444444444444444333333333222222111111111
 151mV : 11111112222233333334444444445555544444444433333332222211111111
 149mV : 11111112222333333444444445555555555555444444443333332222211111111
 147mV : 11111122222333344444444555555555555555544444444333322222111111
 145mV : 11111122223333444444445555655666665565555444444433332222111111
 143mV : 11111222233334444444555556666666666666555554444444333322211111
 141mV : 11112222233334444455555566667666667666655555544444333322221111
```

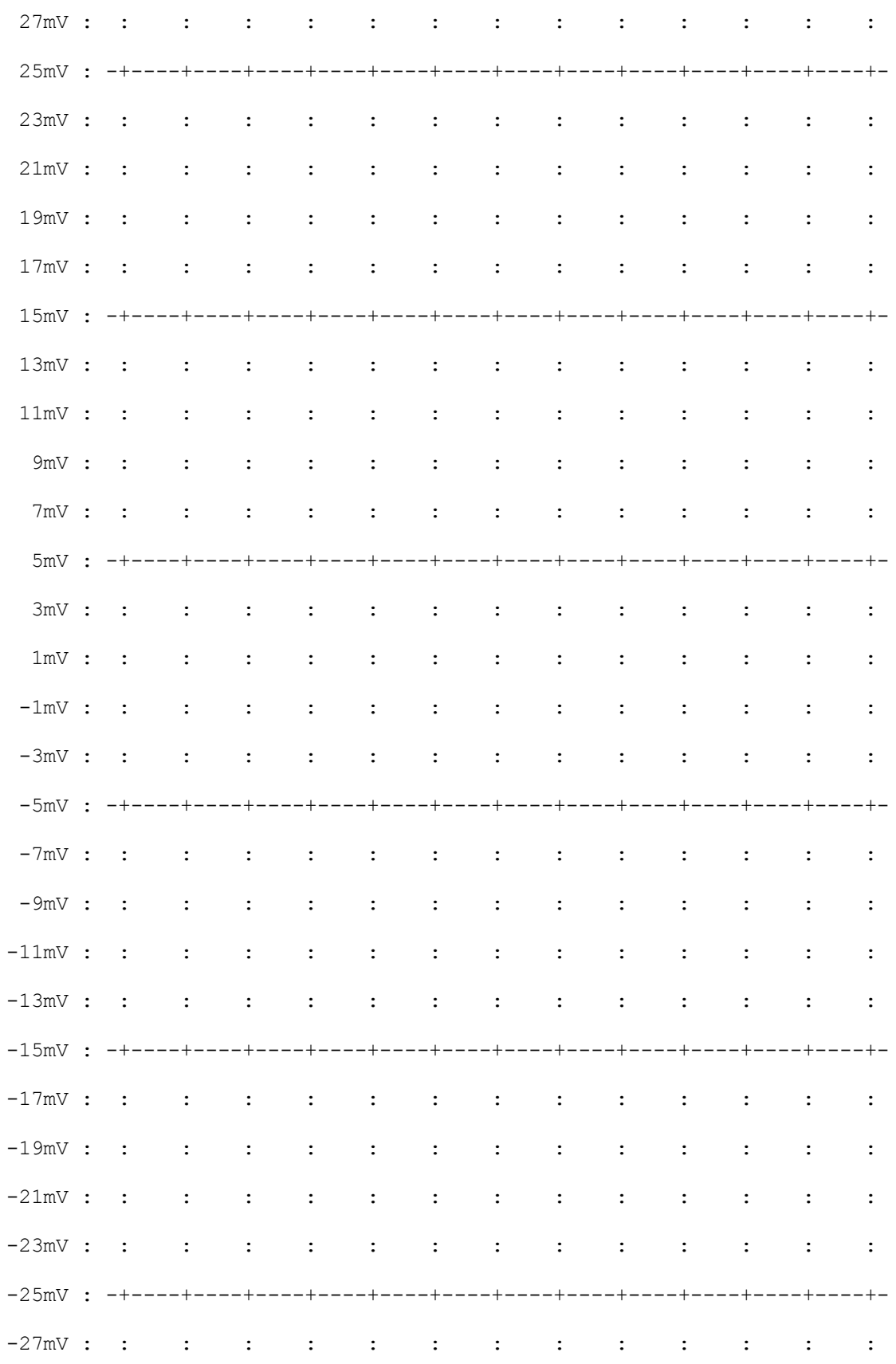
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```
139mV : 1111222233334444445555566767 7776777 767665555444443333222211111
137mV : 111122223334444455555566 7    :    7 66765555554444333222211111
135mV : 11122222333444555556666--7----7----7--666665555544433322222111
133mV : 1122222333444555566666    :    :    :    666655555443332222211
131mV : 11222223344455555566767   :    :    :   767665555554443322222111
129mV : 1222222334445556666677    7    :    7    776666655544433222222111
127mV : 222222333445556666  7:    :    :    :    :7  666655544333222222
125mV : 2222223344455666666-77----+----+----+----77-6666665544433222222
123mV : 222222334455567 66   :    :    :    :    :   66 765554433222222
121mV : 222223334555666777   :    :    :    :    :   777666555433322222
119mV : 2222233445566777:    :    :    :    :    :    :7776655443322222
117mV : 2222333445666 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
```

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```
83mV : 4445567    :    :    :    :    :    :    :    :    :    7655444
81mV : 444556:    :    :    :    :    :    :    :    :    :    :655444
79mV : 4455677    :    :    :    :    :    :    :    :    :    7765544
77mV : 44556 :    :    :    :    :    :    :    :    :    :    : 65544
75mV : 45566-+----+----+----+----+----+----+----+----+----+----+-66554
73mV : 45567 :    :    :    :    :    :    :    :    :    :    : 76554
71mV : 4556  :    :    :    :    :    :    :    :    :    :    :  6554
69mV : 556   :    :    :    :    :    :    :    :    :    :    :   655
67mV : 556   :    :    :    :    :    :    :    :    :    :    :   655
65mV : 5667--+----+----+----+----+----+----+----+----+----+----+--7665
63mV : 5677  :    :    :    :    :    :    :    :    :    :    :  7765
61mV : 66    :    :    :    :    :    :    :    :    :    :    :    66
59mV : 677   :    :    :    :    :    :    :    :    :    :    :   776
57mV : 6: 7  :    :    :    :    :    :    :    :    :    :    :  7 :6
55mV : 6+----+----+----+----+----+----+----+----+----+----+----+----+6
53mV : 6:    :    :    :    :    :    :    :    :    :    :    :    :6
51mV :  7    :    :    :    :    :    :    :    :    :    :    :    7
49mV :  :    :    :    :    :    :    :    :    :    :    :    :    :
47mV :  :    :    :    :    :    :    :    :    :    :    :    :    :
45mV : -+----+----+----+----+----+----+----+----+----+----+----+----+-
43mV :  :    :    :    :    :    :    :    :    :    :    :    :    :
41mV :  :    :    :    :    :    :    :    :    :    :    :    :    :
39mV :  :    :    :    :    :    :    :    :    :    :    :    :    :
37mV :  :    :    :    :    :    :    :    :    :    :    :    :    :
35mV : -+----+----+----+----+----+----+----+----+----+----+----+----+-
33mV :  :    :    :    :    :    :    :    :    :    :    :    :    :
31mV :  :    :    :    :    :    :    :    :    :    :    :    :    :
29mV :  :    :    :    :    :    :    :    :    :    :    :    :    :
```

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```
-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
```

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```
 -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 : 2222223344556566677  :    :    :    :    :  7766665544332222222
-119mV : 222222334445556667 67:    :    :    :    :76 766655544433222222
-121mV : 2222223344455556666 67:7   :    :    :   7:766666555544433222222
-123mV : 12222223344555556666 777  :    :    :  777 6666555554433222221
-125mV : 122222233444555556666+----+----+----+----+66665555544433222221
-127mV : 1122222333444555566667   :    :    :   7666655555444333222211
-129mV : 11122222334444555566667  7    :    7  76666555544444333222111
-131mV : 111222223334444555556677 77777:77777 776655555444443332222111
-133mV : 11112222333444444555556666:76  :  67:666655555444444333222111
-135mV : 1111222223334444444555656666767776766665655544444443332222211111
-137mV : 11111222233333444444555556666667666666555554444443333322221111
-139mV : 111112222233333444444555555666666666555555444444333332222211111
```

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```
-141mV : 1111112222333333444444455555555555555554444444333333222211111
-143mV : 11111122222333333444444455555555555555544444443333332222211111
-145mV : 111111122223333333444444444445555544444444443333333222211111
-147mV : 1111111222223333333444444444444444444443333333322222211111111
-149mV : 11111111222222333333334444444444444444333333333222222111111111
-151mV : 11111111222222223333333343444444444443433333333222222211111111
-153mV : 111111111222222223333333333333333333333333333322222222111111111
-155mV : 1111111111222222222333333333333333333333333322222222211111111111
-157mV : 11111111112222222222333333333333333333333322222222221111111111
-159mV : 111111111112222222222222233333333333222222222222222211111111111
-161mV : 1111111111112222222222222222222222222222222222211111111111
-163mV : 11111111111122222222222222222222222222222222221111111111111
-165mV : 111111111111111122222222222222222222222222211111111111111111
-167mV : 1111111111111111111122222222222222222222111111111111111111111
-169mV : 11111111111111111111111111121112111111111111111111111111111
-171mV : 11111111111111111111111111111111111111111111111111111111111
-173mV : 11111111111111111111111111111111111111111111111111111111111
-175mV : 11111111111111111111111111111111111111111111111111111111111
-177mV : 11111111111111111111111111111111111111111111111111111111111
-179mV : 11111111111111111111111111111111111111111111111111111111111
-181mV : 11111111111111111111111111111111111111111111111111111111111
-183mV : 11111111111111111111111111111111111111111111111111111111111
-185mV : 11111111111111111111111111111111111111111111111111111111111
-187mV : 11111111111111111111111111111111111111111111111111111111111
-189mV : 11111111111111111111111111111111111111111111111111111111111
-191mV : 11111111111111111111111111111111111111111111111111111111111
       : -|----|----|----|----|----|----|----|----|----|----|----|----|-
UI/64  : -30  -25  -20  -15  -10  -5    0    5    10   15   20   25   30
```

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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

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```
     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

  UI/64  : -30  -25  -20  -15  -10  -5    0    5    10   15   20   25   30
         : -|----|----|----|----|----|----|----|----|----|----|----|----|-
   191mV : 1111111111111111111111111111111111111111111111111111111111111111
   189mV : 1111111111111111111111111111111111111111111111111111111111111111
   187mV : 1111111111111111111111111111111111111111111111111111111111111111
   185mV : 1111111111111111111111111111111111111111111111111111111111111111
   183mV : 1111111111111111111111111111111111111111111111111111111111111111
   181mV : 1111111111111111111111111111111111111111111111111111111111111111
   179mV : 1111111111111111111111111111111111111111111111111111111111111111
   177mV : 1111111111111111111111111111111111111111111111111111111111111111
   175mV : 1111111111111111111111111111111111111111111111111111111111111111
   173mV : 1111111111111111111111111111111111111111111111111111111111111111
   171mV : 1111111111111111111122222222222222222222211111111111111111111111
   169mV : 1111111111111111222222222222222222222222222222211111111111111111
   167mV : 1111111111111122222222222222222222222222222222211111111111111111
   165mV : 1111111111112222222222222222222222222222222222211111111111111111
   163mV : 1111111111122222222222222233333333322222222222222211111111111111
   161mV : 1111111111122222222222333333333333333333322222222222211111111111
   159mV : 1111111111222222222333333333333333333333332222222222111111111111
   157mV : 1111111112222222233333333333333333333333333322222222111111111111
   155mV : 1111111122222223333333333444444444443333333333322222221111111111
   153mV : 1111111122222233333333444444444444444444433333333222222111111111
```

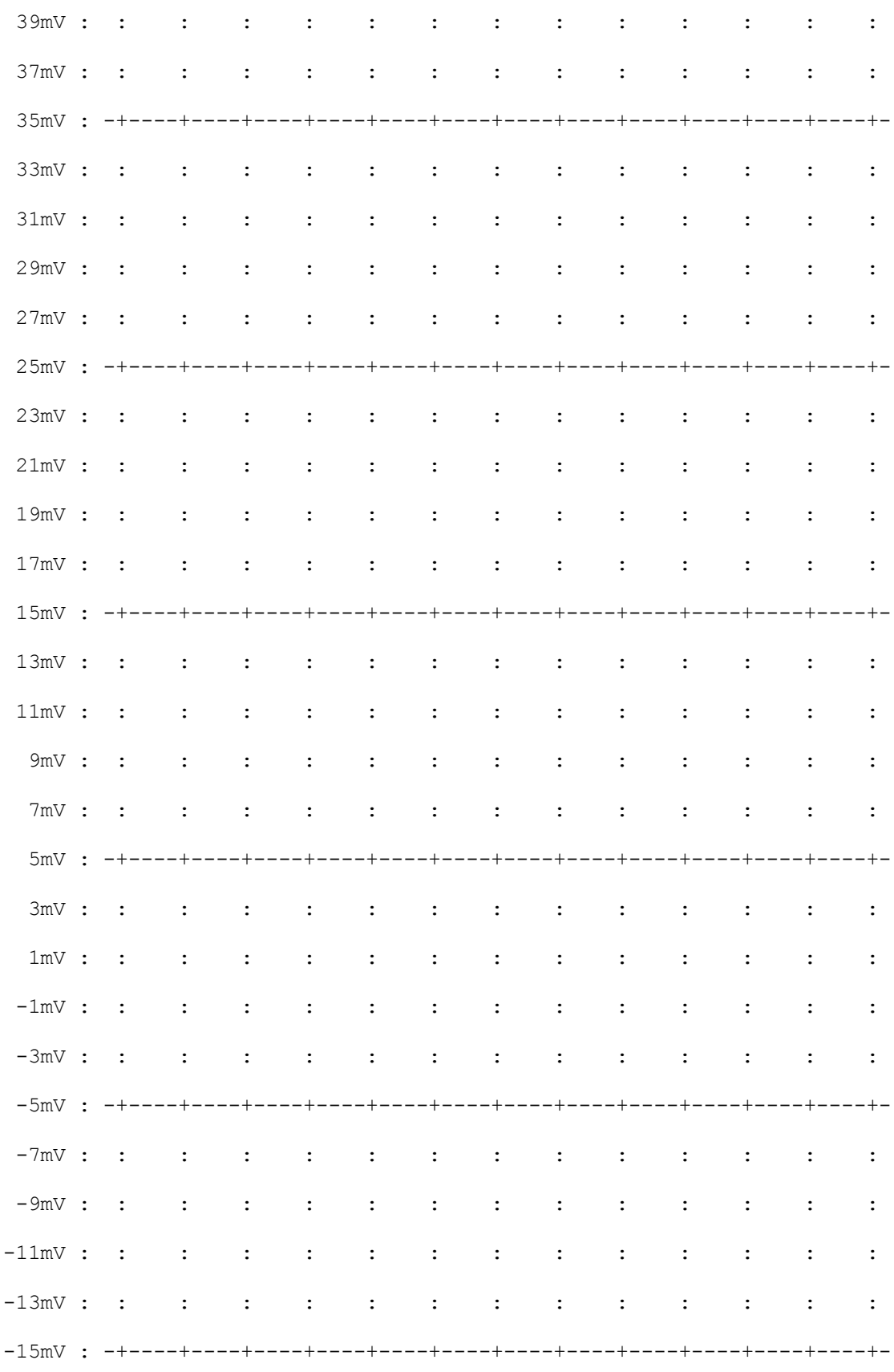
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```
151mV : 1111111222223333333334444444444444444444433333333322222111111111
149mV : 1111111222223333333444444445455555454444444433333333222221111111
147mV : 1111112222233333344444444555555555555544444444333333222222111111
145mV : 1111112222333333444444455555555655555555444444433333322222111111
143mV : 1111122222333334444445555555666666655555554444443333322222211111
141mV : 1111122223333444444455556666676767666665555444444433332222111111
139mV : 1111222223334444445555566667667776676666555554444443332222211111
137mV : 111122223334444445555666667767 : 767766666555544444433322221111
135mV : 11122222333444455555666-7777-7+7-7777-666555555444433322222111
133mV : 112222223344445555566677 :    :    : 77766655555444433222222211
131mV : 11222223334445556666 6  :    :    :  6 666665555444433322222111
129mV : 1222222334445555666677    :    :    :    776666555544433222222 1
127mV : 122222334455555666  7    :    :    :    7  66655555443332222 21
125mV : 2222223344555666666--+----+----+----+----+--66666555443332222 22
123mV : 2222223344555666:77  :    :    :    :    :  77:6665554433222222
121mV : 22222233445566 77    :    :    :    :    :    77 66554433222222
119mV : 222223344556667 7    :    :    :    :    :    7 766655443322222
117mV : 222223344556666777   :    :    :    :    :   777666655443322222
115mV : 2222333455566677+----+----+----+----+----+----+7766655543332222
113mV : 2222333455666 7 :    :    :    :    :    :    : 7 6665543332222
111mV : 2223333456677 7 :    :    :    :    :    :    : 7 7766543333222
109mV : 22233344566:    :    :    :    :    :    :    :    :66544333222
107mV : 223333455667    :    :    :    :    :    :    :    766554333322
105mV : 223334456--+7---+----+----+----+----+----+----+---7+--654433322
103mV : 22333445667:    :    :    :    :    :    :    :    :76654433322
101mV : 2333344567 :    :    :    :    :    :    :    :    : 7654433332
 99mV : 2333445567 :    :    :    :    :    :    :    :    : 7655443332
 97mV : 333344567  :    :    :    :    :    :    :    :    :  765443333
```

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```
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 :  :    :    :    :    :    :    :    :    :    :    :    :    :
```

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```
-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:    :    :    :    :    :    :    :    :    :    :665554
-71mV : 445566:    :    :    :    :    :    :    :    :    :    :665544
```

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```
 -73mV : 4455667    :    :    :    :    :    :    :    :    :    7665544
 -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+--7777765654433322222
-117mV : 222222334455566 6777 :    :    :    :    : 7776 665554433222222
-119mV : 2222223344455666676 7:    :    :    :    :7 67666655444332222222
-121mV : 222222334445556667676:    :    :    :    :676766655544433222222
-123mV : 22222223345555566677: 7   :    :    :  7 :7766655555443322222222
-125mV : 122222233444555556666777-77+----+----+77-776666555554443322222221
-127mV : 11222223334445555566676 7 :    :    : 7 6766655555444433222222211
```

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```
-129mV : 1122222333444455555556676 :    7    : 67665555555444433332222211
-131mV : 11122222333444455555566666:77  :  77:666665555554444333222221111
-133mV : 111122223334444455555666667 777:777 766666555554444433322221111
-135mV : 1111222223334444454555556666-77+77-666655555454444433322221111
-137mV : 11111222233334444444555556667677767666555554444444333322211111
-139mV : 111112222233334444444555556666666666655555444444433332222211111
-141mV : 1111112222333333444444555555656665655555544444433333322222111111
-143mV : 11111122222333333444444445555555555555444444443333332222211111
-145mV : 111111122222333333334444444555555555444444433333333222221111111
-147mV : 111111122222333333334444444544544544444443333333332222211111111
-149mV : 1111111122222233333333434444444444444443433333333222222211111111
-151mV : 11111111222222333333333334444444444433333333333322222211111111
-153mV : 111111111222222223333333333444444444333333333332222222211111111
-155mV : 1111111112222222222333333333333333333333333222222222211111111
-157mV : 11111111111222222222233333333333333333333322222222211111111111
-159mV : 111111111112222222222222233333333333222222222222222211111111111
-161mV : 111111111111222222222222223322323323222222222222222211111111111
-163mV : 1111111111111222222222222222222222222222222222211111111111111
-165mV : 11111111111111222222222222222222222222222222222211111111111111
-167mV : 111111111111111111122222222222222222222221111111111111111111
-169mV : 1111111111111111111111112221222122211111111111111111111111111
-171mV : 11111111111111111111111111111111111111111111111111111111111111
-173mV : 11111111111111111111111111111111111111111111111111111111111111
-175mV : 11111111111111111111111111111111111111111111111111111111111111
-177mV : 11111111111111111111111111111111111111111111111111111111111111
-179mV : 11111111111111111111111111111111111111111111111111111111111111
-181mV : 11111111111111111111111111111111111111111111111111111111111111
-183mV : 11111111111111111111111111111111111111111111111111111111111111
```

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```
-185mV : 11111111111111111111111111111111111111111111111111111111111111
-187mV : 11111111111111111111111111111111111111111111111111111111111111
-189mV : 11111111111111111111111111111111111111111111111111111111111111
-191mV : 11111111111111111111111111111111111111111111111111111111111111
       : -|----|----|----|----|----|----|----|----|----|----|----|----|-
UI/64  : -30  -25  -20  -15  -10  -5    0    5    10   15   20   25   30
```

To get the PCI serdes eye margins and Rx setings with specific lane number

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
       h1ne                   : 18
       h1no                   : 24
       h1pe                   : -7
       h1po                   : -3
       h2                     : -1
       h3                     : 0
       h4                     : 1
       h5                     : 0
       h6                     : 0
       h7                     : 0
       h8                     : 0
       h9                     : 0
       aeq                    : 240
       vga                    : 53
       appmd                  : 5
       shd                    : g4
```

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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...
```

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

          UI/64  :  -30  -25  -20  -15  -10  -5    0    5    10   15   20   25
30
         :  -|----|----|----|----|----|----|----|----|----|----|----|----|-
   459mV :  11111111111111111111111111111111111111111111111111111111111111
   437mV :  11111111111111111111111111111111111111111111111111111111111111
   415mV :  11111111111111111111111111111111111111111111111111111111111111
   393mV :  11111111111111111111111222111111111111111111111111111111111111
   371mV :  11111111111111111122223344554222121111111111111111111111111111
   349mV :  11111111111111122233446688    855534333322222211111111111111
   327mV :  1111111111112222335577---+----+----+8877553423221211111111111
   305mV :  111111111112222335577:    :    :    :    8866443322121111111111
   284mV :  11111111112223345 7  :    :    :    :    : 88564423221211111111
   262mV :  11111111122334466 8  :    :    :    :    :   775533222211111111
   240mV :  111111122233455 :    :    :    :    :    :    :6644332212111111
   218mV :  111111122334577-+----+----+----+----+----+----+8855342322111111
   196mV :  111111223446688 :    :    :    :    :    :    :  77443322121111
   174mV :  1111122335577   :    :    :    :    :    :    :  88563422221111
   152mV :  11112223466:    :    :    :    :    :    :    :    664433221211
   130mV :  11122234477:    :    :    :    :    :    :    :    885533221211
   109mV :  11122335588+----+----+----+----+----+----+----+----+-6644232211
    87mV :  112224466  :    :    :    :    :    :    :    :    : 7755332212
    65mV :  112234577  :    :    :    :    :    :    :    :    : 8866342222
    43mV :  122335588  :    :    :    :    :    :    :    :    :   66442322
    21mV :  1223466    :    :    :    :    :    :    :    :    :   88553322
     0mV :  1223466----+----+----+----+----+----+----+----+----+----+553322
   -22mV :  122335588  :    :    :    :    :    :    :    :    :   88553322
```

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```
   -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 :  11111111222233446688:    :    :    :    : 886644332212111111111
  -306mV :  111111111122222334567 88   :    :    :    : 664533222211111111111
  -328mV :  1111111111122222334566---+----+----+--8866453322221111111111111
  -350mV :  11111111111112222233446688    :   776645332322121111111111111
  -372mV :  111111111111111222222333566643222221111111111111111111111111111
  -393mV :  1111111111111111112222222222111111111111111111111111111111111111
  -415mV :  11111111111111111111111111111111111111111111111111111111111111111
  -437mV :  11111111111111111111111111111111111111111111111111111111111111111
  -459mV :  11111111111111111111111111111111111111111111111111111111111111111
                 :
-|----|----|----|----|----|----|----|----|----|----|----|----|-
  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>:
```

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```
Eye width margin at le-12 is 0.688129 UI
Eye height margin at le-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...
```

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

UI/64  :  -30  -25  -20  -15  -10  -5    0    5    10   15   20   25   30
       :  -|----|----|----|----|----|----|----|----|----|----|----|----|-
 459mV :  11111111111111111111111111111111111111111111111111111111111111
 437mV :  11111111111111111111111111111111111111111111111111111111111111
 415mV :  11111111111111111111111111111111111111111111111111111111111111
 393mV :  11111111111111111111111222111111111111111111111111111111111111
 371mV :  11111111111111111112222334454422212111111111111111111111111111
 349mV :  11111111111111122233445688    855534333322222211111111111111
 327mV :  11111111111122223355 77---+----+----+-+--665534232212111111111111
 305mV :  1111111111222233557 :    :    :    886644332212111111111
 284mV :  111111111222335577  :    :    :    : 88564423221211111111
 262mV :  11111111122334466    :    :    :    :   775533222211111111
 240mV :  11111112223345688    :    :    :    :    :6644332212111111
 218mV :  111111122335577-+----+----+----+----+----+----+8856342322111111
 196mV :  111111223446688 :    :    :    :    :    :    :  77453322121111
 174mV :  1111122335577   :    :    :    :    :    :    :  88563422221111
 152mV :  11112224466:    :    :    :    :    :    :    :    774433221211
 130mV :  11122234477:    :    :    :    :    :    :    :    775533222211
 109mV :  11122335688+----+----+----+----+----+----+----+----+----+-6644232211
  87mV :  112224466  :    :    :    :    :    :    :    :    :    : 7755332212
  65mV :  112234577  :    :    :    :    :    :    :    :    :    :   66342222
  43mV :  122335588  :    :    :    :    :    :    :    :    :    :   77442322
  21mV :  1223466    :    :    :    :    :    :    :    :    :    :   88553322
   0mV :  1223466----+----+----+----+----+----+----+----+----+----+----+553322
 -22mV :  1223355    :    :    :    :    :    :    :    :    :    :   88553322
```

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```
   -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 :  11111112222233446688:    :    :    :    :   664433221211111111
  -306mV :  1111111112222233456:    :    :    :    : 66443322221111111111
  -328mV :  11111111111222223345 66---+----+----+--886645332222111111111111
  -350mV :  111111111111112222233446688    :   77664433232212111111111111
  -372mV :  1111111111111112222223345566633222121111111111111111111111111111
  -393mV :  11111111111111111122222222221111111111111111111111111111111111
  -415mV :  1111111111111111111111111111111111111111111111111111111111111111
  -437mV :  1111111111111111111111111111111111111111111111111111111111111111
  -459mV :  1111111111111111111111111111111111111111111111111111111111111111
         :  -|----|----|----|----|----|----|----|----|----|----|----|----|-
  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 le-12 is 0.687464 UI

Eye height margin at le-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, Darwin 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>]

cable -P | --power <0/1>

cable -T | --tx_disable <0/1>

cable -s|--module_diag_stats --show

OPTIONS:

-m|--module_info : Get the module information

-s|--module_diag_stats : Query optical module diagnostic statistics

-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

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-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 loopbacks. This operation is supported only on CMIS 4.0 and above supported modules.

-t|--loopback_type : This option is used to run 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 the user specifies this option with a valid lane mask, then the module loopback will be run on the specified lanes.

--show : Displays the information in detail.

-P|--power : This option is used to control the physical power to the transceiver module. The valid values are 0 (power off) and 1 (power on)

-T|--tx_disable : This option is used to enable or disable the module transmitter. The valid values are 0 (disable) and 1 (enable)

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
```

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```
                                          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

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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 08
00
       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

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```
"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.
```

To power up the module

1) niccli -i 1 cable -P 1
2) niccli -i 1 cable --power 1

```
Module powered up successfully.
```

To power down the module

1) niccli -i 1 cable -P 0
2) niccli -i 1 cable --power 0

```
Module powered down successfully.
```

To enable the module transmitter

1) niccli -i 1 cable -T 1
2) niccli -i 1 cable --tx_disable 1

```
Module transmitter enabled successfully.
```

To disable the module transmitter

1) niccli -i 1 cable --tx_disable 0
2) niccli -i 1 cable -T 0

```
Module transmitter disabled successfully.
```

To show optical module diagnostic statistics

1) niccli -i 1 cable -s --show
2) niccli -i 1 cable --module_diag_stats --show

```
Optical Module Diagnostic Statistics :
====================================


[Module Identity]
  Module Type                              : 0x0b (SFF-8024)
  SFF Format                               : 0 (SFF-8472 legacy)
  Connector Type                           : 0x02
```

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```
  Host Lane Count                         : 1
  Media Lane Count                        : 1
  Module Fault                            : 0 (non-zero = fault
detected)
  Fault Cause                             : 0 (none)

[Module Status]
    Enforcement State                     : none
    Module Detected                       : yes
    Current Fault                         : no
    Dual Rate Support                     : no
    Diag Data Valid                       : no
    Module Fault                          : no
    Module Unsupported                    : no
    Module Ready                          : yes
    Module Reconfig Done                  : no
    Power State                           : power-on (4)
    Bad A0 Data                           : no

[Real-time Measurements]
  Module Temperature                      : N/A
  Module Supply Voltage                   : N/A
  High Temp Alarm Threshold               : N/A
  High Temp Warn Threshold                : N/A

[Module Alarm and Warning]
    No active alarms or warnings

[Per-lane Alarm and Warning]
  Rx Power Alarms and Warnings :
    No Rx power alarms or warnings
  Tx Bias Alarms and Warnings :
    No Tx bias alarms or warnings
  Tx Power Alarms and Warnings :
    No Tx power alarms or warnings

[Lane Status Flags]
  Rx CDR Loss-of-Lock                     : 0x00
  Tx CDR Loss-of-Lock                     : 0x00
  Rx Loss-of-Signal                       : 0x00
  Tx Loss-of-Signal                       : 0x00
  Tx Fault/Failure                        : 0x00
  Tx Adaptive EQ Fault                    : 0x00

[Status Change]
```

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```
    Tx Failure Changed                    : no
    Tx LOS Changed                        : no
    Tx LOL Changed                        : no
    Tx Adaptive EQ Failure Changed        : no
    Rx LOS Changed                        : no
    Rx LOL Changed                        : no

[Per-lane Measurement]
  Rx optical power per lane :
    lane 0: 0.000 mW
    lane 1: 0.000 mW
    lane 2: 0.000 mW
    lane 3: 0.000 mW
    lane 4: 0.000 mW
    lane 5: 0.000 mW
    lane 6: 0.000 mW
    lane 7: 0.000 mW
  Tx laser bias current per lane :
    lane 0: 0.000 mA
    lane 1: 0.000 mA
    lane 2: 0.000 mA
    lane 3: 0.000 mA
    lane 4: 0.000 mA
    lane 5: 0.000 mA
    lane 6: 0.000 mA
    lane 7: 0.000 mA
  Tx optical power per lane :
    lane 0: 0.000 mW
    lane 1: 0.000 mW
    lane 2: 0.000 mW
    lane 3: 0.000 mW
    lane 4: 0.000 mW
    lane 5: 0.000 mW
    lane 6: 0.000 mW
    lane 7: 0.000 mW
  Media lane BER :
    lane 0: 0
    lane 1: 0
    lane 2: 0
    lane 3: 0
    lane 4: 0
    lane 5: 0
    lane 6: 0
    lane 7: 0
  Media lane SNR per LSB :
```

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```
        lane 0: 0.00 dB
        lane 1: 0.00 dB
        lane 2: 0.00 dB
        lane 3: 0.00 dB
        lane 4: 0.00 dB
        lane 5: 0.00 dB
        lane 6: 0.00 dB
        lane 7: 0.00 dB
      Media lane Level Transition Parameter :
        lane 0: 0.00 dB
        lane 1: 0.00 dB
        lane 2: 0.00 dB
        lane 3: 0.00 dB
        lane 4: 0.00 dB
        lane 5: 0.00 dB
        lane 6: 0.00 dB
        lane 7: 0.00 dB
```

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, Darwin 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.
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.

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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) Only CMIS modules that advertise VDM capability provide VDM statistics. Each module manufacturer may support any combination of statistics or none at all.

SYNTAX :

```
link -s|--status
link -c|--counters --show
link -p|--port_state <port state value>
link -r|--fec_force <0/1>
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>
link -e|--pm_event_log
link --vdm --stats --reset
link --vdm --stats --show
link --vdm --cfg --show
link --vdm --cfg [-T|--sampling_period <seconds>] [--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"

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-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"

-r|--fec_force : This option is used to enable or disable FEC on the port. The valid values are 0 (disable) and 1 (enable)

-e|--pm_event_log : This option is used to display the port module event logs.

--vdm : This option is used to gather the VDM statistics and to configure and reset VDM statistics for a port.

--stats : This option is used to show the VDM statistics and to reset VDM statistics for a port.

--reset : This option is used to reset the VDM statistics for a port.

--cfg : This option is used to configure the VDM configuration parameters.

-T|--sampling_period : Configure the VDM statistics sampling period in seconds for the port. The valid range is from 10 to 2097152 seconds.

--enable : Enable VDM statistics polling.

--disable : Disable VDM statistics polling.

EXAMPLES :

To get the link information

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

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```
      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
      Precoding                       : Disabled
      Current MAD mode                : AN and AD
      Current MAD state               : Auto Negotiation
      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

```
    Effective Physical Errors       : 0
    Effective Physical BER          : 15E-255
    Raw Physical Errors             : 0
    Raw Physical BER (Accumulated)  : 0
    RS corrected errors             : 0
    RS uncorrectable errors         : 0
    CRC Error Frames                : 0
```

To configure the port state to down

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

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```
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.
```

To get the port module event logs

1) niccli -i 1 link -e
2) niccli -i 1 link --pm_event_log

```
idx | timestamp | port_id | extraInfo | pm_event_string
----+-----------+---------+-----------+----------------
```

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```
 0 |          0 |        0 |  00000000 |
 1 |          0 |        0 |  00000000 |
 2 |          0 |        0 |  00000000 |
 3 |          0 |        0 |  00000000 |
 4 |          0 |        0 |  00000000 |
 5 |          0 |        0 |  00000000 |
 6 |          0 |        0 |  00000000 |
 7 |          0 |        0 |  00000000 |
 8 |          0 |        0 |  00000000 |
 9 |          0 |        0 |  00000000 |
10 |          0 |        0 |  00000000 |
11 |          0 |        0 |  00000000 |
12 |          0 |        0 |  00000000 |
13 |          0 |        0 |  00000000 |
14 |          0 |        0 |  00000000 |
15 |          0 |        0 |  00000000 |
16 |          0 |        0 |  00000000 |
17 |          0 |        0 |  00000000 |
18 |          0 |        0 |  00000000 |
19 |          0 |        0 |  00000000 |
20 |          0 |        0 |  00000000 |
21 |          0 |        0 |  00000000 |
22 |          0 |        0 |  00000000 |
23 |          0 |        0 |  00000000 |
24 |          0 |        0 |  00000000 |
25 |          0 |        0 |  00000000 |
26 |          0 |        0 |  00000000 |
27 |          0 |        0 |  00000000 |
28 |          0 |        0 |  00000000 |
29 |          0 |        0 |  00000000 |
30 |          0 |        0 |  00000000 |
31 |          0 |        0 |  00000000 |
```

To disable FEC

1) niccli -i 1 link -r 0
2) niccli -i 1 ink --fec_force 0

```
    FEC disabled successfully.
```

To enable FEC

1) niccli -i 1 link -r 1
2) niccli -i 1 link --fec_force 1

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```
        FEC 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 | --dutycycle> <--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|--dutycycle   : 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.
```

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-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.

--synce : 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
```

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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 --synce --show

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

2) niccli -i 1 timesync --synce --set -Q 25MHz
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                      |
-------------------------------------------------------
Switch loopIndex = 0
```

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```
 |    0    | Disable   |    NONE                        |
Switch loopIndex = 1
 |    1    | Disable   |    NONE                        |
 Switch loopIndex = 2
 |    2    | Disable   |    NONE                        |
  Switch loopIndex = 3
  |    3    | Disable   |    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, Darwin and VMWare operating systems.

SYNTAX :

counters -p | --pcie
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

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-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                                              :
0XFFFFFF58000000FF
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
```

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```
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
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
```

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```
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
TL credit nph histogram counter for bucket5                  : 0
TL credit nph histogram counter for bucket6                  : 0
TL credit nph 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
```

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```
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
```

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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
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
```

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```
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
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
```

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```
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
```

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```
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
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
```

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```
  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 1 counters --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
```

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vf configuration commands
==========
DESCRIPTION :
Performs VF operations

1) Trusted VF operations are supported only in the Linux, Darwin and FreeBSD operating systems.
2) Reserve roce resources option is supported only on the Linux operating system.
3) add_ntuple_filter, free_ntuple_filter, peer_mem_map options are supported only in the Linux operating systems.

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>
vf <-R|--reserve_roce_resources> <-v|--vf_index> <idx> [--qp <value>] [--cq <value>] [--srq <value>] [--mrw <value>] [--av <value>]
vf <-R|--reserve_roce_resources> <-v|--vf_index> <idx> --show

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

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mapping.

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

--gpa : This option is used to specify the list of guest physical addresses. Max 8 entries are supported. The 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.

-R|--reserve_roce_resources : Option is used for dynamic reservation of roce resources. The vf should be down to reserve the roce resources.

--qp : Max number of QPs per VF. The valid range is from 0 to 65536.

--cq : Max number of CQs per VF. The valid range is from 0 to 131072.

--srq : Max number of SRQs per VF. The valid range is from 0 to 4096.

--mrw : Max number of MR/MWs per VF. The valid range is from 0 to 65536.

--av : Max number of AVs per VF. The valid range is from 0 to 65536.

--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

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```
        Command Executed Successfully
```

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

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
   0x1FFFFFFF,0x2FFFFFFF,0x3FFFFFFF,0x4FFFFFFF
   --gpa 0x9FFFFFFF,0xAFFFFFFF,0xBFFFFFFF,0xCFFFFFFF
   --size 0x10000,0x10000,0x8000,0x8000

   ```
   host/guest physical address mapping configured successfully.
   ```

2) niccli -i 1 vf --peer_mem_map --hpa
   0x1FFFFFFF,0x2FFFFFFF,0x3FFFFFFF,0x4FFFFFFF --gpa
   0x9FFFFFFF,0xAFFFFFFF,0xBFFFFFFF,0xCFFFFFFF --size
   0x10000,0x10000,0x8000,0x8000 --ds_port 20

```
  host/guest physical address mapping configured successfully.
```

To query the VF0 resource capabilities and its active usage

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

```
      Device 0000:0b:00.0 resource capabilities on VF 0 :

Min MSIX                      : 0
Max MSIX                      : 64
Min RSS/COS Contexts          : 8
Max RSS/COS Contexts          : 4144
Min Completion Rings          : 64
Max Completion Rings          : 5696
Min Tx Rings                  : 32
Max Tx Rings                  : 5088
Min Rx Rings                  : 64
Max Rx Rings                  : 1216
```

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```
Min L2 Contexts                : 2
Max L2 Contexts                : 2
Min VNICs                      : 2
Max VNICS                      : 508
Min Stat Contexts              : 33
Max Stat Contexts              : 1005
Min HW Ring Groups             : 0
Max HW Ring Groups             : 0
Min KTLS Tx Key Contexts       : 0
Max KTLS Tx Key Contexts       : 0
Min KTLS Rx Key Contexts       : 0
Max KTLS Rx Key Contexts       : 0
Min QUIC Tx Key Contexts       : 0
Max QUIC Tx Key Contexts       : 0
Min QUIC Rx Key Contexts       : 0
Max QUIC Rx Key Contexts       : 0
VF Reservation Strategy        : 1
Max VFs                        : 0


Device 0000:0b:00.0 active configuration on VF 0 :

RSS/COS contexts               : 8
Completion rings               : 64
Transmit rings                 : 32
Receive rings                  : 64
Number of L2 contexts          : 2
Number of vnics                : 1
Statistics context Id          : 0
Default VNIC Id                : 4
Number of VFs                  : 0
Rx multicast filters           : 64
HW ring groups                 : 0
Reserved statistics contexts   : 33
Active MSIX                    : 64
RoCE VNIC Id                   : 65535
Number of KTLS Tx Key contexts : 0
Number of KTLS Rx Key contexts : 0
Number of QUIC Tx Key contexts : 0
Number of QUIC Rx Key contexts : 0
```

tunnel commands
==========

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DESCRIPTION :
Performs Custom, GRE Tunnel and RSS(receive side scaling) operations.
This command is supported on Linux, Windows, FreeBSD, Darwin 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.

-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

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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 commands

==========

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.

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--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  |  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 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     |
```

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```
 |  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     |
```

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```
|  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
```

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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.
```

ring resource command

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==========

DESCRIPTION :
Query and Configure resources of the device.
This command is supported on Linux, Windows, FreeBSD, Darwin 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
```

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To configure resources of the device

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

```
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
```

Congestion Control 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, Darwin and VMWare operating systems.

SYNTAX :

ccparams -d|--dump

ccparams --set -f <configuration file>

ccparams -D|--dyncc [-c|--cfg_table <binary file>] [-a|--dyncc_args <binary 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.

-D|--dyncc : To configure the dynamic congestion control (cc) parameters.

-c|--cfg_table : This option is used to configure the dyncc tables. The user has to provide the binary file and this is an optional parameter.

-a|--dyncc_args : This option is used to configure the dynamic cc related arguments. The User has to provide the binary file and this is an optional parameter.

EXAMPLES :

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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, Darwin and VMWare operating systems.
2) Debug --token options are supported on Linux, Windows, Darwin 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.

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-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.

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-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
```

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

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```
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.
```

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show command
==========
DESCRIPTION :
This command will display all the basic details of the device

1) pcb_gen2_otp option is supported on Linux and Darwin operating systems.
2) recommendations options are 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 [--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

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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.

-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
```

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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
```

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```
        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
```

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```
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
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
```

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```
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

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```
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
```

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```
        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--bcm9574
xx--and-earlier-adapters-.html

     3) Check the switch status for the port connected to the NIC.
```

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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 --dscdump --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*  ...
```

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.

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```
   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

     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.
```

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

     Recommendation for condition #1:
       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
```

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```
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.
```

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```
 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
```

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```
     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.
```

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```
   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
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.
```

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```
   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:
       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.
```

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```
   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
         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_cfcm  = 0

     Recommendation for condition #1:
       No recommendation.
```

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 operations command

==========

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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
pcie <-M|--peer_mem_map> <--hpa> <list of values> <--gpa> <list of values>
  <--size> <list of values> [--ds_port <value>]
pcie <-M|--peer_mem_map> --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.

-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. The 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. The 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.

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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 to take effect.
```

To configure the GPU host and guest physical address mapping

1) nicclid -i 1 pcie --peer_mem_map --hpa 0x1FFFFFFF,0x2FFFFFFF,0x3FFFFFFF,0x4FFFFFFF --gpa 0x9FFFFFFF,0xAFFFFFFF,0xBFFFFFFF,0xCFFFFFFF --size 0x10000,0x10000,0x8000,0x8000
2) nicclid -i 1 pcie --peer_mem_map --hpa 0x1FFFFFFF,0x2FFFFFFF,0x3FFFFFFF,0x4FFFFFFF --gpa 0x9FFFFFFF,0xAFFFFFFF,0xBFFFFFFF,0xCFFFFFFF --size 0x10000,0x10000,0x8000,0x8000 --ds_port 20

```
host/guest physical address mapping configured successfully.
```

To show the peer memory mapping information

1) niccli -i 1 pcie --peer_mem_map --show

```
Peer mmap Info:
-------------------------------------------------------------------
-
 Mapping     HPA                   GPA                   Size(KB)
-------------------------------------------------------------------
-
 0           0x1FFFFFFF            0x9FFFFFFF            0x10000
 1           0x2FFFFFFF            0xAFFFFFFF            0x10000
 2           0x3FFFFFFF            0xBFFFFFFF            0x8000
 3           0x4FFFFFFF            0xCFFFFFFF            0x8000
```

udcc Command

==========

DESCRIPTION :

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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 :

To get and set the UDCC probe parameters

```
udcc --probe --show
udcc --probe --set [-t|--format <value>] [-p|--pad_cnt <value>] [-k|--ack <1-bit value>]
      [-r|--rsvd7 <7-bit value>] [-g|--gns <value>] [-l|--hop_limit <value>] [-e|--req_vec
       <value>]
```

To get and set the UDCC session distribution mode

```
udcc <-s|--session_dist_mode> --show
udcc <-s|--session_dist_mode> --set --mode <0/1>
```

OPTIONS :

-s|--session_dist_mode : This option is used to query or configure the UDCC session distribution mode.

--mode : This option is used to configure the different modes of UDCC.
Supported UDCC session distribution modes are as below:
0 - FCFS
1 - Uniform

--show : This option is used to show the udcc configuration details.

--probe : This option is used to query or configure the UDCC probe parameters.

--set : This option is used to configure the udcc parameters.

-p|--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)

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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.

-k|--ack : This is an optional parameter used to configure the probe packet's bth.ack field. The valid range is from 0 to 1.

-r|--rsvd7 : This is an optional parameter used to configure the probe response packet's bth.rsvd7 field. The valid range is from 0 to 127.

EXAMPLES :

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

1) niccli -i 1 udcc --probe --show

```
Probe Packet Pad Count    : 0
Probe Format              : MAD
BTH header Ack            : 1
BTH header rsvd7          : 64
Global Name Space         : 15
Hop Limit                 : 10
Request Vector            : 0
```

To set the UDCC probe packet pad count and format parameters

1) niccli -i 1 udcc --probe --set --format 1 --pad_cnt 1

UDCC parameters configured successfully.

```
Note: Changing the UDCC probe type can result in incompatibility with
      the UDCC program running currently. In case of such
      incompatibility: the UDCC program will be disabled. Installing
a
      compatible UDCC program package matching the configured probe
      type will be required to activate the UDCC program and enable
      it.
```

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To set the UDCC probe packet parameters with BTH ack and rsvd7

1) niccli -i 1 udcc --probe --set --ack 1 --rsvd7 2

```
UDCC parameters configured successfully.

Note: Changing the UDCC probe type can result in incompatibility with
      the UDCC program running currently.In case of such
      incompatibility the UDCC program will be disabled. Installing
a
      compatible UDCC program package matching the configured probe
      type will be required to activate the UDCC program and enable
       it.
```

To set the UDCC probe IFA parameters

1) niccli -i 1 udcc --probe --set --format 1 --gns 15 --hop_limit 255 --req_vec 255

```
    UDCC parameters configured successfully.

Note: Changing the UDCC probe type can result in incompatibility with
     the UDCC program running currently. In case of such
     incompatibility the UDCC program will be disabled.Installing a
     compatible UDCC program  package matching the configured probe
     type will be required to activate the UDCC program and enable
it.
```

To set all UDCC probe parameters

1) niccli -i 1 udcc --probe --set --format 1 --pad_cnt 1 --gns 15 --hop_limit 255 --req_vec 255 --ack 1 --rsvd7 2

```
      UDCC parameters configured successfully.

Note: Changing the UDCC probe type can result in incompatibility with
      the UDCC program running currently.
      In case of such incompatibility the UDCC program will be
      disabled. Installing a compatible UDCC program
       package matching the configured probe type will be required to
      activate the UDCC program and enable it
```

RoCE commands

==========

DESCRIPTION :

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Query and configure the congestion notification and TOS DSCP parameters

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) esxcli 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
```

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```
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_irrq_oflow: 0
res_unsup_opcode: 0
res_unaligned_atomic: 0
res_rem_inv_err: 0
res_mem_error: 0
res_srq_err: 0
```

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```
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
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
```

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```
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.
```

NOTE: This command is supported only in VmWare OS.

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

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	niccli devid	esxcli niccli devid
nvm	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> -i|--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] [-k |--link]	esxcli niccli nvm -c i -v <index> -F|--restore-factory-defaults [--link]
	niccli -i <index> nvm --remove_onboard_config	esxcli niccli nvm -c i -v <index> --remove-onboard-config
	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 separated> -v|--value <option value with comma separated> [--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 -D | –defrag	esxcli niccli nvm -c i -v <index> -D|--defrag
	niccli -i <index> nvm -L|--listoptions --diff	esxcli niccli nvm -c i -v <index> -a|--listoptions --diff

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	niccli -i <index> nvm --dump <-o|--offset> <val> <--length> <val> > -f <filename>	esxcli niccli nvm -c i -v <index> --dump -m|--offset=<str> -q|--length=<str> -f|--filename=<str>
fw	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>

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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>]
	niccli -i <index> cable -P | --power <0/1>	esxcli niccli cable -c i -v <index> --power=<long>
	niccli -i <index> cable -T | --tx_disable <0/1>	esxcli niccli cable -c i -v <index> -T|--tx-disable=<long>

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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
	niccli -i <index> link -p|--port_state <port state value>	esxcli niccli link -c i -v <index> -p|--portstate=<port state value>
	niccli -i <index> link -S|--port_speed [--speed <value>] [--lanes <number_of_lanes>] -a|--autoneg <on/off> [--fec <value>] [-t|--training <on/off>]	esxcli niccli link -c i -v <index> -S|--port-speed [--speed=<str>] [--lanes=<str>] -a|--autoneg=<str> [--fec=<str>] [-t|--training=<str>]
	niccli -i <index> link -P|--precoding <enable/disable>	esxcli niccli link -c i -v <index> -P|--precoding=<str>
	niccli -i <index> link -r|--fec_force <0/1>	esxcli niccli link -c i -v <index> -r|--fec-force=<long>
timesync	niccli -i <index> timesync <-d | --dutycycle> <--period> <value> --up <value>	esxcli niccli timesync -c i -v <index> -d|--dutycycle --period=<str> --up=<str>
	niccli -i <index> timesync <--dll> <-s|--source> <value> <-q|--frequency> <value>	esxcli niccli timesync -c i -v <index> --dll -o|--source=<value> -q|--frequency=<value>
	niccli -i <index> timesync <--ptp> --show	esxcli niccli timesync -c i -v <index> -p|--ptp --show
	niccli -i <index> timesync <--ptp> --set <-p | --primary_pf> <pid> [<-v | --primary_vf> <vfid>] [<-P | --secondary_pf> <pfid>] [<-V | --secondary_vf> <vfid>]	esxcli niccli timesync -c i -v <index> -p|--ptp --set -r|--primarypf=<str> [-x|--primaryvf=<str>] [-z|--secondarypf=<str> -w|--secondaryvf=<str>]
	niccli -i <index> timesync <--synce> --show	esxcli niccli timesync -c i -v <index> -y|--synce --show
	niccli -i <index> timesync <--synce> --set <-Q | --frequency_profile> <value> [<-c|--primary_clock_state> <value>] [<-C|--secondary_clock_state> <value>]	esxcli niccli timesync -c i -v <index> -y|--synce --set -b|--frequency-profile=<str> [-u|--primary-clock-state=<str>] [-C|--secondary-clock-state=<str>]
	niccli -i <index> timesync <--tsio> --show	esxcli niccli timesync -c i -v <index> --tsio --show

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	niccli -i <index> timesync <--tsio> <-t | --tsio_function_pin> <idx> <-u | --pin_usage_string> <value> <--state> <value>	esxcli niccli timesync -c i -v <index> --tsio -t|--tsio-function-pin=<str> -k|--pin-usage-string=<str> --state=<str>
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
show	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 [--pcie] [-V]	esxcli niccli show -c i -v <index> -r|--recommendations [--pcie] [-V|--verboselevel]
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

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	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> --show	esxcli niccli tunnel -c i -v <index> --cfg --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> resmgmt [--pf/--all] [<-p|--profile> | < --min > |< --max > | <-r | --roce_max> | < -m | --max_completion_rings> | < -s | --strategy >] --show	esxcli niccli resmgmt -c i -v <index> [--pf|--all] [<-p|--profile> | --min | --max | <-r|--roce-max> | <m|--max-completion-rings> | <-s|--strategy>] --show
	niccli -i <index> 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>]	esxcli niccli resmgmt -c i -v <index> [--pf|--all] --set [<-p|--profile> | --min | --max | <-r|--roce-max> | <m|--max-completion-rings>] [-b|--bw=<str>] [<-s|--strategy> -y|--strategytoset=<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>]

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	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>
PCIe 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>

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