

**Broadcom Limited**  
**Broadcom Ethernet Controllers Software Kit**  
**BCM5741x/5750x/57608 Release**  
**RELEASE 233.1.135.7**

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## Summary

- This is a Gold Release of 57608 (Thor 2) 5750x(Thor) and 5741x(Whitney+) for single host adapters.
- This release is based on SIT build 233.1.135.7
- Certified EFI, Windows, SUSE and VMWare ESX drivers are marked with an asterisk in the 'Release Version Information' Table.
  - SUSE signed packages are available in '**Driver**' → 'Broadcom NetXtreme-E Linux Installer' under 'drivers\_linux/bundle/sles\_signed' folder
  - ESXi signed drivers are available in '**Driver**' → 'Broadcom NetXtreme-E ESXi Drivers'  
Note: ESXi signed drivers until 230 release are to be downloaded from [VMware.com](http://VMware.com)
  - Windows signed drivers are available in '**Driver**' → 'Broadcom NetXtreme-E Windows Drivers'

## Supported Devices

This release of software supports:

- Broadcom BCM57412 NetXtreme-E 10Gb Ethernet Controller
- Broadcom BCM57414 NetXtreme-E 10Gb/25Gb/50Gb Ethernet Controller
- Broadcom BCM57416 NetXtreme-E 10GBASE-T Ethernet Controller
- Broadcom BCM57502 NetXtreme-E 10Gb/25Gb/50Gb Ethernet Controller
- Broadcom BCM57504 NetXtreme-E 25Gb/50Gb/100Gb Ethernet Controller
- Broadcom BCM57508 NetXtreme-E 25Gb/50Gb/100Gb/200Gb Ethernet Controller

## Supported Operating Systems

Please refer to the following guide for the list of supported Operating Systems:

[Supported Operating Systems for Ethernet Network Adapters](#)

## Supported Cables

Please refer to the following guide for the list of supported cables and transceivers:

[Supported Cables for Broadcom Ethernet Network Adapters](#)

These cables and transceivers were tested and deemed interoperable with Broadcom's Ethernet network adapters. Note this list does not imply full qualification of the cables.

# User Guide

Please refer to the following user guide for configuring Broadcom Ethernet Adapters:

[Broadcom Ethernet Network Adapter User Guide](#)

## Common Feature Support

Common support for 57608 (Thor 2), 5750x(Thor) and 5741x(Whitney+)

New features (in addition to the features of the last Gold Release 232.1) are marked as 'NEW'.

### Core Support

- Base Ethernet Functionality (L2 drivers)
- Link Establishment & Maintenance: Auto Negotiation, Auto Detect, Link Training
- Pre-Boot: uEFI, iPXE, uEFI iSCSI stack

### CPU Support

- Intel x86
- AMD x86
- ARM

### GPU Support

- Nvidia GPUs support
- AMD GPUs support

### Poll Mode Drivers

- DPDK release 22.11
- DPDK release 23.11
- DPDK release 24.11 (NEW)

# Thor 2 Feature Support

New features (in addition to the features of the last Gold Release 232.1) are marked as 'NEW'.

## Core support

- Multi-root and Multi-host GA support (NEW)
- Flow-redirect
- SR-IOV
  - Max VFs = 128
- NPAR
  - Max total NPAR endpoints = 16
  - Max per port: Dual Port = 8, Quad Port = 4
- TruFlow Generic Application
- OvS offload (kernel and DPDK) GA (NEW)

## RoCE

- Supports RoCEv2 (v1 is deprecated)
- LAG
- RTT (Preview)
- Programmable UDP Source Port (Preview)
- Adaptive Routing (DLB) (Preview)
- RoCE/SRIOV
- Driver improvements for Handling RDMA CM Path (NEW)

## AI Libraries

- ROCm
- Communication and Collectives Libraries
  - RCCL
  - NCCL
- Open MPI
- MVAPICH
- UCX
- rdma-core
- libfabric

## Management

- NC-SI (RMII)
- SMBus
- PCIe
- MCTP/SMBus

- MCTP/PCIe
- NC-SI/MCTP
- PLDM/MCTP
- LLDP/DCBX
- Firmware based DCBX

## Tools

- niccli
  - Usage help improvements (NEW)
- nictune
  - nictune iperf testing support for multiple ports (NEW)
- Monitoring (ethtool, RoCE stats)
  - PCIE read/write latency and credit histogram counters support (NEW)
- Linux Installer
  - Linux Installer Improvements (NEW)
- Broadcom SOSreport
  - bcm\_sosreport improvements (NEW)
- Topology (Istopo, ROCM-smi)
  - AMD-SMI list and topology commands enhancement (NEW)
  - AMD-SMI monitor command - PoC (NEW)
- PCIe Trace Support - GA (NEW)

## Reliability, Accessibility, Serviceability (RAS)

- Health check
- Coredump and Crashdump enhancements
- Firmware Logging in Host

## Security

- Secure boot
- SPDM 1.2 Cert Provisioning
- CNSA 1.0
- kTLS offload support - PoC (NEW)
- FreeBSD kTLS offload support - PoC (NEW)

## Miscellaneous

- PTP (sink)
  - Multi-host support (NEW)
- PTP (source) (Preview)
- PTP Full performance characterization - PoC (NEW)
- Timestamping

- TX pacing
- SyncE (Preview)
- MOFED support (NEW)
- DCN Queue depth telemetry - PoC (NEW)
- Allow HW DCQCN and UDCC to coexist (NEW)

## Thor and Whitney+ Feature Support

The features listed below may not be supported for both 5750x(Thor) and 5741x(Whitney+)  
Please contact the local Broadcom support team if additional clarification is needed.

The features below are supported in this release.

New features (in addition to the features of the last Gold Release 232.1) are marked as 'NEW'.

### Poll Mode Drivers

- Windows NDIS Poll Mode Support
- ENS driver support for VMware Enhanced Data Path
  - ESXi 8.0 ENS Hardware LRO support
  - ESXi 8.0 ENS RSS support
  - Remove the restriction on number of MSIX in ENS mode for 8.0 ESXi driver (NEW)
- OVS 3.1 Support for Thor and Whitney+

### Virtualization

- SR-IOV
  - Small VFs based SR-IOV support for Thor
- MultiQueue

### Offload

- NIC stateless offload features such as checksum & tunneling
- Configurable Flow Acceleration - CFA
- Tunneling offload such as: NVGRE, VxLAN
- DPDK TruFlow offload
- Linux TC offloads
- DPDK Flow Mirroring offload Support
- DPDK Flow Meter offload Support
- DPDK L2 Rewrite offload Support
- TruFlow Generic Template

- Flow update performance optimization
- Generic application support
- Flow template DB size optimization
- Flow scale improvement
- OVS DPDK/TC application migration to generic template
- Action template unification
- Flow scale query
- Phase 3 support (Thor)
- PPP over GRE Support

## RoCE (Thor)

- RoCE drivers
- RoCE Mirroring
- RoCE @ Scale improvements including many performance optimizations
- Guest Mode RDMA support (Linux and Windows only)
- VSAN over RDMA
- Multi-Root RoCE + SR-IOV
- RoCE performance profiles
- Support Error Recovery for RoCE
- RoCE Userlib Benchmark Performance Optimization when Message Size <= 4K
- RoCE SR-IOV scalability improvement for FLR -- POC
- RoCE DCQCN Testing
- Linux auxiliary driver support (Driver re-arch for RoCE)
- RoCE Performance tuning
- RoCE Userlib Performance Optimization
- Add dmabuf support to OOB Linux RoCE Driver
- RoCE Control Plane Performance Improvements for Thor
  - batching, exception handling, and operations/second for register/deregister
- Windows user mode RDMA support - NDSPi
- FreeBSD RoCE v2 support
- FreeBSD RoCE features Phase II
- RoCE statistics accessible to non-root users
- RoCE SRIOV resource configuration improvements
- RoCE Modify QP + CMDQ/CREQ Scalability Improvements
- RoCE Data Plane Latency Scalability Improvements - Phase 2 AI/ML Applications
- Upstream FreeBSD RoCE Drivers and RoCELib -- Phase 1
- HW DCQCN Performance Improvement using Telemetry - PoC
- Co-existence with MLNX IB/RoCE NIC

## RoCE (Whitney+)

- RoCE drivers

- VSAN over RDMA
- RoCE performance profiles
- Windows user mode RDMA support - NDSPI

## AI Libraries (Thor)

- ROCm v6.1.1 (NEW)
- Communication and Collectives Libraries
  - RCCL v2.18.6 (NEW)
  - NCCL v2.21.5 (NEW)
- Open MPI v5.0.3 (NEW)
- Generic UCX Support
  - UCX 1.14.x Support
  - UCX 1.15.x Support
  - UCX 1.16.x Support (NEW)
- rdma-core v51 Support (NEW)

## Management

- System manageability (NC-SI)
- NC-SI Enhancements
  - NC-SI 1.2 Phase 2 for Thor and Whitney+
  - Enhancements for multiple physical mediums (Thor)
- Update to Reporting of DMTF Specifications Versions (Thor/Whitney+)

## Tools

- Devlink improvements
- Support CMIS 4.0 using ethtool
- Linux Installer
  - Error handling and display improvements
  - GPU Direct and hosts with multiple NICs support (Thor)
- NICCLI configuration management utility
  - Vmware ESXi support for NICCLI
  - bnxtqos integration into NICCLI
  - Linux installer NICCLI support
  - NICCLI syntax (help/error/failure/etc) improvements
  - ESXi 8.0 esxcli plugin support
  - NVM PKG query commands improvements
  - PKG Log view command
  - Sliff driver dependency removal
  - UEFI support
  - Removal of legacy commands (Thor and Whitney+)
  - Link Management Improvements (Thor)

- niccli Linux man page support
- niccli Linux auto-completion support
- nictune
  - Tool used for automating performance tuning
- Broadcom SOSReport

## Reliability, Accessibility, Serviceability (RAS)

- Health check
- Coredump and Crashdump enhancements
- Prevent single point of failure in FW upgrade
- Error recovery support
- Various stability and Stateless error recovery improvements (Generic Adapters only)
- Enhanced FW update error codes
- Crash dump copy to host SDRAM
- Unified certificates for tools & Driver RPMs
- Firmware Logging to Host support - PoC (Wh+) (NEW)

## Security

- Secure boot
- Secure FW Update
- Firmware lockdown
- SPDM 1.1 Support
- SPDM 1.2 Support (Thor) (NEW)

## Miscellaneous

- Network Partitioning NPAR 1.2 Phase I
- OEM specific vSwitch feature enhancements
- PTP
  - Enhanced PTP support
  - Multi-Host PTP (Sink Mode only) support
  - PTP support on Whitney+
- Performance tuning and Stress/Boundary Tests
- MSI-X, 802.1q VLAN, Ethernet Statistics
- Dual Rate (10G/25G) transceivers (select boards only)
- Port shutdown for Whitney+ and Thor
- NIC Thermal Shutdown Fixes and Improvements
- IRQ coalescing API in the kernel extended with "EQE vs CQE mode"
- XDP Single Buffer Validation and XDP Multibuffer PoC
- Onboarding NVM Configurations for LOM (Thor)
- 200G PAM-4 Support
- NVMe/TCP Support (VMWare cert)

- Method to control the activation of the attestation feature
- Enable "Filter Mode" for non-PTP packets
- Generic UCX Support
  - UCX 1.14.x Support
  - UCX 1.15.x Support (Thor)
- Live patching for Whitney+
- Validation of SyncE on Thor B2 Silicon
- Add support for simultaneous update of NICs - Deprecated
- Adaptive Interrupt Coalescing Enhancements
- Enhancement for Linux Default Number of Queues
- Feature simplification for Thor and Whitney+
- NVM parameter simplification for Thor and Whitney+
- Netmap Support (Thor)
- Deprecate Legacy BIOS configuration for Thor and Whitney+
- QoS Enhancements Phase 2 (Thor)
- QoS Enhancements for Mbuf configuration (Thor)
- SFP28 25Gbps transceivers through QSFP28-to-SFP28 adapter support (Thor)
- Deprecate Live firmware upgrade feature for Thor and Whitney+
- Netmap Support with Jumbo Frames
- Enhance ARM Support for Thor and Whitney+
- Enable Transmit Packet Steering (XPS) by default on Thor and Whitney+
- Multi-host platform support with N2100G - Phase 2
- NIC thermal threshold and shutdown logging and handling by host driver
- PLDM for FRU Data (DSP0257) support
- Windows HW-QoS support on Thor - Phase I POC support
- Supported and advertised link modes - KR for Thor and Whitney+
- 40G support in Linux (Thor)
- Adaptive QoS algorithm improvements and niccli support
- Adaptive QoS niccli tuning parameters support (Thor)
- Default number of rings increase (Thor)
- Hot-Plug support for OCP 3.0 (Thor)
- PAM4 speeds are enabled by default (Thor)
- VMWare RSS and NetQ enhancement for ENS mode
- Kubernetes SR-IOV Network Device Plugin support with RoCE (Thor)
- BCM957508-N2100GDQ - Thor Quality Improvements with VR support
- Thor Quality Improvements with MPS and TI VR support
  - BCM957508-N2100G, BCM957508-P2100G, BCM957504-N1100G, BCM957504-N425G
- Local node memory allocation - Page pool per NUMA node support
- L2 driver reduce usage of RTNL as a slowpath lock - POC
- ADQ (Application Device Queues) Support (Thor) - Phase 2
- QP Scanning Performance Improvement for up to 64K QPs (Thor)
- Adapter Discovery Support (Thor)
- HII menu update for Link Configuration (Thor/Whitney+)

- HII menu 'Restore Defaults' option removal (Thor/Whitney+)
- Adaptive QoS Phase 3 (Thor)
- AMD rocm-smi tool support PoC (Thor)
- AMD SDCI Support - No ST Mode (Thor)
- AMD SDCI Support - Interrupt Vector Mode (Thor) (NEW)
- Support dynamic port breakout to 2-ports or 4-ports on single port adapters (Thor)
- Custom counters support for Windows Performance Monitor (Thor)
- MOFED support (Thor) (NEW)

## Notes

### Repaving Feature:

- Attempting a repaving action to firmware older than 220.0 might result in card corruption.

### SW/FW:

- The SW/FW versions listed in the “Release Version Information Table” are the only supported combinations at this point.

### RoCE Related:

- The default RoCE congestion control algorithm is to DCQCN-P.
- The IPv4 RoCE v2 GID index for a typical case is 3. Please refer to the User guide for best practices in determining GID type using the Linux sysfs interface.
- ETS has limitations in the RoCE LAG environment in port toggle scenarios

### Generic UCX Support for Single Host non-virtualized environments:

- OpenMPI with UCX PML
- OSU microbenchmarks with OpenMPI/UCX
- UCX perftest
- RDMA Transport
- Atomic operations with UCX are not supported

### RoCE and NPAR:

- If NPAR is enabled, RoCE and ENS cannot be used together

### Linux Automated Installer:

- Linux Automated Installer might fail with secure boot on SLES15 SP3  
Before running the installer, all existing \*bnx\* packages must be removed first. Run the following commands before install
  - `rm /tmp/ansible.*`
  - `bash uninstall.sh`
  - `rpm -qa | grep bnx | rpm -e`

# Usage and Release folder structure

## Firmware NVRAM Images:

- Pre-built NVRAM package files are available in the 'board\_sku\_files' folder under '**Driver**' → 'Broadcom NetXtreme-E Linux Installer'
- NVRAM package files are also available in the '**Firmware**' tab on the respective Ethernet Adapter product page.

## Linux:

- There are several Linux related drivers/packages in the 'drivers\_linux' folder under '**Driver**' → 'Broadcom NetXtreme-E Linux Installer'
  - bundle: Bundle for L2 and RoCE drivers source and DKMS packages. This also contains SUSE signed driver packages
  - bnxt\_en: L2 driver source and DKMS packages
  - bnxt\_re: RoCE driver DKMS packages
  - bnxt\_rocelib: RoCE library source and RPM
  - peer\_mem: GPU Direct driver
- DCSG00411462.self.cert.der: Secure boot openssl certificate
- readme\_secure\_boot.txt: Secure boot readme
- There are 2 tarballs in the drivers\_linux folder, the "bnxt\_en-x.x.xx.tar.gz" is the L2 driver only and the "netxtreme-bnxt\_en-x.xx tar.gz" file is the combined package with L2 and RoCE drivers.
- For the Linux driver included as part of the SW package please refer to the "Readme.txt" file included in the driver tarball for commands, driver settings and other important information.

## Tools:

- Linux Installer:
  - Tool to assist the user in easily installing the Linux and RoCE drivers and upgrading Firmware.
  - This installer is available in the 'utils/linux\_installer' folder under '**Driver**' → 'Broadcom NetXtreme-E Linux Installer'.
  - Refer to 'README.md' file in utils/linux\_installer folder on details of how to use the installer.
- niccli:
  - Tool used for updating NVRAM, including firmware updates and configuration parameters.
  - This tool is available in the 'utils/niccli' folder under '**Driver**' → 'Broadcom NetXtreme-E Linux Installer' for Linux OS.
  - The tool for different OSes is available under the '**Firmware**' tab.

- nictune: GA for Thor
  - Tool used for automating performance tuning of Broadcom NetXtreme Ethernet Network Interface Cards.
  - This tool is available in the 'utils/nictune' folder under '**Driver**' → 'Broadcom NetXtreme-E Linux Installer'.
- bcm\_sosreport:
  - Tool used for collecting system information for support purposes

FreeBSD: FreeBSD drivers are available under '**Driver**' → 'Broadcom NetXtreme-E FreeBSD Driver'

VMware: ESXi signed drivers are available under '**Driver**' → 'Broadcom NetXtreme-E ESXi Drivers'

Windows: Windows signed drivers are available under '**Driver**' → 'Broadcom NetXtreme-E Windows Drivers'

## Release Version Information Table

Product	Version	Previous Version
Firmware NVM Package	233.1.135.7	<< 232.1.132.8
dpdk_21.11-brcm-lts	233.0.121.0	<< 232.0.140.0
dpdk_22.11-brcm-lts	233.0.121.0	<< 232.0.140.0
dpdk_23.11-brcm-lts	233.0.121.0	<< 232.0.140.0
dpdk_24.11-brcm-lts	233.0.121.0	<< 232.0.140.0
Linux L2 Driver	1.10.3-233.0.152.2	<< 1.10.3-232.0.155.5
Linux RoCE Driver	233.0.152.2	<< 232.0.155.5
Linux RoCE Library	233.0.152.2	<< 232.0.155.5
Linux GPU Driver	233.0.152.2	<< 232.0.155.5
Win Srv 2022 x64 Driver	233.0.148.0*	<< 232.0.157.7*
Win Srv 2025 x64 Driver	233.0.148.0*	<< 232.0.157.7*
Win 10 x64 Driver	233.0.148.0*	<< 232.0.157.7*
Win 11 x64 Driver	233.0.148.0*	<< 232.0.157.7*
VMware ESX7.0 L2/RoCE Driver	233.0.156.0*	<< 232.0.154.0*
VMware ESX8.0 L2/RoCE Driver	233.0.156.0*	<< 232.0.154.0*
FreeBSD BNXT Driver	233.0.174.0	<< 232.0.88.0
Linux Installer	233.0.152.2	<< 232.0.155.8
Niccli	233.0.150.0	<< 232.0.153.0
Nictune	233.0.55.0	<< 232.0.53.0
Broadcom SOSReport	233.0.88.0	<< 232.0.96.0
**** 57608/5750x (Thor 2 / Thor) NVM component version ****		
Boot Code	233.0.152.6	<< 232.0.155.9
MBA Driver	233.0.146.0	<< 232.0.155.4
UEFI UNDI	233.0.146.0*	<< 232.0.155.4*
**** 5741x (Whitney+) NVM component version ****		
NCSI	233.0.151.0	<< 232.0.155.2
RoCE Firmware	233.0.151.0	<< 232.0.155.2
Boot Code	233.0.151.0	<< 232.0.155.2
MBA Driver	233.0.146.0	<< 232.0.155.4
UEFI UNDI	233.0.146.0 *	<< 232.0.159.4*

**Note:** An asterisk (\*) following a version number represents a certified driver.  
Arrows (<<) between versions indicate the component has been updated from the previously released software kit.