BROADCOM®

Release Notes

Emulex® NVMe over Fibre Channel for Linux

Release	SLES 12 SP3:	12.0.261.26 and 12.0.261.27
	SLES 12 SP4:	Inbox only
	SLES 15:	12.0.261.26 and 12.0.261.27
	RHEL 7.6:	12.0.344.0 and 12.0.361.0

Purpose and Contact Information

These release notes describe the interoperability matrices, new features, resolved initiator and target issues, known issues, and technical tips associated with this release of the Emulex® NVMe over FC drivers and scripts for SLES 12 SP3, SLES 12 SP4, SLES 15, and RHEL 7.6 on LPe31000-series, LPe32000-series, and LPe35000-series adapters.

For the latest product documentation, go to www.broadcom.com. If you have questions or require additional information, contact an authorized Broadcom® Technical Support representative at ecd-tech.support@broadcom.com.

NVMe over FC Interoperability Matrices

You can build NVMe over FC end-to-end solutions with initiators from SUSE servers or Windows servers, with a Linux target "just a bunch of flash" (JBOF) based on SUSE. This capability enables you to build low-cost, high-performance NVMe over FC storage systems. The following table provides the required initiator and target pairs across the supported out-of-box Emulex NVMe over FC drivers.

If You Are Using This Initiator Driver	Use This Target Driver
Version 12.0.261.26 or later for SLES 12 SP3 maintenance kernel 718 (4.4.126-94.22.1) from SUSE, dated April 23, 2018, or later	Version 12.0.261.26 or later for SLES 12 SP3 or the inbox driver for SLES 12 SP4 GA
Inbox driver for SLES 12 SP4 GA release or later	Version 12.0.261.26 or later for SLES 12 SP3 or the inbox driver for SLES 12 SP4 GA
Version 12.0.261.26 or later for SLES 15 GA release or later	Version 12.0.261.26 or later for SLES 12 SP3 or the inbox driver for SLES 12 SP4 GA
Version 12.0.344.0 or later for RHEL 7.6 GA release or later	Version 12.0.261.26 or later for SLES 12 SP3 or the inbox driver for SLES 12 SP4 GA

NetApp offers the following all-flash array products that support NVMe over FC:

- AFF A300
- AFF A700
- AFF A700S
- AFF A800

The following table shows the supported versions.

If You Are Using This Initiator Driver	Use This NetApp ONTAP Version
Version 12.0.261.26 or later for SLES 12 SP3 maintenance kernel 718 (4.4.126-94.22.1) from SUSE, dated April 23, 2018, or later	ONTAP 9.4, 9.5
Inbox driver for SLES 12 SP4 GA release or later	ONTAP 9.4, 9.5
Version 12.0.261.26 or later for SLES 15 GA release or later	ONTAP 9.4, 9.5
Version 12.0.344.0 or later for RHEL 7.6 GA release or later	ONTAP 9.4, 9.5

NOTE: Install firmware version 12.0.261.15 or later for LPe31000-series and LPe32000-series HBAs, or 12.0.261.17 or later for LPe35000-series HBAs, to ensure interoperability and to include the latest standards and performance updates.

New Features

- This release adds support for the following new operating systems:
  - The RHEL 7.6 GA release or later.
  - The SLES 12 SP4 GA release or later (inbox only).
- This release adds support for LPe35000-series adapters in initiator systems.

NOTE: Do not use a driver earlier than the drivers documented in these release notes with LPe35000-series adapters.

Resolved General Issues

The 12.0.261.27 and 12.0.361.0 drivers resolve an issue with the 12.0.261.26 and 12.0.344.0 drivers in which SCSI LUNs and NVMe devices might experience missing paths following a target fault test.

Resolved Initiator Issues

- NVMe disks are now discovered when 256 subsystems (the maximum number) are created.
- If the driver issues an N_Port Logout in response to an Abort Exchange Timeout failure, a Port Login is now automatically initiated.
- An issue in which a server crash might occur while running NVMe I/O and creating new target interfaces was resolved.
- An issue in which the `NVMe_info` command displayed two entries for the same target port was resolved.

Resolved Target Issues

No target issues were resolved in this release.

Known Issues

1. NVMe multipath is enabled by default in SLES 15. Emulex did not test the NVMe multipath feature.

   Workaround

   You can disable NVMe multipath by adding `nvme-core.multipath=N` as a boot parameter in the Grand Unified Bootloader (`grub`) package.

2. In SLES 12 SP3, the `nvme list` command might not display all namespaces.

   Workaround

   Use the `lsblk` command to display all namespaces.

3. Running the `nvmetcli clear` command on an NVMe target when the NVMe initiator port is down might cause the target system to stop responding. Make sure that the NVMe initiator port is up when running the `nvmetcli clear` command.

4. Warning messages appear when a new namespace is created on a target.

5. The deliberate faulting of NVME discovery commands (also called *jamming*) is not supported. If a `discovery` command is faulted during initial linkup or during the LIP linkup recovery time, NVMe discovery fails on the affected controller.

   Workaround

   Perform a LIP on the initiator link, and remove the condition that is faulting discovery.

6. If you are adding a subsystem dynamically, you must perform a manual scan. See Technical Tips for more information.

7. Creation of N_Port ID Virtualization (NPIV) connections on initiator ports that are configured for NVMe over FC is not supported. However, initiator ports can connect to NPIV Fibre Channel Protocol (FCP) and NVMe targets simultaneously.

8. Fabric-assigned Port World Wide Names (FA-PWWNs) are not supported on initiator ports configured for NVMe over FC.

9. This release supports FC-NVMe specification version 1.18.

10. Target port reset is not supported in this release.

11. Dynamic NVMe target management (including reconfiguration) and dynamic initiator rescan are not supported. Any reconfiguration requires a target server reboot.

    After the target server reboots and the configuration is activated, connected initiators might require a link bounce to rescan the target.

12. NVMe disks might not reconnect after a device timeout greater than 60 seconds has occurred.

    Workaround

    You must reboot the initiator.

13. Due to an issue on Linux operating systems, NVMe I/O might stop if the initiator server administrator continually resets the NVMe controllers for more than one hour while the system is under I/O load.

    Workaround

    Perform a server reboot.

Technical Tips

To manually scan for targets or dynamically added subsystems, type the following command (all on one line):

```
nvme connect-all --transport=fc --host-traddr=nn-<initiator_WWNN>:pn-<initiator_WWPN> --traddr=
nn-<target_WWNN>:pn-<target_WWPN>
```

where:

- *<initiator_WWNN>* is the WWNN of the initiator, in hexadecimal.
- *<initiator_WWPN>* is the WWPN of the initiator, in hexadecimal.
- *<target_WWNN>* is the WWNN of the target, in hexadecimal.
- *<target_WWPN>* is the WWPN of the target, in hexadecimal.

For example:

```
# nvme connect-all --transport=fc --host-traddr=nn-0x20000090fa942779:pn-0x10000090fa942779 --
traddr=nn-0x20000090fae39706:pn-0x10000090fae39706
```