



Intel® Virtual RAID on CPU (VROC) Driver for ESXi* Version 9.0.0.1012

Release Notes

August 2024
Version 1.0



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Driver Revision History

Date	Driver Version	Description
June 2021	Intel VMD release 2.7.0.1157 for VMware® ESXi* 6.5, 6.7, and 7.0	Intel VMD driver for Generation 1, 2, & 3 Intel® Xeon Scalable Processors
November 2022	Intel VMD release 3.0.0.1038 for VMware® ESXi* 7.0 and 8.0	Intel VMD driver for Generation 2, 3, & 4 Intel® Xeon Scalable Processors
August 2023	Intel VMD release 3.2.0.1008 for VMware® ESXi* 7.0 and 8.0	Intel VMD driver for Generation 2, 3, & 4 Intel® Xeon Scalable Processors
November 2023	Intel VMD release 3.5.1.1002 for VMware® ESXi* 7.0 and 8.0	Intel VMD driver for Generation 3, 4, & 5 Intel® Xeon Scalable Processors
August 2024	Intel VMD release 9.0.0.1012 for VMware® ESXi* 7.0 and 8.0	Intel VMD driver for Generation 3, 4, 5, & 6 Intel® Xeon Scalable Processors



Intel® Volume Management Device Driver for VMware® ESXi®

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1 Introduction

1.1 Overview

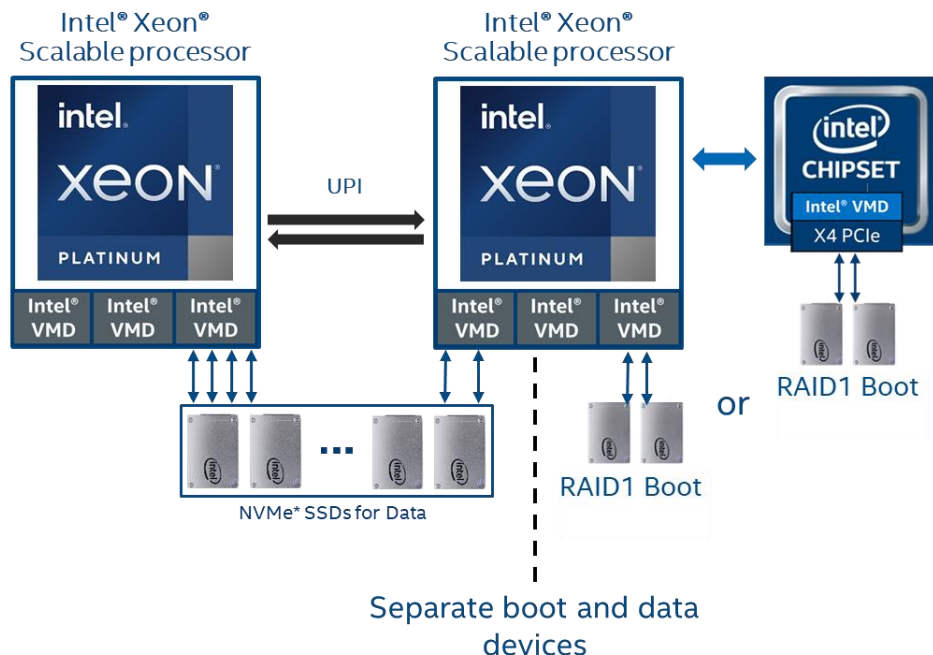
The Intel® Volume Management Device Driver for VMware® ESXi® release package contains the **9.0.0.1012** release of the Intel® Volume Management Device Driver to support Generation 3, 4, 5, & 6 Intel® Xeon Scalable Processors platforms using the VMWare® ESXi® Hypervisor.

Intel® Volume Management Device Driver assists in the management of CPU and PCH attached PCIe NVMe SSDs. Features include ability for PCIe NVMe Surprise Hot Plug, LED Management, and Error Handling within a VMWare® ESXi® environment.

1.2 Key Features

1.2.1 RAID 1 Support

Intel® Volume Management Device Driver version **9.0.0.1012** supports Generation 3, 4, 5, & 6 Intel® Xeon Scalable Processors Platforms for NVMe devices behind VMD. Multiple RAID 1 volumes, including both boot and data, are supported per VMD Domain/Controller. Intel currently verifies functionality of two volumes per Domain/Controller. See the illustration below for clarification.





Intel® Volume Management Device Driver for VMware® ESXi*

For all supported Intel® Xeon Scalable Processors platforms, RAID 1 can be created on devices that are CPU attached NVMe.

Only VMD enabled NVMe devices can be managed with this driver version. For devices not on VMD enabled lanes, the native VMware NVMe driver will load on SSD PCIe NVMe devices. SATA devices are not supported.

The LSU vSAN/vCenter Framework LED Management tool is available in box as of ESXi 7.0U3.

Note: Intel VMD driver name was updated from “intel-nvme-vmd” to “iavmd”.

1.2.2 NPEM LED Management for Switch attached NVMe

Intel VMD ESXi driver supports NPEM LED management on switch attached NVMe that are enabled for Intel VMD. Switches that support NPEM can enable Intel VMD on their PCIe lanes to manage LED blinking patterns. For NVMe devices directly attached to the platform and enabled by VMD, the Intel VMD LED management method will be used.

1.3 Defect Submission Process

With this release, Intel will accept, and process issues reported by customers via the Intel Premier Support (IPS) portal.

To submit an issue, please use the Intel Premier Support (IPS) tool. Information, training, and details can be found at the below website. Your local Intel FAE can also provide you the necessary requirements to enable you to submit an IPS issue (also known as a “case”) including an account setup if you do not already have one.

<http://www.intel.com/content/www/us/en/design/support/ips/training/welcome.html>

2 **Support**

2.1 **Supported Operating Systems**

- Gen 3 - VMware® ESXi® versions 7.0U2+ and 8.0x
- Gen 4 - VMware® ESXi® versions 7.0U3 and 8.0x
- Gen 5 - VMware® ESXi® versions 7.0U3 and 8.0x
- Gen 6 - VMware® ESXi® versions 7.0U3 and 8.0x

2.2 **Supported Platforms**

- Intel® Xeon® Scalable platforms Generation 3, 4, 5, & 6

2.3 **Supported Configurations**

- Up to 2 level deep switch
- Up to 48 PCIe NVMe SSDs

2.4 **Supported PCIe NVMe SSD**

Intel® Volume Management Device Driver supports most shipping enterprise NVMe SSDs. See Section 5 of the following supported configurations document for additional details.

<https://www.intel.com/content/dam/support/us/en/documents/memory-and-storage/Intel-VROC-VMD-Supported-Configs.pdf>

***NVMe Dual controller devices not supported in this release**

3 Release Package Guidance

3.1 Release Package Driver Components

VMware® ESXi® 7.0U3 Intel® Volume Management Device Driver Component

VMW-esx-7.0.0-Intel-Volume-Mgmt-Device-9.0.0.1012-1OEM.700.1.0.15843807.zip

Intel® VMD/VROC and LED Management Tool for ESXi® 7.0U3 Component

VMW-esx-7.0.0-INT-intel-vmdr-cli-9.0.0-2380.zip

VMware® ESXi® 8.0x Intel® Volume Management Device Driver Component

INT-esx-8.0.0-Intel-Volume-Mgmt-Device-9.0.0.1012-1OEM.800.1.0.20613240.zip

Intel® VMD/VROC and LED Management Tool for ESXi® 8.0x Component

INT-esx-8.0.0-intel-vmdr-cli-9.0.0-2380.zip

Note: Component naming may have been abbreviated.

To update or install the VMD driver, VMware® recommends using the following component installation command syntax:

```
# esxcli software component apply -d <path_to_component.zip>
```

3.2 Intel® VMD/VROC and LED Management Tool

Volume and LED Management command line (CLI) tool version(s) are listed in para. 3.1.

Versioning between the VMD driver and tool may differ due to ESXi® version development kit requirements.

Downloads may be obtained from the following links (signed/certified releases only). For unsigned versions, please contact your Intel® representative. Please note compatibility requirements between tool version and ESXi® version as listed on the download page(s).

- ESXi® 7.x - <https://www.intel.com/content/www/us/en/download/784752>
- ESXi® 8.x - <https://www.intel.com/content/www/us/en/download/784751>

3.3 BIOS-Integrated VMDVROC UEFI Drivers

The following Intel® VMDVROC UEFI drivers should be BIOS integrated for best performance:

VMDVROC_1.efi

VMDVROC_2.efi

RCmpVROC.efi – Utility for verifying UEFI driver installation compliance

****Both UEFI drivers are required to perform enumeration and exposure of Intel VMD attached devices in the pre-boot environment.**

3.4 Limitations

3.4.1 VT-d Must Be Disabled when booting to installer

On platform CRB ArcherCity_005 with full BKC#35 with 18434556 ESXi build, VT-d must be disabled due to a PSOD while booting to installer.

3.4.2 Immediate Reboot Required After Migrating a System Device From Pass Through to RAID 1 using CLI tool in Hypervisor

A reboot is required if using the CLI tool in the hypervisor environment to migrate a bootable pass through (non-RAID) ESXi hypervisor drive to a second drive, to create a RAID 1 volume. DO NOT perform any IO to the RAID 1 volume before rebooting.

3.4.3 Certain NVMe Switches Cause VMD LED Status on Other Slots to be OFF During Hotplug

Certain switches may cause the LED Status Locate blinking state to go to OFF when hot plugging other NVMe devices attached to the same switch. This issue cannot be reproduced on other switches Intel VMD has validated, however, it may occur on those not tested.

3.4.4 vSphere Hotplug Insertion Event Tab Limitation

When hot removing a VMD-enabled NVMe SSD, and hot inserting the exact same drive, vSphere events/monitor reports a warning and the device as inaccessible. The Event tab does not report that the drive is re-inserted. This is not specific to NVMe, but occurs with SATA devices as well. Please refer to the Devices tab that shows when the device is re-inserted, or the VMKernel.log to validate that the hot reinserted NVMe device is correctly logged.

3.4.5 Intel® Virtual RAID on CPU (Intel® VROC) HII Menu in Pass Thru mode

Intel VMD and Intel VROC UEFI drivers are packaged together. Intel VMD UEFI driver enumerates and assigns resources for all NVMe devices under the root port. The Intel VROC UEFI driver exposes those devices to the system.

Due to this packaging, the devices in the UEFI HII BIOS menu will be found under the Intel® Virtual RAID on CPU (Intel® VROC) HII menu when Intel VMD is enabled. Intel VROC in Pass Thru mode is seen so that the user knows that NVMe RAID is not supported when Intel VROC is in pass thru mode.

4 ***Known Issues in this Release***

None

5 Resolved Issues

Issue history for Intel® Volume Management Device Driver for VMware® ESXi*

9.0.0.1012

- 22019901682 - ESXi Inbox IAVMD 9.0 Hotplug issue (3367501)

9.0.0.1006

- 15013906459 [ESXi] Disks connected to PE2 Riser slot on both Socket1 and Socket0 is not visible in CRB
 - 22019226284 [CERT] [IOVP] Storage Stress LSUPuginStress test failed for iavmd 9.0.0.1002 (ESXi 7.0, Beta) build
 - 16022977731 [VMD][ESXi] PSOD occurs when issued busreset to Raid1 volume while IO is running
 - 16023094832 [GMR-SP][ESXi] PSOD occurs while running disklist command on ESXi7.0U3G BETA (GMR SP BETA)

3.5.1.1002

14020545480 - [EGS-R 2S][EMR]VROC 8.5 PreOS flexible VMD cfgbar/membar MMIO memory allocation
 18027916020 - [EGS-R 2S][EMR](Hot Plug) Hot plug does not work for half of slots in CRB HSBP - ESXi80GA – verifying the issue, it occurs intermittent

3.5.0.1008

18027757118 - [EGS-R 2S][EMR](Hot Plugs) Hot plug does not work for half of slots in CRB HSBP - RHEL9.0 – Intel CRB
 18027757252 - [EGS-R 2S][EMR](LED Management) LEDs do not blink properly with disks connected to CRB HSBP (VMD) - RHEL9.0 – Intel CRB

3.2.0.1008

16018177812 - Deviation in the LED pattern during RAID background operation (rebuild,initialization,verification and migration) with locate ON and OFF on ESXi 8.0
 14017984058 - When VMD is enabled, observed PSOD, P_CATERR & IERR catastrophic fault on specific customer NVMe SKUs

Inbox Driver Fixes reported to Intel by VMware:

- Added inbox change to stop PSA continue to retry a failed command.
- Fixed NVME Status logic if status is 0x82
- Remove erroneous rp_deletedisk API call in rp_setPathLostTimer to allow for DESTROY_PATH by PSA layer – Fix for RAID1 Hotplug use case.

v3.2 updated to use GA version of vSphere 8.0 NDDK

3.0.0.1038 and prior

18017638574 - ESXi 7.0u3 - PSOD during booting to ESXi installer – fixed with BKC #35 + Latest ESXi 7.0U3
 14014595452 - VMD driver hotfix 2.7.1.1002 can't detect any NVMe under VMD controllers
 16015870651 - When system in idle state getting continuous prints of dirty flag set in Vmkernel logs
 15010191131 - Cedar Island_Cooper lake VMware7.0U1 OS + iavmd 2.7.0.1157 driver. When the nvme disk is hot unplugged under the system, the OS purple screen is stuck with high probability
 15010773008 - [ESXi 6.7 VMDR CLI 2.7-0.0.2177] missing a xml file for HPE smart component creation
 14015496529 - Intel SATA & NVMe SSD H:0xc error reported with iavmd 2.7 driver in ESXi
 14016114981 - ESXi 8.0 inbox IAVMD driver - DriverLoadUnloadWithHighMemUsage PSOD
 14016115169 - ESXi 8.0 Inbox IAVMD driver - Driver Load/Unload non-empty Heap PSOD
 14016212688 - ESXi 8.0 Inbox IAVMD driver - Mismatched metadata causing volume failure



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16016097730 - [VMD] Allow to create RAID1 volume with odd count drives and driver continue to perform operations on that volume then PSOD occurs

16016108261 - [VMDR CLI] Help messages correction on Create RAID volume and suggest to add implement Migration command

16016104276 - [EGS]Creating Raid Volume in VMDRCLI getting PSOD error with ESXi OS 7.0.u3D 19311931 Debug build

15011454129 - After NVMe hot-insert, Samsung U.3 drives do not list in VMware Client (ESXi 7.0U3d and 8.0) Binaries Compiled with Official ESXi 8.0 DDK(s)