



Intel® Virtual RAID on CPU (Intel® VROC) and Intel® Rapid Storage Technology Enterprise (Intel® RSTe) Linux* OS – 5.1 PV Version Release

Release Notes

April 2017
PV Release



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Revision History

Package Definition	Intel® VROC	Release Date
PV	Intel RSTe Linux 5.1 PV Release	April, 2017



1 Introduction

Intel Virtual RAID on CPU (Intel® VROC) and Intel® Rapid Storage Technology enterprise (Intel® RSTe) SATA Production Version (PV) release package for Intel RSTe 5.X Linux supports both PCH based RAID as well as NVMe CPU attached RAID. This PV release package includes key/critical bug fixes resolved since the release. These components include:

- The PV versions of Linux MDRAID with Intel RSTe and Intel VROC
- The Intel® Volume Management Device (Intel® VMD) enabled NVMe driver
- The Intel VROC UEFI drivers and utilities
- The Intel RSTe UEFI drivers and utilities
- The Intel RSTe Legacy Option ROM images and utilities
- The Intel Acceleration Storage Manager (ASM)

Intel® Virtual RAID on CPU (Intel® VROC) is the term describing Intel® RSTe 5.1 with the Intel VMD-enabled NVMe driver. The Intel® VROC upgrade key is required to create, boot and manage RAID volumes across NVMe SSDs attached to the CPU.

1.1 Supported Operating Systems

Intel VROC 5.1 version introduces support for the RHEL 7.3 Business Update (BU) distributions of Linux. Intel VROC is available in the following Linux distributions:

- Red Hat Enterprise Linux (RHEL) 7.3 (Intel VROC) GA and BU – requires Intel VROC package
- SUSE Linux Enterprise Server (SLES) 12 SP3 (Intel VROC) – support available “out of box”

NOTE: Intel VMD has been upstreamed and is included in the Linux 4.10 kernel

1.2 Supported Platforms

Intel® Xeon® E5/E7 SP Purley

- Intel® Xeon® processor E5 / E7 –SP (Sky Lake) product family

Intel® Xeon® SP Basin Falls

- Intel® Xeon® processor -SP (Sky Lake) product family

1.3 Limitations

1.3.1 Hot plug limitations

1. After upgrading to BIOS 94._D6, or newer, and hot plug is enabled, issues may occur when an external Graphics card is plugged into a PCIe slot other than Slot 8.

Workaround:

Put the external graphics card on **Slot 8** with hot plug enabled. It is possible that this same issue is manifested in a different way for different OS

Use the internal graphics.

2. Removal or insertion of PCIe NVMe SSDs while in S4 is not supported
3. S3 power state will only be supported on Purley workstation platforms



1.3.2 Limitations on Platforms with Intel QS Lewisburg PCH

The following workaround is necessary when installing RHEL7.3 for these platforms. There are several Bugzilla issues listed for "QAT" as well as open issues related to Purley that are scheduled to be fixed in RHEL 7.4 and 7.3.z (z-stream/BU).

When installing RHEL7.3, the installation must be edited by appending the following:

```
modprobe.blacklist=qat_c62x
```

1.3.3 RAID WRITE HOLE Policy Selection Limitations

Linux supports only the Distributed PPL policy option. When creating a RAID 5 in UEFI or Windows environment, user is allowed to choose between Distributed PPL, and Journaling RAID WRITE HOLE Policies. For Linux RAID 5, to support the RAID WRITE HOLE, choose the Distributed PPL policy option only.

1.3.4 Updating to RHEL 7.3 Business Update

On platforms that are utilizing Intel VMD and Intel VROC functionality, prior to applying the RHEL 7.3 BU updates, the Intel VROC updates included in this package must be applied.

1.4 Defect Submission Support

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 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>

When submitting a case, please include the following Fields in order to flag Intel VROC / Intel RSTe AE support for Purley Skylake SP platforms.

- Case Information -> Product = Purley
- Case Details -> Subject= <Add short title summary of issue>
- Case Details -> Case Description = <add description and how to reproduce error>
- Case Details -> Case Type = <fill in type of request>
- Case Details -> Severity = <fill in severity of issue>
- Case Details -> End Customer = <name of OEM>
- Case Details -> Issue Source = IPS Cloud
- Case Details -> Severity
- Product/Project Info -> Case Category = TechnologyInitiative
- Product/Project Info -> Case Subcategory = Intel® Rapid Storage Technology enterprise (Intel® RSTe)
- Environment Details -> Purley-PCH = lbg-4

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- Environment Details -> Purley-CPU = skx-2s (or skx 4s)
- Environment Details -> BKC or SW Version = 5.1



2 Included Features

Table 1. Feature Set

Feature	Notes
Surprise Hot-Plug	Requires Hardware / Firmware support
LED Management	VMD Method
Error Management	VMD First
RAID Write Hole	Resolves RAID Write Hole on RAID 5 with Premium Key
Intel VROC Premium	Intel® VROC Premium SKU upgrade key



3 List of Modules supported for Intel® VROC

Table 2 List of Modules supported for Intel® Xeon® based platforms delivered with Intel® VROC for this release

Feature	Notes
Intel VROC UEFI Driver Intel VMD UEFI Driver	<ul style="list-style-type: none">Intel® VMD/VROC UEFI Driver version 5.1.0.1007<ul style="list-style-type: none">RSTeVROC-VMD-Part1.efiRSTeVROC-VMD-Part2.efi
Intel VROC RESTful API	<ul style="list-style-type: none">ASM 1.1.0.2 Linux
Intel® VMD Linux* Driver Intel® RSTe Linux* Driver	<ul style="list-style-type: none">Kernel 4.10



4 Package Components

The following components are included in this package

4.1 Intel RSTe Pre-OS Components

With this release, **Intel will no longer provide a version of the Intel VROC preOS UEFI driver package that by-passes HW activation key enforcement (Super SKU).** You will need to connect either an ES or QS Intel VROC Standard (or Premium) key on the board to test standard (or premium) features.

We have included a tool to run via an EFI shell that can be used to check for the HW key presence (HWKeyCheckRSTeRS.efi). There are 3 possible scenarios; no key inserted, standard or premium key inserted.

RSTe_PreOS-5.1.0.1007.zip

- Efi_sata directory contains the EFI RAID driver to support the platform SATA controller in RAID mode
- Efi_ssata directory contains the EFI RIAD driver to support the platform sSATA controller in RAID mode
- Efi_standalone_rste_rs directory contains the EFI driver to support Intel VROC HW Key enforcement with VMD enabled
 - VMDVROC_1.efi and VMDVROC_2.efi both must be included in the platform BIOS
 - Rcfgrsters.efi is the command line tool executed from an EFI shell
 - HWKeyCheckRSteRS.efi is the HW Key checking tool to help determine if there are issues reading the HW key on the platform
- Legacy_sata directory contains the legacy Option ROM to support the platform SATA controller in RAID mode
- Legacy_ssata directory contains the legacy Option ROM to support the platform sSATA controller in RAID mode
- Legacy_ssata_dos directory contains some DOS based tools to help manage the system in legacy mode.

4.2 Intel VROC for VMD enabled platforms

The contents of this zip file is specifically designed to be applied against a RHEL 7.3 GA / BU Installations. The instructions included in the user guide outline the steps required to apply the supplied patches for Intel VMD and Intel VROC RAID support on a platform that supports VMD.

- Intel_VROC_5_1_PV_Linux_ReleasePackage.zip
 - PreOS
 - Intel OBL Commercial Use License.pdf
 - Intel_VROC_Linux_5_1_PV_Release_Notes.pdf
 - Intel_VROC_NVMe_for_Linux_SW_User_Guide_5_1_PV.pdf
 - Intel_VROC_5X_Linux-TPS.pdf
 - rste-5.1_PV_rhel7.3.zip
 - Intel_ASM-1.0.0.1087-Linux.zip



4.3 Intel VROC and Intel VMD Linux Source Code

The contents of the "SRC" directory (within the iso image) contains the associated source code for the rpm packages included with this release.



5 Intel® VROC 5.1 PV Known Issues

Known issues in this release of Intel® VROC and Intel® RSTe SATA

Title	SLES_12_SP3 – Install Boot Issue – Unable to verify that media mounted successfully
Ext/Int Reference #	116557 / Bugzilla: https://bugzilla.suse.com/show_bug.cgi?id=1034647
Version	SLES 12 SP3
Issue Description	Although ISO is successfully mounted, the installer fails to verify ISO mounting, and installation cannot progress.
Workaround	None at this time

Title	Platform does not wake properly from S4
Ext/Int Reference #	111451
Version	Intel RHEL7.3 Linux 5.0 PV release
Issue Description	While S4 cycle, platform does not wake properly. After about 10-20 iterations. Call Trace occurs and platform goes to reboot instead of resuming from S4 state
Workaround	None at this time

Title	Intel RSTe5.0 Linux VMD Mode Single and RAID Performance Issue
Ext/Int Reference #	1209614337 / 00161150
Version	Intel RHEL7.3 Linux 5.0 PV release
Issue Description	Using FIO for SEQ READS/Writes on Intel VROC RAID volume, performance is lower than expected
Workaround	None at this time



Title	Intel VROC RAID Performance Issue
Ext/Int Reference #	1209614337 / 00161150 / 22807
Version	Intel RHEL7.3 Linux 5.0 PV release
Issue Description	Using FIO for SEQ READS/Writes on Intel VROC RAID volume, performance is lower than expected
Workaround	None At This Time

Title	RSTe RAID Volume Stop Command May Fail
Ext/Int Reference #	99799
Version	Kernel 4.7-rc5
Issue Description	When attempting to stop an RSTe RAID Volume, the command may fail.
Workaround	Retry the command

Title	PPL on Journal Drive Not Supported
Ext/Int Reference #	100608
Version	Kernel 4.7-rc5
Issue Description	The volume will start without any warnings, even though the Journal Drive is not supported, and won't provide any RWH protection without notifying the user.
Workaround	DO NOT create RAID 5 with PPL Journaling Policy option, use only the Distributed PPL option for Linux

Title	Linux RHEL7.3 Install May Fail
Ext/Int Reference #	22832
Version	RHEL 7.3 GA with Purley Lewisburg QS PCH
Issue Description	When attempting to install RHEL7.3 GA to validate Intel VROC, the installation will fail on Lewisburg QS PCH



Workaround	During install please select 'e' and append the following command line after inst.updates=LABEL=RSTE modprobe.blacklist-qat_c62x
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6 Resolved Issues - Intel® VROC Linux Driver 5.1 PV Release

Title	All RAID Disks Blinking During Initialization
Ext/Int Reference #	1209614204
Version	RSTe_5.0.0.2192
Issue Description	<p>On a Linux system, the fault LED will blink on all RSTe managed RAID volume member disks when the RAID volume is in initializing status. This is inconsistent with Windows VMD LED behavior.</p> <p>The planned behavior change is to not have these LEDs blink during initializing state and to have a unified LED behavior across SATA to VMD and RSTe 4.x to 5.x products.</p>
Workaround	Fixed in Intel RSTe SATA Windows 5.1 PV to match the Linux behavior

Title	Unable to Install RHEL 7.3 GA Workstation with RSTe 5.0 ISO
Ext/Int Reference #	116252/
Version	RSTe_5.0 PV Release
Issue Description	If you try to install RHEL 7.3 GA Workstation with RSTe 5.0 ISO package and 'Development and Creative Workstation -> Additional Development' package set has been selected, installation fails with an error
Workaround	Fixed in Intel RSTe Linux 5.1 PV

Title	[2017_WW13 BKC][BIOS:128.R08][Neon city FPGA]System cannot enter S4 on VMD Raid mode.
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Ext/Int Reference #	5346049
Version	Intel RHEL7.3 Linux 5.0 PV release
Issue Description	RAID 1 Cannot enter into S4 when VMD is enabled
Workaround	Fixed in Intel RSTe Linux 5.1 PV

Title	(Manual Migration) R0 to R5 migration broken for arrays with non-aligned size
Ext/Int Reference #	5346049
Version	Intel RHEL7.3 Linux 5.0 PV release
Issue Description	mdadm fails to add disks to RAID or to migrate from RAID 0 to RAID 5 for certain array sizes.
Workaround	Fixed in Intel RSTe Linux 5.1 PV