Intel® Virtual RAID on CPU (Intel® VROC) and Intel® Rapid Storage Technology enterprise (Intel® RSTe) 5.2 PV Release

Customer Release Notes

June 2017

Revision 1.0

Revision History

Revision	Description	Date
1.0	Intel RSTe 5.2 PV Release	June 2017

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Contents

1　*Introduction*

1.1　Overview

The Intel® Virtual RAID On CPU (Intel® VROC) 5.2 Production release (PV) release package is intended for all customers. This package contains the PV version of the Intel VROC drivers and Intel® Rapid Storage Technology enterprise (Intel® RSTe) SATA drivers for Windows*, UEFI, and Legacy OROM. This release supports platforms built with the Intel® C620 and C422 series chipsets.

Intel® Virtual RAID on CPU (Intel® VROC) is the term describing Intel RSTe with Intel® Volume Management Device (Intel® VMD)-enabled NVMe drivers, assisting CPU attached PCIe NVMe SSD bootable RAID.

1.2　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
- Environment Details -> Purley-CPU = skx-2s (or skx 4s)
- Environment Details -> BKC or SW Version = 5.2

1.3   Supported Operating Systems

Only 64bit OS support is available for the following OS versions
- Windows* 7 SP1 (supported on Purley Workstations only)
- Windows* Server 2012 R2 Enterprise (supported on Purley Server platform only)
- Windows* 10 (supported on Purley Workstations and Basin Falls platforms only)
- Windows* 10 RS2 (supported on Purley Workstations and Basin Falls platforms only)
- Windows* Server 2016 Enterprise (supported on Purley Server platform only)

1.4   Supported Platforms

Intel® Xeon® E5/E7 SP Purley

- Intel® Xeon® processor E5 / E7 –SP (Skylake) product family with Intel® C620 series chipset

Intel® Xeon® SP Basin Falls

- Intel® Xeon® processor -SP (Skylake) product family with Intel® C422 series chipset family

Note: For answers to questions concerning the Intel® RSTe C620 and C422 series chipset and/or to obtain other technical collateral, please contact your local Intel FAE.

Intel® VROC / Intel® RSTe 5.2 PV Release Notes

2   Release Package Contents

2.1   New In This Release

This release of Intel RSTe 5.2 PV Release introduces the following:

1. UEFI Specification 2.3 Support for UEFI NVMe Pass Thru Protocol For the following commands:
    - Identify
    - Set Features
    - Get Features
    - Get Logpage
    - Format NVM
    - Firmware Commit
    - Firmware Download
    - **Device Self-Test (DST)**

2. Support for a new Private UEFI Intel VROC Device Information Protocol
-   Allows UEFI applications to retrieve information about each NVMe device on Intel VMD-enabled lanes
    - Bus/device/function
    - SocketNumber
    - Vmd Domain
    - RootPort Number
    - Slot Number
    - Vendor Id
    - Serial Number
    - Model Number
    - Total Blocks
    - Block Size

    *See the Intel VROC Technical Product Specification for complete API and details

3. Managed NVMe Hotplug "Remove Disk" addition to Intel RSTe User Interface
4. Re-sizing of RAID Data Volumes in UI no longer requires a re-boot
5. Intel VROC HII and UEFI RCFG tool now reports device's full serial number
6. Trial Version of Intel VROC is automatic when installed on system without an Intel VROC Hardware Key

2.2   Intel VROC Premium SKU and HW Activation Key Enforcement

Beginning with Intel RSTe and Intel VROC 5.0 PV releases, **we 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 Premium/Standard key on the board to test standard or premium features that support RAID technology.

2.3 Intel VROC Pass-thru mode

Intel VROC Pass-thru mode was introduced in Intel VROC 5.1 and provides 3rd party NVMe support for devices behind VMD-enabled lanes without the need for an Intel VROC Hardware activation key. Pass-Thru mode is limited to the following:

1. NVMe Pass Thru non-RAID support as a single data drive
2. NVMe Pass Thru support as a single Bootable device
3. Requires Intel VROC UEFI drivers from this Intel VROC 5.2 PV release (not backward compatible) listed in section 2.5

NOTE: There is no RAID support included with Intel VROC Pass-Thru.

2.4 Limitations

2.4.1 Intel VROC Trial Version Limitations in this release

- **Data RAID Only (No Boot Support)**
- **Data RAID must be installed on same make/model of NVMe devices**

2.4.2 Microsoft* Windows* 7 Port Event Message

When operating on a Workstation Platform that supports 8 SATA ports and also supports Windows 7 operating system, Windows may log a System Event 143. "The device <*device information*> is attempting to use more than 8 buses, which exceeds the supported maximum. Please refer to the latest documentation from your storage controller manufacturer to determine whether this device and driver are designed to work on this operating system."

This Event ID 143 is informational in nature and can be ignored. To date, there have been no operational issues reported that have been root caused by this limitation. However, customers are advised to see their Microsoft representative for more information concerning Microsoft incident report 113040910350567.

* Please refer to the Intel® VROC and Intel® RSTe for Windows Technical Product Specification for additional information

2.4.3 Intel VROC and Intel RSTe UEFI Driver Uninstall limitations

The Intel VROC and RSTe RAID drivers comply with UEFI Specifications for PCI Driver Model for PCI Device Drivers (Section 13.3.3) and may return Status Code "access denied" from UninstallProtocolInterface routine from Boot services (spec. 6.3). This is expected behavior.

2.4.4   Intel NVMe Wear Leveling Recommendations

NVMe SSD Wear Leveling refers to techniques used to prolong the service life of NVMe drives. This section will outline the recommended configurations (number of drives vs strip size) to maximize Wear Leveling on Intel NVMe SSDs when configured as part of a RAID 5 volume.

Strip Size No of drives	4	8	16	32	64	128
3	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
4	Optimal	Optimal	Optimal	Optimal	Suboptimal	Suboptimal
5	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
6	Optimal	Optimal	Optimal	Optimal	Optimal	Suboptimal
7	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
8	Optimal	Optimal	Optimal	Suboptimal	Suboptimal	Suboptimal
9	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
10	Optimal	Optimal	Optimal	Optimal	Optimal	Suboptimal
11	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
12	Optimal	Optimal	Optimal	Optimal	Suboptimal	Suboptimal
13	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
14	Optimal	Optimal	Optimal	Optimal	Optimal	Suboptimal
15	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
16	Optimal	Optimal	Suboptimal	Suboptimal	Suboptimal	Suboptimal
17	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
18	Optimal	Optimal	Optimal	Optimal	Optimal	Suboptimal
19	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
20	Optimal	Optimal	Optimal	Optimal	Suboptimal	Suboptimal
21	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
22	Optimal	Optimal	Optimal	Optimal	Optimal	Suboptimal
23	Optimal	Optimal	Optimal	Optimal	Optimal	Optimal
24	Optimal	Optimal	Optimal	Suboptimal	Suboptimal	Suboptimal

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Note: It is left to the customer to determine the most effective combination of parameters (number of drives vs. strip size) to achieve their desired performance goals, usage models and drive endurance.

2.4.5   Must use F6 Install Method

The use of the included Intel VROC F6 drivers are required to install an OS onto an Intel VROC managed device(s).   There is no Microsoft "inbox" driver that supports Intel VROC.

The supported Microsoft Operating Systems (except for Windows 7) for this product include inbox drivers that support the Intel® C620 and C422 series chipset Platform Controller Hub (PCH) when configured for RAID mode. It is strongly recommended that the Intel RSTe SATA F6 drivers included in this release be used instead of the available "inbox" driver. The provided "inbox" driver is intended only for those customers who may not have the Intel RSTe F6 SATA drivers readily available and ONLY for installing to a single SATA drive (NOT to a RAID volume). Once the OS is installed, it is strongly recommended that the Intel RSTe installer package be installed immediately. At that point, it will be safe to migrate the SATA system disk into a RAID Volume (using the Intel RSTe GUI).

2.4.6   Intel C620 and C422 series chipset Port Limitations

See Errata Section 3.1 also.

This limitation is in reference to platforms having a PCH that supports more than 6 SATA ports. The Intel C620 and C422 series chipset SATA controller supports 8 SATA ports.   As referenced above, The Microsoft Windows Operating systems that contain the "inbox" drivers for the Intel® C620 and C422 series chipset Platform Controller Hub (PCH) when configured for RAID mode, only support 6 ports. Drives on ports 7 and/or 8 are not enumerated. For this reason, Intel recommends not using these 2 ports as part of the Windows* OS boot installation (as a pass-thru drive or as part of a RAID volume). However, if you do need to use these ports as part of your Windows* boot volume, the steps below can be used as a workaround.

Note: you will need a USB drive with the Intel RSTe RstCLI.exe utility.

1. After you have created the desired RAID volume that includes ports 7 and/or 8 (which you intend to use as your Windows* boot volume) in the PreOS environment, begin the Windows* installation process. ***Make note of the RAID volume name.***
2. Navigate to the Windows* disk selection window. At this point, select the Load Driver button and install the Intel RSTe F6 driver (included in this package).
3. Attempt to continue installing the Windows OS onto the RAID volume. If the installation process does not continue, this error has been encountered.
4. Press f10 to invoke a CMD window.
5. If you have not already done so, please insert the USB drive into the system. Navigate to your USB drive with the RstCLI.exe utility.
6. Run command: Rstcli.exe --manage --normal-volume <volumeName>
7. This will reset the volume to a normal state.
8. Close the CMD window.
9. In the Windows* disk selection window, reload the Intel RSTe f6 driver.
10. Once completed, Windows* should allow installation on the RAID volume.

2.4.7 Intel VROC Key Removal/Upgrade Limitation

With Microsoft* Windows* 10, Fast Startup is enabled by default. Disable Fast Startup prior to removing/upgrading the Intel VROC HW key. OR, perform a complete reboot when removing/inserting a HW key when Fast Startup is enabled.

2.4.8 NVMe Port Assignment by Intel VROC

In Windows and UEFI, the port number shown in the Intel VROC interfaces depends on disk enumeration order by the Intel VMD-enabled NVMe driver, which can be different on each platform. The port numbers shown does not reflect the physical PCIe slot. After each hotplug, there is an enumeration process which is NOT fixed.

* Please see the **Intel® VROC and Intel® RSTe for Windows Technical Product Specification** for information on the new Intel VROC UEFI Device Info Protocol for unique Nvme physical slot locations.

2.4.9 Supported PCIe NVMe SSDs List

All shipping Intel® Data Center and Professional NVMe* SSDs are supported by Intel® RSTe 5.2 PV, except dual port NVMe* SSDs.

2.4.9.1 Non-Intel supported PCIe NVMe SSDs:

Vendor	Model
Lenovo	Atsani
**Huawei	ES3600P
Samsung*	SM951
Samsung	SM961
Samsung	PM961
Samsung	PM953
Toshiba*	XG3
Micron*	9100 Series

**Huawei ES3600P will be fully supported in a 5.2 hotfix release scheduled after 5.2 PV

2.5 Drivers, Images and Utilities

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

Feature	Notes

Intel UEFI Drivers	• Intel® VROC UEFI Driver version 5.2.0.1029
	   ○ VMDVROC_1.efi (HW key enforcement in effect)*
	*Note: With this release, we no longer provide the super SKU UEFI driver version
	• Intel® VMD UEFI version 1.2.0.1004
	   ○ VMDVROC_2.efi
	Note: All of these images are required and intended to support Intel VMD and Intel RSTe SATA functionality as a combined installed package.
	• Intel® RSTe SATA Driver version 5.2.0.1029
	   ○ SataDriver.efi
	• Intel® RSTe sSATA Driver version 5.2.0.1029
	   ○ sSataDriver.efi

Legacy OROM Images	• Intel® RSTe SATA OROM pre-OS image version 5.2.0.1029
	   ○ SataOrom.bin
	   ○ Intel® RSTe sSATA OROM pre-OS image version 5.2.0.1029 sSataOrom.bin

Intel® RSTe Windows* Drivers	• Intel® RSTe Windows GUI version 5.2.0.1212 • Intel® VROC Windows Installer Package version 5.2_4.0.3 SetupRSTE.exe (Multi-lingual) • Intel® VROC Windows F6 Driver version 5.2.0.1194 iaVROC.sys • Intel® RSTe Windows F6 Driver version 5.2.0.1194 iaStorE.sys (SATA) iaStorB.sys (sSATA) iaStorF.sys (Filter driver - Windows* 7 only) • ASM version 1.2.0.78
UEFI Based RAID Configuration Utility	• Intel® VROC version 5.2.0.1029 RCfgRSTeRS.efi • Intel® RSTe SATA version 5.2.0.1029 RCfgSata.efi • Intel® RSTe sSATA version 5.2.0.1029 RCfgsSata.efi *Note: Secure Boot must be disabled to use this tool
DOS Based RAID Configuration Utility	• Intel® RSTe SATA version 5.2.0.1029 RCfgSata.exe • Intel® RSTe sSATA version 5.2.0.1029 RCfgsSata.exe

Feature	Notes
UEFI Based Comply Utility	- Intel® VROC version 5.2.0.1029 RcmpVMD.efi - Intel® RSTe SATA version 5.2.0.1029 RCmpSata.efi - Intel® RSTe sSATA version 5.2.0.1029 RCmpsSata.efi *Note: Secure Boot must be disabled to use this tool
DOS Based Comply Utility	- Intel® RSTe SATA version 5.2.0.1029 RCmpSata.exe - Intel® RSTe sSATA version 5.2.0.1029 RCmpsSata.exe
UEFI based SATA SGPIO/LED Test utility	- Intel® RSTe SATA version 5.2.0.1029 LedToolSata.efi - Intel® RSTe sSATA version 5.2.0.1029 LedToolsSata.efi *Note: Secure Boot must be disabled to use this tool
UEFI based Intel VROC LED Test utility	- Intel® RSTe VROC version 5.2.0.1029 LedToolVMDRSTeRS.efi *Note: This tool can be used to exercise LEDs for NVMe disks behind VMD
UEFI Based Clear Metadata Utility	- Intel® RSTe SATA version 5.2.0.1029 RClrSata.efi - Intel® RSTe sSATA version 5.2.0.1029 RClrsSata.efi
UEFI Based Intel VROC HW Key Checker	- Intel® VROC Activation Key Checker - HWKeyCheckRSTeRS.efi *Note: This tool will check for the presence and type of the HW key

3   *Known Issues in this Release*

This section outlines the known issues that are being actively worked on with the Intel RSTe 5.2 PV release

Title	**Windows* Device Manager May not Detect Hot-removing of RSTe Managed NVMe Disks**
Ext/Int Reference#	1209618853/ 00161319 / 117421
Version	RSTe_5.0.0.2192
Issue Description	On a Windows* system, when hot-removing Intel VROC managed NVMe disks, Device Manager may not show the disks as removed without performing a rescan.
Workaround	Use the Intel RSTe GUI to detect Hot removal of NVMe devices.

Title	**All RAID Member Disk LEDs Blinks On Rebuild**
Ext/Int Reference#	00161145 / 201165
Version	RSTe_5.0.0.2192
Issue Description	On a Windows* system that has a RAID volume in rebuilding status, the fault LED for all RAID member disks will blink along with the activity LEDs. This effects only RSTe managed SATA devices.
Workaround	The planned change is to have only the RAID volume member disk that is being rebuilt blink the fault LED, not all of the RAID volume member disks.

Title	**Uncorrectable error occurred during shutdown when enable VTd+VMD on Windows* 10**
Ext/Int Reference#	220184299 / 00177422 / 00172660 / NSD-2755
Version	Intel VMD 1.2 Intel VROC 5.2
Issue Description	On a Windows* 10 system with VMD and VT'd enabled in the BIOS, system will give CATERR on shutdown
Workaround	Enable Hyper-V

Title	**The Negotiated link rate is shown 0Gb when we open RSTe utility first and then plug NVMe SSD**
Ext/Int Reference#	220302619 / 118067
Version	Intel VROC 5.2
Issue Description	HotPlug NVMe SSD and observe in Intel RSTe UI that NVMe SSD is present, but its Negotiated link rate is shown "0Gb/s".
Workaround	Repeat hot-plug or close UI and re-open

Title	**Huawei ES3600P NVMe SSDs are not visible in Windows OS with VMD enabled**
Ext/Int Reference#	NSD-2821
Version	Intel VROC 5.2
Issue Description	When VMD is enabled, Huawei devices are not visible in Windows Device Manager, but they are visible in BIOS and Linux
Workaround	None At this Time

Title	**Microsoft* Windows* 7 BSE or hang with iaVROC.sys during warm reboot on RAID1**
Ext/Int Reference#	1209828082 / NSD-2798
Version	Intel VROC 5.2
Issue Description	When using certain client NVMe SSDs, the system may BSE or hang during warm reboot loops with Microsoft* Windows* 7
Workaround	Does not occur on Microsoft* Windows* 8 and newer, or when Intel NVMe Enterprise devices are used

Title	**Installing a Windows OS on to RAID 5 Volume May Take a Longer then a non-RAID 5 configuration**
Ext/Int Reference#	22031674, 1406253056 / 116656
Version	Intel VROC 5.2
Issue Description	When installing a Windows OS onto a RAID 5 volume, the installation process may take longer than on a pass-thru drive or other RAID levels may take.
Workaround	None At This Time

Title	**Black screen and hang up after resuming from S3 by manually under Win10 RS2 AHCI OS**
Ext/Int Reference#	220211859
Version	Intel VROC 5.2
Issue Description	When doing S3 testing, the system might be hang if resume the system immediately. Fail rate is ~5%. Issue is still under debugging.
Workaround	None At This Time

Title	**LedToolSata.efi is not working on port6 and port7 for SATA controller**
Ext/Int Reference#	1209740406/ 115541
Version	Intel VROC 5.1
Issue Description	This issue is about LED test tool in Shell. Issue has been fixed. The sGPIO signal for port6 and port7 can be triggered with LedToolSata.efi correctly.
Workaround	Under investigation

Title	**Performing a Drive Hot Remove During a System Sleep State may not Show Up in the GUI or CLI tool**
Ext/Int Reference#	109579
Version	Intel VROC 5.2
Issue Description	When running a system with Intel VROC (or Intel RSTe), when putting the system into a sleep state and then removing one of the drives, when the system resumes the Intel RSTe GUI may not properly update the display to show the drive is gone. This same can occur when looking at the status via the CLI tool.
Workaround	Under investigation

Title	**Reinstalling an OS on a System May Result in a System Failure**
Ext/Int Reference#	110013
Version	Intel VROC 5.2
Issue Description	When running in a system with a Windows OS install on the SATA RAID volume and that volume is deleted in the UEFI HII in order to install an OS onto a VROC RAID volume, the system may encounter a BSOD on the installation's second reset.
Workaround	If possible, remove the SATA drives from the environment when installing onto the VROC RAID volume.

Title	**Windows* 7 Installed onto an Intel VROC RAID 1 Volume May Not Reboot Properly. BSE or hang with iaVROC.sys during warm reboot on RAID1**
Ext/Int Reference#	115641
Version	Intel VROC 5.2
Issue Description	When running in a configuration where Windows 7 is installed onto an Intel VROC RAID 1 volume, the system may enter into a failed state following a reboot
Workaround	Issue only seem to occur on on Windows 7

Title	**Adding Disk to a 6 Disk RAID 0 May Not Add The Disk**
Ext/Int Reference#	220262518 / 00179962 / 117860
Version	Intel VROC 5.2
Issue Description	Using the " Add disk" option in the RSTe GUI to add a disk to an existing SATA RAID 0 volume as the system boot device may result in an unknown error. Consequently, the disk will not actually be added to the volume.
Workaround	None At This Time

Title	**Intel RSTe AHCI Driver May Not Properly Resume from a System Sleep State**
Ext/Int Reference#	220211859 / 117883
Version	Intel VROC 5.2
Issue Description	After installing the Windows 10 RS2 OS with the PCH controller in AHCI mode, using the Intel RSTe AHCI driver, the system may not properly resume from a system sleep state (S3).
Workaround	None At This Time

Title	**Intel RSTe AHCI Driver May Not Properly Resume from a System Sleep State**
Ext/Int Reference#	220211859 / 117883
Version	Intel VROC 5.2
Issue Description	After installing the Windows 10 RS2 OS with the PCH controller in AHCI mode, using the Intel RSTe AHCI driver, the system may not properly resume from a system sleep state (S3).
Workaround	None At This Time

Title	**System and Spare Disk May be Selectable as Journaling Drive**
Ext/Int Reference#	220154328 / 00176358 / 117412
Version	Intel VROC 5.2
Issue Description	Having Windows OS installed on a single disk, when using the RSTe GUI to create a RAID volume and checking the RAID Write Hole option in the advanced tab, the System disk may be selectable as the journaling drive. If a disk is set as a spare, it too may also be selectable.
Workaround	None At This Time

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Title	**NVMe hot plug in different CPU take longer time to update in device manager**
Ext/Int Reference#	1209670442 / 115303
Version	Intel VROC 5.2
Issue Description	When there is NVMe drive connect in different CPU and do hot-plug/removal with one drive. Windows device manager refresh disk status with longer delay than VROC UI.
Workaround	None At This Time

Title	**Hot Removing NVMe Disks May Take Longer Than Expected to Show in Windows Disk Management**
Ext/Int Reference#	220174495 / 00176995 / 117410
Version	Intel VROC 5.2
Issue Description	In the Windows operating system, after removing an NVMe disk, the Windows Disk Management or Device Manager may take 45 seconds to a minute to reflect the change. The RSTe GUI reflects the change within 10 seconds so it is not effected.
Workaround	None At This Time

Title	**RSTe UI show incorrect Negotiated link rate**
Ext/Int Reference#	220302619 / 220327398 / 00182348 / 117410
Version	Intel VROC 5.2
Issue Description	RSTe UI may show incorrect Negotiated link rate when first NVMe hot-plug into the system after boot. Symptom is not reproduce when there is no hot-plug for NVMe drive.
Workaround	None At This Time

Title	**System May Hang when Creating or Deleting a RAID Volume using RSTe efi driver HII Forms.**
Ext/Int Reference#	1209723345 / 00164623/ 22829
Version	Intel VROC 5.2
Issue Description	When using the Intel RSTe HII to create a RAID volume or delete a RAID volume, they system may become unresponsive, requiring a power cycle to recover.
Workaround	None At This Time

Title	Creating/Deleting a RAID Volume in the UEFI HII May Result in a Platform Hang
Ext/Int Reference#	1209582891/ 22803
Version	Intel VROC UEFI 5.2
Issue Description	When attempting to create or delete a RAID volume in the UEFI HII may result in a system hang that requiring a system power cycle.
Workaround	Fix will be in Intel VROC UEFI 5.3 Release

3.1　　　Errata

The following is a list of issues that Intel VROC and/or Intel RSTe has no current plans for resolving.

Title	Installing Windows OS on a RAID Volume That Includes SATA Ports 7 and/or 8
Ext/Int Reference #	1209615034/111641/22822
Version	RSTe_5.0.0.2505
Issue Description	When attempting to install a Windows Operating System onto a RAID volume that includes drives on port(s) 7 (and/or) 8, a message may appear reporting that installation of the operating system is not allowed. The Microsoft* inbox RAID driver (Rapid Storage Technology) is initially installed prior to the option to load the RSTe F6 driver. Due to the fact that the inbox RAID driver does not support more than 6 SATA ports, the RAID volume may inadvertently be marked as "Failed". This failure is not exposed to the user and when the RSTe driver is installed, the failed volume is seen and reported up. Microsoft installer then prevents any further action to be taken on this drive (RAID volume). Since this occurs prior to the RSTe (F6) driver being allowed to be installed, Intel recommends avoiding using ports 7 and/or 8 to install the OS.
Workaround	See section 2.4.2

4 *Issues Fixed in Intel VROC 5.2 PV*

Title	Unknown Error opening Intel RSTe GUI With Win10RS2
Ext/Int Reference #	1209973765; 00170598 / 116540
Version	RSTe_5.0.0.2502
Issue Description	Error message and RSTe UI will not start/open on SATA ports when Fast Boot is enabled.
Workaround	Try: Disabling Fast Boot OR - Install 5.0.0.2414 and then reinstall 5.0.0.2502 over 5.0.0.2414

Title	VMD Windows – NVMe Compare command cannot be passed through to NVMe SSDs behind Intel VMD
Ext/Int Reference#	1209701611 / NSD-2688
Version	Intel VROC 5.0 PC
Issue Description	On NVMe SSDs that support the NVMe Compare Command, an error status is returned on devices connected to VMD-enabled ports
Workaround	**None**

Title	System May Hang when Creating or Deleting a RAID Volume using RSTe efi driver HII Forms
Ext/Int Reference #	1209723345 / 22829
Version	RSTe_5.0.0.2192
Issue Description	When installing the Intel RSTe SATA UEFI driver, Extended SCSI Protocol is installed on ATAPI device handle when the protocol already exists, causing HII forms hang.
Workaround	None

Title	Purley system May Become Unresponsive when Entering into S4 (Win10) with Large Amount of DRAM and Large Data Drive Present
Ext/Int Reference #	209735901 / 00165058/ 115255
Version	RSTe_5.0.0.2192
Issue Description	Systems with large amount of DRAM and a data drive on sSATA controller that is much larger than the OS drive (on the SATA controller), when entering into an S4 state, the system may become unresponsive requiring a reboot to recover.

Title	**M57 Black Screen and hang up 72S0 when enter S4 during migrating RAID in IRST**
Ext/Int Reference #	1209784621 / 116766
Version	RSTe_5.0.0.2502
Issue Description	When put SUT to S4 during migrating RAID in IRST, the system will black Screen and hang up '72S0'
Workaround	None

Title	**With VMD enabled some Switches will not expose all NVMe devices**
Ext/Int Reference #	1209555067 / 111764
Version	RSTe_5.0.0.2502
Issue Description	Switch attached NVMe are visible without VMD enabled. With VMD enabled, only one device is visible
Workaround	None

Title	**Blue Screen when NVMe SSD hot plug(VMD&VROC&Windows 2012 r2)**
Ext/Int Reference #	1209580735 / 111765
Version	RSTe_5.0.0.2502
Issue Description	RAID 5 hot removal after rebuild is finished causes system hang and Blue Screen
Workaround	None

Title	**Black screen and hang up at debug code E3 when resuming from S4 with Win7 OS plus RSTe NVMe driver.**
Ext/Int Reference #	1209592191 / 111766 / NSD-2506
Version	RSTe_5.0.0.2502
Issue Description	Upon S4 resume, certain NVMe 3rd party devices are not enumerated by Intel VMD driver
Workaround	None

Version 1.0 Intel® VROC / Intel® RSTe 5.2 PV Release Notes

Title	Disk management does not display the changed size of NVMe RAID Without Reboot
Ext/Int Reference #	00169563 / 115970
Version	RSTe_5.0.0.2502
Issue Description	When using the UI to increase the size of a RAID to 100%, then opening disk management and refresh disk management, the size of the array is not updated.
Workaround	RCR implemented in Intel VROC 5.2 PV Release for Data Volumes only

Title	Strip Size options May Differ From BIOS and RSTe UI
Ext/Int Reference #	1209614284 / 00161149
Version	RSTe_5.0.0.2502
Issue Description	When creating an Intel VROC managed RAID 5 or 10 volume using the Intel RSTe GUI or the VROC BIOS UI, the strip size options available may differ between what is available in each.
Workaround	None

Title	UEFI driver shows incorrect SDD Serial Number
Ext/Int Reference #	1209719111 / 112102
Version	RSTe_5.0.0.2502
Issue Description	There is a 16 Character limitation for serial numbers so the UEFI driver concatenates the serial number displayed
Workaround	Added Change Request implementation in Intel VROC 5.2 PV Release

Title	NVMe Disk Hot Plug Behind NVMe Switch May Not Work Properly
Ext/Int Reference#	1209754266 / 00165433 / 115343
Version	RSTe_5.0.0.2192
Issue Description	In a system that has NVMe disks installed in a back-plane that is managed by a 3rd party NVMe switch, hot-plug of disks may not work properly. There is an issue with compatibility between the RSTe driver and some switches.
Workaround	N/A

Title	**Data integrity issue after RAID 1 migrated to RAID 5**
Ext/Int Reference#	220177873 / 117737
Version	Intel VROC 5.1
Issue Description	If users migrate RAID 0/1 to RAID 5, users may encounter the data corruption issue on file sizes greater than 10GB.
Workaround	Fixed in Intel VROC 5.2 PV Release

Title	**With VMD enabled some Switches will not expose all NVMe devices**
Ext/Int Reference#	1209555067/ 111764
Version	Intel VROC 5.0
Issue Description	Switch attached NVMe are visible without VMD enabled. With VMD enabled, only one device is visible
Workaround	Fixed in Intel VMD for Intel VROC 5.2

Title	**Disk management does not display the changed size of NVMe RAID Without Reboot**
Ext/Int Reference#	00169563 / 115970
Version	Intel VROC 5.2
Issue Description	Using the UI to increase the size of a RAID to 100%, then open disk management and refresh disk management, the size of the array is not updated.
Workaround	RCR implemented in Intel VROC 5.2 PV Release for DATA Volumes Only

Title	**Journaling Disk Metadata May have Option to Manually Clear**
Ext/Int Reference#	220158458 / 00176562 / 117416
Version	Intel VROC 5.1
Issue Description	After creating an RSTe managed SATA RAID 5 volume and selecting RWH option, the Journaling disk may have the option to manually clear the metadata.
Workaround	Fixed in Intel VROC 5.2 PV Release

Title	**Strip Size options May Differ From BIOS and RSTe UI**
Ext/Int Reference#	1209614284 / 00161149/ 116405
Version	Intel VROC 5.1
Issue Description	When creating an Intel VROC managed RAID 5 or 10 volume using the Intel RSTe GUI or the VROC BIOS UI, the strip size options available may differ between what is available in each.
Workaround	Fixed in Intel VROC 5.2 PV Release

Title	**Intel VROC UEFI Driver May Publish its HII Settings When Intel VMD is disabled**
Ext/Int Reference#	1209612289 / 111726
Version	Intel VROC 5.2
Issue Description	When running in a configuration that supports Intel VROC and Intel VMD is disabled, the Intel VROC HII may still be seen in the BIOS setup menus.
Workaround	None At This Time

5   Issues Fixed in Intel VROC 5.1 PV

*Issues fixed in Intel VROC 5.1 PV release not included in release notes for Intel VROC 5.1 PV Release

Title	**Onboard LAN of PXE can't work When VMD is enabled**
Ext/Int Reference #	1209952748 / 116074
Version	RSTe_UEFI 5.0.0.2502
Issue Description	When VMD is enabled, and LAN PXE boot on Legacy mode is enabled the system freezes
Workaround	Try: Disable hotplug