



Intel® Rapid Storage Technology Enterprise (RSTe) NVMe™ for Windows*

User Guide

January 2016



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1 Introduction

1.1 Objective and Expectations

The objective of this Intel® Rapid Storage Technology enterprise (Intel RSTe) NVMe Production Version (PV) release package is to enable customers to take advantage of the Intel RSTe RAID support on Intel NVMe Solid State Drives when plugged into PCI express slots managed by the platform CPU. This release is targeted toward platforms with Intel® C610/320 series chipset.

1.2 Acronyms

Table 1: Acronyms

Acronym	Definition	Description
Intel RSTe	Rapid Storage Technology enterprise	SCU Driver and RAID stack for the Intel C610/C320 series chipset
I/O	Disk I/O	Running I/O tests to a disk or RAID volume
GUI	Graphical User Interface	Interface to Intel RSTe
NVMe	Non-Volatile Memory express	PCI express based Non-Volatile Memory
SSD	Solid-state Disk	Microchip-based non-volatile storage devices
RAID	Redundant Array of Independent Drives	Intel RSTe supported configurations of RAID 0, 1, 5 and 10

1.3 Scope and Limitations

This is a Production Validation (PV) version of the Intel RSTe NVMe release package and meets Intel's production quality standards.

The following are some constraints:

1. The Intel RSTe NVMe UI requires the presence of Microsoft .NET 3.5 or greater on the system.
2. Intel NVMe SSD drives connected to a mixture of CPU and PCH managed PCIe slots cannot be combined to create a RAID array. In the scenario where a RAID member drive as part of an existing RAID array is moved to a differently managed PCIe slot, the RAID volume will be intact but all RAID management functions will be blocked for this RAID volume until the drive is moved back to its original slot.
3. The Intel RSTe NVMe GUI does not actively block all possible invalid configurations. As a result, choosing a bad combination could result in an unexpected or unpredictable system behavior.
4. After installing the Intel RSTe NVMe release package, any subsequent driver update of Intel RSTe NVMe must be accomplished through the Intel RSTe NVMe installation utility and not by updating the driver through Window* Device manager which could result in unexpected behavior.



1.4 Validation Disclaimer

This Production Validation (PV) version of the Intel RSTe NVMe release package is being released and meets Intel's Production Quality criteria.

Testing included but not limited to:

- Installation
- Creation and deletion of volumes with each of the RAID levels.
- Creation and deletion of volumes with each of the strip sizes.
- Several minutes of I/O run to the RAID volumes.



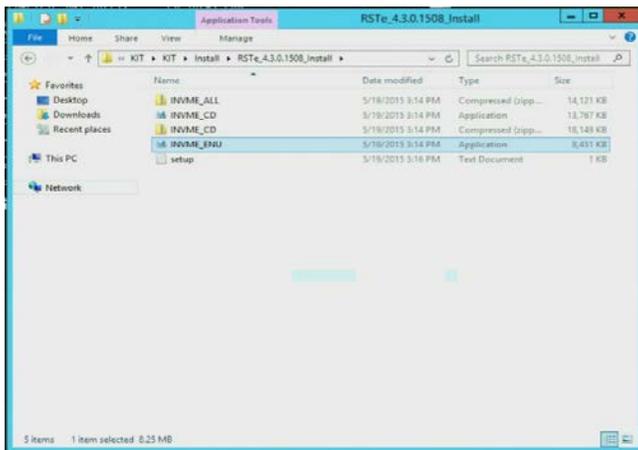
2 Functionality

The Intel RSTe NVMe Production Validation (PV) GUI enables the management of RAID Volumes on Intel NVMe SSD attached to PCI express slots managed by the platform CPU.

2.1 Installing Intel RSTe NVMe Release Package

This installation example assumes you are installing Intel RSTe NVMe for the first time. Installing Intel RSTe NVMe can be accomplished by executing the installation executable.

1. Right mouse click on “INVME_ENU.exe” and run as Administrator.



2. At the Welcome screen, click **Next**.

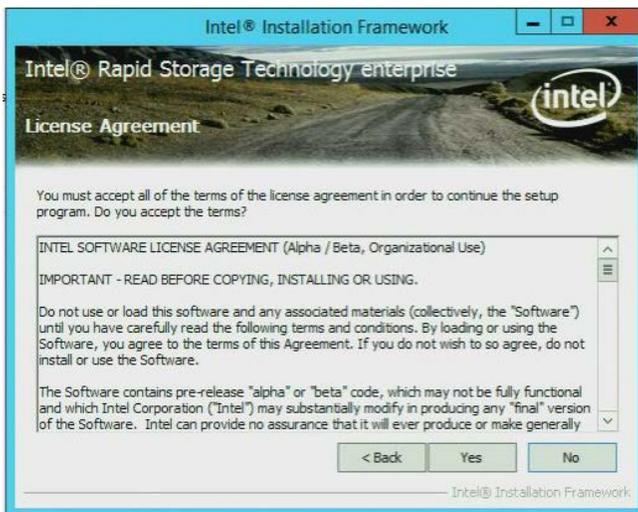




- At the Warning screen, click **Next**.

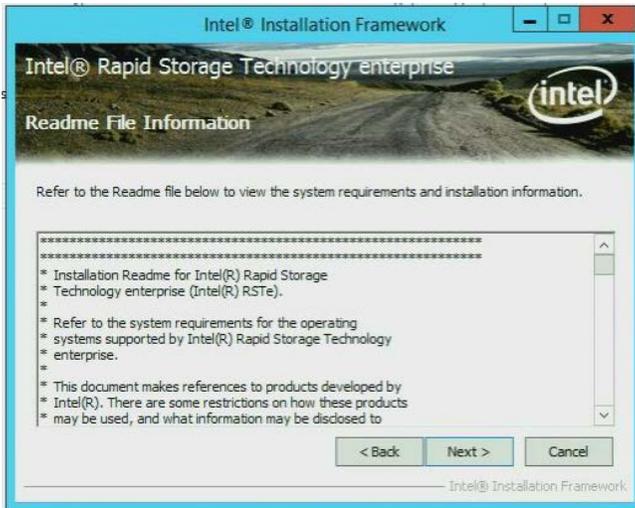


- At the License Agreement screen, read the terms and click **Yes** to accept.

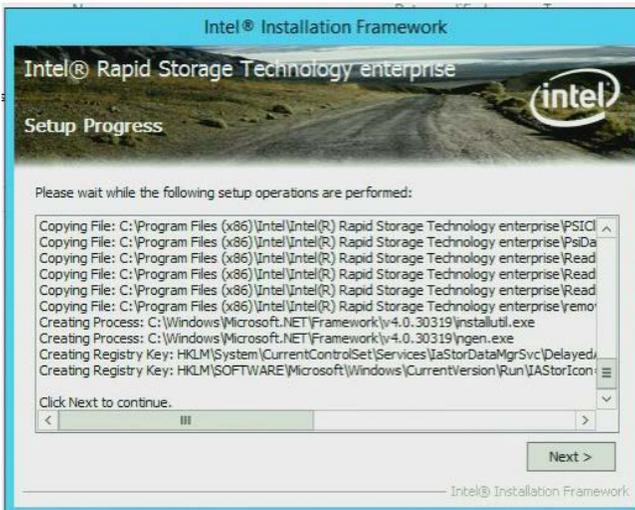




5. At the Readme File Information window, click **Next**.



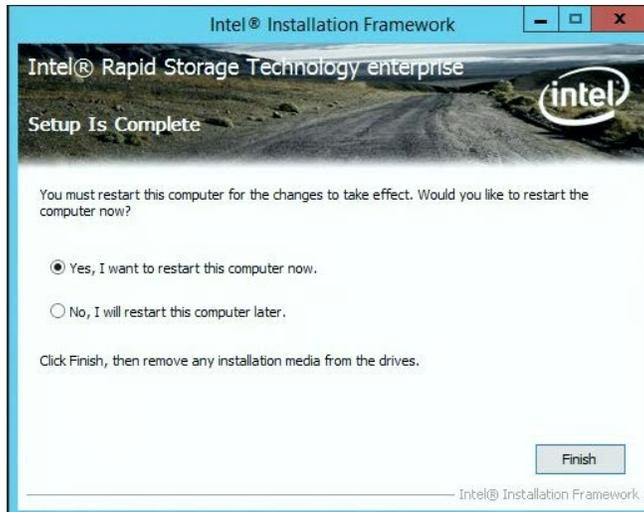
6. At the Setup Progress window, click **Next**.



It is important at this point to restart the system to complete the installation process.



7. At the Setup Is Complete screen, with “Yes, I want to restart the computer now” option selected, click Next.



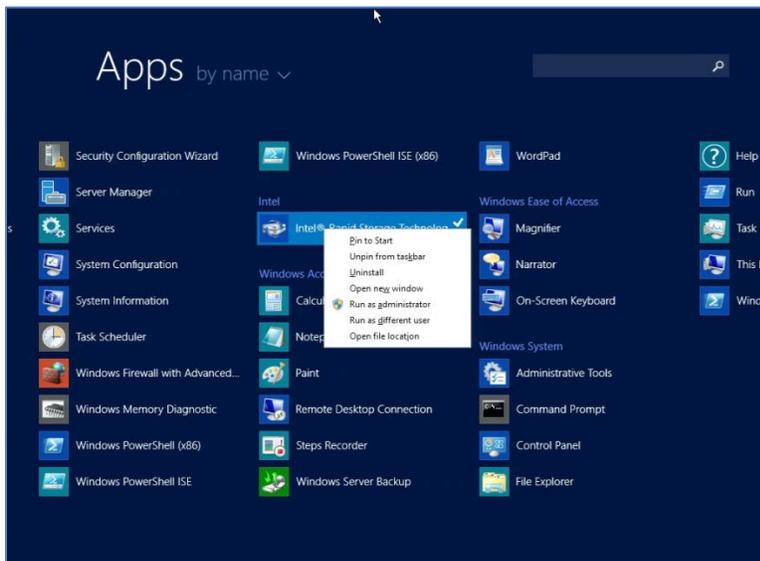
This completes the installation process and reboots the system.



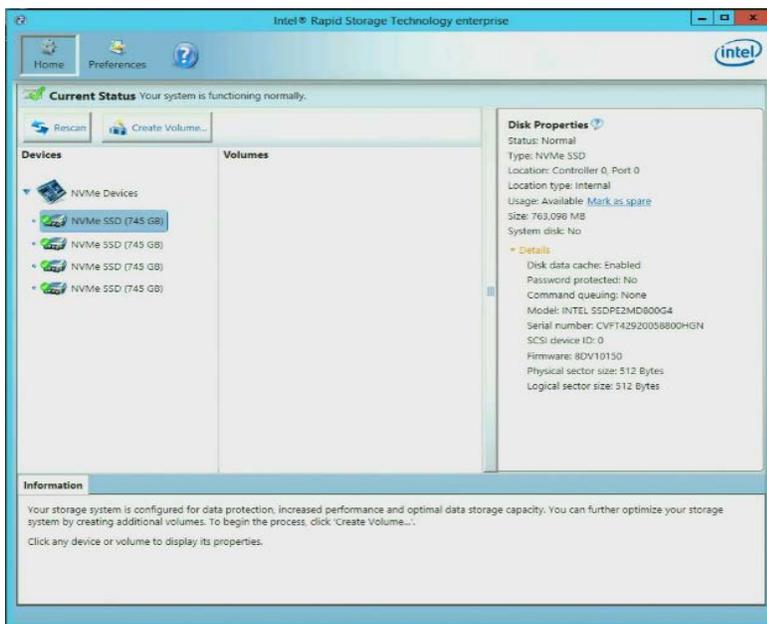
2.2 Opening the GUI

There are two ways to launch the Intel RSTe NVMe GUI. In both cases, the GUI must be launched with Administrator privilege. Right click on the icon and select **Run as Administrator**.

Launch the application via the desktop Icon or, as shown in the example below, by opening the Windows start menu and locating the application. Then right click it and select **Run as Administrator**.



This will open the “Home” page.

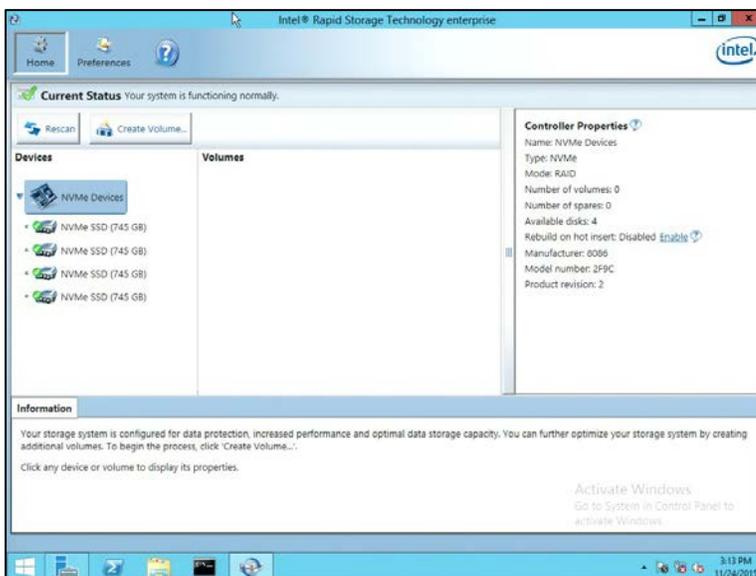




2.3 Intel RSTe GUI Components

The home page is divided into several window panes; each used to convey information to the user depending on the selection.

- The “Devices” pane (left) will show the devices that are connected to the controller.
- The “Volumes” pane (middle) shows the RAID Arrays and RAID Volumes being managed by Intel RSTe.
- The “Properties” pane (right) will show the Properties of the component that is high-lighted in either the “Devices” pane or the “Volumes” pane.
- The “Information” pane (bottom) will show information relative to the current status of the host controller, the devices attached to it or the Array and Volume.





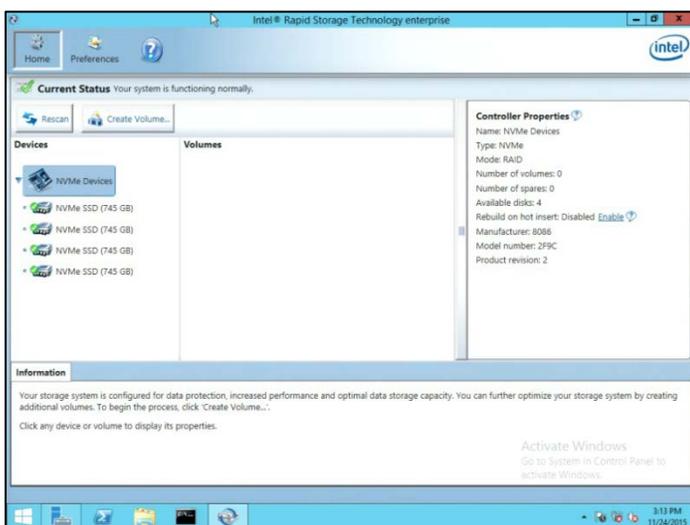
2.4 Volume Creation

The following are some examples of RAID Volume Creations. In the examples the system has been configured with one SATA device as the boot drive and four Intel NVMe SSD drives. Only the Intel RSTe NVMe release package has been installed so the boot drive that is connected to the SATA controller does not show.

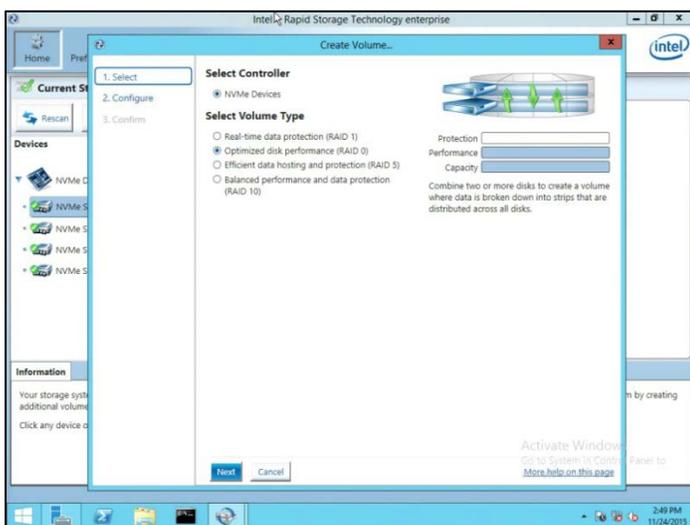
2.4.1 Creating a 2-Drive RAID 0 Data Volume

The following example will step through the process of creating a 2-drive RAID 0 data volume.

1. Within the Home page, click **Create Volume** to begin the process.



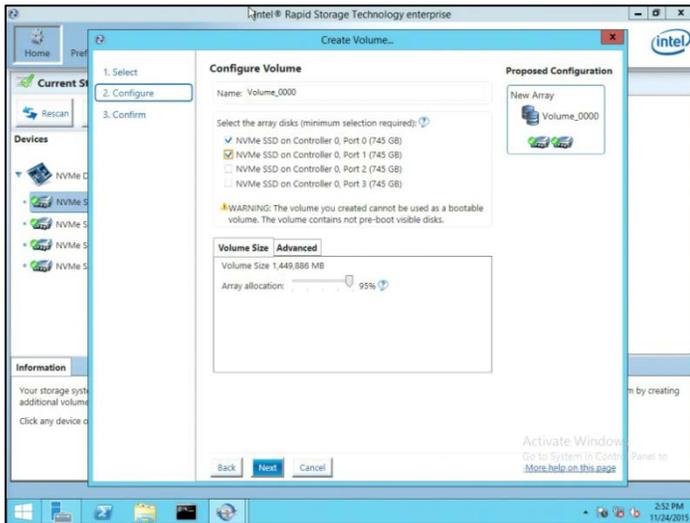
2. Select the **NVMe Devices** controller, if not already selected, then select **Optimized Disk Performance (RAID 0)** and **Next** to continue.



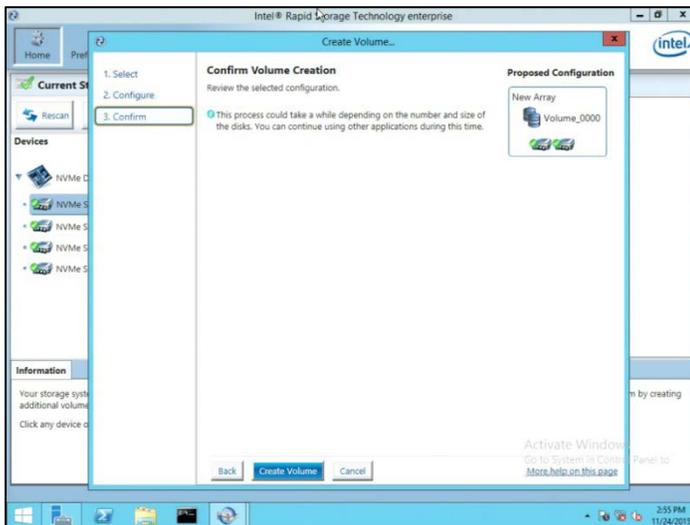


3. In the Configure form, specify the **Name** of the volume, select two drives available to be included in the volume, and click **Next**.

In this example, the name uses the default: **Volume_0000**.

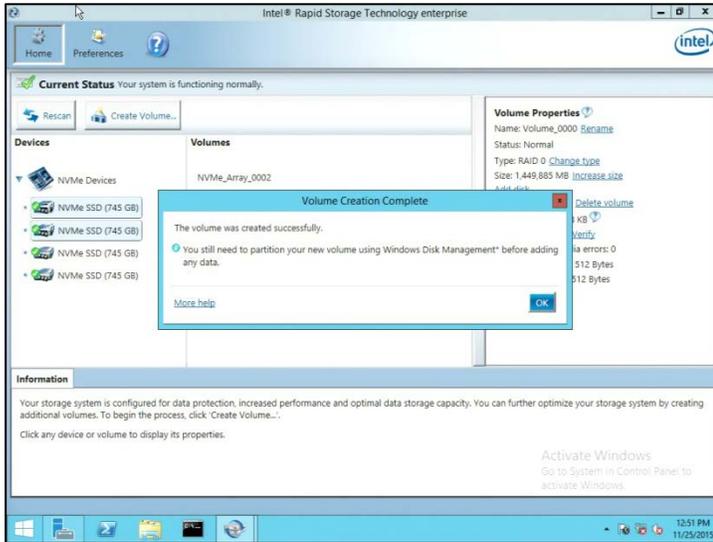


4. In the Confirm form, click **Create Volume**.



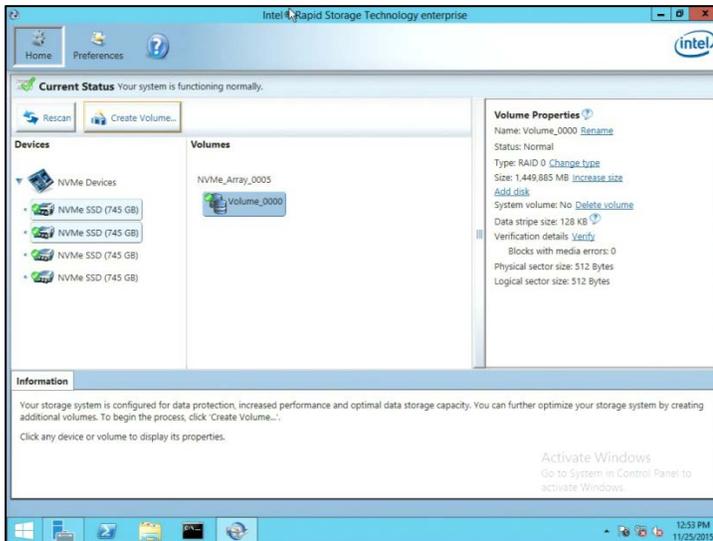


- At the Volume Creation Complete pop-up, click **OK** to complete the process.



Under the **Volumes** section, the new Array and RAID Volume are displayed.

By clicking the RAID volume (**Volume_0000**), the “Properties” pane (right) will refresh to show the current status, properties, and available options of the newly created RAID volume.

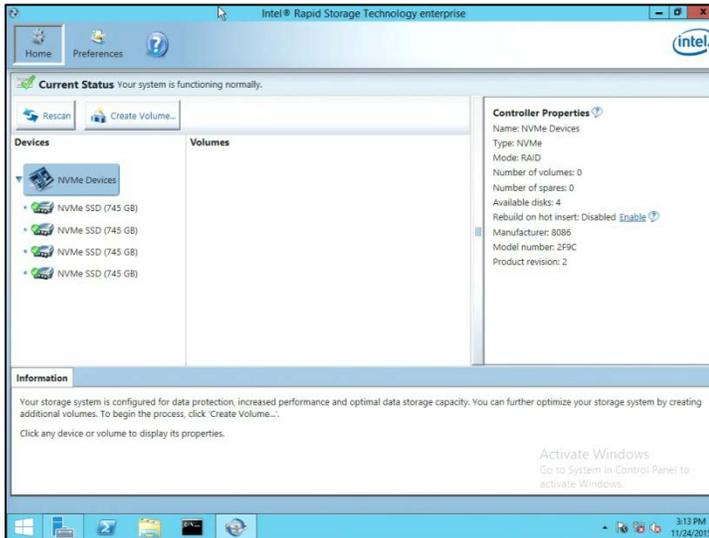




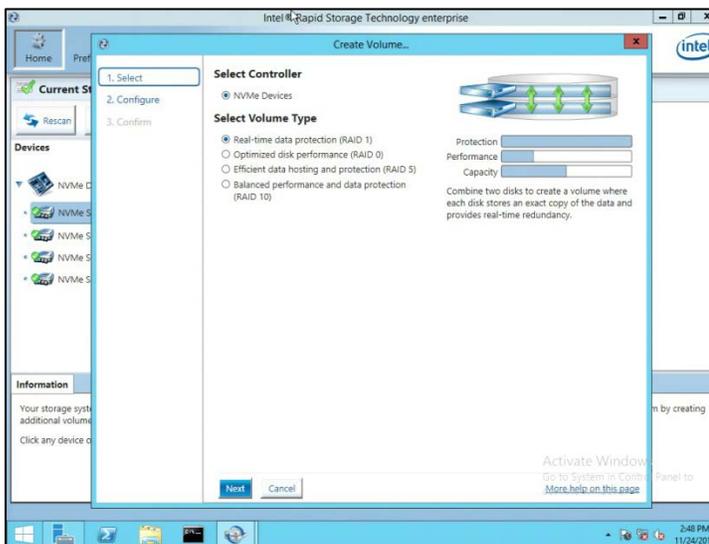
2.4.2 Creating a 2-Drive RAID 1 Data Volume

The following example will step through the process of creating a 2-drive RAID 1 data volume.

1. Click **Create Volume** to begin the process.



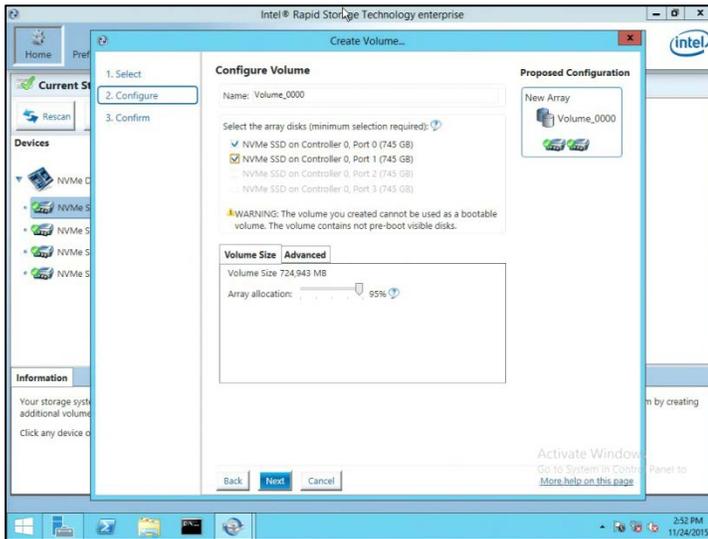
2. Select the **NVMe Devices** controller, if not already selected, then select **Real-time data protection (RAID 1)** and click **Next** to continue.



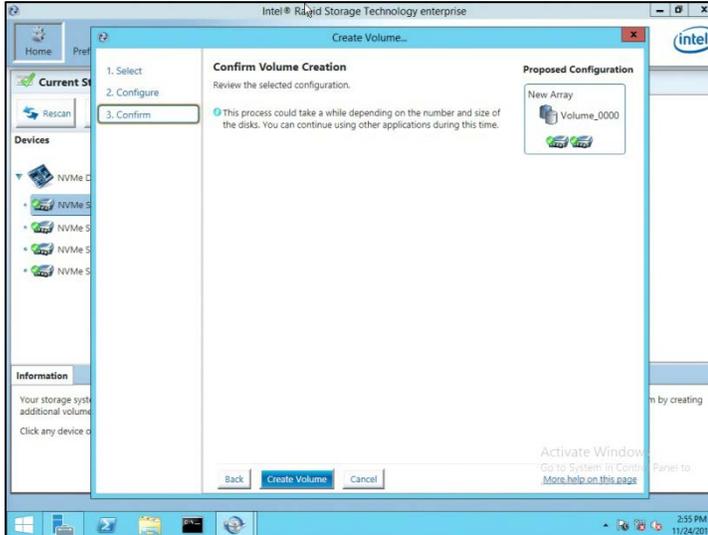


3. In the Configure form, specify the **Name** of the volume, select the two drives to be included in the volume, and click **Next**.

In this example, the name uses the default: **Volume_0000**.

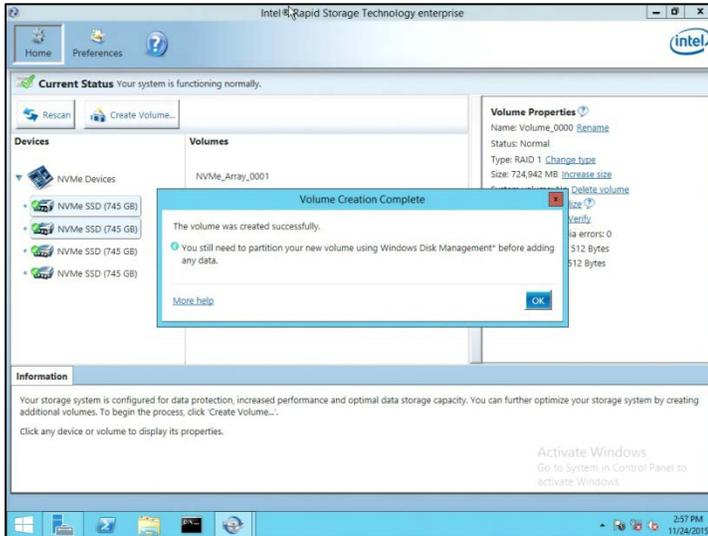


4. In the Confirm form, click **Create Volume**.



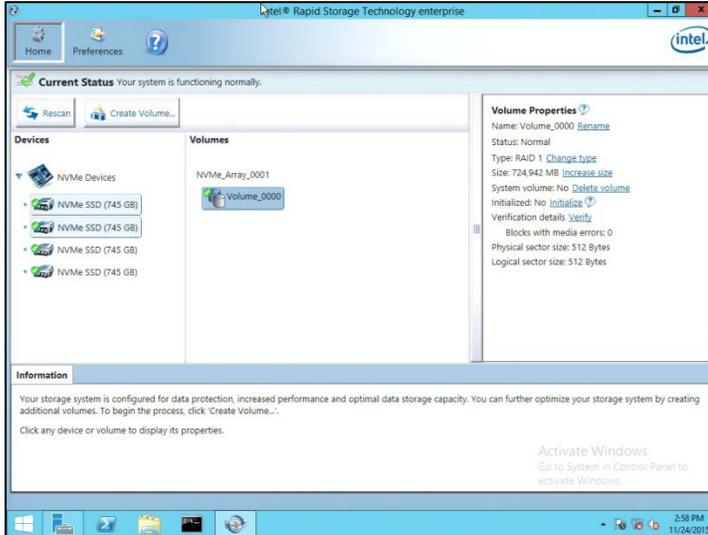


- At the Volume Creation Complete pop-up, click **OK** to complete the process.



Under the Volumes section the new Array and RAID Volume are displayed.

By selecting the RAID volume (**Volume_0000**), the “Properties” pane (right) will refresh to show the current status, properties, and available options of the newly created RAID volume.

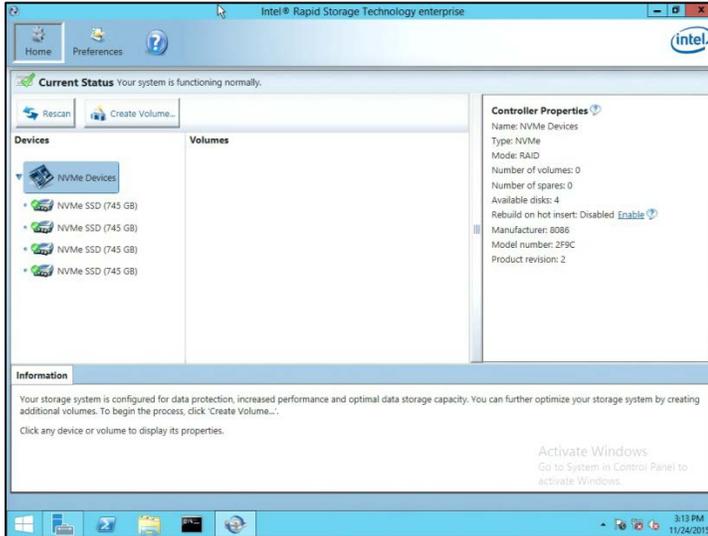




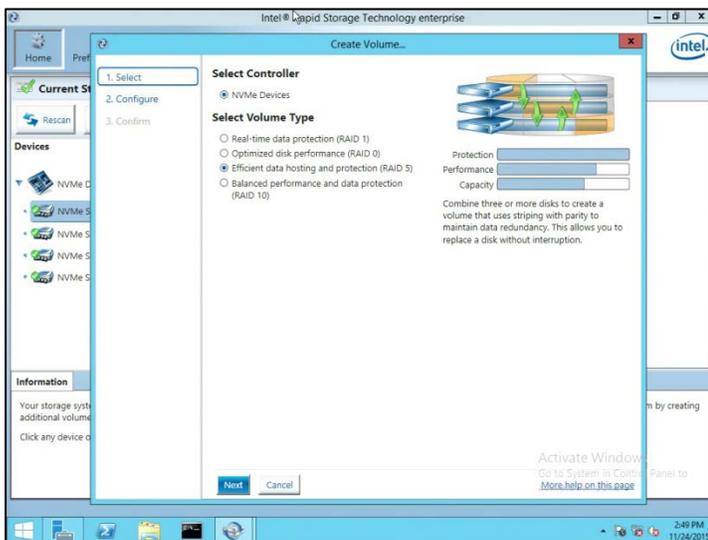
2.4.3 Creating a 3-Drive RAID 5 Data Volume

The following example will step through the process of creating a 3-drive RAID 5 data volume.

1. Click **Create Volume** to begin the process.



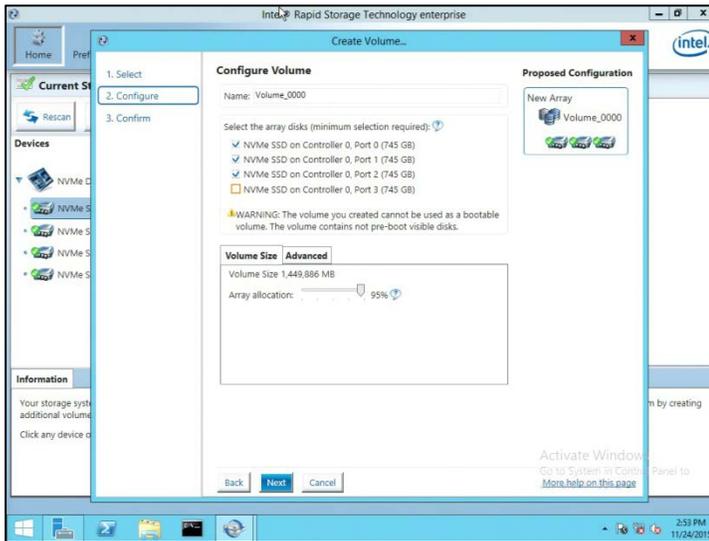
2. Select the **NVMe Devices** controller, if not already selected, select **Efficient data hosting and protection (RAID 5)**, and click **Next** to continue.



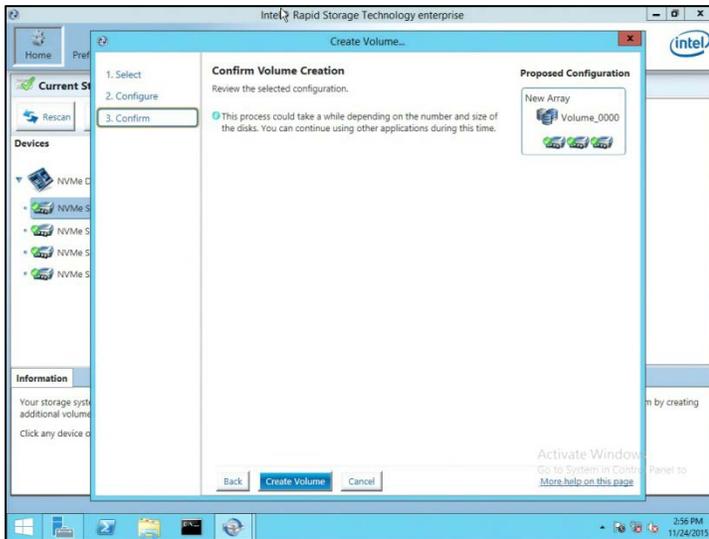


3. In the Configure form, specify the **Name** of the volume, select the three drives to be included in the volume, and click **Next**.

In this example, the name uses the default: **Volume_0000**.

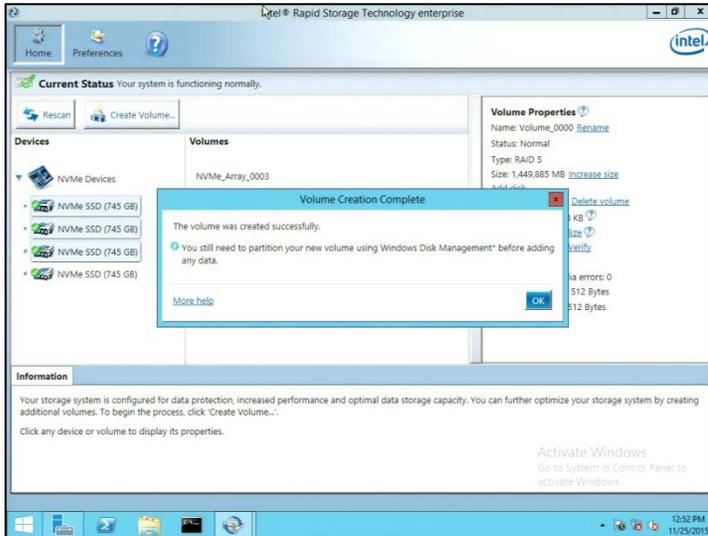


4. In the Confirm form, click **Create Volume**.



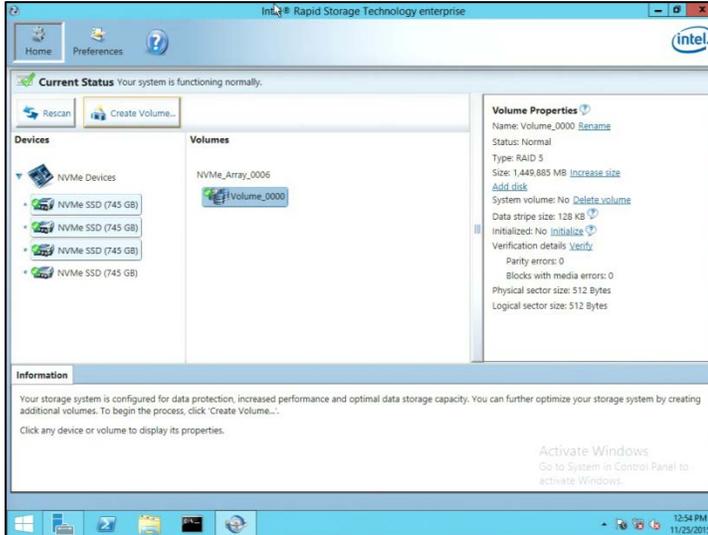


- At the Volume Creation Complete pop-up, click **OK** to complete the process.



Under the Volumes section the new Array and RAID Volume are displayed.

By selecting the RAID volume (**Volume_0000**), the “Properties” pane (right) will refresh to show the current status, properties, and available options of the newly created RAID volume.

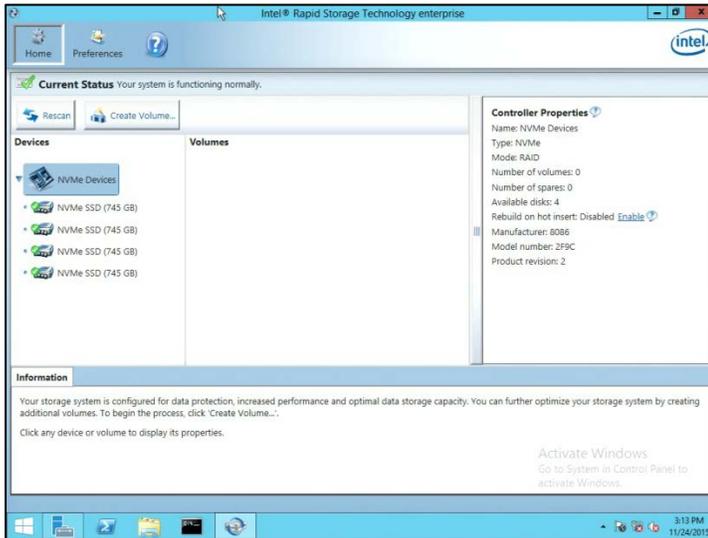




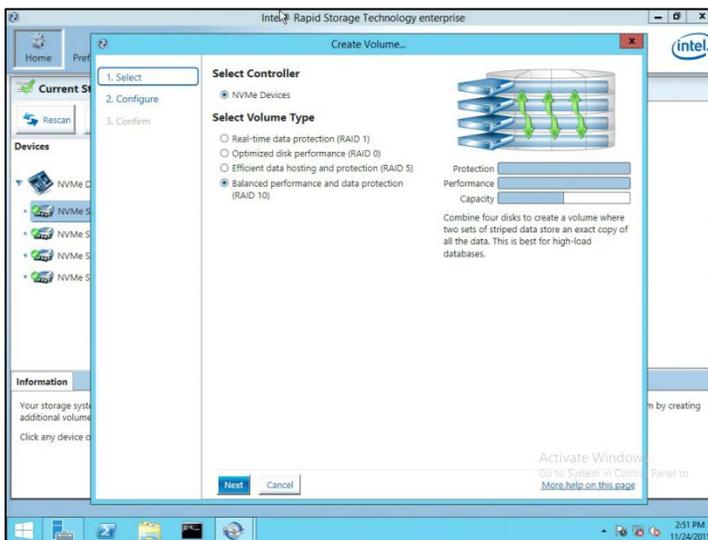
2.4.4 Creating a 4-Drive RAID 10 Data Volume

The following example will step through the process of creating a 4-drive RAID 10 data volume.

1. Click **Create Volume** to begin the process.



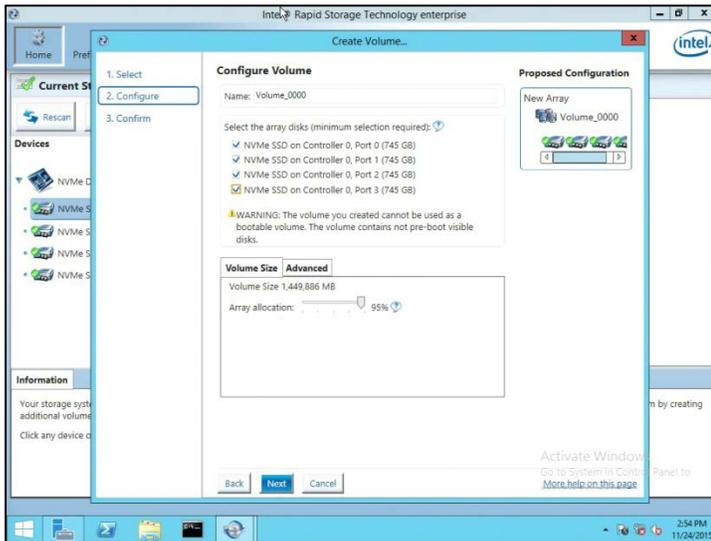
2. Select the **NVMe Devices** controller, if not already selected, select **Balanced performance and data protection (RAID 10)**, and click **Next** to continue.



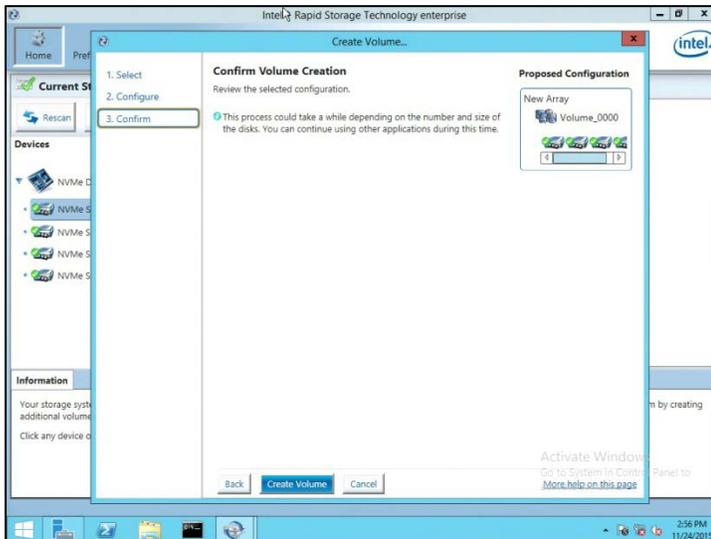


3. In the Configure form, specify the **Name** of the volume, select the four drives to be included in the volume, and click **Next**.

In this example, the name uses the default: **Volume_0000**.

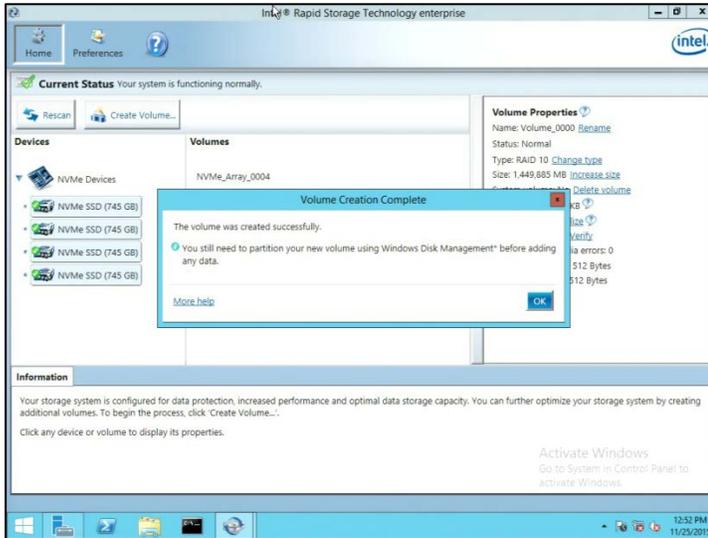


4. In the Confirm form, click **Create Volume**.



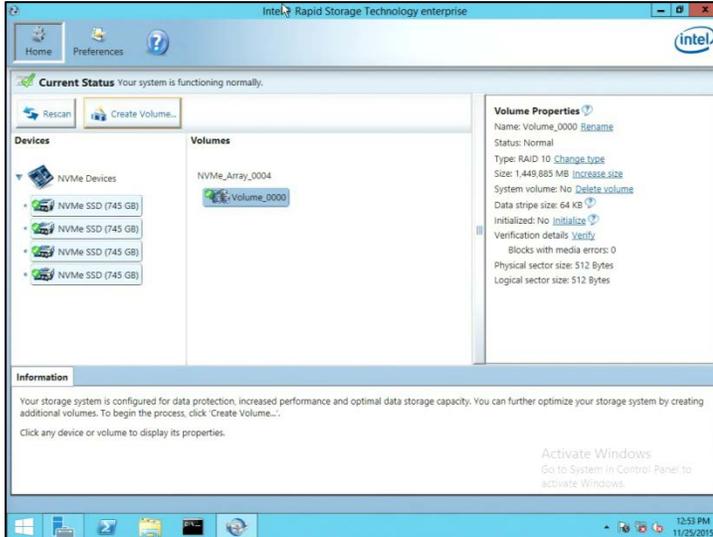


- At the Volume Creation Complete pop-up, click **OK** to complete the process.



Under the Volumes section the new Array and RAID Volume are displayed.

By selecting the RAID volume (**Volume_0000**), the “Properties” pane (right) will refresh to show the current status, properties, and available options of the newly created RAID volume.



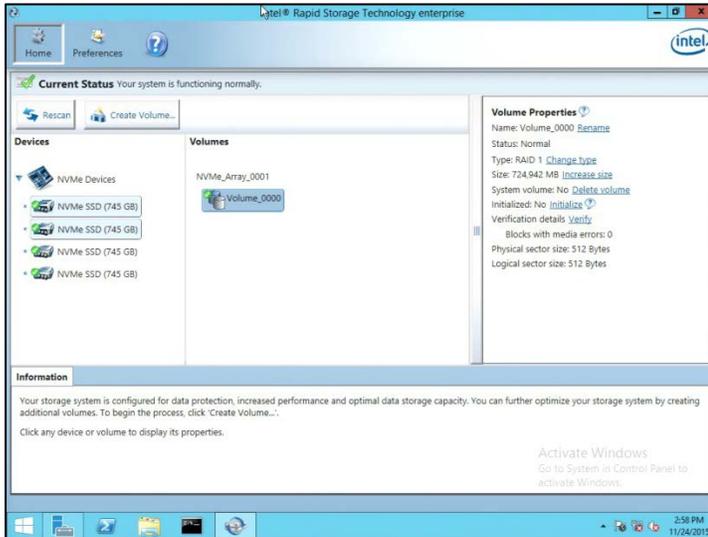


2.4.5 Creating a Matrix RAID Configuration

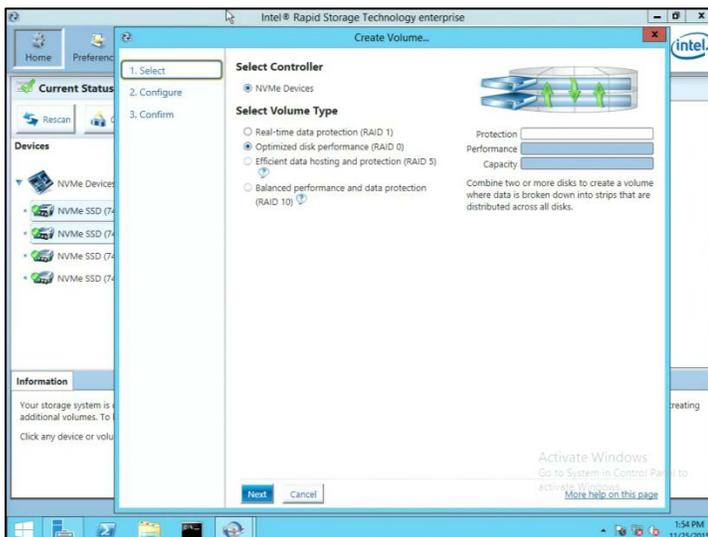
The following example will step through the process of creating 2 RAID volumes (RAID 1 and 0) on a single array.

Follow the steps in section 2.4.2 to create a 2-drive RAID 1 volume. When completed, the Intel RSTe GUI should show as follows.

1. Click **Create Volume** to begin the process.

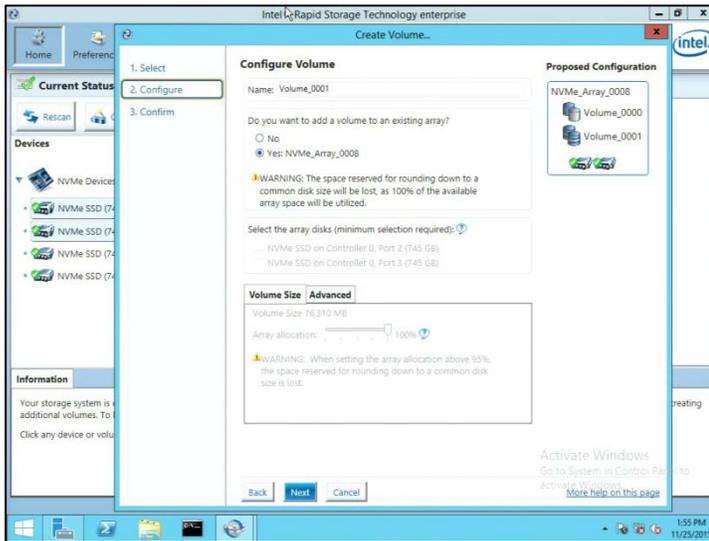


2. Select the **NVMe Devices** controller, if not already selected, select **Optimized Disk Performance (RAID 0)**, and click **Next** to continue.

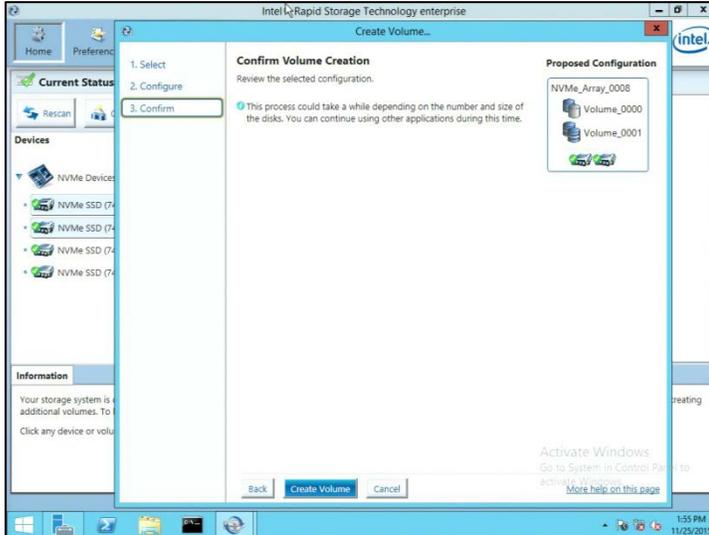




3. In the Configure form, specify the **Name** of the volume
4. Under the option *Do you want to add a volume to an existing array?*, select **Yes: NVMe_Array_<arrayNumber>**, and click **Next**.

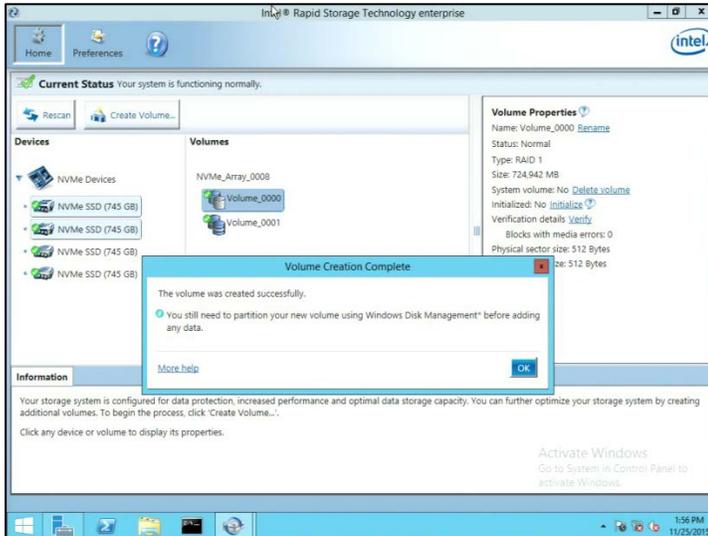


5. In the Confirm form, click **Create Volume**.



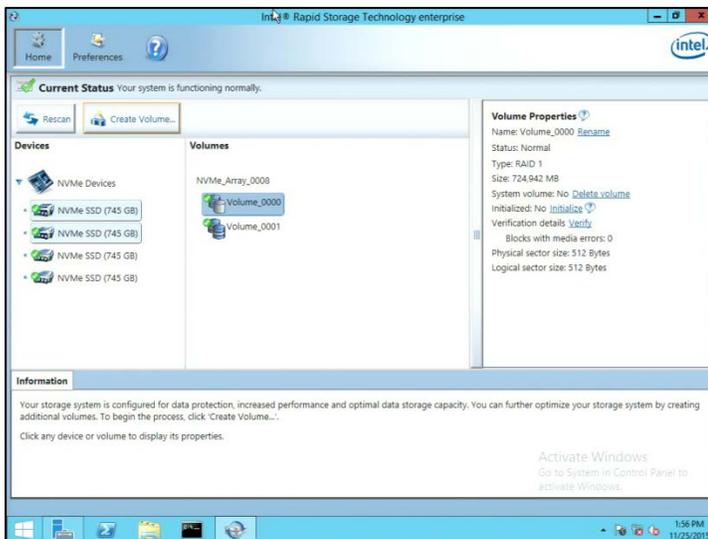


- At the Volume Creation Complete pop-up, click **OK** to complete the process.



Under the Volumes section, both new Arrays and RAID Volumes (Volume_0000 and Volume_0001) will appear.

By selecting either RAID Volumes, the “Properties” pane (right) will refresh to show all properties and available options of the selected volume.

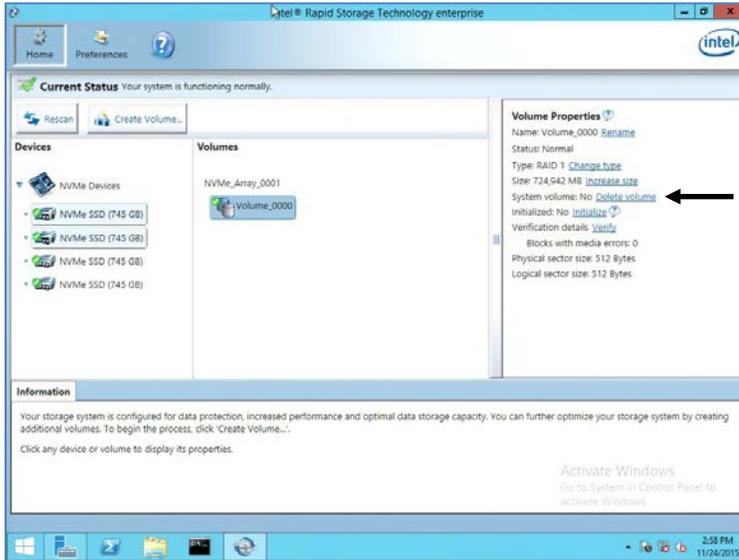




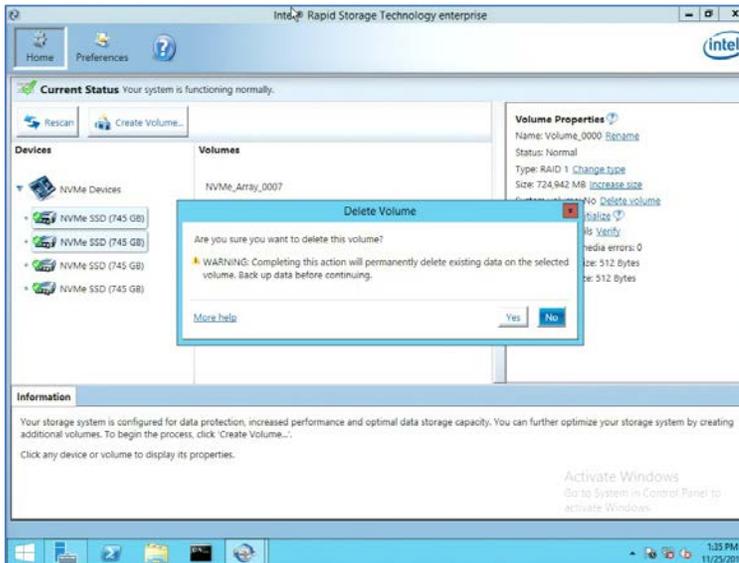
2.5 Deleting a Volume

The following steps through the RAID Volume deletion process.

1. Click the RAID Volume to be deleted in the middle under **Volumes**.
2. On the right side in the **Volume Properties** window pane, select **Delete volume**.

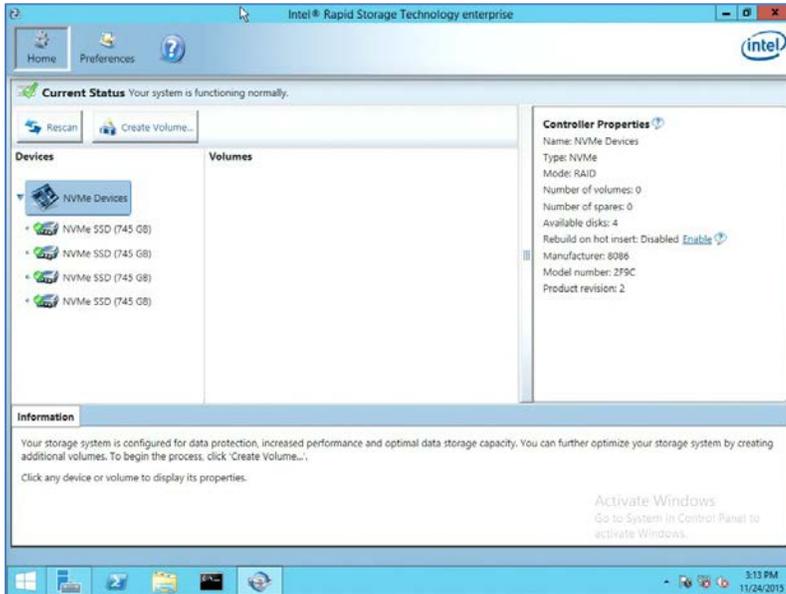


3. At the Delete Volume confirmation pop-up, click **YES** to complete the process.





When the process has completed, the volume will no longer show in the GUI as shown below.





2.6 GUI Overview

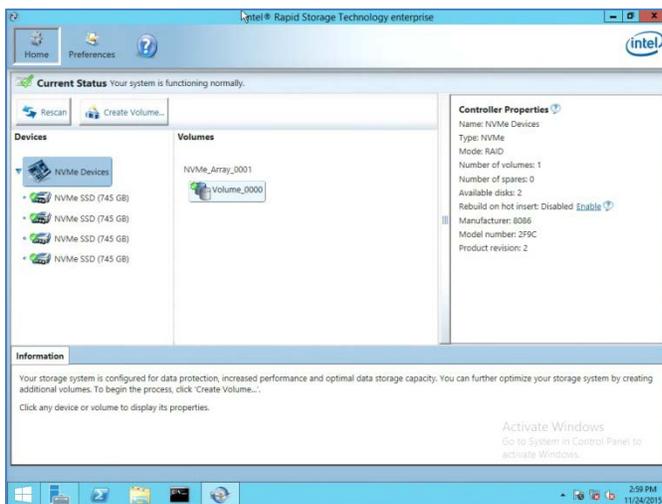
This section will go over the different parts of the GUI along with the information that can be obtained and actions that can be taken.

2.6.1 Devices

The following screenshots show the different information that is presented in the “Properties” window pane.

2.6.1.1 Controller Properties

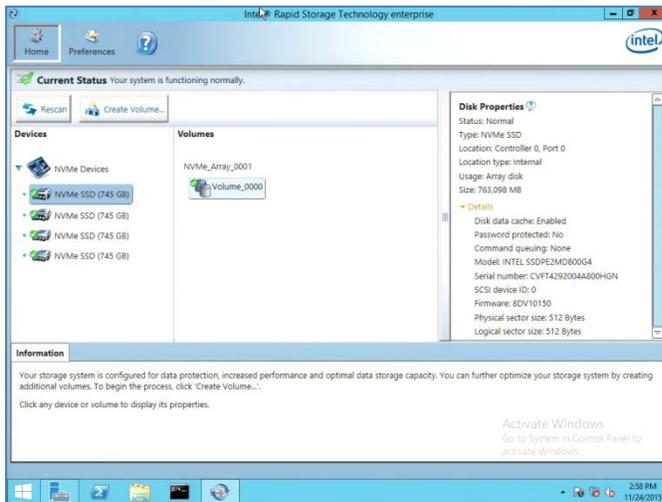
Under **Devices** in the home page of the GUI (to the left), selecting the NVMe controller, the **Controller Properties** will be shown in the properties window pane to the right.





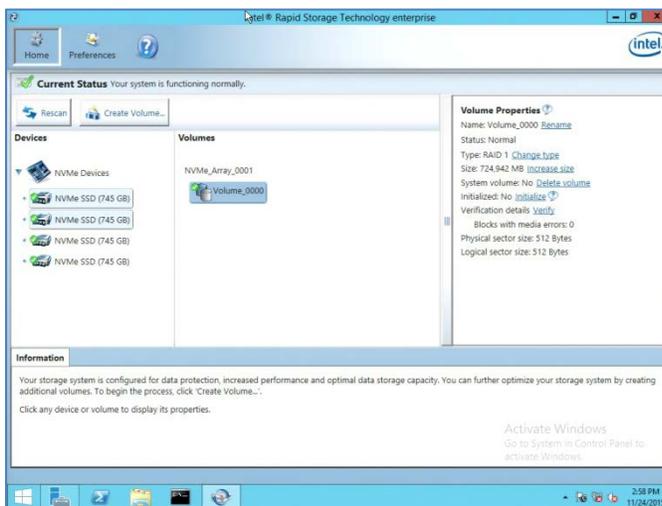
2.6.1.2 Drive Properties

By selecting a specific drive, the **Drive Properties** will appear to the right in the properties window pane.



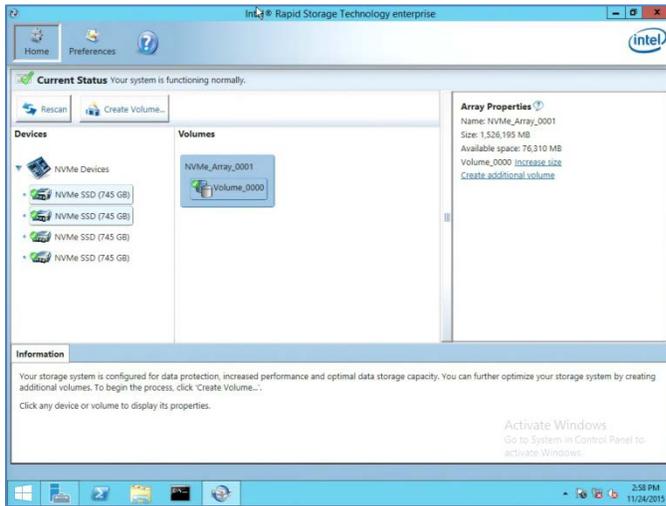
2.6.1.3 Volume Properties

By selecting a RAID Volume, the **Volume Properties** will appear to the right in the properties window pane.



2.6.1.4 Array Properties

By selecting the Array, the **Array Properties** will appear to the right in the properties window pane.



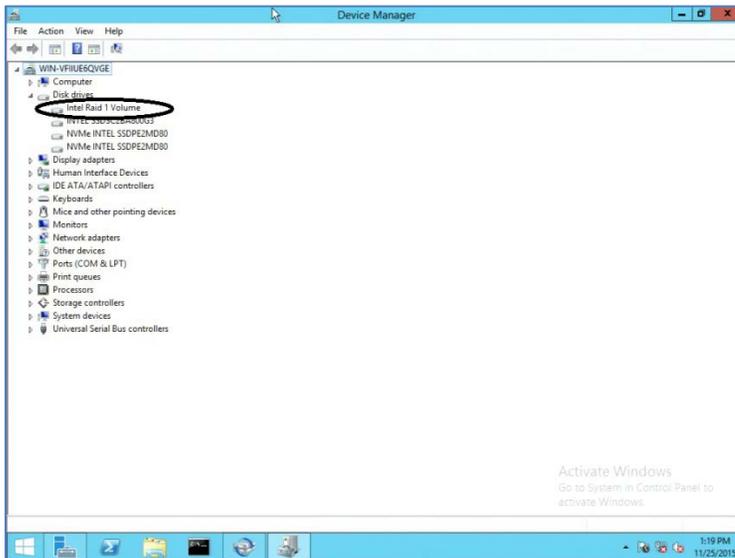


2.7 Viewing RAID Volumes in Window* Control Panel Applets

Attached are some screen captures that show what Window* **Device Manager** and **Disk Management** control panel applet may display after the RAID volume has been created.

1. Bring up **Computer Management** and select Windows* **Device Manager**.

The newly created RAID volume should be shown under **Disk drives**.



2. Go to **Storage -> Disk Management**.

The newly created RAID volume is now available to format.

