

# Securing 14th generation Dell EMC PowerEdge servers with System Erase

Overview of the System Erase feature used to repurpose or retire a PowerEdge server.

Dell EMC Server Solutions

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## Revisions

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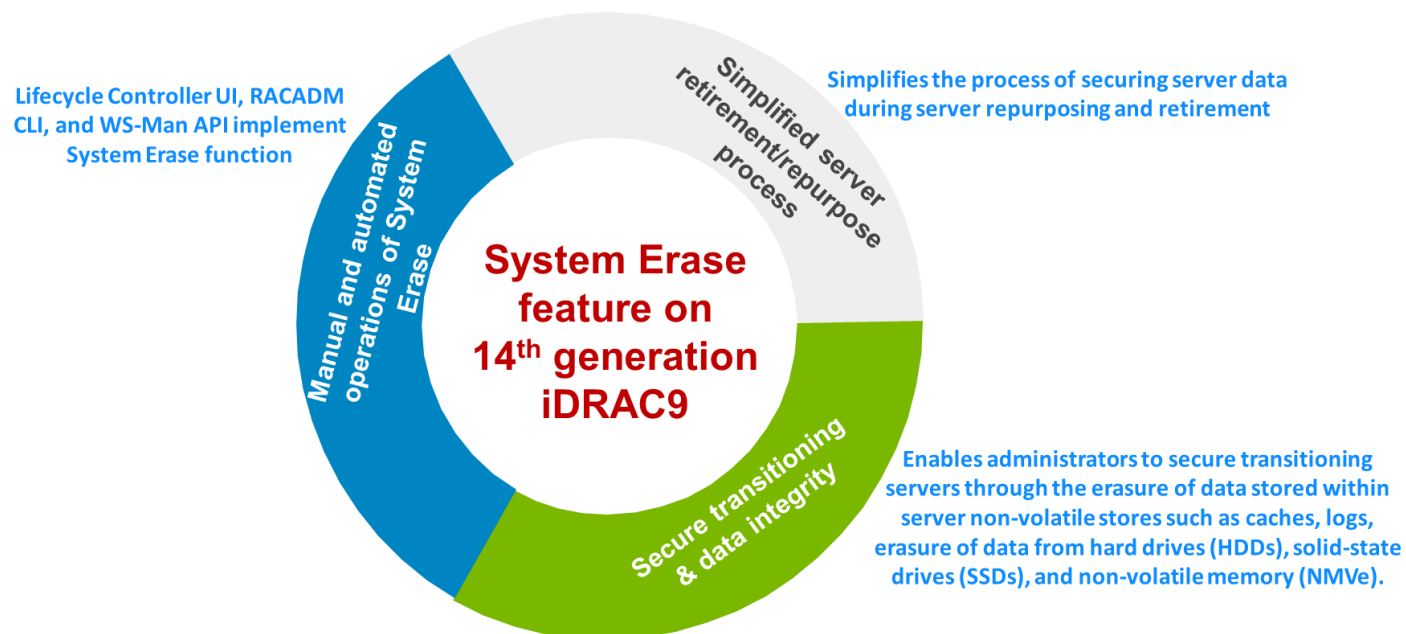
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## Executive summary

Data security is a key consideration when repurposing or retiring a server. 14<sup>th</sup> generation Dell EMC PowerEdge servers provide mechanisms that can help safeguard data by erasing server storage devices and server non-volatile stores such as caches and logs. This technical white paper provides an overview of the System Erase function which simplifies the process of safeguarding server data during server repurposing and retirement. This technical white paper includes step by step procedure to complete the System Erase process.



# 1 Introduction

Data security is a key consideration throughout the lifecycle of a server system. The 14<sup>th</sup> generation Dell EMC PowerEdge servers have been engineered to provide data security at every stage of the server lifecycle. When a server is to be repurposed because of change in workload or change in ownership, or a server is to be retired, IT administrators must ensure that confidential information is not inadvertently disclosed.

System Erase can be performed by following methods:

- Lifecycle Controller
- WS-Man
- RACADM

This technical white paper provides an overview of System Erase and step by step procedure to complete the process.

## 1.1 iDRAC with Lifecycle Controller

The Integrated Dell Remote Access Controller (iDRAC) is designed to:

- Enhance the productivity of server administrators and improve the overall availability of PowerEdge servers.
- Alert administrators to server problems and enabling remote server management
- Reduce the need for an administrator to physically visit the server

iDRAC with Lifecycle Controller allows administrators to:

- Deploy, update, monitor, and manage PowerEdge servers from any location without the use of agents in a one-to-one or one-to-many method.
- Enables configuration changes and firmware updates to be managed from Dell EMC or appropriate third-party consoles directly to iDRAC with Lifecycle Controller on a PowerEdge server, regardless of the operating system that may or may not be running.

For more information about the iDRAC with Lifecycle Controller, see the iDRAC with Lifecycle Controller documents at [dell.com/idracmanuals](http://dell.com/idracmanuals).

## 1.2 Lifecycle Controller Graphical User Interface (GUI)

Lifecycle Controller provides advanced embedded Systems Management features to perform various tasks by using a Graphical User Interface (GUI). It is delivered as part of the iDRAC out-of-band solution and embedded Unified Extensible Firmware Interface (UEFI) applications in the PowerEdge servers. iDRAC works with the UEFI firmware to access and manage every aspect of the hardware, including component and subsystem management that is beyond traditional Baseboard Management Controller (BMC) capabilities.

The iDRAC with Lifecycle Controller technology in the server's embedded management:

- Enables administrators to perform key tasks such as configuring BIOS and hardware settings, deploying operating systems, changing RAID settings, backing up and restoring hardware profiles, and managing server retirement and repurposing.
- Provides a robust set of management functions that can be used throughout the entire server lifecycle.
- Simplifies server lifecycle management—from provisioning, deployment, patching and updating to servicing and user customization—both locally and remotely.
- Includes managed and persistent storage that embeds systems management features and Operating System device drivers directly on the server. This eliminates the media-based system management tools and utilities traditionally needed for systems management.

## 1.3 Using System Erase to repurpose or retire servers

Many servers are repurposed during their lifetime as they transition from workload to workload, or change ownership from one organization to another. When such transitions occur or when a server reaches the end of its useful life and is retired, IT best-practices recommend removing all data from the server to ensure that confidential information is not inadvertently shared. The Lifecycle Controller GUI includes functionality called the Repurpose or Retire System.

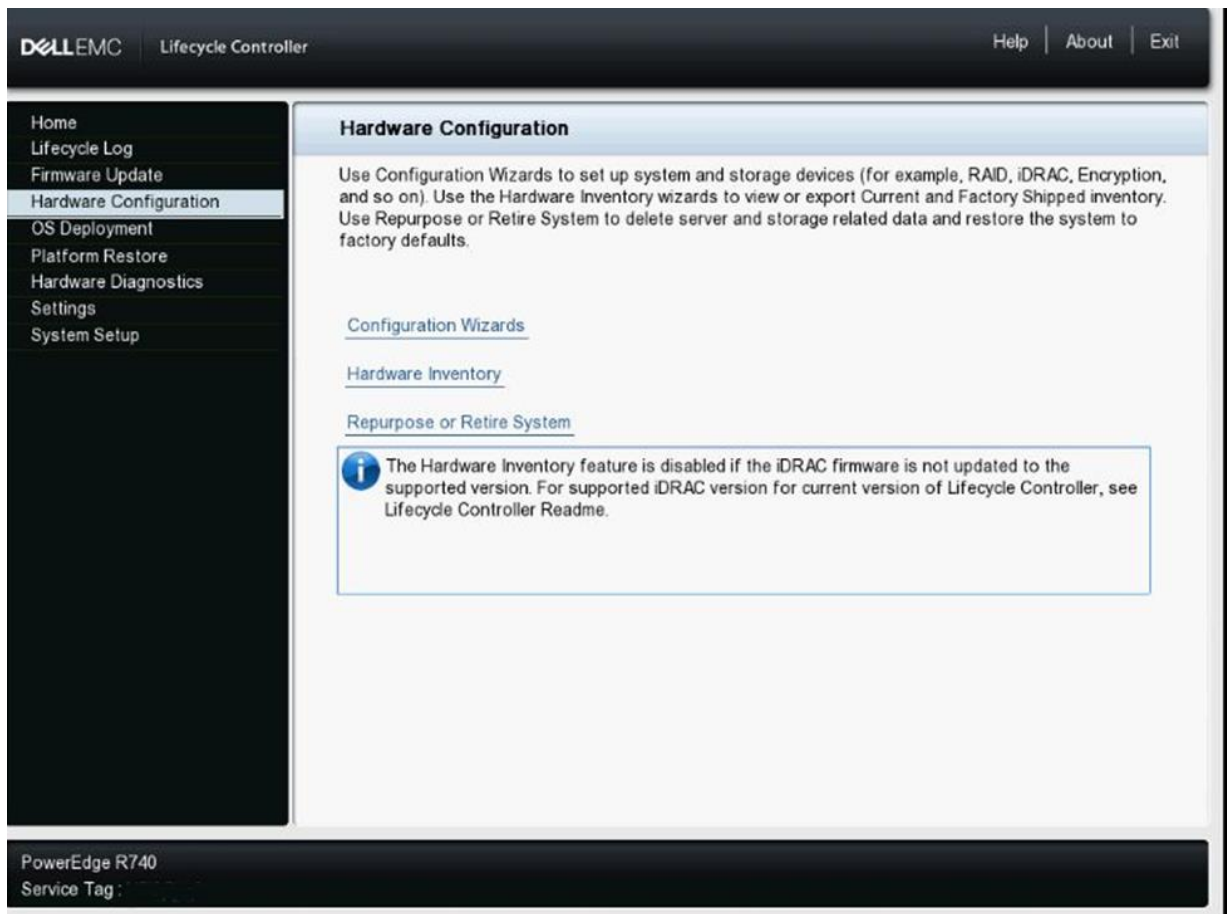
Using Repurpose or Retire System, an administrator can reset a PowerEdge server to its original state (factory settings) with all data removed from internal server non-volatile stores and from all storage devices within the server.

To repurpose or retire servers that describe System Erase by using the Lifecycle Controller GUI that operates from the server console:

1. Turn on the server. During server POST, press F10 to start the Lifecycle Controller GUI.



2. In the left pane, click **Hardware Configuration**. The available hardware configuration features are displayed in the working pane. Click **Repurpose or Retire System**.

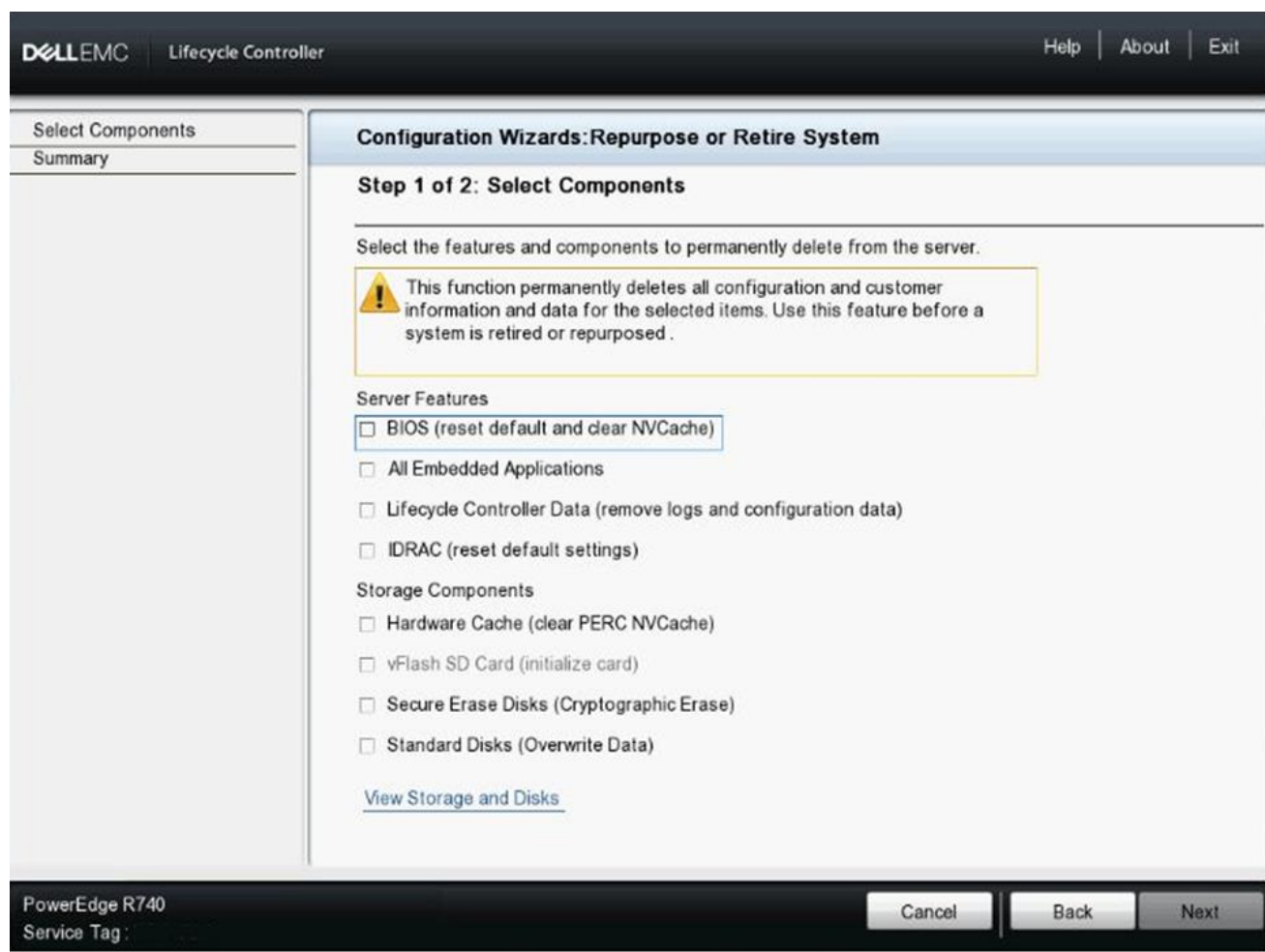




The Retire or Repurpose System function enables removal of data from the server by erasing server non-volatile stores and data stored on hard disk drives (HDDs), Self-encrypting drive (SED), Instant Secure Erase (ISE), and non-volatile memory drives (NVMe)s).

Server non-volatile stores are listed in the **Server Features** section. Also, includes BIOS settings, the server NVCache, any data used by embedded UEFI applications, and iDRAC with Lifecycle Controller log data.

3. In the **Servers Features** section, select the check boxes corresponding to the server features that you want to erase.

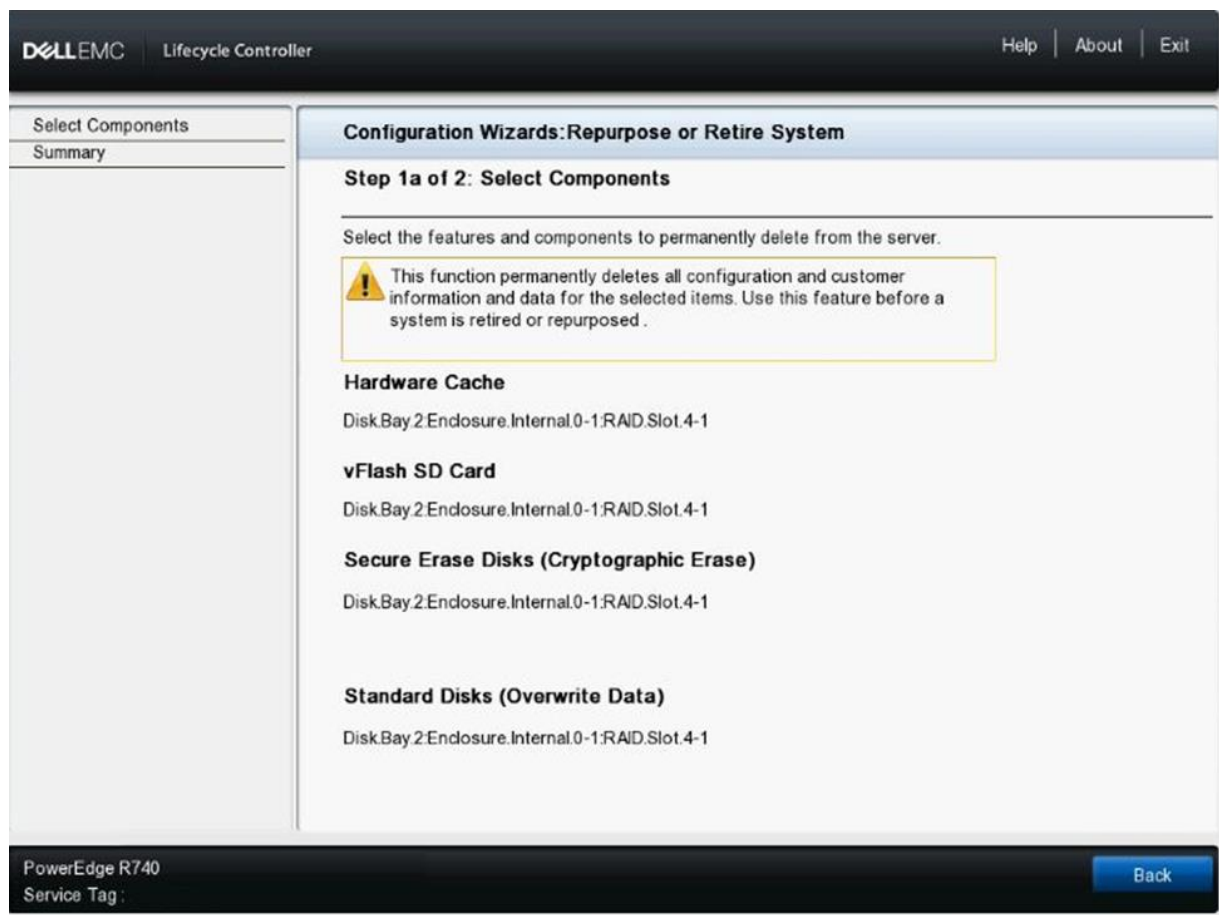


4. To protect data stored on HDDs, SSDs, and NVMe)s, click **View Storage and Disks**. A list all storage drives attached to the server that are supported for erase is displayed. Only those drives that can be erased and are detected are listed.

**Note:** The Retire or Repurpose System feature provides two types of drive erase:

- Instant Secure Erase (ISE) for those devices that support this emerging industry-standard function
- Overwrite for remaining devices.

Both drives that require Overwrite and drives that support Secure Erase are detected.



5. Click **Back** to return to Step 1. Select **Secure Erase Disks** and **Standard Disks (Overwrite Data)** because both types are in the server.

The screenshot shows the Dell EMC Lifecycle Controller interface. The top bar includes the Dell EMC logo, 'Lifecycle Controller', and links for 'Help', 'About', and 'Exit'. On the left, a sidebar contains 'Select Components' and 'Summary'. The main area is titled 'Configuration Wizards: Repurpose or Retire System' and 'Step 1 of 2: Select Components'. It instructs the user to 'Select the features and components to permanently delete from the server.' A yellow warning box states: 'This function permanently deletes all configuration and customer information and data for the selected items. Use this feature before a system is retired or repurposed.' Below this, there are two sections: 'Server Features' and 'Storage Components'. Under 'Server Features', there are four unchecked checkboxes: 'BIOS (reset default and clear NVCACHE)', 'All Embedded Applications', 'Lifecycle Controller Data (remove logs and configuration data)', and 'iDRAC (reset default settings)'. Under 'Storage Components', there are three checkboxes: 'Hardware Cache (clear PERC NVCACHE)', 'vFlash SD Card (initialize card)', and 'Secure Erase Disks (Cryptographic Erase)' which is checked. Below these, 'Standard Disks (Overwrite Data)' is also checked and highlighted with a blue border. A link 'View Storage and Disks' is present. At the bottom, the interface shows 'PowerEdge R740' and 'Service Tag:'. On the right, there are 'Cancel', 'Back', and 'Next' buttons.

Dell EMC Lifecycle Controller

Help | About | Exit

Select Components

Summary

**Configuration Wizards: Repurpose or Retire System**

**Step 1 of 2: Select Components**

Select the features and components to permanently delete from the server.

This function permanently deletes all configuration and customer information and data for the selected items. Use this feature before a system is retired or repurposed.

**Server Features**

- ☐ BIOS (reset default and clear NVCACHE)
- ☐ All Embedded Applications
- ☐ Lifecycle Controller Data (remove logs and configuration data)
- ☐ iDRAC (reset default settings)

**Storage Components**

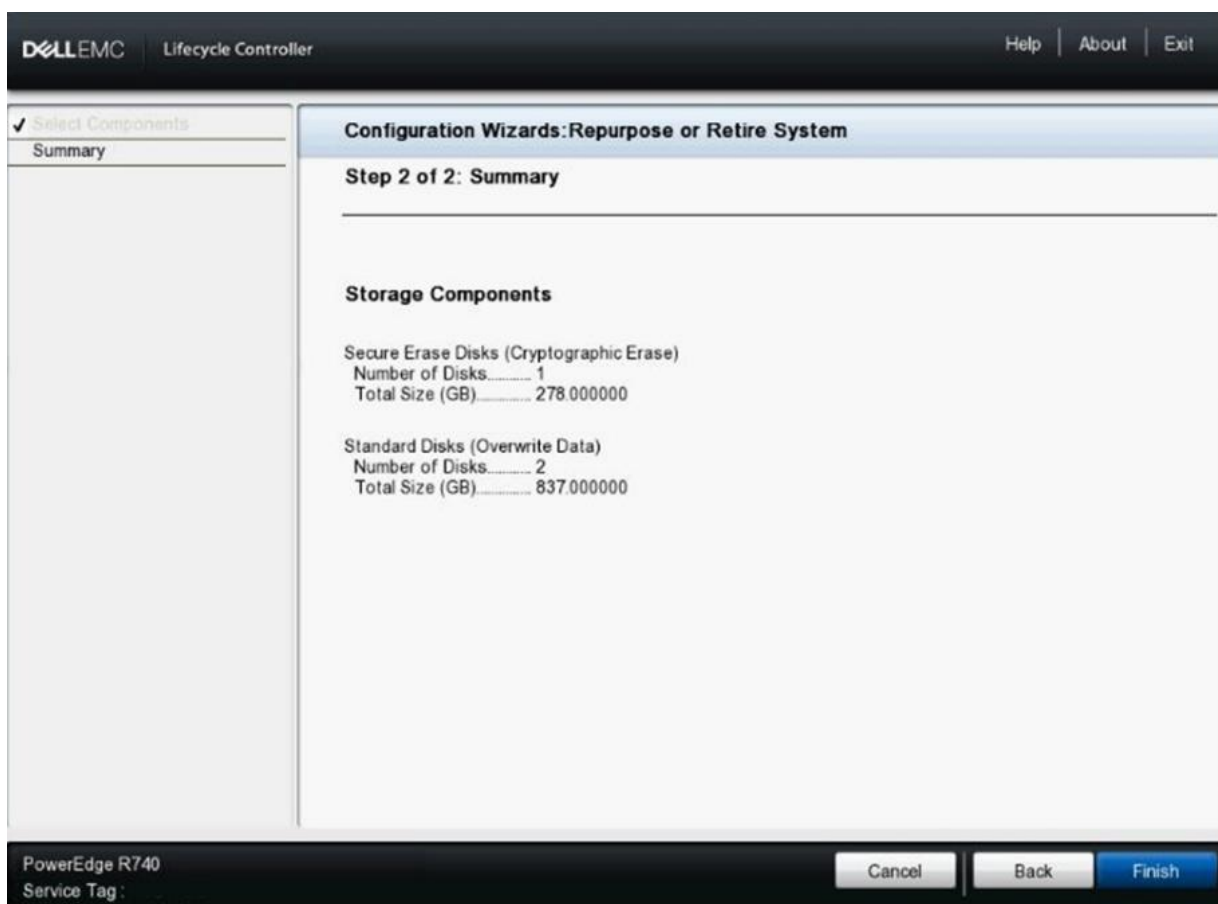
- ☐ Hardware Cache (clear PERC NVCACHE)
- ☐ vFlash SD Card (initialize card)
- ☒ Secure Erase Disks (Cryptographic Erase)
- ☒ Standard Disks (Overwrite Data)

[View Storage and Disks](#)

PowerEdge R740  
Service Tag:

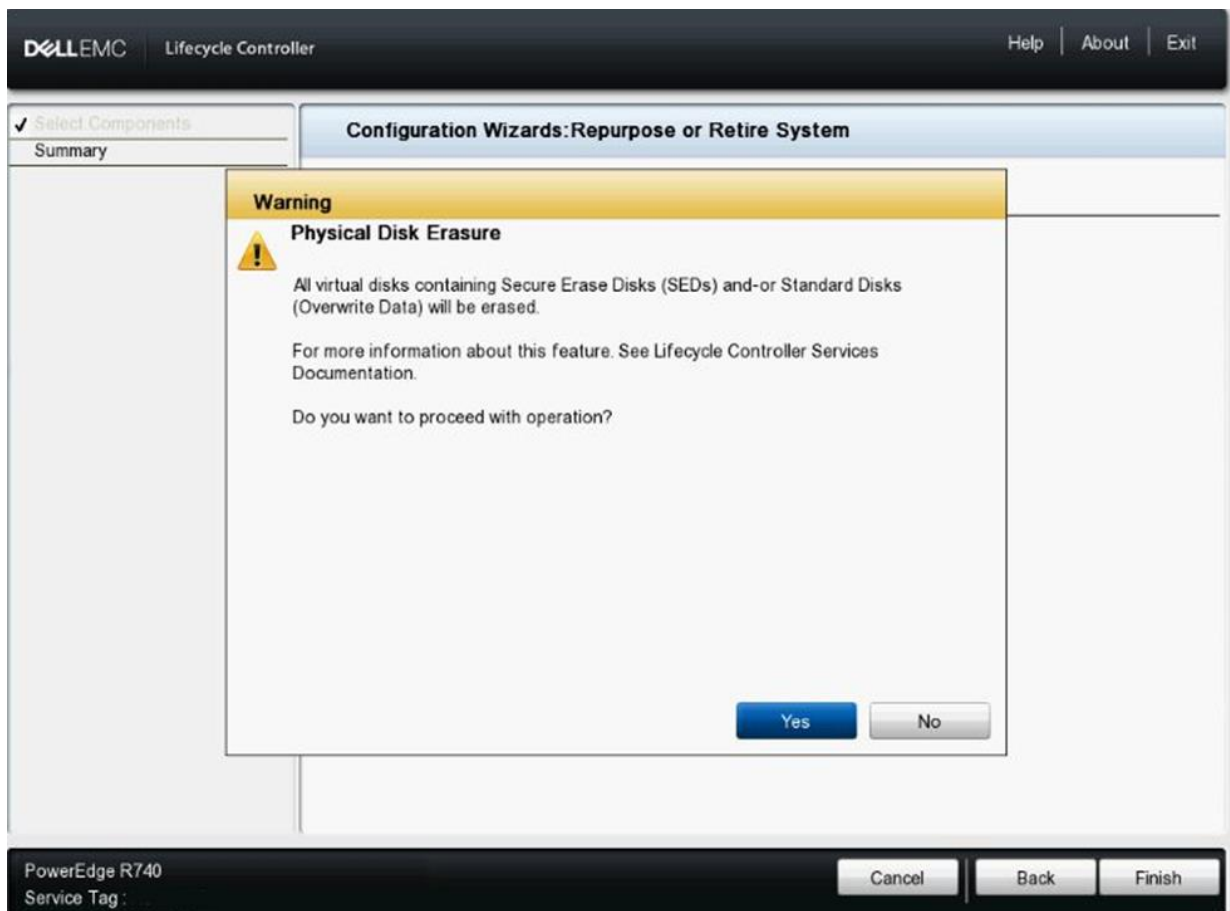
Cancel Back Next

6. Click **Next** to view the **Step 2 Summary** page. This page summarizes the drives that will be erased.



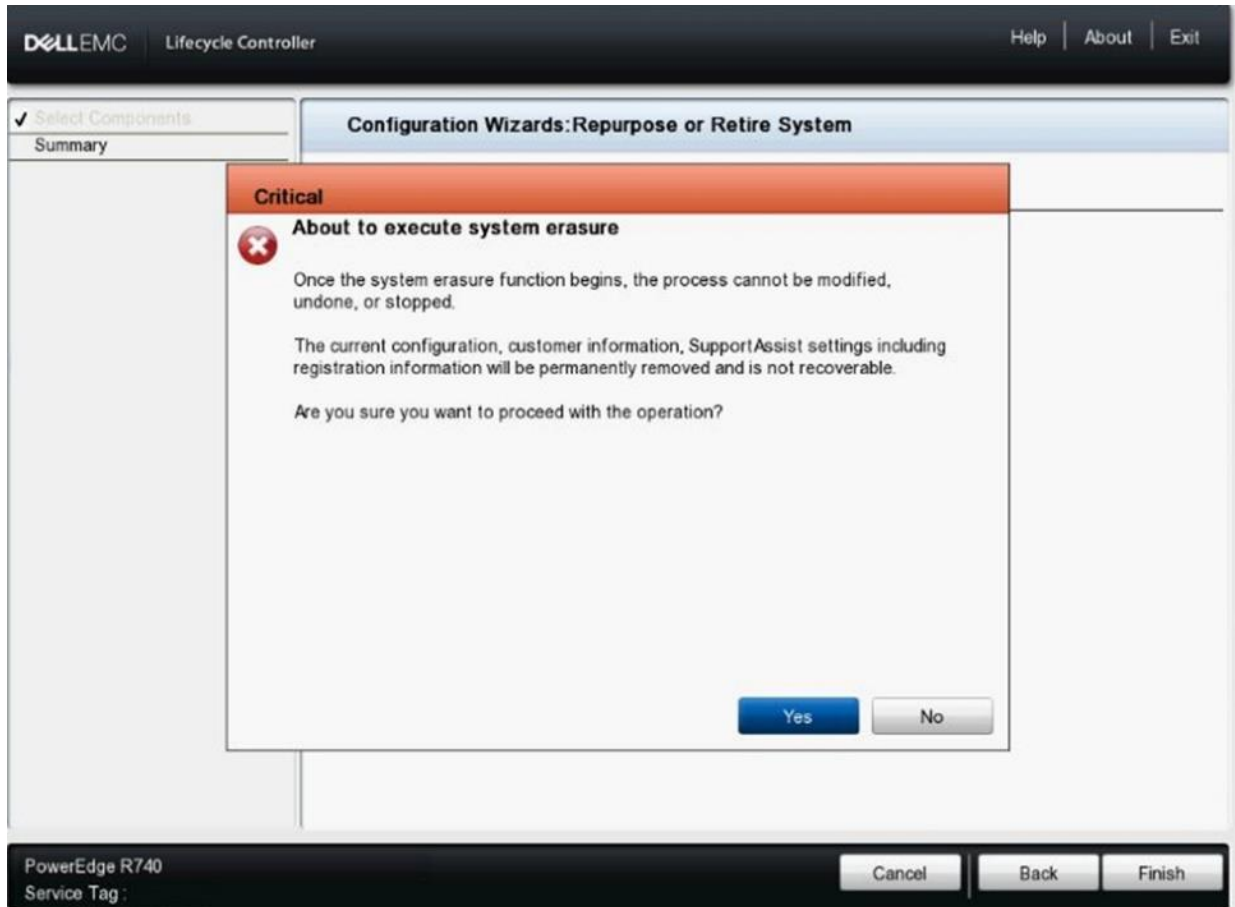
7. Click **Finish**.

A message indicating possible deletion of associated virtual drives is displayed along with a reference for more information about the feature.



8. Click **Yes**.

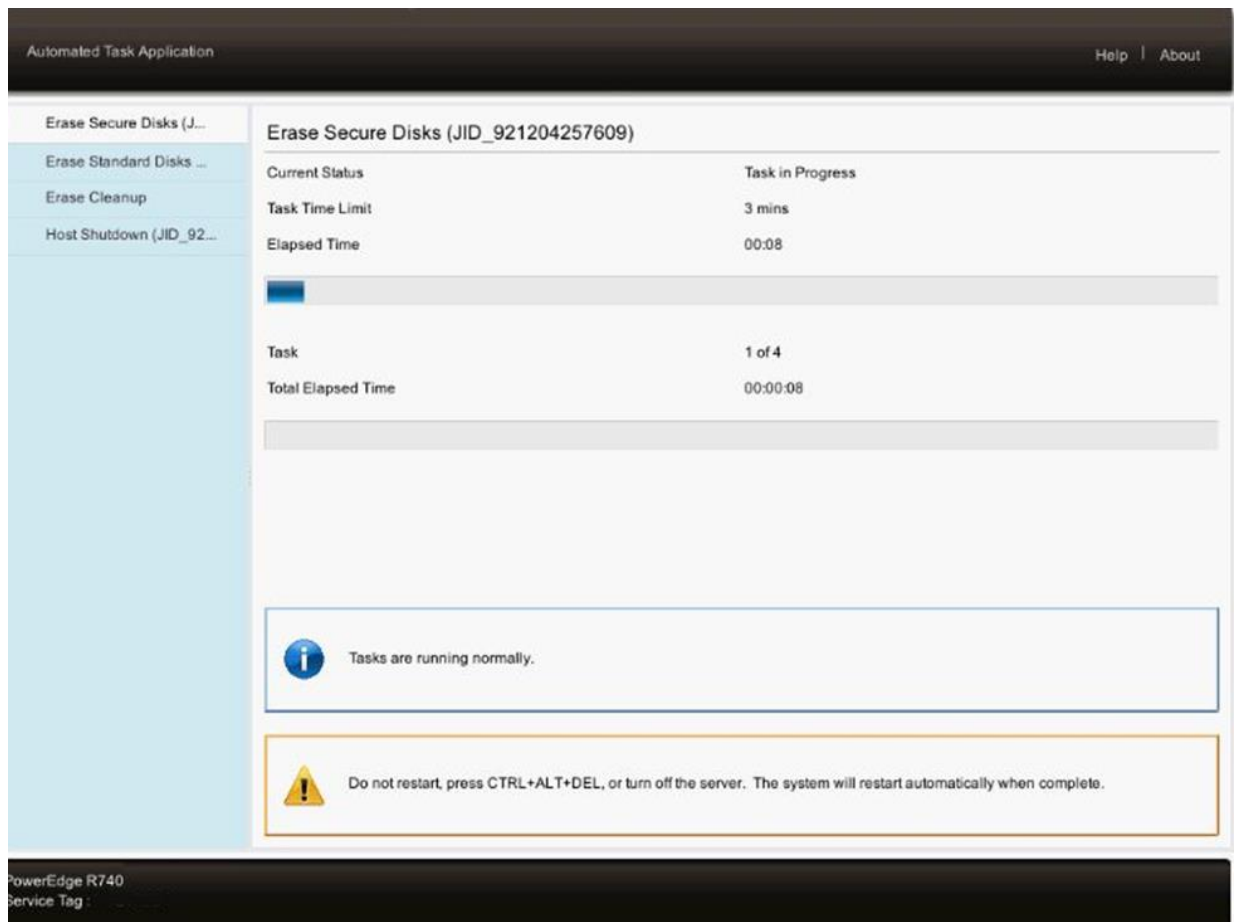
A message is displayed indicating that the erasure process cannot be stopped or modified once started.



9. Click **Yes**. The system is restarted automatically. During POST, the display will indicate entry to Automated Task Application to execute the tasks for erasing the drives.



10. In the **Automated Task Application** dialog box, tasks for erasing the drives and a shutdown task are displayed to monitor the progress of erasure.

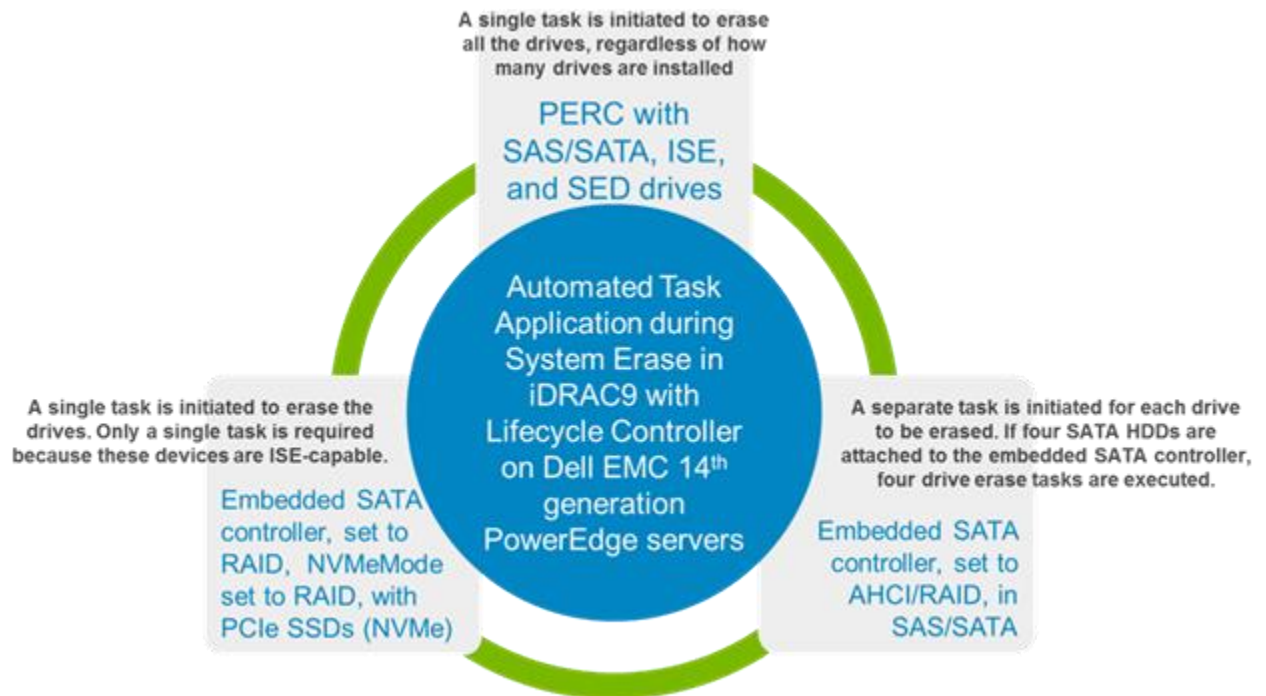




After the tasks are complete, the system is turned off and iDRAC is automatically restarted. When the iDRAC is operational, view the Lifecycle Logs for information about the overall System Erase process.

2017-04-13 17:31:03	SYS1001	System is turning off.
2017-04-13 17:31:02	SYS1003	System CPU Resetting.
2017-04-13 17:30:58	SYS156	Erase operations for System Erase tasks successfully completed.
2017-04-13 17:30:55	SYS201	The disk erase operation on the drive FQDD: Disk.Bay:0:Enclosure.Internal:0-1:RAID.Slot.4-1 with Serial: S2H0095B successfully completed.
2017-04-13 17:30:55	PDR43	The clear operation on Disk 0 in Backplane 1 of RAID Controller in Slot 4 has completed.
2017-04-13 17:30:52	SYS201	The disk erase operation on the drive FQDD: Disk.Bay:1:Enclosure.Internal:0-1:RAID.Slot.4-1 with Serial: S2H0093V successfully completed.
2017-04-13 17:30:50	PDR43	The clear operation on Disk 1 in Backplane 1 of RAID Controller in Slot 4 has completed.
2017-04-13 17:01:02	USR0030	Successfully logged in using root, from 100.71.252.85 and wsman.
2017-04-13 16:55:34	SYS147	Starting non-secure erase-capable drive erase operations.
2017-04-13 16:55:31	SYS201	The disk erase operation on the drive FQDD: Disk.Bay:2:Enclosure.Internal:0-1:RAID.Slot.4-1 with Serial: 6SE2VRTW successfully completed.
2017-04-13 16:55:26	SYS146	Starting secure erase-capable drive erase operations.

## 1.4 Details for Drive Erase



## 1.5 Details for BIOS Reset

When BIOS is selected for System Erase, the server will be turned off and the iDRAC is reset at the end of the Automated Task Application. To complete the process of BIOS reset, the server power must be restored. When the server is turned on, during POST, the BIOS completes the process of resetting to the default properties. At the completion of the reset process, the server will once again be turned off.

Resetting the BIOS also includes the erasing of BIOS related non-volatile settings used by the OS and embedded in the UEFI applications.

## 1.6 System Erase by using RACADM

The RACADM `systemerase` sub-command implements the System Erase function by using the RACADM command line interface (CLI):

### Synopsis

1. To erase a specific component:

```
racadm systemerase <component>
```

2. To erase multiple components:

```
racadm systemerase <component>,<component>,<component>
```

### Input

3. <component> — the valid types of components are:

- o `-bios` Reset BIOS settings and clear NV Cache
- o `-idrac` Reset iDRAC, clear data / logs
- o `-lcddata` Clear Lifecycle Controller data / logs
- o `-allaps data` Clear Diagnostics data, Driver Packs, OS Collector data, and LC ISM data
- o `-secureerasepd` Erase ISE / SED drives
- o `-overwritepd` Erase overwrite drives
- o `-percncvcache` Clear PERC Cache
- o `-vflash` Clear vFlash

To see the list of erasable storage devices similar to step 4, check the system erase capability of all physical storage devices by running:

```
# racadm storage get pdisks -o -p SystemEraseCapability
```

## 1.7 System Erase by using WS-Man

This method takes multiple component names as input. A job ID is returned to you after a successful completion of job. You can also check the LCL logs to get the list of actions completed during this process. Here, multiple components can be grouped in xml file and provide the xml file as an input to the SystemErase method.

Here is an example of xml packet.

```
<p:SystemErase_INPUT xmlns:p="http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/root/dcim/DCIM_LCService"><p:Component>DIAG</p:Component><p:Component>DRVPACK</p:Component>  
  
<p:Component>BIOS</p:Component></p:SystemErase_INPUT>
```

Below is an example of WS-Man workflow using SOAP to perform SystemErase

Management application can use SystemErase method in the following form to erase multiple components.

Request SOAP packet:

```
<?xml version='1.0' encoding='UTF-8'?>  
  
<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"  
  xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"  
  xmlns:wsman="http://schemas.dmtf.org/wbem/wsman/1/wsman.xsd"  
  xmlns:n1="http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/DCIM_LCService">  
  
  <s:Header>  
  
    <wsa:To s:mustUnderstand="true">https://10.94.99.107:443/wsman</wsa:To>  
  
    <wsman:ResourceURI  
  s:mustUnderstand="true">http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/DCIM_LCService</wsman:ResourceURI>  
  
    <wsa:ReplyTo><wsa:Address  
  s:mustUnderstand="true">http://schemas.xmlsoap.org/ws/2004/08/addressing/role/anonymous</wsa:Address></wsa:ReplyTo>  
  
    <wsa:Action s:mustUnderstand="true">http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/DCIM_LCService/SystemErase</wsa:Action>  
  
    <wsman:MaxEnvelopeSize s:mustUnderstand="true">512000</wsman:MaxEnvelopeSize>  
  
    <wsa:MessageID s:mustUnderstand="true">urn:uuid:20067651-5011-11e7-b260-340286bae6cb</wsa:MessageID>
```

```

<wsman:OperationTimeout>PT120.0S</wsman:OperationTimeout>

<wsman:SelectorSet>

    <wsman:Selector Name="__cimnamespace">root/dcim</wsman:Selector>

    <wsman:Selector
Name="SystemCreationClassName">DCIM_ComputerSystem</wsman:Selector>

    <wsman:Selector Name="SystemName">DCIM:ComputerSystem</wsman:Selector>

    <wsman:Selector
Name="CreationClassName">DCIM_LCService</wsman:Selector>

    <wsman:Selector Name="Name">DCIM:LCService</wsman:Selector>

</wsman:SelectorSet>

</s:Header>

<s:Body>

    <n1:SystemErase_INPUT>

        <n1:Component>DIAG</n1:Component>

        <n1:Component>DRVPACK</n1:Component>

        <n1:Component>BIOS</n1:Component>

    </n1:SystemErase_INPUT>

</s:Body>

</s:Envelope>

```

Response SOAP Packet:

```

<?xml version="1.0" encoding="UTF-8"?>

<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
xmlns:n1="http://schemas.dmtf.org/wbem/wscim/1/cim-schema/2/DCIM_LCService"
xmlns:wsman="http://schemas.dmtf.org/wbem/wsman/1/wsman.xsd">

<s:Header>

    <wsa:To>http://schemas.xmlsoap.org/ws/2004/08/addressing/role/anonymous</wsa:
To>

```

```

    <wsa:Action>http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/DCIM_LCService/SystemEraseResponse</wsa:Action>

    <wsa:RelatesTo>urn:uuid:20067651-5011-11e7-b260-340286bae6cb</wsa:RelatesTo>

    <wsa:MessageID>uuid:c2115470-515c-115c-817a-c08530f9c772</wsa:MessageID>

  </s:Header>

<s:Body>

  <n1:SystemErase_OUTPUT>

  <n1:Job>

  <wsa:EndpointReference>
    <wsa:Address>http://schemas.xmlsoap.org/ws/2004/08/addressing/role/anonymous<
/wsa:Address>

    <wsa:ReferenceParameters>

      <wsman:ResourceURI>http://schemas.dell.com/wbem/wscim/1/cim-
schema/2/DCIM_LifecycleJob</wsman:ResourceURI>

      <wsman:SelectorSet>

        <wsman:Selector Name="InstanceID">JID_968337162734</wsman:Selector>

        <wsman:Selector Name="__cimnamespace">root/dcim</wsman:Selector>

      </wsman:SelectorSet>

    </wsa:ReferenceParameters>

  </wsa:EndpointReference>

</n1:Job>

  <n1:ReturnValue>4096</n1:ReturnValue>

</n1:SystemErase_OUTPUT>

</s:Body>

</s:Envelope>

```

Management application can use GET request to poll for the Job status.

Request SOAP packet:

```

<?xml version='1.0' encoding='UTF-8'?>

<s:Envelope xmlns:s="http://www.w3.org/2003/05/soap-envelope"
xmlns:wsa="http://schemas.xmlsoap.org/ws/2004/08/addressing"
xmlns:wsman="http://schemas.dmtf.org/wbem/wsman/1/wsman.xsd">

<s:Header>

    <wsa:To s:mustUnderstand="true">https://10.94.99.107:443/wsman</wsa:To>

    <wsman:ResourceURI
s:mustUnderstand="true">http://schemas.dmtf.org/wbem/wscim/1/cim-
schema/2/DCIM_LifecycleJob</wsman:ResourceURI>

    <wsa:ReplyTo><wsa:Address
s:mustUnderstand="true">http://schemas.xmlsoap.org/ws/2004/08/addressing/role/an
onymous</wsa:Address></wsa:ReplyTo>

    <wsa:Action
s:mustUnderstand="true">http://schemas.xmlsoap.org/ws/2004/09/transfer/Get</wsa:
Action>

    <wsman:MaxEnvelopeSize s:mustUnderstand="true">512000</wsman:MaxEnvelopeSize>

    <wsa:MessageID s:mustUnderstand="true">urn:uuid:38fa18b0-5011-11e7-9f7b-
340286bae6cb</wsa:MessageID>

    <wsman:OperationTimeout>PT120.0S</wsman:OperationTimeout>

    <wsman:SelectorSet>

        <wsman:Selector Name="InstanceID">JID_968337162734</wsman:Selector>

        <wsman:Selector Name="__cimnamespace">root/dcim</wsman:Selector>

    </wsman:SelectorSet>

</s:Head>

```

## 2 Summary

The 14th generation of Dell EMC PowerEdge servers has the capabilities, features and management options to help ensure both the security and integrity of data. Using the System Erase function, system administrators can easily secure server data during server repurposing and retirement. From server conception, design and manufacturing to decommissioning, Dell EMC Security Development Lifecycle and secure server management tools help ensure PowerEdge servers remain secure. Dell EMC technologies, manageability and design minimize the chance of vulnerability at all points in the server lifecycle. Dell EMC diligence and timely firmware updates help the PowerEdge platforms stay ahead in today's threat landscape.

Keeping your IT infrastructure and your data secure are paramount, and the PowerEdge server platform and Dell EMC robust security offerings and wide-spectrum enterprise security and server management portfolio can help enterprises adhere to standards, reduce data breaches and stay ahead of the ever-present growing threats companies face today.