

# DeltaV™ Virtualization Hardware



*The DeltaV™ Virtualization Hardware is fully tested and supported for virtual DeltaV solutions.*

- Fully tested and supported hardware for DeltaV™ Virtualization
- Configurations for both off-line and on-line control systems
- Powerful, cost-effective, and easy to use
- Easy control network installation; ready to plug and play
- Shared storage networks for high availability
- Supports single, dual, and quad monitors

## Introduction

Emerson is committed to providing the same level of performance and reliability for DeltaV™ Virtualization environments that we provide in our traditional physical computer architecture. To ensure reliability and performance, we have rigorously tested virtual DeltaV systems with specific hardware components and configurations designed for realtime process control applications. With DeltaV Virtualization Hardware you can rest assured that your control system is fully tested and supported to meet your process control needs.

DeltaV Virtualization is available for both on-line and off-line applications. For off-line applications, we have software and hardware configurations ideal for development, testing, and training applications. For on-line applications, we provide additional hardware options for high availability servers and thin client networks. Regardless of the application, DeltaV Virtualization Hardware provides the platform you need to deliver the performance required.

## Benefits

### Fully tested and supported hardware for DeltaV

**Virtualization:** This ensures your virtual DeltaV system meets the rigorous requirements for process control applications. No surprises with third-party drivers, compatibility problems, or application performance.

### Configurations for both off-line and on-line control systems:

From standalone host servers to high availability blade servers with integrated storage, DeltaV Virtualization Hardware has it covered.

**Powerful, cost-effective, and easy to use:** DeltaV's integrated virtualization hardware platform, built on Dell's PowerEdge VRTX, is designed for IT simplicity and delivers powerful performance. Out-of-box this blade server with integrated storage comes preconfigured for use with DeltaV Virtual Studio. Virtualization doesn't come easier than this!

**Easy control network installation, ready to plug and play:**

The host servers ship with the appropriate DeltaV control network cards preinstalled. Simply assign host networks using DeltaV Virtual Studio and you're ready to connect to the DeltaV control network, Plant local area network (LAN), or client network.

### Shared Storage Networks for high availability:

Shared storage in the Dell VRTX, or with a standalone Storage Area Network (SAN) device, provides fault tolerant disk storage and supports automatic failover of virtual machines between host computers. Reliability and high availability is a must have for on-line virtualization solutions.

**Supports single, dual, and quad monitors:** DeltaV thin clients are available for single, dual and quad monitor operations using true multi-monitor communications.

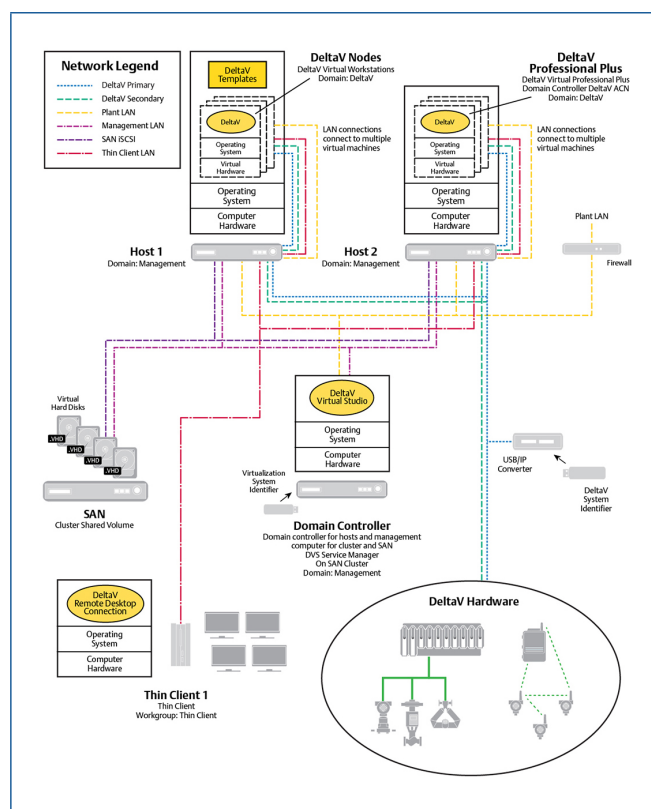
## Product Description

DeltaV virtualization requires specific hardware not found in traditional DeltaV systems. Consolidating multiple DeltaV workstations onto a common host means that hosts must have more computing capacity than traditional control system servers; specifically more CPU processing capacity and RAM memory. Client devices (example thin clients) are required to provide a physical interface to the virtual DeltaV workstations.

Virtual environments also benefit from SAN devices to improve productivity in development/training environments and to take advantage of high availability options for on-line production environments. The hardware described in this document addresses these new requirements for DeltaV virtualization solutions.

Virtualization host servers and shared storage are available as individual components, or as part of an integrated blade server and storage solution using the Dell PowerEdge VRTX.

An example of a DeltaV system for on-line virtualization with high availability is shown below.



## Resource Planning Guidelines

Virtual machines (VM) require host computer resources and are typically limited by available host processors (CPU) or random access memory (RAM). Table 1 provides guidelines on how many virtual machines to assign to host computers based on the VM loading and RAM requirements. VM Units (VMU) are used to estimate relative CPU loading and host limits. These guidelines apply to the standard host server hardware as specified in this document. A special high performance host server is also available for large DeltaV systems with many concurrent engineering users.

**Table 1 – Host VM Resource Planning**

Host VM Resource Planning		
VM Class	VMUs	RAM (MB)
Workstation OS (e.g., Windows 10)		
■ DeltaV v14.3 and later	1	8,192
■ DeltaV v13.3.1 and earlier	1	4,096
Server OS (e.g., Windows Server 2016)		
■ DeltaV v14.3 and later	2	16,384
■ DeltaV v13.3.1 and earlier	2	8,192
Server OS (Windows Server 2016) acting as a Terminal Server and supporting DeltaV Live Remote Sessions	4	16,384
Virtual Controllers (S, M, SZ)	0.5	256
Virtual PK Controller	0.8	1,024
Virtual Ethernet IO Card	0.8	256
Virtual CHARMS IO Card	0.5	64
Virtual CSLS and LSNB <sup>1</sup>	0.8	64
Supported Maximum VMU Limits for Host Servers <sup>2,3</sup>		
On-line Host Server (Normal Operation)	10	
On-line Host Server (Temporary Failover Operation)	20	
Off-line Host Server	20	

**Note 1** – For additional SIS VM limits, see product data sheet for DeltaV SIS with Electronic Marshalling – Virtual Simulation.

**Note 2** – 4GB RAM should be reserved for Host OS.

**Note 3** – Total number of VMs should not exceed available CPU threads  $(= (\text{CPU cores} \times 2) - 1)$ .

## Integrated Virtualization Hardware\*

Designed specifically for virtualization, the integrated hardware platform is a Dell PowerEdge VRTX consisting of blade servers, network storage, and shared switches, preconfigured and tested for use with DeltaV Virtual Studio. The integrated solution is ordered in two parts: 1) network storage and chassis (select one), and 2) individual blade servers (minimum two to maximum four blades per VRTX chassis).

\*Important VRTX Requirement. The VRTX is a highly reliable platform with redundant components for network storage, communications, power, and cooling. The VRTX does contain some redundant components which are not hot-swappable and require the VRTX be shut down for managed repair. These repairs can be performed with little or no virtual machine downtime, provided you have a disaster recovery system available to host the virtual machines during the repair process. To ensure system availability, **all VRTX solutions are required to have disaster recovery capabilities** to support managed repair. For most systems, the recommended disaster recovery solution is to use two VRTX, which distribute virtual machine loading and provide backup through cross VRTX VM replication. For smaller systems, an individual host server (standalone R740) can be used as a replication server for disaster recovery.

### Integrated Network Storage and Chassis

#### 1. VRTX Chassis with 3.6 TB RAID 10 Capacity

**(SE2528V1B-R).** This VRTX configuration provides 3.6 TB of fully redundant (RAID 10) disk storage with six 1.2-TB drives. This size will support approximately 20 DeltaV virtual workstations (without VM Replication).

#### 2. VRTX Chassis with 7.2 TB RAID 10 Capacity

**(SE2528V2B-R).** This VRTX configuration provides 7.2-TB of fully redundant (RAID 10) disk storage with 12 1.2-TB drives. This size will support approximately 40 DeltaV virtual workstations (without VM Replication).

#### 3. VRTX Chassis with 14.4 TB RAID 10 Capacity

**(SE2528V3B-R).** This VRTX configuration provides 14.4 TB of fully redundant (RAID 10) disk storage with 24 1.2-TB drives. This size will support approximately 40 virtual workstations in normal operation plus VM replication for additional 40 virtual machines outside of the VRTX cluster (for disaster recovery scenarios). This VRTX configuration with four host blade servers will support up to 80 VMs running temporarily in a failover scenario.

## Integrated Blade Servers

- 1. Host Blade Server for On-line and Off-line Systems (SE2716V03).** This host blade server is a Dell M640 series server that comes with dual ten-core CPUs and 192GB RAM. It comes with only a “bare-metal” operating system, which means it must be managed by a separate management workstation. An advantage of “bare-metal” servers is that they don’t have the overhead of a full server operating system, which means better performance, and less security vulnerabilities.
- 2. Domain Controller and Host Management Blade Server (SE2717V03).** This blade server functions as a domain controller and provides host management for the VRTX server cluster. It may also be used to manage DeltaV virtual machines using DeltaV Virtual Studio. This server is a Dell M640 server with Windows Server 2016 operating system. This domain controller is separate from the DeltaV network and is not used to manage a DeltaV domain.

## Servers and Storage Devices

### Host Servers

Individual host servers offered with DeltaV have different options to meet different on-line and off-line requirements. Below is a summary of the server options. Additional server specifications are shown on the following specification sheets.

- 1. Host Servers for Development, Test, and Training Systems (SE2714V02 and SE2715V07).** These servers are Dell T640 and R740 series servers that include Windows Server 2016 operating systems so they can be run as a standalone server, without a separate management workstation. They include dual ten-core CPUs with 192GB RAM. These servers come in both a tower and rack-mounted form factor.
- 2. Host Server for On-line or Off-line Applications without a SAN (SE2715V05).** This server is a Dell R740 with dual ten-core CPUs and 192GB RAM. It comes with only a “bare-metal” operating system, which means it must be managed by a separate management workstation. This host server includes a large 1.8 TB RAID 10 hard drive array to provide redundant storage protection for your VMs. Because of this server’s large storage capacity, it is not intended to be part of a failover cluster using a SAN. This server is ideal as a standalone host or VM replication server. This server can be used for both on-line and offline applications using DeltaV Virtual Studio, or for off-line applications using VMware ESXi.

- 3. Host Server for On-line or Off-line Applications with a SAN (SE2715V06).** This server is a Dell R740 with dual ten-core CPUs and 192GB RAM. It also comes with a “bare-metal” OS which requires a separate management workstation or domain controller server. This host is intended for use with a SAN, which is required for automatic failover and high availability. This server can be used for both on-line and off-line applications using DeltaV Virtual Studio, or for off-line applications using VMware ESXi.
- 4. High Performance Host Server for Large DeltaV Systems (SE2715V09).** This server provides enhanced DeltaV ProfessionalPlus performance for large virtualized systems. Response times for database imports / exports and concurrent engineering tasks may be improved by up to 50% using all solid state drives and enhanced CPUs. This server has dedicated storage, therefore high availability is not supported. However, virtual machines may be replicated to separate servers for easy disaster recovery. This high performance server may be used in addition to a Dell VRTX or other standard Dell R740 host servers. Best performance is achieved by running a single ProfessionalPlus VM; however up to four VMs are supported on this host server which includes dual 6-core CPUs with 192GB RAM and 2.4 TB RAID 10 solid state storage.

### Domain Controller and Management Server

**DeltaV Virtualization Domain Controller and Management Server (SE2713V03).** This server is used to manage the host server cluster configuration using a shared network storage. It may be used with individual host servers and SAN devices, or with a Dell PowerEdge VRTX as an external domain controller and host management server. It can also be used to manage DeltaV VMs using DeltaV Virtual Studio. This server is a Dell R440 server with Windows Server 2016 operating system. This domain controller is separate from the DeltaV network and is not used to manage a DeltaV domain.

### Storage Area Network<sup>1,2</sup>

SAN enable you to easily move DeltaV virtual machines between host computers. They can greatly increase flexibility and productivity for off-line development and training systems, and provide increased availability for online production systems. SANs are required for virtual machine automatic failover and high availability options provided with DeltaV Virtual Studio. The SAN devices are Dell PowerVault ME4024 devices with different capacity options.

**1. SAN with 3.6 TB RAID 10 Capacity (SE2543V1).** This SAN provides 3.6 TB of fully redundant (RAID 10) disk storage with six 1.2-TB drives. This size will support approximately 20 DeltaV virtual workstations. The Dell ME4024 may be expanded to a maximum 14.4 TB RAID 10 capacity.

**2. Storage Area Network (SAN) with 7.2 TB RAID 10 Capacity (SE2543V2).** This SAN provides 7.2 TB of fully redundant (RAID 10) disk storage with 12 1.2-TB drives. This size will support approximately 40 DeltaV virtual workstations. The Dell ME4024 may be expanded to a maximum 14.4 TB RAID 10 capacity for use with VM replication (disaster recovery), which supports up to 80 VMs running temporarily in a failover scenario.

**3. SAN with 14.4 TB RAID 10 Capacity (SE2543V3).** This SAN provides 14.4 TB of fully redundant (RAID 10) disk storage with 24 1.2-TB drives. This size will support approximately 40 DeltaV virtual workstations in normal operation plus VM replication for an additional 40 VMs from outside the SAN cluster (for disaster recovery). This SAN configuration supports up to 80 VMs running temporarily in a failover scenario.

**Note 1** – SAN devices are not required with the Dell PowerEdge VRTX, which includes shared storage as part of the integrated hardware platform.

**Note 2** – A secondary SAN or independent host server is recommended for production systems to insure DeltaV system access in the event of SAN iSCSI network disruption. Although SAN networks are redundant, switchover times may take 1-2 minutes during which time dependent VMs will lose communications.

## Thin Clients

**Thin Client for Single, Dual, and Quad Monitors with Redundant Network (SE2549V4).** The thin client for DeltaV virtualization is a Dell Wyse 5070 with Windows 10 IoT Enterprise operating system. It has been selected to meet the needs of on-line process control, including support for redundant thin client networks, with single, dual or quad monitors.

DeltaV virtualization also supports a hardened, rugged thin client for industrial or process environments with Pepperl+Fuchs Industrial Box Thin Client (BTC12 and BTC14). The BTC14 supports up to four monitors, dual networks, and is DeltaV Virtual Studio “Ready” with preinstalled software. Contact P+F or your local Emerson office for more information.

## Switches

### DeltaV Switches for Thin Client, Host Management, and Storage Area Networks

**High Performance 1GB Network Switches (SE6048V1)** are used to ensure performance and integrity of mission critical communications between thin clients, host servers, and SANs. These are Dell N2224X-ON managed switches with Layer 2 feature sets. HIRSCHMANN managed switches (MACH104-20TX-FR) are also supported for thin client and host management networks. HIRSCHMANN RS40 9-port managed switches are also supported for thin client networks.

Unmanaged switches are appropriate for less critical operations such as development or training systems. The recommended and supported unmanaged switches for DeltaV virtualization are Netgear Prosafe switches, available in 24-, 16-, and 8-port configurations (JGS524, JGS516, GS116, GS108).

These switches are intended for 1GB communications for thin client, host management, and SANs only. They are not supported for DeltaV primary and secondary ACN networks.

**DeltaV Smart Switches** are also available for the DeltaV virtualization 1 GB thin client network. DeltaV Smart Switches are managed by the DeltaV system with easy plug-and-play installation and minimal configuration. The smart switches also provide auto port lockdown for advanced network security. See DeltaV Smart Switches product data sheet for additional information.



**SE2528 – DeltaV Integrated Hardware Platform – Network Storage and Chassis****General Specifications [based on Dell PowerEdge VRTX]**

- Optimized chassis to consolidate servers, storage, and networking
- Chassis available in 5U rack-mountable form factor
- Supports up to four blade servers (described below)
- Thirty-two dedicated Ethernet ports (eight per blade server) through eight 4-port NIC cards in PCI slots
- Eight additional Ethernet ports available per blade server through a shared internal 1GB eight-port switch
- Each blade server has 16 available Ethernet ports (eight dedicated, eight shared)
- Redundant, hot-swappable 1100W power supplies (2x2)
- Redundant drive controllers for RAID 10 redundant disk storage
- Redundant Chassis Management Controller for easy management of all resources (server nodes, storage, networking and power)
- Efficient cooling with six hot-swappable, redundant fan modules and four blower modules
- Local power cord option
- Rack configuration dimensions: 28.7" (73.0cm) D x 19.0" (48.2cm) W x 8.6" (21.9cm) H
- Rack configuration weight: 151.5 lbs. (68.7 kg), maximum configuration
- PowerEdge VRTX Rack-ready chassis, Rails and Cable Management Arm included in the box
- Five-year extended warranty with next business day parts replacement (For same day 4 hour parts replacement, contact your Dell representative)



For more information about VRTX, see the PowerEdge VRTX Technical Guide on Dell.com.

**SE2528V1B-R – DeltaV Integrated Hardware Platform – Network Storage for Small Systems**

- Drives: Six 1.2-TB SAS 2.5 hard-drives in a RAID 10 Array, for 3.6 TB redundant disk storage
- Supports up to 20 virtual DeltaV workstations for on-line systems or 32 VMs for off-line systems

**SE2528V2B-R – DeltaV Integrated Hardware Platform – Network Storage for Large Systems**

- Drives: Twelve 1.2-TB SAS 2.5 hard-drives in a RAID 10 Array, for 7.2 TB redundant disk storage
- Supports up to 40 virtual DeltaV workstations for on-line systems or 64 VMs for off-line systems

**SE2528V3B-R – DeltaV Integrated Hardware – Network Storage for Large Systems with Disaster Recovery**

- Drives: Twenty-four 1.2-TB SAS 2.5 hard-drives in a RAID 10 Array, for 14.4 TB redundant disk storage
- Supports up to 40 virtual DeltaV workstations for on-line systems and VM replication for 40 additional VMs. May also be used for off-line systems requiring extra storage.

**\*Notes** – On-line Production systems using the VRTX require disaster recovery capabilities to ensure system availability during upgrades or managed repair.  
 – Additional storage may be required for VM replication on SE2528V1B-R and SE2528V2B-R.  
 – VRTX network storage and chassis (SE2528xxx) cannot be ordered without at least one host blade server (e.g., SE2716)

**SE2716 – DeltaV Integrated Hardware Platform – Host Blade Server****General Specifications [based on Dell M640]**

- Blade Server for VRTX Chassis
- Drives: Two 300-GB SAS 2.5in hard-drives
- Two CPUs – Intel Xeon Silver 4114 2.2 GHz ten cores
- Memory: 192GB
- Sixteen Ethernet ports available through VRTX Chassis (eight dedicated Ethernet ports through PCI slots plus 8 shared Ethernet ports through shared 1GB internal switch)
- Ten-Gb Broadcom network card
- Two USB ports (through front panel)
- Redundant power and cooling fans supplied by Dell PowerEdge VRTX chassis
- Five-year extended warranty

**SE2716V03 – Host Blade Server for On-line and Off-line Applications – “Bare-Metal”**

- For use with Windows 2016 Hyper-V Server “Bare-Metal” operating system software
- For use in both on-line and off-line virtual environments
- Compatible with DeltaV Virtual Studio v3.3.x and later. For DeltaV Virtual Studio v2.3.1 and earlier, use Dell M630 blade (SE2706V01)

**SE2717V03 – DeltaV Integrated Hardware– Domain Controller and Host Management Blade Server****General Specifications [based on Dell M640]**

- Blade Server for VRTX Chassis
- Drives: Two 1-TB SATA 2.5in hard-drives
- Single CPU – Intel Xeon Silver 4110 2.1GHz, 8 cores, 3.0 GHz turbo
- Memory: 96GB (Six 16GB RDIMM)
- Twelve Ethernet ports available through VRTX Chassis (eight dedicated Ethernet ports through PCI slots plus four shared Ethernet ports through shared 1-GB internal switch)
- Two USB ports (through front panel)
- Redundant power and cooling fans supplied by Dell PowerEdge VRTX chassis
- Server delivered with Windows Server 2019 Standard Edition operating system software.  
*\*which must be downgraded (at no additional cost) to Windows Server 2016 Standard Edition for use with DeltaV Virtual Studio v3.3.x. Downgrade media to Windows Server 2016 DVD is included.*
- Five server CAL licenses included
- Five-year extended warranty
- Compatible with DeltaV Virtual Studio v3.3.x and later. For DeltaV Virtual Studio v2.3.1 and earlier, use Dell M630 blade (SE2707V01)



**Specifications Common to all Host Servers and Storage Units**

It is the responsibility of the user to ensure their environment is compatible with G1. Due to compliance to RoHS requirements newer computers may not survive in the same environment as older models. If there is any chance of sulfur in the environment computers must be protected in environmental enclosures or relocated to a sulfur free environment.

Temperature: Operating 10° to 35°C (50° to 95°F), Storage –40° to 65°C (–40° to 149°F)

Relative Humidity: 20% to 80% (non-condensing)

Altitude: Operating –15.2 to 3048 m (–50 to 10,000 ft.), Storage –15.2 to 10,668 m (–50 to 35,000 ft.)

All computers must be installed in a dust-free, contaminant-free environment. These computers are not suitable for mounting in industrial environments unless they are mounted in enclosures that provide the necessary dust-free and contaminant-free environment. Environment must meet Class G1 level for airborne contaminants per the ISA standard ISA–71.04–1985, Environmental Conditions for Process Measurement and Control Systems: Airborne Contaminants.

Servers intended for embedded applications. ‘embedded application’ means a software application that permanently resides in an industrial or consumer device, typically stored in a non-volatile memory such as read-only memory or flash memory.

Server intended for use as appliances. ‘server appliance’ means a server that is not intended to execute user-supplied software, delivers services through one of more networks, is typically managed through a web or command line interface and is bundled with a pre-installed OS and application software that is used to perform a dedicated function or set of tightly coupled functions.

To simplify the ordering process and improve efficiency, below are five standardized pre-configured Dell VRTX part numbers.

Standard VRTX Configurations	Description
<b>SE2730S01</b>	Standard Configuration 01 - 1 VRTX Chassis for Large Systems; 1 Domain Controller Blade; 2 Host Blades; No Monitor; 5 Yrs. Warranty; includes 1 x SE2528V2B-R; 1 x SE2717V03; 2 x SE2716V03
<b>SE2730S02</b>	Standard Configuration 02 - 1 VRTX Chassis for Large Systems with Disaster Recovery; 4 Host Blades; No Monitor; 5 Yrs. Warranty; includes 1 x SE2528V3B-R; 4 x SE2716V03
<b>SE2730S03</b>	Standard Configuration 03 - 1 VRTX Chassis for Large Systems; 2 Host Blades; No Monitor; 5 Yrs. Warranty; includes 1 x SE2528V2B-R; 2 x SE2716V03
<b>SE2730S04</b>	Standard Configuration - 1 VRTX Chassis for Large Systems with Disaster Recovery; 1 Domain Controller Blade; 3 Host Blades; No Monitor; 5 Yrs. Warranty; includes 1 x SE2528V3B-R; 1 x SE2717V03; 3 x SE2716V03
<b>SE2730S05</b>	Standard Configuration - 1 VRTX Chassis for Large Systems with Disaster Recovery; 2 Hosts Blades; No Monitor; 5 Yrs. Warranty; includes 1 x SE2528V3B-R; 2 x SE2716V03

\*Notes: For more details on each part included in the standard configuration refer to individual SE# on pages 6 & 7.



**SE2714V02 – DeltaV Host Server for Development, Test, and Training Systems – Tower Chassis****General Specifications [based on Dell T640 server]**

- Tower Chassis
- Drives: Six 600-GB SAS hard-drives in a RAID 10 Array, for 1.8TB redundant disk storage
- Two CPUs – Intel Xeon Silver 4114 2.2 GHz ten cores
- Memory: 192GB
- Server is delivered with Windows Server 2019 Standard Edition.  
*\*which must be downgraded (at no additional cost) to Windows Server 2016 Standard Edition for use with DeltaV Virtual Studio v3.3.x. Downgrade media to Windows Server 2016 DVD is included.*
- Five server CAL licenses included
- Hot-swappable drive backplane
- Redundant, hot-pluggable 750W power supplies
- Ten Ethernet ports (two ports on motherboard, plus eight through add-in NIC cards)
- Eight USB ports (six on back panel, two on back panel)
- DVD-R/W drive
- USB mouse (two button w/ scroll)
- Local USB country keyboard and Local power cord option
- Five-year extended warranty
- Compatible with DeltaV Virtual Studio v3.3.x and later. For DeltaV Virtual Studio v2.3.1 and earlier, use Dell T630 server (SE2704V01)



**SE2715 – DeltaV Host Servers, Rack-mount****General Specifications [based on Dell R740 server]**

- 2U Rack-mountable chassis with sliding ready rails and cable management arm
- Fourteen Ethernet ports (four on motherboard plus 10 through add-in NIC cards)
- Four USB ports – two back panel and two on front panel
- Hot-swappable drive backplane
- Redundant, hot-pluggable 750W power supplies
- DVD+/- R/W drive
- USB mouse (two button w/ scroll)
- Local USB country keyboard
- Local power cord option
- Five-year extended warranty

**SE2715V07 – Host Server for Development, Test, and Training Systems**

- Server is delivered with Windows Server 2019 Standard Edition  
*\*which must be downgraded (at no additional cost) to Windows Server 2016 Standard Edition for use with DeltaV Virtual Studio v3.3.x. Downgrade media to Windows Server 2016 DVD is included.*
- Five server CAL licenses included
- Memory: 192GB
- Drives: Six 600-GB SAS hard-drives in a RAID 10 Array, for 1.8 TB redundant disk storage
- Two CPUs – Intel Xeon Silver 4114 2.2 GHz ten cores
- Compatible with DeltaV Virtual Studio v3.3.x and later. For DeltaV Virtual Studio v2.3.1 and earlier, use Dell R730 server (SE2705V03)

**SE2715V05 – Host Server for On-line and Off-line Applications WITHOUT an SAN**

- For use with Windows Hyper-V Server “Bare-metal” operating system software
- Memory: 192GB
- Drives: Six 600-GB SAS hard-drives in a RAID 10 Array, for 1.8 TB redundant disk storage
- Two CPUs – Intel Xeon Silver 4114 2.2 GHz ten cores
- Compatible with DeltaV Virtual Studio v3.3.x and later. For DeltaV Virtual Studio v2.3.1 and earlier, use Dell R730 server (SE2705V01)

**SE2715V06 – Host Server for On-line and Off-line Applications WITH an SAN**

- For use with Windows Hyper-V Server “Bare-metal” operating system software
- Memory: 192GB
- Drives: Two 600-GB SAS hard-drives in a RAID 1 Array
- Two CPUs – Intel Xeon Silver 4114 2.2 GHz ten cores
- Compatible with DeltaV Virtual Studio v3.3.x and later. For DeltaV Virtual Studio v2.3.1 and earlier, use Dell R730 server (SE2705V02)

**SE2715V09 – High Performance Host Server for Large DeltaV Systems**

- High performance server to host DeltaV Professional Plus virtual machine for large systems with many concurrent engineering users.
- For use with Windows Hyper-V Server “Bare-Metal” operating system software
- Memory: 192GB
- Drives: Six 800-GB solid state drives in RAID 10 Array for 2.4 TB redundant disk storage
- Two CPUs – Intel Xeon Gold 6128 3.4 GHz six cores
- Supports up to four VMs, including the DeltaV ProfessionalPlus
- Compatible with DeltaV Virtual Studio v3.3.x and later. For DeltaV Virtual Studio v2.3.1 and earlier, use Dell R730 server (SE2705V04)

**SE2713V03 – DeltaV Virtualization Domain Controller and Management Server [based on Dell R440]**

- 1U Rack-mountable chassis with sliding ready rails and cable management arm
- Single CPU – Intel Xeon Silver 4110 2.1GHz, 8 cores, 3.0 GHz turbo
- 16GB Memory
- Eight Ethernet ports (two on the motherboard plus six through add-in NIC cards)
- Five USB ports - two back panel, two front panel, and one internal
- Cabled hard drive backplane
- Redundant, hot-pluggable 350W power supplies
- Two 500-GB cabled SATA hard-drives in a RAID 1 Array for 500-GB redundant disk storage. RAID Controller included for improved performance
- Server is delivered with Windows Server 2019 Standard Edition
  - \*which must be downgraded (at no additional cost) to Windows Server 2016 Standard Edition for use with DeltaV Virtual Studio v3.3.x. Downgrade media to Windows Server 2016 DVD is included.*
- Five server CAL licenses included
- DVD ROM drive
- USB mouse (two button w/ scroll)
- Local USB country keyboard
- Local power cord option
- Compatible with DeltaV Virtual Studio v3.3.x and later. For DeltaV Virtual Studio v2.3.1 and earlier, use Dell R430 server (SE2703V01)



### SE6048V1 – DeltaV Network Switch for Host Management, SAN Storage, and Thin Client Networks

#### General Specifications [Dell N2224X-ON]

- One Gigabit Ethernet, energy efficient switch
- 1U Rack-mountable chassis with ReadyRails; 2x outer and 2x inner rail, 2 or 4 post racks
- Twenty-four Ethernet ports
- Supports redundant host management and thin client networks
- Supports redundant iSCSI communications with SAN device
- Dual internal, hot swappable redundant power supplies for high availability



**Note:** For more detailed specifications, visit [www.dell.com](http://www.dell.com)

#### Environmental

- Temperature Range: 32°F to 113°F (0°C to 45°C)
- Operating Relative Humidity: 95%
- Power Consumption: 238W Max

### SE2549V4 - DeltaV Thin Client for Single, Dual and Quad Monitors with Redundant Network [based on Dell Wyse 5070]

Thin clients used for DeltaV virtualization have been selected to meet the needs of on-line process control, including support for single, dual, and quad monitors, and support for redundant thin client networks.

- Intel Pentium Silver Processor J5005 (2.7GHz)
- Single, Dual, and Quad Monitor Support
- Memory: 8GB RAM
- Storage: 256GB Solid State Drive
- Nine USB ports - 6 USB 3.0 ports (1 front, 4 back, 1 internal), 3 USB 2.0 ports (2 front, 1 internal)
- Display ports: Onboard = (3) DP Add-in video = (1) DP full size and (2) mini DP
  - Supports quad 4k monitor configuration
  - 4k resolution supported with DeltaV Live
- Expansion Card: AMD Radeon E9173 graphics card
- Windows 10 IoT Enterprise (Windows 10 Enterprise 2016 LTSB) operating system for thin clients
- Dimensions: Height 184mm, Width 66mm, Depth 184mm
- Local power cord option
- Three-year warranty with ProSupport
- Pre-installed image with DeltaV Remote Desktop Client and recommended OS configuration



*Recovery media available for download on Guardian.*

*Please refer to Dell product data sheets for environmental and power consumption specifications.*

### Monitor Specifications for Thin Clients

- For DeltaV v11.3.1 and later virtual workstations, dual and quad screen display is supported using true multi-monitor display mode, including wide screen monitors up to 1680x1050
- For DeltaV v9.3.1 through v11.3 virtual workstations, dual and quad screen display is supported using a single window in “span mode,” including wide-screen monitors up to 1680x1050 for dual screens and 1280x1024 for quad screens
- DeltaV supports 16:9 aspect ratio for 1920x1080 monitors in DeltaV v13.3 and newer system

*Please refer to the product data sheets for DeltaV Workstation Hardware for currently supported monitors.*

### Other Supported Thin Clients for DeltaV Virtualization

- Pepperl+Fuchs Industrial Box Thin Client BTC12 and BTC14
- Windows 10 IoT OS with P+F VisuNet Shell 5 firmware installed and DeltaV Virtual Studio “ready”
- Supports up to four monitors with dual NIC cards for redundant thin client networks

*For more information, lookup BTC12 and BTC14 on [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)*

### SE2543 – DeltaV SAN - General Specifications [Dell PowerVault ME4024]

- Rack-mountable chassis with sliding ready rails and cable management arm
- Dual, redundant storage controllers
- Supports RAID 10 redundant disk storage
- 2.5 inch 1.2-TB 10K RPM SAS hard drives
- Expandable up to 24 2.5 inch drives
- High performance 10GB iSCSI network
- Dual redundant power supply



#### Environmental

- Temperature Range: 41°F to 95°F (5°C to 35°C) continuous operation
- Relative Humidity: 10% to 80% continuous operation

### SE2543V1 – DeltaV SAN with 3.6 TB RAID 10 Capacity

- Six 1.2-TB SAS hard-drives in a RAID10 Array
- Supports up to 20 virtual DeltaV workstations

### SE2543V2 – DeltaV SAN with 7.2 TB RAID 10 Capacity

- Twelve 1.2-TB SAS hard-drives in a RAID10 Array
- Supports up to 40 virtual DeltaV workstations

### SE2543V3 – DeltaV SAN with 14.4 TB RAID 10 Capacity

- Twenty four 1.2-TB SAS hard-drives in a RAID10 Array
- Supports up to 40 virtual DeltaV workstations and VM replication for 40 additional VMs



**VE6055 – DeltaV USB to IP Converter****General Specifications [SEH utnserver Pro]**

- USB to IP Converter device for Windows OS
- Provides virtual machine access to DeltaV System ID USB access key (dongle) or other DeltaV access keys (for example Batch Analytics) through Ethernet connection
- Two USB 3.0 ports available
- Dimensions: 120 D x 84 W x 30 H (mm)
- Local power cord options:
  - VE6055P1 – U.S.A.
  - VE6055P2 – European
  - VE6055P3 – U.K.
  - VE6055P4 - JP

**VE6055-R – DeltaV USB to IP Converter – Rack Mount****General Specifications [SEH DongleServer Pro]**

- USB to IP Converter device for Windows OS
- Provides virtual machine access to DeltaV System ID USB access key (dongle) or other DeltaV access keys (example Batch Analytics) through Ethernet connection
- Eight USB ports available
  - 4X USB 3.0 SuperSpeed ports;
  - 4X USB 2.0 Hi-Speed ports
- Dimensions: 15 D x 155 W x 45 H (mm)
- Rack mount kit for 19" server racks
- Local power cord options:
  - VE6055P1-R – U.S.A.
  - VE6055P2-R – European
  - VE6055P3-R – U.K.
  - VE6055P4 - R - JP

**Other Supported Switches for Host Management and Thin Client Networks****Managed Gigabit Switch**

- HIRSCHMANN MACH104-20TX-FR, 24-port Gigabit Ethernet Managed Switch with redundant power
  - 24-port 10/100/1000 BASE-TX (RJ-45), Gigabit Ethernet managed rack-mountable switch
- HIRSCHMANN RS40, 9-port Gigabit Ethernet Managed Switch, DIN Rail Mounted, Fanless
  - 9 Gigabit ports: 5 x Twisted Pair ports RJ45 and 4 x Twisted Pair ports RJ45/SFP combo ports
  - Fiber uplink ports are available in multimode and/or single mode by using Gigabit or Fast Ethernet SFP transceivers

**Unmanaged Gigabit Switches**

- NETGEAR ProSafe Gigabit Switches
  - JGS524 – 24-port 10/100/1000BASE-T (RJ-45) Gigabit Ethernet unmanaged desktop or rack-mountable switch
  - JGS516 – 16-port 10/100/1000BASE-T (RJ-45) Gigabit Ethernet unmanaged desktop or rack-mountable switch
  - GS116 – 16-port 10/100/1000 Gigabit Ethernet unmanaged desktop switch
  - GS108 – eight-port 10/100/1000 Gigabit Ethernet unmanaged desktop switch

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