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.

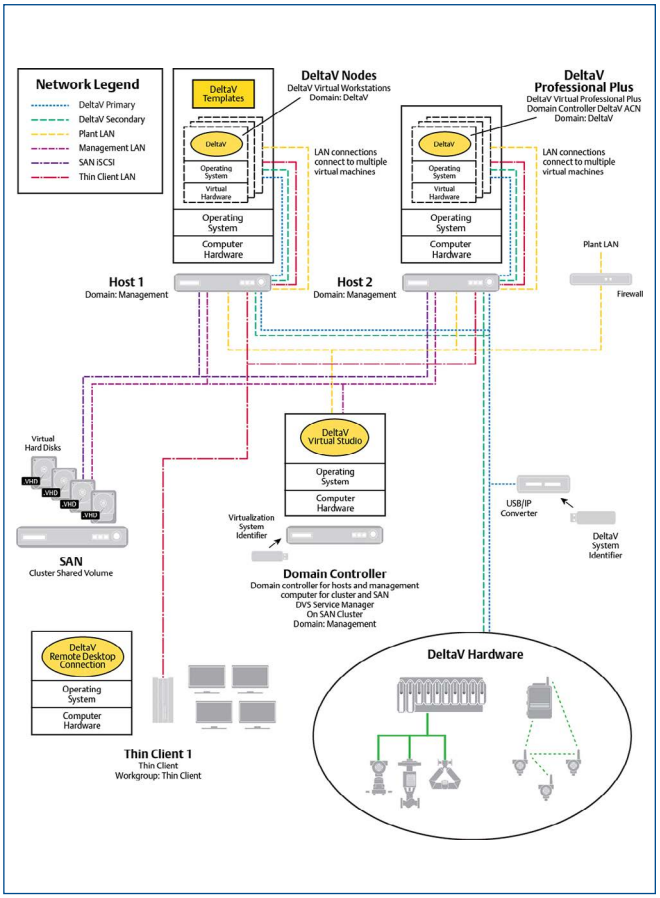
Product Description

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 Resource Planning

Host VM Resource Planning		
VM Class	**VMUs**	**RAM (MB)**
Workstation OS (e.g. Windows 7)	1	2,048
Server OS (e.g. Windows Server 2008)	2	4,096
Virtual Controller (S, M, SZ)	0.4	256
Virtual Ethernet IO Card	0.8	512
Virtual CHARMS IO Card	0.2	64
Virtual CSLS and LSNB	0.5	64
Supported Maximum VMU Limits for Host Servers[1]		
On-line Host Server (Normal Operation)		10
On-line Host Server (Temporary Failover Operation)		20
Off-line Host Server		20

Note 1 – *4GB RAM should be reserved for Host OS*

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 R730) 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).** 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).** 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).** 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 (SE2538V1B).** This host blade server is a Dell M630 series server that comes with dual eight-core CPUs and 64GB 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. **Host Blade Server for Off-line Development, Test, and Training Systems (SE2538V2B).** This host blade server is a Dell M630 series server that includes a Windows Server 2012 operating system so it can be used without a separate management workstation. This blade server includes dual eight-core CPUs and 64GB RAM.

3. **Domain Controller and Host Management Blade Server (SE2539V1B).** 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 M630 server with Windows Server 2012 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 (SE2535V1B and SE2536V3B).** These servers are Dell 630 and 730 series servers that include Windows Server 2012 operating systems so they can be run as a standalone server, without a separate management workstation. They include dual eight-core CPUs with 64GB 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 (SE2536V1B).** This server is a Dell R730 with dual eight-core CPUs and 64GB 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 (SE2536V2B).** This server is a Dell R730 with dual eight-core CPUs and 64GB 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 (SE2536V4B).** 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 R730 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 64GB RAM and 1.2 TB RAID 10 solid state storage.

Domain Controller and Management Server

DeltaV Virtualization Domain Controller and Management Server (SE2542V1M99). 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 R430 server with Windows Server 2012 operating system. This domain controller is separate from the DeltaV network and is not used to manage a DeltaV domain.

Storage Area Network[1,2]

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 MD3220i devices with different capacity options.

1. **SAN with 3.6 TB RAID 10 Capacity (SE2540V1M99).** 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 MD3820i may be expanded to a maximum 14.4 TB RAID 10 capacity.
2. **Storage Area Network (SAN) with 7.2 TB RAID 10 Capacity (SE2540V2M99).** 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 MD3820i 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 (SE2540V3M99).** 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

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

1. **Thin Client for Redundant Network (SE2519V3M99).** This thin client is a Dell Wyse 7010 extended chassis (formally Z90DE7) with dual network connections to support redundant thin client networks. This thin client supports single and dual monitors, and comes preloaded with Windows 7 Embedded operating system, which is specifically designed for thin clients.
2. **Thin Client for Quad Monitors and Redundant Network (SE2519V4M99).** This thin client is a Dell Wyse 7020 quad display (formally Z90QQ7), which supports Quad Monitors and redundant thin client networks. Windows 7 Embedded for thin clients comes pre-installed.

DeltaV virtualization also supports a hardened, rugged thin client for industrial or process environments with Pepperl+Fuchs Industrial Box Thin Client (BTC01*). The BTC01 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 / 10GB Network Switches (SE6047V2P1 and SE6047V2P2) are used to ensure performance and integrity of mission critical communications between thin clients, host servers, and SANs. These are Dell N3024 managed switches with Layer 2 and Layer 3 feature sets including remote device health monitoring. HIRSCHMANN managed switches (MACH104-20TX-FR) are also supported for thin client and host management 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 or tower form factors
  (For rack-mounting, an optional rack mount conversion kit is required. See below)
- 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
- Tower configuration dimensions: 28.7” (73.0cm) D x 12.2” (31.0cm) W x 19.1” (48.4cm) H
- Tower configuration weight: 164.9 lbs. (74.8 kg), maximum configuration
- Five-year extended warranty

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

SE2528V1B – 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 – 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 – 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.

SE2531V-KIT1 – DeltaV Integrated Hardware – VRTX Rack-mount Conversion Kit

- PowerEdge VRTX Rack Rails and Tower-to-Rack Conversion Kit with Cable Management Arm

**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 SE2528V1M99 and SE2528V2M99.
– VRTX network storage and chassis (SE2528xxx) cannot be ordered without at least one host blade server (e.g., SE2538)

SE2538 – DeltaV Integrated Hardware Platform – Host Blade Server General Specifications [based on Dell M630]

- Blade Server for VRTX Chassis
- Drives: Two 300-GB SAS 2.5in hard-drives
- Two CPUs - Intel Xeon E5-2630 2.4 GHz eight cores
- Memory: 64GB (eight 8GB RDIMM)
- 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

SE2538V1B – Host Blade Server for On-line and Off-line Applications – "Bare-Metal"

- For use with Windows Hyper-V Server 2012 "Bare-metal" operating system software
- For use in both on-line and off-line virtual environments

SE2538V2B – Host Blade Server for Off-line Development, Test, and Training Systems - "Full OS"

- Windows Server 2012 Standard Edition operating system software. Server CAL licenses not included
- For use in off-line development, test, and training systems only

SE2539V1B – DeltaV Integrated Hardware– Domain Controller and Host Management Blade Server General Specifications [based on Dell M630]

- Blade Server for VRTX Chassis
- Drives: Two 300-GB SAS 2.5in hard-drives
- Single CPU - Intel Xeon E5-2630 2.4 GHz eight cores
- Memory: 16-GB (Four - 4GB 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
- Windows Server 2012 Standard Edition operating system software. Server CAL licenses not included
- Five-year extended warranty

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.

SE2535V1B – DeltaV Host Server for Development, Test, and Training Systems – Tower Chassis General Specifications [based on Dell T630 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 E5-2630 v4 eight cores
- Memory: 64GB
- Server is delivered with Windows Server 2012 R2 which must be downgraded (at no additional cost) to Windows Server 2012 Standard Edition for use with DeltaV Virtual Studio v2.3.x. Server CAL licenses not 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
- Tower dimensions (without bezel): 443.5mm H w/feet x 304.5mm W x 708.7D with bezel
- Tower weight 43.3 kg (95 lb.), maximum configuration
- Five-year extended warranty

SE2536 – DeltaV Host Servers, Rack-mount - General Specifications [based on Dell R730 server]

- 2U Rack-mountable chassis with sliding ready rails and cable management arm
- Memory: 64GB
- 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
- Rack Server Dimensions 29.31" (74.4cm) D x 17.5" (44.43cm) W x 3.4" (8.64cm) H with bezel attached
- Rack Server Weight 50.71 lbs. (23 Kg), maximum configuration
- Five-year extended warranty

Environmental

- Vibration: Operating: 0.26G at 5Hz to 350Hz for two minutes, Storage: 1.54Grms Random Vibration at 10Hz to 250Hz for 15 minutes
- Shock: Operating: one shock pulse of 41G for up to 2ms, Storage: six shock pulses of 71G for up to 2ms

SE2536V3B – Host Server for Development, Test, and Training Systems

- Server is delivered with Windows Server 2012 R2 which must be downgraded (at no additional cost) to Windows Server 2012 Standard Edition for use with DeltaV Virtual Studio v2.3.x. Server CAL licenses not included
- Drives: Six 600-GB SAS hard-drives in a RAID 10 Array, for 1.8 TB redundant disk storage
- Two CPUs - Intel Xeon E5-2630 v4 ten cores

SE2536V1B – Host Server for On-line and Off-line Applications WITHOUT an SAN

- For use with Windows Hyper-V Server 2012 "Bare-metal" operating system software and DeltaV Virtual Studio v2.3.x
- Drives: Six 600-GB SAS hard-drives in a RAID 10 Array, for 1.8 TB redundant disk storage
- Two CPUs - Intel Xeon E5-2630 v4 ten cores

SE2536V2B – Host Server for On-line and Off-line Applications WITH an SAN

- For use with Windows Hyper-V Server 2012 "Bare-metal" operating system software and DeltaV Virtual Studio v2.3.x
- Drives: Two 600-GB SAS hard-drives in a RAID 1 Array
- Two CPUs - Intel Xeon E5-2630 v4 ten cores

SE2536V4B – 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 2012 "Bare-metal" operating system software and DeltaV Virtual Studio v2.3.x
- Drives: Six 400-GB solid state drives in RAID 10 Array for 1.2 TB redundant disk storage
- Two CPUs – Intel Xeon E5-2643 v4 six cores
- Supports up to four VMs, including the DeltaV ProfessionalPlus

SE2542V1M99 – DeltaV Virtualization Domain Controller and Management Server [based on Dell R430]

- 1U Rack-mountable chassis with sliding ready rails and cable management arm
- Single CPU - Intel Xeon E5-2623 v4 2.6 GHz, four cores
- Eight-GB 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
- Server is delivered with Windows Server 2012 R2 which must be downgraded (at no additional cost) to Windows Server 2012 Standard Edition for use with DeltaV Virtual Studio v2.3.x
- DVD ROM drive
- USB mouse (two button w/ scroll)
- Local USB country keyboard
- Local power cord option
- Rack Server Dimensions 24.00” (61.0 cm) D x 18.99” (48.2cm) W x 1.68” (4.28cm) H with bezel attached
- Rack Server Weight 30.42 lbs. (13.8 Kg)

Environmental

- Vibration: Operating: 0.26 Grms at five Hz to 350Hz; Storage: 1.88 Grms at 10Hz to 250Hz for 15 minutes
- Shock: Operating: six shock pulses of 40G for up to 2.3 ms; Storage: six shock pulses of 71 G for up to 2ms

SE6047V2P1 – DeltaV Network Switch for Host Management and Thin Client Networks

General Specifications [Dell N3024]

- One Gigabit Ethernet, energy efficient switch
- 1U Rack-mountable chassis
- Twenty-four Ethernet ports
- Supports high density, high-performance stacking, and high availability communications
- Supports redundant host management and thin client networks
- Dual internal, hot swappable redundant power supplies for high availability

Environmental

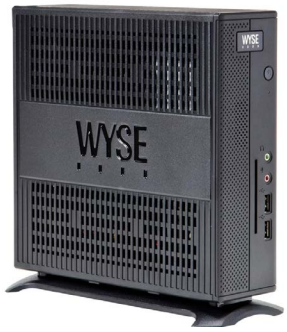
- Temperature Range: 32°F to 113°F (0°C to 45°C)
- Operating Relative Humidity: 95%
- Power Consumption: 53W Max

SE2519 – DeltaV Thin Clients [based on Dell Wyse Thin Clients]

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.

SE2519V3M99 – Thin Client for Single and Dual Monitors and Redundant Network [based on Dell Wyse 7010*]

- Dual-core AMD G-T56N 1.65 GH processor with AMD Radeon HD6320 graphics card
- Single or Dual Monitor Support
- Memory: 16-GB Flash / four-GB RAM
- Six USB ports – Four USB 2.0 (two back panel and two on front panel), two USB 3.0 back panel
- Expansion Card: Single Ethernet port for redundant thin client network support
- Windows 7 Embedded operating system for thin clients
- Dimensions: Height 8.46 " (215mm), Width 2.72" (69mm), Depth 8.85" (225mm)
- Local power cord option



** Dell Wyse 7010 extended chassis was formally Wyse Z90DE7*

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

SE2519V4M99 – Thin Client for Quad Monitor and Redundant Network [based on Dell Wyse 7020**]

- Quad-core AMD GX-415GA 1.5 GHz with AMD Radeon HD8330E / E6240 graphics card
- Quad Monitor Support through three display ports and one DVI-I port
- Memory: 16-GB Flash / 4GB RAM
- Six USB ports – Four USB 2.0 (two back panel and two on front panel), two USB 3.0 back panel
- External USB Network Card for redundant thin client network support
- Windows 7 Embedded operating system for thin clients
- Dimensions: Height 7.87 " (200mm), Width 1.85" (47mm), Depth 8.85" (225mm)
- Local power cord option

*** Dell Wyse 7020 Quad Display was formally Wyse Z90QQ7*

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

Monitor Specifications for Thin Clients

- For DeltaV v13.3, v12.3, v12.3.1, and v11.3.1 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 systems.]

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 BTC01*

- Windows 7 Embedded OS with P+F VisuNet RM Shell 4.0 installed and DeltaV Virtual Studio "ready"
- Supports up to four monitors with dual NIC cards for redundant thin client networks

For more information, lookup BTC01 on www.pepperl-fuchs.com.

SE2540 – DeltaV SAN - General Specifications [Dell PowerVault MD3820i]

- 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
- Requires 10GB SAN switches described below
- Dual redundant power supply

Environmental

- Temperature Range: 50°F to 95°F (10°C to 35°C) continuous operation
- Relative Humidity: 20% to 80% continuous operation

SE2540V1M99 – 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

SE2540V2M99 – 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

SE2540V3M99 – 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

SE6047V2P2 – DeltaV Network Switch for SAN

General Specifications [Dell N3024]

- 2 x 10GB Ethernet ports for connection to SAN storage (MD3820i)
- 24 x 1GB Ether ports for connection to Host Servers
- 1U Rack-mountable chassis
- Supports high density, high-performance stacking and high availability communications
- Supports redundant iSCSI communications with SAN device
- Dual internal, hot swappable redundant power supplies for high availability

Environmental

- Temperature Range: 32°F to 113°F (0°C to 45°C)
- Operating Relative Humidity: 95%
- Power Consumption: 53W Max

VE6051 – DeltaV USB to IP Converter

General Specifications [SEH myUTN-50a USB Device Server]

- 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 2.0 ports available
- Dimensions: 98D x 81W x 31H (mm)
- Local power cord options:
  - VE6051P1 – U.S.A.
  - VE6051P2 – European
  - VE6051P3 – U.K.

VE6052 – DeltaV USB to IP Converter – Rack Mount

General Specifications [SEH myUTN-80 USB Device Server]

- 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 2.0 ports available
- Dimensions: 215D x 155W x 45H (mm)
- Rack mount kit for 19” server racks
- Local power cord options:
  - VE6052P1 – U.S.A.
  - VE6052P2 – European
  - VE6052P3 – U.K.
  - VE6052P5 – Australian

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

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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