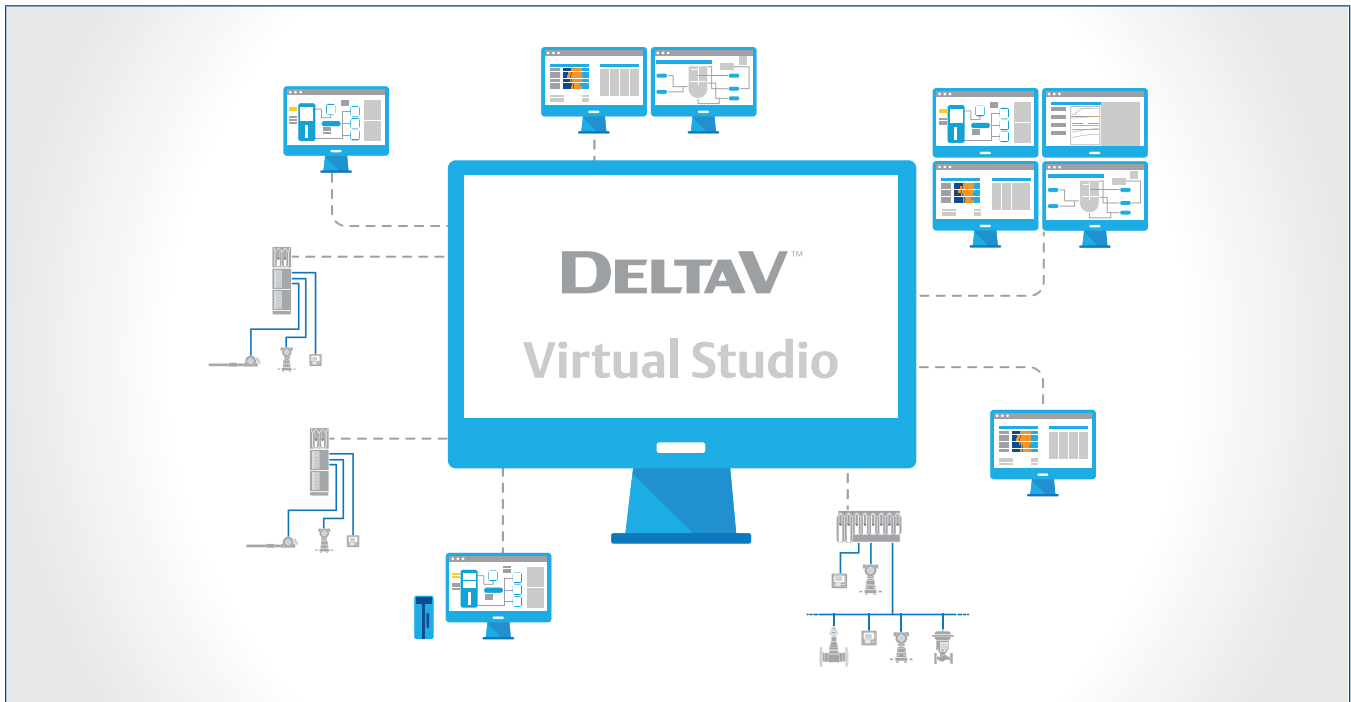


DeltaV™ Virtual Studio



DeltaV™ Virtual Studio makes virtualization easy.

- DeltaV™ Virtualization made easy
- Reduced costs and increased flexibility
- Fewer computers and control hardware
- Extended system life with easy upgrades
- High availability and disaster recovery

Introduction

DeltaV™ Virtual Studio makes it easy to create and maintain virtual DeltaV systems for development, testing, training and on-line production. Setup and maintenance of multiple control systems can be expensive and time consuming. Virtualization offers many compelling benefits including less hardware to buy and maintain, increased configuration flexibility and engineer productivity, and higher availability with easier disaster recovery.

DeltaV Virtual Studio makes it easier than ever to capture the value of virtualization without being an IT virtualization expert.

DeltaV Virtual Studio is easy because it is an integrated virtualization environment which includes prebuilt DeltaV virtual machine templates and virtual networks which simplify system set-up and reduce the risk of configuration errors.

Virtual operator workstations and application servers are easily created from templates without software installation and added to the control network without complicated virtual network mapping. For off-line development and test systems, you can easily create virtual hardware controllers, safety logic solvers, and I/O subsystems for simulation and testing.

Now you can confidently capture the value of virtualization with a fully tested and supported DeltaV virtualization solution. DeltaV Virtual Studio supports virtualization of DeltaV software releases v12.3.1, v13.3.1, v14.LTS, v14.FP1 and v14.FP2.

Benefits

DeltaV virtualization made easy: An integrated virtualization environment makes it easy to create and maintain virtual DeltaV systems without IT virtualization expertise. Easily create DeltaV workstations and virtual control hardware in a fully supported DeltaV virtualization environment.

Increased flexibility and productivity: Easily setup and maintain multiple systems for control development, testing and training. Support multiple systems, on multiple software releases, with the same virtualization hardware. Easily save and restore virtual control systems for more cost effective troubleshooting, making modifications to existing applications, or operator training.

Fewer computers and control hardware: Consolidate workstations on host servers to reduce computer hardware, installation and maintenance costs. For off-line systems, utilize virtual controller, safety logic solver, and CHARMS IO card simulation to reduce the control hardware required for development and testing. Less hardware also means smaller footprint and energy consumption.

Extended system life with easy upgrades: Extend the life of your existing legacy DeltaV system with easy replacement of obsolete workstations with new virtualization hardware. DeltaV software upgrades are also made easier with automated upgrade wizards using virtual machine templates. In a DeltaV virtual environment you can update hardware and software independently, providing flexibility in scheduling upgrades.

High availability and disaster recovery: Virtualization can improve availability by reducing the Mean Time To Recovery (MTTR) for workstations with automatic failover enabled. Virtual machines are easily reassigned to backup host computers, and may be automatically restarted when implemented in a high availability virtual environment. Virtual machine images can also be automatically backed up to remote host servers for fast disaster recovery. A disaster recovery system also makes it easier to upgrade hardware or perform planned repairs.

Product Description

DeltaV Virtual Studio is an integrated DeltaV application environment designed for easy implementation and management of virtual DeltaV control systems for both off-line and on-line production systems.

Typical DeltaV Virtual Studio Applications

Operator Training Systems

Virtualization is ideal for operator training systems (OTS). These systems typically do not include controller or IO hardware and use workstation PC's for operator consoles, application stations, and process control simulators. Figure 1 shows a typical operator training configuration using DeltaV Simulate Multi- node with a ProfessionalPLUS (PPN), 4 Operator Stations (OSN), 3 Application Stations (ASN), and a process simulator (Mimic™).

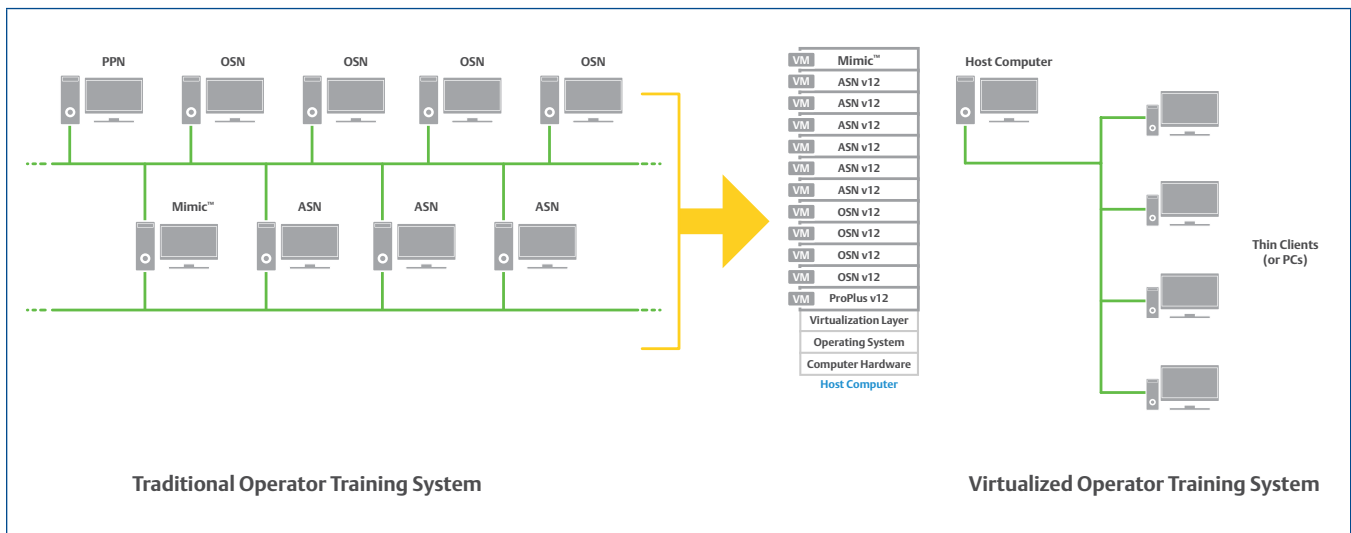


Figure 1 – Example Operator Training System.

With virtualization, all of the OTS computers run as virtual machines in one or more host computers. This capability is particularly useful because training systems often are needed to support multiple process units and different versions of DeltaV. Unique virtual machines (VMs) can be created for these different units and control systems. The VMs can then be activated in the host computer when needed, allowing the same computer hardware to be used for multiple OTS applications.

Development and Test Systems

As with OTS systems, a development and test system can have all the DeltaV workstations virtualized on one or more host computers. With development and test systems however, it is important to checkout the IO assignments, a task traditionally performed with actual controllers and IO cards, or simulated IO via a Virtual IO Module (VIM) card. The virtualized DeltaV workstations can communicate on the DeltaV network to actual controllers and I/O hardware or alternatively to virtual hardware controllers and IO subsystems. The virtual controllers and IO subsystems enable development and testing systems without physical control hardware. *For more information, see the product data sheets for Virtual CHARMS IO Card Simulation, Virtual Ethernet IO Card, and Virtual Machine Controller Simulation.*

DeltaV Virtual Studio makes it possible to support multiple DeltaV development / test systems using common computer hardware. This can be a significant savings and flexibility advantage for central engineering departments and project teams.

Figure 2 shows a typical development / test system configuration using DeltaV Simulate Multi-node with a ProfessionalPLUS (PPN), 1 Application Station (ASN), 1 Professional Station (PSN), 2 Operator Stations (OSN), 2 virtual CHARMS IO Cards, 2 virtual S-series controllers, and a process simulator (Mimic).

Starting with DeltaV v13.3, you can also create virtual machines for development and testing of DeltaV SIS with Electronic Marshalling, and DeltaV Virtual Ethernet I/O Cards. For DeltaV SIS, virtual machine templates are available for the SZ controller, Charms Smart Logic Solver (CSLS) and Local Safety Network Bridge (LSN). For more information, see the product data sheets for DeltaV SIS with Electronic Marshalling – Virtual Simulation, and DeltaV Virtual Ethernet I/O Card for Real-Time Smart Device Control/Data Integration and Simulation.

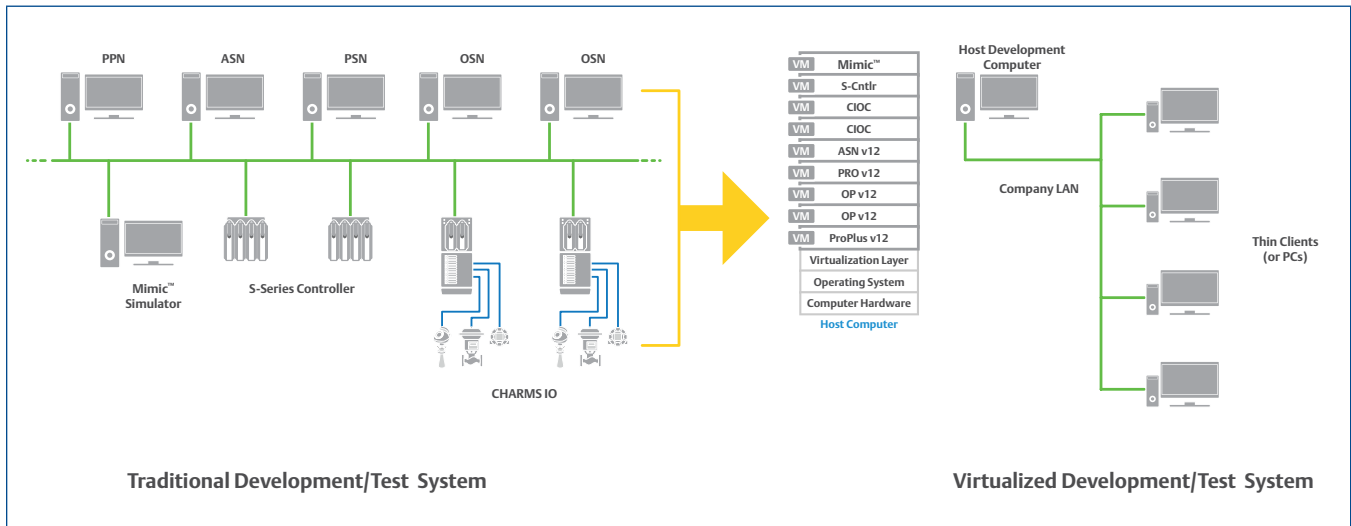


Figure 2 – Example DeltaV Development/Test System.

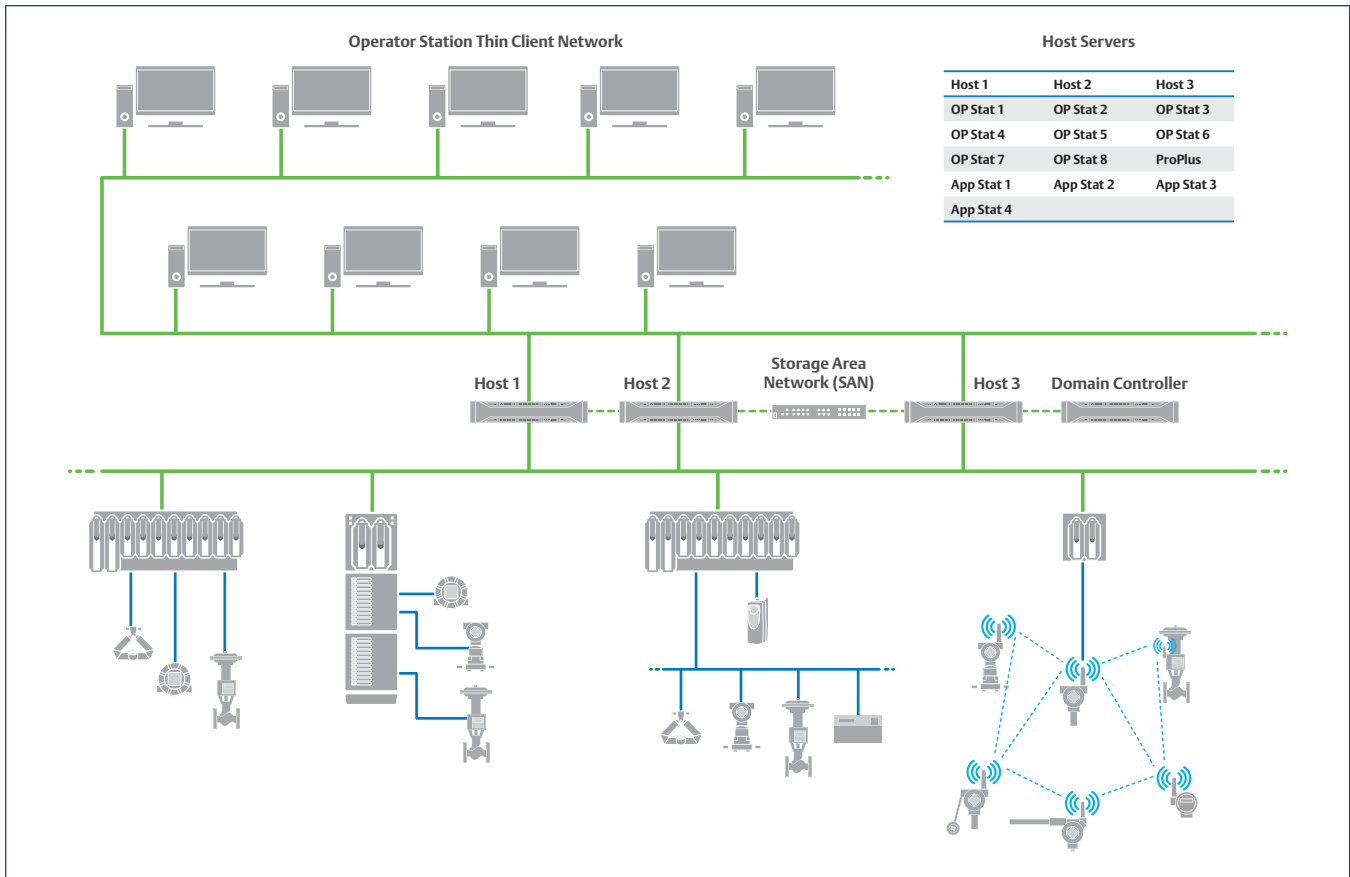


Figure 3 – Example DeltaV Virtualization for on-line production system.

On-line Production Systems

DeltaV Virtual Studio also supports virtualization of DeltaV workstations in on-line production systems such as shown in Figure 3. In this example, virtualization allows you to consolidate 13 workstations into three host servers. For on-line applications, it is recommended to implement high availability with a failover cluster and shared Storage Area Network (SAN) device. With high availability enabled, DeltaV Virtual Studio can automatically move virtual DeltaV workstations to an alternate host in the event of primary host failure. Redundant thin client networks and thin clients with quad monitors are also supported. Redundant applications (e.g., for Batch Executive or OPC Server) are also supported on Application Stations assigned to separate host computers.

DeltaV Virtual Studio Product Features

DeltaV Virtual Studio is designed to make it easy to create and manage virtual DeltaV systems. Most virtualization management software is complicated because the tools are generalized to support many different applications and markets. DeltaV Virtual Studio is designed specifically for virtualization of process control systems and has a workflow and feature set which is easy to use and understand by the typical process control engineer.

DeltaV Virtual Studio puts all the virtualization functionality you need into a simple DeltaV application. You can:

- Create virtual networks and add host computers.
- Create, start, stop and move DeltaV VMs.
- Allocate resources and define failover scenarios.

Logical and Physical VM Assignments

DeltaV control systems have both a physical and logical orientation, allowing control modules to be assigned to both logical plant areas and physical control hardware. DeltaV Virtual Studio also supports a logical and physical paradigm which allows you to assign your DeltaV virtual machines to both physical host computers and logical groups or plant areas. Physical assignments make it easy to allocate your VMs across multiple hosts and move VMs between hosts for resource load allocation and high availability. Logical group assignments allow you to easily manage and distribute physical resources used for specific process units or plant areas. Figure 4 illustrates the logical orientation within DeltaV Virtual Studio.

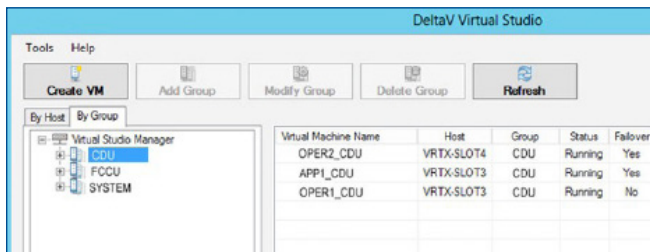


Figure 4 – DeltaV Virtual Studio Logical Grouping.

DeltaV Virtual Machine Templates

DeltaV Virtual Studio also makes virtualization easy by using DeltaV virtual machine templates. These templates allow you to add virtual workstations and controller hardware (for off-line use) from a single configuration dialog (see Figure 5). With a few clicks you can easily create a new DeltaV workstation without additional software installation.

A DeltaV template is a virtual machine with the operating system and DeltaV software fully installed. The virtual machine is then generalized to remove specific DeltaV and network configuration information. To create a new DeltaV VM, DeltaV Virtual Studio completes the DeltaV workstation configuration, creates network connections and adds the VM to the selected DeltaV network.

DeltaV VM templates are available for DeltaV versions v13.3.1, v14.LTS, v14.FP1 and v14.FP2. VM templates for Operator, Professional, Maintenance, Application Station, Zone, and Terminal Servers are pre-built with DeltaV software preinstalled and network connections pre-defined. DeltaV ProfessionalPlus virtual machines use VM templates with automatic software installation and domain creation as specified. DeltaV Virtual Studio also supports automatic creation of DeltaV Independent Domain Controller VMs starting in DeltaV v14.3. AMS server workstations may be created from

VM templates but require some manual software installation. AMS client software may be automatically installed on any DeltaV workstation during VM creation.

DeltaV Remote Clients using Microsoft Terminal Services are also supported using DeltaV server VM templates. DeltaV Remote Client sessions provide the same functionality as DeltaV Operator and Professional Stations but enables multiple sessions using a single server operating system VM. The recommended architecture for full-time operator workstations uses single client desktop machines (e.g., Windows 10 VMs).

DeltaV Remote Clients sessions may also be used for full-time operator stations with the understanding that multiple session on a common server OS have inherent dependency risks. These risks may be minimized by utilizing DeltaV Virtual Studio High Availability and limiting the number of sessions per server OS. For more information, see the DeltaV Remote Client product data sheet.

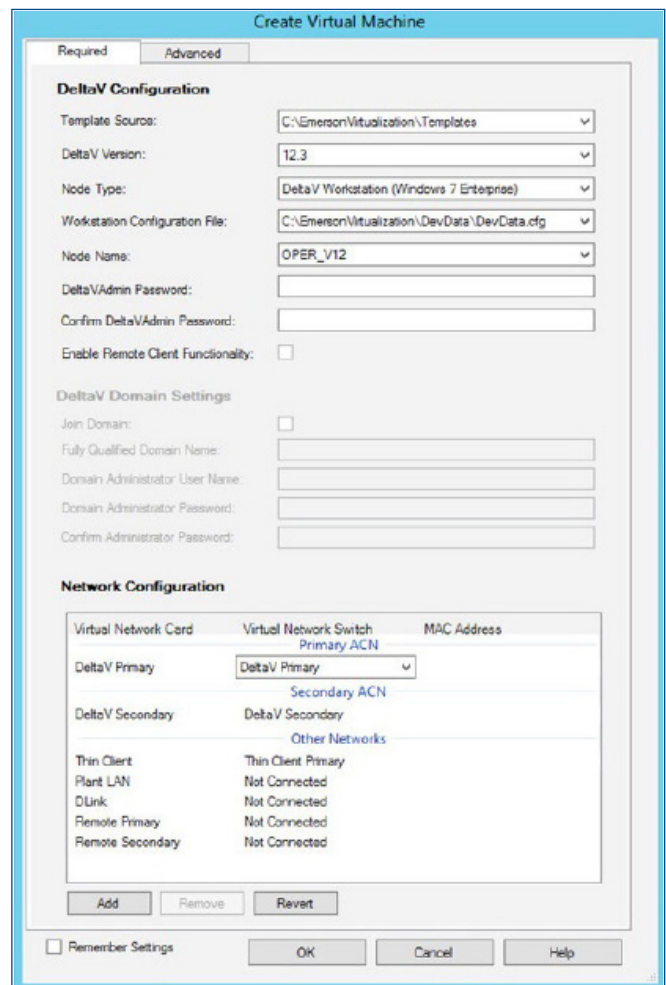


Figure 5 – Example VM Template Dialog.

All DeltaV templates include standard DeltaV release software. Additional hotfixes and OS updates are applied to the DeltaV VMs after instantiation as required.

Customized VM Templates

DeltaV Virtual Studio enables you to create customized VM templates for Windows based virtual machines. After creating a VM with the standard VM templates, you may apply all DeltaV hotfixes and OS updates and create a new customized VM template which can be used for new VM creation. This saves time because you do not have to reapply the same hotfixes and OS updates to each new VM.

Control and SIS Hardware VM Templates

VM templates for control hardware are also available for DeltaV S-series controllers, M-series controllers, PK controllers, CHARMS IO cards, and Ethernet IO cards. These templates are for off-line simulation use only. *For more information, see the product data sheets for DeltaV Virtual Machine Controller Simulation, Virtual CHARMS IO Card Simulation, and Virtual Ethernet IO Card.*

Starting with DeltaV v13.3, VM templates are also available for DeltaV SIS with Electronic Marshalling, including SZ controller, Charms Smart Logic Solver (CSLS) and Local Safety Network Bridge (LSNB). *For more information, see the product data sheets for DeltaV SIS with Electronic Marshalling – Virtual Simulation.*

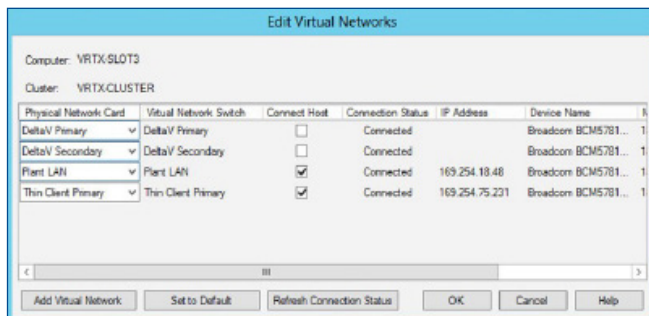


Figure 6 – Easy Network Configuration.

Easy Network Connections

DeltaV Virtual Studio makes it easy to create and manage DeltaV virtual networks. With DeltaV Virtual Studio you can simply add a virtual network to a host server, associate it with a DeltaV system and network device (if externally connected) and you are ready to add DeltaV virtual machines. Multiple DeltaV networks are supported for virtualization environments that encompass multiple systems.

DeltaV virtual machines are easily added to a DeltaV network because their templates come with predefined DeltaV network connections. A simple drop down menu allows you to connect a virtual DeltaV machine to its respective DeltaV network. Figure 6 illustrates DeltaV VM network connections.

Easy DeltaV Updates

DeltaV Virtual Studio makes it easy to upgrade workstations and servers to the latest release of DeltaV. Upgrades can be performed from both existing virtual environments and traditional physical environments. DeltaV Virtual Studio has integrated DeltaV's Upgrade Wizard to automatically capture network and configuration data from existing machines, and inject this information into new VMs created from templates. This saves you time normally required for manual data transfer and software installation. Upgrades are supported for the prior two major DeltaV releases (e.g., you may upgrade to v14.LTS or v14.FP1 from v12.3.1 or v13.3.1)

High Availability and Disaster Recovery

For on-line production control systems, fast recovery from system failures is important to insure maximum uptime. DeltaV Virtual Studio supports both High Availability (HA) and Disaster Recovery (DR) features to maximize reliability and minimize the Mean Time To Recovery (MTTR) after a failure.

High Availability and Disaster Recovery are recommended for all on-line production systems.

High Availability includes automatic failover of virtual machines from a primary host to a secondary host in the event of primary host failure. High availability is implemented using a server failover cluster and shared storage (e.g., Storage Area Network – SAN).

When a host failure occurs, DeltaV Virtual Studio automatically moves the virtual machines that were running on the failed host, to a specified secondary host. The virtual machines are automatically started on the secondary hosts if desired.

DeltaV Virtual Studio also supports Live Migration of the VMs from one host to another, while the VM is running.

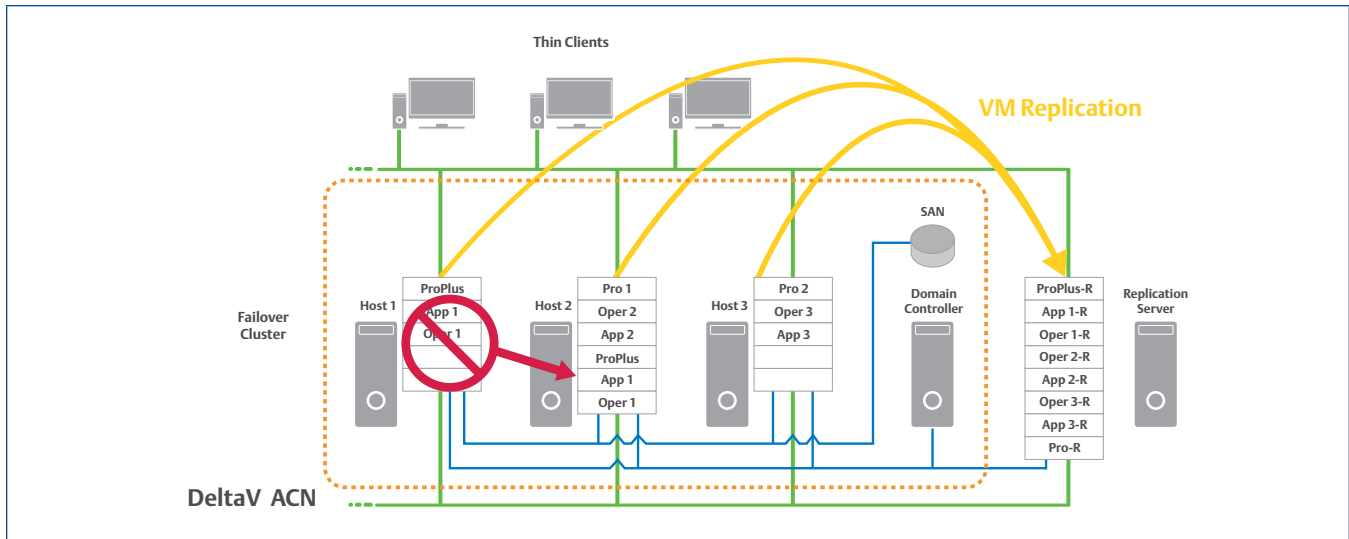


Figure 7 – Example System with High Availability with VM Replication.

DeltaV Virtual Studio also supports disaster recovery with automatic virtual machine snapshot back-ups being saved to a remote backup server. DeltaV Virtual Studio utilizes Microsoft's VM replication which is a standard Windows Server OS feature.

To maximize reliability you can implement both High Availability and Disaster Recovery to take advantage of both failover clusters and VM replication. In this case, High Availability provides very fast recovery from a host failure, and VM Replication protects against a disaster in which the shared network storage or failover cluster fails. Figure 7 illustrates High Availability and Disaster Recovery with three hosts in a failover cluster and an additional replication host server.

Another advantage of a disaster recovery system is easier hardware upgrades and planned equipment repair. For example, in the system shown in Figure 7, you can switch to your replica VMs to perform a SAN upgrade or repair. DeltaV Virtual Studio also supports Live Storage Migration to your replication server for zero downtime of your VMs.

High Availability and Disaster Recovery are supported on individual servers and SAN devices, and in the DeltaV Integrated Hardware Platform for Virtualization utilizing the Dell PowerEdge VRTX. For more information, see the product data sheet for DeltaV Virtualization Hardware.

Figure 8 provides additional architectural details for a typical on-line virtualization configuration for high availability. The recommended architecture includes a secondary host management domain controller which may be implemented on a physical or virtual machine. A Windows Server VM template is available for the virtual host domain controller.

DeltaV Virtualization System Health Alerts

Starting with v3.3, DeltaV Virtual Studio supports virtualization system health alerts within DeltaV. Standard DeltaV alarms can be configured to notify operations and maintenance personnel when there is an abnormal condition in the virtualization hardware or software. Components monitored include host computers, Storage Area Network (SAN), VRTX chassis, host domain controllers, and virtual network communications.

Advanced Virtualization Diagnostics

DeltaV Virtual Studio is implemented using standard Microsoft Windows Hyper-V virtualization technology. Advanced users who want additional virtualization diagnostic features available with Hyper-V, but not exposed with DeltaV Virtual Studio, may use the Hyper-V manager application available with Windows Server OS.

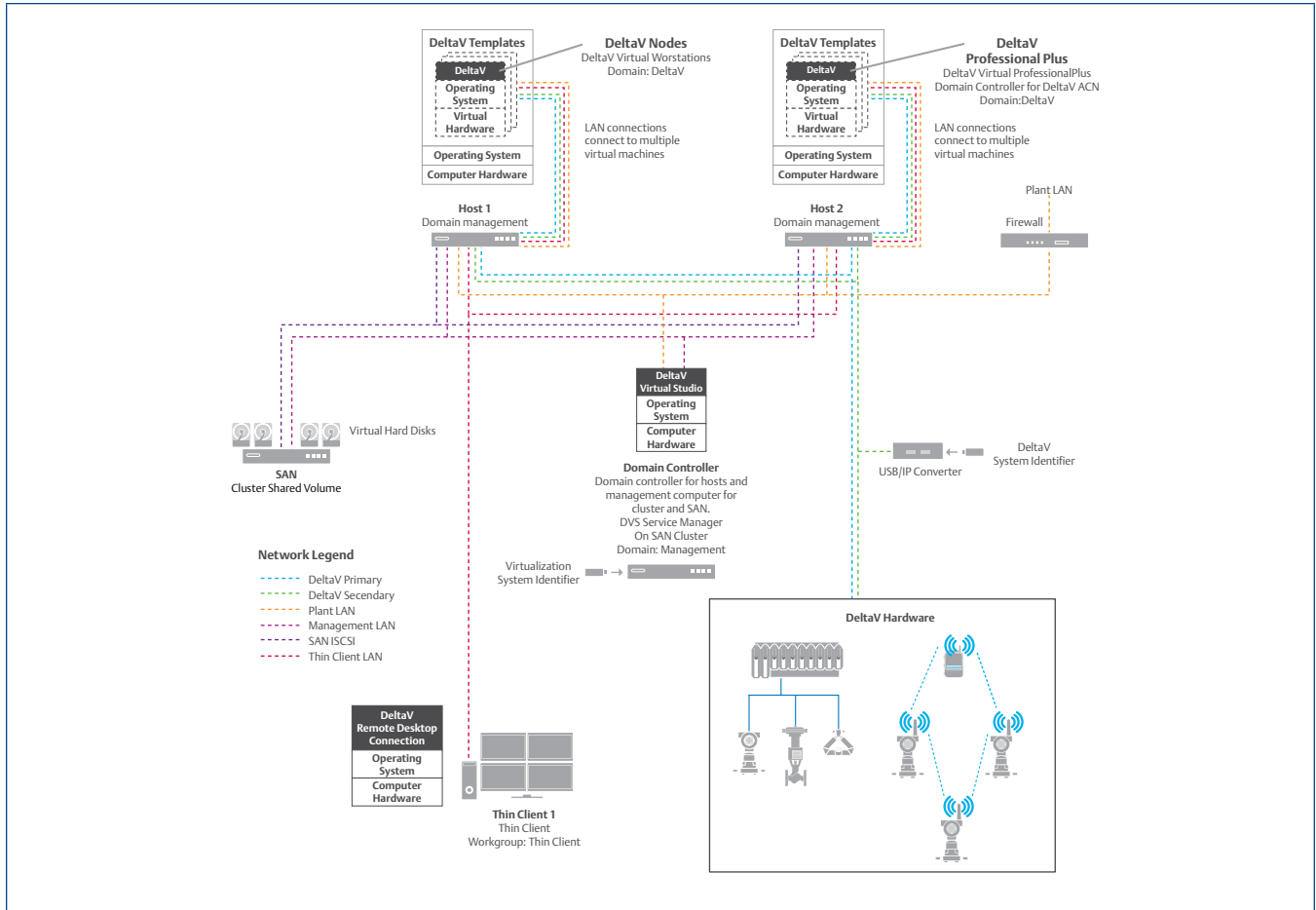


Figure 8 – Example on-line virtualization configuration with High Availability.

Licensing Considerations

DeltaV Virtual Studio is a licensed application that requires a system access key (dongle) and associated license file. The license and dongle are included in the base DeltaV Virtual Studio license bundle. This license and dongle enable DeltaV Virtual Studio across multiple hosts and DeltaV systems within the same virtualization environment, for up to 100 virtual machines. A scale-up license for more than 100 VMs is available.

DeltaV Licenses

A DeltaV system implemented with virtualization requires the same DeltaV licenses that are required for a traditional physical system. For example, you still need licenses assigned to each DeltaV workstation whether they are virtual machines or physical workstations. The DeltaV licenses for DeltaV workstations are tied to a system ID as defined by the system USB access key (dongle). The system access key (dongle) is accessed on a physical DeltaV workstation, or through a USB IP Converter device that is available in the DeltaV Virtualization Hardware product data sheet.

Microsoft Windows OS Licensing

The DeltaV workstations also require Microsoft Windows licenses. The DeltaV Virtual Studio templates include nonactivated Windows operating system software which must be activated with a valid license before use.

Microsoft OS licensing for virtual machines is different for virtual server OS and virtual client OS machines. Virtual server OS machines require a Windows Server embedded OS license for each virtual server OS. Example DeltaV server OS workstations include the: Professional Plus, Application Stations, and Remote Client Terminal Services.

A Microsoft Windows Server 2016 for Embedded Systems Standard licenses is included with the DeltaV Virtual Studio media bundles to cover the first VM created. Additional embedded licenses must be purchased from Emerson. Other licensing types such as Retail, Volume License agreements, and OEM are not compliant when applied to embedded virtual machines. Microsoft Server 2016 VMs are licensed by the number of CPU cores on the host server where they run.

The base 2016 embedded server OS license covers up to 16 cores; additional 4-core add-on licenses are available for hosts with more than 16 cores.

Virtual Windows client OS machines e.g., Windows 10 require a Windows Virtual Desktop Access (VDA) license subscription or Microsoft Software Assurance for each device which is accessing the virtual client machines. A DeltaV Operator workstation is an example of a client OS machine.

VDA subscriptions must be purchased separately from Microsoft or a Microsoft Partner. Proof of a VDA subscription or other valid client access license is required prior to shipment of DeltaV client OS VM templates from Emerson.

Microsoft server Client Access Licenses (CALs) are required for device connections to the host server. For multiple connections to a host server using Remote Desktop Connections, additional Microsoft Remote Desktop Services CALs (RDS CALs) are also required. All thin clients accessing DeltaV virtual machines on a host server will require both CAL and RDS CAL licenses. Microsoft CALs and RDS CALs are available from Emerson or through a direct Microsoft customer license agreement.

Resource Planning Guidelines

Virtual machines require host computer resources and are typically limited by available host CPU or 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 (VMUs) are used to estimate relative CPU loading and host limits. These guidelines are for supported host hardware as specified in the DeltaV Virtualization Hardware product data sheet.

Example 1 – Operator Training System

An operator training system with

- 1 server class ProPlus (2 VMUs)
- 2 server class App Stations (4 VMUs)
- 6 Operator Stations (6 VMUs)

would require 12 VMUs and could all be run in one off-line host computer.

Example 2 – Development Test System

A development / test system with

- 1 server class ProPlus (2 VMUs)
- 2 server class App Stations (4 VMUs)
- 4 Professional Stations (4 VMUs)

- 2 Operator Stations (2 VMUs)
- 10 S-series Virtual Controllers (4 VMUs)
- 30 Virtual CHARMS IO Cards (6 VMUs)

would require 22 VMUs and would need at least two off-line host computers.

Table 1 – Host VM Resource Planning

| Host VM Resource Planning | | |
|--|------|----------|
| VM Class | VMUs | RAM (MB) |
| Workstation OS (e.g., Windows 10) | 1 | 8,192 |
| | 1 | 4,096 |
| Server OS (e.g., Windows Server 2016) | 2 | 16,384 |
| | 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 ¹ | 0.8 | 64 |
| Supported Maximum VMU Limits for Host Servers ^{2,3} | | |
| 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 (=CPU cores x 2) - 1).

Example 3 – On-line Production System

An on-line production system with virtual machines for

- 1 server class ProPlus (2 VMUs)
- 5 server class App Stations (10 VMUs)
- 10 Operator Stations (10 VMUs)

would require 22 VMUs and would need at least three on-line host computers.

Ordering Information

A typical DeltaV Virtual Studio order will consist of the following products:

DeltaV Virtual Studio Base License (i.e., VF1026S002).

DeltaV Virtual Studio Software Media (e.g., VF1049DVS334L39).

DeltaV Virtual Machine templates for a specific DeltaV release (e.g., “VF1049R14LTSL39, VF1049R14TSL39-T and “VF1049R14FP1L39, “VF1049R14FP1L39-T, VF1049R14FP2L39, VF1049R14FP2L39-T).

Microsoft Licenses for Virtual Machine OS and connections.

Server OS licenses for more than the single license provided with templates (e.g., VF1049MS2016).

VM Client Access Licenses (e.g., CALs - VF1049MS5CALs, and RDS CALs - VF1049MS5RDSCALs).

| Description | Model Number |
|--|-------------------|
| DeltaV Virtual Studio (DVS) Base License¹ <ul style="list-style-type: none"> ■ For DVS 3.3.4,v3.3.3, v3.3.2, v3.3.1, v3.3, v2.3.1, v2.3 ■ DVS Licenses: Base license + 100 VM scale-up ■ DVS Access Key (Dongle) | VF1026S002 |
| DeltaV Virtual Studio (DVS) – 100 VM Scale-up License <ul style="list-style-type: none"> ■ For DVS 3.3.4, v3.3.3, v3.3.2, v3.3.1, v3.3, v2.3.1, v2.3 | VF1026UPS100 |
| DeltaV Virtual Studio (DVS) v3.3.4 Software Media <ul style="list-style-type: none"> ■ Includes support for High Availability and Disaster Recovery ■ Includes installation DVD for MS Hyper-V Server 2016 ■ Supports Dell PowerEdge VRTX platform | VF1049DVS334L39 |
| DeltaV Virtual Studio (DVS v3.3.4) Templates – v14.FP2 Media, English² <ul style="list-style-type: none"> ■ v14.FP2 VM server templates ■ v14.FP2 VM Controllers (S, M, and PK), CIOC, CSLs, LSNB, EIOC templates (DVS and VMware) ■ MS Windows Server 2016 OS Embedded License (16 core with 5 server CALs) (includes single license which covers 2 VMs) | VF1049R14FP2L39 |
| DeltaV Virtual Studio (DVS v3.3.4) – VM Client Templates – v14.FP2 Media, English³ | VF1049R14FP2L39-T |
| DeltaV Virtual Studio (DVS v3.3.4) Templates – v14.FP1 Media, English² <ul style="list-style-type: none"> ■ v14.FP1 VM Server Templates ■ v14.FP1 VM Controllers (S, M and PK), CIOC, CSLs, LSNB, EIOC templates (DVS and VMware) ■ MS Windows Server 2016 OS Embedded License (16 core with 5 server CALs) (includes single license which covers 2 VMs) <p><i>Note: v14.FP1 templates will be seen as v14.3.1 FP1 on media and DVS drop-down menus</i></p> | VF1049R14FP1L39 |
| DeltaV Virtual Studio (DVS v3.3.4) – VM Client Templates – v14.FP1 Media, English³ <p><i>Note: v14.FP1 templates will be seen as v14.3.1 FP1 on media and DVS drop-down menus</i></p> | VF1049R14FP1L39-T |
| DeltaV Virtual Studio (DVS v3.3.4) Templates – v14.LTS Media, English² <ul style="list-style-type: none"> ■ v14.LTS VM server templates ■ v14.LTS VM Controllers (S, M, and PK), CIOC, CSLs, LSNB, EIOC templates (DVS and VMware) ■ MS Windows Server 2016 OS Embedded License (16 core with 5 server CALs) (includes single license which covers 2 VMs) <p><i>Note: v14.LTS templates will be seen as v14.3.1 on media and DVS drop-down menus</i></p> | VF1049R14LTSL39 |
| DeltaV Virtual Studio (DVS v3.3.4) – VM Client Templates – v14.LTS Media, English³ <p><i>Note: v14.LTS templates will be seen as v14.3.1 on media and DVS drop-down menus</i></p> | VF1049R14LTSL39-T |

| Description | Model Number |
|--|-------------------|
| DeltaV Virtual Studio (DVS v3.3.4) Templates for Control Hardware Only (Media)⁴ <ul style="list-style-type: none"> ■ v14.FP2, v14.FP1, v14.LTS Virtual CIOC templates ■ v14.FP2, v14.FP1, v14.LTS S-series/M-series VM Controller templates ■ v14.FP2, v14.FP1, v14.LTS SZ Controller, CSLS, LSNB, and EIOC VM templates ■ v14.FP2, v14.FP1, v14.LTS PK VM Controller template ■ All VM templates are provided for DVS and VMware <i>Note: All v14.LTS templates will be seen as v14.3.1 and v14.FP1 will be seen as V14.3.1 FP1 on media and DVS drop-down menus</i> | VF1049S006 |
| DeltaV Virtual Studio (DVS v3.3.x) Templates – V13.3.1 Media (for Server 2016), English² <ul style="list-style-type: none"> ■ v13.3.1 VM server templates (for Server 2016) ■ v13.3.1 VM Controller, CIOC, CSLS, LSNB, EIOC templates (DVS and VMware) ■ MS Windows Server 2016 OS Embedded License (16 core with 5 server CALs) (includes single license which covers 2 VMs) | VF1049R1331BL39 |
| DeltaV Virtual Studio (DVS v3.3.x) – VM Client Templates – v13.3.1 Media (for Windows 10), English³ | VF1049R1331BL39-T |
| DeltaV Virtual Studio (DVS v3.3.3) Template – Host Management VM (for Server 2016) – Software Media <ul style="list-style-type: none"> ■ VM template for DVS backup domain controller on MS Windows Server 2016 ■ MS Windows Server 2016 OS Embedded License (16 core with 5 server CALs) | VF1049S003 |

| Microsoft Licenses | Model Number |
|--|------------------|
| Microsoft Windows Server 2016 License - 16 cores (supports 2 VMs)⁶ <ul style="list-style-type: none"> ■ Includes 5 server Client Access Licenses (CALs) (For use with DeltaV v13.3.1 and v14.3.1) | VF1049MS2016 |
| Microsoft Windows Server 2016 License - 4 Core Add-on⁶ (For use with DeltaV v13.3.1 and v14.3.1) | VF1049MS216UPS |
| Microsoft Client Access License for Server 2016 (CAL) – 5 CALs⁵ | VF1049MS5CALs |
| Microsoft Remote Desktop Service Client Access License for Server 2016 – 5 RDS CALs⁵ | VF1049MS5RDSCALS |

Ordering Information Notes

Note 1 – The DeltaV Virtual Studio base license provides the virtualization licenses only; DeltaV node licenses (e.g., ProPlus, Operator, Application, Virtual CIOC, etc.) are not included. A USB IP converter device must also be purchased to access the DeltaV system access key (dongle). For more information on the USB IP converter, see the product data sheet for DeltaV Virtualization Hardware.

Note 2 – The DeltaV Virtual Studio templates are ordered for each specific DeltaV release (e.g., v14.LTS). You must also order a DeltaV Virtual Studio Base License and DeltaV Virtual Studio media to run your DVS software.

Note 3 – DeltaV VM client templates for Windows 10 workstations (for Operator and Professional Stations) are ordered with DeltaV Virtual Studio software. Proof of a valid Microsoft license (e.g., Virtual Desktop Access “VDA” subscription) for these templates is required prior to delivery.

Note 4 – The Control Hardware VM Templates do not include the Control Hardware VM node licenses which must be ordered separately. If you plan to use these templates with DeltaV Virtual Studio, you must also order a DeltaV Virtual Studio Base License and DeltaV Virtual Studio media to run your DVS software.

Note 5 – Microsoft Windows Server 2016 CALs and RDS CALs may be downgraded for Server 2008 and 2012 client access.

Note 6 – These are Windows Server 2016 licenses for Embedded Systems Standard.

Related Products

- **DeltaV System Health Monitoring.** Provides centralized monitoring of your DeltaV virtualization and control system(s) assets. Continuous automated health monitoring eliminates manual health checks and reduces downtime – enabling effective use of plant maintenance resources. See System Health Monitoring service data sheet for more information.
- **DeltaV Virtual Ethernet IO Card.** For off-line use, the virtual EIOC provides access to data from smart field devices that use Modbus TCP, EtherNet/IP, and EIC61850. For more information, see product data sheet for DeltaV Virtual Ethernet I/O Card.
- **DeltaV Virtual CHARMS IO Card Simulation.** Support simulation of process IO using virtual CHARMS IO cards running in a workstation PC. Virtual CHARMS IO cards provide the same simulation capability as real CHARMS IO cards and can be used for rigorous checkout of IO assignments, operator displays, and control functionality. Available for both DeltaV Virtual Studio and VMware environments. For more information, see product data sheet for DeltaV Virtual CHARMS IO Card Simulation.
- **DeltaV Virtual Machine Controller Simulation.** For off-line use, virtual hardware controllers provide an effective way to checkout control configuration and IO assignments prior to commissioning. The virtual controllers can be named and configured the same as real controllers so that no configuration changes or module reassignments are required. S-series, M-series, and PK controllers are supported and available for both DeltaV Virtual Studio and VMware environments. For more information see product data sheet for DeltaV Virtual Machine Controller Simulation.
- **DeltaV SIS with Electronic Marshalling – Virtual Simulation.** For off-line use, virtual SIS control hardware provides an effective way to checkout safety logic configuration prior to commissioning. Virtual machines are provided for SZ controller, CSLS, and LSNB for DeltaV v13.3 and later. For more information see product data sheet for DeltaV SIS with Electronic Marshalling – Virtual Simulation.

- **DeltaV Virtualization Hardware.** Rigorously tested and supported computer and peripheral devices for use with DeltaV Virtual Studio. An integrated hardware platform is available using Dell PowerEdge VRTX blade server with shared storage. Individual hardware components available include host servers, storage area network (SAN), thin clients, network switches, and related hardware required for DeltaV Virtualization. For more information, see product data sheet for DeltaV Virtualization Hardware.

Recommended Training

- **DeltaV - Virtualization - 7029**
This 4-1/2 day course focuses on the installation, configuration and system administration of a virtualized DeltaV distributed control system. Using a combination of lectures and workshops students will learn skill sets that enable them to properly plan, implement and maintain a robust DeltaV Virtual Studio (DVS) system intended for online (production) use. A key objective of this course is to prepare students for all aspects of owning a DVS system with special emphasis on providing highly available, reliable and secure access for end users of the DVS system.
- **DeltaV - Virtualization Administration - 7028**
This 3 day DeltaV Virtualization course focuses on the various software that is used in the management of a DeltaV Virtualization environment. Students will engage in workshops that will reinforce the material discussed to successfully run and maintain a Virtualized DeltaV system.
- **DeltaV - I.T. for Automation Personnel - 7023**
This 3-day course will provide students with a set of essential information technology (I.T.) skills required to successfully setup, maintain, and troubleshoot a DeltaV distributed control system using a combination of lecture and hands-on workshops. For many, the increase in adoption of technologies such as virtualization, cybersecurity, business system integration, and complex networking demand a new set of skills. This course will distill the core learnings and techniques required from the I.T. toolkit, providing a targeted launch point for process control engineers, instrumentation/electrical technicians, I.T. staff, and others whose responsibilities require them to adopt and successfully use these technologies. After attending, students will be prepared to dive deeply into these technologies by attending other higher-level courses.

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