



EMERSON EXCHANGE 2025

# ACCELERATING INNOVATION



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# Demystifying DeltaV Virtualization with HCI and Network Infrastructure

*Session 3-1861*

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Product Marketing Manager, Emerson



# Agenda

## **DeltaV Virtualization**

**Product Overview**

**DVS Roadmap**

**Smart Strategies**

## **DeltaV Smart Switches**






**New DeltaV Smart Switches Overview**

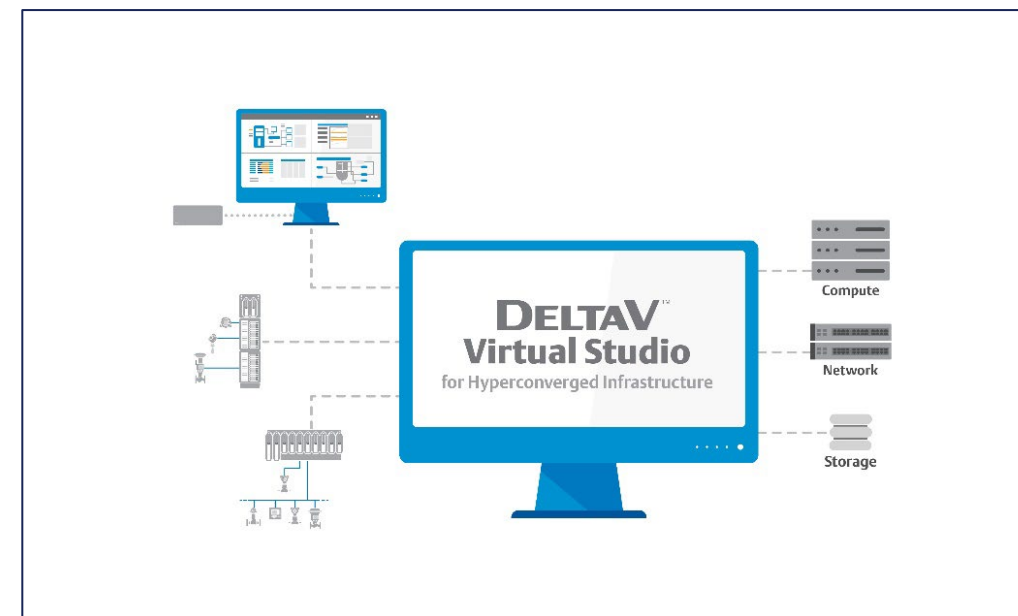
**HiOS and NDCC Updates**

**References and Additional information**

# DeltaV Virtualization

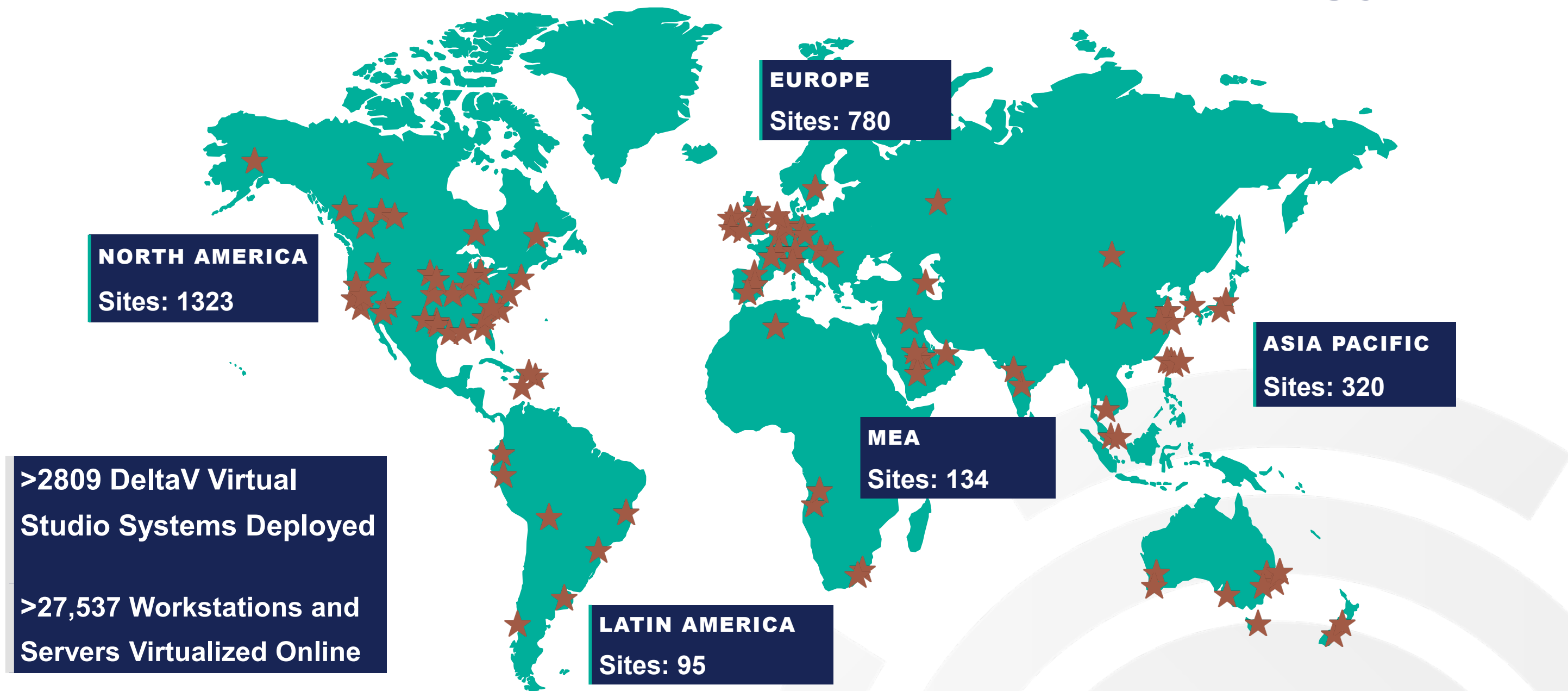
# DeltaV Virtual Studio – Released In 2012

-  Integrated DeltaV Application with enhanced end-to-end automation
-  Out of Box VM Templates for DeltaV workstations, servers and control hardware
-  Reduce risk and minimize downtime with simulation support
-  Significantly reduced hardware footprint
-  Increased system availability



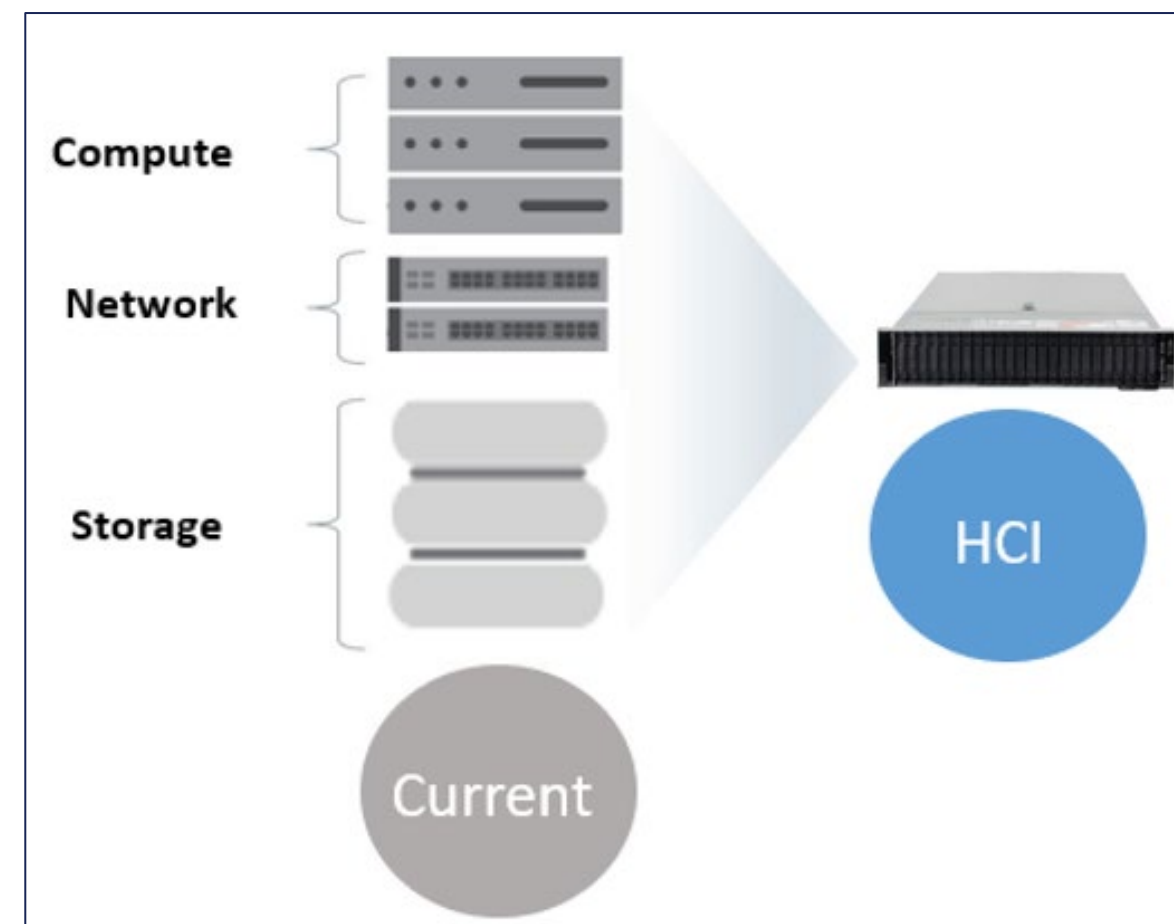
**Virtualization Made Easy**

# DeltaV Virtual Studio – Proven Technology



# DeltaV Virtualization with Hyperconverged Infrastructure

- Generational Advance in Virtualization
- Software-defined, Unified Architecture
  - Storage virtualization
  - Compute virtualization
  - Networking virtualization
  - Advanced management capabilities including automation and operations
- Microsoft Storage Spaces Direct (S2D) - Software-defined storage
  - Automatic mirroring of storage between hosts
  - Storage mirroring Vs. VM replication
  - Set up and manage by DVS
- Reduces Complexity

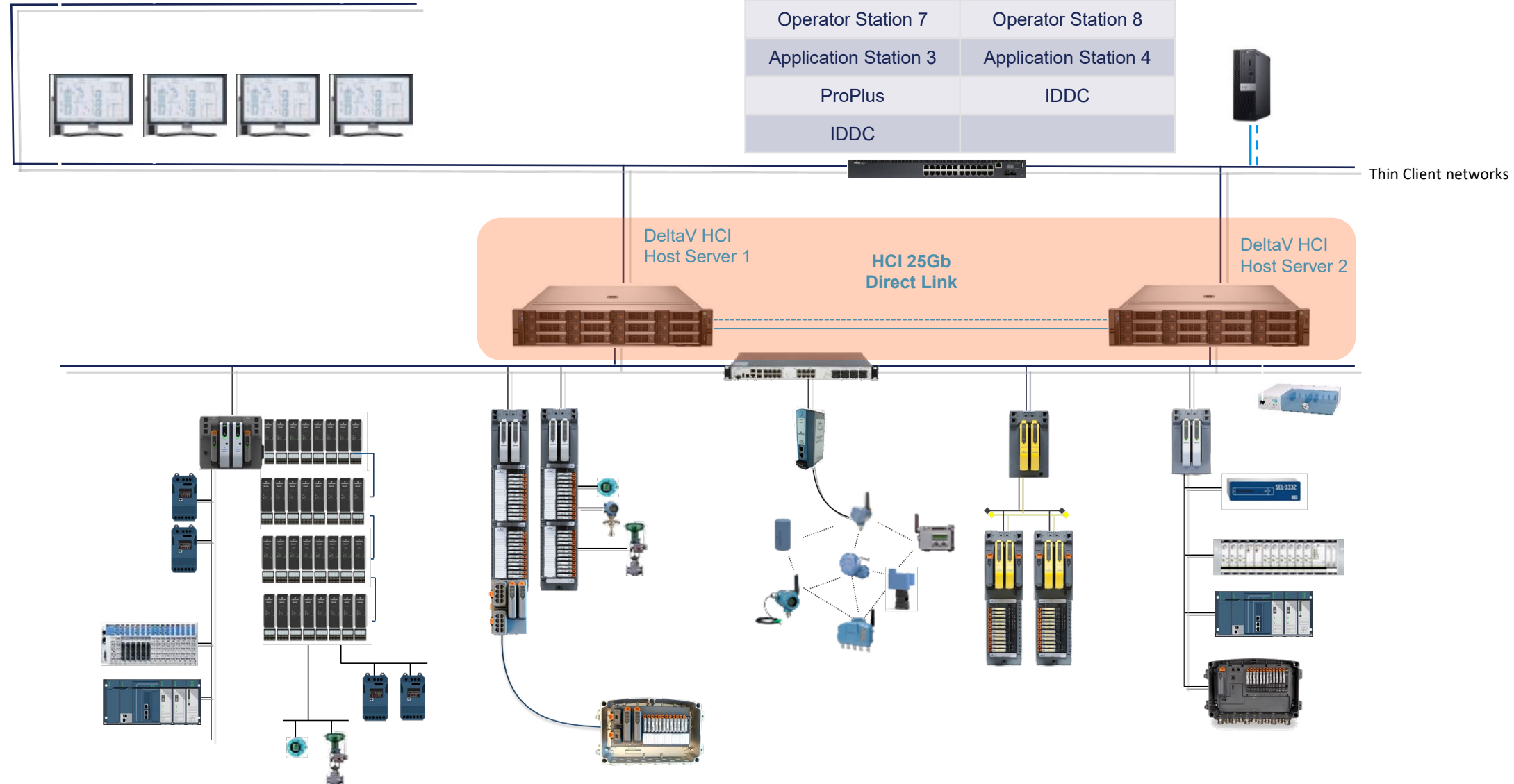


# DeltaV Online Virtualization With Hyperconverged Infrastructure (HCI) HA And DR – 2 Nodes

## Operator Station Thin Clients and Network



Host Server 1	Host Server 2
Cluster DC	Cluster DC
Operator Station 1	Operator Station 2
Operator Station 3	Operator Station 4
Operator Station 5	Operator Station 6
Application Station 1	Application Station 2
Operator Station 7	Operator Station 8
Application Station 3	Application Station 4
ProPlus	IDDC
IDDC	



# DeltaV Online Virtualization With HCI HA And DR – 4 Nodes

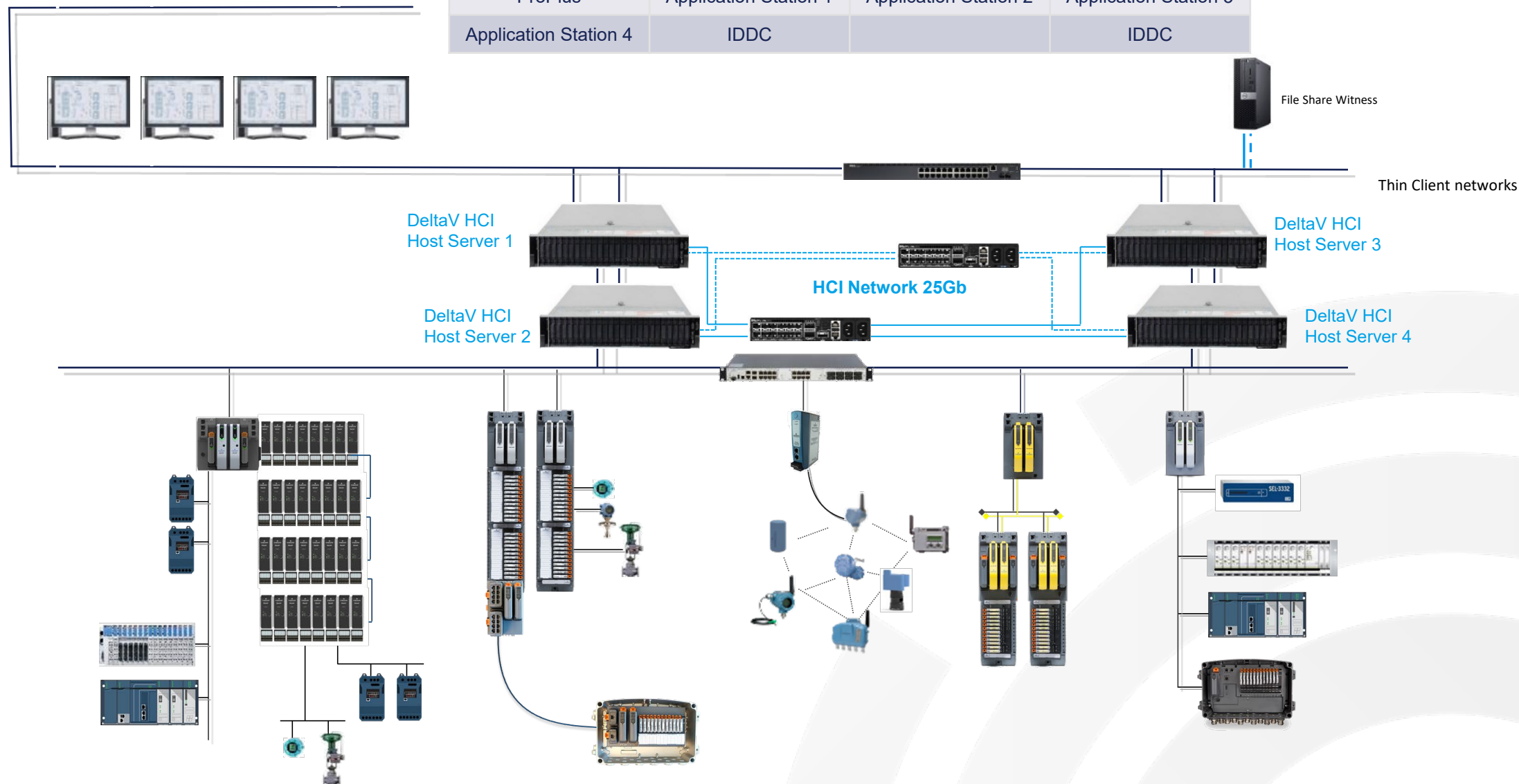
## Operator Station Thin Clients and Network



Host Server 1	Host Server 2	Host Server 3	Host Server 4
Cluster DC		Cluster DC	
Operator Station 1	Operator Station 2	Operator Station 3	Operator Station 4
Operator Station 5	Operator Station 6	Operator Station 7	Operator Station 8
ProPlus	Application Station 1	Application Station 2	Application Station 3
Application Station 4	IDDC		IDDC



File Share Witness

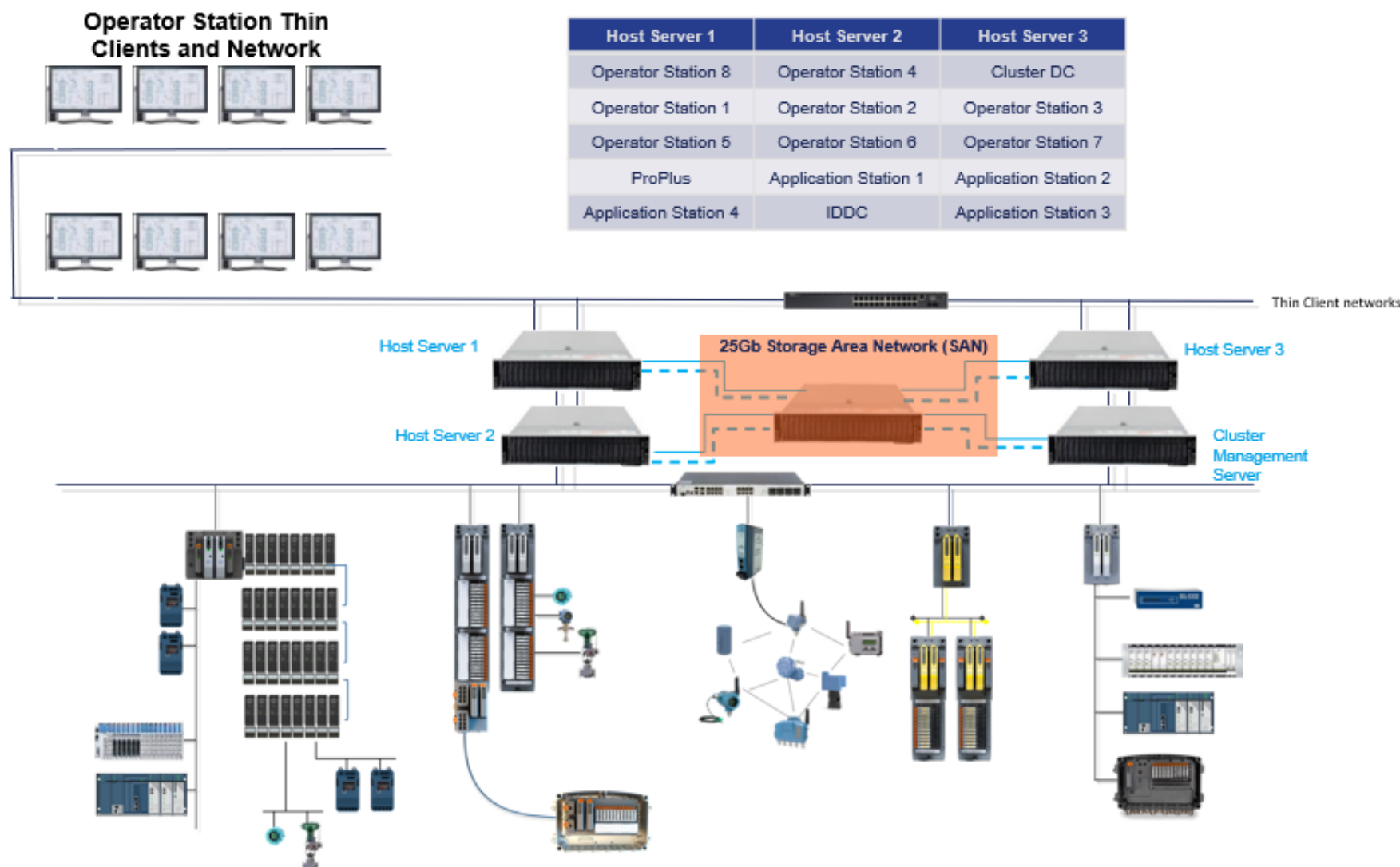


# HCI Virtualization Hardware Summary

- DeltaV HCI Host Servers
  - DeltaV HCI Hosts based on Dell 16G hardware
  - R760 XL; dual 24-core CPUs; 512 GB RAM; increased storage
  - Microsoft Server 2022 Datacenter with S2D technology
- Switches
  - HCI Network Switch
    - 12 25Gb SFP28 ports; DAC, MM and SM Fiber
    - 1U half width rail kit included
  - Thin Client + Host Access Network
    - HIRSCHMANN Greyhound GRS105s
- Thin Clients
  - Pepperl & Fuchs VisuNet BTC22 + BTC24 (Industrial)
  - Amulet Hotkey (DX1550)
  - Lenovo ThinkCentre (M70q)



# Detached Storage Architecture



- ME5024 Storage Array
  - 25Gb iSCSI 8 Port Dual Controller
  - 21TB RAID10 SSD Storage
  - Direct Attach Cable 3m included
- R760 Hosts
  - Dual 24-core CPUs
  - 512 GB RAM
  - Microsoft Server 2022 Standard
- Available with DVS v4.4
- 2, 3 and 4 hosts cluster options

# DeltaV Virtual Studio

# DVS Release Roadmap

**v4.3.0**  
2022

## HCI Automation

- Automated HCI Setup
  - Domain
  - S2D Cluster
  - Switch Configuration
- DVS System Registration
- VRTX and SAN Support

**v4.3.1**  
2023

## v15 Support

- De-coupled from DeltaV Releases
- Soft-key Licensing
- Mixed Microsoft O/S Support

**v4.3.2**  
2024

## Enhanced Automation with Performance Improvements

- Hirschmann Switch Automation
- Improved Network Setup
- Enhanced Diagnostics

**v4.3.3**  
Current

## New HCI Hardware with Best Practices Automation

- Dell 16G hardware support based on R760 XL
- Updated deployment automation with Dell & MS best practices
- Nested Storage Resiliency for 2-Host Clusters

**v4.4**  
2025  
Planned H2

## IQ Support & Licensing Update

- IQ Controller Support
- ME5024 all-SSD SAN
- Term-Based Licensing

# DVS System Registration

The screenshot shows the DeltaV Virtual Studio interface. On the left, a tree view shows the hierarchy: Virtual Studio Manager > DEMOHCICLUSTER > DEMO-HOST1 (with sub-items DEMO-DC1, DEMO-ProPlus, OPERATOR-01) and DEMO-HOST2 (with sub-items APP-01, DEMO-DC2, OPERATOR-02). The main area features a table of hosts and a registration reminder.

Host Name	VM Status	Current Operation	Progress	Action
DEMO-HOST1	VM(s) Running			Shut Down All VMs
DEMO-HOST2	VM(s) Running			Shut Down All VMs

**DVS Registration Reminder**

Upload the latest registration file to Guardian Support once all virtual machines have been created.

The file (\*.epm) on DEMO-HOST1 can usually be found in C:\DVSRegistration. Refer to [DVS help](#) for more information.

Dismiss for 90 days    Remind me next time

**General Information**

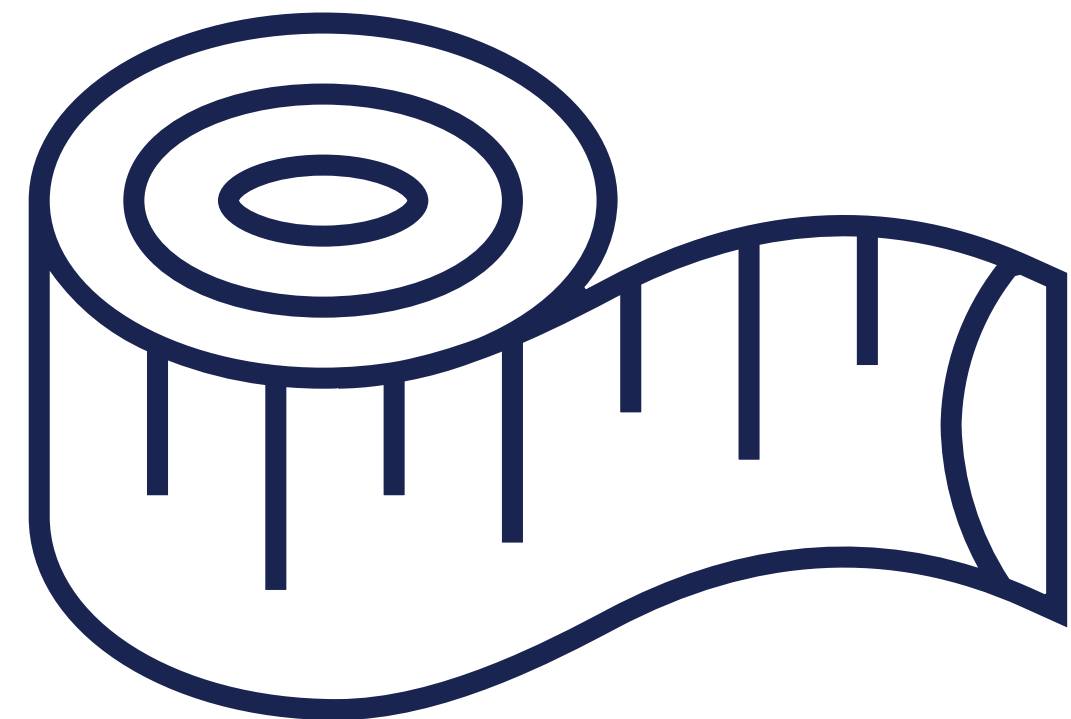
Service Manager Name	DEMO-HOST1
Number of Configured Host	2
Number of Virtual Machines	6
Service Manager NTP Status	Running
Time Master IP Address	10.16.64.124

Current User: democluster\demo\_hci\_admin    Virtual Studio Manager: DEMO-HOST1

# Smart Strategies

# HCI System Design Sizing Guidance

- 1) Determine the number of VMU's required
  - a. 1 VMU per virtualized workstation
  - b. 2 VMU's per virtualized server
- 2) Size the cluster
  - a. Up to 48 VMU's – one 2-host large cluster
  - b. 49 to 96 VMU's – one 4-host large cluster or 2x 2-host clusters (recommended)
  - c. 20 or 50 VM base license + VM scale-ups
- 3) Add Orthogonal Mitigation
  - a. 1 or more Replication hosts
  - b. Replication between HCI clusters



# Orthogonal Mitigation

## What is Orthogonal Mitigation?

- Providing an additional, different method for manual disaster recovery
- Virtual Machine Replication with HCI supported beginning in DVS 4.3.2

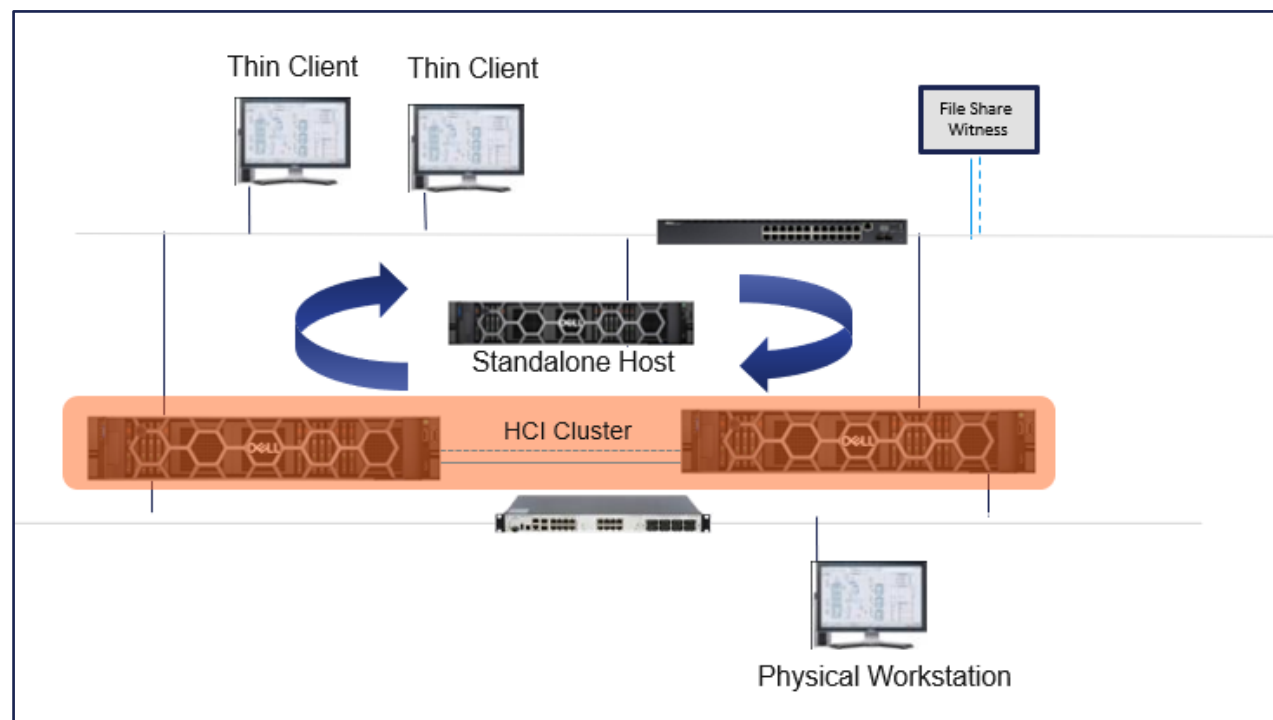
## Supported Options

- Standalone Replication Hosts in addition to HCI Cluster
  - a. 1 or more Replication hosts added outside the HCI Cluster
- Cross-replication between HCI clusters
- Physical workstations on the ACN
  - a. 1 or more physical workstations added outside the HCI cluster

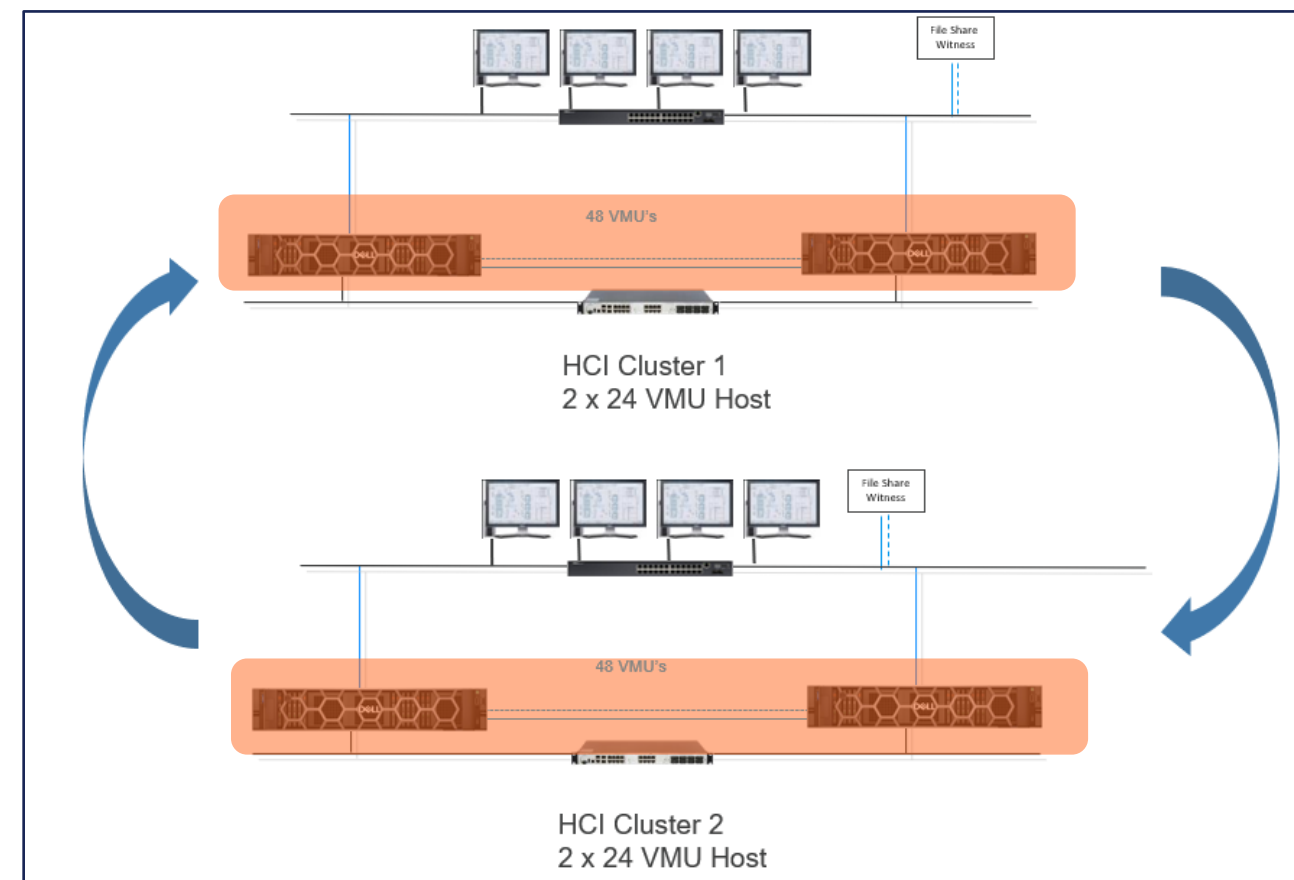


# Orthogonal Mitigation Options

## Standalone Replication Hosts



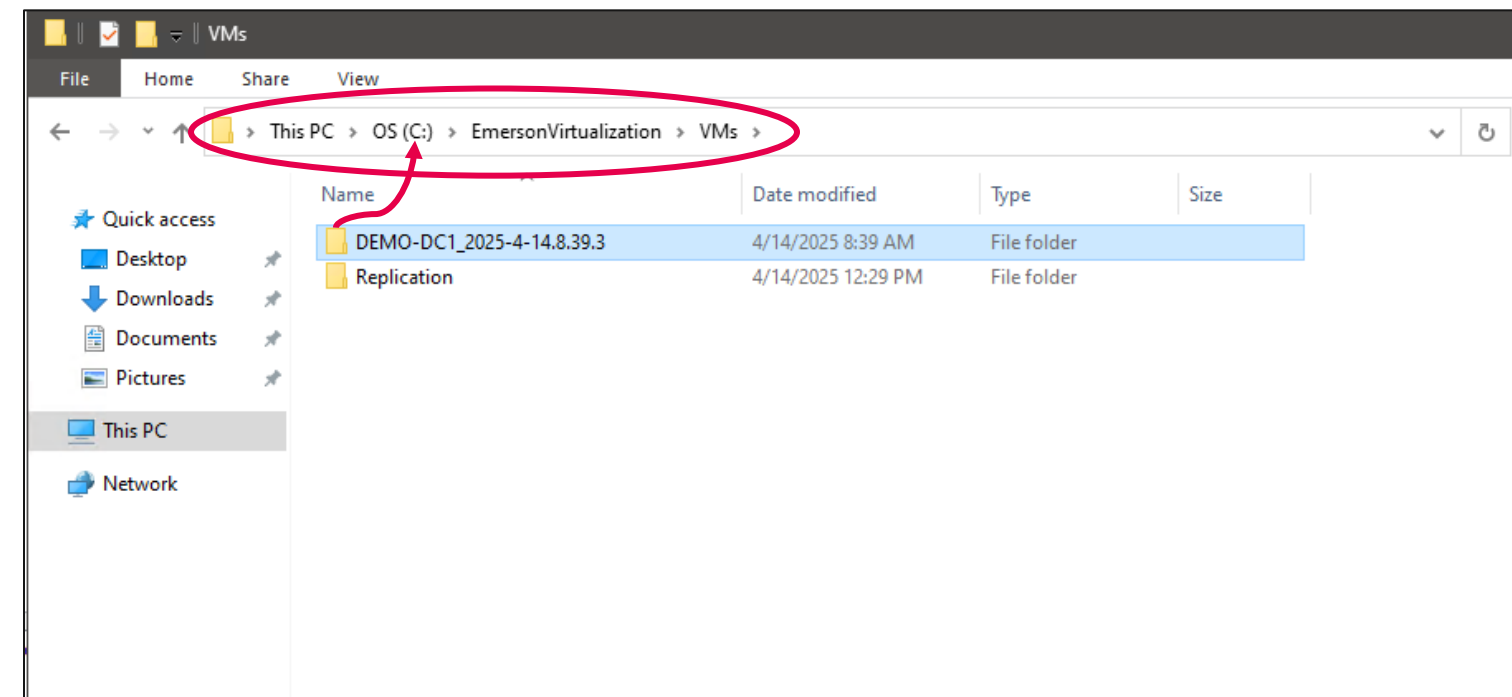
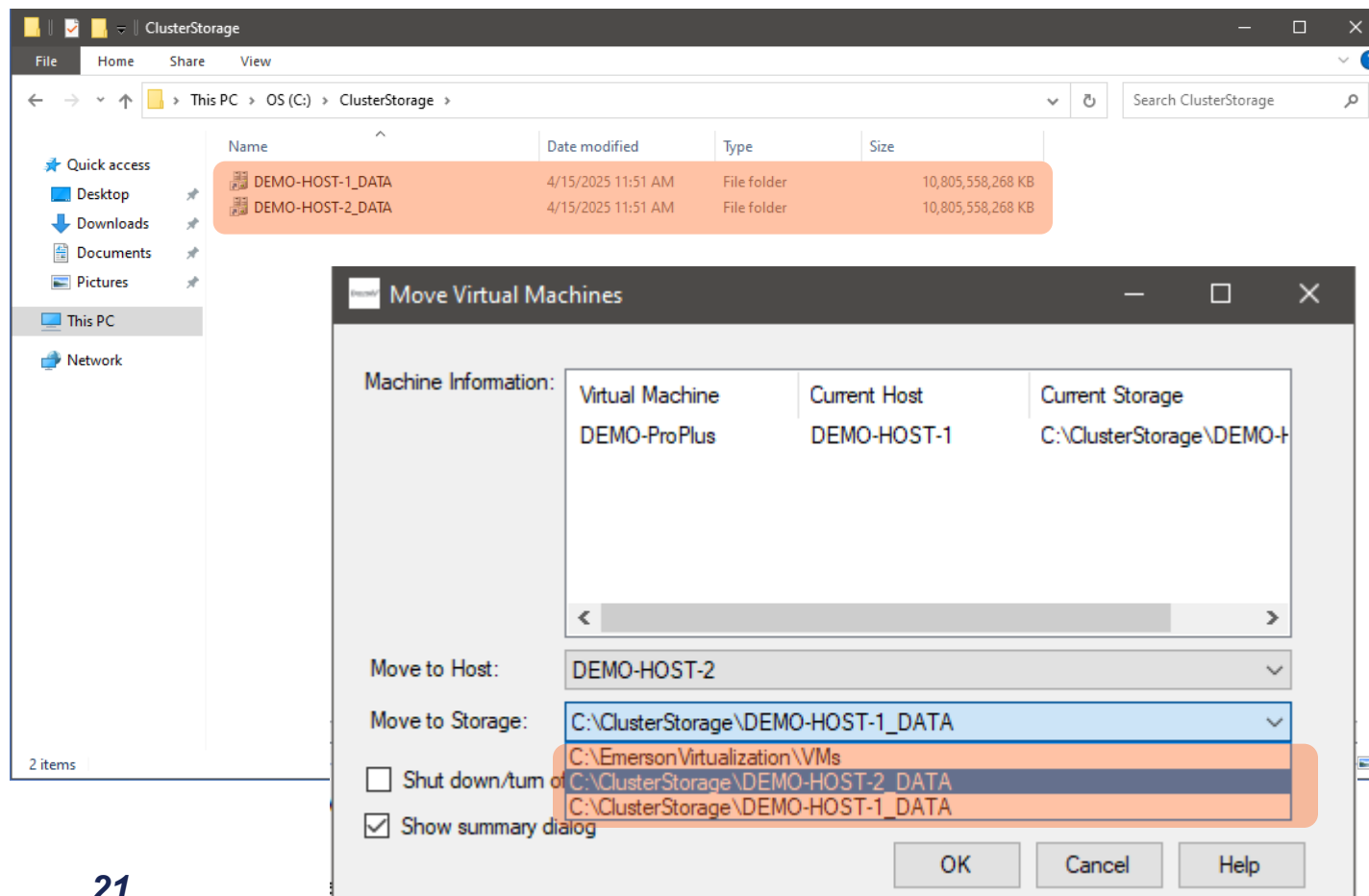
## Replication between HCI Clusters



# Cluster Storage Tips

One CSV per Host, starting with 4.3.3

Virtual Cluster DC is always on the Host



# HCI Health Diagnostics

DeltaV Virtual Studio

Tools Help

Create VM Import VM Edit Virtual Networks **Edit Collection Settings** Remove Host

By Host By Group

Virtual Studio Manager

- DEMOHCICLUSTER
  - DEMO-HOST-1
    - DEMO-DC1
    - DEMO-ProPlus
    - OPP-01
  - DEMO-HOST-2
    - APP-01
    - DEMO-DC2
    - OPP-02

DEMOHCICLUSTER

DEMO-HOST-1

DEMO-DC1

DEMO-ProPlus

OPP-01

DEMO-HOST-2

APP-01

DEMO-DC2

OPP-02

Virtual Studio Manager

DEMOHCICLUSTER

DEMO-HOST-1

DEMO-DC1

DEMO-ProPlus

OPP-01

DEMO-HOST-2

APP-01

DEMO-DC2

OPP-02

Model PowerEdge R760

Number of Virtual Machines 3

Available/Total Memory 464603 MB/523801 MB

Virtual Processors/Logical Cores 10/96

Host Setup Version 4.3.3.18401

NTP Status Running

OK Cancel

center

Virtual Host Name Group Status Failures Replication Current Progress Last Action Action

DE

DE

OP

Shut Down

Shut Down

Shut Down

Exploring DeltaV

File Edit View Object Applications Tools Help

Assigned Modules

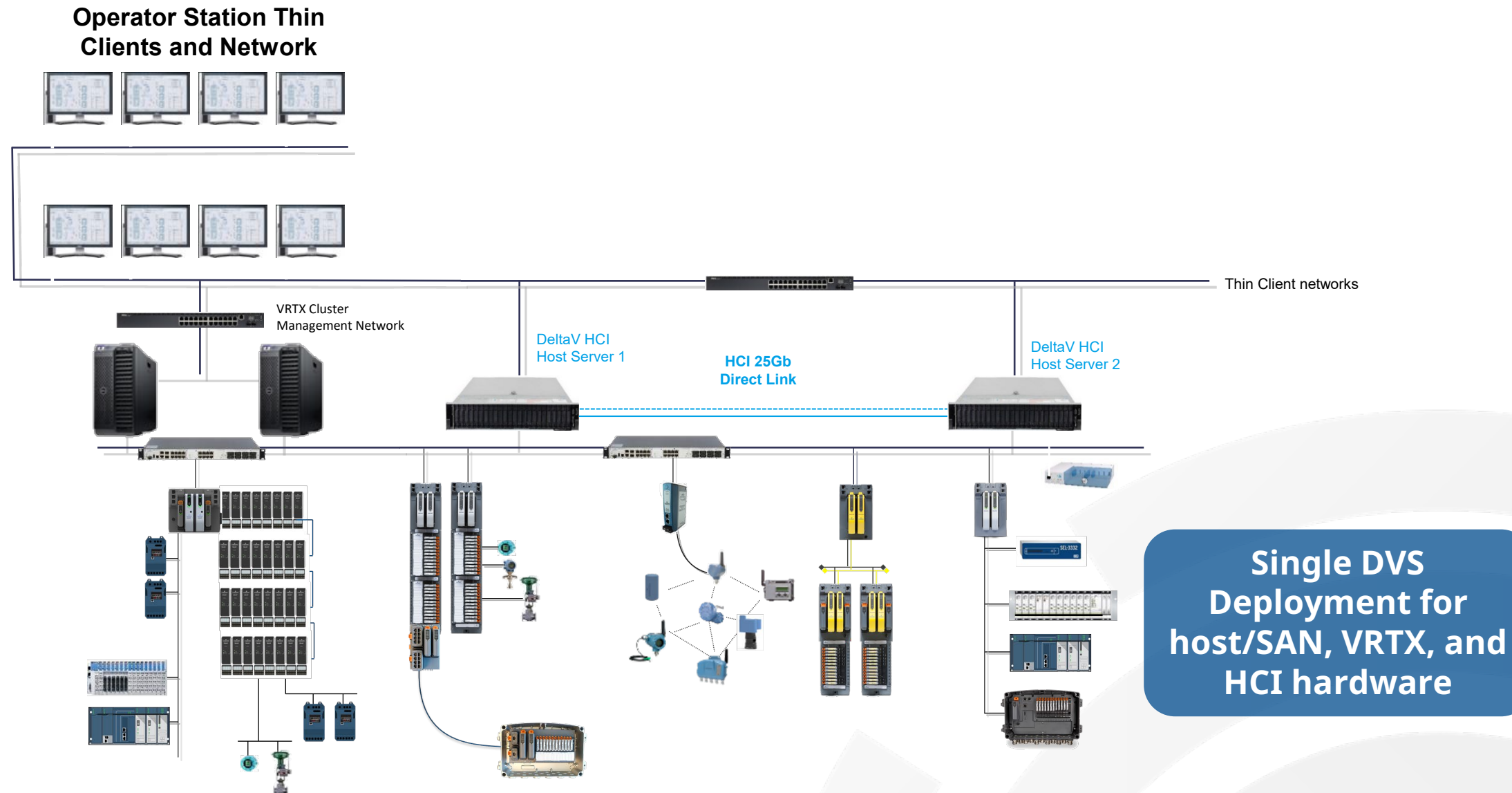
All Containers

- MISC\_DEMO
- MIXER\_TANKS
- REACTORS\_AREA
- SIM
- SPECTRAL\_PAT
- UTILITIES
- Physical Network
- Decommissioned Nodes
- Control Network
  - APP-01
    - Batch Executive
    - Batch Historian
    - Continuous Historian
    - Campaign Manager
    - Assigned Modules
    - External Asset Interfaces
    - Hardware Alarms
    - Simulated Logic Solvers
    - Alarms And Events

Contents of 'Assigned Modules'

Name	Type	Description	Needs D
DEMO-HOST-2	Control Module	Control Module ...	No

# HCI & VRTX Clusters: 1 DVS Deployment 1 DeltaV System



# Key Knowledge Base Insights

- Clusters built with DVS 4.3.2 and prior
  - NK-2400-0237 (Recommended performance optimizations for HCI Clusters)
- Recommended guidelines
  - NK-2400-0341 (Required Procedure for Restarting or Shutting Down an HCI Host)
  - NK-2400-0535 (Considerations for Power Failure Testing of Virtualization Host Servers)

# DeltaV Smart Switches

# New DeltaV Smart Switches



## *Platform Enhancements*

- USB-C Management Port
- Gigabit Connections on all form factors
- Improved Performance with powerful CPUs

## *Security Advancements*

- Enhanced User Management with Role-based Access
  - NDCC, CLI & Web Interface (New Web UI)
- Advanced security features
  - SNMPv3 Encryption
  - Password Management with Brute-force attack prevention & Configurable Password Policy
  - California Law compliance
  - Signed Firmware

Audit Trail with Secure Syslog via TLS

## *NDCC Integration*

- Functional replacements for current generation smart switches
- Fully Integrated with Network Device Command Centre (NDCC) with improved User Experience
  - Discovery of Switches
  - Commissioning
  - Improved Firmware Upgrade
  - Diagnostic & Status Info
  - One-click lockdown

# Switch Commissioning

The screenshot displays the Network Device Command Center interface. On the left, a tree view shows the network hierarchy under 'DeltaV Area Control Network'. The main pane shows details for a switch with MAC address 00:22:E5:31:CB:7E. A 'Commission' dialog box is open, allowing configuration of the switch's name, IP address, subnet mask, password, and location.

Property Name	Value	Location Description
MAC Address	00:22:E5:31:CB:7E	MAC address for the switch
IP Address	0.0.0.0	Internet Protocol address used for switch management
Software Revision		Switch software version
Model	FP40-8TX25M	Product model
Name In Switch	FP40-0022E531CB7E	Switch name stored in the switch

**Commission**

**Commission switch 00:22:E5:31:CB:7E in DeltaV Area Control Network**

Switch Name:

Switch IP Address:

Switch Subnet Mask:

The default Admin account password must be changed upon first login. Enter a new password to reset the pre-configured Admin account password.

New Password:

Confirm Password:

Switch Location:

Plant Area:

Workstation:

Primary Control Display:

# Status Information

**Network Device Command Center** (on V15LTS-PP)

Tools Help

**NXTGEN1\_\$X Emerson2**

Property Name	Value	Location Description
<b>Security</b>		
Locking Status	UNLOCKED	Switch locking status
Lock Timer		Timer before switch locks down automatically
Password Age	0 days	Determines (in days) the countdown hardware ...
<b>Alarms</b>		
COMM		Determines if a COMM alarm is active on the swi...
FAILED		Determines if a FAILED alarm is active on the s...
MAINT		Determines if a MAINT alarm is active on the s...
ADVISE		Determines if an ADVISE alarm is active on the ...
<b>Current Status</b>		
Power Supply 1	Active	Status of power supply 1

Port	Enabled	Node Name	Learned Address	Port Locking Violation
1.1	Yes	(Idle)		No
1.2	Yes	(Idle)		No
1.3	Yes	(Idle)		No
1.4	Yes	(Multiple acti...		No
1.5	Yes	(Idle)		No
1.6	Yes	(Idle)		No
1.7	Yes	(Idle)		No
1.8	Yes	(Idle)		No
1.9	Yes	(Idle)		No
1.10	Yes	(Idle)		No

**Port Statistics**

Primary Network Switch NXTGEN1\_\$X  
Port 1.4 connected to (Multiple active)

Port Property Name	Since Boot	Last 60 Seconds
Duplex mode selection		
Received bytes	936 KByte(s)	
Transmitted bytes	382 KByte(s)	
Link Utilization		
CRC discards	0 packet(s)	
Small packet discards	0 packet(s)	
Large packet discards	0 packet(s)	
Fragmented packet dis...	0 packet(s)	
Jabber packet discards	0 packet(s)	
Collisions	0 packet(s)	
Late collisions	0 packet(s)	

Close

For Help, press F1

# New Upgrade Experience

The screenshot displays the Network Device Command Center interface. On the left, a tree view shows a hierarchy of networks, including 'DeltaV Area Control Network' and 'Primary Network (DVPRIMARY)'. A context menu is open over a device, with 'Advanced Device Operations' selected. A sub-menu is also open, listing various actions such as 'Telnet to Switch', 'SSH to Switch', and 'Upgrade Firmware via WebUI', which is highlighted in orange. The main pane shows a table of properties for the selected device, including 'Locking Status' (UNLOCKED), 'Lock Timer', and 'Password Age'. Below this, a table lists port configurations.

Property Name	Value	Location Description
<b>Security</b>		
Locking Status	UNLOCKED	Switch locking status
Lock Timer		Timer before switch locks down automatically
Password Age	0 days	Determines (in days) the countdown hardware ...
		Determines if a COMM alarm is active on the swi...
		Determines if a FAILED alarm is active on the s...
		Determines if a MAINT alarm is active on the s...
		Determines if an ADVISE alarm is active on the ...
<b>Power s</b>		
Port	E	ply 1
1.1	Y	
1.2	Y	
1.3	Y	
1.4	Yes	(Multiple acti...
1.5	Yes	(Idle)
1.6	Yes	(Idle)
1.7	Yes	(Idle)
1.8	Yes	(Idle)
1.9	Yes	(Idle)
1.10	Yes	(Idle)

# More Information

## Educational Services Course

[EDU-1943] DeltaV Virtualization

[ADD TO SCHEDULE](#)

Tuesday, May 20 | 1:00 PM - 5:00 PM CDT

[ADD TO SCHEDULE](#)

Wednesday, May 21 | 1:00 PM - 5:00 PM CDT

[ADD TO SCHEDULE](#)

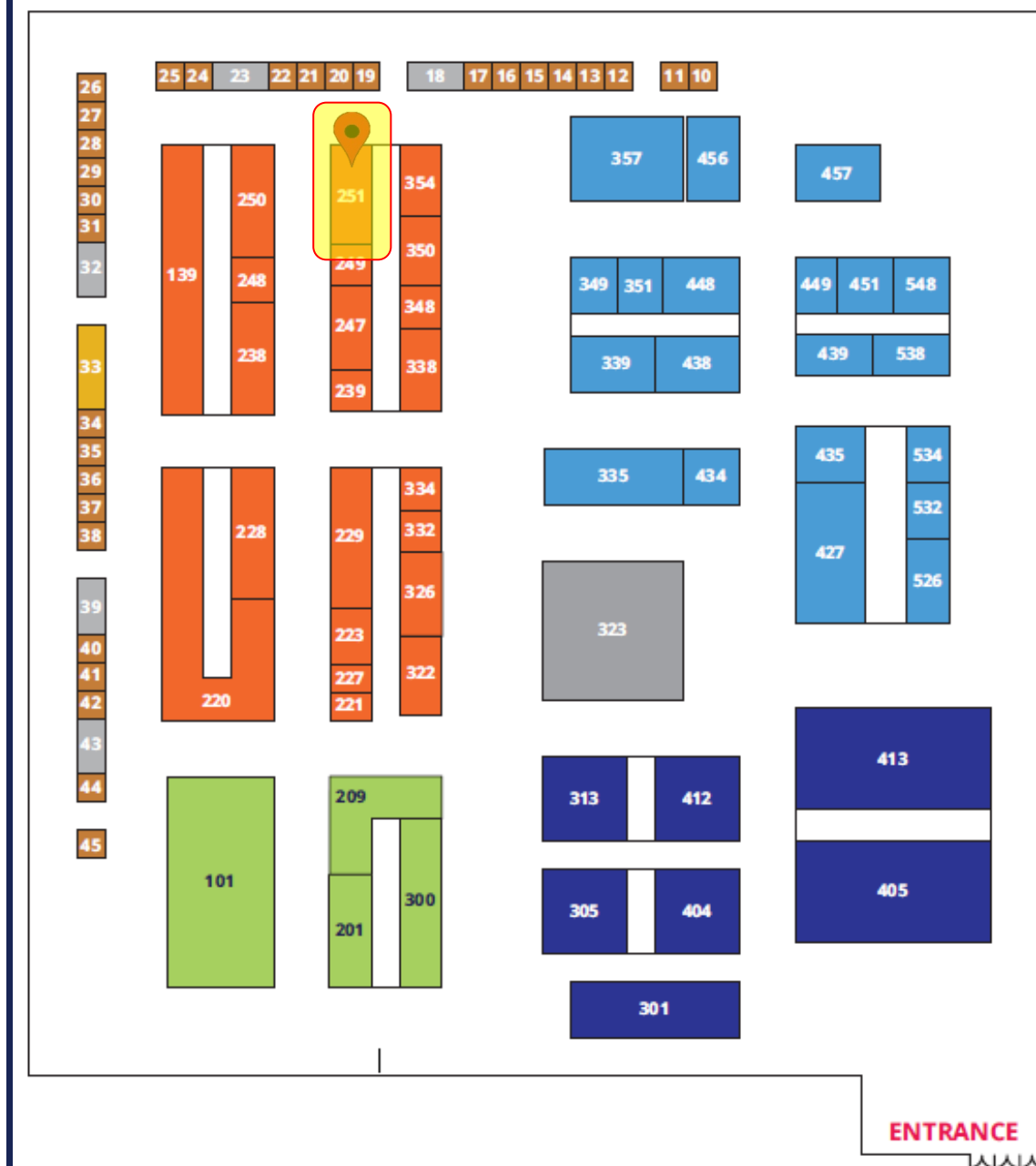
Thursday, May 22 | 8:00 AM - 12:00 PM CDT

## Customer Success Stories

[3-1407] Traditional to HCI DeltaV System Upgrade Success

[3-1806] Have a Splitting Headache? Lessons Learned From a Large Zone Split

[3-1668] Demystification of Mirroring Networks for Threat Monitoring





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# Thank You