The VDI Approach

Presenters:
***Sunny Arogunmati** – Advisory Systems Engineer, DCWS VDI*
***Daniel Williams** – Advisory Systems Engineer, DCWS VDI*

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Agenda

The VDI Approach

Today's Topics

- Why VDI?
- VDI Requirements
- Dell Technologies VDI Platforms
- Dell VDI Validated Solutions
- VDI Use Cases
- GPU & VDI
- Next steps
  - Dell resources
  - Finding more information

Conversations about VDI

- Pre COVID
  - Desktop Management
  - Security
  - TCO & ROI
  - On-prem vs Cloud
- COVID Era
  - Remote Access!!!
- Post COVID
  - Accelerated digital transformation and remote work
  - Revisit current solution, and re-asses for future.

Remote Access Options

- VPN
  - Configured laptop for secured corporate access
  - Ideal for Web and Office apps
- SaaS
  - Cloud & subscription-based software via web browser
  - Zero infrastructure, no longer shrink wrap, just write a check.
- Terminal Services
  - a.k.a. RDSH or Published apps & desktops (Server based)
  - Non-packaged app friendly
  - Poor Man's VDI, could be plagued w/ Latency. (Call Centers)
- VDI (Virtual Desktop Infrastructure)
  - Centralized apps, desktops and management
  - On premise cloud
  - Public Cloud

Why VDI?

- Data in one location makes it more protected and secure.
- Centralized application management and threat detection without significant interruptions.
- Multiple remote access protocols enables work from any location and any compatible device.
- VDI provides advantages that other options do not (GPU support, etc).
- Application publishing can be incorporated to support legacy apps that are critical!
- Centralized management, maintenance and deployment of endpoints.
- Utilization of the same image across multiple workstation types.

What's in a Desktop?

WORKLOADS

- Windows 11/365
- Office 365
- Teams/Zoom
- AutoCAD
- ArcGIS
- **AI**
- Financial Applications
- Bloomberg keyboard
- 4 x 4K Monitors
- Epic
- X-Ray imaging
- Help Desk

CPU | RAM | STORAGE | GPU

USER EXPERIENCE

VDI Delivers Today's Applications

10 years ago

Task Workers
(Mostly text based)

5 years ago

Knowledge Workers
(More graphic intensive)

Today

Specialty Workers, Power Users
(Multi-display, high resolution, 3D graphics)

- Higher bandwidth, improved protocols, hyper-converged infrastructure, and more powerful SOCs have enabled entirely new use-cases and user personas
- With these improvements, thin clients and VDI can address use cases that were previously impractical

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VDI On-prem vs Cloud?

- **On-prem**
  - Control (Outages, patching, refurbish, etc)
  - Security (Data secured in your DC)
  - Customization (Choice of procs, GPU, etc)
  - Scalability
  - Capital expenditure (But predictable, no surprises.)
  - DELL APEX subscription model. (OpeX w/ Cloud benefits)
- **Cloud**
  - Ideal for less than 12 months usage
  - Less time to deploy
  - Cloud vendor managed
  - Latency issues
  - Operating expenditure (but expensive monthly checks)

Neither option will hit all the buttons, go with hybrid approach.

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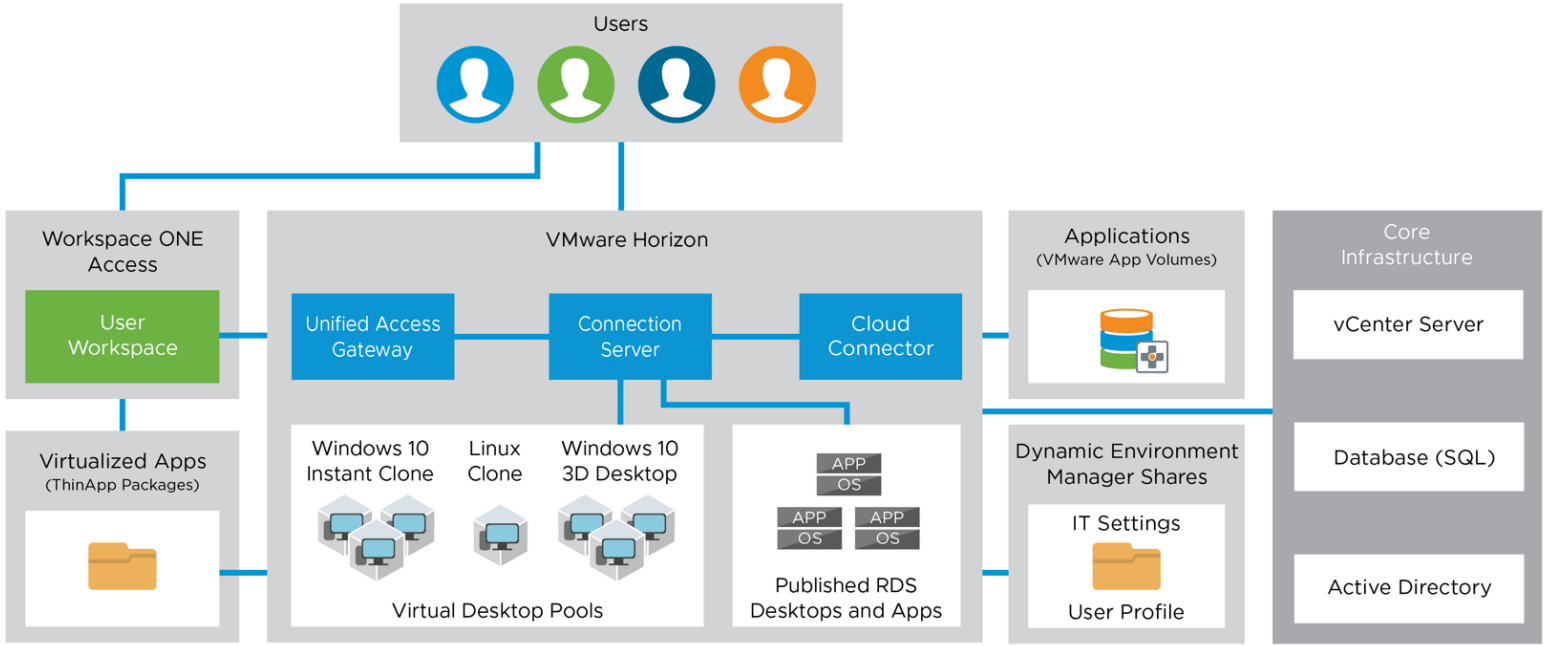
VDI Overview

- VMware Horizon / Citrix Virtual Desktop
- Persistent desktops
- Non-persistent desktops
- Hosted Shared Desktops
  - VMware Horizon with RDSH
  - Citrix Virtual Apps
- Application Layering (AppVolumes, ThinApp, Citrix App Virtualization)
- Profile Management (UEM, FSLogix)

What are VDI Infrastructure components?



Hypervisor (ESX, Azure, Citrix Hypervisor, AHV, KVM) on DELL Compute

DELL Storage (vSAN, PowerFlex, PowerScale, Isilon, Unity)

Network & GSLB (Dell TOR, Cisco, F5, Citrix ADC [Netscaler])

The New *Dell EMC PowerEdge Server Portfolio*

SPECIALTY SERVERS - EDGE

XR11

XR12

SPECIALTY SERVERS – GPU OPTIMIZED

R750xa

XE8545

RACK SERVERS

R550

R7515

R750xs

R750

R7525

R450

R6515

R650xs

R650

R6525

C-SERIES

C6525

C6520

MODULAR COMPUTE SLED

MX750c

ITALICS = ALL NEW INTEL ICE LAKE 2-SOCKET SERVERS(Q2)

UNDERLINE = AMD MILAN(Q1)

YOUR **INNOVATION ENGINE**

*Technology and solutions that help you **innovate**, **adapt**, and **grow***

*Available in Q2 2021

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PURPOSE-BUILT

Accelerate AI Outcomes

PowerEdge XE9680

PowerEdge XE9640

PowerEdge XE8640

POWERED BY 4TH GENERATION INTEL XEON SCALABLE PROCESSORS

No-compromise Accelerated AI

- 8x NVIDIA H100 SXM5 700W 80GB NVLink GPUs or
- 8x NVIDIA A100 SXM4 500W 80GB NVLink GPUs
- Full NVLINK interconnectivity
- Air cooled operation (up to 35C)

Dense Acceleration

- 4x Intel Data Center Max Series GPU with GPU-GPU connectivity
- Dell Smart Cooled DLC GPUs
- 1:1 GPU-I/O enables faster data operations

Superior Performance

- 4x NVIDIA H100 SXM5 700W 80GB NVLink GPUs
- Full NVLINK interconnectivity
- GPU Direct Storage for fast data intake

PURPOSE-BUILT

Accelerate at the Edge

Powerful inside and out

- 1-socket, 2-socket, and multi-node available
- -20c to +65c operating temps
- GPU support

Expanded portfolio

- Compatible with Dell Edge /Telco Solutions
- New multi-node design XR4000 & XR8000

Energy flexibility

- 110-240V AC power
- -48V DC power
- Redundant PSUs

XR7620

2S/2U

XR5610

1S/1U

XR4000

Multi-Node
Xeon D

XR8000

Multi-Node
Xeon SP

PURPOSE-BUILT

Accelerate Core Modernization

PowerEdge R760

PowerEdge R660

PowerEdge R760xa

POWERED BY 4TH GENERATION INTEL XEON SCALABLE PROCESSORS

PowerEdge R960

PowerEdge R860

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Dell Validated Designs for VDI

Platform Solutions

- VxRail HCI & Intel vSAN Ready Nodes
- AMD vSAN Ready Nodes
- Dell PowerStore
- Microsoft Azure Stack HCI
- Dell APEX Private and Hybrid Cloud
- Unity XT All-Flash storage

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Why Dell Validated Solutions for VDI ?

Empowers your Workforce

Transform the workplace by enabling BYOD and mobility to enhance user collaboration and productivity. Predictable costs, performance, and scalability to support a growing workforce

Tested and Validated

Tested and validated solutions of major VDI platforms on HCI, CI and Traditional three-tier infrastructures. Validated Solutions for VDI offer predictable performance and simplifies deployment.

Simplifies IT Management

IT resources can centrally manage images, apps, and endpoints. The solution streamlines IT resources and improves productivity. Wyse thin clients have long life-cycles and self-configure, simplifying deployment.

Improves Security

VDI is inherently more secure than physical desktops because files and data don't leave the data center, and all communications between the client and infrastructure are encrypted. Solution offers virus and malware resistant Dell Wyse thin clients.

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VDI on Dell VxRail HCI and vSAN Ready Nodes

VxRail V670F and PowerEdge R750 Servers
with 3rd Gen Intel Xeon Processors

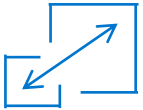
VMware Horizon 8 or
Citrix Virtual Apps and Desktops

Drivers for HCI adoption

Improve efficiency | Lower OpEx costs

Agility

Public cloud speed, efficiency, and economics within the data center



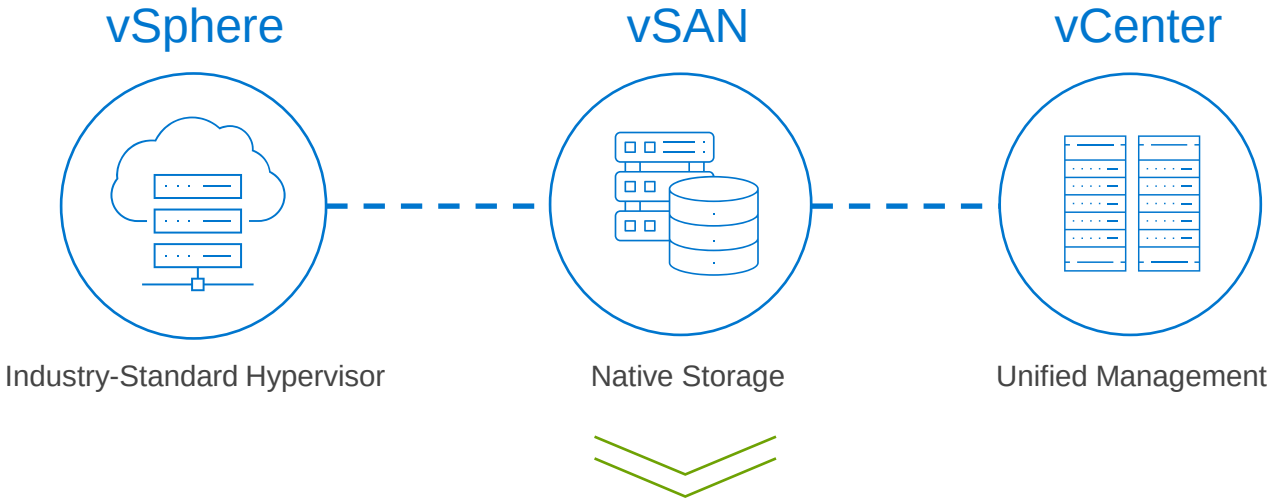
Scalability

Start small and easily scale up or scale out while maintaining performance levels

Simplicity

Simplify operations with software-driven automation and lifecycle management

HCI Powered by VMware vSAN



Broadest Deployment Choices

vSAN ReadyNodes | VxRail Appliances | VMware Cloud Foundation | Public Clouds | Managed Service Providers

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We offer Industry Leading HCI Platforms

Configurable and Flexible solutions

VxRail HCI

- Turnkey solution designed for quick time to value
- Lifecycle Management
- VxRail Marketplace Ecosystem

vSAN Ready Nodes

- Optimized solution with high degree of customizability
- Includes all the BIOS updates and vSphere and vSAN installation

Built on Dell PowerEdge Servers

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Validated Designs for VDI on VxRail

VxRail V670F/P675: VDI-optimized, graphics-ready platform

Simplify infrastructure and ease scalability with a high performing VDI solution

Designed exclusively by Dell Technologies and VMware, VxRail is the easiest and fastest way to implement a high-performance VDI solution

BENEFITS

Simplify
Save admin time with easier deployment, configuration and management

Scale easily
Scale both compute and storage quickly, so you can start small and grow as needs change

Improve performance
All-flash storage with NVIDIA GPU and vGPU options to handle peak performance requirements

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Dell VxRail Design Principles

The fastest and simplest path to IT outcomes in VMware environments

Turnkey experience

Flexible licensing

Operational transparency

Platform innovation

56%

Faster IT service delivery[1]

Lifecycle management

One-click upgrades

Serviceability

489%

Five year ROI[1]

Highly differentiated

VxRail HCI System Software

Full stack integration

Networking automation and LCM

Advanced analytics

4x

More cost effective than public cloud[2]

1. Based on the IDC whitepaper sponsored by Dell, “Delivering Efficient Business Expansion with Dell EMC VMware-Based HCI, October 2018.” Actual results may vary.
2. Based on “The Cost of Using the Public Cloud, Evaluator Group, Jan 2019.”

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VxRail V Series: VDI-optimized, graphics-ready platform

Support for up to six NVIDIA A16 GPU cards for 2D or 3D virtual desktops in a 2U1N form factor

Available in dual socket configurations with 3rd generation Intel Xeon Scalable family processors with up to 40 cores per processor and up to 6 TB of RAM

Ideal for specialized use cases such as high-end 2D/3D visualization

vmware vSphere

vmware vSAN

vmware NSX

vmware vRealize Log Insight 8.0

VXRAIL V670F/R570

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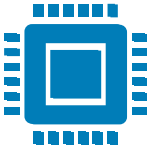
VxRail Platform Update Overview

VxRail V670F Compute Nodes with 3rd Generation Intel Xeon Scalable processors

Processing



- 3rd Generation Intel Xeon Scalable processors : latest 10nm technology
- 40% more CPU performance increase
- 15% per core performance boost
- 42% more cores

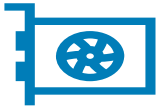
Most comprehensive Intel CPU SKU stack support in Dell's server portfolio

Memory

- 33% more memory channel
- 20% more frequency boost
- 2.66x memory capacity increase
- 2x persistent memory capacity increase

Full featured memory support and maximum capacity, including Intel Optane 200 support

I/O and Acceleration



- PCIe Gen4 (2x I/O BW increase)
- 33% more lane increase
- More direct attached Gen4 NVMe
- Support latest Gen4 Accelerators

Maximum NVMe & PCIe Gen4 slot capacity, and accelerator support

VxRail Platform Update Details

VxRail V670F Compute Nodes with 3rd Generation Intel Xeon Scalable processors

VXRAIL V670F

- **CPU**
  - 3rd Generation Intel Xeon Scalable processors
  - Up to 40 cores per socket
    - Dual socket only
  - Up to 3.1 GHz base clock speed
- **Memory**
  - Up to 32 DIMMs @ 3200 MT/s
  - Up to 6TB Intel Optane Persistent Memory 200 series
- **Storage**
  - 24x 2.5” disk slots
    - Up to 4x 2.5” SAS or NVMe SSDs (vSAN cache tier)
    - Up to 20x 2.5” SAS or SATA SSDs (vSAN capacity tier)
    - 2 disk group options: 1-4x (1+5) or 1-3x (1+7)
  - New BOSS-S2 with 2x M.2 hotplug for boot/OS

- **I/O**
  - PCIe Gen 4
  - OCP 3.0
- **GPU**
  - 2x A16 or A40 GPUs
  - 3x T4 GPUs

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Validated Designs for VDI on VMware vSAN Ready Nodes

High-performance, scalable and cost-effective VDI

Dell vSAN Ready Nodes, built on Dell PowerEdge servers, enable easy VDI deployment with factory installed and pre-tested configurations

BENEFITS

High performance
Provide workstation-level performance for critical users wherever they are

Scalable
Each component of the solution architecture scales out independently with room to grow

Cost-effective
Streamline IT operations and cost management

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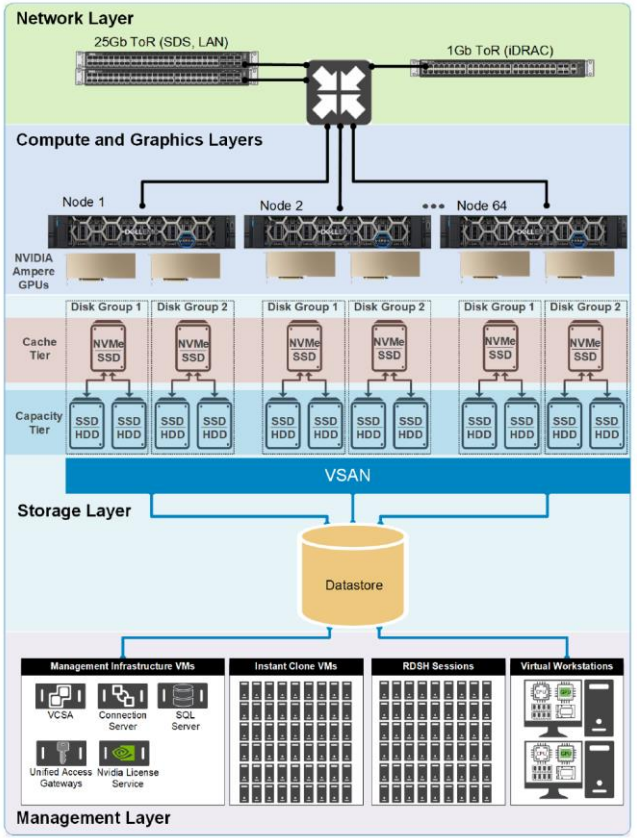
Dell VDI solution on vSAN Ready Nodes

VMware Horizon

This solution is based on Dell VxRail or vSAN Ready Nodes powered by Dell PowerEdge servers with 3rd Generation Intel Xeon Scalable processors, optional NVIDIA GPUs, and a choice of VDI software.

Two VDI software stacks, described in separate Design Guide documents, are available. This architecture is for:

- VMware Horizon 8 VDI software



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Dell VDI solution on vSAN Ready Nodes

Citrix Virtual Apps and Desktops

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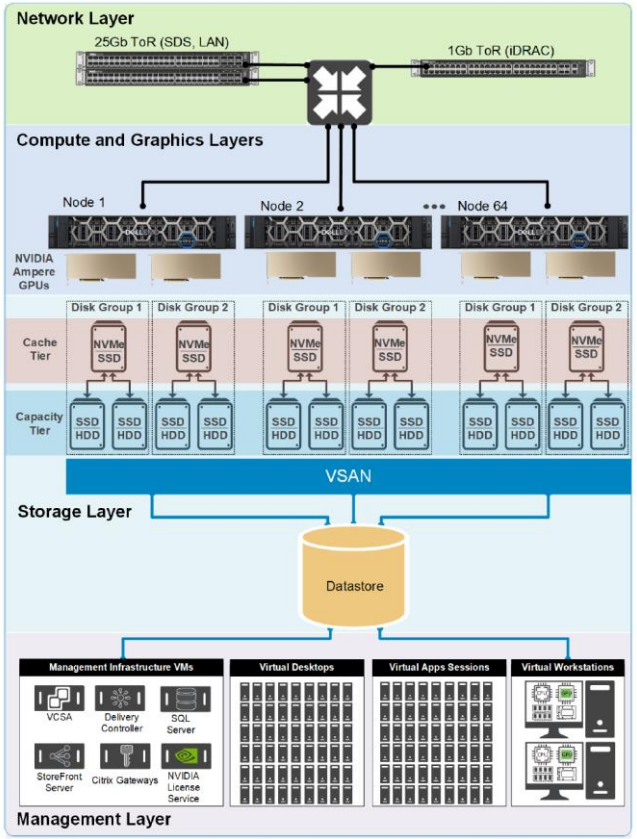

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VDI with Dell APEX Private and Hybrid Cloud

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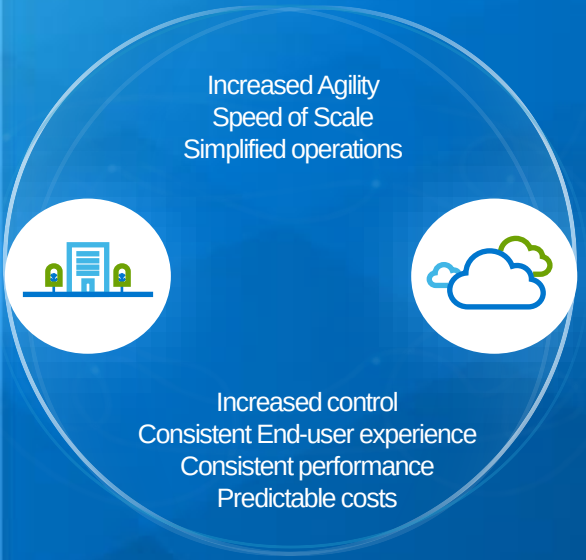
Validated Designs for VDI on Dell APEX



Streamline and Optimize VDI IaaS with cloud-like consumption

Dell Validated Designs for VDI with APEX provides access to applications anytime, anywhere using cloud-like consumption with IaaS for VDI

BENEFITS

Access from Anywhere
Rapidly deploy VDI in a cloud environment, while delivering a user experience better than public cloud

Secure
With hosted desktop infrastructure, your data stays protected, maintaining security without sacrificing performance.

Increased efficiency
Spend less resources procuring, deploying, testing and supporting your ever-changing VDI environment

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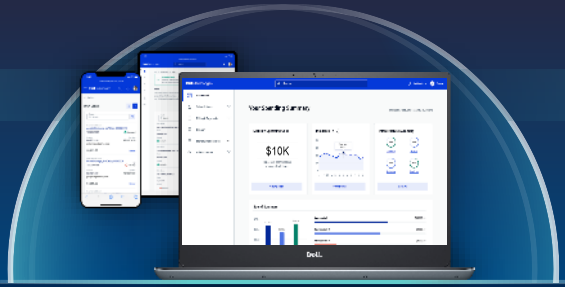
APEX Private Cloud and APEX Hybrid Cloud

APEX HYBRID CLOUD

Consistent and secure operations for your hybrid cloud environment



APEX PRIVATE CLOUD

Bring cloud experiences to on-premises and edge locations

On-premises customer managed infrastructure where Dell provides bi-annual system maintenance and hardware monitoring

OFFER TYPE

- [ ] Private Cloud
- [x] Hybrid Cloud

INSTANCE TYPE

- [ ] Compute Optimized
- [ ] General Purpose
- [x] Accelerator Optimized
- [ ] Memory Optimized
- [ ] Large-Scale Memory Optimized

INSTANCE QUANTITY

- [ ] 25
- [ ] 50
- [ ] 100
- [x] 200
- [ ] 500

SUBSCRIPTION TERM

- [ ] 12 months
- [x] 36 months

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APEX-based VDI environment

Comparing performance and user experience for Virtual Desktop Infrastructure

VMware Horizon on APEX Hybrid Cloud **VS.** Amazon WorkSpaces on AWS **VS.** Azure Virtual Desktop on Azure

BEST USER EXPERIENCE

- ✓ Up to **9.5%** better than AVD on Azure
- ✓ Up to **2.5x** better than Amazon WorkSpaces

LOWEST APPLICATION LATENCY

Zoom app delivered on average:

- ✓ Up to **34%** decreased latency compared to AVD on Azure
- ✓ Up to **54%** decreased latency compared to Amazon WorkSpaces on AWS

BEST LOGON RESPONSE TIME

- ✓ Up to **44%** faster when logon time compared to AVD on Azure
- ✓ Up to **28%** decreased logon time compared to Amazon WorkSpaces on AWS

FEWER SESSIONS FAILED TO LAUNCH

When compared to # of sessions launched:

- ✓ **2x** more AVD sessions failed to launch on Azure
- ✓ **5.5x** more Amazon WorkSpaces sessions failed to launch on AWS

https://www.delltechnologies.com/asset/en-us/solutions/apex/industry-market/cloud-evolutions-vdi-performance-and-user-experience-comparison-apex-cloud-services.pdf

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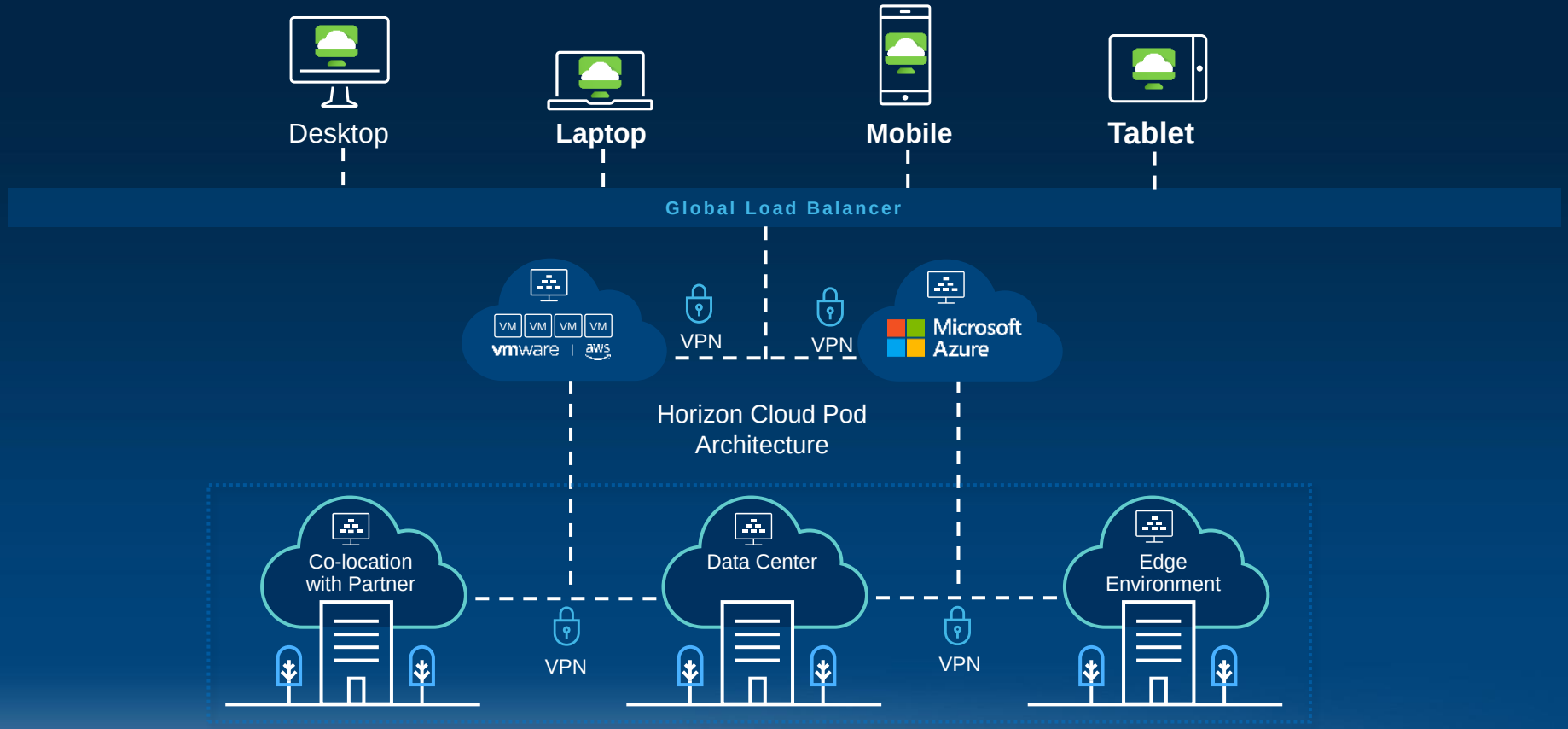
Multi-Cloud VDI with Cloud Pod Architecture



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Dell Validated Designs for VDI

Vertical Industry Solutions

- 3D Graphical Design Collaboration
- Higher Education
- Financial Services Industry
- Geographic Information Systems
- Healthcare and GPU Resource Sharing
- Media, Entertainment, and Gaming
- Automotive and Manufacturing

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VDI Vertical:
3D Graphical Design Collaboration

Virtual Workstation Interactive Collaboration with NVIDIA Omniverse on Dell VxRail and vSAN Ready Nodes

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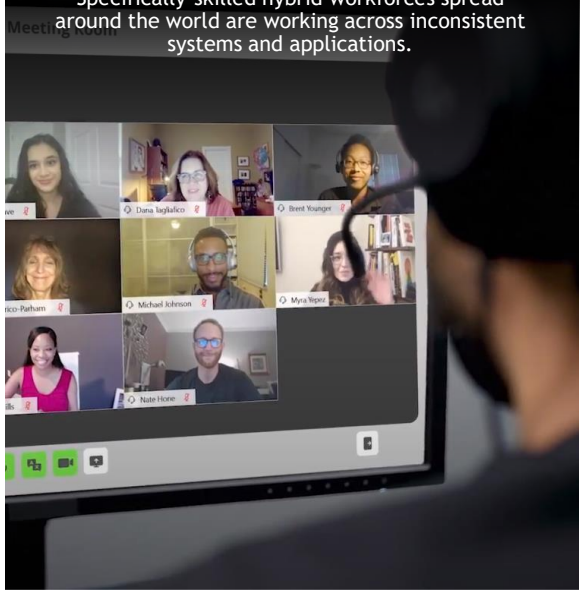
3D graphics design is a complex team activity with numerous, often sequential, steps in the workflows

LARGE TEAMS WITH DIVERSE SKILLS

Specifically-skilled hybrid workforces spread around the world are working across inconsistent systems and applications.



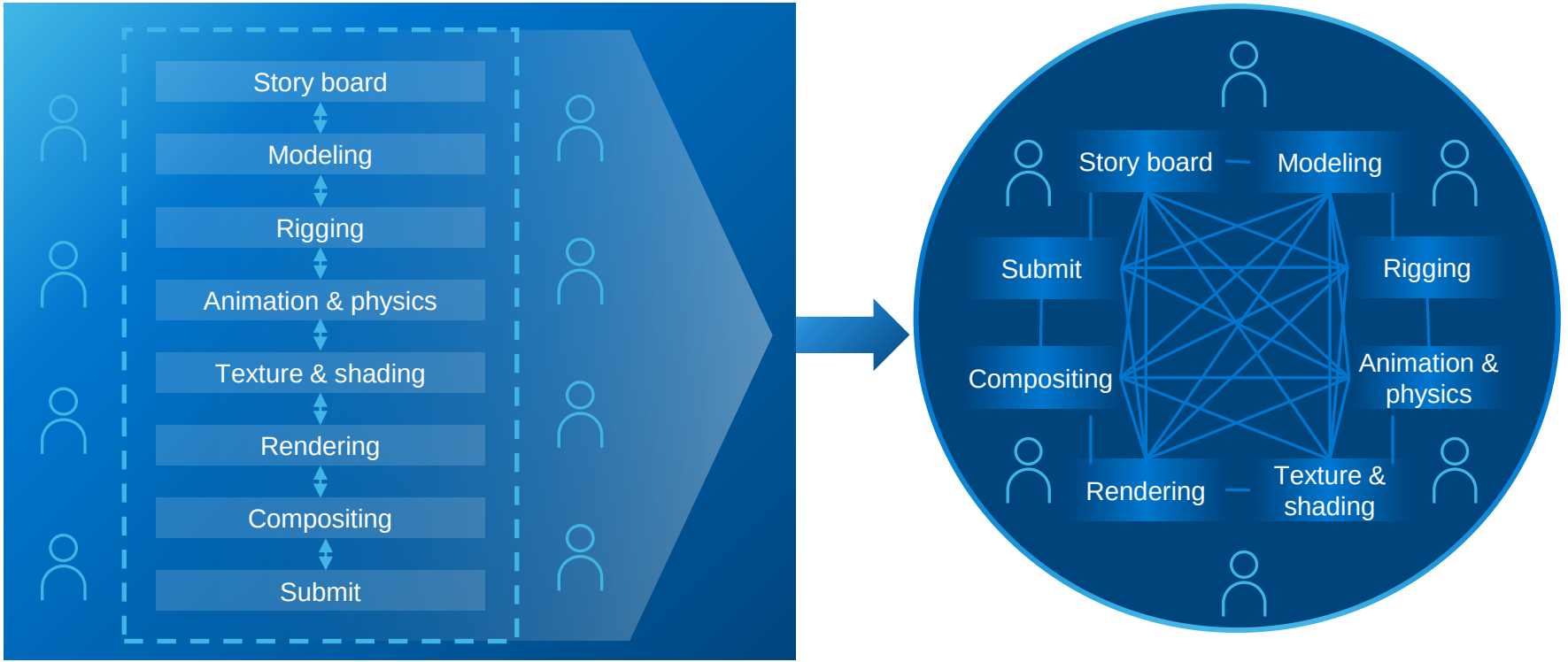
MANY VENDORS, MANY TOOLS

Design teams plagued with often incompatible tools causes tedious import-export, mistakes, time lost, and model decimation.

3D WORKFLOWS RISING IN COMPLEXITY

Demand for compute-heavy technologies like real-time ray tracing, AI, and physically accurate simulation.

Transform 3D workflows with **real-time multi-user collaboration** using NVIDIA Omniverse on Dell VDI



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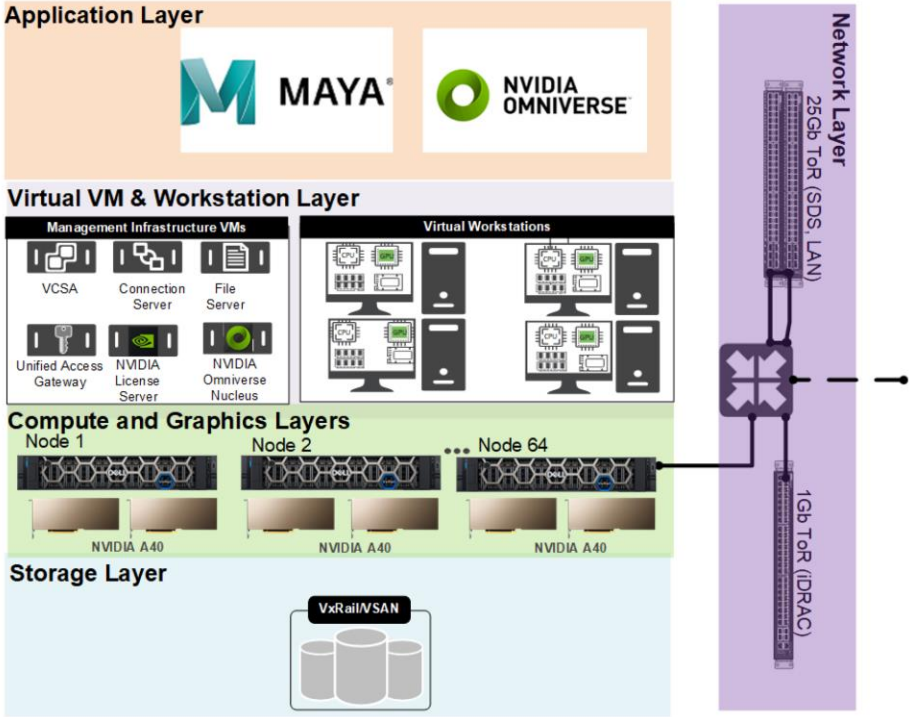
Solution stack

- For this use case, we present an end-user performance analysis using Autodesk Maya as an example of a professional 3D graphics application running on NVIDIA Omniverse collaboration software.
- We specify several user-optimized configurations and measure the performance using NVIDIA nVector benchmarking software.



VDI Solution Stack with Omniverse and Maya

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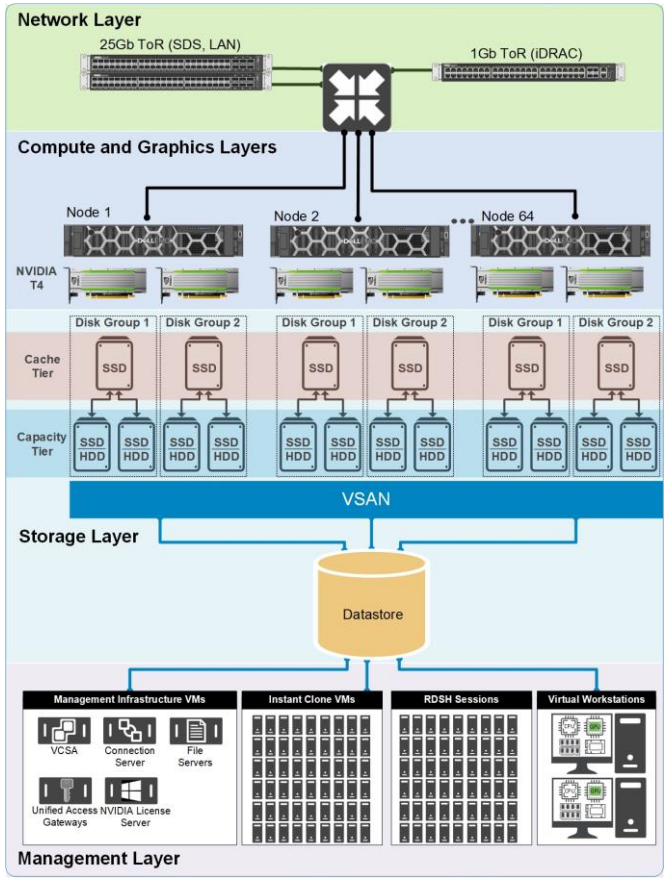
Infrastructure architecture

- In this project, we provide an architecture for running NVIDIA Omniverse collaboration software on Dell infrastructure with VMware Horizon 8 desktop virtualization software.
- The solution is based on Dell VxRail or vSAN Ready Nodes powered by Dell PowerEdge servers with 3rd Generation Intel Xeon Scalable processors and NVIDIA virtual GPUs.



Dell Hyperconverged Infrastructure

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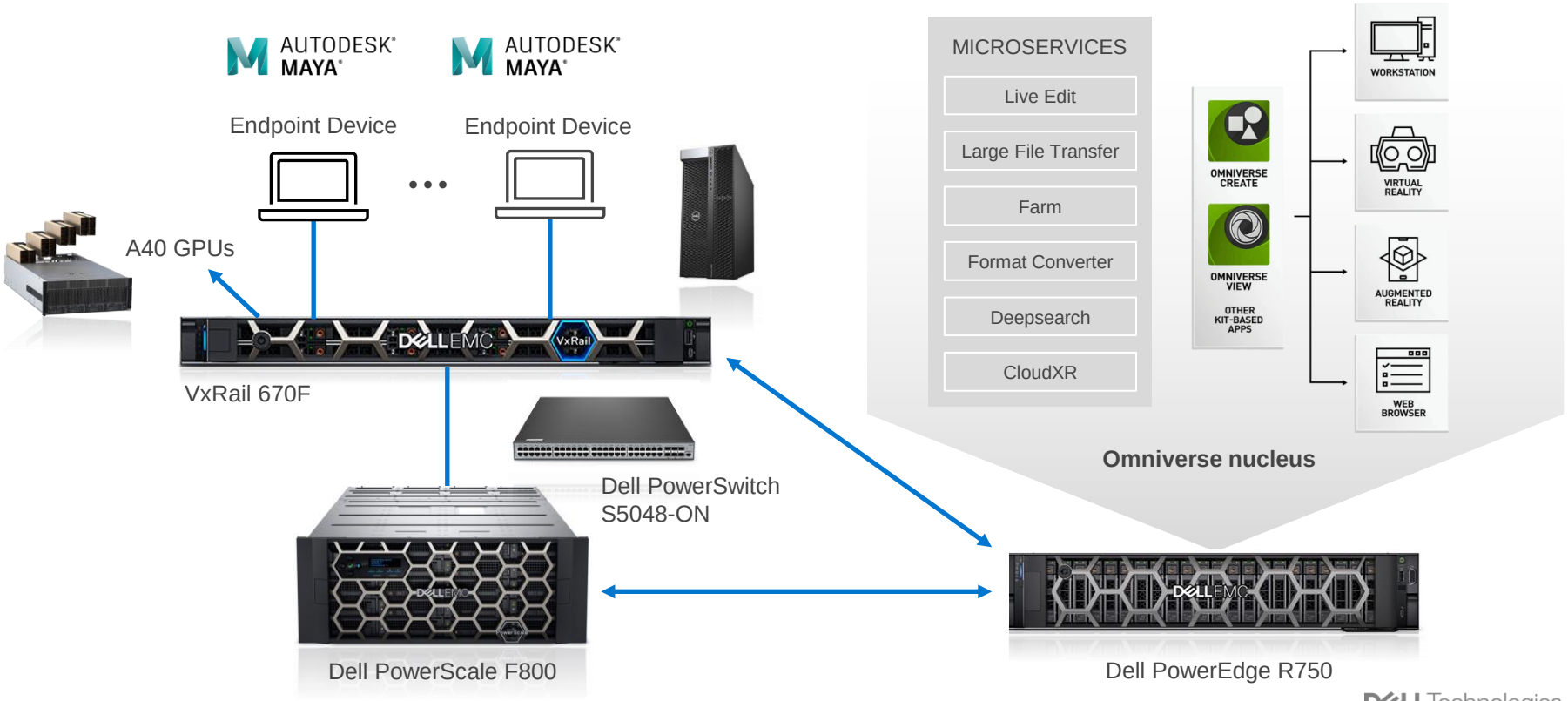
Solution architecture



VDI Vertical:
Higher Education

Remote User Experience with Graphics Software for Higher Education on Dell VxRail

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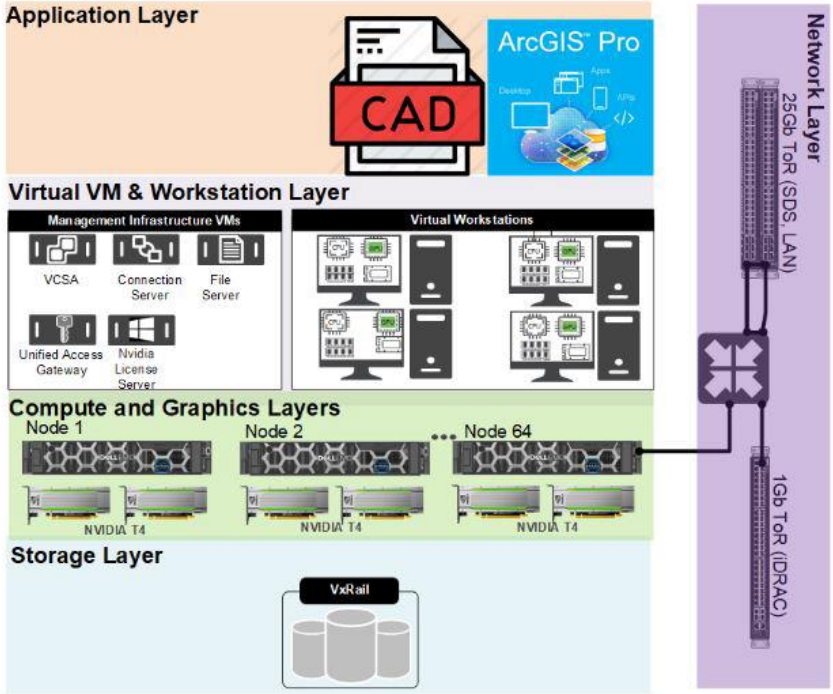
Challenges of distributed higher education

- Organizations in Higher Education are adopting VDI to benefit from centralized management, better security and compliance, and worker mobility. Users in these sectors often run professional-grade graphics applications that require advanced graphic acceleration by dedicated GPU hardware.
- With the diversity of user locations and network environments, it is challenging to provide a consistent user experience.
- For example, a user doing 3D graphics or engineering CAD work at the end of a remote internet connection may be subject to a wide range of distance and performance impairments and might not experience the same quality as someone working on campus.

Solution stack

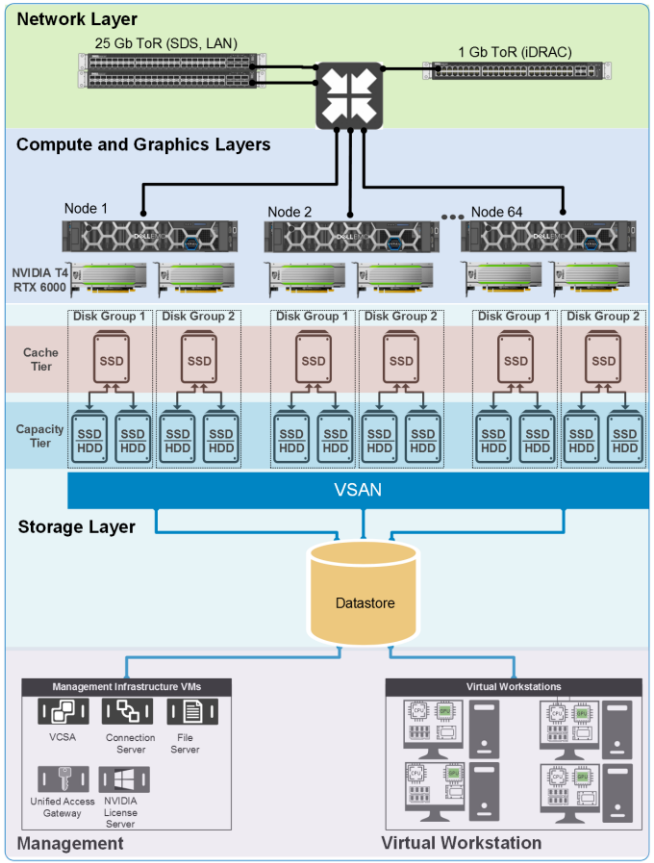
- For this use case, we analyze the performance test results for both baseline local area network (LAN) and remote wide area network (WAN) user experiences with VDI implementations of Esri's ArcGIS Pro GIS software and a leading Engineering CAD application, on Dell VDI with NVIDIA virtual GPUs, using NVIDIA’s nVector performance monitoring tool.



VDI Solution Stack with Esri ArcGIS Pro and Engineering CAD software

Infrastructure architecture

- In this project we use the Dell Validated Design for VDI on Dell infrastructure with VMware Horizon 8 desktop virtualization software.
- The solution is based on Dell VxRail or vSAN Ready Nodes powered by Dell PowerEdge servers with 3rd Generation Intel Xeon Scalable processors and NVIDIA virtual GPUs.



Dell Hyperconverged Infrastructure

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VDI Vertical:
Financial Services Industry

User personas for FSI applications

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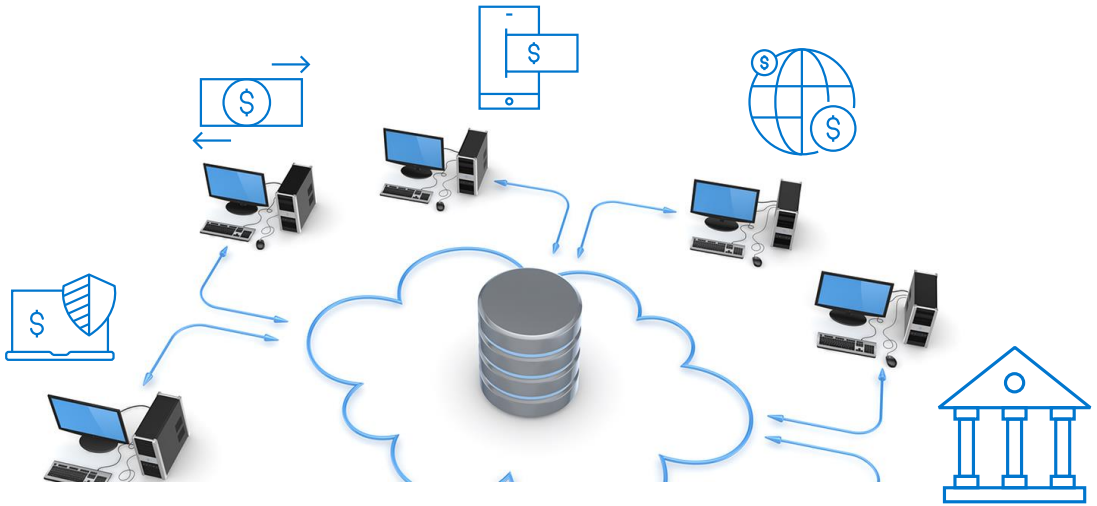
Financial Services Industry (FSI) challenges

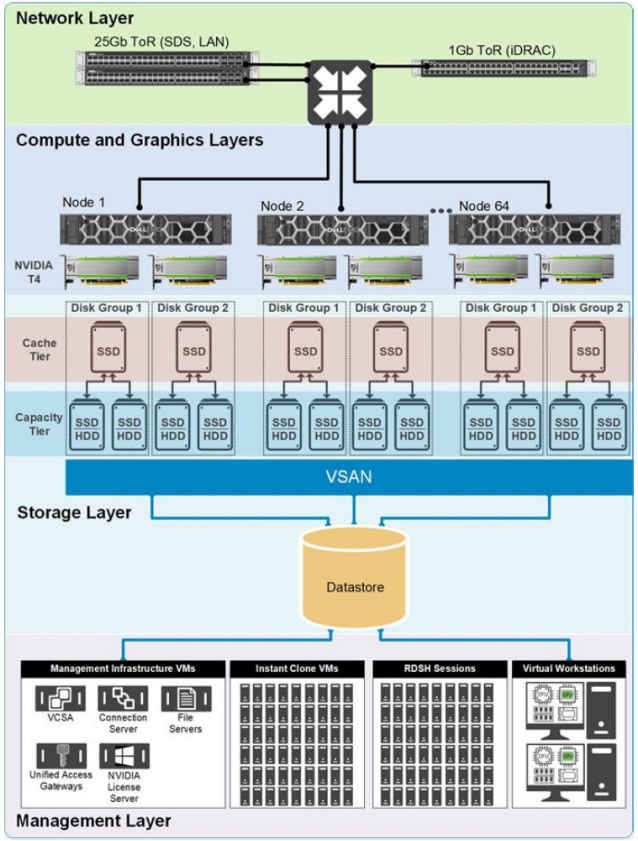
FSI environments have a wide range of requirements that affect sizing and infrastructure design

- Remote working and workforce flexibility, in an industry where this was not traditionally the norm
- Security has always been of the utmost importance, and even more so now with remote work environments
- Business continuity and resilience under all conditions
- Complexity of a diverse and specialized user population, with numerous different user types or personas



Solution architecture

- In this project, Dell Technologies designed and validated an HCI architecture based on Dell VxRail V570F with NVIDIA T4 GPUs, VMware Cloud Foundation software, and VMware Horizon VDI software
- Other valid infrastructure choices for FSI may include Converged Infrastructure (CI) such as Dell VxBlock 1000, or a discrete three-tier architecture based on Dell PowerEdge servers, PowerSwitch networking, and PowerStore, PowerScale, or PowerMax storage
- We have also specified and validated the configurations for several different user personas common to FSI organizations



VxRail Hyperconverged Infrastructure

FSI user personas

The FSI segment has multiple specialized user types, or personas. This solution has been designed to support the following personas:

- **Front Office/Branch Worker** – Typically perform common tasks within a small set of dedicated applications, often customer-facing in a branch office, such as bank tellers or customer service reps
- **Knowledge Worker** – Back office workers and managers who analyze information and create documents, reports, and presentations, with flexibility to work from the office or from home
- **Software Developer** – Develop, run, and test software, with flexibility to work in an office, at home, or geographically remote or off-shore
- **Financial Trader** – Users in the FSI industry who have intensive graphics and compute requirements in order to display real-time financial data and video streams on multiple high-resolution monitors, with flexibility to work from more than one office

Bloomberg Terminal used by Trader persona

VDI Vertical:
Geographic Information Systems

GIS applications with Esri ArcGIS Pro

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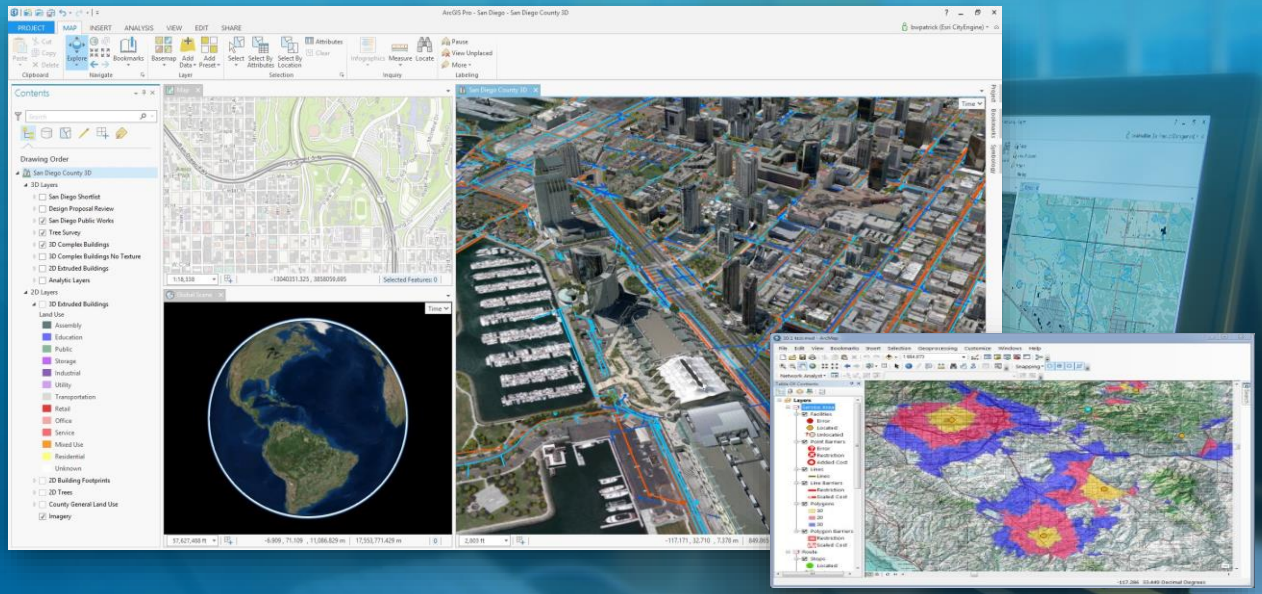
Esri ArcGIS Pro

Professional Geographic Information Systems (GIS) Software that transforms data into specialize maps with actionable information

Supports

- Mapping
- Editing
- Data management
- 2D/3D visualization
- Geospatial analysis
- Imagery analysis
- Advanced cartography



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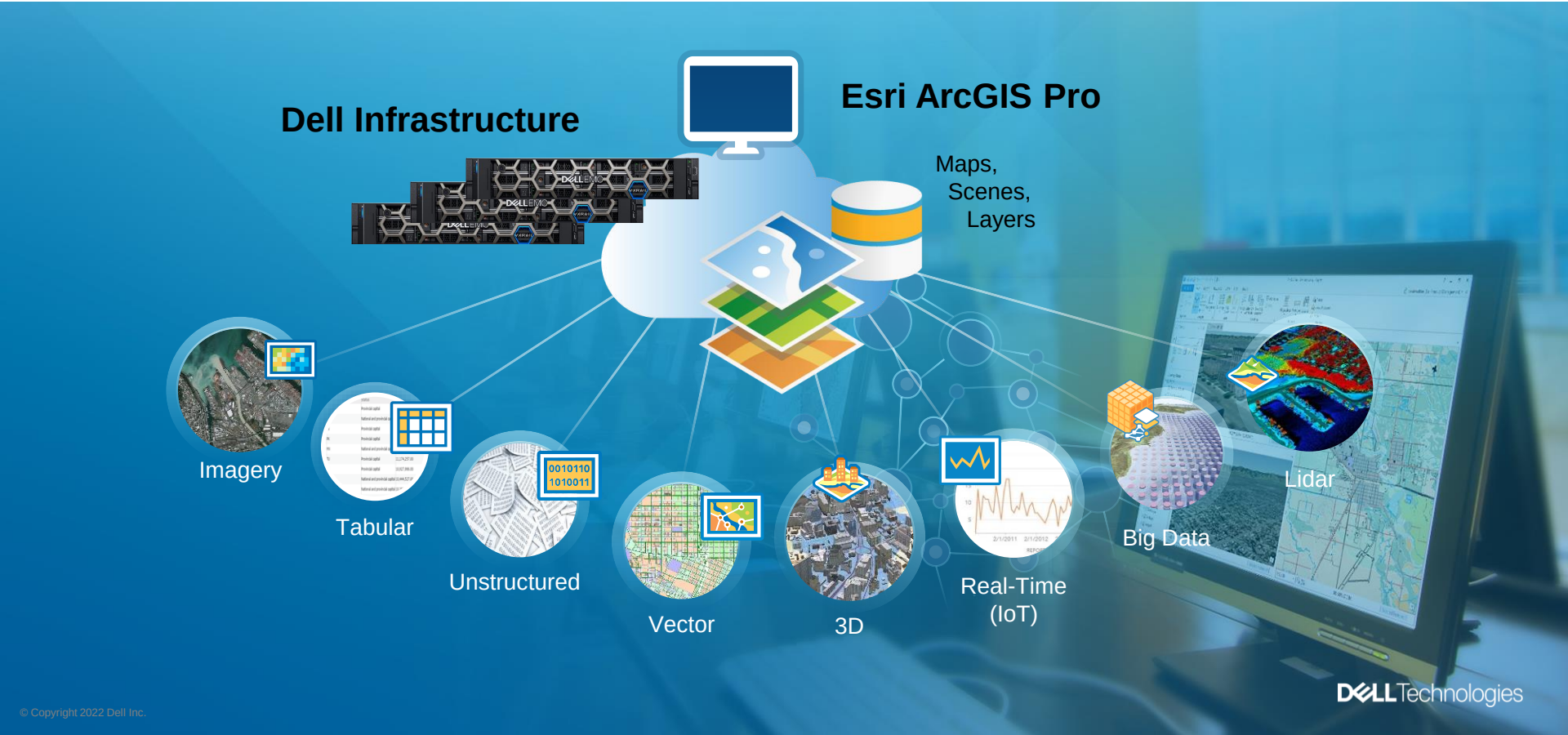
Works with numerous geographic data sources

and runs on Dell VDI infrastructure



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Esri ArcGIS Pro on Dell VDI infrastructure

Validated reference architectures based on Virtual Desktop Integration (VDI) using VMware Horizon, with two reference designs available:

- Hyperconverged infrastructure with VxRail and vSAN storage
- Three-tier architecture with PowerEdge servers and dedicated storage
  - Dell PowerEdge servers
  - Dell PowerSwitch networking environment.
  - Dell storage, with choice of PowerStore T, PowerMax, or PowerScale

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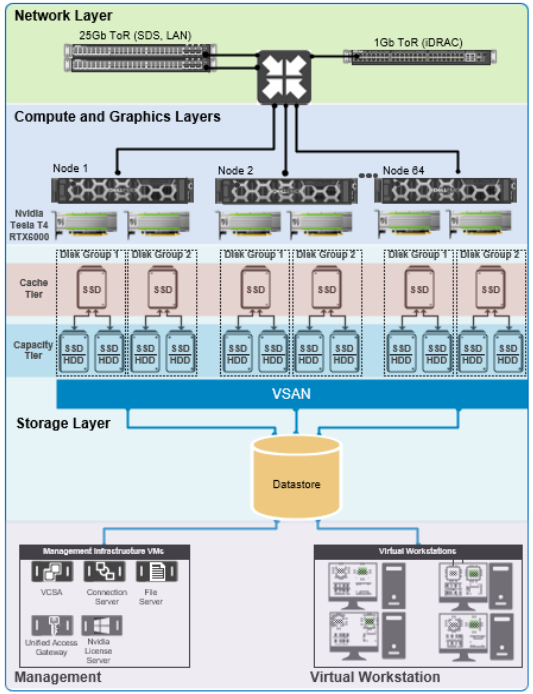
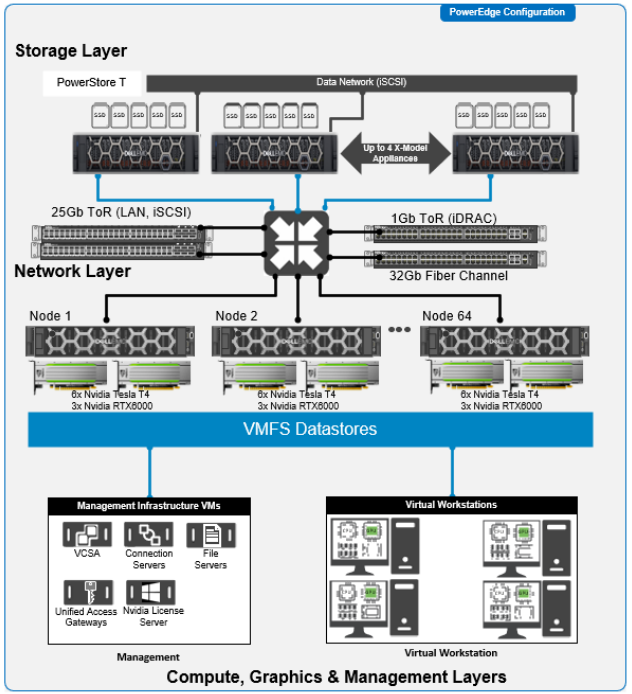
Choice of ArcGIS Pro reference architectures on Dell Infrastructure



VxRail hyperconverged infrastructure



Three-tier Architecture

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VDI Vertical: Healthcare

GPU Resource Sharing for VDI and AI Workloads in a Healthcare Environment

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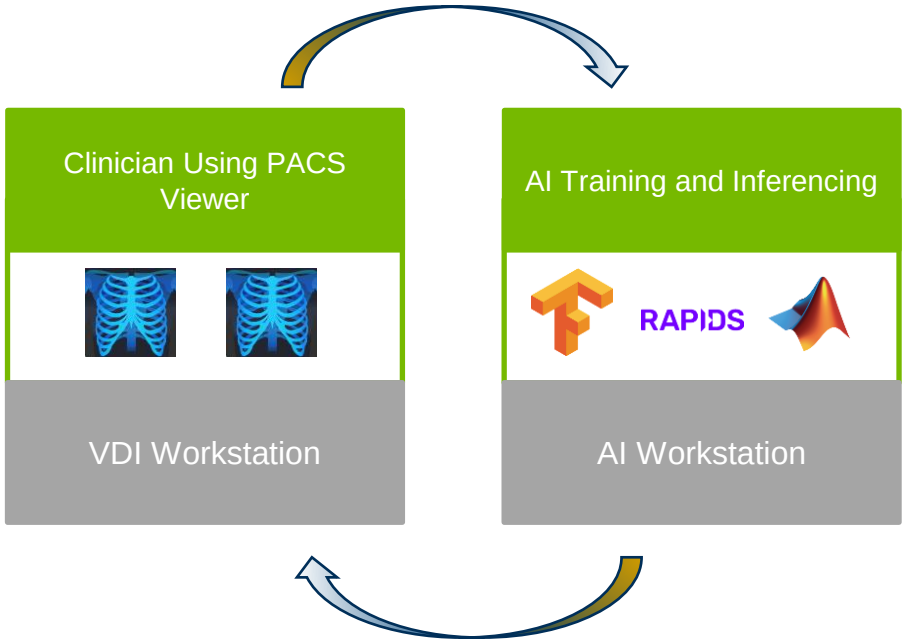
Overview

GPU Resource Sharing for VDI and AI Workloads in a Healthcare Environment

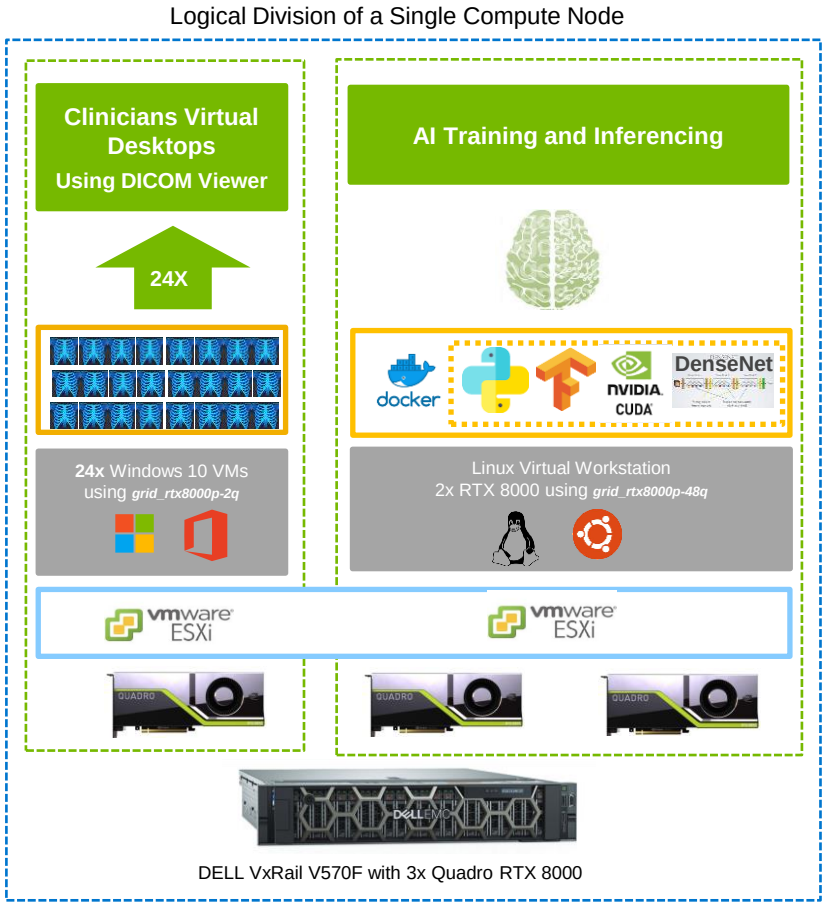


- Reference architecture for a GPU-enabled shared VDI and AI infrastructure
- Supports running VDI and AI workloads either sequentially or simultaneously
- Allows organizations to harvest underutilized GPU capacity
- Sometimes thought of as “VDI by day, compute by night”
- Runs on Dell VxRail hyperconverged infrastructure, VMware Horizon 8, and NVIDIA RTX 8000 GPUs,

Solution Architecture

High-level view of the reference architecture, showing the logical division of a single compute node

- This example shows VDI and AI compute workloads running in parallel, with one GPU assigned to VDI and two to AI
- When the VDI and AI workloads run consecutively, each workload has all three GPUs assigned to it when running



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VxRail Hardware Node Configurations for VDI

VxRail	**Management Optimized** Offers a scalable and value targeted configuration that meets the required compute and I/O demands	**Density Optimized** Offers an abundance of high performance features and components selected to maximize user density
Platform	E560F	V570F
CPU	2x Intel Xeon Silver 4214 (2.2GHz, 12C, 85W)	2x Intel Xeon Gold 6248 (2.5GHz, 20C, 150W)
Memory	12x 16GB 2933MT/s RDIMMs Effective speed: 192GB @ 2400MT/s	12x 32GB, 12x 16GB 2933MT/s RDIMMs Effective speed: 768GB@ 2933MT/s
Storage Controller	HBA 330	HBA 330
Boot Device	2x 240GB BOSS in RAID1	2x 240GB BOSS in RAID1
Storage	1 - 2x 400GB SSD 2.5” (Cache) 1 - 8x 1.92TB SSD 2.5” (Capacity)	1 - 4x 800GB SSD 2.5” (Cache) 1 - 20x 1.92TB SSD 2.5” (Capacity)
Network	Broadcom 57414 DP 25 GbE SFP (NDC)	Broadcom 57414 DP 25 GbE SFP (NDC)
iDRAC	iDRAC9 Enterprise	iDRAC9 Enterprise
Power	2x 1100W PSUs	2x 2000W PSUs
Graphics	None	Up to 3x NVIDIA RTX 8000

GPU Poll question here

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GPU & VDI

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NVIDIA GPUs for Virtualization

Ampere Architecture and RTX

			Workstation Virtualization	Workstation Virtualization	Workstation Virtualization
GPU	**A100**	**A40**	**Quadro RTX 8000**	**Quadro RTX 6000**
GPU Architecture	NVIDIA Ampere	NVIDIA Ampere	NVIDIA Turing	NVIDIA Turing
MEMORY SIZE	40 GB HBM2	48 GB GDDR6	48 GB GDDR6	24 GB GDDR6
VIRTUALIZATION WORKLOAD	Virtualized compute workloads such as AI, deep learning, and high-performance computing (HPC) with NVIDIA Virtual Compute Server (vCS). Upgrade path for V100/V100S Tensor Core GPUs.	Mid-range to high-end 3D design and creative workflows with NVIDIA® Quadro® Virtual Data Center Workstation (Quadro vDWS). Virtualized AI with NVIDIA vCS. Upgrade path for Quadro RTX™ 8000, Quadro RTX 6000.	High-end rendering, 3D design, and creative workflows with Quadro vDWS.	Mid-range to high-end rendering, 3D design, and creative workflows with Quadro vDWS.
vGPU SOFTWARE SUPPORT	NVIDIA Virtual Compute Server (vCS)	Quadro vDWS, NVIDIA GRID® Virtual PC (vPC), GRID Virtual Apps (vApps), vCS	Quadro vDWS, GRID vPC, GRID vApps, vCS	Quadro vDWS, GRID vPC, GRID vApps, vCS

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NVIDIA GPUs for Virtualization

Volta, Turing, Maxwell and Pascal Architectures

		VDI Workstation Virtualization	VDI	VDI Workstation Virtualization
GPU	**V100**	**T4**	**M10**	**P6**
GPU Architecture	NVIDIA Volta	NVIDIA Turing	NVIDIA Maxwell	NVIDIA Pascal
CUDA CORES	5,120	2,560	2,560 (640 per GPU)	2,048
MEMORY SIZE	32/16 GB HBM2	16 GB GDDR6	32 GB GDDR5 (8 GB per GPU)	16 GB GDDR5
VIRTUALIZATION WORKLOAD	Ultra-high-end rendering, simulation, and 3D design with NVIDIA Quadro vDWS. AI, deep learning, and data science with NVIDIA vCS. Ideal upgrade path for V100.	Entry-level 3D design and engineering workflows with Quadro vDWS. High-density, low-power GPU acceleration for knowledge workers with NVIDIA GRID software. AI, deep learning, and data science with vCS	Knowledge workers using modern productivity apps and Windows 10 requiring best density and total cost of ownership (TCO). Multi-monitor support with NVIDIA GRID vPC and vApps.	For customers requiring GPUs in a blade-server form factor. Ideal upgrade path for M6.
vGPU SOFTWARE SUPPORT	Quadro vDWS, GRID vPC, GRID vApps, vCS	Quadro vDWS, GRID vPC, GRID vApps, vCS	Quadro vDWS, GRID vPC, GRID vApps	Quadro vDWS, GRID vPC, GRID vApps, vCS

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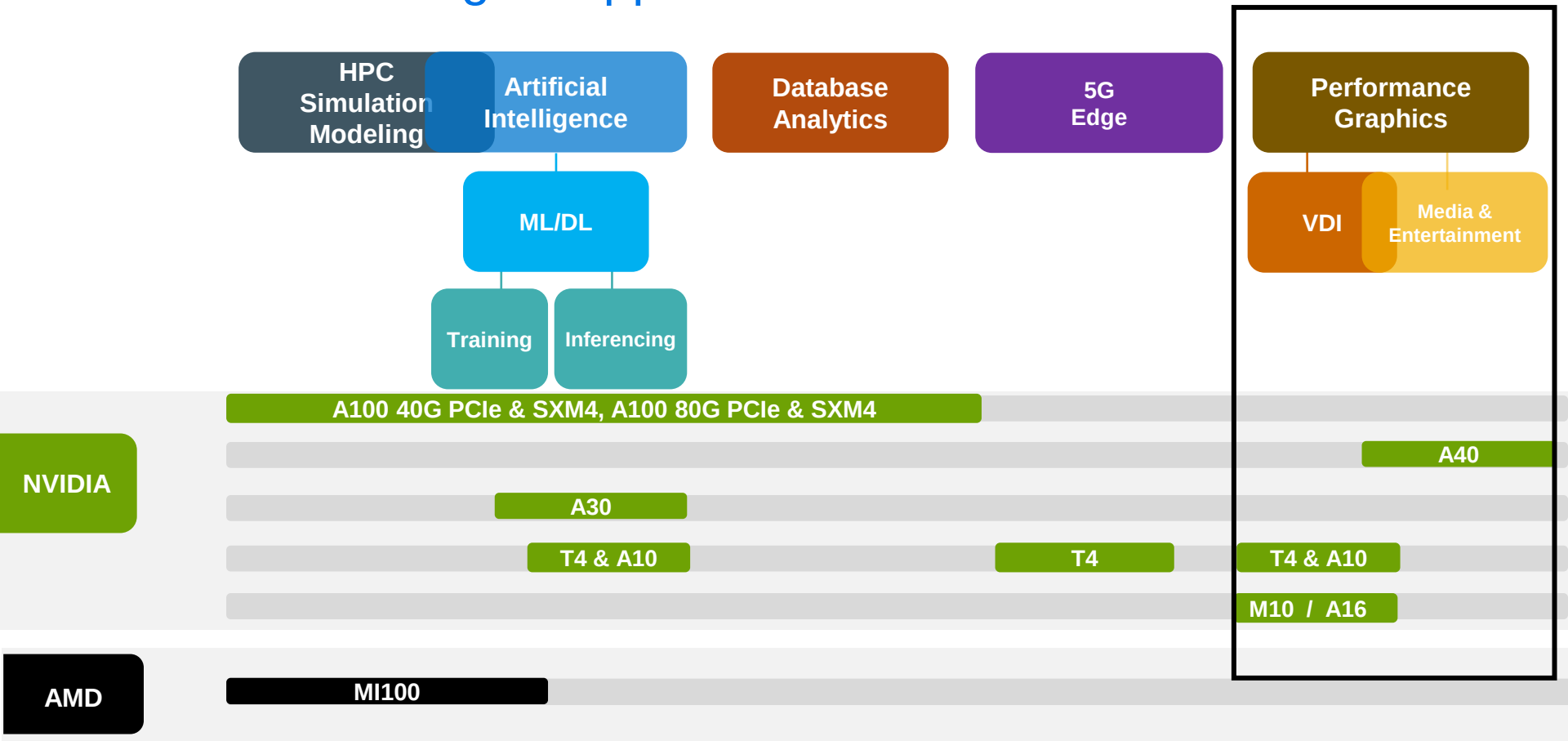
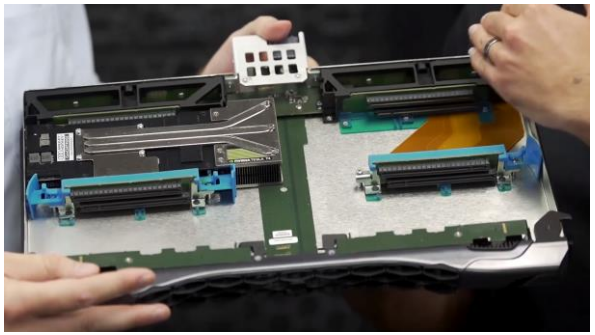
Accelerator Offerings Mapped to Workload



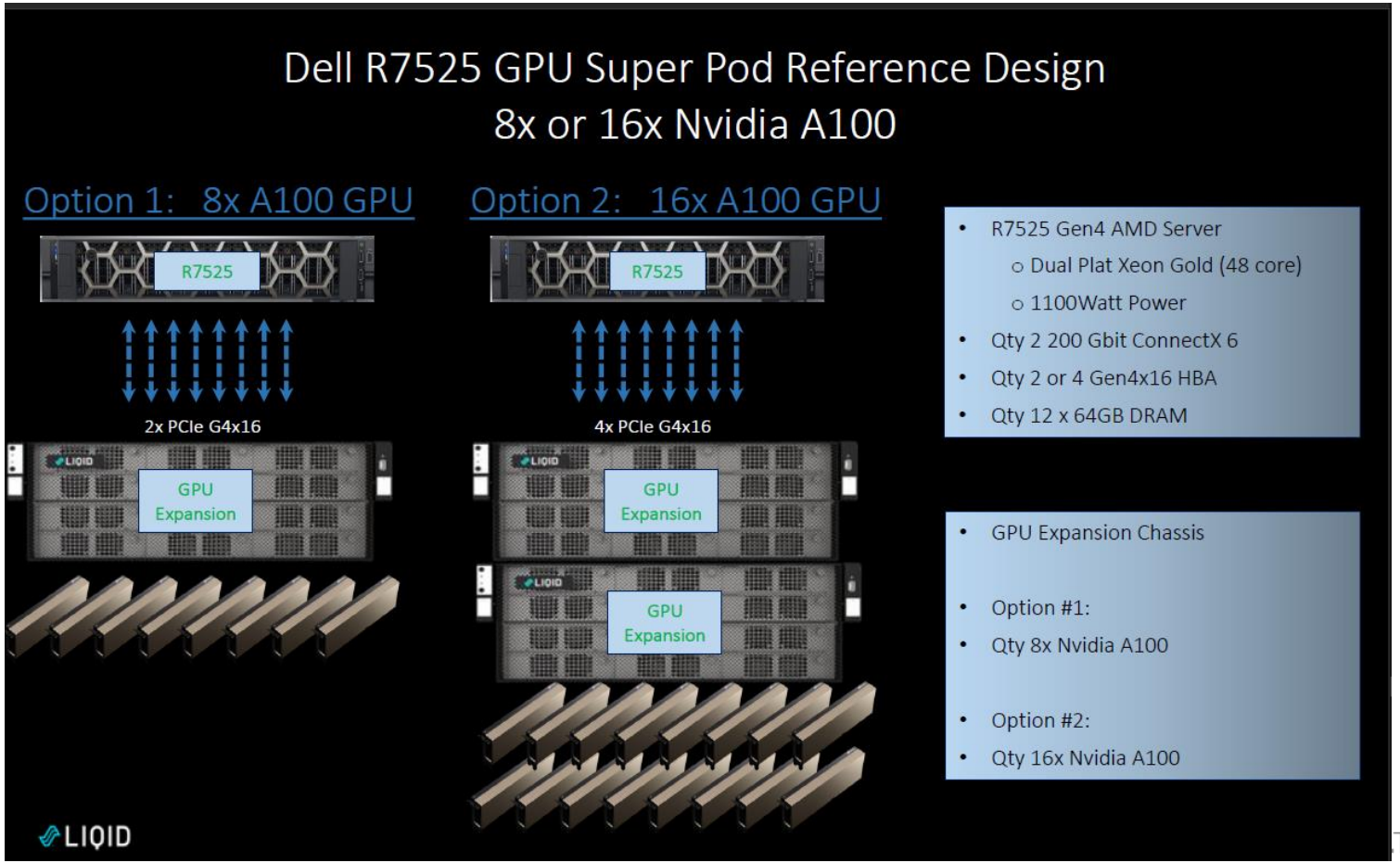
3rd Party GPU Solution - Amulet Hotkey



Amulet Hotkey Specs

- 2 NVIDIA Tesla T4 GPU cards per CoreCartridge
- 4 CoreCartridges per CoreModule
- 2 CoreModules in an MX7000 chassis
- Up to **16 x T4 GPU cards for 256GB vRAM** per chassis
- Installed in the B1 and B2 Fabric.

3rd Party GPU Solution - LIQID

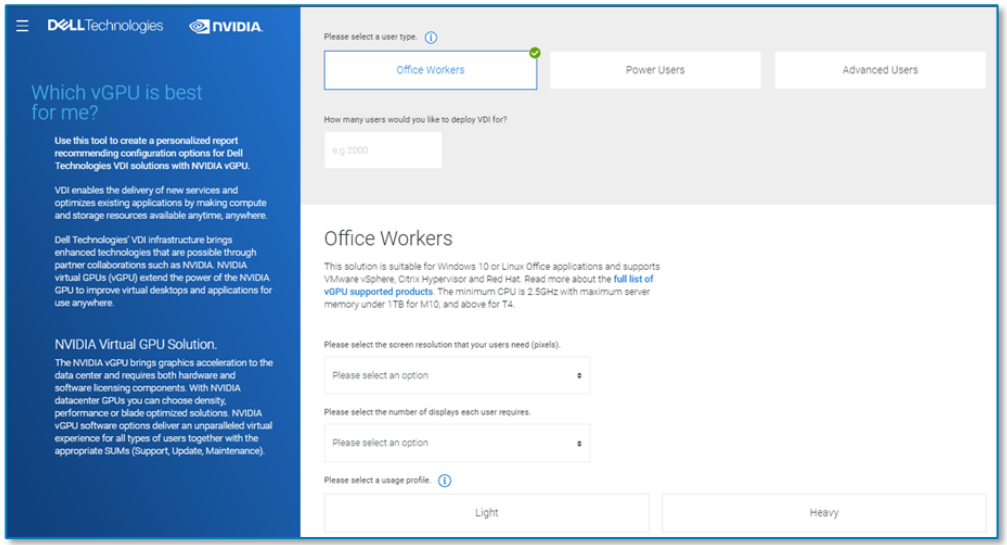


Virtual GPU Recommender

A new online tool to help drive more VDI business with your customers

What is the Virtual GPU Recommender?

By answering a few simple questions online, the Virtual GPU Recommender immediately creates a personalised, downloadable report recommending configuration options for Dell VDI solutions with NVIDIA GPUs and software.



Virtual GPU Recommender

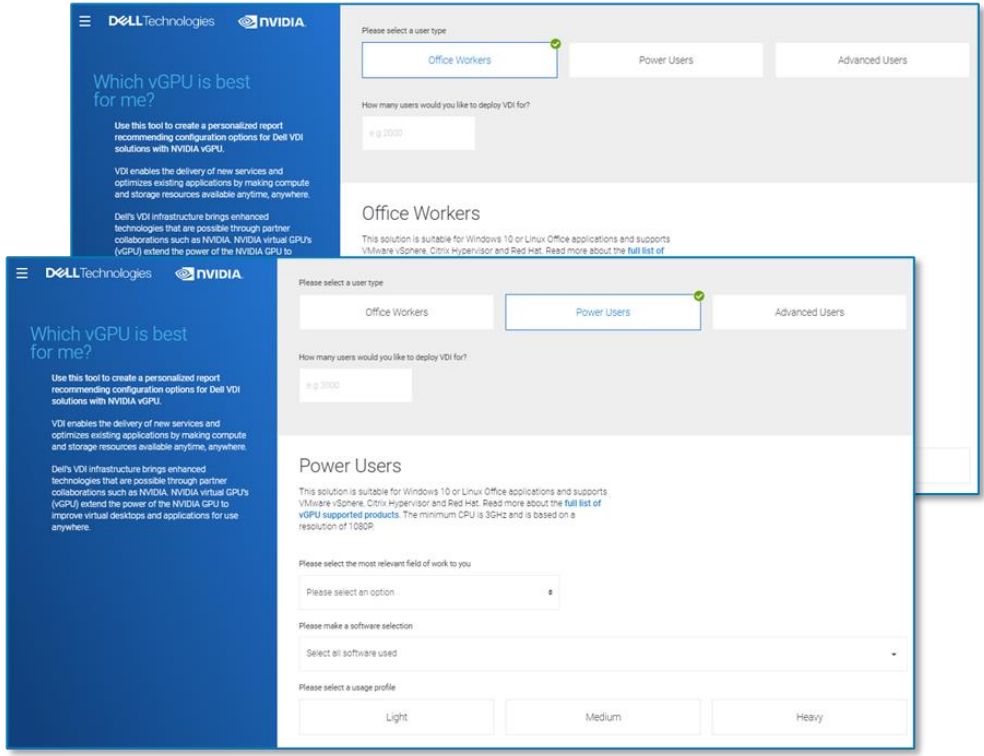
Easy to use and personalise

Report customisation options includes:

- Three user types: Office Workers, Power Users & Advanced Users
- Screen resolution
- User densities & profiles
- Power Users include the most popular ISV applications by industry vertical

Advanced Users:

- This section highlights the new capabilities of Dell VDI and NVIDIA GPUs including Artificial Intelligence and Machine Learning



https://dellgpu.com/recommender/

Thank you!!

Sunny Arogunmati

Key resources:
Virtual Desktop Infrastructure (VDI) | Dell Technologies

Sunny.Arogunmati@dell.com

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