Virtual Workstations
Delivering workstation class applications from the cloud

Learn more. Here:
Key challenges for organizations today

- Valuable IP resides on distributed tower and mobile workstations
- Each workstation and workspace needs to be individually managed
- Scaling up or scaling down is inefficient and burdensome
- Limited mobility and poor workflow as data needs to be shipped back & forth

Why consider virtual workstations?

Virtual workstations enable organizations to deliver graphics-rich workstation class applications from the cloud while enabling greater levels of data security, workforce collaboration and user mobility.

Target audience

The following industries benefit most from virtual workstations:

- Media and Entertainment
- Architecture and Engineering
- Manufacturing and Construction
- Oil and Gas
- Others

Benefits of centralizing workstation resources
Centralizing workstation resources

- Valuable IP resides in the data center and not at the endpoints
- User workspaces can be managed centrally freeing up valuable IT resources
- New users can be added or removed easily, and infrastructure resources can be used more efficiently
- Mobility is enhanced since applications and data are centralized and can be accessed via a variety of endpoints

What Dell brings to the table

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Market leading technology</td>
<td>Proven expertise in workstation and desktop virtualization</td>
</tr>
<tr>
<td>Open architecture</td>
<td>Leverages best-in-class hardware and software via an open standards based architecture</td>
</tr>
<tr>
<td>ISV certifications</td>
<td>Certified by key ISVs with per application performance guidance and hardware configurations for each workload</td>
</tr>
<tr>
<td>End-to-End solutions</td>
<td>One vendor – Dell – from the datacenter to the endpoint</td>
</tr>
</tbody>
</table>

Adopting virtual workstations
Two models for adopting virtual workstations

Wyse Datacenter for Virtual Workstations
- Validated combinations of server, storage, networking and software elements
- Broadest choice of options for organizations that want flexibility

Dell Precision Appliance for Wyse
- Pre-sized validated appliance configuration options that support dedicated and shared GPU modes
- Designed around simplify for rapid deployment with limited virtualization expertise needed

Common Capabilities
- Certified by leading ISVs
- End-to-end solutions
- Thin Clients and other end supported
- Supported by Dell Services

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Dell Precision Appliance for Wyse - overview

Highlights

- 2U pre-configured appliance that deploys in 5 minutes or less; built on top of the Dell Precision Rack 7910
- Supports up to 3 users per appliance in dedicated GPU mode, and 4 or 8 users per appliance in GRID vGPU mode
- Leverages Teradici PCoIP technology for the best remote user experience
- Certified by key ISVs such as Siemens, PTC and more coming

Use Cases

- Improve workforce collaboration, data security, workspace management and user mobility
- Deliver high-performance user workspaces while benefiting from cost advantages that virtualization offers
- Build out a virtual workstation environment quickly with limited virtualization expertise and IT staff
Two configuration options

<table>
<thead>
<tr>
<th></th>
<th>Dedicated GPU</th>
<th>Shared GPU</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graphics Architecture</td>
<td>GPU Pass-Through</td>
<td>NVIDIA GRID vGPU</td>
</tr>
<tr>
<td># of Users / Appliance</td>
<td>3</td>
<td>4 or 8</td>
</tr>
<tr>
<td>Workstation Platform</td>
<td>Precision R7910</td>
<td>Precision R7910</td>
</tr>
<tr>
<td>Graphics Cards</td>
<td>3 x NVIDIA Quadro K4200</td>
<td>2x NVIDIA GRID K2A</td>
</tr>
<tr>
<td>Hypervisor</td>
<td>VMware ESXi 5.5 U2</td>
<td>VMware ESXi 6</td>
</tr>
<tr>
<td>Desktop Virtualization Broker</td>
<td>VMware Horizon View 5 or 6.1 (optional)</td>
<td>VMware Horizon View 6.1</td>
</tr>
<tr>
<td>Connection Method</td>
<td>Tera2 Direct Connect</td>
<td>Horizon View Direct Connect Agent</td>
</tr>
<tr>
<td>CUDA Support</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>User OS</td>
<td>Linux, Windows</td>
<td>Windows</td>
</tr>
<tr>
<td>WAN Support</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Thin Client Recommended</td>
<td>5000 series PCoIP zero client for VMware</td>
<td>5000 or 7000 series PCoIP zero clients for VMware</td>
</tr>
<tr>
<td>Maximum Display Resolution</td>
<td>1 @ 2560x1600 / 2 @ 1920x1200</td>
<td>1 @ 2560x1600 / 2 @ 1920x1200 or 1 @ 2560x1600 / 2 @ 2560x1600 / 4 @ 1920 x 1200</td>
</tr>
</tbody>
</table>
# Hardware specifications

<table>
<thead>
<tr>
<th></th>
<th>Dedicated GPU (GPU Pass-thru)</th>
<th>Shared GPU (NVIDIA GRID vGPU)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CPU</strong></td>
<td>Option 1: (2) Intel Xeon E5-2643 v3 (6C, 3.4 GHz, 15M, 135W)</td>
<td>Option 1: (2) Intel Xeon E5-2643 v3 (6C, 3.4 GHz, 15M, 135W)</td>
</tr>
<tr>
<td></td>
<td>Option 2: (2) Intel Xeon E5-2680 v3 (12C, 2.5 GHz, 30M, 120W)</td>
<td>Option 2: (2) Intel Xeon E5-2680 v3 (12C, 2.5 GHz, 30M, 120W)</td>
</tr>
<tr>
<td><strong>Memory</strong></td>
<td>Default: 128 GB DDR4</td>
<td>Default: 128 GB DDR4</td>
</tr>
<tr>
<td></td>
<td>Option 1: 192 GB DDR4</td>
<td>Option 1: 192 GB DDR4</td>
</tr>
<tr>
<td></td>
<td>Option 2: 256 GB DDR4</td>
<td>Option 2: 256 GB DDR4</td>
</tr>
<tr>
<td></td>
<td>Option 3: 512GB DDR4</td>
<td>Option 3: 512GB DDR4</td>
</tr>
<tr>
<td><strong>Graphics</strong></td>
<td>(3) NVIDIA Quadro K4200</td>
<td>(2) NVIDIA GRID K2A</td>
</tr>
<tr>
<td><strong>Storage</strong></td>
<td>Default: (4) 900GB@10K – RAID 10</td>
<td>Default: (4) 900GB@10K – RAID 10</td>
</tr>
<tr>
<td></td>
<td>Option 1: (8) 900GB@10K – RAID 10</td>
<td>Option 1: (8) 900GB@10K – RAID 10</td>
</tr>
<tr>
<td><strong>Network</strong></td>
<td>At least 4x 1 gigabit network cables (1-4) Intel X540 NDC (2x 10GbE, 2x 1GbE)</td>
<td>At least 4x 1 gigabit network cables (1-4) Intel X540 NDC (2x 10GbE, 2x 1GbE)</td>
</tr>
<tr>
<td><strong>Protocol</strong></td>
<td>(3) Teradici Tera2220 1Gbe Host Cards</td>
<td>Software based PCoIP support</td>
</tr>
</tbody>
</table>

**Quick Start Tool**

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Quick Start Tool allows for fast deployments

Deploy in 5 minutes or less

- GUI-based tool that can be easily downloaded and installed
- Step by step process that reduces complexity of deployment and speeds up time to deploy
- 3 Steps to Configure:
  1. Host Connection
  2. Host Graphics Configuration
  3. Host Configuration

Quick Start Tool for Dell Precision Appliance for Wyse

Configure Host
  Welcome
  Host Connection
  Host Graphics Configuration
  Host Configuration

Configure VM
  VM Configuration

Deploy Configuration
  Review
  Finish

Getting Started
The purpose of this wizard is to configure the basic settings required to begin using the Quick Start Tool for Dell Precision Appliance for Wyse.
Before you begin, it is recommended to gather the following information:
- Dell Precision Workstation Management IP address
- Dell Precision Workstation Management username and password
- Optional: IP addresses of up to two NTP servers.
- Optional: Host License
- Hostnames for the virtual machines.
- The type of operating system for each virtual machine.

Configuration settings entered will only be deployed in the final step of this wizard. Values may be altered at any time prior to initiating the deployment. Please note that the Dell Precision Appliance for Wyse host will require a system reboot for proper configuration.

Wyse Datacenter

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Wyse Datacenter for Virtual Workstations - Solution Overview

At a glance, what is it?
The Wyse Datacenter for Virtual Workstations is an end to end solution that offers Precision-class high performance workstation functionality in a secure, efficient and optimized virtual desktop environment with certified applications.

ISV certification partners
- Autodesk
- PTC
- Siemens
- Dassault Systemes

Virtualization broker
- Citrix XenDesktop
- VMware Horizon View

Hypervisor
- Citrix XenServer
- VMware vSphere

Solution elements
- Precision Rack R7910 workstation
- EqualLogic and Compellent storage
- Force10 networking
- NVIDIA K1 and K2 GRID cards
- Wyse thin and zero cloud clients

Services
- Consulting, implementation, support, management

Applications from ISV certification partners

1st complete end-to-end virtual workstation solution that is ISV certified

Reference Architecture

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Benefits that you can expect

Greater workforce productivity and IT efficiency
• Reliable, secure and fast access to data and applications through a variety of endpoints, including mobile devices
• Need-based access to data and applications, and centralized enforcement of security policies
• Centralized management by IT of user workspaces and endpoints

High performance and reliability for demanding workloads
• Deliver high-performance user workspaces while benefiting from cost advantages that virtualization offers
• Highly available service delivery through Precision-class infrastructure reliability, and disaster recovery options

Rapid & flexible deployment with the freedom to scale
• End-to-end solutions that can be predictably and rapidly deployed, scaled and managed with limited virtualization experience or IT staff
• Users can be easily enabled or disabled as organizational needs change
• Certified by key ISVs w/ per application performance guidance for each workload

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Independent Software Vendor Certified

• Dell works with many software vendors (ISVs) to verify application and system compatibility
• Rigorous testing helps to optimize performance and reliability
• Gives you confidence that your applications will run as expected as you move to a virtualized environment

Certification Partners*

*At the time of publication. Additional ISV certification partners being added on an on-going basis
Dell Precision Rack R7910

Features

- Rack workstation platform, 2U form factor
- Intel Haswell-EP architecture
- Dual socket CPU platform running Intel Xeon E5-2600 v3 family of processors up to 160W and 18 cores
- Support for up to 1.0TB 2133MHz RAM
- Supports up to 8 x 2.5" SAS/SATA disks
- Support for up to 2 x nVidia GRID K2a (active) cards
- Support for up to 4 x discrete single width Gfx cards

Virtual Graphics Architectures

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**1:1 Assignment**
This model enables a 1 to 1 mapping between a compute node, which is paired with a high-end display adapter such as an NVIDIA GRID K1 or K2 graphics card, and a virtual desktop user. This model allows for the user to gain maximum performance at the expense of a higher per user cost since the user has dedicated use of the compute and graphics capabilities available.

**GPU Pass-Through**
Traditionally implemented as 1 compute node to 4 users, this model enables a physical GPU to be mapped to a virtual machine giving each user dedicated use of a single GPU. In this model, while compute capabilities are shared, a virtual desktop user has dedicated use of a GPU, enabling better performance for graphic intensive applications.

**Virtualized Graphics**
Known as vGPU, this model enables the virtualization of GPU. With vGPU technology, graphics commands of each virtual machine are passed directly to the GPU, without translation by the hypervisor. This allows the GPU hardware to be time-sliced to deliver the ultimate in shared virtualized graphics performance.
NVIDIA Kepler™ - based GRID Boards

Designed to enable rich graphics in virtualized environments

NVIDIA GRID™ technology offers the ability to offload graphics processing from the CPU to the GPU in virtualized environments, allowing the data center manager to deliver true PC graphics-rich experiences to more users for the first time.

**GPU Virtualization**
GRID boards allow hardware virtualization of the GPU. This means multiple users can share a single GPU, improving user density while providing true PC performance and compatibility.

**Low-Latency Remote Display**
NVIDIA’s patented low-latency remote display technology greatly improves the user experience by reducing the lag that users feel when interacting with their virtual machine. With this technology, the virtual desktop screen is pushed directly to the remoting protocol.

**Maximum User Density**
NVIDIA GRID boards have an optimized multi-GPU design that helps to maximize user density. GRID K1 boards, which include four Kepler-based GPUs and 16GB of memory, are designed to host the maximum number of concurrent users. GRID K2 boards, which include two higher end Kepler GPUs and 8GB of memory, deliver maximum density for users of graphics-intensive applications.
Enable access to workstation resources through a variety of endpoints

Thin and Zero Cloud Clients
Mobile Devices Tablets Mobile Phones
Laptops & Desktops
Re-purposed existing Devices

Wyse 7000 Series Platforms

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Wyse 7000 series platforms

Dual Core AMD
- Ideal for knowledge workers and power users
- Best peripheral support via optional PCI 2.0 slot
- Windows Embedded, SUSE Linux, and Cloud Desktop configurations available

Quad Core AMD
- Ideal for power users with graphics intensive workloads
- Optional support for up to 6 displays
- Windows Embedded, SUSE Linux, and Cloud Desktop configurations available

Teradici for VMware View
- Designed specifically for VMware View
- Ideal for knowledge workers and power users
- High performance PCoIP protocol

7000 Series Benefits

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Wyse 7000 series benefits

High performance & versatility
- Dual and quad core AMD processors offer uncompromising performance with fast, flexible user connectivity
- Supports the most demanding virtual desktop and cloud applications from HD video to 3D graphics

Class-leading connectivity
- Offers a broad range of fast, flexible connectivity options so one can enjoy their favorite peripherals and up to 6 digital displays
- Optional extended hardware platform offers connectivity to practically any Windows® peripheral

Highly scalable & easy to manage
- Every 7000 series model can be managed remotely with Wyse Device Manager (WDM) saving valuable IT resources
- WDM helps lower the TCO for large deployments and offers remote management that scales to tens of thousands of clients
What are your next steps?

Speak to Dell or contact a Dell PartnerDirect partner. Both will be able to offer consultancy, planning and advice.

1. Learn
Virtualize without compromise
Take your workstations to the next level without sacrificing on the user experience.

Learn more here

2. Discover
Get hands on and evaluate
Nothing beats seeing everything in action for yourself and evaluating it for your specific use case. Take advantage of the resources available at the Workstation Virtualization Center of Excellence at the Dell Solution Center.

Visit the Dell Solution Center

3. Engage
Plan for success
Meet with Dell or a Dell PartnerDirect partner who’ll help you plan, execute and activate your strategy.

Get in touch

Dell.com/workstationvirtualization
Onsite and remote access to Dell’s workstation virtualization solution and experts.

- No fiscal outlay to evaluate the Dell solution
- Access to Dell experts to support you in understanding and evaluating the solution
- Shorter times for implementation
- No disruption to your existing workflow

“Enables customers and partners to receive expert advice from Dell professionals on leveraging virtualized workstations and architecting a solution to best suit their business demands”
For detailed information on Dell Precision Appliance for Wyse, please visit
www.dell.com/precisionappliance

For general information on Dell’s Virtual Workstation Solutions, please visit
www.dell.com/workstationvirtualization

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