

High Performance Digital Workspace Infrastructure for VMware Horizon

Delivering high performance virtual and physical desktop infrastructure built for compute and graphically intense workload environments

CoreStation CX Platform Edition

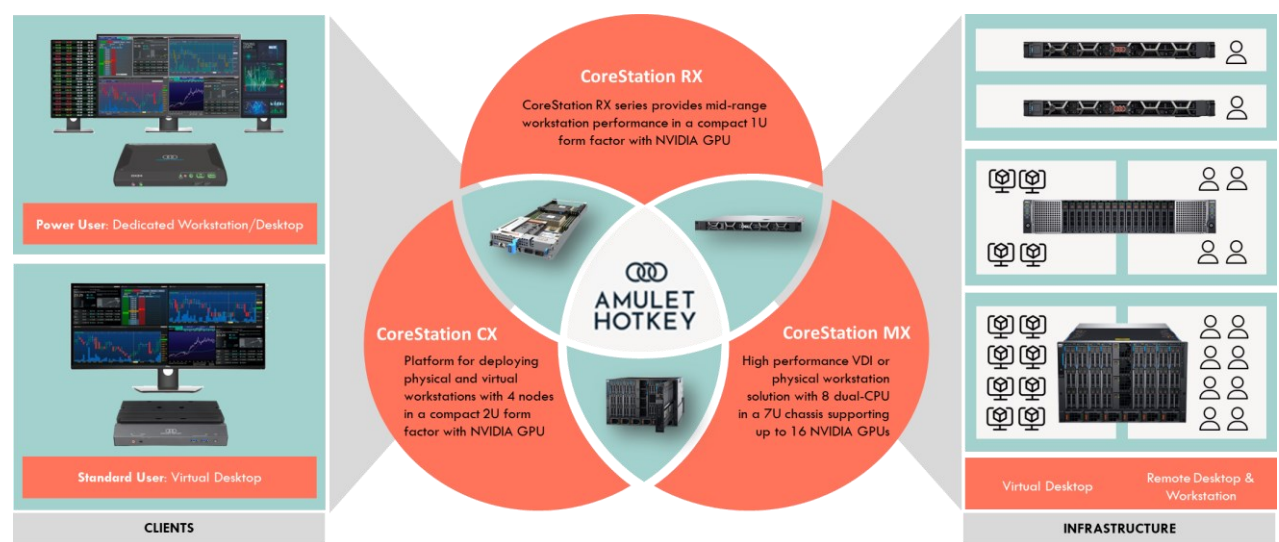
CORESTATION



EXECUTIVE SUMMARY

Amulet Hotkey solutions enable organizations to deploy a hybrid remote desktop environment to its employees. The ability to mix and match the different types of workloads against the diverse employee requirements and use cases is unique in the market.

Add in the client-side hardware devices serves for a complete end to end remote desktop solution that can fit all sizes regardless of the workload.



At the heart of the Amulet Hotkey infrastructure is the CoreStation range of servers. Available as 1U rack mount or modular 2U and 7U chassis, each CoreStation compute node has been optimized for performance and density. Especially when it comes to delivering hardware accelerated graphics where CoreStation can support more GPU resource than any other vendor.

As CoreStation is based on server class platforms, each node can support either a physical workstation on a 1:1 end user basis, or it can run a hypervisor enabling it to run multiple virtual desktop instances, both using the VMware Horizon digital workspace solution to deliver desktop compute resources. Whichever the CoreStation platform deployed, all are optimized for hardware accelerated graphics and provide greater user density than standard off the shelf solutions.

Common across the entire platform is the ability to manage all CoreStation nodes remotely, regardless of form factor, from a single management console that not only makes management simple but also to allow service provider partners to use Amulet Hotkey solution to deliver Desktop-as-a-Service solutions.

SOLUTION OVERVIEW

Infrastructure Platform: Amulet Hotkey CoreStation CX6620

This solutions brief is focused on delivering VMware Horizon based virtual desktops using the Amulet Hotkey CoreStation CX platform.

AMULET HOTKEY CORESTATION CX

CoreStation CX provides a common platform for deploying both physical and virtual workstations.

Utilizing a 2U enclosure, the CoreStation CX holds up to four nodes complete with fully redundant power and agent-free management. It supports native Windows 10 or 11 operating systems when deployed as dedicated workstations and VMware vSphere hypervisor for hosting virtual desktop infrastructure.



To support graphically intensive workloads, the CoreStation CX6620 supports up to two NVIDIA Virtual GPU (vGPU) graphics cards enabling higher performance or higher workload density.

TECH SPEC HEADLINES

COMPONENT	CONFIGURATION OPTIONS
CPU	Up to two 4th Generation Intel® Xeon® Scalable processors with up to 56 cores per processor
Memory	Up to 4800 MT/s RDIMM memory with 16 x DDR5 DIMM slots supporting up to 4TB RAM
Storage	Up to 16 x 2.5-inch SAS/SATA/NVMe (HDD/SSD) drives max 61 TB
Graphics (GPU)	Support for up to two NVIDIA L4 Tensor Core GPU 24 GB GDDR6 memory, x16 PCIe Gen4
Networking	Intel or Broadcom OCP 3.0 network adapter supporting up to Quad Port 10/25GbE

This solutions brief will take advantage of the CoreStation CX6620 flexibility to provide blueprint high-level baseline configurations for different use cases from high-end graphically intensive workloads, to standard office task-based users, including the infrastructure to support the platform.

SOLUTION OVERVIEW

Software Platform: VMware Anywhere Workspace with VMware Horizon

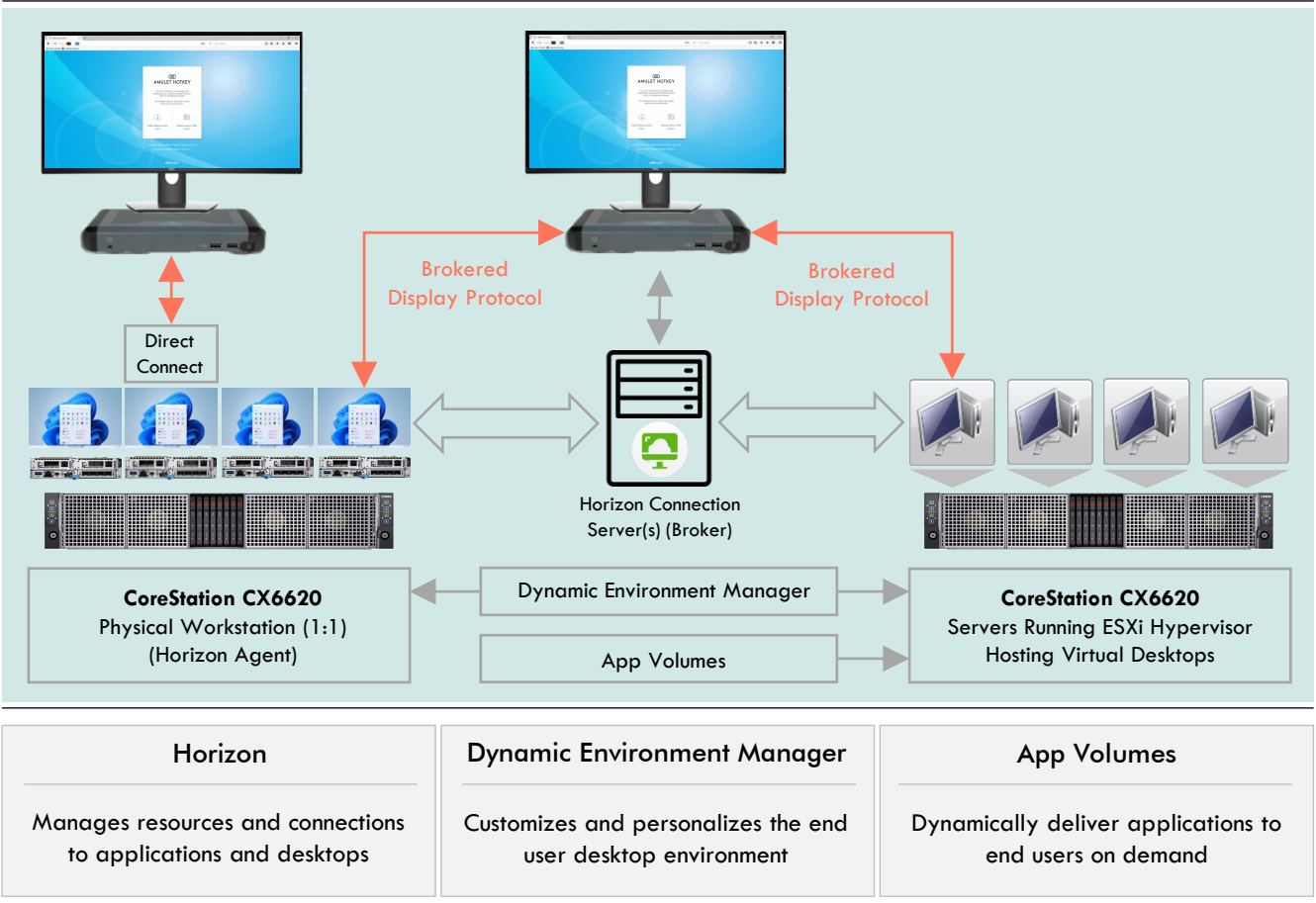
This solutions brief is focused on delivering VMware Horizon based virtual desktop machines using the Amulet Hotkey CoreStation CX solution as both the virtual desktop hosting platform (running the hypervisor) and as physical 1:1 workstations (bare metal desktop OS) both using VMware Horizon to deliver the end user desktop experience.

VMware Horizon Digital Workspace Solution

With VMware Horizon, organizations can deliver remote virtual desktop machines, hosted applications, or connect to physical workstations (either brokered or direct connect) located centrally in the data center. The datacenter can be premises datacenter infrastructure or resources delivered from a cloud service effectively delivering desktops and applications as a managed service to both internal employees and external partners.

In terms of the end user experience, end users are delivered a familiar, personalized desktop or application environment from where they simply launch their virtual desktops, physical desktops, or applications using an end point client device. Administrators gain centralized control, efficiency, and security by having desktop data in the data center.

Core to the VMware Horizon solution for managing and delivering virtual desktop machines, physical desktop machines or hosted applications is the connection broker that connects end users to their resources:



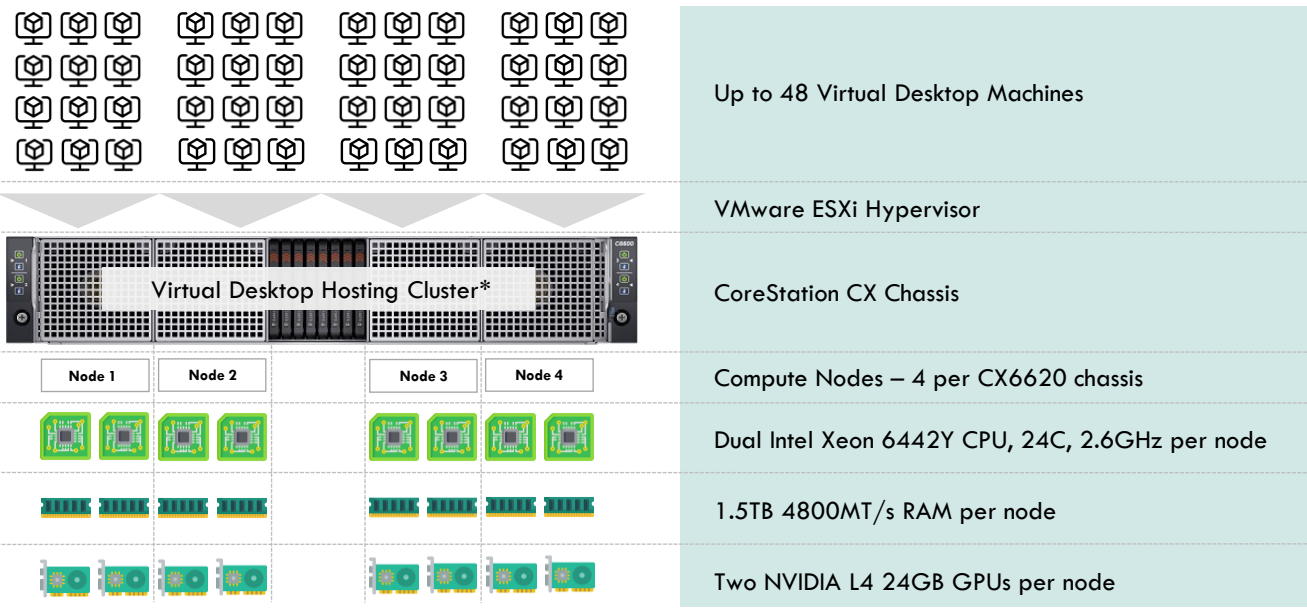
SOLUTION ARCHITECTURE

Blueprint for VDI Power Users

Power users are defined as those users that require large amounts of compute resource to perform their job role. This is down to the fact that the applications being used require more processing power, more memory, and access to hardware-based accelerated graphics.

ARCHITECTURE FOR CX POWER VDI USERS

This blueprint architecture for power VDI users provides consists of the following CoreStation CX6220 infrastructure built on a modular approach to be able support 48 VDI power users utilizing a 4GB graphics profile:



*Cluster Resources: 384 vCPUs, 6TB RAM, 192GB GPU Memory | Virtual CPU = Physical CPU (8 sockets x 24 cores) x2 with hyperthreading enabled

MODULAR APPROACH FOR 48 CX POWER VDI USERS

The power VDI blueprint in this example delivers 48 virtual desktop machines per each 2U chassis. Each virtual desktop, when resources are shared equally, delivers the following virtual hardware configuration:

Eight vCPUs, 64GB RAM, and a 4GB vGPU profile

FLEXIBILITY FOR CX POWER USERS

With the flexibility of CoreStation and VMware virtual desktops, this blueprint architecture for power VDI allows for easy flexibility and the ability to increase the virtual hardware configuration (less end users) or decrease the virtual hardware configuration (more end users). For example, if each end user required an 8GB vGPU profile this would result in 6 end users per node and 24 end users per 2U chassis. This would also allow the virtual desktop machines to increase their virtual hardware configuration to an eight-core vCPU and 128GB RAM.

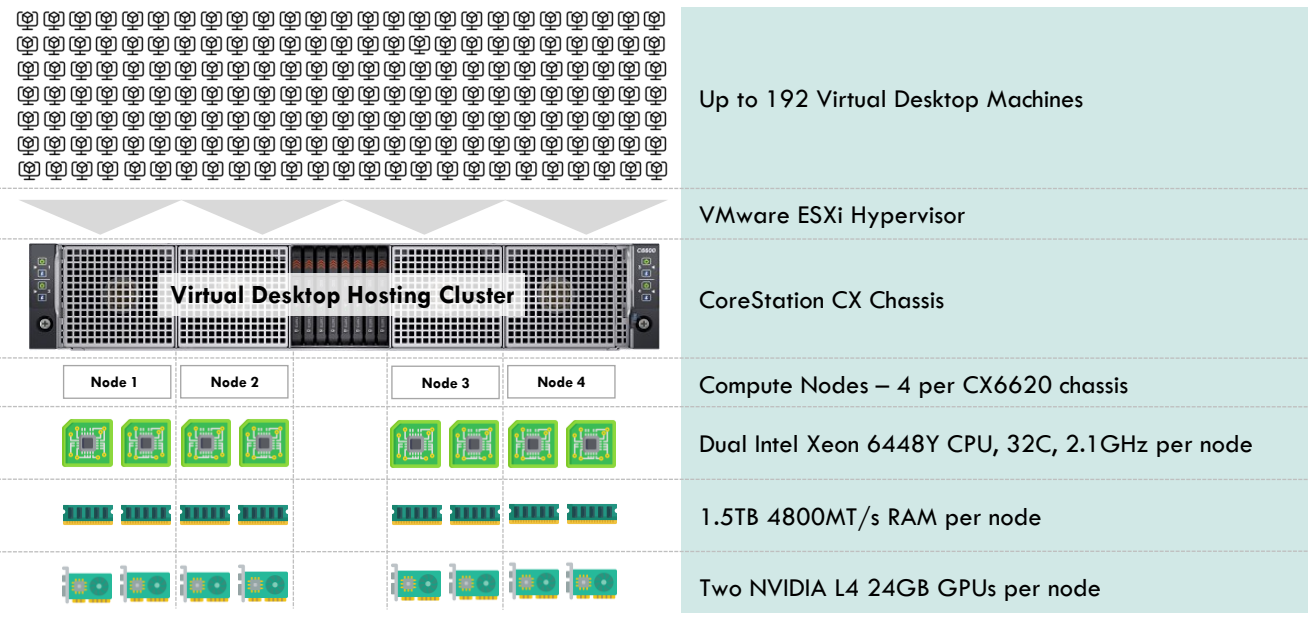
SOLUTION ARCHITECTURE

Blueprint for VDI Standard Users

Standard users are defined as those users that don't require large amounts of compute resource to perform their job role. Typically, this is due to the applications being used are standard office productivity type of application which simply don't support multiple CPUs or large amounts of memory.

ARCHITECTURE FOR CX STANDARD VDI USERS

This blueprint architecture for power VDI users provides consists of the following CoreStation CX6220 infrastructure built on a modular approach to be able support up to 192 VDI standard task-based end users:



*Cluster Resources: 384 vCPUs, 6TB RAM, 192GB GPU Memory | Virtual CPU = Physical CPU (8 sockets x 24 cores) x2 with hyperthreading enabled

SUPPORT FOR 200 CX STANDARD TASK-BASED VDI USERS

The power VDI blueprint in this example delivers approximately 200 virtual desktop machines per each 2U chassis. Each virtual desktop, when resources are shared equally, delivers the following virtual hardware configuration:

Dual vCPUs, 16GB RAM, and a 1GB vGPU profile

FLEXIBILITY FOR STANDARD USERS

With the flexibility of CoreStation and VMware virtual desktops, this blueprint architecture for power VDI allows easy flexibility and the ability to increase the virtual hardware configuration (less end users) or decrease the virtual hardware configuration (more end users). For example, if each end user doesn't require hardware accelerated graphics, then you can increase the total memory capacity of the hosting servers allowing you to increase the user density per node. If each end user only needed a single processor core, then you could support up to 250 end users per 2U chassis as a maximum.

SOLUTION ARCHITECTURE

Blueprint for 1:1 Remote Physical Workstation Users

As well as virtual desktop environments, the CoreStation CX6620 compute nodes can be used as physical workstations running a desktop operating system on the bare metal rather than hosted on a hypervisor to deliver VDI. As with VDI the advantage with this approach is that infrastructure is centrally located, and centrally managed using enterprise-class management tools with desktops being brokered using the VMware Horizon Connection Server.

For end users this delivers them the power of a physical dedicated workstation and for IT administrators the ability to broker both physical and virtual desktops using the same solution while still providing central management.

ARCHITECTURE FOR CORESTATION CX6620 PHYSICAL 1:1 USERS

The CoreStation CX6620 architecture for physical devices is like that of deploying a physical workstation, however the workstation is now deployed centrally in the data center rather than on the end user's desk.

The end user connects to the workstation remotely from an end point device (client) and the workstation, in addition to the other software it runs, is also running the VMware Horizon Agent. This enables VMware Horizon to broker a connection from the client to the physical workstation using the display protocol to deliver the desktop experience to the client. It also enables the redirection any local devices, such as USB devices, from the client to the remote workstation.

	Bare metal OS installation
	Up to four compute nodes per 2U chassis (0.5U each)
	CoreStation CX Chassis
Node 1Node 2Node 3Node 4	Compute Nodes – 4 per CX6620 chassis
	Intel Xeon 6442Y CPU, 24C, 2.6GHz per node
	128GB 4800MT/s RAM per node
	NVIDIA RTX A2000 6GB GPU per node
	M.2 NVMe SSD Drive 960GB

CORESTATION CX6620 FLEXIBILITY & SCALABILITY

The CoreStation CX6620 is fully scalable to meet end user demands and requirements. Each node can be configured with a second processor to provide additional processing power, with the maximum processor configuration being able to deliver up to 56 cores for CPU.

In this configuration an NVIDIA RTX A2000 graphics card has been deployed, however this can also scale to either an RTX A4000 ADA with 20GB, a T4 with 16GB, or an L4 with 24GB.

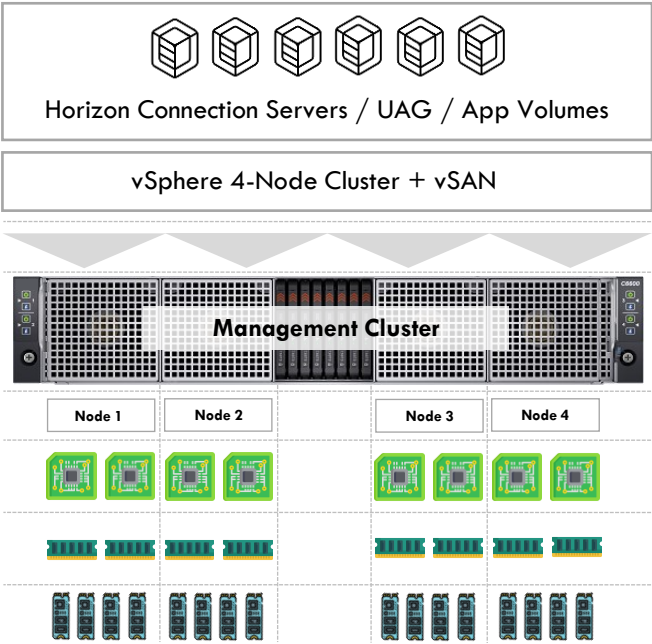
SOLUTION ARCHITECTURE

Blueprint for VMware Horizon VDI Management Infrastructure

To support the VMware Horizon infrastructure components, a management cluster is required to support the virtual server workloads such as the Horizon Connection Servers, Unified Access Gateways, and App Volumes. In this blueprint VMware vSAN is included to provide storage for both the management infrastructure and the virtual desktop management.

ARCHITECTURE FOR VDI MANAGEMENT

This blueprint architecture for the VDI management components uses the CoreStation CX6220 server infrastructure configured to deliver compute and storage resources to support the virtual servers required to support the delivery of the virtual desktop environment to end users.



Virtual Servers hosting Horizon Management Services

10TB vSAN (ESA) using 1.6TB storage devices

VMware ESXi Hypervisor

CoreStation CX Chassis

Compute Nodes – 4 per CX6620 chassis

Dual Intel Xeon 6442Y CPU, 24C, 2.6GHz per node

2TB 4800MT/s RAM per node

4 x NVMe Storage Devices (1.6TB to 6.4TB)

VMWARE HORIZON MANAGEMENT COMPONENTS

The core component of the Horizon solution is the Connection Server. The connection server is responsible for authenticating users, allocating virtual desktop resources based on the end user entitlement, and establishing connections.

Using the VMware pod and block reference architecture, each pod, made up of a number of resource blocks that host the virtual desktop machines, can support up to 12,000 end user connections by deploying a maximum of 7 fully redundant connection servers per pod. You can configure a maximum of 50 pods, each interconnected using the Cloud Pod Architecture Topology, enabling a maximum of 250,000 end users.

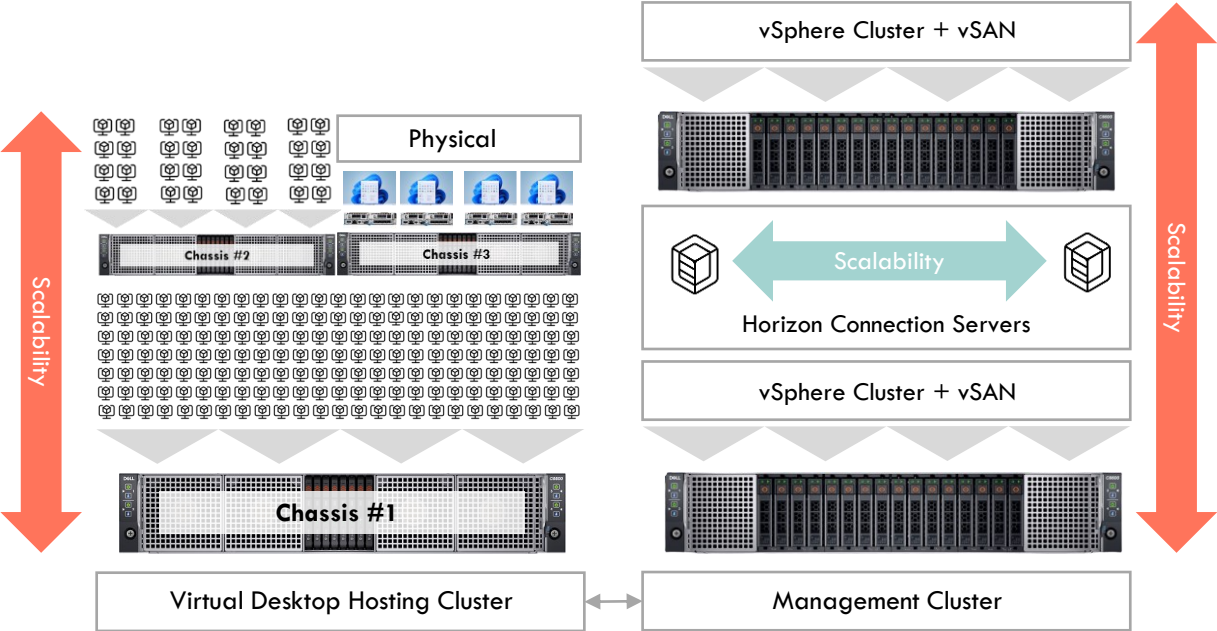
You can then add additional server workloads to deliver additional functionality such as Unified Access Gateways for external access, App Volumes for dynamic application delivery, and DEM to manage the end user environment.

SOLUTION ARCHITECTURE

Scalability

Within this solutions brief flexibility has been key in sizing and configuring the infrastructure platforms for supporting both the virtual desktop machines as well as the management platform.

Taking a modular approach to the infrastructure enables it to be easily scaled to accommodate additional end users. This can be to add additional servers to enable more virtual desktop machines to be supported, or to add additional resources to the management infrastructure to firstly ensure the management infrastructure can support the additional end users or to add new features and functionality that may require virtual machines to be added.



Flexibility is also achievable within the chassis itself. In the example above chassis #1 is built with server nodes configured to support up to 200 standard VDI users while chassis #2 is built with a configuration that supports up to 50 power VDI users. Chassis #3 is configured with compute nodes configured for use on a physical 1:1 basis.

In this blueprint each CoreStation CX chassis has been fully configured with the maximum four server nodes, however with the flexibility within this solution you need only to configure the resources required. For example, you may not need all 150 standard users deployed from day one, and so you could deploy just two server nodes to support approximately 75 end users. Then, as you need to add new end users you can simply add a server node to the chassis and the VMware vSphere cluster.

Equally, the management cluster is sized such that you can add additional Horizon Connection Servers to support the additional end users as required. The same can be said for the other solution components such as adding App Volumes Servers. As with the virtual desktop hosting infrastructure, and additional chassis and server nodes can also be easily added should there be a requirement for additional compute resource or to increase the vSAN storage.

CONNECTING REMOTELY FROM THE EDGE

Thin Client Solutions for Remote Connectivity

The final piece of the solution, now that the hosting platform is in place, and just as important to get right, is the device from which the end user is going to connect to their virtual desktop machine. If the device is underpowered then the end user could experience poor performance regardless of the hosting infrastructure. Therefore, it is critical to use the correct device to match the end users use case.

The Amulet Hotkey 5th generation DX range of thin clients provide not only a range of hardware specifications to meet the end user requirements but also are agnostic when it comes to what operating system they run. This means you can also match the most suitable operating system to the use case.

HIGH PERFORMANCE THIN CLIENTS

The DX1700 (quad screen performance) and DX1500 (quad screen) thin clients are designed to support four screens each running at 4k (3840 x 2160) and configurable with up to 32GB RAM and Intel i5 CPUs.



ADVANCED THIN CLIENTS

The DX1200 (dual screen) thin clients are designed to support two screens each running at 4k (3840 x 2160) and support up to 32GB RAM and Intel i3 CPUs.



STANDARD THIN CLIENTS

The DX1200 (single screen) thin clients are designed to support 4k (3840 x 2160) resolutions and support up to 32GB RAM and Intel U300 CPUs.



IN SUMMARY

This solutions brief has provided you with a high-level blueprint on how to approach delivering high performance virtual desktop infrastructure built for compute and graphically intense workload environments using Amulet Hotkey CoreStation infrastructure solutions and VMware Horizon Digital Workspace technologies.

FIND OUT MORE

To find out more about the Amulet Hotkey CoreStation solutions for delivering high performance virtual desktop infrastructure, and the VMware Horizon virtual desktop solutions, follow the links:



CoreStation CX6620

<https://www.amulethotkey.com/product/remote-workstations/corestation-cx6620/>



5th Generation DX Client

<https://www.amulethotkey.com/product/thin-zero-clients/5gen-dx-client/>



VMware Horizon

<https://www.vmware.com/uk/products/horizon.html>

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