

# High Performance Digital Workspace Infrastructure for Citrix Virtual Apps and Desktops

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

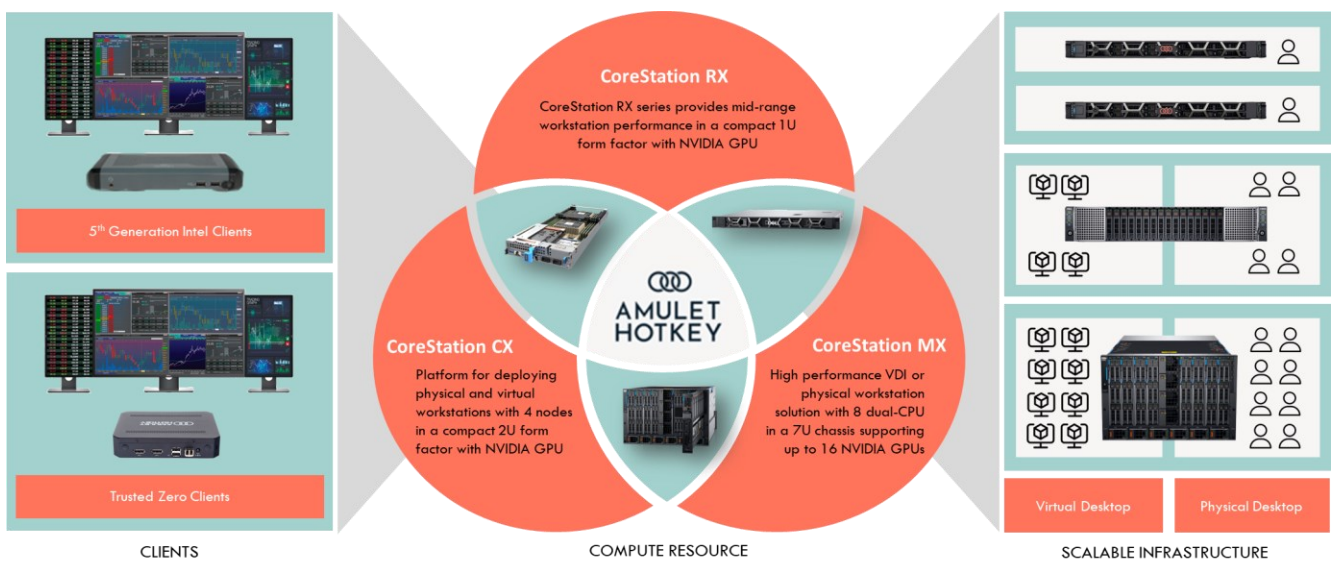
CoreStation CX Platform Edition



## 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 a 1U rackmount or modular 2U and 7U chassis, each CoreStation compute node has been optimized for performance and density.

This is essential when it comes to delivering hardware accelerated graphics where CoreStation can deliver better performance and virtual machine density than many of our competitors.

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 Citrix Virtual Apps and Desktops 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 allows service provider partners to deploy Amulet Hotkey solutions to deliver Desktop-as-a-Service solutions.

## Solution Overview

### Infrastructure Platform: Amulet Hotkey CoreStation CX6620

This solutions brief is focused on delivering end user computing resources with the Citrix Virtual Apps and Desktops solution running on the Amulet Hotkey CoreStation CX platform for hosting virtual desktop machines and physical desktop resources.

### 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, Windows 11, or Linux-based desktop operating systems when deployed as dedicated workstations as well as leading hypervisor platforms such vSphere and Hyper-V for hosting virtual desktop infrastructure – both virtual desktop machines as well as the virtual desktop management infrastructure components.



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 4 <sup>th</sup> or 5 <sup>th</sup> Generation Intel® Xeon® Scalable processors with up to 56 cores per CPU
Memory	Up to 5200 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: Citrix Virtual Apps and Desktops

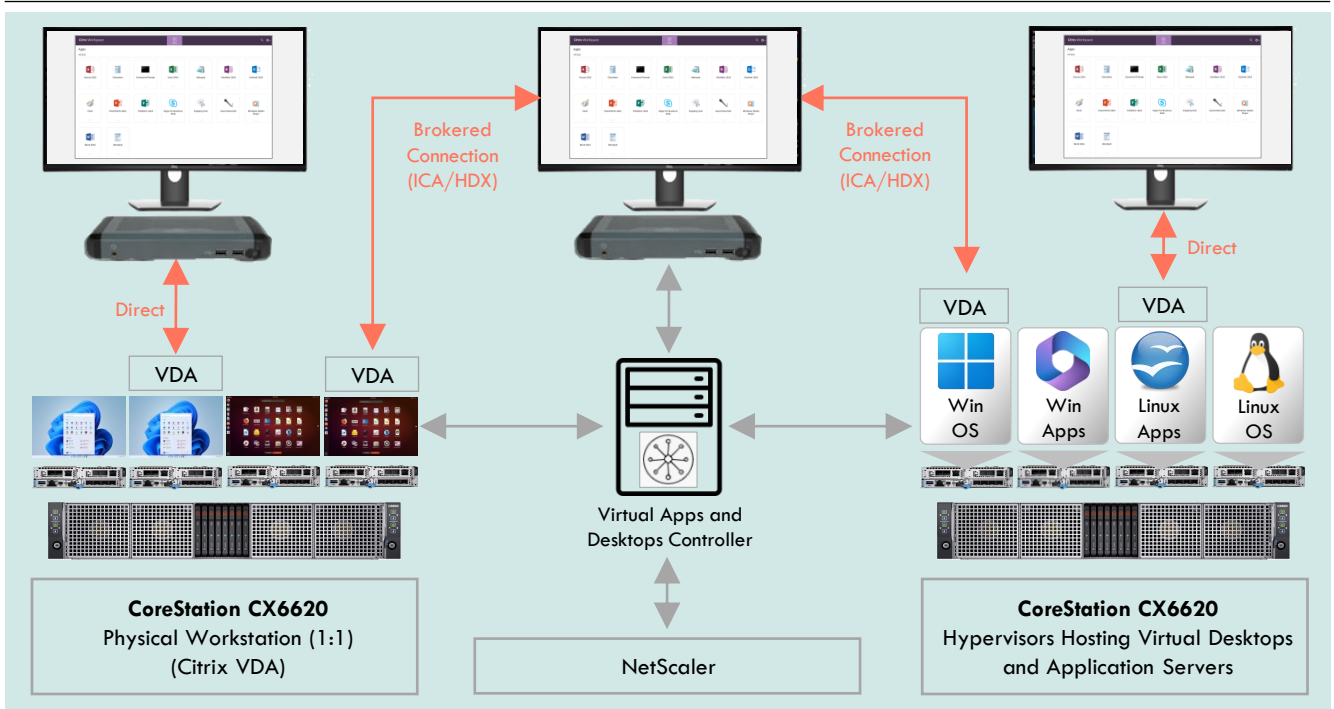
This solutions brief focuses on delivering Citrix-delivered desktop machines using the Amulet Hotkey CoreStation CX platform as both a virtual desktop hosting platform (running a hypervisor) and as physical 1:1 workstations (bare metal desktop operating system). These can be either brokered or connected directly.

### Citrix Virtual Apps and Desktops

With Citrix Virtual Apps and Desktops, organizations can deliver remote virtual desktop machines, hosted apps, or connect to physical workstations (brokered or direct connect) located centrally in the data center to the workforce. The datacenter can be on-premises infrastructure or 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, using their end point client device, end users are presented with an easy-to-use client app where they simply access their personalized virtual desktops, physical desktops, or apps. Administrators gain centralized control, efficiency, and security by having apps and data in the data center.

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



#### Citrix Provisioning Services (PVS)

Uses a software-streaming technology to configure and deliver patches and updates to VMs.

#### Citrix Machine Creation Services (MCS)

Takes advantage of hypervisor APIs to create copies of linked clones from an underlying master VM.

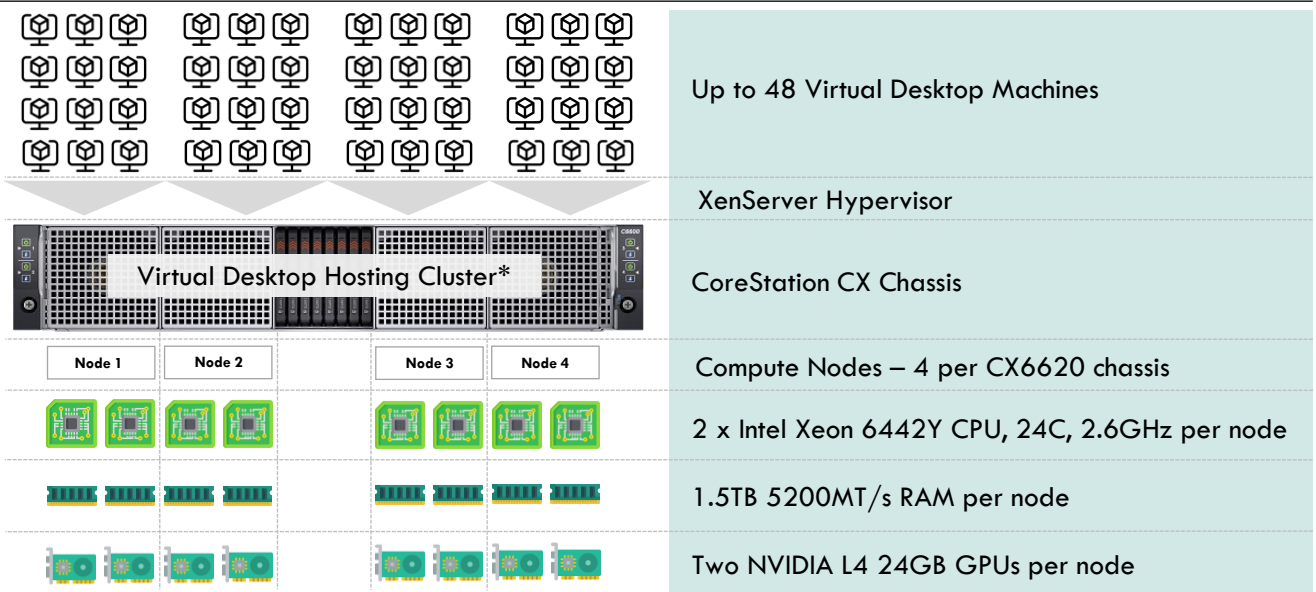
## Solution Architecture

### Blueprint for VDI Power Users

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

### Architecture for Power VDI Users

This blueprint architecture for power VDI users 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 Blocks of 48 Power VDI Users

The power user 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 Citrix Virtual Apps and Desktops, this blueprint architecture for power VDI delivers flexibility and scalability to increase the virtual hardware configuration (fewer end users) or decrease the virtual hardware configuration (more end users). For example, if users requires an 8GB vGPU profile this would result in 6 users per node and 24 end users per 2U chassis. It would also mean the virtual desktop machines increase their virtual hardware configuration to an eight-core vCPU and 128GB RAM.

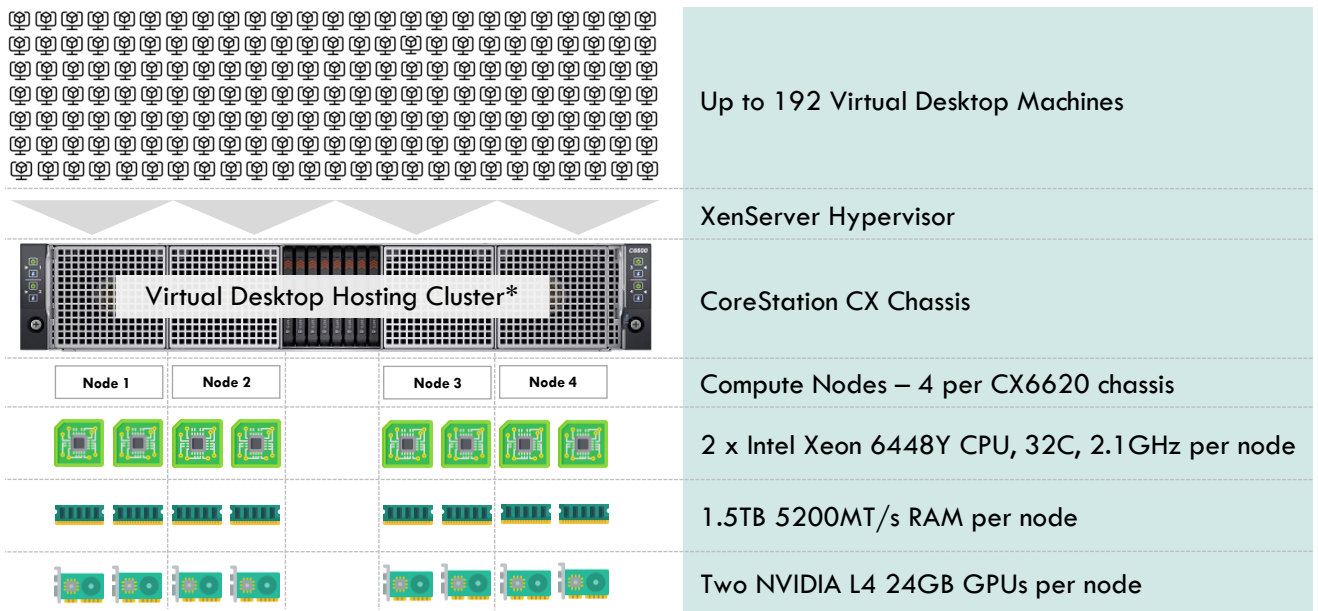
## Solution Architecture

### Blueprint for VDI Standard Users

Standard users are defined as 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 applications which often don't support multiple CPUs or large amounts of memory.

### Architecture for 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

### Modular Approach for Blocks of 192 Standard VDI Users

The standard VDI blueprint in this example delivers 192 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 Citrix Virtual Apps and Desktops, this blueprint architecture for power VDI delivers flexibility and scalability to increase the virtual hardware configuration (fewer end users) or decrease the virtual hardware configuration (more end users). For example, if users don't require GPU, then you can increase the total memory capacity of the hosting servers allowing you to increase the user density per node. If each user only needed a single CPU, then up to 250 users could be supported per 2U chassis.



## Solution Architecture

### Blueprint for 1:1 Remote Physical Workstation Users

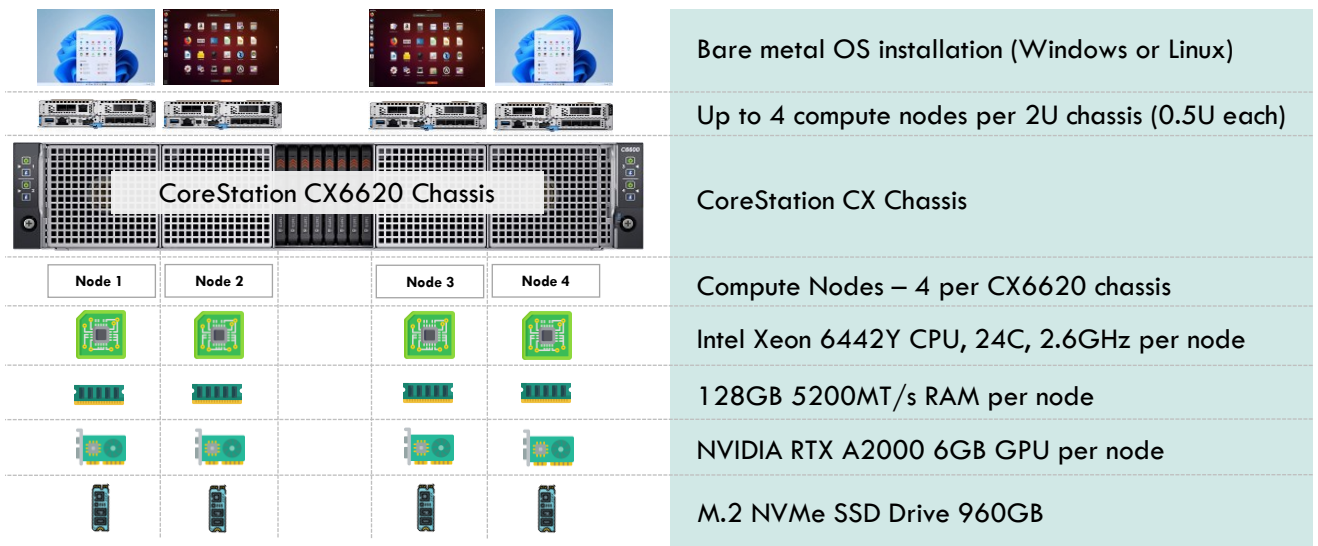
In addition to VDI environments, CoreStation CX6620 compute nodes can be used as physical workstations running a desktop OS on the bare metal rather than hosted on a hypervisor as a VM. The advantage to this approach is that infrastructure is centrally located and managed using enterprise-class server-based management tools to deliver high-powered physical desktops brokered using Citrix Virtual Apps and Desktops.

For users this delivers the power of a physical dedicated workstation, albeit accessed using a thin client device and for IT admins the ability to broker both physical and virtual desktops using the same solution.

### Architecture for CoreStation CX6620 Physical 1:1 Users

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

The user connects to the workstation remotely from a client device with the workstation running the Citrix VDA. This enables a direct connection or the Citrix Delivery Controller 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.



### CoreStation CX6620 Flexibility & Scalability

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. Each node could be configured differently.

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.

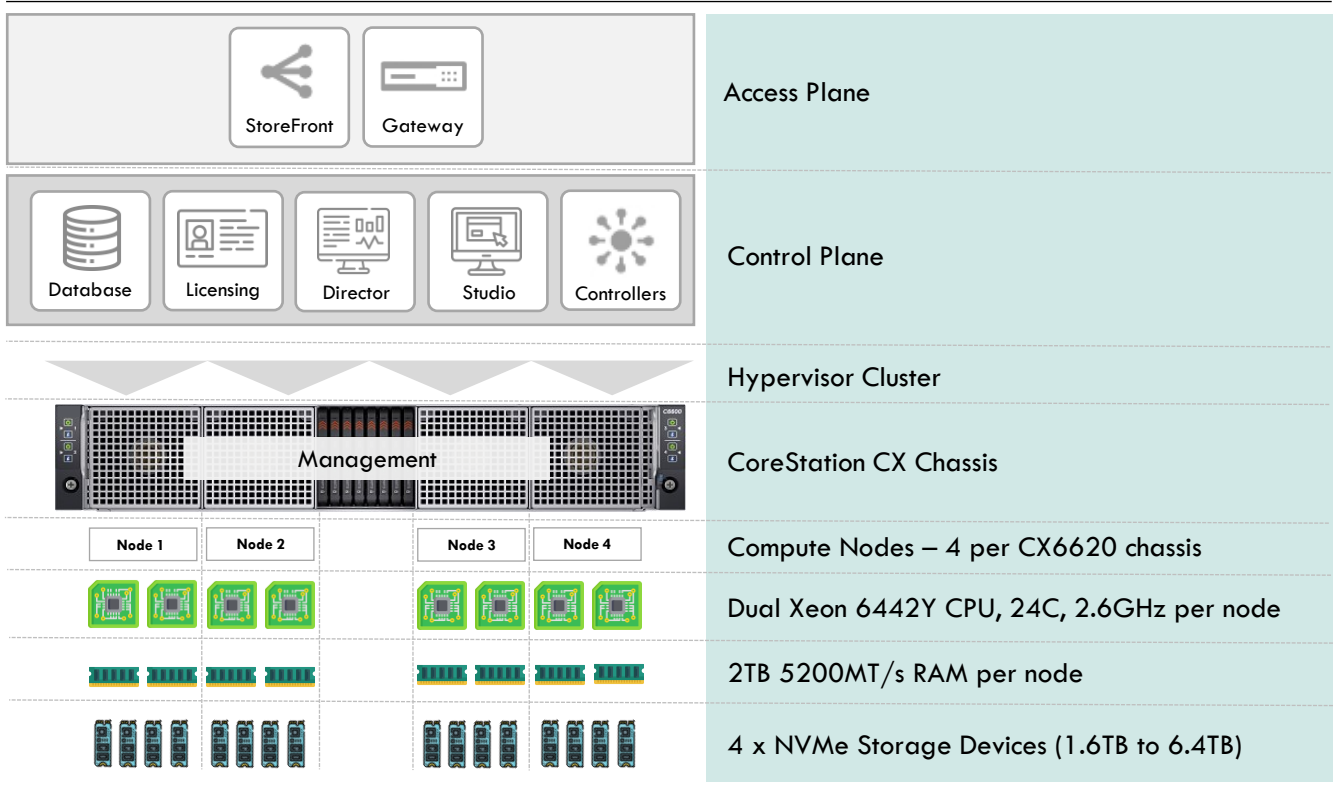
## Solution Architecture

### Blueprint for Citrix Virtual Apps and Desktops Management Infrastructure

To support the Citrix Virtual Apps and Desktops infrastructure components, a management layer is required to support the virtual server workloads running the Virtual Apps and Desktops Controller, Director, Studio, Licensing Services, StoreFront, and Gateway.

### Architecture for VDI Management

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



### Citrix Management Components

- Director** is a monitoring and troubleshooting console for Citrix Virtual Apps and Desktops.
- Studio** is the management used to configure and manage Citrix Virtual Apps and Desktops deployments.
- Delivery Controllers** are responsible for brokering and managing end user access to apps and desktops.
- StoreFront** is an enterprise app store that presets apps and desktops to end users.
- Gateway** enables remote access to apps and desktops from any device.

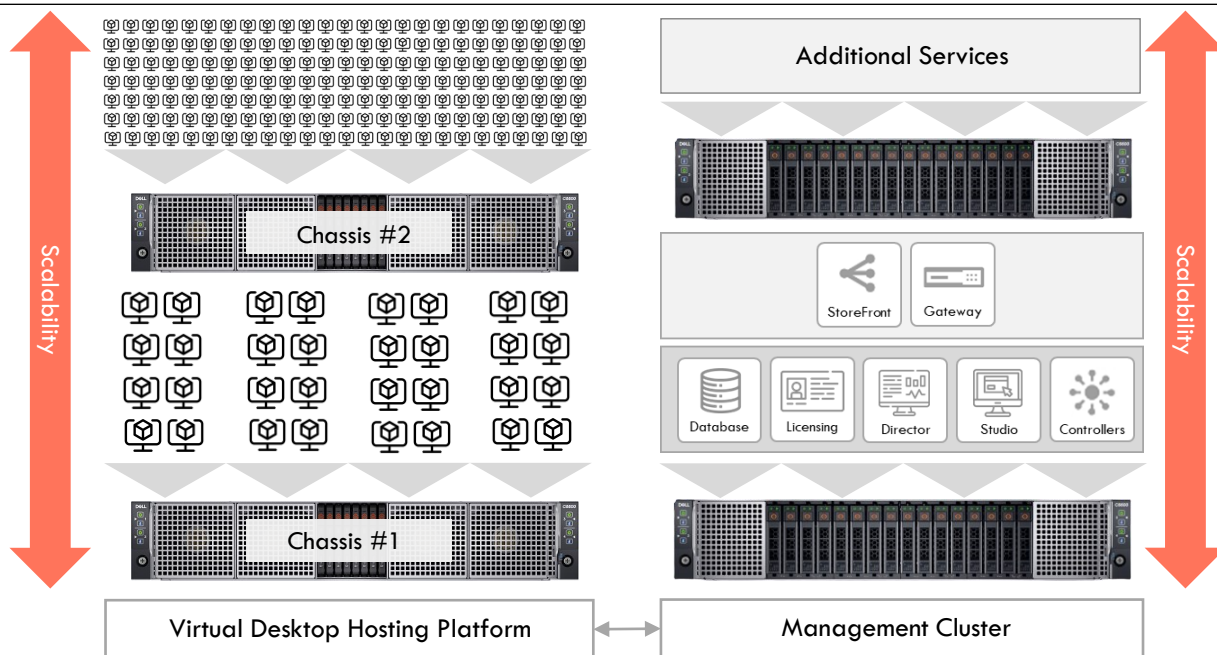


# Solution Architecture

## Flexibility and 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 50 power VDI users while chassis #2 is built with server nodes with a configuration that supports up to 150 standard VDI users.

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 hypervisor cluster.

Equally, the management cluster is sized such that you can add additional Citrix components to support the additional end users as required. The same can be said for the other solution components such as adding MCS or PVS, or Citrix Profile Management. 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 resources or to increase the storage capacity.

## Connecting Remotely from the Edge

### Thin Client Solutions for Remote Connectivity

The final piece of the solution 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.

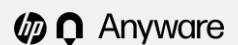
The Amulet Hotkey 5th generation DX range of thin clients and trusted zero clients provide not only a range of hardware specifications to meet the end user requirements but also are agnostic when it comes to what operating system they run. This means you can also match the most suitable operating system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

### High Performance Secure Thin Clients

The DX1500 and DX1700 series 5<sup>th</sup> Generation thin clients are designed to support four screens each running at 4k (3840 x 2160) and are available with up to 16GB RAM and Intel i5, Intel i3 or Intel U300 CPUs.



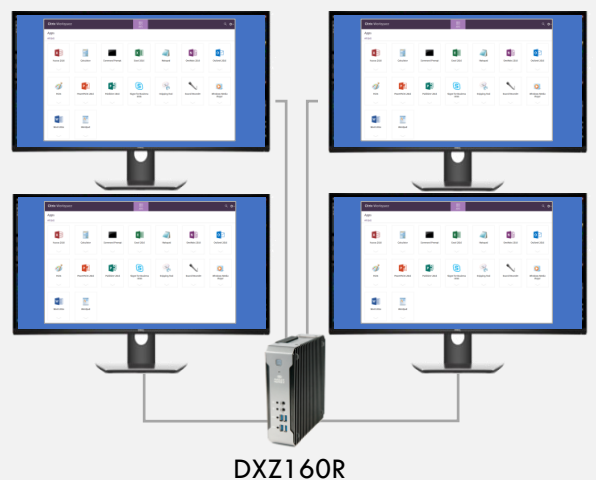
### Trusted Zero Clients



Designed and built for the HP Anyware Trusted Zero Client solution, the AMD-based DXZ130 and DXZ160R support up to four screens running at 4k resolutions, plus optional SFP (copper & fiber) network connections.



DXZ130



DXZ160R

## In Summary

This solutions brief has provided a high-level blueprint that serves as an example of how to approach delivering high performance virtual desktop infrastructure and remote physical workstation solutions, that have been designed and built to cater for compute and graphically intense workload environments.

In this case the compute requirements are delivered using the Amulet Hotkey CoreStation CX6620 solution as the infrastructure platform to host both the Citrix Virtual Apps and Desktops solution as well as the physical 1:1 remote workstation capabilities. All using the same hardware platform as the foundation. Not to mention the ability to include the management components to the solution that can run on the hardware too.

Access to the desktop resources, regardless of being physical or virtual desktop based is enabled using the Amulet Hotkey client solutions as the end point device.

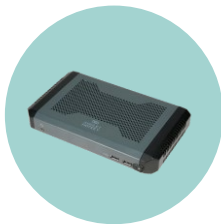
We have defined a modular approach that aligns with the modular approach that Citrix adopts when deploying virtual desktops to enable desktops to be deployed securely and at scale.

## Find out more

To find out more about the Amulet Hotkey CoreStation CX6620 solution, Amulet Hotkey 5<sup>th</sup> Gen thin clients, or Amulet Hotkey Trusted Zero Clients for delivering a complete end-to-end solution for high performance virtual desktop infrastructure, using Citrix digital workspace solutions, click the icons below:



CoreStation  
CX6620



5<sup>th</sup> Gen DX  
Thin Client



Trusted  
Zero Client



Citrix Virtual Apps  
and Desktops

Alternatively, talk to us directly by phoning or emailing your local sales office listed below.

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