

# CUBESYS DISCUSSION SERIES

SESSION 8: AVD FOR ENGINEERING WORKLOADS

# TODAY'S DISCUSSION FORMAT



The discussion is being recorded.



Please use the chat window to ask your questions.



We have our experts on hand to answer your questions.



The video and content will be sent via email post event.

# AGENDA

- CAD Workstations History & Challenges
- CAD in the Cloud
- CAD Benchmarks on AVD
- Demo Graphics Power of AVD



# TODAY'S PRESENTERS



**Paul Heaton**  
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cubesys

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Senior Cloud Consultant  
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**Ian Baxter**  
Customer Success & Delivery  
Manager

 Ian-Baxter



## CAD Workstations History & Challenges



- Supply Chain issues
- Custom Built Desktops
- Cost \$\$
- GPU Cards



## Azure VM GPU SKUs

- AMD or NVIDIA
- Single GPU, Multiple GPUs or Split GPUs
- Compute-Intensive, Graphics Intensive, Visualization Workloads
- CUDA / GRID or AMD
- NVIDIA GRID License: 1 Desktop OR 25 RemoteApps



# Azure VM GPU SKUs

The **NCv3-series** and **NC T4\_v3-series** sizes are optimized for compute-intensive GPU-accelerated applications. Some examples are CUDA and OpenCL-based applications and simulations, AI, and Deep Learning. The NC T4 v3-series is focused on inference workloads featuring NVIDIA's Tesla T4 GPU and AMD EPYC2 Rome processor. The NCv3-series is focused on high-performance computing and AI workloads featuring NVIDIA's Tesla V100 GPU.



The **ND A100 v4-series** size is focused on scale-up and scale-out deep learning training and accelerated HPC applications. The ND A100 v4-series uses 8 NVIDIA A100 TensorCore GPUs, each available with a 200 Gigabit Mellanox InfiniBand HDR connection and 40 GB of GPU memory.

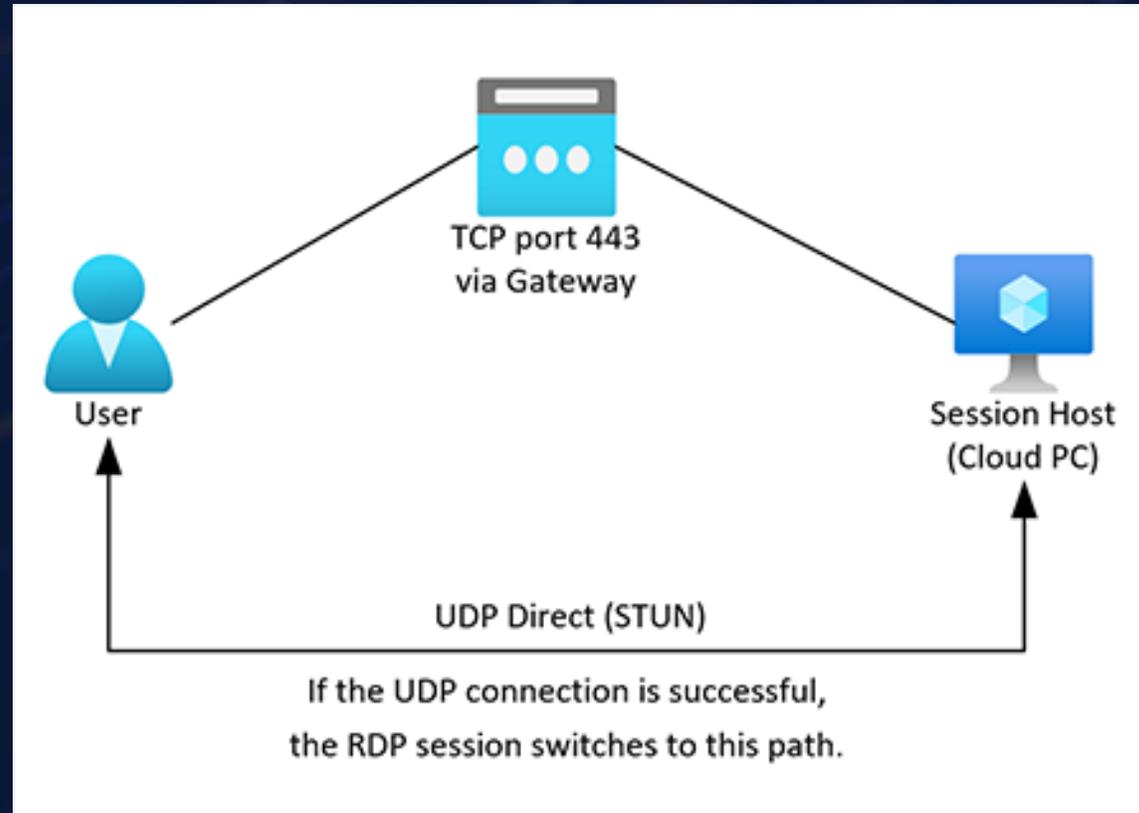
**NV-series** and **NVv3-series** sizes are optimized and designed for remote visualization, streaming, gaming, encoding, and VDI scenarios using frameworks such as OpenGL and DirectX. These VMs are backed by the NVIDIA Tesla M60 GPU.

**NVv4-series** VM sizes optimized and designed for VDI and remote visualization. With partitioned GPUs, NVv4 offers the right size for workloads requiring smaller GPU resources. These VMs are backed by the AMD Radeon Instinct MI25 GPU. NVv4 VMs currently support only Windows guest operating system.

**NDm A100 v4-series** virtual machine is a new flagship addition to the Azure GPU family, designed for high-end Deep Learning training and tightly-coupled scale-up and scale-out HPC workloads. The NDm A100 v4 series starts with a single virtual machine (VM) and eight NVIDIA Ampere A100 80GB Tensor Core GPUs.

# Optimizing GPU VMs

- RDP Shortpath for Public or Managed Networks



# Optimizing GPU VMs

- Install the appropriate drivers/extensions

Home > Virtual machines > Add a virtual machine ...

myasegpudevice

Basics Disks Networking **Advanced** Review + create

Add additional configuration, agents, scripts or applications via virtual machine extensions or cloud-init.

**Extensions**

Extensions provide post-deployment configuration and automation.

For a Red Hat image, follow the [steps to add the GPU extension](#) to the VM. Add the extension after the VM is created.

Extensions ⓘ **1** Select an extension to install

**Custom data and cloud init**

Pass a cloud-init script, configuration file, or other saved on the VM in a known location. [Learn more](#)

Custom data

Home > Virtual machines > Add a virtual machine > Add extension ...

**Add extension** ...

NVIDIA GPU Driver Extension  
Microsoft Corp.

**2**

**Review + create** Previous Next: Review + create



# Optimizing GPU VMs

- GPO

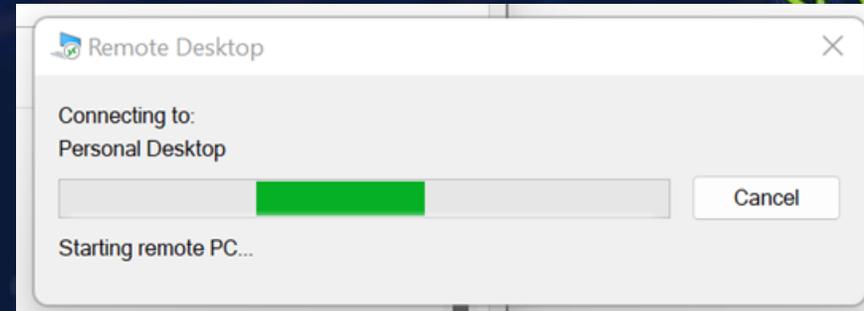
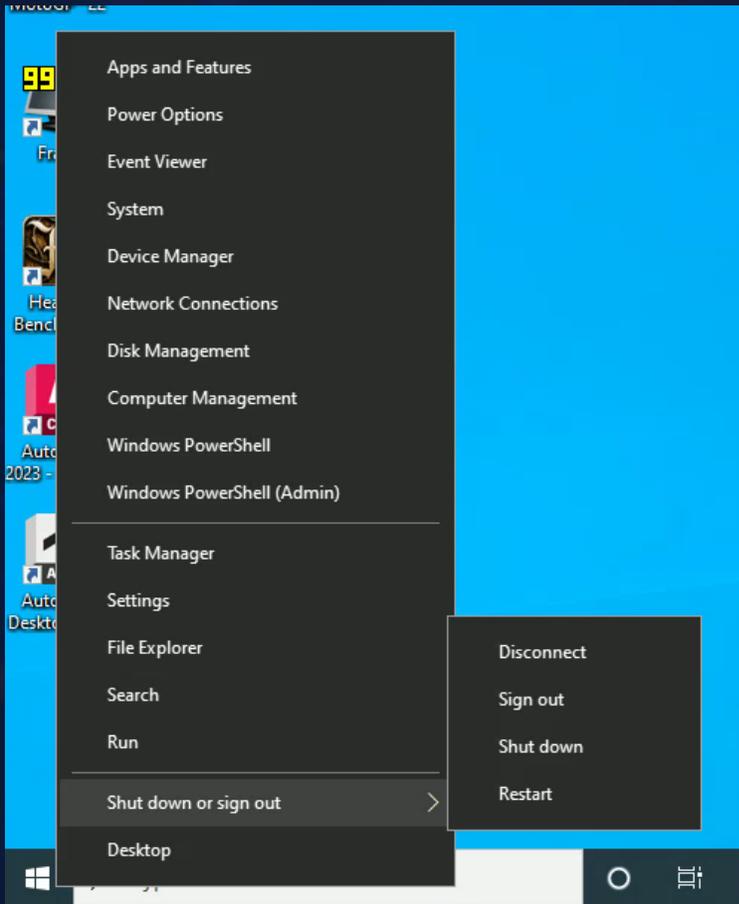


The screenshot shows the Windows Group Policy Editor window. The left pane shows the tree view with 'Remote Session Environment' selected. The right pane displays a list of settings for 'RemoteFX for Windows Server 2008 R2'. The settings are organized into a table with columns for 'Setting', 'State', and 'Comment'.

Setting	State	Comment
RemoteFX for Windows Server 2008 R2		
Use hardware graphics adapters for all Remote Desktop Services sessions	Enabled	No
Prioritize H.264/AVC 444 graphics mode for Remote Desktop Connections	Enabled	No
Configure H.264/AVC hardware encoding for Remote Desktop Connections	Enabled	No
Limit maximum color depth	Not configured	No
Enforce Removal of Remote Desktop Wallpaper	Not configured	No
Limit maximum display resolution	Not configured	No
Limit number of monitors	Not configured	No
Remove "Disconnect" option from Shut Down dialog	Not configured	No
Remove Windows Security item from Start menu	Not configured	No
Use advanced RemoteFX graphics for RemoteApp	Not configured	No
Configure compression for RemoteFX data	Not configured	No
Configure image quality for RemoteFX Adaptive Graphics	Not configured	No
Enable RemoteFX encoding for RemoteFX clients designed for Windows Server 2008 R2...	Not configured	No
Configure RemoteFX Adaptive Graphics	Not configured	No
Use WDDM graphics display driver for Remote Desktop Connections	Not configured	No
Start a program on connection	Not configured	No
Always show desktop on connection	Not configured	No
Allow desktop composition for remote desktop sessions	Not configured	No
Do not allow font smoothing	Not configured	No

# Optimizing GPU VMs

- Start VM on Connect / Power off VMs



```
1 # Find all stopped but not deallocated VMs in a RGs
2 $StoppedVMs = Get-AzVM -Status -ResourceGroupName $resourceGroup | where {$_.PowerState -like 'VM-stopped'}
3
4 # Only run if there are more than 0 machines that need to be deallocated
5 If ($StoppedVMs.count -gt '0') {
6     .....# Loop until each VM is force stopped
7     .....ForEach ($VM in $StoppedVMs) {
8         .....$Name = $VM.Name
9         .....Stop-AzVM -ResourceGroupName $resourceGroup -Name $Name -Force
10        .....}
11 } else {
12     .....# Skip and wait till next cycle to check again.
13     .....exit
14 }
```

# Optimizing GPU VMs

- Fair Share Technology

Fair Share technologies is used to balance CPU, disk, and network bandwidth resources among multiple Remote Desktop sessions.

Applies to: Windows Server 2016, Windows Server 2012 R2, Windows 10 Enterprise multi-session, Windows 11 Enterprise multi-session  
KB4494631



# Optimizing GPU VMs

- Vendor recommendations



ArcGIS Pro

## Leveraging Multi-session VMs to support ArcGIS Pro using Azure Virtual Desktop

3D Visualization & Analytics  
February 16, 2022

 **Ryan Danzey**  
Esri Performance Engineering.

CONNECT: 



“Using AVD is a solid option to deliver ArcGIS Pro to several users on a single VM, this can provide the added benefit to help control cloud costs. When used properly and with a solid cloud use strategy you can deliver ArcGIS Pro to more users leveraging Azure Virtual Desktop.”

[Leveraging Multi-session VMs to support ArcGIS Pro using Azure Virtual Desktop \(esri.com\)](https://www.esri.com/arcgis-blog/topics/arcgis-pro/leveraging-multi-session-vm-to-support-arcgis-pro-using-azure-virtual-desktop/)



# Demo



# QUESTIONS?

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*Thank you*