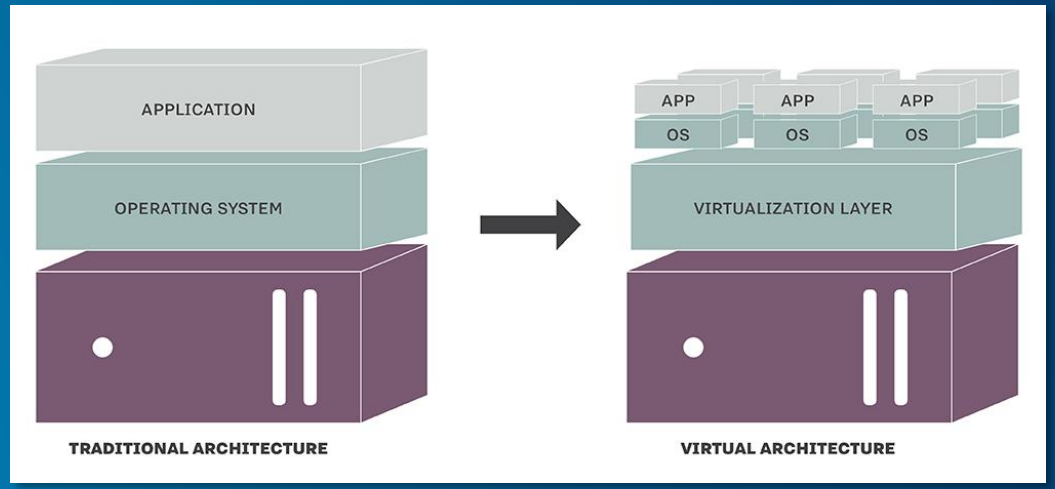
Let’s Get Virtual with Runtime

Rex Hansen

Virtualization – What and Why?

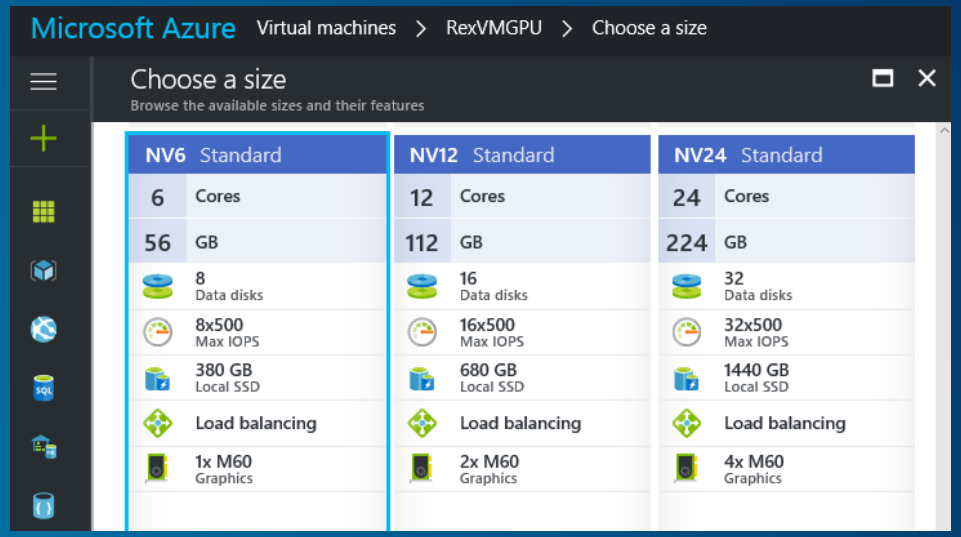
- Creation/use of a simulated computer environment (virtual machine) that acts like a physical computer with an operating system
  - Guest machine(s) operates on a physical host machine
  - Controlled access to physical hardware
- Benefits
  - Reduce costs
    - [On-Prem] Increase utilization of costly hardware
    - [Cloud] Minimal hardware cost
  - Easily managed and maintained
  - Flexible testing environment
  - Enforce security protocols
  - Backup and scale



"The market has matured rapidly over the last few years.
Virtualization revenues will increase to $5.6 billion, up 5.7% this year [2016]"
- Michael Warrilow, research director at Gartner

Virtualization platform providers, clients, and protocols

- Enterprise
  - Citrix
    - XenServer
    - XenDesktop
    - XenApp
  - VMWare
    - ESXi
    - Horizon View
  - Microsoft Hyper-V
- Cloud
  - Amazon
  - Microsoft Azure
  - IBM SoftLayer

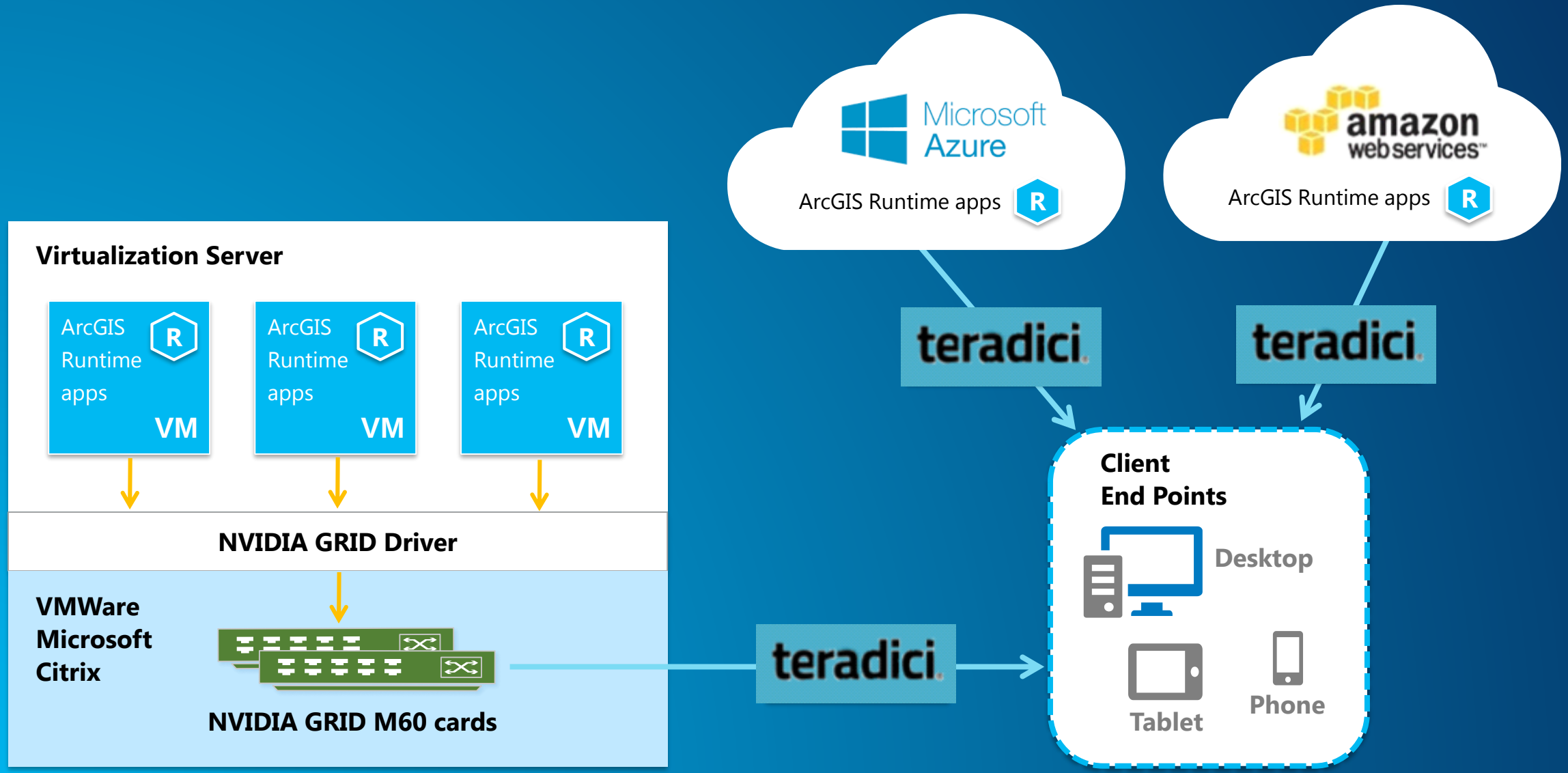


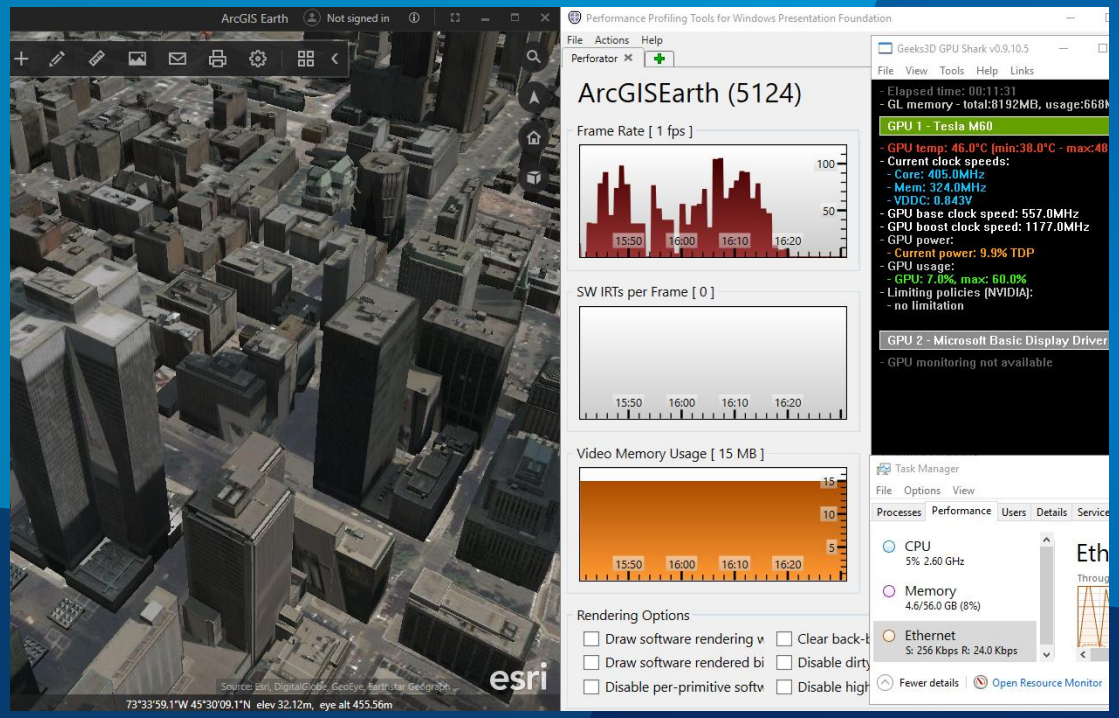
- Clients
  - Teradici
  - TeamViewer
  - Remote Desktop
- Protocols
  - Citrix HDX (TCP)
  - VMWare PCoIP (UDP)
  - Microsoft RDP/Remote FX (TCP/UDP)

ArcGIS Runtime and virtualization

- GPU intensive operations
  - Dynamic graphics, labels, animation
  - Textures: scene layers, tiled layers, dynamic map layers,
- Rendering engine built on DirectX, OpenGL
  - Priority use of graphics card/hardware
  - Fallback to software, if available
- CPU intensive operations – still important!
  - Static graphics, data processing, analysis, local services
  - Multi-threaded

ArcGIS Runtime in native apps on virtualization platforms





Use of ArcGIS Runtime on hardware-accelerated virtual machines

Microsoft Azure NV-series instances

ArcGIS Runtime status and considerations

- ArcGIS Runtime certification in virtual environments in progress
  - Plan to update system requirements/recommendations
  - Use ArcGIS Pro virtualization support as a guide
- Recommendations
  - Latest GPU backed VMs for visualization (eg NVIDIA GRID)
  - HDX, PCoIP clients; not Remote Desktop
- Licensing
  - Account for deployments as you would with physical machines
    - License key
      - Each installation of your app available to a single user counts as a deployment
    - Named User
      - License travels with the user, much easier to manage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