

# Dedicating vGPUs for VDI and SBC Workloads: How the ROI and Business Value more than justify the Expense

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# Primary Drivers for Hosted Virtual Desktop Adoption

## Desktop infrastructure simplification CapEx reduction

- Device simplification and/or consolidation
- Speed new deployments, new apps, new employee provisioning

## OpEx Reduction

- Simplified desk-side support
- Simplified lifecycle management
- Improve productivity

## Ease and speed of OS/app deployments

- Windows 7 migration

## Security

- Control assets outside corporate perimeter (“off-shoring”)
- Device, data security and control

## New Initiatives

- BYOD

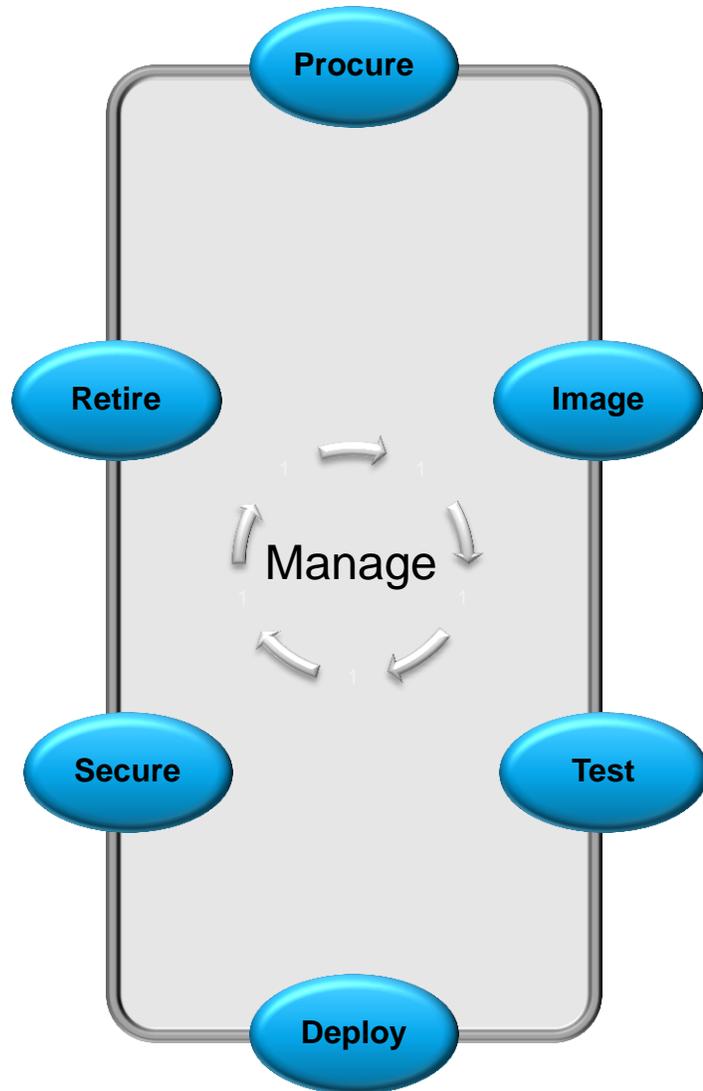
# The TCO Equation



The diagram illustrates the Total Cost of Ownership (TCO) equation. It features three blue circles arranged horizontally. The first circle on the left contains the text 'CAPEX'. To its right is a blue plus sign '+'. The second circle in the middle contains the text 'OPEX'. To its right is a blue equals sign '='. The final circle on the right contains the text 'TCO'. The background is light gray with faint, white, handwritten mathematical formulas like '5a(y+Q)^2 +', '39', and '+A)'. The top right corner has a green-to-blue gradient, and the bottom right corner has a blue-to-teal gradient.

$$\text{CAPEX} + \text{OPEX} = \text{TCO}$$

# Operational Expenses - Enterprise Desktop & Application Management



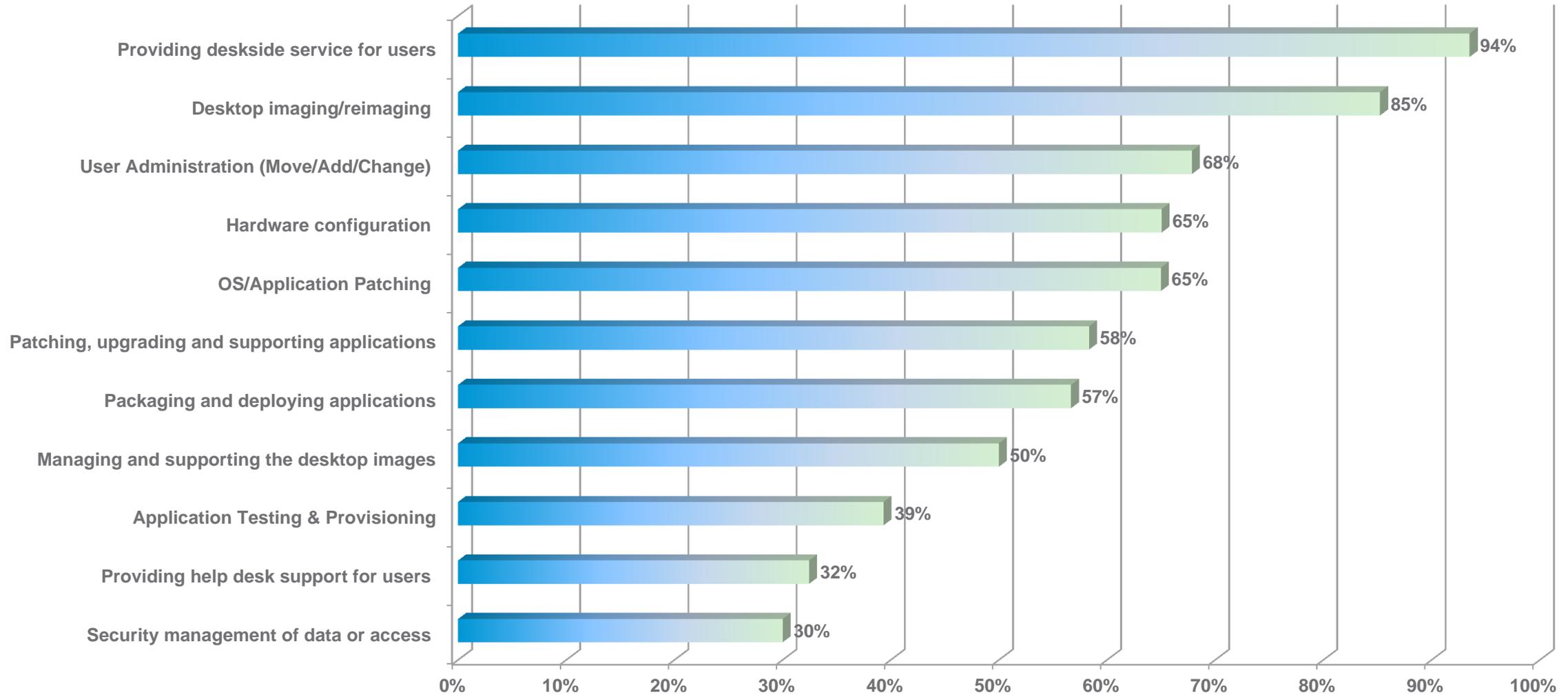
- Hardware/SW configuration
- User administration (Move/Add/Change)
- Desktop imaging/reimaging
- Patching, upgrading OS/applications
- Application testing & provisioning
- Packaging and deploying applications
- Access/data security management
- Help desk support

## Opex Cost Comparisons –an example

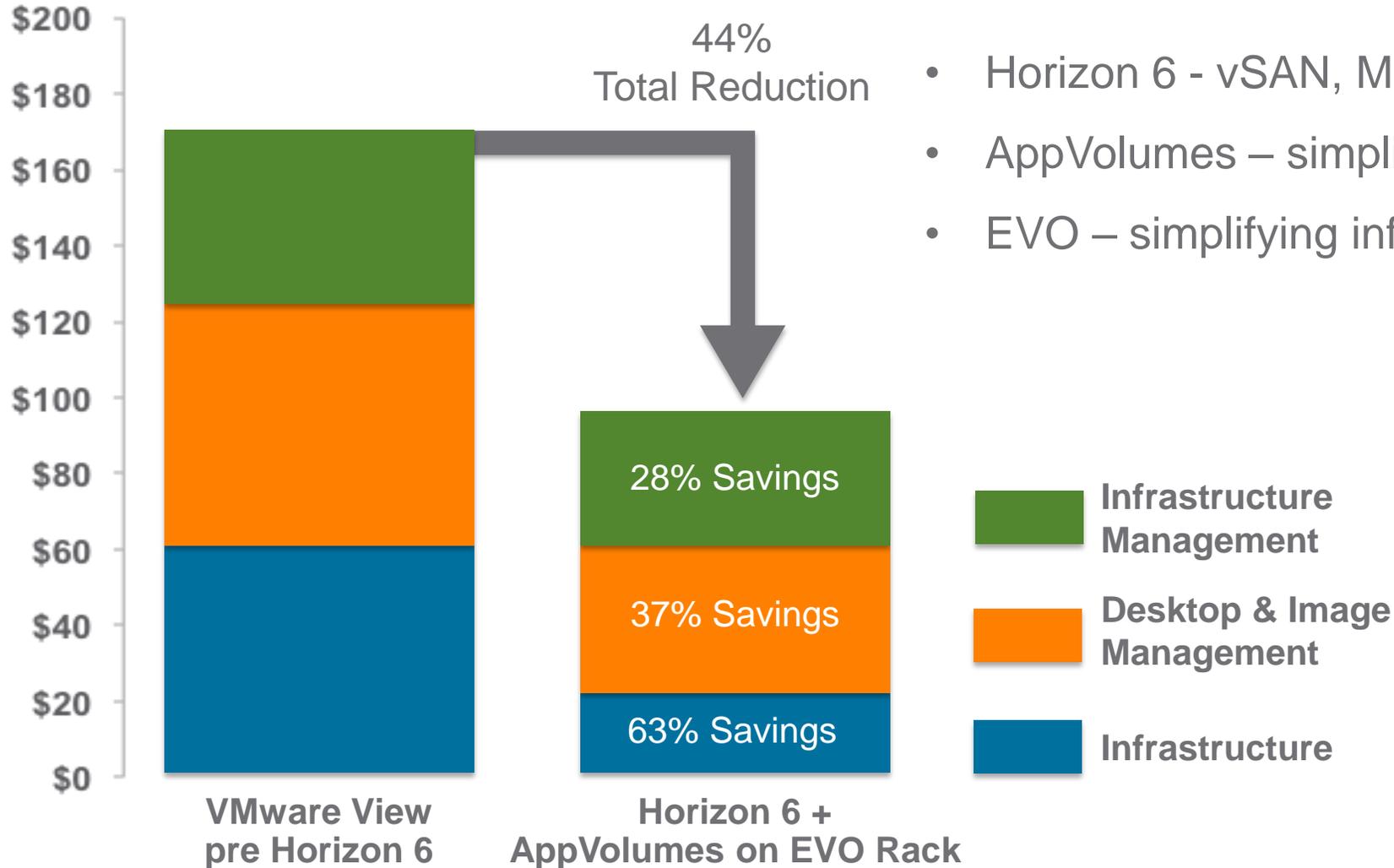
	Traditional PC	VDI	Cost Differential
Average Tech Admin Salary	\$70k	\$70k	\$0
Users per Admin	200	400	
Admin Cost per User	\$350	<b>\$175</b>	<b>\$175</b>
Install Time Spent per User	160 min	90 min	
Install Cost per User	\$90	<b>\$25</b>	<b>\$65</b>
Help Desk	\$105	<b>\$80</b>	<b>\$25</b>
Deskside visit	\$75	<b>\$10</b>	<b>\$65</b>
<b>Total Opex Costs</b>	<b>\$620</b>	<b>\$290</b>	<b>\$330</b>

VDI represents a 47% reduction in Opex costs traditionally associated with PC operations

# IT Labor Savings with VMware Horizon



# Driving Down Per User Costs



- Horizon 6 - vSAN, Management and more
- AppVolumes – simplifying desktop management
- EVO – simplifying infrastructure management

# The World of End-Users and IT is Changing

## Users



Icons representing various user roles and devices: a headset, a computer monitor, a person at a laptop, a person in a suit, a car, a person with a stethoscope, and a tablet and smartphone.

## Apps



Logos for various software applications: SAP, Salesforce, PTC, Oracle, Siemens, Autodesk, Esri, Adobe, Microsoft Word, Dassault Systèmes, and Microsoft Excel.

## Data



Logos for various data management and storage solutions: SharePoint, Airwatch, Oracle, Dropbox, and Box.

# Major Marketplace Demand for Cloud-based Workstations

More distributed  
than ever



Large datasets are  
harder to share



Contractors need  
revocable access



Data leakage &  
corporate security

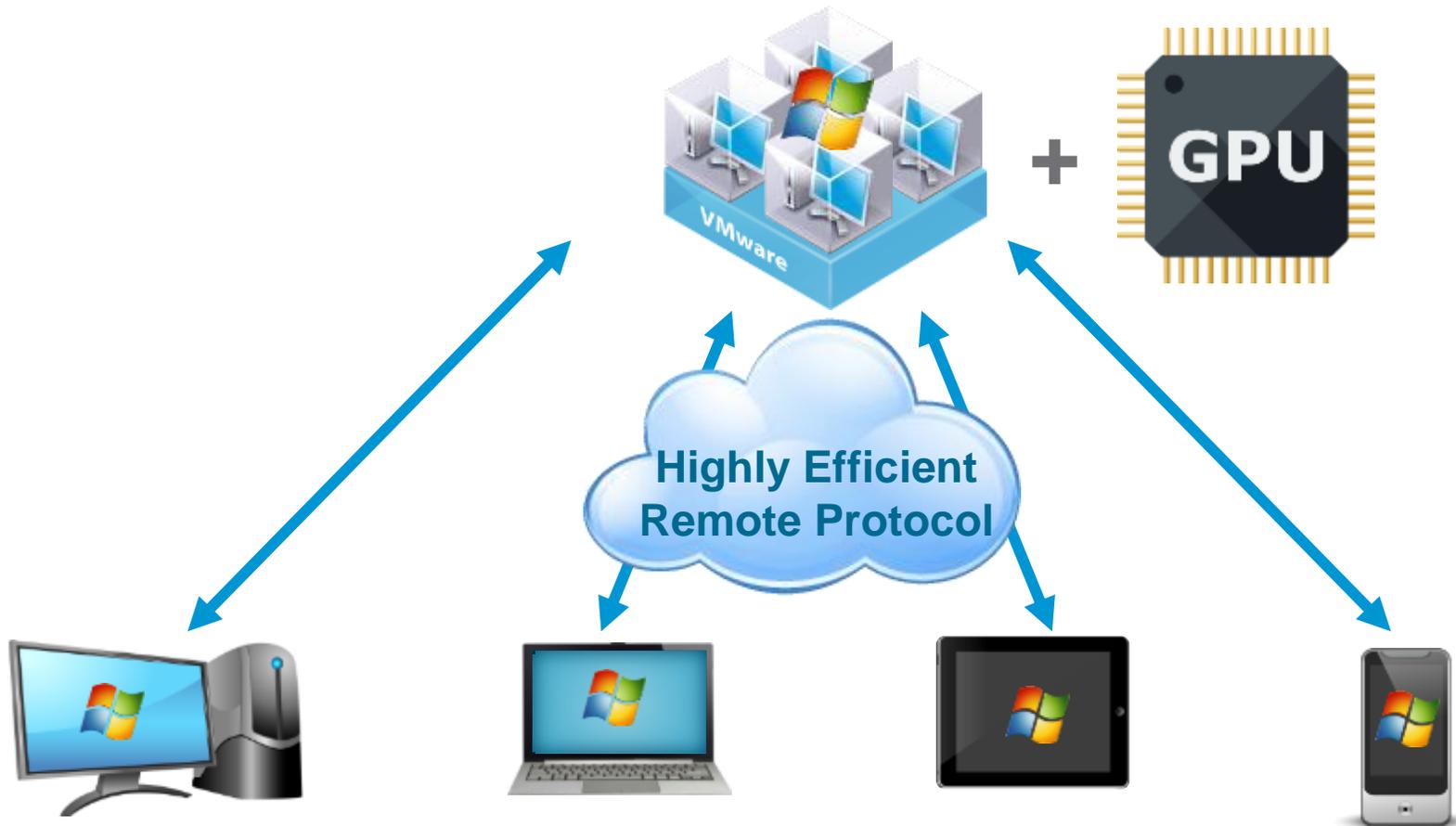


# Graphics-Intensive Apps are Required by More Users



# Desktop and App Virtualization Enables Business Mobility

IT Manages Centralized Virtual Desktops



Users Remotely Access from Various Devices

 Security & Compliance

Desktop Virtualization with Server-side GPU Improves the Delivery of Graphics

 OpEx Savings



Streamlined end user **access** and supplier **connectivity**

*“When I use SolidWorks on virtual desktops, it’s seamless... from my phone, my iPad, and my computer.”*

– Mechanical Engineering Student  
North Carolina State University



Real-time collaboration for engineers in **29 offices** across **7 countries**



*“We are confident that it is now finally economically viable for CH2MHILL to provide a VDI farm for graphically demanding workloads across the globe. This could truly transform the way we do business.”*

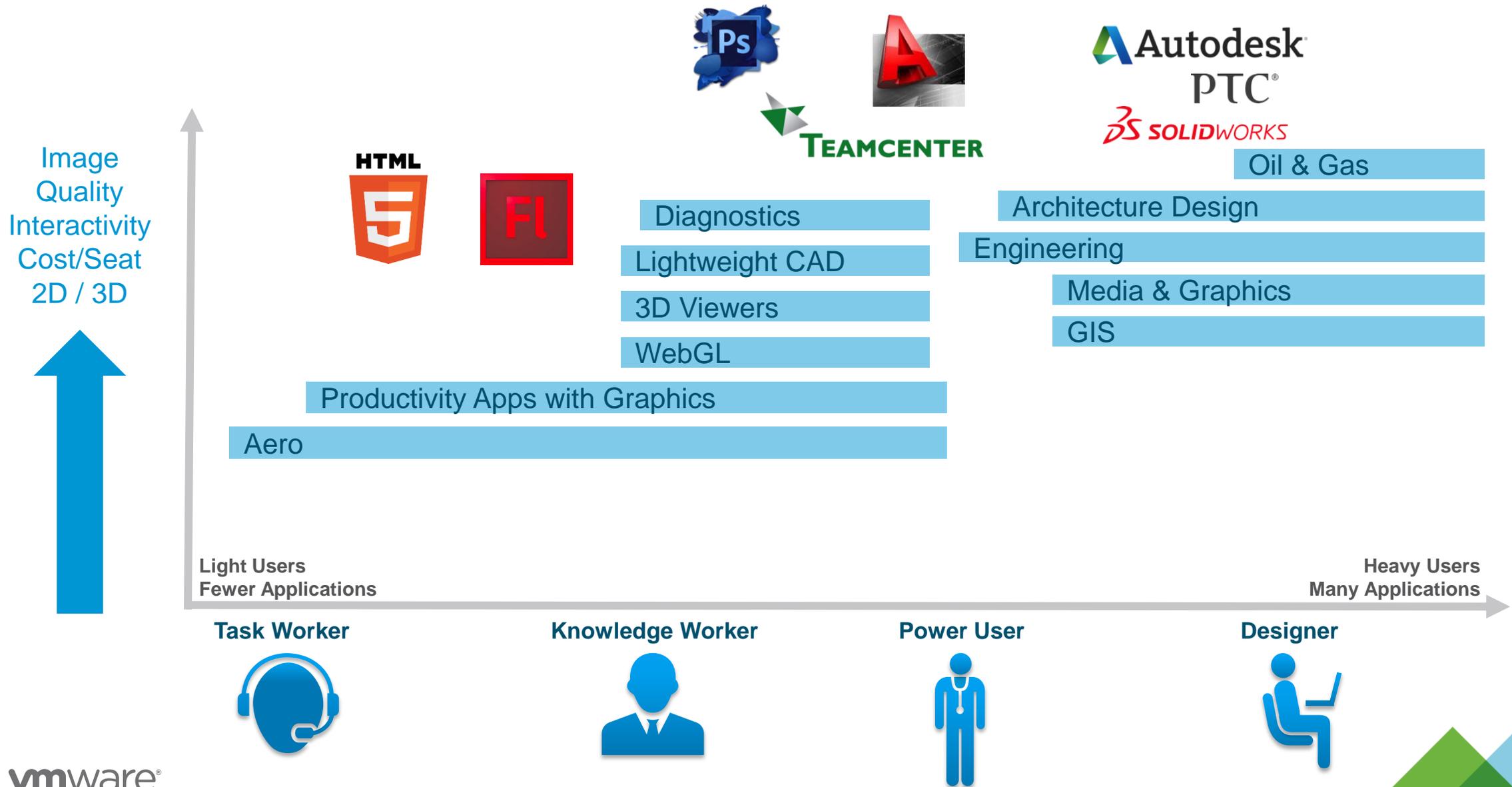
– Craig Fletcher  
CTO  
CH2MHILL



**33% productivity gain**, access to radiology images on a variety of endpoints



# High-Performance Graphics Use Cases



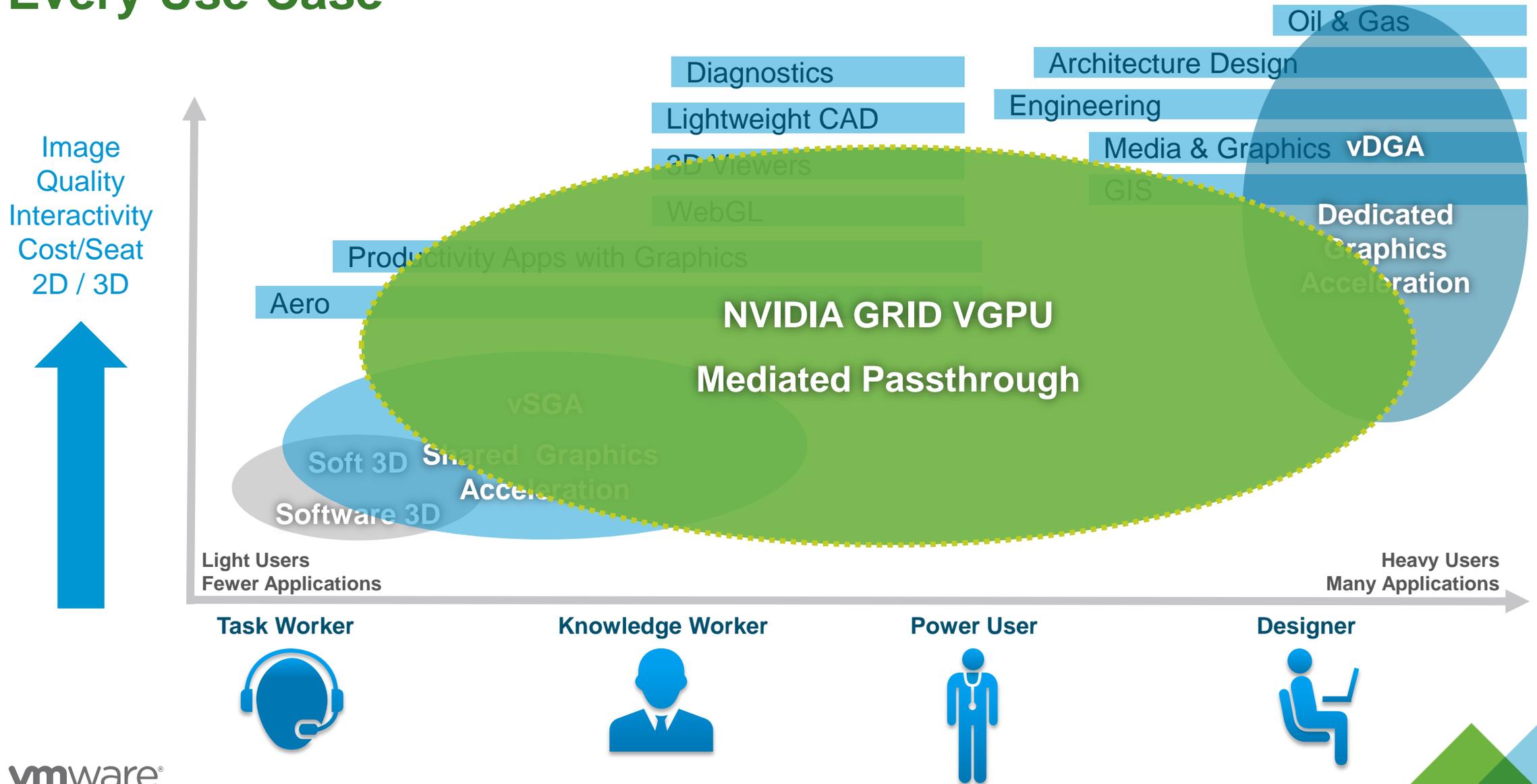
# Why Choose VMware for High-Performance Graphics VDI?

- Proven, industry leading platform, fully integrated end-to-end solution
- Deliver the most graphically intensive applications
- Deliver a superior experience with PCoIP
- Choice of GPU technologies
  - vGPU, vDGA and others



vmware®

# Delivering a Complete Portfolio, for Every Worker, Every Use Case



# High Performance Shared Graphics with NVIDIA GRID vGPU

Support Multiple Graphics Workstations & Applications with NVIDIA GRID

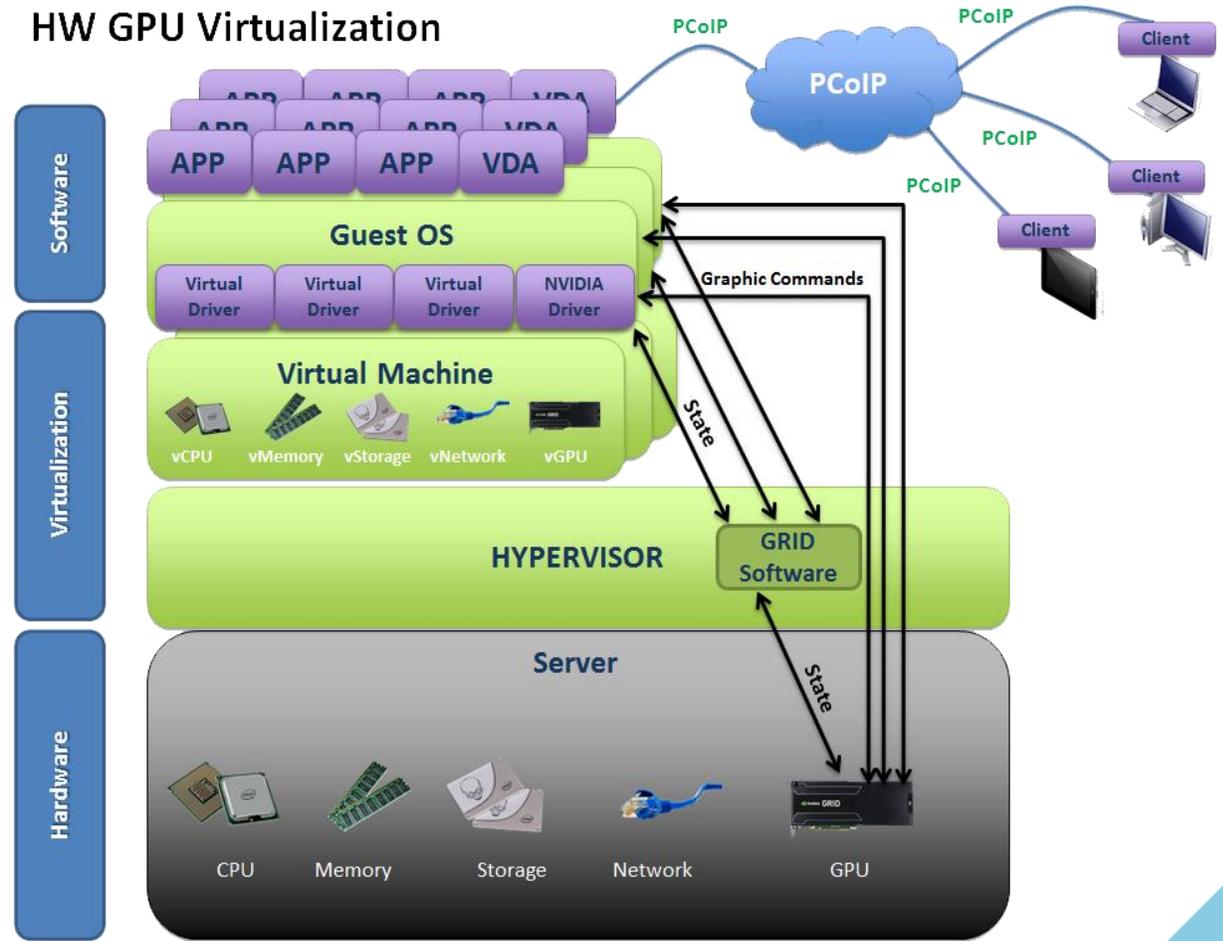
## Overview

- Enables shared access to physical GPUs on NVIDIA GRID GPU hardware for High-performance Graphics and high performance compute workloads
- Uses native NVIDIA drivers in Windows
- NVIDIA VIB installed on ESX to manage GPU
- ISV certifications available from Siemens & ESRI with more to come

## Benefits

- Enables truly high performance graphics
- Cost effective with multiple VMs sharing single GPU resource
- Flexibility in delivering High-performance Graphics graphics for desktop and workstation use cases
- Supports automated pool management with VMware Horizon
- Enhanced multimedia experience for Knowledge Workers

## HW GPU Virtualization



# vDGA – High Performance Dedicated Graphics with NVIDIA GPUs

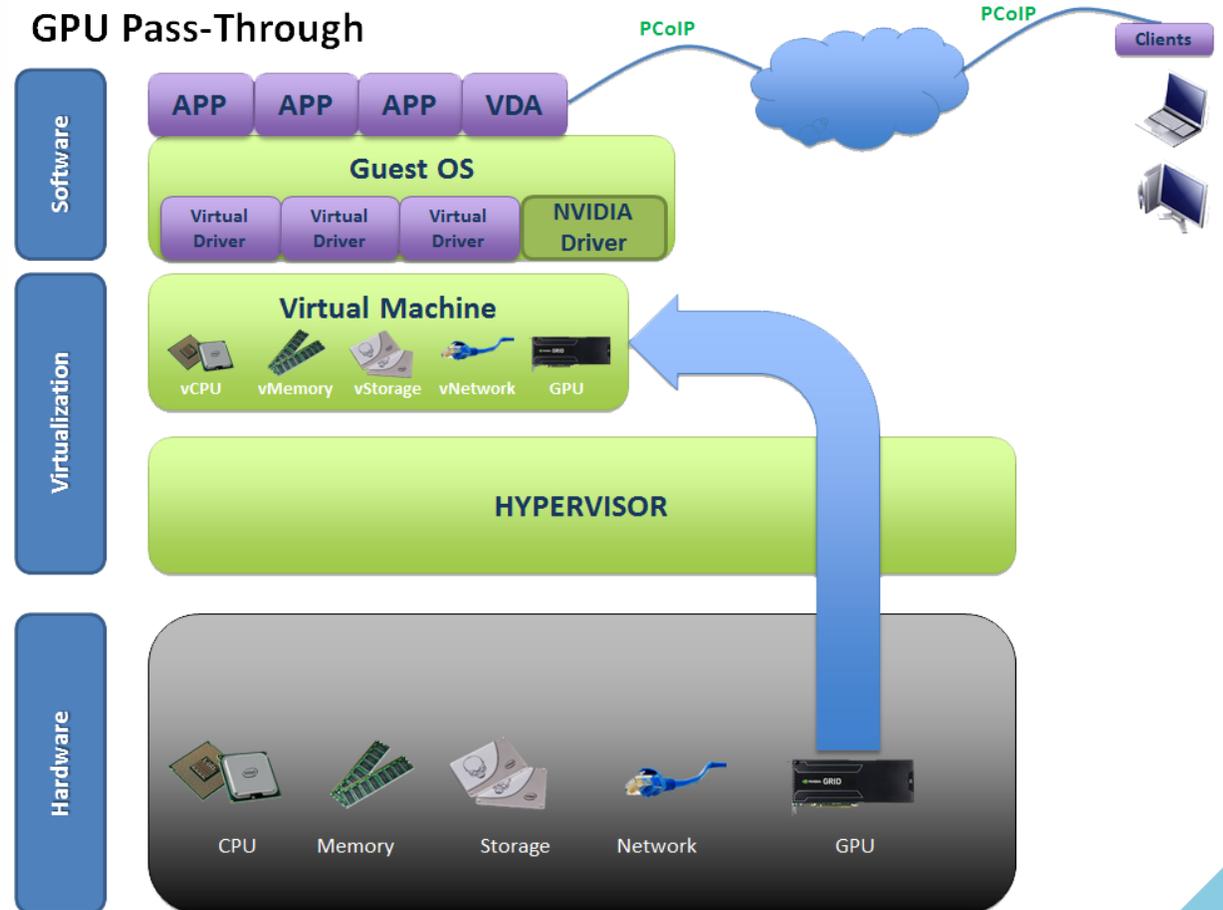
High Performance Compute Option for Virtual Workstations

## Overview

- Enables dedicated access to physical GPUs on NVIDIA GRID GPU hardware for rich graphics and high performance compute workloads
- Ideal for oil & gas, high performance computing
- Uses native NVIDIA drivers in Windows
- ISV certifications available from Siemens & ESRI with more to come

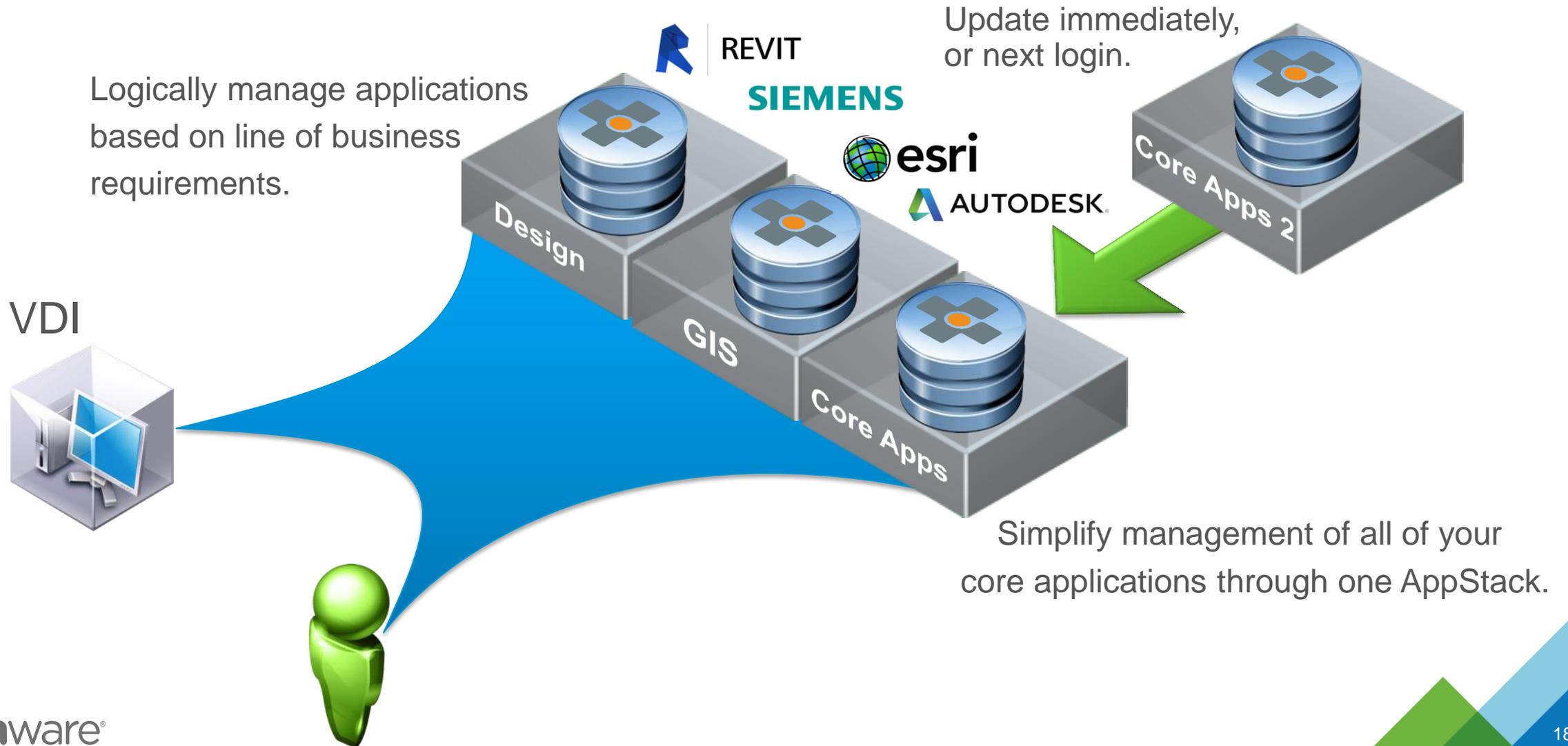
## Benefits

- Enables truly high performance graphics
- Complete application compatibility/certification
- Flexibility in delivering rich graphics for desktop and workstation use cases



# Benefit: Simplify App Deployment and Updates

Deliver, Update, and Retire any set of Applications in Seconds with App Volumes

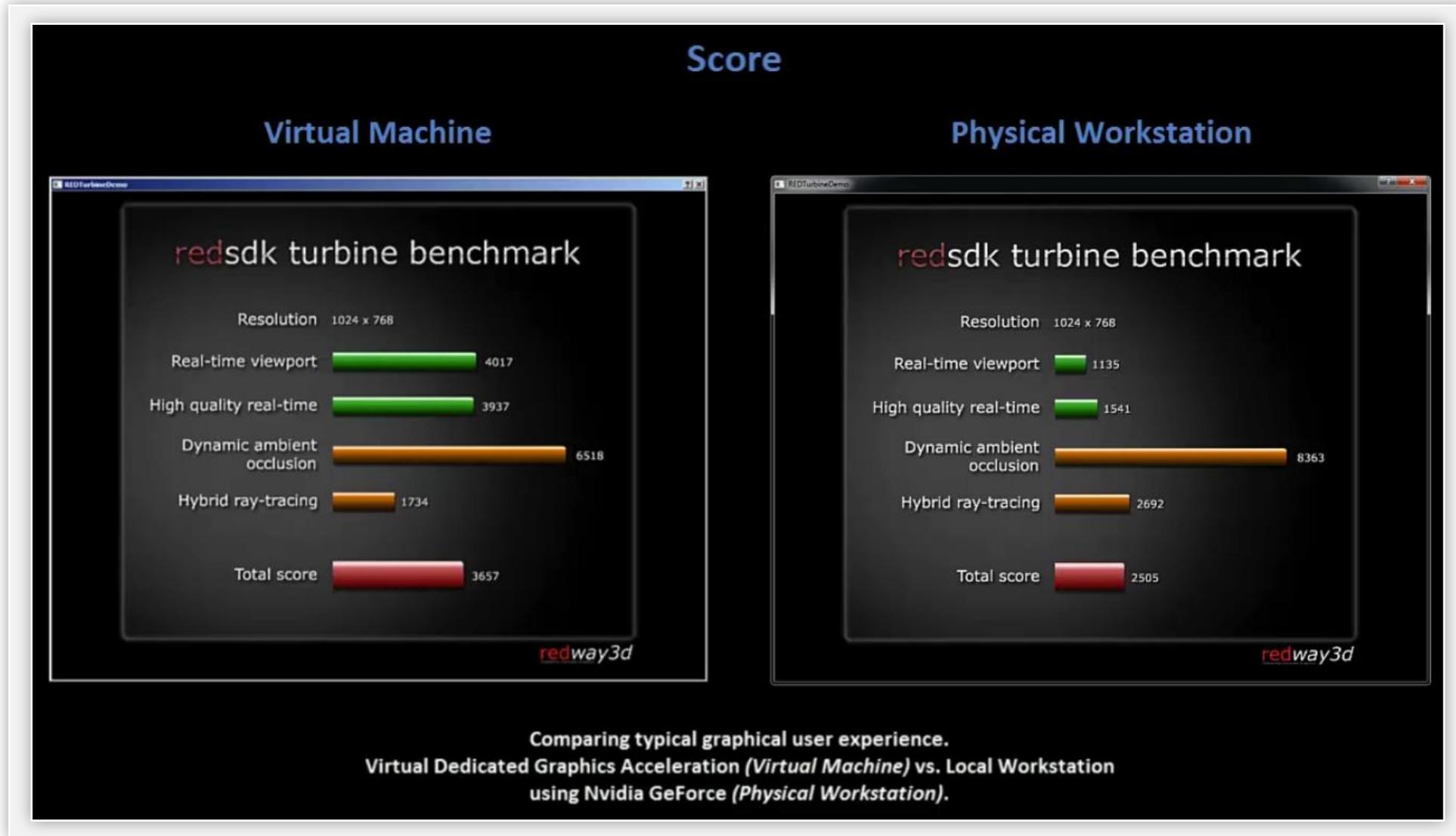


# Configuring Rich Graphics VDI vs. Regular VDI vs. Physical

	Windows 7 VDI Basic	Windows 7 VDI Advanced	Graphics Workstation Reviewer	Graphics Workstation Editor	Graphics Workstation Engineer	High Performance VDI Reviewer	High Performance VDI Editor	High Performance VDI Engineer
<b>OS</b>	Win 7 32	Win 7 32	Win 7 64	Win 7 64	Win 7 64	Win 7 64	Win 7 64	Win 7 64
<b>CPU</b>	1	2	4	4	8-12	4	4	8
<b>Memory</b>	2 GB	3-4 GB	4-8 GB	8 GB	16-32 GB	4-8 GB	8 GB	16-32 GB
<b>IOPS</b>	8-12	25-50	150	150	200-5000	200-400	200-400	400-1000
<b>Graphics</b>	Soft 3D	Soft 3D	Intel Integrated	Quadro 600	Quadro 4000	GRID Q140	GRID Q220	GRID Q260
<b>Users/Core</b>	6-8	2-4	N/A	N/A	N/A	1-2	1-2	1-2
<b>Density</b>	200	100	N/A	N/A	N/A	25-40	15-25	10-16
<b>~Cost</b>	~ \$200 (HW)	~\$3,000			~\$4,500			~\$6,000 +(HW)

# Redway3D CAD Turbine Benchmark Test

Video

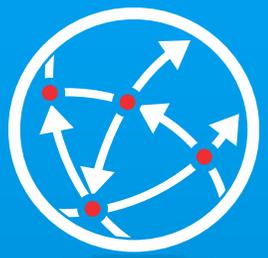


# Imagine the Possibilities...

Early Adopters Share Their Projected Benefits of Deploying VMware Horizon and vSphere with NVIDIA GRID vGPU



## PRODUCTIVITY



# 20%

improvement in workflow cycle time for an engineering firm's remote **CATIA** users

## SCALABILITY



# 20,000+

engineers accessing a single, **centralized desktop image** for their virtualized **Siemens NX** workstations

## COLLABORATION



# 14,700

km between an **engineering** firm's **Revit** teams collaborating from offices in Holland and Australia

## EFFICIENCY



# 5,000

employees at a global transportation company receiving **remote video training** instead of traveling

## SECURITY



# \$10M+

in product development savings for an **automaker** through **intellectual property protection** and real-time supplier **negotiations**

Over 400 customers have participated in the VMware/NVIDIA GRID vGPU Early Access Program since VMworld 2014

Get the infographic here: <http://vmw.re/1vElpAO>

# NEW: DIRECT ACCESS Program for GRID vGPU + Horizon

Accelerating Your Success in Deploying Virtual Desktops with Immersive Rich Graphics

- Launched Feb 2 at VMware Partner Exchange
- For Qualified Customer Applicants who are planning to deploy GRID vGPU in production
- **Exclusive, limited access with these benefits:**
  - **Direct access** to NVIDIA and VMware resources to help optimize your deployment
  - **Receive early access** to evaluate new technologies and products
  - **Exclusive community** moderated by NVIDIA/VMware experts
  - **Provide direct input** on the product to NVIDIA and VMware product teams to influence future offerings
  - **Priority Access** to consulting services from both VMware and NVIDIA (costs associated)



Apply: <http://www.nvidia.com/object/vmware-vgpu-direct-access.html>

# Resources

- VMware Horizon 6 Reference Architecture
  - <http://www.vmware.com/files/pdf/techpaper/VMware-Reference-Architecture-Horizon-6-View-Mirage-Workspace.pdf>
- VMware Horizon with View Graphics Acceleration Deployment Guide
  - <http://www.vmware.com/files/pdf/techpaper/vmware-horizon-view-graphics-acceleration-deployment.pdf>
- VMware Horizon with View on Virtual SAN Reference Architecture
  - <http://www.vmware.com/files/pdf/techpaper/vmware-horizon-view-virtual-san-reference-architecture.pdf>
- NVIDIA GRID Certified Servers
  - <http://www.nvidia.com/object/enterprise-virtualization-where-to-buy.html>
- NVIDIA GRID & VMware Horizon Deployment Guide
  - Coming soon!

# Q&A / Thank You