
# S5265 - Customer Success Story:

## Desktop Virtualization with NVIDIA GRID for a Large Construction Company

#NVIDIA #GTC15


Welcome!

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***End User Computing***


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PQR
Eenvoud in ICT

# THANKS!


# Session Objectives

- Customer
- Original Situation
- Challenge's and Requirements
- Solution
- Notes from the field
- Wrap Up & Take Away


CONSTRUCTION
COMPANY

# Construction Company

- 20 (semi) independent (sub) Companies
- (Civil) engineering, Infrastructure
- 9,000 employees
- 2.1 billion revenue

# Original Situation

- Broad variety of physical desktops
- Engineers and mobile training facility
- AutoDeskt Revit, BIM360, eDrawings, Trimble SketchUp






Challanges

# Challanges

- Physical desktops
- Standardize hardware configuration
- Image management
- Large data sets – multiple locations
- Facilitate the Knowledge Center


Search!

*"A **FLEXIBLE** solution, enabling employees to perform their work on **ANY DEVICE, NO MATTER WHERE** over **ANY CONNECTION** without compromising **SECURITY** and most important with an **EXCELLENT USER EXPERIENCE**"*

# Requirements

- Flexible Solution
  - Location
  - Connection
  - End Point
- Standardize Hard- and Software
- Image Management
- Security


Solution

# VDWhy?

# Why VDI

- **FLEXIBLE**
  - Access anywhere, Any Device, Any Connection
  - Different set-ups for knowledge center
  - Image Management
  - Supports BYOD and COPE
- **SECURITY**
  - Protect IP, Centralized Data
- **Standardized** – HP – Citrix - NVIDIA
- **Disaster Recovery** – Multi Site and Multi Datacenter
- **Reduce Costs** – Centralized Management
- **Ergonomics** – No heat and noise under the desk


User Experience

# Caution

- End-user Experience **(UX)** vs Admin Experience **(AX)**
- End user **Perceived Performance**
- Impact on **Networking**; bandwidth, latency
- Overall **Complexity** in technology stack
- Unified Communications
- **Storage**; balance between IOPS and Capacity

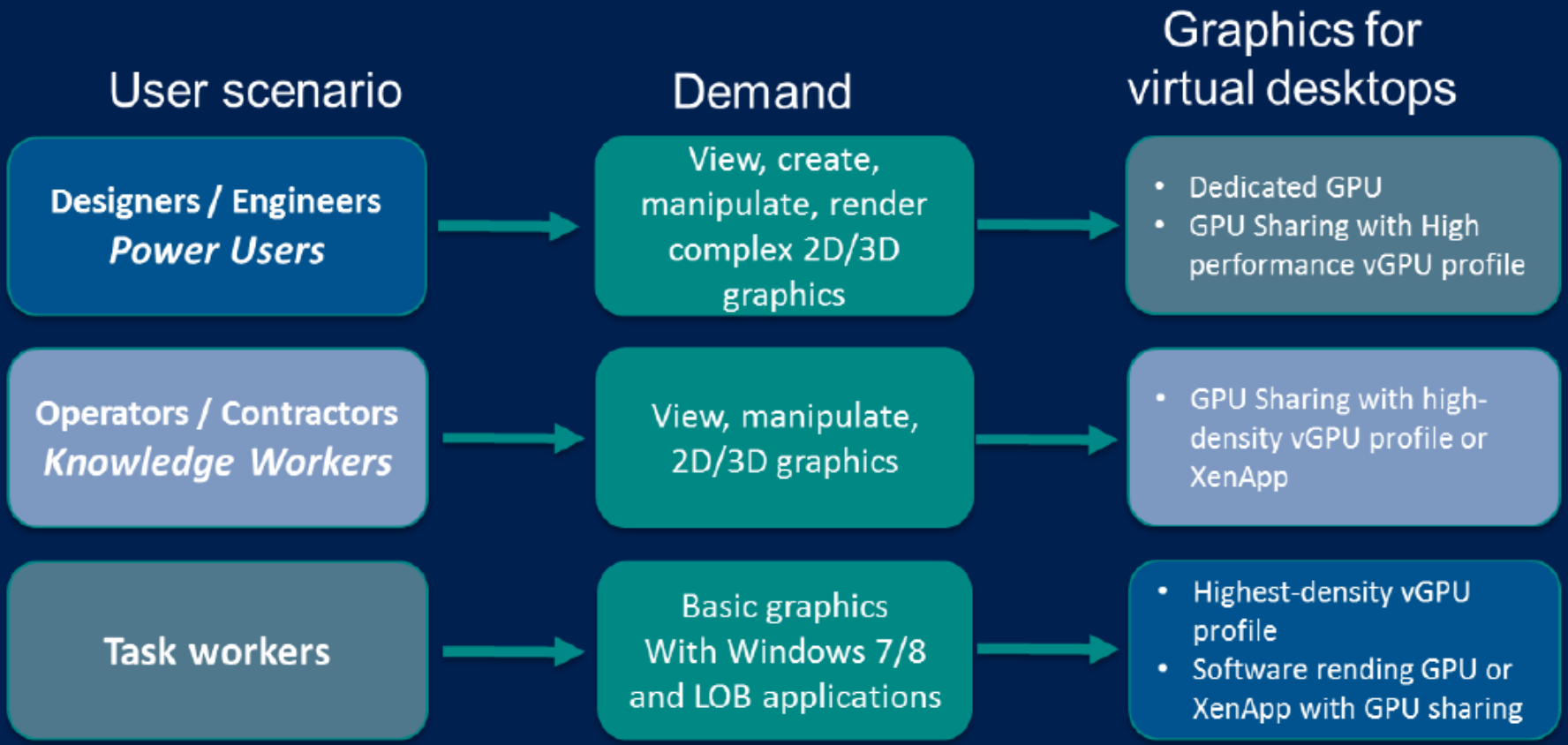

# Graphics for Virtual Desktops


NVIDIA GRID

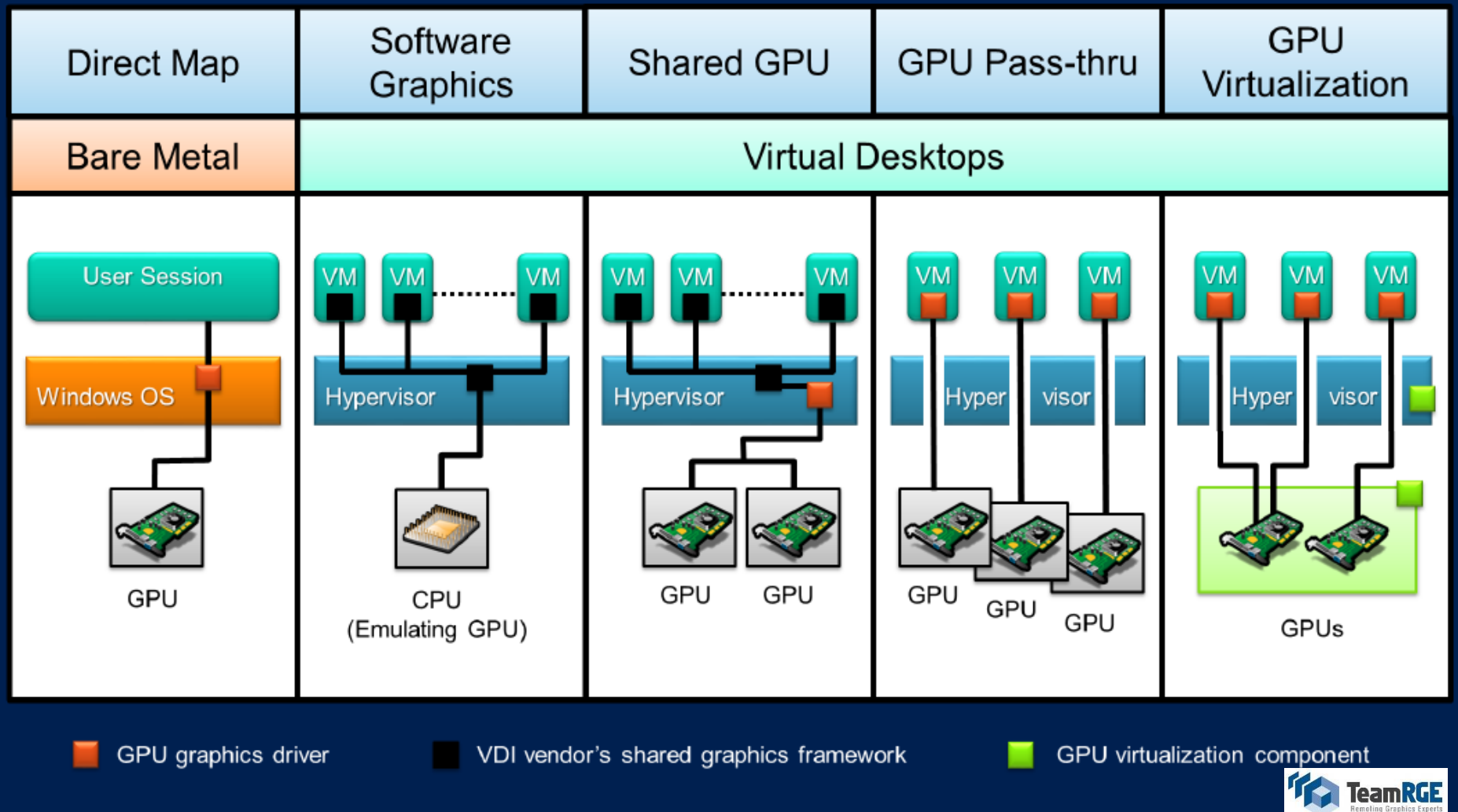
# NVIDIA GRID K1 & K2

| NVIDIA GRID CARD | Physically GPUs pr board | vGPU profiles | Surggested use-case | vGPUs per pGPU | vGPUs per board | GPU memory per VM | GPU CUDA per VM | Max Display Per VM | Max Resolution Per User | Max Users Per Graphics Board | vGPU OS support | Hypervisor Support |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| NVIDIA GRID K2 | 2 | (pass-through) | | 1 | 2 | 4096 MB | 1536 | 4 | 2560x1600 | 2 >* | Windows XP,Vista,7,8,8.1<br>Windows Server 2003,2008R2/2012/2012R2<br>Linux/Solaris/FreeBSD | XenServer<br>Vsphere<br>Hyper-V |
| | | K280Q | | 1 | 2 | 4096 MB | 1536 | 4 | 2560x1600 | 2 | Windows 7,8,8.1 (all 32-64bit)<br>Windows Server 2008R2/2012/2012R2 (64bit) | XenServer |
| | | K260Q | | 2 | 4 | 1920 MB | 768 | 4 | 2560x1600 | 4 | Windows 7,8,8.1 (all 32-64bit)<br>Windows Server 2008R2/2012/2012R2 (64bit) | XenServer |
| | | K240Q | | 4 | 8 | 960 MB | 384 | 2 | 2560x1600 | 8 | Windows 7,8,8.1 (all 32-64bit)<br>Windows Server 2008R2/2012/2012R2 (64bit) | XenServer |
| | | K220Q | | 8 | 16 | 512 MB | 96 | 2 | 2560x1600 | 16 | Windows 7,8,8.1 (all 32-64bit)<br>Windows Server 2008R2/2012/2012R2 (64bit) | XenServer |
| | | K200 | | 8 | 16 | 256 MB | 96 | 2 | 1920x1200 | 16 | Windows 7,8,8.1 (all 32-64bit)<br>Windows Server 2008R2/2012/2012R2 (64bit) | XenServer |
| NVIDIA GRID K1 | 4 | (pass-through) | | 1 | 4 | 4096 MB | 192 | 4 | 2560x1600 | 4 >* | Windows XP,Vista,7,8,8.1<br>Windows Server 2003,2008R2/2012/2012R2<br>Linux/Solaris/FreeBSD | XenServer<br>Vsphere<br>Hyper-V |
| | | K180Q | | 1 | 4 | 4096 MB | 192 | 4 | 2560x1600 | 4 | Windows 7,8,8.1 (all 32-64bit)<br>Windows Server 2008R2/2012/2012R2 (64bit) | XenServer |
| | | K160Q | | 2 | 8 | 2048 MB | 96 | 4 | 2560x1600 | 8 | Windows 7,8,8.1 (all 32-64bit)<br>Windows Server 2008R2/2012/2012R2 (64bit) | XenServer |
| | | K140Q | | 4 | 16 | 960 MB | 48 | 2 | 2560x1600 | 16 | Windows 7,8,8.1 (all 32-64bit)<br>Windows Server 2008R2/2012/2012R2 (64bit) | XenServer |
| | | K120Q | | 8 | 32 | 512 MB | 24 | 2 | 2560x1600 | 32 | Windows 7,8,8.1 (all 32-64bit)<br>Windows Server 2008R2/2012/2012R2 (64bit) | XenServer |
| | | K100 | | 8 | 32 | 256 MB | 24 | 2 | 1920x1200 | 32 | Windows 7,8,8.1 (all 32-64bit)<br>Windows Server 2008R2/2012/2012R2 (64bit) | XenServer |

Poppelgaard.com


User scenario
Demand
Graphics for virtual desktops
Designers / Engineers
Power Users
View, create, manipulate, render complex 2D/3D graphics
• Dedicated GPU
• GPU Sharing with High performance vGPU profile
Operators / Contractors
Knowledge Workers
View, manipulate, 2D/3D graphics
• GPU Sharing with high-density vGPU profile or XenApp
Task workers
Basic graphics With Windows 7/8 and LOB applications
• Highest-density vGPU profile
• Software rending GPU or XenApp with GPU sharing

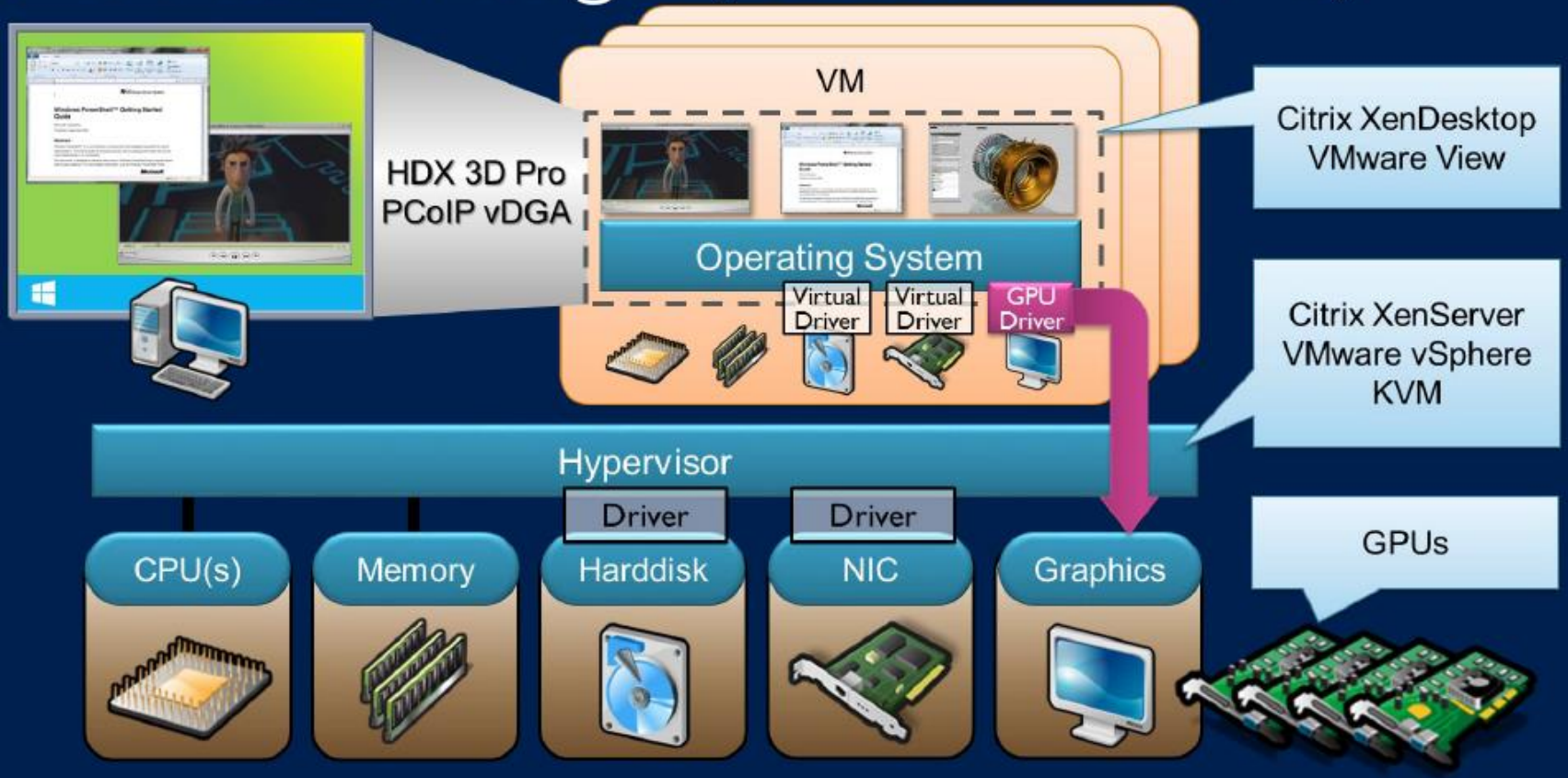
# Graphics Concepts


Direct Map
Software Graphics
Shared GPU
GPU Pass-thru
GPU Virtualization
Bare Metal
Virtual Desktops
User Session
Windows OS
GPU
VM
Hypervisor
CPU
(Emulating GPU)
GPU
GPU
Hyper
visor
GPU
GPU
GPU
GPUs
GPU graphics driver
VDI vendor's shared graphics framework
GPU virtualization component
TeamRGE
Remoting Graphics Experts

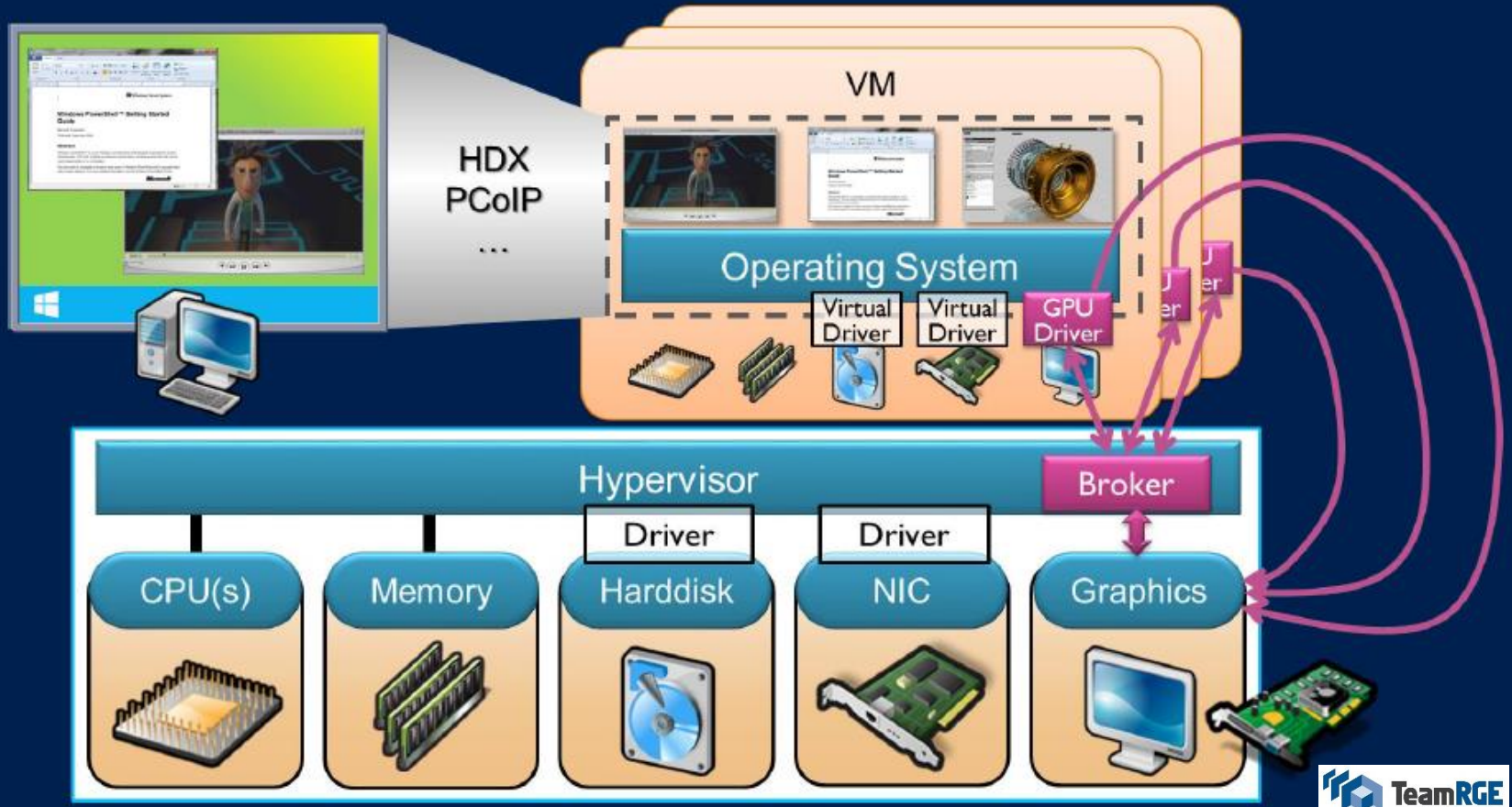
# What is the right solution?

| Graphics for Virtual Desktops | High performance | 3D API support (openGL, DirectX, CUDA) | Cost effective (knowledge worker) | Application certification |
|---|---|---|---|---|
| Software 3D Graphics | ★ | ★ | ★ ★ | ⊘ |
| Bare metal OS | ★ ★ ★ ★ | ★ ★ ★ ★ | ★ | ★ ★ ★ ★ |
| Pass through GPU | ★ ★ ★ ★ | ★ ★ ★ ★ | ★ | ★ ★ ★ ★ |
| GPU Virtualization - vGPU | ★ ★ ★ | ★ ★ ★ | ★ ★ ★ | ★ ★ ★ |
| GPU Sharing for VDI | ★ ★ | ★ ★ | ★ ★ ★ ★ | ⊘ |
| GPU Sharing for XenApp/RDSH | ★ ★ | ★ ★ | ★ ★ ★ ★ | ★ ★ |

# GPU Pass-through (Dedicated GPU)



# GPU Virtualization – GRID vGPU



“Think BIG

act

small“

# Design – Supporting Components

- Supporting Components
  - AD/DNS/DHCP
  - File Services
  - SQL Service
  - Citrix XenDesktop Controllers
  - Licensing Services
  - Citrix NetScaler (VPX)
- VMware vSphere 5.5
- 2 x HP DL380p Gen8
  - CPU 2 x 10 core 2,3 GHz (E5-2650v3)
  - Memory 256 GB
  - Disk 2 x 300 GB SAS 15k, 10 x 450 GB SAS 10k
  - Network 1 x 4 port 10 GB Ethernet


# Design – Heavy Use

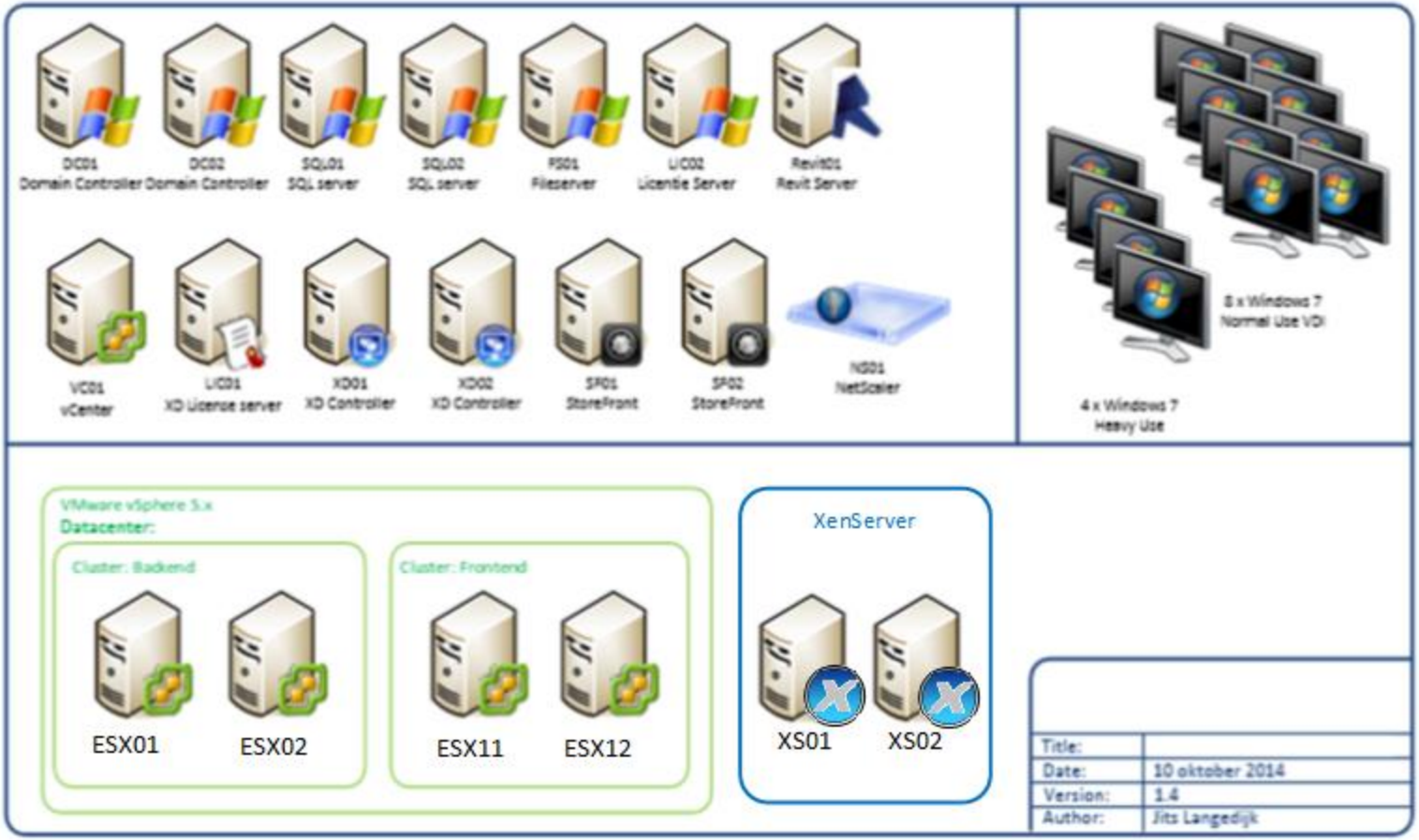
- Windows 7 x64  Stateful VDI
  - GPU Pass-through
- Citrix XenDesktop 7.6
- VMware vSphere 5.5
- 2 x HP DL380p Gen8
  - CPU  2 x 6 core 3,4 GHz (E5-2643v3)
  - Memory  256 GB
  - Disk  4 x 480 GB SSD,
    1,4  TB Workload Accelerator
  - Network  1 x 4 port 10 GB Ethernet
  - GPU  2 x NVIDIA GRID K2

CITRIX XenDesktop

vSphere

# Design – Normal Use

- Windows 7 x64  Stateful VDI
  - vGPU K260Q
- Citrix XenDesktop 7.6
- Citrix XenServer
- 2 x HP DL380p Gen8
  - CPU 2 x 8 core 3,1 GHz (E5-2687v3)
  - Memory 256 GB
  - Disk 4 x 400 GB SSD,
  - Network 1 x 4 port 10 GB Ethernet
  - GPU 2 x NVIDIA GRID K2
- HP T620 TCs, Windows Embedded 8

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| Title: | |
| Date: | 10 oktober 2014 |
| Version: | 1.4 |
| Author: | Jits Langedijk |

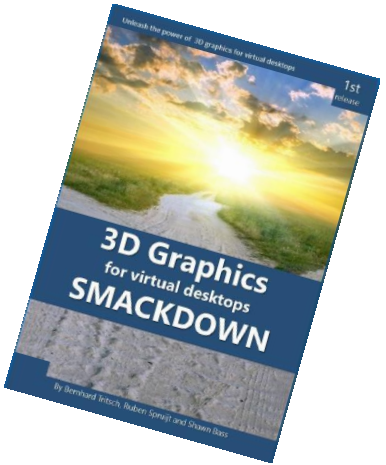
# Notes from the Field

- ‘New technology’ takes time to adopt
- HCL – Certification of entire stack
  - http://www.nvidia.com/object/enterprise-virtualization-where-to-buy.html)
  - http://hcl.xensource.com/
- NVIDIA Drivers
  - Use latest drivers
  - Keep NVIDIA vGPU manager and NVIDIA Grid driver at the same level
- 4 vCPU minimum - http://support.citrix.com/article/CTX135811
- Bandwidth/latency – 2 / 3 Mbps minimum, latency < 150
- Tune Server BIOS – Max Performance CPU, Turn your Fans up

# Wrap Up

- Performance is all about finding the right balance (CPU, Memory, IOPS, GPU, Network)

- 3D Graphics for Virtual desktops Smackdown
  - www.PQR.com/gfx
- PQR YouTube Channel
  - https://youtu.be/nLsWzf5p90M
  - https://youtu.be/jfmqN4_FsAo
  - https://youtu.be/LGeU6rFij3Q
  - https://youtu.be/mx2BR1wajPI

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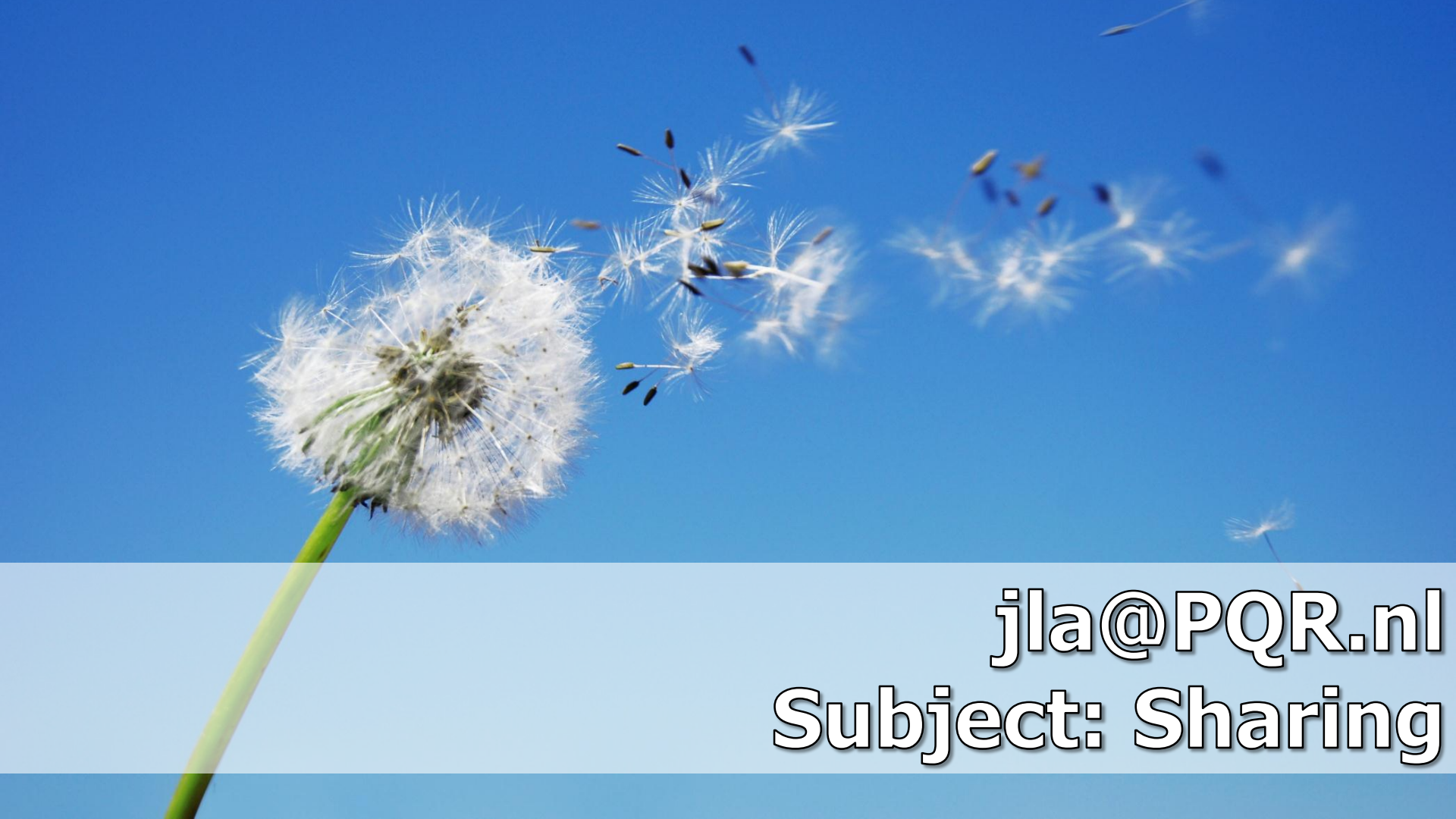
jla@PQR.nl
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Thank You


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