Remoting Your 3D

Ian Williams - Manager, PSG Applied Engineering
Agenda

• Motivations
• Current Remoting Solutions
• Partner Presentation - Citrix
• Summary
Why is Remoting 3D Interesting?

i.e. Why are you here?
Reasons for Remoting 3D

• Data security
• Centralization
• Accessibility
• Management
• Cost savings
• Deliver Capability
  • application+data
• ....
Remoting Solutions

- SW Remote Desktop
  - VNC, Remote Desktop - 2D

- HW Remote Desktop
  - Teradici PC-over-IP

- Application Virtualization
  - Citrix - Virtual Design Studio
HW Remote Desktop
Teradici PC-Over-IP®
True 3D Graphics. Network Delivered

All Applications
All USB
All Graphics

Fully Hardware Accelerated Delivery of the Host GPU

Datacenter
Compute Resource

PCoIP® Delivered Desktop
Teradici PC-Over-IP®
A Flexible Architecture for Both Host and Portal

Hosts
- Dell
- IBM
- ClearCube
- Verari Systems

Add-on Host Boards
- LeadTek
- EVGA
- ELSA

Datacenter
- Blade Workstations
- Blade PC’s
- Blade Servers
- Rack Workstations
- Rack Servers
- Tower Workstations
- Tower Servers

Enterprise IP Network

Desktop
- Dual Display
- Quad Display
- Integrated Display
- Integrated IP Phone
- Mobility

Portals
- Dell
- IBM
- ClearCube
- Verari Systems
- Samsung
- Amulet Hotkey
- LeadTek
- EVGA
- ELSA

Connection Manager, Virtualization
- Citrix®
- Microsoft
- Symantec
- VMware
- Ericom
- LeoStream
- VDIWorks

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Dell Precision™ R5400 and FX100 Remote Access Device™

Remote Access PC-over-IP® Card delivers dedicated hardware compression and encryption for better performance and reduced latency.
Quadro Plex Family

**Quadro Plex Deskside (D2 / D4)**
- Deskside, 3U Rackable
- Up to 8, Synched DVI
- Enabling power desktops and turnkey powerwalls

**Quadro Plex 1U System (S4)**
- Data Center Design
- Graphics via network
- Enabling remote & distributed visualization
## Quadro Plex Remoting Roadmap

<table>
<thead>
<tr>
<th>Year</th>
<th>Model</th>
<th>GPUs</th>
<th>Memory per GPU</th>
<th>Readback to Host</th>
<th>Gen</th>
<th>HICs</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>Quadro Plex 2100 S4</td>
<td>4 G80</td>
<td>1.5GB/GPU</td>
<td>Readback to Host</td>
<td>Gen1</td>
<td>2</td>
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<tr>
<td>2008</td>
<td>Quadro Plex 2200 S4</td>
<td>4 G100</td>
<td>4GB/GPU</td>
<td>Readback to Host</td>
<td>Gen2</td>
<td>2</td>
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</tbody>
</table>
Application Virtualization

Nvision 2008
Amitabh Sinha
Vice President, Engineering
Citrix Systems
Agenda

- Company background
- What is application virtualization?
- Why graphics remoting?
- What is Citrix Virtual Design Studio?
- Optimizing Graphics Remoting Performance
Company Overview

- 2007 Revenue: $1.39 Billion
- 4,200+ employees in 35 countries
- 7,000 partners in over 100 countries
- 200,000 customers
  - 94% customer loyalty
  - 75% of all Internet users
  - 70M corporate users
  - 1,000,000 servers running Citrix infrastructure
  - 100M online virtualization sessions

Microsoft “Global ISV of the Year” 2003, 2005
Leader in Application Delivery Infrastructure
Our Vision for Business

A world where anyone can work and play from anywhere
Citrix Delivery Center

- XenDesktop
- XenApp
- XenServer
- NetScaler

App & Desktop Receivers → Branch Repeater → Workflow Studio → Access Gateway
Traditional Windows Deployment

- 16-bit/32-bit Client components
- Desktop applications
- Web Browser
- Server component
  - Web applications
  - Custom applications
- Data Center

Costly to manage and support
Difficult to secure and monitor
Updates difficult and slow
Centralize and host in data center
Easier to install, manage and support
Applications and data are protected
Why remote graphics?

Manufacturing Drivers
• Globalization
• M&A
• Natural & man-made disasters
• Differentiation via innovation
• Accelerated time to market
• Cost reduction
Global Manufacturers: Business Needs

- Source talent globally
- Outsource or offshore engineering and design
- Around the clock business continuity
- Distributed or Global Product Development
- Enable mobile and occasional productivity
- IT “Do More with Less”
Graphical Application Virtualization - with Citrix Virtual Design Studio

Application processing on server with GPU in the datacenter

Server component
- Web applications
- Custom applications

Data Center

Application Servers

Virtual Design Studio Environment

- Multiple GPU in data center
- Multiple Users per GPU
- Applications and data are protected
Optimizing Graphics Remoting Performance in VDS
Graphics Remoting Considerations

Bandwidth requirements
- Raw frame size is 2.5MBytes
- A medium complex model can generate 12 frames per second
- Bandwidth requirement without compression is 30 Mbytes/second or 240 Mbps!
- Target: Run with acceptable performance in 2Mbps network with 150ms latency

Responsiveness
- Can the model be responsive when you are 75ms away on a low bandwidth network?
- Lag (time between mouse click and response) <= 1second
- Overshoot (time between last mouse click and response) <= 1 second
Questions & Answers?
Summary

• Interest in remoting 3D graphics is driven by strong economic factors:
  • Centralization
  • Management
  • .......
• Remoting 3D Graphics is in its infancy
• Solutions and Technologies are developing quickly
• Partners are critical to 3D remoting Solutions
Thank you!

• Questions?