Summary

PSA Peugeot Citroën IT department presentation

3D Virtualization project
- Introduction
- Today status & goal
- User classification & action field
- Steps, architecture & implementation
- Remote 3D tests

Conclusion
IT department presentation
Guiding the product plan of the Group

- Reducing the time of the design cycle and unit costs (MCP)
  - Rapid delivery of vehicle innovations,
  - Reactivity to market demand,
  - Supporting the increase in the vehicle product plan,
  - Guaranteeing our competitiveness.

- Guaranteeing quality: design to deliver “good”
  - Requirement with regard to the competition and to the growth in volumes,
  - Having processes that guarantee quality and being able to measure it.

- Working in the Extended Enterprise
  - Access for suppliers to our systems from outside,
  - The same for our partners – Toyota, BMW, GM, ....

The Technico-Industrial Upstream assists the Group’s product plan with high-performance tools, such as digital factory and virtual reality.
Challenge in the design world
**IT Department in figures**

**Servers**
- 10,000 Operating Systems Instances
  - Windows, Mainframe, Unix, Linux
  - 60% of Virtual servers

**Storage**
- 14,000 Tbytes
  - Shared open systems
  - Mainframe
  - CAD
  - Dedicated Open systems storage

**Workstations**
- 70,000 Office
- 10,000 CAD/CAM
- 7000 Industrial Terminals

Reducing the time of the design cycle and unit costs (MCP)

Rapid delivery of vehicle innovations,

Reactivity to market demand,

Supporting the increase in the vehicle product plan,

Guaranteeing our competitiveness.

Guaranteeing quality: design to deliver “good” Requirement with regard to the competition and to the growth in volumes,

Having processes that guarantee quality and being able to measure it.

Working in the Extended Enterprise

Access for suppliers to our systems from outside,

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3D Virtualization project
Introduction

- CAD/CAM workstation as it is perceived today will change significantly in coming years.
- Evolution of the deployment model of 3D applications.
- Open infrastructure CAD/CAM designers.
- Data Security.
- Global environment.
- Trivialization of the client.
- Evolution of the workspace
3D Virtualization project
Today Status & Goal
CAD/CAM workstation infrastructure today
Remote solution Today

Solution in production since 2007

- 500 users
  - Partners
  - Subcontractors
  - International sites

SAM Service

Choice of RGS Blade

HP RGS Connection

Partners

Subcontractors

International sites

500 users
Virtualization Goal

1. **Current Situation 1**
   - **Client**: CAD/CAM Workstations
   - **Network**: Software’s are installed in local on the workstations
   - **Server**: Hardware

2. **Current Situation 2**
   - **Client**: RGS Blades
   - **Network**: Hypervisor
   - **Server**: Hardware

**Virtualization**

- On Site
- Off-site
- Hardware
- Hypervisor
3D Virtualization project
User classification & action field
User Classification

- **Task Worker**
  - Desktop applications. *Word, Excel, Outlook,*

- **Gx Entry level**
  - Entry level graphics and minimal multimedia

- **Gx Medium level**
  - Medium Level graphics
  - Compute needs
  - 3D software (Ex: DS Catia)

- **Gx High End Level**
  - Compute intensive applications
  - High End 3D graphics applications

**Session virtualization**

**Virtual Desktop Infrastructure**

**Graphics Accelerated Virtualized**

**3D Workstation**

Increasing overall performances (Graphics + Compute)
Technology status

- **Light Users**
  - Task Worker
  - Desktop applications
  - Gx Entry level users
  - 2D, Minimum 3D, light multimedia

- **Terminal Services, .....**
  - N:1

- **VDI**
  - N:1

- **VDI today can’t address the graphic needs in this area**
  - 3D Graphics must be virtualized with hardware & software capabilities

- **Local Workstations**
  - 1:1

- **Heavy Users**
  - Gx High End Level
  - Workstation Class
  - Performance needs.

- **Image Quality**
  - Interactivity
  - Cost/Seat
  - 2D / 3D

- **VDI Graphics Accelerated**
  - N:1

- **3D Graphics must be virtualized with hardware & software capabilities**

- **VDI Graphics Accelerated**
  - N:1

- **Local Workstations**
  - 1:1

- **Heavy Users**

**HOLE**

**VDI Graphics Accelerated**

- 3D Graphics must be virtualized with hardware & software capabilities

**N:1**

**VDI**

- N:1

**Light Users**

- Task Worker
  - Desktop applications

**Gx Entry level users**

- 2D, Minimum 3D, light multimedia

**Gx medium level**

- Compute needs and 3D graphics performance

**Gx High End Level**

- Workstation Class
  - Performance needs.
Why Virtualize the 3D

- Reduce costs vs 3D remote 1:1 solution
- Answer to power on demand
- Data security improvement
- Data consolidation
- Maintenance improvement
- Power consumption
- Improve mobility
- ....
3D Virtualization project
Steps, Architecture & Implementation
Project Steps

Hardware Prototype configurations in virtualized mode "GPU Passthrough“ evaluation
- Partners Nvidia, HP
- Prototype implementation
- Blade system with multiple GPUs

Software prototype in virtualized mode "GPU Passthrough“ evaluations
- Operating systems, Hypervisors, Remote solutions, protocols, ...
  - Citrix Xenserver
  - Windows Server 2008 R2
  - Parallels Desktop
  - VMWare server
  - Xendesktop
  - Remote FX
  - HP Remote Graphics (RGS)
  - Citrix HDX 3D pro
  - VmWare Views
  - Nvidia Monterey
  - PCoIP
  - ....
Project Steps

Current situation

Step 1: Protocols analysis

Step 2: Architecture Analysis

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Overhall Test Architecture
Detailed Architecture

Virtual Machines

User Application
Guest OS
- WINDOWS 7
- XenDesktop 4.0 Virtual Desktop Agent
- HDX 3D Pro Graphics

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Guest OS
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Administration Console

Nvidia Q300M

Clients

HP

XenServer

HARDWARE

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Blade implementation example

HP Blade
Extension PCIE Blade
Nvidia Quadro Q3000M
Blade Gx
Xenserver 6
Xendesktop 4
Nvidia Quadro Q3000M
Blade implementation example

Chassis Blade Classe C
HDX 3D Pro
3D Virtualization project
Remote 3D tests
Remote is the key feature of the whole project.

Overall feeling for users must be « just like local » and responsive.

Bandwidth consumption and latency effects must be reduced.

Image quality and framerate must be improved.

In 2011 Nvidia Monterey Toolset improve compression, network protocol and client decoder.

All the remote 3D tools are implementing the toolset (HDX 3D, RGS, Views, ...)
Measured Performances

Intensive graphic test: Bench Viewperf Catia 1680x1050

The nvidia remote max bandwidth is lower than the HP GRS min bandwidth
- 275% bandwidth consumption versus HP RGS on similar compressions.

- 33% CPU Usage consumption.

The sharpness of the image after degradation is almost instantaneous on progressive compression.

Users feeling with Catia resolution 1680x1050 from Paris Data Center

« As in local » feeling in Paris facilities (30 Km Radius) → 15-30ms Latency
« As in local » Rest of France facilities (500 Km) → 30 ms Latency
« Good feeling » in Spain Facilities (1500 Km) → 60 ms Latency
« Usable » in China facilities (9000 Km) → 210 ms
The software stack is now almost ready to use
- OS, Hypervisor, GPU Passtrough, Remote, Brooker....

The hardware stack is ready to use
- Blade and extension
- Server with full lenght graphics cards

Prototype is operational

User acceptance is good

Overseas sites can be addressed

Medium and long term vision:
- Full virtualization of graphics (many users per GPU)
- Overall power of the virtualized workstation on demand
- Open to Imagery computing
Special Thanks

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