S9889 - From Passthrough to vGPU : PSA Group's Walk through Next-Generation VDI

Alain Gonzalez – PSA Groupe
Thierry Regis – PSA Groupe
Benoit Bastien – NVIDIA

DIGITAL DATA & CONNECTIVITY ENGENEERING

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Groupe PSA

San Jose | March 17th-21st 2019

AGENDA

1. PSA GROUPE
2. PSALIB SOLUTION
3. PSALIB 2.0 MIGRATION FROM PASSTROUGH TO VGPU
4. ARCHITECTURE DETAILS
5. TEST PROTOCOL & SLA CONTRAINTS
6. CONCLUSION & FUTURE OUTLOOK
7. Q & A

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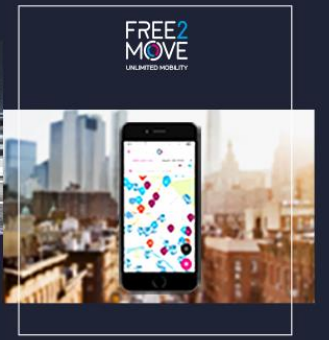
PSA Groupe

2018

FIVE CAR BRANDS & ONE MOBILITY BRAND



3 878 000
VEHICLES SOLD IN 2018

84 $
BILLIONS
IN REVENUE

205 000
EMPLOYEES

2ND
LARGEST EUROPEAN AUTOMAKER

PSA GROUPE

GPU TECHNOLOGY CONFERENCE

DIGITAL DATA & CONNECTIVITY ENGENEERING

PSA Groupe IT Department Missions

BUILD AND CARRY OUT THE IT STRATEGY FOR OVERALL BUSINESS DIVISIONS OF PSA GROUPE

MAINTAIN IN GOOD OPERATING CONDITIONS THE SYSTEMS ALL ALONG THEIR LIFE CYCLE FITTED TO « JUST NECESSARY »

ITS MISSIONS:

- Keep the systems in phase with the objectives of the Group and business priorities
- Guarantee the global consistency of the functional and technical architectural framework
- Ensure continued efficiency and availability of the applications and their distribution to the workstations
- To make the Group benefit from the new information and communication technologies in order to optimize the ratio efficiency/cost.

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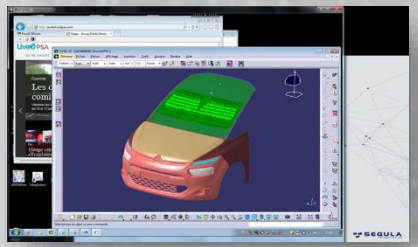
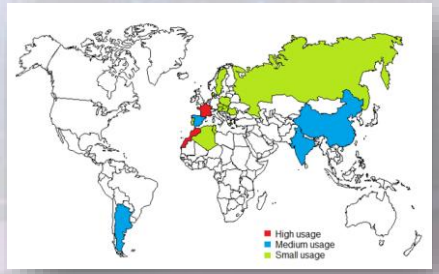
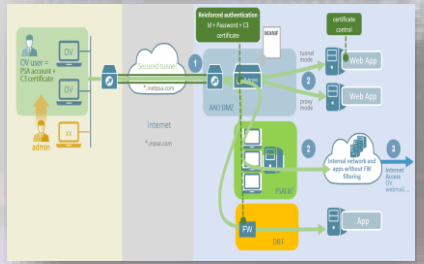
- PSALib allows to any user to work from any device and from any place as if he were in a corporate premises with a PSA Groupe workstation

- PSALib is a DAAS Solution (DesktopAsService)
  - CAD Workstation
  - Office device
  - Accessible in remote display



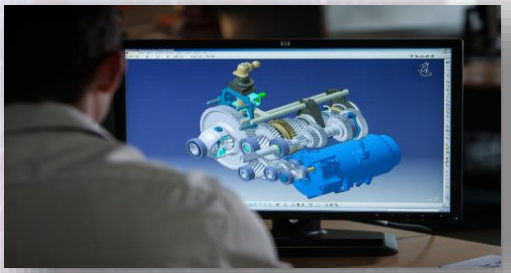


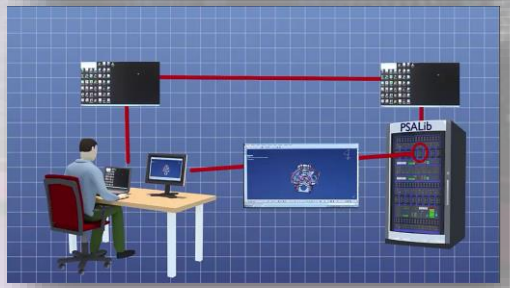
- 10000 Users (6000 3D + 4000 2D):
  - CAD Designers
  - CAD Homeworkers
  - Build & Run IT 2D workers



Why VDI is a success ?

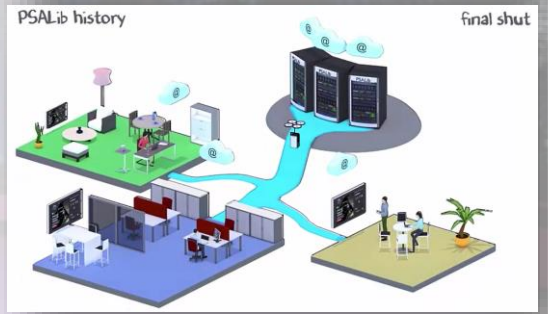
- Co-Design possible with suppliers and partners
- Sharring same datas
- No infrastructure contraints
- Data security
- Geographical distance possible
- Overall Profitable
  - Supplier’s contracts massification & uniformization
  - Real Estate free spaces
  - Design possible from low cost countries
- Work conditions improvments
  - Homeworking





PSALib services

- Helded by PSA Groupe IT as any physical workstation
- CAD Virtual machine assignment : Immediately
- Office Virtual Machine : In less than 2 hours
- User’s data saved automatically
- 100% of Virtual machines uptodate
- Disaster recovery Plan
- 99,9% availability



12 Years Remoting Workstations Time Line

HP Blade Workstation Gen 6
Baremetal Solution
Nvidia Quadro FX 880M
Nvidia Quadro FX 2800M
Remote solution : HP RGS
Storage : DAS
Network : 1Gb
Nb Users : 700
10U chassis Density : 16users

2007-2009

Remote WS 1:1

HP Blade Workstation Gen 6
VDI Passtrough solution
Nvidia Q3000M x 6
Remote solution : RGS / HDX
Hypervisor : XenServer 6.1
Storage NAS & DAS
Network 10Gb / 48VM
Nb users : 50
10U chassis density : 48users

2011-2013

R&D Pilote
PSALib 0.1

HP Blade Workstation Gen 8
VDI Passtrough solution
Nvidia Q3000M x 6
Nvidia K3100M x 6
Remote solution : HDX
Hypervisor : Xenserver 6.2
Storage NAS & DAS
Network 2 x 10Gb / 48VM
Nb users : 3000
10 U chassis density : 48users

2013-2016

Deployment Phase
PSALib 1.0

HP Blade Workstation Gen 9
VDI Passtrough solution
Nvidia K3100M X6
Nvidia M3000M X6
Remote Solution : HDX
Hypervisor : Xenserver 7.1
Storage NAS & DAS
Network 2 x 10Gb / 48 VM
Securtity : From VPN to F5
Nb users : 5000
10 U chassis density : 48

2016-2017

PSALib 1.5

Dell Rackserver R740 XD
vGPU Solution
Nvidia P4 X6
Remote Solution : HDX
Hypervisor : Xenserver 7.1
Storage NAS & DAS
Network 2 x 10Gb / 12VM
Nb Users : 6000
10U chassis density : 60 users

2018

PSALib 2.0

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Context :

- Standard solution for outsourcing, Joint Ventures, Cooperations, internal employees :
  - R&D & IT suppliers users
  - Homeworkers, New Tech Centers , Opel / Vauxhall
- Worlwide : 100 suppliers facilities – 4 Continents
- Continuous growth since deployment
- Efficiency & Flexibility requirements
- Cost optimization

Technical Inductors :

Hardware End of Life :

- HPE Enclosure C7000
- Nvidia MXM Modules
- Networking Cisco B22



Economical & Strategic Inductors :

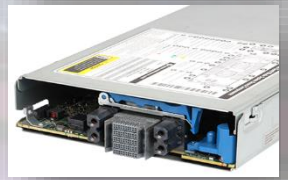
Reduce cost per virtual machine short & long term

Generic 2U chassis Usage

Improve users per chassis density

Reduce specific OEM technology footprint





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Two Hardware philosophies POCs

2017 Blade Workstation

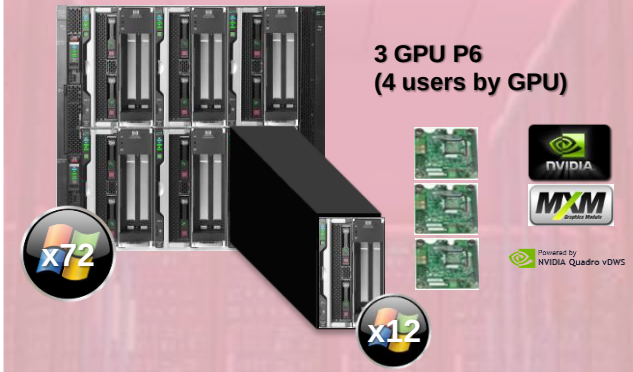
GPU Pass-through

1 enclosure 10U including
8 blade Workstation GEN9

POC Blade Workstation

vGPU

1 frame synergy 10U including
6 blade Workstation GEN10



Higher density due to vGPU technology
(72 VM by enclosure 10U vs 48 actual)

Leadership HPE
Enclosure replaced by Frame Synergy
Switch Cisco B22 replaced
MXM GPU format perennity ?

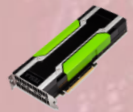
POC Rack Server

vGPU

1 rack server 2U

NVIDIA
Powered by NVIDIA Quadro vDWS

DELL sgi x? lenovo CISCO FUJITSU SUPERMICRO BULL



2 GPU P40
(6 users
by GPU)

x GPU P4
(2 users
by GPU)

Multiple hardware constructors
Test with 4 OEM :

DL380 GEN10 — lenovo SR650

DELL R740XD — CISCO UCS C240 M5

Global Architecture

Client

Remote Display

HDX 3D PRO
CITRIX
7.15 LTSR CU3

Broker & Administration

CITRIX
XenDesktop
7.15 LTSR CU3

Hypervisor

Xen Server
CITRIX
7.1 CU1

Hardware

vGPU

Server R740XD
12 VM by server
16 Servers by rack 42U

x192

6 GPUs P4
by server

NVIDIA

Powered by
NVIDIA Quadro vDWS

Storage & Provisionning

NAS NFS
MetroCluster
NetApp

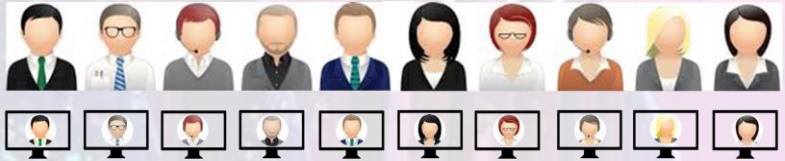
CITRIX PVS
7.15 LTSR CU3

PVS-Accelerator
enable

« Persistent » vs « non Persistent » mode : 2 philosophies

«Assigned» (persistent) Mode:

Users have their own virtual machine



- Virtual machine Customization
- Installation/Software updates managed by users
  Manage large range of issues
- Better user acceptance
  (User keep it's own virtual machine)

«Pool» (non persistent) Mode:

Users are connected to a virtual machine according to their software profile

- Virtual machines trivialization
  Few golden OS images for many people
  Simplified Disaster Recovery Plan
  Surbooking
- Lack of customization
  Define and manage profiles
- Paradigm shift (service concept)

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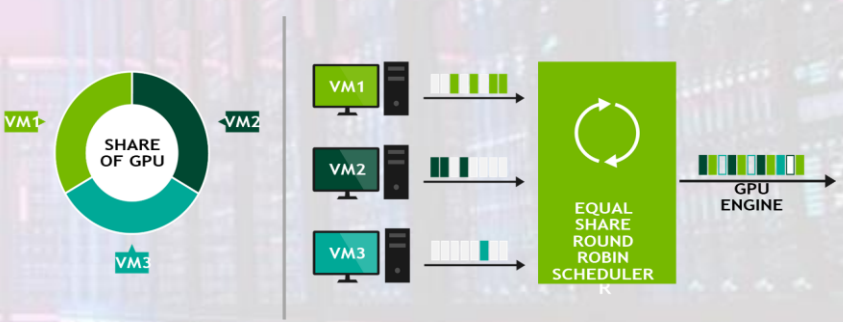
1. CSP like' SLAs
   A. Priority #1 : performance match with physical WS
   B. Priority #1bis : performance consistency

⇒ Avoid performance trouble tickets !

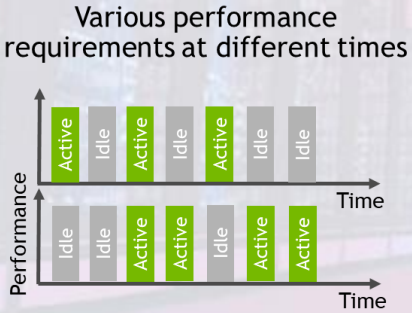
2. Default "best effort" scheduling mechanism wasn't adapted

3. NVIDIA introduces new scheduling flavors

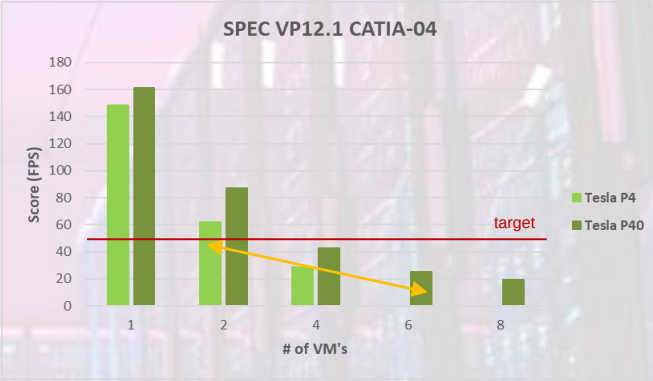


1. Benchmark = guaranteed performances

2. End-Users = Real World



3. SPEC VP 12.1 results (2Q Profile)



4. P40 vs P4 for 3D CAD = P4 wins !

5. ..and provides a lot of room for improvement.

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Conclusion

12 years old project contantly evolving with our R&D departments :

A technology that generates new needs

New needs that have driven technological developments

With the aim of :

Constantly optimize our solutions

Find areas of profitability

Goals fullfilled :

Solution Sustainability (Hardware / software)

Service Level Agreement requirements validated

Cost per VM reduction : -21% versus previous configuration

Performance in vGPU online with GPUPasstrough

PSALib Key enabler on PSA Groupe Digital Transformation :

Has changed our working relationship with our external partners & suppliers

Opel - Vauxhall IT Integration to PSA Groupe IT speedup at controled cost

2019 – 202x outlook :

- Increase density / Cost per VM reduction
- T4 evaluation / Technical upgrades
- Improve UX to address new needs (internal)
- Selective encoding
- New functions : Collaborative mode ?
- New usages : HPC mode / reference platform for GPGPU
- Users usage knowledge / monitoring







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Thanks & Contacts

Thierry Regis - Groupe PSA
Workstation & Virtualization Specialist

Nvidia Europe
Nvidia US
GTC Team

Details:
Alain Gonzalez
Expert Workstations, Graphics Technologies & 3D Imagery
Smart Devices Strategy & Innovation Leader
Contact e-mail: alain.gonzalez@mpsa.com
fr.linkedin.com/in/gonzalezalain

Benoit Bastien
Professional Visualisation – SEMEA, NVIDIA
Contact e-mail: bbastien@nvidia.com
fr.linkedin.com/in/bbastien

Questions & Answers