S23231 - GPU-Acceleration For Office Workers? Yes!

Part 2: Win10/Office2016

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Conecto A/S
Agenda

• Intro
• Recap on Win7/Office 2013
• Testing Win10/Office 2016
• Results
Who am I?

• Rasmus Raun-Nielsen
  - @RBRConecto
  - #GfxForTheUsers

www.teamRGE.com
Introduction

• Who are we?
  – Conecto A/S
    • Established 1997
    • Copenhagen, Denmark
    • Appr. 30 people
Our Focus

• User Experience!
  – Performance
  – Workflows
  – Happy endusers 😊
Introduction

Citrix Platinum Solution Advisor (CSA)
• Specialization Partner, all: Mobility, Virtualization, Networking for Apps, Networking for Datacenter
• Approved subcontractor for Citrix Consulting Services (CCS) in DK

NVIDIA Preferred Solution Provider
Cisco Select Certified Partner
Imprivata Service Provider
SMS Passcode Gold Partner
Introduction to GPU-virtualization

• High-end users
  – Niche applications

• Power users
  – Special applications

• Knowledge workers
  – Common applications
GPU for Office workers?
GPU for Office workers?

• Disclaimer!
  – User experience is much more than server resources!
  – CPU-offloading is just one piece of the puzzle!
Recap of Win7/Office 2013

Office 2013 - avg. process-load

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Recap of Win7/Office 2013

Office 2013 - max. process-load

Microsoft Office 2013
Follow-up!

Windows 10

Office 2016
Test lab – Hardware

• Core i7-6700 4,0 GHz @ 2,3 GHz
  – 4 pCores/8 logical cores
• 16 GB RAM
• Nvidia Tesla P4
Test lab – Software

- XenServer 7.2
- XenDesktop 7.14.1
- Receiver 4.9
- “As default as possible”
  - No tweaking or optimizations
Test lab – Environment, VDI VM

• 2 vCPU

• 4 GB RAM

• P4-1B Profile
Recap of the GRID-technology

• vGPU
  - Timesliced

• Framebuffer
  - Reserved
Test lab – Environment, VDI VM

• Windows 10, version 1607 ("CBB")
• Office 2016
• Standard Workstation VDA (No HDX 3D Pro!)
• GRID 5.0 Tech Preview drivers
Test lab – Environment, session

• ICA FullHD-session (1920 * 1080)
• HDX Policies:
  – “Very Hi-Def UX”-template, but...
  – Adaptive Display v2-protocol
  – Deactivated clipboard
• As few AD-GPO-settings as possible
Test lab – Environment, session

Adaptive Display v2

Selective use of H.264 in detected transient regions

H.264 (Green) is among the best software encoders for video and 3D graphics today – great quality.
- Higher CPU cost and less ‘snappy’ than JPEG

JPEG (Red) is most efficient for office workloads – low CPU and highest compatibility.
- Higher bandwidth cost with video, than H.264

Overlay lossless text (Blue) to avoid blur

Ocearch says it’s found first-ever great white sharks nursery

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American U. of Afghanistan attacked

Earthquake strikes

Tornadoes hit Indiana

CBS Evening News

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Test lab – Methodology

• Scripted, automated sequences
• Sequentially executed
• Monitoring PerfMon-counters of processes
• WMI for FPS
Test lab – Methodology

• 30 runs of simulated workload in:
  − Word
  − Excel
  − Powerpoint
  − IE11 w. YouTube
  − IE11 website idle + scroll
Test lab – Methodology

• 4 scenarios:
  – No GPU, HW-acceleration ON/SW-rendering OFF
  – No GPU, HW-acceleration OFF/SW-rendering ON
  – GPU (P4-1B), HW-acceleration OFF/SW-rendering ON
  – GPU (P4-1B), HW-acceleration ON/SW-rendering OFF
Test lab – Methodology

• 4 calculations:
  – Average dataset from all runs
  – Peak dataset from all runs
  – Average values of 95\textsuperscript{th} percentile dataset
  – Peak values of 95\textsuperscript{th} percentile dataset
Test results
Word 2016 - 95th percentile avg CPU-load

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Test results
Word 2016 - 95\textsuperscript{th} percentile peak CPU-load

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</table>
Test results
Excel 2016

Win10 - Excel 2016 - P4-1B - HW-Acc ON - 95th percentile

% CPU-load

Excel  ctgfx  dwm  Total CPU  FPS
Test results
Excel 2016 – 95\textsuperscript{th} percentile avg CPU-load
Test results
Excel 2016 – 95th percentile peak CPU-load

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Test results
Powerpoint 2016

Win10 - PPT 2016 - P4-1B - HW-Acc ON - 95th percentile

% CPU-load

FPS

Powerpnt  ctgfx  dwm  Total CPU  FPS

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Test results
Powerpoint 2016 – 95th percentile avg

- Powerpoint: 69, 70, 70, 68
- ctgfx: 6, 6, 7, 7
- dwm: 6, 5, 4, 1
- FPS: 16, 16, 14, 14

No GPU - HW-Acc ON
No GPU - HW-Acc OFF
GPU - HW-Acc OFF
GPU - HW-Acc ON
Test results
Powerpoint 2016 – 95\textsuperscript{th} percentile peak

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```
Test results
IE11 YouTube video
Test results
IE11 YouTube video – 95th percentile avg
Test results
IE11 YouTube video – 95th percentile peak
Test results
IE11 Borsen.dk Idle
Test results
IE11 Borsen.dk Idle – 95th percentilae avg
Test results
IE11 Borsen.dk Idle – 95th percentile peak
Test results
IE11 Borsen.dk scroll

Win10 - IE11 Borsen.dk scroll - HW-rendering - P4-1B - 95th percentile

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Test results
IE11 Borsen.dk scroll – 95th percentile avg
Test results
IE11 Borsen.dk scroll – 95th percentile peak

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Summary? CPU-usage reduced by...

- **Word 2016**
  - up to 20% points
- **Excel 2016**
  - up to 16% points
- **Powerpoint 2016**
  - Up to 14% points
Summary? CPU-usage reduced by... Cont’d

• IE11/YouTube
  – Almost 50%-points!
• IE11 idle
  – up to 14%-points
• IE11 scrolling
  – Up to 16 %-points
Summary – Key takeaways

• GPU’s:
  – More than just graphics

• CPU-offload:
  – Just a part of the puzzle

• All users can benefit from GPU’s
Fun(-ish) facts...

• Amount of...
  – Test reruns: Unknown...
  – Consumed beverages: Don’t wanna know
  – Time spent: Don’t ask... 😊