



Enabling today.
Inspiring tomorrow.

COE 2016
Annual PLM Experience
& TechniFair

Booth 407



**3D Design Experience
- Redefined**

ANTOINE REYMOND
INDUSTRY EXECUTIVE
DESIGN AND MANUFACTURING, AMD



THE POWER OF AMD FIREPRO™ GRAPHICS DASSAULT SYSTEMES 3DEXPERIENCE



DASSAULT Systemes 3DEXPERIENCE

CATIA

- ▲ Optimized and certified
- ▲ Provides tools and supporting technology to create the ideal CATIA workstation environment
- ▲ AMD FirePro™ professional graphics delivers a powerful solution for 3DEXPERIENCE users to design and simulate on the same machine.



“The impressive graphics performance of the new certified line of AMD FirePro™ graphics cards will amaze CATIA® and ENOVIA DMU users. AMD FirePro™ delivers the exceptional realism, accuracy, and power needed to help improve the efficiency and productivity of our customers.”

- Jerome Maillot

Technology Director V6 User Experience

INNOVATION

Simultaneous render & compute
Up to six 4K displays¹
Intelligent power technologies



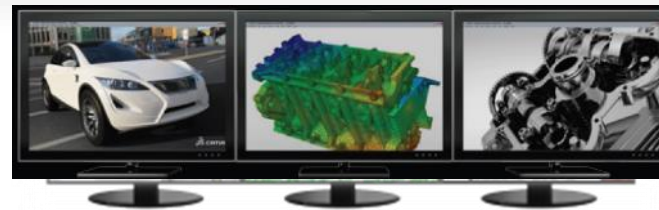
**GCN
ARCHITECTURE**



**POWERTUNE
TECHNOLOGY**

PERFORMANCE

Application optimizations
Latest API support
PCIe® 3.0 support



RELIABILITY

100+ app certifications
Rock-solid drivers
Three year limited warranty



Images courtesy of Dassault Systems



The Right Solution for your 3DEXPERIENCE Workflow



Simulation
SIMULIA



W9100

16GB GDDR5
275W

W8100

8GB GDDR5
220W

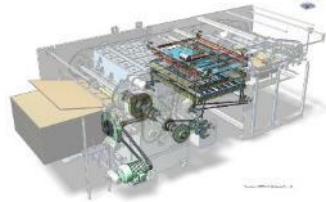


Large Assemblies
and Rendering



W7100

8GB GDDR5
150W

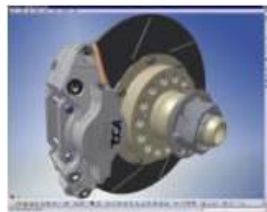


W5100

4GB GDDR5
<75W



Design and
Validation

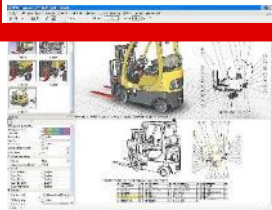
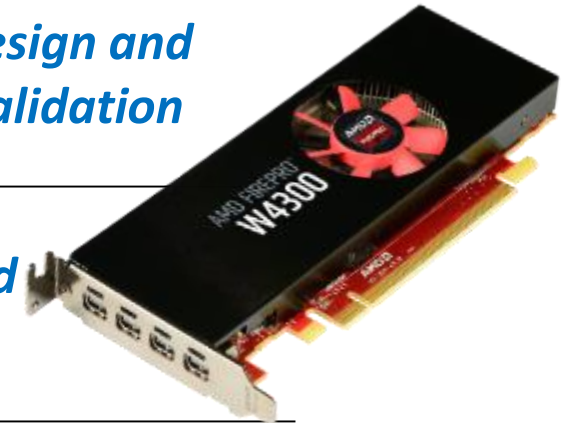


W4300

4GB GDDR5
<50W



Drafting and
Modeling



W2100

2GB DDR3
LP, 26W



Visualize, Review
and Mark-up

Images courtesy of Dassault Systems



AMD FIREPRO™ W4300 GPU VS. K1200 CAD PERFORMANCE LEADERSHIP



▲ SPECviewperf® 12 shows the AMD FirePro™ value for real-world workflows - improved performance and user experience.

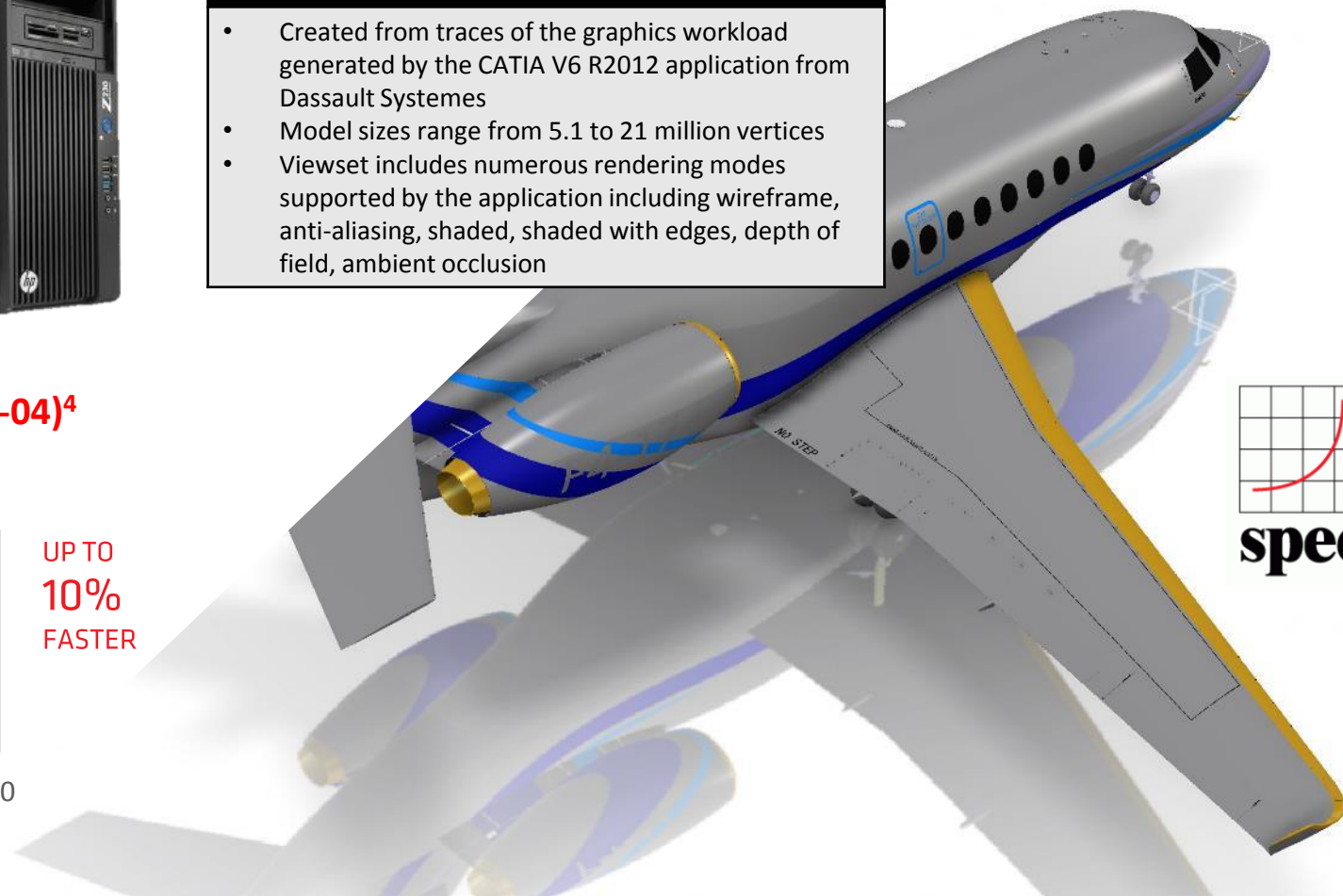
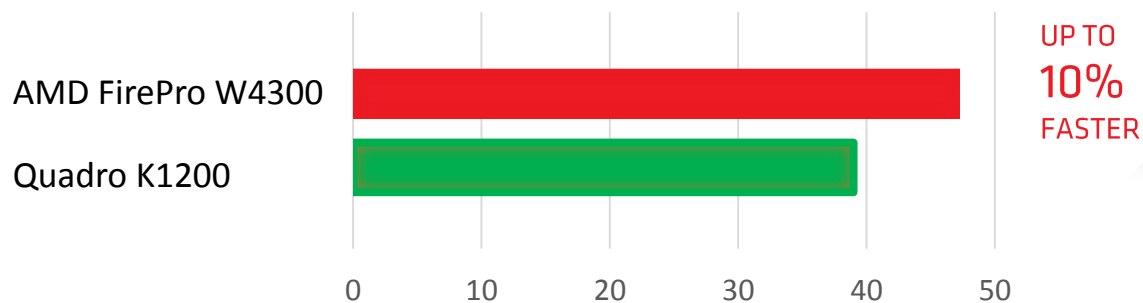


Catia-04

- Created from traces of the graphics workload generated by the CATIA V6 R2012 application from Dassault Systemes
- Model sizes range from 5.1 to 21 million vertices
- Viewset includes numerous rendering modes supported by the application including wireframe, anti-aliasing, shaded, shaded with edges, depth of field, ambient occlusion

Performance Comparison based on SPECviewperf® 12.0.1 benchmark for CATIA® (catia-04)⁴

CATIA - SPECviewperf 12.0.1



FOCUSING WHERE IT MATTERS MOST ON KEY PRODUCTS FOR CAD/CAM/CAE WORKFLOWS



▲ SPECviewperf® 12 shows the AMD FirePro™ value for real-world workflows - improved performance and user experience.

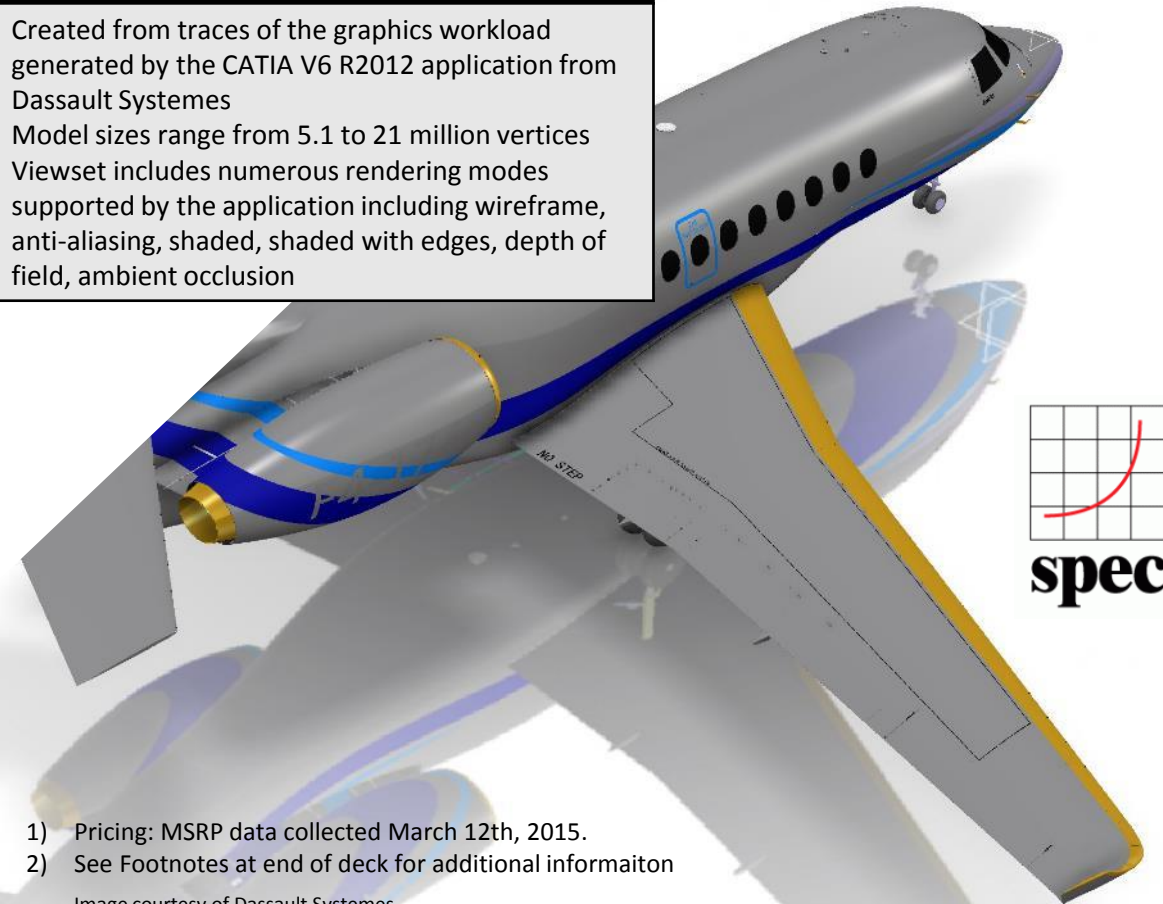


Price¹ - Performance Comparison based on SPECviewperf® 12.0.1 benchmark for CATIA® (catia-04)²



Catia-04

- Created from traces of the graphics workload generated by the CATIA V6 R2012 application from Dassault Systemes
- Model sizes range from 5.1 to 21 million vertices
- Viewset includes numerous rendering modes supported by the application including wireframe, anti-aliasing, shaded, shaded with edges, depth of field, ambient occlusion



Combined with FirePro™ pricing, the result is up to 42% the price performance compared to other professional GPUs

1) Pricing: MSRP data collected March 12th, 2015.
2) See Footnotes at end of deck for additional information
Image courtesy of Dassault Systemes

MOBILE WORKSTATIONS FOR CAD



Entry and Mainstream CAD

CAD + design viz



HP ZBook 14 G2 (14-inch)

- **AMD FirePro™ M4150**
- 1GB GDDR5 GPU Memory
- 384 Stream Procs
- 64GB/s

HP ZBook 15u / 15 G3 (15-inch)

- **AMD FirePro™ W4190M / W5170M**
- 2GB GDDR5 GPU Memory
- 384 / 640 Stream Procs
- 64 / 72GB/s

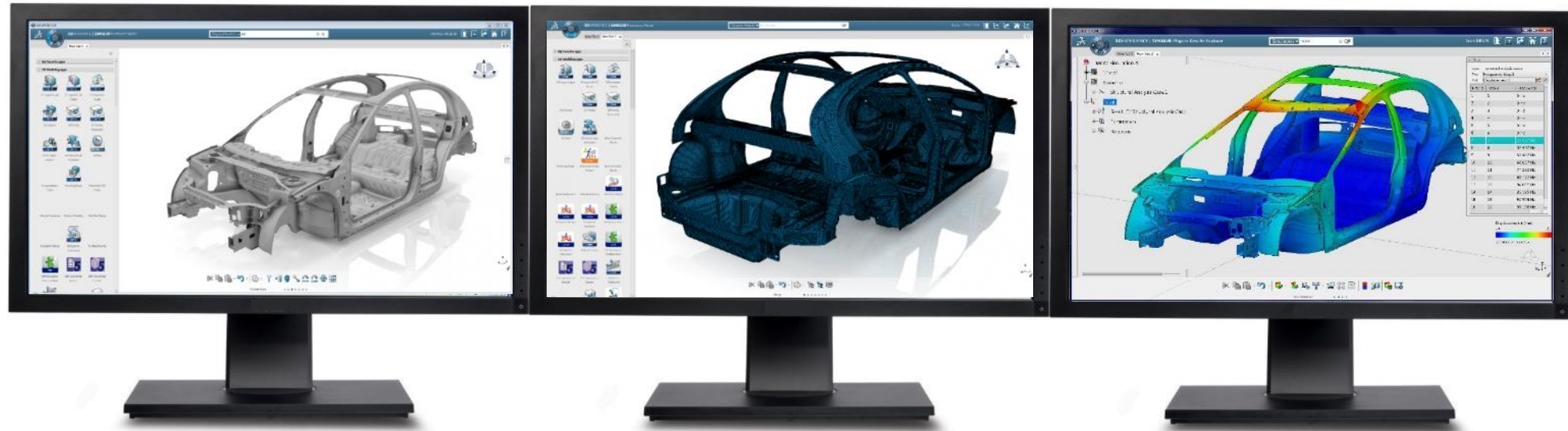
HP ZBook 17 G3 (17-inch)

- **AMD FirePro™ W6150M**
- 4GB GDDR5 GPU Memory
- 896 Stream Procs
- 160GB/s



AMD EYEFINITY MULTIPLE-DISPLAY TECHNOLOGY

SEE MORE. DO MORE.



Increase Your Workflow Productivity

AMD Eyefinity
MULTI-DISPLAY TECHNOLOGY

- Stay updated with real-time information
- Interact with more applications simultaneously
- Work continuously and efficiently
- Up to **SIX** displays^o on a single card
- Flexible display configurations via CCC
- Low total cost of ownership

THE POWER OF AMD FIREPRO™ GRAPHICS DASSAULT SYSTEMES SIMULIA WITH OPENCL™



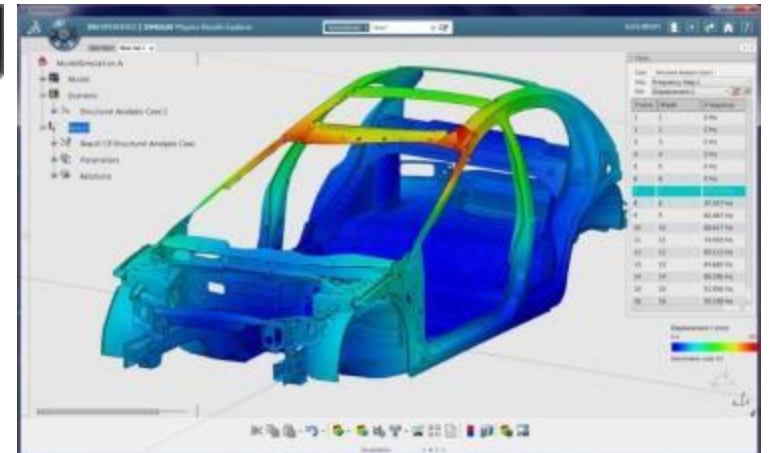
Dassault Systèmes SIMULIA

Abaqus 2016

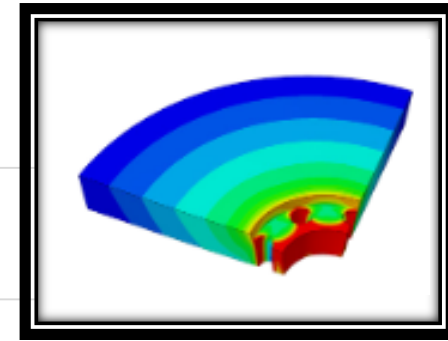
- ▲ Design and Simulate with Abaqus 2016 powered by AMD FirePro™ professional graphics and OpenCL™ technology
- ▲ AMD FirePro™ professional graphics delivers a powerful solution for CATIA and SIMULIA users to design and simulate on the same machine.
- ▲ Up to **6.3x performance gains** over CPU-only acceleration ¹

“By incorporating the OpenCL programming interface into our current Abaqus release, we are providing more graphic hardware choices, such as AMD FirePro™, and accelerating compute performance which will enhance our customers’ ability to deliver innovative, high-quality products to market faster.”

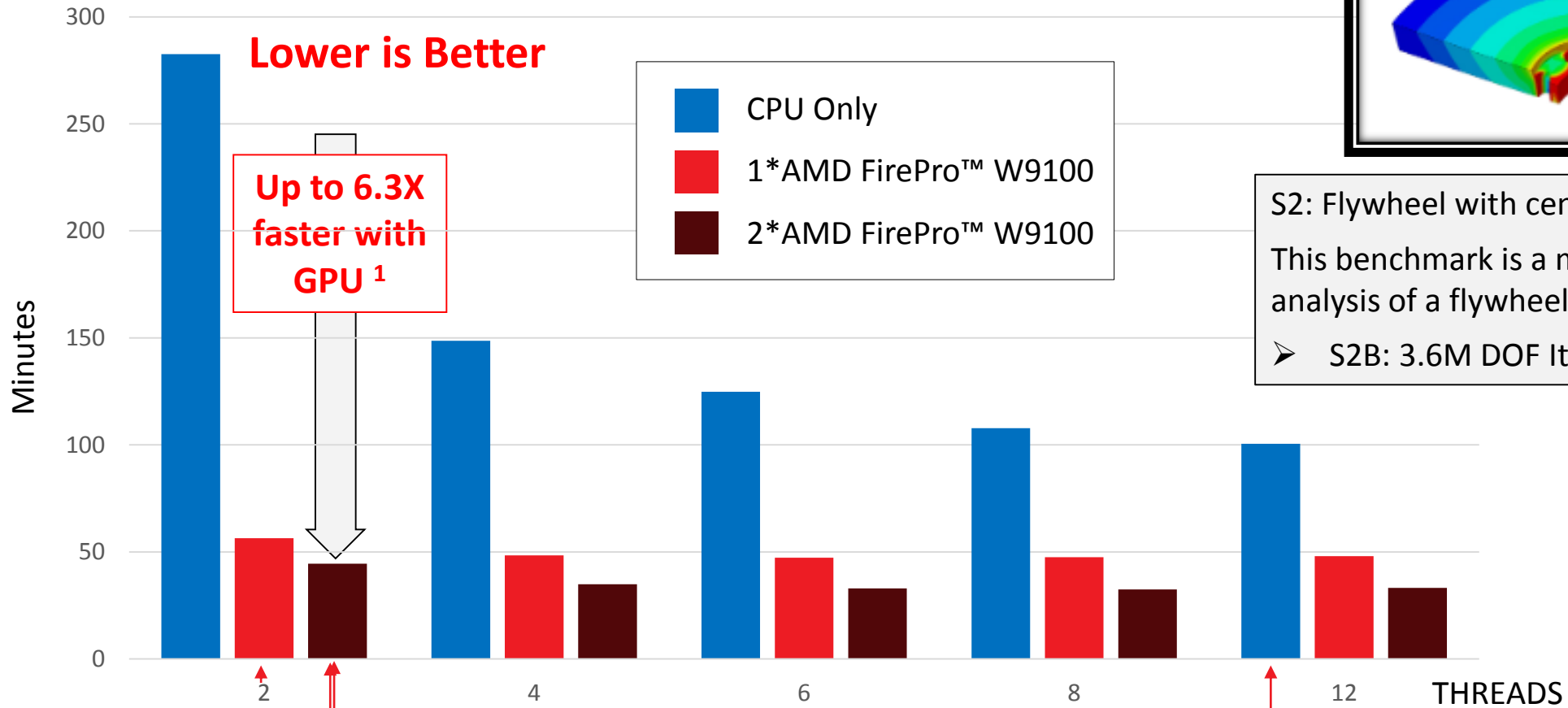
- **Matt Dunbar**
Chief Architect, SIMULIA
Dassault Systèmes



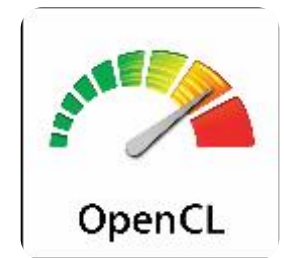
ABAQUS 2016 PERFORMANCE DATA WITH OPENCL™



Abaqus benchmark S2B: 3.6M DOF Iterative solver



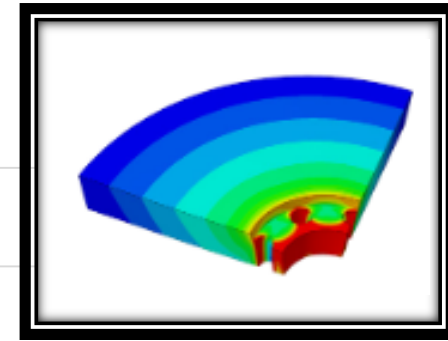
S2: Flywheel with centrifugal load
This benchmark is a mildly nonlinear static analysis of a flywheel with centrifugal loading.
➤ S2B: 3.6M DOF Iterative solver



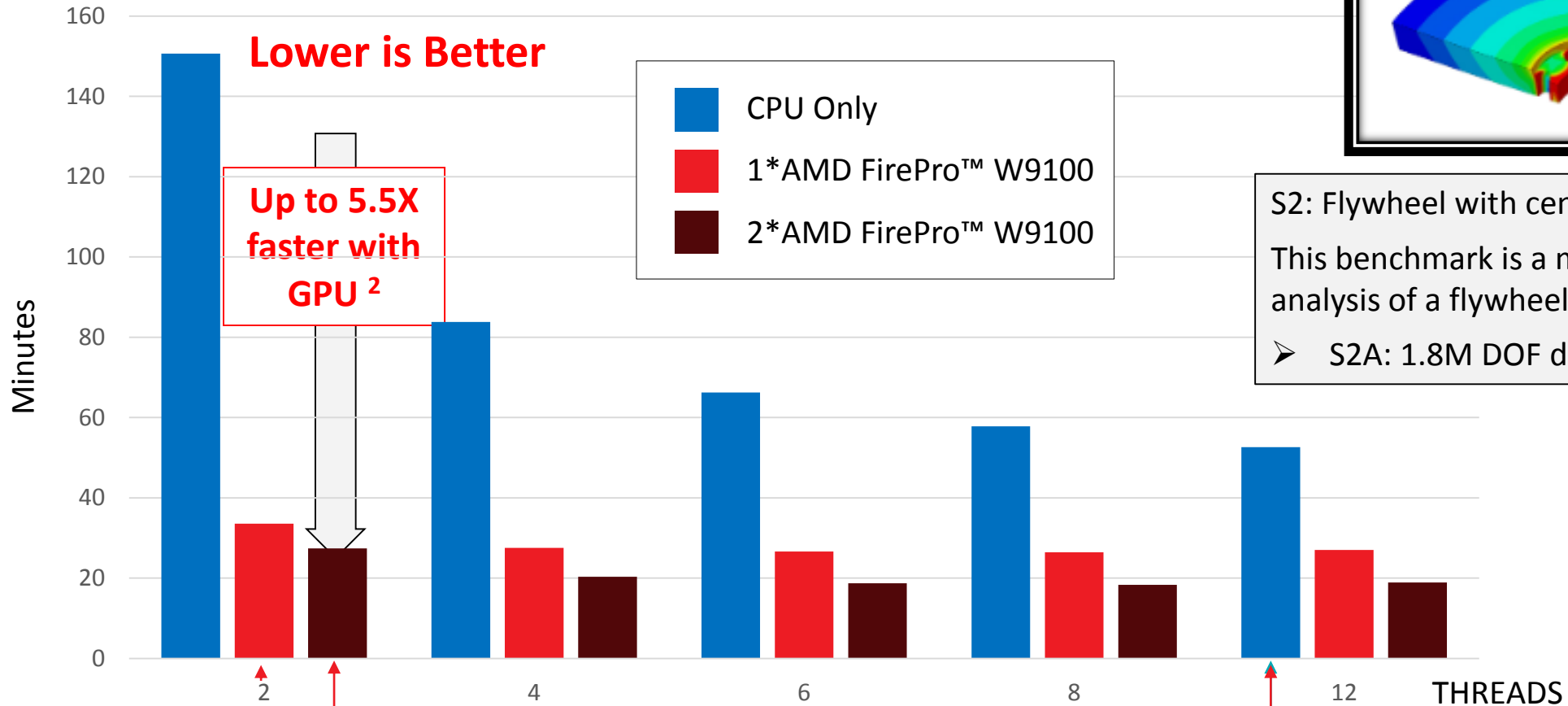
2 CPU + 2*AMD FirePro™ W9100 is 2.3 X faster than 12 CPU

2 CPU + 1*AMD FirePro™ W9100 is 1.8 X faster than 12 CPU

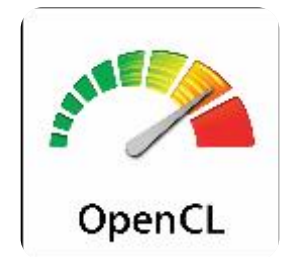
ABAQUS 2016 PERFORMANCE DATA WITH OPENCL™



Abaqus benchmark S2A: 1.8M DOF Direct solver



S2: Flywheel with centrifugal load
 This benchmark is a mildly nonlinear static analysis of a flywheel with centrifugal loading.
 ➤ S2A: 1.8M DOF direct solver



2 CPU + 2*AMD FirePro W9100 is 1.9 X faster than 12 CPU
 2 CPU + 1*AMD FirePro W9100 is 1.6 X faster than 12 CPU

SCALABLE PROFESSIONAL GRAPHICS SOLUTIONS

AMD provides a wide range of professional products for a wide range of Dassault Systemes solutions

Mobile Workstations &
Thin Clients

Desktop Workstations

Cloud

Servers



FOR MORE INFO...



COE 2016
Annual PLM Experience
& TechniFair

Booth 407

Designed to make every detail count

3D Design Experience - Redefined

AMD FIREPRO™ PROFESSIONAL GRAPHICS AND AMD EYEFINITY MULTI-DISPLAY TECHNOLOGY ARE OPTIMIZED AND CERTIFIED FOR CATIA®, PART OF DASSAULT SYSTEMES 3DEXPERIENCE™ PLATFORM, AND ENABLE A SUPERIOR 3D DESIGN EXPERIENCE.

CATBENCH NORMALIZED SCORE

AMD FirePro Model	Comparison	Performance Gain
AMD FirePro W7000	Quadro 6400	72% faster
AMD FirePro W7000	Quadro K6000	2x faster
AMD FirePro W5000	Quadro 4200	479% faster
AMD FirePro W5000	Quadro K2000	3x faster

ACCELERATE YOUR SIMULATION WITH AMD FIREPRO AND OPENCL TECHNOLOGY

The AMD FirePro W-series of professional graphics cards uses the latest generation Graphics Core Next (GCN) GPU architecture from AMD. This design efficiently balances compute tasks with 3D workloads, enabling multi-tasking that is designed to optimize utilization and maximize performance.

In order to leverage the massive parallel processing power of the GPU for engineering analysis and simulation, AMD graphics cards are also optimized for OpenCL™.

Enabled by OpenCL™, the AMD FirePro™ GPU can be used to help accelerate calculations in engineering analysis and simulation, - tasks traditionally carried out only by CPUs. For example, the time taken to perform a structural and multi-physics analysis in the OpenCL™ version of Abaqus from Dassault Systems, SIMULIA can be cut significantly using a high-end AMD FirePro™ Professional graphics card, like the AMD FirePro W8100 or W7100.

Abaqus CAE Performance with OpenCL™

GPU	Time to complete (hours)	Improvement
GPU Core only	2.8x	-
GPU Core + FirePro™	2.25x	83%
GPU Core + FirePro™	1.45x	49%

➤ Visit <http://www.amd.com/catia>



FOOTNOTES



Slide 1: ¹AMD Eyefinity technology supports up to six DisplayPort monitors on an enabled graphics card. Supported display quantity, type and resolution vary by model and board design. Mixed monitors of different resolutions are supported by select AMD FirePro™ professional graphics cards. Confirm specifications with manufacturer before purchase. To enable more than two displays, or multiple displays from a single output, additional hardware such as DisplayPort™-ready monitors or DisplayPort 1.2 MST-enabled hubs may be required. A maximum of two active adapters is recommended for consumer systems. See www.amd.com/eyefinityfaq for full details.

Slide 3: In AMD internal testing on the CAD application Catia-04 viewset in SPECviewperf® 12, AMD FirePro W5100 test system scored 37.67, compared to the Nvidia Quadro K2200 test system score of 44.29. FirePro W5100 MSRP is \$400 USD, and Nvidia K2200 price is \$600 per newegg.com as of 3/12/15. Lab test system configuration: Intel E5-1660 3.3GHz, 16GB RAM, Win7 64bit, AMD 14.301.1010 / Nvidia 340.66. FP-121

Slide 3: In AMD internal testing on the CAD application Catia-04 viewset in SPECviewperf® 12, AMD FirePro W7100 test system scored 54.65, compared to the Nvidia Quadro K4200 test system score of 67.40. FirePro W7100 MSRP is \$800 USD, and Nvidia K4200 price is \$1250 per newegg.com as of 3/12/15. Lab test system configuration: Intel E5-1660 3.3GHz, 16GB RAM, Win7 64bit, AMD 14.301.1010 / Nvidia 340.66. FP-122

Slide 3: In AMD internal testing on the CAD application Catia-04 viewset in SPECviewperf® 12, AMD FirePro W8100 test system scored 60.89, compared to the Nvidia Quadro K5200 test system score of 85.64. FirePro W8100 MSRP is \$1250 USD, and Nvidia K5200 price is \$2500 per newegg.com as of 3/12/15. Lab test system configuration: Intel E5-1660 3.3GHz, 16GB RAM, Win7 64bit, AMD 14.301.1010 / Nvidia 340.66. FP-123

Slide 4: Based on AMD internal testing as of October 12, 2015 using SPECviewperf 12.0.1 to measure visual performance and create the geometric average results of the following four CAD tests: catia-04, creo-01, sn-02 and sw-03. AMD FirePro W4300 scored 47.23 vs. Quadro K1200 which scored 38.99. Test system: Intel E5-1650 v3 3.50GHz, 16GB RAM, Win7 64-bit SP1, AMD 15.201 beta23, Nvidia 354.13. Individual scores for AMD FirePro W4300: catia-04 = 38.79, creo-01 = 43.31, snx-02 = 45.65, sw-03 = 64.86. Individual scores for Quadro K1200: catia-04 = 35.07, creo-01 = 32.77, snx-02 = 29, sw-03 = 69.35. FP-182

Slide 9: In AMD labs' internal testing as of March 2016 on Abaqus 2016, a third party simulation software, the test system using the AMD FirePro W9100 completed the S2B Flywheel with centrifugal load benchmark test in 283 minutes using only 2 CPU threads v. 45 minutes when using two discrete GPUs in addition to 2 CPU threads. Varied system configurations may yield different results. Lab test system configuration: Intel E5-2620 2-core with/without discrete AMD FirePro W9100 GPU, 128GB RAM, Windows7-64sp1, AMD driver 14.502.1019. FP-184

Slide 10: In AMD labs' internal testing as of March 2016 on Abaqus 2016, a third party simulation software, the test system using the AMD FirePro W9100 completed the S2A Flywheel with centrifugal load benchmark test in 151 minutes using only 2 CPU threads v. 28 minutes when using two discrete GPUs in addition to 2 CPU threads. Varied system configurations may yield different results. Lab test system configuration: Intel E5-2620 2-core with/without discrete AMD FirePro W9100 GPU, 128GB RAM, Windows7-64sp1, AMD driver 14.502.1019. FP-185

DISCLAIMER & ATTRIBUTION



The information presented in this document is for informational purposes only and may contain technical inaccuracies, omissions and typographical errors.

The information contained herein is subject to change and may be rendered inaccurate for many reasons, including but not limited to product and roadmap changes, component and motherboard version changes, new model and/or product releases, product differences between differing manufacturers, software changes, BIOS flashes, firmware upgrades, or the like. AMD assumes no obligation to update or otherwise correct or revise this information. However, AMD reserves the right to revise this information and to make changes from time to time to the content hereof without obligation of AMD to notify any person of such revisions or changes.

AMD MAKES NO REPRESENTATIONS OR WARRANTIES WITH RESPECT TO THE CONTENTS HEREOF AND ASSUMES NO RESPONSIBILITY FOR ANY INACCURACIES, ERRORS OR OMISSIONS THAT MAY APPEAR IN THIS INFORMATION.

AMD SPECIFICALLY DISCLAIMS ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. IN NO EVENT WILL AMD BE LIABLE TO ANY PERSON FOR ANY DIRECT, INDIRECT, SPECIAL OR OTHER CONSEQUENTIAL DAMAGES ARISING FROM THE USE OF ANY INFORMATION CONTAINED HEREIN, EVEN IF AMD IS EXPRESSLY ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

ATTRIBUTION

© 2015 Advanced Micro Devices, Inc. All rights reserved. AMD, the AMD Arrow logo, FirePro, and combinations thereof are trademarks of Advanced Micro Devices, Inc. in the United States and/or other jurisdictions. Other names are for informational purposes only and may be trademarks of their respective owners.

OpenCL and the OpenCL logo are trademarks of Apple Inc. used by permission by Khronos. PCI Express is a registered trademark of PCI-SIG Corporation.