



Anslys Hardware Update and Benchmark Webinar

Andy Bax, DRD

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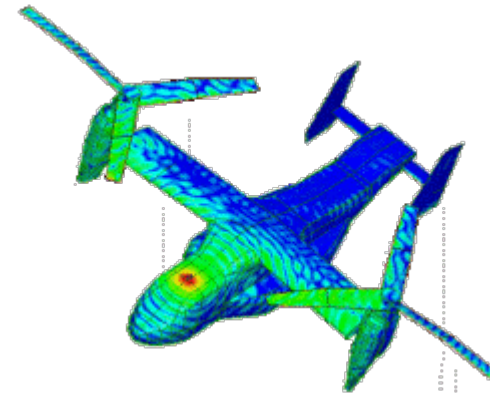
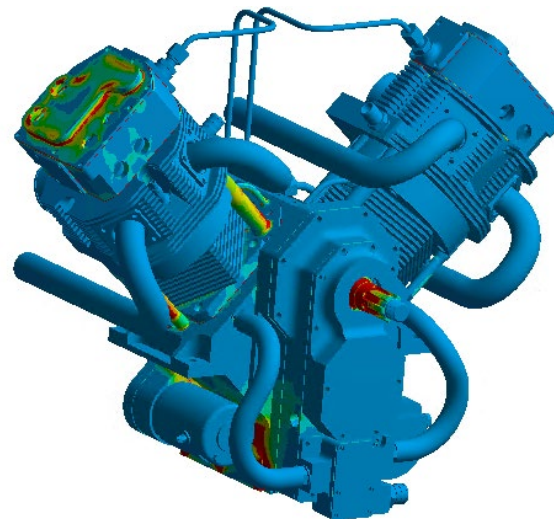
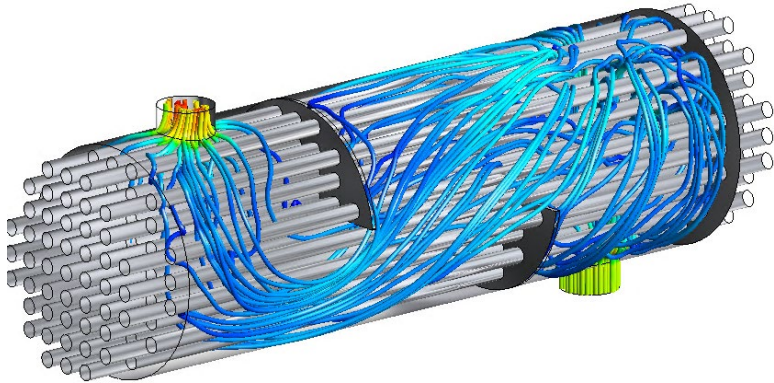
September 25, 2024

Agenda

- Introduction to DRD
- Workstation Hardware Considerations for Ansys Software
- Overview of Exxact Corporation and Offerings
- Review of Ansys HPC Licensing
- Ansys Benchmarks on Mechanical, Fluent, Rocky, HFSS, & EMC+ on Exxact Workstations
- Questions

Mission Statement

DRD Technology helps engineering teams accelerate product development. With in-house expertise spanning the entire range of physics, we ensure customers succeed when using Ansys simulation tools for virtual prototyping and design verification.



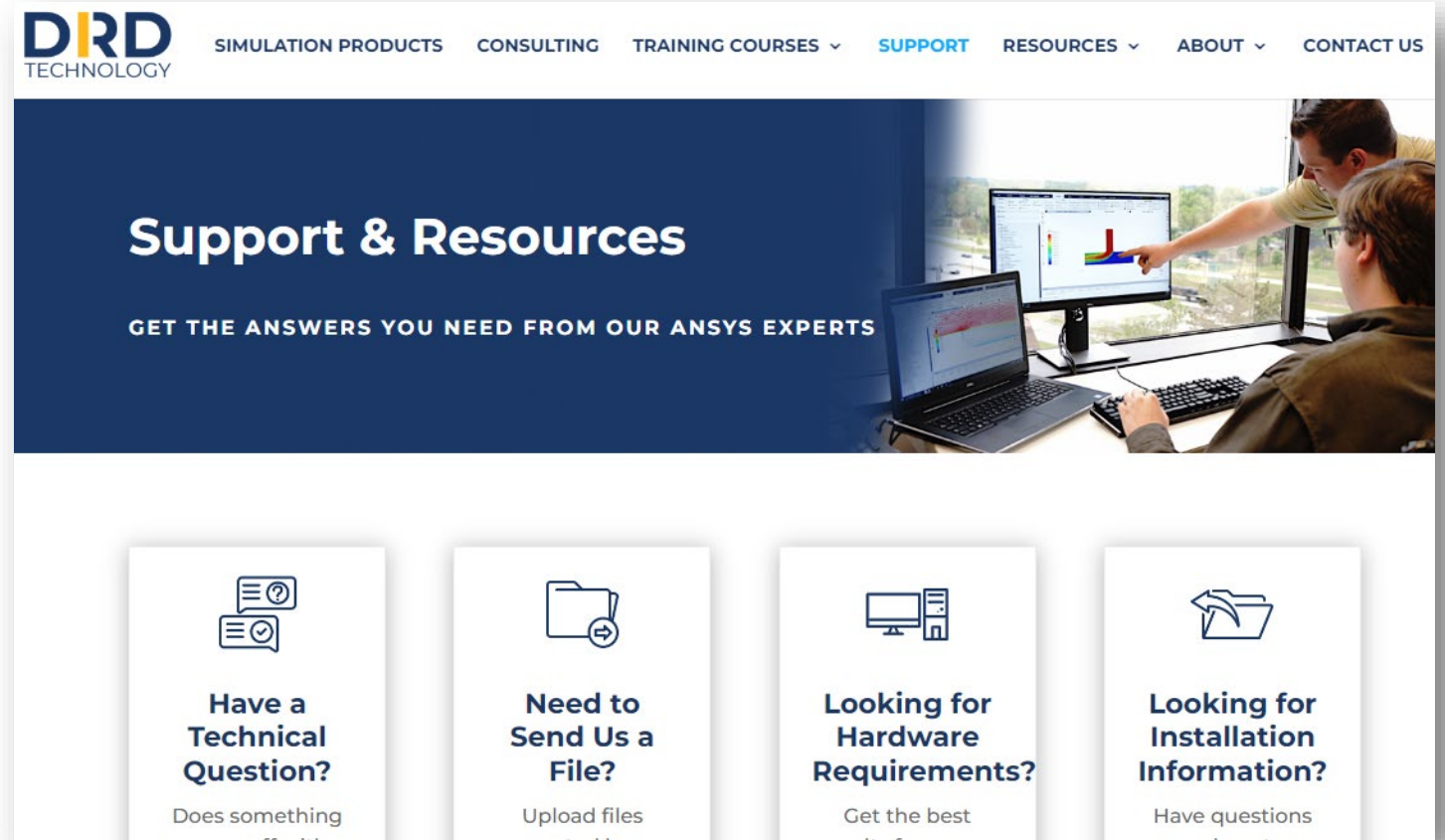
Ansys

CERTIFIED ELITE CHANNEL PARTNER

DRD Ansys Technical Support

Support:
(918) 743-3013 x1
support@drd.com

Or through our website at
www.drd.com



I have had over 40 years of experience working with DRD Technology and have been very satisfied with them through the years.

*- David Stribling, P.E.
Owner, Buffalo Hump Solutions*

Hardware Considerations for Ansys Software

General Hardware Considerations

First, the basics:

- **Mechanical, Fluent, CFX, Maxwell, HFSS, EMC+, Charge+** all use 4 compute cores as part of the standard licensing. The faster the processor the better the performance.
- Hyperthreading should be turned off on your workstation.
- You want more **physical** cores on the computer than your Ansys software of choice is using for the best scaling. Virtual cores don't count!
- For RAM, ideally you will have 8 GB of RAM per processor (i.e. a 16 core computer ideally would have 128 GB of RAM).

General Hardware Considerations

- All memory slots should be filled for best performance using multiple cores. If you have 8 slots, fill all 8 with the same amount of RAM. If it is 12, then all 12 should be filled.
- A minimal graphics card should have at least 4 GB of RAM.
- As of today, if you are using **Discovery Simulation, Fluent, Rocky, the HFSS SBR+ solver, or EMC+**, you may benefit greatly by using an **Nvidia GPU**. The more RAM on the GPU the larger model you will be able to solve (more details in upcoming benchmarks).
- You want PCIe hard drives. 2 TB? 4 TB of space? It depends on all that you run on it.

General Hardware Considerations

- If you are going to use high core counts (i.e. more than 12-15 cores to solve), you likely need multiple hard drives in a RAID 0 configuration. This allows the data being computed on the dozens of cores to be written simultaneously across multiple drives and the solver not slowing down due to I/O issues.
- If you use multiple drives, RAID 0 configuration for speed. Use some other network location later to back up your work. Your workstation should be used for high-speed computing and longer-term storage of results is a different consideration.



Overview of Exxact Corporation



Built to
Power
Innovation

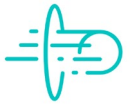


Supercharge Your Engineering Simulation

Exxact and DRD have partnered to combine advanced computing hardware with specialized simulation expertise, delivering optimized solutions that enhance performance, reduce simulation times, and meet the complex demands of engineering simulations across industries.



Why GPUs Over CPUs?



Time

CPUs handle tasks sequentially resulting in those long simulation times. GPUs utilize parallel processing to accelerate simulation run time meaning you can run more iterations or complete workloads faster.



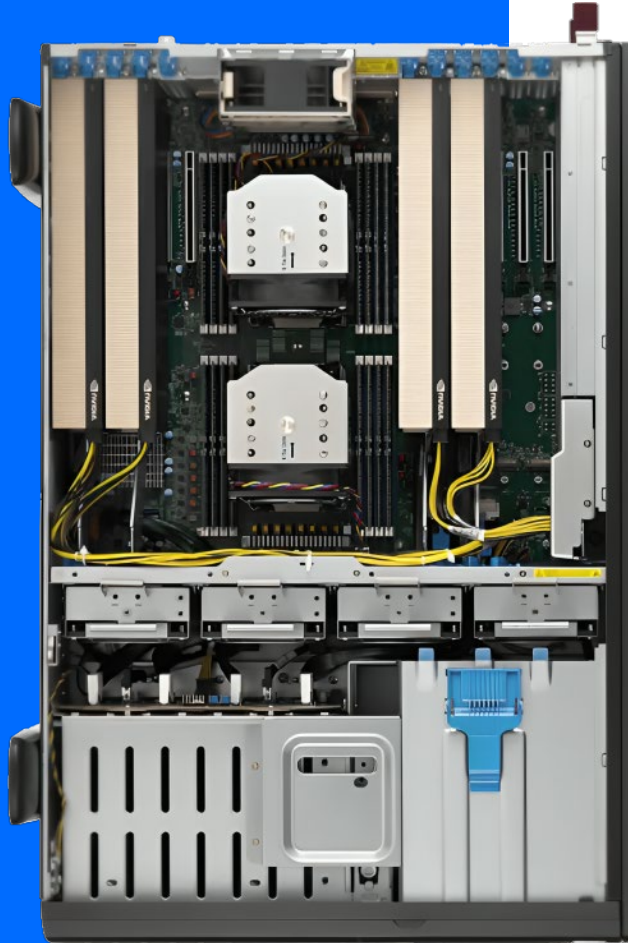
Complexity

Long simulation times on CPUs requiring simplified models to fit the project timeline. GPU speedups allow engineers to retain complexity and complete simulations with time to spare.



Budget

A single GPU compute node can have equivalent performance as a multi-CPU node with hundreds of cores. Utilizing GPUs not only saves time, but also saves money with opportunity for scale.



Established in 1992, Exxact is an industry-leading hardware distributor, service provider, and systems integrator for HPC solutions. We help evaluate, build, and integrate turnkey workstations, servers, and clusters from start to finish.

Market Focus:

- Artificial Intelligence Training & Inference
- Molecular Dynamics & Life Science Research
- Manufacturing & Product Design
- Engineering & Fluids Simulation

Custom HPC Systems

Every workload is unique so, Exxact delivers, fully customizable, workstations, servers, and clusters built to power your research, your discovery, and your innovation.

Modern Hardware

Our partnerships allow us to stock the newest technology, hardware, and components while offering a full range of services to ensure you are satisfied with your Exxact system.

End to End Services

Our goal is to make HPC accessible. Every Exxact system is built to order, stress tested, validated, and preconfigured to deliver a fully turnkey solution that is ready to go right out of the box.

Master Your Simulation Workload

Start configuring today.



Single CPU, Dual GPU Desktop Workstation

Starting at \$5,535.20



Dual CPU, Quad GPU Rackmountable Workstation

Starting at \$12,009.80





Contact us today

Web www.exxactcorp.com
Phone 510-226-7366
Email sales@exxactcorp.com
Address 46211 Landing Pwky, Fremont CA, 94538

Review of Ansys HPC Licensing

Ansys HPC Licensing for Workstations

Ansys HPC Packs. These licenses are bundled together and generally licensed to add to an environment of a couple of users.

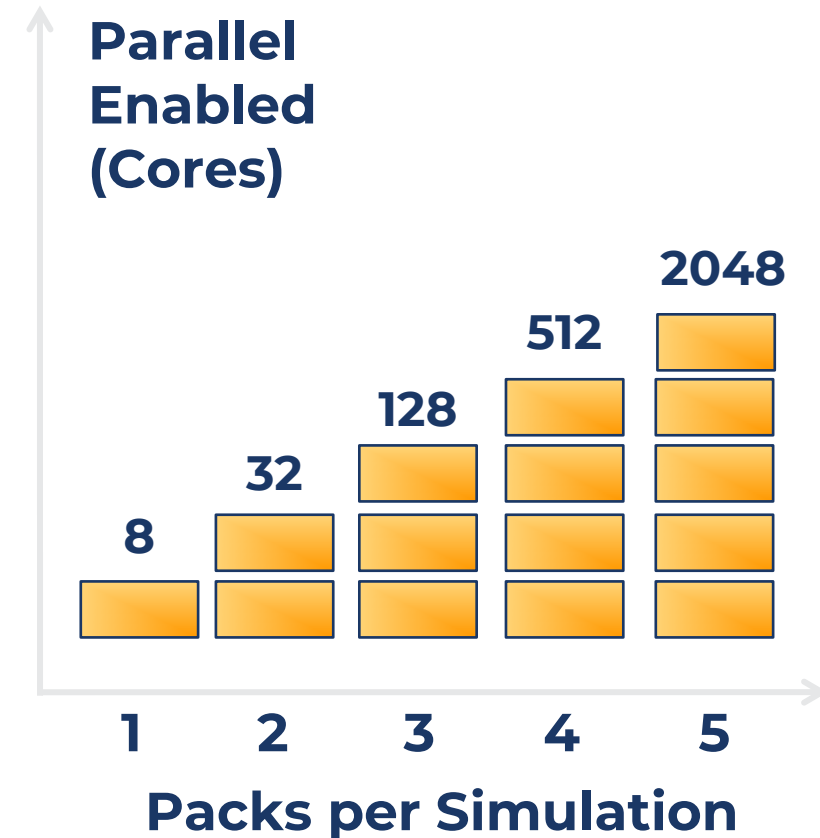
Ansys Workgroups. These licenses are large groups of HPC licenses that can be checked out in arbitrary numbers to be used across, generally, a larger organization.

Core Licensing for Ansys HPC Packs

For traditional CPU computing, this chart shows the additional cores you can access with HPC Packs.

These compute cores are in addition to the 4 compute cores that are bundled with the solvers for *Mechanical*, *Fluent*, *CFX*, *HFSS*, *Maxwell*, *EMC+* and *Charge+*.

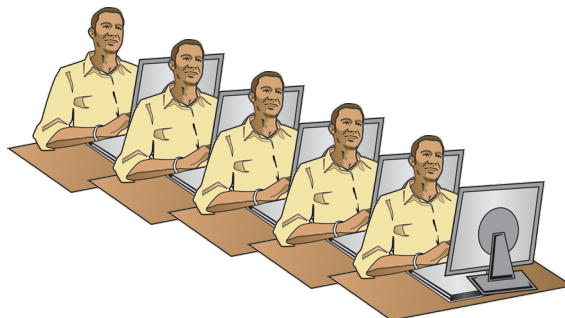
*Ansys HPC Packs do not apply to *Rocky*, *LS-Dyna*, or *nCode* as they currently use a different licensing scheme.



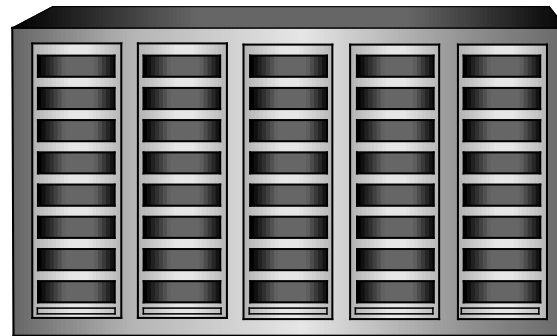
Licensing for Ansys Workgroups

An ANSYS HPC Workgroup provides parallel capacity for multiple users and multiple simulations

- Volume access to parallel processes
- Licensed in blocks from 16 to 32,768 processes
- Shared across any number of simulation tasks, quantity, or users



Local Users



Licensing for GPUs (Streaming Multiprocessors)

Computing on GPUs also uses HPC licensing as there is a large variation in computing capabilities across them.

Ansys Fluent is the application that benefits the most from GPU computing (Ansys Rocky uses a similar, but different, table shown).



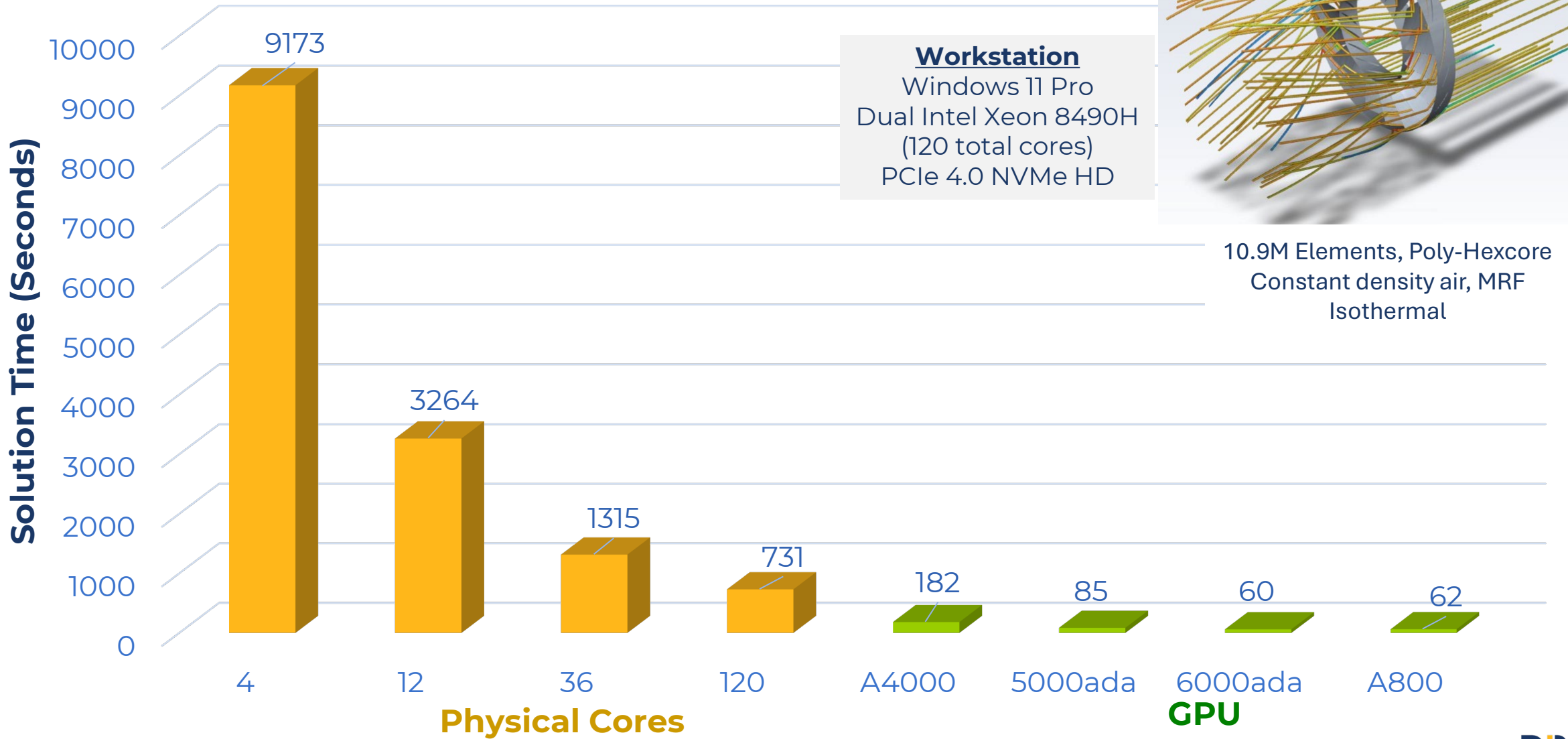
# SM's	HPC Workgroups	HPC Packs
1 – 40	0	0
41 – 48	1 – 8	1
49 – 72	9 – 32	2
73 – 168	33 – 128	3
169 – 552	129 – 512	4
553 – 2088	513 – 2048	5

Representative GPU SMs:

GPU Card	# SMs	HPC Packs
NVIDIA RTX 3500 Ada	40	0
NVIDIA RTX 4000 Ada	48	1
NVIDIA RTX 5000 Ada	100	3
NVIDIA A800	108	3
NVIDIA RTX 4090 Ada	128	3
NVIDIA 6000 ada	142	3

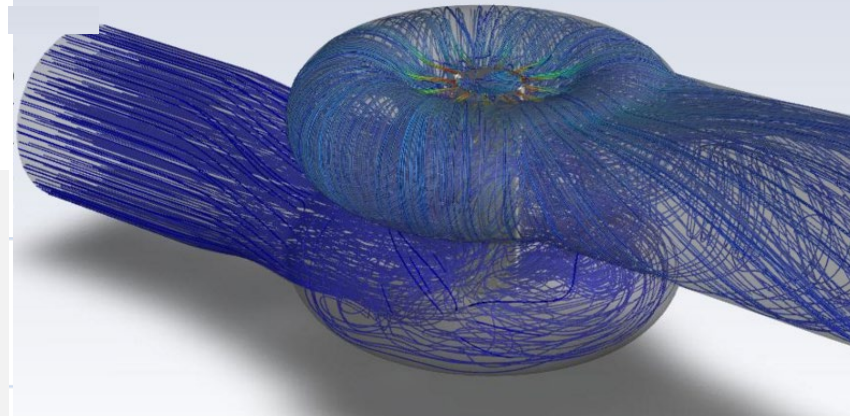
Ansys Benchmark Data

Ansys Fluent Workstation Benchmark

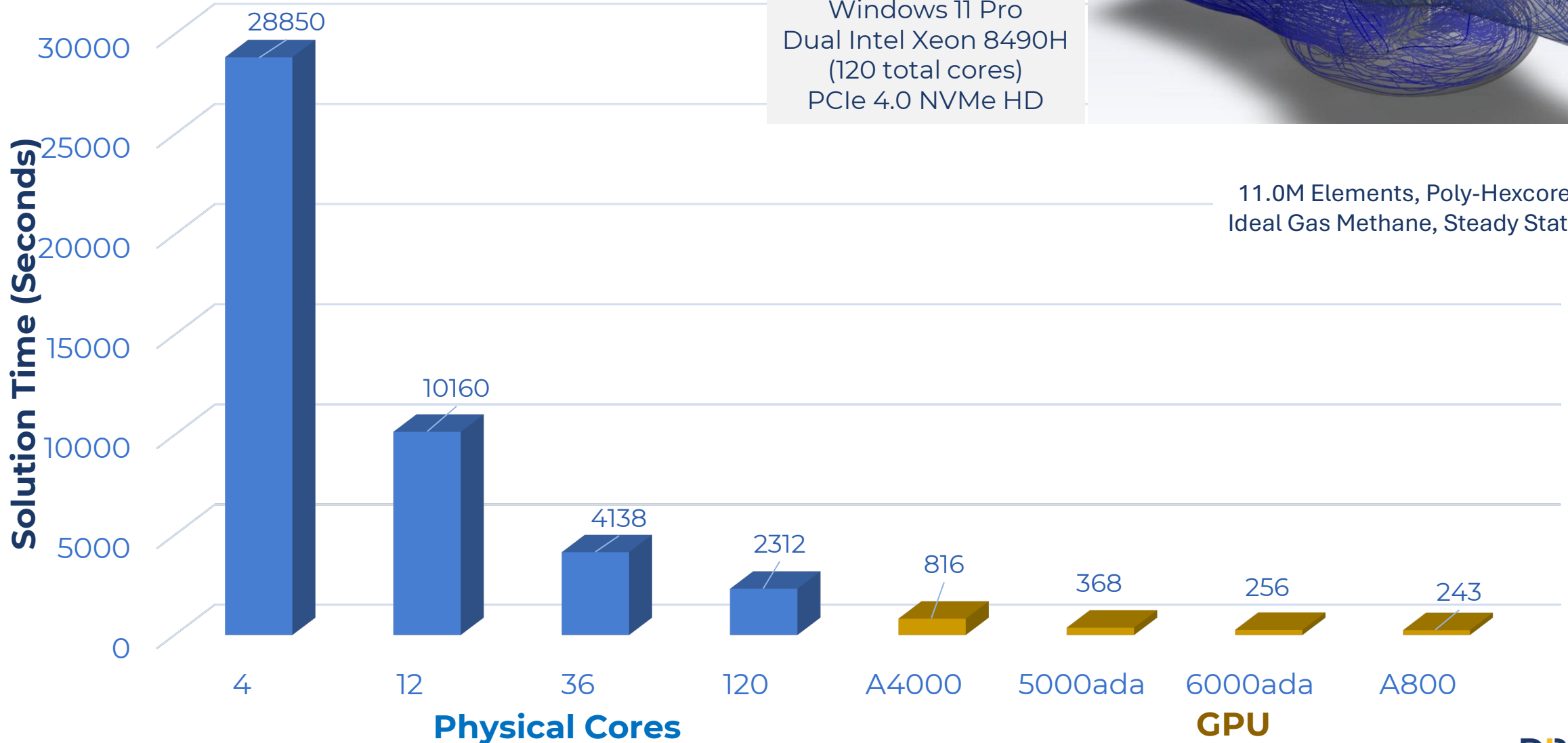


Ansys Fluent Workstation Benchmark

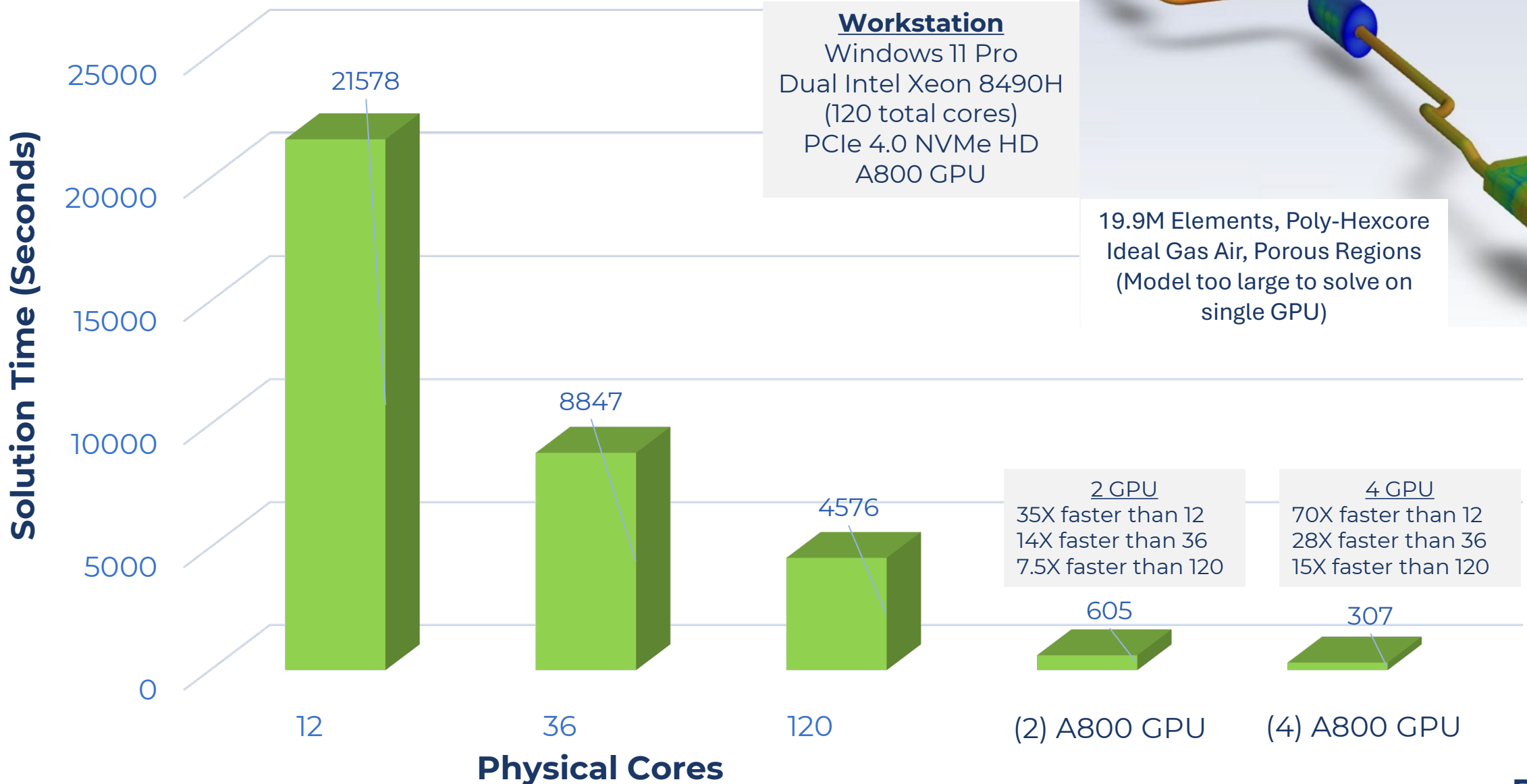
Workstation
Windows 11 Pro
Dual Intel Xeon 8490H
(120 total cores)
PCIe 4.0 NVMe HD



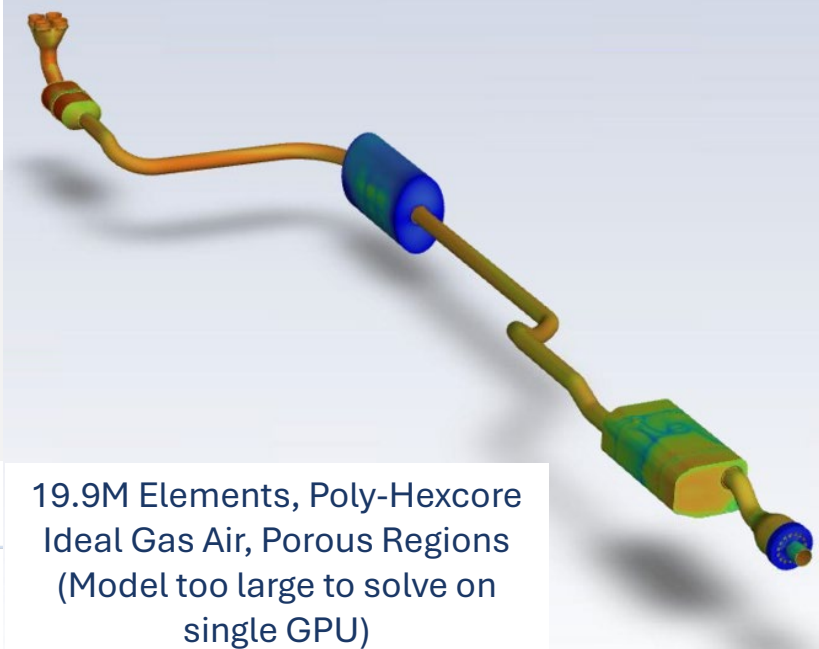
11.0M Elements, Poly-Hexcore
Ideal Gas Methane, Steady State



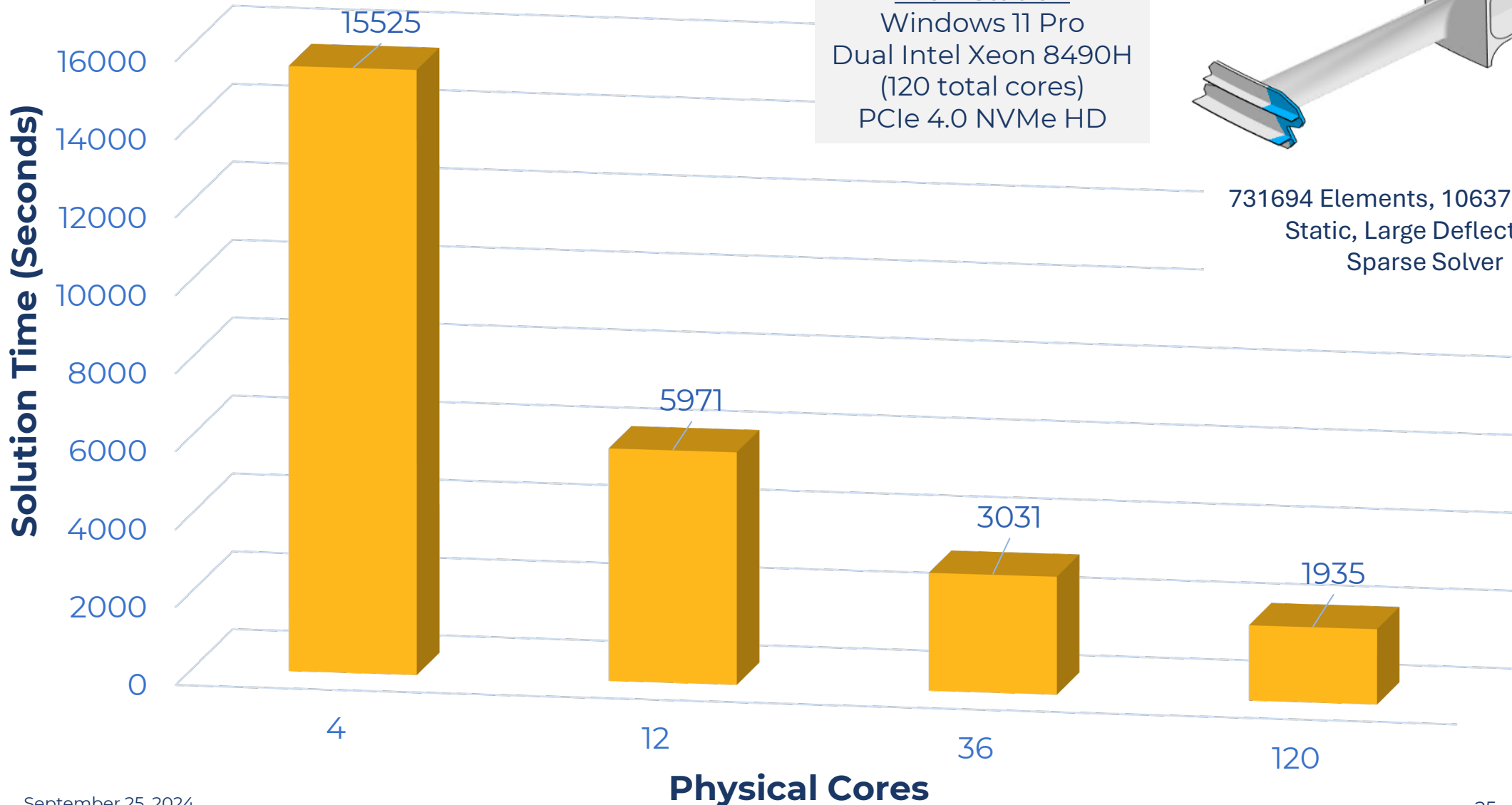
Ansys Fluent Workstation Benchmark



Workstation
Windows 11 Pro
Dual Intel Xeon 8490H
(120 total cores)
PCIe 4.0 NVMe HD
A800 GPU

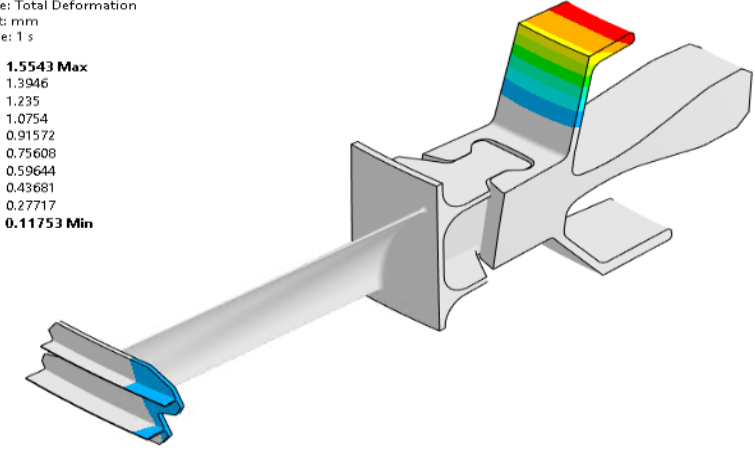


Ansyes Mechanical Workstation Benchmark



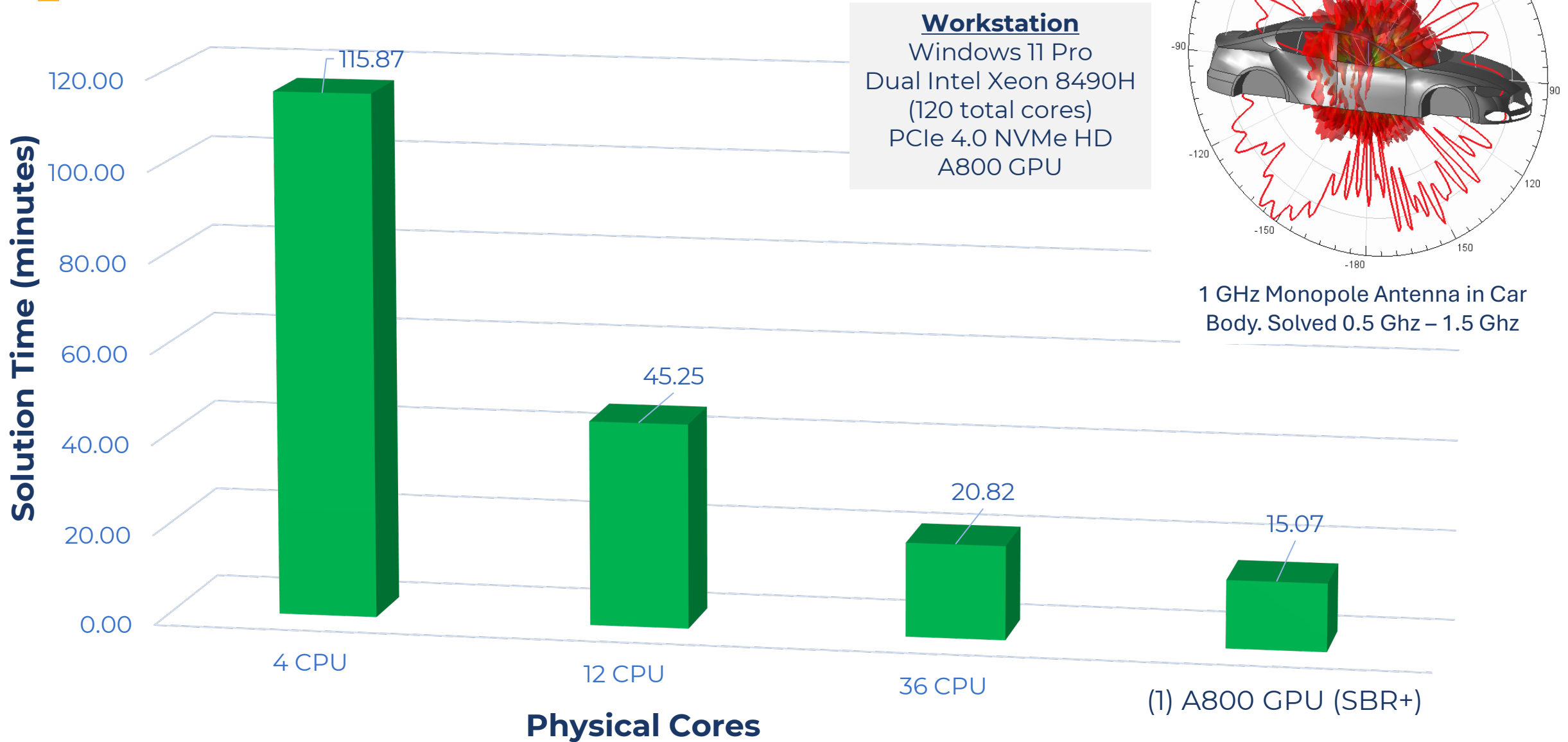
Workstation
Windows 11 Pro
Dual Intel Xeon 8490H
(120 total cores)
PCIe 4.0 NVMe HD

Type: Total Deformation
Unit: mm
Time: 1 s
1.5543 Max
1.3946
1.235
1.0754
0.91572
0.75608
0.59644
0.43681
0.27717
0.11753 Min

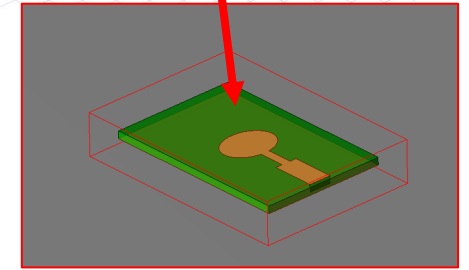
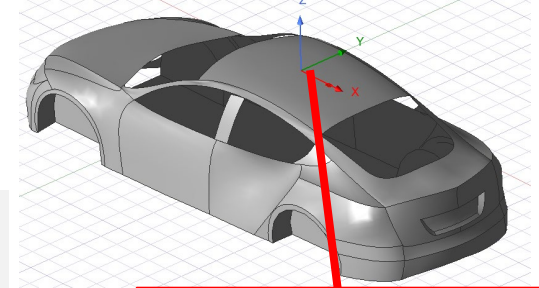


731694 Elements, 1063750 Nodes
Static, Large Deflections
Sparse Solver

Ansyes HFSS Workstation Benchmark

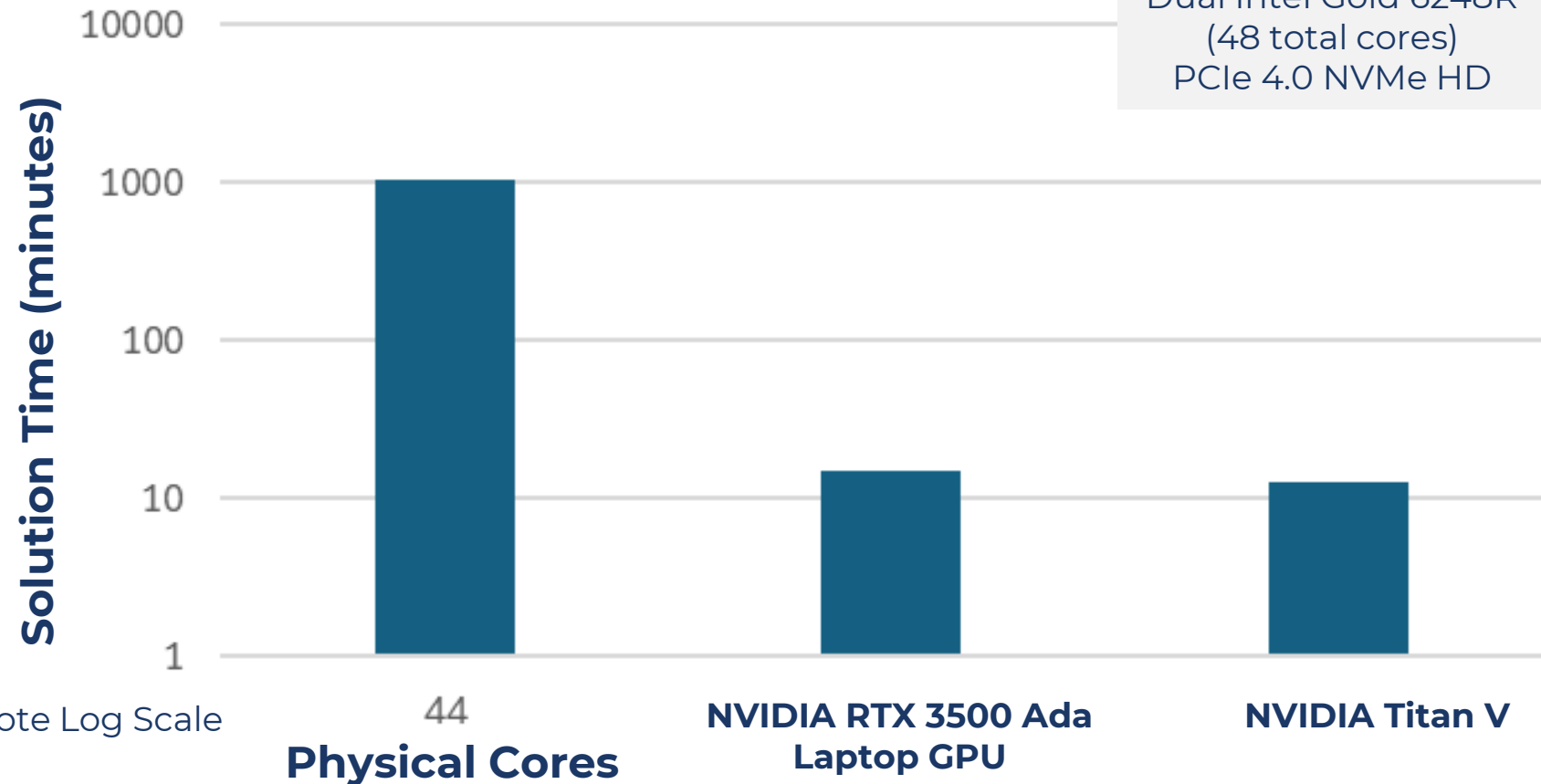


Ansys HFSS SBR+ Workstation Benchmark



Car body with PCB antenna placed on roof. 11.26GHz center frequency

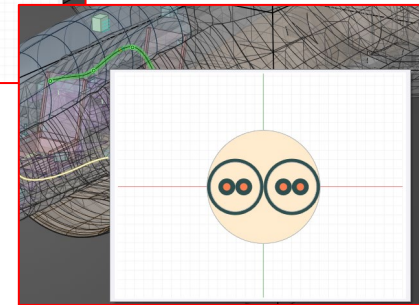
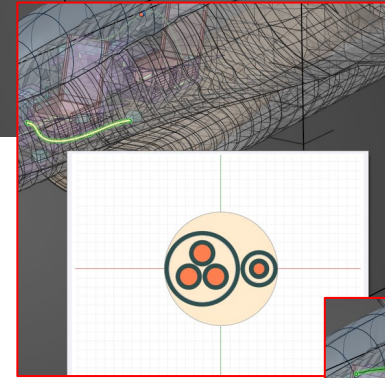
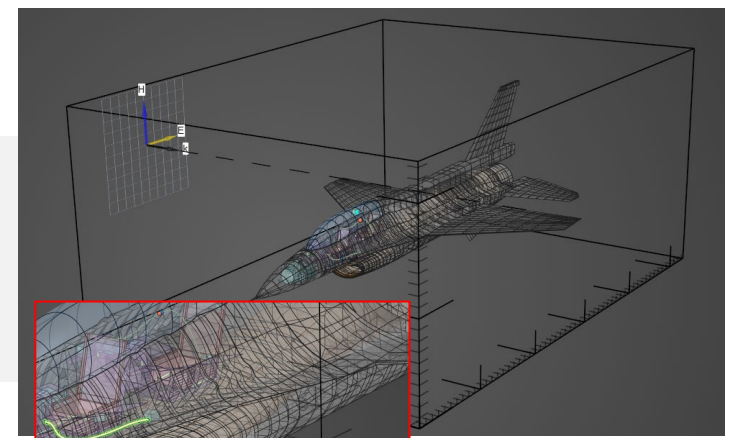
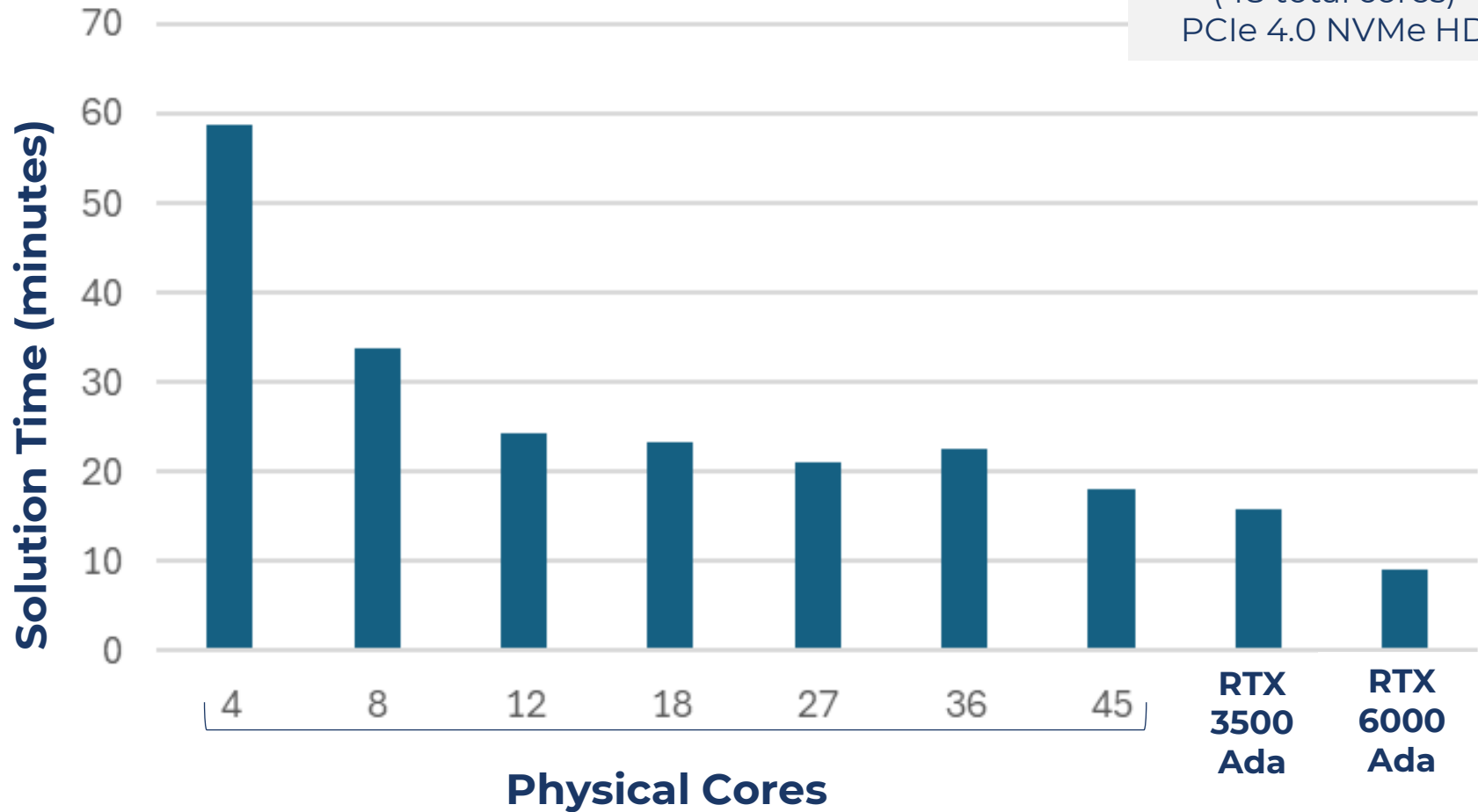
Workstation
Windows 11 Pro
Dual Intel Gold 6248R
(48 total cores)
PCIe 4.0 NVMe HD



*Note Log Scale

Ansys EMC+ Benchmark

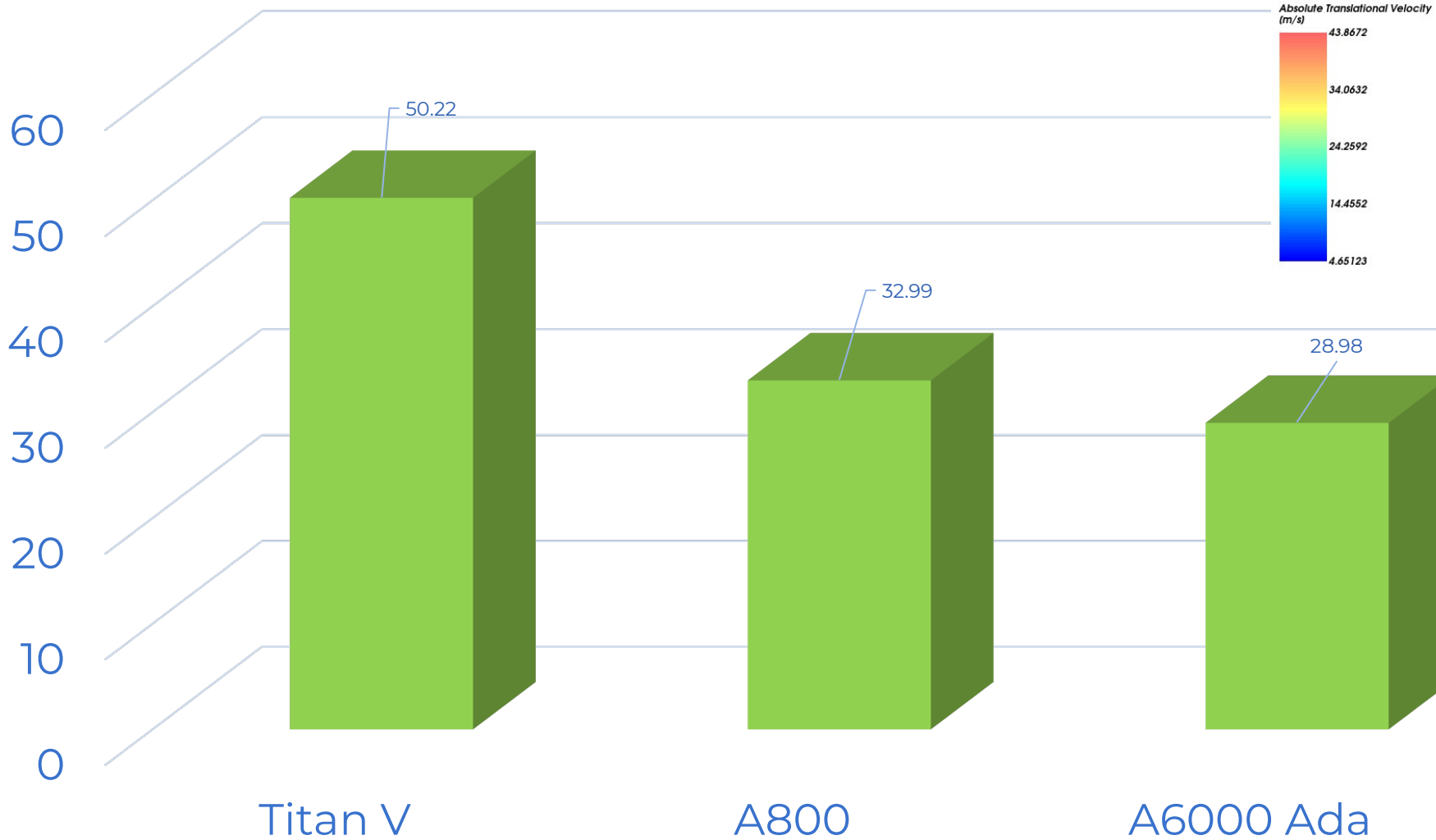
Workstation
Windows 11 Pro
Dual Intel Gold 6248R
(48 total cores)
PCIe 4.0 NVMe HD



Aircraft structure exposed to a plane wave excitation. Predict electric field with wire harnesses

Ansys Rocky Benchmark

Transient Solution Time (hours)



1.36M Particles
Rotor Speed 2700 RPM
Particle Size 0.25mm

NVIDIA GPU

Intel vs AMD Benchmarks & Commentary

Intel and AMD Chip Classifications

Intel and AMD have consumer, workstation and server class compute chips as listed below.

Intel Core Series (i5, i7, i9) - Consumer (Desktop)

Intel Xeon W - Professional (Workstation)

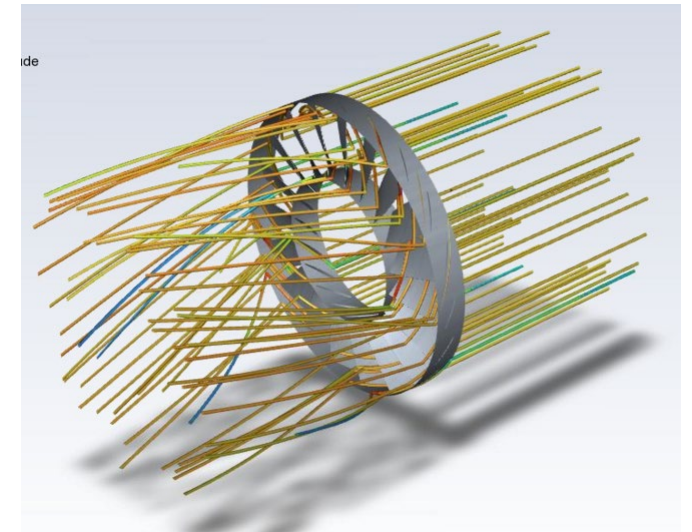
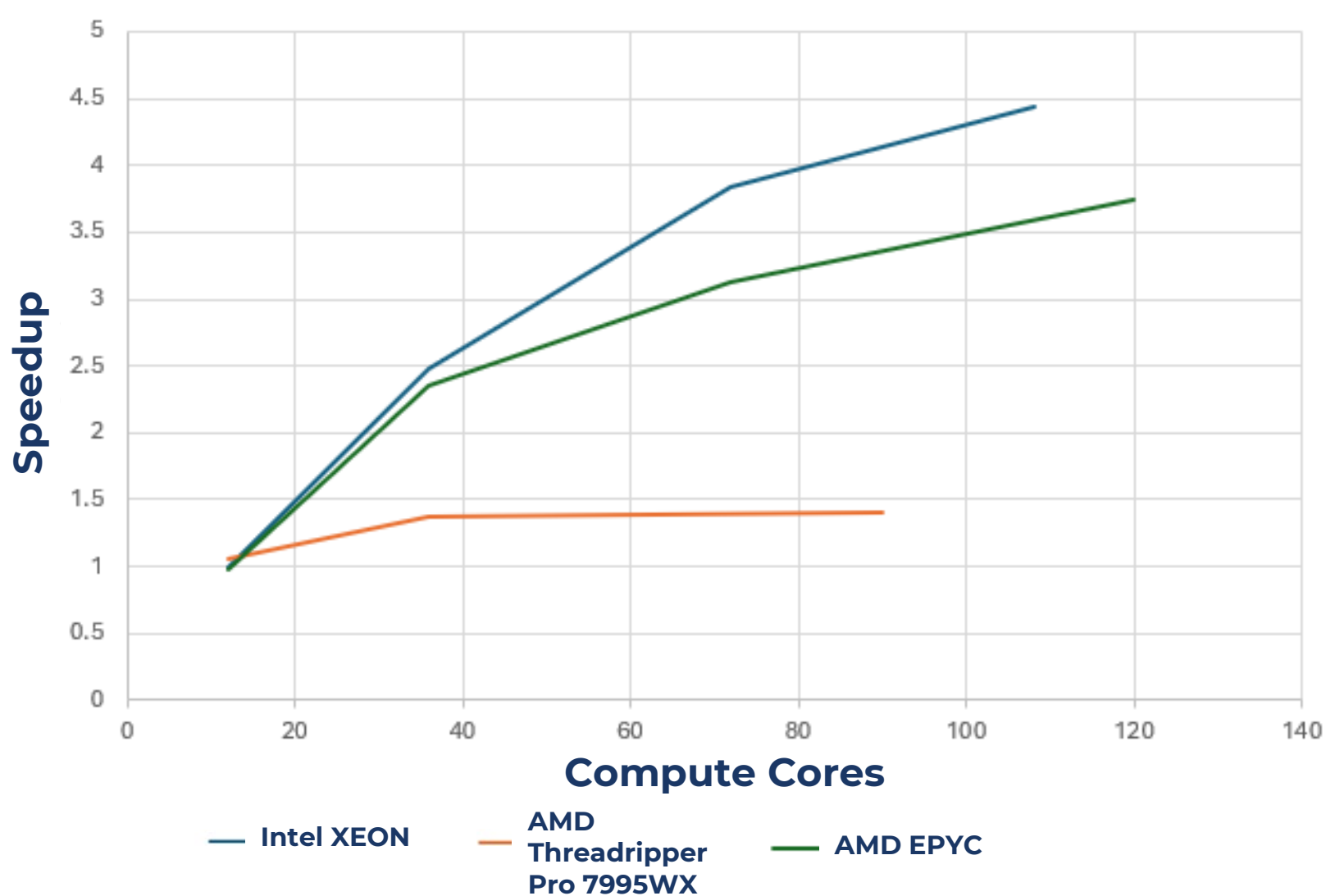
Intel Xeon Scalable - Enterprise (Server)

AMD Ryzen - Consumer (Desktop)

AMD Threadripper & Threadripper PRO - Professional (Workstation)

AMD EPYC - Enterprise (Server)

Intel vs AMD Benchmark

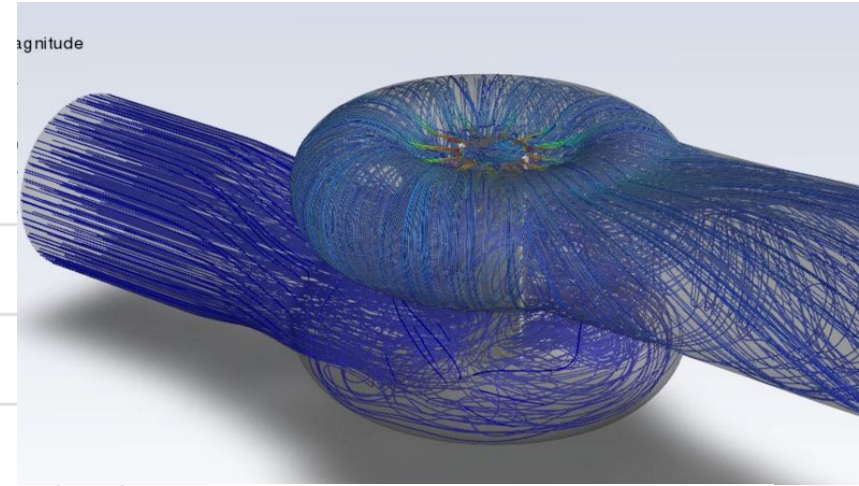


10.9M Elements, Poly-Hexcore
Constant density air, MRF
Isothermal

Windows 11 Pro OS

Similar, high-end, high core count, late generation CPUs were tested.

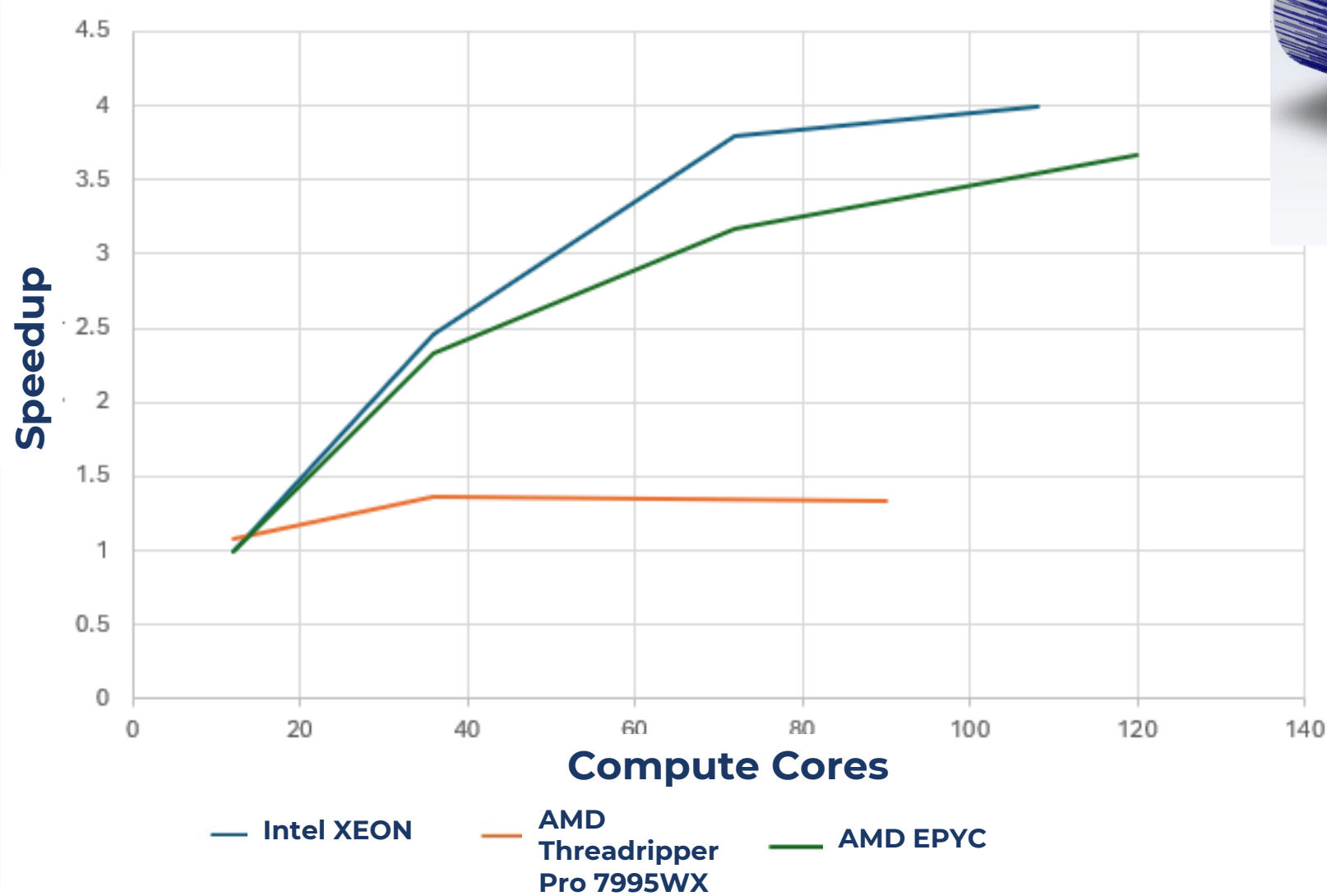
Intel vs AMD Benchmark



11.0M Elements, Poly-Hexcore
Ideal Gas Methane, Steady State

Windows 11 Pro OS

Similar, high-end, high core count, late generation CPUs were tested.



Observations

- Intel consumer grade and server grade CPUs scale well through high counts.
- AMD Threadripper Pro chips have been observed to flatline performance above 25-30 cores on Windows.
- AMD EPYC chips scale throughout high core counts but not to the same level as Intel chips.
- Generally, Intel computer chips are more expensive than AMD chips.

Observations

- For 16 cores or less, the performance of the Intel and AMD current generation chips is very close.
- For higher core counts, the price performance ratio (for hardware) for Intel and AMD is about the same: Intel is more expensive but also performs better. However, AMD Threadrippers did not scale in our testing using a Windows OS.
- For higher core counts, Intel is likely more cost effective for computing because the cost of the software (HPC licensing) in use may be less.

Webinar Summary Points

Thanks to Exxact Corporation for helping DRD research CPU and GPU performance!

100+ core Windows workstations are available for your computing needs without any cluster setup or overhead.

GPUs for your simulation needs may be a game changer if they are applicable!

Obtaining good solver scaling on high core counts of AMD Threadripper chips is difficult, if not problematic, at times on our testing on a Windows operating system.

Questions?

Support:
(918) 743-3013 x1
support@drd.com

Or through our website at
www.drd.com



The screenshot shows the DRD Technology website's 'Support & Resources' page. The header includes the DRD TECHNOLOGY logo and navigation links: SIMULATION PRODUCTS, CONSULTING, TRAINING COURSES, SUPPORT, RESOURCES, ABOUT, and CONTACT US. The main banner features the text 'Support & Resources' and 'GET THE ANSWERS YOU NEED FROM OUR ANSYS EXPERTS' over a background image of two people working at a computer. Below the banner are four white cards with icons and text:

- Have a Technical Question?** (Icon: speech bubbles with question mark) - Does something...
- Need to Send Us a File?** (Icon: folder with plus sign) - Upload files...
- Looking for Hardware Requirements?** (Icon: computer monitor and tower) - Get the best...
- Looking for Installation Information?** (Icon: folder with arrow) - Have questions...