



HPC Best Practices for Ansys Fluent

Andrew Saliba – Structures Application Engineer

June 23, 2026

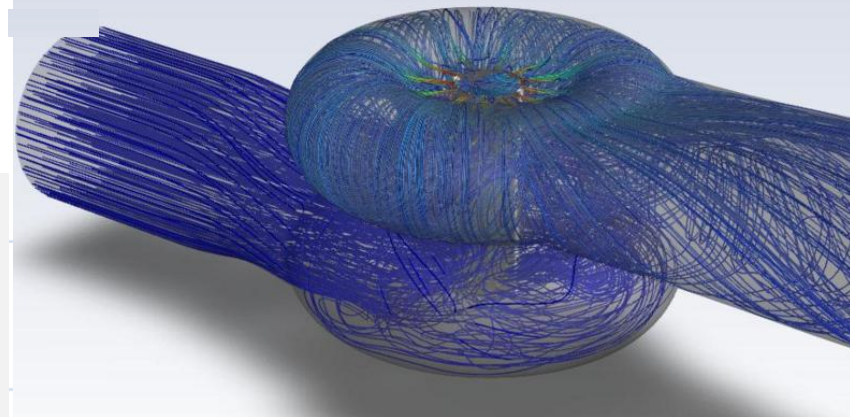
Objective

To inform and provide some best practices surrounding the cost-effective use of HPC licenses in Ansys Fluent

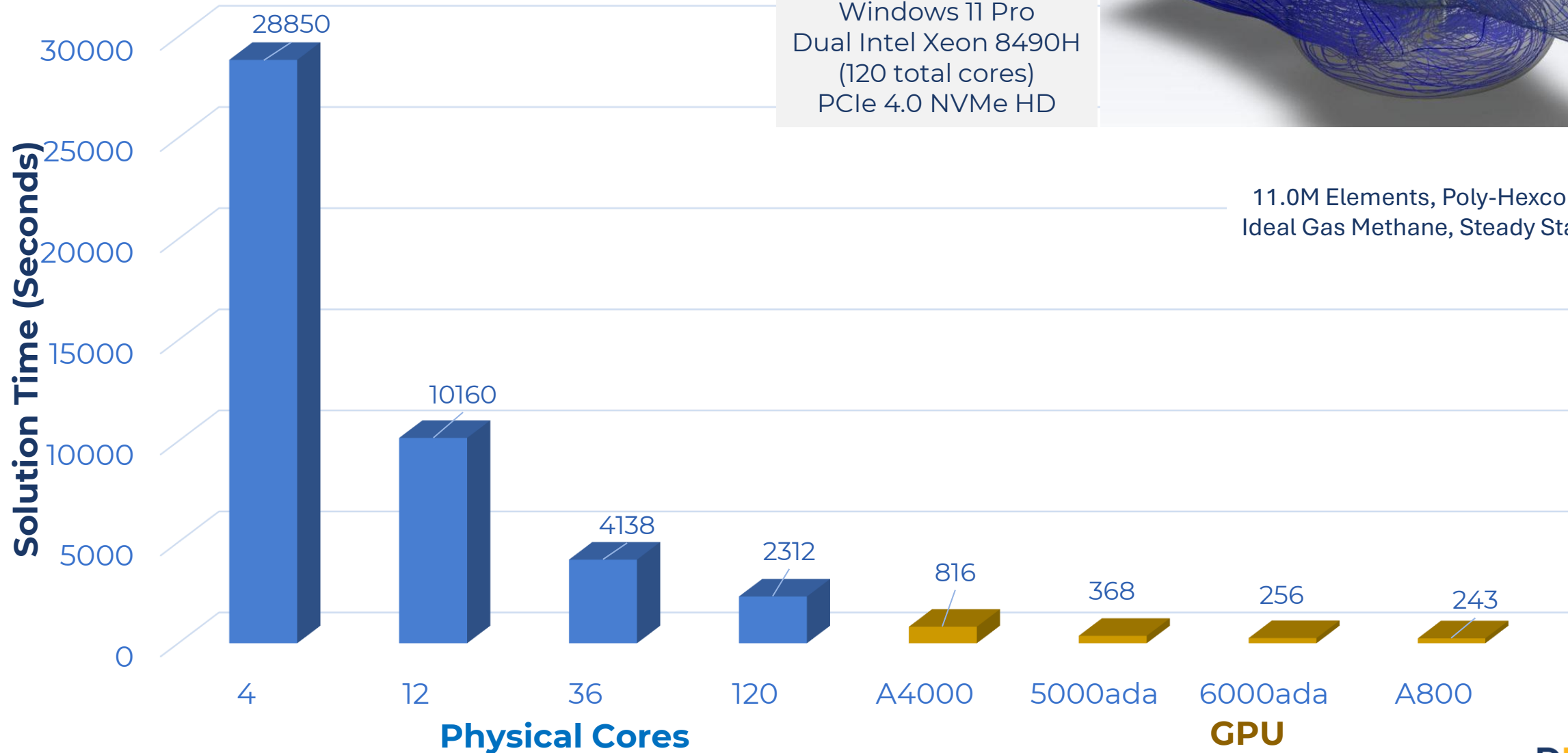
(HPC = High Performance Computing)

Ansys Fluent Workstation Benchmark

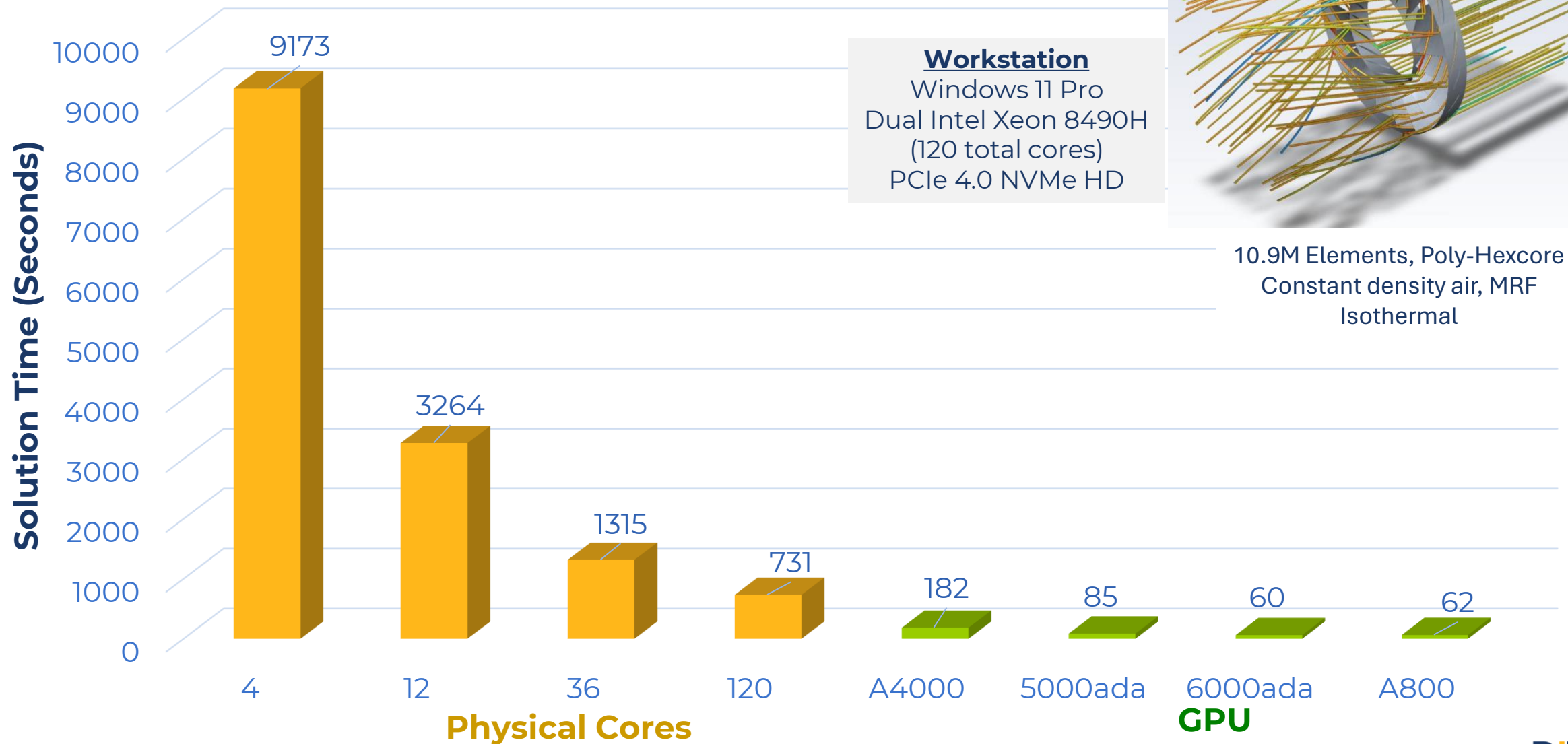
Workstation
Windows 11 Pro
Dual Intel Xeon 8490H
(120 total cores)
PCIe 4.0 NVMe HD



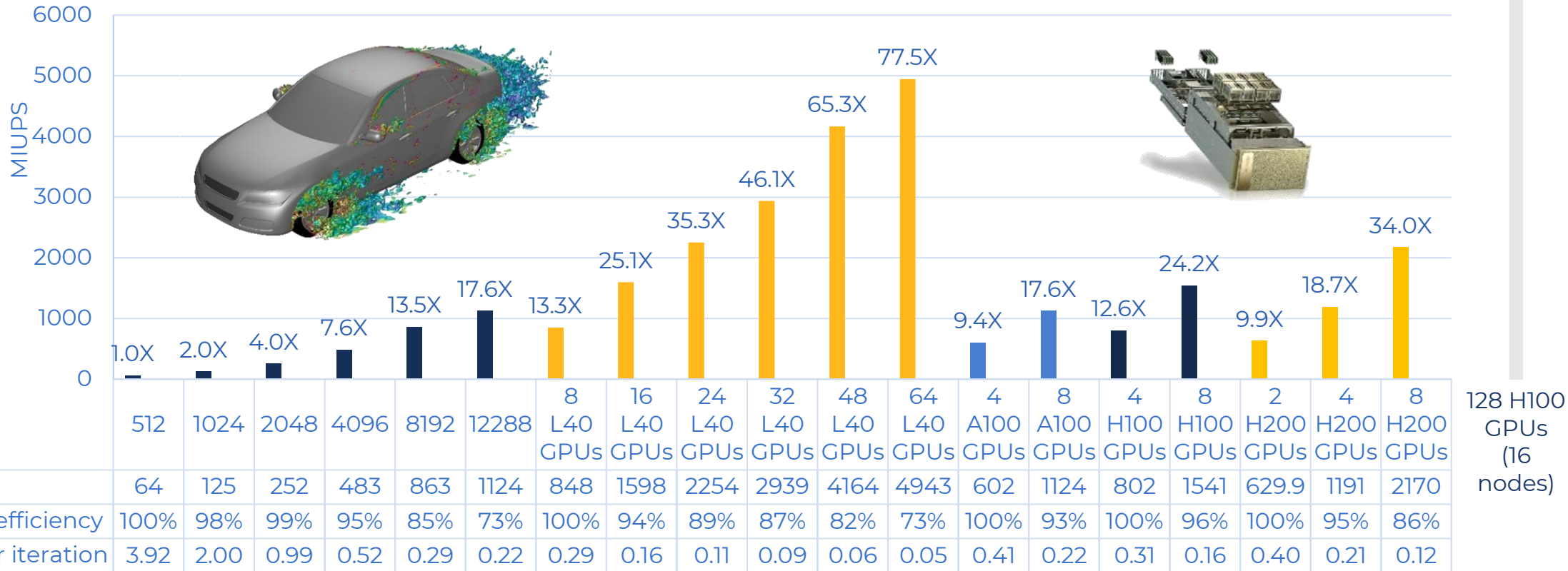
11.0M Elements, Poly-Hexcore
Ideal Gas Methane, Steady State



Ansys Fluent Workstation Benchmark



Native GPU implementation shows astounding performance gains



**CPU Solver best practice for optimum performance:
10,000 – 100,000 cells per core**

Laptop Performance vs. Efficiency Cores

Performance cores are useful for Ansys HPC, and efficiency cores are not.

Example:

Processor 12th Gen Intel(R) Core(TM) i7-12850HX, 2100 Mhz, 16 Core(s), 24 Logical Processor(s)

This laptop has 8 performance cores that are useful for Ansys HPC.

Ansys HPC Licenses

- **Ansys HPC licenses significantly speeds up Ansys solutions.**
- **The Ansys solver licenses provide access to 4 cores and some access to GPU**
- **You need Ansys HPC licenses to use more than 4 cores and access additional GPU resources.**
- **HPC License types:**
 - **HPC Packs**
 - **Individual Ansys HPC licenses in a Workgroup.**
 - **CFD HPC Ultimate**

HPC Licensing Paradigm (Workgroups)

Bundle of additional cores that can be divided up among many users/solves

100 Individual Users

HPC Workgroup 64



Scenario 1:

- 64 engineers check out 1 HPC and solve with 5 cores
- 36 engineers get 0 HPC and solve with 4 cores.

Scenario 2:

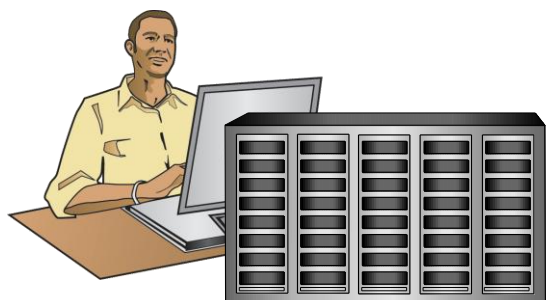
- 1 engineer checks out 64 HPC and solves with 68 cores
- 99 engineers get 0 HPC and solve with 4 cores.

Scenario 3:

- 2 engineers check out 32 HPC and solve with 36 cores
- 98 engineers get 0 HPC and solve with 4 cores.

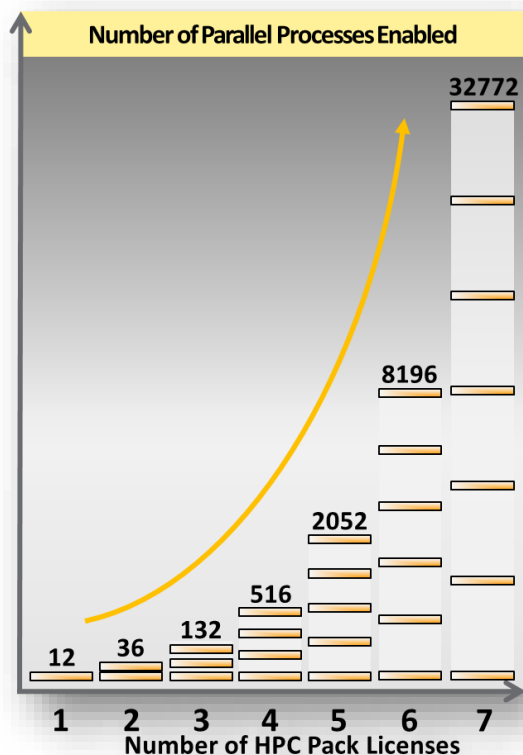
HPC Licensing Paradigm (Packs)

HPC Packs



Stackable license for
doing large, single jobs

$$4 + (8 * 4^{h-1})$$



2 Packs

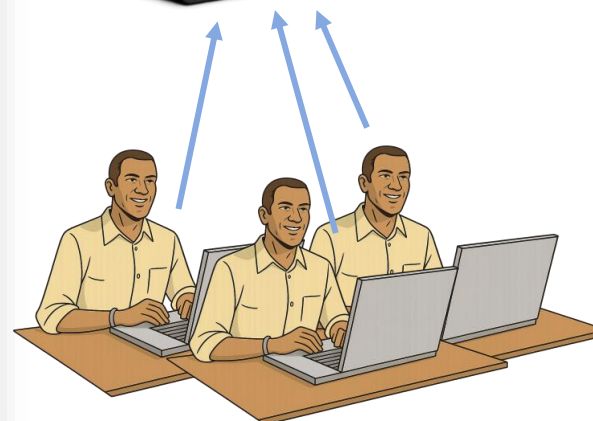


Scenario 1:

- 1 engineer checks out 2 HPC Packs and solves with 36 cores

Scenario 2:

- 2 engineers check out 1 HPC Pack and each solves with 12 cores



HPC Workgroups vs. HPC Packs

Example Computer Environment

- Laptops with 8 performance cores
- Cluster with 1000 cores
- HPC Workgroup 64
- 8 HPC Packs



Best Practices

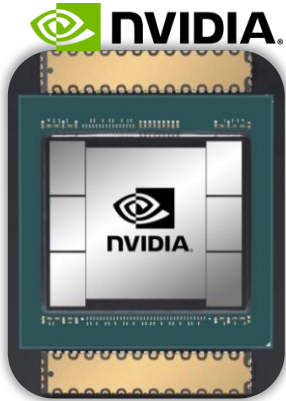
- When solving on a laptop, select 8 cores and use the HPC Workgroup
 - This will check out 4 HPC licenses from the Workgroup 64
- When solving on the cluster, select cores based on problem size and use HPC packs

HPC Licensing Paradigm (CFD HPC Ultimate)

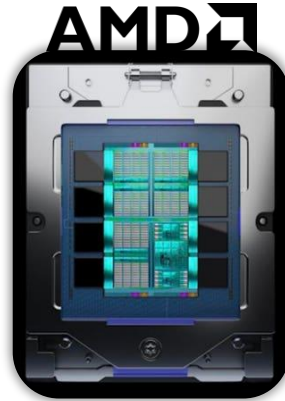
- All capabilities included in CFD Enterprise
- Any number of CPU or GPU cores without the need for additional HPC licensing
- Single task-based product
- For example:
 - The user can run one solve with 10,000 cores at a time without requiring additional HPC licenses



Fluent GPU Solver HPC Consumption



Comprised of streaming multiprocessors (SMs) that contain CUDA cores



Comprised of compute units (CUs) that contain stream processors

# GCUs/SMs	HPC Workgroup	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

Like cores on CPU, GPUs have Graphic Compute Units (GCUs)

CFD Enterprise allows up to 40 GCUs

- HPC licensing required for more GCUs

Unlike CPUs, GPUs cannot be partially utilized

- Must have licensing for entirety of GPU

NVIDIA RTX A6000 has 84 SMs

Using 1 RTX A6000
Requires 44 HPC
(84-40=44)
or 3 HPC Packs

Using 2 RTX A6000
Requires 128 HPC
(84*2-40=128)
or 3 HPC Packs

Ansys HPC Demonstrations

- Demonstration of Ansys license preferences for controlling which HPC license you check out.
- Demonstration of starting Ansys Fluent so that preprocessing and postprocessing sessions will use physical cores without consuming Ansys HPC licenses.

Ansys HPC Demonstrations

Summary

- Ansys offers 3 types of HPC licenses
 - HPC Workgroups for low core count solves
 - HPC Packs for high core count solves
 - HPC Ultimate for any number of cores
- HPC is a valuable resource, and we discussed how judicious selection of number of cores and HPC license type enables much more efficient and cost-effective use of this valuable resource.

Questions?

