



HPC Best Practices for Ansys Mechanical

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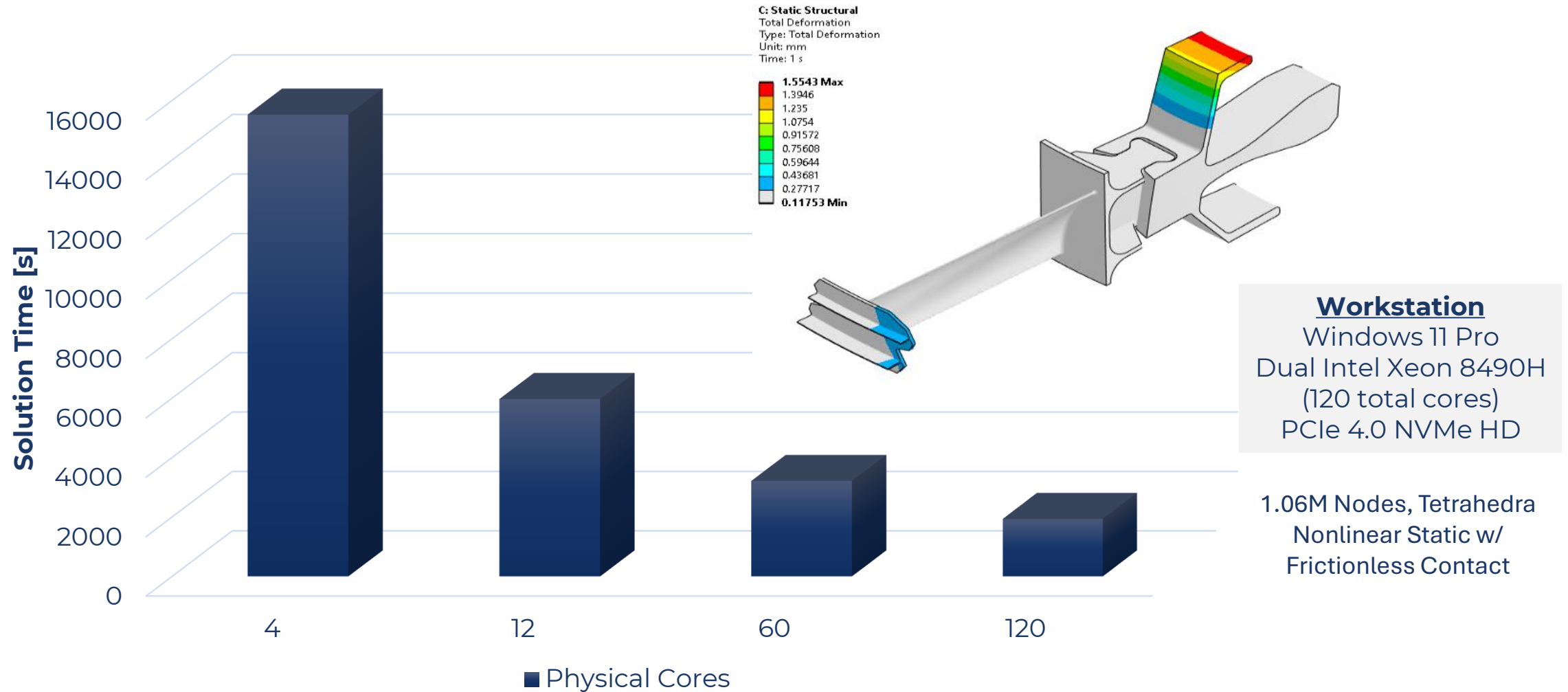
June 16, 2026

Objective

To provide information and best practices leading to the cost-effective use of HPC licenses in Ansys Mechanical

(HPC = High Performance Computing)

Ansys Mechanical Workstation Benchmarks



Ansys HPC Licenses

- **Ansyes HPC licenses significantly speeds up Ansys solutions**
- **The base Ansys solver licenses provide access to 4 cores**
- **You need Ansys HPC licenses to use more than 4 cores**
- **Ansys Mechanical works with GPU; this presentation will focus on CPU computing**
- **HPC License types:**
 - **HPC Packs (ideal for large core count solves)**
 - **Individual Ansys HPC licenses in a Workgroup (ideal for low core count solves)**

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.

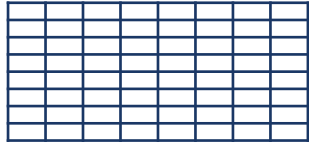
Scenario 2:

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

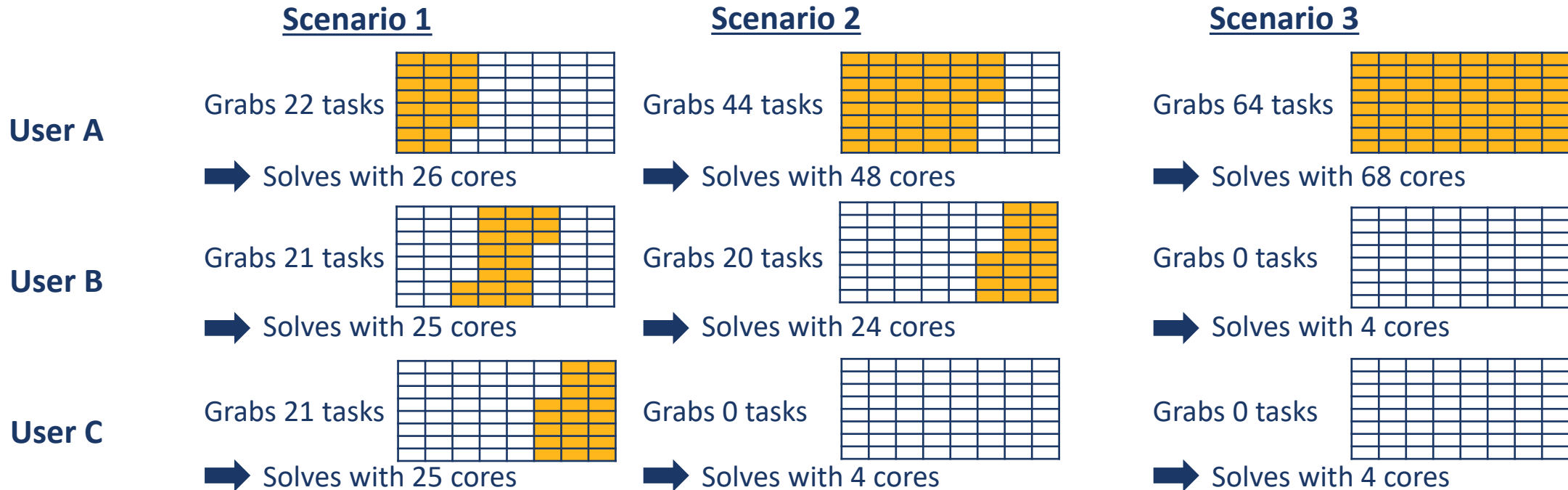
Scenario 3:

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

HPC Workgroup Example



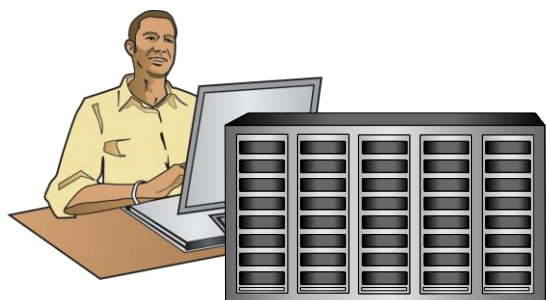
Let's say you have a Workgroup 64 and 3 Mechanical Enterprise Users:



1 task = 1 HPC unit of the Workgroup

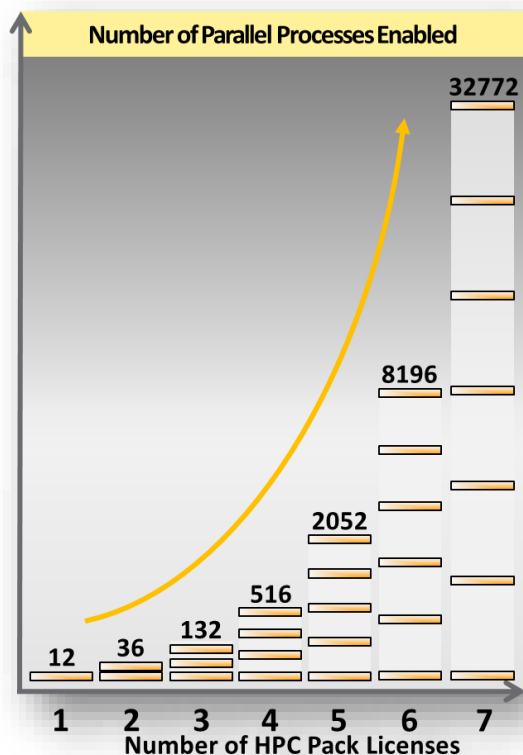
HPC Licensing Paradigm (Packs)

HPC Packs

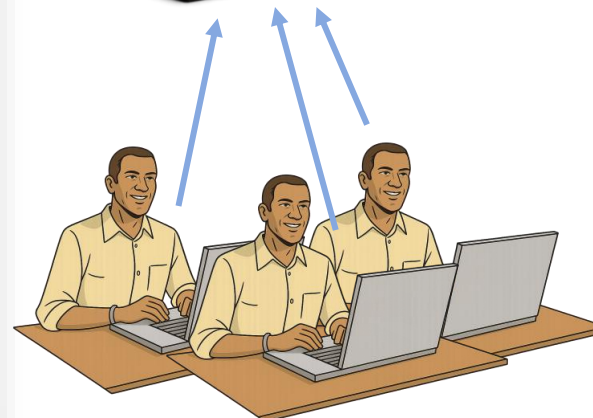


Stackable license for
doing large, single jobs

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



2 Packs



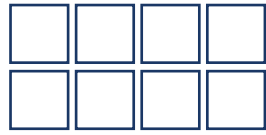
Scenario 1:

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

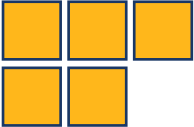
Scenario 2:

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

HPC Pack Example



Let's say you have 8 HPC Packs, 3 Mechanical Enterprise Users, and a 1032-core Cluster:

	<u>Scenario 1</u>	<u>Scenario 2</u>	<u>Scenario 3</u>
User A	Grabs 5 Pack  ➡ Solves with 2052 cores	Grabs 4 Packs  ➡ Solves with 516 cores	Grabs 3 Packs  ➡ Solves with 132 cores
User B	Grabs 2 Pack  ➡ Solves with 36 cores	Grabs 4 Pack  ➡ Solves with 516 cores	Grabs 3 Packs  ➡ Solves with 132 cores
User C	Grabs 1 Pack  ➡ Solves with 12 cores $(4+8*4*4*4*4)=2052$	Grabs 0 Packs ➡ Solves with 4 cores $(4+8*4*4*4)=516$	Grabs 2 Packs  ➡ Solves with 36 cores $(4+8*4*4)=132$

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 36 cores and use HPC packs
 - This will check out 2 of the 8 HPC packs

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 Demonstrations

- **Demonstration of Ansys license preferences for controlling which HPC license you check out.**

Summary

- Ansys offers 2 types of HPC licenses
 - HPC Workgroups for low core count solves
 - HPC Packs for high core count solves
- 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?

