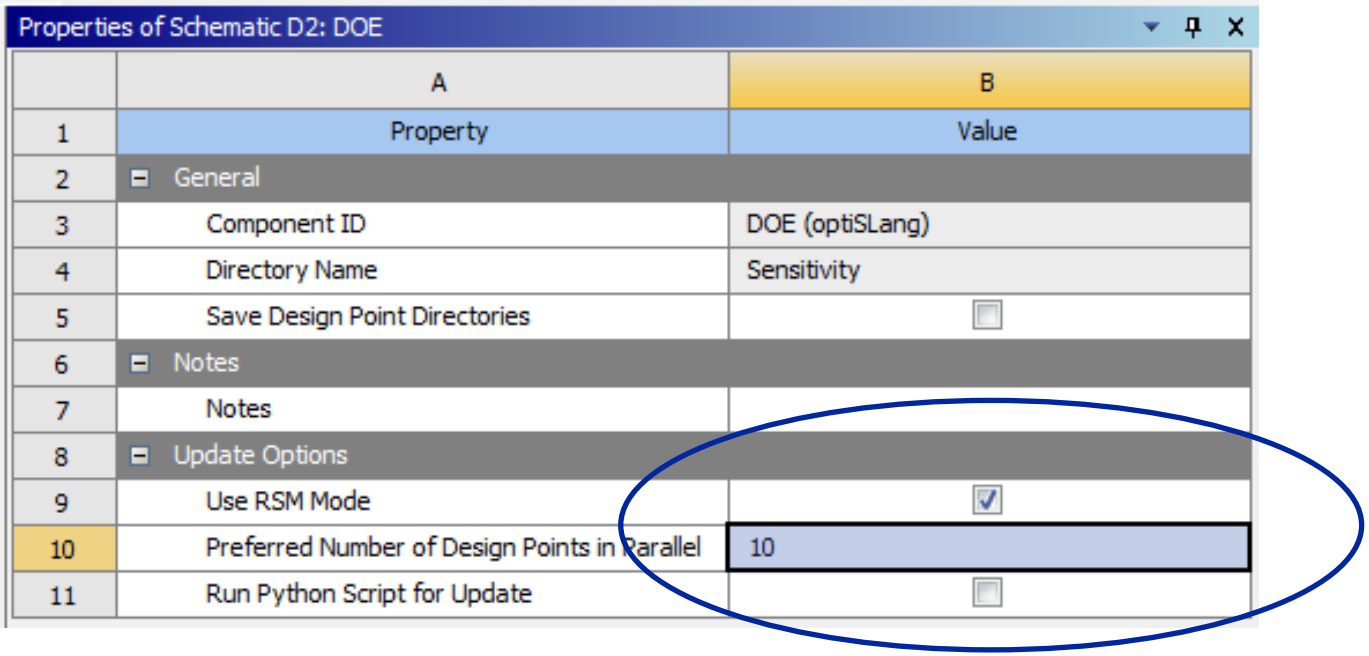
Understand your Design

Hard- and Software for Performant Design Variation

PRACE Autumn School 2013 - Industry Oriented HPC Simulations, September 21-27, University of Ljubljana, Faculty of Mechanical Engineering, Ljubljana, Slovenia

Parallelize your calculations

- Use the optiSLang RSM Mode to send several designs in parallel to your solver system
- optiSLang inside Workbench uses the RSM technology and therfore you can combine it with your own jobmanagement systems.



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Hardware

- Workstation
  - Local High End Computing power
  - Local High End 3D Graphics
  - Up to 16 Cores and 512 GB Memory
- Benefit
  - All kind of *sequential* simulation processing

Desktop Workstation

Mobile Workstation

Z1 All-in-One Workstation

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Hardware

- Compute Server
  - Remote High End Computing power
  - No 3D Graphics
  - Scalable in cores, memory, disks
  - Redundant components
  - Service Level Agreements SLAs availible
  - Remote service access on hardware level → high availability

- Benefit
  - All kind of *sequential* **and** *simultaneous* simulation processing
    - Highly scalable in the number of cores per job
    - Highly scalable in the number of simultaneous jobs → large DoE‘s

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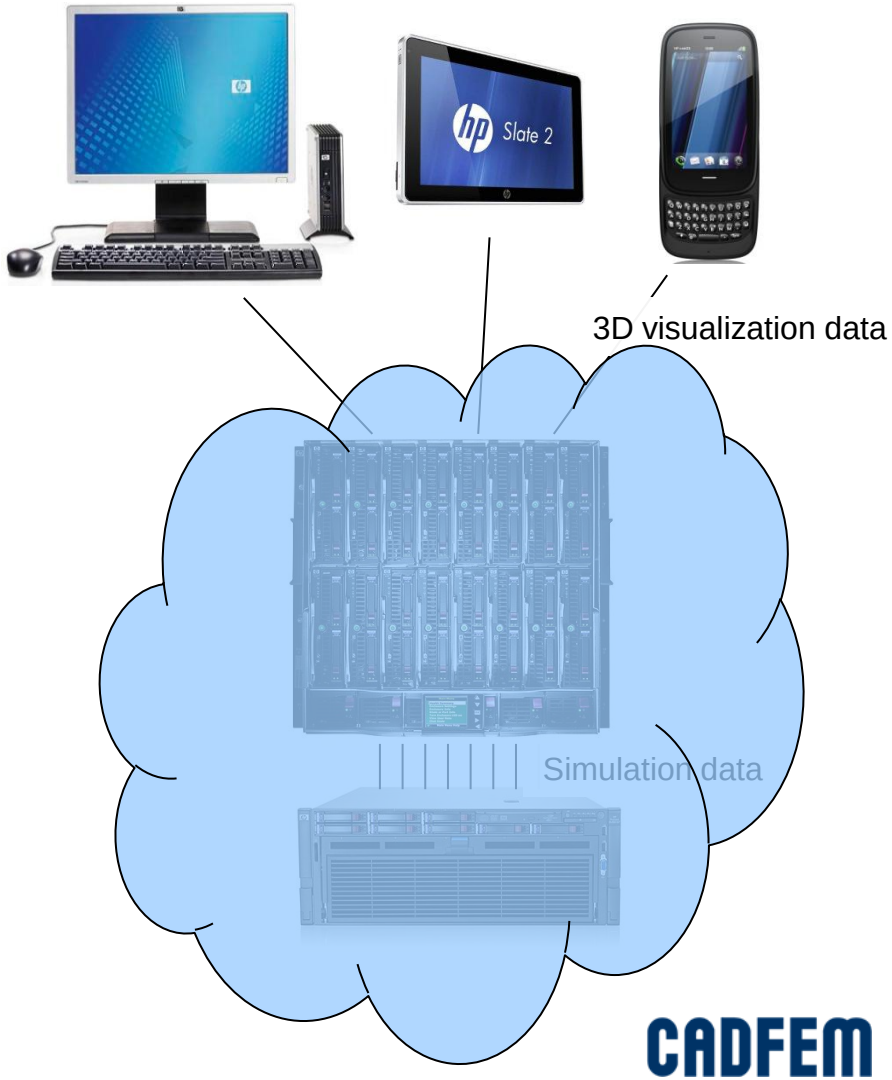
Hardware

- Terminals & Cloud

- Benefit
  - High bandwidth connection from blade workstation to compute server → fast postprocessing
  - Flexible allocation of virtual workstations → cost effective „workstation“ usage by multiple users
  - Flexible scaling of hardware resources → better scaling and availability by external hardware sharing



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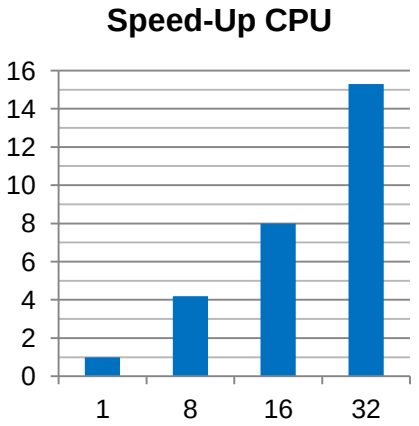
Parallel Processing → Multiple cores per Design

- Use multiple cores
  - Today, every computer is a parallel computer
  - 8 Cores → factor 4 on industry FEA models is typical average
  - HPC Pack with 1 additional GPU → additional factor 1.5
    - NVidia Tesla 2075 ~ 2-3000€
  - Total speedup Cores*GPU: 4 x 1.5 = 6
  - Important: SMP & DMP availible

# Cores	Speed-Up	computing h
1	1	24.0
2	1.4	17.1
4	2.4	10.0
6	3.5	6.9
8	4.2	5.7
16	8	3.0
32	15.3	1.6



Source: MicroConsult

- Benefit
  - 1 HPC-Pack: +200% corepower (300 % with GPU) for +35% costs (ANSYS/MECH)
  - 2 HPC-Pack: +990% corepower (1500% with GPU) for +70% costs (ANSYS/MECH)

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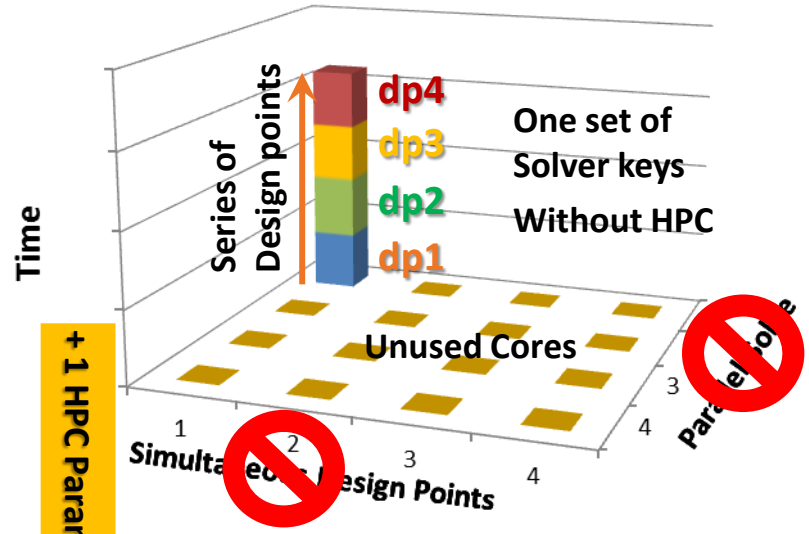
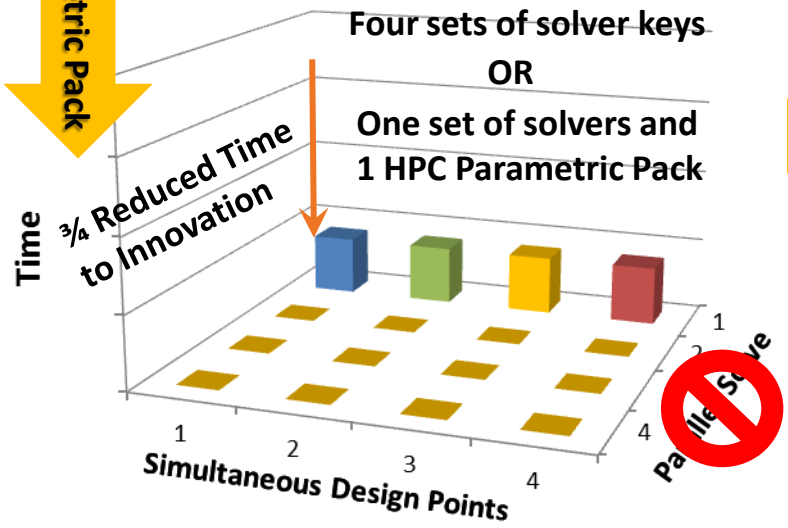
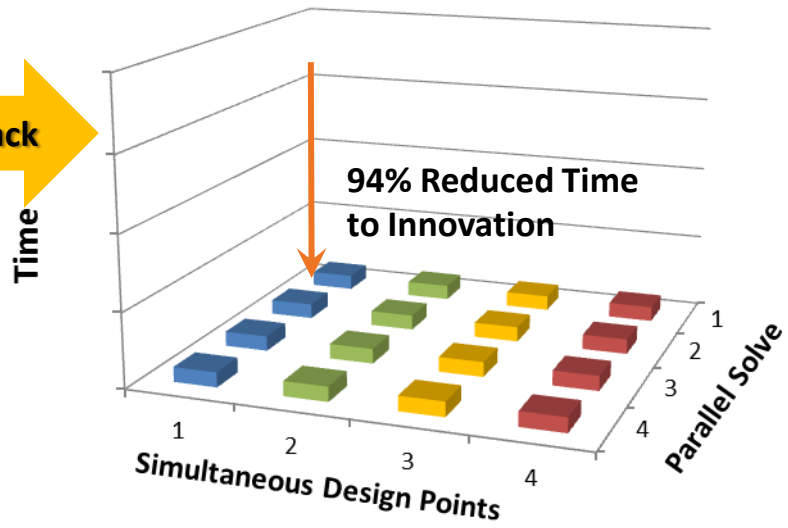
Simultaneous Processing → Multiple Designs at once



+ 1 HPC Parametric Pack



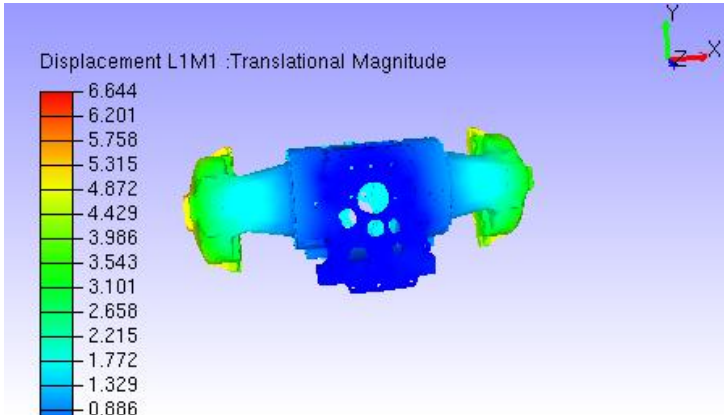
+ 1 HPC Pack



Multiplying licenses enables you to drastically reduce time to innovation

CADFEM C.A.V.E. - Why

- High number of simulation result sets → big data
- Workbench integration of VCollab (Visual Collaboration Technologies)
  - Reduced amount of data by factor 50 to 300 for cost effective archiving and sharing
  - High speed visualization
  - Flexibility by visualization independent from CAE software
  - Sharing of 3D result data for a better understanding of all project partners
  - Seamless integration into ANSYS Workbench and Office



Source: AGCO FENDT

Part	rst-File	cax-File
Injection Molding Tool (9 results)	529 MB	3.3 MB
Automotive Assembly (16 results)	68 GB	1.0 GB
Mechanical Part (8 results)	137 GB	0.4 GB

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CADFEM C.A.V.E. - Summary

- High data compression rate
  - Minimized costs for archiving
  - High speed visualization
- Improves communication and understanding by sharing results
  - 3D Result viewing for everyone free of charge
- Seamless Workbench integration
  - Safety First: Automated consistency
  - Time effective result extraction

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