

Ansys

WOOST

CONFERENCE

Development of optiSLang product line

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Ansys

What got Ansys to simulation leadership...

Users

Analysts

Customizations

WORKFLOWS AND INTEGRATIONS
Created by ACE, Partners, Academic Community, Power Users

Platform

Ansys WORKBENCH

Products



MULTIPHYSICS & SYSTEMS SIMULATION ENGINES

Computing

ON-PREMISE COMPUTING

...the platform that will take Ansys to the next level

Users

All engineers and professionals

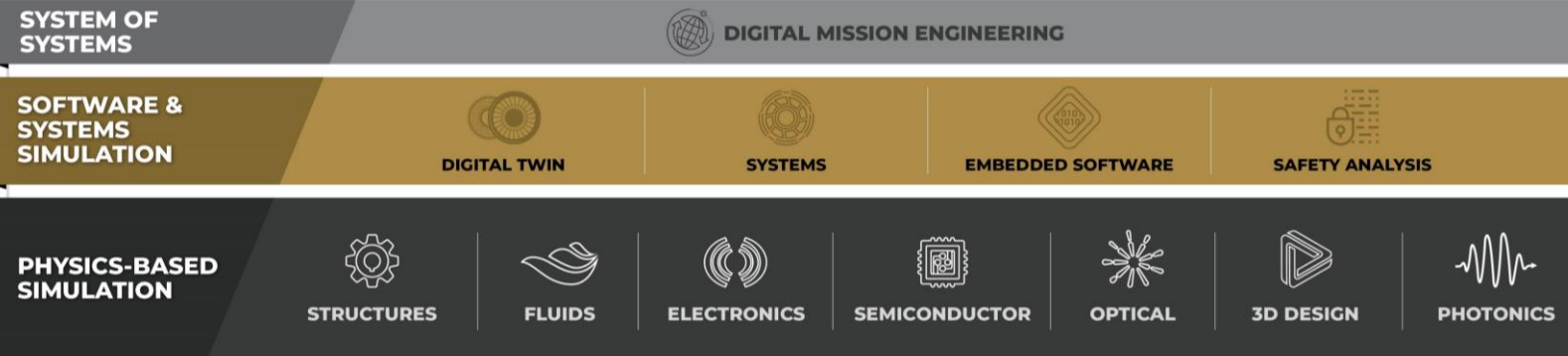
Customizations

PERSONALIZED SOLUTIONS TO WIDE VARIETY OF ENGINEERING PROBLEMS
Created by a developer ecosystem

Platform

 MATERIALS  PROCESS & DATA MANAGEMENT  PROCESS INTEGRATION and DESIGN OPTIMIZATION |  PY  DEV TOOLS  APIs  LEARNING

Products



Computing

LOCATION-INDEPENDENT AND UNCONSTRAINED COMPUTING



Orchestrate and Automate

Increase productivity

Tools Agnostic Process Integration
Simulation workflows building
Openness for Plugins and Extension
Web app generation



Understand and Optimize

Reduce complexity and make better product decisions

Workflows for
Sensitivity Analysis
Metamodeling including AI/ML
Efficient optimization algorithms



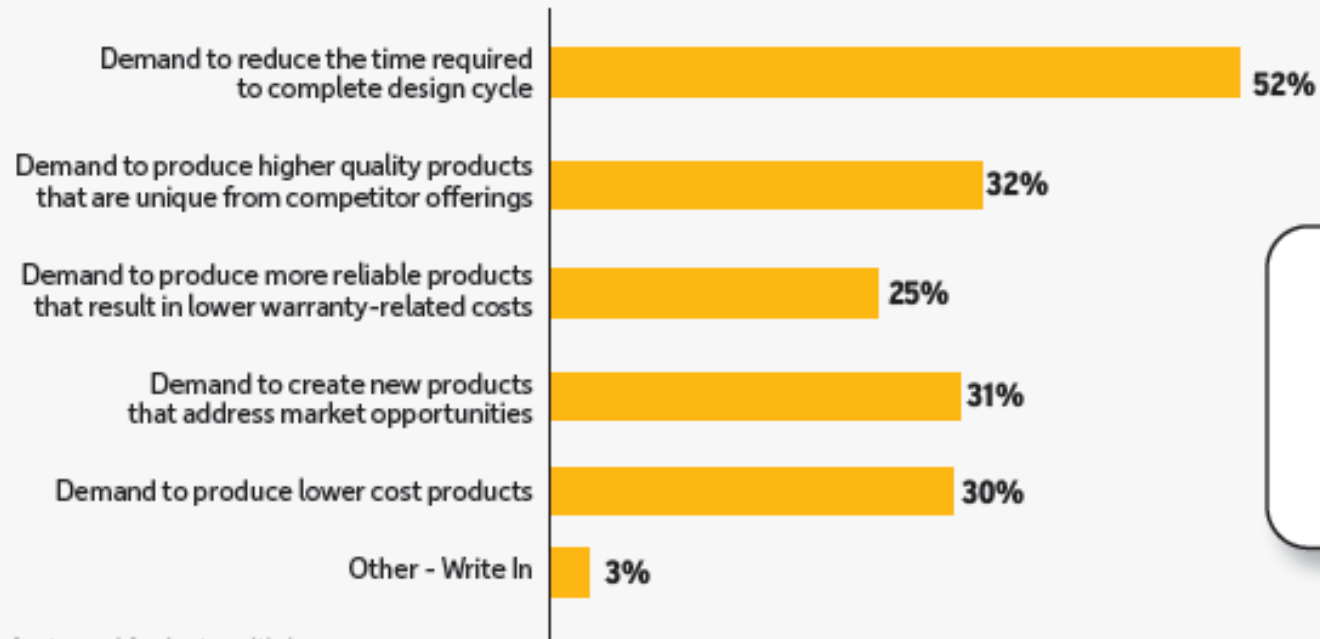
Evaluate Product Reliability

Manufacture with confidence

Workflows for
Robustness evaluation
Reliability analysis
Robust Design Optimization

Study on usage of simulation

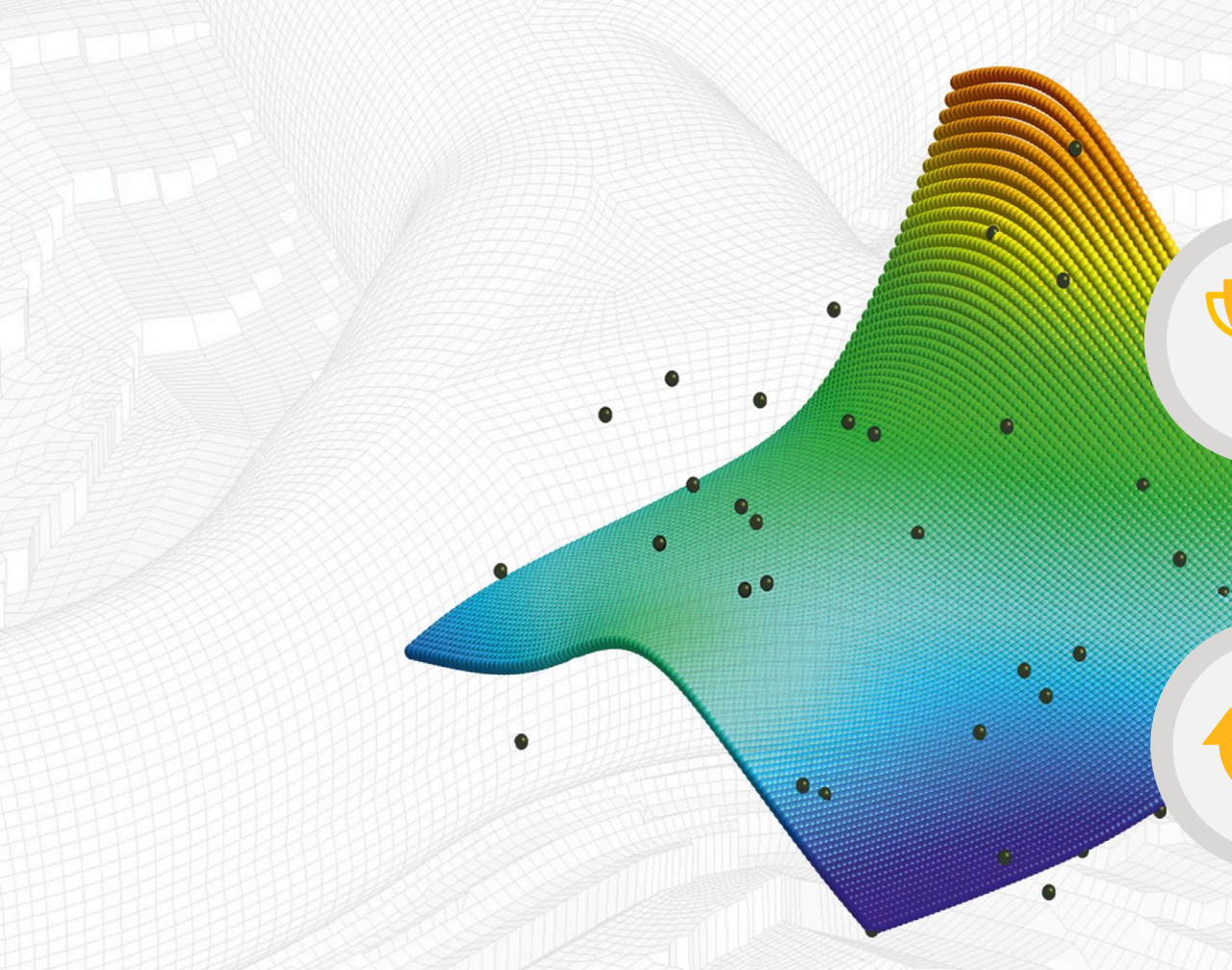
Which business needs would you say are most challenging to you in your design activities?



*Respondents could select multiple answers

52%
said their top business challenge in design activities is pressure to reduce design cycle times

- With optiSLang process automation and orchestration capabilities our customer are able to significantly reduce the turnaround times of product development!
- With design optimization we support better products with lower costs
- With robust design optimization we support more reliable products



optiSLang product line repacking



Automate & Orchestrate

Provide best in class offering to support parametric simulation workflows including CAD/CAE/CAX tool integration, automation and orchestration for both Ansys and third-party.



Scale parametric studies

Enable customers to most effectively perform parametric design studies



Integrate available technology

Integrate DX
Integrate ETK
Integrate SoS

ANSYS optiSLang Premium & Enterprise licensing

Available 2021 R2		
Capabilities	Premium	Enterprise
Algorithms for design point studies		
<i>Optimization & sensitivity analysis</i>	✓	✓
<i>Robust design & reliability analysis</i>	✓	✓
<i>Model calibration</i>	✓	✓
Process Integration		
<i>Build and automate workflows</i>	✓	✓
<i>Integrate 3rd party tools</i>	✓	✓
Interface		
Embedded in ANSYS Workbench	✓	✓
Web app building		✓
Reduced Order Modeling		
Scalar meta-modeling (incl. test data)	✓	✓
Signal/Field meta-modeling (incl. sensor & 3D scan data)		✓
Modeling of imperfect structures for UQ		✓
AI/ML for meta-modeling		✓
optiSLang inbuild concurrent parametric variations (design points)		
Concurrent design point variations	1+3=4	1+7=8

Concurrent design point variations

Accelerate design point studies

- optiSLang inbuild design points enables multiple parallel design variations
- n optiSLang Premium licenses enable $(3n+\text{solver})$ concurrent variations.
 - For Example, 1 optiSLang Premium + 1 CFD Premium = 4 concurrent CFD variations
- n optiSLang Enterprise licenses enable $(7n+\text{solver})$ concurrent variations
 - For Example, 1 optiSLang Enterprise + 1 Mechanical Enterprise = 8 concurrent Mechanical variations
- supports all Ansys solver which support concurrent parametric variations
- Compatible with:
 - Workbench projects
 - AEDT projects
 - DCS projects
 - optiSLang Batch/Bash calls
 - Plugin nodes

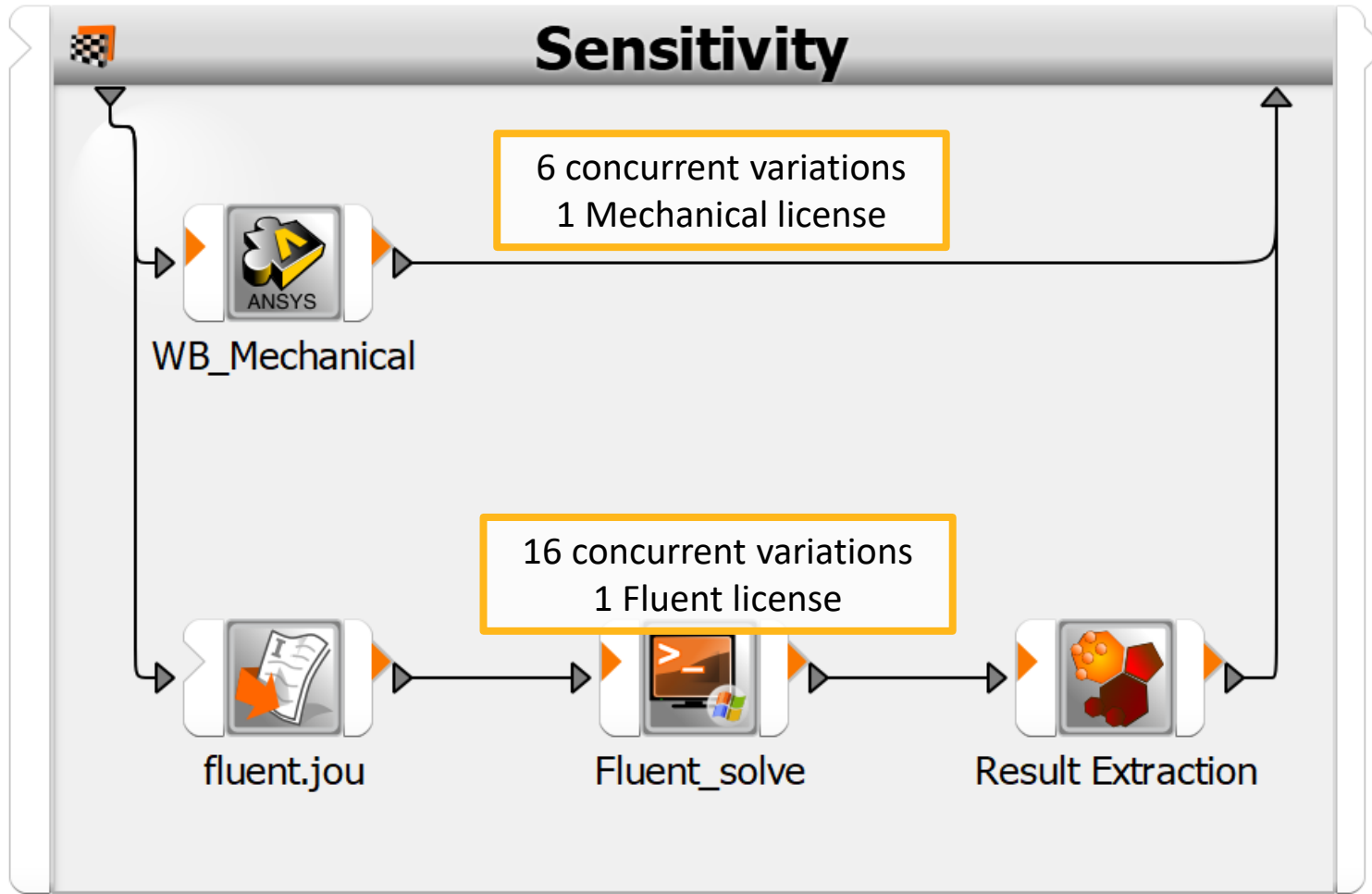
optiSLang Licenses	Premium Concurrent variations *with one solver in workflow	Enterprise Concurrent variations *with one solver in workflow
1	4	8
2	7	15
3	10	22
4	13	29
5	16	36

The screenshot shows the 'Project Checkout Behavior' dialog box. It has three main sections: 'Select the license edition and count:' with a dropdown menu set to 'Enterprise' and a small icon; 'Batch Run Behavior:' with a dropdown menu set to 'Continue, with what is available'; and a 'Summary:' section at the bottom which reads: 'While consuming 3 license increments of the optiSLang Enterprise feature, this project provides 22 concurrent parametric design point variations.'

Control the number of optiSLang licenses used to enable design point variations

Concurrent design point variations

Example: 3 optiSLang Enterprise licenses enable 22 concurrent variations



SKUs Required

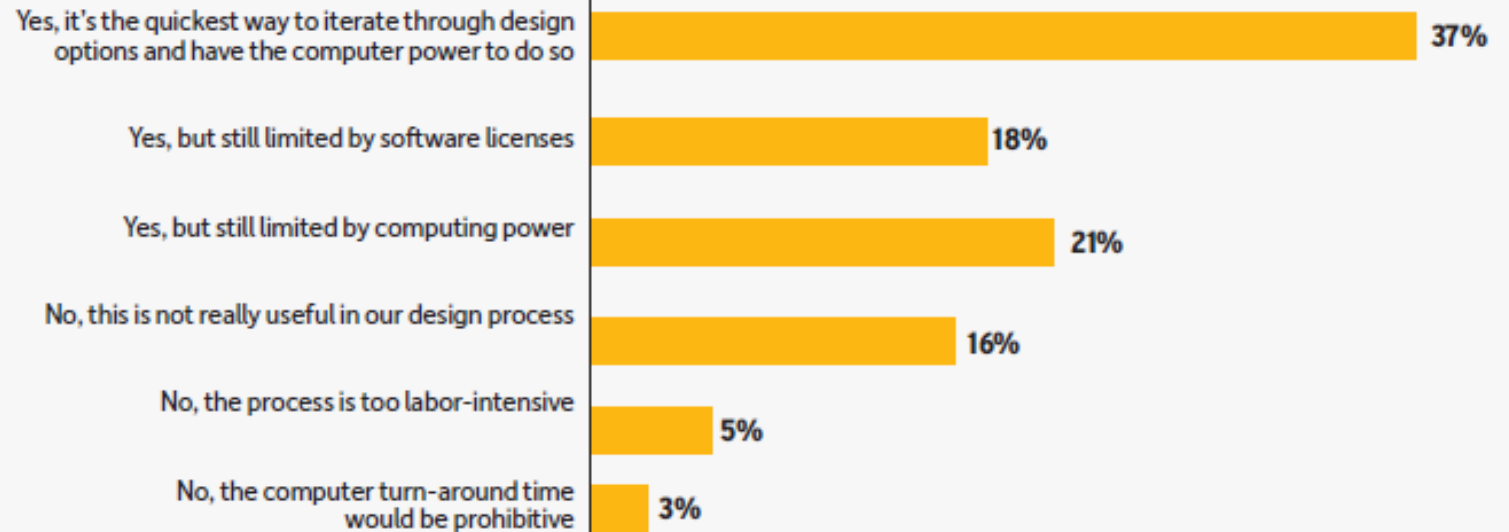
1 CFD
1 Mechanical
3 optiSLang Enterprise

- Each solver can run on 4 cores before additional HPC licenses are required
- After the optiSLang pool of variations is consumed additional HPC-based variations or solver licenses can be used for concurrent variations

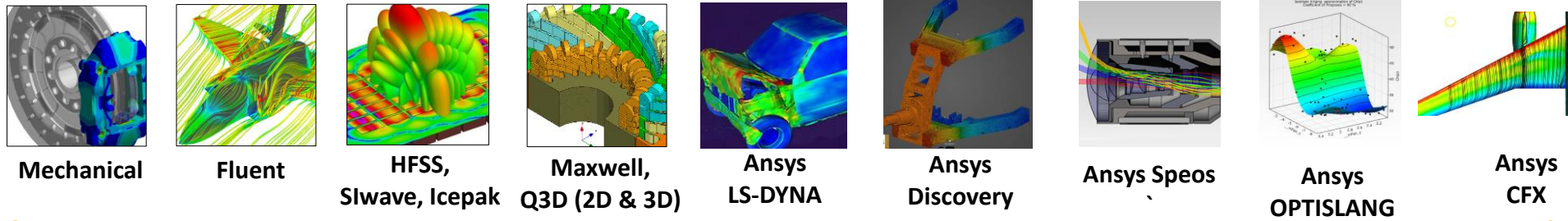
Are you ready for parametric studies?

- 37% of all ANSYS user perform design studies
- 21/18% would like, but feel limitation in licenses and computing power
 - License limitation we address with our new optiSLang inbuild design point variants in Premium/Enterprise
 - Compute power limitations we address with optiSLang at Ansys Cloud.

Do you consider parametric variations of design variables when you perform



ANSYS Cloud – “HPC as easy as it should be”



HPC Optimized

- Better Price/Performance up to **960 cores**
- Increased flexibility for flagship solvers
- New Ansys Electronics Desktop (AEDT) **Configurations and Optimization performance/cost ratio**

In Browser Interactive

- Supporting **Nvidia GPU**
- Up to **120 cores**

New simplified pricing

- **Ansys Elastic Currency**
- **Ansys Managed Hardware Solution**

New Products

- **SPEOS** in the Cloud : More Speed & Flexibility, **Up to 60X** faster than local computing
- **DISCOVERY** in the Cloud : Bring **more Physics in Browser**



BENEFITS :

- ✓ **Solve in the cloud** directly from the desktop application
- ✓ **Highly optimized** for Ansys solvers
- ✓ **Single** vendor solution for Software and Hardware
- ✓ **Nine** data centers worldwide
- ✓ Data **localized** and **secured**

Compute Nodes

- **High memory** bandwidth
- **Large capacity** RAM
- **High performance** interconnect
 - Low latency **Message Passing Interface (MPI)**
 - **High Bandwidth**
- **Faster** working directory

/ Mission of Ansys optiSLang product line

Enable customer to **unlimited** sensitivity analysis, design optimization, parameter calibration, uncertainty quantification and robust design optimization.

Parametric design studies, easy to use (wizard driven) and **safe to use** (automatic selection of suitable algorithms) **guarantees** (continue crashed session, metamodel of optimal forecast quality) the **maximal customer value out of parametric design studies.**

Ansys optiSLang tool chaining and simulation workflow building integrates all simulation tools (Ansys and 3rd party)

Parametric simulation workflows can be automated and published to web apps, enabling our customer **large time and cost savings** as well as **democratizing of parametric design studies and metamodeling**

In build solver variations and cloud support enables user to scale parametric design studies

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