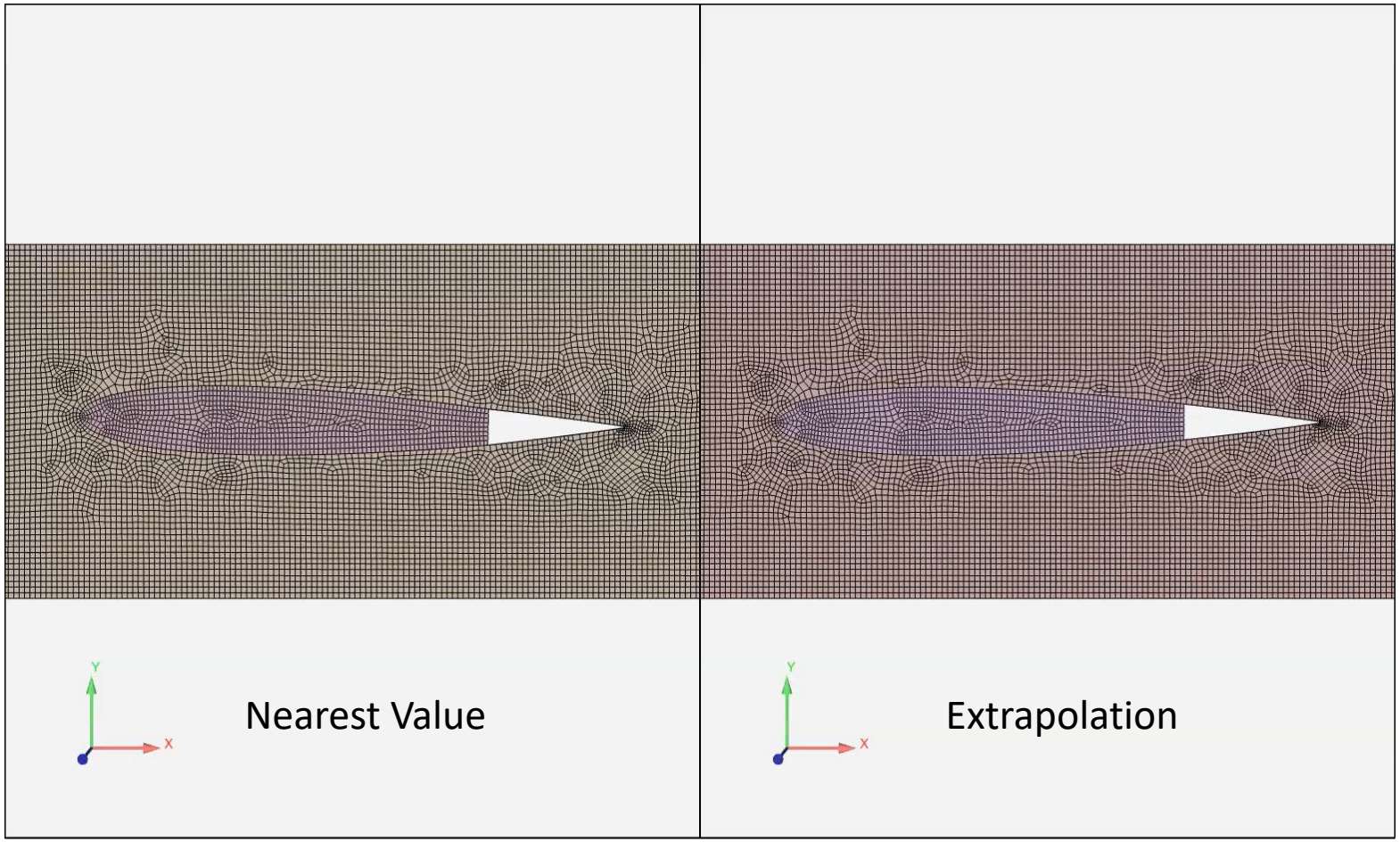
Release 2022 R1 Highlights
System Coupling

Contents

- Non-Overlap Mapping for Motion on FSI interfaces
- Performance Improvements
- Miscellaneous Enhancements
- Participant Library
- Geometry Instancing (BETA)

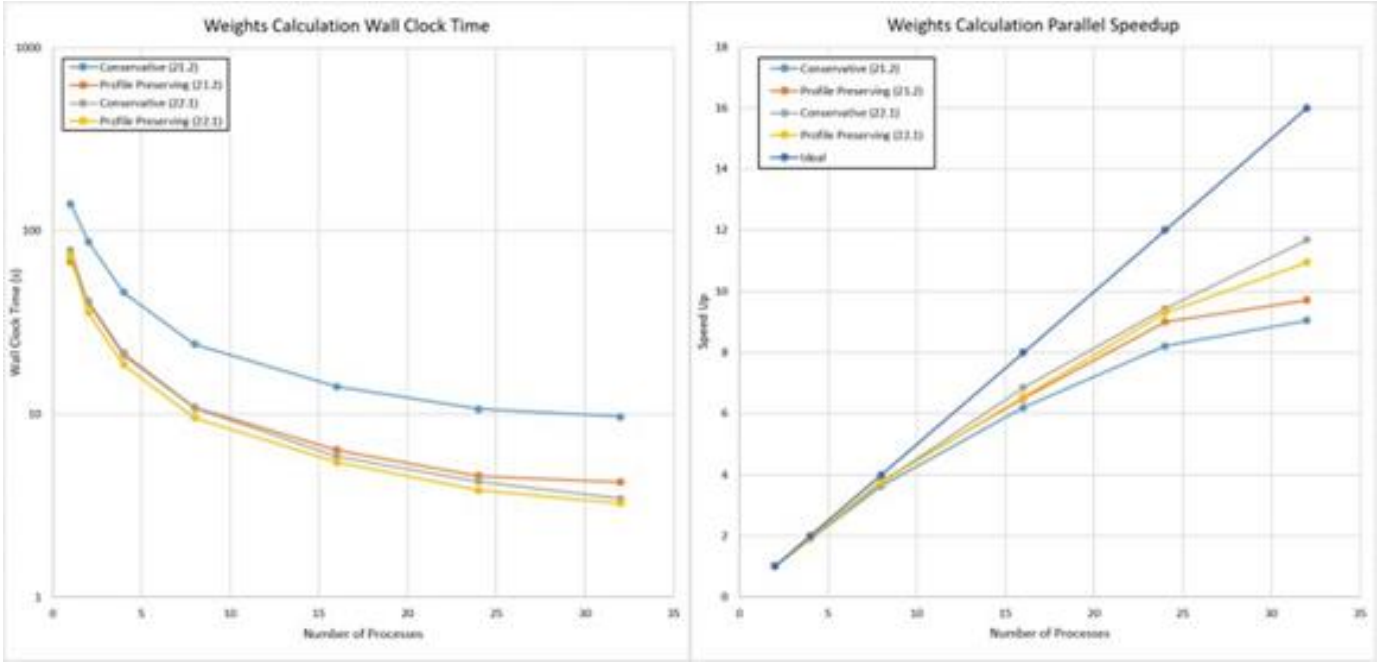
New Extrapolation Method Improves Mapping Non-Overlap Regions

- New "Extrapolation" method uses a novel procedure to provide a smoother and more realistic data profile on non-overlapping portions of a target surface than the existing "Nearest Value" algorithm
- Available for any profile-preserving data transfers on surfaces



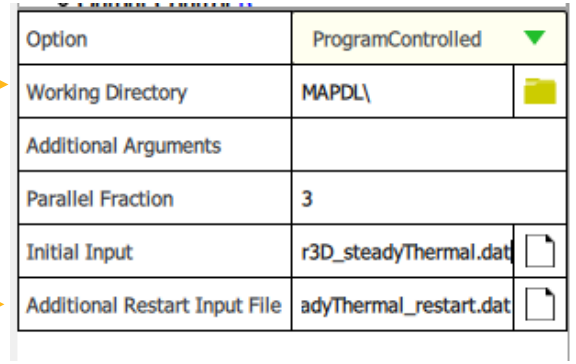
Mapping Improvements for Faster Co-Simulation with Less Memory

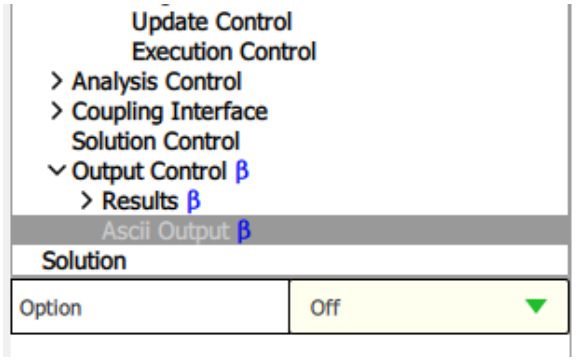
- Parallel improvements for surface-to-surface mapping
- Run-time performance improvements for surface-to-volume mapping
- ~30% memory reduction for surface-to-volume mapping
- ~1.15-2.2x speedup for weights calculations
- ~1.5-20x speedup for interpolation

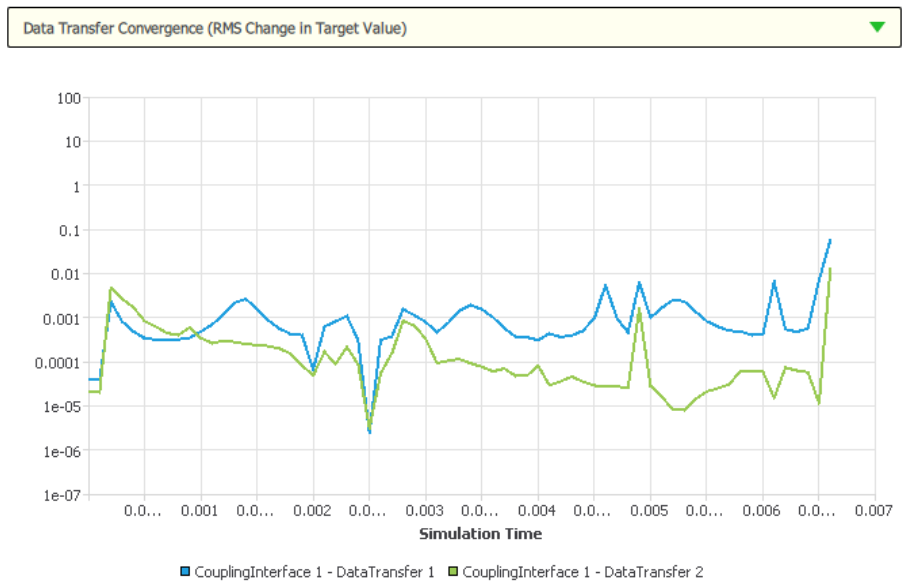


Enhancements for Improved User Experience

- Automated replacement of absolute paths with relative paths
- User specified solver input files for restarts
- New Chart view: Simulation Time on x-axis
- Beta: Ascii Output expert settings now available (as Beta)

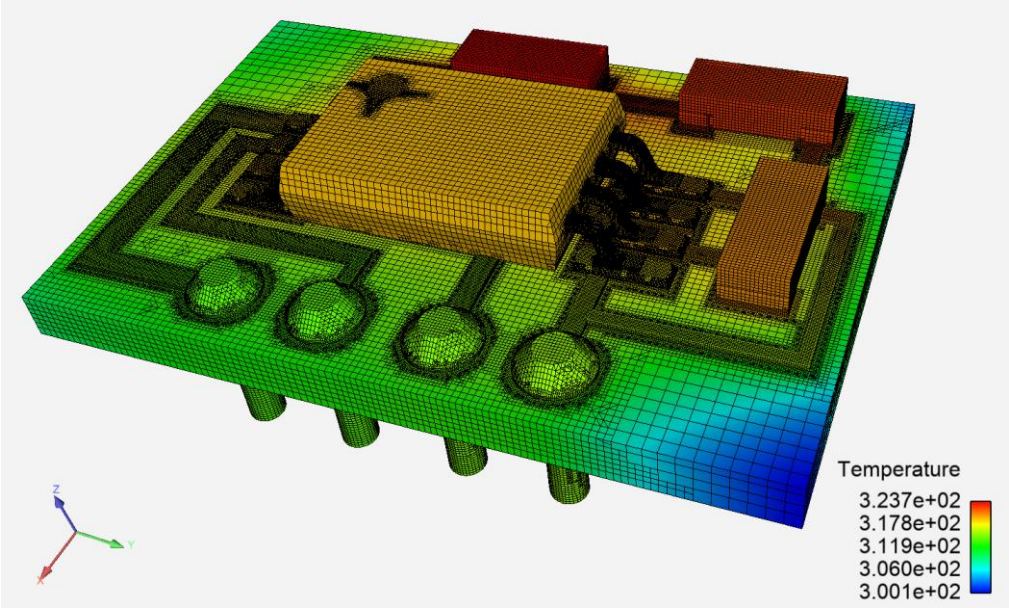






New APIs Support Volume Mesh, Complex Numbers and More

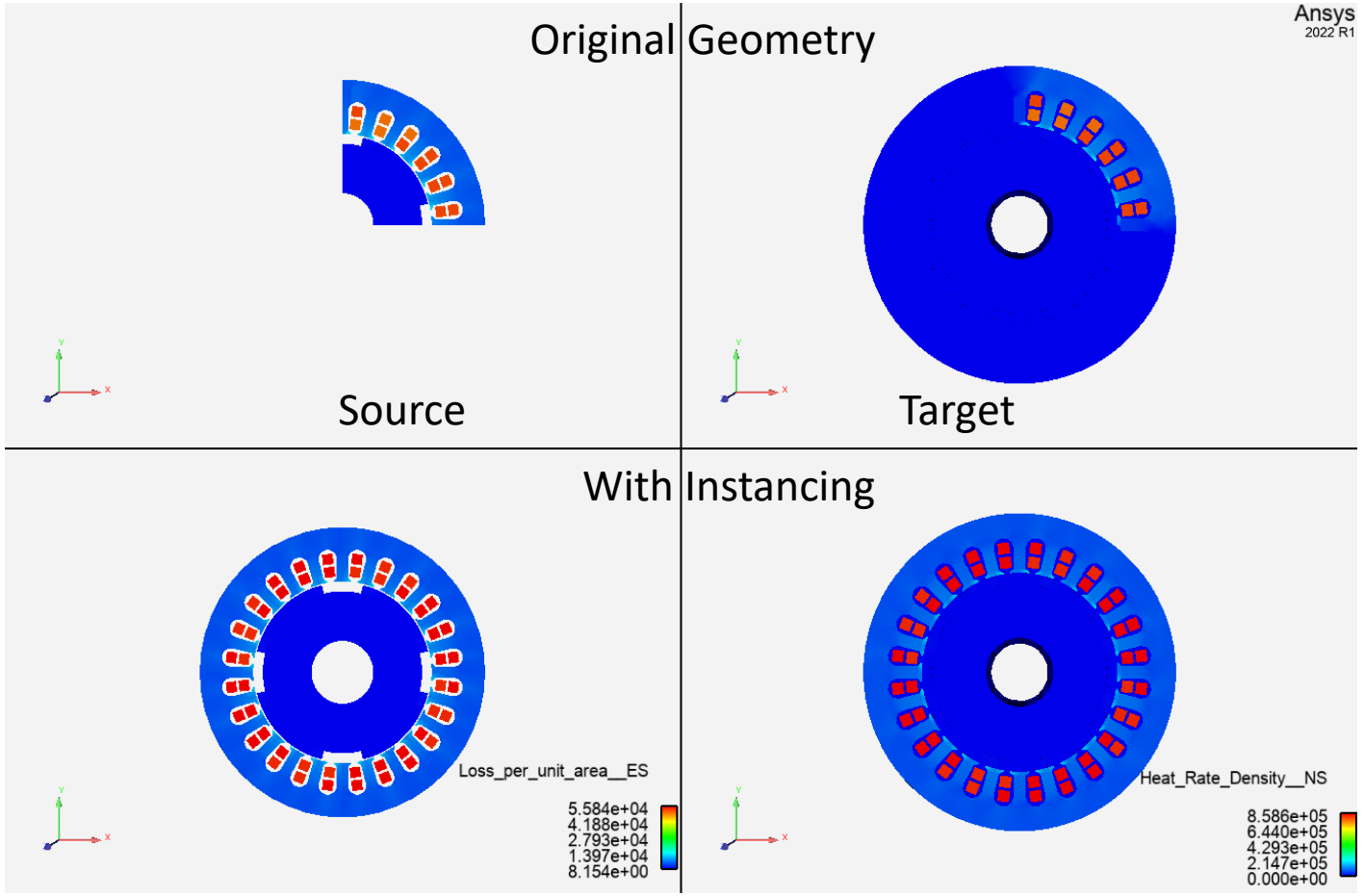
- Available with participants using new 2.0 APIs
- Volume mesh support
  - Face-based (for polyhedral elements)
  - Element-based (for high-order elements)
  - Full support for parallel processing, co-simulation & standalone mapping, shared zones, etc.
- Added support for complex solution data
  - Ex: mapping cyclic mode shapes for aero-damping
- Additional variable attributes
  - Light-weight information about the variable
  - Integer-valued; Real-valued with dimensionality
- Standalone mapping capabilities
  - Allow mapping of variables with different properties:
    - Source & target locations (nodes vs. elements)
    - Source and target, extensive vs. intensive property



Volume mesh used to map temperature

Beta: Geometry Instancing

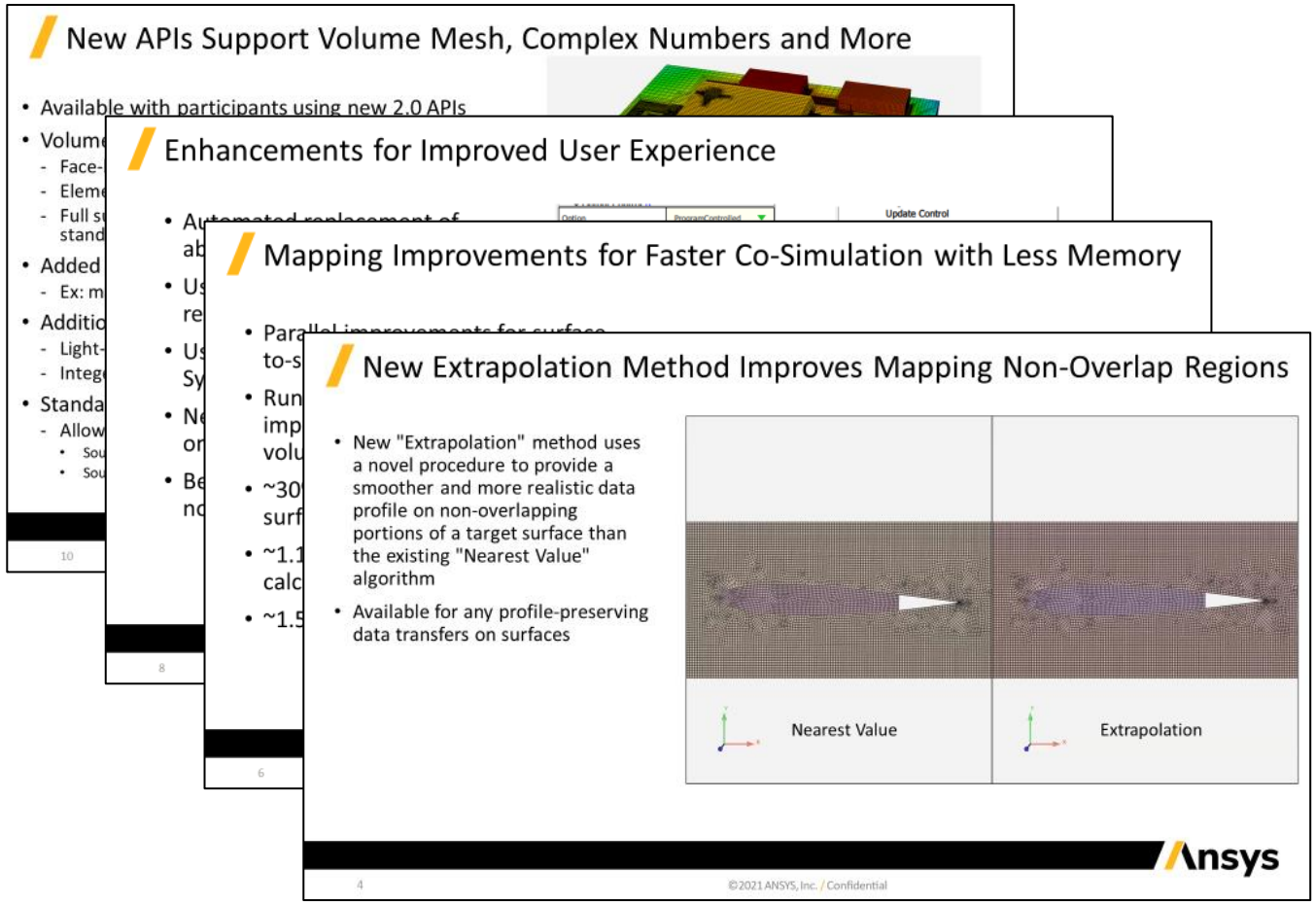
- Replicate a partial geometry to represent the full geometry for mapping
- Target applications:
  - Gas turbine (FSI)
  - Electric machines (thermal-emag)
- Applies to all existing mappings:
  - 3D-3D conservative and profile preserving mapping
  - 2D-2D conservative and profile preserving mapping
  - 2D-3D conservative mapping
  - 3D-2D profile preserving mapping



Summary

System Coupling 2022 R1 Advances Co-Simulation

- Improved non-overlap mapping
- Faster mapping and co-simulation
- Improved user experience
- New APIs for participants
- Beta: Geometry Instancing

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