FACETS: Framework Application for Core-Edge Transport Simulations

Presented by

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In collaboration with the FACETS team:

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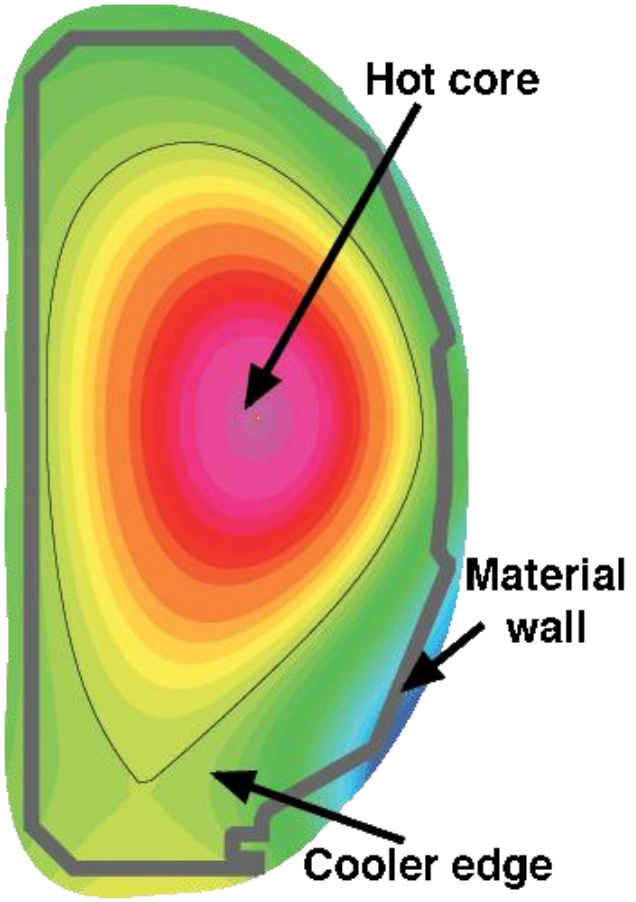
Coupled core-edge plasma simulations

- Couple tokamak plasma interior with edge and wall
- Integrate
  - Multiple simulation codes
  - In multiple regions
  - With multiple algorithms
  - Multiple time steps
  - Multiple scales
  - Diverse physical effects



A simulation and software framework to support this multiscale physics effort

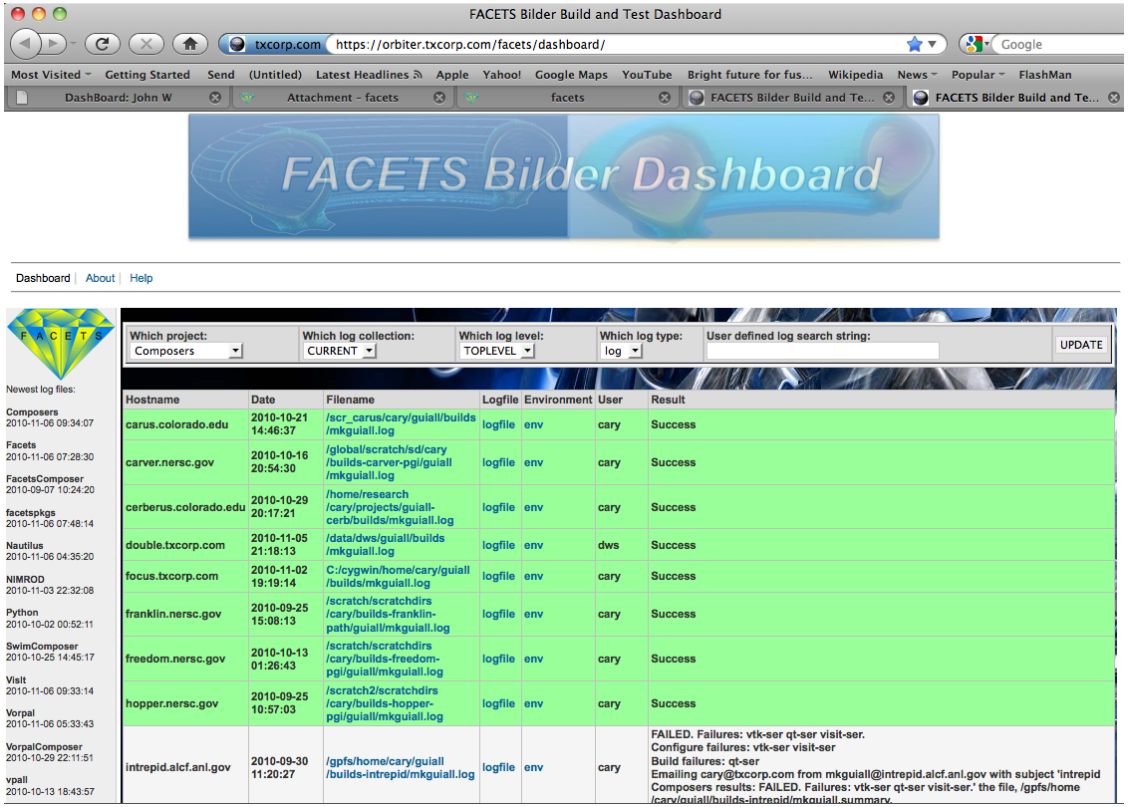
- Defined methods for grid and region coupling (surface based for speed)
- Ability to couple 1-D interior models with 2-D edge and wall models
- Ability to couple various grid schemes
- Ability to substitute fast reduced models with large grand-challenge first principles simulations, and to compare the results
- Can accommodate implicit and explicit algorithms
- Test numerical stability of multi-timescale simulation

With a nature software engineering approach

- Advanced tool chain deployable from laptop to LCFs
- Nightly build integrity testing (moving toward continuous integration)
- Regression testing and unit testing integrated into nightly build tests
- Periodic performance testing (performance regression)
- Bilder: Advanced build configuration tool to enable detection and deployment on a wide range of platforms

Build dashboard

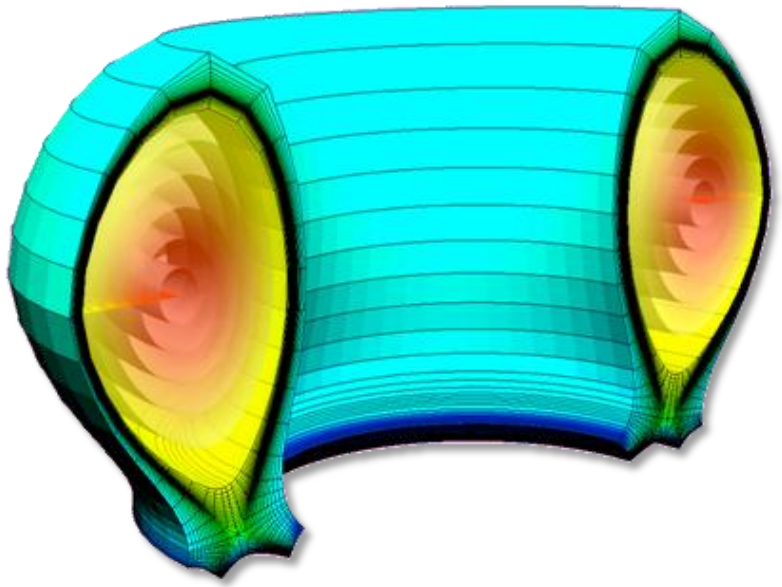
Simplify multiple daily build success/error messages for a large number of test platforms



Powered by TechX Orbiter Technology

FACETS Vizschema

- Defined visualization file format for plasma simulations
- HDF5 based
- Available viewers for matplotlib and VisIt
- SVN available at <https://ice.txcorp.com/code/vizschema/trunk>



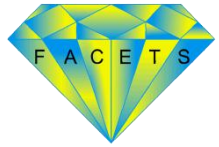
Composer: A develop environment for multiscale plasma simulations

Composer = Setup + Run + Output + Visualize + Help

FACETS Composer is a set of interfaces (scripting and graphical) that aims to make setting up and executing components with frameworks like FACETS easier, while at the same time assist users in visualizing results from remote runs. The code is based on technologies such as Python, Qt C++ Graphical User Interface toolkit, Shell Scripts, and Secure Shell connections

FACETS collaboration team

Contact



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