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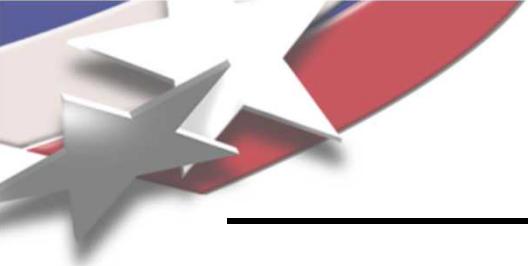
*Computational Modeling Sciences Department*

# Metrics and Geometry

Brett Clark

16<sup>th</sup> International Meshing Roundtable  
External Review

October 2007



# Metrics

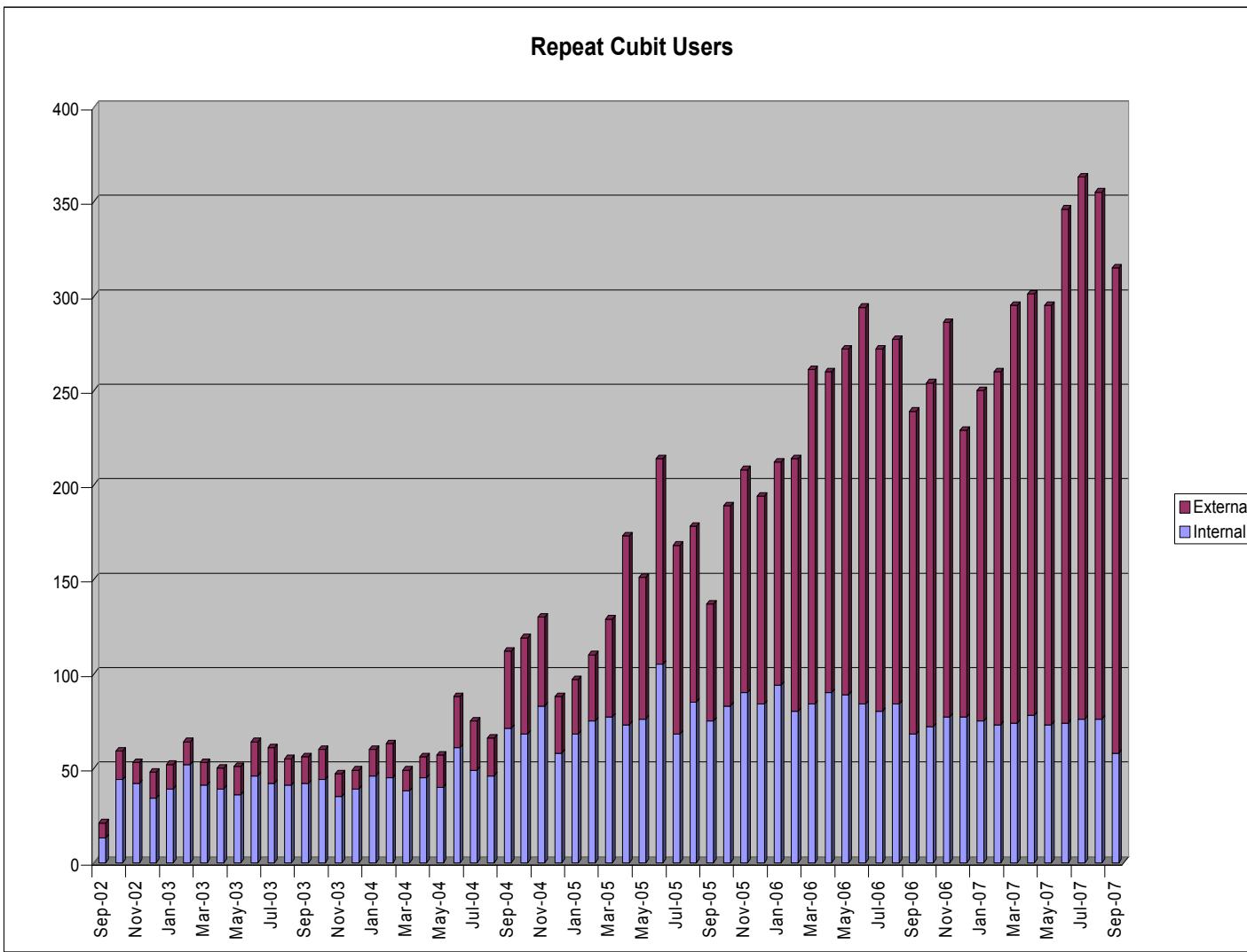
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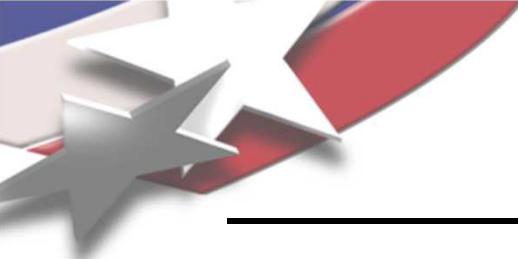
- **Number of repeat users**
  - ~60 Internal to Sandia (also tracked by center)
  - ~250 External to Sandia
- **Nightly build and testing stability on Linux, Linux64, Windows, Mac, (SUN, SGI)**
- **User and tester found bugs**
- **Fixed bugs**

# Metrics

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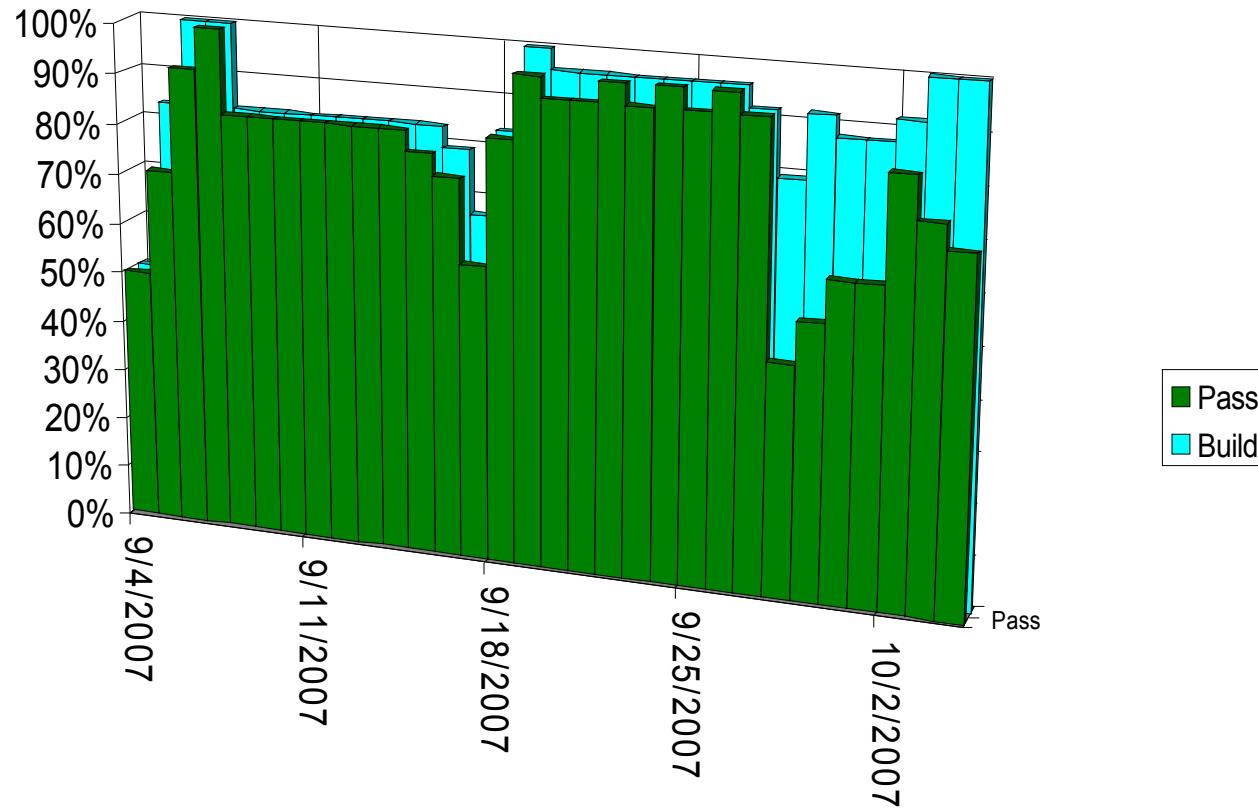
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# Metrics

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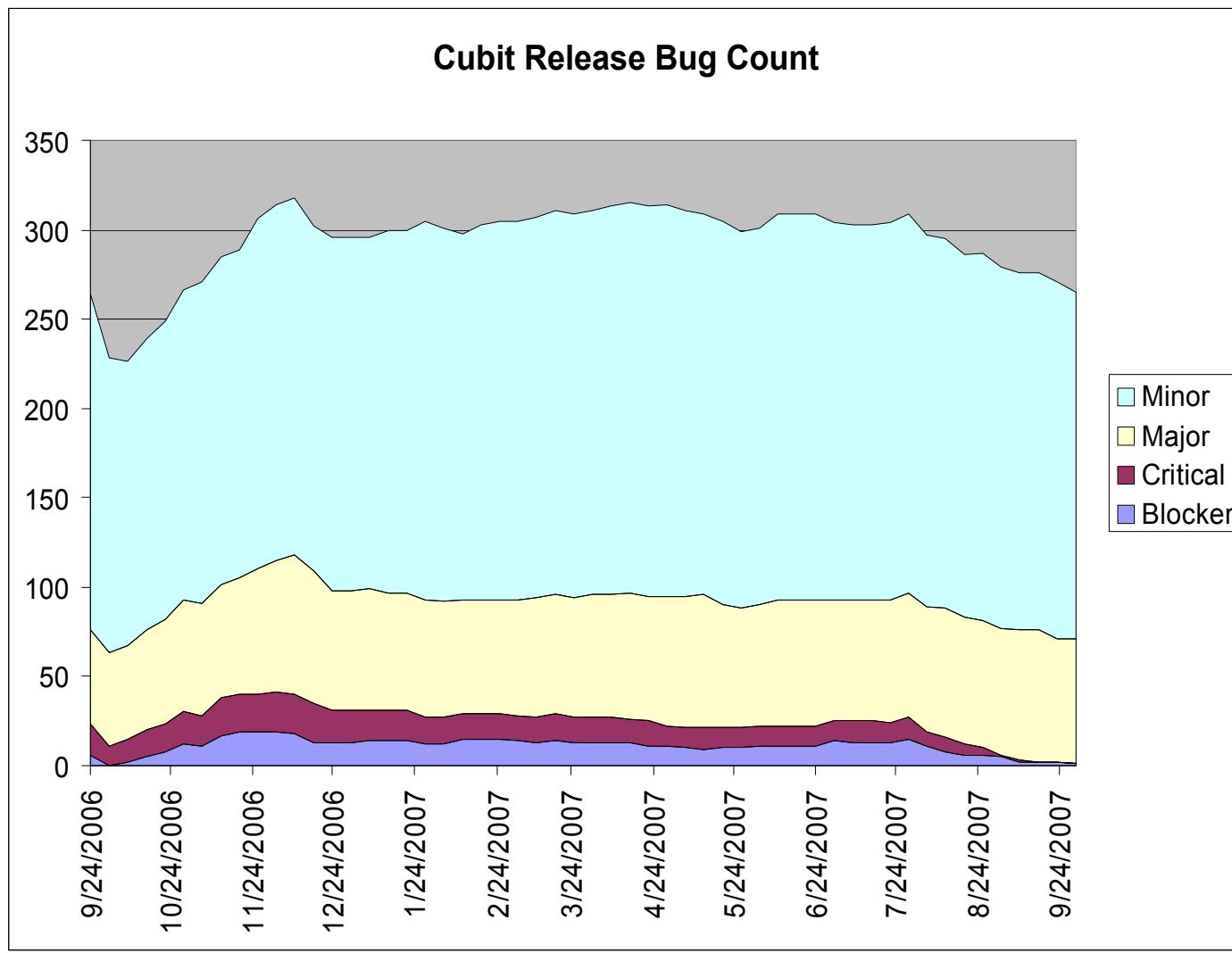
## Nightly Tests



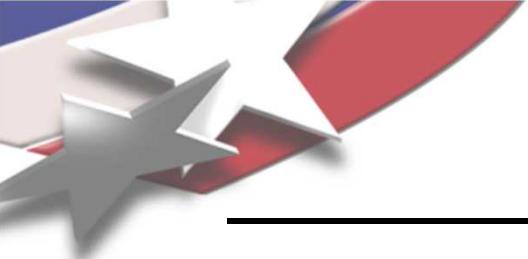
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# Metrics

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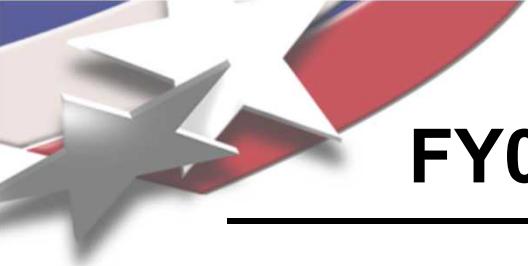


# Recent Geometry Work

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- **Core Functionality in CUBIT**
  - Interoperability between virtual and real operations
    - **Can do ~90% of real operations on volumes containing composites**
  - New operators
    - **Remove Topology process**
- **Automation**
  - Split out narrow regions in surfaces
  - Remove small curves/surfaces from models
  - Determine potential decompositions
  - Detect potential source/target strategies for sweeping
  - Apply composites to force sweepable topology
- **Presentation**
  - ITEM GUI
    - **Diagnostic/Solution Paradigm with packaged solutions**

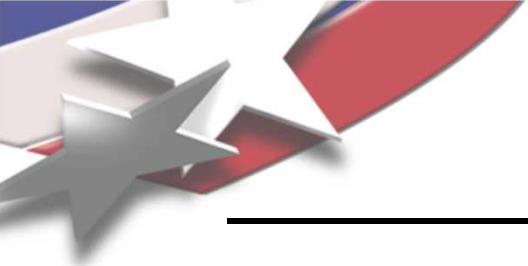


# FY08 Plans for Geometry Work

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- **“Geometry Tolerant Meshing” (ASC L2 Milestone)**
  - Provide diagnostics, visualization, and solutions for fixing common assembly related problems (misaligned volumes, unstitched surface assemblies, ...)
    - **Is automated imprint/merge possible on sloppy geometry?**
  - Transform CUBIT’s “geometry-centric” infrastructure to support more flexible mesh owner paradigms
    - **Would result in many “mesh-centric” capabilities**
    - **Would support geometry tolerant meshes**
  - Geometry tolerant surface tri mesher
    - **“push-button” tet meshing on sloppy geometry**



# Open Issues

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- **Should we continue to focus on making the solid model “pristine” for meshing or focus efforts on making the meshers more tolerant?**
- **Is there a needed definition of “Topology for Meshing” that can be derived from BRep models?**
  - Is this too mesh algorithm dependant?
- **Do/will robust facet Booleans exist?**
  - Is this a worthy pursuit?