

Metrics and Geometry

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16th International Meshing Roundtable

External Review

October 2007



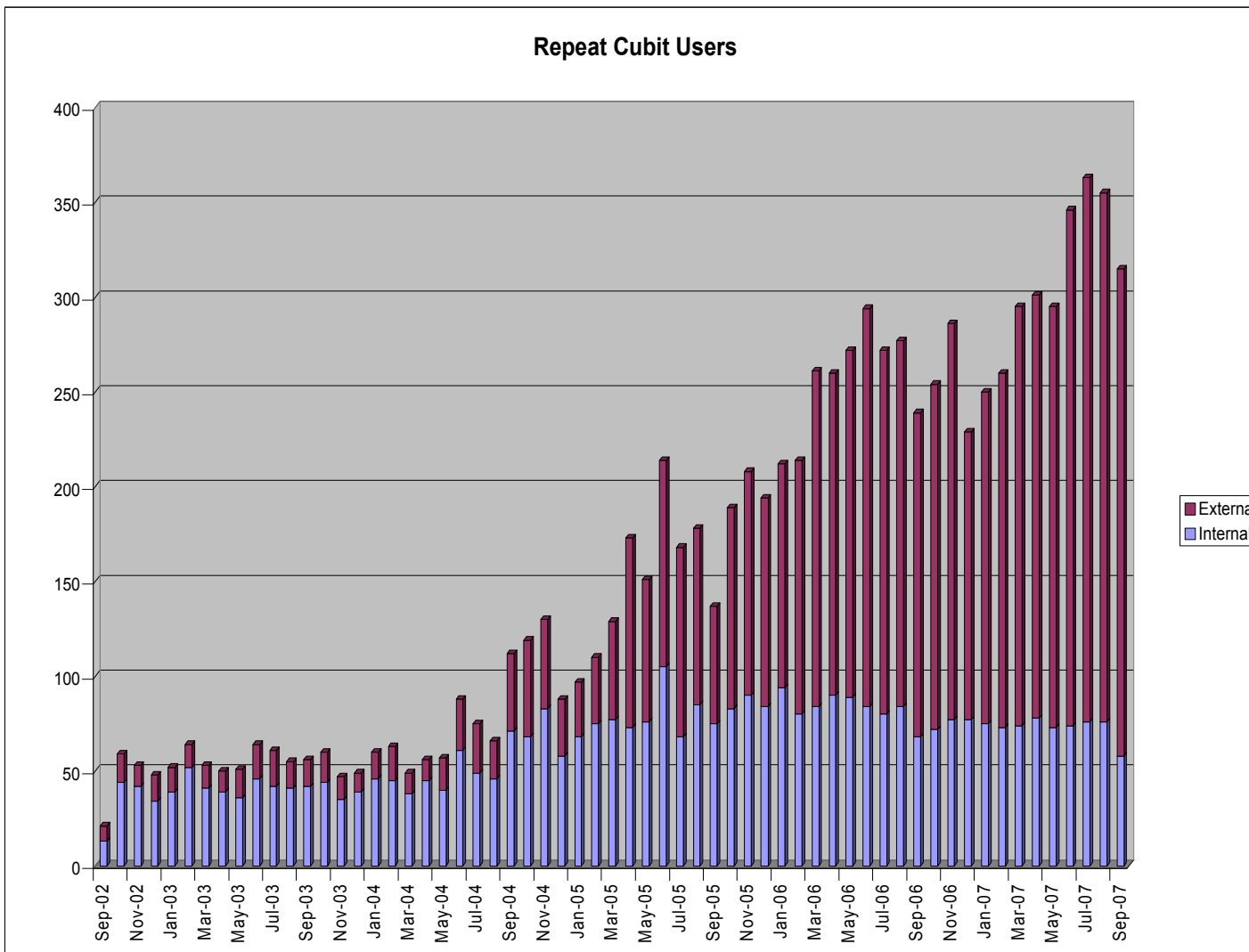
Metrics

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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

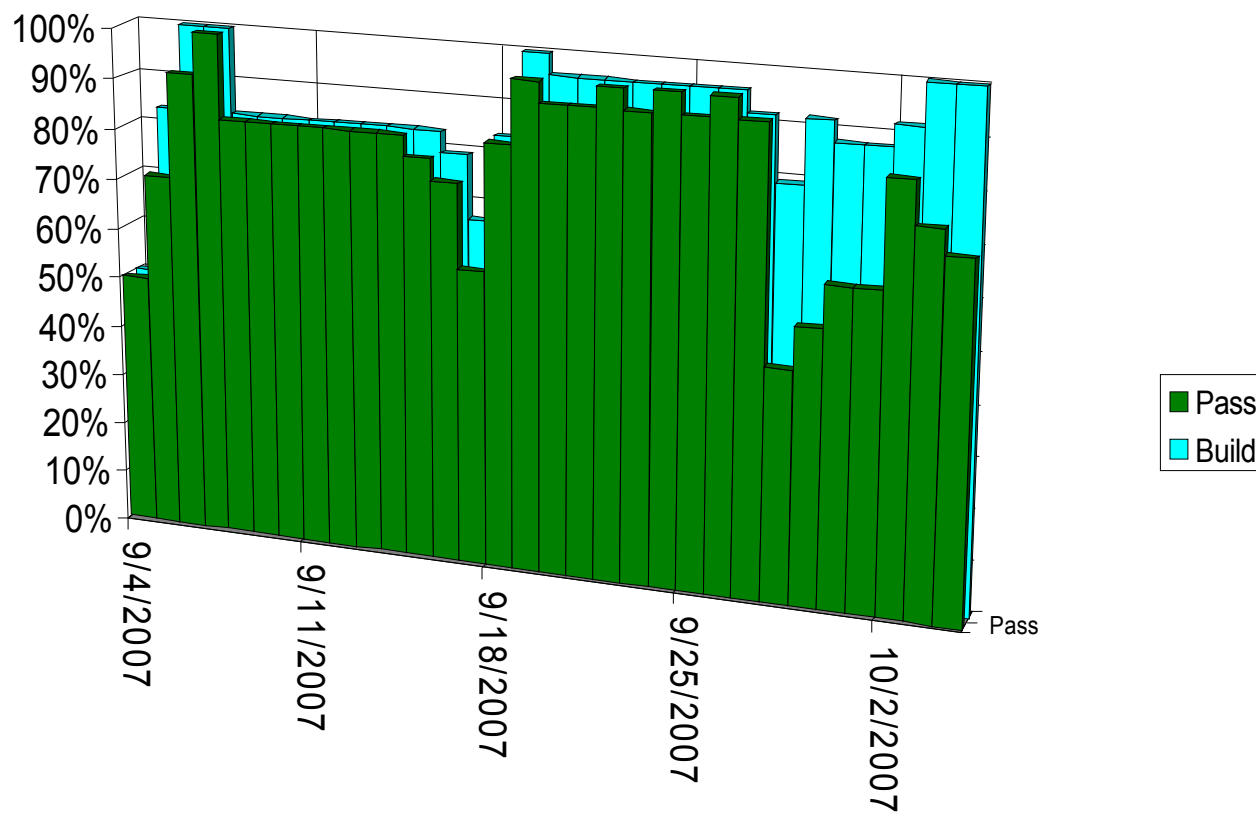
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Metrics

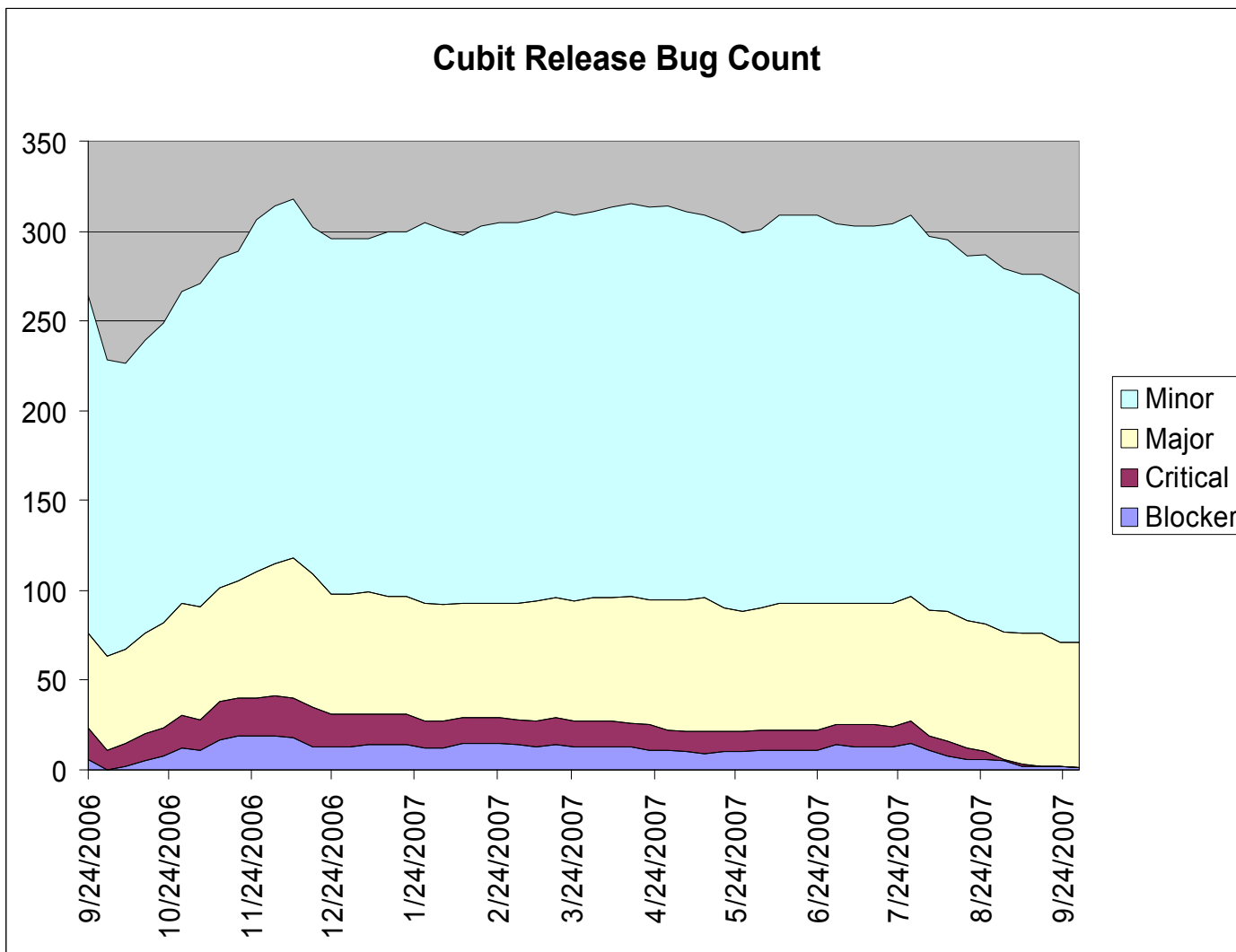
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Nightly Tests



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?