



# Bellerophon

OAK RIDGE NATIONAL LABORATORY

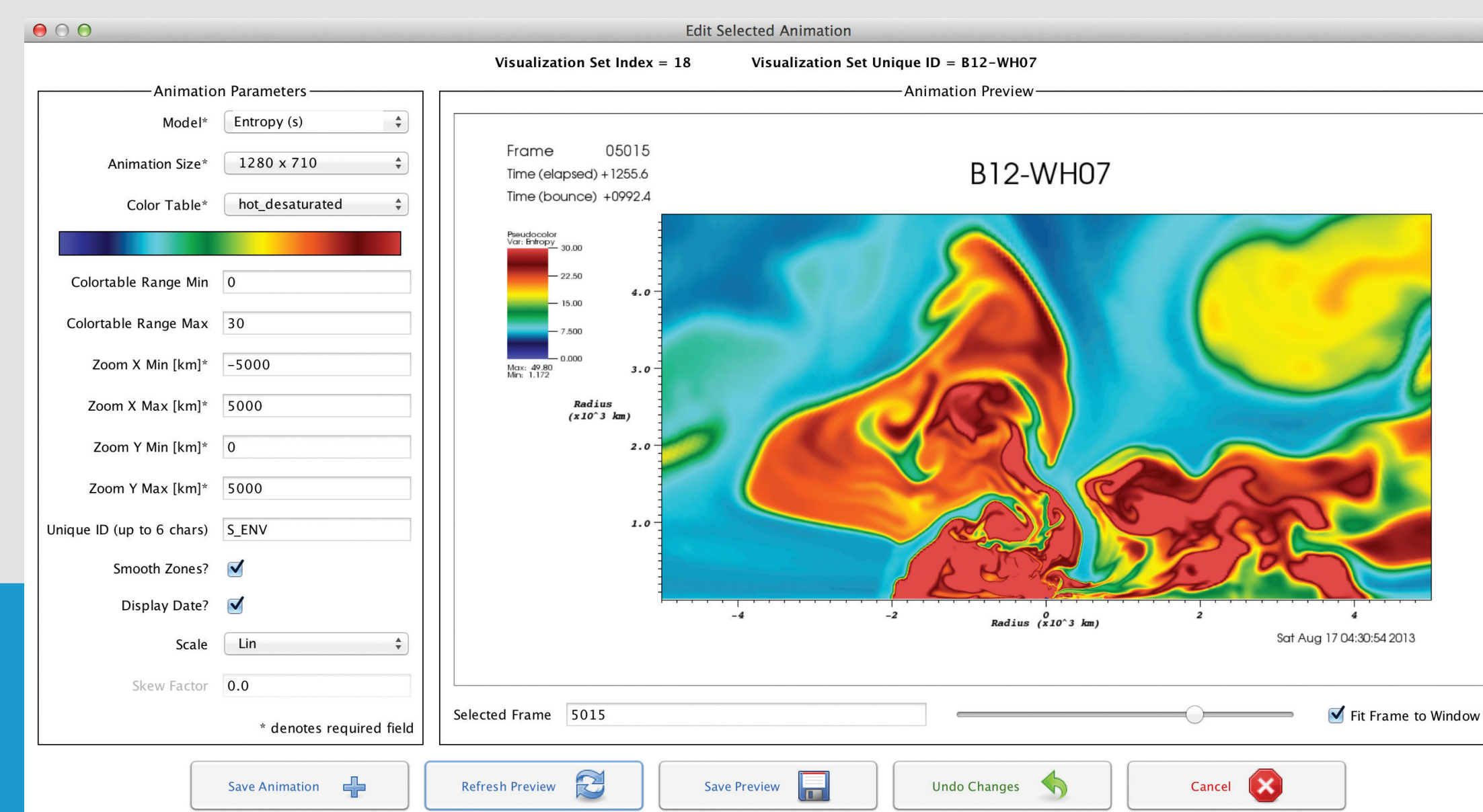
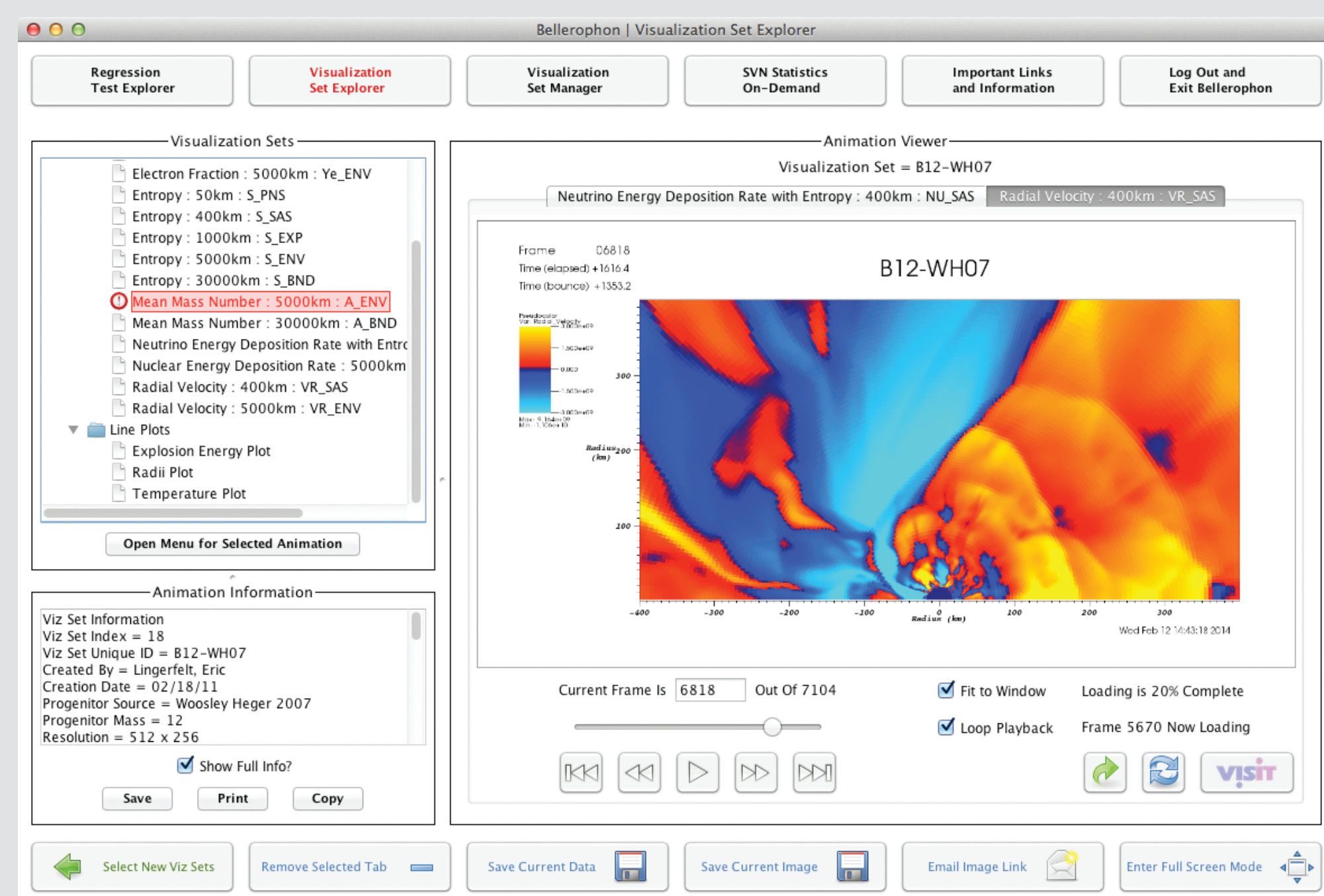
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## A Computational Workflow Environment for Real-time Analysis, Artifact Management, and Regression Testing of Core-Collapse Supernova Simulations

### Real-time Data Analysis

- Robustly access and customize 2D color map and line plot animations within seconds
- View animations with VCR-like controls with the **Animation Viewer**
- Robustly export data, animations, and other artifacts
- Monitor simulation progress and physical time

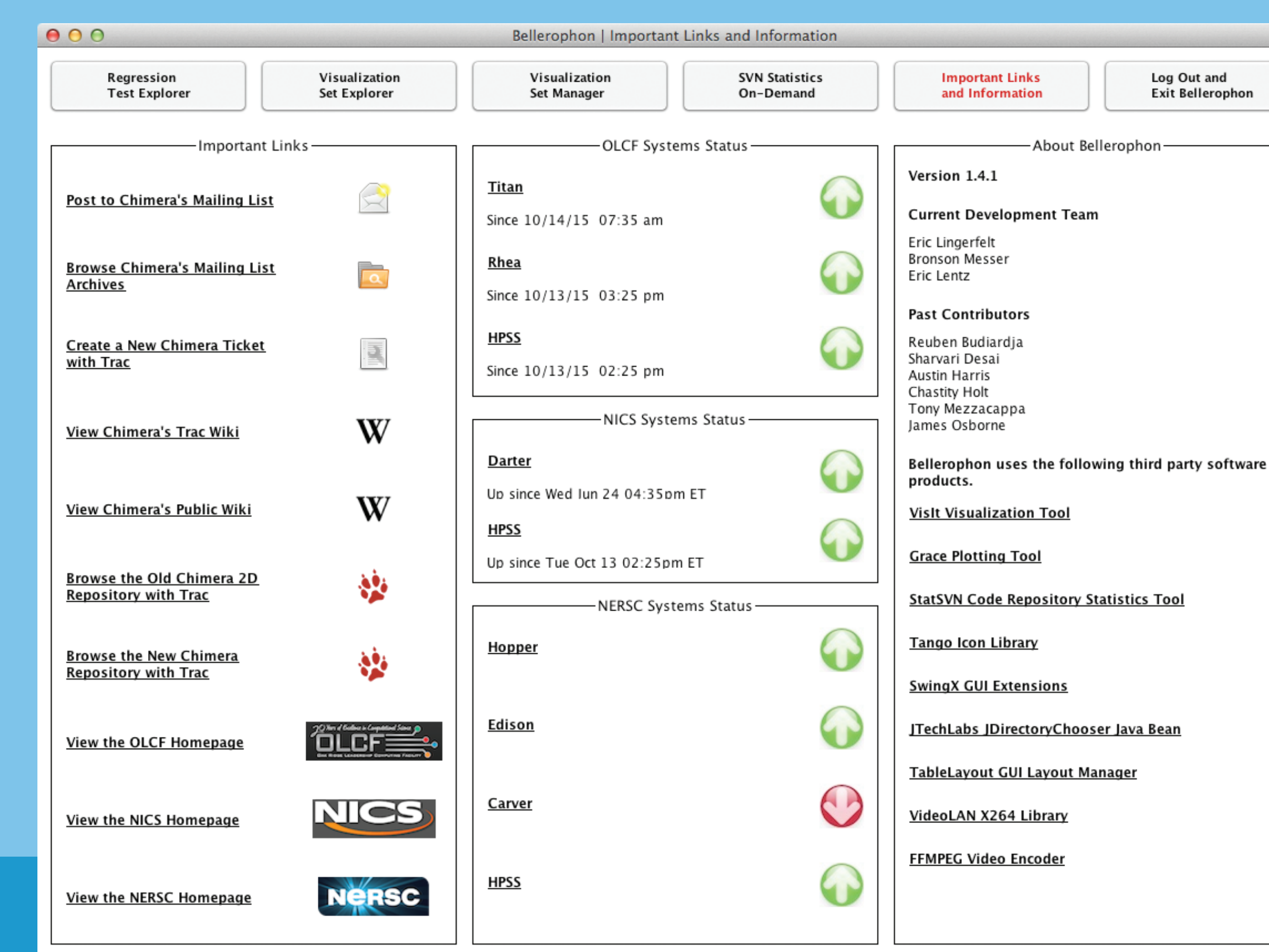


### Simulation Artifact Management

- All data files, metadata, and renderings are tracked in a database
- >110k data files, >850k PNGs, ~850 animations, and >2,200 regression tests
- Metadata includes job id, wall times, user names, dates, etc.

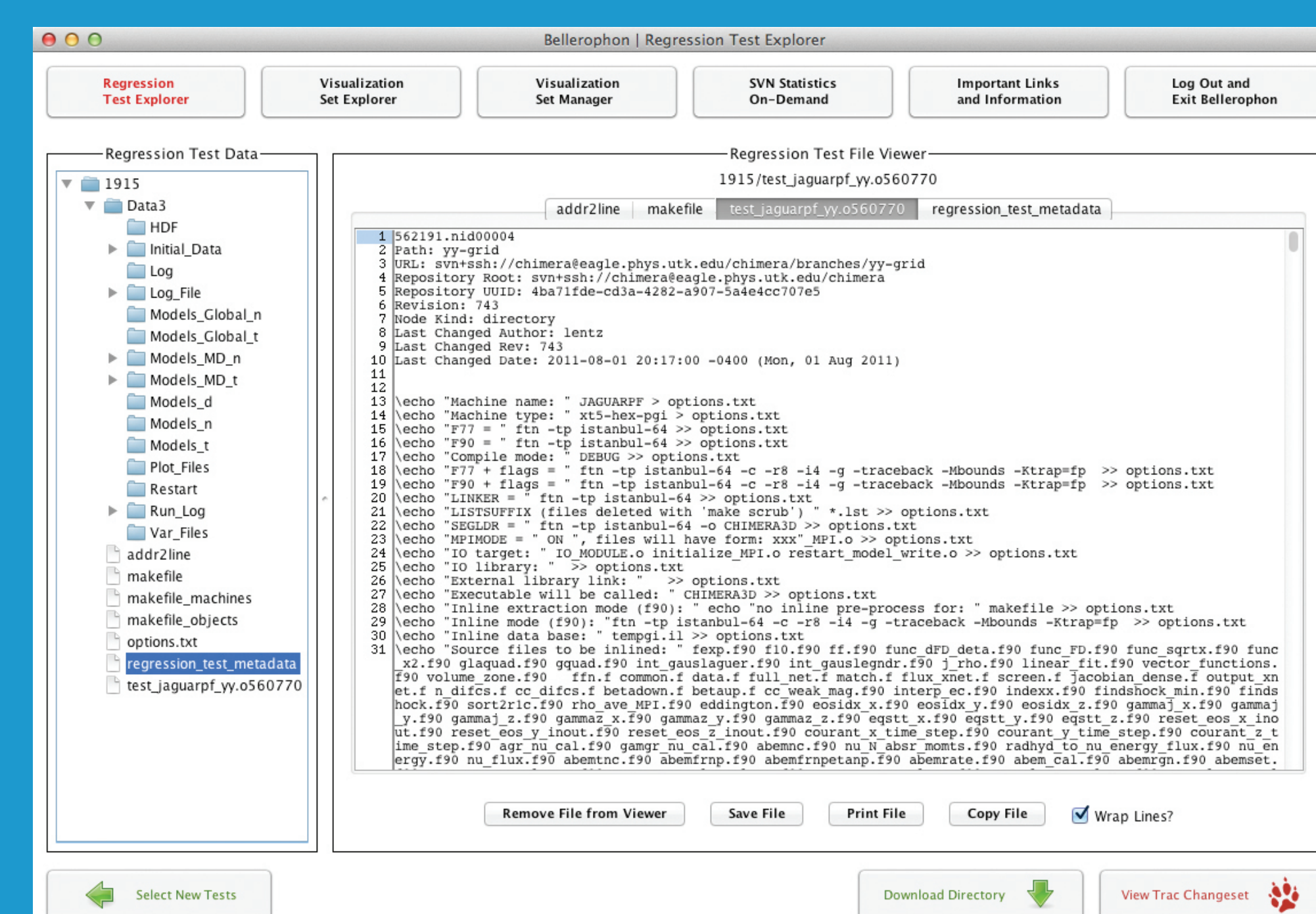
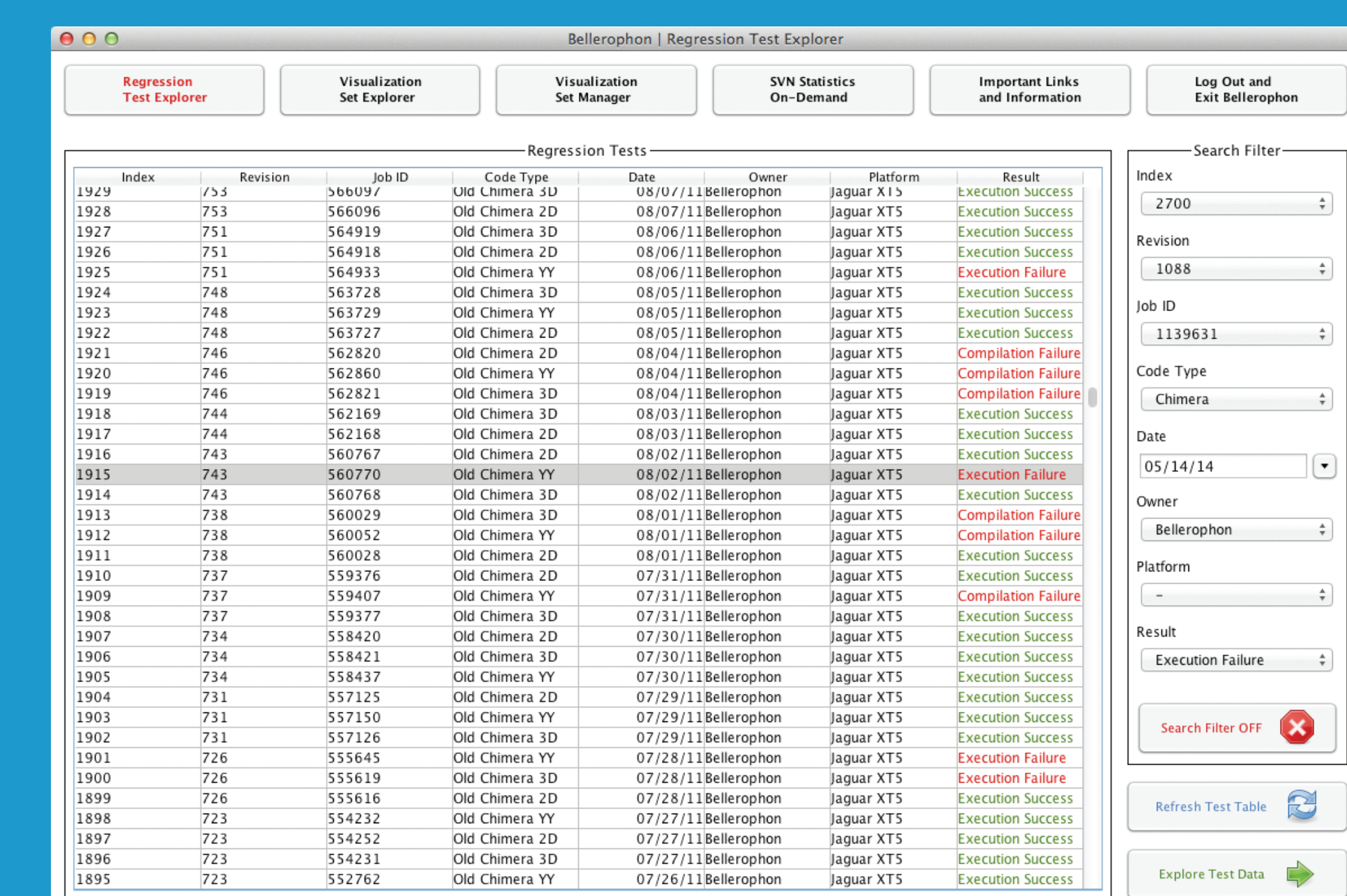
### Scientific Workflow Management and Tool Integration

- Generate SVN repository statistics over a custom date and/or revision range
- Monitor real-time status updates of OLCF, NICS, and NERSC resources
- Integration with SVN, Trac, Visit, Grace, and Mailman
- Consolidation of important links for developers/users

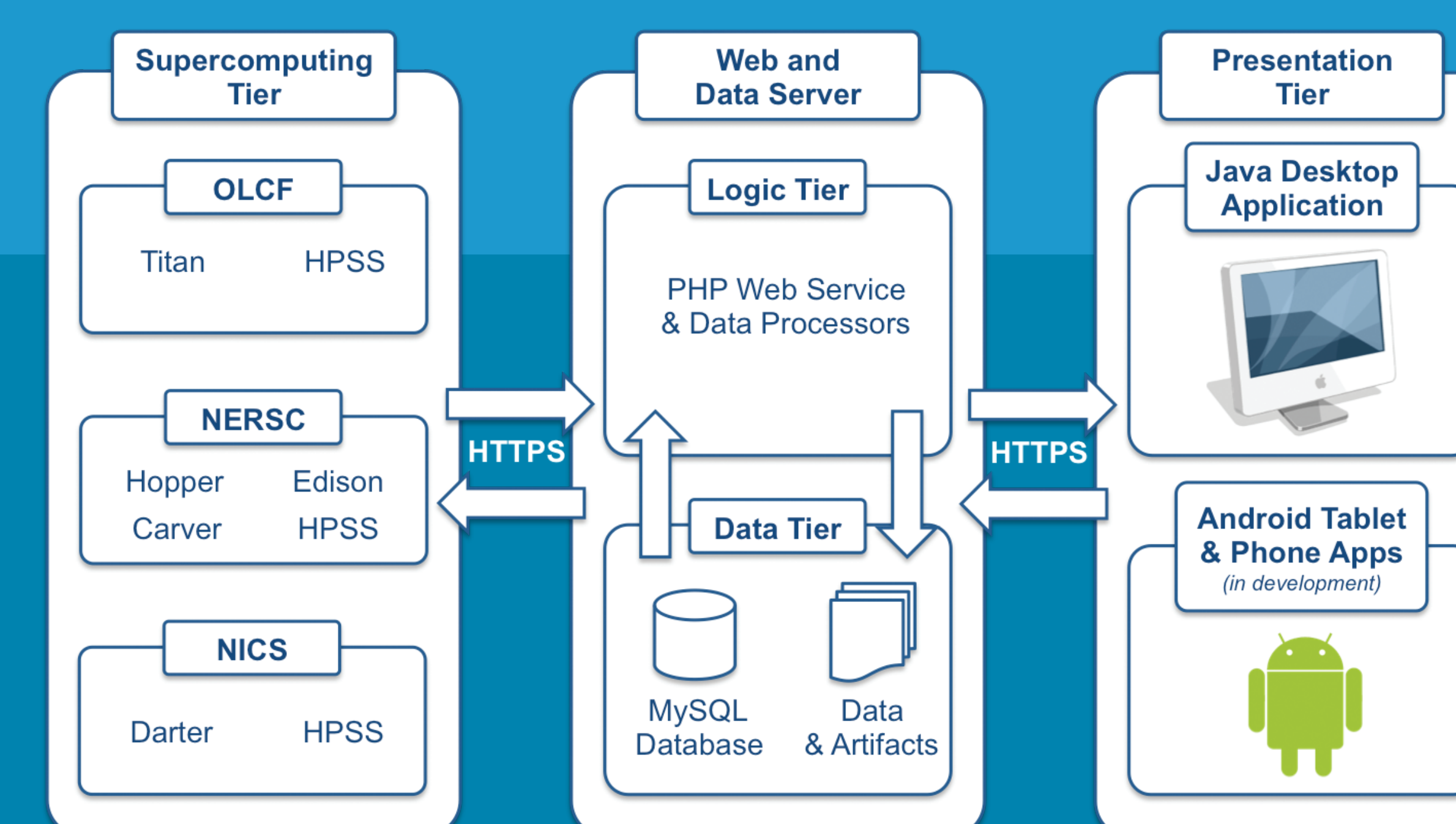


### Software Engineering Tasks

- Automated regression test framework
- Check out, compile, and execute latest revision on a supercomputing resource
- Automated "Blame" email with hyperlinked stack trace
- Access and export full test results with the **Regression Test Explorer**

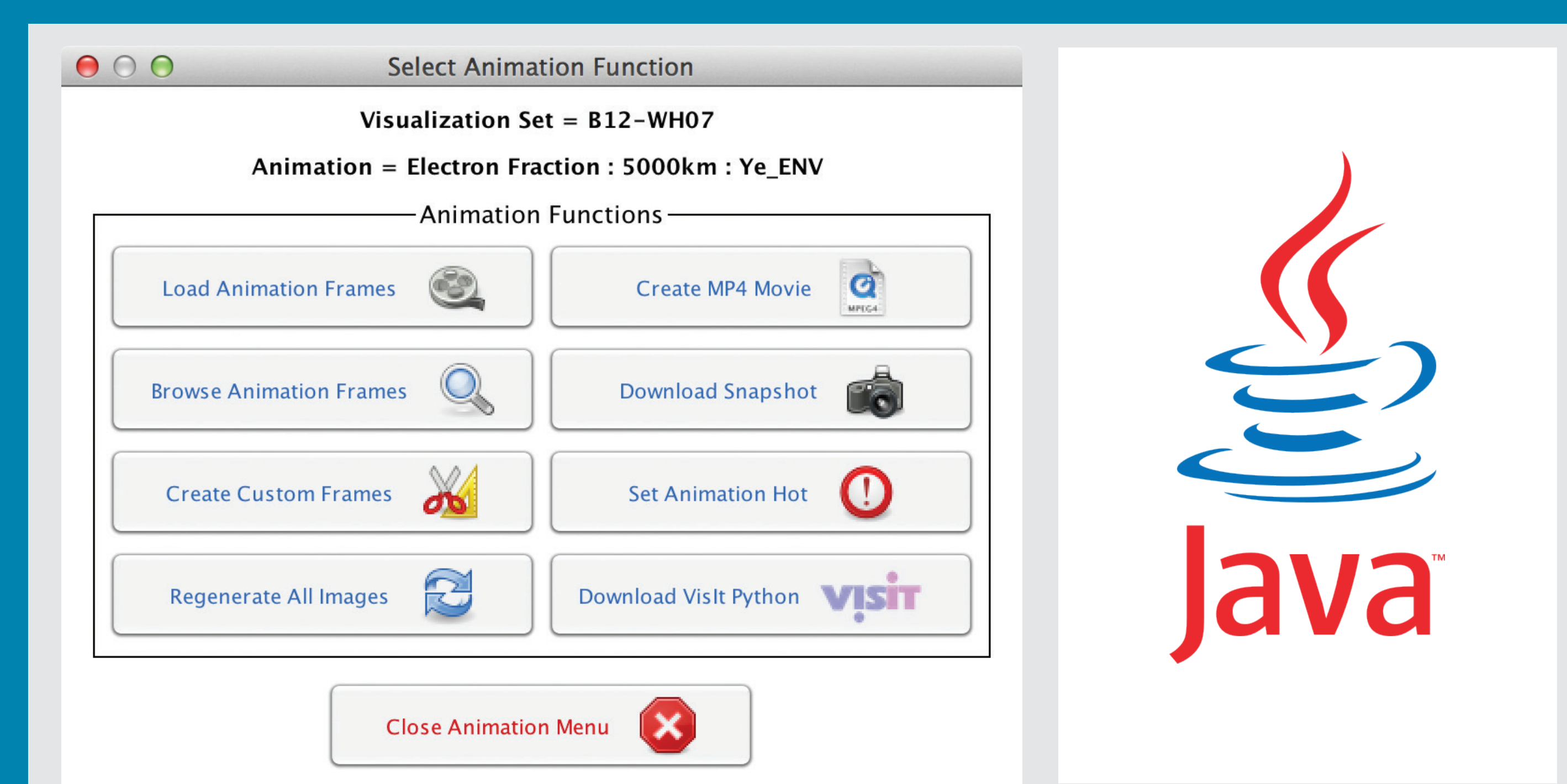


### Multi-tier Architecture includes Supercomputing Resources



### User Interface Design and Deployment

- Cross-platform, digitally signed Java application
- Web-deliverable installation / automatic updates with Java WebStart
- Dashboard / WYSIWYG UI design
- Intuitive use of icons, text, and color for components



### Publications

- E. J. Lingerfelt, O. E. B. Messer, S. S. Desai, C. A. Holt, E. J. Lentz. "Near Real-time Data Analysis of Core-Collapse Supernova Simulations With Bellerophon", International Conference on Computational Science 2014, Procedia Computer Science, Vol. 29, Pages 1504-1514, 2014.
- E. J. Lingerfelt, O. E. B. Messer, J. A. Osborne, R. D. Budiardja, A. Mezzacappa. "A Multitier System for the Verification, Visualization and Management of CHIMERA", International Conference on Computational Science 2011, Procedia Computer Science, Vol 4, Pages 2076-2085, 2011.



Demonstration videos & animated visualizations

[ChimeraSN.org](http://ChimeraSN.org)

