Utah CIBC EAB Meeting 2008

Infrastructure

SCI INSTITUTE
AT THE UNIVERSITY OF UTAH
Definition from NOT-RR-08-006

In some circumstances, TR&D activities may require substantial investment in the design and development or implementation of technological infrastructure that does not constitute a research challenge in its own right (e.g. a test platform for new instrument components or a laboratory information management system). If necessary, such a project may be included in the application under the Infrastructure heading.

From “Changes in the NCRR Biomedical Technology Research Resources (P41) Program”, May 14, 2008.
Goals

Accessibility and Usability
- Multi-platform distributions
- Documentation
- Example datasets

Integration and Extensibility
- Easy to add new functionality
- Interoperability with other tools

Performance and Control
- Robustness
- Efficiency
- Interactivity
Progress: Accessibility and Usability

Streamlined User Experience

- Reorganized modules for ease-of-use
- OSX port and preliminary Windows support (source)
- Simple build-from-source script
- New look-and-feel for SCIRun 4.0
- Windows (XP,Vista{32,64}) and OSX binaries!
- Synchronized Viewer windows

Infrastructure of our Release System

- Regression suite: CTest, DART
- Auto-build of weekly releases

(Download / Documentation)
Progress: Integration and Extensibility

Integration

- MATLAB
- ITK
- Meshing tools (TetGen, Mesquite)

Extensibility

- Developer level documentation
- Split modules into Algorithms
- Virtual interface
- Import/Export plug-ins
- Defibrillation tools
Progress: Performance and Control

Performance
- Correctness
- Stability / Robustness
- Efficiency

Control
- Port caching
- Interactivity
- Synchronized viewers
SCIRun: Plans

Infrastructure

CDash
SCIRunTk
Documentation
I/O Flexibility
Provenance and State Management
Choreography
GPGPU Filtering / Simulation
PowerApps as Integrated Pipelines
Deeper Data Integration
Integrate with Other Major Systems (Slicer3, XIP)
Web interface, Cloud Computing
SCIRunTk

Modules Layer

- Contains schedulers (execution model)
- Easy to build light-weight pipelines in C++ / wrapper
- State management and provenance

Separate Component

- Release
- Build other apps on top of SCIRunTk
  - SCIRunPSE, ImageVis3D, Seg3D
Renewal Plan: Next-Gen Usability

Remote Computing
- Web interface
  - SCIRun in a browser
  - Served from SCI
- Cloud computing
  - Disk images to Amazon, Sun, ...
  - Prototype GPGPU on SCI’s NVIDIA Cluster

User-friendly Network Editor
- Suggest modules (by keyword, by analogy, etc)
- Pipe inspection
- Break-points, control flow

(More Documentation)
- Case studies, tutorials
- Book
PowerApps

Seg3D
Biolimage / ImageVis3D
BioMesh3D
BioTensor
Seg3D

ITK-based

Layers (like Photoshop)

Light-weight

Maintenance Mode (v1.10)
BioMesh3D

Pipeline

- Computationally intensive stages
- Visualization / interaction checkpoints

Migration from Research Code to Release

- Reduce dependencies
- Simplify installation (wiki documentation)
- Simplify scripts
- Develop SCIRun networks for visualization & editing
- Optimize expensive processing stages
- Create regression suite
- Release