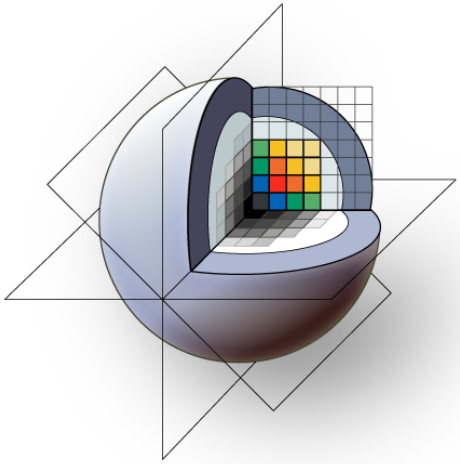
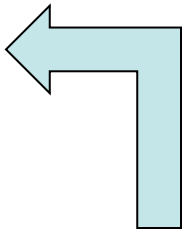
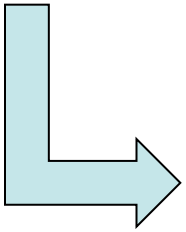
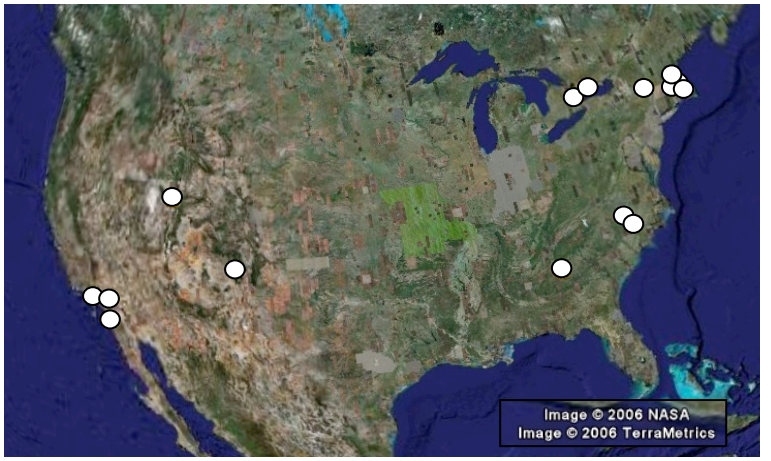
Integrating with Slicer3



3DSlicer







NA-MIC Kit Goals

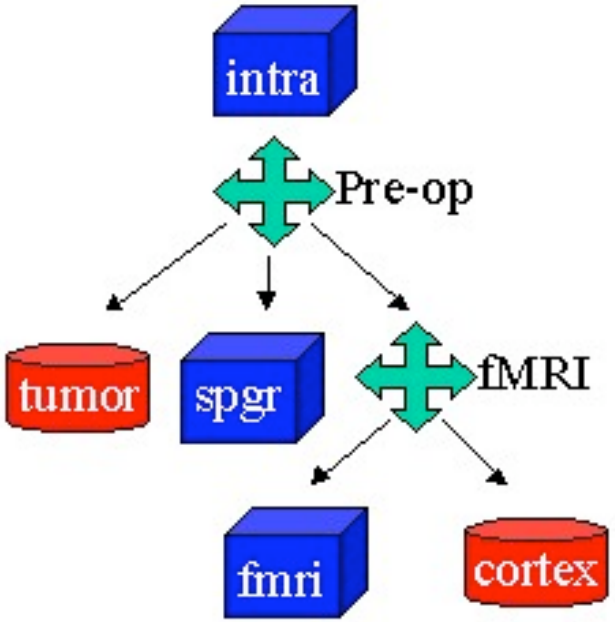
- Software and Methodologies for Medical Image Computing
  - Facilitate Research
  - Promote Interoperability
- Stable, Cross-Platform Run Time Environment
  - Full Set of Core Features
  - Avoid Duplicated Effort
- Flexible Module Architecture
  - Plug-ins should be As Simple As Possible

Slicer3 data model

MRML File:

Volume:	intra
Transform:	Pre-op
Volume:	spgr
Model:	tumor
Transform:	fMRI
Volume:	fmri
Model:	cortex

MRML Tree:

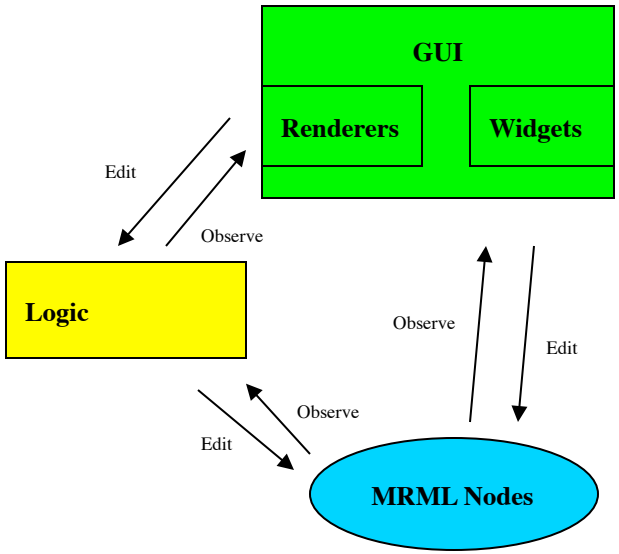


Provided by D. Gering

Slicer3 "Observer MVC" Pattern

- ***MRML*** (Model)
  - For Scene Description and Application State
  - MRML Nodes are Persistent and Undoable
  - Scene and Nodes are Observable
- ***Logic*** Encapsulate VTK and ITK Pipelines (Controller)
  - Observe MRML to Configure Pipelines
  - Help Create/Manage Nodes
  - No UI Components (no Widgets, Actors, Mappers, Renderers or RenderWindows)
- ***GUI*** (View)
  - Observe and Edit MRML
  - Interact with User and Display Hardware

- Modules Should Follow Same Conventions



"**Observe**" means generic event mechanisms are used to pass information.
"**Edit**" means code can directly call methods.

Example: GUI can call methods in Logic classes, but Logic *cannot* call GUI methods.
MRML *cannot* call Logic or GUI methods.

There can be many observers for any event.

Variety of levels of integration

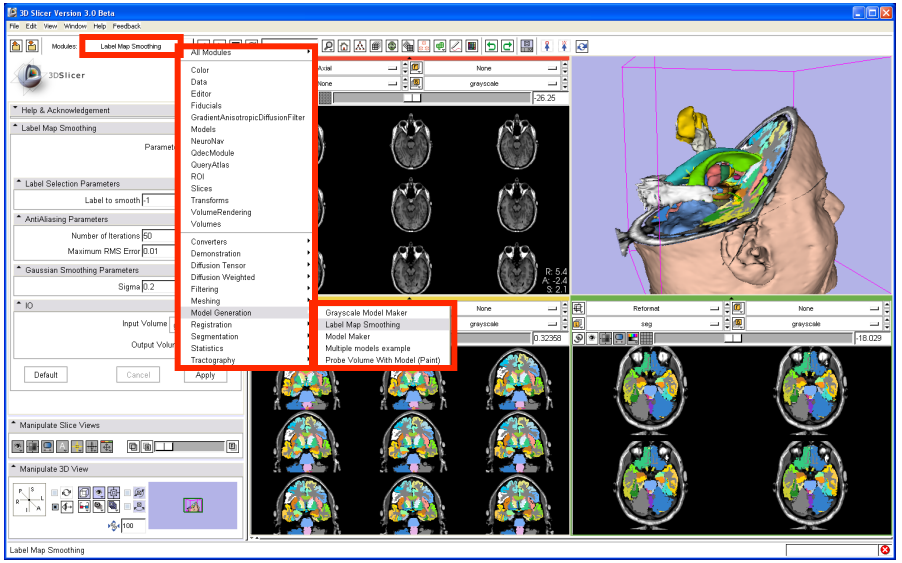
Slicer Libs	• ModuleDescriptionParser • GenerateCLP • vtkITK • MRML	Non-slicer specific support libraries
Slicer Base	• Application logic • Widgets	Common infrastructure for Slicer applications
Built in modules	• Slice viewers • Models • Fiducials • Transforms	Full access to Slicer internals
Loadable modules	• Query Atlas • QDEC • Volume rendering • ChangeTracker • EMSegment	Full access to Slicer internals
Scripted modules	• Editor • Teem Two Tensor Tractography • VMTK	Limited access to Slicer internals
Command line modules	• Registration	Restricted access to Slicer internals
Daemon	• OpenIGTLink • Stochastic Tractography	Access to MRML

Base Features vs. Modules

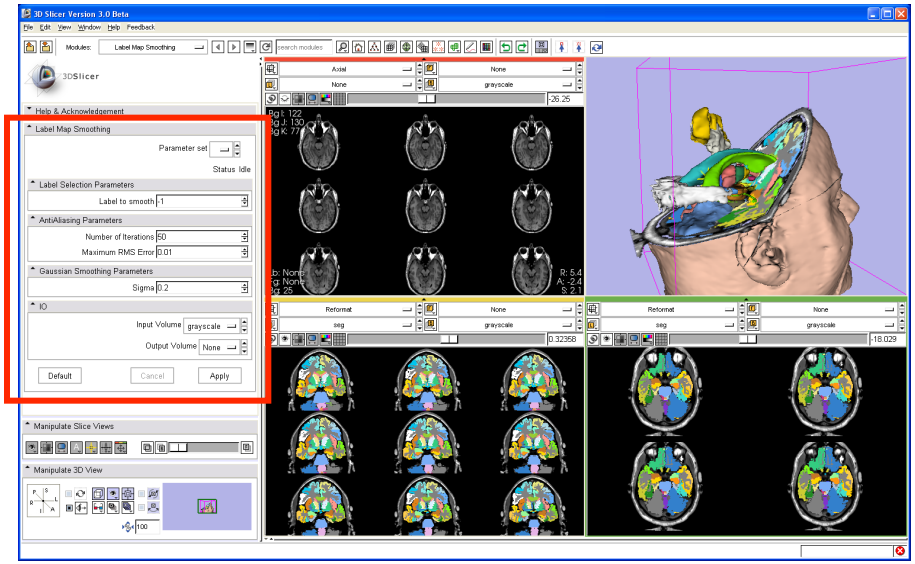
Features	Base	Modules
Visualization	MRML: Models, Volumes, Volume Rendering, Fiducials, Continuum Meshes, Labeled Data	Can create custom MRML Nodes and behavior
Filtering	None	Implemented as Modules using ITK or other Libraries
Registration	Transform Display and Edit, Save/Restore	Calculate Transforms, Resample Data
Segmentation	Label Maps, Parcellated Surfaces	Segmentation Algorithms in ITK or other Libraries
Quantification	Label, Image, Volume Statistics; Numpy access to MRML	Applications in Python or MATLAB
Real-time Integration	VTK Rendering, KWWidgets framework, Tracker Support (as Transforms)	Direct Manipulation of the MRML Scene; 2D/3D Widgets; Device Interfaces, OpenIGTLink Module
Diffusion Imaging	DWI, DTI, Fiber Bundles	Tractography, Clustering, Atlases
Applications	“Bundles” of Modules in Distribution: Registration, Editor, some Filters,	Customized Extensions, Domain-specific code, Optimized Interfaces…

Each module has …

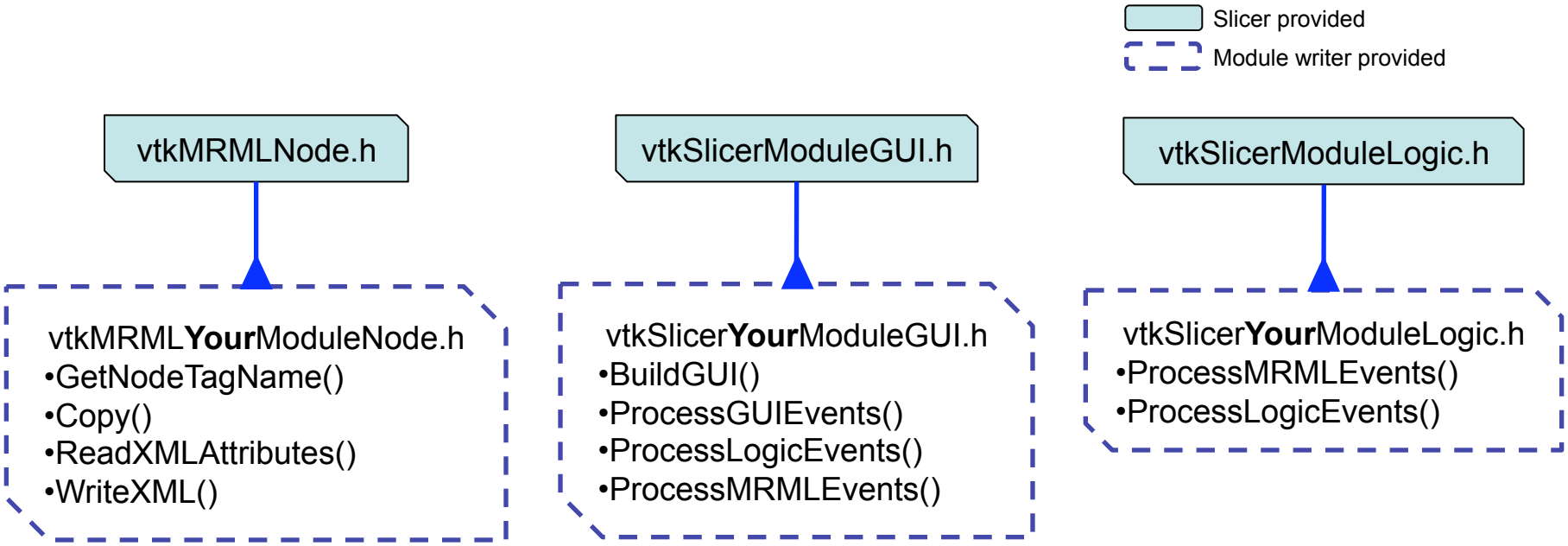
… an entry in the module menu



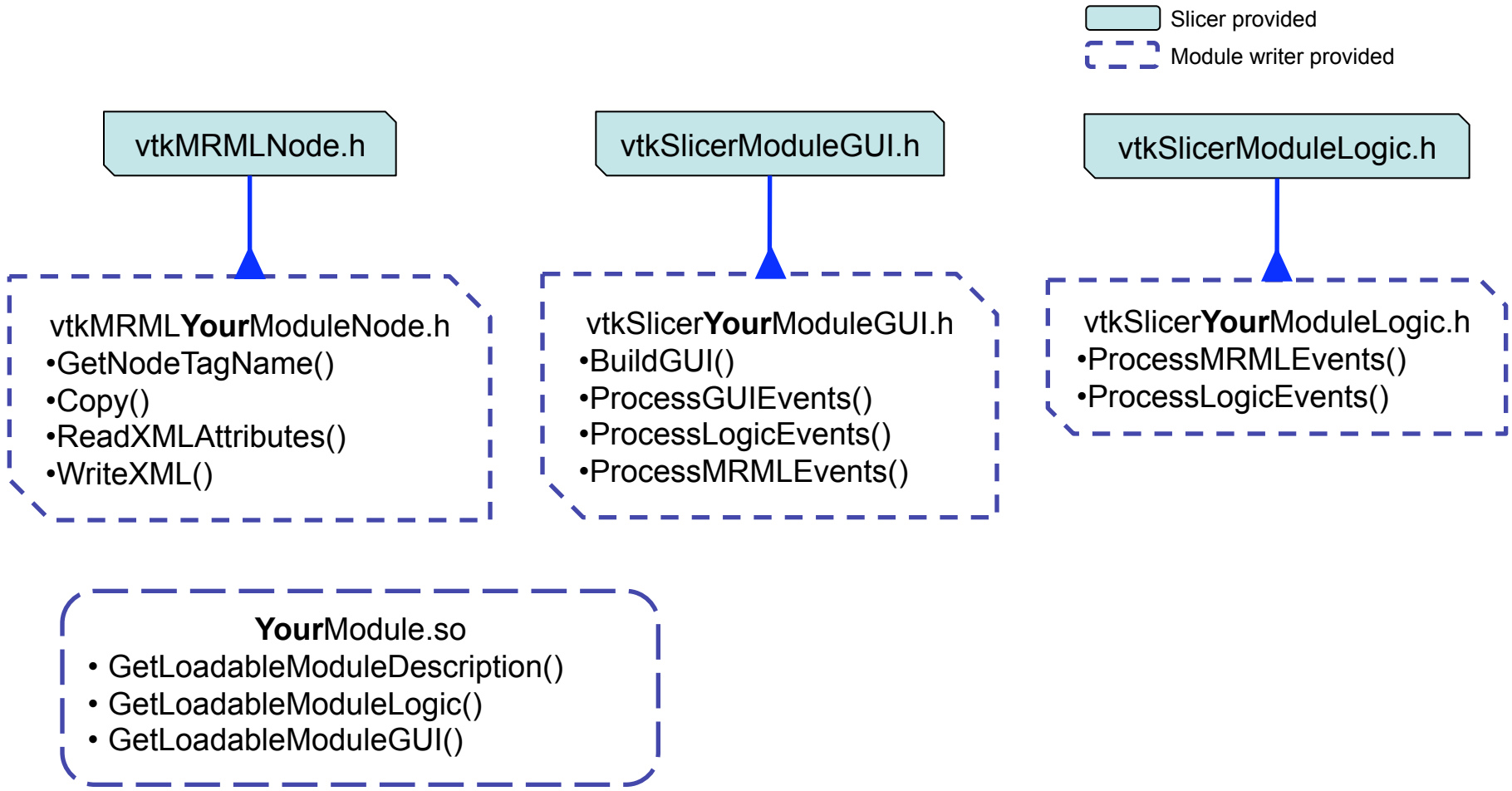
… a panel of user interface controls



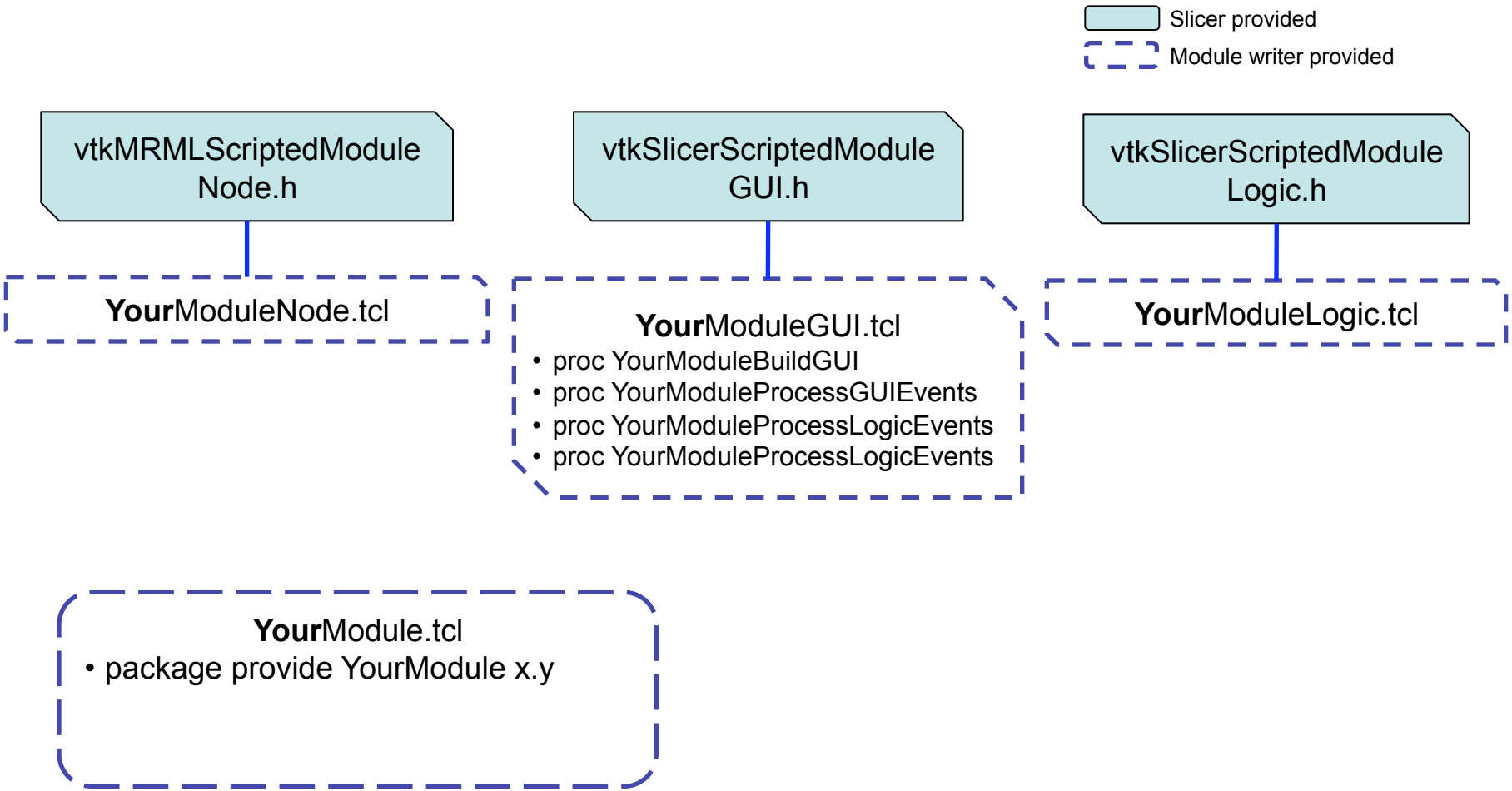
Built in module



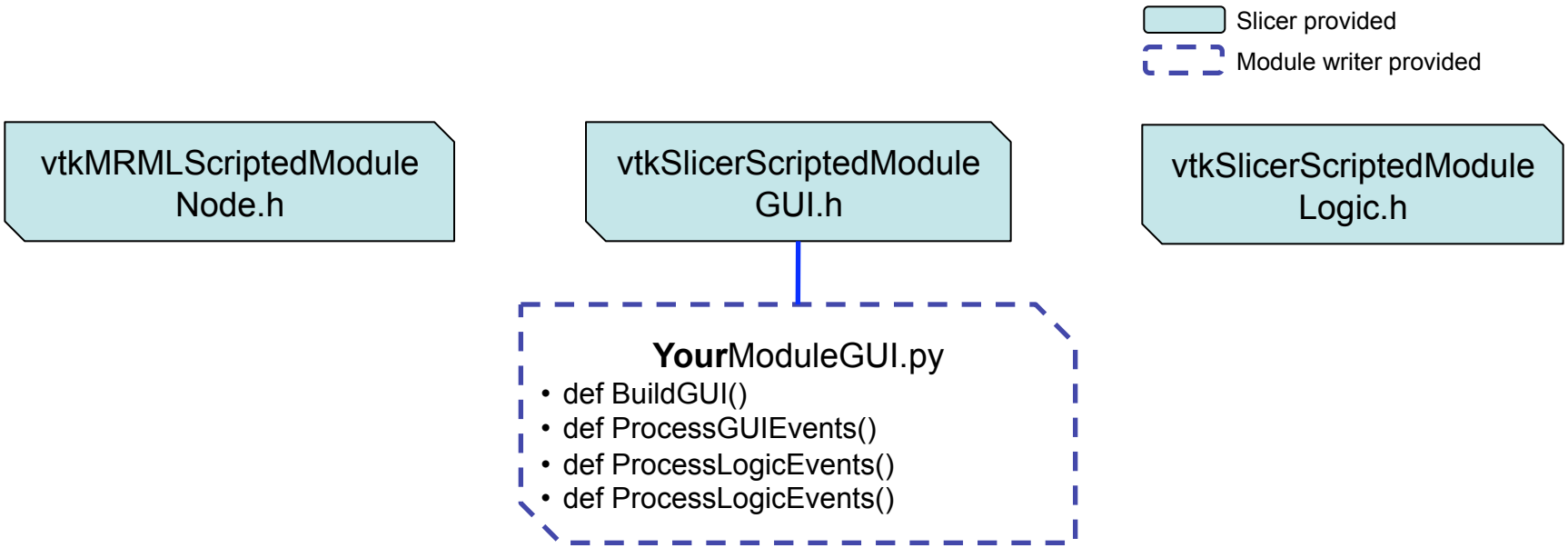
Loadable module



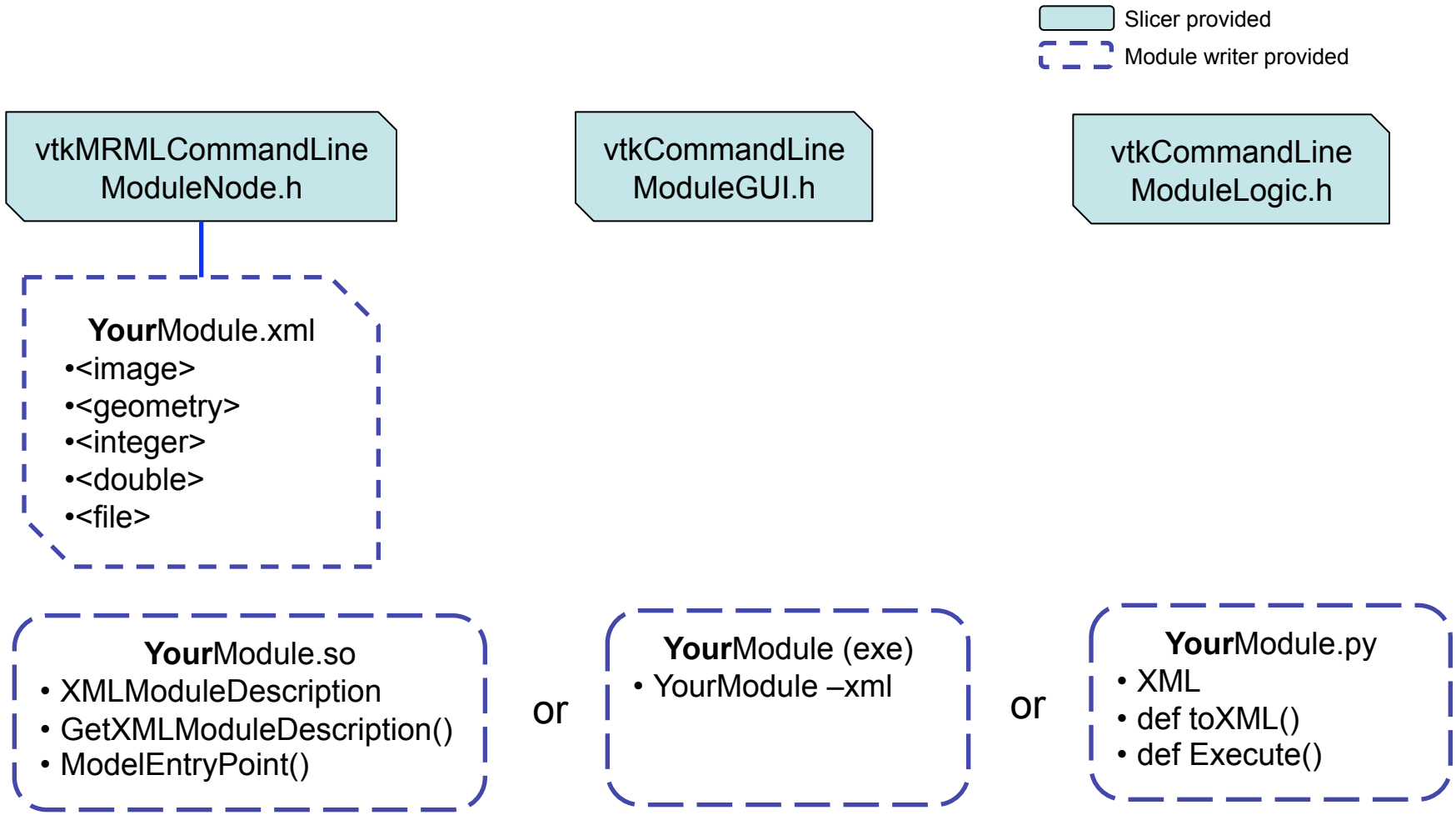
Tcl scripted module



Python scripted module

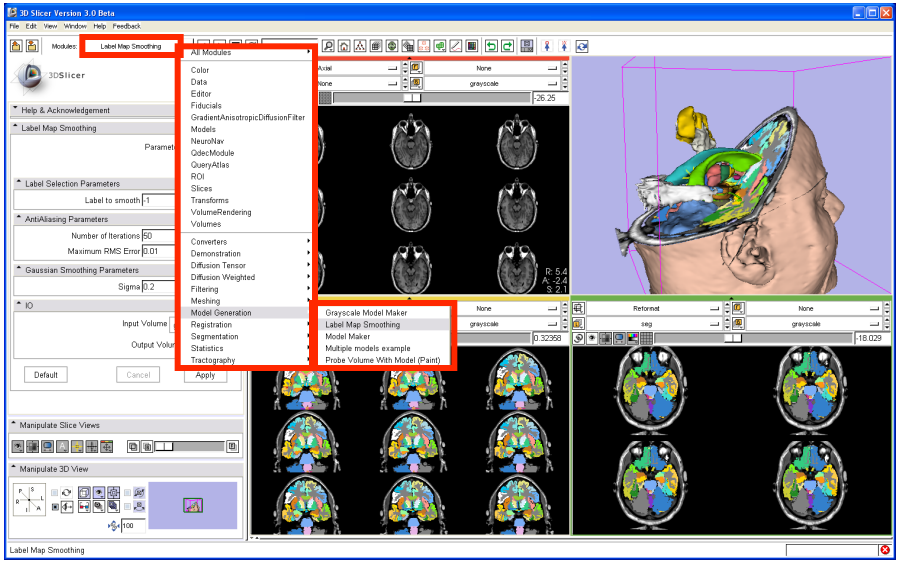


Command line module



All modules are created equal…

… an entry in the module menu



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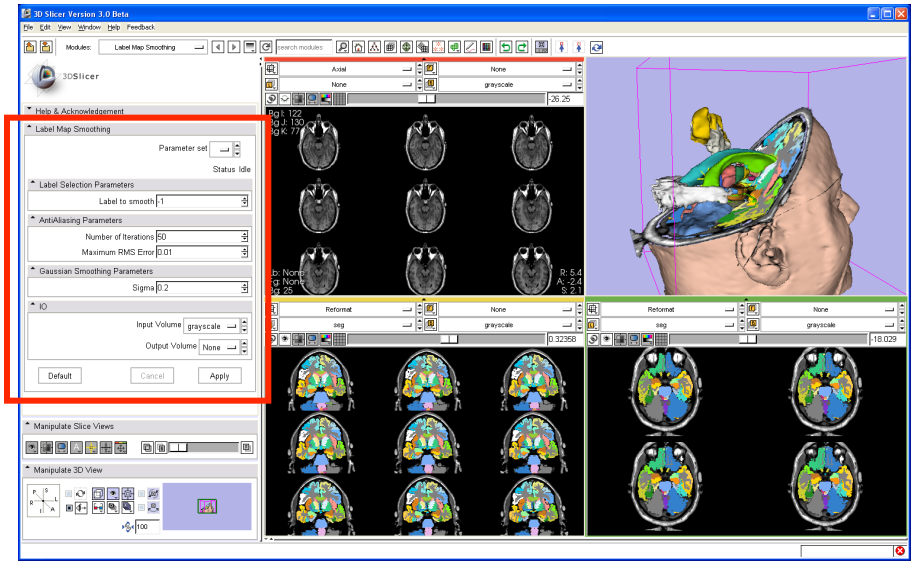
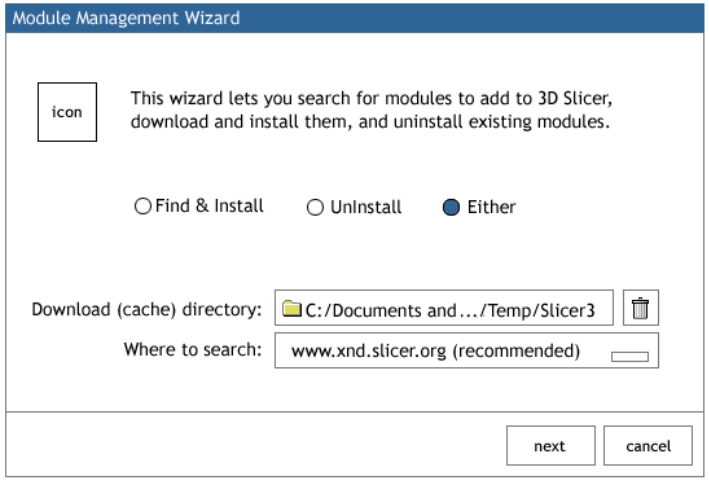
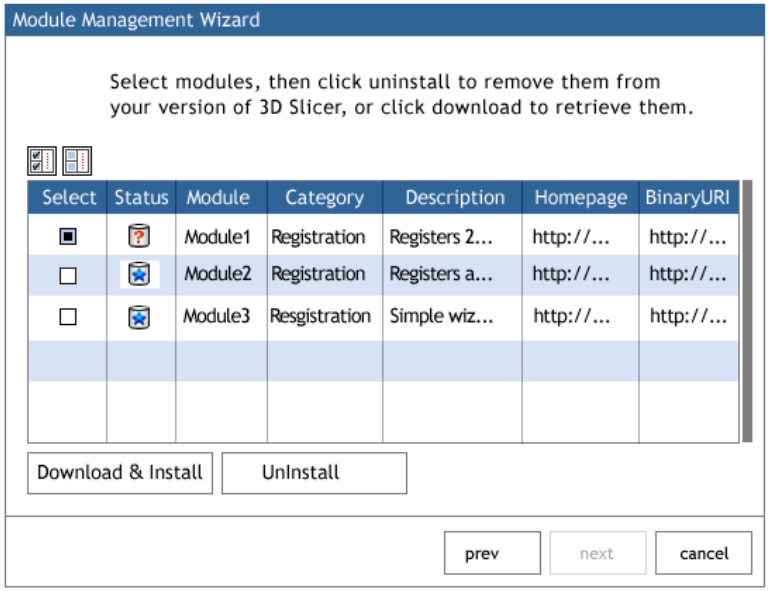


Modularity Goals

- Keep the base package “lean and mean”
- Modules have individual identity
  - Per-module web site, svn, downloads, mailing lists, wiki…
- Allow users to assemble their own set of tools
  - Customized ‘Bundles’ by task or application
- Easy to download compatible extensions
  - Analogous to Firefox extensions
  - Integrate extension builds into developer/nightly/release processs
- NITRC Supplement to NA-MIC helping to pay for needed infrastructure (Neuroimaging Informatics Tools and Resources Clearinghouse)
  - NITRC can host neuroimaging projects (gforge implementation)

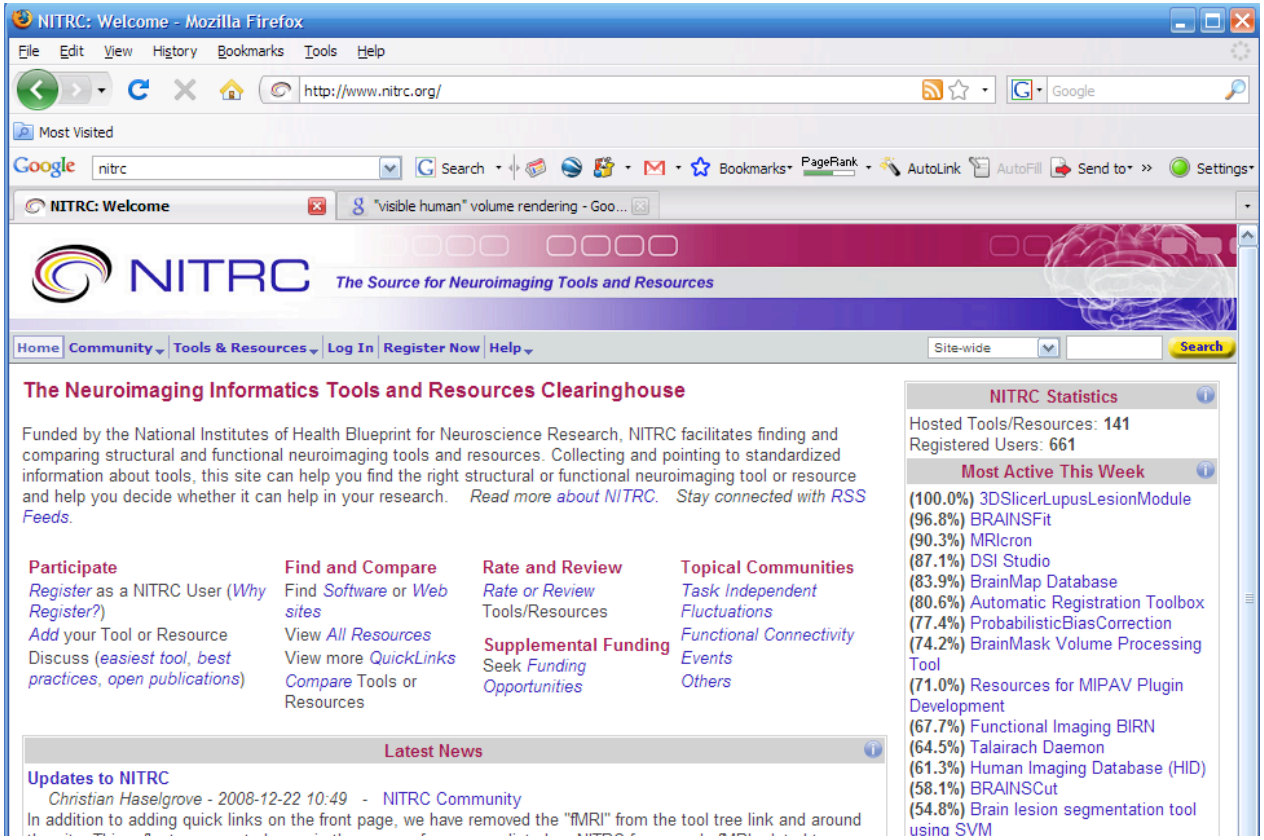
Module distribution*





* Under development

NITRC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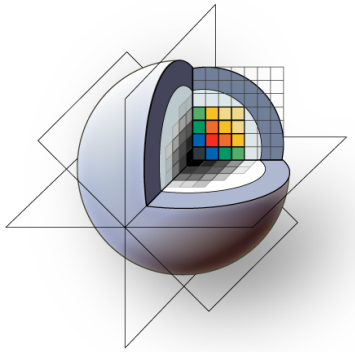
Compare Tools or Resources
Rate and Review
Rate or Review Tools/Resources
Supplemental Funding
Seek Funding Opportunities
Topical Communities
Task Independent Fluctuations
Functional Connectivity
Events
Others
Latest News
Updates to NITRC
Christian Haselgrove - 2008-12-22 10:49 - NITRC Community
In addition to adding quick links on the front page, we have removed the "fMRI" from the tool tree link and around
NITRC Statistics
Hosted Tools/Resources: 141
Registered Users: 661
Most Active This Week
(100.0%) 3DSlicerLupusLesionModule
(96.8%) BRAINSFit
(90.3%) MRIcron
(87.1%) DSI Studio
(83.9%) BrainMap Database
(80.6%) Automatic Registration Toolbox
(77.4%) ProbabilisticBiasCorrection
(74.2%) BrainMask Volume Processing Tool
(71.0%) Resources for MIPAV Plugin Development
(67.7%) Functional Imaging BIRN
(64.5%) Talairach Daemon
(61.3%) Human Imaging Database (HID)
(58.1%) BRAINSCut
(54.8%) Brain lesion segmentation tool using SVM

Daemon



3DSlicer

slicerget.tcl name > image.nrrd

cat image.nrrd | slicerput.tcl name

YourTool

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