



DIY: Vis Applications

ParaView

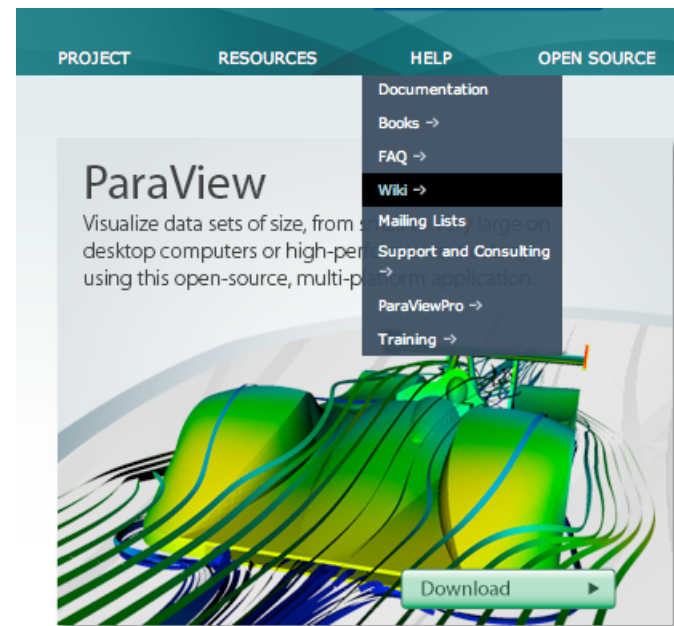
Utkarsh Ayachit
Kitware Inc.

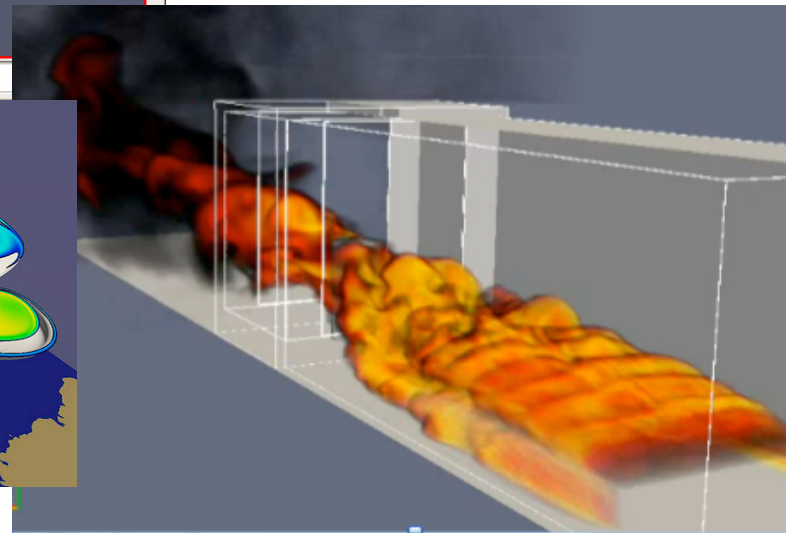
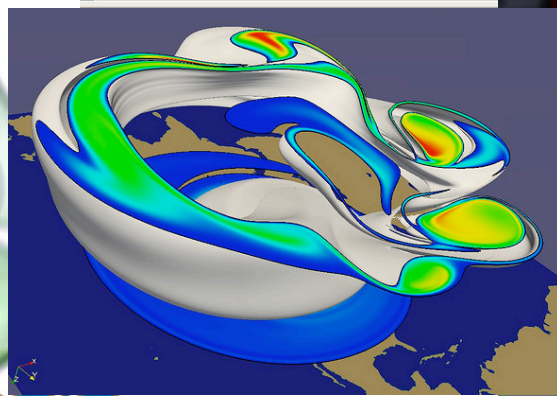
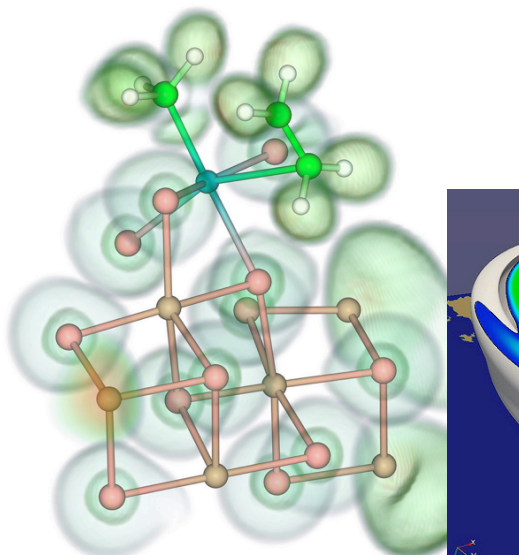
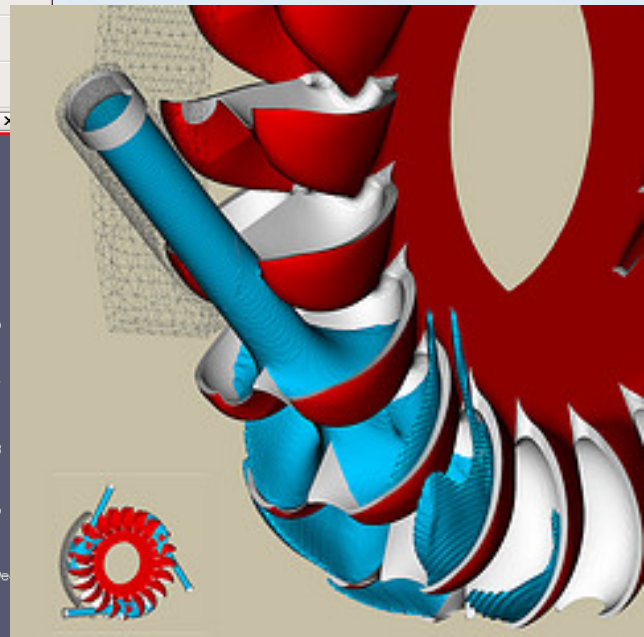
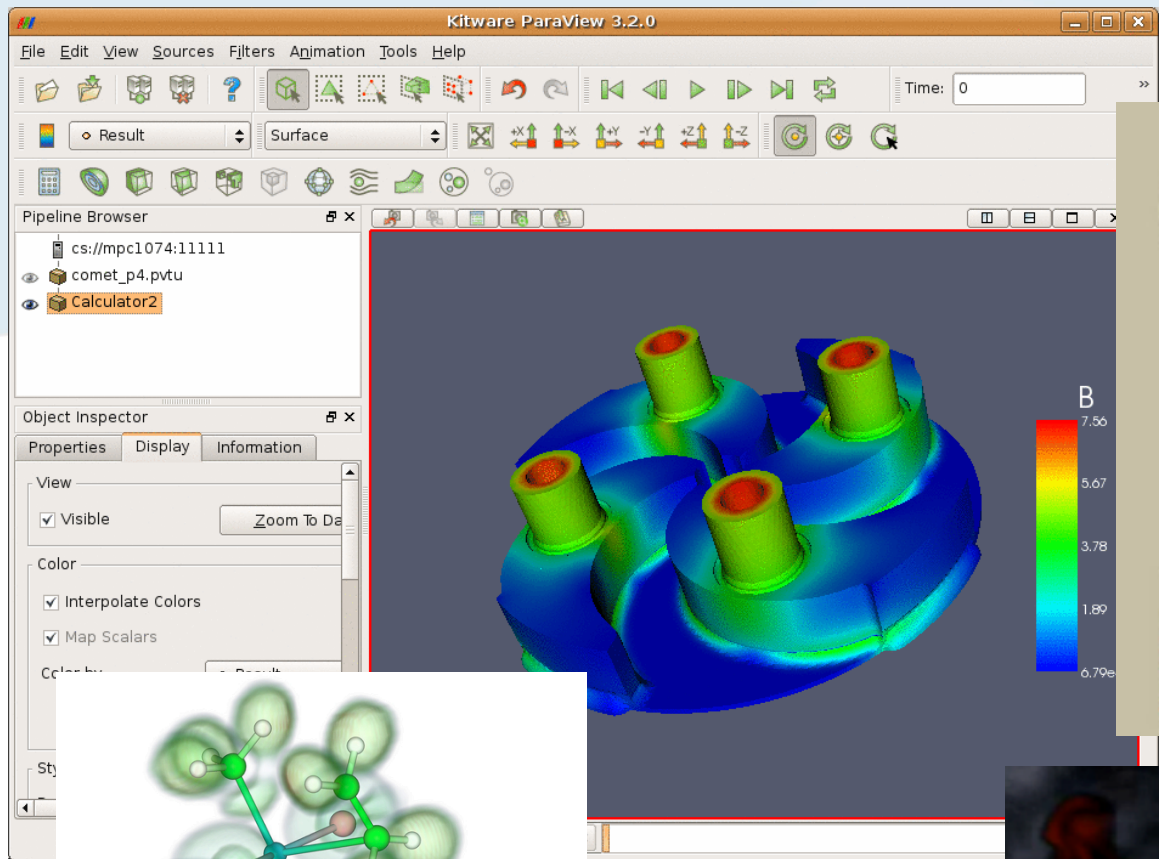
“Why am I here?”



Resources

- Website: www.paraview.org
- Wiki: www.paraview.org/Wiki/ParaView





File Edit View History Bookmarks Tools Help

ParaView Web Visualization Sys... +

ParaView Web Visualization System x

Layers Informations JavaScript

Dataset x

IsoSurface x

StreamTracer x

Color by: CH4

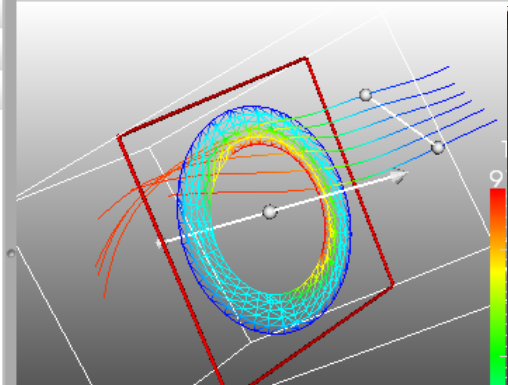
Show ScalarBar:

Show LineSeed:

Input data: V

Line resolution: 5

Max stream length: 50



Web visualization - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://paraviewweb.kitware.com/PWManta/ outerHTML

Kitware Work Mayall Amber11 ParaViewWeb Tripoint Classes Yammer

Kitware Inc. Mail - "vtk" - ... Web visualization Web visualization

ParaViewWeb JavaScript x

A 3D visualization showing a red sphere on a brown ground plane. To the left, there is a blue wireframe structure representing a complex, curved surface.

Web visualization - Mozilla Firefox

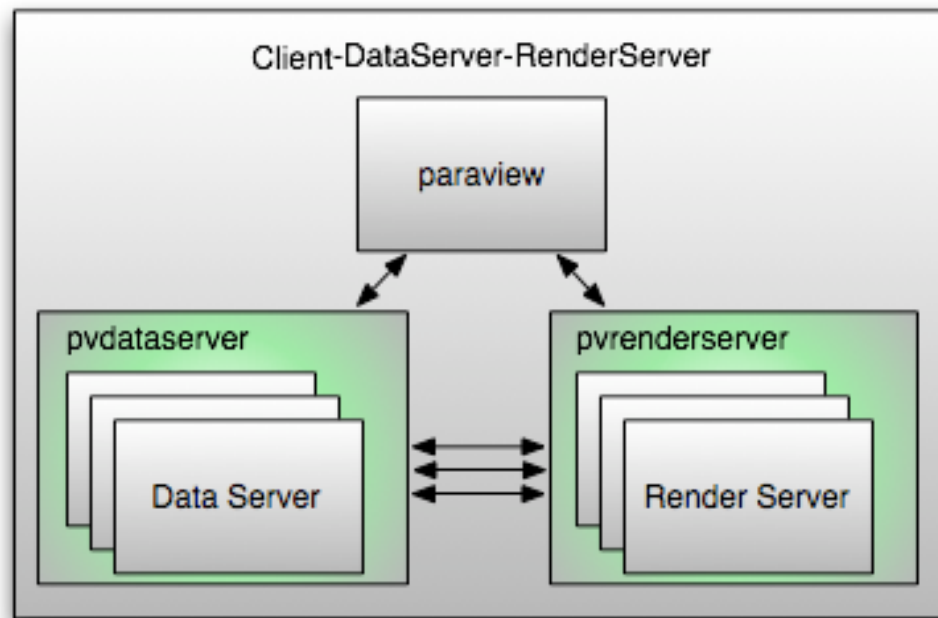
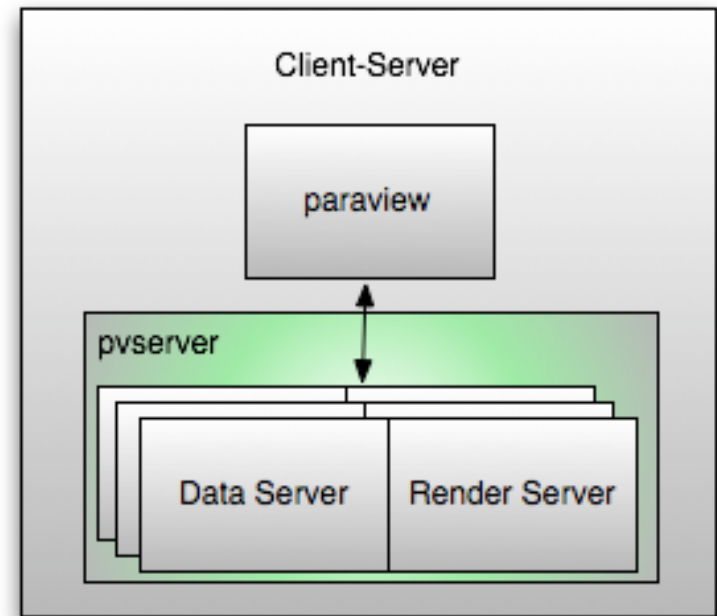
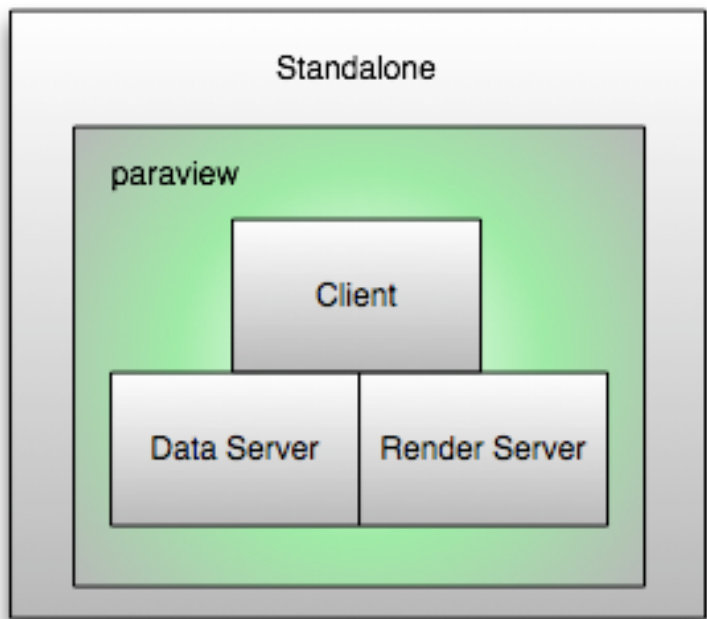
File Edit View History Bookmarks Tools Help

Web visualization +

JavaScript x

A 3D visualization of a complex anatomical structure, possibly a brain or a similar organ. The structure is rendered in shades of blue and orange, with a central orange mass and surrounding blue structures. The visualization is shown in a perspective view.

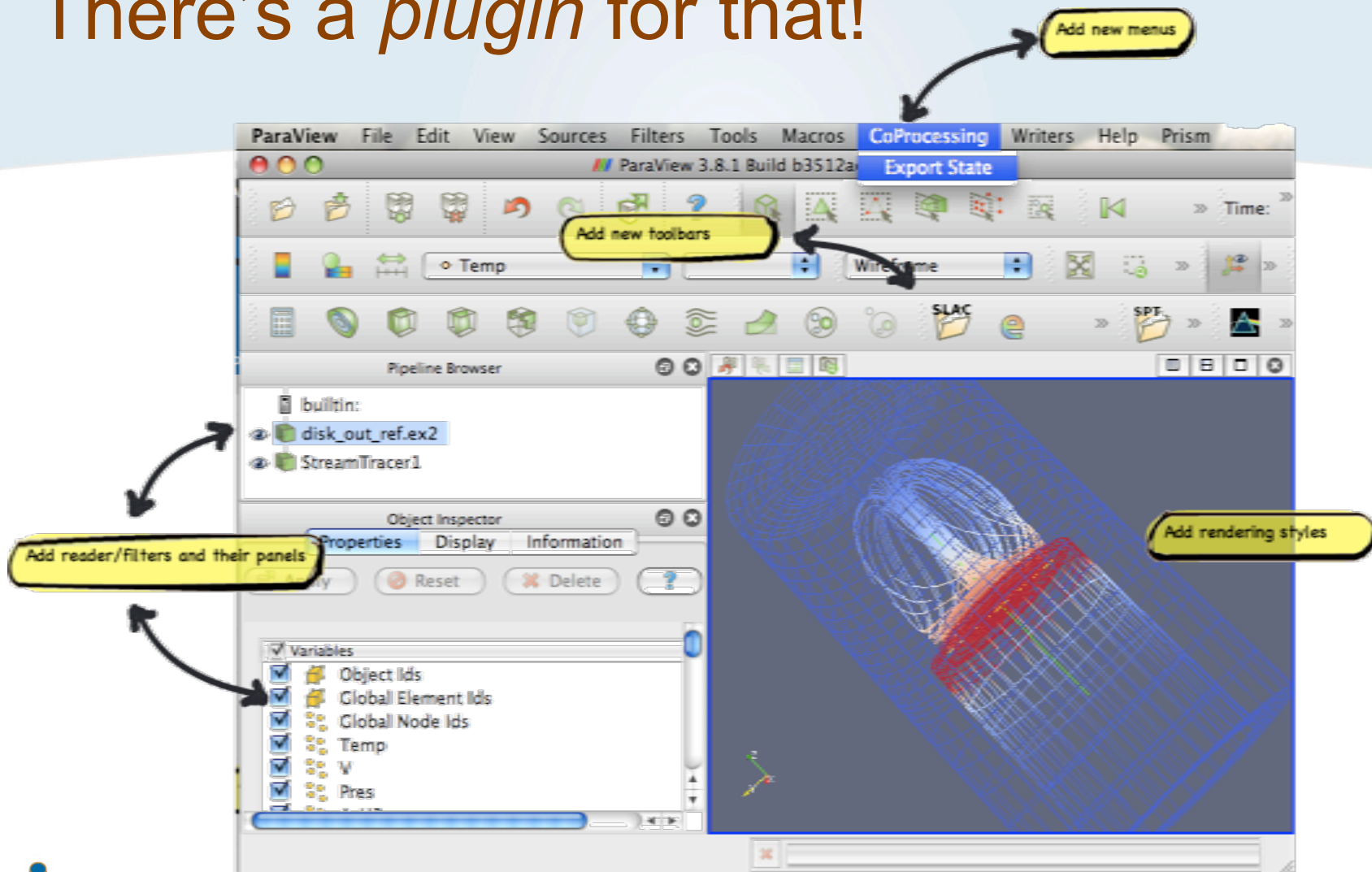




We love customizing!



There's a *plugin* for that!



ParaView File Edit View Sources Filters Tools Macros Help
ParaView 3.8.1 Build b3512ac7 64-bit

- Open ⌘O
- Recent Files
- Load State
- Save State
- Save
- Save As
- Export
- Save As
- Save As
- Connect
- Disconnect
- View Settings
- Main Controls

- 2D Glyph
- 3D Text
- Annotate Time
- Arrow
- Axes
- Box
- Cone
- Cylinder
- Data Object Generator
- Disk
- Hierarchical Fractal
- Line
- Mandelbrot
- Octree Fractal
- Outline
- Plane

- Recent
- Common
- Cosmology
- Data Analysis
- Material Analysis
- Statistics
- Temporal
- Alphabet
- AMR Clustering
- AMR Coarsening
- Annotate
- Append
- Append
- Append
- Block Statistics
- Calculator

- Create Custom Filter
- Add Camera Link

Animation

Mode: Sequence Time: Start Time: [lock]

	Time	
<input checked="" type="checkbox"/>	TimeKeeper - Time	
<input type="checkbox"/>	Wavelet1	Center (0)

- General
- Colors
- Animation
- Charts
- Render View
 - General
 - Camera
 - Server

Settings

Use Immediate Mode Rendering

Use Triangle Strips

LOD Parameters

LOD Threshold 5.00 MBytes

LOD Resolution 50x50x50

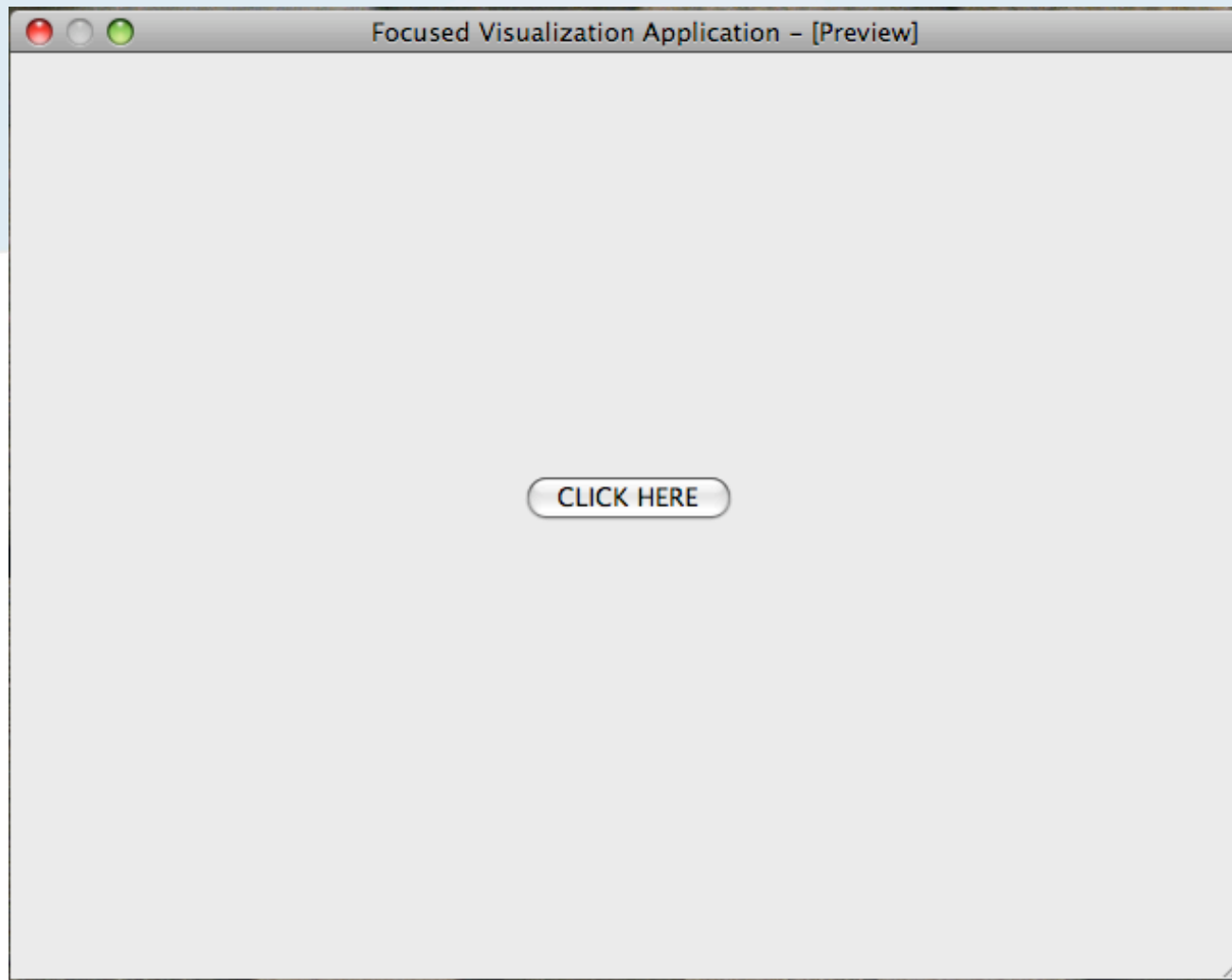
Outline Threshold 0.5 MCells

Allow Rendering Interrupts

Depth Peeling

Enable Depth Peeling

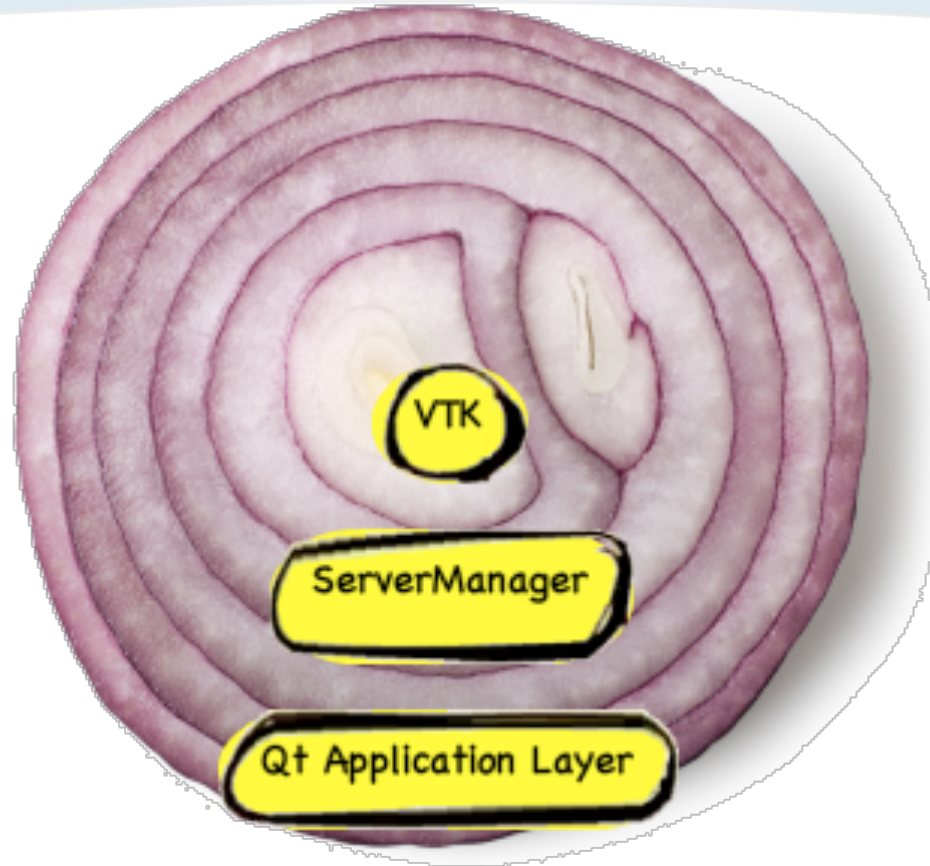
Number of Peels 4





“Let me jump in!”

The ParaView Peels



```
class vtkSphereSource : ....
{
  ...
  public:

    // Set the radius for the sphere.
    void SetRadius(double);

};
```

```
<SourceProxy name="SphereSource" class="vtkSphereSource">
```

```
....
```

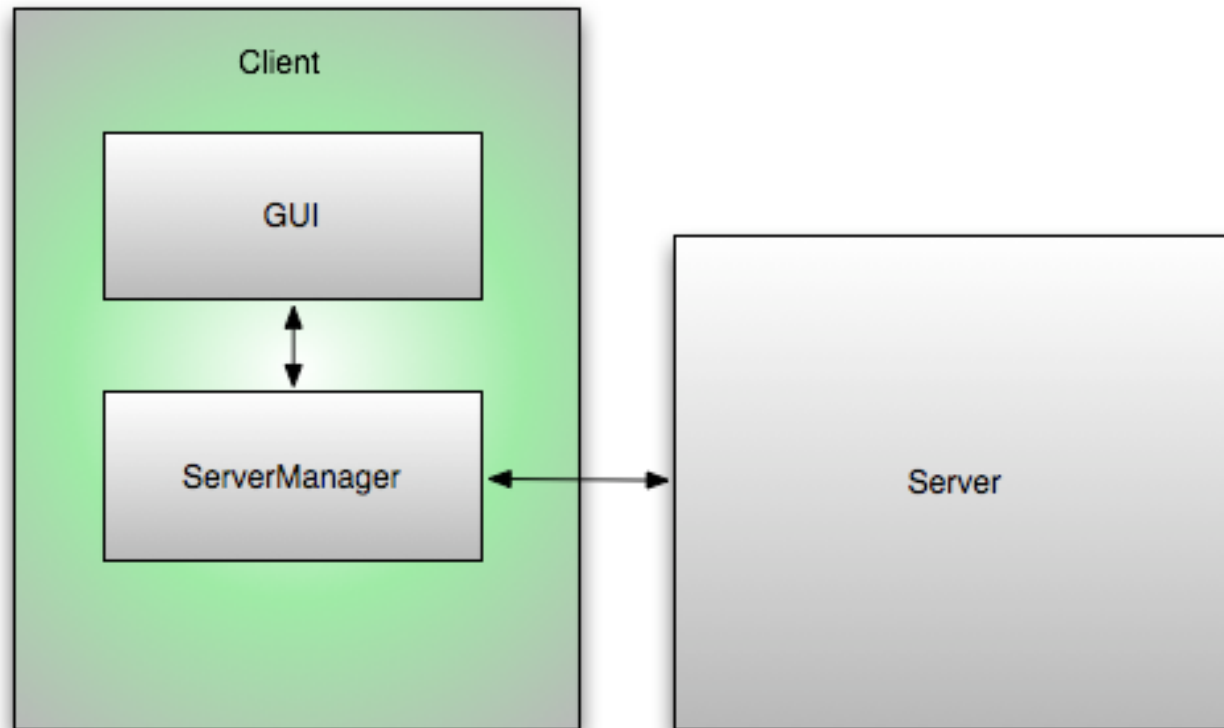
```
<DoubleVectorProperty name="Radius"  
  command="SetRadius"  
  number_of_elements="1"  
  default_values="0.5">  
  <DoubleRangeDomain name="range" min="0" />  
  <Documentation>  
    Set the radius for the Sphere source.  
  </Documentation>  
</DoubleVectorProperty>
```

```
....
```

```
</SourceProxy>
```

```
vtkSMPProxyManager* pxm = vtkSMPProxyManager::GetProxyManager();  
vtkSMPProxy* proxy = pxm->NewProxy("sources", "SphereSource");  
vtkSMPPropertyHelper(proxy, "Radius").Set(5);  
proxy->UpdateVTKObjects();
```

ParaView Server-Manager



The Application Toolbox

- CMake functions
- Custom Qt Widgets
- Standard QAction handlers
- Standard Application behavioral components

class pqAlwaysConnectedBehavior <i>pqAlwaysConnectedBehavior</i> ensures that the client always remains connected to a server. More...	
class pqCategoryToolbarsBehavior <i>pqCategoryToolbarsBehavior</i> is used when the application wants to enable categories from a pqProxyGroupMenuManager to show up in a toolbar. More...	
class pqCommandLineOptionsBehavior <i>pqCommandLineOptionsBehavior</i> processes command-line options on startup and performs relevant actions such as loading data files, connecting to server etc. More...	
class pqCrashRecoveryBehavior <i>pqCrashRecoveryBehavior</i> manages saving/load state. More...	class pqAboutDialogReaction <i>pqAboutDialogReaction</i> used to show the standard about dialog for the application. More...
class pqDataTimeStepBehavior <i>pqDataTimeStepBehavior</i> ensures that whenever more than 1 timestep, the application time \geq the timestep. More...	class pqApplicationSettingsReaction <i>pqApplicationSettingsReaction</i> is a reaction to popup the application settings dialog. More...
class pqDefaultViewBehavior <i>pqDefaultViewBehavior</i> ensures that when a new made, the default view of the user-specified type is More...	class pqAutoApplyReaction Reaction for enabling/disabling auto-apply. More...
class pqDeleteBehavior <i>pqDeleteBehavior</i> handles a multitude of actions source is deleted. More...	class pqCameraReaction <i>pqCameraReaction</i> has the logic to handle common operations associated with the camera such as reset view along X axis etc. More...
class pqFixPathsInStateFilesBehavior <i>pqFixPathsInStateFilesBehavior</i> puts up a dialc (<i>pqFixStateFilesNameDialog</i>) whenever a state	class pqCameraUndoRedoReaction Reaction for camera undo or redo. More...
	class pqChangePipelineInputReaction Reaction for change pipeline input for the currently selected element. More...
	class pqDataQueryReaction <i>pqDataQueryReaction</i> is the reaction that popsups the Data Query Dialog allowing the user to 'search' his data. More...
	class pqDeleteReaction Reaction for delete sources (all or selected only). More...
	class pqEditCameraReaction <i>pqEditCameraReaction</i> is a reaction to show the edit-camera dialog. More...
	class pqEditColorMapReaction Reaction to edit the active representation's color map or solid color. More...
	class pqExportReaction Reaction for exporting a view. More...



“Now, can I jump in?”

Resources

- Website: www.paraview.org
- Wiki: www.paraview.org/Wiki/ParaView

[Visualization](#) *

are effects for

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[\[edit\]](#)

without client

Information on using ParaView for in situ visualization/coprocessing (still in beta).

Books and Tutorials [\[edit\]](#)

- [The ParaView Guide](#) [↗](#)

The official ParaView guide available from Kitware.
[Book Errata](#)

- [The ParaView Tutorial](#)

An introductory and comprehensive tutorial.

- [IEEE Vis10 DIY Vis Application - ParaView](#)

Tutorial slides and code for the IEEE Vis DIY Vis Applications, ParaView section.

- [SC10 Coprocessing Tutorial](#)

Use of ParaView's coprocessing API for *in-situ* visualization.

Adds supp
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- PrismClient
- Moments

Miscellaneous

- [ParaView R](#)

Collection o
releases.

- [Terminology](#)
- [The Kitware](#)

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- [More inform](#)



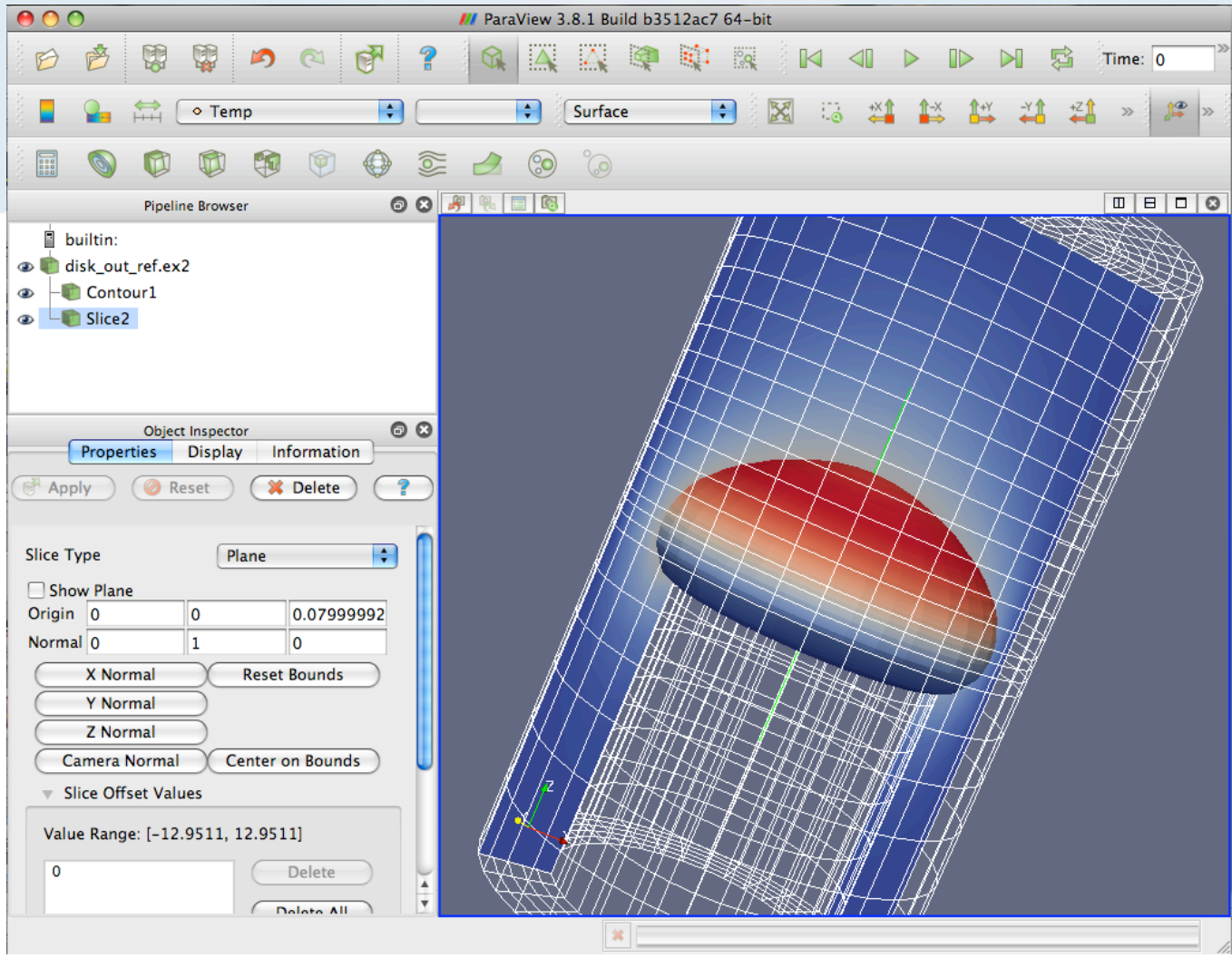
Identify the Use-Case(s)



CHECK LIST

-
-
-
-

COMMENTS:



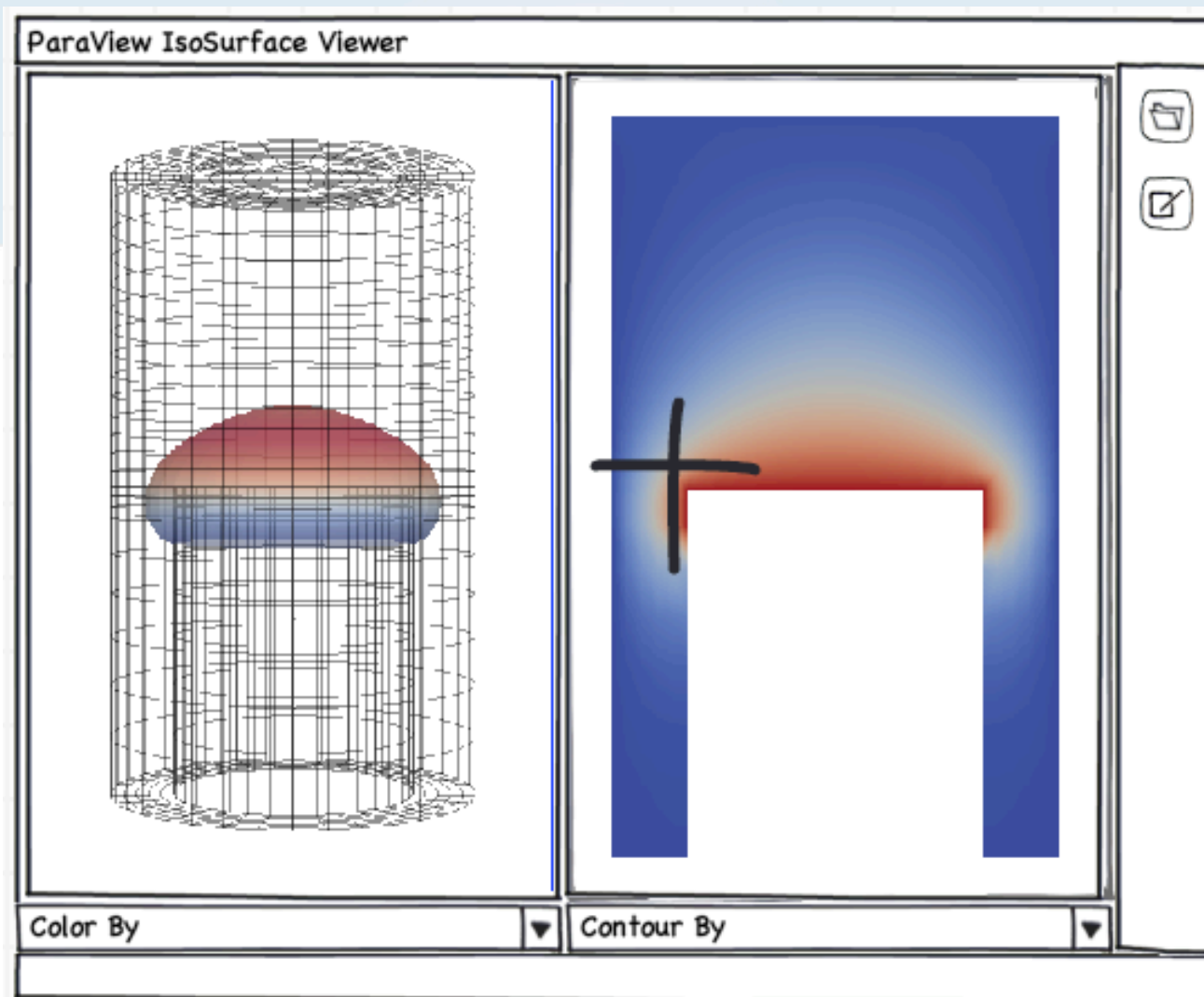
Design the User Interface



CHECK LIST

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COMMENTS:



Build the User Interface

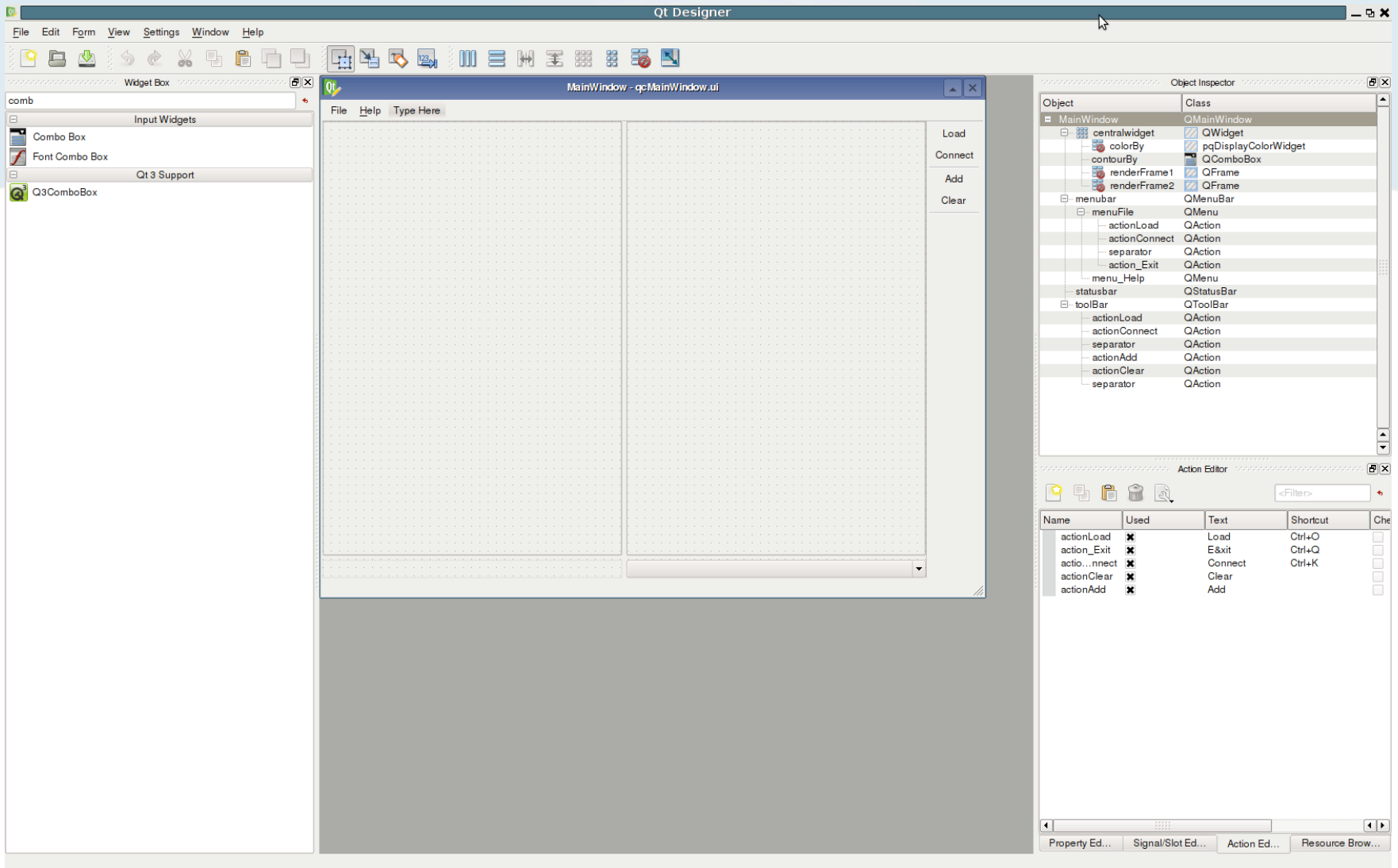
(using Qt Designer)



CHECK LIST

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COMMENTS:



Write Code



CHECK LIST

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COMMENTS:

SimpleApp

DIY.VisApps.Vis2010.SimpleApp.zip



MainWindow.ui

CMakeLists.txt

qcMainWindow.[h|c|xx]

```

# Name of the project
project(QuickContour)

# Locate and import ParaView environment.
FIND_PACKAGE(ParaView REQUIRED)
INCLUDE(${PARAVIEW_USE_FILE})

INCLUDE_DIRECTORIES(
    ${CMAKE_CURRENT_SOURCE_DIR}
    ${CMAKE_CURRENT_BINARY_DIR})

SET (SOURCE_FILES
    qcMainWindow.cxx
    qcMainWindow.h
)

QT4_WRAP_CPP(MOC_SRCS
    qcMainWindow.h
)

QT4_WRAP_UI(UI_BUILT_SOURCES
    qcMainWindow.ui
)

build_paraview_client(quickcontour
    TITLE "Quick Contour (ParaView-based Application)"
    ORGANIZATION "Kitware Inc"
    VERSION_MAJOR 1
    VERSION_MINOR 0
    VERSION_PATCH 0
    PVMAIN_WINDOW qcMainWindow
    PVMAIN_WINDOW_INCLUDE qcMainWindow.h
    SPLASH_IMAGE "${CMAKE_CURRENT_SOURCE_DIR}/SplashScreen.png"
    SOURCES ${SOURCE_FILES} ${MOC_SRCS} ${UI_BUILT_SOURCES} ${RCS_BUILT_SOURCES}
)

```



```

//-----
qcMainWindow::qcMainWindow(QWidget *_parent, Qt::WindowFlags _flags):
    Superclass(_parent, _flags)
{
    Ui::MainWindow ui;
    ui.setupUi(this);

    pqParaViewMenuBuilders::buildHelpMenu(*ui.menu_Help);
    new pqParaViewBehaviors(this, this);

    new pqServerConnectReaction(ui.actionConnect);
    new pqLoadDataReaction(ui.actionLoad);

    pqRenderView* view1 = this->createRenderView(ui.renderFrame1);
    pqRenderView* view2 = this->createRenderView(ui.renderFrame2);
}

//-----
qcMainWindow::~~qcMainWindow()
{
}

//-----
pqRenderView* qcMainWindow::createRenderView(QWidget* widget)
{
    QHBoxLayout *hbox = new QHBoxLayout(widget);
    hbox->setMargin(0);
    pqObjectBuilder* builder = pqApplicationCore::instance()->getObjectBuilder();
    pqRenderView *view = qobject_cast<pqRenderView*>(
        builder->createView(pqRenderView::renderViewType(),
            pqActiveObjects::instance().activeServer()));
    hbox->addWidget(view->getWidget());
    return view;
}

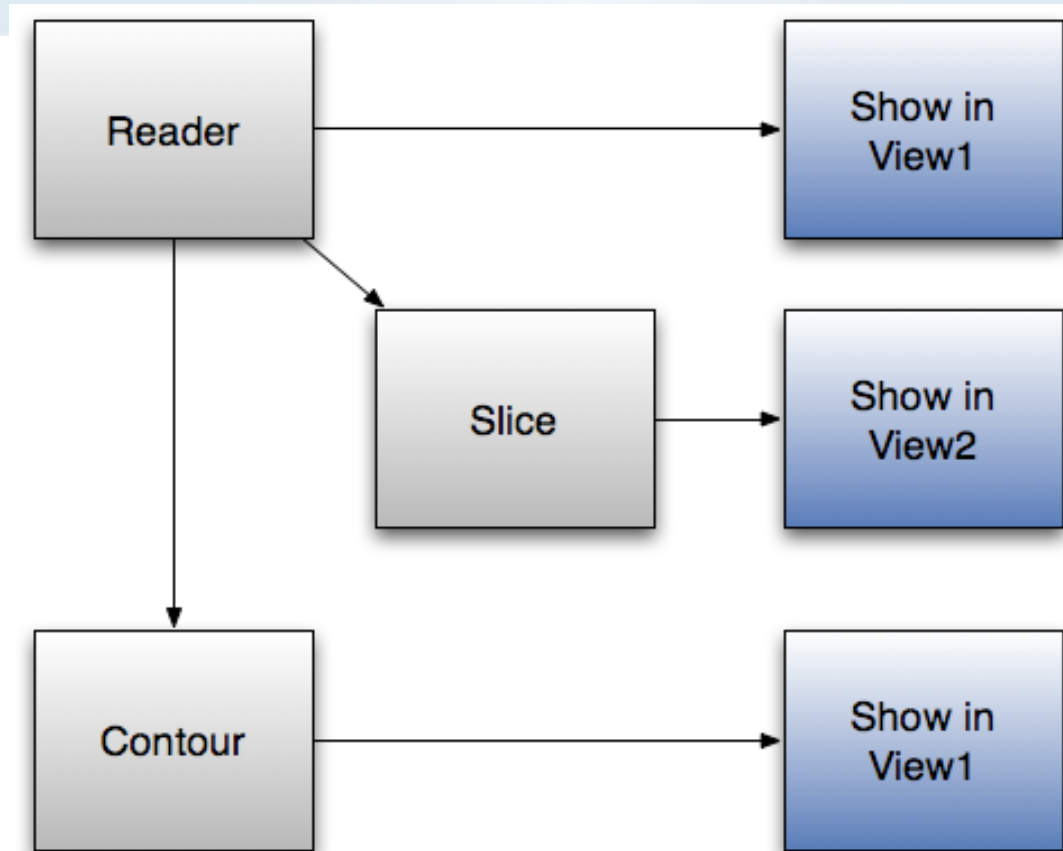
```

QuickContour

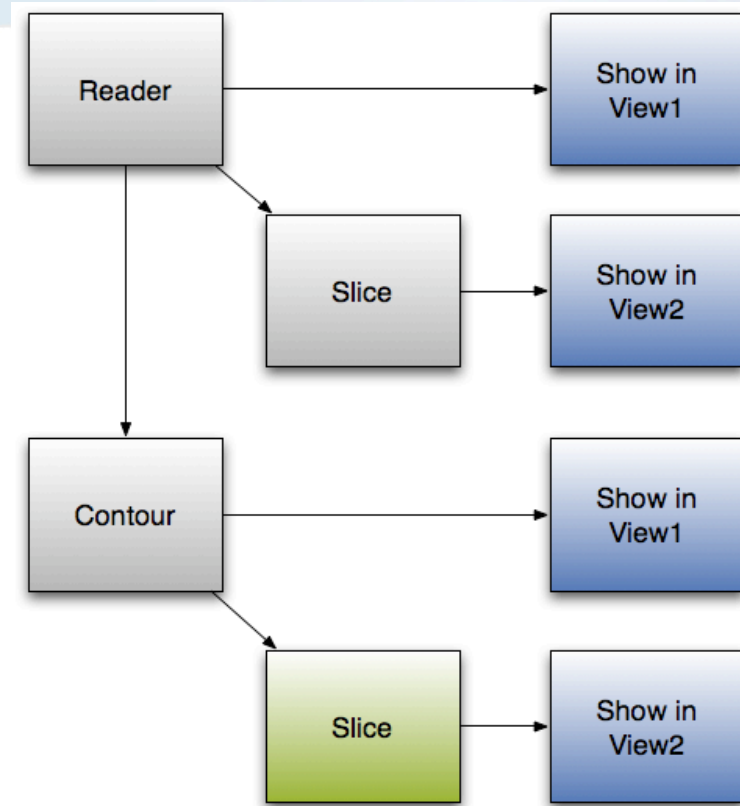
DIY.VisApps.Vis2010.QuickContour.zip



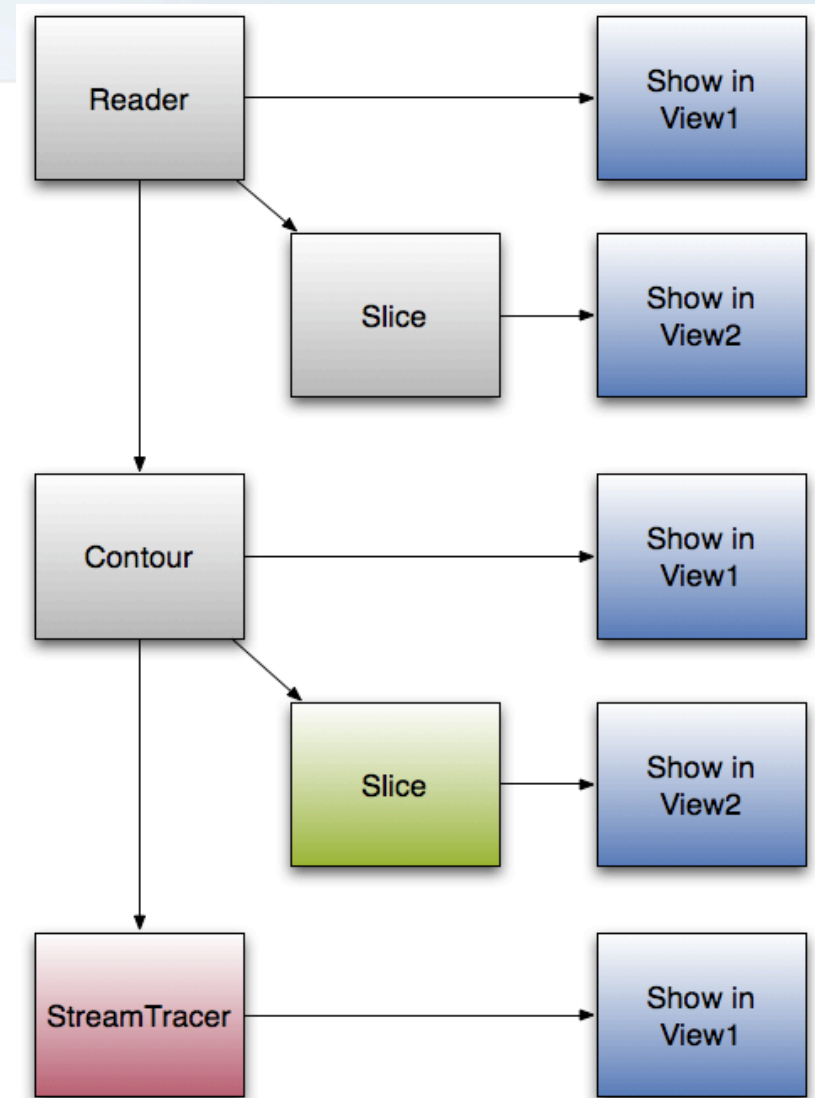
The Visualization Pipeline



The Visualization Pipeline #2



The Visualization Pipeline #3



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