an open source geometry processing and rendering framework

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Overview

- Motivation
- Design Goals
- User Interface
- Plugins
- Writing a Plugin
- Demo
- System Requirements

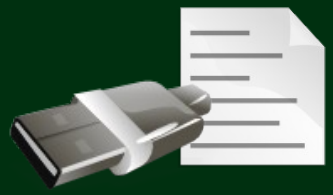
Motivation

- Reduce coding redundancy
  (viewers, datastructures, ...)
- Useable by everybody
  (research code vs. application)
- Exchange functionality without
  exchanging source code

Design Goals

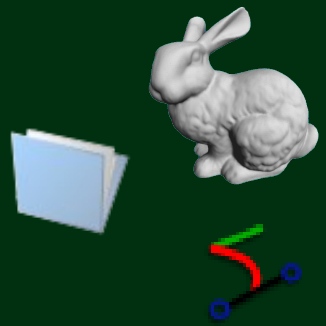
Platform independent

Extensible (→ Plugin based system, Scripting)



Flexibel Interface

Different Data Types (Surfaces / Volumes / ...)

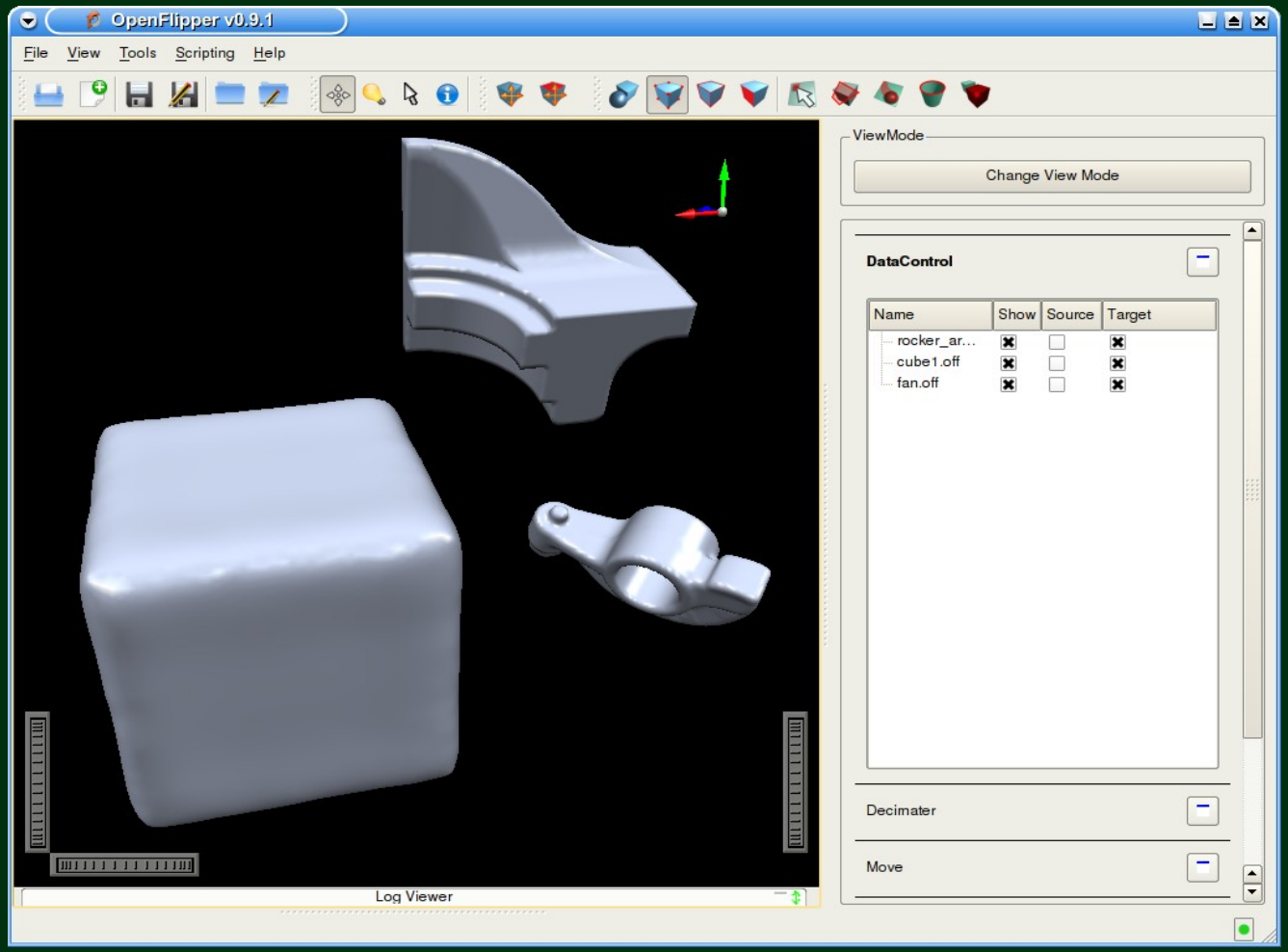


Major Features

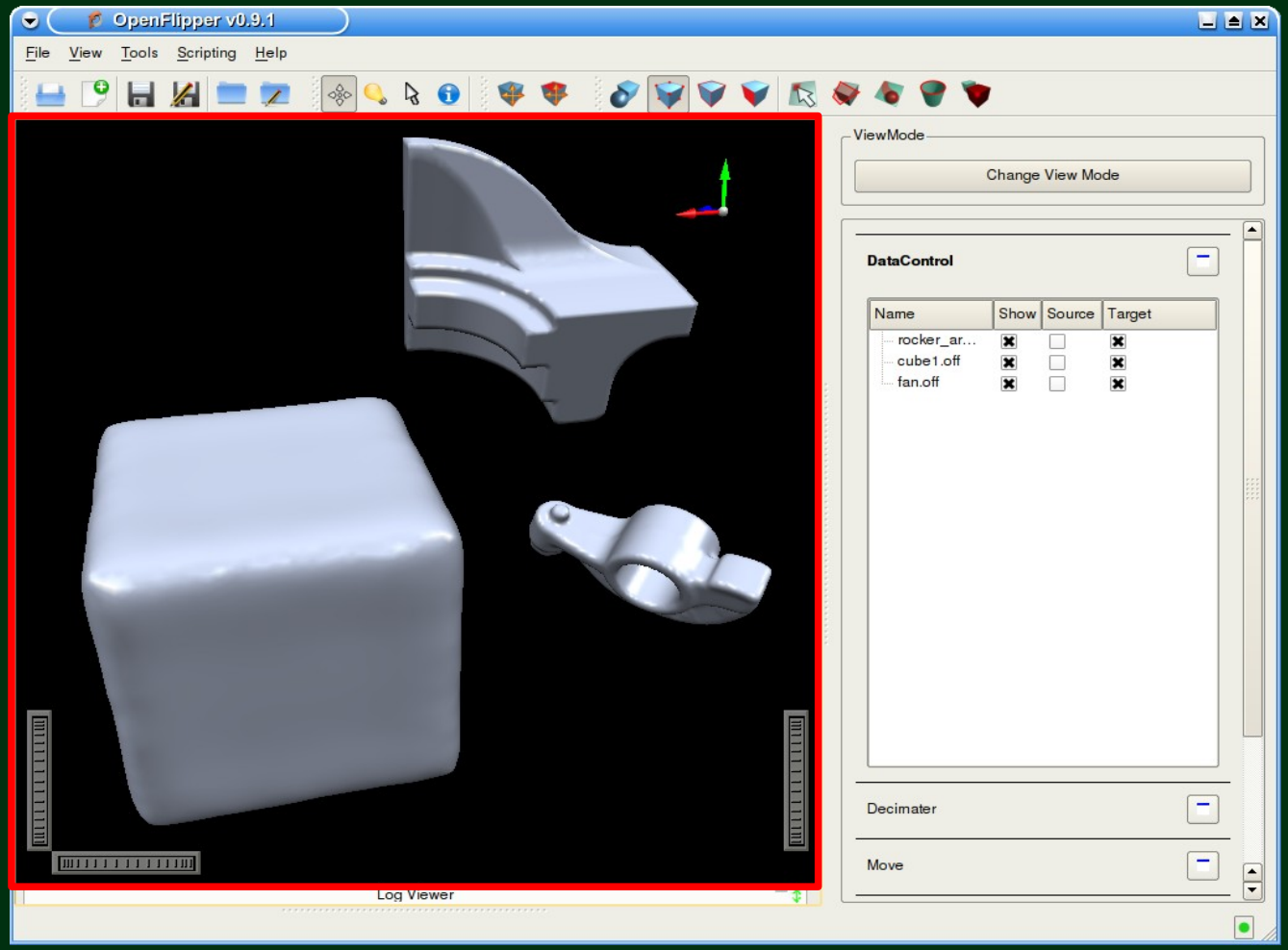
- Graphical User Interface
  - 3D Viewer
  - Selection Metaphors
- Flexible Scenegraph Structure
- Orthogonal Interaction Concepts
  - What (to do)
  - How
  - Where (to apply)
- Scripting

OpenFlipper

OpenFlipper

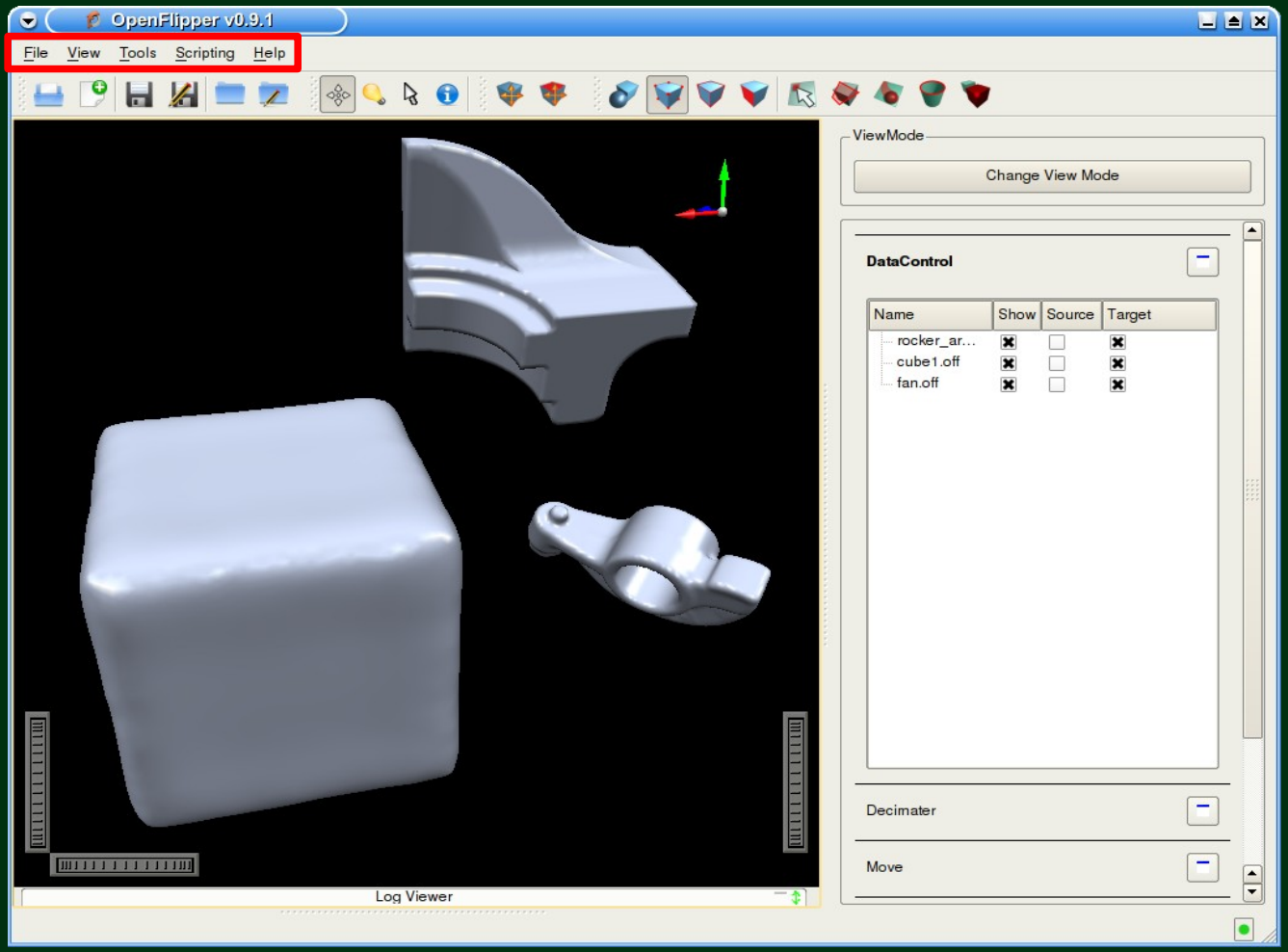


User Interface



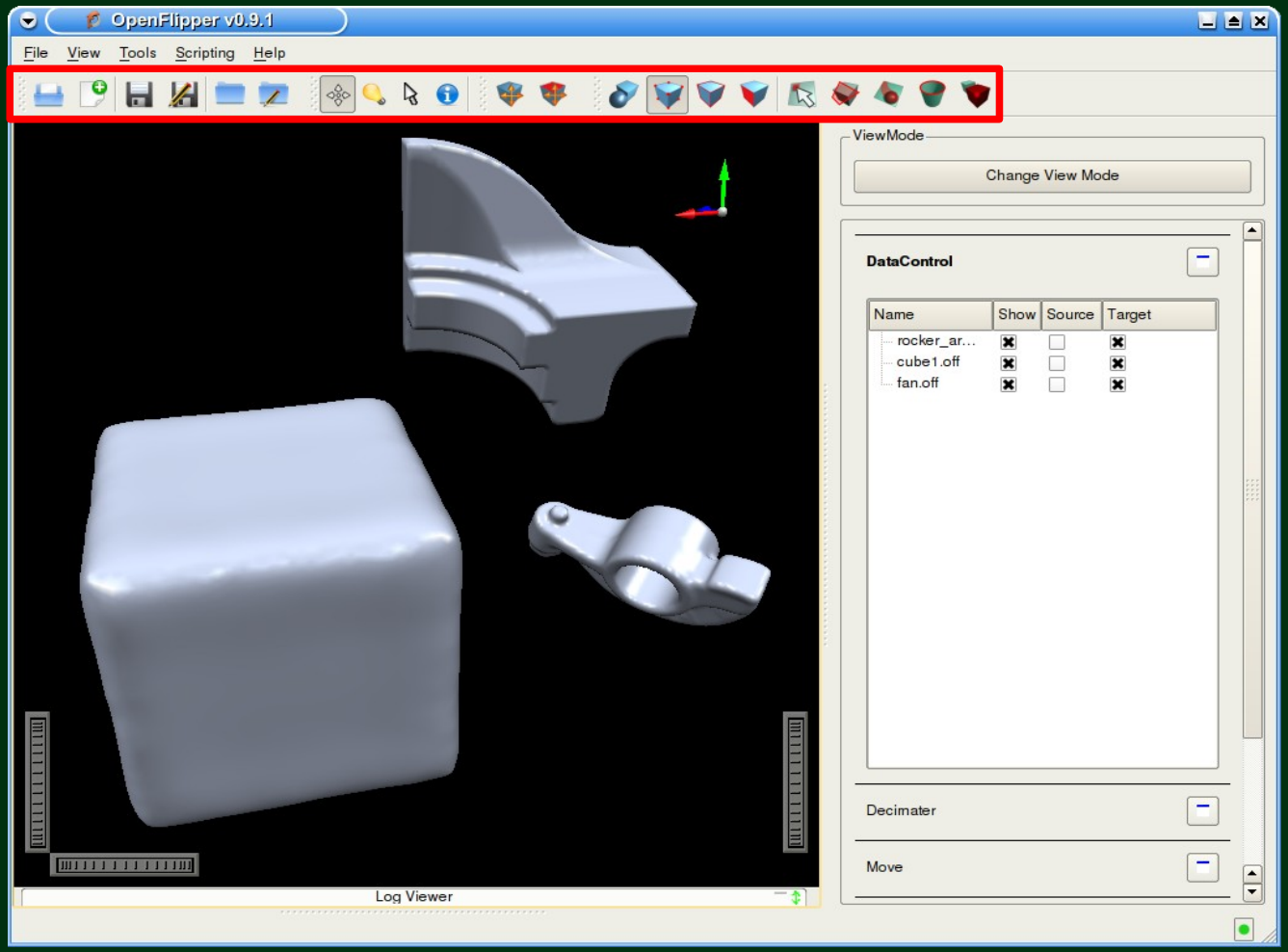
Viewer

User Interface



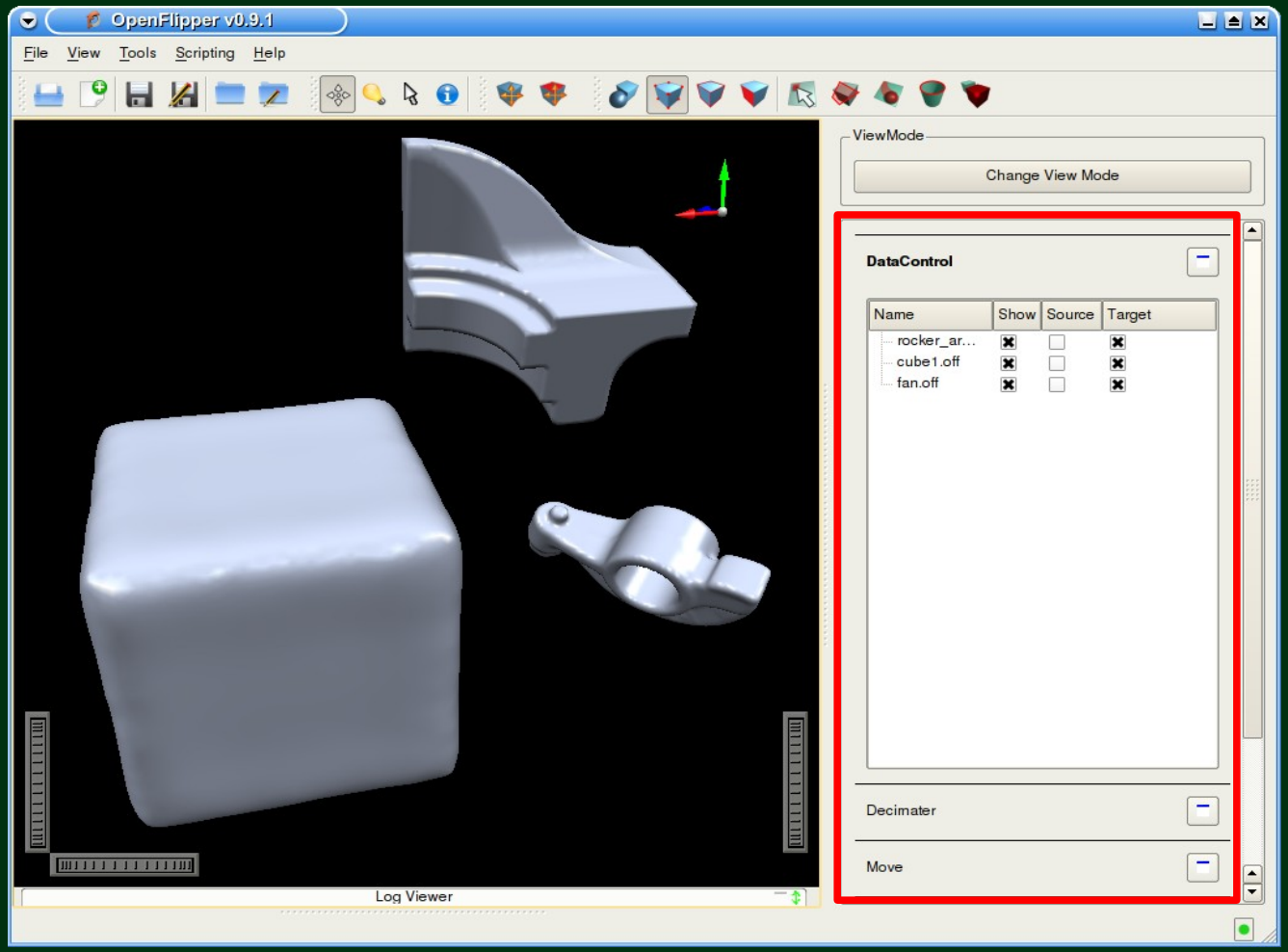
Menubar contains global functions

User Interface



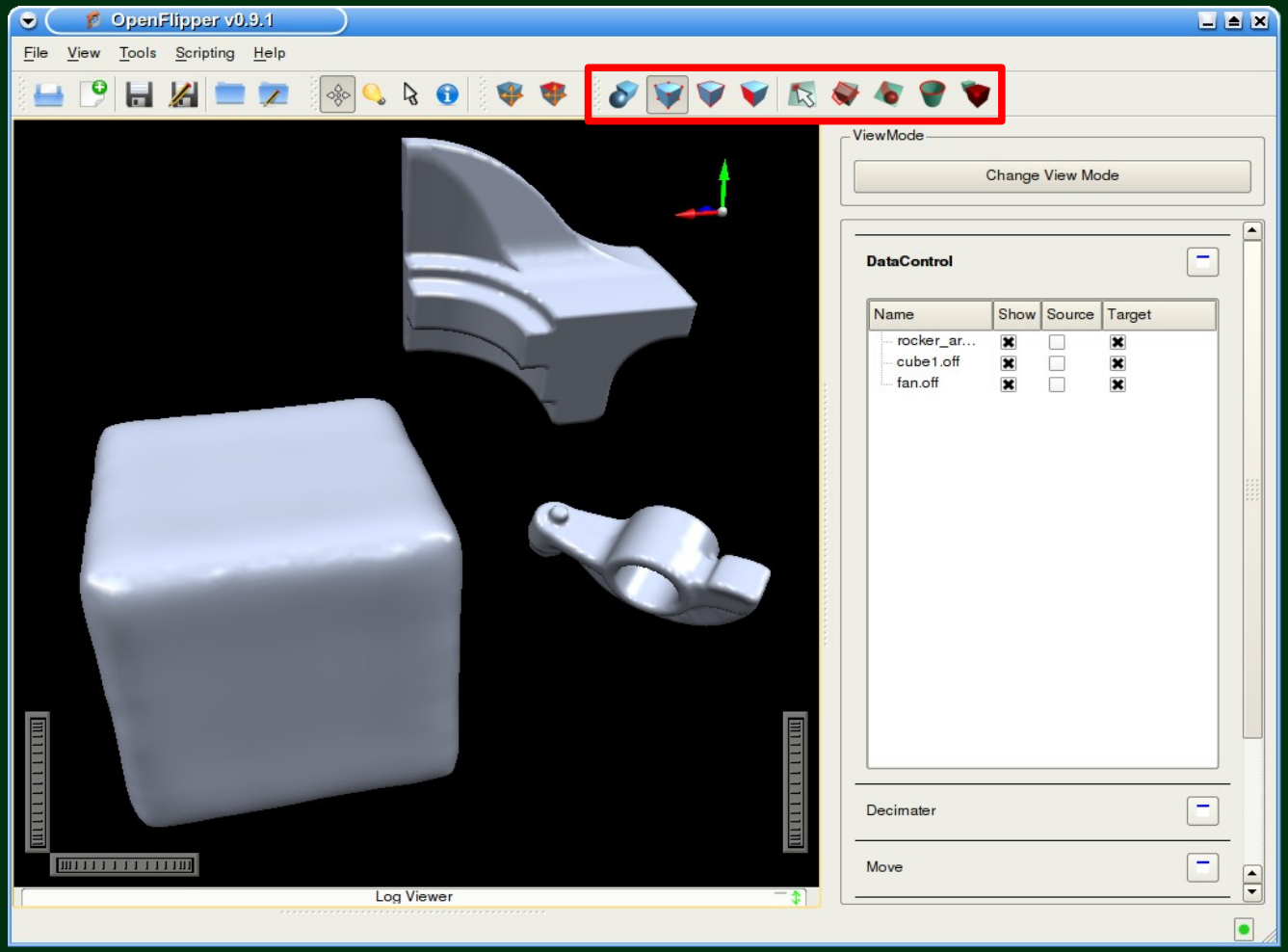
Toolbar for functions requiring user interaction

User Interface

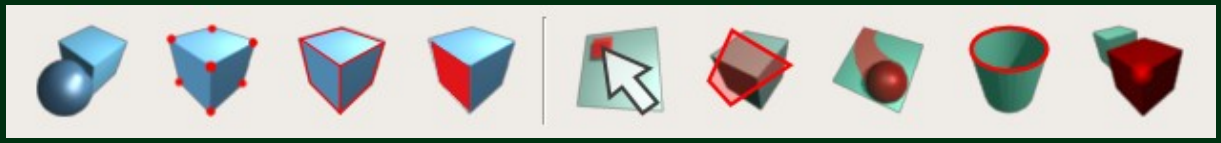


Toolbox for algorithm settings

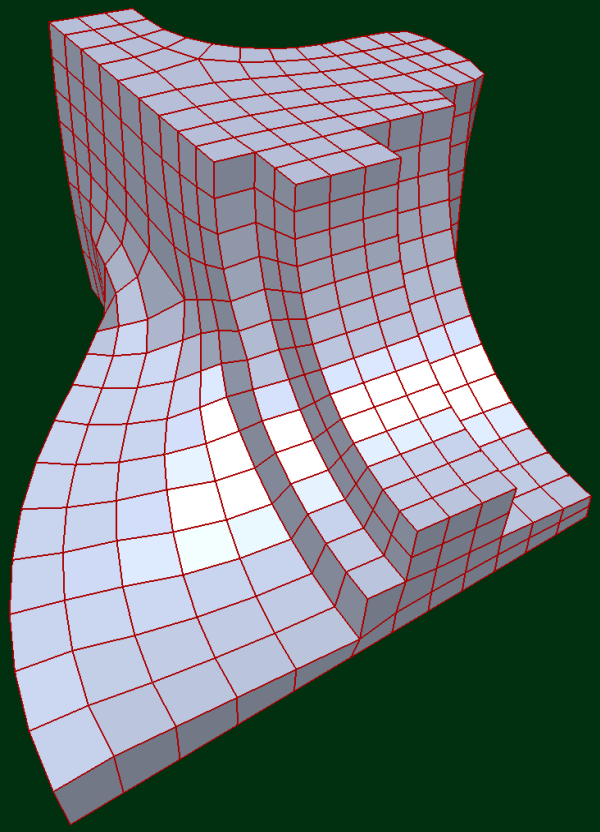
Selection Plugin

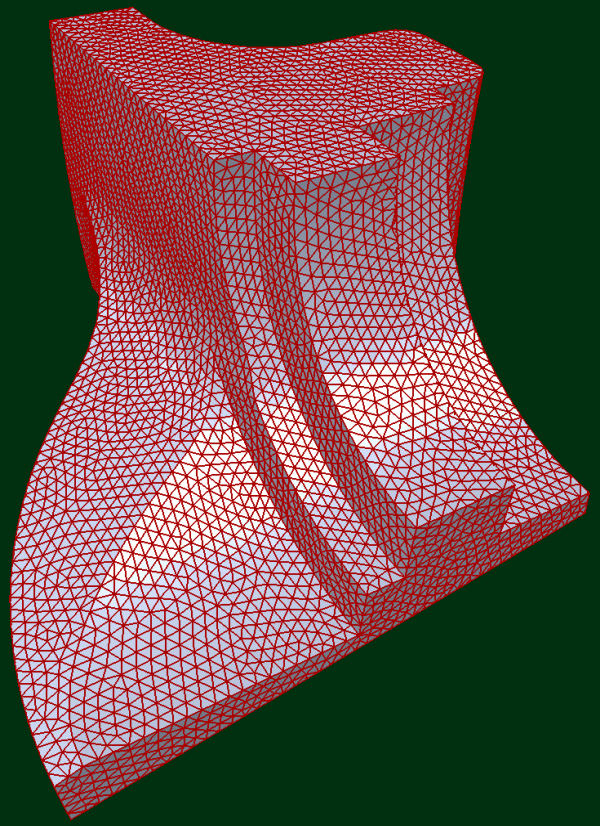


Selection Plugin

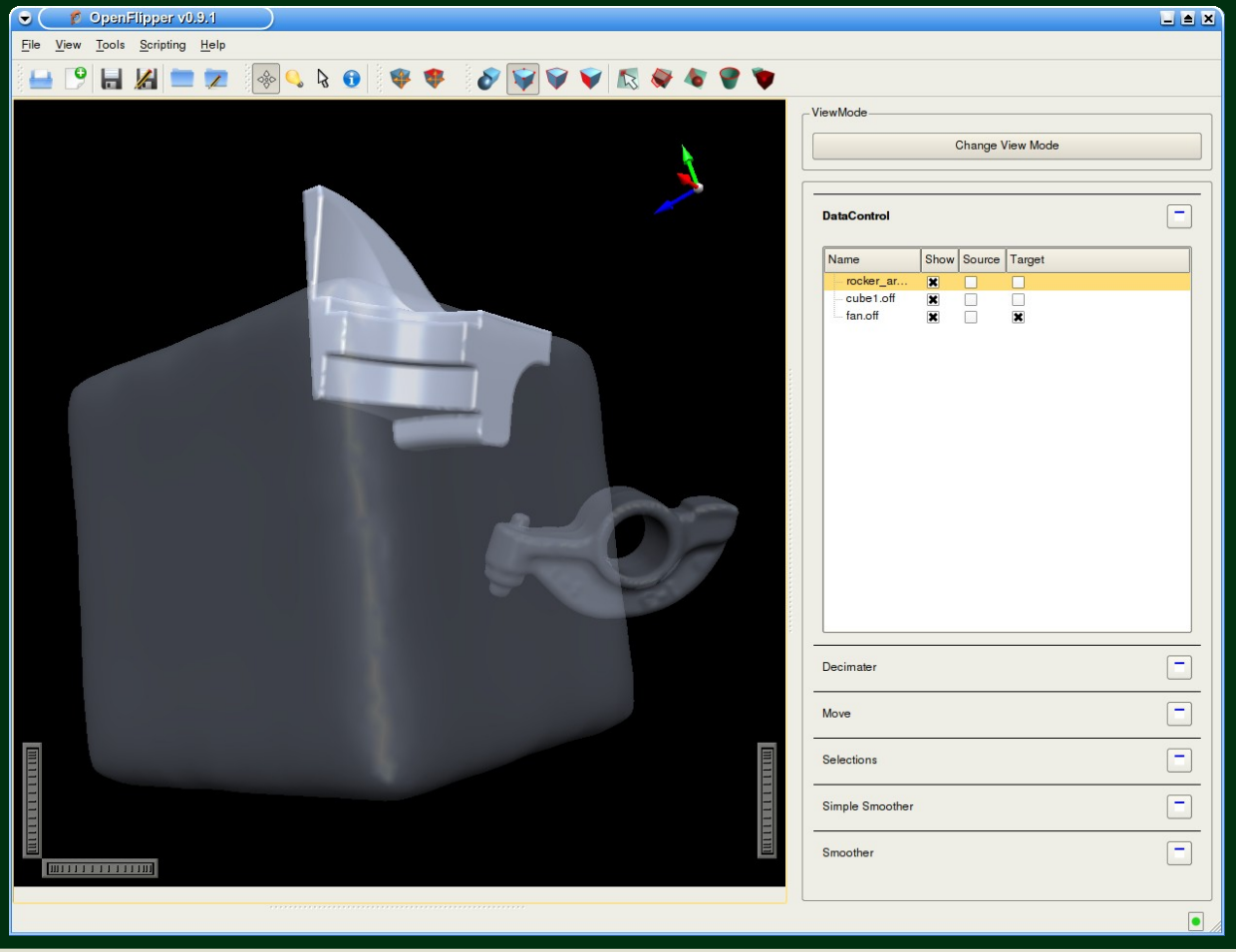


→ Selection on arbitrary Polygonal meshes

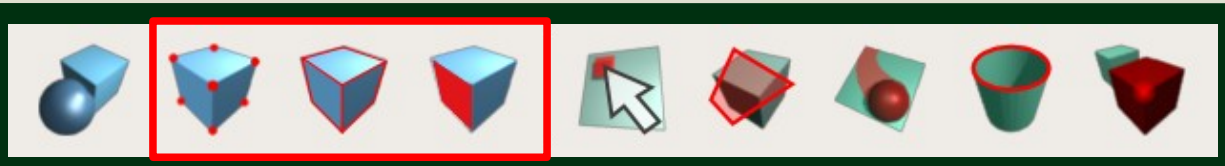




Selection Plugin



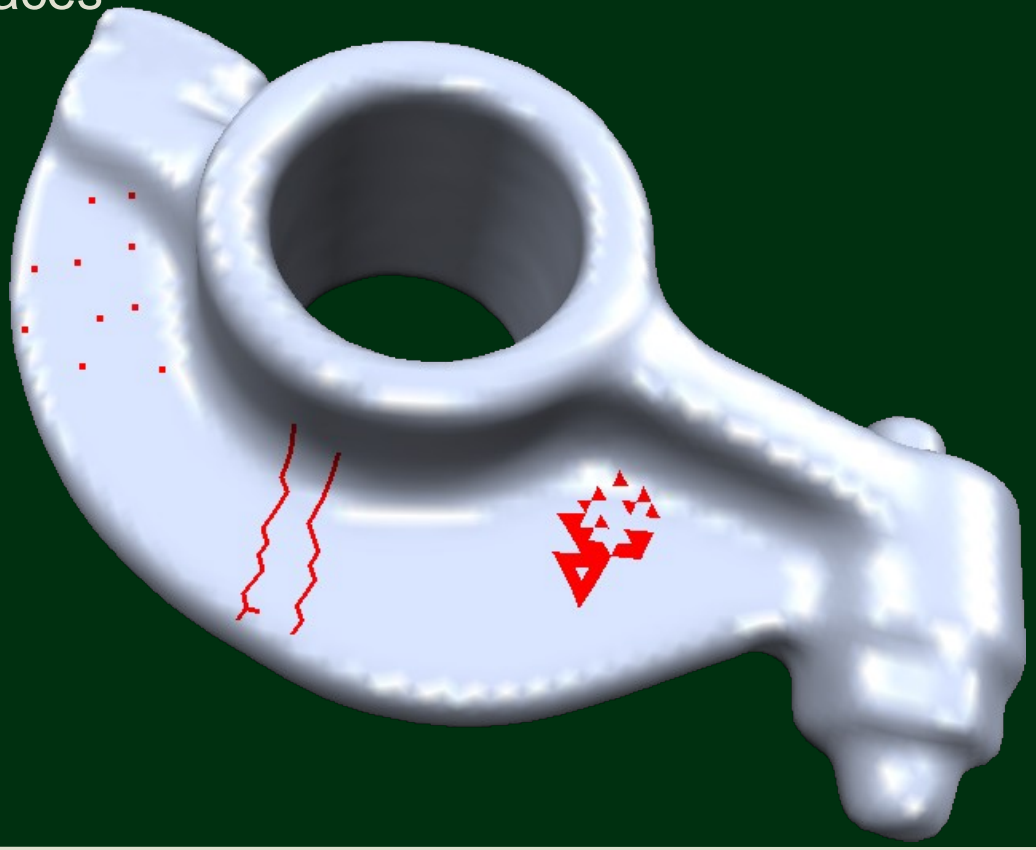
Selection Plugin



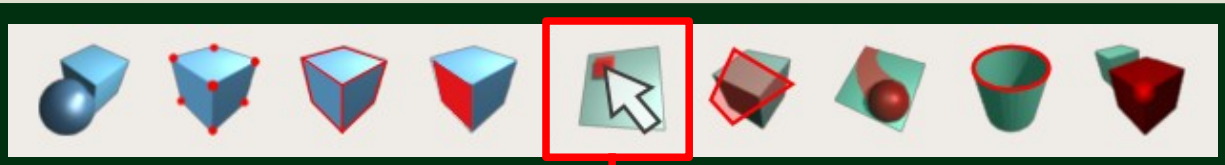
Vertices

Edges

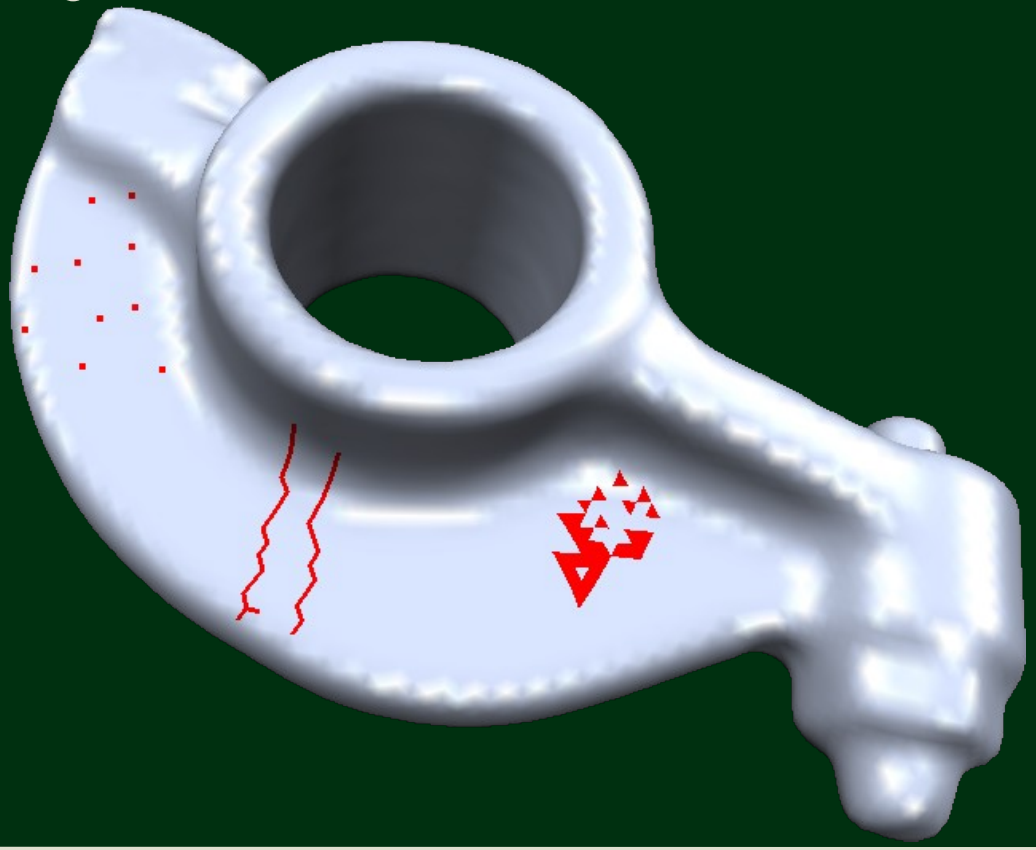
Faces



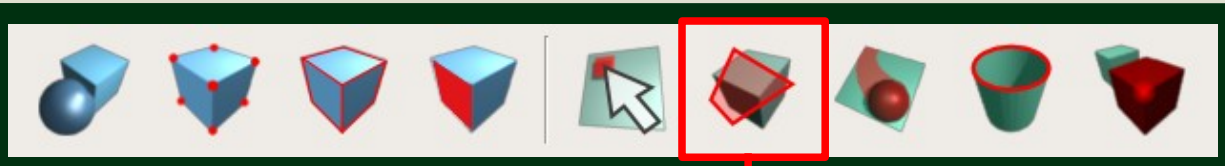
Selection Plugin



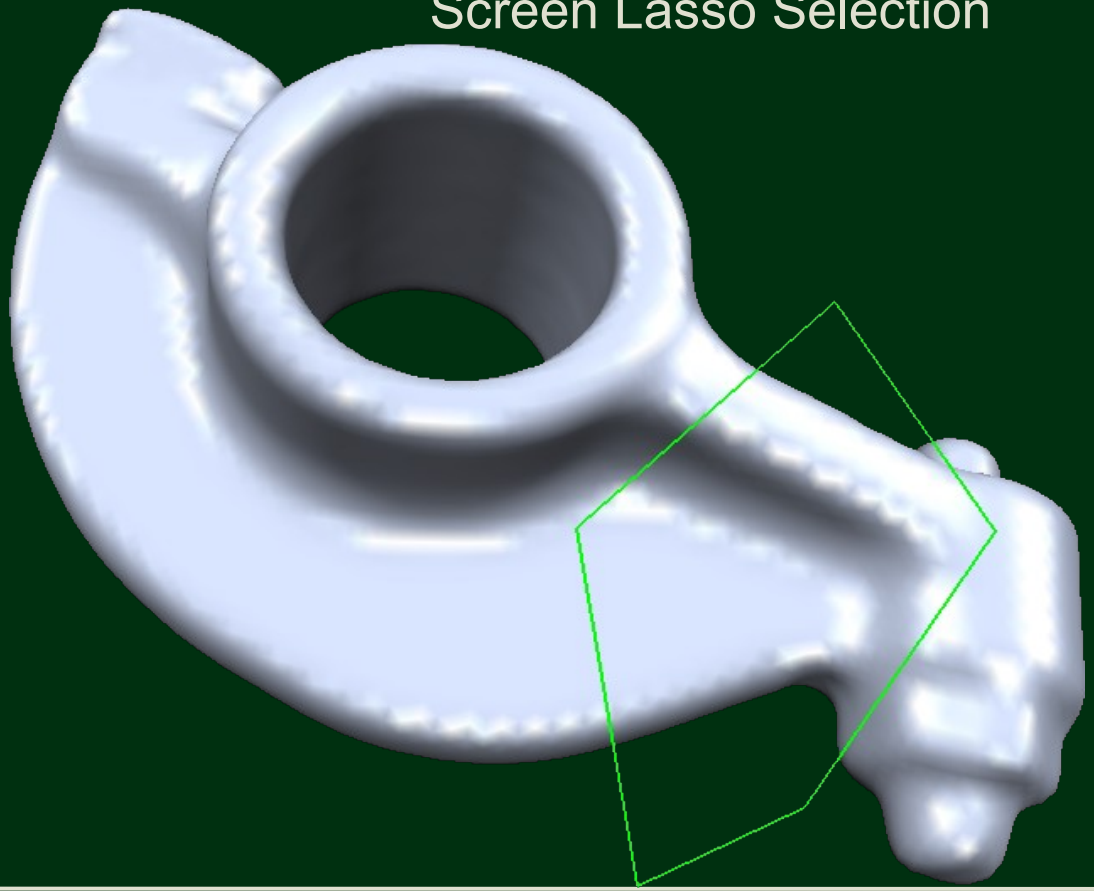
Single Selection



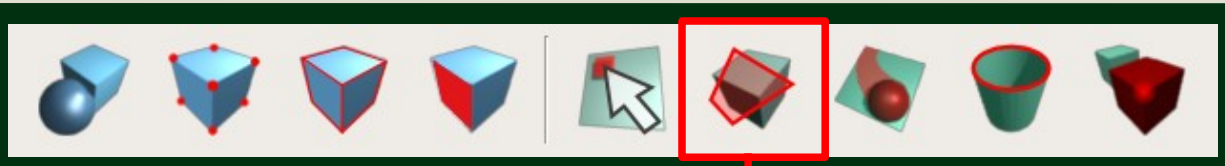
Selection Plugin



Screen Lasso Selection



Selection Plugin



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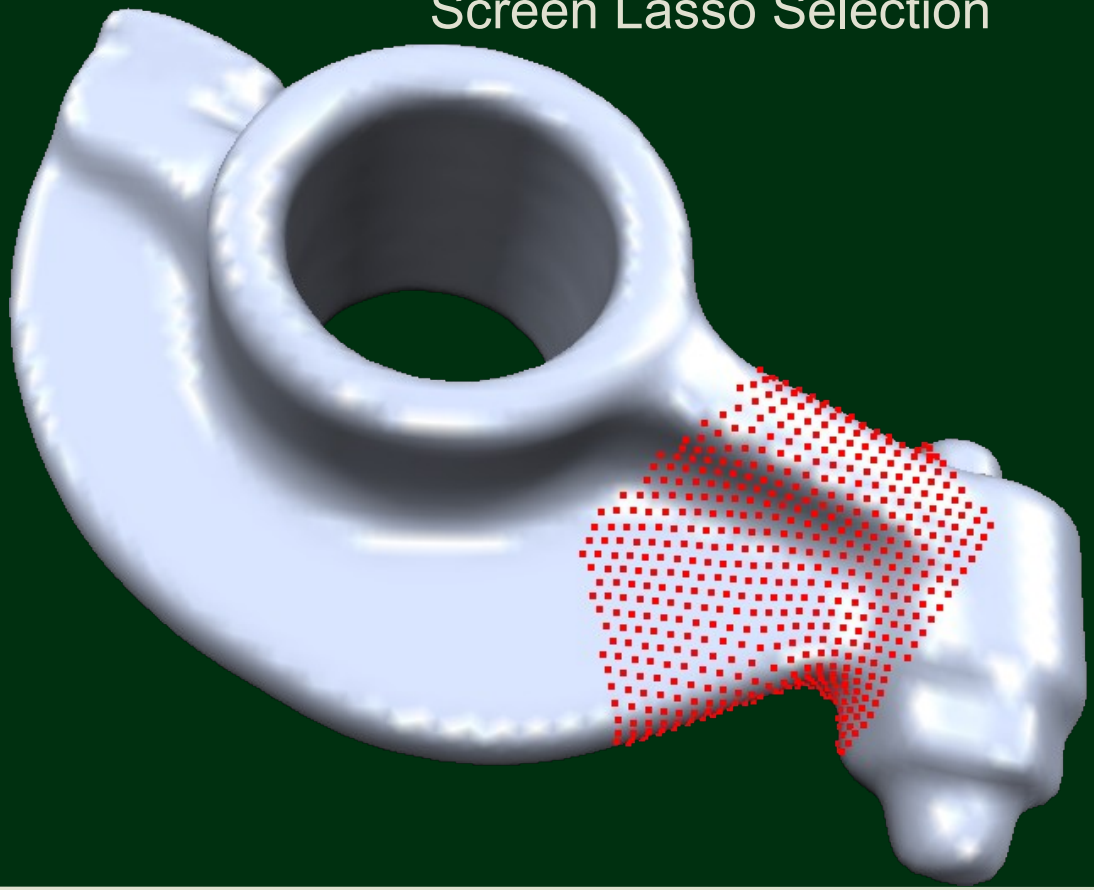
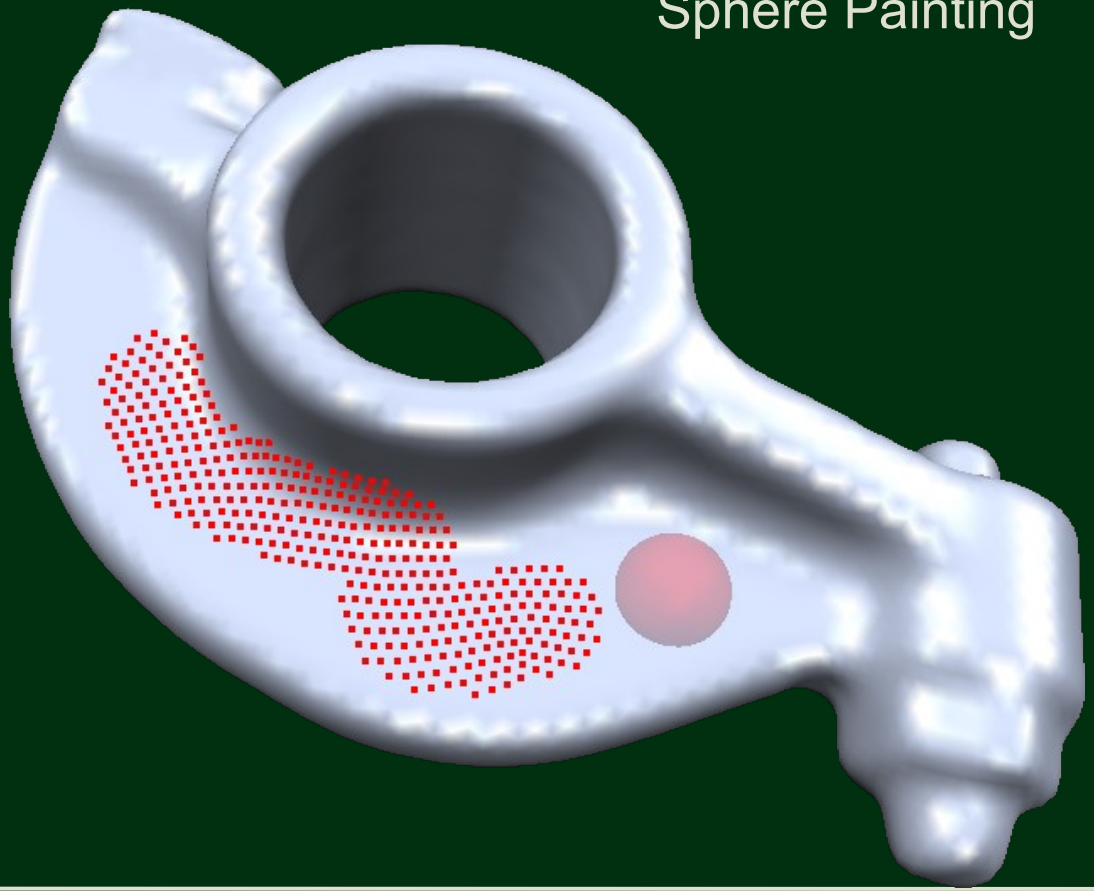


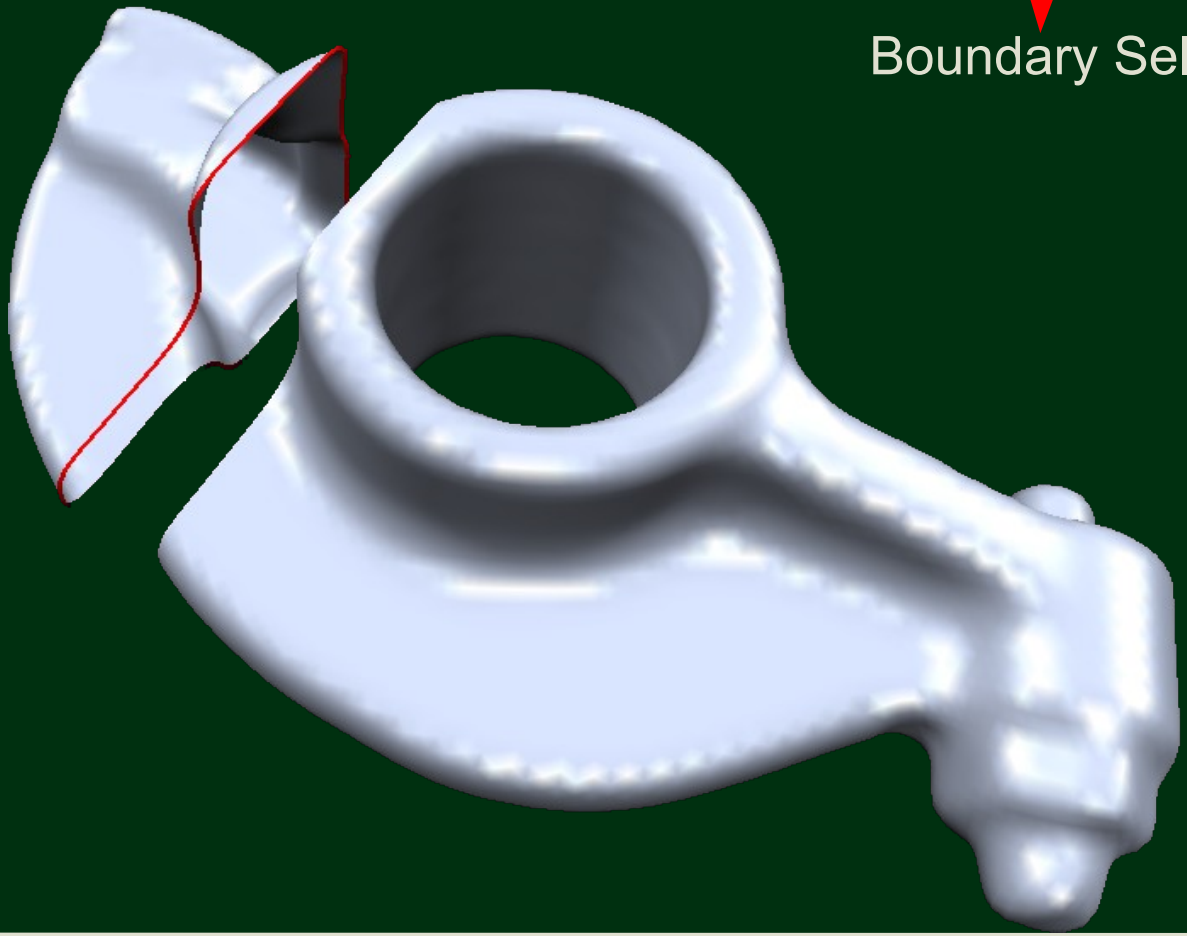
Selection Plugin

Sphere Painting

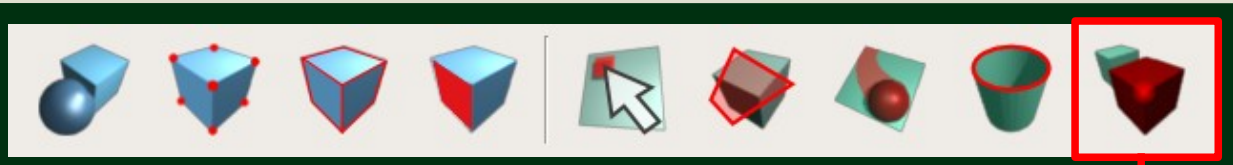


Selection Plugin

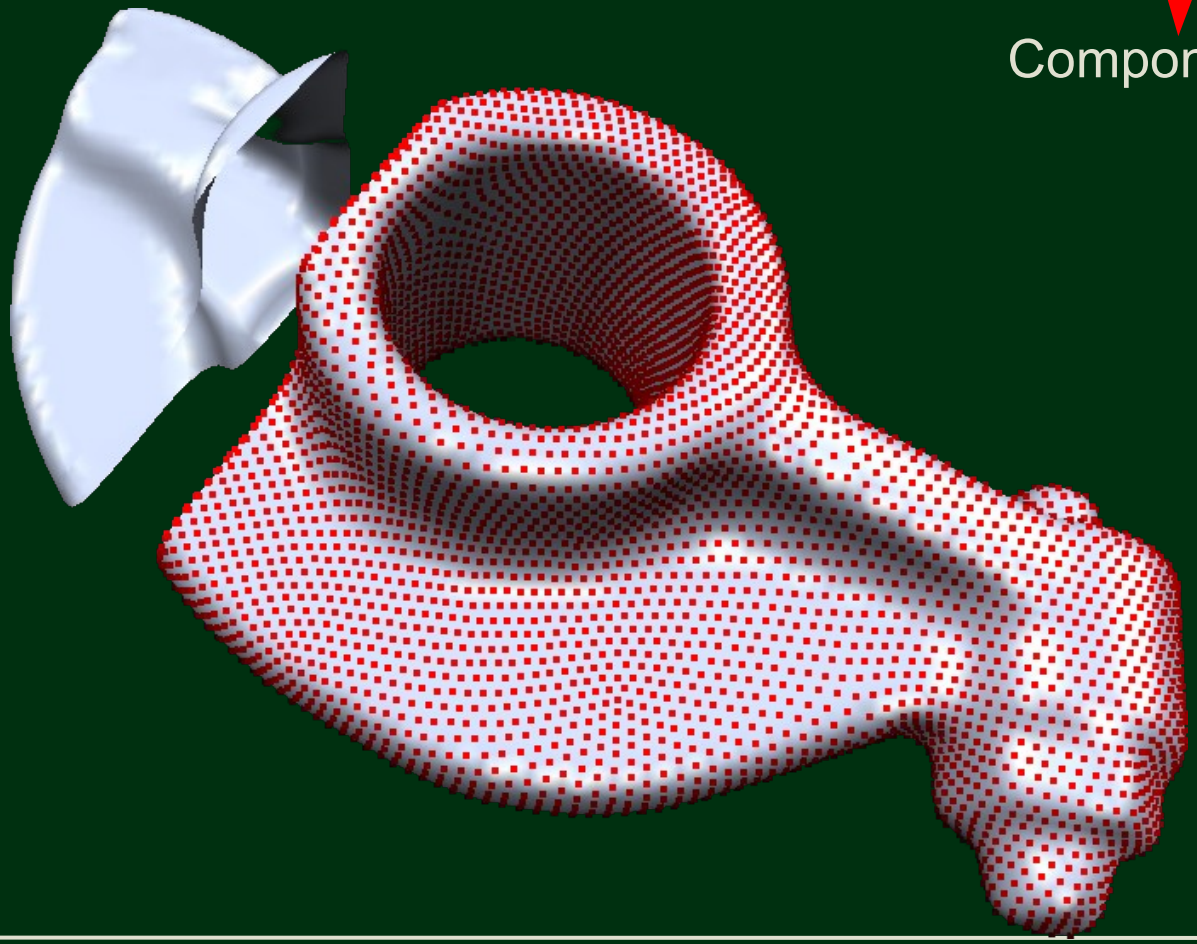
Boundary Selection



Selection Plugin

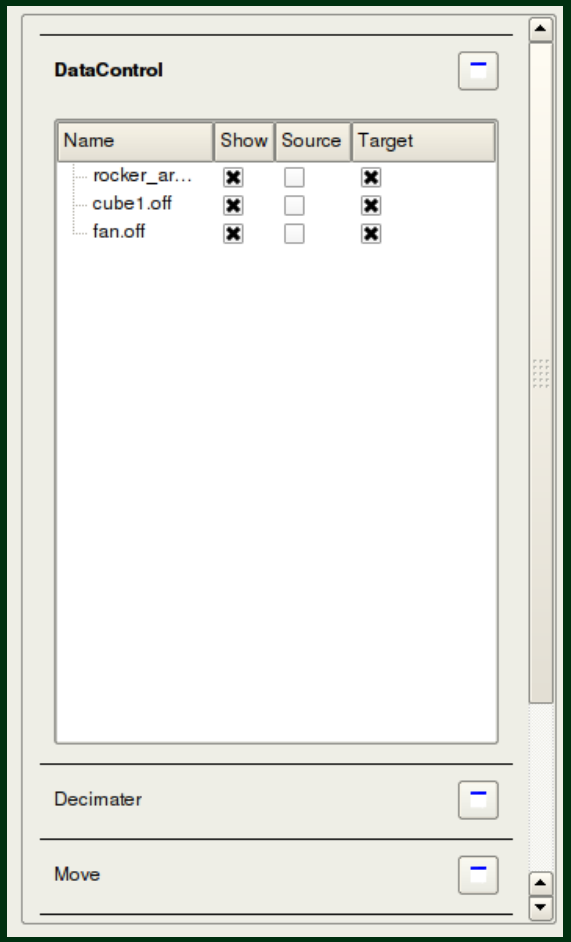


Component Selection

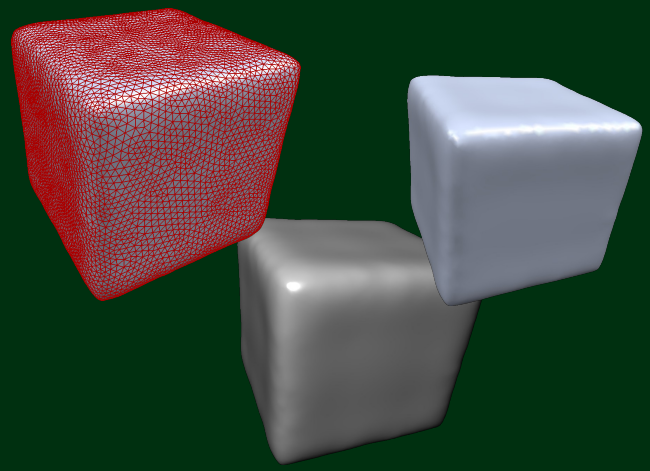


OpenFlipper Plugins

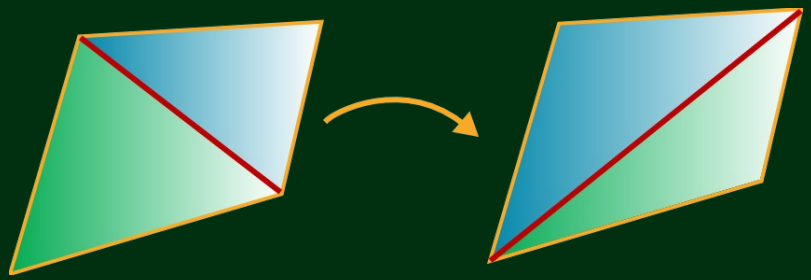
Data control



View Control



Topology

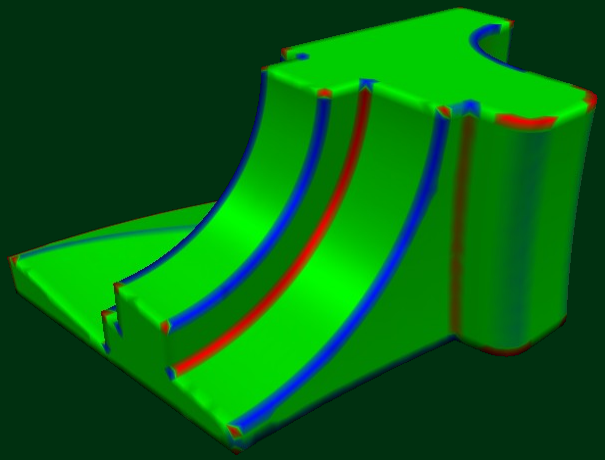


Flip Edges → OpenFlipper

Plugin System Other Interfaces

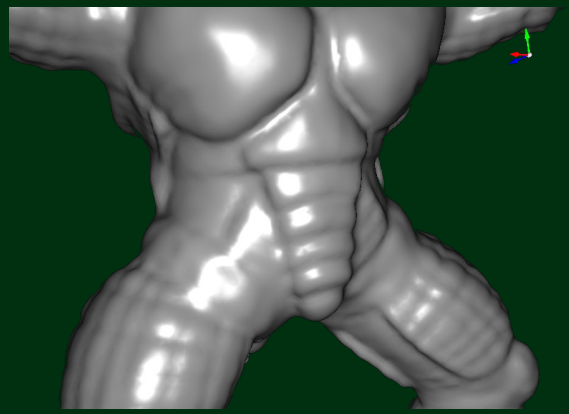
Texture control Plugin

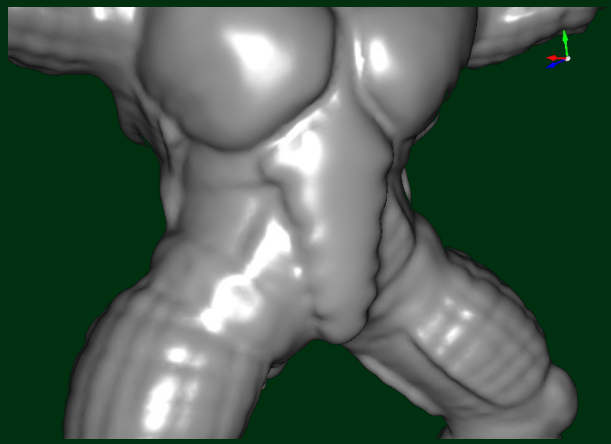
- Visualize arbitrary mesh properties
- Show textures



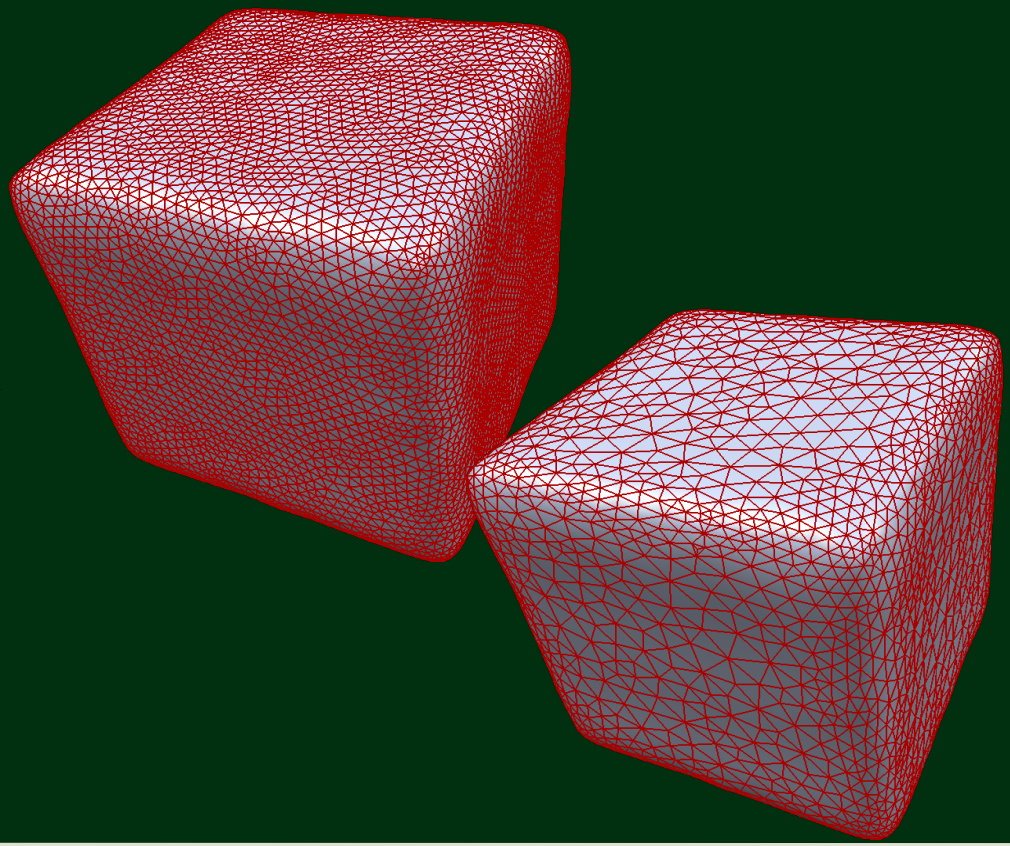
OpenFlipper Plugins

Smoother

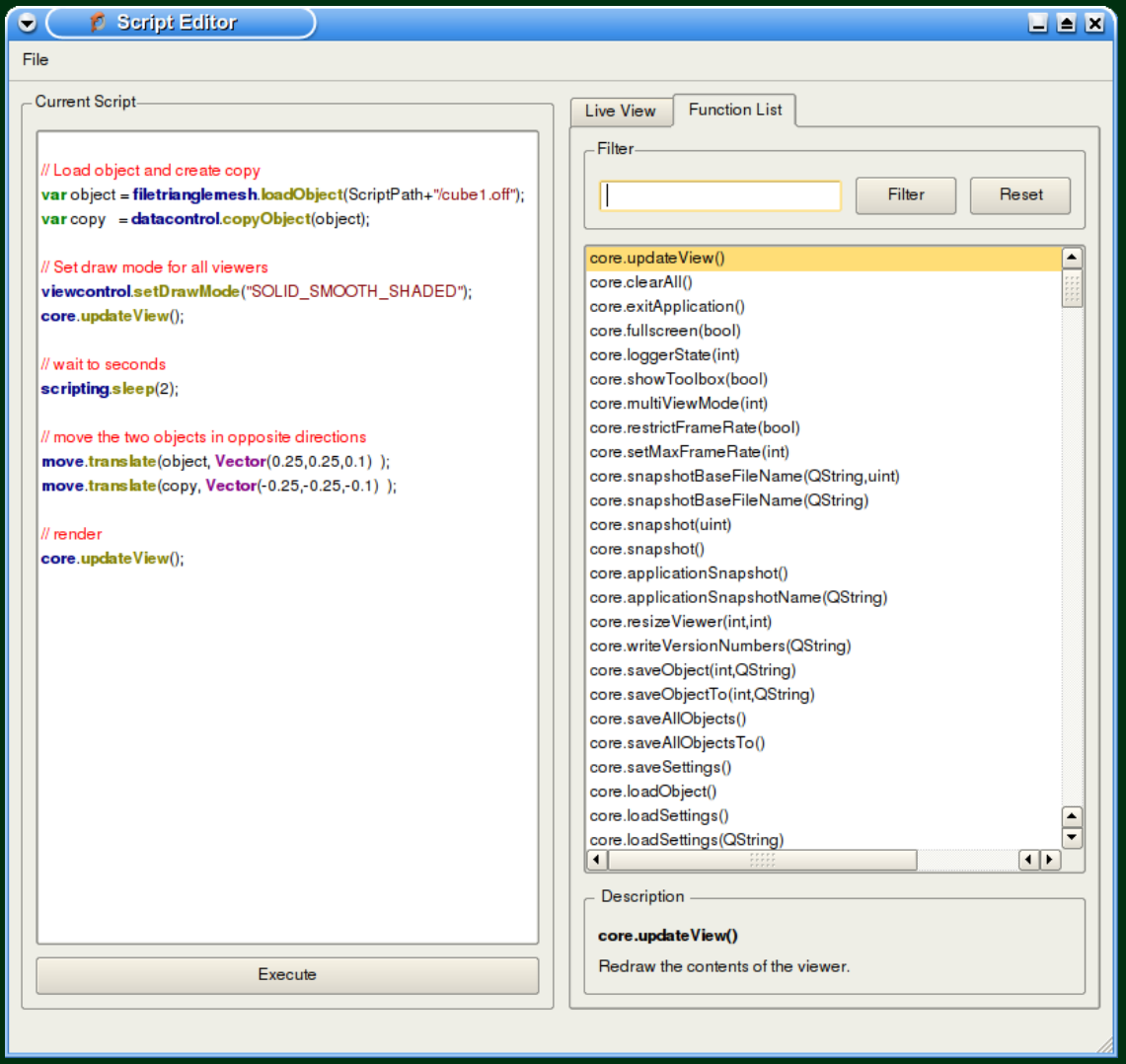




Decimater



OpenFlipper Scripting



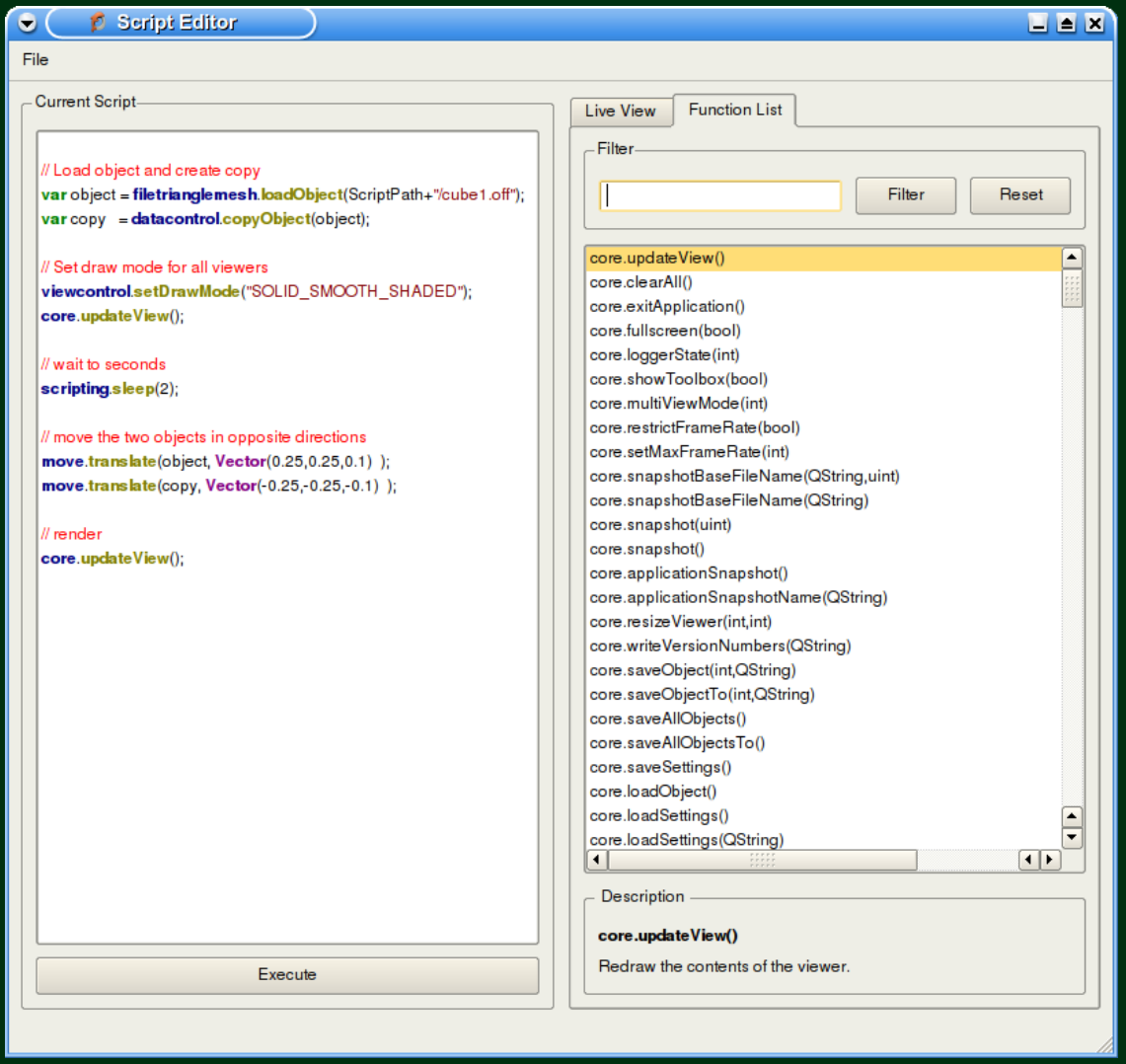
System

- Based on QtScript
- ECMAScript ECMA-262
- Plugins can easily provide functions for scripting
- Gui extension via script

Script Editor

- Collects available functions
- Collects descriptions
- Search for functions
- Editor with Syntax Highlighting
- Live View

OpenFlipper Scripting



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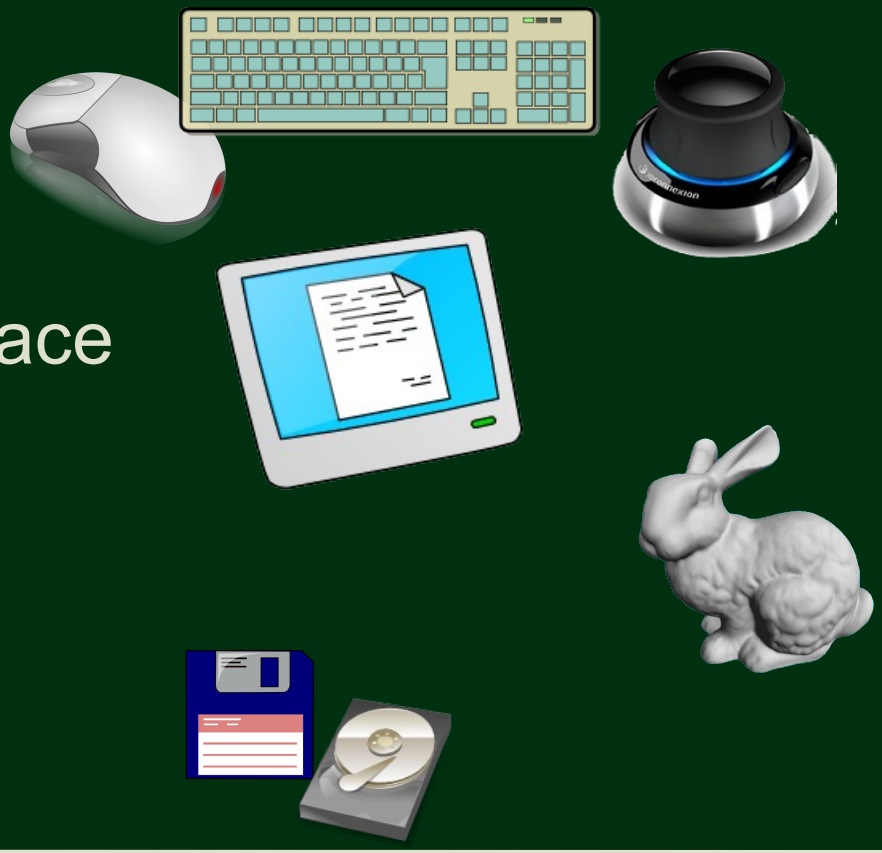
→ Writing a Plugin?

Plugin System

Loads plugins at startup / runtime

Uses Interfaces for communication with core

- User Interaction
- Graphical User Interface
- Visualization
- File/Object handling



Writing a Plugin

example.hh:

```
#include <OpenFlipper/common/Types.hh>
#include <OpenFlipper/BasePlugin/BaseInterface.hh>

class ExamplePlugin : public QObject, BaseInterface
{
  Q_OBJECT
  Q_INTERFACES(BaseInterface)

public :

  QString name() { return "ExamplePlugin"; };

  QString description() { return "Example Plugin Description"; };
};
```

example.cc:

```
#include "example.hh"

Q_EXPORT_PLUGIN2( examplePlugin , ExamplePlugin );
```

Writing a Plugin

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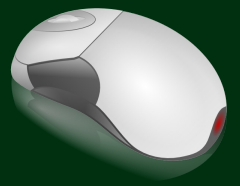

?

Writing a Plugin

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```
#include <OpenFlipper/common/Types.hh>
#include <OpenFlipper/BasePlugin/BaseInterface.hh>
#include <OpenFlipper/BasePlugin/MouseInterface.hh>

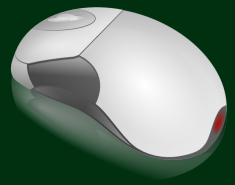
class ExamplePlugin : public QObject, BaseInterface ,MouseInterface
{
  Q_OBJECT
  Q_INTERFACES(BaseInterface)
  Q_INTERFACES(MouseInterface)

private slots:
  void slotMouseEvent( QMouseEvent* _event ) {  …  };

public :

  QString name() { return "ExamplePlugin"; };

  QString description() { return "Example Plugin Description"; };
};
```



Writing a Plugin

Mesh Smoother :

```
private slots:
    void simpleLaplace() {

      for ( ObjectIterator o_it( TARGET_OBJECTS , DATA_TRIANGLE_MESH ) ;
                                  o_it != objectsEnd();
                              ++o_it)
      {
       Smooth ( triMesh(*o_it) ); // Get the mesh and smooth it

        emit updatedObject(o_it->id());
      }
    }
```

Writing a Plugin

Mesh Smoother :

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Scripting?

Writing a Plugin

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       emit updatedObject(o_it->id());
     }
  }
```

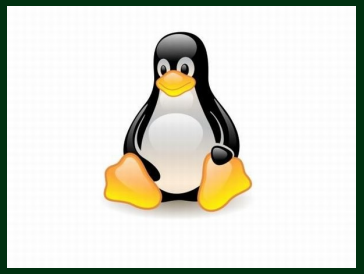
Scripting?

→ exampleplugin.simpleLaplace()

OpenFlipper

Demo

Supported Architectures



Linux

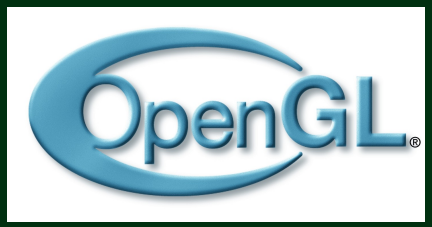
Windows(XP/ Vista)

Mac OS X

All Architectures in 32 / 64 -bit

Build Dependencies

Qt Framework (>= 4.5)



OpenGL

OpenGL Extension Wrangler Library (GLEW)

OpenGL Utility Toolkit (GLUT)

OpenMesh

OpenMesh (2.0 included)

OpenMesh 2.0

OpenMesh

Generic and efficient data structure for representing and manipulating polygonal meshes.

License:	LGPL 2.1
Latest Version:	OpenMesh 2.0
For more information see:	www.openmesh.org

Supported Compilers

Linux & MacOS X

GNU Compiler Collection (GCC >=4.0)

Windows

Visual Studio 2008

Windows / Linux (GCC >=4.3)

Conclusion

- Multi Platform Geometry processing Framework
- Open Source (License LGPL 3)
- Flexible User Interface
- Simple plugin api

Thank You!

www.OpenFlipper.org