What is VTK?

- An open source, freely available software system for 3D graphics, image processing, and visualization.
- Support for hundreds of algorithms in visualization and image processing.
- Object-oriented design with different interpreted language wrappers.
At a Glance

- The core of VTK is written entirely in C++
- Contains 600 existing classes with 325K lines of code
- VTK will compile and run on Windows 98/NT, SGI, Linux, Sun, HP, etc.
- Support OpenGL and Mesa
- Different interfaces for fast prototyping: Tcl/Tk, Java, and Python
- Have users all over the world – The beauty of Open Source!

System Architecture

Interpreted Wrapper (Tcl, Java, Python) [Why?]

- C++ core

Binary Installation: if you will use

- The classes to build your application

Source code Installation: if you want to extend vtk

- Tcl/Tk source
- Java JDK
- Python source

All class source code (could take hours to compile)

Libraries and includes (dll and .h files)

- Tcl/Tk shell
- Java interpreter
- Python interpreter

Or

- .a and .h files

Installation (1)

Windows 9x/NT/2000

- Binary: vtk32Core, vtk32Cpp, vtk32Tcl, vtk32Java, vtk32Python (dll and includes)
  They will install Tcl/Tk for you (for example) if your PC does not have one already.
  With this installed, you can run their sample programs and write your own C++ application.

- Source: You will need VC++ 6.0 installed too.

Installation (2)

Unix (alpha, beta, etc): I have installed a copy on

/usr/class/cis788.14Q/vtk3.2 = path

- Library: $path/common/libVTKCommon.a
- $path/graphics/libVTKGraphics.a
- $path/imaging/libVTKImaging.a
  also there are directories ‘patented’ and ‘contrib’ that you might use.

- Includes: -I$path/common –I$path/graphics –I$path/imaging

Check the makefile in $path/graphics/exampleCxx/Makefile

Installation (2.1)

- CIS unix servers will be slow as we do not have native OpenGL support. Instead, we use Mesa3d. But you can do your labs in any of the CIS labs
- Only C++ is supported (not Tcl/Tk at least)
- When you use the server to run vtk examples, you need to do

  setenv LD_LIBRARY_PATH /n/gold/1/graphics/Mesa3.0/lib

- We probably can install a copy on albatross (graphics lab server)

VTK classes
VTK Object models
- Graphics and Visualization Model
  - Graphics objects: rendering
  - Visualization objects: generating geometry

Data Flow System: Pipeline execution

The Graphics Model
The purpose is to render the geometry (volume) on the screen

Example Program

```
Main() {
    // create a window
    create a renderer; give the renderer to the window;
    create procedural geometry;
    create a mapper; give the geometry to the mapper;
    create an actor; give the mapper to the actor;
    give the actor to the renderer;
    window->render();
}
```

To see is to believe ...
User interaction

- vtkRenderWindowInteractor - allow the user to interact with the graphics objects
- Try the following keypresses:
  - w: wireframe mode
  - s: surface mode
  - r: reset the transformation
  - 3: toggle stereo
  - button 3: zoom; button 2: pan; button 1: rotate;
  - c/o: camera mode or object mode
  - j/t: joy stick or tracer ball mode
  - e: exit

Go home to do the following...

- Install VTK (in your PC)
- Run Tcl or C++ examples
- Build C++ examples OR
- Use the VTK installation on beta:
  - /usr/class/cis788.14Q/vtk3.2/
  - Copy a couple of examples in graphics/examplesCxx to your local directory
  - Modify the makefile there and compile from your local directory
  - Give it a try!