Getting Started with ITK + VTK

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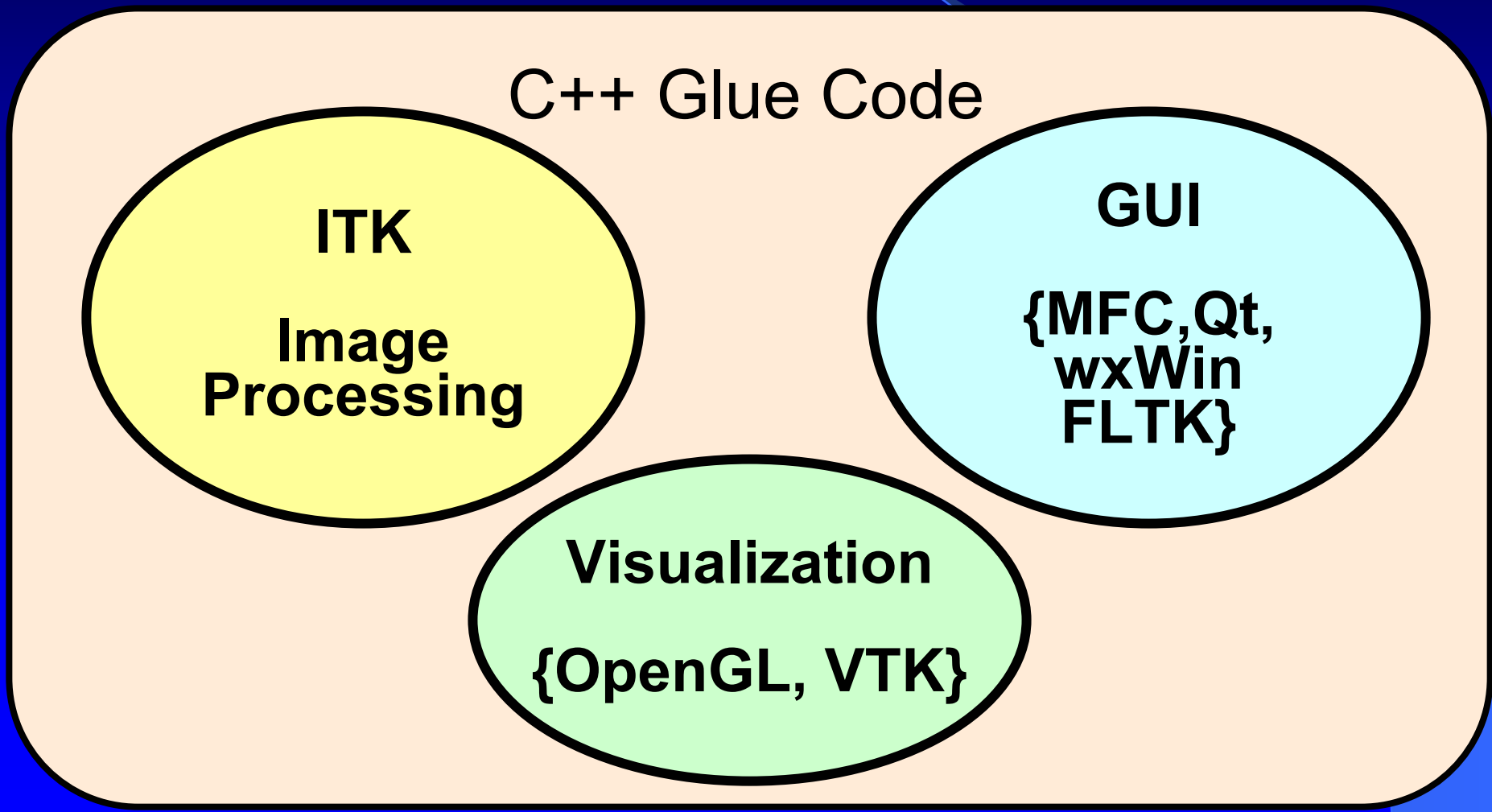
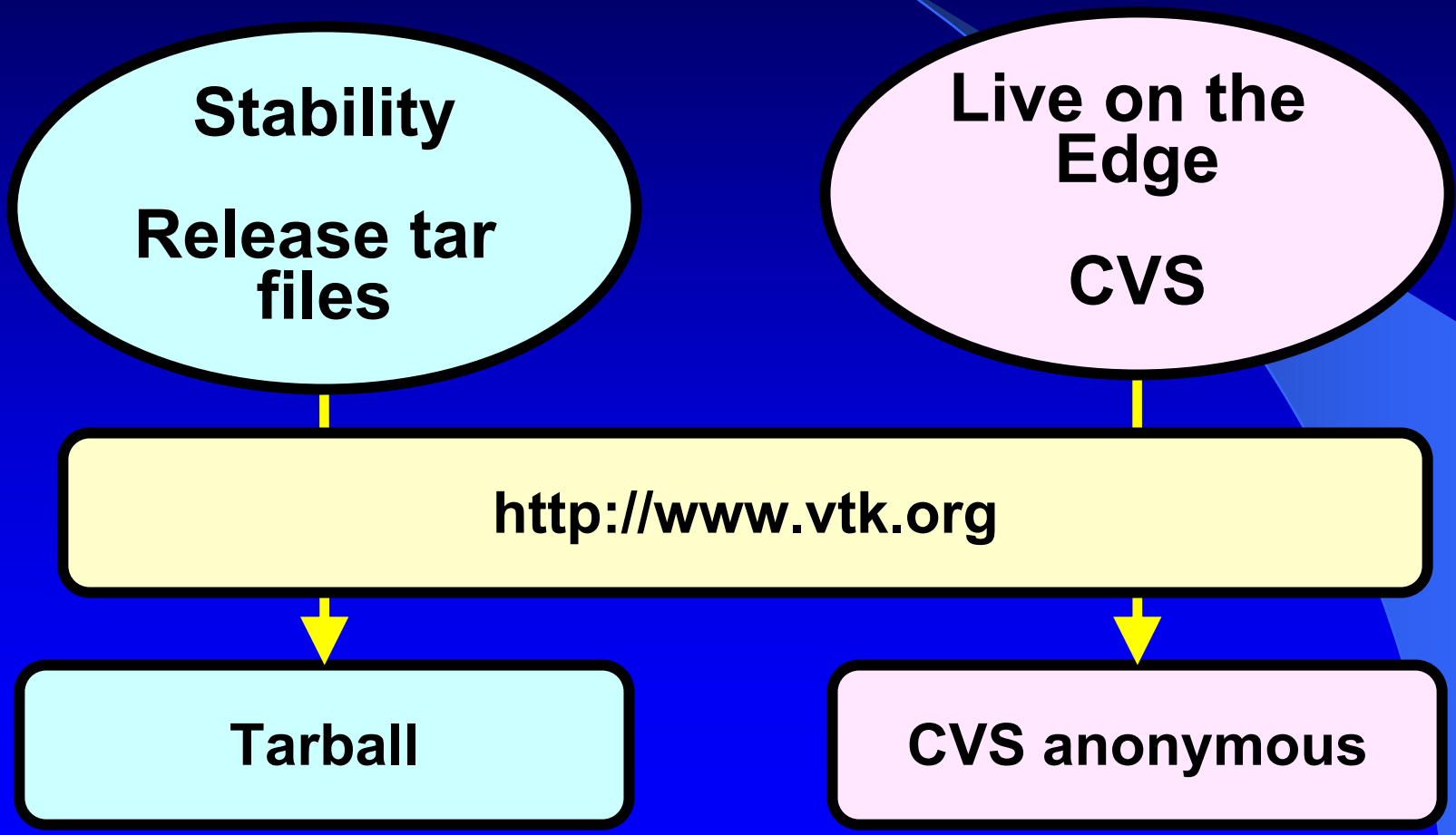
What is ITK

- Image Processing
- Segmentation
- Registration
- No Graphical User Interface (GUI)
- No Visualization

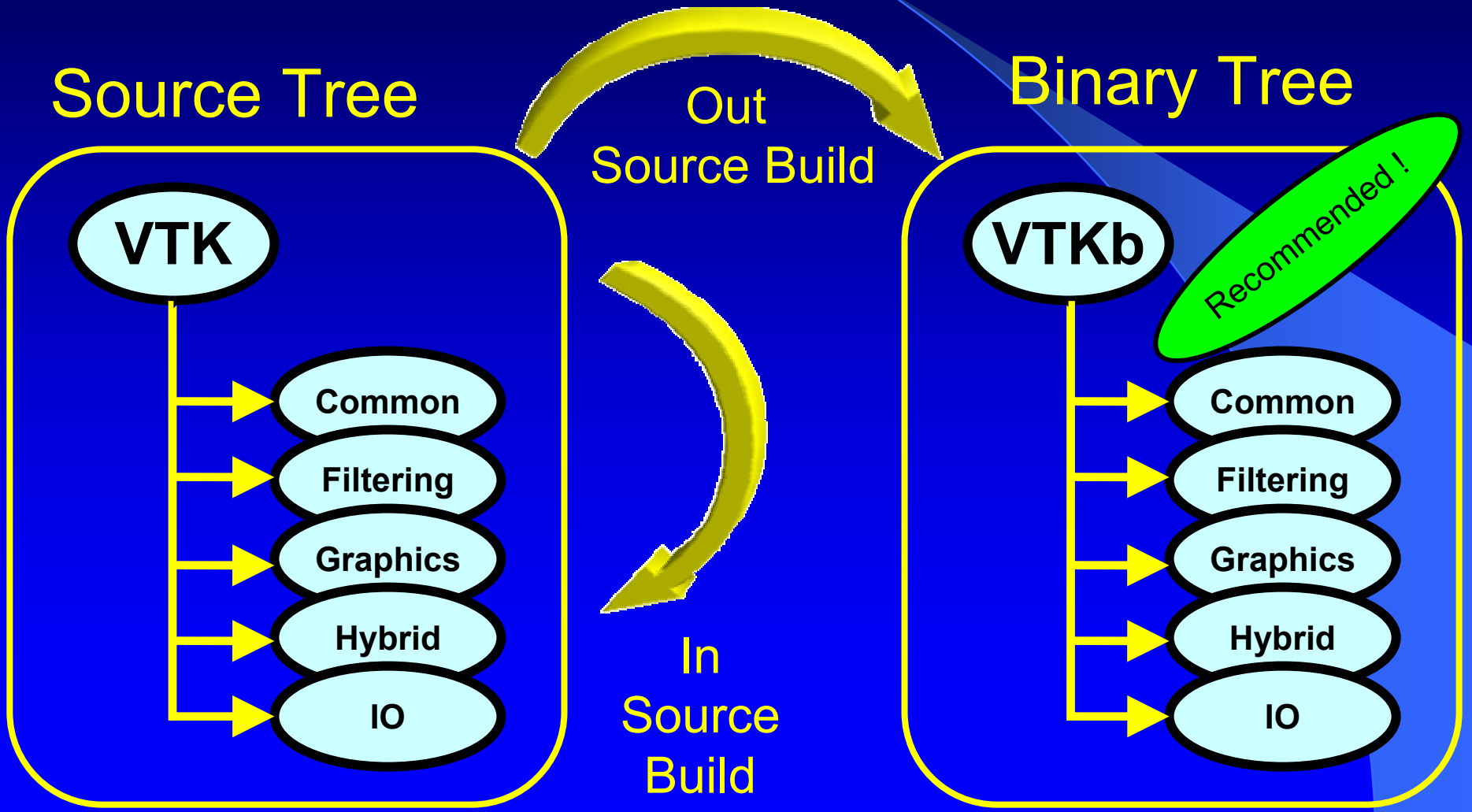
How to Integrate ITK in your application



Step 1. Download VTK



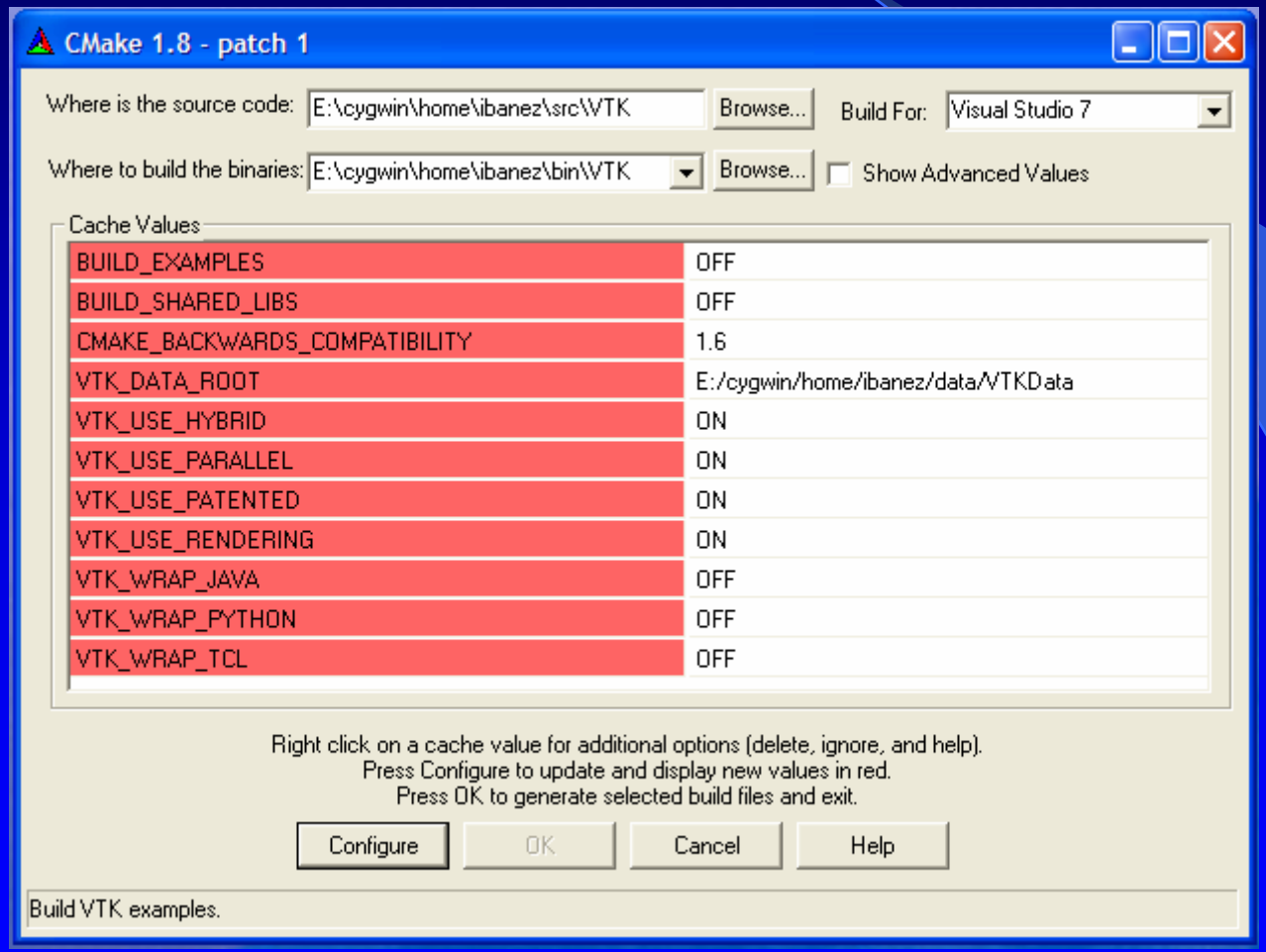
Step 2. Configuring VTK



Step 2. Configuring VTK

- Run CMake
- Select the SOURCE directory
- Select the BINARY directory
- Select your Compiler (same used for ITK)

Step 2. Configuring VTK



Step 2. Configuring VTK

Disable

- BUILD_EXAMPLES
- BUILD_SHARED

Leave unchanged

- CMAKE_BACKWARD_COMPATIBILITY
- VTK_DATA_ROOT

Step 2. Configuring VTK

Enable

- VTK_USE_HYBRID
- VTK_USE_RENDERING
- VTK_USE_PARALLEL
- VTK_USE_PATENTED

Step 2. Configuring VTK

Disable

- VTK_WRAP_JAVA
- VTK_WRAP_PYTHON
- VTK_WRAP_TCL

Enable (Advanced)

- VTK_USE_ANSI_STDLIB

Step 3. Build VTK

- Open VTK.dsw in the Binary Directory
- Select ALL_BUILD project
- Build it

  …It will take about 90 minutes …

Step 4. Verify the Build

Libraries will be found in

VTK_BINARY / bin / { Debug, Release }

Step 4. Verify the Build

The following libraries should be there

- vtkCommon
- vtkFiltering
- vtkImaging
- vtkGraphics
- vtkHybrid
- vtkParallel
- vtkPatented
- vtkexpat
- vtkfreetype
- vtkftgl
- vtkjpeg
- vtkpng
- vtktiff
- vtkzlib

Starting your own project with ITK + VTK

- Create a clean new directory
- Write a CmakeLists.txt file
- Write a simple .cxx file
- Configure with CMake
- Build
- Run

Step 5. Writing CMakeLists.txt

```
PROJECT( myProject )

FIND_PACKAGE ( ITK )
IF (  ITK_FOUND  )
      INCLUDE(  ${USE_ITK_FILE}  )
ENDIF(   ITK_FOUND   )

FIND_PACKAGE ( VTK )
IF (   VTK_FOUND   )
      INCLUDE(  ${USE_VTK_FILE}  )
ENDIF(   VTK_FOUND   )
```

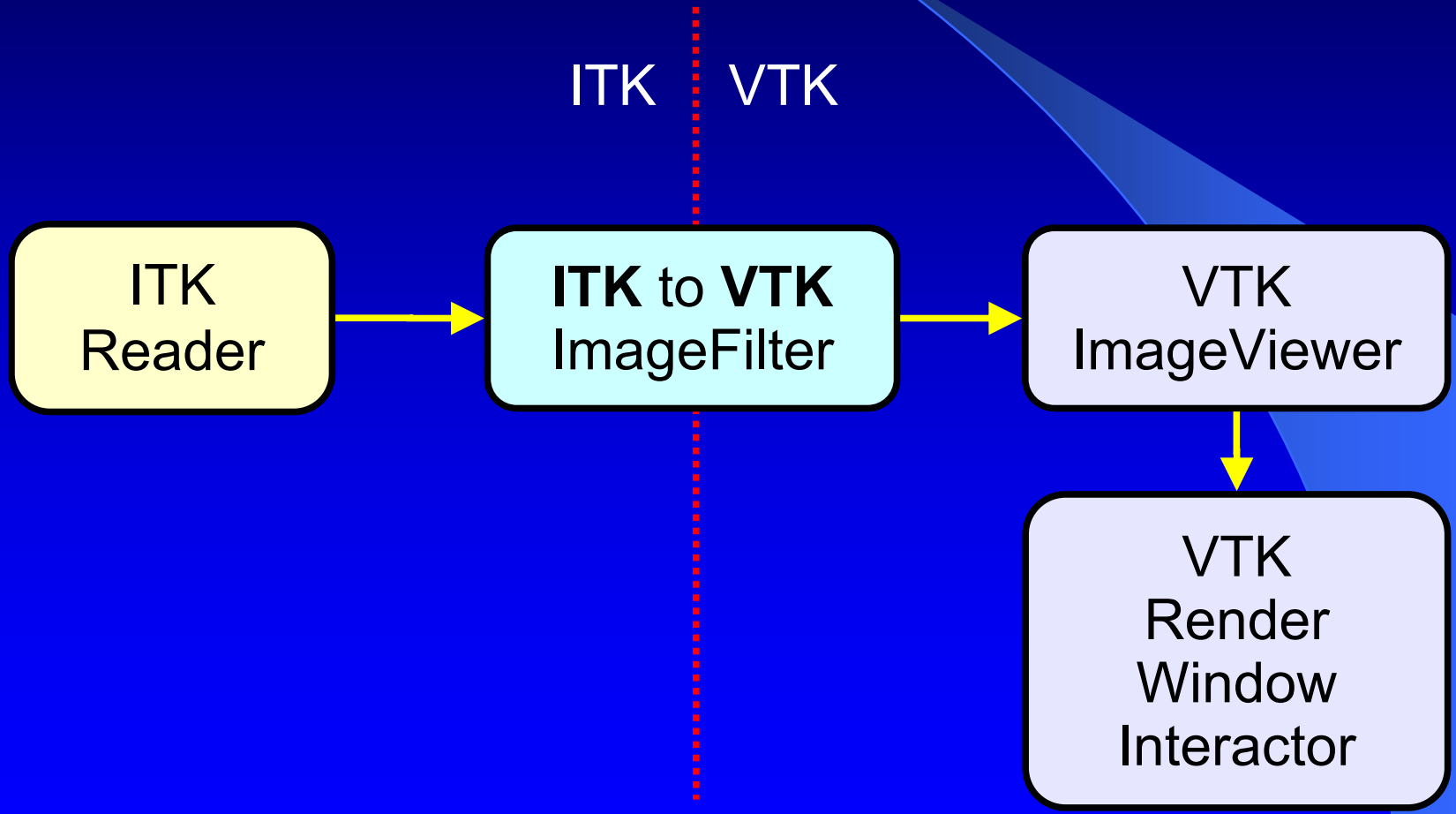
(continue...)

Step 5. Writing CMakeLists.txt

(continue...)

```
INCLUDE_DIRECTORIES(
    ${myProject_SOURCE_DIR}
    )

ADD_EXECUTABLE( myProject   myProject.cxx )

TARGET_LINK_LIBRARIES ( myProject
    ITKBasicFilters ITKCommon ITKIO
    vtkRendering  vtkGraphics vtkHybrid
    vtkImaging vtkIO vtkFiltering vtkCommon
    )
```

Step 6. Writing myProject.cxx



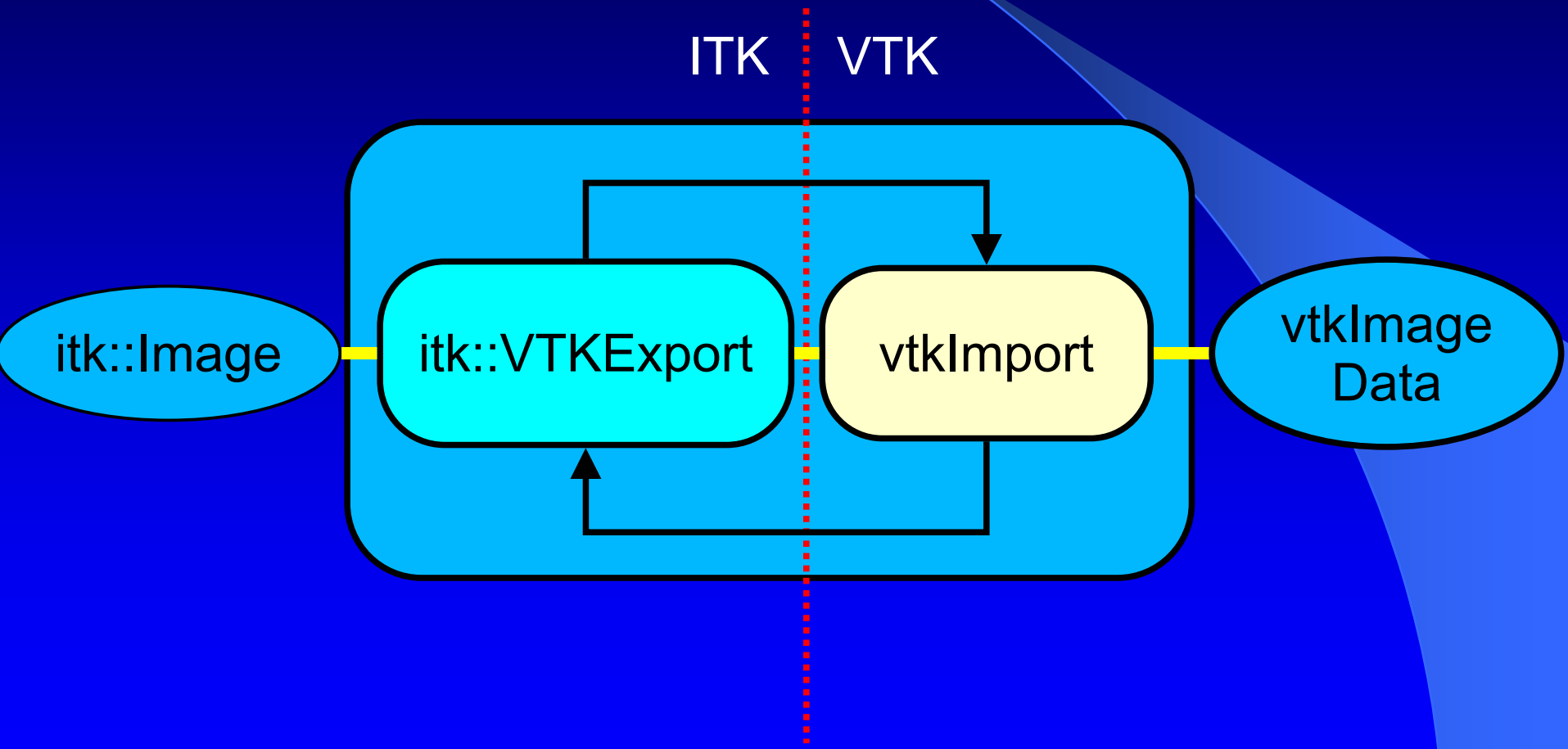
Step 6. Writing myProject.cxx

```
#include "itkImage.h"
#include "itkImageFileReader.h"
#include "itkImageToVTKImageFilter.h"

#include "vtkImageViewer.h"
#include "vtkRenderWindowInteractor.h"

int main( int argc, char **argv ) {

  typedef itk::Image<unsigned short,2>           ImageType;
  typedef itk::ImageFileReader<ImageType>        ReaderType;
  typedef itk::ImageToVTKImageFilter<ImageType>   ConnectorType;

  ReaderType::Pointer reader = ReaderType::New();
  ConnectorType::Pointer connector = ConnectorType::New();
```

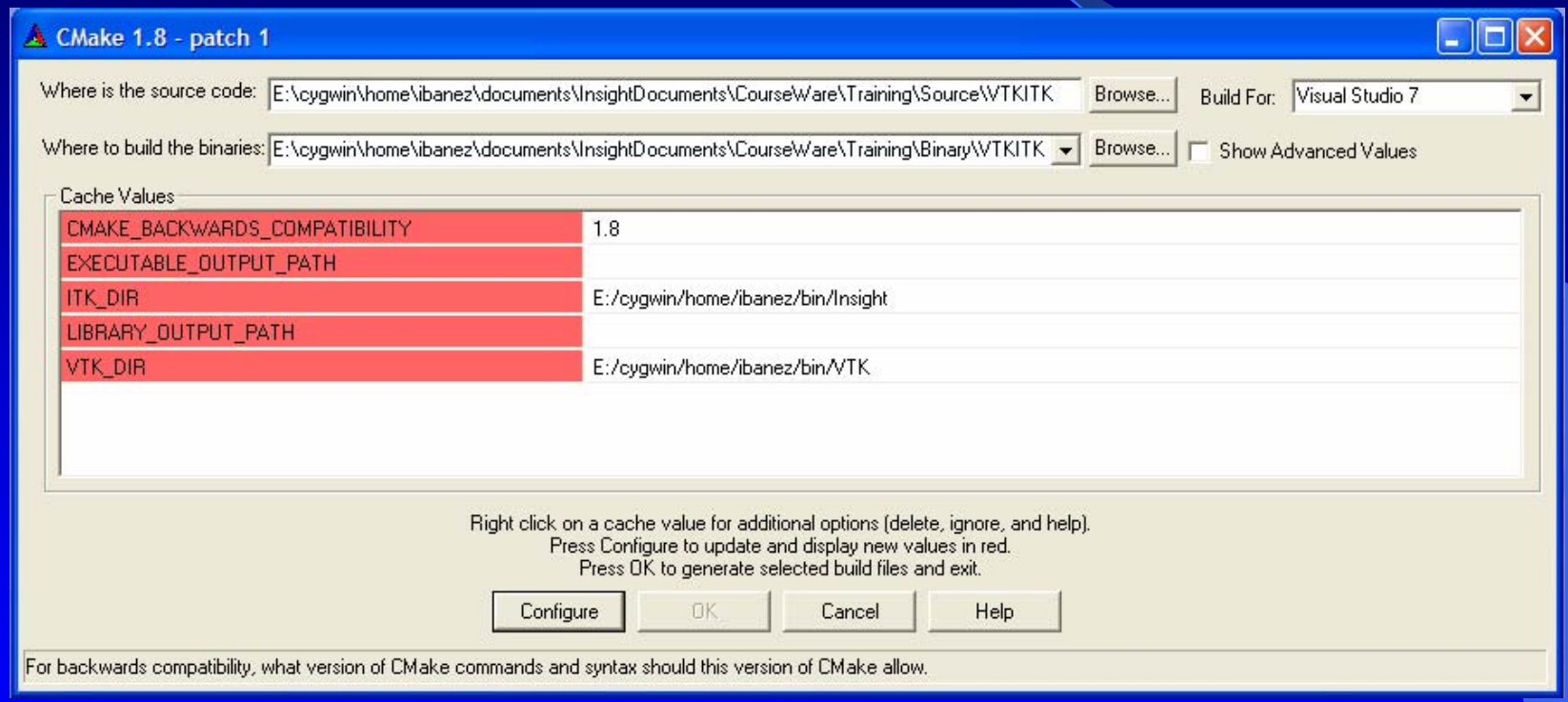
Step 6. Writing myProject.cxx

```
  reader->SetFileName( argv[1] );
  connector->SetInput( reader->GetOutput() );

  vtkImageViewer * viewer = vtkImageViewer::New();

  vtkRenderWindowInteractor * renderWindowInteractor =

   vtkRenderWindowInteractor::New();

  viewer->SetupInteractor( renderWindowInteractor );
  viewer->SetInput( connector->GetOutput() );

  viewer->Render();
  viewer->SetColorWindow( 255 );
  viewer->SetColorLevel( 128 );
  renderWindowInteractor->Start();

  return 0;
}
```

ITK Image To VTK Image



Step 7. Configure with CMake



Step 7. Configure with CMake

- Set ITK_DIR to the binary directory where ITK was built
- Set VTK_DIR to the binary directory where VTK was built

Step 7. Configure with CMake

Leave Unchanged

- EXECUTABLE_OUTPUT_PATH
- LIBRARY_OUTPUT_PATH

Step 8. Build Sample Project

- Open myProject.dsw generated by CMake
- Select ALL_BUILD project
- Build it

  …It will take about 30 seconds …

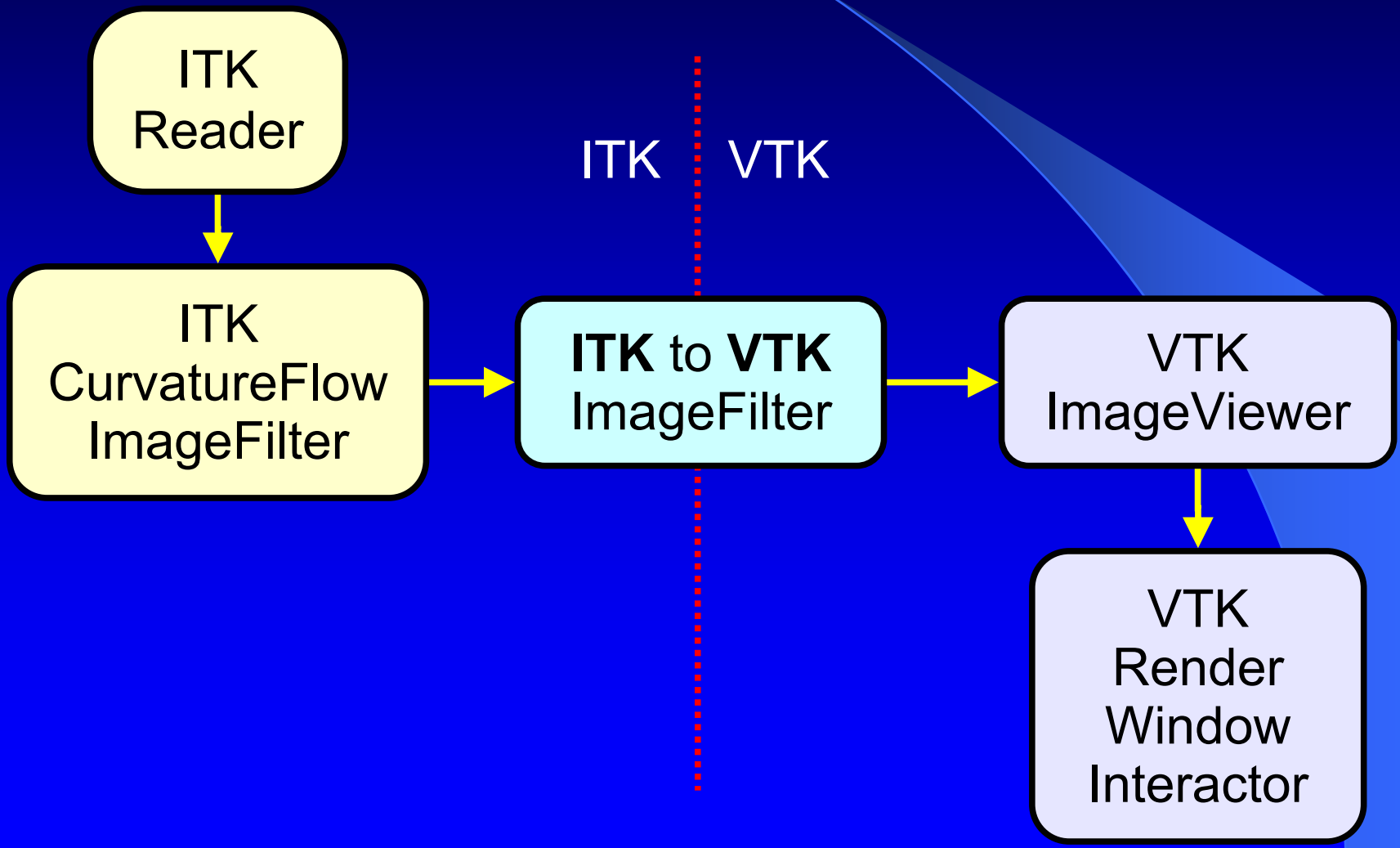
Step 9. Run the example

- Locate the file myProject.exe
- Run it with a 2D image as argument

myProject.exe BrainSlice.png

- It will display the image in a window

Step 10. Add more ITK



Step 10. Add more ITK

```
#include "itkCurvatureFlowImageFilter.h"
...
typedef itk::Image< float , 2 >          ImageType;
...
typedef itk::CurvatureFlowImageFilter<
                  ImageType, ImageType > SmoothingFilterType;

SmoothingFilterType::Pointer smoother = SmoothingFilterType::New();

smoother->SetInput( reader->GetOutput() );
connector->SetInput( smoother->GetOutput() );
viewer->SetInput( connector->GetOutput() );

smoother->SetNumberOfIterations( 7 );
smoother->SetTimeStep( 0.2 );
...
```

Step 11. Run with more ITK

- Configure with Cmake
- Open the project and build it
- Locate the executable
- Run it with a 2D image

  myProject.exe BrainSlice.png

- It will display the smoothed image

Enjoy ITK !