Generic Component Framework

A Qt based Component Framework

GCF

Generic Component Framework

-

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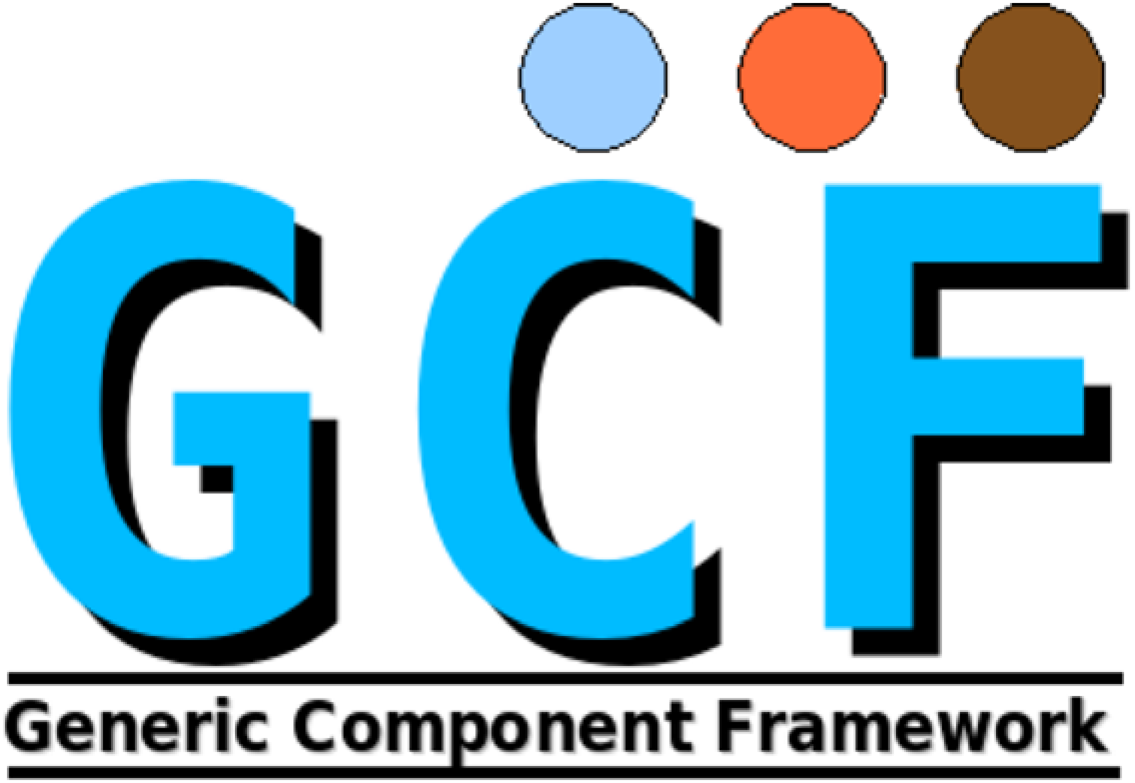
Key Rules in Software Design

- Divide and Rule
- Establish a Constitution
- Similarity in Diversity
- Bring them together

Survey of Component Frameworks

- KDE's KParts
- Microsoft's COM
- Mozilla's XPCOM
- SOAP
- CORBA
- .... and today let me introduce another one :)

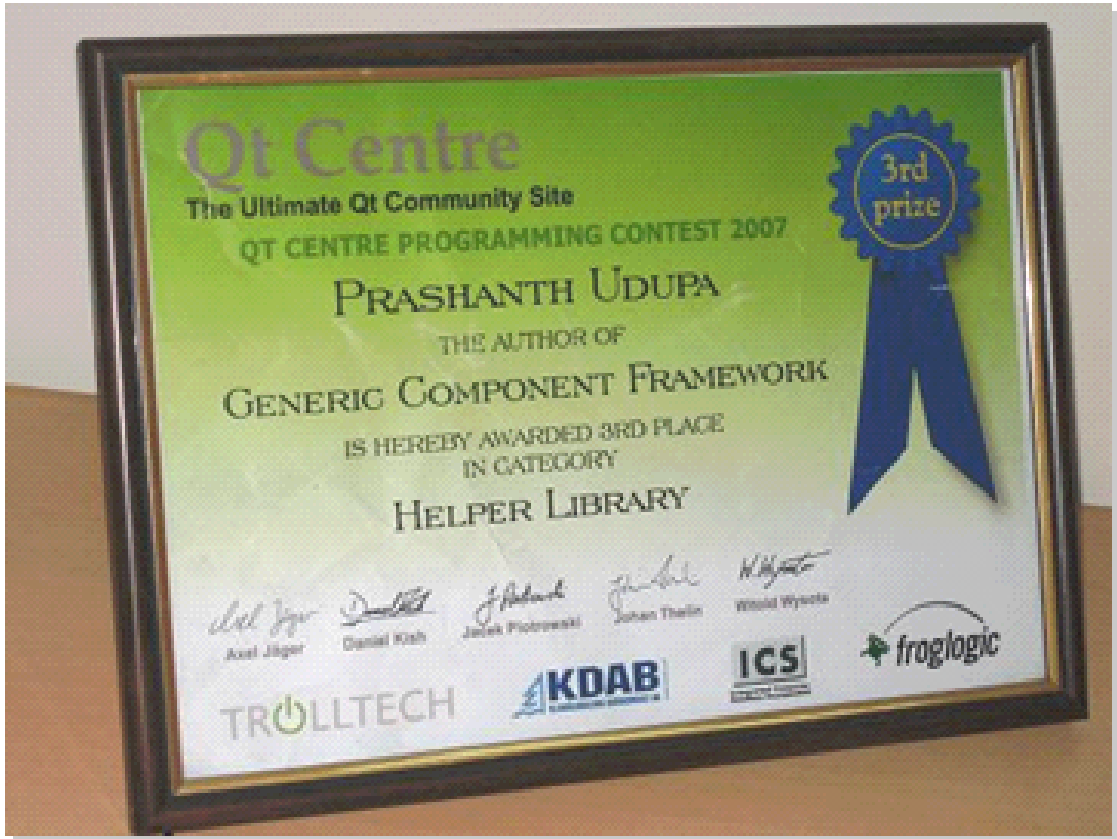
Introducing GCF....



What is GCF?

- A C++ framework for Qt applications. Based on Qt 4.4
- Helps compose modules of an application as a dynamically loadable entities
- Provides GUI merging capabilities
- Provides object/functionality discovery services
- Provides support for inter-process-communication.
- Provides in-built components for common tasks
- Foundation for several commercial software and the open-source VTK Designer 2

Winner of
Qt Centre Programming Contest 2007



Qt Centre
The Ultimate Qt Community Site

QT CENTRE PROGRAMMING CONTEST 2007

PRASHANTH UDUPA

THE AUTHOR OF

GENERIC COMPONENT FRAMEWORK

IS HEREBY AWARDED 3RD PLACE
IN CATEGORY

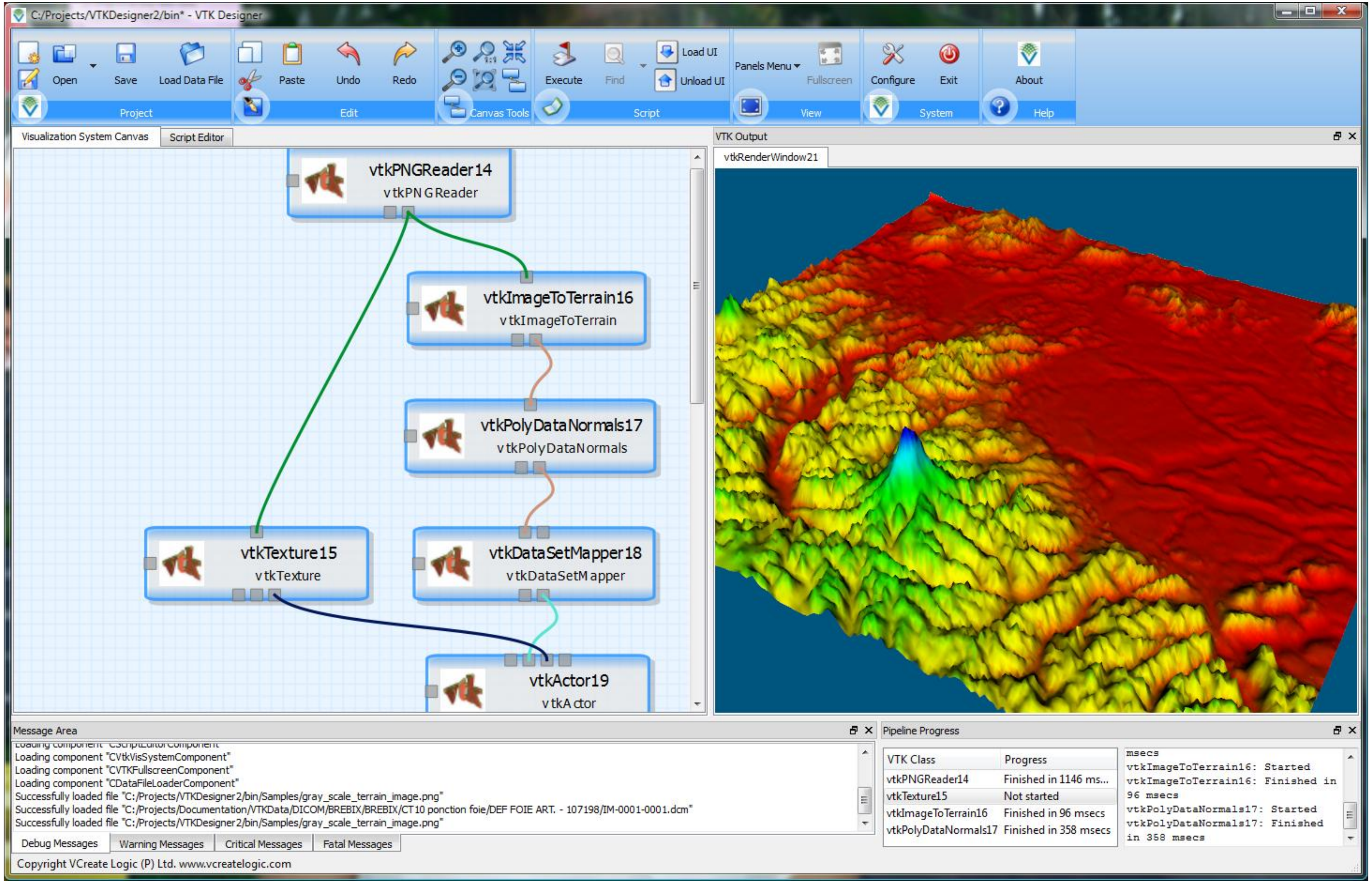
HELPER LIBRARY

3rd prize

Axel Jäger
Daniel Kish
Jacek Piotrowski
Johan Thelin
Witold Wysota

TROLLTECH
KDAB
ICS
froglogic

Gallery.....



```
Loading component "CScriptEditorComponent"
Loading component "CVtkVisSystemComponent"
Loading component "CVTKFullscreenComponent"
Loading component "CDataFileLoaderComponent"
Successfully loaded file "C:/Projects/VTKDesigner2/bin/Samples/gray_scale_terrain_image.png"
Successfully loaded file "C:/Projects/Documentation/VTKData/DICOM/BREBIX/BREBIX/CT10 ponction foie/DEF FOIE ART. - 107198/IM-0001-0001.dcm"
Successfully loaded file "C:/Projects/VTKDesigner2/bin/Samples/gray_scale_terrain_image.png"
```

VTK Class	Progress
vtkPNGReader14	Finished in 1146 ms...
vtkTexture15	Not started
vtkImageToTerrain16	Finished in 96 msecs
vtkPolyDataNormals17	Finished in 358 msecs

```
msecs
vtkImageToTerrain16: Started
vtkImageToTerrain16: Finished in
96 msecs
vtkPolyDataNormals17: Started
vtkPolyDataNormals17: Finished
in 358 msecs
```

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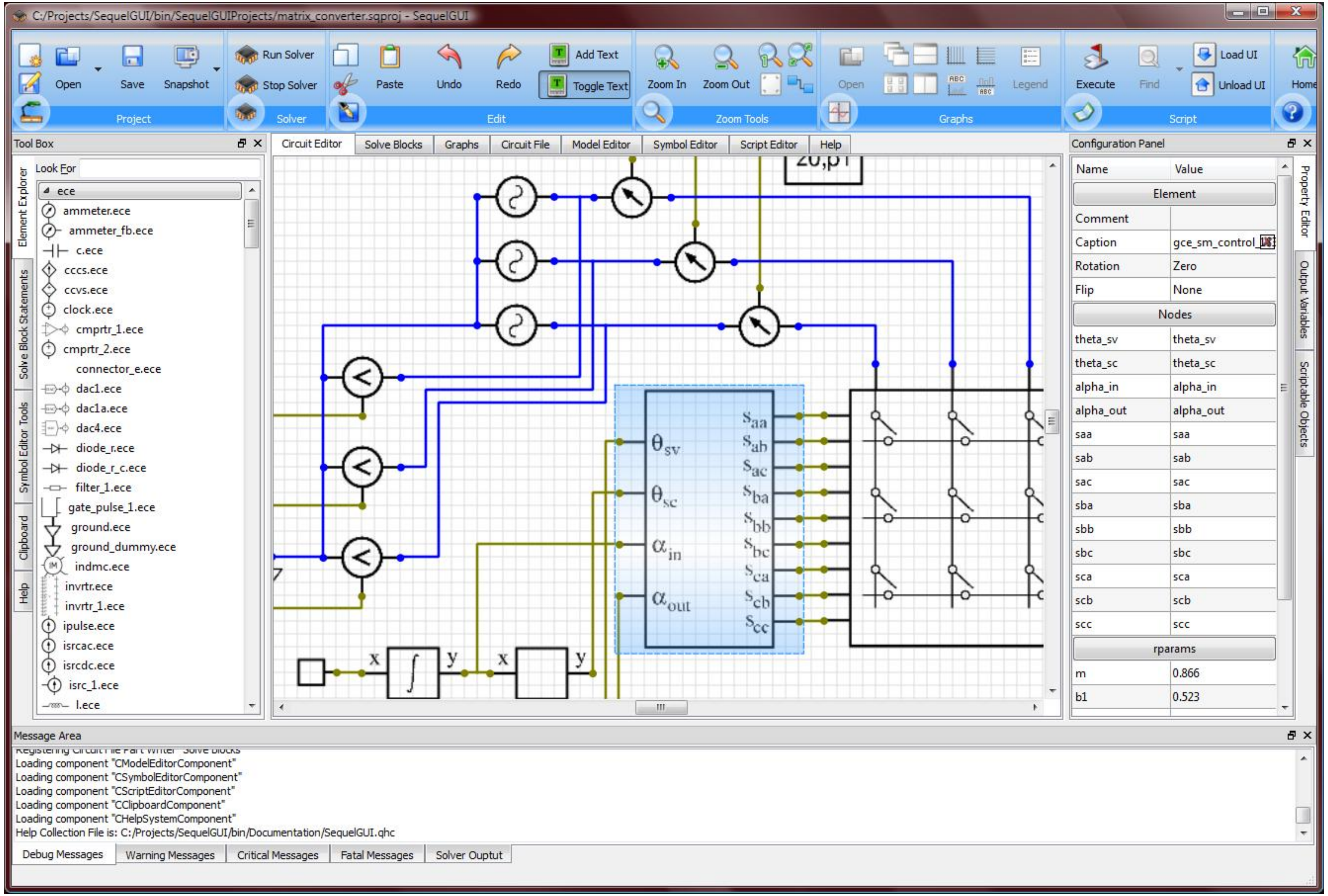
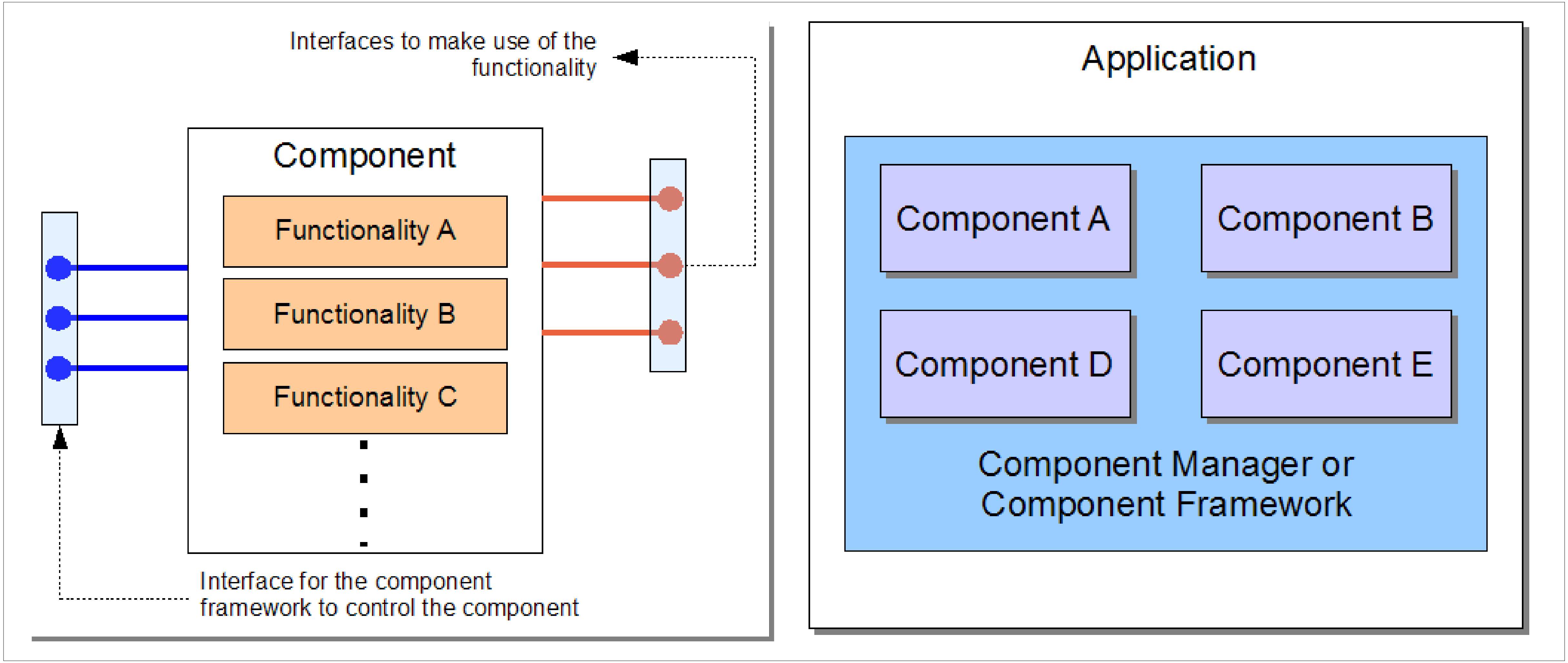
Gallery....



Name	Value
Element	
Comment	
Caption	gce_sm_control_
Rotation	Zero
Flip	None
Nodes	
theta_sv	theta_sv
theta_sc	theta_sc
alpha_in	alpha_in
alpha_out	alpha_out
saa	saa
sab	sab
sac	sac
sba	sba
sbb	sbb
sbc	sbc
sca	sca
scb	scb
scc	scc
rparams	
m	0.866
b1	0.523

```
Registering Circuit File Part Writer "Solve Blocks"
Loading component "CModelEditorComponent"
Loading component "CSymbolEditorComponent"
Loading component "CScriptEditorComponent"
Loading component "CClipboardComponent"
Loading component "CHelpSystemComponent"
Help Collection File is: C:/Projects/SequelGUI/bin/Documentation/SequelGUI.qhc
```

Overview


Interfaces to make use of the functionality
Component
Functionality A
Functionality B
Functionality C
Interface for the component framework to control the component
Application
Component A
Component B
Component D
Component E
Component Manager or Component Framework

How to Divide and Rule

- Package functionality into “GCF Components”
- A GCF component offers
  - One or more widgets (subclasses of QWidget)
  - One or more objects (subclasses of QObject)
  - User interface elements (QAction, QMenu etc)

GCF's Constitution for Applications

- Have a singleton component class for each component
- Provide a GUI-XML file for each component declaring the objects, widgets, actions etc exposed by the application and their merge hints
- Serve objects, widgets, actions, menus, toolbars etc from components
- Expose component functionality via interfaces
- Have one or more objects within your object implement them

Similarity in Diversity

- IComponent – base class of GCF components
- IComponentPlugin – offers a component from a plugin
- CComponentFactory – dictionary of all components (instantiated, uninstantiated, active and inactive)
- Each component's GUI XML exposes one or more objects belonging to the component
- Interfaces implemented by exposed objects can be searched

The IComponent Class

- Interface Methods
  - Methods called by GCF
  - Used for GUI creation and merging
  - Used for handling activation/deactivation of components
  - Reporting component “attendance”

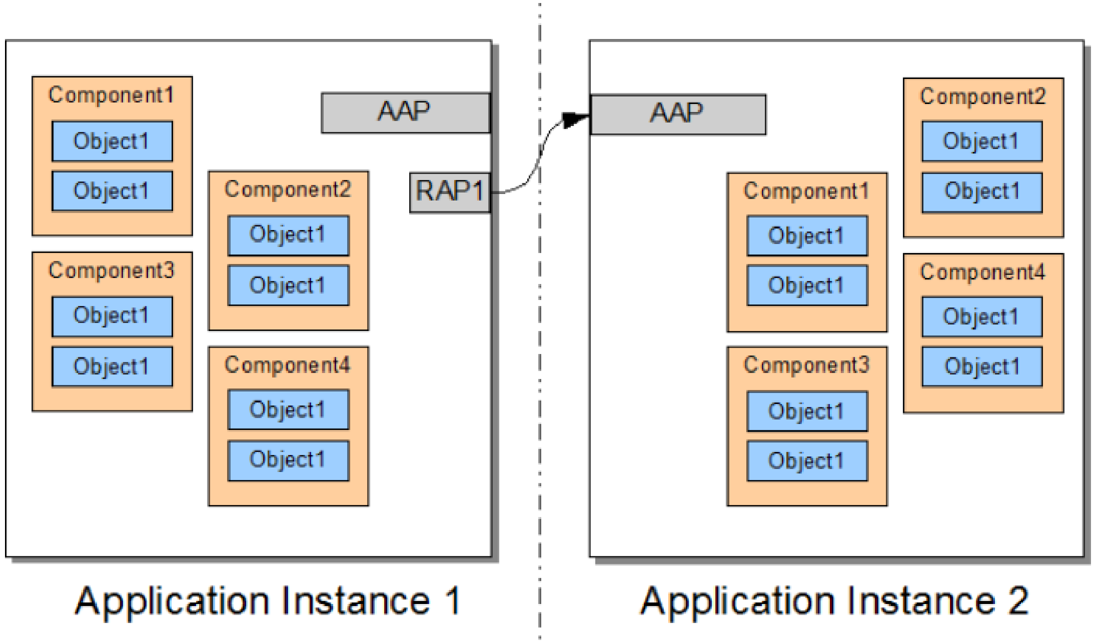
- Service Methods
  - Methods called by components
  - Used for object/service/component discovery
  - Used for establishing and releasing component dependency

Bring them together...

- CComponentLoaderComponent and CComponentGui
- GUI XML File
  - Declares objects, widgets, actions, menus, menu-strip groups
  - All declared objects are called “exposed” objects.
  - For each “exposed” object in the GUI XML file, a corresponding create() method is called on the IComponent.
- Configuration capabilities
  - Can invoke methods, set property values, make connections etc..

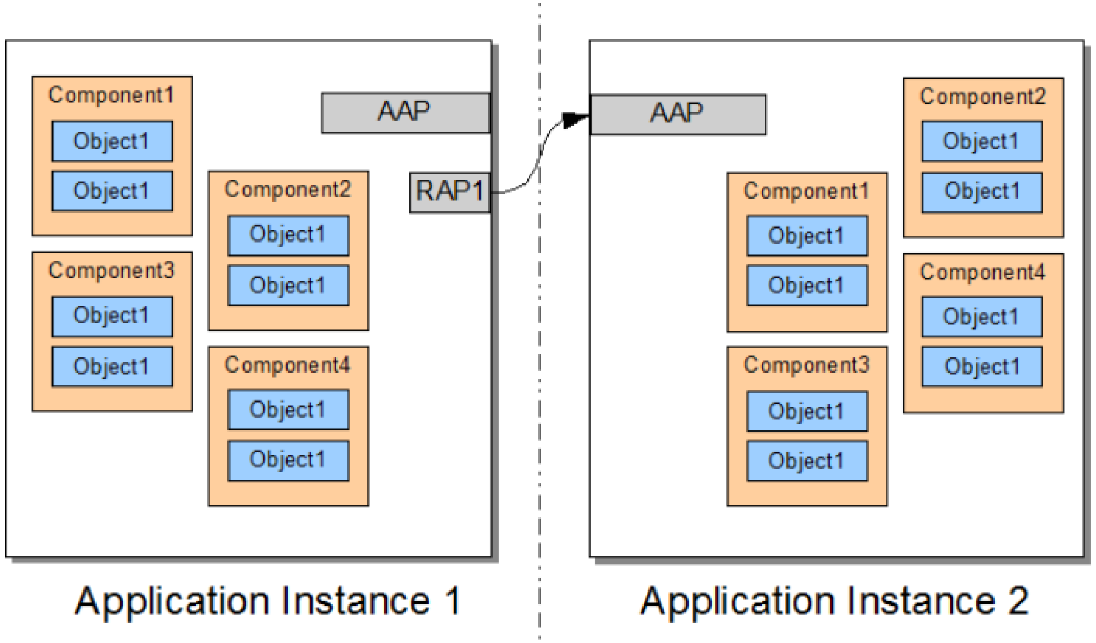
Demo #1

Interprocess Communication



- Application Access Point
  - Access to components and its objects are provided through this.
- Remote Access Point
  - Helps access objects in a remote application
- Remote Object
  - Represents a remote object

Interprocess Communication



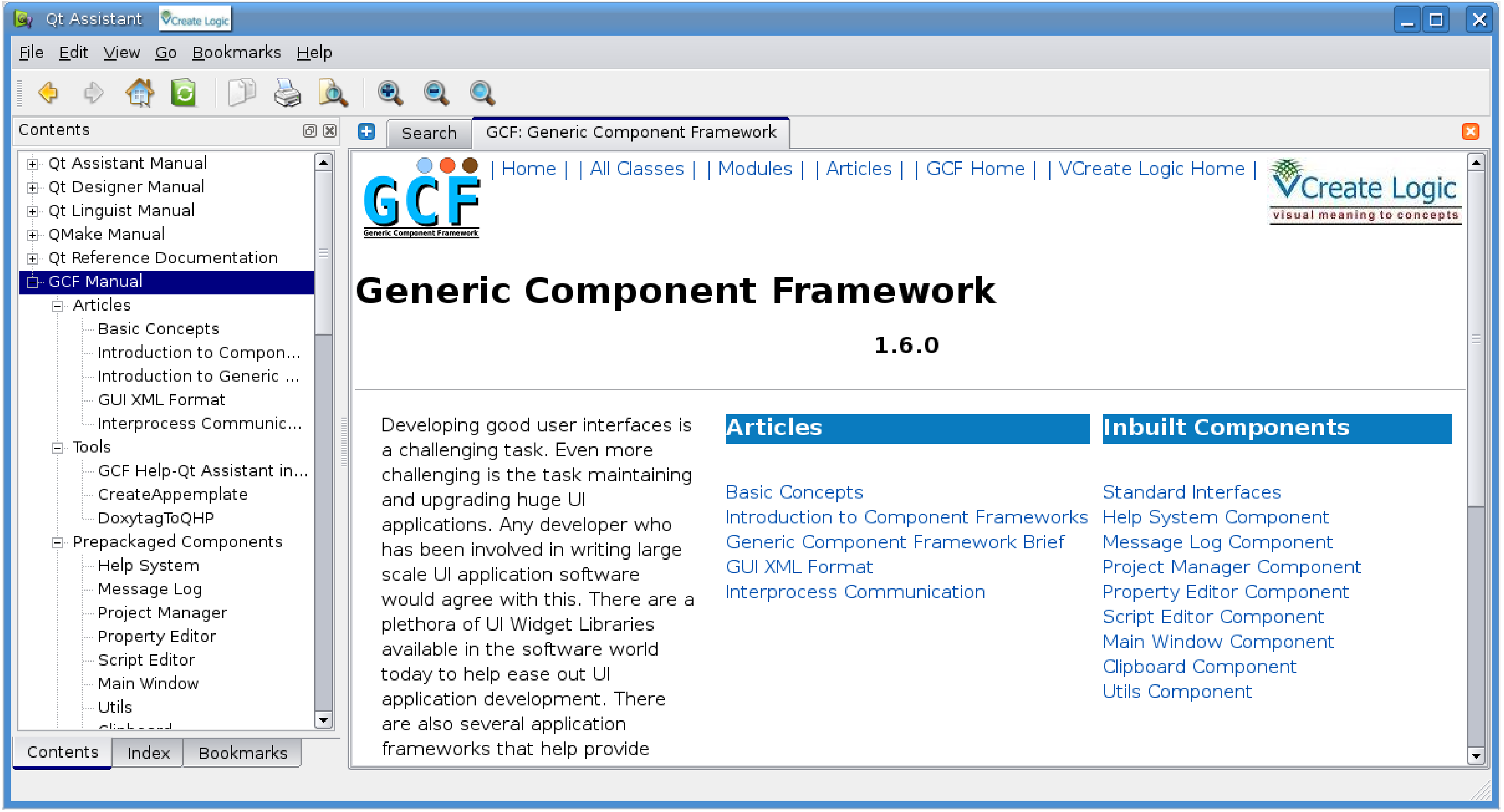
- CAppAccessPoint
- CRemoteAppAccessPoint
- CRemoteObject
- CRemoteAppDiscovery
- CMessage
- CRemoteApp
- Based on TCP/IP

Demo #2

Getting and Installing GCF

- From www.vcreatelogic.com/oss/gcf
- SVN https://svn2.hosted-projects.com/vcreatelogic/GCF
- Supported compilers: g++, MSVC 2005, MinGW
- GCF designed, developed, maintained by VCreate Logic.
- Is distributed under GPL v2 and GPL v3
- Contributions are most definitely welcome.
- KDCF (commercial GCF) can be purchased from KDAB. For more information write to sales@kdab.net

Documentation and How to learn?



Generic Component Framework

1.6.0

Developing good user interfaces is a challenging task. Even more challenging is the task maintaining and upgrading huge UI applications. Any developer who has been involved in writing large scale UI application software would agree with this. There are a plethora of UI Widget Libraries available in the software world today to help ease out UI application development. There are also several application frameworks that help provide

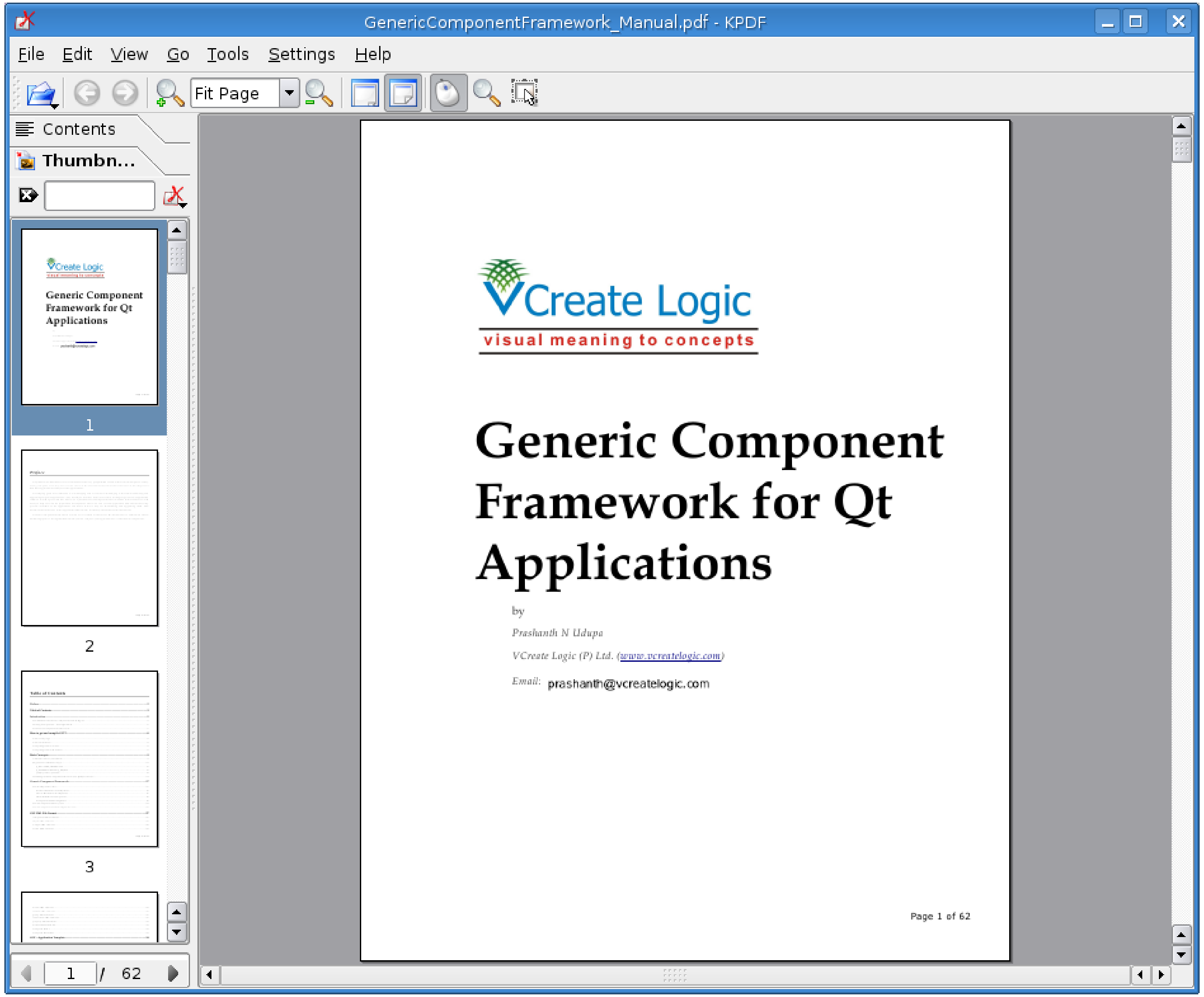
Articles

- Basic Concepts
- Introduction to Component Frameworks
- Generic Component Framework Brief
- GUI XML Format
- Interprocess Communication

Inbuilt Components

- Standard Interfaces
- Help System Component
- Message Log Component
- Project Manager Component
- Property Editor Component
- Script Editor Component
- Main Window Component
- Clipboard Component
- Utils Component

GCF Manual



VCreate Logic
visual meaning to concepts

Generic Component Framework for Qt Applications

by

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Whats next? - GCF's Roadmap....

- Support for KPart components
- Support for ActiveX components
- Support DBUS based IPC
- Support for IPC via shared-memory
- Desktop-class component deployments
- Auto-Update mechanisms
- More built-in components

Thank You

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