

User Interface Manager

Practical example of dependency injection

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Agenda

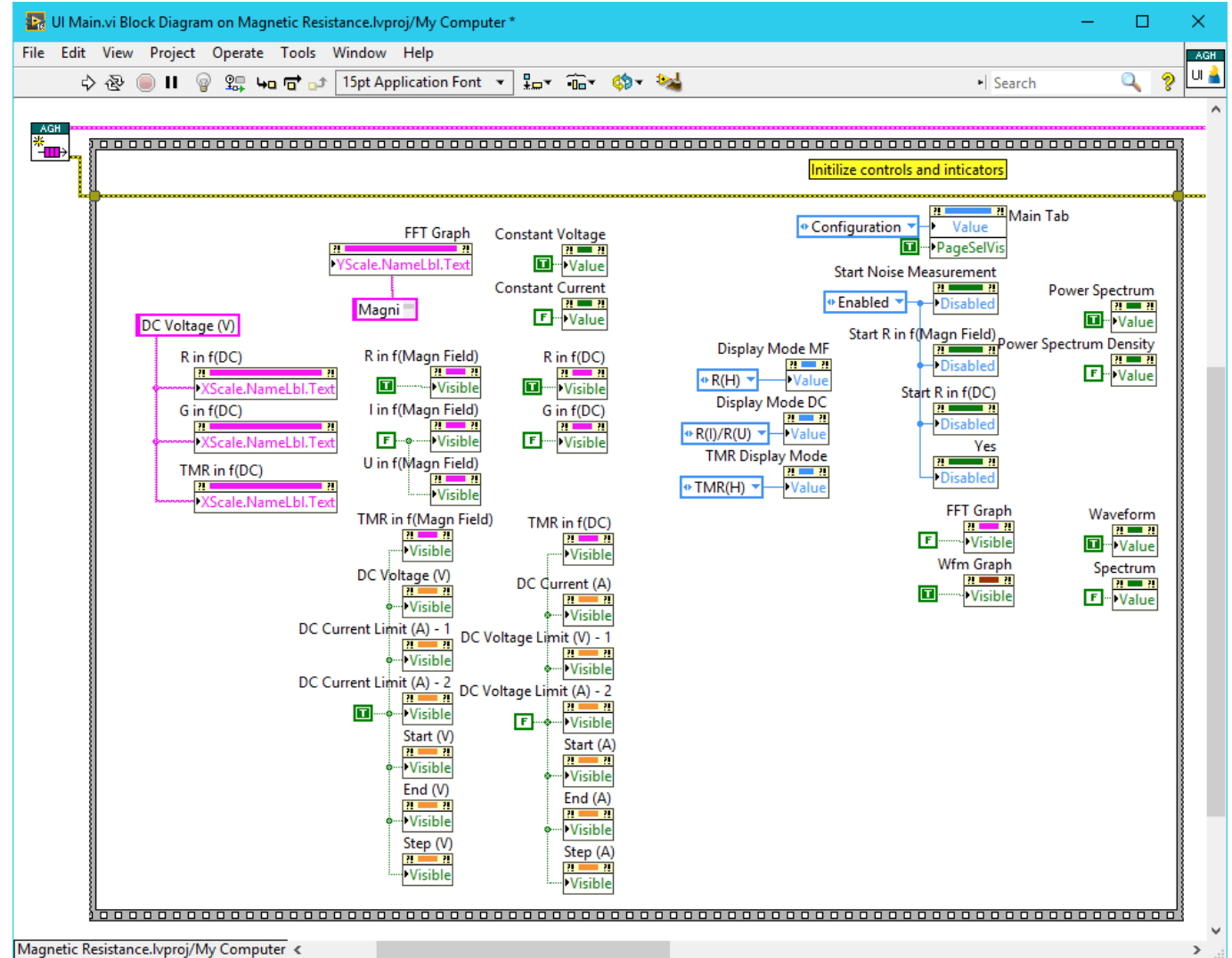
- Problem Statement
- How Others Do It?
- How We Do It?
- The Solution – User Interface Manager
- API
- UI Manager Tool
- QuickDrop
- Right Click Menu
- XML
- Custom Plugin UIP
- Universal Code
- Summary

Problem Statement

- Big applications
- Hundreds of controls and indicators
- Hundreds of UI states possible
- Thousands of properties to be manipulated

How We Do It?

- Manual calls to property nodes
- Big, clunky, don't fit on the screen
- Code duplication leads to bugs
- Frustrating
- Race conditions
- Wiring
- Frequently the same
- Cannot be automated
- Not parsable
- UI modifications recompilation
- Not SCC friendly
- ...

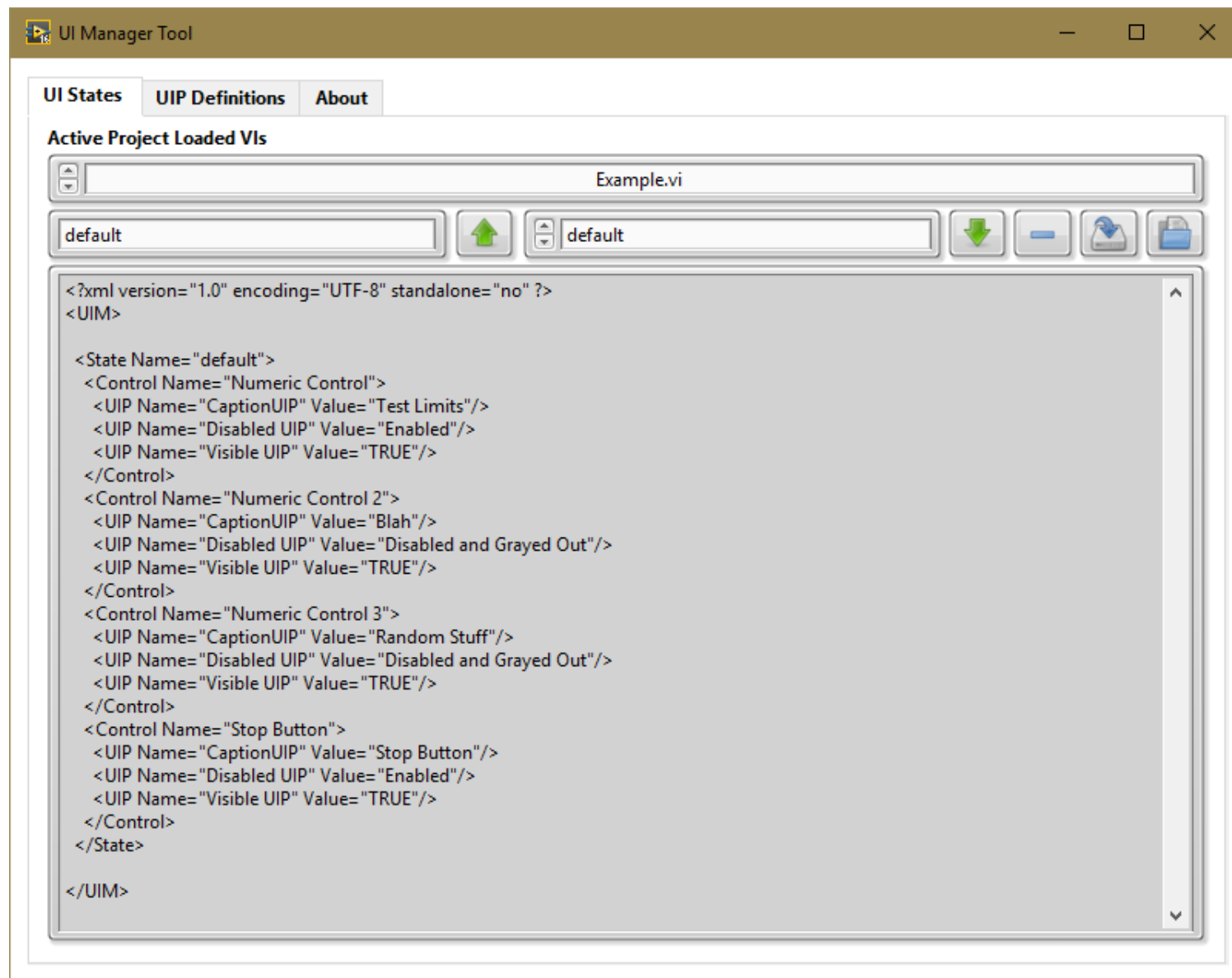


How Others Do It?

- XAML, GladeXML, Qt Designer, FXML
- UI/Application Markup Languages
- Easy to edit
- Structured
- Parsable
- Scriptable
- Detach UI from code
- NOT available in LabVIEW

UI Manager

- XML based
- Programmatic API
- UI Manager Tool for LV
- Any VI Server controls
- Any properties
- Plugin based
- Extensible



Capture

Select State

Apply State

Remove State

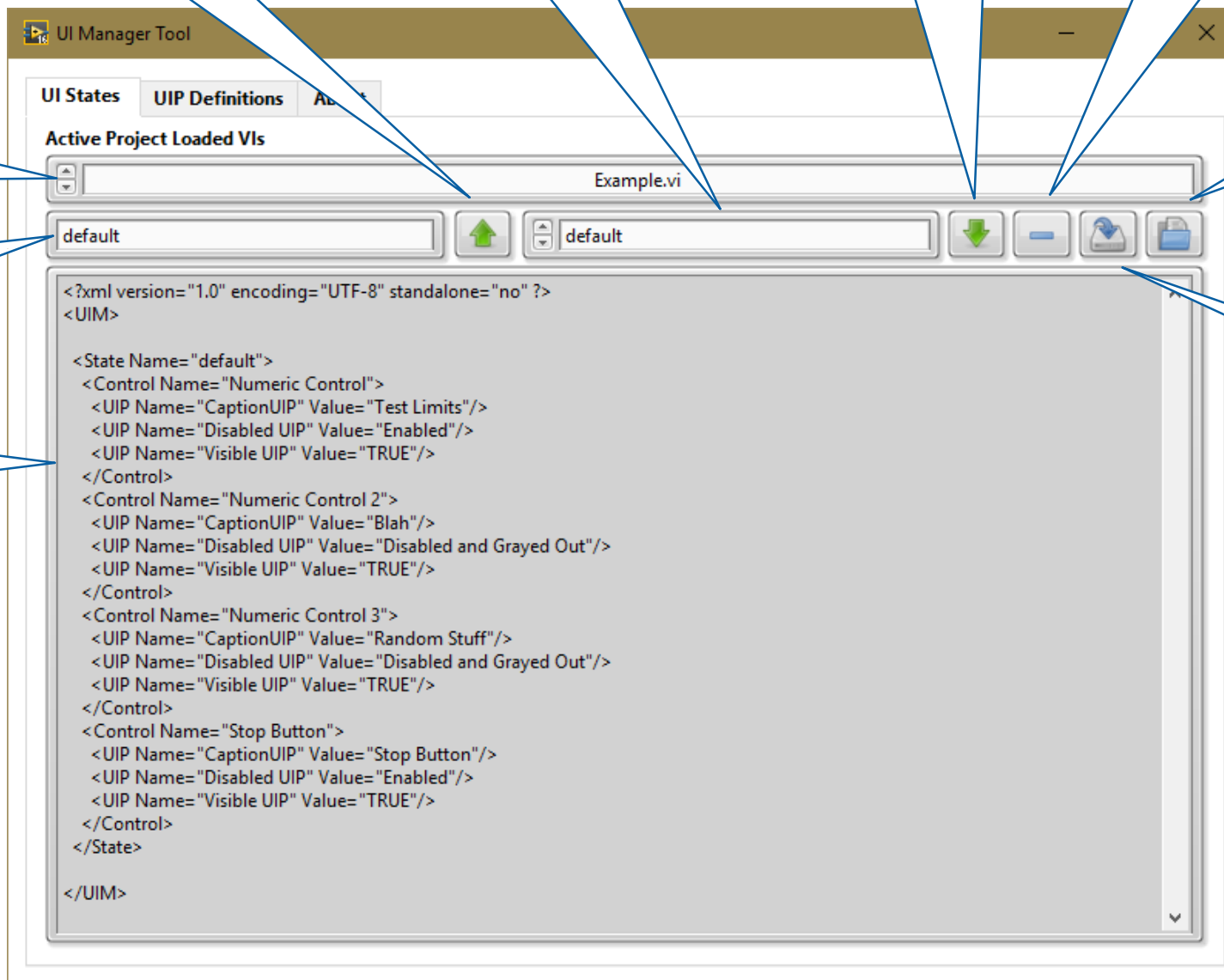
Select VI

Name State

XML View

Load XML

Save XML



Enable UIP Capture

Loaded UIPs

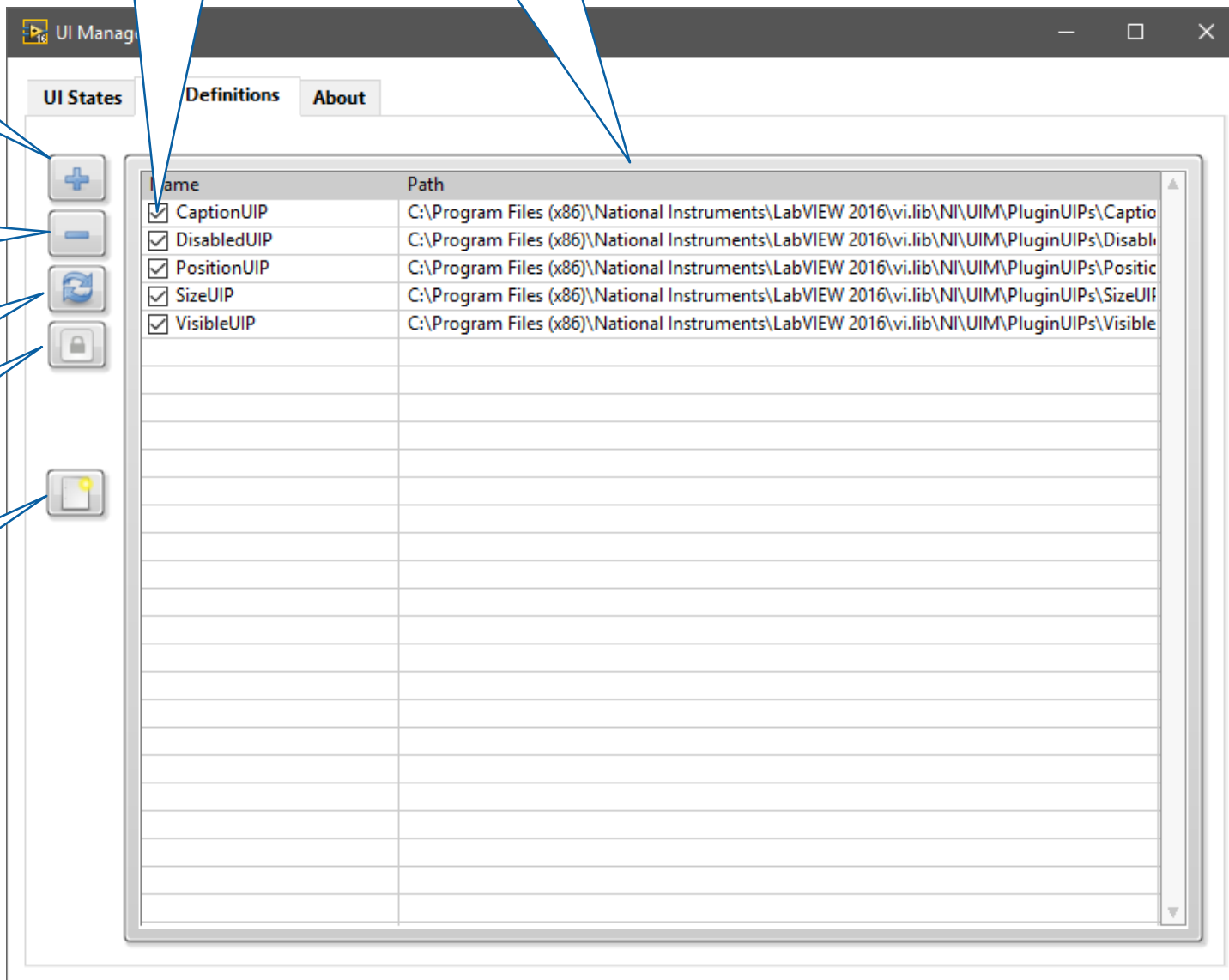
Add UIP

Remove UIP

Reload UIPs

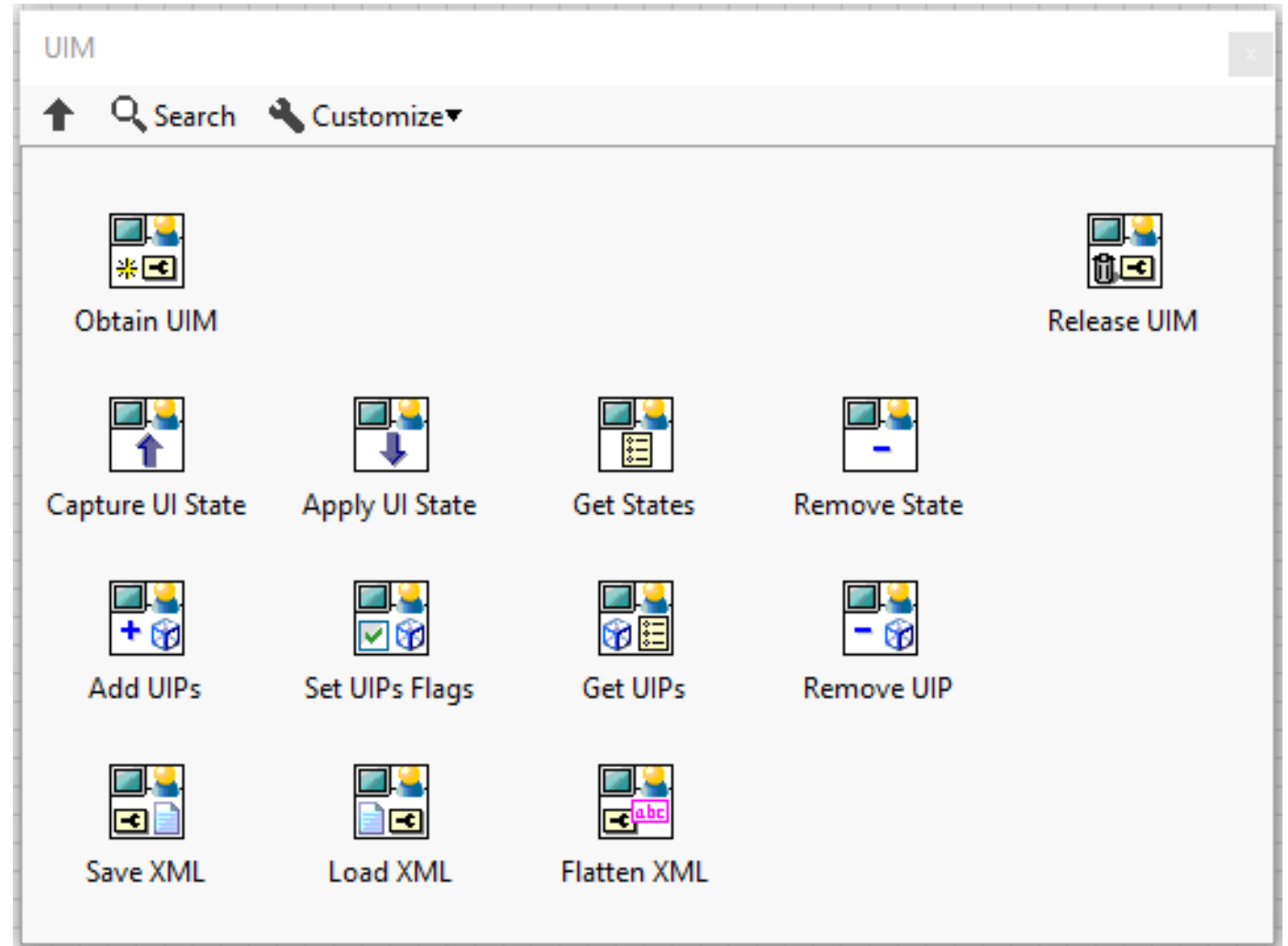
Toggle Enable

New UIP



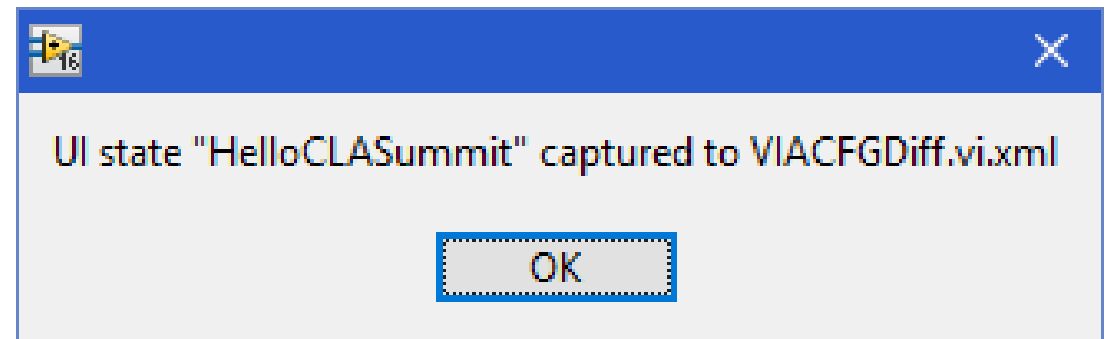
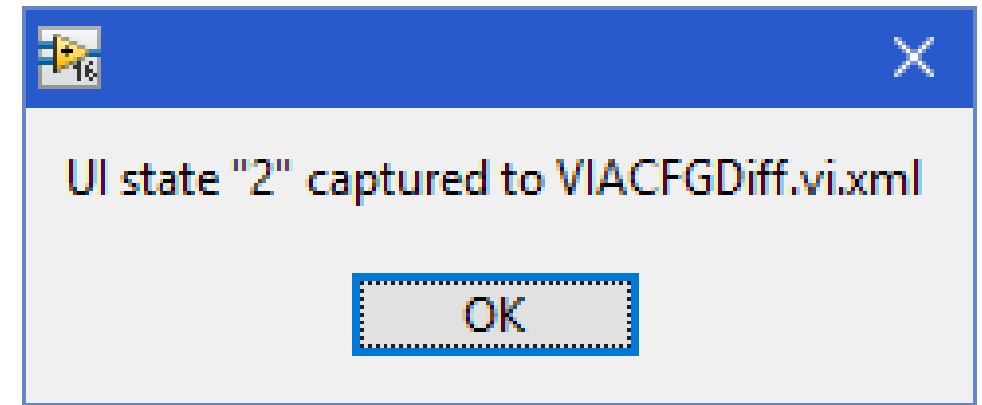
API

- Capture UI State
- Apply UI State
- Manipulate Plugin UIP
- Export/Import XML



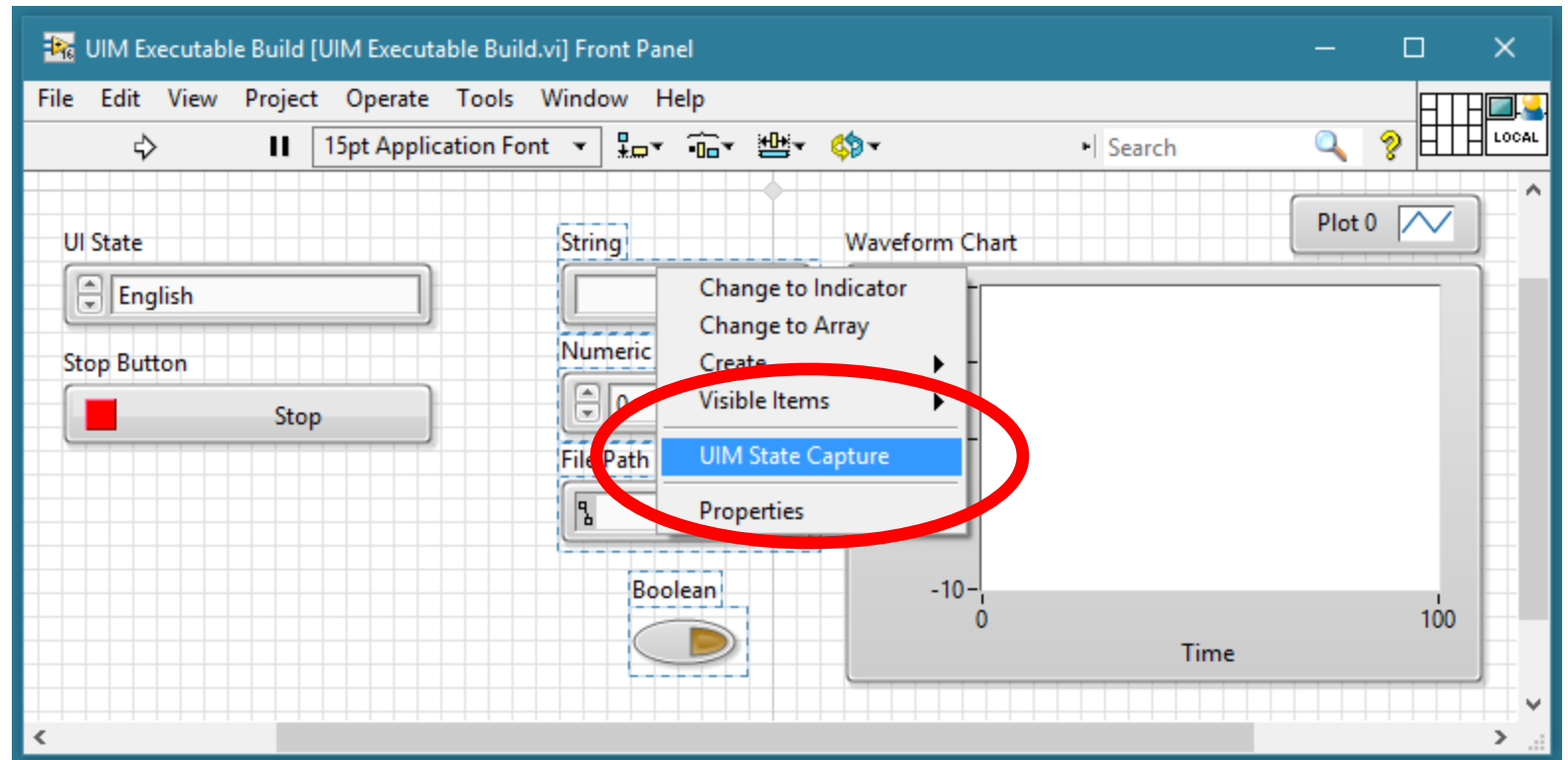
QuickDrop Shortcut

- Quicker way to create and capture state
- <Ctrl>+<U> - incrementing name
- <Ctrl><Shift>+<U> - custom name
- UIP from plugin folder only
- XML name same as the VI



Right Click Menu

- **Quickest way to create and capture state**
- Select one or many controls
- Capture state using right click menu shortcut
- Operates the same way as QuickDrop Shortcut



XML

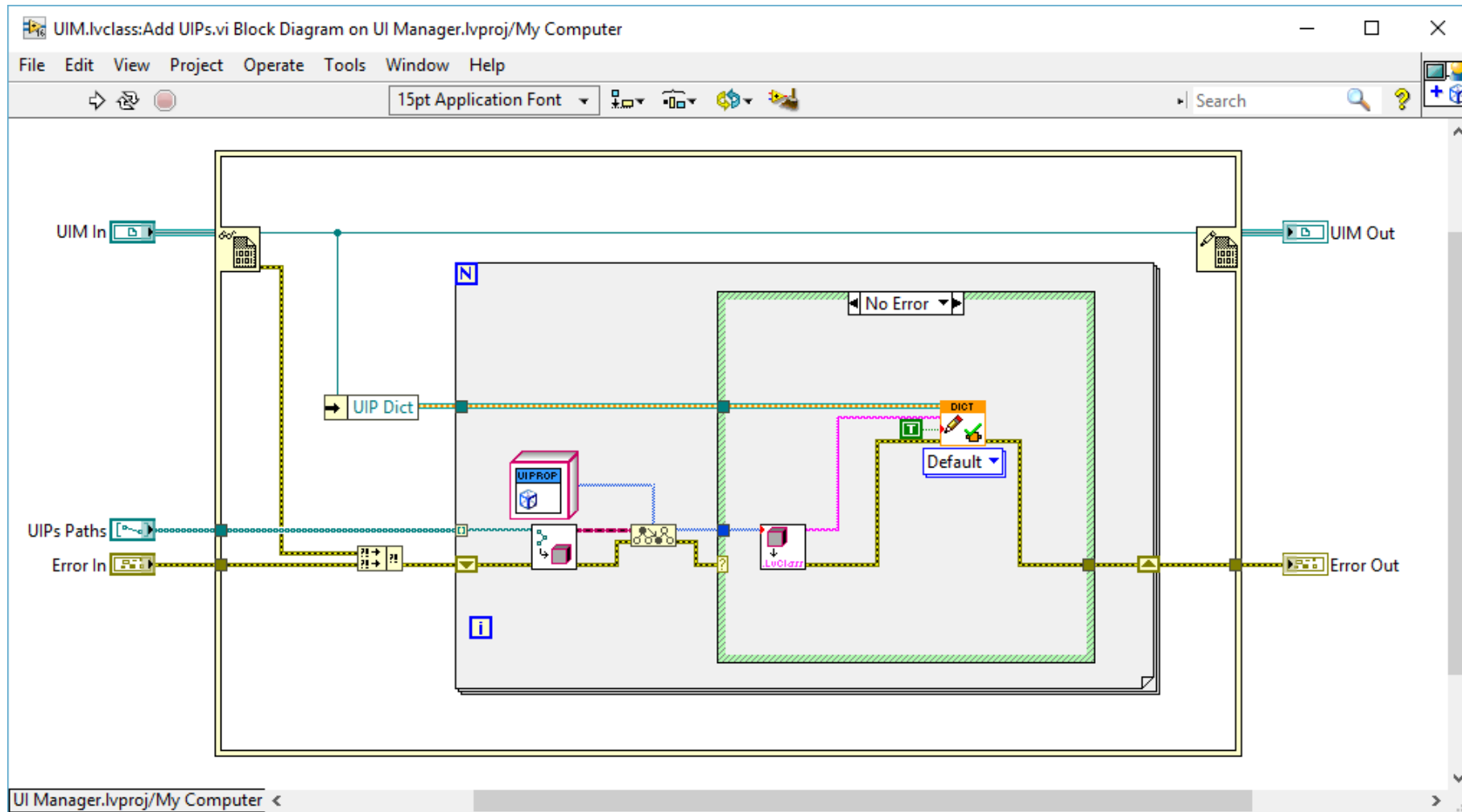
- Structured
- Easy to edit
- Parsable
- Scriptable
- Detached from code

```
<?xml version="1.0" encoding="UTF-8" standalone="no" ?>
<UIM>
  <State Name="default">
    <Control Name="Abort Cal">
      <UIP Name="CaptionUIP" Value="Abort Cal"/>
      <UIP Name="DisabledUIP" Value="Disabled and Grayed Out"/>
      <UIP Name="PositionUIP" Value="2, 81"/>
      <UIP Name="VisibleUIP" Value="TRUE"/>
    </Control>
    <Control Name="Begin Cal">
      <UIP Name="CaptionUIP" Value="Begin Cal"/>
      <UIP Name="DisabledUIP" Value="Disabled and Grayed Out"/>
      <UIP Name="PositionUIP" Value="2, 54"/>
      <UIP Name="VisibleUIP" Value="TRUE"/>
    </Control>
  </State>
</UIM>
```

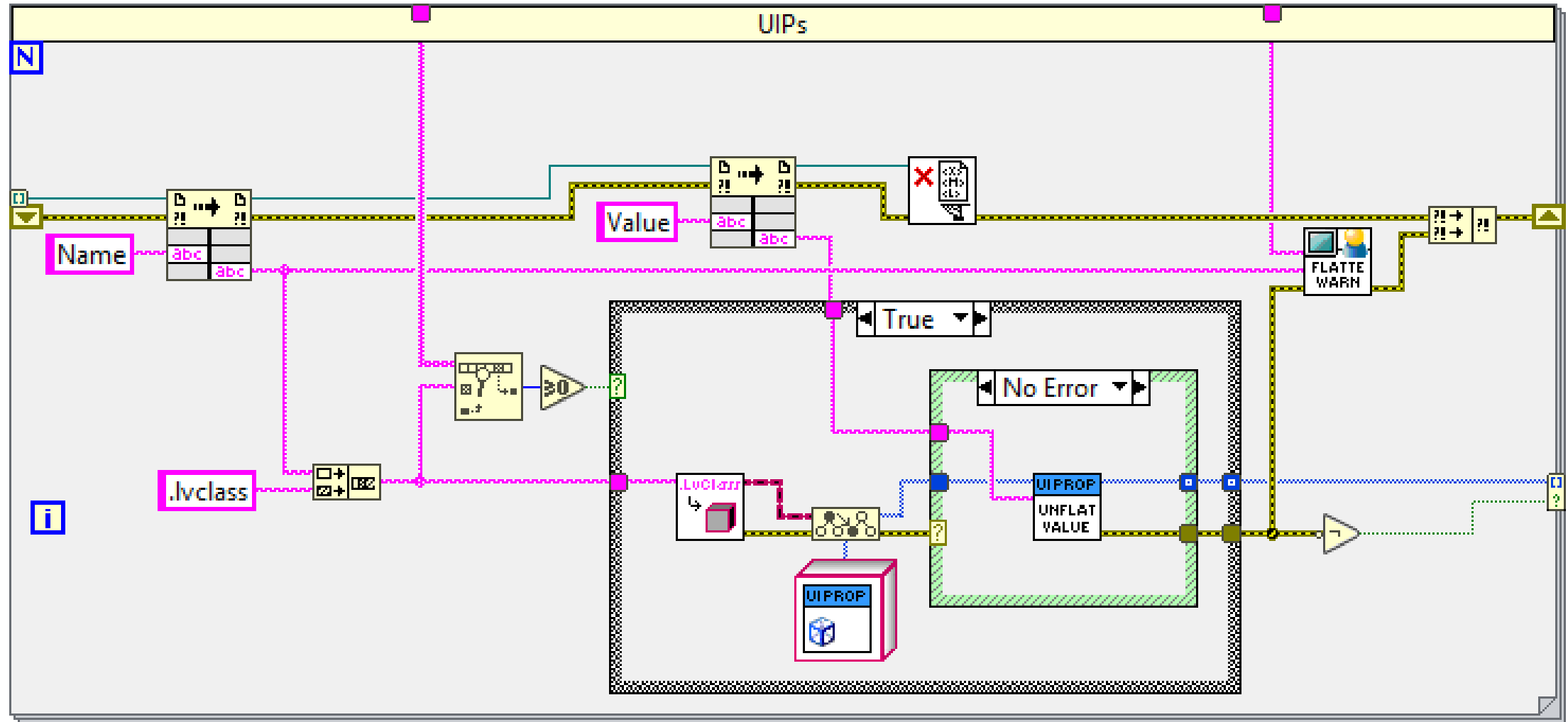
Dependency Injection

- In software engineering, **dependency injection** is a technique whereby one object supplies the **dependencies** of another object. A **dependency** is an object that can be used (a service). An **injection** is the passing of a **dependency** to a dependent object (a client) that would use it.
- Plugin LabVIEW class and its methods – **dependency**
- Loading from folder and using in a generic framework – **injection**
- Plugin frameworks, interfaces

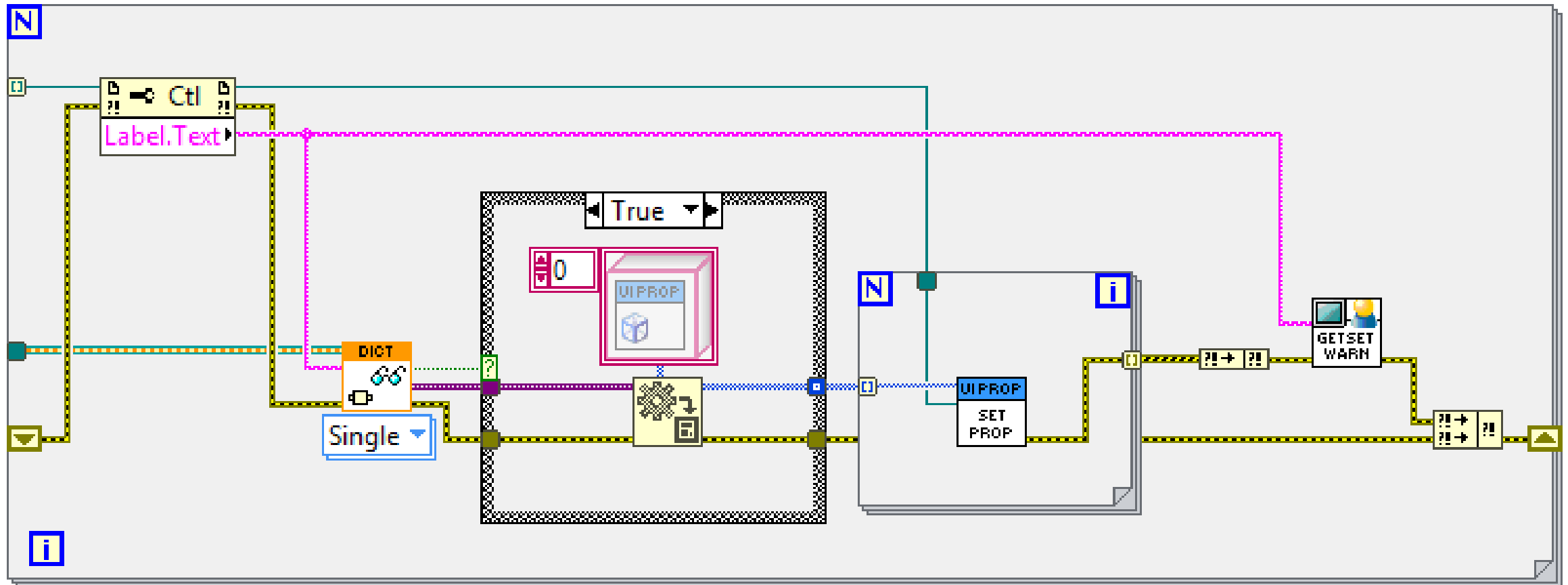
Dependency Injection



Loading UI Property Plugins From XML

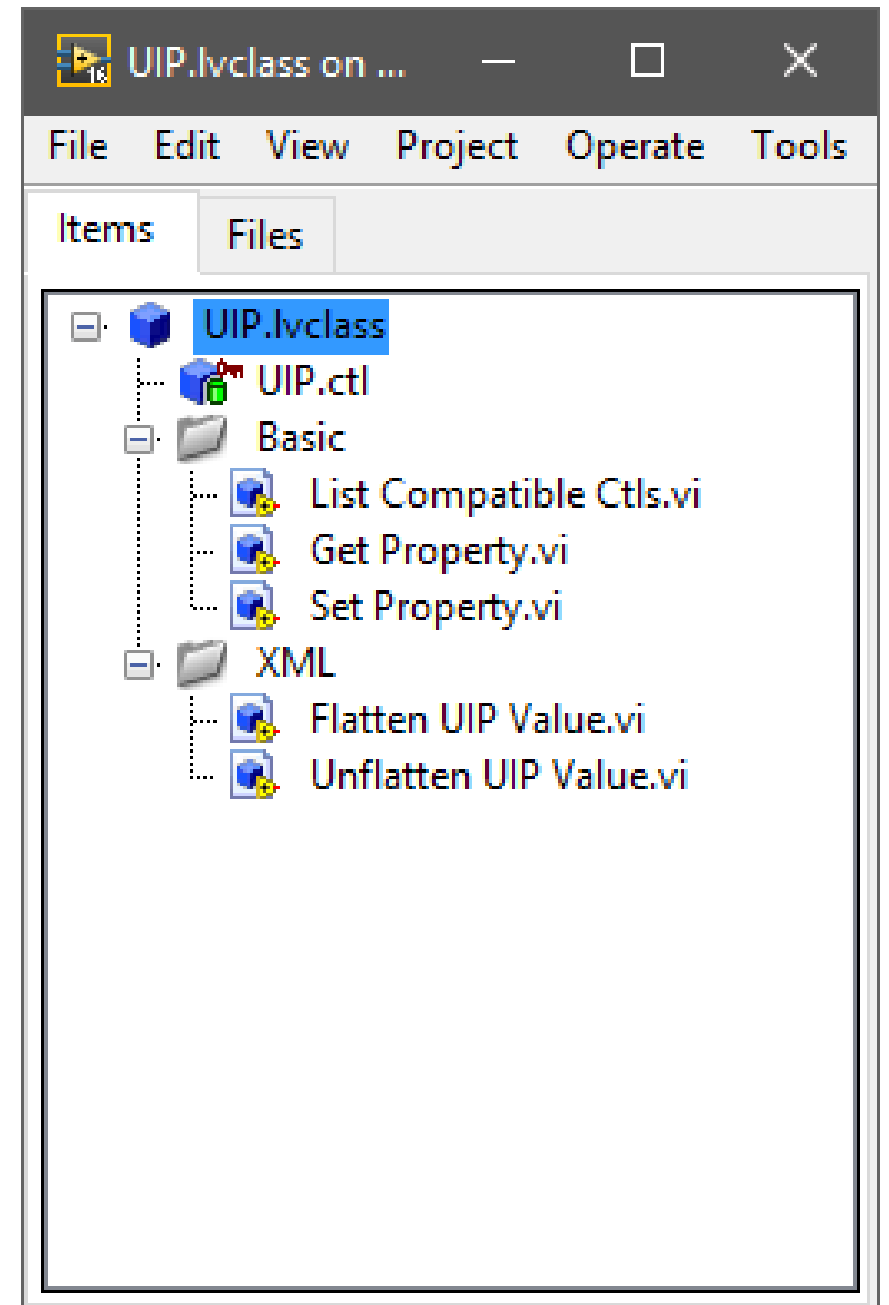


Applying UIP to Control by Label

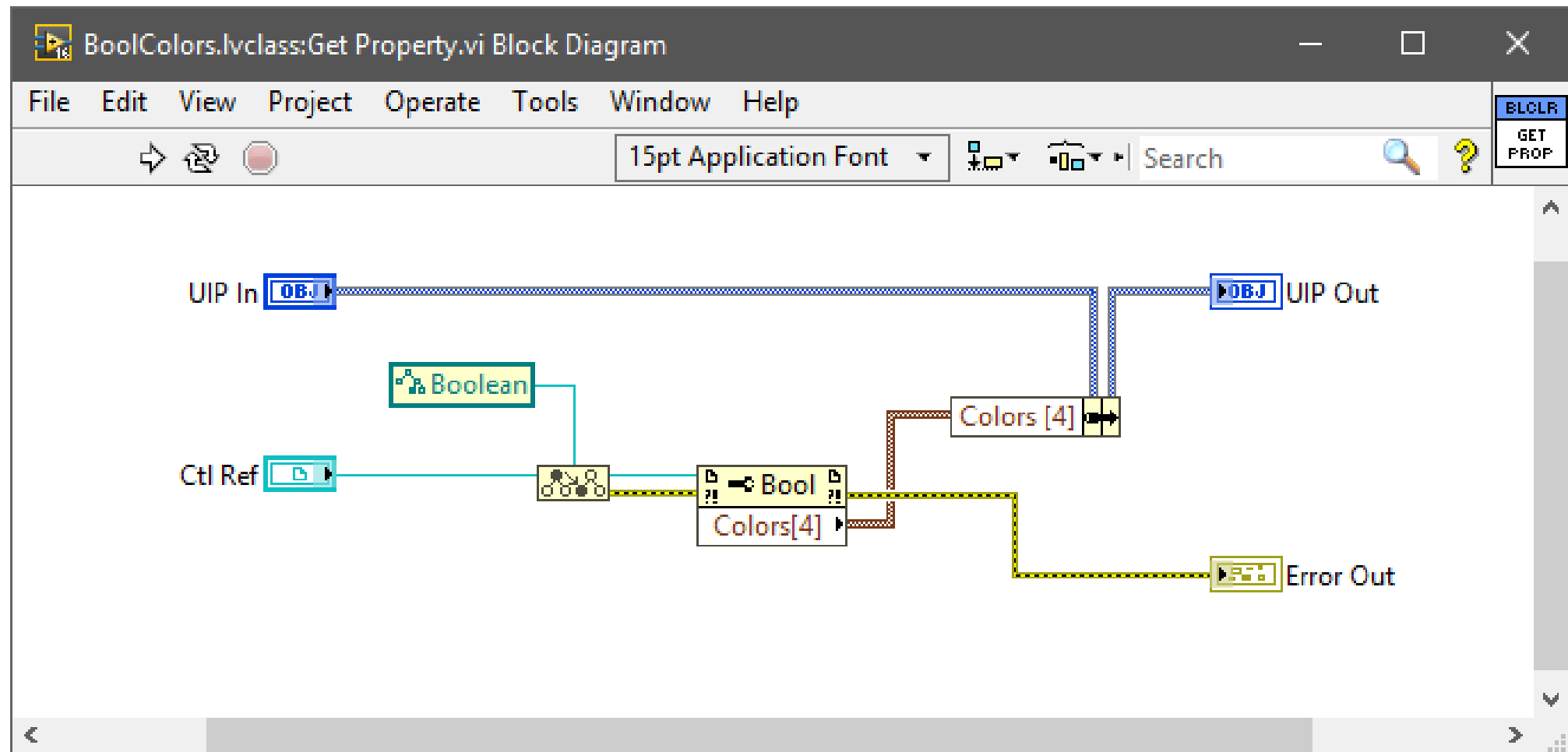


Custom Plugin UIP

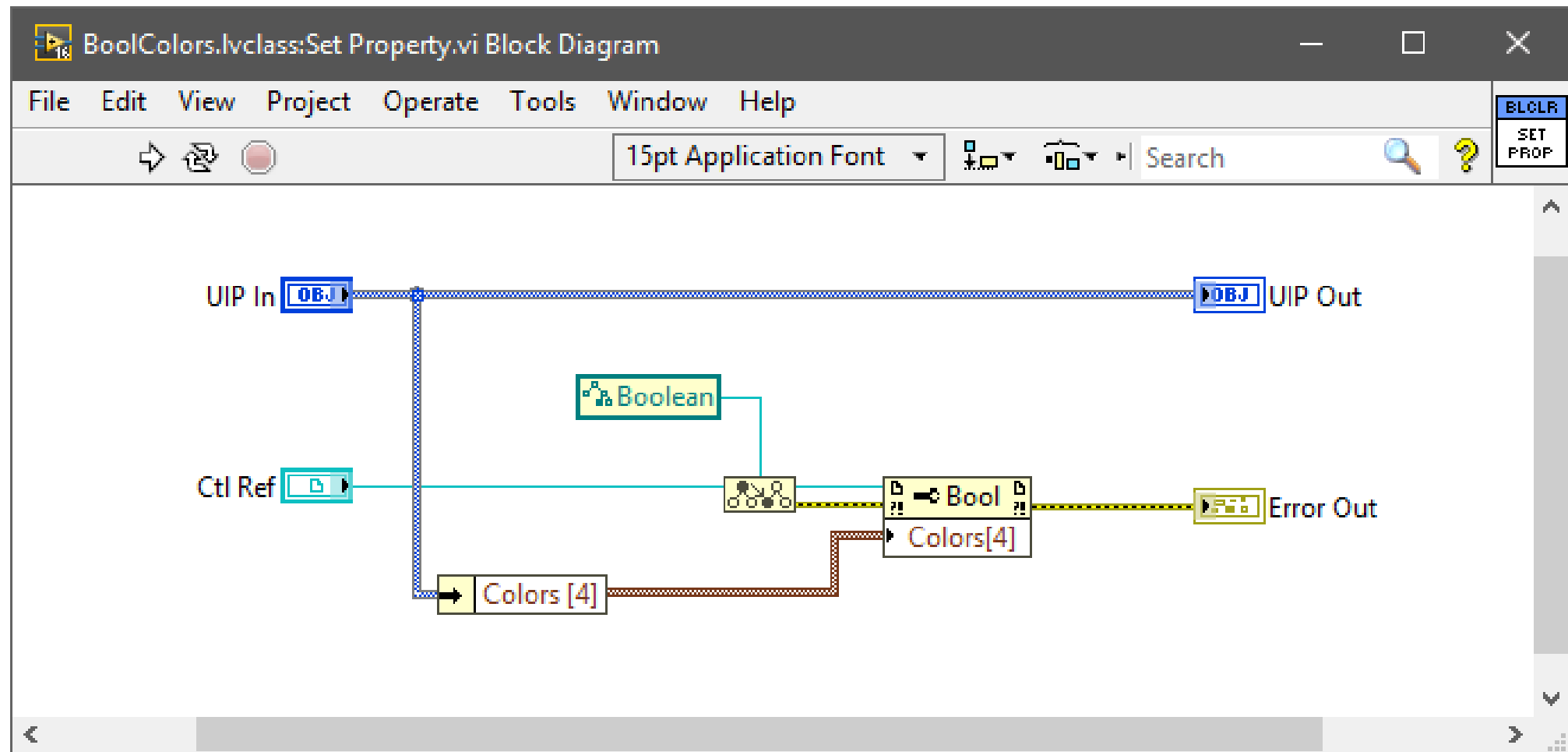
- Inherits from UIP
- Provide override for 5 methods
 - Get State
 - Set State
 - List Compatible Ctls
 - Flatten UIP Value
 - Unflatten UIP Value
- Can be placed within default UIs folder
- Can be loaded dynamically
- Template available in the UI Manager Tool



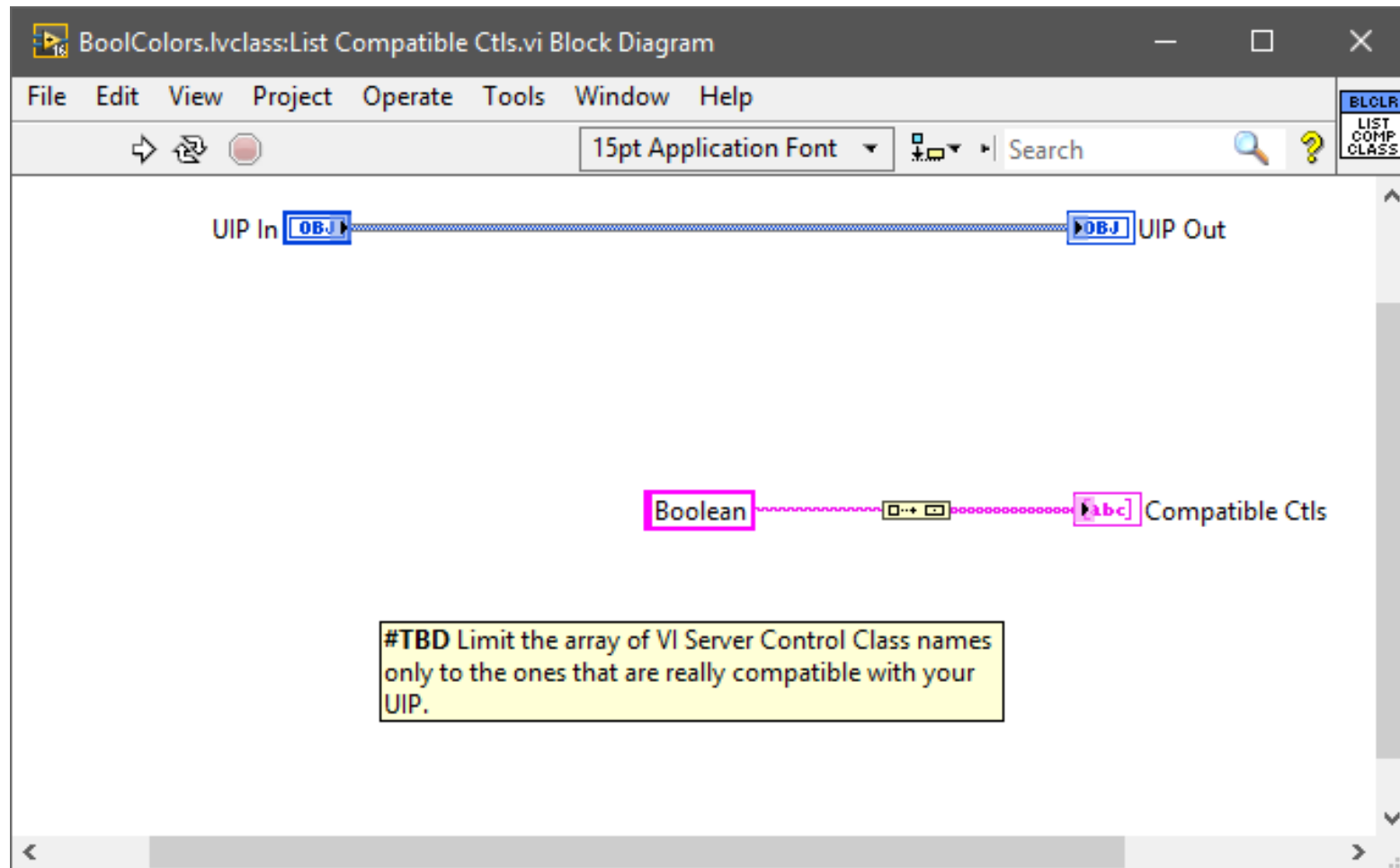
BoolColorsUIP – Get Property.vi



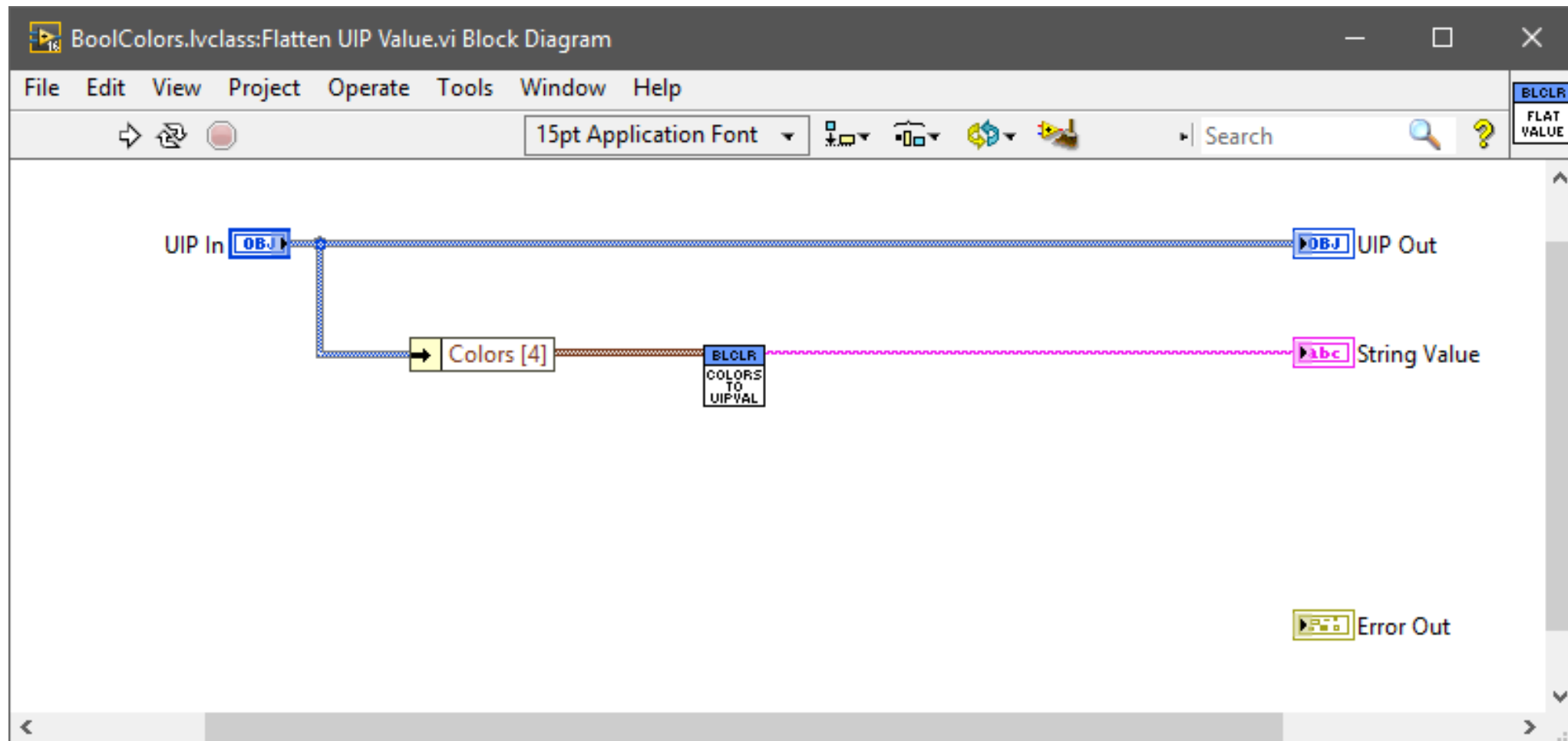
BoolColorsUIP – Set Property.vi



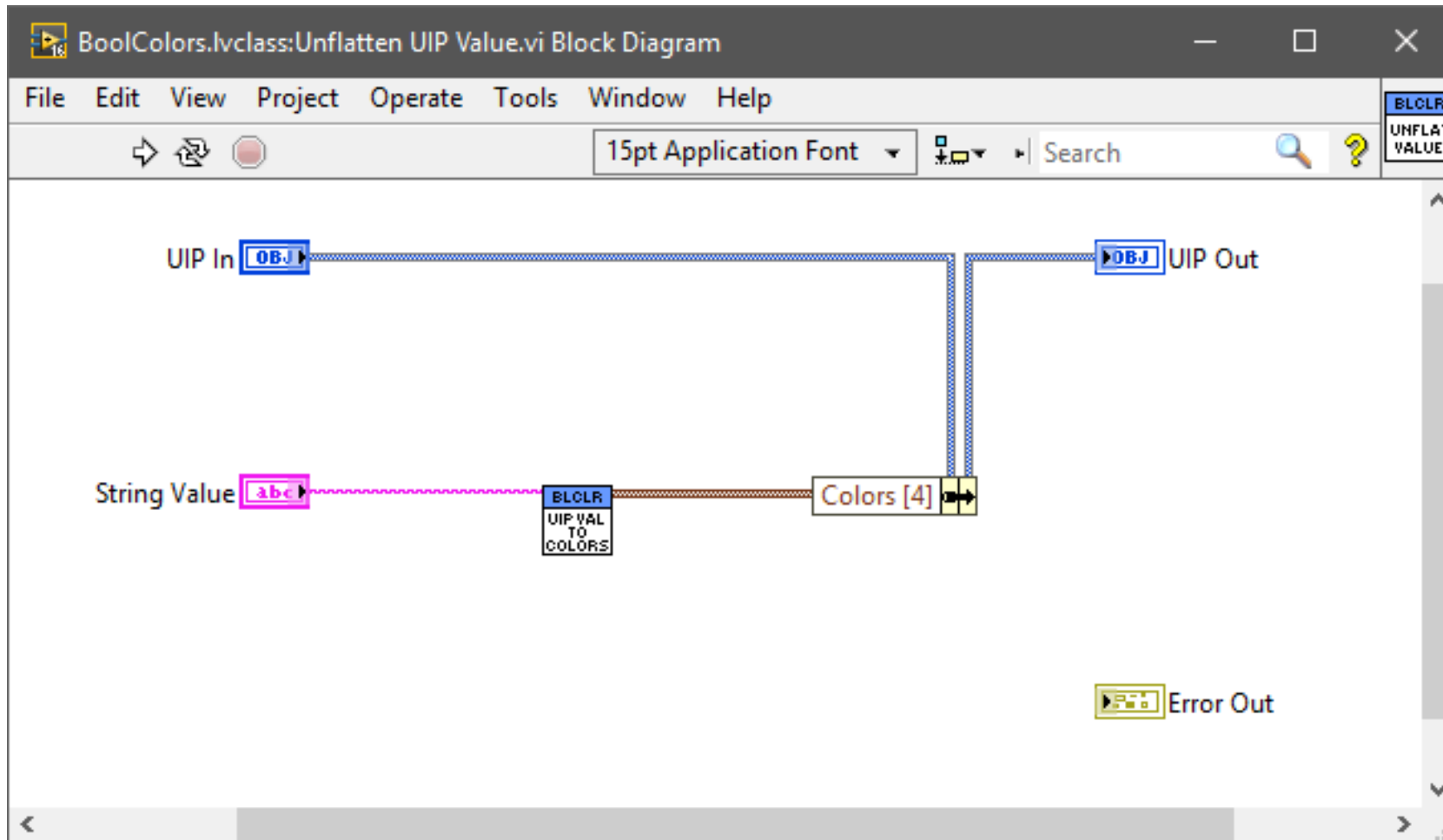
BoolColorsUIP – List Compatible Ctls.vi



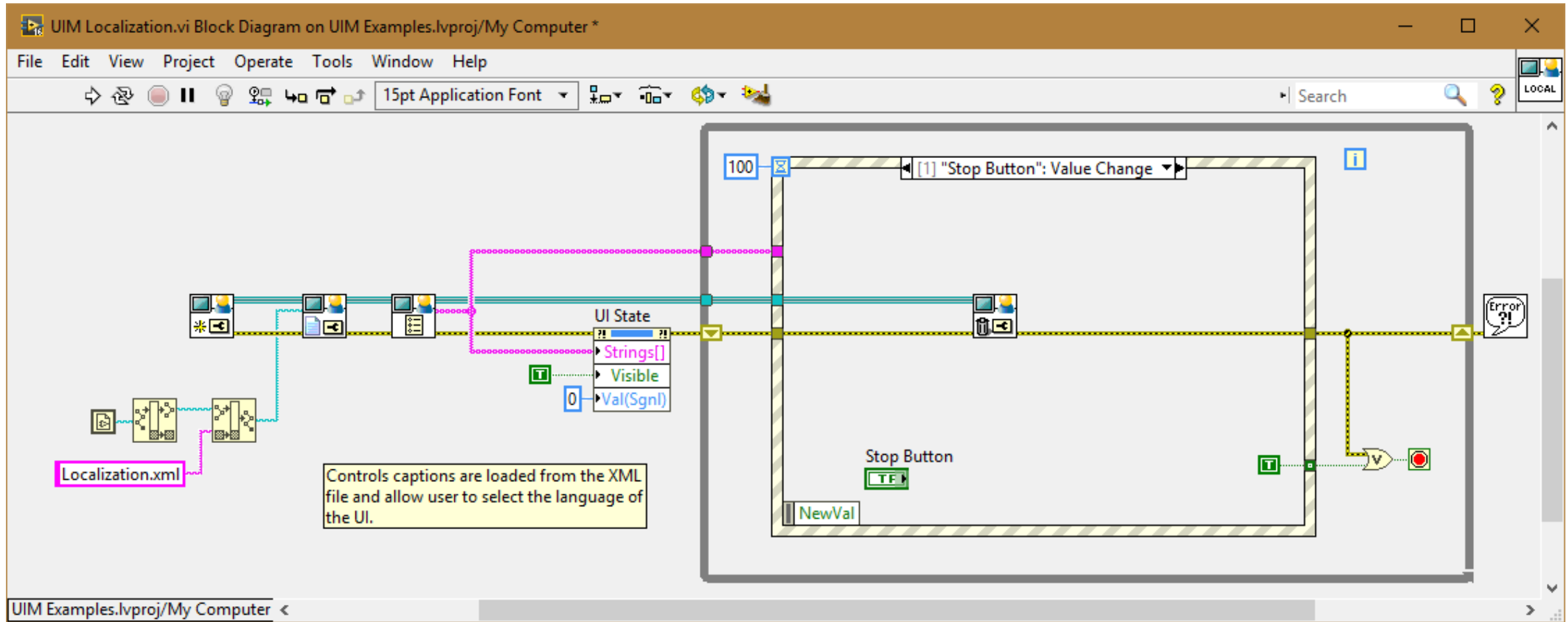
BoolColorsUIP – Flatten UIP Value.vi



BoolColorsUIP – Unflatten UIP Value.vi



Universal Code Example



Summary

- Can be used by anyone – default UI state, resolutions
 - For bigger application indispensable
 - Detach UI editing from source code – no recompilation!
 - Allow for easier team based development
 - One standard
-
- No excuses

<http://forums.ni.com/t5/UI-Interest-Group-Documents/User-Interface-Manager/ta-p/3539490>