Scripting to Save Time

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#OurGiantsAreFemale

Mae C Jemison

- BS Chemical Engineering from Stanford
- MD from Cornell University
- Leader of group of pharmacists, doctors, and other health professionals in Peace Corps in Africa
- Accepted into Astronaut program in 1987
- First black female in space in 1992 on the *Endeavour*

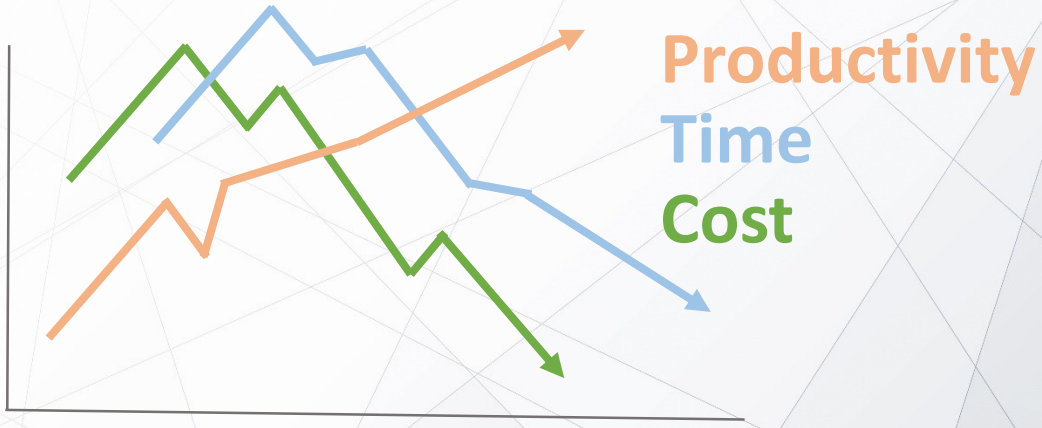
Role of an Architect

- Design a flexible, maintainable, and scalable LabVIEW software architecture
- Build the backbone for development projects
- Selection/Implementation of Design Patterns
- Selection/Implementation of Frameworks
- Lead teams of Developers
- Define communication method/structure
- **Creation of Design Patterns**
- **Creation of tools to aid developers**
- Manage projects – monitor cost/schedule/progress

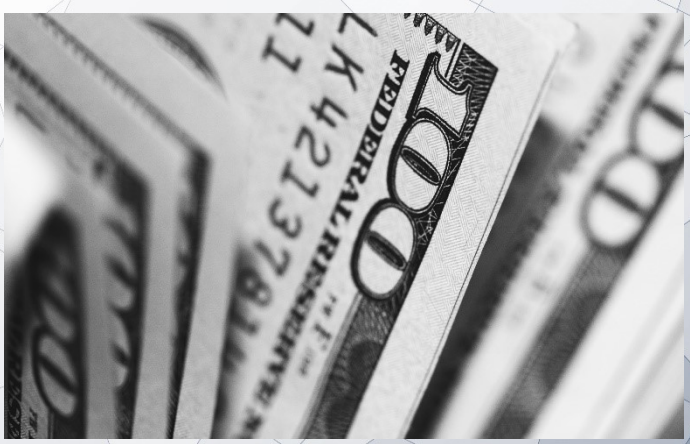
Architects Build the Foundation

We Save Time!

- Our Work:
  - Saves Time
  - Reduces Cost
  - Increases Productivity

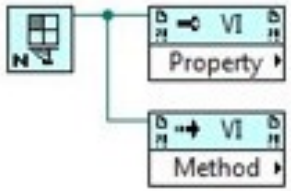


But what about our cost?



VI Scripting

- Using VI Server to programmatically edit, modify, and create LabVIEW Code
- Gives you the set of tools and some examples, but takes creativity:
  - Implement useful tools
  - Build off examples
  - Identify the common steps team members will take

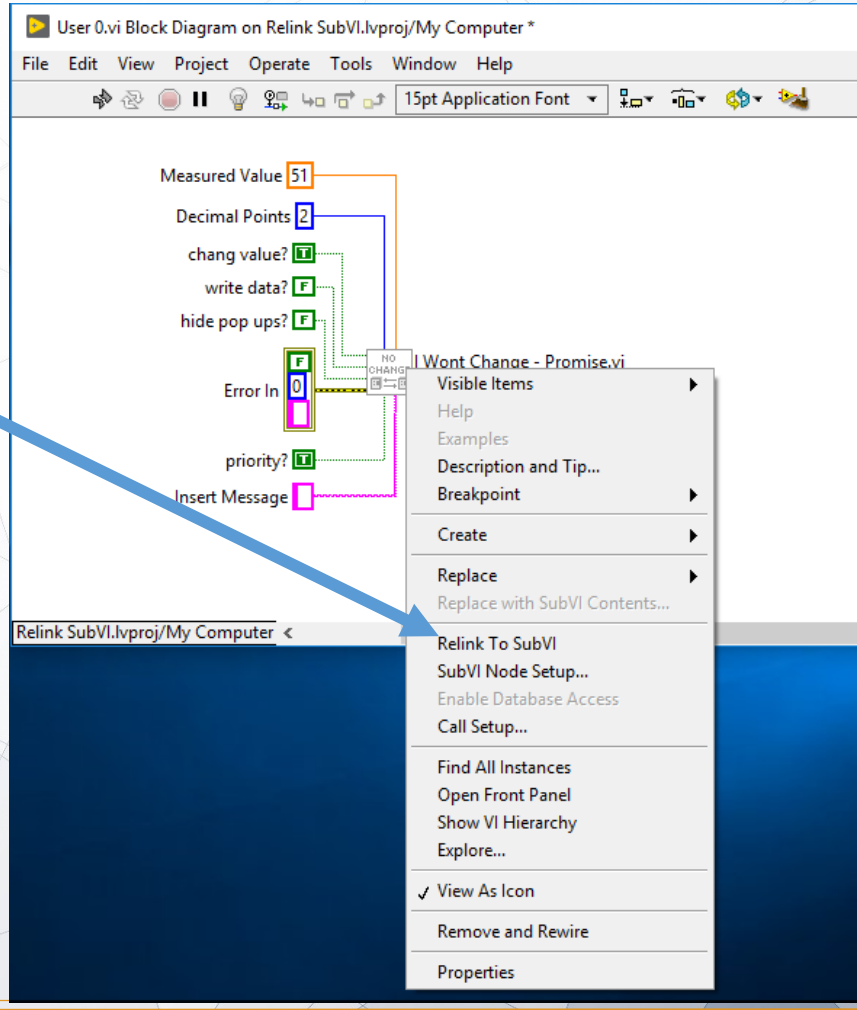


Maybe you create a VI from scratch

Probably not useful…

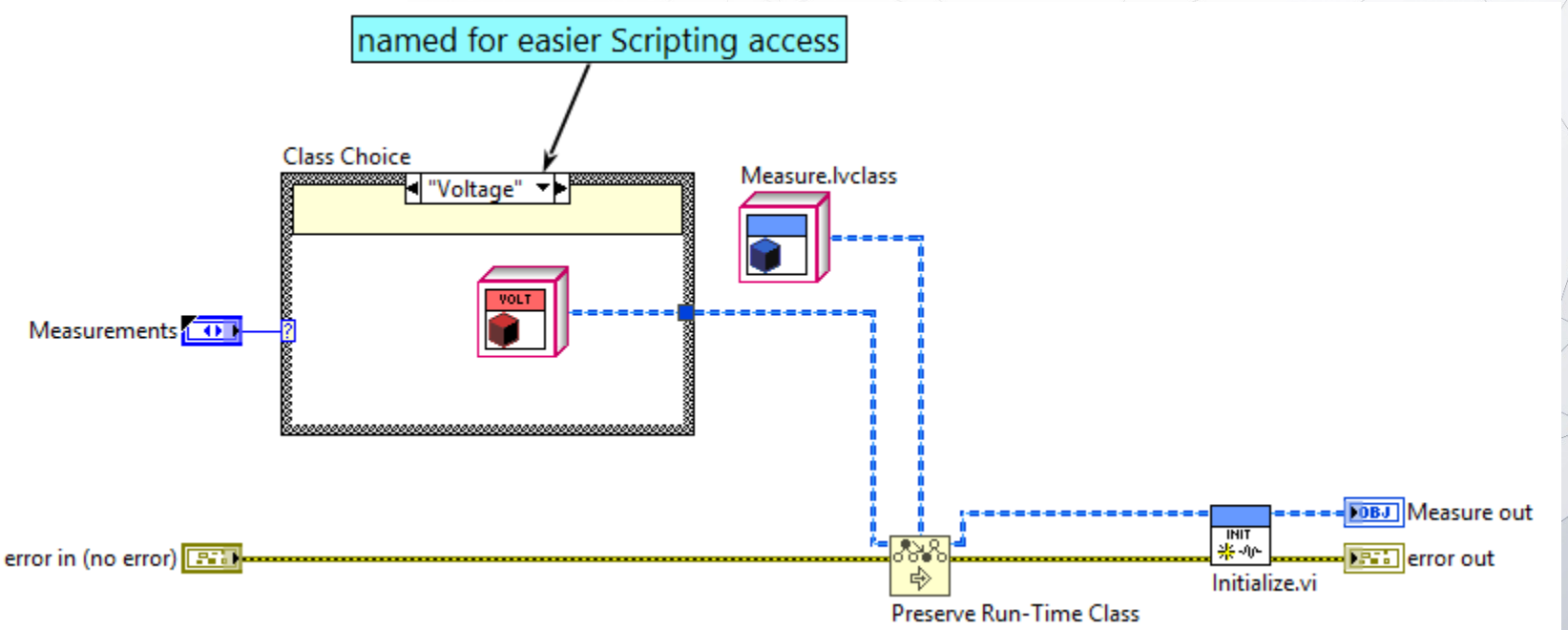
One off to save time

- Relink to subVI?
- Not too painful for a few instances…



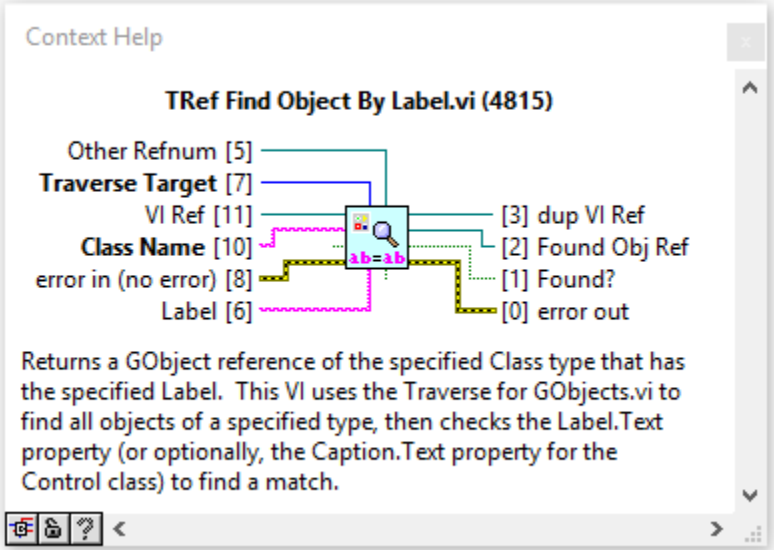
Scripting Relink

Programmatically add case



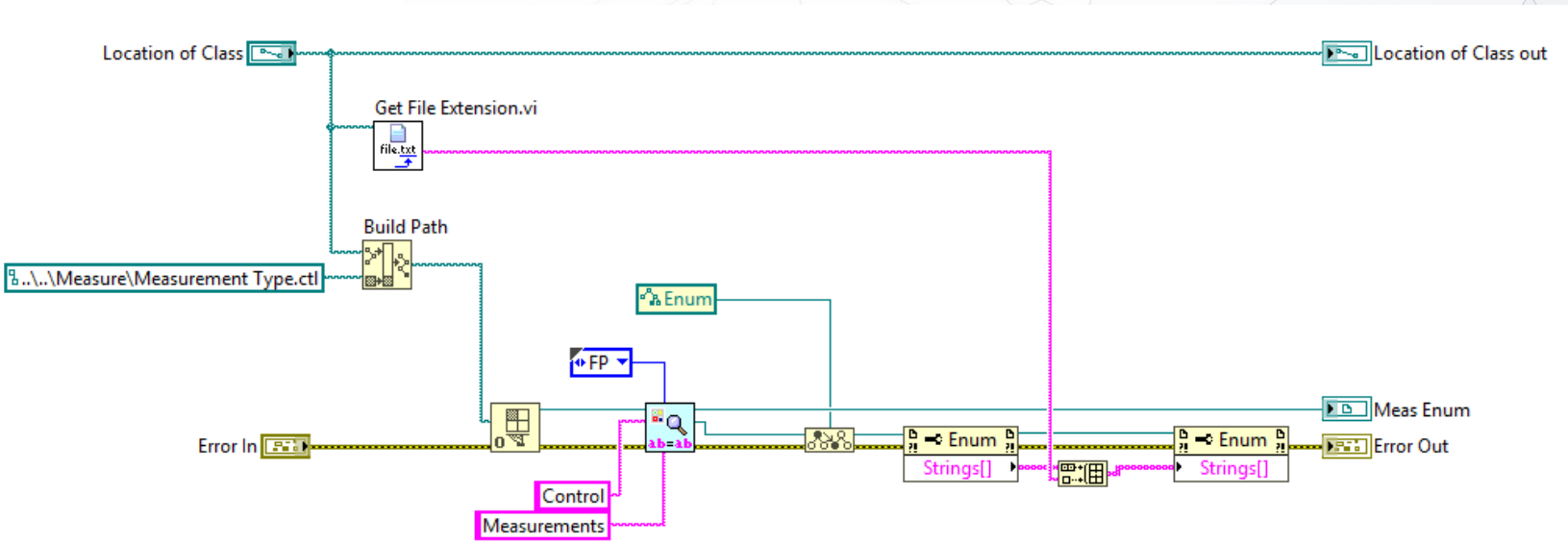
Factory Pattern

Find Object By Label

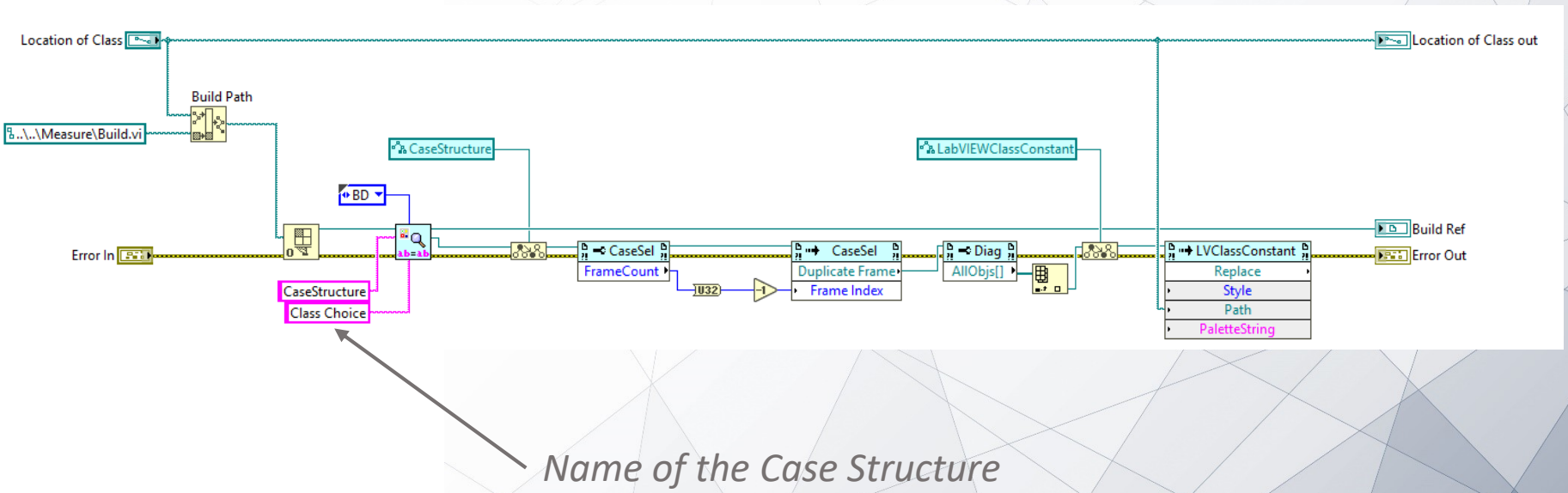


vi.lib\Utility\traverseref.llb

Update the Enum

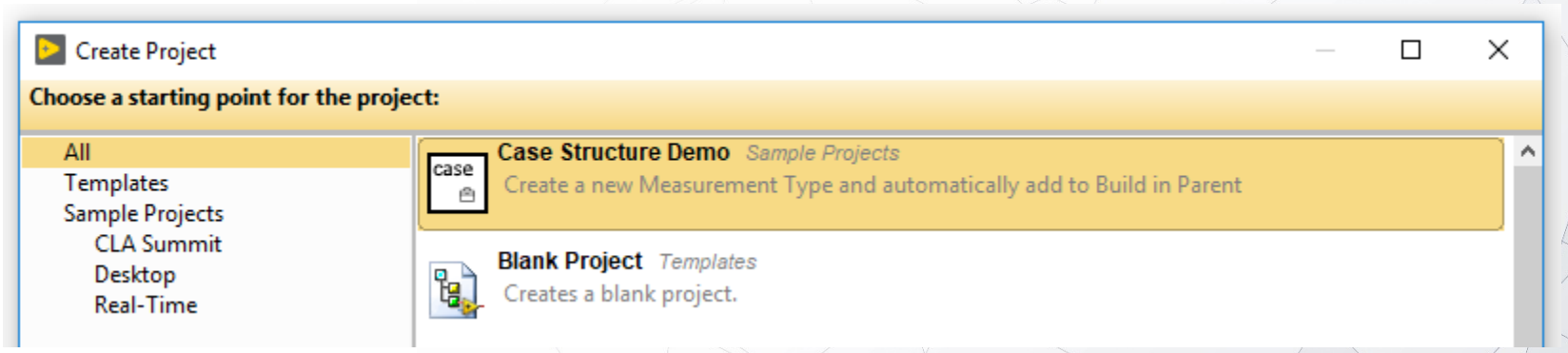


Update the Build VI



Add New Case

Step Further – Project Template



Meta Data

- ProjectTemplates\MetaData
  - XML that defines the wizard calls

```
<MetaData>
  <ProjectTemplate>
    <Title localize="yes">Case Structure Demo</Title>
    <MetaDataClass>scripting/CLA Summit Case Structure Meta Data.lvclass</MetaDataClass>
    <Description localize="yes">Create a new Measurement Type and automatically add to Build in Parent</Description>
    <Filters localize="yes">Sample Projects:CLA Summit</Filters>
    <Keywords localize="yes">Measure;modular;template;design pattern</Keywords>
        <LocationPath>CLA Summit/Case Structure Demo</LocationPath>
        <ProjectPath>NEW-Meas.lvproj</ProjectPath>
        <ListboxImagePath>images/case.png</ListboxImagePath>
    <CustomVIMode>AfterPage2NoUI</CustomVIMode>
    <CustomVIPath>scripting/PostCopyScripting.vi</CustomVIPath>
    <SortPriority>10</SortPriority>
  </ProjectTemplate>
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Source

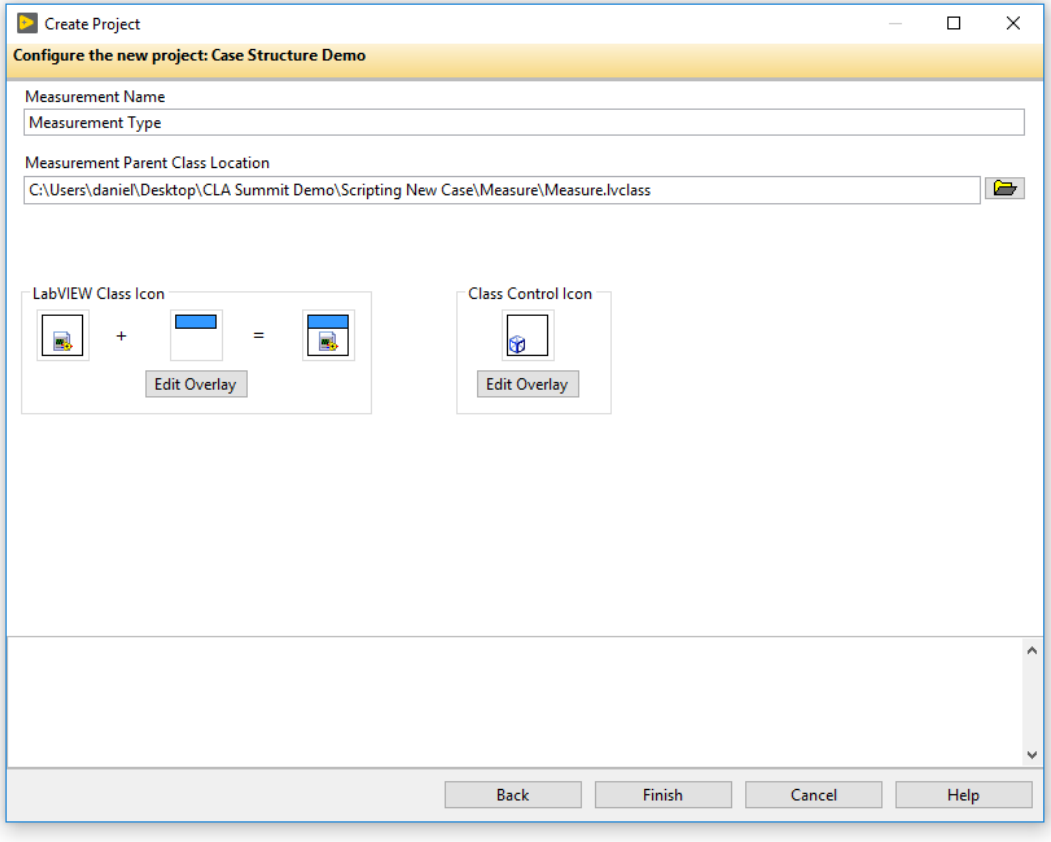
images	9/18/2019 3:09 PM	File folder	
scripting	9/18/2019 3:37 PM	File folder	
Close.vi	9/18/2019 3:26 PM	LabVIEW Instrume...	19 KB
Initialize.vi	9/18/2019 3:26 PM	LabVIEW Instrume...	22 KB
NEW-Meas.lvproj	9/18/2019 3:26 PM	LabVIEW Project	2 KB
TEMP-MEAS.lvclass	9/18/2019 3:26 PM	LabVIEW Class	12 KB

Top Level

CLA Summit Case Structure Meta Data.lv...	9/18/2019 3:16 PM	LabVIEW Class	26 KB
CreateDefaultOverlay - Ctrl.vi	9/18/2019 1:58 PM	LabVIEW Instrume...	32 KB
CreateDefaultOverlay.vi	9/18/2019 1:58 PM	LabVIEW Instrume...	22 KB
PostCopyScripting.vi	9/18/2019 3:30 PM	LabVIEW Instrume...	39 KB
Read Spec Page Path.vi	9/18/2019 3:16 PM	LabVIEW Instrume...	18 KB
Spec-Page.vi	9/18/2019 3:37 PM	LabVIEW Instrume...	39 KB
Template Scripting.lvproj	9/18/2019 3:16 PM	LabVIEW Project	15 KB
Update Build Function.vi	9/18/2019 3:16 PM	LabVIEW Instrume...	34 KB
Update Measurement Enum.vi	9/18/2019 3:31 PM	LabVIEW Instrume...	29 KB
Update Project.vi	9/18/2019 3:15 PM	LabVIEW Instrume...	29 KB

scripting folder

Demo Project Template Page



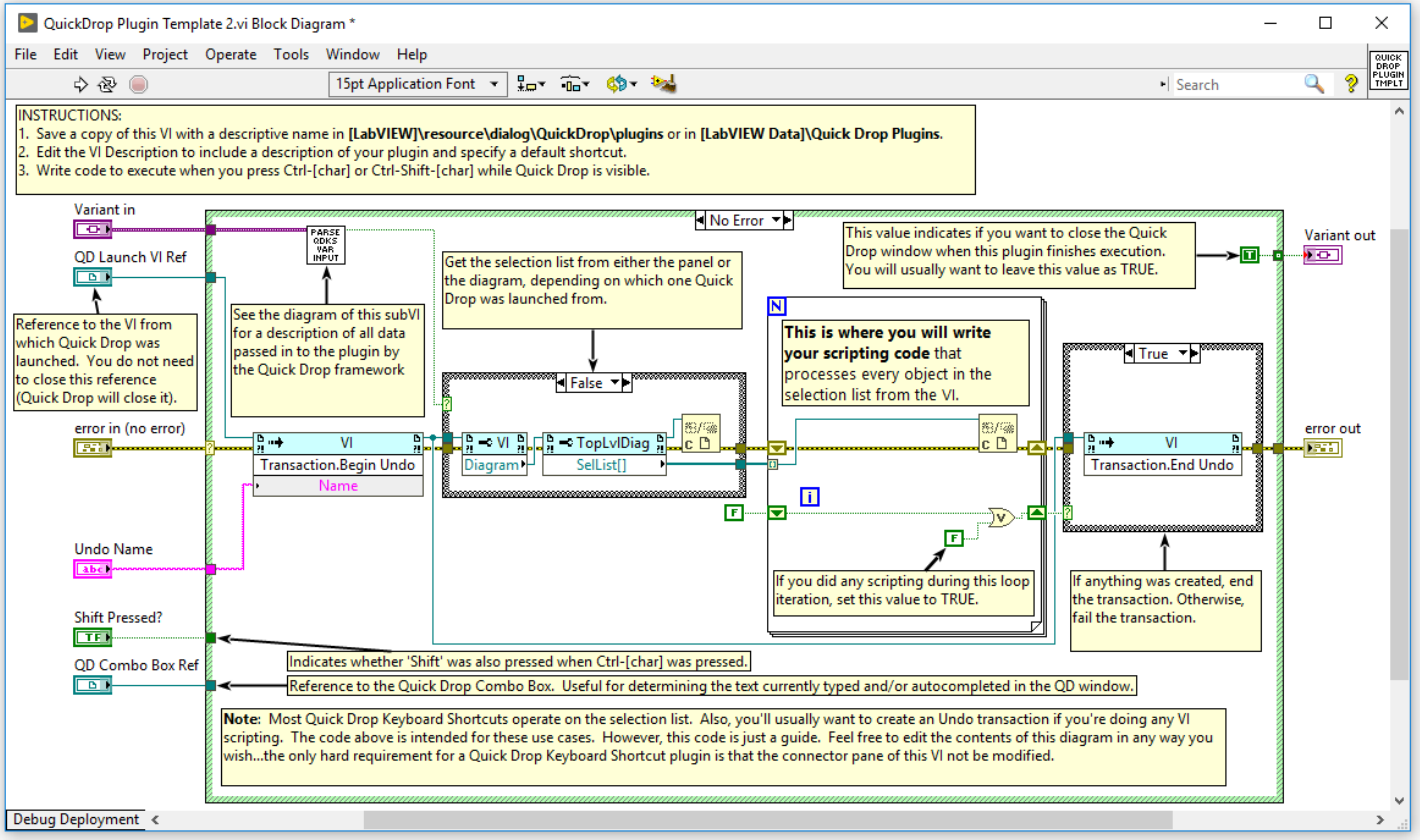
Project Template

Quick Drop – Use It

Keyboard Shortcut	Description
Ctrl-D	Creates controls and indicators for all unwired inputs and outputs of the selected block diagram object(s).
Ctrl-Shift-D	Creates constants for all unwired inputs of the selected block diagram object(s).
Ctrl-W	Wires a row or multiple parallel rows of selected block diagram objects.
Ctrl-Shift-W	Wires a row or multiple parallel rows of selected block diagram objects and cleans up the selected objects.
Ctrl-R	Removes the selected block diagram object(s) and any wires and constants connected to the selected object(s), and connects wires of identical data types that were wired to the inputs and outputs of the deleted object(s).
Ctrl-T	Repositions the visible labels and captions of top-level front panel and block diagram objects to match the **Default label position** you specify in the Options dialog box. You also can select multiple objects on the block diagram, display the **Quick Drop** dialog box, and press <Ctrl-T> to move the labels of only the selected objects.
Ctrl-Shift-T	Repositions the visible labels and captions of top-level front panel and block diagram objects, including terminals contained in subdiagrams, to match the **Default label position** you specify in the Options dialog box.
Ctrl-P	Replaces the selected front panel or block diagram object(s) with the object you select in the **Quick Drop** dialog box.
Ctrl-I	Inserts the object you select in the **Quick Drop** dialog box on the selected wire(s) on the block diagram.
Ctrl-Shift-I	Inserts a single instance of the object you select in the **Quick Drop** dialog box on multiple selected wires.
Ctrl-B	Changes the VI Server class of the selected Property Node(s), Invoke Node(s), and/or class specifier constant(s) to the class you enter in the **Quick Drop** window.
Ctrl-Shift-B	Changes the property or method of the selected Property Node(s) or Invoke Node(s), respectively, to the property or method name you enter in the **Quick Drop** window.

https://zone.ni.com/reference/en-XX/help/371361R-01/lvhowto/qd_keyboard_shortcuts/

Quick Drop – Your Own Shortcuts (or leverage the community…)



resource\dialog\QuickDrop

Conclusions

- Think through the trade-offs:
  - How much time will the tool take vs. how much time will it save?
  - Adapt current scripting to future projects
- Build off examples
- Go after repetitive tasks
- USE TEMPLATES

Useful Links

- Project Templates:
  - Becky Linton's NI Week 2016 presentation: https://bit.ly/2n0xcwJ
  - NI "Tutorial": http://www.ni.com/tutorial/14045/en/
  - Elijah Kerry post: https://bit.ly/2ltXc2P
  - Nate Moehring's CLD Summit 2013 presentation: https://bit.ly/2kTWk7z
- Quick Drop:
  - Community Quick Drops: https://bit.ly/2kWJIfZ
- Scripting:
  - LabVIEW Wiki has great links: https://labviewwiki.org/wiki/VI_Scripting