

NATIONAL INSTRUMENTS

LabVIEW™ 2013

What's New in LabVIEW 2013

Lawrence M. David Jr.

Automation Laboratory Experts - ALE LLC

Presented to the IEEE Long Island Section Instrumentation & Measurement Society and the Long Island LabVIEW Users Group (LILUG) on Thursday September 5, 2013

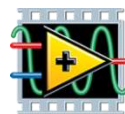
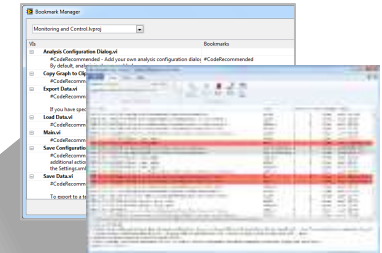
Code Reuse and
Mobile Device Integration



Access the Newest
Hardware Technology



Code Management and
Debugging Tools



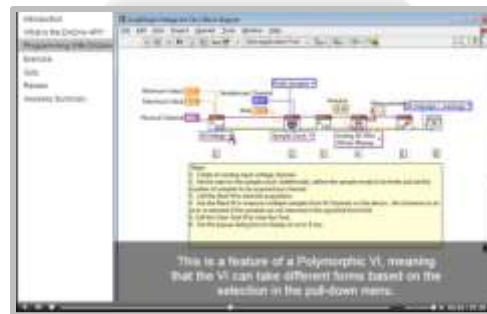
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LabVIEW™ 2013

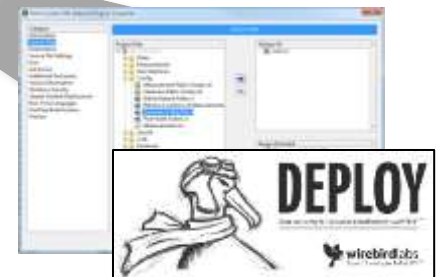
All Systems. Go.



New Sample Projects and
Improved Examples



Expanded Online Training



Streamlined Application Deployment

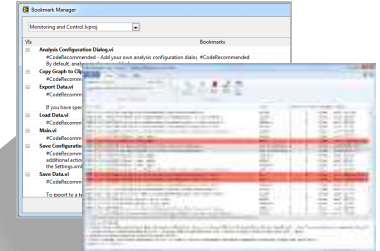
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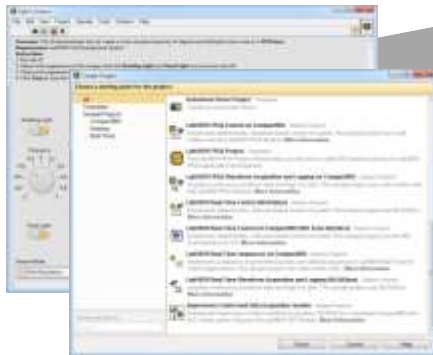
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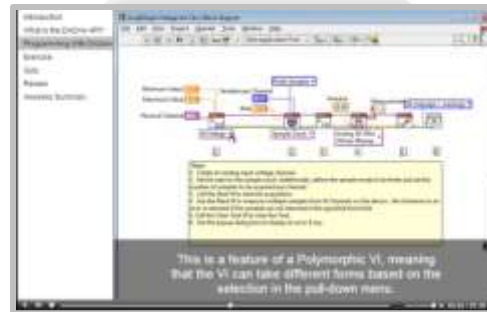
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LabVIEW™ 2013

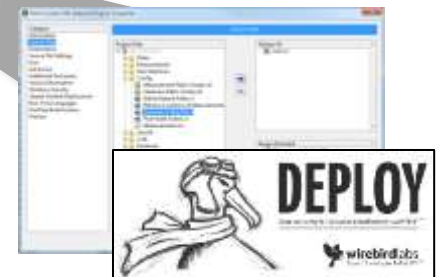
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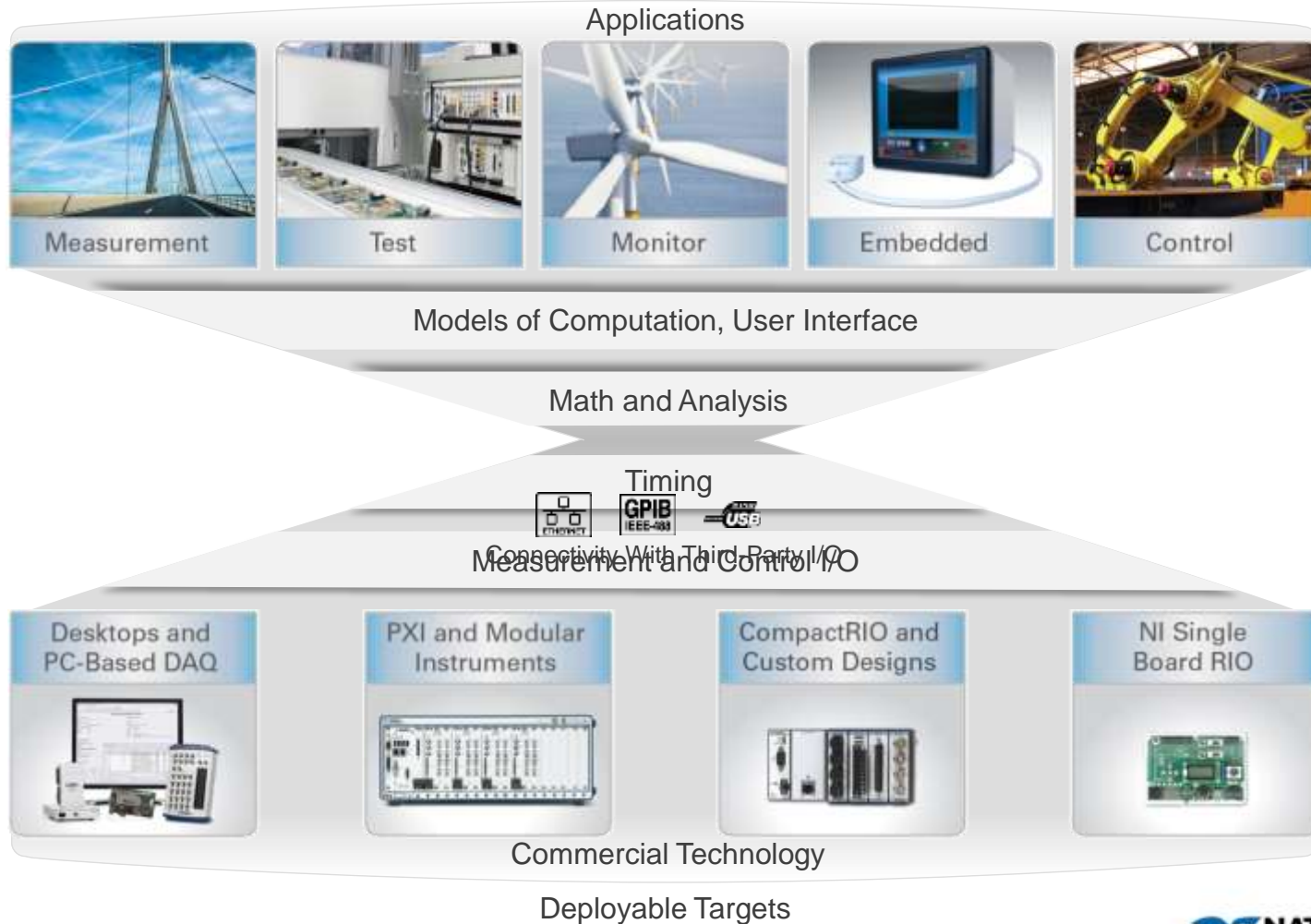
Expanded Online Training



Streamlined Application Deployment

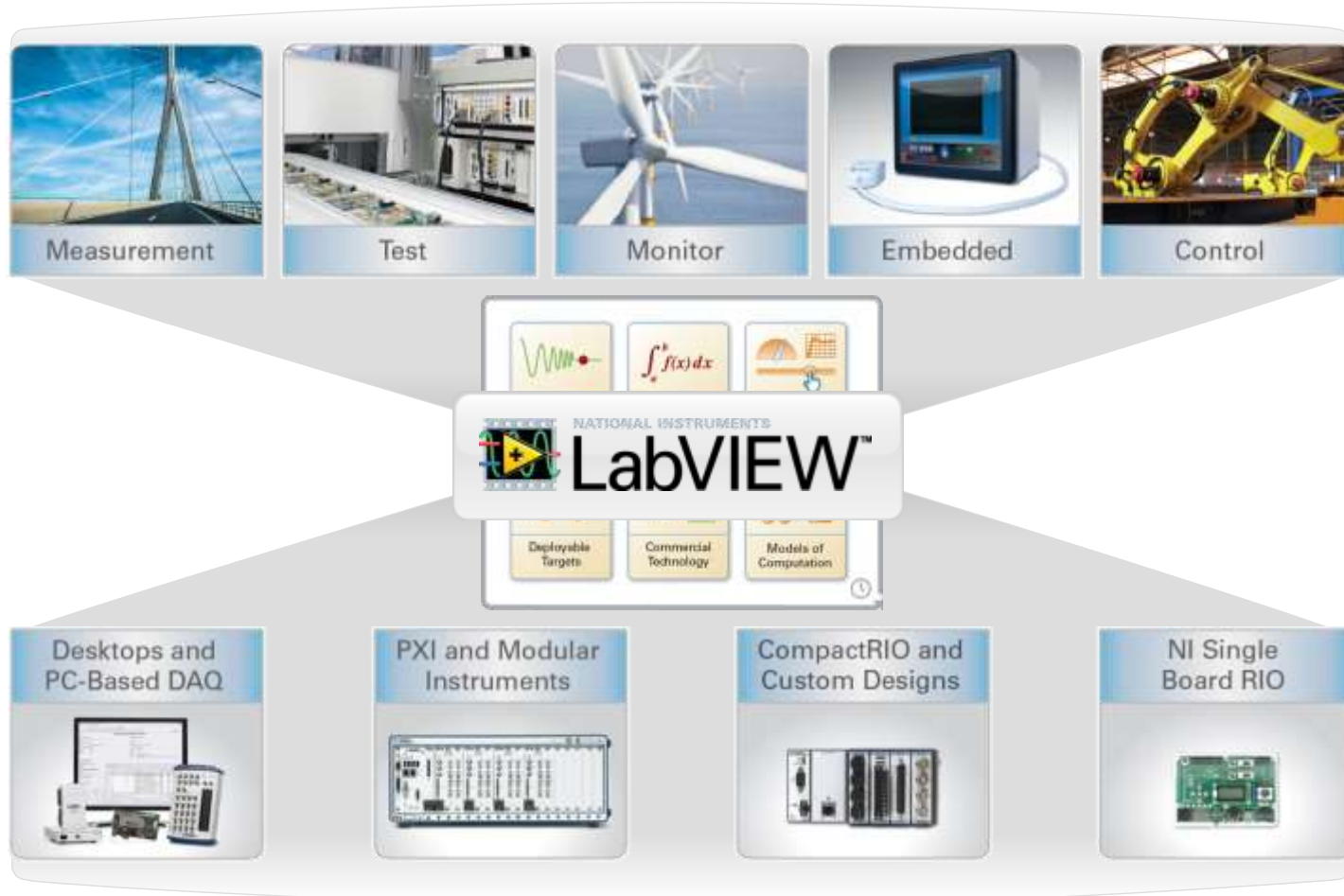
Graphical System Design

A platform-based approach for measurement and control

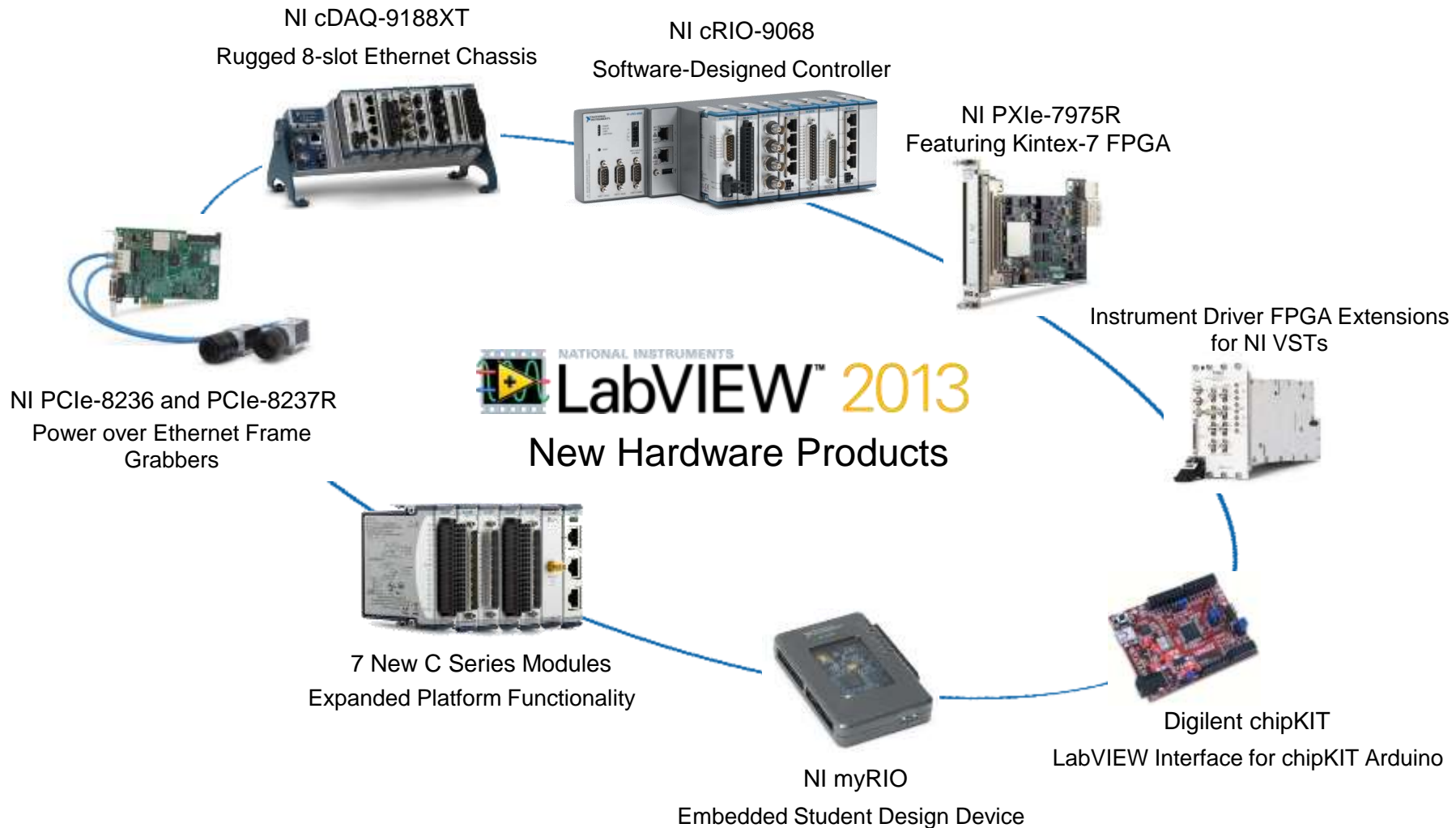


Graphical System Design

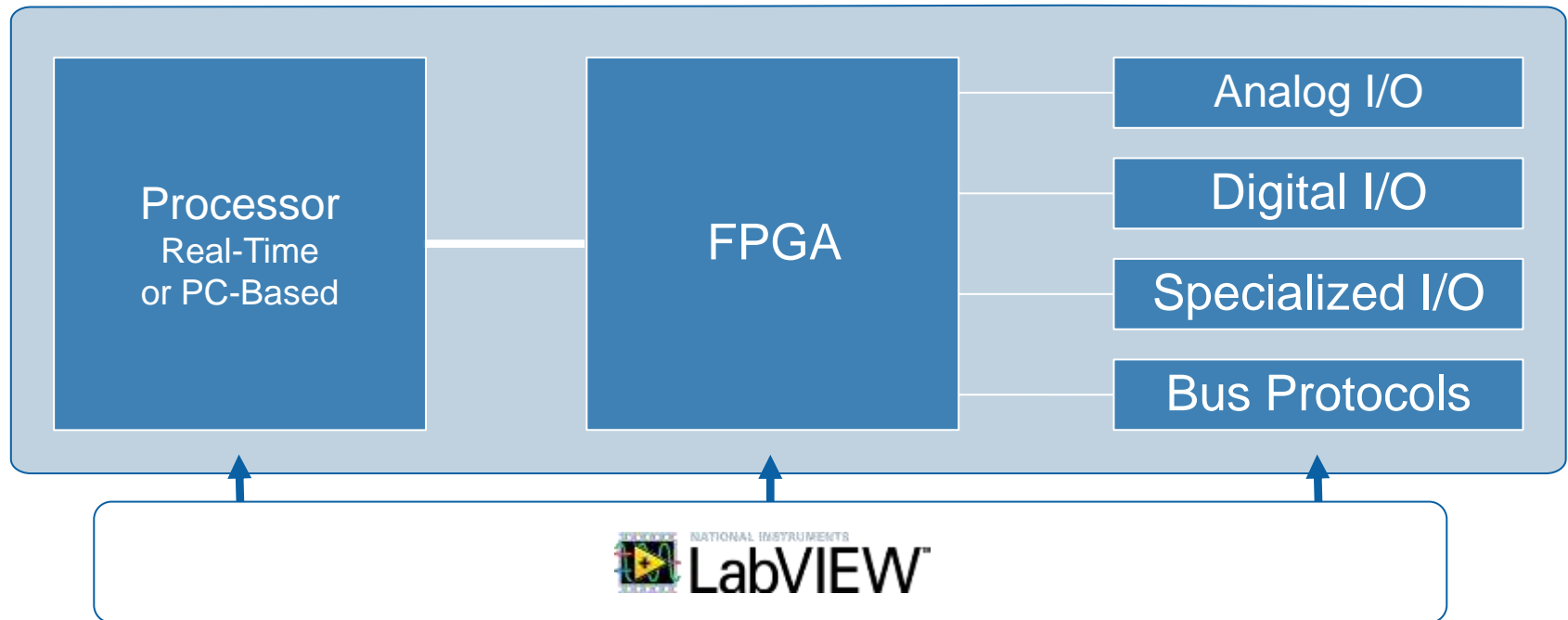
A platform-based approach for measurement and control



Unrivaled Integration with the Latest Technology



LabVIEW RIO Architecture



LabVIEW Programmed NI CompactRIO

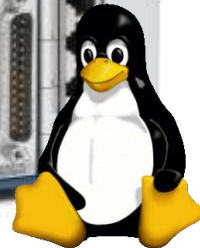
- cRIO-9002
- cRIO-9004
- cRIO-9072
- cRIO-9074
- cRIO-9075
- cRIO-9076
- cRIO-9012
- cRIO-9014
- cRIO-9024
- cRIO-9025
- cRIO-9081
- cRIO-



PowerPC



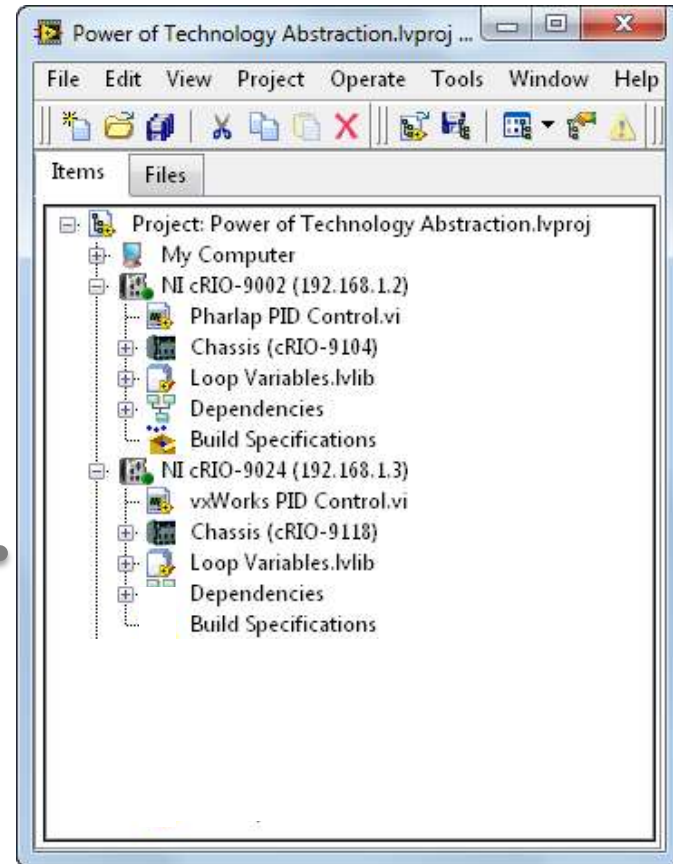
VxWorks



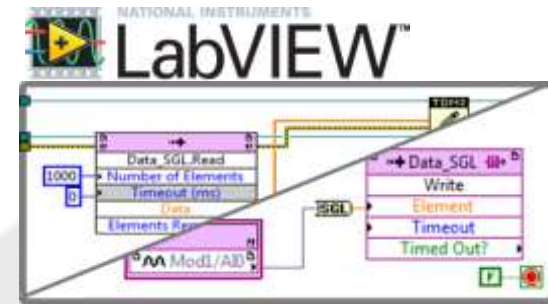
cRIO-9068

ni.com

ZYNQ



The Redesigned CompactRIO



NI LabVIEW System Design

- Program with LabVIEW Real-Time and LabVIEW FPGA modules
- Quickly port existing LabVIEW applications

High Throughput and Performance

- Dual-Core ARM 667 MHz processor
- Xilinx 7 Series FPGA fabric with 85k logic cells
- 16 DMA FIFO channels for data streaming

Ultra Rugged

- 40 to 70° C operating temperature range
- 50 g shock and 5 g vibration tolerance

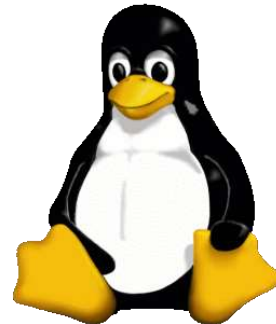
Community and Code Reuse

- NI Linux Real-Time Operating System
- Integrate existing applications and libraries
- Develop, debug, and deploy C/C++ code

LabVIEW Support for NI Linux Real-Time OS®

LabVIEW 2013 Real-Time Module supports developing, debugging and deploying applications to the NI Linux Real-Time OS® deterministic operating system

- For users familiar with Linux, unlock the vast Linux **ecosystem** on the new CompactRIO controller
- **Reuse** C/C++ code in and alongside LabVIEW Real-Time built applications on the redesigned CompactRIO controller
- Freedom in **Connectivity**
 - Expanded LabVIEW design flow for open web service creation
 - Secure file transfer with WebDAV
 - Improved network interface



Data Dashboard for LabVIEW 2.2

Alternate Servers

Now you can set up one dashboard to monitor multiple targets and use the drop down menu to switch where the data is streaming from while the dashboard is running



Multi-Plot

Data Dashboard now supports 2D array of numerics as a datatype for charts and graphs.

Android Tablets

Data Dashboard 2.2 on Android tablets now supports monitor and control applications and free canvas customizations.

Transparency

Adjust the transparency of images, controls, and indicators on your dashboard

Code Reuse and
Mobile Device Integration



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Code Management and
Debugging Tools



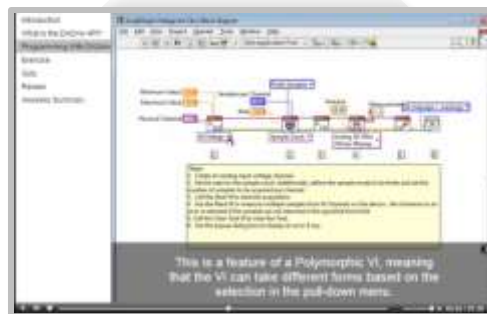
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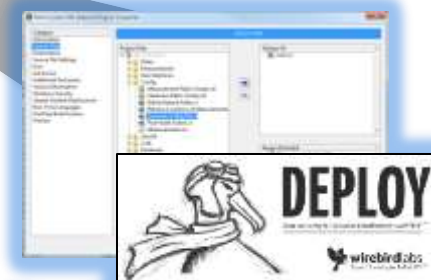
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New Sample Projects and
Improved Examples



Expanded Online Training

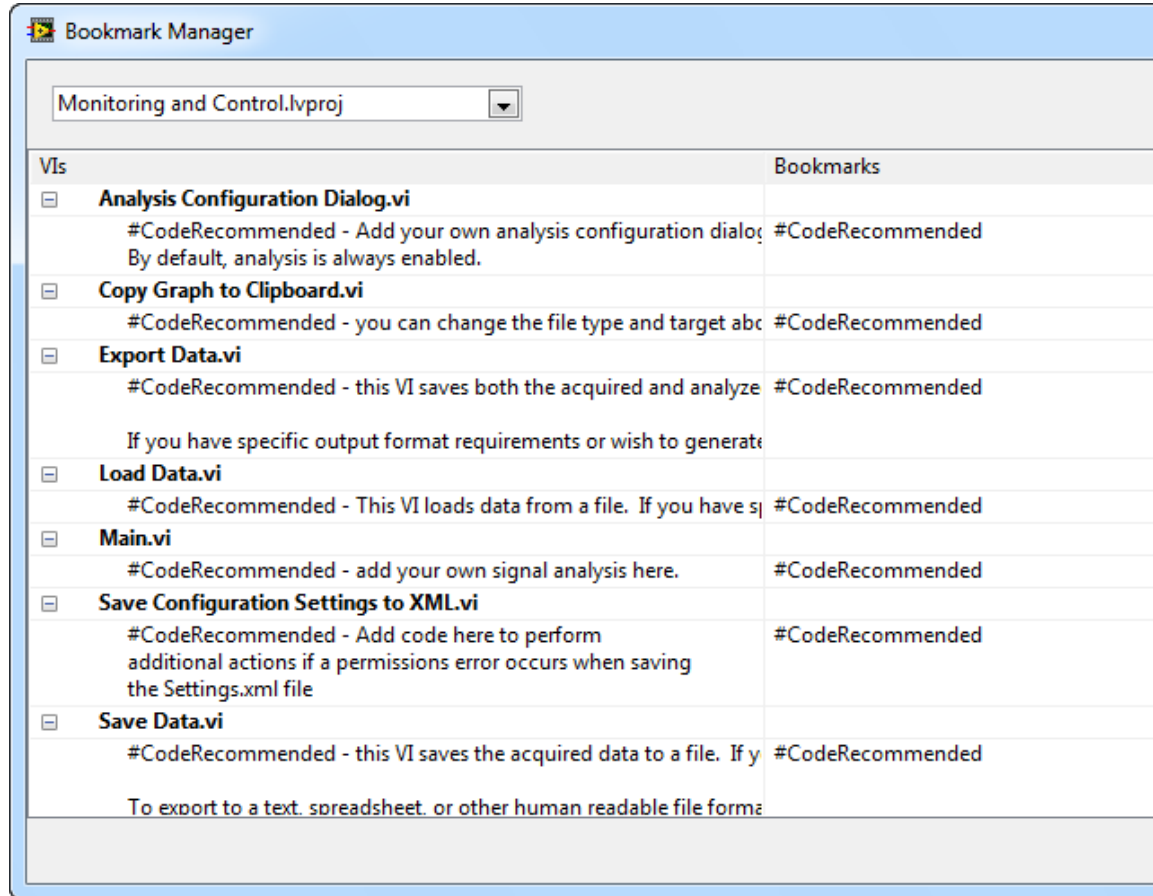


Streamlined Application Deployment

Tools to Document Code

Bookmark Manager

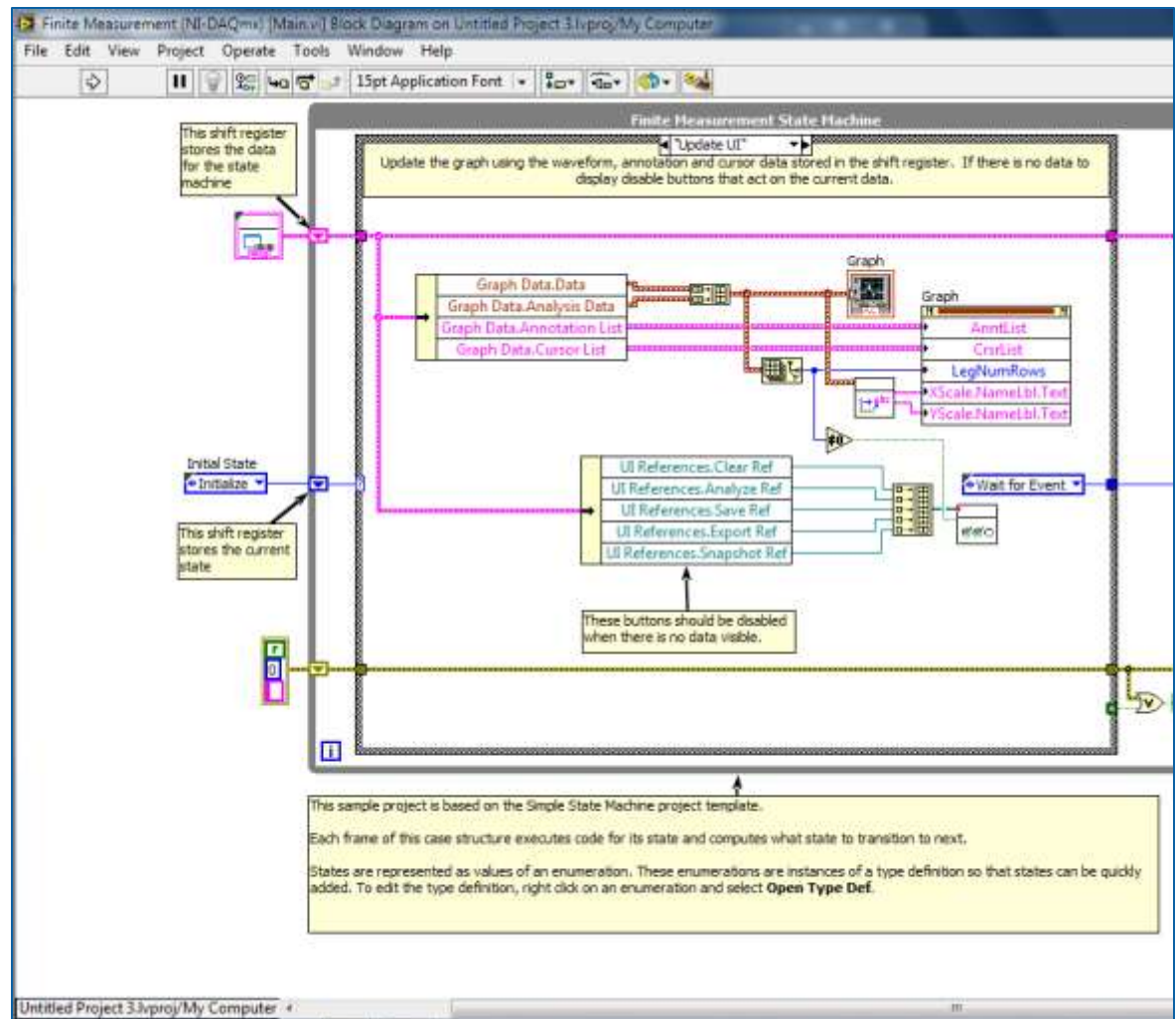
- Aggregates tags from code comments into a single window
- Allows developers to easily navigate through large code hierarchies
- Built on an open and extensible API



Tools to Document Code

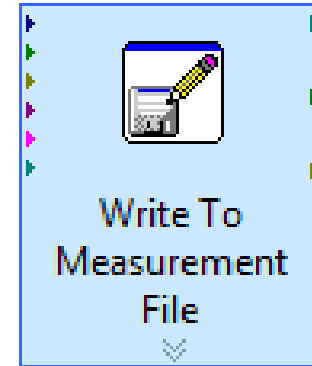
Attached Comments

- Drag arrows from comment to code to create explicit link
- Improve code readability
- Associations preserved with block diagram clean-up



Improved Excel Integration

- Write to measurement file can create an xlsx file
- Does not use ActiveX interface; therefore, Excel does not need to be installed
- Available for use on Real-Time



File Format

Text (LVM)

Binary (TDMS)

Binary with XML Header (TDM)

Microsoft Excel (.xlsx)

Lock file for faster access

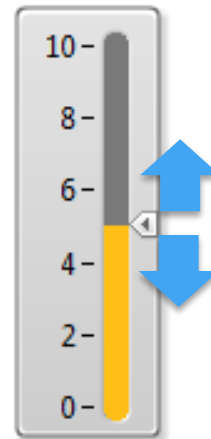
Mouse Wheel Support for Controls and Indicators



Numeric Controls



Sliders

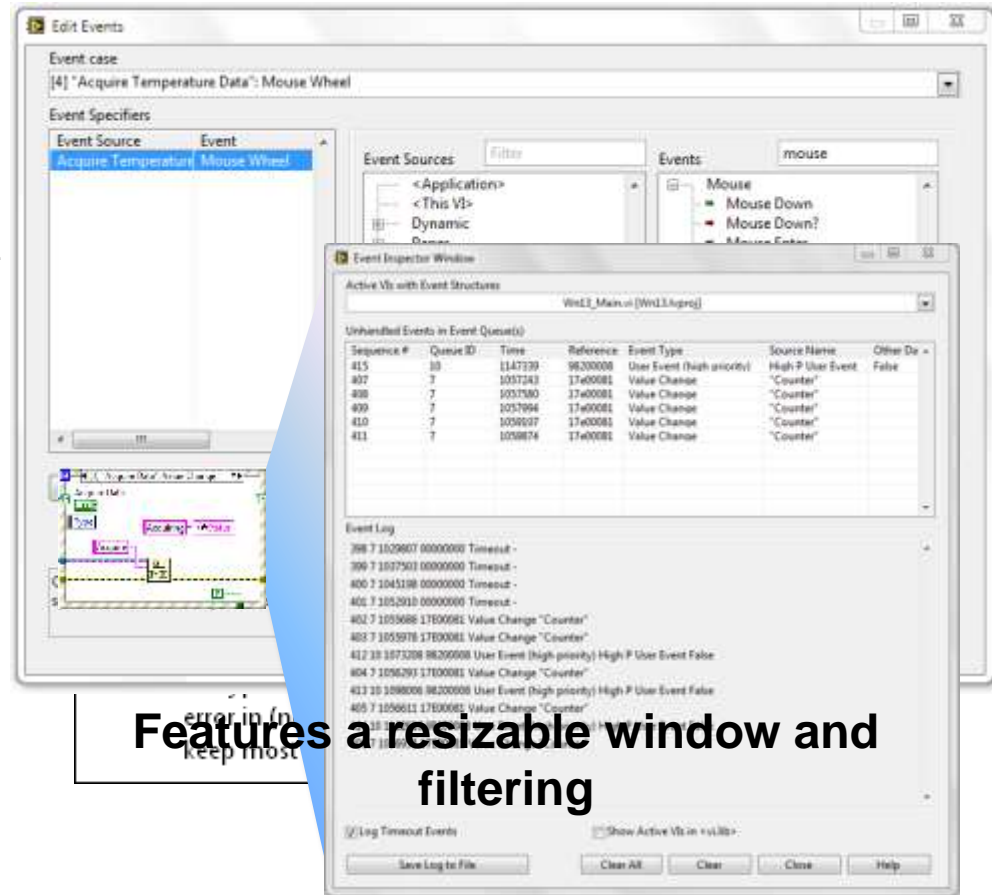


Knob

You can change the values of selected controls using the scroll wheel

Event Structure and API Improvements

- Mouse scrolling included in static events
- Improvements to user interface of 'Edit Events' dialog
- New Event Inspector Window to simplify debugging
- New User Event primitives for advanced control over buffer



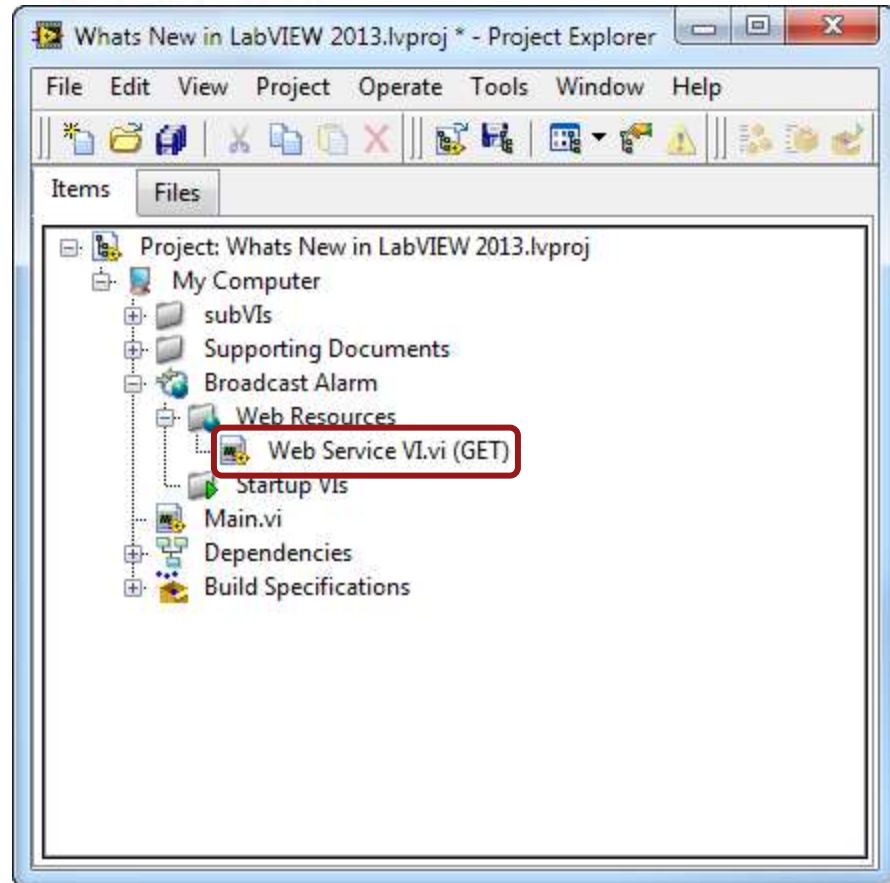
New Web Service Experience

Design

Verify

Deploy

- Provide Remote Access To LabVIEW Applications
- Formerly a Build Specification Item
- Now a Project Item – Faster Edits and Deployment



New Web Service Experience

Design

Verify

Deploy

Debuggable Web Services integrated into the LabVIEW project

*Reserved VI during debugging

The image shows two overlapping LabVIEW windows. The left window is the 'Project Explorer' for 'Whats New in LabVIEW 2013.lvproj'. The 'Broadcast Alarm' VI is selected, and a context menu is open with 'Start' highlighted. A blue arrow points to this menu. The right window is the 'Block Diagram' for 'Web Service VI.vi'. It shows a 'LabVIEW Web Service Request' block connected to an 'Alarm?' block, which is connected to a 'Temperature Averages' block. A 'STORE TEMP DATA' block is also present. A red arrow points to the 'File' menu in the Block Diagram window. A yellow callout box points to the 'Temperature Averages' block with the text: '#7-New_Web_Service_Experience Show web service project item, debugging and new web service category in EXE build specification'. Another yellow callout box points to the 'Temperature Averages' block with the text: 'Check for any duplicate values and do not log any duplicates.' The status bar at the bottom of the Block Diagram window shows 'Whats New in LabVIEW 2013.lvproj/My Computer'.

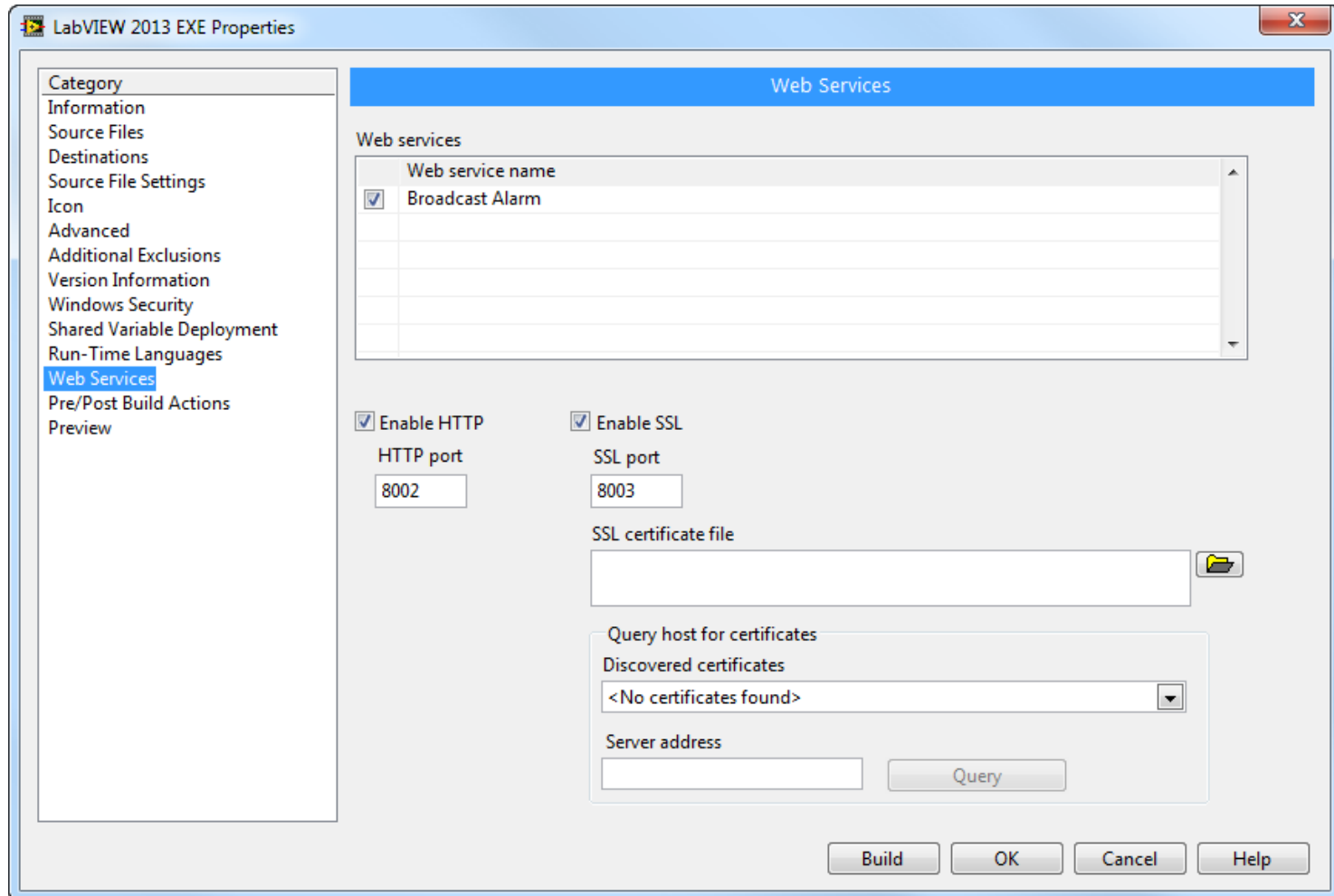
New Web Service Experience

Design

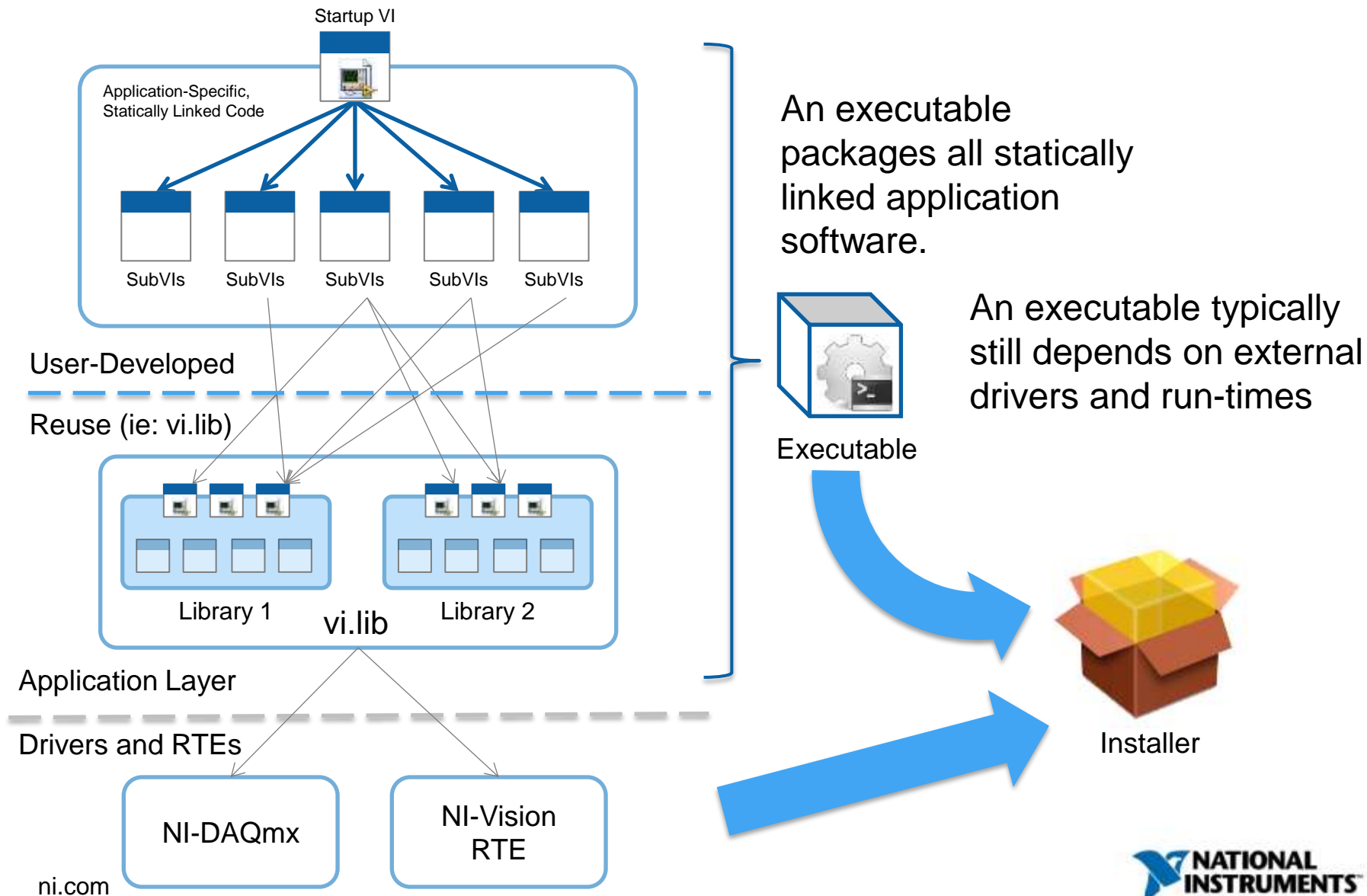
Verify

Deploy

New EXE Build Specification Category to Include & Auto-Deploy

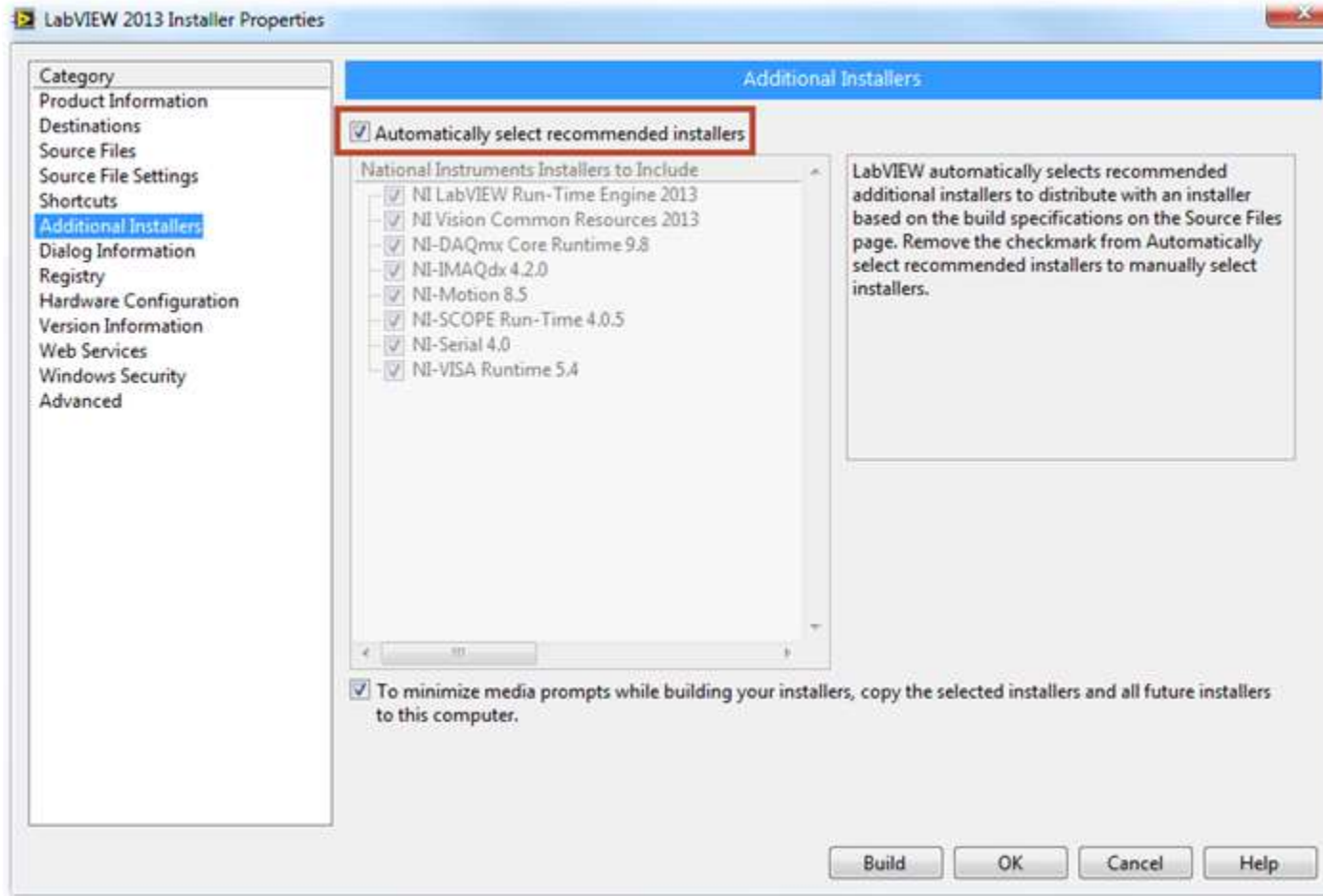


Simplifying the Creation of Installers



Simplifying the Creation of Installers

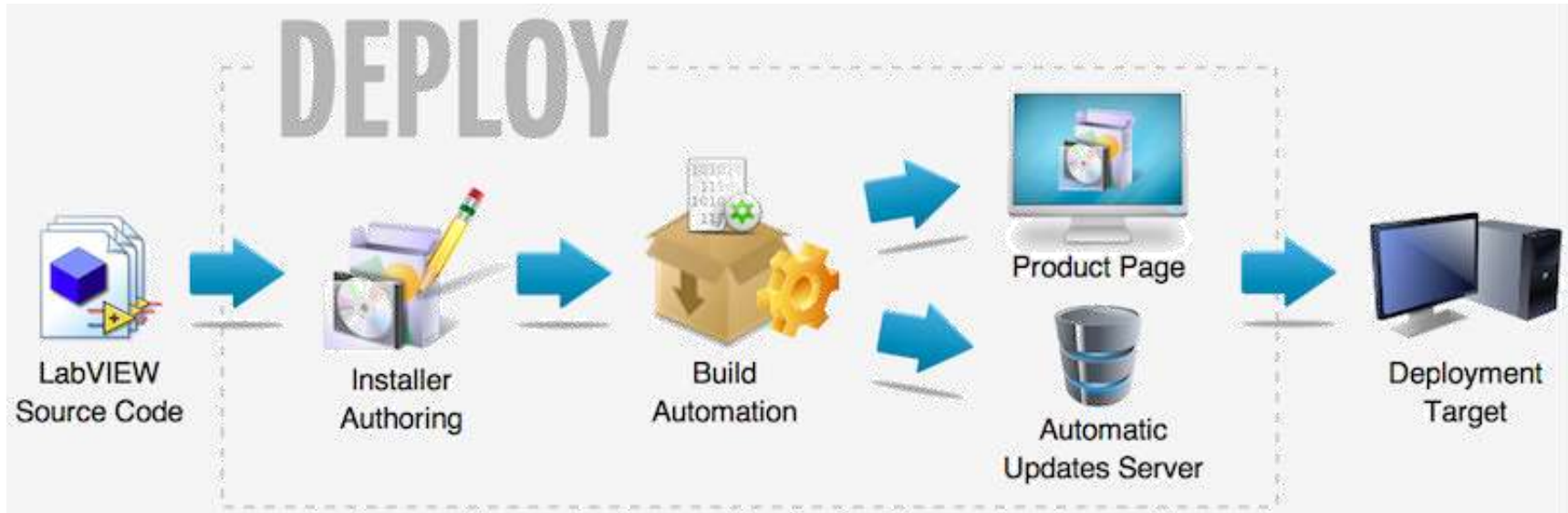
NI LabVIEW Application Builder auto-includes dependencies



LabVIEW Idea Exchange

From Wirebird Labs LLC

Setup Authoring & Application Distribution Add-On for LabVIEW



Automate time-consuming tasks to deliver professional software:

- Inclusion of third-party drivers and run-time engines
- Includes Amazon Cloud hosting services*
- Minimize download footprint by silently downloading dependencies
- Single click install for customers
- In product update notifications

*Deploy can use other services, including local and private servers

VI Package Manager Installed with LabVIEW 2013

Now every LabVIEW user can access and reuse IP and tools from the community

LabVIEW 2013 Platform DVD

Evaluation Product List
Select the products you want to install and

- LabVIEW English (Base/Full)
- VI Package Manager**
- Device Drivers
- Real-Time
- FPGA
- Image Acquisition and Image Pr...
- Industrial Monitoring
- Interactive Datalogging and Meas...
- Motion Control
- Simulation and Control
- Data Management and Reporting
- Signal Processing, Analysis, and Math
- Software Development and Deployment

LabVIEW provides an easy-to-use, interactive graphical programming language for many engineering and science disciplines throughout engineering and science. With LabVIEW, you can

VI Package™ Manager 2013

Unregistered Free Edition
2013.0.0 (build 1878) Loading...

JKI | jki.net/vipm

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Viewpoint's TortoiseSVN Toolkit

The screenshot displays the 'Viewpoint Tools Demo 2012.lvproj' window. The Project Explorer on the left shows a tree view of files and folders. A context menu is open over a file, listing options such as 'Open', 'Explore...', 'Show in Files View', 'Print...', 'Find', 'SVN Update', 'SVN Commit...', 'SVN Get Lock...', 'VSI TSVN Tools', 'Remove from Project', and 'Properties'. The 'SVN Update' option is highlighted. A toolbar at the top contains icons for SVN operations. Callout boxes provide details: 'Icon overlays appear in the Project Explorer' points to a small SVN icon on a file; 'Update and Commit from the Project or Quick Drop' points to the 'SVN Update' menu item; 'Toolbar source code control menu' points to the SVN toolbar; 'Quick drop shortcuts' points to the 'Show in Files View' menu item; and 'Automatically configures diff and merge' points to the 'VSI TSVN Tools' menu item.

Icon overlays appear in the Project Explorer

Update and Commit from the Project or Quick Drop

Toolbar source code control menu

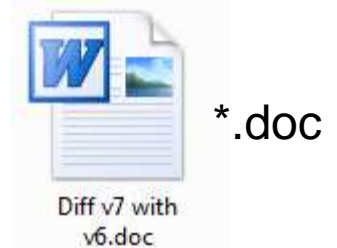
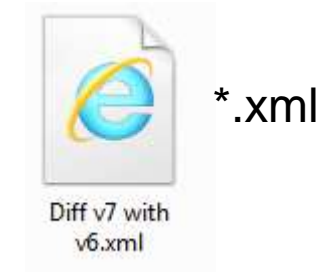
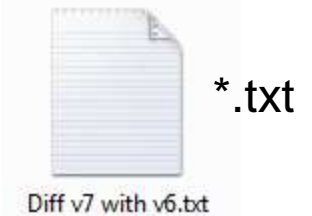
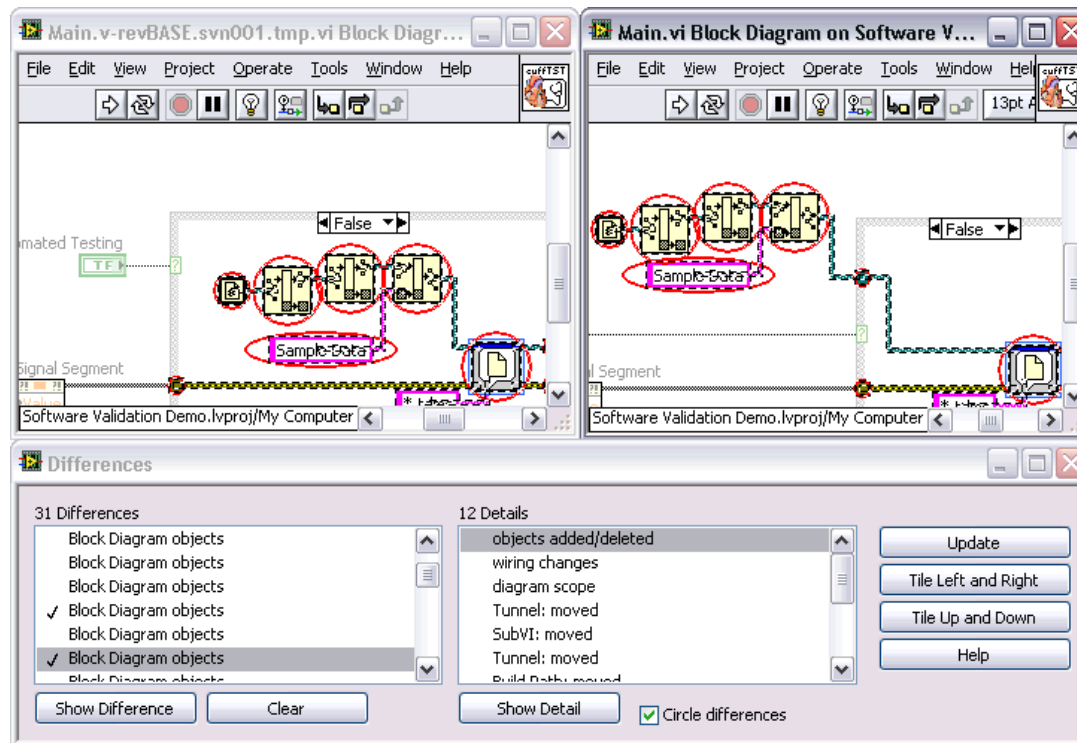
Quick drop shortcuts

Automatically configures diff and merge

Free Subversion provider for LabVIEW

Tools to Manage Code

Export graphical comparisons* to external files that can be viewed outside the LabVIEW editor



*The LabVIEW compare tool, can be configured for use with source code control tools, such as SVN and Perforce

RF Studio by Avera



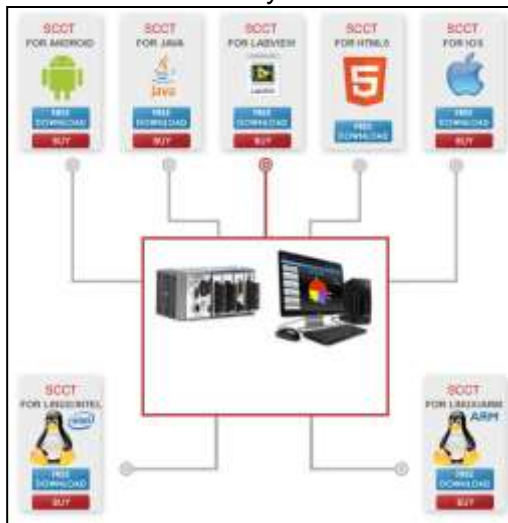
RF Record and Playback for USRP

ImagingLab Robotics Libraries



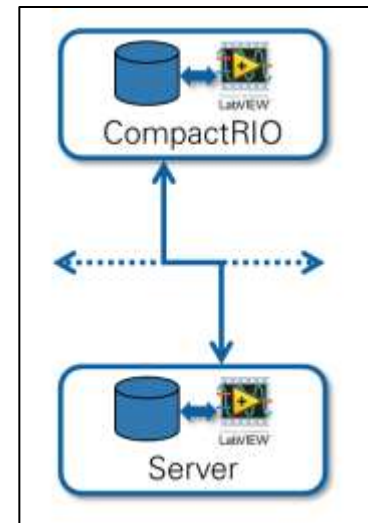
Control Common Industrial Robots

SCCT by T4SM



<http://www.ni.com/labview-tools-network/>

Raima Database API for LabVIEW

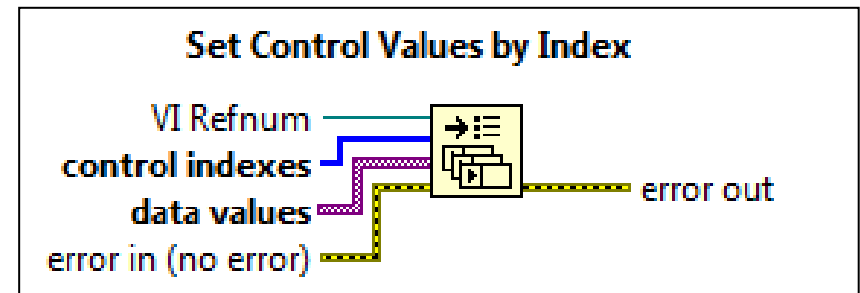
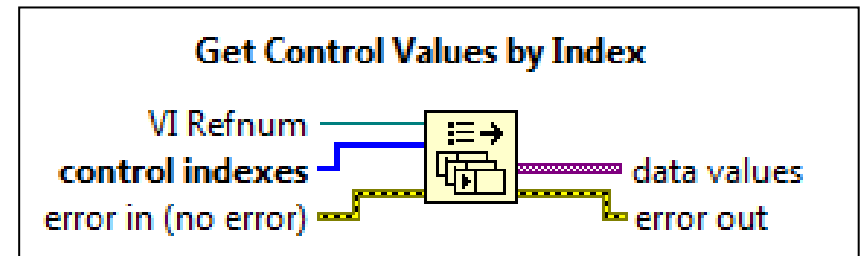


Local Database Solution For NI CompactRIO

New Primitives for Controlling UIs

Advanced API for updating and retrieving values from UI controls and indicators.

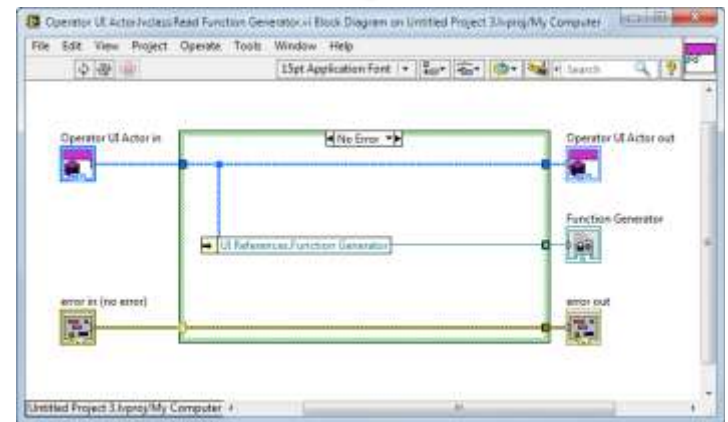
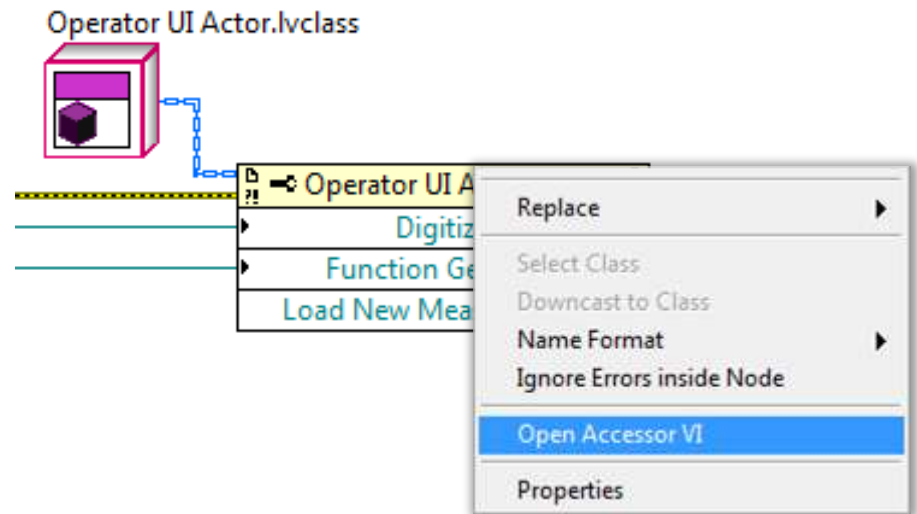
Designed for updating extremely large numbers of UI components with maximum performance



Tools to Manage Code

Accessor Navigation

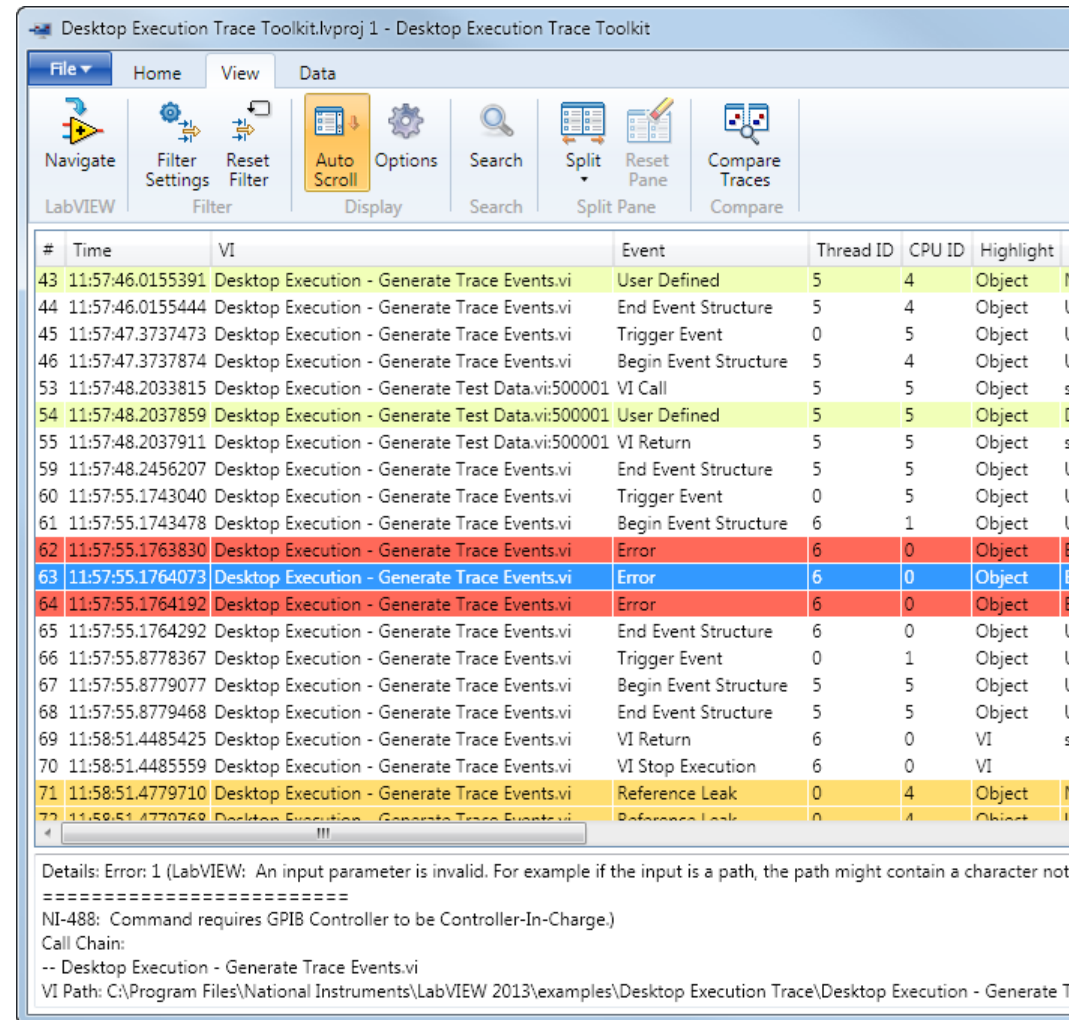
- Simplifies finding the source code of a class data accessor
- Right-click menu includes 'Open Accessor VI' option
- Only applicable to accessors that are exposed via property nodes



LabVIEW 2013 Desktop Execution Trace Toolkit

New Desktop Execution Trace Toolkit

- Reinvented user interface based on user feedback
- Capable of handling much larger traces
- Improved filtering and sorting options
- Comparison tool for diff'ing trace data



Desktop Execution Trace Toolkit.lvproj 1 - Desktop Execution Trace Toolkit

File Home View Data

Navigate Filter Settings Reset Filter Auto Scroll Options Search Split Pane Reset Pane Compare Traces

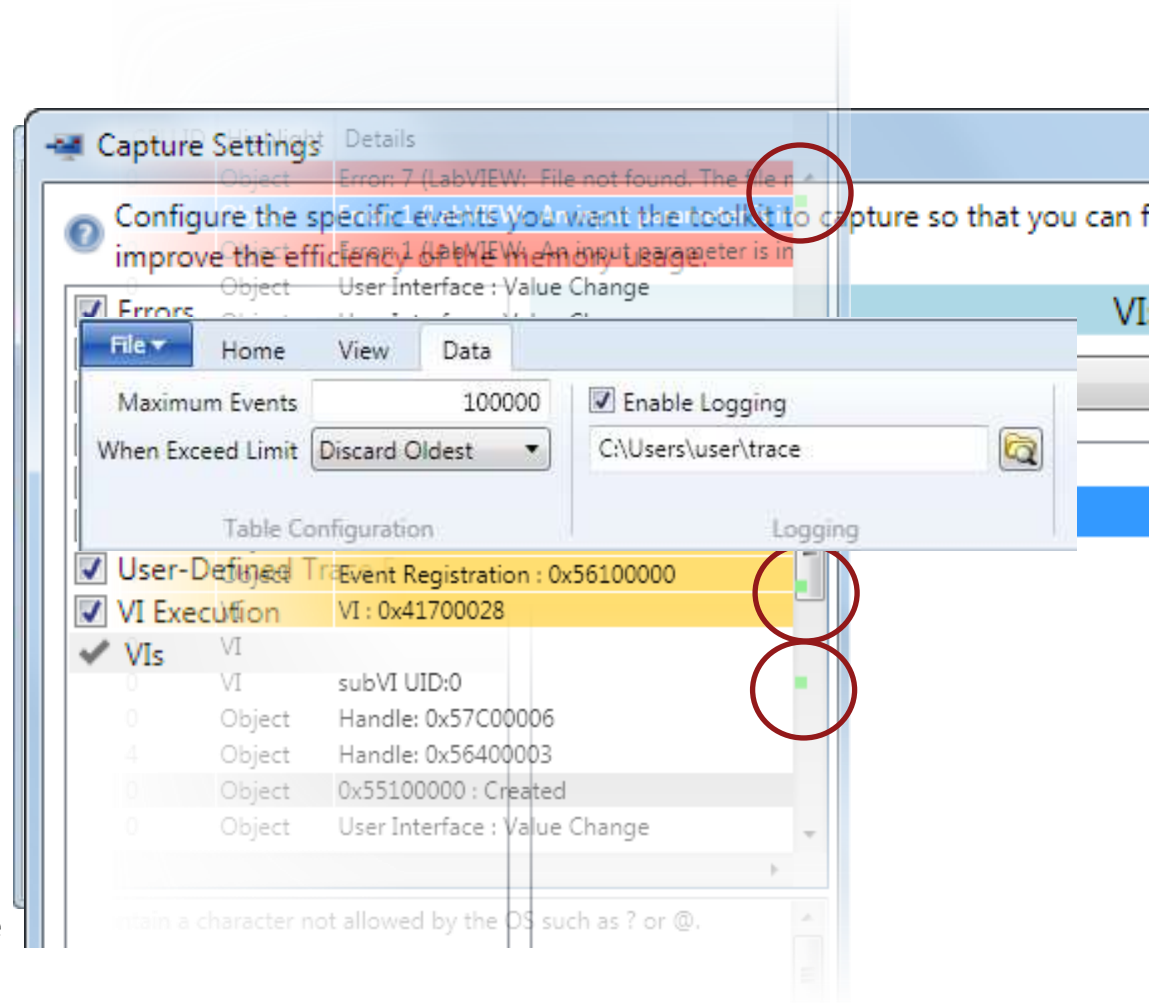
#	Time	VI	Event	Thread ID	CPU ID	Highlight
43	11:57:46.0155391	Desktop Execution - Generate Trace Events.vi	User Defined	5	4	Object
44	11:57:46.0155444	Desktop Execution - Generate Trace Events.vi	End Event Structure	5	4	Object
45	11:57:47.3737473	Desktop Execution - Generate Trace Events.vi	Trigger Event	0	5	Object
46	11:57:47.3737874	Desktop Execution - Generate Trace Events.vi	Begin Event Structure	5	4	Object
53	11:57:48.2033815	Desktop Execution - Generate Test Data.vi:500001	VI Call	5	5	Object
54	11:57:48.2037859	Desktop Execution - Generate Test Data.vi:500001	User Defined	5	5	Object
55	11:57:48.2037911	Desktop Execution - Generate Test Data.vi:500001	VI Return	5	5	Object
59	11:57:48.2456207	Desktop Execution - Generate Trace Events.vi	End Event Structure	5	5	Object
60	11:57:55.1743040	Desktop Execution - Generate Trace Events.vi	Trigger Event	0	5	Object
61	11:57:55.1743478	Desktop Execution - Generate Trace Events.vi	Begin Event Structure	6	1	Object
62	11:57:55.1763830	Desktop Execution - Generate Trace Events.vi	Error	6	0	Object
63	11:57:55.1764073	Desktop Execution - Generate Trace Events.vi	Error	6	0	Object
64	11:57:55.1764192	Desktop Execution - Generate Trace Events.vi	Error	6	0	Object
65	11:57:55.1764292	Desktop Execution - Generate Trace Events.vi	End Event Structure	6	0	Object
66	11:57:55.8778367	Desktop Execution - Generate Trace Events.vi	Trigger Event	0	1	Object
67	11:57:55.8779077	Desktop Execution - Generate Trace Events.vi	Begin Event Structure	5	5	Object
68	11:57:55.8779468	Desktop Execution - Generate Trace Events.vi	End Event Structure	5	5	Object
69	11:58:51.4485425	Desktop Execution - Generate Trace Events.vi	VI Return	6	0	VI
70	11:58:51.4485559	Desktop Execution - Generate Trace Events.vi	VI Stop Execution	6	0	VI
71	11:58:51.4779710	Desktop Execution - Generate Trace Events.vi	Reference Leak	0	4	Object
72	11:58:51.4779768	Desktop Execution - Generate Trace Events.vi	Reference Leak	0	4	Object

Details: Error: 1 (LabVIEW: An input parameter is invalid. For example if the input is a path, the path might contain a character not supported by the operating system.)
NI-488: Command requires GPIB Controller to be Controller-In-Charge.)
Call Chain:
-- Desktop Execution - Generate Trace Events.vi
VI Path: C:\Program Files\National Instruments\LabVIEW 2013\examples\Desktop Execution Trace\Desktop Execution - Generate Trace Events.vi

LabVIEW 2013 Desktop Execution Trace Toolkit

Feature Highlights

- Compare different sessions to examine behavioral changes
- User-requested trace configuration options
- Bookmarks make navigating multiple traces simple
- Automatic logging allows extended trace sessions



LabVIEW 2013 Unit Test Framework

Test Properties : Calculate Blood Pressure - Range Exceeded.lvtest

Category
Configuration
Test Cases
Setup/Teardown
Test Vectors
Advanced

Test Case 5

Comment This case tests the same peak pressures with different hear-rates to ensure the algorithm still correctly computes the blood pressure.

Heart Rates
Peak Pressures
Peak Amplitudes
error in (no error)

mean
Systolic
Diastolic
error out
Output

Input Value

	67.41573
	62.433817

Output Name	Data Type	Comparison	Value
VI under Test			
Systolic	Double Float	=	
Diastolic	Double Float	=	
Output	Cluster	=	
Pressure	Array[Double Float]		
Amplitude	Array[Double Float]		
mean	Double Float	=	62.433817
error out	Cluster	=	

Cancel Help

Tests can be run from within the editor, which makes it easier to iterate on test parameters and your code

New test cases dialog displays the input and outputs of the VI under test

Improved user interface makes it easier to create, edit and run tests



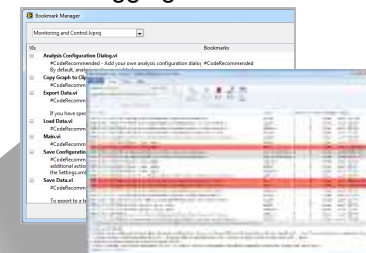
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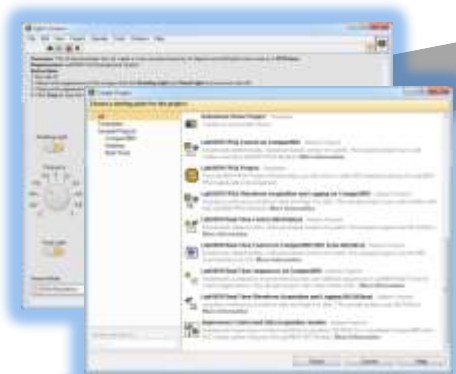


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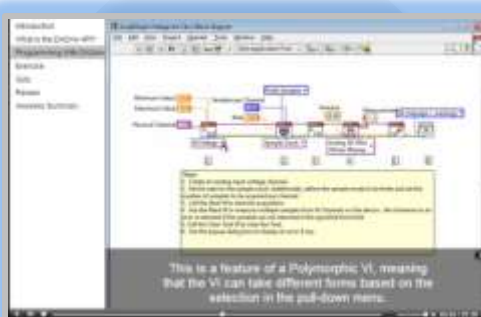
LabVIEW™ 2013

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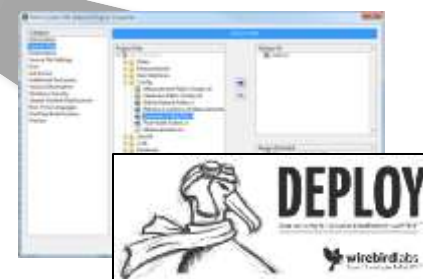
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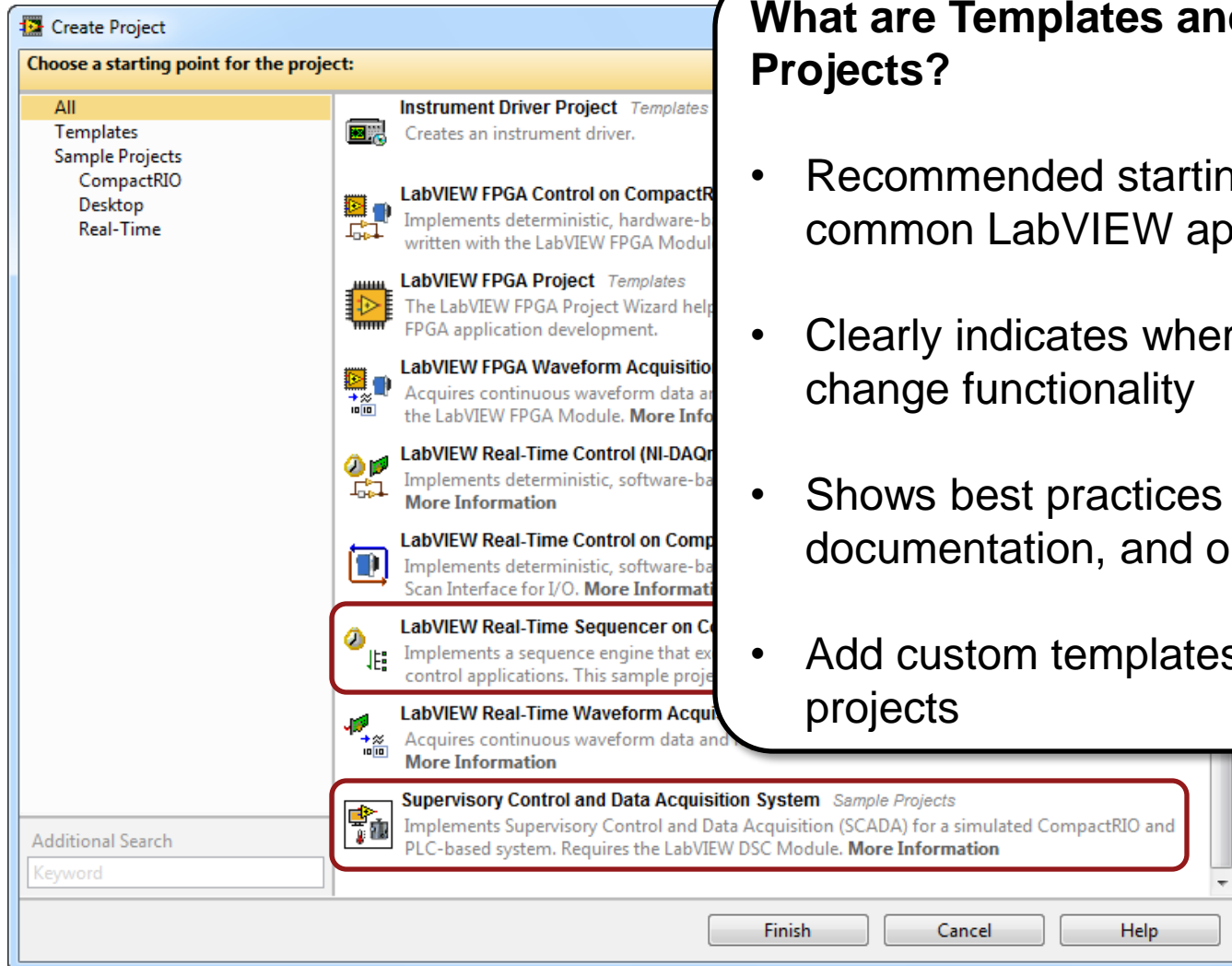
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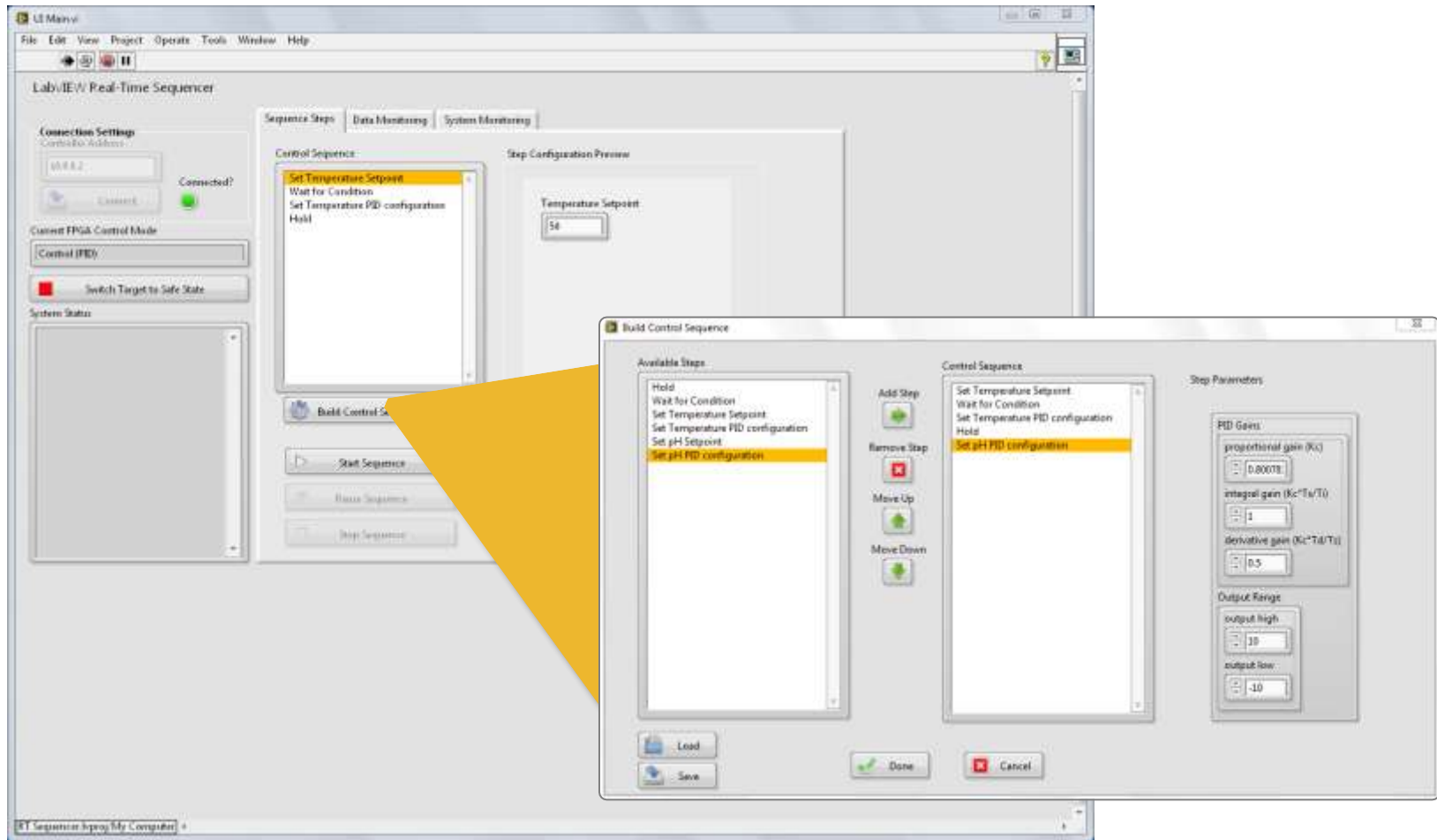


New Templates and Sample Projects



LabVIEW 2013 Sample Project Additions

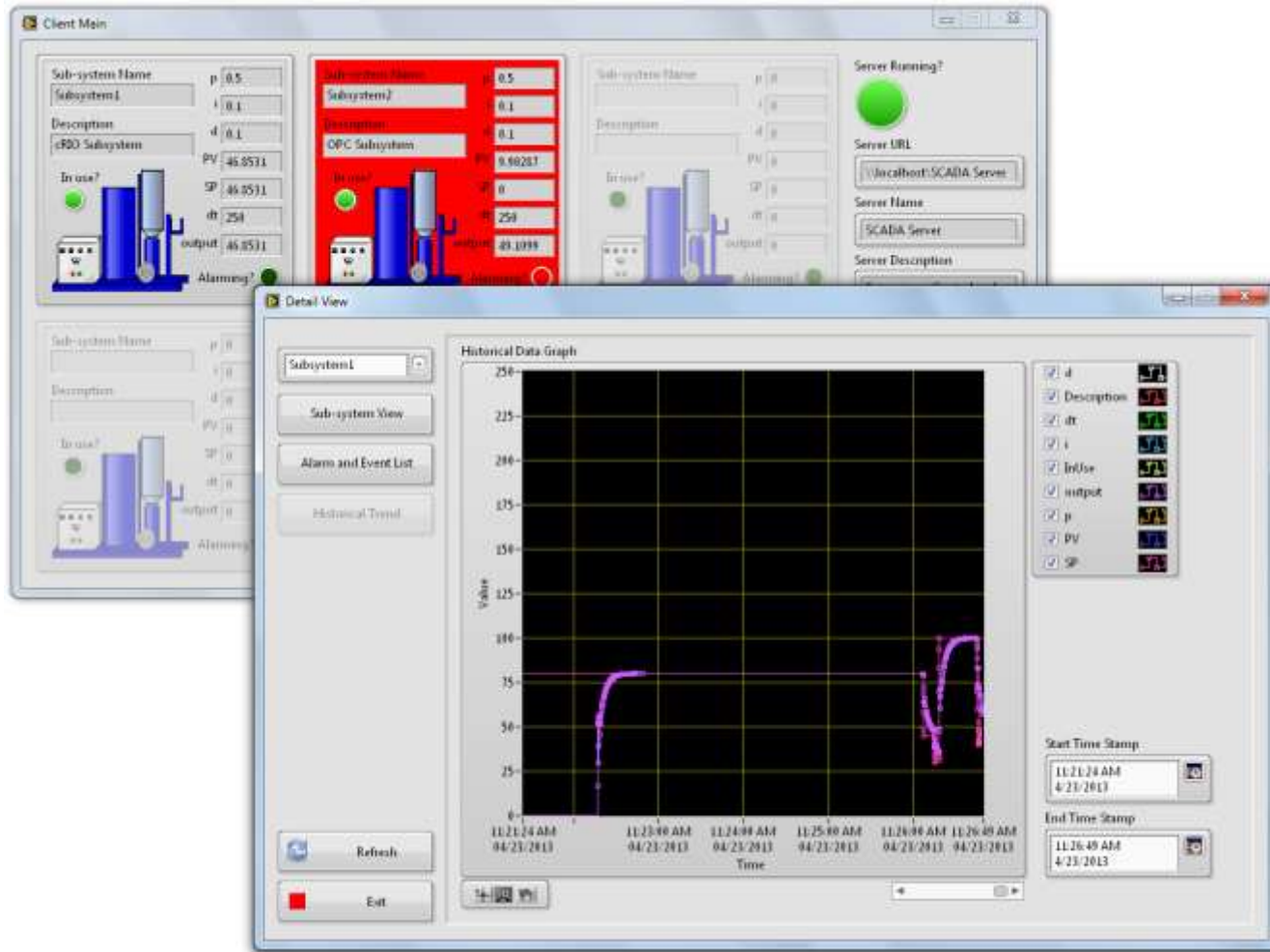
Real-Time Sequencer



LabVIEW + LabVIEW Real-Time Module Required

LabVIEW 2013 Sample Project Additions

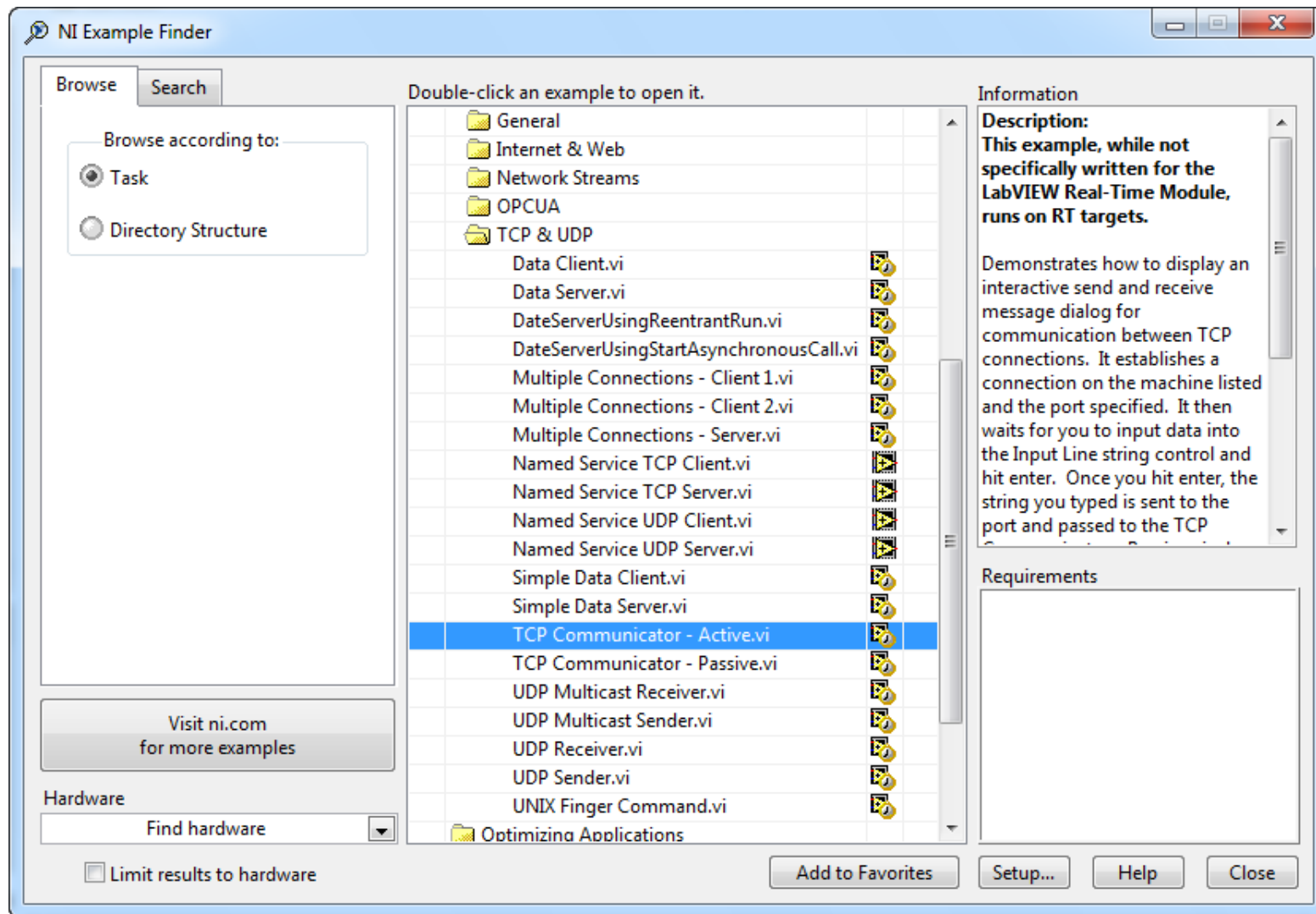
Supervisory Control and Data Acquisition System



LabVIEW + LabVIEW DSC Module Required

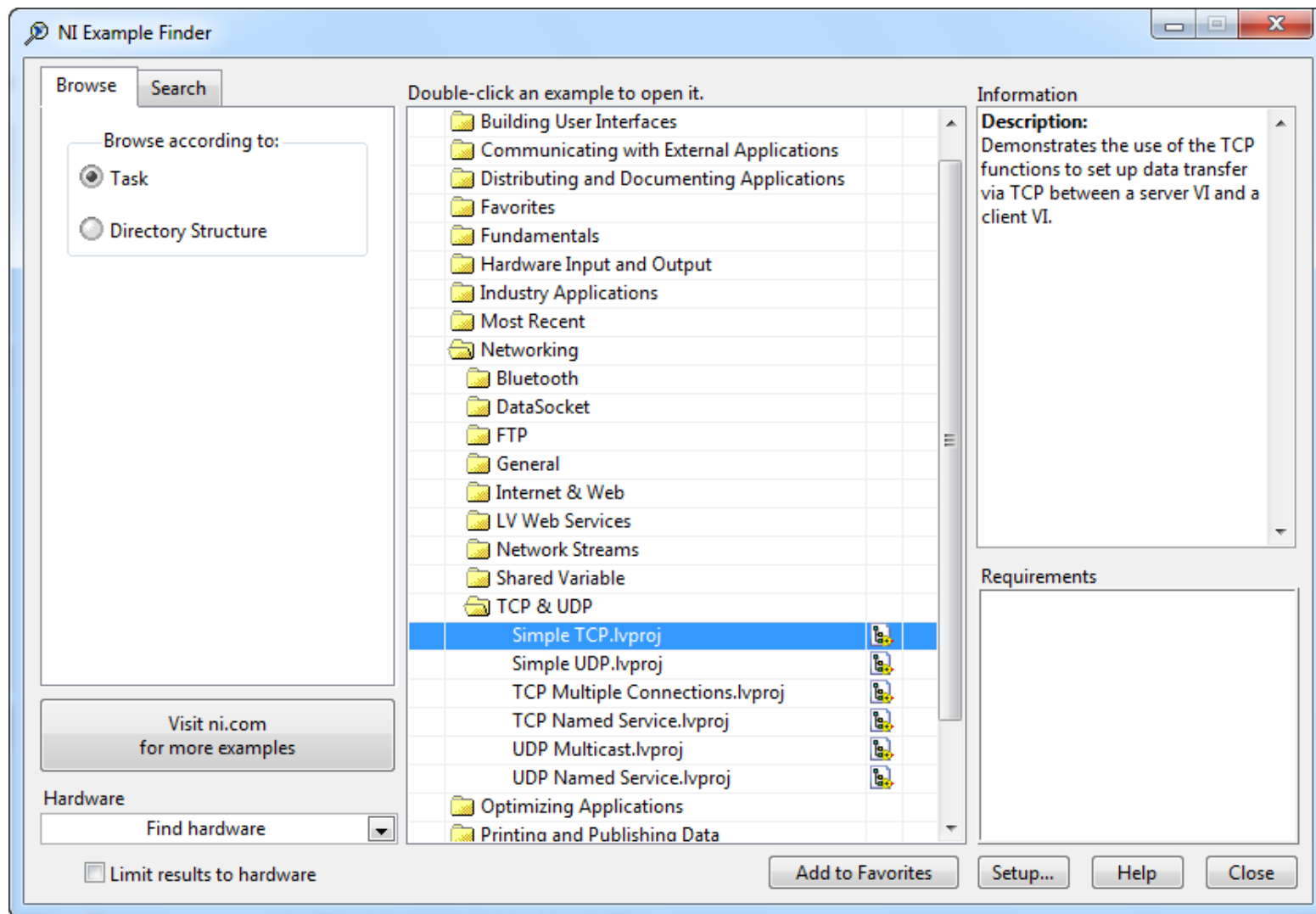
Shipping Example Refresh – Separate Files

2012

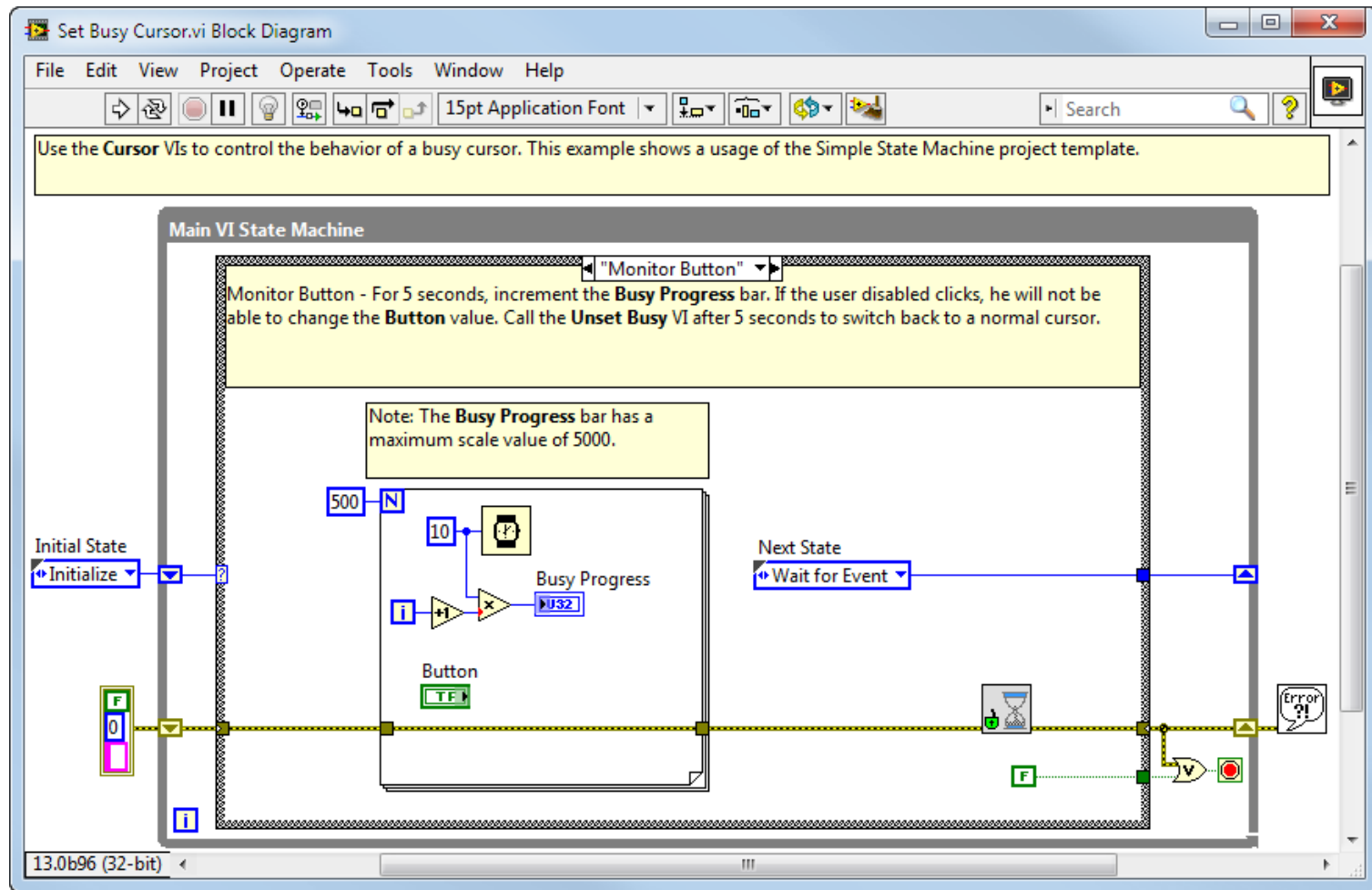


Shipping Example Refresh – Project Based

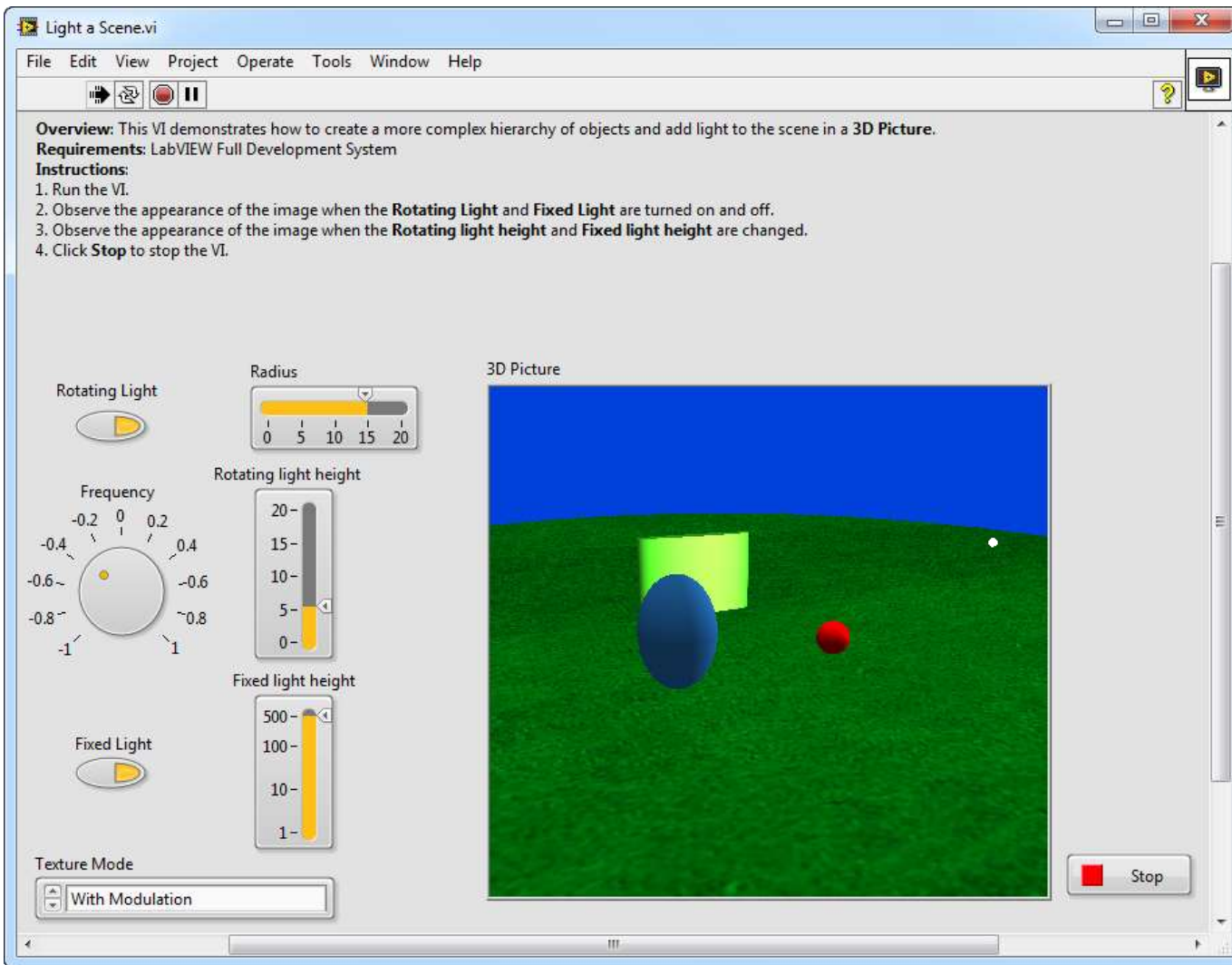
2013



Shipping Example Refresh - Documentation



Shipping Example Refresh – New Examples



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The screenshot shows a LabVIEW training video interface. On the left is a navigation menu with items: Introduction, What is the DAQmx API?, Programming With DAQmx, Exercise, Quiz, Review, and Answers Summary. The main window displays a LabVIEW block diagram titled 'Acq&Graph Voltage-Int Clk.vi Block Diagram'. The diagram includes components like 'Physical Channel', 'Sample Clock', 'Rate', 'Finite Samples', 'timeout', and 'Analog ID Wfm'. Below the diagram is a yellow box with the following steps:

1. Create an analog input voltage channel.
2. Set the rate for the sample clock. Additionally, define the sample mode to be finite number of samples to be acquired per channel.
3. Call the Start VI to start the acquisition.
4. Use the Read VI to measure multiple samples from N Channels on the device. Set error is returned if the samples are not returned in the specified time limit.
5. Call the Clear Task VI to clear the Task.
6. Use the popup dialog box to display an error if any.

Below the steps, there is a text box that reads: 'This is a feature of a Polymorphic VI, meaning that the VI can take different forms based on selection in the pull-down menu.'

LabVIEW Online Training

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Thank you for your interest in NI training and certification. The following resources can help you prepare for the exam.

Exam Details

Prerequisite: Certified LabVIEW Associate Developer

Exam format: Application development

Exam duration: Four hours

Preparation Resources for the CLD Exam

[CLD Preparation Guide \(PDF\)](#)

[CLD success package](#)

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CLD Exercise 10: Step Sequencer based on CSV data

Objective

Develop a step sequencer with a timer, using LabVIEW and the given application front panel (Figure 1). Start with the solution from exercise *CLD 9: Step Sequencer Express Timer Solution*. Replace the hard coded values with values read from the CSV file using *CLD6: CLD 6 CSV file utility.vi*.



Figure 1: Application Front Panel

General Operation

The VI sequences three steps and uses the Data File *CLD 10 CSV File.csv* to read Step Times and Boolean constants. The timer uses the time target for each step, and when that time is elapsed the application moves to the next step and begins a new time cycle. The application turns on the Step LEDs based on the step Boolean data. The timer must have Reset and Auto Reset functionality. The Time Target control overrides the step time constants when the Time Target is a positive non-zero number. The application only advances to the next step if the Elapsed Time is ON and the Auto Reset is ON.





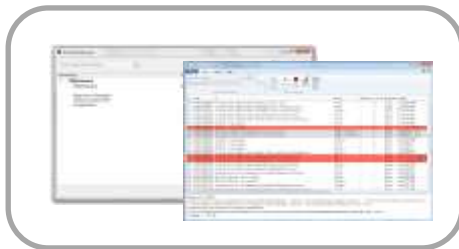
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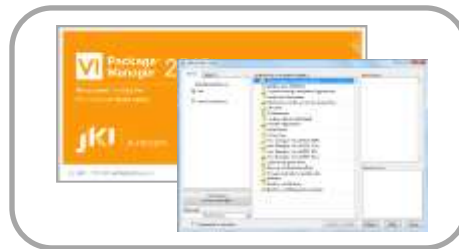
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