
NIDays

# A Discussion on the Future of LabVIEW

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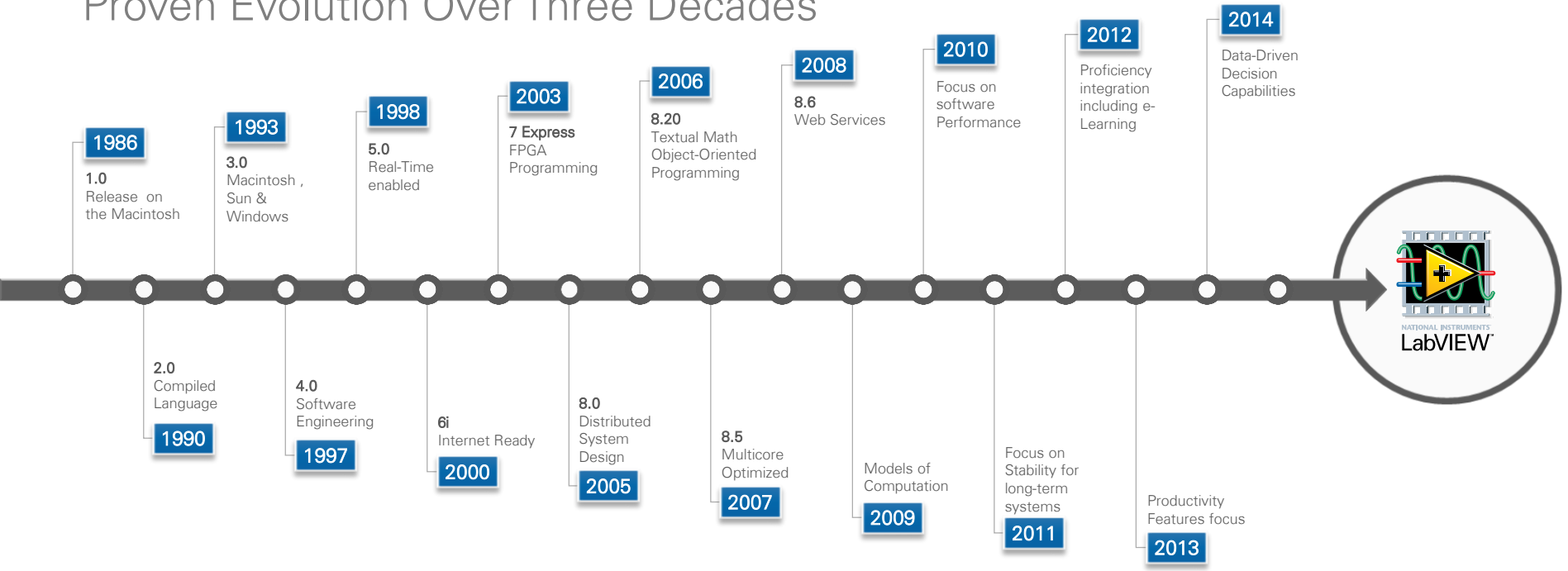
@TheLabVIEWLion

# LabVIEW

## Proven Evolution Over Three Decades



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# What's New in LabVIEW 2015

## Write Code Faster. Write Faster Code.

ni.com

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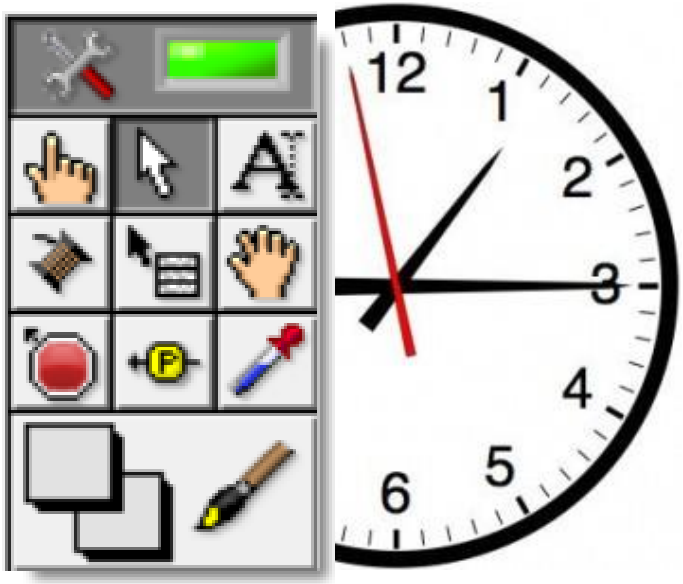
# How do you spend your time in LabVIEW?

- Dropping elements
- Configuring elements
- Wiring elements
- Architecting code
- Developing algorithms
- Optimizing code
- Running deployed code



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LabVIEW™ 2015


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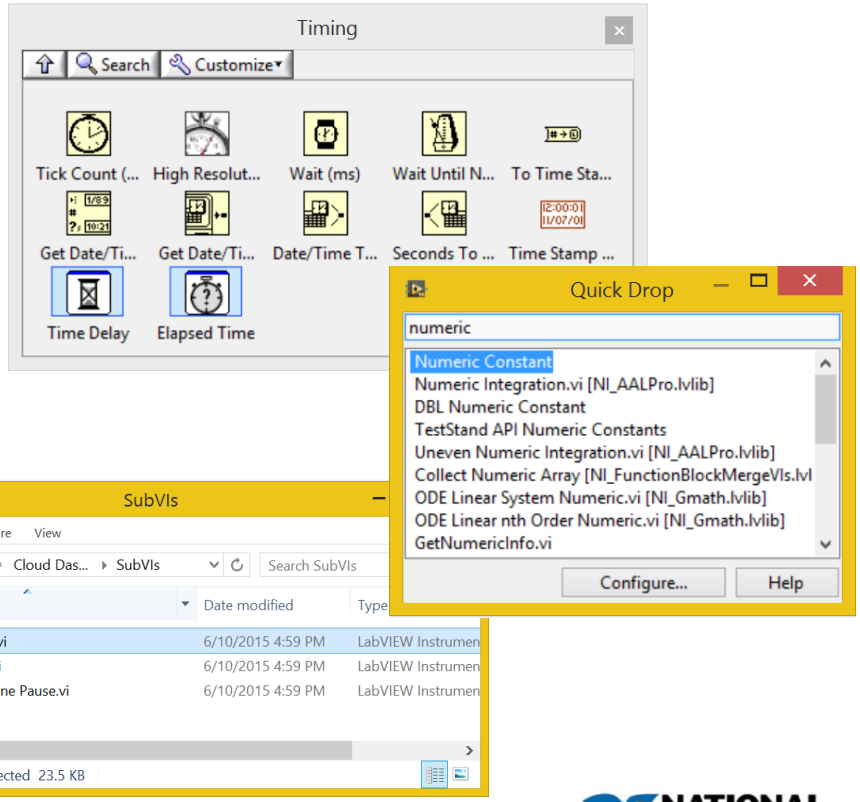
Write Code Faster.

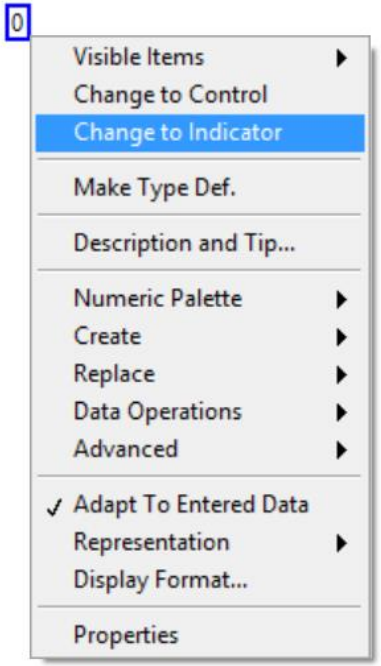
# Finding Elements in the IDE

- Palettes
  - Browse
  - Search
  - Pin
- Quick Drop `<Ctrl + Space>`
- Drag and drop from explorer



# Configuring Elements through Right-Click Shortcuts

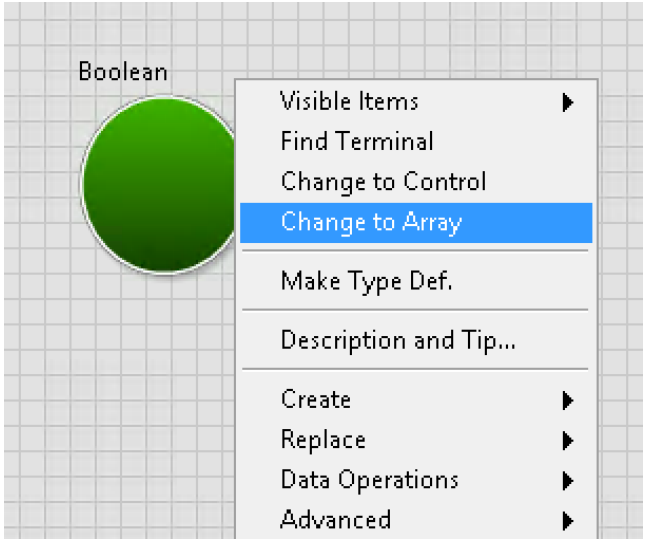
- Replace common tasks with right-click shortcuts
  - "Change to Indicator"
  - "Make Current Value Default"
  - "Delete Chart History"
- Popular requests on Idea Exchange
- Each shortcut required NI R&D development



# 7 New Right-Click Plugins

## Included in LabVIEW 2015

- Change to Array or Element
- Empty Listboxes
- Explore
- Remove and Rewire Objects
- Size Array Constants To Contents
- Transpose 2D
- Create >> All Controls and Indicators



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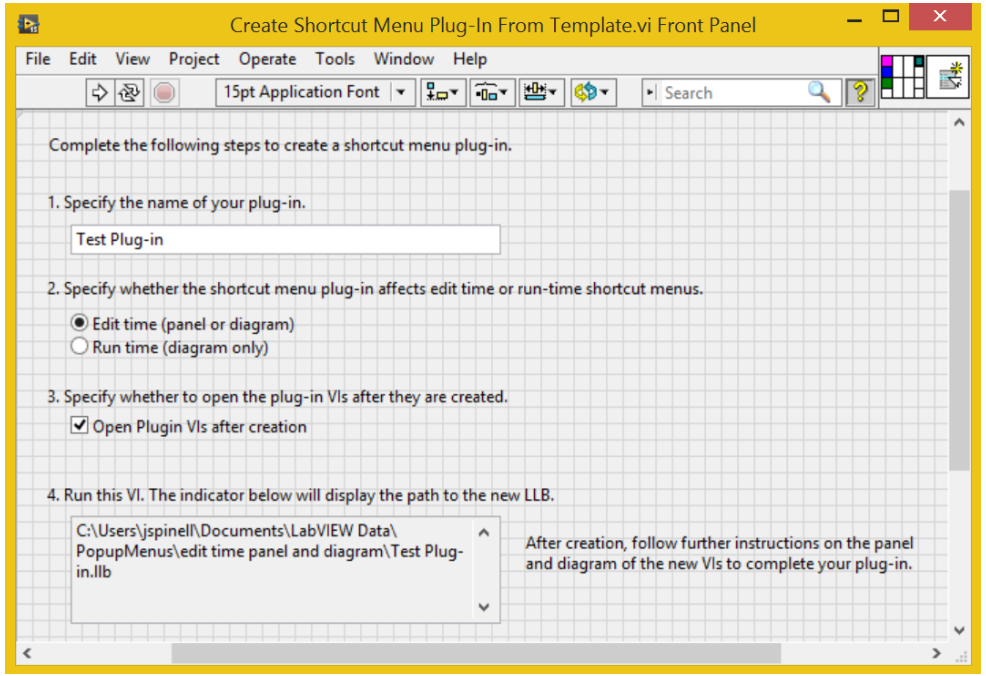
# Extend LabVIEW with Your Own Shortcuts

## Create Shortcut Menu Plug-in From Template in LabVIEW 2015

- Automate common repeated tasks by using a template VI to write your own plug-ins
- Extend the LabVIEW environment with VI Scripting
- Share and download plug-ins at ni.com/lvmenus/
- All Right-Click Shortcuts previously required NI R&D development



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Write Code Faster.

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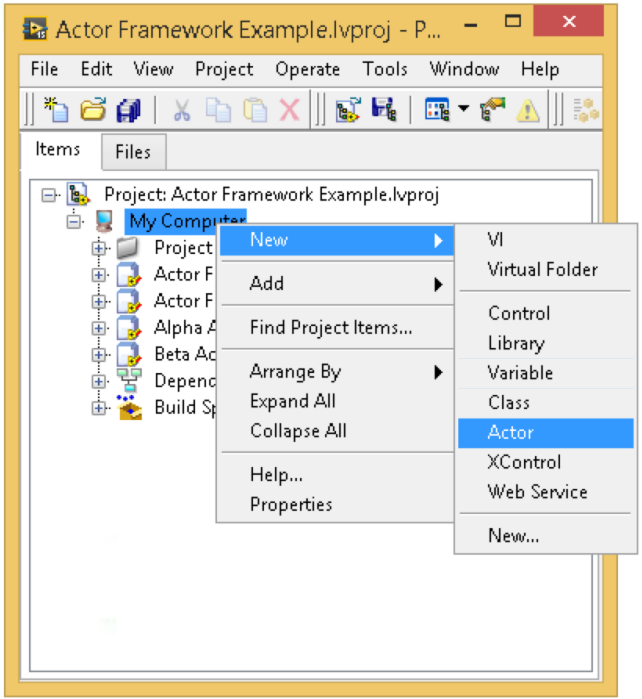
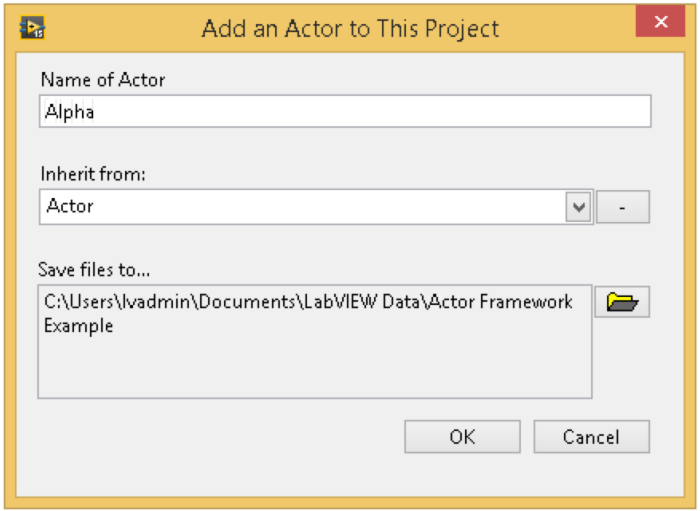
# Create Advanced Architectures Faster

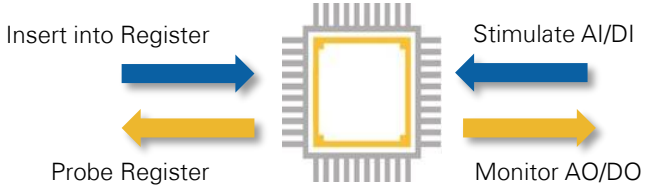
## Natively Create Actor Framework Actors and Messages

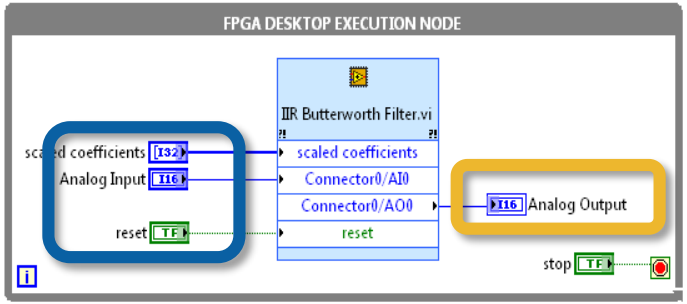


# LabVIEW FPGA Module

## Develop, Debug and Compile Faster




## Develop Your Code Faster with High Quality IP

- Floating-point PID VI for higher precision control
- SPI and I2C VIs for communication with peripherals
- Motor simulation with ANSYS

## Validate Your Designs Faster

- Create test benches with the Desktop Execution Node
- New examples for working with analog and digital stimuli

## Compile Your Code Faster

- LabVIEW FPGA Compile Cloud Service included with SSP
- Offload LabVIEW FPGA compilations to the cloud
- Compile up to 5 designs in parallel

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# LabVIEW Tools Network

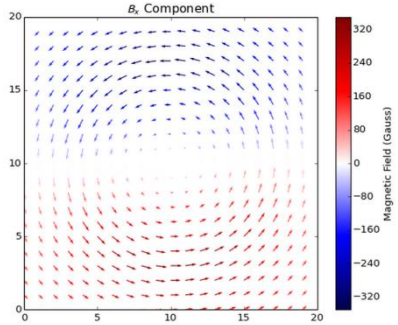
## The App Store for Engineers and Scientists

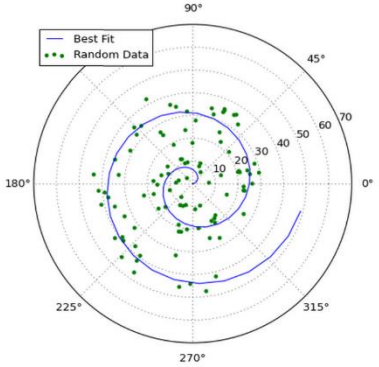
- Download 300+ Free and Paid Add-Ons
- More than 4,000,000 downloads
- ni.com/labviewtools

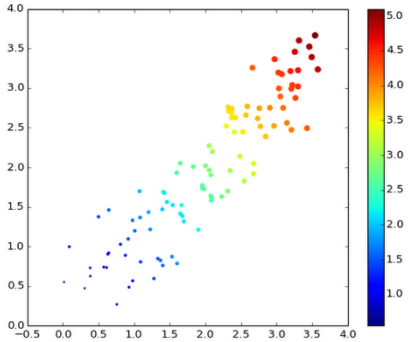
# Visualize Data Faster

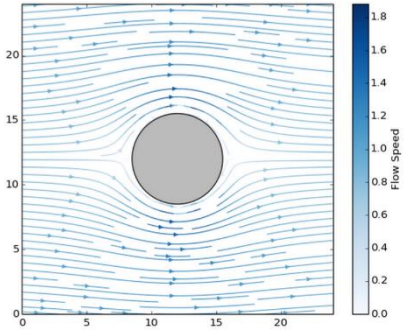
## Advanced Plotting Toolkit by Heliosphere Research

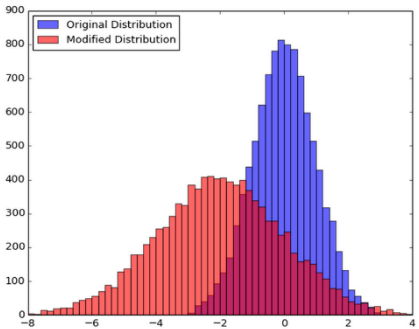
LabVIEW TOOLS NETWORK

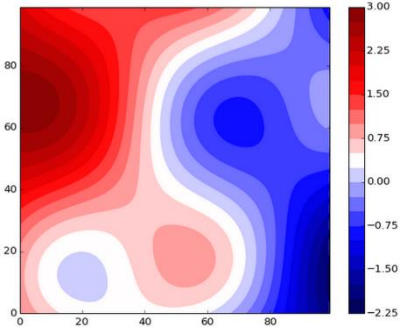




Powerful Front Panel Plotting capabilities:

- Vector Field
- Streamlines
- Contour Plot
- Histograms
- Scatter Plots
- Line Plots
- Bar Plots

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# Build Scalable IoT Applications Faster

## RTI DDS Toolkit for LabVIEW by Real-Time Innovations

LabVIEW TOOLS NETWORK


- Scalable peer-to-peer data communication
- Dynamic peer discovery
- Secure and reliable high-performance communication
- Windows and NI Linux Real-Time OS support (cRIO-9068)

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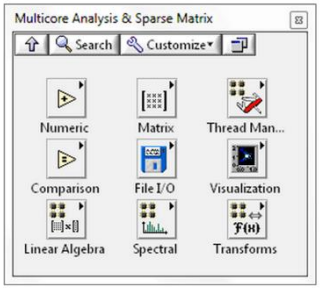
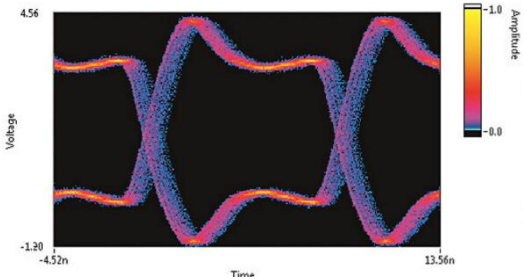
# Build Advanced Applications Faster

## Free New Additions to LabVIEW Tools Network

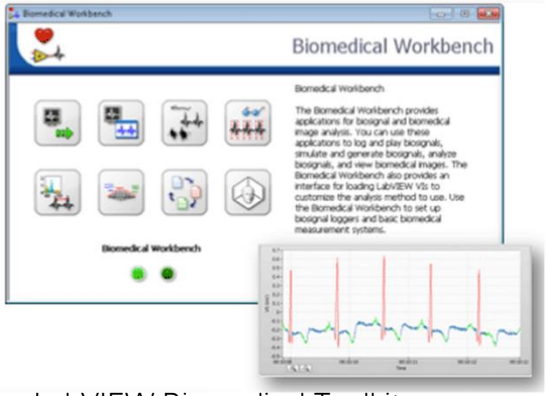
LabVIEW TOOLS NETWORK



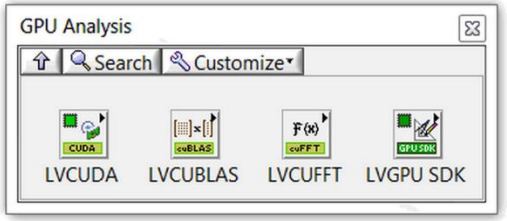

Multicore Analysis & Sparse Matrix Toolkit




Jitter Analysis Toolkit




LabVIEW Biomedical Toolkit




LabVIEW GPU Analysis Toolkit

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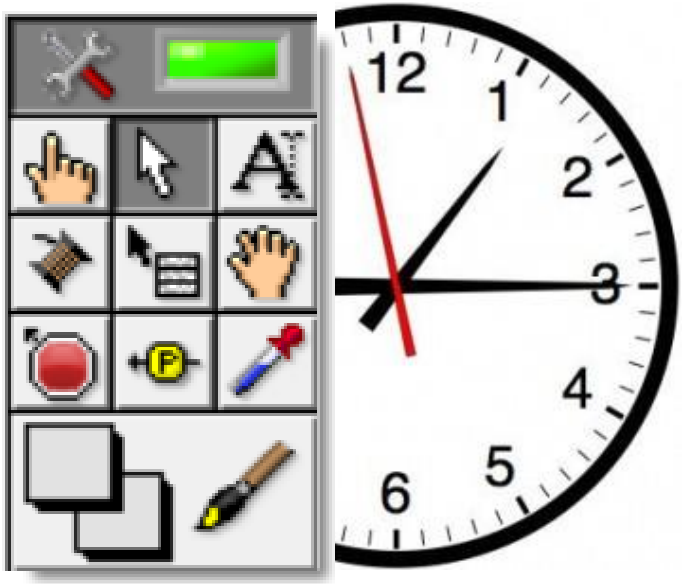



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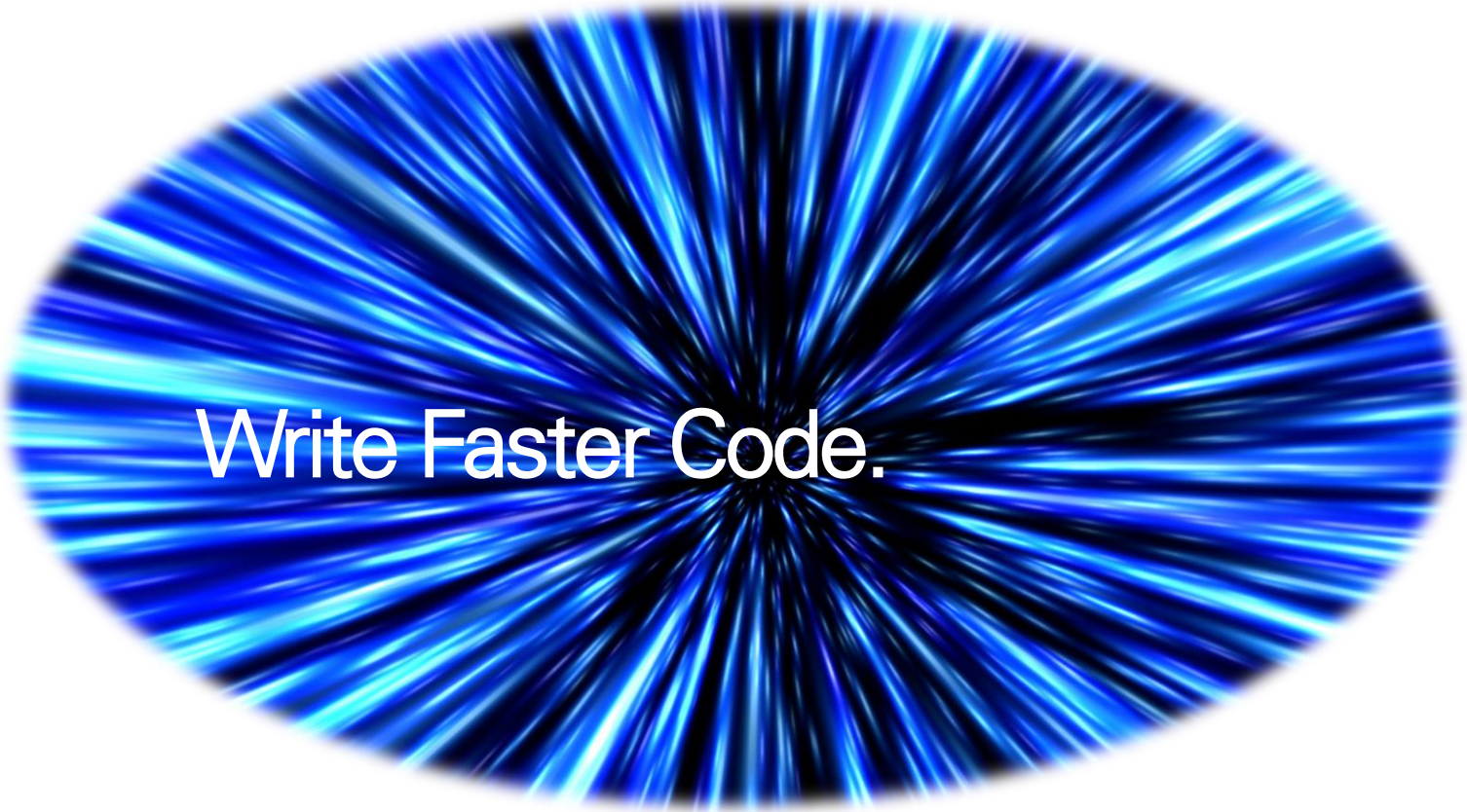
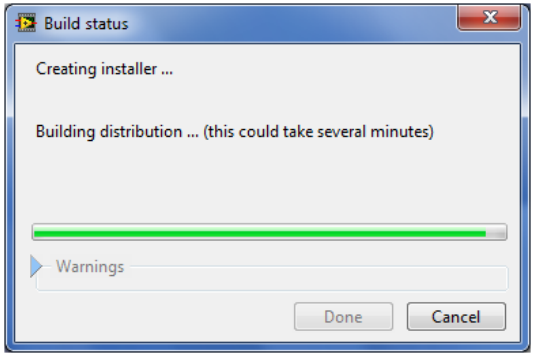
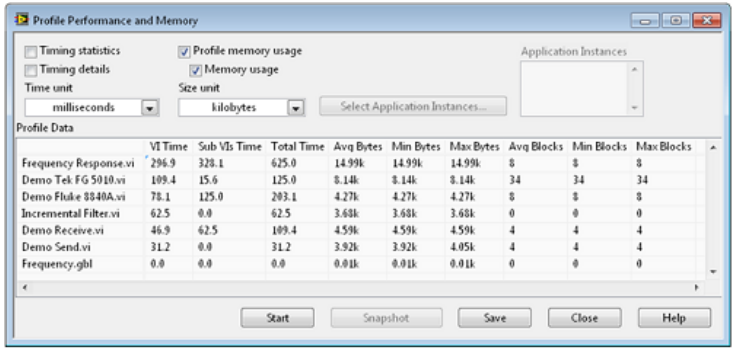

Write Faster Code.

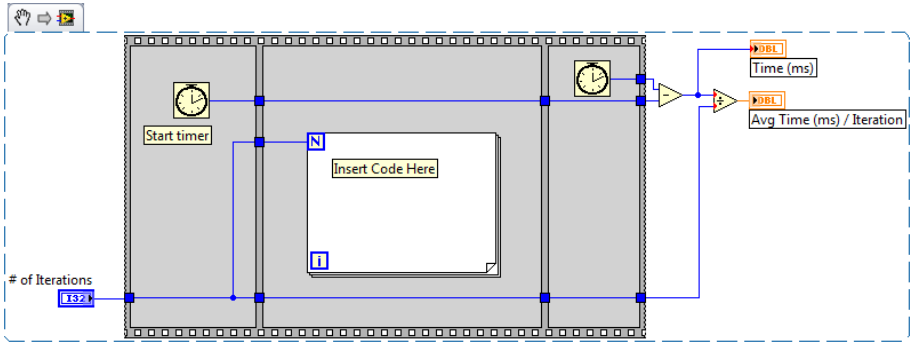
# “LabVIEW Without Limits”

Internal R&D architectural effort to improve:

- Load Times
- Memory Usage
- Application Build Time
- Execution Speed

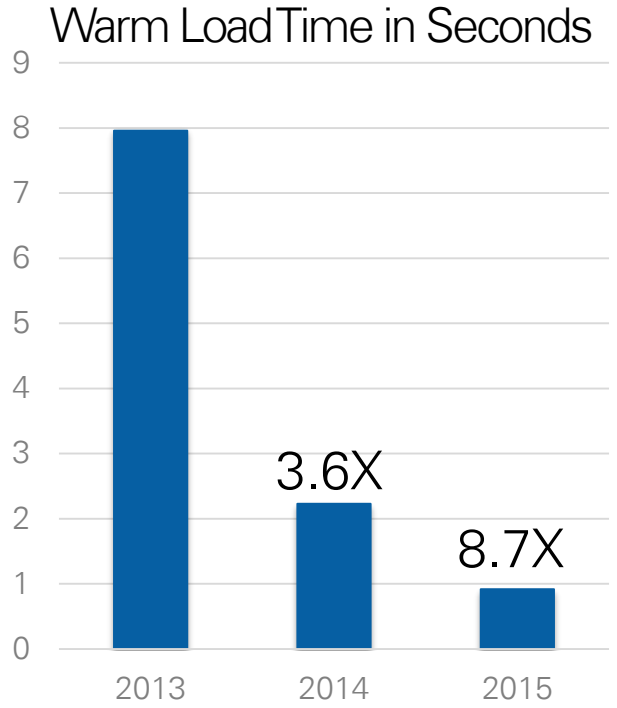


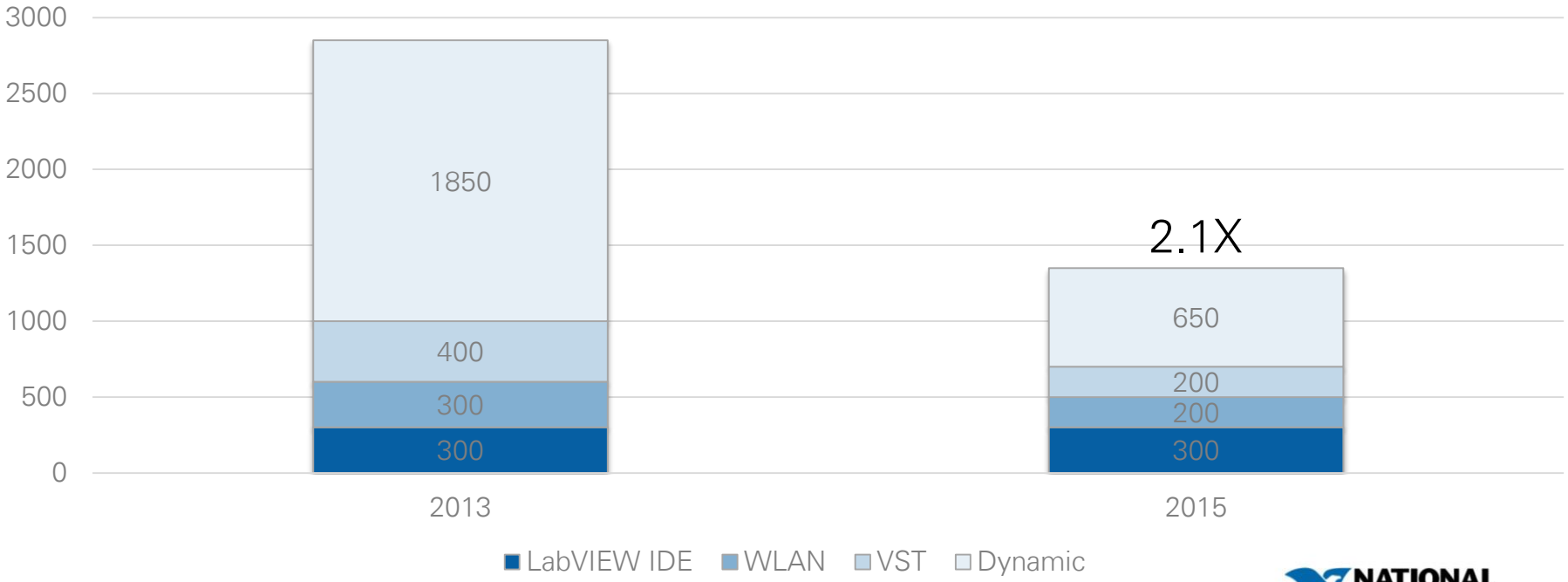
# Open Code Faster

- Faster LabVIEW IDE launch times
- 8X faster load times of large packed project libraries
- Open code without searching for missing VIs from NI modules, toolkits, and drivers



# Use Less Memory – Footprint in MB

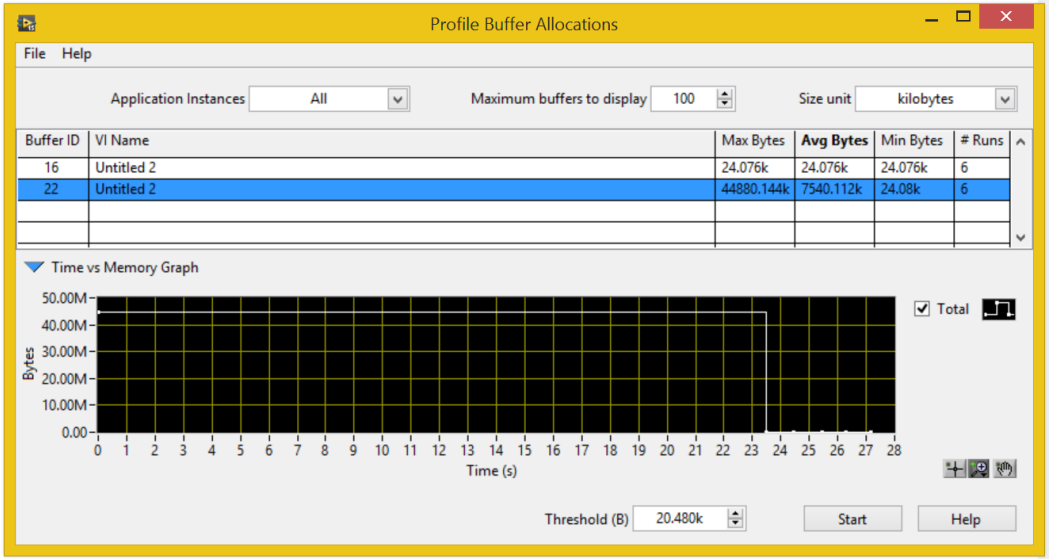
## LabVIEW 2015 applications are built to use less dynamic memory



# Optimize Memory Usage Faster

- New Profile Buffer Allocations tool
- Visualize and identify large memory allocations in VIs

*Tools > Profile > Profile Buffer Allocations…*



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# LabVIEW Real-Time Module

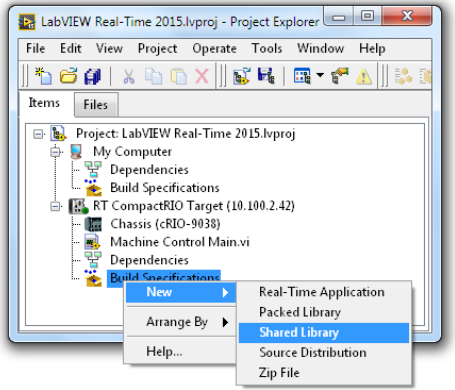
Flexibility to meet your IIoT application needs

## Run Faster with Updated NI Linux Real-Time kernel

- On average 11% faster benchmarked loop rates for single point I/O applications
- Enhanced security feature support

## Download New Packages to Integrate with the Web

- Packages on the NI-hosted repository help connect targets to web applications
- Tools to work with existing php, node.js, and json-c applications and improved Python support




## Build Reusable Shared Libraries

- New LabVIEW Real-Time shared library support
- Built using LabVIEW Application Builder

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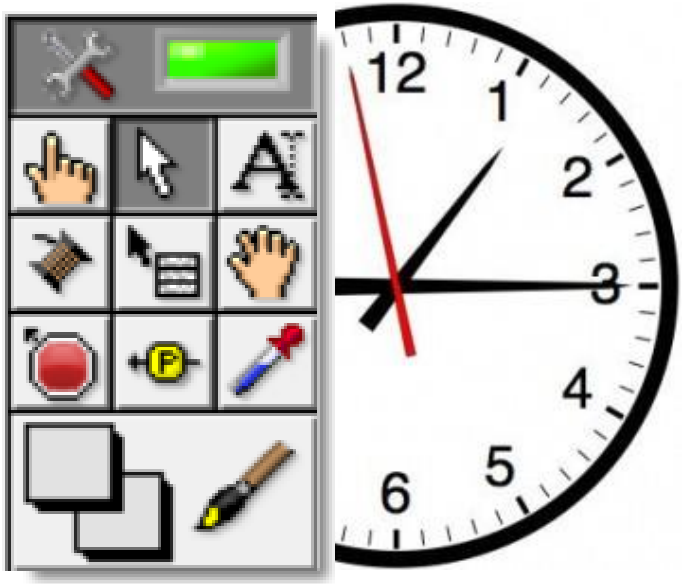



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# A Discussion on the Future of LabVIEW



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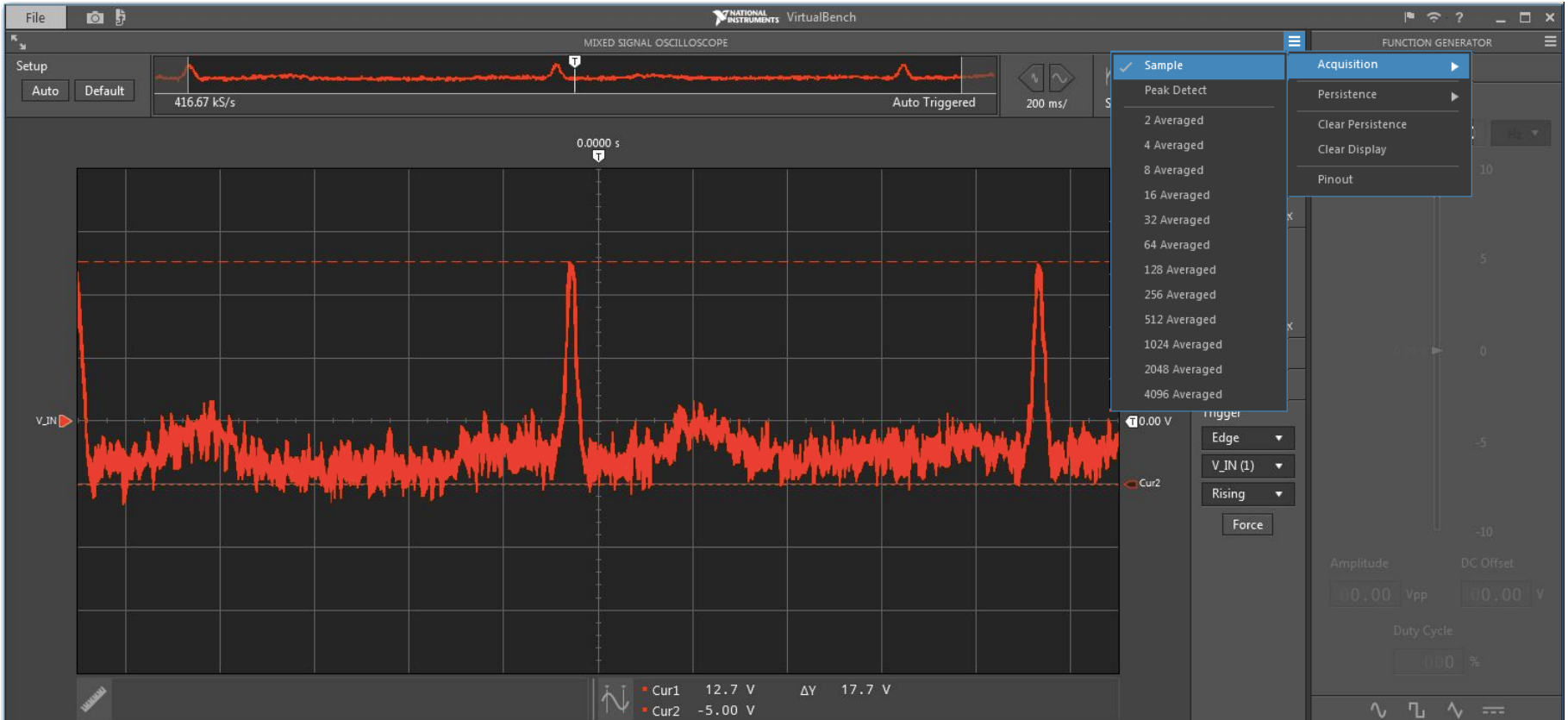
# Summary

- NI is investing heavily in software
- NI's software investments often involve significant, multi-year development work
- New NI software technologies are entering the market now

# Modern User Experience

*Goal: Provide users with a state-of-the-art, productive software experience*



# User Interface Development

*Goal: Empower users to create modern data displays wherever needed*

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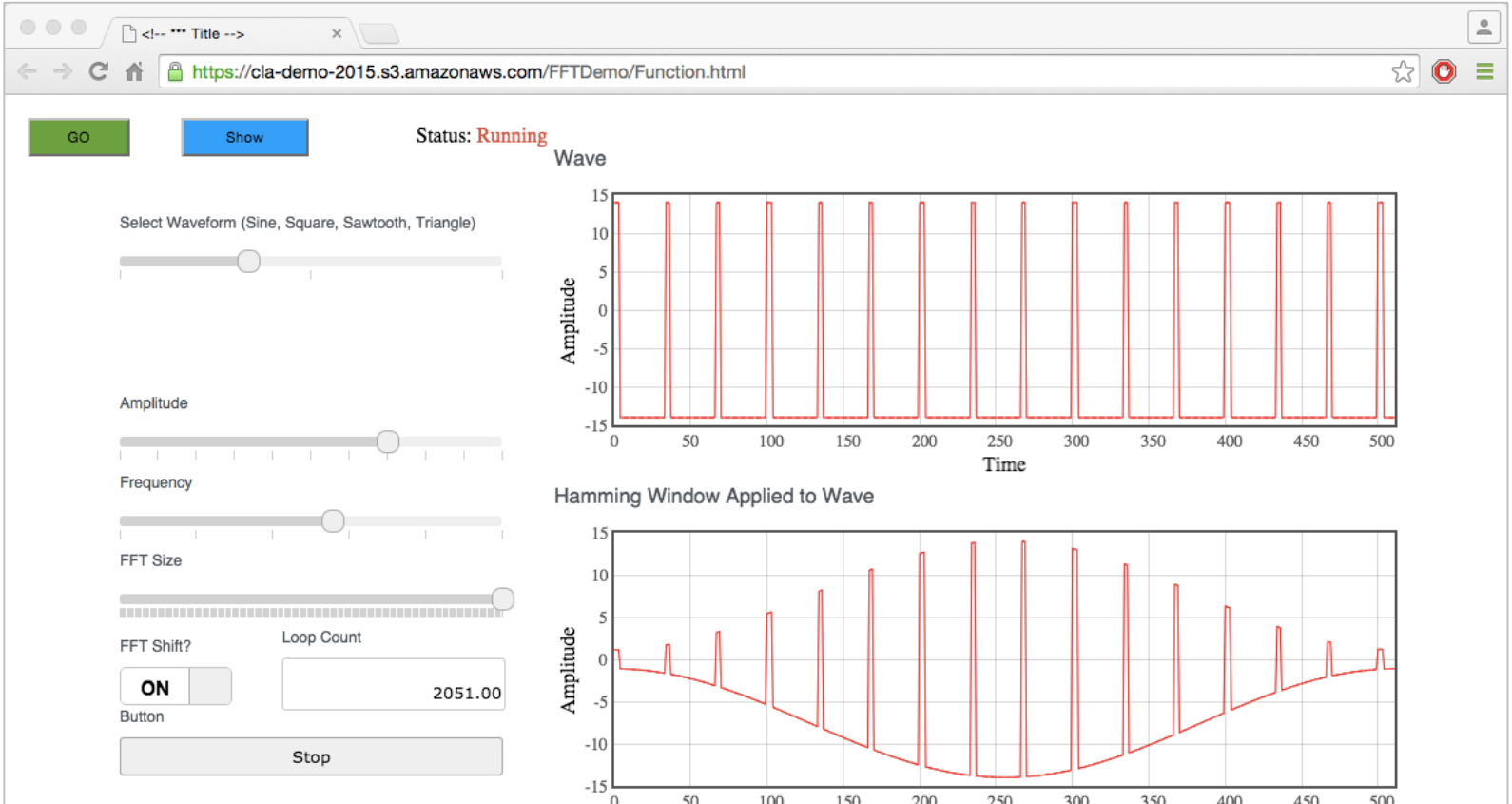
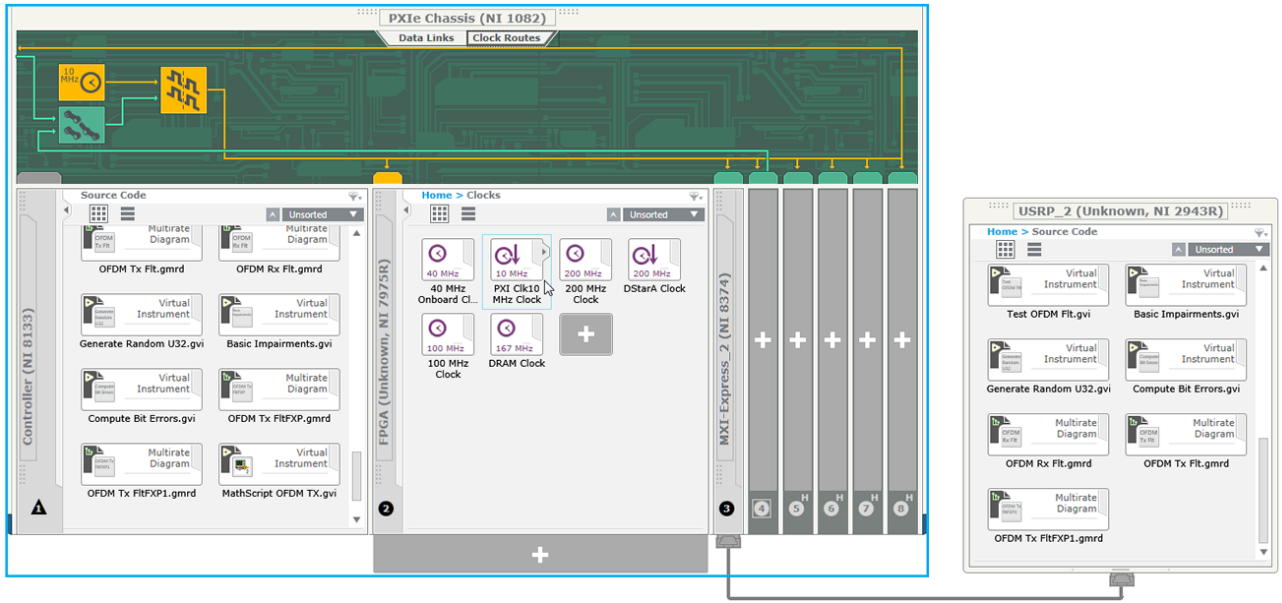


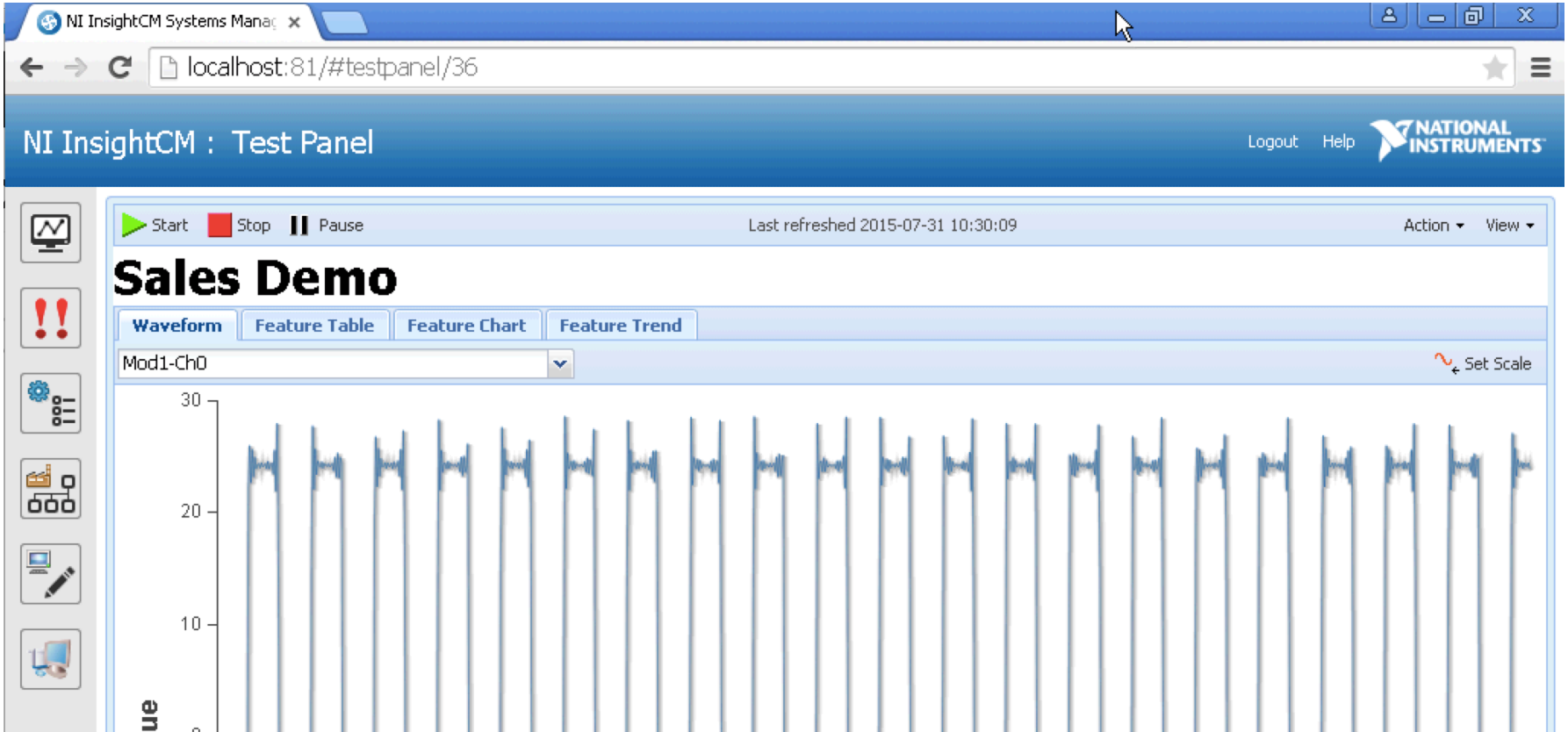
# System Configuration

*Goal: Visualize, configure and document your entire system inside the product (software, backplane routing, sensors, third-party devices, etc.)*



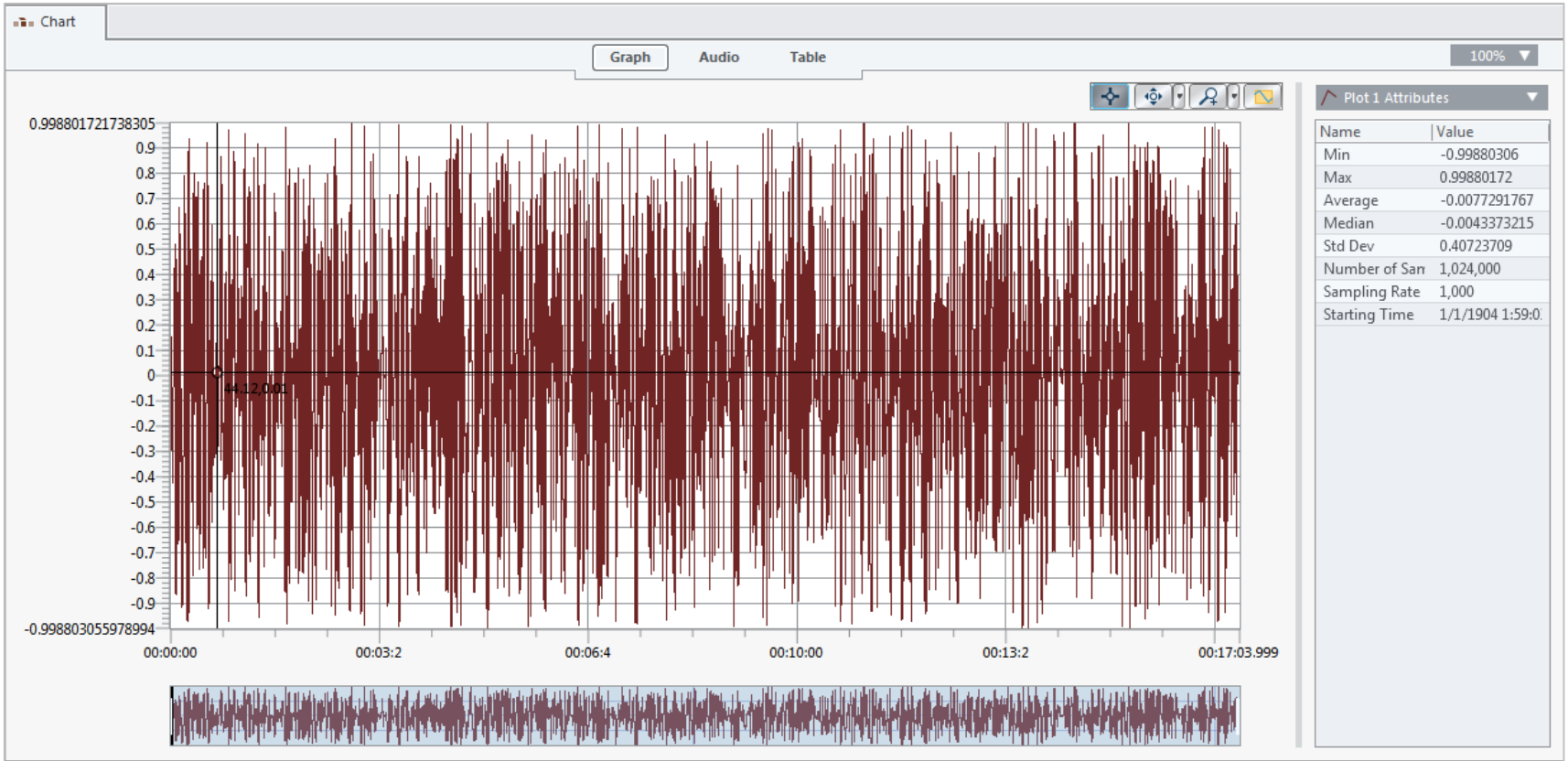
# System Management

*Goal: Manage remote, deployed real-time systems from a web browser*



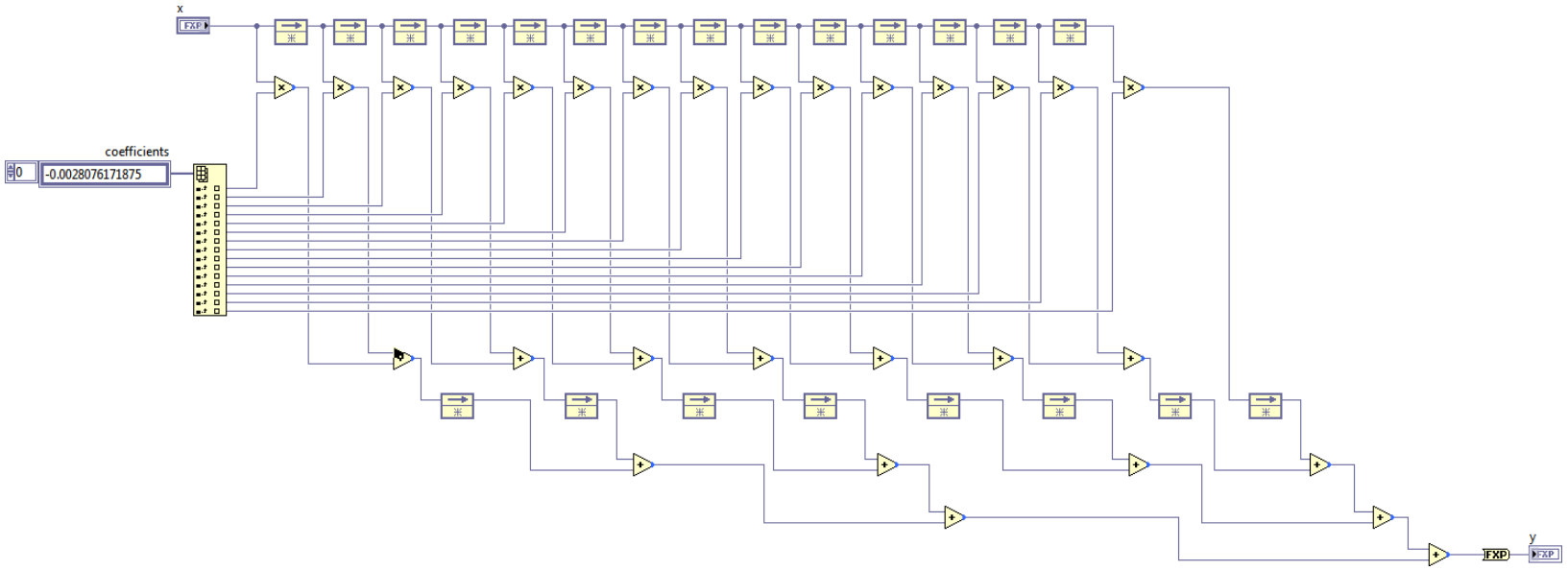
# Data Capture and Analysis

*Goal: Streamline how users capture, analyze and understand their data*



# FPGA Abstraction

*Goal: Drastically simplify the experience of FPGA programming AND increase code performance*



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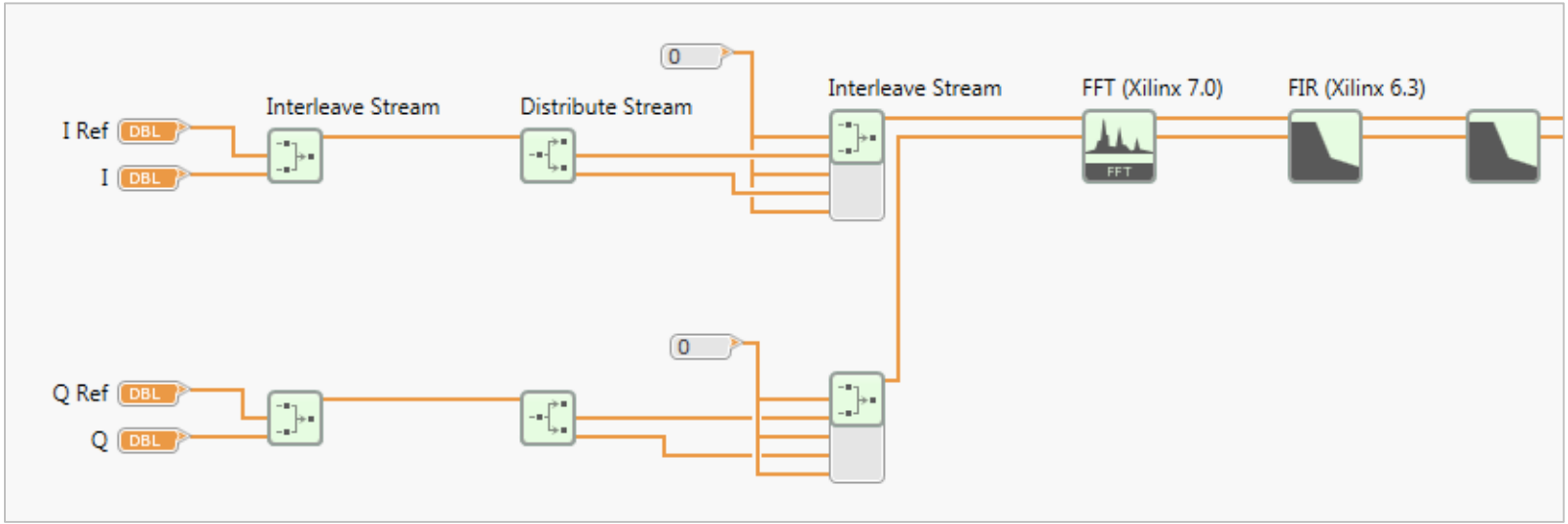
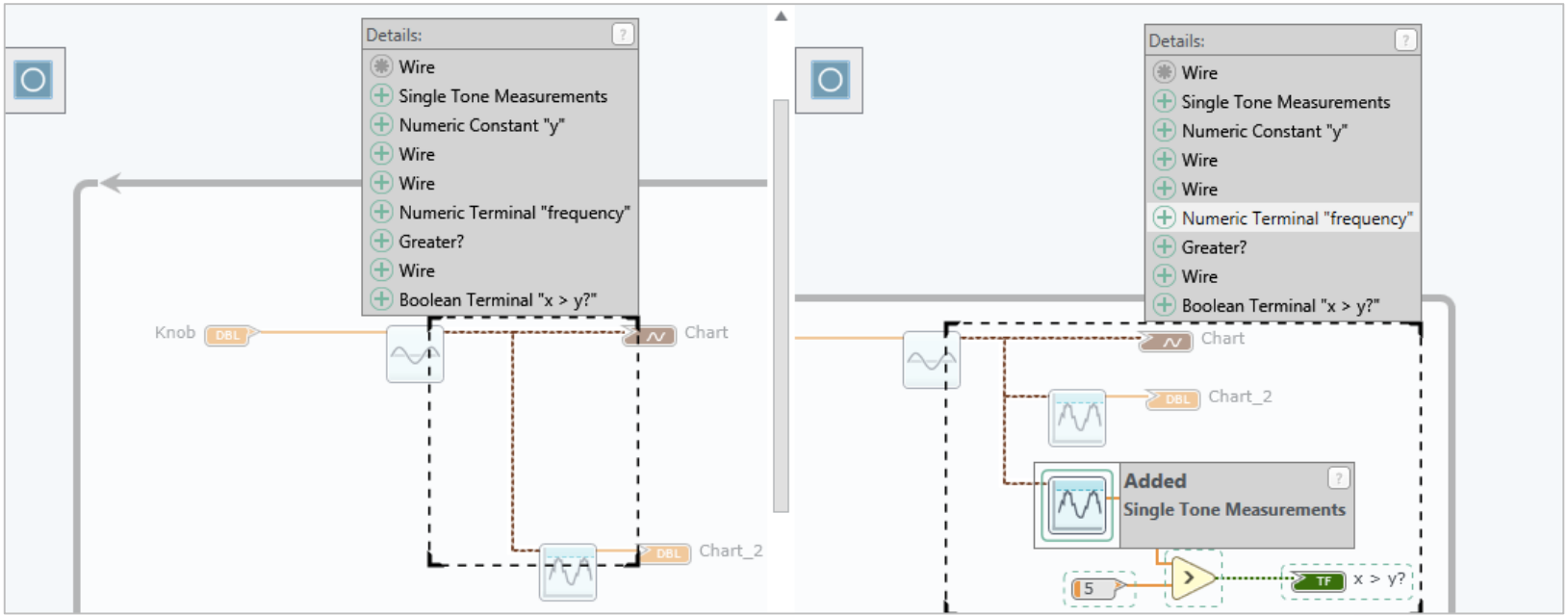


# Large Application Development

*Goal: Integrate seamlessly into companies' software engineering processes and streamline the process of upgrading users' code*



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## [Point of VIEW] Debugging and Demystifying Compilers With Grandma COBOL

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Posted by bcwilson Jul 21, 2015

*Today's post is part of a series exploring areas of focus and innovation for NI software.*

***Today's Featured Author***

*Shelley Gretlein is a self-proclaimed software geek and robot aficionado. As NI's director of software marketing, you can find Shelley championing LabVIEW from keynote stages to user forums to elevator conversations. You can follow her on Twitter at @LadyLabVIEW.*

Grace Murray Hopper (1906–1992), computer scientist and US Navy rear admiral, is on record as the individual who invented the first compiler and popularized the concept of machine-independent programming languages, and her work led to the development of COBOL. Her influence earned her the nickname Grandma COBOL[1].

Hopper's contributions led to the productivity through abstraction that engineers and scientists benefit from regularly. While her work was ahead of her time, compilers have advanced significantly since the Harvard Mark I computer Hopper used in 1944. Compiler design, even for a trivial programming language, can easily become complex, which makes compiler theory one of the most specialized fields among software professionals today. This complexity translates to either a frightening or magical trick for the majority of engineers.

However, all engineers can benefit from this art form of software mastery. From Python to LabVIEW, compilers are primarily used to translate source code from a high-level programming language (G, C#, and so on) to a lower level language (assembly or machine code). Even more beneficial are cross-compilers that can create code to execute on a computer where the target and development CPU or OS are different.

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5 Things You Need to Know

# Summary

- NI is investing heavily in software
- NI's software investments often involve significant, multi-year development work
- New NI software technologies are entering the market now


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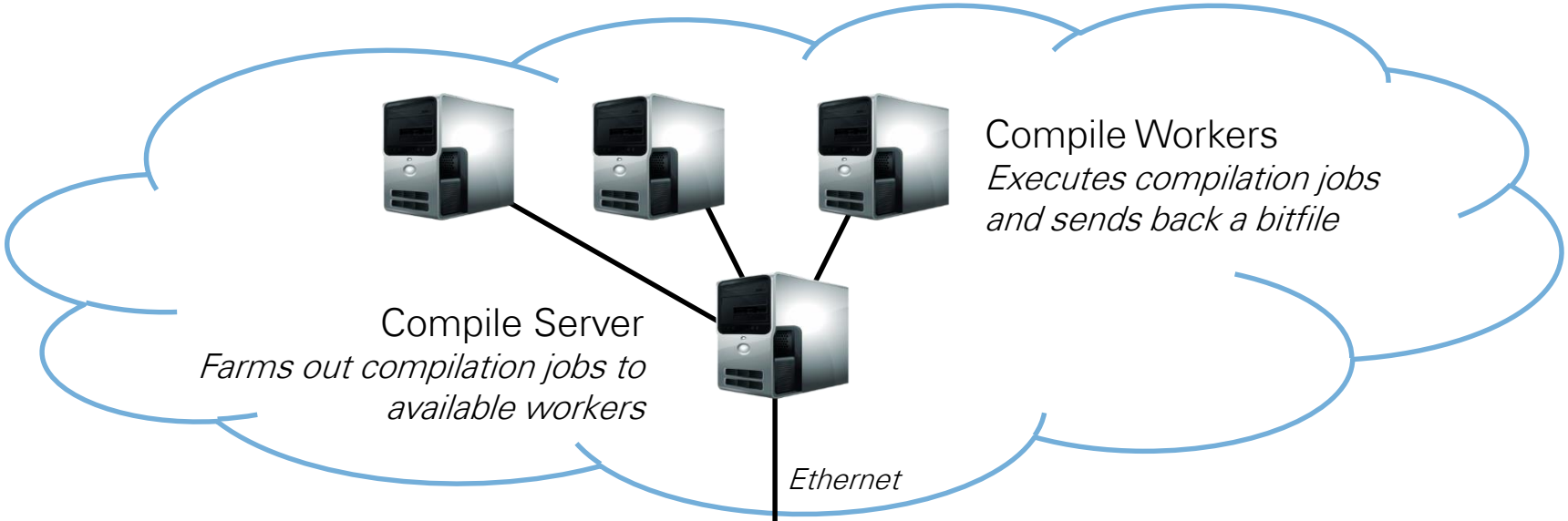
# Appendix

# LabVIEW FPGA Compile Cloud Service



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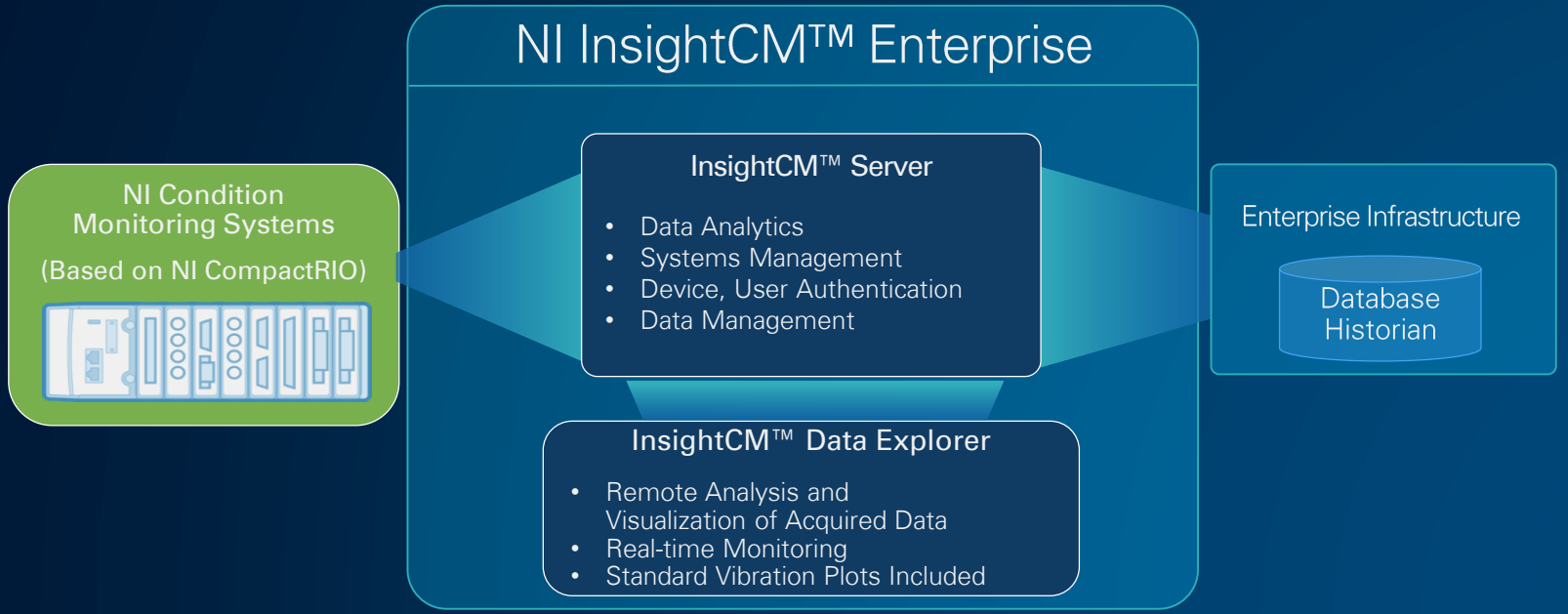

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