

LabVIEW NXG

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The Challenges that Lie Ahead



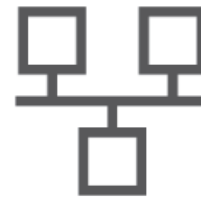
Onboarding New
Developers



Comprehensive
Data Analysis



Managing
Distributed
Systems

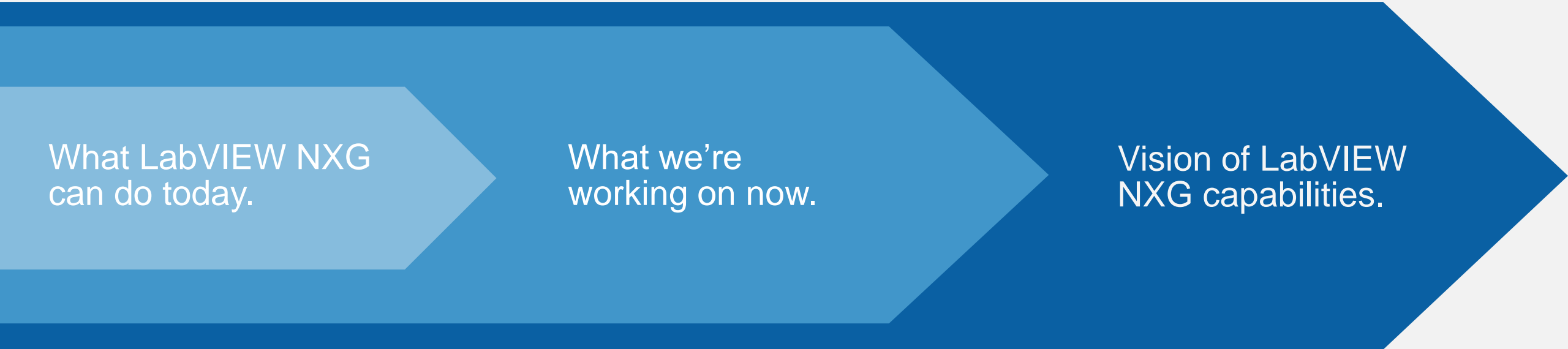


Large
System
Development



Technology
and Industry
Trends

LabVIEW NXG Capabilities



What LabVIEW NXG
can do today.

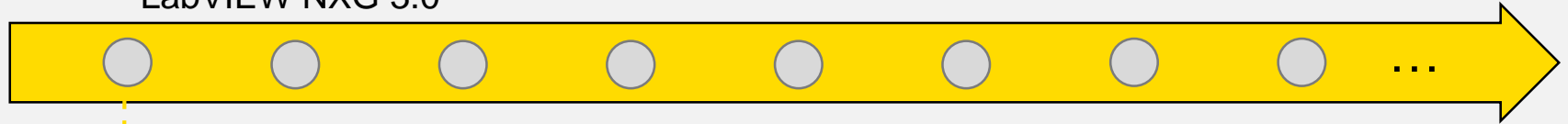
What we're
working on now.

Vision of LabVIEW
NXG capabilities.

Concurrent Investment in LabVIEW

LabVIEW NXG

LabVIEW NXG 3.0



LabVIEW

LabVIEW 2018



Agenda

- What's New
 - Hardware
 - Distribution and Code Reuse
- What applications can I use LabVIEW NXG for?
- The Future of LabVIEW NXG

Working With Hardware

Hardware Support in LabVIEW NXG

Electronic Test and Instrumentation

Digital Multimeters

Switches

Oscilloscopes

Power Supplies and Source Measure Units

Waveform Generators

Digital Waveform/Pattern Instruments

Kintex-7 FlexRIO Custom Instruments and Processing

Wireless Design and Test

USRP and USRP-RIO

700+ 3rd Party Hardware Drivers

Data Acquisition and Control

CompactDAQ Chassis (USB, Ethernet, Wireless) and Modules

PXI Multifunction I/O Modules and Devices (except E and B series)

PXI Analog Input Modules

PXI Temperature Input Modules and Devices

PXI Strain/Bridge Input Modules

PXI Sound and Vibration Modules and Devices

PXI Analog Output Modules and Devices

PXI Digital I/O Modules and Devices

PXI Counter/Timer Modules and Devices

PXI Position Displacement Module

SC Express

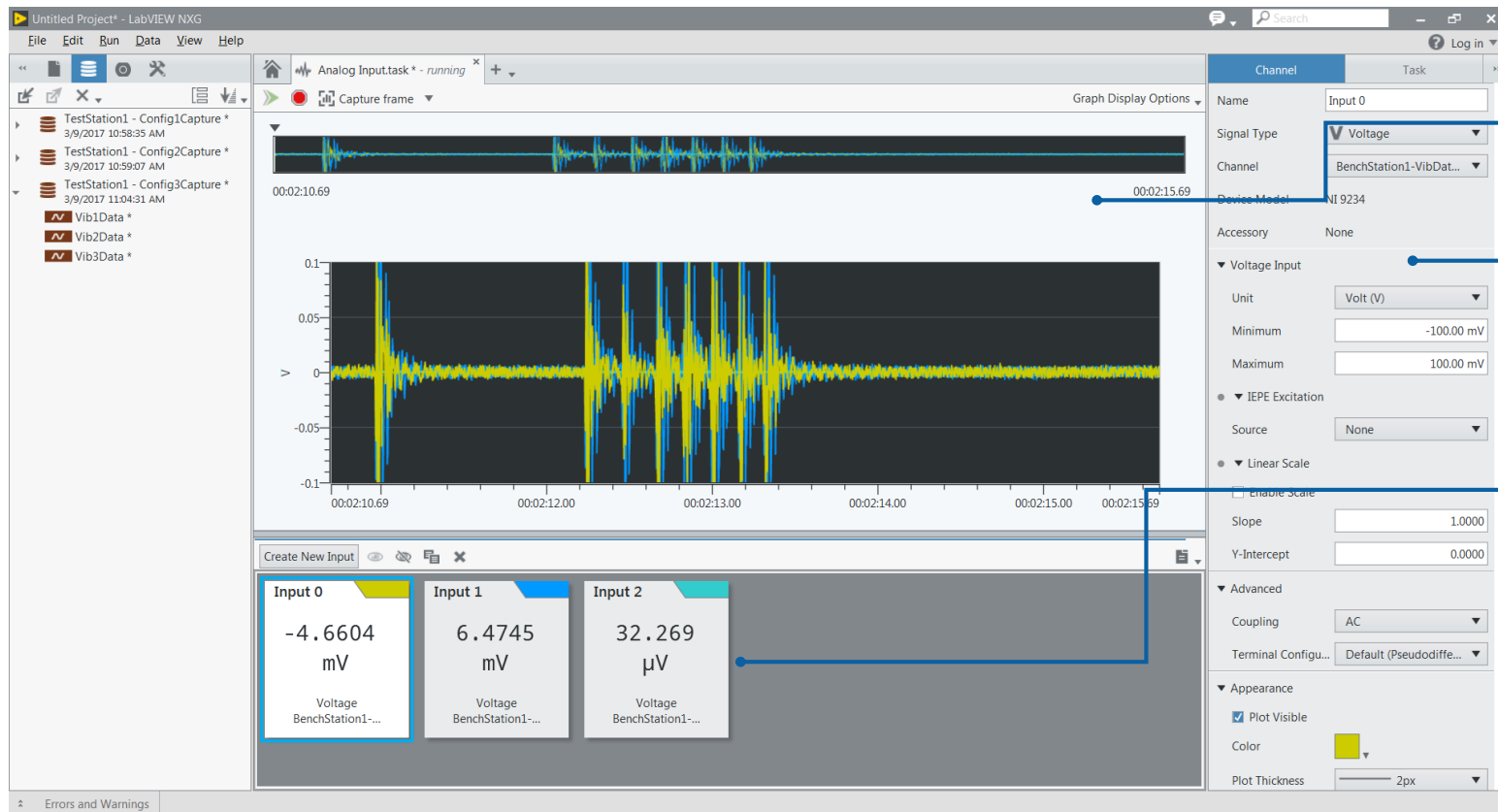
Vehicle Communication Buses—CAN/LIN/FlexRay (PCI/PXI/C Series)

PXI/PCI Frame Grabber Modules (Camera Link and Gigabit Ethernet)

Intuitive Engineering Workflows

Take Your First Measurement Faster

Minimize the time to your first measurement using hardware auto-discovery and interactive panels—programming optional.



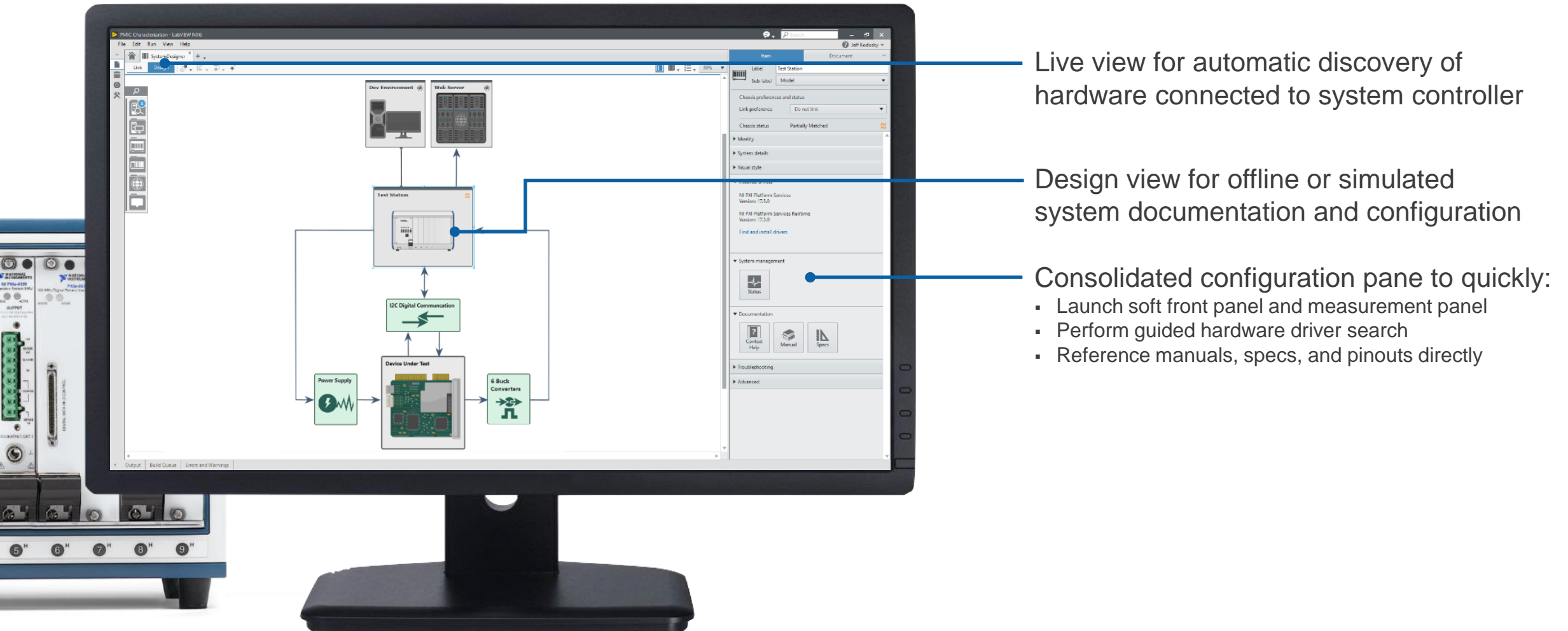
Instant Access to Signals From Hardware

Interactive Configuration of Hardware Channels

Efficiently Manage Configurations Across Channels

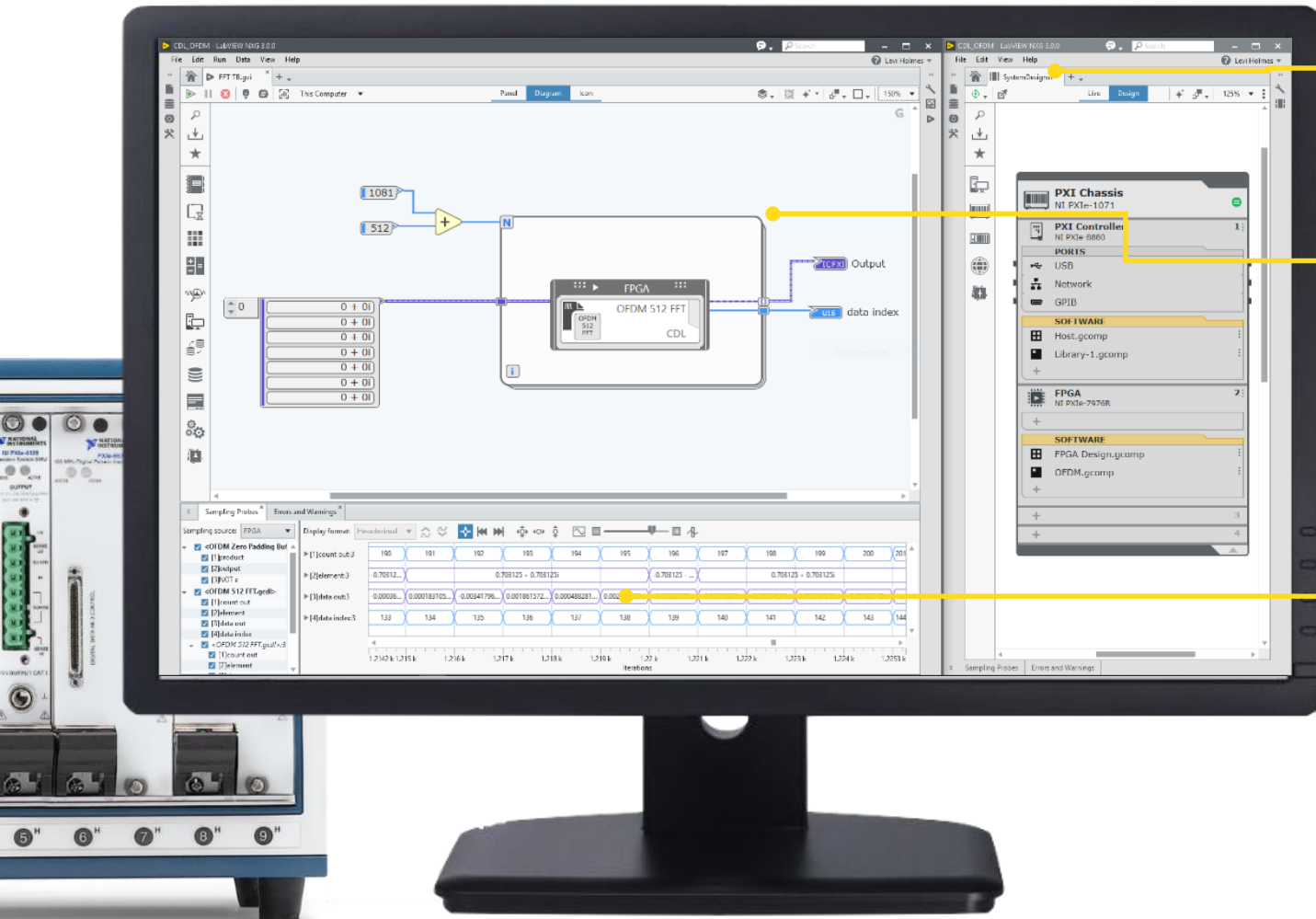
Discover and Configure Your Hardware with SystemDesigner

Reduce System Setup and Validation Time



Optimized Workflows for FPGA Development & Deployment

Develop Systems Faster



Architect and organize your entire system within one IDE, including hardware resources and software components

Use new features optimized for FPGA design, such as clock-driven logic.

Visualize your code operation over multiple clock cycles with cycle-accurate simulation probes

Supports USRP & FlexRIO Hardware
See the [compare table](#) for full hardware support

Key Features and Caveats of FPGA Module

Other New Features:

- Complex Fixed-Point data types
- Cluster support for DMA FIFOs
- Use search to locate FIFO Entry and exit points on block diagram
- Support for multidimensional arrays

Key Caveats:

- Limited HW support
 - USRP
 - FlexRIO (Kintex-7 only)
- Only supports clock-driven operation

LabVIEW NXG Vision Development Module

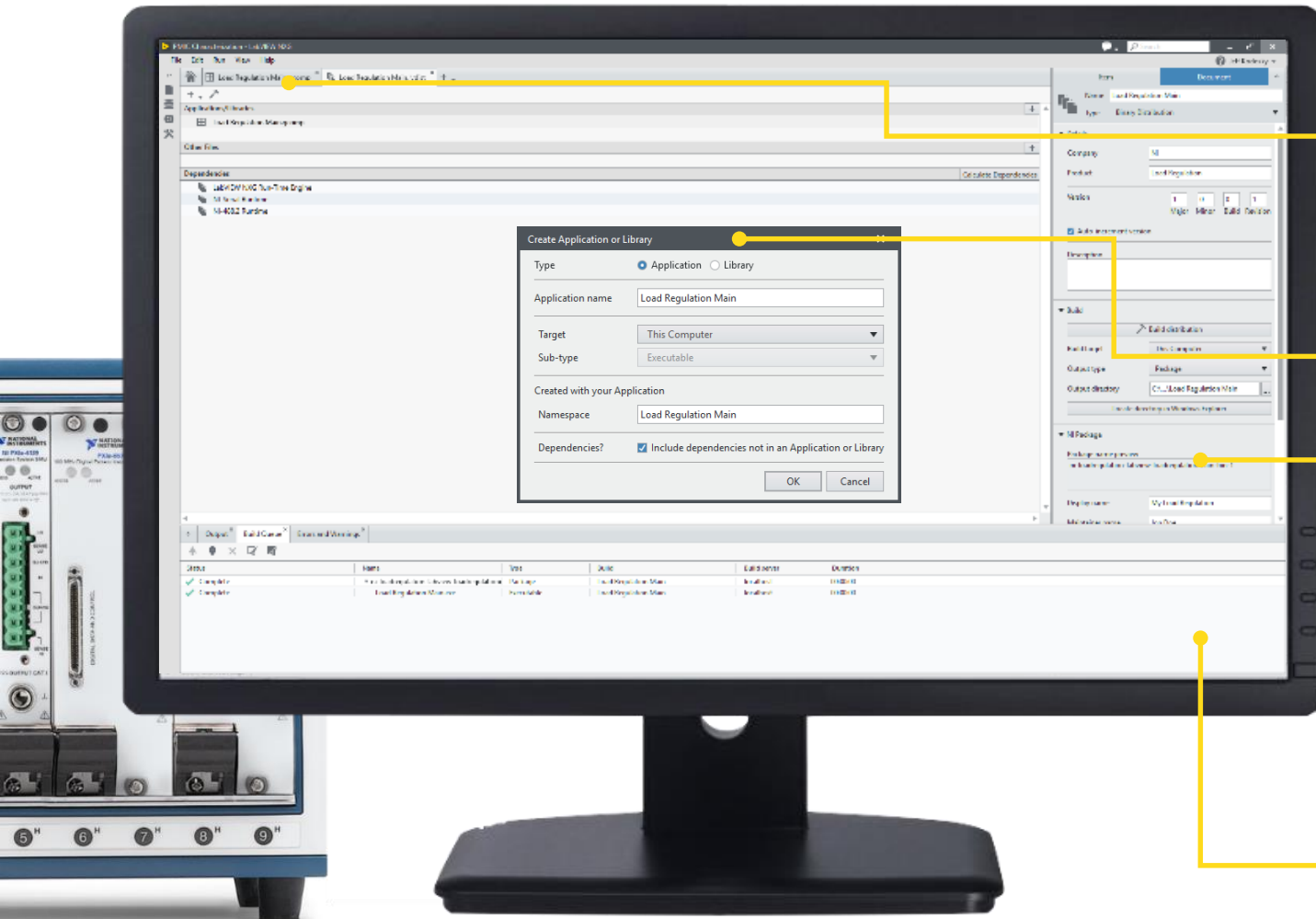
- Vision Development Module is available in LabVIEW NXG for Automated Production Test and Device Validation
- Generate LabVIEW NXG code using Vision Assistant
- Perform object identification and defect detection using Deep Learning with Tensor Flow Inference Engines in VDM



Distribution and Code Reuse

Reuse Code and Distribute Applications

Confidently Replicate and Share System Software



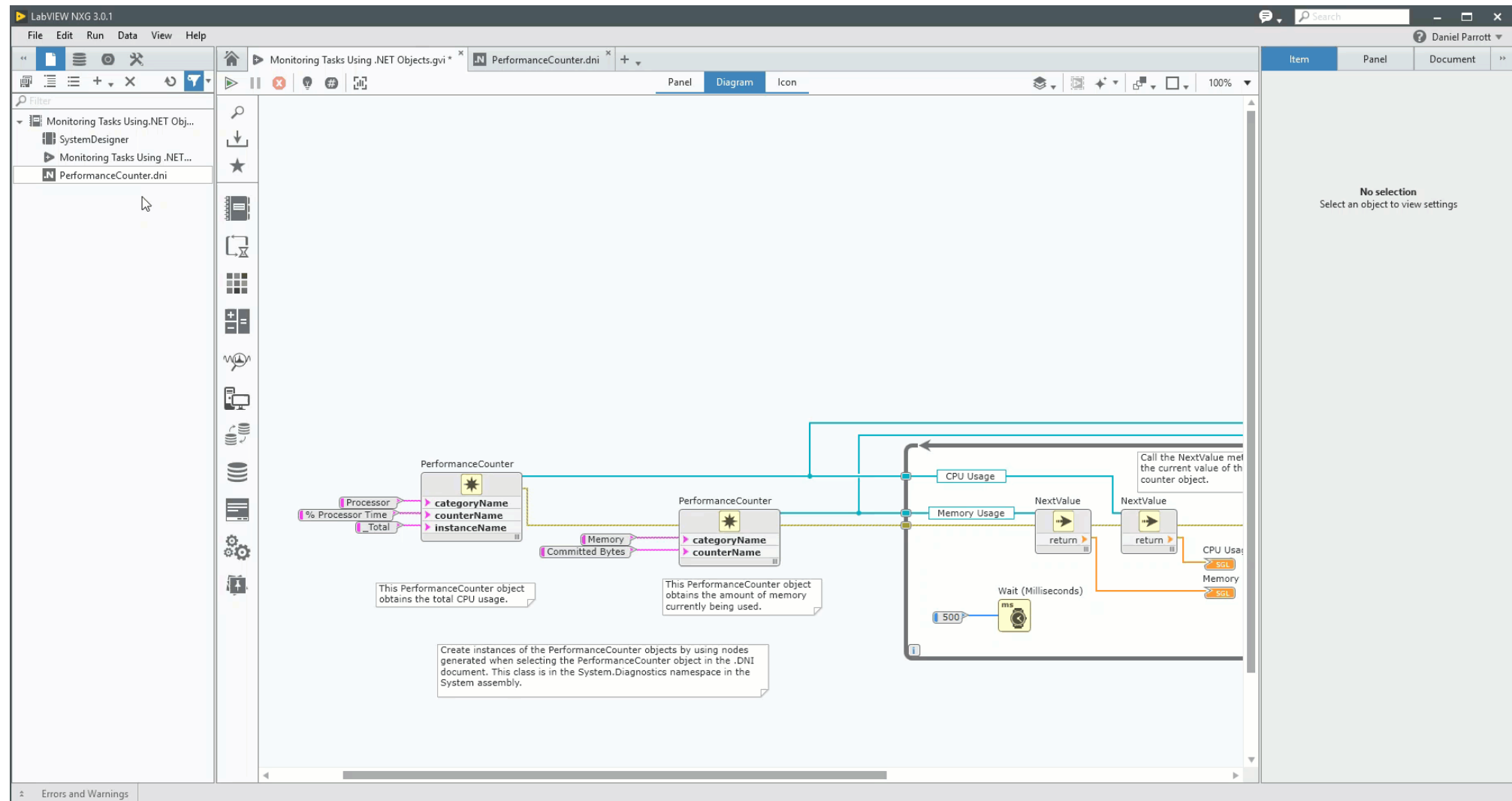
Centralize all the version and build settings for creating a new application or library

Automatic application dependency detection and installer inclusion

Distribute your software using industry-standard package building and package management technology

Reuse 3rd party applications like registered .NET assemblies or MATLAB® code

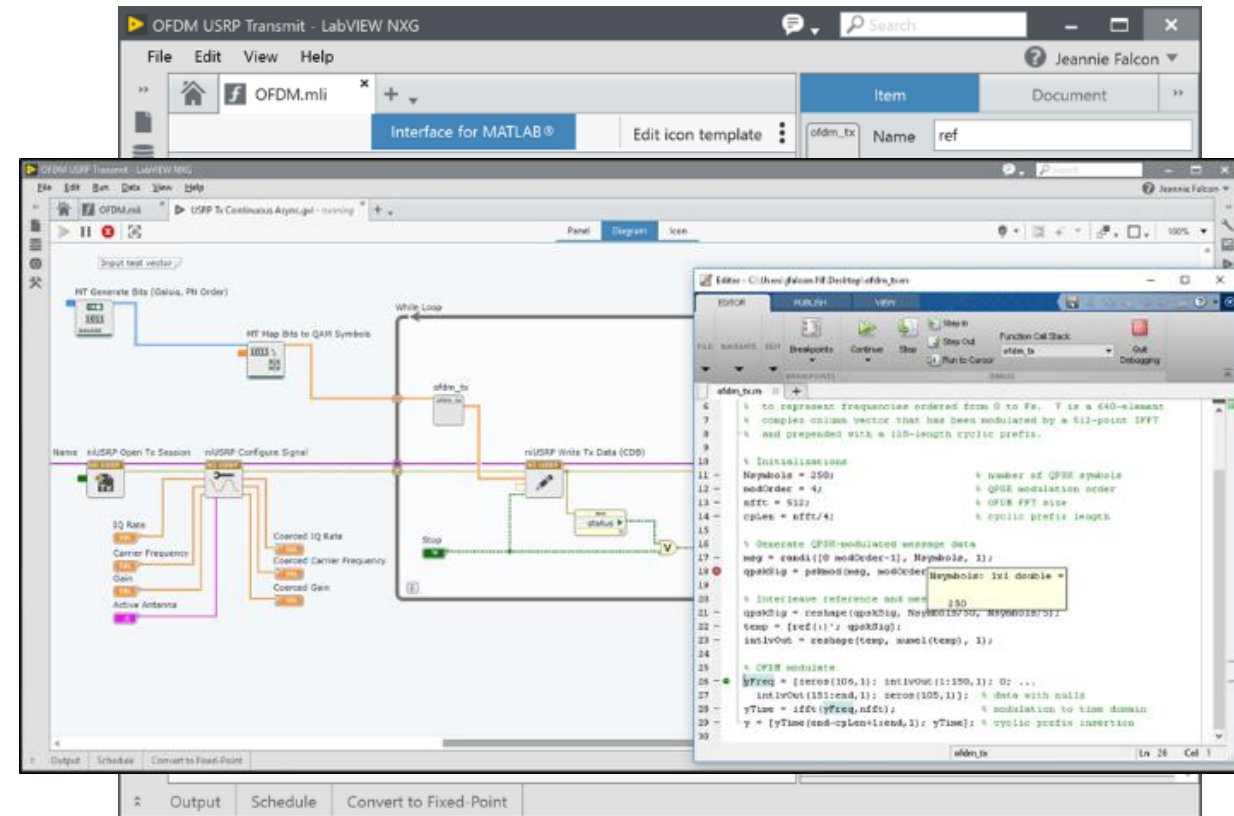
Call Registered .NET Assemblies



Interface for MATLAB®

Reuse your MATLAB® code in your LabVIEW NXG diagram

- Import .m files with the Interface for MATLAB®
- Drop it in your diagram as a subVI node like any other function call
- Debug and modify the MATLAB code while running the VI



What Applications Can I Use LabVIEW NXG For?

Ready

Measure physical systems
with sensors or actuators

Develop production test
systems *

Validate or verify electronic
designs

Wireless research

Not Ready

HIL Test

Smart Machines / Industrial
Equipment

Path to the Future



Upcoming Features in LabVIEW NXG 3.0

User Interface Building

- Manipulate front panels programmatically
- Reflect test status in a Data Grid

Custom Algorithm Design

- Design custom FPGA algorithms

Deployed Applications

- Application splash screen
- Apply a hardware configuration with package installers on deployed machines

Interoperability

- Call registered .NET Assemblies
- Interface for MATLAB®

Collaborative Development

- Easily install dependencies required for a project with the package dependencies document
- VI and Class Hierarchy Viewers

Systems Management

- Connect, configure, and document hardware graphically with SystemDesigner
- Design hardware systems offline from a catalog of NI hardware

Debugging

- Retain wire values
- FPGA sampling probe

Web Technology

- Event Support in WebVIs
- Host WebVIs on SystemLink Cloud
- Integrate JavaScript code to customize WebVIs

Hardware Support

- Utilize Kintex 7 FlexRIO hardware
- Prototype MAC and PHY systems on most software defined radio hardware

Software Engineering

- Compare Projects with NI Compare Tool
- Native project SCC integration with the SVN SCC Add-On for LabVIEW NXG
- Document and generate class-based architectures with the VI Technologies UML Class Editor Beta

What is NOT in LabVIEW NXG as of 3.0 (YET)

- RF instruments (private eval available)
- RT PXI
- cRIO
- cDAQ Controllers
- VirtualBench
- Academic products
 - myDAQ is supported however
- etc..
- Build DLL and .NET assembly
- Graphical Merge
- Xcontrols and Custom controls
- 3D graph and picture control
- Other toolkits and modules (RT Module)
- Native database integration
- etc...

visit ni.com/labview for full Compare Table

▶ LabVIEW[™]NXG Roadmap

Next Release Includes:

Core Editor Enhancements

- Customize the wire appearance of a class
- Abstract LabVIEW FPGA code with object-oriented programming
- Take advantage of palette efficiency and usability improvements

Interoperability

- Import/export .mat files from the The MathWorks, Inc. MATLAB®

User Interfaces

- Display panels dynamically inside other panels
- Display hierarchical column data
- Dynamically change UIs at run time through additional properties

High-Performance Signal Processing

- Reduce compile times with simplified FPGA simulation and debugging workflow
- Automate Xilinx compiler configuration
- Document and manage FPGA resources more easily

Software Engineering

- Build applications with the command line interface
- Create UML diagrams and classes with the VI Technologies UML Class Editor
- Unit test your code with the IncQuery Labs unit test add-on

Web Technology

- Create dynamic, responsive web UIs that scale to desktops and mobile devices
- Expand capabilities by calling JavaScript extensions, which can be shared across projects
- Create UIs in a browser-based dashboard editor
- Communicate data over WebSockets in WebVIs

Distributed Applications

- Debug deployed executables
- Interact with executables from the command line

Near Future Release:

Core Editor Enhancements

- Use additional debugging tools like conditional breakpoints
- Interface natively with common databases

High-Performance Signal Processing

- Leverage UltraScale FlexRIO support
- Target PCI/PXI reconfigurable I/O modules

Web Technology

- Store measurement data in the cloud
- View data at rest in a browser using file API
- Interact with TDMS data in a browser
- Improve integration of third-party web elements

Hardware Support

- Use RF instrumentation

User Interfaces

- Dynamically display images
- Create custom right-click menus
- Enhance run-time list editing capabilities

Future Release Features:

Core Editor Enhancements

- Generate Microsoft Word reports
- Use additional VI Execution Control functionality on local and remote systems
- Abstract LabVIEW Real-Time code with object-oriented programming
- Create projects using the Actor Framework
- Create G code using scripting
- Navigate projects more easily

Interoperability

- Call Python scripts
- Interface with The MathWorks, Inc. MATLAB® code on real-time targets

Software Engineering

- Choose from additional command line interface options

High-Performance Signal Processing

- Get support for real-time and FPGA workflows on CompactRIO hardware

Data Management

- Access advanced TDMS functionality, such as asynchronous write operations

Web Technology

- Enable debugging WebVIs in IDE
- Stream data across web applications over the network

Hardware Support

- Deploy to CompactRIO with NI-DAQmx and PXI systems running NI Linux Real-Time

Distributed Applications

- Create and build binary libraries
- Build and share source distributions
- Implement deterministic applications with broad-based LabVIEW Real-Time support
- Define and manage exact package dependency versions used by the project

User Interfaces

- Quickly configure visually consistent UIs using themes
- Create dynamic panel layouts that work for multiple displays



Consider 3 Things

When evaluating LabVIEW NXG for a future project

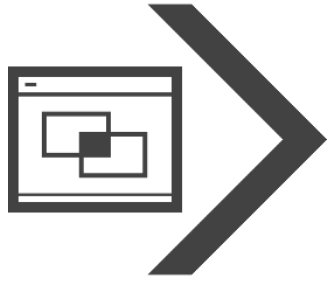
TODAY – Take advantage of LabVIEW 2018 and LabVIEW NXG now

OVER TIME – Transition your skills and knowledge

DEVELOP TOOLS – Create LabVIEW NXG Add-Ons

Effectively Using LabVIEW NXG

Take advantage of LabVIEW NXG together with LabVIEW 2018



New Projects

Consider using LabVIEW NXG when starting new projects that LabVIEW NXG can support.



Augment Existing Applications

Develop on both LabVIEW 2018 and LabVIEW NXG. Complement existing applications by taking advantage of new features.

How to use LabVIEW 2018 and LabVIEW NXG Together

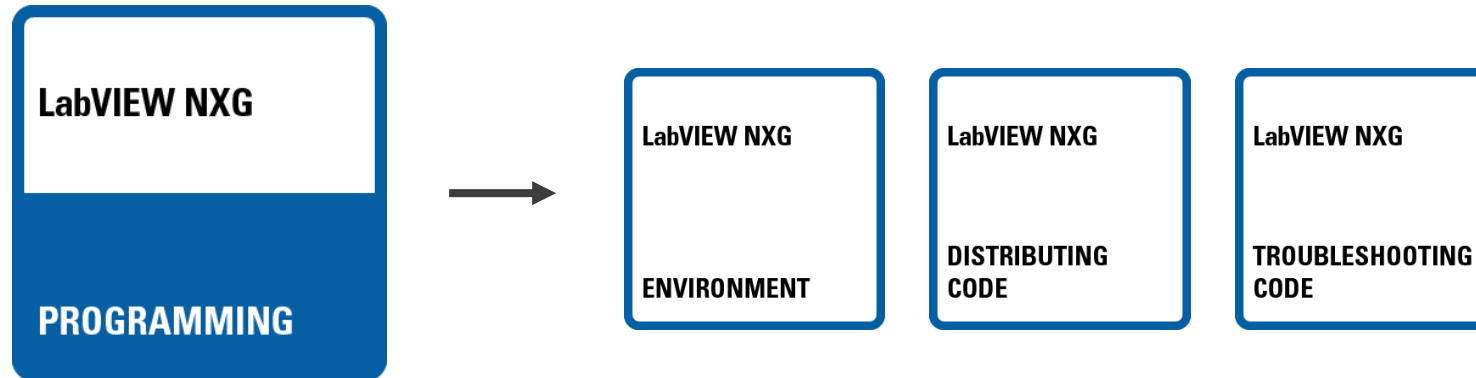
- Use WebVIs
 - Create a WebVI using LabVIEW NXG
 - Hosted on intranet or internet
 - Use LabVIEW Web Services, SystemLink API or HTTP Client API for LabVIEW NXG and LabVIEW 2014+
- Use Network Protocols
 - Use LabVIEW NXG to create the User Interface
 - Communicate from the LabVIEW application using network protocols like TCP/IP
- Use Non-Programming Workflow for Quick Measurements, Logging Data, and Analysis

- Convert your application from LabVIEW 2017 or earlier to NXG
- Convert and fix the result and start working in NXG



How to Start Learning LabVIEW NXG

- LabVIEW NXG badges
- Coding challenges for staff – ask us!
- Transitioning to LabVIEW NXG course
 - Also have Core 1, Core 2 and DAQ courses available



Questions?