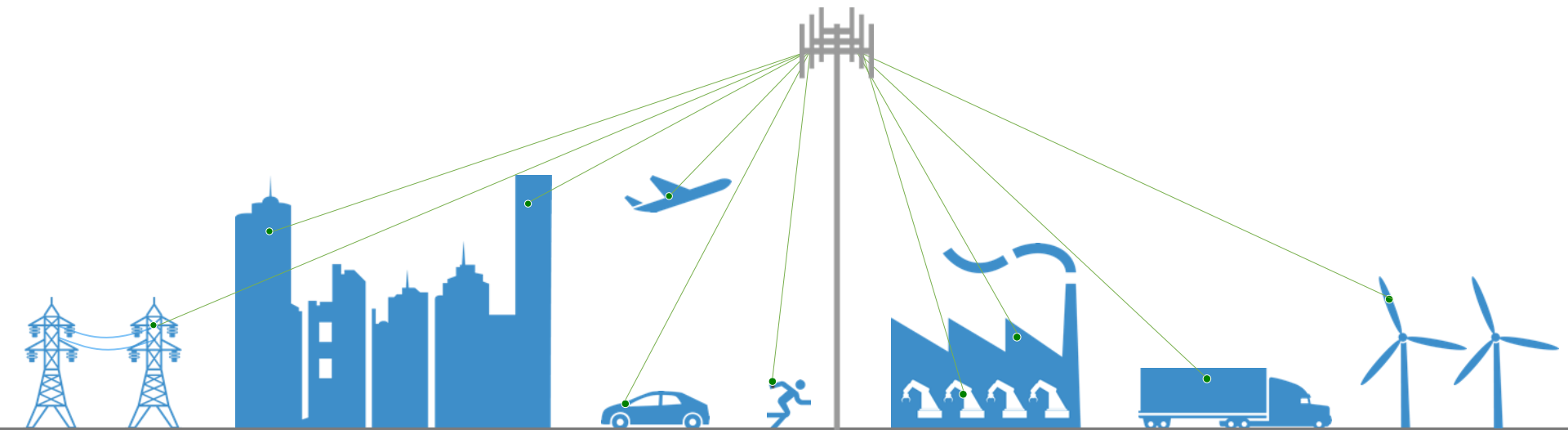


# 2015 LabVIEW Developer Days

Welcome and Introduction

# Hyper-Connected Infrastructure



IOT WILL IMPACT  
**75% ENGINEERS**  
IN 3 YEARS  
*- VDC*



**50 BILLION**  
DEVICES CONNECTED BY 2020

**30X**  
INCREASE IN “THINGS”  
*- GARTNER, 2014*



**1.9 BILLION**  
SMART PHONES

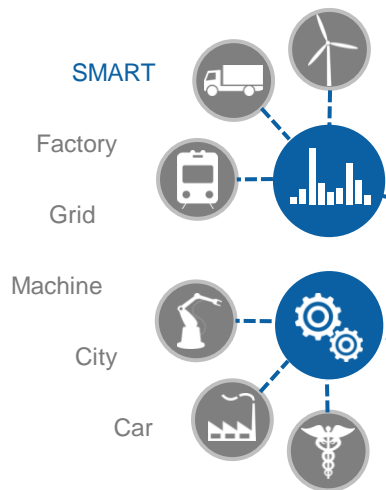
**17.5%**  
CAGR  
*- IDC, 2014*



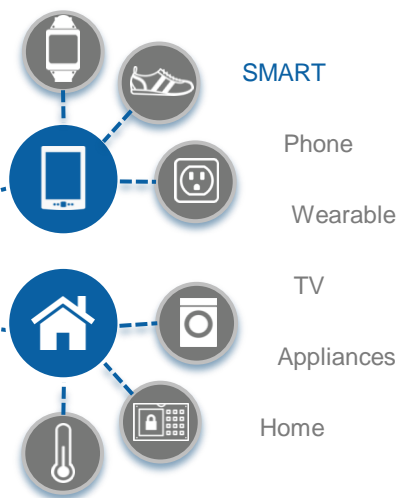
**\$19 TRILLION**  
OPPORTUNITY

# Impacting Much More Than Smartphones

## INDUSTRIAL Internet of Things



## CONSUMER Internet of Things



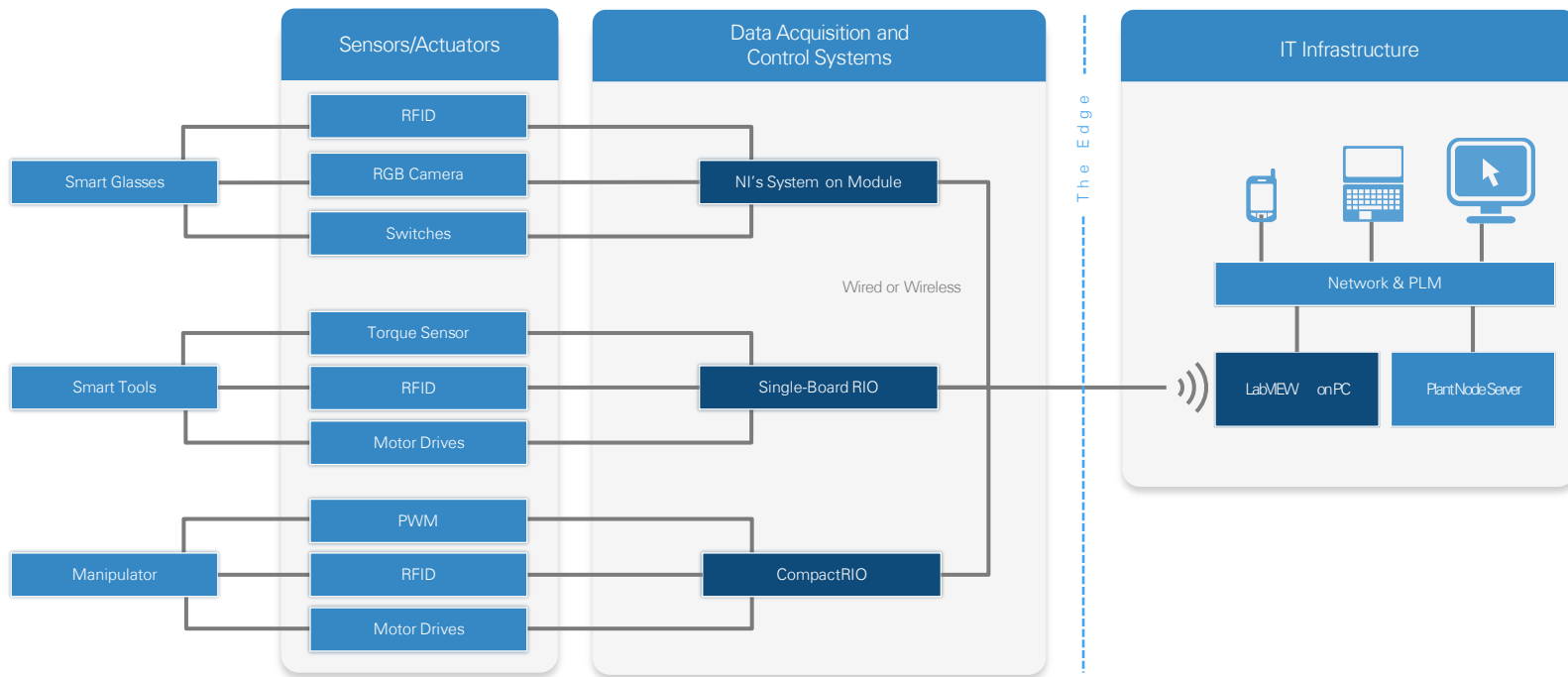
Based on Moor Insights & Strategy's report "Segmenting the Internet of Things (IoT)"

# Platform-Based Design



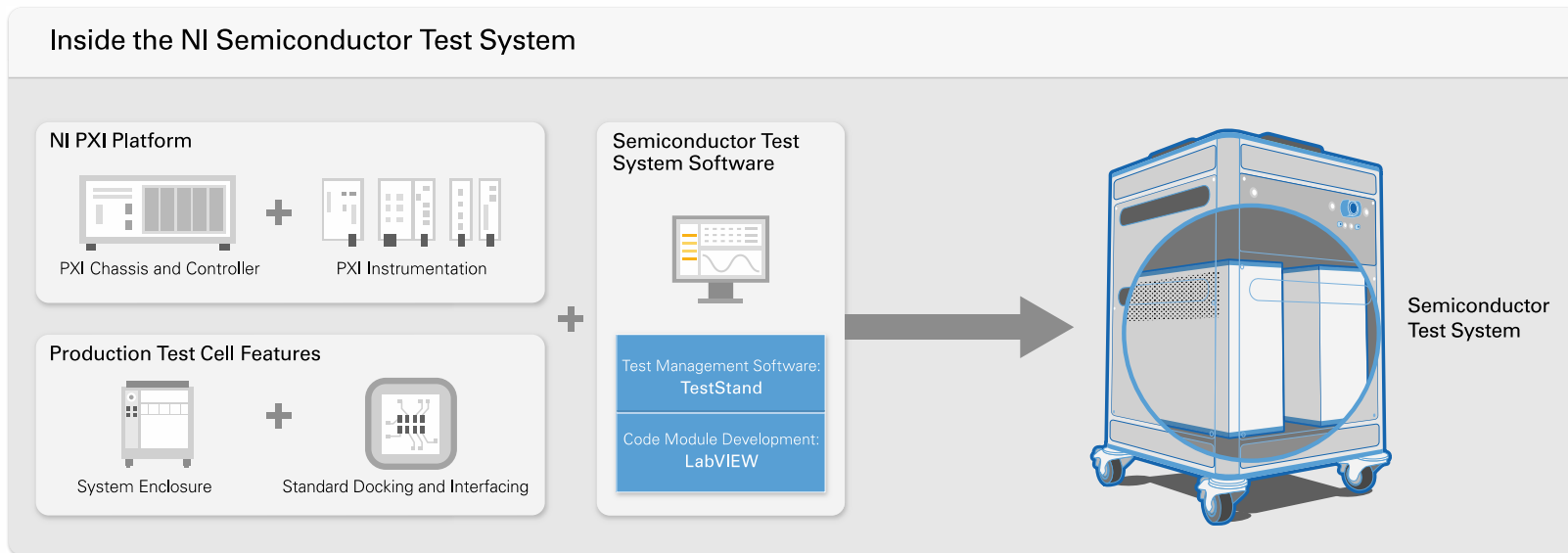
# Example End-to-End Industrial IoT Solution

Factory of the Future: Factory-wide Online Monitoring and Control



# Smart ATE for Smart Devices

A Platform to Economically Test the IoT



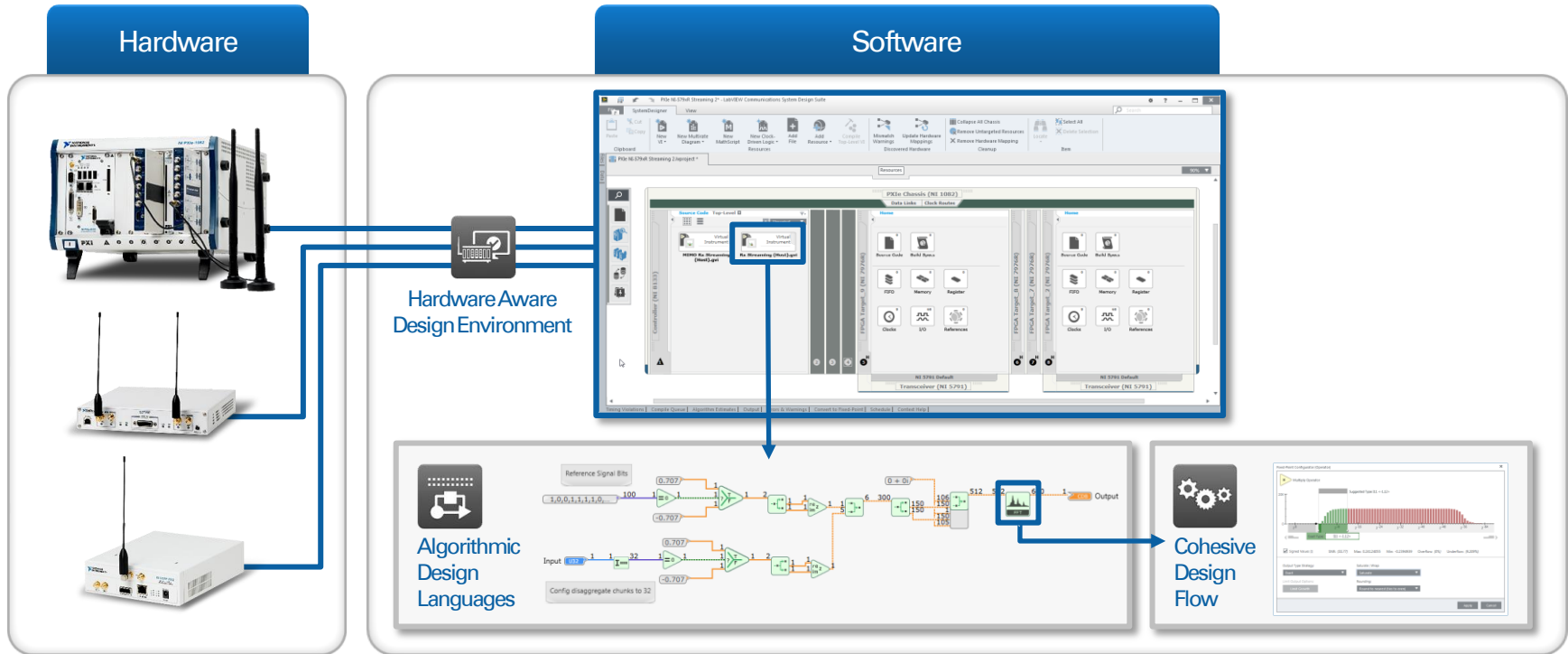


reduced development time by 10X  
with NI solutions.



# LabVIEW Communications System Design Suite

## *The Revolution in Rapid Prototyping – A better way to design wireless systems*



# NI in the Press

**“electronic  
design**  
LabVIEW Tuned For  
Software Defined Radio

**INTERNET  
OF THINGS  
JOURNAL**

**“National Instruments  
on Building an  
Industrial IoT Toolkit**

"NI believes that developing and deploying industrial Internet systems will represent a massive investment for decades to come...To be capable of adapting to changing requirements over time, **you need to build on open, integrated hardware and software platforms**, and you need a real-time network that can scale with new technologies."

**CIO**

– Thor Olavsrud

**“RCR Wireless**  
INTELLIGENCE ON ALL THINGS WIRELESS  
**NI Talks 5G Arms Race**

"Products such as National Instruments' CompactRIO and its sister software LabVIEW 'are essentially **putting more intelligence into industrial machines** to assess their health and predict maintenance and failures.'"

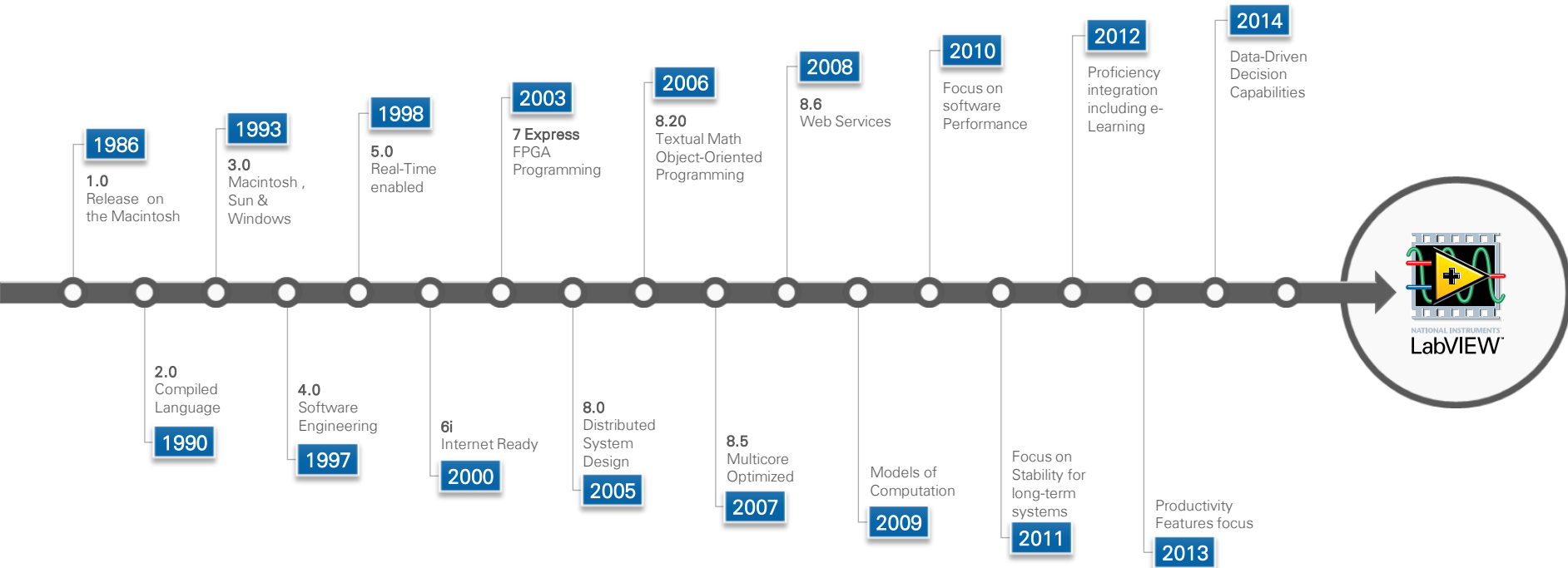
**Forbes** – Robert Vamosi

**“FierceWirelessTech**  
**National Instruments Provides Technology  
Starting Blocks in Race to 5G**

"NI introduced their LabVIEW Communications System Design Suite...**Look for it to expedite 5G.**"

- Lou Frenzel, [\*Electronic Design\*](#)

# LabVIEW | Proven Evolution Over Three Decades



# Market Trends | Technology, Systems, and Connectedness



Multicore  
Development



Developing  
for FPGAs



System  
Architectures



# LabVIEW Without Limits

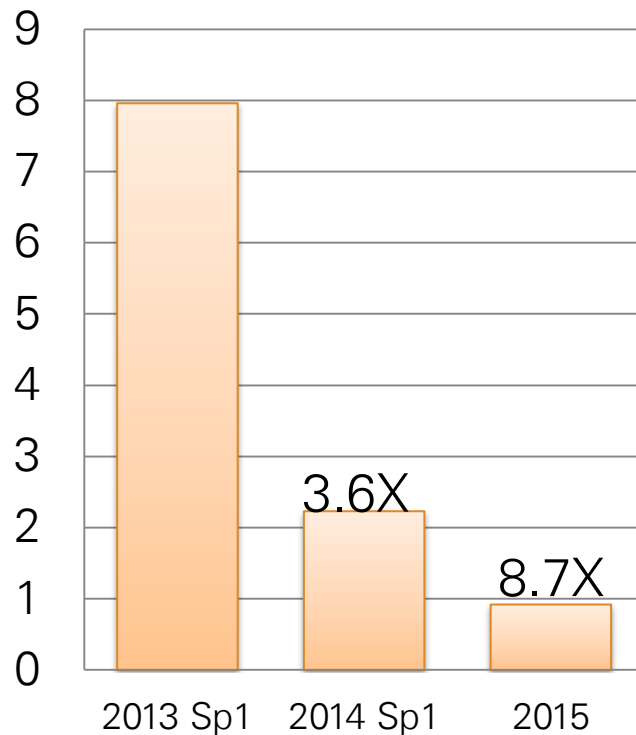
Architectural initiative to improve LabVIEW performance

- Illuminate significant pain points vs. C/C#
- Rapid experimentation
- Drive yearly projects to address pain

Major focus areas:

- Reduce **load-to-run** of built binaries
- Reduce **memory footprint** of large G libraries

Warm LoadTime in Seconds  
Demonstrative Large G Application: RFmx SpecAn PPLs



# Investments for the Future

## Platforms

mobile



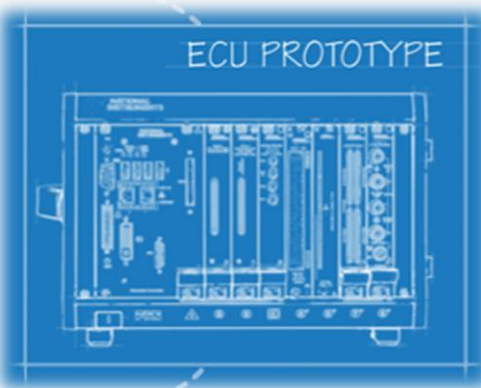
networking



cloud



## System Description

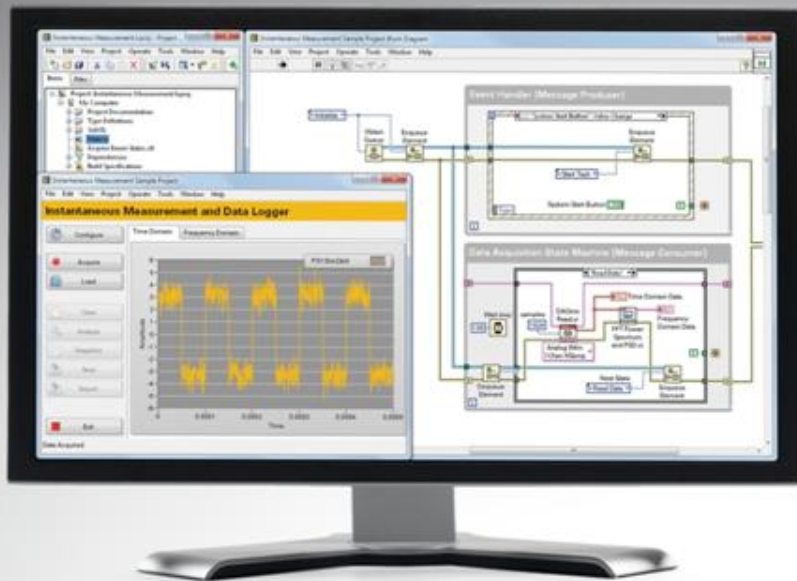


## UI and IDE

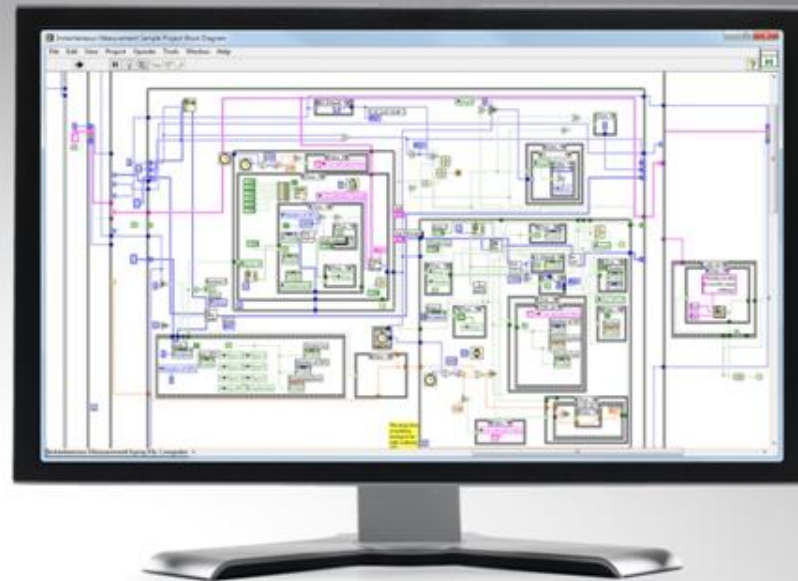








**Build This.**



**Not That.**



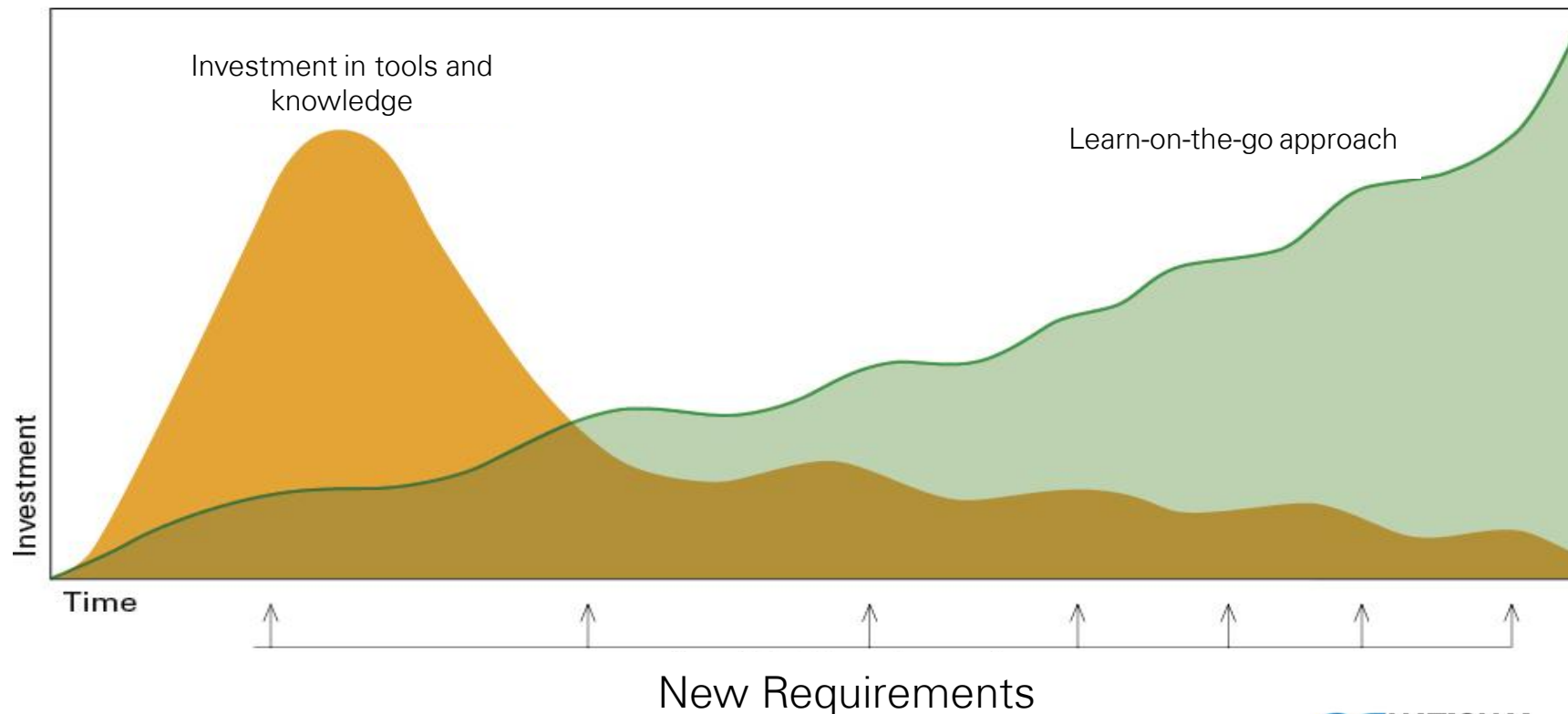
# Agenda For Today

8:30	Registration	
9:00	Keynote	
9:30	Personalizing the LabVIEW Environment to Accelerate Productivity	Software Engineering Best Practices for LabVIEW
10:15	Break	
10:30	The Essentials of File Management with LabVIEW	Data Communication for Scalable Systems
11:15	Best Practices for Code Packaging in LabVIEW	Building Basic Web Applications Using the Web Server
12:00	Lunch	
13:00	User Interface Tips and Tricks	Improving Code Quality Through Automated Code Analysis
13:45	Break	
14:00	Decisions Behind the Design of the Queued Message Handler Template	Report Generation Methods - From Toolkit to Template
14:45	Effectively building proficiency with LabVIEW	
15:30	Certified LabVIEW Associate Developer Exam	Certified LabVIEW Developer Preparation Session

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14:45	Effectively building proficiency with LabVIEW
15:15	Certified LabVIEW Developer Preparation Session

# Making an Investment in Tools and Knowledge



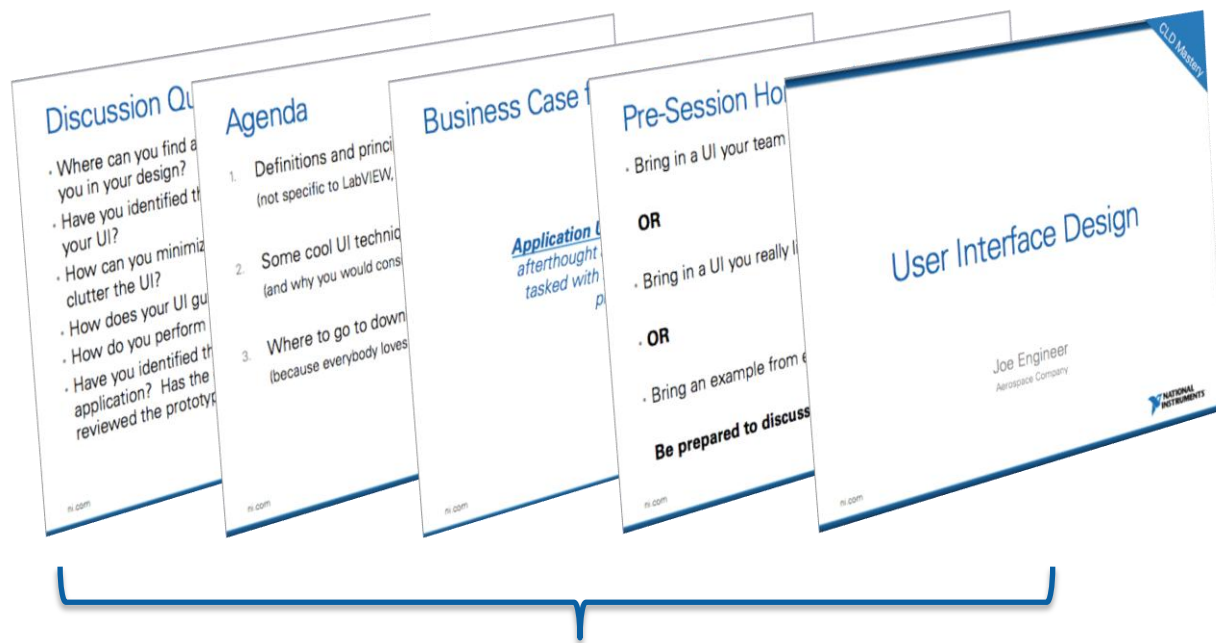
# LabVIEW User Groups



Register for Classes and Certification Exams

[ni.com/usergroups](https://ni.com/usergroups)

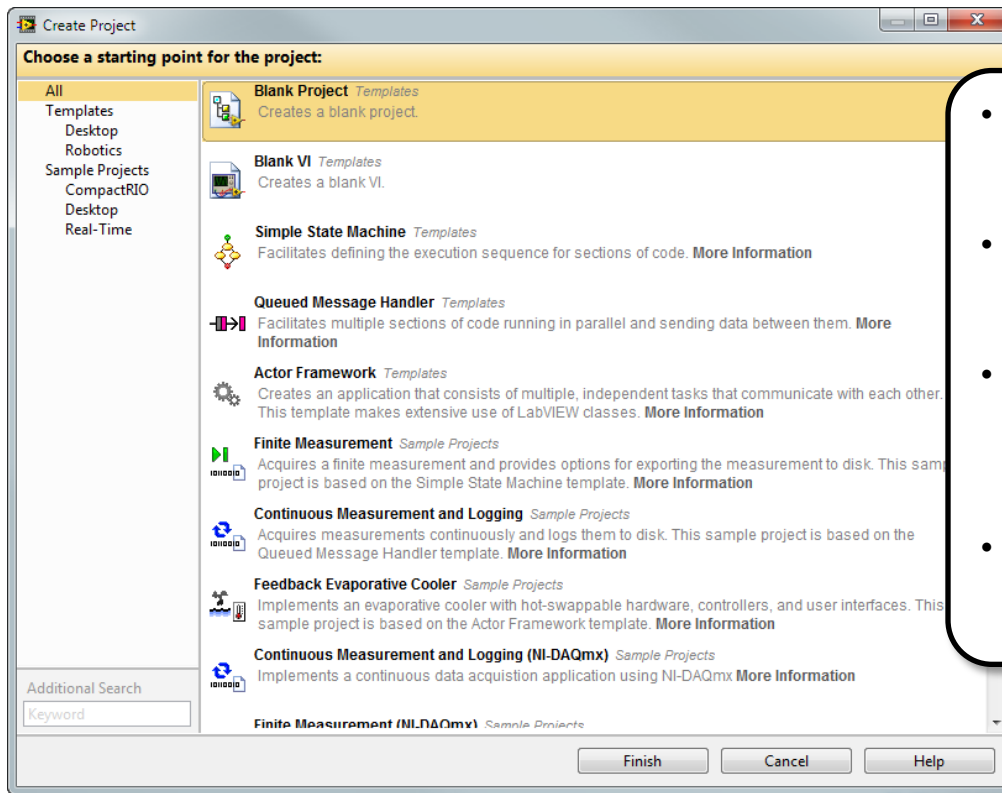
# User Group Strategy: Focused, Consistent, High-Quality



- CLD Mastery
- SCC
- HAL
- Other?

Instructional Design Includes: Consistent Template  
Homework, 30 min Presentation, 30 min Discussion Review by  
Consultant, SME Review

# In-Product Starting Points | Templates and Sample Projects



- 31 recommended starting points for common LabVIEW applications
- Clearly indicates where to add or change functionality
- Shows best practices for code design, documentation, and organization
- Add custom templates and sample projects

# Expanded LabVIEW Online Training

Core LabVIEW skills included with your software purchase

Introduction  
What is the DAQmx API?  
Programming With DAQmx  
Exercise  
Quiz  
Review  
Answers Summary

Acq6iGraph Voltage-Int Clk.vi Block Diagram

Minimum Value  
Maximum Value  
Physical Channel  
Samples per Channel  
Rate  
Finite Samples  
Sample Clock  
Analog I/O Wfm  
Measurement  
OK message + warnings  
Error

Steps:  
1. Create an analog input voltage channel.  
2. Set the rate for the sample clock. Additionally, define the sample mode to be finite and set the 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 a timeout so an 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.

This is a feature of a Polymorphic VI, meaning that the VI can take different forms based on the

## LabVIEW Online Training

- LabVIEW Core 1
- LabVIEW Core 2
- LabVIEW Core 3
- Advanced Architectures in LabVIEW
- Object Oriented Design and Programming in LabVIEW
- LabVIEW FPGA
- LabVIEW Real-Time 1 & 2

[ni.com/training/online](https://ni.com/training/online)

# LabVIEW Learning Path

## Initial Success

LabVIEW  
Getting Started

## Certified LabVIEW Associate Developer

LabVIEW  
Core 1

LabVIEW  
Core 2

## Proficiency

## Certified LabVIEW Developer

LabVIEW  
Core 3

LabVIEW  
Connectivity

LabVIEW  
Performance

Object-Oriented  
Design and  
Programming in  
LabVIEW

## Certified LabVIEW Architect

Advanced  
Architectures  
in  
LabVIEW

Managing  
Software  
Engineering in  
LabVIEW



# LabVIEW Machine Vision

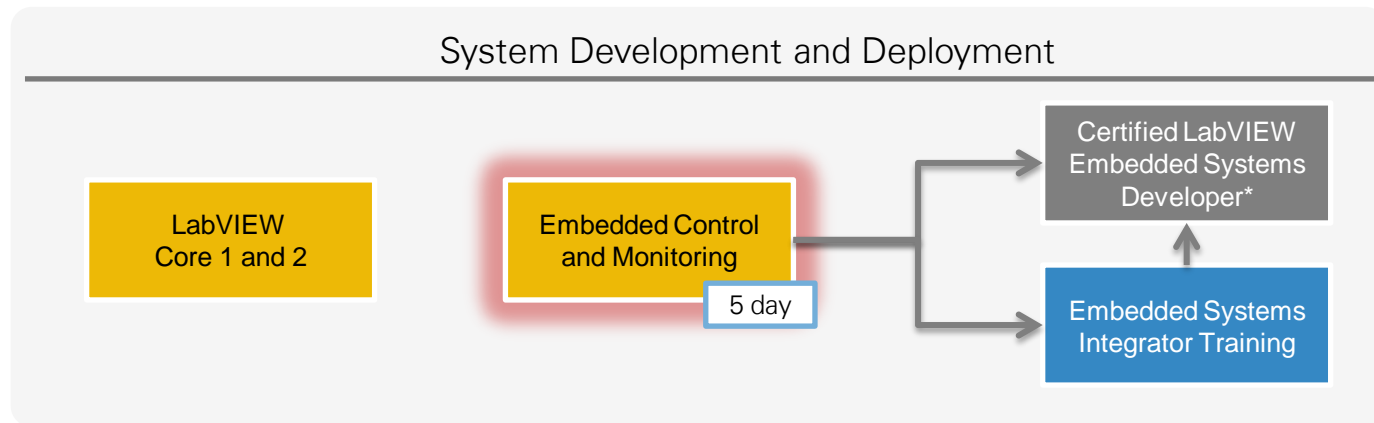
- Target Audience:
  - New users of NI Vision Products
  - Developers of vision applications
- Skills Learned
  - Develop a machine vision application in LabVIEW
  - Acquire and display images
  - Use image processing functions






Released Oct 2014 | Duration: 3 days | Price: \$1689

# New Embedded Control and Monitoring Training Course

- Delivers hands-on training for designing, prototyping, and deploying a reliable embedded control and monitoring application



\*A CLD or higher is required before attempting the CLED exam

-  Recommended course
-  Partner-only course
-  Optional certification

# Attend a CLA or CLD Summit to:



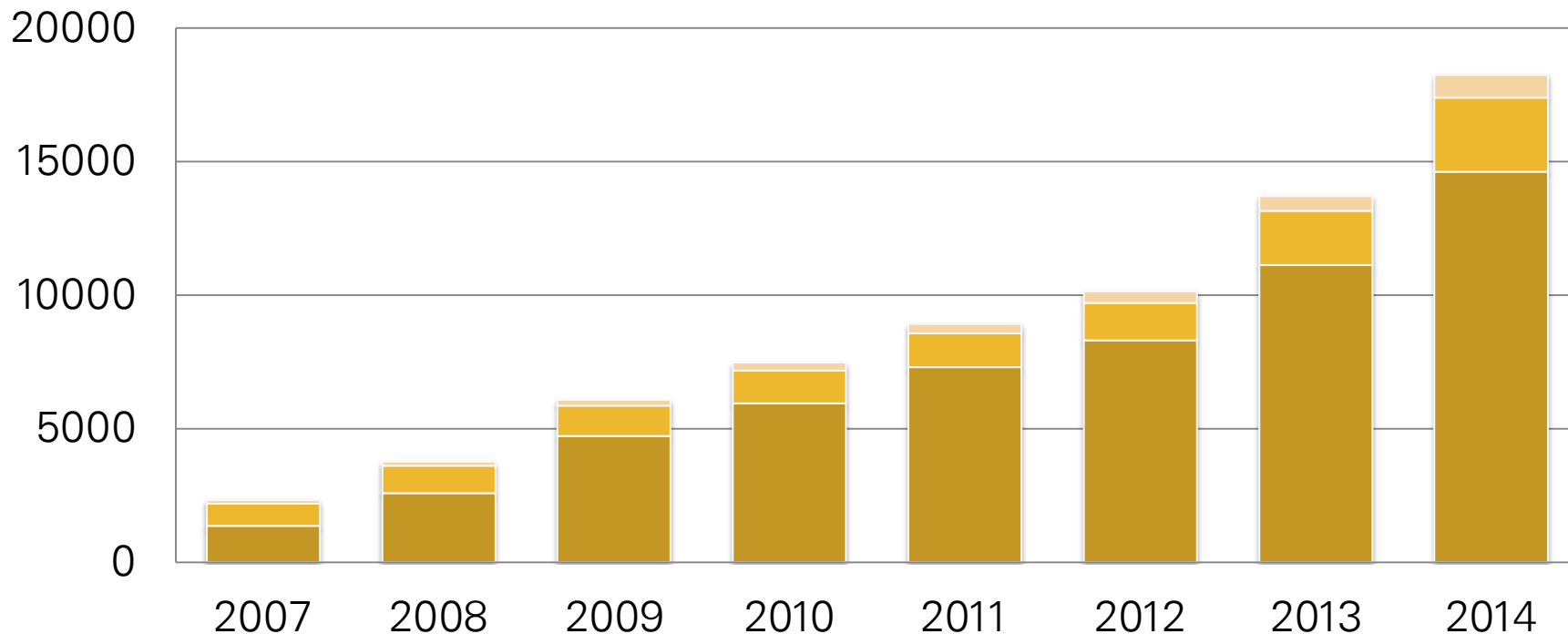
- Network and exchange best practices with other certified professionals and NI engineers
- Participate in highly technical presentations
- Get exclusive opportunities to meet with NI developers
- Take the recertification exam for free

Learn more at [ni.com/cla-summit](https://ni.com/cla-summit)

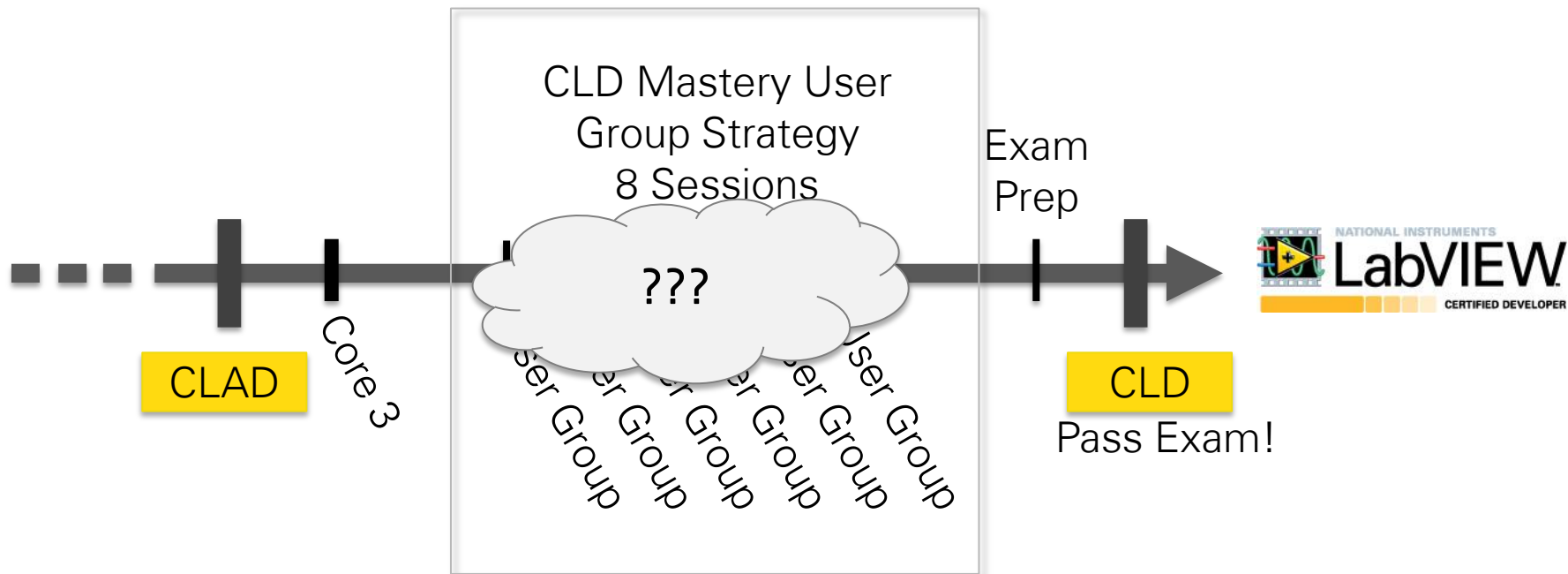
You must be certified to attend a Summit. Email [certification@ni.com](mailto:certification@ni.com) to register for an exam near you.

# Certified LabVIEW Professionals

- Certified LabVIEW Associate Developer
- Certified LabVIEW Developer
- Certified LabVIEW Architect



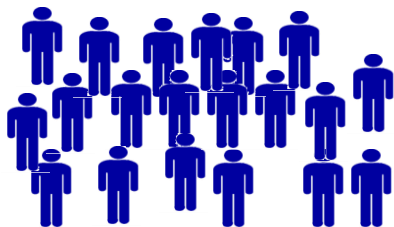
# Learning 2.0: Continuous Learning Path



# Certification Preparation

Yesterday

Numerous People



Learning 2.0

CLD Graders



# LabVIEW for Embedded Systems Certification

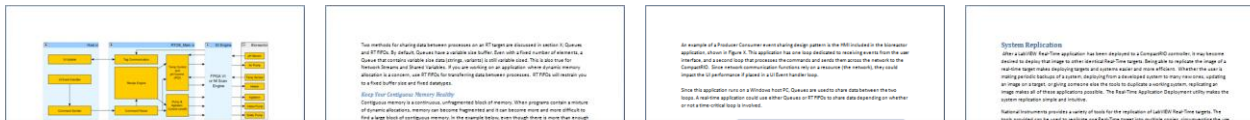
- Validate your expertise using LabVIEW Real-Time and LabVIEW FPGA
- Join over 30 existing CLEDs and attend exclusive community events
- Learn more at [ni.com/cled](https://ni.com/cled)



*"The recognition of being a CLED has gone far to place me as one of the top embedded developers in the industry; my customers are confident knowing they have one of the best solving their challenges." – Robert Mortensen, Endigit*

# LabVIEW for CompactRIO Developer's Guide

- Best practices for designing embedded control and monitoring systems with LabVIEW
- Recommended architectures and frameworks
- Downloadable example code throughout



## 2014 Update: Motion & vision, FPGA simulation, Linux RT and Industrial Protocols





# Next Sessions

## Next Sessions

09:30 – 10:15

Personalizing the LabVIEW  
Environment to Accelerate  
Productivity

Software Engineering Best  
Practices for LabVIEW