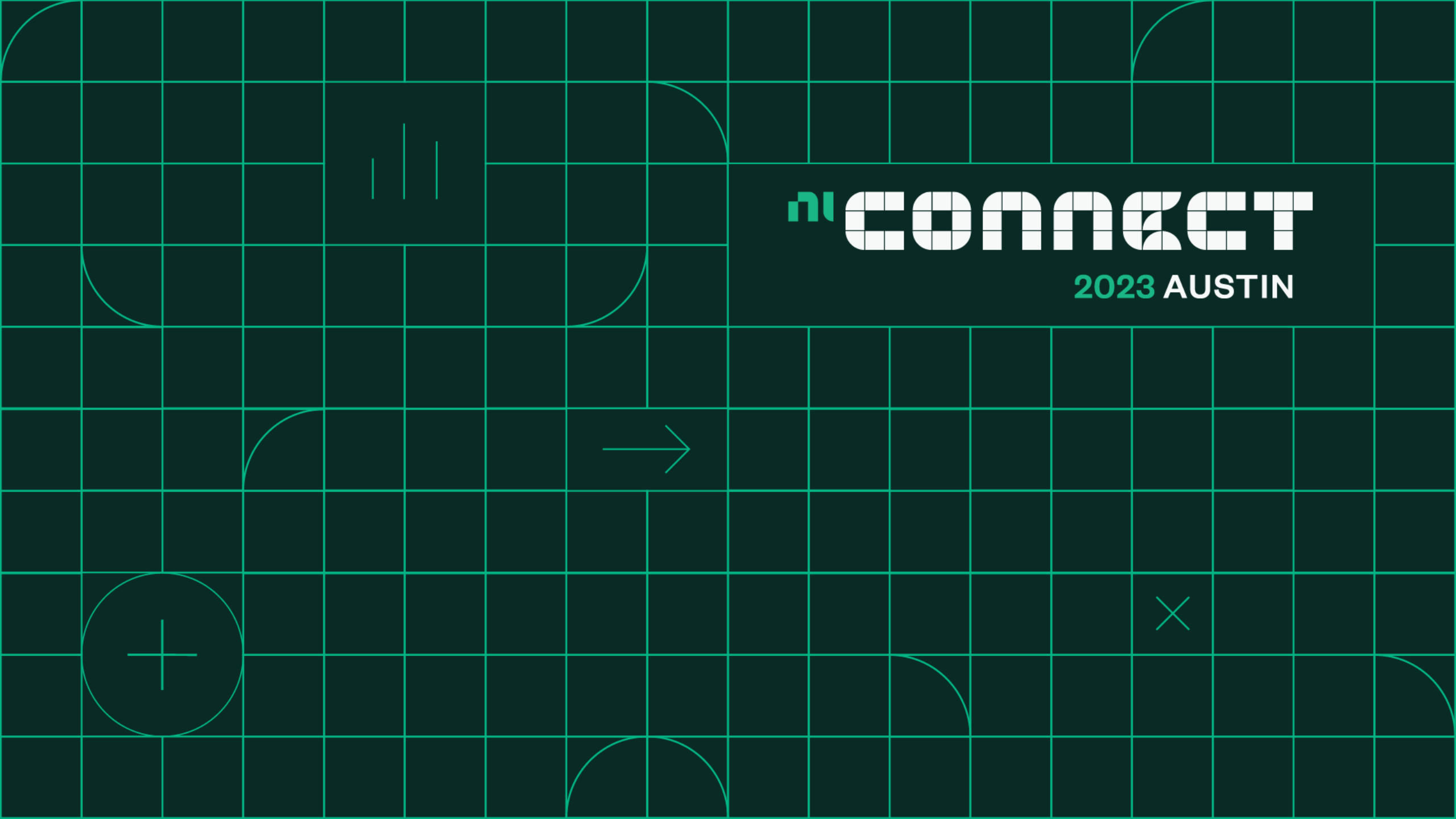

CONNECT
2023 AUSTIN

# How to Build a MeasurementLink Plug-in

Cristina Fuentes-Curiel
Ryan Friedman

- What is MeasurementLink?
- Why MeasurementLink?
- Overview of MeasurementLink Architecture
- LabVIEW Walk-through
- Python Walk-through
- MeasurementLink Roadmap

# The Right Tool for the Right Job

## Validation and Production Test Teams Deliverables

Implement Test Plans
Automate Test
Execute Test
Gain Test Results
Scale Testing And Measurements

## The Right Framework Will Speed Up Overall Test Time

- Helps create efficient, reusable, and maintainable automation test.
- Standardize across teams with guidelines and coding standards
- Provides efficient debugging capabilities and decreases correlation issues

## A Software Framework for Automation Test is Crucial

***But what does it take to build a DIY system?***

- Data Management and Visualization
- Support for Language Interoperability
- Hardware Support from Multiple Vendors
- Support for Various Coding Standards
- Interactive Tools
- Automation Tools
- Reporting Tools
- Drivers
- Data Handling Methods
- Object Repositories
- Test Results Storage
- APIs

# Development, Deployment, Maintenance, and Support *Just to Keep Operating*

**Engineers need to…**

Design the Architecture

Build and Test the Framework

Document the Framework

Maintain the Framework

Structure, Organization, & Set Up for Source Control

**Custom or More Complex Needs**

Language Interoperability

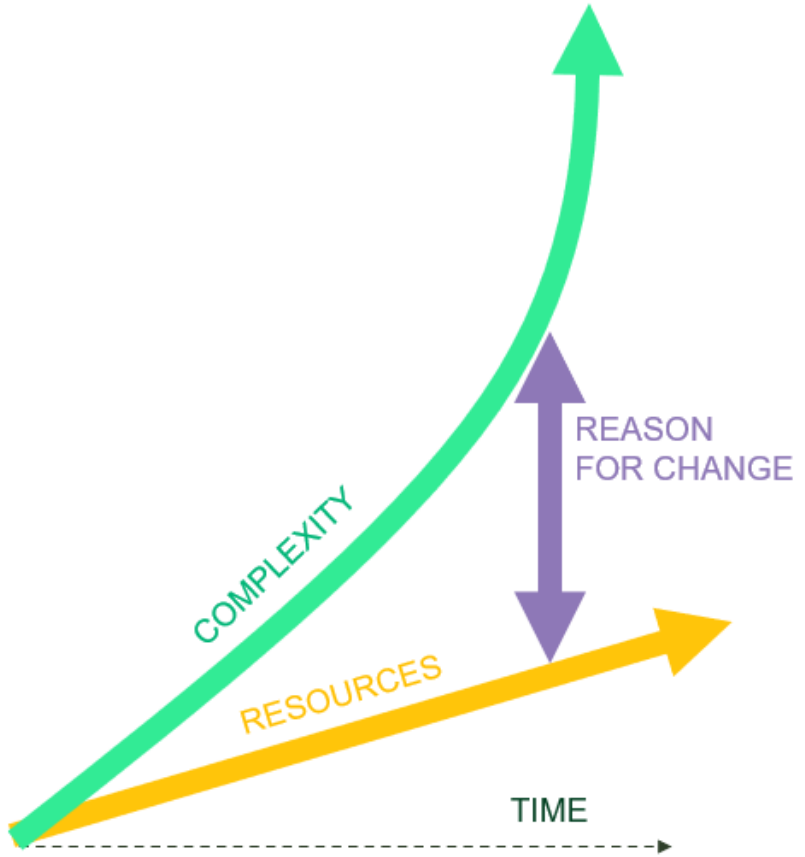
Hardware integration from multiple vendors

Custom User Interfaces for different users

Logging & Reporting Mechanism

Integrating various COTS and DIY solutions

# The Gap Between Test Complexity and Resource Availability Keeps Growing



# MeasurementLink | Connected Workflow for Test and Measurement

## Traditional Workflows

Different frameworks across multiple teams that must be developed, deployed, maintained, and supported.

- Expensive to maintain multiple frameworks
- Duplicate IP and tools built for incompatible architectures
- Challenges for language interoperability between teams

**Product Team A**

- Custom Sequencer A
- DIY Debugging Tools
- Measurement IP
- Custom DUT Control

**Product Team B**

- Custom Sequencer B
- Measurement IP
- Ad Hoc Test Script
- Manual Test Bench

WORKFLOW TRANSFORMATION

## MeasurementLink

Out of the box framework that connects interactive measurement, test automation, and debugging workflows.

### Product Team A and B Connected Workflow

Share Measurements Without Sharing Languages Across Teams

Use NI and 3rd Party Hardware

# MeasurementLink User Workflow

MeasurementLink connects **interactive measurement, test automation, and debugging** workflows for validation and production test engineers using the same measurement IP across the flow.

Bring-up → Manual Test → Automated Test → Reuse

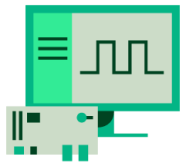
Program measurement in:

Use **pre-built** plug-in/add-on

Ex. Power Validation Add-on

Instrument Studio™

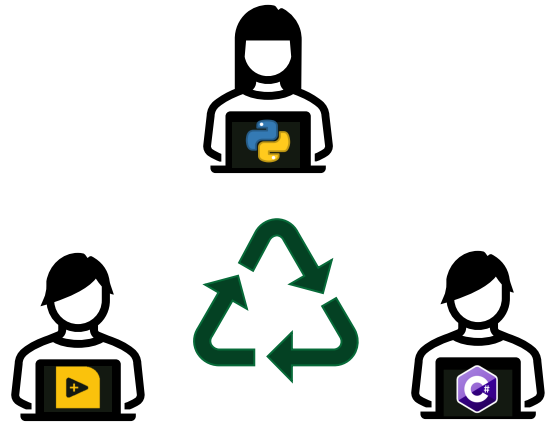
Used for **Interactive** Measurement Interface



TestStand™

Used for **Test Sequencing** & **Automation**

Interactive Debugging



**Integrate** hardware and software from any vendor in any language

**Simplify** the validation workflow for improved efficiency

**Save time** by reusing measurements regardless of programming language

# Connected Workflow Between InstrumentStudio And TestStand

### Copy-Paste Measurements From Bring up to Automation

Copy measurement configurations with one click in InstrumentStudio and paste with one click to TestStand as a test step.

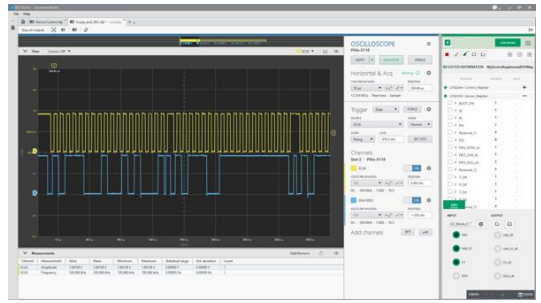
### Interactive Debugging

Debug TestStand automation steps by setting a breakpoint and using the Measurement UI in InstrumentStudio to run the measurement manually. Adjust measurement configurations to see real time changes in TestStand.

### Measurement Monitoring and Tracking

Monitor Measurement UIs while TestStand is running test steps. Track where last measurement was run from in the InstrumentStudio panel for easy traceability.

Instrument Studio™



INTERACTIVE MEASUREMENTS

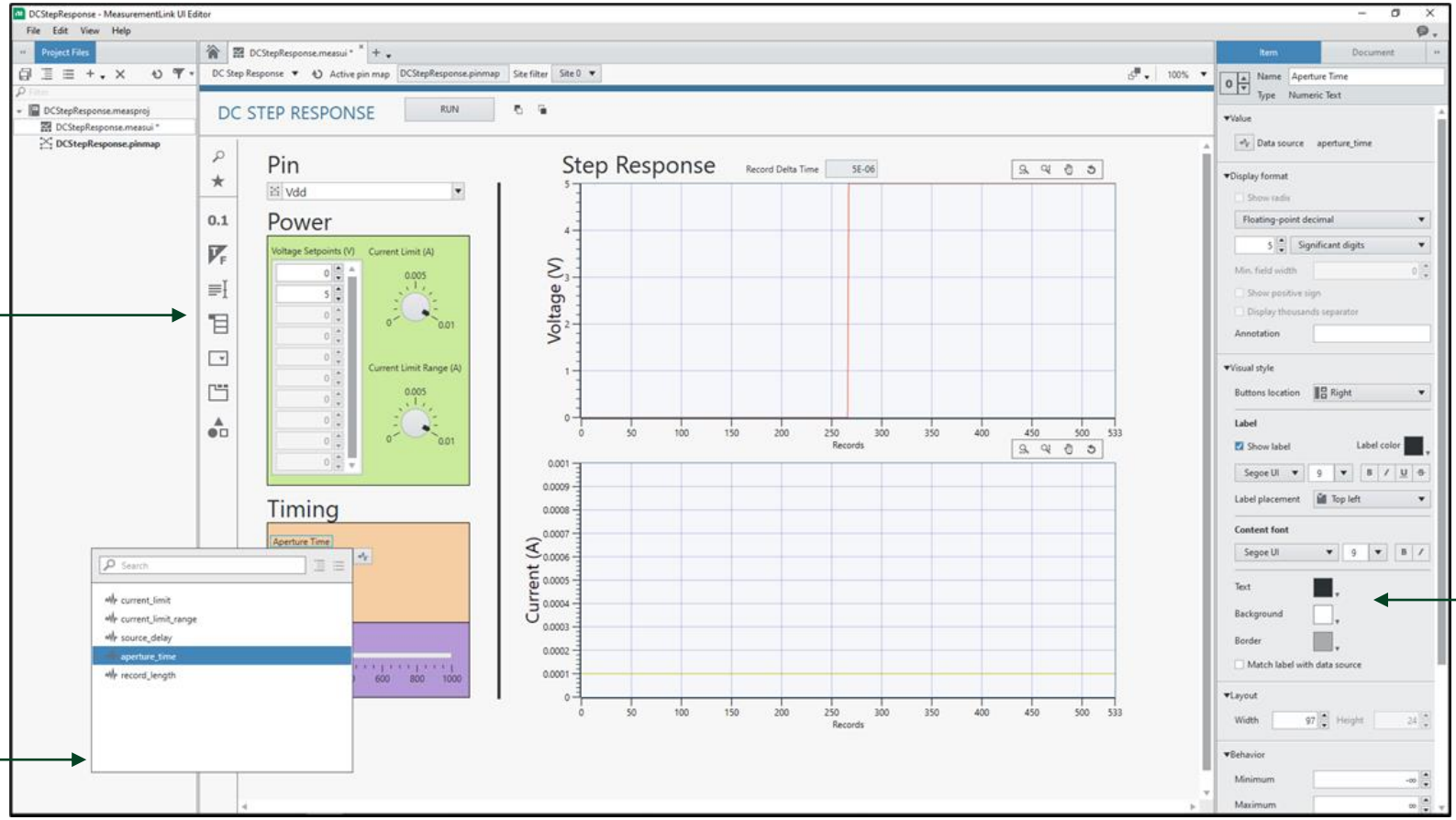
TestStand™


TEST AUTOMATION

# Drag And Drop Tools To Build User Interfaces

Drag and drop icons for Python, LabVIEW and other languages

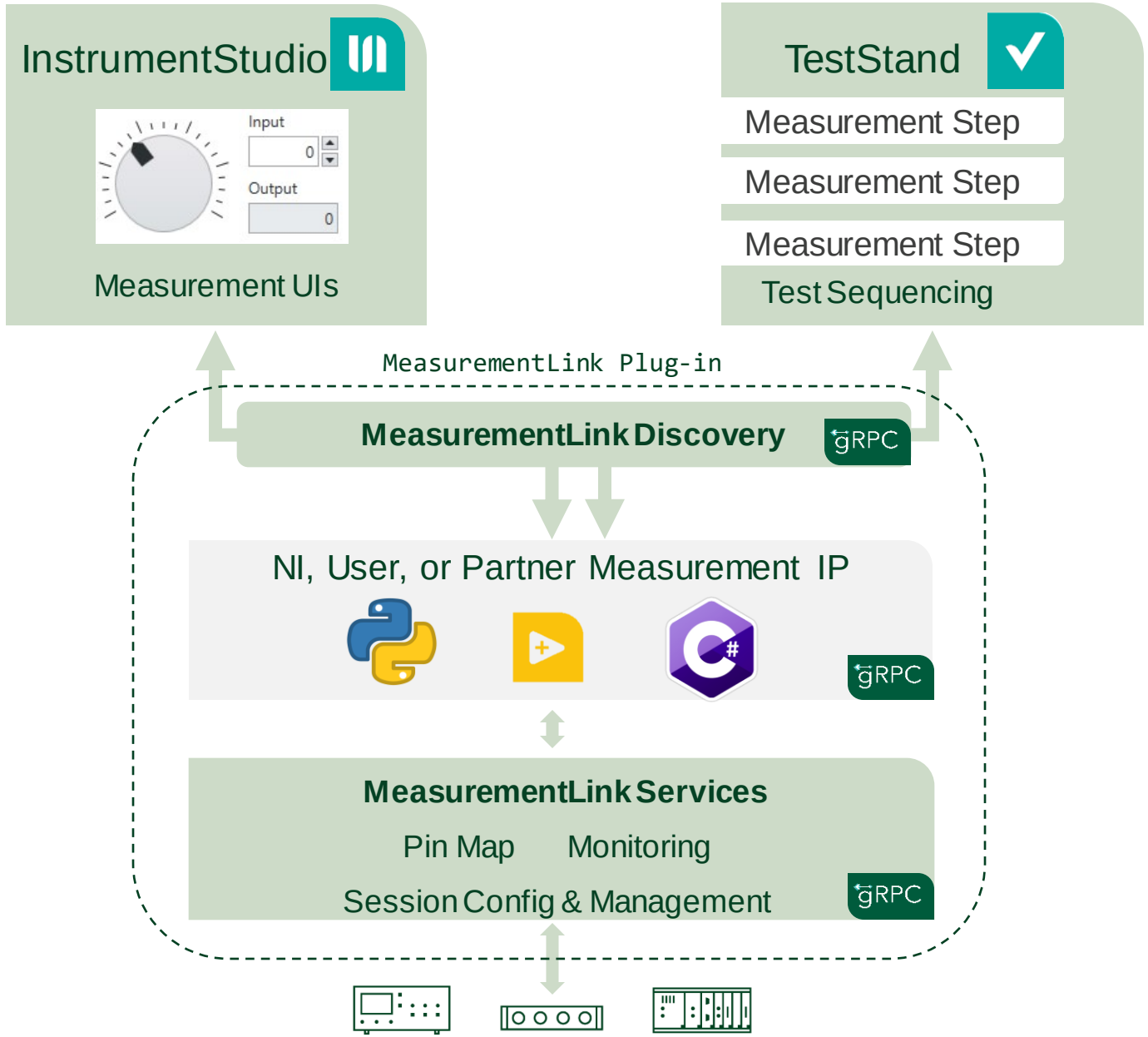
Automatically detected variables from measurement IP




Save UI with measurement IP for interactive debugging

Tools to customize text and colors

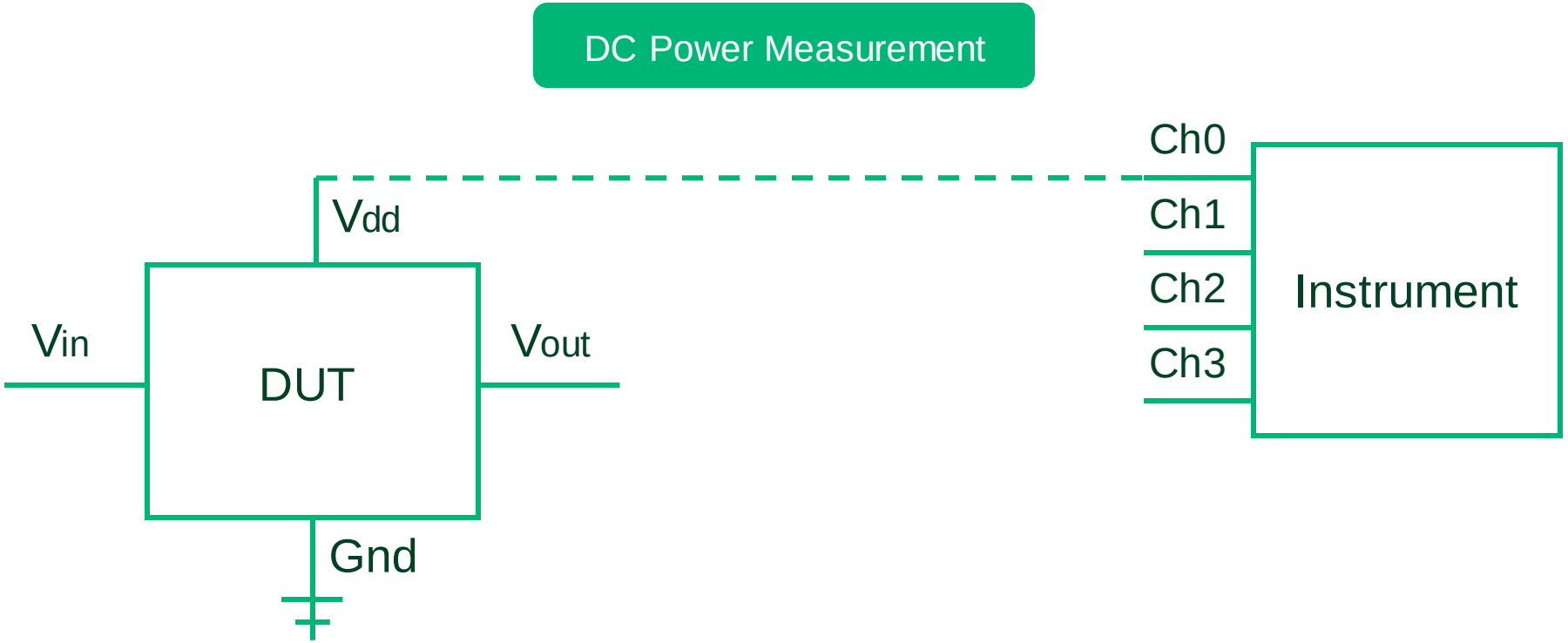
# MeasurementLink Architecture



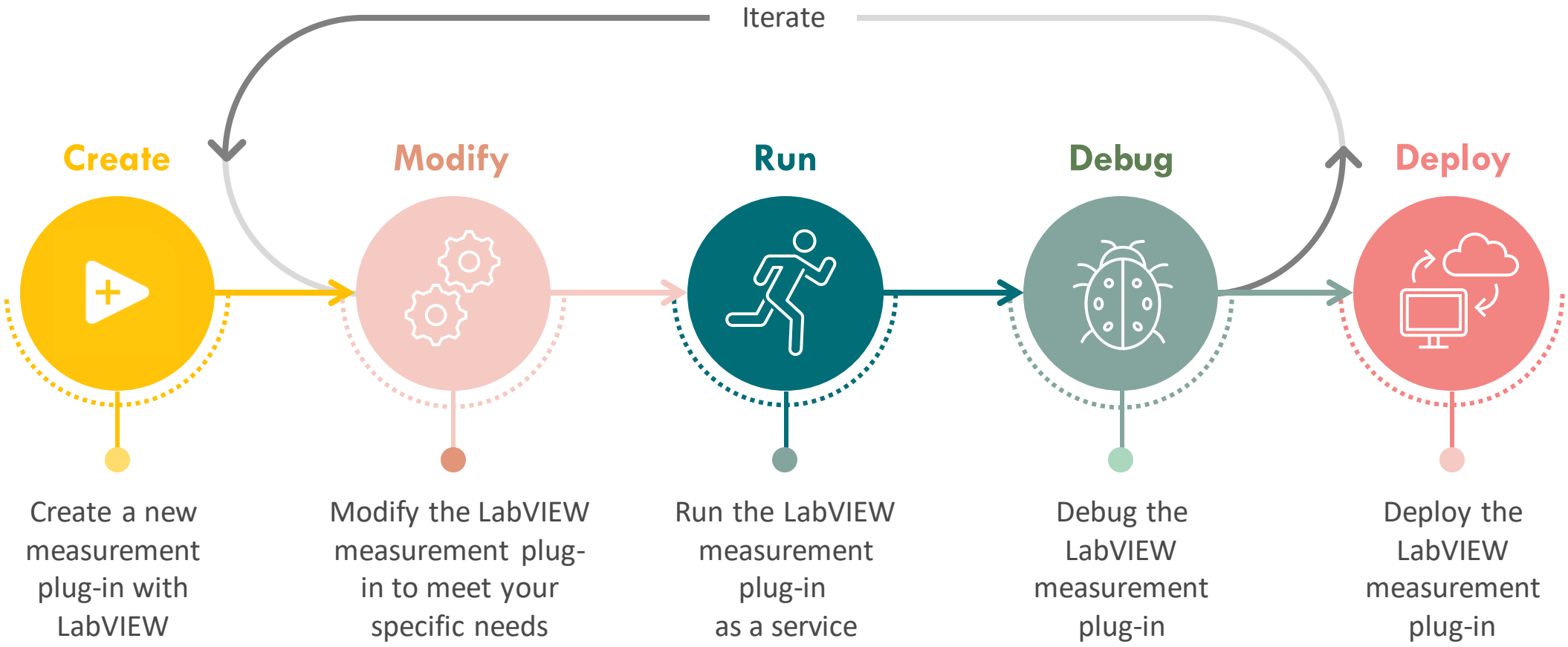
# Why Write MeasurementLink Measurements

- NI is prescribing how to write code
  - Out-of-the-box framework
- Pick a language and write your measurement
  - Used in InstrumentStudio and TestStand
- Write measurement once, get value in the future
  - Existing IP can be reused
- Future updates will provide optimizations to accommodate new workflows
- Invest in an ecosystem that will continue to provide value
  - We listen to customer feedback for new features

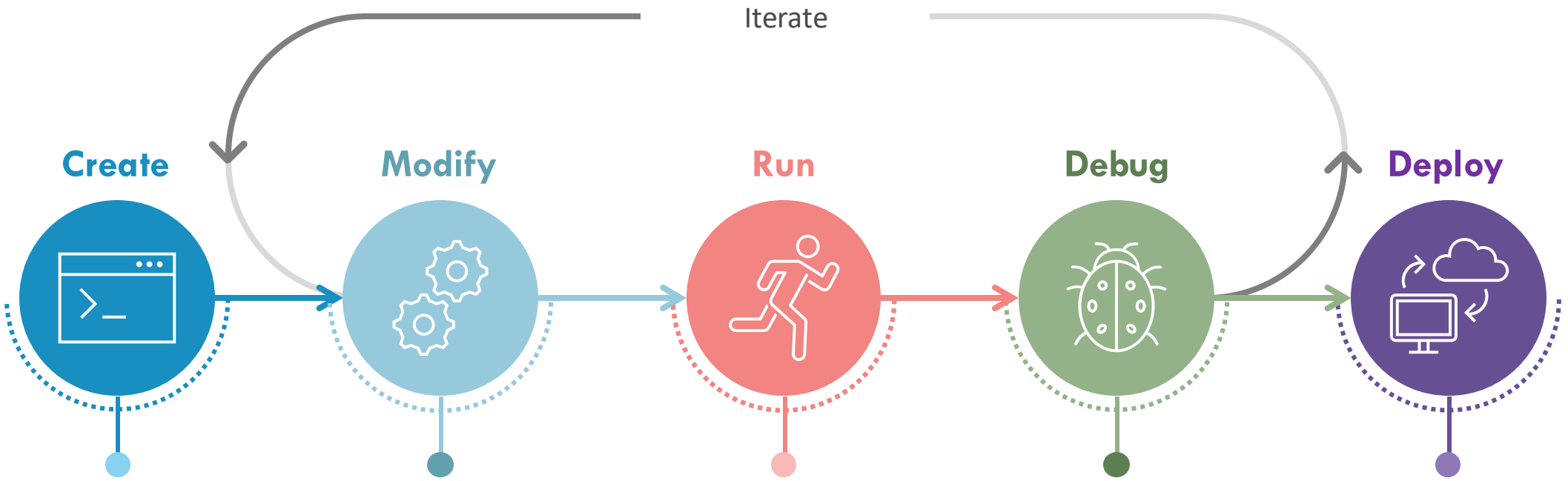
# Running a Measurement Interactively and Automatically



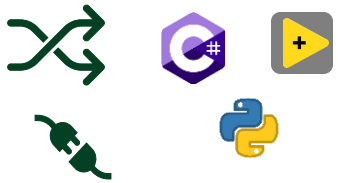
# Developing a Measurement Plug-In with LabVIEW



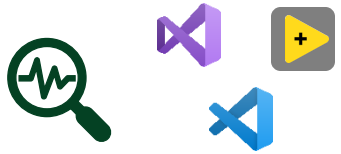
# Developing a Measurement Plug-In with Python



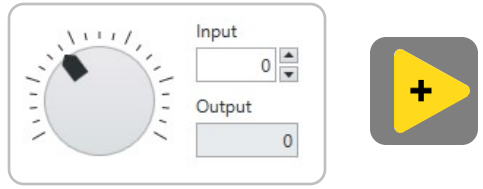
# MeasurementLink - Key Highlights



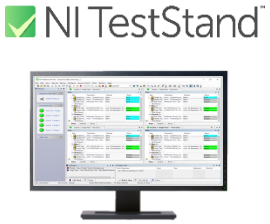
Language agnostic



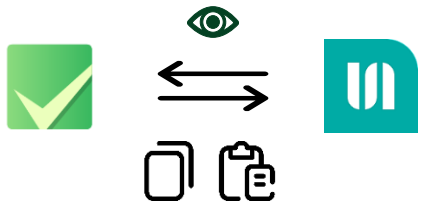
Allows debugging in the native IDE




Building interactive Measurement UIs



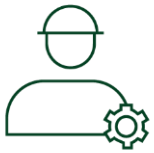

Support for automation using TestStand



Intuitive automation monitor control & quick transfer of configuration

Hardware session management across the tools

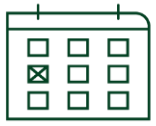
# MeasurementLink Investment Areas



Simplified Test Software Maintenance

Rapid Interactive to Automated Measurements

Ready-to-use Measurement Software Offerings



Integration with Asset Management & Test Planning Tools

Validation-through-Production Efficiency

Migration Path to Cloud-based Test Architectures

# MeasurementLink Roadmap – 2023 Q2

Software framework connecting interactive measurement, test automation, and debugging workflows for validation and production test. Access the latest improvements with an active subscription.

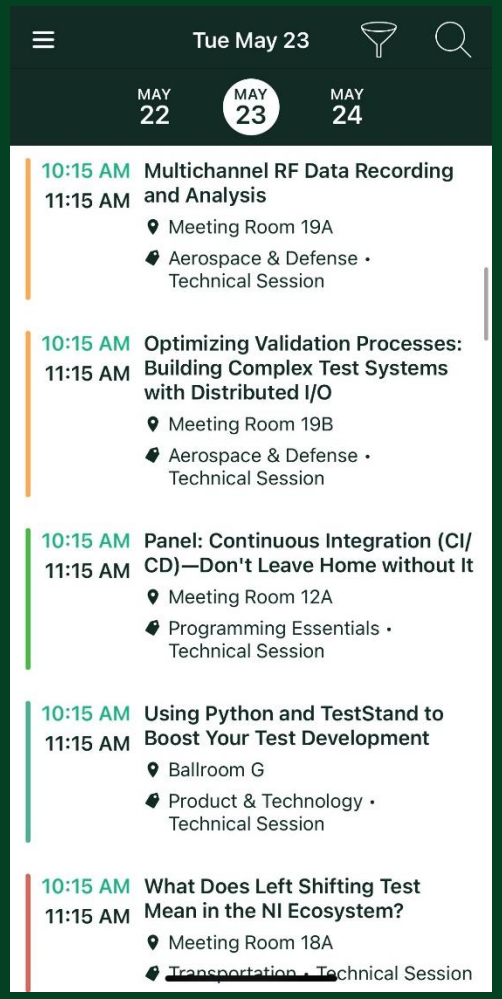
| Capability | Next Release | Next 2-3 Releases | Future Development |
|---|---|---|---|
| **Interactive Workflow** | | | |
| Control updates during long measurements | ✓ | | |
| Measurement composer | | | ✓ |
| Connected workflow between InstrumentStudio and TestStand | | Shipped – 2023 Q1 | |
| **Automation** | | | |
| Simple sequencing within a single application | | ✓ | |
| Parallel testing | | | ✓ |
| Out-of-the-box measurements | | | ✓ |
| Hardware Session Manager – NI and 3rd party hardware and software | | Shipped – 2023 Q1 | |
| **Development** | | | |
| Python DAQmx driver APIs and long measurement support | ✓ | | |
| C# plug in templates | | ✓ | |
| Measurement organization, tree hierarchy and meta data search | | ✓ | |
| Package and deploy tools, package and share measurements, remote measurements | | | ✓ |
| No-code measurement UI builder | | Shipped – 2023 Q1 | |
| DUT-centric measurement API and DUT pin map | | Shipped – 2023 Q1 | |

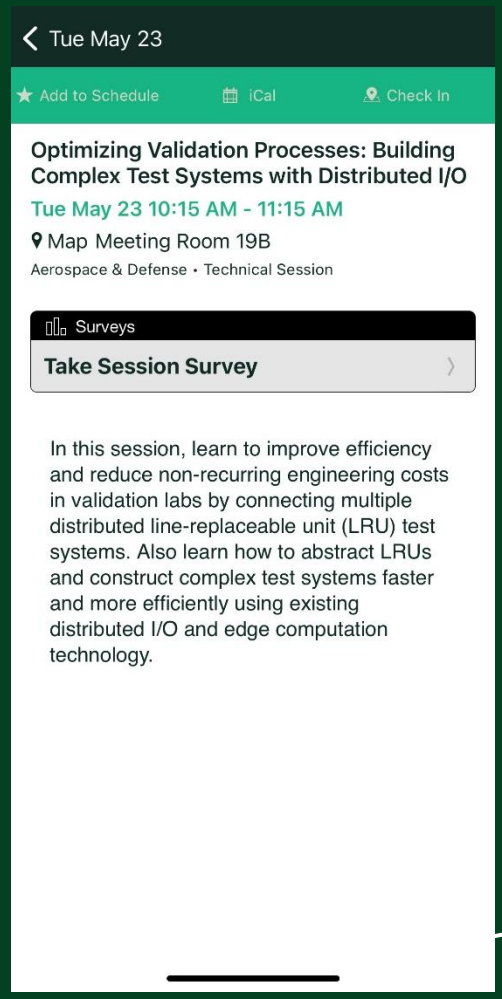
Release Cadence: Quarterly

Roadmap is a snapshot and can change based on a variety of factors, including development execution and customer input.

# Give us your feedback!
# Quick 2 Question Survey

In the mobile app, click into the session you would like to provide feedback for




Click “Take the Session Survey”

# connect