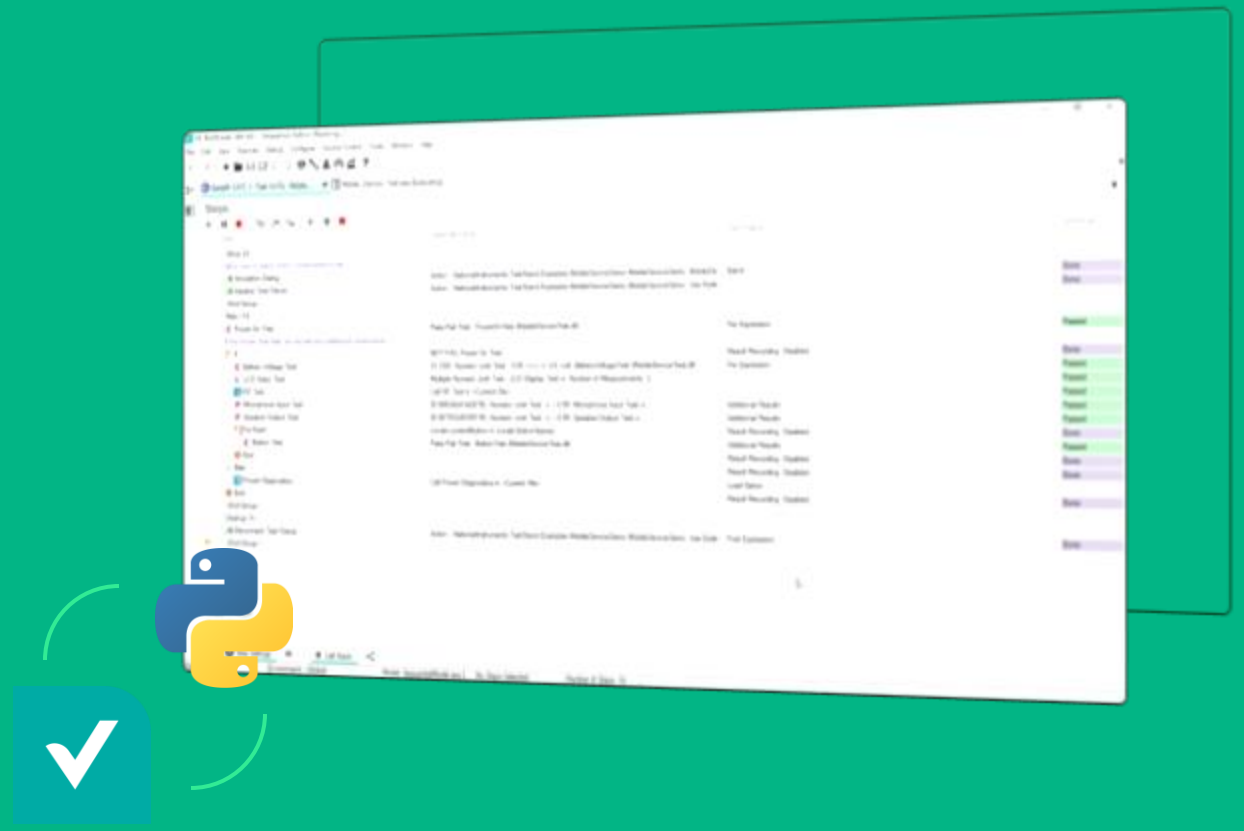
Using Python and TestStand to Boost Your Test Development

David Prida
Jack Arnold



Agenda

- Introduction
- Capabilities of the Python Adapter
- Demos of the Latest Features
  - Python Steps
  - Debugging in VisualStudio Code
  - Namespace Support
  - Improved Information Display
- Q&A

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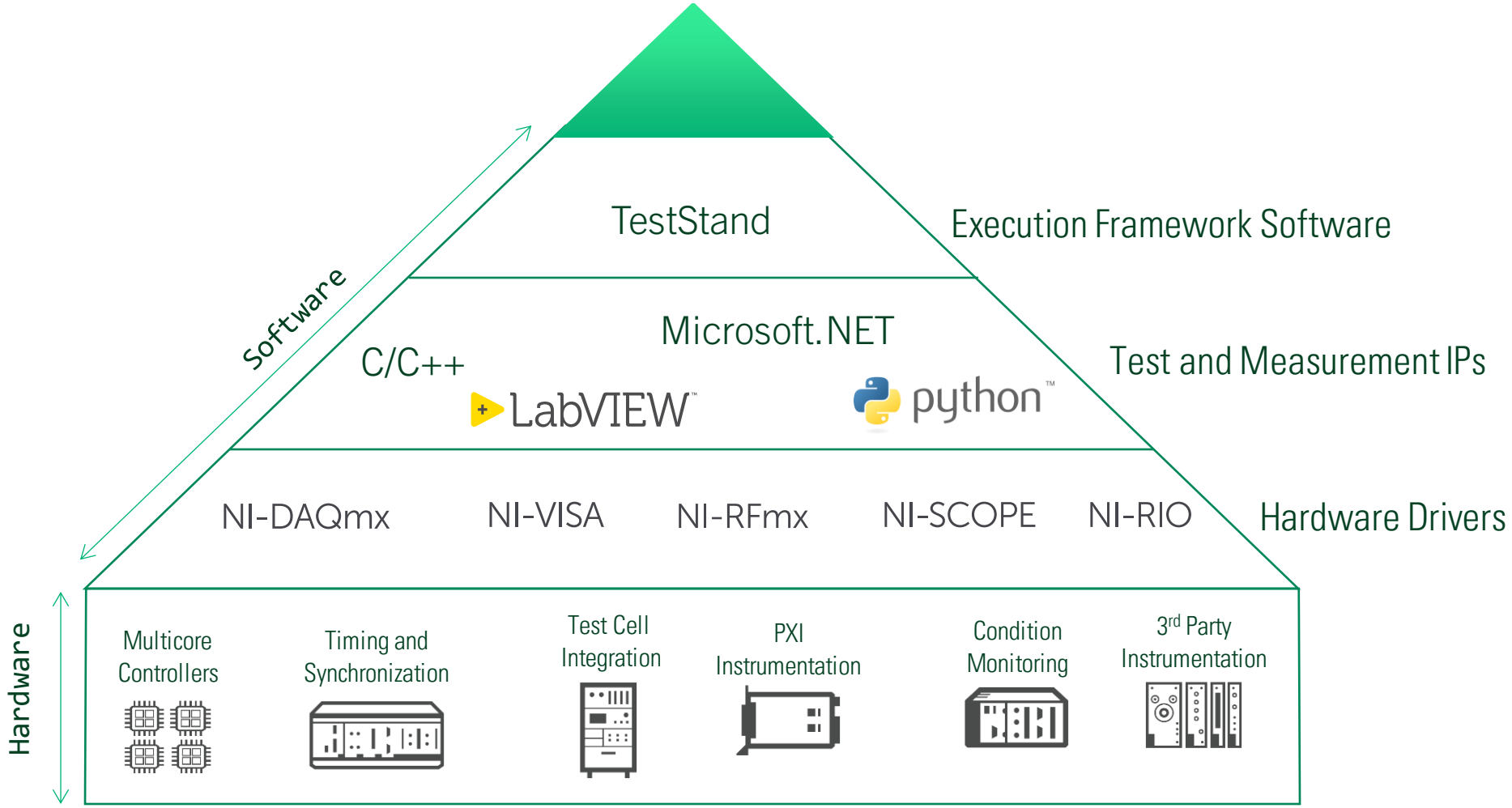
Let’s ask the audience

Architecture of an Automated Test System



NI SOLUTION

TestStand

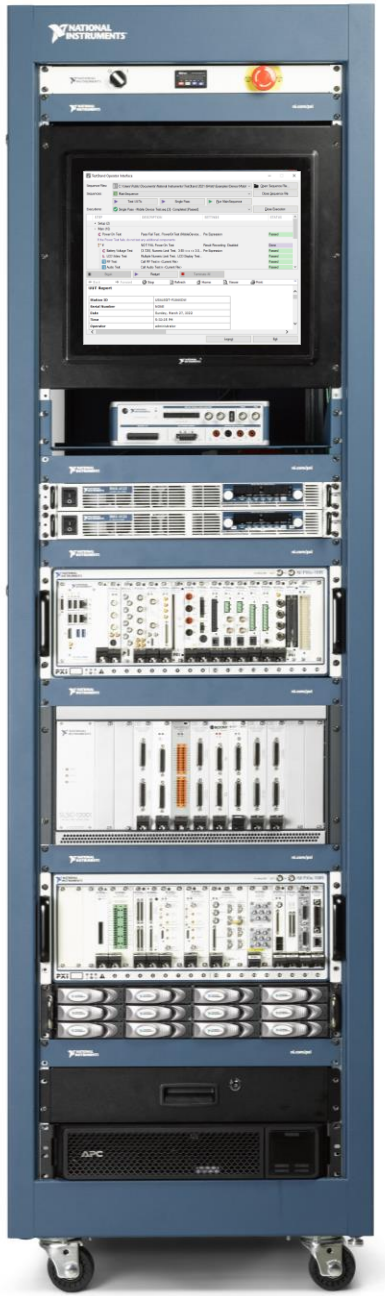
Create, execute and debug test sequences

Re-use test code from LabVIEW, Python, C/C++, .NET, or other programming language

Increase throughput with parallel testing

Automate reports and store to your local or network databases

Deploy to all of your test stations with pre-built or custom operator interfaces

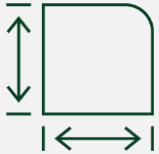


Python

Why?

Easy to Use

Popular



Versatile

Available Libraries

Python in Test and Measurement

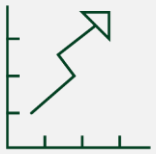
Instrument Control

Machine Learning

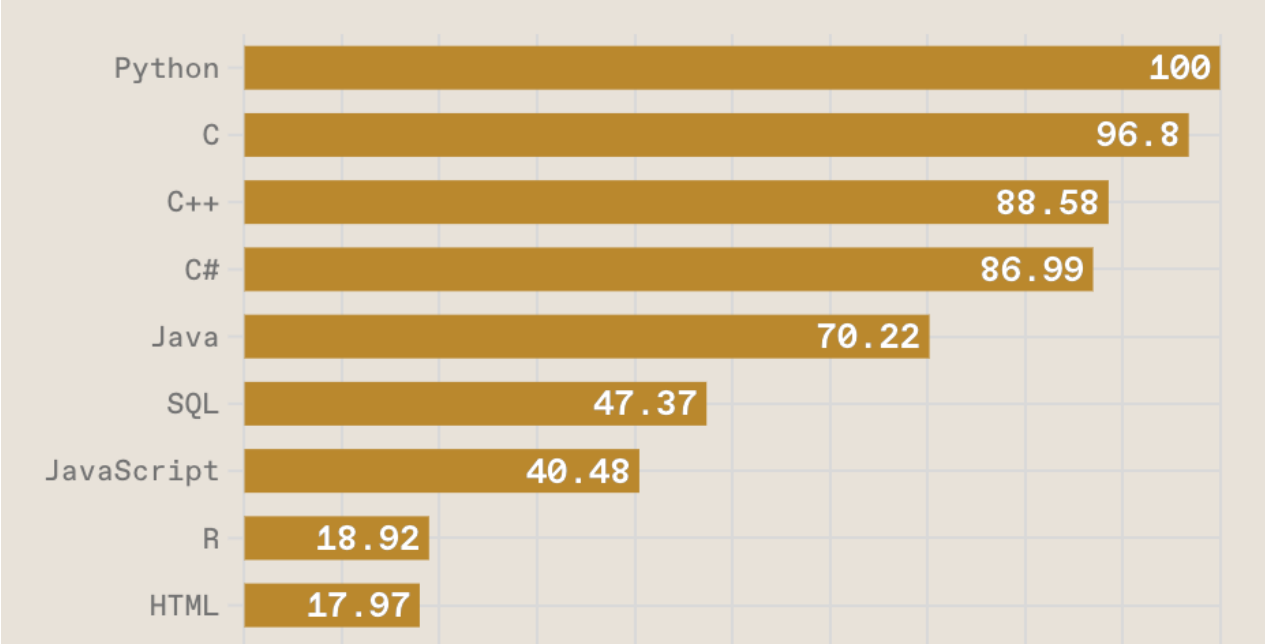
Data Processing and Analysis

Integrating with other Tools

Why are We Talking about Python?

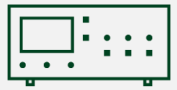


Popular



Source: IEEE

Why are We Talking about Python?



Instrument Control

Hardware

NI has developed Python wrappers for interfacing with and connecting to NI hardware. Learn more about Python compatible NI hardware in the drop downs below.

Learn more about Python compatible NI Hardware

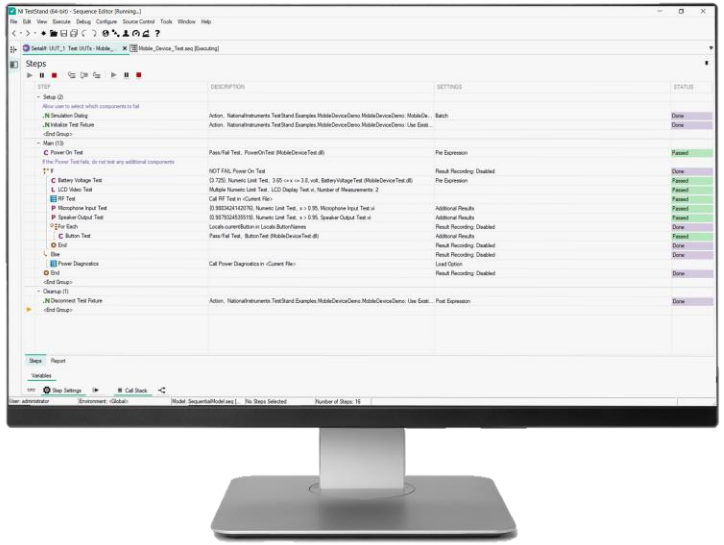
- PXI Instruments
- CompactDAQ and PC-Based DAQ Devices
- RIO Hardware
- Traditional, Benchtop Instruments

Visit ni.com/python for more information about NI Products and Python

TestStand and Python

The Python Adapter

- Support for Python virtual environments+
- Interactive debug support
- Supports different Python versions in same Sequence



TestStand 2020-21

- Pass COM objects
- Enum and array mapping
- Include or exclude container sub properties
- Visual Studio Code debugging
- …

TestStand 2022Q4

- Namespace Support
- Debugging Enhancements
- Improved Information Displayed

TestStand 2023+

- Improve performance of enumerations
- Support for Anaconda
- Support for PyCharm
- Pass default values and variable number of arguments
- And more!

+ Supports Python virtual environments created using *virtualenv* tool

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Demo: Python steps in TestStand

Using Python in our testing is increasing and we have leveraged TestStand's Python adapter to reuse our Python test IP and the extensive libraries Python offers from within TestStand

Franz Josef Asel

Senior Validation Engineer and
Software Architect, ams OSRAM

Namespace Support

Introduced in TestStand 2022 Q4:

- Support for using namespaces when loading Python modules

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Demo: Namespace Support

Improved Information Displayed

Introduced in TestStand 2022 Q4, with the Jedi package, TestStand can now display additional Python elements used in your code modules:

- Inner Class
- Base Class methods and attributes
- Classes, attributes, and functions in current Namespace

* Requires *Jedi* package to be installed in the machine

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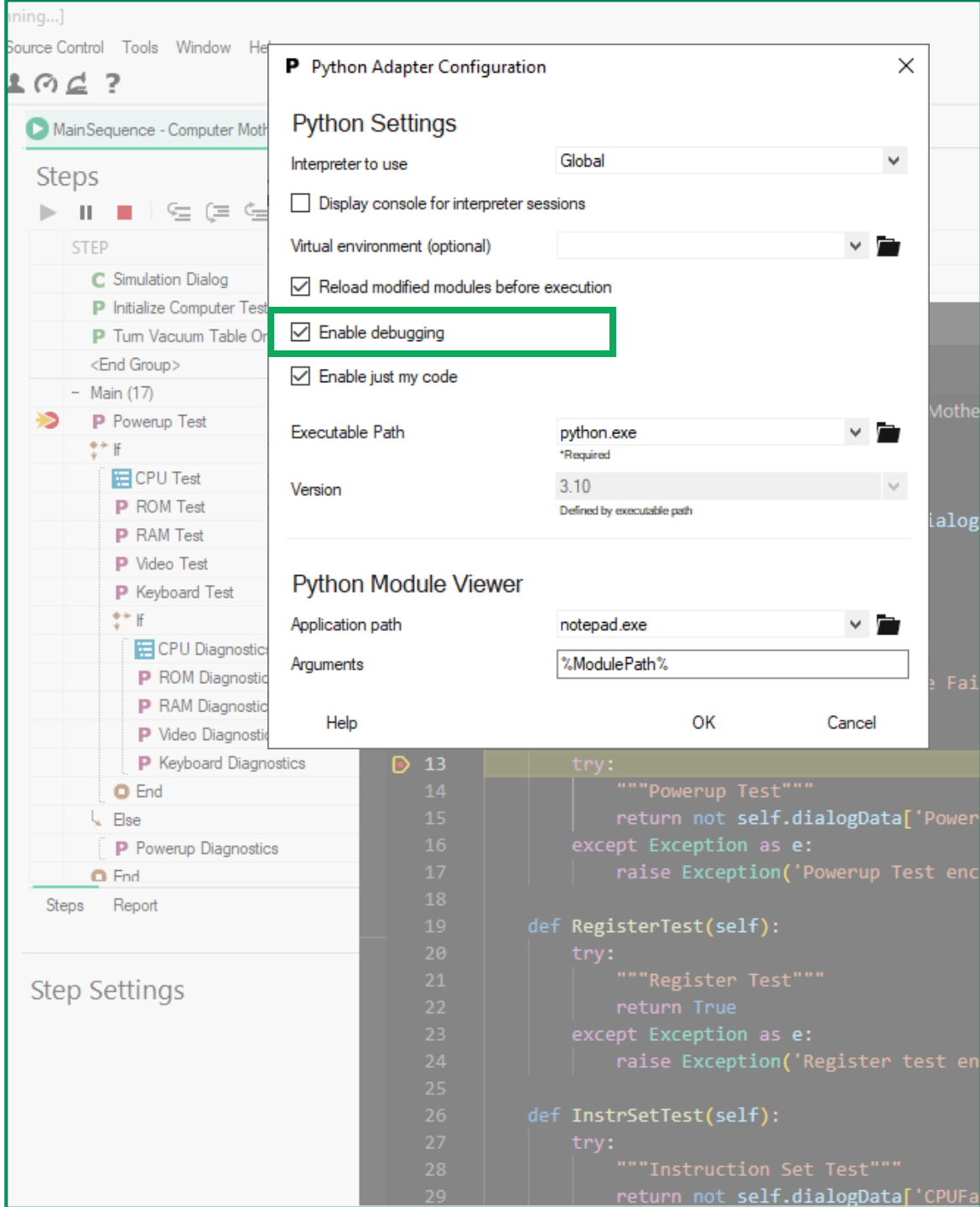
Demo: Improved Information Displayed

Python Module Debugging

Introduced in TestStand 2021 SP1:

- Support for stepping into debugging of Python modules
- Debugging support through Visual Studio Code



* Requires additional one-time setup in the machine

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Demo: Step-into Code Module

ams OSRAM

The debugging capability provided in the Python adapter in TestStand has enabled our validation engineers to seamlessly debug Python modules. This is a great addition to the Python adapter in TestStand.

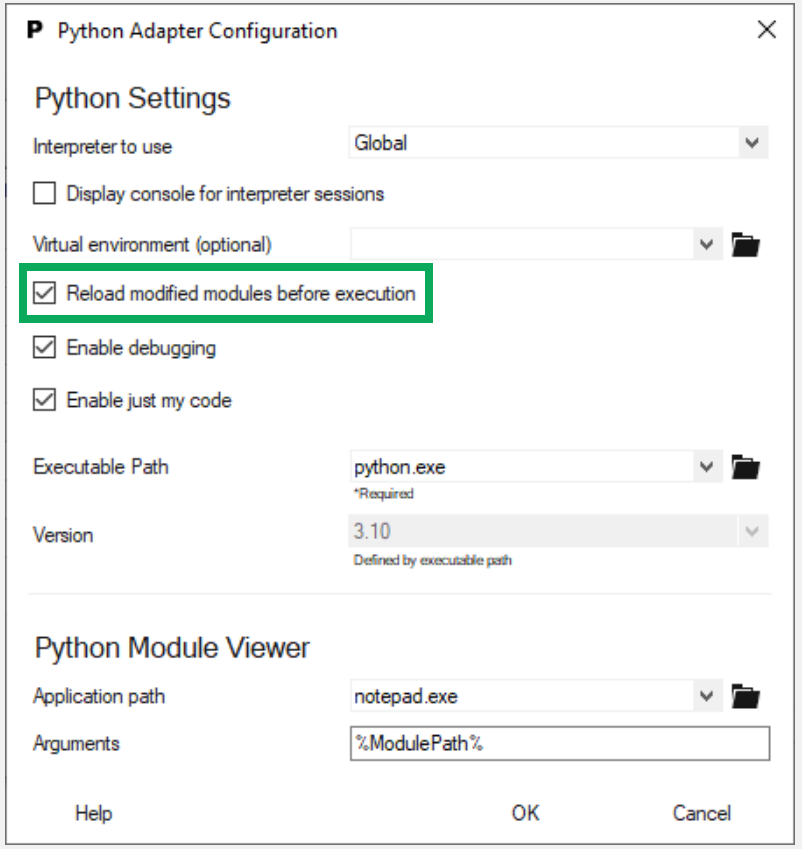
Franz Josef Asel

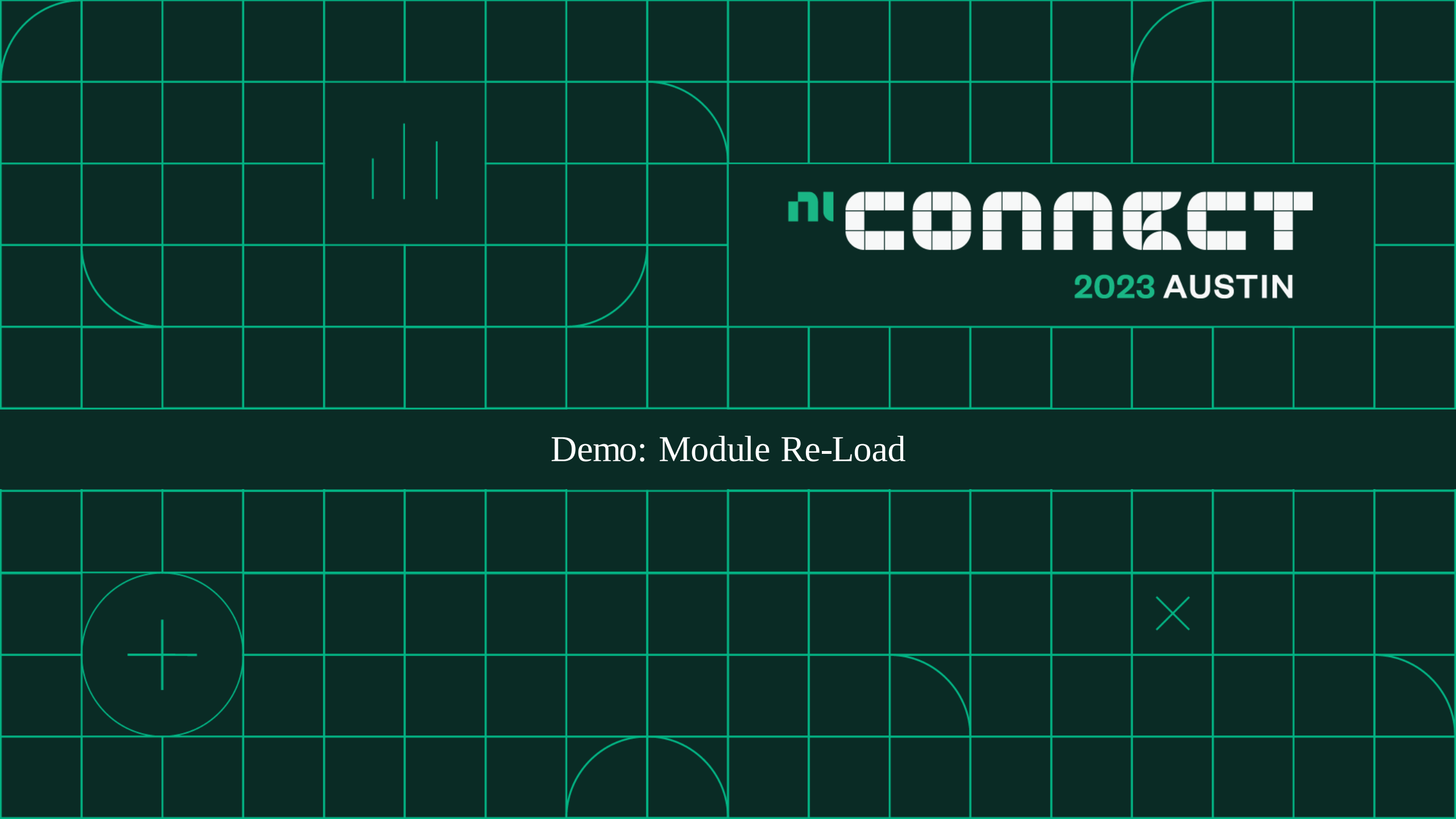
Senior Validation Engineer and
Software Architect, ams OSRAM

Improving Python Debugging

Introduced in TestStand 2022 Q4:

- Configuration of the Python Adapter to allow updates to code modules during execution
- TestStand will reload an updated Python module without unloading other modules or restarting TestStand execution





Demo: Module Re-Load

The TestStand to Python workflow has become efficient to use with debugging options and automatically loading the python files whenever there is an update to it. Thank you, NI for enhancing TestStand based on the feedback from our framework users.

Arvind Balachandran

Project Manager, Soliton

TestStand Roadmap [Python]

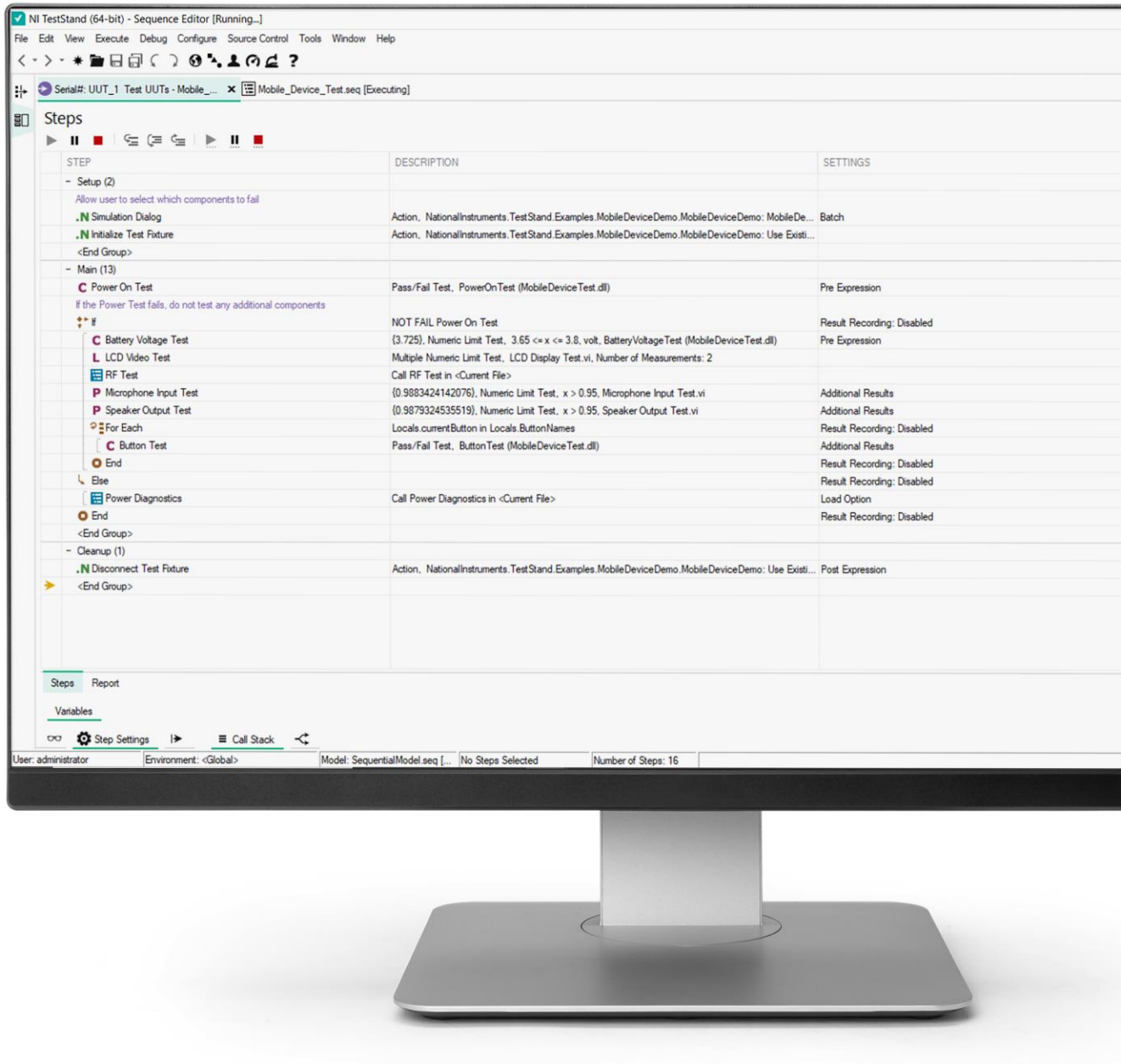
Capability	Next Release	Next 2-3 Releases	Future Development
Interoperability - Python			
Improve performance of enumerations	✓		
Support Anaconda distribution and virtual environments		✓	
Pass default values and variable number of arguments			✓
Support PyCharm IDE for debugging Python code		✓	
Improve performance when passing large set of function parameters			✓

Resources

ni.com/TestStand

Training:

- Developing Test Programs Using TestStand
- Architecting Test Systems with TestStand



Other Relevant Sessions:

- Software Hands-On: Leverage Interoperability between NI's Software to Drive Standardization across Workflows – PART 1
  - Tuesday, 10:15 AM, Ballroom E
  - Wednesday, 10:30 AM, Ballroom E
- Continuous Integration with LabVIEW and TestStand
  - Tuesday, 3:15 PM, Meeting Room 19B
- DQMH and TestStand
  - Tuesday, 2:00 PM, Meeting Room 12B

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Q&A

Thank You