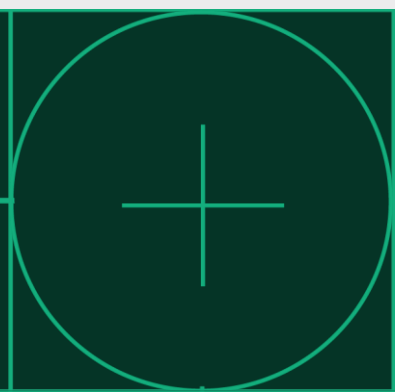




What's New in LabVIEW

Kiran Nagaraj
Christina Rogers



Agenda

1. Evolving NI Test Software
2. LabVIEW 2024 Q1 New Features
3. Sneak Peek: LabVIEW 2024 Q3
4. LabVIEW Roadmap



Kiran Nagaraj
LabVIEW Product Manager



Christina Rogers
LabVIEW Product Owner

The Pace of Change Is Faster than Ever

Organizations Must Rethink Product Innovation or Risk Falling Behind



Societal Impact

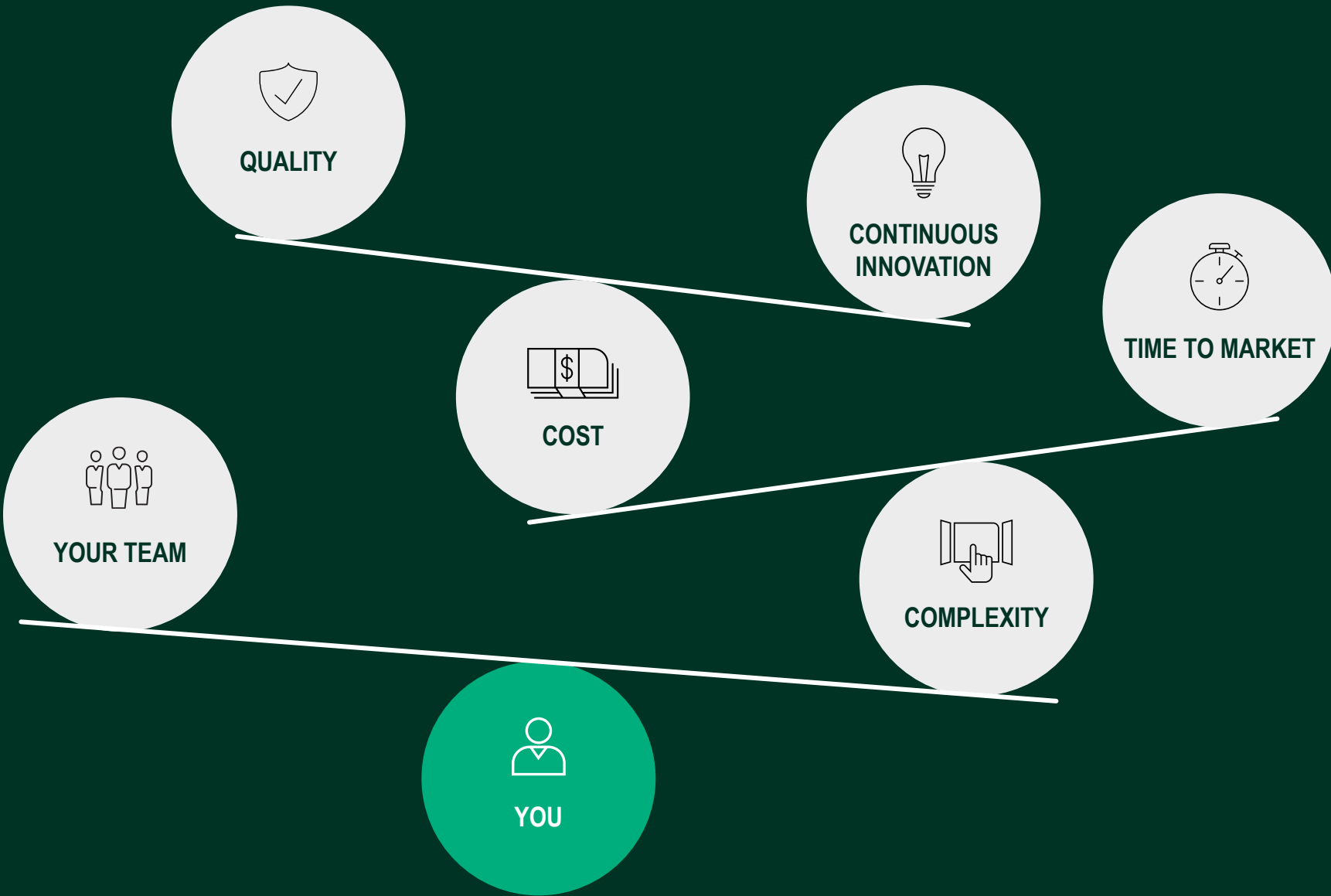


Technological Advancement



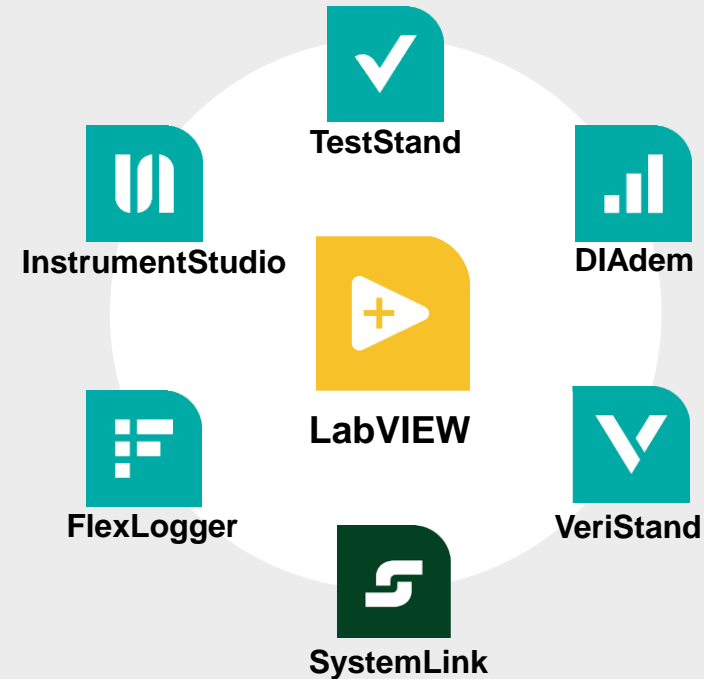
Evolving Business Models

Test Organizations
Must Balance
Competing
Requirements



Evolving NI Test Software

Enable Automated Test & Measurement Professionals



1 Strengthen LabVIEW

Deliver new capabilities in **LabVIEW & NI Software** to meet the evolving requirements of applications and users

2 Connect LabVIEW+

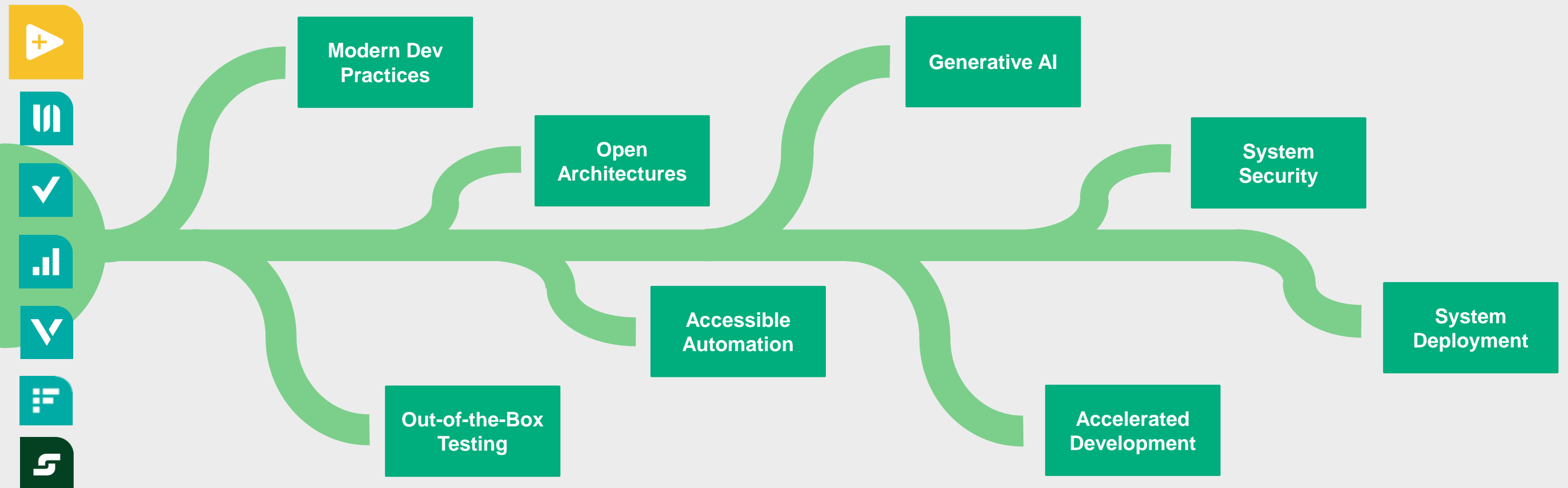
Bridge seamlessly between tools, tasks and teams to accelerate the productivity of test professionals

3 Build Community

Engage and collaborate with the community to empower their continued success

Strengthen LabVIEW

Deliver new capabilities in **LabVIEW & NI Software** to meet the evolving requirements of applications and users

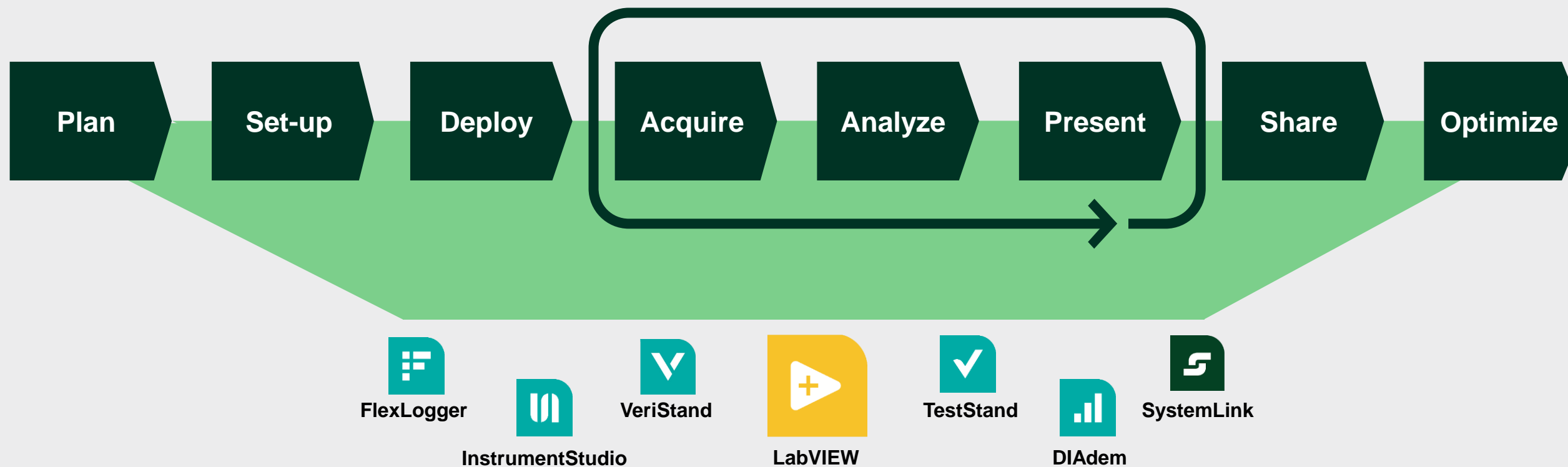


Connect LabVIEW+

Bridge seamlessly between tools, tasks, and teams to accelerate the productivity of test professionals

LabVIEW is a graphical programming environment that accelerates test and measurement application development.

LabVIEW+ brings together a comprehensive & connected suite of software, including LabVIEW, it delivers high-level development across test workflows.



LabVIEW 2024 Q1

[January 2024]

- Toolkits and modules
- Managing dependencies
- New VI functionality

Toolkits and Modules

Toolkits as Version-Independent Add-ons

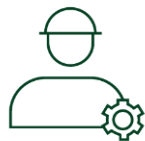
Addresses long-standing pain points around upgrading:



I need to update all my toolkits and drivers since I updated LabVIEW versions



It takes time and effort to install new drivers even when I don't have a change in my hardware set-up



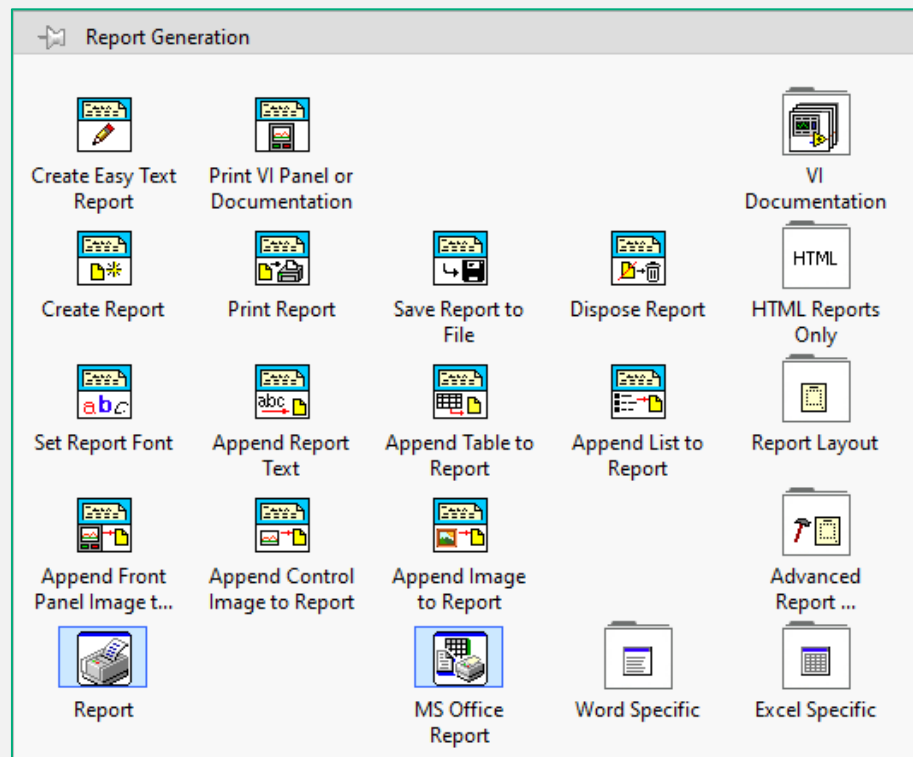
Revalidation efforts for existing applications take longer when toolkits and drivers are updated

- Drivers became independent of LabVIEW versions in 2022 and 2023
- Many toolkits now also install in a way that's not tied to a specific version of LabVIEW
- Allows you to upgrade to newer LabVIEW versions without requiring you to upgrade your drivers and toolkits as well

LabVIEW Toolkits

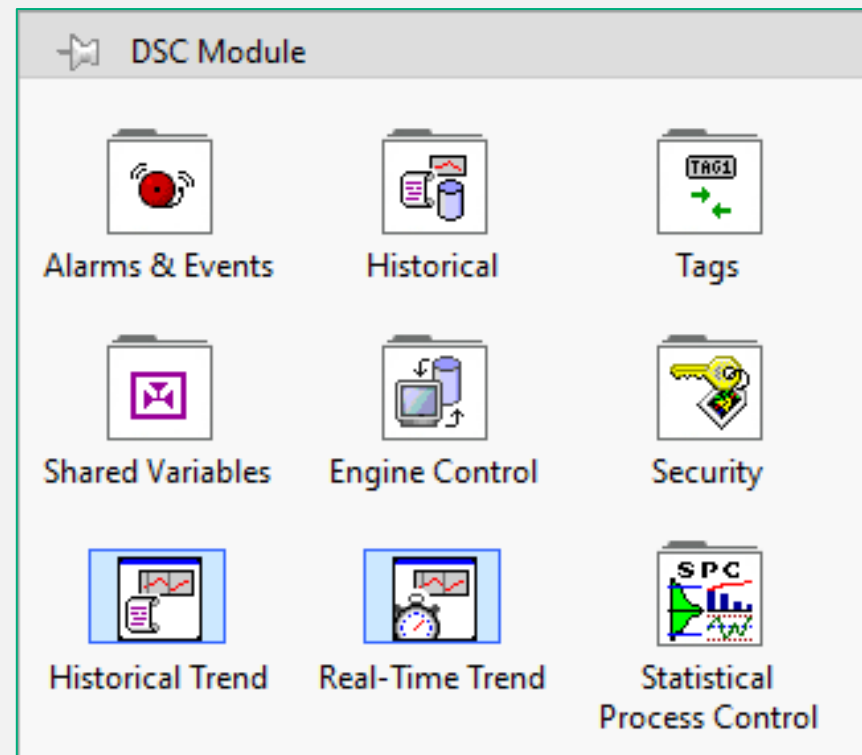
Toolkits released in 2024 Q1 and are part of LabVIEW Professional

1. Report Generation Toolkit
2. Database Connectivity Toolkit
3. Digital Filter Design Toolkit
4. Advance Signal Processing Toolkit
5. Unit Test Framework Toolkit
6. VI Analyzer Toolkit



Update to Datalogging and Supervisory Control Module

- Microsoft announced end of support for 32-bit SQL
- NI added support for 64-bit SQL to the LabVIEW Datalogging and Supervisory Control Module
- Published guide on ni.com:
 - [How to Migrate the LabVIEW DSC Database, NI Citadel, from a 32-bit to 64-bit SQL Database](#)
- Migration process overview:
 1. Backup the data
 2. Setup the environment
 3. Restore the data



Managing Dependencies

Managing Project Dependencies

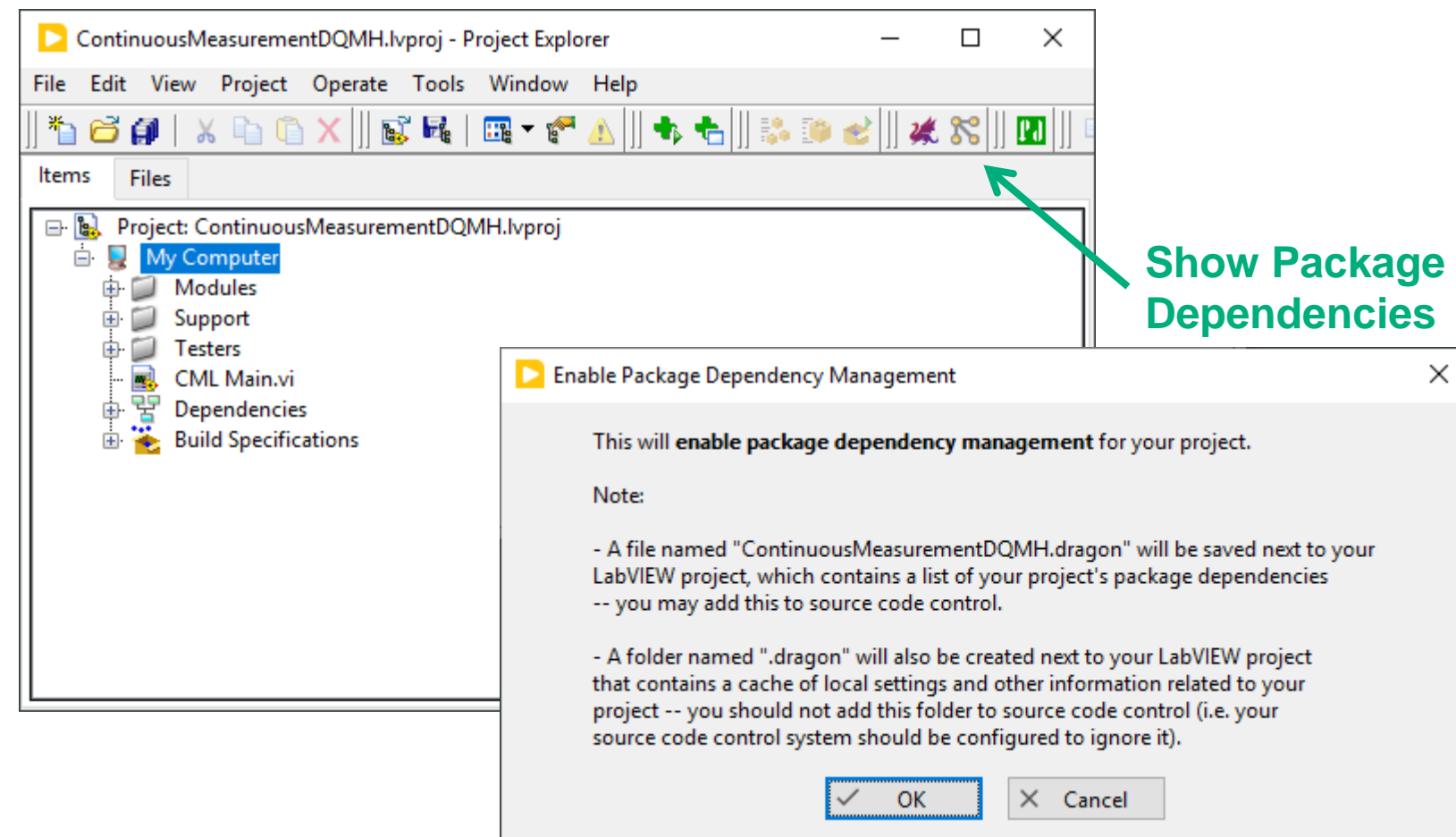


Complete your LabVIEW project faster!

- JKI Dragon is included with LabVIEW at **no additional cost**
- Manage your LabVIEW project's dependencies:
 - **View** package dependencies
 - **Install** package dependencies
 - **Detect** package dependencies automatically
 - **Configure** package dependencies manually
- Supports both **VI Package Manager (VIPM)** and **NI Package Manager (NIPM)**

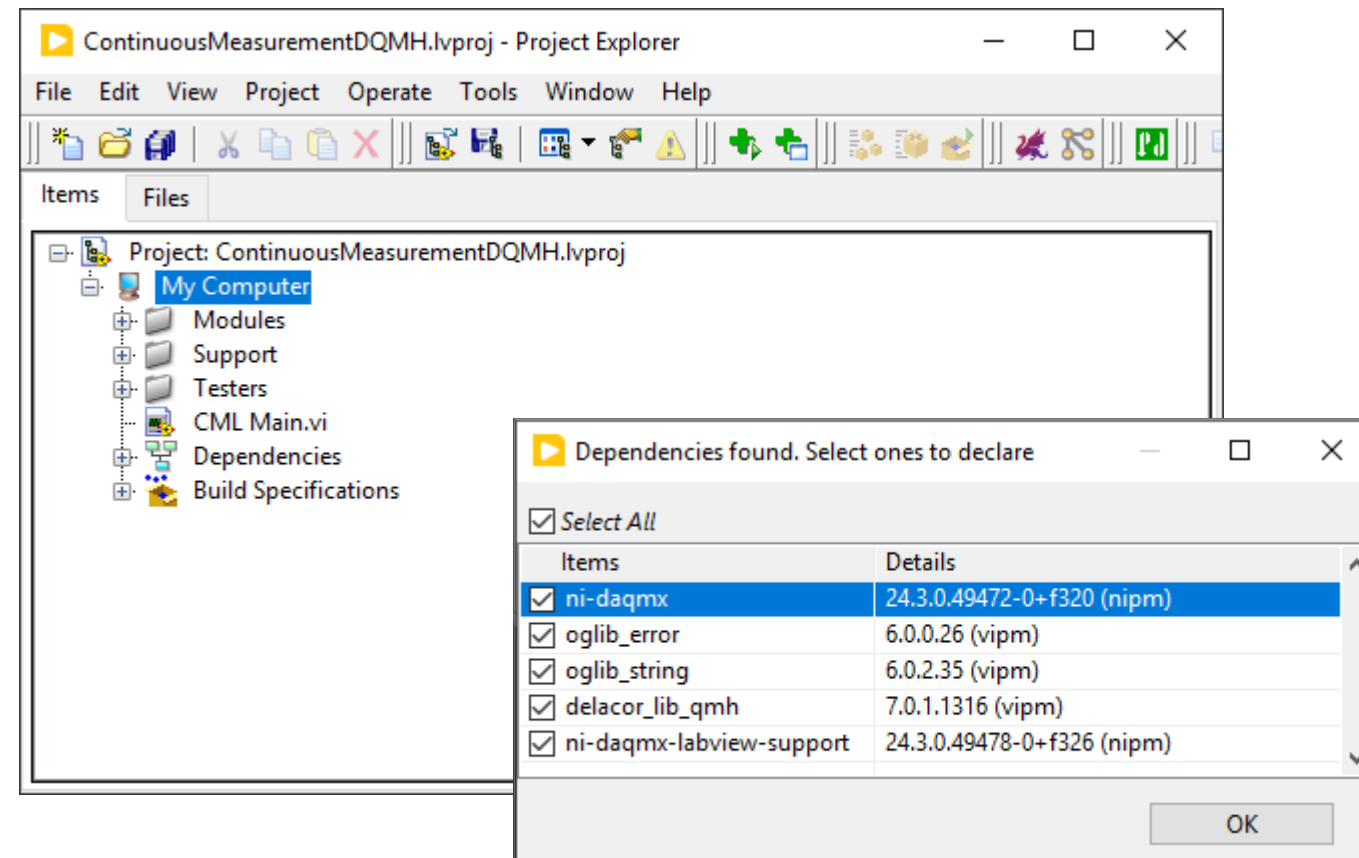
JKI Dragon

- 1) Enable Dependency Management
- 2) Scan for Dependencies
- 3) Review or Modify Dependencies
- 4) Install Dependencies



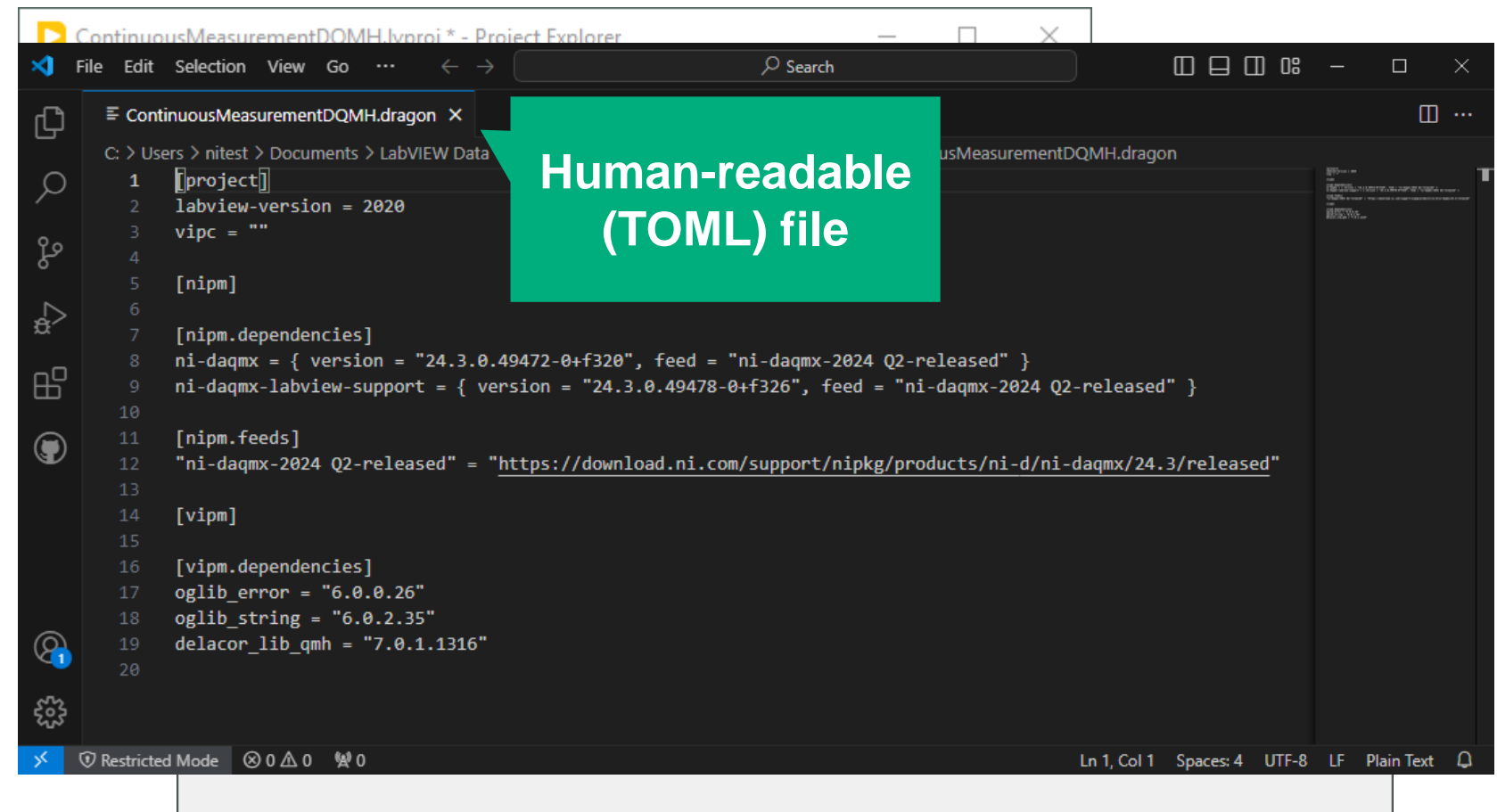
JKI Dragon

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JKI Dragon



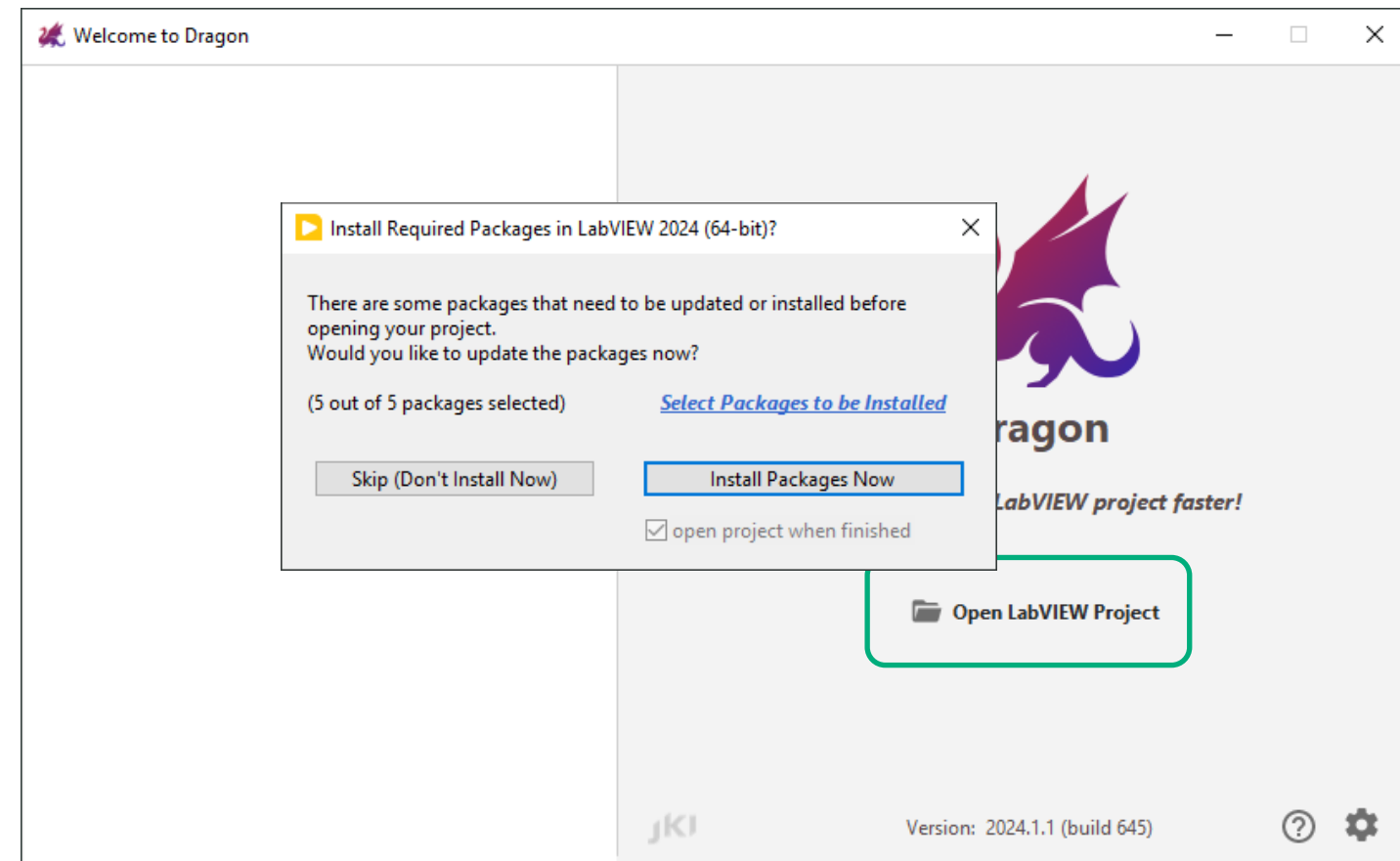
```
ContinuousMeasurementDOMH.lvproj * - Project Explorer
File Edit Selection View Go ... Search
ContinuousMeasurementDOMH.dragon x
C: > Users > nitest > Documents > LabVIEW Data > ContinuousMeasurementDOMH.dragon
1  [project]
2  labview-version = 2020
3  vipc = ""
4
5  [nipm]
6
7  [nipm.dependencies]
8  ni-daqmx = { version = "24.3.0.49472-0+f320", feed = "ni-daqmx-2024 Q2-released" }
9  ni-daqmx-labview-support = { version = "24.3.0.49478-0+f326", feed = "ni-daqmx-2024 Q2-released" }
10
11 [nipm.feeds]
12 "ni-daqmx-2024 Q2-released" = "https://download.ni.com/support/nipkg/products/ni-d/ni-daqmx/24.3/released"
13
14 [vipm]
15
16 [vipm.dependencies]
17 oplib_error = "6.0.0.26"
18 oplib_string = "6.0.2.35"
19 delacor_lib_qmh = "7.0.1.1316"
20
```

Human-readable (TOML) file

Ln 1, Col 1 Spaces: 4 UTF-8 LF Plain Text

- 1) Enable Dependency Management
- 2) Scan for Dependencies
- 3) Review or Modify Dependencies
- 4) Install Dependencies

JKI Dragon





Complete your LabVIEW project faster!

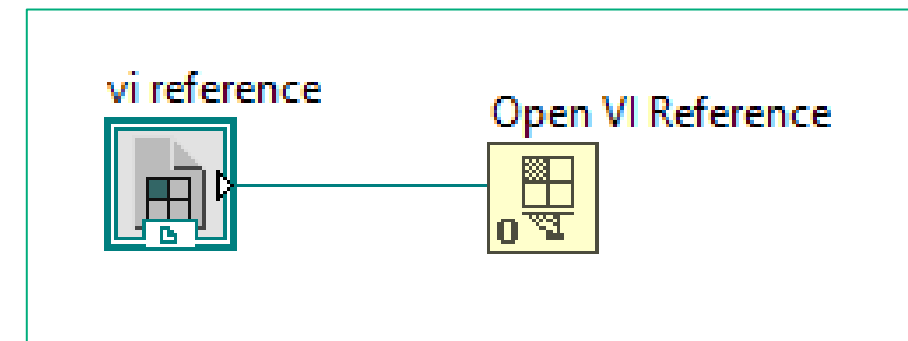
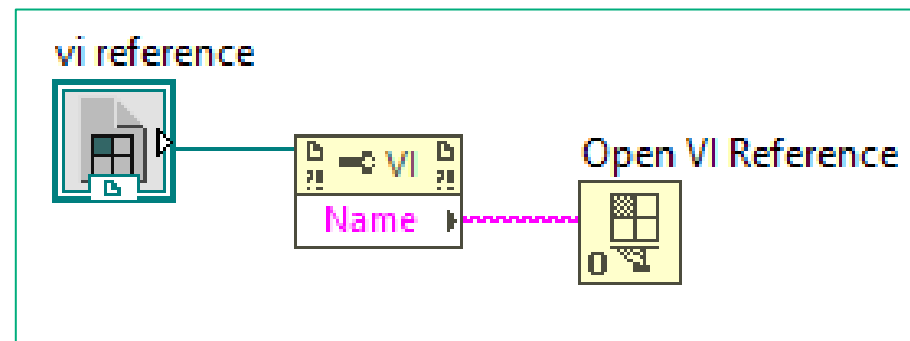
Managing Project Dependencies

- JKI Dragon ships with LabVIEW 2024 Q1
- Releases independently
 - Stable and Preview update feeds
 - Provide feedback on JKI's VIPM Community Discord server
- Visit dragon.vipm.io to learn more

New VI Functionality

Open VI Reference from Reference

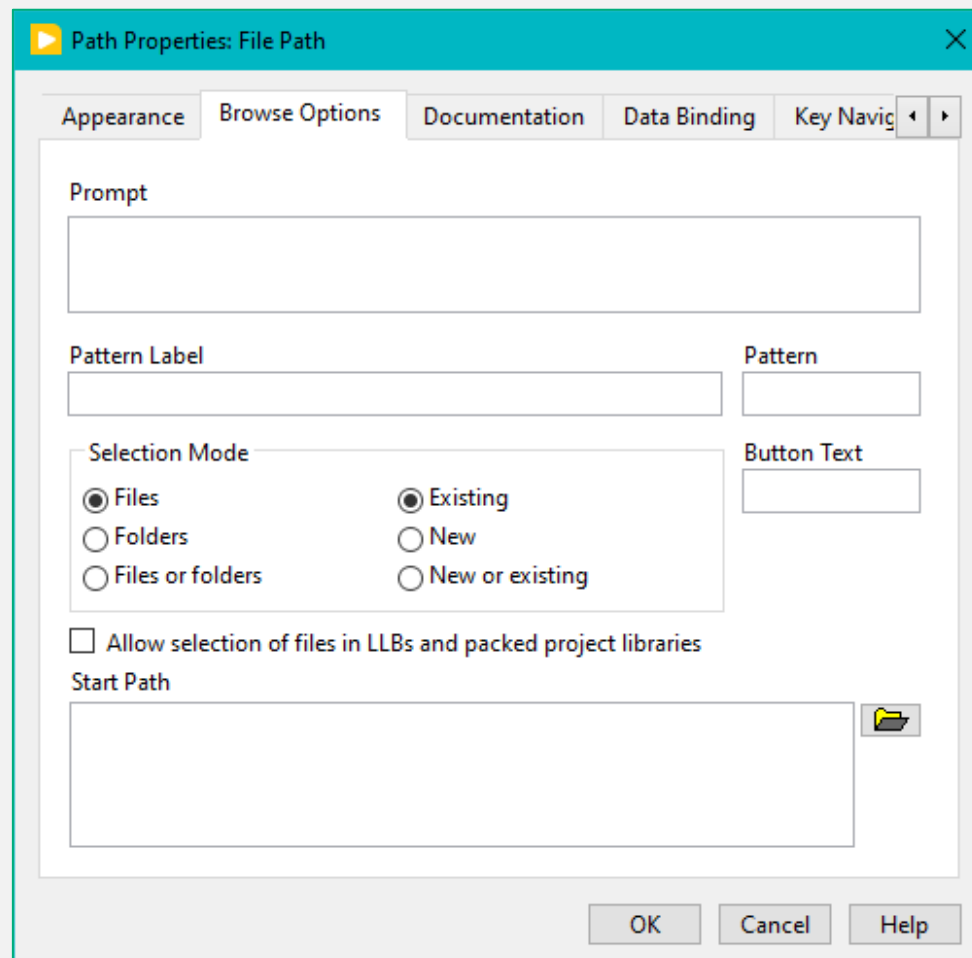
- **Open VI Reference** input “vi path” now accepts a VI Reference type
 - Also continues to accept path and string types
- Simplifies use cases such as:
 - Getting a strict reference from a non-strict reference
 - Creating another reentrant instance of a reentrant VI





Path Control Browse for Path Method

- Browse for Path method
 - Opens a file dialog to allow you to select a path
 - Replicates the functionality of clicking the Browse Button of the Path control on the front panel
 - Uses Browse Options from the control
 - Easier than recreating these options in code



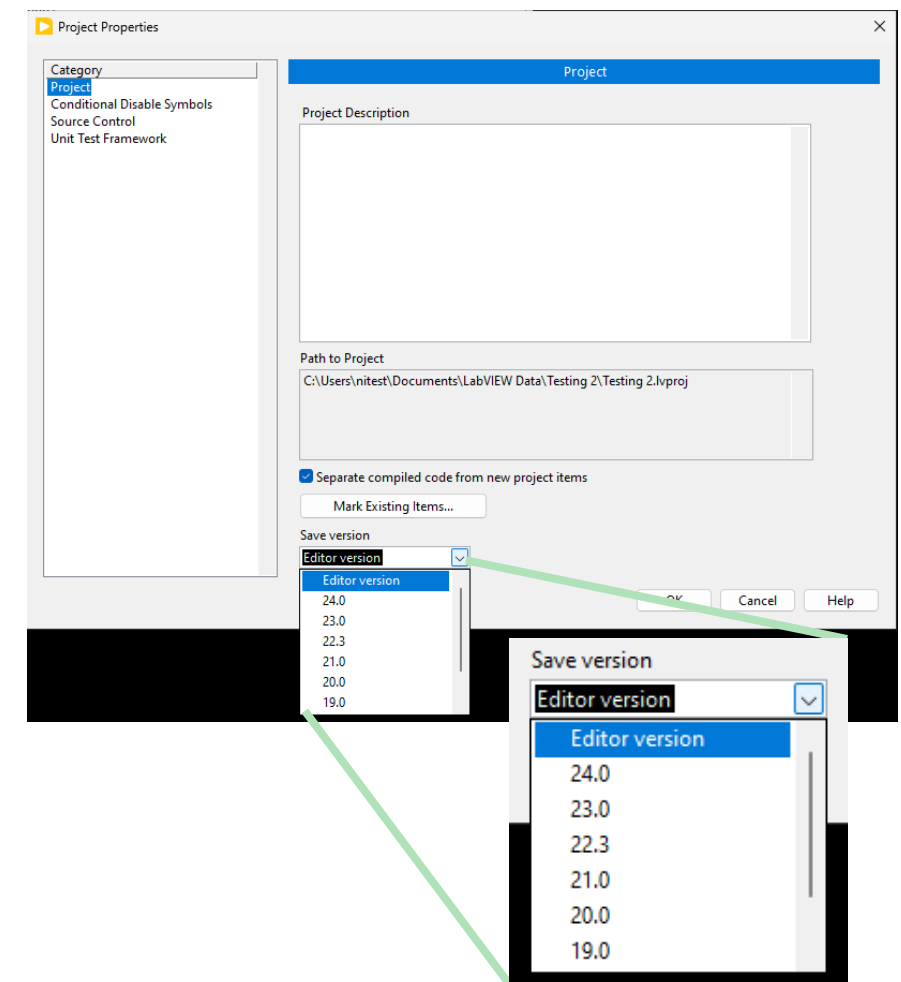
Sneak Peek: LabVIEW 2024 Q3

- Version-independent collaboration
- Compare VIs
- Support .NET 8.0
- Software Bill of Materials (SBOM)

Version-Independent Collaboration

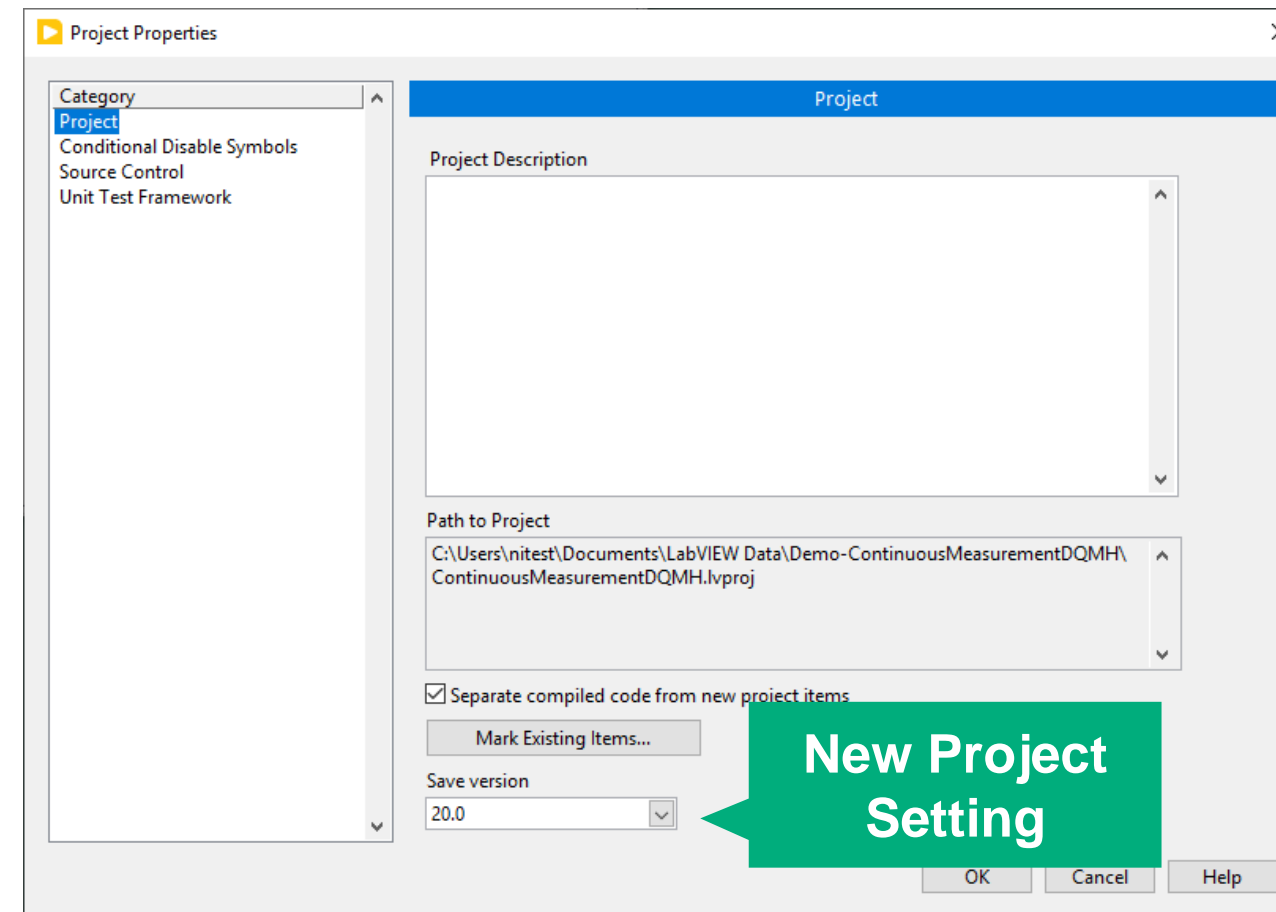
Version-Independent Collaboration

- Take advantage of the **latest LabVIEW editor features** without upgrading the save version of your project!
- *Benefits*
 - Everyone on your team can **choose when to upgrade** LabVIEW independently
 - You can contribute to **open-source projects** more easily
- Different from Save-for-Previous:
 - Saves in-place
 - Does not “lose” code
 - Saves in a later version instead of replacing code with images
 - Provides editor feedback when using newer VI panel or diagram objects



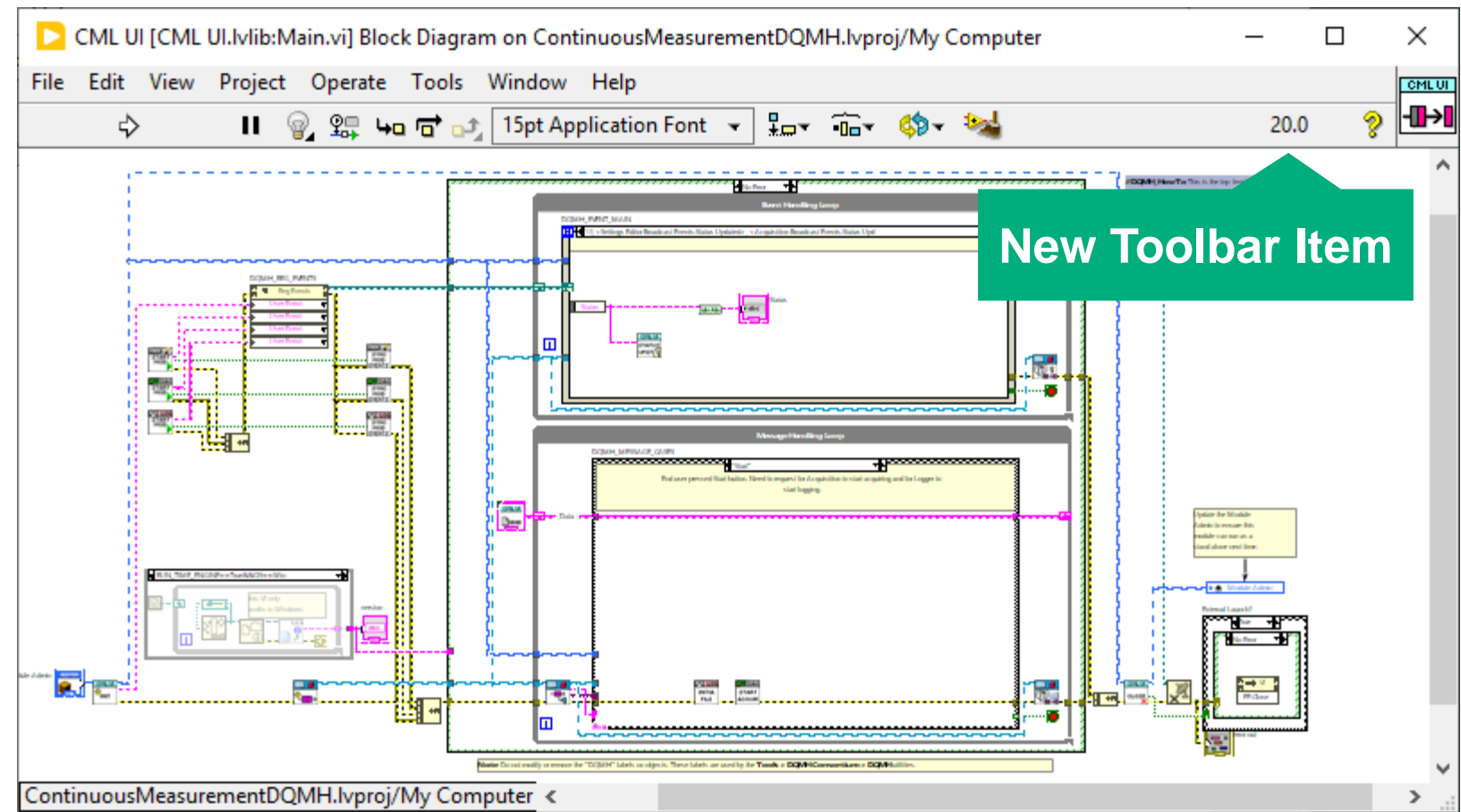
Version-Independent Collaboration

- 1) Configure Save Version
- 2) Edit VIs
- 3) Review Incompatibilities



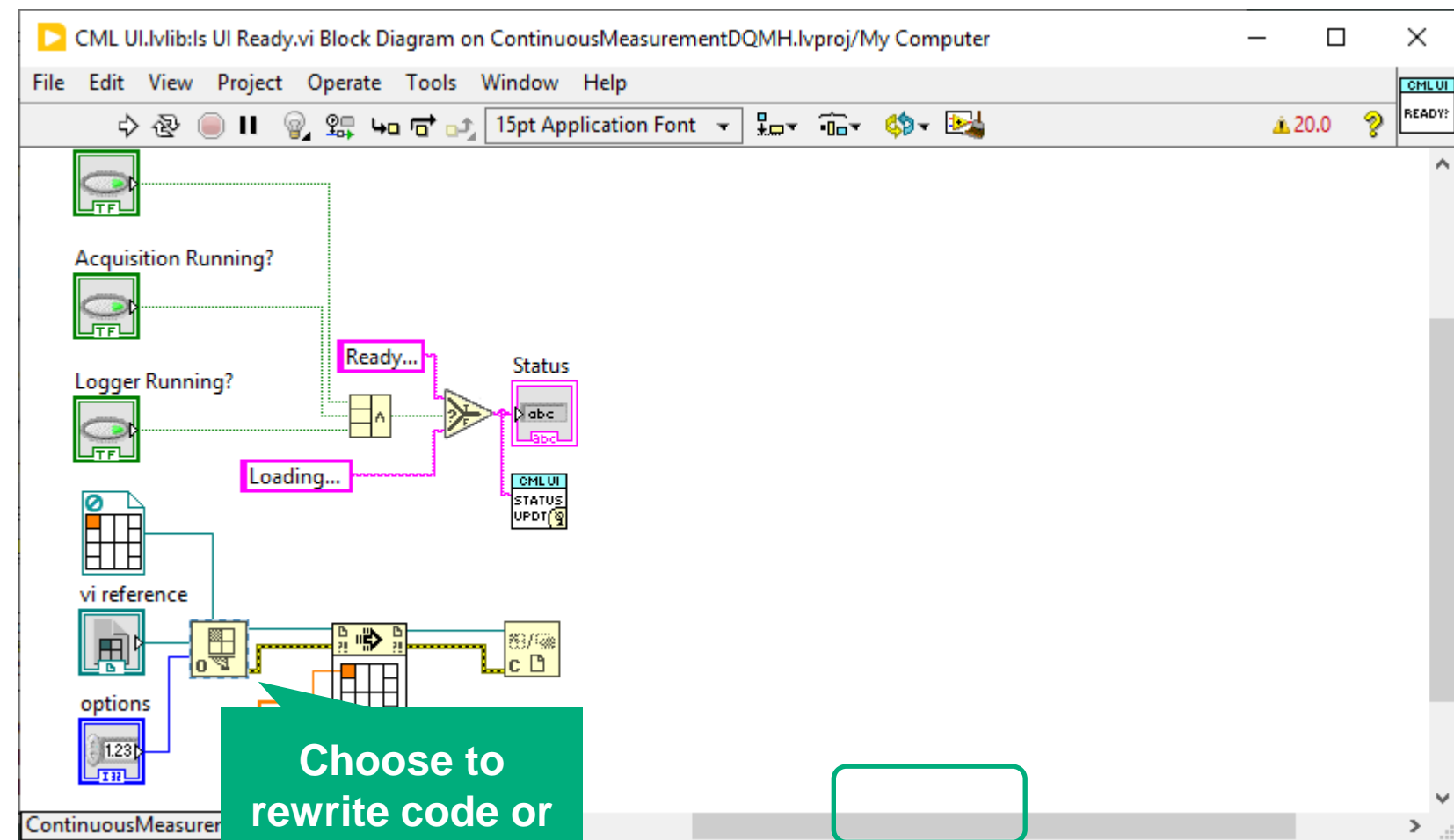
Version-Independent Collaboration

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Version-Independent Collaboration

- 1) Configure Save Version
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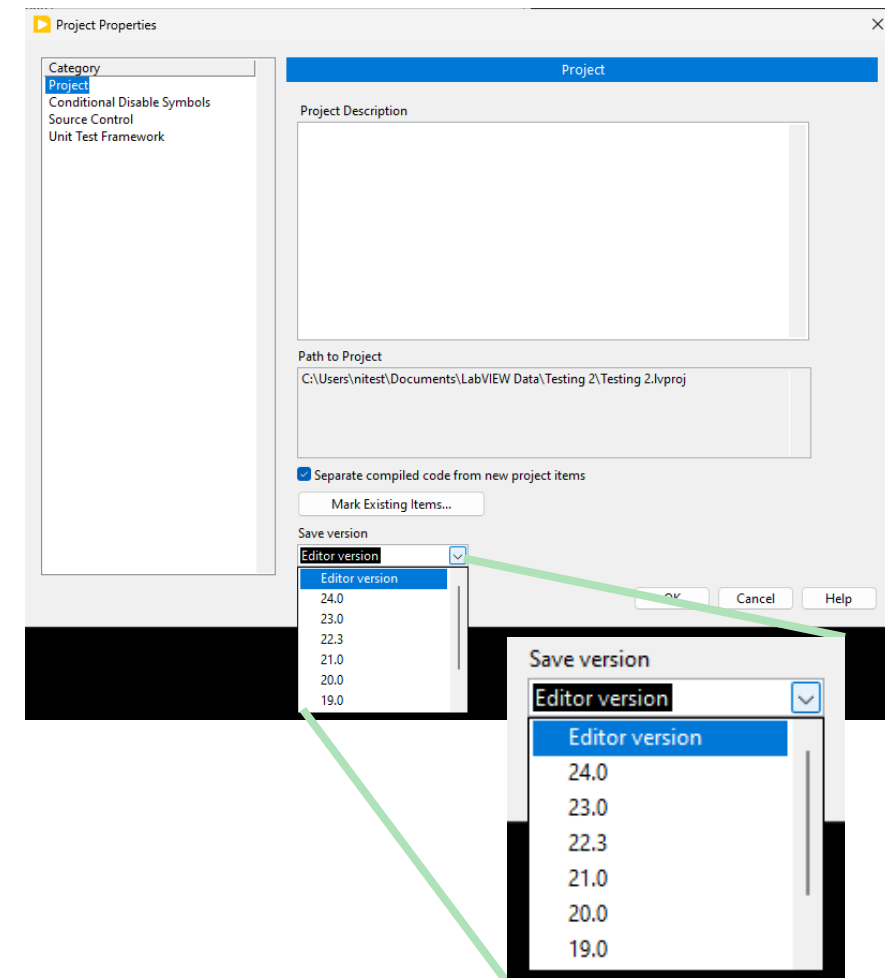


Choose to
rewrite code or
upgrade project

Save Version - Caveats and Limitations

- VIs must “separate compiled code from source file”
- Does not *compile* for previous versions
 - LabVIEW-built applications, shared libraries, and PPLs will save in the editor version
 - Your **build and test pipeline** should continue using your validated version of LabVIEW
- RT target will still need to match your editor for deployment
- Does not support FPGA projects
- Supports save version for LabVIEW 2017 and later

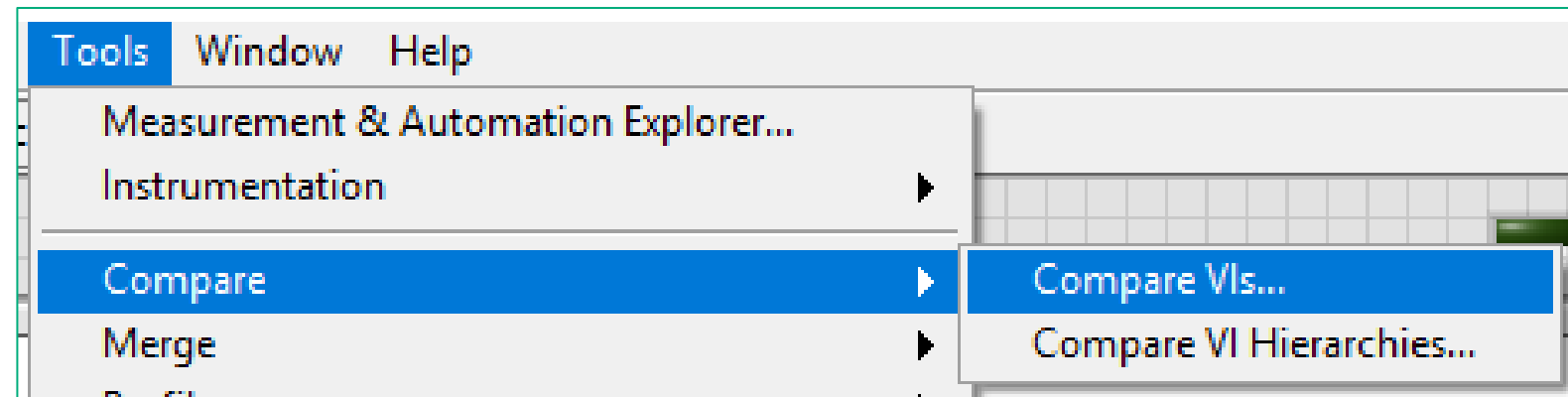
Now in Beta testing! ni.com/beta



Compare VIs

Compare VIs (a.k.a. “Diff”)

- In LabVIEW 2022 Q3 and later, *Compare VIs* is not limited to the Professional Edition of LabVIEW
- Interactively compare VIs using **Tools>Compare** menu items



- Use the helper app **LVCompare.exe** as the diff tool for your source control system

```
lvcompare.exe <path to VI 1> <path to VI 2>  
[-lvpath <path to LabVIEW>] [-noattr] [-nofp] [-nofppos]  
[-nobd] [-nobdcosm] [-nobdpos]
```

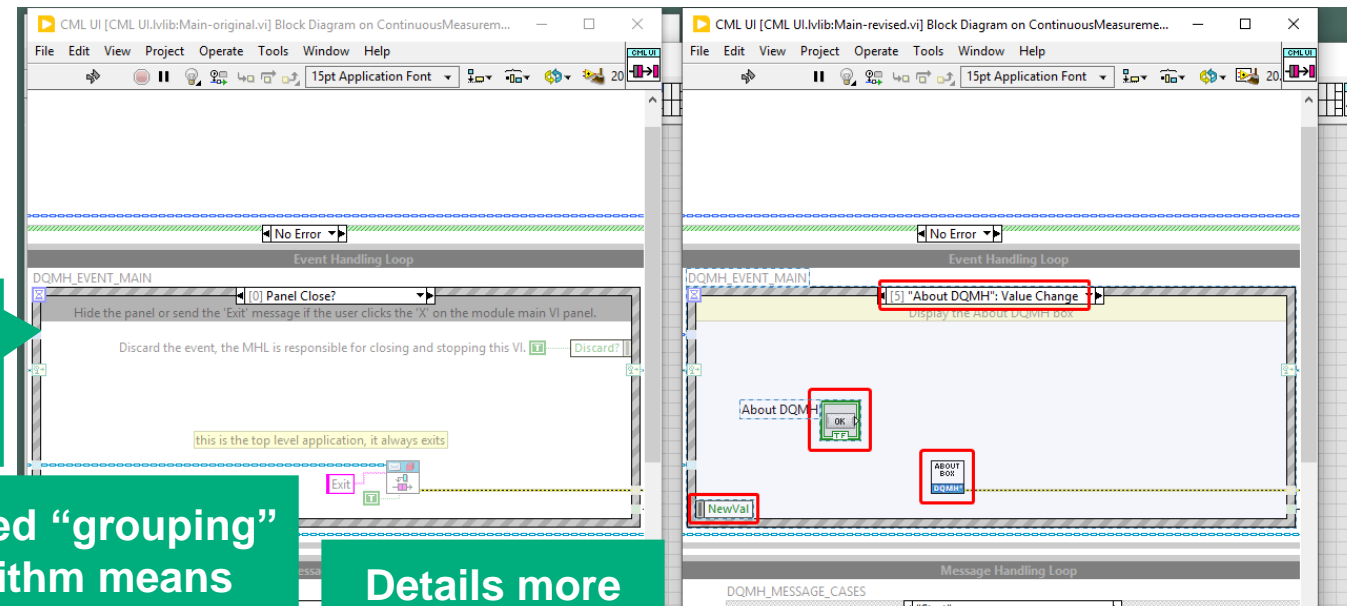
Improvements to Compare VIs

- 1) Clearer Differences
- 2) Cosmetic
- 3) Swap VI Positions

Better visual highlighting

Improved "grouping" algorithm means fewer Differences

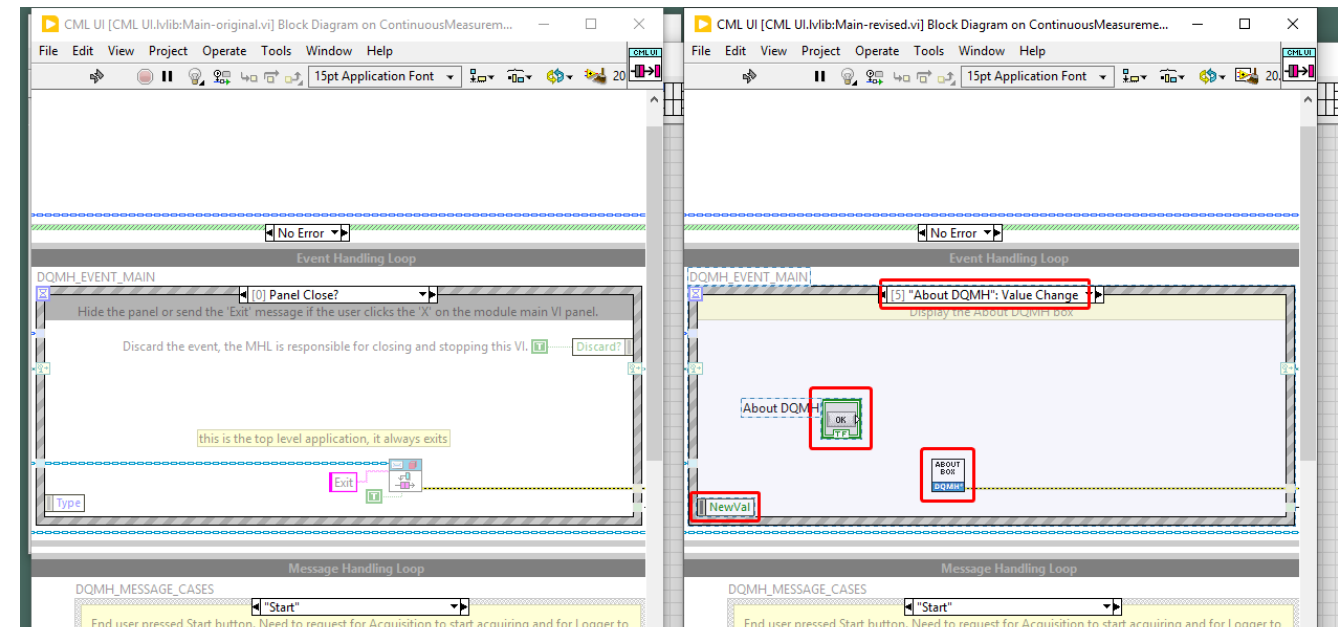
Details more concise



Differences (2 of 5 viewed)	Details (0 of 4 viewed)	Include:
<ul style="list-style-type: none"> ✓ Block Diagram objects Block Diagram objects ✓ Block Diagram objects Front Panel objects VI Attribute - Window Size/Appearance (VI Properties) 	<ul style="list-style-type: none"> Event Structure "DQMH_EVENT_MAIN" - case added : ["About DQMH": Value Change] SubVI "DQMH_About Box.vi" - added at (970,246) Event Data Node "Event Data Node" - added at (746,284) Front Panel Terminal "About DQMH" - added at (865,189) 	<ul style="list-style-type: none"> <input checked="" type="checkbox"/> VI Attributes <input checked="" type="checkbox"/> Front Panel <input type="checkbox"/> Position/Size <input checked="" type="checkbox"/> Block Diagram <input type="checkbox"/> Cosmetic

Improvements to Compare VIs

- 1) Clearer Differences
- 2) Cosmetic
- 3) Swap VI Positions



Differences

Differences (2 of 6 viewed) Details (0 of 4 viewed)

- ✓ Block Diagram objects
- Block Diagram objects*
- Block Diagram objects
- ✓ Block Diagram objects
- Front Panel objects
- VI Attribute - Window Size/Ap (VI Properties)

MAIN" - case added : ["About DQMH": Value Change]
 ed at (970,246)
 e" - added at (746,284)
 MH" - added at (865,189)

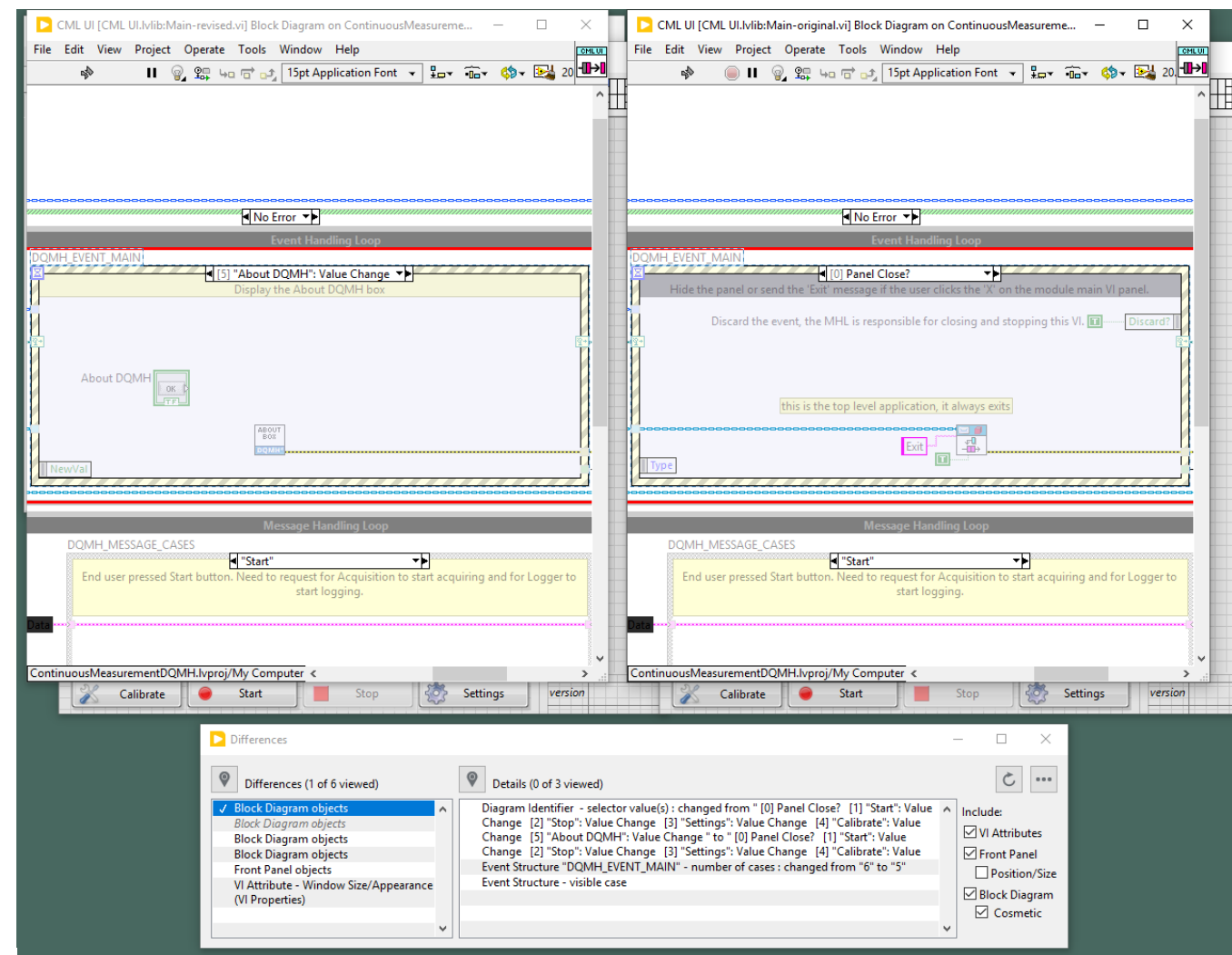
Include:

- VI Attributes
- Front Panel
- Position/Size
- Block Diagram
- Cosmetic

Purely cosmetic differences italicized

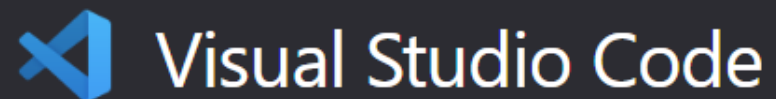
Improvements to Compare VIs

- 1) Clearer Differences
- 2) Cosmetic
- 3) Swap VI Positions



Compare VIs (a.k.a. “Diff”)

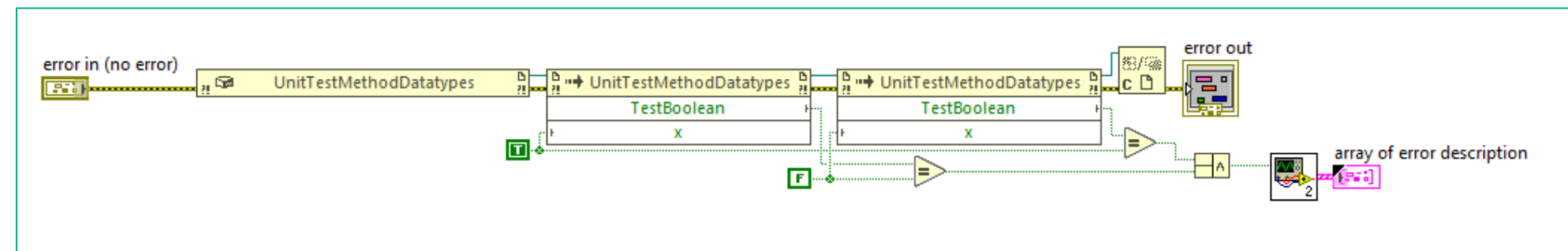
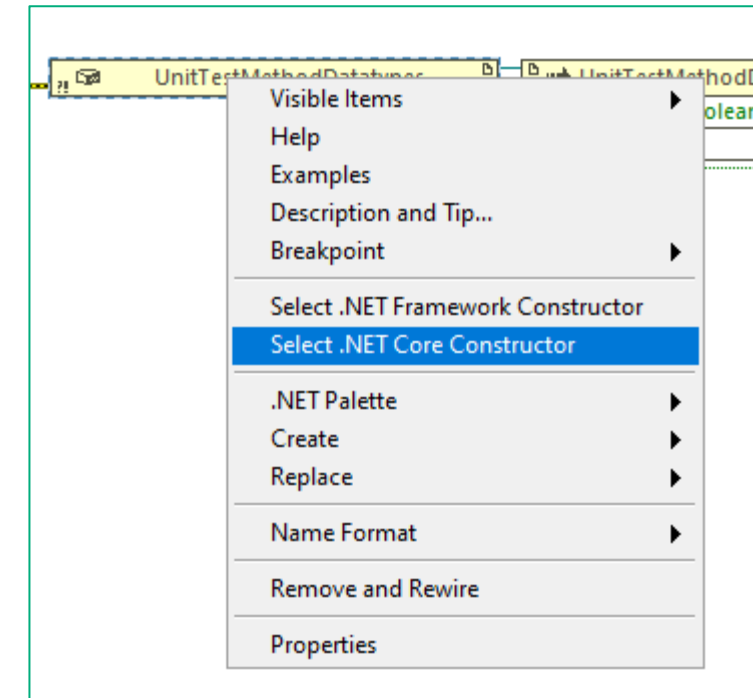
- Consider using LabVIEW 2024 Q3 for code reviews even if you’re maintaining your project in an older save version
- Tell us about your preferred source control system and tools to help us design future improvements

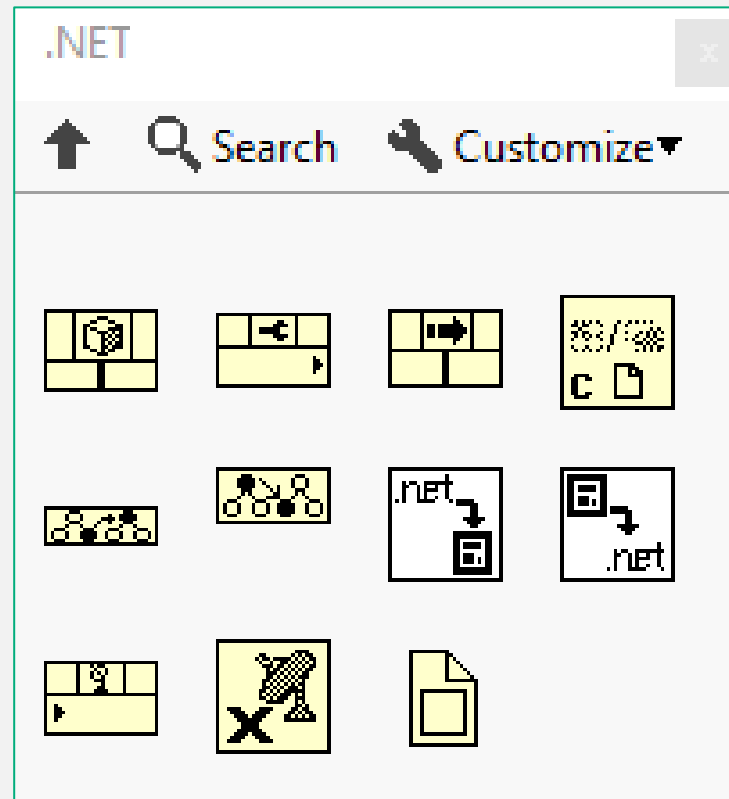


Support .NET 8.0

Preview Feature: .NET 8.0

- LabVIEW will continue to support .NET Framework
- LabVIEW 2024 Q3 will support .NET 8.0 for the following:
 - Constructor Node
 - Invoke Node
 - Property Node
- Supported data types:
 - int
 - char
 - boolean
 - string

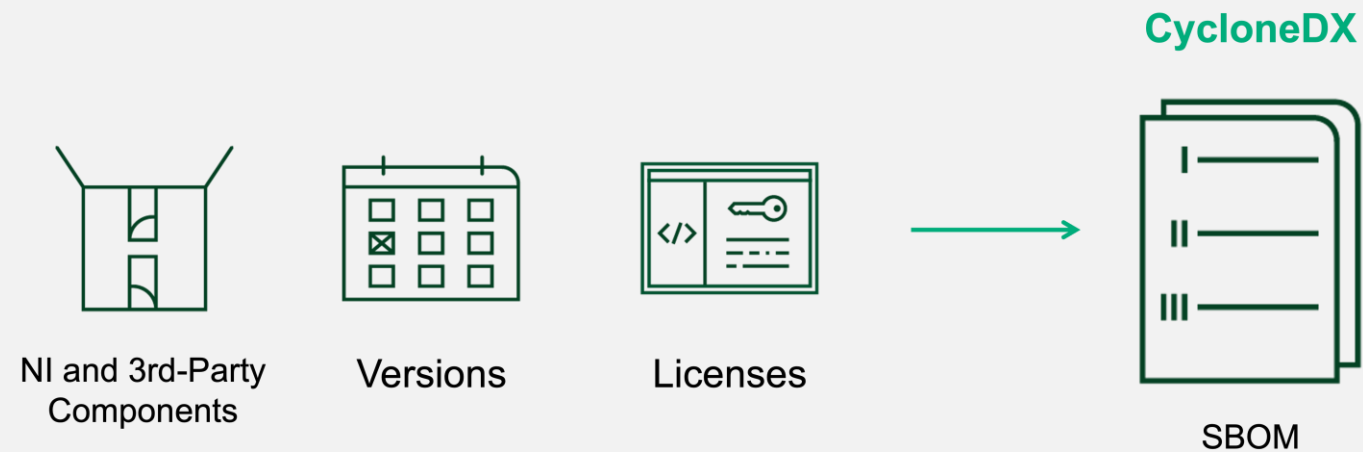




Future .NET 8.0 Work

- Built applications
- Additional data types
- Register Event Callback
- Configuring a specific version of .NET
- Front panel controls
- Linux
- Building .NET Core Interop Assemblies

Software Bill of Materials (SBOM)



Software Bill of Materials (SBOM)

- Machine-readable file containing an inventory of the software components used in an application
- Building block in software security and supply chain risk management
- NI is working toward a standardized format, CycloneDX

```
{
  "$schema": "http://cyclonedx.org/schema/bom-1.6.schema.json",
  "bomFormat": "CycloneDX",
  "specVersion": "1.6",
  "serialNumber": "urn:uuid:3e671687-395b-41f5-a30f-a58921a69b79",
  "version": 1,
  "components": [
    {
      "type": "library",
      "name": "acme-library",
      "version": "1.0.0"
    }
  ]
}
```


LabVIEW Roadmap



Short-term product focus

Improve experience for users looking to work as a team to build larger applications

Improve support for 3rd party tools ensuring flexibility

Long-term product focus

Enhance integration with other NI tools for seamless data exchange and enhanced functionality

Uplevel security features on all data linkages-especially in military and aerospace applications

Capability	Shipped	2024	2025+
Project Management			
Improvements to the speed of building applications	2023		
Driver versions independent from LabVIEW	2023		
Improved LabVIEW Project Dependency Management	2024		
Maintaining projects in older versions		✓	
Enhancements in diff and merge functionalities		✓	✓
Ability to upgrade legacy Windows installers to NIPM packages			✓
CI/CD Workflows - integration into Git source code management			✓
UI Improvements			
Editor improvements: Diagram Zoom, Double click to finish wire, Quick change list	2023		
Debug improvements: Execution highlighting	2023		
Improvements in the areas of breakpoints, probes, and run-time error reporting			✓
Interoperability			
Ease of calling, editing and debugging MATLAB scripts	2022		
Python 3.10 with Python class support	2022		
Call Python code running in virtual environment	2023		
Support for calling .NET Core Assemblies (.NET 8)		✓	✓
System Support			
Data Communication additions (IPv6 support)			✓
General Software Security			
Updating 3 rd party dependencies		✓	
Internal improvements in response to increased global security standards		✓	

Roadmap Date: 2024 Q2 | Next Release: 2024 Q3 | Release Cadence: Q1 and Q3 | Roadmap is a snapshot and can change based on a variety of factors, including development execution and customer input.

Learn More About NI's Gen. AI Roadmap

Session	Time	Location
Sneak Peek: Generative AI and LabVIEW	Tuesday 11:30 AM – 12:30 PM	19A
Generative AI to Accelerate Test Workflows	Tuesday 2:00-3:00 PM	16A
AI at the Edge	Wednesday 1:30-2:30 PM	16A
Experience Lounge		

Other Recommended Sessions

Session	Time	Location
Programming Essentials Track		
What's New in TestStand	Wednesday 1:30-2:30 PM	19B
Software Hands-On: Workflows from Instrument Bring up to Test Automation	Wednesday 1:30-3:45 PM	Ballroom E

Thank you!

Visit the Experience Lounge for LabVIEW demos and more