

CONNECT

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What's New in LabVIEW

May 24, 2022

11 -11.45 am

Kiran Nagaraj



Deborah Burke

Agenda

Introducing standardized NI software versioning

Review new capabilities in three key investment areas

- Project Management
- Interoperability
- LabVIEW Real Time and FPGA

Browse public-facing roadmap

Discuss additional resources

New NI Software Versioning Approach:

<Product> <Year> <Release Quarter>

LabVIEW 2022 Q3

TestStand 2022 Q4

NI-DAQmx 2022 Q3

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Project Management

Addressing Longstanding Upgrade Pain Points

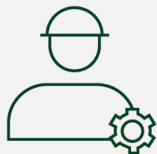
LabVIEW 2022 Q3 and 2023 Q1



“I need to update all my drivers since I updated LabVIEW versions”

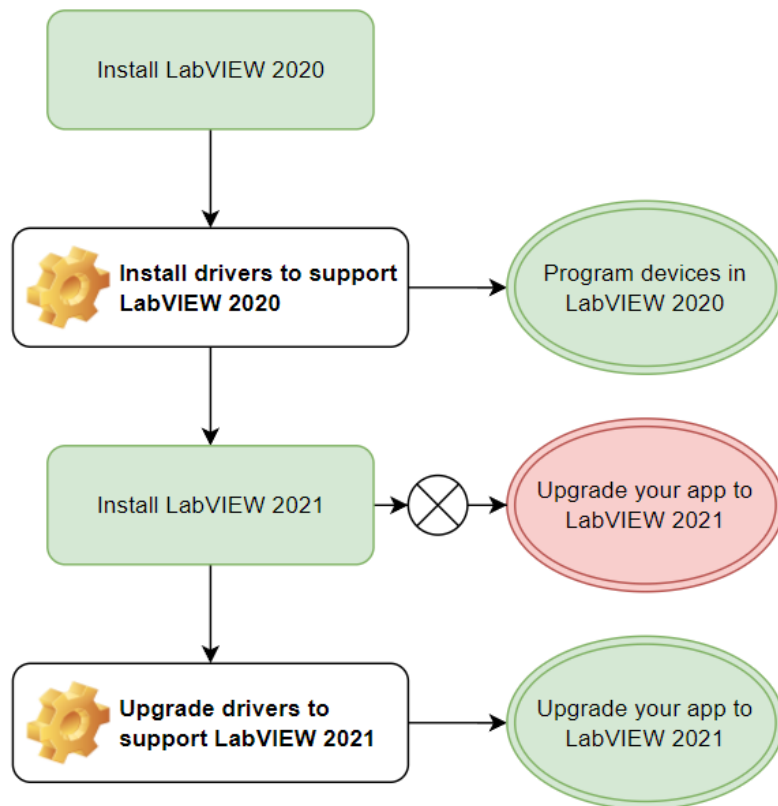


It takes time and effort to install drivers even when I don't have a change in my hardware set-up

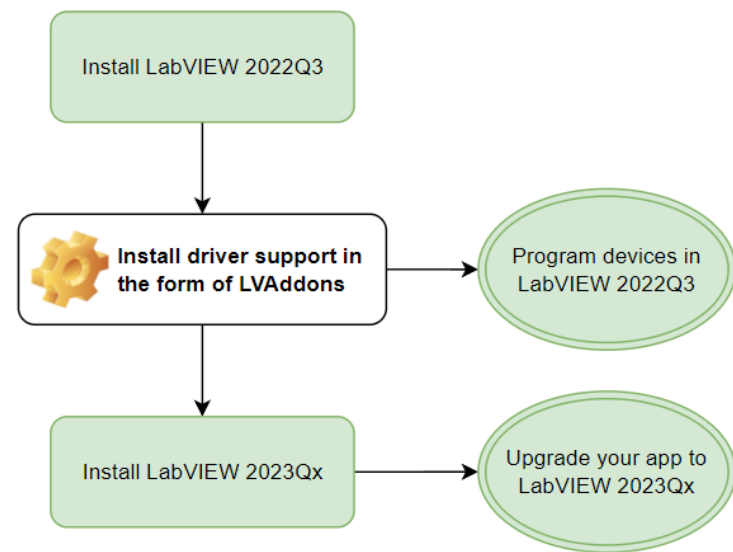


Revalidation efforts for existing applications take longer when drivers are updated

Upgrade LabVIEW Without Upgrading Drivers/Toolkits



Prior to LabVIEW 2022 Q3 release

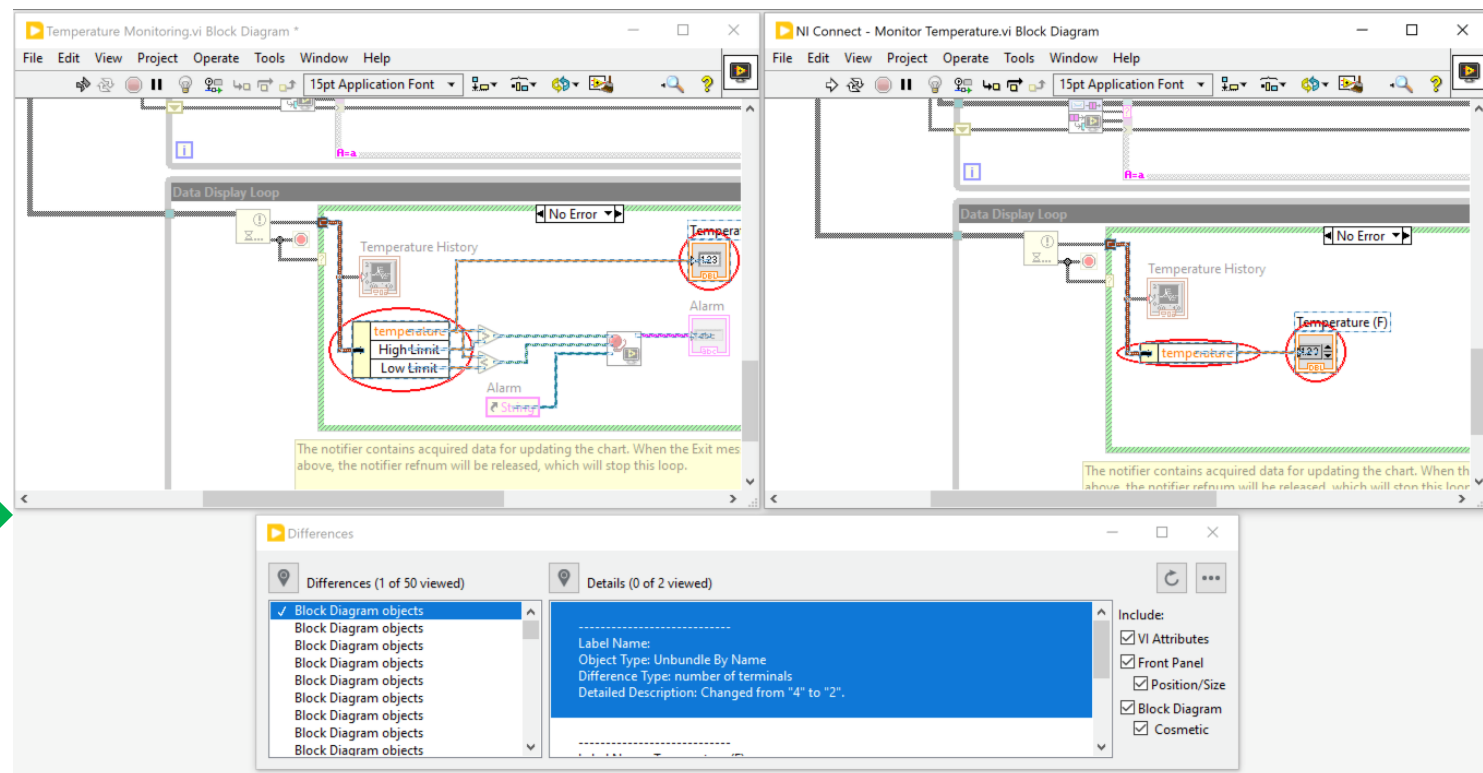
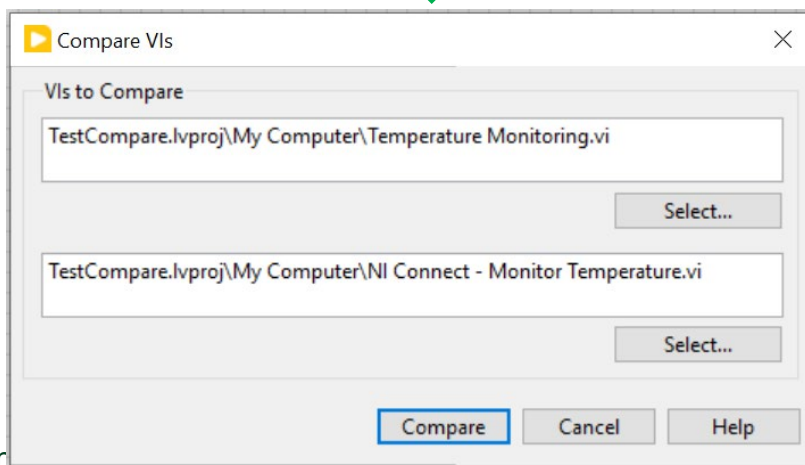
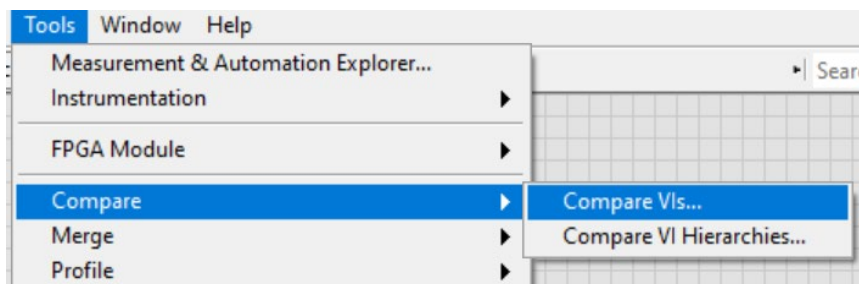


Select drivers from 2022 Q3 release onward

Comparing VIs in Base and Full Editions

Modern software engineering practices require diffing code and should be encouraged across all levels of application complexity

Compare VIs will no longer be restricted to the Professional Edition

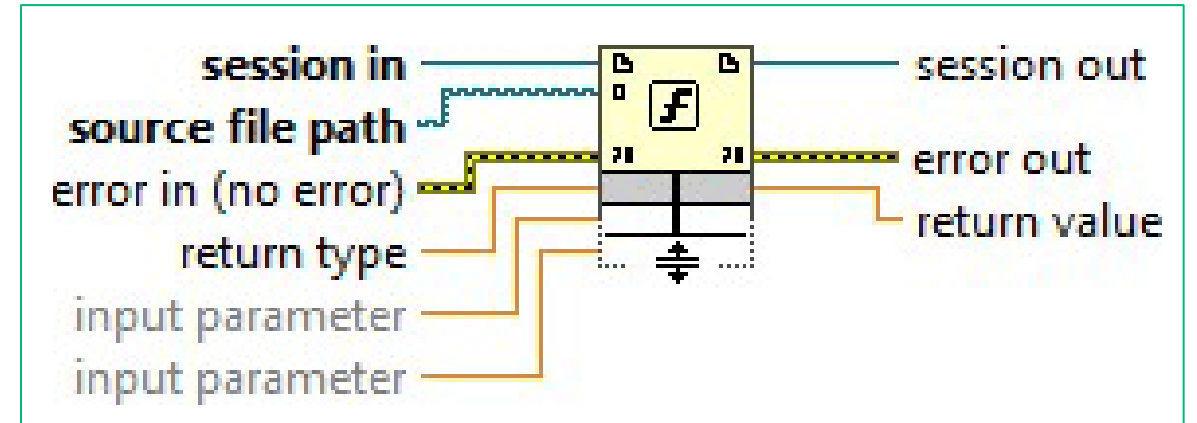


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Interoperability

MathWorks MATLAB® Nodes

- Improving integration and debugging capabilities
- Continuous investment through 2023 and beyond



LabVIEW 2021

- MATLAB Script node to MATLAB Node
- Select MATLAB Version for Execution

LabVIEW 2022 Q3

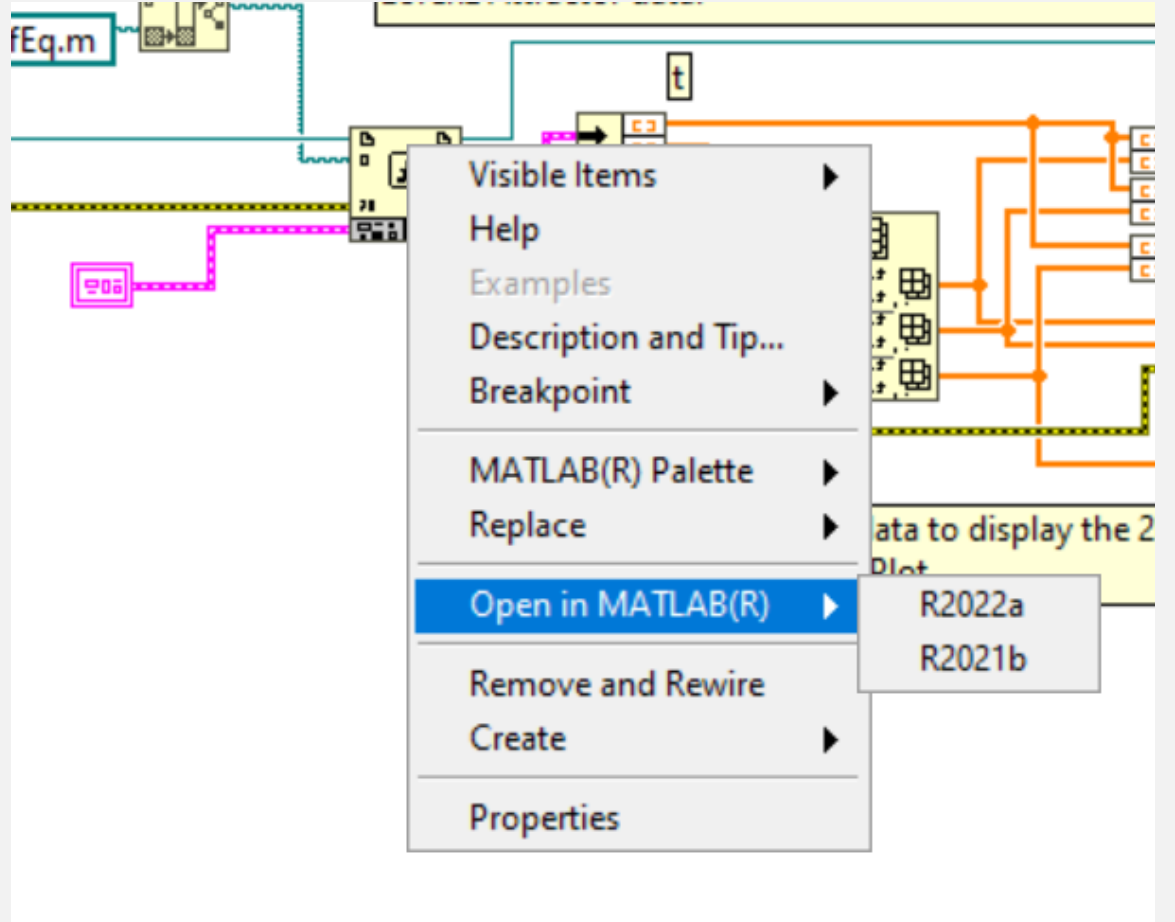
- Enable debugging
- Edit MATLAB (.m) file by calling from LabVIEW

LabVIEW 2023+

- Call MATLAB application from .NET and DLL

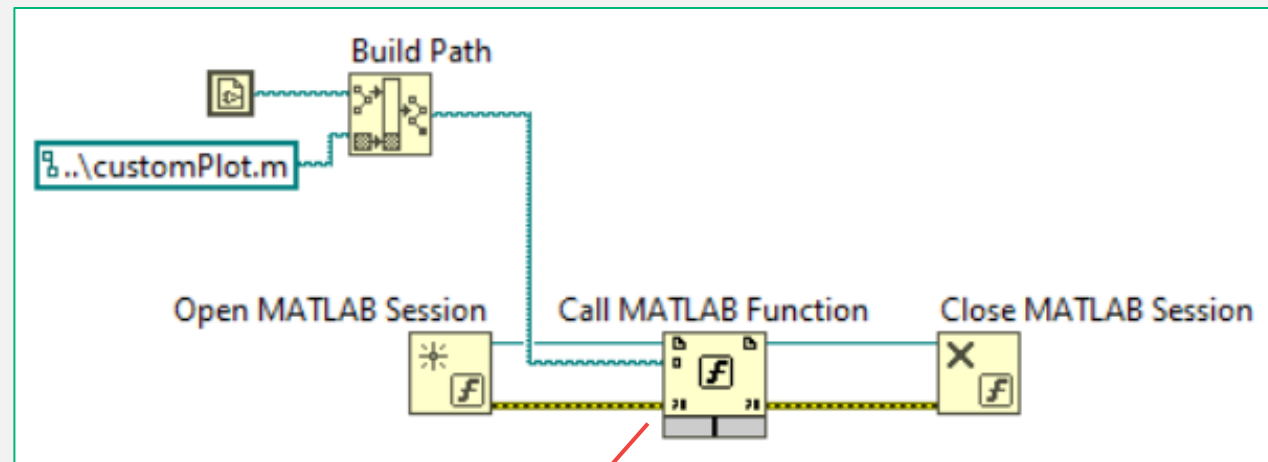
MATLAB® API

- Ability to select specific MATLAB Version for execution
- Debug support added
 - Code can be reviewed by invoking specific version of the MATLAB IDE



MATLAB® API

- Ability to select specific MATLAB Version for execution
- Debug support added
 - Code can be reviewed by invoking specific version of the MATLAB IDE
 - MATLAB IDE can be used for adding breakpoints



```

customPlot.m
1 function [xmuilt,ymuilt,time, W] = customPlot(xmax, xmin, ymax, ymin)
2 t = tic;
3 maxiter=50;
4 m=300;
5 xmuilt = (xmax-xmin)/m;
6 ymuilt = (ymax-ymin)/m;
7 x=linspace(xmin,xmax,m);
8 y=linspace(ymin,ymax,m);
9 [X,Y]=meshgrid(x,y);
10 Z=X+1i*Y;
11 c=Z;
12 for k=1:maxiter
13     Z=Z.^2+c;
14 end
15 W=288*real(exp(-abs(Z)))';
16 time=toc(t);
17 end
    
```



MathScript Module will be deprecated in 2023

MathScript Module

```

1 timerstart
2 maxiter=50;
3 m=300;
4 xmax
5 xmin
6 ymax
7 ymin
8 xmult = (xmax-xmin)/m;
9 ymult = (ymax-ymin)/m;
10 x=linramp(xmin,xmax,m);
11 y=linramp(ymin,ymax,m);
12 [X,Y]=meshgrid2d(x,y);
13 Z=X+1i*Y;
14 c=Z;
15 for k=1:maxiter;
16     Z=Z.^2+c;
17 end
18 W=288*real(exp(-abs(Z)))';
19 time=timerstop;
20 W
21 time

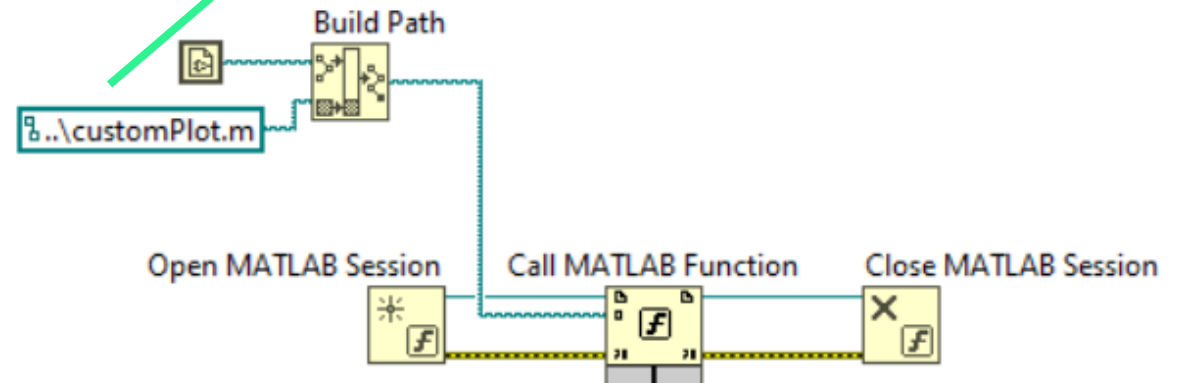
```

MATLAB® Palette

```

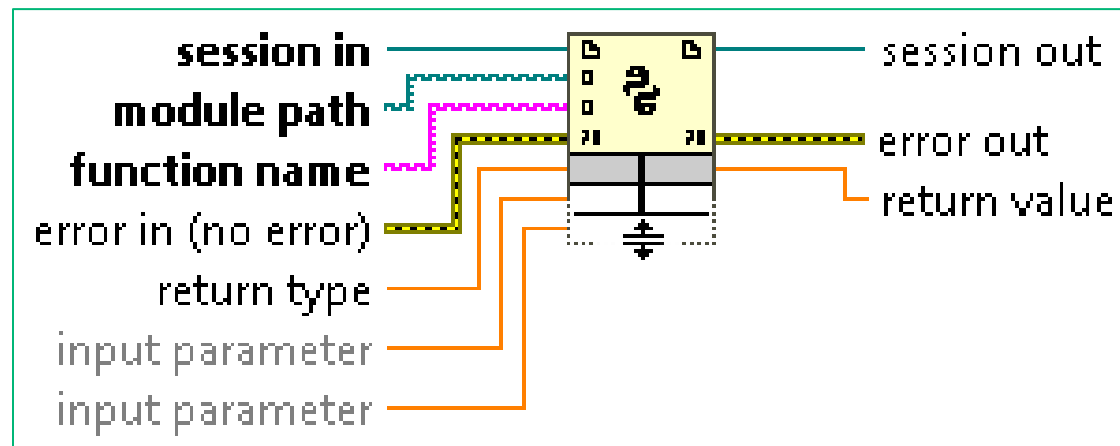
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5 xmuilt = (xmax-xmin)/m;
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8 y=linramp(ymin,ymax,m);
9 [X,Y]=meshgrid(x,y);
10 Z=X+1i*Y;
11 c=Z;
12 for k=1:maxiter
13     Z=Z.^2+c;
14 end
15 W=288*real(exp(-abs(Z)))';
16 time=toc(t);
17 end

```



Python Node

- Improving debugging capabilities and support for data types
- Continuous investment through 2023 and beyond



LabVIEW 2021

- Supported Python version 3.9
- Specify path to Python when calling Python functions
- Support Python named tuples

LabVIEW 2022 Q3

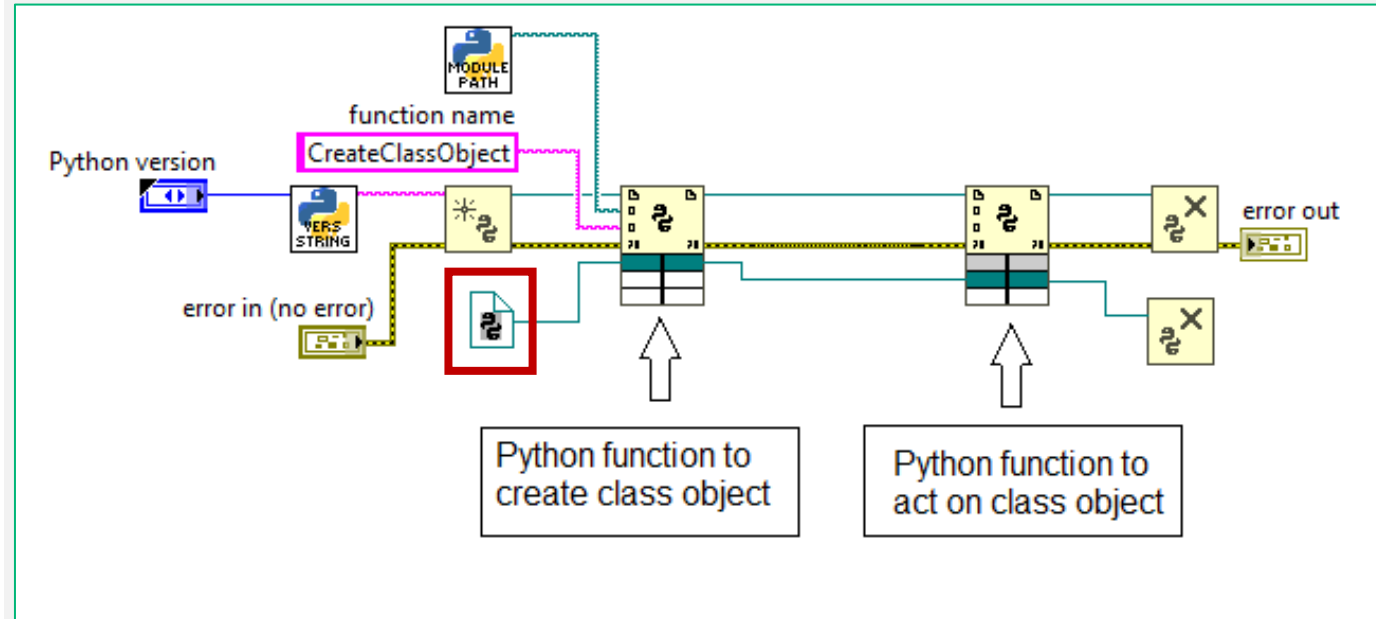
- Support reference to Python class object

LabVIEW 2023+

- Supporting virtual environments (e.g., Anaconda)
- Support Python class methods and properties
- Support Python node on LabVIEW RT

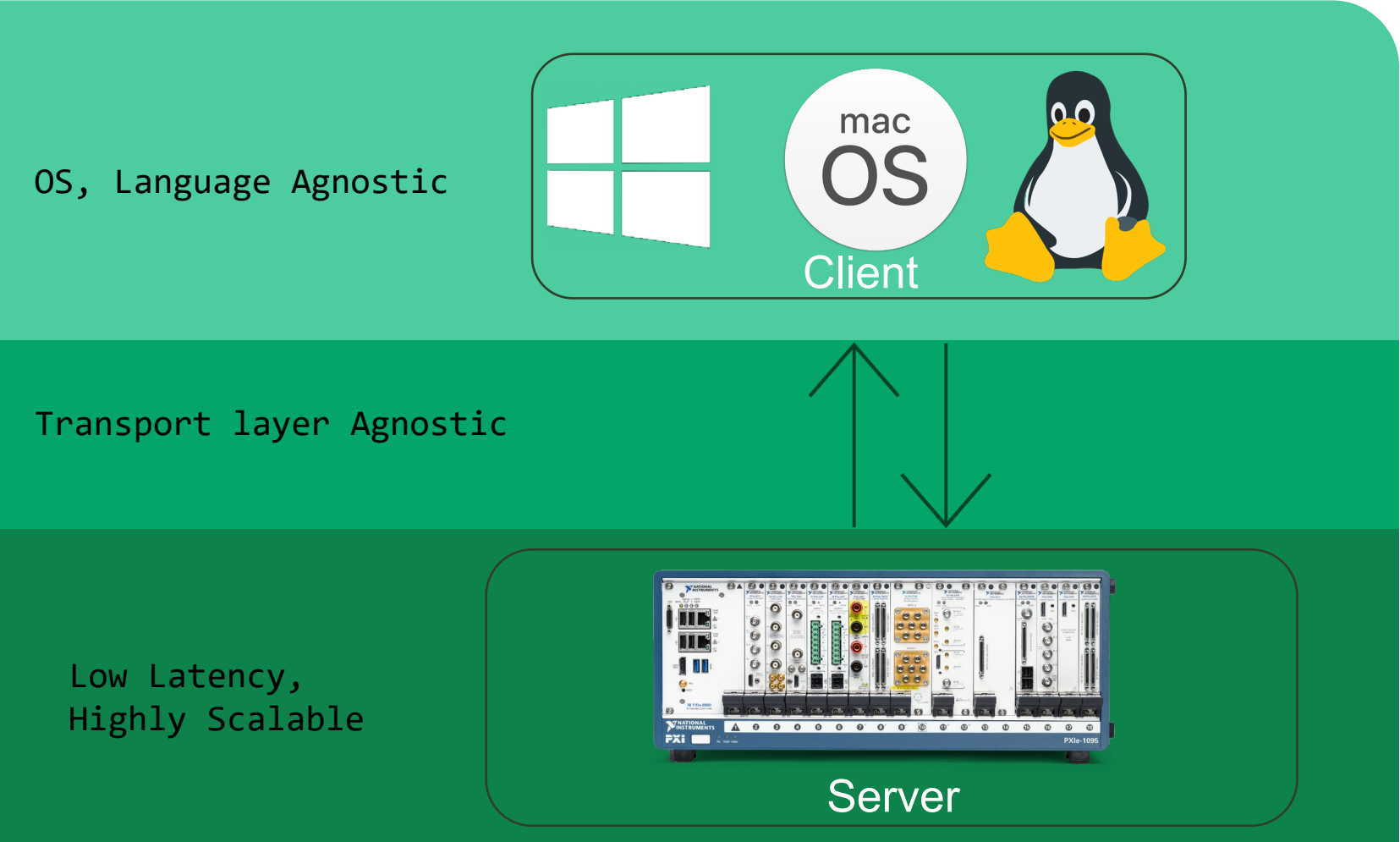
Python API

- Supports passing of Python classes as parameters
- New LabVIEW refnum to represent Python class object
- These refnums can then be passed/wired to "Call Python Node" to python functions which accepts Python class objects as input



NI Remote-Ability

Communication from anywhere, with any language, on any OS

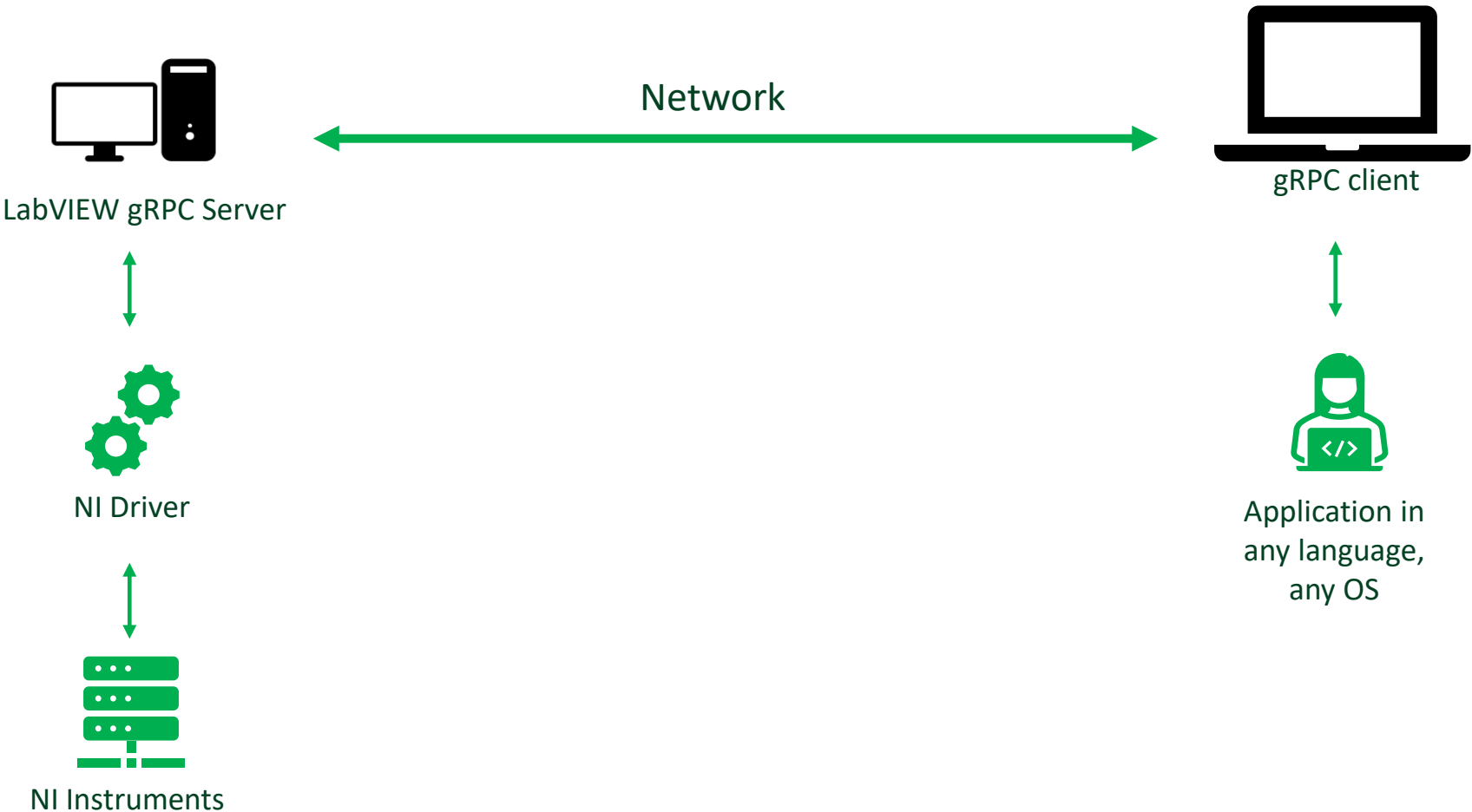


Benefits

- Remotely control NI Hardware and Software
- Minimize time to first measurement
- Leverage existing workflows
- Avoid driver installation on client

How a LabVIEW gRPC Application Works

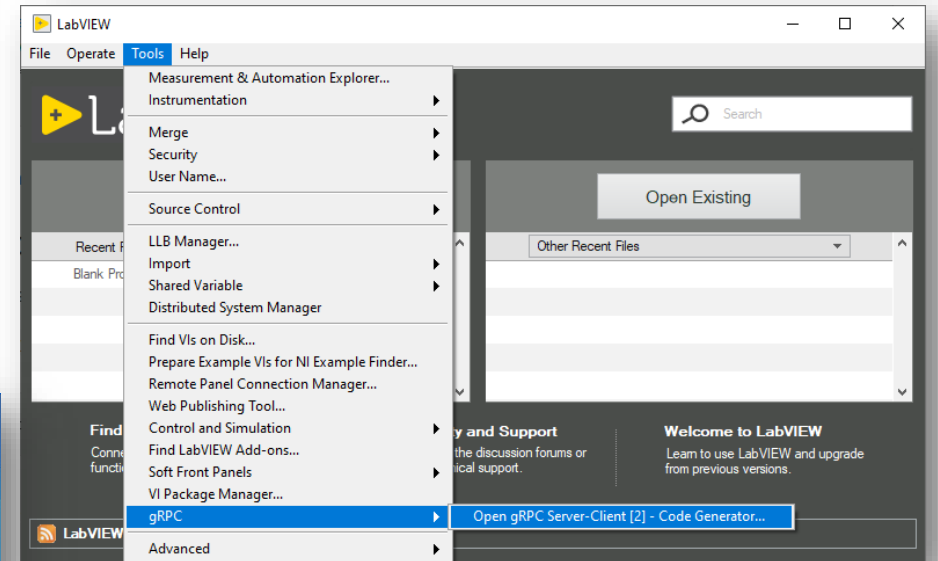
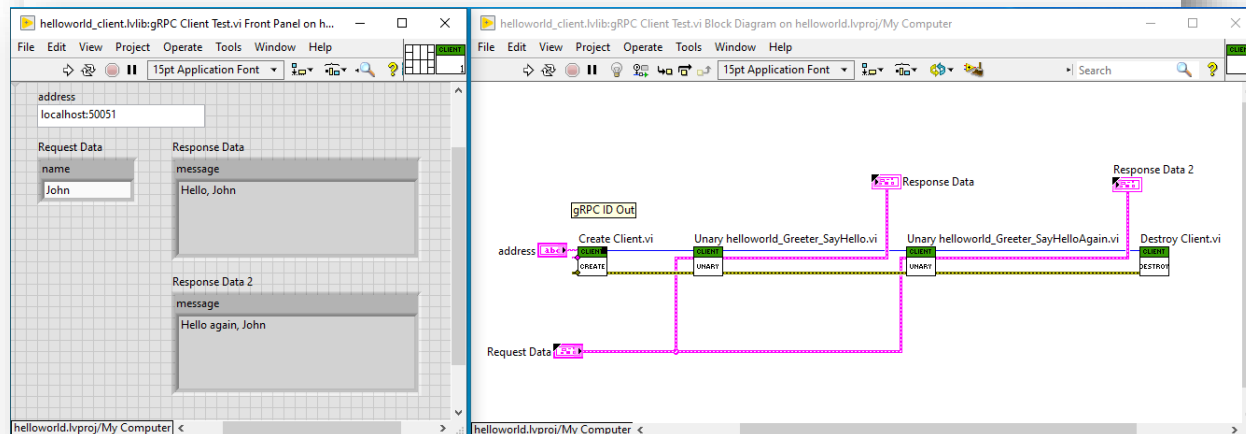
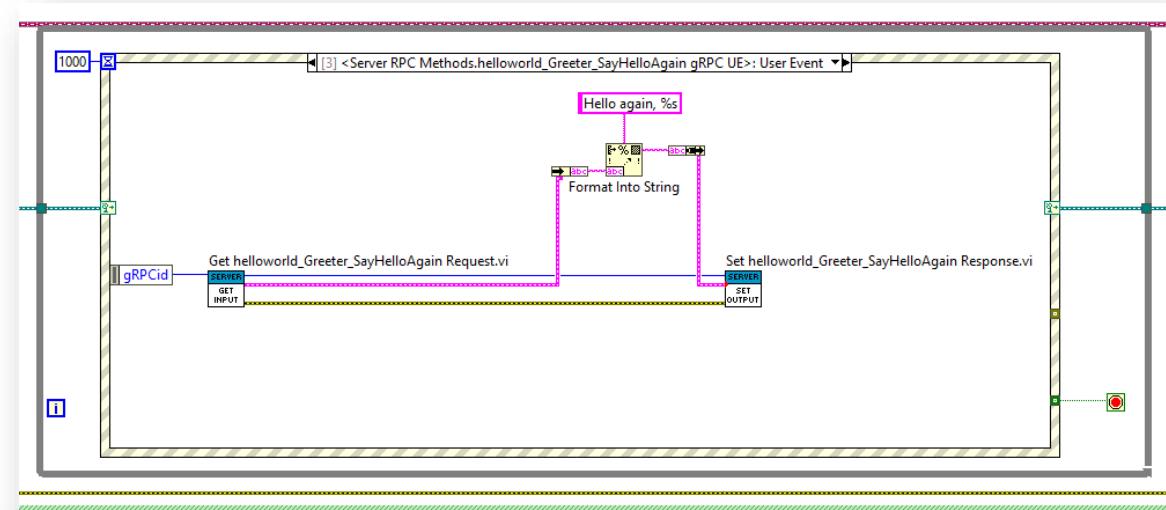
gRPC is an open-source remote procedure call (RPC) framework that can run anywhere



grpc-LabVIEW

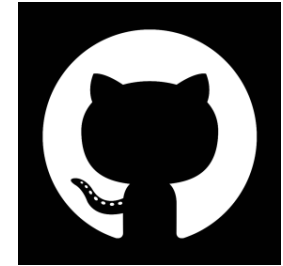
gRPC Client and Server support for LabVIEW

<https://github.com/ni/grpc-labview>



gRPC Code Packaging and Delivery

- LabVIEW gRPC support will be delivered as independent VIPM package
- Available to download from NI Tools Network
- Released independently of LabVIEW 22Q3 releases
- The project is hosted in GitHub and open to public contribution
- Initial release only includes desktop support (not NI Linux RT)



<https://github.com/ni/grpc-labview>

Connecting to Remote Test Systems by Chris Cifra

Tuesday May 24 – 2:30 PM – 3:15 PM CDT
Meeting Room 17AB

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LabVIEW Real-Time and FPGA Modules

LabVIEW Real-Time Continued Investment

- 64-bit RT module development support complete, so that you can use 64-bit version of LabVIEW for both desktop and RT application development
 - CompactRIO 64-bit driver support releasing in 2022 Q4 version
- ELVIS III and myRIO LabVIEW 2021 support planned in H2



LabVIEW 2021

- Base support
- Scan engine
- PXI support

LabVIEW 2022 Q3

- Watchdog
- Modbus API and IO Server
- NI Trace Viewer

LabVIEW 2023+

- Improvements to RT deployment Workflows

LabVIEW FPGA Improvements

Xilinx® Compilation tool support upgraded from
Vivado 2019.1 to Vivado 2021.1*



Benefits from upgrading

- Better Quality of Results (QoR) for newer FPGA families
- New timing-driven logic cone resynthesis optimizations that reduce logic levels

NI hardware with Xilinx UltraScale+ FPGAs can take advantage of this upgrade

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Roadmap



LabVIEW Roadmap

	Capability	Upcoming 1-2 Releases	Future Development
Project Management	Improvements to workflows with source code control tools	✓	✓
	LabVIEW VI compare tool included in all editions (Base, Full, Pro)	✓	
	Driver version independence from LabVIEW (no need to update drivers for every new LabVIEW release)	✓	
	Improved LabVIEW Project Dependency Management	✓	✓
Interoperability	Call Python code running in virtual environments		✓
	Deploy Python scripts to NI Linux RT devices		✓
	Native gRPC server/client interfaces in LabVIEW	✓	✓
	Better integration with MATLAB® for debugging between environments	✓	
	Support for calling .NET Core Assemblies (.NET 5 or later)		✓



LabVIEW Roadmap

	Capability	Upcoming 1-2 Releases	Future Development
System Support	Support for Windows 11	✓	
	Support for MacOS on Apple M1 devices	✓	
	LabVIEW RT/FPGA 64-bit module support for CompactRIO	✓	
	Data Communication additions (SSH API, IPv6 support)		✓
UI Improvements	Support for Unicode in the IDE	✓	✓
	Introducing Data Grid Control		✓
	Dynamically create controls at runtime		✓
	Improve LabVIEW IDE experience on high resolution monitors (e.g. 2560 x 1440)	✓	

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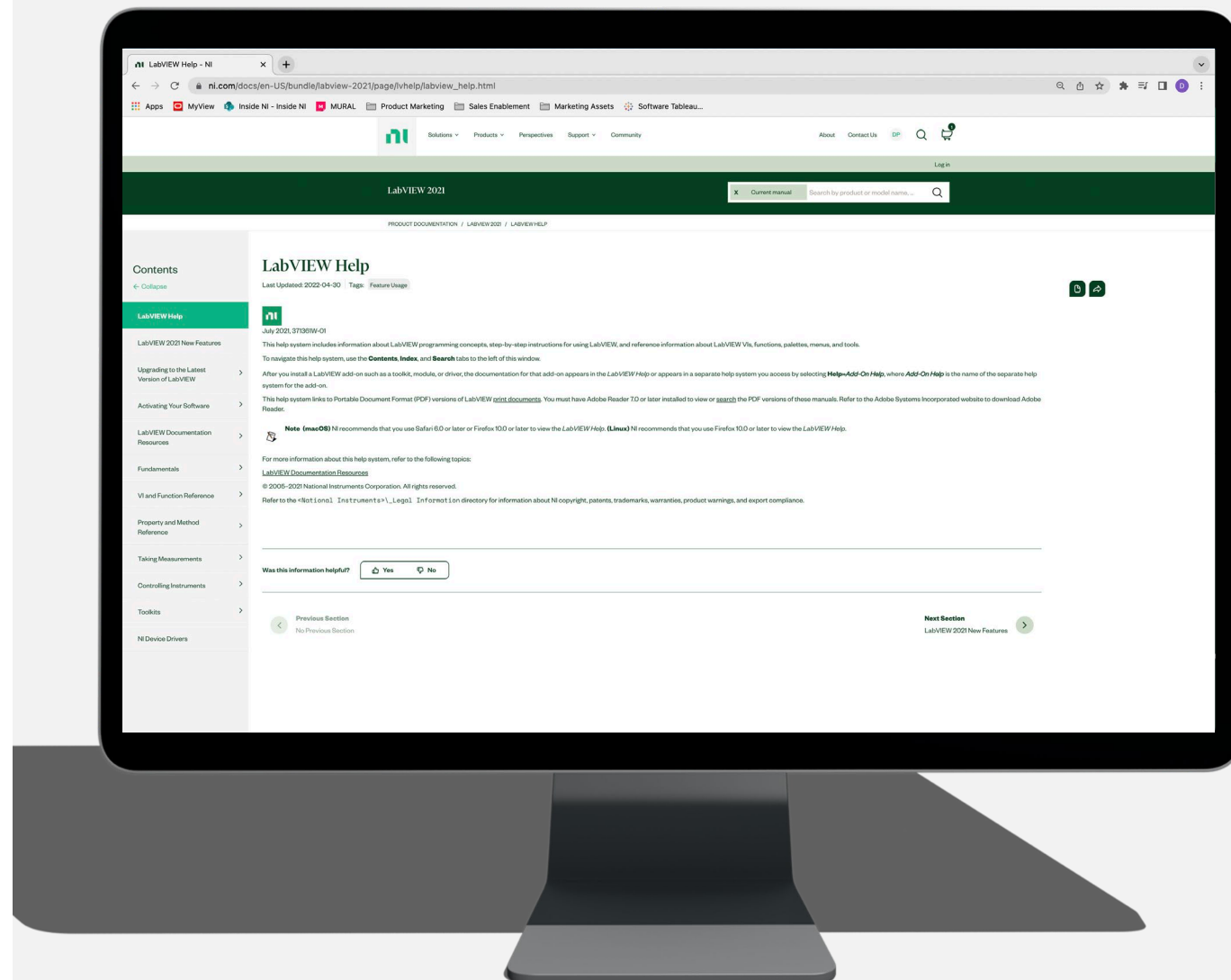


Additional Resources

Check out the LabVIEW 2022 Q3 Beta today online!

New Online Help Experience!

Updated LabVIEW Core 1 and Core 2 Courses



GDevConN.A., GDevCon, GLA

GDevCon N.A. (<https://gdevconna.org/>)

- July 19-21, 2022
- Golden CO, USA

GDevCon (<https://www.gdevcon.com/>)

- September 8-9, 2022
- Amsterdam

GLA (<https://glasummit.org/>)

- November 14-15, 2022
- Global/Online

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