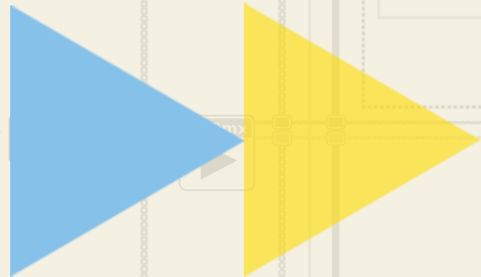


NIIWeek

FUTURE

FASTER


MAY 21-24, 2018, AUSTIN, TEXAS



Bringing Down The Barrier - A Pragmatic View on Software Design

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Quote

“

Perhaps the greatest strength of an object-oriented approach to development is that it offers a mechanism that captures a model of the real world.

”

Grady Booch



Your takeaways

- Starting with Object Oriented Development is not as hard as it may seem at first glance
- LabVIEW classes are easy!
- Confidence to take that first step
- You know tools that help you visualize the big picture and give you a huge productivity boost with OOD / OOP in LabVIEW and NXG
- You'll know just enough UML to be (not too) dangerous

Disclaimer

- I am not a UML or OO guru
- I use UML in a pragmatic way (*which is “just about correct”*)
- Yes, I hope you will start using the tools I will show you later on 😊

But wait...

- It's such a lot of extra work, all these extra files
- Creating classes and it's components is a hassle, a lot of extra clicks
- I don't need it! (*But, you do... You just don't **know** it yet!*) 
- All these frameworks I hear of all the time, the terminology, principles, design patterns... Where do I start? 



The Why

- Maintainability (be nice to future you!)
 - Extensibility (Ideally only add code to add functionality)
 - Testability (modular code is easier to (automatically) test)
 - Reliability (Result of all of the above!)
-
- You can use UML to communicate your ideas!
 - Just need to stick to some basic rules



Quote

“

Perhaps the greatest strength of an object-oriented approach to development is that it offers a mechanism that captures a model of the real world.

”

Grady Booch

Basic Object Oriented Design Concepts

Three Pillars:

- **Encapsulation**

An object:

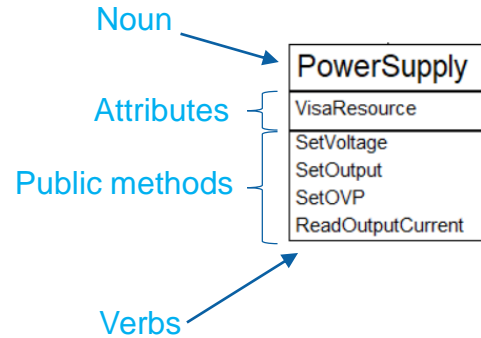
- Encapsulates data and the methods that act upon that data
- Group of VIs with a common responsibility

- **Inheritance**

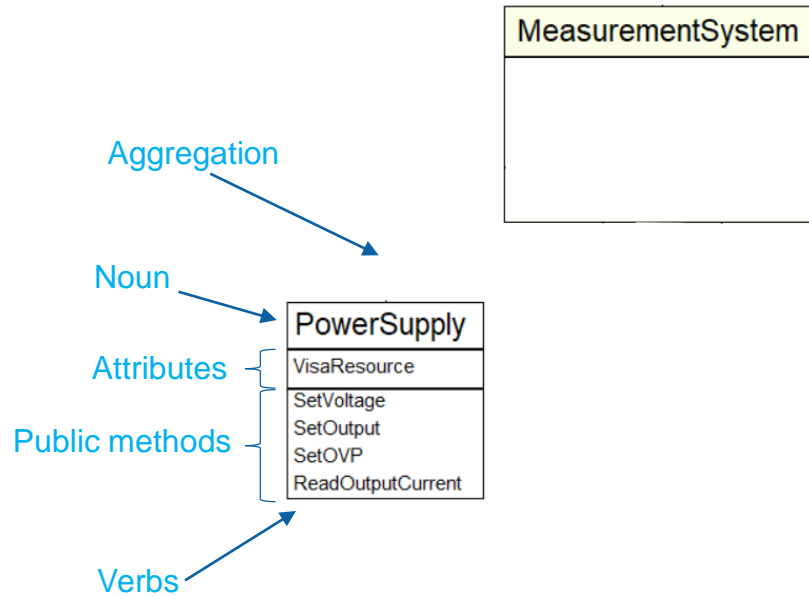
- **Dynamic Dispatching (Polymorphism)**

Think in terms of objects and actions, instead of VIs and sub-VIs

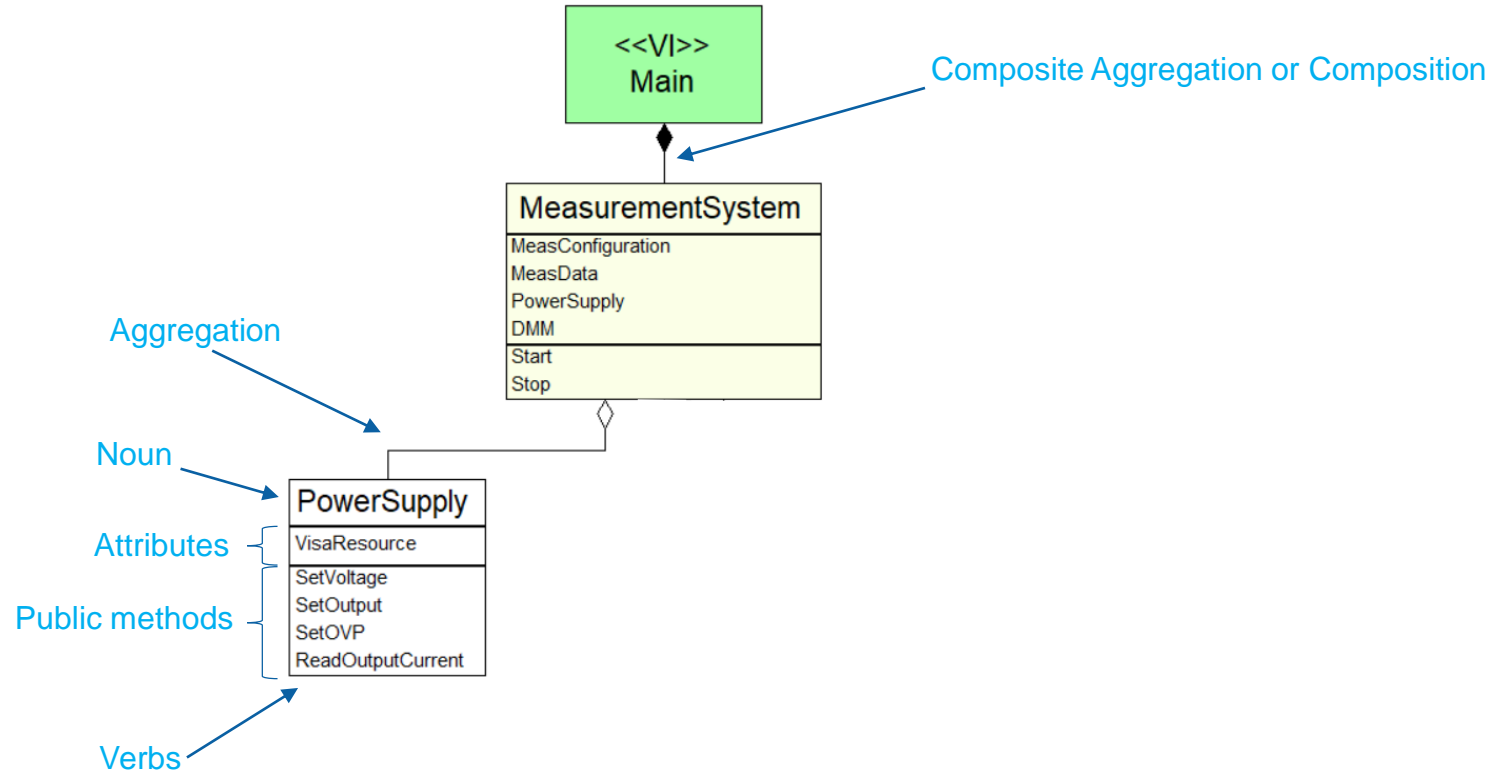
Class diagram – A Measurement System



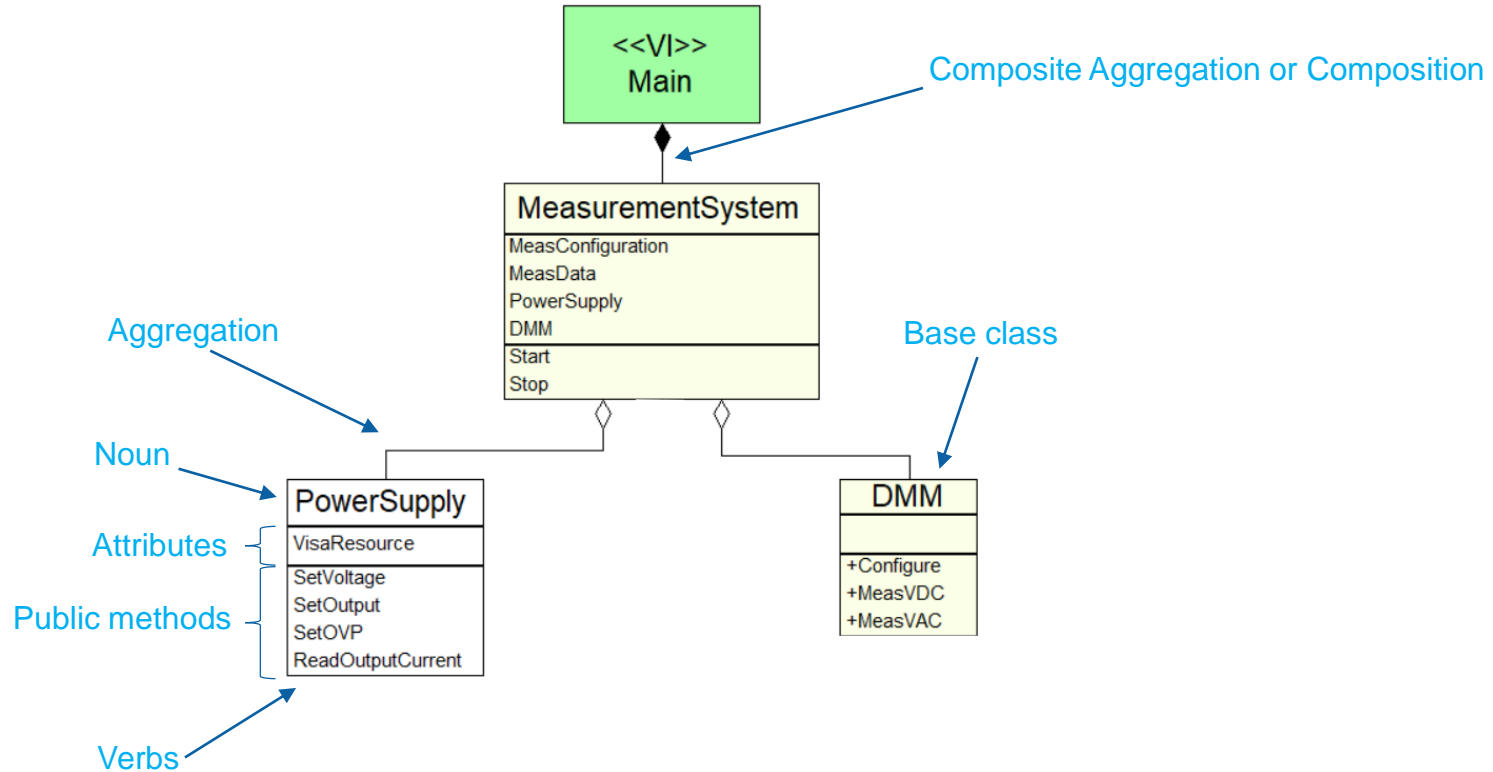
Class diagram – A Measurement System



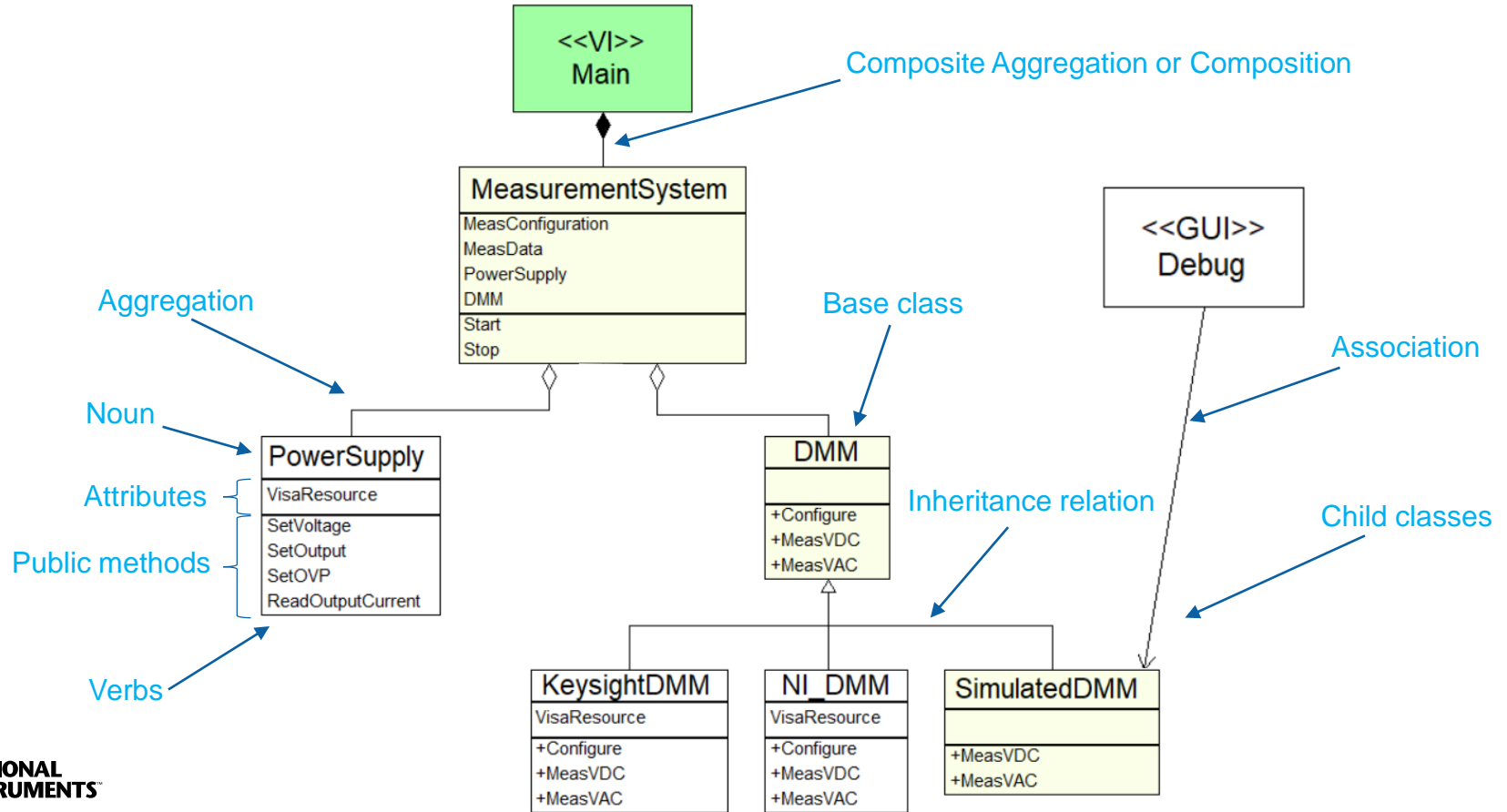
Class diagram – A Measurement System



Class diagram – A Measurement System

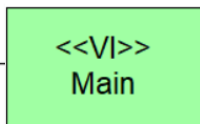


Class diagram – A Measurement System



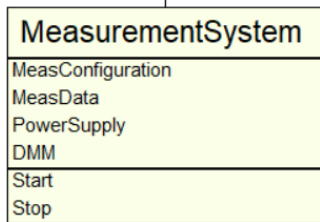
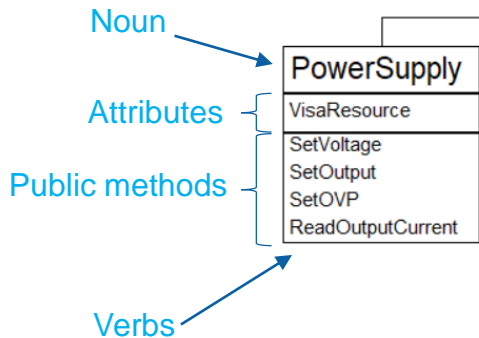
Class diagram – A Measurement System

Main is the toplevel VI for our **MeasurementSystem**. It is responsible for creating all necessary HW objects and passing them to the measurement system.



Composite Aggregation or Composition
Main **Owns** MeasurementSystem

MeasurementSystem **Contains** PowerSupply
Aggregation



Base class

NI_DMM **Is a** DMM
Inheritance relation

Debug **Uses** SimulatedDMM
Association

Child classes

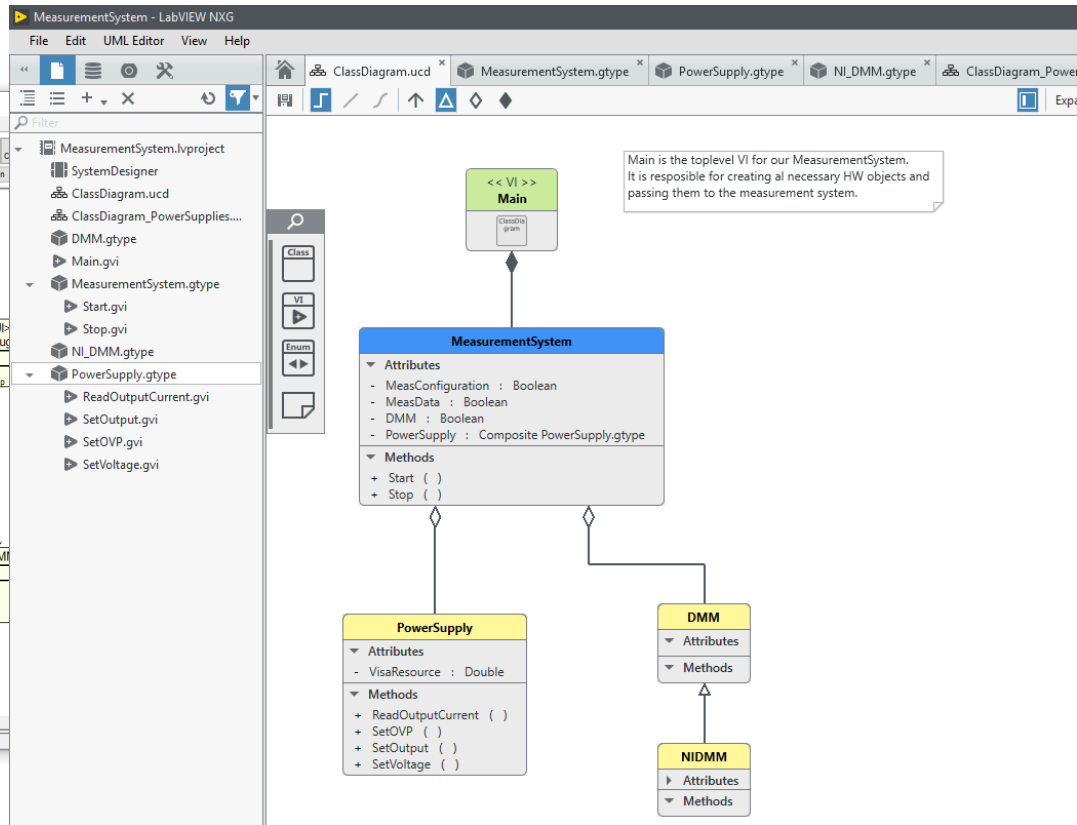
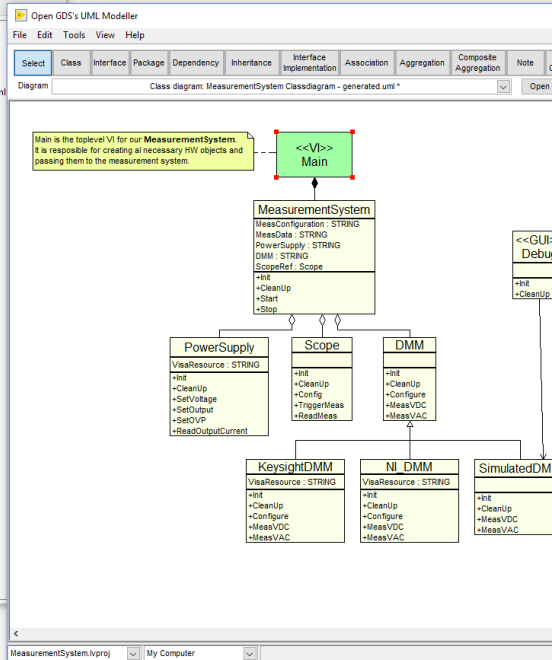
MeasurementSystem.lvproj - Proj...

File Edit View Project Operate Tools Window Help

Items Files

Project: MeasurementSystem.lvproj

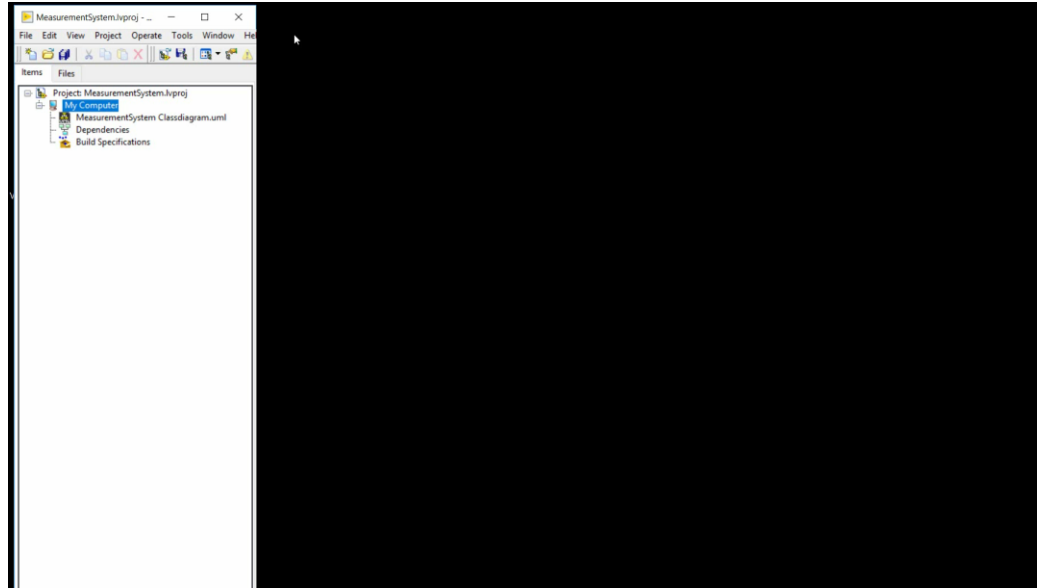
- My Computer
 - Debug.lvclass
 - DMM.lvclass
 - KeysightDMM.lvclass
 - MeasurementSystem.ClassDiagram.uml
 - MeasurementSystem.lvclass
 - private
 - protected
 - MeasurementSystem_Init.vi
 - CleanUp.vi
 - Start.vi
 - Stop.vi
 - NI_DMM.lvclass
 - private
 - protected
 - NI_DMM_Init.vi
 - CleanUp.vi
 - Configure.vi
 - MeasVDC.vi
 - MeasVAC.vi
 - PowerSupply.lvclass
 - Scope.lvclass
 - SimulatedDMM.lvclass
 - private
 - protected
 - SimulatedDMM_Init.vi
 - CleanUp.vi
 - MeasVDC.vi
 - MeasVAC.vi
 - Untitled 19
 - Dependencies
 - Build Specifications



OpenGDS Demo

opengds.github.io/ or

<http://sine.ni.com/nips/cds/view/p/lang/nl/nid/209038> for the NI supported version.



UML Class Editor Add-on for LabVIEW NXG

Demo

Stay in the loop!

For state-of-the-art fully
integrated UML Class Editing
and code synchronization for
LabVIEW™ NXG!





uml-addon.com

Did you know..?

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Did you know..?

Call Setup

LabVIEW automatically looks in current directory
Right-click on VI and select Call Setup to call it dynamically

subVI

Path constant, relative path → Other_VI.vi → Open VI Reference

When using classes: opening a reference to a method that is a member of the same class → ThisClass.lvclass:OtherMethod.vi → Open VI Reference

3 simple ways to open a reference to a VI next to current VI on disk.

4G LTE 12:54 PM

MIWeek Surveys

Title
Processing at the Edge: Why a Platform-Based Approach Is Ideal for the IIoT

Time
Tuesday, 1:00 PM - 2:00 PM

Speaker(s)
Nick Butler

Nick Butler

*1. Please rate the session content on the following

Overall Quality
- select one -

Technical Level
- select one -

Relevance to your job
- select one -

Relevance to published title and abstract
- select one -

Nick Butler

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