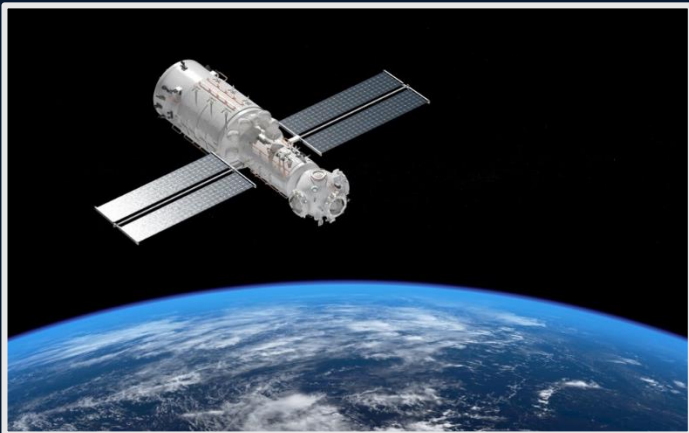


MATLAB EXPO

What's New in MATLAB and Simulink R2023a

Vijayalayan R, MathWorks







Software-Defined Systems

7,39,080

```
>> datestr(739080)
```

```
ans =
```

```
    '13-Jul-2023'
```

```
>> todays_date = datetime('today')
```

```
todays_date =
```

```
datetime
```

```
    '13-Jul-2023'
```

```
>> todays_date -1
```

```
todays_date =
```

```
datetime
```

```
    '12-Jul-2023'
```



categorical



table



datetime



duration



calendarDuration



timetable



string



Bus



Connection Bus



Value Type



Alias Type



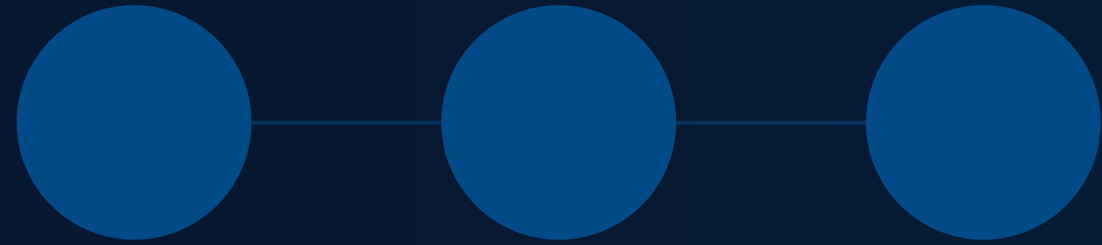
Numeric Type



Enum Type

Types

3,662

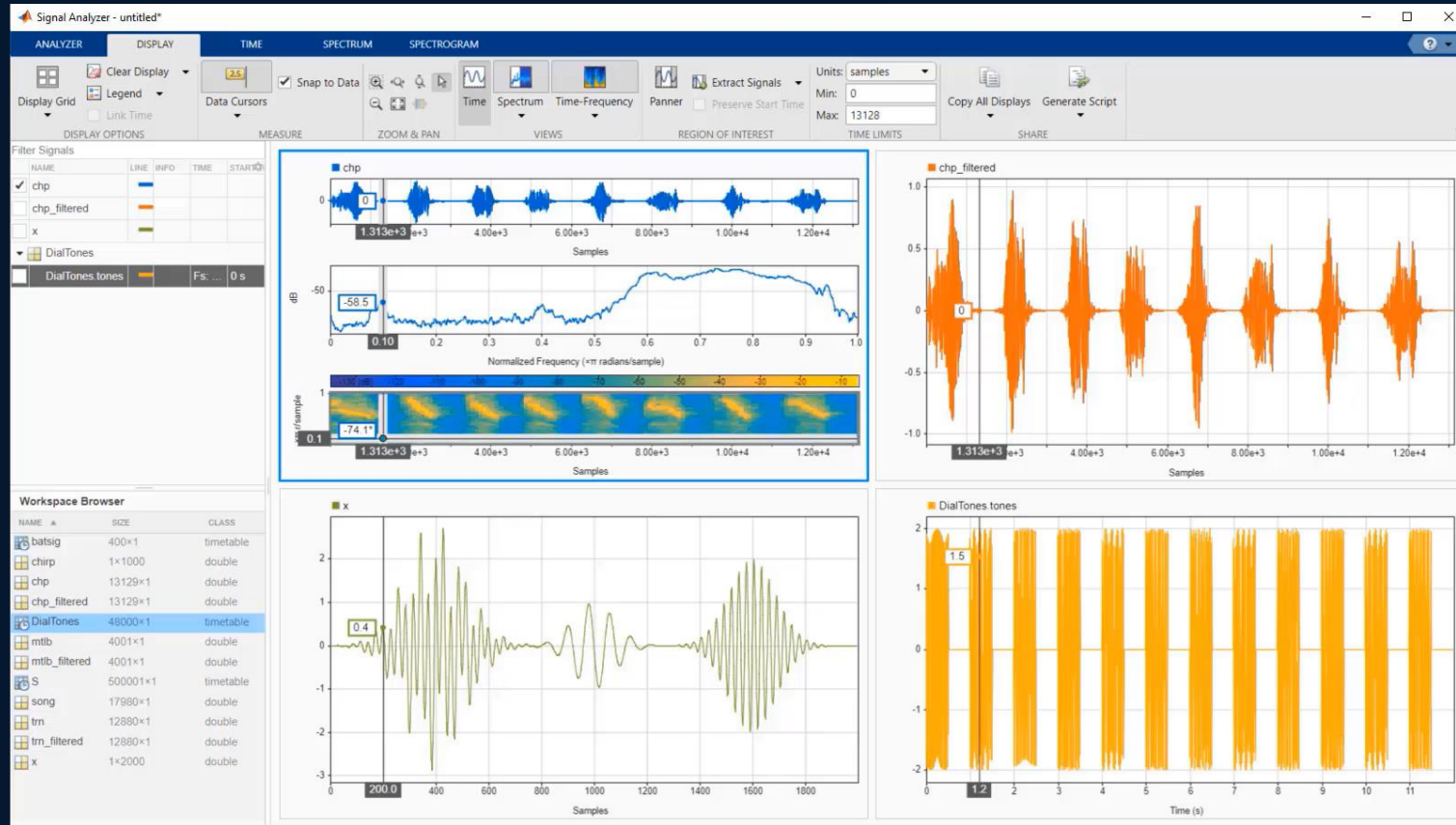


Ease of Use

**Software
Development**

Integration

Low code capabilities



★ FAVORITES



Curve Fitter



Optimization



PID Tuner

System
IdentificationWireless
Waveform G...Signal
AnalyzerInstrument
ControlSimBiology
Model BuilderSimBiology
Model Analy...

MATLAB Coder

Application
CompilerAnalog Input
RecorderAnalog
Output Gen...Modbus
ExplorerWeb App
Compiler

MATLAB

Class Diagram
Viewer

Code Analyzer

Code
Compatibilit...

Data Cleaner

Dependency
Analyzer

Profiler

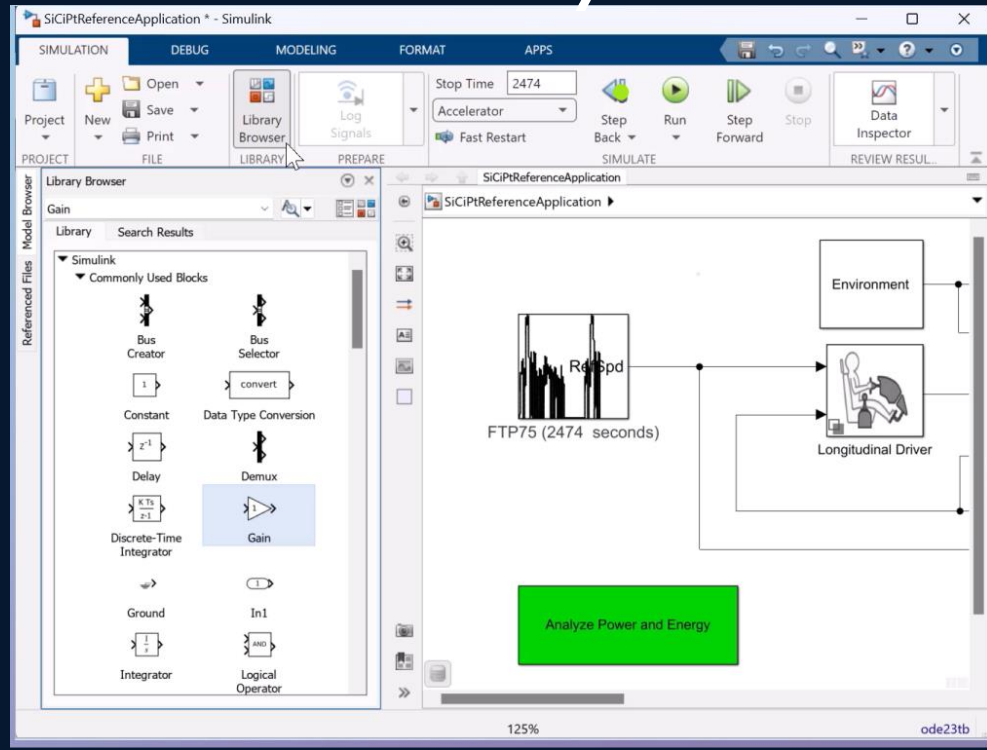


Test Browser

MACHINE LEARNING AND DEEP LEARNING

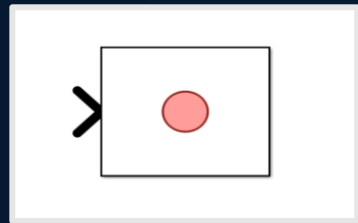
Classification
LearnerDeep Network
DesignerDeep Network
QuantizerExperiment
ManagerNeural Net
ClusteringNeural Net
FittingNeural Net
Pattern Rec...Neural Net
Time SeriesRegression
LearnerReinforcement
Learning De...

Embedded Library Browser

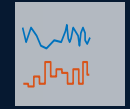
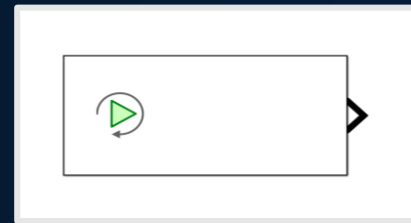


Fast and repeatable tests

Record Block



Playback Block



Step through a Simulation

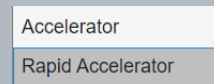
Improve Performance of Simulations



Model Referencing



Fast Restart



Accelerator Modes



Simulink Cache



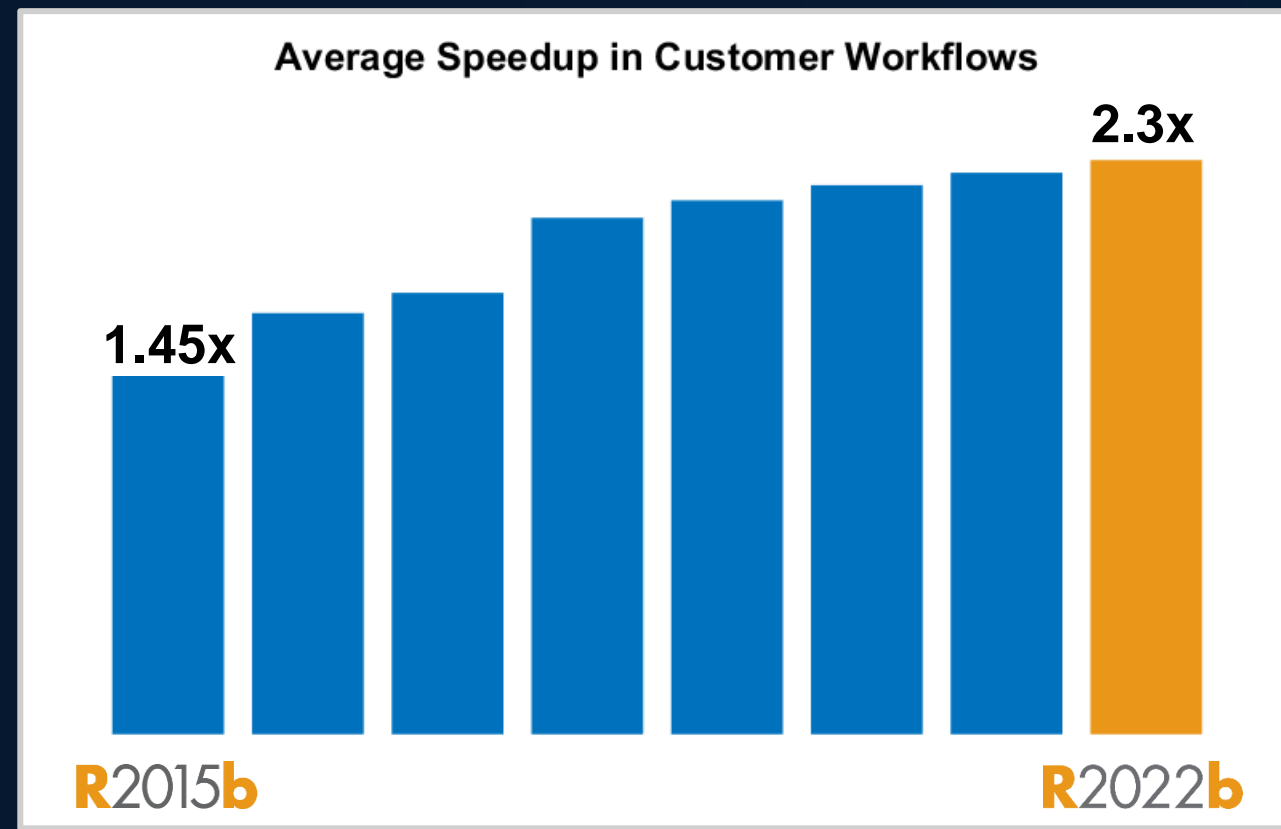
Performance Advisor



Multi-Core Co-Simulation

SIMD

Hardware Acceleration

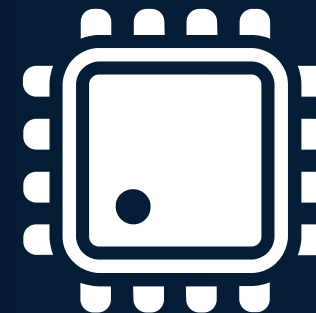


Functions **1.6x**

Function handles **40x**







Code Analyzer

The Code Analyzer identifies and addresses code issues, including problems and areas for improvement.

Overall Summary

11

total files



0

Error



8

Warning



4

Info

Select Folder

/Users/mhirsch/Library/CloudStorage/OneDrive-MathWorks/mfiles/Demos/TwitterAnalysis

Rerun Analysis

Group by Severity

Filter by Severity

Filter by Issue Type

Code Health Details

Analysis Date: 3/31/2023, 5:28:42 PM

Warning (8)

- ▶ Input argument might be unused. Consider replacing the argument with ~ instead. (3)
- ▶ To avoid conflicts with functions on the path, specify variables to load from file. (3)
- ▶ Variable might be used before it is defined. (1)
- ▶ Value assigned to variable might be unused. (1)

Info (4)

- ▼ Add a semicolon after the statement to hide the output (in a script). (3)

Fix All

[Line 3](#)

Script1_ImportTwitterData.m `c = twitter(c.ConsumerKey,c.ConsumerSecret,c.AccessToken,c.AccessTokener`

Fix

[Line 14](#)

Script1_ImportTwitterData.m `statuses = [statuses;sRefresh.Body.Data.statuses]`

Fix

[Line 47](#)

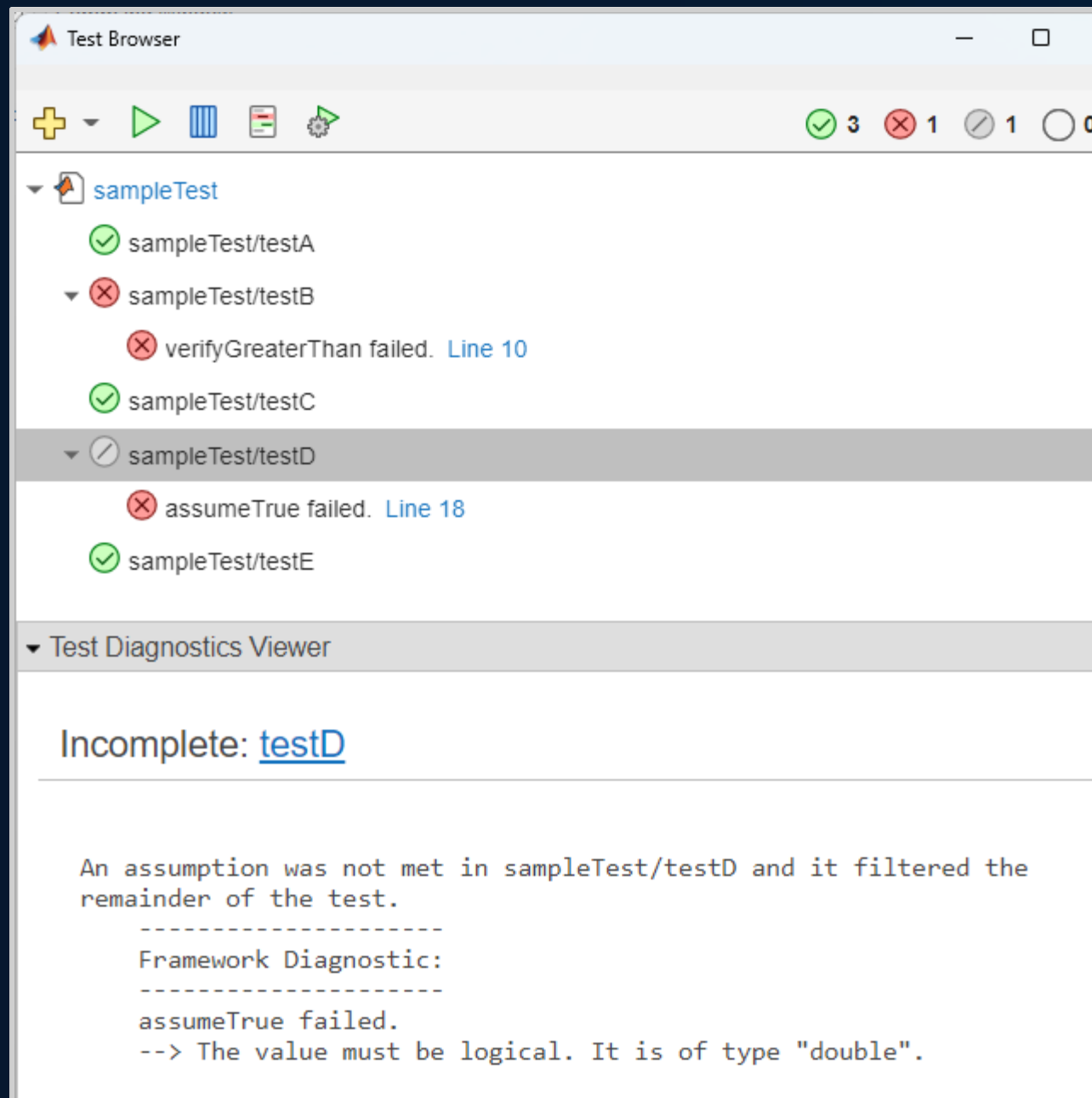
Script1_ImportTwitterData.m `tweets = timetable(tweetTexts,'RowTimes',datetime(tweetTimes,'Format'`

Fix

| | Fix All |
|--|---------|
| <code>ccessToken, c.AccessToker</code> | Fix |
| <code>es]</code> | Fix |
| <code>time(tweetTimes, 'Format'</code> | Fix |

```
2  
3 evalin("base", "newvar = " + x)  
4
```

 Flight Analysis Team standards prohibit use of evalin.



Test Browser

Summary: 3 passed, 1 failed, 1 skipped, 0 pending

- sampleTest
 - sampleTest/testA
 - sampleTest/testB
 - verifyGreaterThan failed. [Line 10](#)
 - sampleTest/testC
 - sampleTest/testD
 - assumeTrue failed. [Line 18](#)
 - sampleTest/testE

Test Diagnostics Viewer

Incomplete: [testD](#)

An assumption was not met in sampleTest/testD and it filtered the remainder of the test.

```

-----
Framework Diagnostic:
-----
assumeTrue failed.
--> The value must be logical. It is of type "double".
  
```

MATLAB Test Manager: All Tests in Current Project

15 Total Tests

14 Passed

1 Failed

Test Details [Expand All](#)


| Test | Diagnostic |
|--|------------|
| <ul style="list-style-type: none"> tests/graph_unit_tests.m <ul style="list-style-type: none"> graph_unit_tests/check_unity_path graph_unit_tests/check_longest_path graph_unit_tests/check_edgeless_start graph_unit_tests/check_edgeless_graph graph_unit_tests/check_non_unique graph_unit_tests/check_invalid_idx_empty_adj graph_unit_tests/check_no_path graph_unit_tests/check_start_end_same | |

1 Error 0 Warning 2 Info

Coverage

| | |
|-----------|-------|
| Function | 100% |
| Statement | 53.7% |
| Decision | 80.6% |
| Condition | 76.7% |
| MC/DC | 53.3% |

Tests



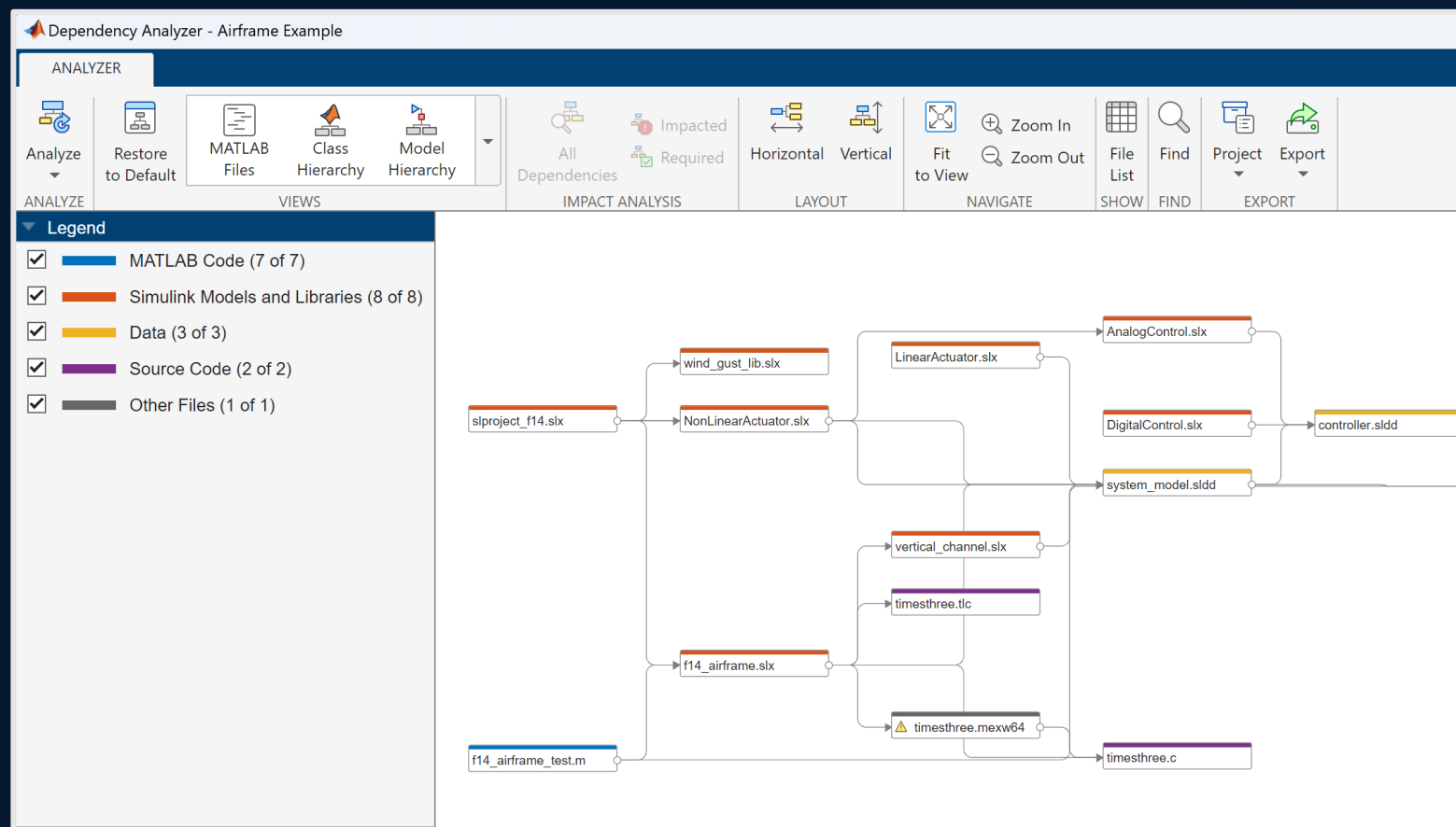
| | |
|------------|-------|
| Passed | 85.7% |
| Failed | 14.3% |
| Incomplete | 0% |
| Not Run | 0% |

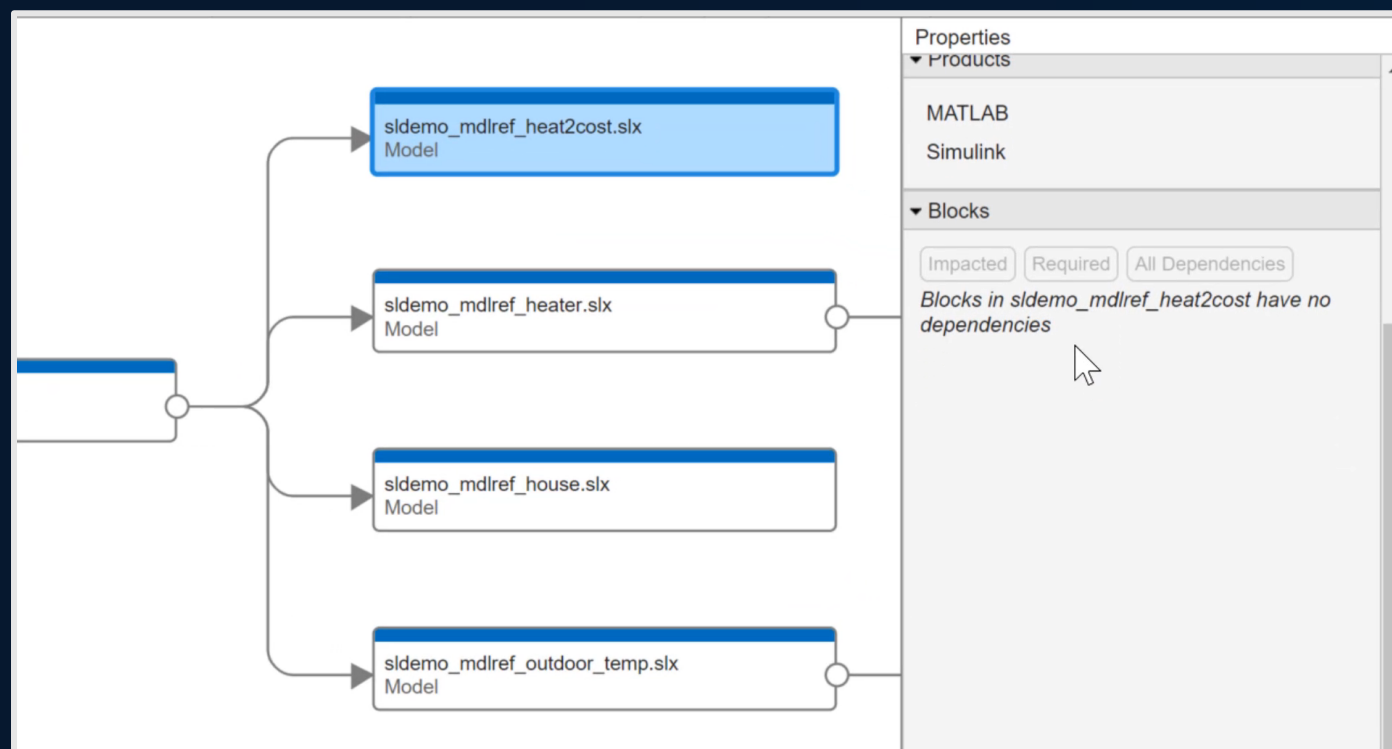
MATLAB Test


```
>> buildtool -tasks  
check    - Identify code issues  
test     - Run unit tests  
Toolbox  - Package Toolbox
```

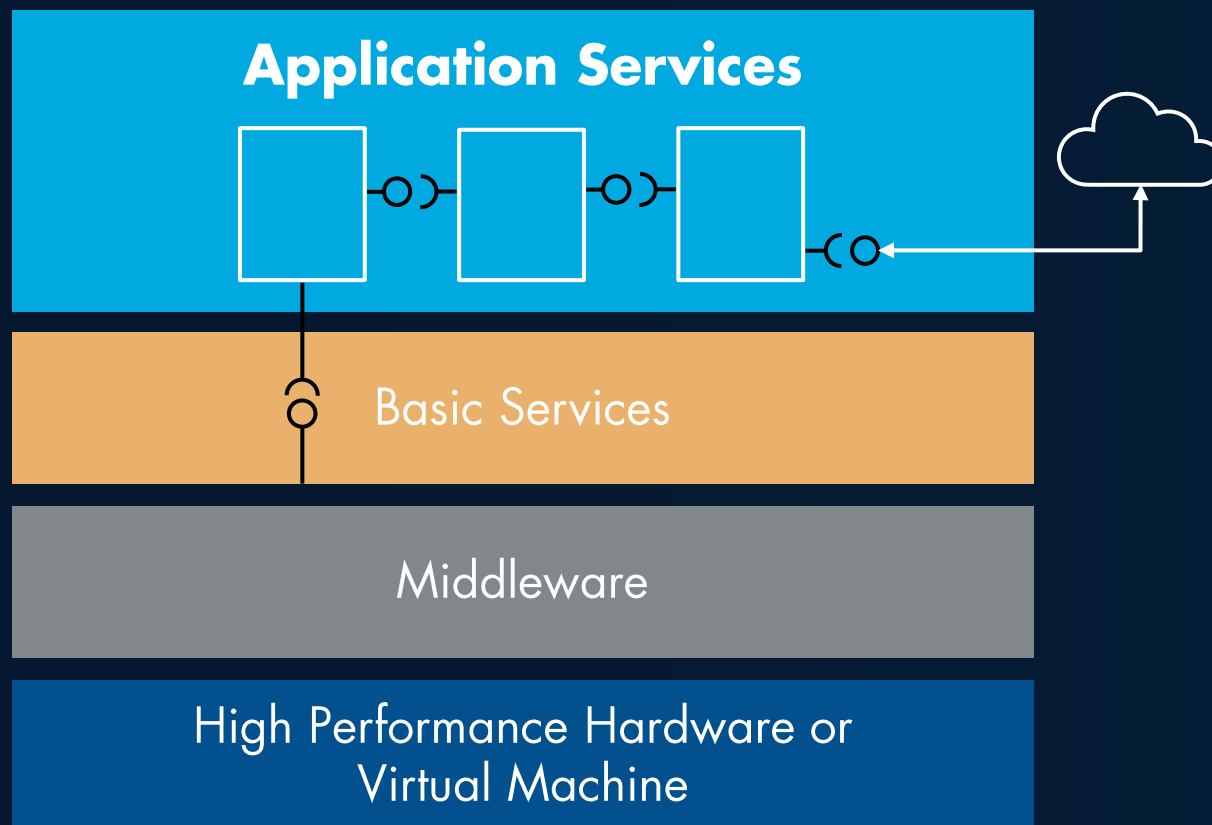
```
>> buildtool  
** Starting check  
** Finished check  
  
** Starting test  
** Finished test  
  
** Starting toolbox  
** Finished toolbox  
>>
```

Projects

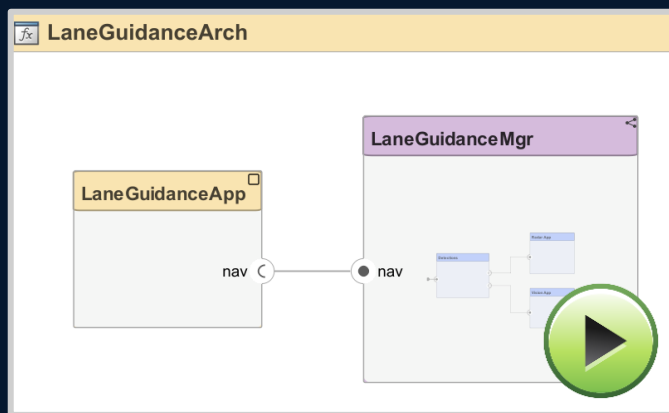




Service-Oriented Architecture (SOA)

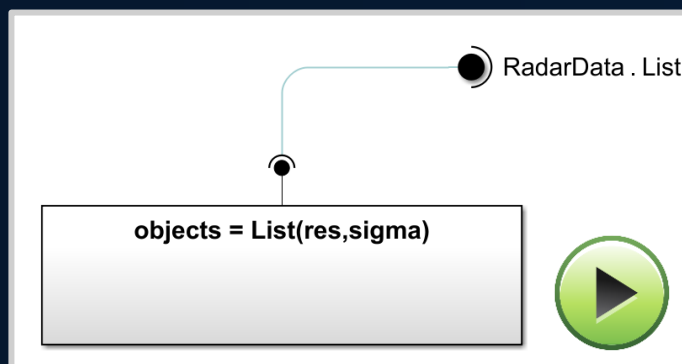


From **architecture** to **design**



Describe Architecture

From **design** to **code**

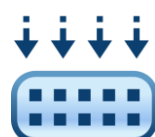


Implement Design

```

36 class scServiceInterfaceExample final
37 {
38     // public data and function members
39     public:
40     // Block signals (default storage)
41     struct B_scServiceInterfaceExample_T {
42         real_T fetchData_b;
43         real_T reset_d;
44         real_T fetchData_m;
45         real_T reset_p;
46     };
47

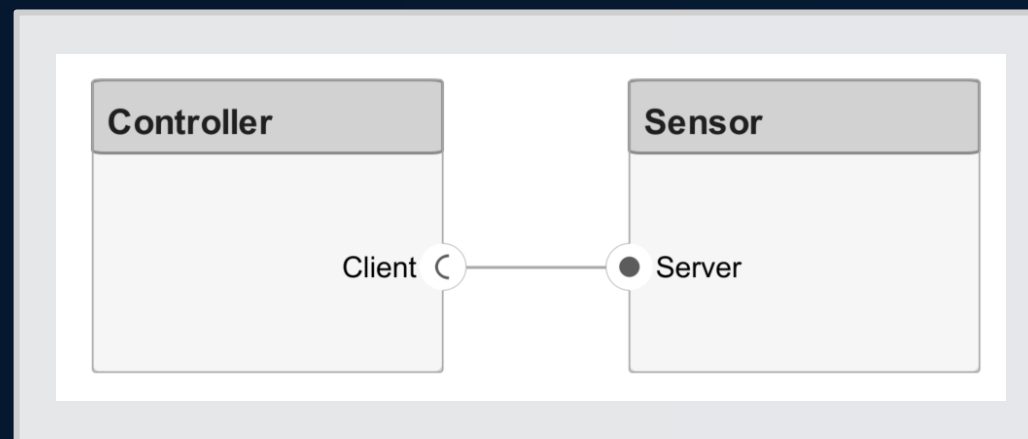
```



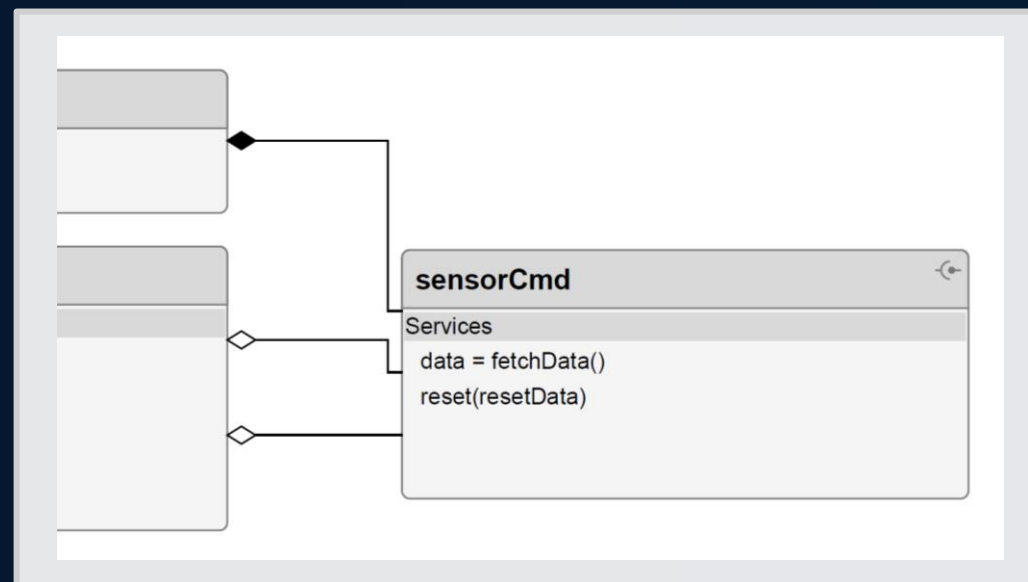
Generate C++ Code

Describe Architecture

Define

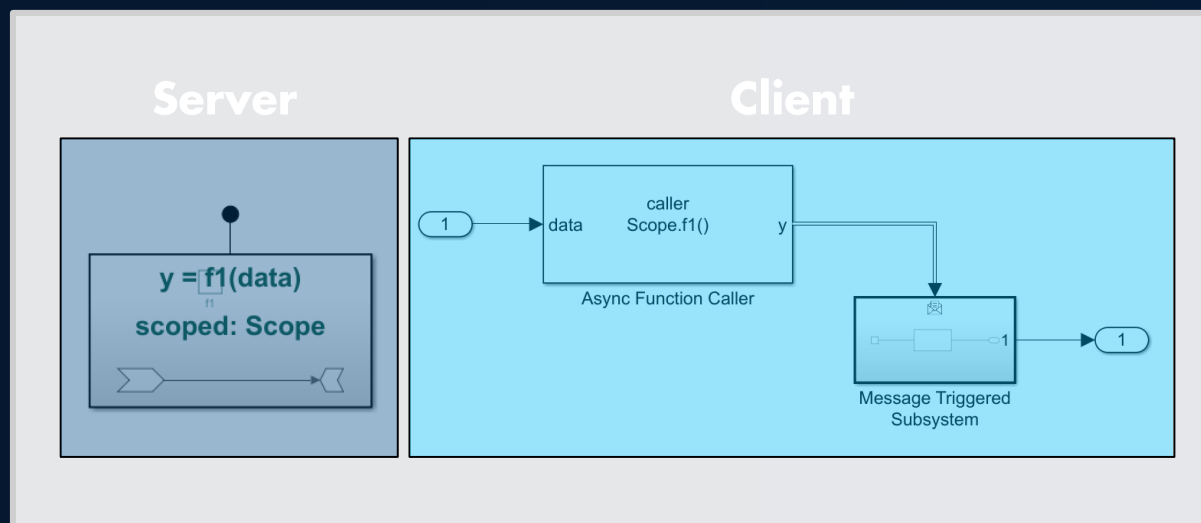


Visualize

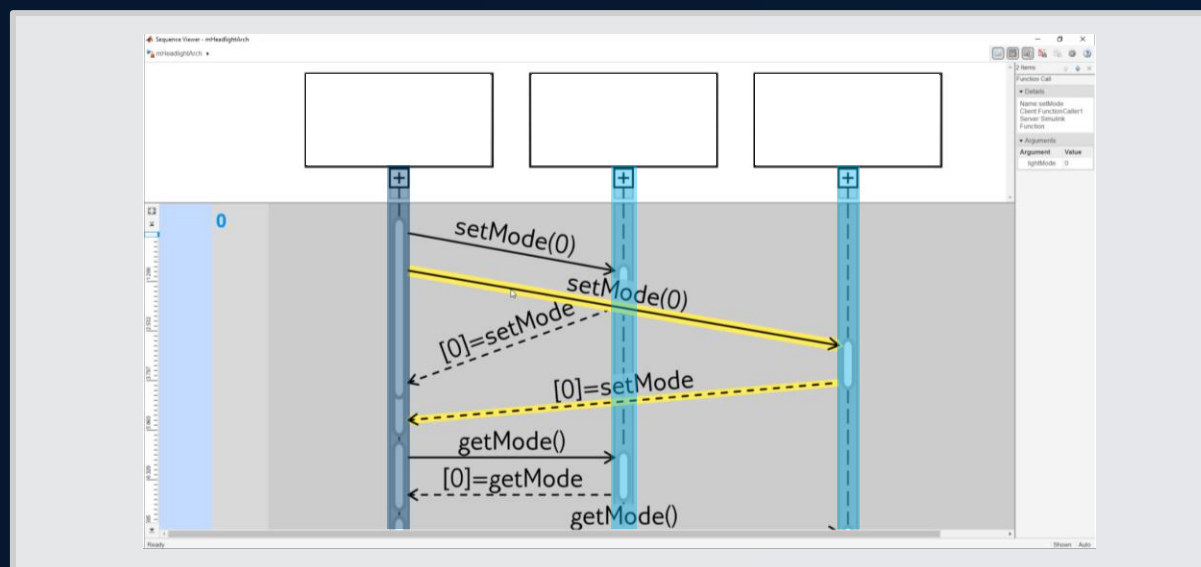


Implement Design

Model



Simulate




Generate Code

```

36 class scServiceInterfaceExample final
37 {
38     // public data and function members
39     public:
40     // Block signals (default storage)
41     struct B_scServiceInterfaceExample_T {
42         real_T fetchData_b;           // '<Root>/Sensor1'
43         real_T reset_d;              // '<Root>/Sensor1'
44         real_T fetchData_m;         // '<Root>/Sensor2'
45         real_T reset_p;             // '<Root>/Sensor2'
46     };

```



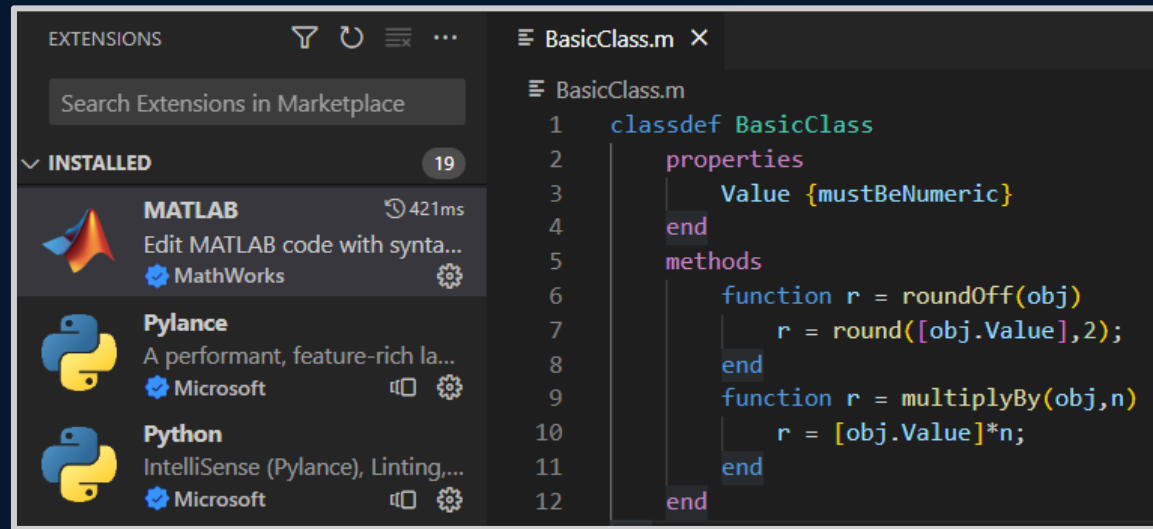
AUTOSAR



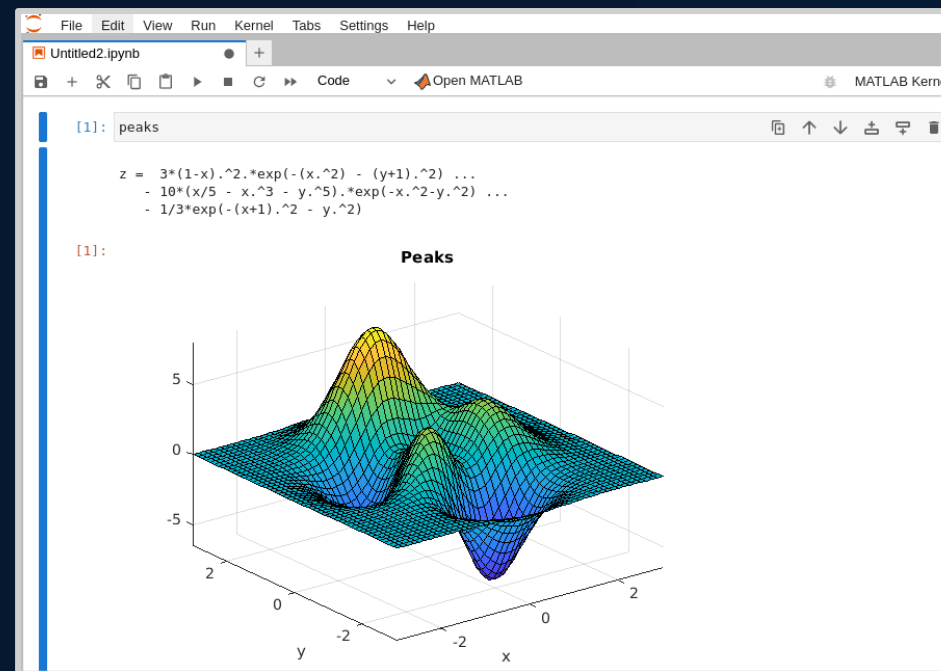
ROS



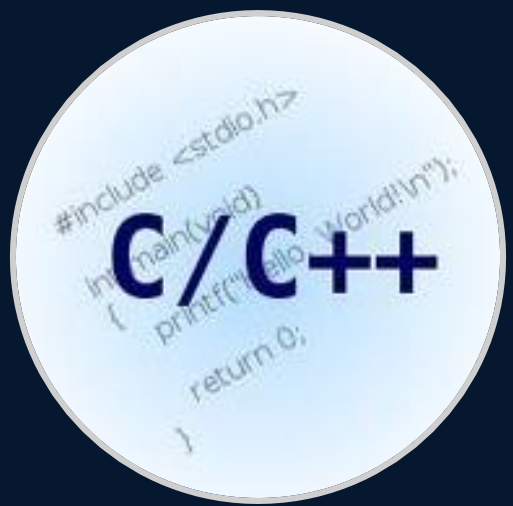




Visual Studio Code



Jupyter





R2017b

FMU
Import

FMU Import

R2018b

<FunctionName>

C Caller

R2020a

C

C Function

R2021a



Code Importer

R2022a

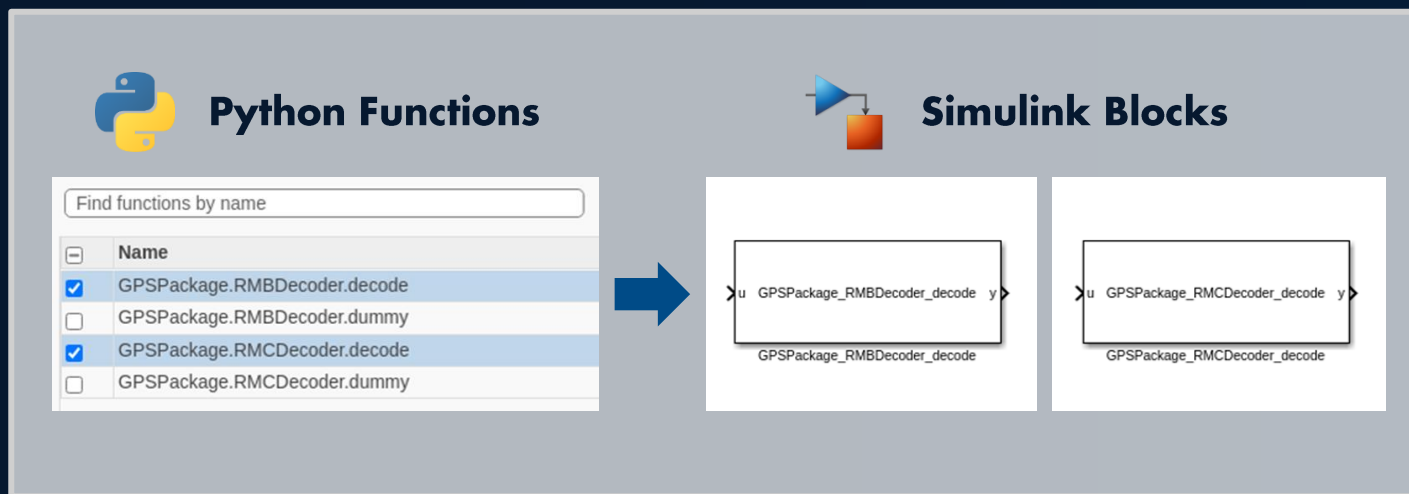
C

C Function
Supports C++

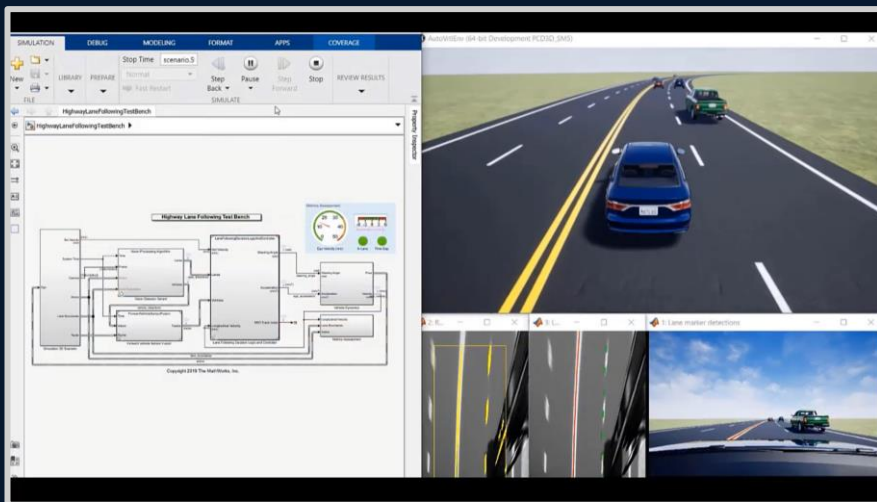
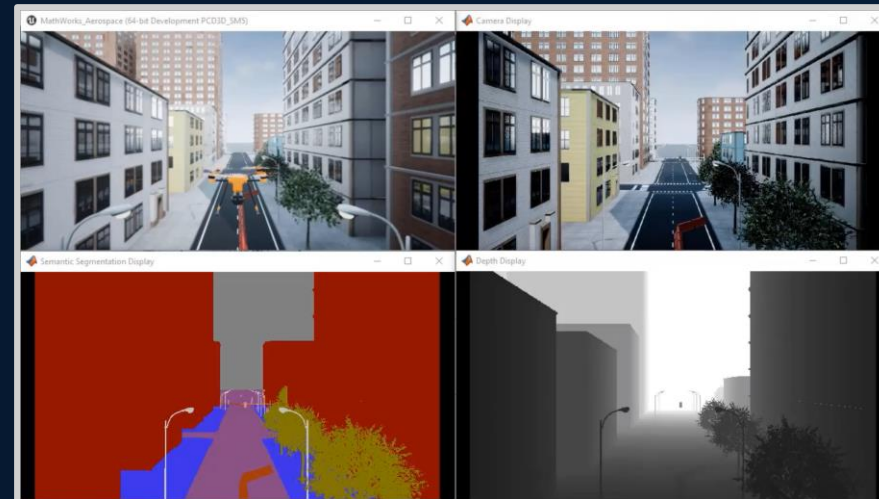
R2023a



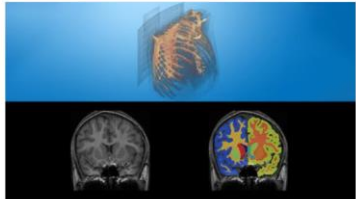
Python Importer



3D Visualizations

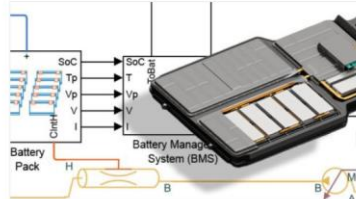


New Products



Medical Imaging Toolbox

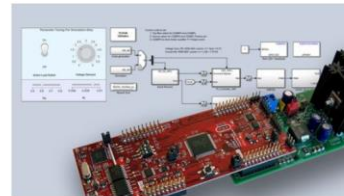
Visualize, register, segment, and label 2D and 3D medical images



Simscape Battery

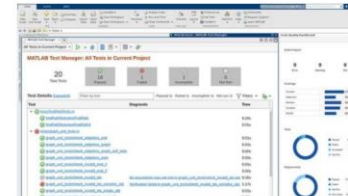
Design and simulate battery and energy storage systems

New Products



C2000 Microcontroller Blockset

Design, simulate, and implement applications for Texas Instruments C2000 microcontrollers



MATLAB Test

Develop, manage, analyze, and test MATLAB applications



<https://www.mathworks.com/videos/whats-new-in-matlab-and-simulink-r2023a-1683545073311.html>

MATLAB EXPO

Thank you



© 2023 The MathWorks, Inc. MATLAB and Simulink are registered trademarks of The MathWorks, Inc. See [mathworks.com/trademarks](https://www.mathworks.com/trademarks) for a list of additional trademarks. Other product or brand names may be trademarks or registered trademarks of their respective holders.