MATLAB Institute-Wide License Overview
INAF

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Customer Success Program

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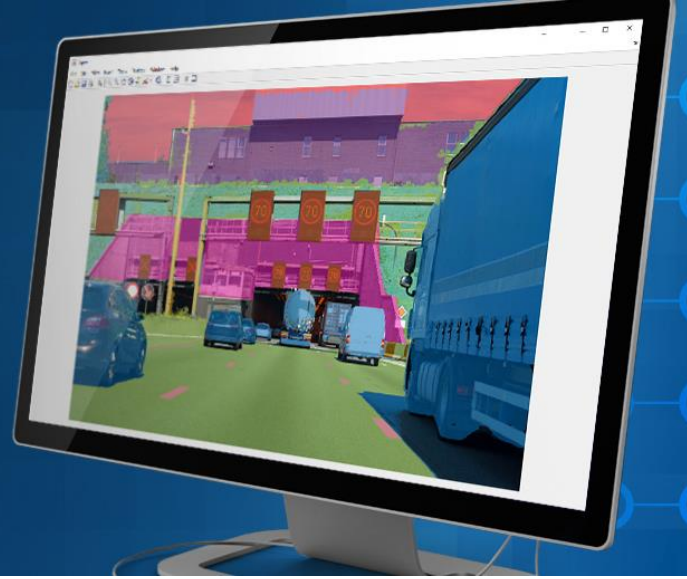
Agenda

- **License Overview**
- **How to access the license**
  MATLAB Portal
- **Online Resources**
  - MATLAB and Simulink Courses & Certification
  - MATLAB Online
  - MATLAB Drive
  - MATLAB Mobile
  - Thing Speak
- **Live Scripts, with examples on antenna analysis and design**
- **Next Steps: MATLAB Parallel Server**
- **Q&A**

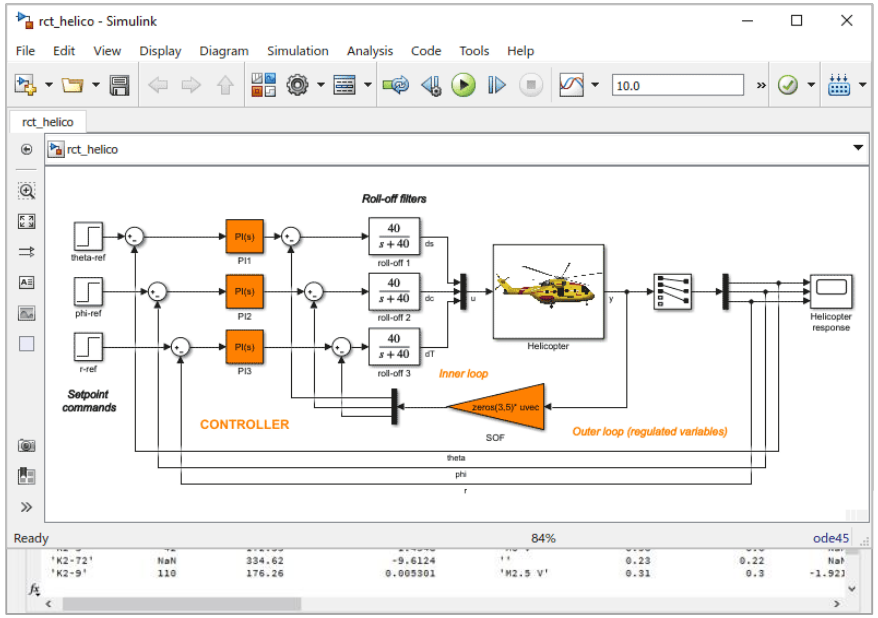
License Overview

MATLAB® & SIMULINK®



Accelerating the pace of Engineering & Science

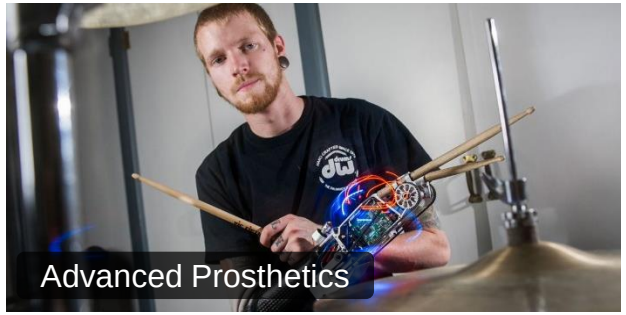
- MATLAB is a programming environment for algorithm development, data analysis, visualization, and numeric computation.
- Simulink is a graphical environment for designing, simulating, and testing systems.
- Nearly 100 add-on products for specialized tasks are available.

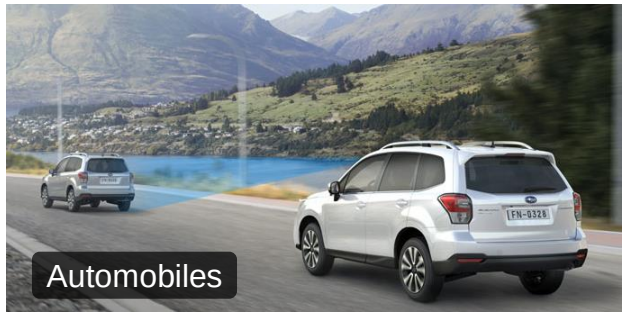


MATLAB® & SIMULINK®

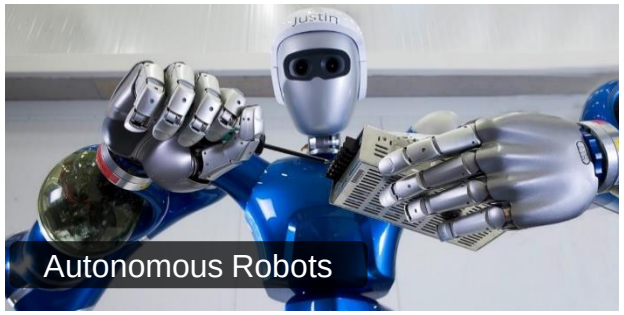
Our software is used to design the products we rely on every day

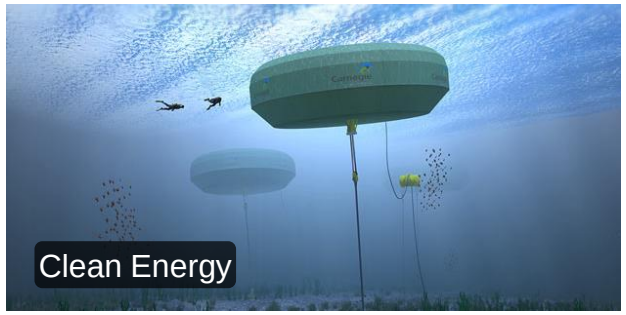
Reusable Rockets


Advanced Prosthetics


Automobiles

Commercial Aircraft


Autonomous Robots

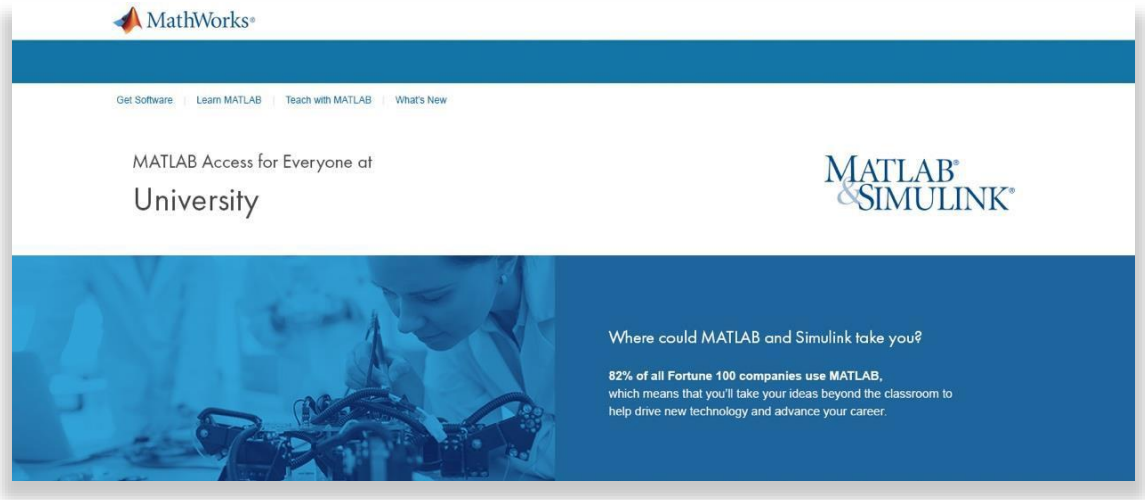

Clean Energy

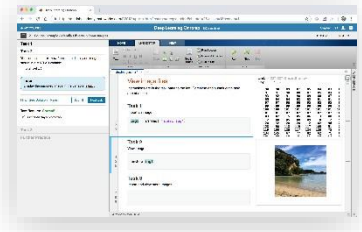

Smartphones


Consumer Goods

Institute-Wide License Overview

Institute & lab computers

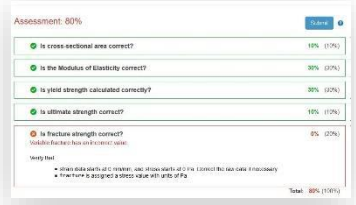




Self-paced online learning

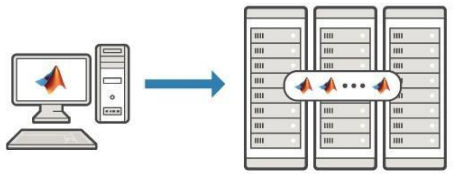
Online access

- License covers all faculty, staff, researchers and students their devices
- Access on site, in lab and field, and at home, including off-network
- Immediate tool availability for end users via self-serve portal
- Lower IT administration overhead
- Portal minimizes IT overhead related to software deployment and support
- Portal provides training, videos, code examples, IT support and more!

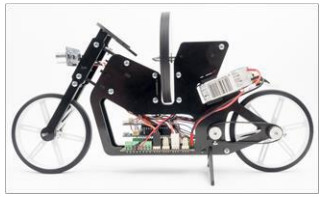


Auto-graded homework

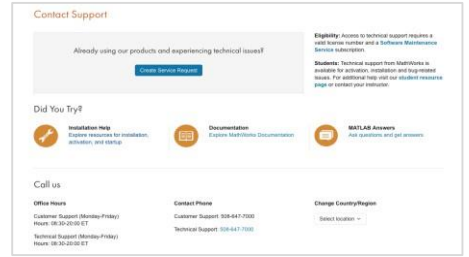
Personal Computers & Mobile Devices



Clusters & HPC



Low-cost hardware support



Installation Support

Full Suite: Access to MATLAB, Simulink and Toolboxes

- MATLAB
- Simulink
- Additional Toolboxes

R2019b

MathWorks
Accelerating the pace of engineering and science

Products available through Campus-Wide License

MATLAB Product Family

MATLAB

Application Deployment
MATLAB Compiler
MATLAB Compiler SDK

Code Generation
Embedded Coder
Filter Design HDL Coder
Fixed-Point Designer
GPU Coder
HDL Coder
HDL Verifier
MATLAB Coder

Data Science and Deep Learning
Deep Learning Toolbox
Predictive Maintenance Blockset
Statistics and Machine Learning Toolbox
Text Analytics Toolbox
Reinforcement Learning Toolbox

Database Access and Reporting
Database Toolbox
MATLAB Report Generator

Math, Statistics, and Optimization
Curve Fitting Toolbox
Deep Learning Toolbox
Global Optimization Toolbox
Mapping Toolbox
Optimization Toolbox
PDE Toolbox
Statistics and Machine Learning Toolbox
Symbolic Math Toolbox

Parallel Computing
MATLAB Parallel Server
Parallel Computing Toolbox

Simulink Product Family

Simulink
System Composer

Code Generation
AUTOSAR Blockset
Embedded Coder
Fixed-Point Designer
HDL Coder
HDL Verifier
Simulink Code Inspector
Simulink Coder
Simulink PLC Coder

Event-Based Modeling
SimEvents
Stateflow

Physical Modeling
Simscape
Simscape Driveline
Simscape Electrical
Simscape Fluids
Simscape Multibody

Real-Time Simulation and Testing
Simulink Desktop Real-Time
Simulink Real-Time

Simulation Graphics and Reporting
Simulink 3D Animation
Simulink Report Generator

Verification, Validation, and Test
Simulink Check
Simulink Coverage
Simulink Design Verifier
Simulink Requirements
Simulink Test

Application Products

Aerospace
Aerospace Blockset
Aerospace Toolbox

Automotive
Automated Driving Toolbox
AUTOSAR Blockset
Model-Based Calibration Toolbox
Powertrain Blockset
Vehicle Dynamics Blockset
Vehicle Network Toolbox

Autonomous Systems
Automated Driving Toolbox
Robotics System Toolbox
Navigation Toolbox
ROS Toolbox
Sensor Fusion and Tracking Toolbox

Computational Biology
Bioinformatics Toolbox
SimBiology

Computational Finance
Database Toolbox
Datafeed Toolbox
Econometrics Toolbox
Financial Instruments Toolbox
Financial Toolbox
Risk Management Toolbox
Spreadsheet Link
Trading Toolbox

Control Systems
Control System Toolbox
Fuzzy Logic Toolbox
Model Predictive Control Toolbox
Predictive Maintenance Blockset
Reinforcement Learning Toolbox
Robust Control Toolbox
Simulink Control Design
Simulink Design Optimization
System Identification Toolbox

FPGA and ASIC Design
Filter Design HDL Coder
Fixed-Point Designer
HDL Coder
HDL Verifier
LTE HDL Toolbox
SoC Blockset
Vision HDL Toolbox

Image Processing and Computer Vision
Computer Vision Toolbox
Image Processing Toolbox

RF and Mixed Signal
Antenna Toolbox
Mixed-Signal Blockset
RF Blockset
RF Toolbox
SerDes Toolbox

Signal Processing
Audio Toolbox
DSP System Toolbox
Phased Array System Toolbox
Signal Processing Toolbox
Wavelet Toolbox

Systems Engineering
Simulink Requirements
Stateflow
System Composer

Test and Measurement
Data Acquisition Toolbox
Image Acquisition Toolbox
Instrument Control Toolbox
OPC Toolbox
Vehicle Network Toolbox

Wireless Communications
5G Toolbox
Communications Toolbox
LTE Toolbox
WLAN Toolbox

Polyspace Product Family
Polyspace Bug Finder
Polyspace Code Prover

mathworks.com

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- **Q&A**

How to Access the License

Go to MATLAB PORTAL

https://www.mathworks.com/academia/tah-portal/inaf-31448132.html

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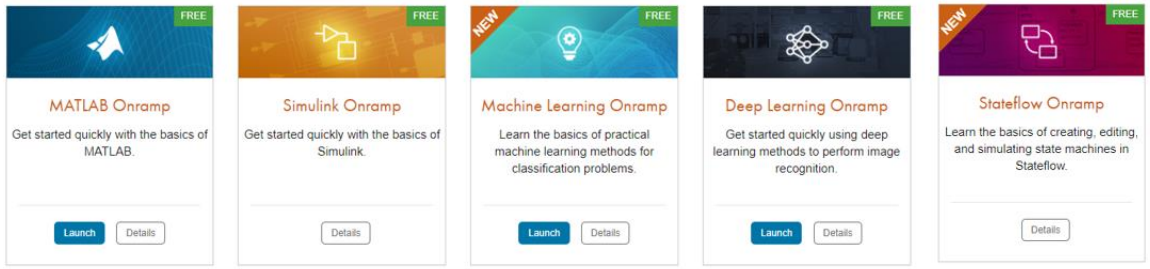
Online Resources

Available Self-Paced Training Courses

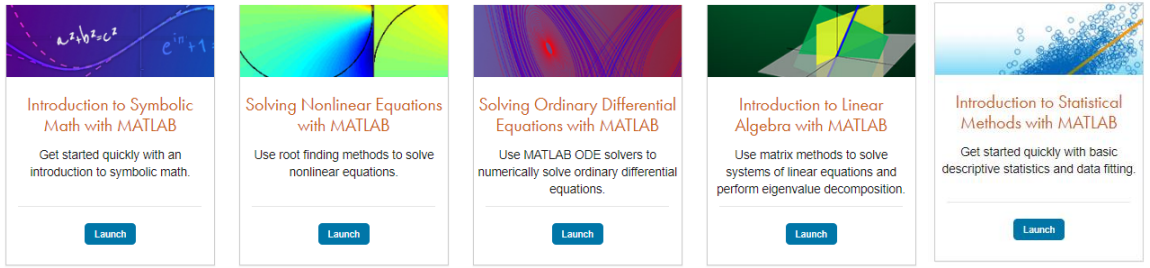
Getting Started



10 hours of FREE content – available for everyone

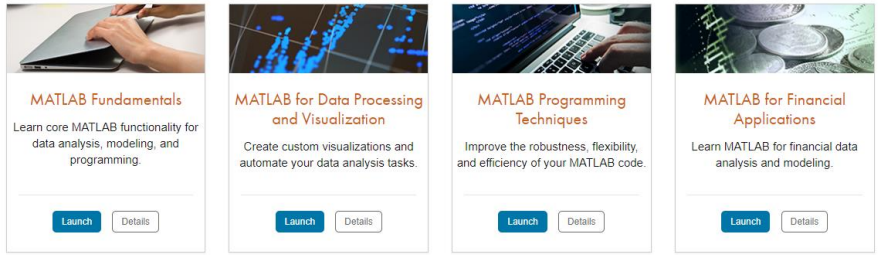
Computational Mathematics

*Available only to users at universities that offer campus-wide online training access.

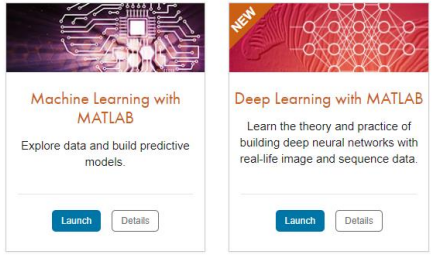


9 hours of short courses on computational mathematics topics

Core MATLAB



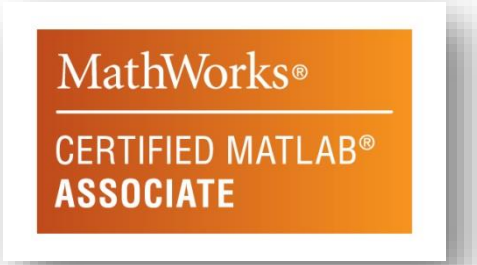
Data Science

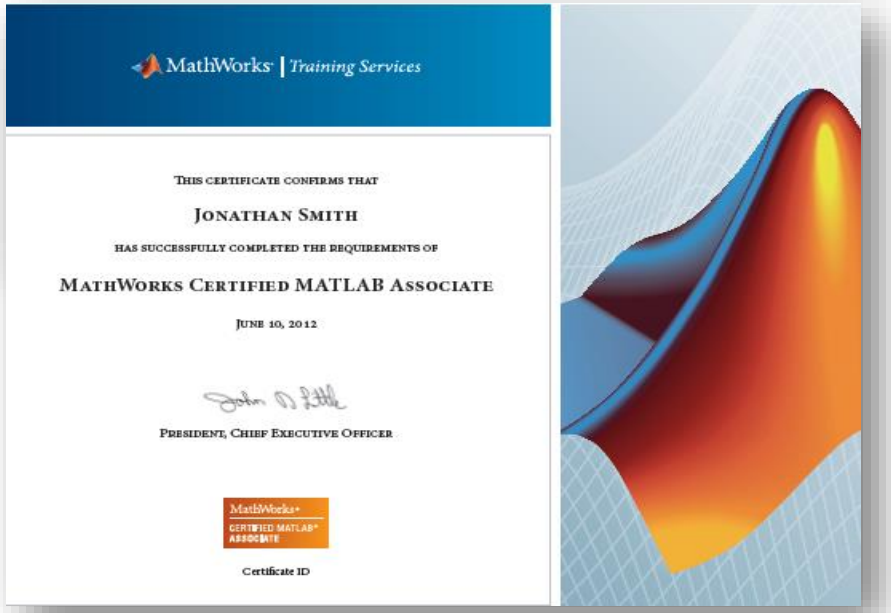


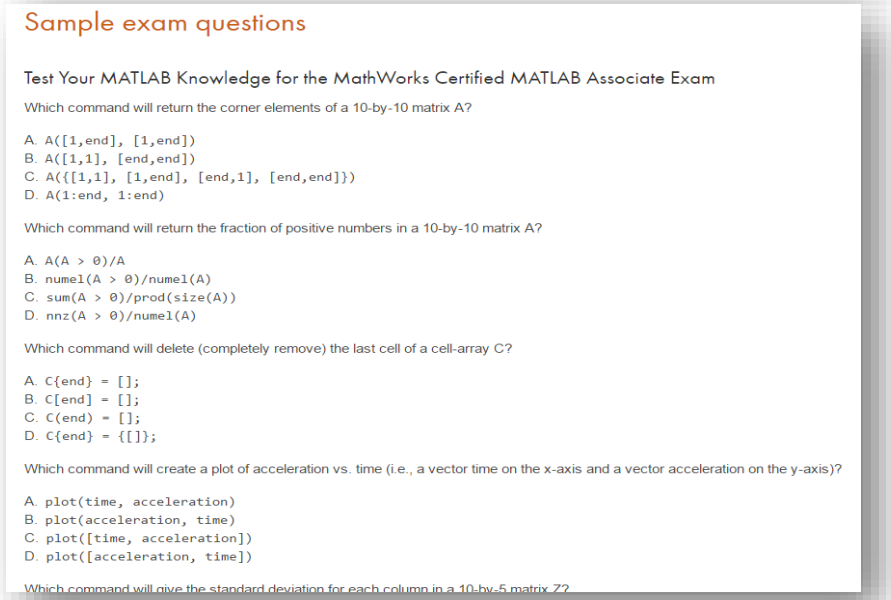
Over 80 hours of comprehensive MATLAB learning content

MATLAB Certification

- 3-hours MATLAB exam with multiple-choice questions
- Certification
- To take the exam, you must take the MATLAB Foundation course







Sample exam questions

Test Your MATLAB Knowledge for the MathWorks Certified MATLAB Associate Exam

Which command will return the corner elements of a 10-by-10 matrix A?

A. `A([1,end], [1,end])`
B. `A([1,1], [end,end])`
C. `A({[1,1], [1,end], [end,1], [end,end]})`
D. `A(1:end, 1:end)`

Which command will return the fraction of positive numbers in a 10-by-10 matrix A?

A. `A(A > 0)/A`
B. `numel(A > 0)/numel(A)`
C. `sum(A > 0)/prod(size(A))`
D. `nnz(A > 0)/numel(A)`

Which command will delete (completely remove) the last cell of a cell-array C?

A. `C{end} = [];`
B. `C[end] = [];`
C. `C(end) = [];`
D. `C{end} = {[]};`

Which command will create a plot of acceleration vs. time (i.e., a vector time on the x-axis and a vector acceleration on the y-axis)?

A. `plot(time, acceleration)`
B. `plot(acceleration, time)`
C. `plot([time, acceleration])`
D. `plot([acceleration, time])`

Which command will give the standard deviation for each column in a 10-by-5 matrix Z?

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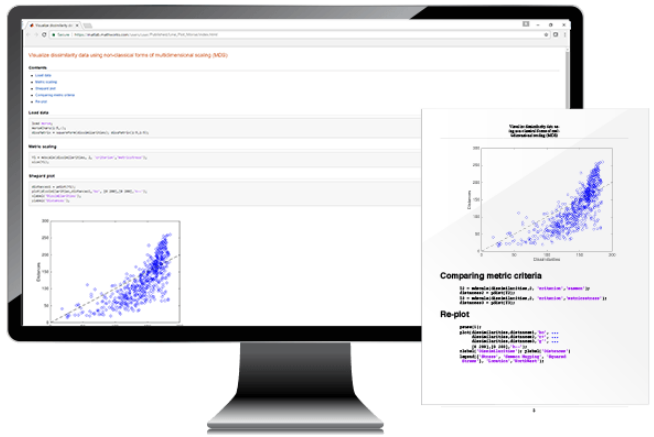
MATLAB for anyone, anytime, and anywhere

MATLAB for anyone, anytime, and anywhere



MATLAB for Desktops

Individual access on personal and university-owned machines

MATLAB Online

Access MATLAB with a web browser

MATLAB Mobile

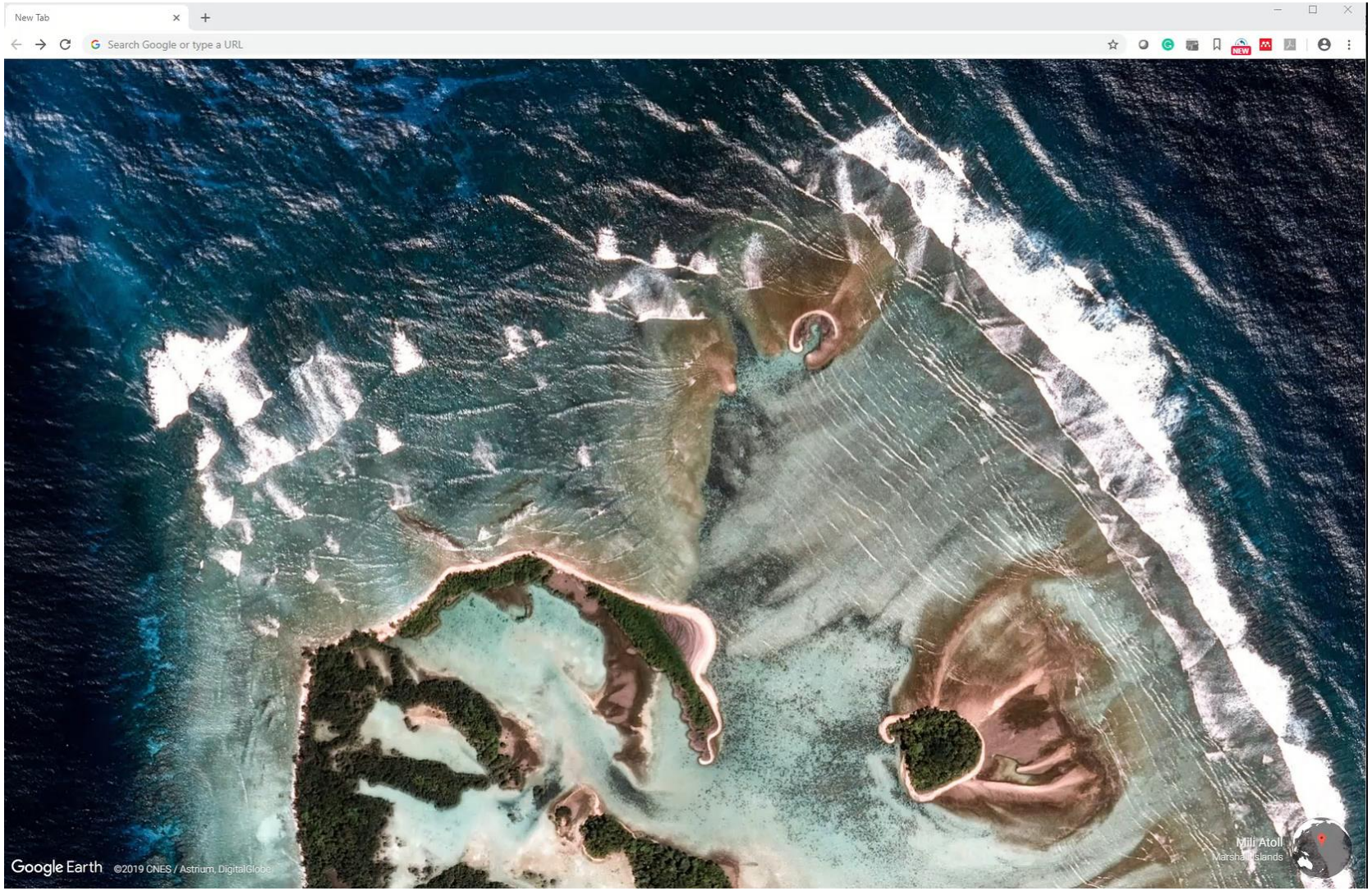
Access MATLAB on iOS/Android devices

MATLAB Online

- Instant access to MATLAB through your browser
  - No downloads or installations required
- Hosted on MathWorks Cloud
  - Compute provided through MathWorks
  - Use on any computer, laptop, or Chromebook
  - Available anytime, anywhere
- Uses the latest version of MATLAB
- Access hardware through the cloud
  - Raspberry Pi through wireless connection
  - IoT devices through ThingSpeak
  - Mobile sensors through MATLAB Mobile

http://matlab.mathworks.com

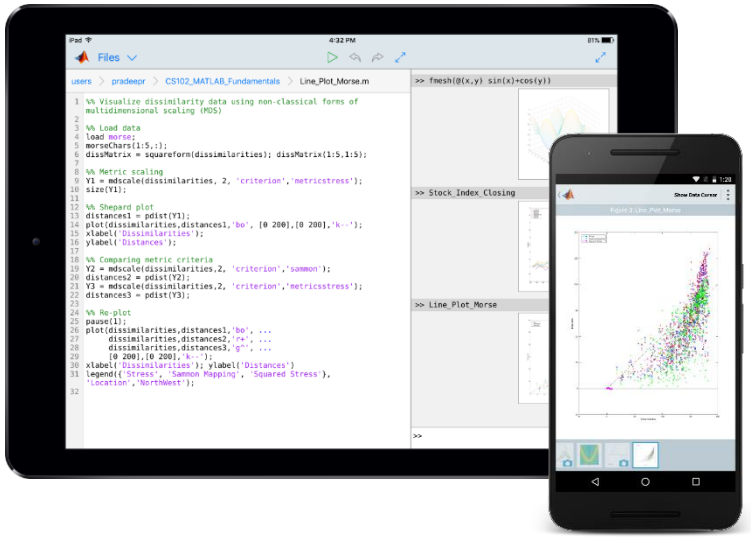
MATLAB Online



http://matlab.mathworks.com

MATLAB Mobile for iPhone, iPad, and Android devices

- **A lightweight desktop**
  - Command-line access to MATLAB and add-on products on the cloud
  - Lightweight editor for scripting and prototyping
  - Upload files and data to MATLAB Drive and run them from the app
  - Data visualization
- **Gateway to sensor data acquisition**
  - View and acquire sensor data in MATLAB Mobile (even when offline)
  - Send acquired data to MATLAB for further analysis and visualization
- **A mobile aid for teaching and learning**
  - Professors can create examples and demo them from their mobile devices
  - Can follow along in the classroom and instantly connect results to concepts

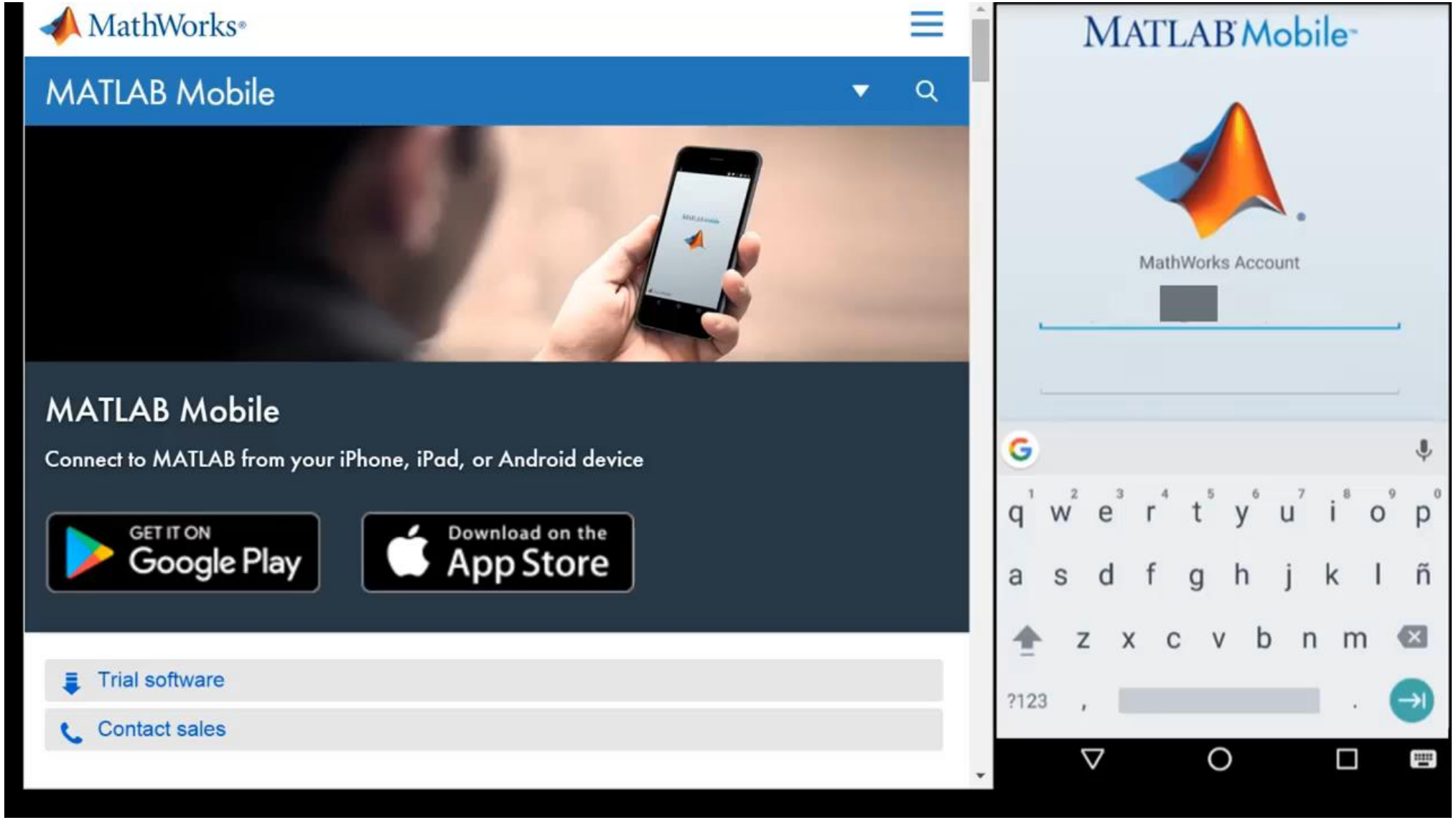


Get MATLAB Mobile Today

GET IT ON Google Play

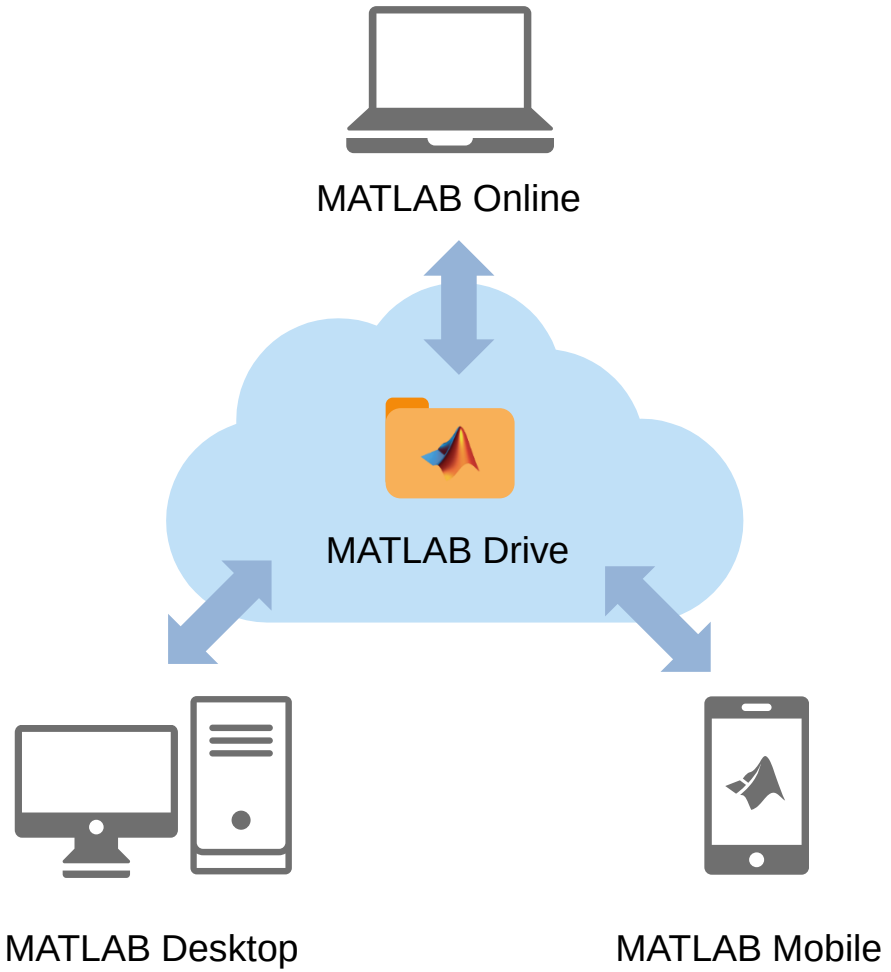
Download on the App Store

MATLAB Mobile for iPhone, iPad, and Android devices



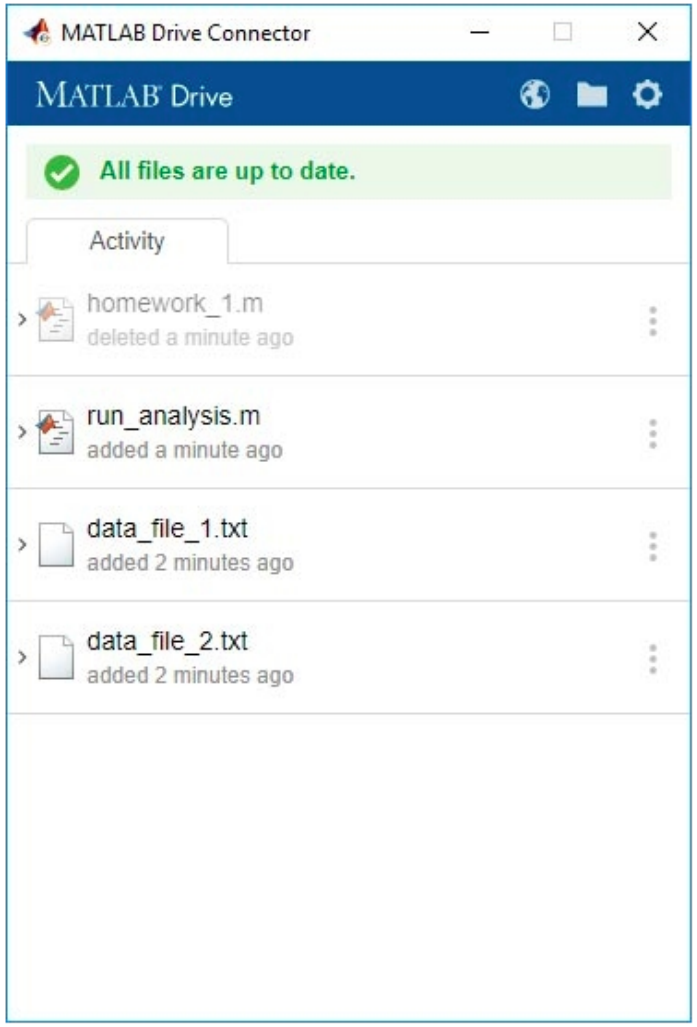
MATLAB Drive

- MATLAB Online provides access to 5GB of online storage through MATLAB Drive
- Access and synchronize your files with MATLAB Online, MATLAB Mobile, MATLAB Drive online, and MATLAB on your desktop
- Access hardware through the cloud
  - Raspberry Pi through wireless connection
  - IoT devices through ThingSpeak
  - Mobile sensors through MATLAB Mobile



MATLAB Drive

Search MathWorks.com



Use MATLAB Drive from Your Desktop

Enable MATLAB Drive on your desktop by installing MATLAB Drive Connector, which:

- Integrates MATLAB Drive with your MATLAB environment
- Provides simple access to your files through the MATLAB Drive folder
- Enables offline access, syncing changes after connectivity is restored

Install MATLAB Drive Connector:

Install for Windows | Install for Mac | Install for Linux

Use MATLAB Drive Connector to sync your files between your computers and MATLAB Online, eliminating the need for manual upload or download.

https://www.mathworks.com/products/matlab-drive.html

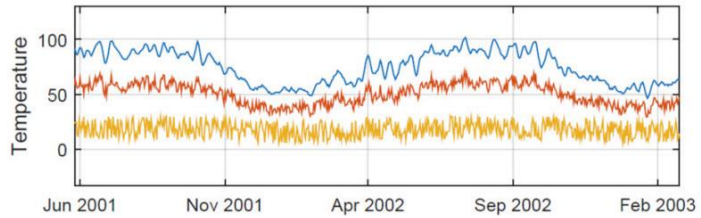
Internet of Things

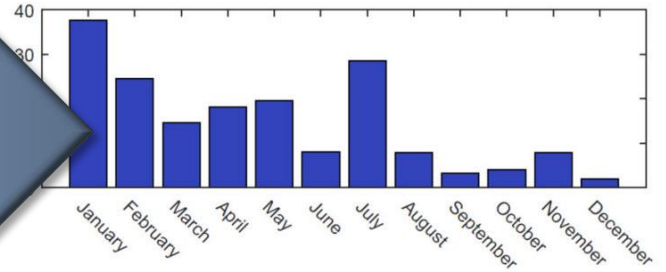
The Internet of Things

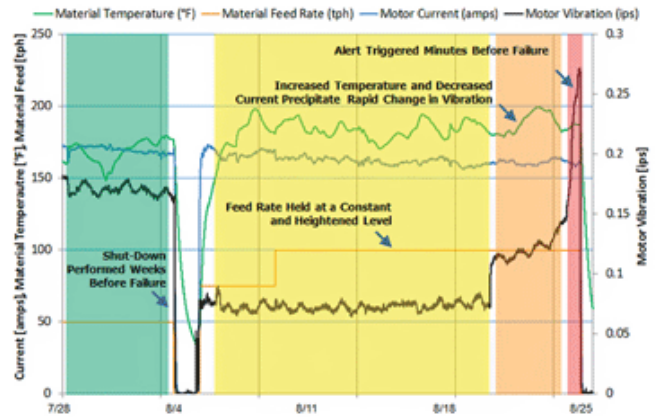
Collect data from “things”

?

Analyze for insights & Take action







Collect

Send sensor data to the cloud.

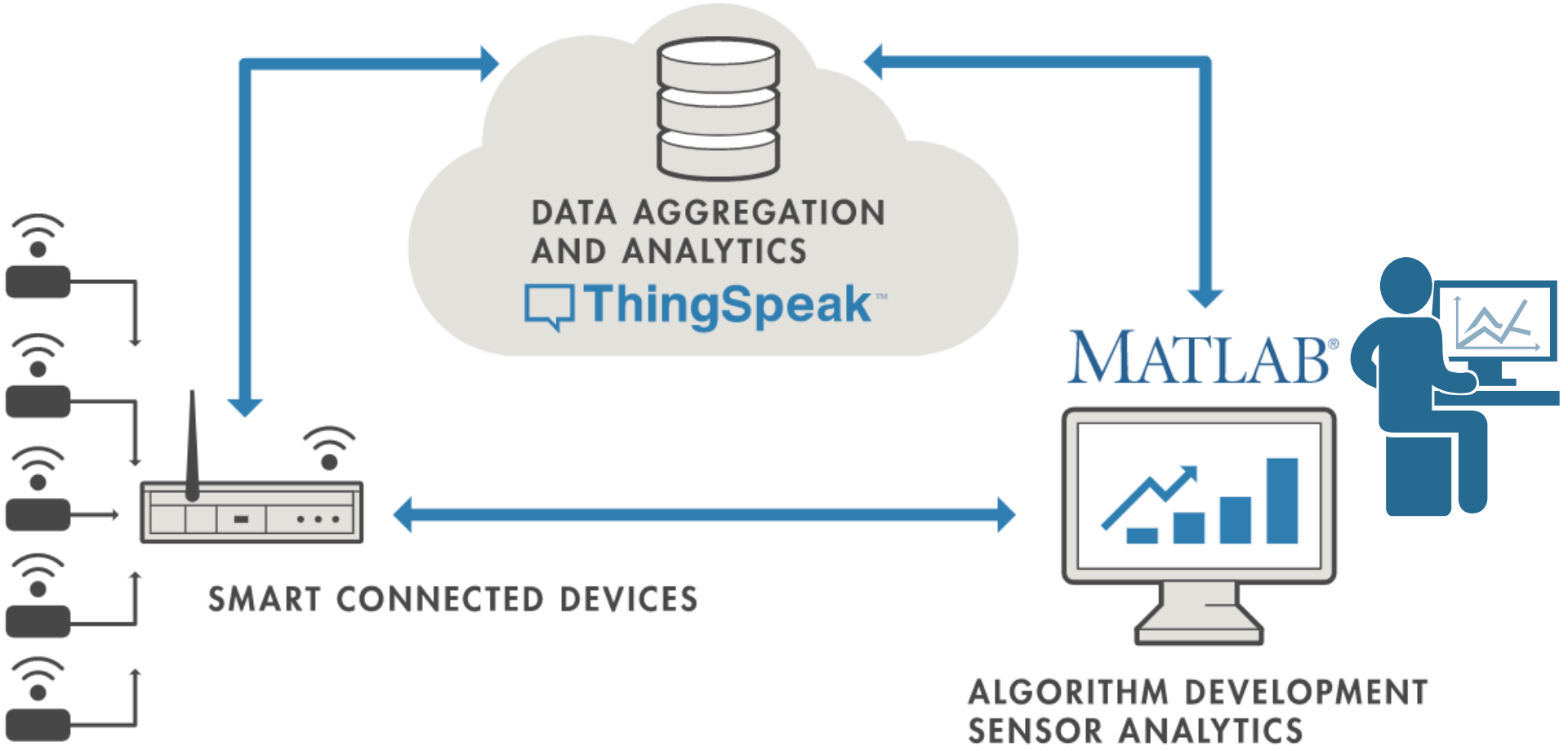
Analyze

Analyze and visualize your data with MATLAB.

Act

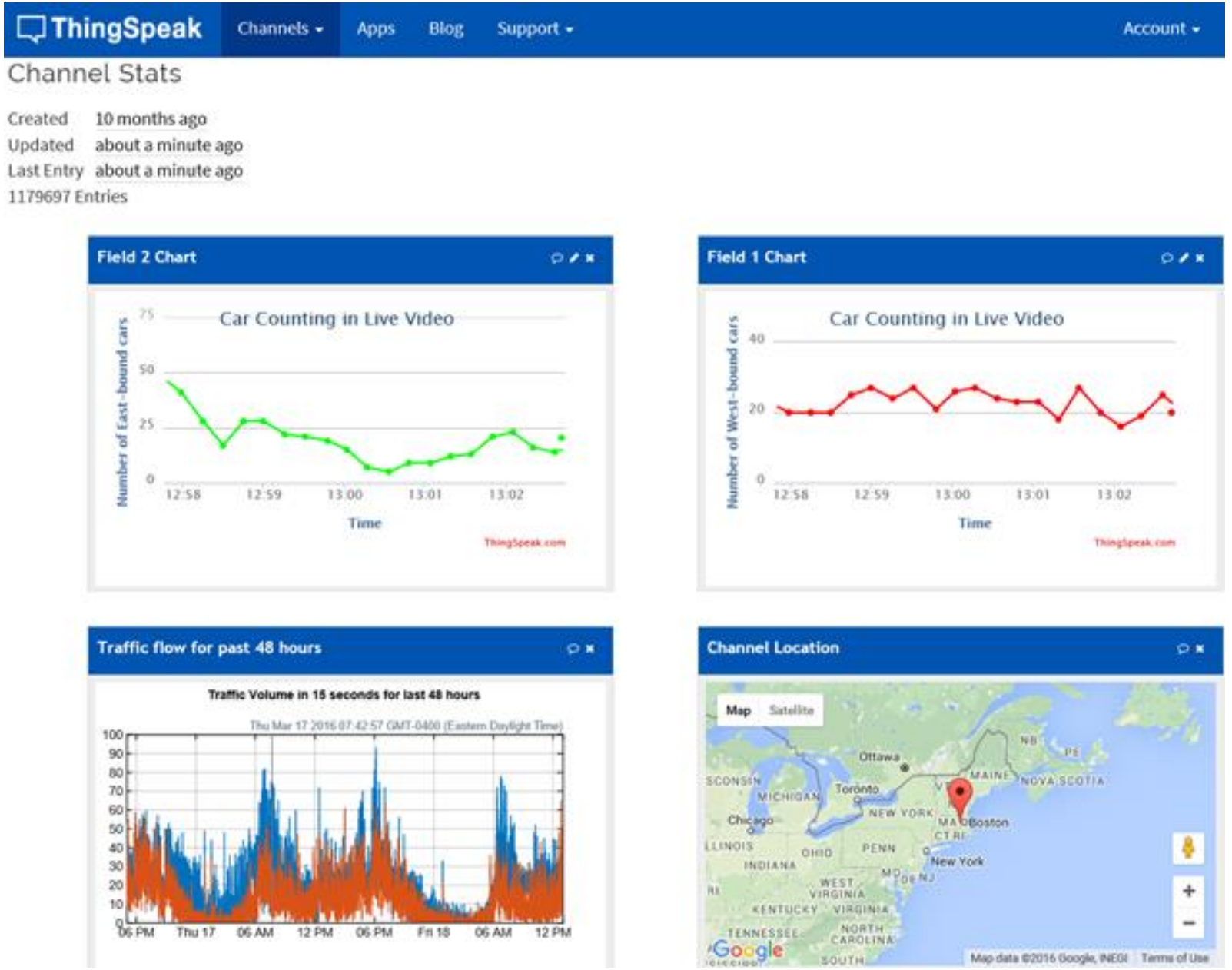
Trigger a reaction.

IoT Workflow



MathWorks Provides Capabilities for All of these Steps

An Example



Raspberry Pi,
a web cam &
ThingSpeak

to count cars and analyze traffic patterns on a busy highway

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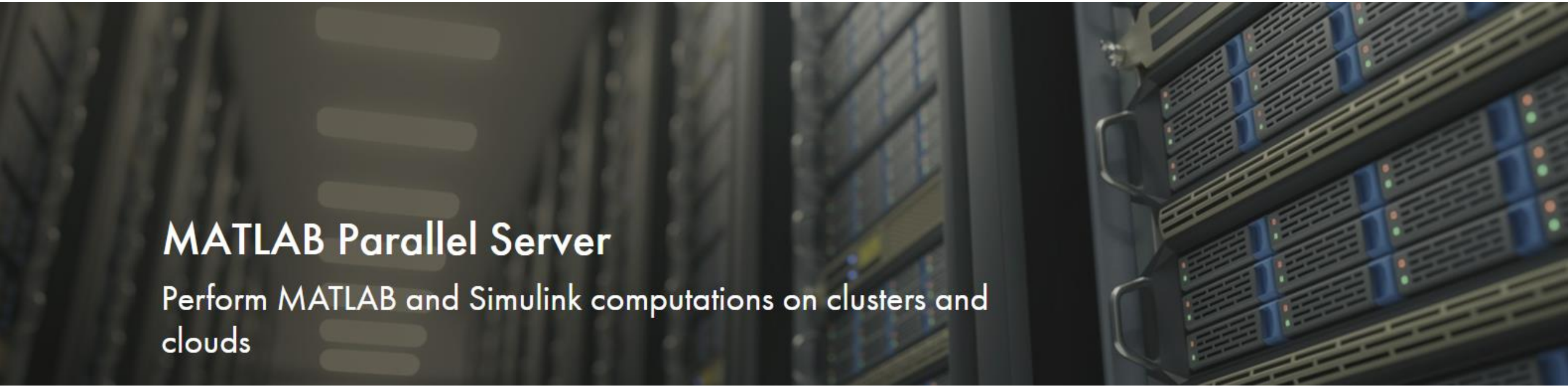
Next Appointments

MATLAB Parallel Server

MATLAB Parallel Server



MATLAB Parallel Server™ lets you scale MATLAB® programs and Simulink® simulations to clusters and clouds.

https://www.mathworks.com/products/matlab-parallel-server.html

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Q&A?

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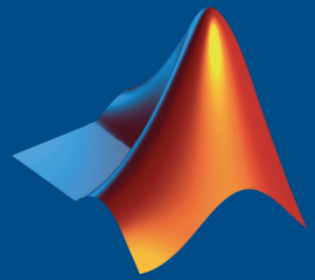

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