What’s New in MATLAB and Simulink

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Imagine making your applications run faster than you ever thought possible!
Imagine stepping forward through a simulation
Imagine stepping forward and back through a simulation
Usability

Collaboration

Visualization

Scalability
Usability
Where is MATLAB and Simulink Today?
Connecting to and Targeting Hardware

Host Computer
MATLAB and Simulink Models

Data I/O
Ethernet, USB, Bluetooth

MATLAB Hardware Support Packages

Target
Simulink Hardware Support Packages

Low Cost Hardware
Android Sensors
Lego EV3
Arduino

Get Support Package Now

Low Cost Hardware
iPhone

Exhibitor: Video Processing on a System on Chip Target
MATLAB: Importing Data

- **Import Tool**
  - Interactive import of delimited and fixed-width text files
  - Provides improved handling of numbers, text, and dates
  - Automatically generate MATLAB code (scripts and functions) to automate the process

- **Access online data** *(webread)*
  - JSON, CSV, and image data

- **Read and write data from network-connected devices** *(tcpclient)*
MATLAB: New Fundamental Data Types

- **table**
  - For mixed-type tabular data
  - Supports flexible indexing
  - Built-in functionality (merge, sort, etc.)

- **categorical arrays**
  - For discrete non-numeric data
    - Values drawn from a finite set of possible values ("categories")
    - Can be compared using logical operators
      - Similar to numeric arrays
Where is MATLAB and Simulink Today?

The New MATLAB Desktop
See what you’ve been missing.

EXHIBITOR:
Model-Based Control Design and Rapid Prototyping of a Motion System

DISCOVER THE NEW LOOK AND FEEL of Simulink

With Simulink® Release 2012b, it’s even easier to build, manage, and navigate your Simulink and Stateflow® models:
- Smart line routing
- Tabbed model windows
- Simulation rewind
  - Signal breakpoints
  - Explorer bar
  - Subsystem and signal badges
  - Project management

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MATLAB®
FIGURE

MATLAB & SIMULINK

MATLAB CONFERENCE 2015
Simulink: Accelerate Model Building

Smart Editing Cues
Simulink: Comment Out and Comment Through

Comment a block so that the output equals the input

- Signal passes through the block during simulation
- Comment out option remains available
- Works on blocks with the same number of inputs and outputs
Visualization

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Scalability
New Graphics System
Overview

- New look
  - New default colormap and line colors
  - Anti-aliased fonts and lines
  - Subtler grid lines

- Easier to customize
  - Graphics objects now behave like other MATLAB objects
  - Support dot-notation to access and change properties

Data easier to interpret

```matlab
>> p = plot(x,y);
>> p.Color = 'red';
```
New Graphics System

- Multilingual text and symbols
- Automatic updating of datetime tick labels
- New visualization functions
  - histogram
  - animatedline
- Multiple colormaps per figure
- Rotatable tick labels
- User interfaces with tab panels
MATLAB: Date and Time Arrays
Simulink: Better Simulation Data Analysis

New Simulation Data Inspector
Simulink: Tune and Monitor Your Simulations

New graphical controls and displays
Scalability
Data Capabilities in MATLAB

Memory and Data Access
- 64-bit processors
- Memory Mapped Variables
- Disk Variables
- Databases
- Datastores

Programming Constructs
- Streaming
- Block Processing
- Parallel-for loops
- GPU Arrays
- SPMD and Distributed Arrays
- MapReduce

Platforms
- Desktop (Multicore, GPU)
- Clusters
- Cloud Computing (MDCS on EC2)
- Hadoop
Simulink: Performance Advisor
Simulink: Faster Consecutive Simulations

Fast Restart
Stateflow: Start Simulation Faster
Just-In-Time Compilation

Presentation: Verify, Validate, and Document Models and Code
MATLAB and Simulink: Managing Code and Models

Source Control Integration

- Manage code from MATLAB Desktop and Simulink Projects

- Leverage source control capabilities
  - Git and Subversion integration in Current Folder browser

- Use Comparison Tool to view and merge changes between revisions
Simulink: Sharing Projects

Share a project on GitHub® via email or as a MATLAB Toolbox

- Make project publicly available on GitHub
- Share your project via email
- Package project as a MATLAB toolbox
App and Toolbox Packaging

- Package your app or toolbox as a single installer file
  - Contains all of the code, data, apps, documentation, and examples
  - Checks for dependent files and automatically includes them
  - Documents required products

- Included folders and files automatically appear on path when installed

- View details and uninstall toolboxes with Manage Custom Toolboxes dialog box
Simulink Data Dictionary

Store, edit and access design data using the data dictionary

- Componentization
- Scalability and performance
- Requirements linking
- Change tracking and differencing
- Defined model-data relationship
- Integration with Simulink Projects
Concluding Remarks

- Methods for improving **ease-of-use** during the design process

- Convey information in a universal manner and make it **simple to share**

- “**Scale up**” and “**Scale out**”

- Work together to a common purpose to achieve **business benefits**