What’s New in MATLAB and Simulink

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What was new for Simulink in R2012b?

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
What Was New for MATLAB in R2012b?

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

R2012b introduces a fresh new MATLAB® Desktop, making it easier to find what you need.

Toolstrip
Highlights commonly used functionality

Apps Gallery
Displays in-product and user-written apps

Online Documentation and Redesigned Help
Improves searching, browsing, and filtering
New MATLAB Graphics System
Simulink – Tune and Monitor Your Simulations
New graphical controls and displays in Simulink
Simulink – Better Simulation Data Analysis

New Simulation Data Inspector
Stateflow – Watch Data
Simulink – Accelerate Model Building

Smart Editing Cues
Simulink – Comment Out / 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
Simulink – Model Templates

Build models using design patterns that serve as starting points to solve common problems

- Use shipped templates to get started with building models or create custom templates to from a Simulink model
- Avoid repetitive tasks when starting out to build a new model
- Enforce a standard process for building models for the entire team or organization
MATLAB Tables

- **table** – new fundamental data type
- For mixed-type tabular data
  - Holds both data and metadata
- Supports flexible indexing
- Built-in functionality (merge, sort, etc.)
MATLAB
Categorical Arrays

- **categorical** – new fundamental data type

- For discrete non-numeric data
  - Values drawn from a finite set of possible values ("categories")

- More memory efficient than a cell array of strings

- Can be compared using logical operators
  - Similar to numeric arrays
MATLAB
Date and Time Arrays
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**)
Simulink – Data Dictionary

Store, edit and access design data using the data dictionary

- Change tracking and differencing
- Defined relationship with SLDD file
- Componentization
- Integration with Simulink Projects
- Scalability and performance
Simulink – Performance Advisor
Simulink – Faster Consecutive Simulations

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

Before R2015a

R2015a

gear_state

first

UP
second

DOWN

first

UP
second

DOWN
MATLAB – Big Data Capabilities

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**
MATLAB – Access Big Data

datastore

- Easily specify data set
  - Single text file or collection of text files
  - Database (using Database Toolbox)
  - Data stored on HDFS

- Preview data structure and format

- Select data to import using column names

- Incrementally read subsets of the data

airedata = datastore('*.csv');
airedata.SelectedVariables = {'Distance', 'ArrDelay'};
data = read(airedata);
MATLAB – Analyze Big Data

**mapreduce**

- Use the powerful MapReduce programming technique to analyze big data
  - **mapreduce** uses a **datastore** to process data in small chunks that individually fit into memory
  - Useful for problems with complex grouping, or when intermediate results do not fit in memory

- **mapreduce** on the desktop
  - Increase compute capacity (Parallel Computing Toolbox)
  - Analyze big database tables (Database Toolbox)
  - Access data on HDFS to develop algorithms for use on Hadoop

- **mapreduce** on a cluster
  - Run on cluster or Hadoop using MATLAB Distributed Computing Server
  - Deploy applications and libraries for Hadoop using MATLAB Compiler
MATLAB – Toolbox Packaging
Simulink – Sharing Projects

Share a project on GitHub® via e-mail or as a MATLAB Toolbox

- Make your project publicly available on GitHub.
- Share your project via email.
- Package your project as a MATLAB toolbox.
MATLAB and Simulink – Managing Code and Models

Source Control Integration

- Manage your code from within the MATLAB Desktop and your models from within Simulink Projects

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

- Use Comparison Tool to view and merge changes between revisions
Learn More


www.mathworks.com/products/simulink/whatsnew.html

www.mathworks.com/products/matlab/whatsnew.html