Introduction

Improvements to:

- Design Workflow
- Simulation Workflow
- Component Based Modelling
- Model review and refinement
Design Workflow
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 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
Smart Editing Cues

Accelerate model building with just-in-time contextual prompts

- Smart prompts for inserting blocks upon typing the block name
- Suggests marquee actions when a group of blocks are selected Ex: Create Subsystem
- Easily insert blocks that occur in pairs Ex: Goto, From pair
Simulink – Accelerate Model Building
Smart Editing Cues
Rich annotations

Annotate Simulink models with rich text, graphics, and hyperlinks

- Add formatted text, tables and lists
- Copy and paste images or import a graphics file
- Add hyperlinks to Web pages or other documents
Annotation Connectors

Associate annotations with blocks in models

- Quickly switch between an annotation-free model
- One click way to turn off and on annotations in the model
- Enable the feature to specific annotations
  Ex: review comments
- Create annotations programmatically
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
Simulation Workflow
Diagnostic viewer

- Model based grouping
- Severity Filters
- Group/Ungroup similar warnings
- Live Search
- Overall Summary
- Hyperlink
- History
- Grouping of messages related to macro events such as Simulation
- Group similar warnings
- Error-Cause hierarchy

Message Viewer

**Model Load**

- Update Diagram

**Simulation**

- Build

- Overall Summary

**Warning Details**

- [100 similar] Output port 1 of 'vdpl_demo/Mux' is not connected.
- [100 similar] Input port 2 of 'vdpl_demo/Mux' is not connected.

**Hyperlink**

- Click to open configuration dialog.
Fast Restart

Run consecutive simulations more quickly

- Efficiently run multiple interactive simulations
- Saves simulation time eliminating recompilation between simulation runs
- Improves calibration workflows where the user is tuning block parameters between runs
Faster consecutive simulations
Ready … get set … GO!
New Simulation Data Inspector

View live signal data and access visualization options such as data cursors

- Toolstrip to access and discover signal visualization actions
- Add up to 2 data cursors to monitor signal values
- View signal data in the Simulation Data Inspector as the simulation runs
Component Based Modelling
Expand subsystem

Flatten model hierarchy by bringing the contents of a subsystem up one level

- Pull a set of blocks into parent system by expanding the subsystem
- Inverse of Create Subsystem
- Quickly refactor models and subsystems
MATLAB System Objects

Create and select System objects from block dialog

- **New**: allows you to create a new System object from one of the following templates: *Basic, Advanced, or Block Extension*
- **Browse**: select a System object using file browser
- **Auto-complete**: matching System objects in *pwd* appear as you type
Simulink Functions

Create and call functions across Simulink and Stateflow

- Simulink users can define and access functions that are reused throughout the model.
- Simulink function block is paired with function caller block to define and call a function respectively.
- Simulink function can be directly accessed from Stateflow as well.

Simulink Function Block

Function caller block

Simulink Function Block Parameters: Caller

- Call a function to compute output signals from input signals.
- Parameters:
  - Function prototype: \( y = \text{timestwo}(u) \)
  - Input argument specifications: (for e.g. int8(1)) double(1)
  - Output argument specifications: (for e.g. int8(1)) double(1)

MATLAB EXPO
Advisor-based workflow for converting subsystems to Model blocks

Simplify the process of converting a subsystem to a referenced model

- Guides users through all conversion steps
- Provides detailed information about problems
- Supports automatic fixing of certain problems
Data Dictionary for defining and managing design data

Store, edit and access design data using the data dictionary

- Change tracking and differencing
- Defined relationship with SLDD file
- Componentization
- Scalability and performance
- Integration with Simulink Projects
Simulink Projects

Find, manage, and share all the required files of your projects

- Includes impact analysis, dependency analysis, category labels, templates
- Identify file dependencies at an individual block-level
- Connects to Subversion and Git
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
Model review and refinement
Viewmarks

Save graphical views of a model for quick access to areas of interest

- Snap graphical view of SL/SF models
- User info: name customizable, also annotation allowed
- Viewmark data saved in preference
- Viewmark manager UI
Interface Display

View and trace the input and output signals of a model or subsystem

- Easily view, understand and inspect the interface to a Simulink model
- Trace a signal’s path by clicking on the signal name
- Zoom in to see bus elements corresponding to a bus signal and trace the element’s signal path
Option to run Model Advisor checks in the background

Use Parallel Computing Toolbox to Run Model Advisor checks

- Non blocking run for checks
- Keep working as model advisor runs checks in background
Improved navigation and filtering for the Model Advisor HTML report

Quickly navigate model advisor by filtering results

- Table of content navigation
- Check filtering by keyword and status (keyword filtering hides checks that don’t include the provided keywords in their title.)
- Back to top button
- Global control for collapsible check tables/lists
Block Dependencies in Impact Graph

Highlight the blocks affected by changes made to project files

- Identify file dependencies at an individual block-level
- Popup makes the viewer easy to use even when zoomed out
- Improved edge routing makes it easier to interpret large projects
Performance Advisor checks validate overall performance improvement

Performance Advisor has new checks and enhancements

- Performance Advisor can now set code generation options for MATLAB System Block
- Performance Advisor will now validate for all suggested changes
What else?
Simulink to Embedded Hardware

- Application Track 1 at 16:15
- Running Simulink models in-the-loop on embedded hardware
- Verifying, profiling and optimising your design on hardware
- Future-proofing and sharing models and code
Design and Verification of FPGA and ASIC Applications

- Application Track 2 at 16:15

- Automatic implementation of algorithms on FPGAs and ASICs
- Verification of HDL against specifications using co-simulation and FPGA-in-the-loop
- Reuse of models and testbenches in SystemC/TLM and SystemVerilog environments
Conclusion

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Questions?

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