Strategies for MATLAB and Simulink Upgrades

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Upgrade Constraints

Windows
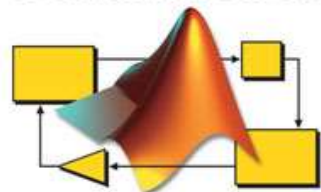
Compilers

Co-Simulation

Linux

Upgrade Challenges

- Short time between projects to upgrade

- Encountered a show-stopping issue after an upgrade

- Limited knowledge of new features and their impact on the process

- Took multiple years to upgrade to a new version

- Custom tools don't work in the new version

- Maintaining hundreds to thousands of models

- Will have to revalidate the models and code

- Users want to stay in the old version

Upgrade Workflow

Assess → Plan → Migrate ⟳ Test → Release → Support
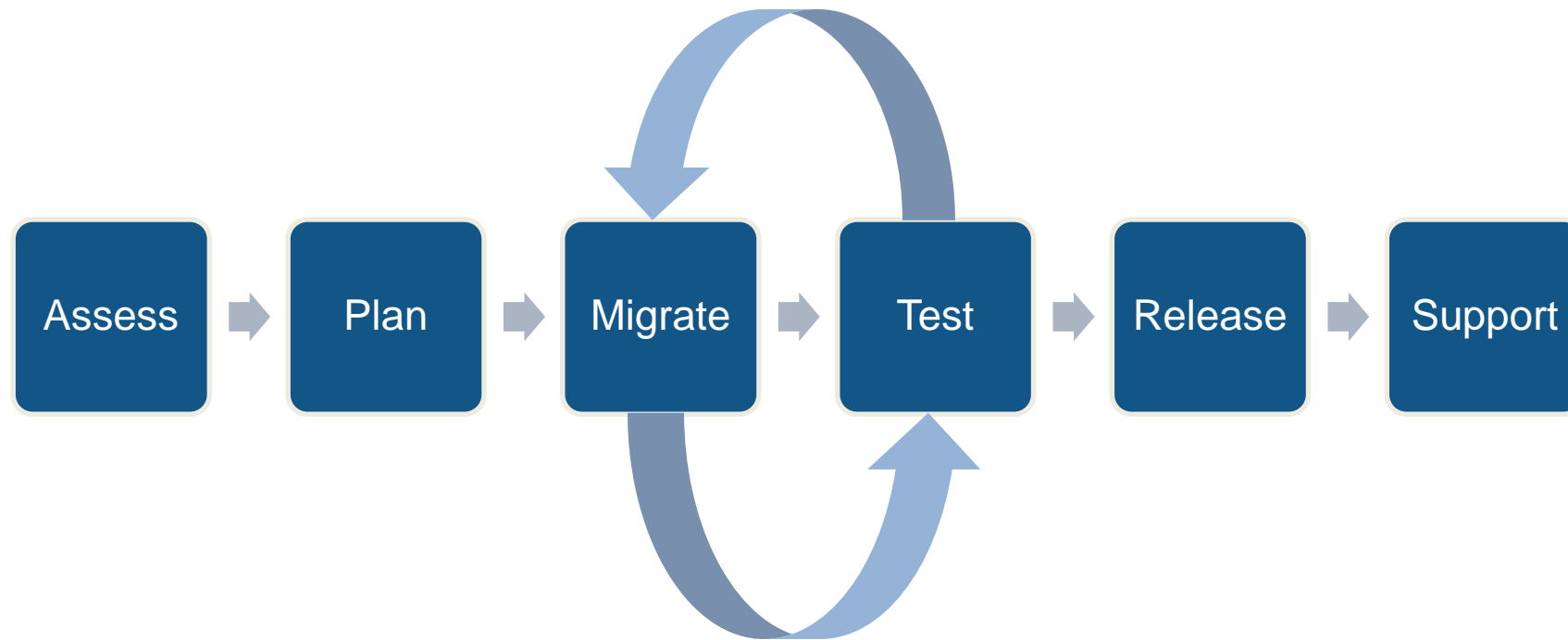
ASSESS
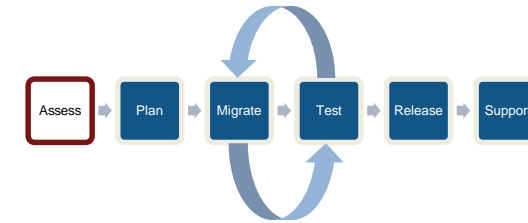
- Choose a Target Version
  - Review [Release Notes](#) and [Bug Reports](#)
  - Contact MathWorks partners to verify which versions they support
  - Choose and change your target version if necessary

- Initial Testing
  - Run Upgrade Advisor on a model

- Regression Testing
  - Run regression tests on tasks that users commonly perform
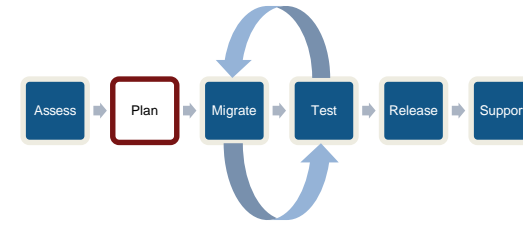 - Better to find the issues now than find them later

PLAN: Create a Business Case
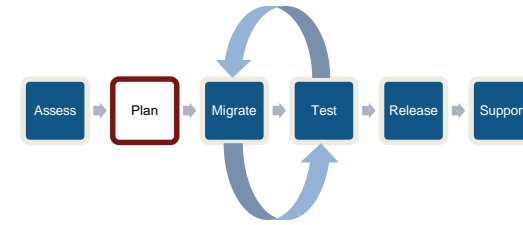
- New features that will improve your workflows

- Upgrading to a new operating system

- Third party software will no longer support your version
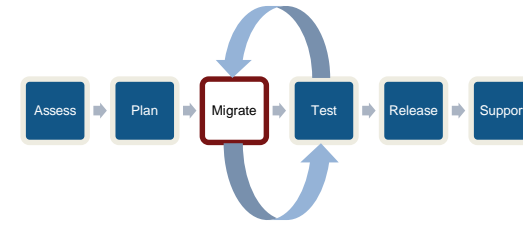
PLAN: Define Your Goals Upfront

- Limit the scope of the upgrade process
  - Don't try to do everything

- Upgrade existing models to a new version
  - Upgrade models without introducing new features
  - Validate models in the new version

- Upgrade custom tools to a new version
  - Replace custom tools with built-in Simulink functionality

MIGRATE: Initial Migration

- Select a large model to test the upgrade process
  - Complies with your modeling style guidelines

- Run Upgrade Advisor on the model

- Test your typical workflows

- Document warning and error messages

- Expand testing to more models
  - Different modeling styles

- Resolve the issues

MIGRATE: Automated Migration
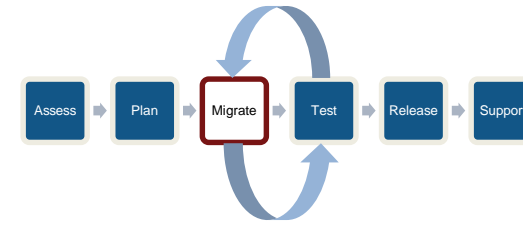
- Automate the conversion process

- Create one MATLAB script that calls everything

- Recommend that the model expert convert his/her models
  - Aware of production deadlines
  - Will need to validate the model

TEST
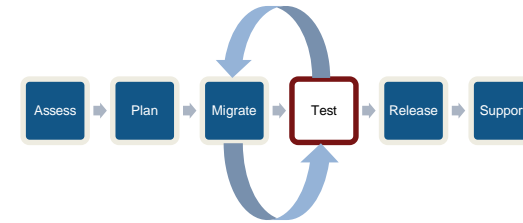
- ## Custom Tools
  - Verify the custom tools perform the intended behavior in the new version

- ## Third Party Tools
  - Test third party tools with the new version

- ## Beta Testing
  - Start using the new MATLAB version for everyday work

RELEASE
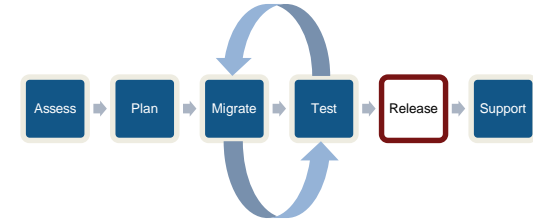
- Training
  - New Features
  - Custom Tools

- Timing
  - Needs to be flexible
  - Don't want to impact a production schedule
  - New models should use the new version
  - Set a deadline for the rest of the models

Continuous Upgrade Philosophy

- Prerelease Testing
  - Test your models and custom tools for each prerelease
  - Send your feedback to the MathWorks
  - Don't wait until your next upgrade to start testing

- Industry Model Testing
  - Submit models to MathWorks Industry Model Testing
  - MathWorks will run tests on your models prior to the prerelease
  - Dramatically reduces the chance of release incompatibilities

- Seminars
  - To keep up to date with MathWorks new features
  - Will help you decide what version to upgrade to

Benefits

- Surprises are minimized.

- You don't have to wait to use new features.

- The new version is released in a timely manner.

- MathWorks may resolve your issues before your next upgrade.

- Your future upgrades will be easier.

TOOLS

Upgrade Advisor
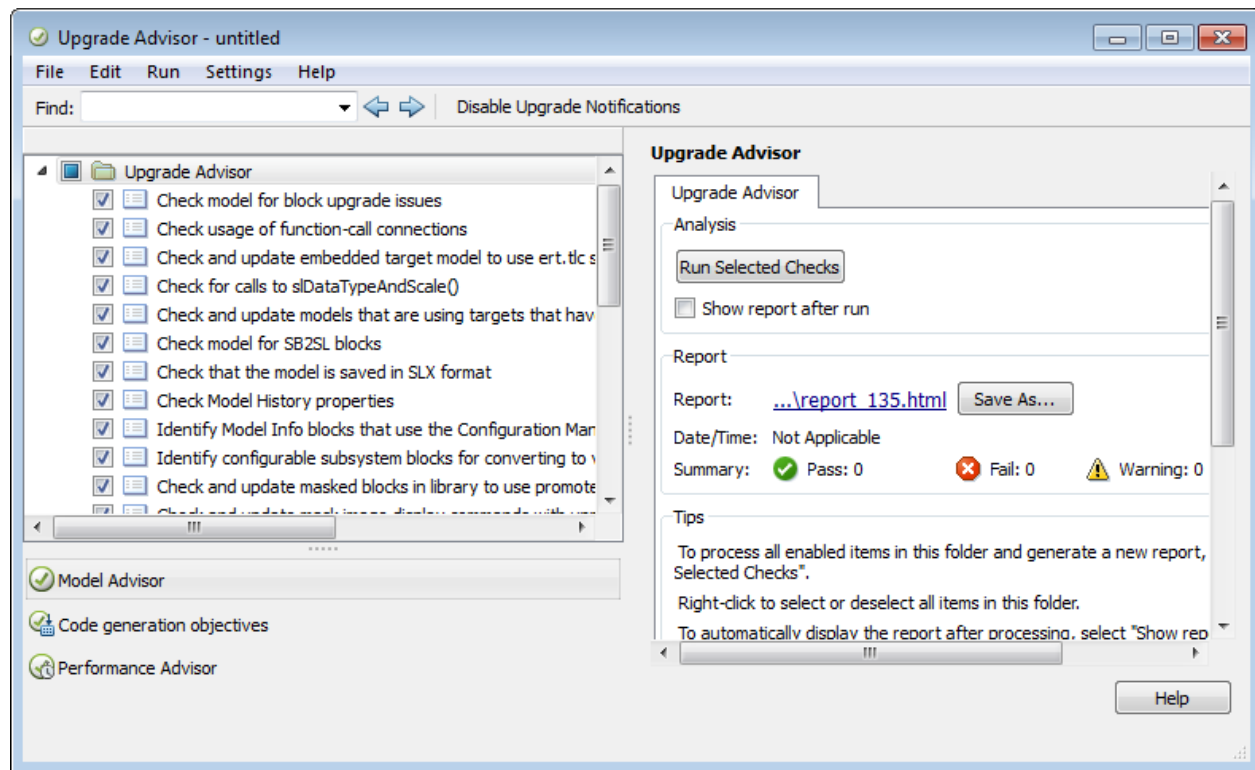
Performance Advisor

TOOLS

Simulink Test

RESOURCES

Upgrade Paper

Upgrade Center

SUPPORT

Technical Support

Consulting Services

MATLAB and Simulink Upgrade Experience

Chris DeBoer

Eaton Corporation – Vehicle Group

Upgrade Process Overview

- Assess the Current Situation

- Plan Business Case and Decision Gates

- Migration Activities

- Testing the Upgraded Toolchain

- Release Process

Assess the Current Situation

- Initial Investigation
  - Revealed Enterprise move to new OS
  - Discovered issues with Custom Storage Classes
- Consultation with MathWorks
  - Changed Target version from R2014b to R2015b
  - Received guidance to resolve Custom Storage Class issues

Create Business Case and Decision Gates

- ## Business Considerations
  - ## Cost: Time, Resources
  - ## Program Timing
  - ## Risks
- ## Decision Gates
  - ## Business Case
  - ## Migration Progress
  - ## Testing
  - ## Pre-Release
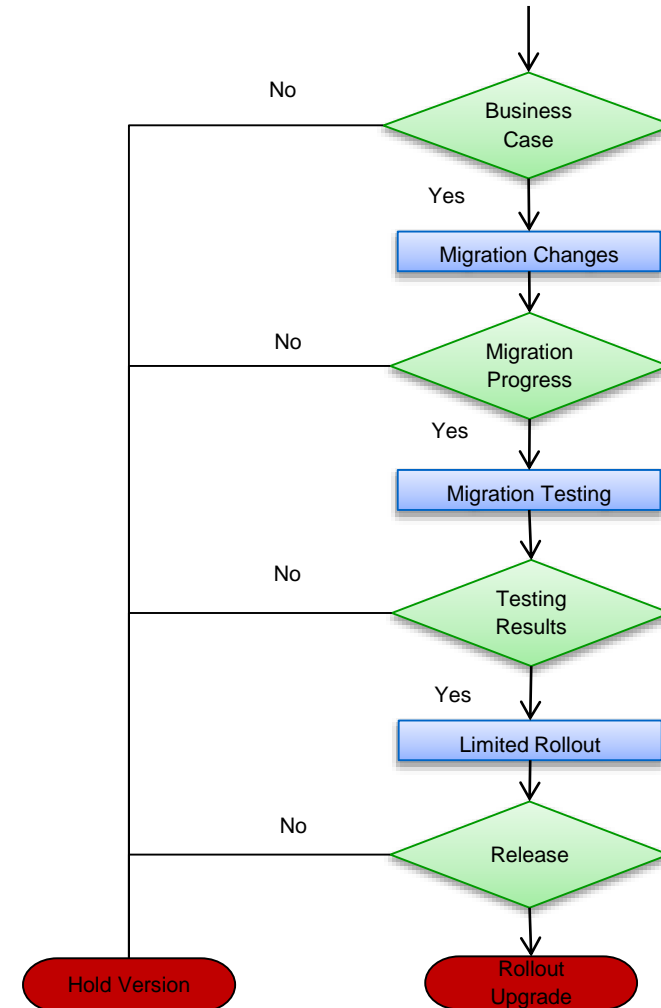
Migration Activities and Testing

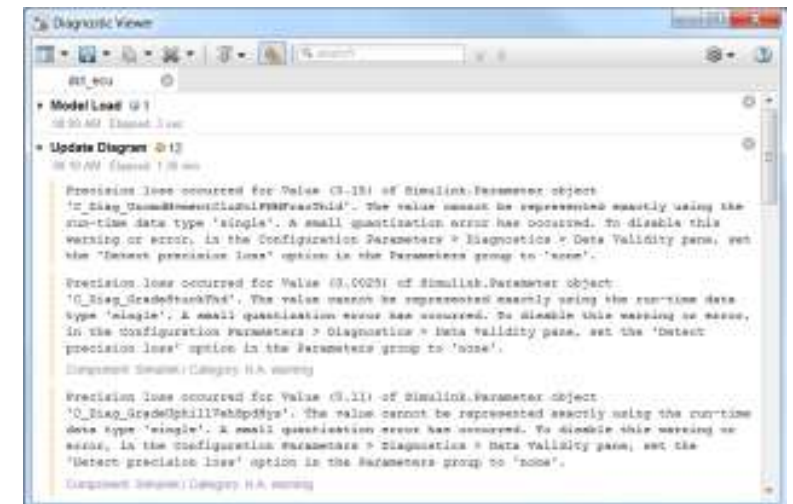- **Upgrade Custom Storage Classes**
  - Format Change from R2011b to R2012a

- **Resolve New Errors and Warnings**
  - Heavy use of "Update Diagram"
  - Limited use of Upgrade Advisor

- **Update TLC files**

- **Update Build process**
  - Legacy Build process to Standard Build process

Testing

- Simulation Testing
- HiL Testing
- Test Cell Testing
- Vehicle Testing
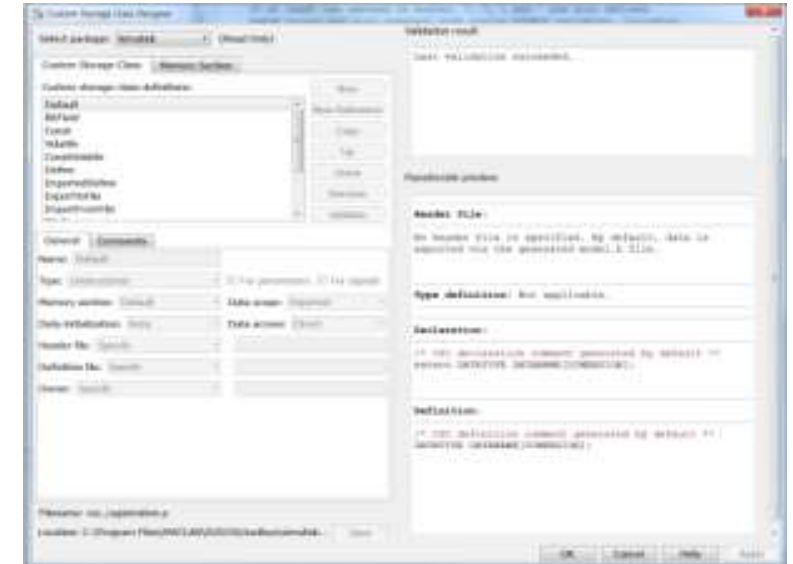
Release

- User Installation
  - Installation Information distributed prior to Release
  - Required confirmation of simulation and build
- User Training
  - User Interface
  - New build process
- User Testing
  - Beta Testers verify updated toolchain
- Full Release