Enterprise Infrastructure for Model-Based Design

Good to Great

Dave Hoadley, PhD

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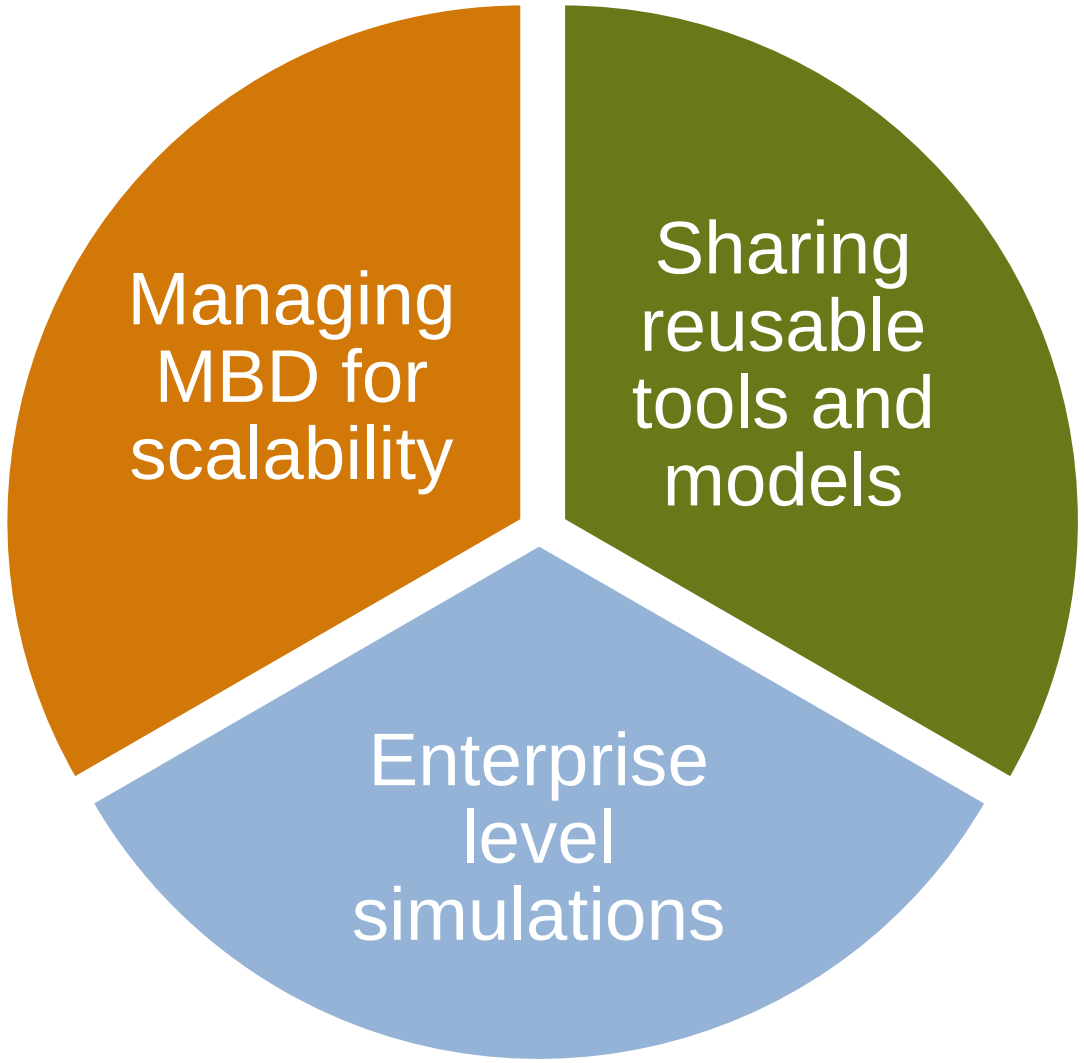
Opportunities of Enterprise-level Model-Based Design

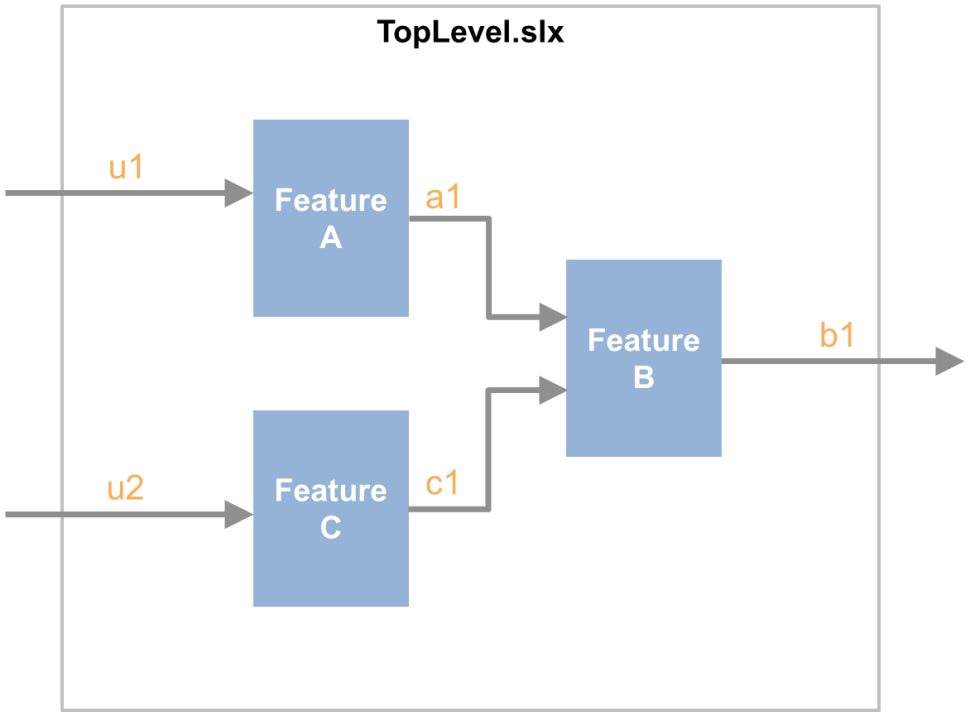
- Enabling scalability
  - Inter-team collaboration
  - Multi-component simulation
- Empowering reuse
  - Designing for reuse
  - Publishing
- Expanding simulations and analysis
  - Parallel
  - Distributed

Agenda


Managing MBD for scalability
Sharing reusable tools and models
Enterprise level simulations

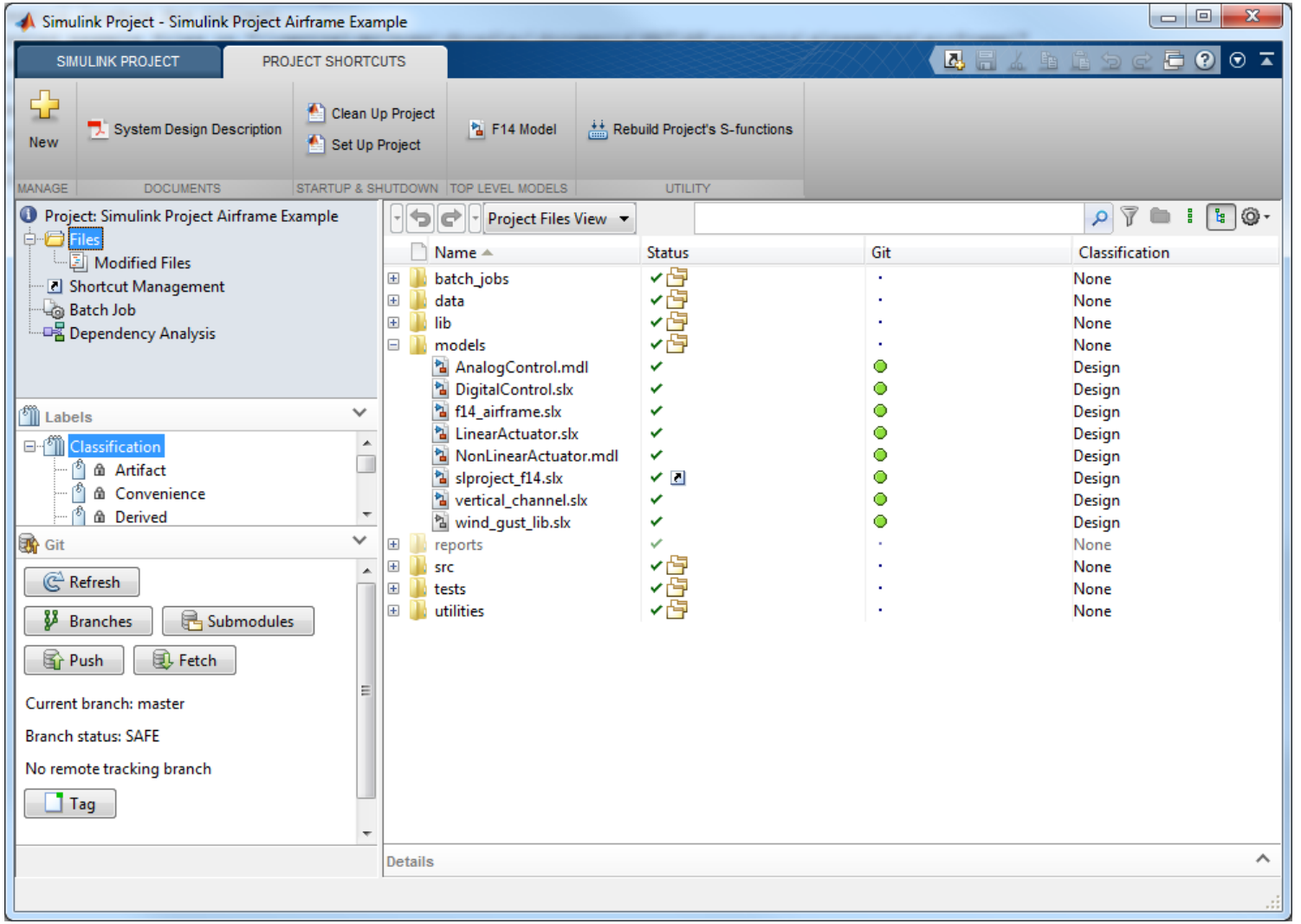
Managing Model-Based Design for Scalability

- Key to scalability is careful management
  - Model reference
  - Interface definition (buses, ARXML import)
  - Simulink Data Dictionaries
  - Simulink Projects
  - Configuration Management integration



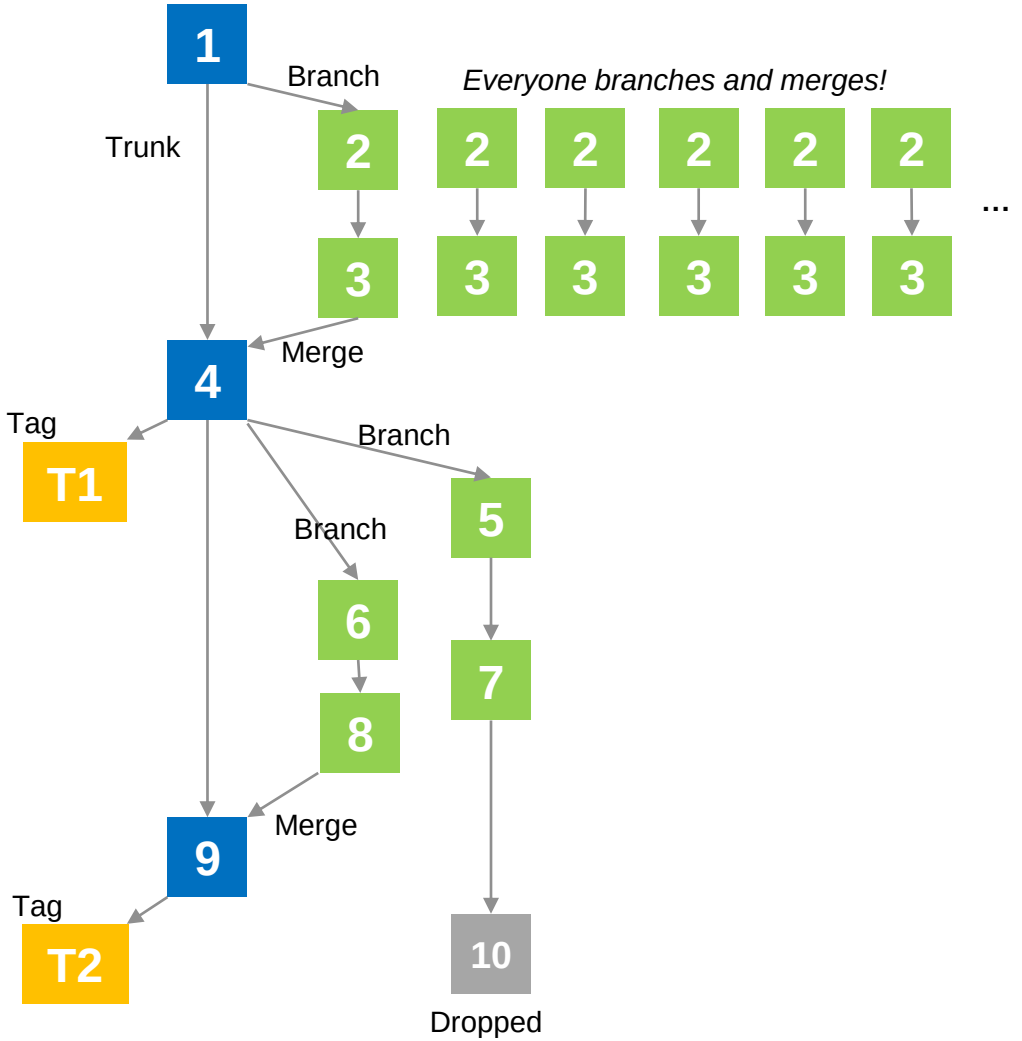
Simulink Projects for teams: Collaborate, automate, integrate

- Find and group files
- Standardize tasks
- Promote commonality with templates
- Label items for workflow support
- Share with SCM tools
- Project referencing for scalability



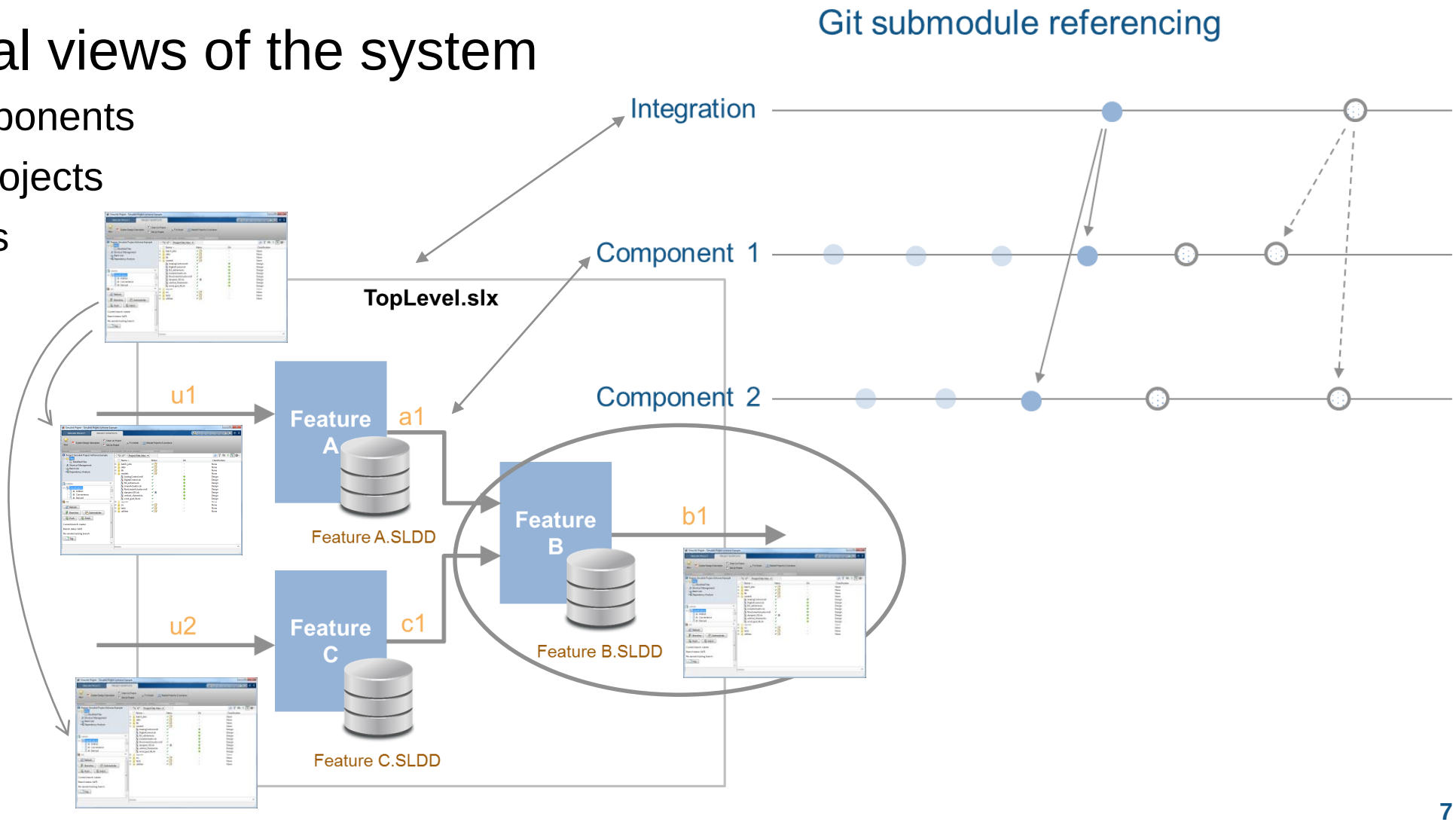
Source Control Management example: Git

- Common SCM features
  - Shared location
  - All versions stored
  - Branches, labels, tags
- Git difference
  - Designed for distributed development
  - Favors branch & merge over fetch/lock/update
- For models, data dictionaries, .mat files this is tricky

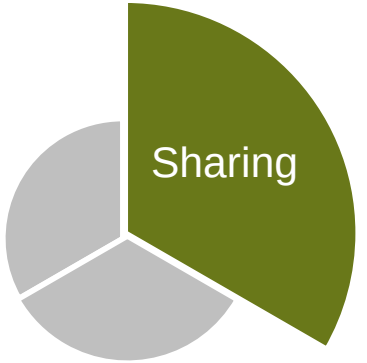


Scalable component management strategy

- Align logical views of the system
  - Model components
  - Simulink Projects
  - Git modules
  - Data



Managing for reuse



- Challenges to reuse
  - Location
  - Clarity
  - Status

  → Simulink Projects, design templates, SCM integration

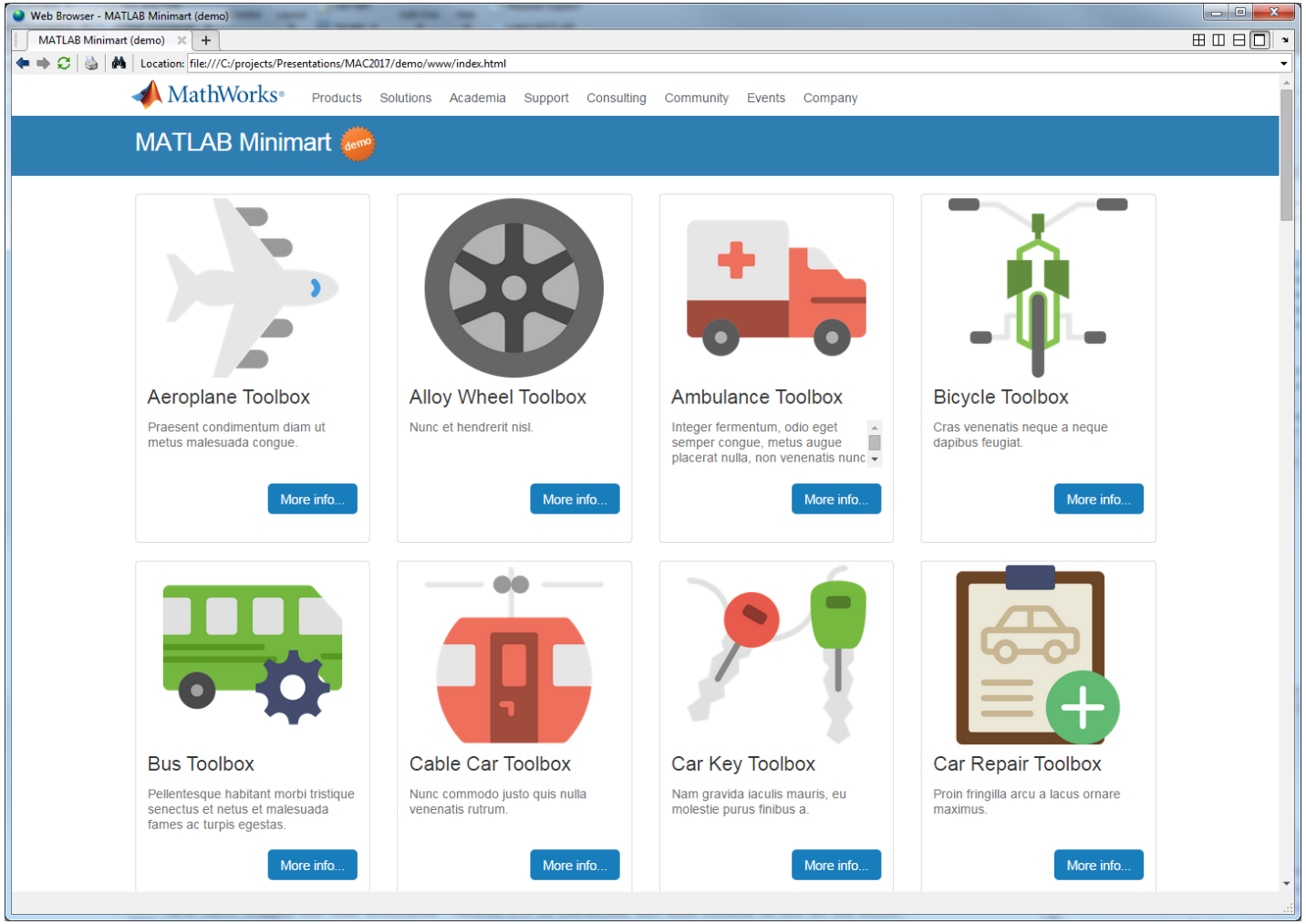
  - Awareness
  - Interoperability
  - Trust

  → ??

- Can we go further for sharing than just SCM?

Challenge of discovery

- Discovering what?
  - Your own apps
  - Engineering data
  - Models
  - Automation tools
  - Templates
- MATLAB Minimart add-on
  - Package and publish
  - Download and install
  - Versioning
  - Compatibility



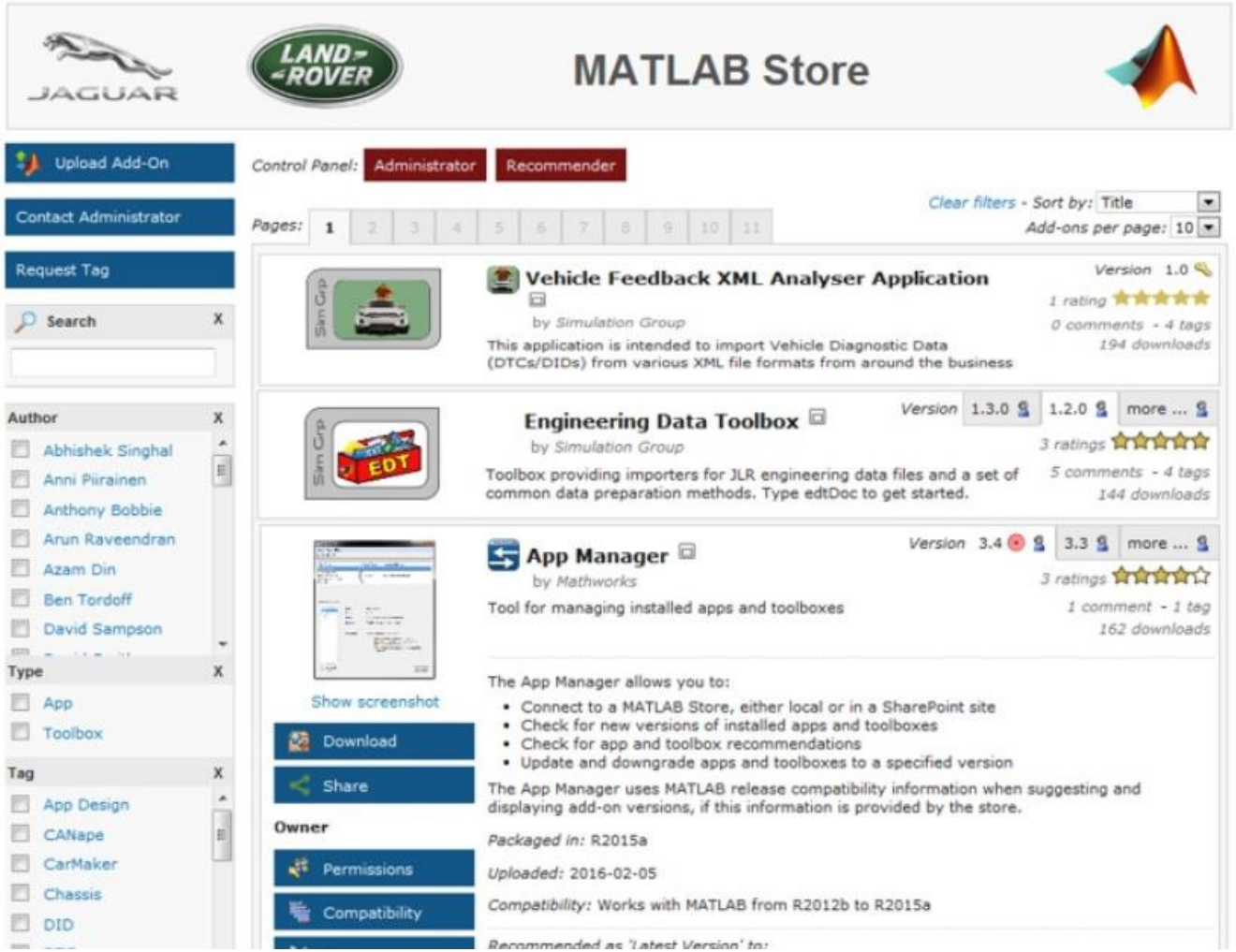
Socializing this idea ➔ MATLAB App Store

- Search/filter
- Scope
- Approval workflow
- Component interdependencies
- Ownership
- Download tracking
- Notifications
- User ratings
- Comments
- Recommendations

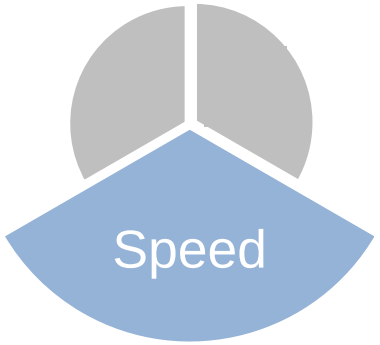
You might also like …

MATLAB Store at Jaguar Land Rover

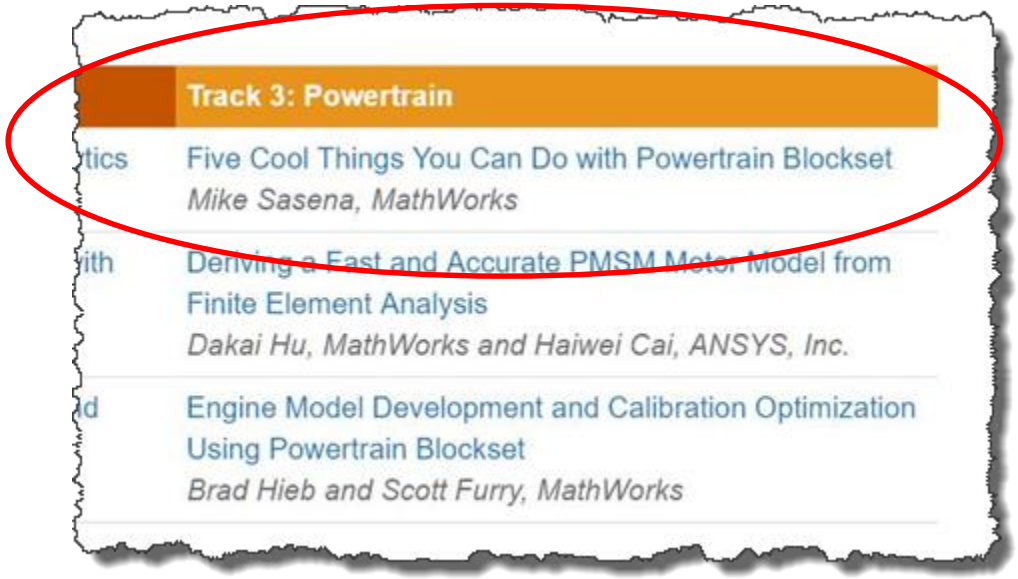
- After 18 months
  - 100 internally authored apps and toolboxes
  - downloaded 6000 times
  - almost 1000 users
- Reduce duplication
- Encourage and recognize sharing
- Engineering productivity increased



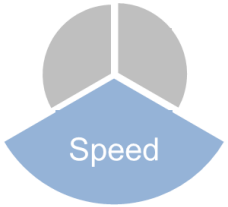
Challenge of growth of simulations and analysis



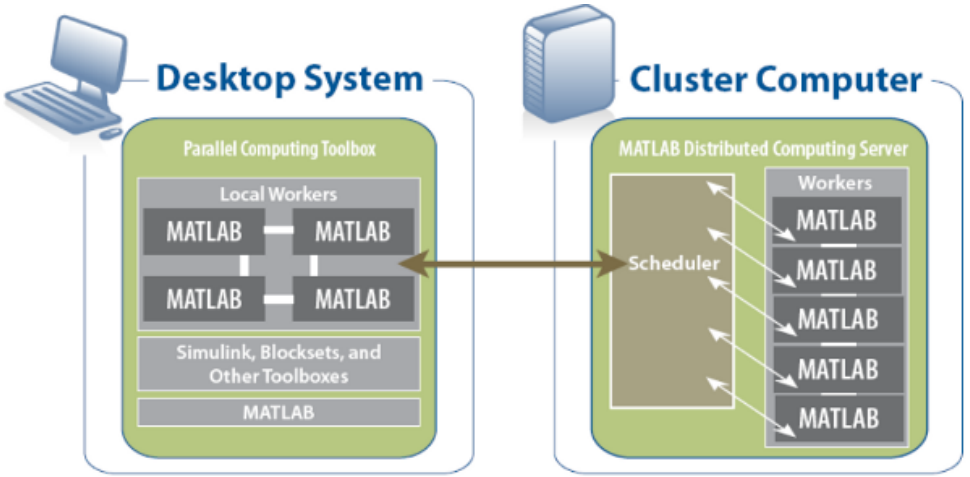
- Scope
  - component – subsystem – vehicle – fleet
- Types of tasks
  - Design of experiments
  - Controller/system optimization
  - Parameter sensitivity analysis
  - Training machine learning algorithms
  - System validation



MathWorks solutions

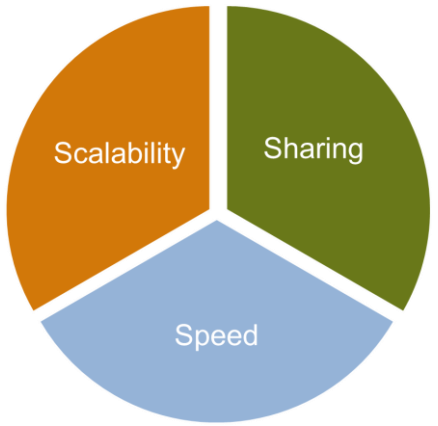


- Parallel Computing Toolbox
  - Multiprocessor/Multicore
  - GPU
- MATLAB Distributed Computing Server

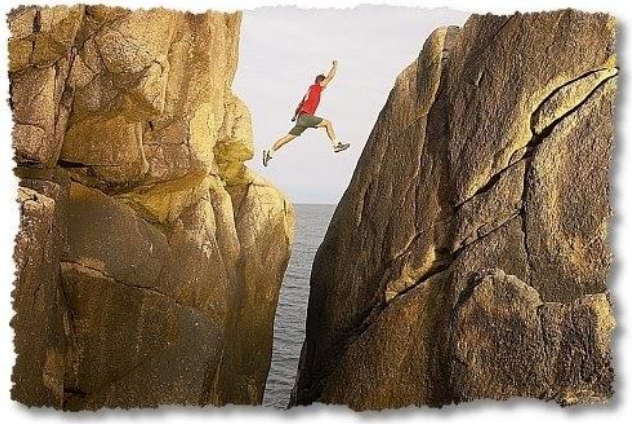


	Track 1: Automated Driving	Track 2: Data Analytics	T
2:30 p.m.	Introduction to Automated Driving System Toolbox *Mark Corless, MathWorks*	What's New in MATLAB for Engineering Data Analytics *Will Wilson, MathWorks*	
3:05 p.m.	Deep Learning: New Tools for Algorithm Design and Validation *Arvind Jayaraman, MathWorks*	Building a Digital Twin of Your Vehicle Powertrain with MATLAB and Simulink *Arvind Hosagrahara, MathWorks*	
3:40 p.m.	Case Study: Vision and Radar-Based Sensor Fusion *Seo-Wook Park, MathWorks*	Developing Prognostics Algorithms: Data-Based and Model-Based Approaches *Seth DeLand, MathWorks*	

Conclusion



- Optimize your adoption for enterprise
  - Scalability
  - Sharing
  - Speed
- Companies are improving in some dimensions
- Tackling all will lead to a world-class state



For further information

- Large scale modeling

  https://www.mathworks.com/help/simulink/large-scale-modeling.html

- Git integration

  https://www.mathworks.com/help/simulink/examples/using-a-simulink-project-with-git.html

- Jaguar Land Rover User Story

  https://www.mathworks.com/company/user_stories/jaguar-land-rover-standardizes-on-matlab-for-developing-packaging-and-sharing-engineering-tools.html

- MATLAB Distributed Computing Server

  https://www.mathworks.com/products/distriben.html

- Amazon EC2 early adopter program

  https://www.mathworks.com/campaigns/products/offer/mdcs-cloud.html