

Model Versioning and Enterprise Architect





My Background



- OOM & Model Engineering, TU Vienna
- 2011 PhD: *Model Versioning*, TU Vienna
- Sparx Trainer & Consultant
- LieberLieber Product Manager



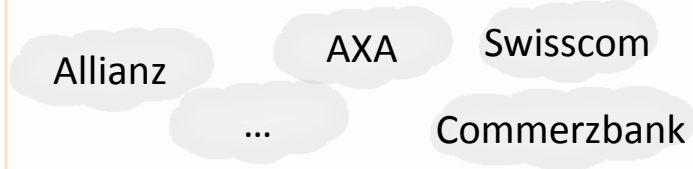


Peter Lieber



Who Needs Modeling?

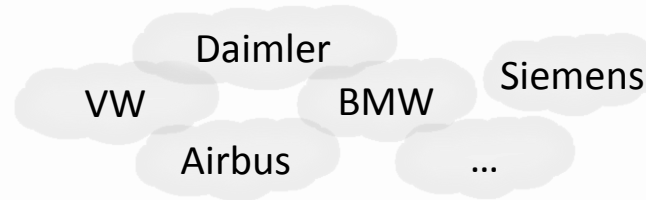
Information Management



Companies collecting, controlling and managing information

- Insurance companies
- Telecommunication companies
- Banks
- etc.

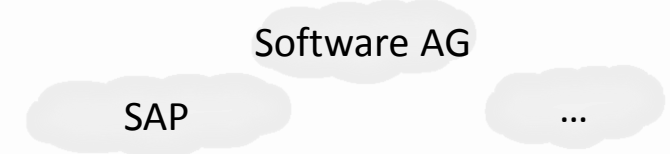
Cyber Physical Systems



Manufacturers of embedded devices

- Automotive
- Healthcare
- Defense
- Railway
- Customer Electronics
- etc.

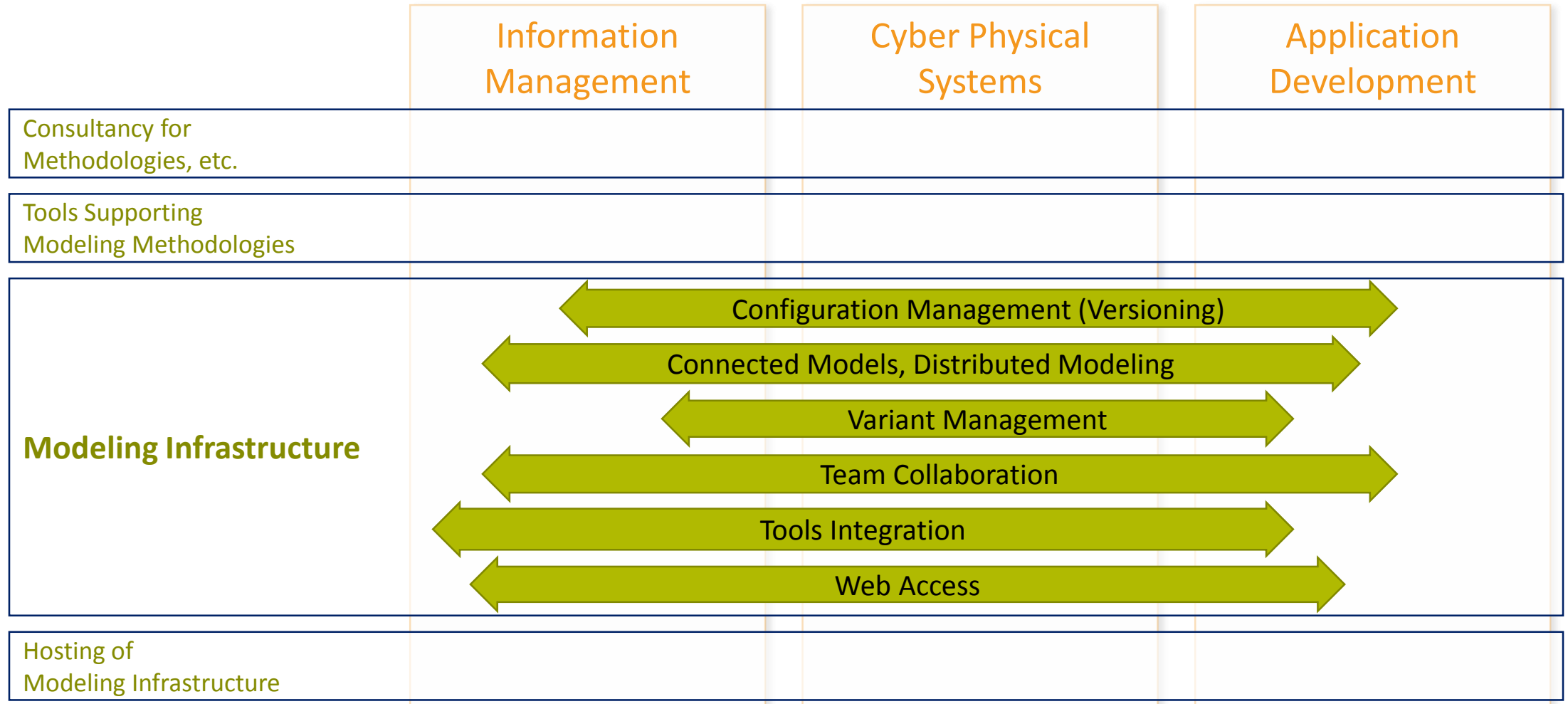
Application Development



Companies developing application software

- Web Applications
- Mobile Applications
- Desktop Applications
- etc.

Modeling Infrastructure is Challenge for Everyone

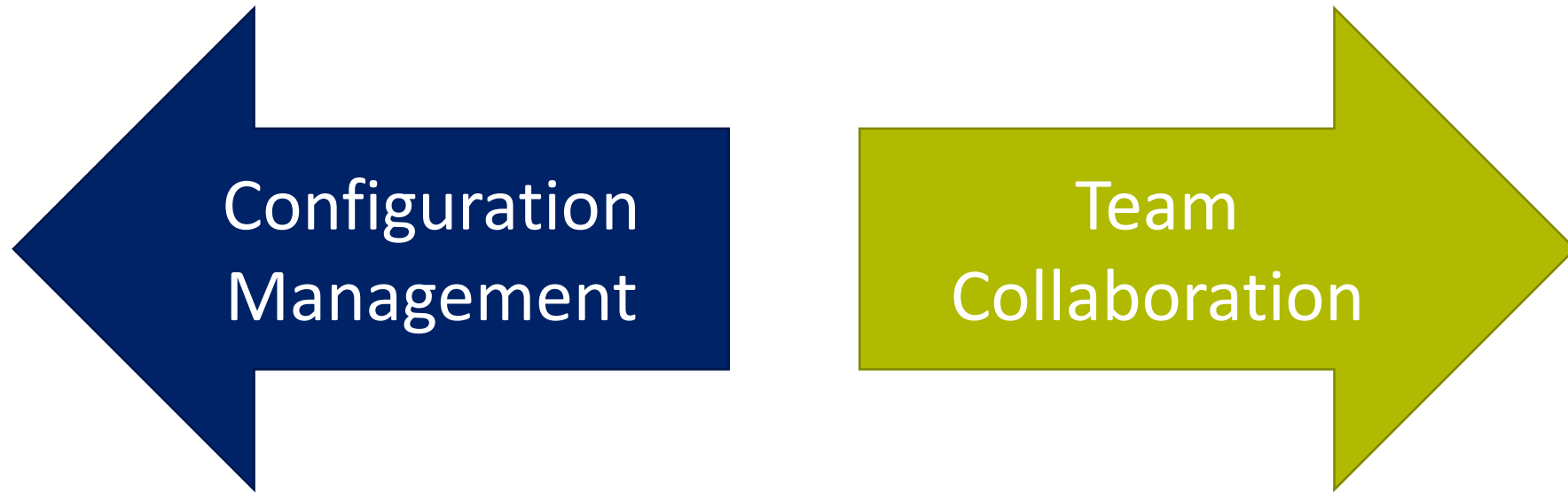


Agenda

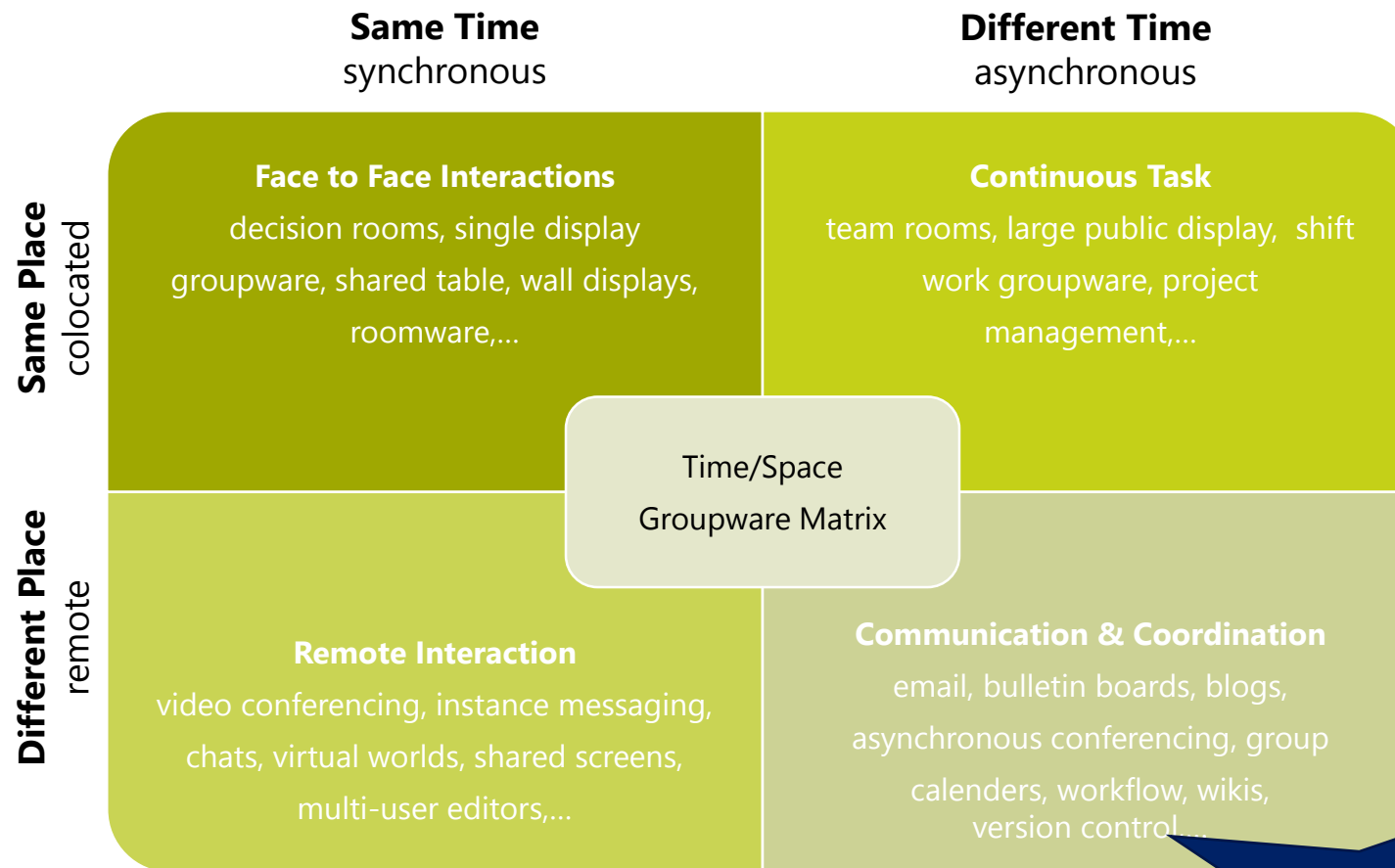
- Motivation
- Built-In Feature
- Third Party Market
- Conclusion



Enterprise Architect Chellange



Collaboration in General



VCS –
Version Control Systems



Configuration Management, Change Management and Collaborative Modeling

Working collaboratively
on a model is hard

Versioning for EA
Models is hard and
error-prone

Tracking Changes in
Models is very complex

RESULT → Modeling with EA is often used
without Configuration Management



EA Built-in Features

EA Built-in Features

- Manage multiple file copies
- Package Baselines
- XMI Export/Import with Merge Sets
- Reusable Asset Service
- VCS Integration
- (Time-Aware Modeling)



Typical Versioning Concepts

Manage Multiple File Copies

- ✓ Easy to use
- ✓ Works for one person well
- ✓ Good Performance

- Change Management not possible
- Configuration Management not possible
- Teamwork not possible
- Comparison of EAP-Files not possible
- Transfer content only via XML

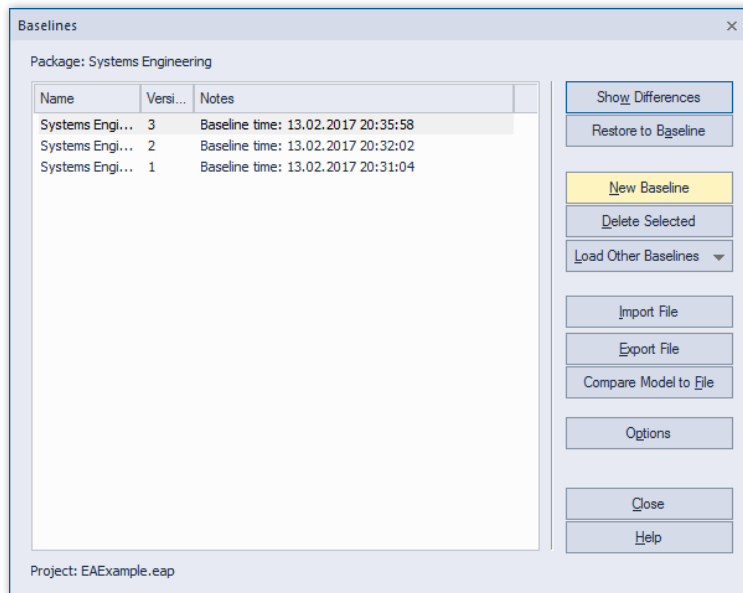
<input type="checkbox"/> Name	Type	Size
<input checked="" type="checkbox"/> v0.eap	Enterprise Archite...	
<input type="checkbox"/> v1.eap	Enterprise Archite...	
<input type="checkbox"/> v2 13.02.17.eap	Enterprise Archite...	
<input type="checkbox"/> v2 backup.eap	Enterprise Archite...	
<input type="checkbox"/> v2 for meeting.eap	Enterprise Archite...	
<input type="checkbox"/> v2.eap	Enterprise Archite...	



Typical Versioning Concepts

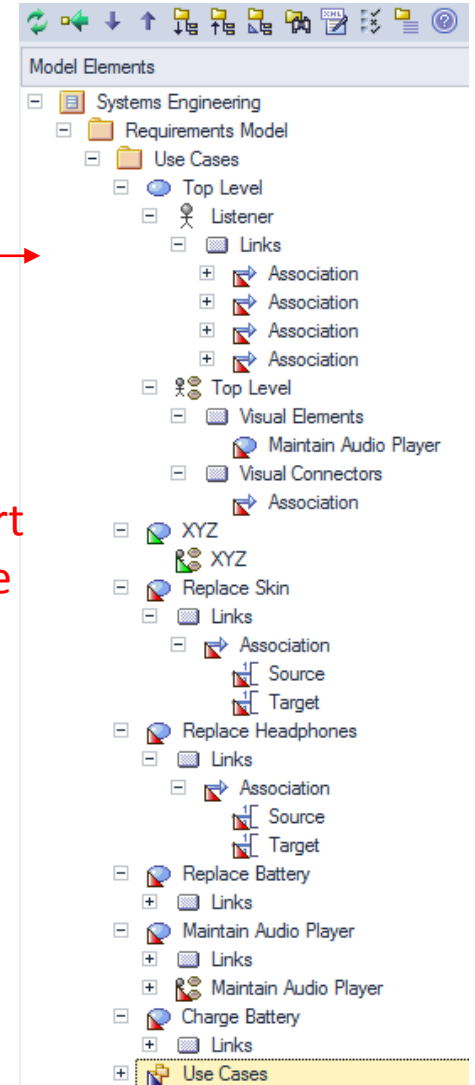
Package Baseline

- ✓ Easy to use
- ✓ Works for teams as package backup well
- ✓ Not bad for review of one changed diagram



Only one change
one Use Case was deleted

- Change Management only with high effort
- Configuration Management only with high effort
- Comparison between the baselines not possible
- Slow for big packages
- No overview of available baselines
- For review of complex changes not usable
- Selective restore (merge) not usable
- Many elements properties not visible
- Blows up the EAP-files
- 3-way Diff and Merge not supported
- Cross package dependencies causes problems



Typical Versioning Concepts

XMI Export/Import

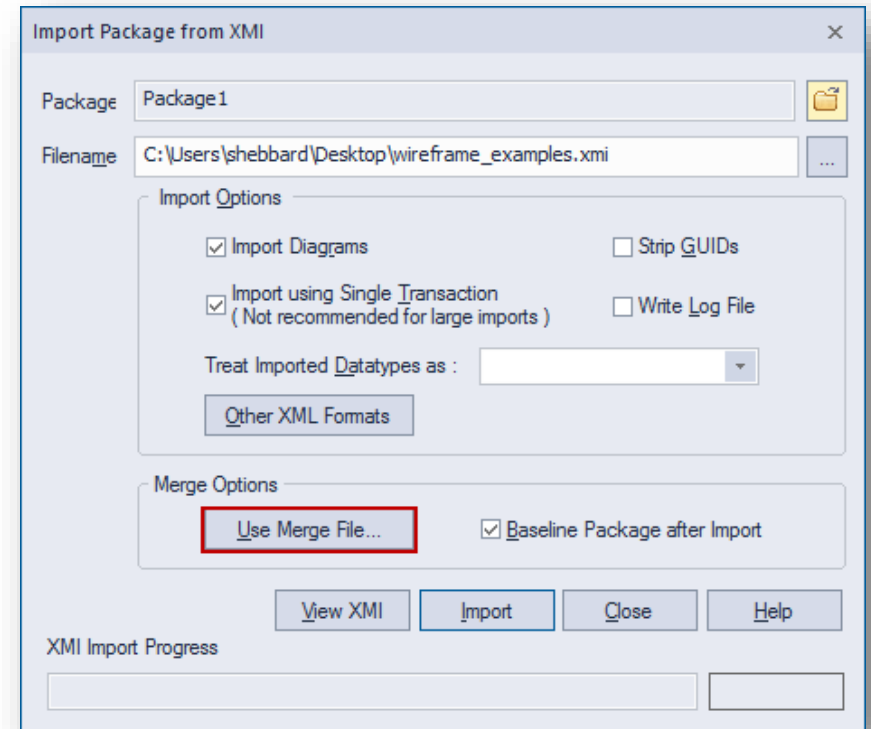
- Merge Sets
- Reusable Asset Service
- XMI in VCS (EA Integration)



XMI Merge Using Baseline Merge Sets

- Used when users are editing separate parts (as in separate elements, diagrams or sub-packages) within the same containing package

- ✓ Allows integrating work from multiple people
- ✓ DBMS and files-based
- ✓ Used when users are editing separate parts (as in separate elements, diagrams or sub-packages) within the same containing package
- ✓ Better than simple import
- ✓ Kind of 3-way merge
 - Only union (Vereinigungsmenge)
 - Complex handling of multiple files
 - No Conflict Resolution
 - Not intended to change the same element
 - Configuration Management only with high effort
 - Similar problem than baseling because of similar technique used



Reusable Asset Service (RAS)

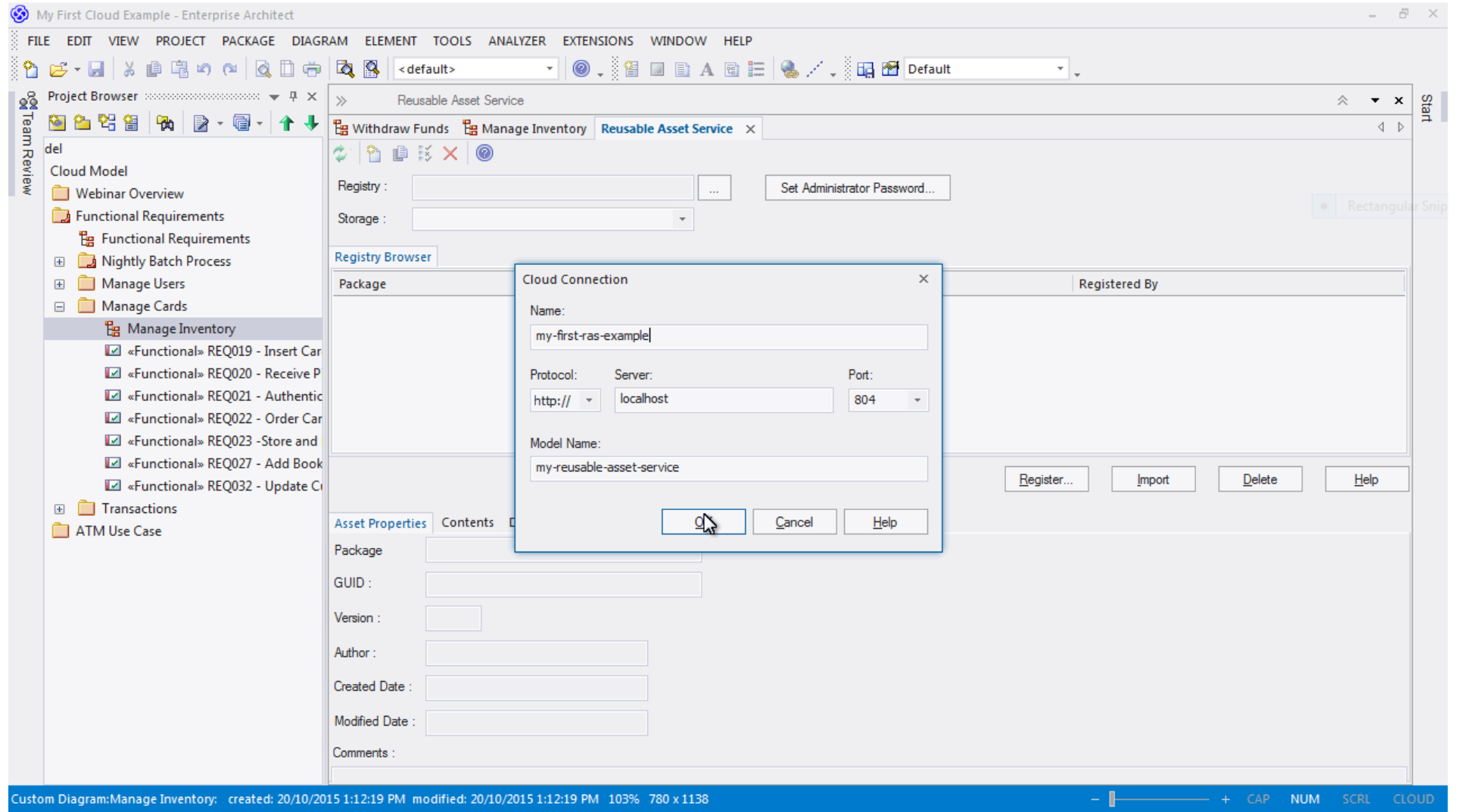
- XMI not in VCS, but in a shared repository, accessible via Cloud Service

For each Package, the RAS automatically identifies the:

- Version of the Package held in the registry
- Diagrams and elements (including child Package elements) contained by the Asset Package
- Dependencies on parent Packages of any external elements that the Asset Package references
- Dependencies on MDG Technologies



RAS



RAS

The screenshot displays the Enterprise Architect interface for a project titled "My First Cloud Example - Enterprise Architect". The left sidebar shows a "Project Browser" with a tree structure including "Cloud Model", "Webinar Overview", "Functional Requirements", "Nightly Batch Process", "Manage Users", "Manage Cards" (selected), "Manage Inventory", and "Transactions". The main workspace is titled "Reusable Asset Service" and contains a "Registry Browser" table. A red oval highlights the table, which has the following data:

Package	Version	Last Registered	Registered By
Manage Cards	1.0	20/10/2015 4:28:37 PM	sparxsys

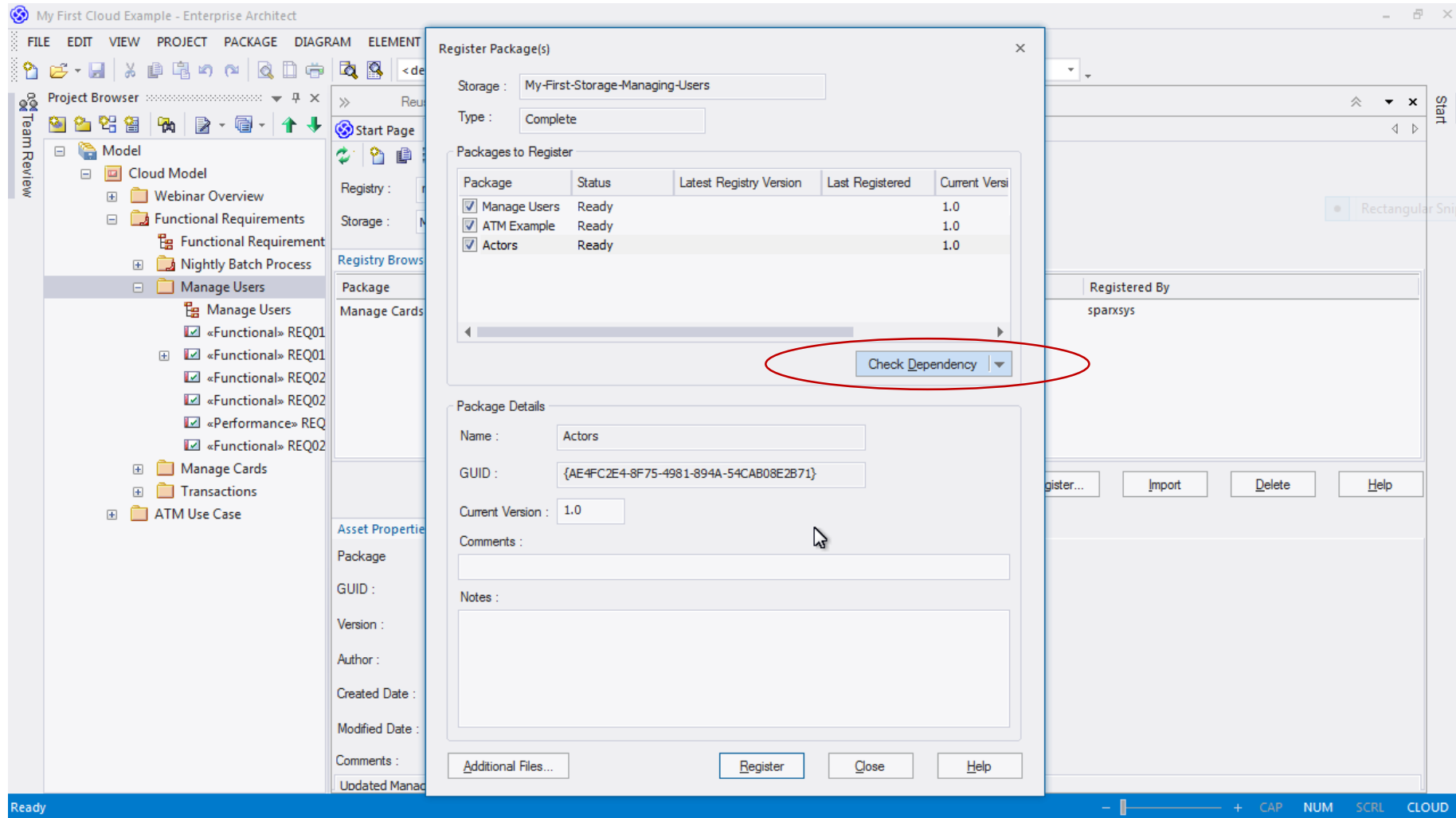
Below the table, the "Asset Properties" tab is selected, showing details for the "Manage Cards" package. A red oval highlights the "Asset Properties" tab and its fields:

- Package: Manage Cards
- GUID: {E3B45DD6-7187-4b2a-B280-E265B569B4A4}
- Version: 1.0
- Author: sparxsys
- Created Date: 20/10/2015 4:28:37 PM
- Modified Date: 20/10/2015 4:28:37 PM
- Comments: Manage Cards

The status bar at the bottom indicates "Package: Manage Cards" and includes a zoom slider and keyboard shortcuts (CAP, NUM, SCRL, CLOUD).

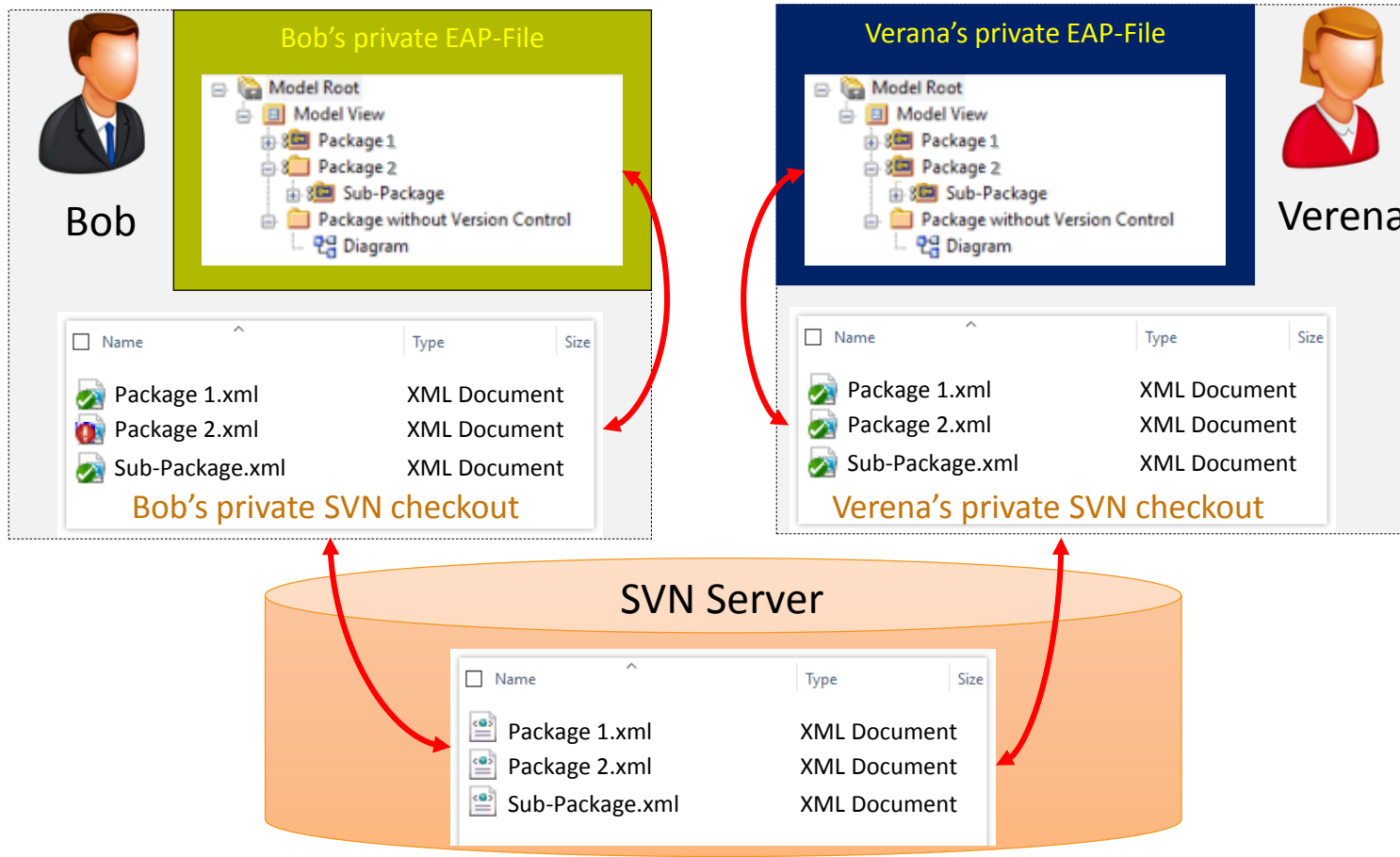


RAS



Typical Versioning Concepts

EA VCS Integration



- ✓ Out of the box available
 - ✓ Team work possible
 - ✓ Model under Configuration Control
 - ✓ No conflicts (good & bad)
-
- Working independently of each other not possible
 - Requires high discipline and effort
 - Model structure according to versioning paradigm
 - Change Management only with high effort
 - Bad performance for big models
 - For review of complex changes not usable
 - Selective restore (merge) not usable
 - Many elements properties not visible
 - Cross package dependencies causes problems
 - Many CVS solutions not supported (e.g. Git)

Summary Built-In features

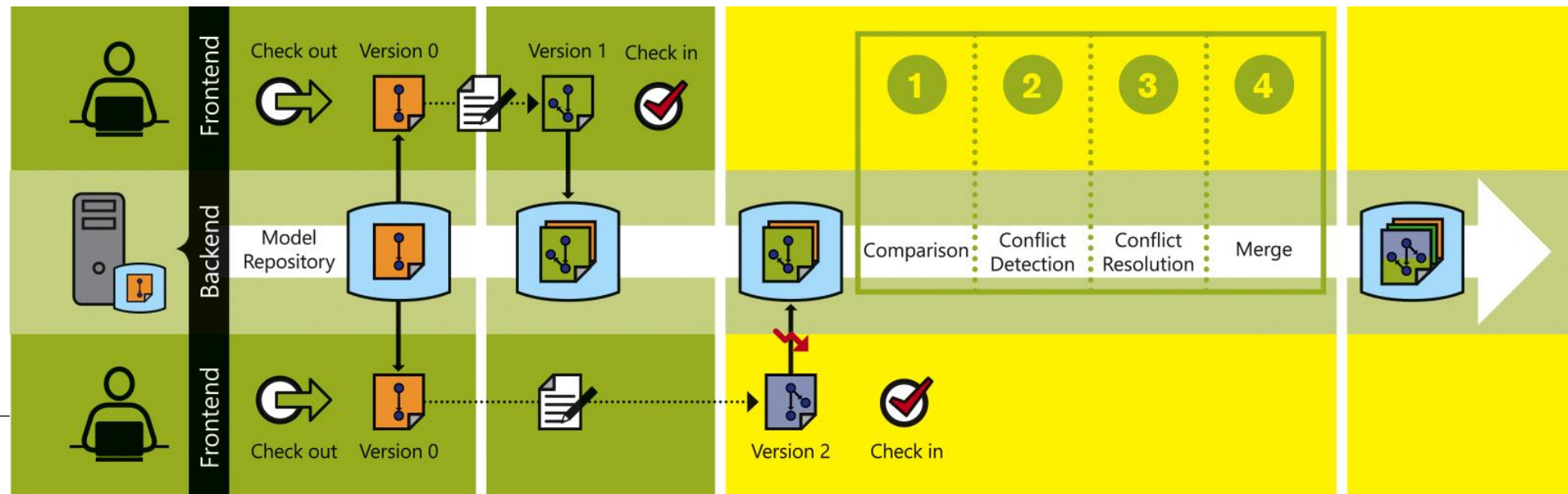
1. Multiple File Copies
2. Baselines
3. XMI Export/Import incl. Merge Files
4. SVN Integration (“Pessimistic Versioning”)
5. (Time-aware Modeling)

Independent of DBMS/file-based repository!

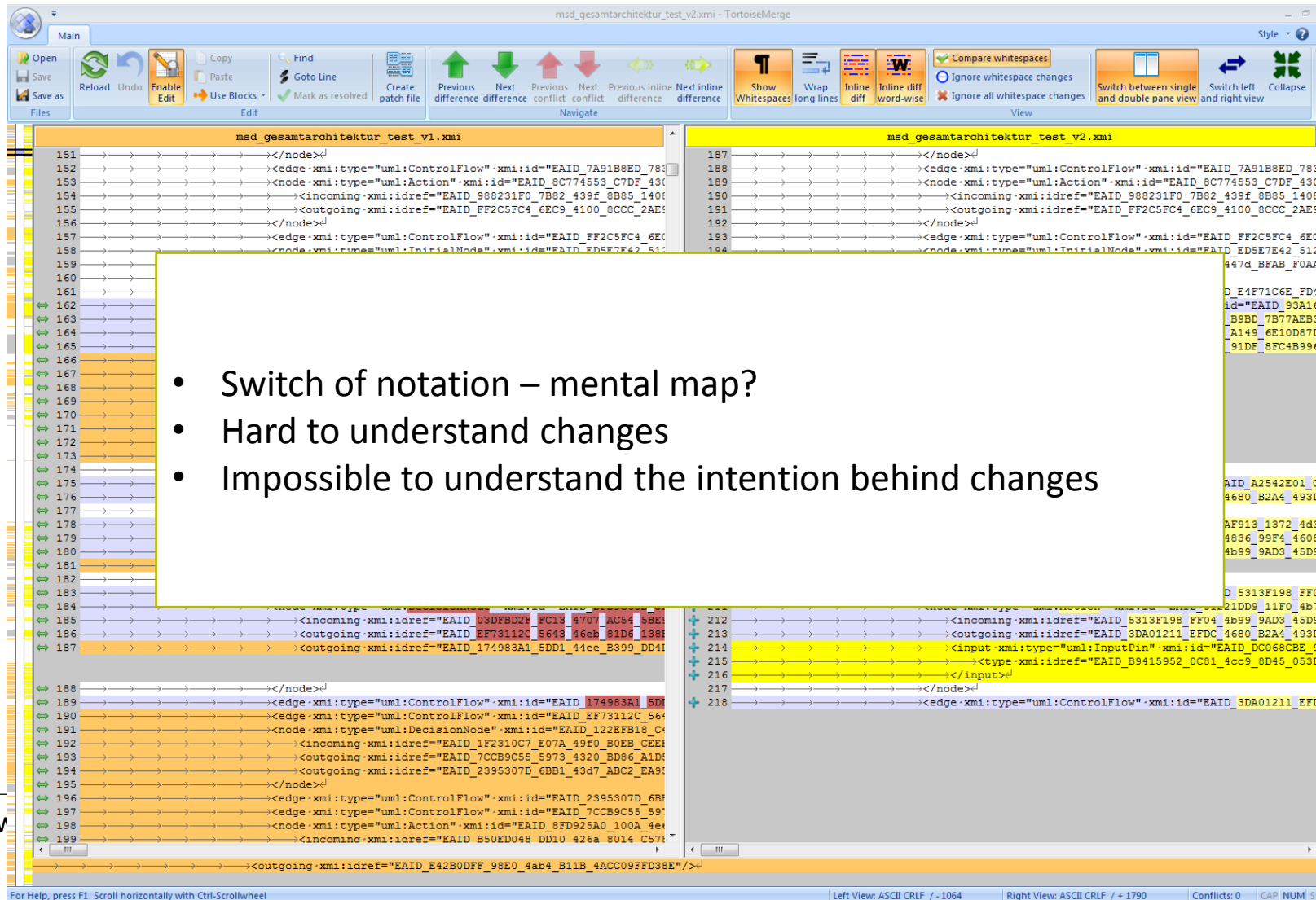


VCS – Version Control Systems

- Pessimistic (EA):
 - Model is locked → Sequential work
- Optimistic:
 - Parallel work, but conflicts possible



Why not using traditional diff tools?

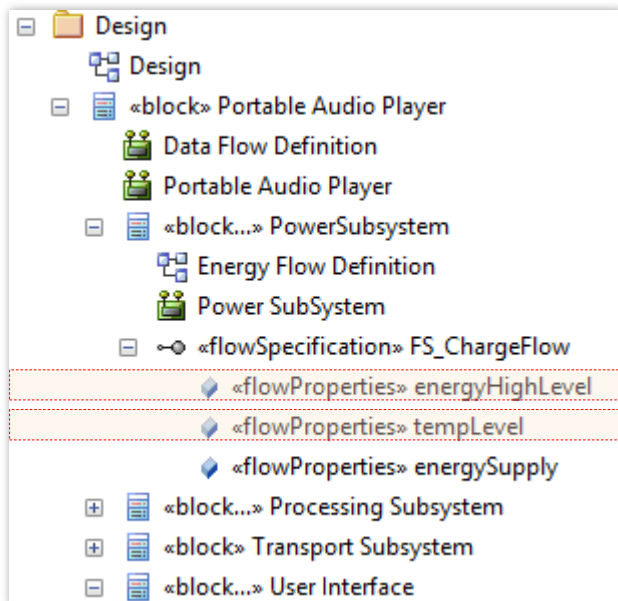


Why is Three-Way Diff and Merge so Important

Two-Way Diff compares two Models to each other



Bob



✓ Same attribute has different names **EnergyHighLevel** and **EnergyLowLevel**

✓ Bob or Verena has changed?
– Has Bob renamed?
– Or has Verena renamed?

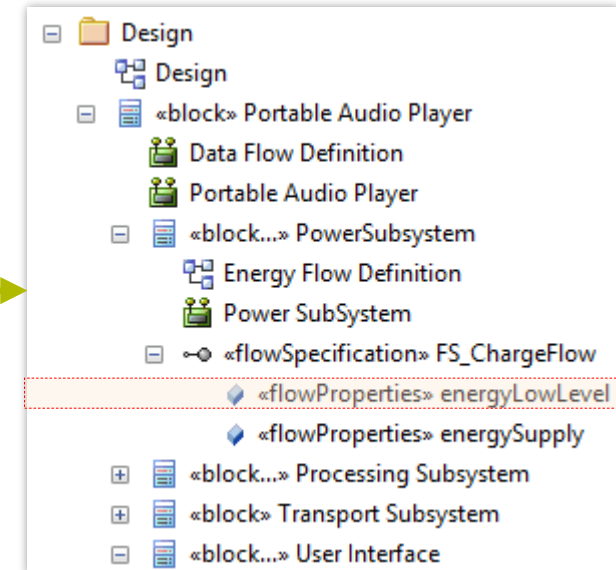
compare

✓ **TempLevel** Attribute is missing in Verena's version

– Bob or Verena has changed?
– Has Bob added or renamed?
– Or has Verena deleted or renamed?



Verena

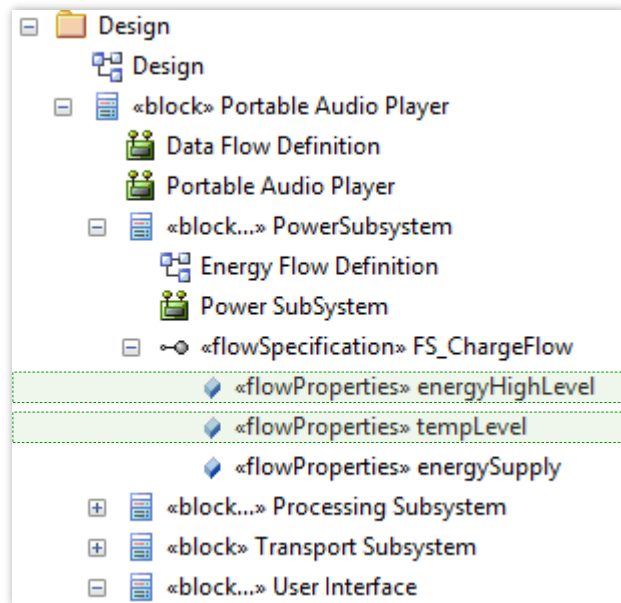


Why is Three-Way Diff and Merge so Important

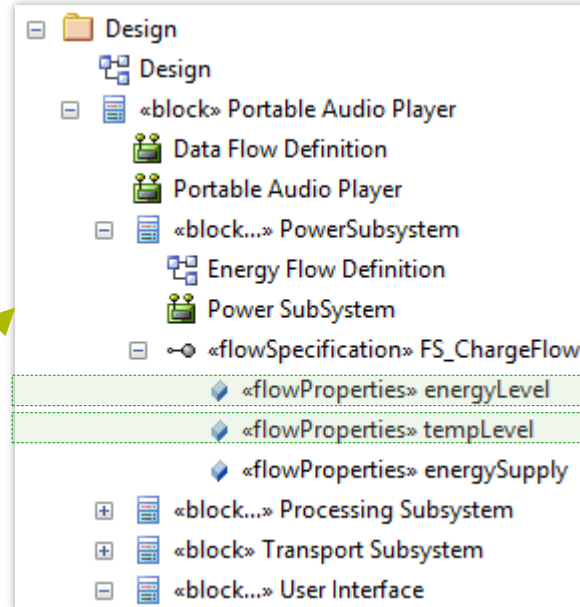
Three-Way Diff compares each Model to their both predecessor



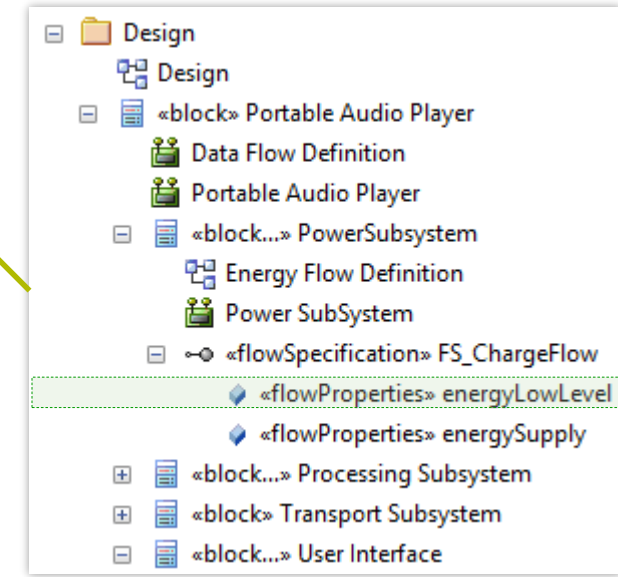
Bob



Version Predecessor



Verena



compare

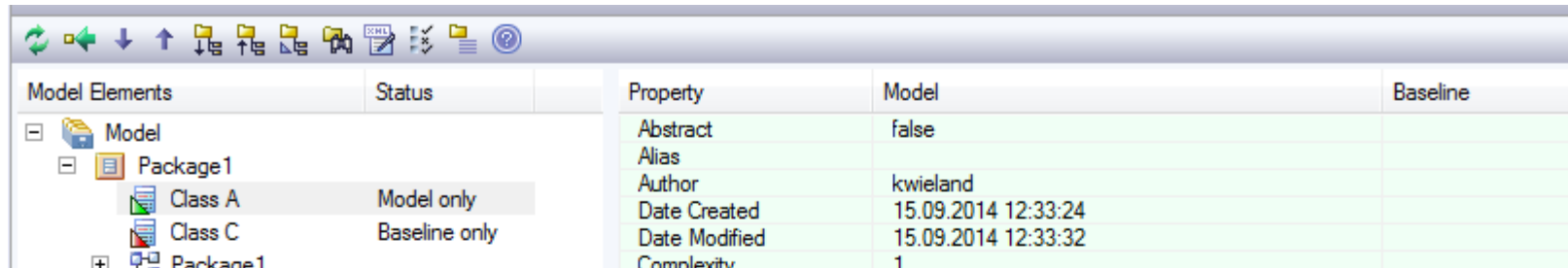
compare

- ✓ TempLevel Attribute is missing in Verena's version
- ✓ Verena has deleted !

- ✓ Verena and Bob they both have differently renamed the attribute **EnergyLevel**, Bob to **EnergyHighLevel** and Verena to **EnergyLowLevel** !



Why 3-way Diff is useful?

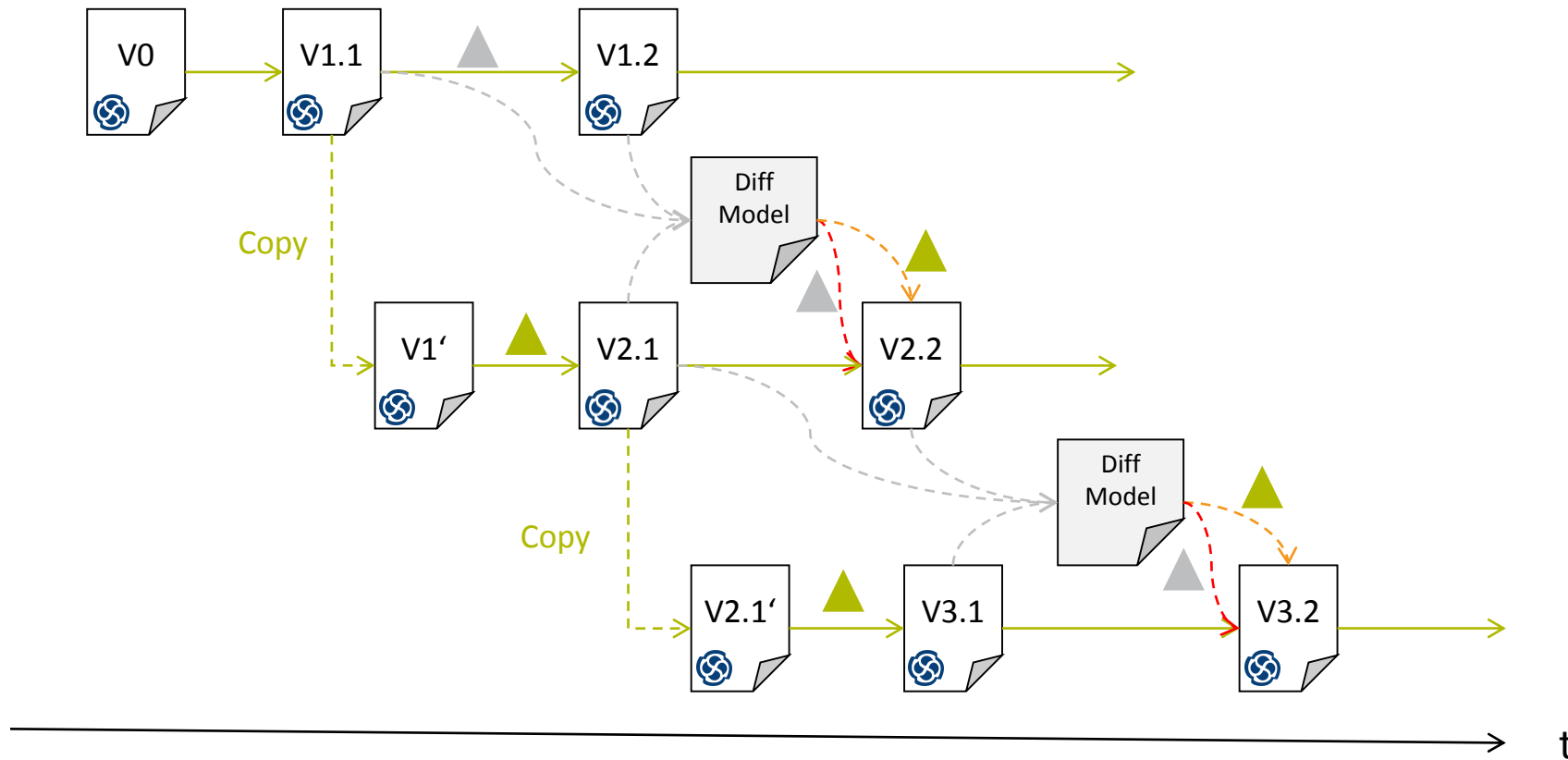


Model Elements	Status	Property	Model	Baseline
Model		Abstract	false	
Package1		Alias		
Class A	Model only	Author	kwieland	
Class C	Baseline only	Date Created	15.09.2014 12:33:24	
Package1		Date Modified	15.09.2014 12:33:32	
		Complexity	1	

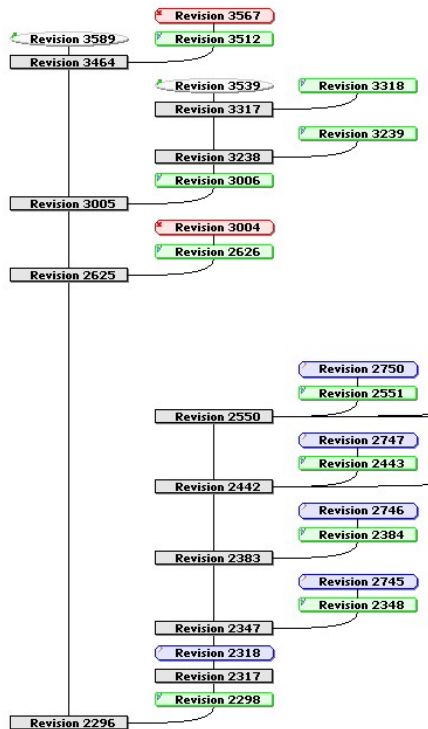
2-way diff: Common base version is not considered

- Changes are hard to understand
- Merge cannot cover all intentions

3-Wege-Diff and Merge



Why is Three-Way Diff and Merge so Important



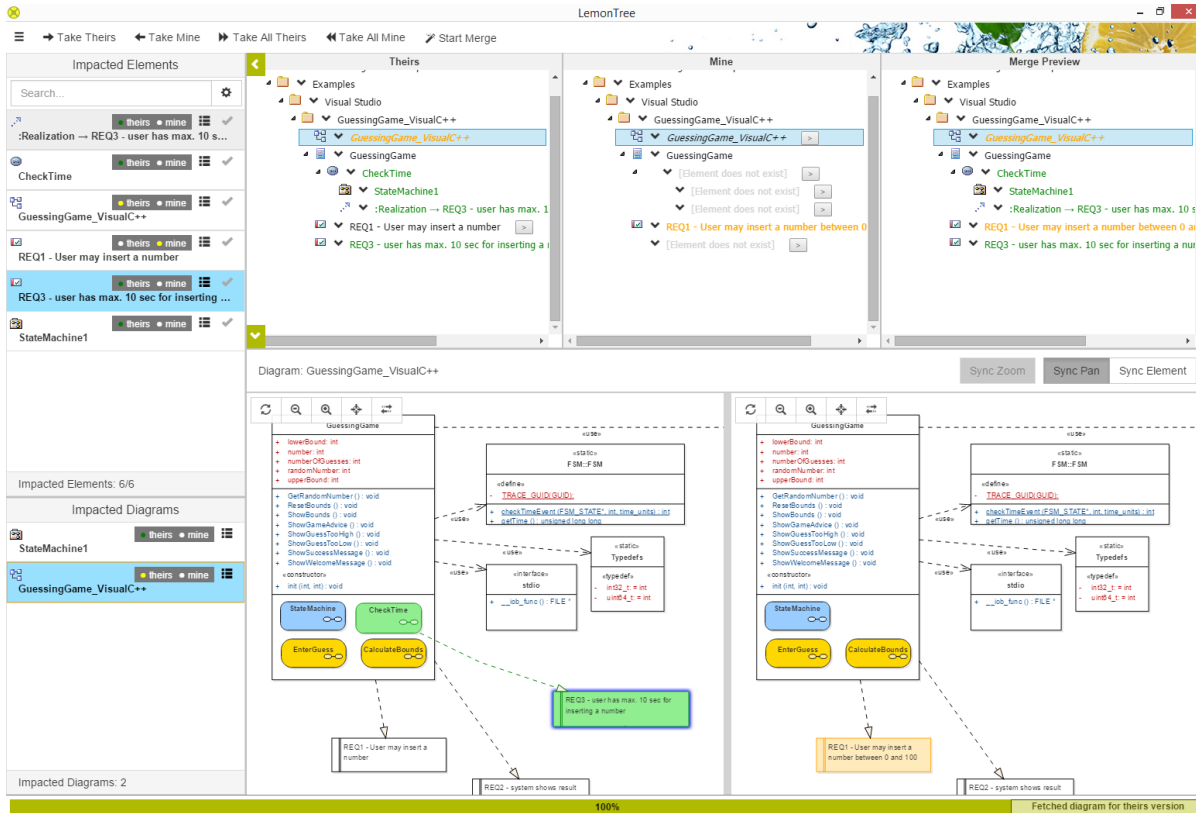
Allows me to see during merging
if it my changes or theirs

Enables branching of models

Same approach as for source
code (since 60ies)

LemonTree ©

3rd Party EA Tool



Standalone Application

Compares & Merges EA Models

EAP-files and MBSE (e. g. MS SQL) are supported

3-way diff and merge is supported

Integrates into VCS (e. g. SVN, Git, PTC, etc.)

Versioning of complete EAP-Files (similar to text files)



Especially for Safety Projects

“In general, standards such as IEC 61508 demand the application of configuration management.

This refers to all artifacts, including UML models.

The solution from LieberLieber is our key to revealing the changes that have been made to a revision.”

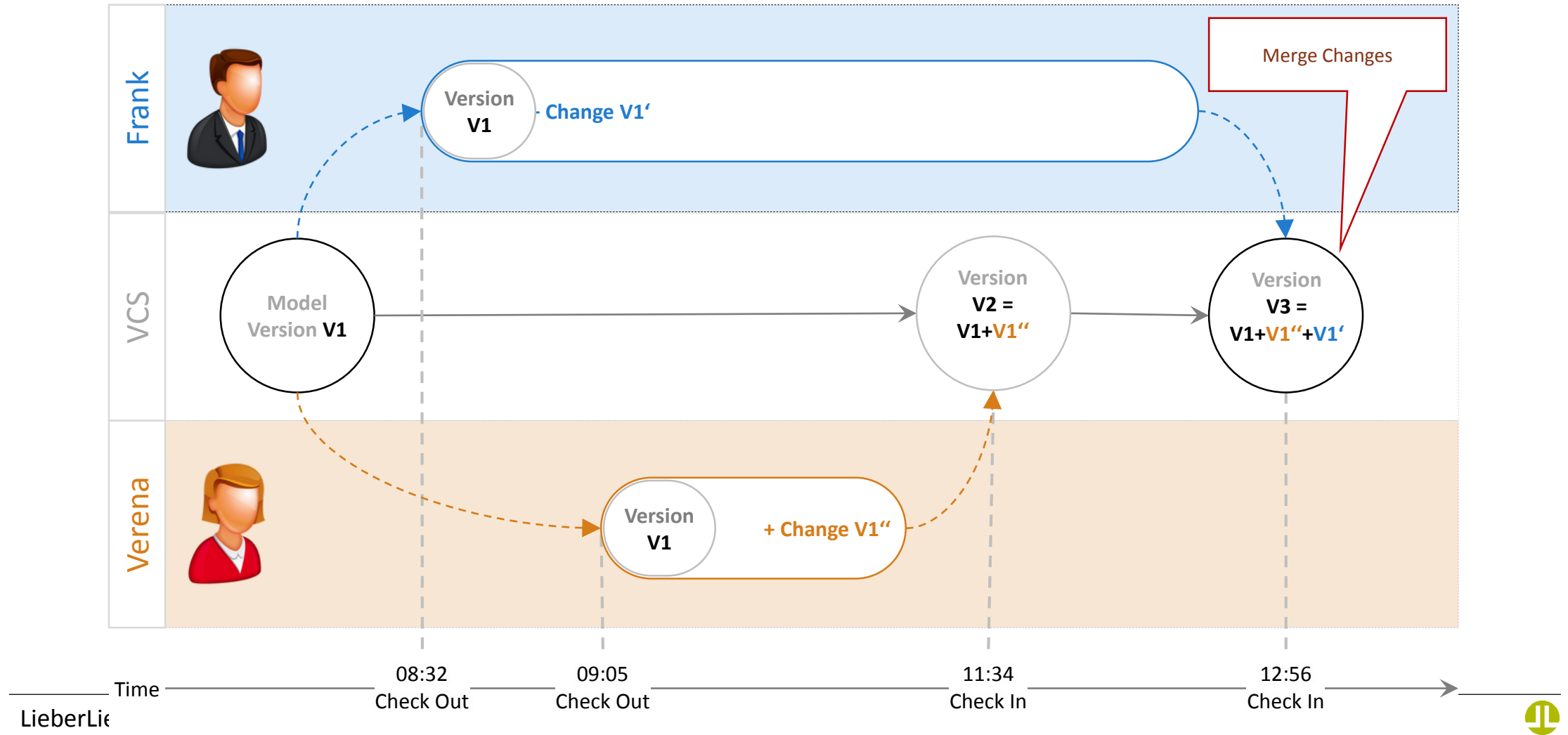
STEFAN MÜLLER
HIMA PAUL HILDEBRANDT GMBH
SAFETY-RELATED AUTOMATION SOLUTIONS



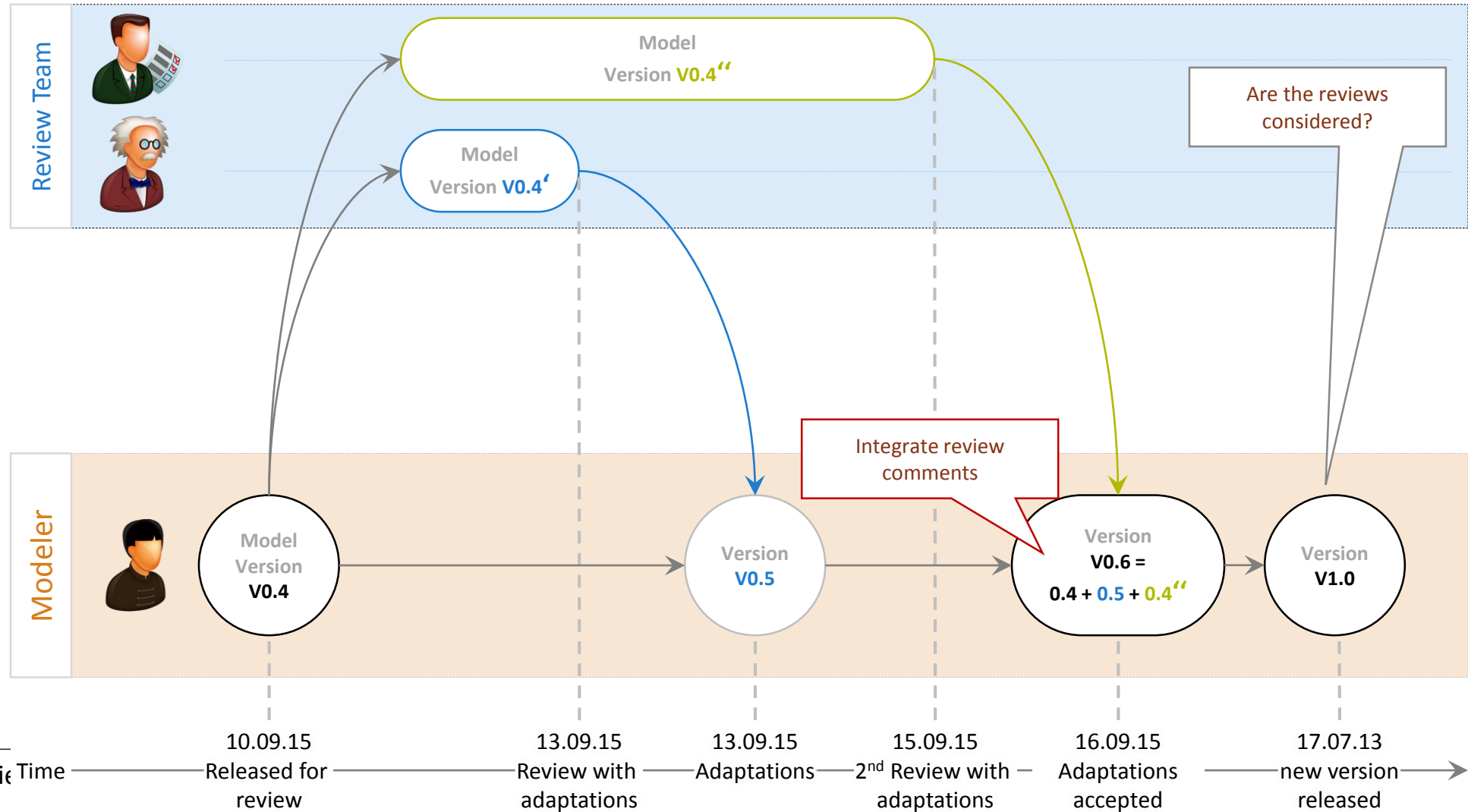
New challenges
can be tackled now



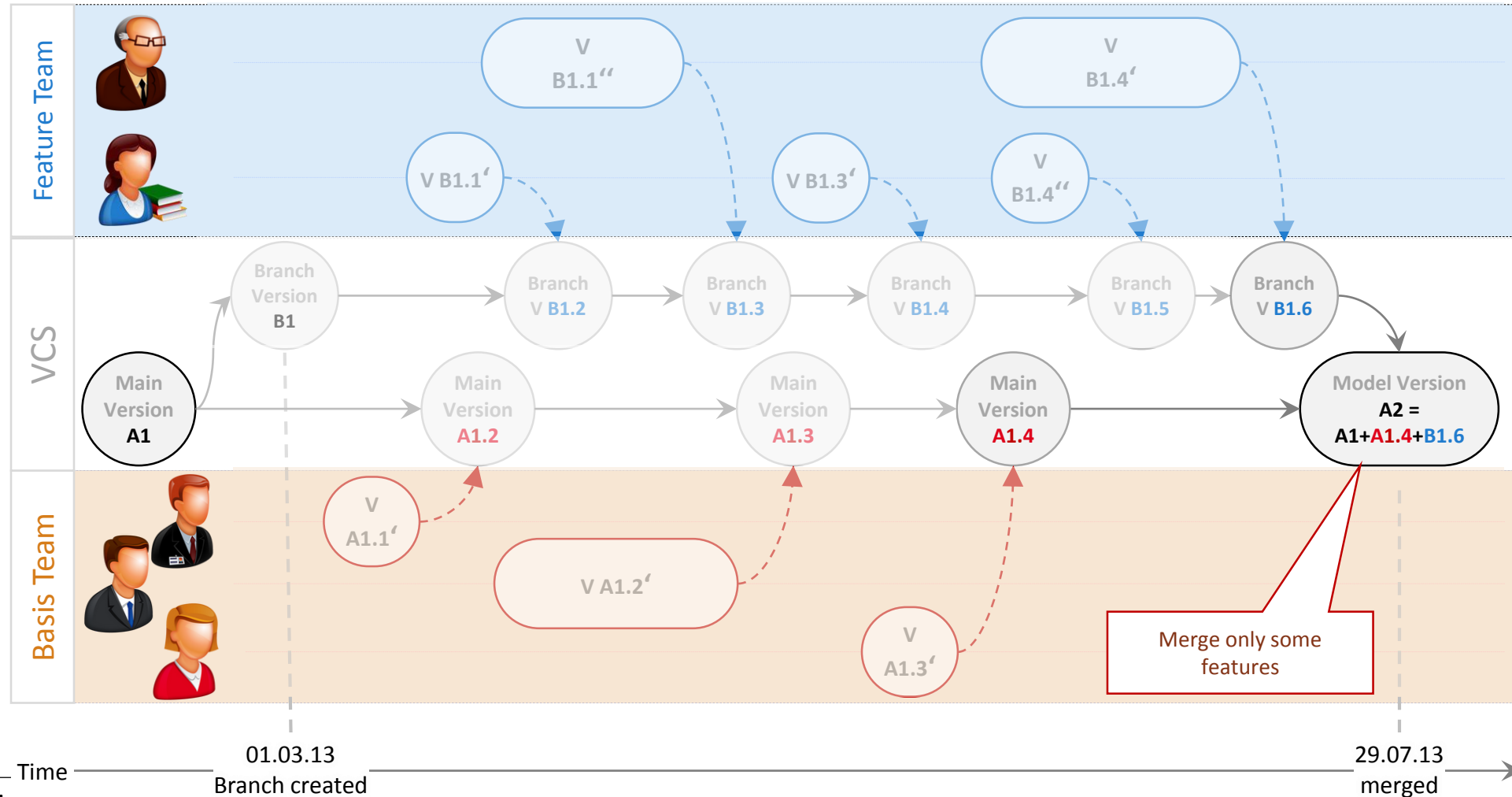
Collaborative Modeling under Version Control



Review of Model Changes



Model Branches



Conclusion

- Team Collaboration vs. Configuration Management
- Change tracking is essential
- Many techniques, but how do I want to work?
- Features of VCS are necessary for today's challenges



Thank you!

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