

Configuration Management in Model Based Systems Engineering MBSE

Agile versioning as key technology for successful
safety projects of distributed teams



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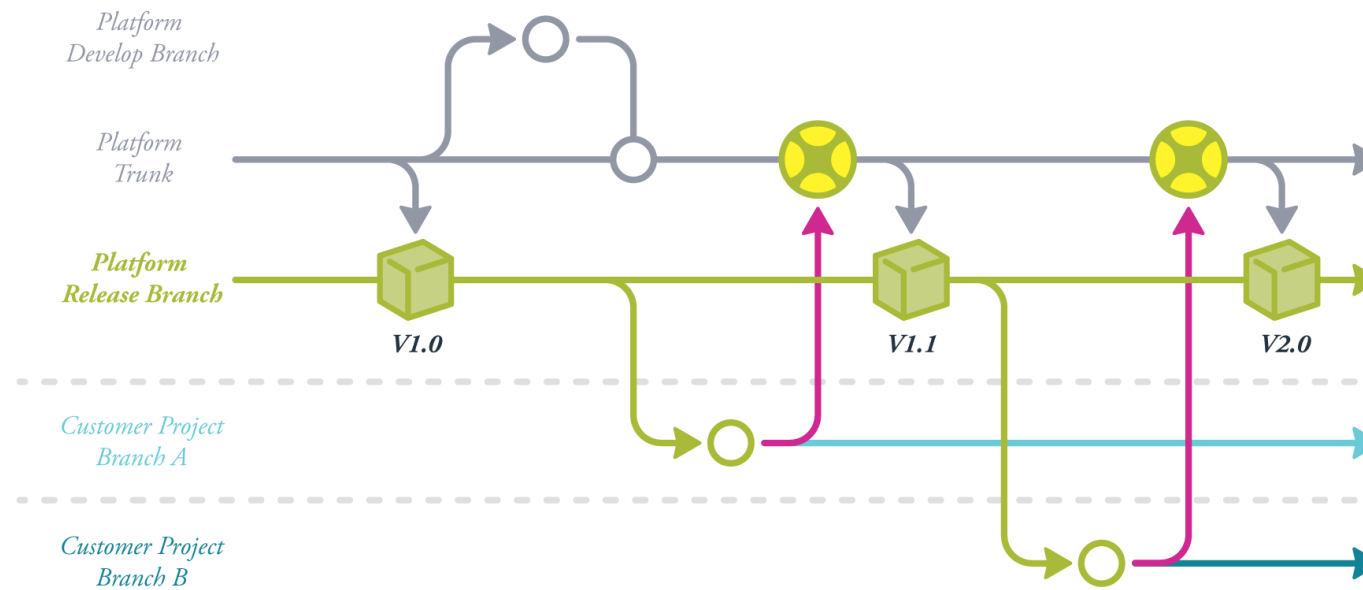
Horst
Kargl



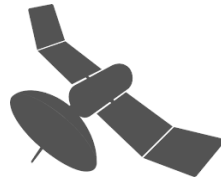
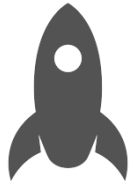
Daniel
Siegl

The Challenge as of 2014

- **MBSE needs advanced Configuration Management**
- Established Git processes are not supported by commercial modeling solutions
- No “useable” commercial solution for SysML Data



The Industry Challenge



Agenda

- History of Model Versioning
- Different Solutions of Model Versioning
- Model Versioning with LemonTree



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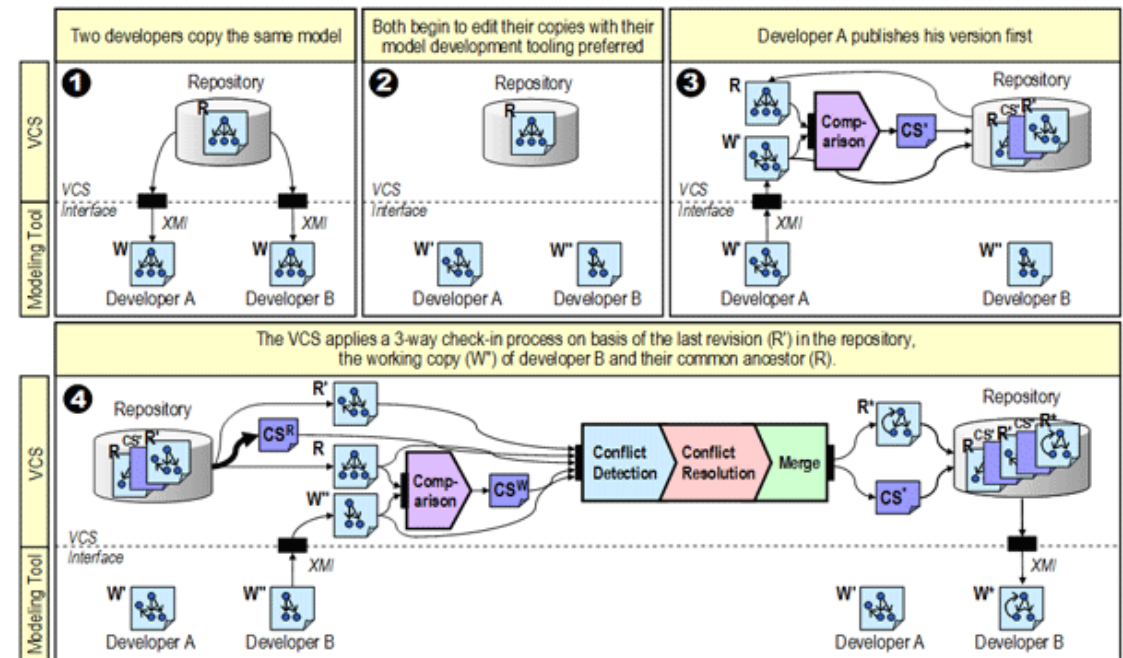
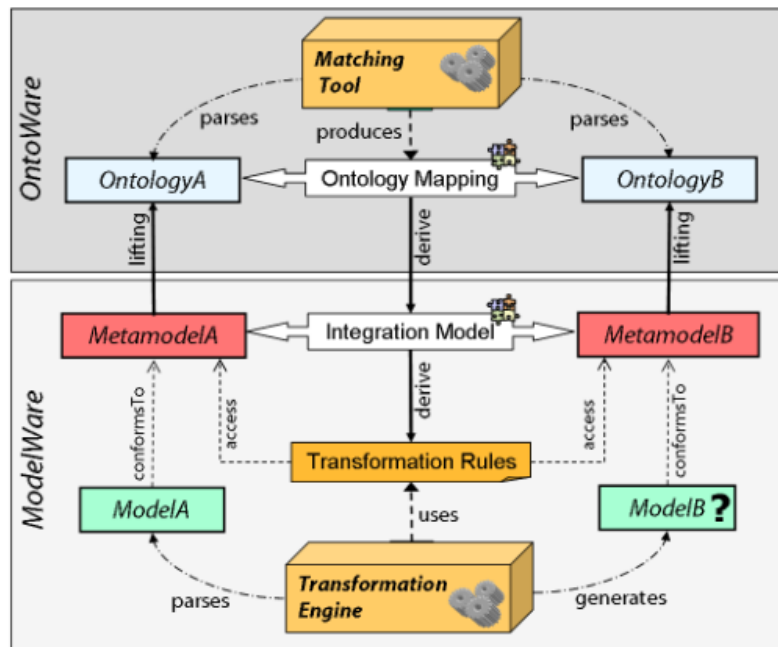
The History 2005 -> 2008

The ModelCVS Project
THE WORKING PROJECT



Arikan Productivity Group

A Semantic Infrastructure for Model-based Tool Integration



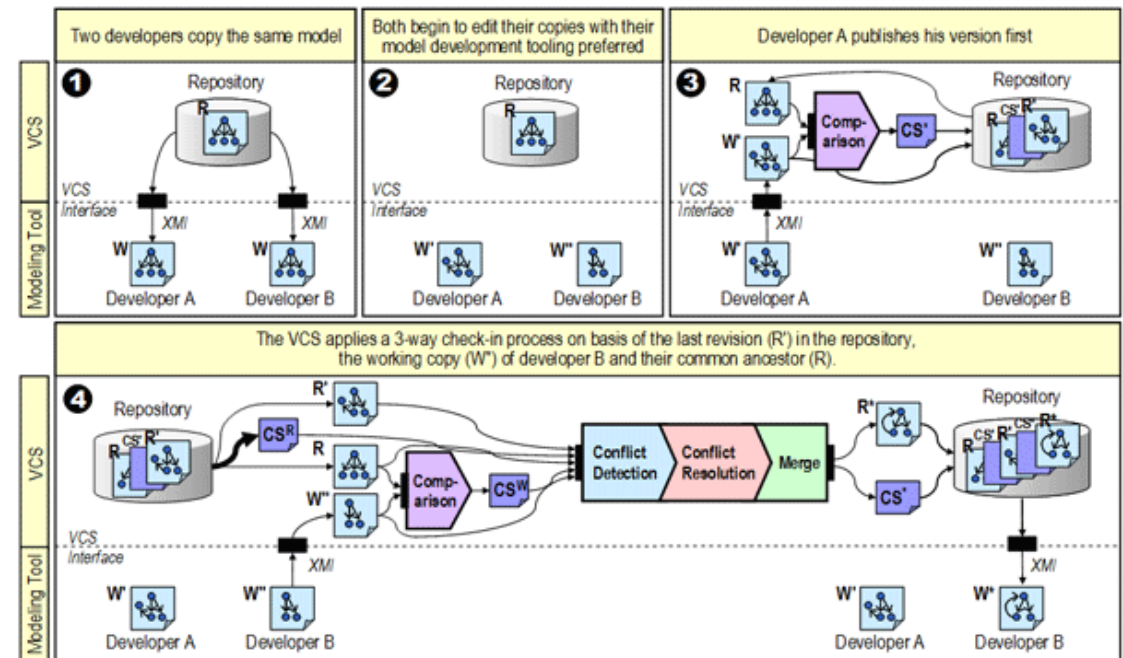
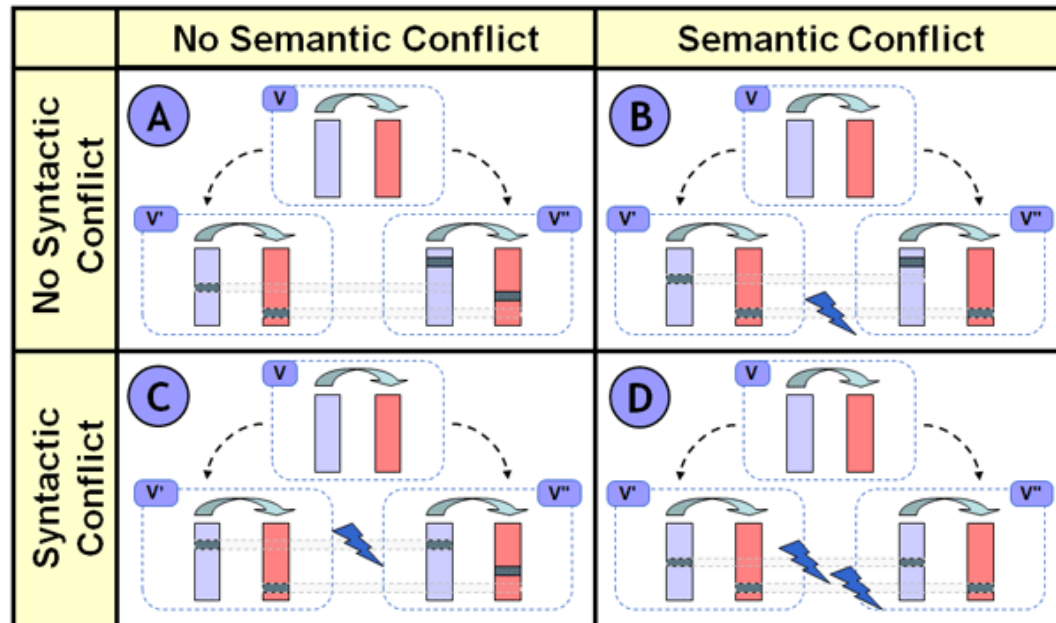
The History 2005 -> 2008

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The History 2005 -> 2008

The ModelCVS Project
THE WORKING PROJECT



Arikan Productivity Group

A Semantic Infrastructure for Model-based Tool Integration

- ➔ G. Kappel, G. Kramler, E. Kapsammer, T. Reiter, W. Retschitzegger, W. Schwinger:
ModelCVS - A Semantic Infrastructure for Model-based Tool Integration, Technical Report, 2005
- ➔ Gerti Kappel, Elisabeth Kapsammer, Horst Kargl, Gerhard Kramler, Thomas Reiter, Werner Retschitzegger, Wieland Schwinger, and Manuel Wimmer,
Lifting metamodels to ontologies - a step to the semantic integration of modeling languages to be presented at the ACM/IEEE 9th International Conference on Model Driven Engineering Languages and Systems, Genova, Italy, 2006
- ➔ Gerti Kappel, Horst Kargl, Gerhard Kramler, Andrea Schauerhuber, Martina Seidl, Michael Strommer and Manuel Wimmer,
Matching Metamodels with Semantic Systems - An Experience Report, BTW 2007 Workshop Model Management und Metadaten-Verwaltung, Aachen; 05.03.2007 - 09.03.2007 (2007).
- ➔ M. Strommer, M. Wimmer, H. Kargl, G. Kramler:
"Towards Model Transformation Generation By-Example";
Vortrag: 40th Hawaii International Conference On System Science (HICSS 40th), Hawaii, USA; 03.01.2007 - 06.01.2007; in: "Proceedings of the Fortieth Annual Hawaii International Conference on System Sciences", IEEE Computer Society, 40 (2007), ISBN: 0769527558; S. 285 - 286.
- ➔ H. Kargl, M. Wimmer:
"SmartMatcher: Improving Automatic Matching Quality";
IEEE Intelligent Systems, 23 (2008), 6; S. 75 - 77.
- ➔ G. Kappel, H. Kargl, T. Reiter, W. Retschitzegger, W. Schwinger, M. Strommer, M. Wimmer:
"A Framework for Building Mapping Operators Resolving Structural Heterogeneities";
Vortrag: 2nd International United Information Systems Conference (UNISCON'2008), Klagenfurt (eingeladen); 22.04.2008 - 25.04.2008; in: "Information Systems and e-Business Technologies (UNISCON'2008)", R. Kaschek, C. Kop, C. Steinberger, G. Fliedl (Hrg.); Springer, LNBIP 5 (2008), ISSN: 1865-1348; S. 158 - 174.

Complete List of Publications:

<http://www.modelcvs.org/publications/>

The History 2005 -> 2008 – 2009 -2011

The ModelCVS Project
THE WORKING PROJECT

A Semantic Infrastructure for Model-based Tool Integration



Arikan Productivity Group

AMOR
Adaptable Model Versioning

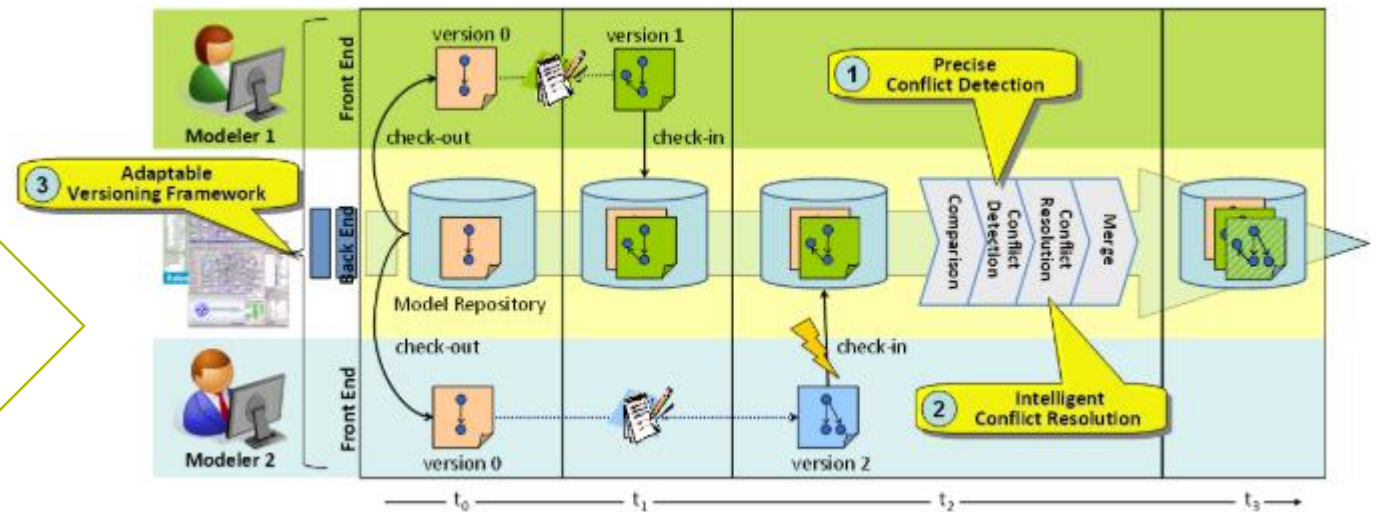
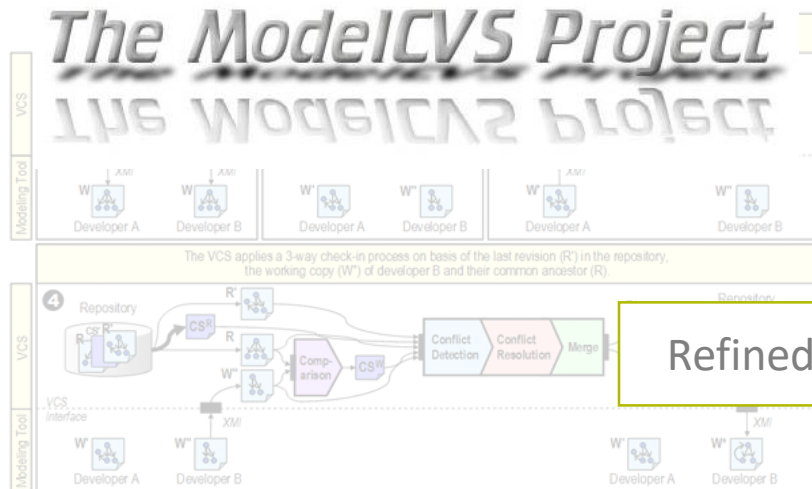
Adaptable Model Versioning



The History 2005 -> 2008 – 2009 -2011



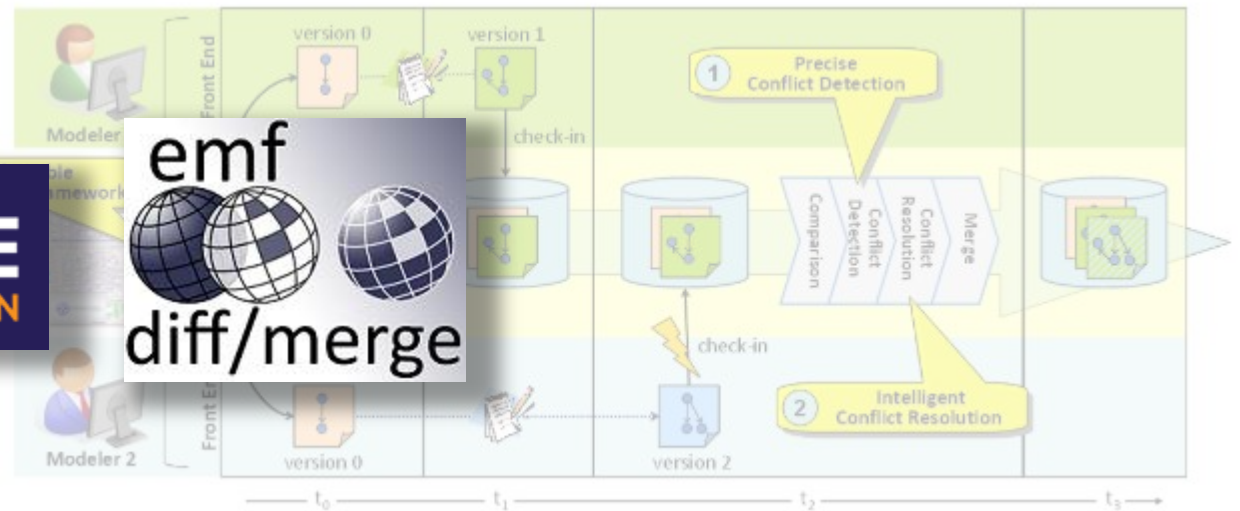
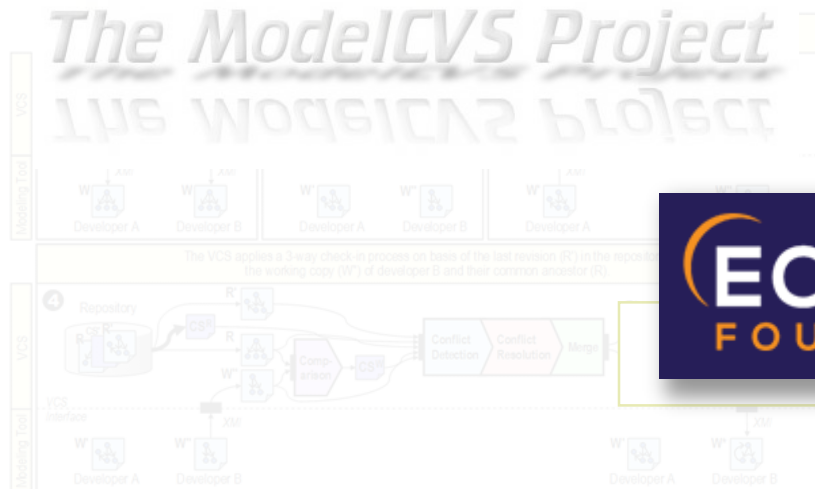
Adaptable Model Versioning



The History 2005 -> 2008 – 2009 -2011



Adaptable Model Versioning



The History 2005 -> 2008 – 2009 -2011



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6 <packagedElement xmi:type="uml:UseCase" xmi:id=
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29 <elements>
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36 <tags/>
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38 <extendedProperties tagged="0" package_name=
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40 <paths/>
41 <times created="2020-05-28 16:57:13" modifie
42 <flags iscontrolled="FALSE" isprotected="FA
```



The History 2005 -> 2008 – 2009 -2011



- Missing or not standardized Unique IDs
 - In SysML V2: there will be a standardized ID.

The History 2005 -> 2008 – 2009 -2011



Adaptable Model Versioning



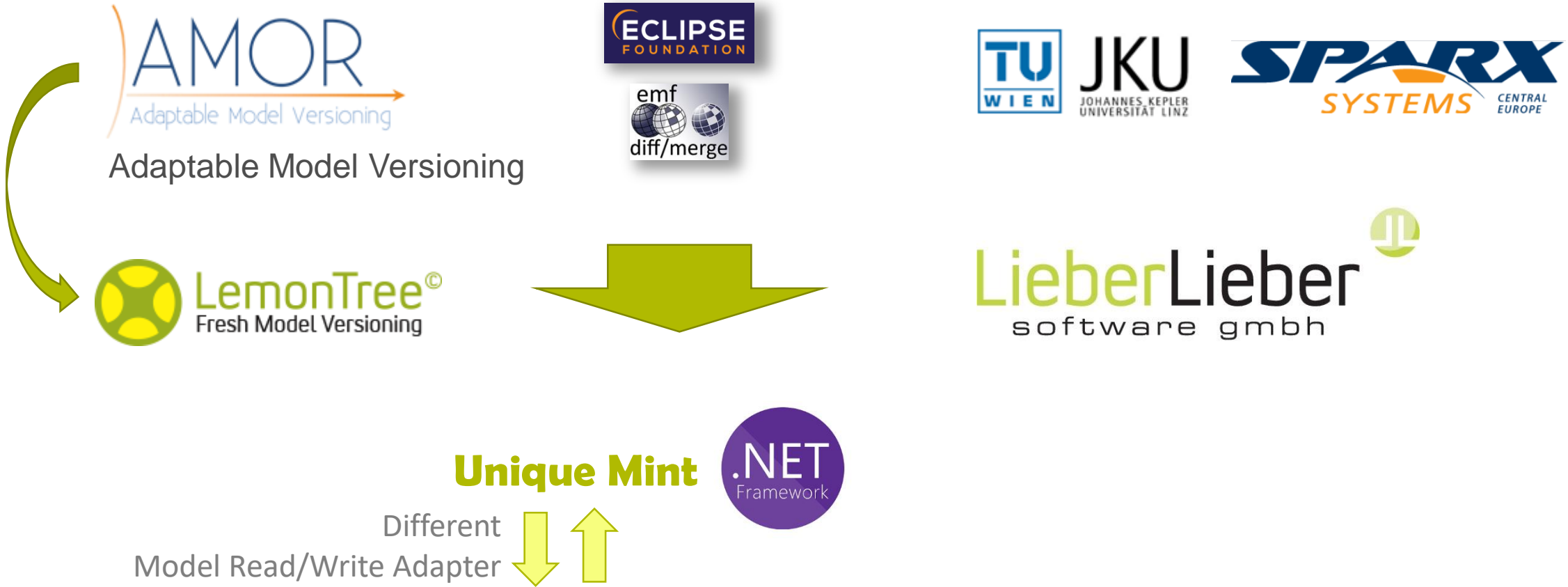
- ➔ K. Altmanninger, G. Kappel, A. Kusel, W. Retschitzegger, M. Seidl, W. Schwinger, and M. Wimmer, **AMOR - Towards Adaptable Model Versioning**, presented at the 1st Int. Workshop on Model Co-Evolution and Consistency Management, in conjunction with Models'08, 2008
- ➔ K. Altmanninger, M. Seidl, and M. Wimmer, **A survey on model versioning approaches**, International Journal of Web Information Systems (IJWIS), vol. 5, no. 3, pp. 271-304, 2009
- ➔ M. Wimmer, M. Seidl, P. Brosch, H. Kargl, and G. Kappel, **On Realizing a Framework for Self-tuning Mappings**, in Objects, Components, Models and Patterns - Proceedings of the 47th International Conference TOOLS EUROPE 2009, Springer, pp. 1-16, 2009
- ➔ P. Brosch, M. Seidl, K. Wieland, M. Wimmer, and P. Langer, **We can work it out: Collaborative Conflict Resolution in Model Versioning**, in Proceedings of the 11th European Conference on Computer Supported Cooperative Work (ECSCW 2009), Springer, pp. 207-214, 2009
- ➔ P. Brosch, P. Langer, M. Seidl, K. Wieland, M. Wimmer, G. Kappel, Colex: **A Web-based Collaborative Conflict Lexicon**, in Proceedings of the 1st International Workshop on Model Comparison in Practice @ TOOLS 2010, ACM, pp. 42-49, 2010.

Complete List of Publications:

<http://www.modelversioning.org/>



The History 2005 -> 2008 – 2009 ->2011 – 2012 ->



The History 2005 -> 2012 -> 2020

The ModelCVS Project



JKU
JOHANNES KEPLER
UNIVERSITÄT LINZ



Arikan Productivity Group

A Semantic Infrastructure for Model-based Tool Integration

AMOR
Adaptable Model Versioning
Adaptable Model Versioning

15 years of research and product development and already a big step forward.



JKU
JOHANNES KEPLER
UNIVERSITÄT LINZ

SPARX
SYSTEMS
CENTRAL EUROPE

LemonTree®
Fresh Model Versioning

LieberLieber
software gmbh

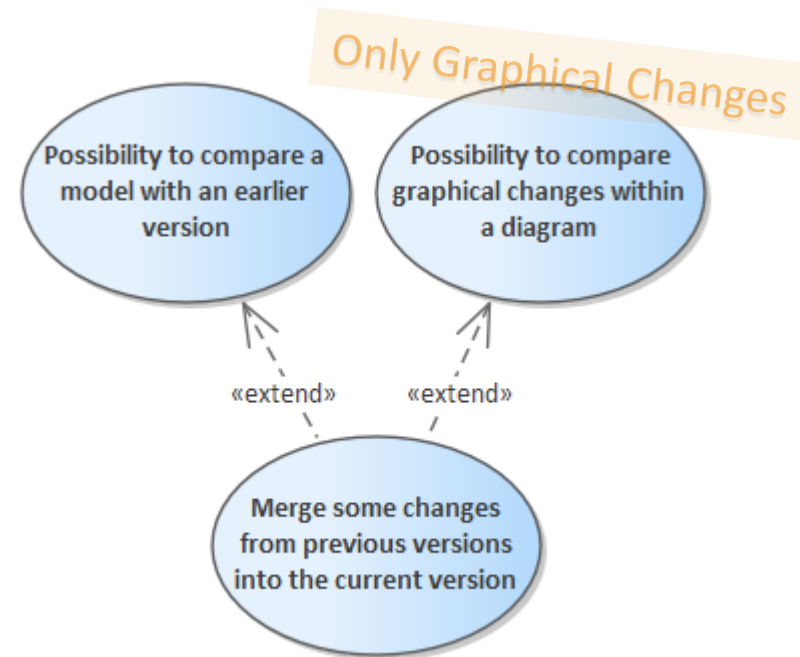
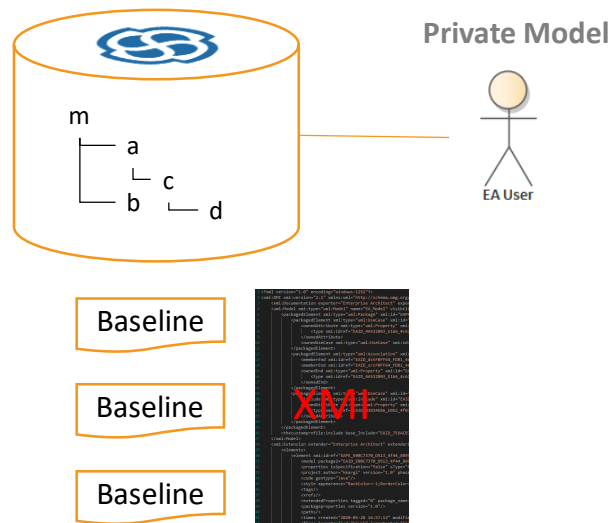


Agenda

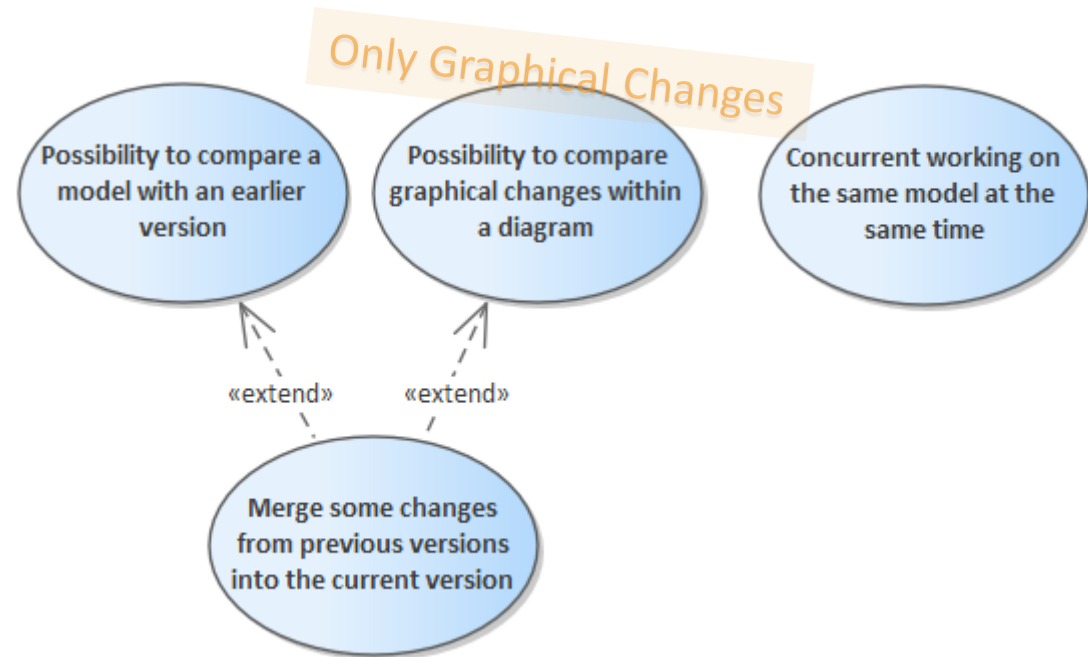
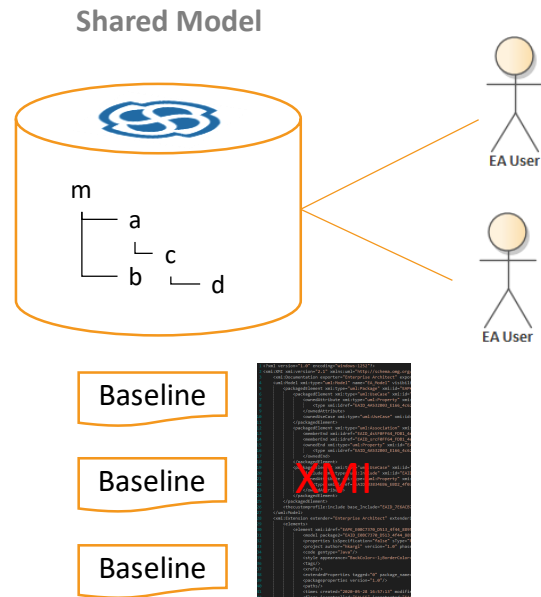
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- Different Solutions of Model Versioning
- Model Versioning with LemonTree



Create Model Versions with Baselines

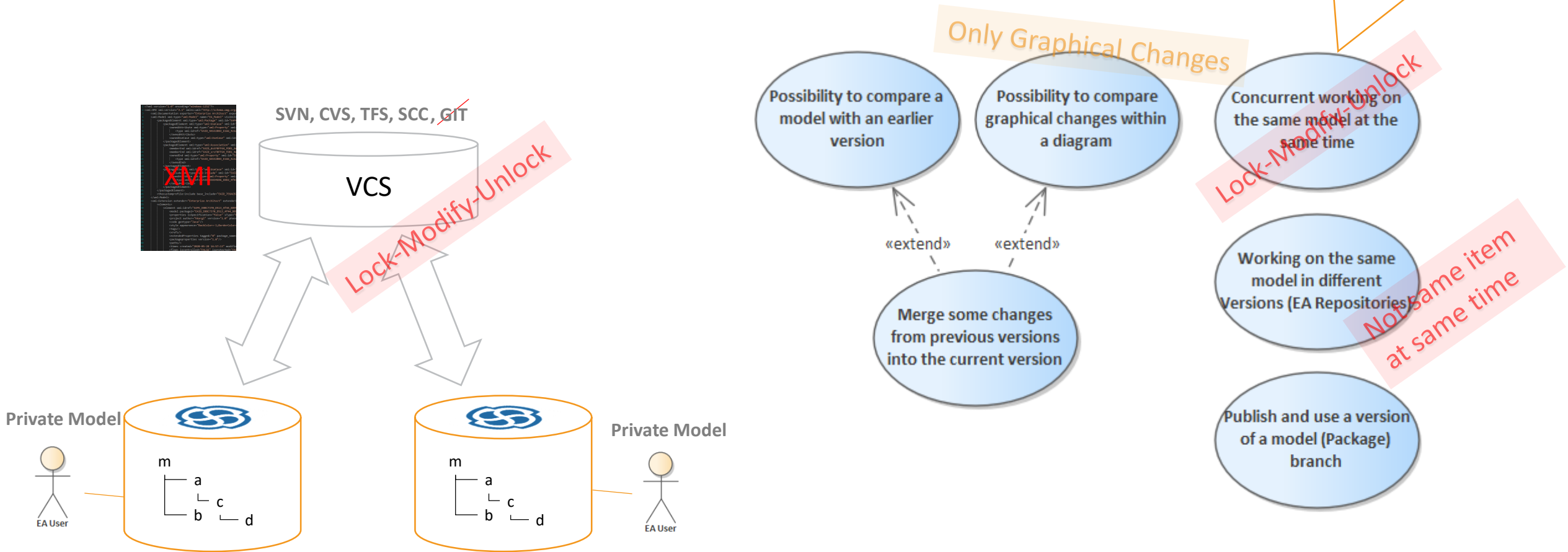


Create Model Versions with Baselines



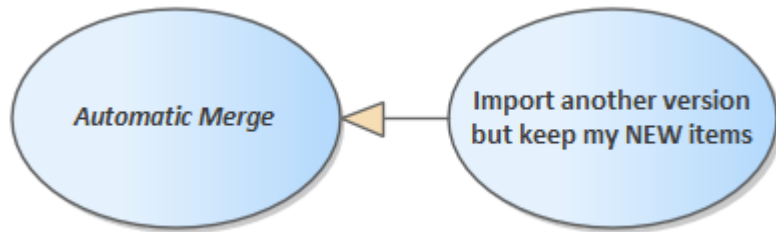
Using a Version Control System

If private model is used as shared model it is possible.

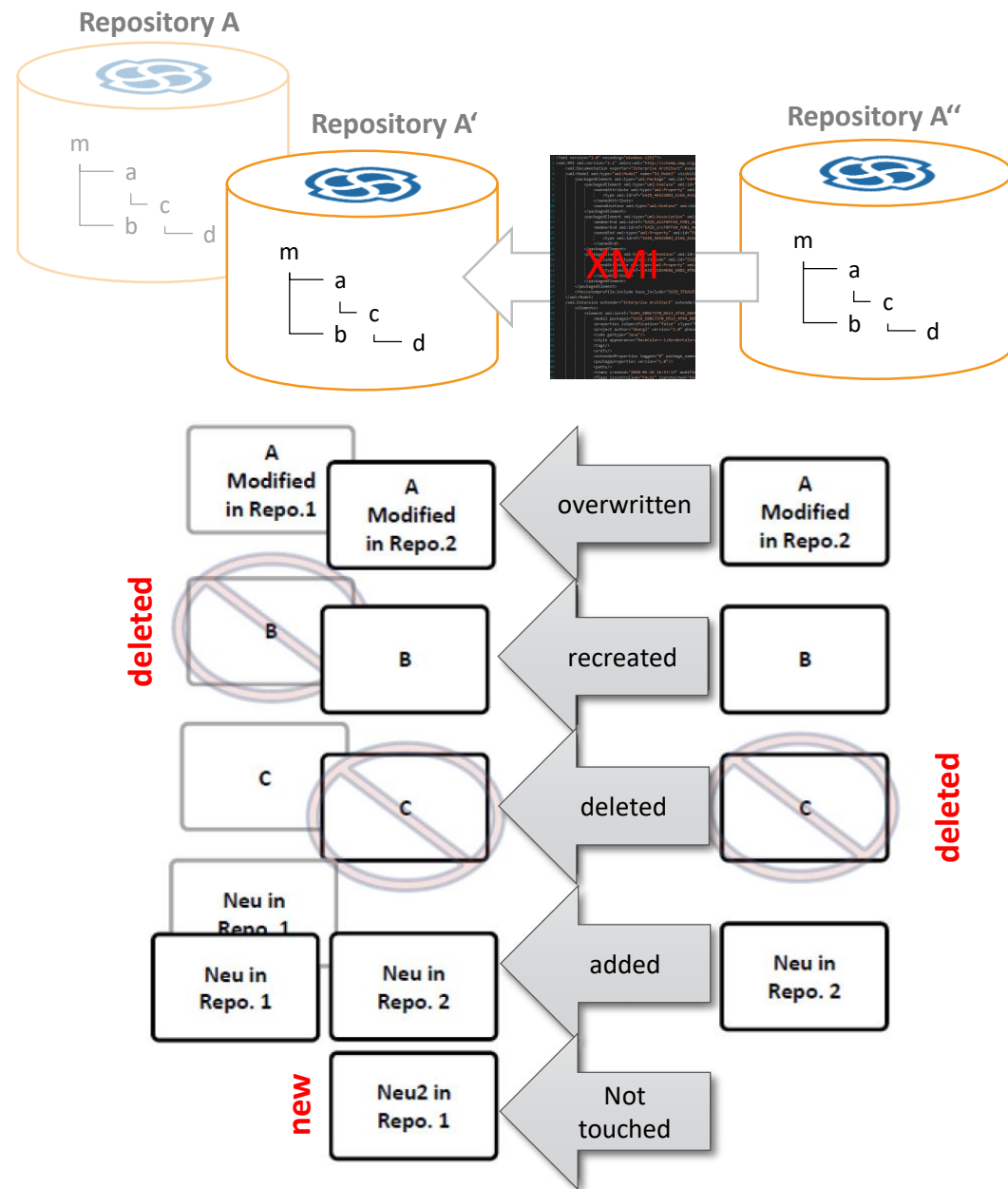


Using XMI Merge

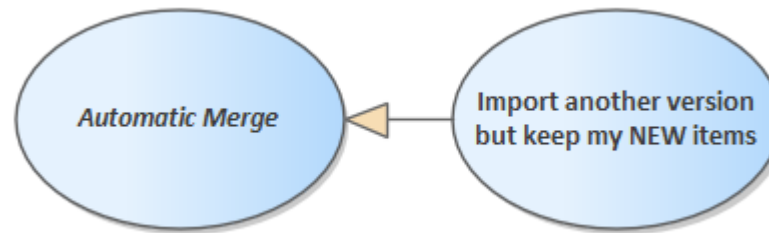
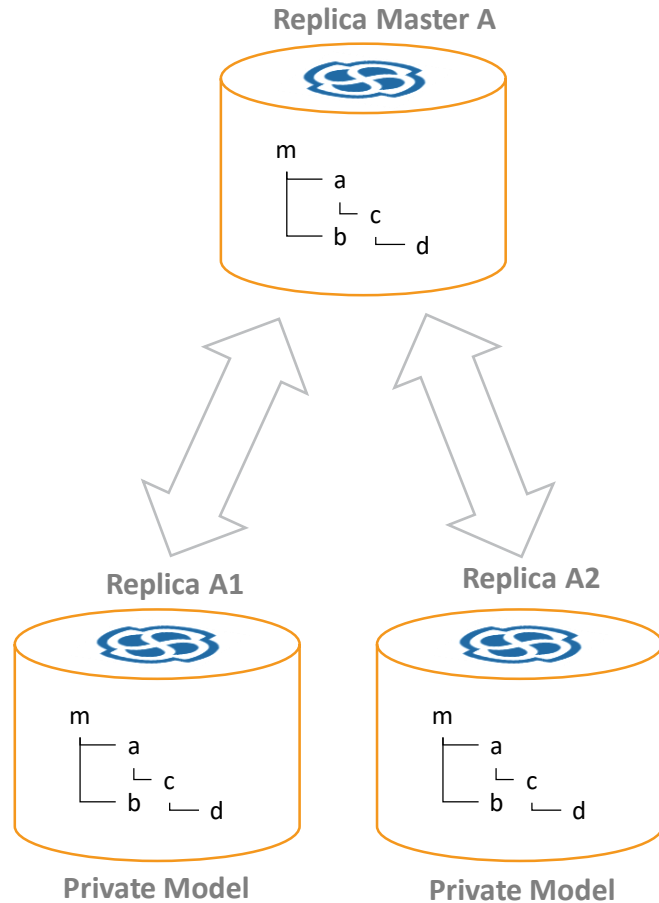
Take everything from the XMI (Repository A'') and keep the new items from Repository A'



Create a Baseline before import and merge XMI in order to be able to see all changes.



Using Replicas - only for MS-Jeteap(x)

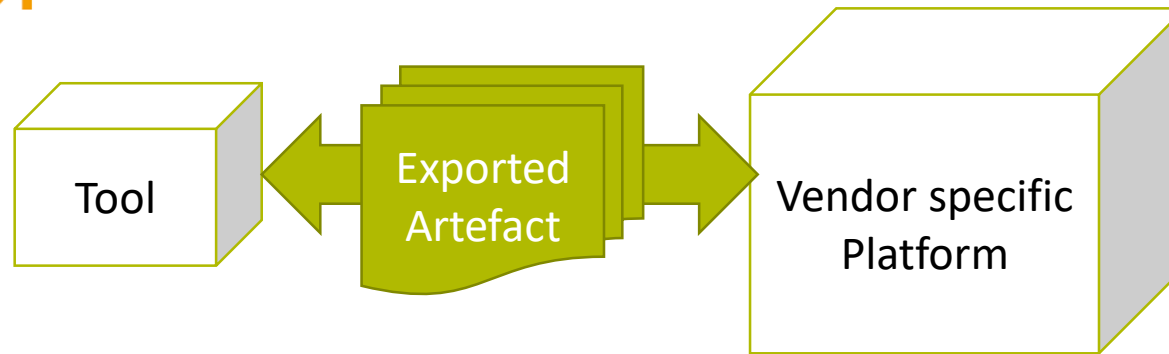


Create a Baseline before merge in order to see what happened.

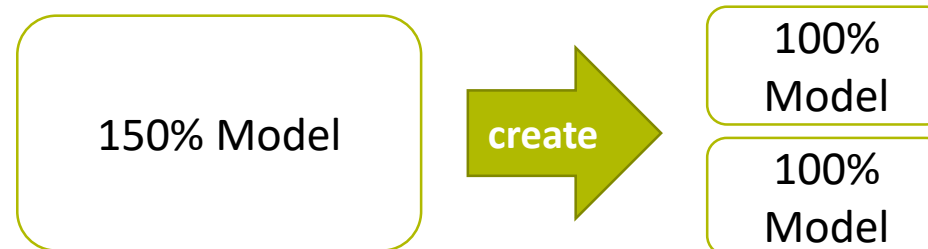
Update <-> *Update* conflicts must be solved in DB record level.



Model Versioning Approaches



pure::variants



Model Versioning Approaches



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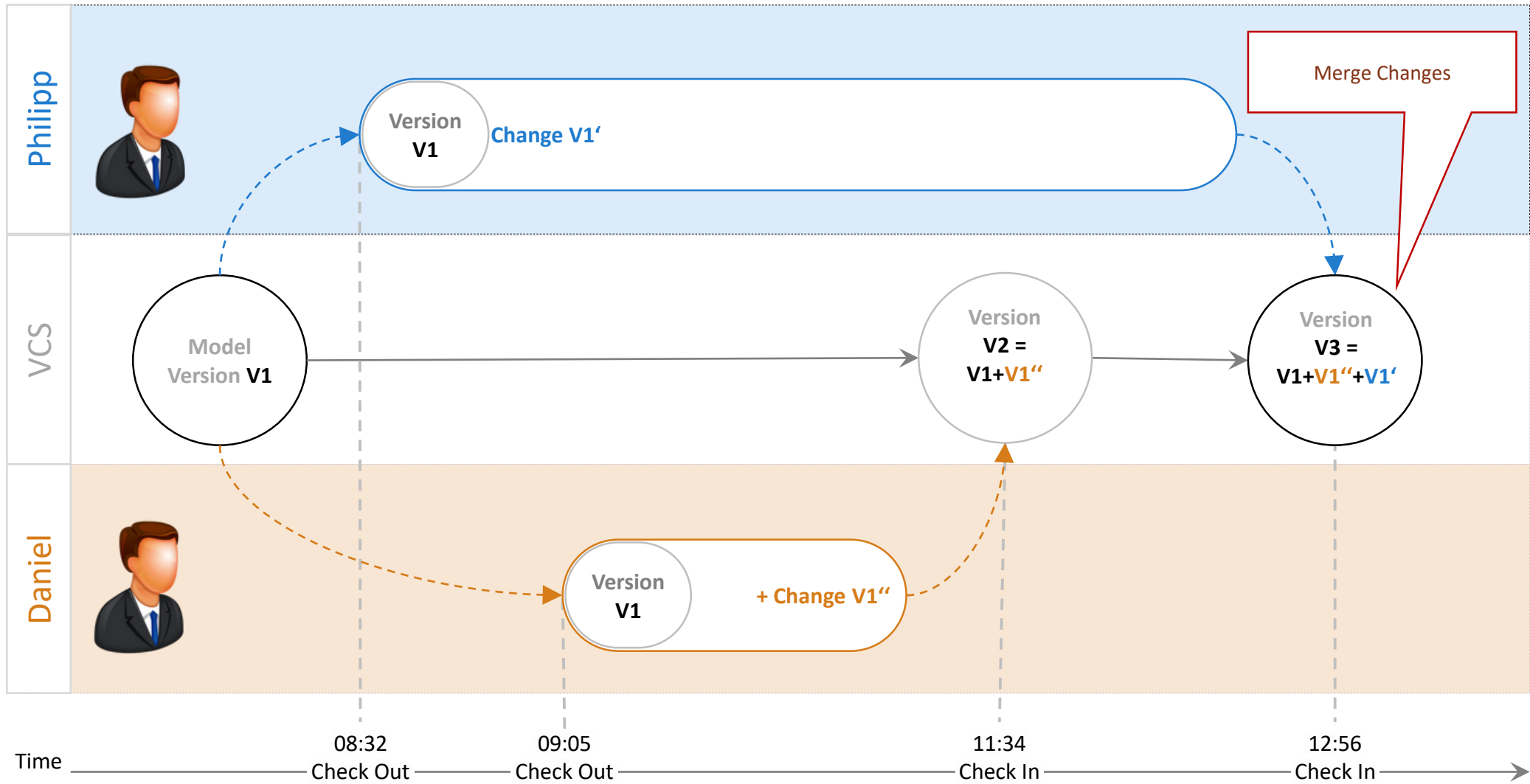




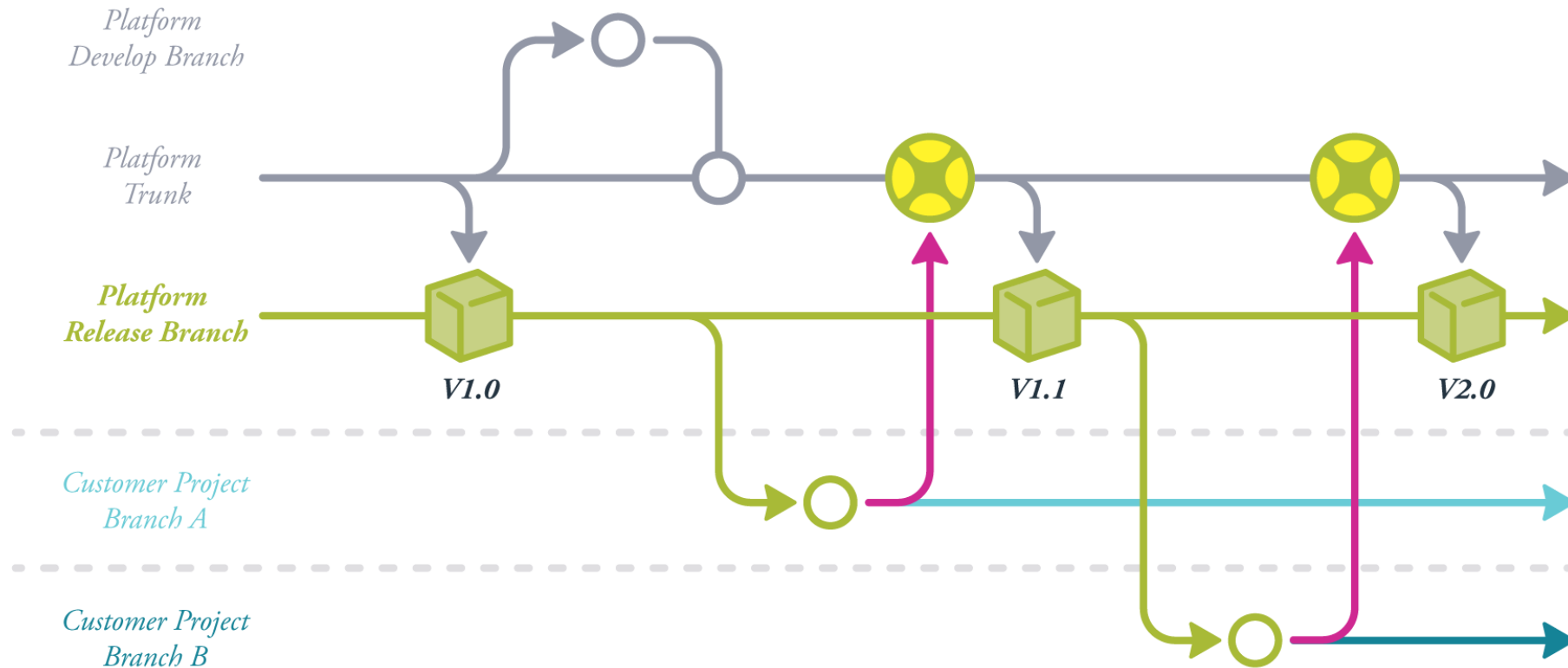
FRESH MODEL VERSIONING



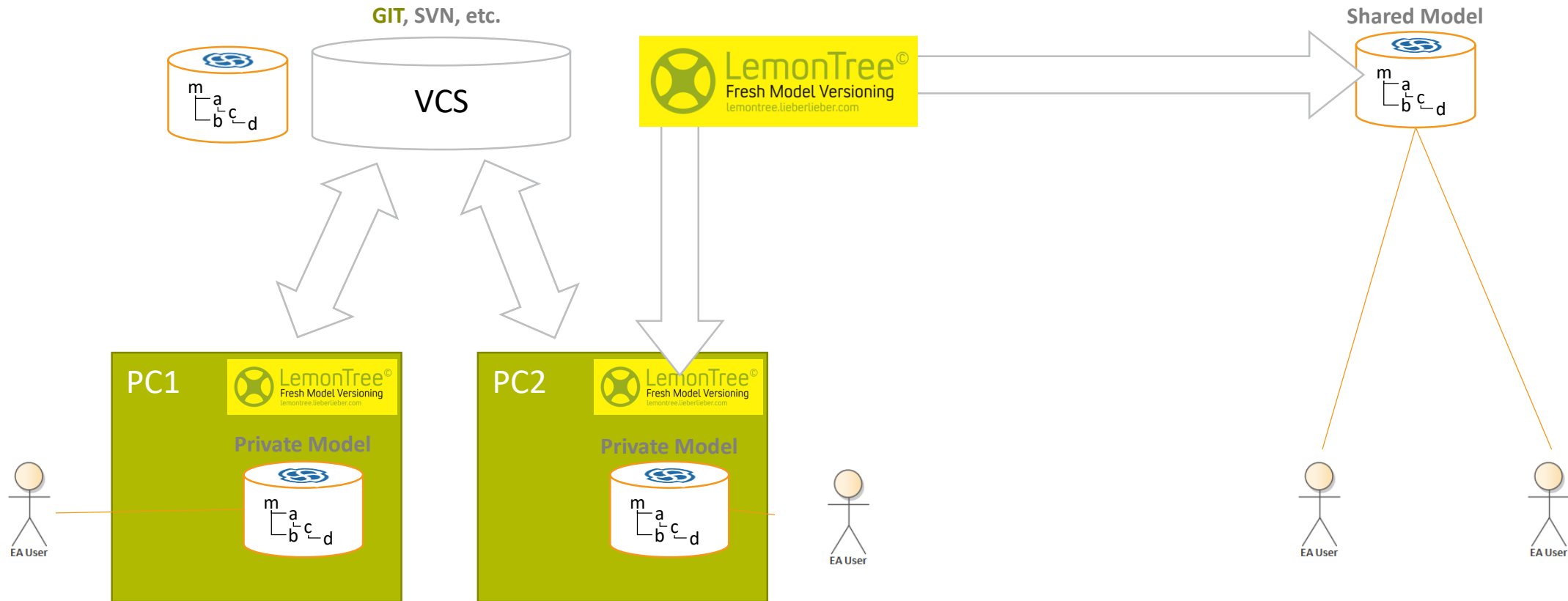
LemonTree[©]
Fresh Model Versioning
lemontree.lieberlieber.com



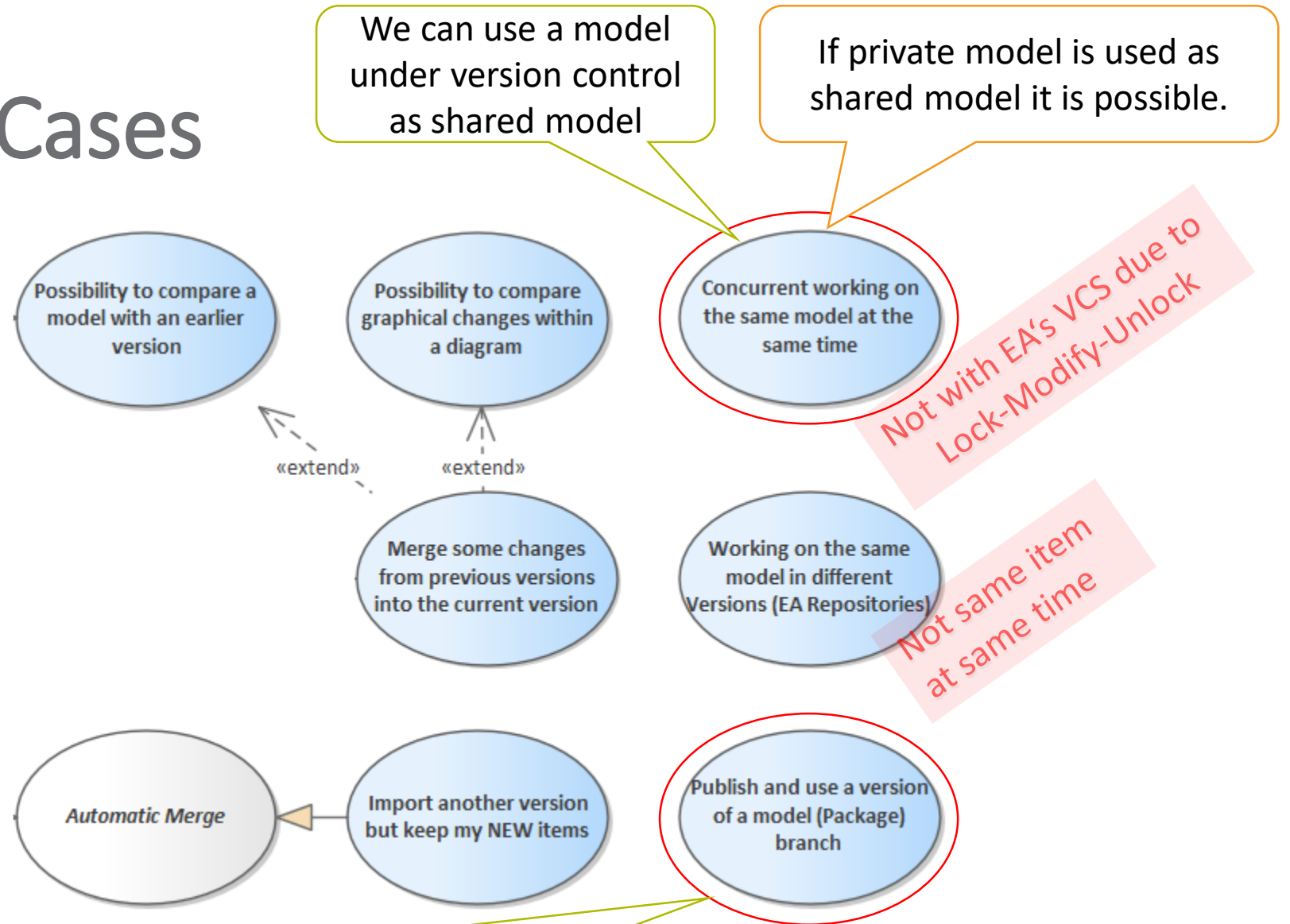
Typical Scenario with Branching



LemonTree – Advanced Scenarios



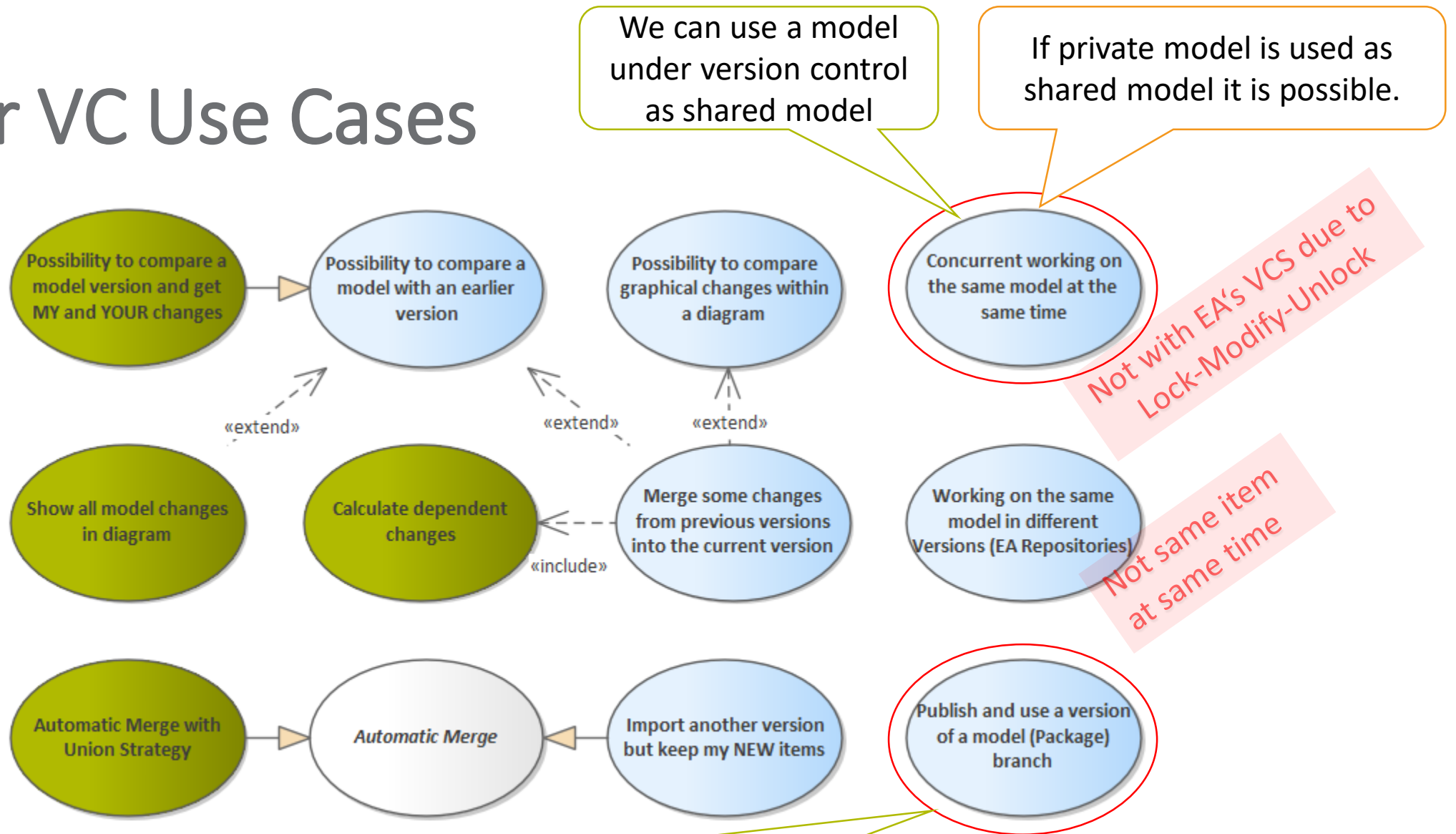
Major VC Use Cases



With Model Packaging and Manage System (MPMS)



Major VC Use Cases



Conclusion

15 years of research and product development and already a big step forward.

We are still working on standardized model versioning across tools.

LemonTree is one promising approach – that has 1000s of users around the globe.



Thank You! Questions?



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FRESH MODEL VERSIONING



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