



Technische  
Universität  
Braunschweig



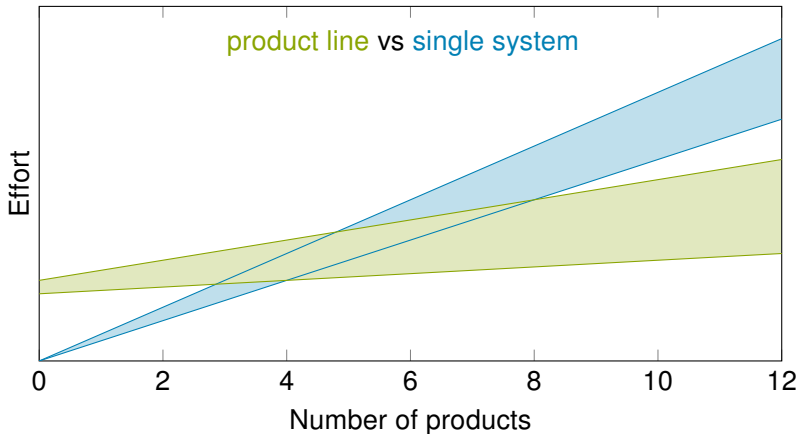
# VariantSync - Automating the Synchronization of Software Variants

Thomas Thüm, Wolfram Fenske, Sandro Schulze, Lei Luo, Tristan Pfofe  
FOSD Meeting, May 14, 2015

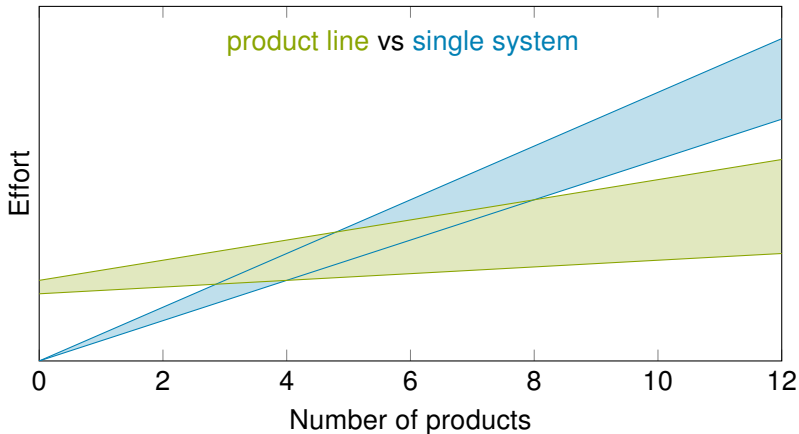
Part I

**A Research Gap**

# Product-Line vs Single-System Engineering

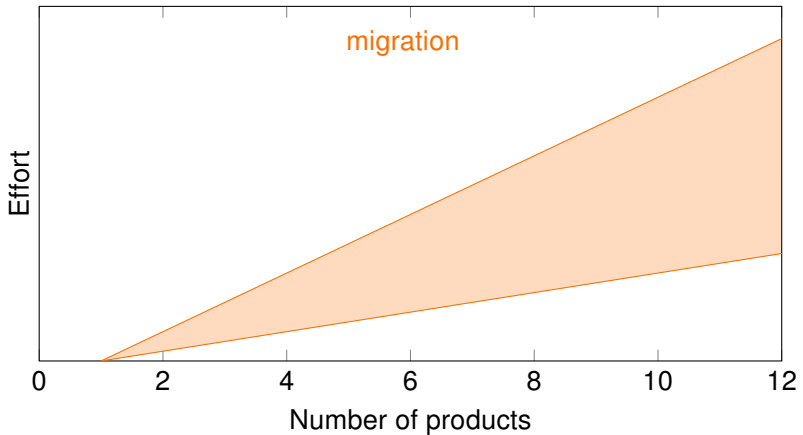


# Product-Line vs Single-System Engineering

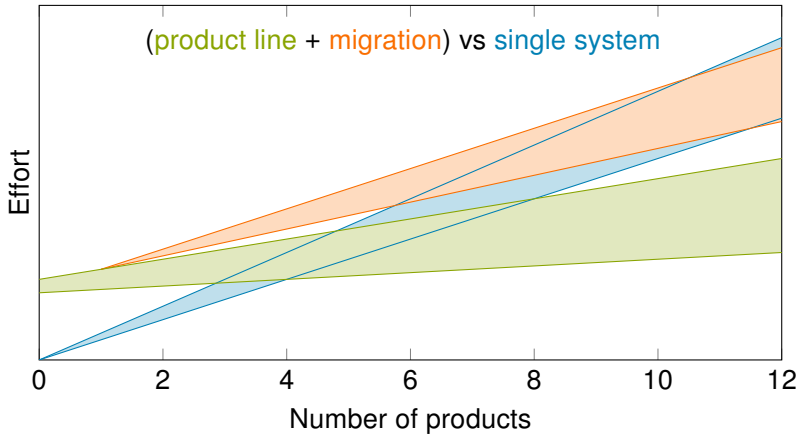


What if products are *possibly* added in future?

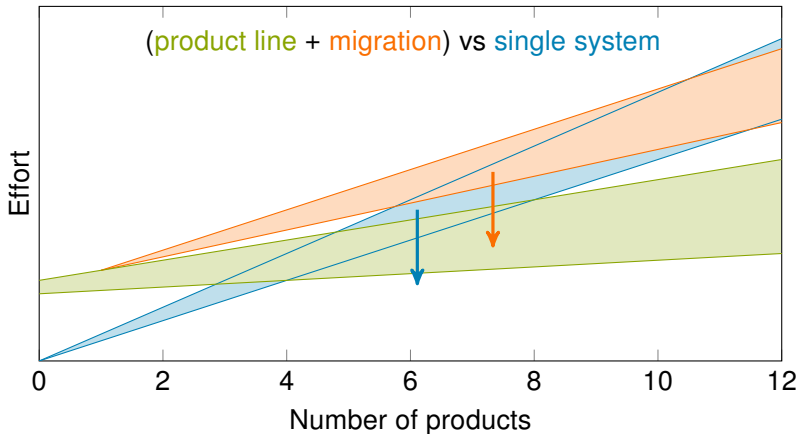
# Migration to Product Line



# When to Migrate to a Product Line?

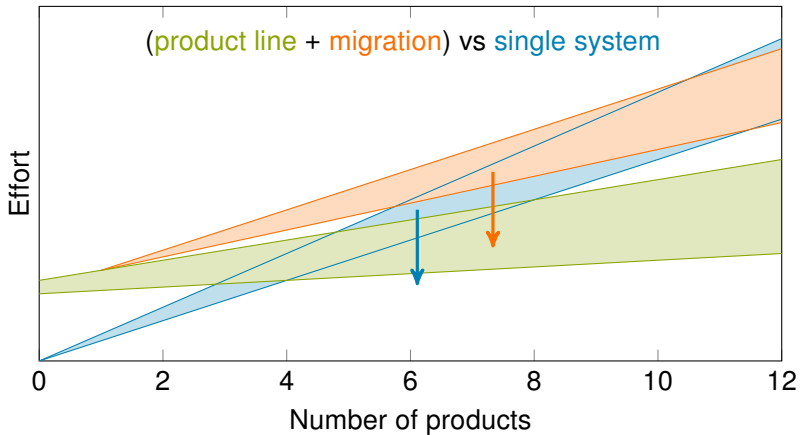


# When to Migrate to a Product Line?



Goal: reduce effort for **migration** *and* **single systems**

# When to Migrate to a Product Line?



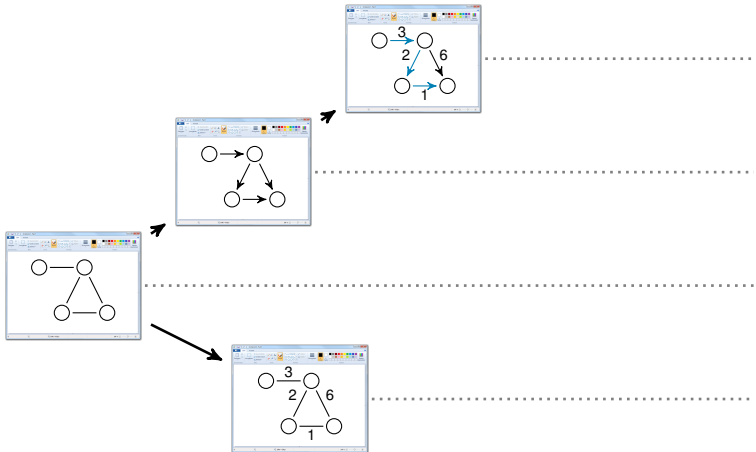
Goal: make development of few variants more efficient



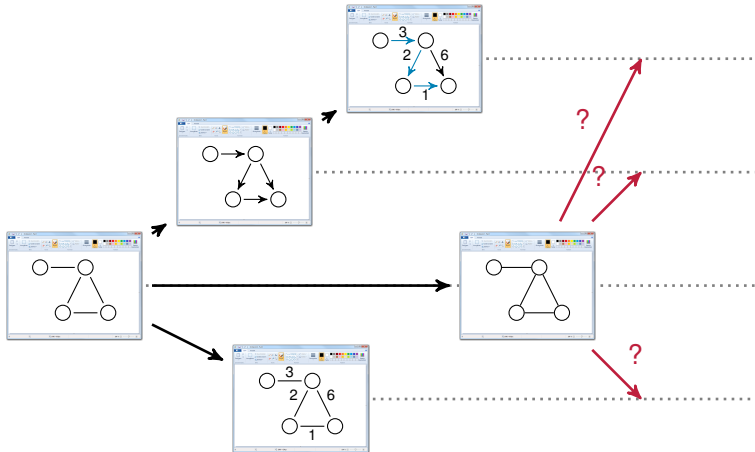
Part II

**Bridging the Gap**

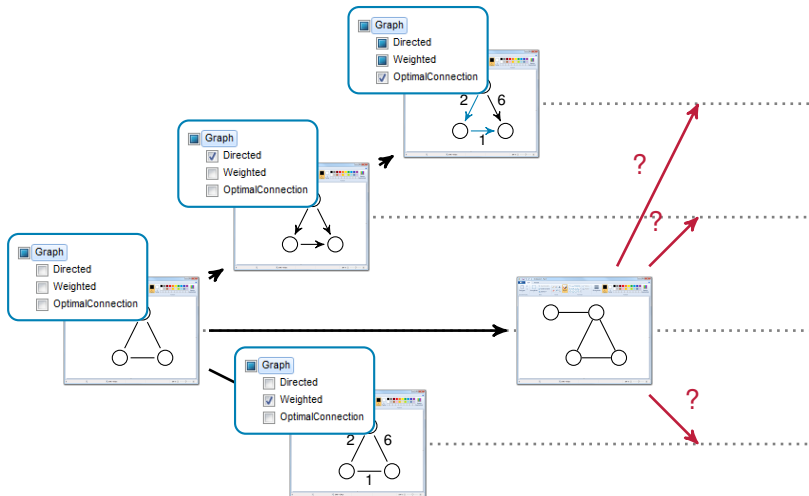
# Documenting and Exploiting Domain Knowledge



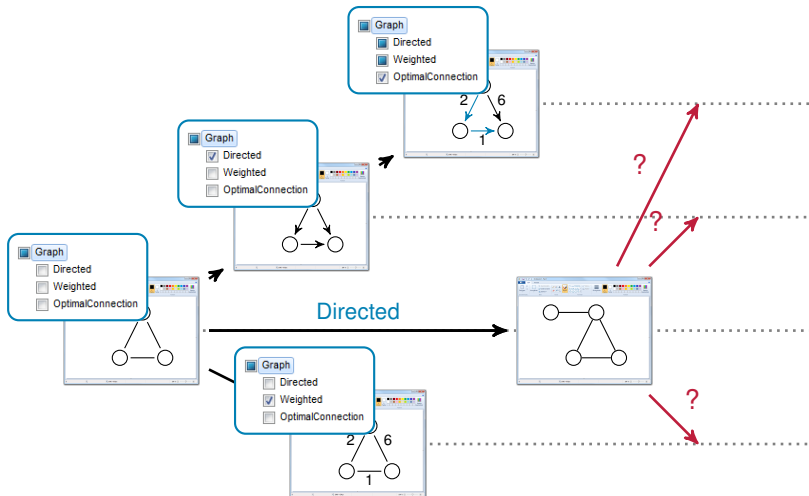
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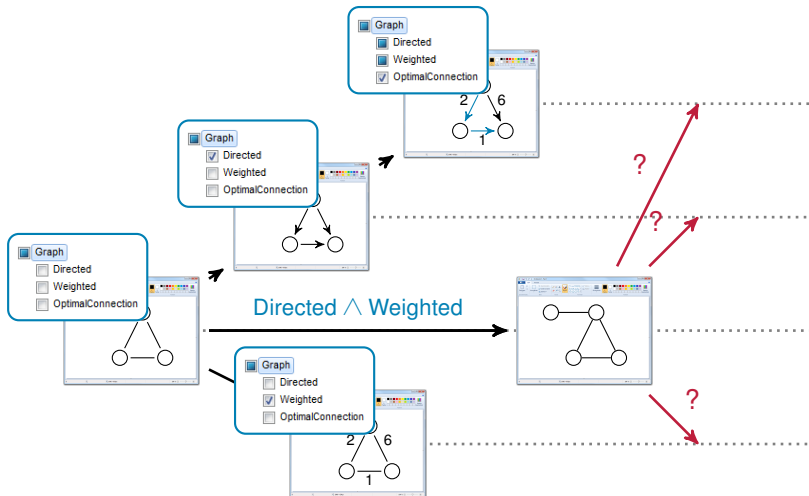
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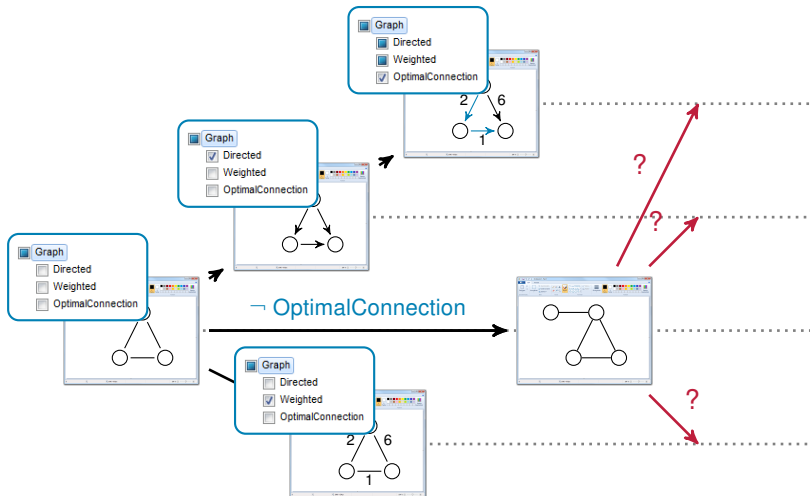
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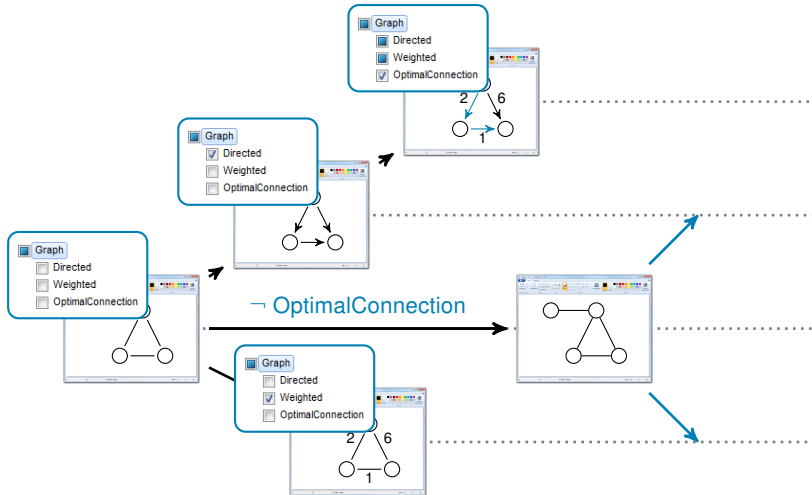
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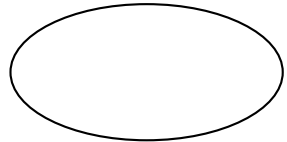
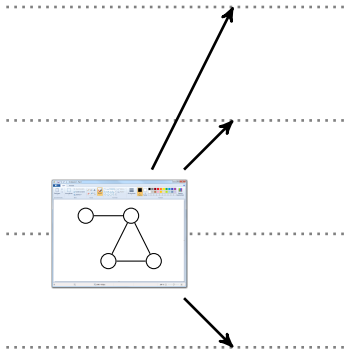


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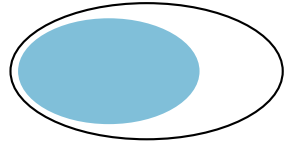
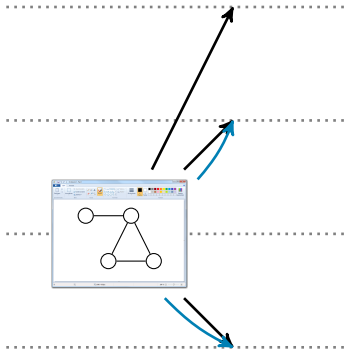


# Automating Variant Synchronization



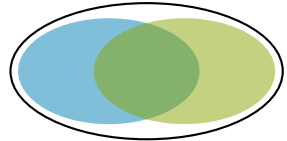
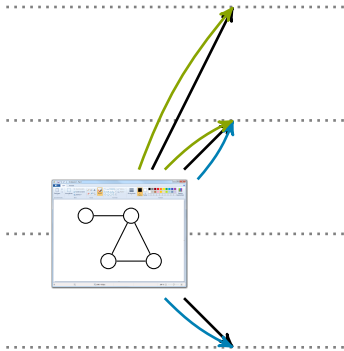
# Automating Variant Synchronization

products to synchronize



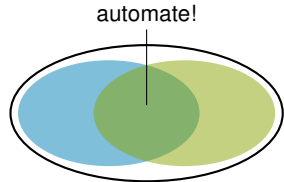
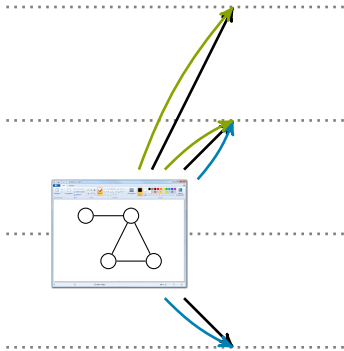
# Automating Variant Synchronization

products to synchronize vs synchronizable products



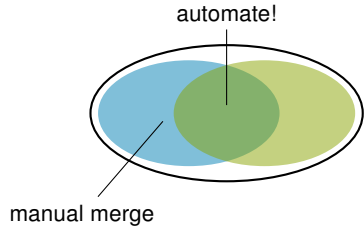
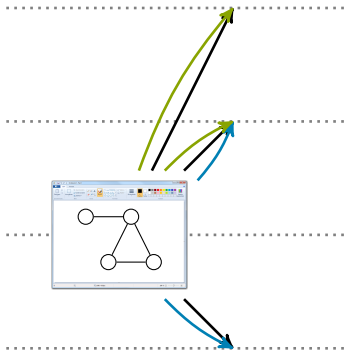
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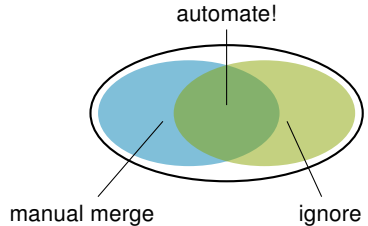
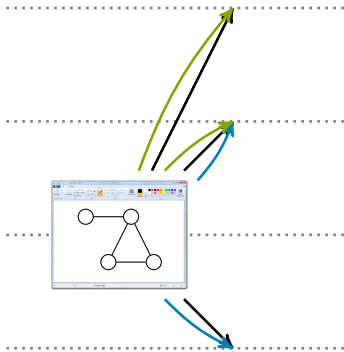
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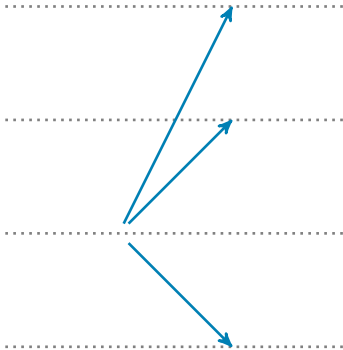
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products to synchronize vs synchronizable products



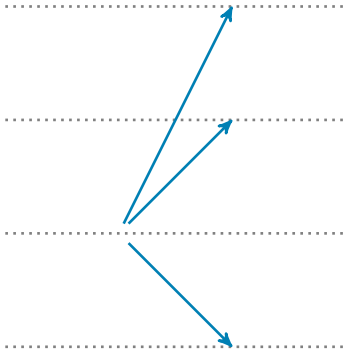
# Feature- vs Variant-Centric Synchronization

feature-centric

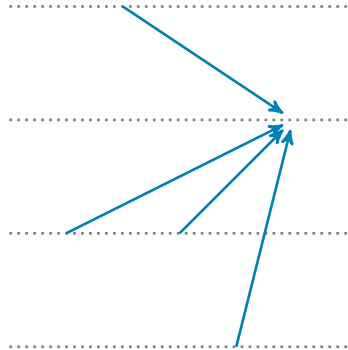


# Feature- vs Variant-Centric Synchronization

feature-centric



variant-centric





# VariantSync

Java - Eclipse Platform

File Edit Source Refactor Navigate Search Project Run Window Help

Resource Changes

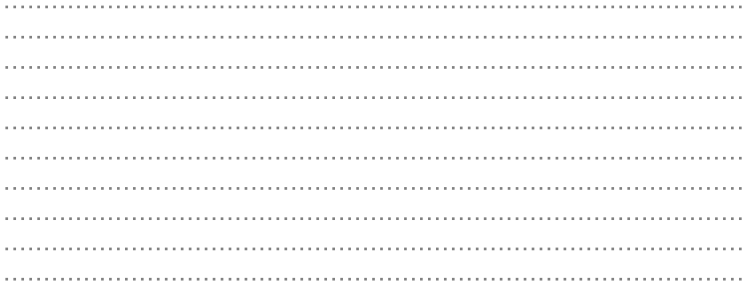
Resource	Project	Possible Targets	Targets
Project root			
src			
Test1.java			
FILE_ADDED Sep 21, 2012 12:01:31 PM	Project1		Project2 Project3 Project4 Project5
FILE_CHANGED Sep 21, 2012 12:02:38 PM	Project4	Project1 Project2 Project3 Project5	
Folder1			
FOLDER_ADDED Sep 21, 2012 12:02:09 PM	Project2	Project1 Project3	
Test2.java			
FILE_ADDED Sep 21, 2012 12:02:09 PM	Project2	Project1 Project3	Project4 Project5
FILE_CHANGED Sep 21, 2012 12:02:56 PM	Project4	Project2 Project5	
Folder2			
FOLDER_ADDED Sep 21, 2012 12:04:04 PM	Project5	Project1 Project2 Project3 Project4	

## Part III

# Evaluation of the Bridge

# Simulation of 10 Branches

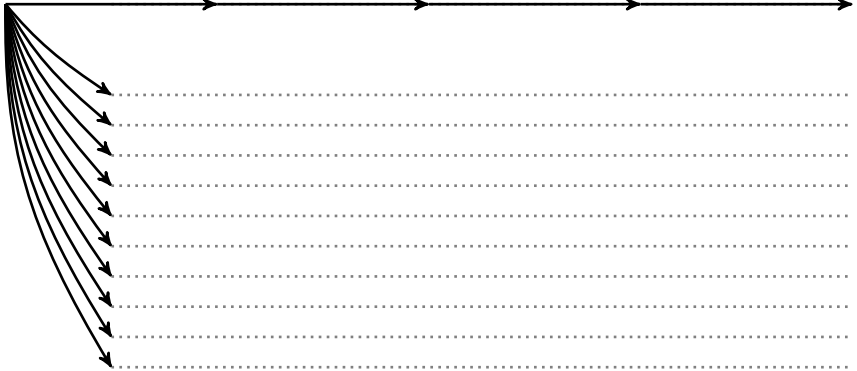
DesktopSearcher: student's product line with 22 features and 91 revisions



product generation, simulation, automated merge, comparison

# Simulation of 10 Branches

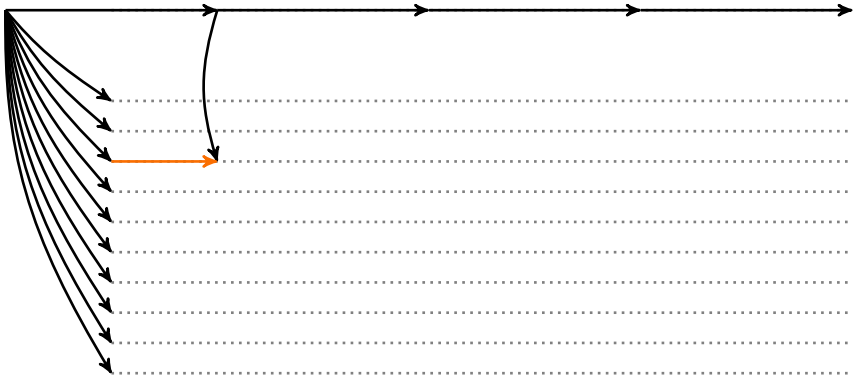
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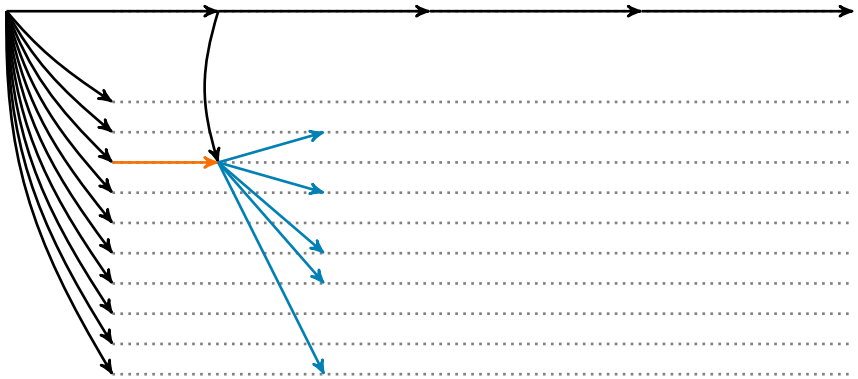
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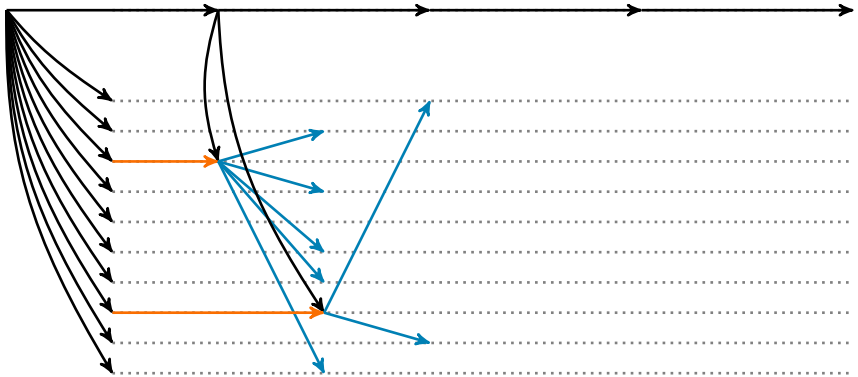
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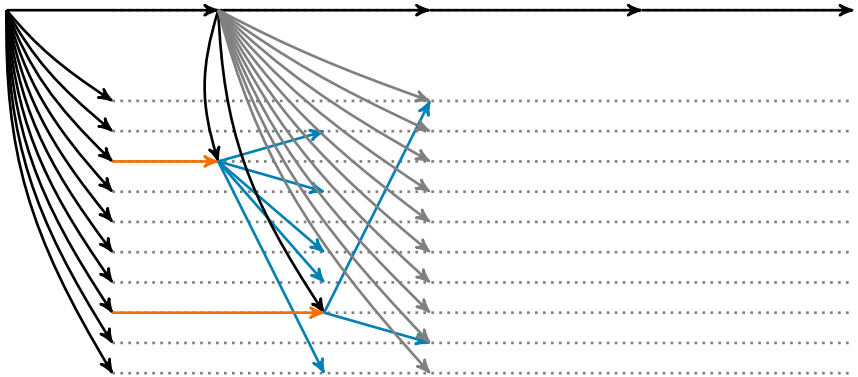
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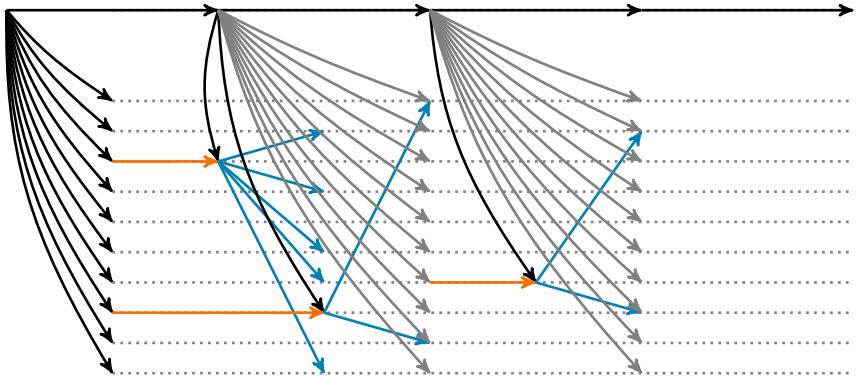


product generation, simulation, automated merge, comparison



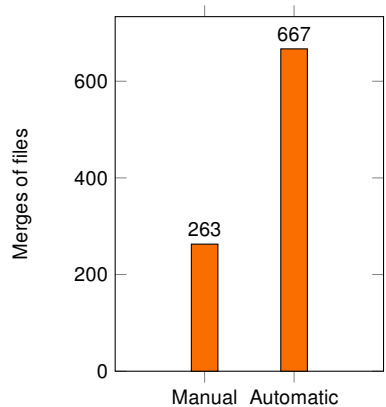
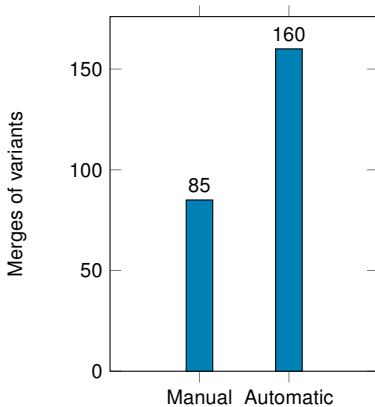
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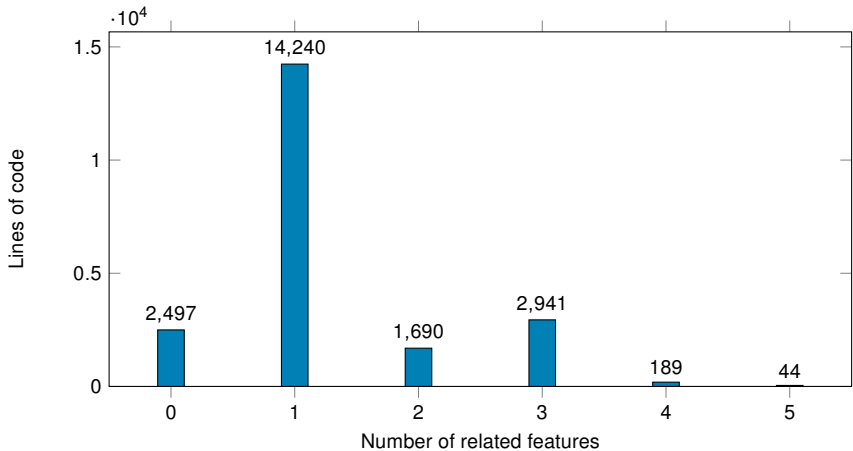


product generation, simulation, automated merge, comparison

# Manual vs Automatic Synchronization



# Effort for Later Migration



# Future Directions

Work in progress...

- Implementation of the variant-centric workflow
- Support merge orders that not align with timestamps
- Integration with existing migration tools and evaluation (ideas?)
- Evaluation on real clone-and-own/branches (ideas?)
- Challenge with evaluation: What is the baseline? What to measure?