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# Industrializing Software Product Line Development for Small Companies

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MIPT

Antiplagiat

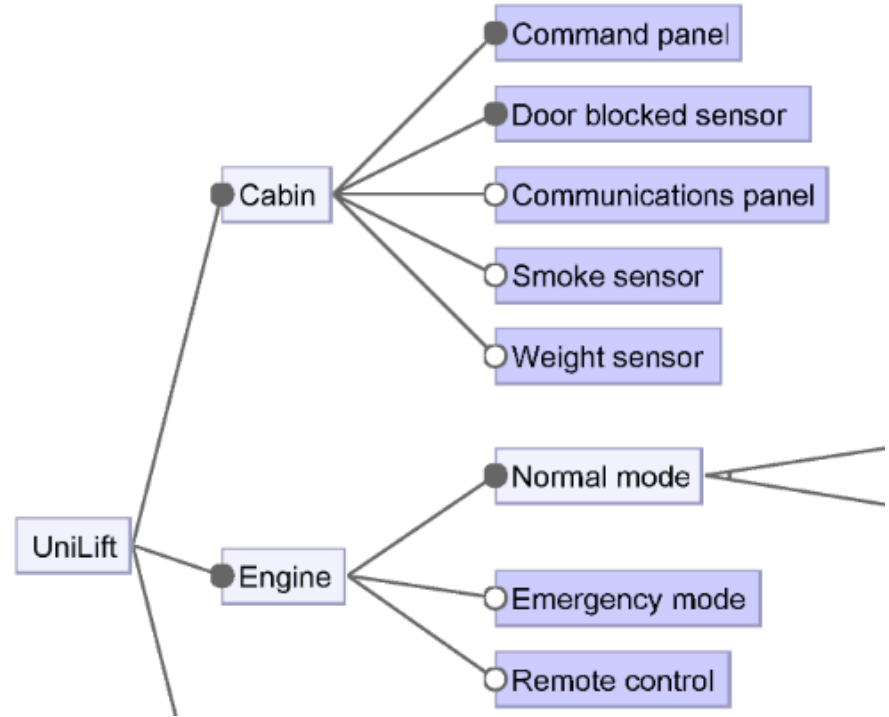
# Basic idea

- Several products for specific market
- Similar but different
- Want to reuse (multiuse) shared parts



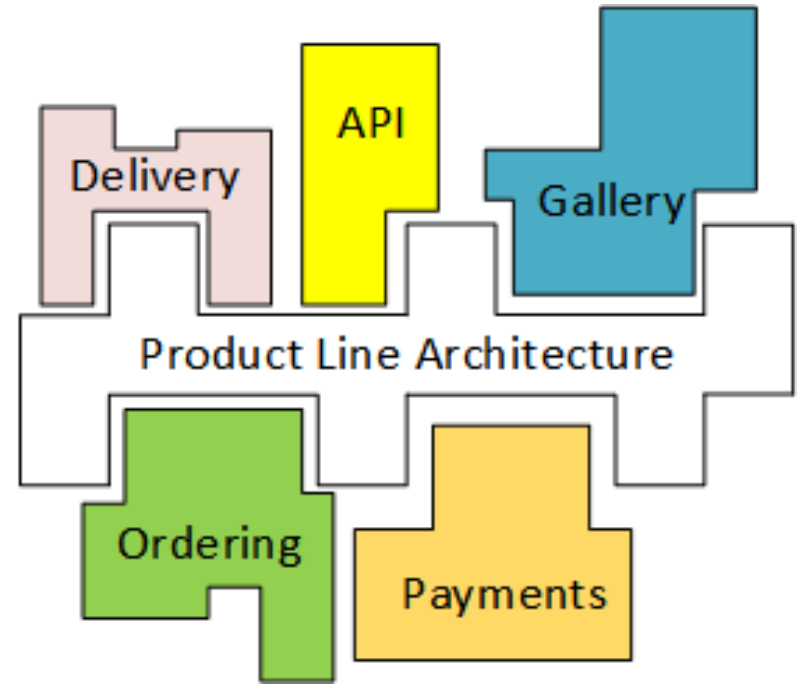
# Divide products into features

- Divide functionality into features
- If features intersect – that's a new sub-feature
- Describe products as sets of features



# Implementation

- Extensible reference architecture
- Separate implementation of features
- Assemble products from features

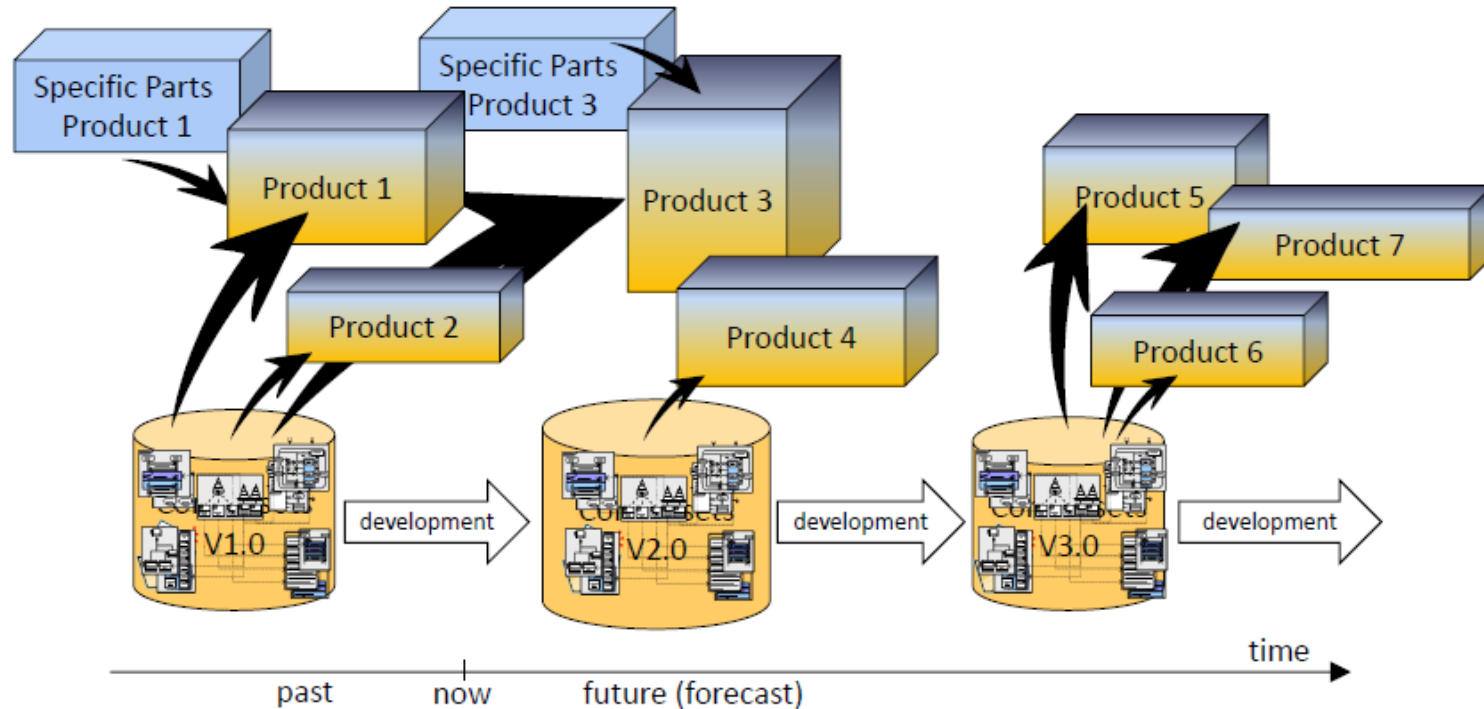


# Software Product Line Engineering (SPLE)

**Software product line (SPL)** is

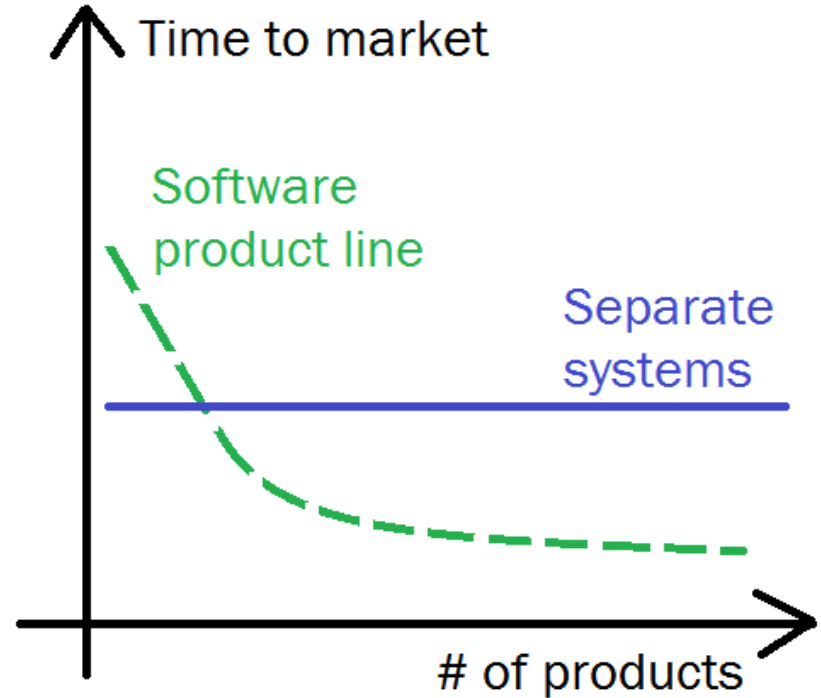
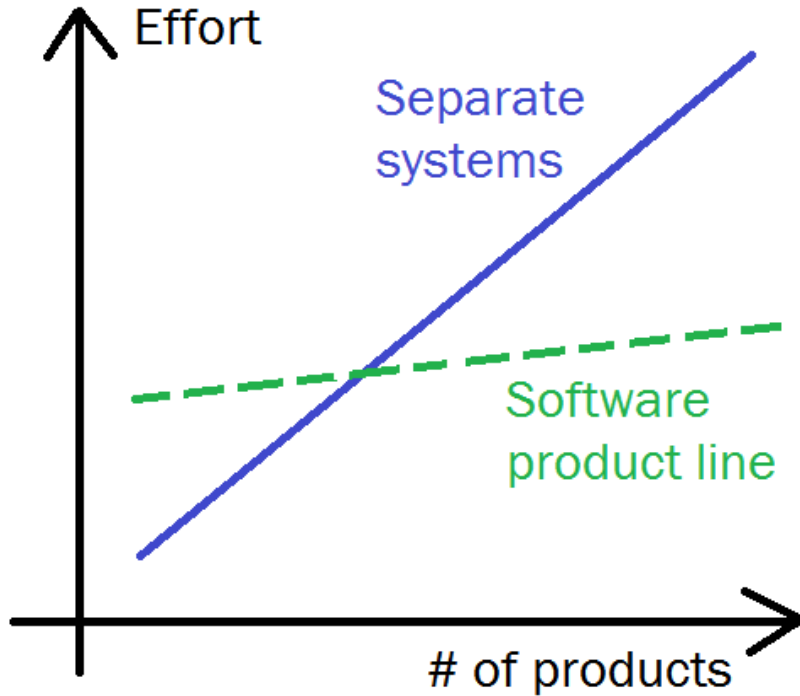
- a group of related but different **products**
- targeting **specific needs** within a selected market
- sharing common, managed set of **features**
- developed from **core assets** in a **predefined way**

# Developing products from core assets

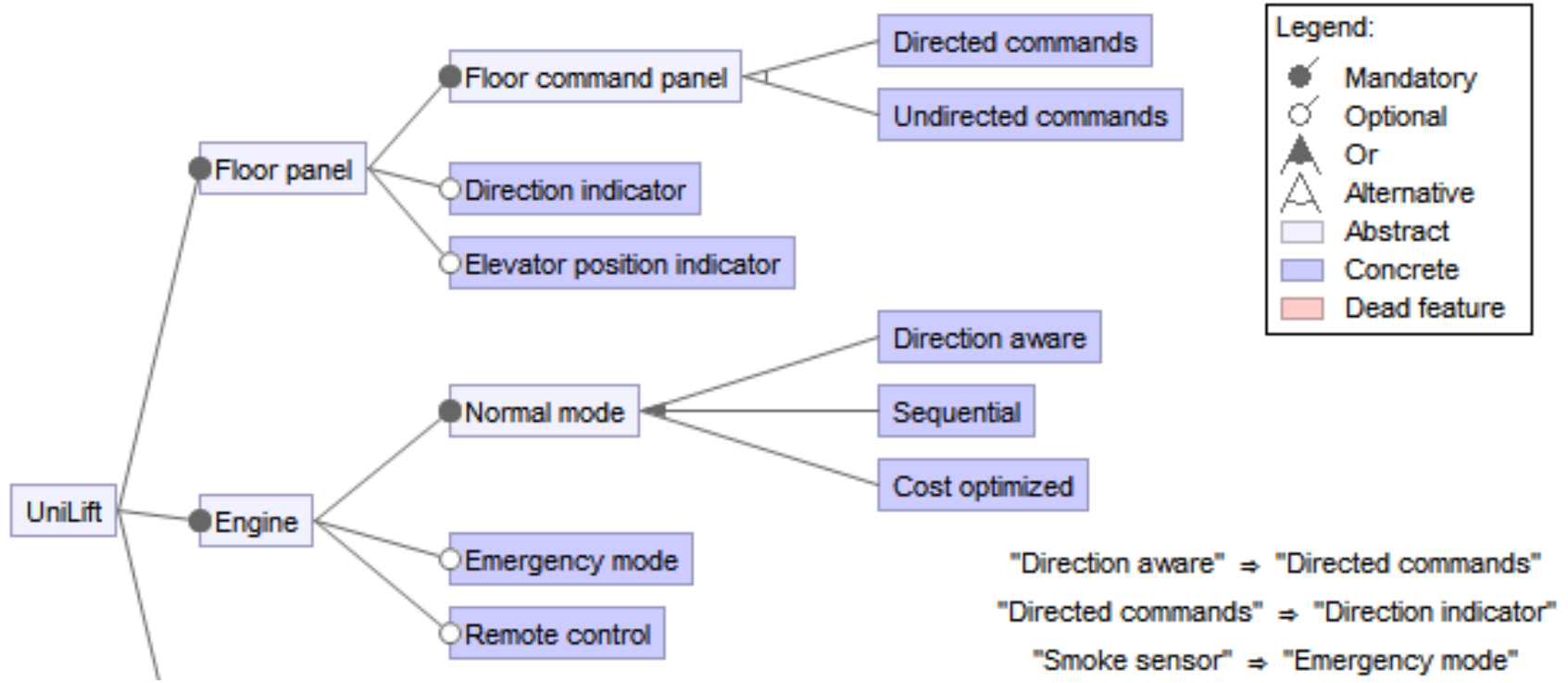


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Software Product Line Engineering, WS 13/14

# Economics of software product lines

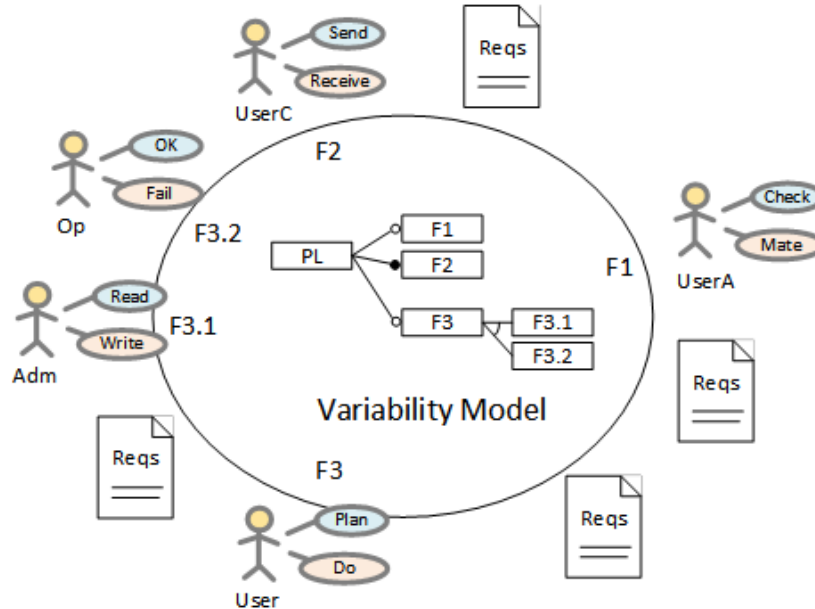


# Variability model

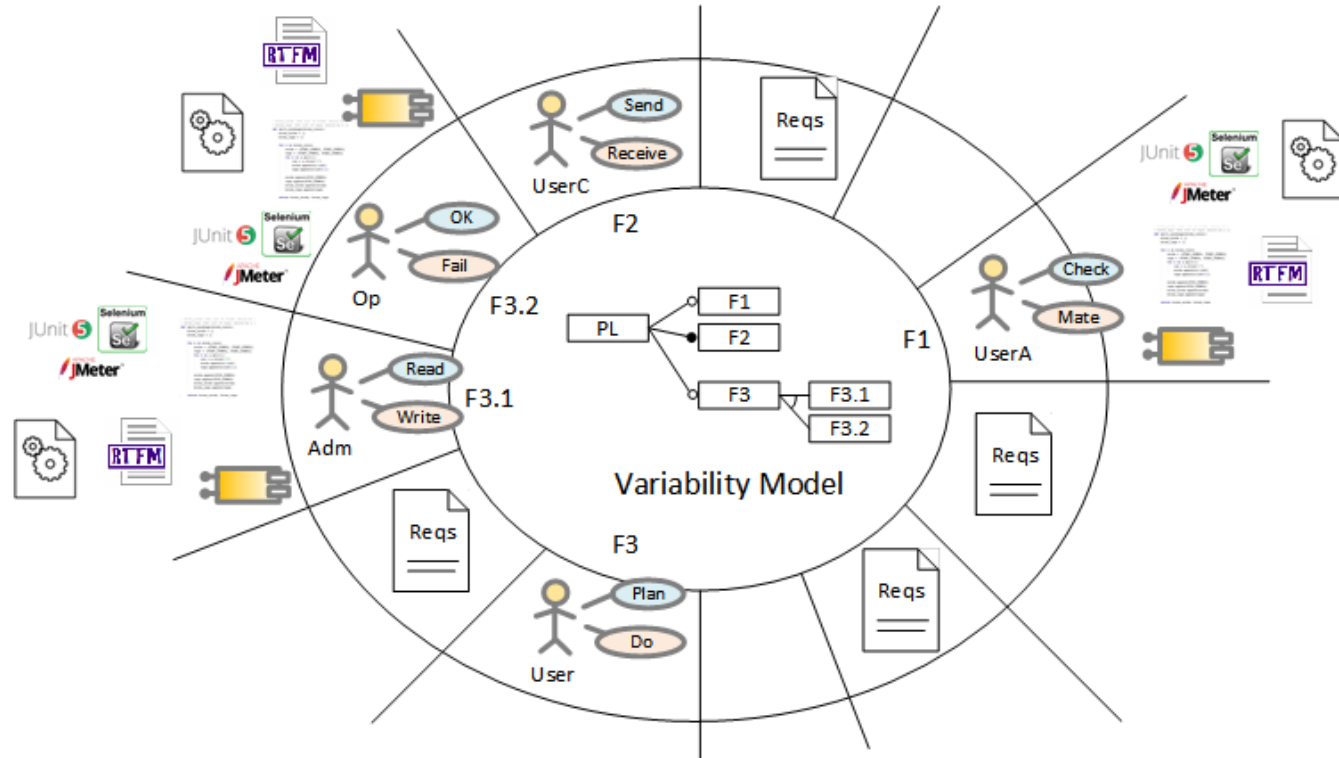




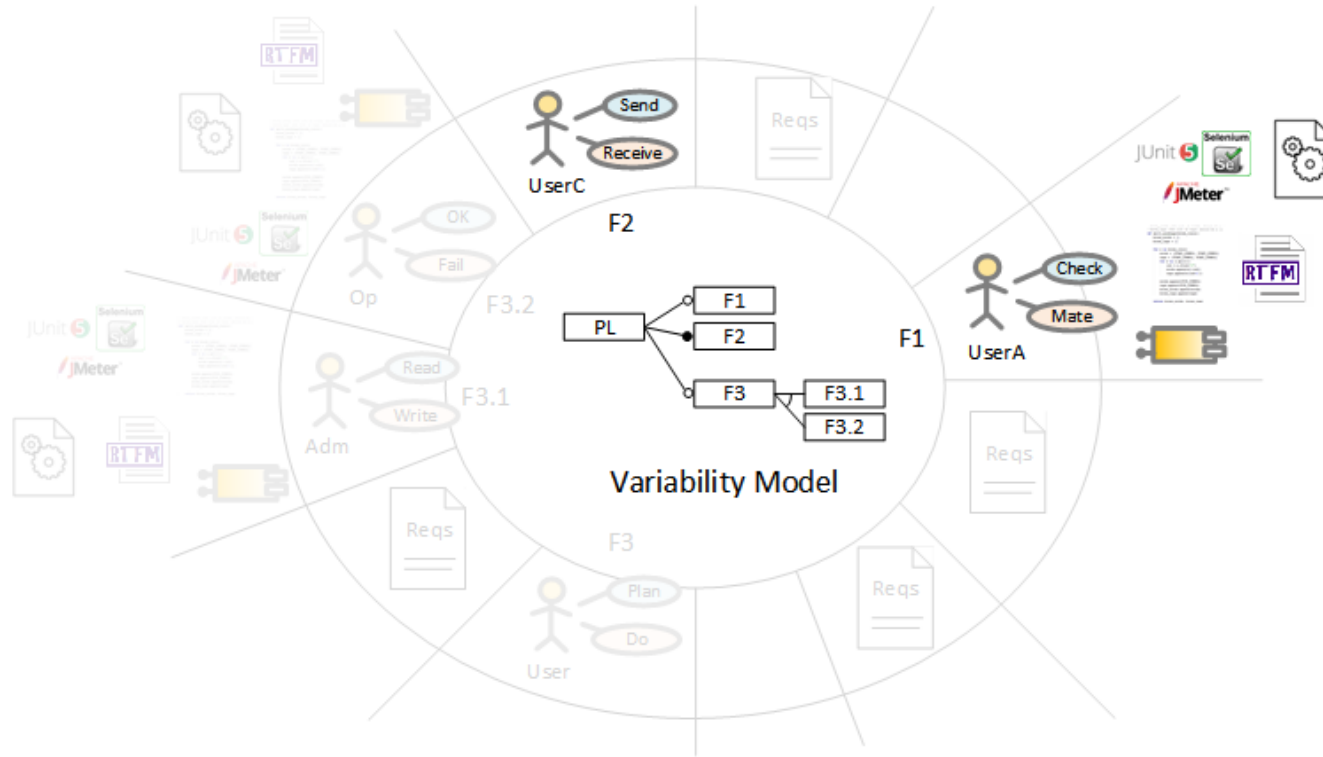
# Requirements management



# Asset reuse



# Product configuration (1/3)

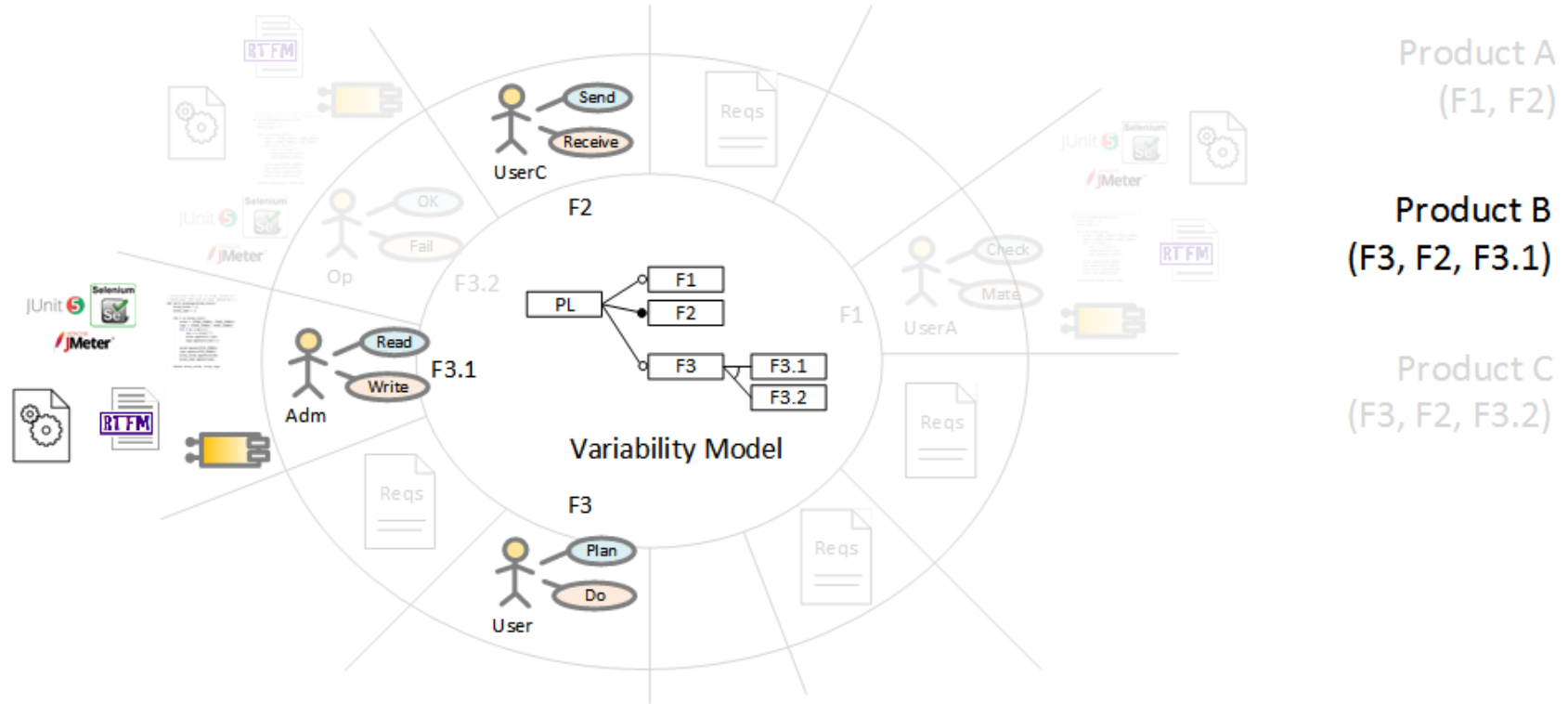


Product A  
(F1, F2)

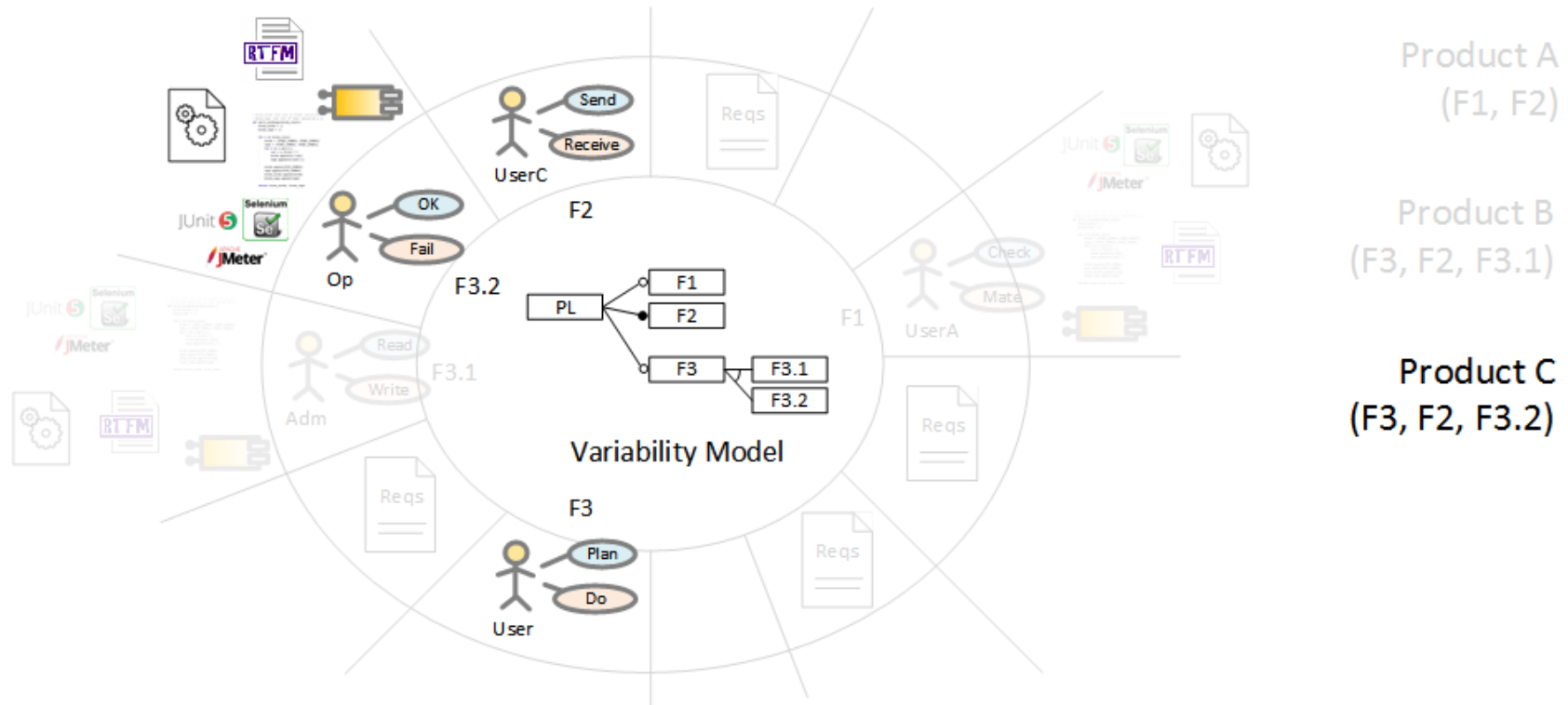
Product B  
(F3, F2, F3.1)

Product C  
(F3, F2, F3.2)

# Product configuration (2/3)



# Product configuration (3/3)



# Case Study: Antiplagiat SPL

- Internet-scale SaaS and on-premises
- Family of plagiarism checking products for
  - Educational institutions
  - Research organizations
  - Personal use

# Motivation for change

## Problems

- Unmaintainable code
- Ad-hoc product management and communication
- And prevent in the future

## Opportunities

Leverage similarities

- increase development productivity
- increase quality
- decrease time to market
- lessen support burden

# Example features

Feature	Description	Used in
Static website (abstract)	Display supplementary information about the site, news, on-line help depending on the configuration	Except when API-only
Admin area	Site admin can create, delete, edit user accounts and change user password, search for users with filtering and sorting. A site admin can log in as a user.	Except when External Auth.
University admin	Site admin can create, edit and delete tags. Site admin can assign tags to professors and TAs. Site admin can assign and edit student IDs	AP.University
User profile	User can log in and log out with username and password. User can view his profile and contact support.	AP.User, AP.University, ...

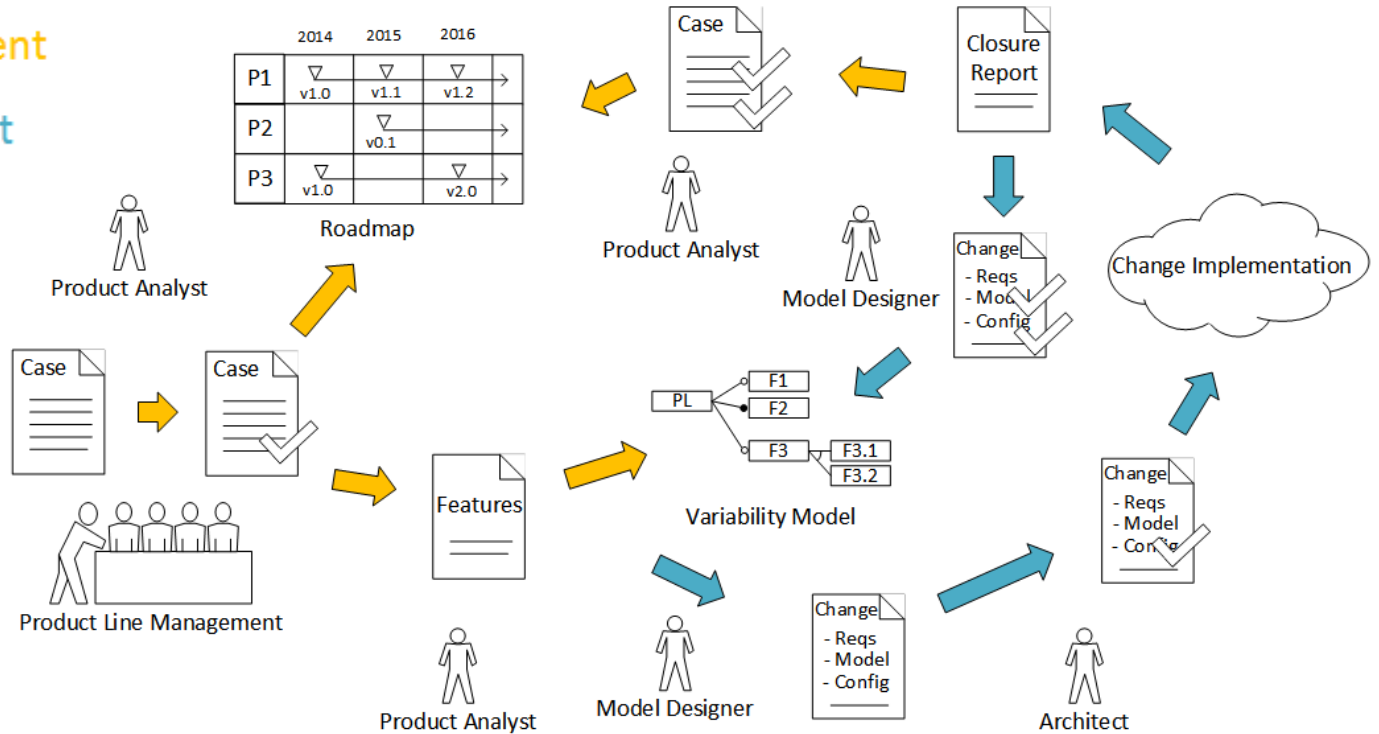


# Product line management process

## Roadmap development

## Change management

- Business strategy
- Customer input
- Operations and maintenance
- Market analysis
- Regulations



# Lessons learned

- Obtain and maintain sponsorship and support

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- Obtain and maintain sponsorship and support
- Expect initial costs
  - Refactoring
  - Process tailoring
  - Training
- Start small and travel light
- Architecture is an important investment

# Industrializing Software Product Line Development for Small Companies

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- Architectural considerations
- Implementation best practices
- Proactive and reactive SPLE
- Variability management
- Configuration management
- Connecting to DevOps or SAFe