Product Lines that supply other Product Lines: A Service-Oriented Approach

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Overview

- In industry, product-lines commonly use parts of other product lines
- So far, this situation is unlikely for software product lines
- The problem is the combination of different parts produced by different product lines
  - We propose a service-oriented architecture to do so,
  - in which product lines are regarded as services,
  - which are consumed by service-oriented product lines
- We illustrate these ideas with an example, but we believe that much more work is needed
An Introductory Example: car assembly line

Note that the car seat is a subproduct of a product line (next!)
An Introductory Example: car seat assembly line
An Introductory Example:
product lines that supply other product lines

PL_1

Suppliers

B1

B2

B3

PL_2

C1

C2

C3

Consumer

A1

A2

A3

A4

A5

A6

the car product-line is supplied by other product lines

Product

PL_A

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A Portal / Portlet scenario
Portals & Portlets

- A **Portal** is a Web application that provides centralized access to a variety of services.
- Services are often offered by 3rd party components called Portlets:
  - Are presentation-oriented web services.
  - Business logic and web user interface.
Portal Architecture

- End-user accesses Portal with web browser
- Portal aggregates different portlets
- Portlets provide business logic and representation
Scenario: Portlet Product Lines

Different portals demand similar **portlet**s that overlap in functionality

Different customers demand similar **portals** that overlap in functionality

MyBrowser

X Portal

Y Portal

Portlet_A_1

Portlet_A_2
Scale
Implementing Product Lines of Product Lines

- Current solutions (e.g., software populations) require manual integration of individual supplied products.
- Supplying product lines can come from different vendors.

- How can a software product line automatically request and consume a product from another product line?
- Can we automate registration, consumption and production?

- Our proposal use SOA as infrastructure: Service Oriented Product Lines
Service Oriented Product Lines?
A supplier is a product-line that supply products to other product lines (e.g., travel portlet product line)
- Descriptive info (registration purposes)
- Product info (which features are offered to distinguish product functionality)
- Production interface (how is the product ordered, delivered, etc)

A consumer is a product-line that consumes products from other product lines (e.g., research portal product line)

Operation involves registration and consumption (based on existing SOA standardization efforts & tooling)
Discussion

- How to ensure consistency, e.g., when propagating features (requirements) over different SPLs?
- How can we ensure products from supplying SPLs are provided in time for a production schedule?
- Can we use or learn from concepts like BPEL for orchestration?
- Can we use service oriented product lines to refactor one product line into several smaller supplying product lines to separate concerns?
- Can we build a market for SPLs that can supply products to other SPLs?
Conclusions

- Product lines that supply other product lines appear frequently in industry
- Can we confer this concept on software product lines?
  - We believe that SOA is a powerful paradigm to do so
  - We present an illustrative example and its scenario
  - We sketch initial ideas to implement it (using SOA)
- Further work is needed to assess our approach
  - We need more work to create the infrastructure to make this really a viable approach with models, tools, etc.
Service Oriented Architectures and Product Lines - What is the Connection?

- We would say that SOA techniques can be used as infrastructure to build more complex SPL systems.
- Our longstanding envision is to facilitate the emergence of a concurrent market where atomic products from supplier product lines can be automatically integrated into a larger product line.
Thank you!

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