AOP-Driven Variability in Product Lines of Pervasive Computing Applications

Motivation

**Problem:** The demand for pervasive computing applications has increased. The great number of different devices and features per device make it difficult to quickly respond to such demand and to comply with ever-increasing quality and reuse requirements.

**Solution:** Use AOP in order to provide easier feature variability implementation for product lines related to pervasive devices.

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Product Line Development

Core Asset Development
- Feature Modeling
- Design Product Line Architecture
- Design variations using aspects

Product Development
- Compose aspects of a product and business classes using AOP Weavers
- Generate version of a product

Management

Process overview

Feature Modeling → Design product line architecture

Generate version of a product

Compose aspects of a product and business classes using AOP Weavers

Design variations using aspects

Feature = Aspect+ auxiliary classes
Case Study: J2ME Dictionary

1. Feature View

- Define product line features
- Identify common features for all products
- Identify variable features

2. Architecture View

- Design flexible architecture
- Focus on mandatory features
- Use architectural/design patterns

3. Variation View

- Identify application points to be crossed
- Design aspects correspondent to variable features (feature -> aspect)
- Design auxiliary classes
- Use design patterns

4. Composition View

- Collect the aspects relative to the desired features
- Select auxiliary classes
- Use an AOP Weaver
- Generate weaved code

5. Product Generation View

- Process code
- Package the application
- Install and test