Strategic reuse with software product lines

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Problems with ad hoc approach

Software product lines basic concepts

Problems with used approach?

Problems

- Use case and code duplication
- Reuse is achieved via property files only
- Badly structured, difficult to maintain, use cases and code
- Products organized as branches
- No high-level automatic product generation
- No high-level visualization of products and features

Problems due to focus on product...

www.usm.maine.edu

not product family!

it.zaobao.com

Products with common functionality, but with variations too

From hardware products to software products...

Program families are sets of programs whose common properties are so extensive that it is advantageous to study the common properties of the programs before analyzing individual members

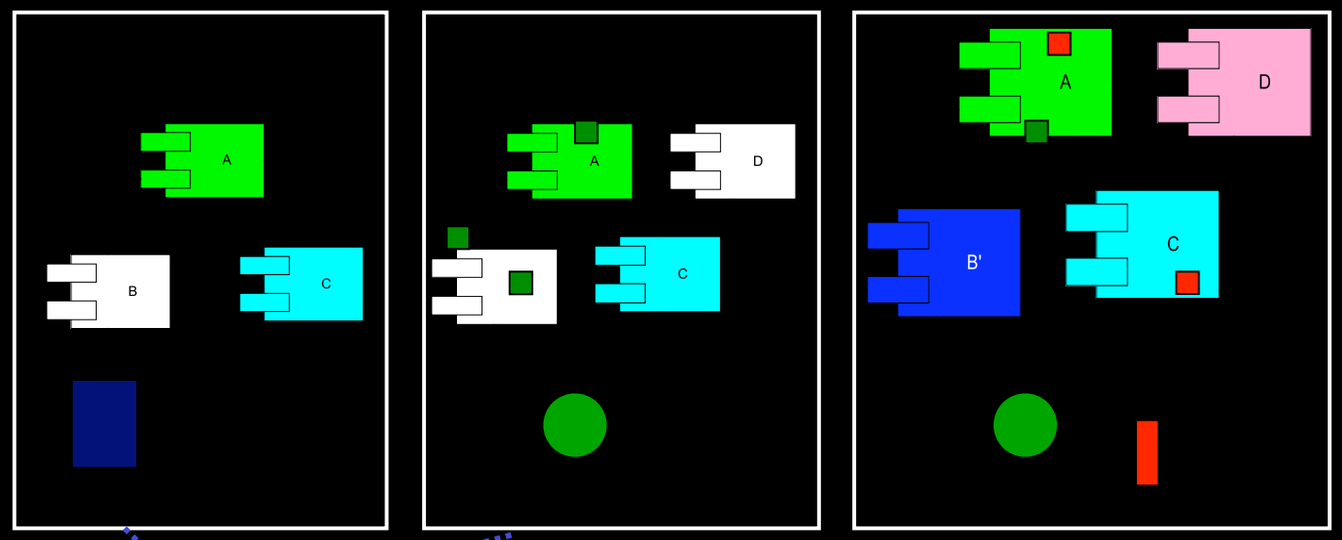
Adapted from: On the Design and Development of Program Families (Parnas 1976)

Different devices, 15 to 60 different applications…

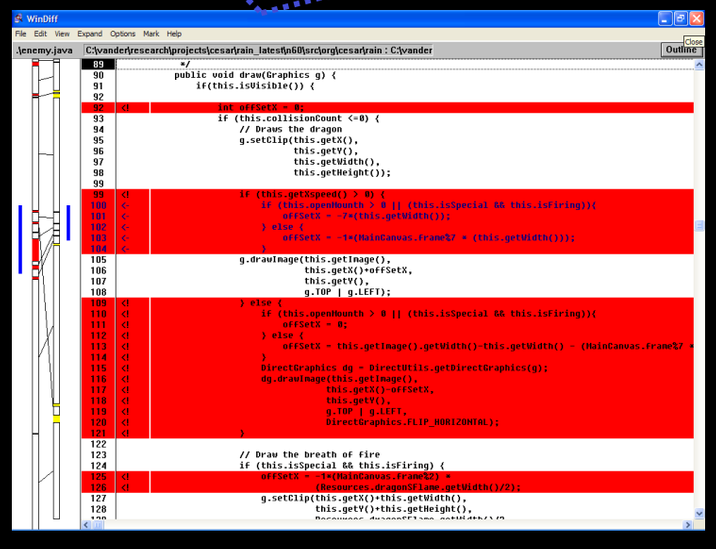
64kb, flip 4Mb, flip 100Kb, sem flip

Different clients, different products

Little reuse and agility, high costs

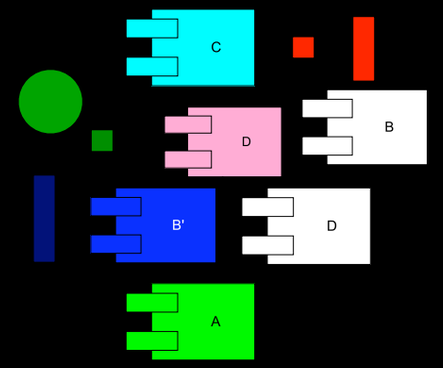


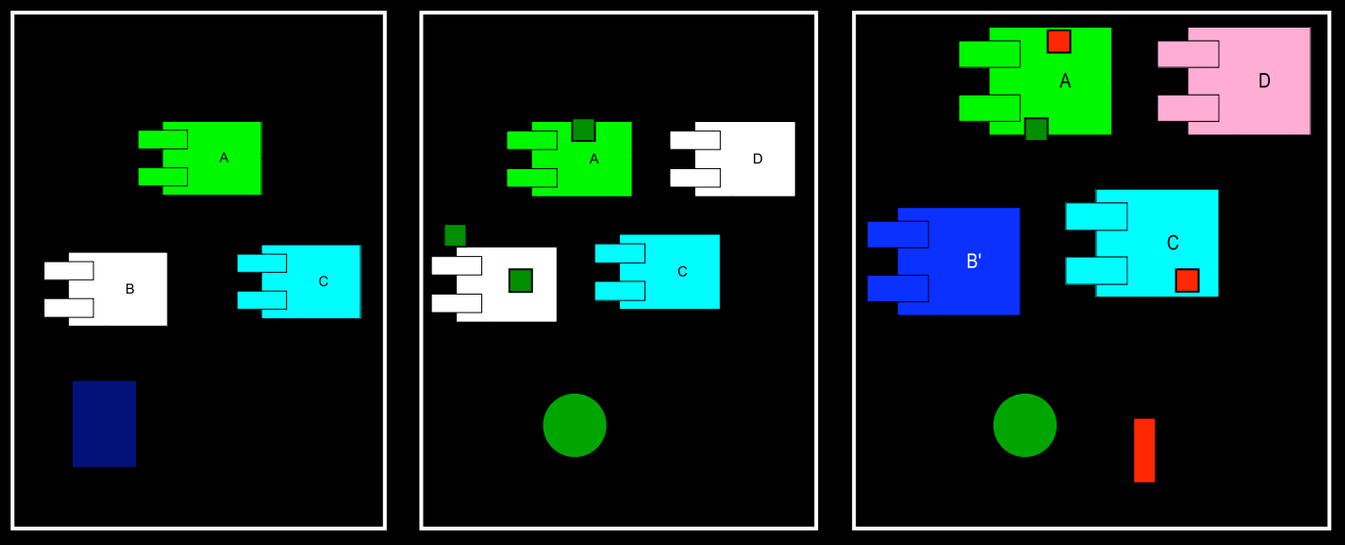
Even with J2ME!



Solution: product line

Strategic reuse of core assets: common artifacts and variations





Software product line

.java

.aj

.xml

.jpg

reusable assets

No Clouds

Static Clouds

Moving Clouds

related products

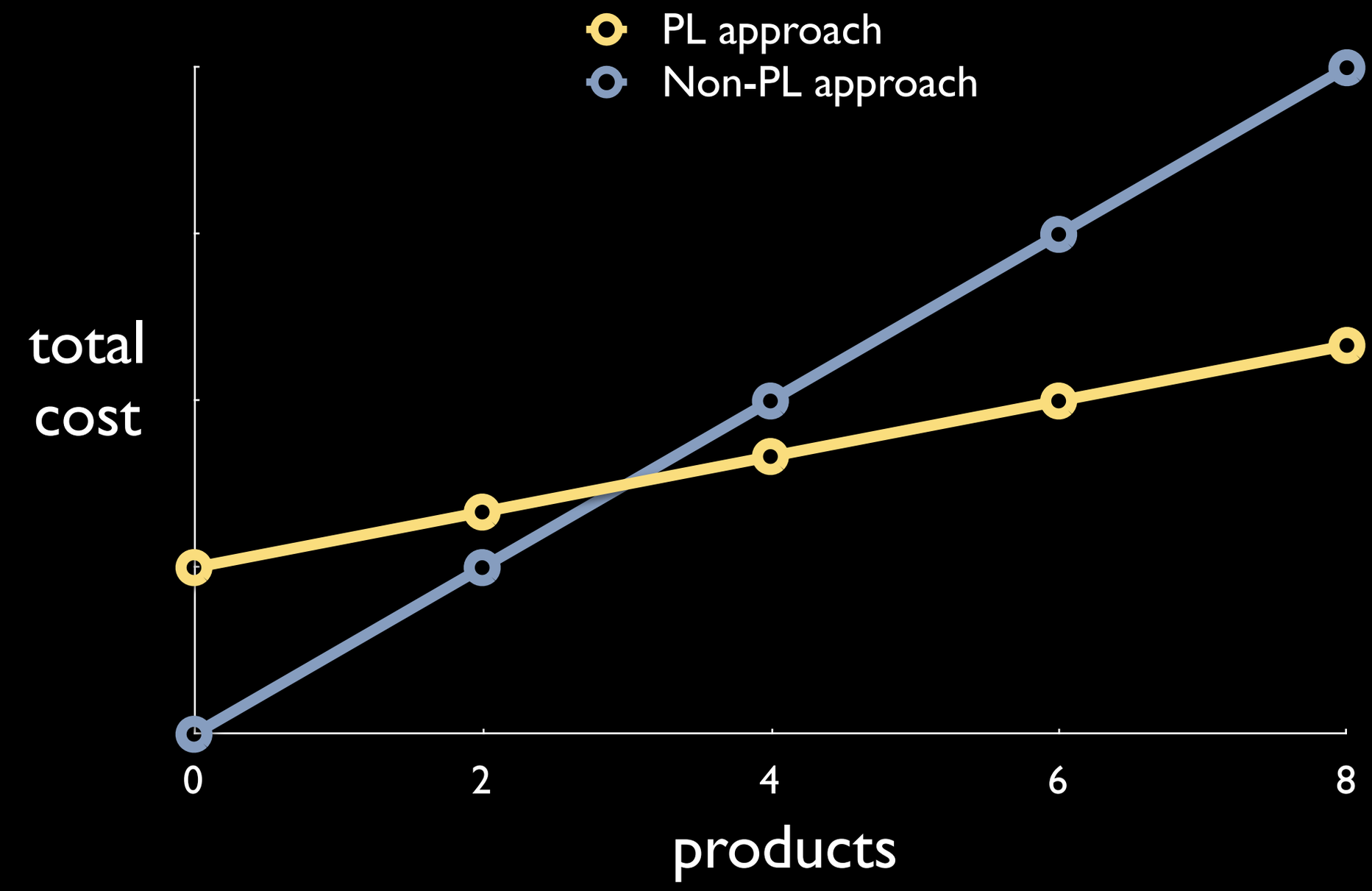
Family = Line?

- Family
  - Elements
- Line
  - Support that enables the generation of the elements

PL approach improves...

- customization
- productivity (development and maintenance)
  - 700 builds costing little more than 1
- time to market
- quality

But not before you have it up and running!



A software product line is...

a set of software-intensive systems sharing a common, managed set of features that satisfy the specific needs of a particular market segment or mission and that are developed from a common set of core assets in a prescribed way

Software Product Lines, Practices and Patterns.
Clements and Northrop 2002.

Feature

- User-visible aspect or characteristic of the family (Kang 1990)
  - define both common aspects of the family as well as differences between products in the family
- Logical unit of behavior specified by a set of functional and quality requirements (Bosch 2000)
- Groups requirements

Yet another reuse approach?

- Text reuse is not reuse!
- Class reuse
  - Failure for business concepts: Client, Account, etc.
  - Even with repositories and search mechanisms
  - OK inside a single project or for infra-structure software
- Component reuse
  - Better than class reuse due to interfaces, deployment and visibility of components
  - Similar problem with business concepts, repositories and search

Or reuse that pays?

- Services reuse
  - Same as component reuse except for technology involved, and its non technical consequences
- Framework reuse
  - Class or components
  - Successful for both infra-structure (look at GUI) and business (in this case with limited flexibility)
- Knowledge reuse
  - Extremely successful with patterns
- Strategic reuse

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