

Software product lines

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Software product lines basic concepts

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Um produto



www.usm.maine.edu



Uma família de produtos



it.zaobao.com

Produtos com várias funcionalidades comuns mas com variações entre si



Agora passando de produtos de hardware para software...

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)



Aparelhos diferentes, 15 a 60 aplicações diferentes...



64kb, flip



4Mb, flip



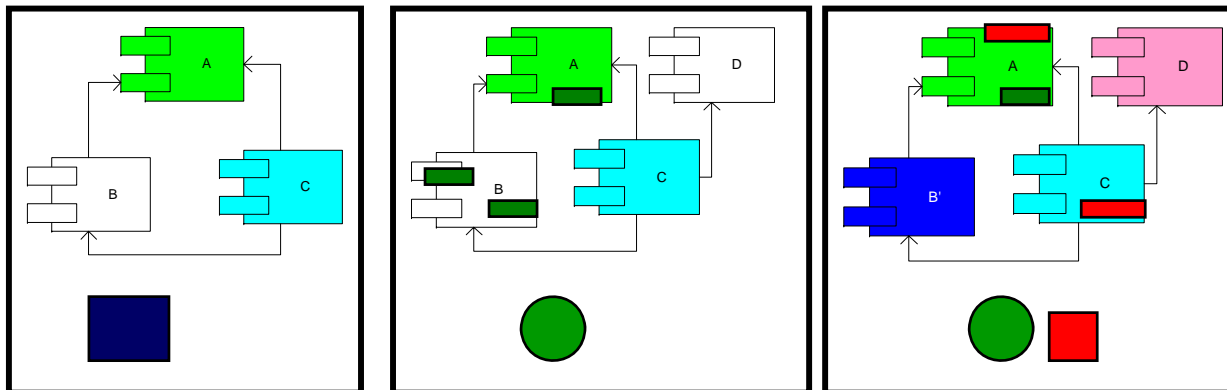
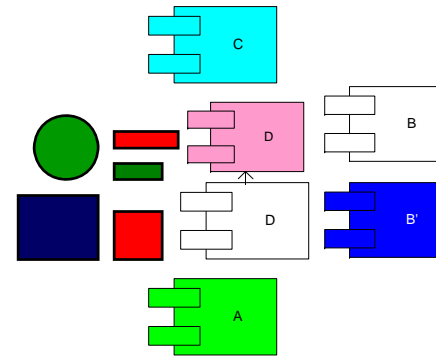
100Kb, sem flip

Produtos diferentes para clientes diferentes



Solução: **linha** de produtos

Reuso estratégico
de artefatos
comuns e variações



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



Family = Line?

- Family

- Elements

- Line

- Support that enables the generation of the elements

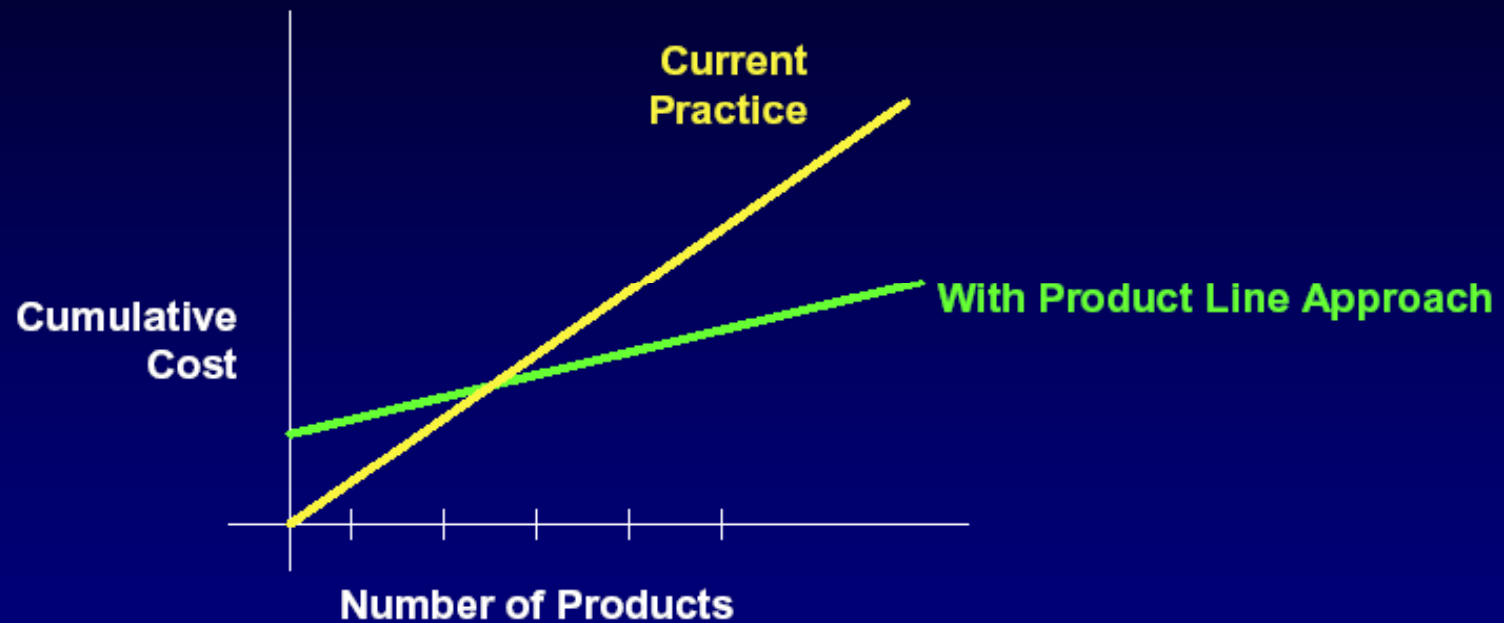


Benefícios

- Oferta de vários produtos sem multiplicação de custos (mass customization)
- Maior fatoramento dos custos de desenvolvimento entre vários clientes
- Aumento de produtividade
 - redução em custos, time to market, e número de desenvolvedores
- Maior qualidade
- ...



Economia de escopo



Derived from data supplied by
Lucent Technologies
Bell Laboratories Innovations

Population

- Sharing as in a family, but with more significant changes between products
- Might consist of separate families
 - family of DVD players
 - family of digital TV set top boxes
- Not necessarily a single architecture with the same plug and play options



Better understanding the definition...

a set of software-intensive systems
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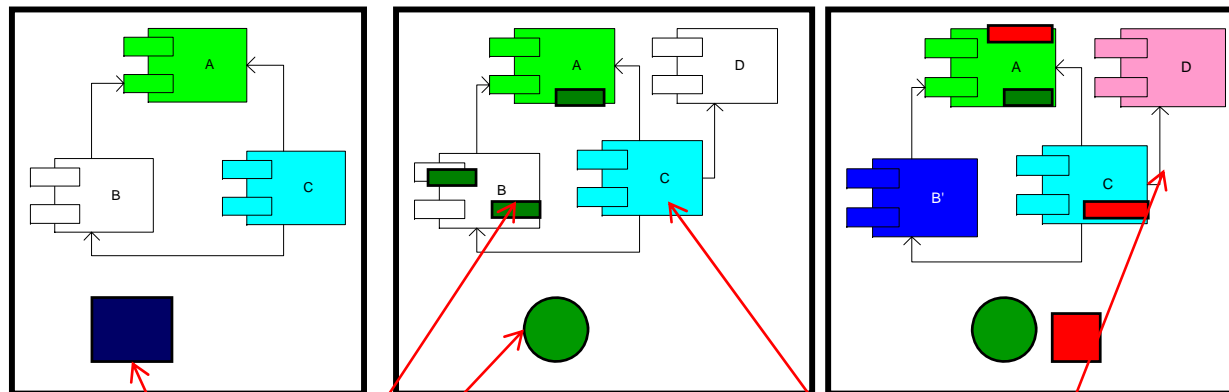


Feature

- 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



Variations and variations points

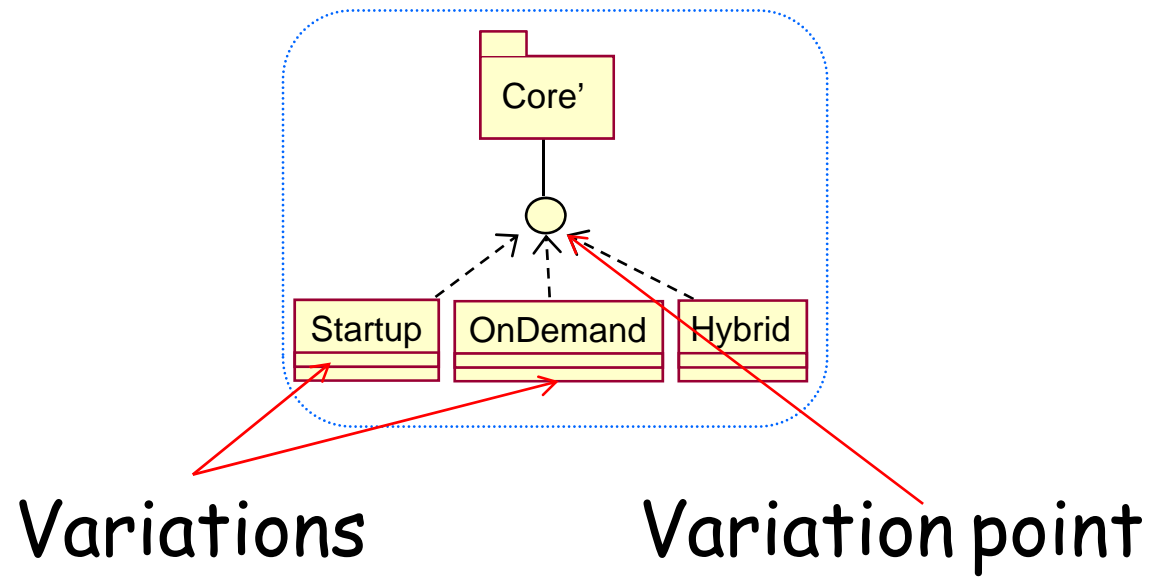


Variations

Variation points

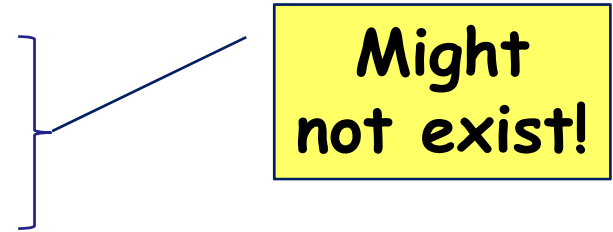


Mechanisms for managing variations

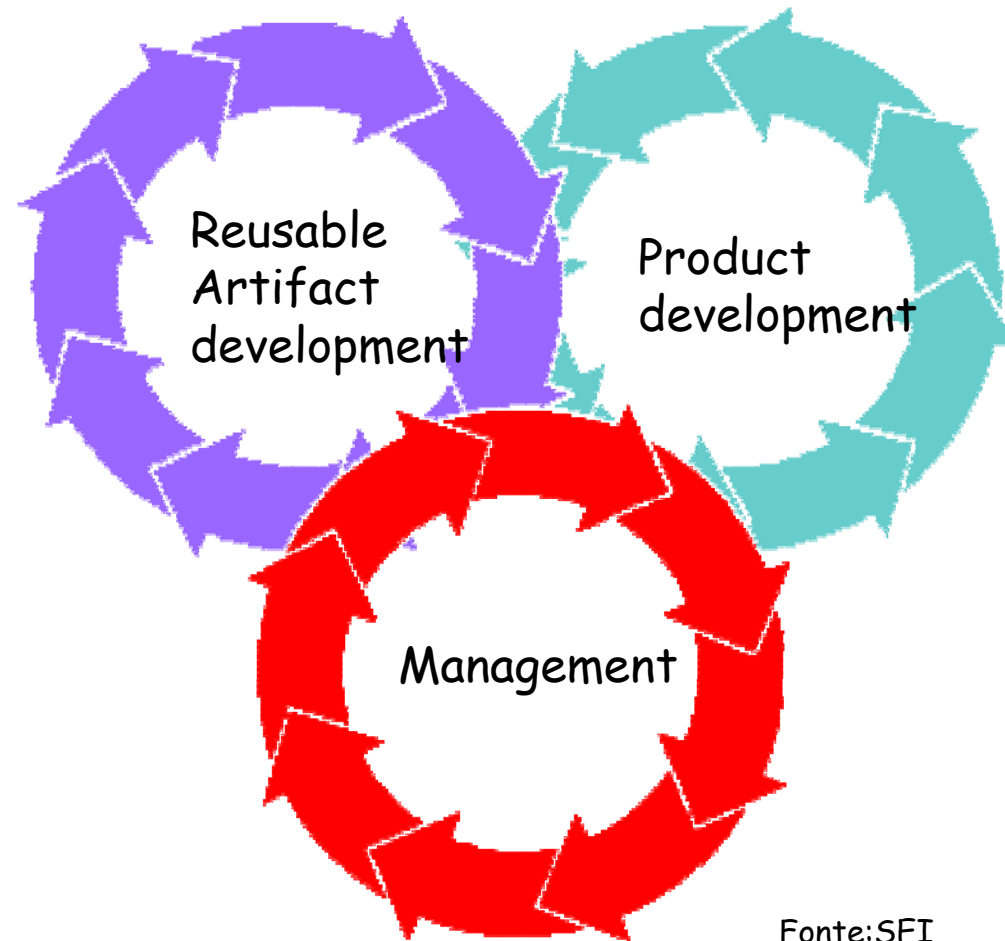


Variations and features

- Each feature is realized by a set of **core assets**
 - variations
 - common behavior
 - common architecture
- Both are managed



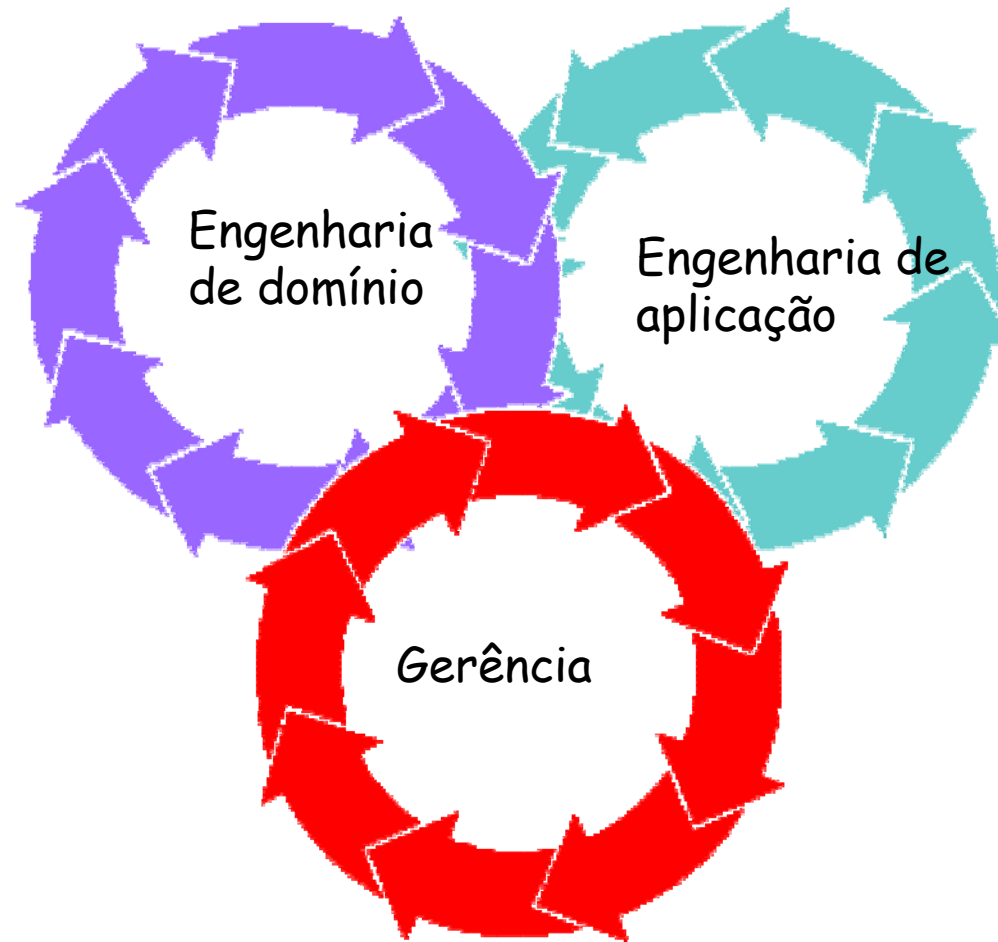
Atividades para criar uma linha de produtos



Fonte:SEI



Outros nomes para as atividades



Product line development approaches

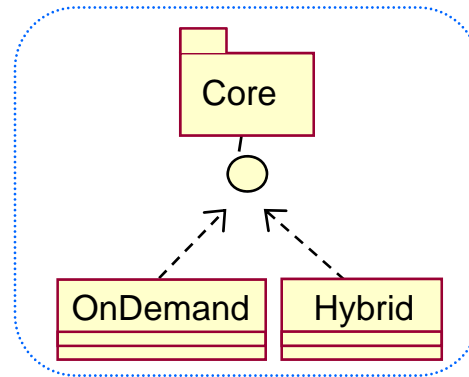
- Proativa (*Big bang*)
- Extrativa
- Reativa



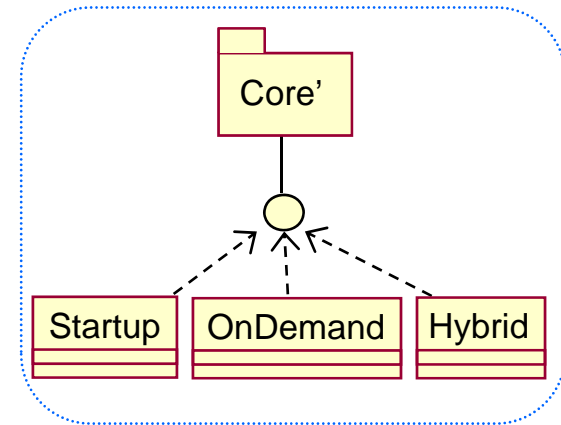
Extractive and reactive approaches



Extractive
→



Reactive
→



Yet another reuse approach?

- **Text reuse, not reuse!**
- **Class reuse**
 - Failure for business concepts: Client, Account, etc.
 - Even with repositories and search mechanisms
 - OK inside a single project or for infrastructure 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

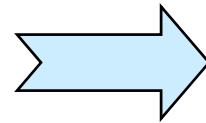


O projeto visa...

desenvolver uma linha de produtos a partir de um produto existente



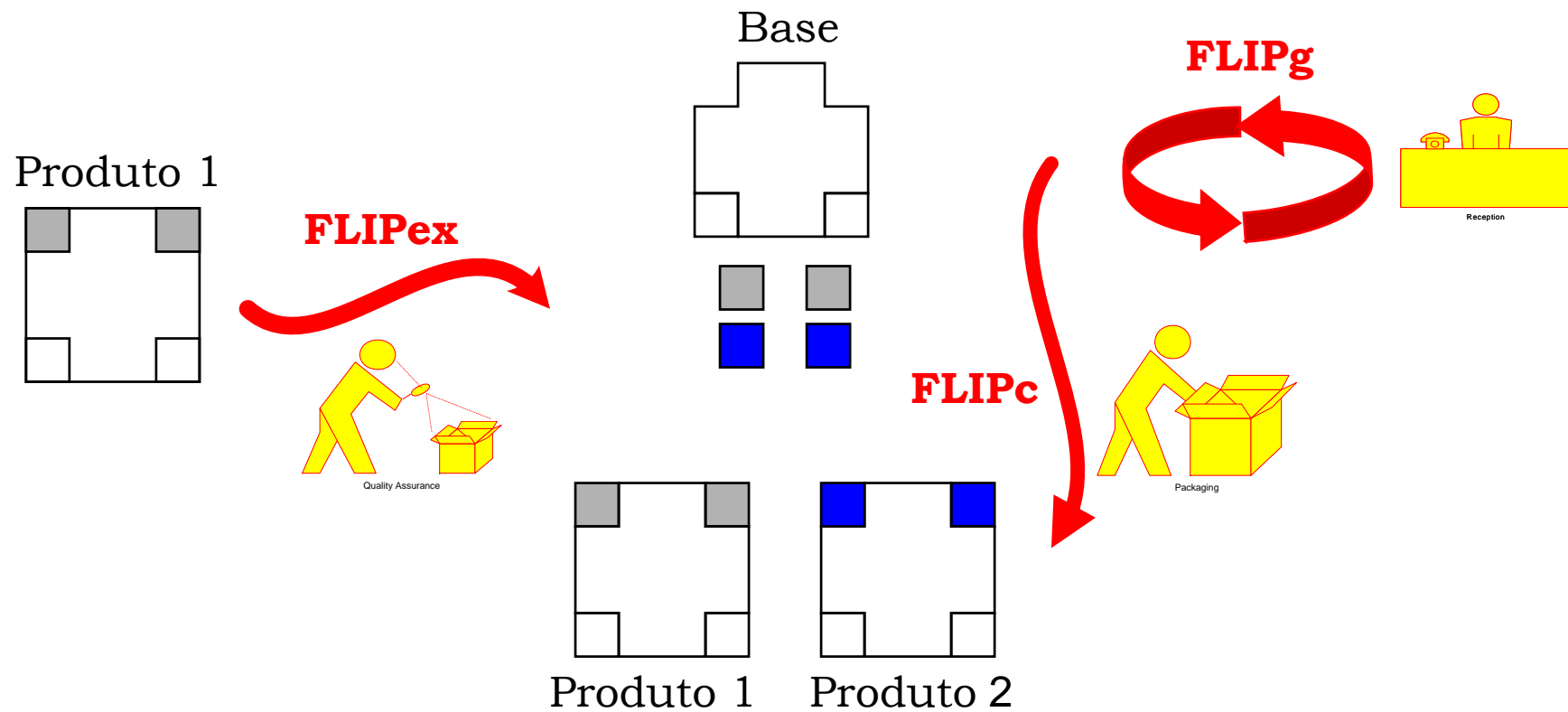
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Ferramentas do FLIP



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