Software Process Improvement in Europe: Potential of the new V-Model XT and Research Issues

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    - Broaden VM XT to some kind of "product lines"

    - Deepen VM XT according to enhanced method and tool support.

- Summary and Outlook.

Motivation

- Common goal of SE is the construction of most valuable high-quality Software products → Software processes provide the basic concept to reach this goal.

- A huge number of different common and organization specific software processes hinder efficient collaboration on European level.

- Differences in structure, project proceeding, application domain, etc.

We identify a need for

- collaboration support for Customers and Project Managers.

- systematic process mapping to support these collaboration approaches.

- a flexible approach applicable to common SW processes, also suitable for SMEs.

→ V-Modell XT is a promising opportunity to support a common European software process model used as "umbrella" for software processes.

The V-Modell XT Framework

- VM XT is a mandatory software process for public area software projects in Germany since February 2005.

Benefits of VM XT:

- Basic software process for projects without restrictions to specific a application domain.

- Process modules cover guidelines for hard/software products, logistics, security, etc.

- VM XT supports a preliminary call for tender (bidding scenarios).

- Support of customer / contractor cooperation (regarding "call for tender").

- VM XT provides three different process strategies:

    - System development from developer point of view (project core processes)

    - System development from customer point of view (integration of customer stakeholder)

    - Implementation and maintenance of the software process itself to achieve continuous software process / product improvement.
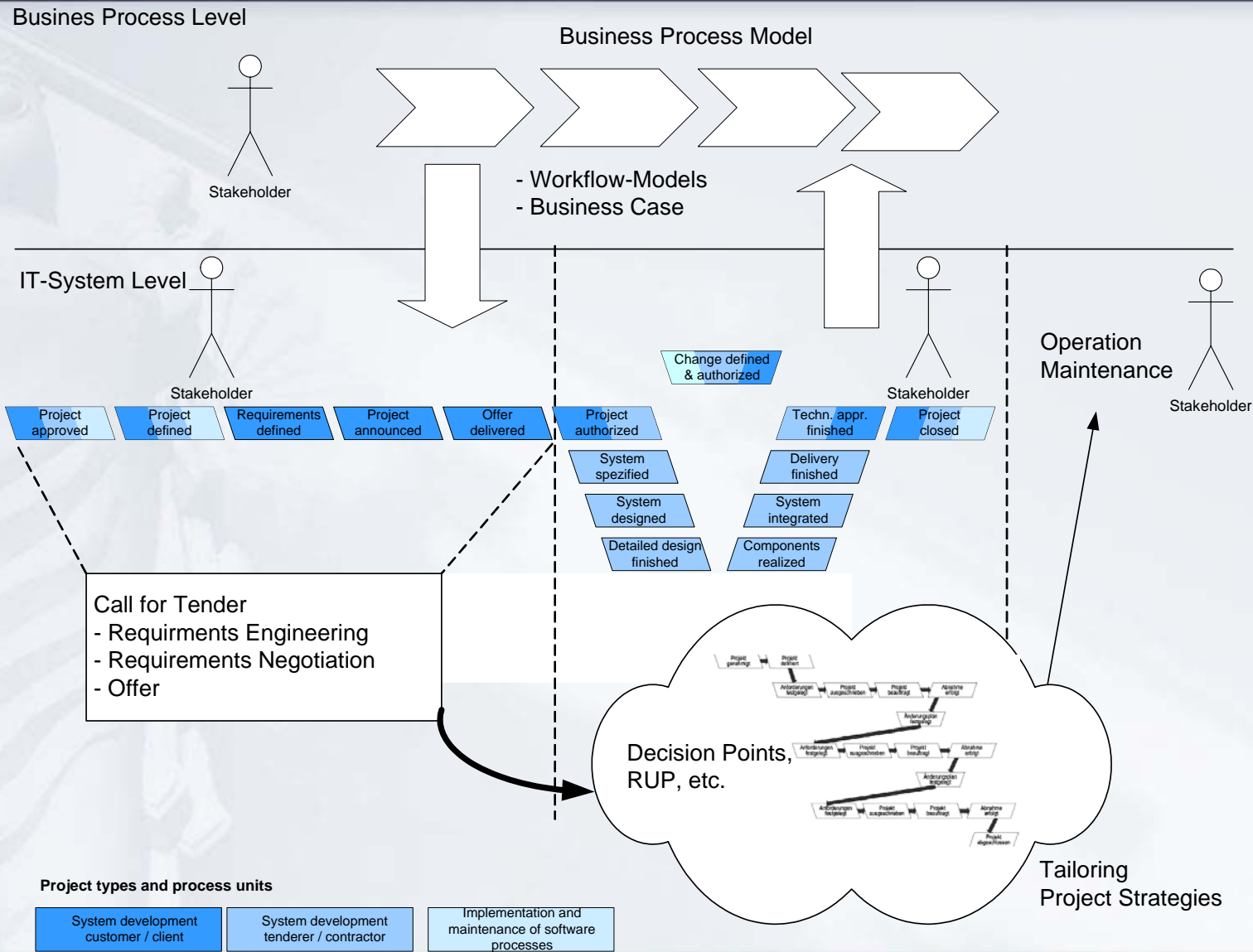
Components of VM XT

Components of VM XT

- Products, Activities, Roles, and Methods & Tools.

- Process Modules including *core components* and *optional elements* to meet the individual requirements of the application domain.

- Decision Points represent the state of treatment.

- Project Operation Strategy as a defined sequence of decision points for project course.

Application options of VM XT:

- Immediate support for project courses without modification of the basic concept.

- Application after tailoring to project criteria within the range of optional process modules.

- Extension and customizing of the basic model according to individual needs (using an XML based editors provided by VM XT developers).

VM XT in the context of Business Processes

Busines Process Level

Business Process Model

Stakeholder

- Workflow-Models
- Business Case

IT-System Level

Stakeholder

Change defined & authorized

Stakeholder

Operation Maintenance

Stakeholder

| Project approved | Project defined | Requirements defined | Project announced | Offer delivered | Project authorized | | Techn. appr. finished | Project closed |

System spezified

System designed

Detailed design finished

Delivery finished

System integrated

Components realized

Call for Tender
- Requirments Engineering
- Requirements Negotiation
- Offer

Decision Points, RUP, etc.

Tailoring Project Strategies

Project types and process units

| System development customer / client | System development tenderer / contractor | Implementation and maintenance of software processes |

Business Value Translation

- **Key elements of Value-based Software Engineering (VBSE):**

    - Identification of success-critical project stakeholders.

    - Eliciation and negotiation of main value propositions.

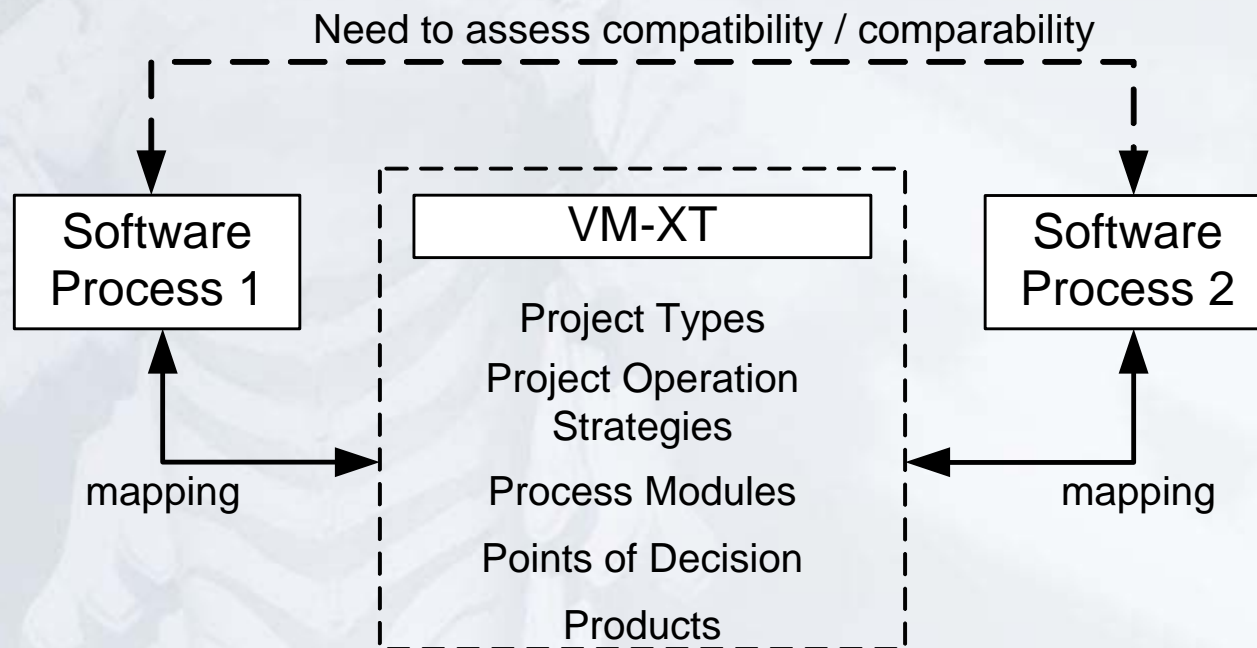   - Translation into IT requirements and engineering solutions.

- Usually, there must be a balance between product quality, functional range, development duration and development cost.

- Application of best practice approaches according to best possible cost/benefit rates (concerning project size, application domain, project complexity).

→ Enhancement of technical focus with better integration to business process level.

→ Contribution of VM XT as a start to better address VBSE considerations.

Software Process Mapping

- **Why Software Process Mapping?**

    - Several software processes to produce high-value software in diversified application domains across Europe → a wide range of different processes exist (common software processes, in-house solutions, etc).

    - Different software processes hinder efficient collaboration and common software process improvement.

    - Comparability to enable cooperation in multi-company software development.

→ Comparability on software product level to achieve better collaboration between different companies applying basic VM XT elements.

→ Contribution of VM XT as a flexible software process structure, adaptable to specific application domains (some kind of meta model).
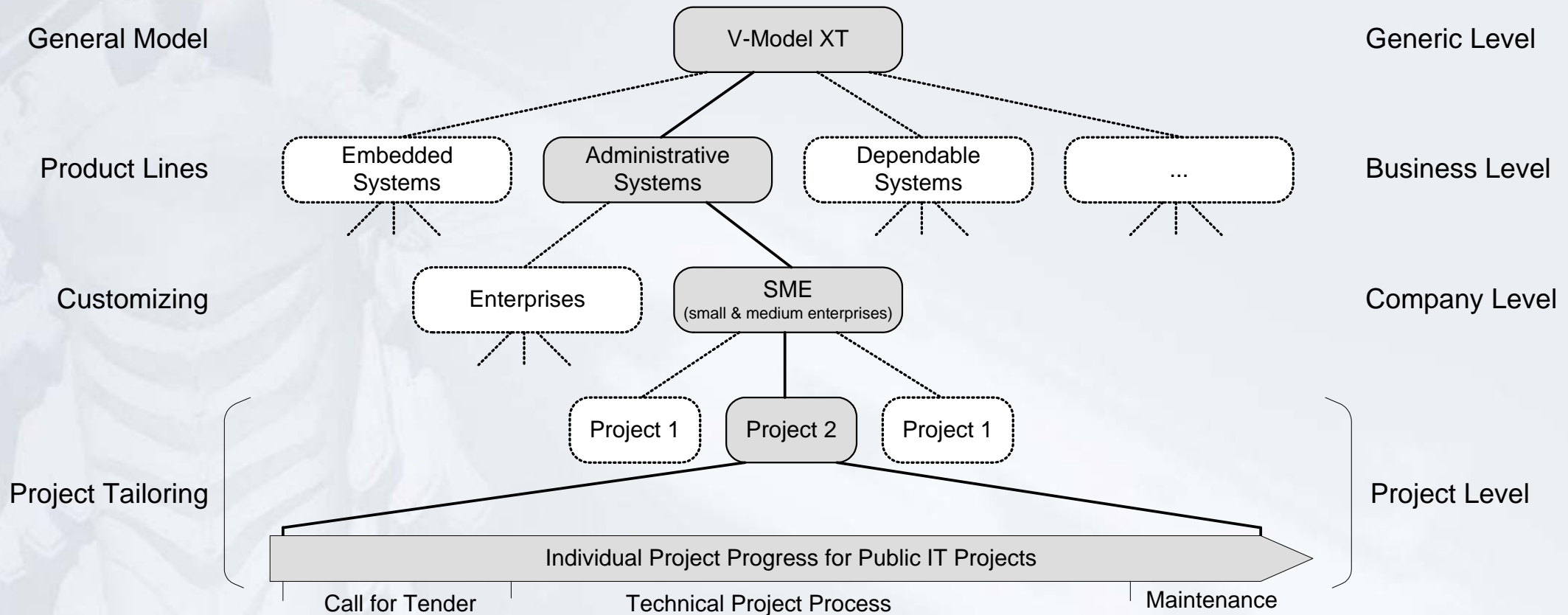
Basic Concept for Process Mapping

VM XT as a bridging intermediate model process following three basic steps.

Need to assess compatibility / comparability

Software Process 1	VM-XT	Software Process 2

VM-XT box contents:
- Project Types
- Project Operation Strategies
- Process Modules
- Points of Decision
- Products

mapping   mapping

1. *Structural analysis*: identification of basic components of SPx.

2. *Initial mapping*: comparison of SPx and VM XT basics - (a) similar elements, (b) different elements, and (c) "mixed elements".

3. *Refine mapping*: rework comparison of mixed elements to identify a degree of coverage.

Extensions of VM XT

- **VM XT is a generic software process model, independent of specific application domains.**

    - There is still a need for domain specific software processes, based on a common process model (to minimize customization and tailoring effort).

    - We purpose some kind of "product lines" as an extension of VM XT.

➔ Top-down approach based on VM XT basics. (a) generic level (VM XT), (b) product lines based on business areas, (c) Customized process model (on company level), and (d) tailored software approach (based on project requirements).

➔ Including a "light-weight software process" for SMEs.

➔ Contribution of VM XT as a flexible software process structure, adaptable to specific application domains including domain specific set of process modules, decision points, etc.

Extensions of VM-XT to Process "Product Lines"

General Model	V-Model XT	Generic Level

| Product Lines | Embedded Systems | Administrative Systems | Dependable Systems | ... | Business Level |

| Customizing | Enterprises | SME (small & medium enterprises) | Company Level |

| Project Tailoring | Project 1 | Project 2 | Project 1 | | Project Level |

Individual Project Progress for Public IT Projects

Call for Tender   Technical Project Process   Maintenance

Summary & Further Work

- The software process VM XT is a promising approach for an European software process due to its flexibility and modularity.

- VM XT allows customizing (according to individual needs of organizations and application domains) and tailoring on project level.

- Therefore the model supports

  → Business value translation into IT solution to maximize benefits for all stakeholders.

  → Process mapping to enable comparability of different software processes to enable collaboration and communication between several organizations.

  → Product line generation to enable domain specific software processes based on a common basic model.

  → Extension approaches for enhanced method and tools support

Thank you for your attention!

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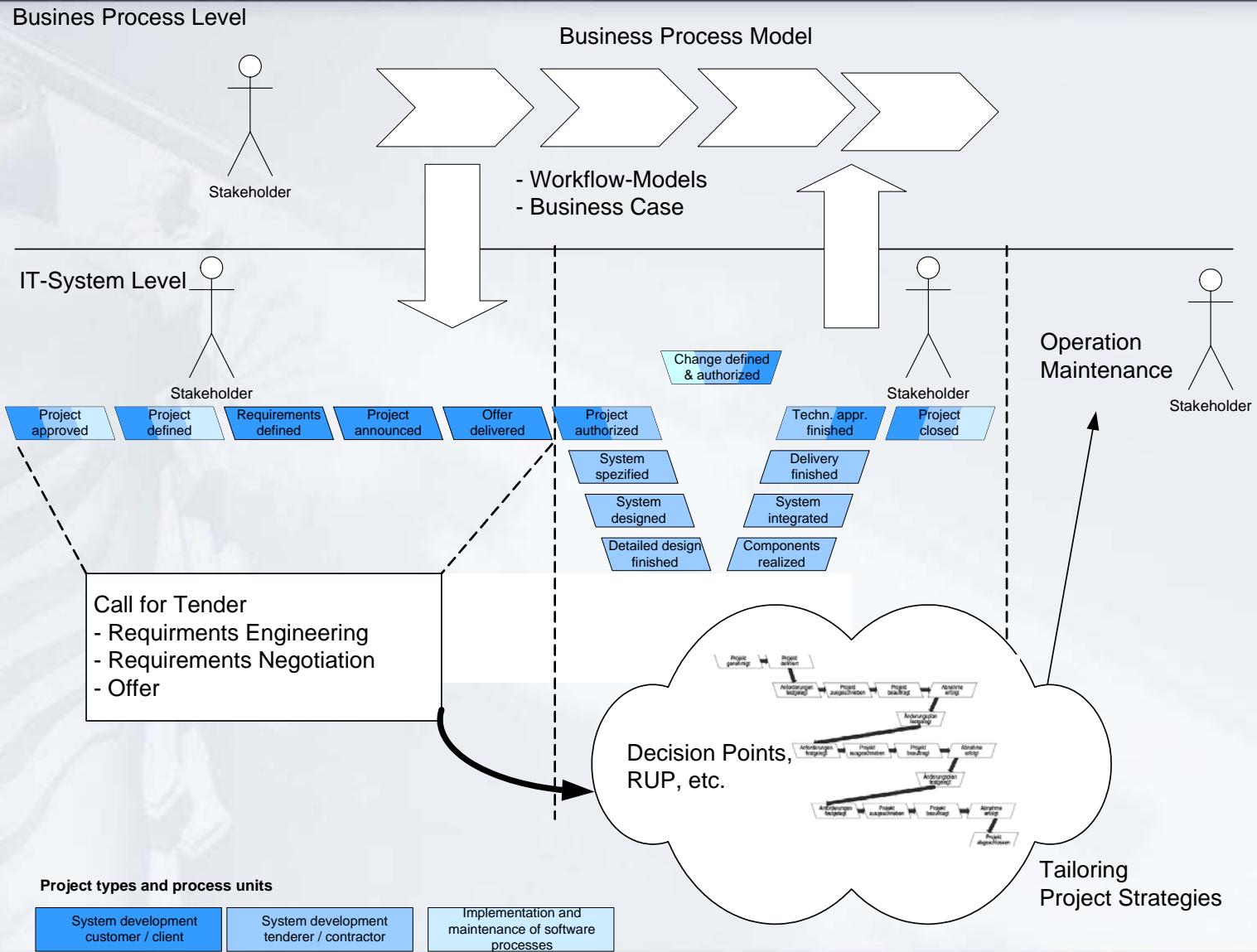
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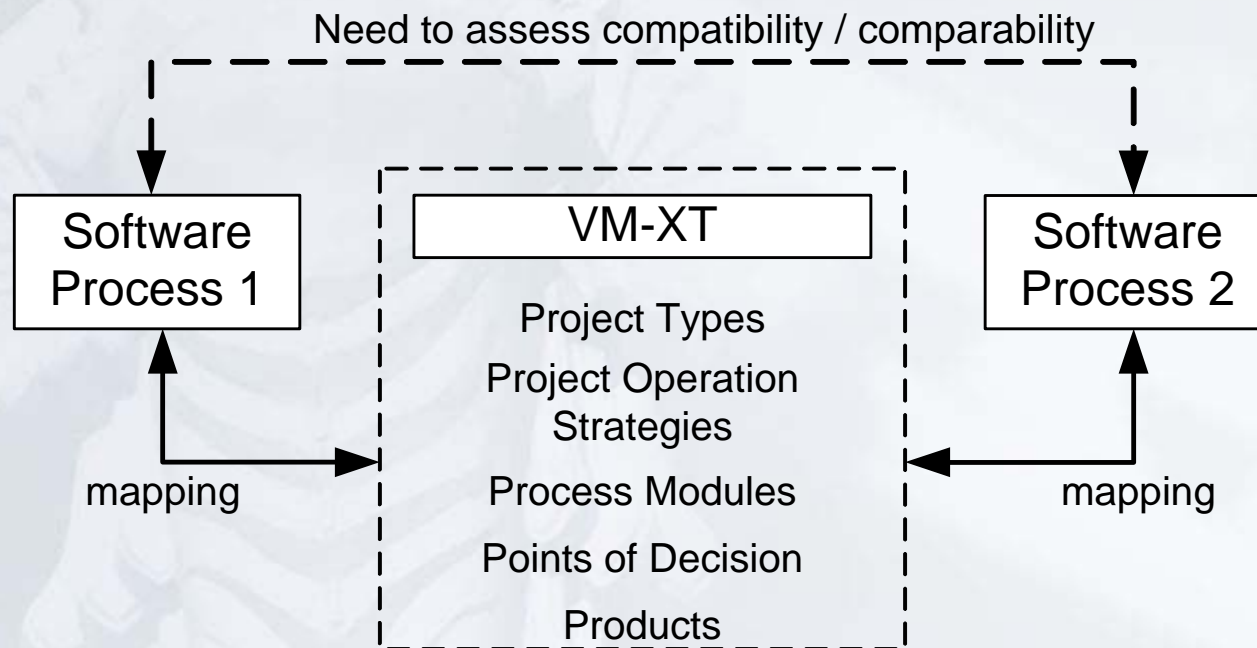   - Translation into IT requirements and engineering solutions.

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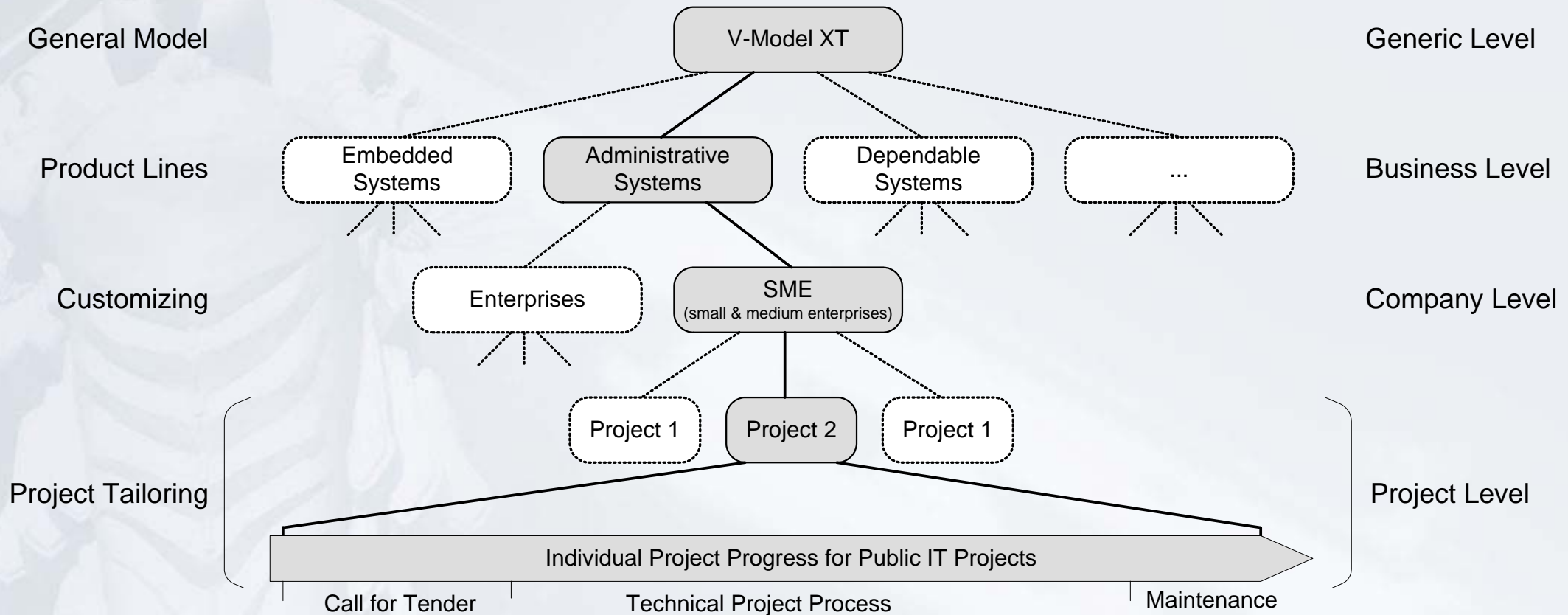
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