

## Help

Transition Strategy	Description
<b>Incremental Introduction</b>	It starts small and expands incrementally. It does not only mean that product line concepts are introduced incrementally, but also that the development of product line artifacts is not done up-front, instead it is performed as part of product development activities.
<b>Big Bang</b>	In this strategy, first the domain engineering is performed completely and the common platform is built. When the platform assets are ready, application engineering starts and the applications are derived from the platform.
<b>Tactical Approach</b>	This approach is generally driven by problems, for example, change management and configuration management for multiple products. The tactical transition can start informally, however, the product management sub process and the planning for future development have to be performed after a short initial phase, so that, the results can be made measurable and predictable.
<b>Pilot Project</b>	It involves the development of a new product in one of several alternative ways: (i) It is started as a potential first member of a SPL; (ii) It is an extension of a series of related products. Often the goal is that the related products are going to be incorporated into the SPL; (iii) It is performed as a toy product. A toy-product project can be started when the risk or cost of creating a new product completely with a new approach is too high; and (iv) It is performed by prototyping. The engineering rules for prototyping are often less strict than for standard products.

Organizational Structure	Description
<b>Development Department</b>	In this scenario, there is only a single organization unit dealing with the complete SPL (i.e., both the reusable product line assets and the concrete systems built based on these assets are developed and maintained by a single organizational unit).
<b>Distributed Domain Engineering</b>	Also known as “business units” structure it is organized around business units, where each of them is responsible for one or a subset of the products in the product line. Reusable assets are shared among business units and the evolution of existing assets or development of new assets is performed by the unit that has the most pressing need to incorporate it in its products
<b>Centralized Domain Engineering</b>	Also known as “domain engineering unit”, this organizational model is concerned with separating the development and evolution of shared assets from the development of concrete systems.

<b>Several Domain Engineering Units</b>	Also known as “hierarchical domain engineering units”. When organizations with centralized domain engineering reaches the maximum staff member size, an additional level has been introduced in the SPL. If the new level contains one or more specialize product lines that are managed using the distributed domain engineering model or can require a centralized domain engineering.
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<b>Barrier</b>	<b>Description</b>
<b>Initial associated cost</b>	The development of the product line infrastructure - including new practices, processes, and tool support - requires investment.
<b>Time to devote to product line activities</b>	It is greater than the time required in traditional software development, since the technical and management artifacts in the asset base must capitalize on the commonality among products and, at the same time, support the variability among those same products, which adds greater care and precision in the development of tasks
<b>Lack of a product line vision</b>	Software product line engineering requires long-term planning
<b>Lack of maturity in an organization</b>	Some authors consider that an organization need a certain level of maturity before they should consider a SPL approach.
<b>Lack of documentation</b>	The documentation has an important role in all software projects, especially in SPL context, since it should support the commonality and manage variability among products.
<b>Absence of an explicitly defined development process</b>	If the business unit has already embraced standardized engineering procedures for developing its products, the rigor required to smoothly adopt a product line approach will be less than in an organization with chaotic procedures.
<b>Lack of necessary knowledge and possible talent</b>	Some authors highlight that to adopt SPL the technical staff needs to have traditional software engineering skills, but that it is not enough.
<b>Inadequate Organizational Structure:</b>	A product line approach entails new roles and responsibilities to be assigned to work units and people who have the talent and skills to do the job.
<b>The necessity of change:</b>	The SPL adoption involves changes of different magnitudes, not only in a way in which the organization develops software, but also in different business activities areas.
<b>Lack of a product line champion and/or angel</b>	Champions are staff members who are convinced of a new idea (e.g., product line engineering) and also try to convince and support other staff members in applying the approach. Angels are members of management or senior engineers who have influence due to their role in the hierarchy or due to their experience and expertise
<b>Lack of motivation in SPL adoption</b>	If the SPL approach is not critical to its success or was chosen arbitrarily the chance to succeed will be low.
<b>Overhead associated with starting the SPL</b>	It is a common challenge that organizations face when considering an adoption strategy, since resources need to be shifted from existing projects, and rarely they have resources to spare.

<b>Unpredictability due to the global financial crisis:</b>	In times of crisis, organizations can not afford the up-front investment of SPL and also, they can not predict the next products that should be developed.
<b>Hardware / Software integration issues in SPL</b>	The integration between hardware and software is a barrier, since most of the companies do not know how to integrate hardware components into a SPL and therefore, they develop system-specific products instead of product lines.
<b>Lack of a SPL Adoption Plan</b>	The adoption plan is the base for successful adoption of product line culture.
<b>Focusing on in technology only</b>	Software professionals who develop software intensive systems, such as simulators and embedded systems focus only on the technology, they have limited knowledge about software reusability and SPL.
<b>Abstract statements in case studie</b>	Most of the cases studies in this area are poorly reported, they did not provide enough information to support the practitioners in the adoption process.
<b>Lack of Tool Support</b>	The two reasons in which the lack of tools support obstructs the SPL adoption are: (i) the companies really wanted tools; (ii) the amount of information and the relationships and dependencies among artifacts require a tool in order to support the management of this information.
<b>Lack of SPL experts and high cost of trainings</b>	There are few SPL experts in the global area and the costs of tranings are very high.
<b>Lack of Management Maturity</b>	In SPL the complexity of managing projects grows exponentially with the projetcs' size. The introduction of a SPL approach requires, independent of the organizational model, a relatively high level of maturity with respect to project management.
<b>Convince the different organization decision levels</b>	An important point to the introduction of the product line culture lies the challenge of convincing the different organization-decision levels about the appropriateness of investing in this technology.
<b>Terminology differences</b>	The use of different terms in Europe and USA makes the evaluation of published resources a difficult task.
<b>Lack of practical resources</b>	There is a absence of studies that explain the SPL process or UML-based reuse extensions in a practical way.

Based on: J. F. Bastos, P. A. da M. Silveira N., E. S. de Almeida, and S. R. de L. Meira, "Adopting software product lines: A systematic mapping study," in Evaluation and Assessment in Software Engineering - EASE, Durham, UK, 2011.