

SOFTWARE PRODUCT LINE ANALYSIS OF ENTERPRISE INFORMATION SYSTEM

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Abstract: Now a day geographical and physical constraint that allowed only for fixed and static placements of resources has vanished completely within an enterprise utilizing the concept of information technology to integrate their business needs. The object oriented programming approach has paved a way to reusability of components thus reducing cost and development efforts up to certain extend. Software product line has further strengthened the concept of reusability, and component-based architecture. In this paper we have analysed the concept of Software Product Line Analysis for an Enterprise Information System which will help to construct a Software Product Line within the organization to produce high quality software product in order to full fill the information technology requirements of the organization.

1 INTRODUCTION

1.1 Enterprise Information System

Enterprise Information System (EIS) can be defined as an application, or group of applications integrated together to provide information infrastructure for an enterprise. Every enterprise has certain business processes and underlying data in order to efficiently run its business. The Enterprise Information System implements these business processes over the core umbrella of underlying data to fulfill the information technology requirements of the enterprise.

1.2 Software Product Line

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, 2003).

1.3 Software Product Line Analysis

Software Product Line Analysis (Chastek et al., 2000) is requirements engineering for a product line, it is the link between the recognition of a business opportunity and the design of product line architecture. Product line analysis is part of Core Asset Development. The essential activities performed during the course of software product line analysis can be described as following,

- Scope of Software Product Line Analysis.
- Organizational Structure Analysis.
- Stakeholder Identification & Impact.
- Business Process Identification & Description.
- Requirement Analysis.
- Requirement Modelling.
- Technological Analysis.
- Constraints Analysis.

Figure 1.1 illustrates the relationship of those activities among each other. Client application uses services, business objects and functions to process data for information retrieval.

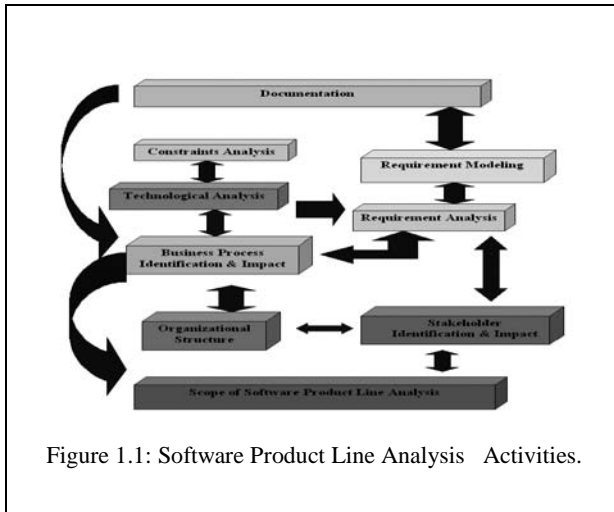


Figure 1.1: Software Product Line Analysis Activities.

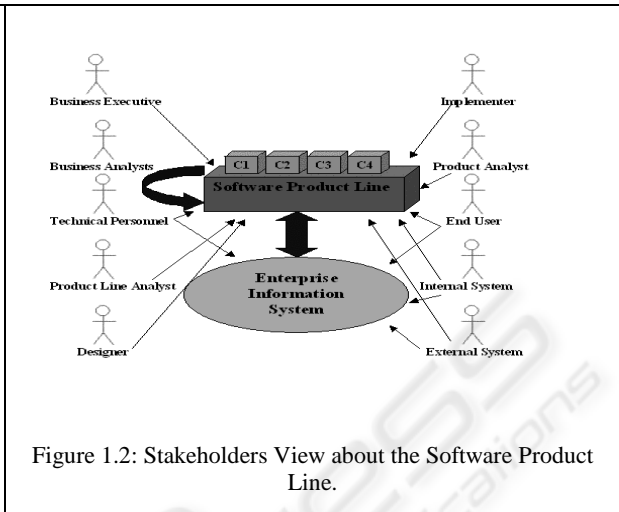


Figure 1.2: Stakeholders View about the Software Product Line.

2 SOFTWARE PRODUCT LINE ANALYSIS FOR EIS

2.1 Scope of Software Product Line Analysis

The product line scope is a description of the products that will constitute the product line or what the product line is capable of including (A Framework for Software Product Line Practice, 2003). The scope defines the overall goal to be achieved by incorporating and development of software product line within an enterprise. The scope elaborates objectives, context, boundaries and utilization of software product line. An enterprise always looks software product line as an integral tool to help in achieving the information technology requirements of the organization in a better cost effective and efficient manner

2.2 Organizational Structure Analysis

The organizational structure enables us to determine the nature and functional hierarchy of the organization, which helps in making a decision topology tree. Typical structure within an enterprise includes various departments like, Information Technology, Procurement, Payroll, Marketing, Inventory, Management, Human Resource, Business Development and Training. Organizational structure definition and elaboration during the product line analysis yields us sources for requirement gathering

and analysis, it gives us a view of the business process and their description within the enterprise.

2.3 Stakeholder Identification & Impact

A stakeholder in an organization is (by definition) any group or individual who can affect or is affected by the achievement of the organization's objectives (Freeman, 1984). It can be customer, project manager, executive, engineer, personnel, technician, and database administrator. During the software product line analysis we determine the potential stakeholders, which are affected by the development of the software product line. Enterprise information system may have stakeholders like, business executives, business analysts, technical personnel, product line analysts, designers, implementers, product analysts, end users, internal and external systems, government departments etc. Figure 1.2 shows the stakeholders view about the software product line.

2.4 Business Process Identification & Description

The business processes describe the functional capability and structure of the enterprise. The goal of the business process is offer the products and the services which customers will need, with the most appropriate speed, quality and cost (Kobayashi, 1997). The business view itself describes and

interrelate various operational activities require to be performed to meet the enterprise objectives within business domains. The integral components used to identify and describe a business process within an enterprise are people who performed the activities, strategy used to define the directions of the action, functions illustrates the process and task that an enterprise must perform, infrastructure gives us the resources like equipments, machinery the enterprise hold to perform activities, information is the knowledge and data enterprise already have to be followed, organizational structure describe responsibilities with respect to business process.

2.5 Requirement Analysis

The requirement analysis is the process of gathering, refining and interpretation of the requirements for the system under consideration of construction. Requirement analysis for the software product line to be developed for an enterprise information system yields the following major facts,

Identify the basic needs of software product line for enterprise.

Identify the utilization of software product line for the future software products.

Identify the structure of the software product line for enterprise.

Identify the integration of components with in an enterprise information system.

Elaborates the information technology infrastructure of the enterprise.

Describe the information technology needs of the potential users of the enterprise.

Evaluate the cost and schedule effectiveness of the software product line.

Identify the business process to be implemented.

2.6 Requirement Modelling

Requirement modelling provides us facility to model the requirement graphically so that requirements must become more elaborative and can be easily understand by various stakeholders. The product line requirements model is a set of four interrelated work products (Product Line Analysis, 2003), which are Use Case Model, Feature Model, Object Model and Dictionary. Figure 1.3 illustrates the top-level model of the enterprise information system, how it is

decomposed in to various sub systems and how the enterprise information system serves as a bridge between various sub applications. Figure 1.4 illustrates the functional behaviour of the software product line with respect to various stakeholders. It shows that stakeholders are generally divided into two categories. The one category of stakeholders are those that take part directly or indirectly in the development of software product line and other group take advantage of products developed.

2.7 Technological Analysis

Enterprise information systems are built on the basis of various technologies and processing topologies. It can be from client server to multi-tier distributed processing system using J2EE, Enterprise Java Beans, and CORBA. The technological layer in the enterprise information system always serve as the physical platform on which the entire system is working, therefore it is necessary to perform analysis with respect to choice of technology, compatibility among different technologies, existing configuration, proposed and future technology resources and processing requirements.

2.8 Constraints Analysis

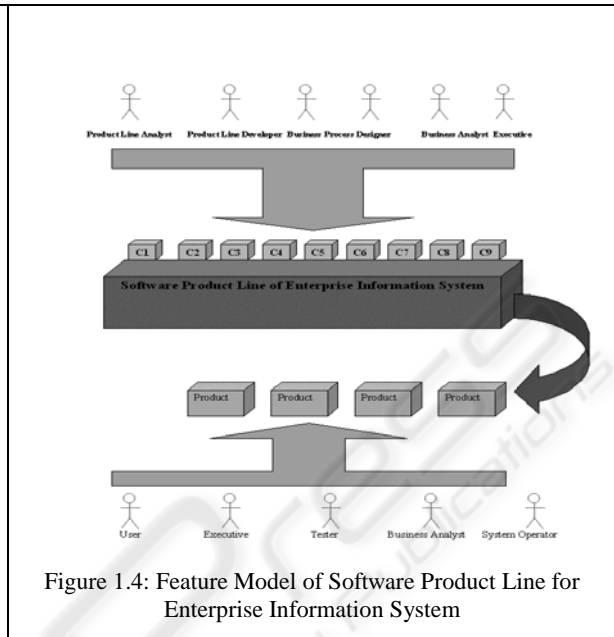
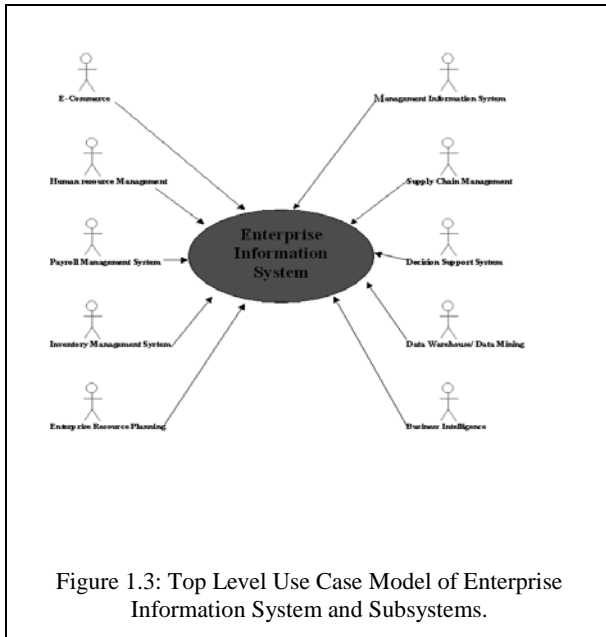
Constraints are those predefined conditions under which system has to develop and will operate. Constraint analysis therefore provides a formal basis for insuring the views and operations on views are correctly specified (Urban, 1989). Constraints analysis will help to find out external and internal predefined conditions and requirements to be fulfilled by the enterprise information system for smooth functioning, they can be operating system, hardware constraints, network constraints, inter process communication, scalability, integration of components, business rule and security.

3 FINAL REMARKS

Software Product Line has emerged as integral and vital concept for the reusability of existing resources in the process of software development. Enterprises can incorporate this concept to reduce the cost, resources and schedule in order to meet the information technology requirements. This can put him ahead of their competitors and will enable them to provide better and new services to its end user. Software product line analysis is an essential activity while developing software product line for an

organization, it helps out to find out requirements, present resources, business process and

implementation constraints, implication and advantages of implementation.



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