

Assessing Business and Technical Considerations for Product Line Development

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Introduction

- Business and technical considerations offer incentives for product line development
- Business and technical considerations also pose challenges to product line development
- Perspectives and priorities of “stakeholders” concerning product line development should depend on the type of stakeholder
 - Buyer (makes the decision to acquire the software)
 - Developer (builds something with the software)
- Stakeholder perspectives and priorities on reusable (product line) software are worthy of assessment
 - To better understand incentives and barriers to software reuse
 - To identify possible domain areas for product line development and application

Introduction (continued)

- For a product line to be successful, the following issues must be taken into consideration
 - Business case for justifying the product line
 - Definition of the domain
 - Technical challenges
 - Organizational issues
 - Stakeholder perspectives, conflicts and constraints
 - Strategy for implementing the product line

Assessment Objectives and Approach

- Conduct “fact finding” survey among buyer and developer stakeholders
- Gather additional insight into technical, business and organizational considerations for product line development and application
- Survey incentives and challenges concerning product line development
- Better understand perspectives, conflicts, constraints and possibilities for cooperation among different types of stakeholders
- Implement survey “on line” using web-based technology
- Make survey available on line at GSAW99 for review and completion by interested participants

Progress to Date

- Participation in Control Channel Toolkit (CCT) product line development effort
- Review of product line development literature
- Identification of initial set of business, technical and organizational considerations relating to product line development
- Identification of issue categories (“talking points”) for a user survey
- Development of initial set of survey items based on “talking points”
- Coordination with Richard S. Marken on his “Reusable Software” survey objectives presented at GSAW99
- With Marken, consolidation of respective survey objectives and placement of survey items (questions) into a single survey
- Placement of consolidated survey on web server to make survey available at GSAW99

Integration with Marken's Survey Objectives

- This presentation and its survey objectives are linked to the “Reusable Software” survey objectives of Richard S. Marken at GSAW99
 - “What Reusers Want to Know About Reusable Software”
 - Aspects of reusable software that contribute to its acceptance and success
- Marken and Vanderwarker objectives are consolidated into a single survey
 - Oriented toward development of satellite ground system software
 - More efficient survey development, information collection, and data analysis
- Survey is available on line at GSAW99 for review and completion by interested participants

Assumptions and Challenges

- Bounding the scope of survey effort to a “reasonable” level of effort
 - Determining most important survey objectives
 - Determining most important and useful survey items (questions)
- Tailoring survey for buyer versus developer stakeholders
 - Tailoring has been incorporated into survey
- Consolidation with Marken’s survey objectives
- Meaningful interpretation of survey results
 - Extracting meaningful and useful conclusions
- Communication and application of survey results

Survey Topics (“Talking Points”)

- Buyer and developer incentives for product line development as a function of project development phase
- Barriers and challenges associated with choosing a product line development approach
- Stakeholder (buyer and developer) perspectives with respect to product line development
- Business, organizational and technical influences, and how these pose challenges to successful product line development
- Degree of support for product line development in the Satellite Ground Control community
- Relative importance of component maturity and component testing
- Relative importance of DoD and commercial standards

Sample Survey Items & Questions

- Buyers and Developers are asked to rate the following variables in terms of their importance to product line development
 - Demonstrated cost savings from using software components in previous, similar applications
 - Demonstrated development time savings from using software components in previous, similar applications
 - History of successful use of software components in similar projects
 - Developer's preference to "build from scratch"
 - Degree to which development conforms to a reference architecture
 - Development phase in which the software components are used (e.g., definition, design/development, production, O&M)
 - How thoroughly components have been tested

Sample Survey Items & Questions (con't)

- Buyers and Developers are asked to rate the following variables in terms of their importance to product line development
 - Satellite ground control domain (planning, scheduling, commanding) covered by the reusable components
 - Maturity of contractor's software development process
 - Project complexity
 - Compliance with DoD and commercial standards
 - Component maturity
 - Interface management strategy
 - Stability of the requirements
 - Level of support from software component developer
 - Level of customer support (e.g., training, help)

Implementation and Availability of Survey

- Survey has been implemented “on line” using a web server
 - Incorporates both Marken and Vanderwarker survey objectives
 - Hardcopy versions of survey also available
- Currently available for review and completion by interested participants at GSAW99
- Responses to survey items will be entered and collected on line
- Web location/address will be specified

Plans for Data Analysis

- Data acquisition and analysis tools are being placed on the web server
- Analysis of survey responses will be performed using these web-based data acquisition and analysis tools
- Additional tools and techniques will be utilized as required
- Consolidation of Marken and Vanderwarker objectives into a single survey should simplify information collection and data analysis

Summary

- Business and technical considerations offer both incentives and challenges for product line development
- Perspectives and priorities of stakeholders concerning product line development should depend on the type of stakeholder
- Stakeholder perspectives and priorities on reusable (product line) software are worthy of assessment
 - To better understand incentives and barriers to software reuse
 - To identify possible domain areas for product line development and application
 - To gather additional insight into technical, business and organizational considerations for product line development
- Survey responses are expected to yield additional insights into these business and technical considerations