Assessing Business and Technical Considerations for Product Line Development

Daniel R. Vanderwarker
Software Engineering Department
The Aerospace Corporation
Chantilly, VA 20151

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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