Ground System Product Lines: Issues and Solutions

GSAW2001
Breakout Session 4
Summary

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Breakout Group Approach

• Formal and informal presentations on product line experiences and issues

• Identification of key issues encountered implementing product lines for ground systems
  – Beginning with those identified at the Software Product Line Conference (SPLC1) workshop on Product Lines for C2 Ground Systems
  – Come to consensus on critical open issues
  – Group discussions about the issues
    • Are product lines being used effectively in satellite ground programs?
    • How are the major issues being addressed?

• Identify effective approaches and solutions
Participants

• Excellent, substantive contributions by all of the 32 participants, including presenters:
  – Mark Walker, The Aerospace Corp.,
    Breakout Session Co-Chair
  – Bruce Bohannan, Raytheon
  – Paul Davis, TRW
  – Linda Martz, Raytheon
  – Neno Medvidovic, USC-CSE
  – Don Reifer, RCI
  – Dan Vanderwarker, The Aerospace Corp.
Issues Discussed - Approaches and Solutions Identified
Evolution strategy for product line architectures

• Need a vision - long-term and short-term - for where the product line wants to go
  – Every year the market changes, and the product must change too

• Always have a rolling 3 to 5 year vision – this is the detailed vision that has to fit into a long range plan
  – This is being done by contractors today

• Need a roadmap for evolving from legacy to future architecture

• Need a marketing strategy for this to fit into

  How well does government policy allow these (when the government is the customer)?
What is the product line?

• What is the scope of the product you are selling – a component or a system?

• Companies are trying to apply a product line architecture across multiple domains
  – Issue of trying to scope domains – don’t bite off more than you can chew

• Different parts of the acquisition process have different views of the product line
  – Customer, developer, and vendor objectives differ
Product line ownership

- Who owns a product line architecture - the customer or the developer?
  - The answer may depend on the contract
- There are successful models where the customer owns the architecture
- There are successful models where the contractor owns the architecture
Business models, acquisition strategies to support product lines

• When there are too few customers, a product line is not a good idea
  – e.g., one (or few)-of-a-kind ground systems

• When you’re selling multiple instances of a similar product, a product line may be effective
  – Business case favors contractors that win multiple contracts for similar systems at the same time

• Some (government) customers don’t want to buy products – they want to own the software
Business considerations in developing a product line

• Is the goal the product line or the product?
• What information and how much information is needed to justify developing a product line?
  – Need standard templates for business cases for satellite ground system product lines
  – Reuse business models were developed (1995) -- are they applicable to product lines?
Acquisition issues

• Product lines are being demanded/required when the business case doesn’t support them
• The government forces contractors to reuse in order to be competitive
  – Product line architecture is a method to reuse
• Acquirer wants developers to use architectures/components/systems they've already paid for
• Prime contractors are not COTS vendors in the eyes of the government
  – Data rights -- contractors are competitively inhibited from demanding data rights, yet they lose their investment if they don’t get them
Organizational changes to support a product line

• Within an organization some one (person/organization) needs to control the architecture
  – Chief engineer / chief architect
  – Architecture review boards
• How are components owned and maintained within the organization?
• How do you get developers to reuse existing assets and work within a product line
• Training
Technical Needs

• Tools and processes to support product line development, instantiation, and evolution
  – Processes for technology insertion/refresh
    • Be able to throw out a whole component, and replace it
  – CM approaches and tools
• For the most part, these exist or are being worked
Conclusions

• Product lines are being implemented in the ground system domain

• There are still technical issues, but they are being addressed
  – By contrast, at GSAW2000 most PL issues identified were technical

• It is important to develop a business model with:
  – Agreement by all parties
  – Sufficient funding
  – Ready market

• The really difficult issues are cultural, political, organizational
For next year

• Many of these difficult issues have been solved by specific organizations in specific contexts
• Participants want to come to GSAW2002 and exchange solutions
• Group requested:
  – Case studies, successful and not, so attendees will have solutions to take away with them
  – Technical issues and solutions in the ground system architecture domain
  – Lessons learned