Product Lines for Satellite Ground Systems

Issues Identified at the Product Lines for Command and Control Ground Systems Workshop at SPLC1

Presented by

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Outline

• Background
• Results
• Issues
• Next Steps
Background

• The Software Engineering Institute held the First Software Product Lines Conference (SPLC1) August 28-31, 2000, Denver, CO
• Full day workshop focused on product lines for command and control ground systems
• Goals were to:
  – Identify issues that are:
    • C2 ground system (domain) specific vs. common across multiple domains
    • product line specific vs. common to all products
  – Identify recommended actions:
    • for the PL community
    • for the command-and-control ground system communities
    • for academic and industrial researchers
Participants (1)

Organizers
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The Aerospace Corp.
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Outbriefer
Mike Hogan
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Presenters
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Raytheon

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Boeing

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Results of the Workshop

• We identified high importance issues in two categories
  – technical
  – other

• Most of the issues we identified arise in many domains
  – But we identified the need for C2 specific solutions
### SGS PL Issues - Other

<table>
<thead>
<tr>
<th>Problem</th>
<th>SGS Specific?</th>
<th>PL Specific</th>
</tr>
</thead>
<tbody>
<tr>
<td>1) How do you manage change of an organization to effectively use product lines?</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>• rewards</td>
<td></td>
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<td>• training</td>
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<td>• infrastructure</td>
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<td>• technology base</td>
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| 2) How do you make a business case for a product line?  
  - cost savings  
  - shorter schedule  
  - lower risk | N | Y |
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<td>3) How is a partnership reached to make PL successful for both customer/acquirer and developer/contractor?</td>
<td>Question is not, but a domain-specific solution is needed</td>
<td>Y</td>
</tr>
<tr>
<td>– should the Government incentivize product lines?</td>
<td></td>
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<td>– should the market forces determine if product lines are appropriate?</td>
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## SGS PL Issues - Technical

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</table>
| 4) Is it possible (and if so, when is it appropriate) to define a reference architecture?  
  – Industry-wide?  
  – For the Command & Control domain? | Question is not, but a domain-specific solution is needed | Y            |
| 5) How do we evolve existing architectures into a product line architecture? | N             | Y           |
### SGS PL Issues - Technical

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<td>6) We need to identify and apply tools &amp; methodologies to adequately define architectural components and interactions – including common semantic properties – that will allow definition of standard interfaces – with reference implementations – of fine granularity – specific to C2 product lines</td>
<td>Question is probably not, but a domain specific solution is needed</td>
<td>Y</td>
</tr>
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</table>
Next steps

• Work to find solutions to these issues
  – Can these be solved? How?

• Are community efforts solving the problems?
  – Space Object Technology Group
  – Other?

• Are product lines really being used in satellite ground programs?
  – Are they working?