Architecture-Centric Evolution (ACE) Working Group 2008

Session 10C
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Session Goals

- Sixth of a GSAW series
  - Promote the central role of software architectures during the acquisition & development of software-intensive systems

- Forum for software-intensive system experts, users, developers & researchers
  - Collaborate and elucidate high-level recommendations for improving software architectures representation, development, & analysis

- Presentations & panel discussion
  - Software architecture techniques, tools, and practices for more responsive ground systems that better adapt to new capabilities and missions

Presenters/Panelists

- **Development Perspective**
  - Jeff Garland, Crystal Clear Software, Inc.
  - George K Auyeung, Lockheed Martin, IS&GS
  - Jeff Estefan, Jet Propulsion Laboratory

- **Research and Tools Perspective**
  - Dr. Peter Capell, Software Engineering Institute
  - Dr. Hadar Ziv, University of California Irvine
  - Paula Obeid, EmbeddedPlus

- **Acquisition and Oversight Perspective**
  - Bill Macaulay, The Aerospace Corporation
  - Dr. Peter Hantos, The Aerospace Corporation
Key Points

• Best of times and worst of times for software architecture
  • Major improvements in documentation, evaluation, and tools
  • Gap between requirements and architecture persists

• Identified successful architecture techniques
  • Formal process for architecture quality evaluation
  • Dynamic modeling/simulation to verify architecture
    • High level components
    • However, it is difficult to identify and define the key scenarios
  • Formal analysis of failure modes/response
  • Early day-in-the-life scenario development
Key Points

- Panel challenged to define architecture process and artifacts for software system
  - Key attributes: extensible, adaptable, and maintainable
  - Defined necessary analysis and documentation
  - Program realities (schedule, costs, immediate needs) resulted in tradeoffs
  - “Nice to haves” won’t occur without explicit requirements
- Importance of architecture governance
  - Principles, architecture board, compliance
- Software needs to be delivered as a complete package
  - Code, architecture, tests, environment…
Conclusions

- Programs would benefit from early and continuing discussion of architectural quality tradeoffs vs. programmatic constraints (cost, risk, schedule)

- For each program, stakeholders need to agree on:
  - Important architectural qualities (e.g. adaptability, extensibility, maintainability)
  - Definition, measurement, and evaluation of those qualities
  - Minimal acceptable threshold (what can’t be compromised)