Architectures in Context: A Scenario-Based Lifecycle

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Motivation

- Some terms/concepts are loosely defined
  - Use cases
  - Scenarios
  - Goals
- Big nasty problems persist
  - Scalability
    » Family of applications, product families
    » Enterprise architectures, product-line architectures
    » Systems of systems
  - Traceability
  - Testing
Question Everything!

- Question the basic definitions of relationships between
  - Use cases to Goals (1:1?)
  - Use cases to Scenarios (1:m?)
  - Goals to Scenarios?
  - All of the above to design and implementation???

- Question the process model/product development lifecycle
  - We have defined a lifecycle model focused on artifacts
  - It is high-level enough to be flexible and scaleable
  - It plugs some of the holes in existing models and methods
Deployed Systems (of Systems)
Stakeholders use Deployed Systems
Artificial Details at Lifecycle Layers

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Add Testing to Lifecycle

- Stakeholders
  - Goals
    - operationalized by
      - Requirements
        - realized by
          - Systems Architectures
            - derive
              - Operational Tests
                - validate
                  - Acceptance Tests
                    - validate
                      - Systems in Environments
                        - deployed as
                          - Systems Implementations
                            - validate
                              - implement by
                                - Component/Unit Tests
                                  - validate
                                    - System/Integration Tests
                                      - derive
Some Challenges/Opportunities

- Stakeholders and Goals modeled explicitly
  - Stakeholder goal analysis
  - Acceptance Testing derived from Goals

- Requirements modeled explicitly
  - Traceability between Goals and Requirements
  - Will this change how we model Requirements?
    » Scenarios
  - Operational Testing derived from Requirements
    » Scenario-based Testing

- Deployed systems modeled explicitly
  - Testing of deployed systems
    » Residual Testing
Highlights and Future Work

- A complete lifecycle should not ignore
  - Stakeholders, goals, goal networks, scenarios, scenario networks, episodes, concerns, aspects
  - Testing of the above, Traceability among all of the above
- We are doing (or wanting to do) work in
  - goal analysis and goal decomposition
  - Scenario composition, scenario refactoring, scenario analysis (including episodes)
  - Design and implementation using concerns and aspects (for cross-cutting concerns)
  - Scenario-based testing, aspect testing, residual testing
- Possible cooperation and collaboration with Aerospace
  - Applying and validating ideas
  - Templates/frameworks for goals/scenarios