Software Engineering for Adaptive and Self-Managing Systems

Session 2
Architecture-based Techniques for Adaptive Systems

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A note about the title of the session

"Architecture-based" can mean several things:

1. What kinds of architectural styles/patterns/frameworks are needed to support self-adaptive behavior?
2. How can architectural descriptions be used (at run time) to enable dynamic adaptation?
3. Distinguishing between behavioral and structural adaptations?
4. Others?

This Session: Questions to Think About

- The Big Question: What kinds of architectural styles/patterns/frameworks are needed to support self-adaptive behavior?
- Sub-issues:
  - Where does self-awareness and control live?
    - Centralized? Distributed? Layered? Internal/external?
  - How to partition the functionality for self-adaptation?
    - How can we modularize self-adaptive capability? Are layers the end of the story?
  - What quality attributes are critical?
    - Reuse, maintainability, scalability?
  - How generic should the architecture be?
    - Domain-specific self-adaptation?
  - What is being adapted?
    - System? Adaptation? Goals?

The Papers

- An Architectural Style for Solving Computationally Intensive Problems on Large Networks
  Yuriy Brun and Nenad Medvidovic (USC)
- An Architectural Strategy for Self-Adapting Systems
  Danny Weyns and Tom Holvoet (Katholieke U)
- Towards an Autonomic Element Architecture for ASSL
  Emil Vassev and Joey Paquet (Concordia)
- Representing Hierarchical Mobility in Software Architectures
  Fernando J. Barros (U Coimbra)