Coordinating multiple autonomic functions

draft-ciavaglia-anima-coordination-01

IETF102 – Montreal
Pierre Peloso, Laurent Ciavaglia
Why coordinate…?

... because AF interactions are complex
AF interactions

- Can be Conflict, Cooperation, Dependency...
- Complex to manage by humans because of
  - scale, speed, hidden dependencies

→ **Proposal:** Coordinate collective behavior via a common function available to all AFs
# Coordination lifecycle

| Specification | - Autonomic function descriptor (metrics, parameters, actions...)  
|               | - Static map, a priori knowledge |
| Deployment    | - Per instance/resource:  
|               |   • inventory of metrics monitored, of actions performed and computation paths  
|               |   • build connected control loops graphs  
|               |   • Identify conflicting control loops  
|               | - Deployed conflict map |
| Run-time      | - Arbitrate conflict based on coordination strategies and available mechanisms  
|               | - Infer new dependencies  
|               | - Dynamically update interaction groups |
Coordination strategies

• Random, token-based…
• Separation in time
• Hierarchical optimization
• Centralized multi-objective optimization
• Other control theory approaches
Discuss: ANIMA implications

• Coordination:
  – a must-have feature (stability, convergence)
  – cross-autonomic functions (re-usable component)
  – requires common descriptors, lifecycle (registration/discovery, negotiation…)
  – common representation of information/knowledge (cf. conflict map)
  – common “control/command” interface