Coordinating multiple autonomic functions

draft-ciavaglia-anima-coordination-01

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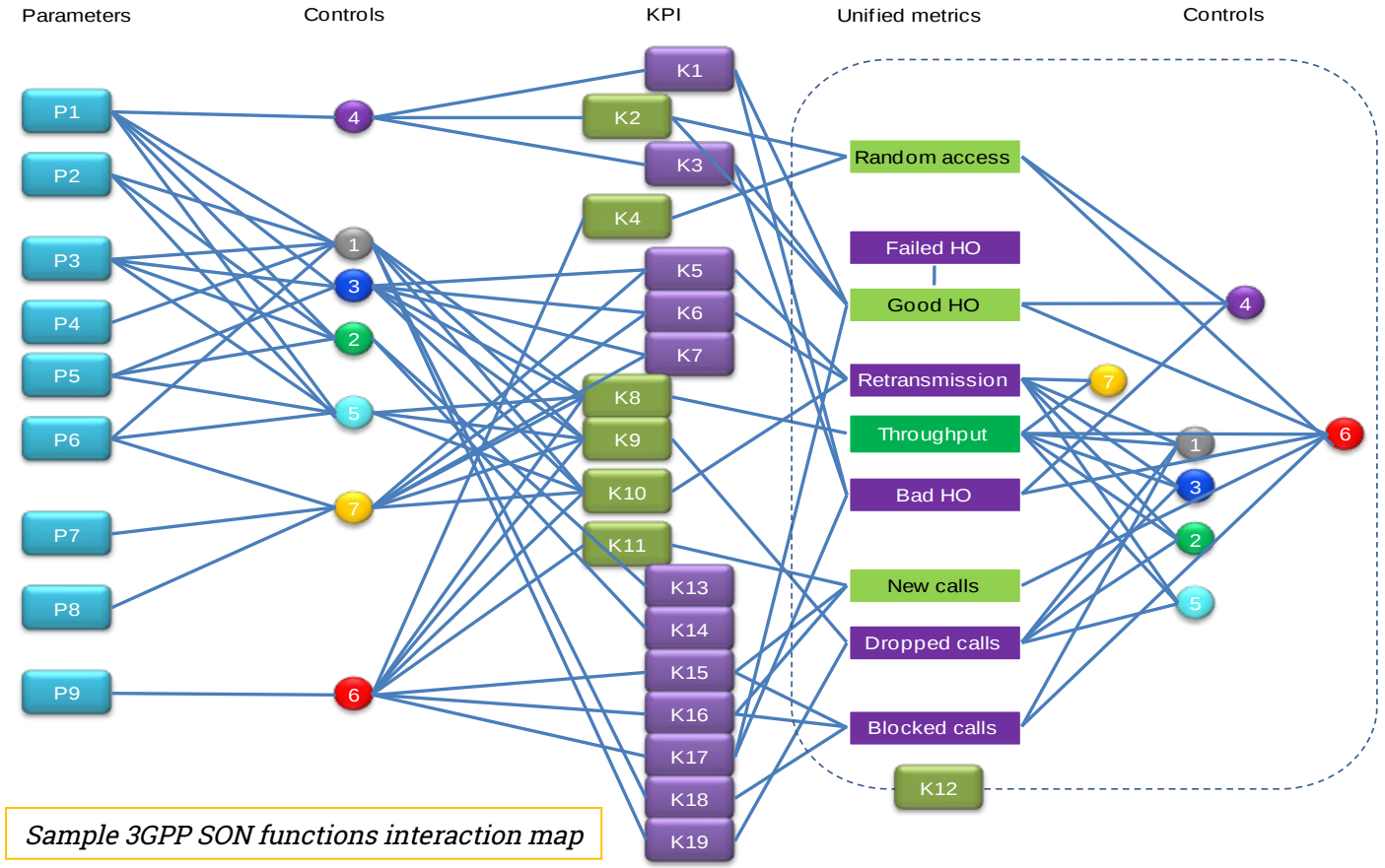
Why coordinate…?



Sample 3GPP SON functions interaction map

… 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