

Grand challenge: composing control mechanisms

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Current autonomic solutions...

- Are composed mostly of **hierarchical** control structures...
- In a **controlled** environment...
- Where control mechanisms **cooperate**...

The human body...

- Contains **competitive** control mechanisms
- Where the outcome is stable even though the efforts of controls are **not coordinated**
- Summary of my grand challenge: stability of compositions of **competitive** control mechanisms
 - “Multi-vendor”
 - “Exterior”

Part 1: escape from the machine room

- Create autonomic mechanisms that function in **open and uncontrolled environments**.
- Requires:
 - Open-world assumption.
 - Tolerance of other unknown control loops.

Part 2: understand control loop composition

- “Exterior” composition: combine loops without coordination.
For **cooperative** sets of independent loops...
- For **competitive** sets of independent loops...

Part 3: what if...

- Given an existing situation, what will happen if we add a new control loop to the situation without removing the others?
- Change behavior by adding and removing loops, rather than by controlling parameters of a loop.