The MAPE-K Loop Considered Harmful

SEAMS 2015 Panel

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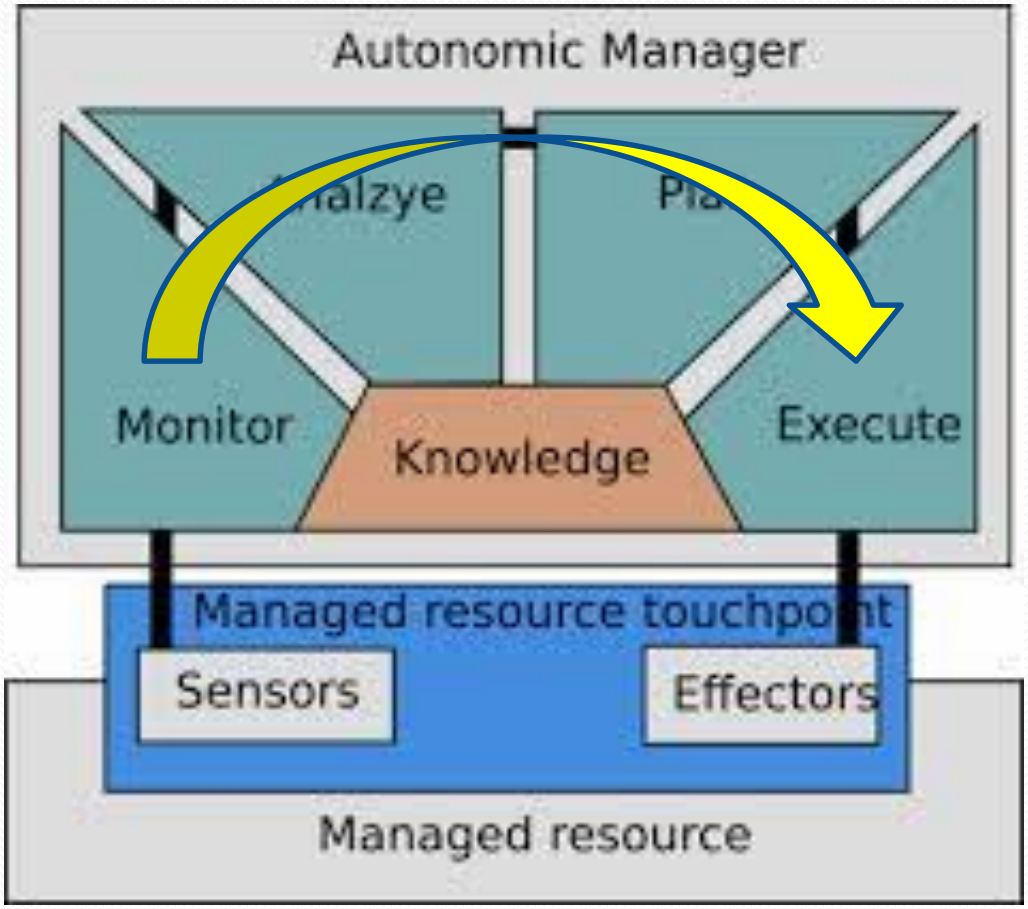
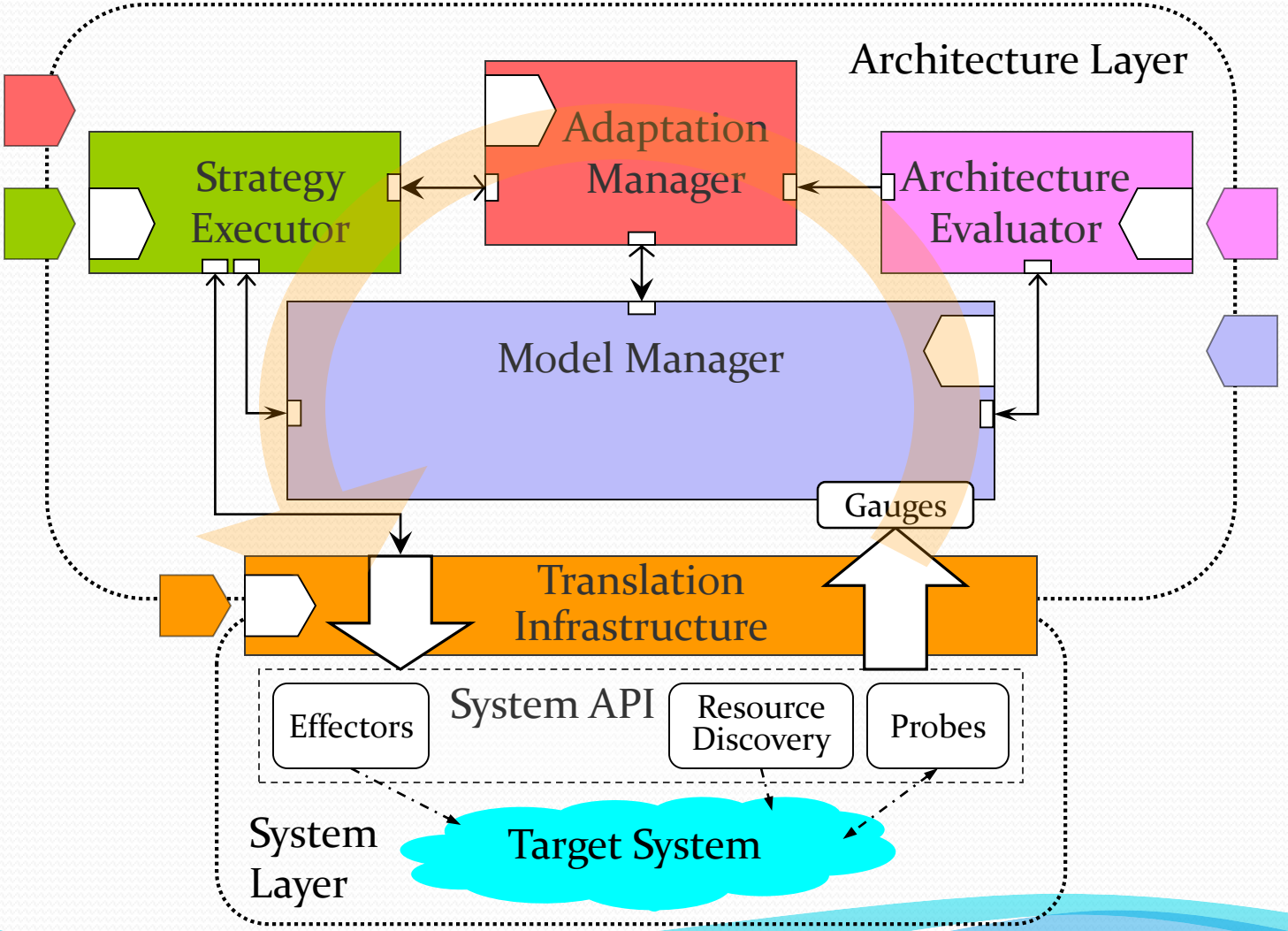
MAPE-K



Rainbow Framework



So What's the Problem?

- In practice there are many reasons to
  - Cross MAPE-K abstraction boundaries
  - Combine stages
  - Involve outside agents (humans, other adaptive systems)
- Is it time to rethink the decomposition?
  - Might allow more flexible ways of adaptation
  - Might lead to new synergies
  - Might produce more realistic systems

Examples

- P ⇔ M (Plan and Monitor)
  - Applications: Adaptive monitoring
- P ⇔ A (Plan and Analyze)
  - Deciding what is broken takes time
  - Analyzing future predictions may depend on what you want to do
- A ⇔ E (Analyze and Execute)
  - Actuators may be broken
  - New forms of actuation may be acquired dynamically
- H ⇔ P (Humans and Planning)
  - Involving humans in the loop to achieve goals
  - Reasoning about adversaries

Humans and MAPE-K