Predictive risk awareness for proactive management

IETF92 – Dallas

Bruno Vidalenc, Laurent Ciavaglia

History

- Concept and mechanism presented at NMRG IETF89-London

  http://www.ietf.org/proceedings/89/slides/slides-89-nmrg-1.pdf

- Use case presented at UCAN BoF IETF90-Toronto

  http://www.ietf.org/proceedings/90/slides/slides-90-ucan-2.pdf
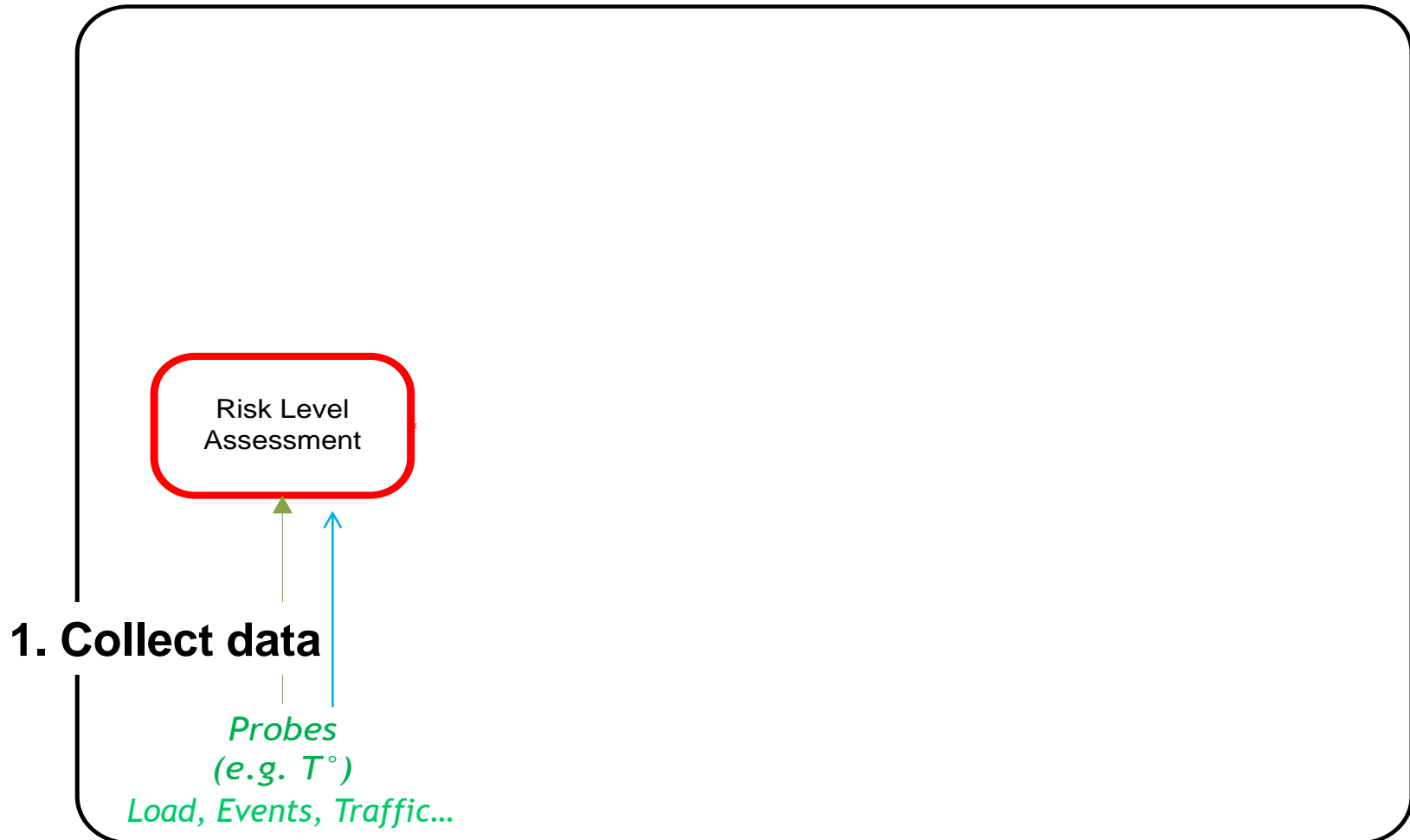
- **Today: towards an ANIMA-compliant ASA?**

Mechanism recap

Risk Level
Assessment

Probes
(e.g. T°)
Load, Events, Traffic...

Mechanism recap
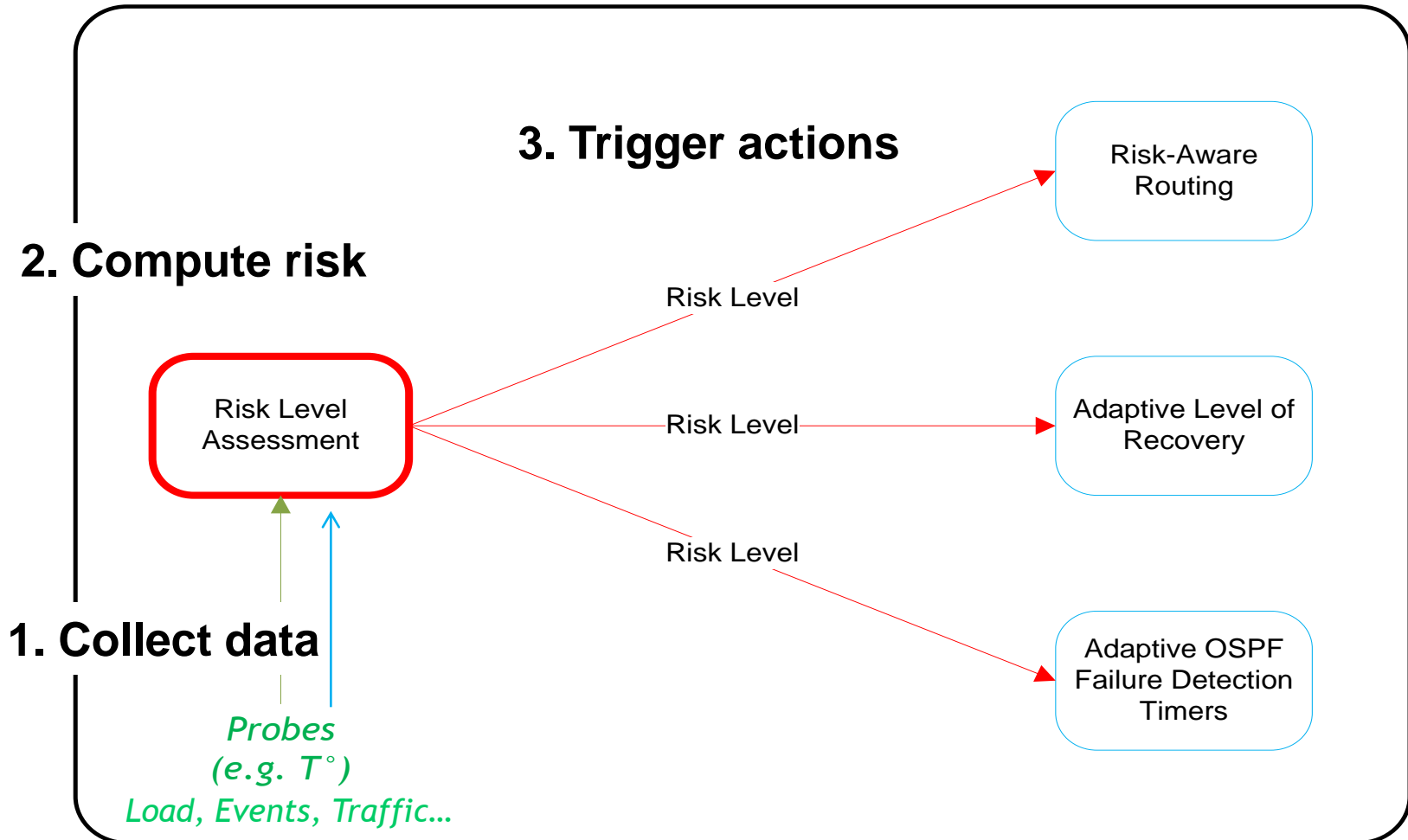
Risk Level
Assessment

1. Collect data

*Probes
(e.g. T°)
Load, Events, Traffic...*

Mechanism recap

2. Compute risk

Risk Level
Assessment

1. Collect data

*Probes
(e.g. T°)
Load, Events, Traffic…*

Mechanism recap

3. Trigger actions

2. Compute risk

Risk-Aware Routing

Risk Level Assessment

Risk Level

Risk Level

Risk Level

Adaptive Level of Recovery

Adaptive OSPF Failure Detection Timers

1. Collect data

*Probes
(e.g. T°)
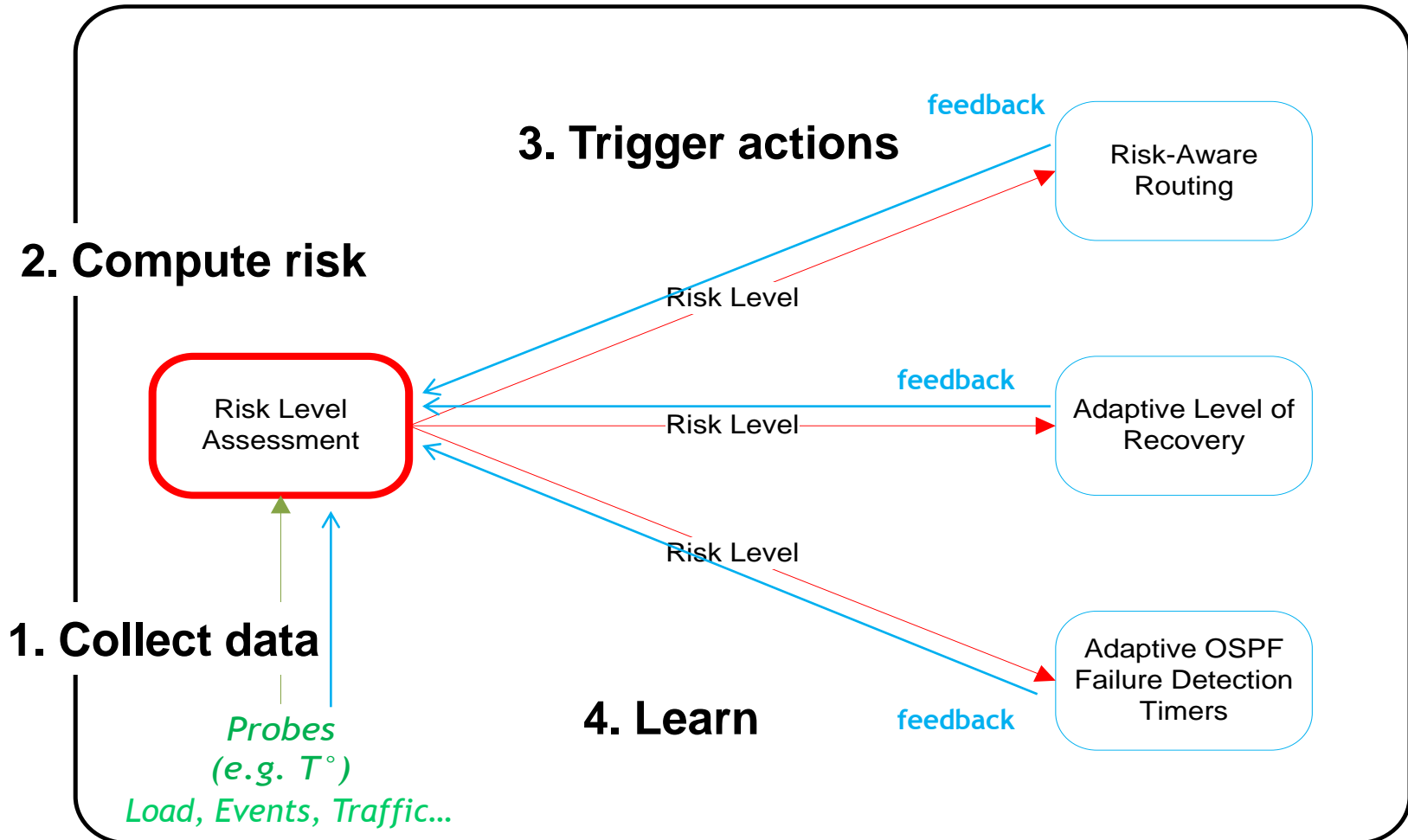Load, Events, Traffic…*

Mechanism recap

Notes

- Learning to improve process accuracy, utility over time
- Local
  - Local decision-based
  - Local device information/monitoring
  - Distributed execution
- Global
  - Mitigate local instabilities
  - Deeper risk "understanding" thanks to correlation/context awareness
  - Local/global risk information/patterns for other mechanisms
- Time window
  - Big (hours)→ preventive maintenance (e.g. field interventions)
  - Small (seconds) → automatic mechanisms (restoration/protection, cold stand-by activation…)

(tentative) Mapping to reference model

```
+-------------------------------------------------------------+
|                                                             |
|        +---------+ +---------------+                        |
|        |         | | Feedback      |                        |
|        | Intent  | | Loops         |                        |
|        +---------+ +---------------+                        |
|             ^           ^                                   |
|                                                             |
|        Autonomic User Agent                                 |
|             V           V                                   |
|                                                             |
|  +------------+    +------------+       +------------+       |
|  | Self-      |    | Autonomic  |       | Network    |       |
|  | knowledge  |<------>| Service |<------>| Knowledge  |     |
|  |            |    | Agents     |       | (Discovery)|       |
|  +------------+    +------------+       +------------+       |
|                         ^                    ^              |
|                         |                    |              |
|                         V                    V              |
| ---------------------------------------------------------   |
|          Autonomic Control Plane                            |
| ---------------------------------------------------------   |
|       Standard Operating System Functions                   |
+-------------------------------------------------------------+
```
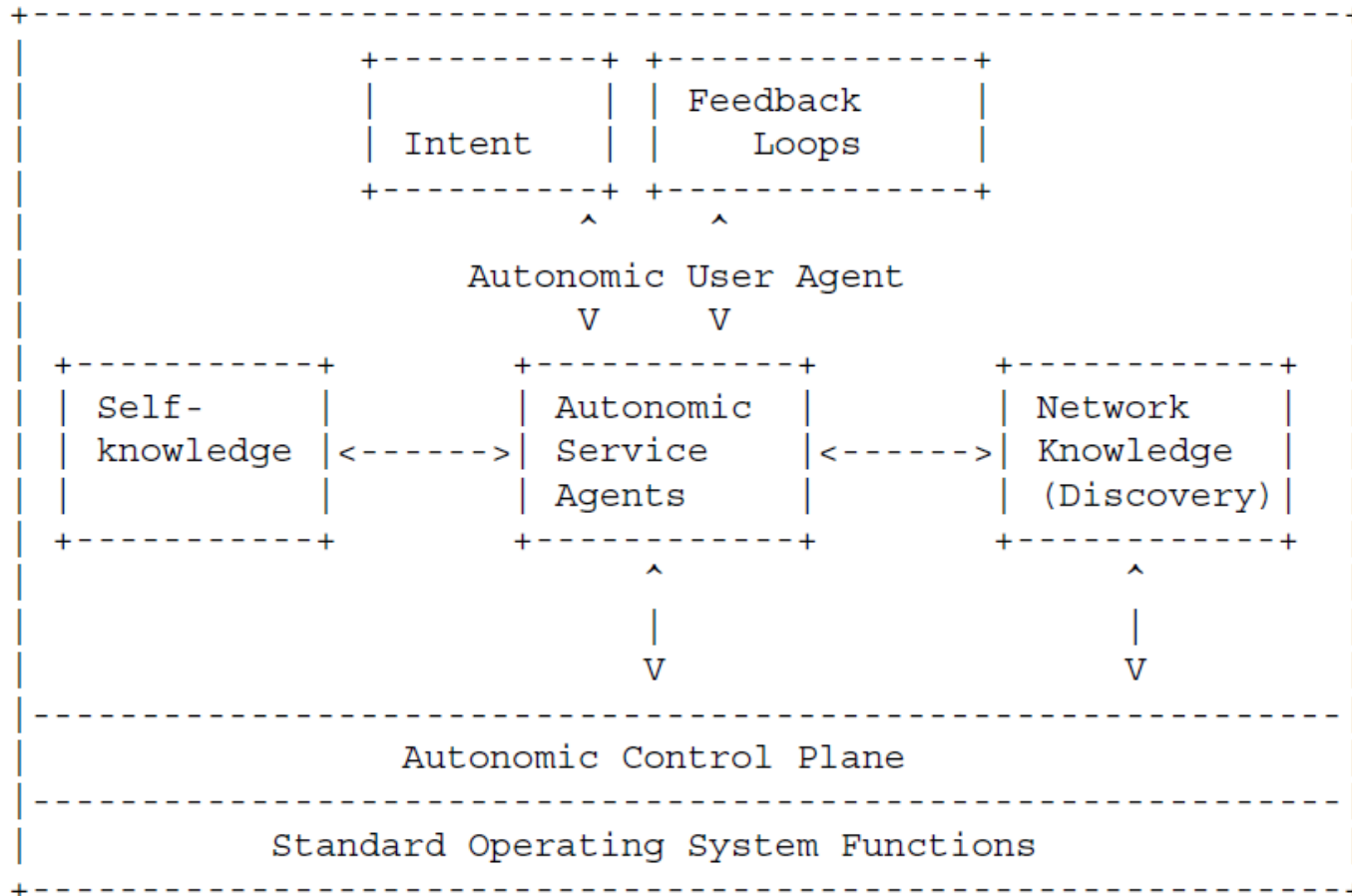
(tentative) Mapping to reference model
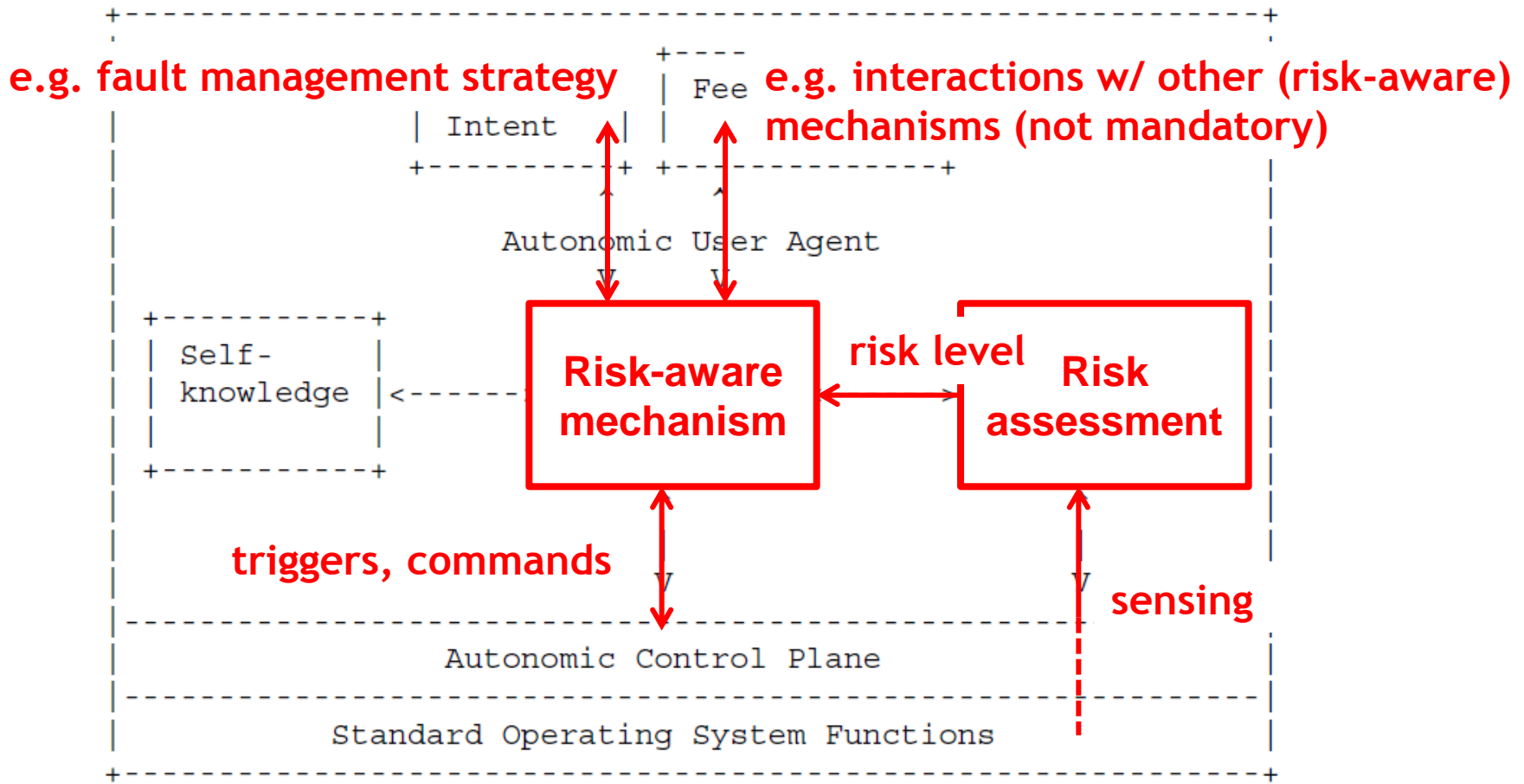
Discuss: ANIMA compliance/impact

- Ability to anticipate on future network condition/context
  - a new capability of interest to many mechanisms

- How to make it accessible and useful for other ASAs?
  - common components, place in the reference model, interfaces...
- How to design a generic yet customizable functionality (via intent, capability-aware) and not replicate per function/service?
- Common way(s) to connect to information sources…
- Common way(s) to disseminate risk information to target functions/agents…
- Common way(s) to learn/build knowledge but also store, query, process…
- Interfaces to GDNP...? Specify GDNP objectives...?