# SyLA - Systèmes Logiciels Adaptables
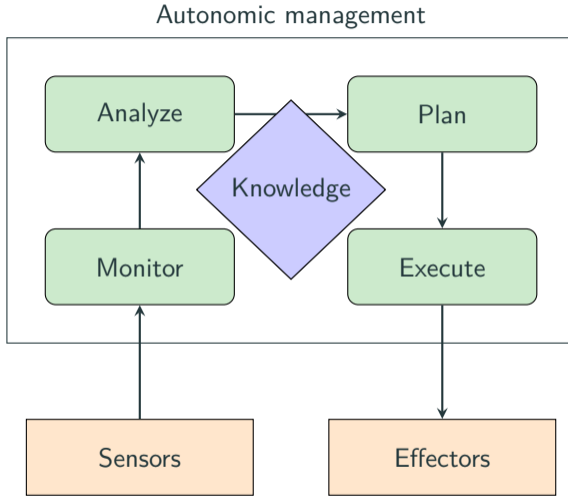
Défi GDR GPL 2025-2030

Rabéa Ameur-Boulifa, Simon Bliudze, Fréderic Loulergue, **Jolan Philippe**

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LabSoc (Paris) - SPIRALS (Lille) - LMV (Orléans) - DiverSE (Rennes)

## Autonomic management



- Set of properties to maintain
- Decision-taking on defined criteria
- Autonomous loops

**A complex task for large systems**

- **Interdependencies**
- **Scalability**
- **Configuration Management**
- **Security**
- **Performance Optimization**
- ...

**Endogenous events**

Originate within the system itself - Mostly predictable leading anticipated management

- Timeout
- Process failure
- Consistency update
- ...

- **Information Retrieval and Aggregation:** How to efficiently collect coarse-grained data about the system's overall state?
- **High-Level Control:** Optimize interactions between the system and its components while maintaining an appropriate control granularity (i.e., high-level).
- **Optimization of Analysis and Planning Phases:** Use collected data to solve resource placement, task scheduling, and load balancing problems.

**Exogenous events**

Originate from outside the system - Less predictable, very large possibilities

- Query from users
- Cloud provider actions
- Real-world disaster
- ...

- **Modeling of Exogenous Events:** Define a structured space of possibilities, classify, and quantify external events.
- **Consideration of Uncertainty:** Integrate a probabilistic approach to anticipate and react to external events.

- **Modeling:** How to represent the uncertainties associated with internal events or observations?

- **Uncertainty Propagation:** Study the impact of uncertainties on the decisions made by the MAPE-K loop.

- **Learning and Control Approaches:** Leverage machine learning or approximation techniques to dynamically adjust the system's behavior in the face of partial information.

**Examples of studied extra-functional properties in this context**

- **Safety:** Ensure that critical properties are respected.

- **Level of Uncertainty:** Quantify uncertainty to guide decision-making.

- **Reliability:** Assess the confidence in the collected information.

# Community

## People with interest

- **Spirals, Lille:** Simon Bliudze
- **Vesontio, Besançon:** Olga Kouchnarenko
- **Stack, Nantes:** Hélène Coullon
- **DiverSE, Rennes:** Jolan Philippe, Noel Plouzeau
- **LMV, Orléans:** Frédéric Loulergue
- **Kairos, Nice:** Julien De Antoni
- **Verimag, Grenoble:** Marius Bozga, Radu Iosif
- **Ctrl-A, Grenoble:** Sophie Cerf, Eric Rutten
- **OLAS, Sophia-Antipolis**
- **LTCI:** Rabéa Ameur

## Transversal thematics with other "Defi GDR GPL"

- MetaD
- EDT
- IIDM
- SCALPEL

## Related to ongoing projects

- Taranis (PEPR Cloud)
- SeMaFoR (ANR)
- Smartcloud (ANR)
- ADAPT (ANR)