

Engineering Adaptive Software System@NII

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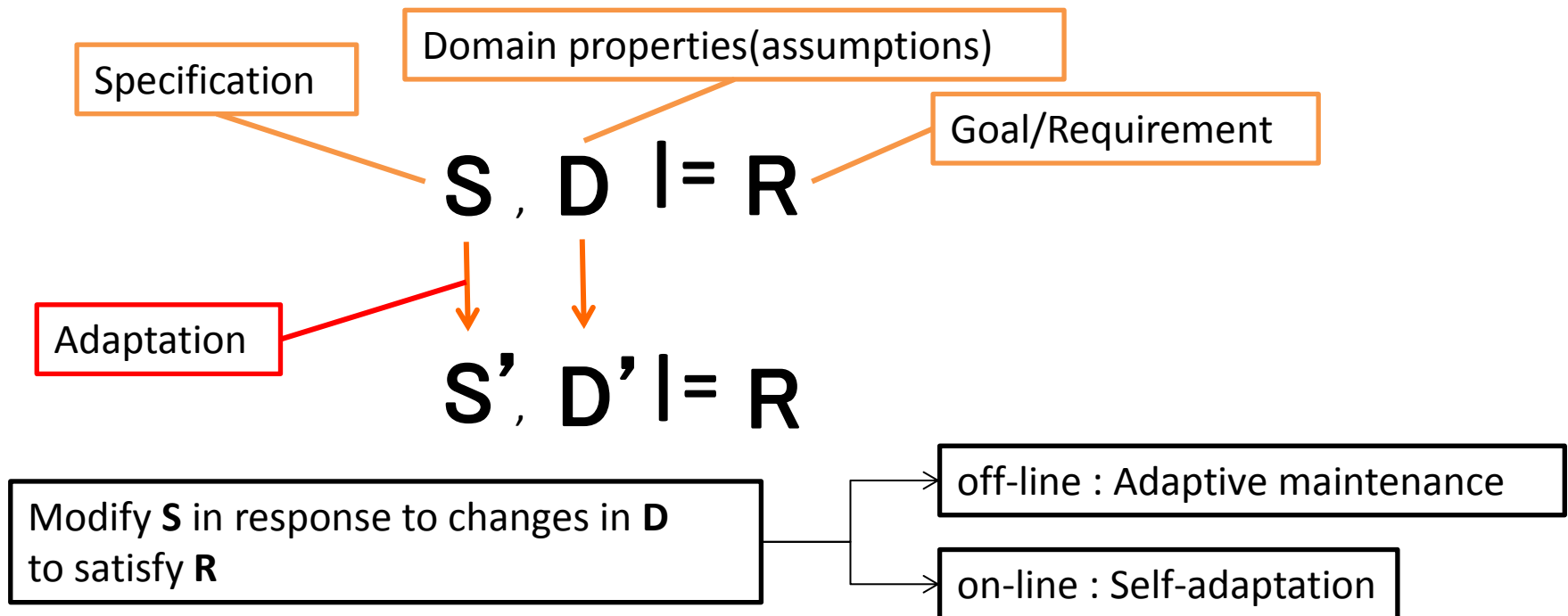
National Institute of Informatics

Adaptive Software System

self-adaptation

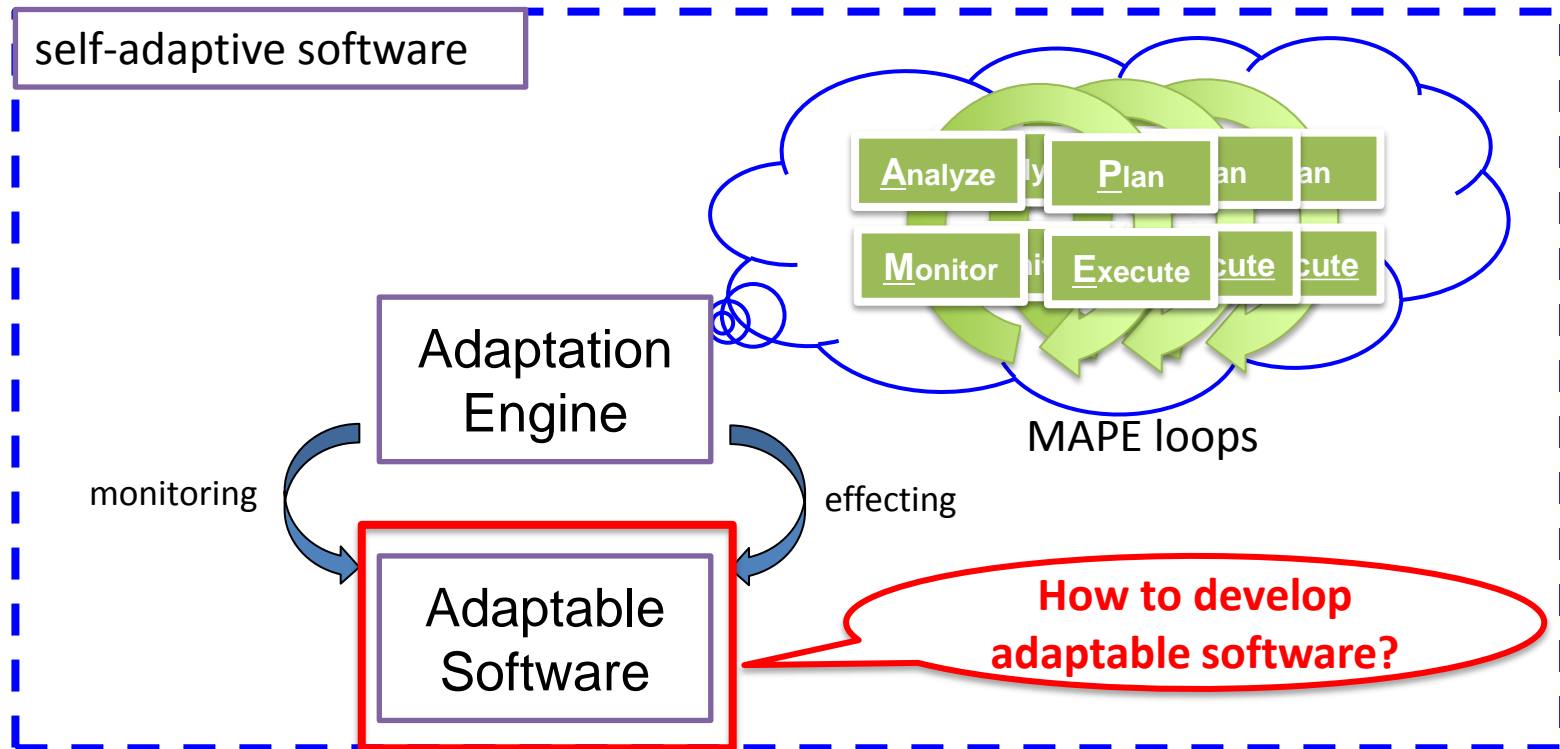
systems that are able to **modify their behavior and/or structure** in response to **their perception of the environment** and **the system itself**, and **their requirements**

Rogério de Lemos, et.al., Software Engineering for Self-Adaptive Systems: A Second Research Roadmap, SEAMS2011.



Self-adaptive Software Systems

self-adaptation



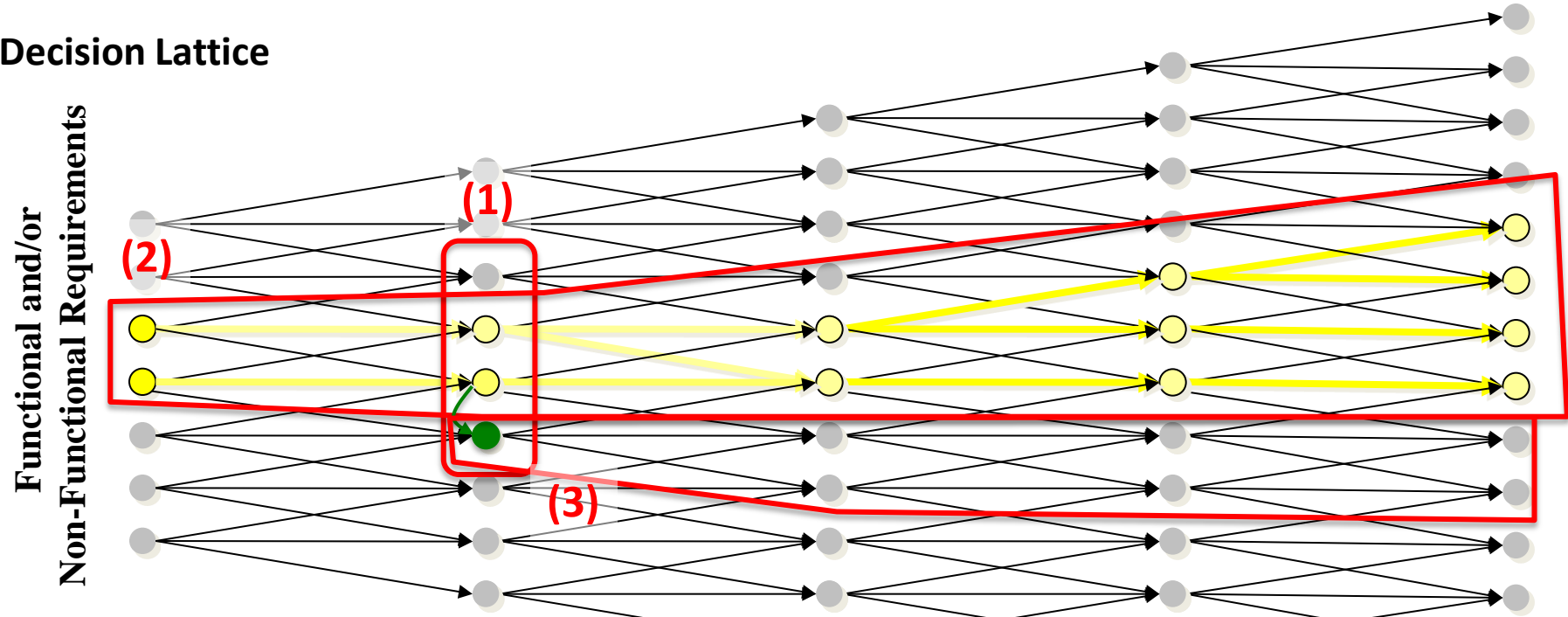
Developing Adaptable Software for Self-Adaptive Software Systems

Software development can be seen as a sequence of decisions

abstract • coarse grain

concrete • fine grain

Decision Lattice



To develop adaptable software,

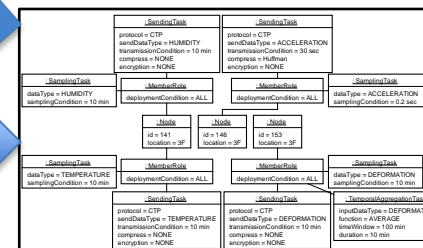
(1) **adaption space** should be analyzed

(2) **traceability between reqs. structure/behavior designs** should be maintained

(3) **changes at any abstraction level** should be propagated to other levels properly

Impl.

- **Composition-based interaction design for adaptable distributed software systems**
- Kenji Tei**



Overview of works in NII

Req. analysis

Architecture Design

Detailed Design

Impl.

- **Exploration of adaptation space**

Fuyuki Ishikawa

Adaptation space analysis

- # ▪ Designing Self-adaptive system Using Control Loops Shinichi Honiden

Adaptation

Traceability maintenance to localize changes

- **Putback-based Bidirectional Programming**
Zhenjiang Hu
- **Bidirectional Graph Transformation Infrastructure and its Applications**
Soichiro Hidaka

Change propagation

- **Composition-based interaction design**
for adaptable distributed software systems
- Kenji Tei**

