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Emergence of Composite Services in Smart Environments

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Emergence of Composite Services in Smart Environments

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Opportunistic Software Composition

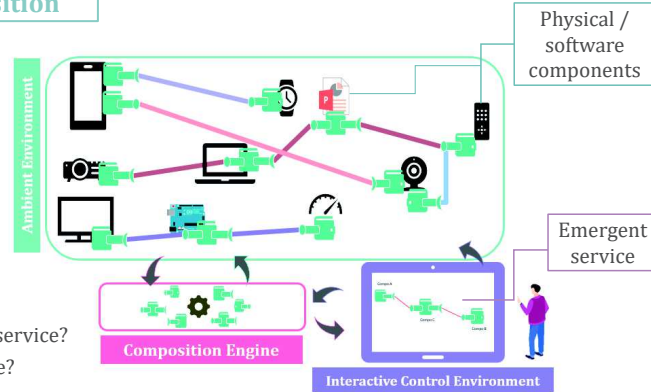
Connected objects in an ambient environment

User
 Constant mobility
 Unpredictable needs

Services
 Unpredictable availability

Environment
 Uncertain
 Highly unstable

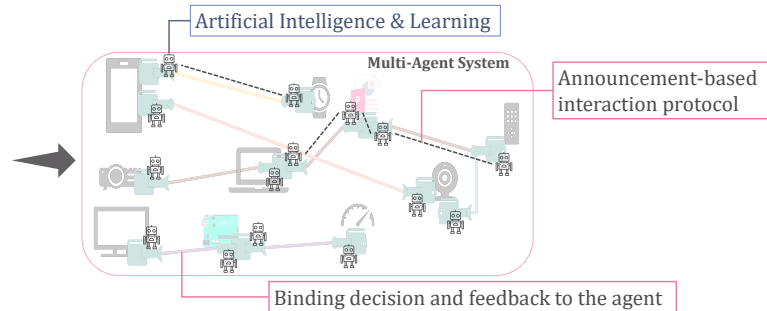
- How to provide a working and relevant composite service?
- How to let the user manipulate an emergent service?



Opportunistic Composition Engine "OCE"

Principles

- Environment-directed service composition
- Emergence of new composite services adapted to the context and the user
- Dynamic and continuous adaptation
- Learning by reinforcement
- Decentralized and automatic decision
- Integration of new appearing services

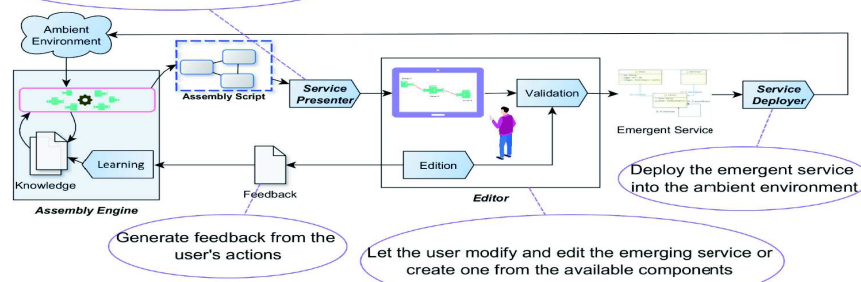


Binding decision and feedback to the agent

Interactive Control Environment "ICE"

Methods and Tools

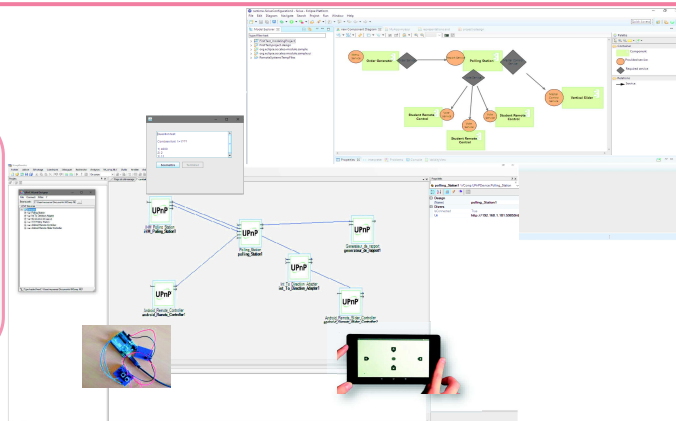
Present to the user the emerging service



- Domain Specific Languages (DSL)
- Model-Driven Engineering (MDE)
- Model transformations
- Eclipse Modeling Framework, GEMOC

Current status

- Operational prototypes of OCE and ICE
- Demonstration of simple use cases with real connected objects
- Arduino, Android, Node.js, WComp...



Future Work

- Consolidation of the learning mechanism in OCE
- Interface adaptation to the user
- Feedback generation by ICE
- Feedback exploitation by OCE
- Full integration of OCE and ICE
- Scalability assessment