



**HAL**  
open science

## Emergence of Composite Services in Smart Environments

Maroun Koussaifi, Walid Younes, Françoise Adreit, Jean-Paul Arcangeli,  
Jean-Michel Bruel, Sylvie Trouilhet

► **To cite this version:**

Maroun Koussaifi, Walid Younes, Françoise Adreit, Jean-Paul Arcangeli, Jean-Michel Bruel, et al.. Emergence of Composite Services in Smart Environments. 8th EuroScience Open Forum (ESOF 2018), Jul 2018, Toulouse, France. pp.0, 2018. hal-02280356

**HAL Id: hal-02280356**

**<https://hal.science/hal-02280356>**

Submitted on 17 Sep 2019

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



## Open Archive Toulouse Archive Ouverte

OATAO is an open access repository that collects the work of Toulouse researchers and makes it freely available over the web where possible

This is an author's version published in:

<http://oatao.univ-toulouse.fr/22488>

### Official URL

DOI : <https://doi.org/10.13140/RG.2.2.21832.42248>

**To cite this version:** Koussaifi, Maroun and Younes, Walid and Adreit, Françoise and Arcangeli, Jean-Paul and Bruel, Jean-Michel and Trouilhet, Sylvie *Emergence of Composite Services in Smart Environments*. (2018) In: 8th EuroScience Open Forum (ESOF 2018), 9 July 2018 - 14 July 2018 (Toulouse, France).

Any correspondence concerning this service should be sent to the repository administrator: [tech-oatao@listes-diff.inp-toulouse.fr](mailto:tech-oatao@listes-diff.inp-toulouse.fr)

# Emergence of Composite Services in Smart Environments

Maroun KOUSSAIFI, Walid YOUNES  
 Françoise ADREIT, Jean-Paul ARCANGELI, Jean-Michel BRUEL and Sylvie TROUILHET

firstname.lastname@irit.fr

University of Toulouse, France - Toulouse Institute of Computer Science Research



## Opportunistic Software Composition

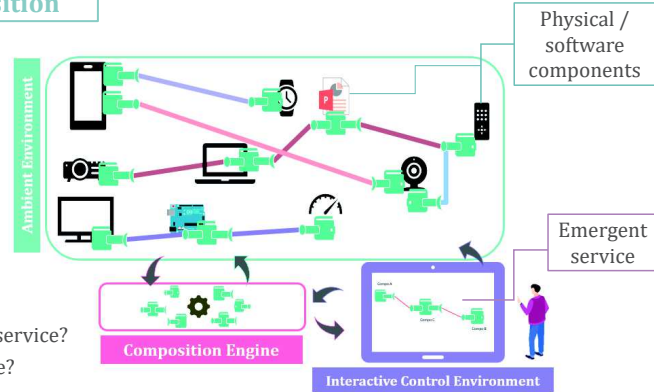
Connected objects in an ambient environment

**User**  
 Constant mobility  
 Unpredictable needs

**Services**  
 Unpredictable availability

**Environment**  
 Uncertain  
 Highly unstable

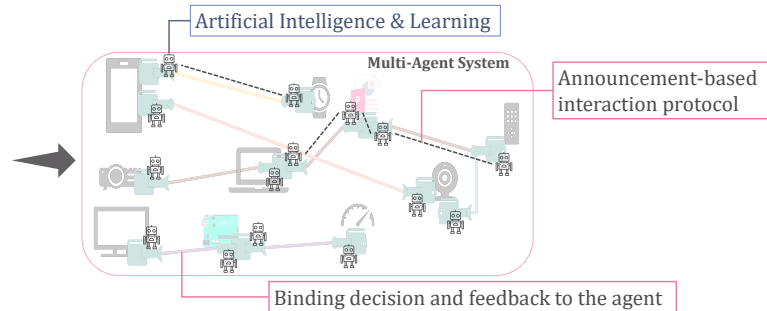
- How to provide a working and relevant composite service?
- How to let the user manipulate an emergent service?



## 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

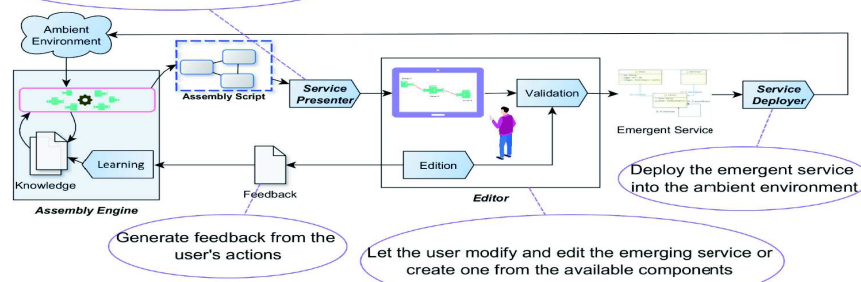


Binding decision and feedback to the agent

## Interactive Control Environment "ICE"

### Methods and Tools

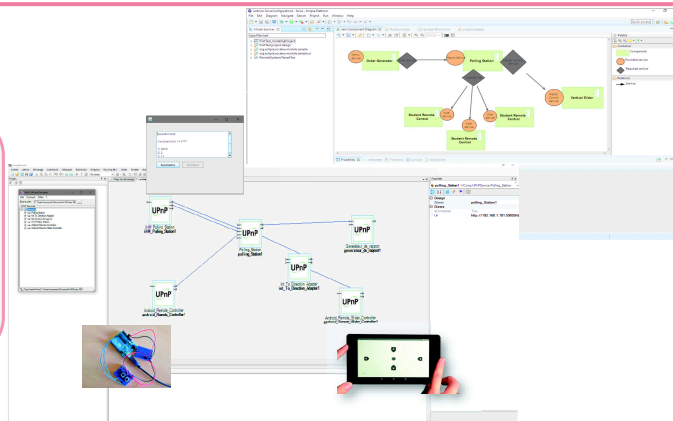
Present to the user the emerging service



- 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