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Software Evolution Multi-View: From the Smart Home to the Cloud

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Context



Smart Home characteristics

- Heterogeneity: different *elements* e.g., devices, services and technologies.
 - Variability: different characteristics e.g., the amount of offered resources for a given element.
- ⇒ Volatility: changing set of applications deployed on a changing set of elements Where to deploy new applications? In the Smart Home? On the Cloud? Or distributed on both?
- ⇒ How to deploy them? Only in one place? By distributing the applications between the Cloud and the Smart Home?

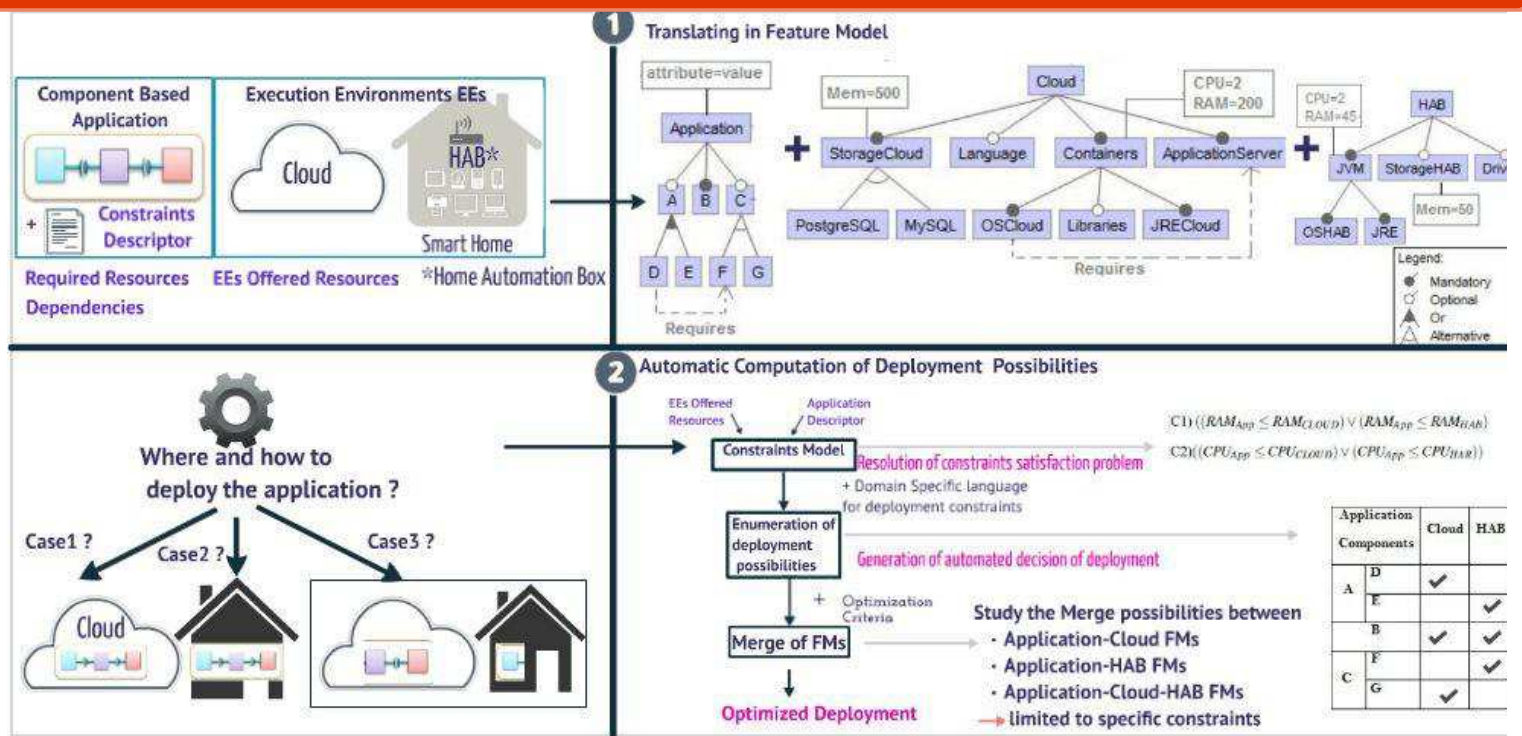
Motivations

1. Balance the computational load between the Smart Home and the Cloud.
2. Reduce the acquisition cost for users by limiting the embedded systems resources.
3. Reduce the scalability cost when application set grows.

Challenges

1. Optimization of the deployment of a new component-based application onto a distributed environment (Smart Home + Cloud) despite the heterogeneity and the variability.
2. Run Time self-adaptation of the application deployment to volatility.

Approach



Ongoing Work

- Choosing FM [1] formalism to manage variability and heterogeneity.
- Extending FM by addressing Localization Constraints e.g., Colocation, Dislocation of software components.
- Proposing a DSL to express the deployment constraints.

Future Work

1. React to the volatility by run time self-adaption of the application deployment using code offloading and migration between the Smart Home and the Cloud
2. Build a self-* architecture supporting the self-configuration, self-optimization and self-adaptation of the application deployment[2].

References

- [1]Benavides, David, Sergio Segura, and Antonio Ruiz-Cortés, « Automated Analysis of feature models 20 years later : A Literature view » Information System 35.6 (2010) : 615-636.
- [2]Movahedi, Zeinab et al. « A Survey of Autonomic Network Architectures and Evaluation Criteria » Communications Surveys & Tutorials, IEEE 14-2(2012):464-490.