Open Research Webinars

Open Collaboration in European Research Projects

MORPHEMIC Cloud computing optimization platform

Alessandra Bagnato, Softeam (Docaposte Group)

May 3, 2022 - 16:00-17:00 CET

Presented by: RESEARCH @ ECLIPSE FOUNDATION & OW2

Abstract

- The talk will describe the MORPHEMIC Project and its unique way of adapting and optimizing Cloud computing applications starting from the **Cloud Application Modelling and Execution Language (CAMEL) multi-domain-specific language (DSL)** allowing users to specify multiple aspects/domains related to multi-/cross-cloud applications, such as the domains of deployment, requirement, metric, scalability, security, organization and execution.

The MORPHEMIC Project

The project is an extension of MELODIC Project which is a multi-cloud platform developed in the H2020 project.
MELODIC Cross-Cloud open source platform is extended by MORPHEMIC with innovative pillars:

- **Polymorphing architecture:** Ability to run and deploy a component, depending on its requirements and workload, in different technical forms (i.e., in a Virtual Machine (VM), in a container, as a big data job, or as serverless components, etc.)
- **Proactive adaptation**: Forecast of future resource needs and deployment configurations

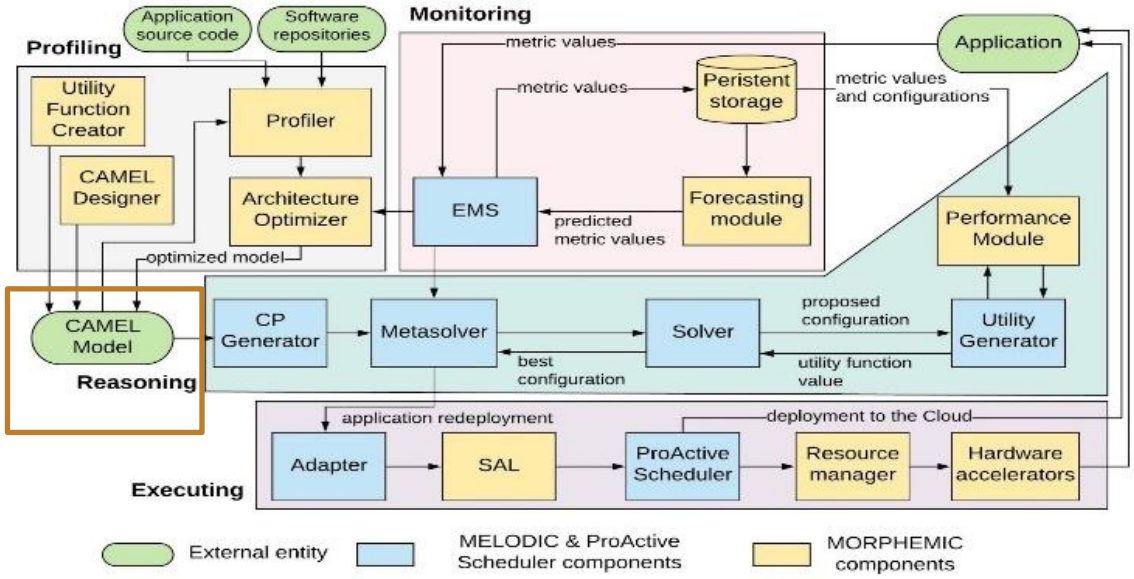
MORPHEMIC

MORPHEMIC Vision

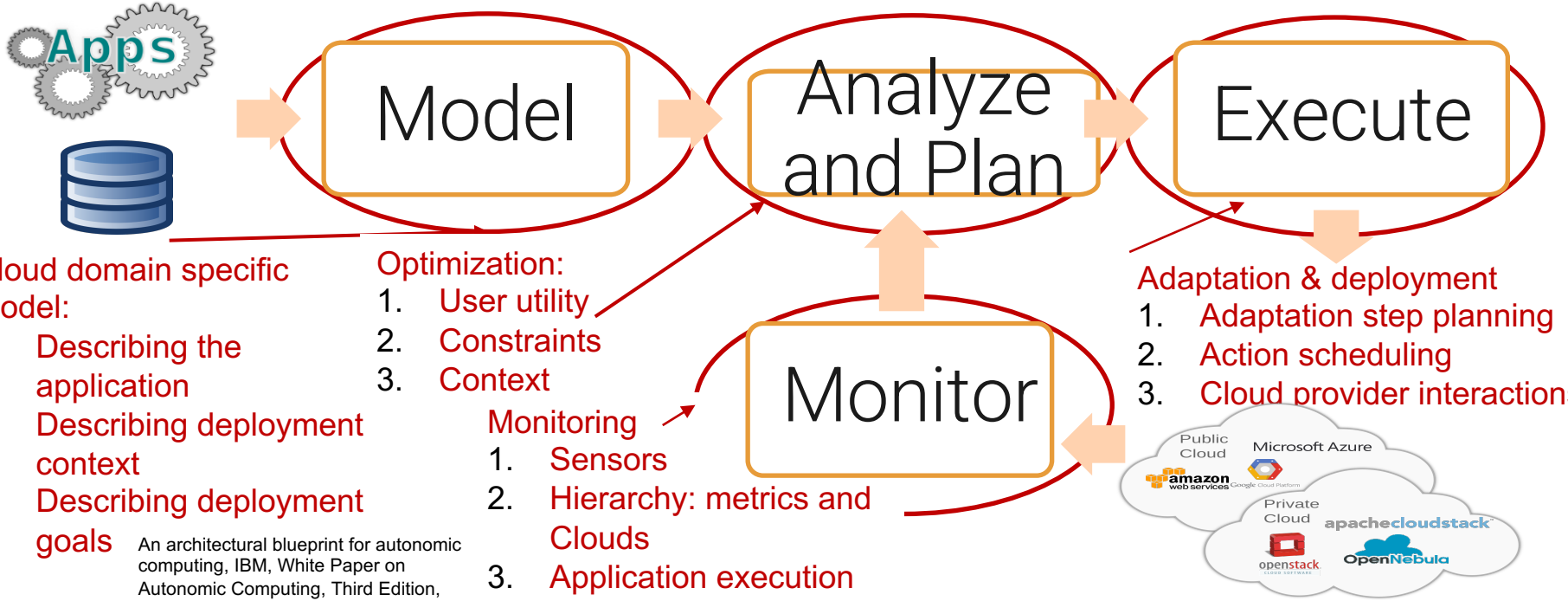
- Simplify **Cloud application modelling** and continuously optimize and morph the deployment model to take advantage of beneficial Cloud capabilities
- MORPHEMIC project aims at optimizing the deployment and life-cycle management of **data-intensive applications**. With the MORPHEMIC approach the initial deployment of Cloud application components is performed and then proactively scaled according to the incoming workload and the defined service level objectives.

Overview of the MORPHEMIC Architecture

- **Profiling** - data input, application modelling and architecture optimization,
- **Reasoning** - optimization of the implementation plan,
- **Executing** - physical application deployment,
- **Monitoring** - application monitoring and metrics collection.



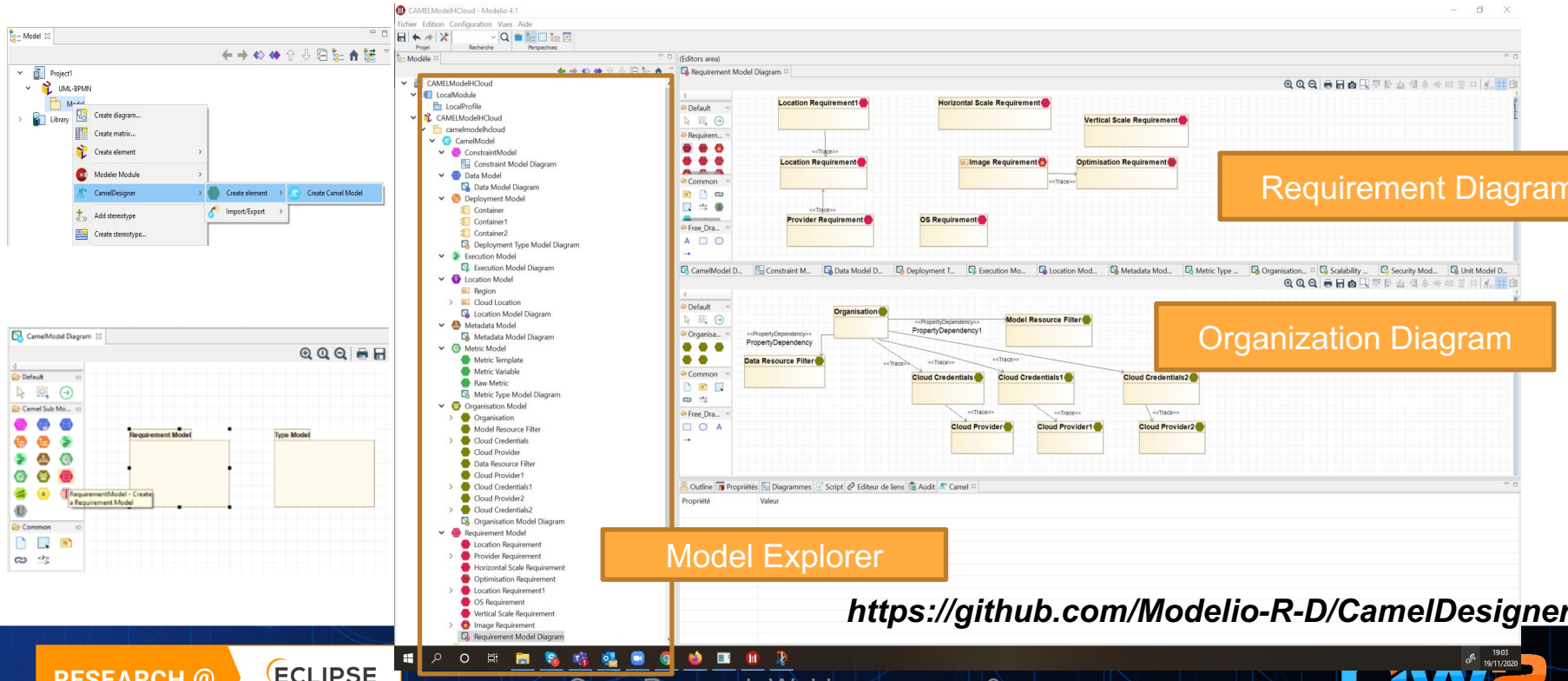
MORPHEMIC – multicloud optimization



Cloud Application Modelling and Execution Language (CAMEL)

- Cloud Application Modelling and Execution Language (CAMEL) is a multi-domain-specific language (DSL) allowing users to specify multiple aspects/domains related to multi-/cross-cloud applications, such as the domains of deployment, requirement, metric, scalability, security, organization and execution.
- The full-fledge cloud (application) modelling language is adopted various European projects, including MORPHEMIC, PaaSage, CloudSocket and Melodic.

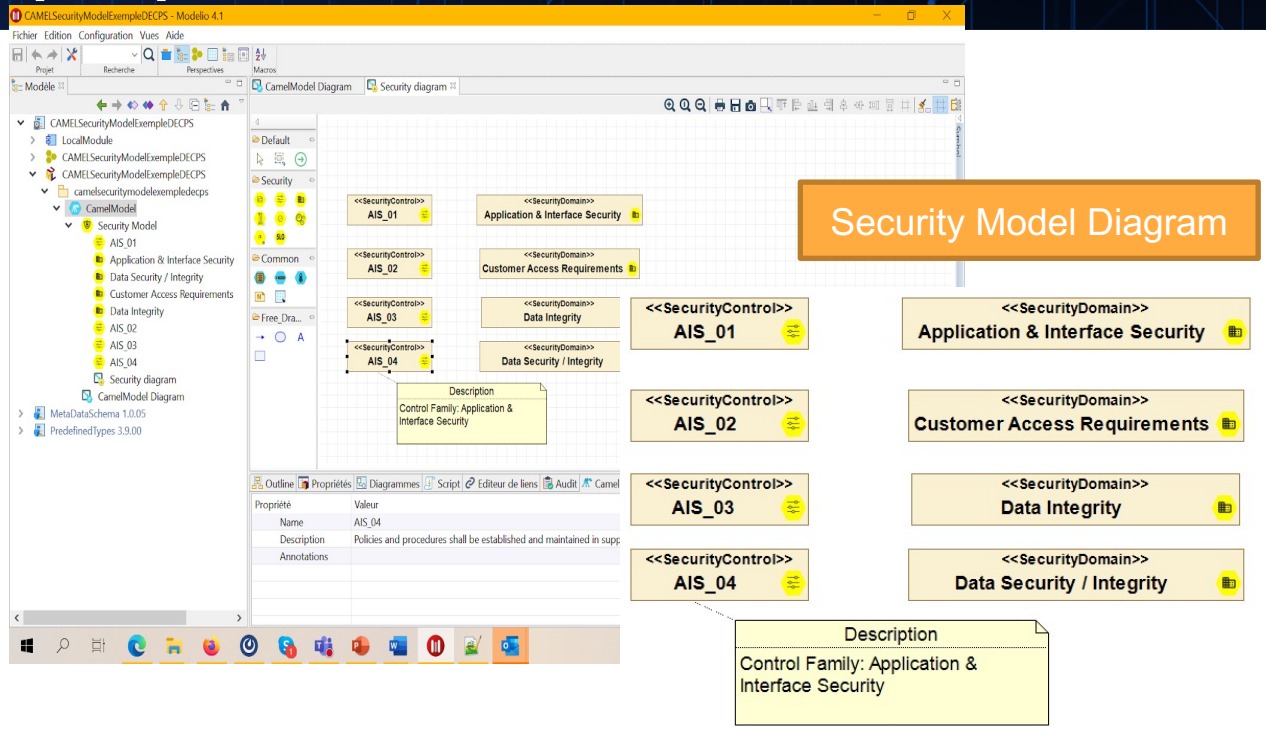
Cloud Application Modeling with the Modelio CAMEL Designer (1/2)



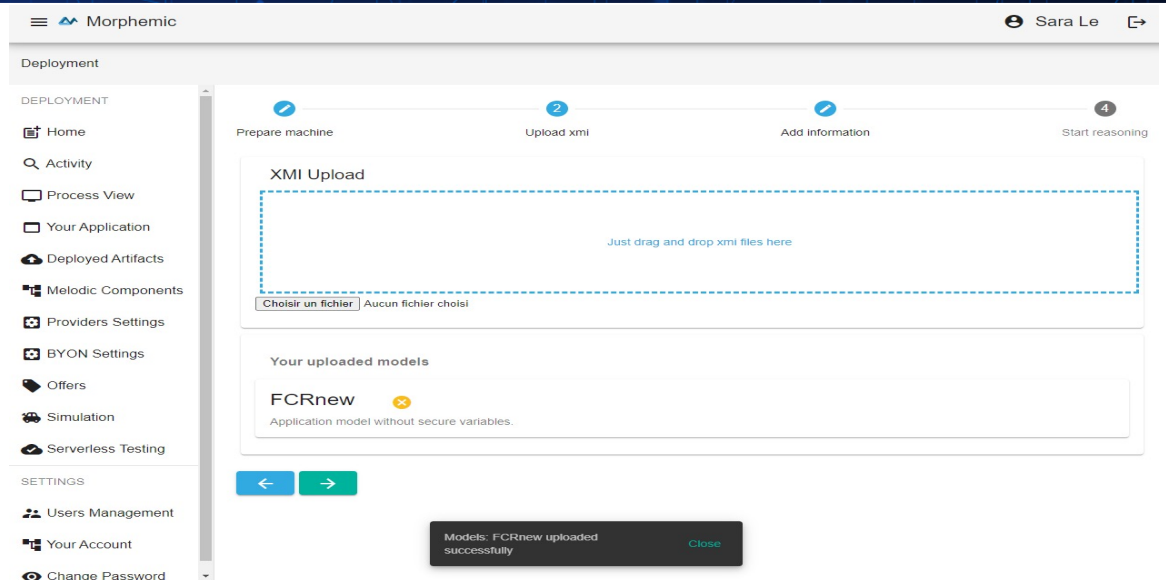
https://github.com/Modelio-R-D/CamelDesigner

Cloud Application Modeling with the Modelio CAMEL Designer (2/2)

- *A model explorer shows the hierarchy of the persisted model elements and allows to create, delete and copy/paste other model elements*
- *A set of tools is provided for each diagram to allow the user to modify the model such as adding new elements, properties, dependencies or just customizing the visual appearance of the elements illustrated in the diagram*



The MORPHEMIC Platform User Interface CAMEL Model Upload



Upload a CAMEL file in XMI format

MORPHEMIC Benefits

- Data Intensive Cloud applications performance and usability are maximised by the deployment in the best environment identified by clear decision parameters, application up time is improved due to predictive analysis of the application's future state.
- Data intensive application are offered a selection of cloud providers with potential cost saving and vendor lock avoidance due to predictive analysis of the application's future state.

References

- MORPHEMIC Project https://www.morphemic.cloud/
- CAMEL Designer Module Modelio pour CAMEL https://github.com/Modelio-R-D/CamelDesigner
- Modelio open source comunity: www.modelio.org
- CAMEL DSL https://camel-dsl.org/
- Morphemic Platform on OW2 GitLab, Available at: https://gitlab.ow2.org/melodic/morphemic-preprocessor

Thanks!!

Alessandra Bagnato
Softeam Software R&D
Alessandra.bagnato@softeam.fr
@alebagnato

www.softeam.fr

Follow MORPHEMIC project
@_morphemic_

RESEARCH @ ECLIPSE FOUNDATION

CW2