

MODAClouds



The main goal of MODAClouds is to provide methods, a decision support system, an open source IDE and run-time environment for the high-level design, early prototyping, semi-automatic code generation, and automatic deployment of applications on multi-Clouds with guaranteed QoS.

AT A GLANCE

Project title:

MOdel-Driven Approach for design and execution of applications on multiple Clouds

Project coordinator

Politecnico Di Milano (IT)

Scientific coordinator:

Stiftelsen SINTEF (NO)

Collaboration coordinator:

Institute e-Austria Timisoara (RO)

Partners:

Imperial College of Science, Technology and Medicine (UK),
SoftTeam (FR),
Siemens Program and System Engineering SRL (RO),
BOC Information Systems GmbH (AT),
Flexiant Limited (UK),
Atos Spain SA (SP),
CA Technologies Development Spain SA (SP)

Duration:

October 2012 – September 2015

Total cost:

€ 8.6 M

Website:

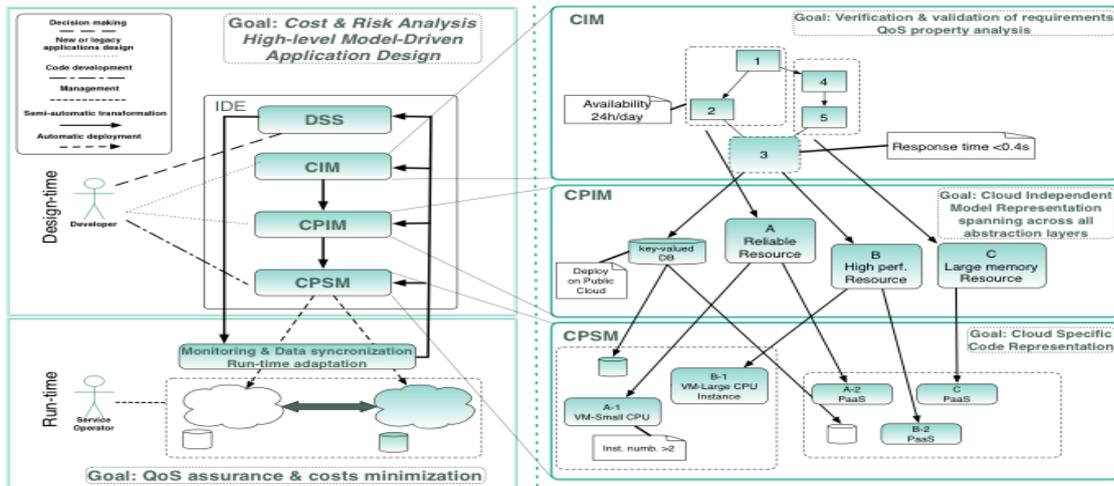
<http://www.modaclouds.eu>

Context

Cheap and flexible services to end-users at a much larger scale than before are promised by Cloud computing. However, Cloud business models and technologies are still in their initial hype and characterized by critical early stage issues, which pose specific challenges and require advanced software engineering methods.

Proposed solution

Model-driven development combined with novel model-driven risk analysis and quality prediction will enable developers using MODAClouds technologies to specify Cloud-provider independent models enriched with quality parameters, implement these, perform quality prediction, monitor applications at run-time and optimize them based on the feedback, thus filling the gap between design and run-time. Additionally, it will provide techniques for data mapping and synchronization among multiple Clouds. MODAClouds innovations thus are: (i) simplify Cloud provider selection favoring the emergence of European Clouds; (ii) avoid vendor lock-in problems supporting the development of Cloud enabled Future Internet applications; (iii) provide quality assurance during the application life-cycle and support migration from Cloud to Cloud when needed.



Expected impact

The vendor neutral solution will enable the use of a multiple Cloud solutions and the ability to migrate from Cloud provider to provider. This will increase the competitive advantage and agility of European Cloud providers or Cloud brokers. The proposed abstractions over Cloud providers will reduce the complexity of implementation over multiple Clouds, thus increasing the possibilities of SMEs to realise benefits. Moreover, the proposed solution will improve trust in Cloud-based applications by monitoring performance and behaviour and providing an approach for moving applications and data from Cloud to Cloud according to requirements. MODAClouds will enable a better control over services of Cloud providers, and the possibility to combine services from different Cloud providers. It will define design and run-time quality measures, prediction models, and assurance techniques. The project will offer mechanisms and guidelines for the migration of legacy applications to the Cloud by supporting the measurement and identification of non-functional characteristics of these applications in their original environments, and by guiding developers in defining the right modelling abstractions for these applications. Key components such as an approach for

modeling functional and non-functional properties, an integrated development environment, a decision support system and a run-time environment will be developed as open source solutions.

Approach

MODAClouds solution targets system developers and operators by providing them with tools that support the following software system life-cycle phases:

1. *Feasibility study and analysis of alternatives*: a special tool will enable developers in analyzing and comparing various Cloud solutions.
2. *Design, implementation and deployment*: the IDE will support a Cloud agnostic design of software systems, the semi-automatic translation of design artifacts into code, and their deployment on the selected target Clouds.
3. *Run-time monitoring and adaptation*: The run-time layer will (i) enable system operators in overseeing the execution of the system on multiple Clouds; (ii) automatically trigger some adaptation actions (e.g., migrate some system components from a IaaS to another offering better performances at that time); and (iii) provide run-time information to the design-time environment that can inform the software system evolution process.

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