DOSSIER-Cloud
DevOpS-based Software engIneERing for the cloud

Project

DOSSIER-Cloud is a 3–year project that proposes a series of coordination and support actions for promoting research in the area of Software Engineering for Distributed Systems development. It brings together two internationally recognized scientific groups from the Netherlands (University of Tilburg UvT) and Italy (Politecnico di Milano POLIMI) that collaborate with Cyprus University of Technology (CUT).

Aim

The aim of DOSSIER-Cloud is to facilitate transfer of scientific knowledge and expertise, as well as of best research practices from UvT and POLIMI to CUT and ultimately strengthen the research and scientific profile of the partners in the relevant area.

Activities

A series of actions and activities were organized and performed aiming to transfer the scientific knowledge to CUT members in the area of DevOps oriented software engineering:

First of all, CUT members participated in a number of site visits in Milan, where researches from POLIMI delivered lectures related to software development and deployment for distributed applications. The site visits in POLIMI were concluded with a workshop, during which members of all project partners came forward with a deeper discussion on topics that needed to be studied further in order to be exploited according to the project's objectives.

A new series of site visits in the Netherlands followed. Researches from CUT attended various lectures given by UvT members that included DevOps principles and workflows, and were focused on applied techniques and methodologies. The topics mentioned during the UvT visits were summarized and presented in a workshop that followed. Project partners examined research opportunities and applications, and discussed possible collaborations and focus of effort for submitting joint proposals to H2020 calls in order to attract further funding.

Two mini-schools on Cloud Computing and Software Services were organized in Cyprus at the CUT's premises. The schools included project meetings, lectures by senior researches from POLIMI and UvT, a stakeholders meeting and a workshop.

During the 1st mini-school researchers from POLIMI delivered lectures to audiences consisted of undergraduate and graduate students at the dept. of Computer engineering and Informatics of CUT, as well as members of the academic staff. Throughout the stakeholders' meeting and workshop, the DOSSIER-cloud project was presented to various representatives from the Cypriot market industry, and the public sector.

The activities of 1st year were completed with the 2nd mini-school which followed the same structure and organization with the 1st mini-school. During the 2nd mini-school senior researchers and academics from UvT delivered talks on relevant topics of the project and discussed with CUT's undergraduate and graduate students issues related to distributed systems, service oriented computing, Internet of Things and smart processing.

Outcomes and Research

The series of site visits and the activities performed for sharing of knowledge between the participating universities during the first year of the project enabled the identification of several research challenges and subjects :

- **Social Software Engineering**
  - Modeling and analysis of the organizational and social structures of teams aiming at investigating their impact on the software process for Cloud services
  - Improvement of teams' organizational and social structure targeting at optimizing the software process by decreasing waste (time, effort, code)
  - Definition and analysis of the optimal organizational structure for DevOps strategies that results in a framework/guideline for better organizational configuration setups
- **Cloud Pricing**
  - Development of solutions for optimizing pricing policies
  - Focus on supporting cloud providers to offer an attractive pricing scheme to their customers targeting to maximize their profit, while at the same time taking into account their services cost and market competition
- **Cloud Resource Management**
  - Proposition of a dedicated group of services that support resource management on the Cloud (workload prediction, dynamic provisioning, automatic resource management)
  - Utilization of CI/AI techniques to address Cloud optimization problems
- **Self Adaptive Systems for the Cloud**
  - Evolve MAPE (Monitor-Analyze-Planning-Execute) control loops to deal with complex scenarios of Cloud services and/or resource management by replacing conventional techniques (e.g. control theory) with Computational Intelligence / Artificial Intelligence models

Small groups with specific research focus have been formed to examine each of the aforementioned challenges and start investigating the relevant subjects in more depth targeting at producing high quality and publishable research outcomes.

Outcomes and EU Funding

The collaboration and brainstorming between the teams of the participating universities during the series of site visits performed in the first year of the project facilitated the production of a new proposal for funding under the Horizaon2020 framework, and more specifically in the pillar Spreading Excellence and Widening Participation, which is closely related to the Dossier Cloud project.

The new project is called ARTEMIS and it was submitted to the WIDESPREAD-04-2017: Teaming Phase 1 call. The consortium consists of the three partners in Dossier Cloud and additionally the Laboratoire d'InfoRmatique en Image et Systèmes d'information / CNRS from Framnce, the Fraunhofer Institute for Industrial Engineering from Germany, and the Cyprus Chamber of Commerce and Industry.

Proposal Abstract

The SmARt DaTa and SystEMs of Deep InSight for Sustainable Development (ARTEMIS) consortium will provide a unique,invaluable contribution to the pursuit of excellence in Cyprus' research and innovation system. It will establish an outward looking Centre of Excellence by launching a high concentration of outstanding cutting-edge research in the fast-growing area of Smart Data, Services & Applications that is vital for Cyprus' and Europe's competitiveness.

ARTEMIS boasts an impressive partnership of 4 leading European research institutions that together with Cyprus Univ. of Technology will conduct ground-breaking research and push the frontiers of knowledge in Smart Data by converting raw data into valuable insights leading to smarter decisions, increased automation, performance improvement and substantial cost savings.

The ARTEMIS business plan will ensure that it will deliver new discoveries that are crucial to Cyprus and the region's knowledge base and innovative capacity, creating the scientific breakthroughs essential to propel an agglomeration of high-tech industrial activity and attract funding. ARTEMIS will be properly embedded with the regional and national structures of Cyprus and become part of its "innovation system" by targeting squarely its Smart Specialization Strategy.

Research in ARTEMIS will be embedded in priority sectorial specialization areas such as tourism, healthcare, shipping and food industry for sustainable development to generate broader social and economic benefits. This is expected to attract international collaborations and top talent and lead to successful partnerships with government and local industry encouraging greater investment and job creation.

ARTEMIS targets at progressively becoming financially autonomous by following a well-defined, realistic business plan comprising analysis of the potential markets, financial planning of the Centre and market strategy for the introduction of the products and services it will deliver.

Consortium

Software Engineering and Intelligent Information Systems Research Lab

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