Cluster of Cloud related actions

Novel approaches and technologies for Cloud resource and service management

eucloudclusters.wordpress.com/new-approaches-for-infrastructure-services

Cluster membership

- Started in June 2015
- 20 actions/projects from H2020-ICT/FP7-ICT/CIP-ICT

Cluster Objective

Forum

for discussing

the current research and innovation challenges

encountered at infrastructure-as-a-service level

and generated by the desire

to improve

the user experiences

and the efficient use of the available resources

Goals

- ✓ define a **map of the challenges**
  related to the group topics & approaches /actions
- ✓ identify **complementarities and synergies**
  for collaboration & results adoptions by other actions
- ✓ identify **new challenges**
  to influence the new research agendas by providing recommendations
- ✓ organisation of **common dissemination actions** like
  common publications (e.g. articles, white papers)
  trainings and workshops

Documents

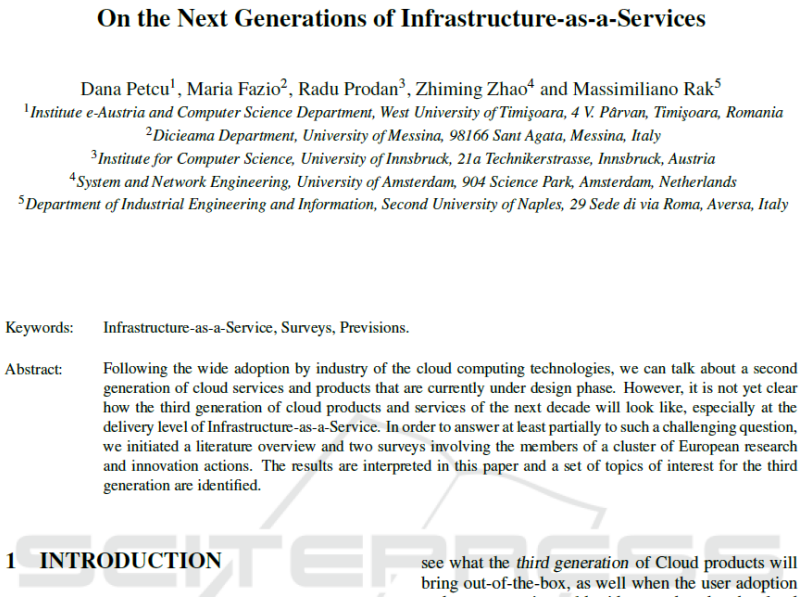
- **Map of challenges**, Oct 4, 2015
- **Recommendations for the WP18-19**, Dec 24, 2015, based on a questionnaire from Nov 2015
- **White paper,** Apr 15, 2016

Examples of joint events

- **MICAS 2015**, 21 Sept 2015, 1 tutorial, 6 action presentations
- **Booth at NetFuture 2016**, 20 Apr 2016

Examples of joint papers/vols

- **Paper at Closer 2016**, 24 Apr 2016, 5 actions
- **Special Issue of Scalable Computing** Journal, 11 Oct 2016, 5 actions



On the Next Generations of Infrastructure-as-a-Services

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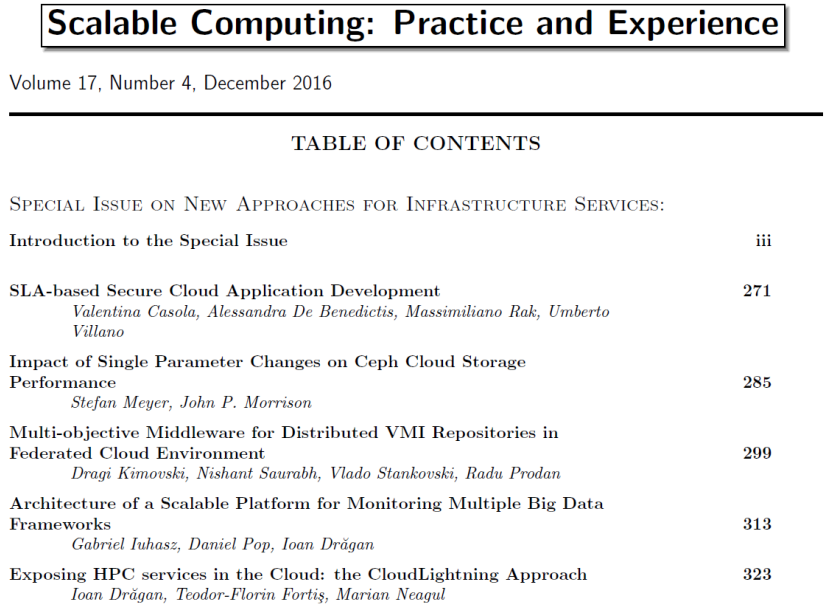
Keywords: Infrastructure-as-a-Service, Surveys, Previsions.

Abstract: Following the wide adoption by industry of the cloud computing technologies, we can talk about a second generation of cloud services and products that are currently under design phase. However, it is not yet clear how the third generation of cloud products and services of the next decade will look like, especially at the delivery level of Infrastructure-as-a-Service. In order to answer at least partially to such a challenging question, we initiated a literature overview and two surveys involving the members of a cluster of European research and innovation actions. The results are interpreted in this paper and a set of topics of interest for the third generation are identified.

1 INTRODUCTION

see what the *third generation* of Cloud products will bring out-of-the-box, as well when the user adoption



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Instead conclusions

- **Goals**
  - were achieved in the proposed time scale (1.5 year)
- **Web site with the documents:**

  https://eucloudclusters.wordpress.com/new-approaches-for-infrastructure-services
- **Contacts:**
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Agenda

- 09:30-09:45Radu Prodan, NATRES cluster and ENTICE
- 09:45-9:55 Roberto Bruschi, INPUT
- 9:55-10:05 Paul Martin, SWITCH
- 10:05-10:15 John Kennedy, MIKELANGELO
- 10:15-10:25 Pedro Garcia Lopez, IOSTACK
- 10:25-10:45 Massimiliano Rak, SPECS & MUSA
- 10:45-10:55 Anastasios Zafeiropoulos, ARCADIA
- 10:55-11:55 All, Next steps on the cluster activities

Project Innovations

- ARCADIA
  - Toolkits for novel reconfigurable-by-design application development paradigm over programmable infrastructure
  - Software engineering, optimized deployment and orchestration, policy management framework
- BEACON
  - Open source Cloud network federation integrated with OpenNebula and OpenStack for Cloud management
  - Integrated virtualization layer for elastic, secure, location-aware federated deployment of Cloud applications on top of heterogeneous underlying physical networks, computing and storage infrastructures
- CLOUD LIGHTNING
  - New delivery model for self-organizing self-managing heterogeneous Cloud
  - Formation of heterogeneous collections of homogeneous resource coalitions with different quality, reliability, cost and power capabilities

Project Innovations

- CloudWave
  - Tools for feedback-driven application development and operation activities
  - Coordinated infrastructure and application adaptation based on generation, analysis and aggregation of monitoring data at all levels on the Cloud stack
  - Stakeholders: Cloud operators, application developers, application operators
- CloudT
  - Cloud Computing as an efficient communication and collaboration platform of the Internet of Things with Internet of People via Internet of Services,
  - Cloud storage interface, dynamic scalability, service development
- DICE
  - UML-based model-driven engineering approach and quality assurance tool chain for optimized data-intensive Cloud applications
  - Advanced tools for simulation, verification, optimization, iterative design, deployment and testing

Project Innovations

- ENTICE
  - Distributed lightweight VM image storage for transparent, decentralized and highly optimized VM management in federated Clouds
  - Multi-objective VM and repository optimization based on size, cost and elasticity
  - Released as GitHub repository with AppHub under evaluation
- iKaaS
  - Open source, distributed and decentralized multi-Cloud platform for IoT, Big Data applications
  - Autonomic service instantiation and reconfiguration based on Service Catalogues, Service Managers and Security Gateways
- IOSTACK
  - Software-defined Storage for reduced costs of Big Data management in Clouds
  - Filters, monitoring metrics, policies, controller
  - Contribution to OpenStack

Project Innovation

- INPUT
  - Improve resource and service management in the edge network for hosting both software/network virtualized operations and fog applications/services
  - Resource/application configuration, instantiation and migration of virtualized Cloud services through consolidation, orchestration and monitoring (utilization and power)
  - Stakeholders: Telecom operator and Cloud service provider
- MIKELANGELO
  - Unified virtualization stack for HPC and Clouds
  - Tools for optimized I/O and reduced virtualization and management overhead integrated into OpenStack
- MCN
  - Architecture for future mobile network deployment and self-operation onto the Cloud
  - Business scenarios and models for cloudified composed service delivery

Project Innovations

- MODAClouds
  - Model-driven toolbox for multi-Cloud resource management
  - IDE, decision support system, runtime environment
- RAPID
  - Mobile remote acceleration based on high-performance GPUs and networks
  - Acceleration client/service, directory service, SLA and VM managers
- SPECS
  - SLA-based security-as-a-service
  - Negotiation, monitoring and enforcement of user and provider-centric SLAs
  - Bitbuket repository

Project Innovations

- SWITCH
  - Tools for development, deployment, execution and control of time-critical applications on Clouds
  - Application-infrastructure co-programming and control model that considers QoS, QoE, programmability and controllability of the Cloud environment
  - Open source GitHub release under Apache license
  - AppHub and EGI marketplaces considered for future