PrEstoCloud - Proactive Cloud Resources Management at the Edge for Efficient Real-Time Big Data Processing

Results

Project information

PrEstoCloud

Grant agreement ID: 732339

Project website

Status
Ongoing project

Start date
1 January 2017

End date
31 December 2019

Funded under:
H2020-EU.2.1.1.

Overall budget:
€ 4 256 502,50

EU contribution
€ 4 256 502

Coordinated by:
SOFTWARE AG
Germany

Deliverables

Other (12)

PrEstoCloud Security Enforcement Mechanism - Iteration 1
Research and development of appropriate microservices for enforcing security at the PrEstoCloud platform.

Mobile Context Analyser - Iteration 1
This deliverable will report on the first iteration of the context model and the inferencing engine for analysing contextual information derived from any resources at the extreme edge of the network.

Mobile Offloading Processing Microservice - Iteration 1
This deliverable will report on the first iteration of the Mobile Offloading Processing microservice that will follow the instructions of the Autonomic Resources Manager for finding appropriate mobile devices and efficiently offloading processing nodes from the RTPN.
Inter-site Network Virtualization Orchestrator - Iteration 1
This deliverable will report on the first iteration of the orchestrator mechanism for managing the inter-site network virtualization.

Autonomic Data-Intensive Application Manager - Iteration 1
This deliverable will provide the application manager with the meta-scheduling capabilities for big data processes

Fog Deployment and Monitoring Services - Iteration 1
This deliverable will provide the implementation of the monitoring services for the Fog/Cloud infrastructure.

Placement algorithms and implementation - Iteration 1
This deliverable provides the algorithms and implementation of the placement and scheduling over the cloud infrastructure extended to the extreme edge of the network.

Autonomic Resource Manager - Iteration 1
This deliverable will provide a demonstrating prototype of the cloud/fog resource manager which will be given in the iteration

Communication Broker - Iteration 1
This deliverable will include the deployment of enterprise service bus that will support the basic publish/subscribe functionalities. In addition, it will provide the necessary adapters for plugging into the PrEstoCloud platform the Big Data streams of the project’s pilots.

PrEstoCloud Situation Detection Mechanism - Iteration 1
Research and development of a situation detection mechanism that recognizes interesting situations that might lead to resources adaptation recommendations or data-intensive application reconfiguration or redeployments. The first version of this deliverable also includes a report on the meta-model that captures all the important aspects for enhancing with situation awareness the PrEstoCloud platform.

Spatiotemporal Processing Capabilities - Iteration 1
This deliverable will report on the first iteration of the spatio-temporal processing mechanism with enhanced ad-hoc autonomous computing capabilities in order to cope with poor network coverage situations.

Resources Adaptation & Data-intensive Application Recommenders - Iteration 1
This deliverable will report on the two PrEstoCloud recommenders in the first iteration. It includes the research and development of two microservices: i) the first one is able to
recommend at the appropriate time, the necessary adaptations of the RTPN, ii) the second one will assist in the appropriate fragmentation of data-intensive applications into smaller parts that can be efficiently deployed over network resources.

**Documents, reports (11)**

**PrEstoCloud Conceptual Architecture**
This deliverable gives a bird's view on the general architecture of the system and should lay a foundation for the integration. Each component will be described through its functional and non-functional requirements.

**Architecture of the PrEstoCloud platform**
Gathering of all components to take part of the integrated system. Design of the system architecture. Refinement of requirements based on the technology developed in the first year of the project.

**Communication Roadmap & Activities Report - Iteration 1**
This iteration of this deliverable will report on the expected project outputs and communication activities and will prepare the project’s website, short reports, press releases, whitepapers and flyers.

**Communication Roadmap & Activities Report - Iteration 2**
This iteration will report on the accomplished communication activities.

**Requirements for the PrEstoCloud Platform**
This deliverable will collect initial requirements for PrEstoCloud platform in terms of functionality, interfaces (hardware and software) and information flow. Well-established methodologies for system requirements capturing and description will be used to minimise risks from the wide scope of the PrEstoCloud platform.

**Dissemination and Standardisation Plan and actions - Iteration 1**
This deliverable describes the dissemination policy of the project, defining the target audience, the methodology and approach of our dissemination. Report on the dissemination activities, including applied dissemination methodology and examples of achieved scientific publications. Moreover, this document will discuss adoption and contributions to standardisation activities.

**Report on scientific and technological state-of-the-art analysis**
This deliverable will report on the current related work in all the relevant research areas of PrEstoCloud project. Additionally, it will provide description of the pre-existing tools available within the consortium or open-source and repository available for the rest of
the project partners.

**PrEstoCloud showcase - Iteration 1**

This 1st version will contain a specification of the PrEstoCloud industry showcase including design of promotion material and requirements for software needed to run the showcase.

**PrEstoCloud Semantic model**

This deliverable will describe a semantic model that will allow Big Data application developers to annotate their code with respect to data-intensive application fragmentation and deployment.

**Format and procedures for plugging in real-time data streams**

This deliverable will provide format, procedures and adaptors for plugging Big Data streams to the PrEstoCloud platform.

**Project KPI Report**

Within the first 4 months of the project, a set of Key Performance Indicators (KPIs) will be developed and agreed with the Project Officer.

**Open Research Data Pilot (2)**

**Data Management Plan Update 1**

first update of the data management plan as preparation of m18 review

**Initial Data Management Plan**

This deliverable will clarify which of data will be made openly available.

**Publications**

**Conference proceedings (9)**

**Wide Area Video Surveillance Based on Edge and Fog Computing Concept**

**Author(s):** Kioumourtzis, George; Skitsas, Michael; Zotos, N; Sideris, A

**Published in:** 8th International Conference on Information, Intelligence, Systems & Applications (IISA), Issue 1, 2017

**DOI:** 10.5281/zenodo.1138596

**Quality of Experience Estimation for WebRTC-based Video Streaming**

**Author(s):** Yevgeniya Sulema ; Noam Amram ; Oleksii Aleshchenko ; Olena Sivak
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Author(s): Verginadis, Yiannis; Alshabani, Iyad; Mentzas, Gregoris; Stojanovic, Nenad
Published in: 7th International Conference on Cloud Computing and Services Science (CLOSER 2017), 24-26 April 2017, Issue 3, 2017
DOI: 10.5281/zenodo.1133307

PrEstoCloud: Proactive Cloud Resources Management at the Edge for Efficient Real-Time Big Data Processing

Author(s): Salman Taherizadeh, Blaz Novak, Sebastjan Vagaja, Marija Komatar and Marko Grobelnik
Published in: KDD 2018 Project Showcase Track, 2018

Challenges and Research Directions in Big Data-driven Cloud Adaptivity

Author(s): Andreas Tsagkaropoulos, Nikos Papageorgiou, Dimitris Apostolou, Yiannis Verginadis and Gregoris Mentzas
Published in: 8th International Conference on Cloud Computing and Services Science CLOSER 2018, 2018

Towards Massive Consolidation in Data Centers with SEaMLESS

Author(s): Andrea Segalini; Dino Lopez Pacheco; Quentin Jacquemart; Myriana Rifai; Guillaume Urvoy-Keller; and Marcos Dione
Published in: 18th IEEE/ACM International Symposium on Cluster, Cloud and Grid Computing (CCGrid 2018), 2018

Towards non-intrusive measurements of available bandwidth for multi-cloud applications

Author(s): Alessio Pagliari; Quentin Jacquemart; Guillaume Urvoy-Keller

A data-driven approach for multivariate contextualized anomaly detection: industry use case

Author(s): Stojanovic, Nenad; Dinic, Marko; Stojanovic, Ljiljana
Published in: 2017 IEEE International Conference on Big Data, Issue 3, 2017
DOI: 10.5281/zenodo.1159124

Seamless Task Offloading on Multi-Clouds and Edge Resources: an Experiment

Author(s): Tsagkaropoulos, Andreas; Verginadis, Giannis; Apostolou, Dimitris; Mentzas, Gregoris
Published in: 8th International Conference on Information, Intelligence, Systems and
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Author(s): Harald Schoening, Software AG
Published in: SummerSoc 2017, Issue 1, 2017
DOI: 10.5281/zenodo.1133312

Dynamic Multi-level Auto-scaling Rules for Containerized Applications

Author(s): Salman Taherizadeh, Vlado Stankovski
Published in: The Computer Journal, 2018, ISSN 0010-4620
DOI: 10.1093/comjnl/bxy043