European Commission

CloudWave

CloudWave aims to revolutionize modern cloud infrastructures and tools by enabling agile development and the delivery of cloud services which dynamically adjust to changes in their environment so as to optimize service quality and resource utilization.

AT A GLANCE

Project title
Agile Service Engineering for the Future Internet

Project number
610802

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Partners
IBM Research Haifa, SAP AG, Intel Performance Learning Solutions, Telecom Italia, Atos, Cloudmore, Universitaet Duisburg-Essen, Universita Degli Studi Di Messina, Technion, Universitaet Zuerich

Duration
November 1, 2014 – Oct 31, 2017

Total cost
€10,331,392

Programme
FP7 ICT *Call 10*

Website
www. Cloudwave-fp7.eu

The need for CloudWave

Cloud computing has evolved from technology hype to one of the most significant developments in ICT in the last decade. While the cloud is proving itself in terms of cost savings for the delivery of various business models such as PaaS (platform as a service), SaaS (software as a service), etc., it has still to address the issue of guaranteeing the quality of the delivered software services, and by supplying relevant feedback, holds the potential to reduce the development cycle of these services.

In order to address these challenges and given Europe a competitive edge, CloudWave is researching novel technologies for optimizing service quality, resource utilization and cost for cloud-aware SaaS applications though dynamic feedback and optimization of the cloud infrastructure, where the term infrastructure refers to the physical and virtual servers which offer computation, storage and networking resources as well as Internet of Things (IoT) connectivity to the services deployed over them.

The CloudWave solution

The CloudWave architecture is built upon three main innovations:

Execution Analytics – where programmable mechanisms and

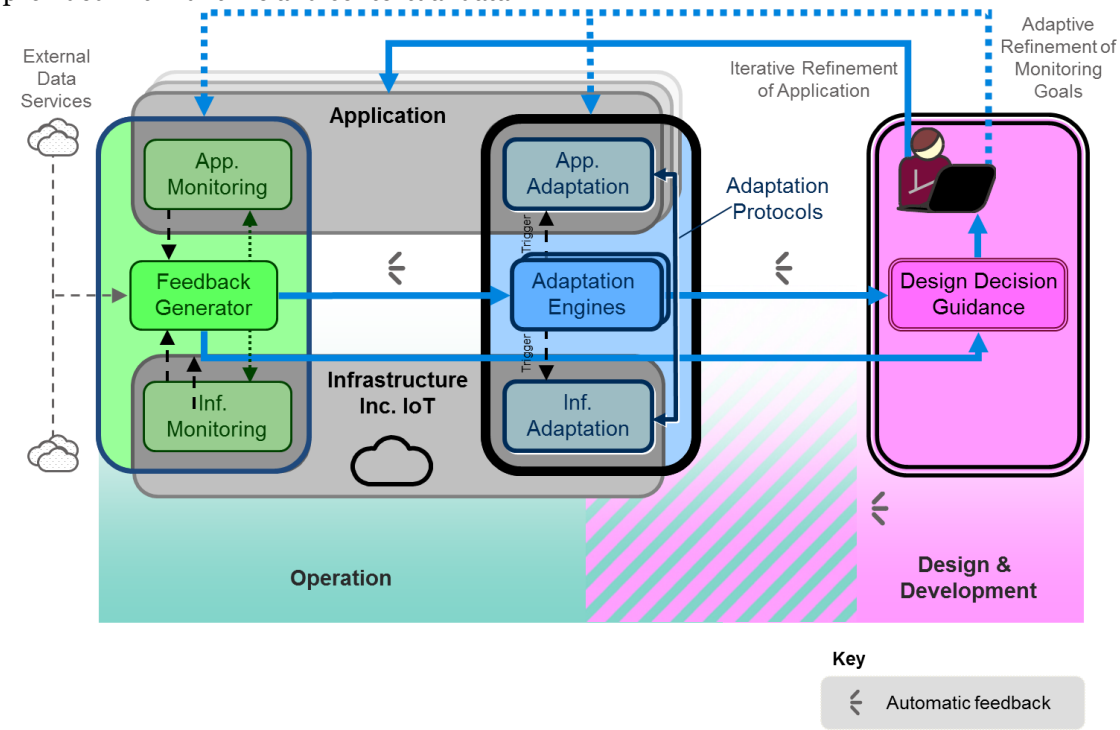
specialised algorithms are used to dynamically introspect and analyse Cloud infrastructure and application behaviour, using open interfaces, seamlessly integrating data pertaining to physical resources, virtualized resources and IoT elements, thereby supporting application adaptation and agile incremental development.

Coordinated Adaptation – where distributed algorithms and data models enable cloud infrastructures and applications take coordinated adaption actions in response to the dynamic changes in their environment to optimize service quality and resource utilization.

Feedback-driven Development – where business application developers are provided with runtime and contextual data to allow them to enhance their applications based on the actual operating conditions.

As shown in Fig. 1, when combined together, these three main architectural components can not only create a dynamically optimized service delivery platform, but also help shortened the development cycle for further improvements to the hosted applications.

Figure 1. CloudWave architecture



Expected impact of CloudWave

CloudWave expects to make an impact on the way that cloud applications are designed and adopted in order both to gain a higher quality of service and reliability for cloud based applications, and also to allow for shorter development cycles of these services.

CloudWave's industrial partners represent both cloud server providers and cloud infrastructure provides. CloudWave's use cases will not only analyze the business requirements of these partners, but will also serve as a means of verifying the CloudWave reference architecture.

It is expected that a number of CloudWave innovations will be contributed to the OpenStack community, and the project's industrial partners are committed to bringing CloudWave results back into their organizations.