



# RECAP:

## Reliable Capacity Provisioning and Enhanced Remediation for Distributed Cloud Applications

RECAP is a Horizon 2020 project to develop the next generation of cloud/edge/fog computing capacity provisioning and remediation via targeted research advances in cloud infrastructure optimisation, simulation and automation. The outcomes of the project will pave the way for a radically novel concept in the provision of cloud services, where services are elastically instantiated and provisioned close to the users that actually need them via self-configurable cloud computing systems.

### AT A GLANCE

#### Project title

**RECAP - Reliable Capacity Provisioning and Enhanced Remediation for Distributed Cloud Applications**

#### Project coordinator

Ulm University, Germany

#### Partners

Umeå University, Sweden  
Dublin City University, Ireland  
IMDEA Networks Institute, Spain  
Tieto, Sweden  
Linknovate, Spain  
Intel, Ireland  
SATEC, Spain  
BT, United Kingdom

#### Duration

01. 2017 – 12. 2019

#### Total cost

4,607,871.25 €

#### EC Contribution

4,607,871.25 €

#### Programme

H2020-ICT-2016-2017

#### Further information

<http://www.recap-project.eu/>  
[@recap2020](https://twitter.com/recap2020)

### Context and motivation

The cloud is a key enabling technology for connected people and computers. Tens of billions of devices are already connected to the Internet and whilst the cloud supports this connectivity at hyperscale, it is slowly reaching the end of its capacity. Modern network structures currently place data centre resources and servers closer to the end user to overcome the growing latency and delays arising from the growing usage. Despite advances in technologies, most services and resources are still provided in a best-effort fashion and quality of service cannot be controlled.

### Challenge

While recent years have seen significant advances in system instrumentation as well as data centre energy efficiency and automation, computational resources and network capacity are often provisioned using best-effort models and coarse-grained quality-of-service (QoS) mechanisms, even in state-of-the-art data centres. These limitations are seen as a major hindrance in the face of the coming evolution of the Internet of Things (IoT) and the networked society, which are projected to significantly increase the load on networks and data centres, as well as require a much higher degree of intelligent automation.

## Solution

RECAP will develop the next generation of cloud, edge and fog computing capacity provisioning via targeted research advances in cloud infrastructure optimisation, simulation and automation. It will incorporate a much more elastic model, which delivers services and allocates resources in a dynamic manner, tied to time-varying user requirements. This will ensure that communication critical applications will always achieve their goals without unnecessary delays, no matter where they are located. To fulfil the vision of RECAP, the project will define and implement a novel architecture:

**The RECAP Collector** gathers, synthesizes and analyses relevant monitoring metrics across the infrastructure, focusing on the edge layer.

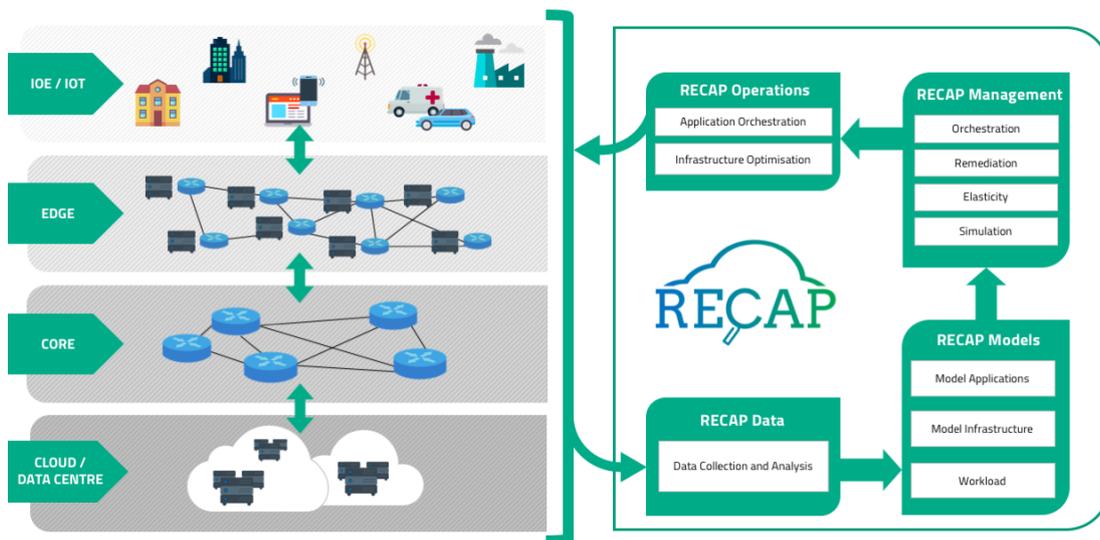
**The RECAP Application Modeller** addresses the challenge of discovering and

defining applications internal structure as well as their quality of service requirement.

**The RECAP Workload Modeller** implements model decomposition, classification and prediction of workloads, as well as models for how the load propagates in applications.

**The RECAP Optimiser** uses infrastructure more efficiently and maintains application KPIs through infrastructure optimisation techniques and application placement optimisation.

**The RECAP Simulator** assists the RECAP Optimiser to evaluate different trade-offs such as cost, energy, resource utilization, allocation of resources and performance, before actually applying them into the real deployment



## Expected impact

The project will solve known constraints and offer genuine commercial benefits to the consortium partners and other European adopters of the RECAP output.

The expected results include:

- Distributed and efficient data collection on heterogeneous infrastructures.
- Data science analysis for automated infrastructure and application modelling.

- Intelligent automation by automated cloud infrastructure optimisation.
- End-to-end component-level quality assurance by capacity provisioning.
- Application and infrastructure simulation for cloud optimisation.
- System observability by visualizing data collection and modelling results.
- Improved resource utilisation and user satisfaction.