

Autopoietic Cognitive Edge-cloud Service



Value Proposition

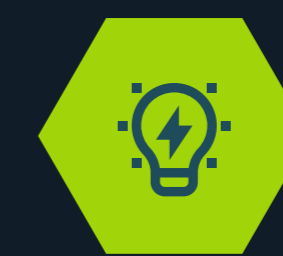
- AI/ML supported edge-cloud service deployment
 - Efficient operations of distributed infrastructure for edge-services for data-dense environment
- Functions optimized for Edge distributed infrastructure regarding energy consumption, data transfers, security bandwidth, GDPR



Context and problems

The rapidly increasing quantity and capabilities of connected and interacting edge devices exchanging vast amounts of data are the root cause of the growing demand for cloud services at the edge (edge-services).

Cloud computing architectures at the edge face a number of difficulties as a result, such as: the capacity to provide transaction resiliency; ensuring the stability; AI and transparency.



Solution

- By integrating autopoiesis and cognition at various cloud management levels, ACES will be able to address these issues and provide AI with a variety of capabilities, including:
- allocation of workload, management of services and resources, and management of data and policies
 - intelligent networking
 - UIX-based transparency of autonomous decision making
 - cognitive frameworks for supporting workload placement, service and resource



Scope

ACES will develop a System based on open common architecture, device and platform agnostic and fit on the largest Edge MicroDataCenter down to the smallest server cluster.



Uses Cases

ACES envisions three use-cases: Market place and asset distribution (UC1), Distributed process management (UC2) and IoT based asset monitoring and management (UC3).



Goal

- Improved European leadership in the global data economy
- Reinforced Europe's ability to manage urgent societal challenges
- Maximised social and economic benefits from the wider and more effective use of data

Outcomes

The key outcomes of ACES will be:

- 1) A cognitive cloud-edge framework for autopoiesis;
- 2) AI/ML agents, awareness tools, and service and resource management, data and policy management, telemetry, and monitoring agents for workload placement
- 3) agents that maintain stability under conditions of extreme complexity and load;
- 4) a technique and implementation based on swarm technology for orchestrating resources at the edge;
- 5) an edge-wide optimization and placement service for workloads;
- 6) an app store where AI models used in ACES can be categorized, stored, shared, and rated.

Impact

ACES will be demonstrated and validated in three scenarios that require support for highly decentralized computing, the capacity to make autonomous decisions, a reduction in the costs of cloud-edge management, an increase in efficiency, and a reduction in environmental impact.

A distributed, opportunistic, collaborative, heterogeneous, self-managed, and self-organizing environment for edge services is the goal of ACES. This environment will be primarily edge-to-edge (east-west) and then on the edge-to-cloud continuum (south-north). a cognitive edge-services architecture in which multiple agents (AI, ML) perform autonomous actions on edge-services, the edge-services software stack, and edge-services hardware Mesh for Edge MicroDataCenters (EMDC)..