

## **COLMENA: COLaboración entre dispositivos Mediante tecnología de ENjAmbre**

### **Description**

The COLMENA project addresses data processing challenges in the IoT landscape, where data collection predominantly occurs on IoT devices, but about 80% of processing occurs in centralized data centres. This approach leads to communication delays, high energy consumption, and underutilization of device resources. COLMENA seeks to transform this paradigm by enabling collaborative IoT and edge devices, reducing reliance on the Cloud, and enhancing system efficiency.

COLMENA's core objective is to streamline developing, deploying, and managing reliable services across IoT, edge, and Cloud domains. It proposes a decentralized architecture, uniting autonomous nodes into dynamic, collaborative groups (swarms). Over 30 months, the project plans to identify service needs, define a simplified programming syntax, design a software stack for swarm platforms, implement stack components, and deploy a pilot use case for evaluation.

The project envisions significant technological advancements, including pioneering swarm programming and personalized data exchange solutions. It also aims to enhance the Quality of Experience, decentralized service orchestration, and data management in IoT-Edge-Cloud environments. These contributions bolster Europe's edge computing market presence and benefit all stakeholders by simplifying service development and supporting adaptability.

COLMENA's platform empowers providers to deploy services without vendor constraints, promoting efficiency and adaptability. Device collaboration reduces costs, cloud-based computation, and network congestion during operation, ultimately improving energy efficiency.

COLMENA will promptly share achievements, results, and open-source code with industry and academic communities to maximize impact. This comprehensive endeavour signifies a shift towards collaborative, efficient, and decentralized IoT-Edge-Cloud ecosystems, holding the potential to reshape the technological landscape.

Financiado por la Unión Europea-NextGenerationEU

REGAGE22e00052903679

Barcelona Supercomputing Center - Centro Nacional de Supercomputación

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**Source URL (retrieved on 15 Mar 2025 - 17:25):** <https://www.bsc.es/es/research-and-development/projects/colmena-colaboraci%C3%B3n-entre-dispositivos-mediante-tecnologia-de>