The AC3 project:
Driving the next generation of European computing infrastructure

C. Catalán-Torrecilla, M. Chamorro-Cazorla, S. Pascual, A. Gil de Paz, M. Cividanes, B. Capper, R. Carroll and R. Jenkins.
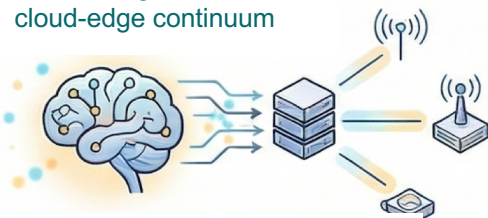
What is AC³ ?

‘Agile and Cognitive Cloud edge Continuum management’
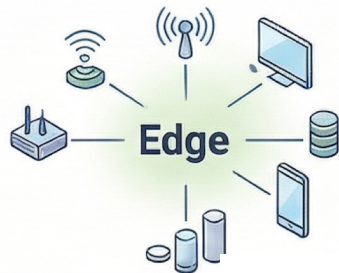
Cloud

What is AC3?

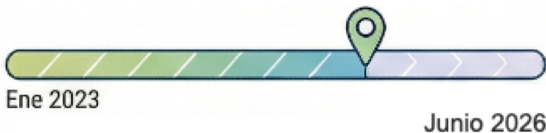Smart management of the cloud-edge continuum

Apply IA to predict resource usage & optimize the microservice location

Edge

GOALS:

To develop a new architecture, zero-touch management and a sustainability-oriented configuration.

Ene 2023

Junio 2026

Horizon Europe Research and Innovation Actions (RIA)

HORIZON-CL4-2022-DATA-01-02 - Cognitive Cloud: AI-enabled computing continuum from Cloud to Edge (RIA call). Total budget: 6M €.

The AC³ project will employ an AI/ML algorithm to predict CECC resources (i.e., Cloud/ Edge Computing resources, networking, and Data) usage as well as far edge availability, which when combined with application profiles, will help determine the optimal placement of the microservices that will run the application on the CECC infrastructure.

A European Consortium (Industry + Academy)

| Participant organisation name	Short name	Country
Athena	ATH/ISI	Greece
Eurecom	EUR	France
IBM	IBM	Ireland
Citrix	CTX	Greece
Hewlett-Packard Enterprise	HPE	Italy
Hewlett-Packard Enterprise - CDS	CDS	Italy
ARSYS	ARS	Spain
IONOS	ION	Germany
Red Hat	RHT	Israel
Spark Works	SPA	Ireland
Ubitech	UBI	Greece
Fingletek	FIN	Finland
Iquadrat	IQU	Spain
Universidad Complutense de Madrid	UCM	Spain
University of Piraeus Research Center	UPR	Greece

Work Packages
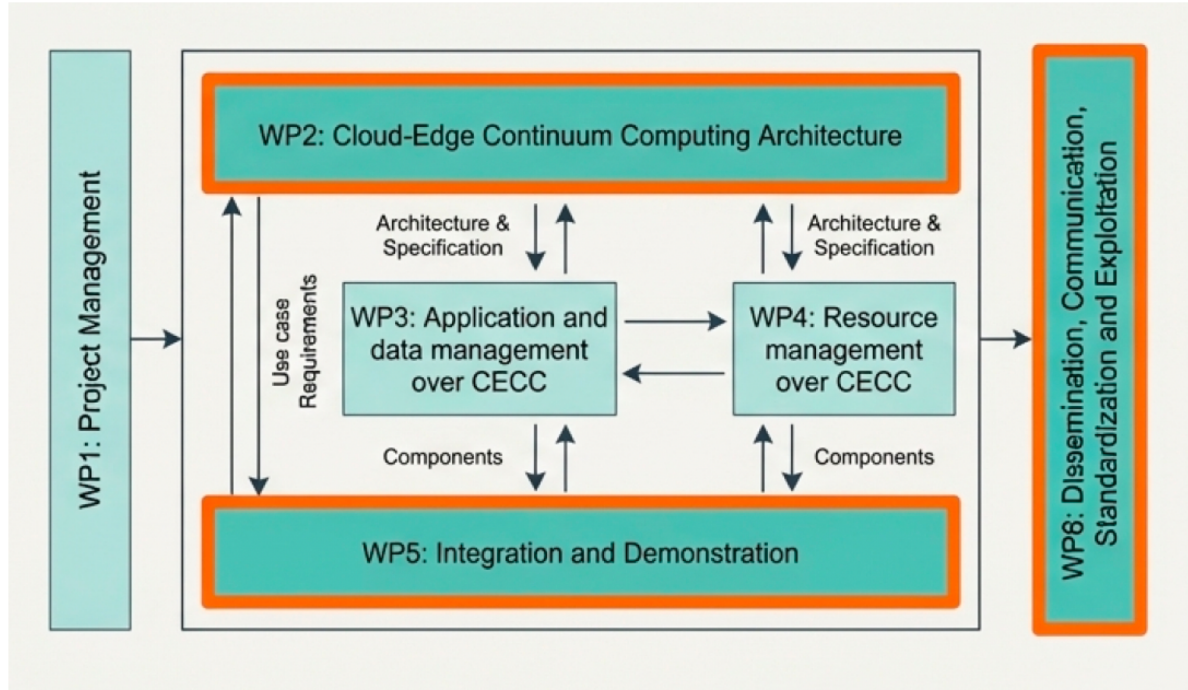
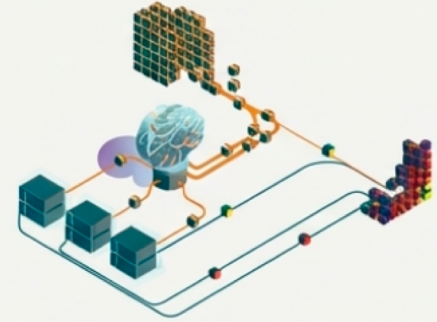Contribution: WP2, WP5 & WP6

Proof of concept: Uses-Cases

AC3 is validated through three scenarios that test its capabilities across different domains.
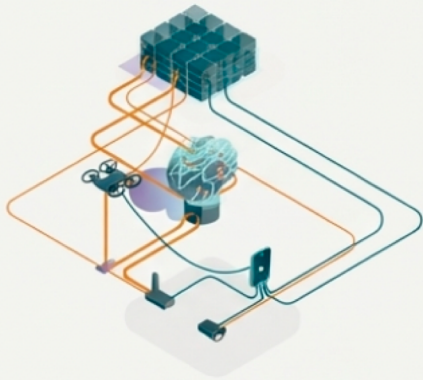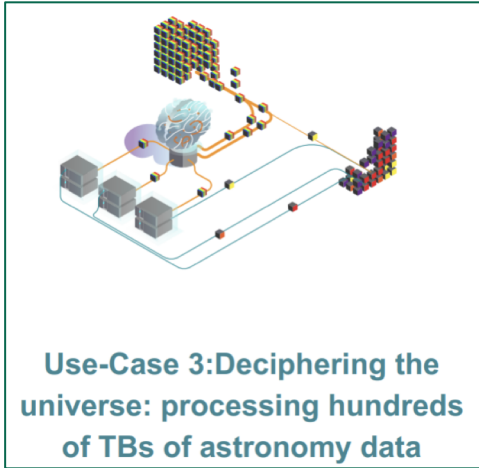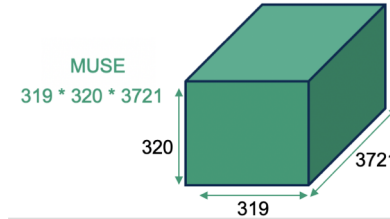

Use-Case 1: IoT and Data
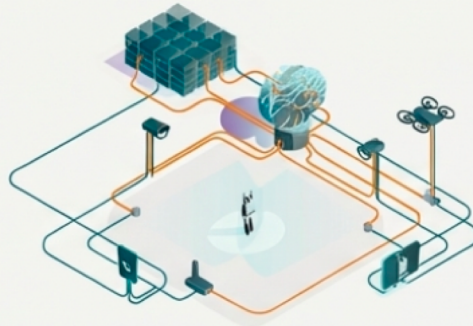
Use-Case 2: Smart Monitoring System using UAV

Use-Case 3: Deciphering the universe: processing hundreds of TBs of astronomy data

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MUSE
319 * 320 * 3721

320

3721

319

More than 100000 spectra per galaxy!!!

Methodology: Full spectrum fitting

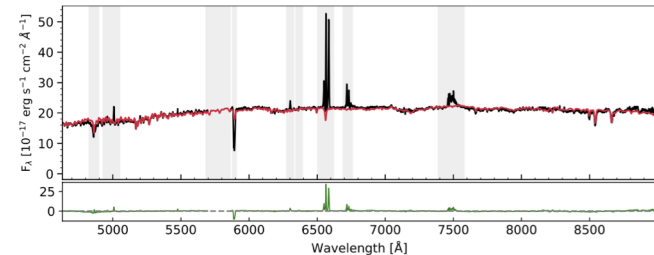$$M_\lambda = \left[\sum_{j=1}^{N} x_j b_{j,\lambda} r_\lambda \right] \otimes G(v_*, \sigma_*)$$

- To demonstrate the CECCM's capabilities to deploy and run astronomical software to process data cubes.
- To integrate scientific applications that will take advantage of hybrid cloud native infrastructures to optimize the computation process.
- To enable the whole astronomy community to accelerate the analysis of the novel data gathered from newer IFS instruments.
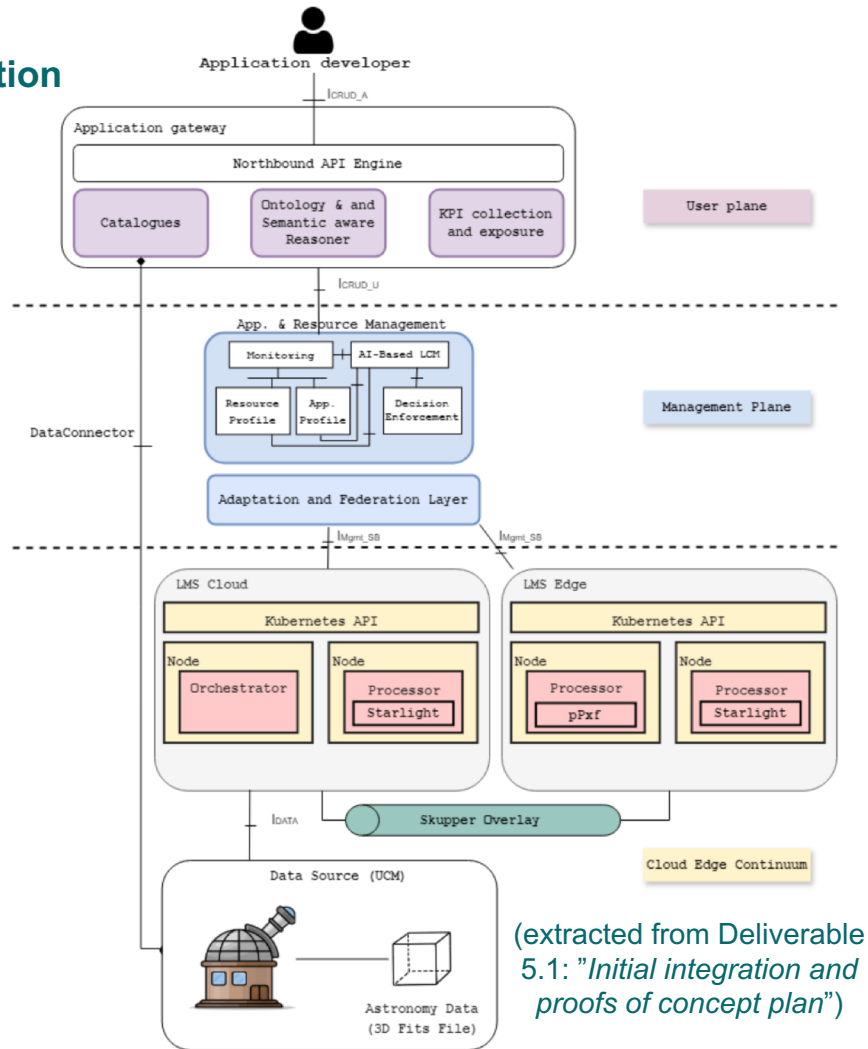
Use-Case 3 - Integration and demostration

The architecture of UC3 following the AC3 general architecture paradigm

The UC implementation will make use of a set of containerized specific-use analysis tools to process the data that is distributed by the CECC manager. The tools that will be integrated are different spectral synthesis software assets.

Use Case 3: a multi-disciplinary collaboration between Red Hat & UCM

(extracted from Deliverable 5.1: "*Initial integration and proofs of concept plan*")

GUI Data Management Console

GUI Data Management Console

Plenary Meeting 2025

AC³

https://ac3-project.eu/

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the European Union