



This project has received funding from the European Union's Horizon 2020 research and Innovation programme under grant agreement N° 101016854.



# AURORAL

ARCHITECTURE FOR UNIFIED REGIONAL AND OPEN  
DIGITAL ECOSYSTEMS FOR SMART COMMUNITIES AND RURAL AREAS  
LARGE SCALE APPLICATION

TOPIC: DT-ICT-09-2020 - INNOVATION ACTION  
BOOST RURAL ECONOMIES THROUGH CROSS-SECTOR DIGITAL SERVICE PLATFORMS



Architecture for **Unified Regional and Open** digital ecosystems for Smart Communities and wider **Rural Areas** Large scale application.



## AURORAL IN A NUTSHELL

25

Partners

11

European  
Member States

8

Pilot  
Regions

5+

**Domains**  
Farming, Tourism  
Mobility, Energy,  
Health, others...

4

Years

# AURORAL APPROACH



## **CO-DEVELOPMENT & INTEROPERABILITY**

AURORAL focuses on delivering interoperable, open and integrated digital platforms that serve rural regions and contribute to a European, globally competitive, ecosystem of digital services and businesses to empower Smart Communities.

## **ECOSYSTEM & EMPOWREMENT**

AURORAL aims to deliver a dense network of Smart Communities under a common multi-interoperability framework aimed at succeeding the just, fair and open digital transformation. AURORAL pilot regions implement the concept throughout Europe, targeting an investment platform of innovative services, primary focusing Smart Communities onto rural areas.

## COOPERATION APPROACH ORIENTATION

**AURORAL digital environment** is demonstrated by cost-efficient and flexible cross-domain applications through large-scale pilots in eight European regions: **Alentejo (PT), Southern Burgenland (AT), Penedès (ES), Piemonte (IT), Lapland (FI), Hålogaland (NO) – Tourism, Hålogaland (NO) – Health, Västerbotten (SE).**

**AURORAL is expected to be a driver** of the emergence of a dense network of Smart Communities in Europe

**ALENTEJO PROTOCOL open to adhesion**



**AURORAL**





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## SMART COMMUNITIES

Communities of care,

Communities of trust,

Communities of skills

To respond to the digitalization vs proximity paradox



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## SMART COMMUNITIES DIGITAL ENVIRONMENT

To fully reach the proposed objectives, large scale demonstrator pilot sites are divided into 2 categories: **targeted domains** and **cross-domain pilots**.

On **targeted domains**, special focus is given to a specific domain in order to reach higher readiness levels and broader offer of tools regarding that specific domain.

On **cross-domain pilots**, focus is transferred to the cross-domain approach, benefitting from the availability of tools provided by the domain-oriented pilots and the interoperability provided by AURORAL data brokerage middleware.

Domain-oriented pilots are referred to as “use cases” and cross-domain pilots as “demonstrators”.



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# STARTING PILOT REGIONS

5 USE-CASES (TARGETED-DOMAIN)

**Alentejo  
(PT)**



Tourism

**Piedmont  
(IT)**



Farming

**Hålogaland  
(NO)**



Health

**Västerbotten  
(SE)**



Energy

**Lapland  
(FI)**



Mobility



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# STARTING PILOT REGIONS

5 DEMONSTRATORS (CROSS-DOMAIN)

**Alentejo  
(PT)**

**Piedmont  
(IT)**

**Nordland  
(NO)**

**VSouthern Burgenland  
(AT)**

**Penedès  
(ES)**





# ALENTEJO (PT) PILOT



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# HÅLOGALAND (NO) PILOT – HEALTH



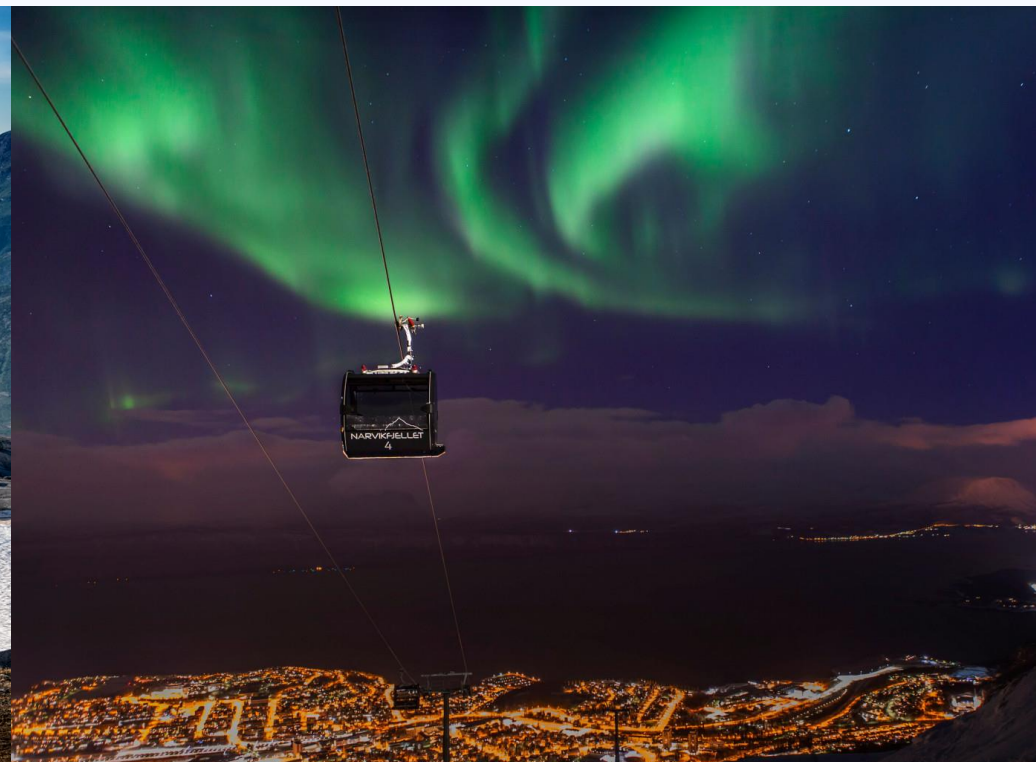
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# HÅLOGALAND (NO) PILOT – TOURISM



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# LAPLAND (FI) PILOT



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# PENEDES (ES) PILOT



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## PIEDMONT (IT) PILOT



# SOUTHERN BURGENLAND (AT) PILOT



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# VÄSTERBOTTEN (SE) PILOT



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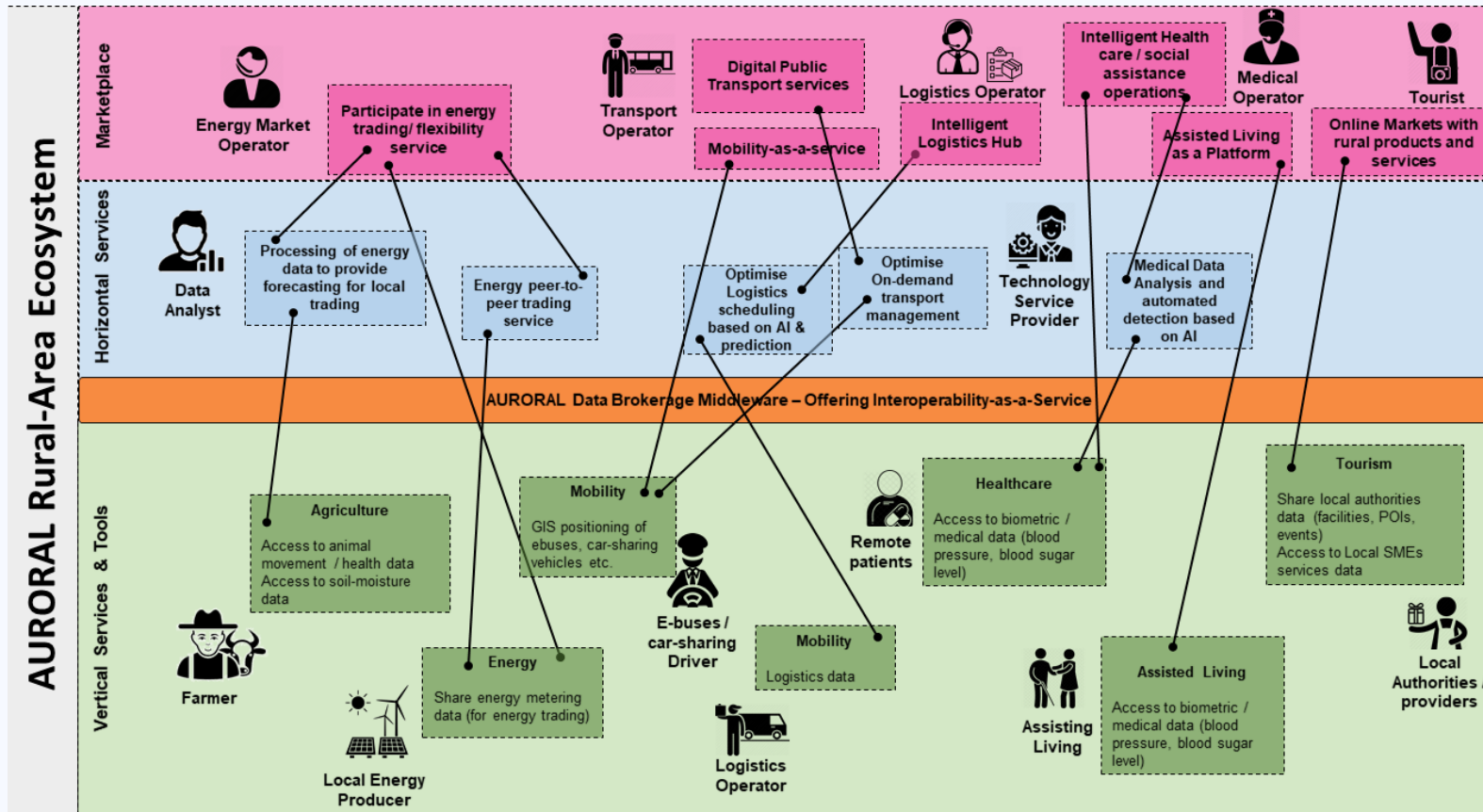




# AURORAL REFERENCE ARCHITECTURE

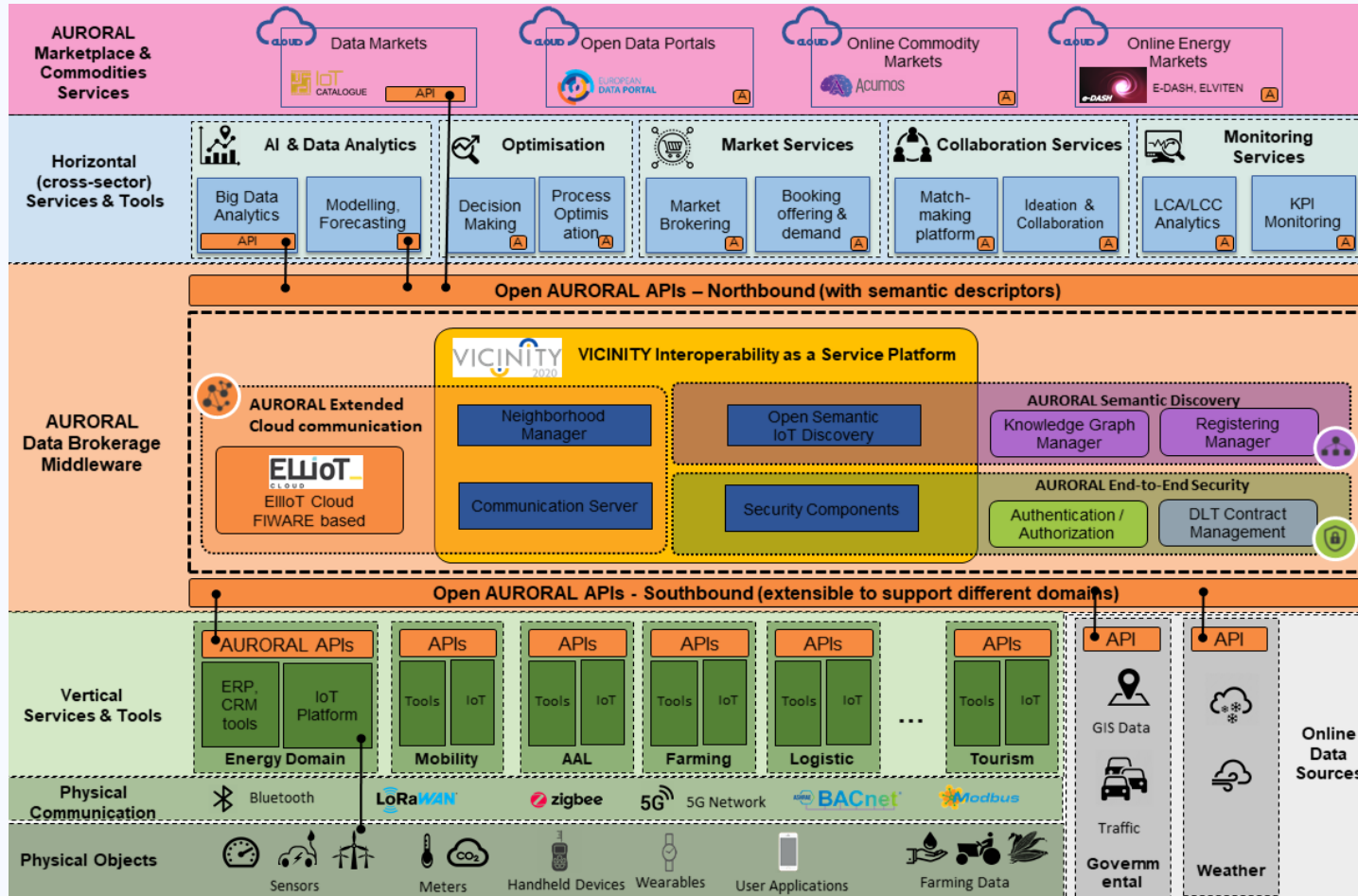


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The image highlights how the proposed AURORAL Reference Architecture aims to bridge vertical services on different rural domains with horizontal services and online digital marketplaces, allowing different stakeholders to cooperate in a seamless and transparent manner.

# AURORAL DATA BROKERAGE MIDDLEWARE



AURORAL aims to enable a **flexible interoperable Rural Ecosystem**, facilitating easy integration and data exchange between vertical and horizontal ends, further facilitating the participation in open Marketplaces and commodities services. A high-level architecture of the overall AURORAL platform is presented on the scheme.



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# AURORAL INTEROPERABLE DATA BROKERAGE MIDDLEWARE



## ***Semantic Discovery Components***

The **Semantic Discovery Components** provide a transparent discovery and access to the different IoT devices, tools or services within a context that aim at being connected to the AURORAL cloud. From a technical point of view, semantic interoperability (SI) will translate heterogeneous data, fetched from heterogeneous data endpoints into the AURORAL ontology.



## ***AURORAL End-to-End Security***

The AURORAL project will extend **security, privacy and trust** already inherent in the VICINITY platform, by integrating advanced authentication/authorization mechanisms for granting access, and protection under advanced encryption methods but also novel encoding approaches for data protection based on DLT Contract Management. To improve overall response to security checks against threats and vulnerabilities, an **Intrusion Detection Security (IDS)** mechanisms for embedded systems will also be employed.



## ***AURORAL Extended Cloud Communication Components***

AURORAL Data Brokerage Middleware will further integrate core components of the Elliot Cloud middleware, which is an industry-ready concrete configuration of the core FIWARE open source components. Its core element, Orion Context Broker, allows handling of context information at large scale by implementing standard REST APIs using NGSIv2 API to perform updates, queries or subscribe to changes on context information. By relying on FIWARE NGSI (Next Generation Service Interface) API, AURORAL will be able to utilize (i) “standardised” data models for context information, using the notion of context entities, (ii) a context data interface for exchanging information by means of query, subscription, and update operations and (iii) a context availability interface for exchanging information on how to obtain context information. By adopting the currently evolving NGSI-LD Entities (a reference ETSI standard, where entities are represented using JSON-LD, a JSON-based serialization format for Linked Data), AURORAL will extend VICINITY into a new-era platform of platforms.

The **Open AURORAL APIs** aims to facilitate the seamlessly communication and easy integration of different tools and services available in rural areas, comprising of two different sets of API front-ends which will be described through well-documented OpenAPI 3.0 standards: **a) the southbound APIs** enabling the communication with vertical tools as services, such as local IoT platforms or enterprise data systems, online data sources;

**b) the northbound API** enabling the communication with horizontal services, available applications, and marketplace and commodities services.

# AURORAL COOPERATION MODEL



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<http://www.businessmodelgeneration.com>

An indicative cooperation model canvas is shown for overall dissemination of AURORAL results generating impact on enhancing European Smart Communities

## LATEST COLLABORATIONS ALENTEJO / EXTREMADURA



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When, in October 2020, President Ursula Von der Leyen, presented **New European Bauhaus initiative**, all European territories were invited to redesign, together, under an umbrella of culture, **the Europe we want to live in.**

It challenged us to connect people and organisations from different **rural areas of the south west of the Iberian Peninsula**, joining skills in a bottom-up approach as a catalyst for Innovation bridging science to art and culture by mobilising designers, architects, engineers, scientists, students, and creative minds.

## LATEST COLLABORATIONS **ALENTEJO / EXTREMADURA**



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**SWING**bauhaus  
South Western Iberian New Bauhaus Team

SWING Bauhaus is the acronym for South Western Iberian New Bauhaus, an open, cross-border movement from where we invite people and organisations that share our purpose to join us – the more we are, the merrier!

<https://swingbauhaus.eu/en/home-english/>

# SWING BAUHAUS' HACHEXTREM



**HackExtrem**  
hackextrem.com

**POWERED BY:**

- SWINGbauhaus South Western Iberian New Bauhaus Team
- SINGULAR TEAMLABS
- emprendedores
- mb3 GESTION

**PATROCINADORES:**

- FUNDACIÓN EXTREMEÑA DE LA CULTURA
- Extremadura
- JUNTA DE EXTREMADURA
- Consejería de Cultura, Turismo y Deportes
- Alimentos de Extremadura

**COLABORADORES:**

- Fundación JOSÉ MANUEL CALDERÓN
- DIPUTACIÓN DE CÁCERES
- DIPUTACIÓN DE BADAJÓZ
- ayuntamiento CÁCERES
- redesx Red Extremena de Desarrollo Rural
- elfaro
- RegiónDigital.com
- SW
- ALDEALAB
- Telefónica
- DIEX ASOCIACIÓN DE ORGANIZACIONES DE EXTREMADURA

**MEDIA PARTNER:**

- canal extremadura
- YOROKOBU TAKE A WALK ON THE SLOW SIDE

#NewEuropeanBauhaus

Hackextrem is the vehicle through which the SWING Bauhaus takes action!

It is composed by a sequence of hackathons in which you are invited to identify challenges and agents and to build sustainable solutions for the territory in an inclusive way.

With the **#Hack0** we have achieved that this first stage gives rise to a movement that was born from Extremadura open to cross-border cooperation. It has been a 6-week process, that began on May 15 with a face-to-face event at “Embarcadero” in Cáceres, and then virtual sessions until the face-to-face closing session, the 26th of June, where 6 different prototypes were launched.

# AURORAL PARTNERS



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UNIVERSITY OF OULU



POLITÉCNICA

UNIVERSIDAD POLITÉCNICA DE MADRID





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# THANK YOU!

**SWING**bauhaus  
South Western Iberian New Bauhaus Team

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## MORE ON:

[www.auroral.eu](http://www.auroral.eu)  
<https://swingbauhaus.eu>