CREATE-IoT

European Large-Scale Pilots Programme

European Large-Scale Pilots

Use Cases

CREATE-IoT U4IoT ACTIVAGE PROJECT IOF2020 INTERNET OF FOOD & FARM MONICA SYNCHRONICITY AUTOPILOT

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European Large-Scale Pilots Programme

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- **SYNCRONICITY** (DELIVERING AN IoT ENABLED DIGITAL SINGLE MARKET FOR EUROPE AND BEYOND).

Large-Scale Pilots (LSPs)

European Large-Scale Pilots Programme

Project	Partners	Use Cases
ACTIVAGE	49	8
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Overview of LSP deployment site / use case locations

ACTIVAGE (ACTIVATING INNOVATIVE IOT SMART LIVING ENVIRONMENTS FOR AGEING WELL)

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Deployment Sites

1. Galicia (GAL-ES)
2. Valencia (VLC-ES)
3. Madrid (MAD-ES)
4. Regione Emilia Romagna (RER-IT)
5. Greece (GRE-GR)
6. Isère (ISE-FR)
7. Weiterstadt and Rodgau (Hesse), Treuchtlingen and Bad Grisbach (Bavaria) (WOQ-DE)
8. Leeds (UK)
9. Finland (FI)

Coordinator: Medtronic Ibérica SA (ES) Website: www.activageproject.eu

ACTIVAGE

Use cases: AUC 1 Daily Activity Monitoring (Clinical approach); AUC 1 Daily Activity Monitoring (Social approach); AUC 2 Integrated care for older adults under chronic conditions; AUC 4 Emergency trigger; AUC 6 Cognitive stimulation for mental decline prevention; AUC 7 Prevention of social isolation - Deployment site: Galicia (GAL-ES).

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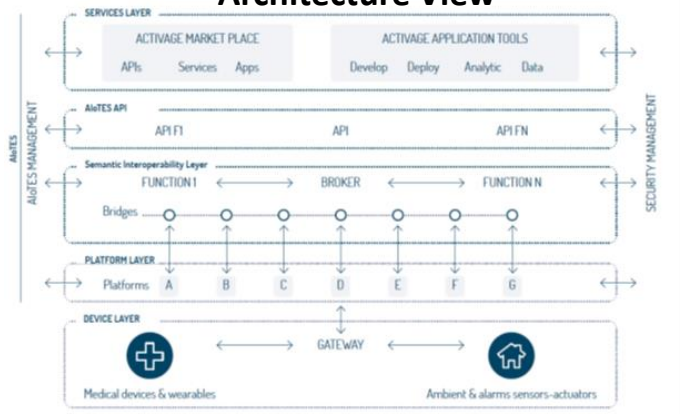
Activage GAL-ES Ecosystem
Users Stakeholder: Fundacion Vodafone España, CRE (Cruz Roja España)
Application Provider: TELEVES, SERGAS
Service Provider: CRE, SERGAS
Systems Integrator: UPV
Platform Provider: TELEVES, SERGAS
Network provider: Telefonica* Vodafone*
Device Provider: TELEVES

Domain application areas addressed
Daily Activity Monitoring (Clinical approach); Daily Activity Monitoring (Social approach); Integrated care for older adults under chronic conditions; Emergency trigger; Cognitive stimulation for mental decline prevention; Prevention of social isolation.

Short description and location
Web application to monitor health. It is used by the medical staff (TELEA); Alarm Central Receiver (ARC); Web application to monitor social and behavioural information. It is used by Formal and informal caregivers (Carelife); Voice messages provided by the Gateway to the Elderly People and Formal and Informal Caregivers (in Home). Galicia (ES)

Architecture View



*Not Partner but provider/associated with other ACTIVAGE partner(s).

SW/HW Infrastructure
Cloud servers: SOFIA2, Carelife.
Gateways: Carelife, ADSL

IoT Applications
Home monitoring; Health monitoring

IoT Platforms and Software
SOFIA2

IoT Technologies and Standards
ZigBee, IEEE802.15.4; Bluetooth, IEEE 802.15.1; EN 50134; WiFi, IEEE 802.11; IEEE 11073; HL7; Ethernet, RJ45

IoT Devices
Presence sensor; Door opening; Weighing scale; Tensiometer; Coagulometer; Emergency push button; Smoke detector; CO Detector

CREATE-IoT U4IoT ACTIVAGE PROJECT IOF2020 INTERNET OF FOOD & FARM MONICA SYNCHRONICITY AUTOPILOT

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ACTIVAGE

Use cases: AUC 1 Daily activity monitoring at home; AUC 3 Monitoring assisted persons outside home - Deployment site: Valencia (VLC-ES).

European Large-Scale Pilots Programme

Activage VLC-ES Ecosystem
Users Stakeholder: GESMED, Las Naves
Application Provider: MySphera
Service Provider: ATENZIA
Systems Integrator: MySphera
Platform Provider: ISI Bienestar
Network provider: Telefonica* Vodafone*
Device Provider: MySphera

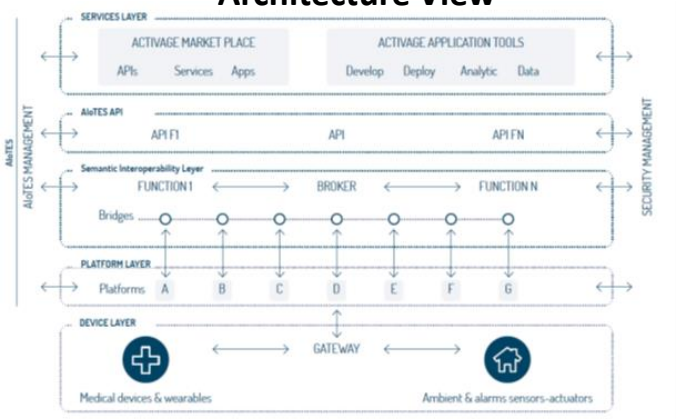
Domain application areas addressed
Daily activity monitoring at home; Monitoring assisted persons outside home.

IoT Applications
Home monitoring; Activity monitoring

Short description and location
LOCS backend application: processes data from sensors and derive user behaviour, manage users and infrastructure, visualize user and infrastructure status; LOCS mobile app: retrieves and visualize information related to user activity and generate alerts; LOCS-outdoor mobile app: monitors user when outdoor (location, activity) and provide guidance to pre-defined point-of-interest, provide information related to city social activities and transport; LOCS-home app: provides information to the elderly about his status, agenda, reminders and recommendations, and city-related information including social activities and transport; LOCS-SAD app: is for the professional caregivers that assist the elderly and visit them periodically at home, automatically register the visits and time spent and provide information about the elderly.

IoT Platforms and Software
universAAL

Architecture View



*Not Partner but provider/associated with other ACTIVAGE partner(s).

SW/HW Infrastructure
Cloud servers: universAAL
Gateways: Tablet Android 4.0 (home); Smartphone Android 4.0

IoT Technologies and Standards
BLE 4.0, IEEE802.15.1; GPS; 3GPP2; LTE Advanced, IEEE 802.11 a,b,g,n; ISO/IEC 8802-3

IoT Devices
Door sensor; Presence sensor; Temperature sensor; Humidity sensor; Smartphone MEMS; Smartwatch

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ACTIVAGE

Use cases: AUC 3 Monitoring assisted persons outside home; AUC 5 Exercise promotion for fall prevention and physical activeness; AUC 6 Cognitive stimulation for mental decline prevention; AUC 7 Prevention of social isolation - Deployment site: Madrid (MAD-ES).

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ACTIVAGE PROJECT

Activage MAD-ES Ecosystem
Users Stakeholder:
TEA (Tercera Edad Activa)
Application Provider: Tecnalia
Service Provider:
ATENZIA, Tecnalia
Systems Integrator: LST-UPM
Platform Provider: ISI Bienestar
Network provider: Telefonica*
Vodafone*
Device Provider: EMT* Others*

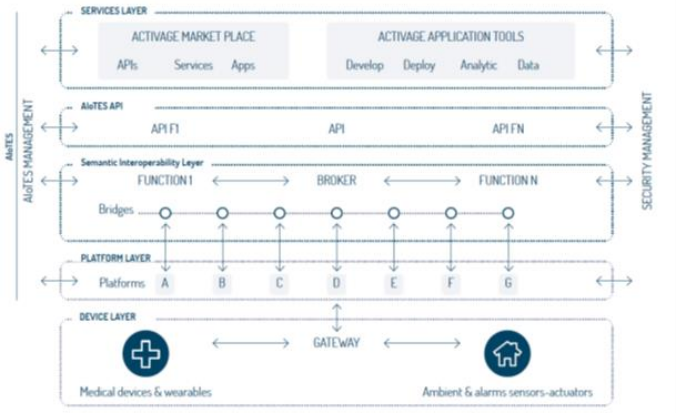
Domain application areas addressed
Monitoring assisted persons outside home; Exercise promotion for fall prevention and physical activeness; Cognitive stimulation for mental decline prevention; Prevention of social isolation.

IoT Applications
Home monitoring; Health monitoring

Short description and location
Authentication (login service); Notifications (delivery service for the interventions notification); Brain Training (games for brain training); DFA (alternative and augmentative communication app to enable the user to use the smartphone without touching the screen); Tracking Outdoor (application to monitor outdoor activities, as visiting POIs); Social (chat application); Physical Activity (application to monitor physical activities, such as sleep or walking steps) ; Balance Training (balance training and assessment games); Dashboard (app for visualizing data for the cares)

IoT Platforms and Software
universAAL

Architecture View



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SW/HW Infrastructure
Cloud servers: universAAL
Gateways: ADSL Ethernet; ADSL WAN routing; Samsung Galaxy S5 mini; EMT public city bus embedded gateway.
Aggregation point: Raspberry pi 3; ACTIVEAGE Centre

IoT Technologies and Standards
WiFi, IEEE802.11 ac,n,b,a; Ethernet, IEEE802.3; NFC, NDEF; GPS, ISO/IEC14443; BLE 4.0, IEEE802.15.1; Zwave; USB2.1; CAN Bus

IoT Devices
Door sensor; BT lamp; NFC tag; Equimetrix floormat; Wecam; eBeacon

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ACTIVAGE

Use cases: AUC 1 Daily activity monitoring at home; AUC 2 Integrated care for older adults under chronic conditions; AUC 3 Monitoring assisted persons outside home; AUC 5 Exercise promotion for fall prevention and physical activeness -
Deployment site: Regione Emilia Romagna (RER-IT).

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ACTIVAGE PROJECT

Activage RER-IT Ecosystem
Users Stakeholder:
C2K, LHA Parma, AURORA
Application provider:
CNR-ISTI, IBM
Service Provider: AURORA, IBM
Systems Integrator: UNI-PR
Platform Provider: CNR-ISTI
Network provider: WIND
Device Provider: WIND

Domain application areas addressed
Daily activity monitoring at home; Integrated care for older adults under chronic conditions; Monitoring assisted persons outside home; Exercise promotion for fall prevention and physical activeness.

Short description and location
Televisit application (Unnamed); Professional health portal (Region emilia Romagna, Unnamed); eHR, Electronic health record (FSE fascicolo sanitario elettronico)

Architecture View

SW/HW Infrastructure
Cloud servers: IBM BlueMix; FSE.
Gateways: WiFi (HomeSpot wirelss router); 2G/3G/LTE

IoT Applications
Home monitoring; Health monitoring

IoT Platforms and Software
FiSTAR (FiWARE)

IoT Technologies and Standards
WiFi, IEEE802.11 ac,n,a,g,b; IEEE802.3; LTE, 3GPP; UMTS/EDGE/GPRS/GSM, DC-HSDPA/HSPA

IoT Devices
Presence sensor; Contact sensor; Bed occupancy sensor; Toilet presence sensor; Wearable sensor

ACTIVAGE

Use cases: AUC 1 Daily Activity Monitoring, emergency trigger; AUC 2 Integrated Care; LUC01 Mobility monitoring and advice for active mobility - Deployment site: Greece (GRE-GR).

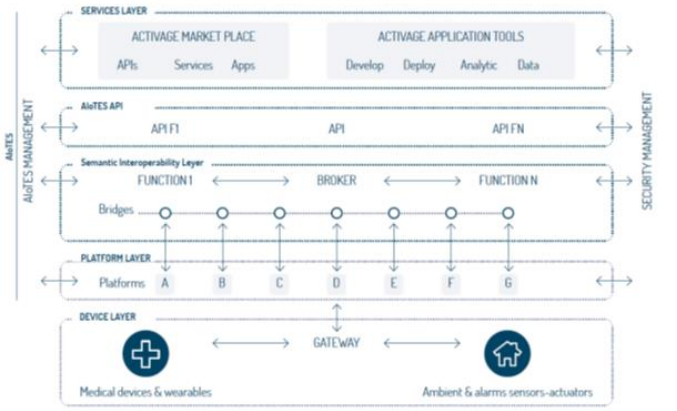
European Large-Scale Pilots Programme

Activage GRC-HE Ecosystem
Users Stakeholder:
DCCG-CitiesNet, MM
Application provider: INFOTRIP
Service Provider:
INFOTRIP, GNOMON
Systems Integrator: CERTH
Platform Provider: ICCS
Network provider: OTE*
Vodafone*
Device Provider: MPH

Domain application areas addressed
Daily Activity Monitoring, emergency trigger; Integrated Care; Mobility monitoring and advice for active mobility.

Short description and location
Smart home scenarios (Application for helping the installer to install and set up the equipment in the smart home; helping the corresponding employees of the municipality offer support to the end-users; helping carers (both formal and informal) monitor the health status/activity of the corresponding elderly; offering decision support to health professionals through advanced data analytics; offering monitoring and decision support to the administrator of the infrastructure of the municipaliy through advanced data analytics.
Mobility scenarios (Mobility behaviour monitoring; Pre-trip mobility information; Intersection alerts; IoT device manager & User management).

Architecture View



*Not Partner but provider/associated with other ACTIVAGE partner(s).

SW/HW Infrastructure
Cloud servers: On site servers.
Gateways: ADSL; 3G/4G
Aggreation point: Raspberry Pi 3 model B w/Z-wave plus and RaspBee (ZigBee); Televes w/X-wave USB (UZB)

IoT Applications
Health monitoring; Home monitoring; Mobility/Traffic monitoring;

IoT Platforms and Software
universAAL; IoTivity; FiWare

IoT Technologies and Standards
BLE 4.0, IEEE802.15.1;
Z-Wave; ETSI EN 300 220-1; 3G/4G, IEEE802.15.1, UMTS/HSPA, LTE; CEN TC278 WG 16; ISO TC204 WG 18; UMTS/HSPA.

IoT Devices
Blood pressure/glucose device; Bluetooth detectors; Connected traffic signals; Connected taxi vehicles; Pedestrian presence detectors; Motion detectors; Door/Window opening detector; Panic button; Temperature/Humidity sensor; CO sensor

CREATE-IoT U4IoT ACTIVAGE PROJECT IOF2020 INTERNET OF FOOD & FARM MONICA SYNCHRONICITY AUTOPILOT

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ACTIVAGE

Use cases: AUC 1 Daily activity monitoring (Behaviours); AUC 4 Emergency Trigger; AUC 5 Promotion exercise (Age-related changes); AUC7 Prevention of social isolation (Social engagement); AUC 8 Safety and comfort at home (Assistive technologies) - Deployment site: Isère (ISE- FR).

European Large-Scale Pilots Programme

ACTIVAGE PROJECT

Activage ISE-FR Ecosystem
Users Stakeholder:
MINALOGIC, FFD
Application provider: CD38, TASDA
Service Provider:
KORIAN, IMA, MADOPA
Systems Integrator: CEA-LETI
Platform Provider: TECHNOSENS
Network provider: Orange*
Boygues*
Device Provider:
FFD, STMicroelectronics

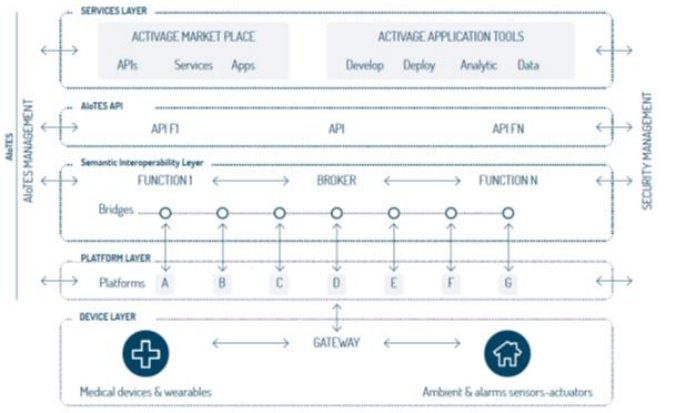
Domain application areas addressed
Professional care, patient, family/relatives, and alert applications: Daily activity monitoring (Behaviours); Emergency Trigger; Promotion exercise (Age-related changes); Prevention of social isolation (Social engagement); Safety and comfort at home (Assistive technologies).

IoT Applications
Home monitoring; Environment monitoring; Health monitoring

Short description and location
Professional carers application (gives information related to the patient living at the care facility); Patient application (provides social link to the caretaker, it displays text messages to question the caretaker about its wellness depending on defined scenario, and it sends alarm to the nurse call system if abnormal activity are detected); Family-relatives application (provides social link between the family and the resident, which is the caretaker. They can give voice call, send mail and share picture. Besides the family can manage the contact list); Alert application (provides a screen for all active alerts in an establishment).

IoT Platforms and Software
sensiNact

Architecture View



*Not Partner but provider/associated with other ACTIVAGE partner(s).

SW/HW Infrastructure
Cloud servers: sensiNact virtual machine on Korian server; sensiNact virtual machine on CEA/Technosens server; Technosens server
Gateways: ADSL
Aggregation point: Rasberry Pi mopdel 3/B

IoT Technologies and Standards
Z-wave; BLE4.0, IEEE 802.15.1; WiFi LAN, IEEE 802.11 n,g; Ethernet, ISO/IEC 8802-3

IoT Devices
Magnetic contactor; Smart bulb; Light RF module; Smart outlet; Wired switch light; Wall switch; Smart shower head; Bed sensor; Motion sensor; Electrical meter; Air quality sensor; Gas leakage sensor; Pedometer; Weight scale

ACTIVAGE

Use cases: AUC 4 Emergency trigger; AUC 8 Safety, comfort and security - Deployment site: Weiterstadt and Rodgau (Hesse), Treuchtlingen and Bad Grisbach (Bavaria) (WOQ-DE)

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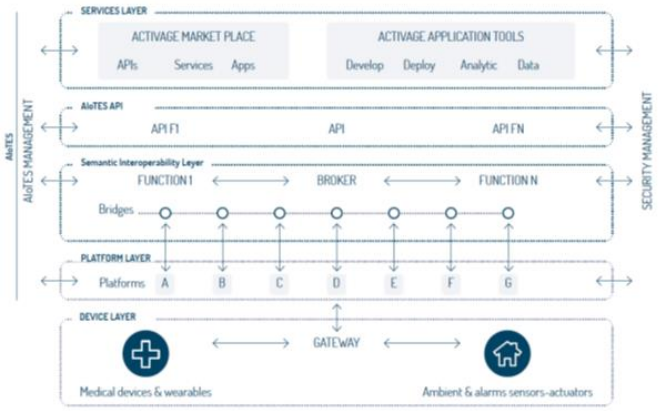
Activage WOQ Ecosystem
Users Stakeholder: WOQUAZ
Application provider: Sageliving
Service Provider: WOQUAZ
Systems Integrator: Fh-IGD
Platform Provider: Fh-IGD
Network provider: Telekom*
Device Provider: AJT

Domain application areas addressed
Emergency trigger; Safety, comfort and security.

Short description and location
Emergencies can be triggered by a manual switch by the Assisted Persons (AP), or by any of the services. When triggered, an alarm chain will be executed that is highly configurable and can use different ways communication, e.g. e-Mail, SMS, or SIP.
A set of rules for the system to automatize the devices in the environment to support the AP with his/her activities of daily life to achieve safety, comfort and security.

Architecture View



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SW/HW Infrastructure
Cloud servers: universal Space/RAPI/UI Handlers; WOQ DS does not use a cloud
Gateways/Aggregation point: AHS Lisa; universAAL

IoT Applications
Home monitoring; Environment monitoring; Health monitoring; Home control; Patient control

IoT Platforms and Software
universAAL; AHS Lisa; OpenHAB

IoT Technologies and Standards
Z-wave; MQTT via Ethernet; PLC/Modbus; SIP via Ethernet; VDE 0834/ESPA-X

IoT Devices
Multi-sensor (Motion, temperature, humidity, light intensity); CO2 sensor; Door/Window sensor; Bed occupancy sensor; Home wall plug; Electrical device switch; Smoke detector; Flood sensor; Shut of valve (water); Oven switch; Blinds (control); Weighting scale; Blood pressure; Blood sugar; Heart rate monitor; Telephone (alarm chain); Door lock; Light control; Manual emergency trigger; Speakerphone

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ACTIVAGE

Use cases: AUC 1 Daily activity monitoring; AUC 4 Emergency trigger; AUC 7 Prevention of social isolation - Deployment site: Leeds (UK).

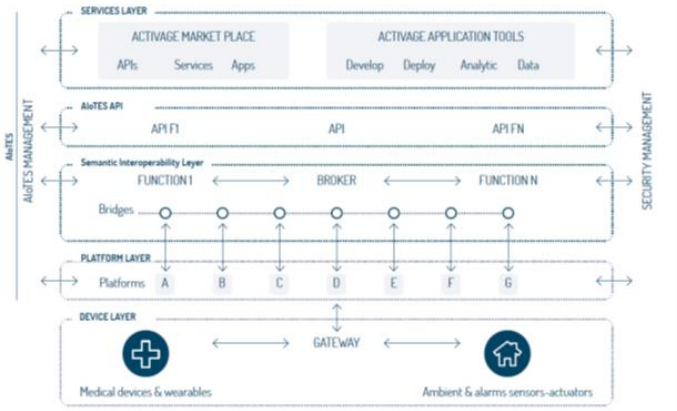
European Large-Scale Pilots Programme

Activage LEE-UK Ecosystem
Users Stakeholder:
Leeds City Council (LCC)
Application provider:
SAMSUNG, UniS
Service Provider: CSEM
Systems Integrator: CSEM
Platform Provider: SAMSUNG
Network provider: 3*
O2*
Device Provider: SAMSUNG

Domain application areas addressed
Daily activity monitoring; Emergency trigger; Prevention of social isolation.

Short description and location
The most important objective (in the first half)will be evaluation of System adoption by end users, carers and GPs; Remote monitoring & emergency trigger using web portal; and Strengthening carer/end user relation through technology. Success at the core objectives will foster private and public investment in order to start mass adoption of the solution, generate new business models and create more jobs.

Architecture View



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SW/HW Infrastructure
Cloud servers: Joyent/Amazon
Gateways: ADSL
Access point: Mi Home

IoT Applications
Home monitoring; Health monitoring

IoT Platforms and Software
OpenThings

IoT Technologies and Standards
RF (433kHz) OpenThings; Ethernet, IEEE802.3; BLE4.0/4.2, IEEE802.15.1; GPS; IEEE802.11 b,g,n; NFC

IoT Devices
Door sensor; Motion sensor; Energy plug; House monitor; Smart watch; User mobile (activity, location, connectivity); User mobile (sleep).

CREATE-IoT U4IoT ACTIVAGE PROJECT IOF2020 INTERNET OF FOOD & FARM MONICA SYNCHRONICITY AUTOPILOT

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ACTIVAGE

Use cases: AUC 1 Daily monitoring; AUC 7 Prevention of social isolation - Deployment site: Finland FIN-FI).

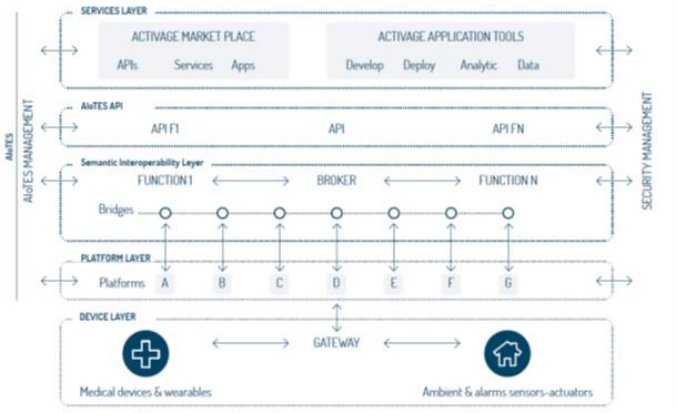
European Large-Scale Pilots Programme

Activage FIN-FI Ecosystem
Users Stakeholder:
Turku University, eHoiva
Application provider:
GoodLife Technology, eHoiva
Service Provider: eHoiva
Systems Integrator: SE Innovations
Platform Provider: SE Innovations
Network provider: ELECOM*
Vodafone*
Device Provider: SE Innovations

Domain application areas addressed
Daily monitoring; Prevention of social isolation.

Short description and location
A communication and social media application providing the means for effective communication and data gathering. This app incudes an IoT part that is utilized as a gateway. A backend platform is used for data gathering and evaluations.

Architecture View



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SW/HW Infrastructure
Cloud servers: SEI Cloud 1 (apps); SEI Cloud 2 (web services); SEI device
Gateways: SeniorSome (SE1001); WLAN (WiFi)

IoT Applications
Health monitoring; Home monitoring

IoT Platforms and Software
Seniorsome; Sofia2; Fiware; OpenIoT

IoT Technologies and Standards
Bluetooth 3.0/4.0, IEEE802.15.1; WiFi, IEEE802.3.11 a,b,g,n; ADSL; 3G/4G

IoT Devices
Senescreen (tablet w/sensory) Wrist device (movement, health status); Camera device (digirehab detection); Motion/Magnetic detection device (motion, Access)

CREATE-IoT U4IoT ACTIVAGE PROJECT IOF2020 INTERNET OF FOOD & FARM MONICA SYNCHRONICITY AUTOPILOT

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Overview of LSP use case locations

AUTOPILOT (AUTOMATED DRIVING PROGRESSED BY INTERNET OF THINGS)

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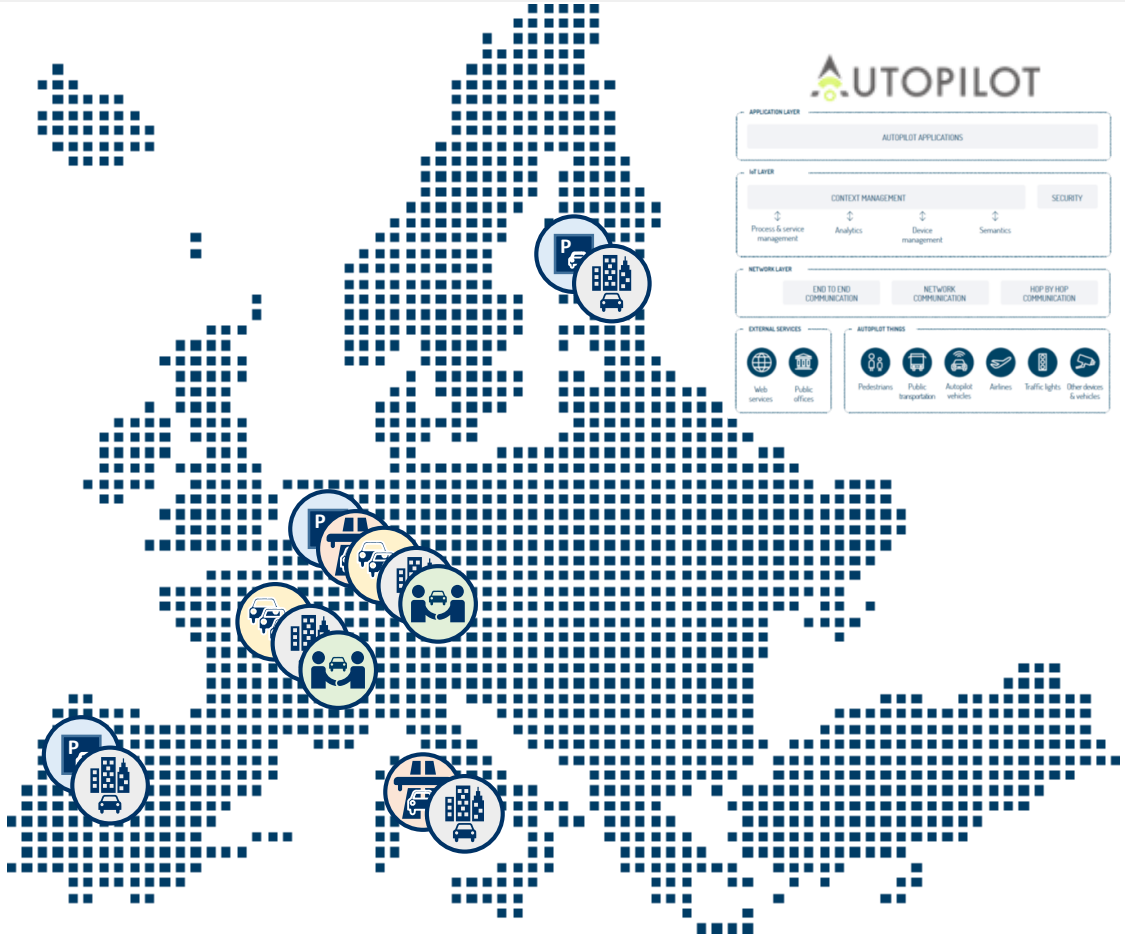
AUTOPILOT:

- Urban driving
  - Versailles (FR), Brainport (NL), Vigo (ES), Livorno (IT), Tampere (FI), Daejeon (KR)
- Automated valet parking
  - Brainport (NL), Vigo (ES), Tampere (FI)
- Highway pilot
  - Brainport (NL), Livorno (IT)
- Platooning
  - Versailles (FR), Brainport (NL)
- Car sharing
  - Versailles (FR), Brainport (NL)



Coordinator: ERTICO-ITS Europe (BE) Website: www. autopilot-project.eu

CREATE-IoT U4IoT ACTIVAGE PROJECT IOF2020 INTERNET OF FOOD & FARM MONICA SYNCHRONICITY AUTOPILOT

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AUTOPILOT

Use case: Urban driving - Versailles (FR)

European Large-Scale Pilots Programme

AUTOPILOT

Pilot site leader
Versailles Grand Parc (FR)

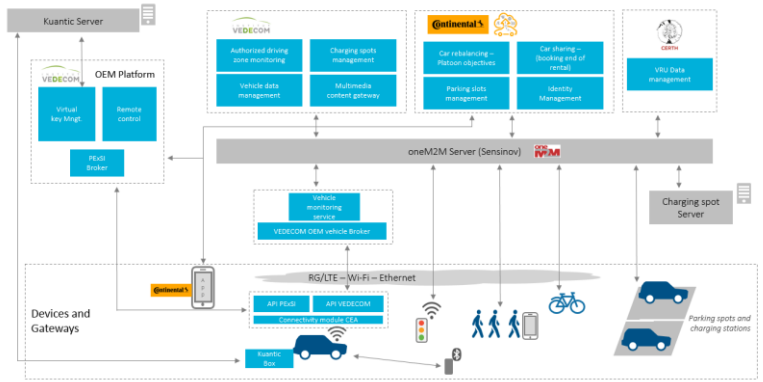
Use case leader
VGP (FR)

Partners
VEDECOM (FR); SENSINOV (FR); CERTH (GR); AKKA (FR), CONTI (FR)

Domain application areas addressed
Automated driving in an urban environment is expected to increase safety, provide more comfort and create several new business opportunities for mobility services.

Short description and location
The Urban Driving use case requires automated driving vehicles to identify, predict and react in an array of complex situations. Fully automated vehicles will be tested driving from point A to B, without any action from the driver. However, the driver will be able to override and get back to manual driving at any time. Versailles (FR).

Architecture View (PS overview)



SW/HW Infrastructure
Cloud; RSU; in-Vehicle

IoT Applications
Connected and automated driving with point of interest notifications (audio/video) and VRU detection (collaborative perception).

IoT Platforms and Software
SENSINOV oneM2M

IoT Technologies and Standards
oneM2M; 4G/LTE; PEXSI Broker; Kuantic Server

IoT Devices
IoT-enabled vehicles w/sensors;
IoT enabled traffic lights (presence detectors 79GHz)

Co-funded by the European Commission

AUTOPILOT

Use case: Urban driving - Brainport (NL)

European Large-Scale Pilots Programme

AUTOPILOT

Pilot site leader
TNO (NL)

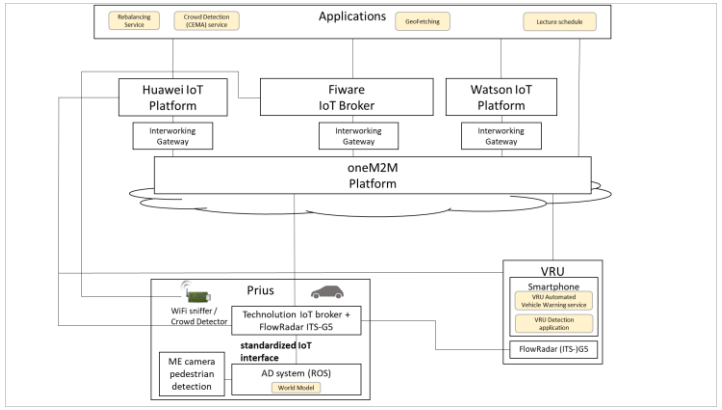
Use case leader
TU/e (NL)

Partners
TUE (NL); TECHN (NL); HUAWEI (D); NEC (D); NXP (NL); VICOM (ES); (IBM (IR): link to Car Sharing)

Domain application areas addressed
Automated driving in an urban environment is expected to increase safety, provide more comfort and create several new business opportunities for mobility services.

Short description and location
The main scope is to show how automated driving with vulnerable road users (VRUs) detection can be realized using only mobile sensors in 3 different modalities: Crowd Estimation & Mobility Analytics using WiFi based measurements, VRU with IoT connected smartphone (2-way: warning VRU and info to vehicle) & mobile ITS-G5 units.

Architecture View



SW/HW Infrastructure
Cloud, In-vehicle

IoT Applications
Crowd estimation & Mobility analytics; GeoFetching; Rebalancing; VRU detection; AD vehicle warning service

IoT Platforms and Software
oneM2M; FiWARE; Huawei OceanConnect; (Watson IoT → link to Car Sharing)

IoT Technologies and Standards
oneM2M; CAM/DENM; HTTP; Raspberry Pi; WiFi, Bluetooth; GPS; 3G/4G; ITS-G5/LTE

IoT Devices
In-vehicle camera; *Laser Scanners*; *RADAR*; Accelerometer; Wireless sniffers; *Beacons*; GPS

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AUTOPILOT

Use case: Urban driving - Vigo (ES)

European Large-Scale Pilots Programme

AUTOPILOT

Pilot site leader
CTAG (ES)

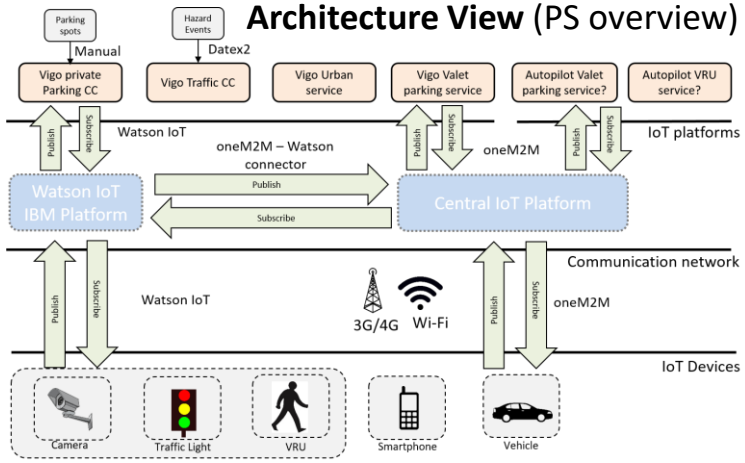
Use case leader
CTAG (ES)

Partners
VIGO (ES) PSA (FR)

Domain application areas addressed
Automated driving in an urban environment is expected to increase safety, provide more comfort and create several new business opportunities for mobility services.

Short description and location
The Urban Driving use case requires automated driving vehicles to identify, predict and react in an array of complex situations. Fully automated vehicles will be tested driving from point A to B, without any action from the driver. However, the driver will be able to override and get back to manual driving at any time. Vigo (ES).

Architecture View (PS overview)



SW/HW Infrastructure
Cloud; RSU; In-vehicle

IoT Applications
Urban service (Traffic light monitoring/notifcation); VRU (object/pedestrian) detection; Hazard warning

IoT Platforms and Software
oneM2M, IBM Watson IoT, SENSINOV oneM2M

IoT Technologies and Standards
oneM2M; CAM; CAN Bus; SPAT; GPS; DENM; LDM; 3G/4G; LTE-V2X; ITS-G5

IoT Devices
Smart camera; Traffic light, Control centre management system

Co-funded by the European Commission

AUTOPILOT

Use case: Urban driving - Livorno (IT)

European Large-Scale Pilots Programme

AUTOPILOT

Pilot site leader
CNIT (IT)

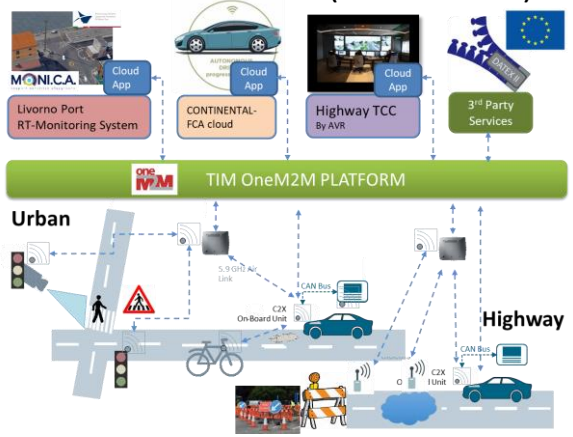
Use case leader
CNIT (IT)

Partners
AVR (IT); CONTI (FR); CRF (IT); ISMB (IT); THALES (IT); TELECOMITALIA (IT)

Domain application areas addressed
Automated driving in an urban environment is expected to increase safety, provide more comfort and create several new business opportunities for mobility services.

Short description and location
The Urban Driving use case requires automated driving vehicles to identify, predict and react in an array of complex situations. Fully automated vehicles will be tested approaching to an intersection with a "smart" traffic light, without any action from the driver. However, the driver will be able to override and get back to manual driving at any time Livorno (IT).

Architecture View (PS overview)



SW/HW Infrastructure
Cloud; RSU; In-vehicle

IoT Applications
Pederstrian detection; Fallen bicycle detection; Pothole detection; Car behaviour

IoT Platforms and Software
oneM2M

IoT Technologies and Standards
oneM2M; CAN Bus; 6LowPAN; IEEE802.15.4; USB2.0; 3G/4G; LTE-V2X; ITS-G5

IoT Devices
In-vehicle IoT platform; on board pothole detector; IoT accelerometer; smart bicycle; IoT traffic light with pedestrian detection, IoT RSU

Co-funded by the European Commission

AUTOPILOT

Use case: Urban driving - Tampere (FI)

European Large-Scale Pilots Programme

AUTOPILOT

Pilot site leader
VTT (FI)

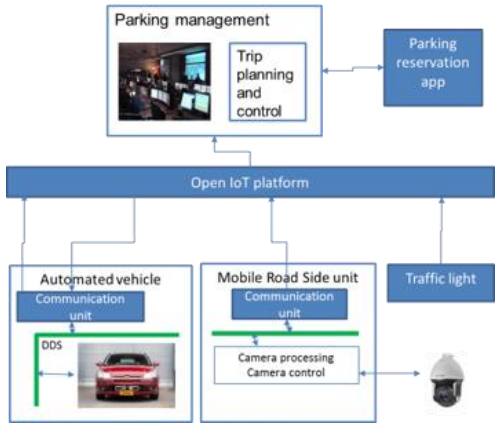
Use case leader
VTT (FI)

Partners
VTT (FI)

Domain application areas addressed
Automated driving in an urban environment is expected to increase safety, provide more comfort and create several new business opportunities for mobility services.

Short description and location
The Urban Driving use case requires automated driving vehicles to identify, predict and react in an array of complex situations. Fully automated vehicles will be tested driving from point A to B, without any action from the driver. However, the driver will be able to override and get back to manual driving at any time. Tampere (FI).

Architecture View (PS overview)



SW/HW Infrastructure
Cloud; RSU; In-vehicle

IoT Applications
VRU detection

IoT Platforms and Software
oneM2M

IoT Technologies and Standards
oneM2M; DDS; MQTT; SPAT/MAP; ITS-G5

IoT Devices
Traffic lights; RSU units; Cameras

Co-funded by the European Commission

AUTOPILOT

Use case: Automated valet parking - Brainport (NL)

European Large-Scale Pilots Programme

AUTOPILOT

Pilot site leader
TNO (NL)

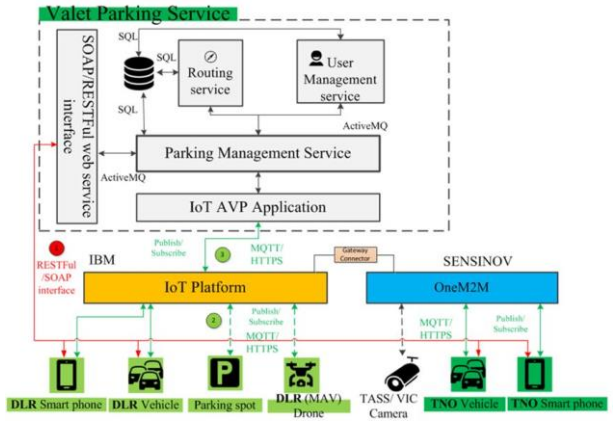
Use case leader
DLR (DE)

Partners
City Helmond (NL); DLR (DE); NEC (UK); NEVS (SE); TASS (NL); VICO (ES)

Domain application areas addressed
Automated Valet Parking (AVP) is a driverless Automated Driving use case including on-street car drop-off, driving to and from a parking spot, forwards and backwards manoeuvring as well as on-street passenger pick-up. IoT functions include routing, localization of obstacles and even control decision making at the IoT Edge.

Short description and location
In the Automated Valet Parking (AVP) use case, the driver is able to leave the car at some predefined drop-off location and is able to retrieve it once he/she needs it back. The operations of parking and manoeuvring the car in the parking area (inside or outside) and retrieving it are managed by the parking management system and supported by a Micro Air Vehicle (MAV) Brainport (NL).

Architecture View



SW/HW Infrastructure
Cloud; RSU; In-vehicle; MAV

IoT Applications
Crowd detector; object detection; Free parking slot detection

IoT Platforms and Software
oneM2M; Watson IoT; FiWARE Semantic; Huawei IoT

IoT Technologies and Standards
oneM2M; CAM/DENM; HTTP; CoAP/6LowPAN; Raspberry Pi; WiFi, Bluetooth; GPS; 3G/4G; ITS-G5/LTE

IoT Devices
Laser Scanners; Accelerometer; Wireless sniffer; Beacons; GPS; MAV

Co-funded by the European Commission

AUTOPILOT

Use case: Automated valet parking - Vigo (ES)

European Large-Scale Pilots Programme

AUTOPILOT

Pilot site leader
CTAG (ES)

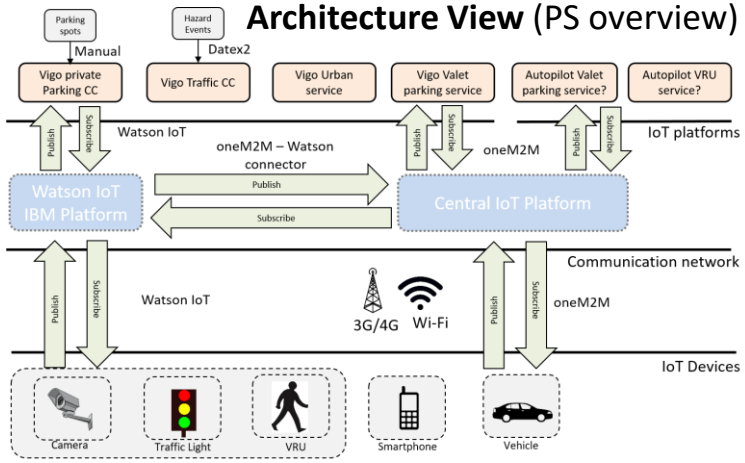
Pilot site leader
CTAG (ES)

Partners
VIGO (ES) PSA (FR)

Domain application areas addressed
Automated Valet Parking (AVP) is a driverless Automated Driving use case including off-car drop-off, driving to and from a parking spot, forwards and backwards manoeuvring as well as off-street passenger pick-up. IoT functions include routing, localization of obstacles and even control decision making at the IoT Edge.

Short description and location
In the Automated Valet Parking (AVP) use case, the driver is able to leave the car at some predefined drop-off location and is able to retrieve it once he/she needs it back. The operations of parking and manoeuvring the car in the parking area (inside or outside), retrieving it, and possibly other additional services, will be managed by the parking management system. Vigo (ES).

Architecture View (PS overview)



SW/HW Infrastructure
Cloud; RSU; In-vehicle

IoT Applications
Parking management system; VRU (object/pedestrian) detection; Spot detection

IoT Platforms and Software
oneM2M, SENSINOV oneM2M, IBM WATSON IoT

IoT Technologies and Standards
oneM2M; CAM; CAN Bus; SPAT; GPS; DENM; LDM

IoT Devices
Smart camera; *Ultrasound sensors*; *Lidar (3D)*

AUTOPILOT

Use case: Automated valet parking - Tampere (FI)

European Large-Scale Pilots Programme

AUTOPILOT

Pilot site leader
VTT (FI)

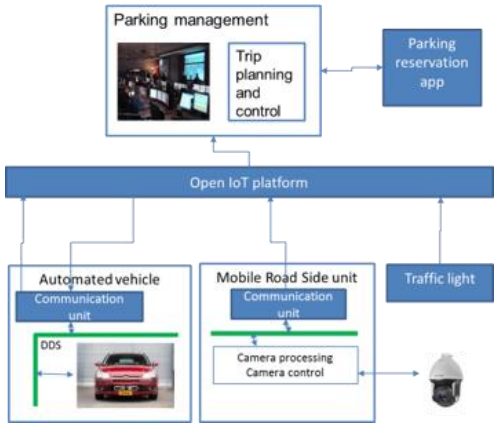
Use case leader
VTT (FI)

Partners
VTT (FI)

Domain application areas addressed
Automated Valet Parking (AVP) is a driverless Automated Driving use case including on-street car drop-off, driving to and from a parking spot, forwards and backwards manoeuvring as well as on-street passenger pick-up. IoT functions include routing, localization of obstacles and even control decision making at the IoT Edge.

Short description and location
In the Automated Valet Parking (AVP) use case, the driver is able reserve a parking space and to leave the car at some predefined drop-off location. The operations of parking and manoeuvring the car in the parking area (inside or outside) will be managed by the parking management system. Tampere (FI).

Architecture View (PS overview)



SW/HW Infrastructure
Cloud; RSU; In-vehicle

IoT Applications
Parking management; Parking reservation

IoT Platforms and Software
oneM2M

IoT Technologies and Standards
oneM2M; DDS; MQTT; SPAT/MAP; ITS-G5

IoT Devices
Cameras

Co-funded by the European Commission

AUTOPILOT

Use case: Highway pilot - Brainport (NL)

European Large-Scale Pilots Programme

AUTOPILOT

Pilot site leader
TNO (NL)

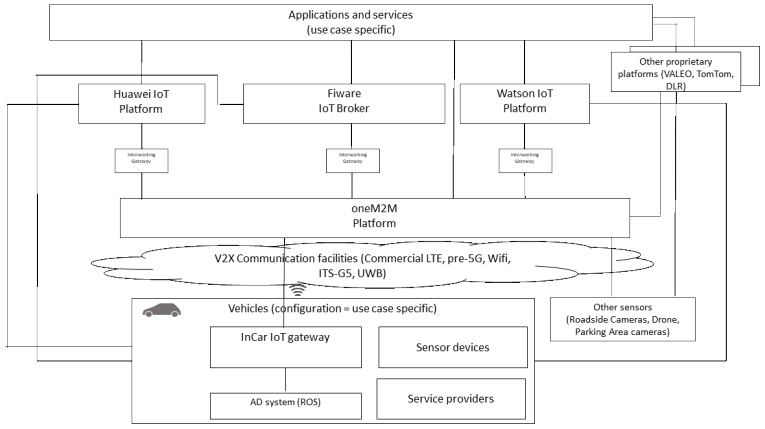
Use case leader
VALEO (FR)

Partners
TOMTOM (NL); TASS (NL); VICOMTECH (SP)

Domain application areas addressed
The use case is relevant for manual, assisted and autonomous driving on all sorts of roads. For the hazard detection part, the system operates transparently. For the driving adaptation part, the system anticipates hazards with warnings and recommendations, which are eventually executed automatically in autonomous driving mode. No further user actions are required.

Short description and location
A cloud service merges the sensors' measurements from different IoT devices in order to locate and characterize road hazards. The goal is then to provide the following vehicles with meaningful warnings and adequate driving recommendations to manage the hazards in a safer or more pleasant way. Brainport (NL)

Architecture View (PS overview)



SW/HW Infrastructure
Cloud; Map Platform; IoT Platform; Control Center; In-vehicle

IoT Applications
Detection of Road Surface Hazards and Obstacles

IoT Platforms and Software
oneM2M

IoT Technologies and Standards
oneM2M; HTTP; 3G/4G; MQTT

IoT Devices
Laser Scanner; Front Camera; IMU; Roadside Camera

Co-funded by the European Commission

AUTOPILOT

Use case: Highway pilot - Livorno (IT)

European Large-Scale Pilots Programme

AUTOPILOT

Pilot site leader
CNIT (IT)

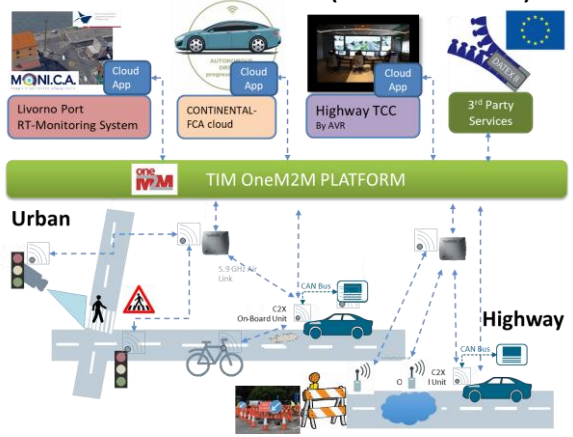
Use case leader
CRF (IT)

Partners
AVR (IT); CONTI (FR); CRF (IT); ISMB (IT); THALES (IT); TELECOMITALIA (IT)

Domain application areas addressed
Automated Driving on motorways from entrance to exit, on all lanes, incl. overtaking. The driver must deliberately activate the system, but does not have to monitor the system constantly. There are no request from the system to the driver to take over when the systems in normal operation area.

Short description and location
In the Highway Pilot use case, a cloud service merges the sensors' measurements from different IoT devices in order to locate and characterize road hazards. The goal is then to provide the following vehicles with meaningful warnings and adequate driving recommendations to manage the hazards in a safer or more pleasant way. Livorno (IT).

Architecture View (PS overview)



SW/HW Infrastructure
Cloud; RSU; In-vehicle

IoT Applications
Puddle detection; Pothole detection; Road works notification; Car behaviour

IoT Platforms and Software
oneM2M

IoT Technologies and Standards
oneM2M; NB-IoT; CAN Bus; DATEX; 6LowPAN; IEEE802.15.4; USB2.0; 3G/4G; LTE-V2X; ITS-G5

IoT Devices
In-vehicle IoT platform; on board pothole detector; Road side equipment: WSN water level detector; NB-IoT puddle detector; IoT-RSU

Co-funded by the European Commission

AUTOPILOT

Use case: Platooning - Versailles (FR)

European Large-Scale Pilots Programme

AUTOPILOT

Domain application areas addressed

The platooning use case demonstrates vehicular platoons consisting of a lead vehicle and one or more highly automated or driverless following vehicles which have automated steering and distance control to the vehicle ahead. The control is supported by V2V communication.

Short description and location

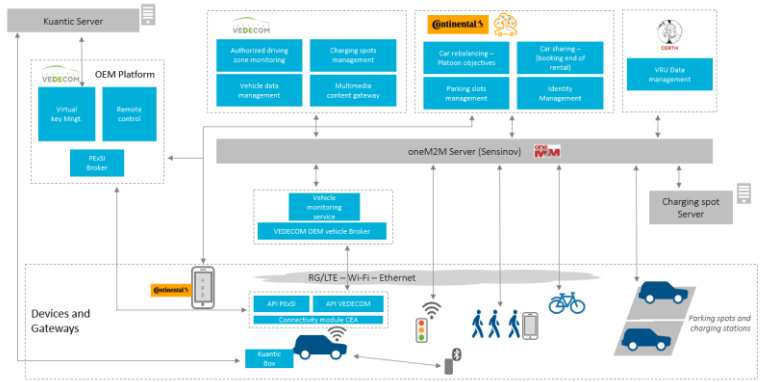
The Platooning Use Case is part of the car rebalancing business case. It is closely linked to the fleet management system that indicates which vehicles have to be transferred from one station to another. The mission planning includes choosing the leading vehicle and the follower vehicles. The traffic light assist suggest reference speed in order to minimize the waiting time. Versailles (FR).

Pilot site leader
Versailles Grand Parc (FR)

Use case leader
VGP (FR)

Partners
VEDECOM (FR); SENSINOV (FR); CERTH (GR); AKKA (FR), CONTI (FR), CEA (FR)

Architecture View (PS overview)



IoT Applications
Mission planning; Traffic light assist; VRU detection/management

IoT Platforms and Software
SENSINOV oneM2M

IoT Technologies and Standards
oneM2M; 4G/LTE; PEXSI Broker; Kuantic Server; GPS

SW/HW Infrastructure
Cloud; RSU; In-vehicle

IoT Devices
Smart watch; smart glasses; Smart phones

Co-funded by the European Commission

AUTOPILOT

Use case: Platooning - Brainport (NL)

European Large-Scale Pilots Programme

AUTOPILOT

Domain application areas addressed

The platooning use case demonstrates vehicular platoons consisting of a lead vehicle and one or more highly automated or driverless following vehicles which have automated steering and distance control to the vehicle ahead. The control is supported by V2V communication

Short description and location

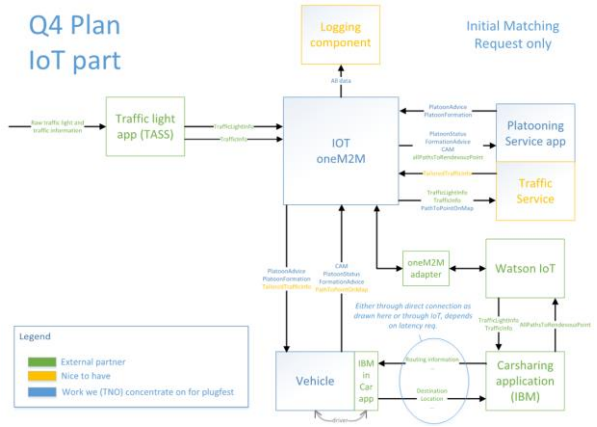
The main scope is to show how increased flexibility in platoon manoeuvring capabilities can be realized, and how it can benefit from the use of IoT technology. Additional achievements are the use of IoT data on hard shoulder authorization and availability for platooning, traffic light status and request handling, occupancy of bus lanes, etc. Brainport (NL).

Pilot site leader
TNO (NL)

Use case leader
TNO (NL)

Partners
TUE (NL); TECHN (NL); NXP (NL); DLR (DE)

Architecture View



SW/HW Infrastructure
Cloud; RSU; In-vehicle

IoT Applications
Crowd detector; ...

IoT Platforms and Software
oneM2M; Watson IoT; FiWARE Semantic; Huawei IoT

IoT Technologies and Standards
oneM2M; CAM/DENM; HTTP; CoAP/6LowPAN; Raspberry Pi; WiFi, Bluetooth; GPS; 3G/4G; ITS-G5/LTE

IoT Devices
MAV; Monitoring cameras; Laser Scanners; Accelerometer; Wireless sniffer; Beacons; GPS; IoT enabled traffic lights

AUTOPILOT

Use case: Real time car sharing - Versailles (FR)

European Large-Scale Pilots Programme

AUTOPILOT

Pilot site leader
Versailles Grand Parc (FR)

Use case leader
VGP (FR)

Partners
VEDECOM (FR); SENSINOV (FR); AKKA (FR), CONTI (FR), CEA (FR)

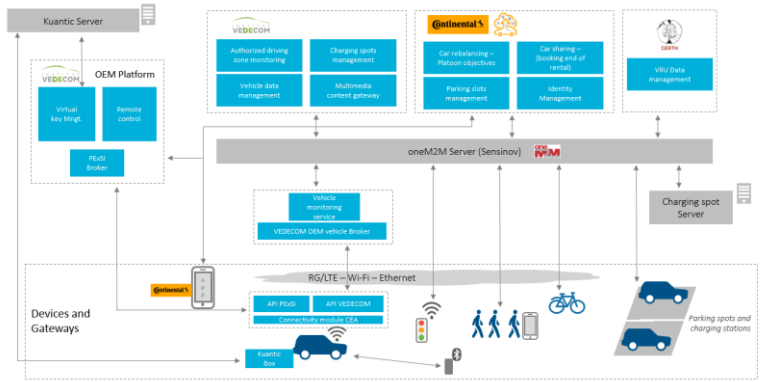
Domain application areas addressed

The objective is to allow commercial and individual car sharing services to use automated driving cars. The service platform collects the end user needs and uses relevant data in the IoT platform to suggest car sharing (pick-up/drop-off) possibilities. Real time and reliable information about the vehicles' current status and their scheduled routes by the fleet management system.

Short description and location

The real time car sharing use case is offering a car sharing service for tourists. It also supports the urban driving and platooning use cases. The use of IoT is expected to assist responding to the demand of having a sufficient number of vehicles in different stations. The objective is on one hand to increase the quality of service for the users and on the other hand, to reduce the exploitation costs. Versailles (FR).

Architecture View (PS overview)



IoT Applications

Touristic applications; Loclization; Battery level; Charging points; Car rebalancing; ...

IoT Platforms and Software

oneM2M

SW/HW Infrastructure

Cloud; RSU; In-vehicle

IoT Technologies and Standards

oneM2M; 4G/LTE; PEXSI Broker; Kuantic Server

IoT Devices

Smart tags; UWB; RTK

CREATE-IoT U4IoT ACTIVAGE PROJECT IOF2020 INTERNET OF FOOD & FARM MONICA SYNCHRONICITY AUTOPILOT

Co-funded by the European Commission

AUTOPILOT

Use case: Real time car sharing - Brainport (NL)

European Large-Scale Pilots Programme

AUTOPILOT

Pilot site leader
TNO (NL)

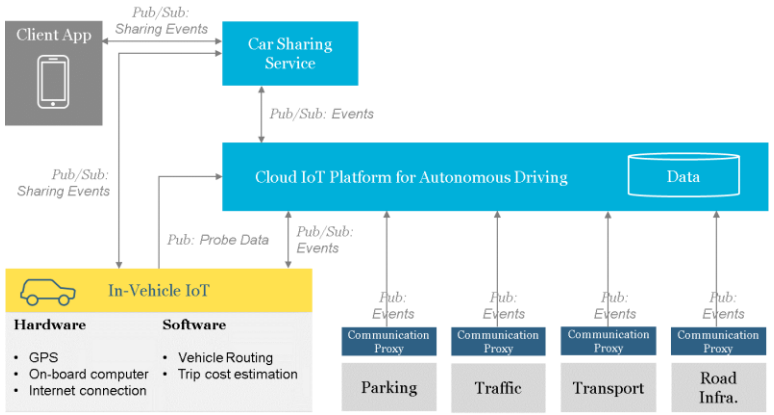
Use case leader
IBM (IE)

Partners
TUE (NL); TECHN (NL)

Domain application areas addressed
The objective is to allow commercial and individual car sharing services (either self-driving or not). The service platform collects the end user needs and uses relevant data in the IoT platform to suggest car sharing (pick-up/drop-off) possibilities. Real time and reliable information about the vehicles' current status and their scheduled routes by the fleet management system.

Short description and location
Three levels of car sharing services: (i) service that finds the closest available car and assigns it to a single customer; (ii) ride sharing, when multiple customers that possibly have different origins and destinations share a part of the ride on a common car; (iii) allow customers to specify pick-up and drop-off time-windows to increase flexibility and planning. Brainport (NL).

Architecture View



SW/HW Infrastructure
Cloud; RSU; In-vehicle

IoT Applications
Vehicel routing; Trip cost estimation

IoT Platforms and Software
oneM2M; Watson IoT; FiWARE Semantic; Huawei IoT

IoT Technologies and Standards
oneM2M; CAM/DENM; HTTP; CoAP/6LowPAN; Raspberry Pi; WiFi, Bluetooth; GPS; 3G/4G; ITS-G5/LTE

IoT Devices
MAV; Laser Scanners; Accelerometer; Wireless sniffer; Beacons; GPS

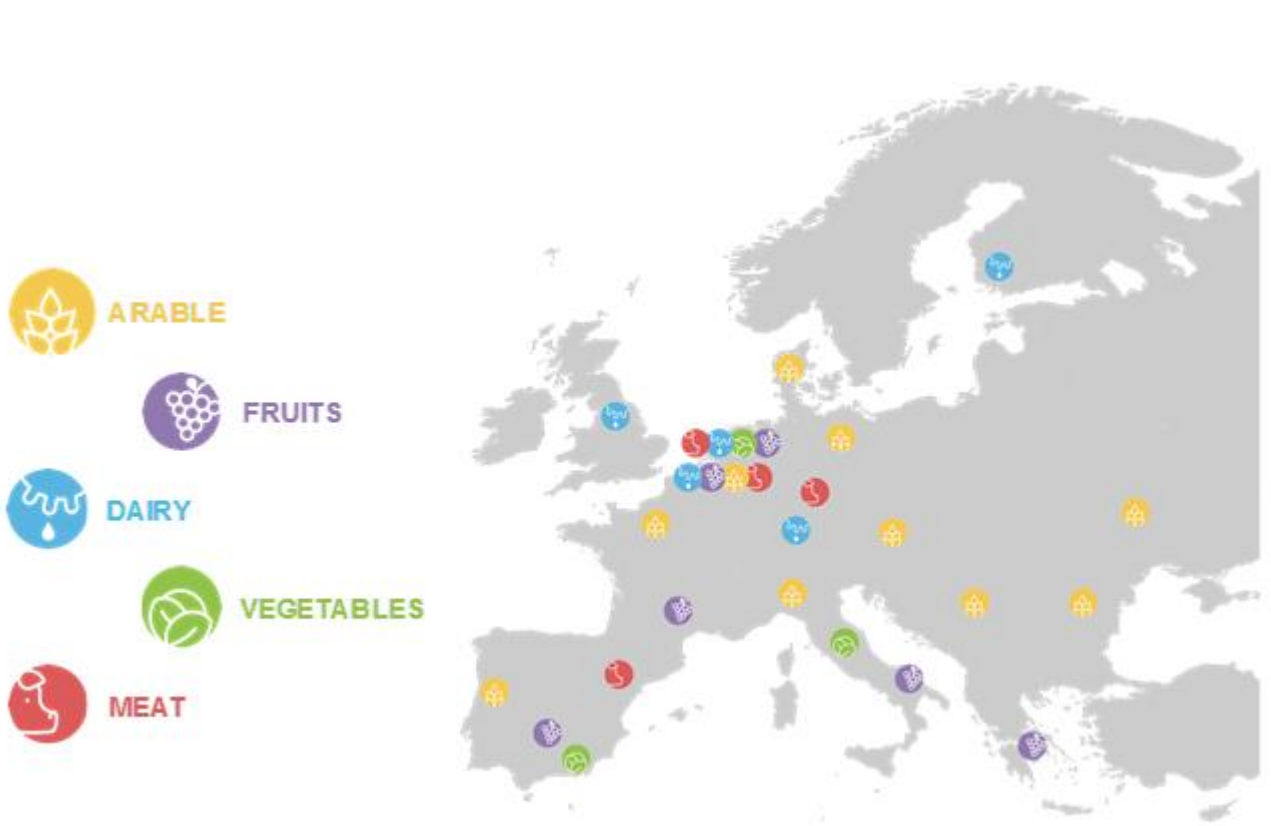
Co-funded by the European Commission

Overview of LSP use case locations

IoF2020 (INTERNET OF FOOD AND FARM 2020)

European Large-Scale Pilots Programme

- The Internet of Arable Farming
  - Within-field management zoning
  - Precision Crop Management
  - Soya Protein Management
  - Farm Machine Interoperability
- The Internet of Dairy Farming
  - Grazing Cow Monitor
  - Happy Cow
  - Silent Herdsman
  - Remote Milk Quality
- The Internet of Fruits
  - Fresh table grapes chain
  - Big wine optimization
  - Automated olive chain
  - Intelligent fruit logistics
- The Internet of Vegetables
  - City farming leafy vegetables
  - Chain-integrated greenhouse production
  - Added value weeding data
  - Enhanced quality certification system
- The Internet of Meat
  - Pig farm management
  - Poultry chain management
  - Meat Transparency and Traceability



Coordinator: Wageningen University and Research (NL) Website: www.iof2020.eu/

Co-funded by the European Commission

IoF2020 - Trial: The internet of Arable Farming

Use case 1.1: Within-field management zoning

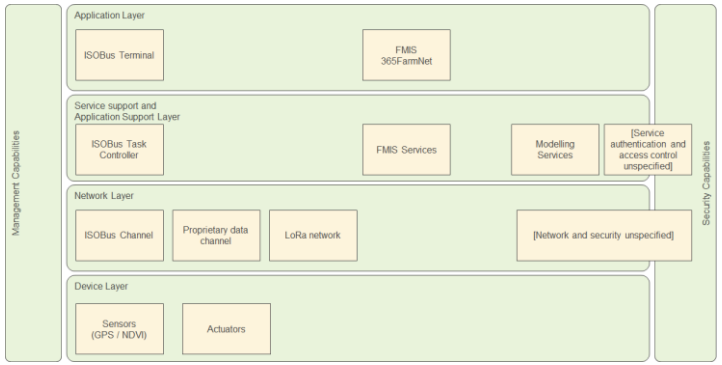
European Large-Scale Pilots Programme

Domain application areas addressed
Management zoning of arable fields; Crop protection; Yield prediction. (Farming, Logistics)

Short description and location
Sensing and actuating devices are used to gather data, mainly related to potatoes, predict yields, define management zones, monitor and optimize growing potatoes' behaviour, optimize use of herbicides, and optimize farm management. (NL, DE)

Partners
ZLTO (NL); Kverneland Group (NL); KPN (NL); Bayer CropScience AG (DE); Van den Borne Aardappelen (NL); Grimme Landmachinen-fabrik GmbH & Co (DE); Wageningen University & Research (NL).

Architecture View



SW/HW Infrastructure
Cropfield sensors platform, Agriculture combination (e.g., tracktor), Manufacturer Cloud with cloud storage, FMIS Cloud, Prediction Model Cloud

IoT Applications
Weather forecast service, Growing crops, Akkerweb agro-eco algorithms; GIS, zoning and T&T modules; Control fertilize machines; Control irrigation systems; Measure soil temperature and water potential

IoT Platforms and Software
Initiatives and platforms: FIWARE, FIspace, EPCIS, AgroSense, Apache Cassandra, Apache Flink, Apache Spark

IoT Technologies and Standards
Lora Network, 365FarmNet, Zoner, Crop-R and Akkerweb platforms, Cloudfarm FMIS, ISOBUS.

IoT Devices
30 sensors for soil moisture, Veris soil scanner, machine control, yield sensors, indoor climate, crop quality, 4 weather stations, 3 GEO-localization units, NDVI Sensor

Co-funded by the European Commission

IoF2020 - Trial: The internet of Arable Farming

Use case 1.2: Precision Crop Management

European Large-Scale Pilots Programme

Domain application areas addressed

Nitrogen and water monitoring; Precision irrigation control; Crop growth optimization. (Farming)

IoT Applications

Weather forecast service, Arvalis agro-eco algorithms, Irrigation management, Fertilizers' management; Control transport; Control Handling; Control grow conditions;

Short description and location

Smart wheat crop management by sensors data embedded in a low-power, long-range network infrastructure (FR)

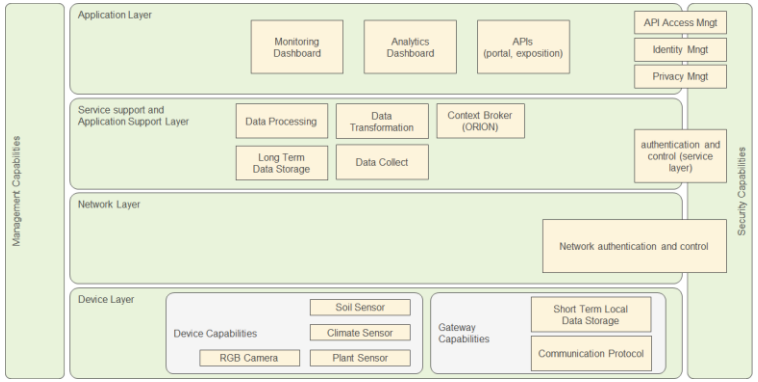
IoT Platforms and Software

8 gateways, Arvalis IoT platform; 365FarmNet; Atland FMIS, Cloud services.

Partners

Arvalis Institut du végétal (FR); Orange (FR); Hi-Phen (FR); Bosch (DE).

Architecture View



SW/HW Infrastructure

Cloud Storage, Cloud FIWARE Cygnus, Cloud FIWARE Context Broker; Cloud FIWARE PEP Proxy; Cloud Analytics infrastructure; Cloud Data processing unit; Farm IoT Gateway; Farm RGB Cameras; Farm Sensors

IoT Technologies and Standards

SDI-12, Bluetooth LE, SPI/I2C, HTTP (Data in ASCII format with an AES128 signature), JSON/HTTPS, OAuthV2, HTTP, NGSI/HTTP

IoT Devices

16 sensors for water potential and soil temperature, 8 climate sensors, 8 plant sensors, 8 RGB cameras, 8 IoT gateways, reflectance and leaf area index, 3 weather stations (wind speed, solar radiation, air temperature, air humidity, rain).

CREATE-IoT U4IoT ACTIVAGE PROJECT IoF2020 INTERNET OF FOOD & FARM MONICA SYNCHRONICITY AUTOPILOT

Co-funded by the European Commission

IoF2020 - Trial: The internet of Arable Farming

Use case 1.3: Soya Protein Management

European Large-Scale Pilots Programme

Domain application areas addressed
Protein monitoring and forecasting; Rational water usage (irrigation); Mechanical weeding. (Farming)

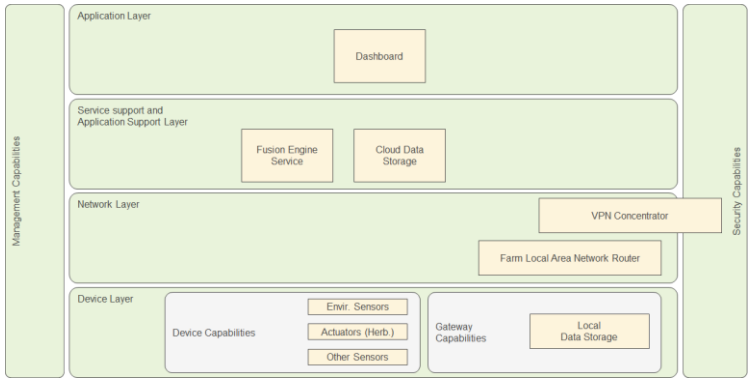
IoT Applications
Weather forecast; Agronomic models of extension services; Control transport; Control Handling; Control grow conditions

Short description and location
Short description
Improving protein production by combining sensor data and translate them into effective machine task operations. (AT, IT)

IoT Platforms and Software
Platform 365FarmNet, FMIS

Partners
Donau soja (AT), SOIA ITALIA (IT), PESSL (AT), GRAINSENSE (FI)

Architecture View



SW/HW Infrastructure
Cloud data storage and Dashboard; Farm Server (Cloud Service interface, IOT Adapters, Local Data Storage); Actuators and Sensors

IoT Technologies and Standards
TBD

IoT Devices
Environmental MEMS sensors, NIR sensors, 20 soil moisture and crop quality sensors; accurate GNSS receivers; cameras for weed detection, 4 weather stations, 2 soil scanners.

Co-funded by the European Commission

IoF2020 - Trial: The internet of Arable Farming

Use case 1.4: Farm Machine Interoperability

European Large-Scale Pilots Programme

Domain application areas addressed
Sustainable soil tillage; Machine to machine communication for application of task maps; Farm equipment data sharing.
(Farming)

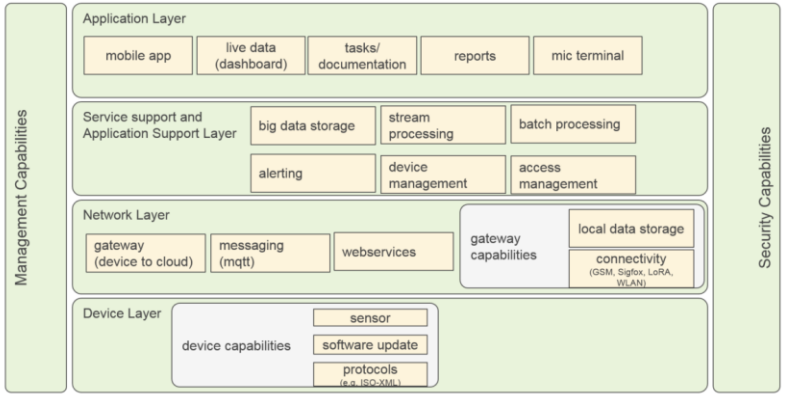
IoT Applications
Soil-plant-atmospheric algorithms; Weather forecast; GIS and zoning tool; Traffic optimization modules. Control persons; Control machines, Planning and scheduling of tasks

Short description and location
Data exchange between field machinery and farm management information systems for supporting cross-over pilot machine communication.
(DK, NL, DE, BE)

IoT Platforms and Software
365FarmNet, ThingWorx IoT platforms , FIWARE infrastructure

Partners
CNH Industrial NV (BE); Aarhus University (DK); Kverneland Group (DE); AGRO Intelligence (DK); 365FarNet (DE);AGCO Corporation (DK); Wageningen University & Research (NL);

Architecture View



SW/HW Infrastructure
Farm sensors, Farm gateway, Farm app, Farm mics. Manufacturer data storage, IoT system, FMI data storage, FMI machine connector, FMI reporting engine,

IoT Technologies and Standards
ISO-XML, ADAPT, mqtt, EFDI

IoT Devices
Soil and yield sensors on 2 tractors, 2 soil tillage implements and on 1 combine; 10 stations for precipitation, humidity, air and soil temperature, soil moisture and 1 weather station.

CREATE-IoT U4IoT ACTIVAGE PROJECT IoF2020 INTERNET OF FOOD & FARM MONICA SYNCHRONICITY AUTOPILOT

Co-funded by the European Commission

IoF2020 - Trial: The Internet of Dairy Farming

Use case 2.1: Grazing Cow Monitor

European Large-Scale Pilots Programme

Domain application areas addressed
Cow Tracking and Tracing; Pasture Time Monitoring.
(Farming)

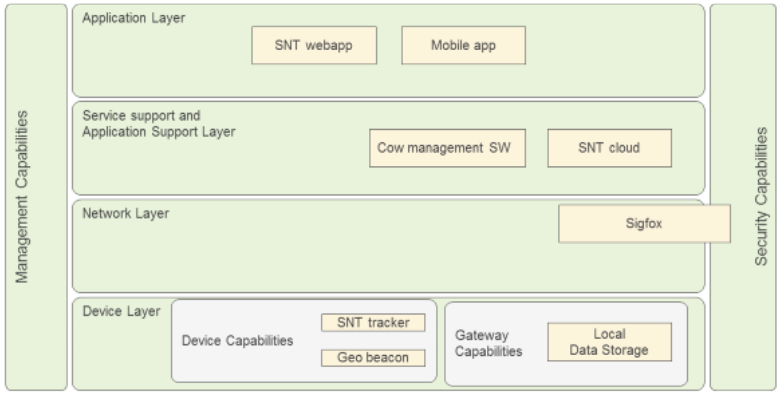
IoT Applications
Grazing Cow Monitor app; Farmer Controls Pasturing; Monitor Cow position

Short description and location
Monitoring and managing the outdoor grazing of cows by GPS tracking within ultra-narrow band communication networks.
(BE)

IoT Platforms and Software
UNB (Sigfox and LoRa)
IoT platform 365FarmNet

Partners
ILVO (BE); Sensolus (BE); Inagro (BE)

Architecture View



SW/HW Infrastructure
Cloud Service Platform (Cow management software, Mobile app, Web app, SNTCloud Data Storage); Farm platform (SNS tracker and Geo beacon)

IoT Technologies and Standards
BLE, Sigfox, HTTP

IoT Devices
75-100 stickntrack GPS-trackers, BLE tags, 1-5 GEO beacon; 50 SNT trackers

IoF2020 - Trial: The Internet of Dairy Farming

Use case 2.2: Happy Cow

European Large-Scale Pilots Programme

Domain application areas addressed

Real-time 3D monitoring of dairy cow activity; Animal Health Management; Cow Fertility Management.
(Farming)

IoT Applications

Cloud-based decision support system, analytics cow centric behaviour, prediction algorithm; Control transport; Control cow daily growth; control health conditions; environmental sensing

Short description and location

Improving dairy farm productivity through 3D cow activity sensing and cloud machine learning technologies.
(NL)

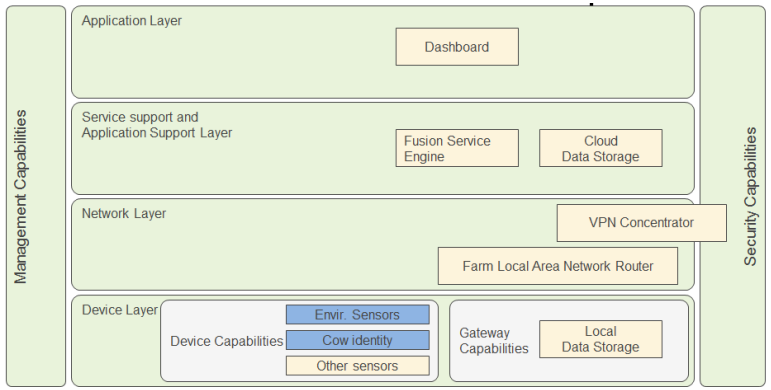
IoT Platforms and Software

Base Station Device oData, Connecterra IoT platform, connection to 365FarmNet.

Partners

Connecterra (NL); Wageningen University & Research (NL); ZLTO (NL); VetEffect (FI), 365 Farmnet (DE)

Architecture View



SW/HW Infrastructure

Cloud Service Platform (Data Storage, Business Intelligent dashboard, Fusion Service Engine), Farm Server (IoT Dashboard, IoT adapters, local data storage, IoT Middleware); Sensor platform; Climate Control Platform

IoT Technologies and Standards

XMPP-IoT, HTTP, Sub-1GHz, BLE, 6LoWPAN

IoT Devices

500-700 neck/leg transmitters with accelerometer RF sensors for dairy cow activity in 3D space 50-60 intelligent routers; 1 Accelerometer per animal; MEMS Temperature, Humidity, and Pressure sensor per animal and farm; BLE sensor per animal

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IoF2020 - Trial: The Internet of Dairy Farming

Use case 2.3: Silent Herdsman

European Large-Scale Pilots Programme

Domain application areas addressed
Monitoring of animal behaviour (motion); Early detection of livestock diseases.
(Farming)

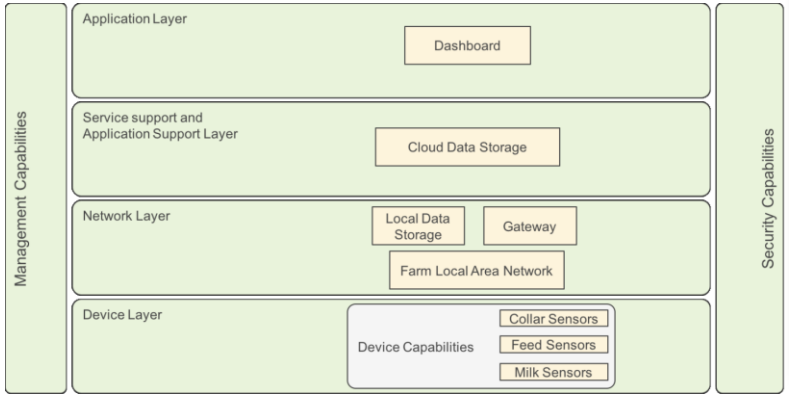
Short description and location
Herd alert management by a high node count distributed sensor network and a cloud-based platform for decision-making.
(UK)

IoT Applications
Collar-based analytics, early illness detection; Control Cow Illness; Control Milk extraction; Control Cow Feeding; Control Cow Fertility

IoT Platforms and Software
LoRa; Hypercat, connection to 365Farmnet.

Partners
University of Strathclyde Glasgow (UK), Farmers include Mackie's Of Scotland, Alex Bankier and Co, Crichton Farm (UK), Müller (UK), Afimilk (UK), 365 Farmnet (DE)

Architecture View



SW/HW Infrastructure
Cloud Data Storage; Cloud Dashboard; Farm Server (Local Middleware, Local data storage, dashboard, IoT adapter), Sensors

IoT Technologies and Standards
HTTP; LoRa

IoT Devices
150-200 Afimilk Silent Herdsman devices; 3 Fullwood Merlin 2 Robot; 3 Lely model A; 3 T4 Robot for feed measurement; 2 GEA Mono Box Robot; 2 GEA Automatic Feed; 2 ForFarmers Q Series PLC; 500 Afimilk Collar Sensors

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Use case 2.4: Remote Milk Quality

European Large-Scale Pilots Programme

Domain application areas addressed
Remote quality monitoring of raw-, half- and end-products; Validation/calibration quality info; Product composition analysis (incl. fresh-grazed grass & cow pregnancy indicators).
(Processing, Consumption)

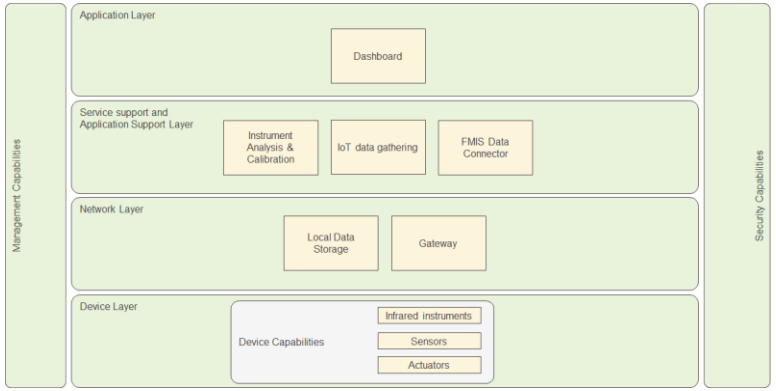
IoT Applications
QA data visualization, remote alerts, interventions harmonization, milk composition/quality analytics.

Short description and location
Remote quality assurance of accurate instruments and analysis & pro-active control in the dairy chain.
(NL)

IoT Platforms and Software
Qlip platform for automatic calibration and validation.

Partners
Qlip (NL)

Architecture View



SW/HW Infrastructure
TBD

IoT Technologies and Standards
TBD

IoT Devices
20-30 InfraRed sensors (FTIR) to measure milk quality composition; Daily handling & virtualisation of over 50,000 objects, identified by RFID

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IoF2020 - Trial: The Internet of Fruits

Use case 3.1: Fresh table grapes chain

European Large-Scale Pilots Programme

Domain application areas addressed
Smart Irrigation; Variable Rate Spraying; Smart Post-Harvest Processing & Packaging.
(Farming, Packaging)

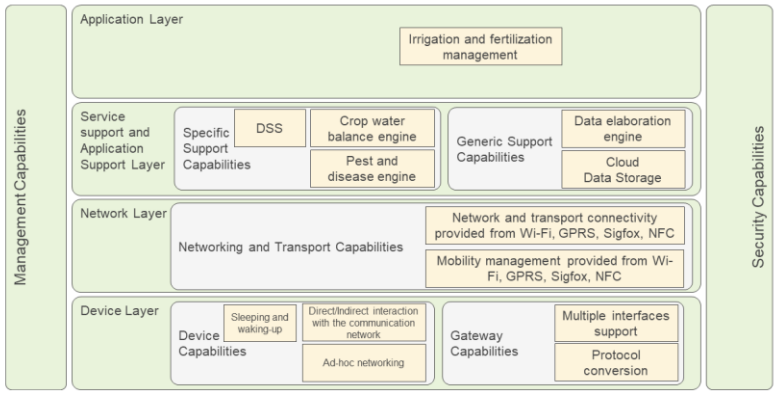
IoT Applications
Control Fertilize Spraying; Control irrigation

Short description and location
Real-time monitoring and control of water supply and crop protection of table grapes and predicting shelf life.
(IT, EL)

IoT Platforms and Software
GPRS/4G and long RF communication; FIWARE

Partners
CIHEAM (FR); ApoFruit (IT); SysMan (IT); Agricultural University of Athens (GR); Pegasus (GR); Synelixis (GR), S-COM (BE), UNIBAS (IT)

Architecture View



SW/HW Infrastructure
Cloud Service Platform(Data Storage, Pest and disease engine, Crop water balance engine, data elaboration engine); Farm Server (IoT adapter, IoT middleware, Local Data Storage); Irrigation Control System; Crop and Field Sensors Platform

IoT Technologies and Standards
GPRS; Wi-Fi; Sigfox; NTAG213; HTTP; NFC/QR Code; BluLeaf™ DSS

1200 BLOW gas sensors; 1 Rain gauge; 1 Barometer; 6 thermo-hygrometer sensor; 1 Digital thermo-hygrometer sensor; 3 Solar radiation sensors; 4PAR sensors; 2 Leaf wetness sensor; 3 Anemometer; 4 FDR sensor; 4 EC sensor; 4 EC sensors; 2 Drill & Drop sensors; 2 atmometer sensors; 1 Stem psychrometer sensor

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IoF2020 - Trial: The Internet of Fruits

Use case 3.2: Big wine optimization

European Large-Scale Pilots Programme

Domain application areas addressed

Pest management; Selective harvesting automatically; Wine cellar monitoring.
Value chain coverage: Vineyard => Processing => Commercialization.
(Farming, Processing)

IoT Applications

Management software for Wine Production from process to wine; Control Vineyard Treatments; Control Vinification; Control Cooling system; Track distribution chain

Short description and location

Optimizing cultivation and processing of wine by sensor-actuator networks and big data analysis within a cloud framework. TRL Organic: IR-VIS spectrum reader (Current 5, Target 8); Adapted Temperature data logger (Current 6, Target 8). TRL Conventional: IoT System for Vine Growing and Wine Production (Current 6, Target 8). (FR)

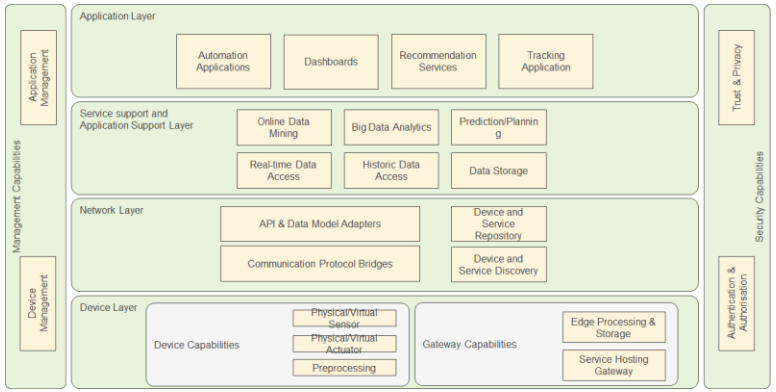
IoT Platforms and Software

SensiNact IoT platform; Cassandra (NO SQL).

Partners

Denis Dubourdieu Domaines (FR), ERTUS Group (FR); Vinidea SRL (IT); CEA-LETI (FR); Bordeaux INP – IMS Laboratory (FR); STMicroelectronics Grenoble 2 SAS (FR); ISVEA SRL (IT).

Architecture View



SW/HW Infrastructure

Cloud Service Platform (Vineyard Monitor; Cellar Monitor; Distribution Monitor; Calibration Service; Cellar Cooling Service; Cloud IoT Middleware; Cloud Data Storage); Vinwyard infrastructure

IoT Technologies and Standards

IETF; OASIS; IETF/CoRE; 6LoWPAN; IETF/YLS; OMA; LoRa; IEEE 802.3; IEEE 802.11; ADSL2 ITU G.992.3; GSM/GPRS/3G/4G; GPS

IoT Devices

27 sensors for detecting IR and VIS absorbance and temperature (cellar); 9 DEMETTER and Davis stations to monitor weather conditions in the vineyards; 34 Hobo U23 Pro V2 Temp/Rh to monitor micro-climes (weather conditions) in the vineyards; video sensors to monitor phenological vine stages, insects in the vin,

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IoF2020 - Trial: The Internet of Fruits

Use case 3.3: Automated olive chain

European Large-Scale Pilots Programme

Domain application areas addressed
Fertigation; Harvesting Logistics; Smart Mill Processing.
(Farming, Processing)

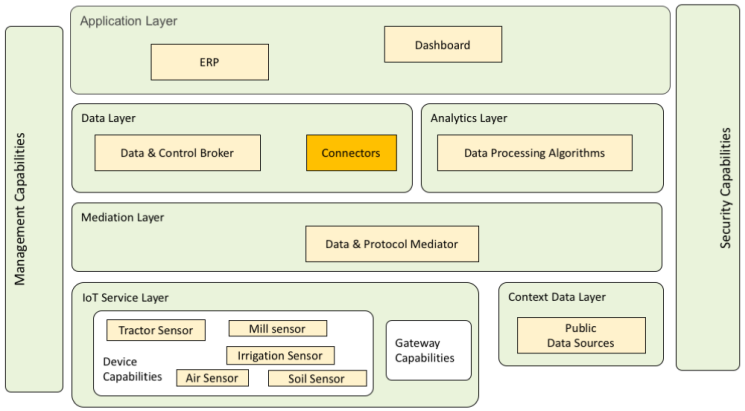
IoT Applications
Olive mill Control; Traceability; Control Irrigation;

Short description and location
Automated field control, product segmentation, processing and commercialisation of olives and olive oil.
(ES, IT)

IoT Platforms and Software
FIWARE infrastructure (Context Broker9

Partners
HispaTec (ES); DCOOP (ES); Tecnova (ES); Synelixis (GR); Nileas (GR); Agricultural University of Athens (GR).

Architecture View



SW/HW Infrastructure
Cloud platform; Application platform; IoT Service Platform; Big Data Platform

IoT Technologies and Standards
NGSI; MQTT; LWM2M;

IoT Devices
soil/air sensors for water, temp. nitrates, conductivity, humidity, radiation, Product barcodes/QR, RFID; weather station; Resistive sensor for leaf wetness; pyranometer; flow sensors; water pressure; NIR.

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IoF2020 - Trial: The Internet of Fruits

Use case 3.4: Intelligent fruit logistics

European Large-Scale Pilots Programme

Domain application areas addressed
Returnable Transport Items (RTI) for Fruits packaging and transporting; Field to Fork logistics; Super Market Placing and Monitoring.
(Logostics, Consumption)

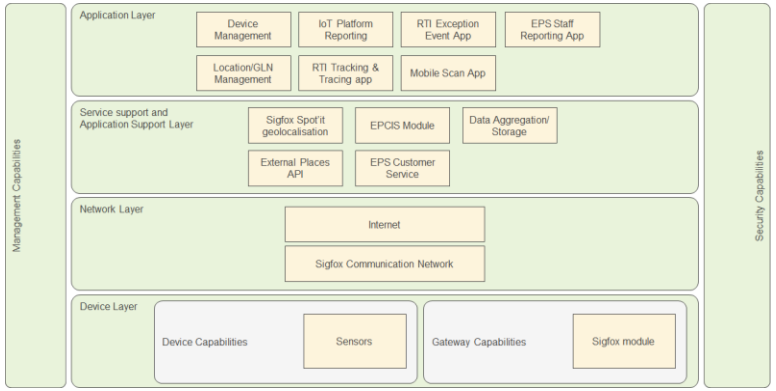
IoT Applications
Control Washing/Sorting Machine; Control RTI Storing; Control Shipment

Short description and location
Fresh fruit logistics through virtualization of fruit products by intelligent trays within a low-power long-range network infrastructure.
(DK, NL)

IoT Platforms and Software
EPCIS based middleware system, LoRa related localisation of objects.

Partners
ATB (DE); Euro Pool System (DE); GS1 (DE); ATB Bremen(DE); NXP (DE)

Architecture View



SW/HW Infrastructure
EPS Data Centre server; Application Server; IoT Devices; Sigfox Server; Cloud Server; Mobile Application

IoT Technologies and Standards
Sigfox; HTTP; ViZix

IoT Devices
1000s RFID related transponders in trays, handheld and fixed RFID readers; Sigfox/LoRa module; Geolocation Sensor; Environmental Sensors; Mobile Device.

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IoF2020 - Trial: The Internet of Vegetables

Use case 4.1: City farming leafy vegetables

European Large-Scale Pilots Programme

Domain application areas addressed
Advanced sensing of crop conditions in indoor farming; Automatic execution of growth recipes; Integrate production with processing & distribution.
(Farming/City Farming, Logistics)

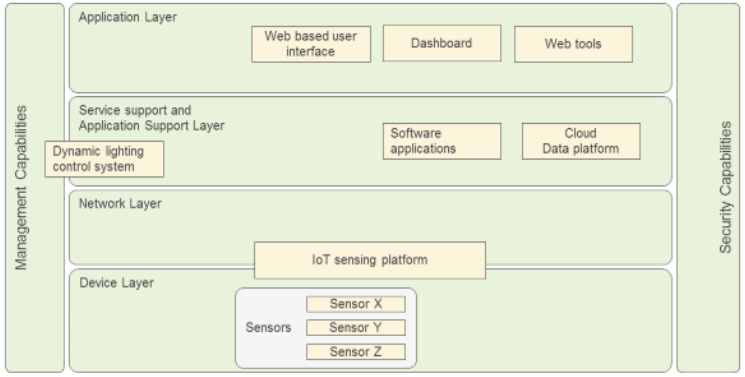
IoT Applications
1 production control, 1 "Green Cloud" climate control (incl. irrigation) system.

Short description and location
Value chain innovation for leafy vegetables in convenience foods by integrated indoor climate control and logistics.
(NL)

IoT Platforms and Software
30 wired and/or Zigbee connections from sensors to city farming system.

Partners
Philips Lighting (NL), Staay Food Group (NL), HAS Den Bosch (NL).

Architecture View



SW/HW Infrastructure
Cloud Service Platform; IoT Sensing Platform;

IoT Technologies and Standards
Wi-Fi; ZigBee; LoRa; I2C; Modbus; HTTPS; JSON

IoT Devices
Advanced crop sensors (100x each) for temperature, humidity, CO2, pH, nutrition, air flow, plant observers, electrical conductivity, 15000 LED lighting devices; Philips lights

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IoF2020 - Trial: The Internet of Vegetables

Use case 4.2: Chain-integrated greenhouse production

European Large-Scale Pilots Programme

Domain application areas addressed
Traceability and monitoring ambient conditions of fresh tomatoes along value chains; Pesticide residue management; Energy efficiency management.
(Farming, Logistics, Consumption)

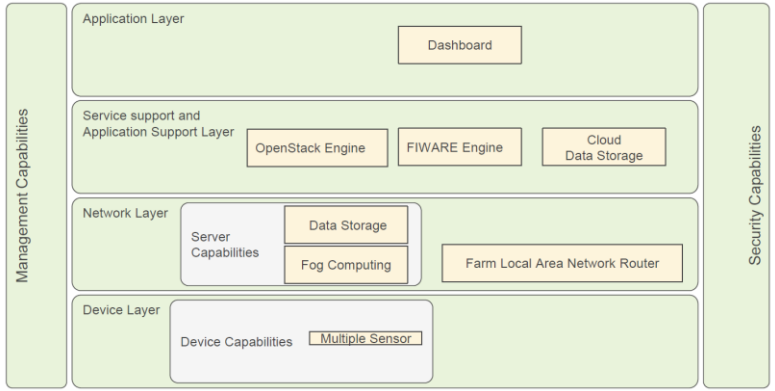
IoT Applications
DSS production managing; DSS for handling & transport managing; Control Growing Conditions

Short description and location
Integrating the value chain and quality innovation by developing a full sensor-actuator-based system in tomato greenhouses.
(ES, IT)

IoT Platforms and Software
FIWARE; OpenStack.

Partners
Coexphal (ES), Universidad De Almería (ES), Valoritalia (IT).

Architecture View



SW/HW Infrastructure
IoT web platform; Local Server Scada; Farm interfaces

IoT Technologies and Standards
Wi-Fi; Ethernet; USB; RS-232; SDI-12

IoT Devices
Sensors for temp. & moisture, humidity, CO2, water supply, soil water; leaf wetness, and nutrients, and PAR; IP cameras and 4 weight devices.

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IoF2020 - Trial: The Internet of Vegetables

Use case 4.3: Added value weeding data

European Large-Scale Pilots Programme

Domain application areas addressed
Automated weed control; Crop monitoring and harvest prediction based on weeding data; Optimizing weeding efficiency.
(Farming)

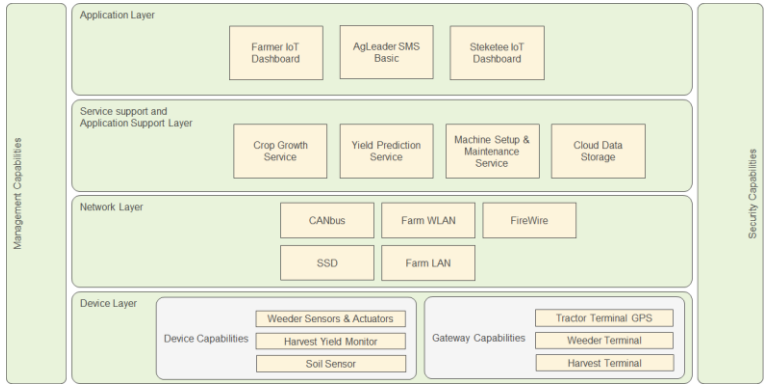
IoT Applications
Growth, Weed, Harvest, Soil Monitoring.

Short description and location
Boosting the value chain by harvesting weeding data of organic vegetables obtained by advanced visioning systems .
(NL, DE)

IoT Platforms and Software
1-2 local data storage & image pre-processing syst., 3-4 gateways, 2 WiFi networks, cloud IoT platform.

Partners
DLO(NL), Steketee (NL), Wageningen University & Research (NL); Agrom (AT); Neways Technologies (NL)

Architecture View



SW/HW Infrastructure
Local Farm PC; Cloud Platform; Cloud;

IoT Technologies and Standards
GPS;

IoT Devices
6 RGB Cameras, GPS, timestamp, Handheld (Smartphone), 1-2 GUI (Touchscreen in tractor), 12 Weed actuators; Height sensors; Harvest sensors

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IoF2020 - Trial: The Internet of Vegetables

Use case 4.4: Enhanced quality certification system

European Large-Scale Pilots Programme

Domain application areas addressed
Compliance to PDO, organic and GlobalGap certification; tracking and tracing, verification of product origin and production method.
(Farming, Logistics, Consumption)

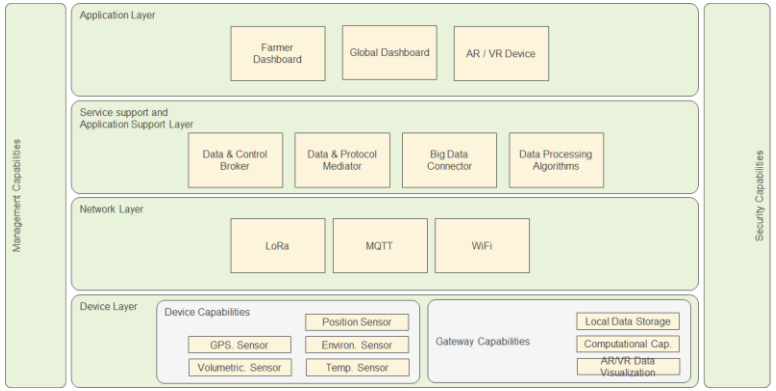
IoT Applications
Control vineyard; Control Harvest Machine; Control Wine Press; Control Wine Tank

Short description and location
Enhanced trust and simplification of quality certification systems by use of sensors, RFID tags and intelligent chain analyses.
(IT, ES)

IoT Platforms and Software
FIWARE Orion Context Broker; FIWARE IoT Agent; MongoDB platform; Cygnus

Partners
Valoritalia (IT); Coexphal (ES); Universidad De Almería (ES); Cisco Italia (IT).

Architecture View



SW/HW Infrastructure
Vineyard IoT Service Platform and Gateway; Wine Cellar Service Platform and Gateway; Cloud (Service Platform); Farm Server; Application platform

IoT Technologies and Standards
NGSI; MQTT; LoRa; Wi-Fi

IoT Devices
GPS sensors; AR/VR device; Temperature Soil Sensors; Volumetric Sensors

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IoF2020 - Trial: The Internet of Meat

Use case 5.1: Pig farm management

European Large-Scale Pilots Programme

Domain application areas addressed
Pig production monitoring and early warning; Boar taint detection; Informing consumers about production conditions.
(Farming, Processing, Consumption)

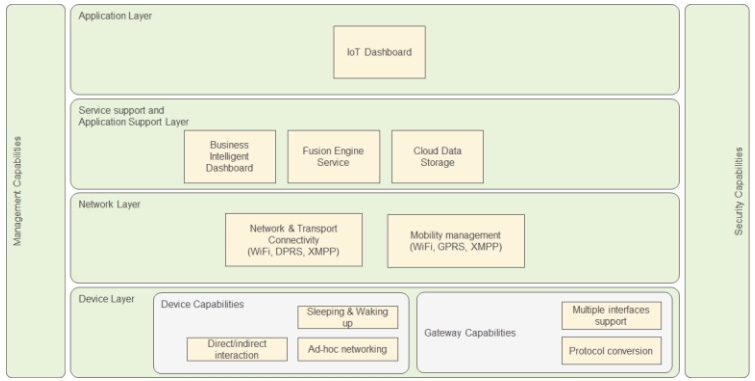
IoT Applications
Early Warning System Application; Boar Taint presence report linking with preventive measures; Data Analytics & Visualization; Fattening Control; Eating Control; Health Control.

Short description and location
Optimise pig production management by interoperable on-farm sensors and slaughter house data.
(NL, BE)

IoT Platforms and Software
1 Virtus Middleware + LinkSmart Middleware components; 1 ebbits Adaptation Layer; FIWARE Orion Context Broker;

Partners
ZLTO (NL); ILVO (BE); Vion Food Group (NL); Porphyrio (BE); ISMB(IT).

Architecture View



SW/HW Infrastructure
Cloud Service Platform; Farm Server; Slaughterhouse; Farm Server; Farm Sensors

IoT Technologies and Standards
XMPP-IoT; RFID; GHM Meettechniek Flowmeter MID1-008AP001E with LABO-MID1-008UNS; LLRP; UHF; HF; SQL; MQTT;

IoT Devices
Sensors for water & feed consumption, daily growth, cough monitoring and stable climate control; PigWise sensor; RFID Readers (FEIG/DTE), RFID Tags (HID Global); slaughterhouse recordings of 2000 pigs.

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IoF2020 - Trial: The Internet of Meat

Use case 5.2: Poultry chain management

European Large-Scale Pilots Programme

Domain application areas addressed

Poultry growth monitoring and weight prediction; Monitoring of picking & logistics; Poultry category assessment slaughterhouse.
(Farming, Logistics, Processing)

IoT Applications

Early Warning System, Birds Manipulation Assistant, Environmental Assistant, Production Management DSS, Data Visualization.

Short description and location

Optimize production, transport and processing of poultry meat by automated ambient monitoring & control and data analyses.
(ES, BE)

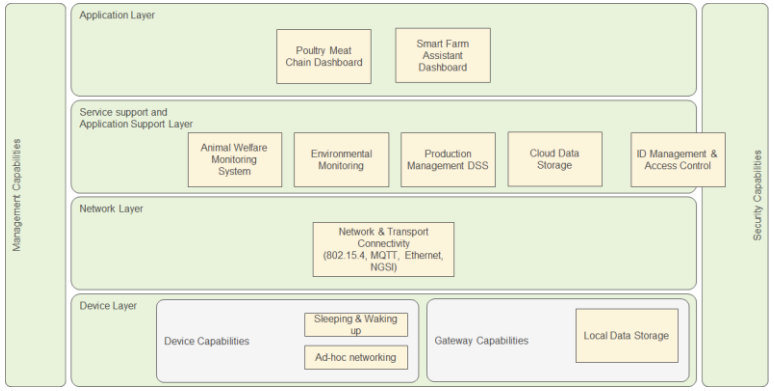
IoT Platforms and Software

GPRS/WIFI WSNs, Bluetooth 4.0 SmartBands, IoT Data Platform & Middleware; FIWARE;

Partners

Exafan (ES); Grupo SADA (ES); IK4-Tekniker (ES); Porphyrio (BE).

Architecture View



SW/HW Infrastructure

Cloud Service Platform (FIWARE and Porphyrio); Farm Gateway; Farm Environmental Sensors; Farm Animal Sensors; Slaughterhouse Gateway; Slaughterhouse Database; Smart Bracelets

IoT Technologies and Standards

NGSI; MQTT; HTTP; Ethernet; Transport protocol RS485; SQL database

IoT Devices

Sensors for temperature, humidity, luminosity, CO2, noise and ammonia (farms, trucks); scales with integrated sensors & camera); silo weight cells, SmartBands.

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IoF2020 - Trial: The Internet of Meat

Use case 5.3: Meat Transparency and Traceability

European Large-Scale Pilots Programme

Domain application areas addressed
Transparency food safety and quality information; Cold chain monitoring; Quality decay prediction and pro-active alerts.
(Farming, Logistics, Processing, Consumption)

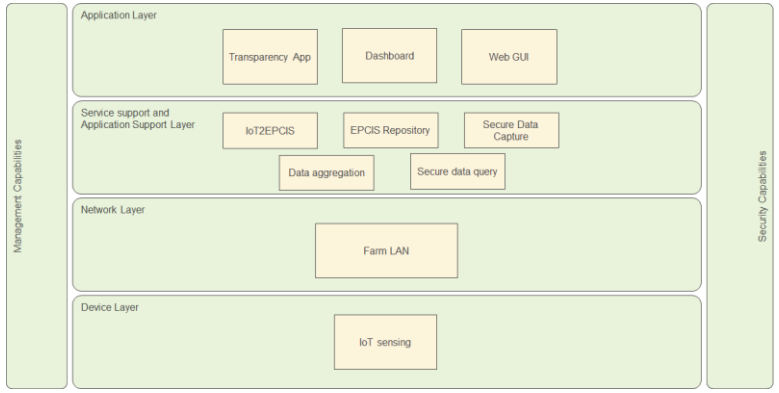
IoT Applications
Connectors, Discovery App, Aggregation App.

Short description and location
Enhancing transparency and traceability of meat based on an monitored chain event data in an EPCIS-infrastructure.
(NL, GE)

IoT Platforms and Software
EPCIS repositories – IoT Data platform, Discovery server.

Partners
Wageningen University & Research (NL); GS1 (DE); European EPC Competence Center GmbH (DE); VION (NL), ZLTO (NL)

Architecture View



SW/HW Infrastructure
Cloud platform; Transparency data accessing application; end-user application

IoT Technologies and Standards
SOAP/REST

IoT Devices
barcode/QR readers; RFID gates at slaughterhouse and meat processor.

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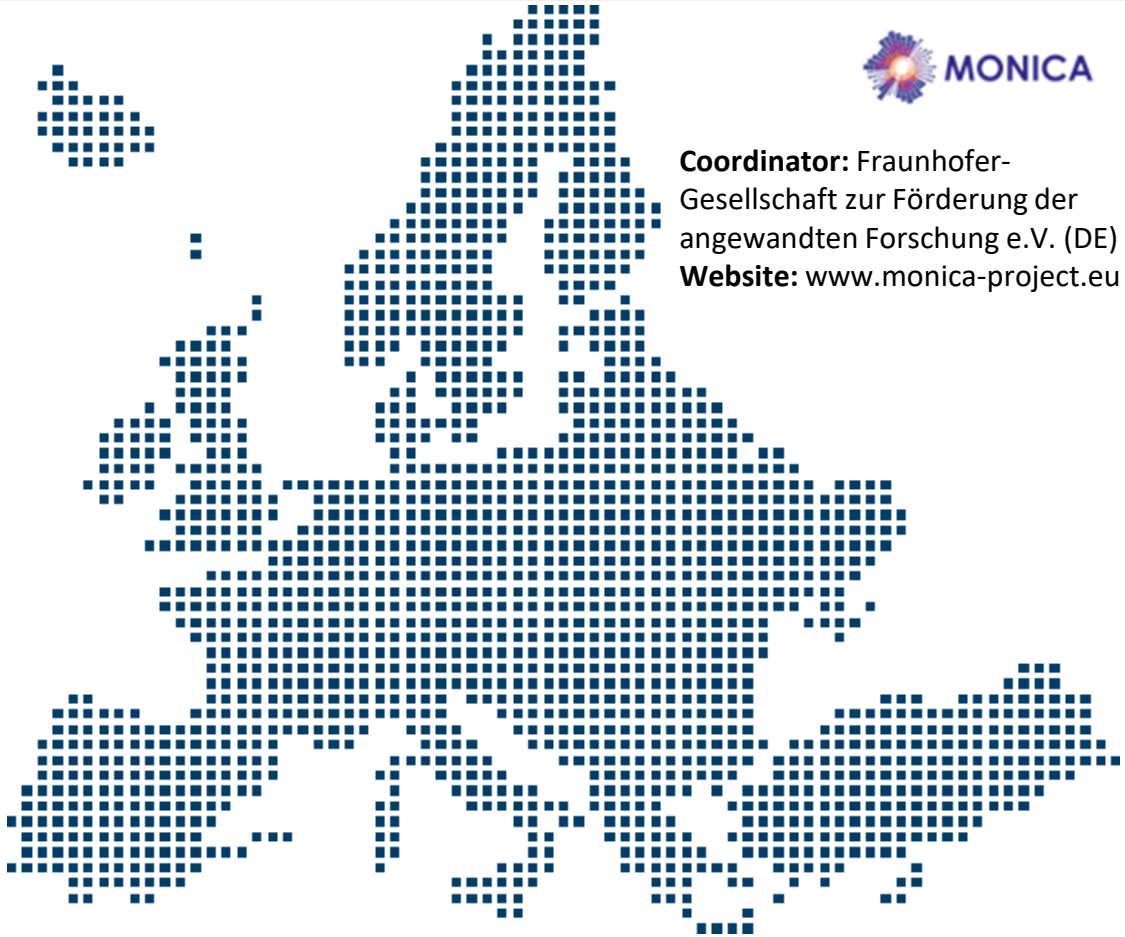
Overview of LSP use case locations

MONICA (MANAGEMENT OF NETWORKED IOT WEARABLES – VERY LARGE-SCALE DEMONSTRATION OF CULTURAL AND SOCIETAL APPLICATIONS)

European Large-Scale Pilots Programme

Applications for Sound monitoring and control; Crowd safety and security; and Citizen engagement and innovation.

1. **Sound monitoring and control:** Copenhagen (DK), Lyon (FR), Bonn (DE), Torino (IT).
2. **Crowd and capacity monitoring:** Copenhagen (DK), Lyon (FR), Bonn (DE), Leeds (UK), Torino (IT), Hamburg (DE)
3. **Security - Health incidents:** Copenhagen (DK), Bonn (DE), Hamburg (DE), Torino (IT), Leeds (UK), Lyon (FR).
4. **Missing persons/Locate staff members:** Copenhagen (DK), Hamburg (DE), Bonn (DE), Leeds (UK), Torino (IT), Lyon (FR).



MONICA

Coordinator: Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V. (DE)
Website: www.monica-project.eu

MONICA

Use case Group: Sound monitoring and control (Monitor and adjust sound level).

European Large-Scale Pilots Programme

Short description

The objective of the MONICA sound monitoring and control solutions is to provide users with tools that enable them to have a full overview of the sound levels during and after the event. It has as well the objective to enhance users to make informed decisions when it comes to controlling the sound levels in order to provide an optimal experience to concert goers, while avoiding discomfort provoked by the sound propagation to neighbouring areas.

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MONICA – SOUND MONITORING

Use case 2.1: Monitor sound levels; Use case 3.1: Get Event Information

European Large-Scale Pilots Programme

MONICA

Partners

ISMB, FRAUNHOFER, ATOS, B&K, ACOU, DTU, CNET, OPTINVENT, HWC, PILOTS: MOVE, TO, BONN, TIVOLI, LYON

Domain application areas addressed

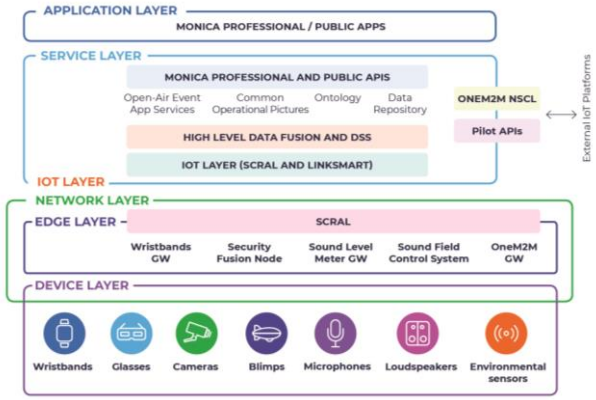
Enhanced sound experience and noise control at concert and festival events.

Short description and location

Monitor sound levels inside and outside of the venue making use of sensor technologies. Subjective feedback will also be collected in order to receive a full overview of the perceived sound quality from the point of view of visitors, staff members and neighbours. Data can be visualized in the form of a heat map and graphs through the COP interface. The solution is also able to send alerts when sound overcomes thresholds in specific locations to enable users to act on time and avoid unwanted scenarios.

Copenhagen (DK), Lyon (FR), Bonn (DE), Torino (IT)

Architecture View



SW/HW Infrastructure

Airship
Communication Infrastructure/ Contribution Algorithm (built in IoT microphones),
ASFCS

IoT Applications

COP, MONICA App (for staff), MONICA App (for visitor), MONICA App (for neighbours), Heat map (requires almost full ASFC functionality); Harmonica Index (to inform users)

IoT Platforms and Software

oneM2M Network Service Capability Layer / GW; LinkSmart, RioT, SCRAL; Azure, ASFCS (Adaptive Sound Field Control System)

IoT Technologies and Standards

ISO/IEC/IEEE 42010:2011 (used for architecture views and doc.), OGC SensorThings API, OASIS MQTT; ETSI SAREF, W3C SSN, SO/IEC/IEEE 42010:2011, AIOTI HLA; Bluetooth BLE / DASH7 / WiFi – IEEE 802.11;

IoT Devices

Sound level sensors; Environmental sensors (wind, temperature, humidity); Smart glasses, Smartphones

.

Co-funded by the European Commission

MONICA – SOUND CONTROL

Use case 2.2: Control sound levels

European Large-Scale Pilots Programme

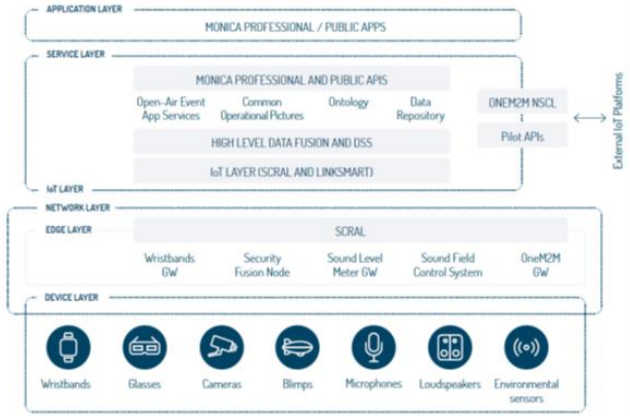
MONICA

Partners
ISMB, FRAUNHOFER, ATOS, DTU, CNET, B&K, PILOTS: MOVE, TO, BONN, TIVOLI, LYON

Domain application areas addressed
Enhanced sound experience and noise control at concert and festival events.

Short description and location
MONICA provides an optimized sound field in the audience area and minimizes the impact on neighbouring areas through the Adaptive Sound Field Controller (ASFC). Additionally, MONICA also offers a quiet zone application through which local quiet areas can be installed in the event in locations **Copenhagen (DK), Lyon (FR), Bonn (DE), Torino (IT)**

Architecture View



SW/HW Infrastructure
ASFCS (sound field optimization algorithm and sound propagation model), DANTE network system, the venue's sound-system, including PA loudspeakers, amplifiers, cables, etc., as well as access to the PA system signals.

IoT Applications
COP, Adaptive Sound Field Controller

IoT Platforms and Software
oneM2M Network Service Capability Layer / GW; LinkSmart, RioT, SCRAL; Azure, ASFCS (Adaptive Sound Field Control System)

IoT Technologies and Standards
ISO/IEC/IEEE 42010:2011 (used for architecture views and doc.), OGC SensorThings API, OASIS MQTT; ETSI SAREF, W3C SSN, SO/IEC/IEEE 42010:2011, AIOTI HLA; Bluetooth BLE / DASH7 / WiFi – IEEE 802.11;

IoT Devices
IOT Microphones, Environmental Sensors, ASFC Computational Core, Additional Sound speakers, Self-contained solution

Co-funded by the European Commission

MONICA

Use case Group: Crowd and Capacity Monitoring and Management

European Large-Scale Pilots Programme

Short description

The objective of the MONICA **Crowd and Capacity monitoring solutions** is to provide users with tools that allow them to have a full overview and control of the crowd levels in different areas of the event and prevent catastrophes by making sure venue capacity is not overloaded, ways are cleared and no queues or blockages obstruct the flow of people.

The MONICA app is also able to provide users with a functionality to discover shorter queues, closers exits or suggestions on the fastest way.

MONICA – CROWD and CAPACITY MONITORING

Use cases: 3.1-Detect high risk queues; 3.3 - Monitor Crowd based on capacity

European Large-Scale Pilots Programme

MONICA

Partners

ISMB, FRAUNHOFER, ATOS, VCA, DEXELS, KU, CNET, OPTINVENT, HWC, LBU, DIGISKY, CNET, PILOTS: BONN, TO, TIVOLI, FHH-SC, ACOUCITE, MOVE, YCCC

Domain application areas addressed

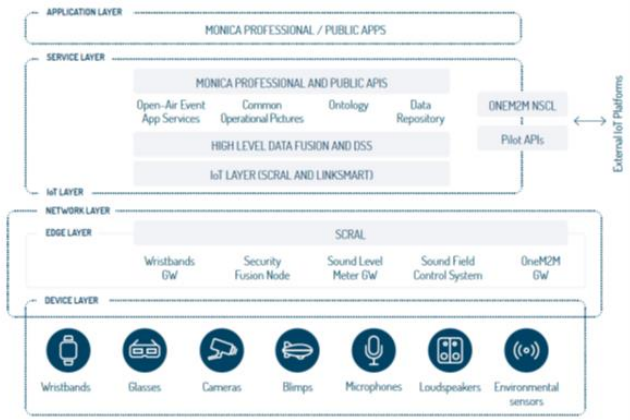
Large-scale events like festivals, concerts, theme parks, stadiums etc.

Short description and location

MONICA makes possible the counting of people and detection of flow magnitude, direction and speed through different technologies. The information collected can be directly compared to the capacity of the venue in order to estimate if people needs to be re-directed. The overview of the situation is then delivered to the control room through the Common Operational Picture interface using vectors in a georeferenced map indicating location, direction and magnitude of the flow as well as providing the user with alerts.

Copenhagen (DK), Lyon (FR), Bonn (DE), Leeds (UK), Torino (IT), Hamburg (DE)

Architecture View



SW/HW Infrastructure

UWB anchors: PoE infrastructure / 868MHz base stations
RFID network
Wired & wireless network
Processing node for existing IP cameras
MONICA cloud
COP API
Crowd density estimation algorithms

IoT Applications

COP
MONICA App (for staff)
MONICA App (for visitors)
Digital ticketing
Blimp from DIGISKY when appropriate

IoT Platforms and Software

LinkSmart, SCRAL; Azure; VCA Framework; SFN (Security Fusion Node), HLDF (High Level Data Fusion)

IoT Technologies and Standards

RFID/NFC
ISO/IEC/IEEE 42010:2011 (used for architecture views and doc.), OGC SensorThings API, OASIS MQTT; ETSI SAREF, W3C SSN, SO/IEC/IEEE 42010:2011, AIOTI HLA, WiFi – IEEE 802.11;

IoT Devices

Staff wristband, Crowd wristband
Blimps to install cameras, PT Camera, IR Camera, PTZ Camera, Smartglasses, Drone or blimp to host airborne camera

MONICA- CROWD and CAPACITY MONITORING

Use cases: 3.2: Re-direct high risk queues, 3.4: Manage Crowd based on capacity

European Large-Scale Pilots Programme

MONICA

Domain application areas addressed

Full overview and control of the crowd levels in different areas of the event and prevent catastrophes by making sure venue capacity is not overloaded, ways are cleared and no queues or blockages obstruct the flow of people.

Short description and location

MONICA´s communication support applications simplify coordination between actors and visitor´s guidance. Route suggestions can also be communicated to visitors through different means depending on the requirements of each event. (E.g. light guidance, Airborne, digital displays, etc.)

The MONICA app is also able to provide users with a functionality to discover shorter ques, closes exits or suggestions on the fastest way to get from A to B.

Copenhagen (DK), Lyon (FR), Bonn (DE), Leeds (UK), Torino (IT), Hamburg (DE)

IoT Applications

COP

MONICA App (for staff)

MONICA App (for visitors)

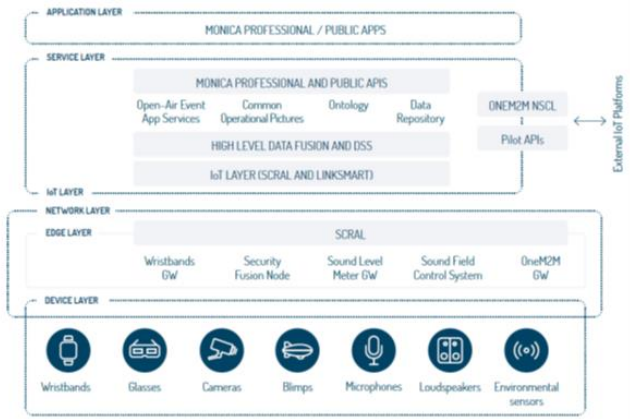
IoT Platforms and Software

LinkSmart, SCRAL; Azure; VCA Framework; SFN (Security Fusion Node), HLDF (High Level Data Fusion), DSS (Decision Support System)

Partners

ISMB, FRAUNHOFER, ATOS, CNET, DEXELS, LBU, KU, CERTH, PILOTS: BONN, TO, TIVOLI, FHH-SC, ACOUCITE, MOVE, YCCC

Architecture View



SW/HW Infrastructure

Existing infrastructure such as display screens, etc,

Visitor's smartphones in the case that they are running an app

IoT Technologies and Standards

RFID/NFC

ISO/IEC/IEEE 42010:2011 (used for architecture views and doc.), OGC SensorThings API, OASIS MQTT; ETSI SAREF, W3C SSN, SO/IEC/IEEE 42010:2011, AIOTI HLA, WiFi – IEEE 802.11;

IoT Devices

Visitor Wristband (led colour coding)

Airborn

Digital Displays

Smartphones

CREATE-IoT U4IoT ACTIVAGE PROJECT IOF2020 INTERNET OF FOOD & FARM MONICA SYNCHRONICITY AUTOPILOT

Co-funded by the European Commission

MONICA

Use Case Group: Missing Persons/Locate Staff Members

European Large-Scale Pilots Programme

Short description

The MONICA missing person solution aims to support the fast reunification of a lost child with his/her parents or guardian. Direct support to children and parents through the MONICA app and functionalities to rapidly escalate reports when such a scenario takes place, are part of the proposed solution

Co-funded by the European Commission

MONICA – Missing Persons/Locate Staff Members

Use case 4.1 Report lost person; 4.2 Locate lost person; 4.3 Report Found person; 4.4 Locate parent or guardian; 5.1 Locate staff member

European Large-Scale Pilots Programme

MONICA

Partners

ISMB, FRAUNHOFER, ATOS, CERTH, CNET, DEXELS, DIGISKY, DTU, HWC, KU, LBU, OPTIN, TIM, VCA, ACOUCITE, PILOTS: TO, TIVOLI, FHH-SC, BONN, YCCC, MOVE

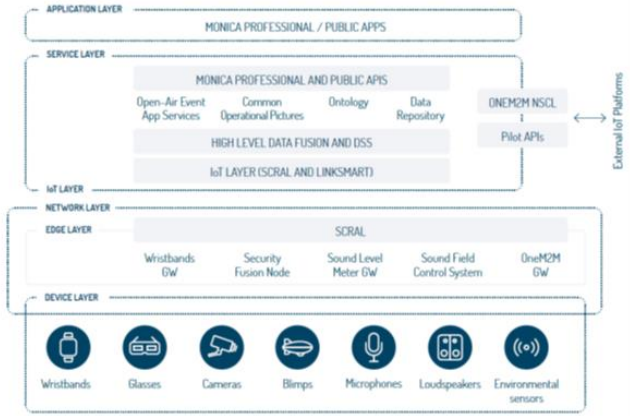
Domain application areas addressed

Large-scale events like festivals, concerts, theme parks, stadiums etc.

With the use of wearables the location of people can be determined. Either by wearing the so-called crowd wristband (accuracy about 20 meters) or by wearing a staff wristband (< 20 cm). The location of a missing child can be easily determined and displayed on an app. Instead of a missing child it can also be used to track staff in case there is an incident.

Copenhagen (DK), Hamburg (DE), Bonn (DE), Leeds (UK), Torino (IT), Lyon (FR).

Architecture View



SW/HW Infrastructure

RFID system, Processing node for existing IP cameras, video encoders for on-encoder counting of existing analogue cameras, time-of-flight cameras for on-camera counting
Network internet access
UWB anchors
Base stations

IoT Applications

COP, MONICA App (for staff – internal communication system), MONICA App (for visitor – Children/friend finder)

IoT Platforms and Software

LinkSmart, SCRAL; Azure, SFN (Security Fusion Node), HLDF (High Level Data Fusion)

IoT Technologies and Standards

ISO/IEC/IEEE 42010:2011 (used for architecture views and doc.), OGC SensorThings API, OASIS MQTT; ETSI SAREF, W3C SSN, SO/IEC/IEEE 42010:2011, AIOTI HLA; Bluetooth BLE / DASH7 / WiFi – IEEE 802.11;

IoT Devices

Crowd wristbands (868MHz), Staff wristbands (UWB), Cameras, RFID system, Smart glasses, Smartphones

MONICA

Use case Group: Security and Health Incidents

European Large-Scale Pilots Programme

Short description

The objective of the MONICA Health, Security and Safety incident solutions is to support the detection, reporting and handling of health, security and safety incidents that occur during the events.

Detect incidents

The system is able to detect incidents automatically through different technologies such as cameras, microphones, accelerometers and environmental sensors (measure wind speed).

Report incidents

MONICA allows staff members to forward incident reports directly to the control room through MONICA applications.

Handle incidents

A real-time overview of staff and resources is accessible to the user through the COP. The location of actors, role and activity history can be visualized in order to ease the management of staff members and resources. Additionally, MONICA´s communication support applications simplify task planning by connecting stakeholders from different levels in the hierarchies, allowing actors to forward alerts or ask for targeted support when handling an incident.

MONICA - Health Incidents

Detect incident: Fall detection, Incident detection through video and through sound;
Report incident;
Handle incident

European Large-Scale Pilots Programme

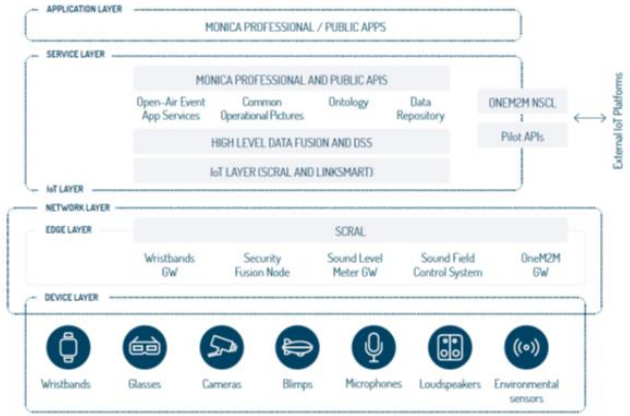
MONICA

Partners
ISMB, FRAUNHOFER, ATOS, B&K, ACOUCITE, VCA, KU, LBU, DEXELS, CNET, OPTINVENT, CERTH, PILOTS: MOVE, TO, TIVOLI, FHH-SC, BONN, YCCC.

Domain application areas addressed
Large-scale events like festivals, concerts, theme parks, stadiums etc.

Short description and location
Detection, reporting and handling of health, security and safety incidents that happen occur during the events
Copenhagen (DK), Bonn (DE), Hamburg (DE), Torino (IT), Leeds (UK), Lyon (FR).

Architecture View



SW/HW Infrastructure
Network infrastructure to stream video from cameras to bridge appliances;
Algorithms to detect specific security threats
Processing node from which the algorithms can be run;
RFID system, Digital ticketing,
Processing node for existing IP cameras, video;

IoT Applications
COP, MONICA App (for staff), MONICA App (for visitor)

IoT Platforms and Software
LinkSmart, SCRAL; Azure, SFN (Security Fusion Node), HLDF (High Level Data Fusion), DSS (Decision Support System)

IoT Technologies and Standards
ISO/IEC/IEEE 42010:2011 (used for architecture views and doc.), OGC SensorThings API, OASIS MQTT; ETSI SAREF, W3C SSN, SO/IEC/IEEE 42010:2011, AIOTI HLA; Bluetooth BLE / DASH7 / WiFi – IEEE 802.11;

IoT Devices
Staff wristband/Smartphone (accelerometer), Cameras, IoT Microphones (Stream Sound data/ or processed sound), Environmental sensors,
Smart glasses,

Co-funded by the European Commission

Overview of LSP use cases

SYNCHRONICITY (DELIVERING AN IoT ENABLED DIGITAL SINGLE MARKET FOR EUROPE AND BEYOND)

European Large-Scale Pilots Programme

3 Initial services (+ 5 micro-services)

- Human-centric traffic management
- Multi-modal transportation
- Community policy suite

Open calls use cases (~20)

- Specific areas/topics to be determined from the winning applications

Coordinator: Aarhus Universitet (DK) Website: www.synchronicity-iot.eu

SyncroniCity

Use case: Human-centric traffic management

European Large-Scale Pilots Programme

SYNCHRONICITY

Domain application areas addressed

Data-driven bicycle mobility: Stimulate bicycle usage by to optimize cycling experience (flows, waiting times, safety) and improve infrastructure planning leveraging data from different sources throughout the city.

IoT Applications

City data base application for historical traffic information.
Improved mobility in the city

Short description and location

To ensure liveability, mobility and quality-of-life in general, cities indicate that there is a strong need to sustain and improve bicycle mobility. Cities indicate that bicycle mobility comprises many different elements and goals will be different on a city-by-city basis.

IoT Platforms and Software

Orion Context Broker, CKAN, IDAS, OpenDataSoft, other specific city platforms …

Partners

Antwerp (Belgium)
Eindhoven (Nethernlands)
Milan (Italy)
Digipolis(Belgium)
Heijmans(Netherlands)
Imec (Belgium)
ATOS NL (Netherlands)

Architecture View

SW/HW Infrastructure

Traffic management systems
Bikes sharing infrastructure
Public lightning
Traffic lights

IoT Technologies and Standards

OASC principles and data models, Context API NGSI, MQTT, Data Storage ETSI NGSI-LD, OAUTH2, etc

IoT Devices

Traffic and Public lights, bikes, noise sensors..

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Co-funded by the European Commission

SyncroniCity

Use case: Multi-modal transportation

European Large-Scale Pilots Programme

SYNCHRONICITY

Domain application areas addressed

Transport

Multi-modal assistant: Seamlessly mix public and private transportation modes with new (shared) mobility services to enable smoother, more reliable and pleasant choice of transportation modes while improving city quality of life

IoT Applications

Multi-modal assistant based on user position and destination

Public/private parking availability (and estimation)

Short description and location

Improved and more efficient mobility will alleviate the impact that traffic can have on cities; a way to obtain these results is to provide citizens with appropriate tools

IoT Platforms and Software

OpenTripPlanner, CKAN,WSO2, Orion Context Broker, other specific city platforms …

Partners

University of Cantabria (SP)
TST Sistemas (SP)
ATOS (SP)
Porto (PT)
Ubiwhere (PT)
Engineering (IT)
Milano (IT)
Aalto (FIN)
Forum Virium (FIN)

Architecture View

SW/HW Infrastructure

City data base application for historical parking information
Ticketing/payment platform
Public bikes infrastructure
Public vehicles routes & scheduling

IoT Technologies and Standards

OASC principles and data models, ODF, MQTT, O-MI, Context API NGSI, Data Storage ETSI NGSI-LD, OAUTH2, etc

IoT Devices

Sensors: Traffic, parking, environmental, vehicle
Bike docking stations
Users' smartphones (GPS)
Ticketing systems

Co-funded by the European Commission

SyncroniCity

Use case: Community policy suite

European Large-Scale Pilots Programme

SYNCHRONICITY

Domain application areas addressed

Agile governance: Incorporate data-driven Agile Governance in city management and policy making that cuts across vertical organization models and enhances local authority responsiveness and improve citizen engagement.

IoT Applications

Enable local authorities to become more agile in their management and policy making processes

Short description

IoT provides cities with real-time data that is often used for day-to-day operational functions, but is not currently being utilized for service management or strategy development

IoT Platforms and Software

Orion Context Broker, IDAS, Organicity API, , other specific city platforms …

Partners

Manchester (UK)
Porto (Portugal)
Carouge (Switzerland)
Porto Digital (Portugal)
Bronze Lab (UK)
Mandat International ()
Ubiwhere (Portugal)

Architecture View

SW/HW Infrastructure

Situational awareness data base, decisión making tools, interactive maps, city sensors, ticketing, parking…

IoT Technologies and Standards

OASC principles and data models, Context API NGSI, HyperCat, Data Storage ETSI NGSI-LD, OAUTH2, FIESTA semantics, etc

IoT Devices

City sensors, human traffic, air quality sensor, motorized traffic counting, car park sensor, noise sensor

SyncroniCity

Baseline service (micro-service): Route calculation

European Large-Scale Pilots Programme

SYNCHRONICITY

Application Theme(s)
Human-centric traffic management

Short description and location
Routing service that allows citizens to execute queries to find routes, bus /taxi stops, city bikes, bicycle routes. On top of it, it also displays (trigger) disruption info and perform itinerary planning

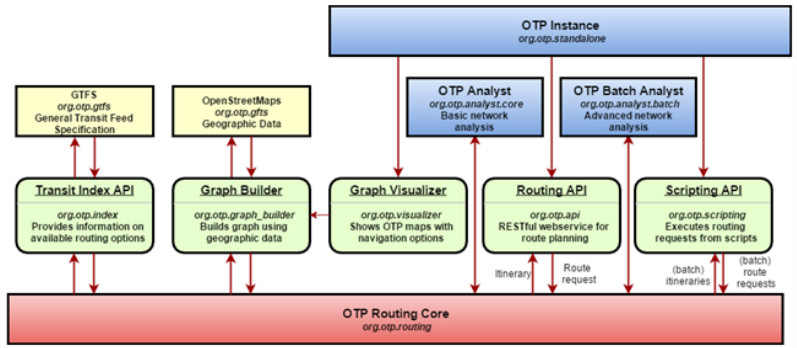
IoT Applications
API that returns an itenerary plan based on users' preferences (together with a tuple origin/destination)

IoT Platforms and Software
OpenTripPlanner

Dev team
FVH (FI)
TST (SP)

RZs
Helsinki (FI)
Milan (IT)
Porto (PT)
Santander (SP)

Architecture View



Features
OpenTriplanner (OTP)
Special routes for people with limited mobility (through scalators, elevators…)

IoT Technologies and Standards
OpenTripPlanner, General Transit Feed information (GTFS)

IoT Devices
Bus/taxi stops, city bikes, traffic intensity sensors

Co-funded by the European Commission

SyncroniCity

Baseline service (micro-service): Parking estimator

European Large-Scale Pilots Programme

SYNCHRONICITY

Application Theme(s)
Multi-modal transportation

IoT Applications
API that exposes the estimations calculates by the baseline service

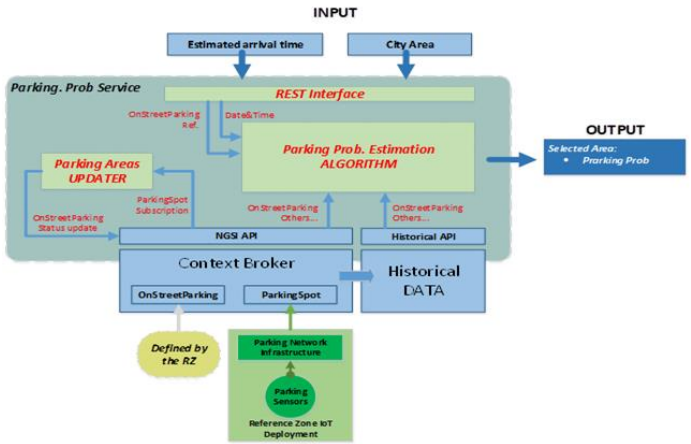
Short description
Service that estimates the probability of finding a free parking lot over a particular area in the city for a given time window (up to one hour time ahead), based on the information gathered of both current and historical values

IoT Platforms and Software
Orion Context Broker, Historic values (Cygnus or STH Comet)

Dev team
UNICAN (ES)
ATOS (ES)
ENG (IT)
MIL (IT)
TST (ES)

RZs
Milan (IT)
Santander (ES)
Carouge (CH)*
Seoul (KR)*

Architecture View



Features
Current data
Historical data
Different types of vehicles
Estimators
Machine Learning

IoT Technologies and Standards
OASC principles and data models, Context API NGSI, MQTT, Data Storage ETSI NGSI-LD, OAUTH2, etc

IoT Devices
On & Off street parking sensors (public & private)

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Co-funded by the European Commission

SyncroniCity

Baseline service (micro-service): Traffic flow estimation

European Large-Scale Pilots Programme

SYNCHRONICITY

Application Theme(s)
Multi-modal transportation

Short description and location
Service that estimates the intensity of traffic for the next minutes/hours based on the information gathered of both current and historical values

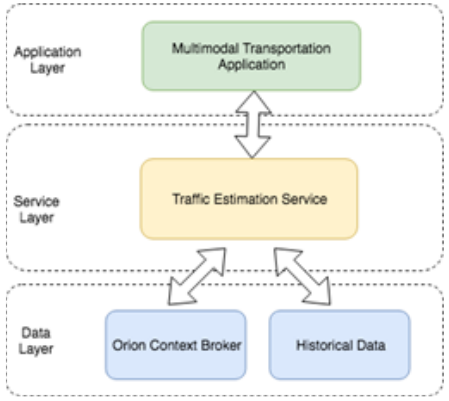
IoT Applications
API that exposes the estimations calculates by the baseline service

IoT Platforms and Software
Orion Context Broker, Historic values (Cygnus or STH Comet)

Dev team
POR (PT)
ATOS (ES)
ENG (IT)
UNICAN (ES)

RZs
Milan (Italy)
Santander (Spain)

Architecture View



Features
Current data
Historical data
Estimators
Machine Learning

IoT Technologies and Standards
OASC principles and data models, Context API NGSI, MQTT, Data Storage ETSI NGSI-LD, OAUTH2, etc

IoT Devices
Traffic intensity sensors

CREATE-IoT U4IoT ACTIVAGE PROJECT IOF2020 INTERNET OF FOOD & FARM MONICA SYNCHRONICITY AUTOPILOT

Co-funded by the European Commission

SyncroniCity

Baseline service (micro-service): Map visualization (graphical user interface)

European Large-Scale Pilots Programme

SYNCHRONICITY

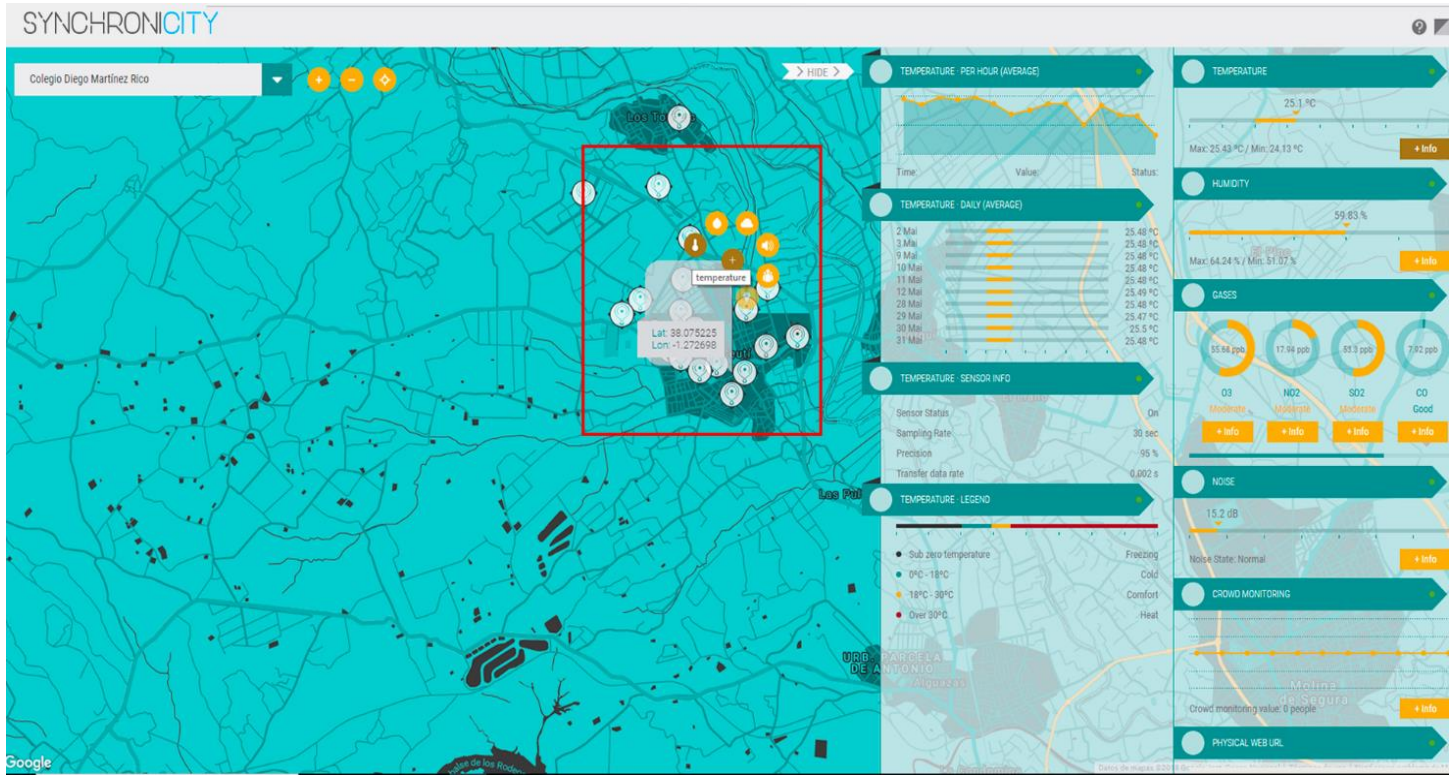
Application Theme(s)
Human-centric traffic management
Multi-modal transportation
Community Policy Suite

Short description
Web service interface that provides end-users a simple and user-friendly visualization (on a map) of the devices/context entities available across the different Reference Zones

Dev team
HOPU (Spain)

IoT Technologies and Standards
OASC principles and data models, Context API NGSI, CKAN, OAUTH2, etc

Screenshot



CREATE-IoT U4IoT ACTIVAGE PROJECT IOF2020 INTERNET OF FOOD & FARM MONICA SYNCHRONICITY AUTOPILOT

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SyncroniCity

Baseline service (micro-service): Time series visualization

European Large-Scale Pilots Programme

SYNCHRONICITY

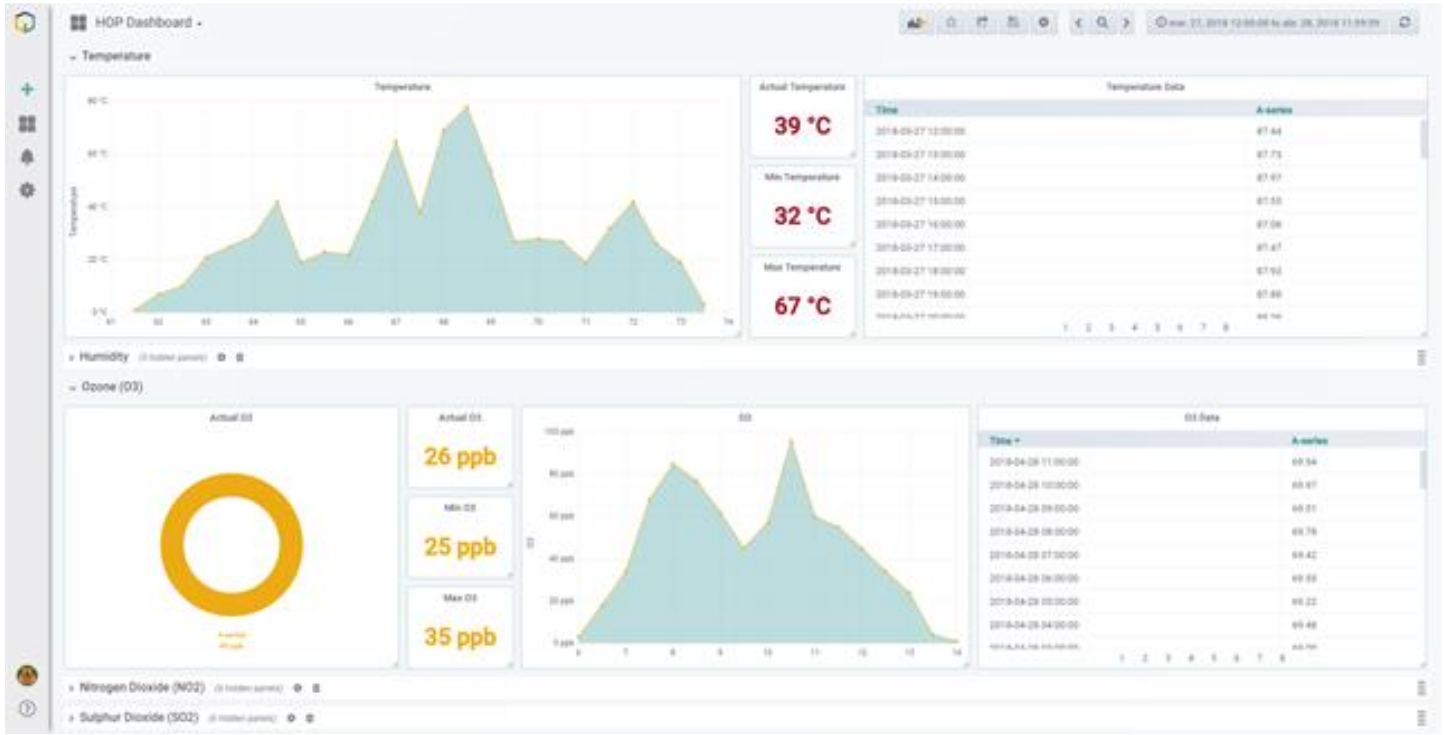
Application Theme(s)
Human-centric traffic management
Multi-modal transportation
Community Policy Suite

Short description
Web service interface that provides end-users a simple and user-friendly visualization of the evolution of the context entities' information throughout time

Dev team
HOPU (Spain)

IoT Technologies and Standards
OASC principles and data models, Context API NGSI, QuantumLeap/Cygnus, OAUTH2, etc

Screenshot

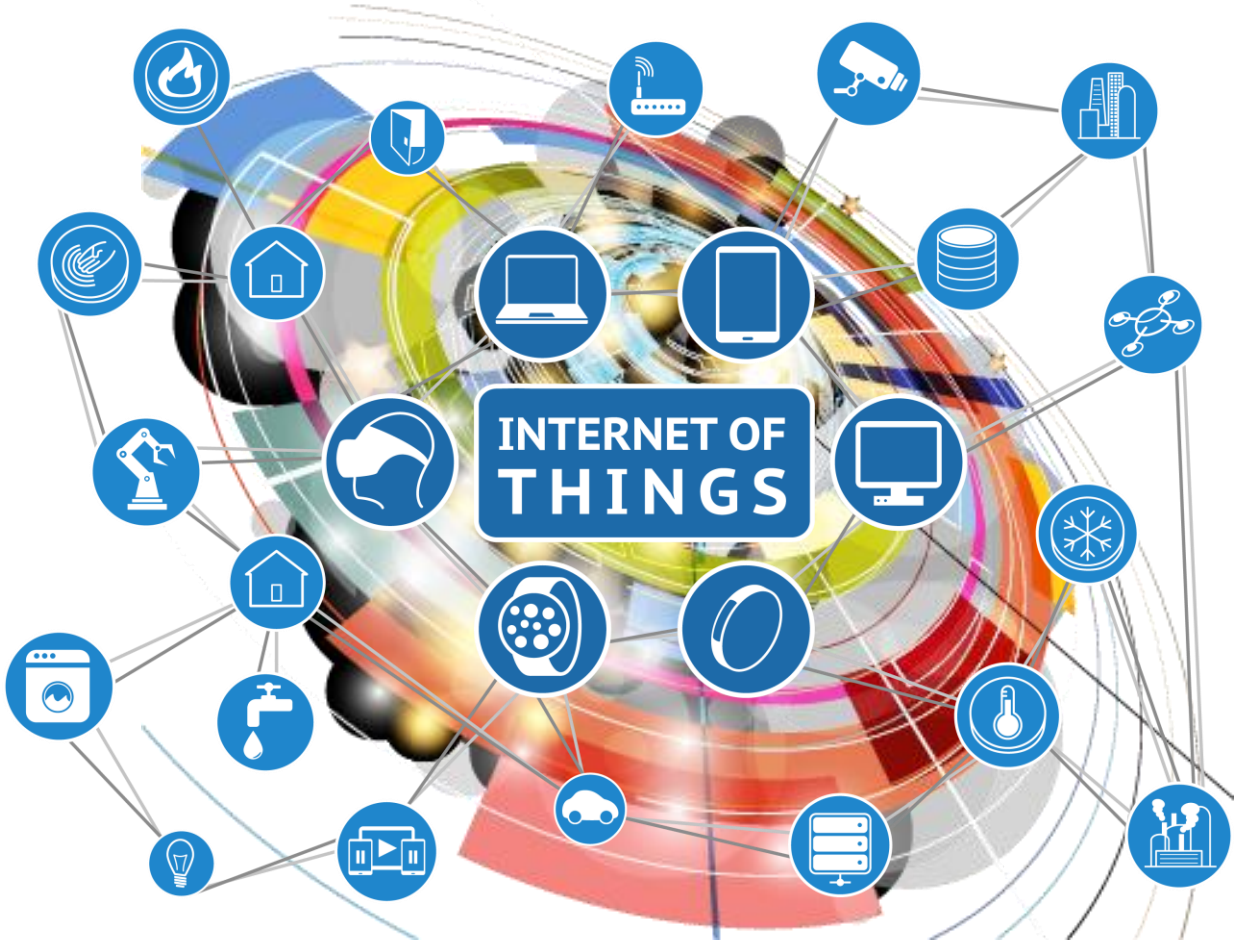


CREATE-IoT U4IoT ACTIVAGE PROJECT IOF2020 INTERNET OF FOOD & FARM MONICA SYNCHRONICITY AUTOPILOT

Co-funded by the European Commission

Thank You!

European Large-Scale Pilots Programme



CREATE-IoT U4IoT ACTIVAGE PROJECT IOF 2020 INTERNET OF FOOD & FARM MONICA SYNCHRONICITY AUTOPILOT

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