Co-funded by Horizon 2020 programme of the European Union

Hyper-connected Society

IoT European Large-Scale Pilots Programme

Standardisation, Architecture and Interoperability
IoT Standardisation, Architecture and Interoperability - Objectives

1. Architectures that may be reused across multiple use cases and enable interoperability across those
2. Interoperability and integration testing on open IoT platforms
3. Best practices for mapping of pilot architecture approaches
4. Interoperability and standards approaches at technical/semantic levels
5. Architectures that may be reused across multiple use cases and enable interoperability across those
Why an Activity Group on Standardisation, Architecture and Interoperability?

**Commonalities**
- Methods and solutions
- Interoperability Framework
- IoT standards
- Gaps and resolution

**Consolidation**
- Use Cases
- Lessons learned
- Best practices
- Guidelines

**Influence**
- Reference Architecture
- Coordinated contributions to standardisation
- Relevant pre-normative activities

**Dissemination**
- Leveraged LSPs innovations
- Involvement of end-users and SMEs
- Influence in Europe and beyond

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Building the Interoperability Framework for the LSPs

The Interoperability Framework

- **Reference Architectures**
  - Support for IoT communications
  - Gateway capabilities and protocol conversion
  - Unique device ID / Naming
  - Alignment with other IoT architectures

- **Interoperability Points and Mechanisms**

- **Platforms and technologies**
  - Support of common IoT communication protocols
  - Extensibility for different sensor types
  - User Device Detection Capability
  - Support of the main IoT middleware platforms
  - Support of design and development

- **Standards and pre-normative activities**
  - Standard protocols for device communications
  - Semantic and syntactic interoperability

A collaborative work

- **#1 Engage** 01/18
- **#2 Exchange** 04/18
- **#3 Consolidate** 06/18
- **#4 Promote** 11/18
- **#5 Refine** 03/19
- **#6 Disseminate** 06/19

8 workshops in 2018/19
Starting from LSP Use Cases: assessing Architectures, Platforms, Standards

IoF2020 – TRIAL: THE INTERNET OF ARABLE FARMING
Use case 1.4: Farm Machine Interoperability

MONICA – SOUND MONITORING
Use case 2.1: Monitor Sound Levels; Use case 3.1: Get Event Information
## Identifying the IoT Architecture Layers

<table>
<thead>
<tr>
<th>IoT ARCHITECTURE LAYERS</th>
<th>COMPONENTS</th>
<th>ACTIVAGE</th>
<th>AUTOPILOT</th>
<th>IoF2020</th>
<th>MONICA</th>
<th>SYNCHRONICITY</th>
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<tr>
<td><strong>COLLABORATION &amp; PROCESSES</strong></td>
<td>Business System Integration</td>
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The LSP model extends current IoT reference architectures and is aiming at:

- Ensuring a common view of the different layers of the IoT systems from Physical up to Business;
- Providing additional viewpoints to the different stakeholders (not just to the developers) regarding some additional cross systems functions such as security, privacy or safety and the shared analysis of some properties (e.g., integrability) between different stakeholders.

The additional dimension of properties is a new way to discuss the properties of the IoT system between different involved parties (e.g., users, contractors, designers) and identify the elements in support (e.g., functional building blocks, APIs) and those missing.
Examples of contributions include:

The collaborative development by LSPs of a 3D Reference Architecture model expanding the reach of architecture specification and aimed at contributing to standardisation;

The development by the MONICA of requirements for a new standard for time-critical data links for IoT sensors (with a submission for a new wireless interface);

The development by the AUTOPILOT of requirements for new OneM2M standards;

The LSPs contributions to SAREF (Smart Appliances REFerence ontology), a modular network of standardised semantic models led by ETSI, which is being extended to IoT application environments such as Smart Cities and Smart AgriFood, contributing to the development of a strong EU standards ecosystem;

The contributions of SynchroniCity to the ITU Study Group 20 on IoT and Smart Cities, where 2 standards promoted by the project are under work since 2017: Draft recommendation on Open API for IoT in Smart Cities and the Technical Report on Artificial Intelligence in the IoT and Smart City ecosystem. SynchroniCity is also contributing to the Focus Group (FG) on Data Processing and Management.
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**ACTIVAGE PROJECT**
Breaking barriers for a sustainability Active and Healthy Ageing through IoT technologies.

**AUTOPILOT**
Unlocking the potential of IoT to take autonomous driving to the next level.

**IoF**
Strengthen competitiveness of farming and food chains in Europe.

**MONICA**
Sound and security solutions for large open-air events in the smart city.

**SYNCHRONICITY**
Single digital city market of Europe.

**European Large-Scale Pilots Programme**

**Common Innovative Solutions**
Stimulate collaboration between IoT initiatives. Development and growth of IoT ecosystems based on open technologies and platforms.

**Strengthen competitiveness of farming and food chains in Europe.**

**Unlocking the potential of IoT to take autonomous driving to the next level.**

**Sound and security solutions for large open-air events in the smart city.**

**Single digital city market of Europe.**

**Standards Architectures Interoperability**
The CREATE-IoT project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 732929.