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Smart-M3 and OSGi: The Interoperability Platform

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CONSORZIO COOPERATIVE COSTRUZIONI

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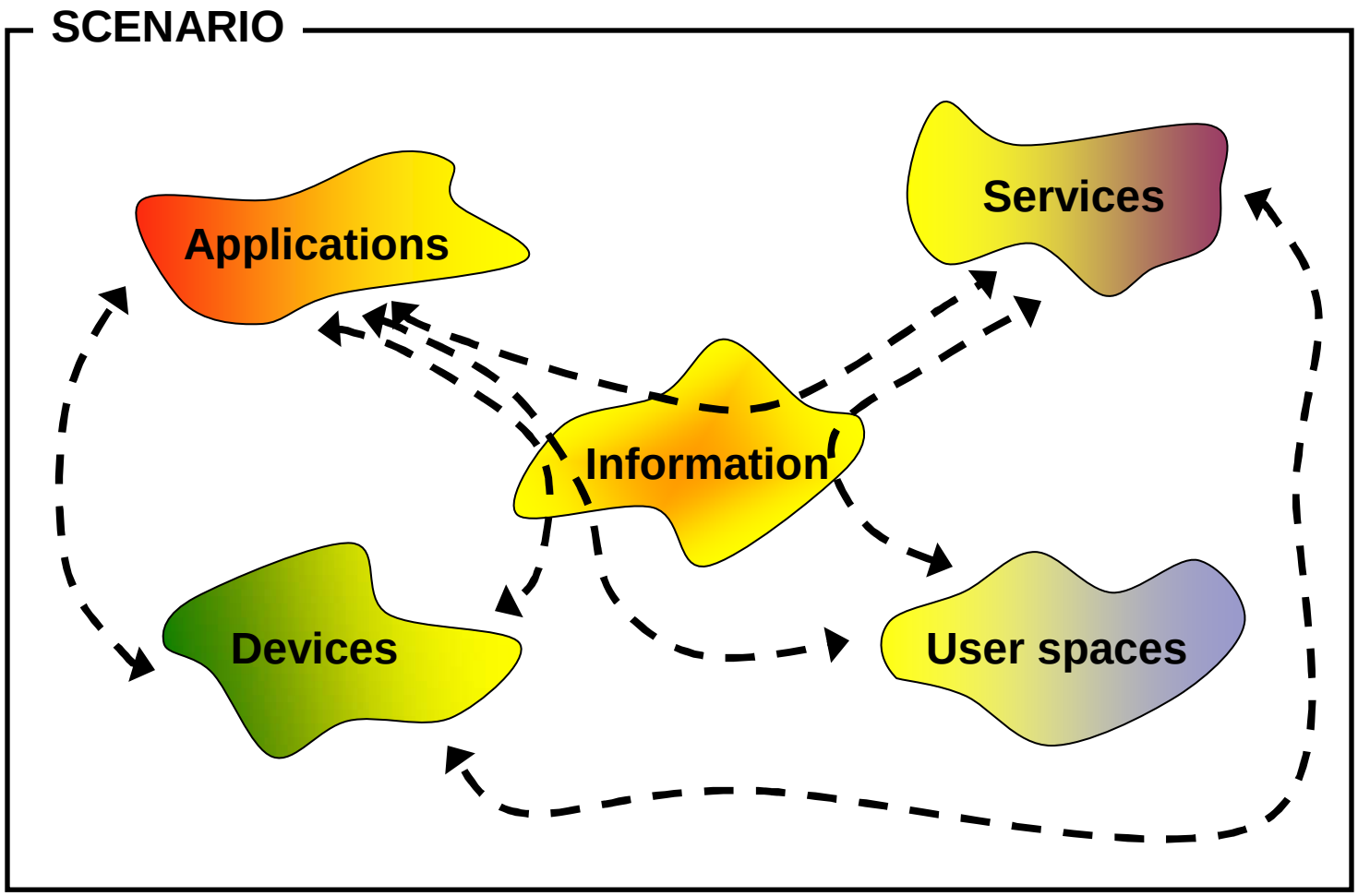
ARTEMIS

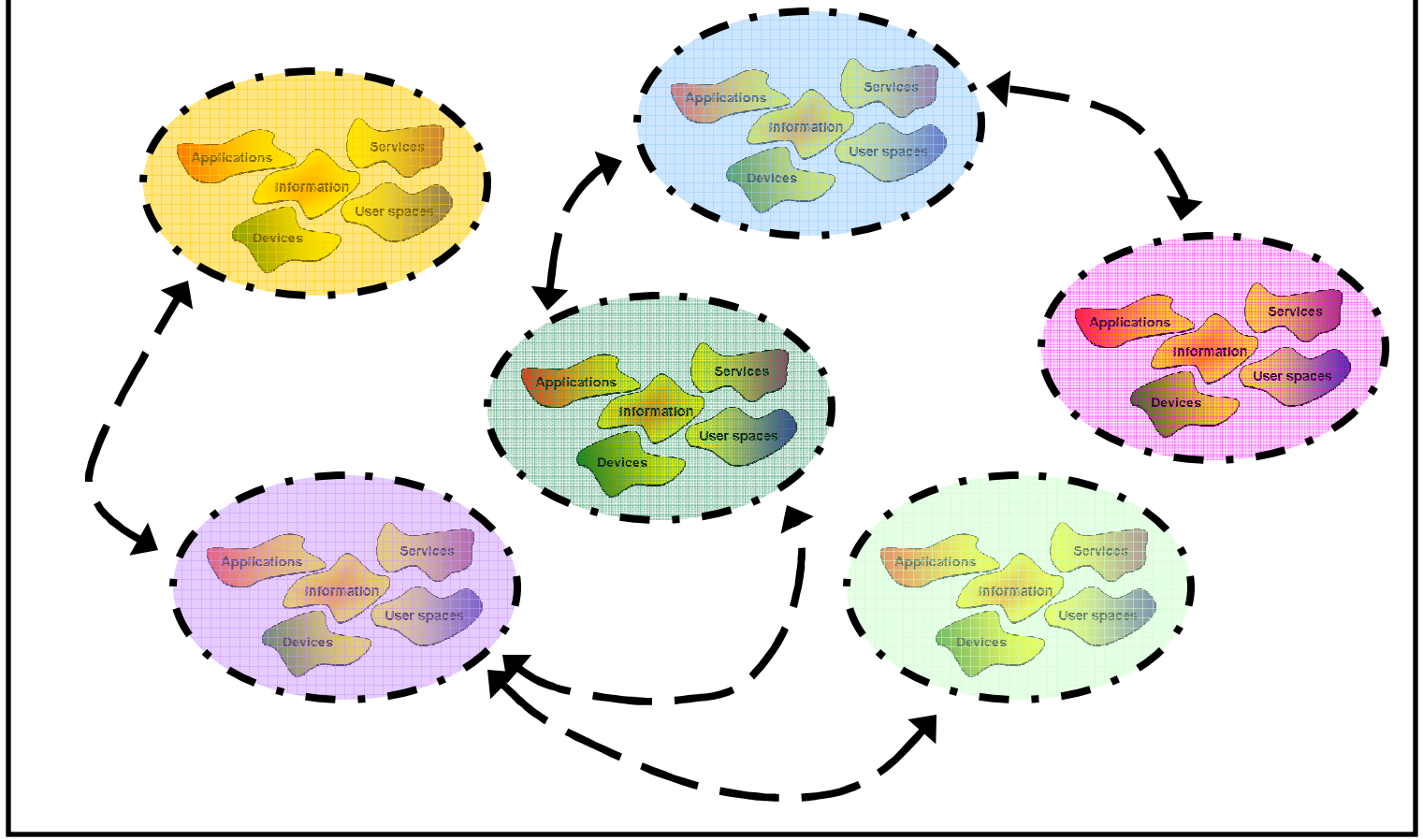
Summary

- Application domains and scenario
- Case Study
- Challenges
- Proposed solution
- Conclusion



Actors and components of a generic use-case

Large set of un-connected islands



Need of information or service from another use-case

FACT

- NO Cooperation between applications
- NO Integration of services
- NO Sharing of information and context data

CONSEQUENCES

Increasing developing, maintenance and integration cost

Compromised cross domain interoperability

Case study

Existing Support

- **Multi-vendor devices** offer an increasing number of **services** and end-user **applications**
- Increasing number of **embedded sensors** may provide information originating from the environment that can be used to adapt the **service behaviour** to the **user context**

Challenges

- Devices are **not able to exchange information** because of a lack of a shared data storage and common information exchange methods
- Standards and domain specific building blocks are available but have **troubles related to**: integration, cooperation, growing complexity and dependency

Goal

- An **infrastructure** that makes the **coexistence** of multi-vendor **devices** easy is needed
- It should allow **low cost development** and simple **fruition** of **services**
- The result should also **speed up and simplify** the **design**, **development**, and **deployment** of **cross-domain applications**
- It should reduce both software and hardware **integration** issues through **interoperability**

Smart-M3

Context Management system

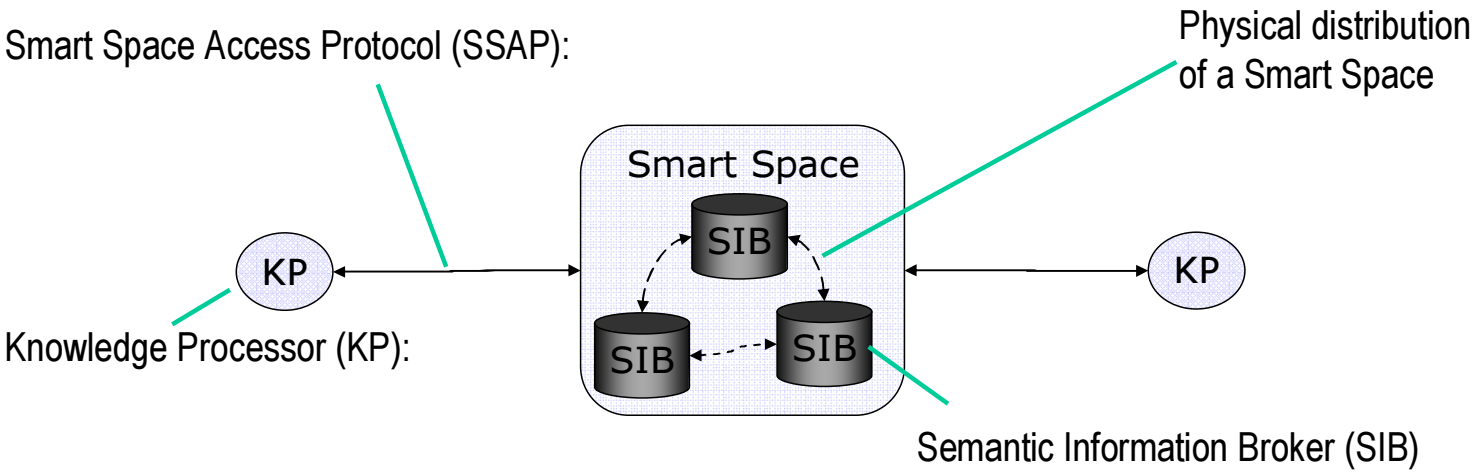
Vision: fusion of physical and information worlds

Information from physical world…

and doing all this
vendor independently,
device independently and
domain independently

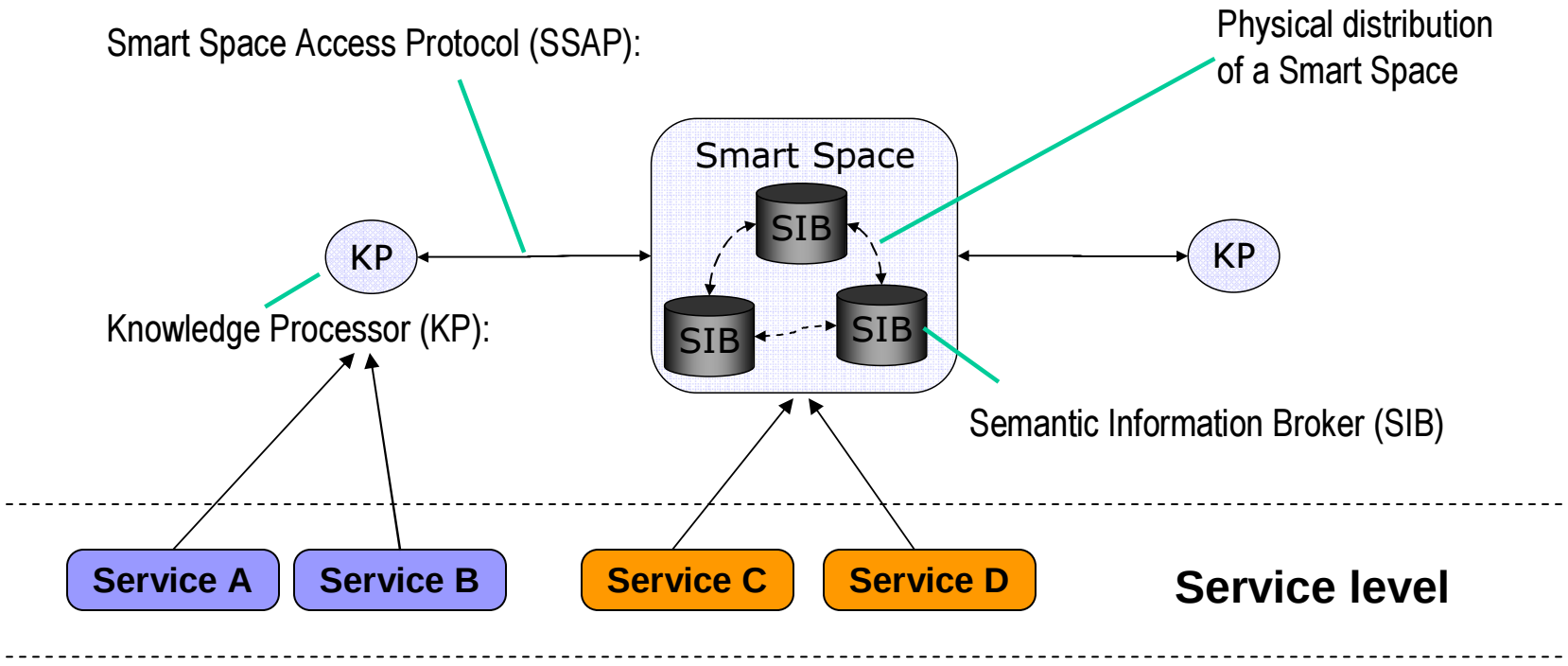
Smart-M3

Context Management system



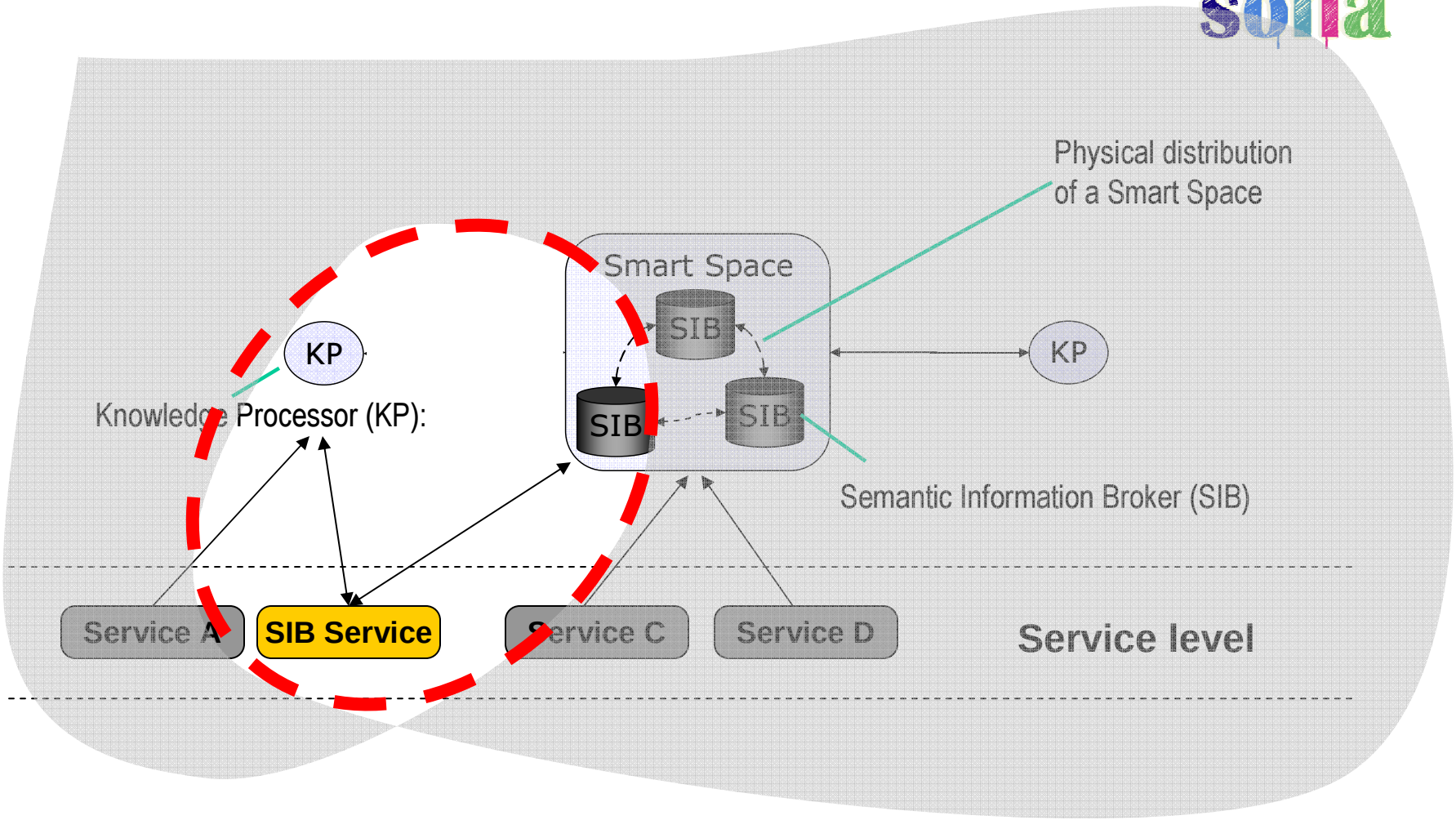
Smart-M3

Context Management system



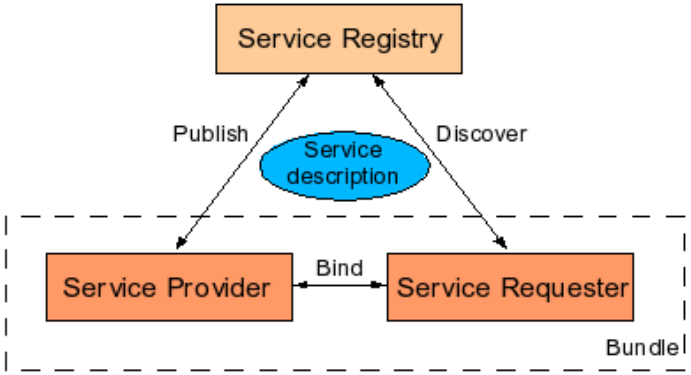
Smart-M3

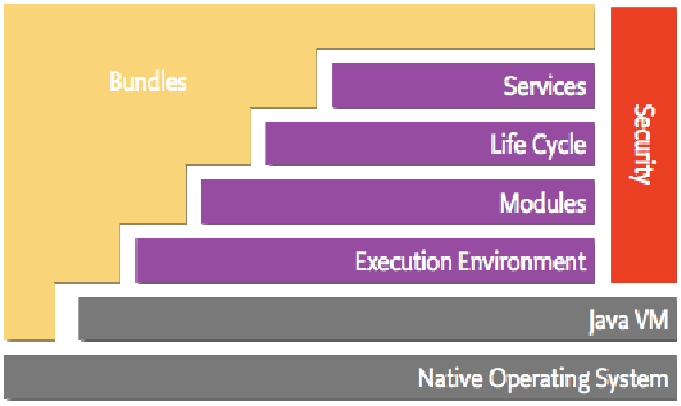
Context Management system



OSGi framework

Service management





Assure interoperability of applications and services based on its component integration platform

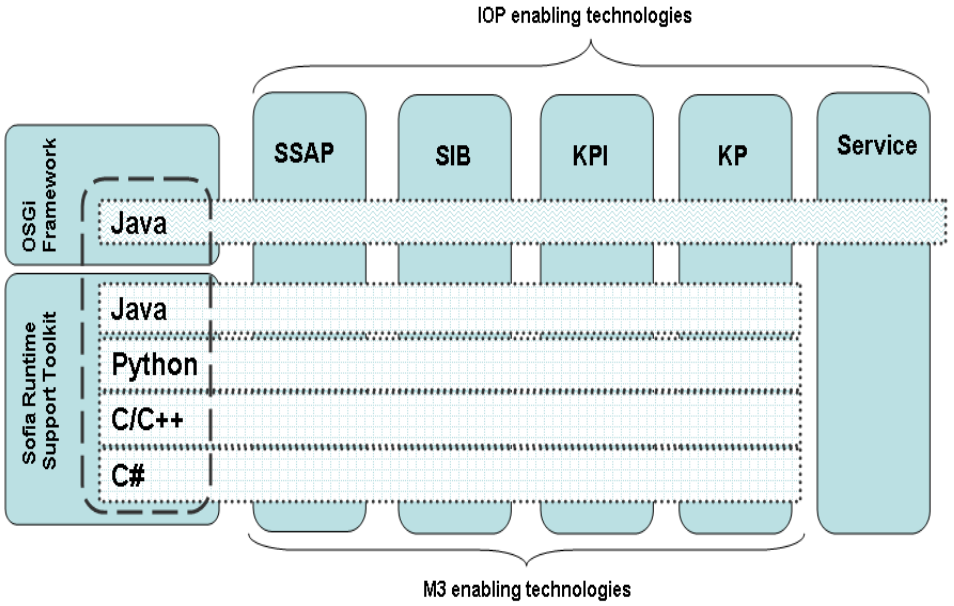
The OSGi technology provides the standardized primitives that allow applications to be constructed from small, reusable and collaborative components. These components can be composed into an application and deployed.

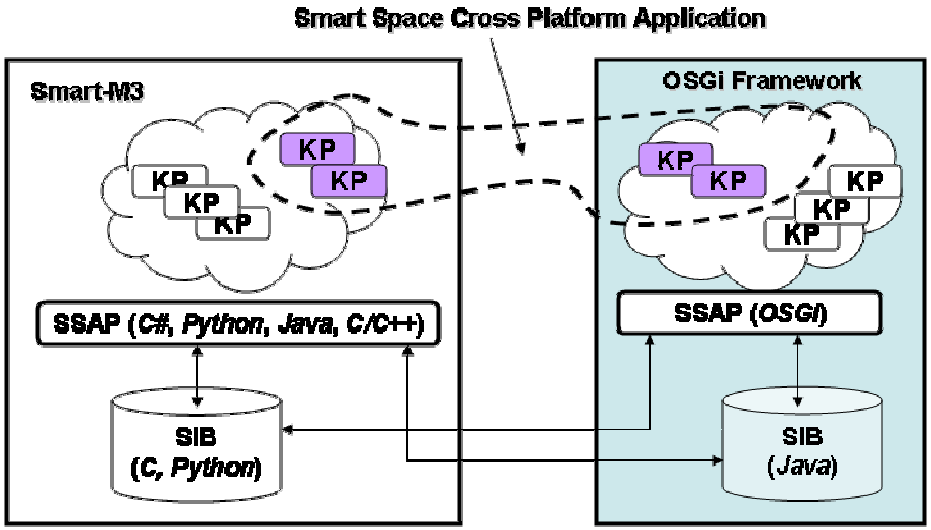
OSGi framework

Benefits

- **bundles reduces the complexity** (in terms of development and system architecture)
- OSGi framework **is simple** with the only requirement of a **minimal JVM**
- OSGi is a **dynamic framework** (bundles can be updated on the fly and the associated services come and go dynamically)
- Bundles can be **managed without bringing down the whole system**
- The framework is **adaptive**, because bundles can find out what capabilities are available on the system
- Uses only **standard Java classes**
- It is available since **1998** and has been **extensively used** in several application contexts (automotive, mobile and fixed telephony, industrial automation, gateways & routers, private branch exchanges, etc.)
- It is supported in many **development environments** (IBM Websphere, SpringSource Application Server, Oracle Weblogic, Sun's GlassFish, Eclipse, and Redhat's JBoss) and by **key companies** (Oracle, IBM, Samsung, Nokia, IONA, Motorola, NTT, Siemens, Hitachi, Ericsson, etc.)

Smart-M3 with Service management

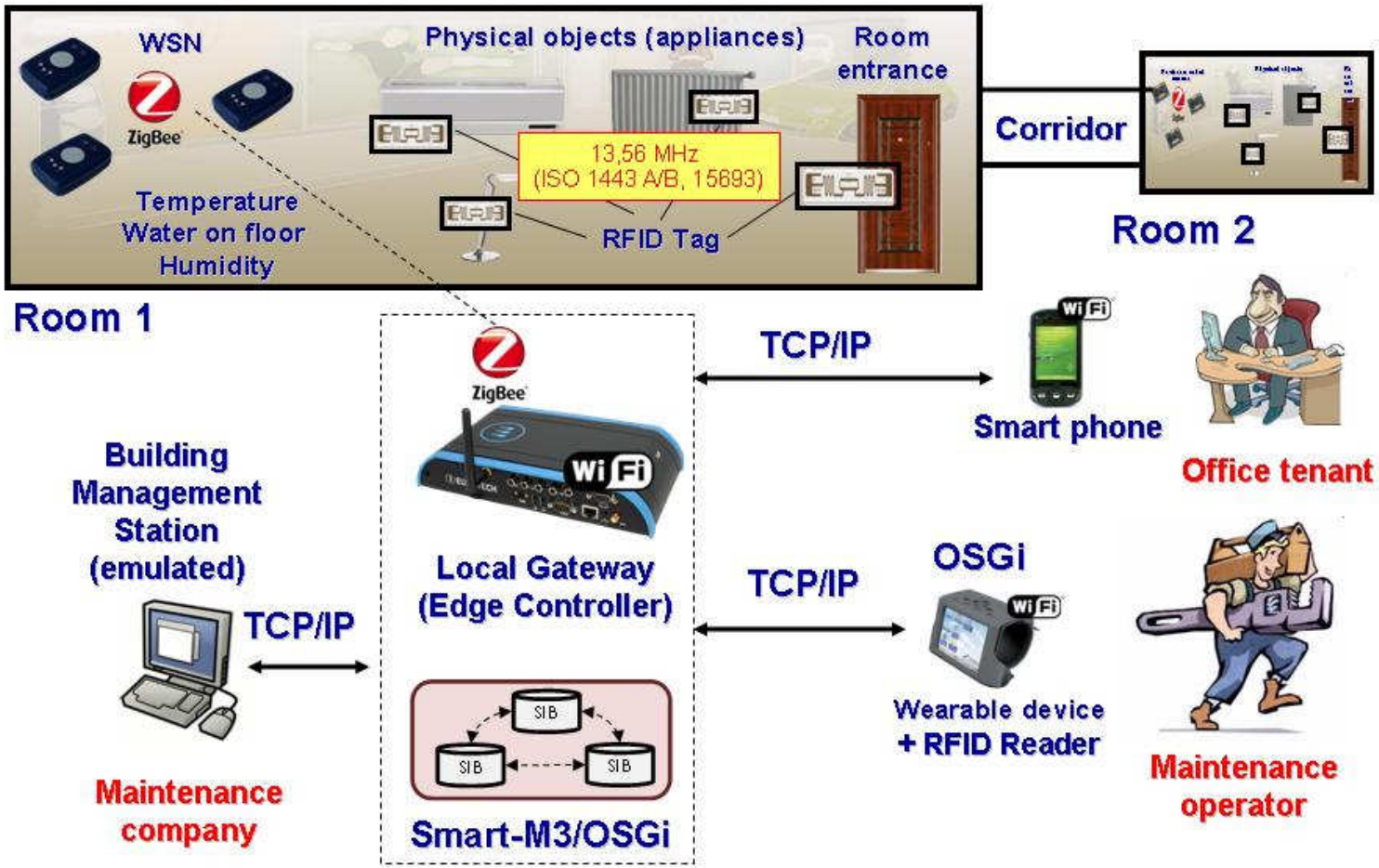




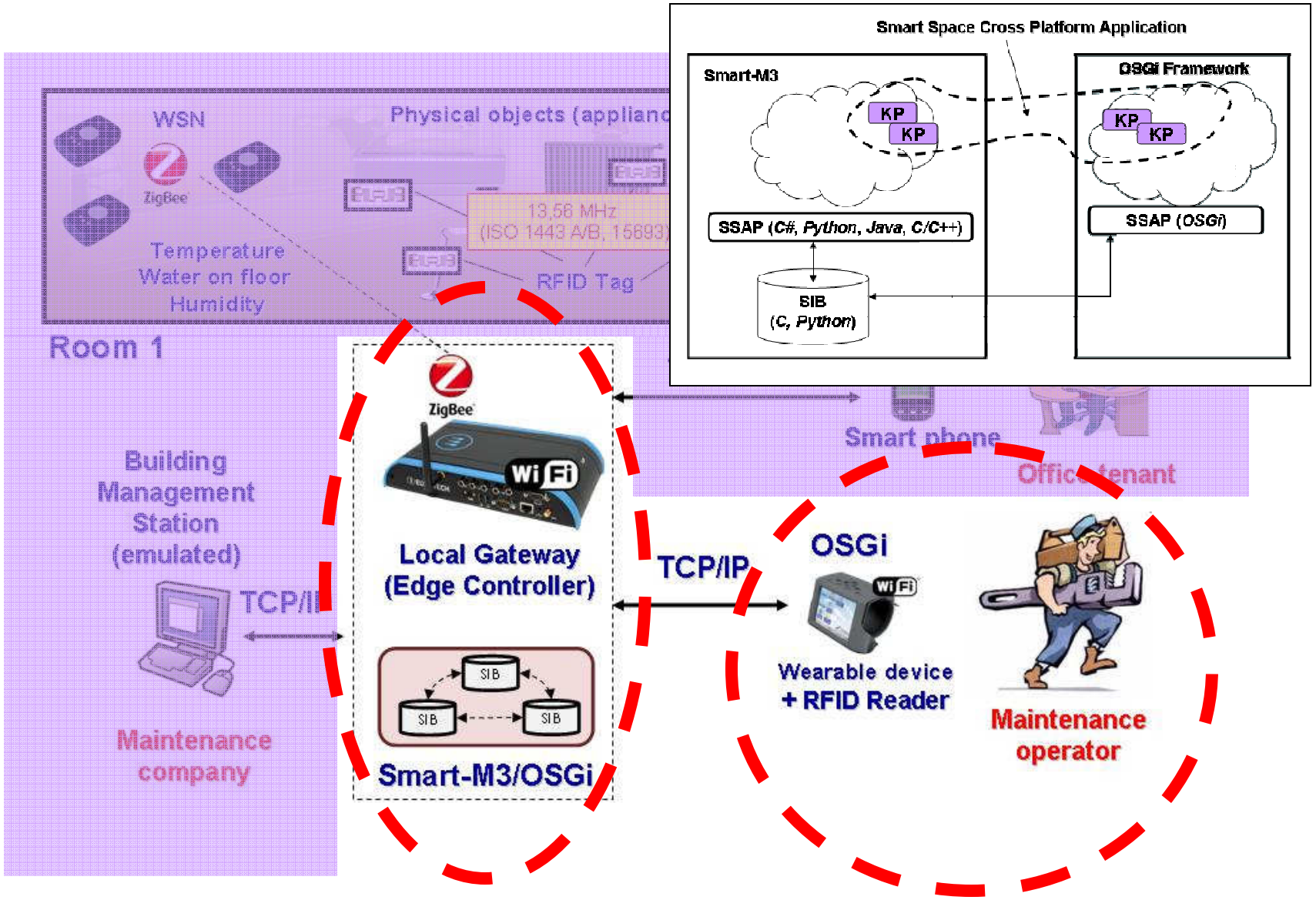
Smart-M3 and OSGi fusion

The result is a dynamic interoperability service architecture where it is possible to publish a new service at runtime, discover and use services, share both raw data and high level information obtained from devices and sensors

Maintenance: system architecture



Maintenance: system architecture



Conclusion & Future work

- **Joined activity with industrial, research and academic partners**
- **Demonstration platform ready**
- **Demo available next door**
- **Service level benefits**

- **Challenges for the near future:**
  - **Access control and Security management**
  - **Service composability**
  - **Service discovery**
  - **Content adaptation**

Thank you!

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