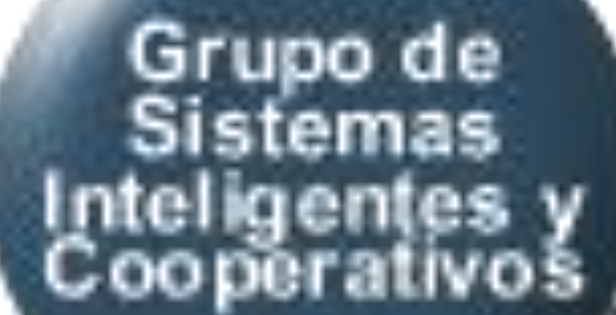




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HERA: A New Platform for Embedding Agents in Heterogeneous Wireless Sensor Networks



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Introduction

- HERA (*Hardware-Embedded Reactive Agents*) platform
 - Intended to build Ambient Intelligence (Aml) based systems
 - Based on the *SYLPH platform*
 - Allows the interconnection of heterogeneous WSNs to gather information needed by Ambient Intelligence environments
 - HERA allows using heterogeneous WSNs on which agents are directly embedded on the wireless nodes
 - As SYLPH, HERA can be integrated into standard agent platforms
 - No difference between a software agent and a hardware agent

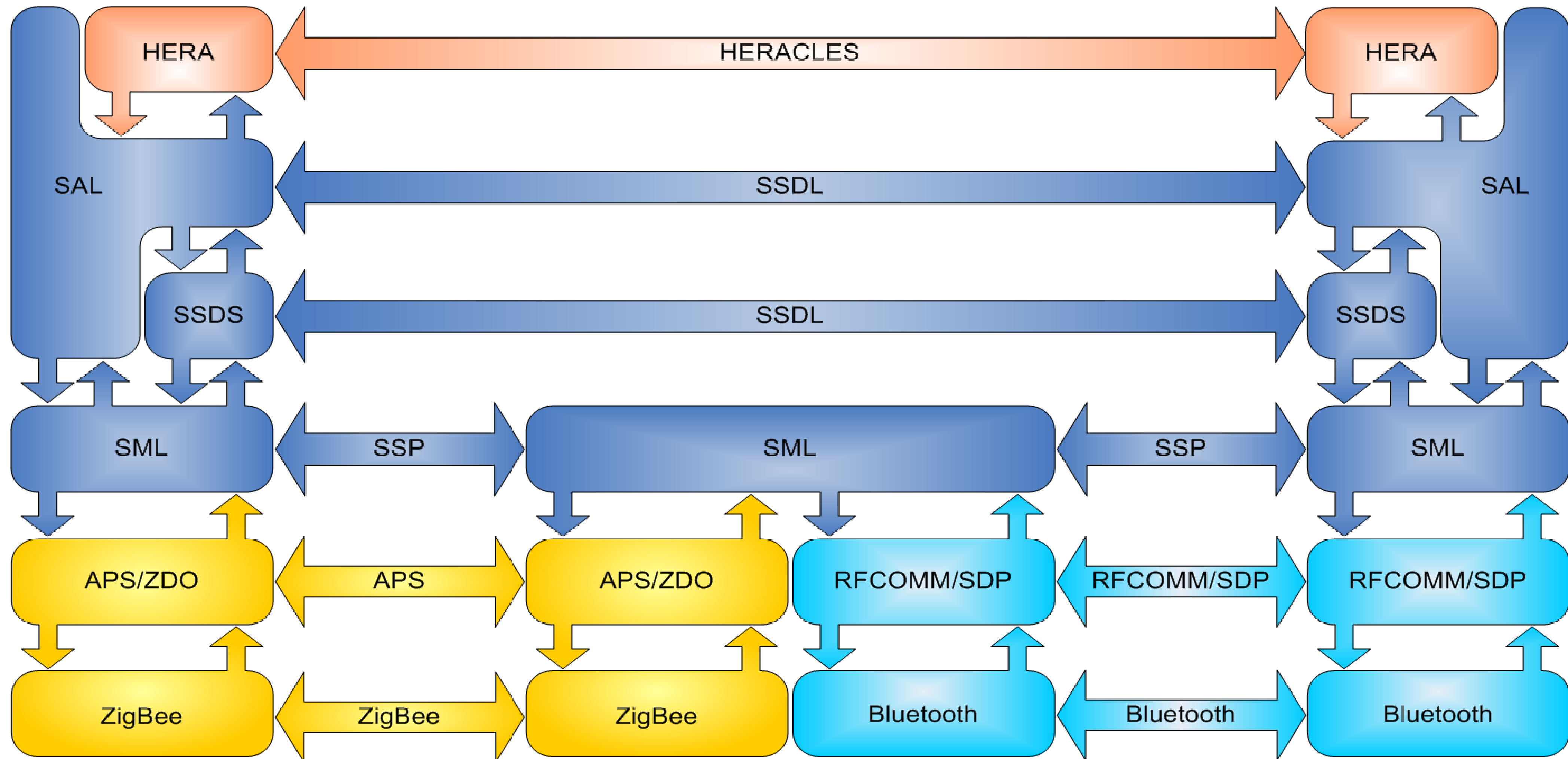
Problem Description

- Key aspect of AmI systems: obtaining context information
 - Wireless Sensor Networks (WSNs)
 - ZigBee, Bluetooth, Wi-Fi...
- Difficulty when integrating devices from different technologies
- Context information must be managed by reasoning mechanisms to learn from past and adapt their behavior
 - Multi-Agent Systems
- Difficulty when integrating MAS and WSNs
 - Development of distributed applications for devices with limited resources
 - Interfaces developed for these applications are too simple or even do not exist

The HERA Platform

- Based on the SYLPH (*Services laYers over Light PHysical devices*) platform
 - Distributed model: Service-Oriented Architectures
 - Heterogeneous Wireless Sensor Networks (WSNs)
 - Can be integrated with agent platforms
- In HERA, agents are directly embedded on the WSN nodes
 - Thanks to SYLPH, their services can be invoked from other nodes in the same network or other network connected to the former one

HERA Agents over SYLPH platform



ZigBee Node

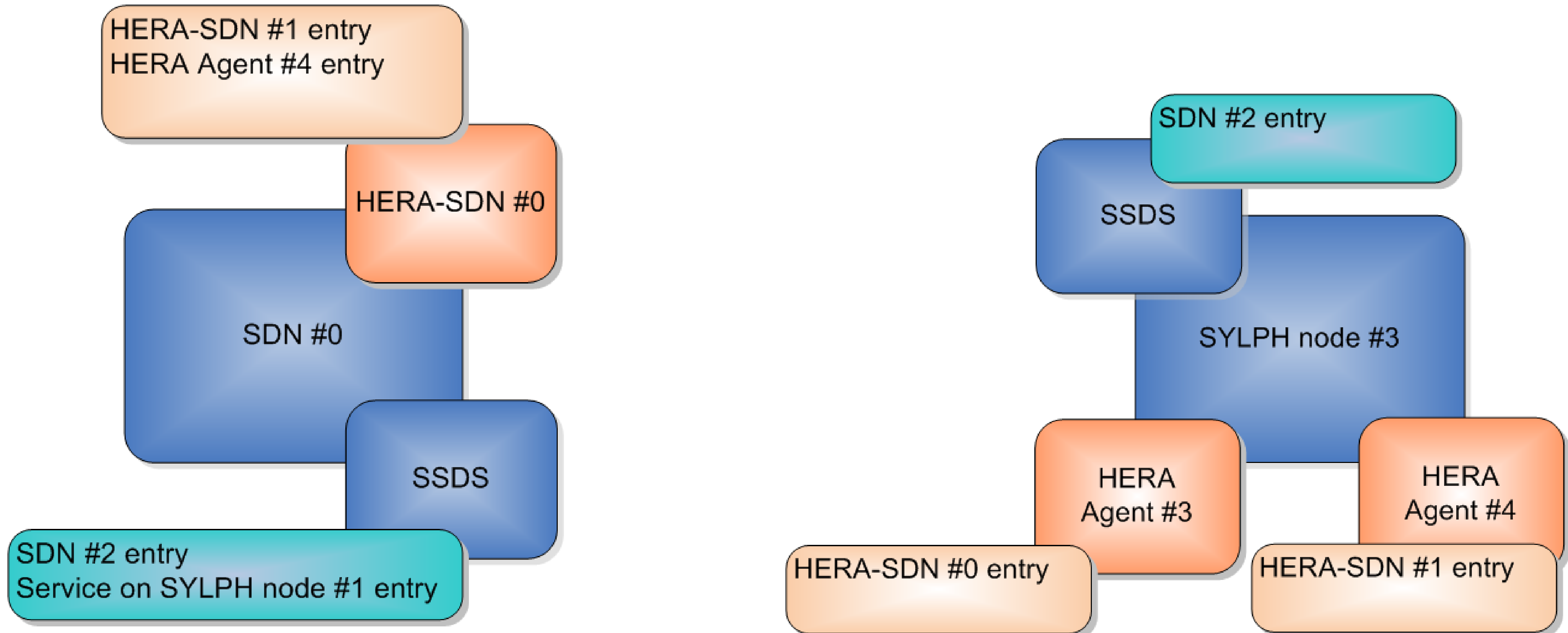
ZigBee-Bluetooth SYLPH Gateway

Bluetooth Node

The HERACLES language

```
request {  
  sender agent1;  
  receiver agent2;  
  content {  
    message msg;  
  };  
  in_reply_to msg;  
  reply_with response;  
  language HERACLES;  
  ontology HERA_ONTOLOGY;  
};
```

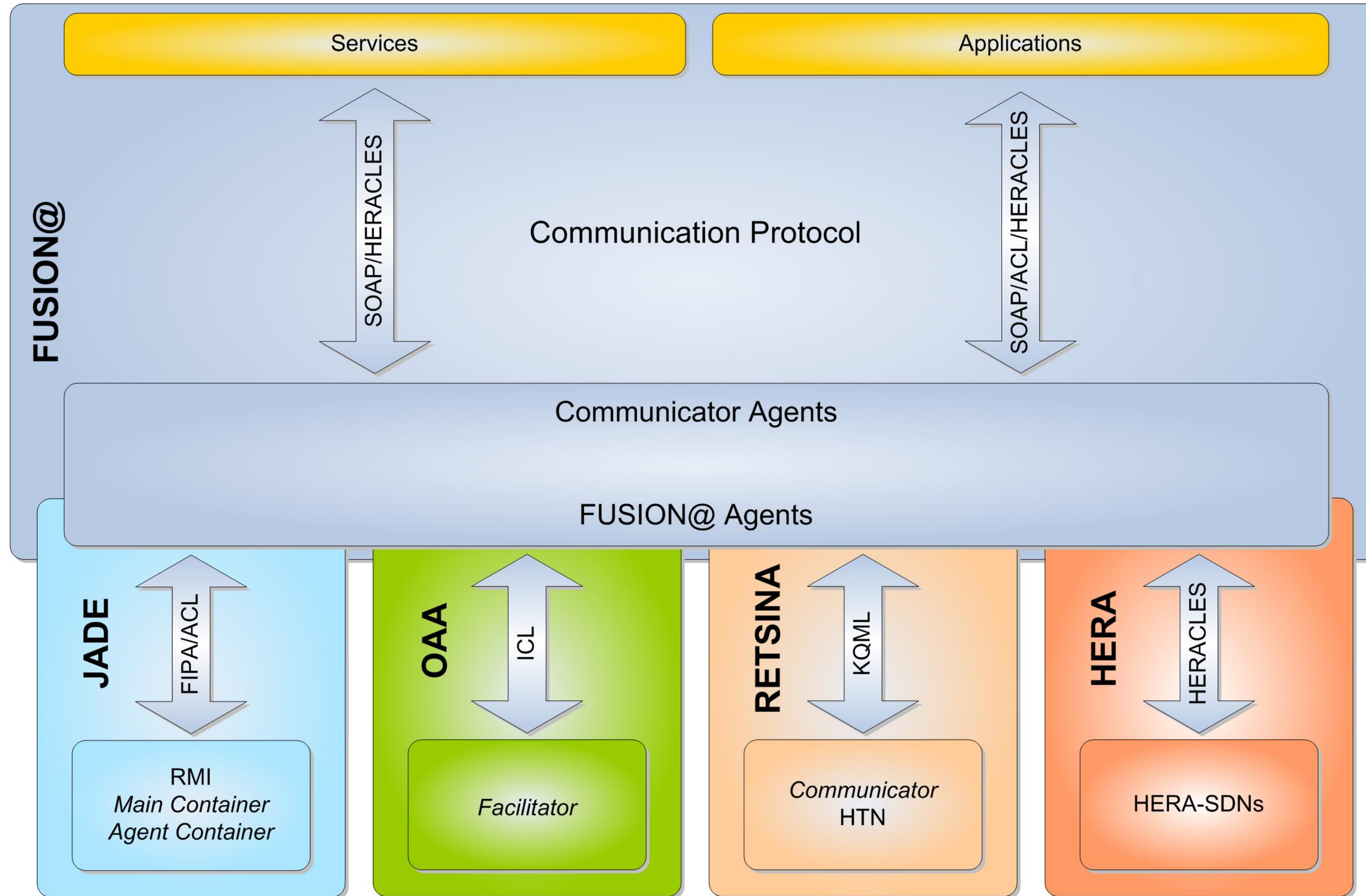
The HERA Spanned Directory Nodes (HERA-SDNs)



Conclusions

- The platform allows wireless devices from heterogeneous WSNs to work together in a distributed way
- Unlike other approaches, HERA directly embeds agents onto sensor nodes
- It is possible to create flexible AmI systems and reduce implementation costs
- Distributed approach makes it possible to add new components at execution time
- HERA adds intelligence to sensors by means of light reactive agents
 - Improves the experience of developers and users in context-aware technologies

Current Work: Integration of HERA into FUSION@



The logo for BISITE, featuring a red square with a white shape inside, followed by the word "BISITE" in a bold, black, sans-serif font.

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