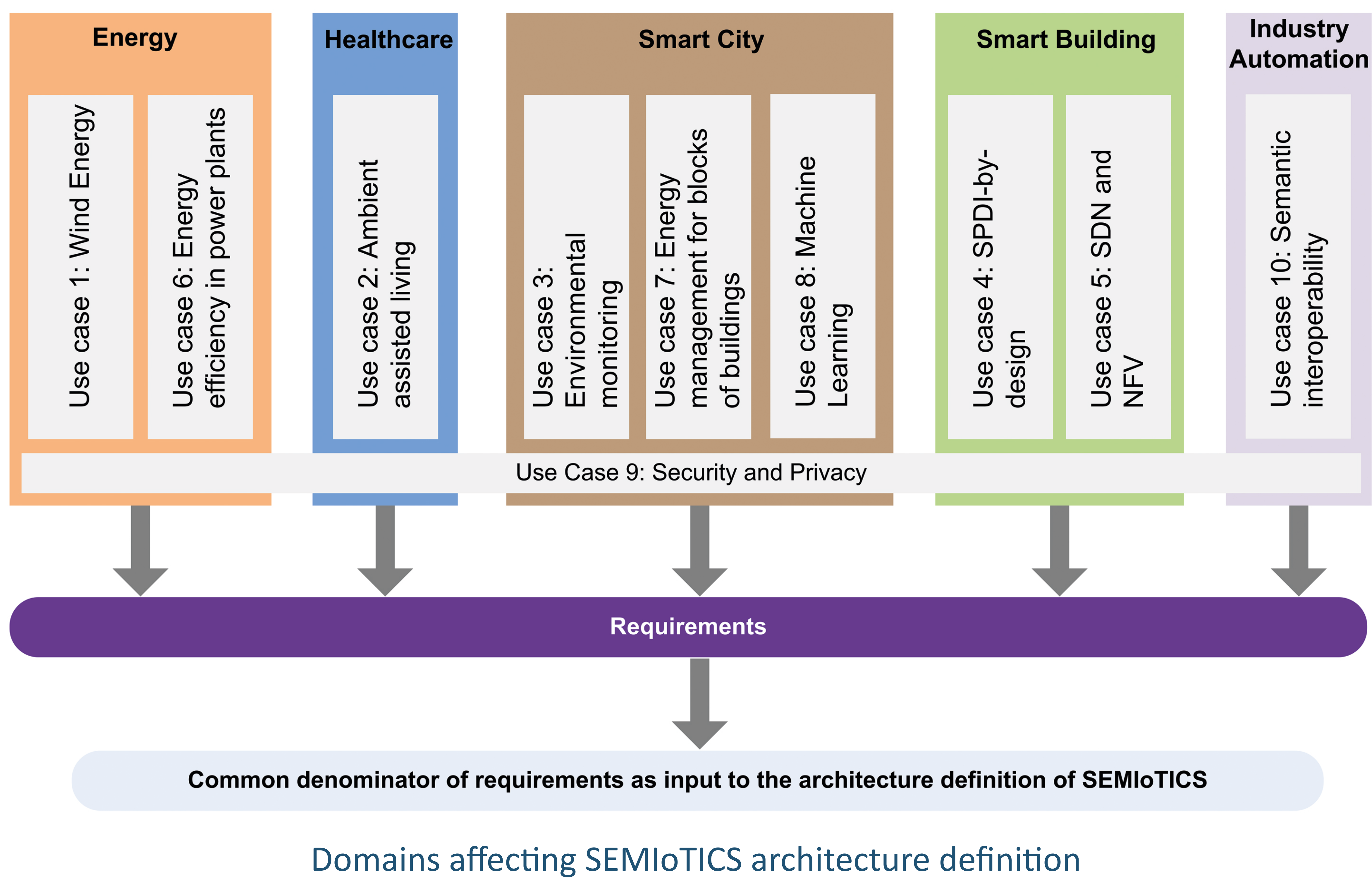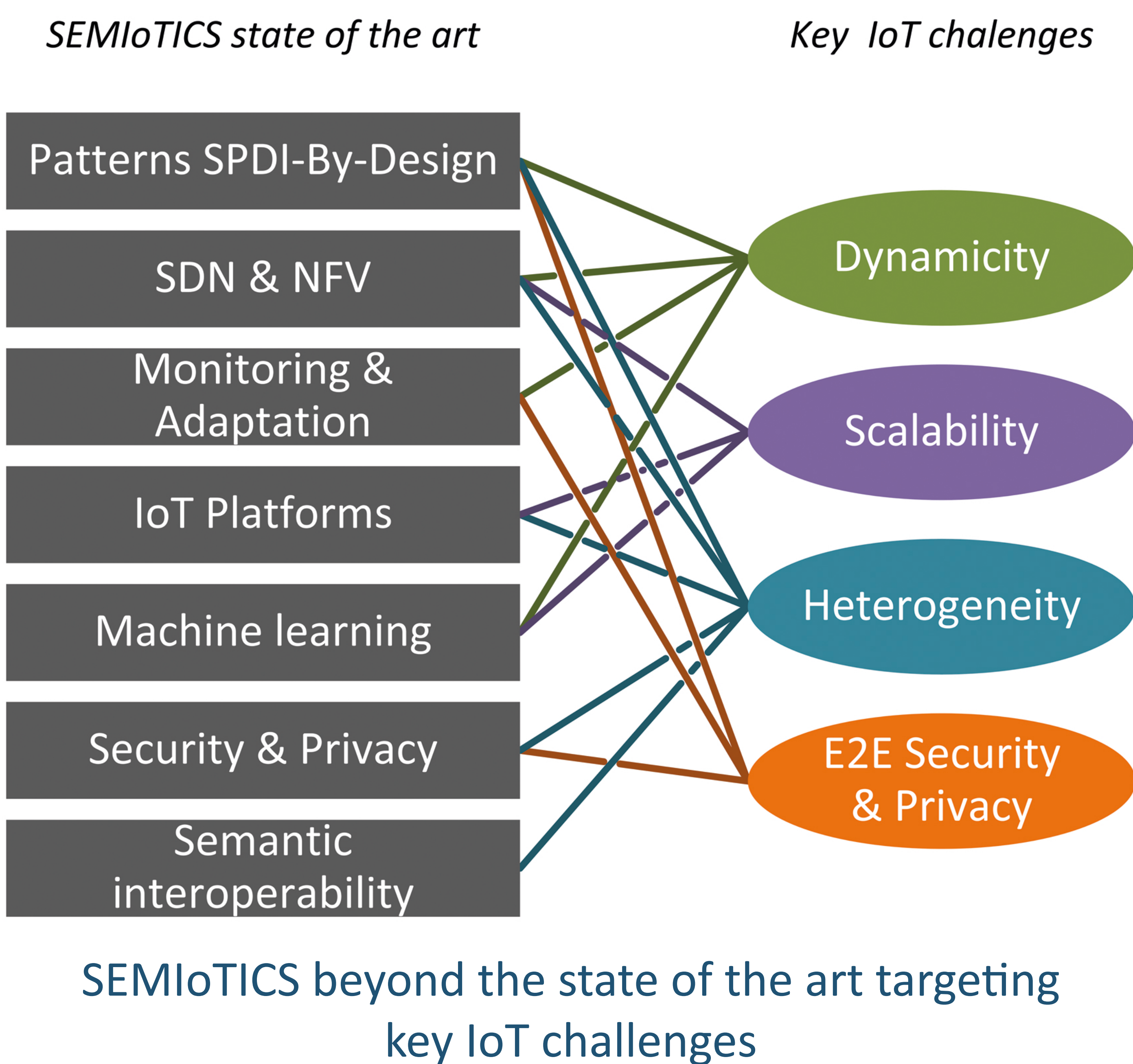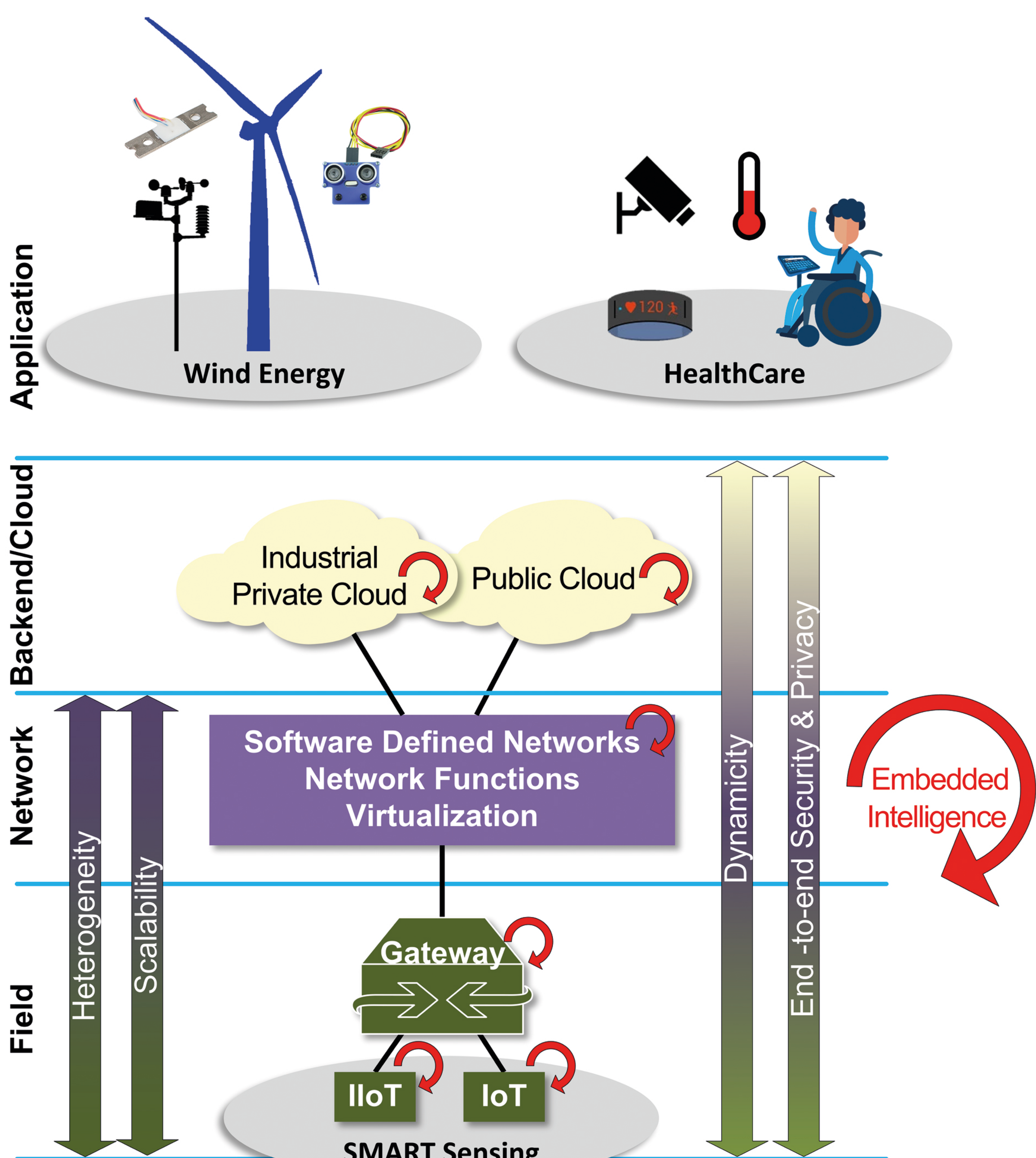# SEMIoTICS

Smart End-to-end Massive IoT Interoperability, Connectivity and Security

Develop a pattern-driven framework, built upon existing IoT platforms, to enable and guarantee secure and dependable actuation and semi-autonomic behaviour in IoT/IIoT applications.

Energy
- Use case 1: Wind Energy
- Use case 6: Energy efficiency in power plants

Healthcare
- Use case 2: Ambient assisted living

Smart City
- Use case 3: Environmental monitoring
- Use case 7: Energy management for blocks of buildings
- Use case 8: Machine Learning

Smart Building
- Use case 4: SPDI-by-design
- Use case 5: SDN and NFV

Industry Automation
- Use case 10: Semantic interoperability

Use Case 9: Security and Privacy

Requirements

Common denominator of requirements as input to the architecture definition of SEMIoTICS

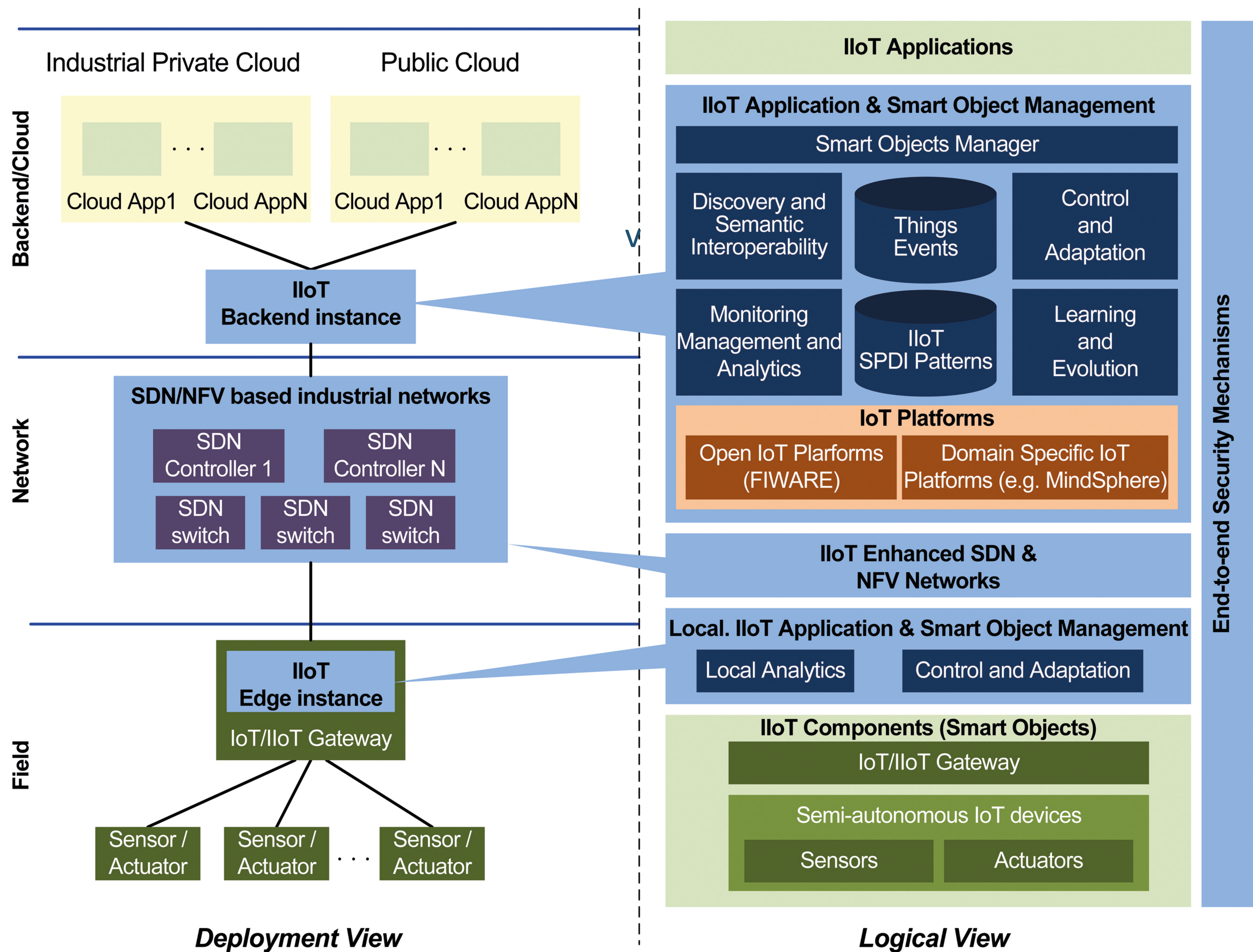Domains affecting SEMIoTICS architecture definition

SEMIoTICS demonstrates following 3 use cases:
- **Wind Energy:** Local smart behaviour at IIoT devices in wind turbines.
- **Healthcare:** Socially assistive robotic solution for ambient assisted living.
- **Smart Sensing:** Intelligent heterogeneous embedded sensing.

Wind Energy

HealthCare

Application

Backend/Cloud

Industrial Private Cloud   Public Cloud

Network

Software Defined Networks Network Functions Virtualization

Heterogeneity   Scalability

Dynamicity   End-to-end Security & Privacy

Embedded Intelligence

Field

Gateway

IIoT   IoT

SMART Sensing

Key IoT challenges driving SEMIoTICS

SEMIoTICS state of the art | Key IoT challenges

- Patterns SPDI-By-Design
- SDN & NFV
- Monitoring & Adaptation
- IoT Platforms
- Machine learning
- Security & Privacy
- Semantic interoperability

- Dynamicity
- Scalability
- Heterogeneity
- E2E Security & Privacy

SEMIoTICS beyond the state of the art targeting key IoT challenges

Backend/Cloud

Industrial Private Cloud   Public Cloud

Cloud App1 Cloud AppN   Cloud App1 Cloud AppN

IIoT Backend instance

IIoT Applications

IIoT Application & Smart Object Management

Smart Objects Manager

Discovery and Semantic Interoperability | Things Events | Control and Adaptation

Monitoring Management and Analytics | IIoT SPDI Patterns | Learning and Evolution

IoT Platforms

Open IoT Platforms (FIWARE) | Domain Specific IoT Platforms (e.g. MindSphere)

Network

SDN/NFV based industrial networks

SDN Controller 1   SDN Controller N

SDN switch   SDN switch   SDN switch

IIoT Enhanced SDN & NFV Networks

Local. IIoT Application & Smart Object Management

Local Analytics   Control and Adaptation

Field

IIoT Edge instance

IoT/IIoT Gateway

Sensor / Actuator   Sensor / Actuator   Sensor / Actuator

IIoT Components (Smart Objects)

IoT/IIoT Gateway

Semi-autonomous IoT devices

Sensors   Actuators

End-to-end Security Mechanisms

Deployment View   *Logical View*

Envisioned architecture and deployment of SEMIoTICS framework