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Deploying a private 5G infrastructure for manufacturing

02.12.2024 | Walter Quadrini

Our facilities



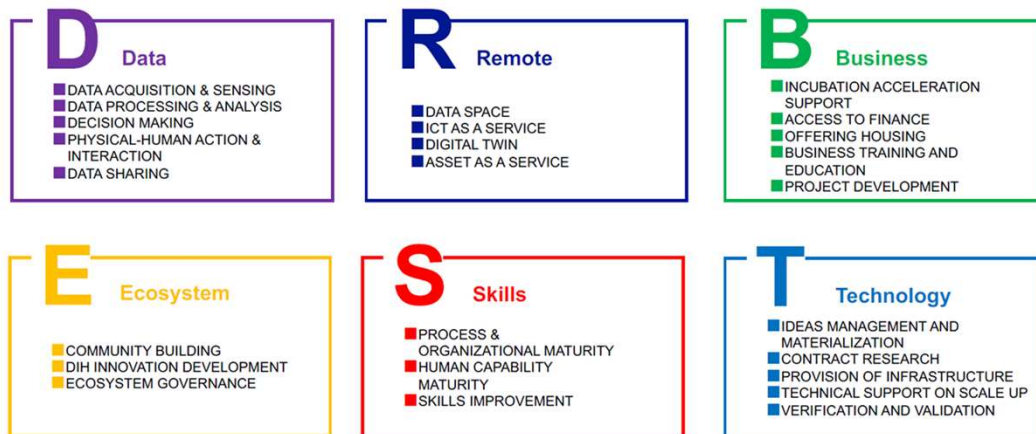
Gavkalova, N., Gładysz, B., Quadrini, W., Sassanelli, C., Asplund, F., Ramli, M. R., ... & Terzi, S. (2024). Digital Innovation Hubs and portfolio of their services across European economies. *Oeconomia Copernicana*.

<https://journals.economic-research.pl/oc/article/view/2757>

AI REDGIO 5.0 DF Network

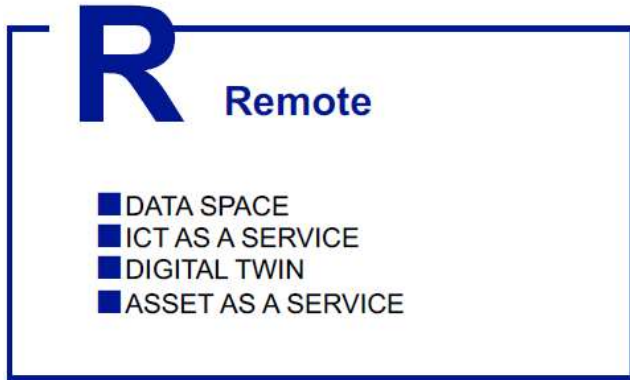


DR-BEST framework and Service Portfolio



- **DR-BEST analysis** is at the base of the **Service Portfolio configuration**.
 - The framework helps the DFs to **outline their current and future** service portfolio and highlight any gaps in their service offering.
 - It also facilitates the **collaboration opportunities** identification with peer DFs applying the method.
- A three-level taxonomy is used to classify services, which has two benefits:
 1. It provides a comprehensive overview of all the services that a DF could offer;
 2. It ensures that services are presented in a consistent and understandable manner, common to the Network or Ecosystem applying it (common language).

DR-BEST taxonomy: R dimension



The macro-classification (1st level of the taxonomy) divides services into six classes (Data, Remote, Business, Ecosystem, Skills, Technology), from which the acronym DR-BEST is derived; for each class, level 2 (service type) and level 3 (service instance) are defined to further clarify and categorize the type of activity.

Spanning over the 6 classes, more than 70 services are classified

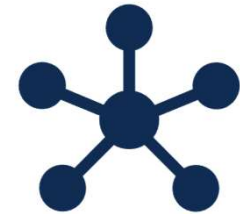
CLASS	TYPE	SERVICE
REMOTIZATION	Data Space	Real Time Industrial Data Platform
		Assets Administration Shell
		Open Data Repository
		Assets Data Marketplace
	ICT as a Service	Software as a Service
		Platform as a Service
		Infrastructure as a Service
	Digital Twin	FEM/CFD/FSI simulation
		Discrete event simulation
		Ambient virtualization
	Asset as a Service	Teleoperation
		Monitoring platform
Avatar		

(E)DIH Ecosystem and Collaboration Corridors

The European Digital Innovation Hubs will form part of a large network and **collaborations will be one of the main keys they will have to better support SMEs** and the public sector by taking advantage of the experience and knowledge of other hubs.

Depending on their characteristics (sector, technology, geographic location), several **EDIHs may work together in a structured way**, in order to jointly develop common services or provide a package of innovative services in a way that aligns with the objectives and needs of the companies. concerned parties.

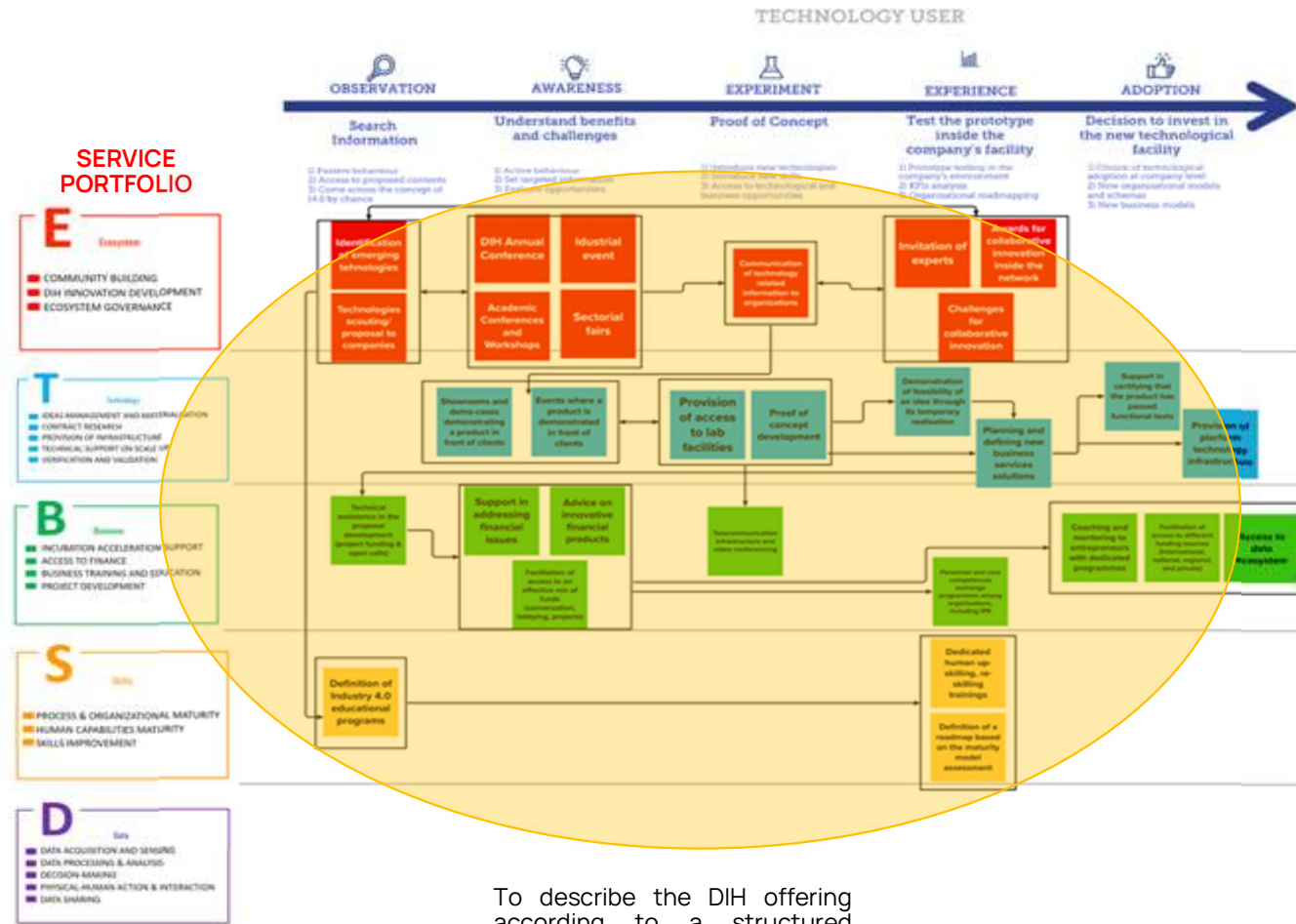
For this reason, define ways EDIHs can collaborate, is essential to offer the best support to stakeholders.



METODIH: main pillars

SERVICE PIPELINES

Tool to match service offering and customer needs



CUSTOMER JOURNEYS

To analyse the DIH customer base, to identify main barriers and needs

To describe the DIH offering according to a structured framework

The 5G use case



P2CODE



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MADE
Competence Center I4.0

The 5G use case



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The 5G use case



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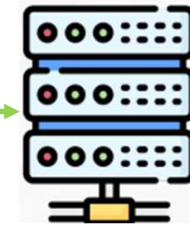
The 5G use case



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On premise server



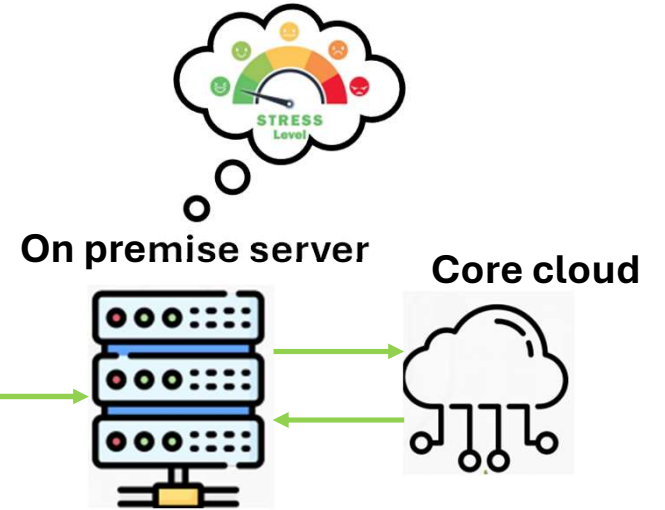
Core cloud



The 5G use case



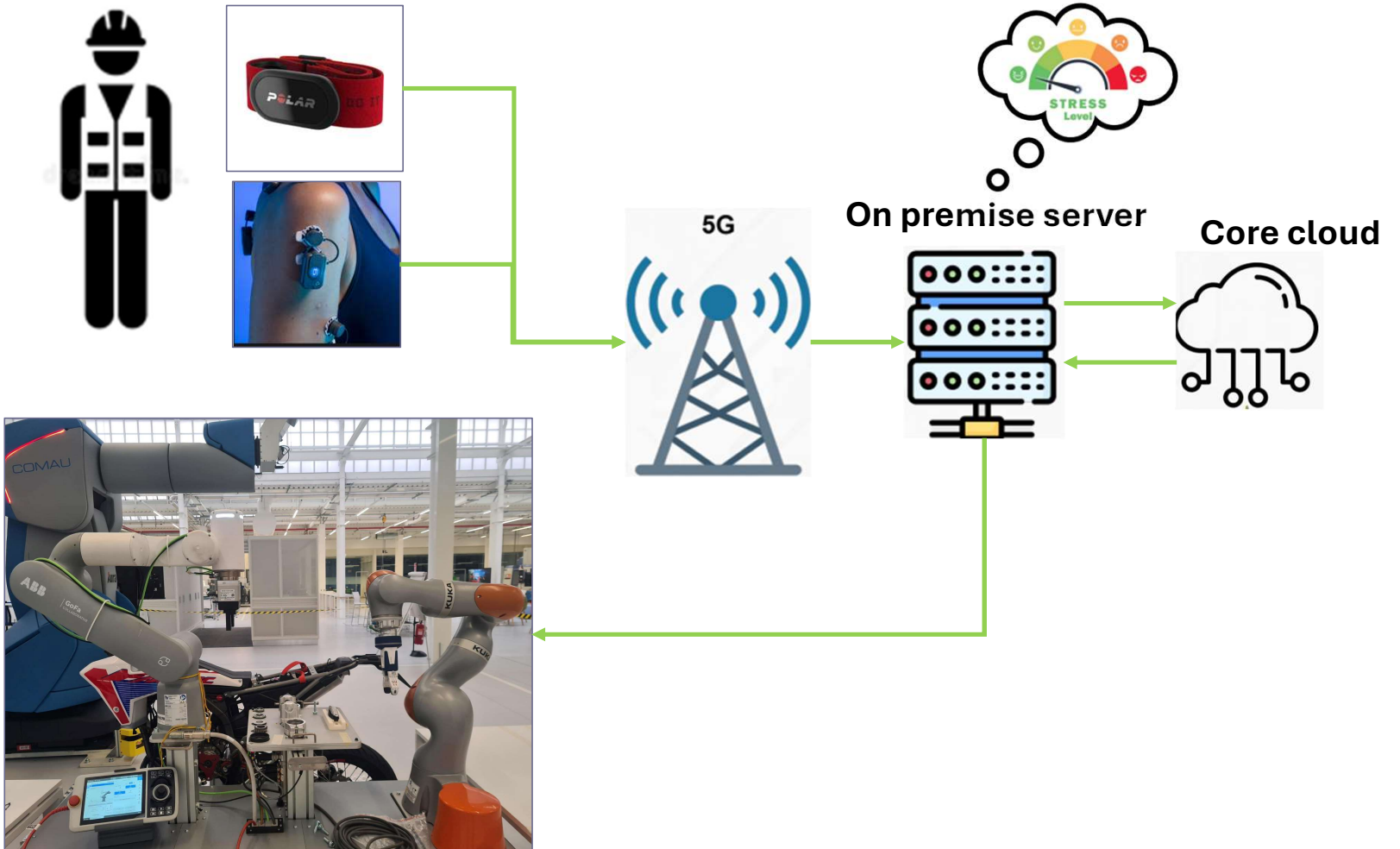
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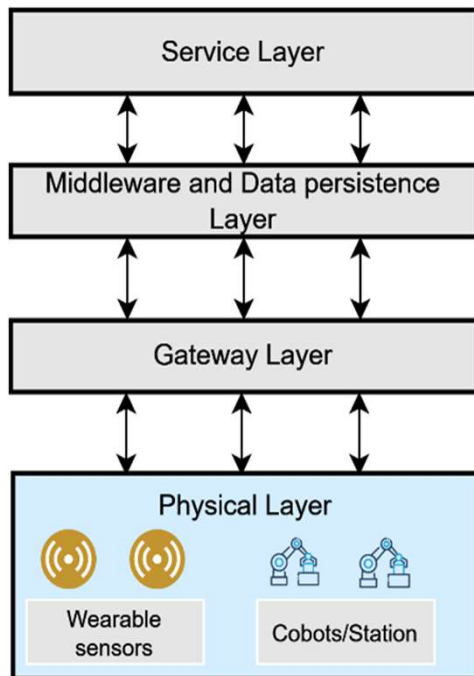
The 5G use case



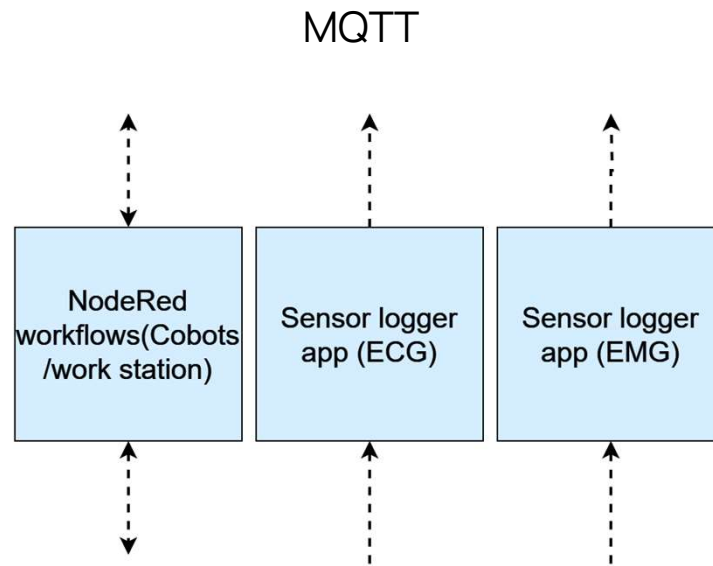
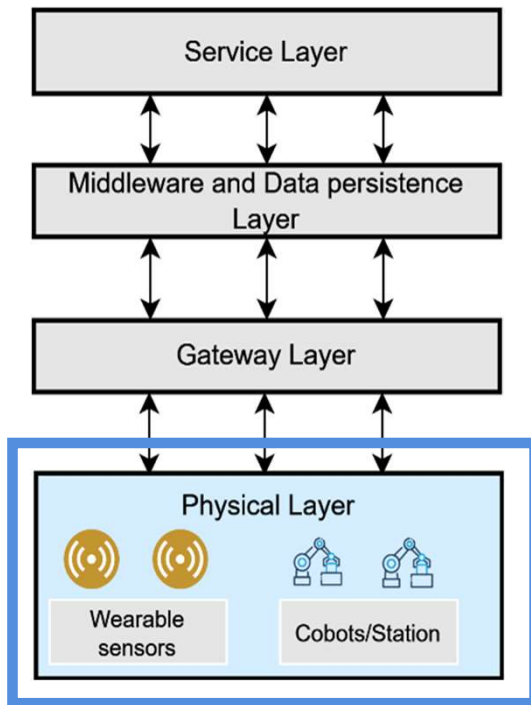
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Development

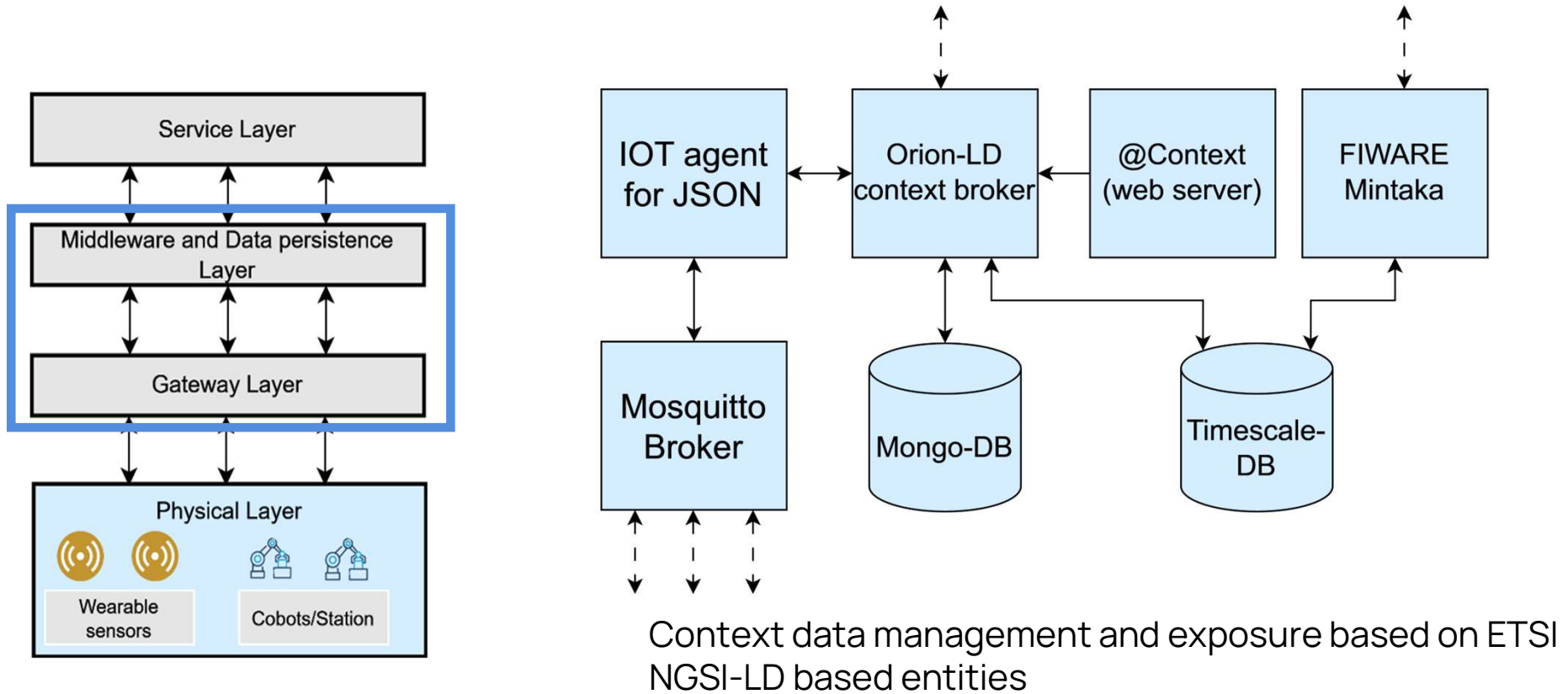


Development

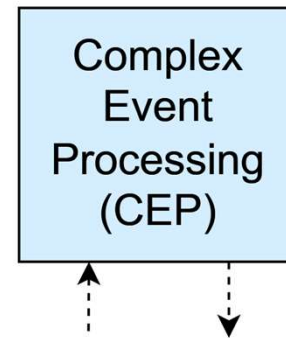
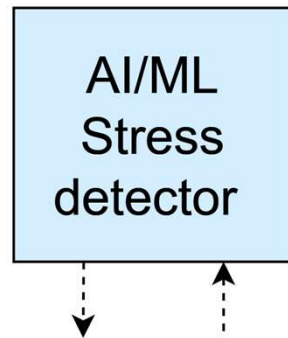
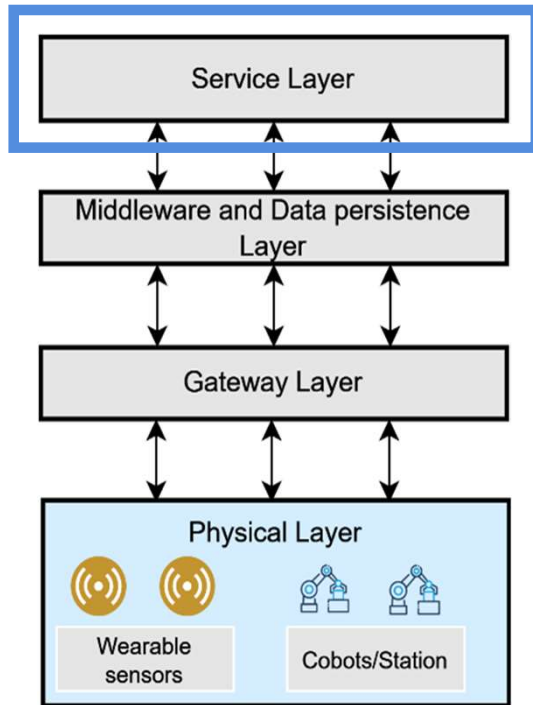


Mixture of open and proprietary protocols

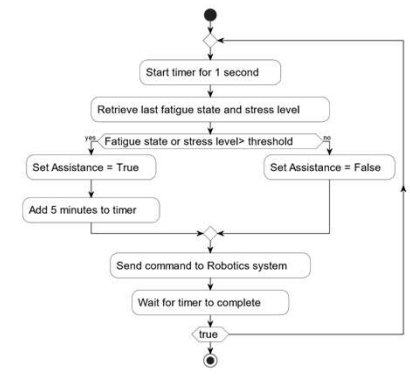
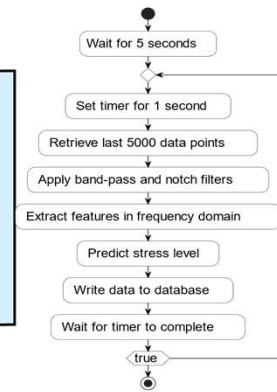
Development



Development



Context data consumption and updating



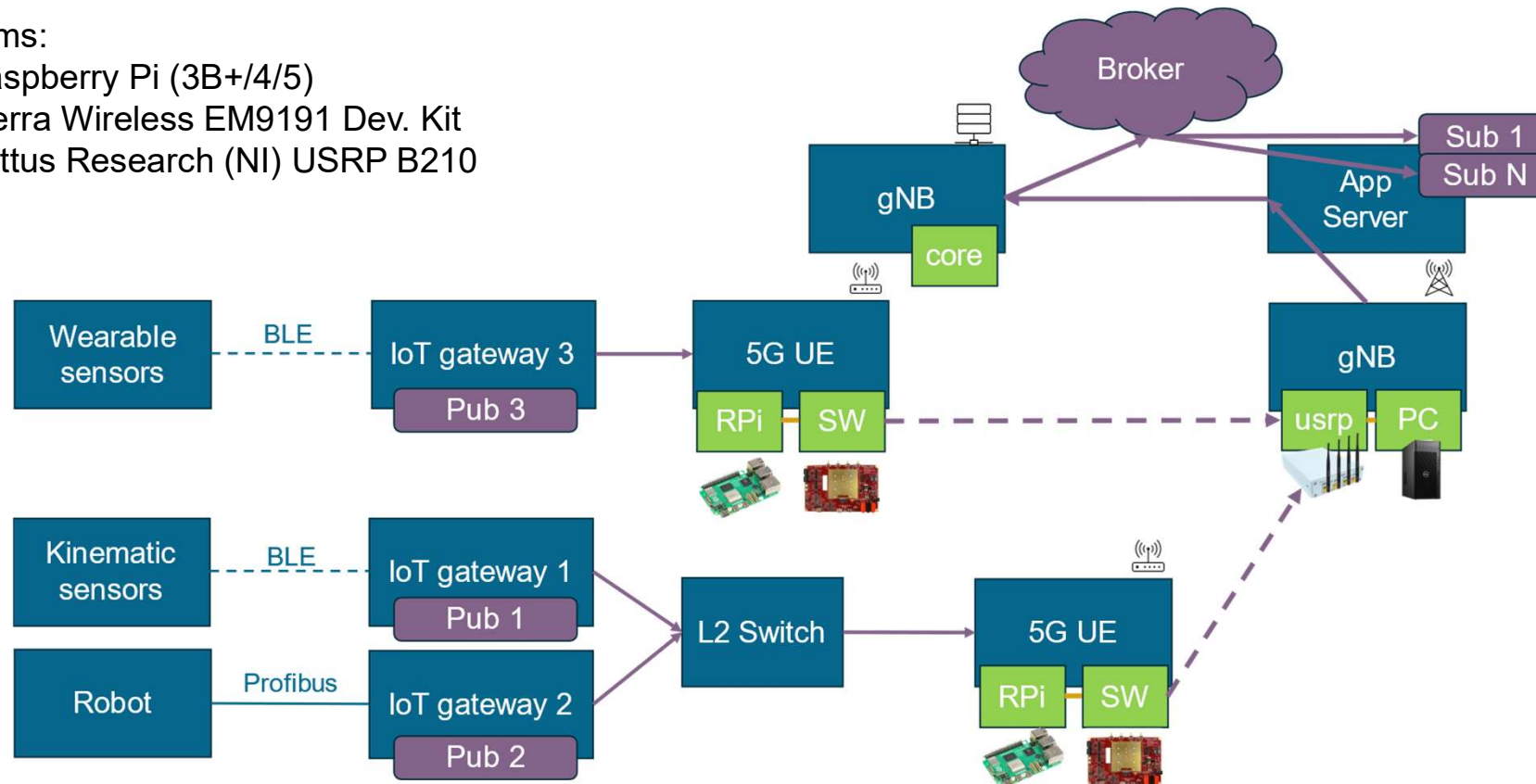
Deployment

Acronyms:

RPi: Raspberry Pi (3B+/4/5)

SW: Sierra Wireless EM9191 Dev. Kit

Usrp: Ettus Research (NI) USRP B210



Lessons learnt

- Deployment of a 5G private network can overcome reliability limits of WiFi in an industrial environment
- 5G latency is “closer” to the requirement of monitoring loops closed to control layer
- Italian normative makes very hard to create research infrastructure embodying 5G
 - Luckily, networking of DF made everything possible

Thank you for your attention

Walter Quadrini
walter.quadrini@polimi.it