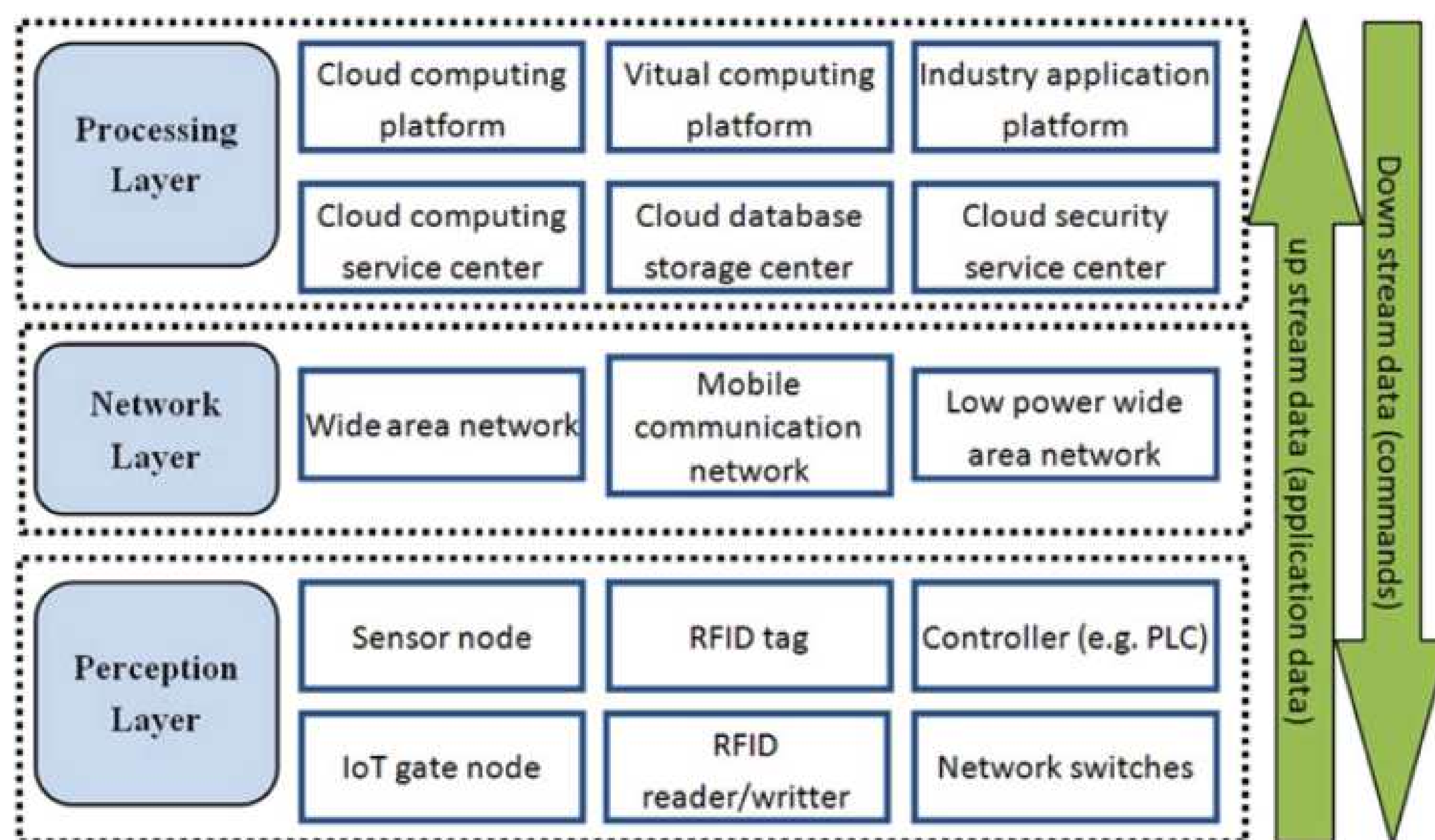


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Context

In the frame of the CYBEREXCELLENCE project, I am working on the subject of "Security considerations in the design of IoT transceivers". Precisely, the research focuses on the industry environment (IIoT) and on the IEEE.802.15.4 standard as it is used as the basis of numerous wired or wireless LRWPAN (Low-Rate Wireless Personal Area Network) communications standards for IoT like ZigBee, Smart mesh IP, G3-PLC, 6LoWPAN, Wireless HART, THREAD, ...



[1] Chuan-Kun Wu. *Internet of Things Security Architectures and Security Measures*. Springer Singapore, 2021.

Problems in IIoT

The IIoT devices are constrained:

- Energy
- Computational Power
- Environment

Moreover, there is a lot of different devices and protocols for IoT communications. Also, the wireless channel is often used and is available to everyone whom want to listen. Then, securely and efficiently communicating becomes a challenge.

Physical authentication

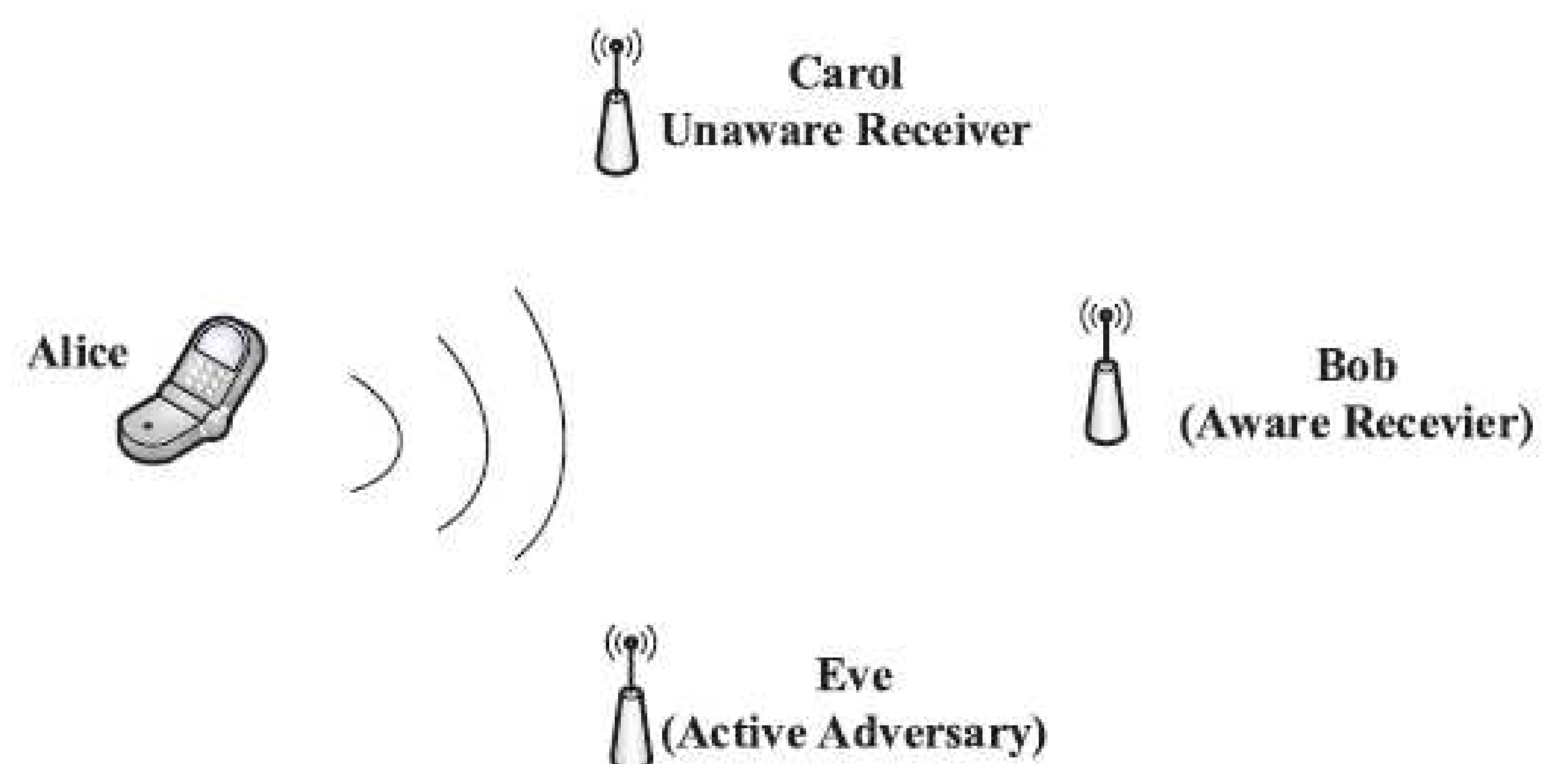
The Physical authentication allows legitimate receiver to quickly distinguish between a legitimate transmitter or a rogue one [2]. There are two types of physical authentication: active, in which the nodes exchange a secret key or embed a tag in the signal; passive, in which the nodes use the communication channel properties to authenticate signals.

[2] N. Xie, Z. Li et H. Tan. « A Survey of Physical-Layer Authentication in Wireless Communications ». In: *IEEE Communications Surveys Tutorials* 23.1 (2021), p.282-310.

Attacks

Common attacks on low OSI layers are:

- Spoofing
- Eavesdropping
- Jamming
- Replay
- Side-Channel



[3] N. Xie et C. Chen. « Slope Authentication at the Physical Layer ». In: *IEEE Transactions on Information Forensics and Security* 13.6 (2018), p. 1579-1594.

Next steps of the research

The next steps of my research work are:

- pursuing the state-of-the-art of security mechanisms proposed in low layers of IIoT
- Testing security techniques on simulations
- Testing security techniques on real platforms and in real environment