

Course Takeaways

1. IoT network characteristics and specificities

Hint : *List the major peculiarities of IoT physical networks. If needed, you can take the case of Low-Power Wireless Personal Area Networks (LP-WPAN) that we considered during the course and explain how they differ from conventional computer networks and what are the specific constraints that they are subject to.*

- Large Number of Devices (Scalability)
- Dynamic Topology
- Low Bandwidth
- Latency and Real-Time Constraints
- Small Payloads and Event-Driven Communication
- Specialized Protocols and Standards (e.g., IEEE 802.15.4, 6LoWPAN, Zigbee, BLE)
- Focus on Energy Efficiency and Cost Reduction
- Usable with any standardized protocol (like MQTT)

2. Rationale for adopting an IPv6 based architecture to support the communications of an IoT system or use case

Hint : *List the main benefits of adopting an IP based architecture in an IoT system, up the connected object (e.g. sensor, etc.).*

- IoT-Specific Protocol Support (compatible with 6LoWPAN for low-power IoT devices)
- Vast Address Space
- Scalability
- Efficient Data Transmission (as seen during the course)
- Mobility and Flexibility (better handling of dynamic and mobile IoT environments)

3. IPv6 basics

Hint : First, from the experiments and traffic captures that you did during TD1, describe the different IPv6 initialisation steps that a host goes through, when switched on. Explain the rationale of the different steps, and the messages (with the types of IPv6 addresses) that are used to complete these steps. Then, derive some of the requirements of IPv6 (in terms of transmission capabilities of the physical network, and host availability) and enrich them with some other important characteristics of IPv6.

4. IPv6 adaptation and extensions in order to enable its use atop a physical IoT network

Hint : Without delving into the details, and relying on the experiment that you undertook during TD2, list the main additions, adjustments and optimizations of IPv6 that were defined for an application in the context of an IoT network.

5. The IETF IPv6 based stack for IoT

Hint : Depict the protocol stack proposed by the IETF for IoT and then briefly describe the main network functions performed by the new layers. Also, provide a few words to describe the proposed application level protocols.

6. Existing IPv6 based network technologies for IoT

Hint : List the existing IoT network technologies that are using IPv6 and their associated vertical(s) (application domain(s))

7. Is an IPv6 based stack relevant for your semester project ?

Hint : After briefly describing your semester project, elaborate very shortly on the relevance of adopting IPv6 in your semester project.

8. IoT and sustainability

Hint : to be updated soon

Dans le sens de la durabilité environnementale.

