

An insight into Internet based technologies and protocols for Wirelessly connected things

Teacher: Slim Abdellatif

Descriptive Part

The course addresses the convergence of IPv6 with the Internet of Things in a context where connectivity is becoming ubiquitous. The material begins by exploring the fundamental characteristics of IPv6 that make it particularly suited to the IoT, including its large address space and self-configuring capabilities. It continues with a study of the adaptations needed to deploy IPv6 in constrained environments, where resources are limited. The course particularly highlights the paradox between the potential of IoT as a solution to global sustainability challenges, and the sustainability issues inherent in IoT devices themselves. This duality raises important questions about how we design and deploy these technologies.

Technical Part

The practical work was an essential part of the learning, allowing a concrete application of the theoretical concepts. The first TD focused on the fundamental mechanisms of IPv6, allowing us to observe in real time how devices self-configure and communicate with each other. The use of Wireshark allowed us to analyze in detail the packet exchanges and understand the subtleties of the protocols. The second TD explored the adaptation of IPv6 for constrained networks through 6LoWPAN. The use of the Mininet-wifi emulator allowed us to experiment with header compression and RPL routing in a controlled environment. This practical experience was particularly enriching because it revealed the concrete challenges of implementing these technologies.

Analysis Part

Studying this subject allowed me to develop a deeper understanding of the challenges of IoT. Beyond the purely technical aspects, I realized the crucial importance of a balanced approach between innovation and sustainability. The technical choices we make today in the design of IoT systems will have lasting repercussions on our environment. The course also highlighted the importance of standardization and interoperability to ensure the sustainable development of IoT. The issue of sustainability can no longer be considered secondary, but must be integrated from the design of systems. This awareness fundamentally changes our approach to technological development, pushing us to consider not only technical performance, but also the long-term environmental impact of our solutions.

