

Unlocking IoT Potential: Empowering LoraWAN for Secure, Distributed Smart Water Management

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Abstract—This Keynote explores the convergence of IoT technology and sustainable water management, providing advances for future distributed and secure IoT applications. Firstly, it investigates the transformation of LoRaWAN networks, crucial for enabling long-range, low-power connectivity in IoT applications. Advocating for decentralized architectures exemplified by DeLoRaN, the study showcases how distributed control and blockchain technology enhance reliability, scalability, and resilience. Through empirical validation, DeLoRaN's superiority over centralized models is demonstrated, heralding a paradigm shift in IoT connectivity. Secondly, by addressing critical privacy concerns related to LoRaWAN device identity, the keynote highlights the need for robust mitigation strategies to safeguard IoT ecosystems. Finally, we present the framework represented by GraphSmart which optimizes energy efficiency while ensuring precise water flow measurement within the LoRaWAN infrastructure, serving as a metering and communication platform for water management. This multifaceted exploration not only advances IoT technology but also offers sustainable solutions to mitigate global water scarcity challenges.

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BIO

Francesca Cuomo is Full Professor at Sapienza University of Rome teaching courses in Telecommunications, Network Infrastructures and Smart Environments. Prof. Cuomo has advised numerous master students in computer engineering and has been the advisor of 14 PhD students in Networking. She is the Chair of the Master Degree in Data Science in Sapienza. Her current research interests focus on Low Power Wide Area Networks and Internet of Things, 5G and Open Radio Access Networks, Smart Metering and Vehicular networks, Multimedia Networking. She participated in several national and international research projects, being Principal Investigator of many on them. Francesca Cuomo has authored over 185 peer-reviewed papers published in prominent international journals and conferences. Her Google Scholar h-index is 33 with 4650 citations. She has been in the editorial board of Computer Networks (Elsevier), Ad-Hoc Networks (Elsevier), IEEE Transactions on Mobile Computing, Sensors (MDPI), Frontiers in Communications and Networks Journal. She has been the TPC co-chair of several editions of the ACM PE-WASUN workshop, TPC Co-Chair of ICCCN 2016, TPC Symposium Chair of IEEE WiMob 2017, General Co-Chair of the First Workshop on Sustainable Networking through Machine Learning and Internet of Things (SMILING), in conjunction with IEEE INFOCOM 2019; Workshop Co-Chair