

EFFICIENT AND SECURE INTENSIVE DISTRIBUTED COMPUTING, 6G MOBILE NETWORKS, AND NON-TERRESTRIAL NETWORKS (NTN)

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Research Group: Information & Computing Lab

The Information & Computing Lab (Iclab) is a research group with over 12 years of experience that aim to foster experimentation and development at the crossroads of data analysis techniques and ICTs, which serve as key drivers of the emerging digital economy and society. We have four main areas of expertise: (1) decentralized learning, including decentralized federated learning, continual learning and split learning; (2) privacy & security, including Byzantine-robustness, coded decentralized computing and differential privacy; (3) IoT/C2E computing, including Decentralized federated learning over IoT and Cloud-to-Edge computing; and (4) quantum networks, including Quantum Internet, Quantum Key Distribution (QKD) and Quantum security.

Further information can be found at our webpage (<https://iclab.uvigo.gal>): including comprehensive details about publications members, ongoing research projects, and cooperation and knowledge transfer projects.

Keywords: Non-terrestrial networks (NTN) | 5G-6G | Compute-Intensive Distributed Computing | Privacy and security

Research Focus:

The analysis of large volumes of data collected by users in remote and mobile environments - such as maritime areas, aerial platforms, or isolated regions - enables the provision of monitoring services, anomaly detection, and environmental analysis. To deliver more reliable services, it is necessary to combine information from multiple users, which in these environments often requires the use of different technologies and hybrid networks. However, several constraints must be addressed, including potentially intermittent connectivity, limited energy resources, and the need to guarantee privacy and security in both data and communications. Distributed computing represents a natural solution that leverages the participation of different infrastructure elements across NTN systems and advanced low-latency networks such as 6G. The objective of this research is to develop efficient, secure, and privacy-preserving distributed computing solutions capable of operating under conditions of intermittent connectivity, mobility, and limited energy availability.