

EIIN924	Peer to Peer	CM 21h	TD 3h	HNE 26h
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Cours proposé dans la mineure / Course offered in the minor :

AL	CyberSec	IA-ID	IHM	IoT-CPS	Ubinet	IF	M1 EIT DSC	M2 EIT DSC	M2 Fintech
	x						x	x	x

Responsable / In charge of : **Liquori Luigi** (Luigi.LIQUORI@inria.fr)

Résumé / Abstract :

Since the early days of the internet, from the email to the Web, the client-server architecture has been used for data transfer. However, in a few years, the peer-to-peer architecture has changed our way to share information. Peer-to-peer communications still account for a large part of the internet trafic. The peer-to-peer architecture deployment has followed a rare model in the history of the internet. Whereas, most of the time, even the smallest improvement requires years of academic evaluations and experimentations, before a real large scale deployment, peer-to-peer systems were deployed at large scale based on an empirical process. The understanding of these new systems is fundamental today for anybody who wants to work in an area related to networking and distributed systems.

Prérequis / Prerequisite :

Objectifs / Objectives :

Contenu / Contents :

- Course overview, state of the art survey
- Theory and practice of the most common and historical P2P protocols and Distributed Hash Table like e.g. Chord, Kademlia, Torrent, Tor, Blockchain
- Routing, search and query issues in P2P networks and protocols
- Trust, security, anonymity, fairness and privacy issues in P2P networks and protocols
- Legal, social and economic issues in P2P networks and protocols
- Some killer past and current applications lie e.g. eMule, Napster, Skype, BitTorrent, Tor browser, Cryptocurrencies ...

Références / References :

- Ion Stoica and Robert Tappan Morris and David Liben Nowell and David R. Karger and M. Frans Kaashoek and Frank Dabek and Hari Balakrishnan, Chord: a scalable peer-to-peer lookup protocol for internet applications, ACM Trans. Netw. 11(1), 2003.
- Petar Maymounkov and David Mazières. Kademlia: A peer-to-peer information system based on the XOR metric. In Proceedings of the 1st International Workshop on Peer-to-Peer Systems, IPTPS '02.
- Bram Cohen, Bittorrent protocol, [https://www.bittorrent.org/beps/bep\\_0003.html](https://www.bittorrent.org/beps/bep_0003.html)
- Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System, <https://bitcoin.org/>
- Roger Dingledine and Nick Mathewson, The Tor protocol onion routing and browser. <https://www.torproject.org/>
- Salman Baset and Henning Schulzrinne, An Analysis of the Skype Peer-to-Peer Internet Telephony Protocol, INFOCOM '06.

Acquis / Knowledge :

- You will learn about peer-to-peer systems and protocols and some distributed system challenges and problems.

Evaluation / Assessment :

Homeworks, github-based compile-and-run well established implementations, shepherding, 3h exam