SEMINAR ANNOUNCEMENT

DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
COLLEGE OF DESIGN AND ENGINEERING
Website: https://cde.nus.edu.sg/ece

Area: Communications & Networks

Host: Associate Professor Biplab Sidkar

TOPIC	:	**Impact of Network Synchronisation and Timing In 5g Networks and Applications**
SPEAKER	:	**Mr Chellappan Pillai Sreedevi Ullas Kumar** **Graduate Student, ECE Dept, NUS**
DATE	:	**Monday, 9 January 2023**
TIME	:	**11.00AM to 12.00PM**
VENUE	:	**Join Zoom Meeting** **https://nus-sg.zoom.us/j/8092137897?pwd=eXFwV0s2SW14VFBzYW5GVXJtdUtvQT09** **Meeting ID: 809 213 7897** **Passcode: 405792**

ABSTRACT

Network Synchronisation is fundamental to cellular networks. The coordination between the cells are necessary for the best performance and quality of experience of the UE (user equipment). The frequency accuracy requirement of a base station originates from the fundamental need to support the mobility of user equipment (UE) within a cell. The moving user creates a doppler frequency effect; the base station observes a different frequency than transmitted by the UE. As required, the base station frequency accuracy must be within 50 ppb to support moving UEs and their handoff to neighbouring base stations. The frequency requirement also helps complying to the regulatory frequency allocation by not creating interferences to the nearby cells. In traditional network synchronisation, the input into the RF section of the base station assumes to have 16ppb frequency accuracy, the same as the frequency accuracy requirement back into the network from the base station. The phase accuracy requirement is much more stringent than the frequency accuracy requirements. In traditional cellular networks, the base stations were to be within +/- 1.5µs accuracy required to support the fundamental network operation in (TDD) time division duplexing systems. Switching between uplink and downlink, handover of UEs and collaborative features for performance improvements depends heavily on phase synchronisation amongst the base stations. With 5G, the advanced features of collaborative performances, such as MIMO and carrier aggregation, requires lower relative timer error between radios within the same base station clusters. The architectures for 5G with virtual and distributed systems make achieving synchronisation more challenging than traditional architectures. This seminar gives an overview of synchronisation distribution for 5G networks, technologies, and architectures. The various application scenarios and the requirements of synchronisation are discussed. The talk introduces potential new architectures for various elements in the cellular infrastructure.

BIOGRAPHY

Ullas Kumar is pursuing his doctoral degree from the Department of Electrical and Computer Engineering. He has been working in the Telecommunications Industry for the past several years.