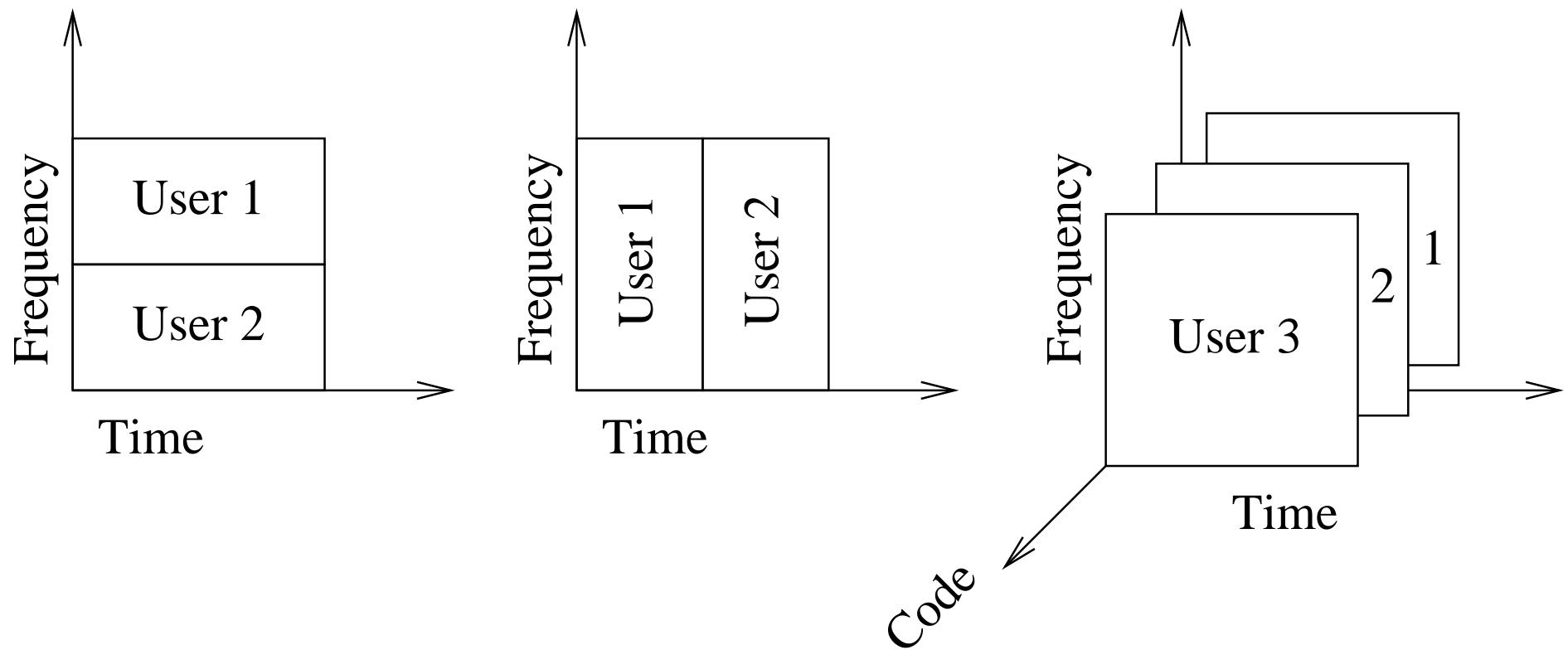


Non-Orthogonal Multiple Access for 5G and Beyond

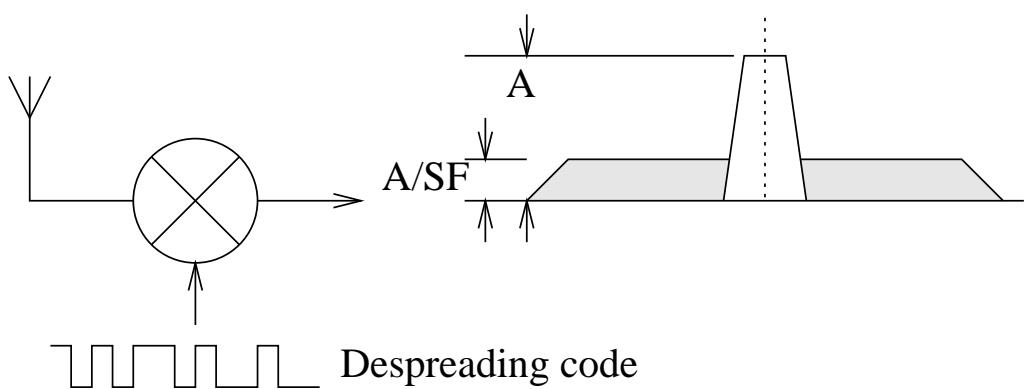
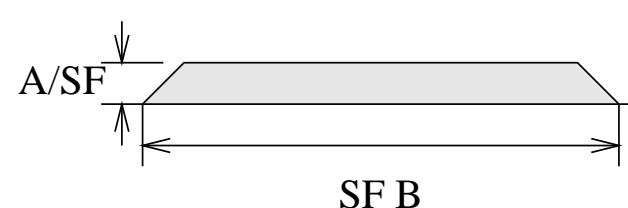
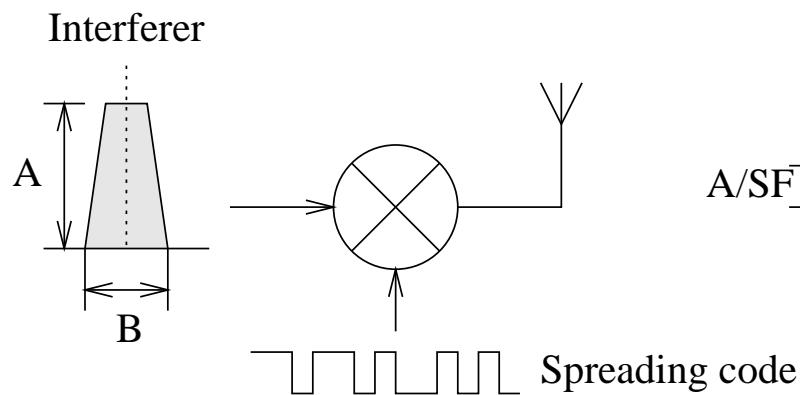
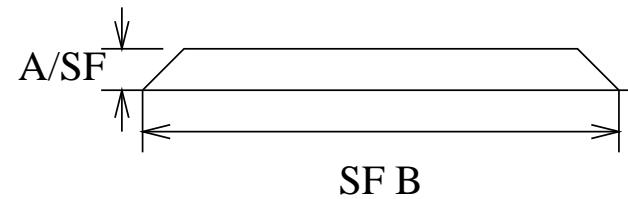
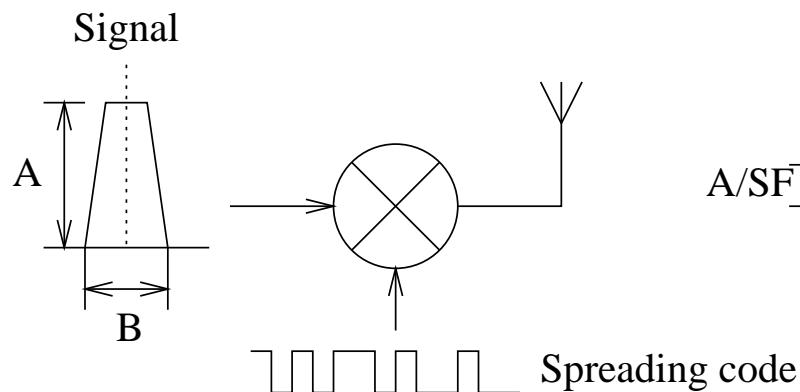
Proceedings of the IEEE, Dec. 2017

**by
Yuanwei Liu, Zhijin Qin, Maged Elkashlan,
Zhiguo Ding, Arumugam Nallanathan and
Lajos Hanzo**

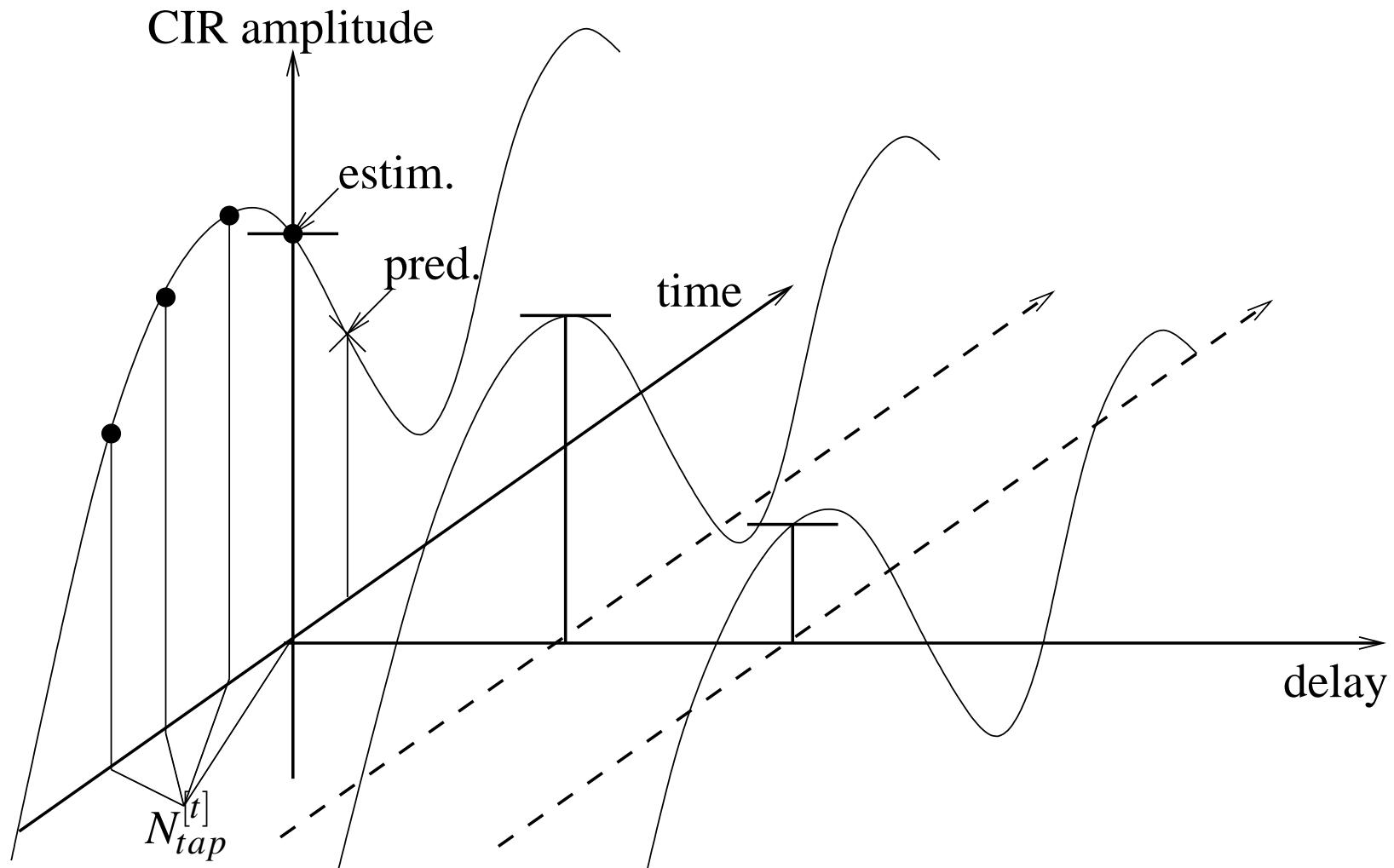
Orthogonal multiple access schemes: FDMA, TDMA and CDMA



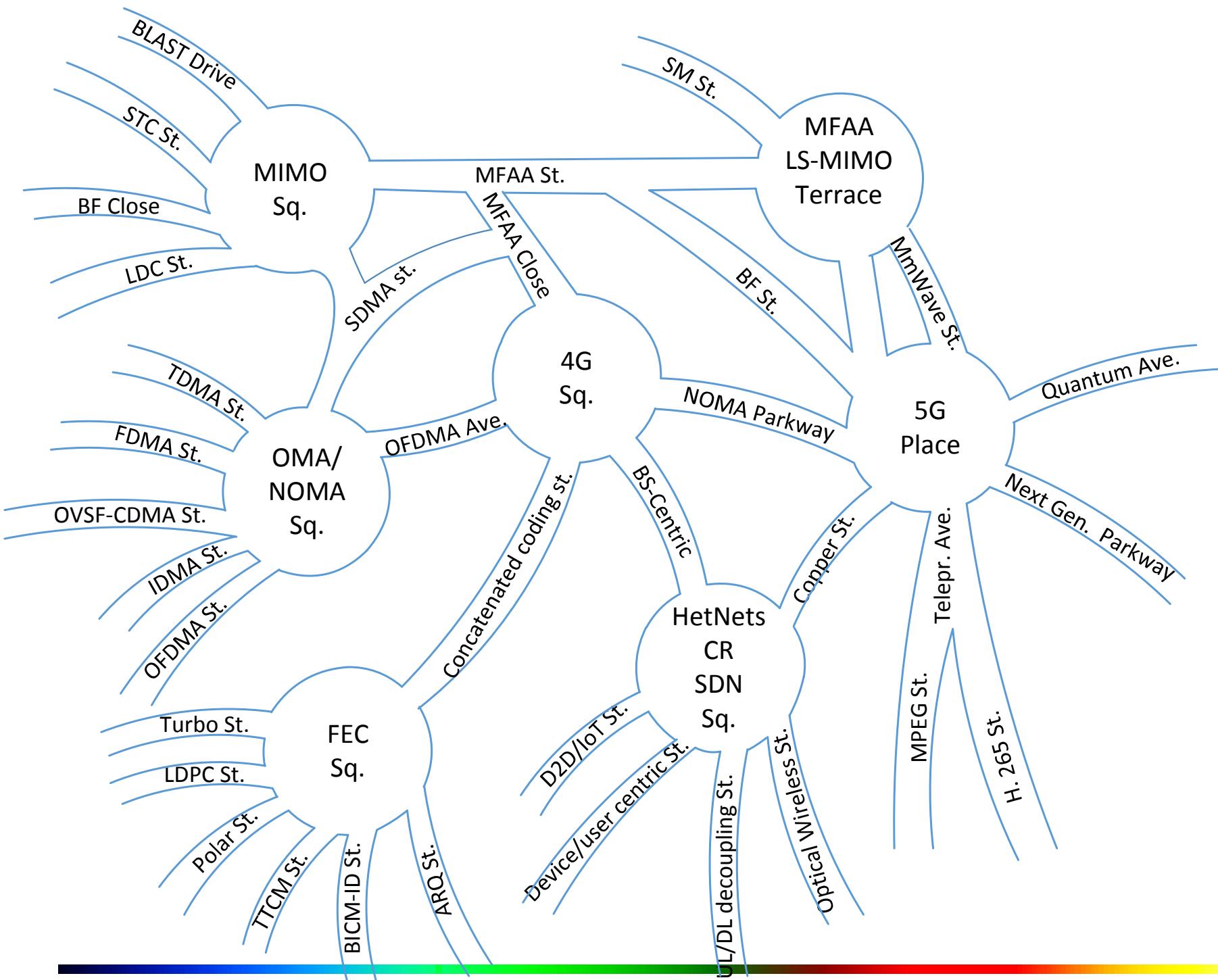
Intentional DS-CDMA Spreading



Unintentional Channel-Induced Spreading

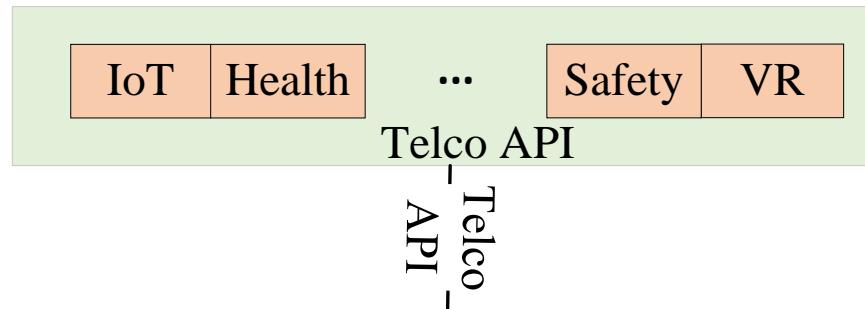


Evolution of Multiple Access & its Impact on Wireless Standardization



Next-generation network architecture.

Applications

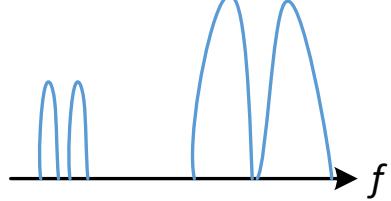


Virtualization

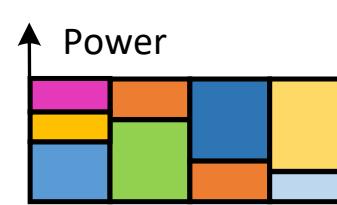
Software defined networking controller

Forwarding

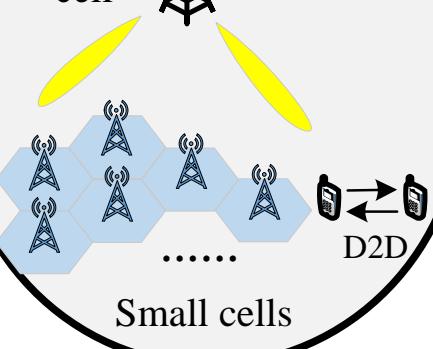
- Ultra Wideband (cmWave, mmWave)



- NOMA



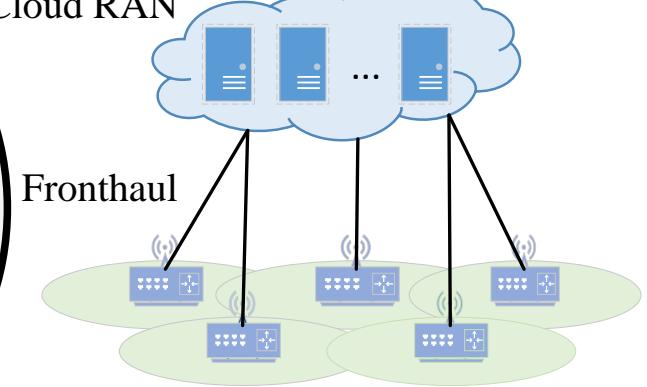
Macro cell
Massive MIMO



Telco API
API

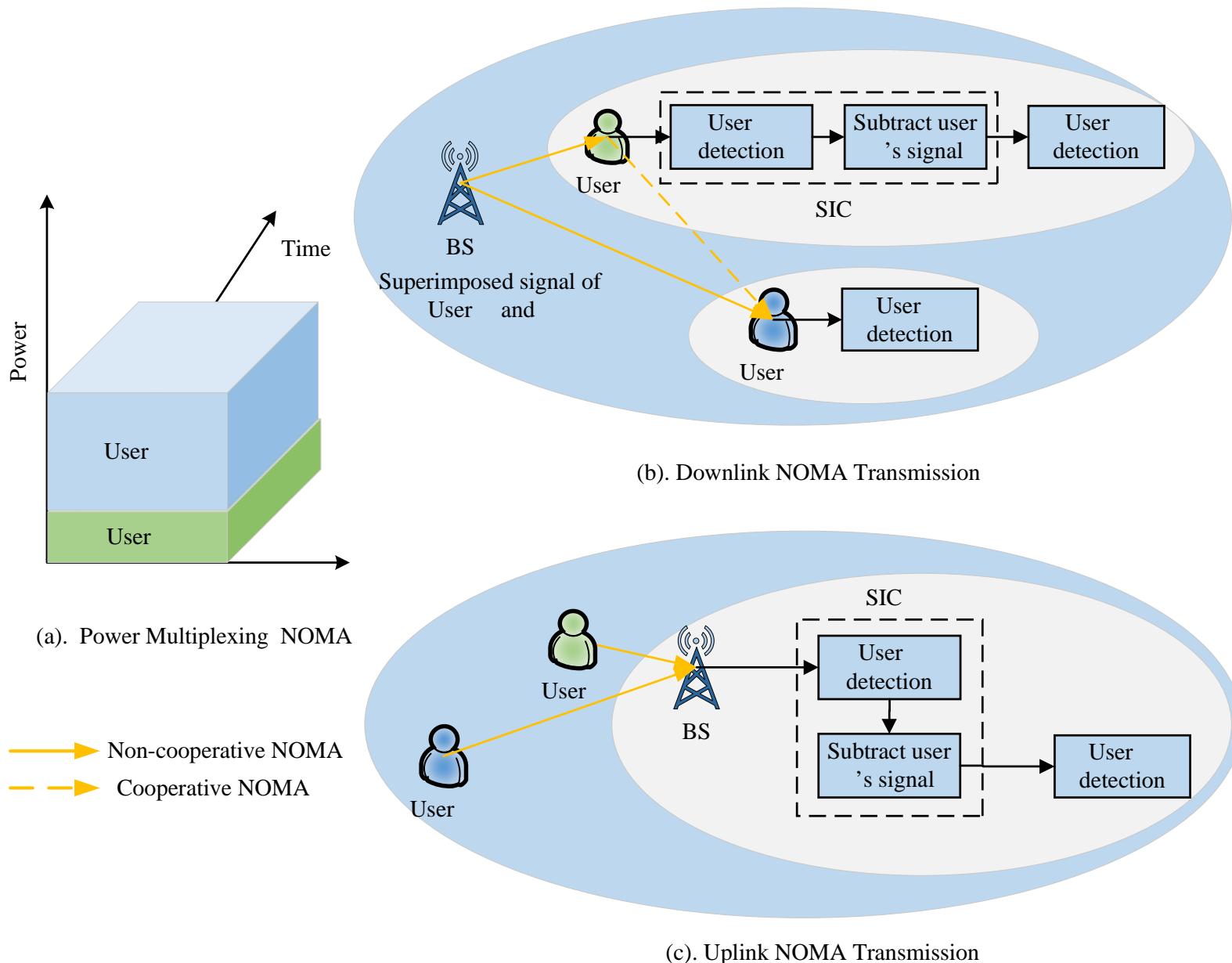
Software defined networking controller

Cloud RAN

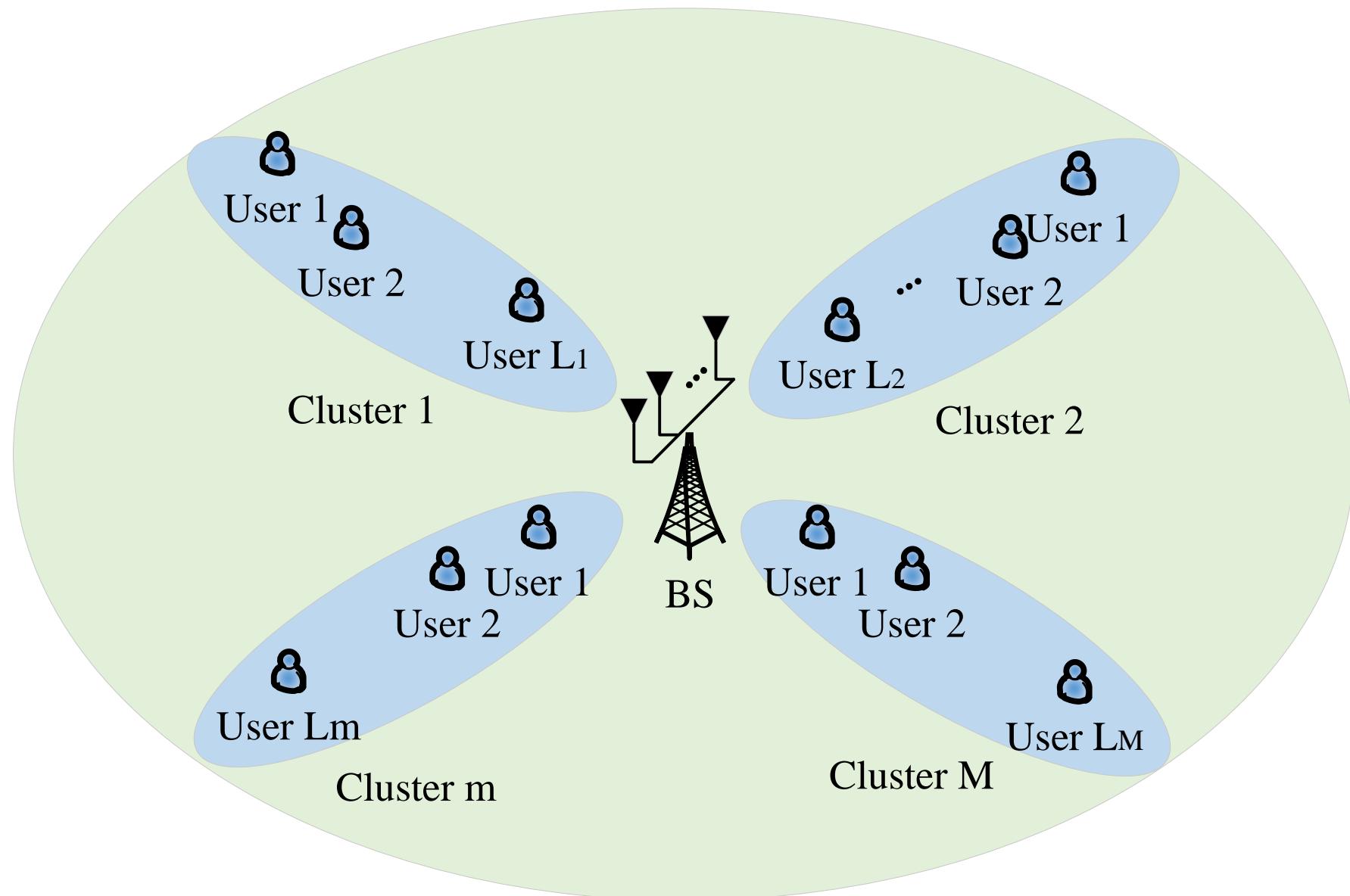


Radio access unit

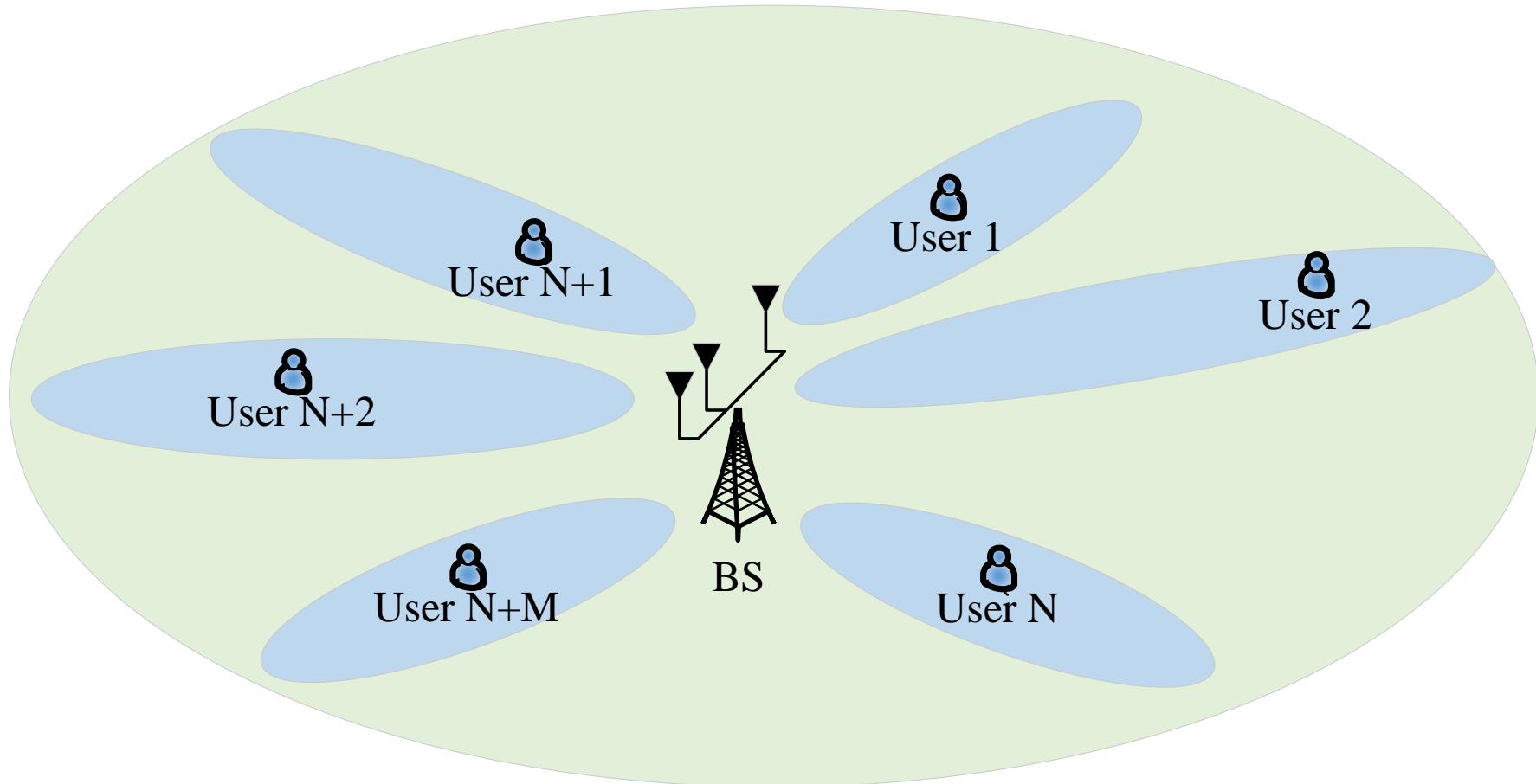
Power-Domain NOMA



Cluster-based MIMO-NOMA.



Beamformer-based MIMO-NOMA.



NOMA and massive MIMO based hybrid HetNets.

