

University of Kent – Broadband and Wireless Communications Research Group

Dr Nathan Gomes, Prof J Wang – 5G PPP information day, Paris, 28th April 2014

The **University of Kent** is a research-led university in Canterbury, Kent, UK.

The **Broadband and Wireless Communications** (BWC) Research Group consists of 9 academic staff, around 25 research students and staff, and approaching 20 visiting and honorary researchers.

The group has specific interests in:

- Fibre-wireless access, e.g. fibre transmission and fibre networking for 5G mobile and C-RAN (i.e. particularly fronthaul issues)
- Massive MIMO technologies for 5G
- Mm-wave beamforming (digital and analogue)
- D2D and MTC (to serve massive numbers of low-rate, short packet devices)

Fibre-wireless access idea: An Ethernet C-RAN

Requires adaptation modules:

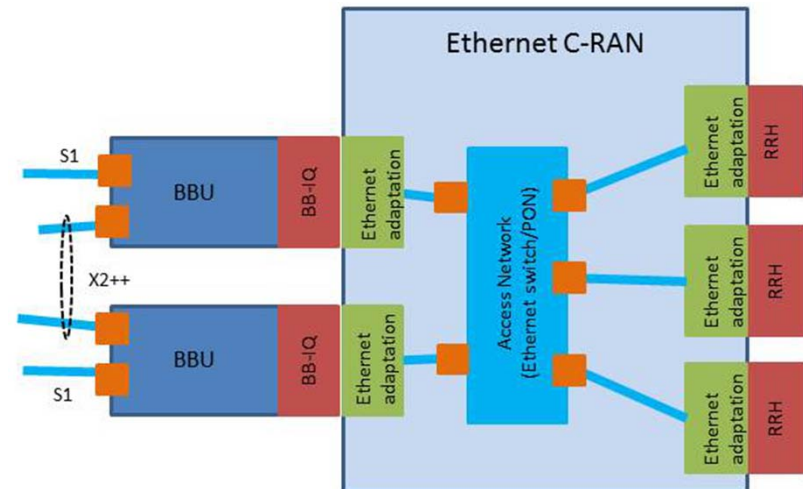
- Transport IQ samples with new profile
- CPRI/ORI adapted to Ethernet

Advantages:

Ethernet networking/virtual networking

Monitoring, support of SLAs

Low-cost, support of FMC, standardised, widely used...



Challenges:

Synchronisation, jitter, delay (SynchE, provision of IEEE 1588) – especially through switches

High bit-rates at cost commensurate with access networks

Alternative: Midhaul (different BBU-RRH partition) – loss of functionality (e.g. CoMP)?

D2D communication in 5G networks

D2D communication can share spectrum with the infrastructure mobile/wireless system, bringing some control back to operators. D2D based distributed caching can further overcome limited backhaul capacity by using the storage of mobile devices to cache content for the purpose of reuse.

Advantages are:

Improved spectral efficiency

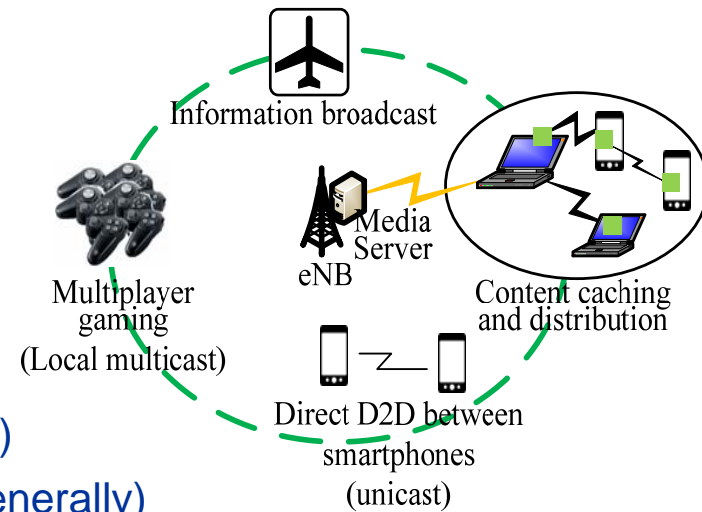
Reduced energy consumption

(for network and user devices)

Traffic offloading from infrastructure

(further improving spectral and energy efficiency)

Low data transmission delays for applications (generally)



Challenges are:

Signalling overhead – does it negate spectral/energy efficiency advantages?

Complexity for optimising performance; interference management

Achieving low latency radio access control due to signalling overhead