ECORAN

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Energy Efficient Cloudlets for ORAN (ECORAN)
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To build **energy efficient processing cells** using a new form of **cellular passive optical networks C-PON** for interconnecting servers that are used to implement CU, DU, RIC and customer data processing and storage. These cells are equipped with **ML algorithms** and **software** to **move processing** capabilities to where they are needed driven by customer density and demand by joining modular processing cells through access networks.

The development of new energy efficient network architectures, algorithms and hardware to address the needs of emerging ORAN applications and services is of particular importance currently in the communications field and the wider ICT industrial community as it **reduces OPEX** (**Energy**) and **CAPEX** (**number of servers needed**) and opens a door for research focusing on future **adaptive** high capacity wireless systems, in particular ORAN systems.

Our Impact on the market

- **C-PON can reduce Processing Energy OPEX by 82%.**
    - **Deployed in the UK it can save £103 million annually.**
    - **Deployed worldwide it can save £4.2 billion annually which is equivalent to eliminating the emissions due to all homes in a country the size of Greece or Belgium.**

- **C-PON can reduce Processing CAPEX by 43% compared to current network equipment.**
    - **Mobile Edge Computing spend $11bn by 2024, 52.9% annual growth ***
    - **Global data centre spend $208bn in 2020, 1.9% annual growth ****

- **Providing 100x faster inter-server communications unlocking up to 60x faster intensive computations.**

*https://www.juniperresearch.com/press/press-releases/mobile-edge-computing-spend-reach-11bn-2024
**https://www.gartner.com/en/newsroom/press-releases/2020-01-15-gartner-says-global-it-spending-to-reach-3point9-trillion-in-2020

How are we doing it?

Innovation: A key innovation in ECORAN is processing steering. The solutions introduced by ECORAN project reduce the power consumption of the commodity hardware used by introducing novel ways of interconnecting and manging servers, accelerators, storage and interfaces in small processing cells (cloudlets).

Disruption: Optical Interconnection Solution. Initial results show that the power consumption of the network interconnecting the servers can be reduced by around 82% and a similar reduction (around 85%) is observed in latency by eliminating the hierarchies of the switches that connect the servers in a spine and leaf architecture for example.

Platform: The C-PON interconnected servers and accelerators will realise and open high performance compute platform that can be used to implement different ORAN functions (CU, DU, RIC) and user edge processing.

Workshops/Events: We expect to exploit our leadership and participatory roles in IEEE initiatives, and in the academic community to organise events and journal special issues that bring researchers in these areas together.* We will organise special focussed sessions and workshops at two international conferences in this area (e.g. ICC/GLOBECOM, ECOC, OFC) enhancing the UK's leadership role in this area.

Standards: We will also contribute to standards where the PI is currently the chair of the IEEE Green ICT Standards committee and has successfully introduced 5 standards with a focus on energy efficiency: IEEE P1925.1, IEEE P1926.1, IEEE P1927.1, IEEE P1928.1, IEEE P1929.1.

Dissemination will be subject to the terms of the IP agreement.

Collaboration possibilities with ECORAN

Edge/Fog Network Operators: Vodafone, BT and Orange.

Manufacturers: Rolls Royce, Jaguar, Ford, Nissan and High Value Manufacturers Catapult.

Data Centre Operators: Google, Microsoft and Facebook.

Vendors: Xilinx, Lenovo, NEC and Nokia.