SUPERFLUIDITY

WHAT

Provisioning network functions and services on-the-fly, running them anywhere in the network, moving them transparently to different locations, and making them portable across multiple hardware platforms.

Benefits:
- **location-independence**: network services deployable in heterogeneous networks
- **time-independence**: near instantaneous deployment and migration of services
- **scale-independence**: transparent service scalability
- **hardware-independence**: development and deployment irrespective of the underlying hardware.

End results: A cloud-native 5G concept that will enable innovative use cases at the mobile edge, empower new business models, and reduce investments and operational costs.

WHY

To **tackle** crucial today's **shortcomings**:

The increase of world population and proliferation of new or improved applications and services that need network connectivity pose more and more **demanding requirements to networks**; but revenue growth for telecom operators is expected to halve from now to 2020.

Demand cannot be satisfied by simply increasing network capacity, especially in networks that are becoming always more diverse, dense, mobile and changing unpredictably.

Specific **technical issues**:

- long provisioning times
- wasteful over-positioning used to meet variable demand
- reliance on rigid and cost-ineffective hardware devices
- complexity, emerging from heterogeneity of traffic and sources, services and needs, and access technologies.

HOW

- **decomposition** of network components and services into elementary and reusable primitives
- native, converged **cloud-based architecture**
- **virtualization** of radio and network processing tasks
- **platform-independent abstractions**, permitting reuse of network functions across heterogeneous hardware platforms while catering to the vendors' need for closed platforms/implementations
- high performance **software optimizations** along with leveraging of **hardware accelerators**

WHERE

WHEN

March 2018

MAIN ACHIEVEMENTS:

1. Definition of the **architecture**, based on the concept of Reusable Functional Blocks (**RFB**s).
2. Pro-active monitoring and feedback allowing services to **react on demand**
3. Lightweight virtualization: **fast (milliseconds) boot times**, ultra-efficient packet processing in modular software routers
4. Modelling of network functions through semantic description allowing simulations and **verifications for increased security**
5. Prototype of a **Cloud-RAN** that is decomposed into RFBs. It includes front-haul and core
6. Prototype of a **Mobile Edge Computing (MEC)** that is decomposed into RFBs; it runs a video delivery application

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TWO TESTBEDS:

- **Nokia France** premises: a hardware and wireless platform allowing to demonstrate innovations (e.g. Cloud RAN, RFB decomposition,...) conducted in the project and made accessible to all partners
- **BT UK** premises: hardware platform consisting of 5 servers and a switch (made accessible to all partners) which allows flexible virtualisation experiments and demonstrations to be run by all partners

TWO DEMONSTRATIONS:

1) Rapid deployment/reconfiguration of a **software-defined wireless network** (C-RAN), integrated with Mobile Edge Computing, for efficient video delivery from the edge.

2) **Demand-driven orchestration** for 5G deployment

WHO

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