A NOvel Radio Multiservice adaptive network Architecture for 5G networks

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Consortium

- **Finland**
  - Nokia Networks
- **France**
  - Alcatel-Lucent, Orange
- **Germany**
  - Alcatel Lucent, Deutsch Telekom, Nokia Networks, Nomor Research, Technische Universität Kaiserslautern
- **Italy**
  - Azcom Technology
- **Spain**
  - ATOS, Telefonica, Univerdidad Carlos III de Madrid
- **UK**
  - King’s College London, NEC, Real Wireless

- **3 vendors**: ALU, NEC, Nokia Networks
- **3 operators**: Deutsche Telekom, Orange, Telefonica
- **1 IT company**: ATOS
- **3 SMEs**: Azcom Technology, Nomor Research, Real Wireless
- **3 Academia**: King’s College London, Technische Universität Kaiserslautern, Universidad Carlos III de Madrid
Motivation (1/2)

• Current and future 5G applications, e.g. e-health, public safety, public transportation, V2V, bring a lot of benefits to society; however they bring as well a lot of challenges to the network.

• Today architectures do not provide the required flexibility to cope with requirements from new 5G applications, like low latency and high reliability.

• 5G NORMA develops a conceptually novel, adaptive and future-proof 5G mobile network architecture.
  – the architecture is enabling unprecedented levels of network customisability, ensuring stringent performance, security, cost and energy requirements to be met;
  – as well as providing an API-driven architectural openness, fuelling economic growth through over-the-top innovation.
Motivation (2/2)

Technology disruption vs. installed

- Analog systems
- GSM
- WCDMA
- LTE
- New air interface, etc.
- New air interface, MIMO, etc.

Track to 5G

- Fast and smooth evolution path
- Edge cloud capabilities, API-driven architecture, etc.

Development
Research

5G NORMA: 5G NOvel Radio Multiservice adaptive network Architecture
The “5” Innovations (1/2)

Controller

Software Defined mobile Network Control (SDNC) applies SDN principles to mobile network functions

5G NORMA architecture

Edge Cloud

Network Cloud

Joint optimization of mobile access and core network functions when located together in the network or edge cloud

Adaptive (de)composition and allocation of mobile network functions (c-plane and u-plane) between network and edge cloud that depends on the service and deployment

5G NORMA: 5G NOvel Radio Multiservice adaptive network Architecture
The “5” Innovations (2/2)

- Mobile Network Multi-tenancy to support on-demand allocation of RAN and CN resources in a fully multi-tenant environment
- Multi-service- and context-aware adaptation of network functions to support a variety of services and corresponding QoE/QoS requirements

5G NORMA: 5G NOvel Radio Multiservice adaptive network Architecture
Demonstrators

- **SW Demo (Nomor)**
  - Adaptive allocation of functions

- **PoC demo 1 (Azcom+ATOS)**
  - Adaptive allocation of functionalities

- **PoC demo 2 (Azcom+IMDEA +ATOS)**
  - Tailored mobility

- **Testbed (IMDEA+ATOS)**
  - QoE tailored mobility based on flow and service request

5G NORMA: 5G NOvel Radio Multiservice adaptive network Architecture
Socio-economic analysis

- Analysis of the **benefits of 5G NORMA innovations** to determine the value both to the wireless industry and to the users in society
- Analysis of the **business impact** of candidate mobile network concepts under discussion for 5G by translating technical KPIs to business KPIs of relevance to each sector, such as cost efficiency, return on investment, reduction in service creation time, etc