Towards 5G validation trials:
Innovation potential & applications outlook

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INFOCOM WORLD CONFERENCE 2018

67%
international
activities

19
countries with
local presence

1,722
employees
worldwide

A global telecommunication systems and solutions vendor with extensive know-how and a proven track record.

70
countries we
export to

3
R&D
centers

40
years of
experience

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Core Offerings

Wireless Access & Transmission

Intracom Telecom products employ the most advanced field-proven technologies achieving and exceeding the level of performance required by the modern applications for wireless access and backhaul.

Telco Software Solutions

Intracom Telecom has been building and enriching a wide portfolio of advanced telco software solutions, enabling Operators to generate new revenues and boost their Customers' Experience.

ICT Services & Smart City Solutions

Intracom Telecom strategically focuses on the delivery and operation of top-notch services for converged networking and cloud computing solutions. The company also offers a range or Smart City solutions.

Energy Solutions

Intracom Telecom designs, installs and commissions energy-related systems, providing Smart Grids and Energy Management solutions.

Markets Served

Telecom Operators

Utility Companies

Large Enterprises

Healthcare Institutions

Public Authorities

5G Related Products & Services

Wireless Front-/Back-haul

➤ 1–10 Gbps

➤ PtP / PtMP

➤ SDR & SDN-enabled

➤ Ethernet / CPRI for Backhaul / Fronthaul

✓ *Multiple deployments around the globe*

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WiBAS OSDR   **STREETNODE**

NFV Accelerator Platform

➤ Performance & Energy aware placement

  ✓ 14-30% Power   ✓ 30-60% Data Rate

➤ Non-disruptive tenant collocation

➤ Adaptive SLA-guided NS optimization

➤ Automated HW / SW & workload profiling

NFV-ready Virtualized Wi-Fi

➤ Multi-access Edge Computing

➤ End-to-end Slicing & Multi-tenancy

➤ Accelerated Service Deployment

➤ SFC support ▸ Rich VNF Library

✓ *Completed pilot tests for MGTS (CIS)*

Media Distribution

➤ Live TV / VoD / multi-play services

➤ Full-fledged: encryption, transcoding, distribution & reception of content –Virtualized components

➤ Web, Smart TV/Phone, Tablet Interfaces

✓ *Multiple deployments e.g., USA*

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Content Distribution Network

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5G Research Activities

Network & Service Management

➢ Softwarization of WindPark Networks

➢ Cross-domain Slicing & KPI monitoring

➢ Optimized cross-slice communication

➢ MEC orchestration

➢ IoT Slicing

Advanced Wireless Network Infrastructure

➢ SDN / SDR Wireless Backhaul

➢ Transport Network Slicing

➢ RoF-based Fronthaul

➢ mmWave Beamforming

➢ Terahertz Communications

H2020 / 5G PPP Projects

Phase 1 *Phase 2 / B5G* *Phase 3*

Standardization
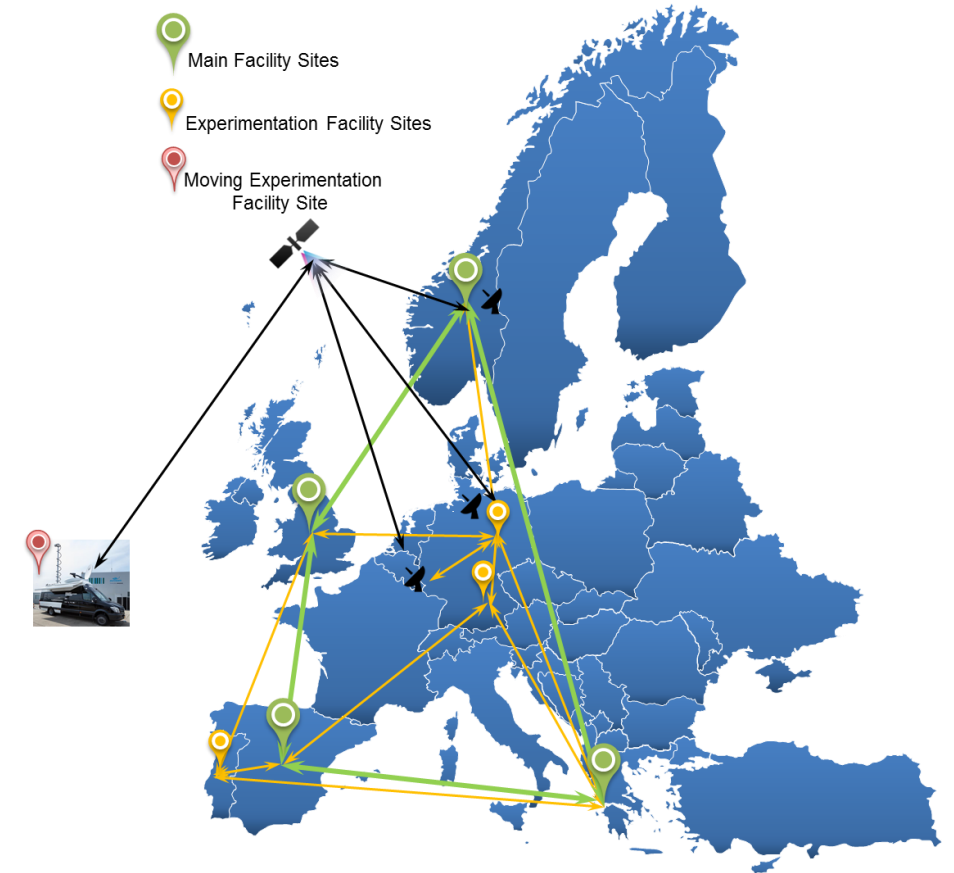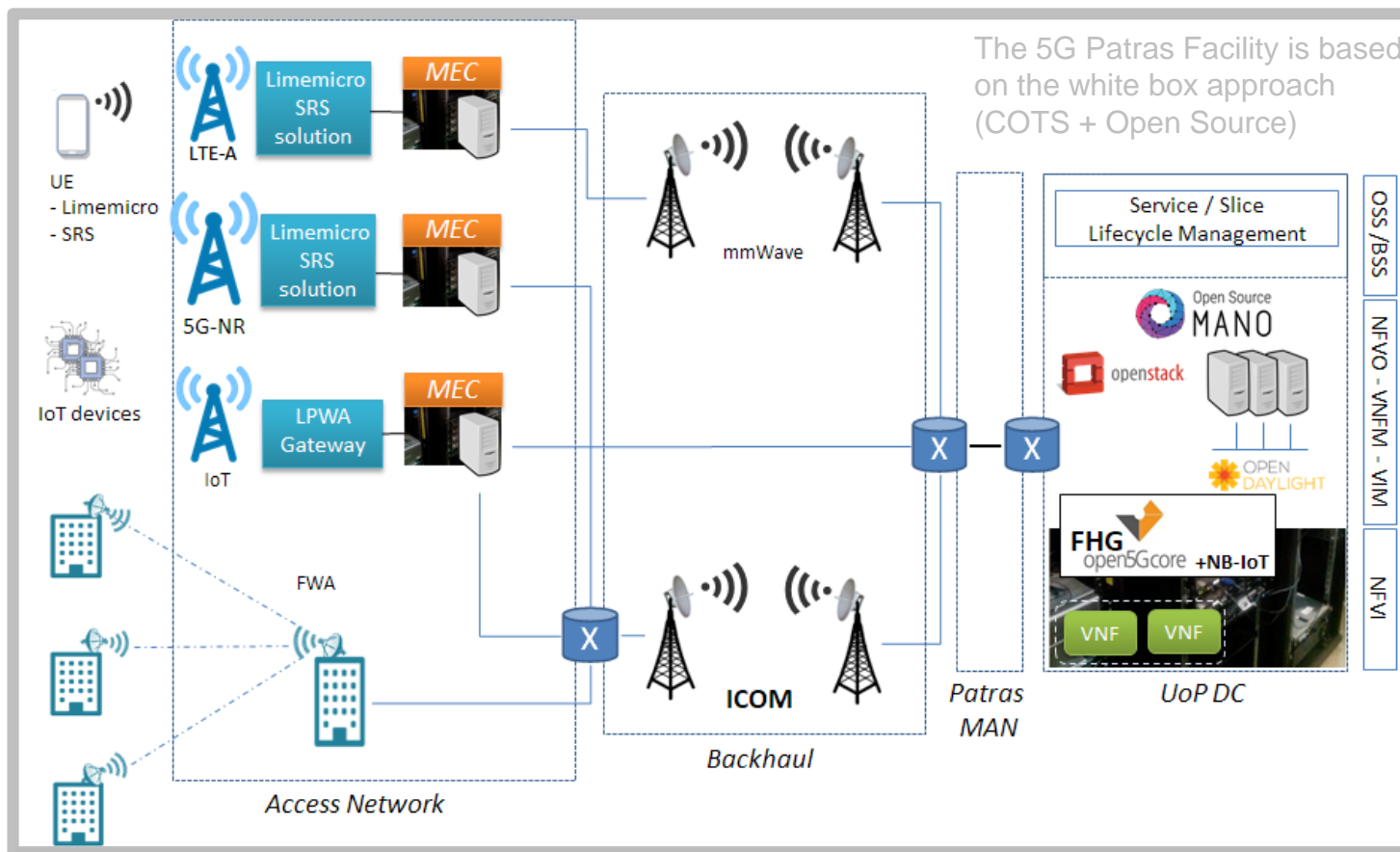

NFV & MEC ISGs

Technologies / Frameworks

5G PPP Phase 3: 5G-VINNI

- **Main Facility sites**: E2E 5G-VINNI facility that offers services to ICT-18-19-22 projects with well-defined Service Level Agreements.

  - Norway (Oslo, Kongsberg)

  - UK (Martlesham)

  - Spain (Madrid)

  - Greece (Patras)

- **Experimentation Facility sites**: provide environments for advanced focused experimentation and testing possibilities on elements and combinations of elements of the E2E model.

  - Portugal (Aveiro)

  - Germany (Berlin)

  - Germany (Munich)

- **Moving Experimentation Facility site**: satellite connected vehicle.

Main Facility Sites

Experimentation Facility Sites

Moving Experimentation Facility Site

5G-VINNI

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Wireless Backhauling

Challenges

▶ Realize 5G roll-out, supporting densification at low deployment costs

▶ Support for high throughput, low latency 5G use cases (enhanced Mobile Broadband (eMBB), Ultra-Reliable and Low-Latency Communications (URLLC))
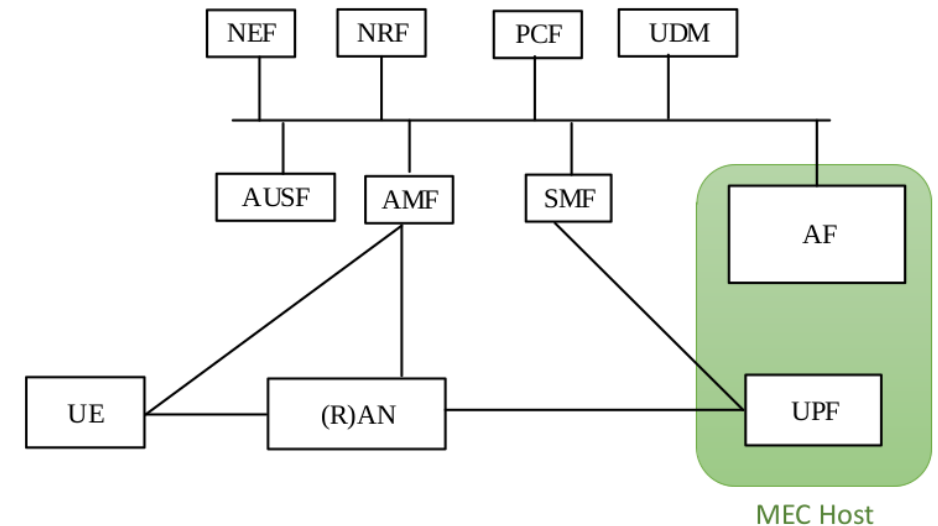
Contributions

▶ Provide mmWave backhaul and Fixed Wireless Access (FWA) solutions

- **UltraLink™-GX80** mmWave PtP Ethernet radio @ 70/80 GHz (E-Band), providing a 10 Gbps backhaul capacity, to interconnect the g/eNBs with the core network and the data centre at the Uni. of Patras

- **WiBAS™ G5** FWA solution (112MHz channel, 1Gbps to subscriber), providing broadband access to public organizations' sites (e.g. University Campus, City Hall, etc.)

▶ Add support for **SDN-based network slicing** to the wireless backhaul and FWA

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Multi-access Edge Computing (MEC)

Challenge

- Integrate MEC with 5G system architecture

- Develop and integrate appropriate KPI tools / methods

Contributions

- Baseline **service orchestration - MANO**

  - Application lifecycle management

  - DNS and traffic flow management

- **Mobility support** mechanisms

  - Location Service for mobility management events

  - Application context transfer interfaces

  - User redirection: network/application level

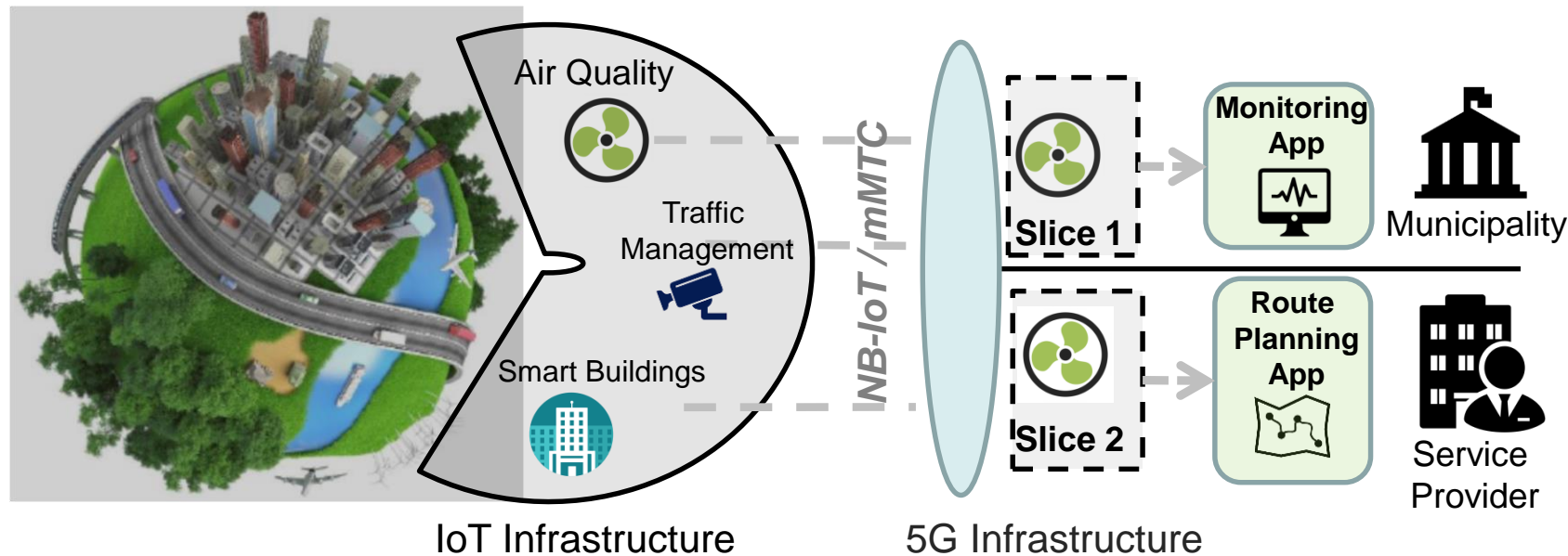- KPI assessment tools for mobile video streaming, AR/VR applications

An example of MEC mapping with 5G system architecture

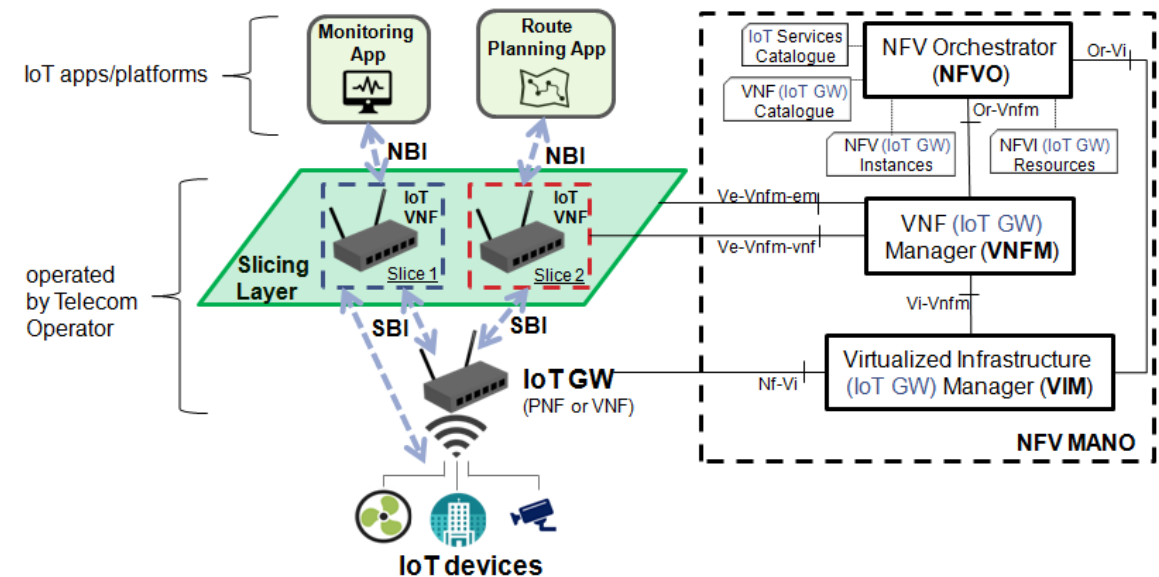*Source: ETSI White Paper No. 24 MEC Deployments in 4G and Evolution Towards 5G, ISBN No. 979-10-92620-18-4*
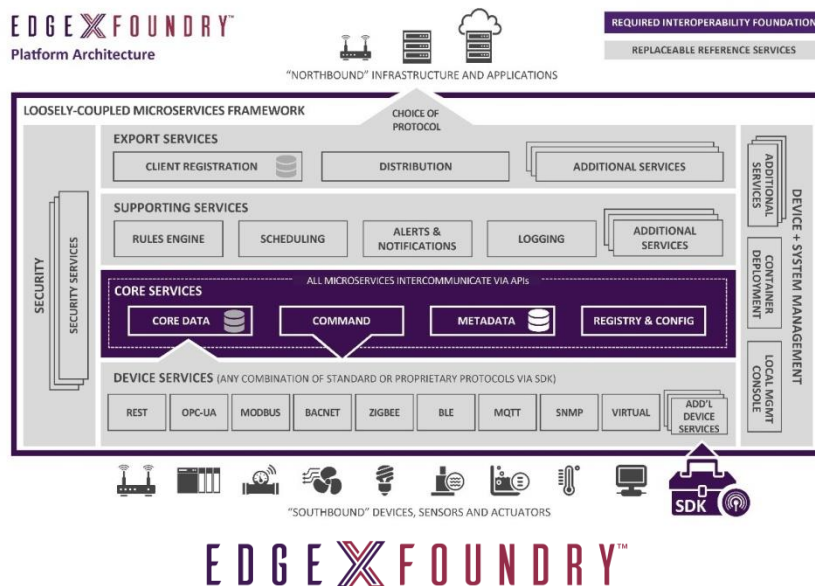
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IoT Slicing

Challenge

▶ Enable IoT infrastructure sharing - Focus on Smart City / Infrastructure environments

  • New market opportunities for IoT infrastructure providers

▶ Extending 5G infrastructure slicing model to the IoT domain

  • Synergy between 5G operators and IoT infrastructure owners

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IoT Slicing

Contribution

- Design and implementation of a **Virtualized IoT Infrastructure Management** component

  - Equivalent to an **IoT Gateway Hypervisor**

  - Resource allocation, scheduling, conflict resolution, etc.

- Integration within **5G-VINNI MANO**

- Flexible architecture based on **micro-services**

Towards Vertical Trials

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Infrastructure support

- Wireless backhauling for facility extensions
- MEC orchestration – KPI tools
- IoT Slicing: multiple verticals/applications sharing IoT infrastructure

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Enhanced Video Streaming Services / vCDN - eMBB

- High resolution and/or VR/360 video streaming
- User Generated Content / Personalization / multi-party streaming / social networking
- AR and Video Analytics application support: streaming / MEC infrastructure

fs|cdn Content Distribution Network

Multiple Vertical domains

- **Media & Entertainment**: large event coverage (sports, festivals, *etc.*)

- **PPDR**: first responders video sharing
  drone-based surveillance / coordination
  crowd-management, etc.

- **Smart X-culture:** precision agriculture/fish farming, field monitoring

- **eHealth:** ambulance support/remote
  expert guidance, *etc.*

- **Automotive:** see-through overtaking
  infotainment, *etc.*

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Massive UHQ/360 Live Video Distribution

▶ Multi-source, multi-viewer support

- ✓ MEC-based Pub/sub, Adaptive HTTP Streaming

▶ Live **+** 4K/8K **+** 360^0

- ✓ eMBB (up to 1Gbps)

- ✓ URLLC: *motion-to-photon* latency (5-17ms)

- ✓ *Field-of-view* optimizations

➢ Massive event coverage (Media & Entertainment)

➢ Situational awareness (PPDR, Infrastructure monitoring)

▶ **Precision Spraying**: Spraying decision per plant – Space out , Weed eradication

- • Real-time Video analytics and spraying decision/actuation - CPS
- ✓ MEC, eMBB, URLLC

▶ **Remote Disease Diagnosis**

- • Real-time Video analytics – diagnosis – AR interface
- ✓ MEC, eMBB, URLLC

▶ **Drone Based Monitoring**

- • Mission-planning & remote control
- • Rich video feed & comparison against Satellite
- ✓ MEC, eMBB, URLLC

thank
you

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