MICRO OPERATORS FOR VERTICAL SPECIFIC SERVICE DELIVERY IN 5G

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CWC CENTRE FOR WIRELESS COMMUNICATIONS
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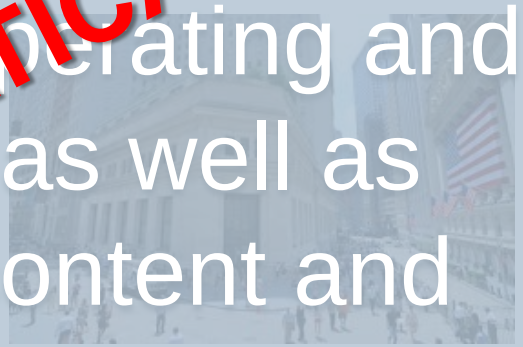
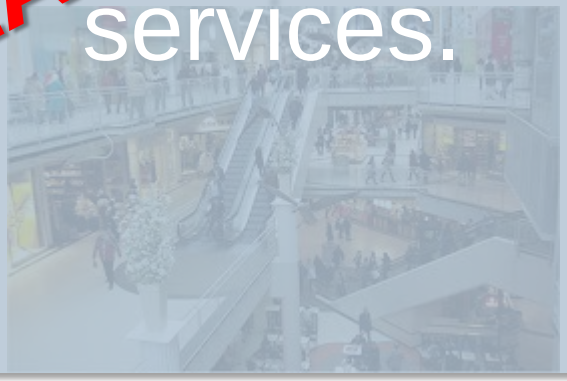
Content, Context & Insentives






The owner of the space must have a role and insentive in building, operating and maintaining the network as well as creating context related content and services.

THE ROLE OF LOCAL CONNECTIVITY WILL INCREASE DRAMATICALLY

How Operator Roles May Change?

- Spectrum **regulation** is going towards shared spectrum.
- **Wide coverage** area technically challenging for high datarates (>1Gbps).
- **Spectrum crunch** is efficiently tackled via densification.
- With **Small cell** technologies networks will be build mainly to indoor environments.
- Who has **incentive to invest** in NW infrastructure, operate and maintain the network as well as provide context related services?
- Emergence of new local **micro operators**?

Micro Operator - uO

- A virtual operator does not have own infrastructure but has own customer base.
- A micro operator (uO) has own infrastructure but not necessarily own customer base.
  - In public areas micro roaming is needed to grant access to all possible users.
  - In private areas, the owner of the space dictates who has access.
- Revenue models for uOs are not based on monthly fees of bytes.
  - Part of property offering – inclusion to rent
  - Part of customer service model
  - Improving the efficiency of public services
- Possible only via changes in regulation (both spectrum and telecom regulation in general).

Challenge Finland Tekes

A national project with Finnish industry, operators, Ministry of Transport and Telecommunications and Academia to study the bottlenecks and key enablers for uO business models.

Technical building blocks:
-Dense small cell networks
-Network virtualization
-Mobile edge computing
-Operation in higher carrier frequencies
-Spectrum sharing and management techniques

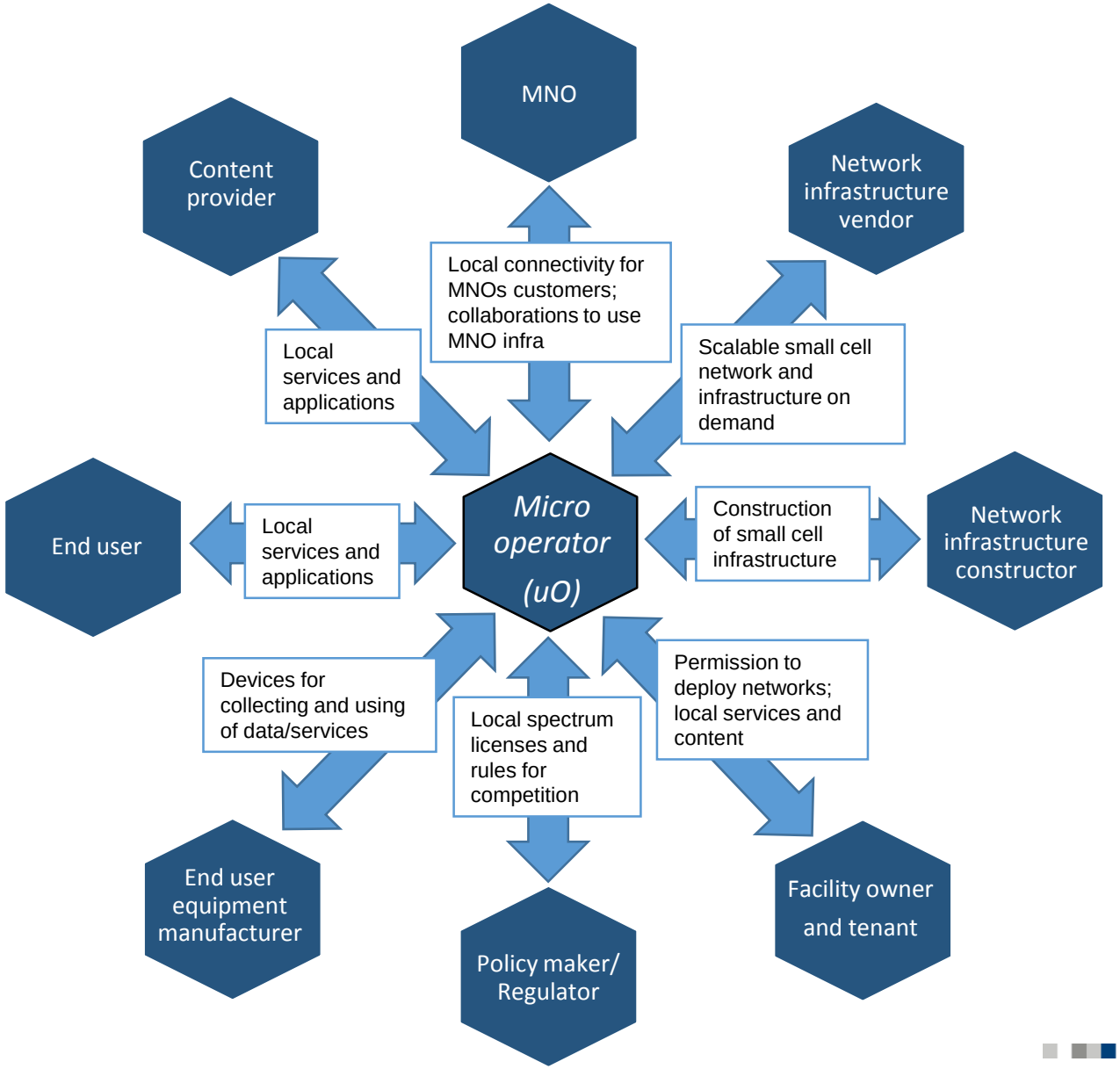
uO concept:

uOs build and operate indoor small cell networks and offer local context related services and content

Business models

Regulatory building blocks:
-Availability of 5G spectrum
-Local micro licenses
-Rights to build indoor networks
-Rules for collection and use of data
-Collaboration/ competition rules with MNOs

STAKEHOLDERS



STAKEHOLDERS

Business environment change

General services for masses

Technology / regulation change

Transparent / Shared

Closed / Controlled / Isolated

Special requirement services

Wholesale services

- Venues: Shopping malls, Campuses, Mass event arenas

- Offering: uO provides local connectivity to MNOs' customers on-demand

Retail services

- Venues: Hotels, Offices

- Offering: uO provides on-demand connectivity and content locally to facility owners/tenants

Micro operator (uO)

Context-defined services

- Venues: Personalized consumer services, vehicular networks

- Offering: uO provides specific personalized content and context services to end-users on-demand

Vertically defined services

- Venues: Manufacturing sites, Smart grids, Hospitals

- Offering: uO provides tailored on-demand services to facility tenants' end-users and systems

Oulu 5G Network for uO Piloting

Project Part-Financed by the European Union

European Regional Development Fund

Nationally funded (Tekes 5th Gear) research trial project

Network operation by VTT and University of Oulu, Nokia radio and core network products

Campus area, includes private network (VTT) and public network (University)

State-of-art LTE	5G Proof of Concepts		Step-by-step towards commercial 5G		
2015	2016	2017	2018	2019	2020
LTE-M live network performance tests	5G vs. LTE air interface and e2e performance		New 5G technologies, use cases, applications and business models		

Tekes

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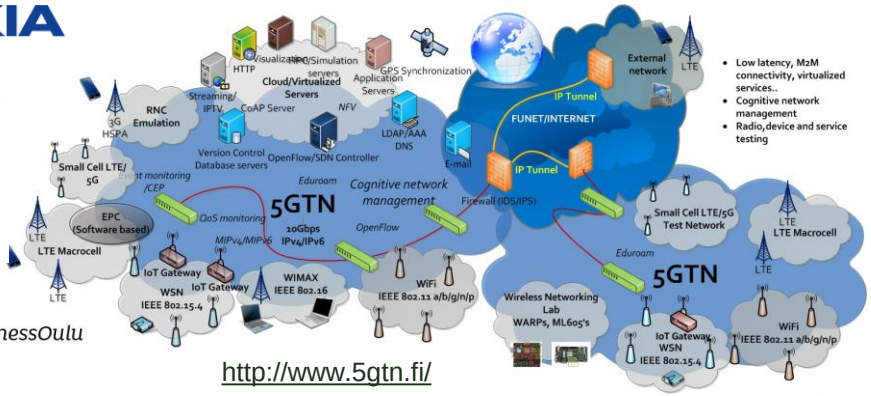


http://www.5gtn.fi/

Oulu 5G Test Network Offerings

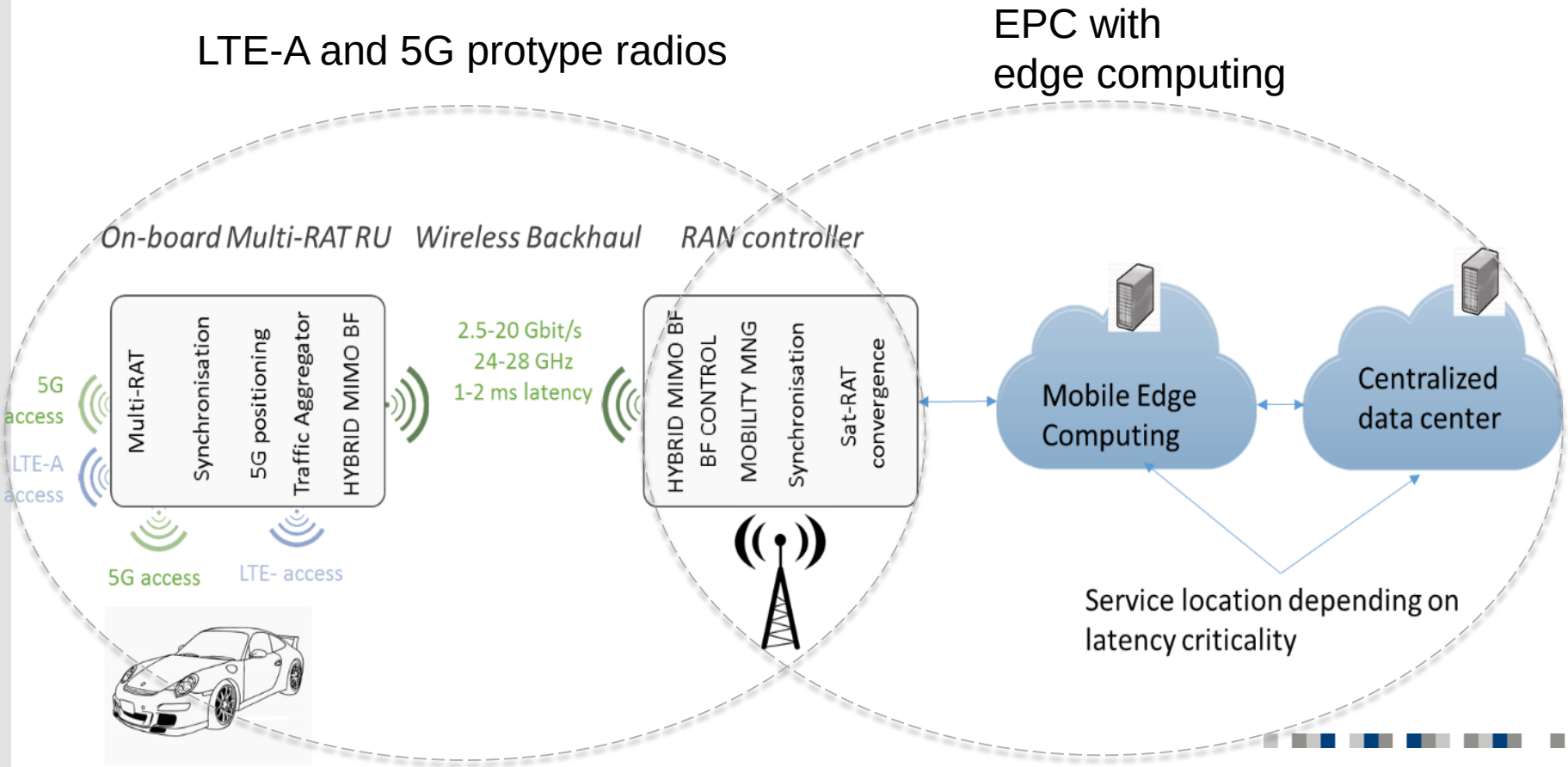
Project Part-Financed by the European Union
European Regional Development Fund

- Real-life Lab for testing 5G portfolio, New Services, Applications and Business Models
- Current status
  - Outdoor & indoor coverage built @2.6GHz and 3.5GHz (outdoor coming soon).
  - Pre-commercial 5G radio with adaptive beamformer @28GHz by early 2017.
  - Commercial EPC for 100k users under installation.
  - Several Mobile Edge Computing servers already installed
  - IoT extension with ~1000 nodes completed during 2017.
  - 100 testphones currently; target to offer SIM for students and personnel to enable testing with 15-20000 users at the campus area

A real operator grade 5G test network

Oulu 5G Test Network used in PyeongChang 2018

"The first 5G system PoC in conjunction with the PeyongChang winter Olympics"
http://www.5g-champion.eu/



The first live demos for uO concept are planned to given at:

EUCNC 2017 June 12-15

European Conference on Networks and Communications | Oulu, Finland

5G: European Roadmap, Global Impact

European Commission Tekes

12 - 15 June 2017

www.eucnc.eu

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EuCNC 2017 is the 26th edition of a successful series of technical conferences in the field of telecommunications, sponsored by the European Commission. The event will be organised in Oulu, Finland. It targets to bring together researchers from all over the world to present the latest research results, being one of the main venues for showcasing, demonstrating and trialling the results