LuxTurrim5G and Neutral Host Pilot

5G Momentum Älykaupungit verkostotapahtuma Juha Salmelin, Nokia







Nokia Bell Labs driven Business Finland Consortium Project

"Smart 5G small cell street pole infrastructure for digital service ecosystem in future urban city environments"

18Me Business Finland funded project, 28month, started 2/2017























Smart cities require fast communication networks

Smart cities require a new service infrastructure and a truly digital ecosystem enabling:

- Development of smart city services
- High data capacity for citizens
- New service and business opportunities for companies
- Big Data for local use of city, citizens and companies
- Sustainable growth
- To meet UN SDG's
- To keep the privacy

Need

Our modern society and growing cities face great **challenges** nowadays, e.g. to improve :

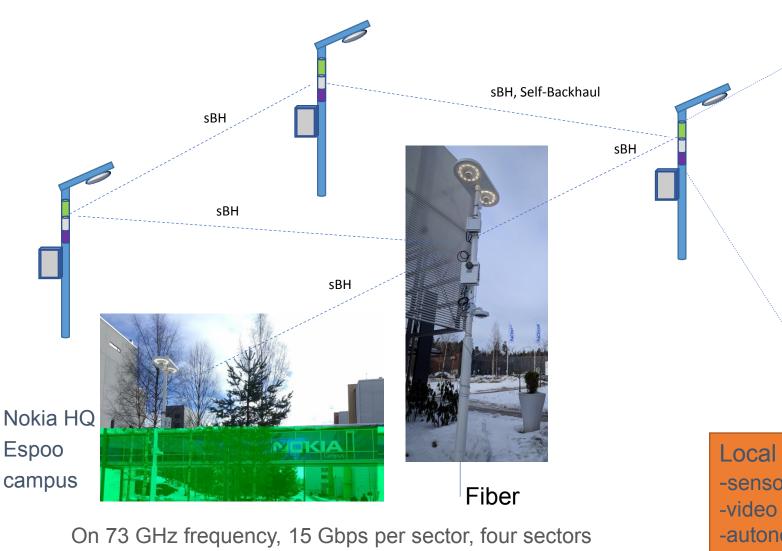
- safety
- energy efficiency
- air quality
- effectivity of transportation
- · general quality of living



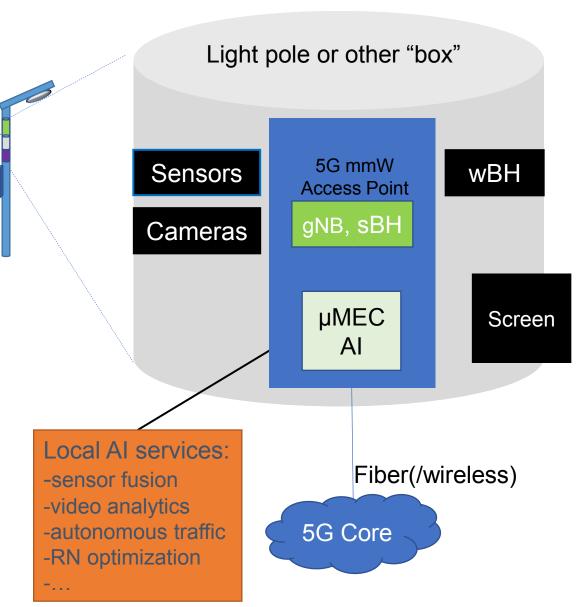
Digital Smart City: LuxTurrim5G

5G mmW access points in every light pole

5G Base station with sensors, cameras, sBH,...

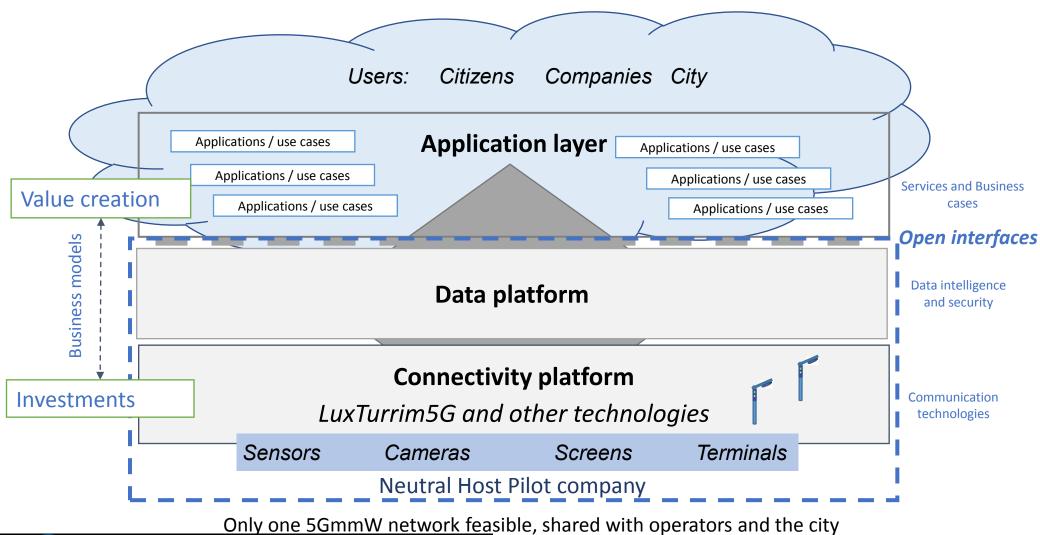


On 26 GHz frequency, 5 Gbps per sector, four sectors



Neutral Host Pilot - Approach

City wide network (Metropolitan Area Network, MAN)



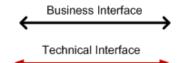


City 5G Network - Example -

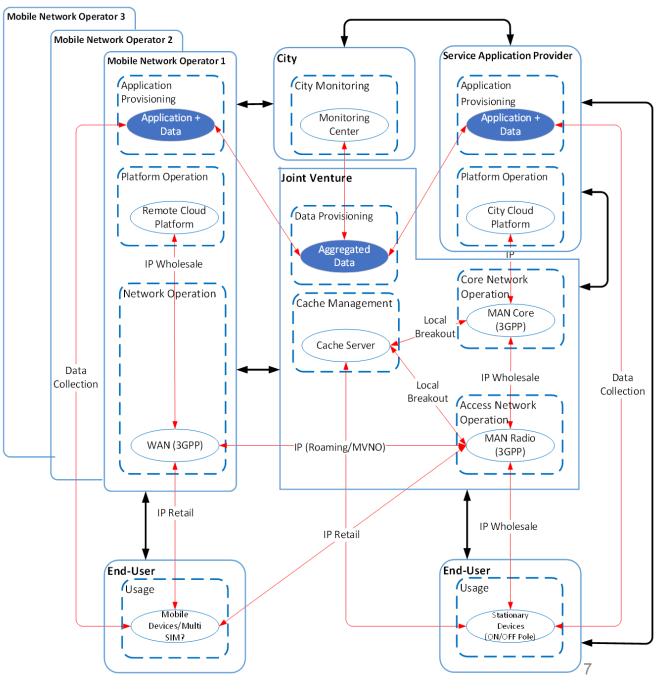
Joint MNO driven Value Network Configuration (VNC)

In case of 5G MAN driven by MNO joint venture:

- Also cooperation in roaming?
- Also cooperation in data part?







Results

VNC 's Comparison Table

			<u>avic</u>					
5G MAN OWNER	Main Asset	WAN-MAN Relation	City data Synergies	Cloud Competence	3GPP Competence	Global Scalability	Regulatory Concerns	5G MAN Investment Capability
Single MNO driven VNC	WAN	Cooperation	Low	High	High	Medium	National MNO asymmetry	Medium
Joint MNO							''anal	⊔iσh
FNO driven VNC	Fiber infra	Cooperation and/or competition		Low	Low	Low	Local monopoly	Medium
Power Company driven VNC	Power infra, digging sync	Cooperation and/or competition		Low	Low	Low	Local monopoly	Medium
Cloud (International) driven VNC	Data platform	Competition		Very high	Low	High	National autonomy	Medium



High visibility

Kauppalehti =

<u>UUTISET</u> PÖRSSI YRITYKSET JOHTAMINEN OPTIO TOIMITILAT

UUTISET SUPERGRAAFIT **PUHEENVUOROT**

KUMPPANIBLOGIT

√√₩LuxTurrim 5G

www.luxturrim5G.com

"Perinteisiä bensiini- ja

pitkään aikaan mikään."

ILMASTONMUUTOS | Tero Lehto 0 1.9.2018 klo 09:30

Myrskyt, kuivuus, hurrikaanit ja taifuunit kieputtavat rahaa - Sään ääri-ilmiöt luovat bisnestä

TURVALLISUUS Matti Keränen @ 23.11.2018 klo 13:41

tekniikka talous

5g-bussipysäkki turvaa levotonta lähiötä -Kuvaa videota suoraan valvojille, jotka voivat kutsua poliisin



Tästäkö alkaa vallankumous? - Verl Nokialla suunnitelmat rakentaa ensimmäiset 32 kilometriä 5g-tietä Suomeen, ensimmäiset robottiauto iikenteeseen



Tukiasemat 5g-verkot rakentuisivat valaisinnylväiden varaar

Valaisinpylväs verkottaa

kaupunkiverkoissa operaattorit käyttävät yhteisiä tukiasemia

"Kaupalliset tuotetavoitteet on asetettu



Kunnat yllättyivät: nopea 5g vaatii ison ponnistuksen ja lakimuutoksia - ja valokuituyhteydet katulamppuihin

13.11.2018 07:00 TEKNIIKKA ASUMINEN DIGITALOUS VERKOT PALVELUT



Indagon kehittää älyliikenteen digityökaluja

INDAGON.

Senttien tarkkuudella. Matti Lankisen Indagonin testilabra-autolla on testattu automaattiajamista Muoniossa. Auto löytää paikkansa tiellä senttien tarkkuudella. KUVA: PETTERI PAALASMAA

Nokia-taustaisella yhtiöllä on käynnissä kolme isoa älyliikenteen digihanketta.

Liikenne digitalisoituu nyt vauhdilla. Esimerkiksi ajoneuvojen välinen, ajoneuvon ja kuljettajan välinen ja avoneuvojen ja liikenneväylien välinen tiedonsiirto ja -vaihto kehittyvät nopeasti.

"Logistiikka on viimeisiä alueita, joita on alettu digitalisoida", sanoo huipputarkan gps-paikannuksen ja tiedonsiirron laite- ja palvelutoimittaja Indagonin toimitusjohtaja Matti Lankinen.

Business Model Innovations for 5G deployment in Smart Cities

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Abstract: The amount of users and new digital services planned in the future Abstract: The annount of users and new digital services planned in the future of Smart Cities could not be served with the existing opacity of mobile networks. The development of new communication systems, such as \$G\$, will be thus acting as enablers of new kind of services and applications with advanced requirements especially in terms of latency, resilience, goygrage and bandwidth Despite successful Smart City ministrues remoth the workfu there is a need for a business model innovations' in the implementation of \$G\$ infrastructure valsely in the future. Organize project, LuxfurmaC₀, will solve the future Conjung project, LuxfurmaC₀, will solve the supplementation of \$G\$ in the future of the supplementation of \$G\$ in the supplementation of critical challenges by developing and demonstrating concrete technical solutions for smart light pole based 5G infrastructure. This study focuses to identify and define business model innovation for the smart light pole based 5G

Keywords: Business Model Innovation; 5G; Smart City;





√√₩LuxTurrim 5G

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LuxTurrim5G ecosystem:

LuxTurrim5G outdoor test network in Nokia HQ Espoo Karaportti campus area in Espoo.

Part of Finland wide 5G Test Network Finland (5GTNF) cooperation and 5G research funded by Business Finland

Close **co-operation with city of Espoo**:

- Kera area building: "Clean and Smart Kera" Project
- Smartest city and community of the year 2018 (ICF):
- Selected by UN as an example of future digital smart city (OiER, UNGII):
 - Aim to meet UN sustainable goals already in year 2025
 - Target to leverage best practices within UN SDG 25+5 cites Leadership Platform

Cooperation on standardization:

Alliance for the Internet of Things Innovation (AIOTI)

Open and Agile Smart Cities (OASC, 120 cities worldwide)

Kera District, smart city innovation:

Nokia HQ Campus digitalization, sustainability



Kera railway station

ICF, International Community Forum OiER, Organization for International Economic Relations UNGSII, Global Sustainability Index Institute



Excellent possibility to promote the pilot to all cities globally

Data for local use of cities -> sustainable growth -> meet UN SDG's -> save the Planet

