

WCNC
2014

Today's Challenges shape the Future of Wireless

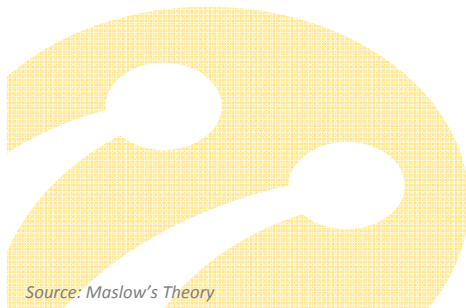
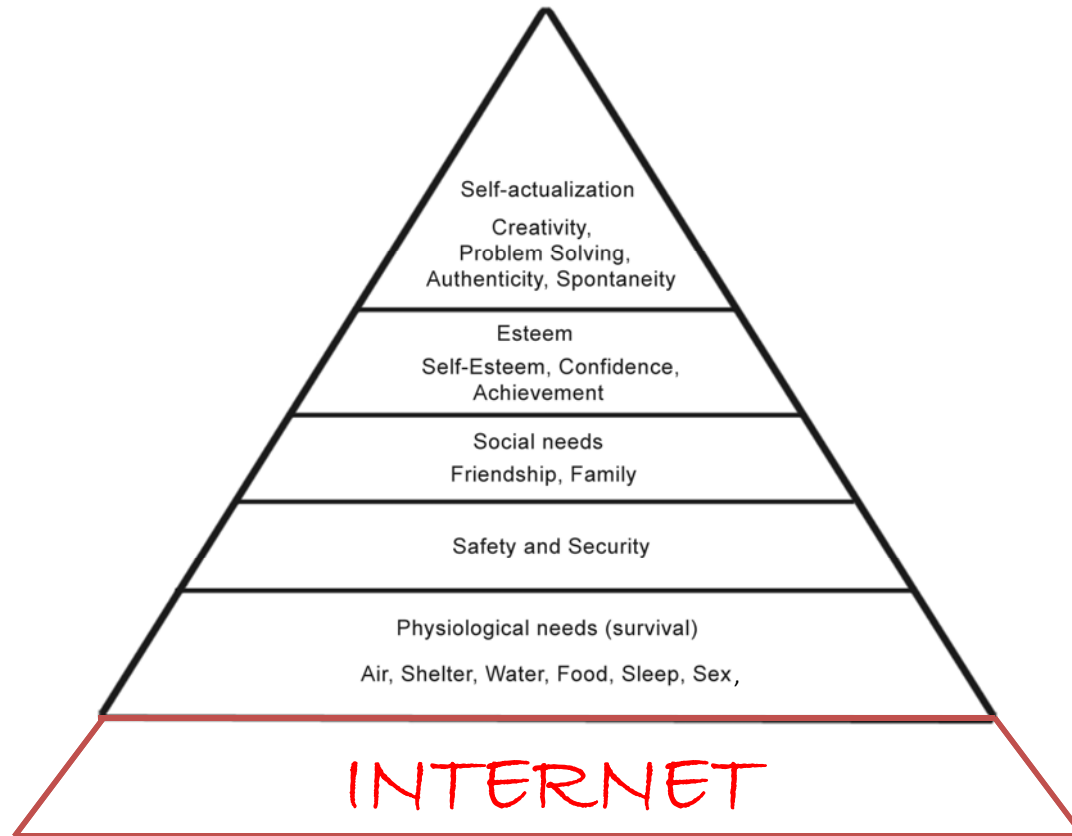


İLKER KURUÖZ
Chief Technology Officer

7 Nisan 2014



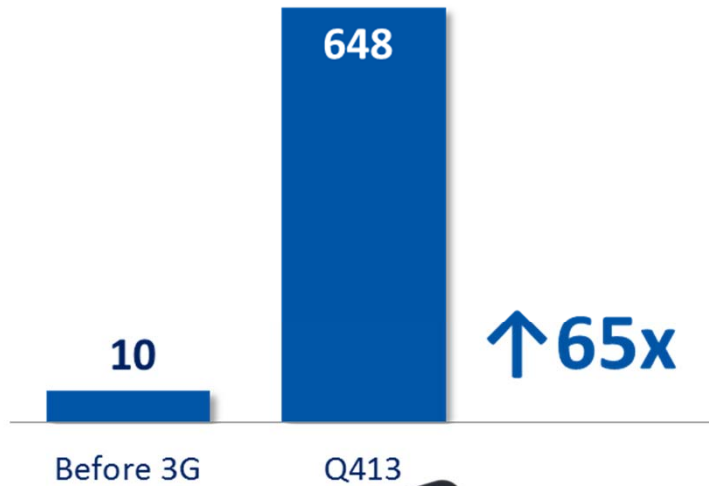
Modified Human Needs



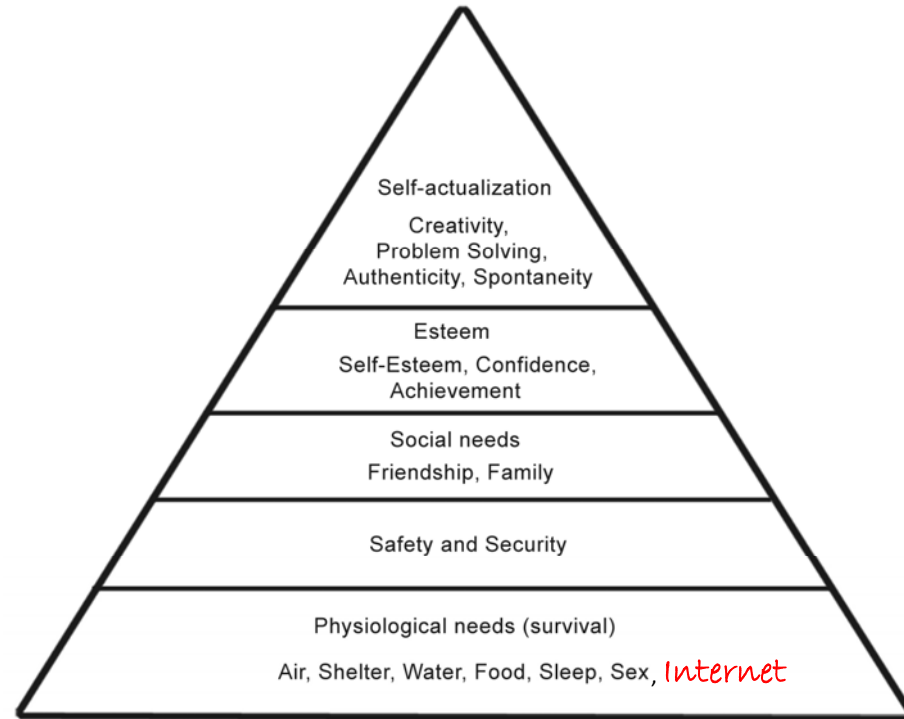
Modified Human Needs



MOBILE DATA USAGE



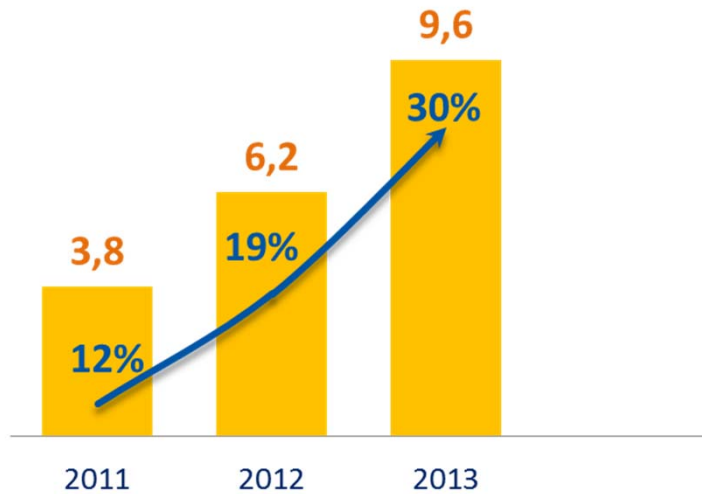
Source: Turkcell Investor Presentation, March 2014



Modified Human Needs



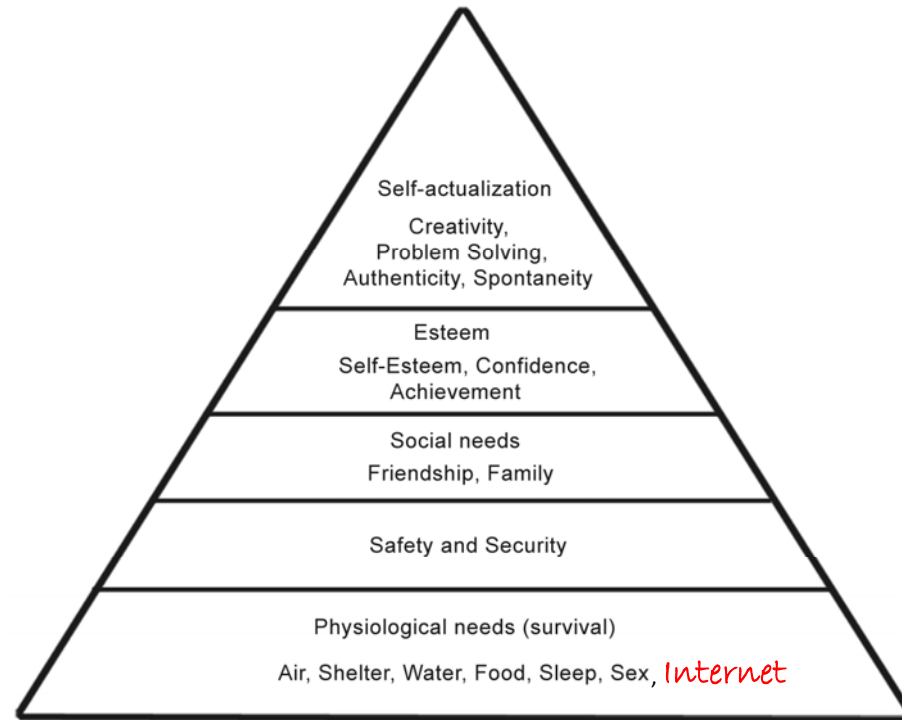
SMARTPHONES (million)



of smartphone — Smartphone Penetration

Smartphones generate **4.6x** more traffic and **3.3x** more data ARPU compared to non-smartphones

Source: Turkcell Investor Presentation, March 2014

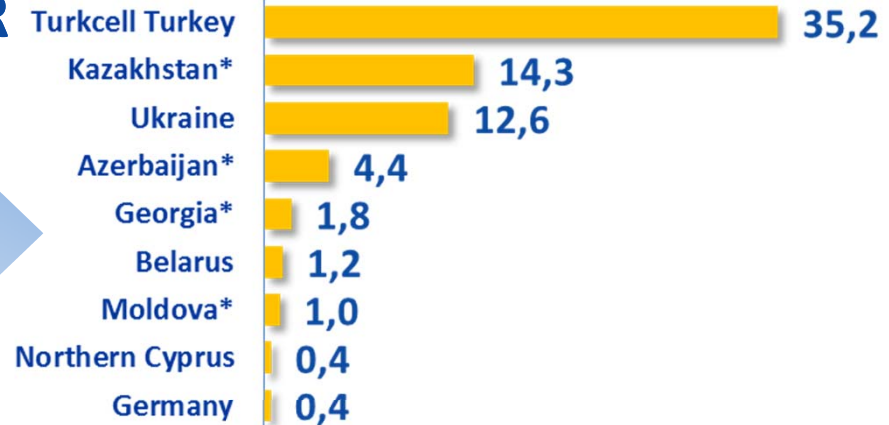


REGIONAL LEADER

9 COUNTRIES

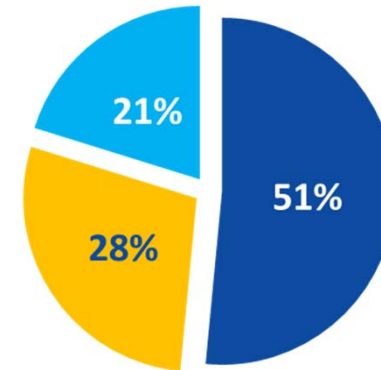
71.3 MILLION MOBILE SUBSCRIBERS
(incl. unconsolidated Fintur subscribers)

OUR SERVICES: MOBILE VOICE,
MOBILE BROADBAND, MESSAGING,
FIXED BROADBAND & OTHER



(*) Turkcell owns 41.45% of Fintur which has interests in Kazakhstan, Azerbaijan, Moldova and Georgia. Fintur is not consolidated to the Group.

TURKCELL TURKEY: COUNTRY LEADER



■ Turkcell ■ Operator A ■ Operator B



Source: Turkcell Investor Presentation, March 2014

Being a Technology Company



Communication
Anywhere
Anytime

Access to Knowledge
Innovation, Higher value add, ↑ economical development

GSM

Communication

Technology

Turkcell

- Mobile voice
- SMS

- Mobile broadband
- Fiber broadband

TURKCELL
SUPERONLINE

- **Software**
- T Smartphones & Tablets
- Cloud Computing
- M2M
- TV
- Mobile services
 - Finance
 - Education
 - Health
 - ...

Source: Turkcell Investor Presentation, March 2014

Technology leader in Turkey



COVERAGE

+ 6000
more
base stations

%99.49 in 2G and
%86.17 in 3G
coverage



#1 country in the
world in terms of mobile
network coverage

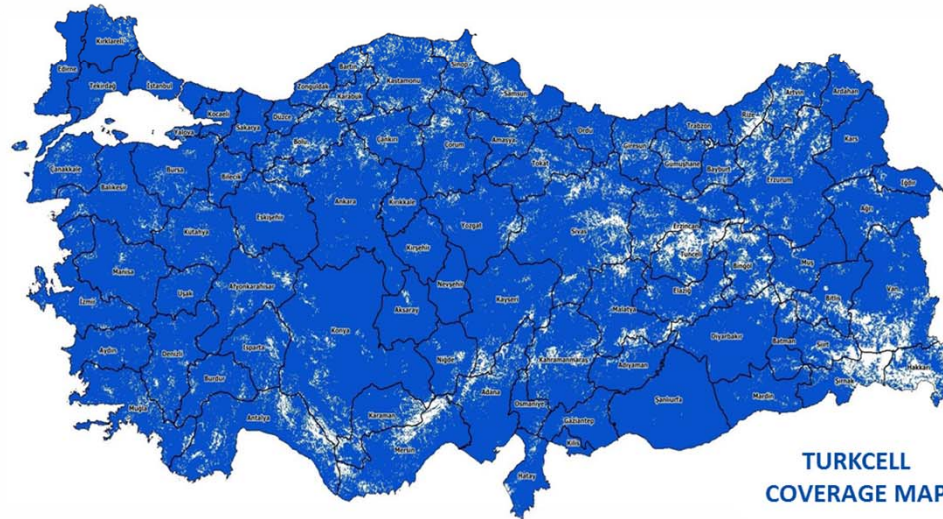
SPEED



43.2 Mbps
Mobile Broadband
Speed



891.6 Mbps speed
at LTE Advanced speed
test



TURKCELL
COVERAGE MAP



Source: Turkcell Investor Presentation, March 2014

Mobile Operator Challenges



Data
Growth

ultrafast
Connectivity

Apps over the
Top

Connected
World

Spectrum

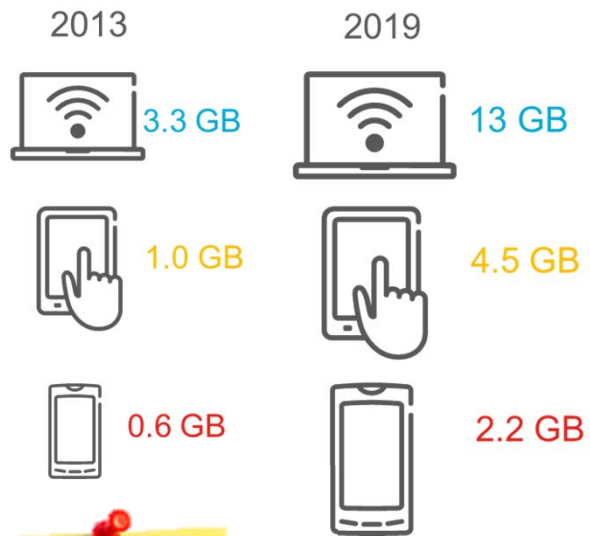
Sustainable
Operations



Data growth is massive...

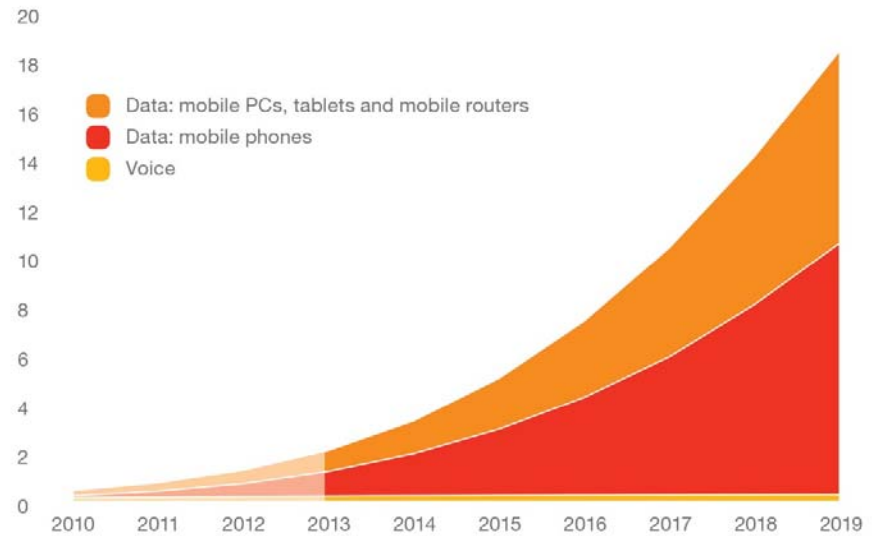


Monthly consumption per device type



Data Growth

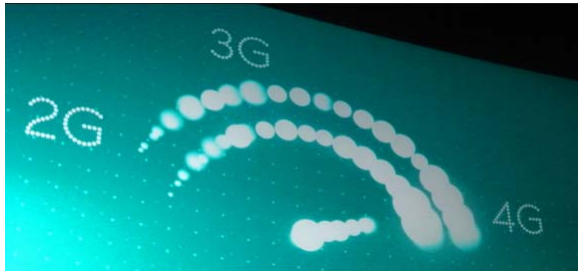
Global mobile traffic (monthly ExaBytes)



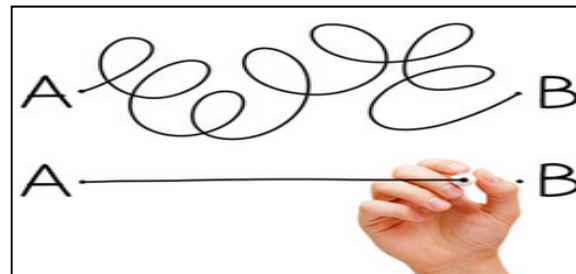
Source: Ericsson (November 2013)

10X
growth in mobile
data traffic between
2013 and 2019

Connect faster with real time response



 **Faster Speed Demand**

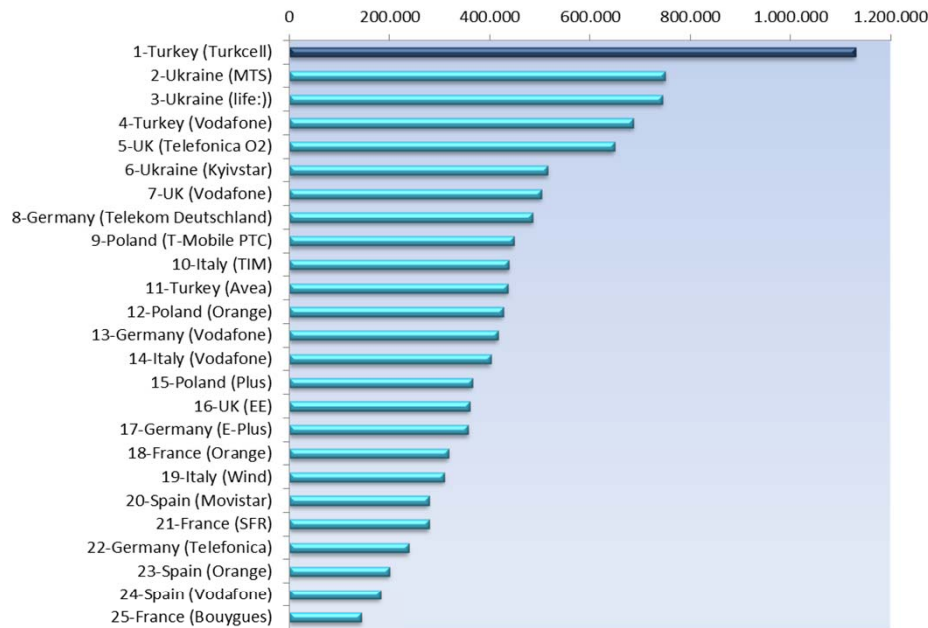


 **Lower Latency**



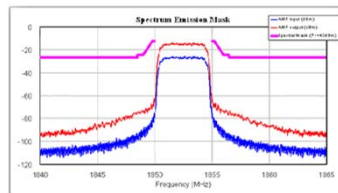
 **Real Time Access**

Spectrum demand is expanding...



🛡️ Speed, capacity => More & more spectrum

🛡️ Turkcell is leader in Europe within first tier 25 operator in terms of spectrum usage efficiency with 1,13 million subscriber per unit MHz.



Spectrum is the most valuable resource



Source: Frequency → WE: Cullen International Feb. 2013, CEE: Cullen International June 2012
Subscriber → GSMA Oct-Nov 2013

Apps are changing the dynamics



Apps Over the Top

Source: Facebook, Statista

Challenges and Opportunities are together

Find the Best of both Worlds

Connect not only People, but Everything



M2M Connections



215m
2012

1.2bn
2017

41.6%
CAGR

House

Remote control of facilities
House security

Consumer electronics

Remote operation using personal terminal

Multiple personal devices

Interaction across multiple devices

Transportation (Car/Bus/Train)

Entertainment, Navigation
Traffic information

mAutomotive



85,000 Lives lost annually in road traffic accidents

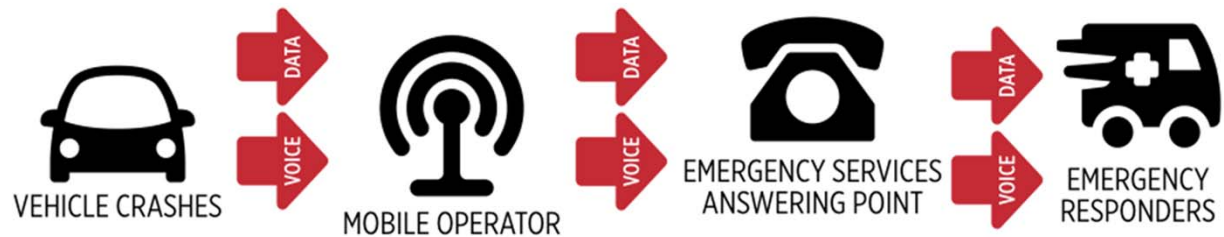


1 IN 9 LIVES SAVED OR

35,000

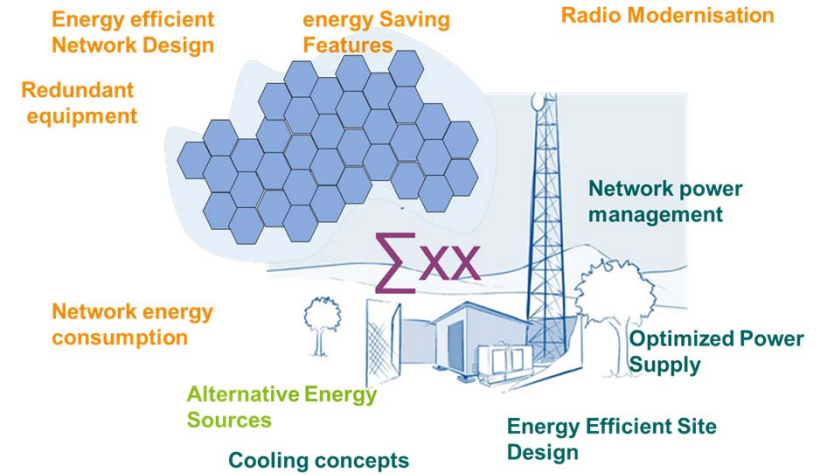
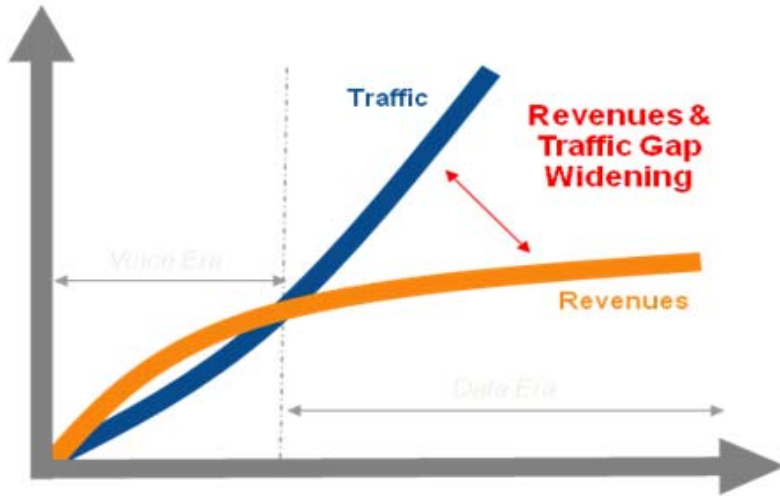
LIVES SAVED BY 2017 THROUGH IN-CAR EMERGENCY CALLING SERVICES

Connected World



Source: The Mobile Economy, GSMA, 2013

What about other resources?



Sustainable Operations

Operations Efficiency



Energy

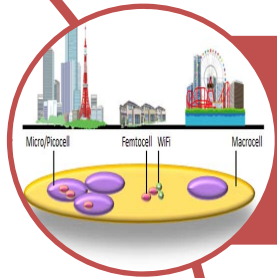
Site Leasing

Transmission

Regulation fees



Challenges point out New Technologies



Small Cells
LTE-A
5G

Data Growth

Connected World

Ultrafast Connectivity

Spectrum



SDN/NFV
Cloud

Sustainable Operations

Apps over the Top

Connected World



New Services
New Devices

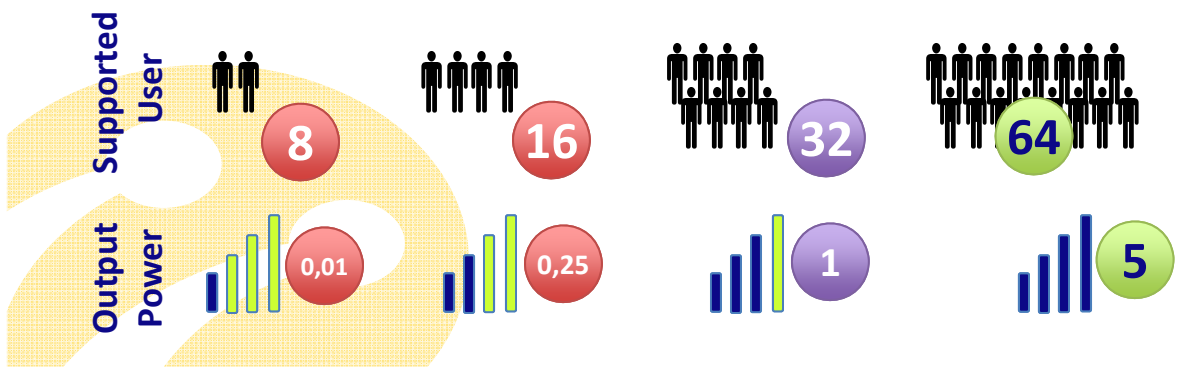
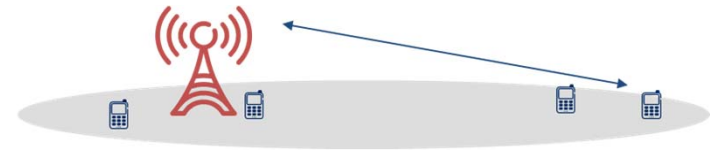
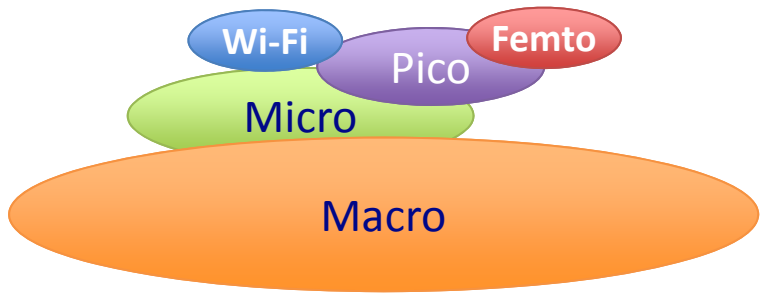
Apps over the Top

Connected World

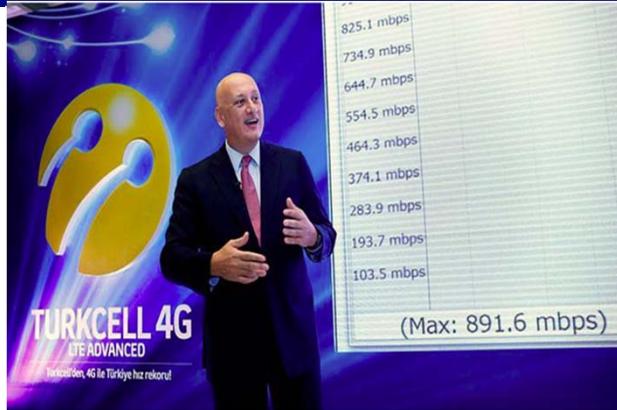
Sustainable Operations

New Revenue

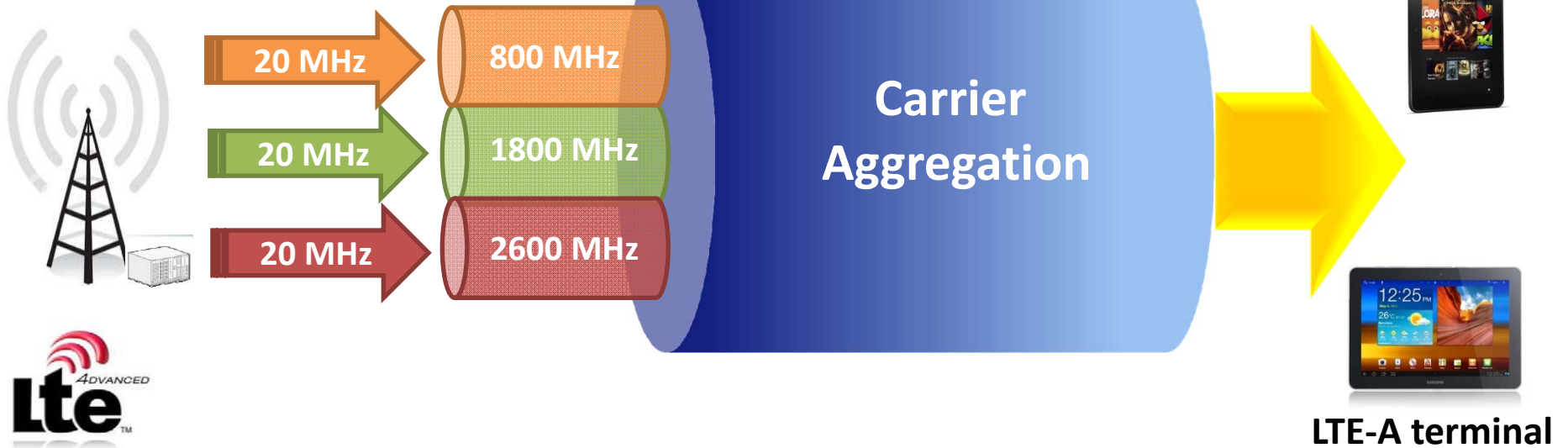
Small Cell / Hetnet



LTE ve LTE-Advanced



- Higher speeds
- Low Latency
- New Spectrums, Higher capacities



5G is on the way...



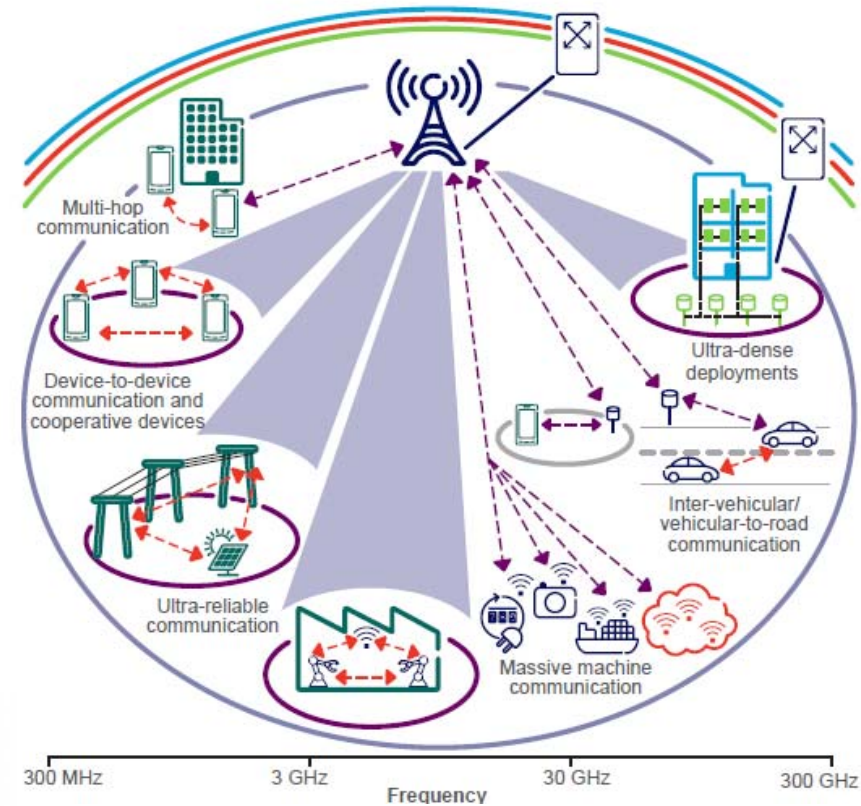
New Technology Platform to complement LTE

- 🛡️ high density demand
- 🛡️ ever increasing consumption of a wide variety and variability of devices, services and applications.
- 🛡️ new use cases such as massive machine type communication (like M2M, Internet of Things)
- 🛡️ More stringent demands for real time communications.

** White paper is being prepared by NGMN about 5G requirement of 19 leading operators including Turkcell*



Reference: NGMN Press Release Mobile Operators work together to define requirements for "5G" Barcelona, Spain – 24th February, 2014

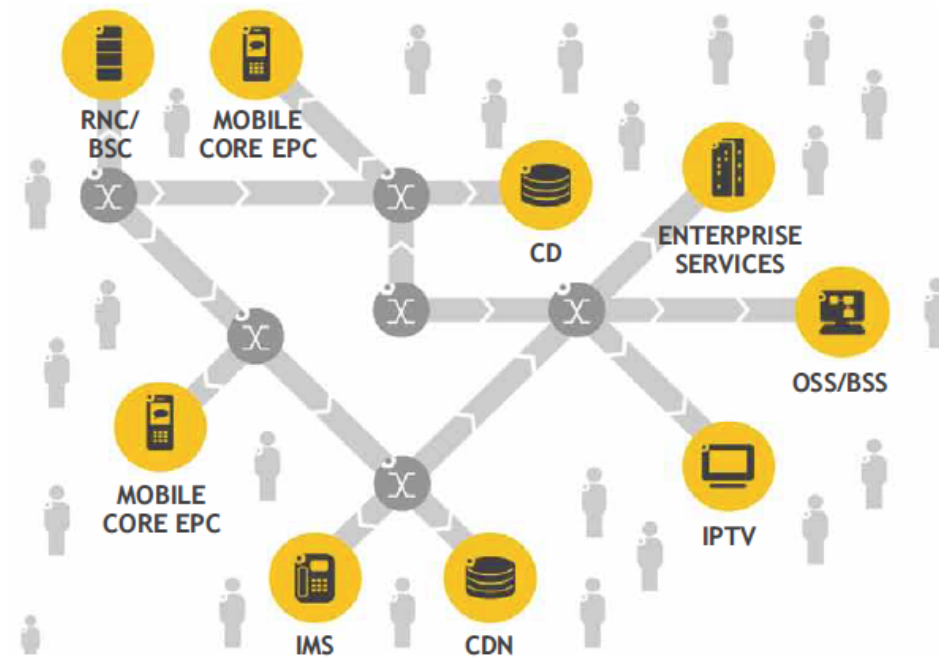


Source: Ericsson White Paper – 5G Radio Access

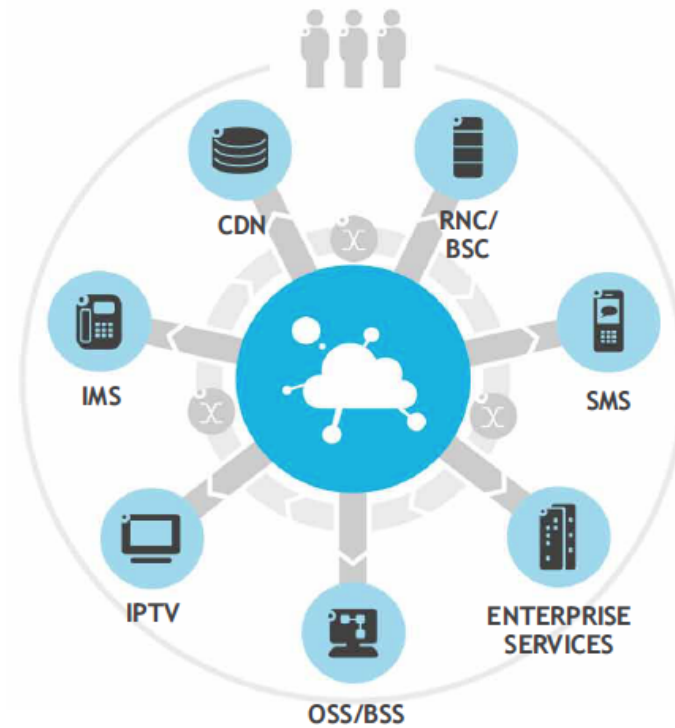
Virtual networks on the Clouds



FROM THE CARRIER OF TODAY...

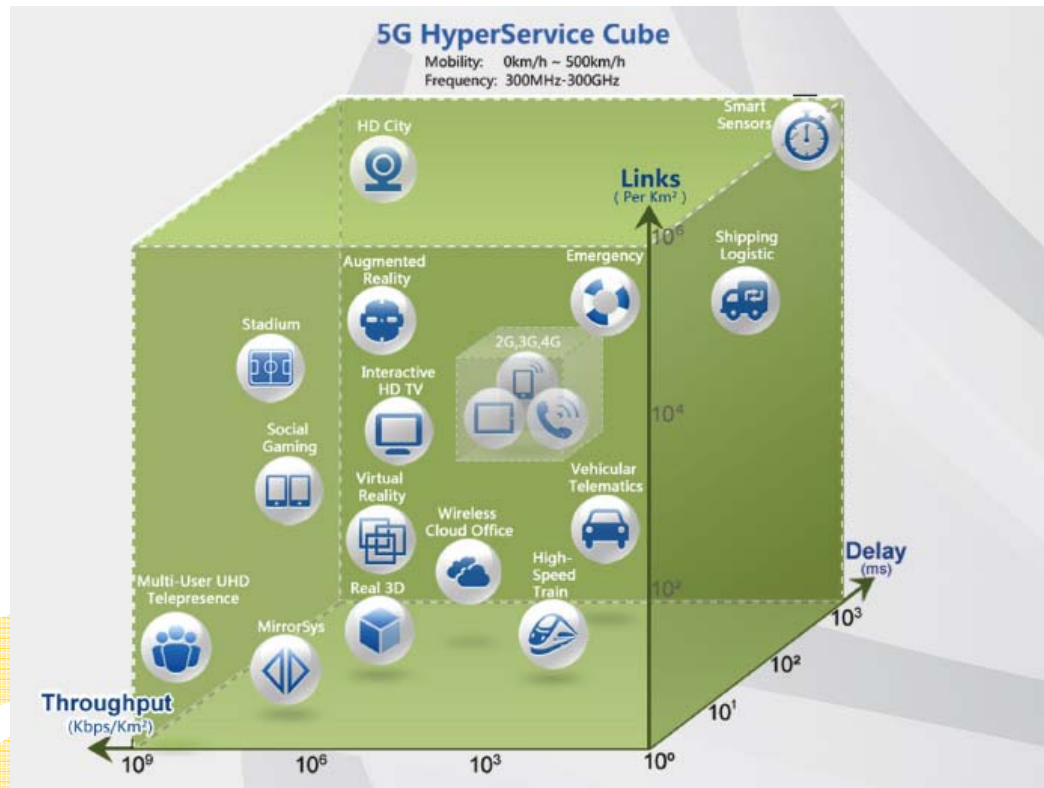


TO THE CARRIER OF TOMORROW.



Source: ALU NFV White Paper

New Services and Devices



Source: Huawei 5G Technology Vision WP

«Wireless Technologies» should bring new opportunities for solving today's challenges introducing enhanced services and improving the lives of people, business and society...

