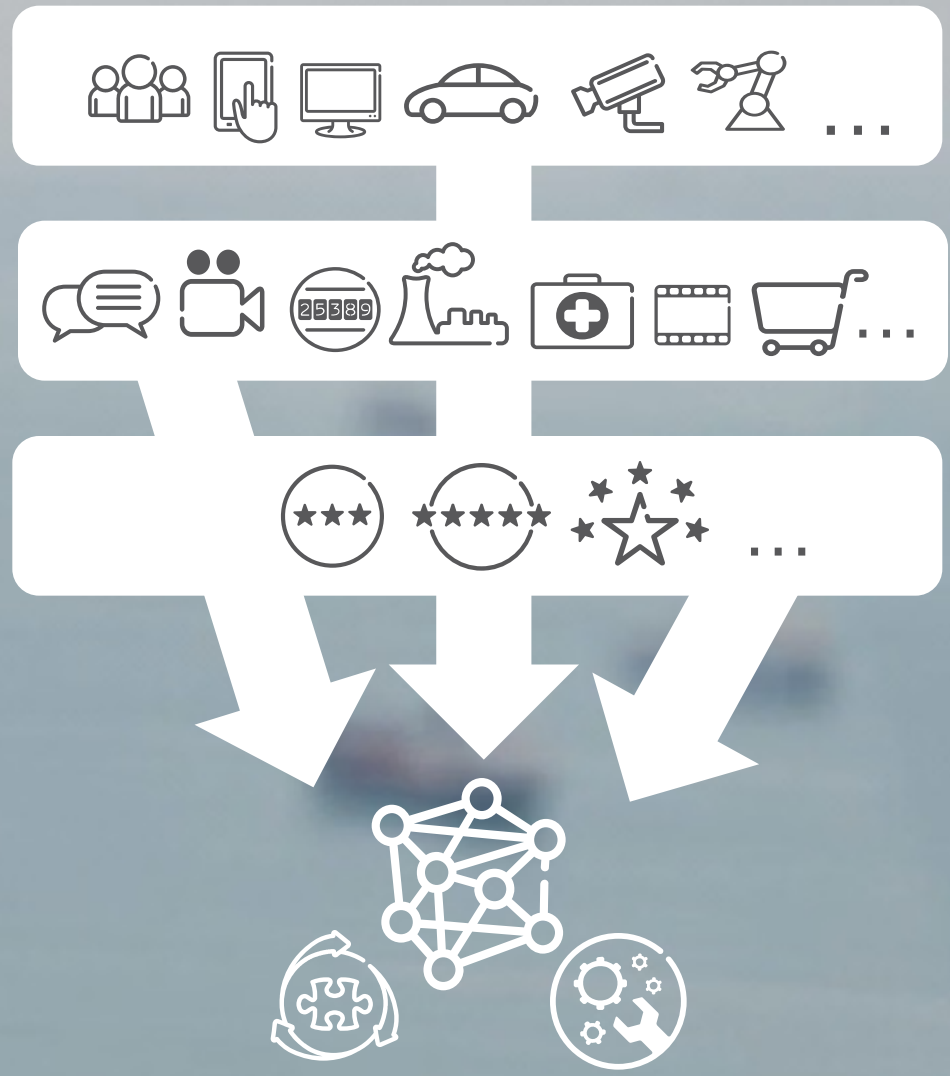
DEMAND 2020



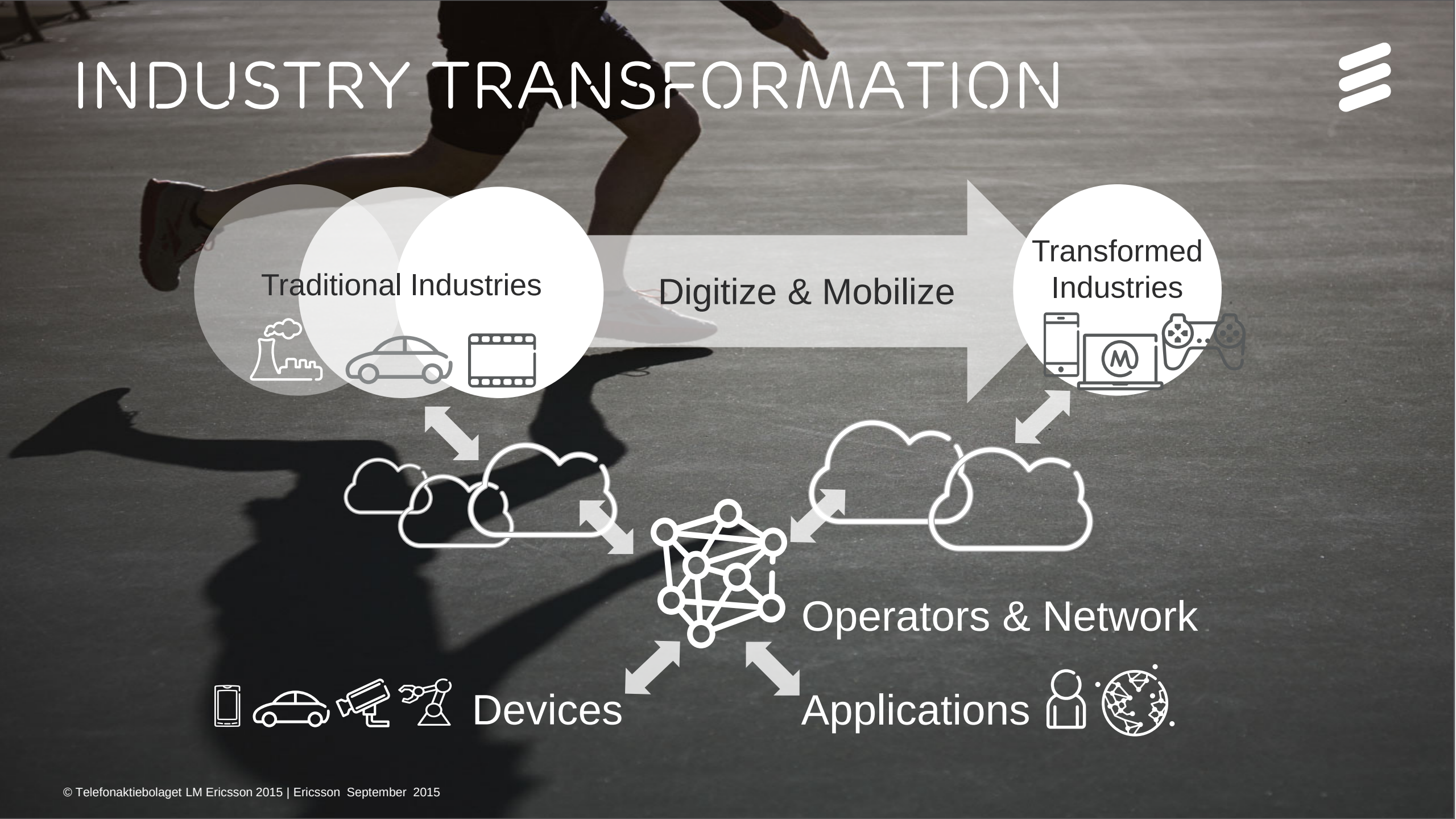
Devices & Consumers

Applications & Industry

Service Providers

Network

INDUSTRY TRANSFORMATION



BUILDING 5G

One Network – Multiple Industries

Platform for 50 Billion
Open Innovation

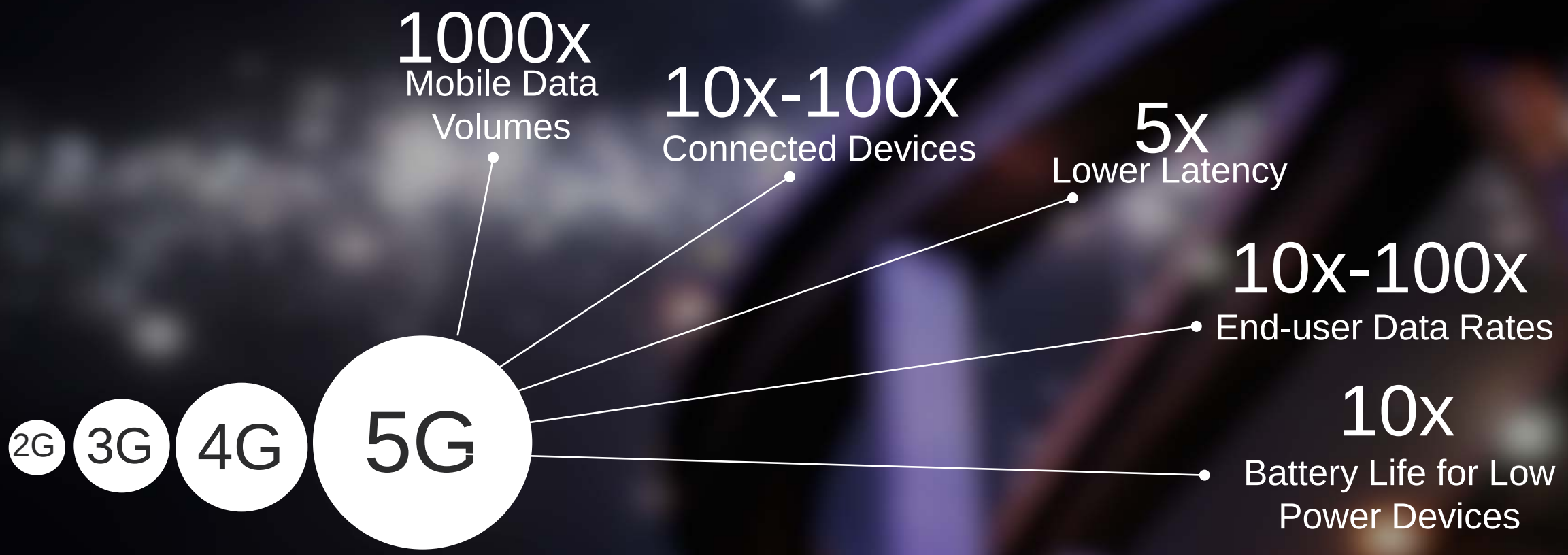
Industry Journey

Global developments
Global standard

Technology Evolution

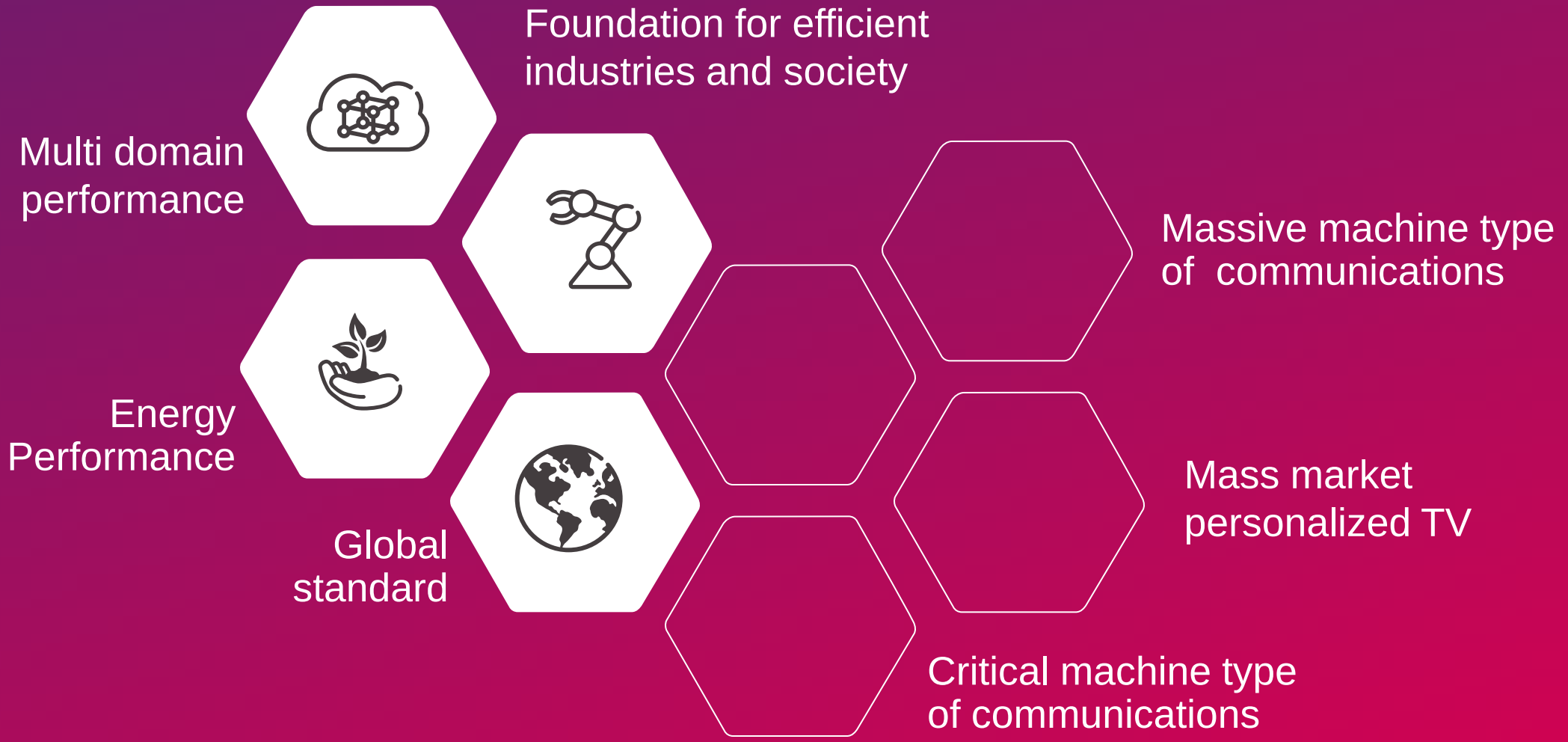
Milestones every year
Research & Development
5G System View

EVOLUTION TOWARDS 2020



Source: METIS

WHAT 5G WILL PROVIDE



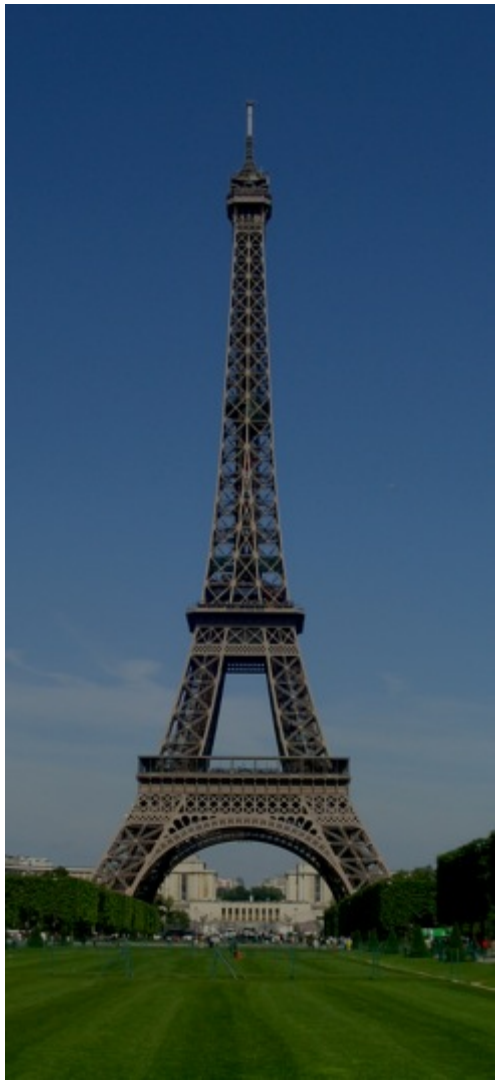
FLEXIBILITY AND ROBUSTNESS

FLEXIBILITY

ROBUSTNESS

ERICSSON DRIVES 5G TO BECOME A GLOBAL STANDARD






ONE NETWORK – MULTIPLE INDUSTRIES

A common network platform with dynamic and secure Network Slices

5G Network Evolution to Meet Expectations

Sustainability

Management & Orchestration

Radio Access

Applications

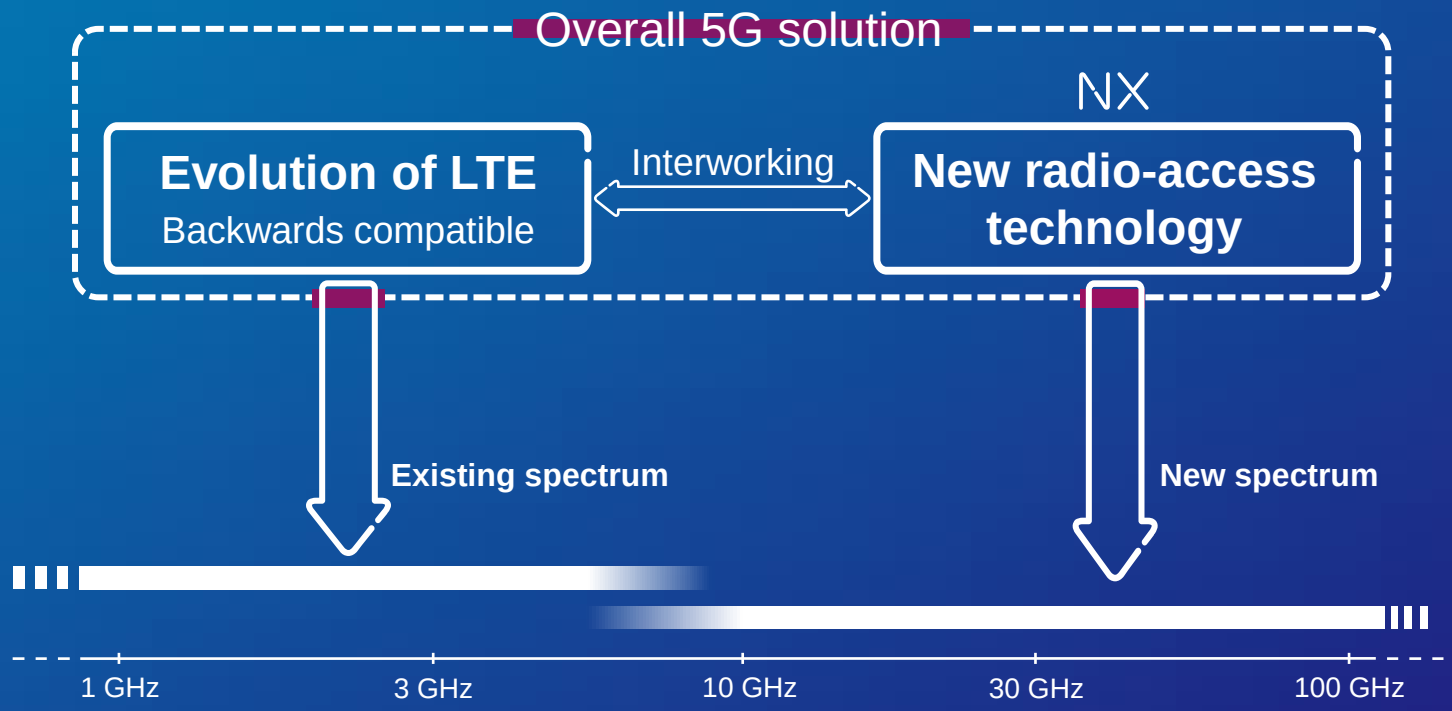
Cloud Infrastructure

IP Infrastructure

Security

Scope for 5G

5G RADIO ACCESS & SPECTRUM



Spectrum flexibility

Flexible duplex

FDD and TDD

Dynamic TDD

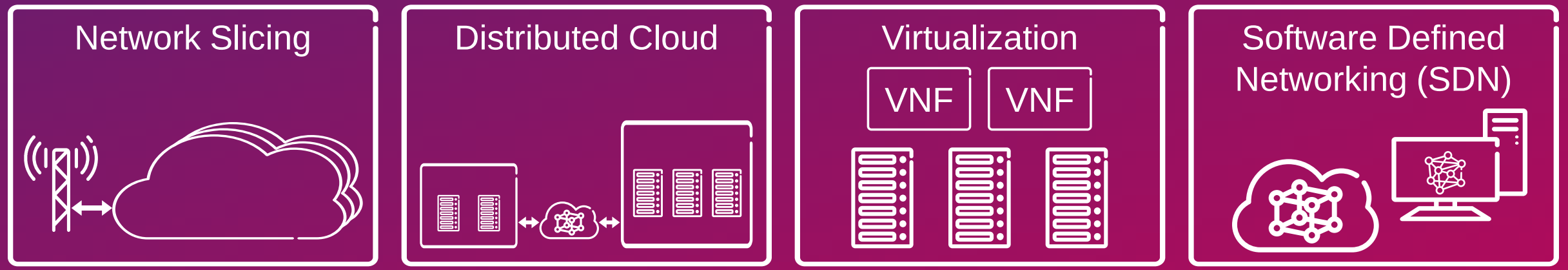
Full Duplex

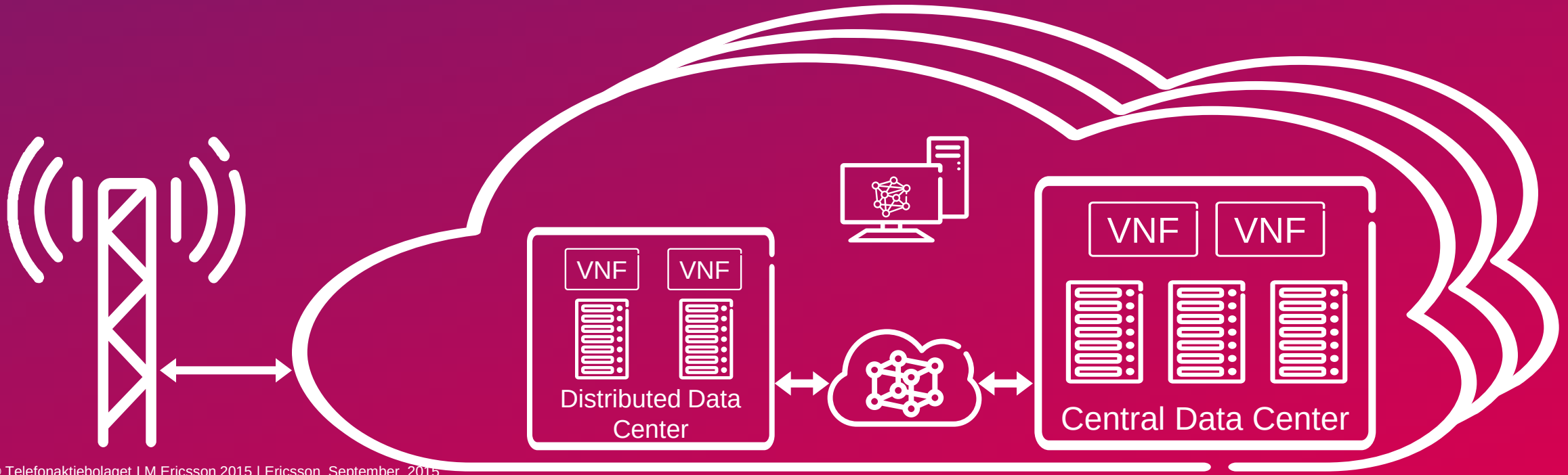
Dedicated Licensed Spectrum

Complimented with spectrum sharing

Unlicensed
Shared licensed

NETWORK ARCHITECTURE – CORE/IP





OSS/BSS: ENABLING THE AGILE OPERATOR

<1 HOUR
Automated fulfillment for complex services

<5 MINUTES
Automated fault correlation

60% FEWER
Manual touch-points for 2/3 of all orders

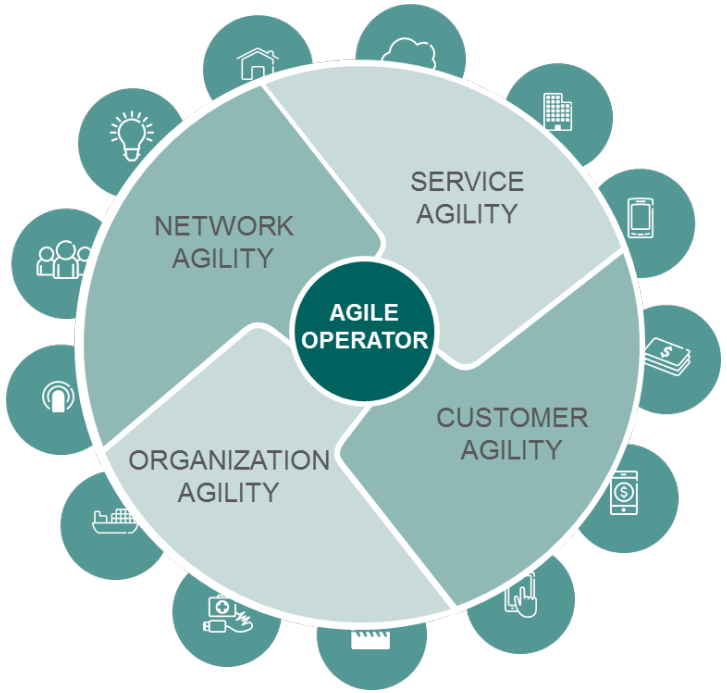
11.5 MILLION
B2B transactions managed per day

14K SERVICES OFFERED
Derived from more than 85 B2B partners

Monetization of Digital Services

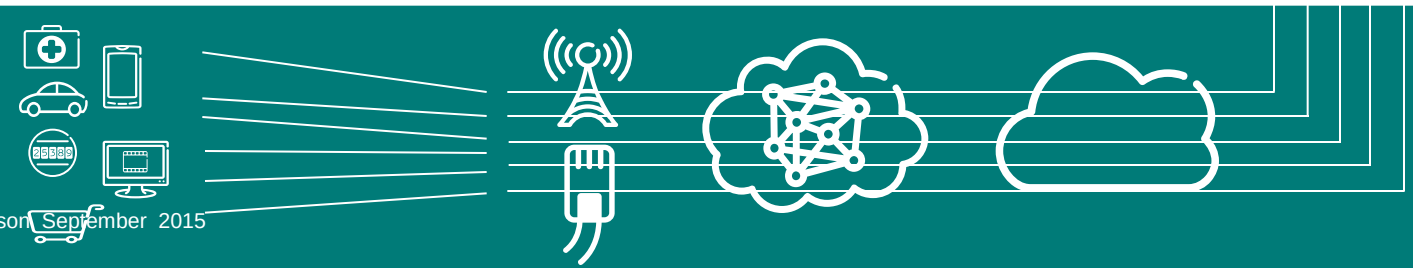
Management and Orchestration of NFV/SDN/Cloud

Analytics and Customer Experience Management



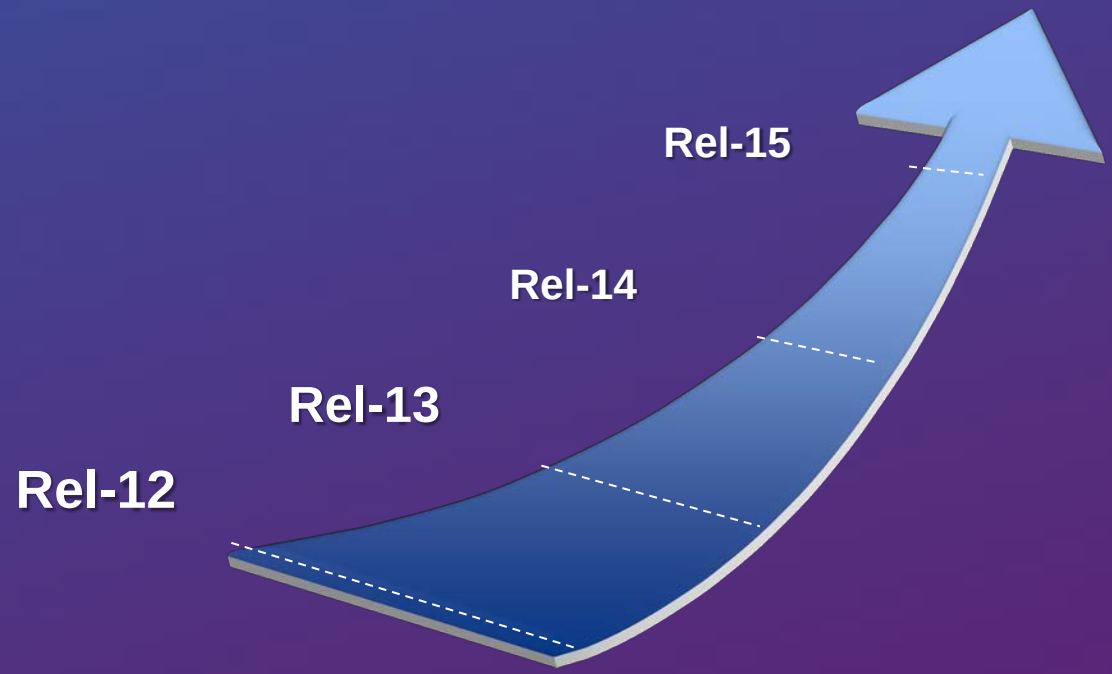
ERICSSON RANKED FIRST WORLDWIDE

- > **OSS**
- > **BSS**
- > **NMS**
- > **Service Enablement**
- > **Related services**

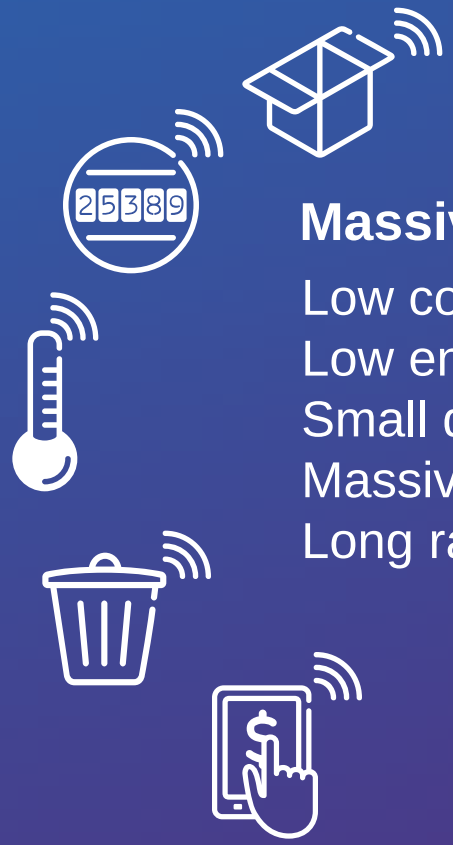


LTE EVOLUTION LEADS TO 5G

- LTE Advanced
- LTE Broadcast
- Latency reductions
- License Assisted Access and Unlicensed Spectrum
- Multi-antenna enhancements
- Device to Device
- Massive MTC enhancements



MACHINE TYPE COMMUNICATION



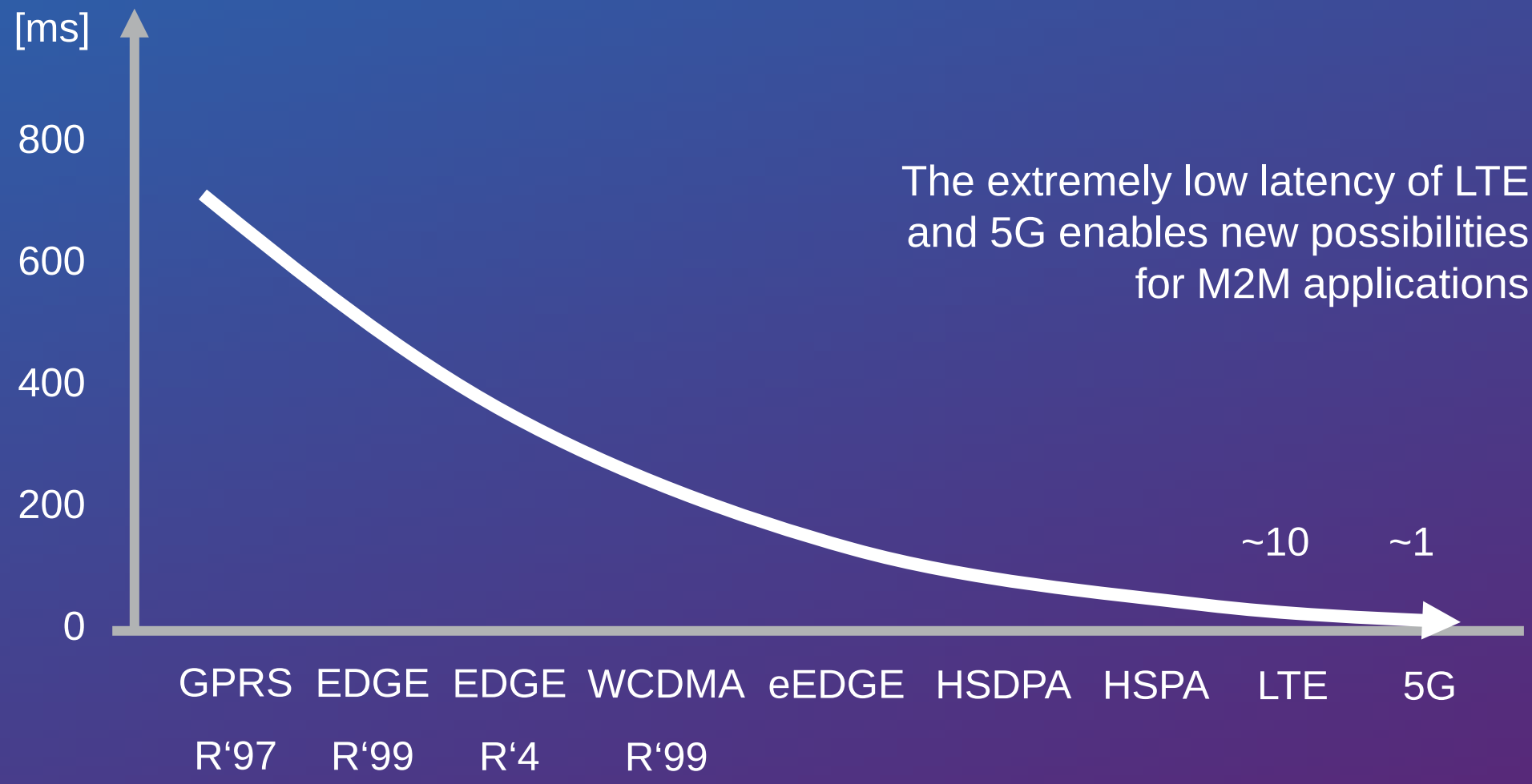
Massive MTC

Low cost
Low energy
Small data volumes
Massive numbers
Long ranges

Critical MTC

Ultra reliable
Very low latency
Very high availability

LATENCY REDUCTIONS



The extremely low latency of LTE and 5G enables new possibilities for M2M applications

5G JOURNEY IN THE INDUSTRY

Builds on LTE and previous experiences

Global efforts for a global standard in 2020

Challenging 5G system requirements

Open platform for industry eco-system to leverage

5G USE CASES

5G
USE CASES

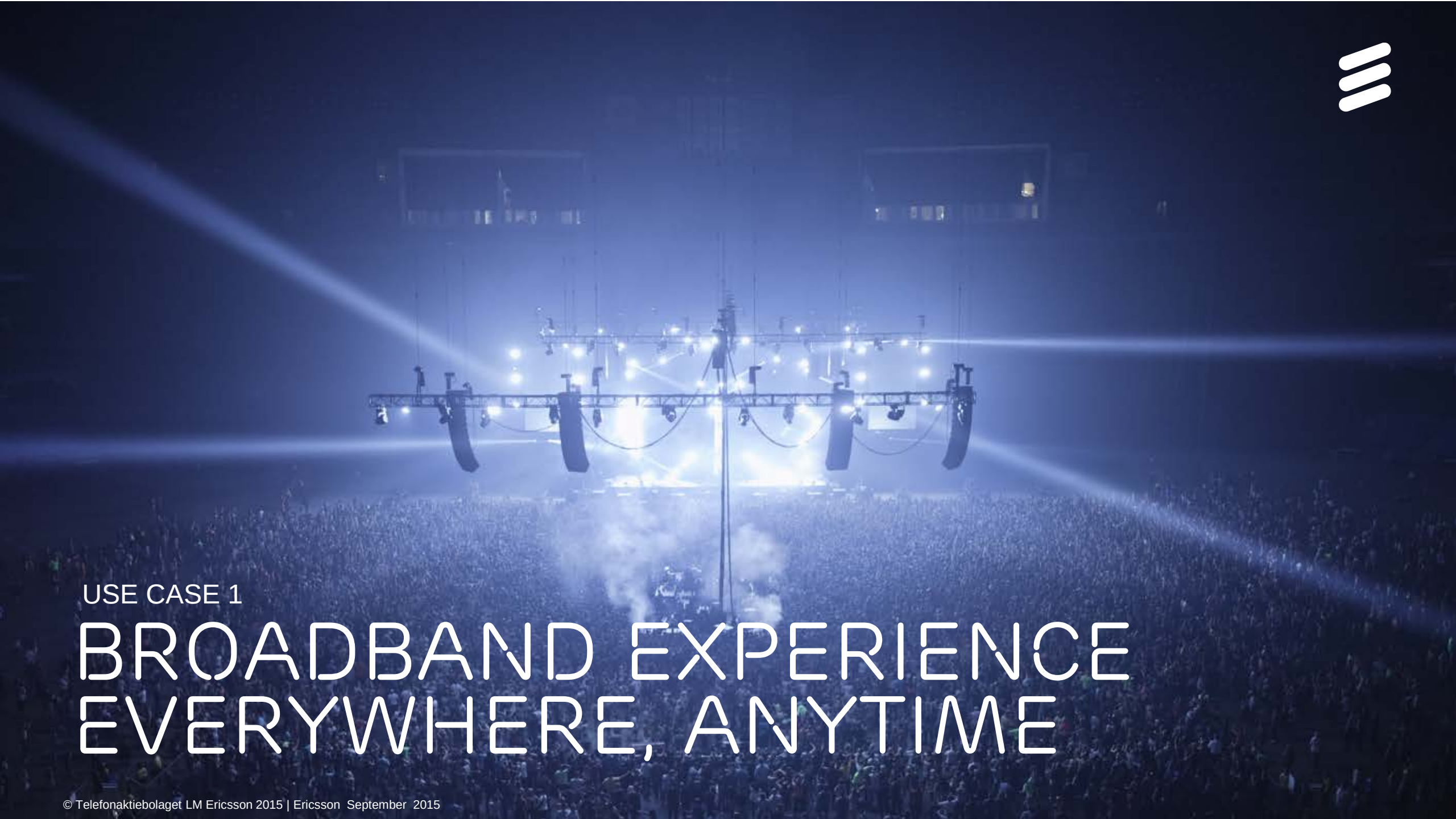
BROADBAND EXPERIENCE
EVERYWHERE, ANYTIME

SMART VEHICLES,
TRANSPORT & INFRASTRUCTURE

MEDIA
EVERYWHERE

CRITICAL CONTROL
OF REMOTE DEVICES

INTERACTION
HUMAN-IOT



USE CASE 1

BROADBAND EXPERIENCE EVERYWHERE, ANYTIME

BROADBAND EXPERIENCE EVERYWHERE, ANYTIME

SUB-USE CASES

- Broadband access in crowded areas
- Broadband access in public transport
- Event platform

BENEFITS

- **Maximizes customer experience** in both indoor & outdoor connectivity
- **High QoS broadband** even in challenging network conditions

Opportunity Areas

- Security
- Sustainability
- Mobility
- Capacity
- Coverage

Target Users

- Generic mobile users
- Network operators
- Event venue
- Olympic games

BROADBAND
EXPERIENCE
EVERYWHERE,
ANYTIME

TECHNOLOGY ENABLERS

ENABLERS

5G radio access	High-data rates High volumes High mobility Spectrum efficiency Maximize capacity
5G core network	QoS support for e.g. emergency/safety related communication. Aggregated data rates are targeted. Roundtrip latency significantly reduced to be in the 1 ms range
5G management & orchestration	Congestion handling per subscriber/service or based on usage. Dynamic allocation of resources according to traffic variation. Reduce load on transport links and central processing units.

USE CASE 2

SMART VEHICLES, TRANSPORT AND INFRASTRUCTURE

SMART VEHICLES TRANSPORT & INFRASTRUCTURE

SUB-USE CASES

- Smart infrastructures
- Connected bus-stops
- Connected trucks
- Connected cars

BENEFITS

- Focused on **massive machine type communication**.
- We can consider **sensors** embedded in **roads**, **railways** and **airfields** to communicate each other and/or with **smart vehicles**.

Opportunity Areas

- Sustainability
- Security
- Mobility
- Deployment
- Scalability

Target Users

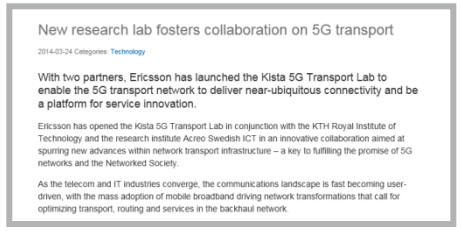
- Automotive
- Infrastructures
- Transport companies
- Administration/governments

SMART VEHICLES TRANSPORT & INFRASTRUCTURE

TECHNOLOGY ENABLERS

ENABLERS

5G radio access	Massive density Device energy consumption Device cost Significantly reduced signalling overhead compared to today. Soft-SIM or no-SIM operation for (at least) sensor type devices.
5G core network	Integrate public infrastructure network within network slices Support for pub/sub message oriented communication.
5G management & orchestration	Orchestration of a big amount of data and input interfaces. Common view for all the utility/infrastructures suppliers. Define different user profiles to access the same network.


New research lab fosters collaboration on 5G transport

2014-03-24 Categories: Technology

With two partners, Ericsson has launched the Kista 5G Transport Lab to enable the 5G transport network to deliver near-ubiquitous connectivity and be a platform for service innovation.

Ericsson has opened the Kista 5G Transport Lab in conjunction with the KTH Royal Institute of Technology and the research institute Acreo Swedish ICT in an innovative collaboration aimed at spurring new advances within network transport infrastructure – a key to fulfilling the promise of 5G networks and the Networked Society.

As the telecom and IT industries converge, the communications landscape is fast becoming user-driven, with the mass adoption of mobile broadband driving network transformations that call for optimizing transport, routing and services in the backhaul network.

USE CASE 3

MEDIA EVERYWHERE

MEDIA EVERYWHERE

SUB-USE CASES

- Live TV at scale
- On-demand anything
- Mobile for In-home TV
- Accelerating emerging markets

BENEFITS

- **Ultimate** video quality **anywhere** – 4K, 8K, HDR, HFR
- Enables industry **transformation to all IP**
- Meeting **consumer demands** for TV on their terms

Opportunity Areas

- Broadcast/Multicast
- Shift to all media consumption on consumers terms
- 5G for TV for in-home screens and devices
- Enabling media vision for ‘mobile first’ markets

Target Users

- Consumers
- Pay TV Operators
- Broadcasters
- New content owners and aggregators
- OTT providers

MEDIA EVERYWHERE

TECHNOLOGY ENABLERS

ENABLERS

5G Radio	Improved beam forming Massive MIMO Carrier aggregation New high frequency spectrum
Service agility	Cloud based flexible deployment of media services Hybrid
5G management & orchestration	Flexible and dynamic deployment of media services Network slices all optimized media delivery and managed services enabling enhanced business models, performance, and consumer experiences

USE CASE 4

CRITICAL CONTROL OF REMOTE DEVICES

CRITICAL CONTROL OF REMOTE DEVICES

SUB-USE CASES

- Remote control of heavy machineries
- Factory automation
- Real-time monitoring of plant / process conditions
- Smart grids
- Remote surgery

BENEFITS

- Controlling heavy machinery remotely to **lower risks** in **hazardous environments**
- Increase **efficiency** and **reduce costs**. Replace communication bus with wireless links

Opportunity Areas

- Safety
- Sustainability
- Mobility
- Data
- Legal

Target Users

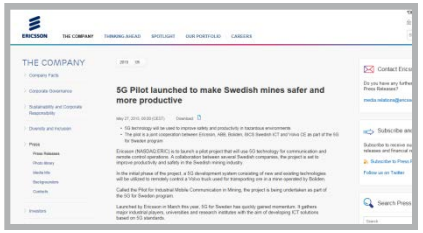
- Manufacturing
- Mines
- Healthcare

CRITICAL CONTROL OF REMOTE DEVICES

TECHNOLOGY ENABLERS

ENABLERS

5G radio access	Enhanced radio connections for accessibility and retainability Estimate and report about achieved reliability of a connection. High node/service availability at least 99.999% node availability Uplink for high quality video
5G core network	QoS functions to “guarantee” deadlines match 99.9% accessibility and retainability for comm. services
5G management & orchestration	Improve response time for diagnostic questions. Meet real-time constraints Estimate and report about achieved reliability of a connection. The system shall be able to estimate and report about the achieved reliability of a connection (per user, per service).



USE CASE 5

INTERACTION HUMAN - IOT

INTERACTION HUMAN - IOT

SUB-USE CASES

- Immersive augmented reality
- Immersive gaming
- Surveillance
- Tactile internet
- Smart biker-helmets
- Child monitoring
- Smart houses
- Smart shipping/post

BENEFITS

- Fills a gap between **humans and IoT**.
- **Context awareness** is the main difference from M2M.

Opportunity Areas

- Non Intrusiveness
- Privacy
- Real-time
- Sustainability
- Mobility

Target Users

- Public safety
- Fitness
- Health care
- Family life, everyday life

INTERACTION
HUMAN - IOT

TECHNOLOGY ENABLERS

ENABLERS

5G radio access	Many of the things are already provided by LTE. This is the LTE evolution effect and 5G will improve performance and make things more flexible
5G core network	Integrate environment network within network slices Support for pub/sub message oriented communication.
5G management & orchestration	Achieve a data management system that can address device heterogeneity. Support for different departments/users

5G RADIO TEST BED

MOBILE EUROPE

Home

ERICSSON HITS 5GBPS IN 5G TRIAL

ON 02 JULY 2014.

Ericsson has demonstrated download speeds of 5GBps on the 15GHz band, as it becomes the latest vendor to test 5G technology.

The Sweden-based company said it used a new radio interface and advanced Multiple-Input Multiple-Output (MIMO) technology as part of the trial, which was witnessed by executives from NTT DOCOMO and SK Telecom.

Ericsson is developing new technology for 5G, including new antenna types with wider bandwiths, higher frequencies and shorter transmission times. It is also building new radio base stations with bespoke baseband and radio units.

Other priorities for 5G were placing small cells within hetnets, examining new frequency bands and coming up with new ways of delivering high speed, high capacity backhaul, according to the

docomo 5G

ERICSSON

5.36 Gbps

downlink throughput

LEARN

Technology for large bandwidth, high frequency systems

INVESTIGATE

Propagation @ 10+ GHz

DEMONSTRATE

> 5 Gbps

5G RADIO TEST BED PHASES

Phase 1

2014-2015

- 400 MHz BW
- 15 GHz band
- 5+ Gbps peak rate
- Flexible duplex
- 4 stream MIMO
- Multi-site deployments
- Distributed MIMO

Phase 2

2015-2016

- Next generation test bed hardware
- Implementation and testing of multiple 5G technology components

Phase 3

2017+

- Complete trial network
- Form factor for pre-commercial trials

5G EXCAVATOR DEMO AT MWC 2015

Ericsson Research demonstrated remote control of real life, full size Excavators at MWC2015.
See the video:
http://www.ericsson.com/news/150306-remote-control-over-mobile-networks_244069647_c

5G MOBILE CLOUD ROBOTICS DEMO

Ericsson Research demonstrated How 5G mobile cloud robotics will revolutionize industry at CTIA 2015.
See the video:
http://www.ericsson.com/news/150910-how-5g-mobile-cloud-robotics-will-revolutionize-industry_244069645_c

"5G FOR SWEDEN" - PROGRAM

PURPOSE OF PROGRAM

- Strengthen competiveness of Swedish industry
- Apply ICT in Industrial processes, products & services
- Leverage current and 5G mobile networks

PROGRAM FOCUS

- Industry pilots
- Innovation projects
- Establish research community in ICT

EXAMPLE OF OUTCOME

- Enabling remote control of equipment in hazardous environments
- Provide ultra reliable and low latency for remote control center and process automation

SAAB	Vinnova
Scania	RISE
Volvo	SICS
TeliaSonera	KTH
	LiTH
	LTH
	Chalmers

DRIVING THE 5G EVOLUTION

World leading research together with industry and academia

Global efforts for a global standard 2020

Technology Leadership in all 5G domains

Track record in digitalization of industries

We will make it work. As always.


ERICSSON
To know more about our 5G visit http://www.ericsson.com/spotlight/5G