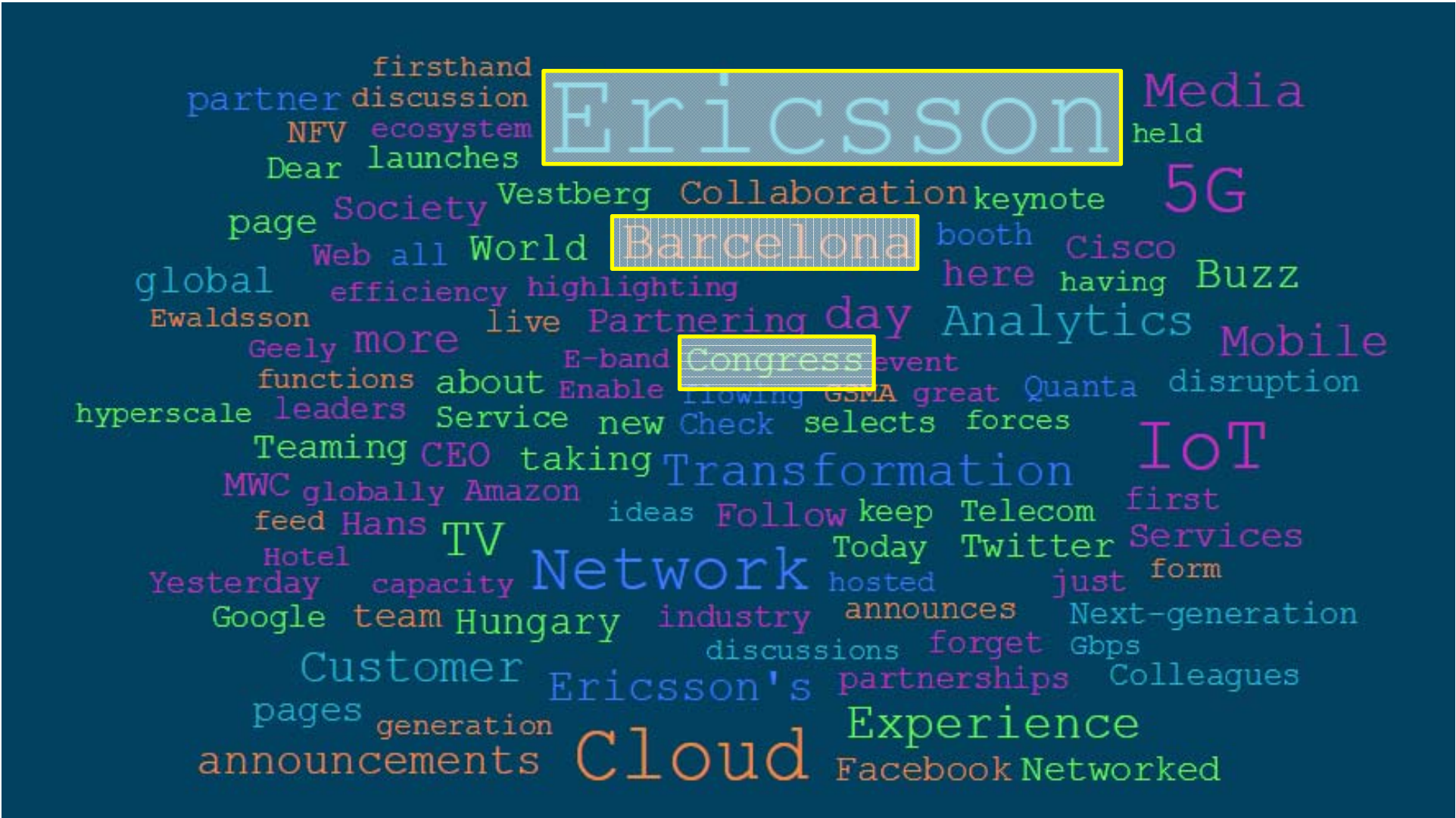




TASTE OF
BARCELONA 2016





BARCELONA 22-25 FEB 2016



- 101,000 attendees
- 204 countries and territories were present
- 3,600 members of the international press and media
- 2,200 companies
- 374 speakers from consumer brands, mobile organisations, mobile operators and industries
- 29 industry partners to provide events, user conferences, trainings and forums
- 40 Global Mobile Awards handed over for game-changing products, services, devices, apps and technologies
- MWC Tours covered the most important topics:
 - 5G
 - NFV
 - mobile apps
 - retail & digital commerce
 - mobile media
 - IoT
 - security.



BARCELONA 27 FEB-2 MAR 2017

GSMA HOSTING MWC



BARCELONA 22-25 FEB 2016



MWC 3 hottest topics:

5G, IoT, Virtual Reality

MWC Keynote Speakers:



Jonah Peretti
Founder &
CEO,
BuzzFeed



Guo Ping
Rotating CEO,
Huawei



Derek Aberle
President,
Qualcomm



Ann Cairns
President &
CEO,
Int'l mark,
MasterCard



Brian Krzanich
CEO,
Intel
Corporation



Chuck Robbins
CEO,
Cisco



Kate Unsworth
Founder &
CEO,
Vinaya



Hans Vestberg
President &
CEO,
Ericsson



**Mark
Zuckerberg**
Founder &
CEO,
Facebook



**Ralph de la
Vega**
President &
CEO,
AT&T Mobile & Bus
Sol

BUZZ FROM MWC 2016

- › “**Mobile is disruption** – and includes people all over in society” Hans Vestberg, President and CEO, Ericsson
- › “Vittorio Colao, CEO Vodafone: "The Gigabit society, i.e the society we're building now. **Scaling is not an issue anymore, scaling is instant.**"
- › “We have a golden position now, we used to talk about the Networked society , now we have the Networked society, so **we need to change – and embrace the change**” Yogesh Malik Group CTO, Vimpelcom
- › Robin Thurston Chief Digital Officer Under Armour; “**Hyper personalized experience** is the future”
- › F1 world champion Lewis Hamilton;
“Nowadays **to stay ahead of the game** it’s not just driving, **you need to understand the telco side of the car.**”



GSMA KEYNOTES

Keynote 1: Keynote no 1 - Mobile is everything

The overall theme of this session was the Gigabit society. Vittorio Colao, CEO Vodafone: "The Gigabit society, i.e the society we're building now. Scaling is not an issue anymore, scaling is instant" and he added that " **Drones will be the future transport system**".

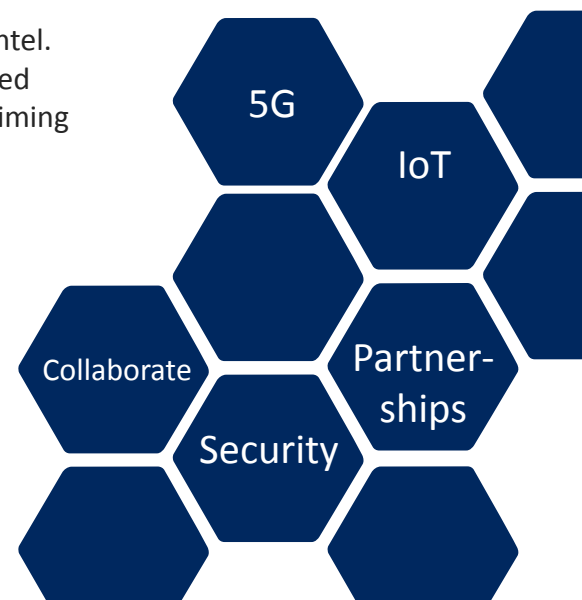
Keynote 2: GSMA Keynote: Mobile is disruption

Vestberg joined the GSMA keynote "Mobile is disruption" together with CEOs from AT&T and Intel. They discussed 5G, IoT and Cloud inside and beyond the telecom industry. All executives stressed importance of detailing use and business cases. The three speakers were in agreement of the timing and scaling of **5G with pilots starting in 2018 and commercial services by 2020**.

Keynote 4: Mark Zuckerberg

Last one out on the keynote program for Monday was Mark Zuckerberg, Facebook.

Facebook has just launched The Telco Infra Project program with partners Intel, Deutsche Telekom, Nokia, SKTelecom and Globe Telecom. "**We design but do share it as open source**" Zuckerberg said. By using modular components that combine hardware and software Zuckerberg hopes to create a more simplified network architecture.



GSMA KEYNOTES (CONT'D)

Keynote 5: 5G creating value for Industry verticals

Gunther Oettinger, Commissioner, Digital economy, European Commission kicked off the session stating that **EU is late in deploying 4G and need to learn from this and accelerate deployment of 5G**. Commission will work with the industry to make an action plan ready end this year, this will involve the verticals and telecoms industry players to find synergies and open up standards. Ulf Ewaldsson, CTO Ericsson, stated that Mobilizing verticals is the biggest opportunity the Telecom industry has ever had. More than ever verticals are involved at this MWC.

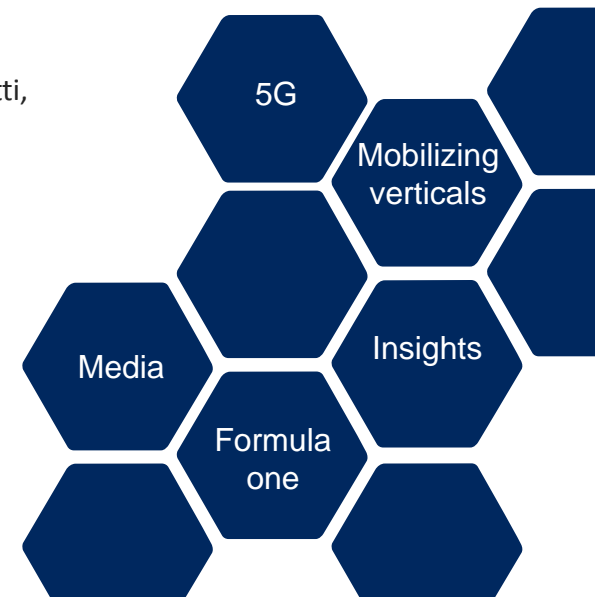
Keynote 6: Mobile is Media, Part 1

The face of Media is changing. The **dramatic growth through video is astonishing**. Jonah Peretti, Founder & CEO BuzzFeed: "Media spreads because people love it and they share it"

Ralf Reichert, CEO, ESL "**Esport = Sport and the question is not 'if' but 'when'.**"

Keynote 7: Qualcomm & MERCEDES AMG Petronas Formula One Team

And what about a Formula One driver for a MWC keynote? On stage, Aberle was joined by Lewis Hamilton and Paddy Lowe, Executive Director, Technical Mercedes AMG Petron. The discussions were around the partnerships with Qualcomm and **how it is possible to making Formula 1 even faster by using high speed wireless access so the data** can be used easily and use all the insights for a better experience on tracks.





CEO KEYNOTE

PARTNERSHIP FOR INNOVATION



- Main Topics:
 - partnering and collaboration
 - new ways of working
 - continuous transformation
 - innovation creates new solutions
- Guests:
 - Roger Gurnani, Chief Information and Technology Architect for Verizon
 - Gary Shapiro, President & CEO of the Consumer Technology Association
 - Mats Granryd, Director General, GSMA
 - Chuck Robbins, Chief Executive Officer of Cisco.



CTO/CSO KEYNOTE



5G – OPPORTUNITIES BEYOND SMARTPHONES

- CTO Ulf Ewaldsson
- CSO Rima Qureshi
- Topics:
 - 5G eco system
 - important milestones
 - partners
 - emerging opportunities.
- Guests:
 - Aicha Evans, Corporate Vice President of Platform Engineering Group at Intel;
 - Alex Choi, CTO of SK Telecom;
 - Gary Shapiro, President & CEO of the Consumer Technology Association.

Ericsson

firsthand
partner discussion
NFV ecosystem
Dear launches

Media
held
5G

page Society Vestberg Collaboration keynote
Web all World Barcelona booth Cisco
global efficiency highlighting here having Buzz

Ewaldsson live Partnering day Analytics Mobile
Geely more E-band Congress event

hyperscale leaders Service new Check selects forces
functions about Enable flowing GSMA great Quanta disruption

Teaming CEO taking Transformation IoT

MWC globally Amazon ideas Follow keep Telecom first
feed Hans TV Today Twitter Services

Hotel capacity Network hosted just form
Yesterday Google team Hungary industry announces Next-generation

Customer Ericsson's partnerships Colleagues
discussions forget Gbps

pages generation
announcements Cloud Experience
Facebook Networked

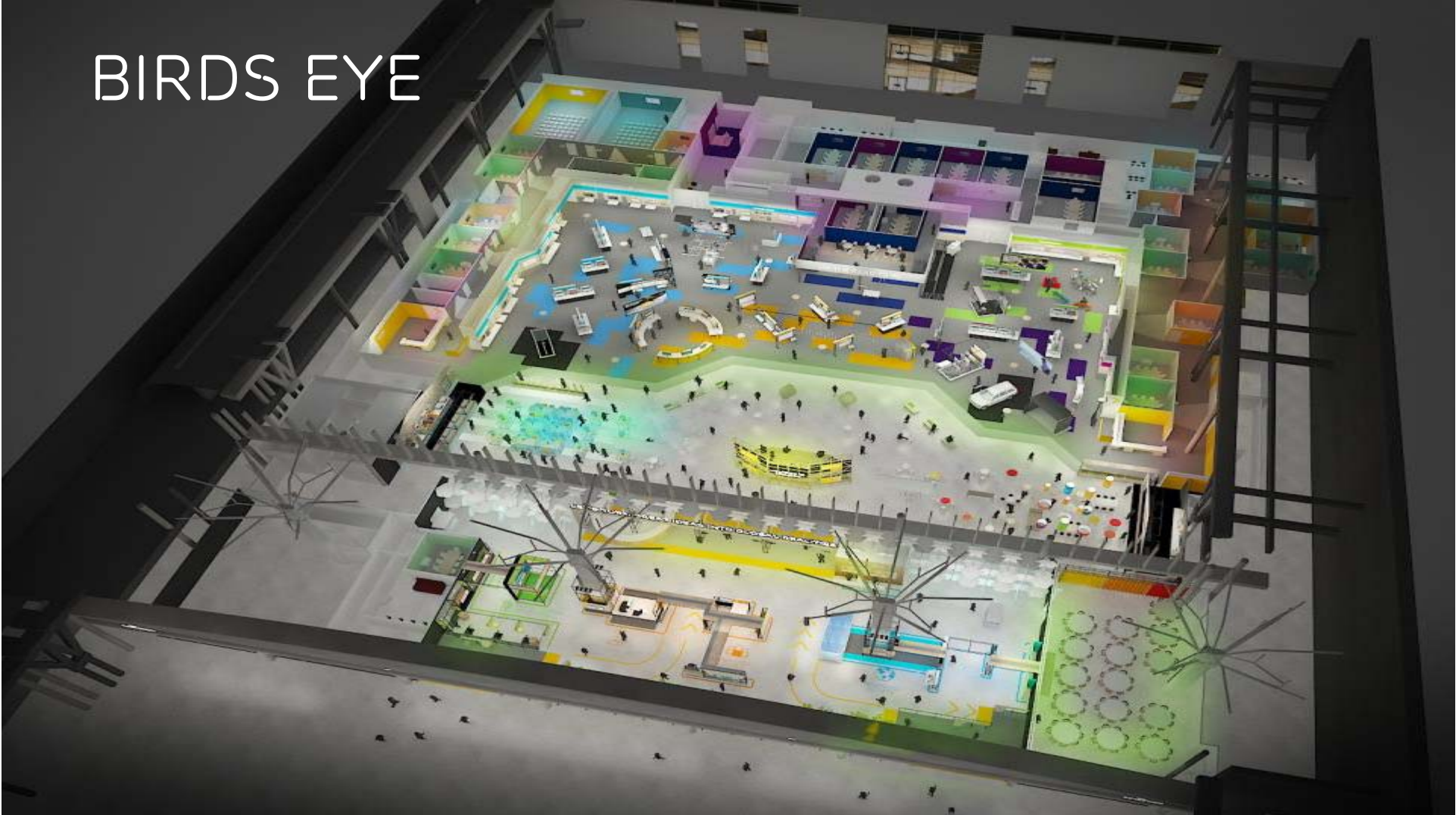
THE ERICSSON WORLD



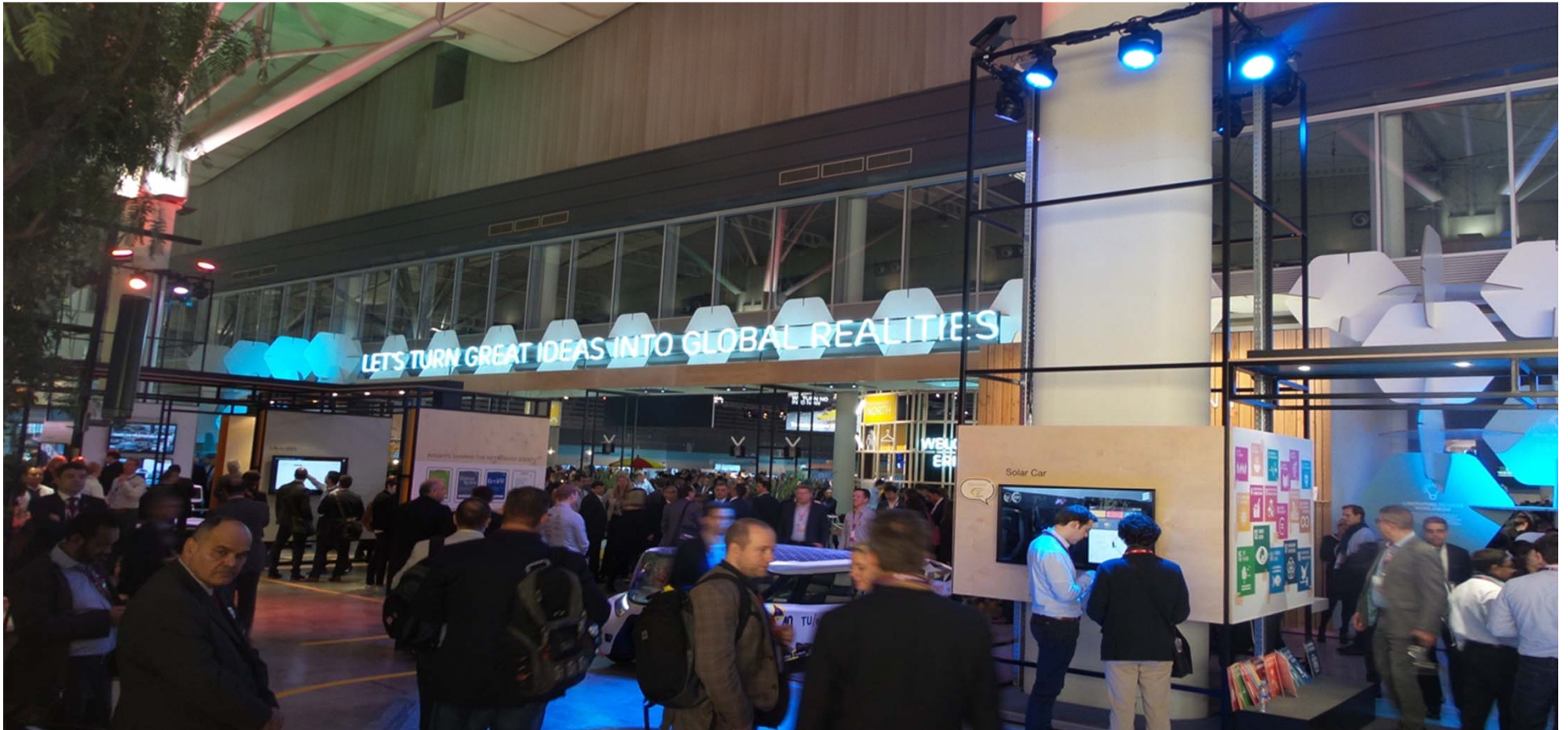
FACTS FROM THE E/// STAFF



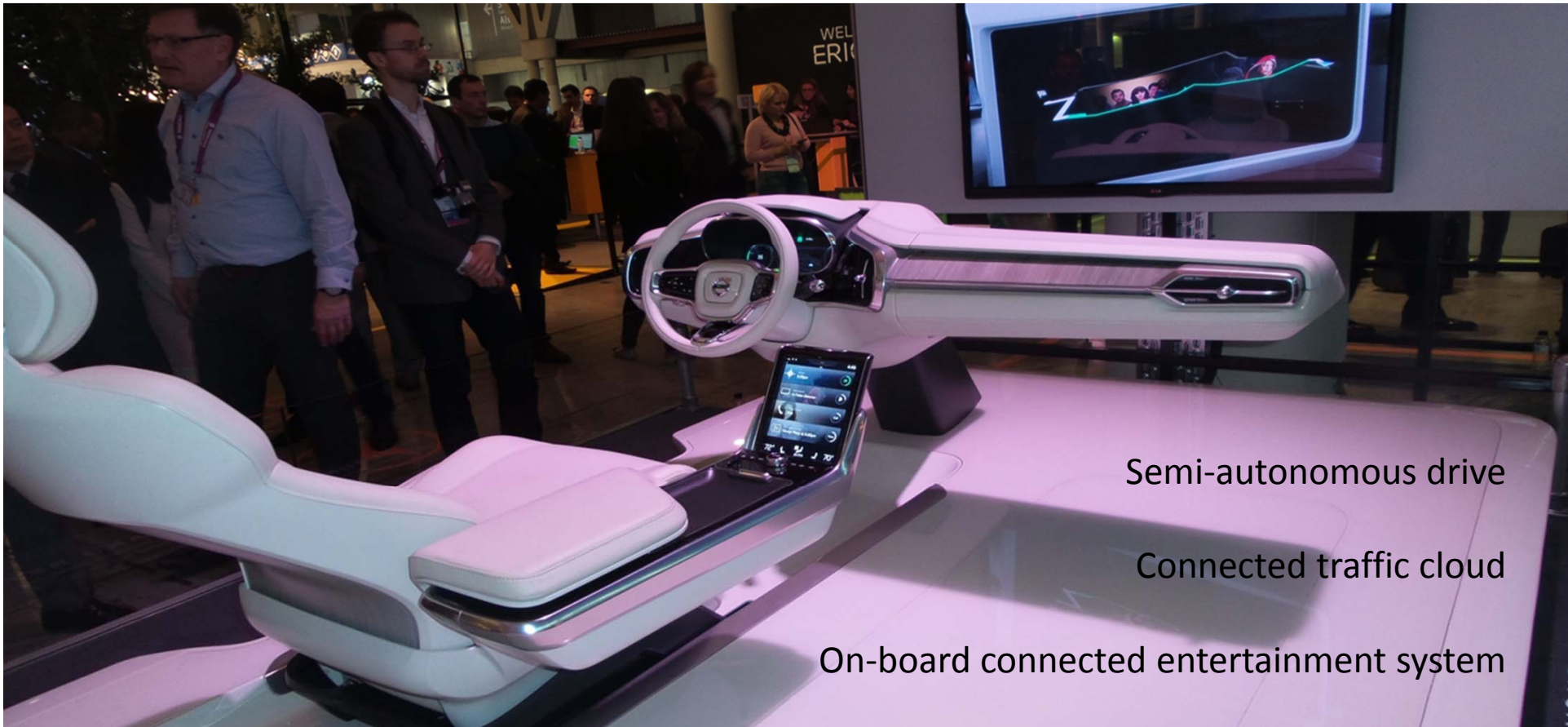
BIRDS EYE



EXHIBITS ON THE OUTER SPACE



WHEN YOU DRIVE



Semi-autonomous drive

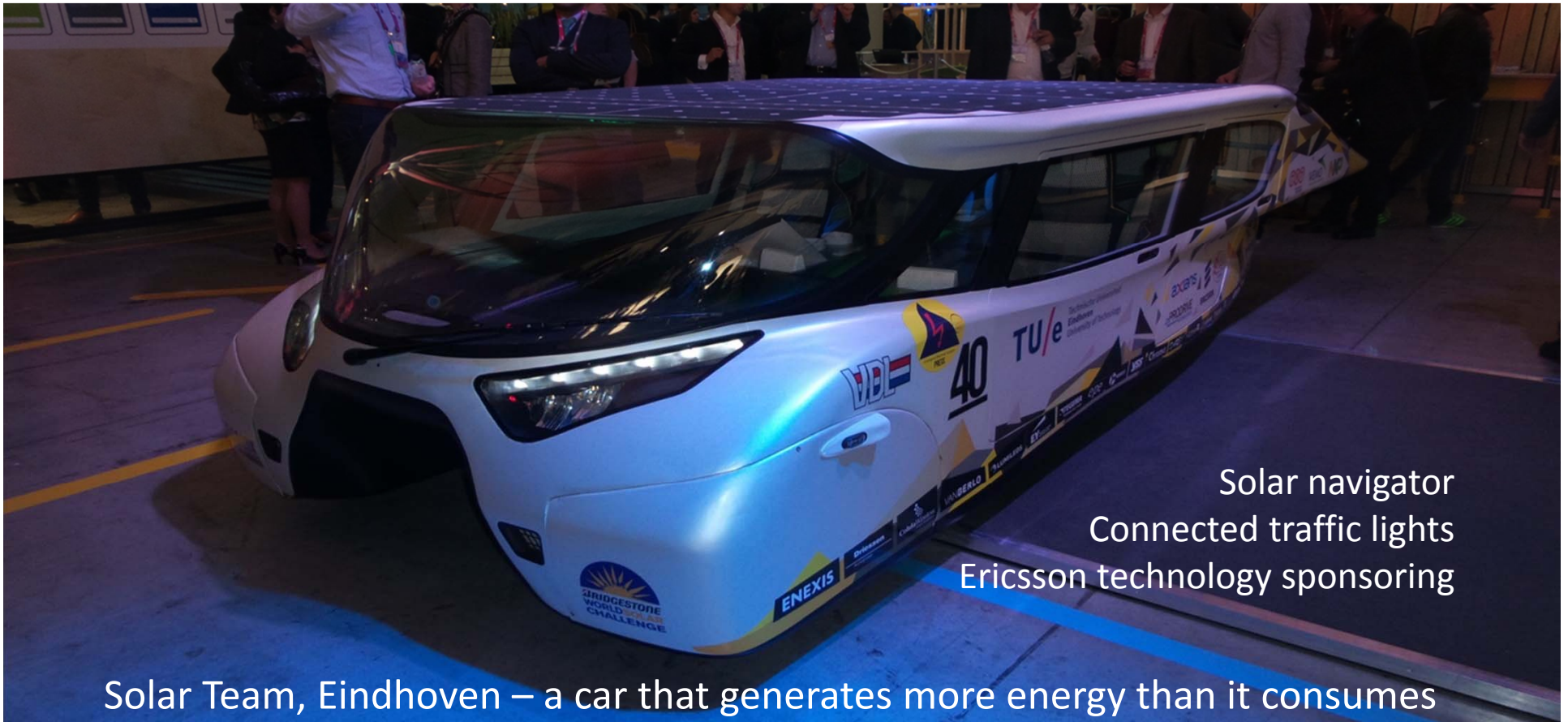
Connected traffic cloud

On-board connected entertainment system

WHEN THE CAR DRIVES



CONCEPT CAR FOR ENERGY EFFICIENCY



Solar navigator
Connected traffic lights
Ericsson technology sponsoring

Solar Team, Eindhoven – a car that generates more energy than it consumes

LOOKING IN THE MIRROR



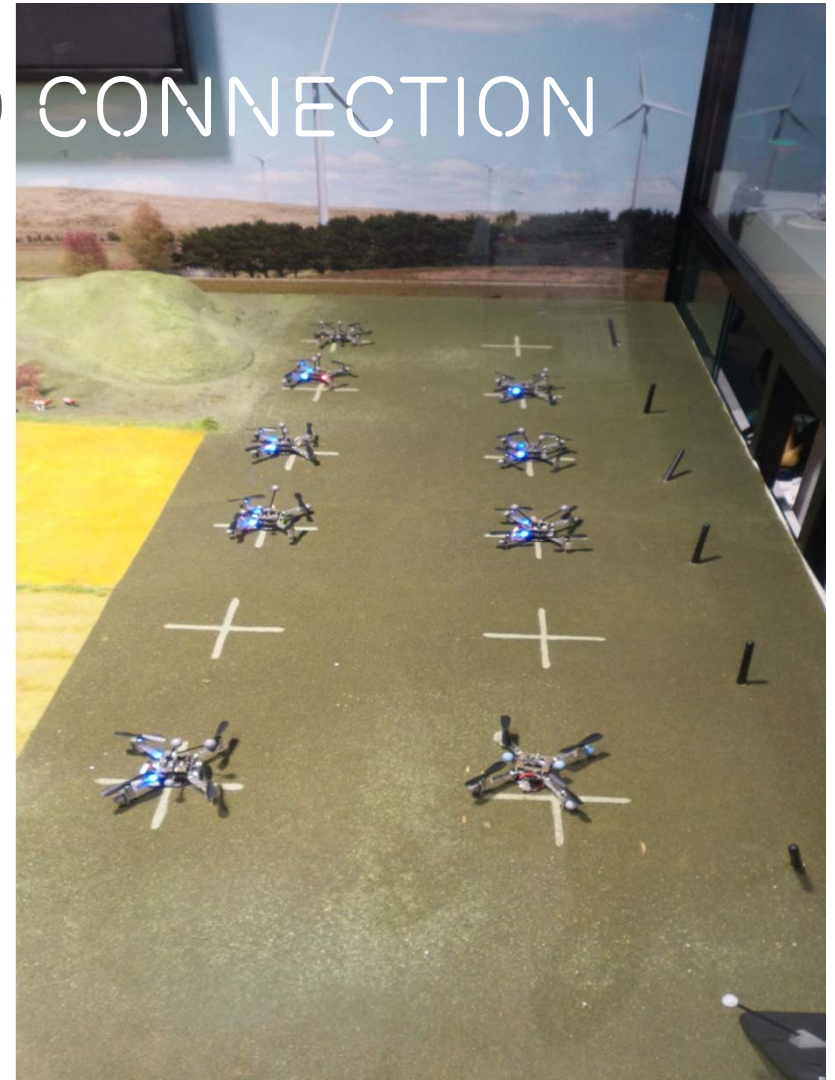
Stella Lux

The energy positive family car
World Solar Challenge 2015 Winner in Cruiser Category

DRONES WITH CLOUD CONNECTION

DRONE COPTERS

- For industry use
- Cloud connected
- Semi-autonomous drive for safe landing
- Haptic (kinesthetic) control



HOUSING CONCEPT

FOR BILLIONS OF PEOPLE

- Design concept
- Wind and solar power
- Energy efficiency
- Water saving

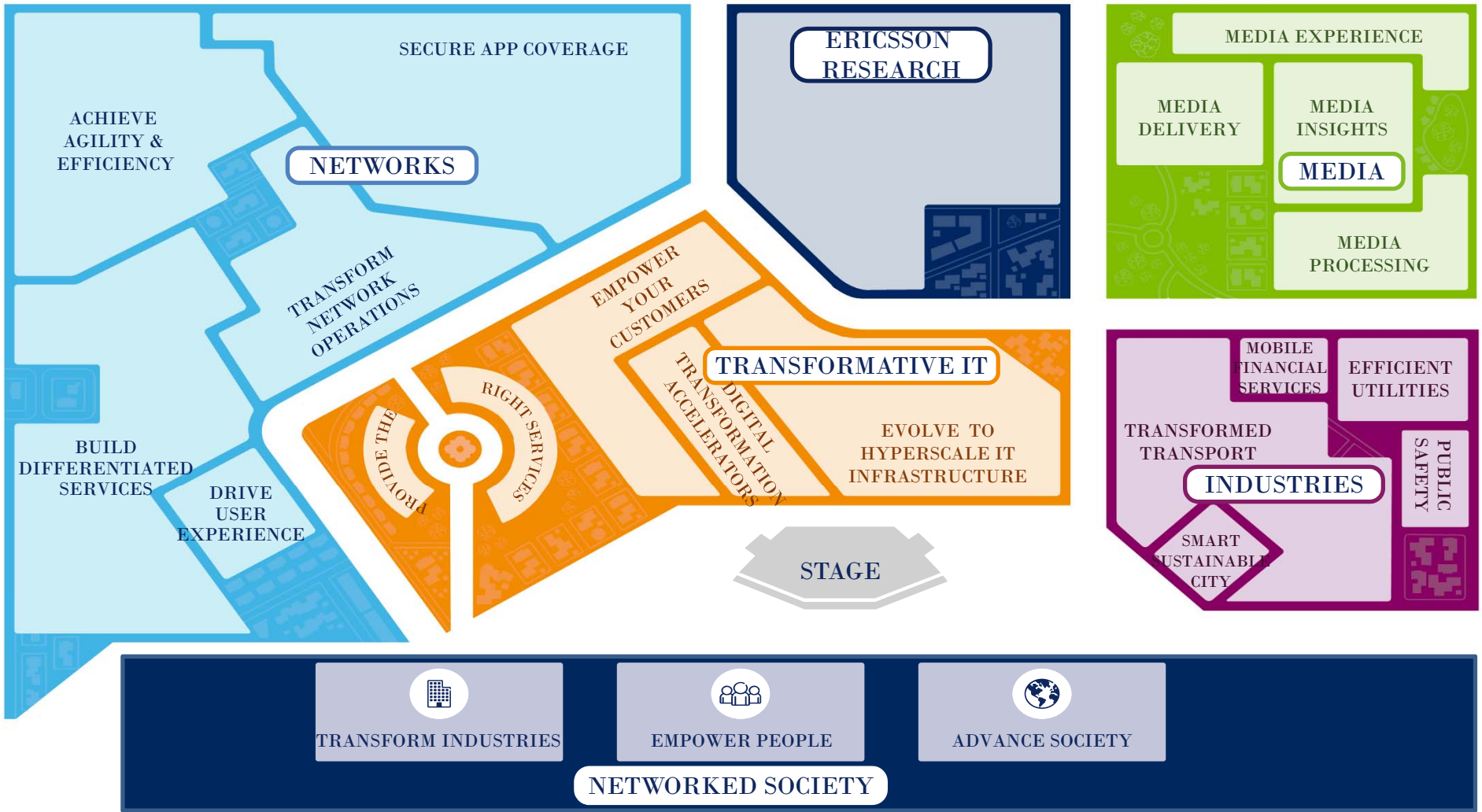


CONNECTED WATER



INDUSTRY IMPLEMENTATION

- Avoid costly measurements
- Speed-up alerting system
- Continuous measurement
- In cooperation with AT&T
- IoT and Cloud based solution



ERICSSON LAUNCHES

1/2



Smart Metering as a Service



Ericsson's Smart Metering as a Service (SMaaS) is an end-to-end solution that streamlines utility companies' business processes, reducing the costs and allowing them to focus on their core business.

Integrated Video Insights



Integrated Video Insights is a powerful data analysis toolkit that helps video service providers aggregate and analyze large amounts of data derived from users, video platforms and networks.

Diversifying Cellular for Massive IoT



Mobile networks will be platform for IoT growth in Smart Cities, Utilities and other industries with Ericsson's complete cellular low-power wide-area (LPWA) solution.

User and IoT Data Analytics



Embedded subscriber database analytics help operators improve internal efficiency and monetize data assets, while exploring new cross-vertical Internet of Things (IoT) applications.

Experience Centric Managed Services



Operators want to bridge the gap between network performance and customer perception. This latest solution allows them to measure the entire customer experience to meet customer service expectations.

Delivering Extreme App Coverage



Ericsson delivers extreme app coverage for operators and end users with Gigabit LTE and Elastic RAN, while new products within the Ericsson Radio System meet the ever-growing needs of the Networked Society.

ERICSSON LAUNCHES

2/2



Mobile Broadband for Everyone



Ericsson is presenting a three-part solution that address performance, efficiency and innovation as operators continue to connect the world.

Revenue Manager



Revenue Manager's breakthrough, cloud-ready and fully convergent architecture incorporates near limitless configurability to support any type of service, subscription or business model.

Dynamic Service Manager



Today's business environment requires fast-changing network services. Ericsson's latest solution allows operators to lower operating costs across network domains and technologies, regardless of vendors.

IoT Transformation



This is a comprehensive set of professional services and a modular IoT reference solution that enables operators to reach new customers, capture revenues beyond connectivity, and monetize assets ranging from apps to data.

Hyperscale Now



Ericsson uses automated, governed and secure software-defined infrastructure to help customers to industrialize cloud infrastructure, operate with efficiency and transform businesses



CONTINUED GROWTH IN MOBILE DATA TRAFFIC

9.2
BILLION

mobile
subscriptions
by the end of 2020

10X

growth in smartphone traffic
between 2014 and 2020



of mobile data traffic will
come from video in 2020

RADIO TRANSFORMATION REQUIREMENTS



2020 VISION → Multi-standard // Multi-band // Multi-layer

RADIO
PERFORMANCE



Deliver the
best user
experience

SCALABILITY



Meet the
challenge
of growth

FLEXIBILITY



Deliver capacity
and performance
where it is needed

ENERGY
EFFICIENCY



Sustainable
and profitable
networks

TOTAL COST
OF OWNERSHIP



Secure the best
business case for
mobile networks

INTRODUCING – 3 NEW POWERFUL RADIOS



More power

RADIO
2212



▶ 2x80W output power

4 TX / 4 RX

RADIO
4415



▶ 4x4 MIMO

New band

RADIO
2012

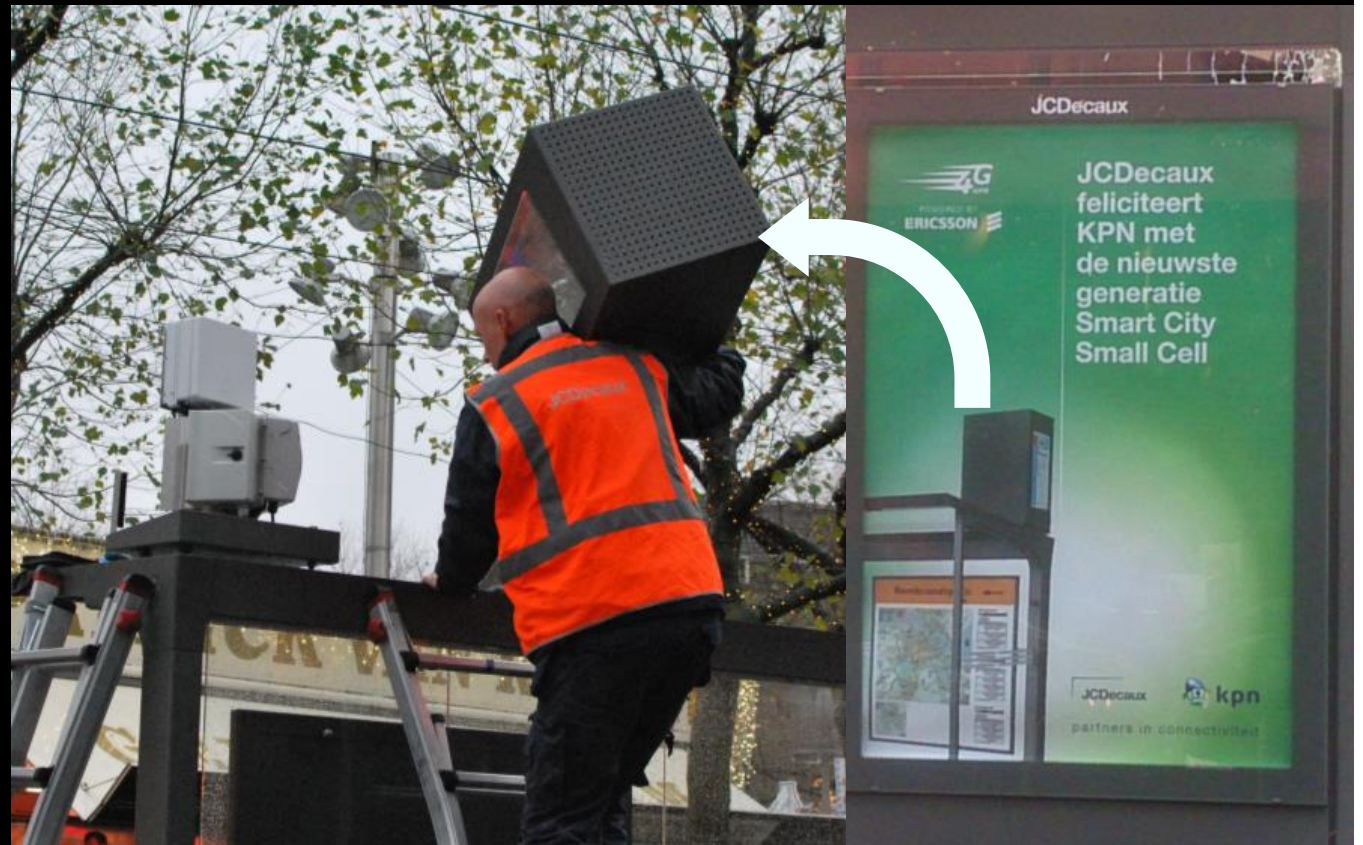


▶ Supplemental Downlink
on 1400 MHz

MULTI-STANDARD INCLUDING GSM

CONNECTED BUS STOP

- The capacity is planted where the users need it
- Small cell deployment on street level
- Most compact radio in the industry
- Tight coordination with Macro network



USING EVERY SURFACE



In cooperation with Swisscom

- Swisscom and Ericsson have deployed the [world's first underground vault site for LTE and small cells](#) in Switzerland.
- Ericsson Vault Remote Radio Unit
- Kathrein Street Connect – an in-ground micro cell antenna system
- Swiss authorities have approved 250 new rollouts across the country



antenna in the street.

LTE EVOLUTION



Unlicensed &
Carrier
Aggregation



Low latency

Dramatically improved
responsiveness and
C-MTC emerging.



VoLTE

Stability, performance.



MTC / IoT

Low cost, low power,
extended coverage
with Cat-M.



Lean design

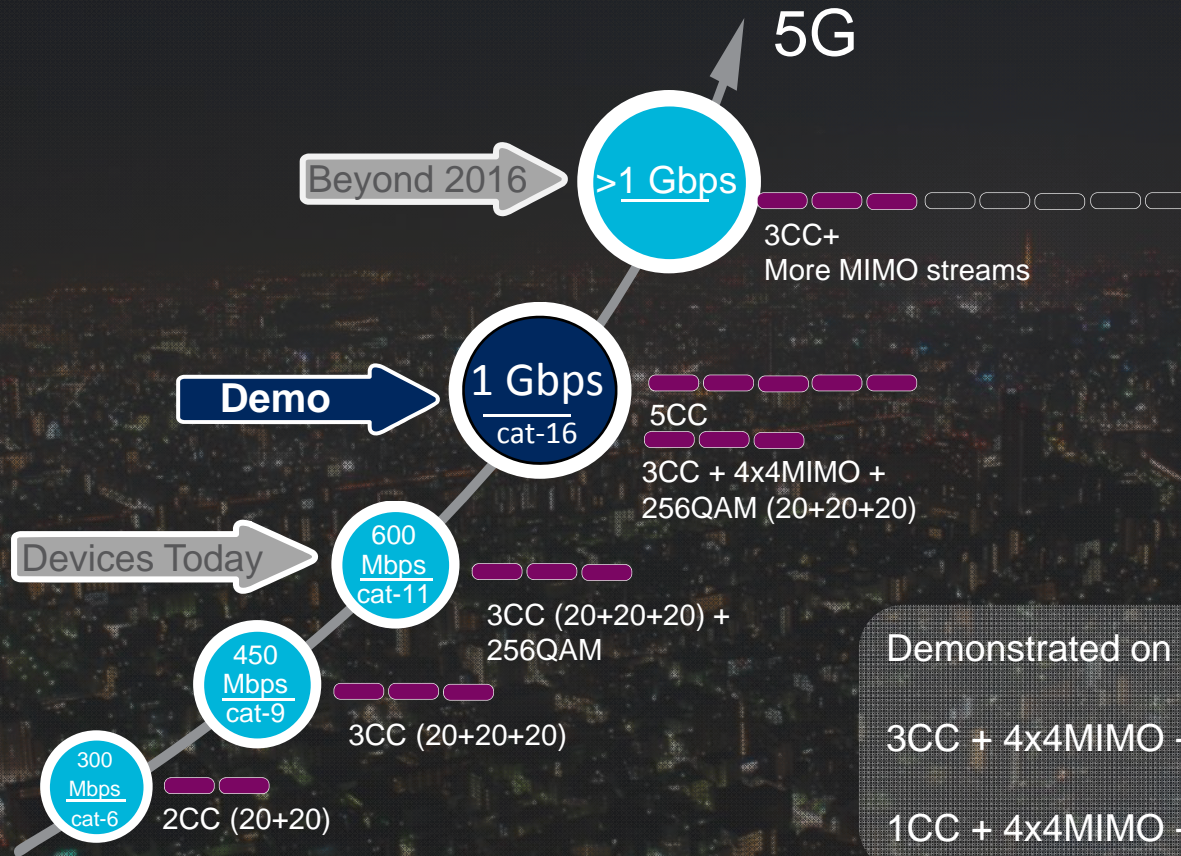
Reduced inter-cell
CRS interference
through innovation.



Architecture

D-RAN, C-RAN, E-RAN

SPEED EVOLUTION



Demonstrated on the MWC:
3CC + 4x4MIMO + 256QAM ~ 979 Mbps
1CC + 4x4MIMO + 256QAM ~ 371 Mbps

EXPERIENCE BEYOND EXPECTATIONS



APP EXPERIENCE OPTIMIZATION

>2.5B
SUBSCRIPTIONS
IN NETWORKS
MANAGED BY US


CONSUMERLAB
INSIGHTS

40%
TRAFFIC IN ERICSSON
INFRASTRUCTURE


OTT PARTNERSHIP
PROGRAM

NETWORK BENCHMARK PREPARATION OPTIMIZE FOR END USER EXPERIENCE

Magyar Telekom, Hungary

Hungary is a saturated market for traditional telecom services. The entry of new MVNOs is increasing the competition, existing operators are focusing on the quality of service aiming best customer experience.

Ericsson offered a partnership within its Best Performing Networks initiative that included several service modules targeting different aspects of the network.

The joint target of the engagement was to win the P3 network benchmarking test in Hungary and included network audit. Ericsson and Magyar Telekom internal projects have been executed to optimize the network.



Networks IT Media Industries

Ericsson launching SW 17A for Massive IoT



90%

MODULE COST
REDUCTION

NB-IoT devices support



10+

YEARS
BATTERY LIFE

Extended Long DRX (LTE-M
& NB-IoT)



7X

BETTER
COVERAGE

Extended Coverage (NB-
IoT)



1M+

DEVICE
CONNECTIONS

Support massive number
of connections per cell
site

5G IS DRIVEN BY THE APPLICATIONS



BROADBAND EXPERIENCE
EVERYWHERE, ANYTIME



MEDIA
EVERYWHERE



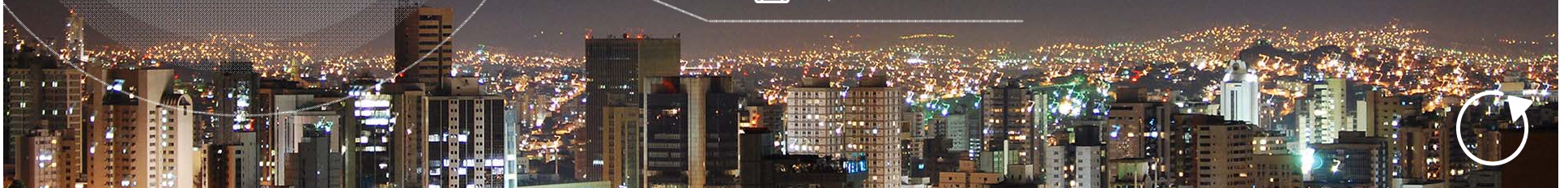
SMART VEHICLES,
TRANSPORT & INFRASTRUCTURE



CRITICAL CONTROL
OF REMOTE DEVICES



INTERACTION
HUMAN-IOT

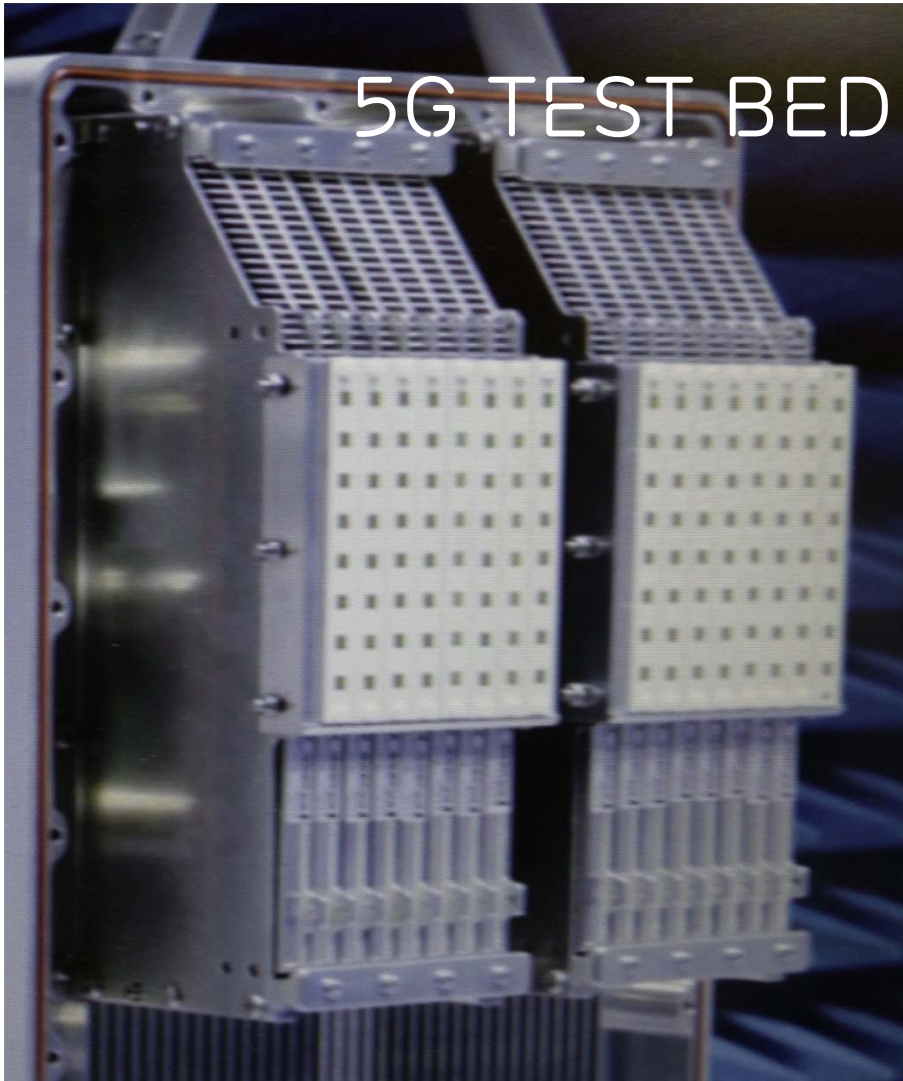


5G TEST BED



The components

- Stationary 5G terminal
- Moving 5G terminal
- 8 x 8 beam forming antenna elements
- Beam Tracking
- Multiuser MIMO
- Beam forming



5G TEST BED - ANTENNAS



THE COMPONENTS

- Stationary 5G terminal
- Moving 5G terminal
- 8 x 8 beam forming antenna elements
- Display 1 – Beam Tracking
- Display 2 – Individual DL speeds
- Display 3 – Total DL speed

5G TEST BED – DISPLAY 1.



5G TEST BED – DISPLAY 2.



5G TEST BED – DISPLAY 3.

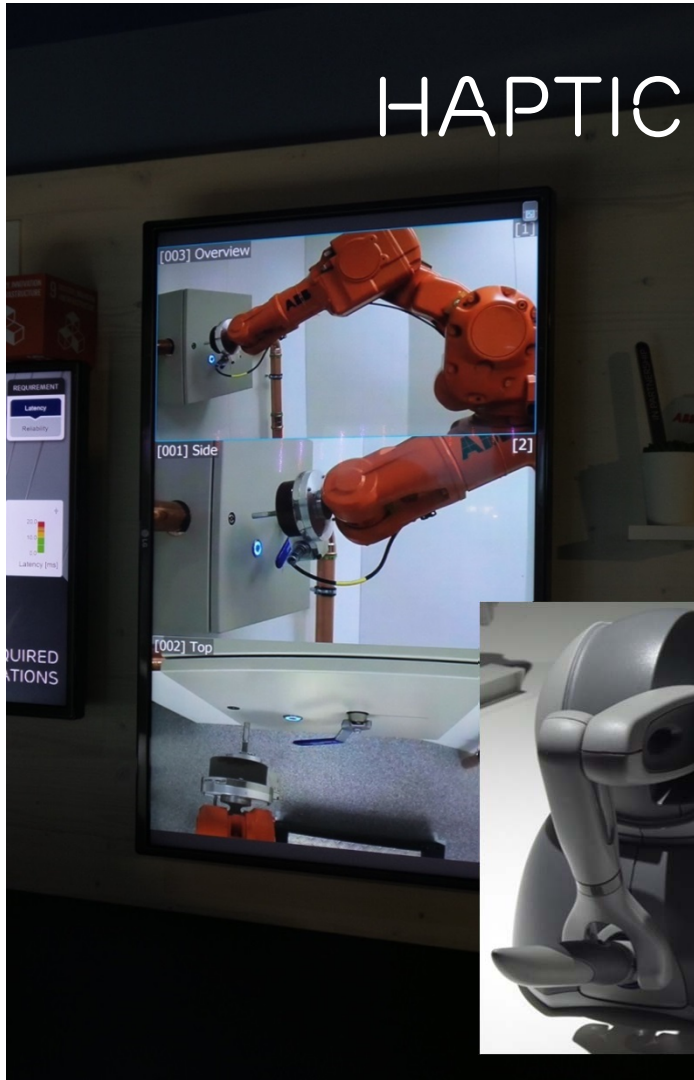


THE COMPONENTS

- Stationary 5G terminal
- Moving 5G terminal
- 8 x 8 beam forming antenna elements
- Display 1 – Beam Tracking
- Display 2 – Individual DL speeds
- Display 3 – Total DL speed



HAPTIC CONTROL OVER 5G

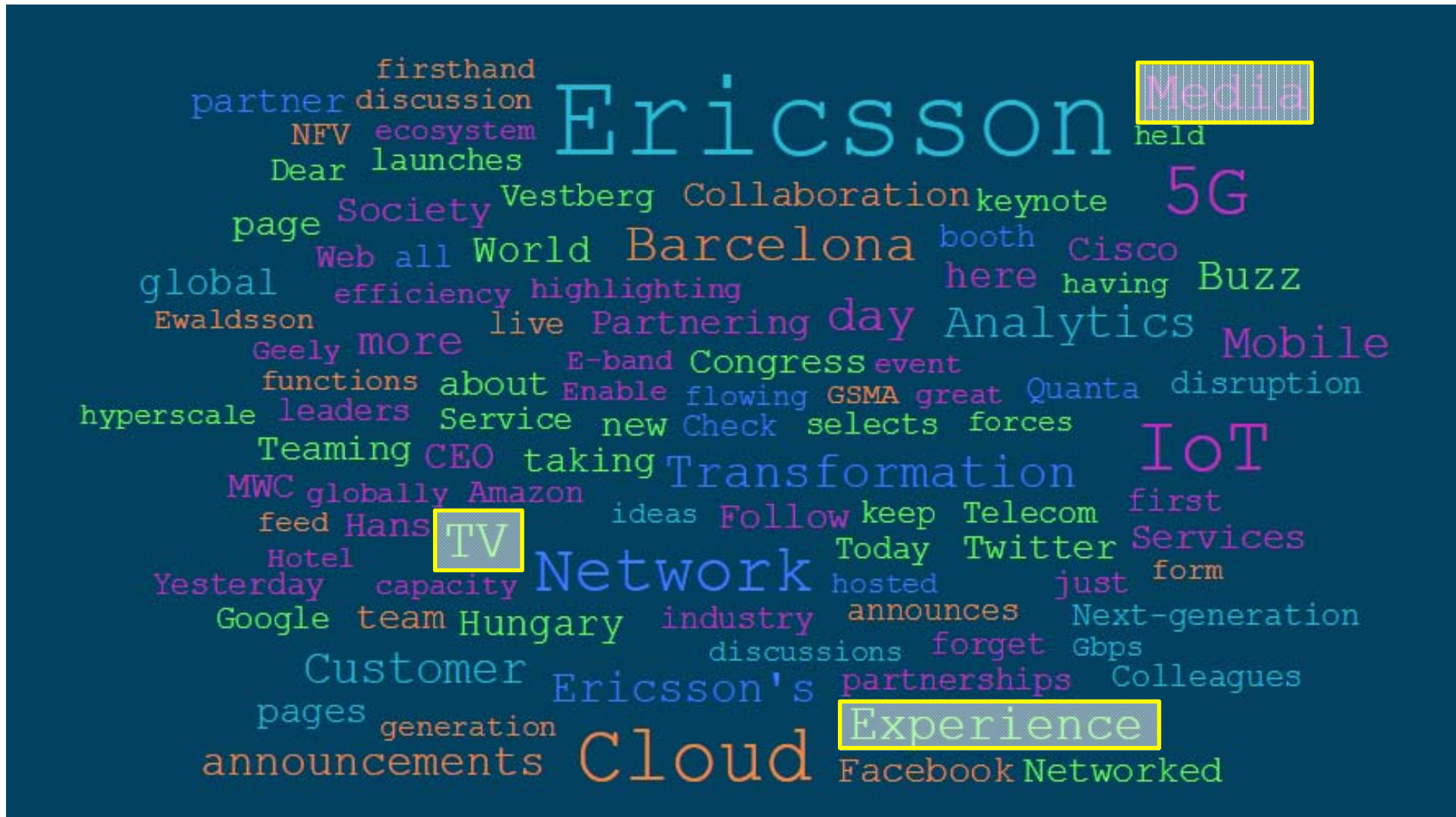


Partnering with ABB

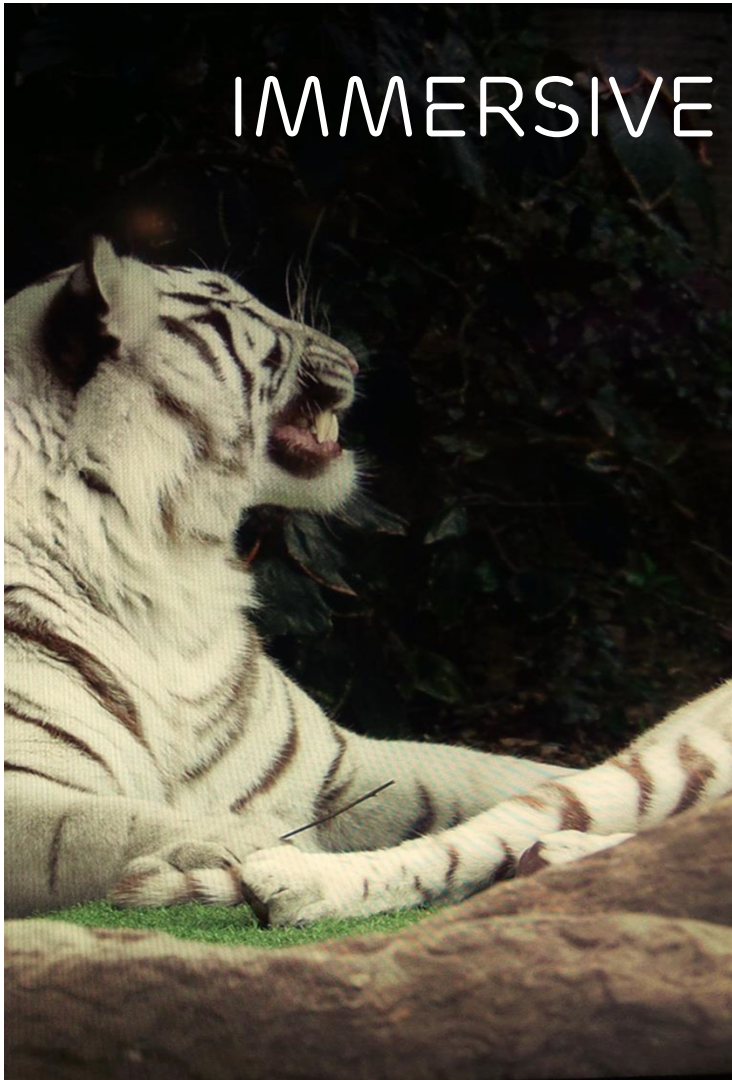
- Control arm connected to a robotic arm installed 2500 km away in Sweden
- Robotic arm follows movements of the control arm
- Control arm gives haptic feedback
- Feedback quality depends on connection quality (delay)

5G FOR PLATOONING





IMMERSIVE TELEVISION



INCREASED DYNAMIC RANGE

- More vivid picture
- Large distance between dark and bright parts of the picture
- Needs special TV sets but no increase in number of dots

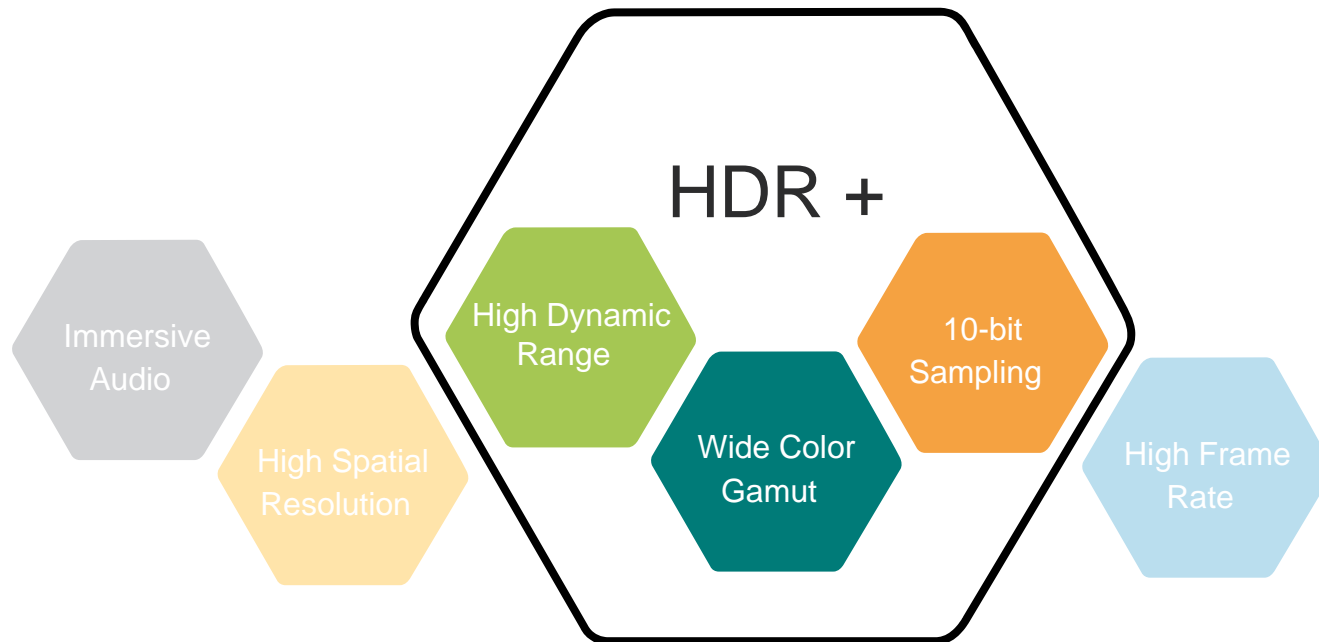


IMMERSIVE VIEWING EXPERIENCE

The 6 key ingredients



IMMERSIVE VIEWING EXPERIENCE: HDR+



HIGH DYNAMIC RANGE (HDR)



SHARPER IMAGES AND MORE 'RESOLUTION' ON ANY SCREEN



IMMERSIVE TV EXAMPLE



VIDEO INSIGHTS



VIDEO DELIVERY IS KEY

- User experience is highly influenced by video quality
- Analytics can reveal
 - Video stoppage
 - Buffering
 - High latency or jitter
 - Blurred picture
- Analytics can find
 - Who are affected?
 - How many are they?
 - Where are they?

Ericsson

Media
held
5G
keynote
Collaboration
Vestberg
Society
page
Barcelona
World
Web
all
Cisco
booth
here
having
Buzz
global
efficiency
highlighting
Ewaldsson
live
Partnering
day
Analytics
Mobile
Geely
more
E-band
Congress
event
functions
about
Enable
flowing
GSMA
great
Quanta
disruption
hyperscale
leaders
Service
new
Check
selects
forces
Teaming
CEO
taking
Transformation
IoT
MWC
globally
Amazon
ideas
Follow
keep
Telecom
first
feed
Hans
TV
Today
Twitter
Services
Hotel
capacity
Network
hosted
just
form
Yesterday
Google
team
Hungary
industry
announces
Next-generation
discussions
forget
Gbps
Customer
Ericsson's
partnerships
Colleagues
pages
generation
Experience
announcements
Cloud
Facebook
Networked



CLOUD

- Industrialize cloud infrastructure
 - Industrialize cloud infrastructure built on security, automation, governance, and accessibility
- Operate with efficiency
 - Cloud transformation, management and orchestration to make operations more efficient
- Transform businesses
 - New opportunities enabled by cloud adoption, wider ecosystems and innovative business models



HYPERSCALE CLOUD



HDS8000

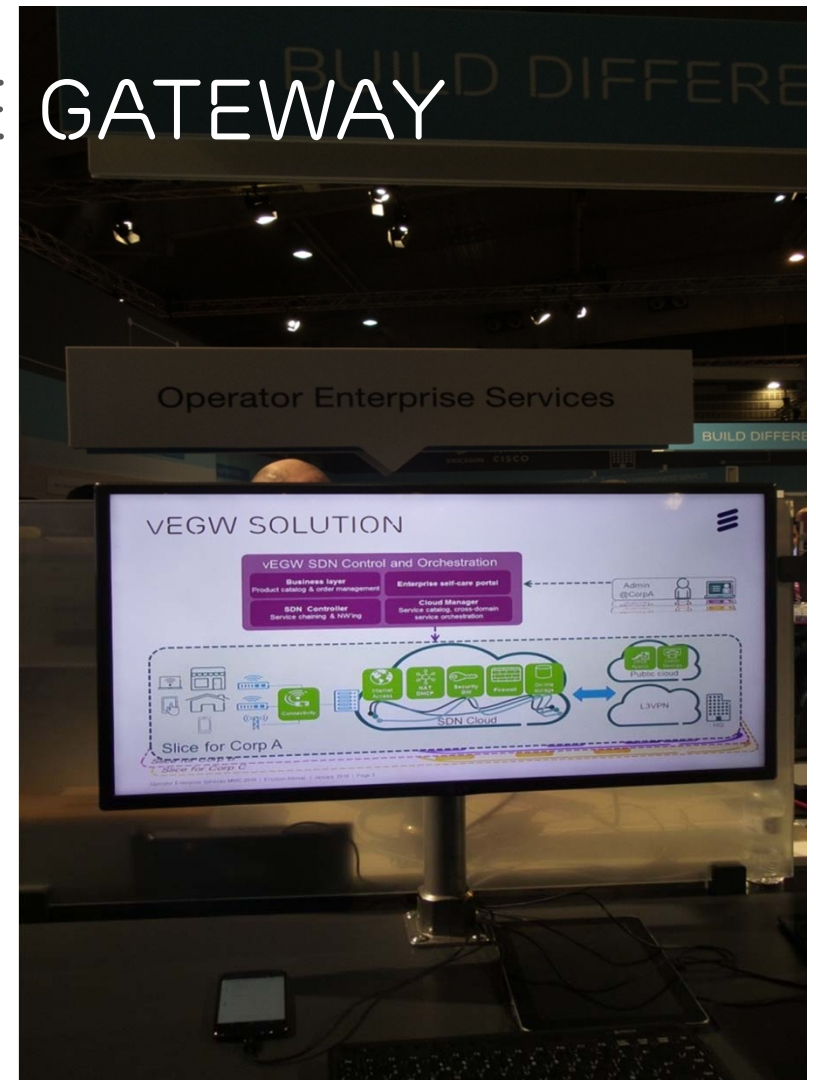
- Intel Partnership
- All fiber connections
- Added copper interconnectivity
- On the fly re-configuration
 - Memory allocation
 - CPU allocation
 - Storage allocation
- Cloud Manager Software



VIRTUAL ENTERPRISE GATEWAY

CLOUD COMPUTING WITH vEGW

- Before: CPE delivers complex functionality
 - Security
 - FW
 - DHC
 - NAT
- After: CPE provides connectivity
- Service provider cloud delivers all necessary functions
 - Low cost CPE
 - Higher reliability
 - Fast configuration



NFV – VIRTUAL EPC TEST



EXTREME TESTING

- vEPC installed on Data Center HW in Sweden
- 50M simultaneous subscriber connections simulated
- 35M LTE + 10M GSM + 5M WCDMA



NEW PRODUCT AFTER 72 DAYS



ERICSSON DYNAMIC SERVICE MANAGER



ENABLING FAST-CHANGING NETWORK SERVICES

Automated coordination of on-demand networks across domains, technologies and vendors

Network services:

- › Mobile backhaul
- › IP core
- › Business VPNs
- › Fixed broadband
- › Inter-data center connectivity

Portals Order Management Enterprise Catalog

Ericsson Dynamic Service Manager

Multi-service
Multi-domain
Multi-vendor
Multi-layer

Policy Management Service Orchestration Network Analytics

Closed-loop

FIXED ACCESS AGGREGATION EDGE IP CORE

Ericsson Dynamic Service Manager | Ericsson Internal | 2016-02-19 | Page 15

OUR COMBINED CAPABILITIES



>2,500
Consulting and
Systems
Integration projects
per year

E2E and deep
knowledge
across Telecom
business

Customers in
180+
countries

Leaders in
mobility
and IP

>300
Managed
services
contracts
combined

77,000+
Services
professionals –
66,000 from
Ericsson and
11,000 from Cisco

>1 Billion
Managed Services
Subscribers

Strong local
competence and
global scale

In partnership with



firsthand
partner discussion
NFV ecosystem
Dear launches
page Society Vestberg Collaboration keynote
global Web all World Barcelona booth Cisco
Ewaldsson efficiency highlighting here having Buzz
Geely more live Partnering day Analytics Mobile
functions about E-band Congress event
hyperscale leaders Service new Check selects forces
Teaming CEO taking Transformation IOT
MWC globally Amazon ideas Follow keep Telecom first
feed Hans TV Today Twitter Services
Hotel capacity Network hosted just form
Yesterday team Hungary industry announces Next-generation
Google discussions forget Gbps
Customer Ericsson's partnerships Colleagues
pages generation
announcements Cloud Experience
Facebook Networked



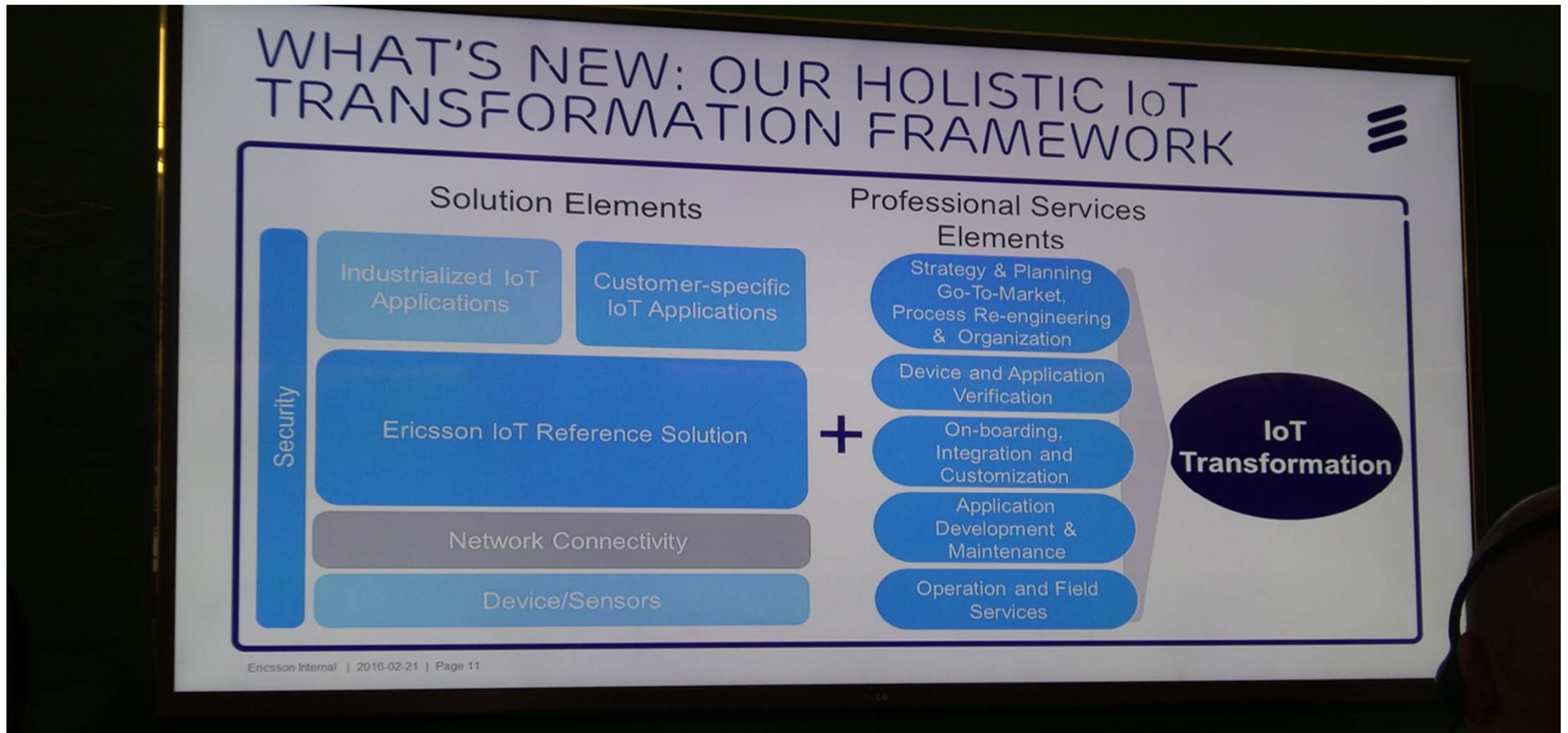
IOT CHALLENGE FOR OPERATORS



HOW TO WIN THE IOT GAME?

- Complex Ecosystem
- High number of devices demand low cost operation
- Limited resources and skills
- Limited experience in transformation
- High upfront investment
- High risk with large installed base

IOT TRANSFORMATION FRAMEWORK



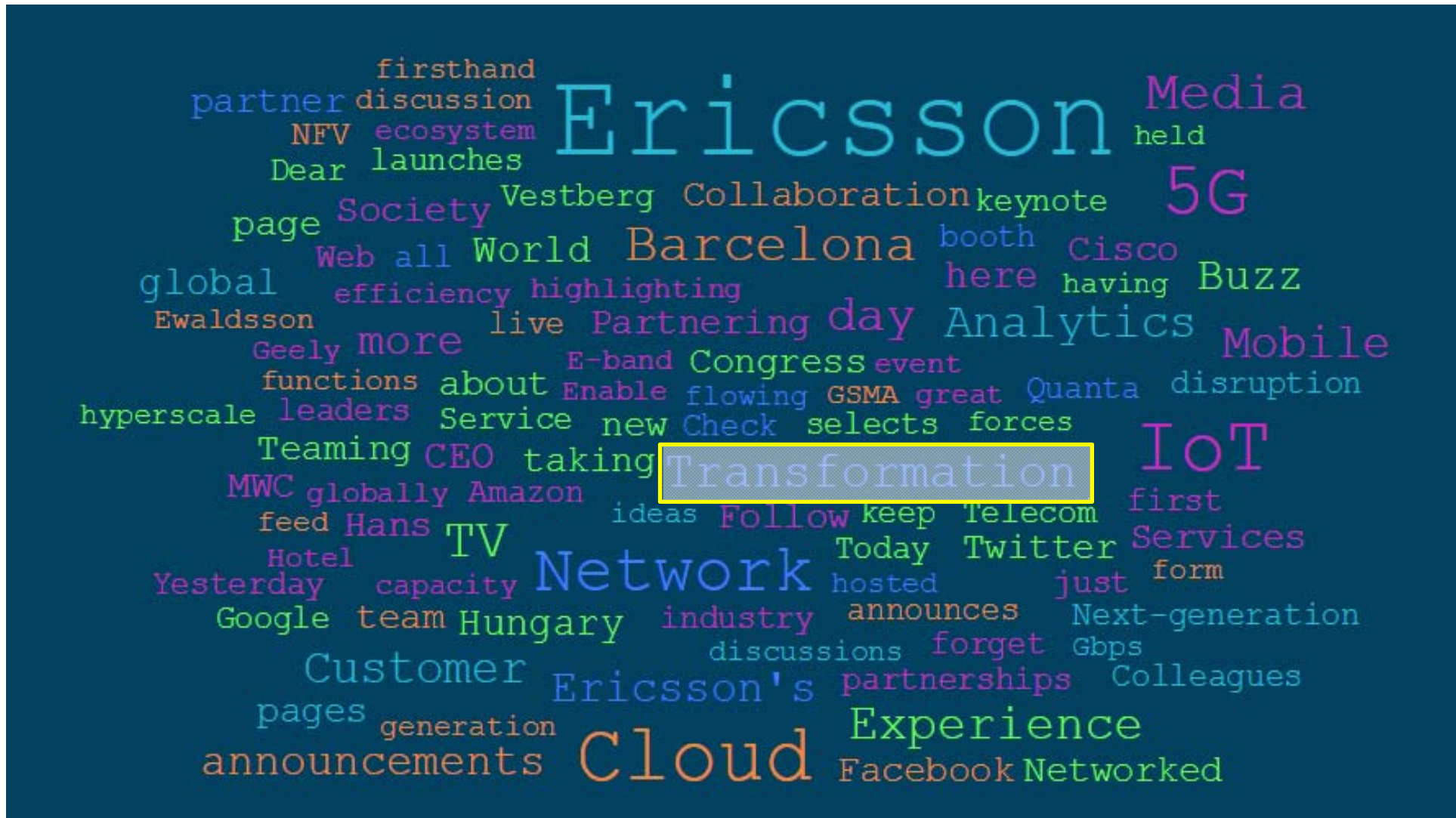


IoT PARTNERSHIPS

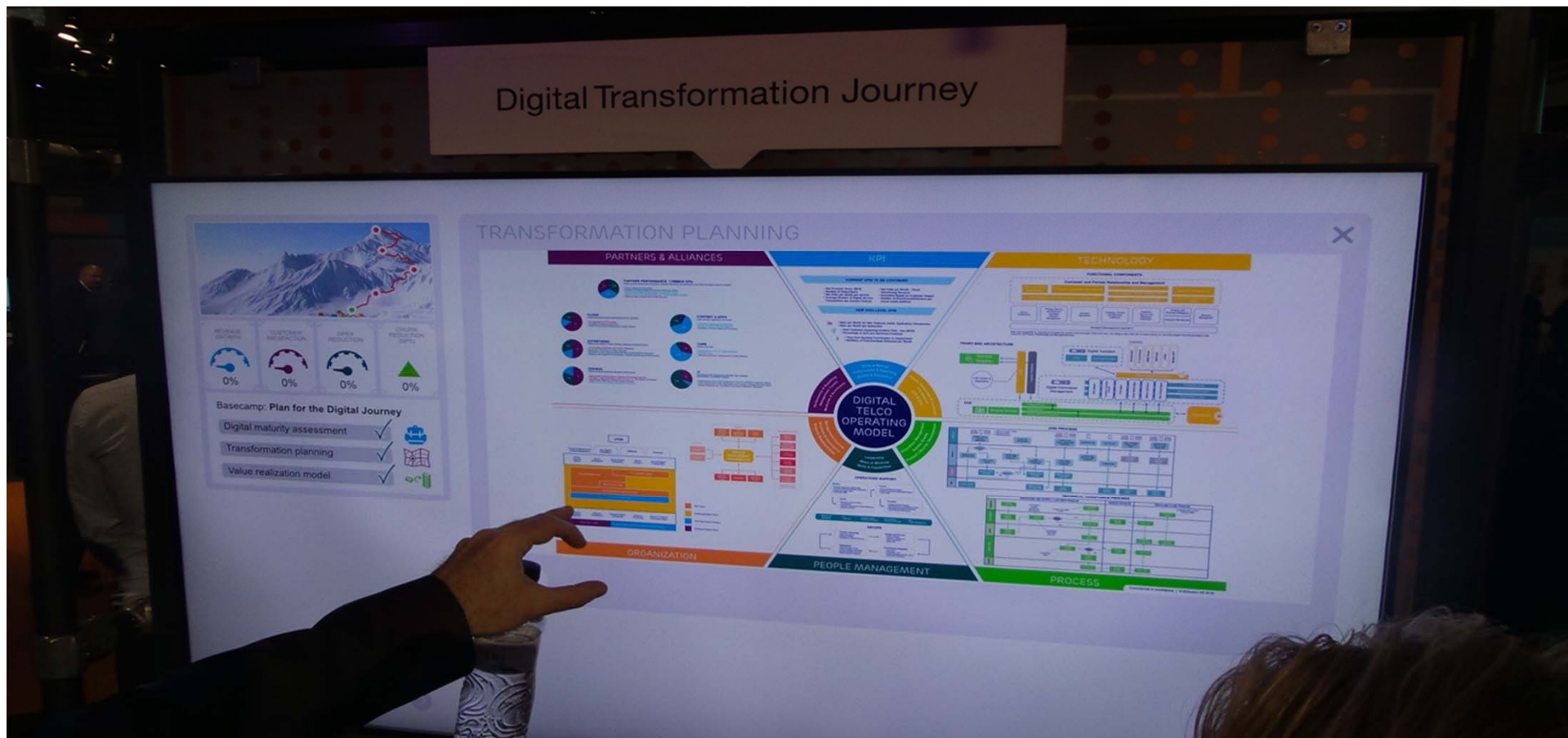


CO-DEVELOPMENT

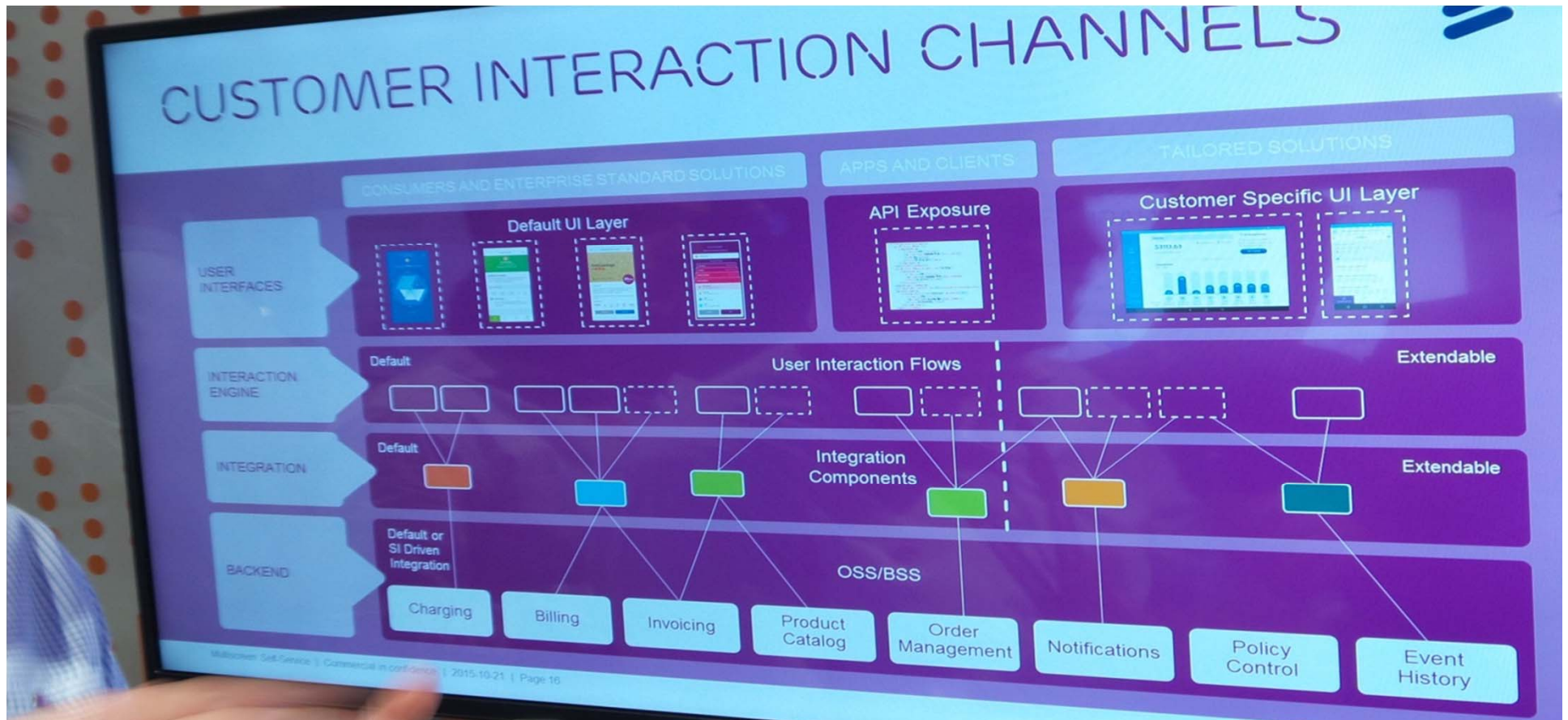
- **Gemalto**
 - Ericsson and Gemalto simplify m2m adoption
 - The solution comprises the [Ericsson Device Connection Platform](#) integrated with the [Gemalto Subscription Management Platform](#)
- **Intel**
 - Ericsson and Intel are working together to establish and bring to market [Ericsson Hyperscale Datacenter System 8000](#) as a best-in-class solution based on [Intel® Rack Scale Architecture](#)

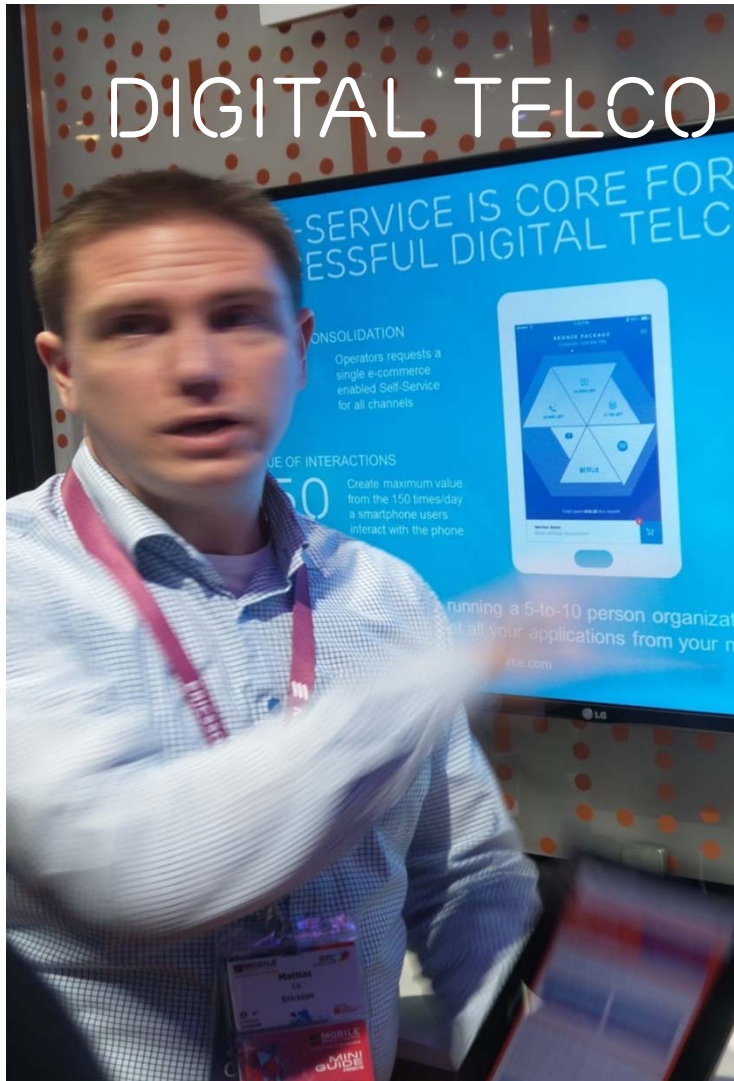


DIGITAL TRANSFORMATION PLANNING



"AMAZONIFICATION"



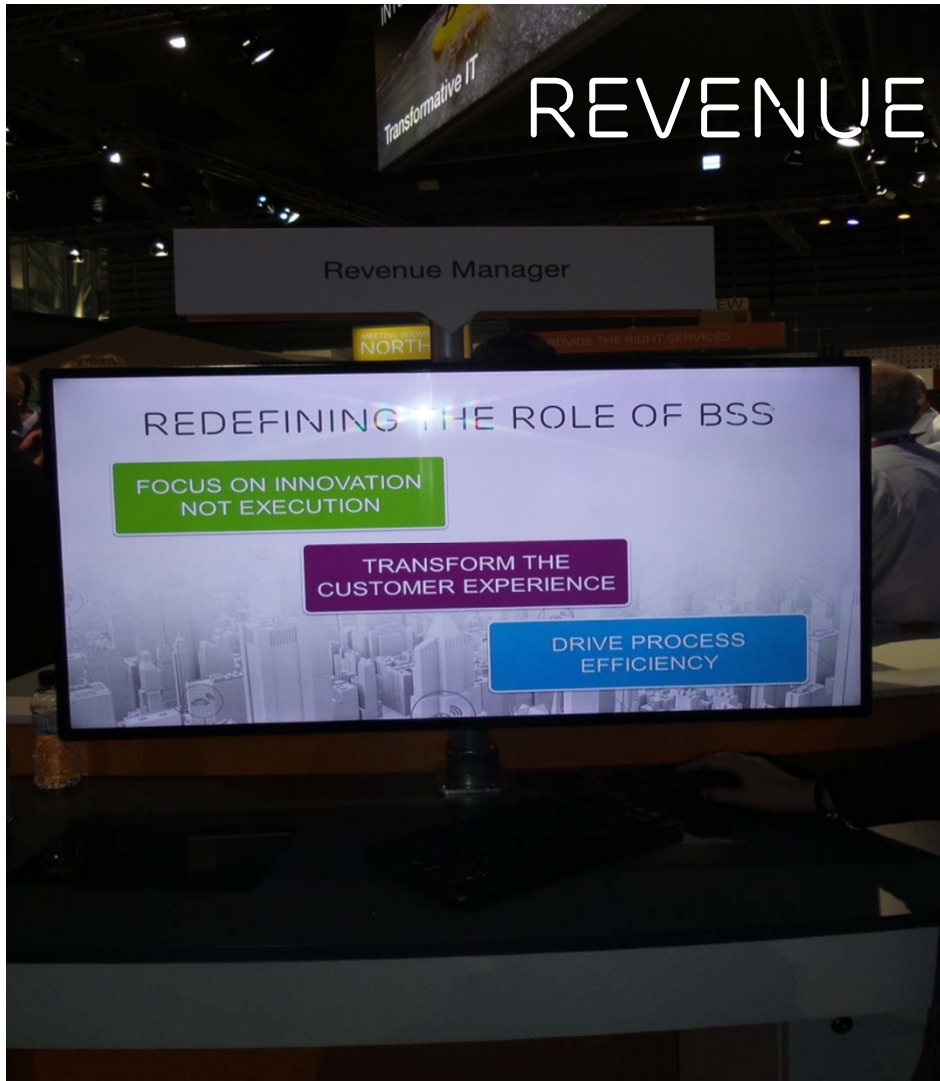


DIGITAL TELCO INTERFACE



EMPOWER YOUR CUSTOMER

- All info on a single interface
- App or HTML5
- Dynamic change of tariff plan
- Can be connected to campaigns
 - Bonus points
 - Coupons
- Immediate feedback on changes
 - Top-ups
 - Re-configuration



REVENUE MANAGER



REDEFINING THE ROLE OF BSS

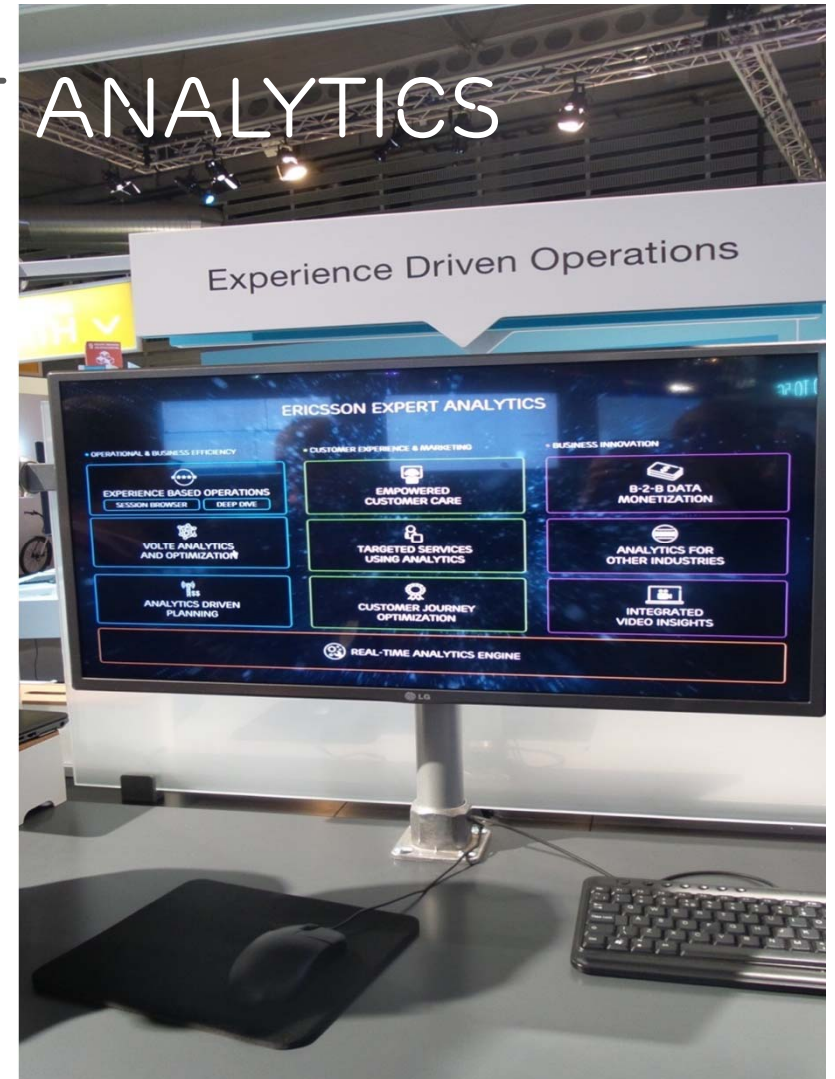
- Charging and billing re-designed
- Focus on
 - Innovation (fast enrollment of new products)
 - Customer experience (support digital on-line channels)
 - Drive process efficiency (with automation and process control)
- Goals:
 - Scale
 - Efficiency
 - Adaptability
 - Speed

firsthand discussion partner NFV ecosystem Dear launches Society Vestberg Collaboration keynote held Media
 Ericsson
 page Web all World Barcelona booth Cisco here having Buzz 5G
 global efficiency highlighting Ewaldsson live Partnering day Analytics Mobile
 Geely more E-band Congress event functions about Enable flowing GSMA great Quanta disruption
 hyperscale leaders Service new Check selects forces Teaming CEO taking Transformation IoT
 MWC globally Amazon ideas Follow keep Telecom first feed Hans TV Today Twitter Services
 Hotel capacity Network hosted just form Yesterday Google team Hungary industry announces Next-generation
 Customer Ericsson's partnerships Colleagues discussions forget Gbps
 pages generation announcements Cloud Experience Facebook Networked

ERICSSON EXPERT ANALYTICS

EXPERIENCE DRIVEN OPERATIONS

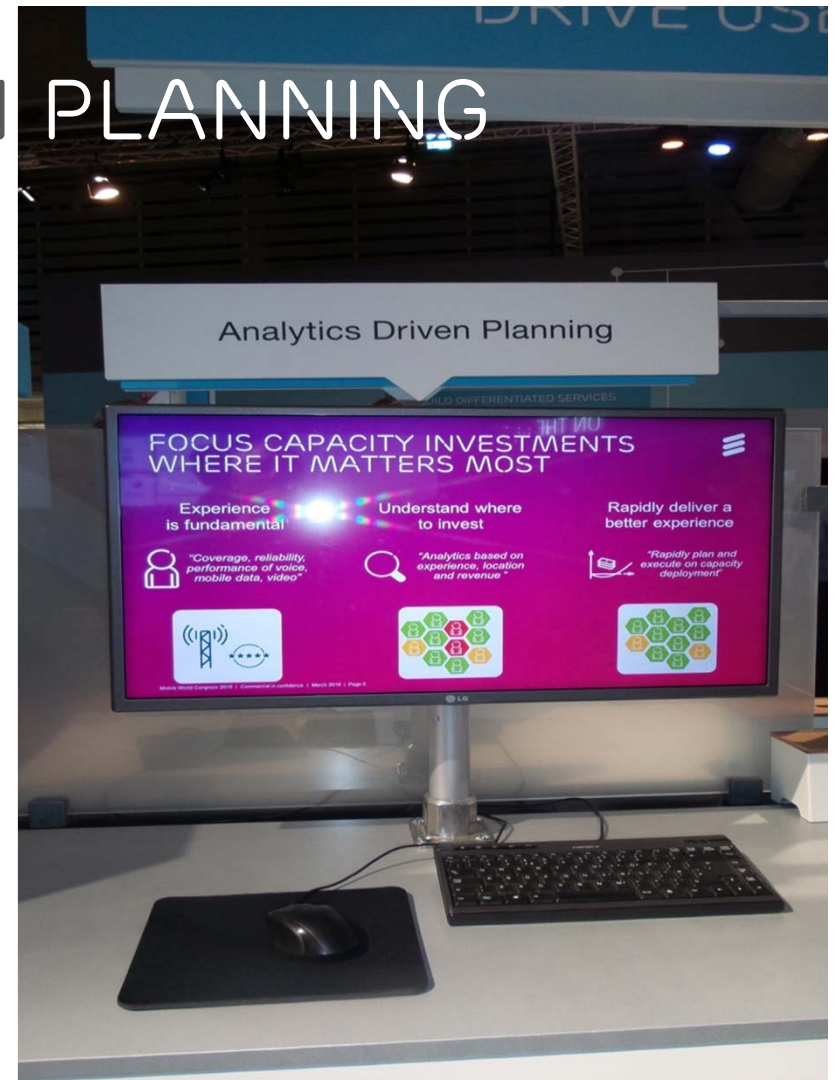
- **Technology area**
 - Deep Dive and Session Browser
 - VoLTE Analytics
 - Analytics Driven Planning
- **Marketing Area**
 - Customer Care
 - Targeted Services
 - Customer Journey
- **Business Innovation**
 - B-2-B monetization
 - Analytics for Other Industries
 - Integrated Video Insights



ANALYTICS DRIVEN PLANNING

FOCUS ON EFFICIENT SPENDING

- **Selecting target area**
 - Worst performing Cells
 - Cell Level Index (CLI)
 - Reason for low CLI revealed
- **Understand user demand**
 - Where are the users?
 - What are the devices they use?
 - What are the applications?
 - What is the application experience?
- **Where are the high ARPU users?**
 - Where is the high risk of loss?
 - Where is the high potential gain?

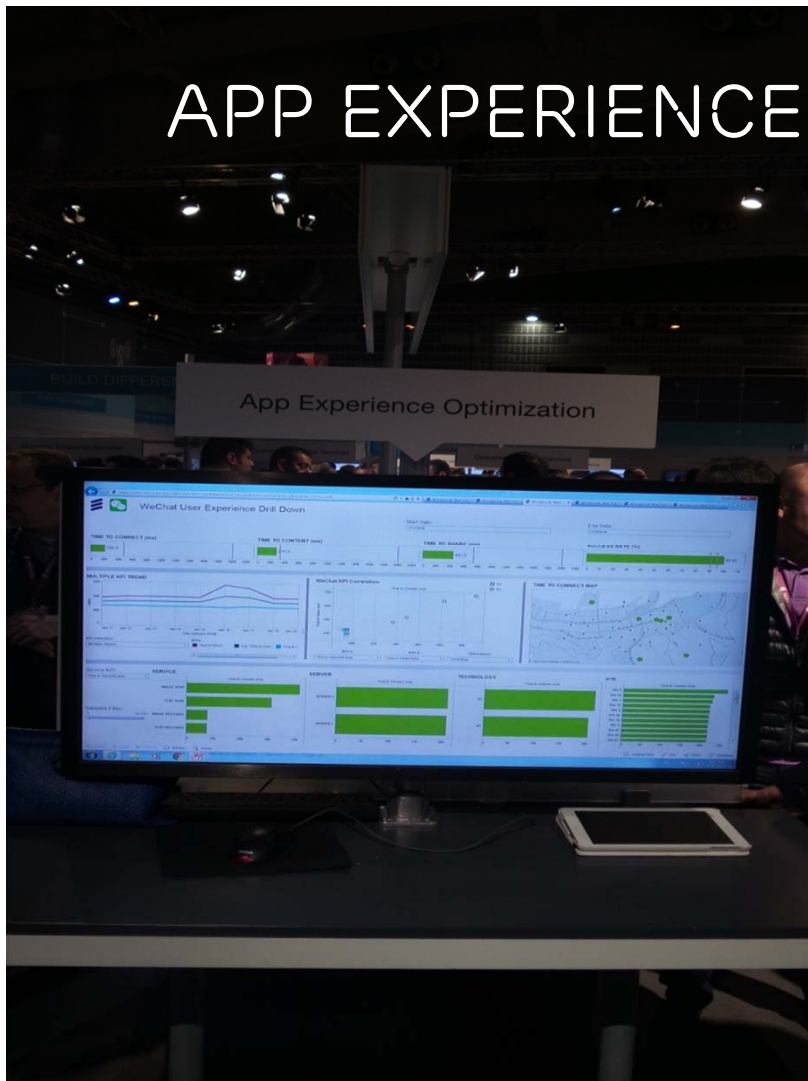


APP EXPERIENCE OPTIMIZATION



EEA BUILT-IN TO SERVICES

- Tuning can focus on specific applications, e.g:
 - Web browsing
 - Video viewing
 - Facebook experience
- Application related traffic can be filtered by EEA
- Analysis on application traffic delivers unique insights
- Tuning targets set on specific parameters to enhance service delivery



TARGETED SERVICES MARKETING



FOLLOW-UP THE USER JOURNEY





ERICSSON