

ALL-IP MIGRATION CENTRAL PART OF DEUTSCHE TELEKOM'S SUPERIOR PRODUCTION MODEL

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LIFE IS FOR SHARING.

OUR STRATEGY: TECHNOLOGY LEADERSHIP IS KEY FOR OUR MISSION TO BECOME THE LEADING EUROPEAN TELCO

LEADING EUROPEAN TELCO

TECHNOLOGY
LEADERSHIP

INTEGRATED
IP NETWORKS

BEST
CUSTOMER
EXPERIENCE

WIN WITH
PARTNERS

LEAD IN
BUSINESS

TRANSFORM PORTFOLIO

EVOLVE FINANCIAL TARGETS & EFFICIENCY

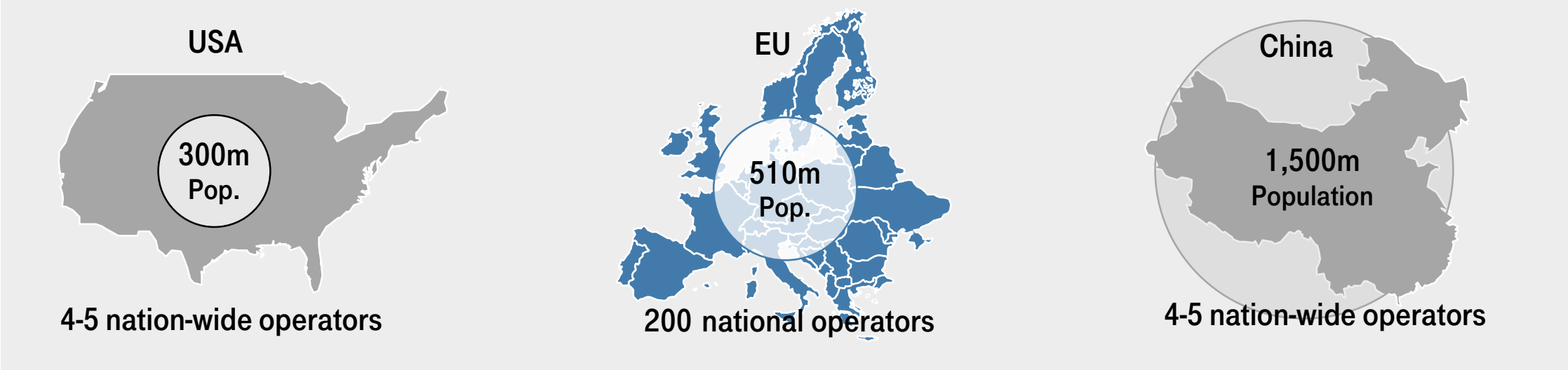
ENCOURAGE LEADERSHIP & PERFORMANCE DEVELOPMENT



LIFE IS FOR SHARING.

OUR CHALLENGES: EUROPEAN TELCO MARKET EXTREMELY FRAGMENTED COMPARED TO OTHER MARKETS

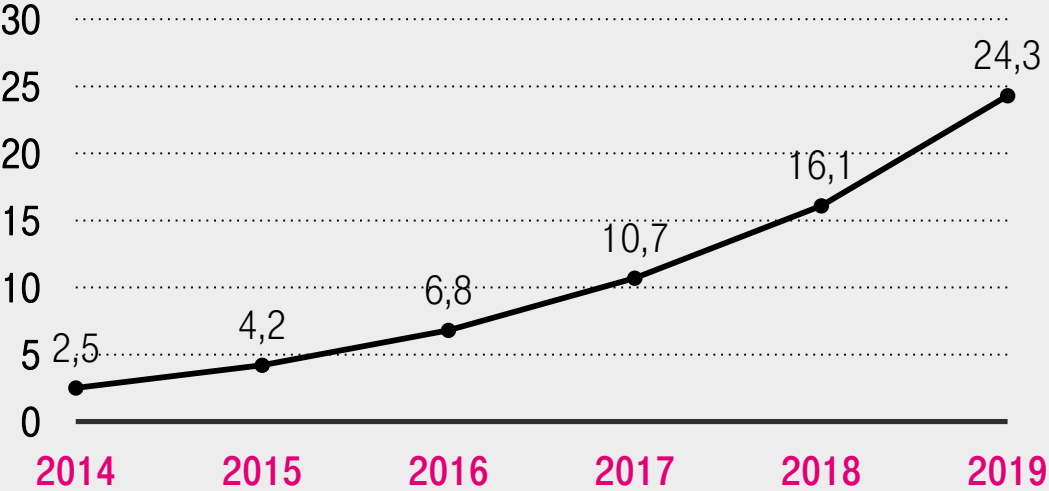
MARKET SIZES COMPARED TO NUMBER OF OPERATORS PER REGION



Source: European Commission

OUR CHALLENGES: DATA CONSUMPTION IS SKYROCKETING

TRAFFIC IN EXABYTES PER MONTH



Source: Cisco Systems; [ID 271405](#)

OUR ANSWER: WE RADICALLY CHANGE TELCO PRODUCTION



DT'S SUPERIOR PRODUCTION MODEL: A VISIONARY APPROACH



LIFE IS FOR SHARING.

WHAT DIFFERENTIATES US: WE THINK 'TRANSFORMATION' BEYOND TECHNOLOGY

WAIT AND SEE - DO WHAT IS NECESSARY, REACTIVE

Stick to **currently installed technology** for as long as **possible** and wait for vendors to offer key-turn-projects

Stay **away of anything that affects the customer relationship** (risk of loosing customers by shutting down old platforms)

Technology function fully responsible for the whole "All IP Transformation"

Use Governance & regulations as excuses for limited cross-country synergies

Develop **only own products**

VS.

THINK BIG - GO FOR POTENTIAL, PROACTIVE

Drive industry & vendors (e.g. TeraStream, 5G)

Use all migration paths, **convince customers of advantages** of new platforms and go for **upselling potential**

Cross-company approach & cross-functional for transformation project

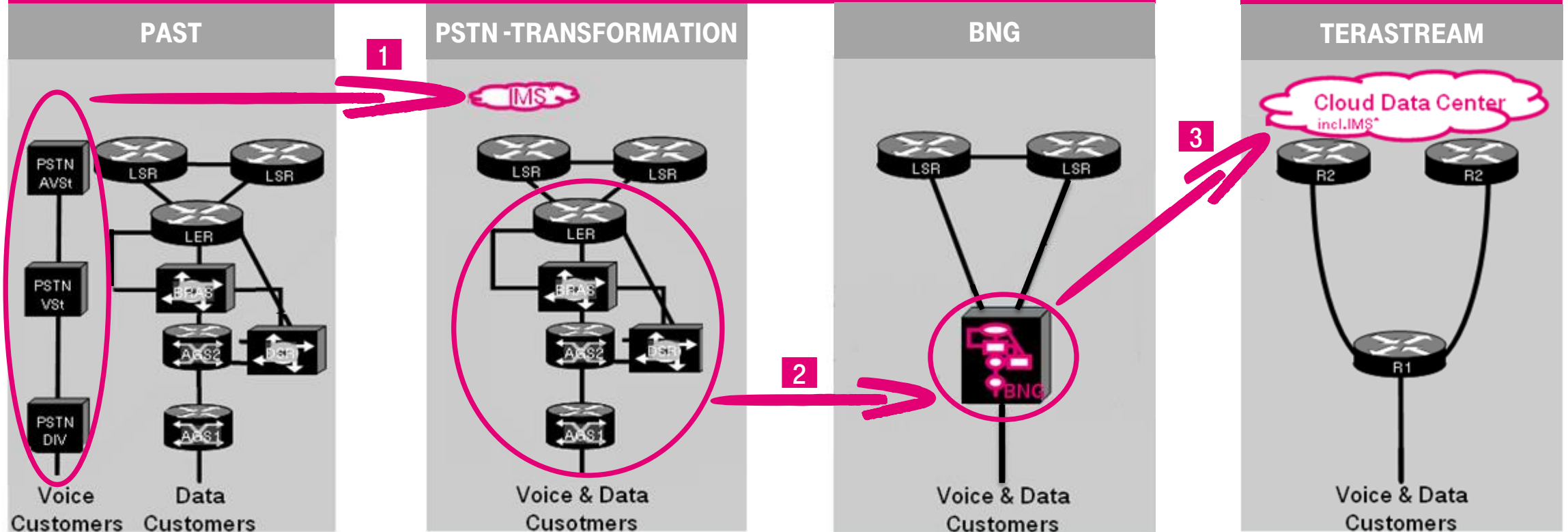
Go for cross-country synergies beyond procurement: **Work with all stakeholders**, vendors, investors, governments

Go for **partnering**

WE START WITH WHAT WE HAVE AND WORK TOWARDS OUR TARGET PICTURE

Cloudification /
IT centralization

STEP-BY-STEP TRANSFORMATION



DT'S SUPERIOR PRODUCTION MODEL BUNDLES THE STRENGTHS TO REACH TECHNOLOGY LEADERSHIP & BEST CUSTOMER EXPERIENCE

DIGITAL TRANSFORMATION OF CUSTOMER FACING PROCESSES

COST EFFICIENCY & SIMPLICITY



ALL-IP TRANSFORMATION



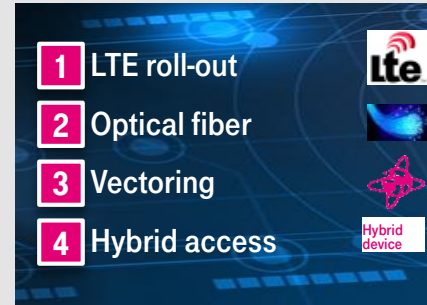
PLUG & PLAY

PAN-EUROPEAN NETWORK



TIME TO MARKET

INTEGRATED NETWORK STRATEGY



BEST CONNECTIVITY

Annual run rate adj.
Opex savings:

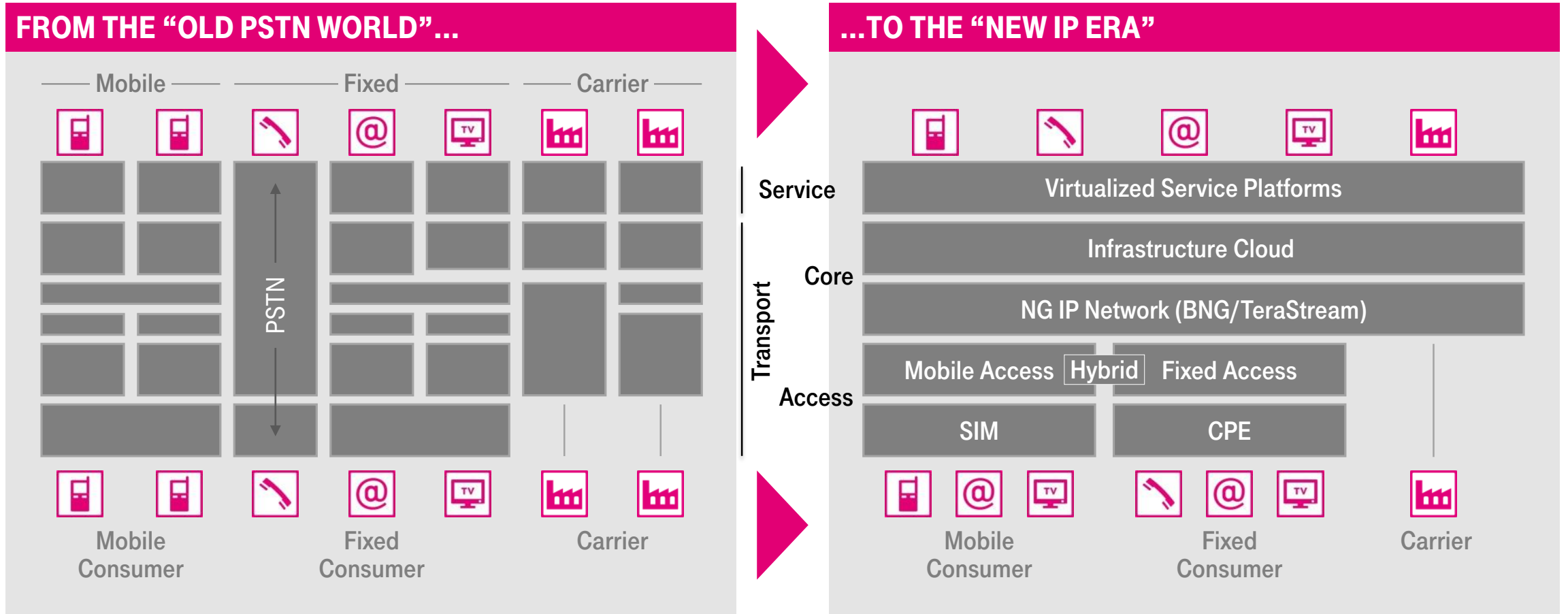
≈ €-1.2 bn¹

¹ Gross Opex savings D/EU before any counter effects (e.g. personnel cost increases)

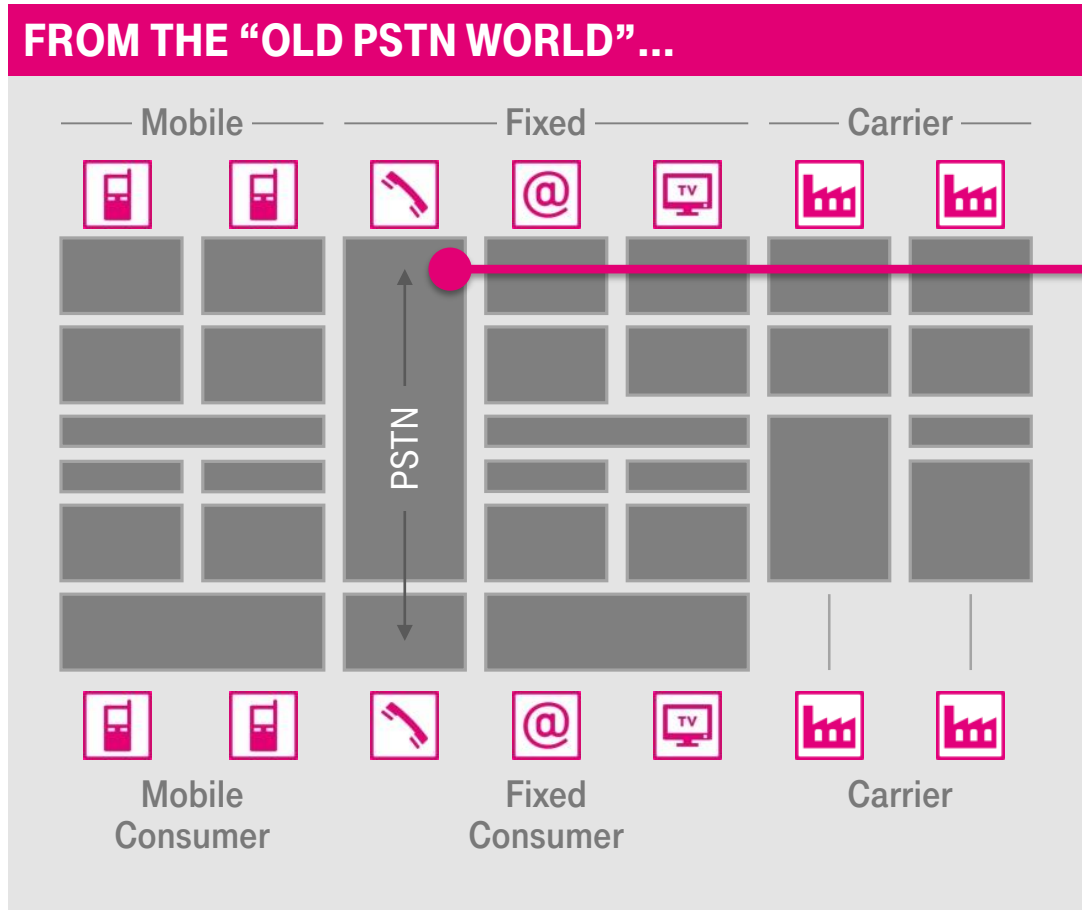
ALL IP TRANSFORMATION: BASIS FOR PLUG AND PLAY EXPERIENCE



ALL IP TRANSFORMATION: THE CREATION OF A SIMPLIFIED AND STANDARDIZED NETWORK



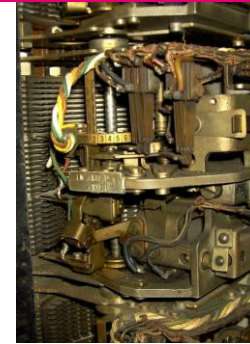
PSTN MIGRATION: IT IS TIME FOR REVOLUTION INSTEAD OF EVOLUTION



EVOLUTION OF VOICE PRODUCTION PLATFORM



Manual switching



Strowger switch



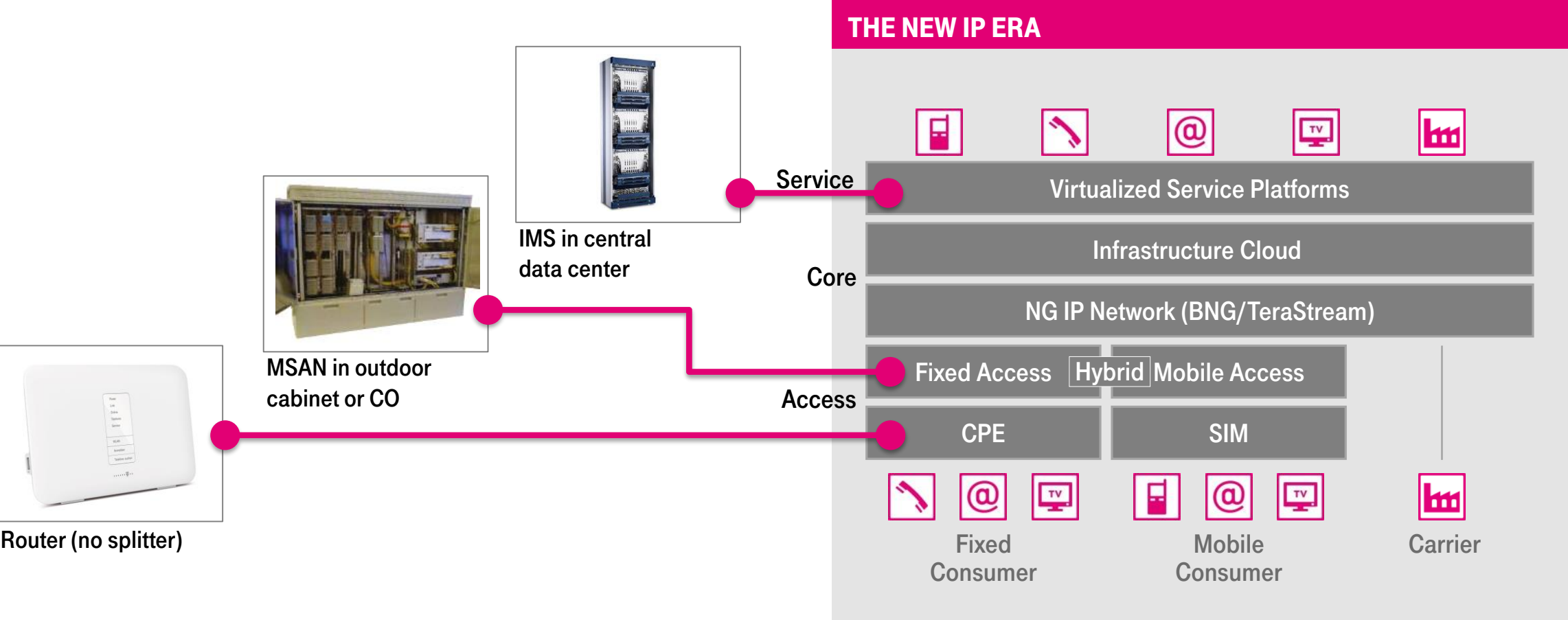
ISDN



Softswitch

Softswitch would keep us in technology silo instead of paving the way for a layered structure

PSTN MIGRATION IS THE FIRST STEP ON THE WAY TO SEPARATE SERVICES FROM TRANSPORT LAYERS



DEUTSCHE TELEKOM PURSUES DIFFERENT PSTN MIGRATION STRATEGIES IN EUROPE

Mass market scenarios only

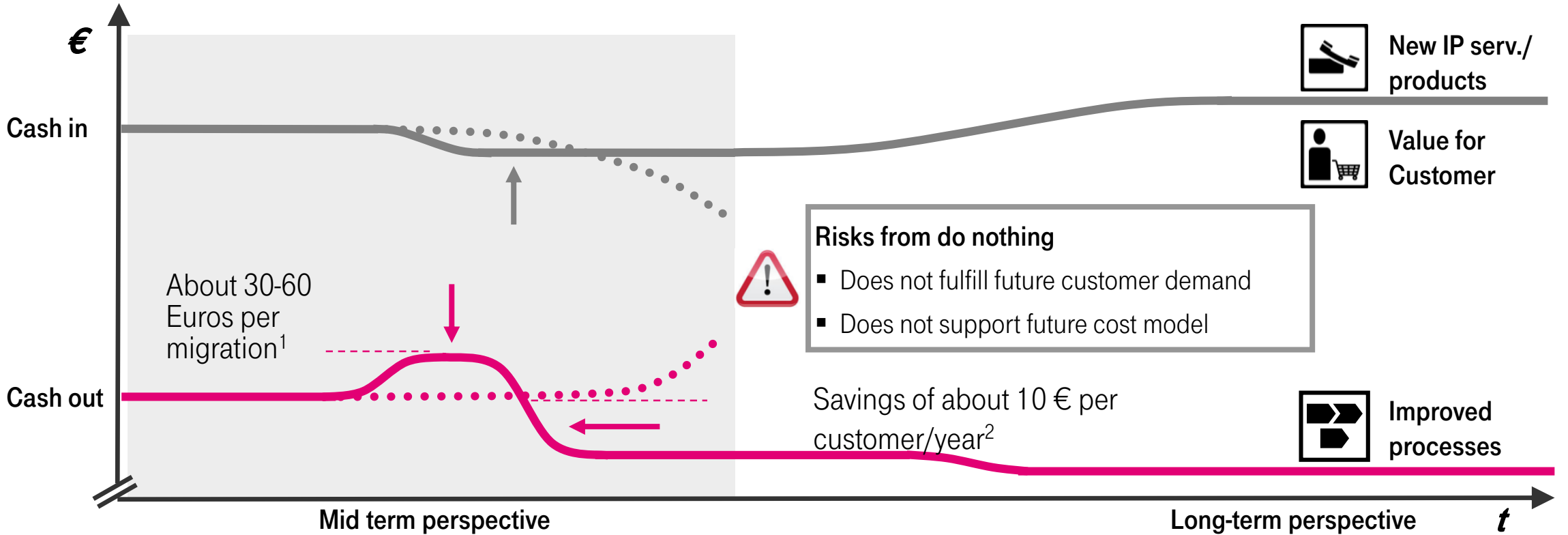
PSTN replacement only	Reduced VoBB scenario	All DP/TP on VoBB	Extended VoBB scenario	Full All-IP
<ul style="list-style-type: none"> Using MSAN card solutions for all customers (Single (SP), Double (DP) and Triple Play (TP) customers) + silent migration + low risk of churn + cheaper and faster - additional operating costs (2 ports per customer and higher configuration cost) - no All-IP opportunities 	<ul style="list-style-type: none"> all Single Play customers actively migrated Double Play customers 	<p>MSAN cards for</p> <ul style="list-style-type: none"> all Single Play customers 	<ul style="list-style-type: none"> most of the Single Play customers 	<ul style="list-style-type: none"> Using VoBB for all customers + all-IP opportunities + up-sell potential + future ready - higher costs - higher risk of churn and revenue loss
	<p>VoBB for</p> <ul style="list-style-type: none"> rest of Double Play customers all Triple Play customers 	<p>VoBB for</p> <ul style="list-style-type: none"> all Double Play customers all Triple Play customers 	<p>VoBB for</p> <ul style="list-style-type: none"> Single Play customers with high up-sell potential all Double and Triple Play customers 	

Business Perspective

ALL-IP Strategy Perspective

VoBB = Voice over Broadband MSAN = multi-serviceaccess node

PSTN MIGRATION IS PRIMARILY ABOUT COST AVOIDANCE & ENABLING OF IP SERVICES/PROCESSES

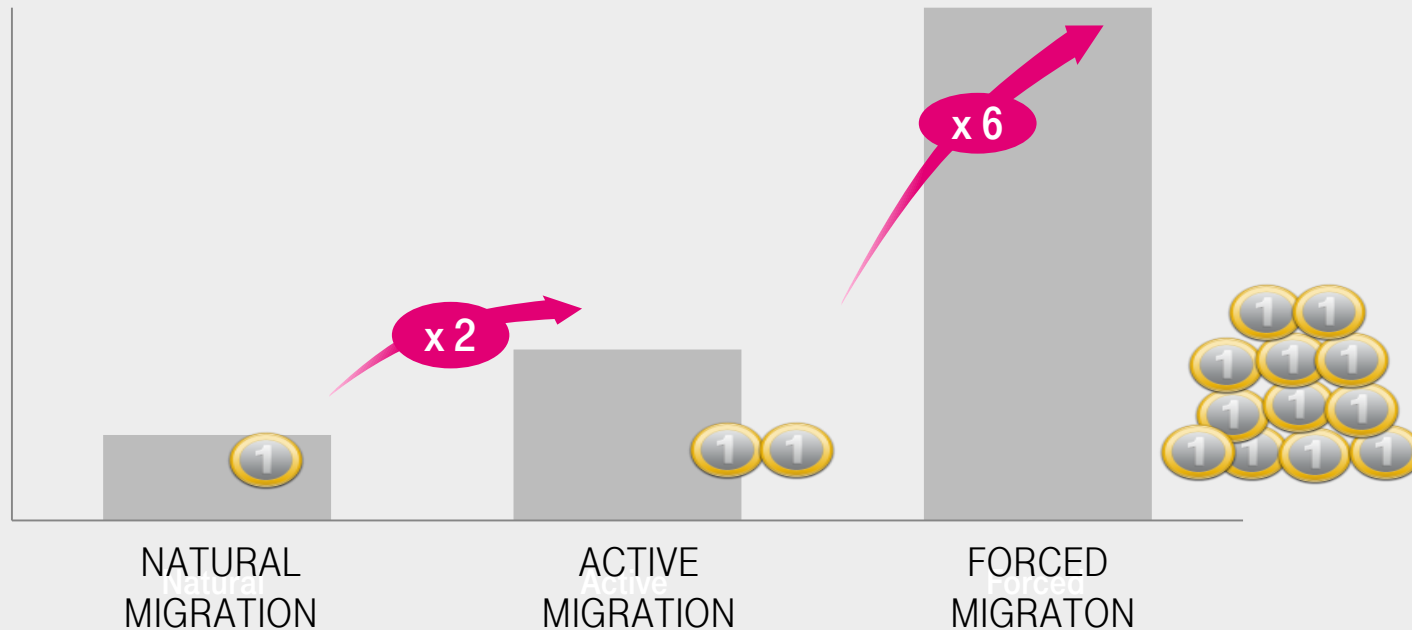


1 Depending on migration strategy; 2 After complete PSTN switch-off

— Migration
 ⋯ Do nothing case
 → Influencing

WE NEED TO MIGRATE 100% OF OUR CUSTOMERS AND IT GETS MORE EXPENSIVE IN THE END

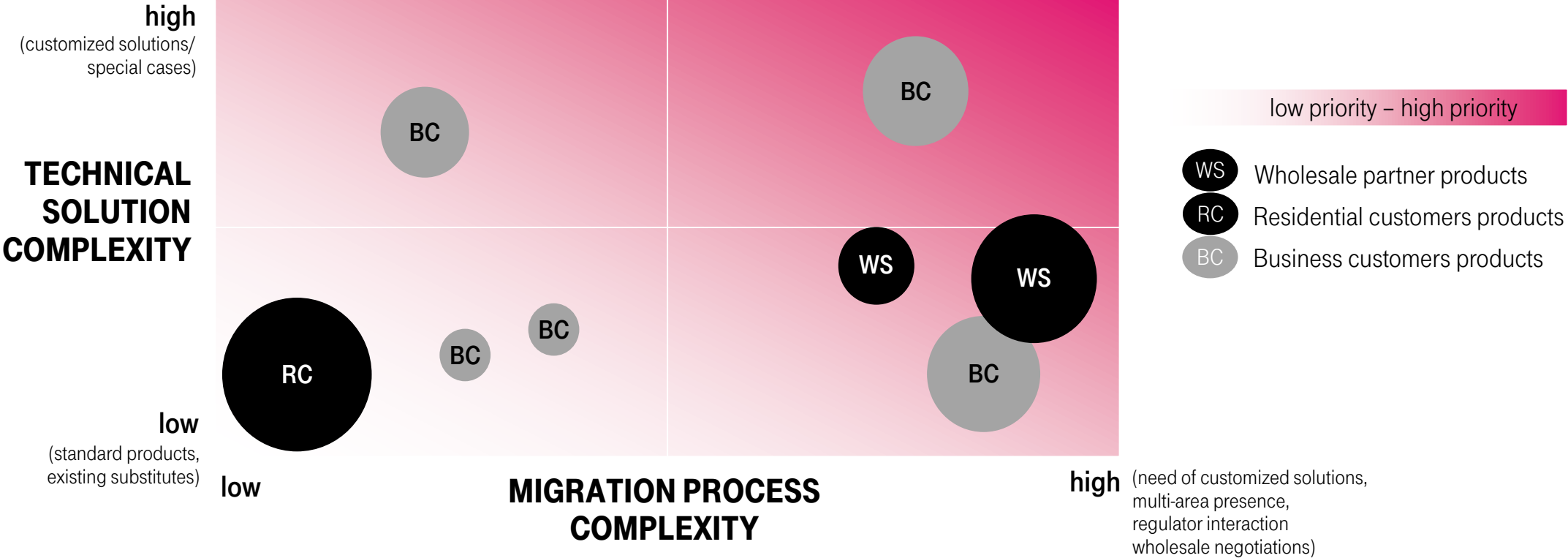
MIGRATION COSTS IN DIFFERENT PHASES



Push customer driven NATURAL migration, then start the ACTIVE opportunity driven approach to avoid the costs of the FORCED migration.

IT'S NECESSARY TO DIFFERENTIATE BETWEEN CUSTOMER SEGMENTS WHEN STARTING MIGRATION

CUSTOMER SEGMENT AS A PRIORITIZATION CRITERIA

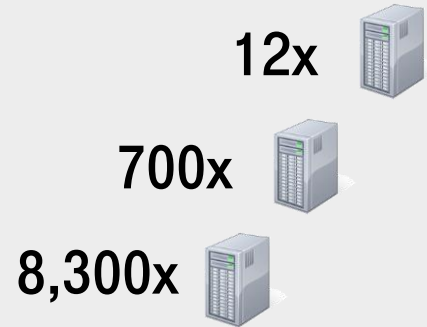


**ALL IP TRANSFORMATION IS NOT A PURE TECHNOLOGICAL
APPROACH BUT IT IS ABOUT A CROSS-FUNCTIONAL ENABLING**



INTRODUCTION OF NEW FEATURES GOES DOWN TO ONLY ONE SOFTWARE UPGRADE

OLD WORLD



KNOWN FOR MORE THAN 14 YEARS

NEW WORLD

Example:
„HD Voice“



IMPLEMENTED FROM DAY 1
UPGRADES EASY

SERVICE PROVISIONING: INSTANT DELIVERY FOR THE CUSTOMER WITH „ZERO TOUCH“ PROVISIONING FOR OPERATOR

Example:
„Broadband on Demand“

OLD WORLD

NEW WORLD

Duration	Days or Weeks	Seconds
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Customer Experience	5 steps interaction 	3 Clicks 
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Production	5 steps, semi manual	Fully automated
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EXPENSIVE, SLOW

ENABLING IMPULSE PURCHASES

TANGIBLE RESULTS: HIGHER PRODUCTIVITY & QUALITY

CRITERIA

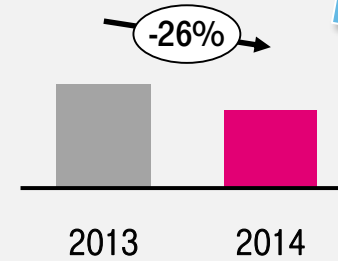
FIGURES

Example:
Macedonia

Personnel intensity



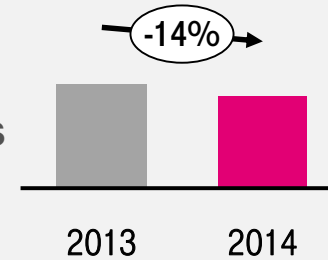
FTE in Customer Services



Maintenance intensity



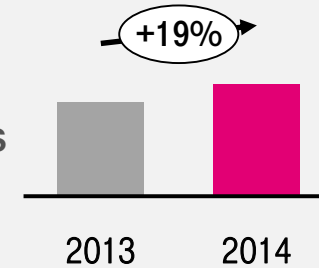
Customer announced Faults



Reliability



Mean Time Between Failures



BENEFITS OF PSTN MIGRATION RESULT IN 10€ COST REDUCTION FOR VOICE PRODUCTION PER ACCESS LINE

POWER



Reduced energy consumption of 348 GWh¹ yearly equals a 8 km long train with 500 cisterns with fuel oil

¹ Number refer to the sum of HU, GR, RO, MK, HR, SK, ME

MAINTENANCE



Line-up of dismantled legacy equipment within DT group would be longer than the entire M25 (>180KM)









SERVICE



Massive Simplification

ALL-IP TRANSFORMATION: WE ARE ON TRACK

ALL-IP TRANSFORMATION BY COUNTRY (NUMBERS IN THOUSANDS)

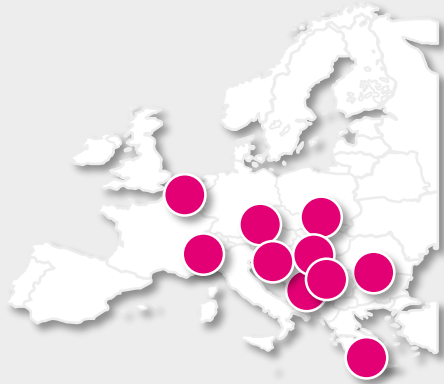
	Total Voice customers August 2015	IP access lines August 2015	Areas shut down August 2015	expected completion dates
 Macedonia	230	230 (100%)	22 of 22 ✓	Jan 15 th , 2014
 Slovakia	598	598 (100%)	50 of 50 ✓	Dec 15 th , 2015
 Croatia	1.110	1.076 (97%)	46 of 72	EoY 2015
 Montenegro	144	130 (90%)	0 of 4	EoY 2015
 Hungary	1.406	954 (68%)	25 of 67	EoY 2016
 Romania	2.000	227 (11%)	0 of 96	EoY 2018
 Greece	2.601	29 (1%)	0 of 190	EoY 2018
 Europe	8.089	3.244 (40%)	143 of 501	EoY 2018

PAN EUROPEAN NETWORK: THE NEXT TELCO PRODUCTION. MADE FOR EUROPE.



WE COMPETE AGAINST CENTRALIZED PLAYERS WITH OUR CURRENT LOCAL AND DETACHED PRODUCTION

DT EUROPE



Local Platform

- Limited investment capabilities to scale up and innovate
- Challenge to keep services & quality up to date

GLOBAL PLAYERS



Joint Platform

- Joint x-border global production with **significant economies of scale**
- Fast **time-to market** for new services
- **Huge level of innovation** driving the digital world

TO FACE THIS WE APPLY STANDARDS PROVEN IN OTHER INDUSTRIES FOR YEARS

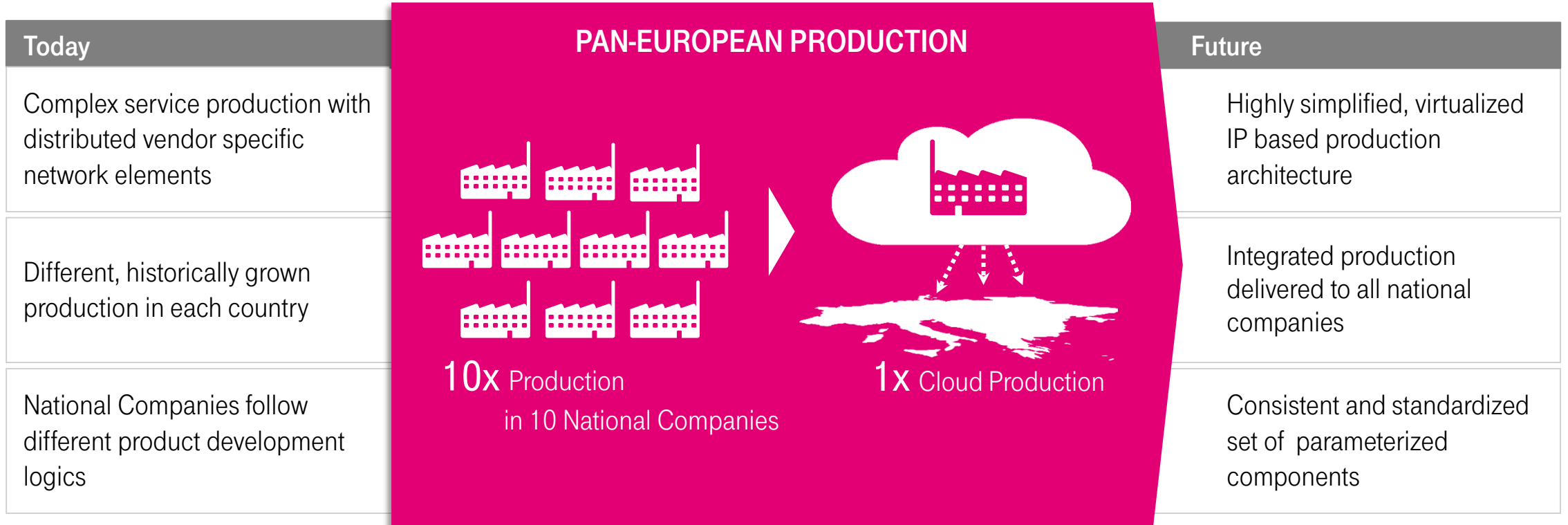
COMMON COMPONENTS



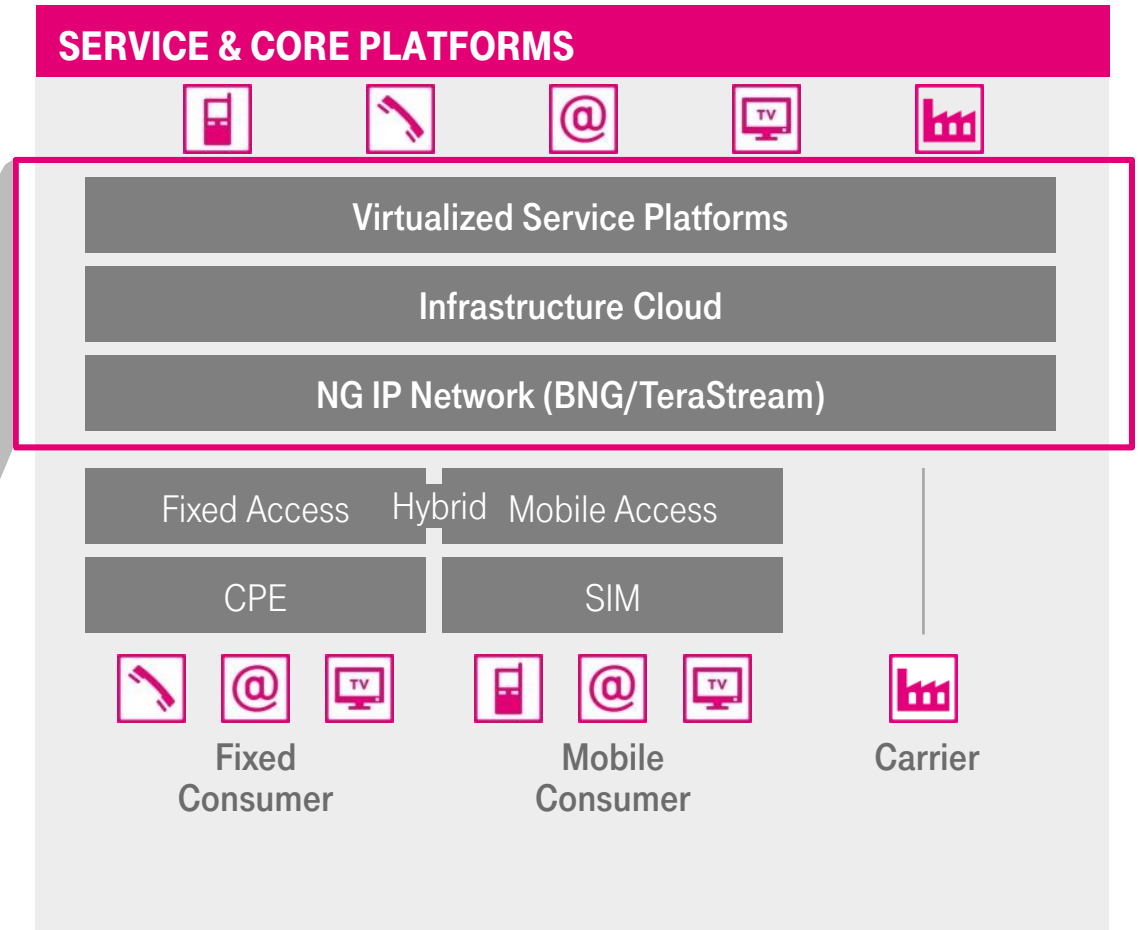
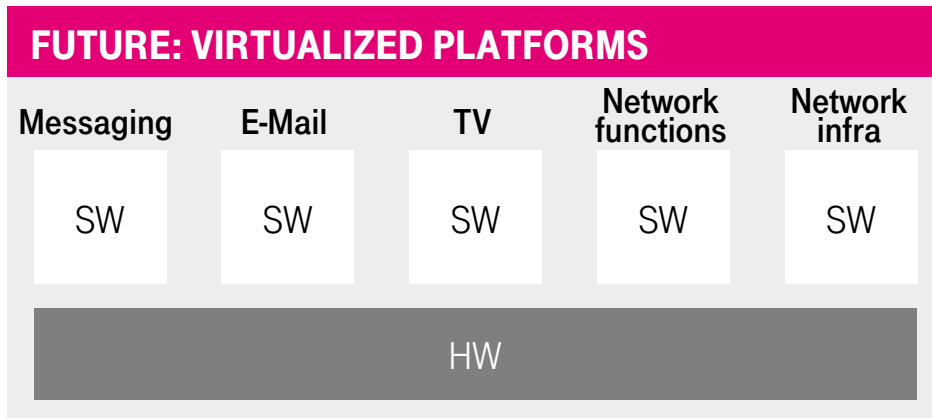
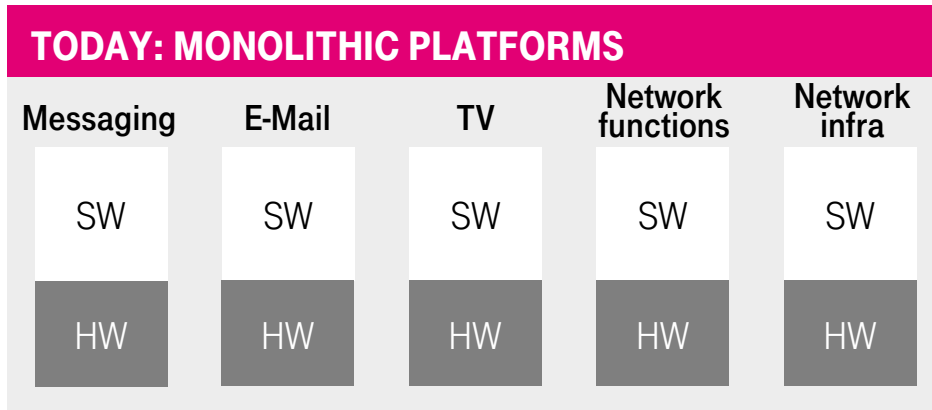
FLEXIBILITY TO ADJUST FOR LOCAL NEEDS



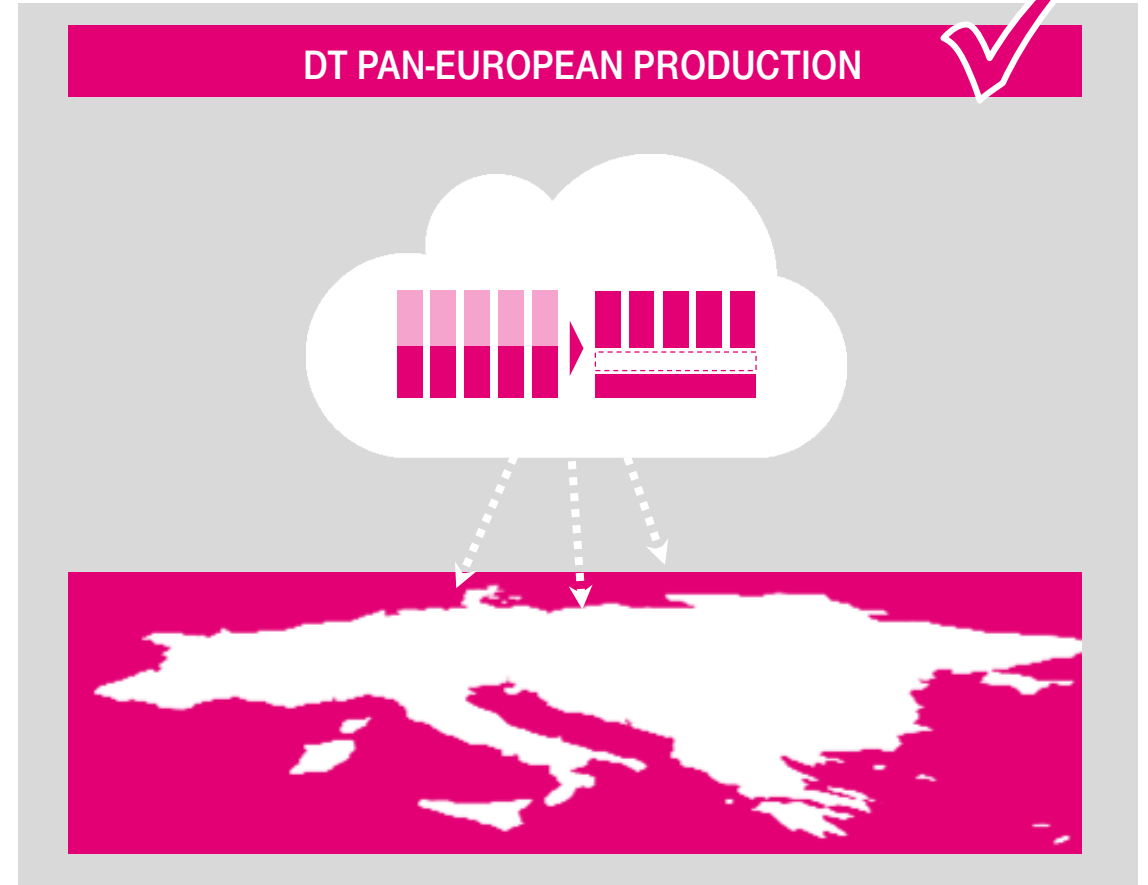
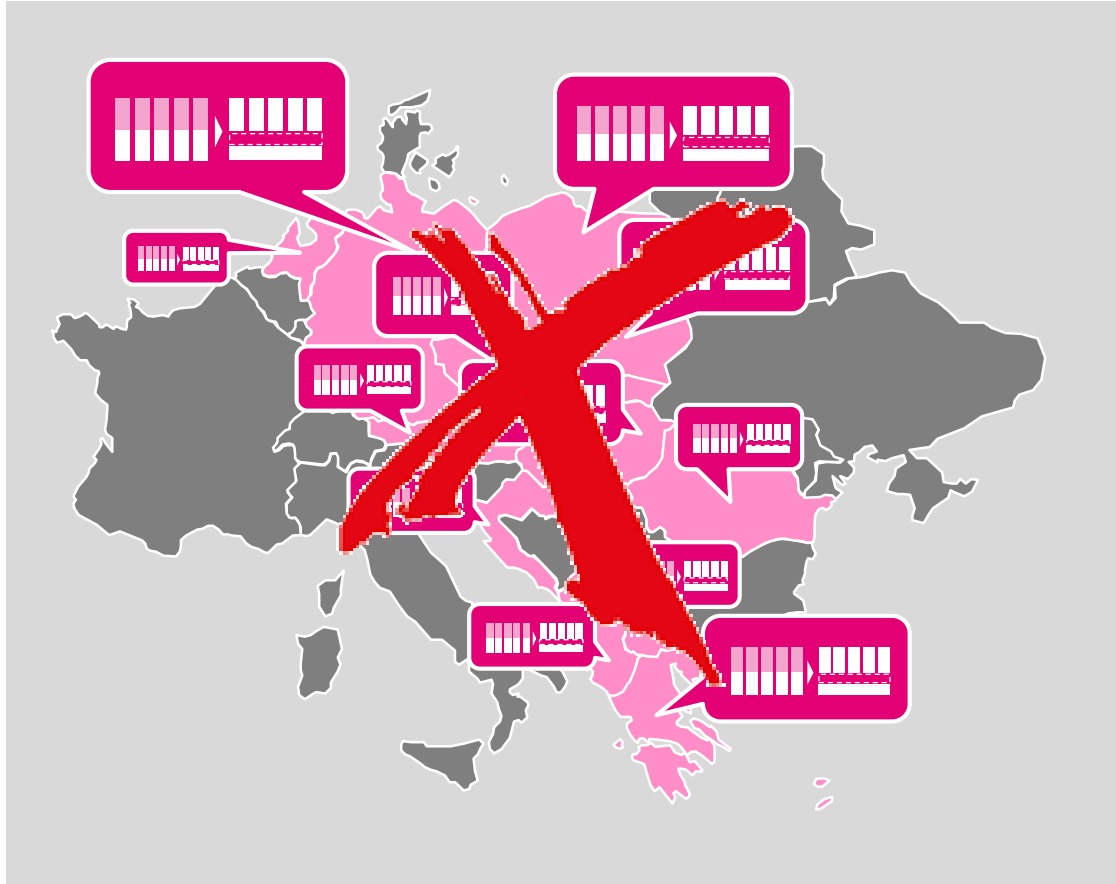
WE BUILD AN INTEGRATED EUROPEAN NETWORK WITH MAXIMUM TECHNOLOGY AND COMMERCIAL BENEFITS



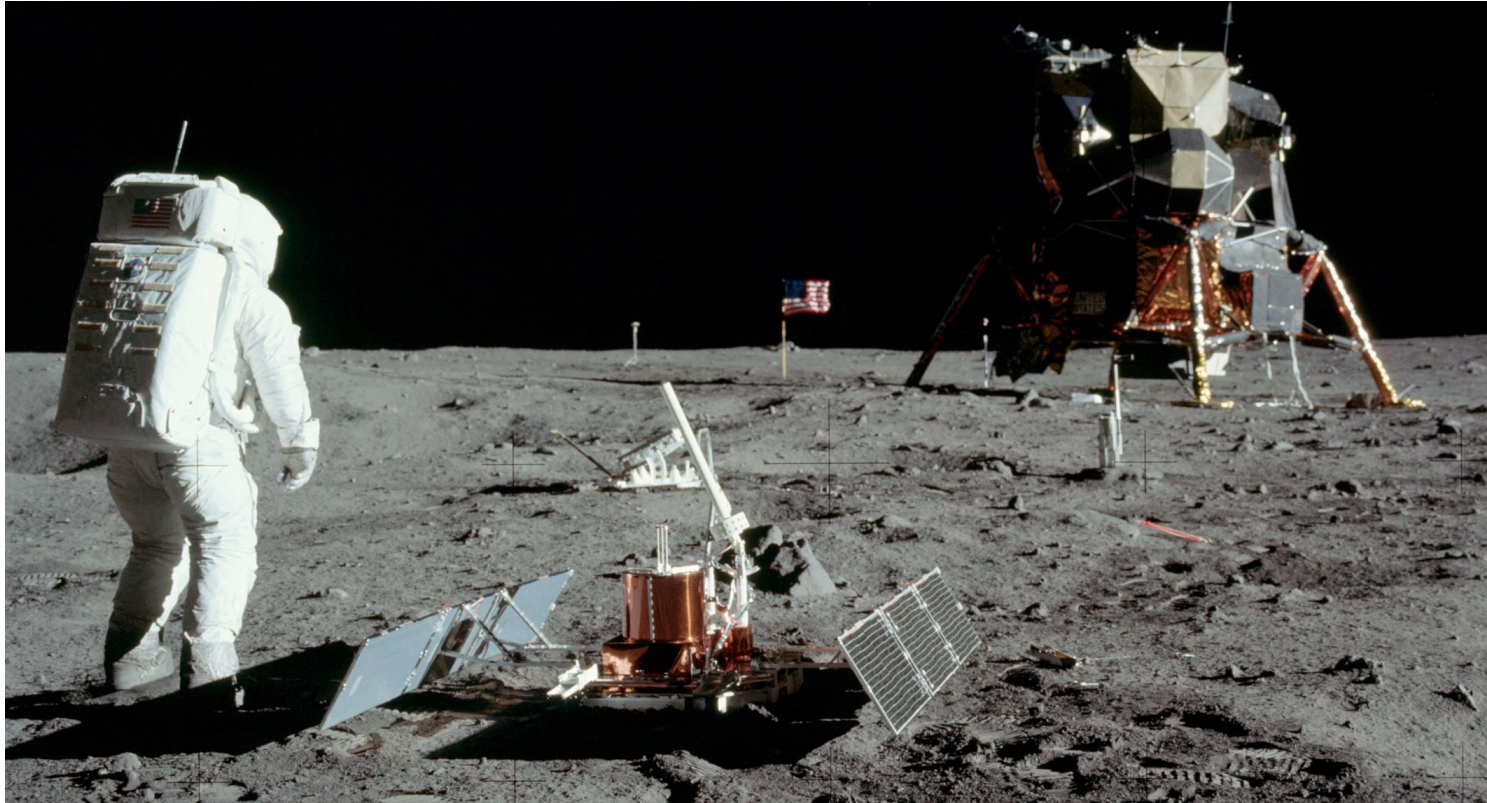
VIRTUALIZATION AND SEPARATION OF HARDWARE AND SOFTWARE ARE KEY PREREQUISITES TO BUILD AN INTEGRATED NETWORK



WE AIM AT BUILDING THIS ON A PAN-EUROPEAN LEVEL



DEUTSCHE TELEKOM CUTS THE NUMBER OF PLATFORMS BY 90% FROM 500 TO 50



>50 PLATFORMS
WILL BE MIGRATED

ACROSS 10 NATCOS

RESULTING IN >500
MIGRATIONS TOWARDS
PAN-NET

Up to new frontiers:
With >500 migrations, Pan-Net goes where no other program has gone before.









ALL SERVICES WILL BE DELIVERED TO NATCOS BASED ON A GLOBALLY SCALABLE BUSINESS MODEL













What is our mission?

What does that imply for our national companies and our customers?

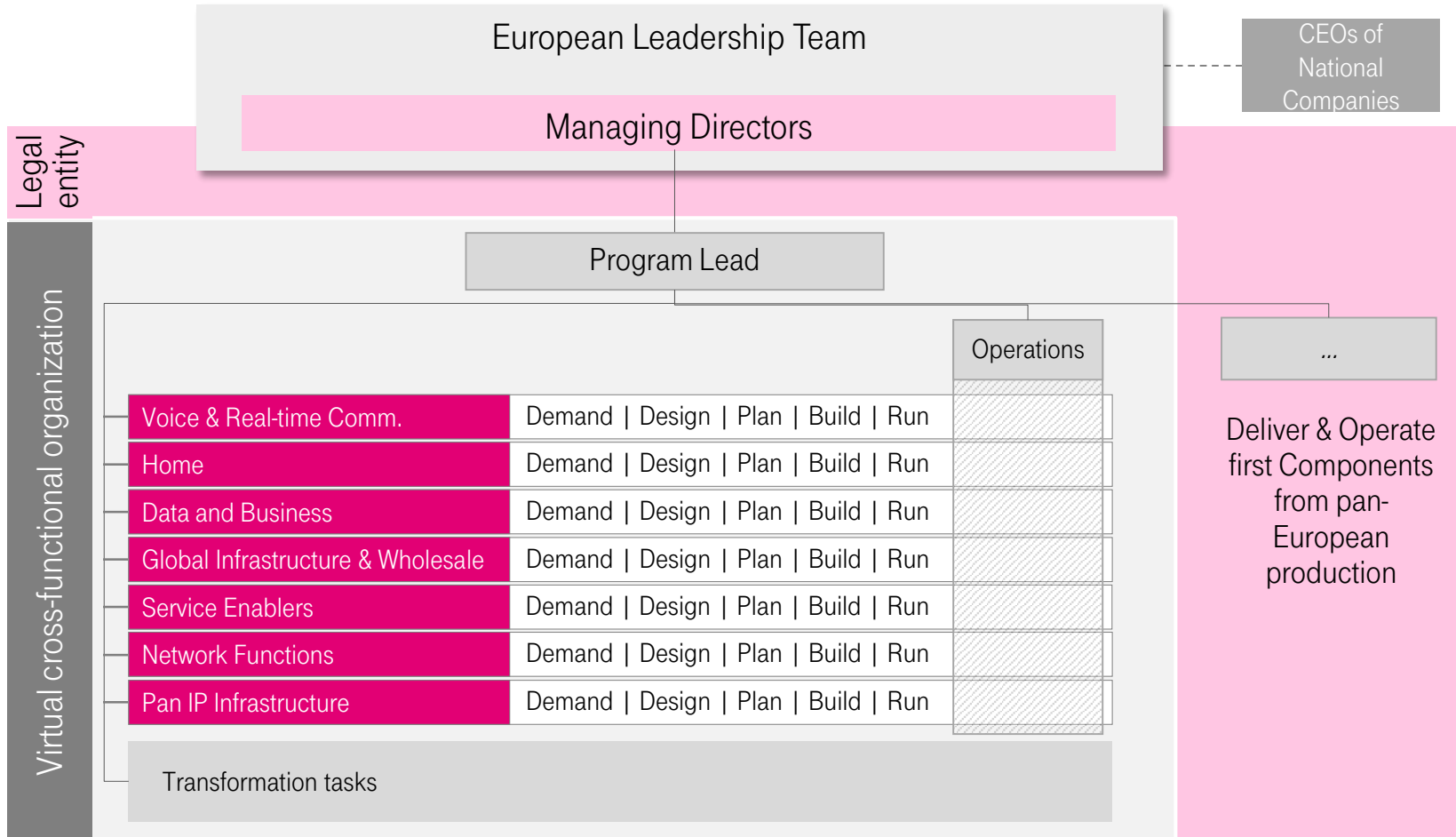


THE BUILDING BLOCKS OF THE PAN-EUROPEAN PRODUCTION COVER THE FULL TELCO PORTFOLIO

 Voice & Real-time Communication	 Voice Services  Message Services  Fax & other Communication Services
 Home	 TV  Gaming  Smart Home
 Data & Business	 Privacy & Security Services  Data & Connectivity Services  Business Cloud Services  Managed Services
 Global Infrastructure & Wholesale	 International Voice Connectivity  International Data Connectivity  International Infrastructure
 Service Enablers	 Payment Services  Service Configuration Services  E-Mail  Location & Registration Services

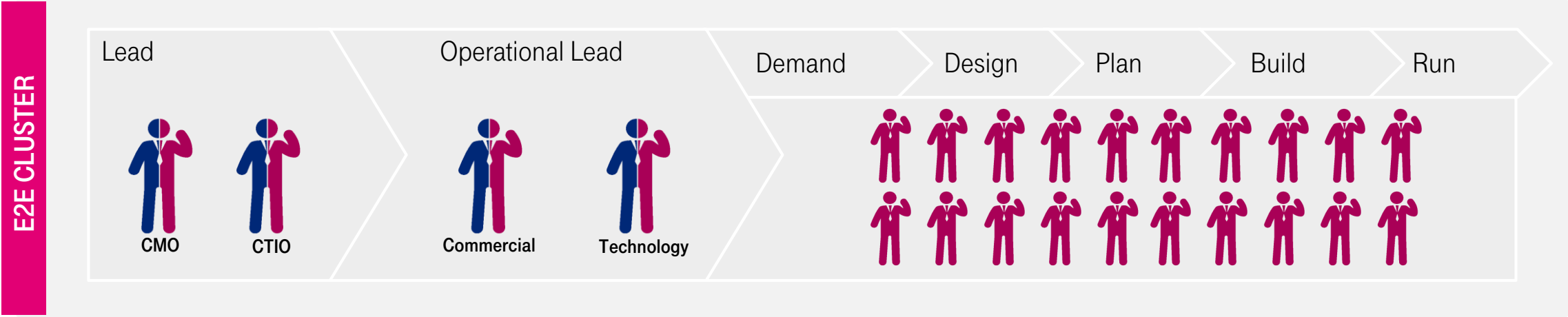
 Network Functions	 Basic Mobile Network Functions  Basic Fixed Network Functions  Identity, Profile & Authent. Functions  Basic Voice Functions  Data Service Connectivity Functions  Policy & Control Functions
 Pan IP Infrastructure	 IP Network Infrastructure  Data Centre Infrastructure & Housing  Virtualization & Orchestration Layer  Basic IP Connect & Control Functions

TO MANAGE THE TRANSFORMATION WE ESTABLISHED A STRONG LEADERSHIP TEAM WITH END TO END RESPONSIBILITY



- Managing the Transformation with a **strong and transformation project** plus setting up **stable structures for the future in parallel**
- Eight Cluster are end-to-end responsible** for the building blocks – from demand specification to operations

THE PRINCIPLES OF 'DUAL CITIZENSHIP' AND 'SHARED LEADERSHIP' TAKE OUR TRANSFORMATION PROGRAM TO THE NEXT LEVEL



WE LIVE CROSS-NATIONAL AND CROSS-FUNCTIONAL COLLABORATION!

Voice & Real-time Communication

Lead: **CTIO** (Czech Republic)

Co-Lead: **CMO** (Croatia)

Service Enablers

Lead: **CTIO** (Serbia)

Co-Lead: **CMO** (Greece)

Home

Lead: **CTIO** (North Macedonia)

Co-Lead: **CMO** (Hungary)

Network Functions

Lead: **CTIO** (Greece)

Co-Lead: **Engineering HQ**

Data & Business

Lead: **CTIO** (Hungary)

Co-Lead: **CMO** (Romania)

Pan IP Infrastructure

Lead: **CTIO** (Slovakia)

Co-Lead: **Architecture HQ**

Global Infrastructure & Wholesale

Lead: **Global Network Factory HQ**

Co-Lead: **BEX HQ**

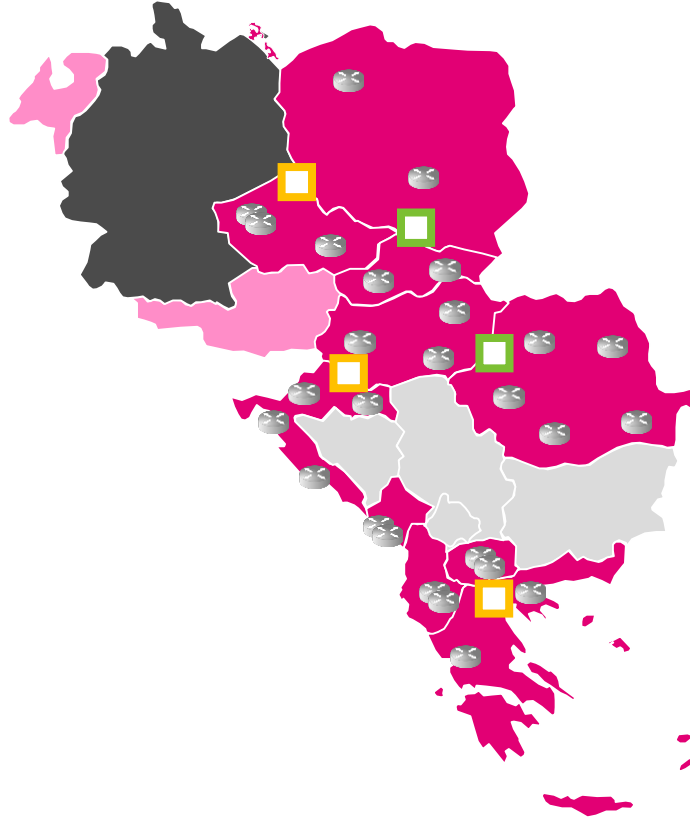
Operations

Lead: **CTIO** (Croatia)

PHYSICAL INFRASTRUCTURE OF THE PAN-EUROPEAN NETWORK OWNED BY THE NEWLY CREATED PAN-NET COMPANY

DT EU PORTFOLIO: BROAD & ADJACENT FOOTPRINT IN EUROPE

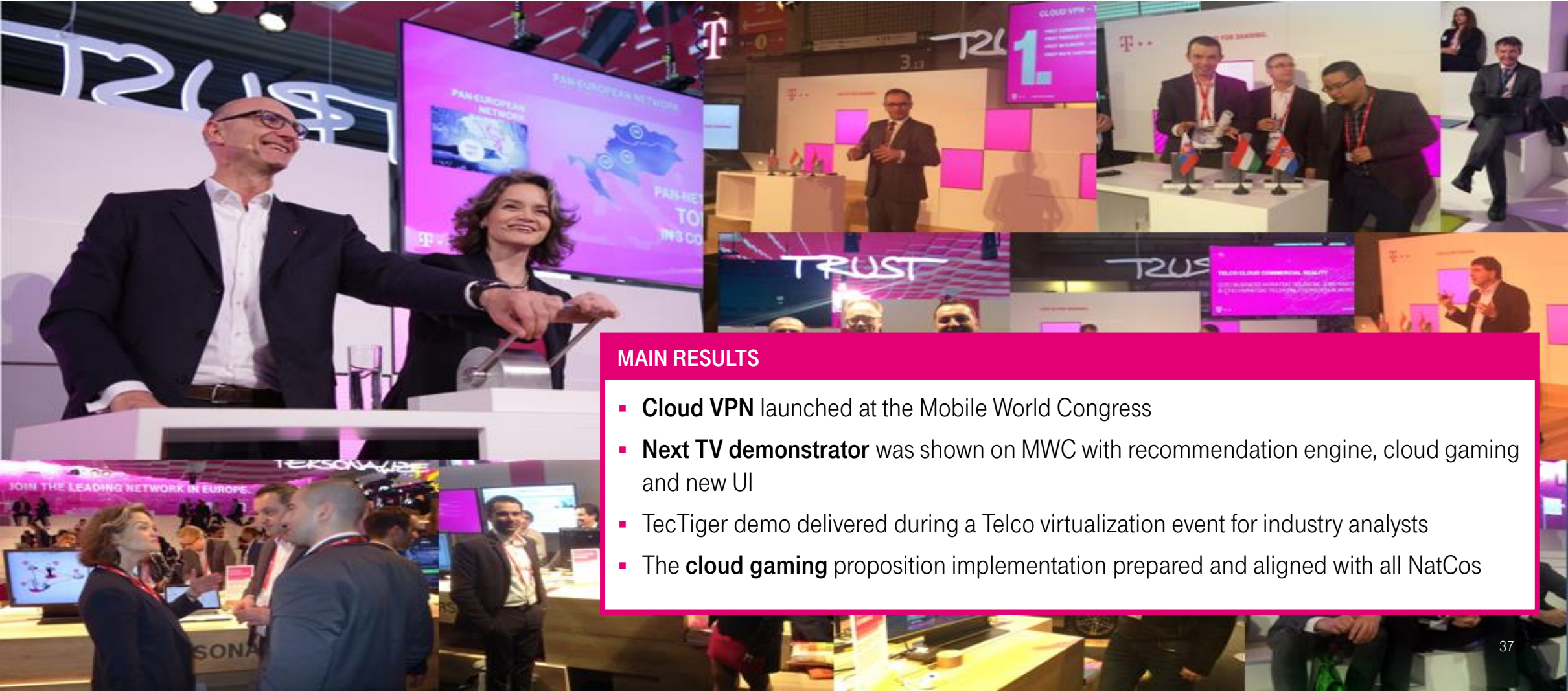
locations and number of backend data and network operations centers not decided yet



PAN-NET characteristics:

- 3 backend data centers (■)
- 2 geo redundant network operations centers (■)
- In each country minimum 2 data centers with routers at the edge of the network (☹)
- 1 distribution network, fast and highly capable

FIRST PAN-EUROPEAN IMPLEMENTATIONS WERE LAUNCHED AT MWC 2015



MAIN RESULTS

- **Cloud VPN** launched at the Mobile World Congress
- **Next TV demonstrator** was shown on MWC with recommendation engine, cloud gaming and new UI
- TecTiger demo delivered during a Telco virtualization event for industry analysts
- The **cloud gaming** proposition implementation prepared and aligned with all NatCos

KEY LEARNINGS FROM PSTN MIGRATION AND GUIDING PRINCIPLES FOR TRULY PAN-EUROPEAN ALL IP INTEGRATED PRODUCTION MODEL

PSTN MIGRATION LESSONS LEARNED



- Top Management drive and cross organizational alignment (technology , B2B, B2C) are crucial
- It is about 100% or nothing
- It is not about setting to ambitious targets but about hitting the target as planned
- It is not about additional revenues, but about cost avoidance and churn minimization

**NOT JUST A PURE TECHNOLOGICAL APPROACH BUT
CROSS-FUNCTIONAL ENABLING.**

SUCCESS FACTORS PAN-EUROPEAN NETWORK



- Focus on areas that allow for standardization
- Deploy new technologies and services and re-define role of vendors
- Proactively approach all stakeholders
- Collaborate and jointly transform commercial and technology operating models
- Execute!

**PAN-NET GOES WERE NO OTHER PROGRAM
HAS GONE BEFORE.**

Q&A

T...

LIFE IS FOR SHARING.