

# WEBINAR

# IP-TRANSFORMATION

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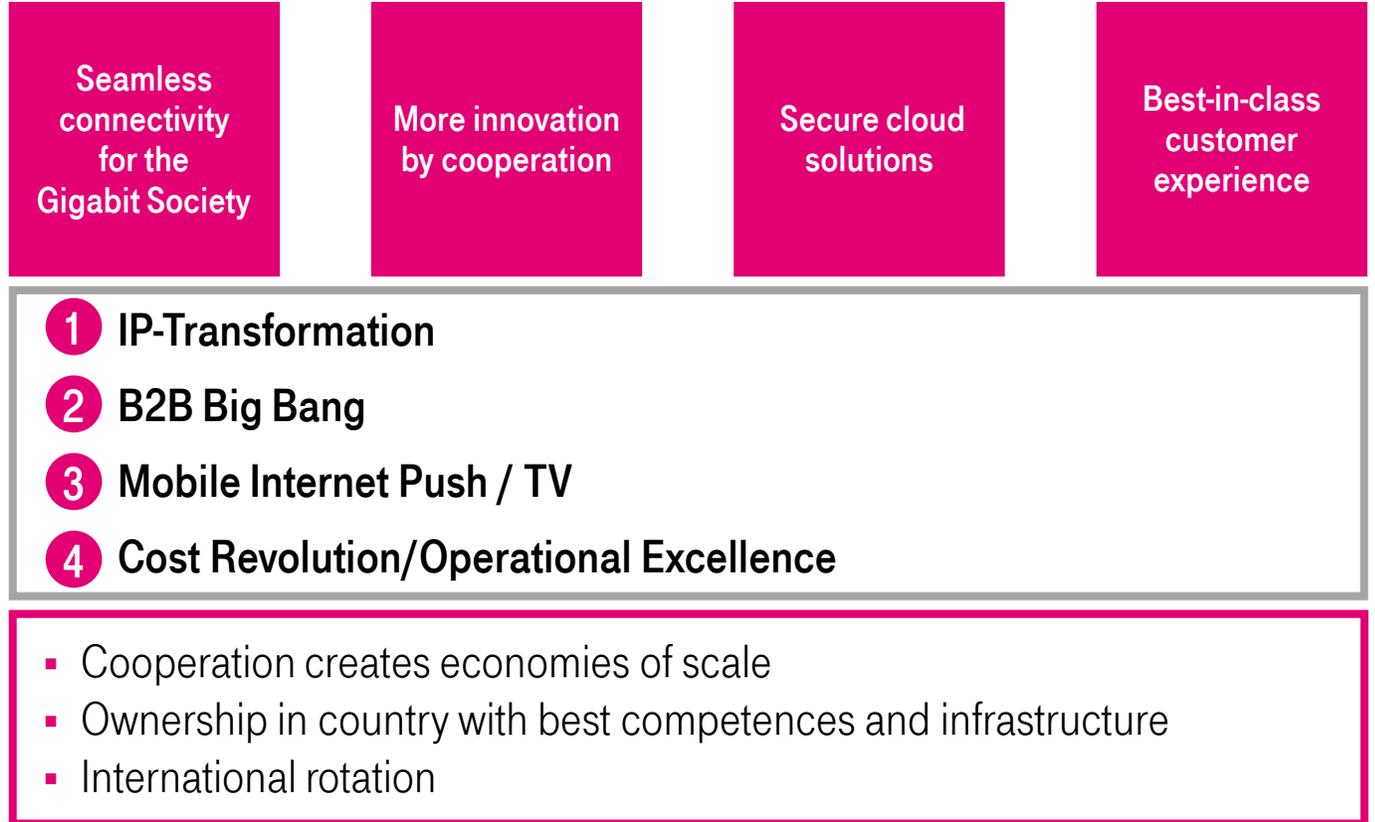
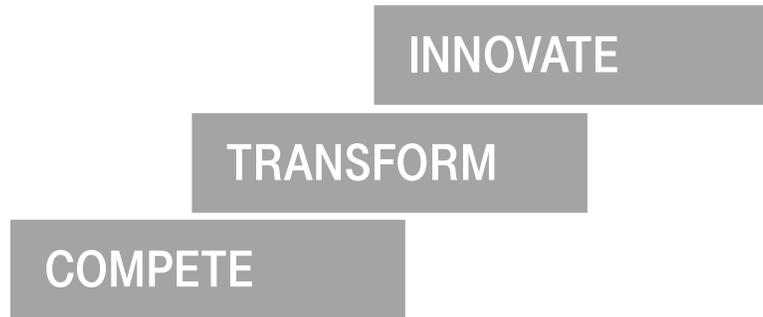
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# AGENDA

- **Europe strategy**
- **Transformation program for next decade**
- **All IP-Migration**
  - What is IP-Transformation
  - Why now
  - Advantages and challenges of migration
  - Commercial opportunities
  - When is the completion date
- **Target network infrastructure TeraStream**
  - Development from today to TeraStream
  - TeraStream in detail
  - Highlights and benefits
- **Final remarks**



# IP-TRANSFORMATION IMPORTANT CORNERSTONE OF EU STRATEGY



# OUR TRANSFORMATION PROGRAM FOR THE NEXT DECADE

## PSTN migration is the first step



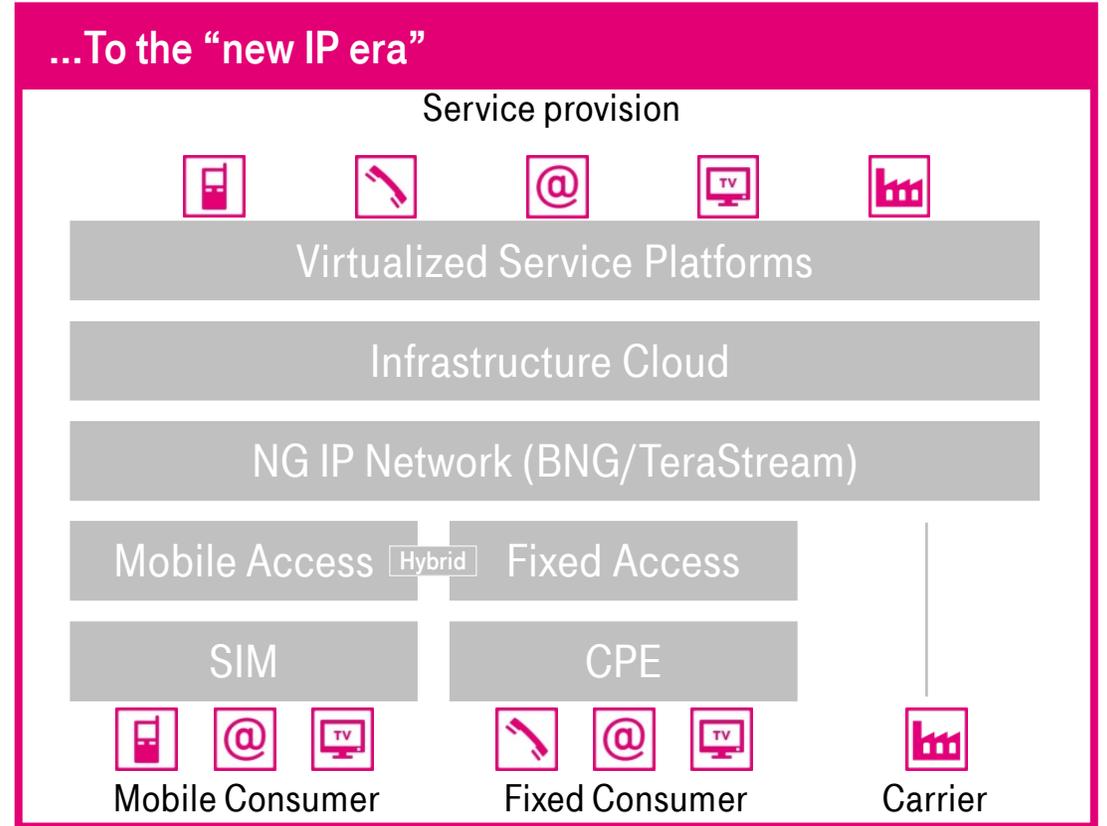
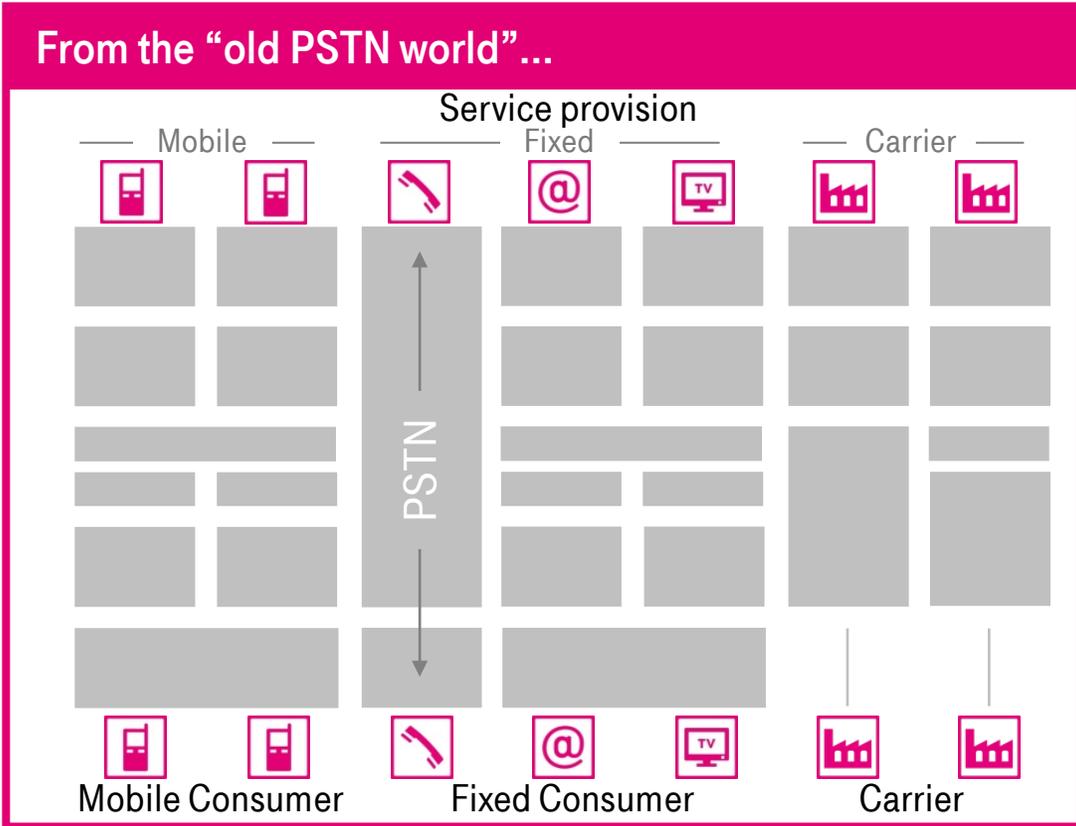
- Execute **switch-off PSTN/ISDN** products efficiently in each country
- The **PSTN migration has been accelerated in 2013** with specific migration plans for each country
- ➔ Focus on **additional customer services** (e.g. self-provisioning) for superior customer experience and **efficient cost savings**

## Optimization of IP production



- Step 1 **Broadband Network Gateway (BNG)**: consolidation of aggregation and relevant IT systems
- Step 2 **TeraStream**: applying cloud model to network infrastructure, network function virtualization, new real-time OSS
- BNG and TeraStream pilots started in Greece and Croatia respectively
- ➔ Focus on **capacity increase for traffic explosion and additional customer services** (e.g. plug-and-play, reduced latencies, 1 Gigabyte capacity) and **lower network production cost**

# WHAT IS IP-TRANSFORMATION? – THE CREATION OF A SIMPLIFIED AND STANDARDIZED NETWORK



# WHY IS NOW THE RIGHT TIMING FOR A STRONG FOCUS ON IP-TRANSFORMATION?

## Customers need

- Demand for IP products and services
- Demand for fast & easy new solutions (instant activation)
- Demand for integrated personalized products & services
- Customer demand for bandwidth (+68% in mobile, +21% in fixed CAGR 2012 to 2017)

## IP-Transformation

## Technology

- New technologies enable creation of new production model
- Software-Defined Networking (SDN)
  - Content Delivery Network (CDN)
  - Virtualization
  - Optical IP

Source: Cisco Visual Networking Index: Forecast and Methodology, 2012–2017

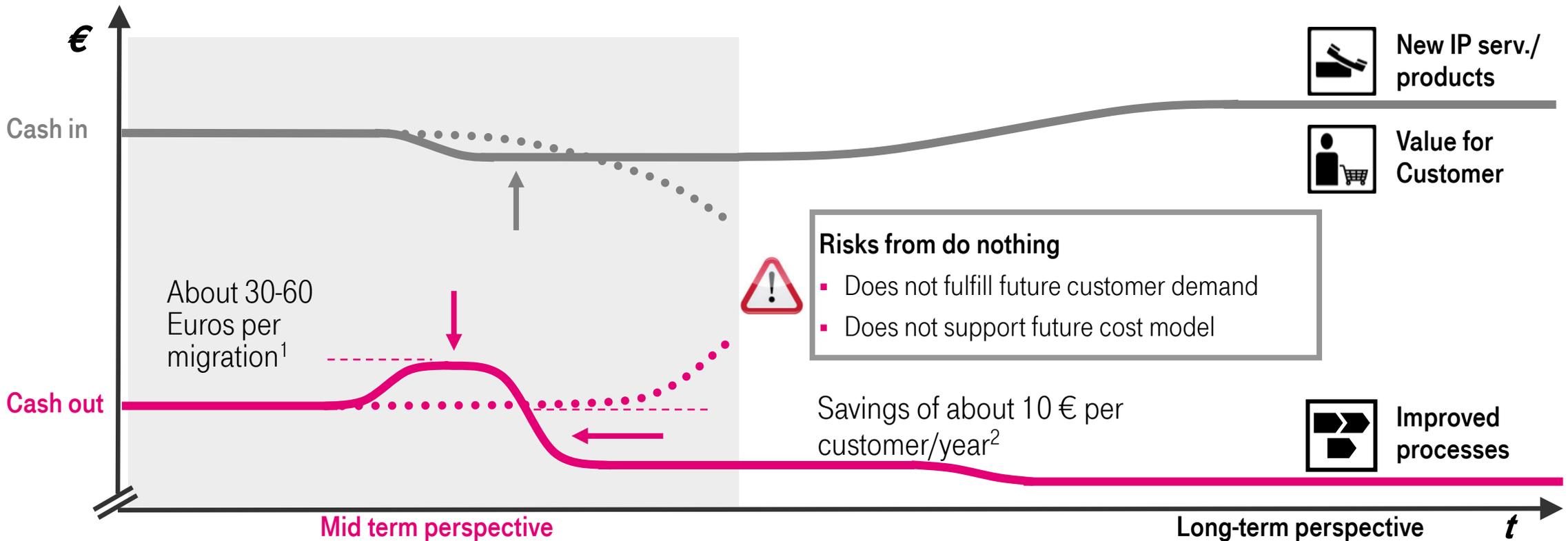


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# ADVANTAGES AND CHALLENGES OF PSTN-MIGRATION



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

— Migration      ..... Do nothing case      → Influencing

# COMMERCIAL OPPORTUNITIES IN B2B & B2C

## Value for Customer

- Instant provisioning & faster customer service
- Network stability
- Clear voice quality
- ➔ Product examples:
  - Hybrid Access
  - HD Voice
  - Broadband on demand (e.g. Macedonia)
  - On-demand scalability (e.g. number of lines)

## New IP services/products

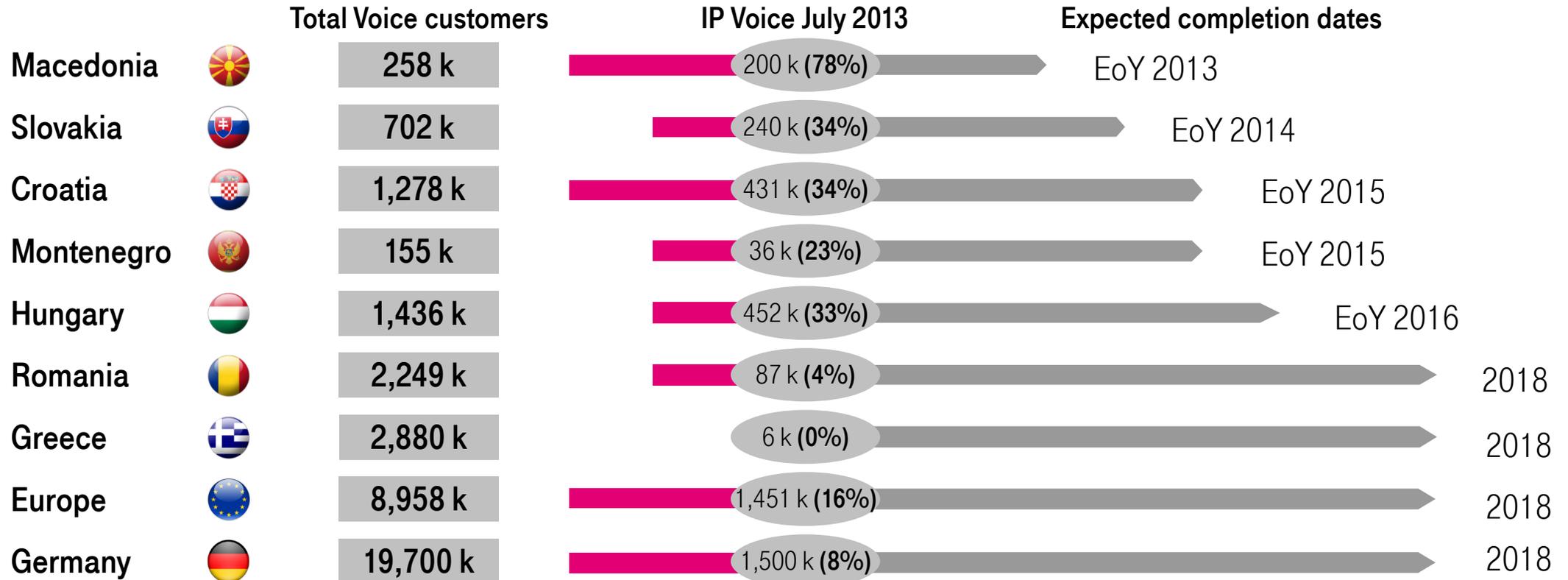
- Accelerated time-to-market
- Future proof product concept
- Enables convergent solutions
- ➔ Product examples:
  - IP Centrex/Hosted PBX
  - Unified Communication
  - IP Phone Portfolio

## Improved processes

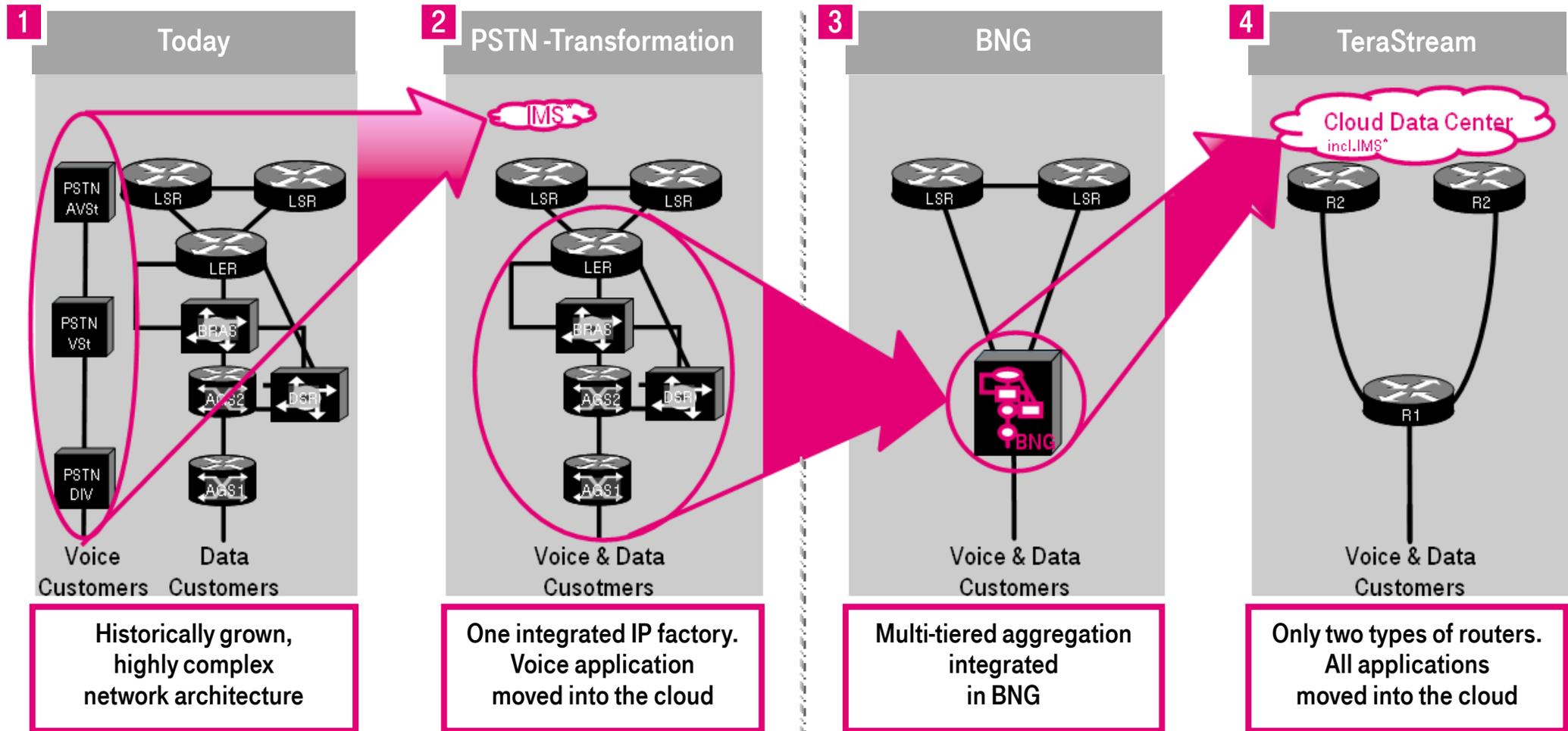
- Enables Zero Touch for provisioning and repair (plug & play without assignment of technicians)
- Increase self provisioning capabilities

# TARGET SCHEDULE FOR PSTN MIGRATION BY COUNTRY

## Subscriber base, actuals and target completion dates



# TECHNOLOGY DEVELOPMENT: PSTN (TODAY) – ALL IP /BNG – ALL IP/ TERASTREAM

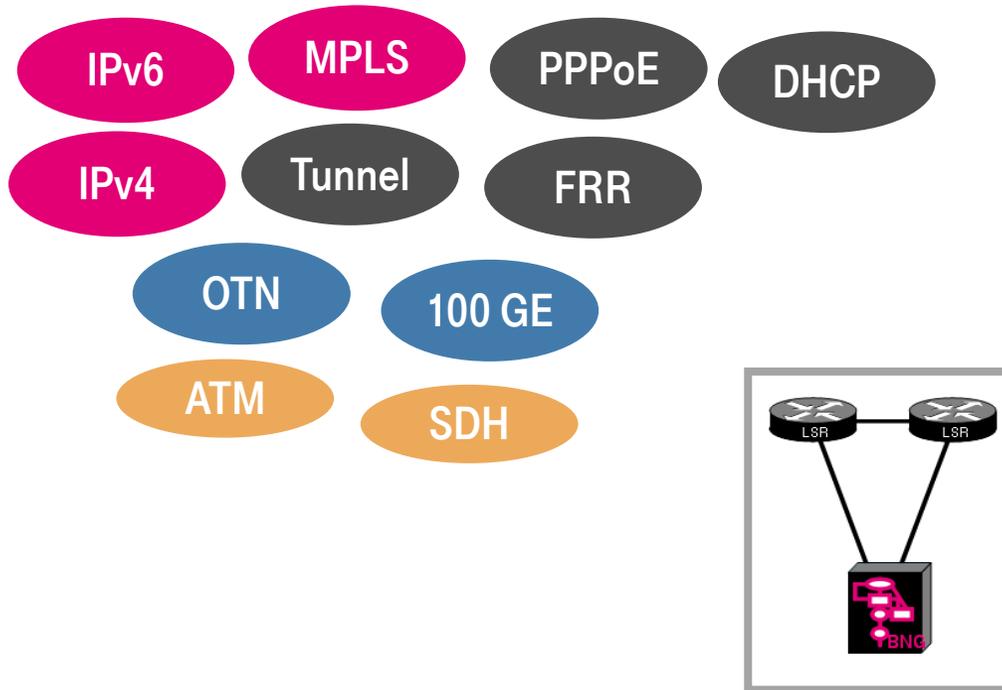


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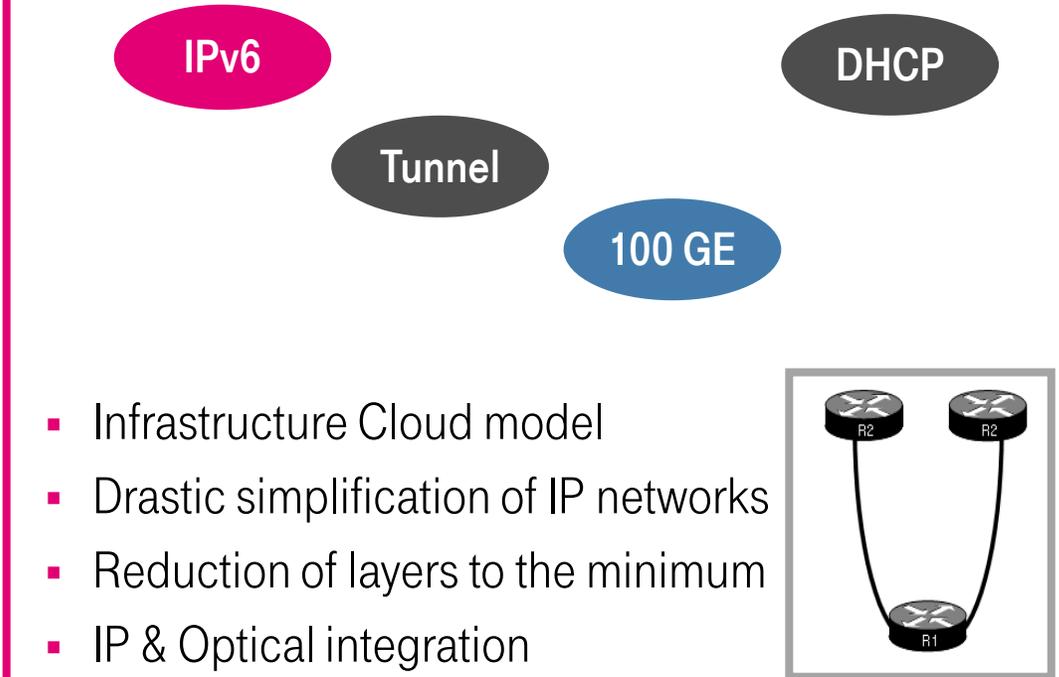
\*AGS1 - Aggregation Switch 1; AGS2 - Aggregation Switch 2; AVst - Automatic Switching Center; BRAS - Broadband Remote Access Server; DIV - Digital Switching Center (PSTN/ISDN); DSR - D-Server Router (Distribution of IP Multicast for IP/TV); IMS - IP Multimedia Subsystem; LER - Label Edge Router; LSR - Label Switch Router; R\* - Router; VSt - Switch Center

# THE STEP FROM BNG TO TERASTREAM LEADS TO A REDUCTION OF PROTOCOLS

## BNG - Protocols



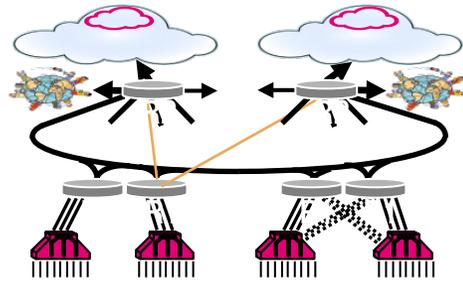
## TeraStream - Protocols



# TERASTREAM FEASIBILITY ALREADY REALIZED AS A PILOT IN CROATIA

## TeraStream

- European first native IPv6 network
- Worldwide first integration of network and cloud technology for service production = Network function virtualization<sup>1</sup>
- Worldwide first 100 Gb/s network using IP and optical integration
- New real-time operations support system (OSS)
- Works with all access technologies (e.g. fiber, vectoring, DSL, LTE)



## Benefits

### Time to market:

- Software-based service production - Innovation cycle will be reduced dramatically from years to month

### Customer Experience:

- Self service and plug & play will be common for all customers
- Realtime – minimal latency (from 10s of ms to ms)
- Highest upstream and downstream bandwidth
- It is the basis for simplicity and future customer experience

### Cost Aspect:

- It will be operated at a fraction of today's cost capital, labor and energy cost

<sup>1</sup> As a result, 40% of total traffic going forward will be delivered by data centers, tightly linked to the network; all more complex parts of production machine will be centralized

# SUMMARY AND CLOSING REMARKS

## IP-Transformation is a must do for the industry

- Enhanced customer experience → Superior products, better customer service and faster technology (e.g. higher speed and less latency)
- Efficient cost structure → Savings of about 10 € per customer/year<sup>1</sup> in Europe
- Lean production & virtualization → Easier maintenance and technology roll outs

## DT aspirations

- First operator to finalize a PSTN-migration in a European country (Macedonia) by end of 2013
- Migration of all countries by end of 2018
- TeraStream pilot in Zagreb shows DTs superior future production model
- TeraStream principles as key element of the target production model identified and vital part of our vision for a pan-european integrated IP network for Europe

<sup>1</sup> After complete PSTN switch-off

# Q & A

# GLOSSARY

<b>AGS1</b>	Aggregation Switch 1	<b>LER</b>	Label Edge Router
<b>AGS2</b>	Aggregation Switch 2	<b>LSR</b>	Label Switch Router
<b>ATM</b>	Asynchronous Transfer Mode	<b>MPLS</b>	Multi Protocol Label Switching
<b>AVst</b>	Automatical Switch Center	<b>NFV</b>	Network Functions Virtualization
<b>BRAS</b>	Broadband Remote Access Server	<b>OTN</b>	Optical transport network
<b>CDN</b>	Content Delivery Network	<b>R*</b>	Router
<b>DIV</b>	Digital Switch Center (PSTN/ISDN)	<b>PPPoE</b>	PPP over Ethernet
<b>DHCP</b>	Dynamic Host Configuration Protocol	<b>PSTN</b>	Public Switched Telephone Network
<b>DSR</b>	D-Server Router (Distribution of IP Multicast for IP/TV)	<b>SDH</b>	Synchronous Digital Hierarchy
<b>FRR</b>	Fast Re-Route	<b>SDN</b>	Software-Defined Networking
<b>GE</b>	Gigabit Ethernet	<b>VSt</b>	Switch Center
<b>IMS</b>	IP Multimedia Subsystem		
<b>IPv4</b>	Internet Protocol Version 4		
<b>IPv6</b>	Internet Protocol Version 6		

