

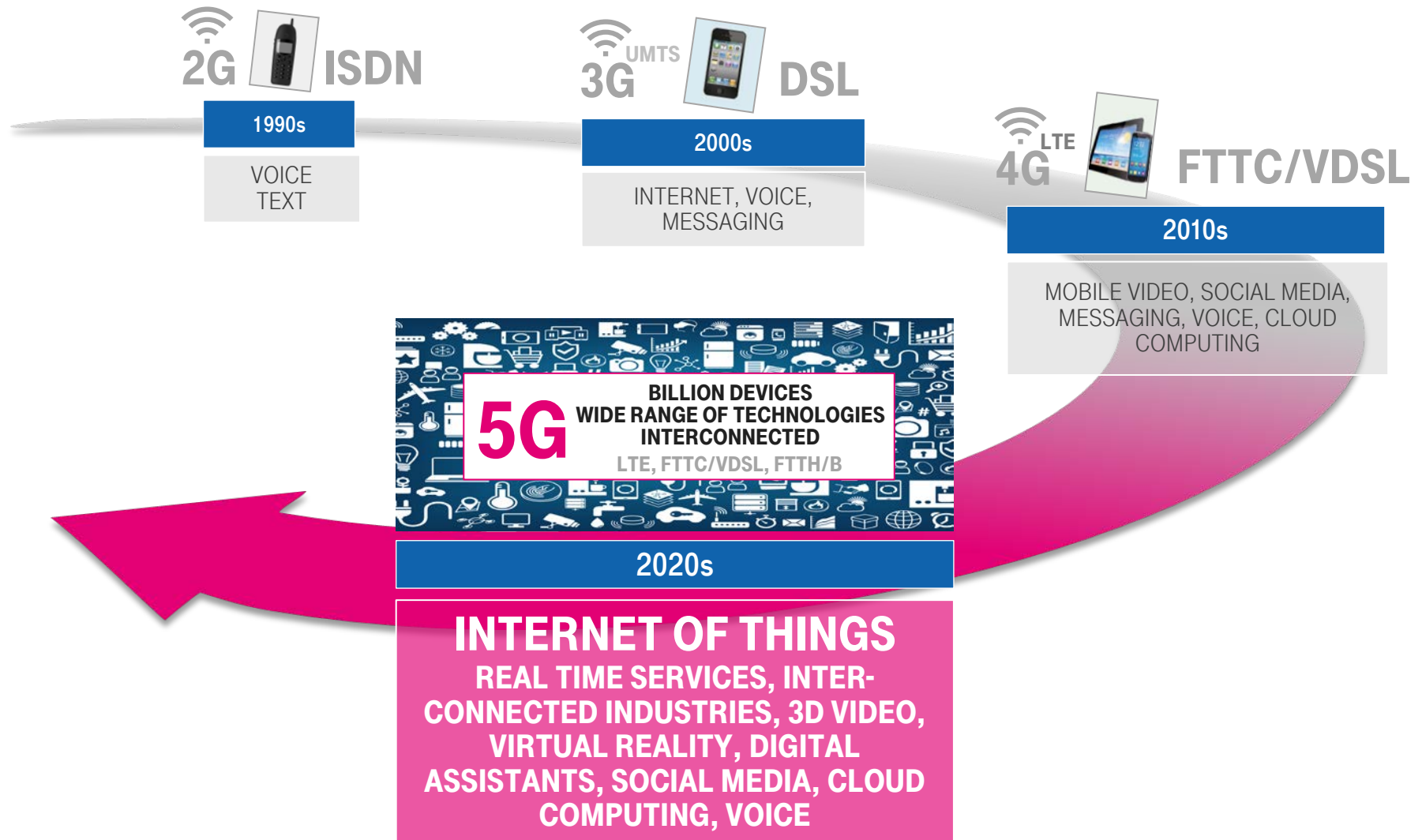
# CAN EUROPE LEAD IN 5G? STRATEGIC THOUGHTS

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Deutsche Telekom  
Brussels, 26.10.2016



LIFE IS FOR SHARING.

# 5G WILL BE NEXT MILESTONE IN DIGITAL COMMUNICATIONS



# ANYTHING THAT CAN BE DIGITIZED WILL BE DIGITIZED – AND INTERCONNECTED

**> 50 billion**  
connected devices



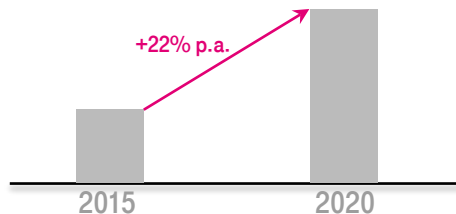
**> 10 devices**  
per user



**Everything in the  
cloud**  
content & applications



**Data traffic**  
continued growth



**Mobile dominates**

**2/3**

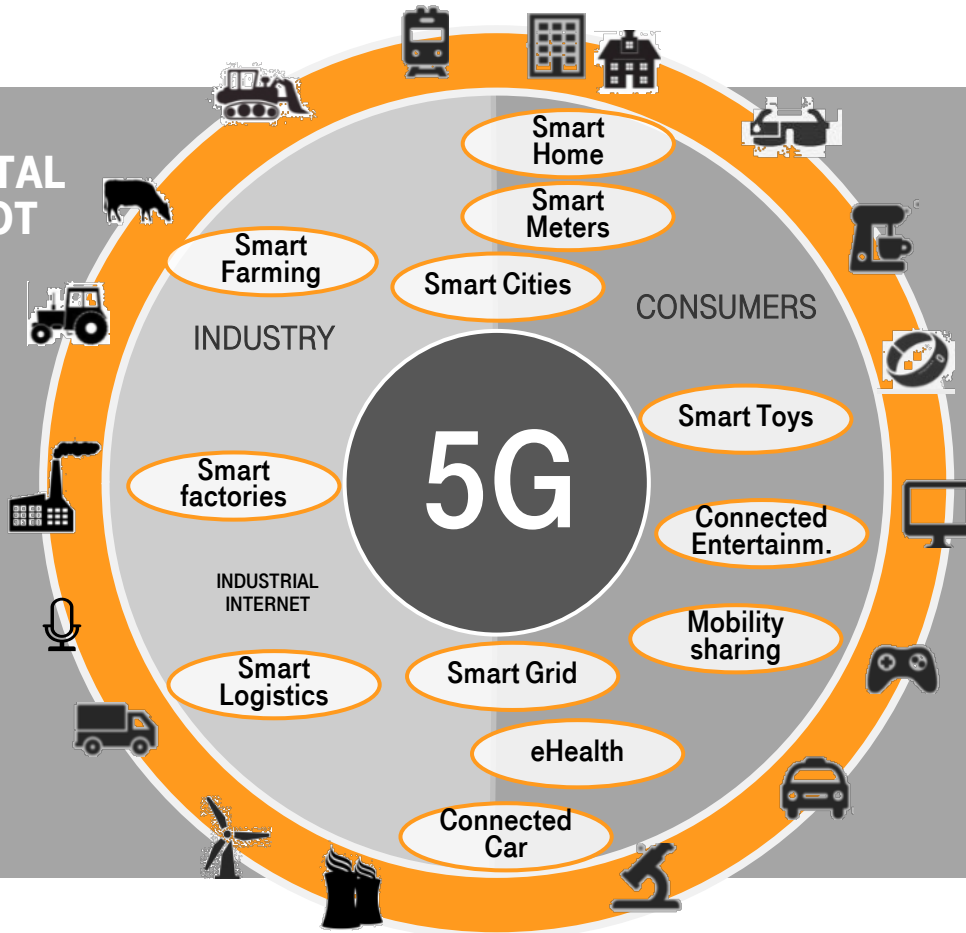
Mobile and wire-  
less devices  
generate 66%  
of total Internet  
traffic

**Tactile Internet**  
with realtime interaction



# THE INTERNET OF THINGS INTERCONNECTS ECONOMY AND SOCIETY IN ALL AREAS

## 5G PLAYS FUNDAMENTAL ROLE FOR IOT



- **Digital data:** Many interconnected devices generating data – used to optimize processes, products and interactions
- **Automation:** Business processes automated across companies and every link of the value chain
- **5G network management:** fundamentally transformed architecture and virtualisation of networks. Tailored supply of network functions and transmission capacity. Fixed and mobile networks converge.

# ONLY WITH 5G EVERYTHING THAT IS DIGITIZED WILL BE CONNECTED AS WELL

## WHAT 5G IS ABOUT – THE EUROPEAN COMMISSION’S VIEW



**FIBRE-TO-THE-HOME: JUST ONE  
OPTION AMONG MANY TO PROVIDE  
HIGH SPEED BROADBAND ACCESS**

Source: EU Commission, July 2016

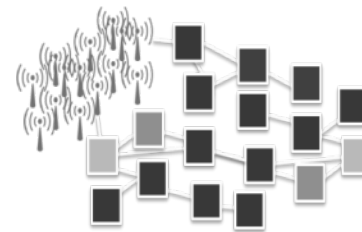
# 5G IS THE KEY TECHNOLOGY FOR THE CONNECTED SOCIETY

## CURRENT SITUATION: MANIFOLD NEW APPLICATION FIELDS AND INCREASING DEMAND FOR FLEXIBILITY



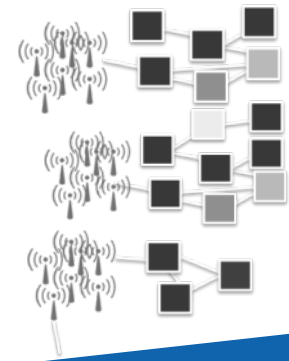
## PROBLEM: TODAY'S CONVENTIONAL SOLUTIONS REACHING THEIR LIMITS

„Everything in one physical network”?



Too complex

Separate physical network for each service?



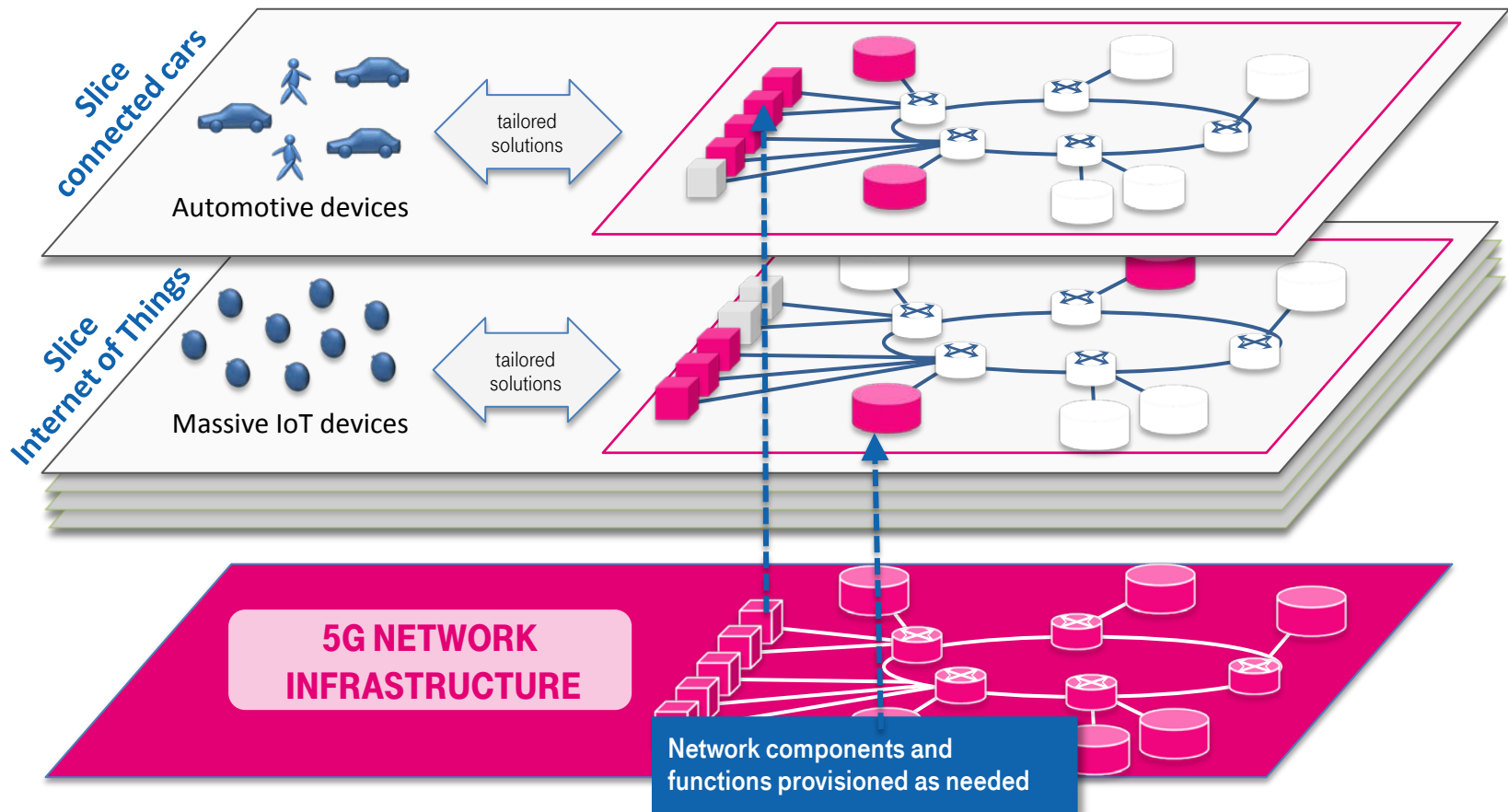
Too expensive

**SOLUTION: NEW 5G TECHNOLOGY WITH SEVERAL LOGICAL LAYERS ON A COMMON PHYSICAL INFRASTRUCTURE (SO-CALLED “SLICES”)**

# NETWORK SLICES: VIRTUALISATION OF NETWORK FUNCTIONALITIES

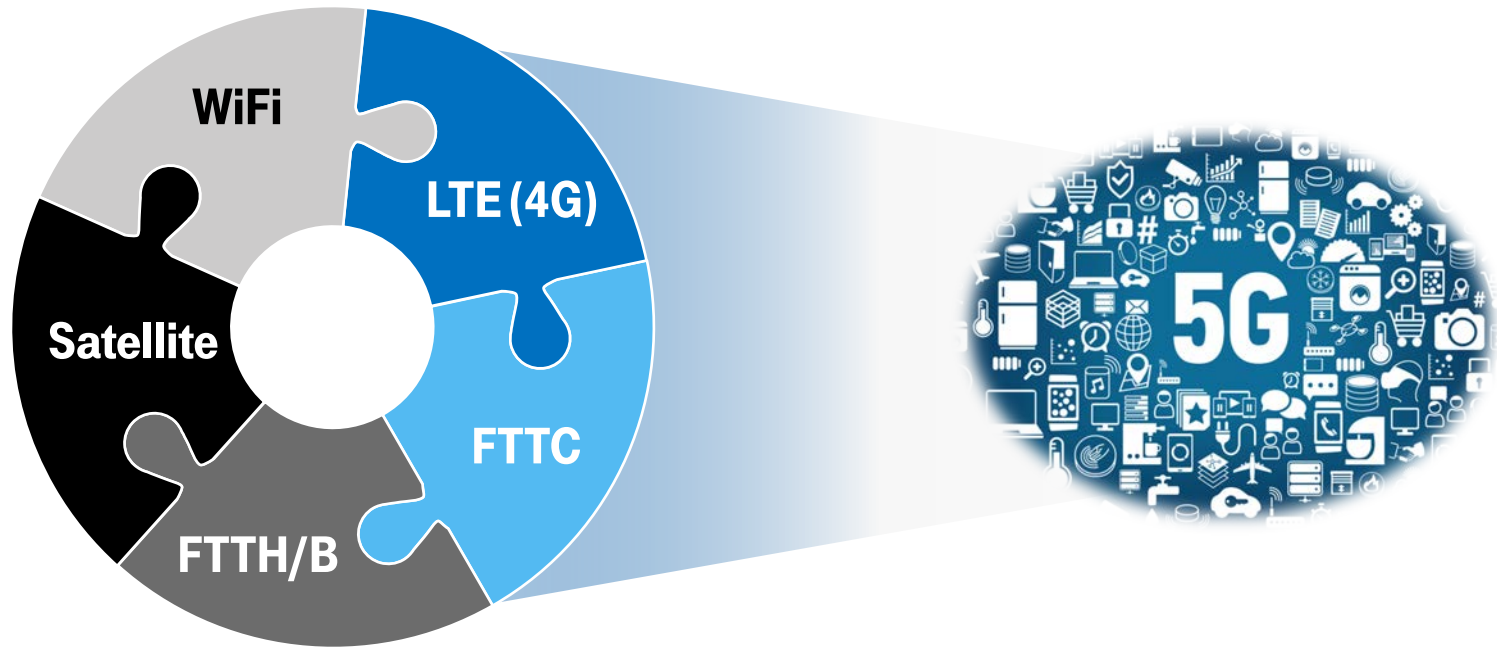
5G network slicing means: dividing one physical network into multiple “slices” that serves different needs, providing tailor-made solutions for different user requirements

Examples connected driving and Internet of Things





# 5G WILL LEVERAGE ON THE STRENGTHS OF DIFFERENT TECHNOLOGIES



The **5G architecture** is expected to

- run over a converged optical-wireless-satellite infrastructure
- leverage flexible intra-system spectrum usage
- make optimal utilisation of the specific strengths of the different underlying infrastructures



# CHALLENGES AND POLICY RECOMMENDATIONS FOR 5G NETWORK DEPLOYMENT

## CHALLENGES

### BILLION-INVEST NEEDED...

#### Fiber rollout



#### Deployment 5G networks (Hardware & Software)



#### Availability of spectrum



### ... AND REGULATORY HURDLES:

Regulatory practice today:

- Access and price regulation de-facto give preference to non-investing resellers
- New fiber networks subject to legacy rules
- Imminent regulation of mobile in converging networks
- Far-reaching obligations in case public funding
- Spectrum regulation without sufficient investment incentives
- Only hesitant attempts for deregulation in the EU („Keep it up“)

## RECOMMENDATIONS

- 1 Establish technology and competitively neutral **BROADBAND GOALS** with focus on 5G.
- 2 Ensure freedom to act and predictable legal **FRAMEWORK** to build 5G networks.
- 3 Harmonised **SPECTRUM POLICY** fostering investment.
- 4 Make **PUBLIC INFRASTRUCTURE** available for 5G roll-out.
- 5 **PUBLIC FUNDING** should address market failures, without distorting competition.
- 6 Support market driven **STANDARDISATION** process.

# POLICY INITIATIVES & COLLABORATION IMPORTANT FOR PAVING THE WAY TOWARDS 5G IN EUROPE

## SEVERAL IMPORTANT POLICY INITIATIVES ON NATIONAL AND EU-LEVEL

such as Review of regulatory telecommunications framework (Electronic communications code) and 5G Initiative for Germany

## COLLABORATION KEY TO REALISE 5G VISION FOR EUROPE

Important that different players (network operators, vertical industries, others) jointly work on making 5G reality. DT deeply involved, e.g. via standardization bodies, 5G Alliance, first 5G trials etc.



**EU-REVIEW  
TELECOMS  
REGULATORY  
FRAMEWORK**



**THANK YOU.**



ERLEBEN, WAS VERBINDET.

# BACKUP



ERLEBEN, WAS VERBINDET.

# MANIFOLD APPLICATIONS MEANS MANIFOLD REQUIREMENTS FOR TOMORROW'S NETWORKS

## Up to now: unilateral focus on megabits



- Transmission speeds still overarching indicator – also for political broadband targets
- Trend: different quality requirements depending on particular applications – both for residential and industry users

## Tomorrow: differentiated quality parameters

Latency



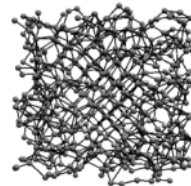
Availability

99,999%

Coverage



Density



High-speed mobility



Bandwidth



In-time provision



Costs



Convergence



# A SOUND TECHNOLOGY MIX: THE BEST STRATEGY TO BUILD HIGH SPEED BROADBAND NETWORKS FOR EUROPE



## Technology mix to build high speed broadband networks with 5G focus

... with decisive economic advantages:

1. Future-proof and demand-driven high speed network roll-out. Requirements of the Gigabit society will be met
2. Blurred lines towards FTTH. Early FTTH offers depending on market demand
3. Productivity, growth, welfare and employment benefits: chance for an industrial renaissance in Europe
4. Gradual fibre roll-out is cost-efficient; fast path to achieve high NGA coverage throughout Europe
5. Network topology, socioeconomic factors favour FTTC Vectoring and 5G in important European regions

# DEUTSCHE TELEKOM ASSUMING A LEADING ROLE DEVELOPING 5G

## DT: leading role in standardization bodies



## 5G Alliance



## First 5G end-to-end network worldwide



## World records



< 1 ms latency



> 70 Gbps  
> 1,5 Gbps per device