Technology & Innovation
Claudia Nemat
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Key messages

Review
We delivered our CMD 2018 promises including the DT ‘Superior Production Model’ (All IP Migration, Agile IT Transformation, Integrated Network Leadership).
Going forward, we evolve to an experience-obsessed tech player:

01 Automation, cloudification & disaggregation
We will move towards a high degree of automation. Hyperscaler-like, yet telco-grade

02 Digitalization & SW/data capabilities
We will continue digitalizing the full stack and continue to enhance the software/data capabilities of our employees

03 Continued network leadership
Our integrated network leadership will continue to deliver clear business benefits

04 Green – Energy efficiency
To support DT’s ambitious climate targets, we will double energy efficiency in network production

05 Experience obsession
Experience-obsessed, focused innovation and new products will leverage our superior networks
Review
2017–2021
IP Migration with customer experience and cost benefits

Superior Production Model 1/3 – All IP Migration 100% at DT, with radically simplified BNG architecture in GER

- Broadband availability
  - 10 mn HH
  - ≥ 250 Mbps
  - enabled by SuperVectoring & FTTH

- Simplicity for customer
  - Plug & Play
  - for all customers

- Relief of service organization
  - Activation incidents reduced by 40%

- Cost savings
  - €100 mn
  - annual cost saving already realized in 2020

- Stable & secure networks during Covid-19
  - +100% fixed voice calls
  - +300% video conferencing

All numbers YE 2020
IT Transformation with huge impact on speed, stability and cost

Superior Production Model 2/3 – Agile IT Transformation

2017

- Time-to-market: **18 months**
- Share of flexible delivery: **0%**
- Share of agile working: **< 5%**
- Improvable IT stability
- IT spend above benchmark-level
- Tightly coupled **legacy** IT

YE 2020: Industry leading IT

- Time-to-market: **3.5 months**
- Share of flexible delivery: **70.5%**
- Share of agile working: **80%**
- Operational stability almost doubled\(^1\)
- Reduced IT spend\(^2\): **-€0.2 bn**
- IT **modernization**, decoupling and selective greenfields

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\(^1\) Index for business impact from 252 (2017) to 132 (2020)  
\(^2\) YE 2017 vs. plan for YE 2021e
Integrated Network Leadership with clear competitive advantage

Superior Production Model 3/3 – Integrated Network Leadership

Integrated network leadership
- Best in mobile Connect Test (01/2021)
- Best in 5G Chip Test (01/2021)
- World’s best mobile network Umlaut (10/2020)

Network quality perception
+23pp vs. best competitor

#1 in 8/10 markets based on network TRIM²

Mobile network leadership
- OPENSIGNAL Winner 5G & LTE (01/2021)
- TMUS delivering 5G leadership (02/2021)
- Perception as “the 5G company”
+120% since Q3/2019

Our clear competitive advantage

T... Brand worth
> $50 bn

#1 in DAX30 reputational ranking³

Source of data: Kantar Image and Advertisement Monitor for German footprint (2020), % of participants that attribute statements to a brand

³ Source of data: Kantar Image and Advertisement Monitor for German footprint (2020), % of participants that attribute statements to a brand

² AT, CZ, GR, HR, HU, ME, MK, NL, PL, SK (2020)

³ Dr. Doeblin Society for Economic Research 2021
### CMD 2018 commitments: We delivered!

<table>
<thead>
<tr>
<th>Technology leadership</th>
<th>Ambition level</th>
<th>Achievements 2020</th>
<th>2017–2021e</th>
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<tbody>
<tr>
<td></td>
<td>Gigabit rollout</td>
<td>• approx. 1.2 mn HH in 2021e (0.5 mn in Q4)</td>
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<td>Ramping up to 2 mn HH p.a. in GER by 2021e</td>
<td>• 1.4 mn HH in 2021e</td>
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<td>0.75 mn HH p.a. in EU by 2021e</td>
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<td></td>
<td>Mobile network leadership &amp; leading in CX</td>
<td>• 99% in 2020</td>
<td>✨</td>
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<td></td>
<td>99% outdoor LTE coverage in GER by 2020</td>
<td>• 98% in 2021e</td>
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<td></td>
<td>99% outdoor LTE coverage in EU by 2021e</td>
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<td>5G innovation leadership</td>
<td>• First European 5G network in Austria (2019), DSS pioneer (2020), Connect 5G Innovation Award (2021)</td>
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</tbody>
</table>

| Value transformation | IT spend reduction of €0.2 bn in 2021e | €0.2 bn reduction achieved by 2021e | ✨ |
|----------------------|----------------------------------------|-------------------------------------| |
|                      | IT delivery time down to 6 months in 2021e | Down to 3.5 months already in 2020 | ⬤ |
|                      | IP migration completed in 2020 | Completed across the entire footprint in 2020 | | |

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1: FTTH/B & Docsis 3.1; AT, CZ, GR, HR, HU, ME, MK, PL, SK (excl. RO & PL)
Strategy
2021–2024
We evolve towards an experience-obsessed tech player

FROM a reliable network builder & operator

Superior Production Model

- All IP Migration
- Agile IT Transformation
- Integrated Network Leadership

Capabilities built so far

- Global skill-based organization implemented
- DevOps in place in NT & IT
- First successes in radical automation, disaggregation & software integration

TO an experience-obsessed tech player

Tech player

- **01** Network automation, cloudification & disaggregation
- **02** All value-chain digitalization & SW/data capabilities
- **03** Continued integrated network leadership

Green

Path to carbon neutrality\(^1\) – Energy efficient

Experience-obsessed

- Best connectivity experience
- Seamless interplay at home
- Beyond the core

\(^1\) CO\(_2\) neutral scope 1&2 in 2025, scope 3 in 2040, addressed in RfPs with high priority
Network automation proven and ready to scale

**PROVEN**

- Hyperscaler like & telco grade voice operations
  - 18 months from idea to product
  - 90 days from SW to rollout
  - 14 days bug fix
  - Many nightshifts required

**SCALING**

- We are live with 1 mn customers
  - Voice production platform
    - Fully automated
    - Open
    - Multi-vendor
    - Cloudified

- All voice customers on one automation platform by 2024

- At least 50% of data customers on one platform by 2024e
Automated network planning proven and ready to scale

PROVEN

AI driven FTTH rollout planning

- 25 days average planning time
- Fully automated, AI based planning processes
- Digitized municipal applications

25
- Manual processes
- Complex handovers with municipalities

Deployed for 75% of new areas

Reduction of working hours by up to 75% in structural planning

5

25% unit cost vs. 2020 by 2024e

SCALING

Contributes to

- Enables ramping > 2.5 mn HH p.a. to achieve 10 mn FTTH HH passed until 2024e

1 Planning effort is one out of many factors reducing unit costs
Network disaggregation will increase choice and efficiency

**PROVEN**

**Mobile access – “ORAN”**
- Cornerstones laid down by
  - OTIC test and integration lab (Europe’s 1st)
  - Open fronthaul requirements binding in RfPs
- Implementation with ORAN town in real network

**Fixed access – “Access 4.0”**
- Evolving BNG
- Edge-cloud based fixed broadband access live and in production (World’s 1st)

**SCALING**

Capabilities built so far

- 350 experts for NW integration, NW operations & NW management
- 20 agile squads
- New way of working

Diverse ecosystem with increasing competition leading to more choice and efficiency

e.g. 10–20% efficiency in RAN as planned by 2024

Example GER
Digitalization capabilities proven and ready to scale

**PROVEN**

**Easy Fiber ordering** (Gigabit Geschäftssystem)
Cloud-based, fully digital platform to order, provision and configure Fiber products instantly and in any channel

**Award-winning bot** (Frag Magenta)
Digital assistant for personalized 24/7 service automation

**SCALING**

**Complete Fiber rollout**
channeled and processed via the platform by 2022

**Leveraging AI in all customer service interactions**
by 2025
We accelerate digitalization with future-proof IT

**YE 2020:**
Industry leading IT

- Time-to-market: 3.5 months
- Share of flexible delivery: 70.5%
- Share of agile working: 80%
- Operational stability almost doubled
- IT modernization, decoupling and selective greenfields
- IT spend reduced by €0.2 bn
- Share of cloudified production: 8% in IT

**2024e:**
World class IT

- Time-to-market: 2 months
- Share of flexible delivery: 80%
- Share of agile working: 100%
- Further improved IT stability
- Massive increase of microservices & APIs
- IT spend further reduced by > €0.2 bn
- Share of cloudified production: 80% in IT ≈55% in NT

1 Index for Business impact should be < 100 by 2024e
2 YE 2017 vs. YE 2021e
3 YE 2020 vs. YE 2024e
4 In core network; GER: 67% & EU: 42% in 2024e
We are driving skill and cultural transformation

Modern chapter tribe setup in board area Technology & Innovation

<table>
<thead>
<tr>
<th>Tribes</th>
<th>SW chapter</th>
<th>AI/data chapter</th>
<th>Architects chapter</th>
<th>Engineers chapter</th>
<th>CX Design chapter</th>
<th>DevOps chapter</th>
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Chapters

Scale proven skill transformation in tech & innovation area
Quota of relevant skills, %

- SW/System engineer
- DevOps engineer
- Data scientist
- Architect
- Agile expert

2020
- 12k FTE
- 26%
- 23% (2.8k FTE)

2024e
- 12k FTE
- 44%
- 9%

Non-technical skill sets (e.g. scrum master, product mgr.)
Other technical NT/IT experts
Key profiles in engineering & agility
We will remain the network experience leader

<table>
<thead>
<tr>
<th>5G Leadership in GER, EU² &amp; US</th>
<th>Commitment to Fiber in GER² &amp; EU³</th>
<th>Toolbox of best combinations (own &amp; orchestrated)</th>
</tr>
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<tbody>
<tr>
<td>based on superior (PoP) coverage</td>
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<td>≈500k customers on 4G hybrid solution + customer trial for 4G/5G indoor repeater⁴</td>
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<td>80% PoP coverage</td>
<td>2.3 mn HH</td>
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<td>18% PoP coverage</td>
<td>6.1 mn HH</td>
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<td>90% PoP coverage</td>
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<table>
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<tr>
<th>2024e</th>
<th>10 mn HH</th>
<th>• Leverage 5G for superior seamless performance in- and outdoors</th>
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<tr>
<td>≈97% PoP coverage</td>
<td>10 mn HH</td>
<td>• Orchestrate best customer experience across own- and third-party networks where required⁵</td>
</tr>
<tr>
<td>&gt; 75% PoP coverage</td>
<td>≈10 mn HH</td>
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<tr>
<td>97% PoP coverage (2022e)</td>
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¹ AT, CZ, GR, HR, HU, ME, MK, NL, PL, SK (excl. RO) ² Incl. cooperation ³ AT, CZ, GR, HR, HU, ME, MK, NL, SK (excl. RO & PL); FTTH/B & Docsis 3.1 ⁴ Tech-JV with SKT from South Korea ⁵ E.g. broadband satellite for IoT and rural coverage & mmWave FWA for selected broadband use cases
We are convinced by the comprehensive benefits of 5G

**Higher Capex efficiency**
-40% Capex per Mbps for top speeds by 2024e

**3G Shutdown**
in combination with 5G increasing energy efficiency

**Fixed wireless access**
mainly in US and partially in EU

**Up & cross selling in B2C**
e.g. grow number of German customers on L/XL tariffs by factor 1.5–2.0x by 2024e

**B2B differentiation**
Industrial connectivity, edge cloud, IoT & new 5G SA core with QoS and slicing
Cumulating in campus networks: > €100 mn revenue until 2024e

5G Leadership in GER, EU & US
We will double energy efficiency to offset volume explosion

Long-term stable energy consumption...

Energy consumption per region, mn MWh

- Germany: 4.6 (2020) vs. 2.7 (2024e)
- Europe: 1.9 (2020) vs. 1.9 (2024e)

... with efficiency levers offsetting volume increases

- We will retire legacy platforms\(^1\) to counterbalance other trends such as rise in data traffic, network densification & rollout of more active network components

- In addition, efficiency from...
  - Network measures, including site sharing & AI steering
  - Copper to Fiber migration
  - Energy efficient data centers, on- and nearshore
  - In addition, innovation in packaging, materials, and decentral energy production

\(^1\) Like PSTN or SDH

Double overall energy efficiency
by 2024e
Delightful home experiences built on best networks

Products & Innovation

3 Experiences

BEST CONNECTIVITY EXPERIENCE

SEAMLESS INTERPLAY

BEYOND THE CORE

Unprecedented “Magenta Moments”

Magenta TV

Magenta Smart Home

Telemom Router

Magenta Gaming

Hallo Magenta

Integrate Home Operating System

3 Experiences

BEST CONNECTIVITY EXPERIENCE

SEAMLESS INTERPLAY

BEYOND THE CORE

3 Enablers

VOICIFICATION

BIG DATA & AI

SERVICE ORCHESTRATION

Commitment to Fiber

Superior Mobile networks

Toolbox of best combinations

Unprecedented “Magenta Moments”

Magenta TV

Magenta Smart Home

Telemom Router

Magenta Gaming

Hallo Magenta

Integrate Home Operating System

Unprecedented “Magenta Moments”

Magenta TV

Magenta Smart Home

Telemom Router

Magenta Gaming

Hallo Magenta

Integrate Home Operating System
We scale experience innovation across our footprint

Customer expectations

- **BEST CONNECTIVITY EXPERIENCE**
  - Stable & fast connection everywhere at home – like at the curb

- **SEAMLESS INTERPLAY**
  - Simple & seamless onboarding, upgrading and operating of new devices – OTT like

- **BEYOND THE CORE**
  - Home experiences with friends and family – all voice enabled

PROVEN

- > 1 mn routers with automated self-installation based on a new RouterOS logic with decoupled HW & SW, and massive leverage of data for CX optimization, and predictive maintenance

  - New HomeOS (API-first orchestration layer) launched e.g. with 200k engaged customers on Smart Home in 2021e

  - > 100k smart speakers sold, plus nearly 100k users via TV app/remote control in 2021e

SCALING

- 75% of DT router base by 2024e

- 90% of DT customer base enabled by 2024e

- All DT services voice enabled by 2024e
Midterm ambition level
### Midterm ambition level

<table>
<thead>
<tr>
<th>Technology leadership</th>
<th>Value transformation</th>
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<tr>
<td>Commitment to Fiber rollout</td>
<td>IT spend reduction: &gt; €0.2 bn</td>
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<td>GER: 10 mn HH passed</td>
<td>Time-to-market: 2.0 months</td>
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<tr>
<td>EU: ≈10 mn HH passed</td>
<td>Agile share of development: 100%</td>
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<td>5G PoP coverage &amp; network leadership</td>
<td>Increase degree of cloudified production</td>
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<tr>
<td>GER: ≈97%</td>
<td>NT: GER 67%; EU 42%</td>
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<tr>
<td>EU: &gt; 75%</td>
<td>IT: 80%</td>
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<tr>
<td>Further enhancing 5G innovation leadership &amp; consumer experience</td>
<td>Adj. indirect cost AL reduction (GER/GHS): €0.7 bn</td>
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<td>Technology energy consumption (GER &amp; EU): stable</td>
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<th>Year</th>
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1 AT, CZ, GR, HR, HU, ME, MK, SK (excl. RO & PL; FTTH/B & Docsis 3.1)  
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