We are all online:
Internet in the times of Corona

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Lots of data. lots of data crunchers

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DE-CIX at a glance

Easy Interconnection. Anywhere!
The world’s largest neutral interconnection ecosystem

- **2,200+** ASNs Connected networks
- **25** IXs
- **500+** Access Points
- **100+** Countries
- **66+** TB Connected Capacity
- **18+** Tbps Peak Traffic

Connected networks include NYC, LIS, MAD, MRS, DXB, FRA, DUS, HAM, MUC, IST, PMO, and 100+ countries. DE-CIX's ecosystem provides over 2,200+ ASNs for interconnected services.
Topic of today: Internet in times of Corona
A very special moment

Our *physical* lives almost on pause globally.
All our fundamentals are affected (health, education, transport, logistic chain…)

Most activities fully transferred or complemented by the *digital sphere* to ensure continuity of the institutional, private & business life, and contribute to the resolution of the crisis.
### Traffic patterns @ DE-CIX – General hits & shifts

<table>
<thead>
<tr>
<th>Before</th>
<th>Since the crisis</th>
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<tbody>
<tr>
<td>**+10-50% peak increase per **annum</td>
<td>**+10-50% average increase traffic in **days</td>
</tr>
<tr>
<td>Steady growth, new peaks in <strong>fall &amp; winter</strong></td>
<td>New peaks correlate with <strong>lockdowns</strong></td>
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<td>(sometimes live events, updates, or releases)</td>
<td>(exact dates varying by region)</td>
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<tr>
<td><strong>Stable</strong> distribution of traffic/applications</td>
<td><strong>Extreme</strong> rise of some applications</td>
</tr>
<tr>
<td>(e.g. video, CDN content, web)</td>
<td>(e.g. collaborative tools, gaming, video)</td>
</tr>
<tr>
<td><strong>Diurnal</strong> cycles, morning &amp; night low</td>
<td><strong>Significantly more</strong> traffic during the days,</td>
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<td></td>
<td><strong>higher</strong> amplitudes, and <strong>higher</strong> peaks</td>
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Same outcome at all DE-CIX hubs
Different boosters of traffic
Similar explanatory factors
Once the lockdown started mobile traffic decreased measurably and increased as relaxations started in mid April.
Changes in workday vs. weekend patterns as seen at ISP

Regular Workday pattern with strong increase in evening hours
Changes in workday vs. weekend patterns as seen at ISP

Regular Workday vs Weekend pattern - more traffic during daytime on Weekend
Changes in workday vs. weekend patterns as seen at ISP

The “Covid“ effect – workday pattern looks more like weekend
Traffic patterns @ DE-CIX – example: DE-CIX Frankfurt

Traffic by volume

- Traffic increase of 10%

Collaborative working by volume

- Collaborative tools (e.g. Skype, Webex, Zoom, Teams...)
- 100% increase in traffic
- More traffic during the week

A gaming provider by volume

- A gaming provider with target group of younger people: every day is weekend!
Traffic patterns @ DE-CIX – example: DE-CIX Madrid

- No. of users (unique IPs)
- About 20% increase

- Collaborative tools (e.g. Skype, Webex, Zoom, Teams...)
- No. of users grew by factor of 5

- Video-on-demand services
- No. of users doubled
- Hard to observe weekly patterns anymore
### Possible impacts on the Internet infrastructure

<table>
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<tr>
<th>In the short term</th>
<th>In the mid to long term</th>
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<tbody>
<tr>
<td>Internet backbone can absorb fast-growing demand</td>
<td>Incremental capacity deployed over a few weeks is used by newly initiated projects</td>
</tr>
<tr>
<td>Application / use case specific traffic patterns with “extreme” peaks</td>
<td>Shift in traffic patterns in the Internet, extreme situation a glimpse into the future (?)</td>
</tr>
<tr>
<td>No strict differentiation between business and residential usage and networks – uncommon traffic relations</td>
<td>Internet architecture must support certain quality guarantees – multi-services interconnection (e.g. Cloud)</td>
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</tbody>
</table>
The strategic shift ahead we are already anticipating

Traditional traffic going to cloud

- No quality guarantee across the Internet
- No unified access to cloud services
The strategic shift ahead we are already anticipating

Traditional traffic going to cloud

Shift of distribution of traffic
Getting prepared for after the crisis
DE-CIX Business Continuity – Infrastructure

- Ensuring full security, stability and scalability:
  - ISO Certified 27001
  - Business Continuity Plan regularly updated & adapted to the situation
  ➔ 25 years of experience makes a difference now!
  - DE-CIX platform limitlessly scalable
  - Average global usage of existing capacity:

[Average global usage chart: 63% used, 37% free]
DE-CIX Business Continuity – Partners & Institutions

- In permanent contact with partners
  - DC partners to access sites
  - Carrier partners to ensure connectivity
  - Hardware vendors to secure timely delivery & stocks

- DE-CIX treated as critical infrastructure worldwide
  - In contact with different local authorities
  - Empowerment by local authorities to guarantee access to our infrastructure
Elements of a New Deal for the interconnection industry

**Awareness & acceptance**
- Across entire society: institutions, citizens, enterprises
- From *explaining* to *doing* (acceleration of project implementations)
- *Digital* on top of *physical* (not instead of)

**Everywhere, everybody, everything**
- Global & interconnected (worldwide ecosystem)
- Closer to the edge
- More cloud & content applications
- Interconnection solutions for closed user groups / enterprises

**Easy**
- Automation complementing people (API, robot, SDN etc.)
- Sharing (knowledge, open source etc.)
- Self-service (portal)
- Super-flexible. Multi-:
  - services (off-the-shelves, customized)
  - scales (capacity, SME to corporate)
  - providers (neutrality)
  - channels (in-/direct, self-service)
A very special heritage for all providers of digital infrastructure

• The Internet is needed everywhere, for everybody and everything. Thus, *interconnection infrastructure has to be global, neutral & universal.*

• Interconnection anytime, anywhere, anyhow implies *making it easy.* *More automation, self-service, openness & neutrality, flexibility* (capacity, partners, one-stop-shop of services).

• Higher *awareness & unquestionable importance* of interconnection infrastructures amongst citizens, governments and enterprises.

• Enterprises & institutions will *accelerate their digital transformation: more cloud, more closed user groups* e.g. health, education.
Thank you & stay healthy!
Traffic changes: January 2019 to June 2020