Welcome to DE-CIX Virtual Get-together
7 April 2020
House Keeping for the video conference

Right-hand tool bar:
• Presenters
• List of participants
• Handout – can be downloaded
• Post questions in writing or raise your hand

Questions & Answers:
• At the end of the presentation
• We read questions posted or open microphones

Session is recorded:
• Link sent by email after video conference
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
A very special impact for all of us

Our common responsibility: more than ever, the providers of digital infrastructure, and especially our interconnection community, must deliver continuous & performant connectivity everywhere, for everybody, for everything.

Consequence: more than ever digital infrastructure has to be as global, opened (neutral), resilient, scalable & secure as possible to deliver all services needed by the people, institutions & businesses
Like others, DE-CIX has special responsibilities, amplified by its position as the largest neutral interconnection ecosystem globally.
Very special outcomes & initiatives

Support & back you up in your mission and efforts on the frontline, everywhere:

- Up to +50% increase of average traffic at DE-CIX’s hubs within a few weeks; absorbed with constant availability and quality
- 8 traffic peak records broken (DUS, FRA, HAM, MUC, MRS, MAD, DFW, DXB)
- Accelerated processes (ordering & provisioning)
- Backed up by government(s) & public institutions as critical infrastructure
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.
DE-CIX Business Continuity Plan & Outlook for 2020

24/7

DE-CIX

Where networks meet

www.de-cix.net
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 experience makes a difference now!

- DE-CIX platform limitlessly scalable

- Average global usage of existing capacity:

  - Average used: 63%
  - Average free: 37%
1. Extended availability via 2\textsuperscript{nd} shift to accelerate provision of services for new orders

2. Customer Service reachable in emergencies as usual 24/7 anywhere

3. DE-CIX global interconnection ecosystem is largely automated

4. NOC core team in the office to ensure access to DC at all times

5. NOC operations and rest of team in home-office to ensure health & continuity
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 guaranty access to our infrastructure
Outlook for DE-CIX 2020 – Further expanding capacity and enabled sites at existing hubs

<table>
<thead>
<tr>
<th>DE-CIX Hubs</th>
<th>Incremental capacity</th>
<th>New enabled sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>North America</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NYC</td>
<td>12x</td>
<td>+2</td>
</tr>
<tr>
<td>DFW</td>
<td>12x</td>
<td>+1</td>
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<tr>
<td>South Europe</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAD</td>
<td>7x</td>
<td>+1</td>
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<tr>
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<tr>
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<tr>
<td>Germany</td>
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<td></td>
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<tr>
<td>FRA</td>
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<tr>
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<tr>
<td>DUS</td>
<td>12x</td>
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</tr>
<tr>
<td>MUC</td>
<td>12x</td>
<td>+1</td>
</tr>
</tbody>
</table>
### Outlook for DE-CIX 2020 – Further expanding capacity and enabled sites at recently opened/new hubs

<table>
<thead>
<tr>
<th>DE-CIX Hubs</th>
<th>Incremental capacity</th>
<th>New enabled sites</th>
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</thead>
<tbody>
<tr>
<td>India</td>
<td></td>
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<tr>
<td>MUM</td>
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<tr>
<td>Singapore</td>
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<tr>
<td>SIN</td>
<td>-</td>
<td>+1</td>
</tr>
</tbody>
</table>
Outlook for DE-CIX 2020 – Further deployment of tools & services

GlobePEER Remote Dallas–NYC in Q4
(15 locations interconnected)

Add-on on our platform Apollon

Peering LAN 2.0
Outlook for DE-CIX 2020 – Further deployment of tools & services

API – release of version 2 in Q2-3/2020 (extension to other DE-CIX Services)

DE-CIX Portal – Extension of functionalities

DirectCLOUD

VirtualPNI

API
Signals of changes in the global interconnection ecosystem?
### Traffic patterns @ DE-CIX – General hits & shifts

<table>
<thead>
<tr>
<th>Before</th>
<th>Since the crisis</th>
</tr>
</thead>
<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 fall &amp; winter</td>
<td>New peaks correlate with lockdowns (exact dates varying by region)</td>
</tr>
<tr>
<td>(sometimes live events, updates, or releases)</td>
<td></td>
</tr>
<tr>
<td>Stable distribution of traffic/applications</td>
<td>Extreme rise of some applications (e.g. collaborative tools, gaming, video)</td>
</tr>
<tr>
<td>(e.g. video, CDN content, web)</td>
<td></td>
</tr>
<tr>
<td>Diurnal cycles, morning &amp; night low</td>
<td>Significant more traffic during the days, higher amplitudes, and higher peaks</td>
</tr>
</tbody>
</table>

Same outcome at all DE-CIX hubs
Different boosters of traffic
Similar explanatory factors
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

**+100%**
- a gaming provider with target group of younger people: every day is weekend!
Traffic patterns @ DE-CIX – example: DE-CIX Madrid

Total by users

- no. of users (unique IPs)
- about 20% increase

Collaborative working by users

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

VOD by users

- video-on-demand services
- no. of users doubled
- hard to observe weekly patterns anymore
# Possible impacts on the Internet infrastructure

<table>
<thead>
<tr>
<th>In the short term</th>
<th>In the mid to long term</th>
</tr>
</thead>
<tbody>
<tr>
<td>Internet backbone can absorb fast-growing demand</td>
<td>Incremental capacity deployed over last weeks will be 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>More demand for uncommon traffic relations – working remote &amp; entertainment</td>
<td>The Internet architecture must support certain quality guarantees (even inter-domain)</td>
</tr>
</tbody>
</table>
Observed patterns likely to stay? DE-CIX preparing for it

Traditional traffic going to cloud

- Shift towards more direct interconnection
- Well distributed users of cloud services
- Quality guarantees at inter-domain level
Observed patterns likely to stay? DE-CIX preparing for it

Traditional traffic going to cloud

Shift of distribution of traffic

Home

Mobile

Enterprises

ISP 1

ISP 2

ISP 3

Cloud A

Cloud B

Cloud C

Cloud D

Internet

ISP 1

ISP 2

ISP 3

Home

Mobile

Enterprises

Internet Exchange Point
Getting prepared for after the crisis
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)
Want to ask a question?

via microphone: click here to raise your hand
(webinar administrator will activate your microphone)

in writing: write your question here & send it.
(webinar administrator will address it to the panelists)
Meeting us virtually again in the coming weeks & months

<table>
<thead>
<tr>
<th>Event</th>
<th>Date</th>
<th>Type</th>
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<tbody>
<tr>
<td>DE-CIX Academy webinar: Peering Tools</td>
<td>8 April 2020</td>
<td>Online webinar</td>
</tr>
<tr>
<td>DE-CIX Academy webinar: BGP 01 - Prefixes and Autonomous Systems</td>
<td>9 April 2020</td>
<td>Online webinar</td>
</tr>
<tr>
<td>RIPE 80</td>
<td>11 May 2020</td>
<td>Online meeting</td>
</tr>
</tbody>
</table>

Subscribe to DE-CIX newsletter on www.de-cix.net
People to ask, tell or talk to

support@de-cix.net

sales@de-cix.net
Thank you & stay healthy!