THE DAWN OF A NEW DIGITAL AGE

Annual Report 2020

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CONTENTS

Harald A. Summa
CEO, DE-CIX Group AG

EXECUTIVE SUMMARY

Dear Readers,

In the remarkable year 2020, DE-CIX experienced one milestone after the other. The past months have shown us how important a functioning, secure, and reliable digital infrastructure is for all areas of life. Despite the challenging conditions brought on by the global Covid-19 pandemic, DE-CIX was able to maintain its position as the operator of the largest Internet Exchange and home to the largest carrier and data center neutral interconnection ecosystem in the world. It was able to provide uninterrupted service to customers connected to its exchanges – helping to keep data flowing during physical lockdowns.

With all the changes in usage patterns and the extreme growth in global data traffic in 2020, there was initially concern among users that the Internet would not sustain this growth long-term. But the exact opposite has been the case: The Internet has defied the pandemic, bearing the protracted global burden of the coronavirus.

Within just a few days in March 2020, average global data traffic rose between 15% and 30%, depending on the region. This resulted in the largest annual increase in peak traffic at DE-CIX Frankfurt in its entire history – including the breaking of two world records – reaching 10.3 terabits per second in November. Other DE-CIX locations around the world also rose to the challenge, with a rise in peak traffic of around 30% across the board. DE-CIX, therefore, played a part in keeping economies afloat and people in contact during the sustained global crisis, the like of which we have not seen in modern times.

But I mentioned milestones above – and there are more to be proud of. DE-CIX celebrated its 25th birthday and took the opportunity to thank our many and various partners and customers, without whom the Internet could never have developed into what it is today. And the story doesn't end here, with the Covid-19 pandemic acting as a catalyst for ever greater levels of digitalization of the economy and society. In answer to the growing need for digitalization across industries, DE-CIX has been working to broaden its palette of interconnection services to better serve the enterprise segment.

DE-CIX has also been closely involved in the development of the European data infrastructure project Gaia-X, to enable, on the one hand, greater data sovereignty for connected enterprise and other networks, and on the other, to enable a wide variety of stakeholders to share their respective data pools securely and efficiently. The foundation stone for Gaia-X was set in 2020, and the project has received significant interest and support from infrastructure stakeholders and industry verticals alike.

In terms of business milestones, DE-CIX enjoyed close to 18% growth in customers globally in 2020, bringing the total figure to over 2,200 customers. In its 25th birthday year, DE-CIX Frankfurt was also able to welcome its 1,000th customer to the exchange. Continued growth in excess of 45% in 100GE ports globally was also in part responsible for the 33% growth in connected customer bandwidth, which reached a massive 73 terabits (Tb) during the year.

MESSAGE FROM THE CEO

While we work continuously at bringing the Internet infrastructure ever closer to the physical location of our customers within each of the DE-CIX locations to ensure the lowest latencies, we also continue to expand worldwide to more and more regions, building and operating new IXs in locations where our customers need them. In the spirit of "glocalization", the DE-CIX interconnection ecosystems around the globe are becoming both more broadly accessible and more intricately interwoven. In 2020, in addition to announcing new Internet Exchanges in Barcelona, Chicago, Richmond, and Singapore, DE-CIX also implemented new IXs with partners in Athens (SEECIX) and the Ruhr Region in Germany (Ruhr-CIX) through the DE-CIX as a Service program. By the end of 2020, the global total of DE-CIX-operated IXs had grown to 27.

Financially, the company was also able to weather the Covid-19 storm. Global revenues grew by 10% to 43.4 million Euro, and revenues from international activities jumped by 34 percent in comparison to 2019, making up 17.4 percent of total revenue in 2020.

Another of the many highlights of 2020 was winning the Global Carrier Awards in the category Best Internet Exchange & Best Internet Exchange Innovation 2020, an award DE-CIX has now earned five times since its inception in 2015.

As the global pandemic gradually comes under control in 2021, we will re-enter our global village to find a world transformed. 2021 marks the beginning of a new decade – perhaps the most exciting digital decade since the inception of the Internet. At DE-CIX, we are working to provide our customers with the best interconnection services possible for their evolving needs. With our two-pronged strategic approach of diversifying services and creating an increasingly dense geographical map of interconnection points, DE-CIX can offer an ever-larger proportion of the world's markets low-latency interconnection; able to do justice to the needs and the applications of today and tomorrow.

Best regards,

Harald A. Summa
Chief Executive Officer – DE-CIX Group AG

ORGANIZATION & CORPORATE GOVERNANCE

Executive Management

Harald A. Summa
Chief Executive Officer &
Chair of the Board

Ivo Ivanov
Chief Operating Officer &
Vice Chair of the Board

Sebastian Seifert
Chief Financial Officer & Member
of the Board

**DE-CIX Group AG
Supervisory Board**

Felix Höger
Chair of the Board

Klaus Landefeld
Vice Chair of the Board

Rudolph van Megen
Member of the Board

THE DE-CIX ORGANIZATION & CORPORATE GOVERNANCE

A strong and stable foundation for future growth

eco – Association of the Internet Industry is the sole shareholder of the DE-CIX Group AG, to which the three subsidiaries DE-CIX Management GmbH, DE-CIX International GmbH, and DE-CIX Asia Pte. Ltd. belong. All domestic and international DE-CIX activities, financial investments, and company parts are consolidated under the umbrella of the DE-CIX Group AG. The Chair of the DE-CIX Supervisory Board Felix Höger and Vice Chair Klaus Landefeld, both of whom are Members of the Board of the eco Association, constitute the point of connection between the association and the holding company. Rudolf van Megen completes the DE-CIX Supervisory Board.

Harald A. Summa (CEO) is Chair of the Board of the DE-CIX Group AG and Ivo A. Ivanov (COO) Vice Chair. Sebastian Seifert is a further Member of the Board and the Chief Financial Officer of the DE-CIX Group AG. The company is led by CEO Harald Summa, also initiator and CEO of eco – Association of the Internet Industry, and is guided in its decision-making by the Customer Advisory Board. The Customer Advisory Board is elected by DE-CIX customers, and meets about twice a year to oversee management, develop strategy, and ensure the secure and stable growth of the company.

The three wholly-owned subsidiaries of the DE-CIX Group AG, along with their scope of operations, their subsidiaries, and joint ventures are set out in the following.

DE-CIX Management GmbH is led by Harald A. Summa, and operates the DE-CIX Internet Exchanges in Frankfurt, Hamburg, Munich, and Dusseldorf. The UAE-IX in Dubai, SEECIX in Greece, and Ruhr-CIX in Germany are operated as Managed Services in cooperation with local data center and carrier partners in the respective regions.

DE-CIX International GmbH, led by Ivo Ivanov, is responsible for the majority of DE-CIX's international activities, either directly (Madrid, Marseille, Palermo, Lisbon), or through subsidiaries in the USA (DE-CIX North America Inc. – operating New York, Dallas, Chicago and Richmond) and in Turkey (DE-CIX Istanbul Network Connections LLC). The Angola-based angonix has placed its trust in the consultancy services of DE-CIX International. DE-CIX International is also a partner in the joint venture DE-CIX Interwire Internet Services Private Limited, operating the four DE-CIX locations in India: Mumbai, Chennai, Delhi, and Kolkata.

DE-CIX Asia was founded in 2020 to provide an umbrella for the Southeast Asian operations, and is led by both Harald A. Summa and Ivo Ivanov. In Southeast Asia, the joint venture companies DE-CIX Malaysia Sdn. Bhd. and DE-CIX Singapore Pte. Ltd., established as mergers with the Malaysian operator Starwing Technologies Sdn Bhd, operate the three DE-CIX Internet Exchanges in Kuala Lumpur, and Johor Bahru, and Singapore respectively.

DE-CIX Management GmbH Senior Management

Lucia Falkenberg
Chief People Officer

Dr Thomas King
Chief Technology Officer

Daniel Melzer
Chief Network Architect

Arnold Nipper
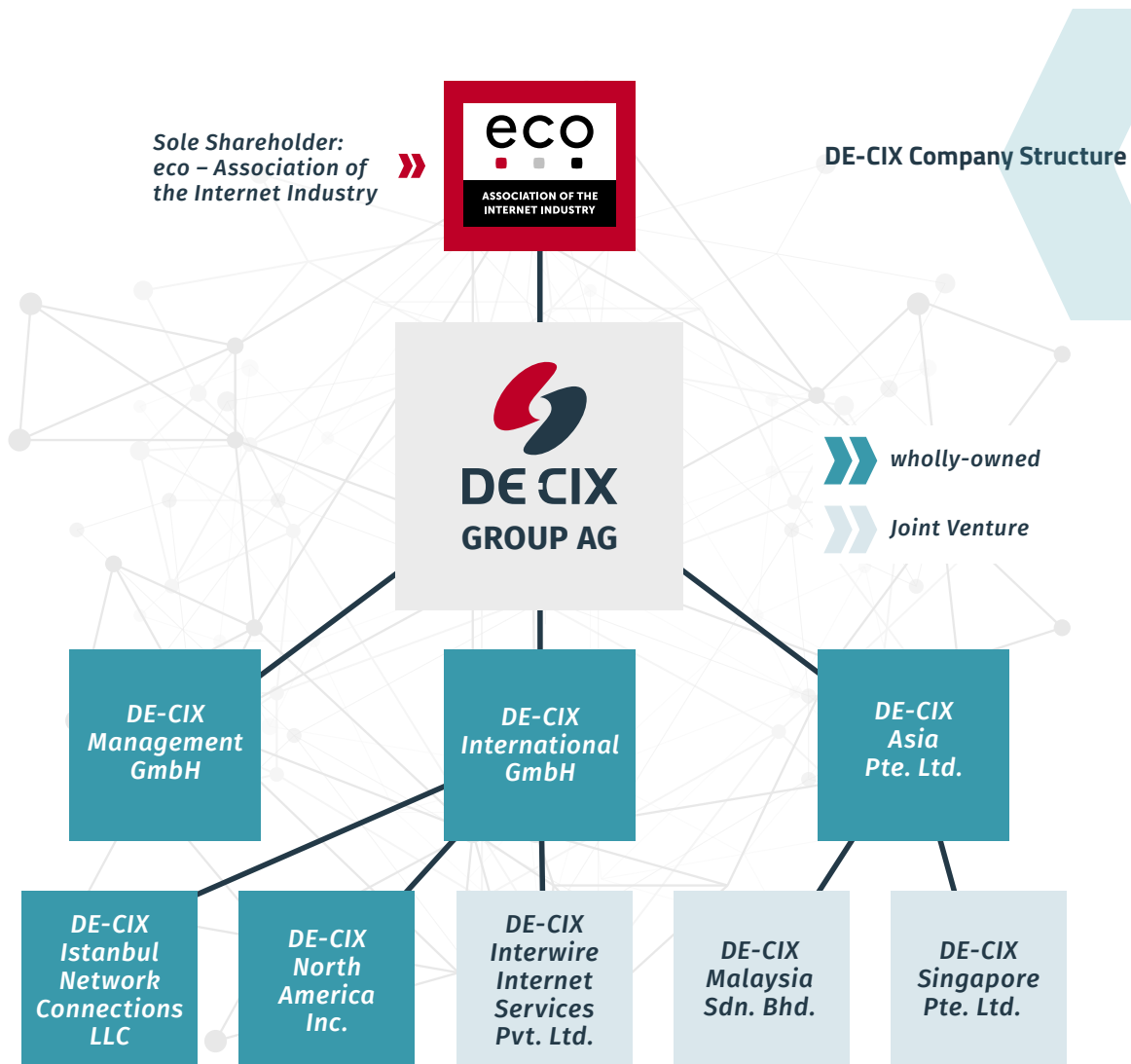Chief Technology Evangelist and
Co-Founder of DE-CIX

Gregor Reinhold
Chief Financial Officer

Stephan Rohloff
Chief Marketing Officer

Andreas Sturm
Chief Business Development
Officer

*Sole Shareholder:
eco – Association of
the Internet Industry* »

eco
ASSOCIATION OF THE
INTERNET INDUSTRY

DE-CIX Company Structure

DE-CIX GROUP AG

» *wholly-owned*

» *Joint Venture*

DE-CIX Management GmbH

DE-CIX International GmbH

DE-CIX Asia Pte. Ltd.

DE-CIX Istanbul Network Connections LLC

DE-CIX North America Inc.

DE-CIX Interwire Internet Services Pvt. Ltd.

DE-CIX Malaysia Sdn. Bhd.

DE-CIX Singapore Pte. Ltd.

In partnership with our customers – the DE-CIX Customer Advisory Boards

The Customer Advisory Boards reflect the customer base, as their members can be seen as representatives of the variety of networks connected to DE-CIX: national and international, small and large ISPs, as well as regional and global content providers. While the Customer Advisory Boards do not have decision-making authority, their members communicate with the DE-CIX management team and help guide the overall direction of DE-CIX. As of today, there are three Customer Advisory Boards supporting DE-CIX in different markets: Germany, North America, and Turkey; more are to be assigned in further regions soon.

The Board of the DE-CIX Management GmbH has five members in order to represent the global customer reach of DE-CIX. One of the Board Members is appointed directly by eco – Association of the Internet Industry. The other four members are elected directly by DE-CIX customers. The Customer Advisory Board was elected in 2017. Re-elections were originally planned for 2020, but were postponed until 2021 due to the Covid-19 pandemic.

Germany: DE-CIX Management GmbH Customer Advisory Board

Falk von Bornstaedt
Executive Board,
RIPE NCC

Malte von dem Hagen
Director Global Backbone,
GoDaddy

Zaid Kahn
GM, Cloud AI and
Advanced Systems at
Microsoft

Bernhard Krönung
Managing Director and
Founder
regio [.NET]

Klaus Landefeld
Board Member
eco – Association of the
Internet Industry

USA: DE-CIX North America Customer Advisory Board

Scott Brown
President,
Pixel Factory, Inc.

Phil Koblence
COO
New York Internet – NYI

Steven Schecter
Senior Manager of Network
Architecture
Akamai Technolgies Inc.

Carl Williams
IPv6 Hall of Fame
Adjunct Professor at Temple
University

Turkey: DE-CIX Istanbul Network Connections LLC Customer Advisory Board

Cem Çelebiler
CEO,
TurkNet

Çağlar Dabanoğlu
Senior Network Architect,
Akamai

Serkan Sevim
CEO,
Medianova

25 YEARS OF DE-CIX

Stephan Rohloff
Chief Marketing Officer

25 YEARS DE-CIX – THE INTERNET COMES OF AGE

In 2020, DE-CIX celebrated its 25th birthday under the shadow of the Covid-19 pandemic – challenging, certainly, but also indicative of how much the Internet has developed in the last quarter of a century. The pandemic showed just how essential the Internet is for business and private life – not just on the global scale, but also locally. The story of how the Internet developed to the extent that it has, and the contributions of the different players in the digital infrastructure industry, was the focus of the DE-CIX 25 Years anniversary campaign, "Without You".

In a nutshell, the Internet as we know it would not be possible without our customers, partners, and DE-CIX employees. Together with our valued sponsors Interxion, Angola Cables, Axians, Nokia, GasLINE, EdgeconneX, Core-Backbone, ITENOS, TeleMaxX, and Capacity Media – from the data center, network, and hardware sectors – DE-CIX told the story of the development of the Internet via a campaign that lasted for the entirety of 2020. With our 25th birthday approaching, the decision was taken to celebrate the special role that DE-CIX has played in the development of the Internet – while also highlighting that the creation of the world wide web would have never been possible without the entire ecosystem of different stakeholders which have been key to the Internet's development and that continue to revolutionize our digital world. The integration of partners and clients into the campaign highlighted the close relationships of all inhabitants of the digital ecosystem DE-CIX is nurturing, and thus emphasized DE-CIX's position as a global interconnection hub.

By also involving DE-CIX staff, the campaign was further designed to drive employee engagement.

Central to the campaign was the virtual DE-CIX Anniversary Party on 26 June, which played host to more than 8,600 unique views of the show from all over the world, and the campaign website withoutyou.de-cix.net was visited over 70,000 times. Thus, in our 25th birthday year, we were able to set an outstanding example and to raise awareness for DE-CIX, our partners, and our community.

The Internet as we know it …
The Internet we know today would not have been possible 25 years ago. That's because bandwidth has been growing constantly for as long as the Internet has been a medium for private and commercial communication. In the history of DE-CIX, technological milestones have come and gone – with connections of 100 Megabit Ethernet, 1 Gigabit Ethernet (GE), then 10 GE, and a few years later 100 GE. Initially, such bandwidths seemed thoroughly extravagant – and then, just as suddenly, they were a thing of the past. Currently, we are at another of these points with 400 GE – with 800 GE under development for our future bandwidth needs, as our world's economies become ever more digital.

WITHOUT YOU

DE CIX

DE CIX 25 YEARS

WITHOUT YOU »

Today, the warehouses of the new digital economy are the secure and high-performance modern data centers, which provide a home not only for data itself but also for the platforms and applications that have become so ubiquitous in the modern world. At the same time, logistics is handled by network operators, who have expanded their networks around the planet and continue to invest heavily in bringing fast Internet to more and more regions via undersea, terrestrial, mobile, and even satellite-based connectivity. Interconnection has taken on truly global proportions, with more and more of the world being offered access to the advantages of digitalization with every passing year. Central to the seamless functioning of today's and tomorrow's applications and content is interconnection – which is why DE-CIX partners in a neutral manner with data center operators and network operators of all kinds, in order to nurture digital ecosystems.

... would not have been possible ...
The more interconnected data centers there are operating within close proximity to one another, and the more networks that connect into these, the greater the interconnection gravity becomes. This attracts more and more data center operators to build nearby, bringing more and more networks that want to access and participate in the increasingly dense ecosystems of digital hubs. The mushrooming interconnectivity in Frankfurt nicely illustrates the profound effect that digitalization has been having on our world for the last two decades. Without these ecosystems of data centers, the networks connected to them, and Internet Exchanges like those from DE-CIX interconnecting them, the Internet would not, and could not, have developed as it has.

When the DE-CIX Apollon platform – designed to be as scalable and expandable as possible – was first conceived and built, the focus was on DE-CIX's flagship Internet Exchange in Frankfurt, primarily to sustain further growth. At that stage, DE-CIX New York – along with the other (still long in the future) locations around the globe – was barely a twinkle in the IX operator's eye. In the meantime, the brand has become established across the globe, in a belt that spans from the Americas to Europe, on to the Middle East, to India, and then on to Southeast Asia. In each region, it is the connected networks and connectivity partners that transform the DE-CIX Internet Exchanges into digital ecosystems, new digital hubs. This geographical expansion allows connected networks to exchange traffic locally, offering better user experience in each region, and reducing the

costs. Today, this infrastructure encompasses a total of 28 IXs, most of which are directly interconnected, accessible from data centers in more than 500 cities across over 80 countries – an interconnection ecosystem spanning seas, oceans, and continents along DE-CIX's digital interconnection equator.

With the cloud now fully established as an enterprise solution, with video streaming in high definition, video conferencing as a standard form of communication, and the rise in popularity of online gaming, with the Internet of Things bringing connectivity and intelligence to homes, cities, and factories, the smooth, fast Internet of today looks and feels very different to the clunky, noisy Internet of 1995. And now this Internet is changing how we communicate, how we do business, and what our expectations are, which in turn places new demands on digital infrastructure to take the next steps in the evolution of digital services.

... without you.

The next steps are just around the corner, with the roll-out of the new 5G mobile standard, with the development of edge data center concepts for real-time transmission, and with the development of satellite Internet to bring Internet to remote locations, along with other exciting innovations. With this, we begin to see the digital future taking shape before our very eyes. Combining connectivity of this scale with digital innovations like artificial intelligence will herald a new digital age, with new demands on digital infrastructure to enable business to be conducted in a secure and trustworthy environment. Without you – our connectivity partners around the world, network builders and operators, ISPs, CDNs, and CSPs small and large, our data center partners of all shapes and sizes, and the hardware suppliers on the basis of whose innovations we all operate – there would be no digital infrastructure on which to build this future.
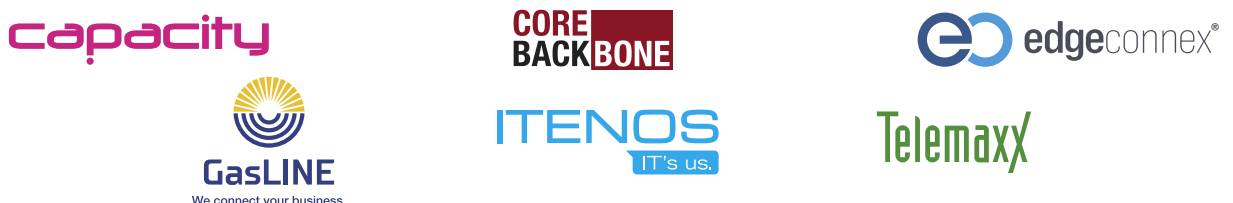
Anniversary partners:

Platinum partners

Gold partners

Silver partners

TECHNICAL UPDATE

Dr Thomas King
Chief Technology Officer

TECHNICAL UPDATE 2020

Growth in traffic during the pandemic

In the fateful year of 2020, the Internet became an essential aid to continued communication and economic activity, as the Covid-19 pandemic shut down one region of the globe after another. This had an enormous impact on both the amount and the composition of data traffic. In a study that is the first of its kind worldwide, an international team of researchers – including members of the DE-CIX Research and Development team – examined the effects of the coronavirus pandemic on the global Internet infrastructure. In the period from January to June 2020, data traffic was examined at Internet Exchanges in Central and Southern Europe, as well as on the US East Coast.

The study found that within just a few days in March, average global data traffic rose between 15% and 30%, depending on the region. The use of video conferencing services and virtual private networks (VPNs) for access to company resources from the home environment, as well as the use of video streaming and online gaming, rose sharply. At DE-CIX Frankfurt, for example, data traffic resulting from video conferencing alone rose by 120%. 2020 saw the largest increase in peak traffic at DE-CIX Frankfurt within a single year since its foundation, rising by approx. 2.5 terabits. In mid-November 2020, a new world record was set, with data throughput in Frankfurt reaching a massive 10.3 terabits per second. Other DE-CIX locations around the world – including New York, Madrid, Munich, Mumbai, and Dubai – also recorded record peak traffic growth. A total of 32 exabytes of data traffic flowed through the DE-CIX Internet Exchanges in 2020. The effects of the increased traffic volume could be easily absorbed: either by using existing reserve capacity or by quickly switching additional bandwidth. This kept the infrastructure team busy throughout the year, faced with the challenges of bottlenecks for shipping hardware, gaining access to data centers during curfews and lockdowns, and restrictions on travel. Despite the enormous growth in 2020, at no time did the DE-CIX IXs experience a bottleneck in terms of network capacity – there was consistently in excess of 25% extra capacity available for ad hoc traffic growth at all exchanges. The clear result of this is that the Internet – and with it, DE-CIX – has proven it is robust and adaptable enough to withstand pandemics.

Geographical expansion under challenging conditions

The enormous growth seen across the DE-CIX infrastructure all over the world was complemented by increasing geographical growth for DE-CIX in 2020. In total, DE-CIX established four new exchanges during the year, with the new IXs in Barcelona, Chicago, Richmond, and Singapore all announced during the year. The groundwork was laid for all four exchanges from a technical perspective, however, some delays in installation and implementation needed to be accepted as a result of the pandemic. At the same time, a further 11 enabled sites were implemented at existing DE-CIX IX locations during the year.

Two further exchanges were established as part of the new DE-CIX as a Service program: SEECIX powered by DE-CIX in Greece in partnership with the data center operator Lamda Hellix (now Interxion), and Ruhr-CIX powered by DE-CIX in Germany, in collaboration with the data center operator and city carriers of DOKOM21, TMR and GELSEN-NET, in the cities of Dortmund, Bochum, and Gelsenkirchen respectively. As part of DE-CIX as a Service, DE-CIX delivers the technical set-up needed for an interconnection platform as a fully pre-configured and standardized "DE-CIX in a Box" solution – easy for data center operators to plug and play.

32Exabytes
total traffic volume

that's 32,000,000 Terabytes or a video
call lasting almost 8 million YEARS

Customer numbers and services continue to grow
Indicative of the strong growth in customer numbers, upgrades were undertaken in Dusseldorf, Munich, and Madrid, with renumbering also becoming necessary in Dusseldorf. The flagship Frankfurt exchange achieved a further milestone in 2020, with the connection of the 1000th customer.

In direct response to record growth across exchanges, DE-CIX took steps to further improve customer service. Introducing a second shift in the Customer Service team meant it became easier to cover the demand of customers in different time zones. A new ticketing system was also introduced, and processes were streamlined to be more efficient and faster in provisioning. In addition, a new Customer Service team was established in India, specifically for the growing market there.

Based on the DE-CIX API and using an API-first strategy, the new Self-Service Portal was implemented as a beta version for customers in Frankfurt in early 2020. The IX-API Version 2, which is the underlying standard for the DE-CIX API, was also released and implemented in 2020, including cloud connection capabilities, private VLAN, and closed user groups, with customers already using it by the end of the year. In Frankfurt in 2020, the new Blackholing Advanced service became available as a beta version and the Microsoft Azure Peering Service (MAPS) was introduced. Meanwhile, access to the DirectCLOUD service was expanded to Mumbai and Dubai, making it accessible at all DE-CIX locations.

In addition, as a founding member of the GAIA-X AISBL, DE-CIX was involved in the process of GAIA-X standardization in 2020, bringing in on-demand interconnection services with guaranteed bandwidth and latency. In this way, together with partners within the initiative, we are contributing to the creation of an innovative, secure, and sovereign infrastructure for digital federated services in Europe.

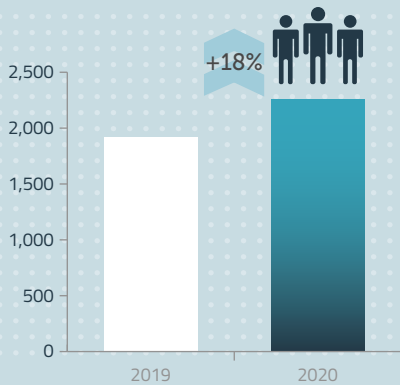# DE-CIX GLOBAL AND REGIONAL GROWTH IN 2020

5

DE-CIX GLOBAL AND REGIONAL GROWTH IN 2020

In the remarkable year 2020, DE-CIX experienced growth across all regions and business units. Against the backdrop of the challenging conditions caused by the global Covid-19 pandemic, the company was nonetheless able to maintain its position as the home of the largest carrier and data center neutral interconnection ecosystem in the world. It was able to provide uninterrupted service to customers connected to its exchanges – helping to keep data flowing during physical lockdowns. DE-CIX helped to keep economies afloat and people in contact throughout a very difficult and historic period.

Beyond this, in addition to announcing new Internet Exchanges in Barcelona, Chicago, Richmond, and Singapore, DE-CIX also implemented new exchanges with partners in Athens (SEECIX) and the Ruhr Region in Germany (Ruhr-CIX) through the DE-CIX as a Service program. This program is designed to create interconnection ecosystems, fully operated by DE-CIX, wherever there is a need.
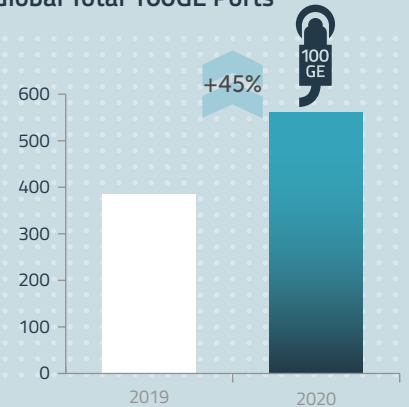
GLOBAL GROWTH

Global Total Customers

+18%

2,500
2,000
1,500
1,000
500
0

2019   2020

Global Total Customer Bandwidth (Tbit)

+33%

80
70
60
50
40
30
20
10
0

2019   2020
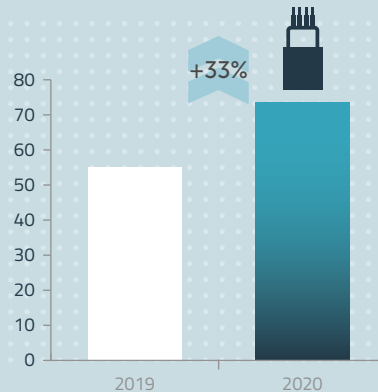
Global Total 100GE Ports
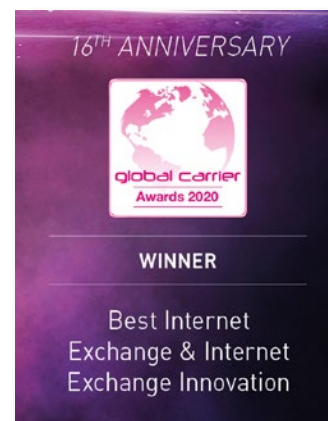
+45%

600
500
400
300
200
100
0

2019   2020

DE-CIX also extended the reach of its existing locations by setting up more enabled and access sites where networks can connect. By the end of 2020, DE-CIX's 25th anniversary year, the global total of DE-CIX-run IXs had grown to 27. Based on growing interconnection needs, DE-CIX continued working on developing new services, with product offers becoming increasingly customized and tailored to individual business needs, and – together with valued partners – moved even closer to the edge. DE-CIX's increasing range of interconnection services contributed substantially to the growth in customers, ASNs, and connected bandwidth during 2020.

DE-CIX's success globally and in the various regions in 2020 speaks for itself. Already the world's leading provider of premium interconnection services, DE-CIX enjoyed close to 18% growth in customers globally in 2020, bringing the total figure to over 2,200 customers. Continued growth in excess of 45% in 100GE ports was also in part responsible for the 33% growth in connected customer bandwidth, which reached a massive 73 terabits (Tb) during the year. Even larger was the amount of traffic exchanged across the DE-CIX platform around the globe: in total, the increase in peak traffic across various locations averaged at around 30%, and peak traffic records were broken multiple times around the world during the tumultuous year. To top this off,
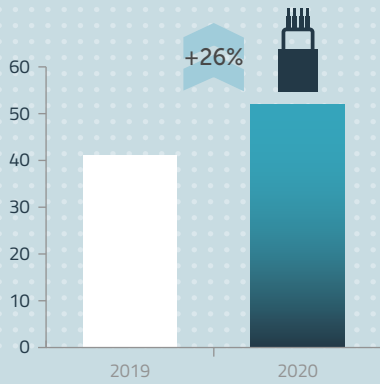
32 Exabytes of data traffic flowed through the DE-CIX Internet Exchanges in 2020 – roughly the same amount of data required for an eight-million-year-long video call.

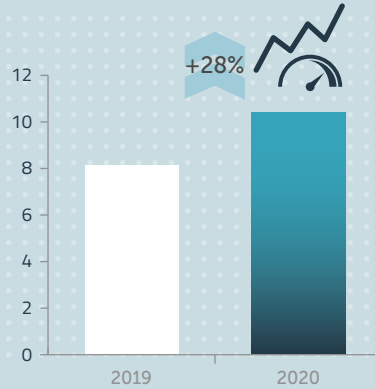**Capacity Awards – DE-CIX again hailed as Best Internet Exchange globally**
Among many highlights of the challenging year in 2020, DE-CIX was honored at this year's Global Carrier Awards in the category Best Internet Exchange & Best Internet Exchange Innovation 2020. The award was presented in the first-ever virtual Global Carrier Awards ceremony. DE-CIX has now earned this important industry award five times since its inception in 2015
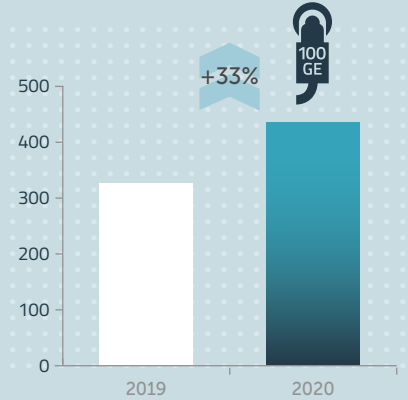
Frankfurt Customer Bandwidth (Tbit)

+26%

	2019	2020
60		
50		
40		
30		
20		
10		
0		

Frankfurt Peak Traffic (Tbit/s)

+28%

	2019	2020
12		
10		
8		
6		
4		
2		
0		

Frankfurt 100GE Ports

+33%

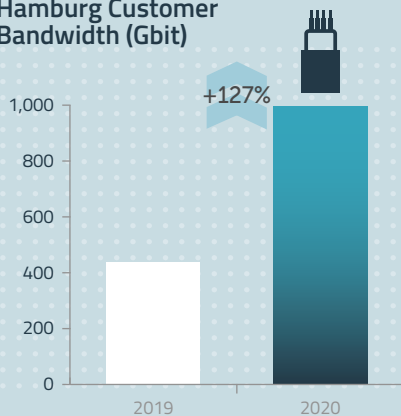|	2019	2020
500		
400		
300		
200		
100		
0		

GERMANY

Andreas Sturm
Chief Business
Development Officer

"The Internet was more important than ever to connect people during the lockdown phases. The numbers clearly showed us that people and businesses used video applications to talk, chat, play, and of course stream more than ever before. Traffic increased by up to 120%."
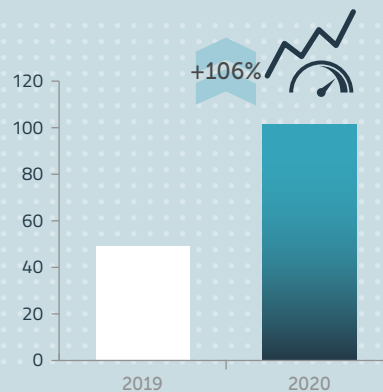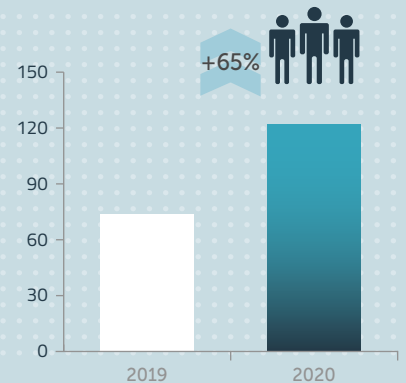
Hamburg Customer Bandwidth (Gbit)

+127%

	2019	2020
1,000		
800		
600		
400		
200		
0		

Munich Peak Traffic (Gbit/s)

+106%

	2019	2020
120		
100		
80		
60		
40		
20		
0		

Dusseldorf Customer Growth

+65%

	2019	2020
150		
120		
90		
60		
30		
0		

DE-CIX in its home market in Germany – solid growth and huge demand for more bandwidth

As a result of the challenging situation and lockdowns in 2020 due to the pandemic, people and businesses relied more and more heavily on digital infrastructure and applications, such as videoconferencing, streaming, and gaming. 25 years since its inception in 1995, DE-CIX Frankfurt twice broke its own record, reaching 9 Tbit/s data throughput in March and crossing the 10 Tbit/s barrier in November, an overall plus of 28% compared to the peak traffic in 2019. Customers extended their bandwidth at the DE-CIX flagship IX by 26% to close to 52 Tb connected capacity, with a 33% growth in 100GE ports. On top, DE-CIX Frankfurt also celebrated the arrival of its 1,000th customer in 2020.

Continuous growth at the German regional exchanges

In 2020, the German regional exchanges in Hamburg, Dusseldorf, and Munich extended their success story in all aspects. The northern-most German IX, DE-CIX Hamburg, increased its customer bandwidth by a substantial 127% and enjoyed a rise in peak traffic of close to 150%. DE-CIX Dusseldorf experienced customer growth of just shy of 65%, while the southernmost German IX, DE-CIX Munich, increased its peak traffic by over 105%, with customer bandwidth growing by roughly 30%.

At DE-CIX, not only do networks meet, but people do too. DE-CIX has a long tradition of hosting important IT industry events like the Summits, ISP and Carrier Lunches, DE-CIX Round Tables, and Tech Meetings. Due to the pandemic, DE-CIX moved most of these events to virtual formats – keeping the community spirit up, whilst also building awareness for DE-CIX's role and its work within the community and beyond.

North America 100GE Ports

	2019	2020
	~27	~67

+148%
100 GE
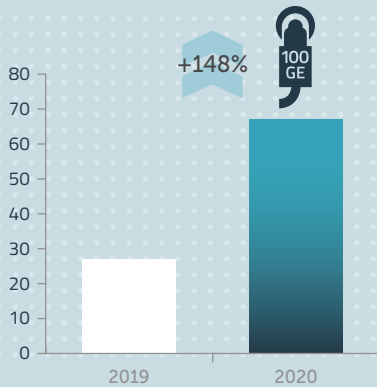
North America Total Customer Bandwidth (Gbit)

	2019	2020
	~5,500	~9,500

+73%
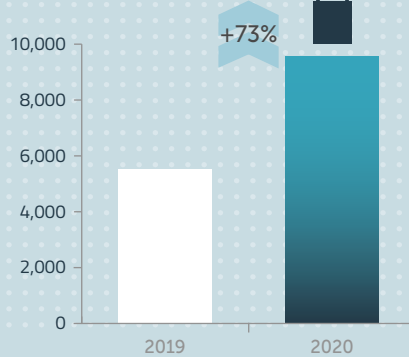
New York Customers

	2019	2020
	~220	~255

+15%
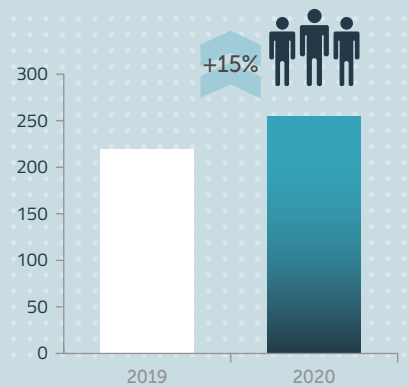
NORTH AMERICA

Ed d'Agostino
Vice President
DE-CIX North America

"DE-CIX came to North America because we saw an opportunity to fill a void in the market. As a neutral exchange operator, we have the ability to establish relation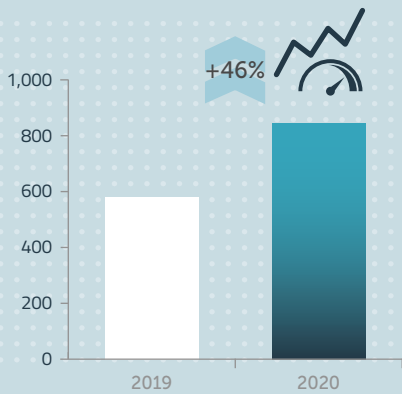ships with many data center operators and network operators without competing with them – rather, enhancing their abilities to sell their solutions. As a for-profit business, we have the incentive to drive the growth of connectivity. That "niche" in the US has not been filled since PAIX was taken over. The model has certainly worked, and our tremendous success first in New York and then in Dallas has allowed us to continue our expansion to Chicago and Richmond."
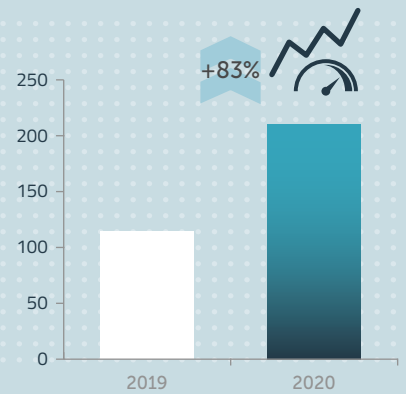
New York Peak Traffic (Gbit/s)

+46%

1,000		
800		
600		
400		
200		
0	2019	2020

Dallas Customers

+38%

100		
80		
60		
40		
20		
0	2019	2020
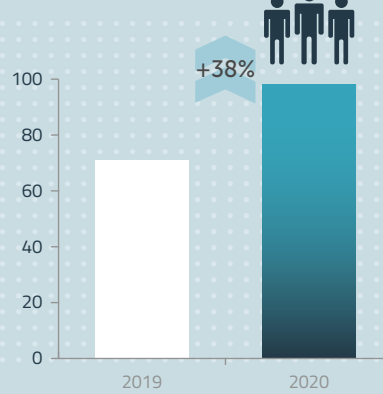
Dallas Peak Traffic (Gbit/s)

+83%

250		
200		
150		
100		
50		
0	2019	2020

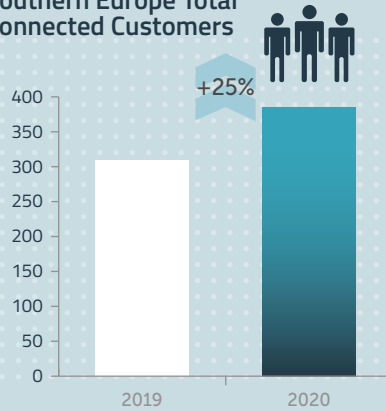## Creating the largest neutral interconnection ecosystem in North America

DE-CIX's importance for the interconnection of networks in North America was confirmed again in 2020. DE-CIX New York is the region's largest neutral IX and one of the top five in the US, while DE-CIX Dallas ranks among the top 20 IXs in North America. There was significant growth in both locations during 2020, with DE-CIX New York's customer numbers growing by 15% and DE-CIX Dallas' by 38%. The aggregated number of 100GE ports sold in North America grew by 150%, and aggregated connected customer capacity increased by over 70% to just shy of 10,000 Gbit. At the same time, peak traffic at the exchanges rose by more than 45% in New York to 844 Gbps and more than 80% in Dallas to 210 Gbps. Highlighted during the virtual DE-CIX Interconnection Summit North America in December 2020, the opening of DE-CIX Chicago and the announcement of DE-CIX Richmond in Q4 2020 represented significant strategic action – a step which doubles DE-CIX's footprint in the North American market, creating the foundation for the largest carrier and data center neutral interconnection ecosystem in North America. DE-CIX North America's four IXs are set to cover key markets including the Northeast (DE-CIX New York), Southwest (DE-CIX Dallas), Midwest (DE-CIX Chicago), and Mid-Atlantic (to be DE-CIX Richmond) regions, able to serve millions of end-customers with latencies of below 15 milliseconds.

In addition, all four locations in North America are in future to be interconnected: The interconnection of DE-CIX Chicago, DE-CIX New York, and DE-CIX Dallas with each other via a private network, creating a fully redundant, optimized, low-latency route between each market, is to be implemented in Q1 2021. This ecosystem will be extended to interconnect also with DE-CIX Richmond in due course. DE-CIX Richmond was established as a collaboration with the existing community exchange, RVA-IX, with the aim of facilitating accelerated growth in the local ecosystem, bringing content closer to the edge in this tier-2 environment and lowering latencies to Europe and South America, as well as continuing to serve the community.
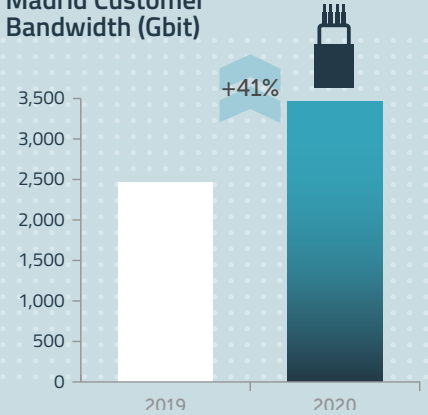
In addition to access to peering and cloud connectivity services available through DE-CIX's DirectCLOUD capabilities, customers can access the world's largest carrier and data center neutral interconnection ecosystem through DE-CIX's GlobePEER Remote solution.

Southern Europe Total Connected Customers

+25%

400		
350		
300		
250		
200		
150		
100		
50		
0	2019	2020

Madrid Customer Bandwidth (Gbit)

+41%

3,500		
3,000		
2,500		
2,000		
1,500		
1,000		
500		
0	2019	2020

SOUTHERN EUROPE

Theresa Bobis
Regional Director
Southern Europe

"The year 2020 was difficult for all of us, especially since we couldn't be with our families and friends in person to celebrate special occasions. However, the power of digital communication brings us all closer to each other virtually. DE-CIX in Southern Europe is part of that digital value chain, not just bringing networks together, but also helping to bring people closer together."

Marseille Customer Bandwidth (Gbit)

+42%

	2019	2020
1000		
800		
600		
400		
200		
0		

Lisbon Connected Networks

+89%

	2019	2020
60		
50		
40		
30		
20		
10		
0		
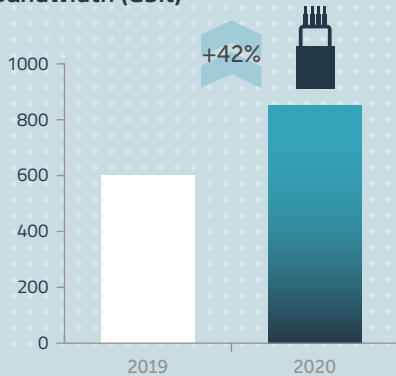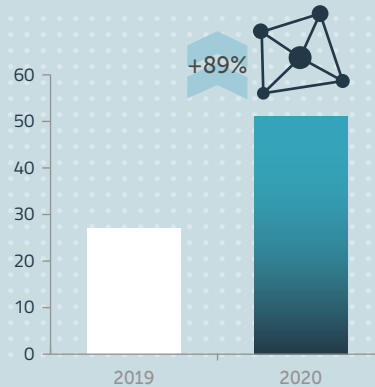
Solid growth for Southern Europe's Internet Exchanges

In 2020, the four DE-CIX IXs in Southern Europe – Lisbon, Madrid, Marseille, and Palermo – experienced solid and continuous growth. The connected networks (ASNs) across all IXs grew by close to 25% to 385, while the total connected customer bandwidth rose by almost 40% to a new high of 4776 Gbit. A large portion of the growth came from the DE-CIX flagship IX in Madrid. In particular, the upgrade to 100GE ports (+69%) accelerated the growth in customer bandwidth, which rose to 3465 Gbit, a plus of 41%. In addition, the number of connected networks grew by 17% to over 200, a new milestone for the Spanish capital. Located on the shores of the Mediterranean Sea, DE-CIX Marseille's peak traffic rose by almost 90% and the total customer bandwidth grew by 42%. Within its first year of full operation, DE-CIX Lisbon made significant progress, with the number of connected networks rising by 89% and the total customer bandwidth by 57%. The successful year for the region was topped off by DE-CIX Palermo, whose number of connected networks grew by 63%.

Also in 2020, the extension of DE-CIX's presence in the region was announced. During the first edition of the DE-CIX Virtual Interconnection Summit, live from Madrid, customers and partners welcomed DE-CIX Barcelona to the DE-CIX family. The new IX will serve local eyeballs and key enterprises in Catalonia and beyond and is planned to be ready for service in spring 2021.
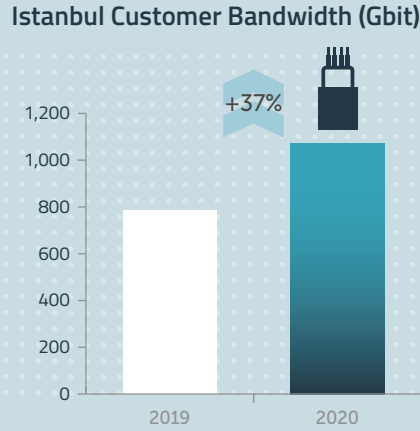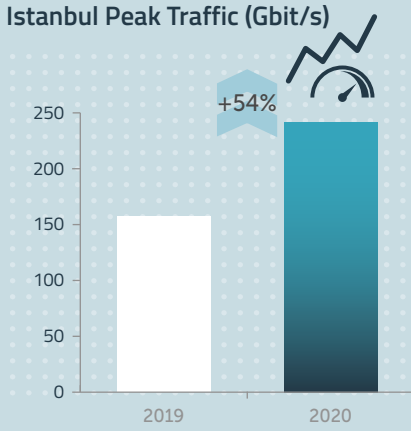
RUSSIA

Maxim Pozdnyakov
Regional Director
Northern & Eastern
Europe

"When we talk about classic peering services, then the next potential markets in the region are those with weaker connectivity and high population density, like Tajikistan, Uzbekistan, Kazakhstan, and neighboring countries. We will ensure that these regions also benefit from the best possible interconnection in the future."

**Moscow and Saint-Petersburg offer
DE-CIX interconnection services**
After the successful start of the partnership between MSK-IX, the leading IX operator in Russia, and DE-CIX in 2019, the two locations in Moscow and Saint-Petersburg picked up considerable momentum in 2020. From the past year on, DE-CIX customers worldwide are not only able to peer remotely at the two Russian locations, but they can now also directly access the IXs and use the DE-CIX services VirtualPNI and DirectCLOUD.

Istanbul Peak Traffic (Gbit/s)

+54%

	2019	2020
250		
200		
150		
100		
50		
0		

Istanbul Customer Bandwidth (Gbit)

+37%

	2019	2020
1,200		
1,000		
800		
600		
400		
200		
0		

ISTANBUL

Bülent Șen
Regional Director
Turkey

"Despite the global pandemic, 2020 was a successful year, bringing DE-CIX Istanbul closer to becoming the Digital Hub of the region – thanks to our new record peak traffic of 240 Gbit/s and the high customer demand for our cloud services – through the DirectCLOUD service, as well as the fantastic DE-CIX Istanbul Virtual Summit 2020."

Virtually celebrating 5 years of DE-CIX Istanbul

Being the only IX on the globe that operates on two continents – Europa and Asia – DE-CIX Istanbul celebrated its fifth anniversary together with numerous industry experts and government officials during a virtual summit at the CNN Türkiye studios in late 2020. Within five years of operations, DE-CIX Istanbul has grown to be an important interconnection gateway between the Middle East and Europe. In the last year, it experienced growth in customers of 16%, bringing the connected customer capacity to a new all-time high of more than 1000 Gbit (+37%). Also in 2020, the regional situation during the pandemic and customers upgrading to more capacity lead to an increase in peak traffic at DE-CIX Istanbul of 54%.

UAE·IX

powered by DE·CIX

DUBAI

Marco Brandstaetter
Regional Director
Middle East & India

"The global pandemic has made clear that data needs to be as close to the customer and the user as possible to increase quality, security, and resilience, as well as to reduce latency. So, it was a special milestone for us to sign the agreement with DU in December for the expansion of UAE-IX to five more sites in the UAE. With the extended footprint of UAE-IX, we are underlining the strong position of the UAE as the data hub for the GCC and beyond, and we are bringing data much closer to the edge."

UAE-IX Customer Bandwidth (Gbit)

+63%

1,500	
1,200	
900	
600	
300	
0	
2019	2020

UAE-IX Peak Traffic (Gbit/s)

+73%

250	
200	
150	
100	
50	
0	
2019	2020
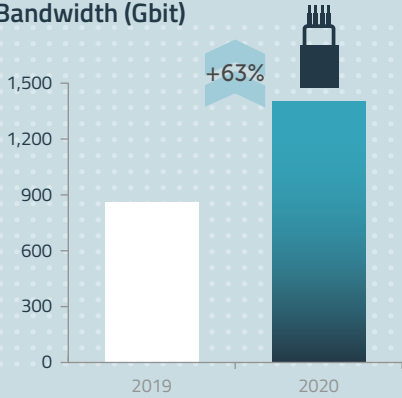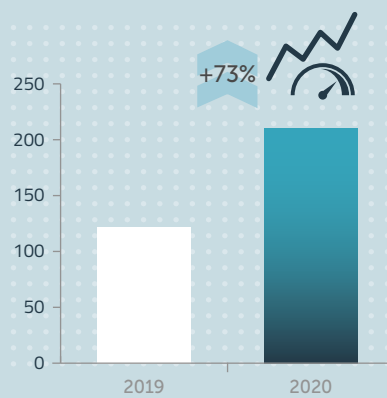
UAE-IX expanding to new locations in the United Arab Emirates

The Internet Exchange UAE-IX powered by DE-CIX in Dubai will be extended to further sites and data centers in the UAE, including Dubai, Abu Dhabi, and Fujairah. UAE-IX is the first carrier and data center neutral Internet Exchange for the Middle East that interconnects global networks, network operators, and content providers in the GCC region.

In 2020, Microsoft Azure became available at UAE-IX through the DE-CIX Cloud Exchange and its DirectCLOUD service. Further, due to the global pandemic, leading providers of collaboration tools – needed for home office and homeschooling – increased their capacity in spring by up to 400%.

In the last year, UAE-IX experienced a growth in total customer bandwidth of 63%, increasing to 1403 Gbit. The need for interconnection is clearly visible here. Tremendous growth was also shown in the peak traffic: the new record of 210.45 Gbit/s represents an increase of 73% and resulted, among other things, from the huge wave of working from home and homeschooling.

INDIA

Sudhir Kunder
Sr. VP,
National Head Sales
DE-CIX Interwire, India

"I have always believed that having a great idea is good, but execution is of paramount importance. In 2020 at DE-CIX India, we have unambiguously demonstrated to the industry how we are able to significantly impact and redefine the market. We became the market leader in India with a rapidly growing customer base. This is thanks to our all-around commitment to customer-first ideology, which ensured first-in-class initiatives to become the most preferred IX ecosystem. We are positive that DE-CIX Mumbai will become the No. 1 IX in the APAC region soon."

Mumbai Customer Bandwidth (Gbit)

+75%

Year	
3,000	
2,500	
2,000	
1,500	
1,000	
500	
0	

2019   2020
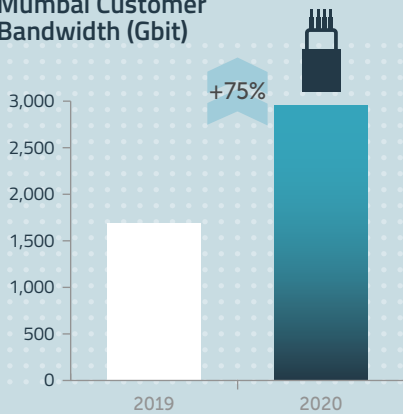
Mumbai Connected Customers

+53%

Year	
300	
250	
200	
150	
100	
50	
0	

2019   2020
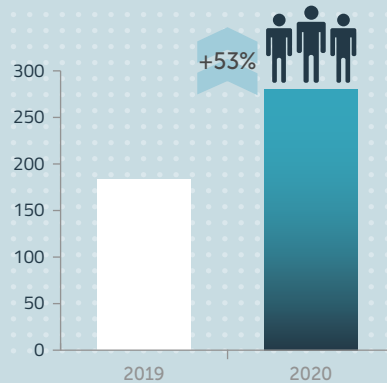
Exciting innovations and expansions for DE-CIX India in 2020

The DirectCLOUD service was launched in Mumbai in 2020, meaning that customers were able to access the DE-CIX Cloud Exchange for the first time. This made possible a connection to the global cloud services provided by Microsoft Azure and Google Cloud, quickly followed by Amazon Web Services and Oracle Cloud: the start to an extensive Indian cloud ecosystem. Furthermore, several additional Points of Presence (PoPs) found their way into the DE-CIX India portfolio, such as Sify Technologies and GPX2 in Mumbai and STT Telemedia's (Tata Communications) data centers in Chennai and Delhi. Further to this, DE-CIX India expanded its DWDM network capacity in all four markets, and therefore replaced existing devices to increase capacity up to 320GE.

All of these expansions and innovations contributed to the excellent news in 2020 that DE-CIX Mumbai, the largest of the four Indian Internet Exchanges, gained the ranking of the second-largest IX, based on connected networks, in the Asia Pacific (APAC) region (according to PeeringDB).

DE-CIX Mumbai enjoyed a total customer bandwidth growth of 75%, due to both new customers and upgrades of existing customers. Looking at the 100GE ports, for example, there was an increase of 67%. At the end of 2020, the location counted 280 customers – up 53% from December 2019.

SOUTHEAST ASIA

Frank Orlowski
SVP Corporate
Development

"Southeast Asia represents some of the fastest-growing economies in the world, with Singapore – one of the world's largest Internet hubs – right in its center. This is why we decided to enter Singapore, along with its neighboring market Malaysia. It is our mission to support the Internet transformation in the region, meaning more content will be made available closer to the end users instead of being delivered from Singapore. We intend to develop the largest distributed and neutral interconnection ecosystem in Southeast Asia, which will allow customers from many markets to interconnect both locally and across the region. This will be a game changer for all markets DE-CIX will enter in Southeast Asia in the near future."

Kuala Lumpur

Johor Bahru

Singapore

Gaining a foothold in new markets – expanding into Southeast Asia

With more than 600 million inhabitants in Southeast Asia, there is massive digital demand that needs to be served, and DE-CIX followed a strategic international expansion plan into this region in 2020. Announced in late 2019, DE-CIX and the local Malaysian Internet Exchange provider JBIX, running three Internet Exchanges in the greater Kuala Lumpur, Johor Bahru, and Singapore region, successfully merged in 2020 to form DE-CIX Malaysia and DE-CIX Singapore. With excellent international and terrestrial connectivity to the rest of Southeast Asia and beyond, Malaysia has the potential to complement the major content hub of Singapore by providing regional interconnection for growing local needs. DE-CIX Singapore, announced in early 2020, is a further logical step in DE-CIX's expansion in Southeast Asia. As a result of the challenges caused by the Covid-19 pandemic, technical work on the infrastructure was delayed in 2020. However, all three exchanges are to be migrated to the DE-CIX infrastructure in early 2021. In 2020, DE-CIX undertook steps to introduce a shared interconnection fabric for the Southeast Asian interconnection ecosystem, where participants of the three Internet Exchanges in Singapore, Kuala Lumpur, and Johor Bahru will be able to interconnect with one another. The movement towards an interconnection platform that spans multiple markets in the region follows a similar transformational process to other parts of the world. This shift will not reduce the need for strong hubs like Singapore, but rather supplement that need with greater edge peering, networking, and computing resources. This paves the infrastructure path for content and applications to get as close as possible to the users, increasing the quality of user-experience and supporting the digitalization of business in the region.
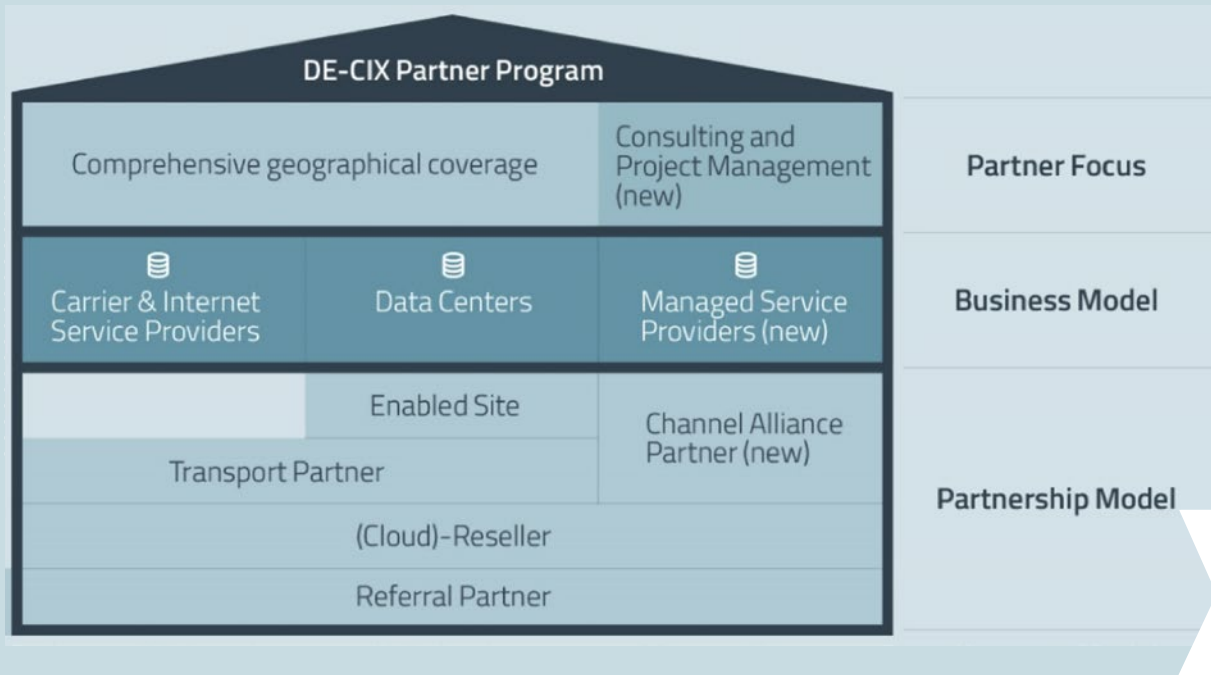
PARTNERS

Melanie Kempf
Director Global Partner Relations

"We are proud to see that our ecosystem is constantly expanding and perceive our partner community as an integral part of our business growth. The expansion of the DE-CIX portfolio focuses on opening up new customer segments and verticals, as well as different markets. This results in the need for different categories of partners, the coverage of which brings a high degree of diversity to our partner landscape. This diversity makes us strong because each party brings its individual strengths to the table. Therefore, we have developed different types of partner models to meet the needs, demands, and roles of each partner. All of our partners, regardless of type, have an individual yet equally important meaning to us."

DE-CIX Partner Program

			Partner Focus
Comprehensive geographical coverage		Consulting and Project Management (new)	
Carrier & Internet Service Providers	Data Centers	Managed Service Providers (new)	Business Model
	Enabled Site	Channel Alliance Partner (new)	
Transport Partner			Partnership Model
(Cloud)-Reseller			
Referral Partner			

Partner program: Partner community integral to business growth

Digital value chains are at the heart of what we do: delivering a platform that interconnects its participants in the most transparent, secure, and performant way. Together with its partners – data centers, ISPs, resellers, managed and cloud service providers, carriers, and others – DE-CIX plays home to the largest neutral interconnection ecosystem worldwide and therefore has always been a place "where networks meet". By working together, we can all grow and benefit mutually from each other.

In 2020, the DE-CIX partner program was extended. Not only were the resources doubled within the team, but also DE-CIX introduced a program component for Channel Alliance partners: The onboarding, support, and commercial conditions were tailored towards the needs of the 'Trusted Advisors' of enterprise customers. At the same time as expanding the footprint of our program, DE-CIX also relies on the force of the existing and strong reselling partners. These partners were responsible for adding more than 100 sub customers in 2020 across all DE-CIX Internet Exchanges worldwide. The top three resellers in 2020 were GlobeNET, RETN, and Turk Telecom International.

With the expansion of the DE-CIX service portfolio, new markets for our partners are being enabled. Constant product trainings, during 2020 especially in the form of webinars, are a key success factor for partners to keep their sales force trained on DE-CIX products. Informational webinars were also offered for the customers and prospects of our partners. DE-CIX will continue this approach also in the future as one focus area.

Top 3 Reseller 2020

Dr Christoph Dietzel
Global Head of
Products & Research

"The unmatched success story of the Internet is only a few decades old, and yet we can already see the start of a similarly significant transformation of the telecommunications and interconnection industry. The convergence of players and markets on the one hand and the emergence of new business models, on the other hand, is driven by the transformation of IT service delivery, new connectivity and interconnection requirements, and resource consumption. The use of interconnection and network services will increase sharply and, similar to the way cloud services are requested and instantiated today, will be available where they are needed with seemingly infinite capacity in the shortest possible time. In particular, machine-to-machine communication will drive this trend by imposing dynamic changes in network requirements and massively growing bandwidth demand. The new analytic age will process significantly more data in a distributed manner in order to enable data-driven businesses – this will particularly affect enterprises and large industry segments in any vertical. I am thrilled to be part of this journey and provide the right interconnection services to best serve DE-CIX customers now and in the future."

DaaS

Blackholing

SERVICES

DE-CIX interconnection services

With its research and development expertise and its 25 years of experience, DE-CIX is the interconnection looking glass for the future of the Internet, as well as the state-of-the-art for interconnection of today and tomorrow. It is in DE-CIX's DNA to (inter)connect networks as close to the source as possible in order to make the best performance and most reliable interconnection easily available for everyone. Living by this motto, the number of DirectCLOUD users increased by 51% during 2020 compared to the previous year. The services GlobePEER – with an increase of 65% in users worldwide – and GlobePEER Remote – with 47% more users worldwide – also had a successful year. 2020 brought an increase of 57% in customers worldwide for Virtual PNI. Looking at the global DE-CIX portfolio of interconnection services, last year brought some exciting innovations and new services.

New interconnection services 2020:

DE-CIX as a Service (DaaS)

This pioneering opportunity allows partners to have their own interconnection platform, operated by DE-CIX. The fully functional interconnection platform can then be offered to their customers, with services from peering to cloud connectivity and more. The DE-CIX Apollon technology thereby delivers high performance as well as secure and resilient connectivity. Partners bring in the local knowledge, DE-CIX provides the hardware, software stack, technological know-how, and customer service, and secures the ongoing operation. Examples

of DE-CIX as a Service include the success story behind UAE-IX powered by DE-CIX in Dubai, as well as SEECIX powered by DE-CIX in Athens, Greece, and the German Ruhr-CIX, the latter two both launched in 2020.

Blackholing Advanced (beta)

In the face of ever-growing DDoS attacks, DE-CIX has developed Blackholing Advanced, which revolutionizes DDoS mitigation at IXPs and has only the name in common with the existing Blackholing service. The patented mechanism gives customers the opportunity of fine-grained filtering of unwanted traffic based on transport protocols and ports. According to these filters, traffic is discarded or shaped directly on the DE-CIX Apollon platform. The specific shaping allows the inspection of a portion of the traffic while protecting the infrastructure from congestion at the same time. Together with a new blackholing dashboard, this allows a more precise and educated mitigation of DDoS attacks and network hygiene to filter unwanted traffic altogether. Blackholing Advanced will be available at all DE-CIX locations by the end of 2021.

GlobePEER Asia:

The distributed service was launched in Kuala Lumpur, Johar Baru, and Singapore in 2020. Local traffic must remain local in order to be processed and used as efficiently as possible. The definition of local depends on market requirements: The fast-growing and densely populated ASEAN region, for example, has its own interconnection and peering requirements. GlobePEER Asia, therefore, offers a distributed peering LAN and

Closed User Groups

MAPS

DirectCLOUD

GlobePEER
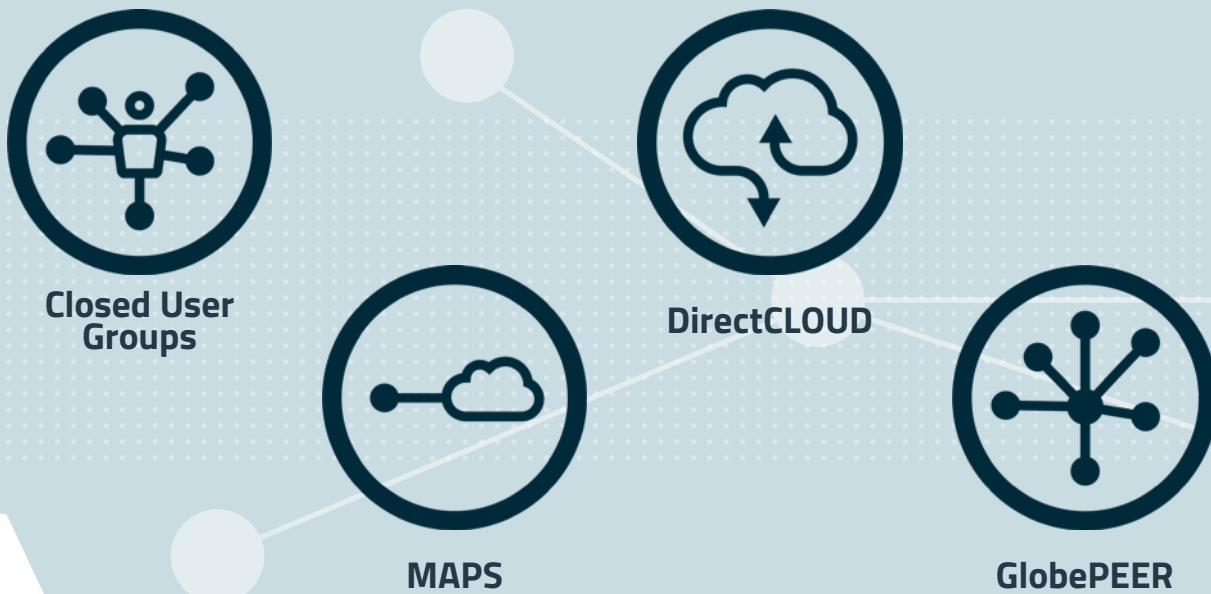
allows customers in all three metropolitan areas to connect to it – reaching all connected networks at the three locations – and to profit from one another.

DirectCLOUD Flex:

This bundle service is an addition to the standard DirectCLOUD solution and serves customer needs for flexibility in a growing and fast-changing market to cope with internal requirements or strategy changes. Up to the ordered bandwidth (5, 10, or even 100 GE), customers are able to set up as many cloud connections with bandwidths from 0.01 up to 10 GE as needed. The connections can be set up or canceled as often as wanted, as long as all connections together do not exceed the total ordered bandwidth.

"Special guest" GAIA-X

Announced in June 2020, DE-CIX is a founding member of the European data and infrastructure project GAIA-X, initiated by the German Federal Ministry for Economic Affairs and Energy (BMWi). GAIA-X aims to facilitate data sovereignty, data availability, and digital innovation on a European level and is intended to bundle existing cloud solutions in Europe and produce new approaches to data and infrastructure in accordance with EU standards. DE-CIX is actively contributing to GAIA-X on many different levels, such as management, technical committees, working groups, event organization, and projects.

Existing interconnection services

Closed User Groups: Industries and businesses are undergoing digital transformation, a process that was forced in some cases faster than expected in 2020 by the global pandemic. Companies are shifting to platform-based models, where they take part in ecosystems to share data and intelligence, and run distributed workloads with third-parties involved. Scalable and distributed connectivity platforms are key to facilitate data sharing among a set of partners (many-to-many communication). Connectivity requirements are increasing, and very often, connectivity is needed to a specific, defined area or group that is logically separated from the Internet while simultaneously being accessible anywhere. DE-CIX's interconnection system allows dedicated user groups to be set up as logically separated services. These Closed User Groups can be used either for exchanging data only with selected, trusted partners or for a dedicated service.

Microsoft Azure Peering Service (MAPS): The first dedicated Closed User Group at DE-CIX is the Microsoft Azure Peering Service. By exchanging data with Microsoft directly, the service enables a one-hop connection with the highest possible quality regarding security, bandwidth, and latency. Microsoft customers that are connected via this service can benefit from an Internet telemetry service to monitor their traffic.

GlobePEER Remote

Interconnection FLEX

VirtualPNI

FlexPOP
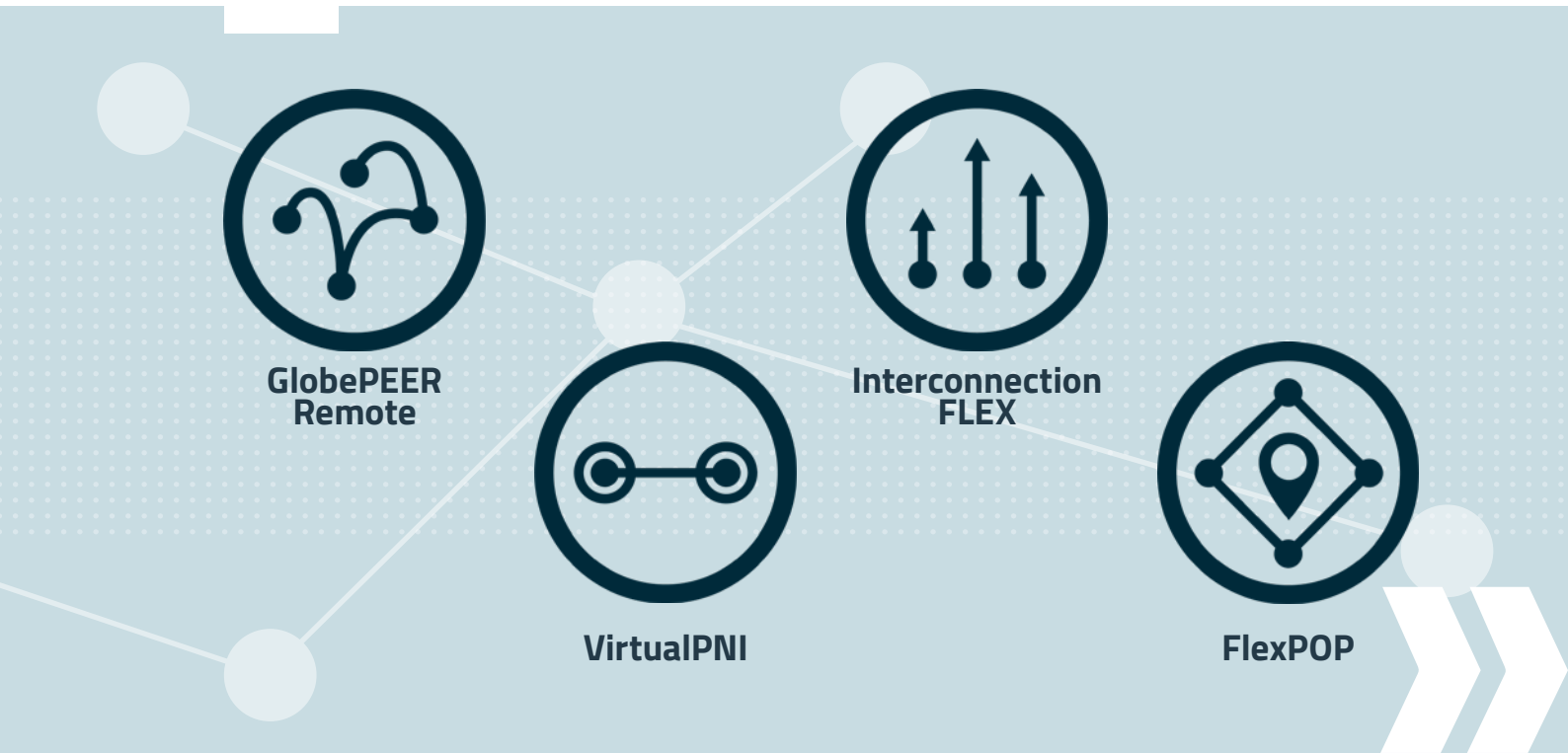
DirectCLOUD: This service was implemented at further international locations in 2020, with the aim of creating regional cloud ecosystems. This enables customers to access the services of multiple cloud service providers, including not only large players – such as Amazon Web Services (AWS), Microsoft Azure, or Google Cloud – but also many niche and specialist cloud providers.

GlobePEER: This was the first interconnection service DE-CIX started with in 1995. Today, it is still an important part of the DE-CIX service world. Peering reduces IP Transit and network costs by aggregating all kinds of ISPs on a Layer 2 switching platform. By connecting hundreds of networks on the most advanced industry platforms – more than 1,000 connected customers in Frankfurt alone – the service enhances the speed and reliability of all kinds of IP products.

GlobePEER Remote: The DE-CIX exchanges in Frankfurt, Dusseldorf, Hamburg, Munich, New York, Marseille, Lisbon, Madrid, Palermo, and Istanbul are interconnected. With access in one of these locations, customers can peer remotely at every other GlobePEER Remote location. In addition, Moscow, St. Petersburg, and Berlin can be reached from Frankfurt – and vice versa – and Dubai can be reached from Marseille and vice versa. The most heavily-booked connections are from Frankfurt to the German regional DE-CIX exchanges.

VirtualPNI: The VirtualPNI service allows customers to easily establish virtual private connections. The connection can be provisioned easily, between any two points within a metro region and also between metro regions. It can be used for MPLS connections, enterprise network traffic, or the selling of transit or paid peering.

InterconnectionFLEX: This service is designed especially for enterprises and includes several DE-CIX service components, such as GlobePEER, GlobePEER Remote, DirectCLOUD, and Virtual PNI, as well as consulting. Depending on the customer's current and future interconnection needs, InterconnectionFLEX is – as the name implies – flexibly adaptable: Customers buy a certain bandwidth and are able to use the DE-CIX services as needed within their bandwidth.

FlexPOP: This service offers carriers the chance to use DE-CIX's infrastructure as if it were their own (Infrastructure as a Service, IaaS): At DE-CIX PoPs, carriers can create virtual PoPs, allowing them to increase their on-net coverage without the need to invest in their own expensive infrastructure.

6
FINANCIAL
RESULTS

Sebastian Seifert
Chief Financial Officer, DE-CIX Group AG

FINANCIAL RESULTS

The DE-CIX Group performed very well in the 2020 financial year and was able to achieve an increase in revenues of 10 percent through the expansion of their global IX presence and the addition of new interconnection services to the product portfolio.

In the consolidated annual financial statement for 2020, the global revenues of all company parts grew by 3.8 million to 43.4 million Euro, in comparison to the previous year's 39.6 million Euro. Revenues from international activities jumped by 34 percent in comparison to 2019 and represented 17.4 percent of total revenues in 2020. The EBIT for 2020 amounted to 3.0 million Euro and the EBITDA to 4.5 million Euro. In the 2020 financial year, no use was made of debt capital.

The Profit and Loss statement below provides further details on the consolidated global results of the DE-CIX companies in 2020.

DE-CIX Global Consolidated Profit and Loss Account 2020

In thousands of EUR	2020	2019
Revenue	**43,442**	**39,571**
Inventory Change	–11	50
Operating Result	**43,431**	**39,621**
External Services / Cost of Goods	–447	–91
Gross Income	**42,984**	**39,530**
Other Operating Income	900	480
Personnel Costs	–12,301	–10,148
Depreciation	–1,483	–1,575
Other Operating Costs	**–27,056**	**–24,997**
Operating Result/EBIT	**3,045**	**3,290**
Financial result	48	–40
EBT	**3,093**	**3,250**
Tax	–1,151	–1,153
Annual Profit/Loss	**1,942**	**2,098**
For information: EBITDA	4,528	4,865

STRATEGIC
OUTLOOK

Ivo Ivanov
Chief Operating Officer, DE-CIX Group AG

STRATEGIC OUTLOOK

Latency is the new currency – bringing digital infrastructure closer to people and business
Society and businesses around the globe are entering a new era of digitalization in which digital applications and services will be needed everywhere, for everyone. All areas of business and private life rely more heavily today than ever before on digital applications. These have proven their worth during the Covid-19 pandemic, finding their place in our professional and personal lives. Beyond the virtual desktop and video streaming, we are now seeing the emergence of digital applications and services across many sectors. As these become more sophisticated and assume increasingly critical roles within society, the more essential it becomes to ensure their performance in terms of secure and resilient digital infrastructure.

To ensure the best performance of digital applications and services, latency needs to be minimized; meaning that digital applications need to get closer to the users. The maximum latency to ensure an acceptable end-user experience with today's general-use applications currently stands at around 65 milliseconds. A latency of no more than 20 milliseconds is already necessary to enjoy an excellent level of performance. Assuming that latency requirements continue to develop in line with the speed of innovation that we have seen in recent years, it will not be long before the uppermost limit reduces

to 20ms. Translating this into distance, applications like interactive online gaming and live streaming in HD/4K, even today, need to be less than 1,200 km from the user. But the applications that our digital future will be based on, such as smart IoT and critical applications like autonomous driving and e-robotics – requiring real-time responses – demand much lower latency: in the range of 1-3 milliseconds. These need to be performed within a range of 50-80 km from the user. Gone are the days when centralized data centers or cloud infrastructure on one continent could serve the needs of people and businesses on another. The foundation of user experience at the highest level – regardless of where users are, which continent they live on, which applications they are using – is the proximity of digital infrastructure to the users. In order to implement autonomous driving safely, for example, mini data centers will need to be set up at roughly every highway interchange.

Digital infrastructure at the edge
To get closer to the user, the digital infrastructure that houses and transports data needs to be at the edge of the network – as close as possible to the point where the user connects to the network or where the data is being generated. This digital infrastructure includes the data centers, the terrestrial and undersea cabling, up to and including the last mile. It includes mobile communication towers, the cloud, and interconnection hubs – but it

Digital everywhere for everything & everyone in our daily lives...

BUSINESS	e-manufacturing	virtual desktop, video conferencing, ...
	<1ms	**<15ms** ~**65ms**
	<80km	**<1,200km** **<5,500km**
PRIVATE	Mobility, connected car	Live streaming, online gaming, e-learning, e-health, ...

Latency is decisive for the performance of general purpose and critical applications.

also encompasses factors like 5G technology, edge interconnection, and low-earth orbit (LEO) satellite technology. This digital infrastructure needs to be near businesses and people, everywhere, to serve their needs, to deliver the performance required – bringing digital applications and content to within a geographical area that enables the lowest possible latencies.

Achieving this on a global level is possible through the glocalization of the Internet and is only possible through maintaining neutrality and working together with a wide range of infrastructure partners. Working together with data center, cloud, and network partners of all kinds, DE-CIX is building and expanding interconnection services. We bring our networks and our infrastructure to data centers, and we also work with transit partners to bring customers from outlying regions to our networks. We expand to new locations where there is a clear need, where the traffic flows will benefit from local interconnection, bringing the content close to the user, lowering costs and latency for the local networks, and improving user experience in regional areas.

Beyond this, interconnection infrastructure can also be ordered as a managed service, with the setup and operation of Internet Exchanges for data center partners. With DE-CIX as a Service (DaaS), a highly scalable turn-key solution, data center operators and other stakeholders

are able to create their own interconnection ecosystem and their own interconnection story. Examples of DE-CIX as a Service include UAE-IX in Dubai, SEECIX in Athens, and Ruhr-CIX in Germany, with more locations around the globe on the horizon.

Through our continual program of geographical expansion, we can go a long way towards improving latency and performance for end users and for enterprise customers. However, this strategy on its own is not enough to support the digitalization of our world. Through our highly valued Research & Development team, DE-CIX also constantly undertakes research in order to develop the next generation of interconnection services and technological setups. Currently, as the technological component to the DE-CIX as a Service program, we are able to ship "DE-CIX in a Box" to our partners. But there will be a time in the not-too-distant future where we will be installing something more like a "DE-CIX shoebox" at highway crossroads, in 5G cell-towers, and in smart factories, in this way bringing interconnection services even closer to the data collection point.

Service diversification – catering for the enterprise segment

Beyond this, DE-CIX is constantly innovating its service portfolio, bringing tailor-made interconnection services to an ever-wider range of customers. While Internet

Digital applications & content closer to people

<1,200km
(~15ms)

<5,500km
(~65ms)

<80km
(~1ms)

6,000 km 4,000 km 2,000 km 0 km 2,000 km 4,000 km 6,000 km
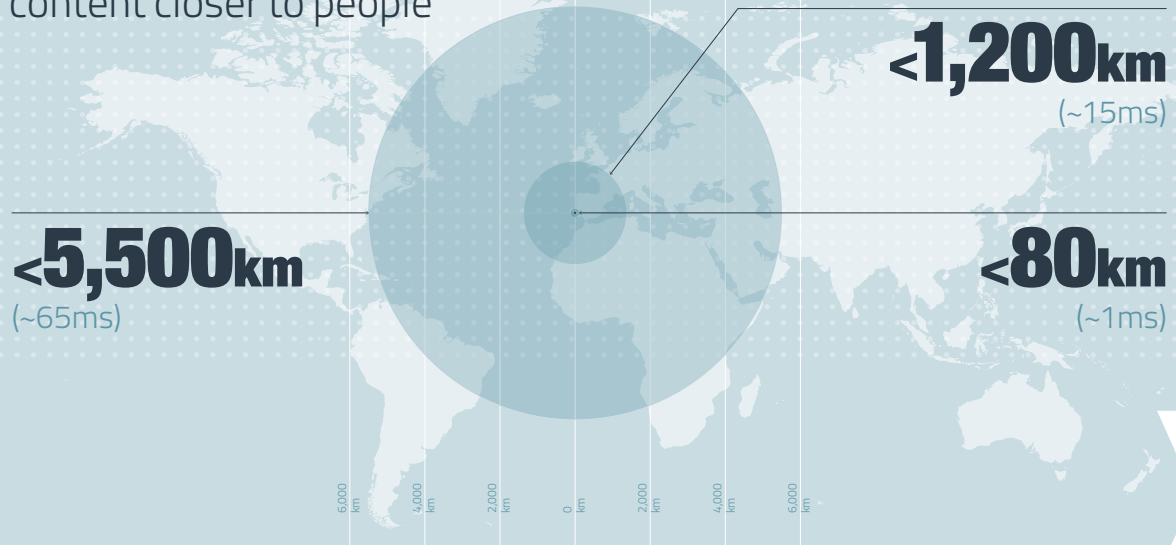
To ensure the best performance, digital applications need to get closer to the users, everywhere.
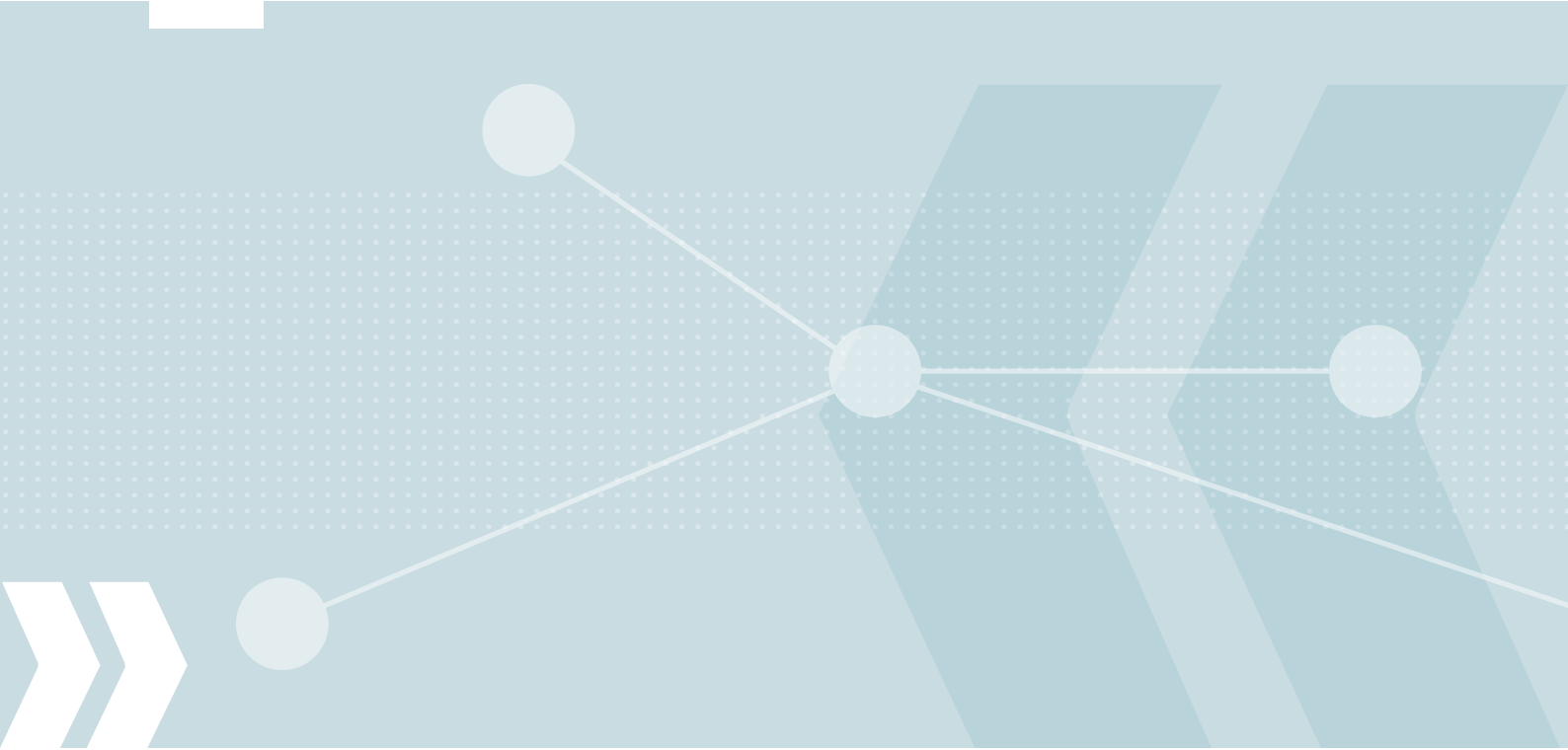
Exchanges have traditionally been seen as locations where carriers, ISPs, content networks, and content delivery networks interconnect to exchange data, we are now seeing an increasing number of participants joining from other industry segments, like healthcare, finance, retail, logistics, and of course, automotive. This is a development that we at DE-CIX aim to support in order to ensure the smooth transition to a digital society and economy.

In the digital world, performance, resilience, and security in network connections are business-critical. Enterprises need the fastest reaction times and the highest resilience, which together improve the performance and the reliability of different applications and services. Furthermore, in the increasingly complex world of digital business, where companies exchange data with one another for the provision of digital services and applications across national borders and regulatory regions in a platform economy, it is important to reduce the complexity of the relationships and ensure that partners comply with policy and legal requirements, as well as ensuring the highest level of security on the data transmission and the network.

By connecting to DE-CIX, an enterprise can position itself right on the spot where the digital economy is already playing out and where the future is being molded. The

DE-CIX IXs around the world have established vibrant ecosystems of diverse kinds of networks. The chances are high that the networks the enterprise needs to interconnect with are already participating in these ecosystems. DE-CIX enables direct interconnection between these parties, using the very efficient principle of one-to-many or many-to-many. Our offering to the enterprise market was initiated several years ago with the establishment of the DirectCLOUD service. This was expanded in 2020 to include the Microsoft Azure Peering Service (MAPS). These two services support the internal digitalization process of enterprises, offering low-latency, high reliability, and secure connections to the networks an enterprise requires to support its business processes.

But DE-CIX has now taken its service offering to the enterprise segment further – enabling an enterprise to build a closed and secure private ecosystem, a Closed User Group (CUG), within the existing DE-CIX ecosystem. In this way, the enterprise can further minimize the geographical distance to the other networks – and thus optimize the latency – as well as ensuring resilience. The enterprise's policies for compliance requirements can be enabled within this CUG, making fulfillment of these policies a prerequisite for all the participants of the group, and this can be efficiently controlled. This can even be undertaken per market, per regulatory region,

even at a federal or state level. Doing this via a highly secure, high-performance DE-CIX Internet Exchange means that the demand for resilience, security, and fast reaction times can be fulfilled in a simplified manner and – backed by Service Level Agreements (SLAs) – guaranteed. At DE-CIX, this can be further enhanced by additional premium security solutions, developed wholly or partly by DE-CIX Research & Development. The result of this is that the enterprise can have the best of all worlds when it comes to connectivity – high-performance, reliable, and secure interconnection to enhance and protect their digital products and to satisfy and protect their customers.

Unlocking access to information and digital applications & services, everywhere
Using a two-pronged approach – working towards greater geographical density, as well as developing premium interconnection services for specific market environments – DE-CIX is supporting the transformation to a digital world of working and living. Doing this together with our many partners brings more businesses online and serves an increasing portion of the world's vast population. In this way, DE-CIX is helping to pave the way for the bright future of the digital economy and the digital enterprise.

The past year has taught us that regions with solid, reliable digital infrastructure stand in stark contrast to those regions of the globe that remain underserved – not only in terms of the economy and industry but also when it comes to crisis management. Thus, the digital divide must be eliminated so that in future all communities can unlock access to information, digital communication tools, and digital content in general. Different stakeholders, including governments, investment policy makers, and the Internet industry itself, must take as a high priority mandate the goal of creating a minimum level of robust digital infrastructure everywhere to prepare the world for the challenges ahead of us this century. Digitalization – relying on robust digital infrastructure – everywhere will not only enhance the way we manage upcoming crises but will also enable us to live better lives in the future.

DE-CIX

THE DAWN OF A NEW DIGITAL AGE

Annual Report 2020

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