



***Unlocking
a New Digital Age***
Annual Report 2019



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Harald A. Summa
CEO, DE-CIX Group AG

Executive Summary

Dear Readers,

It's hard to believe that I'm now presenting to you the Annual Report for 2019 – as in 2020, DE-CIX is celebrating its 25th anniversary. That said, it's now nearly a quarter of a century since a very small Internet Exchange in Frankfurt saw the light of day in a disused post office. From that first spark of interconnection, DE-CIX has grown to be the operator of the world's largest neutral interconnection ecosystem.

And in this, our 25th birthday year, we can see that the Internet and the digital infrastructures on which it is based have come of age. The COVID-19 crisis has made clear how essential digital infrastructure is. In the wake of global lockdown, the pace of digital transformation has accelerated massively and the world has come to realize the importance of robust, secure, resilient, and high-performance digital infrastructures for everything from educating children at home to keeping businesses afloat. I'm proud to say that DE-CIX was prepared for this sudden, unprecedented growth. At the cutting edge of interconnection technology and high-performance interconnection platform design and operation, DE-CIX remains prepared for the future, whatever it may bring.



DE-CIX
25
YEARS

Looking back to the pre-Corona world of 2019, I am pleased to report that DE-CIX enjoyed further growth across all regions, with more than 20% growth in customers world-wide, bringing the total to over 1900 customers by the end of the year. Connected customers' thirst for greater capacities led to continued growth of over 25% in 100GE ports, which was partially responsible for connected customer bandwidth reaching 55 Terabits in the course of the year. Milestones were achieved for the exchanges in North America, Southern Europe, the Middle East, India, and South East Asia, too many for me to list them all – but the continued success of DE-CIX Frankfurt, breaking its own peak traffic world records year for year, hitting 8.1 Terabits per second (Tbit/s) in December, certainly deserves a mention.

As well as entering the South East Asian market, our team was busy around the world in 2019, extending the reach of existing locations, setting up further enabled sites and access sites, developing new services – with product offers becoming increasingly customized and tailored to individual business needs – and operating in the meantime more than 20 Internet Exchanges on four continents.

From a financial perspective, the DE-CIX Group performed very well in 2019, achieving a healthy increase in revenues of more than 10 percent. In the consolidated annual financial statement for 2019, the global revenue of all company parts grew by 11 percent to 39.6 million Euro, while revenues from international activities jumped by 29 percent in comparison to 2018, and represented 15 percent of total revenue for the year.

So, the DE-CIX story continues – and you can read more about 2019, as well as about the last 25 years, and also get a glimpse of what the future has to offer, on the following pages. But none of this would have been possible without our many valued partners around the globe. Without you, our ISP and carrier partners, our data center partners, our cloud partners, our hardware partners, the many and varied partners that make up our interconnection ecosystems worldwide, the Internet would not have developed as it has – as an economic and societal boon, as a value-creation and life-enhancing – even life-saving – tool.

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

Set for further expansion domestically and internationally – getting closer to the edge

In autumn 2018, the legal basis for the next phase of growth of DE-CIX was established with a new corporate structure. This structure has proved its worth and was not changed in 2019. eco – Association of the Internet Industry is the sole shareholder of the DE-CIX Group AG, into which the eco subsidiaries DE-CIX Management GmbH and DE-CIX International GmbH are set. All domestic and international DE-CIX activities, financial investments, and company parts are thus consolidated under the umbrella of the DE-CIX Group AG. Chair of the DE-CIX Supervisory Board Felix Höger and Vice Chair Klaus Landefeld, both of whom are Members of the eco Board, constitute the point of connection between the association and the holding company. As Member of the Board, Rudolf van Megen completes the 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 Chief Financial Officer of the DE-CIX Group AG.

The DE-CIX Management GmbH operates the DE-CIX Internet Exchanges in Frankfurt, Hamburg, Munich, and Dusseldorf, and the UAE-IX in Dubai as Managed Services in cooperation with datamena. The company is led by CEO Harald Summa, also founding member of eco – Association of the Internet Industry, and is guided in its decision-making by the Customer Advisory Board. The 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.

DE-CIX International GmbH, led by Ivo Ivanov, is responsible for the vast majority of the international activities of the DE-CIX brand, either directly (Madrid, Marseille, Palermo, and Lisbon), or through subsidiaries in the USA (New York and Dallas) and Turkey (Istanbul). Furthermore, the Angola-based angonix has placed its trust in the consultancy services of the company. DE-CIX International is also a partner in a joint venture with the DE-CIX Interwire Internet Services Private Limited, operating the Mumbai IX since 2017 as a first entry-point of DE-CIX into the promising Indian market. In 2019, three new DE-CIX locations in India opened additionally: DE-CIX Chennai, Delhi, and Kolkata.

Also in 2019 DE-CIX entered South East Asia, announcing its market entrance by creating a joint venture with the local technology group “Starwing Technology”. The new joint venture company “DE-CIX Malaysia” will collectively take over the Johor Bahru Internet Exchange (JBIX), which is the most recent Internet Exchange in Malaysia. It is located in Johor Bahru, the southern-most city of the Malaysian Peninsula and in close proximity to Singapore. DE-CIX Malaysia will operate two Exchanges: “DE-CIX Kuala Lumpur” – serving providers in the Kuala Lumpur and Cyberjaya metro markets – and DE-CIX Johor Bahru powered by JBIX – serving the metropolitan market of Johor Bahru. With these new locations, DE-CIX has established a first strong foothold in the ASEAN region.

**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



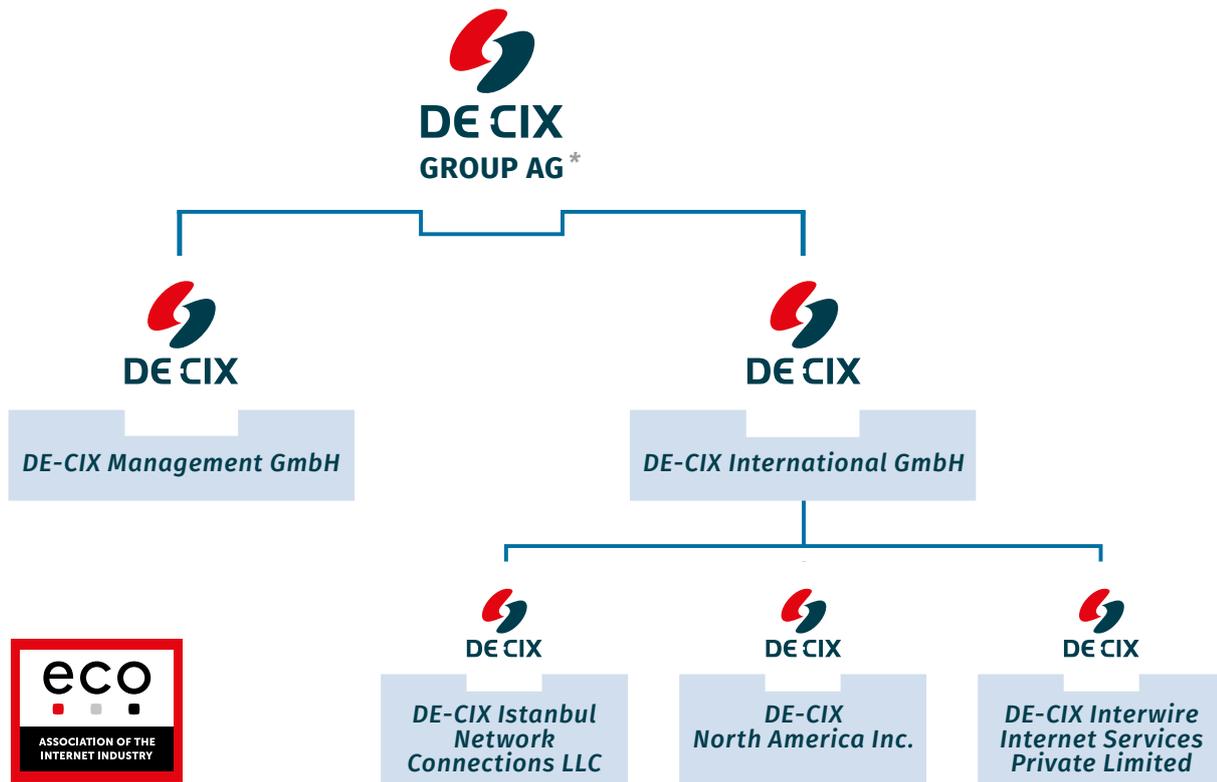
Gregor Reinhold
Chief Financial Officer



Stephan Rohloff
Chief Marketing Officer



Andreas Sturm
Chief Business Development
Officer



*Sole Shareholder:
eco – Association of
the Internet Industry

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 us in different markets: Germany, North America, and Turkey; more are to be assigned in further regions soon.

Germany: DE-CIX Management GmbH Customer Advisory Board

The Board 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 and will be re-elected in 2020.

Germany: DE-CIX Management GmbH Customer Advisory Board



Falk von Bornstaedt
Executive Board,
RIPE NCC



Zaid Kahn
GM, Azure Infrastructure
at Microsoft



Bernhard Krönung
Managing Director and
Founder
regio [.NET]



Klaus Landefeld
Board Member
eco – Association of the
Internet Industry



Malte von dem Hagen
Director Global
Backbone, GoDaddy

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 Technologies Inc.



Carl Williams
Network Engineer
Linode

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



Çağlar Dabanoğlu
Senior Network Architect
Akamai



Serkan Sevim
CEO of Medianova



Cem Çelebiler
CEO of TurkNet

The background features a glowing blue globe with a network of white nodes and lines. The globe is surrounded by various technical icons such as a magnifying glass, a cloud, a Wi-Fi symbol, a smartphone, and a person icon, all set against a blue grid background.

Technical Update



Dr Thomas King
Chief Technology Officer



Technical Update 2019

Rising to the challenges and keeping ahead of demand

Hardly a year goes by where DE-CIX does not set world records, push the boundaries of the possible, and further enhance the high quality of interconnection services. 2019 was no different. The technical team was active around the world, establishing new Internet Exchanges, adding new data center sites to existing Internet Exchanges, future-proofing networks for both anticipated and unexpected growth in traffic, and responding to the demands for a greater variety of interconnection services to meet specific requirements. DE-CIX always keeps its technology at least one step ahead of developments, and hence is able to respond rapidly to changing conditions.

New locations and sites

As in previous years, the DE-CIX team brought further new locations onto the interconnection map in 2019. Three of these were in India, expanding the DE-CIX presence on the sub-continent to the cities of Chennai, Kolkata, and Delhi. In addition to these, Lisbon was officially launched in 2019, bringing the DE-CIX Internet Exchanges to four in Southern Europe.

Existing DE-CIX locations were also extended through the addition of new data centers, so-called DE-CIX-enabled sites, which allow customers to connect to DE-CIX simply by ordering a cross-connect. In total more than 15 DE-CIX-enabled sites were added globally in 2019.

Interconnecting more exchanges

In order to make it easier for our customers to get interconnection services available at other DE-CIX locations without having a physical PoP there, the DE-CIX network was extended to Madrid, Lisbon, and Palermo in 2019. We extended our network heavily in the reporting year, interconnecting our different locations – Madrid to Marseille, Marseille to Dubai, and Madrid to Frankfurt, as

well as Palermo to Frankfurt. This allows our customers to easily consume remote interconnection services like GlobePEER Remote, DirectCLOUD, and VirtualPNI. On a technical level, this means that the different DE-CIX IXs are becoming interconnected with each other.

The partnering Internet Exchange MSK-IX was also connected to the DE-CIX network, allowing customers of both entities to easily consume interconnection services from the other.

Getting closer to the edge

Together with data center partners, DE-CIX extended its presence to new regions during 2019. Two examples of this are, firstly, Pfalzkom, which extended the Frankfurt exchange into the German Palatinate region. Secondly, StackIT extended the presence of the DE-CIX Munich exchange into Austria – the first time a DE-CIX Internet Exchange has established an enabled site across national borders.

Ready for the future

We overhauled a number of networks in 2019, with the upgrade of the network infrastructure in New York, Dallas, Madrid, Marseille, Dusseldorf, Frankfurt, Hamburg, Munich, Istanbul, and Mumbai. Capacities were increased substantially in all these locations (by a factor of twelve in New York, Dallas, Dusseldorf and Munich, and a factor of ten in Istanbul). This represents a major investment in additional capacity and state-of-the-art network infrastructure, ensuring that our networks are ready for the future traffic growth we are expecting.

The networks in India were further extended in terms of technical upgrades, and the DE-CIX Service World was made accessible at the Indian Internet Exchanges. The Service World is now accessible at all DE-CIX locations around the globe.

Furthermore, new services were technically implemented and taken to market, namely: FlexPOP, InterconnectionFLEX, Closed User Groups, and the Microsoft Azure Peering Service.

Other tasks undertaken by the technical team in 2019 included the introduction of 400GE as access ports for customers, adding RPKI validation as a security feature to our route servers, and carrying out a renumbering project for DE-CIX New York, extending the peering LAN IP space to make sure we can grow even further.

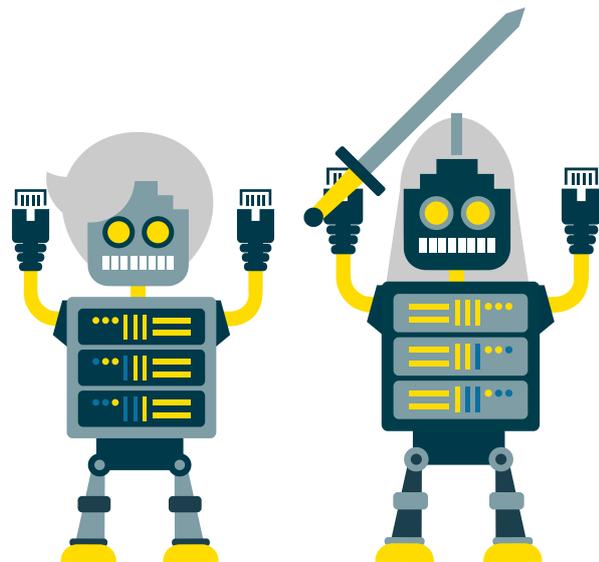
The DE-CIX Customer Portal was relaunched in 2019 with enhanced functionality. These features allow customers to order additional interconnection services quickly and easily. Additional features will be added over time, as our services evolve further. One of the features already implemented in the new DE-CIX Customer Portal in 2019 is the DE-CIX Service Insights System. The Service Insights System is now available for all DE-CIX Exchanges in Europe (except our partner Exchanges Berlin and Moscow) and the United States. Using the system, networks can easily analyze the traffic that goes in or out of the GlobePEER service, and also analyze traffic relationships with up to five peers, for example.

IX API

Our path to automation

In order to make interconnection easy for our customers, in 2019 we also continued our journey down the path towards automation. Steps taken during the year include the development of the DE-CIX API, the introduction of a new customer portal, and implementing two additional patch robots.

The DE-CIX API (Application Programming Interface), based on IX-API, an industry standard developed for provisioning interconnection at Internet Exchanges, was implemented in 2019. It supports fully end-to-end automated processes, making it possible for customers to easily order, configure, and cancel interconnection services. The IX-API consortium was created together with AMS-IX and LINX, in order to standardize a provisioning API for interconnection services. Interxion and Epsilon also joined the consortium as launching partners. The first steps were taken on the standardization work in 2019, and a detailed roadmap, with features like DirectCLOUD and VirtualPNI-support, has been agreed upon and committed to.



During 2019, two additional patch robots were implemented at Interxion in Frankfurt, and these were named Sir Patchalot and Margaret Patcher by the DE-CIX community. These join the first patch robot, Patchy McPatchbot, in supporting the fast and effortless provisioning of ports. Through the use of the robots, a port can be provisioned in just a few minutes, without the need for a technician to actually be physically present.

As initial steps towards automation, these three projects help to simplify the ordering and provisioning process, and offer customers greater insights and control over their interconnection services. However, this is just the beginning: DE-CIX is on a journey towards greater automation and more simplified customer service.



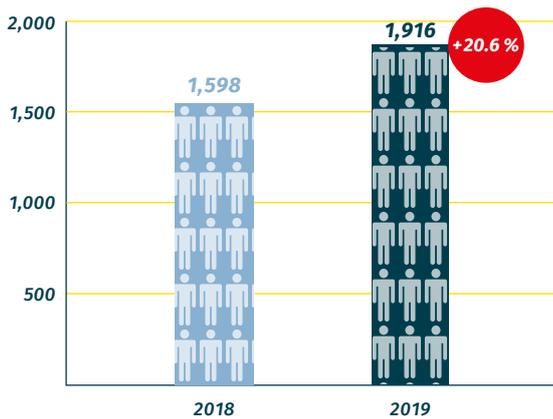
***DE-CIX Global and
Regional Growth 2019***

DE-CIX Global and Regional Growth in 2019

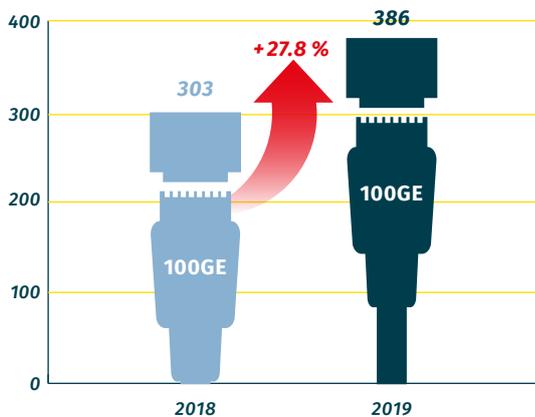
In 2019, DE-CIX experienced further growth across all regions and business units. In addition to announcing its market entrance in South East Asia, DE-CIX extended the reach of its existing locations by setting up more enabled sites and more access sites where networks can connect. Based on growing interconnection needs, DE-CIX developed 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 at the 20 Internet Exchanges operated by DE-CIX around the world during 2019.

DE-CIX's success globally and in the various regions in 2019 speaks for itself. Already the world's leading provider of premium interconnection services, DE-CIX enjoyed more than 20% growth in customers globally in 2019, bringing the total figure to over 1900 customers. Continued growth in excess of 25% in 100G ports was also in part responsible for the 21% growth in connected customer bandwidth, which reached a massive 55 Terabits during the year.

DE-CIX Global Total Customers



DE-CIX Global Total 100GE Ports



DE-CIX Global Total Customer Bandwidth (Terabits)



Andreas Sturm
Chief Business Development
Officer

Significant growth in the home market of Germany

In the home market of Germany, total customer numbers connected to DE-CIX exchanges grew by 12.6% to well over 1000 in 2019. In addition, more and more companies outside DE-CIX's classical customer base approached DE-CIX directly to get connected, examples being a major international automotive manufacturer and a large German-wide chain of retail stores, both enterprises having joined DE-CIX to avail themselves of cloud services and peering, taking advantage of the new service InterconnectionFLEX, which was launched in October 2019. A range of key industry customers increased their connected capacity at the German exchanges in 2019, and several major global networks are now also available at the regional German DE-CIX locations.

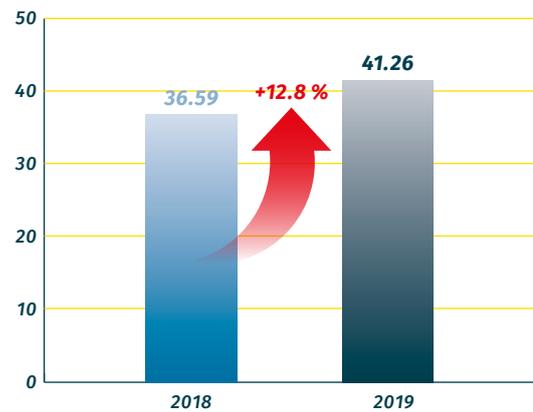
DE-CIX Frankfurt setting new world records

In 2019, Frankfurt continued its record-breaking streak. A significant milestone was achieved by exceeding the number of 900 ASNs. The connected customer bandwidth rose 12.8% to over 41 Terabits. Further growth was achieved in Frankfurt through upgrades, with existing customers ordering 128 upgrades across all services in 2019. DE-CIX Frankfurt also set new peak traffic world records: in September breaking the data throughput-mark of 7 terabits per second (Tbit/s), and in December hitting 8.1 Tbit/s. Four new enabled sites were connected to the Frankfurt exchange during 2019, e.g. adding the Rhine-Neckar Region to DE-CIX Frankfurt.

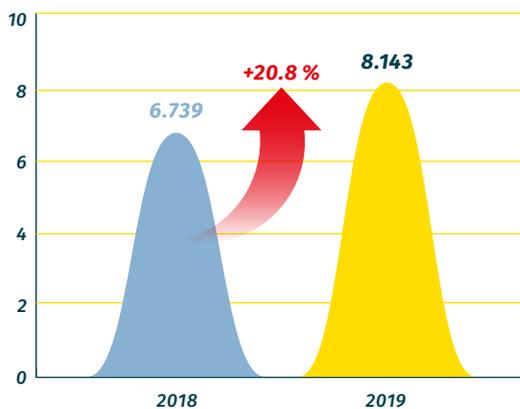
DE-CIX Frankfurt Connected Networks



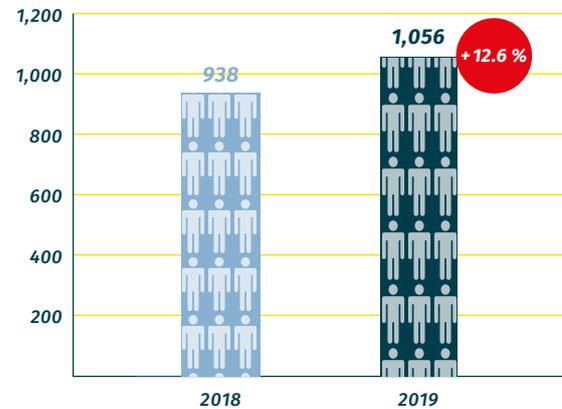
DE-CIX Frankfurt Total Customer Bandwidth (Terabits)



DE-CIX Frankfurt Peak Traffic (Tbit/s)



Germany Total Customer Growth

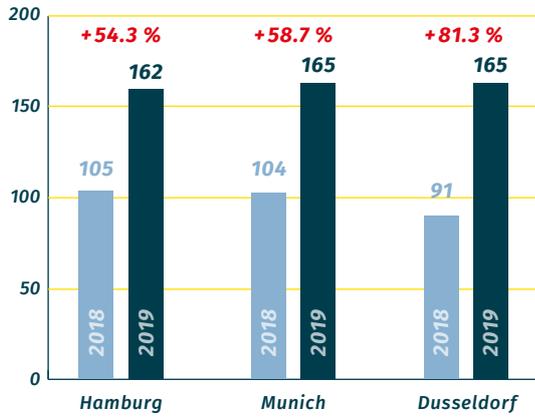


Getting closer to the edge in regional Germany

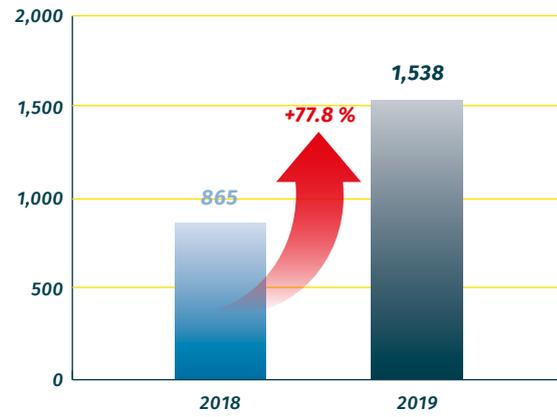
However, the success of DE-CIX Frankfurt should not eclipse the exciting developments in regional Germany. The regional exchanges experienced aggregated growth of over 50% in customers and nearly 80% in connected customer bandwidth. Munich established a further DE-CIX-enabled site located in Austria, the first DE-CIX exchange to have an enabled site in a different country. Both Hamburg and Munich individually enjoyed growth of more than 50% in ASNs (Hamburg at 54%, and Munich at close to 59% growth), while Dusseldorf exploded, with over 80% growth in ASNs, allowing it to catch up with its regional counterparts for the first time. This positive growth in regional networks is indicative of the success of the DE-CIX strategy of bringing networks closer to the edge, and of the popularity of the DE-CIX GlobePEER Remote service.

Hosting important IT industry events like the ISP and Carrier Lunch, DE-CIX Round Tables, and TechMeetings also supported the growth of the German regional exchanges. Such events bring the community together, promote the ongoing exchange within the community, and build awareness for DE-CIX's role and its work.

German Regional Exchanges Connected Networks



German Regional Customer Bandwidth (Gbit)



DE-CIX international business is growing fast

Globally, DE-CIX was successful across the board in 2019. Milestones were achieved for the exchanges in North America, Southern Europe, the Middle East, India, and South East Asia. Customer numbers at the individual exchanges grew by over 30%, an aggregated increase of 203 customers to the established and developing DE-CIX locations around the world.

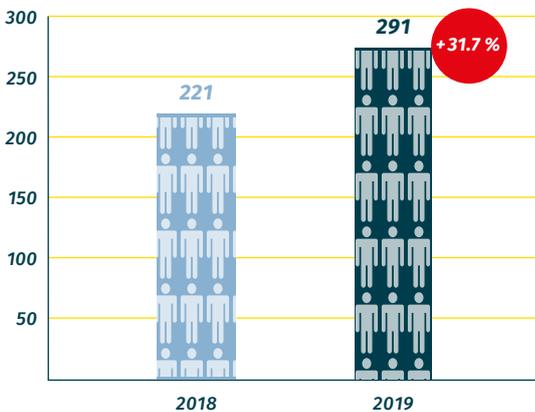


Ed d'Agostino
Vice President DE-CIX North America

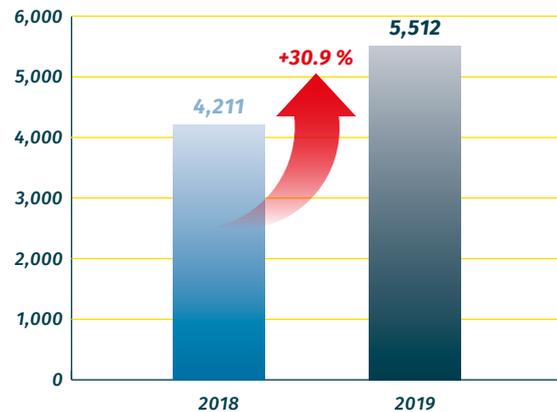
North America

By the middle of the 2019, DE-CIX North America Inc. had already crossed the break-even point and the business year was concluded positively overall. DE-CIX North America grew strongly, with more than 30% growth in customer numbers and customer bandwidth. Both locations, DE-CIX New York and DE-CIX Dallas, gained one new DE-CIX-enabled site in 2019.

DE-CIX North America Customer Growth



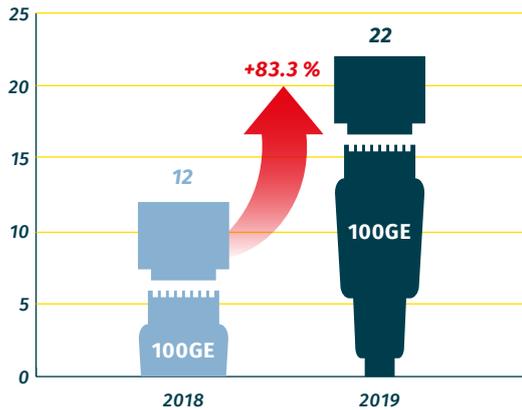
DE-CIX North America Total Customer Bandwidth (Gbit)



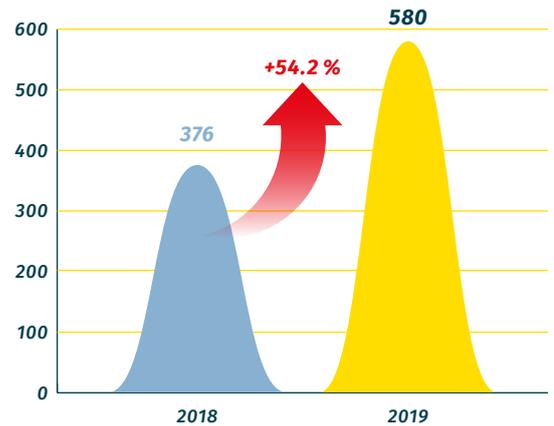
DE-CIX New York

DE-CIX New York, which celebrated its 5th birthday in 2019, hit a landmark with a peak traffic of 580 Gbit/s (up 54%) and is currently ranked number five of all IXs in the US. Customers at the exchange increased by close to 30%. The popularity of the 100G ports continued to have a strong impact, with orders nearly doubling during 2019, and customer bandwidth increasing by a quarter.

DE-CIX New York 100GE Ports



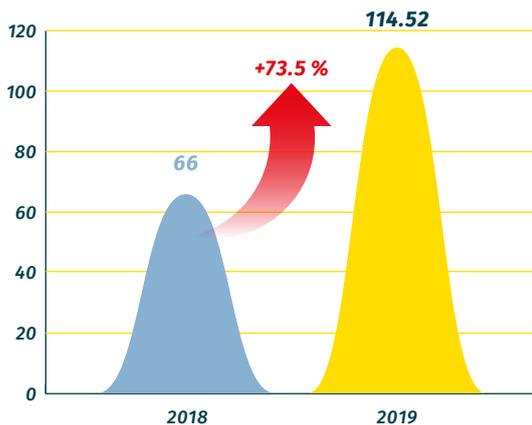
DE-CIX New York Peak Traffic (Gbit/s)



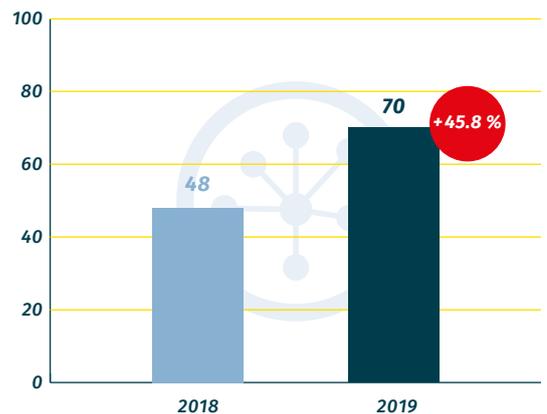
DE-CIX Dallas

DE-CIX Dallas has now been placed in the top 20 list for IXs in the US, and is the largest Open-IX certified and first data center-neutral Internet Exchange in Dallas. The exchange experienced an increase in peak traffic of 74% in 2019, rising to 114.5 Gbit/s. 100G port orders began to take off, and customer bandwidth grew by over 65%. Customer numbers and ASNs both increased by 45%, ending the year with 70 networks connected to the exchange.

DE-CIX Dallas Peak Traffic (Gbit/s)



DE-CIX Dallas Connected Networks



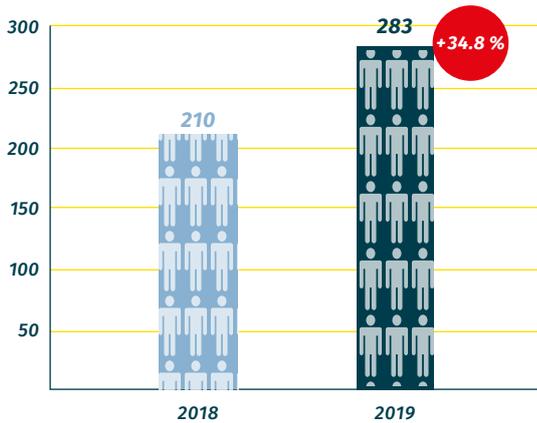


Theresa Bobis
Regional Director South Europe

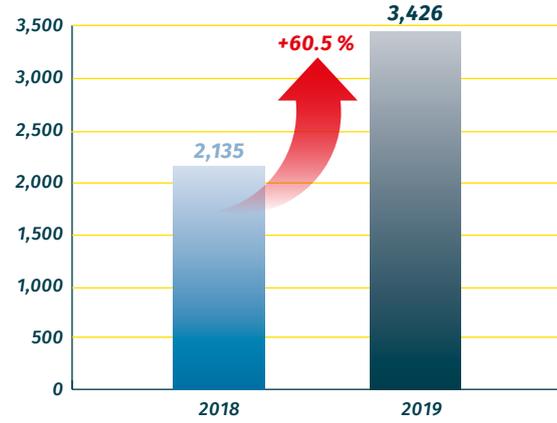
Southern Europe

DE-CIX's Internet Exchanges in southern Europe (Lisbon, Madrid, Marseille, and Palermo) enjoyed further success and substantial growth in 2019. The region experienced total growth in customers of almost 35%, with an increase of 60% in customer bandwidth.

DE-CIX Southern Europe Customer Growth



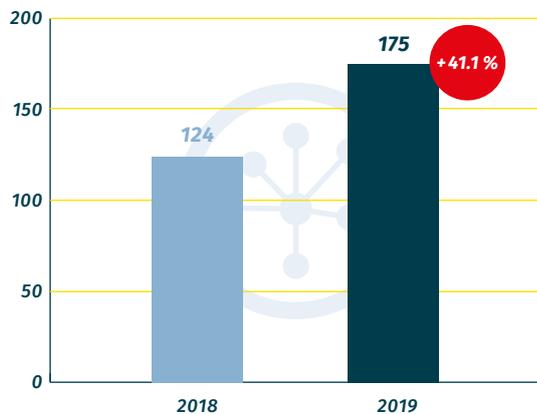
DE-CIX Southern Europe Customer Bandwidth (Gbit)



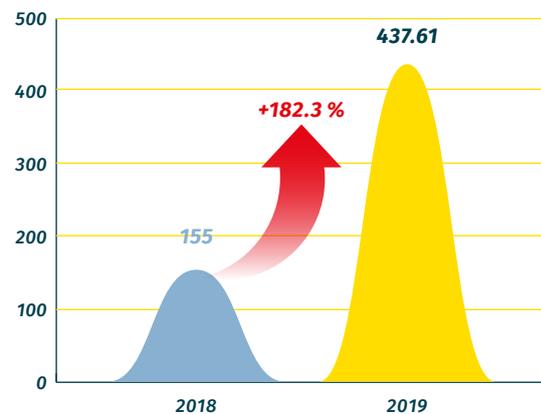
DE-CIX Madrid

DE-CIX Madrid, the flagship IX in southern Europe, continued to enjoy strong growth. With 175 connected ASNs (up 41%) in just four years of operation, and peak traffic nearly tripling in 2019 to reach 437 Gbit/s, it has exceeded all expectations. Growth was also achieved through upgrades, with a further 30 orders made across all services at DE-CIX Madrid in 2019. The GlobePEER Remote service was launched at DE-CIX Madrid in 2019, connecting the exchange to the other DE-CIX exchanges.

DE-CIX Madrid Connected Networks



DE-CIX Madrid Peak Traffic (Gbit/s)



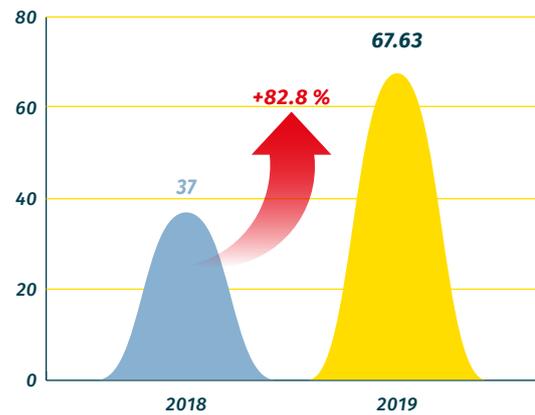
DE-CIX Marseille

ASNs in Marseille grew by over 33% in 2019, resulting in more than 90 connected ASNs by the end of the year. Customer bandwidth increased by over 28% during the year, and peak traffic almost doubled, reaching 67.6 Gbit/s. A GlobePEER Remote connection between DE-CIX Marseille and UAE-IX in Dubai was also launched in 2019.

DE-CIX Marseille Connected Networks



DE-CIX Marseille Peak Traffic (Gbit/s)



DE-CIX Palermo

Meanwhile, at DE-CIX Palermo, customer bandwidth grew by more than 60%. The GlobePEER Remote service was launched at DE-CIX Palermo, connecting it to the other DE-CIX exchanges.

DE-CIX Lisbon

DE-CIX Lisbon, launched early in 2019, took off rapidly and by the end of the year already had close to 30 connected networks. With 60% of these coming from West Africa, Lisbon has opened the gateway for African networks to southern Europe. In addition, DE-CIX launched its GlobePEER Remote service in Lisbon in 2019.



Maxim Pozdnyakov
Regional Director Northern & Eastern Europe

DE-CIX Moscow powered by MSK-IX

In March 2019, DE-CIX and MSK-IX, the leading IX operator in Russia, launched a partnership. The two strategically important IXs were successfully interconnected, and DE-CIX customers worldwide are able to peer remotely with more than 400 ASNs actively peering at MSK-IX.

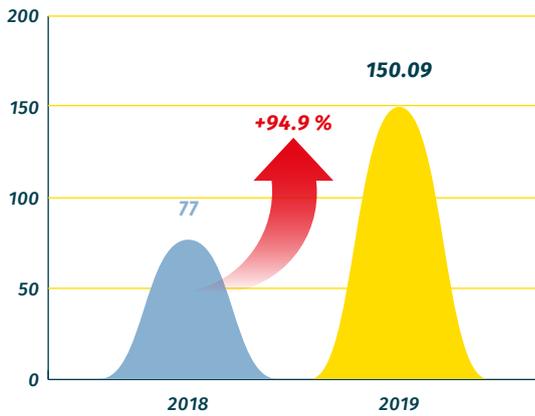


Bülent Şen
Regional Director Turkey

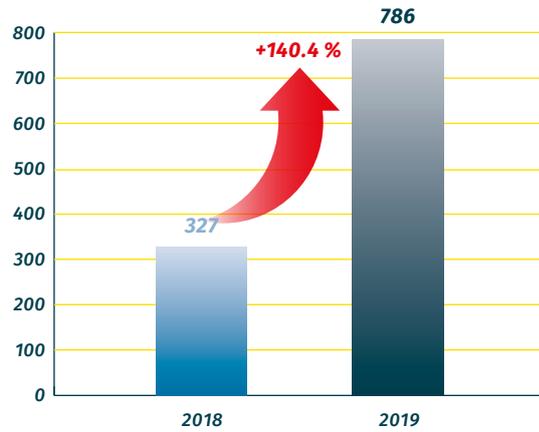
DE-CIX Istanbul

DE-CIX Istanbul enjoyed more than 55% growth in ASNs during 2019, and almost doubled its peak traffic during the year, up 94% to reach 150.9 Gbit/s. The exchange connected its first 100G customer early in 2019, with further 100G ports sold during the year. As a result, connected customer bandwidth also grew strongly in 2019, increasing by 140%. The number of customers using the GlobePEER Remote service to DE-CIX Frankfurt doubled during the year.

DE-CIX Istanbul Peak Traffic (Gbit/s)



DE-CIX Istanbul Customer Bandwidth (Gbit)

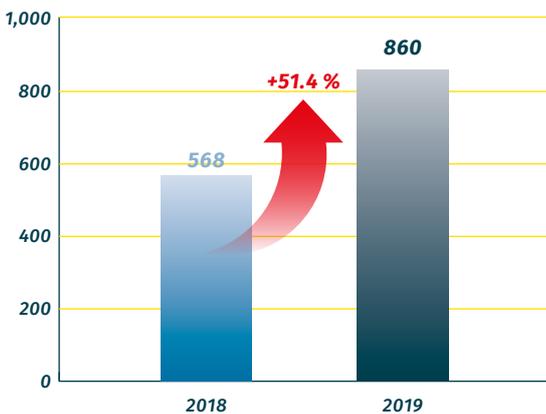


Marco Brandstaetter
Regional Director Middle East & India

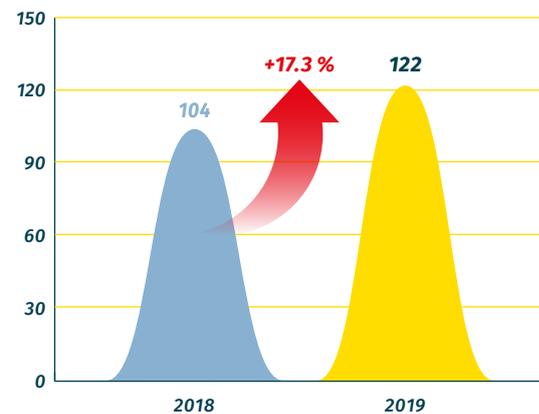
UAE-IX powered by DE-CIX

UAE-IX in Dubai was upgraded to the Apollon advanced platform in 2019. This allowed the introduction of the access and service model, giving connected networks access to the full range of DE-CIX services. This includes access to cloud service providers with the DirectCLOUD service, as well as the possibility to peer with networks at DE-CIX Marseille using GlobePEER Remote. UAE-IX experienced significant growth in 2019 through customer upgrades, with connected customer bandwidth increasing by more than 50% during the year. There was a 44% rise in the number of 10G ports sold. Data exchanged via the IX also saw an increase, with peak traffic rising by 17% to 122 Gbit/s.

UAE-IX Customer Bandwidth (Gbit)



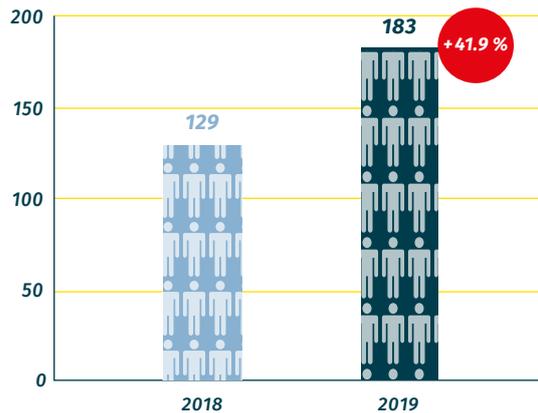
UAE-IX Peak Traffic (Gbit/s)



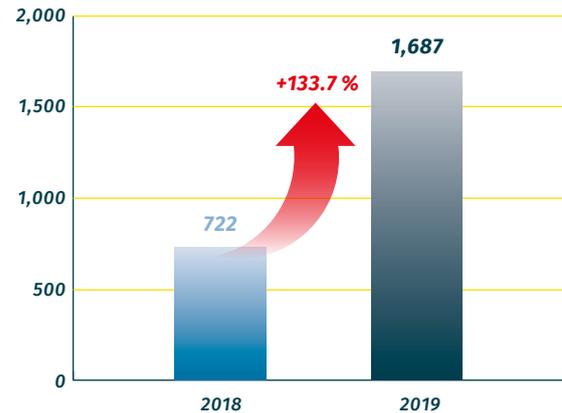
DE-CIX India

Mumbai-IX grew strongly during 2019. Customer numbers increased by more than 40% during the year, and connected customer bandwidth more than doubled, rising to nearly 1700 Gbit/s. By the end of 2019, the exchange had over 180 ASNs. In addition to Mumbai, three new locations were launched in India in the first half of 2019: Chennai, Delhi, and Kolkata.

Mumbai-IX Connected Customers



Mumbai-IX Customer Bandwidth (Gbit)



Frank Orłowski
Vice President
Corporate Development

South-East Asia

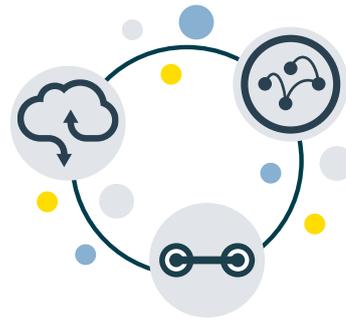
In 2019, DE-CIX entered South East Asia, announcing its market entrance by creating a joint venture with the local technology group “Starwing Technology”. The new joint venture company “DE-CIX Malaysia” will collectively take over the Johor Bahru Internet Exchange (JBIX), which is the most recent Internet Exchange in Malaysia. It is located in Johor Bahru, the southern-most city of the Malaysian Peninsula and in close proximity to Singapore.

DE-CIX Malaysia

DE-CIX Malaysia will operate two Exchanges: “DE-CIX Kuala Lumpur” – serving providers in the Kuala Lumpur and Cyberjaya metro markets – and DE-CIX Johor Bahru, powered by JBIX – serving the metropolitan market of Johor Bahru. With these new locations, DE-CIX has established a first strong foothold in the ASEAN region.



Dr Christoph Dietzel
Global Head of Products &
Research



New interconnection services

When it comes to DE-CIX interconnection services, the year 2019 brought some exciting innovations. Always at the forefront of the digital revolution, DE-CIX is constantly developing new services in order to make interconnection easy for everyone. Newly launched services of the year 2019 were:

- **FlexPOP:** The service offers carriers the chance to use DE-CIX's infrastructure as if it was 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.
- **InterconnectionFLEX:** This service was designed especially for enterprises and includes several DE-CIX service components like GlobePEER, GlobePEER Remote, DirectCLOUD and Virtual PNI, as well as consulting. The whole package is very flexible and thereby allows a customized solution.
- **Closed User Groups:** DE-CIX's interconnection system can be used to establish dedicated user groups as logically separated services. These Closed User Groups can either be used for exchanging data only with selected, trusted partners, or for a dedicated service.
- **Microsoft Azure Peering Service:** 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.

Existing interconnection services

- **DirectCLOUD:** This service was implemented at further international locations in 2019 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. By the end of 2019, DE-CIX partners had built up 830 Gbit total capacity for the use of cloud connectivity. More than 50 cloud providers are connected in Frankfurt alone, and the service is now not only available at DE-CIX directly, but also via more than 30 certified DirectCLOUD data centers and via over 35 certified DirectCLOUD ISPs.
- **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. In 2019 there was a 50% growth in orders, with the most heavily-booked connections being 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.



Melanie Kempf
*Director Global Partner
Relations*



Partner Program

At DE-CIX, we strongly believe that the way forward in our business is highly dependent on our partnerships with all kinds of partners from the industry. DE-CIX has always been the place “where networks meet”, and the premise has always been working together with our partners and customers to grow business in a mutually beneficial way. As a result, work was also continued on different forms of partnerships in 2019. Data centers and cloud service providers, ISPs, carriers, and of course also our reseller partners, play an important role in this segment. DE-CIX has been looking into various other potential partnerships as well.

At the same time as expanding our range of partnerships, DE-CIX also acknowledges and supports our existing and strong reselling partners. These partners were responsible for bringing in almost 1,000 orders of DE-CIX services in 2019, sold to their customers across all Internet Exchanges. The top three resellers in 2019 were Angola Cables, Core-Backbone, and GlobeNet. Whether it is GlobePEER, GlobePEER Remote, DirectCLOUD or our Virtual PNI service, it fills DE-CIX with pride to see that our reselling partners are happy to enrich their portfolio with our interconnection services.

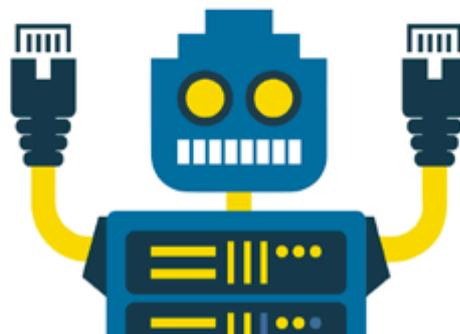
Top 3 Resellers in 2019



angola
cables

CORE
BACKBONE

globenet





Financial Results



Sebastian Seifert

Chief Financial Officer, DE-CIX Group AG

Financial Results

The DE-CIX Group performed very well in the 2019 financial year and was able to achieve an increase in revenues of more than 10%, by expanding their global IX presence and adding new interconnection services to the product portfolio.

In the consolidated annual financial statement for 2019, the global revenue of all company parts grew by 11 percent to 39.6 million Euro, in comparison to the previous year's 35.7 million Euro. Revenues

from international activities jumped by 29 percent in comparison to 2018, and represented 15 percent of total revenue in 2019. The EBIT for 2019 amounted to 3.3 million Euro and the EBITDA to 4.9 million Euro. In the 2019 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 2019.

DE-CIX Global Consolidated Profit and Loss Account 2019

<i>In thousands of EUR</i>	2019	2018
Revenue	39,571	35,704
Inventory Change	50	0
Operating Result	39,621	35,704
External Services / Cost of Goods	-91	0
Gross Income	39,530	35,704
Other Operating Income	480	503
Personnel Costs	-10,148	-8,778
Depreciation	-1,575	-2,036
Other Operating Costs	-24,997	-23,186
Operating Result/EBIT	3,290	2,207
Financial result	-40	48
EBT	3,250	2,255
Tax	-1,153	-933
Annual Profit/Loss	2,098	1,322
For information: EBITDA	4,865	4,243



DE-CIX 25 YEARS





From Frankfurt to the world – 25 years of interconnection excellence

From an old post office to the world's leading interconnection provider: 25 years after being founded in 1995, DE-CIX continues to grow worldwide. Without DE-CIX and its connected networks, the development of the Internet in Germany and worldwide would have been an entirely different story.



“Back in 1995, Frankfurt was already established as Germany’s telecommunications capital.”

DE-CIX Frankfurt: The heart of the German Internet

From Frankfurt to Madrid, Dubai, over New York to Kuala Lumpur: Since 1995, the development of DE-CIX has been a global success story. Its place of birth? A switch in an old post office in Frankfurt – so to speak the heart of the German Internet. In this very spot 25 years ago, the interconnection of three Internet service providers, MAZ (Hamburg), EUnet (Dortmund), and XLink (Karlsruhe), led to the foundation of DE-CIX. On the second floor of the post office, the founders met to drive global interconnection – without which, today’s digitalization milestones would never have been achieved.

“In 1995, Frankfurt was already established as Germany’s telecommunications capital. The financial industry there, naturally, was and is very interested in fast information exchange. That is the reason why numerous carriers were already in Frankfurt back then. And fast information exchange was exactly what we could offer our customers,” says co-founder Arnold Nipper, now Chief Technology Evangelist at DE-CIX. This still holds true today, 25 years after DE-CIX was founded.

“Peering has significantly influenced the development of the Internet in Germany.”

We make interconnection easy. Anywhere.

The groundbreaking mission of DE-CIX remains valid to this day: We make interconnection easy, anywhere. Until 1995, data streams between different German providers had to cross the Atlantic twice – even when sender and receiver were only a few kilometers apart. “Whether we’re talking about 1995 or 2020: The basic systematics of peering have not changed,” says Andreas Sturm, Chief Business Development Officer. “Internet service providers, network operators, content delivery networks, carriers, and companies exchange their data traffic in this cost-neutral way. They use our Internet Exchanges to transport data from one network to another and finally to the end-user via the fastest route.” However, although the basic concept remains the same, the technical infrastructure has changed massively. Transfer speed is one example: “25 years ago, the standard connection at DE-CIX was a 10 Mbit/s line via Ethernet. Today, this has increased ten-thousand fold to 100 Gbit/s. If desired, even up to 400 Gbit/s is possible,” says Wolfgang Tremmel, Head of the DE-CIX Academy.

“Without you – our partners, customers, employees and other visionaries – we would not be where we are today.”

Without you, we would not be where we are today

One of the most important factors that has driven the development of DE-CIX over the last 25 years is the interconnection ecosystem that emerges and grows around DE-CIX Internet Exchanges. In 1999, the number

of connected networks at DE-CIX had already grown so rapidly that the Cisco switch used at that time had to be moved out of the post office and into the Interxion data center on Hanauer Landstrasse, Frankfurt. Only two years later, a second switch with redundant fiber and electricity connection was installed there. "At that time, Interxion was not a data center in the classic sense," says DE-CIX co-founder Harald Summa, who now heads DE-CIX as CEO. "But we got along well with each other right away and were able to get six carriers into the building within half a year. What already became apparent here has determined our entire company history ever since: Without you – our partners, customers, employees, and other visionaries – we would not be where we are today."

"It was a major relocation of over 450 customers during live operations – open-heart surgery on the Internet."

Enormous growth rates – and open-heart surgery at the center of the Internet

From 2000 onwards, the growth of DE-CIX continued. In 2003, a third site was opened in Frankfurt, another one three years later. In the following years, further Internet Exchanges followed in Hamburg, Munich, and Dusseldorf. This development has not lost momentum even today. "In 2018, we reached another milestone with our new site at the Kleyerstrasse campus in Frankfurt," reports Harald Summa. "It was a major relocation of over 450 customers during live operations – the technological equivalent of open-heart surgery." More than 15 kilometers of fiber optic cable were laid during the migration. Patchy McPatchbot, the world's first patch robot created and used by an Internet Exchange, turned out to be of great assistance: Patchy automatically takes care of provisioning ports for customers, and has been of great service since its inception. It has proven so successful that two more patch robots have been added to the DE-CIX team in the meantime. But even with the most modern technology: Without the skills and determination of the employees, accomplishing mammoth tasks like these would not have been possible.



"DE-CIX now operates Internet Exchanges in Europe, North America, the Middle East, India, and Asia – and continues to grow!"

DE-CIX goes global: 500+ access points worldwide

Parallel to continued expansion in Frankfurt and the establishment of further IXs in Germany, in 2012, DE-CIX opened the Internet Exchange UAE-IX in Dubai. This was the firing shot of the starting gun for a dynamic process of internationalization, which reached a further peak in 2015 with the establishment of DE-CIX New York. "We entered the US market highly motivated and passionate about our pioneering model," remembers Ivo A. Ivanov, CEO DE-CIX International. "For me, New York is pure energy – the whole region is bursting with innovative power. That is why we wanted to ensure that this market can also benefit from best-in-class interconnection services." This move was particularly successful – as can be seen in the 220+ networks that are now connected there, making the Internet Exchange the fastest growing IX in the entire region. Meanwhile, DE-CIX maintains further Exchanges in the Middle East, India, and South East Asia, next to the IXs in Europe and North America – and continues to grow!

"Without outstanding interconnection, technologies like the Internet of Things or autonomous driving cannot be realized."

Data throughput that sets a new world record

In Germany, DE-CIX currently handles a large portion of the peering traffic. A new world record was set at DE-CIX Frankfurt with data throughput of more than 8.1 terabits per second in December 2019. "This record is not due to a single event," explains Chief Technology Officer Dr. Thomas King. "It is the logical consequence of the increase to more than 950 networks connected at DE-CIX, as well as the fact that in the winter season, more people use digital services such as streaming services. Milestones like the 8.1 Tbit/s in December would not be possible without this content."

***“To us, where networks meet
is where people meet.”***

***Minimal latencies are paving the way for the
future***

Due to the ongoing transformation in digital enterprises, the shift of data and computing processes to the cloud, streaming in increasing resolutions, and new fields of technology such as 5G, artificial intelligence, or the Internet of Things, data traffic is currently increasing at an astonishing rate. “Without outstanding interconnection, technologies like the Internet of Things or autonomous driving cannot be realized. Our infrastructure enables us to distribute loads at peak times, minimize the risk of downtimes, reduce latencies, and help our customers to scale their business models,” says Andreas Sturm. Minimal latencies are particularly important for future technologies. “It’s less about volume than about quality. The closer you are to the client physically, the shorter the data packet runtimes.” That is why DE-CIX is increasingly present in Germany and beyond – be it through company-own facilities or partnerships, e.g. in Berlin and Moscow. At the same time, the reach of the individual Internet Exchanges is expanding – not only in Germany, but also on a global level.

The human being at the heart of the Internet

“Our goal is to further improve the Internet ecosystem and facilitate access to it,” emphasizes Ivo A. Ivanov. “Our motto Where networks meet can be translated into the motto Where people meet. Why? Because our work is always about communication and people.” For all the technical excellence, one thing is certain: Without the billions of users of the Internet and all the players who make the Internet possible in all its varieties, the heart of the Internet would be different. Certainly, it would not have its current potential to connect people, make information accessible, and enable new technologies.

**WITHOUT
YOU
»» WE WOULD NOT
BE CELEBRATING
25 YEARS OF
OUTSTANDING
SUCCESS**



***A global lockdown
needs a digital unlocking***



Ivo Ivanov
Chief Operating Officer, DE-CIX Group AG

Strategic Outlook

In a time of crisis, a global lockdown needs a digital unlocking

We are at a very special moment in history right now. Never before in modern times have we seen such a global impact and a global response to a crisis, which largely ignores geopolitical borders. The COVID-19 outbreak and its repercussions have put cities, countries, entire regions on hold. The news each day brings new stories of economic hardship, of fear, and grief, peppered with signs of hope – hope for a cure, for a vaccine, for ways to work and earn a living whilst facing lockdown, hope for the time after the Corona virus has lost its capacity for destruction.

One saving grace of this crisis is that the global digital infrastructure – the terrestrial and mobile networks, the data centers, the undersea cables and the satellite connections that support the global Internet – is by now well enough developed for people in most countries to stay in constant contact despite isolation.

Lockdown does not mean shut-down

This means that, today, lockdown does not necessarily need to mean shut-down.

Where possible, people are finding ways to make the best they can of the situation. Companies that have sent their workforce into home office, keeping their staff in employment and their operations running. Logistics are being maintained, and retailers have been quick to offer delivery services for those unable to leave their homes. Freelancers are seeking creative new ways to make ends meet using digital tools, and communities are looking for ways to support local initiatives.

Digital communication is vital to this. It enables people to stay in contact with loved-ones they can't meet with. It enables children and students of all ages to continue with their education. It helps doctors to –

when appropriate – provide consultations and therapy via telemedicine to avoid unnecessary contact. Even the researchers who we all pin our hopes on finding a vaccine are using digital applications to remain in contact and share data in their efforts to understand the virus.

Digital applications are key to enduring the crisis

So digital applications that enable communication and collaboration are key to enduring the current crisis. Globally, we now see a very high demand for digital applications, and these are becoming crucial for enabling business and private life to function, not only in times of crisis. But even the best application cannot perform if the underlying digital infrastructure is not as solid, resilient, and secure as possible.

Of course, this is even more critical in the current situation, but it also highlights the general trend that, as our economy becomes more global, as our planet becomes home to more and more people, and as more regions need to be enabled in terms of communication, the only answer can be digitalization. Because otherwise it won't scale, and therefore won't work in the long run.

Digitalization – and therefore reliable digital infrastructure – is the only answer

Therefore, one answer to some of the challenges posed by the COVID-19 pandemic – and the modern world in general – is sophisticated digital infrastructure, because this allows the use of smart digital applications and solutions which will make people's lives better. In a globalized world, economic growth and the development of societies in most regions is now based on digital communication and digital services, and these in turn depend on the underlying digital infrastructure.

As a result, the interconnection community – more than ever before – must deliver continuous and high-performance connectivity: everywhere, for everybody, and for everything. This community, and

the infrastructure that they build and care for, is just as critical as other critical services in a crisis. It is essential that this digital infrastructure is as global, open (neutral), resilient, scalable and secure as possible, in order to deliver the many and varied services needed by people, institutions, and businesses.

As an element of this crucial digital infrastructure, Internet Exchange Points like DE-CIX are key to improving the quality of performance of digital applications and digital communication – for businesses, for medical facilities, for education, recreation/entertainment and for news and media outlets – for all users, wherever they are. Interconnection services need to allow communication to occur along the shortest route and in the most secure way.

Digital communication on the rise

These times of global lockdown are having a strong impact on how we interact with each other and how we behave, how we work and how we communicate with each other. As a global operator, DE-CIX's Internet Exchanges on four continents are all recording the same trend: Internet traffic is growing, together with demand for quality. While different regions are at different stages of development, depending on when the COVID-19 infections began to take off in their locality, the trend is valid from North America to Europe, to the Middle East, and on to the Indian sub-continent.

Three types of Internet traffic in particular have risen substantially: traffic from collaborative communication tools has doubled since the crisis began, as has traffic from streaming services. This is significant of both enterprises and the education sector migrating their activities online. Added to this, we see around a 50% increase in traffic from online gaming. Everywhere, we see a similar demand for reliable digital infrastructure.

Communication behavior will significantly change in the long term

Even before the current crisis, we were seeing huge investments in new streaming services. But what's happening now, in response to lockdowns around the world, will change the game in many areas of activity. The current transformation of attitudes, processes and systems will continue to echo through the post-Corona era. People are taking the time to keep in touch with their loved-ones on a more regular basis. To value the time they have together, despite the distance.

Many employers are looking into how remote working benefits business continuity and supports their employees to master challenges. But beyond this, decision makers are also beginning to recognize

the long-term benefits of a more profound digital transformation. Companies are taking a long, hard look at how they manage their offices, how staff interact, how teams collaborate, what business travel is actually essential, whether meetings can be reconceived to be more productive. They are becoming aware of how the move online can unlock the potential to save money and increase revenues.

This won't only have an effect in the short-term – it will be a game changer for business and private communication behavior, and is likely to lead to even higher usage of digital applications than we would have forecast in the pre-COVID-19 world. This is not to suggest that now everything will be digital only. Rather, that we need to recognize that we have options: processes should be reviewed, and we should learn from the times of crisis how to make our life better in general.

While the virus itself currently remains a serious threat, we are all doing what we can towards minimizing its impact, stopping its spread, flattening the curve, and finding a cure. But this crisis can also offer us a chance to re-evaluate, to see things differently. Right now, we are being forced to do that. Let's also take the time to learn to manage tasks more efficiently, operate more prosperously, discover successful modes of behavior in terms of business and private communication, which we can apply now and in the future.

Meaningful investment decisions should be made in the future

We have to learn out of this so we can make meaningful investment decisions in the future. Digital infrastructure is the enabler of this long-term transformation, and it helps to ease the pain of today's lockdown. The Corona crisis throws into stark relief the regions that have solid, reliable digital infrastructure, and those regions of the globe that remain underserved. The digital divide must be eliminated so that all communities can in future have access to information, access to digital communication tools, and access to digital content. The Internet industry must take as their mandate the goal of a minimum level of digital infrastructure everywhere.

Nothing will be the same after COVID-19. Not for humankind itself, not for how we do business or how we (inter)connect in this new decade. This century, like last century, is presenting us with global challenges. However, these challenges – though of a different nature – can also be transformed by people and businesses. The current global crisis will change our life going forward, and to survive in the present and prepare for the post-Corona future, this global lockdown needs a full digital unlocking.

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Harald A. Summa

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Keep in touch

phone +49-69-1730902-12
sales@de-cix.net
www.de-cix.net

Where
networks
meet