



Interconnection Quarterly

FOURTH QUARTER / 2020

INTRODUCTION

I am excited to reveal that my quarterly interconnection update has transformed into the Interconnection Quarterly, a hand-tailored, independent briefing on the interconnection industry. Right now, my plans are to publish the Interconnection Quarterly shortly after the last public companies report earnings, as I've done with the previous updates. This may change in the future, but for now, this is the plan.

In this inaugural issue, you'll find the latest financial and business metrics for select data center operators and interconnection platforms, as well as insights into key developments and newsworthy events that occurred within the fourth quarter of 2020.

We're at an important juncture for interconnection, and while it still may be seen by some as just a basic service that a data center or colocation provider must offer, the truth is, that interconnection is much more important.

From cross-connects to cloud networks, the constant here is in the connection. How that connection is established and what you can do with it is what's changing as we adapt to a world powered by software in the cloud.

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MARKET ACTIVITY

OCTOBER 2020

KEY DEVELOPMENTS

- **The Wells Building is Acquired**
1547 Data Centers along with Harrison Street acquired the Wells Building in Milwaukee. The facility stands at 324 E. Wisconsin Ave and was once home to Western Union Telegraph, just like 60 Hudson—but smaller. The building serves as Milwaukee's primary interconnection point, however, most interconnection occurs in Chicago, given its proximity.
 - **Cogent Launched the Global Peer Exchange**
Cogent launched the Global Peer Exchange, a virtual network fabric that leverages the company's broad footprint in over 1,300 data centers to allow customers to connect with each other, on-demand with consumption-based pricing.
 - **Equinix Fabric Extends Beyond Four Walls, Again**
DRFortress tied into the Equinix Cloud Exchange Fabric, which has since been renamed to the Equinix Fabric, to bring cloud connectivity to customers in its Hawaii data center. The interconnect with Equinix occurs in Los Angeles.
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OTHER NEWS

PCCW Console Connect expanded aggressively, adding a number of cloud on-ramps with Oracle and Anexia Cloud, as well as 9 new enabled data centers in Europe, 1 in each of North and South America, 2 in Africa, 1 in Cambodia, and 13 in Hong Kong.

OVH launched a direct cloud interconnect product with Equinix and Megaport as initial partners.

Flexential launched an edge solution in partnership with American Tower, offering interconnection between its facilities and micro data centers near tower sites. EdgePresence is providing the facilities for American Tower.

Lumen, formerly known as CenturyLink, launched self-service connectivity options for WAN and Internet connectivity.

Teraco enabled direct access to the Microsoft Azure Peering Service for customers who require internet-first access to the cloud.

MARKET ACTIVITY

NOVEMBER 2020

KEY DEVELOPMENTS

- **DE-CIX will Establish an Internet Exchange in Barcelona**
After launching DE-CIX Madrid in 2016, the company announced it will establish DE-CIX Barcelona, as it looks to create the world's largest network of independent Internet Exchange Points. DE-CIX Barcelona will be the 3rd Internet Exchange in Barcelona, with the others being Equinix Barcelona, and Catalunya Neutral Internet Exchange (CATNIX).
- **AMS-IX and Telecom Egypt Partner on Internet Exchange In Cairo**
Telecom Egypt and the Amsterdam Internet Exchange announced a partnership to create and launch an Internet Exchange Point in Cairo, Egypt (EG-IX). The IX will be the African country's 2nd, but the first neutral and independent IX. The Cairo Internet Exchange Point (CAIX) was been established in 2002 by the Ministry of Communications and Information Technology (MCIT) and is operated by the National Telecom Regulatory Authority (NTRA).
- **Digital Realty Acquired Lamda Helix**
Lamda Helix, the primary interconnection hub serving Athens, Greece was acquired by Digital Realty. The company continues to expand throughout Europe after its acquisition of Interxion, which was completed earlier in 2020.

OTHER NEWS

A number of new Internet Exchange Points launched in Indonesia, with Biznet Networks launching the Biznet Internet Exchange (BIX) in 6 locations throughout the country, and DCI Indonesia launching the DCI-IX.

Google Cloud added a new on-ramp in Boston at Markley's One Summer facility.

Equinix Cloud Exchange Fabric is now known as the Equinix Fabric, has enabled interconnection with Equinix Metal, and now allows Equinix Fabric customer's to connect to Non-Equinix Fabric customers.

(Continued)



MARKET ACTIVITY

NOVEMBER 2020

OTHER NEWS (CONTINUED)

PacketFabric and Cisco added on-ramps and enabled an integration for WebEx Edge Connect to allow virtual connections for customers looking to directly connect to Cisco's WebEx.

PCCW Console Connect continues its aggressive expansion strategy, enabling connectivity at more than 15 data centers, along with additional on-ramps to IBM and RingCentral, and Kaopu Cloud.

The Cameroon Internet Exchange Point (CAMIX) launched two locations in Cameroon, Africa.

LINX expanded into the Iron Mountain data center in Manassas, VA.

Epsilon added interconnections with Google Cloud on-ramps in Singapore.

PacketFabric raised an additional \$9.9M in an undisclosed funding round.

MARKET ACTIVITY

DECEMBER 2020

KEY DEVELOPMENTS

- **Google Cloud Launches More On-Ramps**

Google Cloud added a number of on-ramps throughout North America data centers, including Cologix Minneapolis, EdgeConneX Portland, and CyrusOne Aurora, Austin, Houston, San Antonio, and Council Bluffs.

- **France-IX Evolves its Footprint**

France-IX, the largest Internet Exchange platform in France, serving the Paris metropolitan area and Marseille announced it will acquire Rezapole, the operator of the LyonIX, which is the 5 largest IXP in the country. France-IX also announced it will begin to deploy in additional cities throughout France at a rate of 2 new cities per year over the next 2-3 years. The company also announced it will be splitting services from ports, allowing customers to add the specific services they need on the port, rather than having to buy an IX port along with additional ports depending on which services they required.

- **DE-CIX Won't Stop Growing**

DE-CIX brought its Internet Exchange to Chicago, IL and Richmond, VA, it's 3rd and 4th Internet Exchange Points in North America as it continues its global expansion. It launches in Richmond through the acquisition of the RVA-IX and will be available in both EdgeConneX and QTS data centers.

OTHER NEWS

Megaport launched port diversity at select data centers, allowing customers to create diverse physical connections.

GPX India (recently acquired by Equinix) announced a 5th internet exchange at its Mumbai campus with the addition of National Internet Exchange of India (NIXI)

ExtremeIX, an internet exchange operating in Mumbai, Delhi, Chennai, Hyderabad, and Kolkata, has expanded into 7 new data centers, with plans to be available in more than 30 locations in the country by the end of 2020

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MARKET ACTIVITY

DECEMBER 2020

OTHER NEWS (CONTINUED)

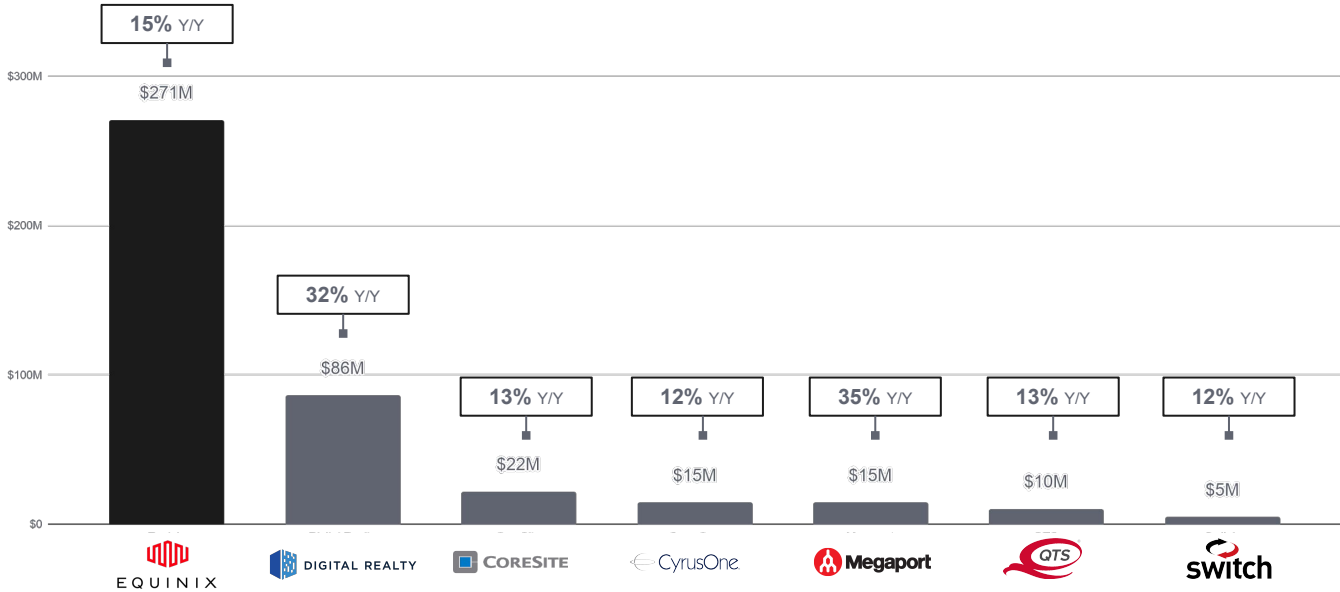
Colt and Equinix announced further integration to enable Equinix Fabric customers with on-demand interconnection capabilities, allowing them to connect to Colt's 29,000+ on-net locations.

PCCW ConsoleConnect launched Internet On-Demand, enabling customers to poison internet access through via its automated interconnection platform.

@Tokyo expanded its connectivity options through a new partnership with the Korea Internet Neutral Exchange (KINX) that will provide connectivity between the countries for respective customers.

DATA TRACKER

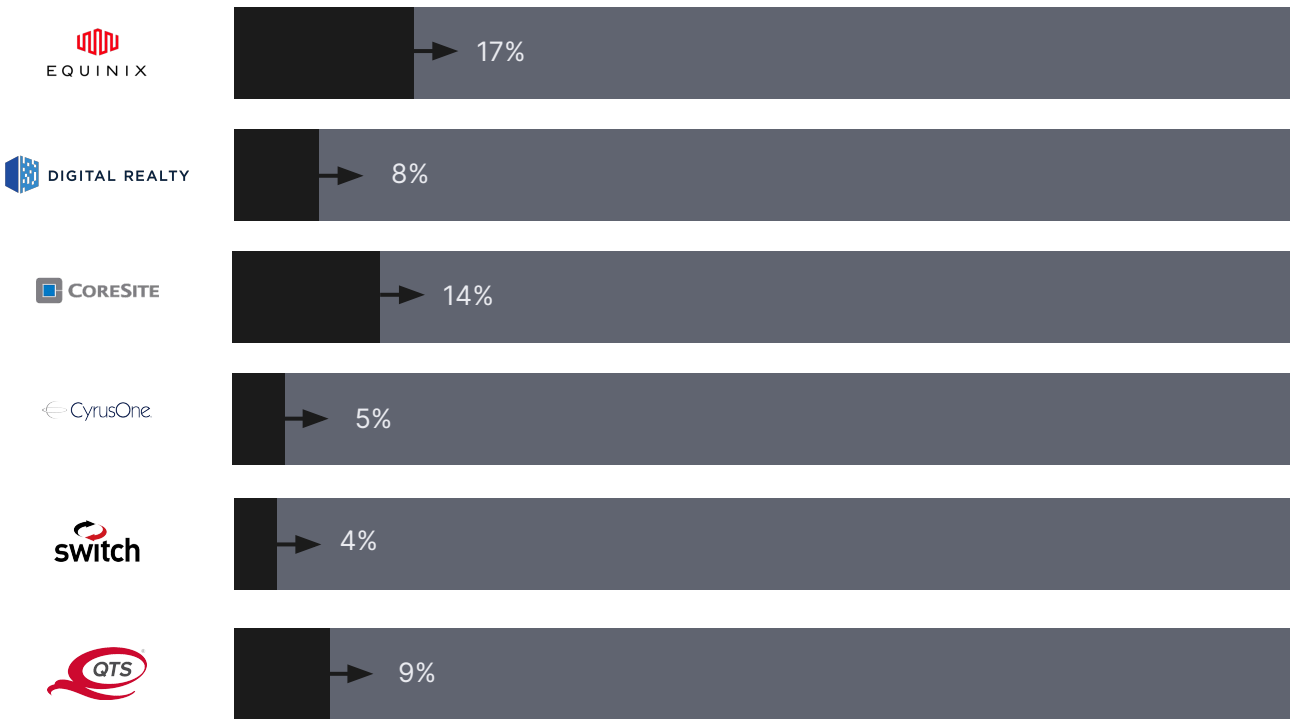
REVENUE - Q4 2020



Revenue (\$M)	2019	2020			
	Q4	Q1	Q2	Q3	Q4
Equinix	\$235M	\$242M	\$249M	\$261M	\$271M
Digital Realty	\$66M	\$70M	\$85M	\$86M	\$86M
CoreSite	\$19M	\$20M	\$21M	\$21M	\$22M
CyrusOne	\$13M	\$13M	\$14M	\$15M	\$15M
Megaport	\$11M	\$12M	\$13M	\$14M	\$15M
QTS	\$9M	\$9M	\$10M	\$10M	\$10M
Switch	\$5M	\$5M	\$5M	\$5M	\$5M
TOTAL REVENUE	\$353M	\$367M	\$393M	\$406M	\$419M

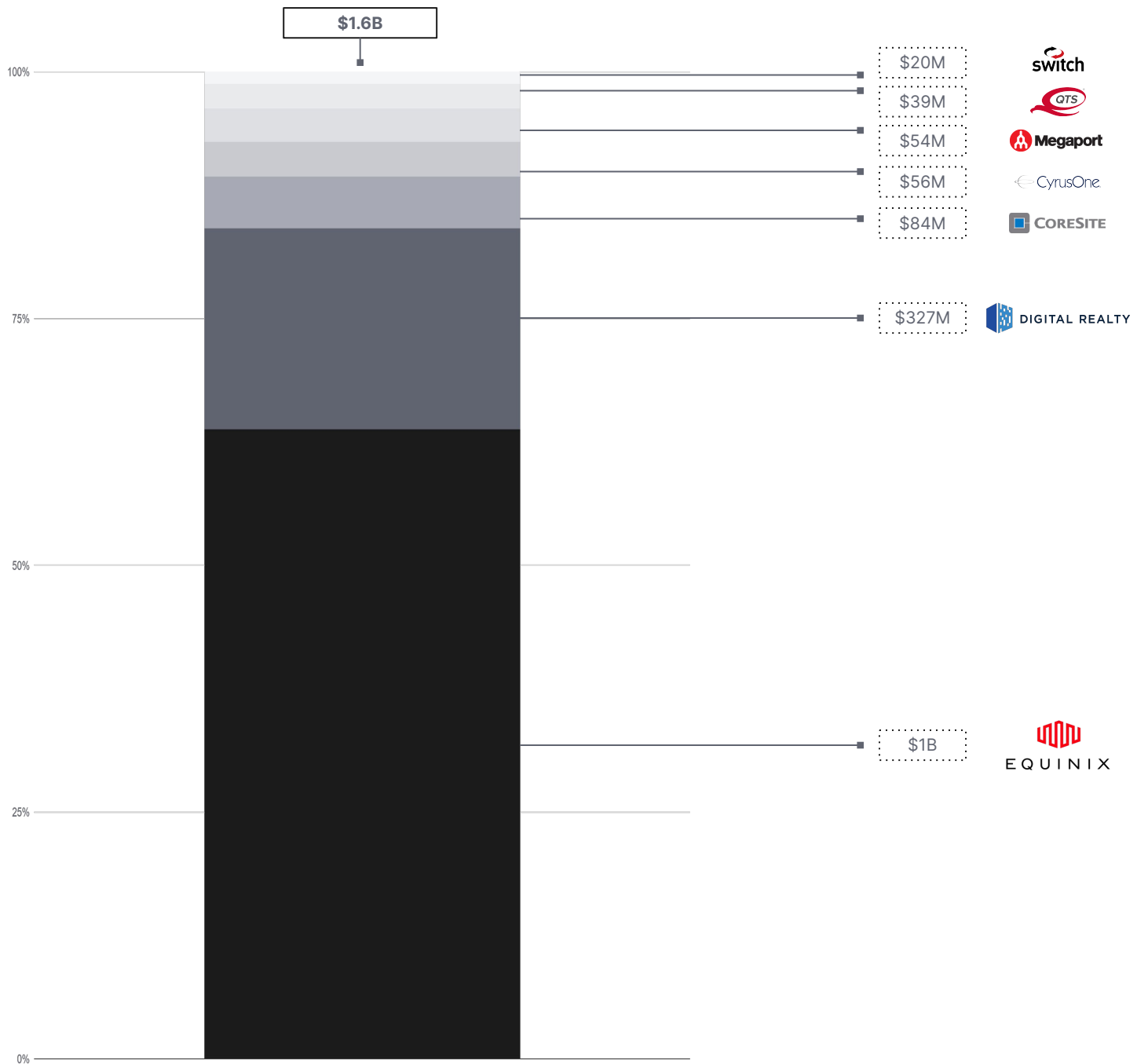
DATA TRACKER

INTERCONNECTION % OF REVENUE - Q4



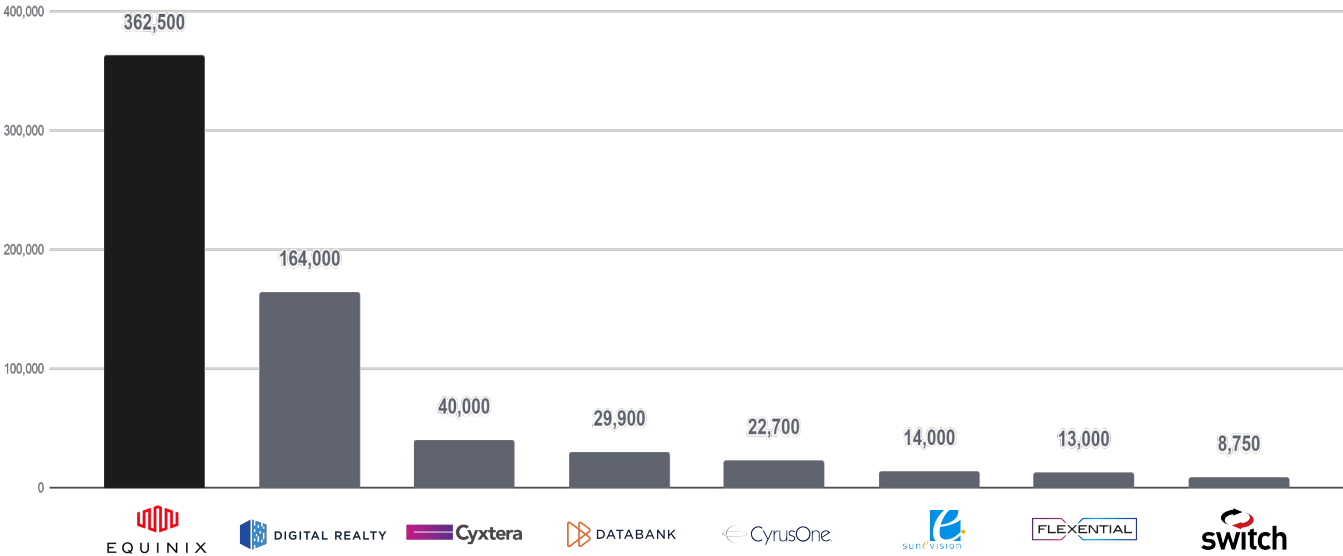
DATA TRACKER

REVENUE - FULL YEAR 2020



DATA TRACKER

CROSS-CONNECTS - Q4

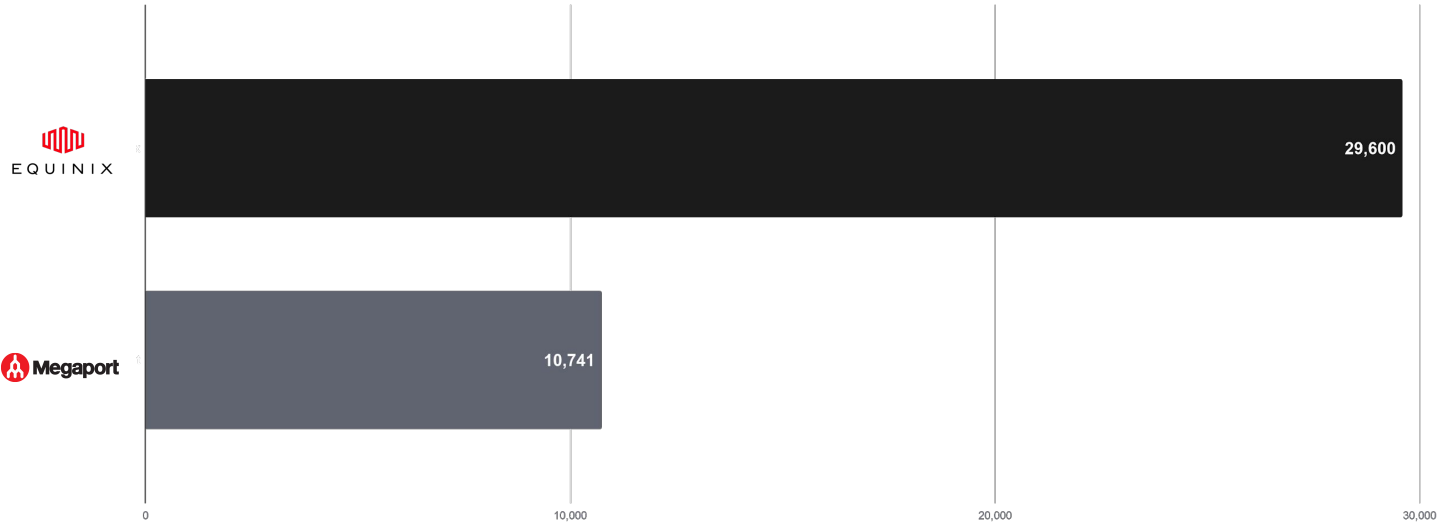


Cross Connects	2019	2020			
	Q4	Q1	Q2	Q3	Q4
Equinix	340,900	346,100	352,200	359,200	362,500
Digital Realty Trust	81,000	91,600	160,000	162,000	164,000
Cyxtera	0	0	0	40,000	40,000
DataBank	0	0	6,800	29,900	29,900
CyrusOne	22,000	22,700	22,700	22,700	22,700
SUNeVision	13,000	14,000	14,000	14,000	14,000
Flexential	0	0	13,000	13,000	13,000
Switch	6,500	7,500	8,000	8,500	8,750
TOTAL CROSS-CONNECTS	463,400	481,900	576,700	649,300	654,850

*A zero is reported for the periods prior to a company reporting metrics and the same number is reported in forward quarters for companies that do not report and have not updated the number that may have been found in conference or marketing materials.

DATA TRACKER

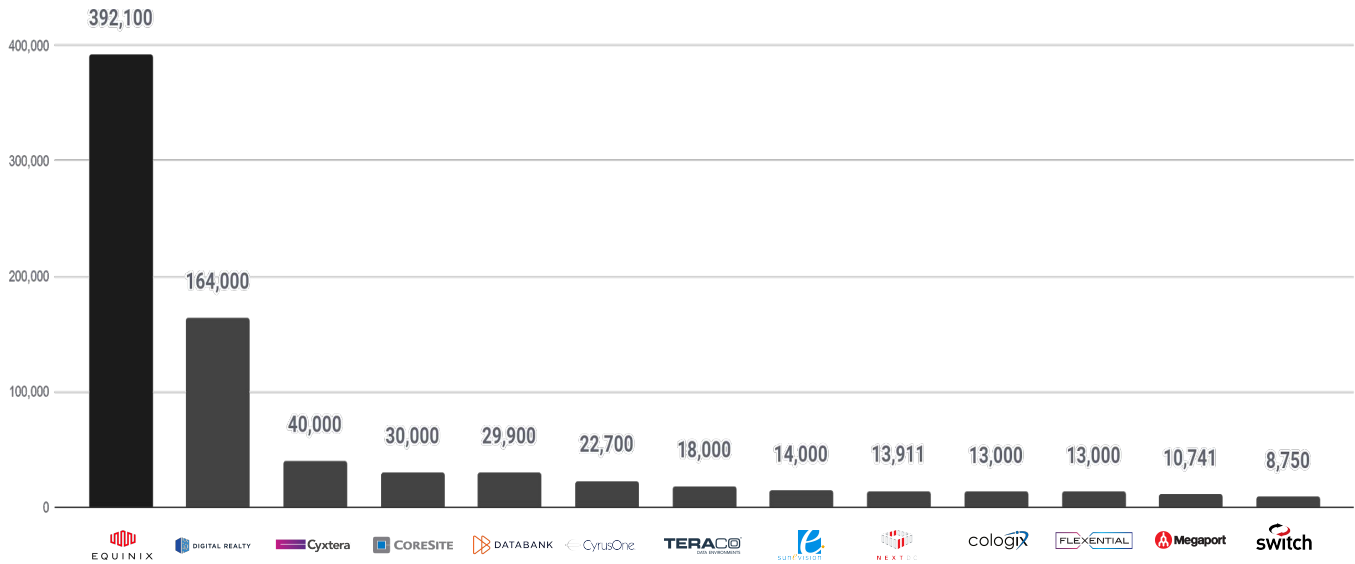
VIRTUAL CONNECTIONS - Q4



Virtual Connections	2019	2020			
	Q4	Q1	Q2	Q3	Q4
Equinix	22,500	24,100	26,000	27,500	29,600
Megaport	7,488	8,529	9,248	10,046	10,741
TOTAL VIRTUAL CONNECTIONS	29,988	32,629	35,248	37,546	40,341

DATA TRACKER

TOTAL INTERCONNECTIONS - Q4



Total Interconnections	2019	2020			
	Q4	Q1	Q2	Q3	Q4
Equinix	363,400	370,200	378,200	386,700	392,100
Digital Realty	81,000	91,600	160,000	162,000	164,000
Cyxtera	0	0	0	40,000	40,000
CoreSite	28,000	28,000	28,000	30,000	30,000
DataBank	0	0	6,800	29,900	29,900
CyrusOne	22,000	22,700	22,700	22,700	22,700
Teraco	0	0	0	18,000	18,000
SUNeVision	13,000	14,000	14,000	14,000	14,000
NextDC	12,012	12,012	13,051	13,051	13,911
Cologix	0	13,000	13,000	13,000	13,000
Flexential	0	0	13,000	13,000	13,000
MegaPort	7,488	8,529	9,248	10,046	10,741
Switch	6,500	7,500	8,000	8,500	8,750
TOTAL INTERCONNECTIONS	533,400	567,541	665,999	760,897	770,102

*Total Interconnections is either derived from 1) the sum of cross-connects and virtual connections when available, or 2) the number reported by the company

LOOKING AHEAD

As interconnection needs evolve, the customer requirements to support Hybrid IT operating models and align with the cloud experience—consumption-based, on-demand, API-driven—will continue to drive further expansion and innovation for interconnection platforms that are both multi-tenant data center owned & operated, as well as independent and data center neutral platforms.

I believe that the interconnection platforms we know today will be very different tomorrow and one of the reasons is that the interconnection market is small but fragmented across geographies. This small market size will lead to the convergence of a number of products and services, given the power of platforms and demand in a cloud-first world.

The opportunity to break down legacy TAMs that include traditional carrier services like MPLS, IP VPN, and other data transport offerings is also a factor to consider when thinking about how this new breed of interconnection platforms will evolve, as well as the unbundling of hardware, including the hardware vendor transformation to as-a-service models.

It's hard to plot the time horizon for the continued evolution given we are only a few years into the networking chapter of the cloud story. Compute and storage is 15 years into their journey, and still maturing.

If there is one thing that's important to know about the future of interconnection it's that the book is written in software, not on paper.

ABOUT THE AUTHOR



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Christian is currently a Director of Product Management at Digital Realty. In 2016, Christian Co-Founded the New York Network Operators Group, a non-profit organization that aims to connect network operators and technology professionals through educational events and programs. He currently serves on the Board of Directors as President. Prior to founding NYNOG, Christian was a member of the Board of Directors for the Open-IX Association, a non-profit that was formed to foster the development of critical Data Center and Interconnection standards. Christian also currently serves on the Board of Directors of the Seattle Internet Exchange.

Over the past 20 years, Christian has held several leadership and operational roles at companies such as Microsoft, Twitter, and Globix. Most recently, Christian was the Head of Product Management for Cloud at PacketFabric.

Christian started writing the weekly newsletter now known as Foundations in early 2016 which is read by thousands of industry professionals, and is the largest independent newsletter covering Digital Infrastructure. The Interconnection Quarterly is a supplement of the Foundations Newsletter.

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Views expressed in this document accurately reflect my personal views and opinions and are based upon (a) my professional experience, (b) information from; conference presentations, white papers, company reports, and other sources I believe to be accurate and reliable.

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