VOLUME 1

GLOBAL INTERCONNECTION INDEX

MEASURING THE GROWTH OF THE GLOBAL DIGITAL ECONOMY

EQUINIX

GLOBAL INTERCONNECTION INDEX

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FOREWORD

An industry-first look at how Interconnection Bandwidth is shaping and scaling the global digital economy.

IT'S SCALE OR FAIL IN THE GLOBAL DIGITAL ECONOMY

As business models become increasingly distributed and dependent on the real-time engagement of many more users, partners and service providers, a company's ability to transform into a digital business has become a matter of survival.

Organizations must take swift and decisive action to scale their digital platforms or risk extinction. And the only way to do that is through dynamic, on-demand, anytime, anywhere Interconnection. This means deploying IT traffic exchange points and provisioning Interconnection Bandwidth to integrate direct private connections between counterparties and providers. These traffic exchange points are hosted in carrier-neutral data center campuses with distributed, colocated IT components. Without this vital fuel, digital business falters.

Interconnection's role as an essential building block of the global digital economy permeates the world around us. Interconnection scaled the internet, the web, and thriving digital ecosystems like financial securities trading. In 2014 alone, Interconnection enabled cross-border data flows that added $2.8 trillion to the world's GDP, per McKinsey. And now it is enabling the rapid growth of multicloud, giving rise to new ecosystems like the Internet of Things and propelling digital business to outgrow the overall economy by 3X.

As crucial as Interconnection is to how digital business is conducted, it's never been quantified. The Global Interconnection Index, published by Equinix, changes this with industry-first projections of how Interconnection growth and access will unfold through 2020. This in-depth view arms businesses with the data-driven insight they need to consider their own Interconnection strategy for digital business success.

The Index's new global baseline tracks, measures and forecasts the growth of Interconnection Bandwidth, a measure of the capacity to transfer traffic via direct, private Interconnection with a diverse set of counterparties at distributed exchange points. For the first time, organizations can see multidimensional projections of Interconnection Bandwidth requirements by region, industry, use cases, firmographics and maturity model.

The worldwide reliance on Interconnection Bandwidth is growing rapidly as businesses competing within this evolving landscape mature from exchanging traffic over a few connections through a single network carrier as the intermediary, to activating multiple direct Interconnection exchange points among a global ecosystem of providers and counterparties.

Continued on next page

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FOREWORD

CONTINUED

Interconnection Bandwidth is outpacing traditional connectivity approaches as it grows:

- Nearly 2X faster and 6X larger than global IP traffic
- 10X faster than MPLS networks

The Index projects that by the year 2020, the Interconnection Bandwidth used to conduct scalable digital business will grow to over 5,000 Tbps, outpacing the growth of overall global IP traffic, the internet and MPLS, today's leading private network model.

To put this into context, consider what would be possible with this robust level of Interconnection. You could:

- Transfer the entire printed content in the U.S. Library of Congress 3X in a single second
- Process nearly 550,000 electronic payments per minute–assuming the average value is $50, that's $27.5M per minute or $1.6B per hour
- Analyze and exchange the DNA sequence of the entire human population in 2.5 hours, unlocking the possibility for new medical treatments and breakthroughs

The right Interconnection strategy has the power to make even the boldest business ambitions a reality. But without it, organizations will lack the scale, agility, capacity, security and quality of service they need to successfully conduct digital business around the globe.

The Global Interconnection Index provides important insight into this fundamental measure of how digital business is conducted and equips companies with the forward-looking data they need to measure, predict and stay ahead of their own Interconnection needs in an increasingly connected future.

Interconnection fuels digital transformation by:

- Unlocking the ability to scale multicloud to its fullest potential
- Providing proximity to digital services to reduce latency and accelerate business interactions
- Empowering businesses to establish operational control over centralized and distributed digital platforms
- Reducing cybersecurity risk by bypassing the internet and activating local security perimeters

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HOW THE GLOBAL INTERCONNECTION INDEX WAS CREATED

INAUGURAL EDITION

The Global Interconnection Index[1] is the emergence of a new global baseline.

Its goal is to track, measure and forecast the growth in bandwidth required for direct traffic exchanges which enable private Interconnections among companies supporting digital business.

OUR PROCESS

1 CREATED MARKET BASELINE	2 ASSESSED MARKET CONDITIONS	3 CORRELATED DEMAND DRIVERS	4 BUILT PREDICTIVE MODEL
Analyzed the adoption profile of thousands of carrier-neutral colocation data center providers and participants globally across every region and major metro[2]	Assessed local and regional market conditions, including macro economic trends, market demo-graphics and industry concentrations	Identified key demand drivers of digital business that force the distribution and Interconnection of IT components within proximity of users	Built a predictive model to forecast Interconnection Bandwidth growth by region, use case and market segment
Created a stratified market baseline across industries, regions and company size segmentation	Developed a set of indicators and local market condition filters to assist in producing tailored predictions	Produced a weighted demand multiplier to assist in predicting growth to factor the impact of digital business transformation	Utilized market baseline, applied local market condition filters and factored demand drivers to derive forecast

[1] This report contains forward-looking statements. These forward-looking statements involve known and unknown risks and uncertainties that may cause actual events or results to differ materially from the estimates or the results implied or expressed in such forward-looking statements.

[2] Utilized technology market intelligence from data sources including Forrester, IDC, 451 Research and Synergy Research Group

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EMERGENCE

OVERVIEW OF INTERCONNECTION

Interconnection emerged from the challenge to globally scale the internet.

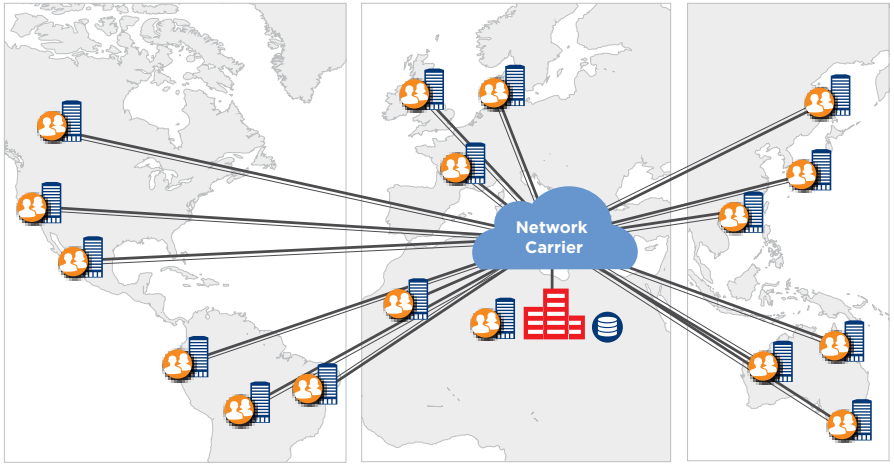
This required the industry to solve how to exchange and transfer traffic among different provider networks across different regions and countries.

Physical infrastructure meeting places, called Internet Exchanges, were created and hosted inside carrier-neutral colocation data center campuses. The voluntary exchange of traffic among providers became known as peering.

Over time, peering in carrier-neutral data center campuses evolved to become IT traffic exchange points for all types of machine-to-machine traffic by integrating direct private connections of counterparties with distributed IT components colocated. This is known as Interconnection.

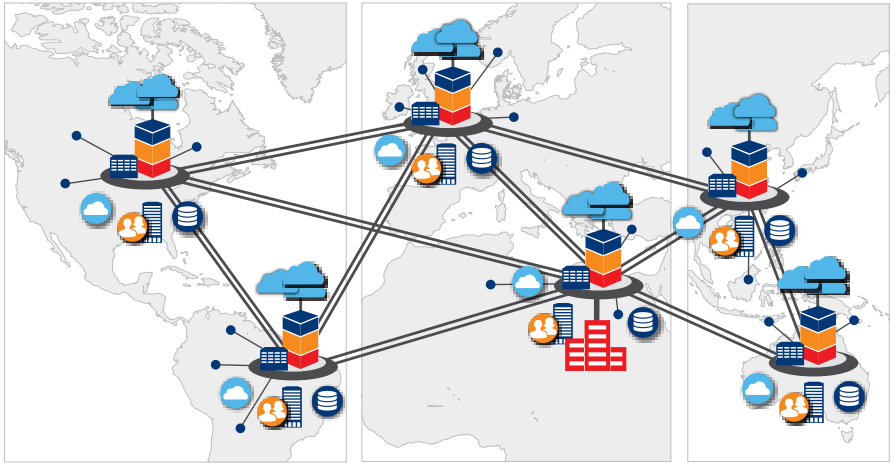
Interconnection Bandwidth is defined as the total capacity provisioned to privately and directly exchange traffic with a diverse set of counterparties and providers at distributed IT exchange points.

BEFORE INTERCONNECTION [1]



[1] Constrained point-to-point connectivity, backhauling user traffic to central data center

WITH INTERCONNECTION [2]



[2] Optimized, multipoint connectivity via direct private traffic exchange points between users and local services

Clouds · People & Locations · Data · Physical IT Traffic Exchange Point · Enterprise Headquarters · Network Endpoint · Network Carriers · Carrier-neutral Data Centers

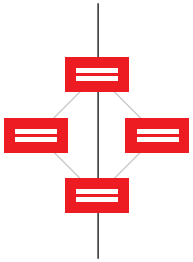
EVOLUTION

HISTORY OF INTERCONNECTION

The power of Interconnection has proven extensible, helping to create the building blocks of the digital economy.

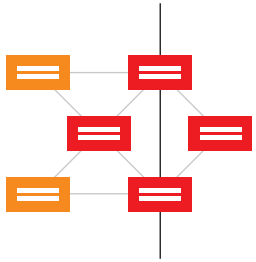
Interconnection enabled the web to scale. It solves performance and integration barriers, creating the global electronic trading ecosystem; and provides an on-ramp to securely scale into the cloud.

Today, for companies in all industries, Interconnection helps integrate digital services with providers and partners so they can interact in real time to consume and provide services digitally.



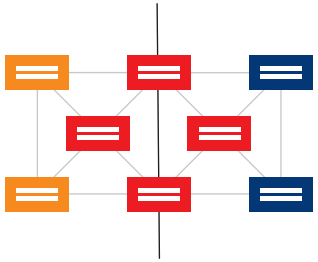
INTERNET

Networks directly connected to other networks to privately exchange data traffic, solve for regional proximity and scale the internet



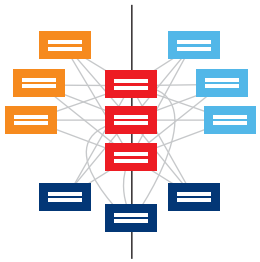
WEB

Content and e-commerce platforms directly connected to networks to privately exchange data and content traffic, place copies of websites and content inside exchange points and scale the web



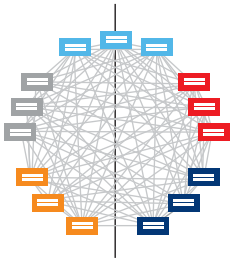
ELECTRONIC TRADING

Buy-Side and Sell-Side Exchange platforms directly connected to each other to privately exchange market data and trade traffic, place trading engines inside the exchange points and scale the electronic trading ecosystem



CLOUD

Cloud infrastructure providers are enabling direct connection access to privately exchange data and workload traffic, solve for access proximity and scale the cloud-enterprise ecosystem



DIGITAL BUSINESS

Enterprises across all industry segments are beginning to directly connect to each other to privately exchange traffic, create new ecosystems and scale digital business

RELEVANCE

INDUSTRY TRENDS PRIORITIZING NEED FOR INTERCONNECTION

As digital business transformation increasingly becomes a mandate for survival in the digital era, Interconnection grows particularly relevant.

Key macro, technology and regulatory trends are changing the interaction between businesses, consumers and physical infrastructure.

The world is rapidly going digital, and Interconnection is a critical building block for success.

INDUSTRY TRENDS

TREND	INSIGHT	IMPLICATION	NEED
Digital Technology Use	Digital technology use can create $1.36 trillion in additional economic output in the world's top 10 economies in 2020 [1]	Digital technologies force the need to support real-time interactions which enable digital value capture	Real-time interactions require the Interconnection of people, locations, clouds and data
Urbanization	Approximately two billion people are expected to migrate to major cities by 2030, creating as many as 50 urban metro hubs [2]	Urbanization is transforming global demographics, creating a proximity need for digital services	Supporting urban density requires the Interconnection of applications, data, content and networking colocated in metro hubs
Data Sovereignty	More than 18 major countries globally block the transfer of data related to accounting, tax and financial information [3]	Compliance with data regulations requires the need to maintain data locally while being used globally	Managing compliance requires the Interconnection of data storage, analytics and networking colocated in business regions that require compliance
Cybersecurity Risk	By 2020, 60% of digital businesses will suffer major service failures, due to the inability of IT security teams to manage digital risk [4]	Cybersecurity risk permeates across the physical and digital platforms of the business	Managing cybersecurity risk requires the Interconnection of applications, data, networking and security controls colocated across regions to create necessary safeguards
Global Trade of Digitally Deliverable Services	Trade in digitally deliverable services has more than doubled over the past decade, comprising approximately 50% of total services exports [5]	Digital trade flows are creating global business and data processes involving customers, partners and employees	Solving the shift to digital flows requires an interconnected mesh of metro hubs and colocated digital capabilities where trade flows. This is critical to participation in a digital ecosystem

[1] Accenture Digital Density Index [2] Connectography (Parag Khanna) [3] ITIF Cross Border Data Flows Report
[4] Gartner, Special Report: Cybersecurity at the Speed of Digital Business, 30 August 2016 [5] McKinsey Digital Globalization Report

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BANDWIDTH FORECAST

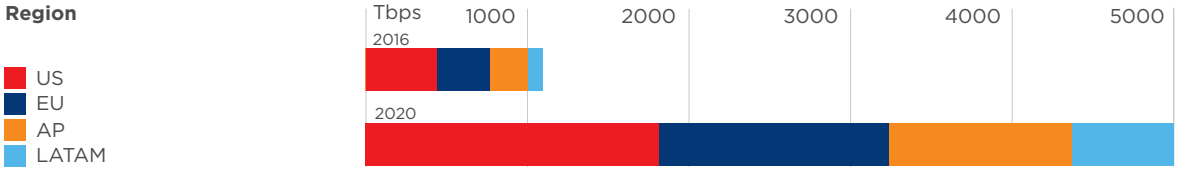
2020 FORECAST

Interconnection Bandwidth is defined as the total capacity provisioned to privately and directly exchange traffic with a diverse set of counterparties and providers at distributed IT exchange points.

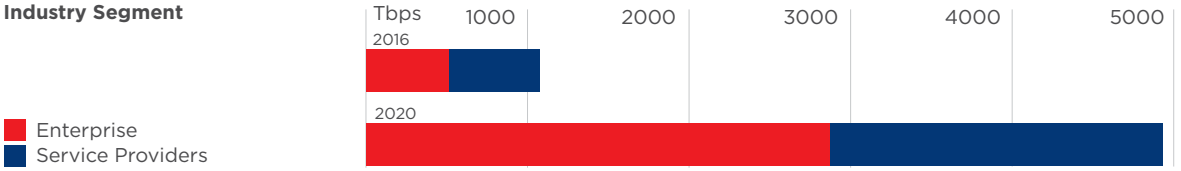
By 2020, Installed Interconnection Bandwidth capacity is expected to reach 5000 Tbps, a fourfold increase from 2016, with double-digit growth across all industries and use cases.

INTERCONNECTION BANDWIDTH HIGHLIGHTS

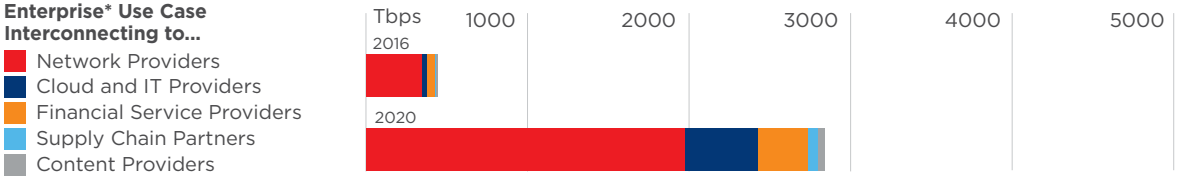
Region



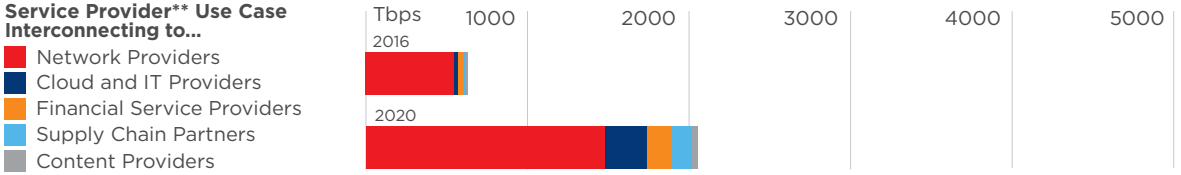
Industry Segment



Enterprise* Use Case Interconnecting to...



Service Provider Use Case Interconnecting to...**



* Enterprises are defined as companies with a primary business purpose including Banking and Insurance, Manufacturing, Securities & Trading, Business & Professional Services, Energy & Utility, Retail, Healthcare and Government

** Service Providers are defined as companies with a primary business purpose including Telecommunications, Cloud and IT, along with Content and Digital Media

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REGIONAL VIEW

INTERCONNECTION BANDWIDTH*
GROWTH BY 2020

A radical reinvention of enterprise IT is underway.

Interconnection Bandwidth is expected to grow at a rapid pace over the next four years with growth across all regions predicted to grow 40% per annum or greater.

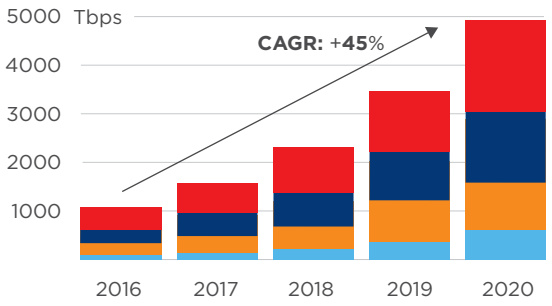
United States is expected to grow 40% per annum to reach 1,800 Tbps of installed capacity by 2020, contributing more than a third (36%) of Interconnection Bandwidth globally.

Europe is expected to grow 44% per annum to reach 1,450+ Tbps by 2020, contributing more than a quarter (29%) of Interconnection Bandwidth globally.

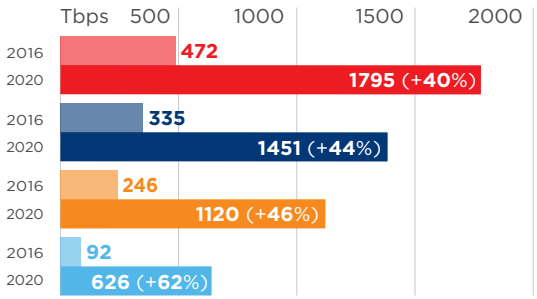
Asia-Pacific is expected to grow 46% per annum to reach 1,120 Tbps of installed capacity, approaching nearly a quarter (22%) of Interconnection Bandwidth globally.

Latin America is expected to grow 62% per annum to reach 620+ Tbps of installed capacity, contributing 13% of Interconnection Bandwidth globally.

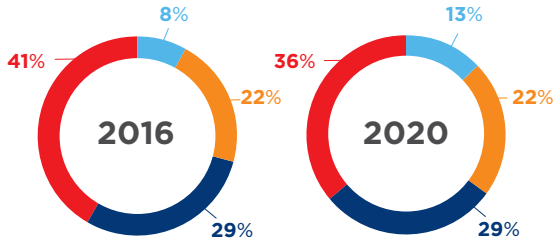
WORLDWIDE GROWTH



REGIONAL GROWTH



REGIONAL MIX



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INDUSTRY VIEW

INTERCONNECTION BANDWIDTH*
GROWTH BY 2020

Digital is disrupting all industries, forcing companies to transform their business and IT infrastructure strategies to compete.

Interconnection is emerging pervasively to scale digital business transformation with growth projected across all major industries.

Banking and Insurance is expected to grow 61% per annum and reach 955+ Tbps of Interconnection Bandwidth capacity by 2020.

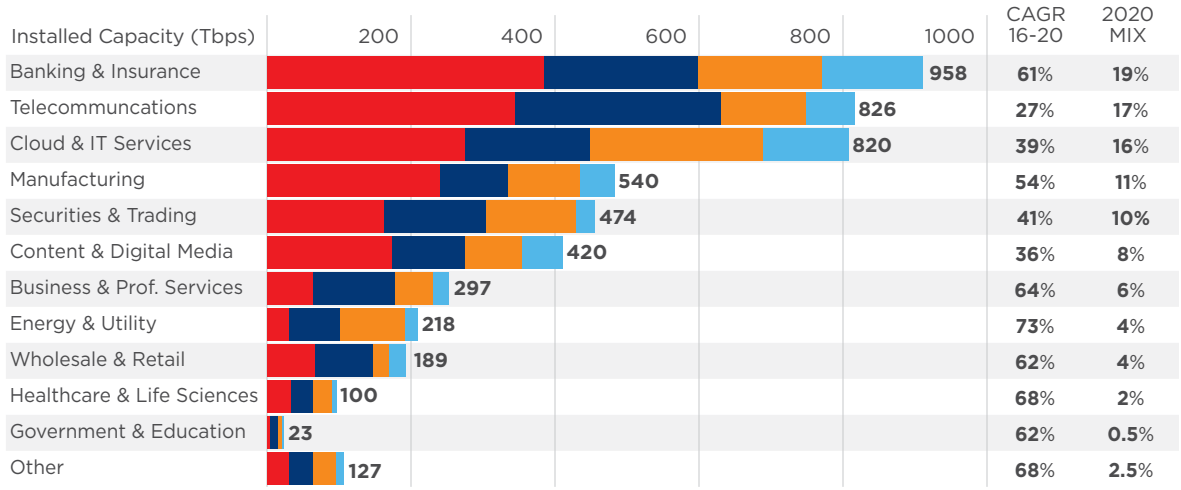
Telecommunications is expected to grow 27% per annum and reach 825+ Tbps of Interconnection Bandwidth capacity by 2020.

Cloud and IT is expected to grow 39% per annum and reach 820 Tbps of Interconnection Bandwidth capacity by 2020.

Manufacturing is expected to grow 54% per annum to 540 Tbps of Interconnection Bandwidth capacity by 2020.

Emerging High-growth Segments include Business & Professional Services, Energy, Retail and Healthcare, and are expected to grow their use of Interconnection Bandwidth capacity by more than 66% by 2020.

SERVICE PROVIDERS CONNECTING TO INDUSTRY TYPE



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ENTERPRISE USE CASES

INTERCONNECTION BANDWIDTH* GROWTH BY 2020

Enterprises in these business categories are all striving to digitize their business through individual use cases.

For purposes of this index, Enterprise use cases are defined as enterprises with common purposes in these areas: Banking and Insurance, Manufacturing, Securities and Trading, Business and Professional Services, Energy and Utility, Retail, Healthcare and Government.

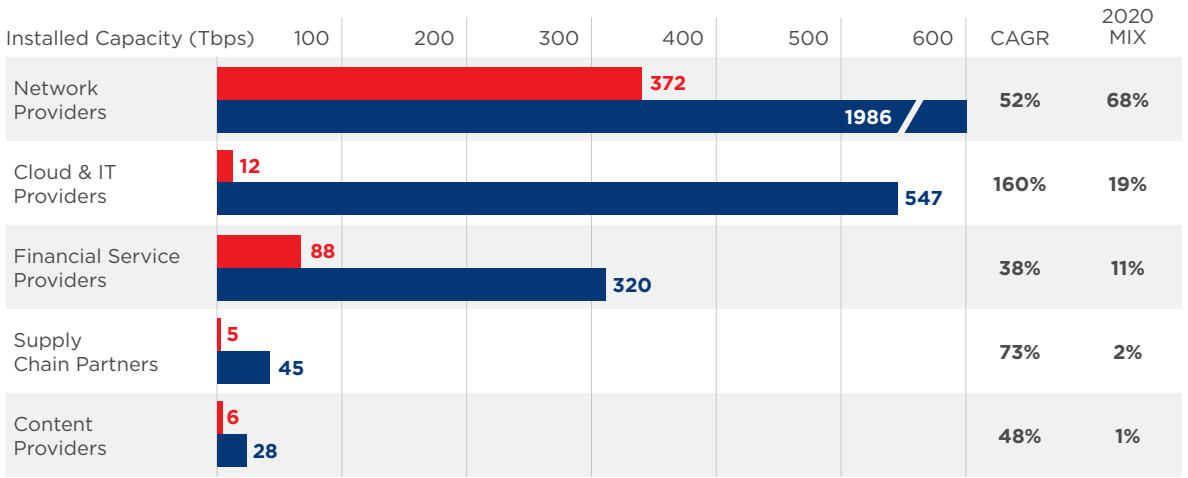
Highlights:

- All use cases are projecting strong double-digit growth by 2020
- Enterprises Interconnecting to Clouds use case is projected to grow the fastest at 160% CAGR, becoming the second-largest use case share of Interconnection Bandwidth by 2020
- Enterprises Interconnecting to Financial Service Providers is projected to grow 38% per annum, reaching 300+ Tbps of Interconnection Bandwidth by 2020 as digitization of the industry evolves from trading to including banking, insurance and wealth management

Enterprise Interconnection Use Cases:

- Interconnecting to Network Providers: to rewire network topology for digital
- Interconnecting to Cloud and IT Providers: to deliver digital services on demand
- Interconnecting to Financial Service Providers: to transact or exchange payments digitally
- Interconnecting to Supply Chain Partners: to collaborate digitally with business partners
- Interconnecting to Content Providers: to enable rich digital experiences for their users

USE CASES: ENTERPRISES INTERCONNECTING TO...



See page 14 for more information implementing Interconnection use cases

* Interconnection Bandwidth is defined as the total capacity provisioned to privately and directly exchange traffic with a diverse set of counterparties and providers at distributed IT exchange points.

2016 2020

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SERVICE PROVIDER USE CASES

INTERCONNECTION BANDWIDTH* GROWTH BY 2020

Service Providers in these business categories are all striving to digitize their business through individual use cases.

For the purposes of this index, Service Provider use cases are defined as those with common purposes in these areas: Telecommunications, Cloud and IT, and Content and Digital Media.

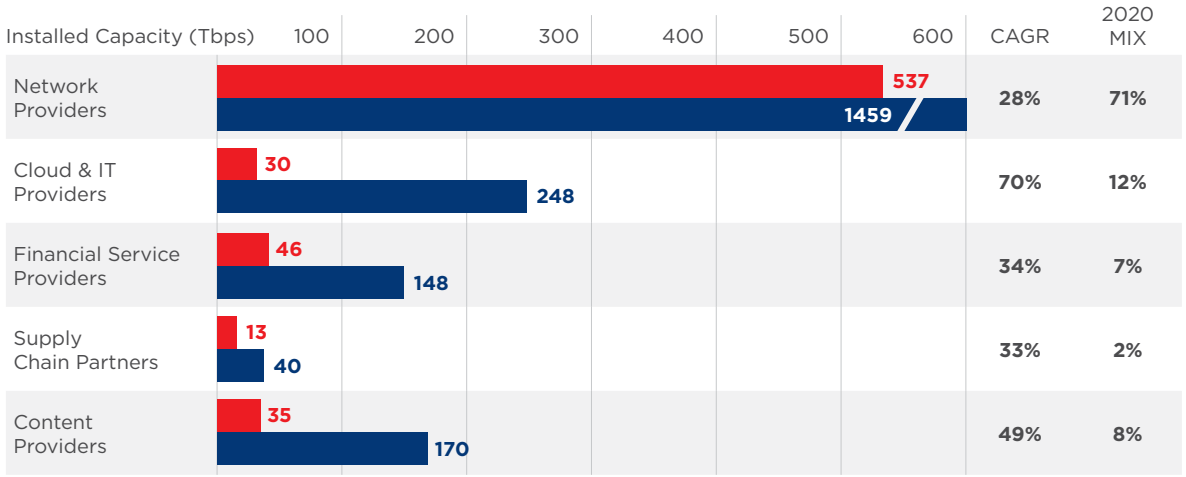
Highlights:

- All use cases are projecting strong double-digit growth by 2020
- Service Providers Interconnecting to Clouds use case is projected to grow the fastest at 70% CAGR, becoming the second-largest use case share of Interconnection Bandwidth by 2020
- Service Providers Interconnecting to ontent & Digital Media use case is projected to grow 49% per annum, reaching 170 Tbps of Interconnection Bandwidth by 2020 as digitization is transforming the content production and distribution value chain

Service Provider Interconnection Use Cases:

- Interconnecting to Network Providers: to extend network coverage and scale for digital
- Interconnecting to Cloud and IT Providers: to provide cloud-native digital services
- Interconnecting to Financial Service Providers: to transact or exchange payments digitally
- Interconnecting to Supply Chain Partners: to collaborate digitally with business partners
- Interconnecting to Content Providers: to enable rich digital experiences for their customers

USE CASES: SERVICE PROVIDERS INTERCONNECTING TO...



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2016 2020

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FIRMOGRAPHICS

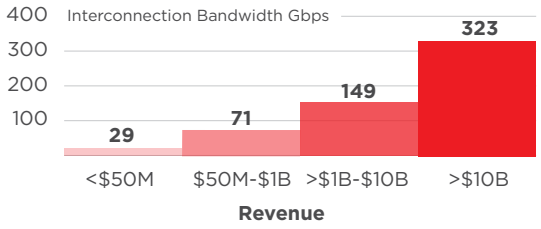
INTERCONNECTION BANDWIDTH* GROWTH BY 2020

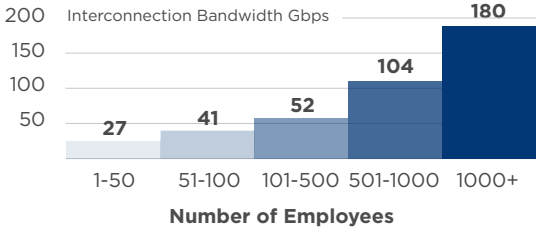
Firmographic profiling shows a direct correlation of Interconnection Bandwidth adoption by enterprises based on three categories—Size, Geographical Presence and Use of Distributed IT Services.

- The larger the company, the greater the number of Interconnections used, and there is a requirement for more Interconnection Bandwidth
- The broader a business' physical presence, the greater the number of Interconnections used, and there is a requirement for more Interconnection Bandwidth
- The more extensively a firm employs distributed IT services, the greater the number of Interconnections used, and there is a requirement for more Interconnection Bandwidth

1 USERS

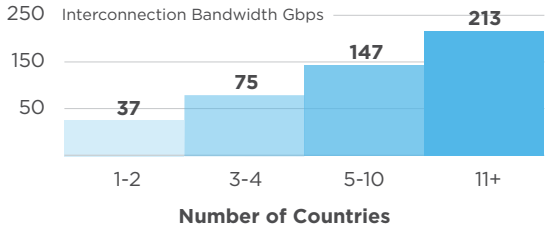
Average Interconnection Bandwidth by Revenue and Number of Employees

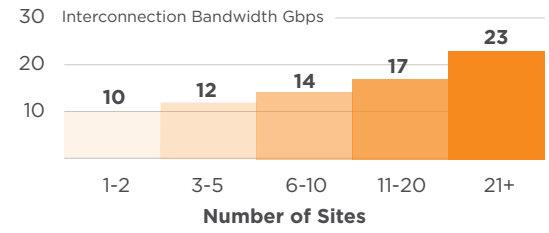




2 LOCATIONS

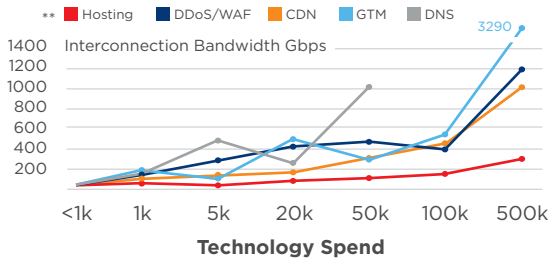
Average Interconnection Bandwidth by Geographical Presence

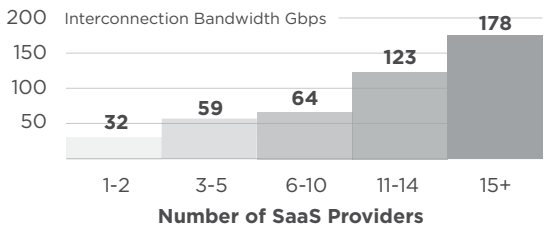




3 USE OF DISTRIBUTED IT SERVICES

Average Interconnection Bandwidth by Number of Distributed IT Services





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* Interconnection Bandwidth is defined as the total capacity provisioned to privately and directly exchange traffic with a diverse set of counter-parties and providers at distributed IT exchange points.

** Hosting—third-party hosting of application and infrastructure; DDos/WAF—Distributed Denial of Service & Web Application Firewall; GTM—Global Traffic Management; DNS—Domain Naming Service; CDN—Content Distribution Network

ENTERPRISE ADOPTION BY COUNTERPARTY

INTERCONNECTION GROWTH BY PROFILE

Interconnection Bandwidth growth of an individual firm can be projected based on its maturity of adoption.

As described on page 5 of the Index, the evolution of Interconnection began with the private exchange of traffic over a single Interconnection and progressed to multiple Interconnections, duplicating across multiple locations and finally maturing to global ecosystem Interconnections.

Using the Interconnection Maturity Model, any company can start to plan for its Interconnection Bandwidth needs.

First, a firm must identify:

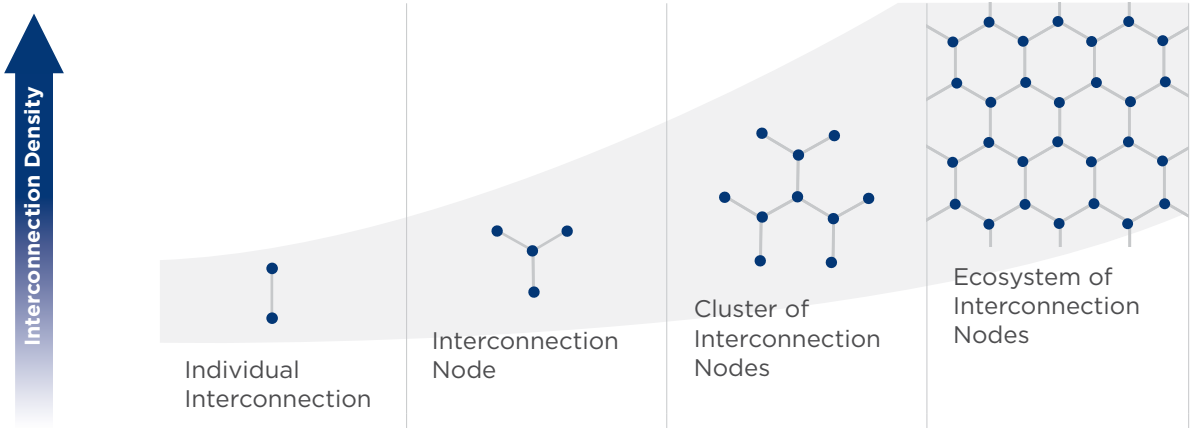
- # of counterparties in initial location
- # of counterparties in each location of business presence

Second, a firm must determine:

- Need for Interconnection
- Purpose of Interconnection
- Value of Interconnection

Finally, a firm must confirm which IT deployment patterns need to be implemented in each location adjacent to the point of Interconnection. See www.IOAKB.com for further guidance.

INTERCONNECTION MATURITY MODEL



Density	1	10's +/-	100's +/-	1000's +/-
Need	Solve latency	Solve complexity	Solve scale	Solve integration
Purpose	Shorten distance between users and services	Segment & localize traffic via single exchange point	Adjacently deploy critical security and data services	Create a meeting place to collaborate with customers, partners and providers
Value	Enhance user experience	Reduce cost and time to connect	New business capabilities	New business opportunities

* Interconnection Bandwidth is defined as the total capacity provisioned to privately and directly exchange traffic with a diverse set of counterparties and providers at distributed IT exchange points.

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2020 FORECAST

GLOBAL INTERCONNECTION BANDWIDTH* GROWTH BY 2020

Total Interconnection Bandwidth is expected to grow 45% per annum by 2020.

A radical reinvention of Enterprise IT is underway, with Interconnection Bandwidth between companies, industries, business partners and service providers set to grow at a rapid pace over the next four years.

By 2020, Interconnection Bandwidth is projected to grow more than fourfold from 2016, translating into 5,000 Tbps of installed bandwidth capacity, with double-digit growth across all industries and use cases.

INTERCONNECTION INSTALLED BANDWIDTH CAPACITY (TBPS)

	2016	2017	2018	2019	2020	CAGR
By Industry						
Banking & Insurance	144	230	367	590	958	61%
Telecommunications	319	409	523	662	826	27%
Cloud & IT Services	221	314	445	607	820	39%
Manufacturing	96	147	226	348	540	54%
Securities & Trading	119	160	224	322	474	41%
Content & Digital Media	121	170	235	316	420	36%
Business & Professional Services	41	66	108	179	297	64%
Energy & Utility	24	43	74	128	218	73%
Wholesale & Retail Trade	27	44	71	115	189	62%
Healthcare & Life Sciences	13	21	35	59	100	68%
Government & Education	3	5	9	14	23	62%
Other	16	27	46	76	127	68%
Total Industry	**1,144**	**1,636**	**2,363**	**3,417**	**4,991**	**45%**
By Use Cases						
Enterprise Use Cases						
Interconnecting to Network Providers	372	571	880	1,341	1,986	52%
Interconnecting to Cloud & IT Providers	12	31	80	209	547	160%
Interconnecting to Financial Service Providers	88	122	168	232	320	38%
Interconnecting to Supply Chain Partners	5	9	17	29	45	73%
Interconnecting to Content Providers	6	9	14	21	28	48%
Total Enterprise Use Cases	**483**	**743**	**1,159**	**1,833**	**2,926**	**57%**
Service Provider Use Cases						
Interconnecting to Network Providers	537	703	913	1,167	1,459	28%
Interconnecting to Cloud & IT Providers	30	50	85	145	248	70%
Interconnecting to Content Providers	35	52	79	117	170	49%
Interconnecting to Financial Service Providers	46	61	81	109	148	34%
Interconnecting to Supply Chain Partners	13	26	45	46	40	33%
Total Service Provider Use Cases	**660**	**893**	**1,203**	**1,584**	**2,065**	**33%**
Total Use Cases*	**1,144**	**1,636**	**2,363**	**3,417**	**4,991**	**45%**
Region						
US	472	654	913	1,275	1,795	40%
EU	335	473	681	987	1,451	44%
AP	246	355	519	759	1,120	46%
LATAM	92	154	249	395	626	62%
Total Region	**1,144**	**1,636**	**2,363**	**3,417**	**4,991**	**45%**

* Interconnection Bandwidth is defined as the total capacity provisioned to privately and directly exchange traffic with a diverse set of counterparties and providers at distributed IT exchange points.

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UNITED STATES (US)

NEW YORK | CHICAGO | WASHINGTON, D.C. | SILICON VALLEY

INTERCONNECTION
BANDWIDTH GROWTH* 2020

The United States is expected to grow 40% per annum to reach 1,800 Tbps of installed capacity by 2020, contributing more than a third (36%) of Interconnection Bandwidth globally.

The United States is the largest and most advanced region. The market had an early head start in terms of Interconnection adoption, with places like Ashburn in Northern Virginia hosting the largest concentration of network participants and becoming a hotbed for most of the world's internet traffic. Despite being an early adopter of Interconnection, growth in the US is expected to further accelerate by 300 basis points to 40% by 2020.

- US Interconnection Bandwidth is expected to reach 1,795 Tbps at 40% CAGR by 2020, driven by strong anticipated growth in Chicago (42% CAGR) and New York (40% CAGR)
- Banking and Insurance is expected to be the largest industry segment driving Interconnection growth in the US, accounting for approximately 22% of the overall market by 2020, overtaking Telecommunications
- The Enterprise vertical is expected to account for 55% of total Interconnection, up from 41% in 2016
- Over 82% of Enterprises' bandwidth is expected to be dedicated to two use cases: Interconnecting to Network and to Cloud by 2020
- The four largest metros of provisioned Interconnection Bandwidth capacity—New York, Chicago, Washington, D.C., Silicon Valley—currently make up more than 70% of the total market in North America and are expected to sustain growth around 40% annually until the end of the forecast period

INTERCONNECTION INSTALLED BANDWIDTH CAPACITY (TBPS)

	2016	2017	2018	2019	2020	CAGR
By Industry						
Banking & Insurance	68	106	164	252	386	54%
Telecommunications	133	172	222	282	354	28%
Cloud & IT Services	84	115	156	206	268	34%
Manufacturing	45	66	100	153	240	52%
Content & Digital Media	63	85	114	147	187	31%
Securities & Trading	44	56	75	103	140	34%
Business & Professional Services	13	19	29	47	78	58%
Wholesale & Retail Trade	11	17	26	41	68	59%
Healthcare & Life Sciences	3	5	9	14	24	62%
Energy & Utility	2	4	6	9	16	59%
Government & Education	1	1	2	3	5	53%
Other	5	7	11	17	28	57%
Total Industry	**472**	**654**	**913**	**1,275**	**1,795**	**40%**
By Use Cases						
Enterprise Use Cases						
Interconnecting to Network Providers	136	200	294	431	609	45%
Interconnecting to Cloud & IT Providers	5	13	32	80	203	152%
Interconnecting to Financial Service Providers	47	64	86	116	154	35%
Interconnecting to Supply Chain Partners	1	3	5	8	12	69%
Interconnecting to Content Providers	2	3	4	6	8	44%
Total Enterprise Use Cases	**191**	**282**	**421**	**641**	**986**	**51%**
Service Provider Use Cases						
Interconnecting to Network Providers	238	306	390	488	596	26%
Interconnecting to Cloud & IT Providers	13	21	36	60	101	67%
Interconnecting to Content Providers	12	18	27	39	55	47%
Interconnecting to Financial Service Providers	14	19	26	34	46	34%
Interconnecting to Supply Chain Partners	4	8	14	14	12	33%
Total Service Provider Use Cases	**280**	**372**	**492**	**635**	**809**	**30%**
Total Use Cases*	**472**	**654**	**913**	**1,275**	**1,795**	**40%**
By Metro						
New York	103	141	195	274	391	40%
Chicago	83	116	166	236	339	42%
Washington, D.C.	87	121	166	231	323	39%
Silicon Valley	68	94	131	183	255	39%
Total Metro**	**341**	**472**	**658**	**924**	**1,308**	**40%**

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** These are the top metros and not inclusive of all metros.

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EUROPE (EU)

LONDON | FRANKFURT | AMSTERDAM | PARIS

INTERCONNECTION
BANDWIDTH GROWTH* 2020

Europe is expected to grow 44% per annum to reach 1,450+ Tbps by 2020, contributing more than a quarter (29%) of Interconnection Bandwidth globally.

Europe's growth will be driven by a number of factors, including data sovereignty and the need for European businesses to exchange information with other businesses in-region; the evolution of the European public peering model, including more private direct connections among organizations; and the rapid economic development in the Middle East and Africa.

- EU's Interconnection Bandwidth is expected to quadruple in size, at 44% CAGR
- While London is expected to remain the largest Interconnection market in Europe, Frankfurt is expected to overtake Amsterdam as the second-largest Interconnection market in Europe, benefitting from strong enterprise demand
- Banking and Insurance is expected to add 200+ Tbps of bandwidth by 2020, a greater than sixfold increase, catapulting it ahead of Cloud and IT Services, with Telecommunications narrowly retaining the lead
- Of all the regions, the Enterprise segments are expected to capture the highest bandwidth share by 2020, reaching 63% total bandwidth share in the EU

INTERCONNECTION INSTALLED BANDWIDTH CAPACITY (TBPS)

	2016	2017	2018	2019	2020	CAGR
By Industry						
Telecommunications	102	130	165	209	260	26%
Banking & Insurance	42	63	98	157	259	58%
Cloud & IT Services	59	82	115	153	203	36%
Securities & Trading	40	54	77	114	174	45%
Business & Professional Services	16	27	44	73	120	64%
Manufacturing	16	25	39	60	92	54%
Energy & Utility	12	20	33	54	89	65%
Wholesale & Retail Trade	10	17	28	45	74	64%
Content & Digital Media	24	32	42	54	69	30%
Healthcare & Life Sciences	6	11	18	30	51	67%
Government & Education	2	3	5	8	13	64%
Other	5	9	16	28	47	75%
Total Industry	**335**	**473**	**681**	**987**	**1,451**	**44%**
By Use Cases						
Enterprise Use Cases						
Interconnecting to Network Providers	114	174	271	420	641	54%
Interconnecting to Cloud & IT Providers	3	7	18	49	132	165%
Interconnecting to Financial Service Providers	30	42	59	83	118	40%
Interconnecting to Supply Chain Partners	2	3	6	10	17	79%
Interconnecting to Content Providers	2	3	5	7	10	52%
Total Enterprise Use Cases	**150**	**229**	**359**	**570**	**918**	**57%**
Service Provider Use Cases						
Interconnecting to Network Providers	150	194	246	308	378	26%
Interconnecting to Cloud & IT Providers	10	15	23	34	50	49%
Interconnecting to Content Providers	6	10	17	28	47	67%
Interconnecting to Financial Service Providers	14	18	24	32	45	33%
Interconnecting to Supply Chain Partners	4	8	13	14	12	33%
Total Service Provider Use Cases	**185**	**244**	**322**	**417**	**532**	**30%**
Total Use Cases*	**335**	**473**	**681**	**987**	**1,451**	**44%**
By Metro						
London	114	159	227	330	486	44%
Frankfurt	51	74	110	165	252	49%
Amsterdam	59	83	118	168	242	42%
Paris	30	42	59	84	120	41%
Total Metro**	**254**	**357**	**514**	**747**	**1,100**	**44%**

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ASIA-PACIFIC (AP)

SINGAPORE | SYDNEY | HONG KONG | TOKYO

INTERCONNECTION BANDWIDTH GROWTH* 2020

Asia-Pacific is expected to grow 46% per annum to reach 1,120 Tbps of installed capacity, approaching nearly a quarter (22%) of Interconnection Bandwidth globally.

Asia-Pacific region is expected to overtake the US and EU as the largest regional economy. This is consistent with the Index forecast for Interconnection Bandwidth, as the region is predicted to outpace both US and EU by 2020.

- AP's Interconnection Bandwidth is expected to grow more than fourfold with 46% CAGR through 2020 to 1,120 Tbps
- Cloud and IT services providers is expected to overtake Telecommunications providers as the largest users of Interconnection Bandwidth by 2018
- Banking & Insurance, growing at 71% CAGR, is expected to share 13% of the total Interconnection Bandwidth by 2020, compared to only 7% in 2016, making it the third-largest industry overall by 2020
- Energy & Utility is expected to grow the fastest (82% CAGR), resulting in a market share increase from 3% in 2016, to 8% in 2020. Manufacturing's Interconnection Bandwidth is expected to grow by more than 5X by 2020, positioning it as the second-largest Enterprise industry behind Banking
- Global Interconnection Index analysis predicts metros from China are likely to grow into top metros in future years

INTERCONNECTION INSTALLED BANDWIDTH CAPACITY (TBPS)

	2016	2017	2018	2019	2020	CAGR
By Industry						
Cloud & IT Services	57	82	120	166	227	42%
Telecommunications	68	86	108	135	166	25%
Banking & Insurance	17	29	50	85	143	71%
Manufacturing	26	39	60	91	140	52%
Securities & Trading	29	40	58	85	127	44%
Energy & Utility	9	16	29	53	93	82%
Business & Professional Services	9	16	26	44	74	68%
Content & Digital Media	21	29	40	52	68	34%
Healthcare & Life Sciences	2	4	6	11	19	74%
Wholesale & Retail Trade	3	5	8	12	19	59%
Government & Education	1	1	2	3	5	69%
Other	5	8	14	22	37	65%
Total Industry	**246**	**355**	**519**	**759**	**1,120**	**46%**
By Use Cases						
Enterprise Use Cases						
Interconnecting to Network Providers	87	135	209	318	468	52%
Interconnecting to Cloud & IT Providers	3	8	21	56	145	159%
Interconnecting to Financial Service Providers	7	10	14	20	27	40%
Interconnecting to Supply Chain Partners	1	2	4	7	11	71%
Interconnecting to Content Providers	2	2	4	5	7	46%
Total Enterprise Use Cases	**101**	**158**	**252**	**406**	**659**	**60%**
Service Provider Use Cases						
Interconnecting to Network Providers	112	147	192	245	305	29%
Interconnecting to Cloud & IT Providers	8	13	23	38	65	68%
Interconnecting to Content Providers	9	13	20	29	42	48%
Interconnecting to Financial Service Providers	13	16	21	28	38	32%
Interconnecting to Supply Chain Partners	3	7	12	12	10	32%
Total Service Provider Use Cases	**145**	**197**	**267**	**353**	**461**	**34%**
Total Use Cases*	**246**	**355**	**519**	**759**	**1,120**	**46%**
By Metro						
Singapore	60	85	122	176	256	43%
Sydney	40	58	83	119	173	44%
Hong Kong	29	43	65	97	149	51%
Tokyo	30	43	62	90	132	45%
Total Metro**	**159**	**229**	**332**	**482**	**710**	**46%**

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LATIN AMERICA (LATAM)

SÃO PAULO | RIO DE JANEIRO | MEXICO CITY | BUENOS AIRES

INTERCONNECTION
BANDWIDTH GROWTH* 2020

Latin America is expected to reach 626 Tbps of installed capacity, achieving 13% of Interconnection Bandwidth globally by 2020.

Latin America is the smallest region in terms of Interconnection Bandwidth but is growing the fastest, as more infrastructure gets built (data centers, submarine cables) and in-region policy becomes more business-friendly.

- LATAM is expected to be the fastest-growing region in terms of Interconnection Bandwidth, growing at a 62% CAGR through 2020
- All industry verticals are expected to witness a high double-digit (>50%) CAGR except Telecommunications, which started at a high base. Energy & Utility is expected to lead all segments, growing by 21X from 2016 through 2020
- Banking & Insurance is expected to overtake Cloud and IT Services as the largest segment, accounting for 27% of LATAM Interconnection Bandwidth in 2020
- Consistently across both Enterprise and Service Providers, the primary use case for Interconnection Bandwidth is to connect to Cloud and IT Service Providers

INTERCONNECTION INSTALLED BANDWIDTH CAPACITY (TBPS)

	2016	2017	2018	2019	2020	CAGR
By Industry						
Banking & Insurance	17	31	55	96	169	78%
Cloud & IT Services	21	35	54	82	121	55%
Content & Digital Media	13	24	39	62	96	65%
Manufacturing	9	16	27	43	67	66%
Telecommunications	17	22	28	36	46	29%
Securities & Trading	6	9	14	21	32	50%
Wholesale & Retail Trade	3	6	10	17	27	73%
Business & Professional Services	2	5	8	15	25	82%
Energy & Utility	1	3	6	12	21	97%
Healthcare & Life Sciences	0.46	0.98	2	3	6	89%
Government & Education	0.04	0.08	0.16	0.27	0.46	83%
Other	1	3	5	9	15	79%
Total Industry	**92**	**154**	**249**	**395**	**626**	**62%**
By Use Cases						
Enterprise Use Cases						
Interconnecting to Network Providers	35	63	106	172	269	66%
Interconnecting to Cloud & IT Providers	1	3	9	24	67	181%
Interconnecting to Financial Service Providers	4	6	9	13	20	52%
Interconnecting to Supply Chain Partners	1	1	2	3	5	72%
Interconnecting to Content Providers	1	1	2	3	3	46%
Total Enterprise Use Cases	**41**	**74**	**127**	**216**	**363**	**73%**
Service Provider Use Cases						
Interconnecting to Network Providers	37	57	86	126	180	48%
Interconnecting to Cloud & IT Providers	3	5	9	18	35	91%
Interconnecting to Content Providers	4	7	10	15	23	55%
Interconnecting to Financial Service Providers	5	8	11	14	20	39%
Interconnecting to Supply Chain Partners	1	3	6	6	5	38%
Total Service Provider Use Cases	**51**	**80**	**122**	**180**	**263**	**51%**
Total Use Cases*	**92**	**154**	**249**	**395**	**626**	**62%**
By Metro						
São Paulo	27	49	82	133	213	68%
Rio de Janeiro	14	25	42	66	102	65%
Mexico City	14	23	35	55	87	58%
Buenos Aires	10	16	25	40	63	60%
Total Metro**	**65**	**112**	**185**	**295**	**466**	**62%**

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METHODOLOGY

This initiative analyzes trends in colocation subscriber growth, rates of Interconnection and the average bandwidth used across Interconnections.

The methodology for sizing the global Interconnection market commenced with an analysis of thousands of colocation ecosystem participants worldwide, across every region and major metropolitan area. The research sample was additionally stratified across industries and company size segments, providing a comprehensive breakdown of colocation subscribers, and their Interconnections, by company type.

Average Interconnections per company were applied to global counts of colocation participants to identify the current volume of Interconnections worldwide. A variety of primary and secondary data sources were used to accurately determine the size and future growth of global Interconnection. Research from several technology market intelligence firms (Forrester, IDC, 451 Research and Synergy Research Group) were used as inputs into the Global Interconnection Index.

Research data on a variety of technology markets, such as Software as a Service, public and hosted private cloud services, cloud IT infrastructure and hybrid cloud investments, was analyzed to identify strong correlations with investments in colocation and Interconnection. Predictive models were used to forecast growth in company Interconnection Bandwidth by region and metropolitan area, driven by analyst projections of growth in enterprise spending on key technologies such as cloud products, data and infrastructure services.

The methodology used to estimate provisioned peak capacity builds upon the current and forecasted growth in Interconnection Bandwidth worldwide. The peak capacity, measured in gigabit per second, was identified for each of the connections used by the companies in this study's research sample. The estimated provisioned peak capacity, measured in gigabit per second, was identified for each Interconnection use by the companies in this study's research sample. Additionally, an increase in the estimated provisioned peak capacity to support projected growing Interconnection to counterparties and providers was projected for this analysis. The Index applied average provisioned peak capacity by estimated Interconnection to counterparties and providers worldwide to estimate the provisioned peak capacity by use case.

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Report: "Colocation-Based Interconnection Will Serve as the 'Glue' for Advance Digital Business Applications"

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