



Cisco Visual Networking Index (VNI) Complete Forecast Update, 2017-2022

Americas/EMEAR Cisco Knowledge Network (CKN)
Presentation

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Shruti Jain | Senior Analyst

Usha Andra | Senior Analyst

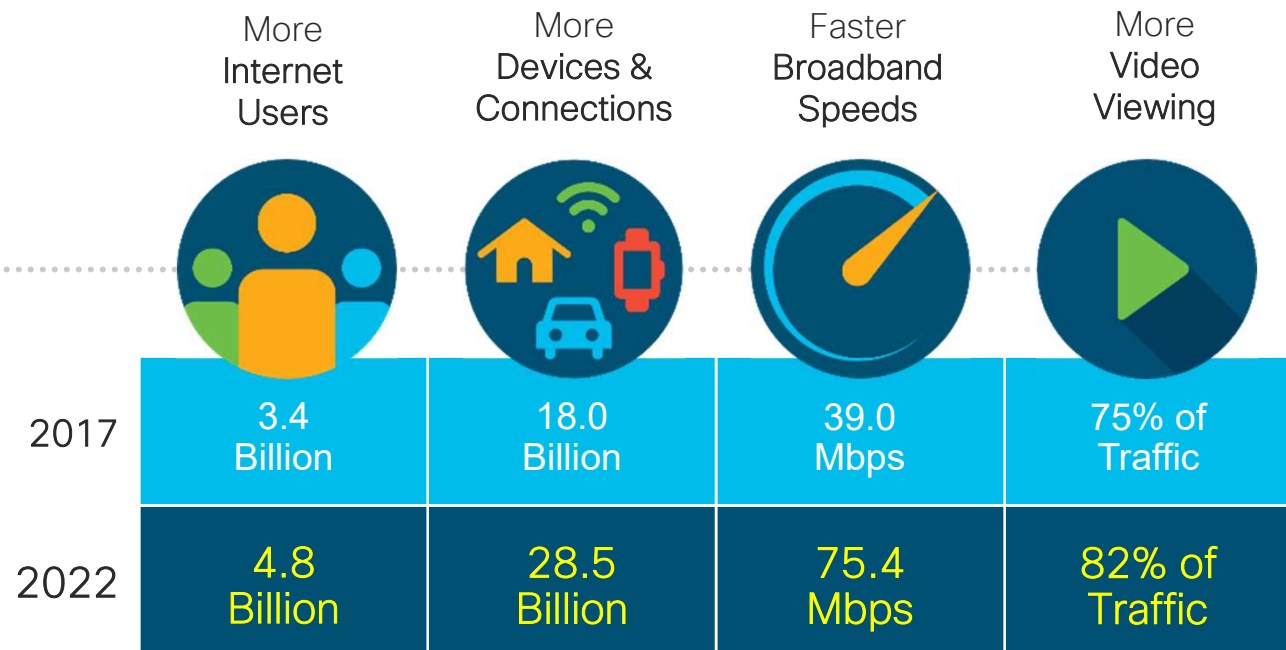
Taru Khurana | Senior Analyst

December 2018

Global Internet Growth and Trends

Key Digital
Transformers

By 2022

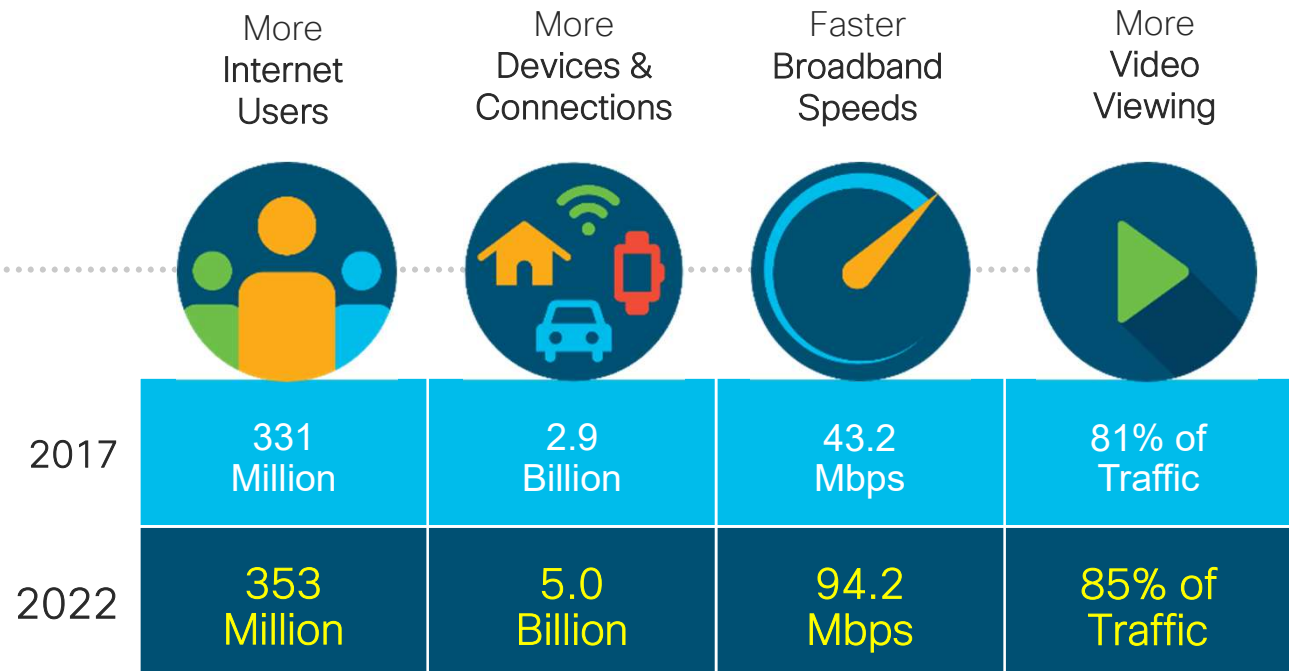


Source: Cisco VNI Global IP Traffic Forecast, 2017–2022

North America Internet Growth and Trends

Key Digital
Transformers

By 2022

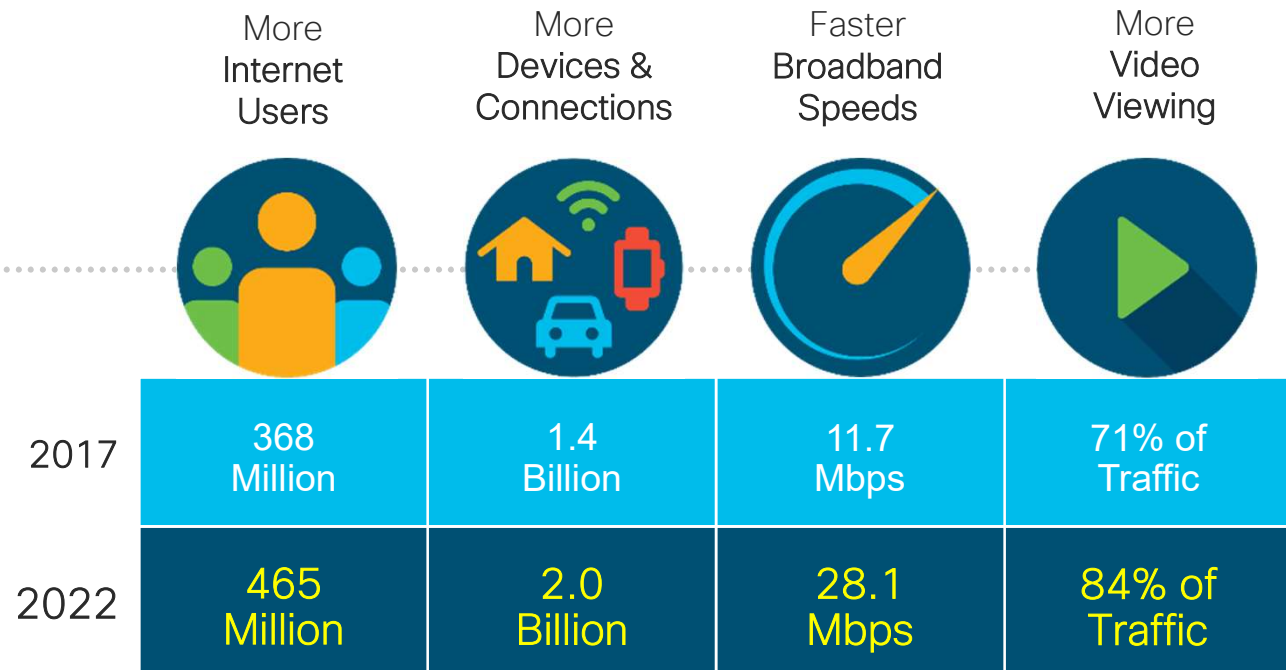


Source: Cisco VNI Global IP Traffic Forecast, 2017–2022

LATAM Internet Growth and Trends

Key Digital
Transformers

By 2022

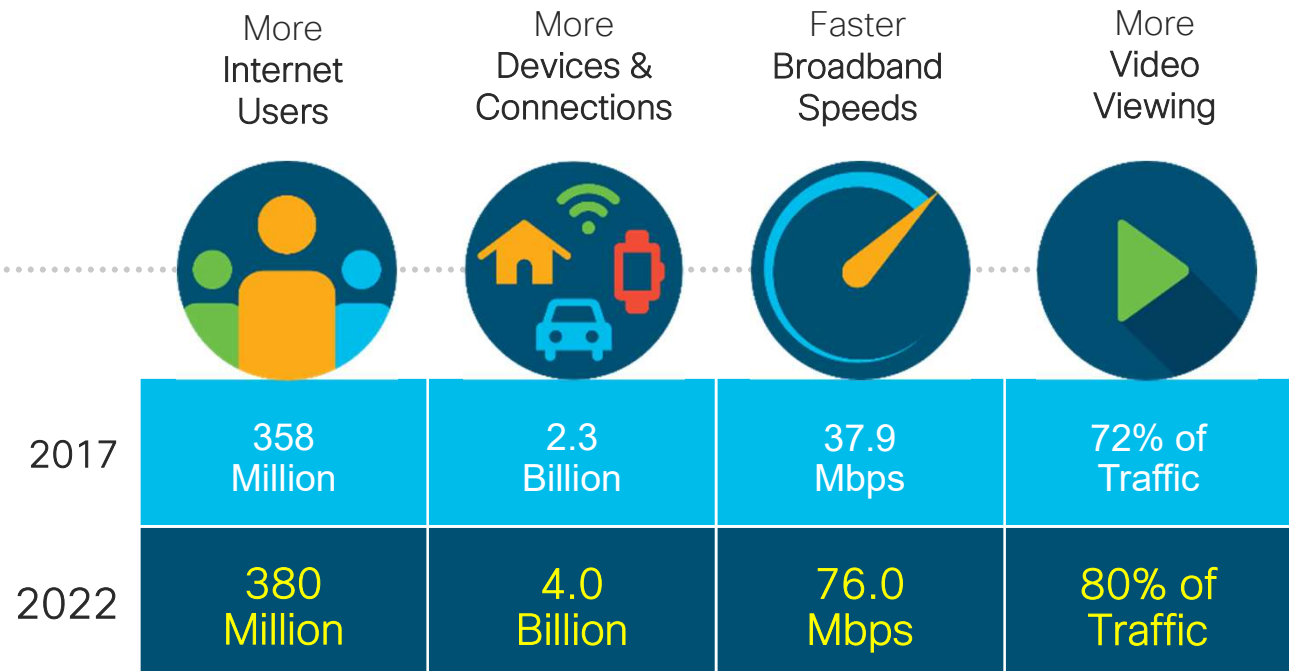


Source: Cisco VNI Global IP Traffic Forecast, 2017–2022

WE Internet Growth and Trends

Key Digital
Transformers

By 2022

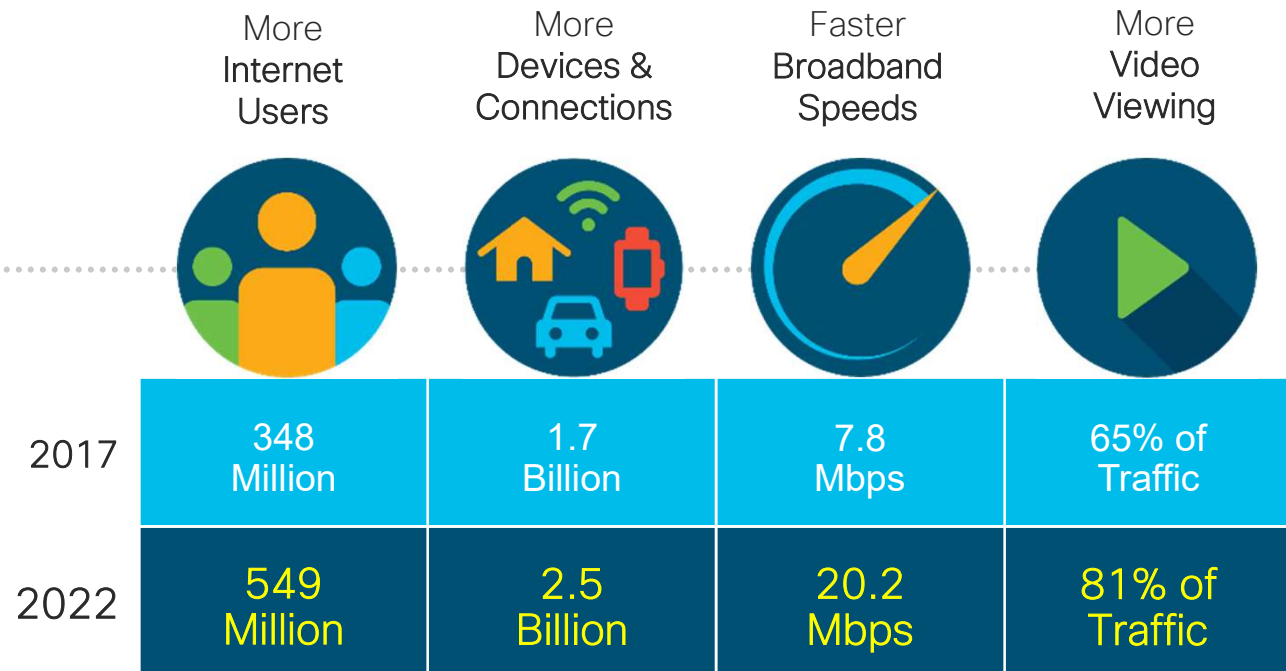


Source: Cisco VNI Global IP Traffic Forecast, 2017–2022

MEA Internet Growth and Trends

Key Digital
Transformers

By 2022



Source: Cisco VNI Global IP Traffic Forecast, 2017–2022

Overview

Entering the Multi-Zettabyte Era

By 2022, global IP traffic will reach an annual run rate of 4.8 zettabytes per year

4.8 zettabytes is equal to:

- Nearly 11X more than all IP traffic generated in 2012 (437 exabytes)
- All movies ever made crossing global IP networks in less than a minute (53 seconds)

What is a zettabyte?

One trillion gigabytes

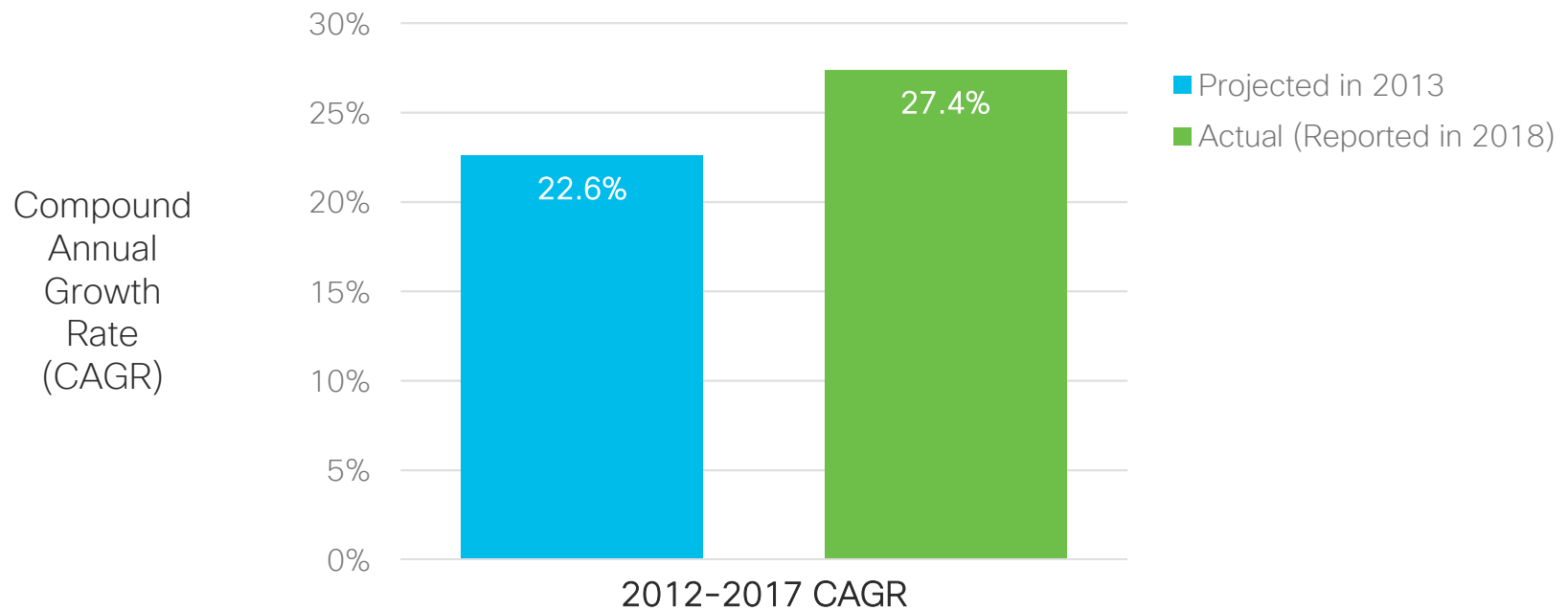
Approximately 10^{21}

(1,000,000,000,000,000,000 bytes)



VNI Projections and Actuals (Global)

Actual growth has been within $\pm 10\%$ of projected growth

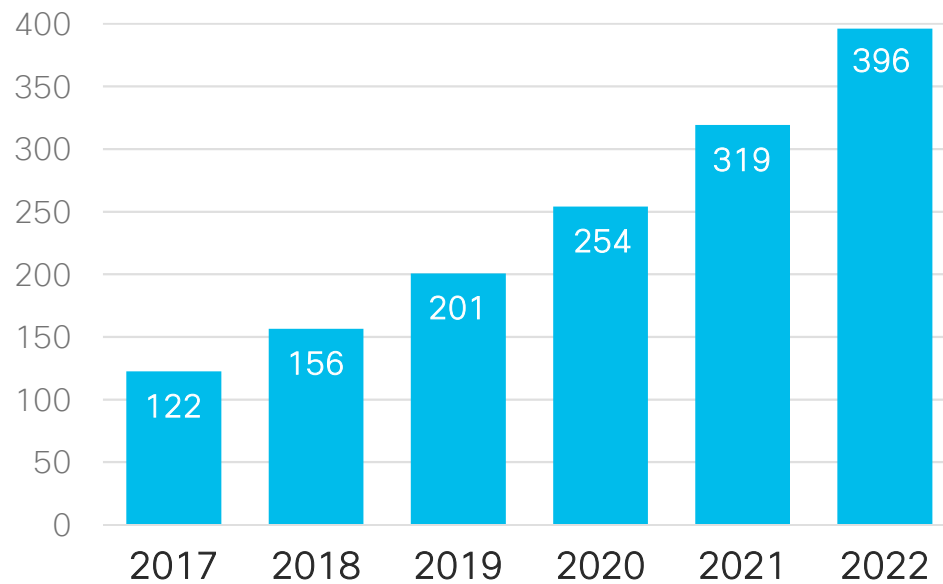


Global IP Traffic Growth

Global IP traffic will increase 3-fold from 2017 to 2022

26% CAGR
2017-2022

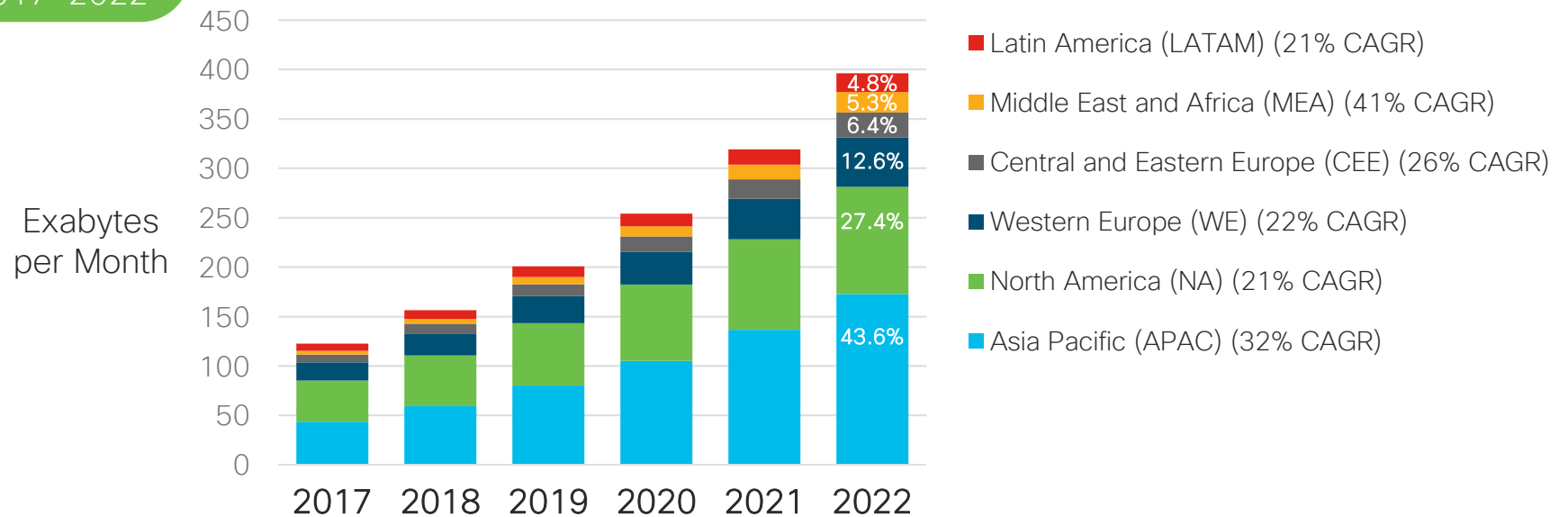
Exabytes
per Month



Global IP Traffic Growth by Region

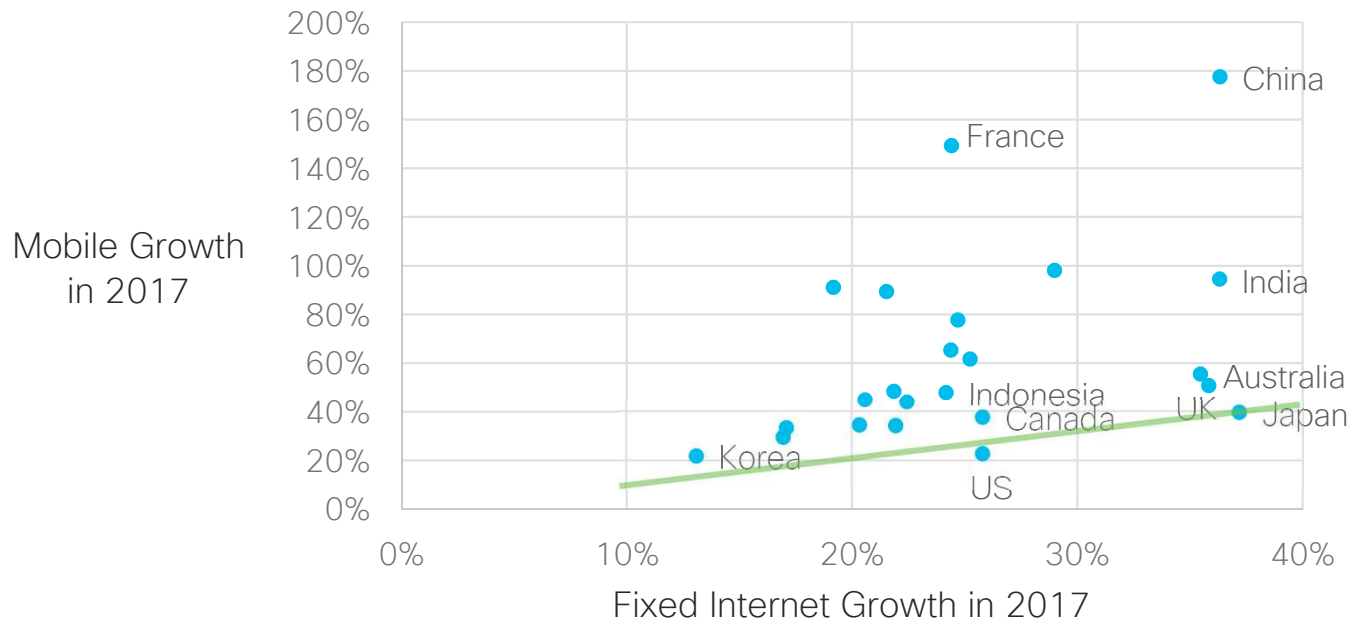
MEA has the highest growth rate (41%) from 2017 to 2022
APAC will generate 44% of all IP traffic by 2022

26% CAGR
2017-2022



Fixed and Mobile Growth in 2017

Most countries have higher mobile than fixed growth
But there are a growing number of exceptions



Top Trends

Top Trends

Devices & Connections



- 1 Devices/Connections Mix
- 2 IoT/M2M by Verticals
- 3 IPv6 Adoption

Traffic Trends



- 4 Traffic Growth by App
- 5 Traffic Pattern Analysis
- 6 "Cord-Cutting"

Network Performance and User Experience



- 7 Wi-Fi Momentum
- 8 Accelerating Speeds
- 9 Security Analysis

Top Trends

Devices & Connections



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Network Performance and User Experience

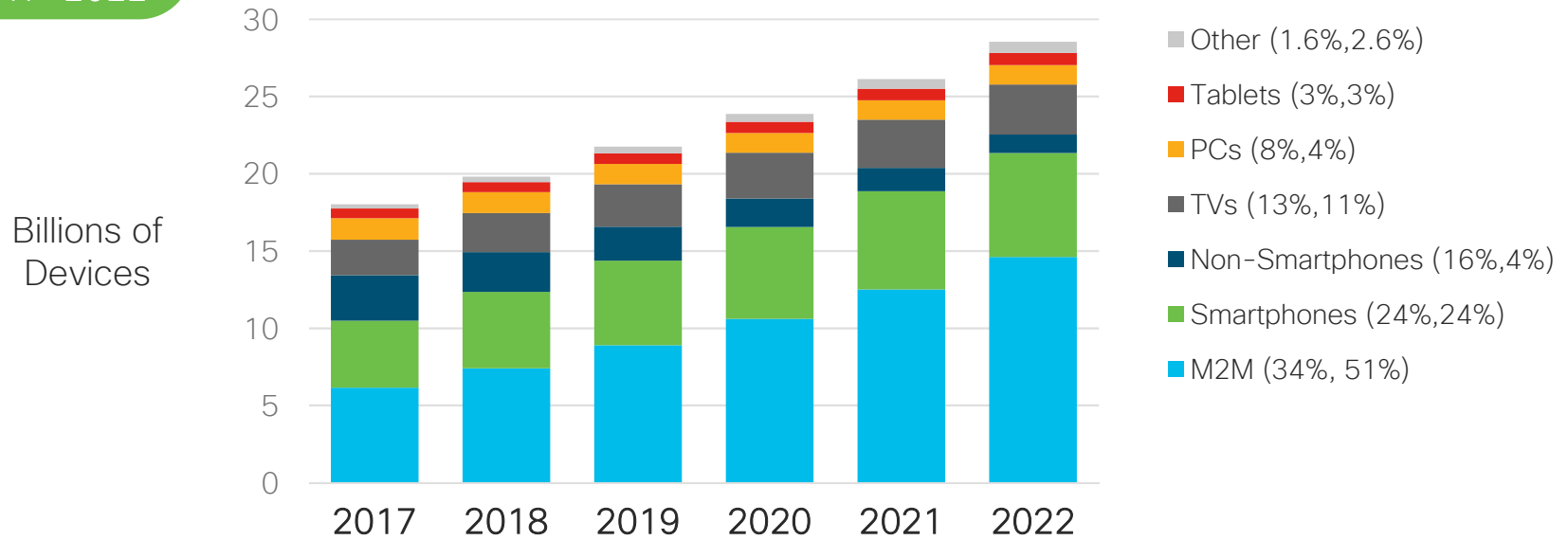


- 7 Wi-Fi Momentum
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- 9 Security Analysis

Global Device/Connection Growth by Type

By 2022, M2M connections will be more than half of total connections

10% CAGR
2017-2022



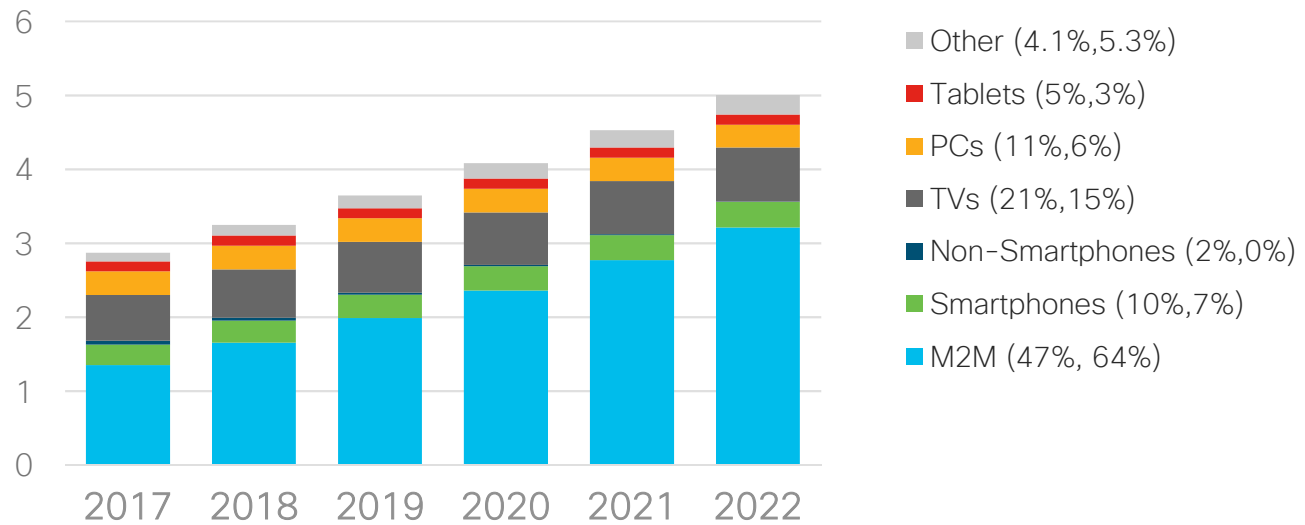
* Figures (n) refer to 2017, 2022 device share

NA Device/Connection Growth by Type

By 2022, M2M connections will be nearly two-thirds of total connections

12% CAGR
2017-2022

Billions of
Devices



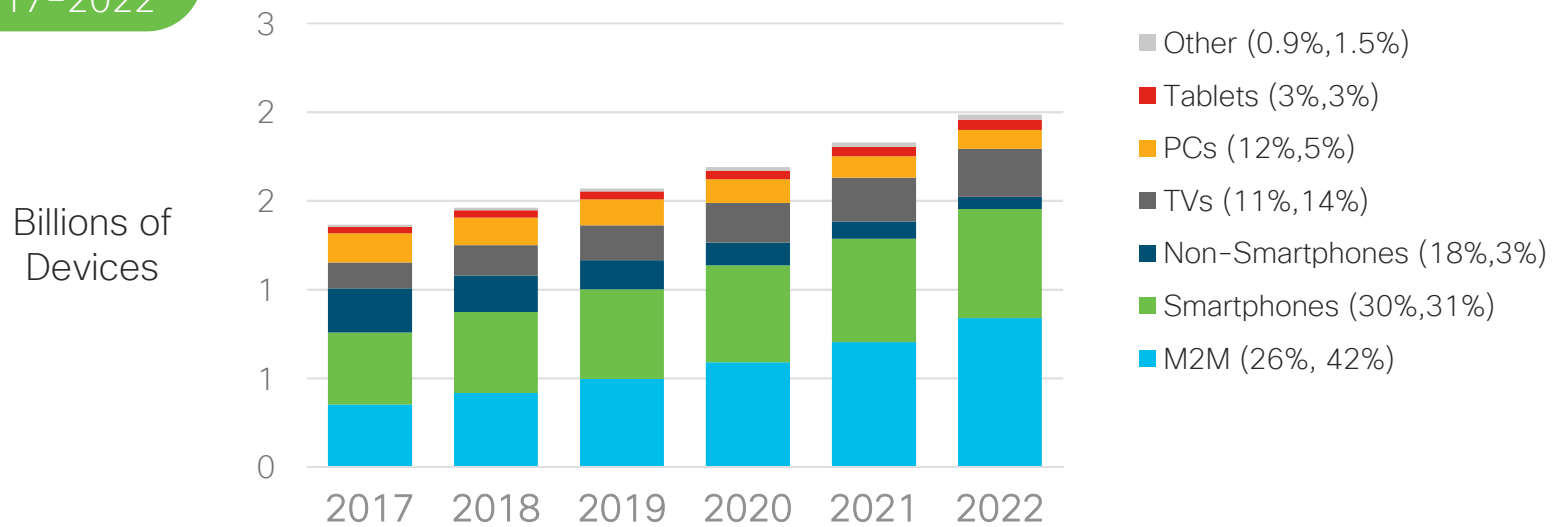
* Figures (n) refer to 2017, 2022 device share

Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

LATAM Device/Connection Growth by Type

By 2022, M2M connections will be over forty percent of total connections

8% CAGR
2017-2022



* Figures (n) refer to 2017, 2022 device share

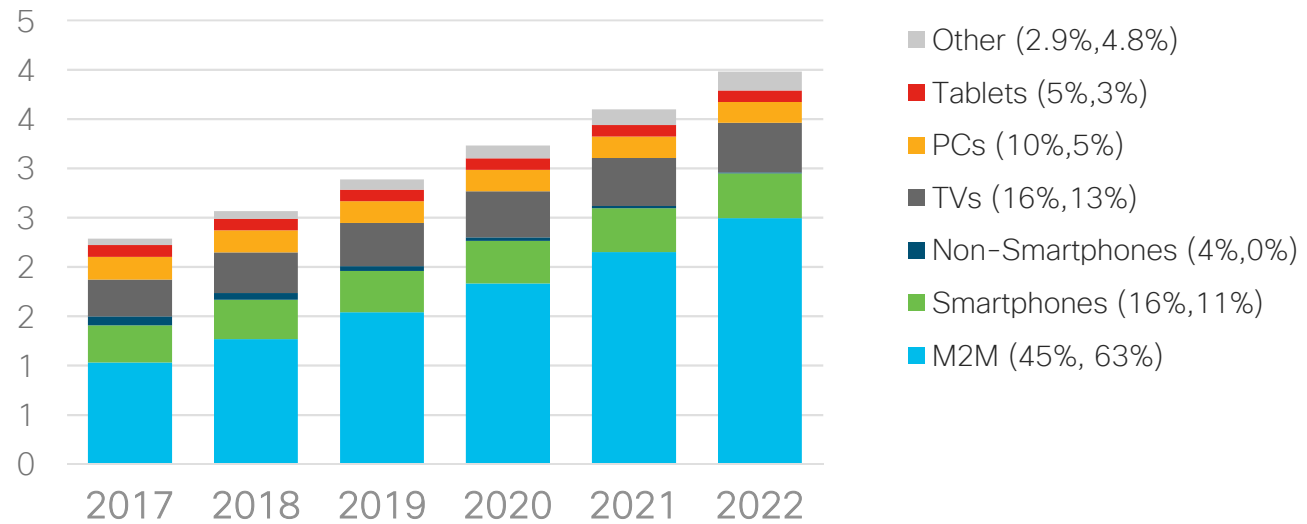
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

WE Device/Connection Growth by Type

By 2022, M2M connections will be nearly two-thirds of total connections

12% CAGR
2017-2022

Billions of
Devices



* Figures (n) refer to 2017, 2022 device share

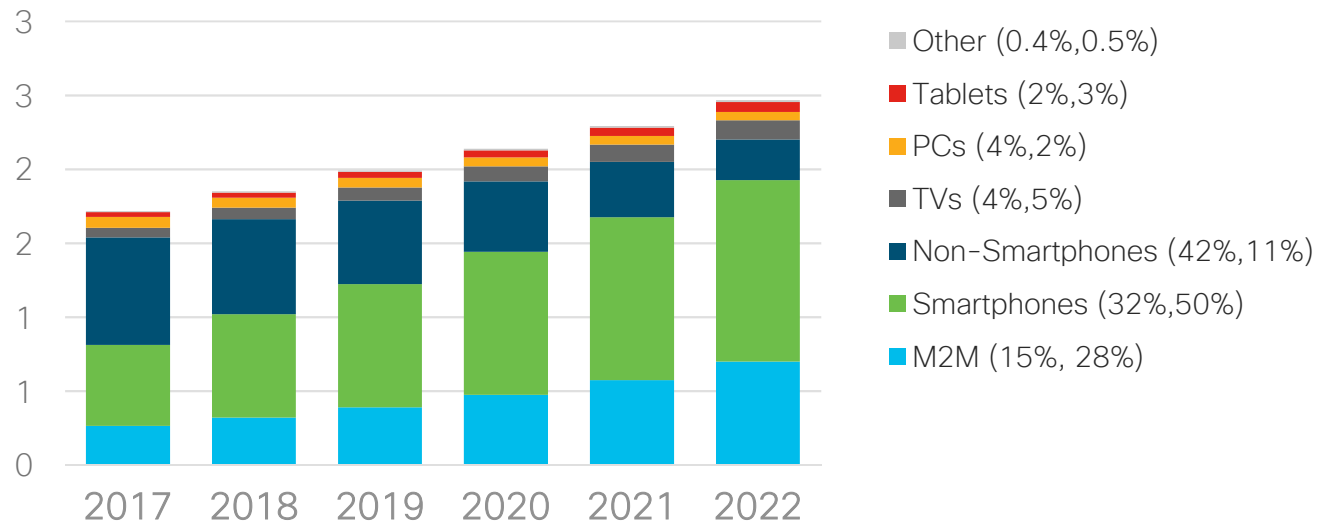
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

MEA Device/Connection Growth by Type

By 2022, M2M connections will be nearly a third of total connections

8% CAGR
2017-2022

Billions of
Devices

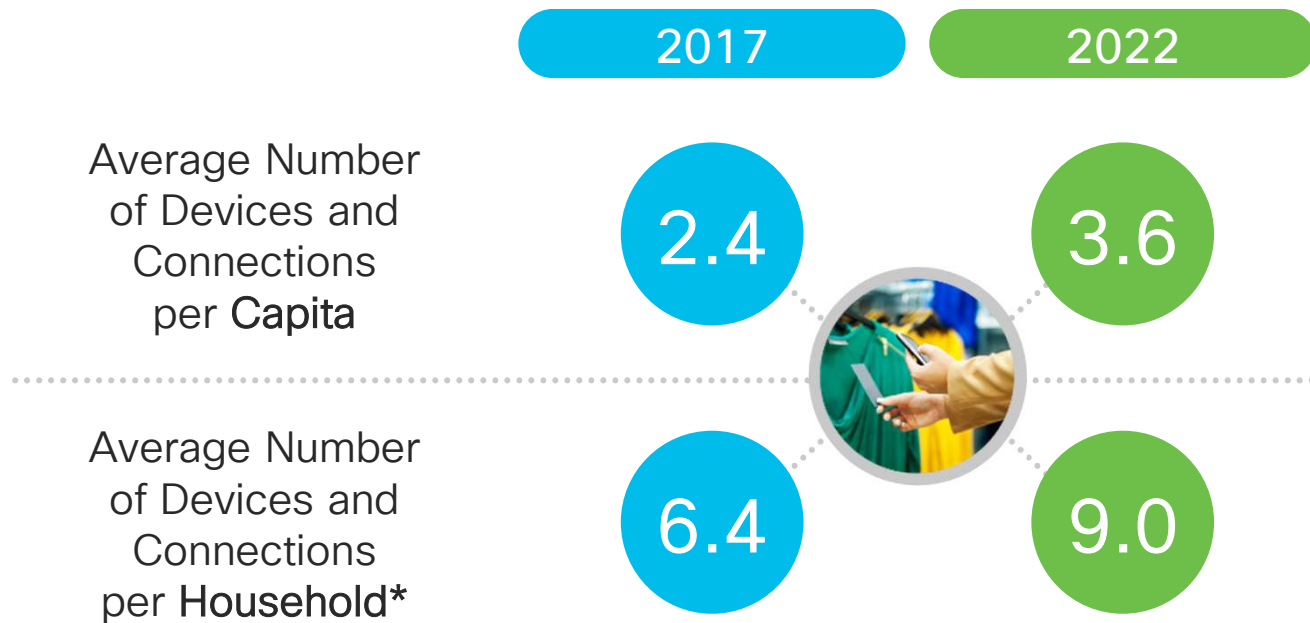


* Figures (n) refer to 2017, 2022 device share

Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

Global Devices and Connections

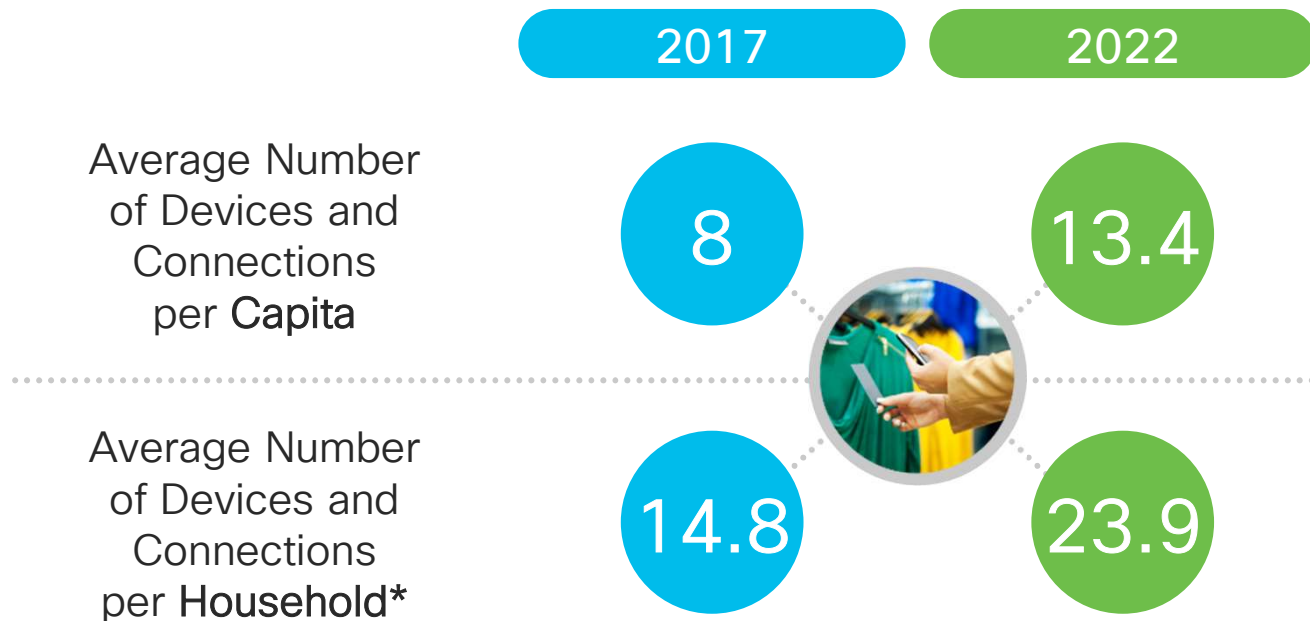
Average per capita and per household



* Household average includes only Consumer devices and connections

NA Devices and Connections

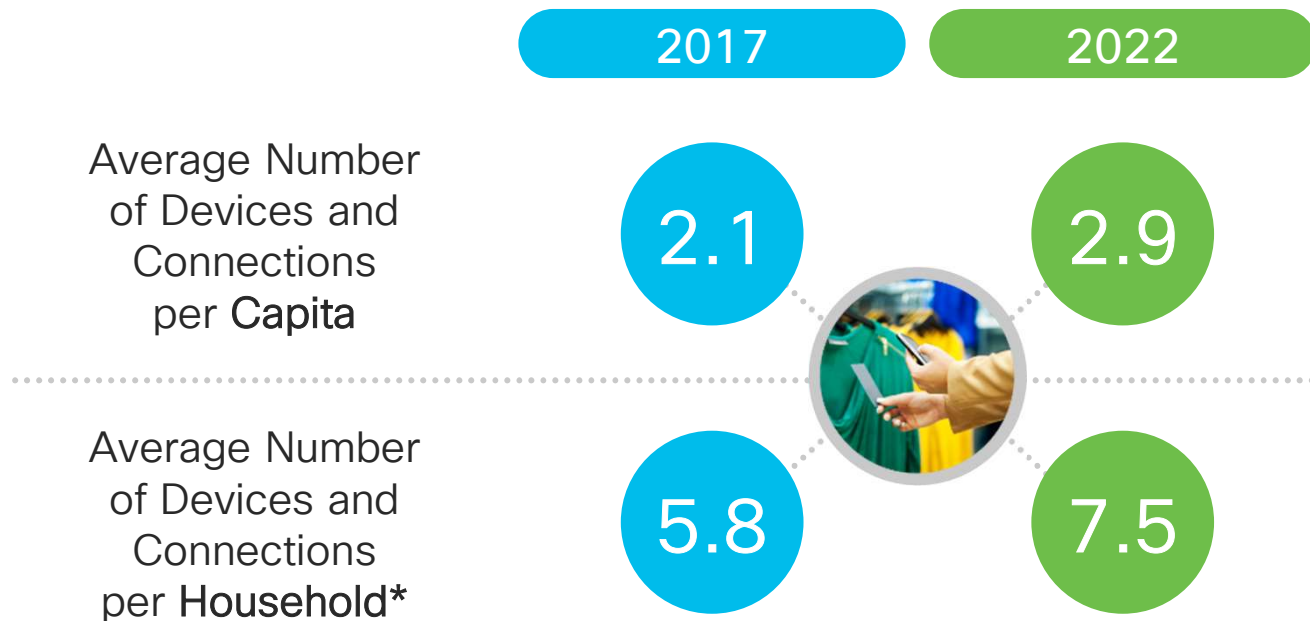
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LATAM Devices and Connections

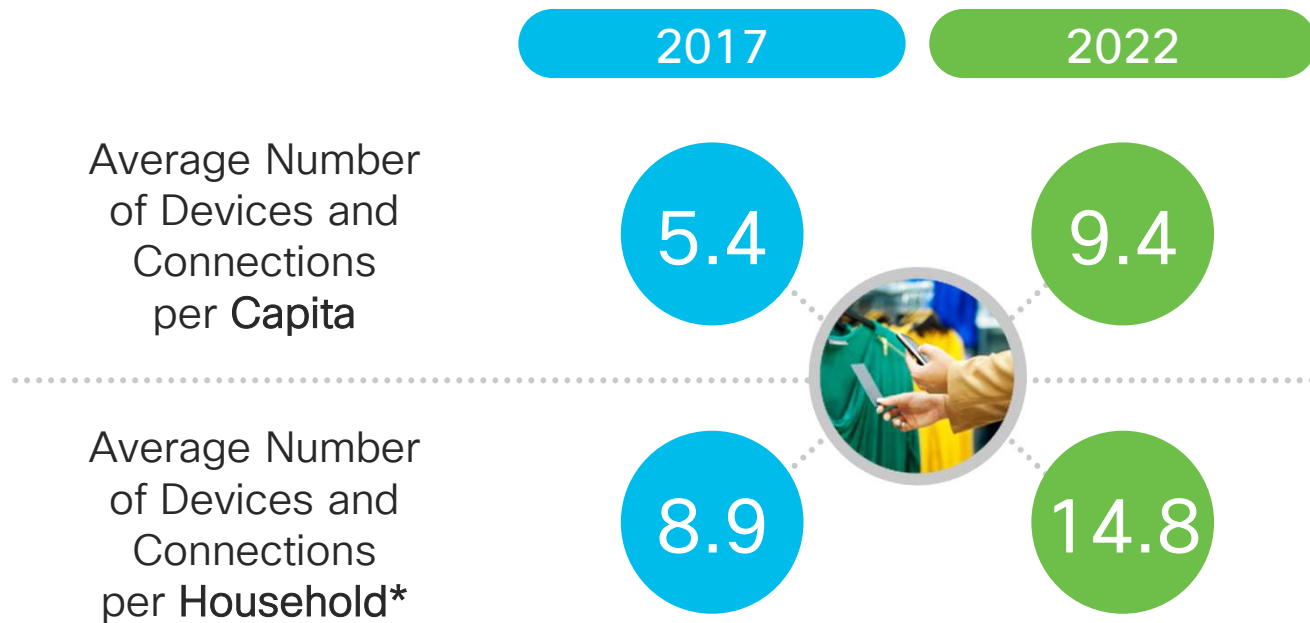
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WE Devices and Connections

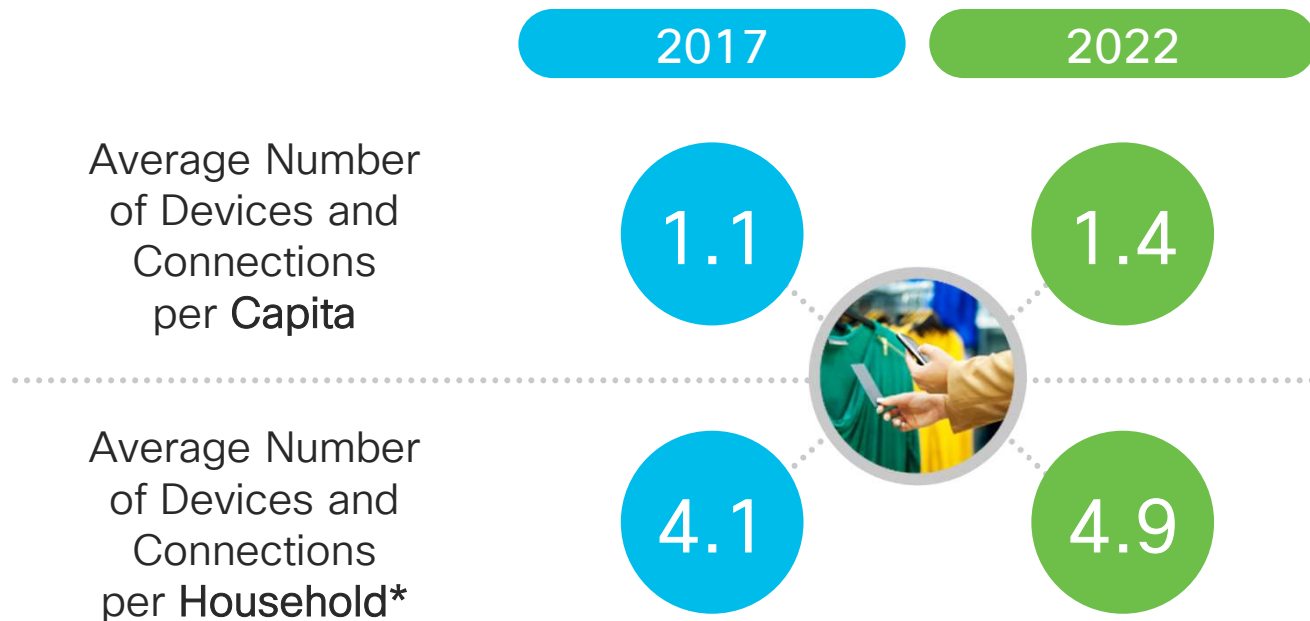
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MEA Devices and Connections

Average per capita and per household

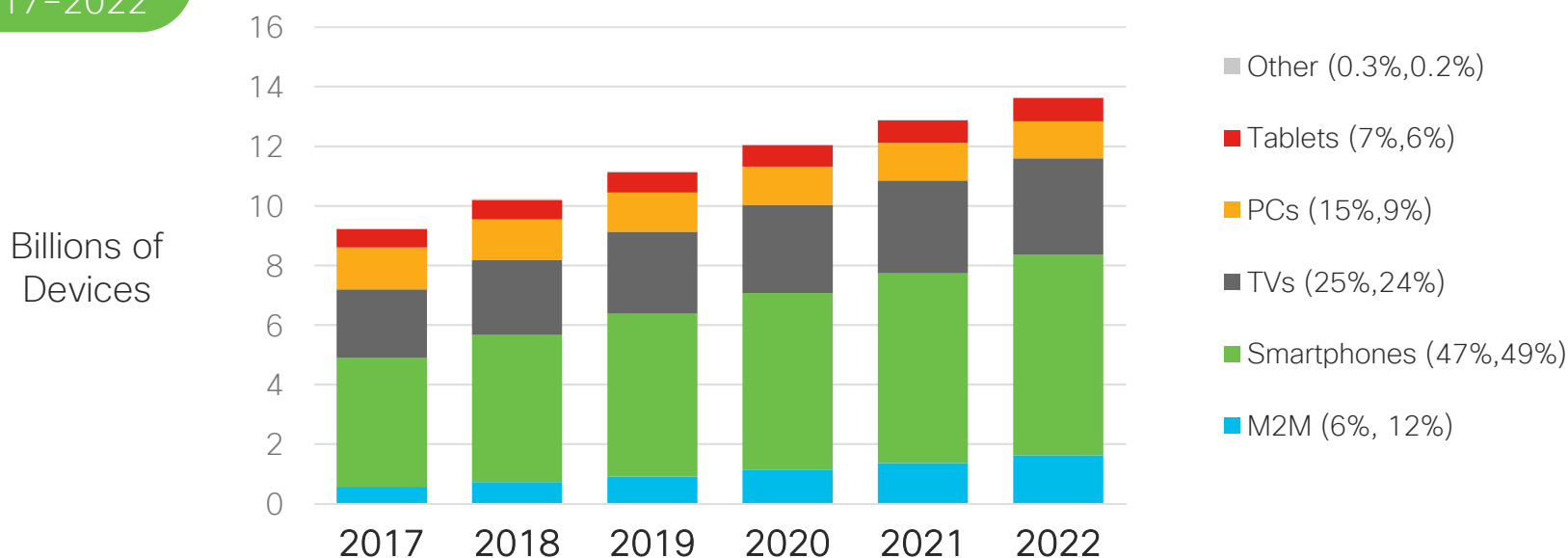


* Household average includes only Consumer devices and connections

Global Video Capable Device Growth by Type

By 2022, nearly half (48%) of total devices and connections will be video capable

8% CAGR
2017-2022

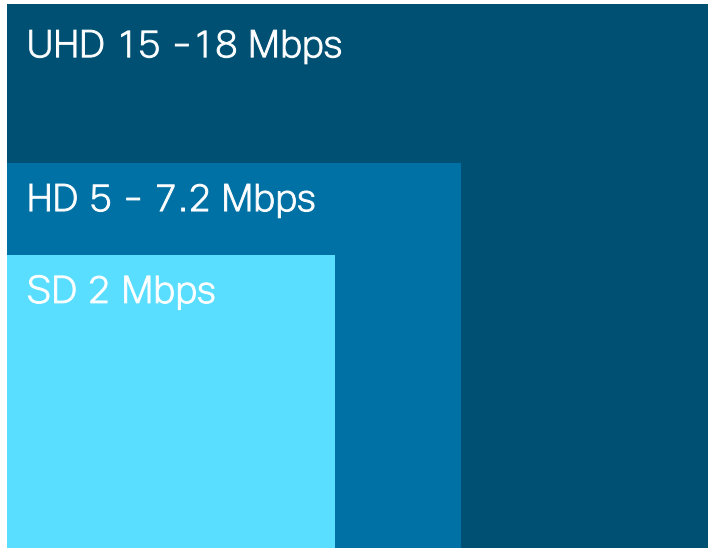


* Figures (n) refer to 2017, 2022 device share

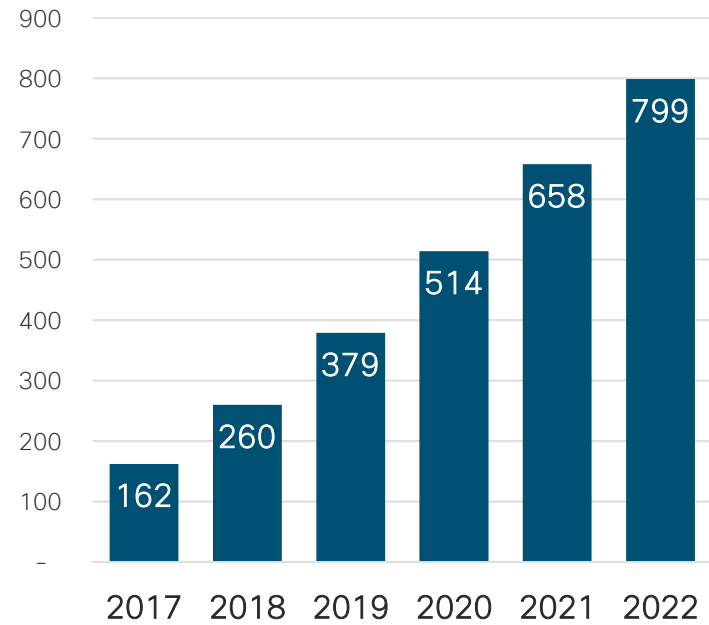
Increasing Video Definition

By 2022, nearly two-thirds (62%) of connected flat panel TVs will support 4K

38% CAGR
2017-2022



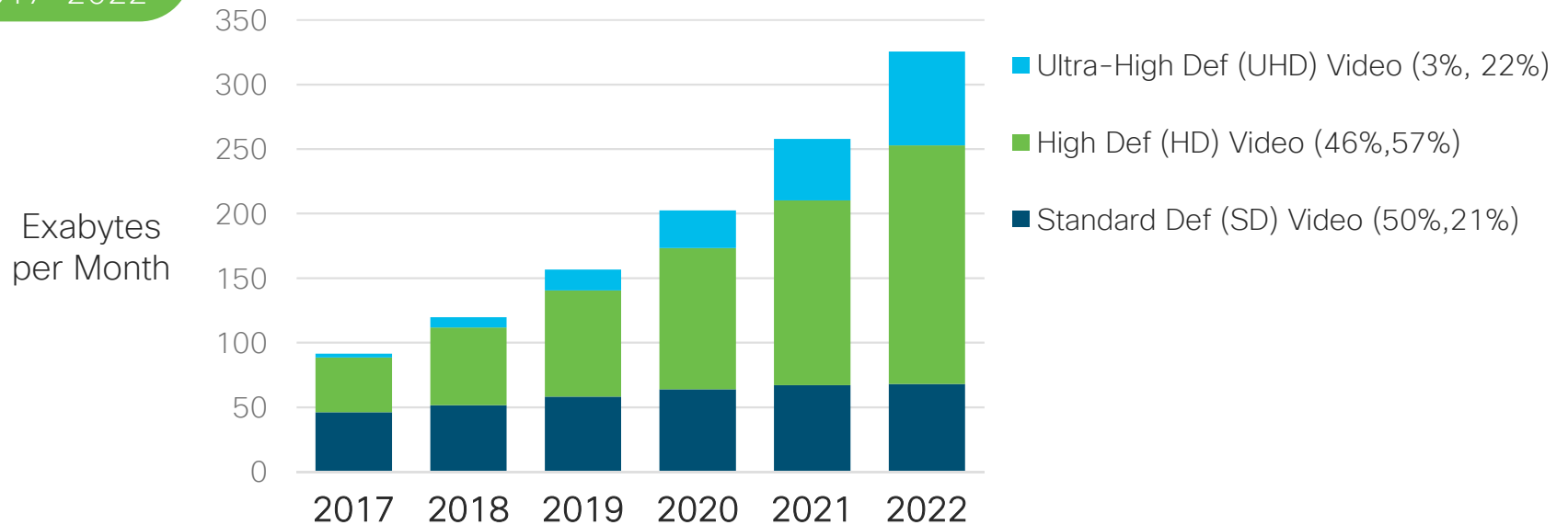
Connected
4K TV Sets
(M)



High Definition Content Impacts IP Video Growth

UHD IP video will account for 22% of global IP video traffic by 2022

29% CAGR
2017-2022



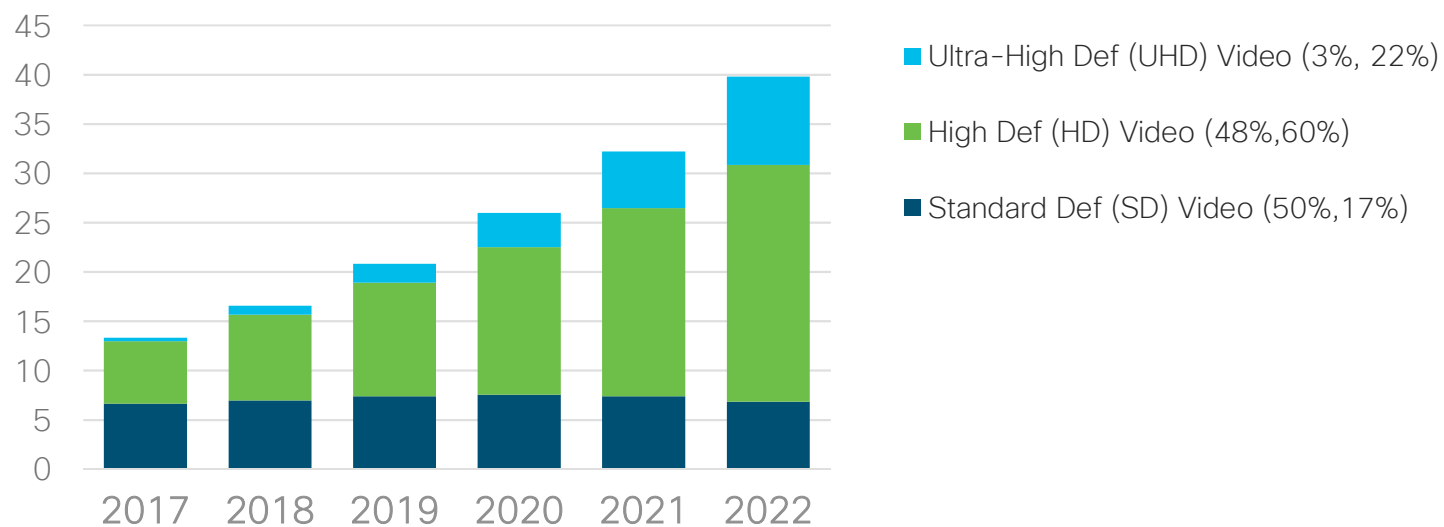
* Figures (n) refer to 2017, 2022 traffic share

WE High Definition Content Impacts IP Video Growth

UHD IP video will account for 22% of WE IP video traffic by 2022

24% CAGR
2017-2022

Exabytes
per Month



* Figures (n) refer to 2017, 2022 traffic share

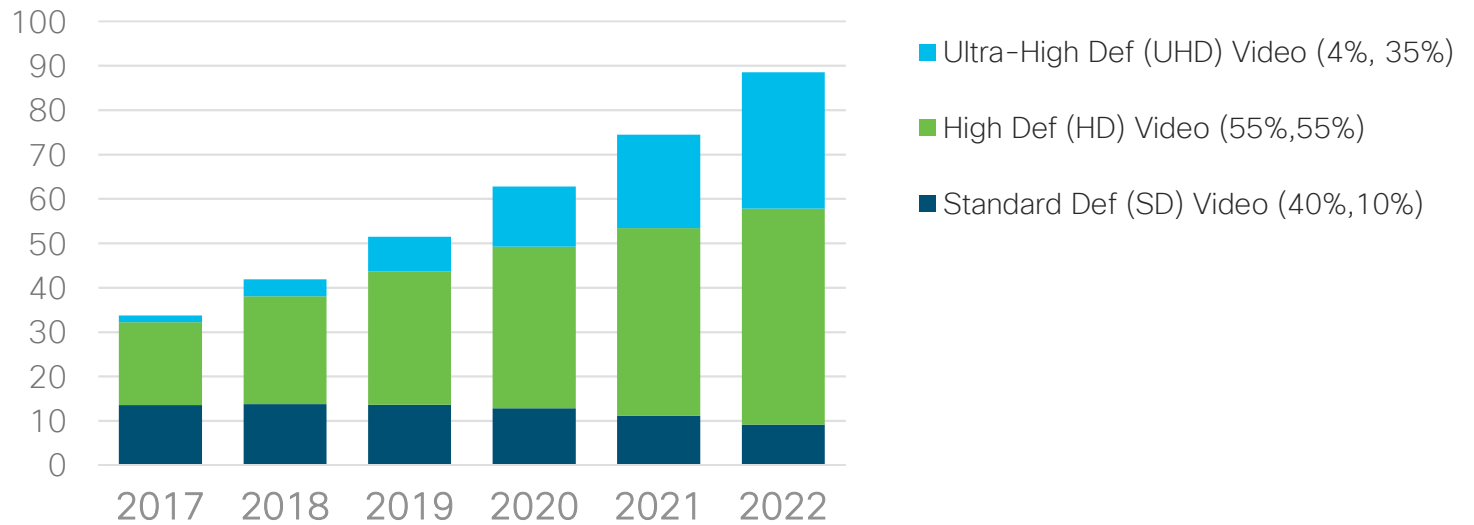
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

NA High Definition Content Impacts IP Video Growth

UHD IP video will account for 35% of NA IP video traffic by 2022

21% CAGR
2017-2022

Exabytes
per Month



* Figures (n) refer to 2017, 2022 traffic share

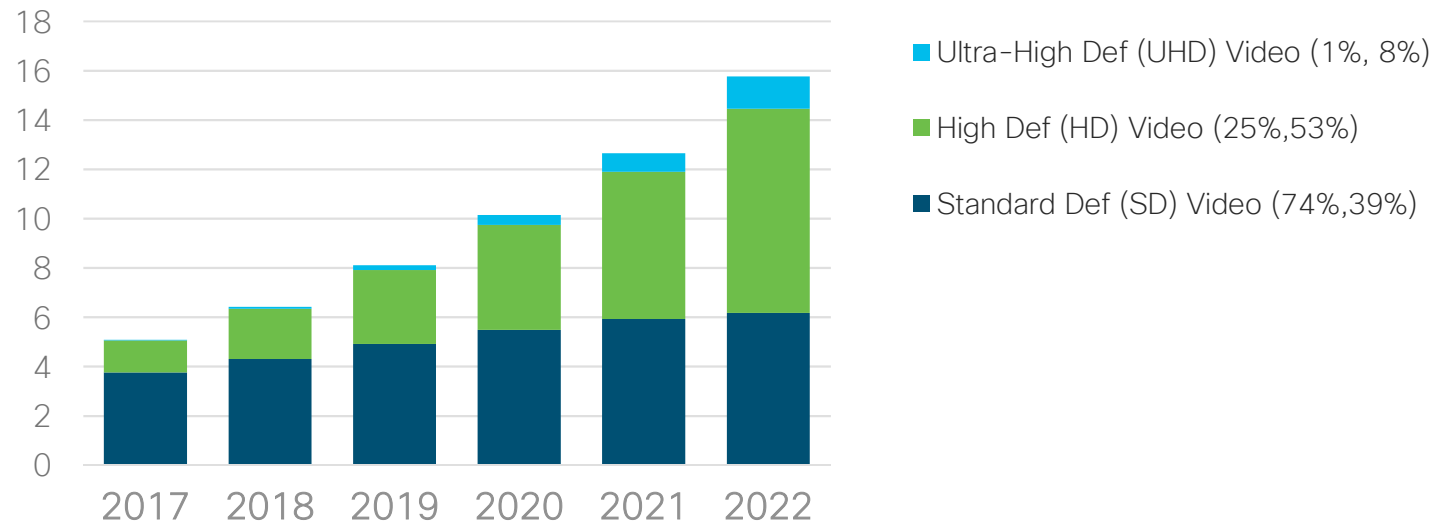
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

LATAM High Definition Content Impacts IP Video Growth

UHD IP video will account for 8% of LATAM IP video traffic by 2022

25% CAGR
2017-2022

Exabytes
per Month



* Figures (n) refer to 2017, 2022 traffic share

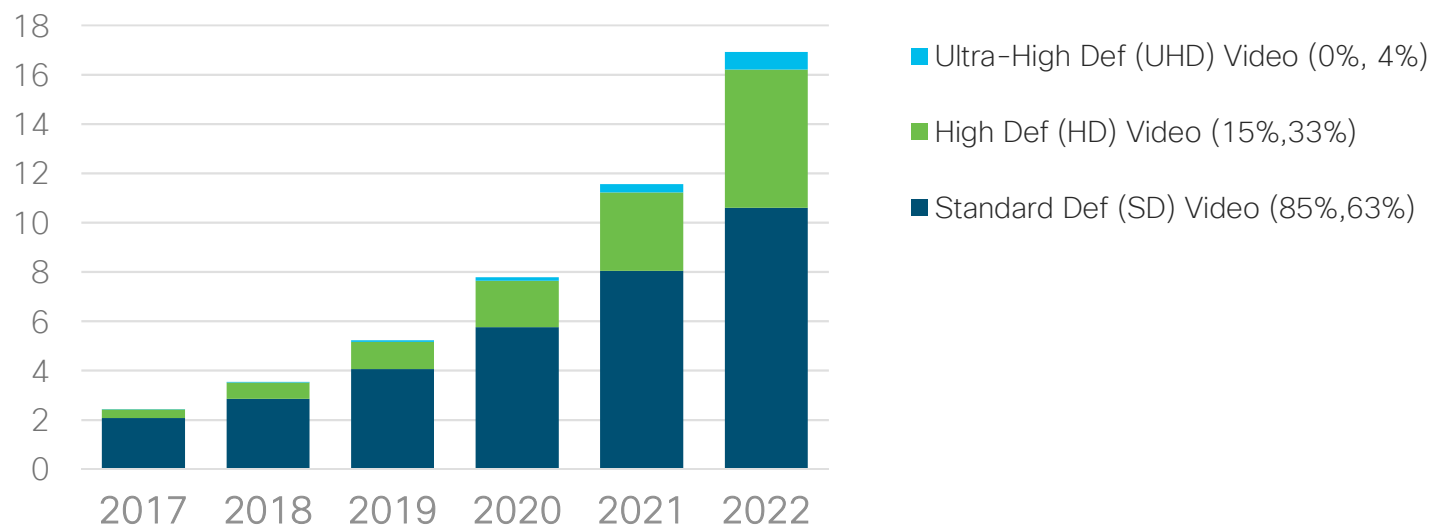
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

MEA High Definition Content Impacts IP Video Growth

UHD IP video will account for 4% of MEA IP video traffic by 2022

47% CAGR
2017-2022

Exabytes
per Month



* Figures (n) refer to 2017, 2022 traffic share

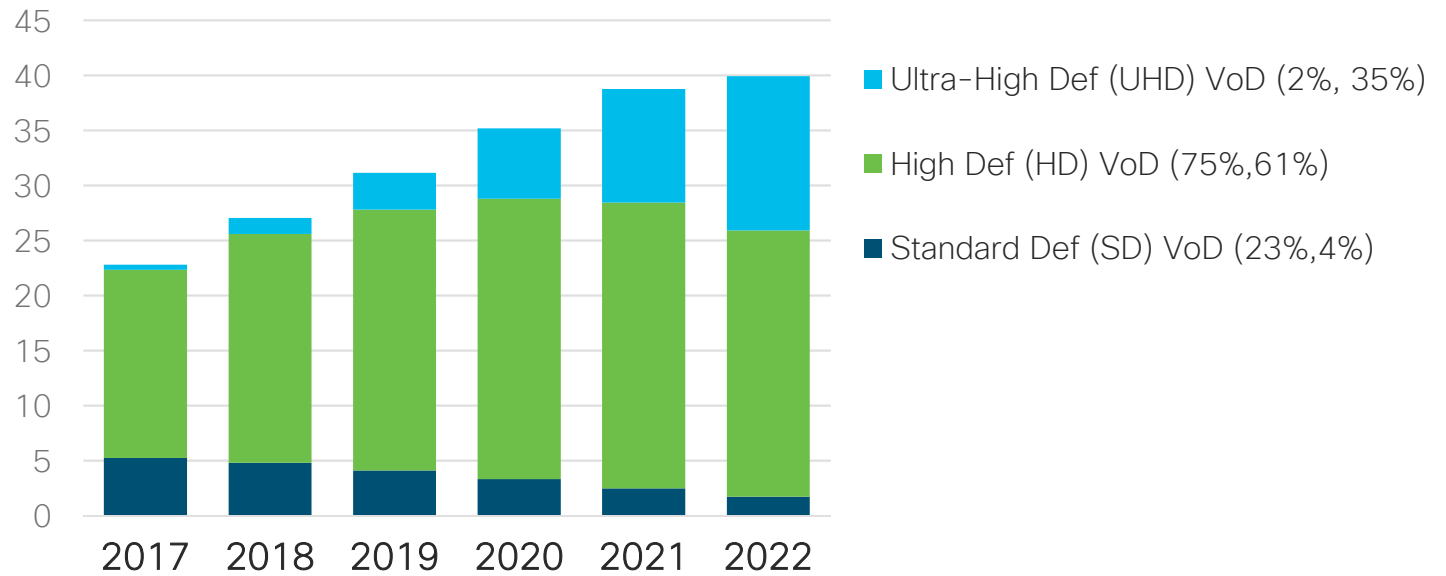
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

High Definition Content Impacts IP VoD Growth

UHD VoD will account for 35% of global IP VoD traffic by 2022






12% CAGR
2017-2022

Exabytes
per Month



* Figures (n) refer to 2017, 2022 traffic share

Global Average IP Traffic Per Device

		2017	2022
		MBs per Month	MBs per Month
	M2M Module	610	1,730
	Smartphone	5,110	26,100
	Tablet	10,380	31,140
	Laptop / PC	35,950	59,250
	Ultra High Definition TV*	7,520	35,840

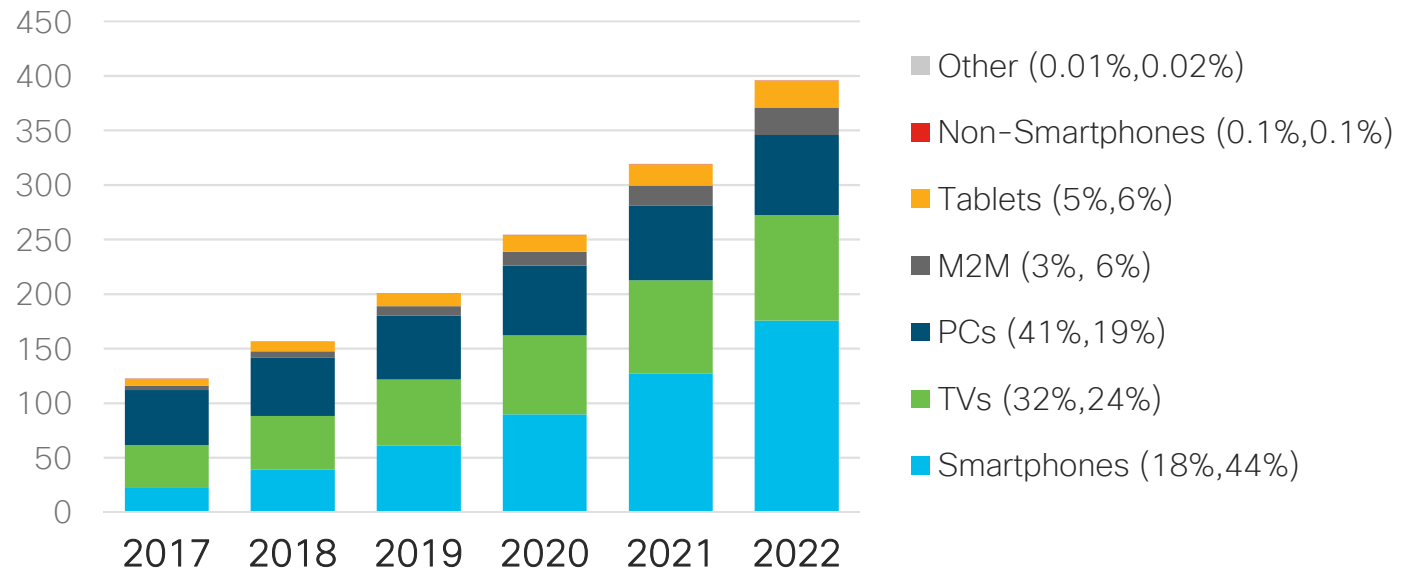
* Includes IP VoD traffic

Global IP Traffic by Device Type

By 2022, non-PC devices will drive 81% of global IP traffic

26% CAGR
2017-2022

Exabytes
per Month

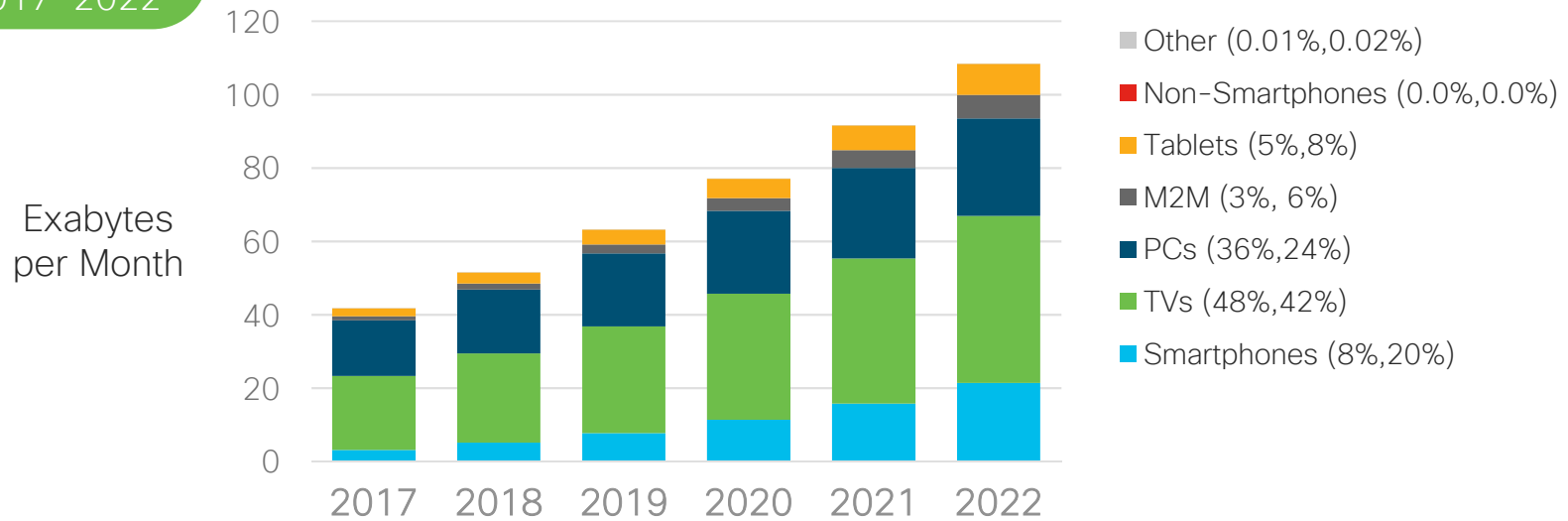


* Figures (n) refer to 2017, 2022 traffic share

NA IP Traffic by Device Type

By 2022, non-PC devices will drive 76% of regional IP traffic

21% CAGR
2017-2022



* Figures (n) refer to 2017, 2022 traffic share

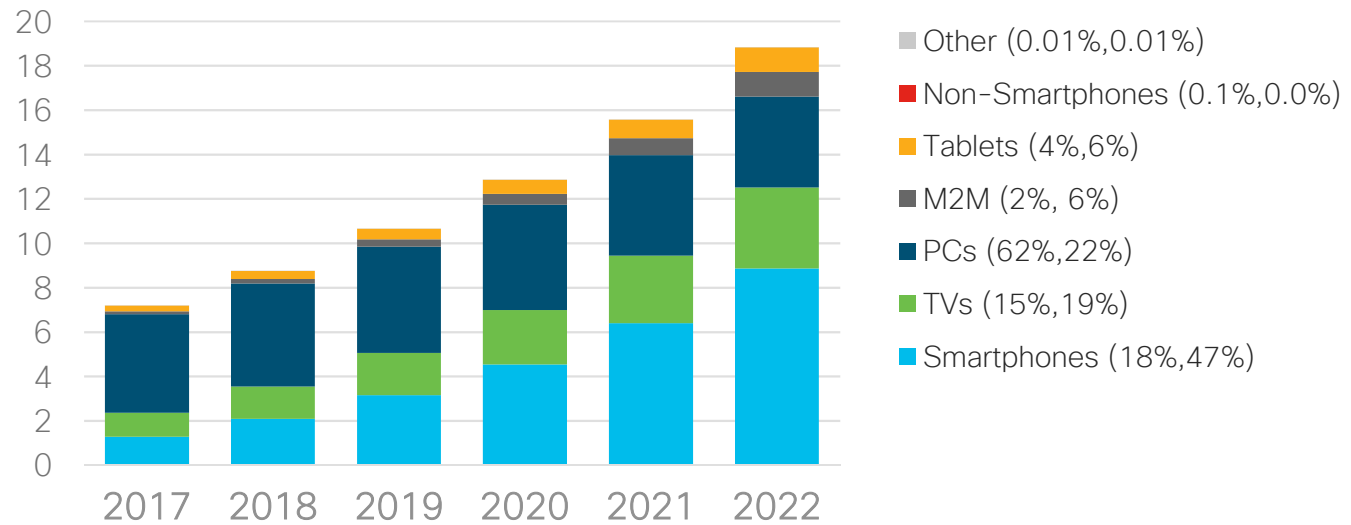
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

LATAM IP Traffic by Device Type

By 2022, non-PC devices will drive 78% of regional IP traffic

21% CAGR
2017-2022

Exabytes
per Month



* Figures (n) refer to 2017, 2022 traffic share

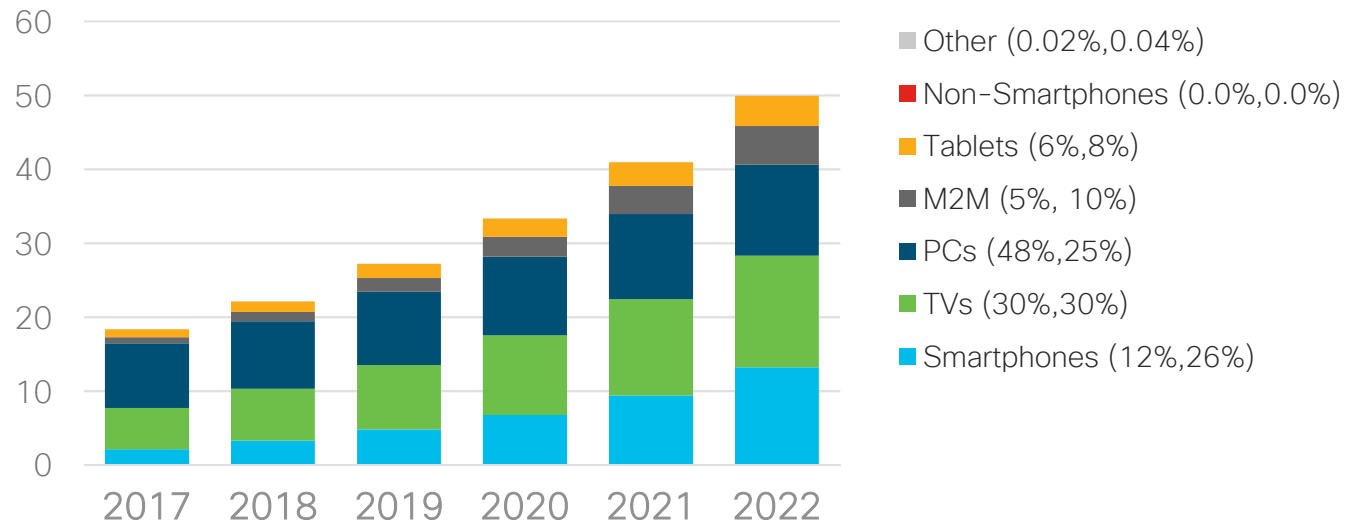
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

WE IP Traffic by Device Type

By 2022, non-PC devices will drive 75% of regional IP traffic

22% CAGR
2017-2022

Exabytes
per Month



* Figures (n) refer to 2017, 2022 traffic share

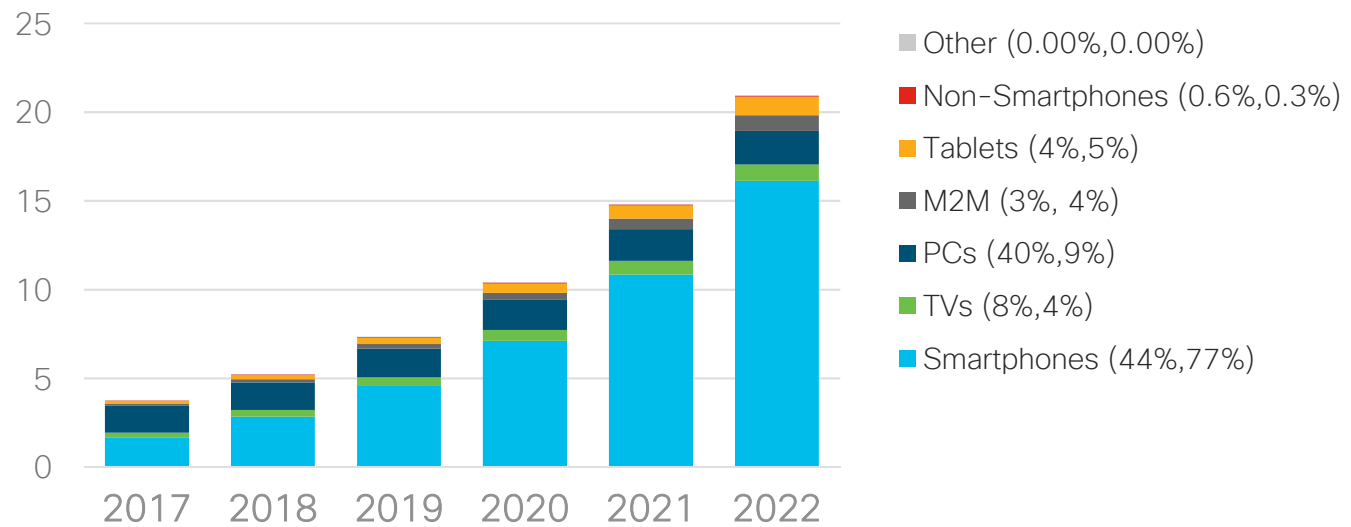
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

MEA IP Traffic by Device Type

By 2022, non-PC devices will drive 91% of regional IP traffic

41% CAGR
2017-2022

Exabytes
per Month



* Figures (n) refer to 2017, 2022 traffic share

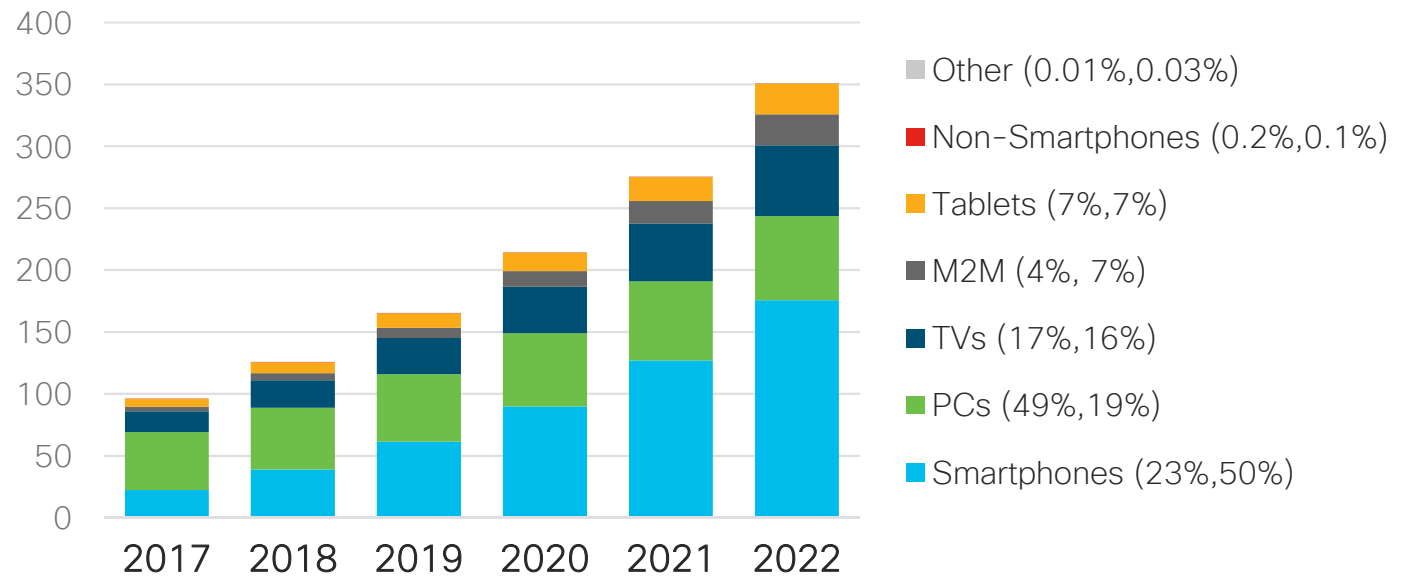
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

Global Internet Traffic by Device Type

By 2022, non-PC devices will drive 81% of global Internet traffic

30% CAGR
2017-2022

Exabytes
per Month



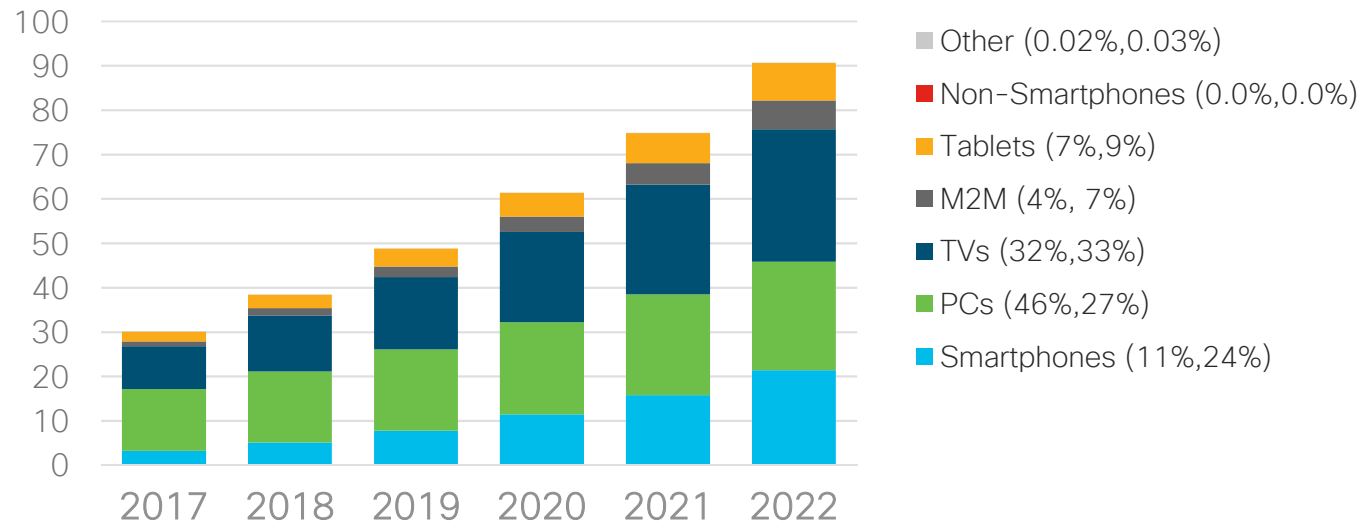
* Figures (n) refer to 2017, 2022 traffic share

NA Internet Traffic by Device Type

By 2022, non-PC devices will drive 73% of regional Internet traffic

25% CAGR
2017-2022

Exabytes
per Month



* Figures (n) refer to 2017, 2022 traffic share

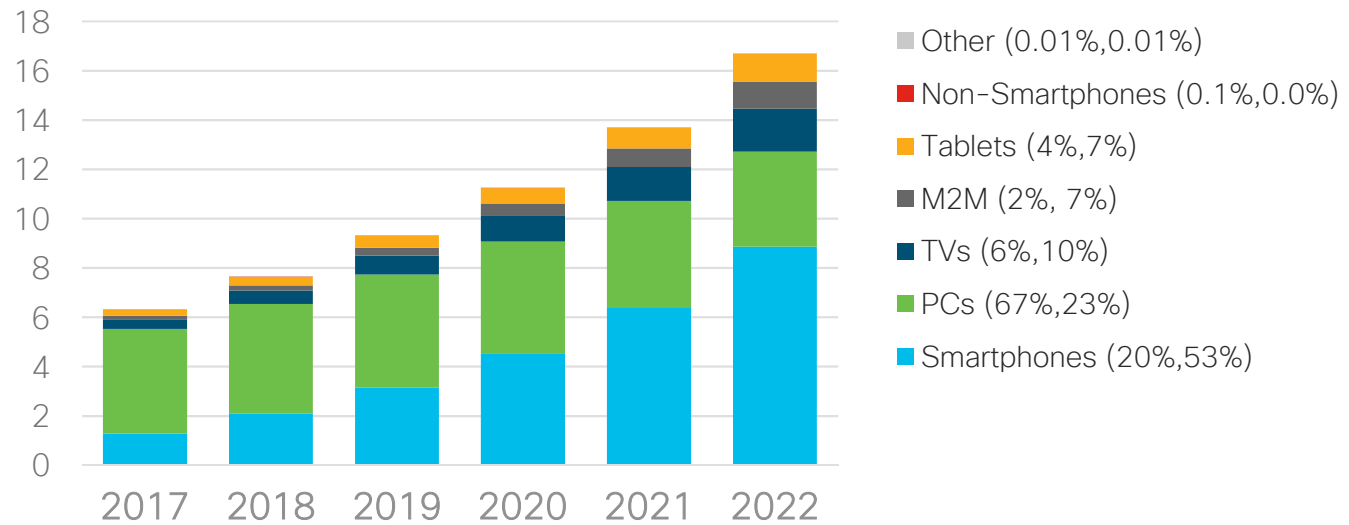
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

LATAM Internet Traffic by Device Type

By 2022, non-PC devices will drive 77% of regional Internet traffic

21% CAGR
2017-2022

Exabytes
per Month



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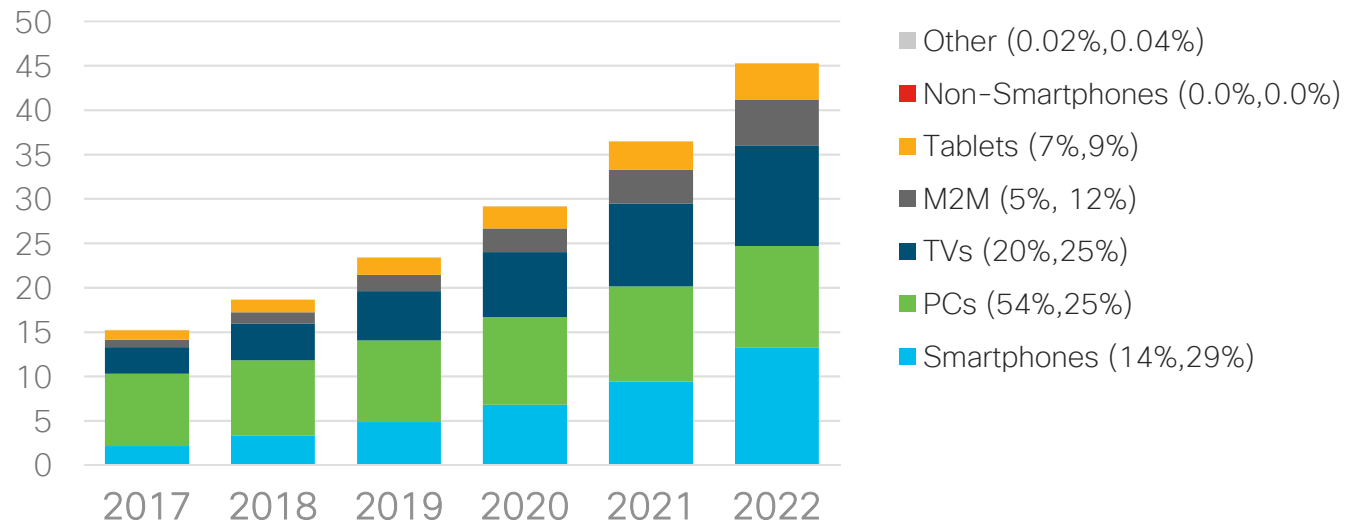
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

WE Internet Traffic by Device Type

By 2022, non-PC devices will drive 75% of regional Internet traffic

24% CAGR
2017-2022

Exabytes
per Month



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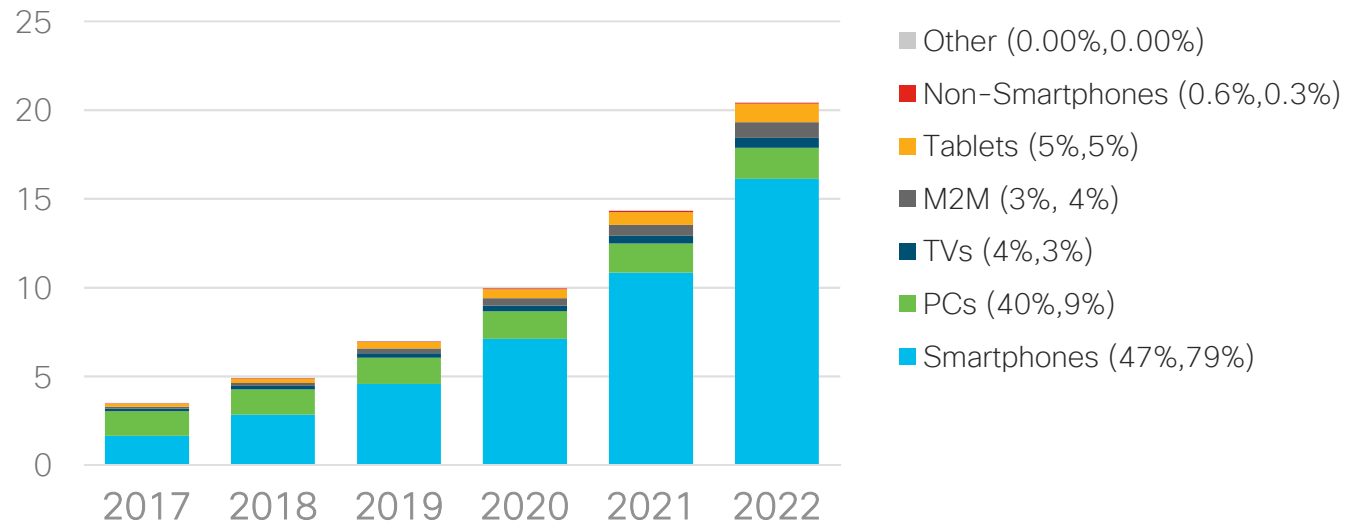
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

MEA Internet Traffic by Device Type

By 2022, non-PC devices will drive 91% of regional Internet traffic

42% CAGR
2017-2022

Exabytes
per Month



* Figures (n) refer to 2017, 2022 traffic share

Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

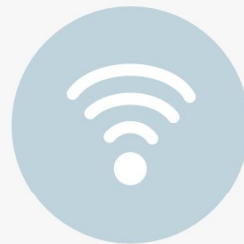
Top Trends

Devices & Connections



- 1 Devices/Connections Mix
- 2 IoT/M2M by Verticals
- 3 IPv6 Adoption

Traffic Trends



- 4 Traffic Growth by App
- 5 Traffic Pattern Analysis
- 6 "Cord-Cutting"

Network Performance and User Experience



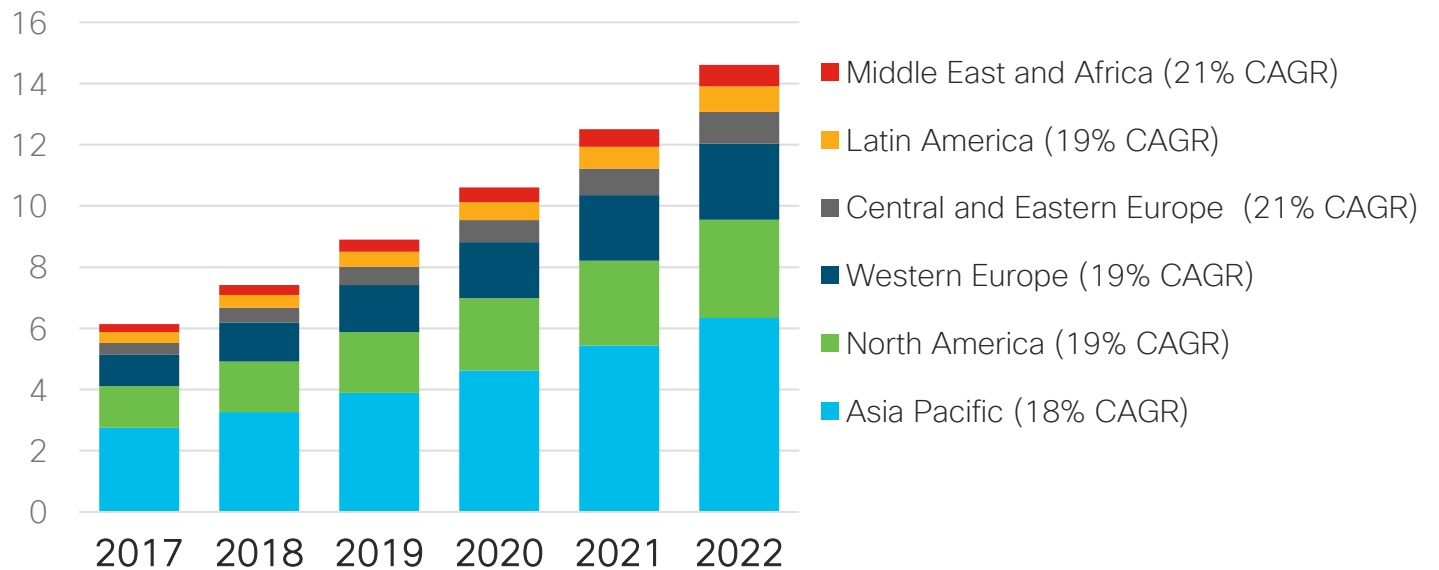
- 7 Wi-Fi Momentum
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Global M2M Connections / IoT Growth

By 2022, 1.8 M2M connections per capita globally

19% CAGR
2017-2022

Billions of
M2M
Connections

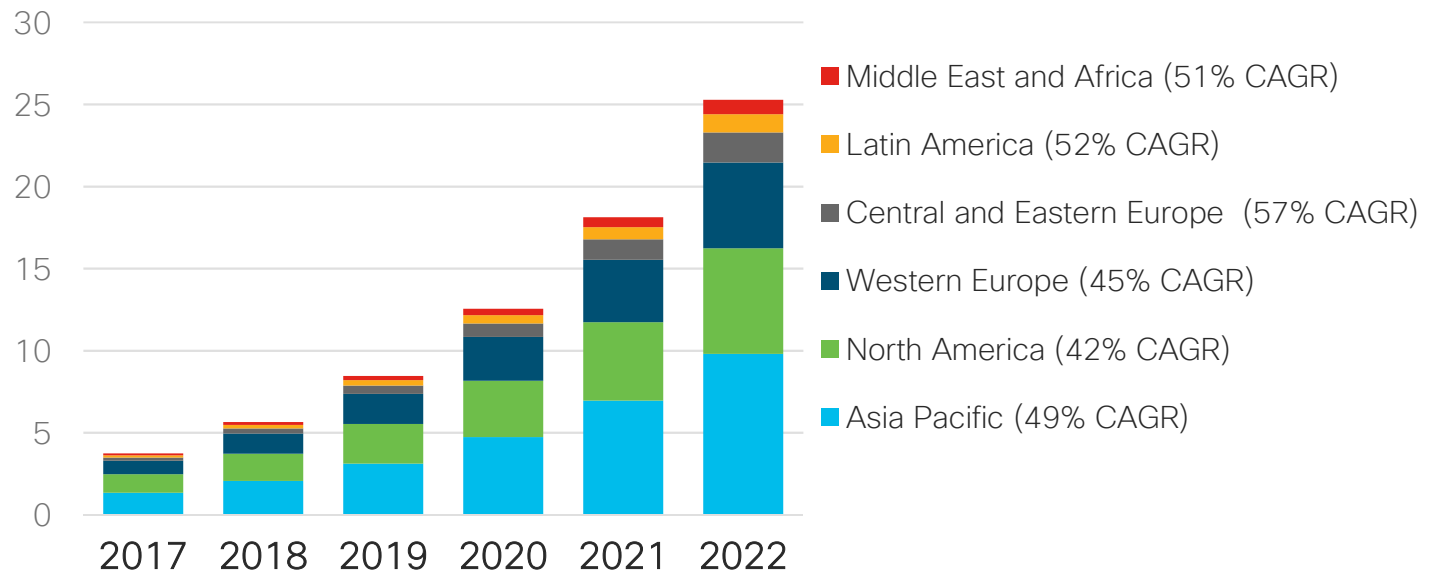


Global M2M Traffic Growth

M2M traffic will grow more than 7-fold from 2017 to 2022

47% CAGR
2017-2022

Exabytes
per Month



By 2022, M2M modules will be **51%** (*14.6 billion*) of total **global** devices and connections and will account for **6%** (*25.3 EBs/month*) of total global IP traffic.

Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

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By 2022, M2M modules will be **64%** (*3.2 billion*) of total **NA** devices and connections and will account for **6%** (*6.4 EBs/month*) of total regional IP traffic.

Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

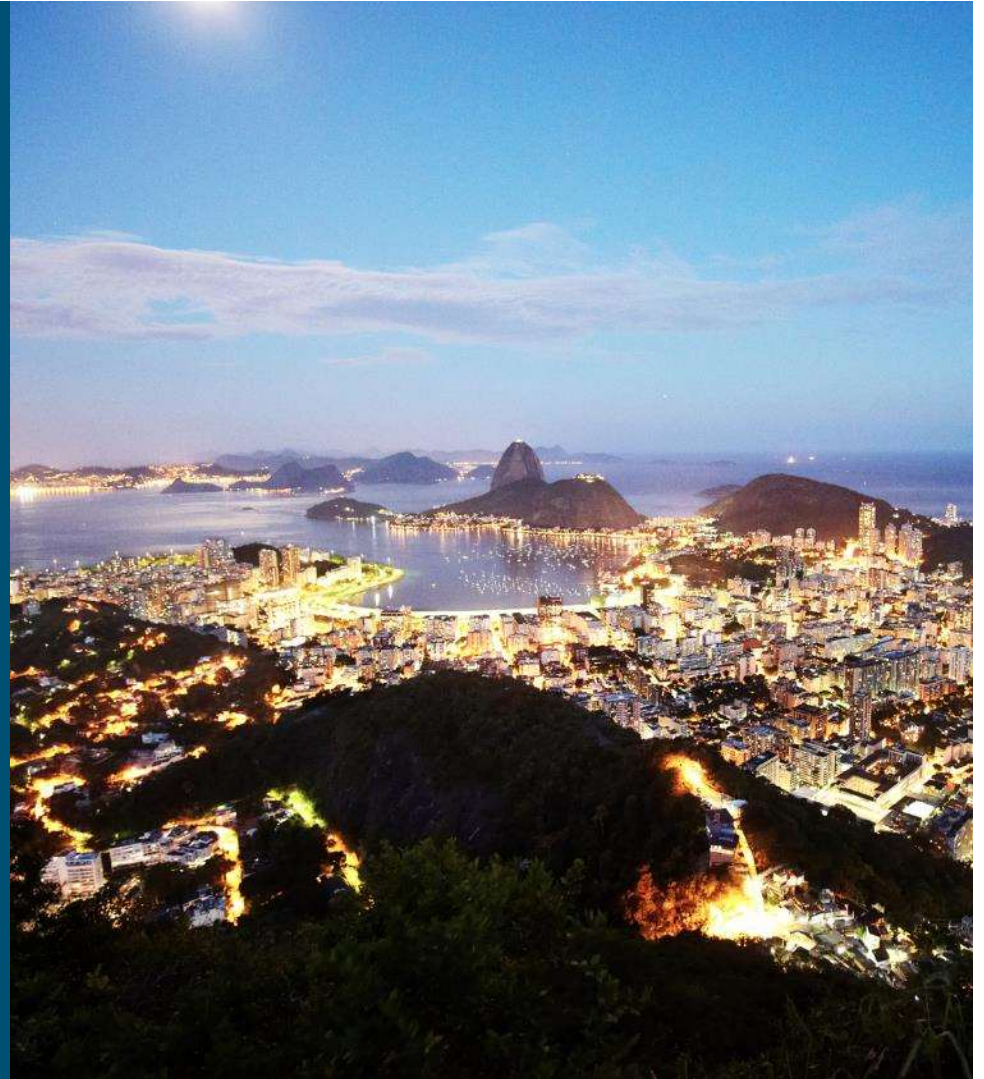
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By 2022, M2M modules will be **42%** (*839 million*) of total **LATAM** devices and connections and will account for **6%** (*1.1 EBs/month*) of total regional IP traffic.

Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

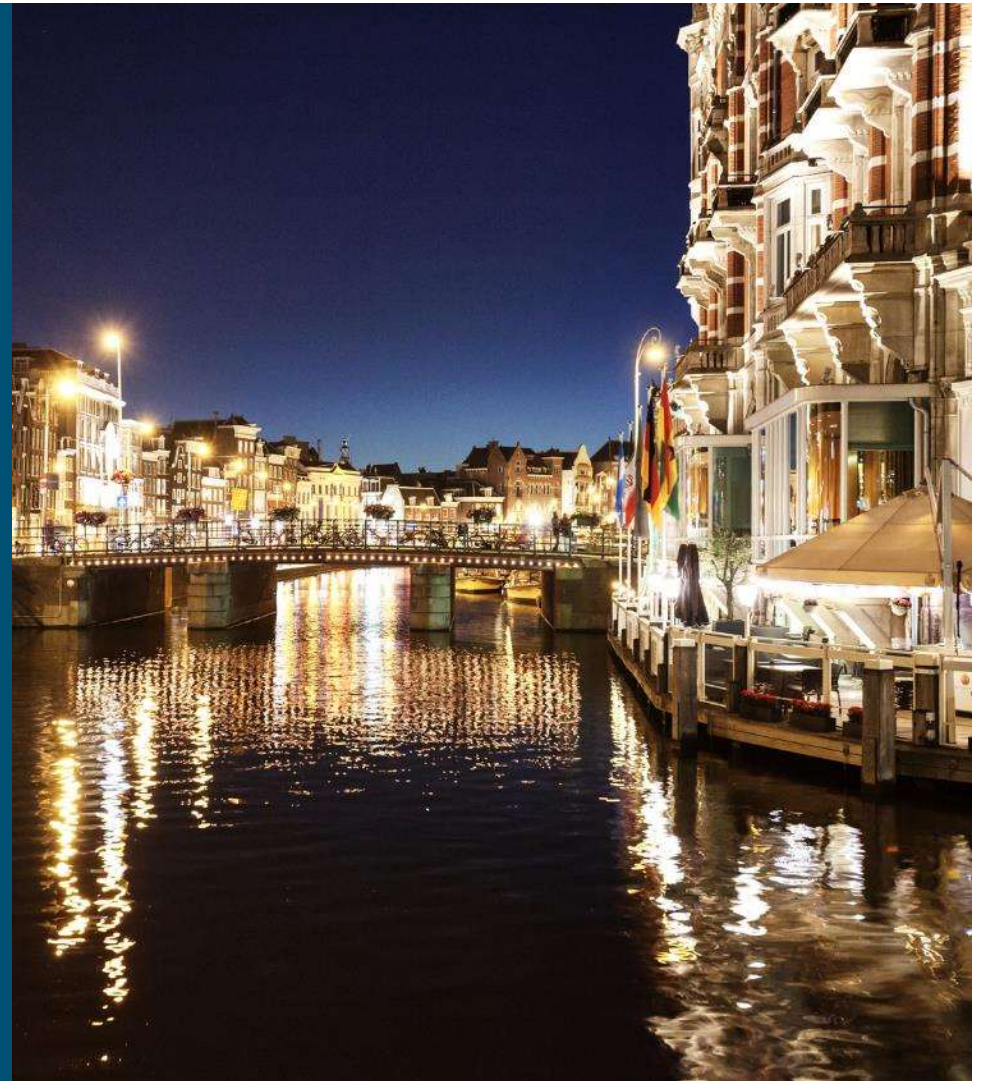
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By 2022, M2M modules will be **63%** (*2.5 billion*) of total **WE** devices and connections and will account for **10%** (*5.2 EBs/month*) of total regional IP traffic.

Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

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By 2022, M2M modules will be **28%** (*700 million*) of total **MEA** devices and connections and will account for **4%** (*0.9 EBs/month*) of total regional IP traffic.

Source: Cisco VNI Global IP Traffic Forecast, 2017–2022

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Connected Home



- Home automation
- Building security
- Network equipment – printers + routers +
- Network infrastructure – routers +
- White goods
- Tracking applications
- Household information devices

Connected Work



- Office building automation
- Building security
- Office equipment – printers +
- Routers +
- Commercial appliances

Connected Car



- Fleet management
- In-vehicle entertainment systems, emergency calling, Internet
- Vehicle diagnostics, navigation
- Stolen vehicle recovery
- Lease, rental, insurance management

Connected Health



- Health monitors
- Assisted living – medicine dispensers +
- Clinical trials
- First responder connectivity
- Telemedicine

Connected Cities



- Environment and public safety – closed-circuit TV, street lighting, waste removal, information +
- Public space advertising
- Public transport
- Road traffic management

Retail



- Retail goods monitoring and payment
- Retail venue access and control
- Slot machines, vending machines

Manufacturing & Supply Chain



- Mining and extraction
- Manufacturing and processing
- Supply chain
- Warehousing and storage

Energy



- New energy sources – monitoring and power generation support apps
- Smart grid and distribution
- Micro-generation– generation of power, by residential, commercial and community users on their own property

Other

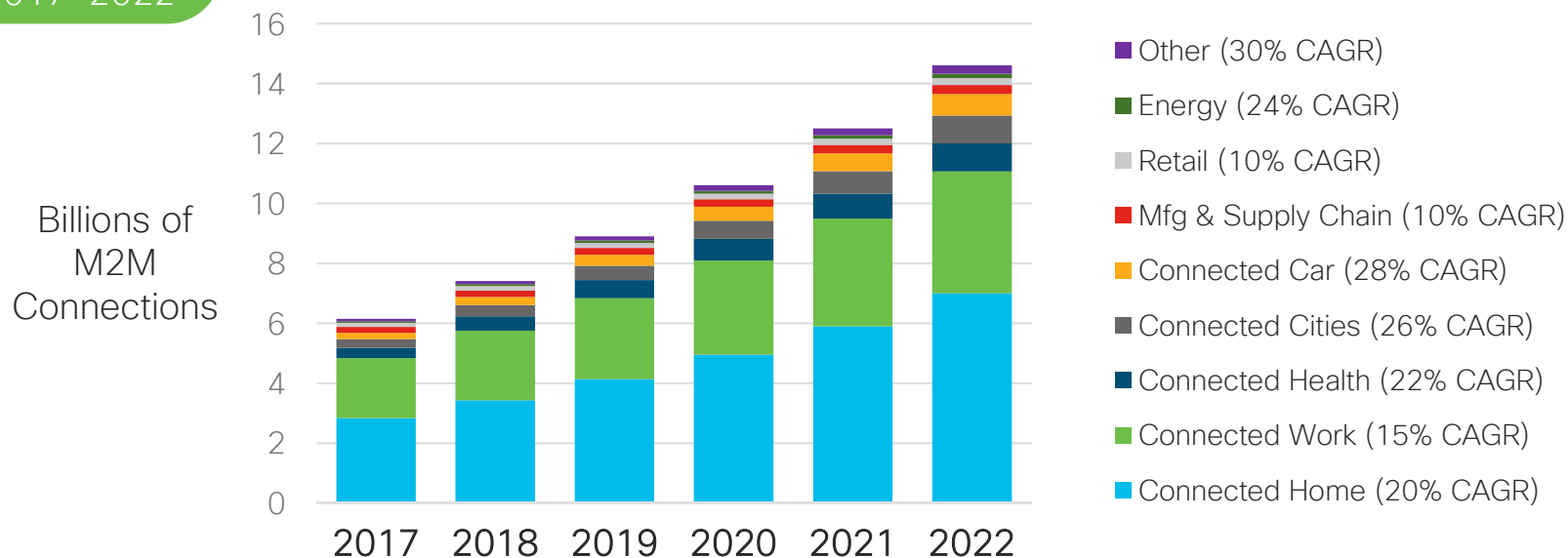


- Agriculture – livestock, soil monitoring, water and resource conservation, temperature control for milk tanks +
- Construction: Site and equipment monitoring
- Emergency services and national security

Global M2M Connections / IoT Growth by Vertical

By 2022, connected home largest, connected car fastest growth

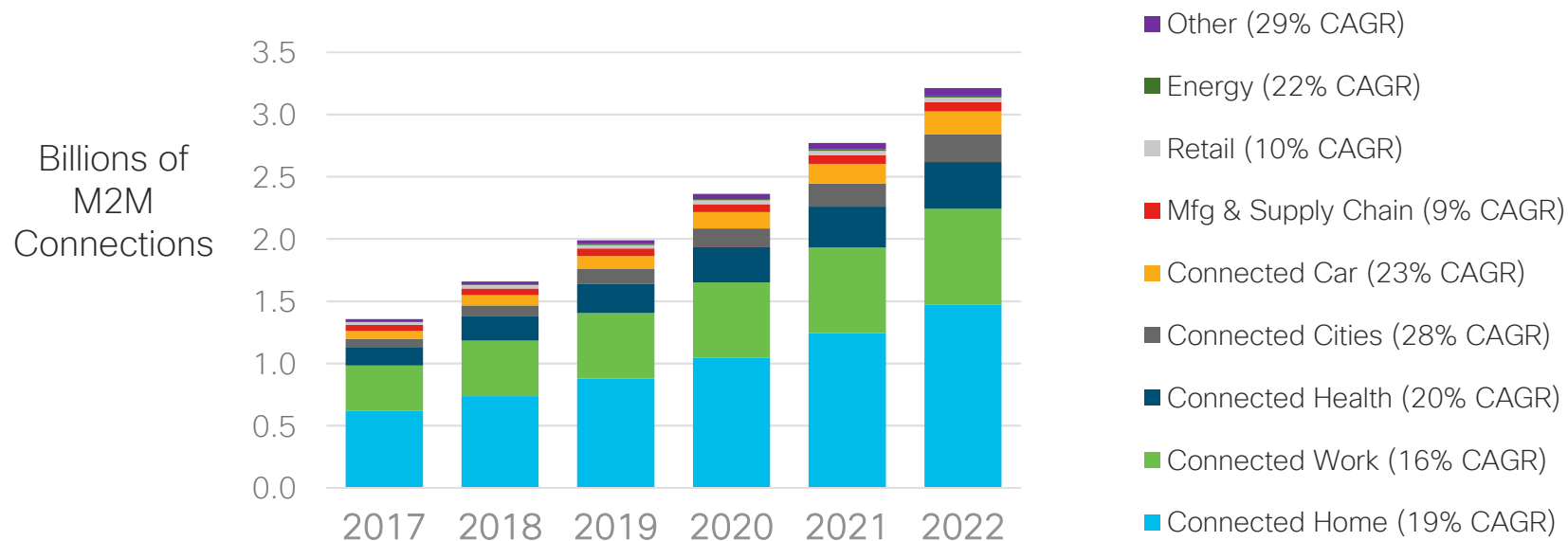
19% CAGR
2017-2022



NA M2M Connections / IoT Growth by Vertical

By 2022, connected home largest, connected cities fastest growth

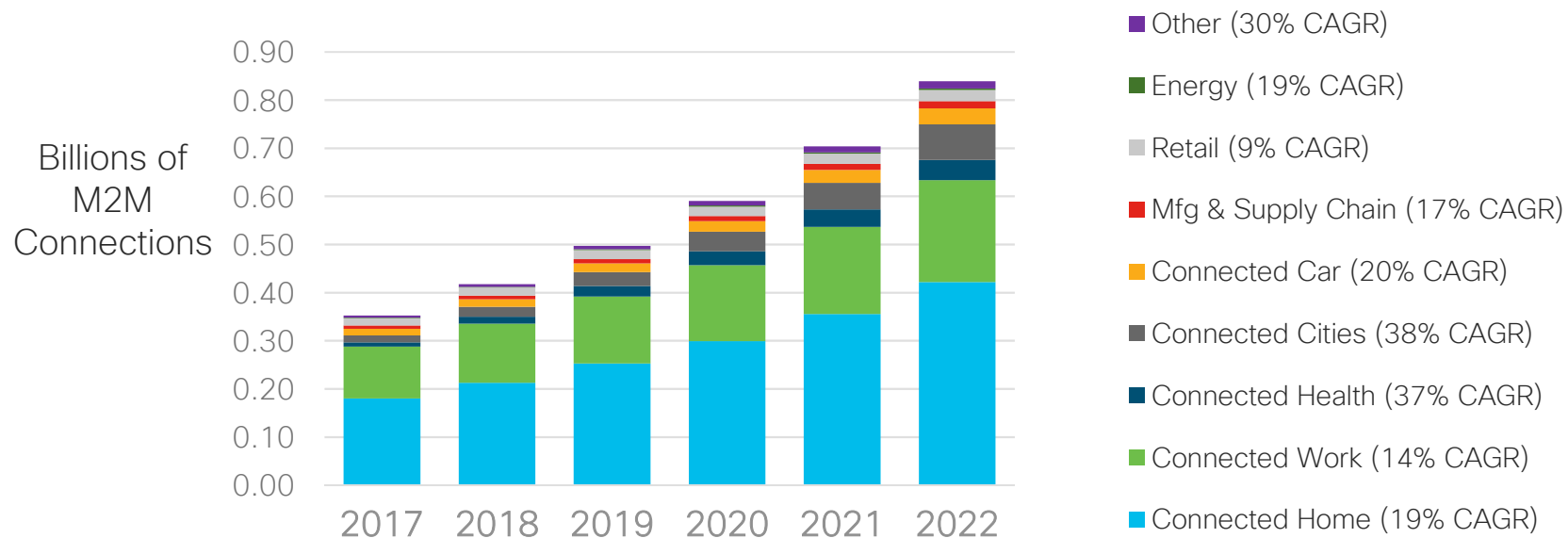
19% CAGR
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LATAM M2M Connections / IoT Growth by Vertical

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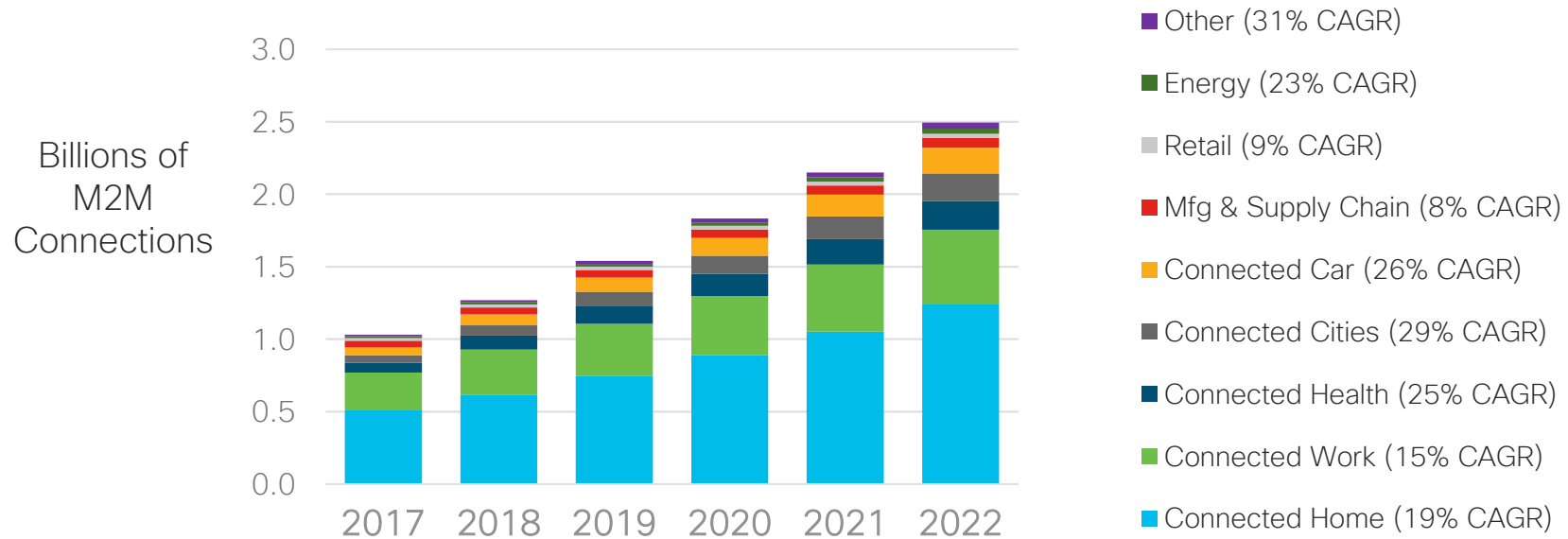
19% CAGR
2017-2022



WE M2M Connections / IoT Growth by Vertical

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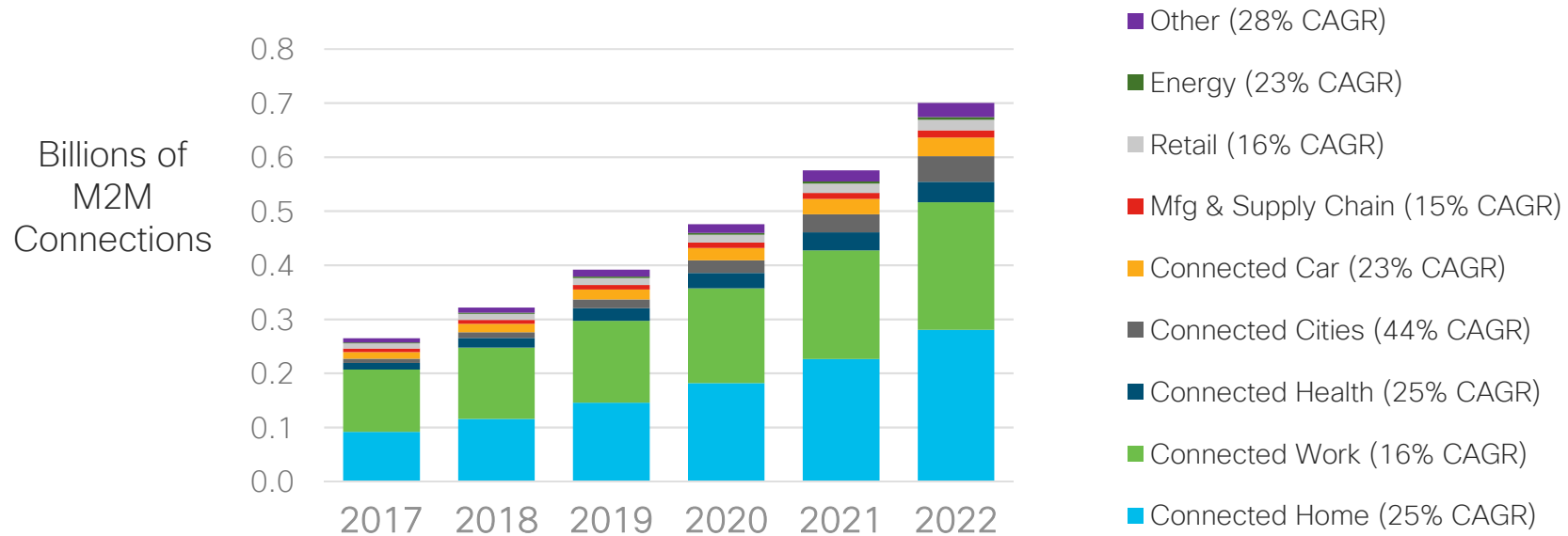
19% CAGR
2017-2022



MEA M2M Connections / IoT Growth by Vertical

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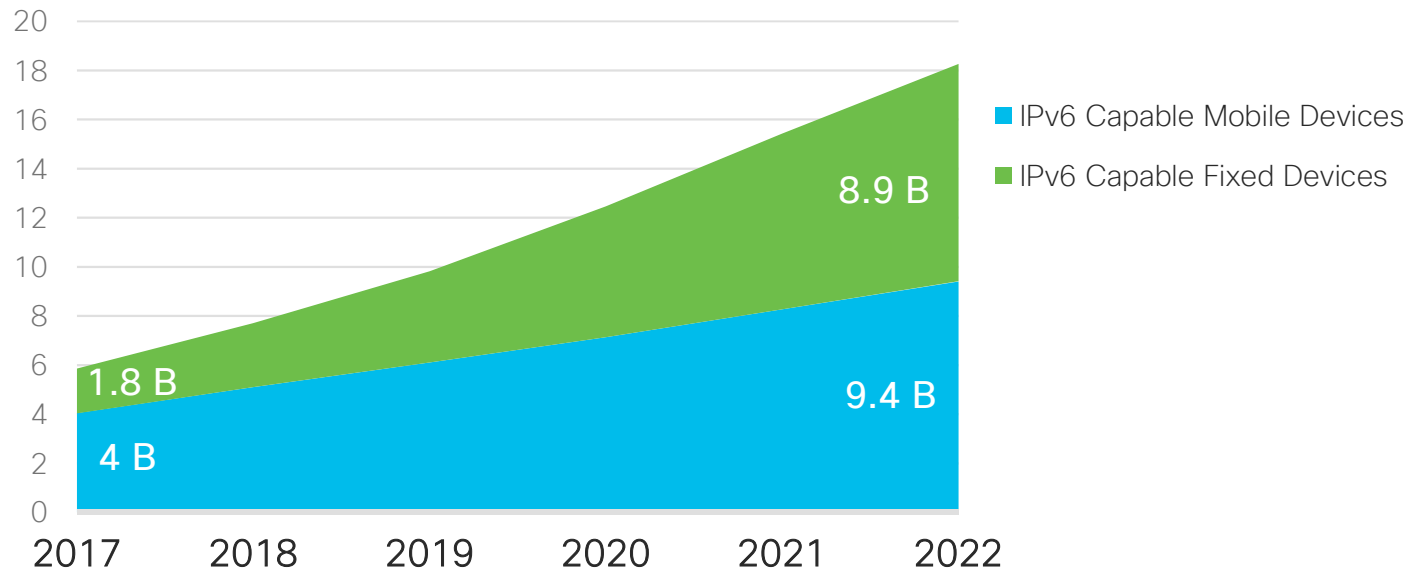
- 7 Wi-Fi Momentum
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Global IPv6-Capable Devices/Connections

By 2022, 64% of devices/connections will be IPv6-capable

26% CAGR
2017-2022

Number of
Devices
(Billions)

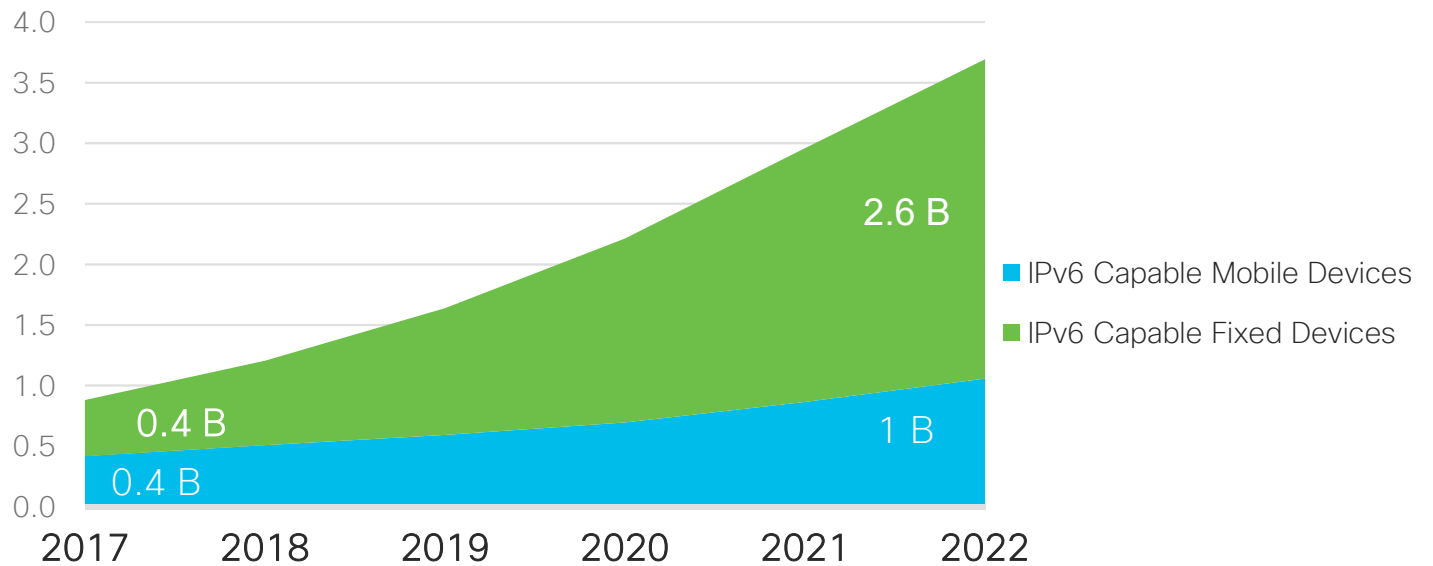


NA IPv6-Capable Devices/Connections

By 2022, nearly 74% of devices/connections will be IPv6-capable

33% CAGR
2017-2022

Number of
Devices
(Billions)

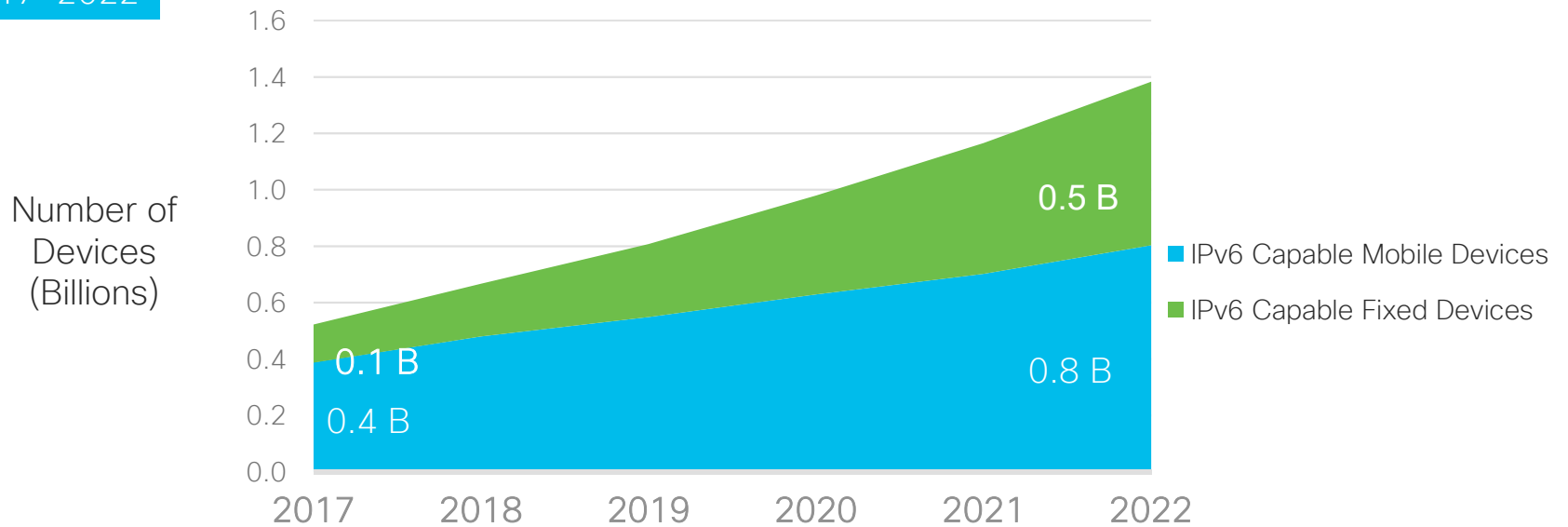


Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

LATAM IPv6-Capable Devices/Connections

By 2022, nearly 70% of devices/connections will be IPv6-capable

22% CAGR
2017-2022

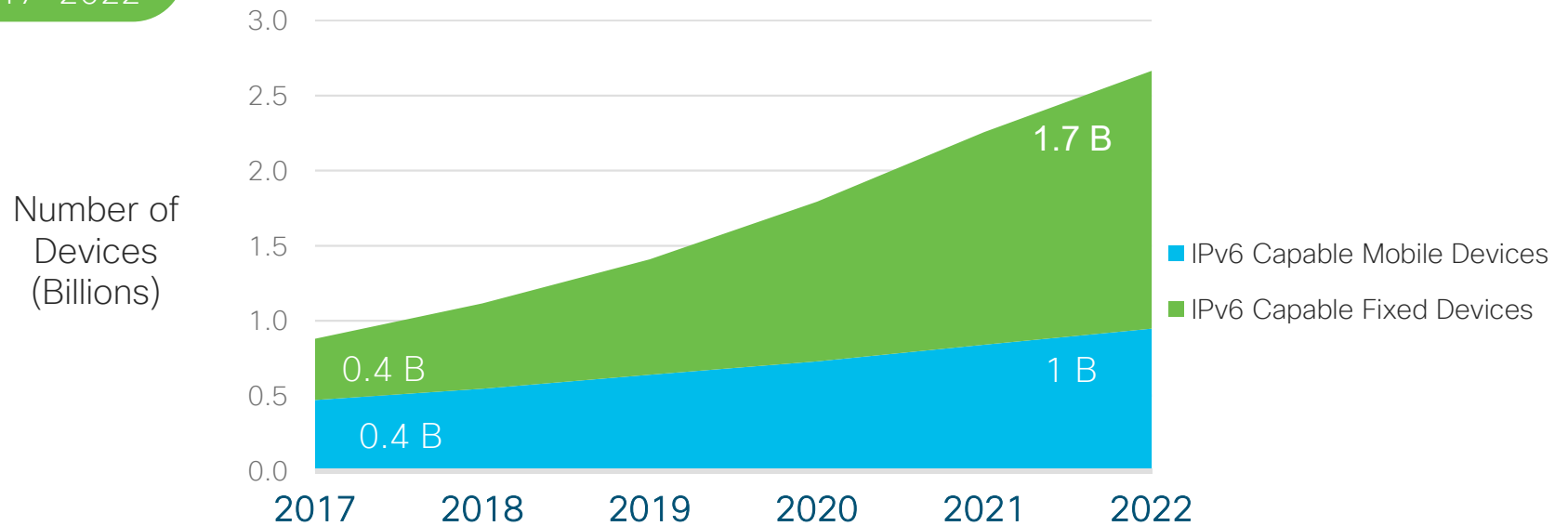


Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

WE IPv6-Capable Devices/Connections

By 2022, nearly 70% of devices/connections will be IPv6-capable

25% CAGR
2017-2022

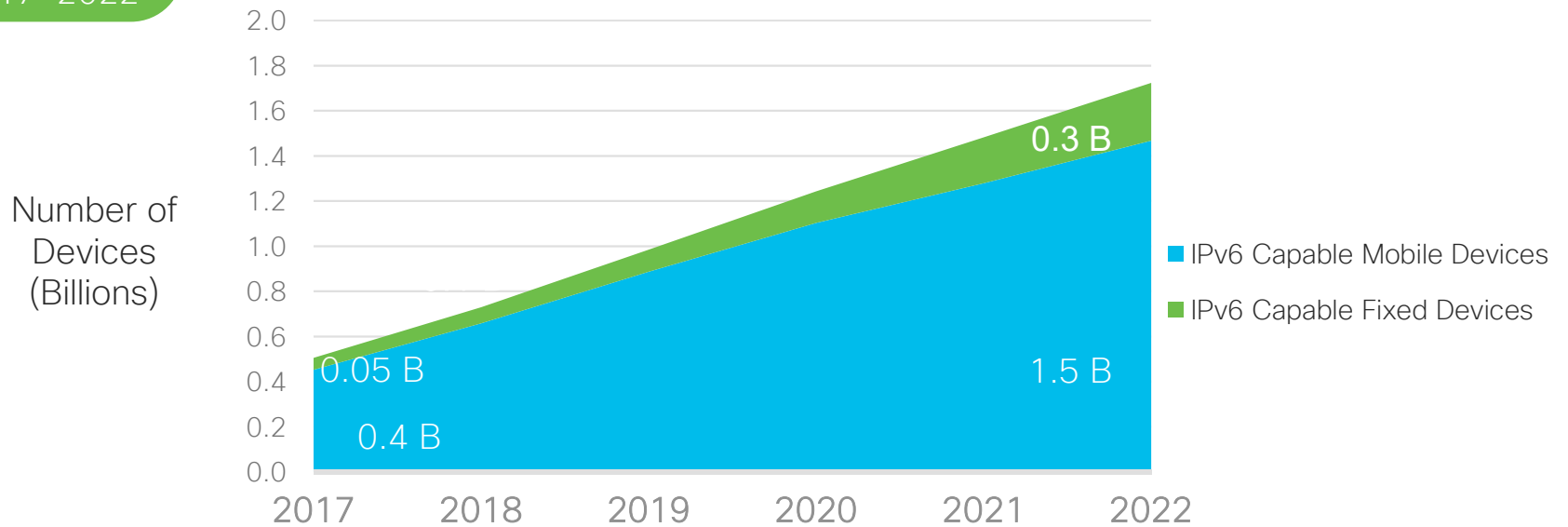


Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

MEA IPv6-Capable Devices/Connections

By 2022, nearly 70% of devices/connections will be IPv6-capable

28% CAGR
2017-2022

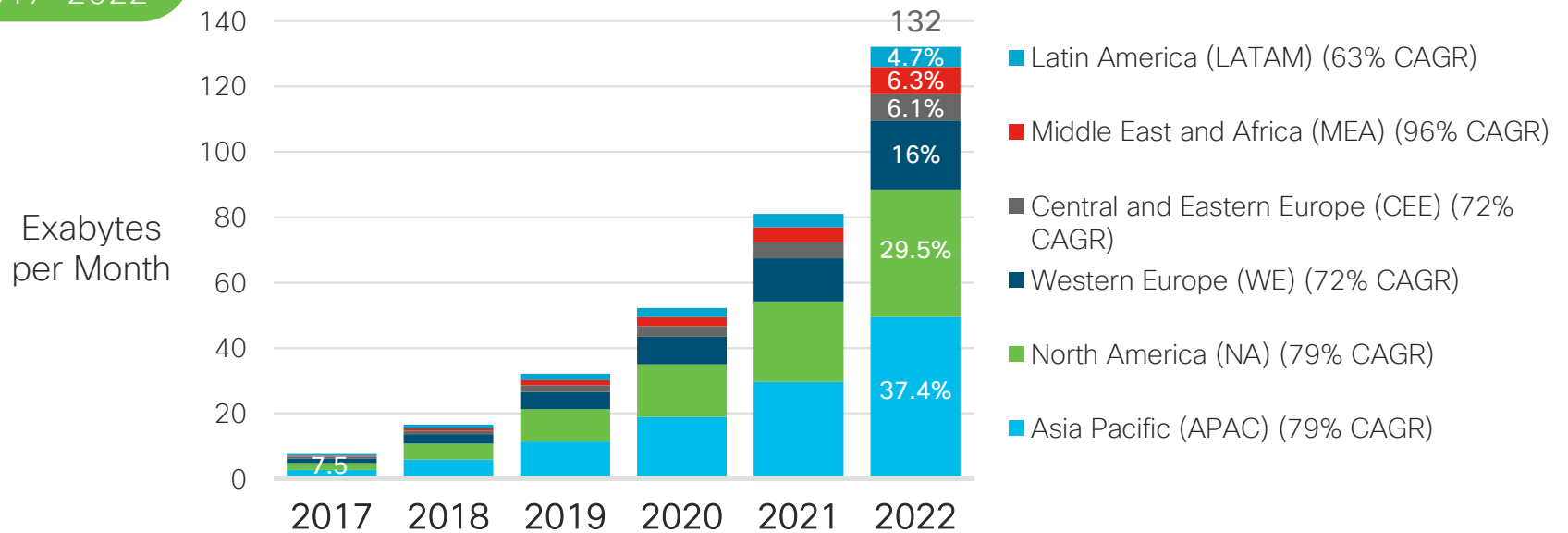


Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

Global IPv6 Traffic Growth / Regions

By 2022, IPv6 will represent 38% of total Internet traffic

77% CAGR
2017-2022



Top Trends

Devices & Connections



- 1 Devices/Connections Mix
- 2 IoT/M2M by Verticals
- 3 IPv6 Adoption

Traffic Trends



- 4 Traffic Growth by App
- 5 Traffic Pattern Analysis
- 6 "Cord-Cutting"

Network Performance and User Experience



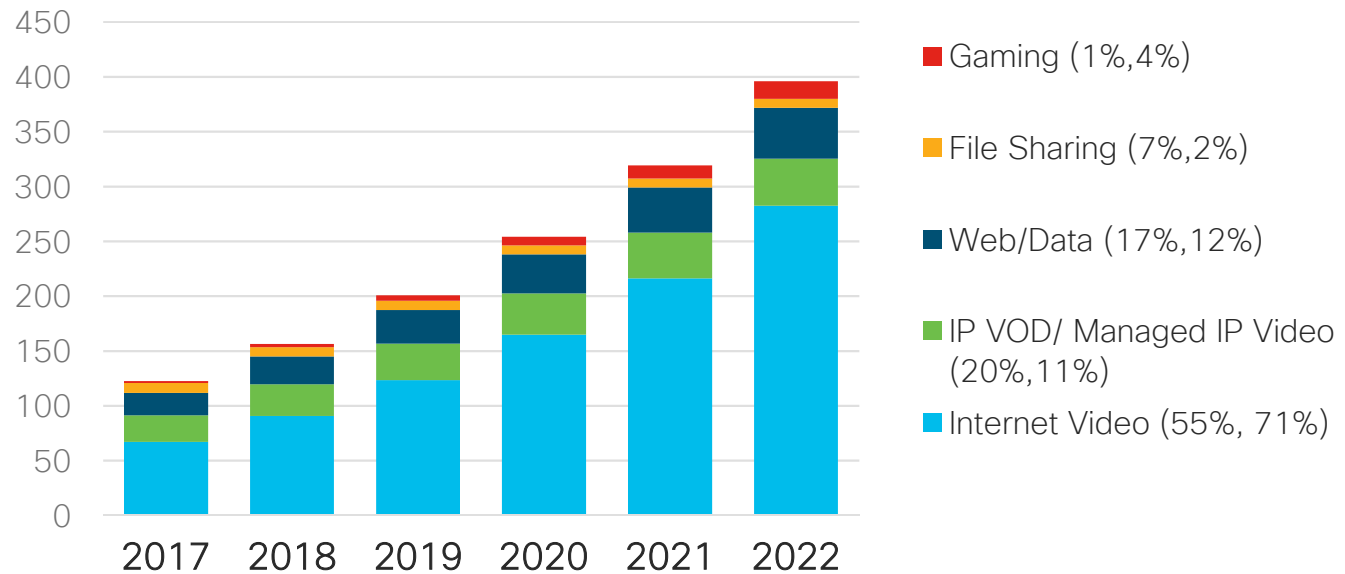
- 7 Wi-Fi Momentum
- 8 Accelerating Speeds
- 9 Security Analysis

Global IP Traffic by Application Type

By 2022, video will account for 82% of global IP traffic

26% CAGR
2017-2022

Exabytes
per Month

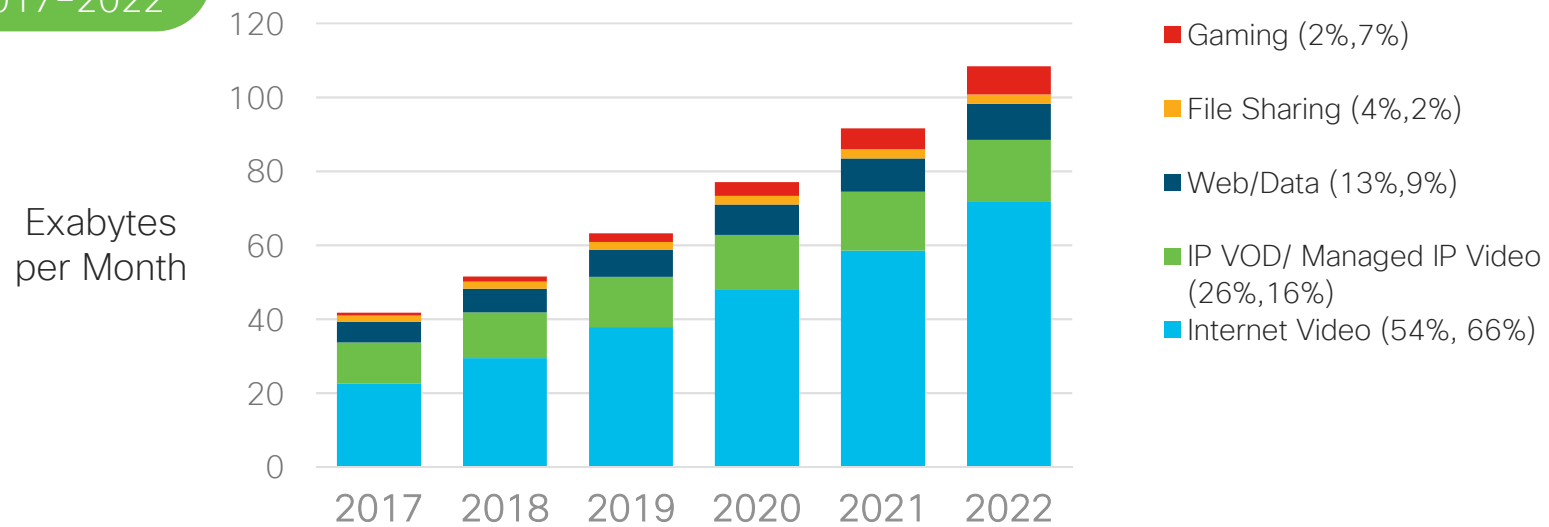


* Figures (n) refer to 2017, 2022 traffic share

North America IP Traffic by Application Type

By 2022, video will account for 82% of North America IP traffic

21% CAGR
2017-2022



* Figures (n) refer to 2017, 2022 traffic share

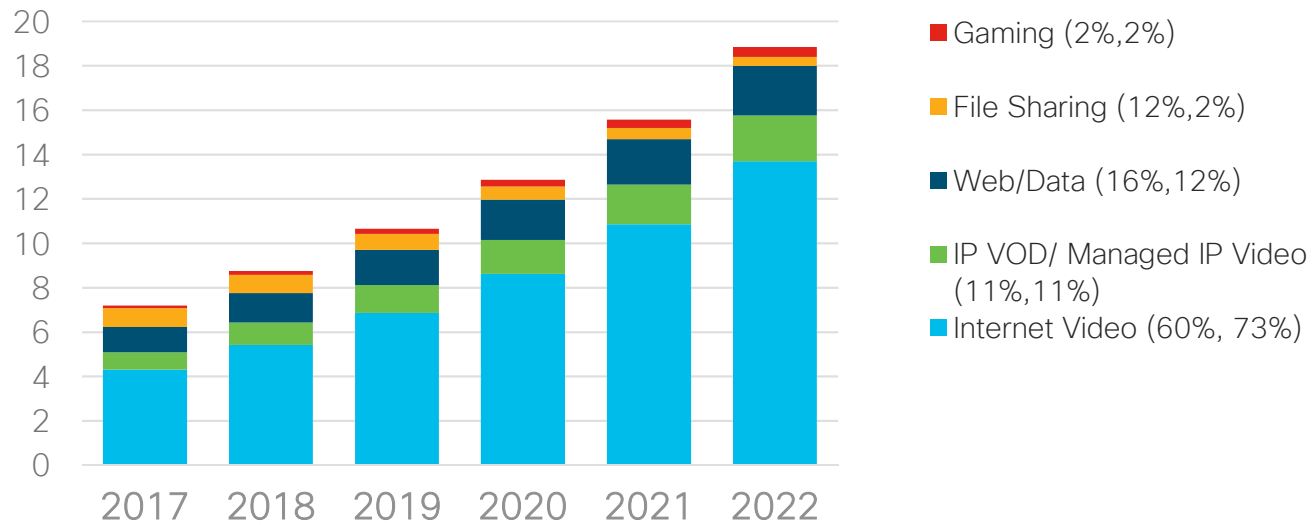
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

Latin America IP Traffic by Application Type

By 2022, video will account for 84% of Latin America IP traffic

21% CAGR
2017-2022

Exabytes
per Month



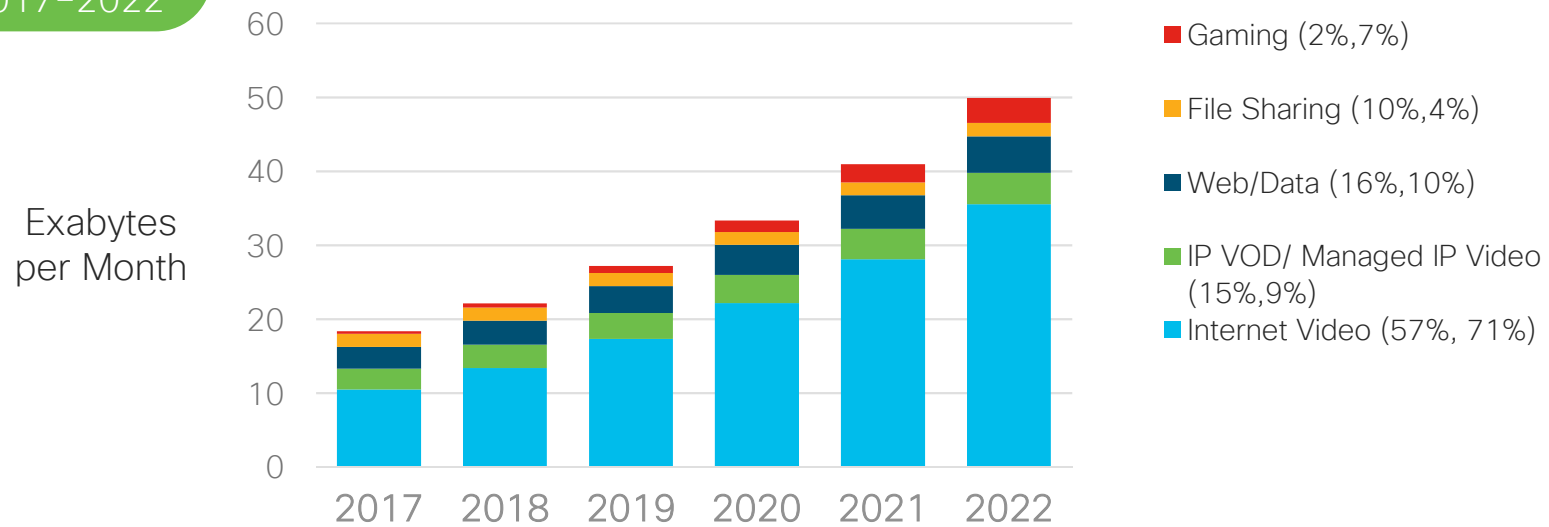
* Figures (n) refer to 2017, 2022 traffic share

Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

Western Europe IP Traffic by Application Type

By 2022, video will account for 80% of Western Europe IP traffic

22% CAGR
2017-2022



* Figures (n) refer to 2017, 2022 traffic share

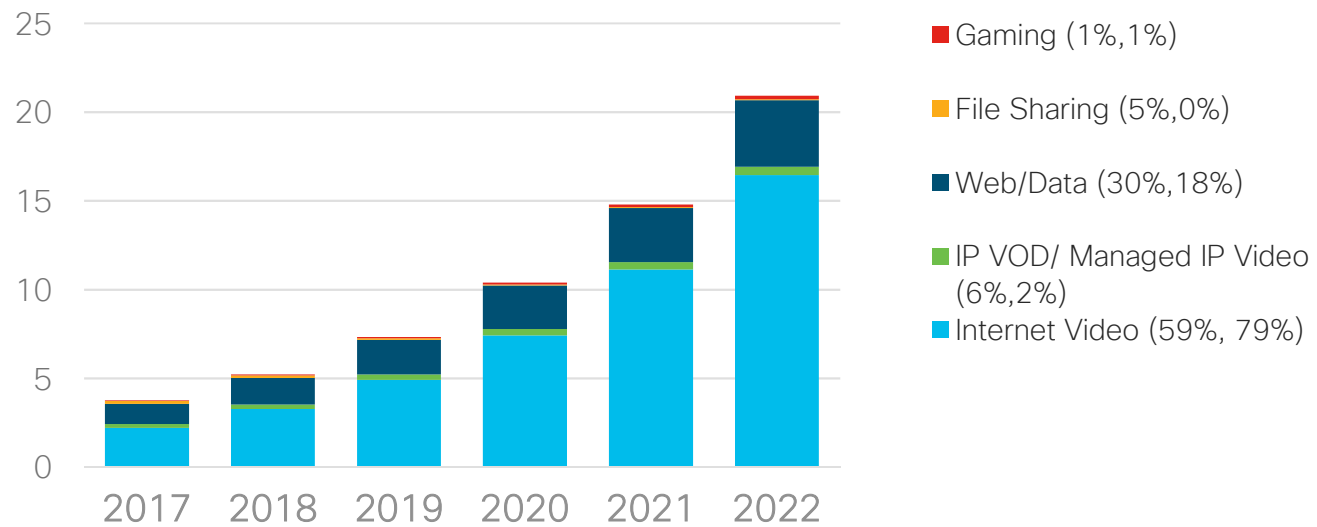
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

MEA IP Traffic by Application Type

By 2022, video will account for 81% of MEA IP traffic

41% CAGR
2017-2022

Exabytes
per Month



* Figures (n) refer to 2017, 2022 traffic share

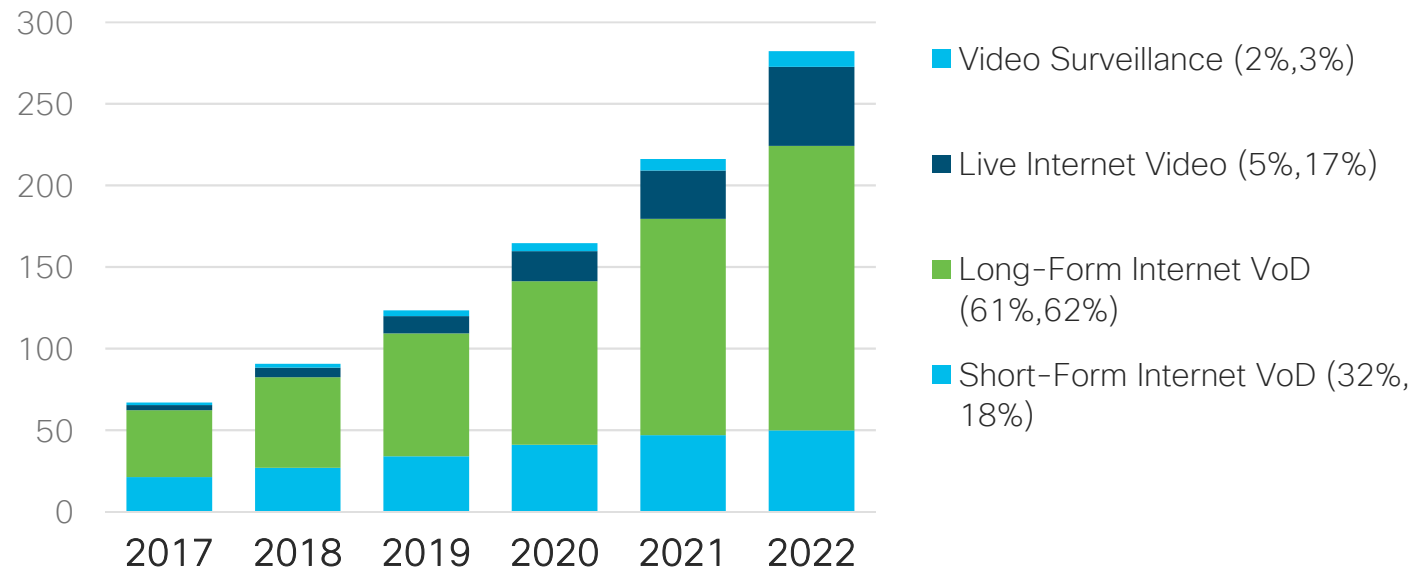
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

Global Internet Video Traffic by Type

By 2022, live video will increase 15-fold and reach 17% of Internet video traffic

33% CAGR
2017-2022

Exabytes
per Month

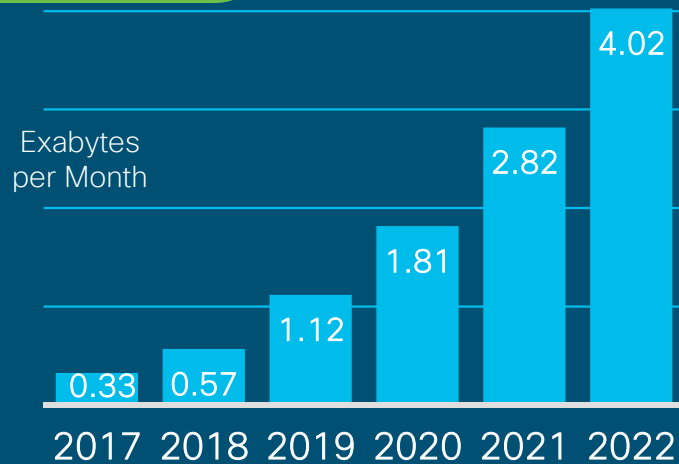


* Figures (n) refer to 2017, 2022 traffic share

Virtual and Augmented Reality Traffic

By 2022, VR/AR traffic will increase 12-fold

65% CAGR
2017-2022



Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

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Top Trends

Devices & Connections



- 1 Devices/Connections Mix
- 2 IoT/M2M by Verticals
- 3 IPv6 Adoption

Traffic Trends



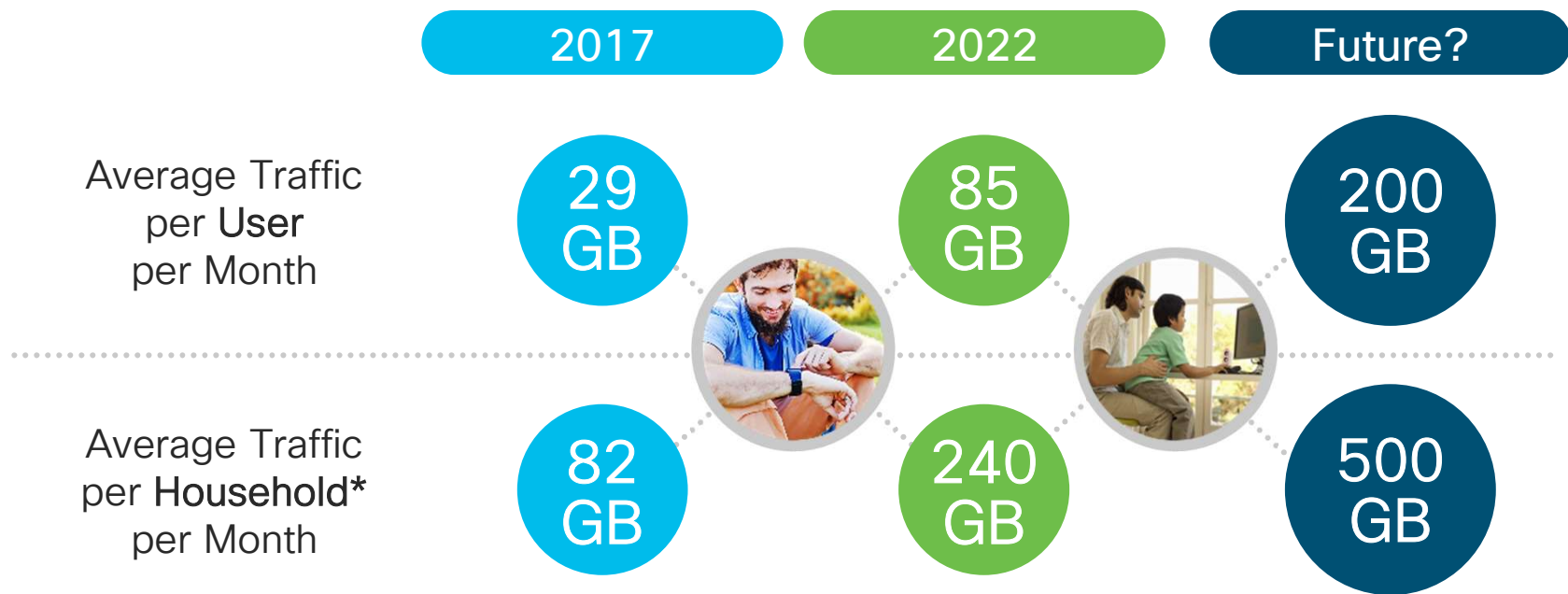
- 4 Traffic Growth by App
- 5 **Traffic Pattern Analysis**
- 6 “Cord-Cutting”

Network Performance and User Experience

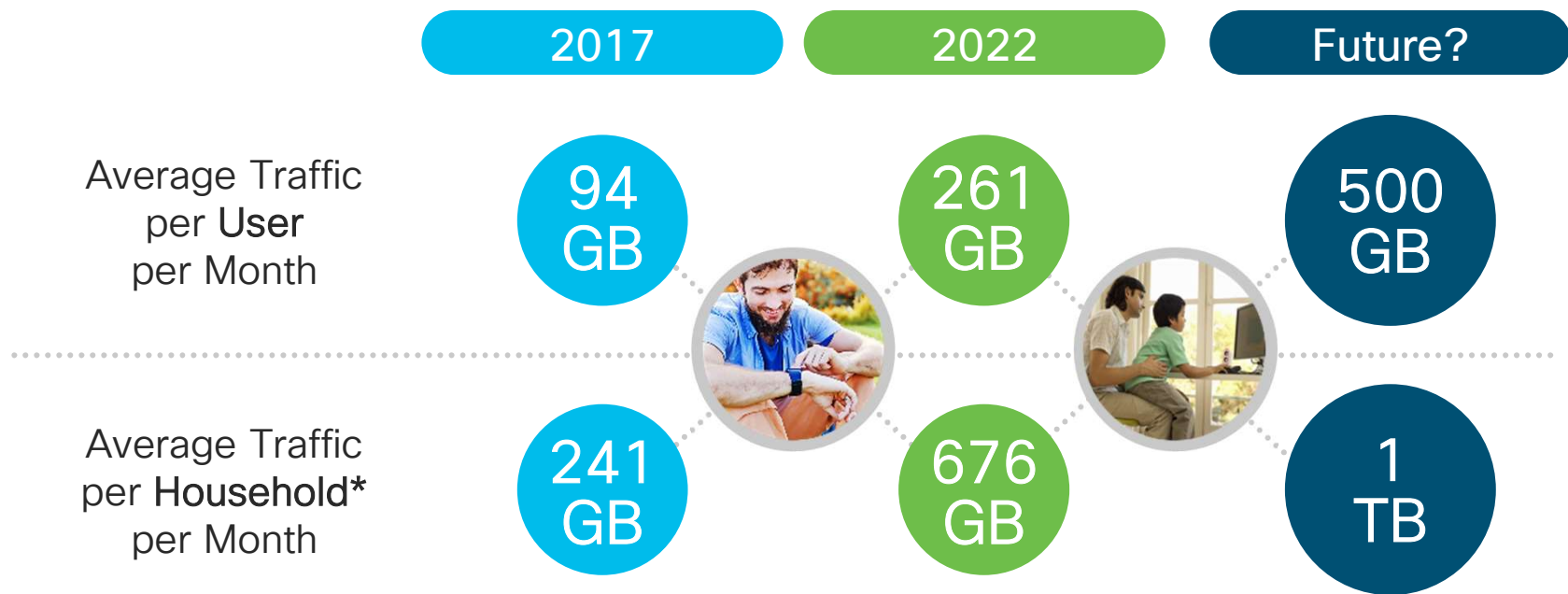


- 7 Wi-Fi Momentum
- 8 Accelerating Speeds
- 9 Security Analysis

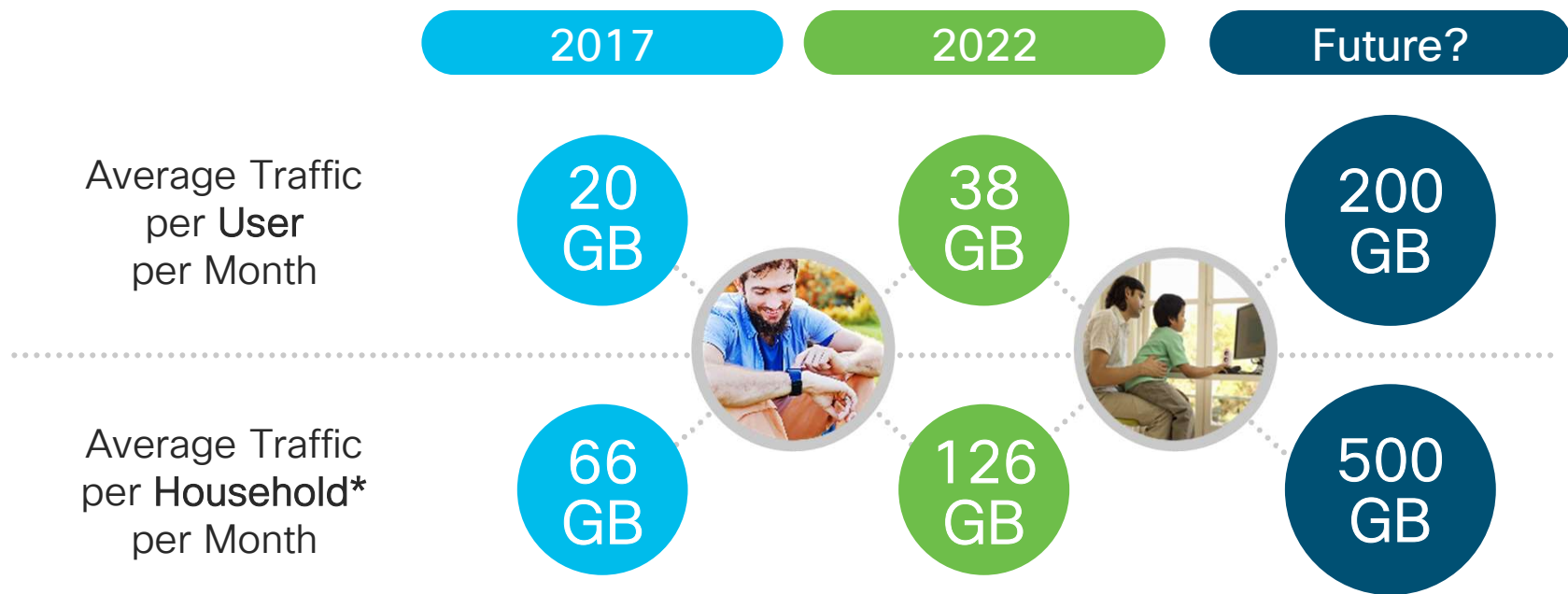
Average Global Internet Bandwidth Usage



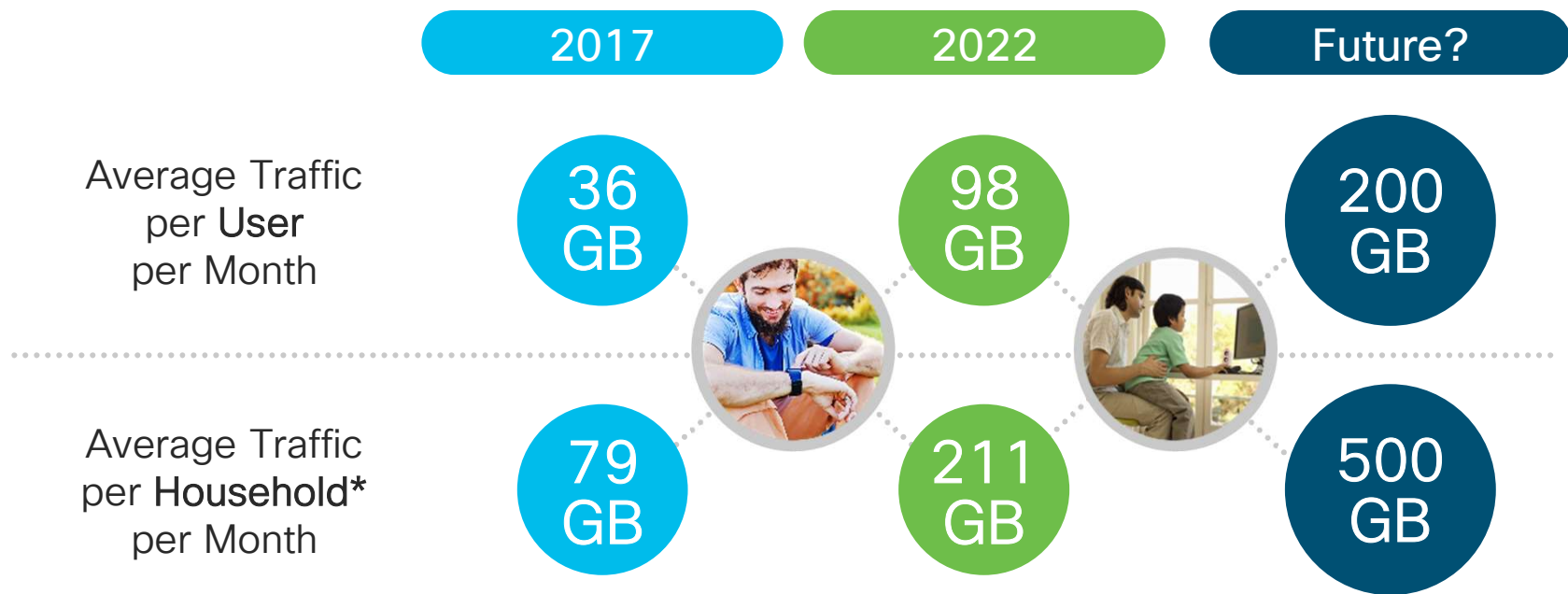
Average NA Internet Bandwidth Usage



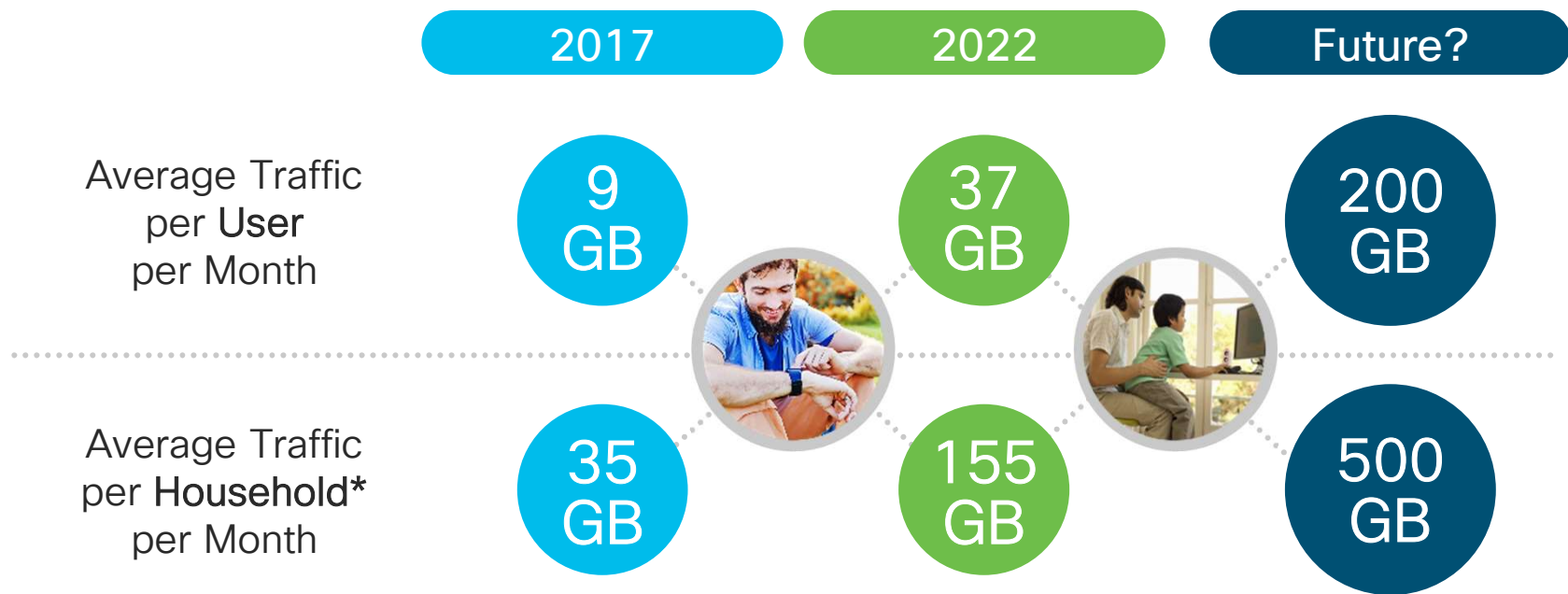
Average LATAM Internet Bandwidth Usage



Average WE Internet Bandwidth Usage

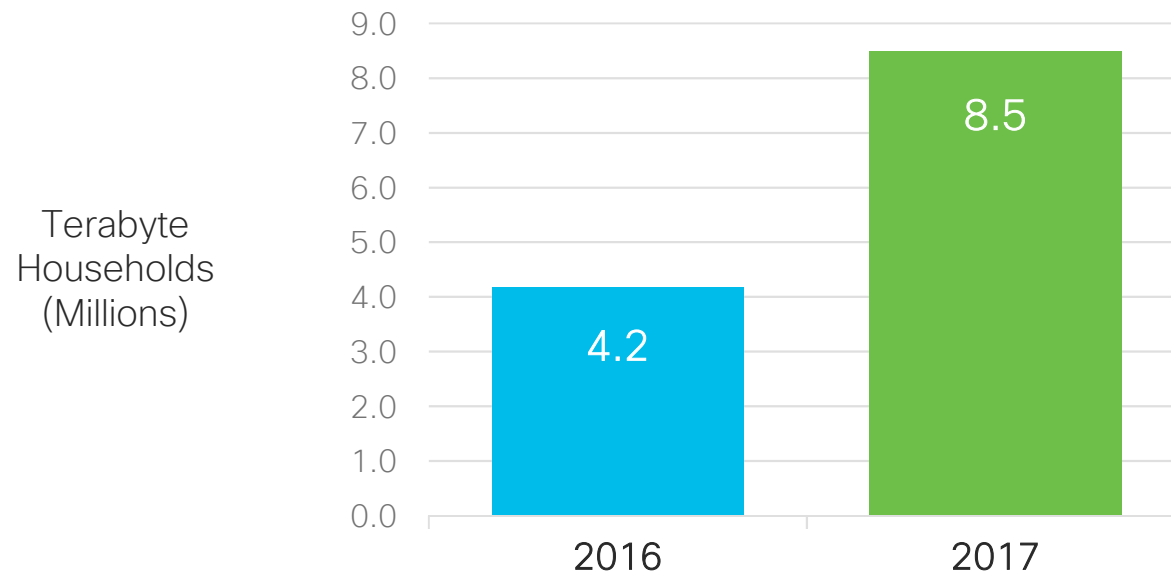


Average MEA Internet Bandwidth Usage



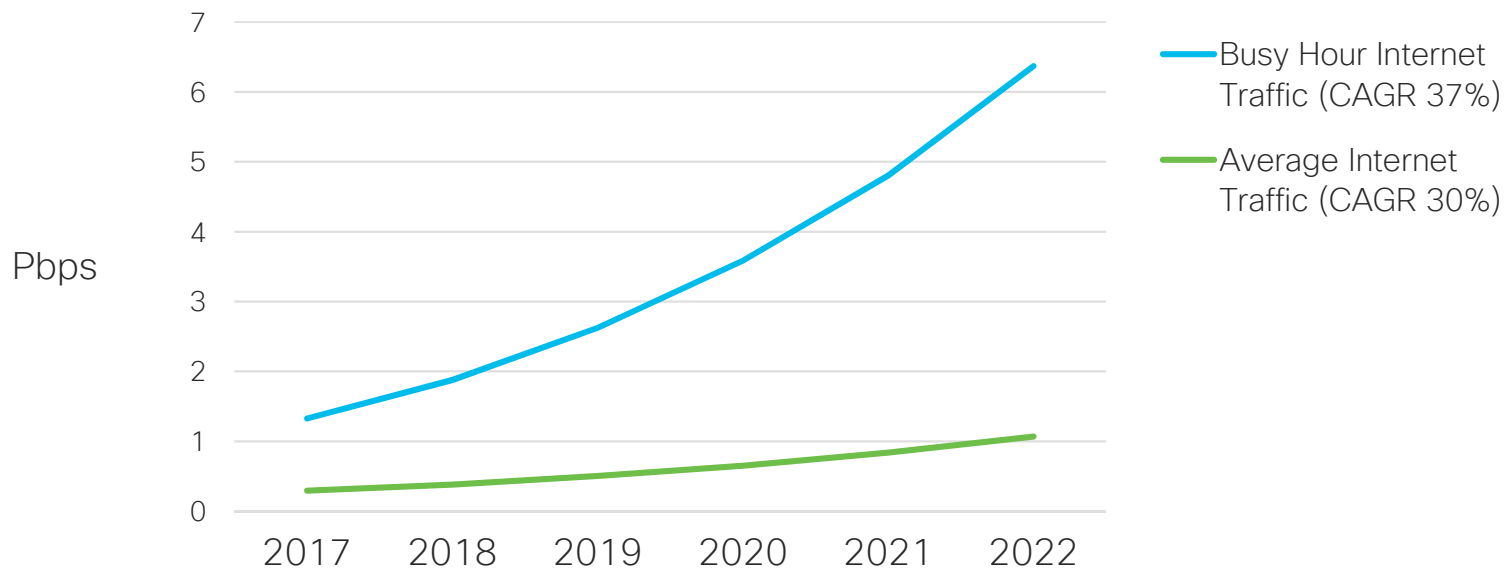
Internet Households Reshape Usage Limits

Internet households exceeding 1 TB more than doubled in 2017



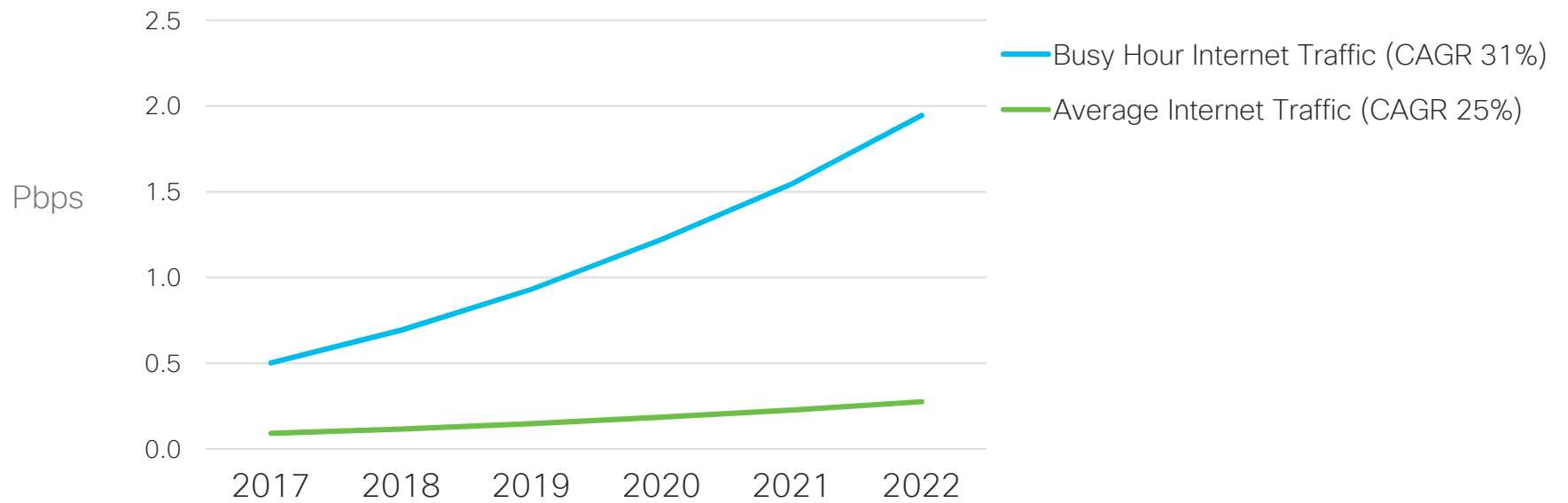
Global Busy-Hour vs. Average Hour Internet Traffic

By 2022, busy Internet traffic will be nearly 6X greater than average traffic



NA Busy-Hour vs. Average Hour Internet Traffic

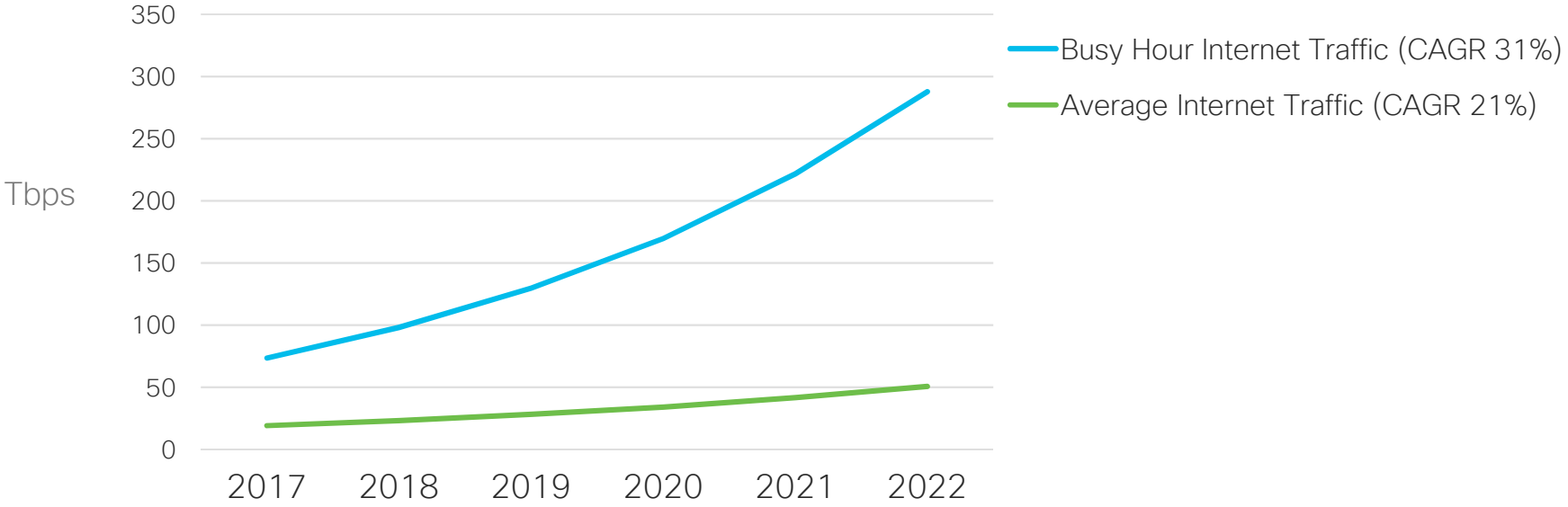
By 2022, busy Internet traffic will be 7X greater than average traffic



Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

LATAM Busy-Hour vs. Average Hour Internet Traffic

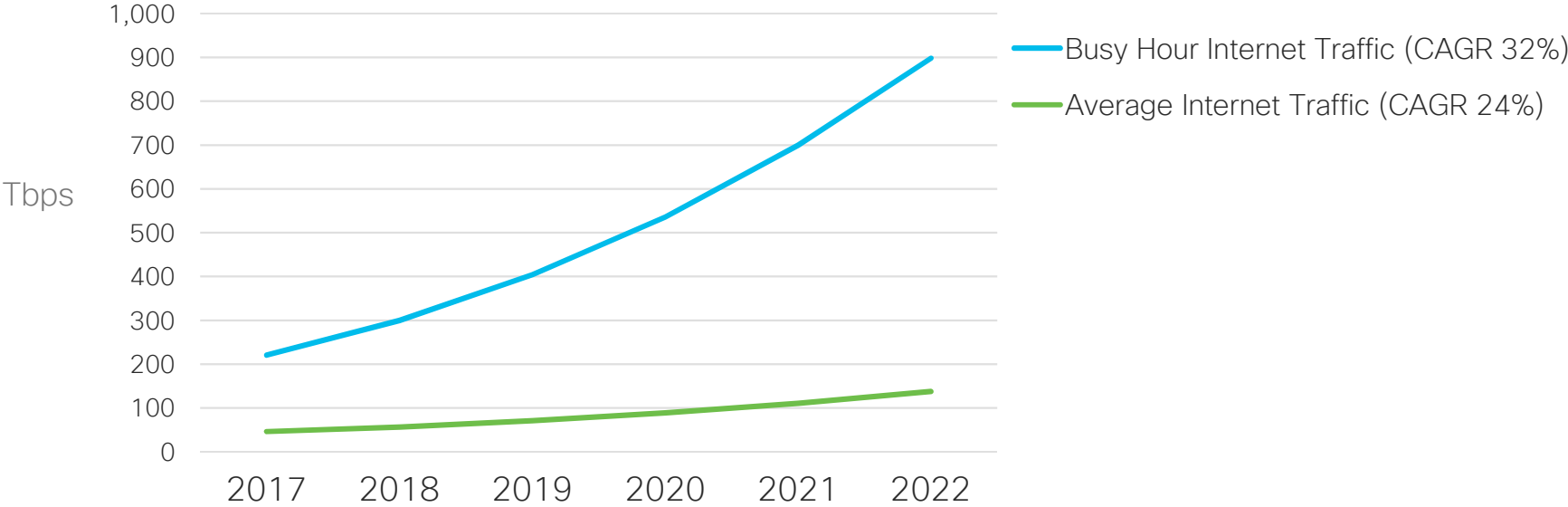
By 2022, busy Internet traffic will be 6X greater than average traffic



Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

WE Busy-Hour vs. Average Hour Internet Traffic

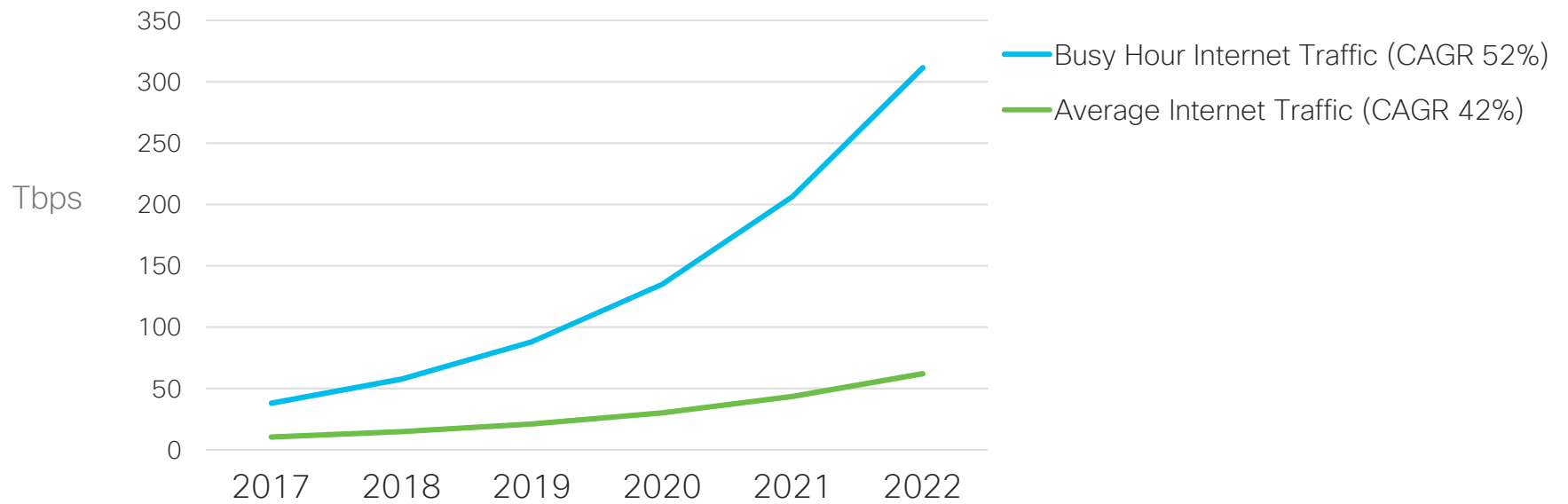
By 2022, busy Internet traffic will be 7X greater than average traffic



Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

MEA Busy-Hour vs. Average Hour Internet Traffic

By 2022, busy Internet traffic will be 5X greater than average traffic



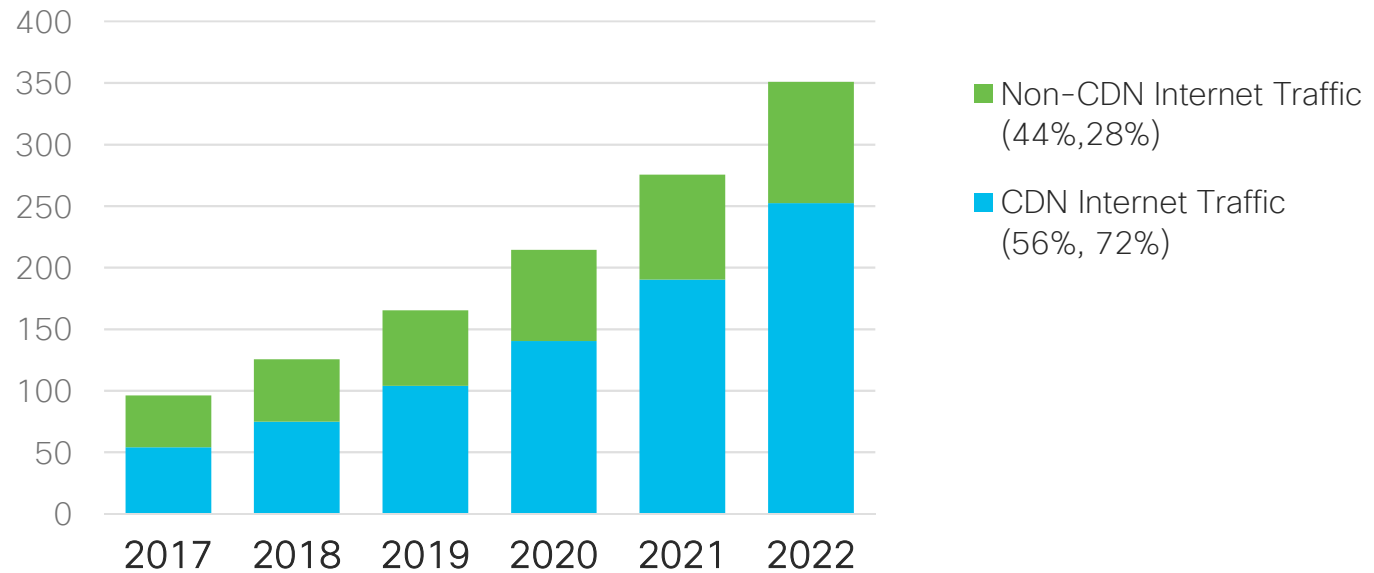
Source: Cisco VNI Global IP Traffic Forecast, 2017–2022

Global Content Delivery Network (CDN) Traffic

CDNs will deliver 72 percent of Internet traffic by 2022

30% CAGR
2017-2022

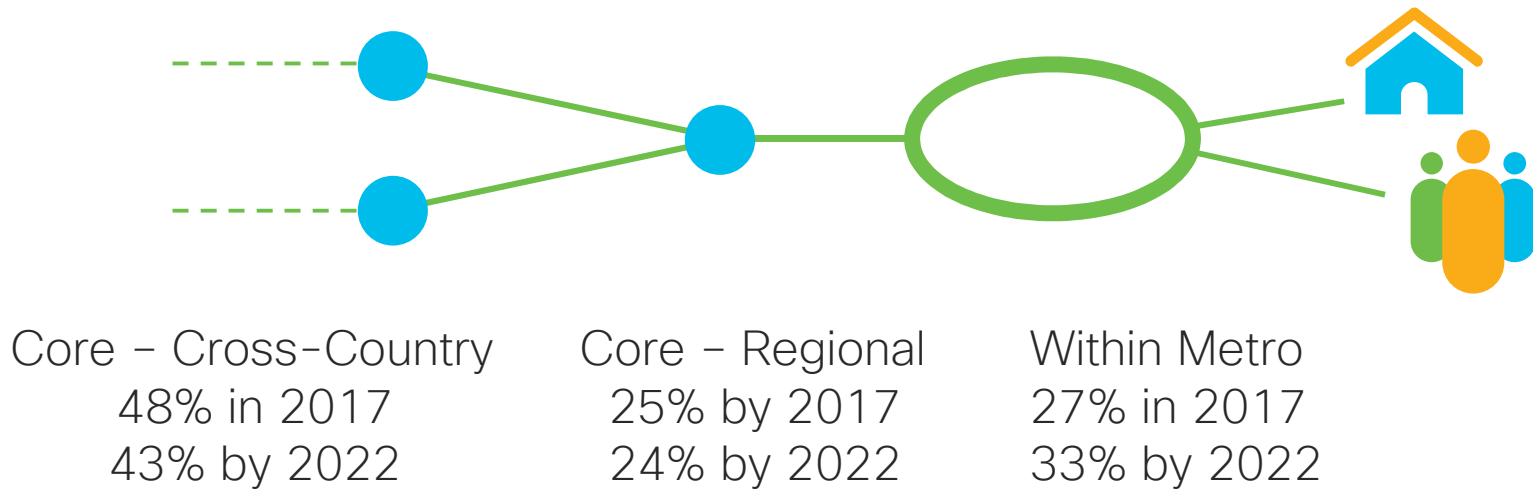
Exabytes
per Month



* Figures (n) refer to 2017, 2022 traffic share

SP Network Capacity Moving Closer to the Edge

Over one-third of capacity will bypass core completely by 2022



Top Trends

Devices & Connections



- 1 Devices/Connections Mix
- 2 IoT/M2M by Verticals
- 3 IPv6 Adoption

Traffic Trends



- 4 Traffic Growth by App
- 5 Traffic Pattern Analysis
- 6 "Cord-Cutting"

Network Performance and User Experience

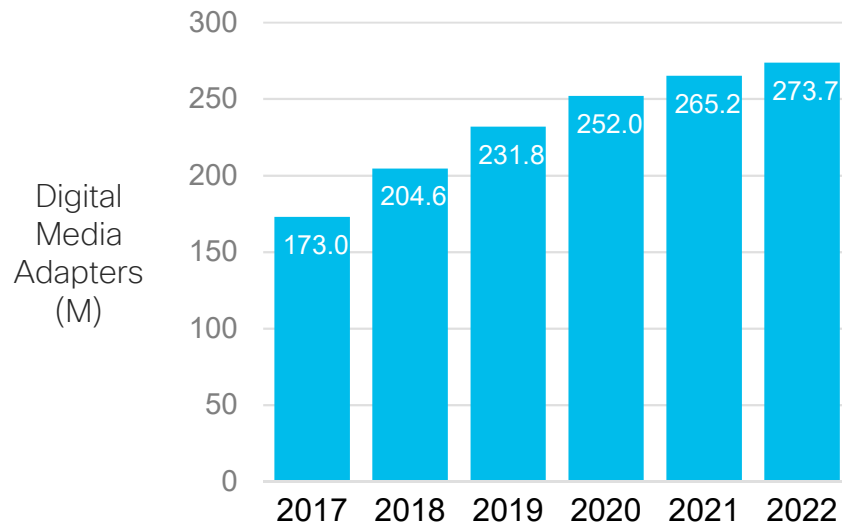


- 7 Wi-Fi Momentum
- 8 Accelerating Speeds
- 9 Security Analysis

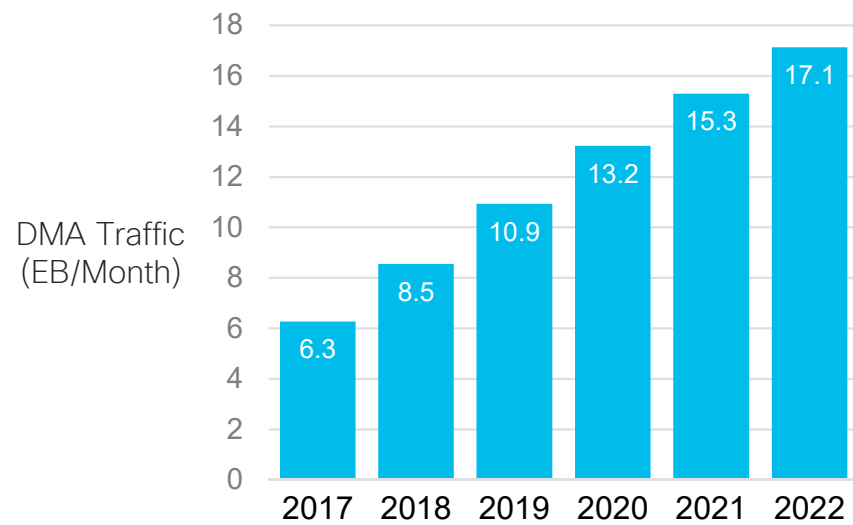
Global Digital Media Adapters* Growth

By 2022, DMAs will represent 9% of global Internet connected TV
by 2022, DMAs will represent 18% of global Internet connected TV traffic

10% CAGR
2017-2022



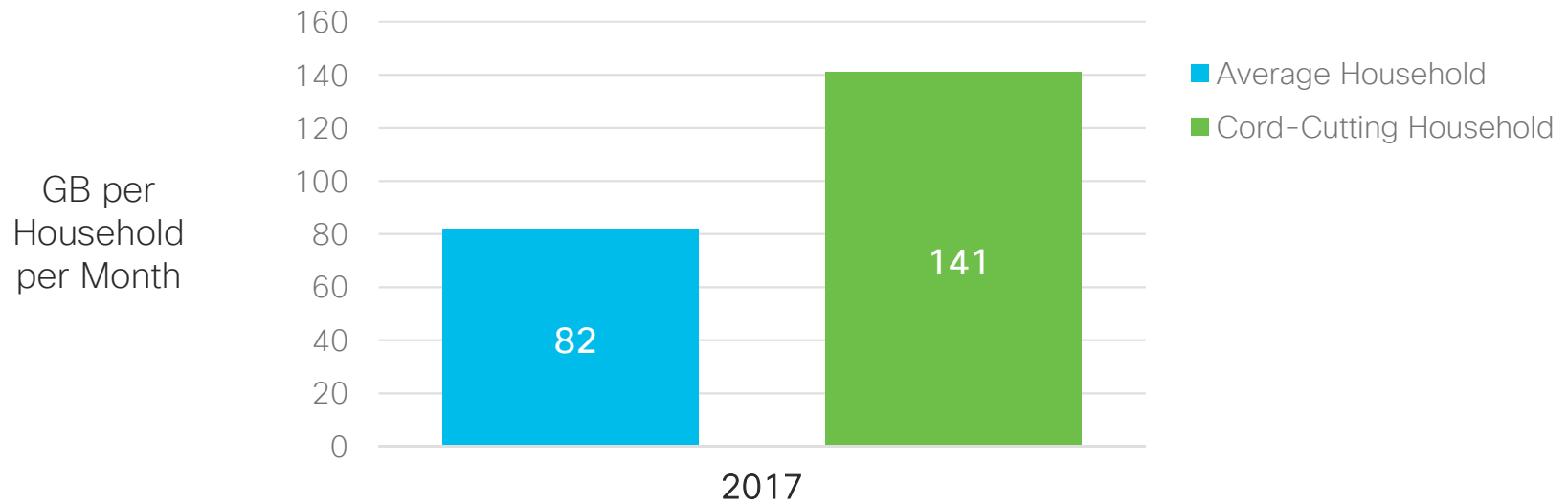
22% CAGR
2017-2022



* DMAs include devices such as Roku, Apple TV, Chromecast

Cord-Cutting Household Traffic Is 72% Higher

A global cord-cutting household generates 141 GB per month in 2017, compared to 82 GB per month for an average household



Top Trends

Devices & Connections



- 1 Devices/Connections Mix
- 2 IoT/M2M by Verticals
- 3 IPv6 Adoption

Traffic Trends



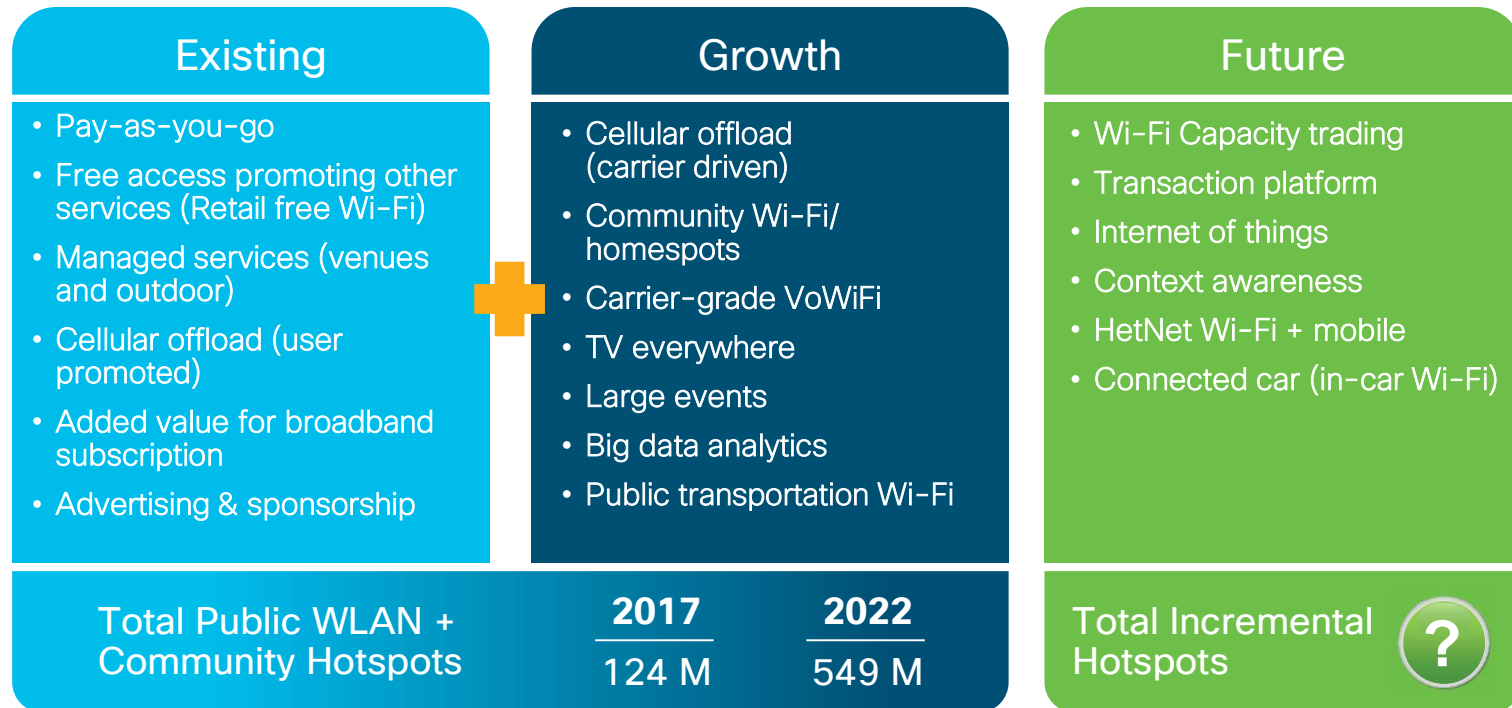
- 4 Traffic Growth by App
- 5 Traffic Pattern Analysis
- 6 "Cord-Cutting"

Network Performance and User Experience



- 7 Wi-Fi Momentum
- 8 Accelerating Speeds
- 9 Security Analysis

Global Wi-Fi Hotspot Coverage and Availability

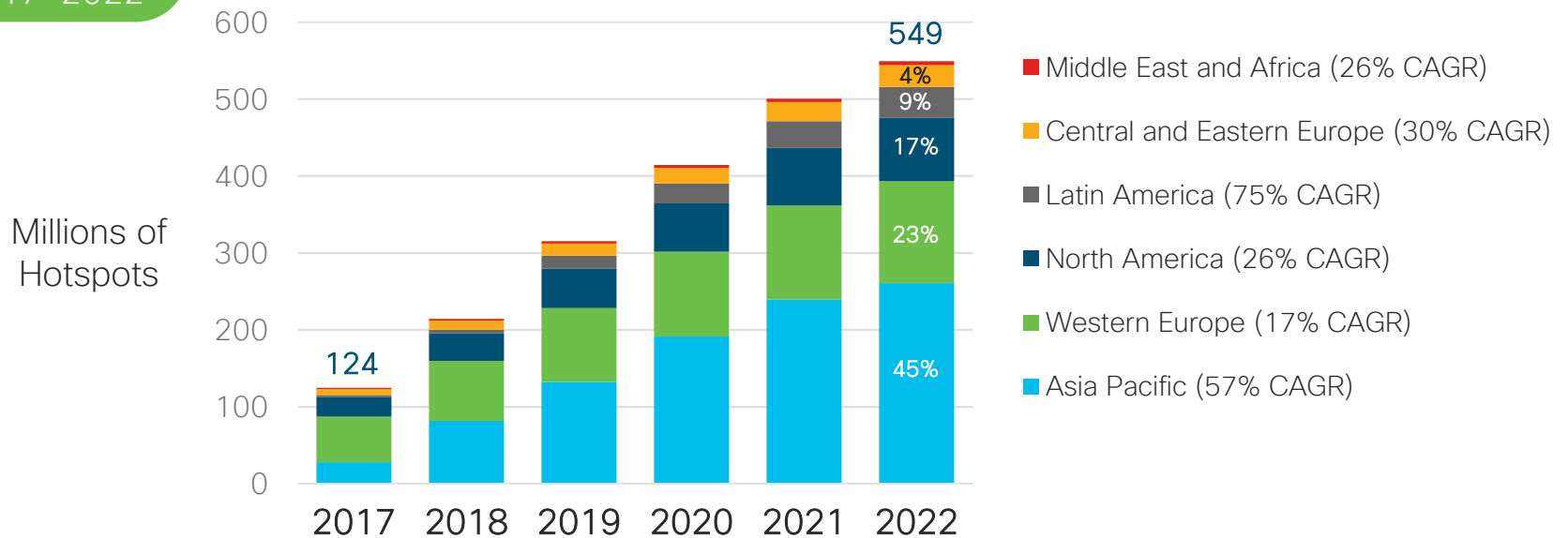


[Back to Trends Menu](#)

Global Public Wi-Fi Hotspots

Asia Pacific leads with 261 Million (47%) Hotspots by 2022

35% CAGR
2017-2022

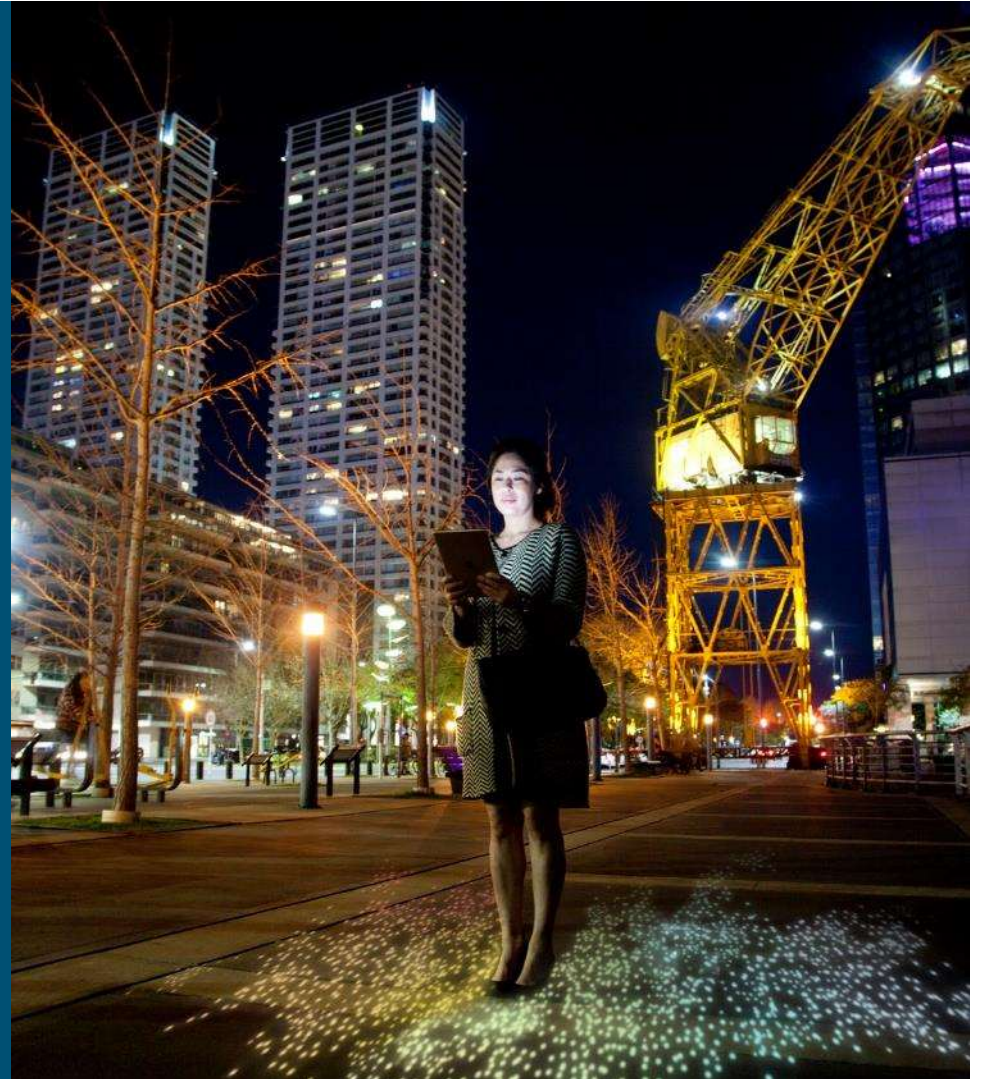


* Middle East and Africa represents 1% of global public Wi-Fi hotspots by 2022

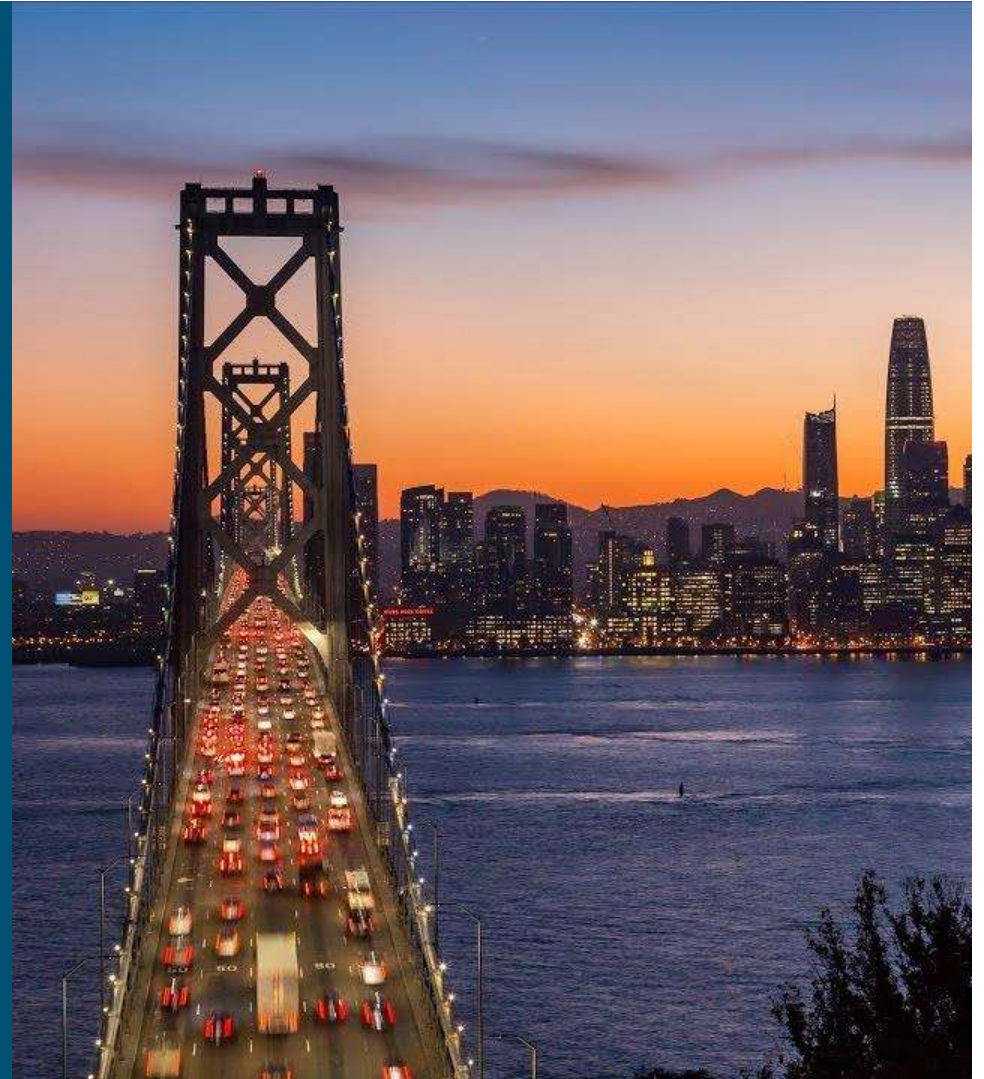
By 2022, China will have **34%** of global hotspots, the most number of hotspots (**185 million**) in the world.

Source: Cisco VNI Global IP Traffic Forecast, 2017–2022

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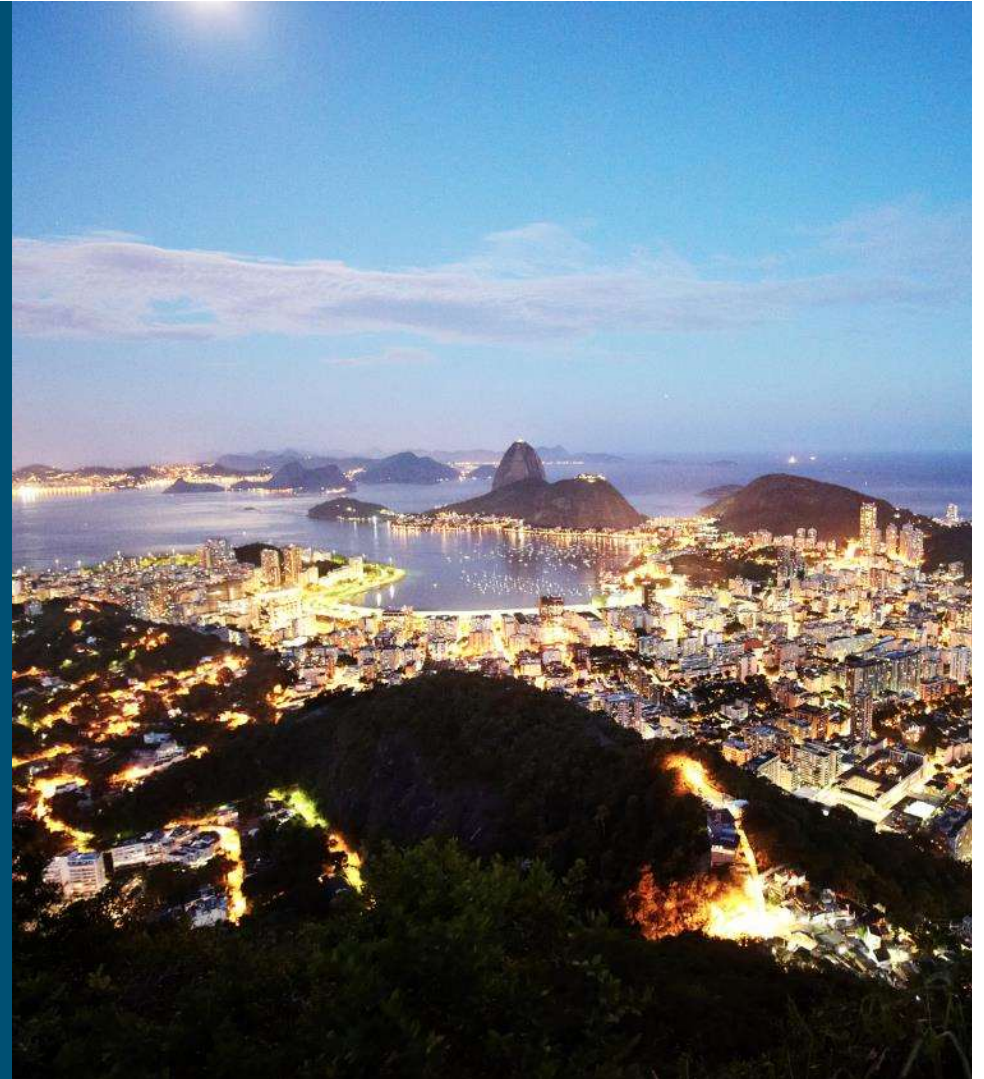
The United States will have 93% of NA hotspots, the most number of hotspots in NA, 77 M by 2022.



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Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

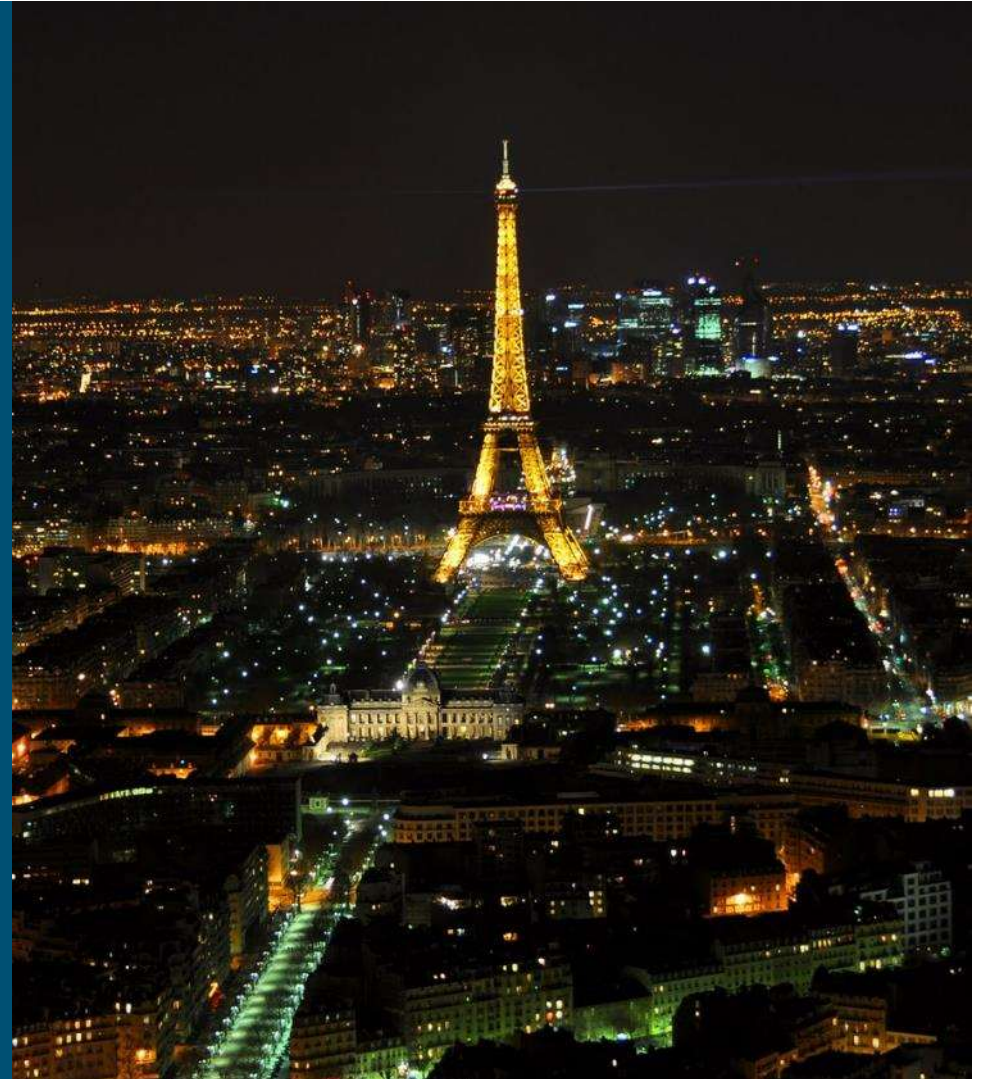
Brazil will have 45% of LATAM hotspots, the most number in the region, 18 M by 2022.



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Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

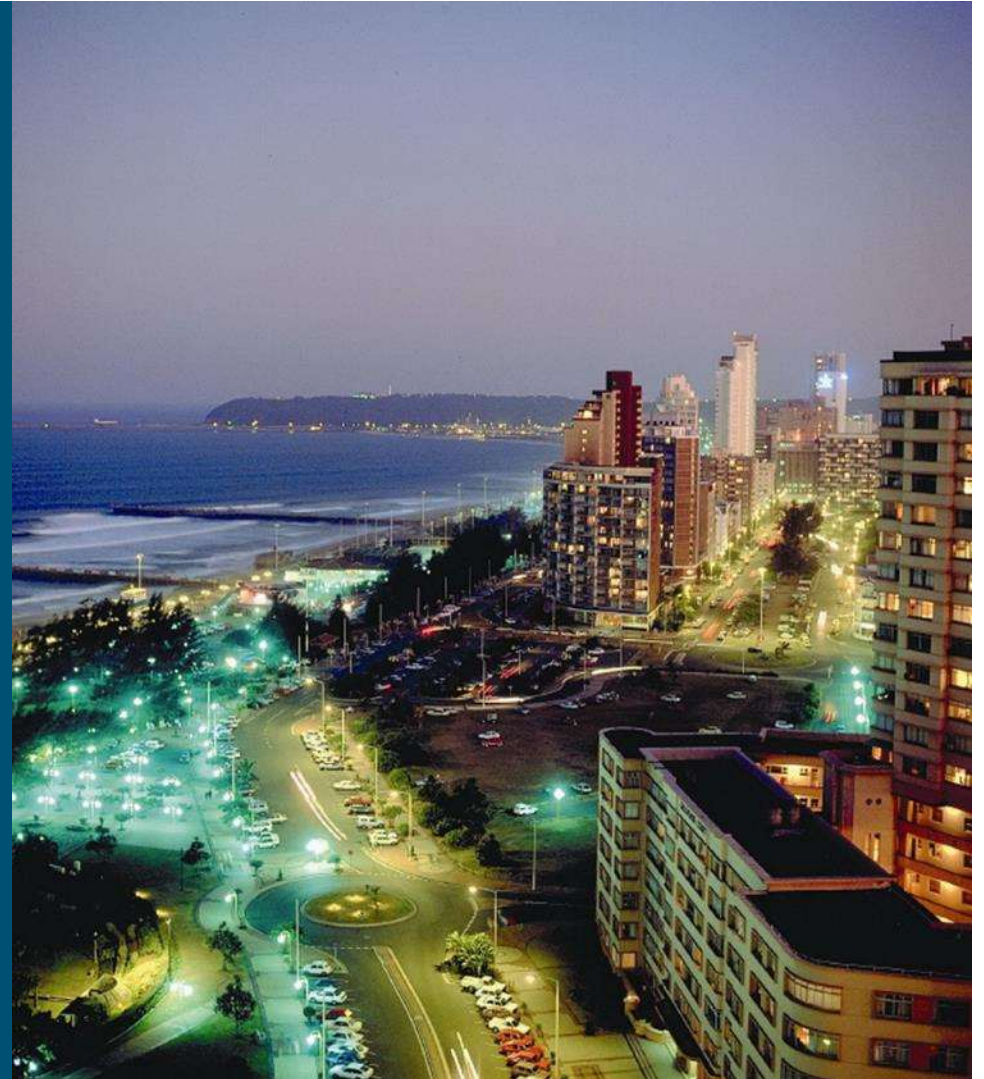
France will have
23% of WE
hotspots, the most
number of hotspots
in WE, 30 million by
2022



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Source: Cisco VNI Global IP Traffic Forecast, 2017–2022

South Africa will have 30% of MEA hotspots, the most number in the region, 1.2 M by 2022

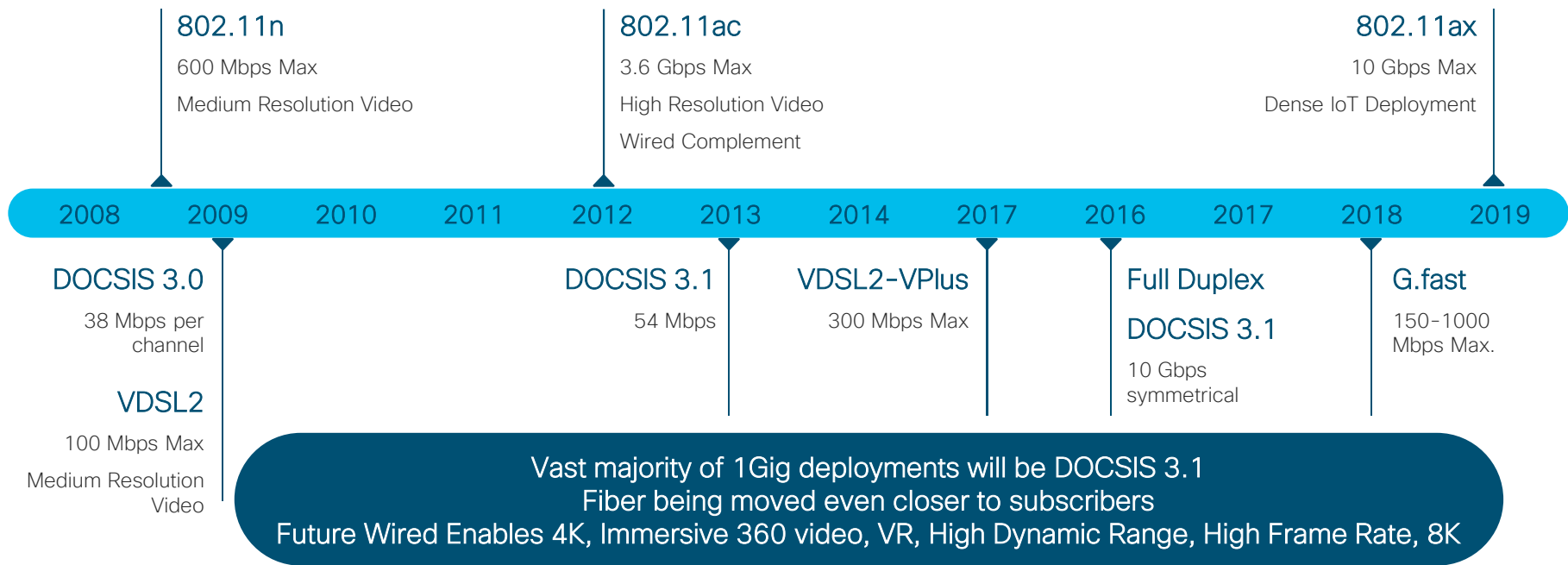


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Source: Cisco VNI Global IP Traffic Forecast, 2017–2022

Future of Wired and Wireless Technologies

By 2022, 9.5% of total SOHO will be equipped with 802.11ax
 By 2022, 86.9% of total SOHO will be equipped with 802.11ac
 Future Wi-Fi Enables Virtualization, IoT, Speech Processing, Security, Data Analytics

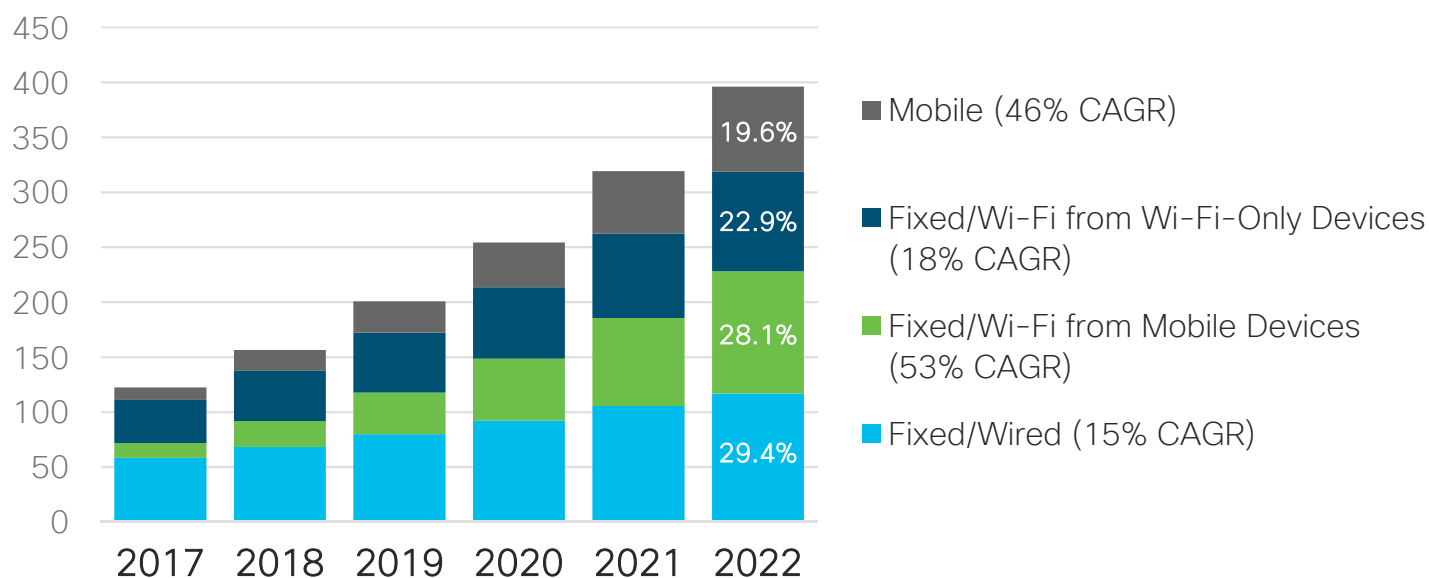


Global IP Traffic by Local Access Technology

By 2022, 71% of total IP traffic will be wireless*

26% CAGR
2017-2022

Exabytes
per Month



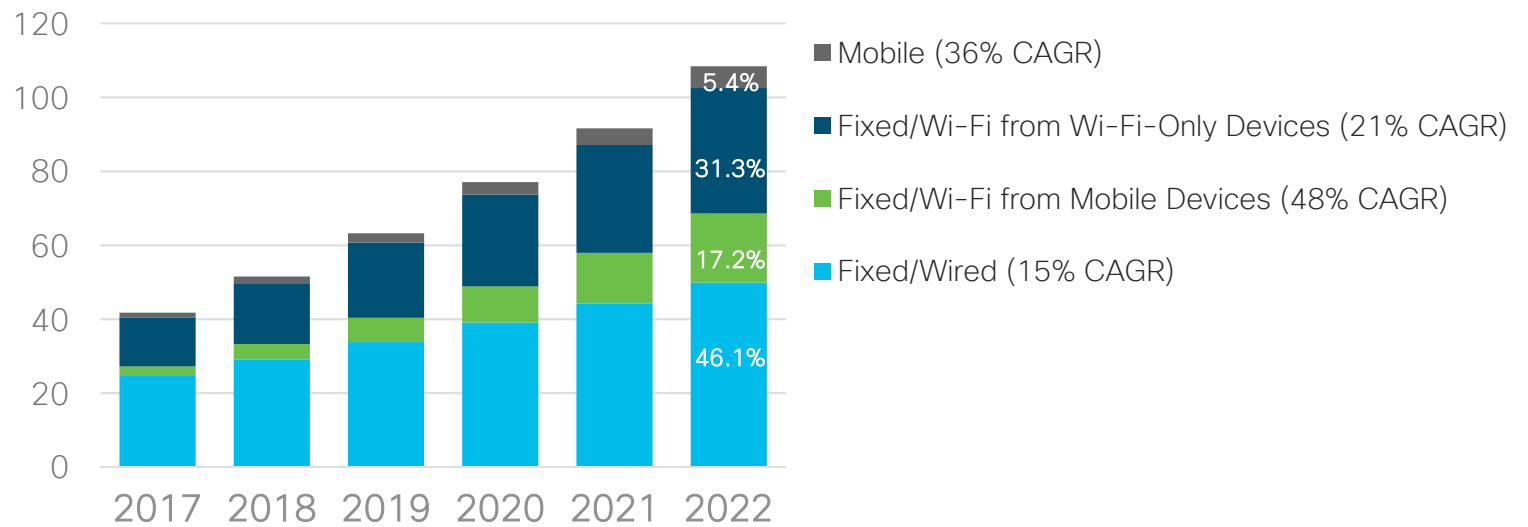
* Wireless traffic includes Wi-Fi and mobile

NA IP Traffic by Local Access Technology

By 2022, 54% of total IP traffic will be wireless*

21% CAGR
2017-2022

Exabytes
per Month



* Wireless traffic includes Wi-Fi and mobile

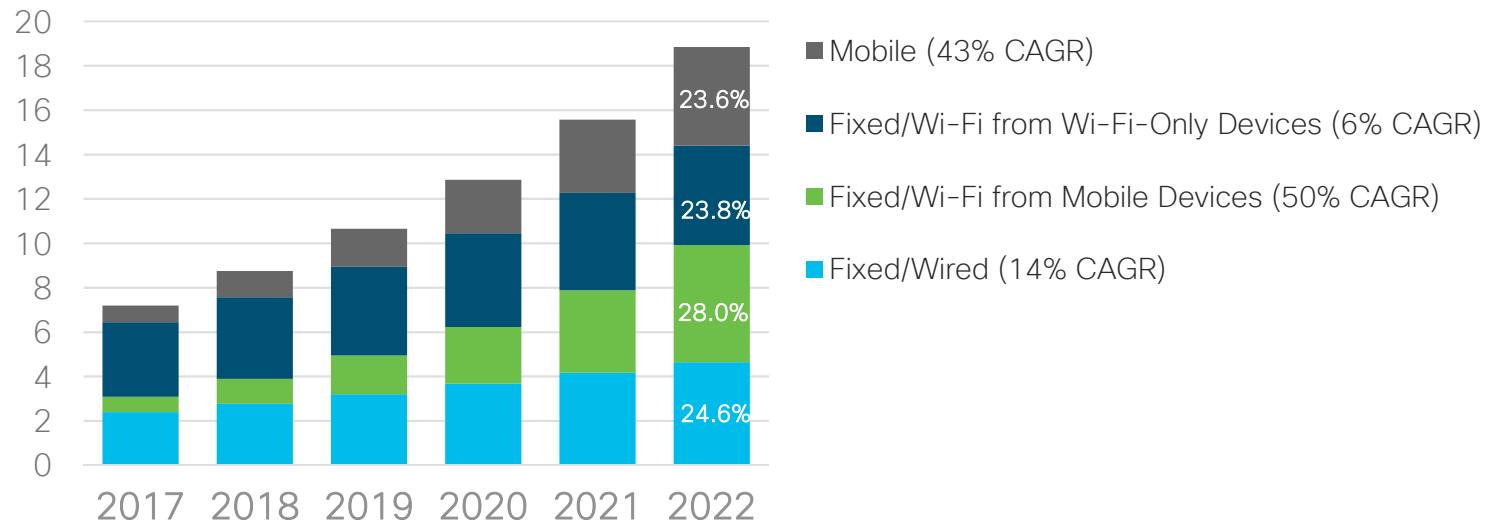
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

LATAM IP Traffic by Local Access Technology

By 2022, 75% of total IP traffic will be wireless*

21% CAGR
2017-2022

Exabytes
per Month



* Wireless traffic includes Wi-Fi and mobile

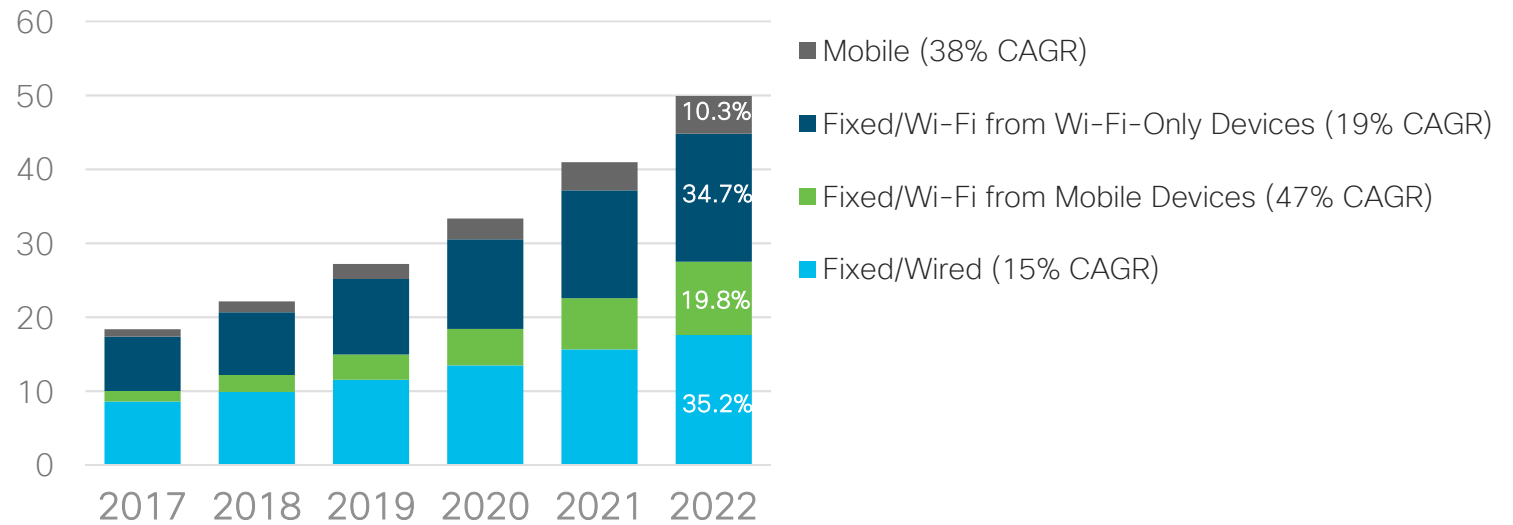
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

WE IP Traffic by Local Access Technology

By 2022, 65% of total IP traffic will be wireless*

22% CAGR
2017-2022

Exabytes
per Month



* Wireless traffic includes Wi-Fi and mobile

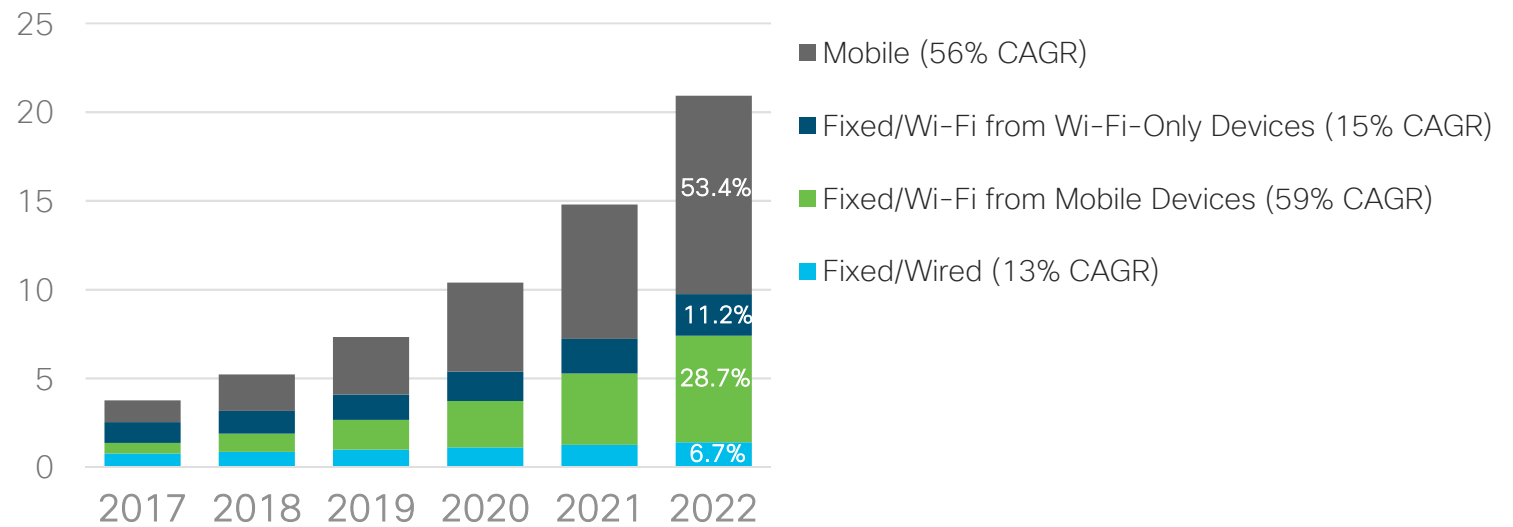
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

MEA IP Traffic by Local Access Technology

By 2022, 93% of total IP traffic will be wireless*

41% CAGR
2017-2022

Exabytes
per Month



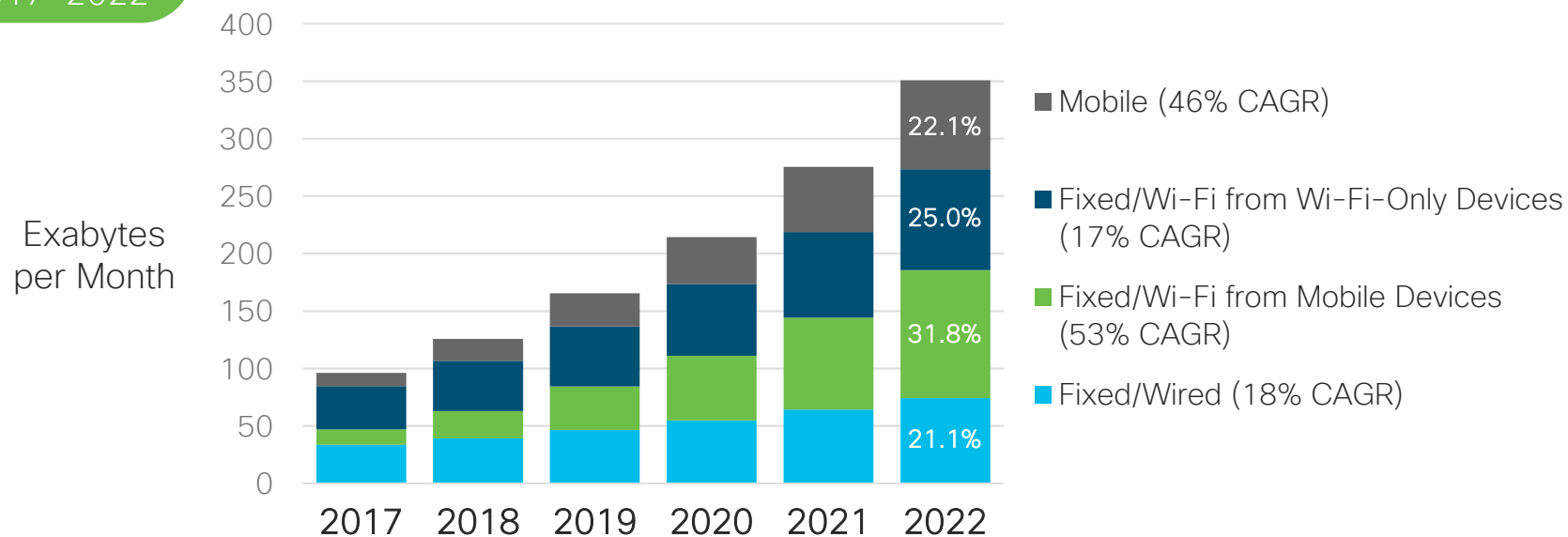
* Wireless traffic includes Wi-Fi and mobile

Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

Global Internet Traffic by Local Access Technology

By 2022, 79% of total Internet traffic will be wireless*

30% CAGR
2017-2022



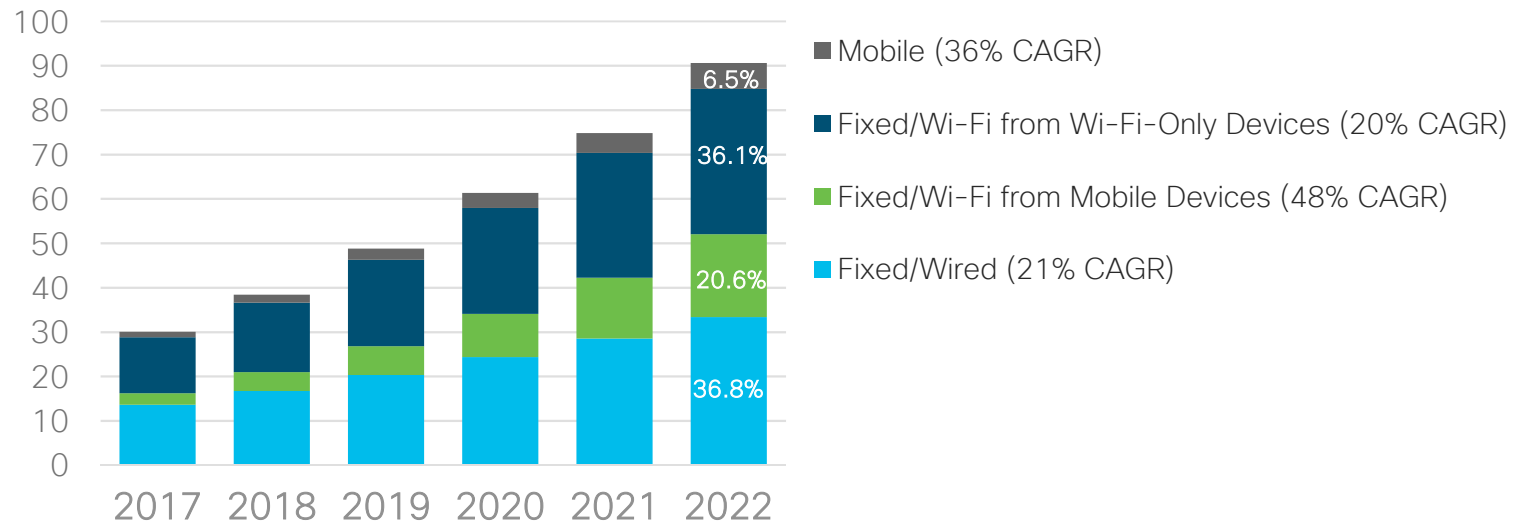
* Wireless traffic includes Wi-Fi and mobile

NA Internet Traffic by Local Access Technology

By 2022, 63% of total Internet traffic will be wireless*

23% CAGR
2017-2022

Exabytes
per Month



* Wireless traffic includes Wi-Fi and mobile

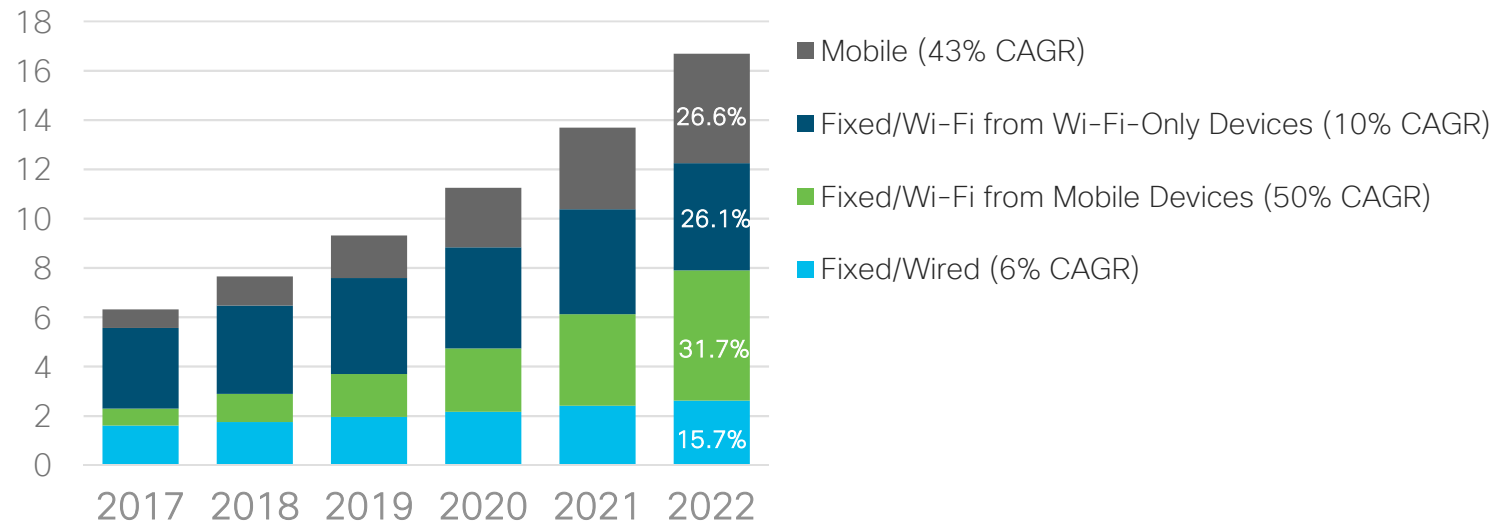
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

LATAM Internet Traffic by Local Access Technology

By 2022, 84% of total Internet traffic will be wireless*

17% CAGR
2017-2022

Exabytes
per Month



* Wireless traffic includes Wi-Fi and mobile

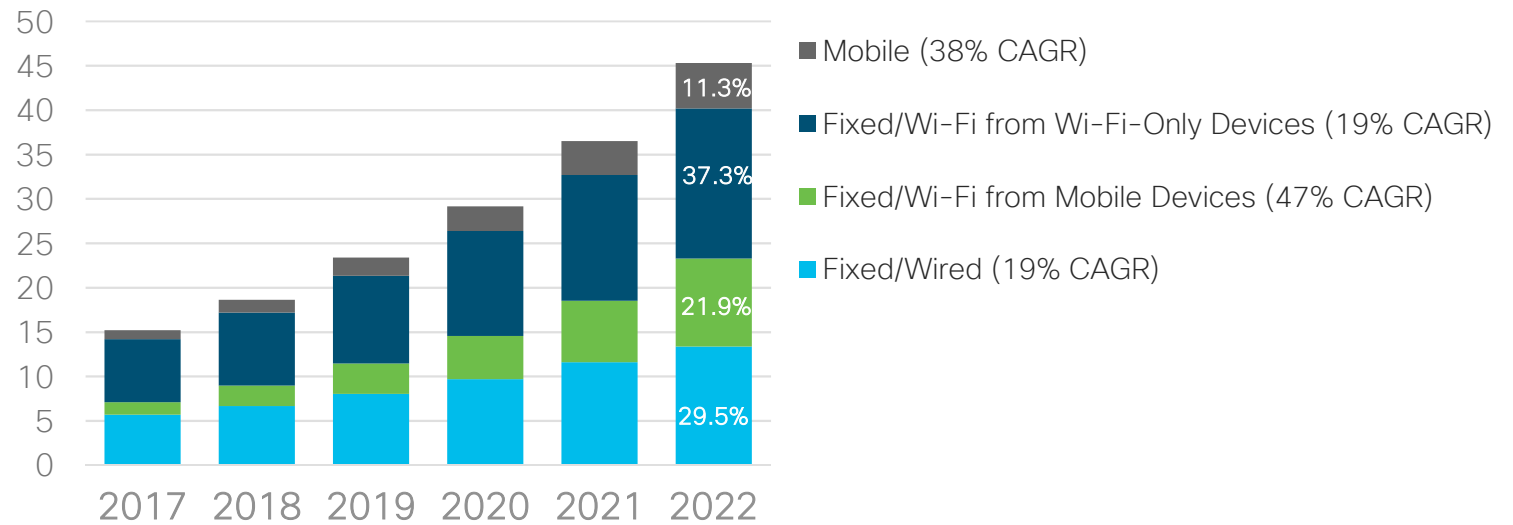
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

WE Internet Traffic by Local Access Technology

By 2022, 70% of total Internet traffic will be wireless*

22% CAGR
2017-2022

Exabytes
per Month



* Wireless traffic includes Wi-Fi and mobile

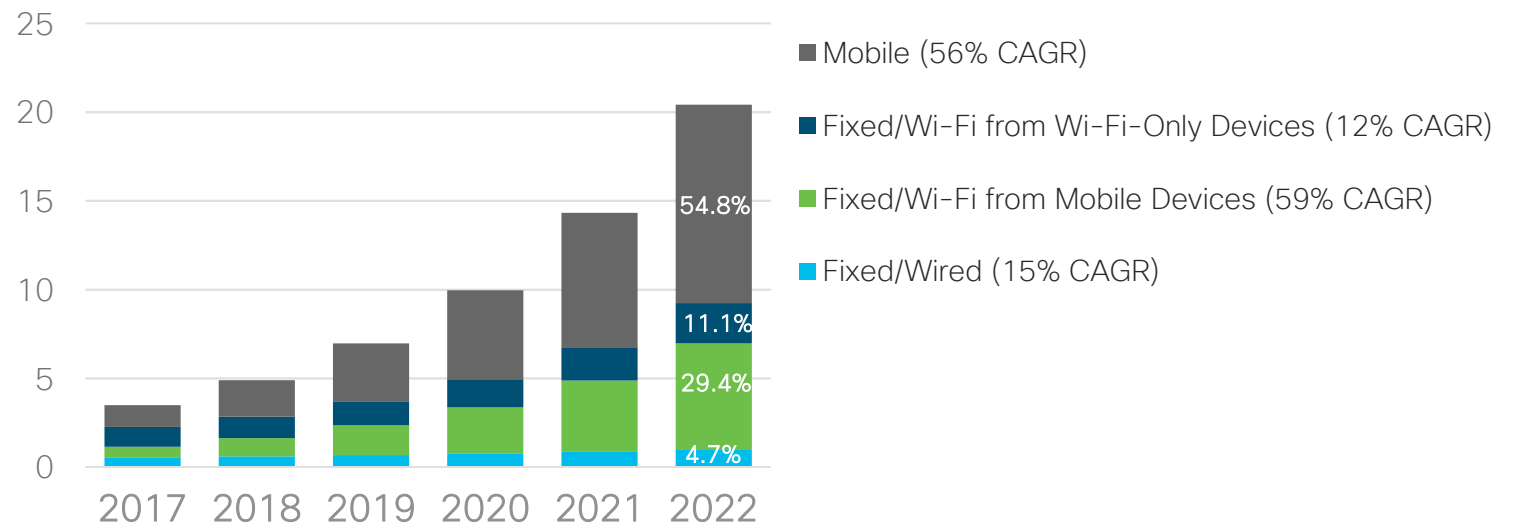
Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

MEA Internet Traffic by Local Access Technology

By 2022, 95% of total Internet traffic will be wireless*

42% CAGR
2017-2022

Exabytes
per Month



* Wireless traffic includes Wi-Fi and mobile

Source: Cisco VNI Global IP Traffic Forecast, 2017-2022

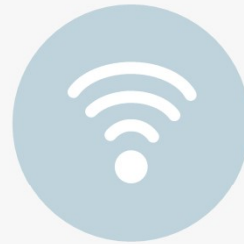
Top Trends

Devices & Connections



- 1 Devices/Connections Mix
- 2 IoT/M2M by Verticals
- 3 IPv6 Adoption

Traffic Trends



- 4 Traffic Growth by App
- 5 Traffic Pattern Analysis
- 6 "Cord-Cutting"

Network Performance and User Experience



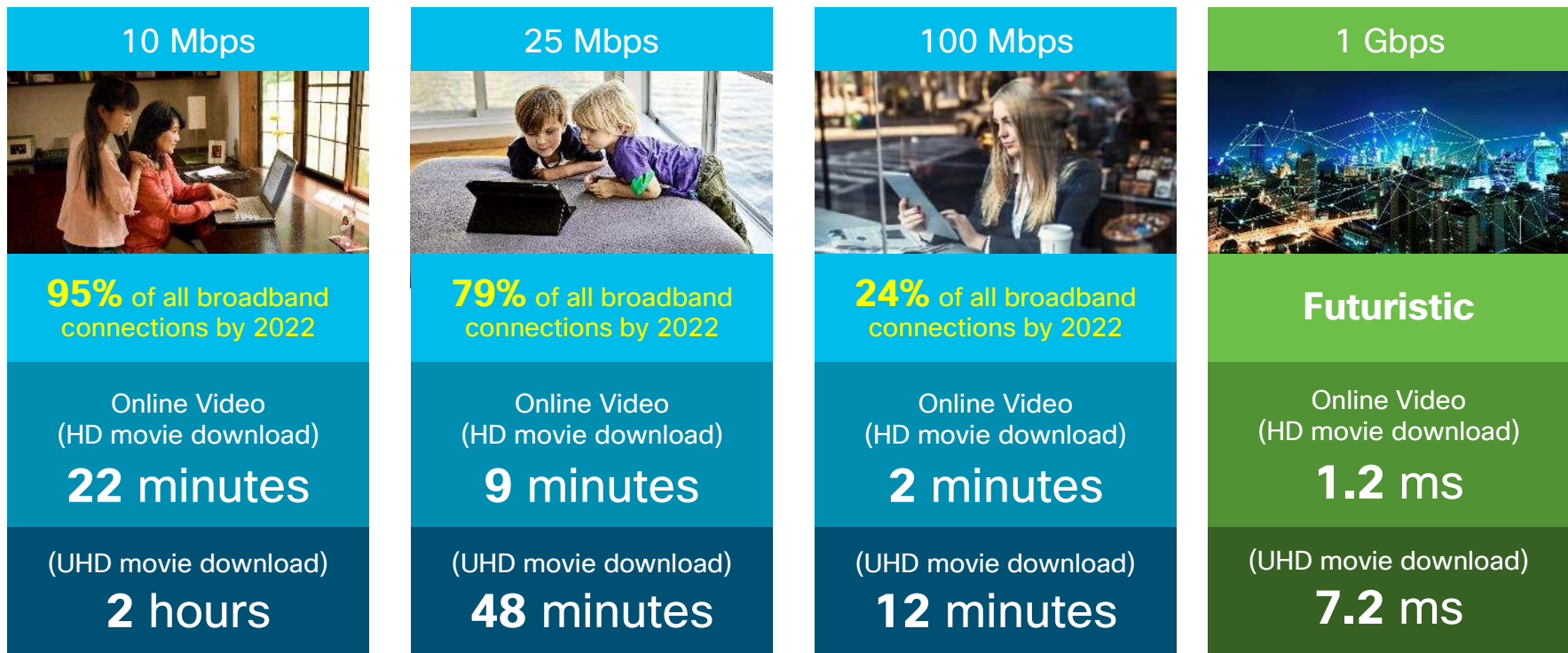
- 7 Wi-Fi Momentum
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Global Average Fixed Broadband Speeds

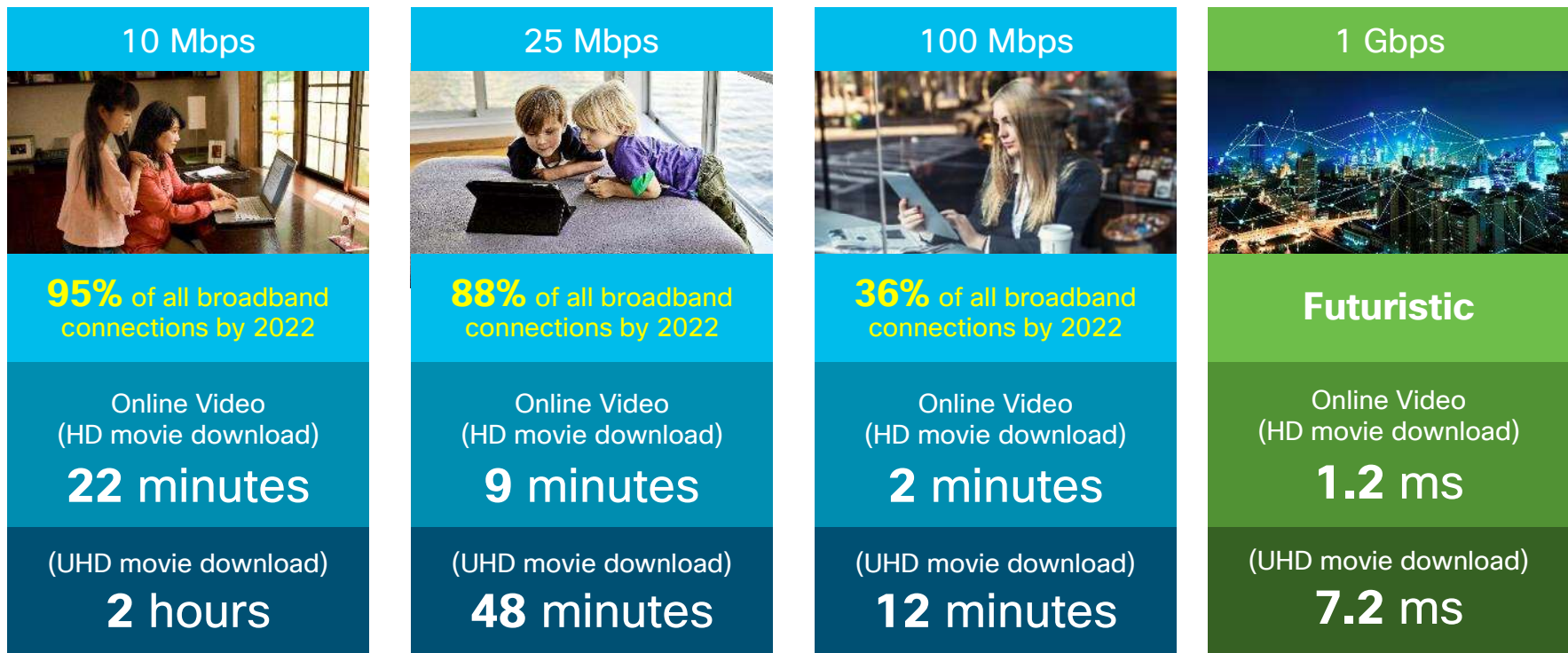
Doubling in speeds from 2017-2022

In Mbps	2017	2022
GLOBAL		
Global	39.0	75.4
BY REGION		
Asia Pacific	46.2	98.8
Latin America	11.7	28.1
North America	43.2	94.2
Western Europe	37.9	76.0
Central and Eastern Europe	32.8	46.7
Middle East & Africa	7.8	20.2

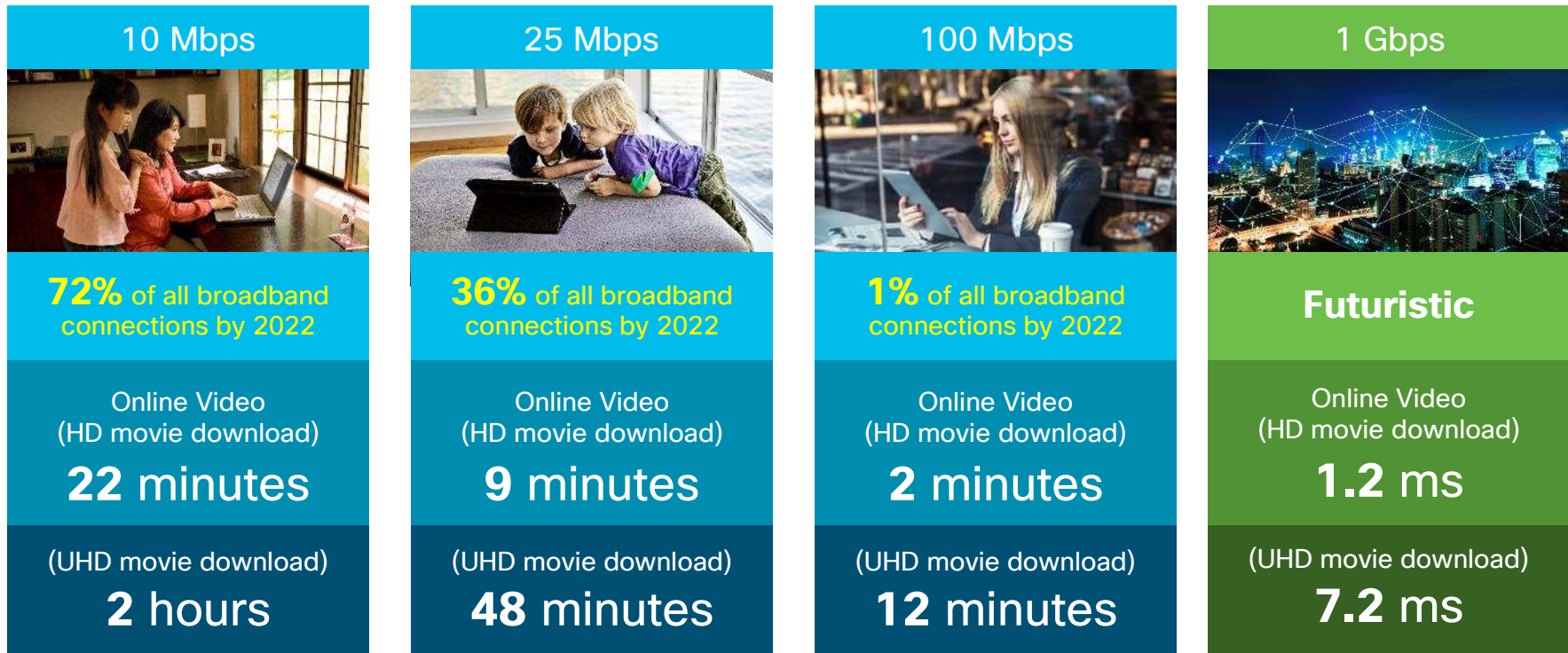
Global Faster Networks Enable Better Experiences



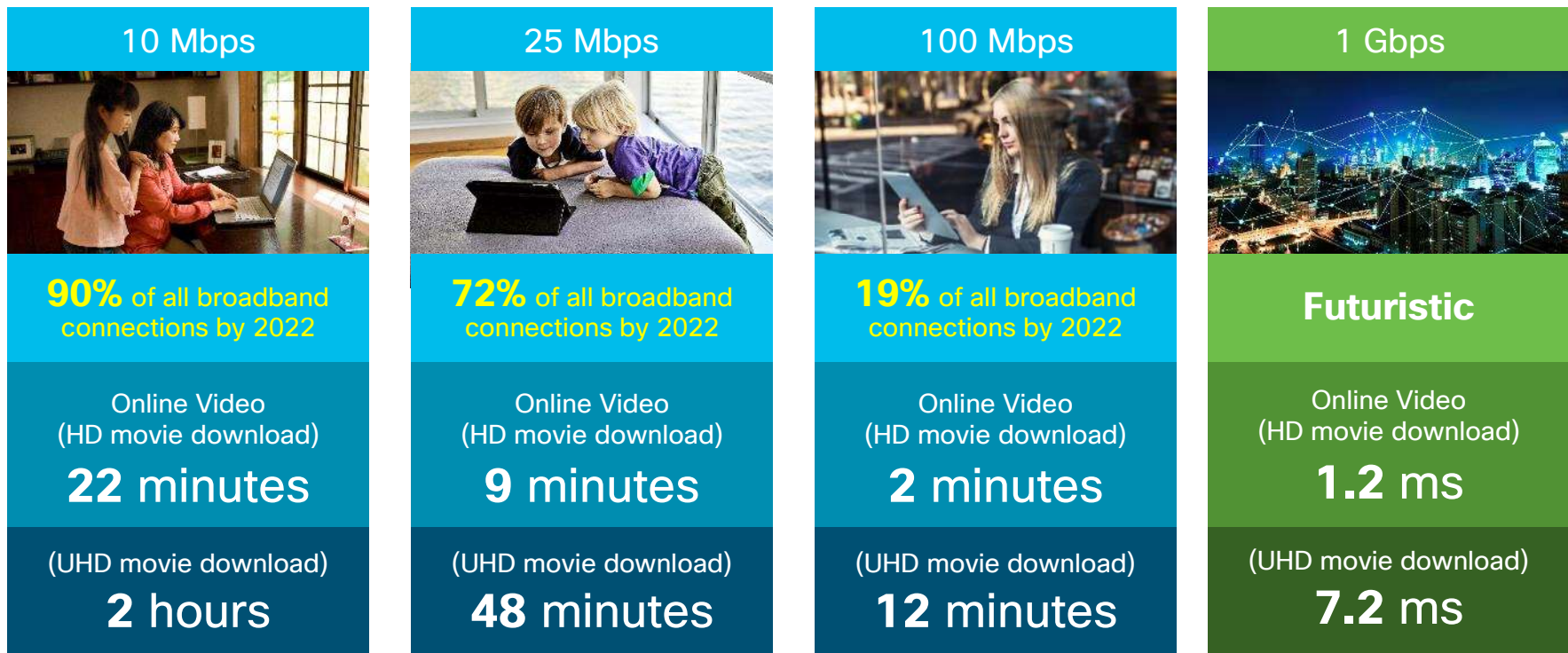
NA Faster Networks Enable Better Experiences



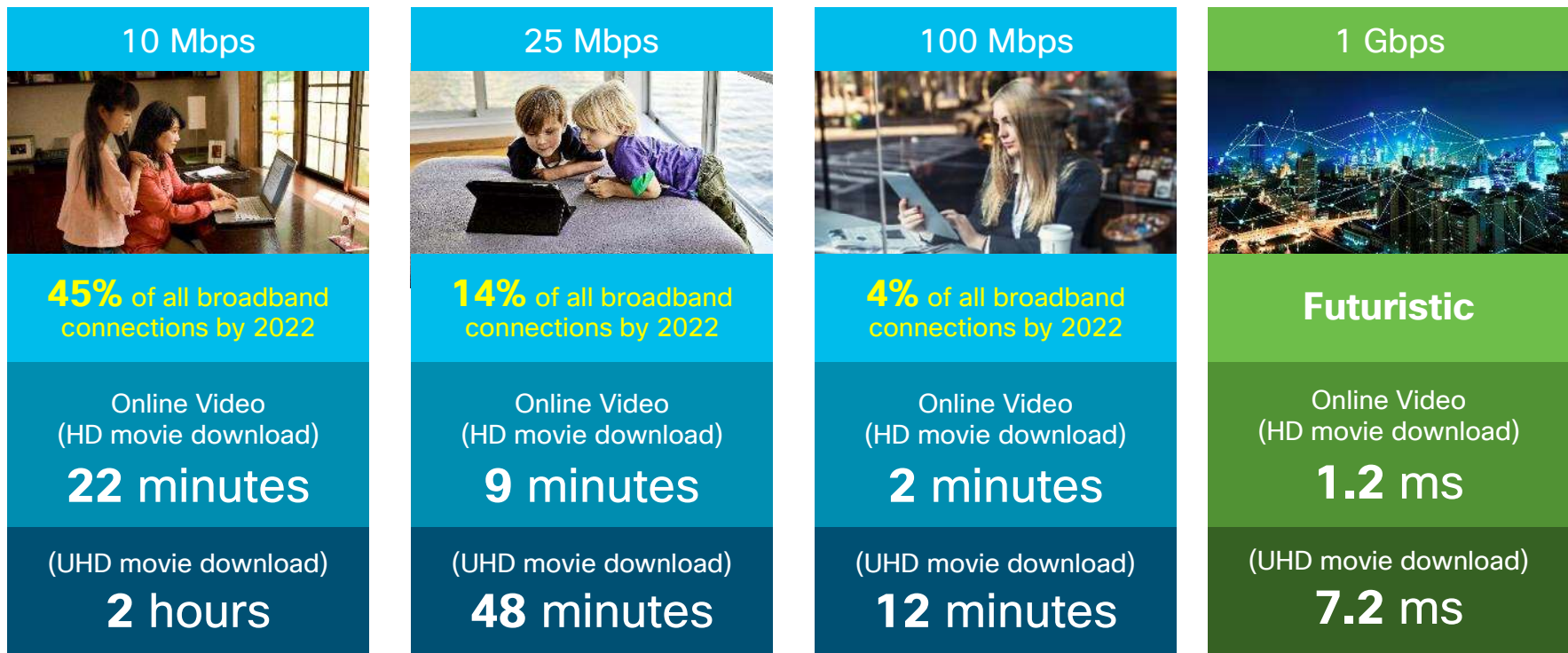
LATAM Faster Networks Enable Better Experiences



WE Faster Networks Enable Better Experiences

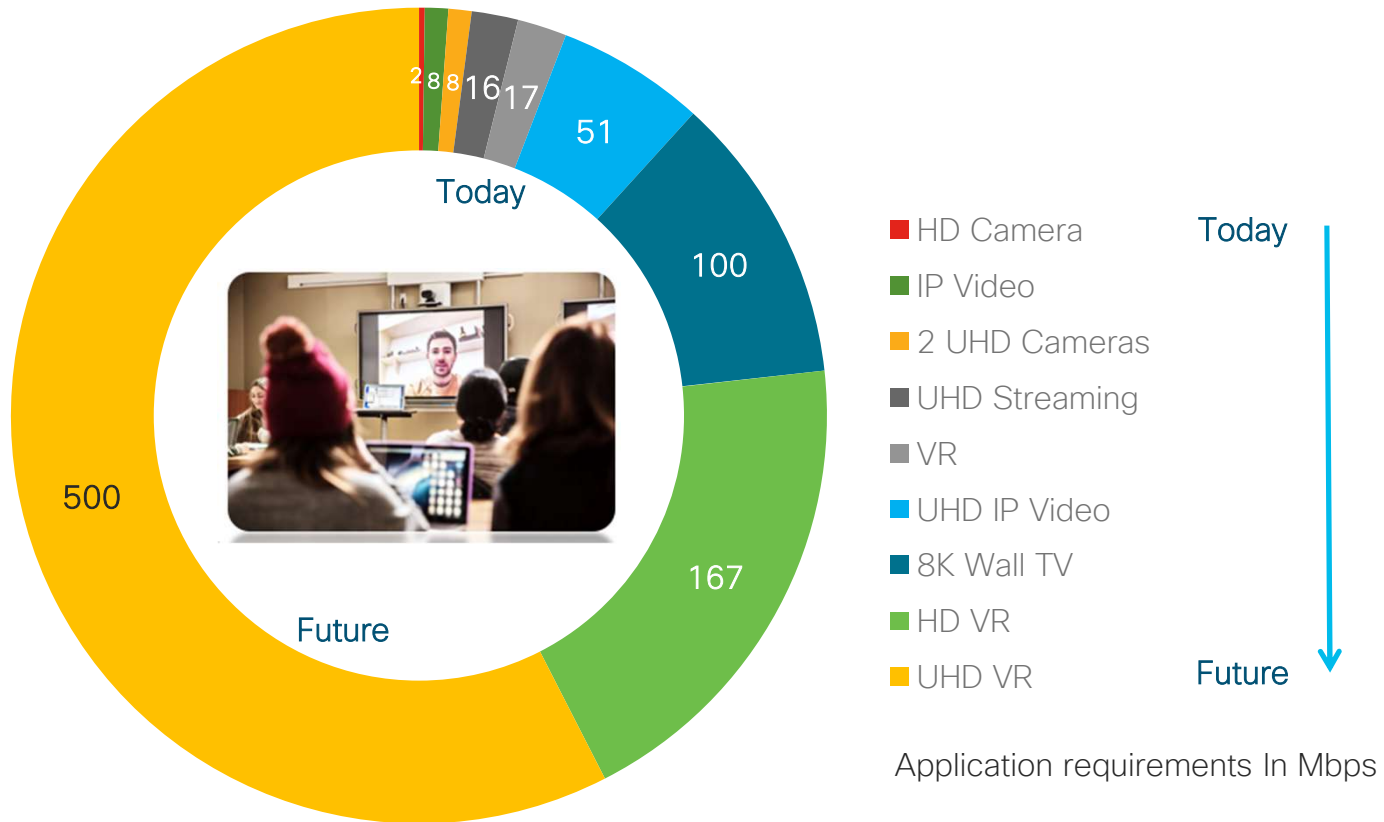


MEA Faster Networks Enable Better Experiences



Video in the Home of Today and the Future

Significant demand for video in the home of the future



Global Average Wi-Fi Speeds

Wi-Fi speeds double from 2017-2022

In Mbps	2017	2022
GLOBAL		
Global	24.4	54.2
BY REGION		
Asia Pacific	26.7	63.3
Latin America	9.0	16.8
North America	37.1	83.8
Western Europe	25.0	49.5
Central and Eastern Europe	19.5	32.8
Middle East & Africa	6.2	11.2

Global Average Cellular Speeds

Mobile/Cellular speeds double from 2017-2022

In Mbps	2017	2022
GLOBAL		
Global	8.7	28.5
BY REGION		
Asia Pacific	10.6	28.8
Latin America	4.9	17.7
North America	16.3	42.0
Western Europe	16.0	50.5
Central and Eastern Europe	10.1	26.2
Middle East & Africa	4.4	15.3

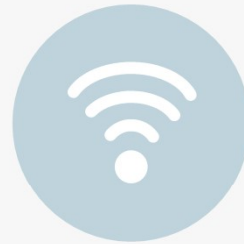
Top Trends

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- 1 Devices/Connections Mix
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- 3 IPv6 Adoption

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Network Performance and User Experience



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- 9 Security Analysis

DDoS Attack Size and Traffic Increasing

Peak attack size increased **174% Y/Y**.*

DDoS attacks can represent up to **25%** of a country's total Internet traffic while they are occurring.

Average DDoS attack size between 1-2 Gbps increased **37% Y/Y** which is faster than Internet traffic at **33% Y/Y**.

* 1H2017- 1H2018

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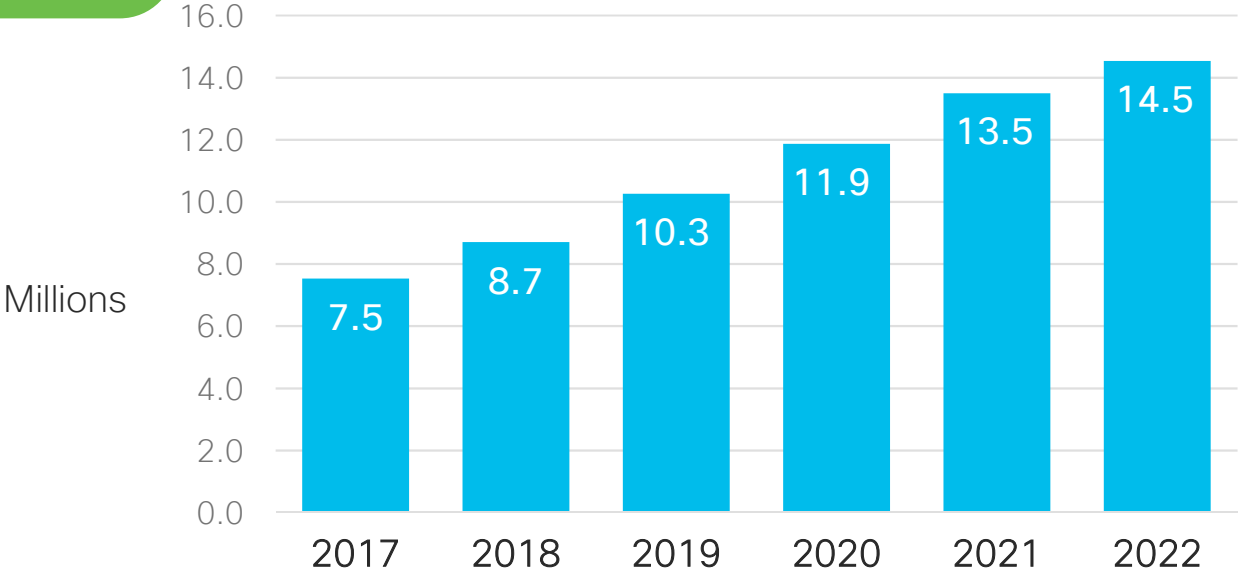


Source: Arbor Networks, Cisco VNI Global IP Traffic Forecast, 2017-2022

Number of DDoS Attacks

Attacks will double to 14.5 million by 2022 globally

14% CAGR
2017-2022





39,554 Records Exposed per Breach

Total Breaches: **864**

Records Exposed: **34.2 Million**

Highest in Business: **46.8%**

Highest in Business: **63.7%**

Accessing Cisco VNI Forecast Resources

Complete VNI Forecast: <http://www.cisco.com/go/vni>

- [Press Release](#)
- [White Paper / FAQ](#)
- [Cisco VNI Web-based Tools](#)

SalesConnect: <https://salesconnect.cisco.com/#/program/PAGE-10578>

Cisco VNI Forecast Inquiries: traffic-inquiries@cisco.com

Cisco VNI/ GCI Community: <https://cisco.com/go/discussions-vni-gci>

