Cisco Visual Networking Index (VNI) and VNI Service Adoption

Forecast Update, 2016–2021

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Previsões para o tráfego IP no Brasil 2016 – 2021

2

2,3x
Crescimento no tráfego total

3

3,6x
Crescimento no tráfego de pico

3

3x
Crescimento no tráfego de vídeo

6

6x
Crescimento no tráfego móvel

Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

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Volume de tráfego
Previsões para 2021

44

44,3 GBytes/mês
por usuário

120

118,9 Gbytes/mês
por residência

240

239 Gbytes/mês
por residência com
acesso FTTX

Crescimento aprox. 2x em relação a 2016.

Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

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Global Internet Growth and Trends

Key Digital Transformers

By 2021

	More Internet Users	More Devices & Connections	Faster Broadband Speeds	More Video Viewing
2016	3.3 Billion	17.1 Billion	27.5 Mbps	73% of Traffic
2021	4.6 Billion	27.1 Billion	53.0 Mbps	82% of Traffic

Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

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Brazil Internet Growth and Trends

Key Digital Transformers

By 2021

	More Internet Users	More Devices & Connections	Faster Broadband Speeds	More Video Viewing
2016	135 Million	503.4 Million	11.2 Mbps	70% of Traffic
2021	180 Million	734.3 Million	21.3 Mbps	86% of Traffic

Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

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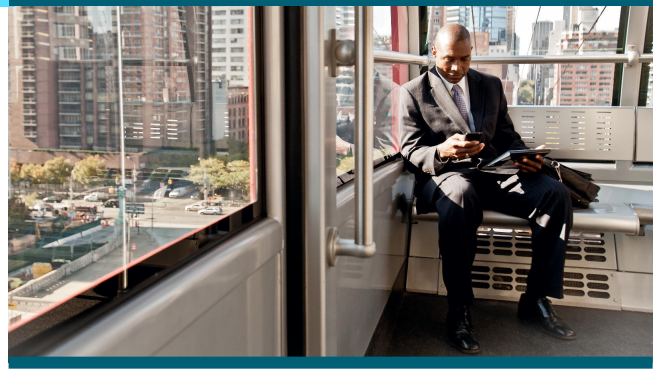
Establishing the Zettabyte Era

By 2021, global IP traffic will reach an annual run rate of 3.3 zettabytes per year

What is a zettabyte?

- One trillion gigabytes
- Approximately 10^{21} (1,000,000,000,000,000,000,000 bytes)



3.3 zettabytes is equal to:

- 14X more than all IP traffic generated in 2010 (232 exabytes)
- All movies ever made crossing global IP networks every minute

Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

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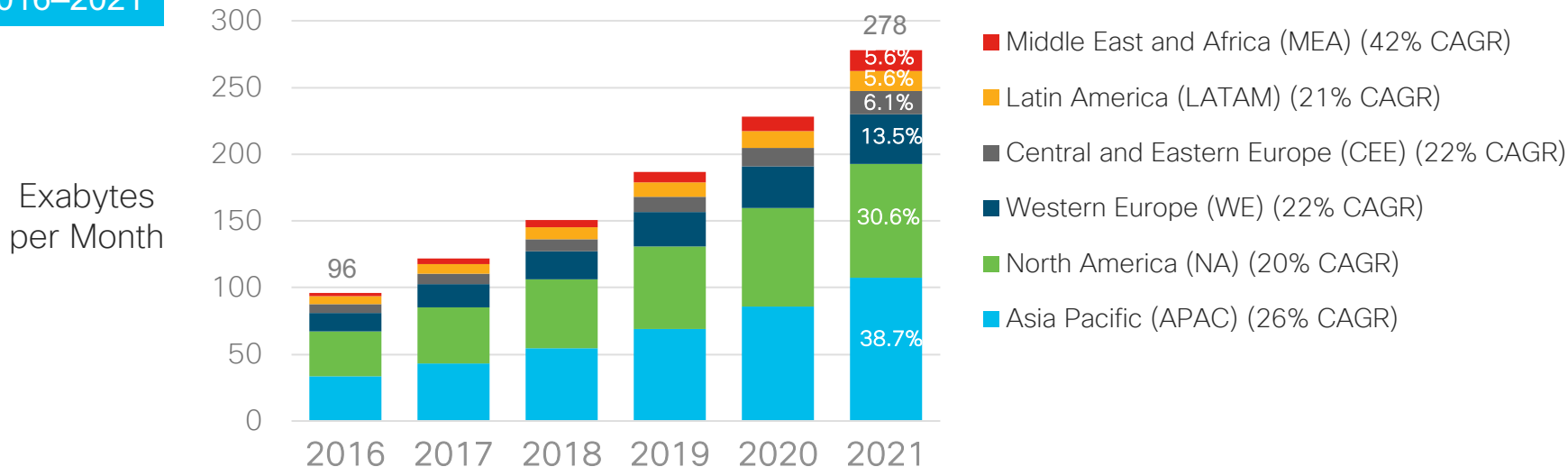
Global IP Traffic Growth by Region

MEA has the highest growth rate (42%) from 2016 to 2021
APAC will generate 39% of all IP traffic by 2021

24% CAGR
2016–2021



In Brazil, IP traffic will reach 5.5 Exabytes per month in 2021(2.4 Exabytes per month in 2016, 18% CAGR).
The gigabyte equivalent of all movies ever made will cross Brazil's IP networks every 1 hour.

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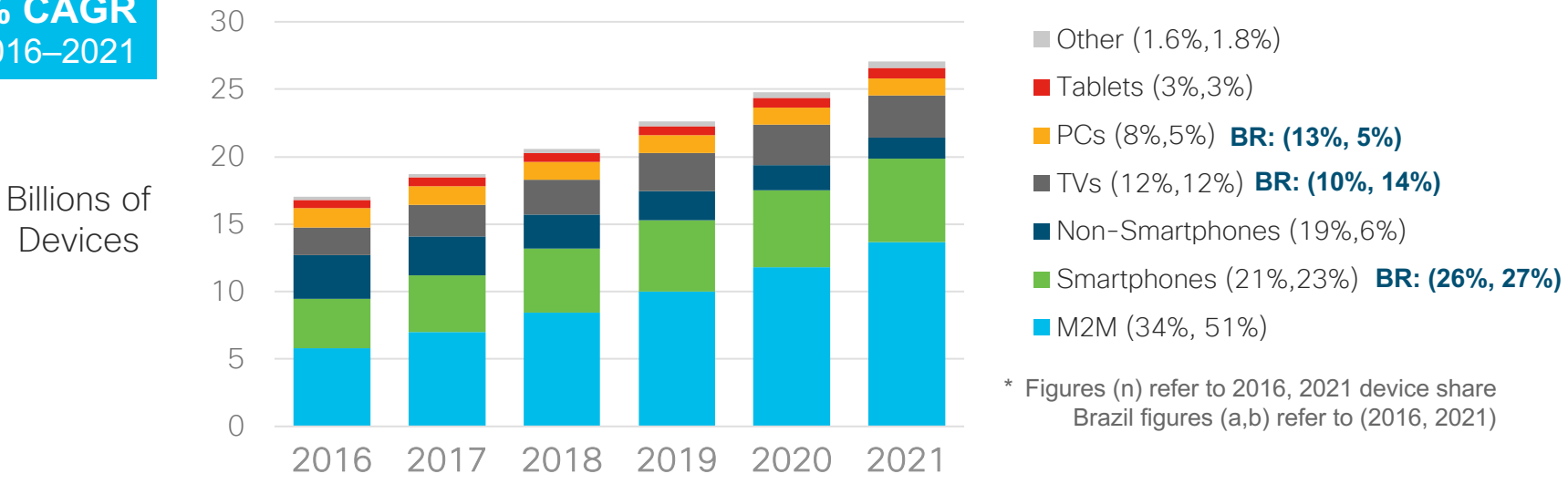
Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

Global Device/Connection Growth by Type

By 2021, M2M connections will be more than half of total connections

10% CAGR
2016–2021



* Figures (n) refer to 2016, 2021 device share
Brazil figures (a,b) refer to (2016, 2021)

In Brazil, by 2021 M2M modules will account for 44% of total devices / connections (from 28% in 2016), Smartphones 27% (from 26%) and Connected TV 14% (from 10%).

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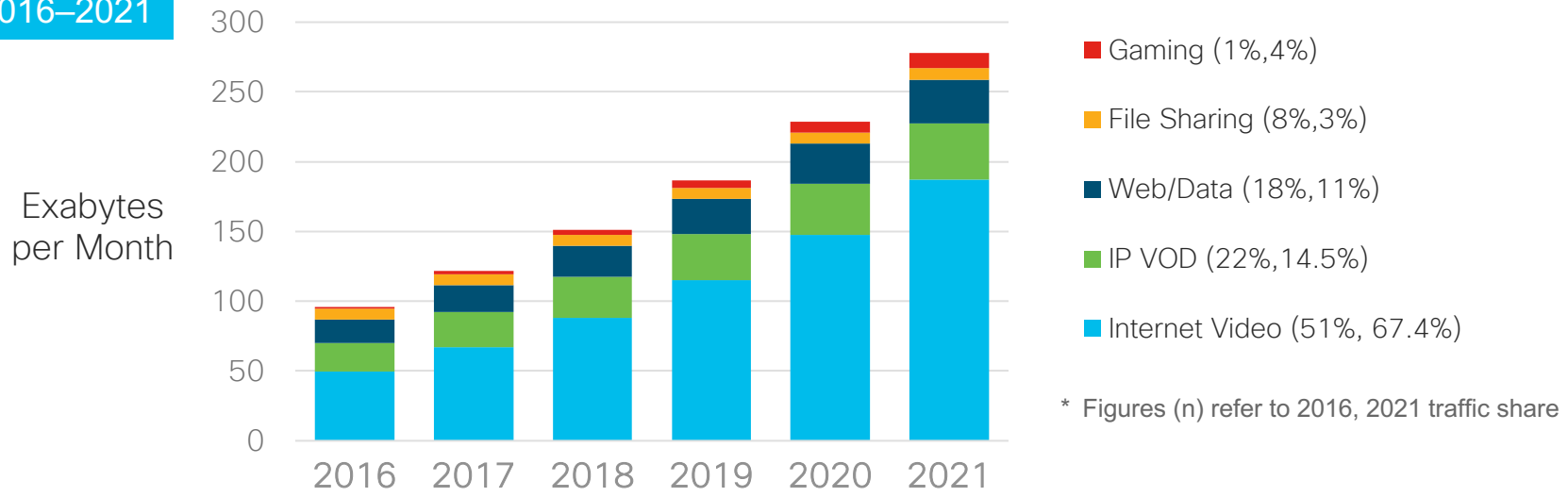
Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

Global IP Traffic by Application Type

By 2021, video will account for 82% of global IP traffic
Gaming starts showing significant growth

24% CAGR
2016–2021



In Brazil, IP video will be 86% of all IP traffic in 2021, up from 70% in 2016.

47% of all Internet Video will go through a CDN, 70% will be long-form.

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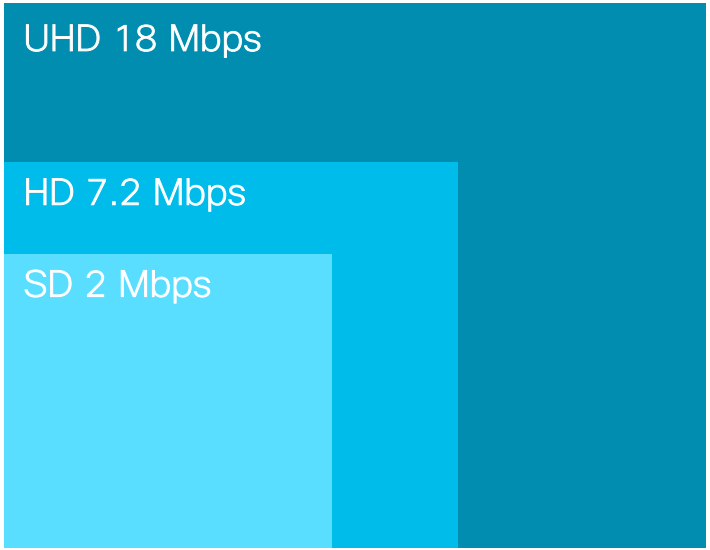
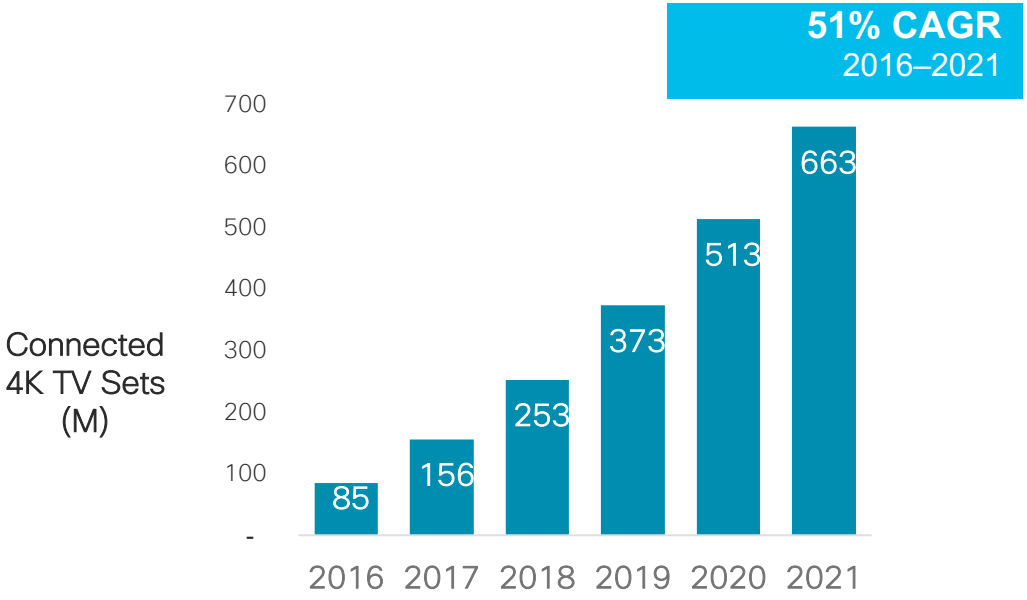
Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

Increasing Video Definition

By 2021, more than half (56%) of connected flat panel TVs will support 4K





In Brazil, 4K TVs will account for 35% (17.2 million) of all flat panel TVs in 2021, compared to 6.1% (1.1 million) in 2016, (72.5% CAGR).

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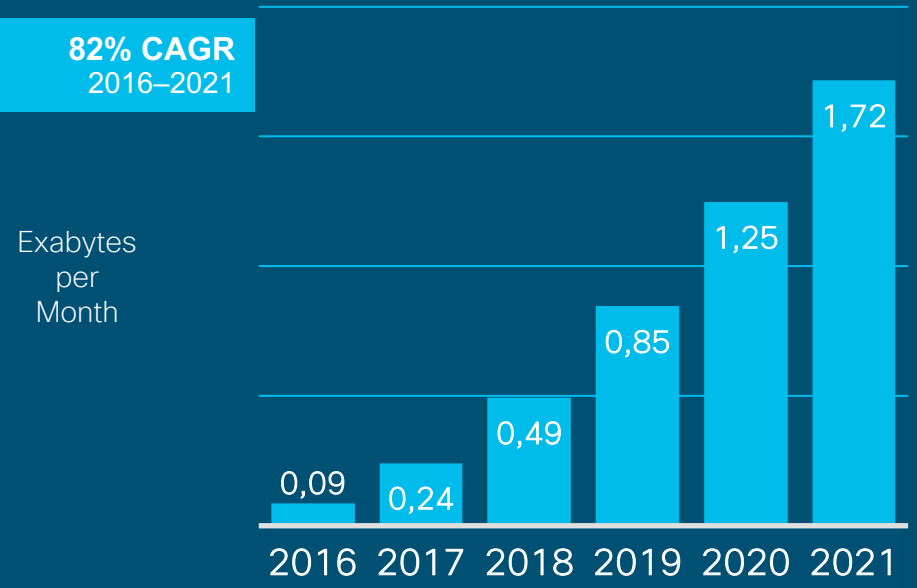
Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

Virtual and Augmented Reality Traffic

By 2021, VR/AR traffic will increase 20-fold, 1% of Entertainment Traffic

82% CAGR
2016–2021



Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

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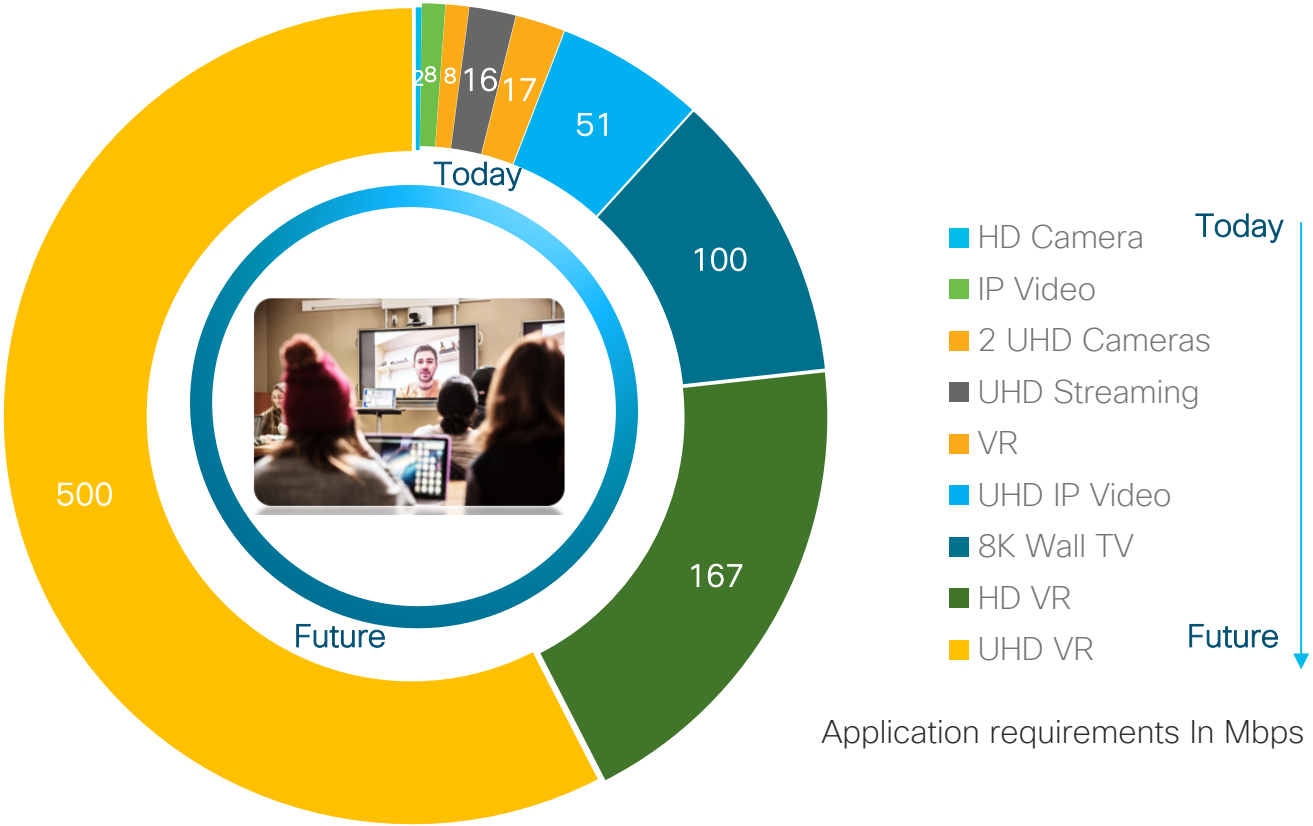
Video in the Home of Today and the Future

Significant demand for video in the home of the future



Application requirements In Mbps

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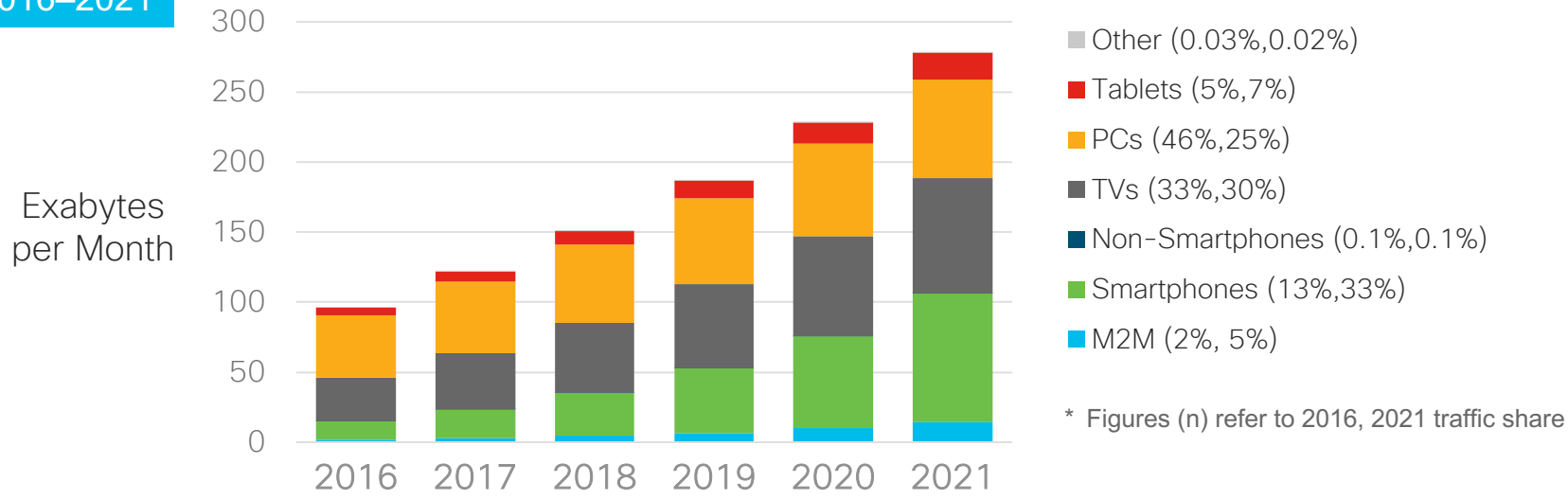
Global IP Traffic by Device Type

By 2021, non-PC devices will drive 75% of global IP traffic

24% CAGR
2016–2021



In Brazil, PCs accounted for 66% of IP traffic in 2016, reducing to 28% in 2021.
While Smartphones will grow from 14% to 39% and Connected TV from 14% to 24%.

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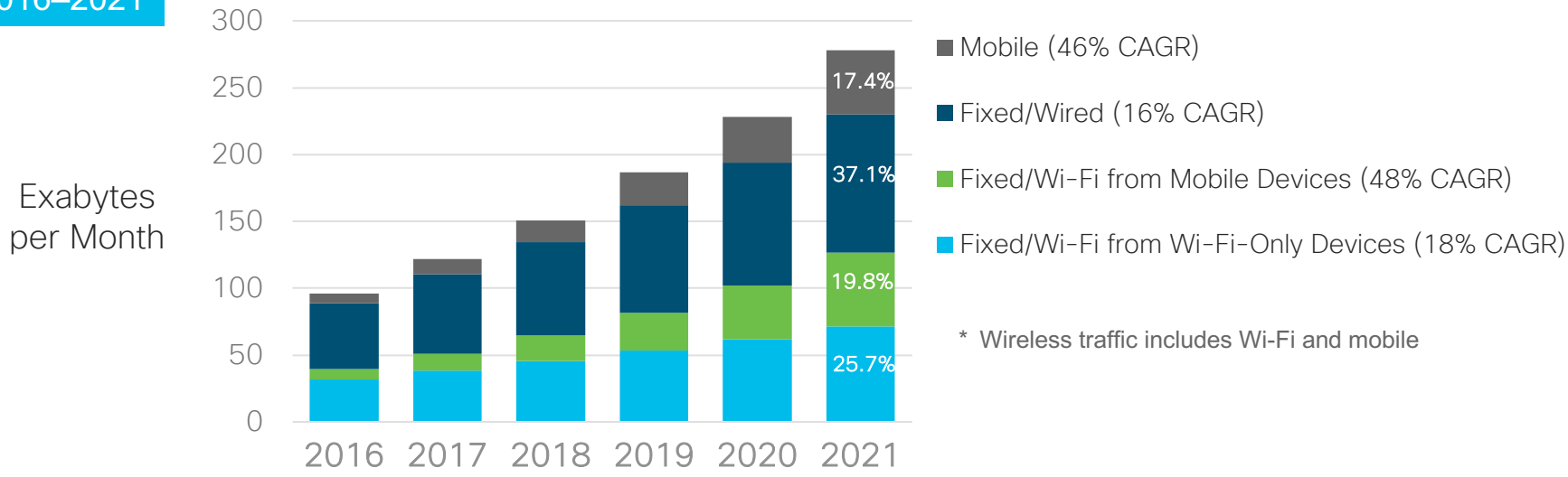
Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

Global IP Traffic by Local Access Technology

By 2021, 63% of total IP traffic will be wireless*

24% CAGR
2016–2021



Brazil's Mobile was 7% of total IP traffic in 2016, and will be 16% of total IP traffic in 2021. Fixed/Wired will represent 31% and Fixed/Wi-Fi from Mobile 53%.

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Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

Global Average Fixed Broadband Speeds

Doubling in speeds from 2016–2021

In Mbps	2016	2021
GLOBAL		
Global	27.5	53.0
BY REGION		
Asia Pacific	33.9	63.7
Latin America	9.3	20.5
North America	32.9	74.2
Western Europe	30.2	53.6
Central and Eastern Europe	29.2	45.5
Middle East & Africa	7.8	17.1
Brazil	11.2	21.3

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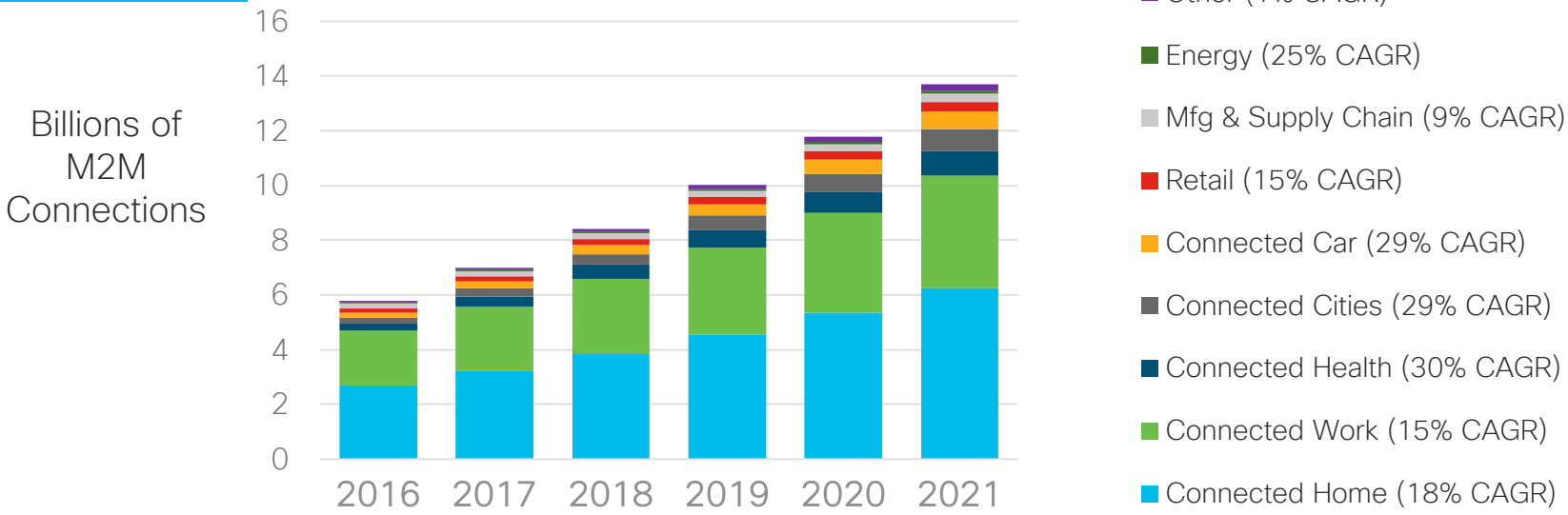
Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

Global M2M Connections / IoT Growth by Vertical

By 2021, connected home largest, connected health fastest growth

19% CAGR
2016–2021



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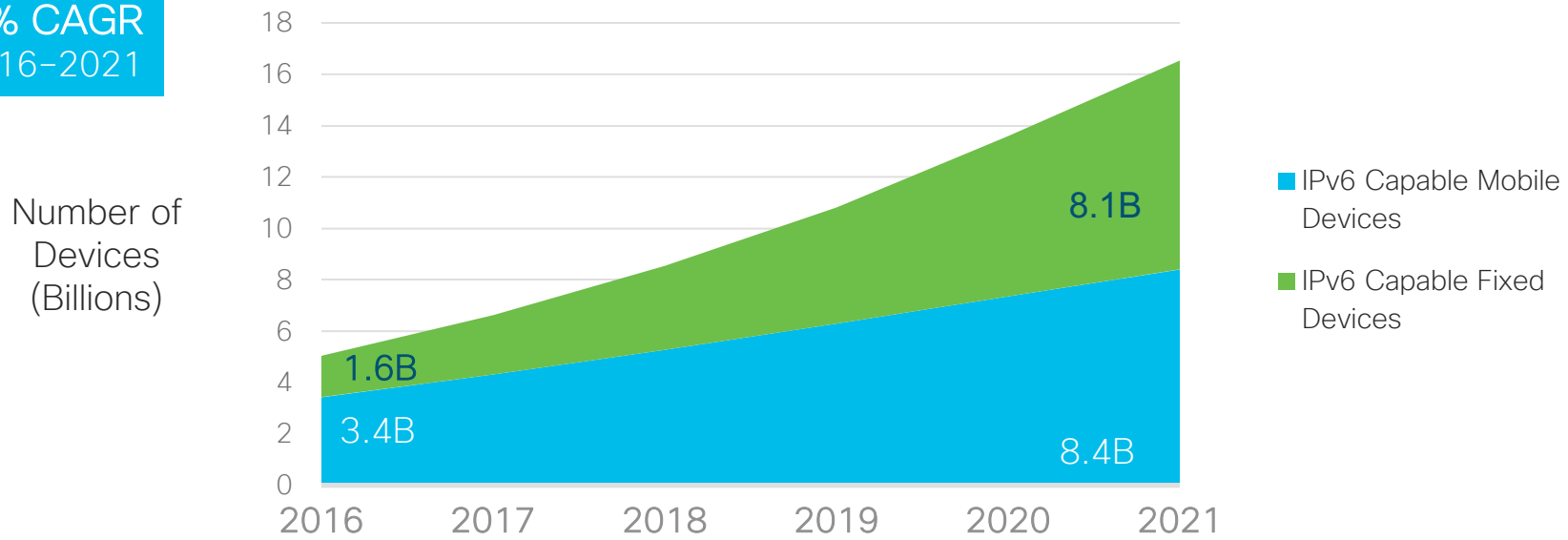
Source: Cisco VNI Global IP Traffic Forecast, 2016–2021

Global IPv6-Capable Devices/Connections

By 2021, 61% of devices/connections will be IPv6-capable

27% CAGR
2016-2021



In Brazil, 62.3% of all fixed and mobile networked devices will be IPv6-capable in 2021, up from 35.3% in 2016.

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Source: Cisco VNI Global IP Traffic Forecast, 2016-2021

Service Provider Strategies to deal with Traffic Growth – Examples

- Increase network capacity and access speeds
  - Backbone link capacity – 100Gbps and beyond (>24Tb/s per fiber)
  - Internet router capacity – >50 terabit/sec systems
- Simplify network architecture
- Leverage Big Data, Analytics and Automation
- Adopt global traffic engineering tools and practices
- Move content closer to the user (CDNs)
- Expand peering agreements and distribute peering

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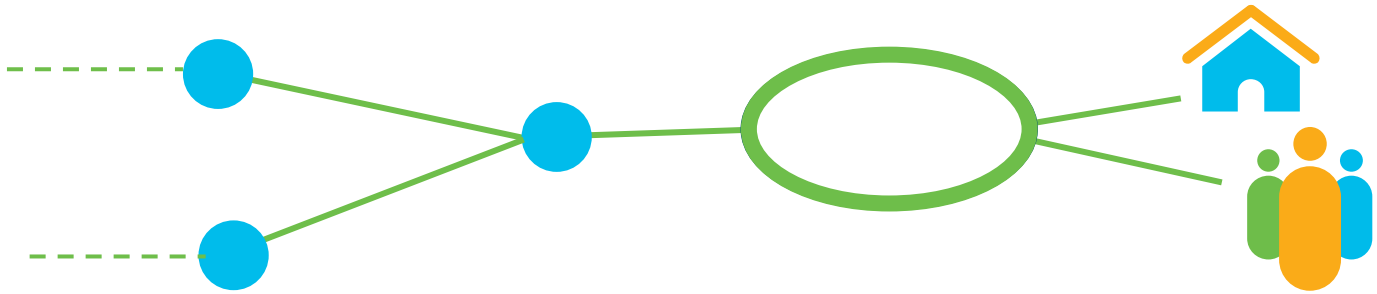
End-User Internet Traffic Moving Closer to the Edge

Over one-third of traffic will bypass core completely by 2021



Core – Cross-Country	Core – Regional	Within Metro
58% in 2016	20% by 2016	22% in 2016
41% by 2021	23% by 2021	35% by 2021
	(64% cumulative)	(100% cumulative)

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DDoS Attack Size and Traffic Increasing

Peak attack size increased 60% Y/Y.

DDoS attacks can represent up to 18% of a country's total Internet traffic while they are occurring.

Average DDoS attack size increases at 22% which is relatively the same rate as Internet traffic at 29% Y/Y.

Source: Arbor Networks, Cisco VNI Global IP Traffic Forecast, 2016–2021

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