



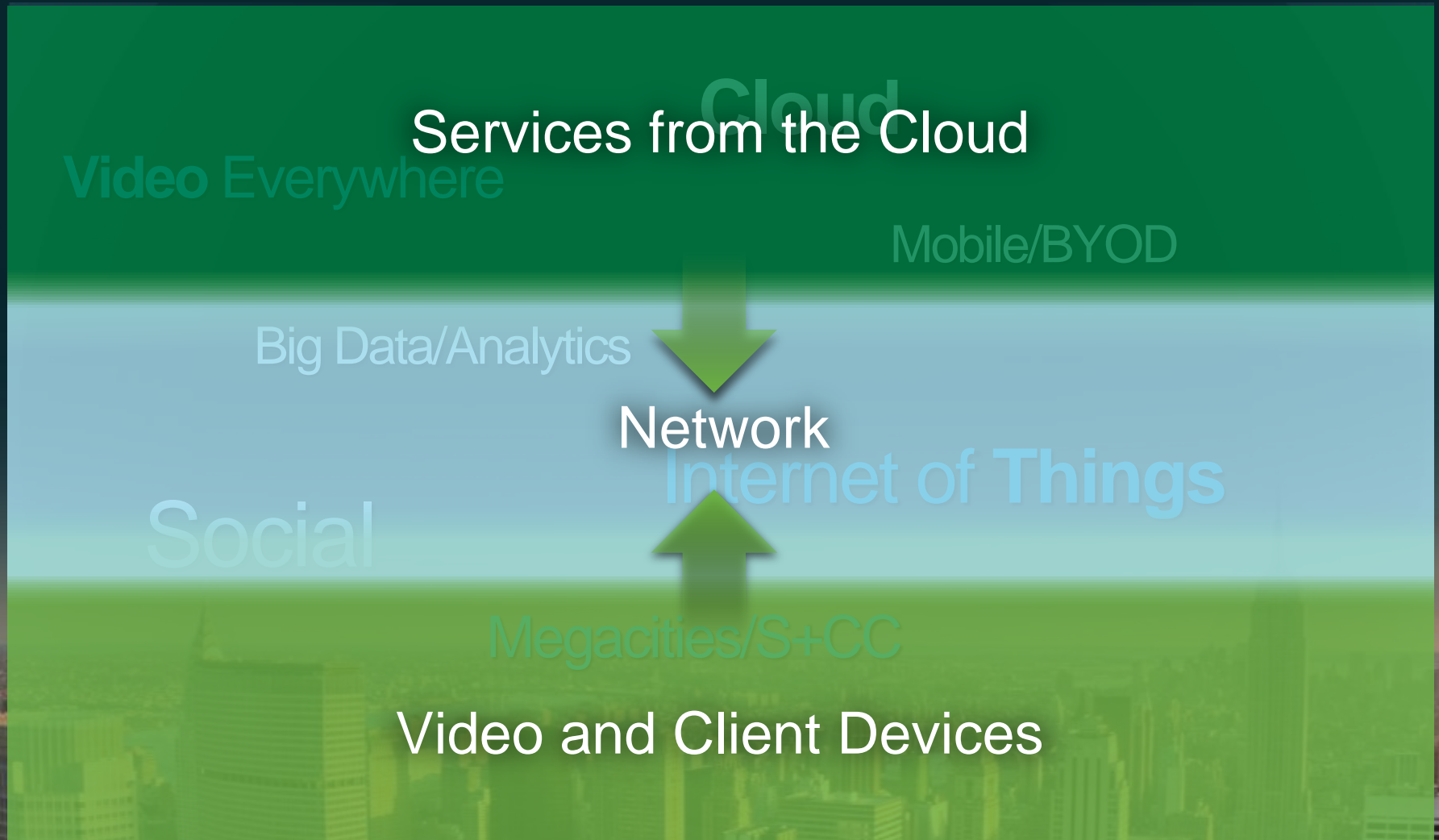
Technology Trends

Implications for Telecom Networks and Business Models

January 2014

Montego Bay, Jamaica

Mega Market Transitions



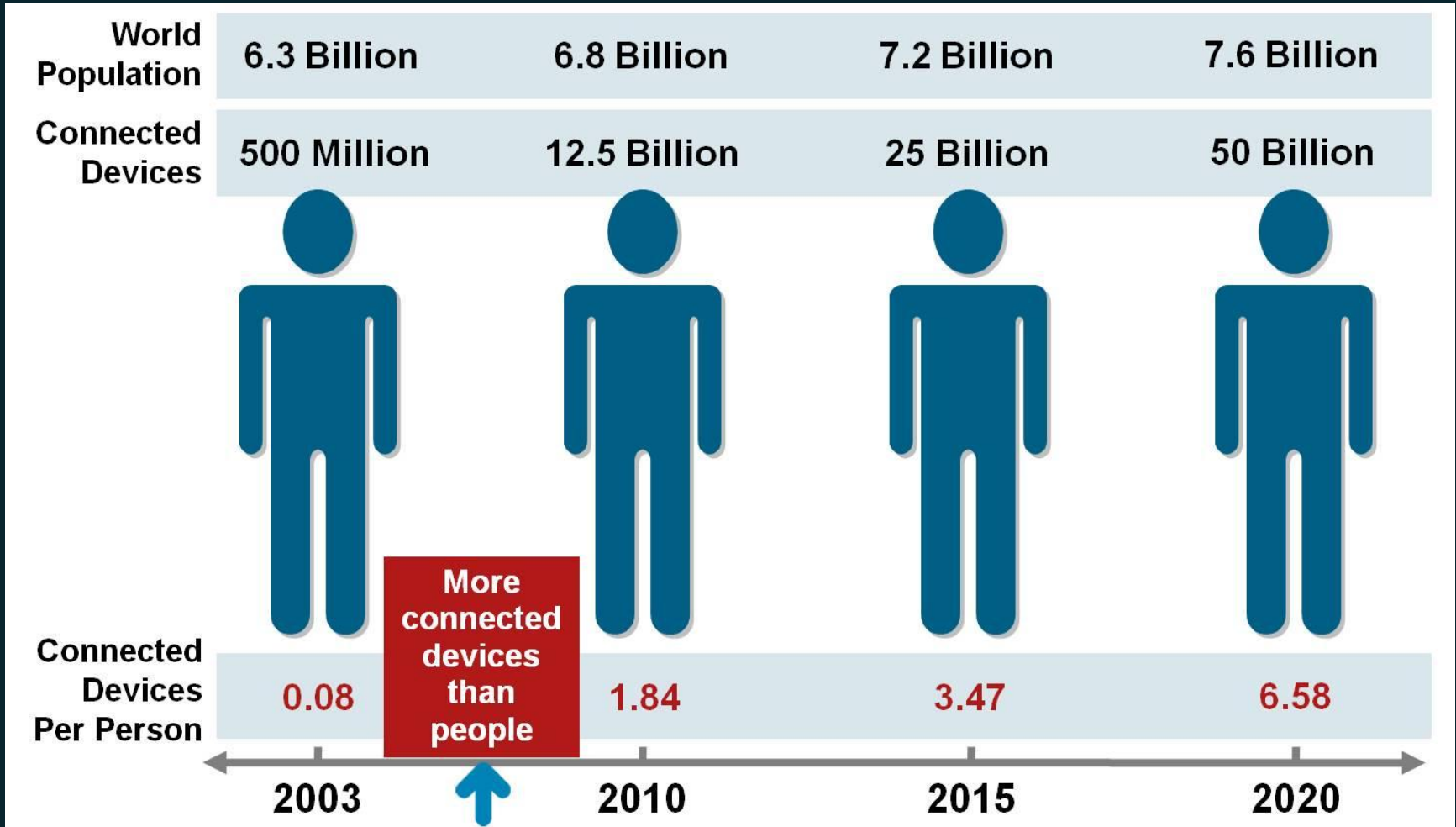
Top 10 Mobile Networking Trends

Cisco® VNI Forecast Update, 2012–2017

- 1 **Device Diversification**
- 2 **Growth in Average Traffic per Device**
- 3 **IPv6-Capable Mobile Devices**
- 4 **Mobile Video and Cloud**
- 5 **User Apps Driving Mobile Data Consumption**
- 6 **Mobile Network Connection Speeds to Increase 7-fold**
- 7 **Impact of 4G Connections on Traffic**
- 8 **The Impact of Tiered Pricing—Shake-Up at the Top**
- 9 **Traffic Offload from Mobile Networks to Fixed Networks**
- 10 **The (Mobile) Internet of Things**

Context

Who and What is driving growth...



Source: Cisco IBSG

Global Mobile Users

From 4.3 Billion in 2012 to 5.2 Billion by 2017 at 4% CAGR

Global Mobile Users Growing 3.5X Faster Than Global Population

North America

2012: 288 M
2017: 316 M
CAGR 1.9%

Western Europe

2012: 362 M
2017: 380 M
CAGR 1%

Central/Eastern Europe

2012: 319 M
2017: 342 M
CAGR 1.4%

Latin America

2012: 438 M
2017: 494 M
CAGR 2.5%

Middle East & Africa

2012: 661 M
2017: 849 M
CAGR 5.1%

Asia Pacific

2012: 2,216 M
2017: 2,819 M
CAGR 4.9%

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Global Mobile Data Traffic Drivers

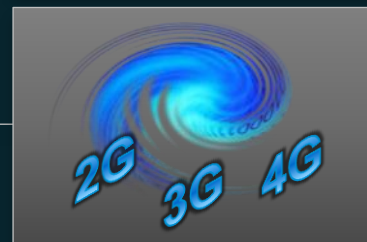
By 2017...



More Mobile Connections



Faster Mobile Speeds



More Mobile Users



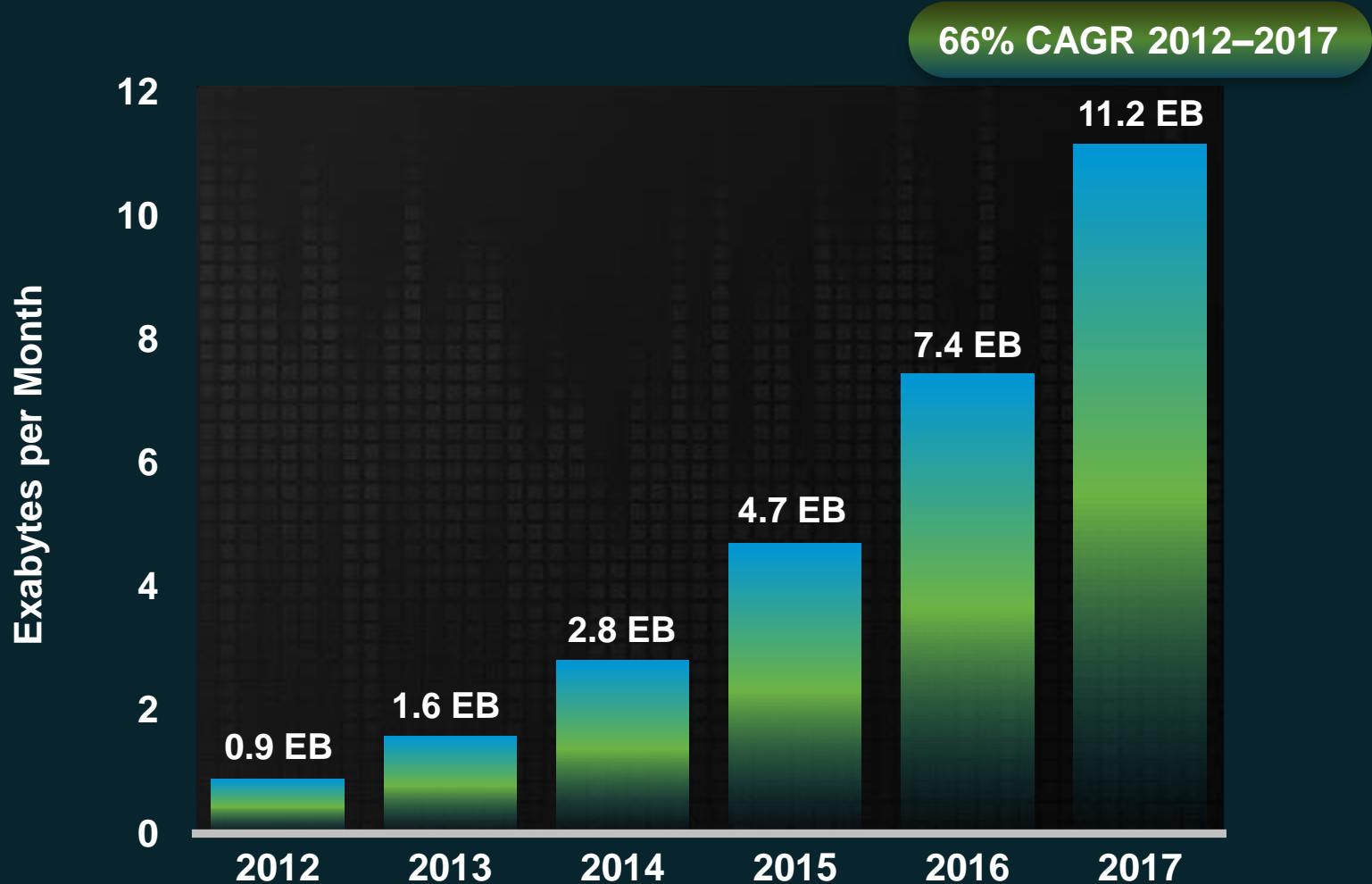
More Mobile Video



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Global Mobile Data Traffic Growth / Top-Line

Global Mobile Data Traffic will Increase 13X from 2012 to 2017



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Global Mobile Device and Connections

From 7 Billion in 2012 to 10.3 Billion by 2017 At 8.3% CAGR

North America

2012: 459 M
2017: 841 M
CAGR 12.9%

Western Europe

2012: 601 M
2017: 954 M
CAGR 9.7%

Central/Eastern Europe

2012: 589 M
2017: 785 M
CAGR 5.9%

Latin America

2012: 714 M
2017: 940 M
CAGR 5.7%

Middle East & Africa

2012: 1,117 M
2017: 1,588 M
CAGR 7.3%

Asia Pacific

2012: 3,470 M
2017: 5,240 M
CAGR 8.6%

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

By 2017, global mobile data traffic will reach an annual run rate of 134 exabytes per year.



134 Exabytes
is equal to:

- 134X More than all IP traffic generated in 2000
- 30 Trillion images (e.g., MMS or Instagram)
- 3 Trillion video clips (e.g., YouTube)

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Technology trends

Mobile

-Heavy impact on WiFi and Fixed infrastructure



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Powerful Devices

The World in the Palm of Your Hand

5 C's of Devices

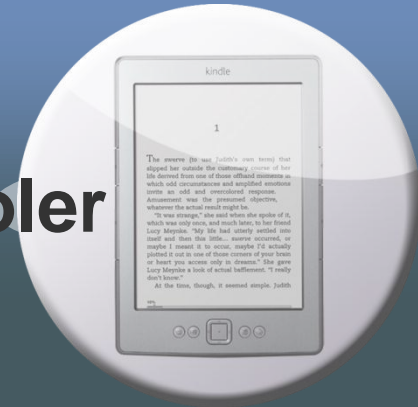
Cleverer

Connected

Cheaper

Converged

Cooler



BYOD—The Consumerization of IT

Public and Private organizations

60%

Knowledge workers who use a mobile device for work

42%

Employees who own the smartphones they use for work

84%

IT leaders who are seeing BYOD growth in their networks

89%

Companies that enable BYOD in some form

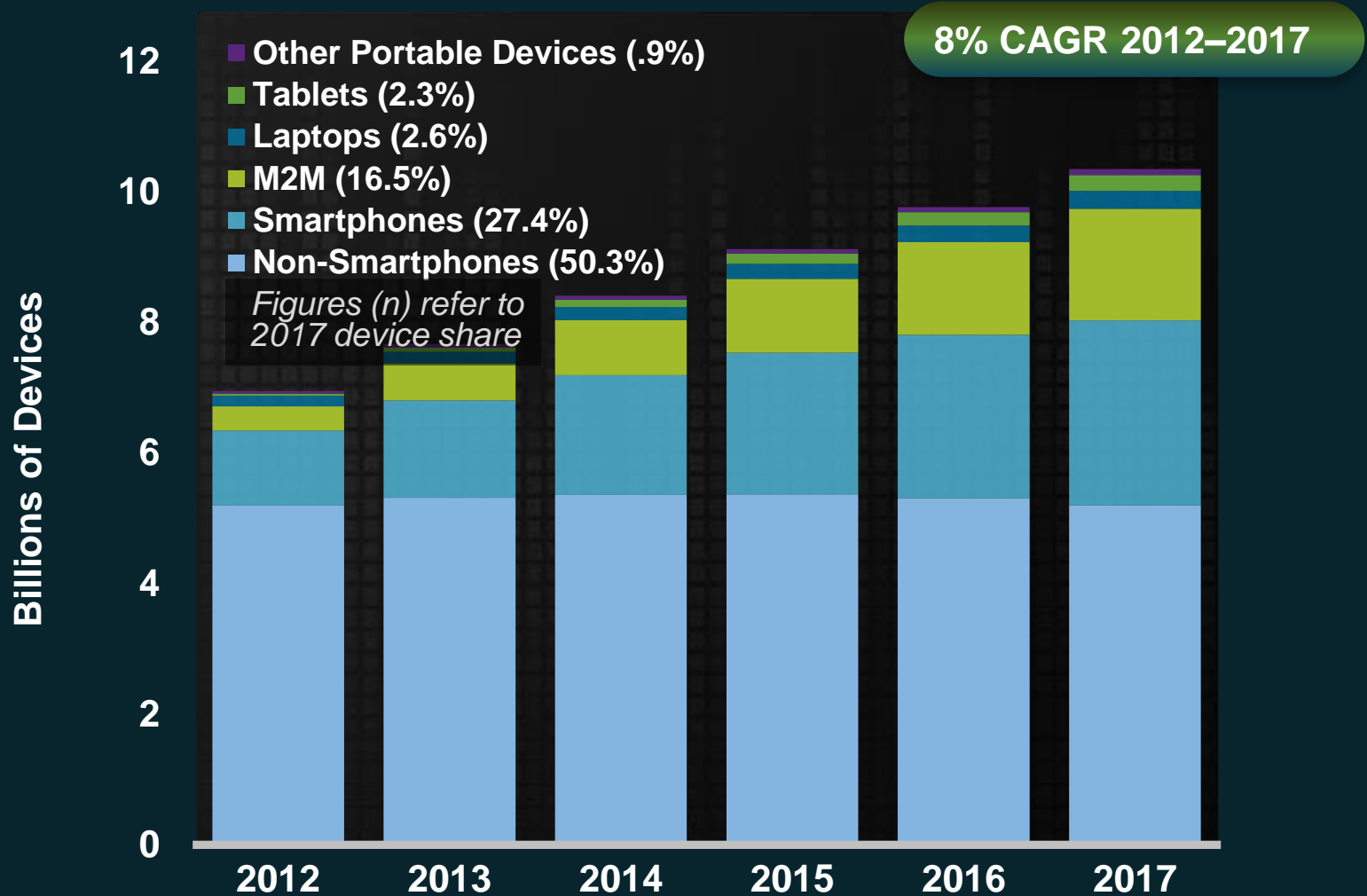
#1

Employees want an any-device, anywhere work style (37%)

Source: Cisco IBSG, 2012

Global Mobile Device Growth by Type

By 2017, Smartphones Will Gain 11 Points to Reach 27% Share



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

VNI Mobile Forecast Update, 2012–2017

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Average Mobile Connection; Traffic per Month



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Average Mobile Connection; Traffic per Month

GLOBAL	2012	2017
Global MB per Month	131	1,226
BY REGION		
North America	566	3,956
Western Europe	333	2,106
Asia-Pacific	90	1,100
Latin America	78	849
Central & Eastern Europe	115	1,264
Middle East & Africa	44	556

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Mobile Device Data Traffic

2012 Mobile Device Data Traffic Generation Comparisons



M2M Module =

9 X



(monthly basic mobile phone data traffic)



Handheld Gaming Console =

42 X



(monthly basic mobile phone data traffic)



Smartphone =

50 X



(monthly basic mobile phone data traffic)



Tablet =

120 X



(monthly basic mobile phone data traffic)



Laptop =

368 X



(monthly basic mobile phone data traffic)

Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

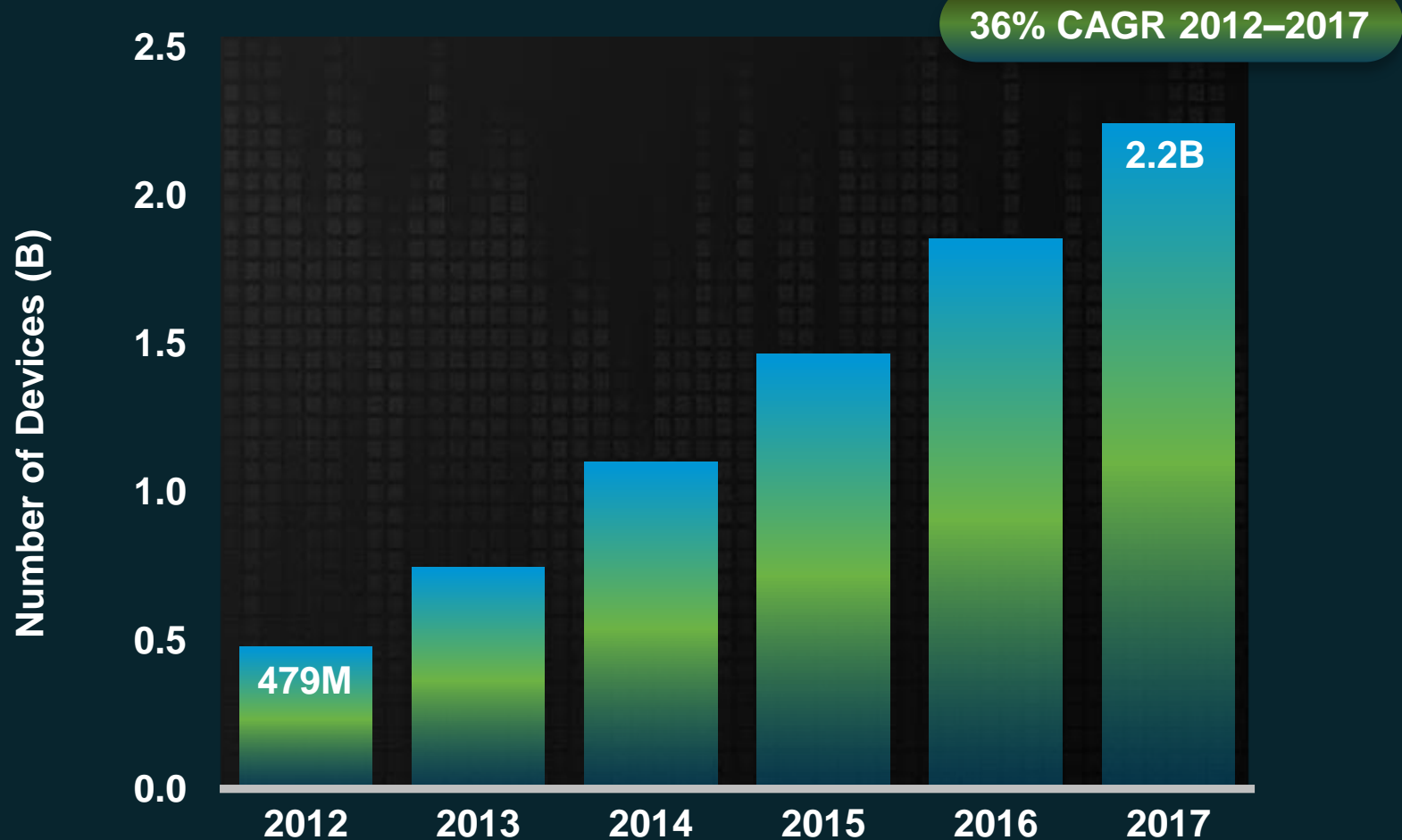
VNI Mobile Forecast Update, 2012–2017

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Global IPv6-Capable Mobile Devices/Connections

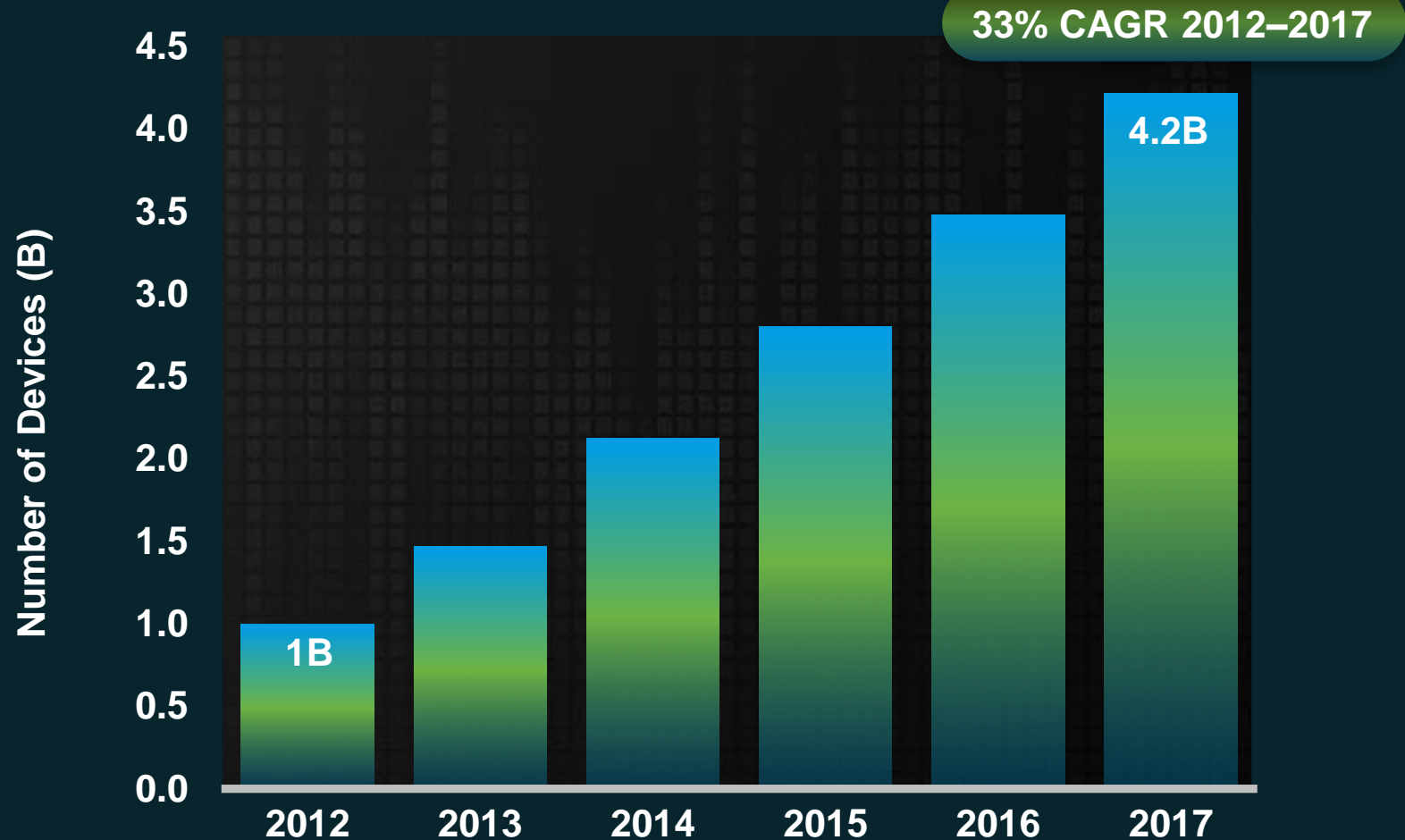
2.2B Smartphones/Tablets IPv6-Capable by 2017



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Global IPv6-Capable Mobile Devices/Connections

4.2B Total IPv6-Capable Mobile Devices/Connections by 2017



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

VNI Mobile Forecast Update, 2012–2017

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By 2017, two-thirds of
the world's mobile data
traffic will be video.

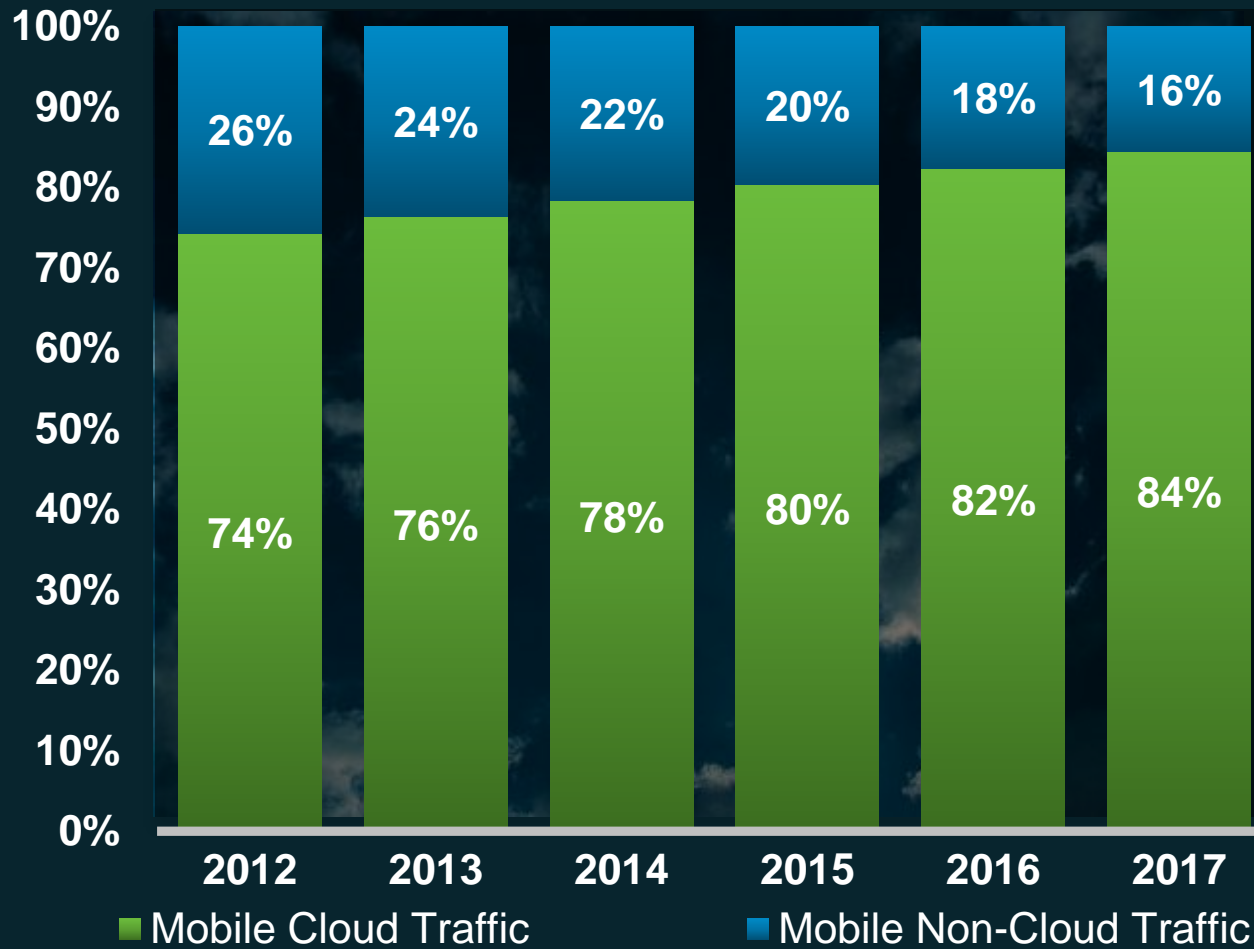


Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Global Mobile Cloud Traffic

Cloud Accounted for 74% of Mobile Data Traffic in 2012

Cloud Will Account for 84% of Mobile Data Traffic by 2017



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017





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Top Application Types

What's Driving Mobile Data Consumption?

	Smartphone 	Tablet 
	% Data Consumption	% Data Consumption
Video / Communications	45%	50%
Information	12%	17%
Web Browsing	6%	7%
Social Networking	7%	3%
Music/Audio Streaming	4%	3%
System	16%	13%
Other	10%	7%



Source: Cisco Data Meter, Sep 2012–Dec 2012

VNI Mobile Forecast Update, 2012–2017

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Mobile Network Speeds to Increase 7-fold by 2017

Average Mobile Connection Speed (526 kbps in 2012);
Will Grow at a 49% CAGR—Reaching 3.9 Mbps in 2017

(kbps)	2012	2013	2014	2015	2016	2017	CAGR 2012–2017
GLOBAL							
Global Mobile Connection	131	1,226	131	1,226	131	1,226	49%
Global Smartphone Connection	2,064	2,664	3,358	4,263	5,284	6,528	26%
Global Tablet Connection	3,683	4,811	6,082	7,624	9,438	11,660	26%
BY REGION							
North America	2,622	4,083	5,850	8,023	10,793	14,399	41%
Western Europe	1,492	2,233	3,124	4,168	5,429	7,013	36%
Asia-Pacific	316	506	806	1,318	2,039	3,036	57%
Latin America	200	349	586	956	1,492	2,207	62%
Central & Eastern Europe	551	909	1,458	2,288	3,426	4,760	54%
Middle East & Africa	219	371	640	1,101	1,837	2,898	68%

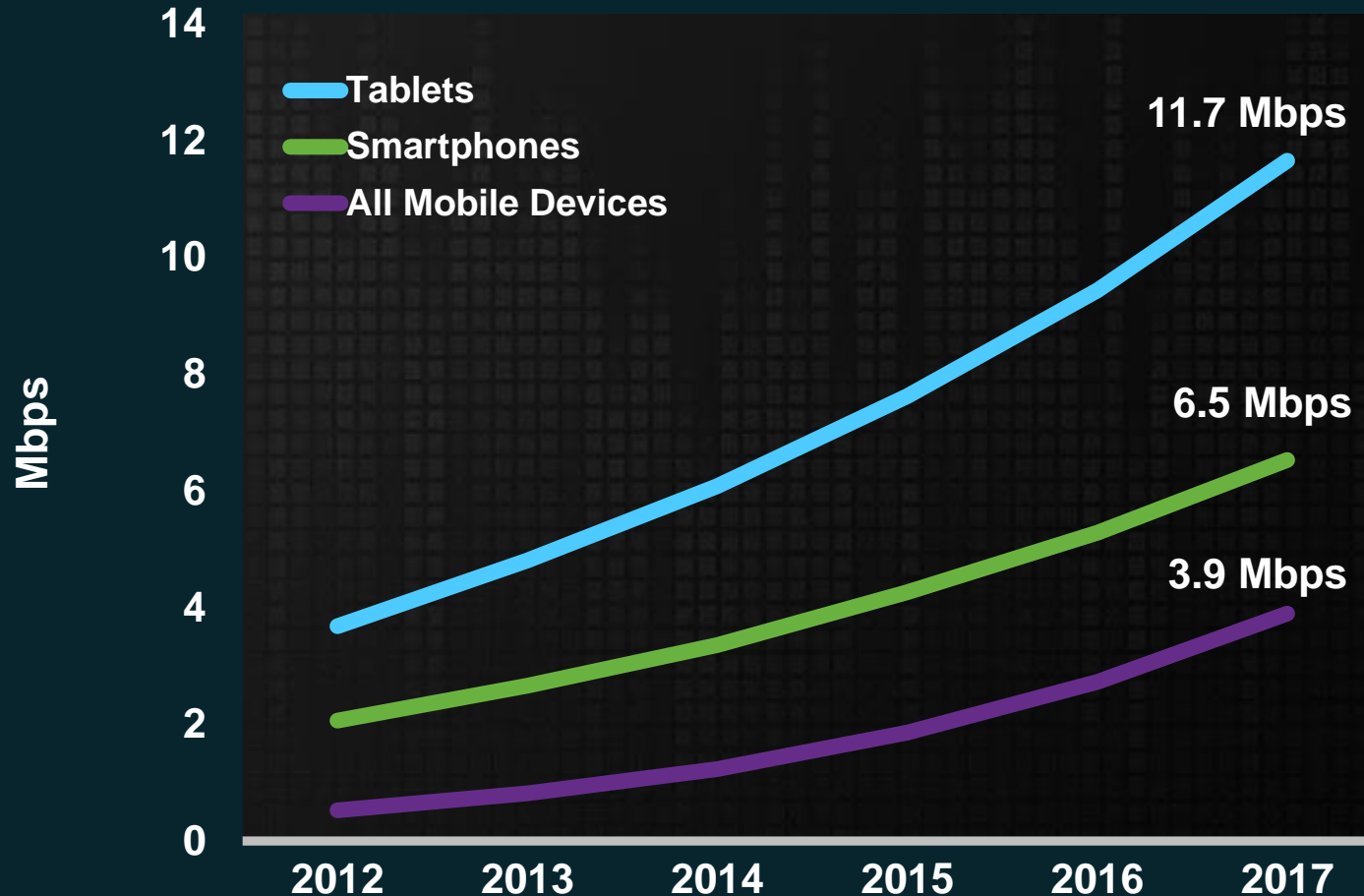
Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017



Global Mobile Speeds by Device Type

Tablet Speeds are 3x Higher than Average in 2017

Smartphone Speeds are 1.7x Higher than Average in 2017



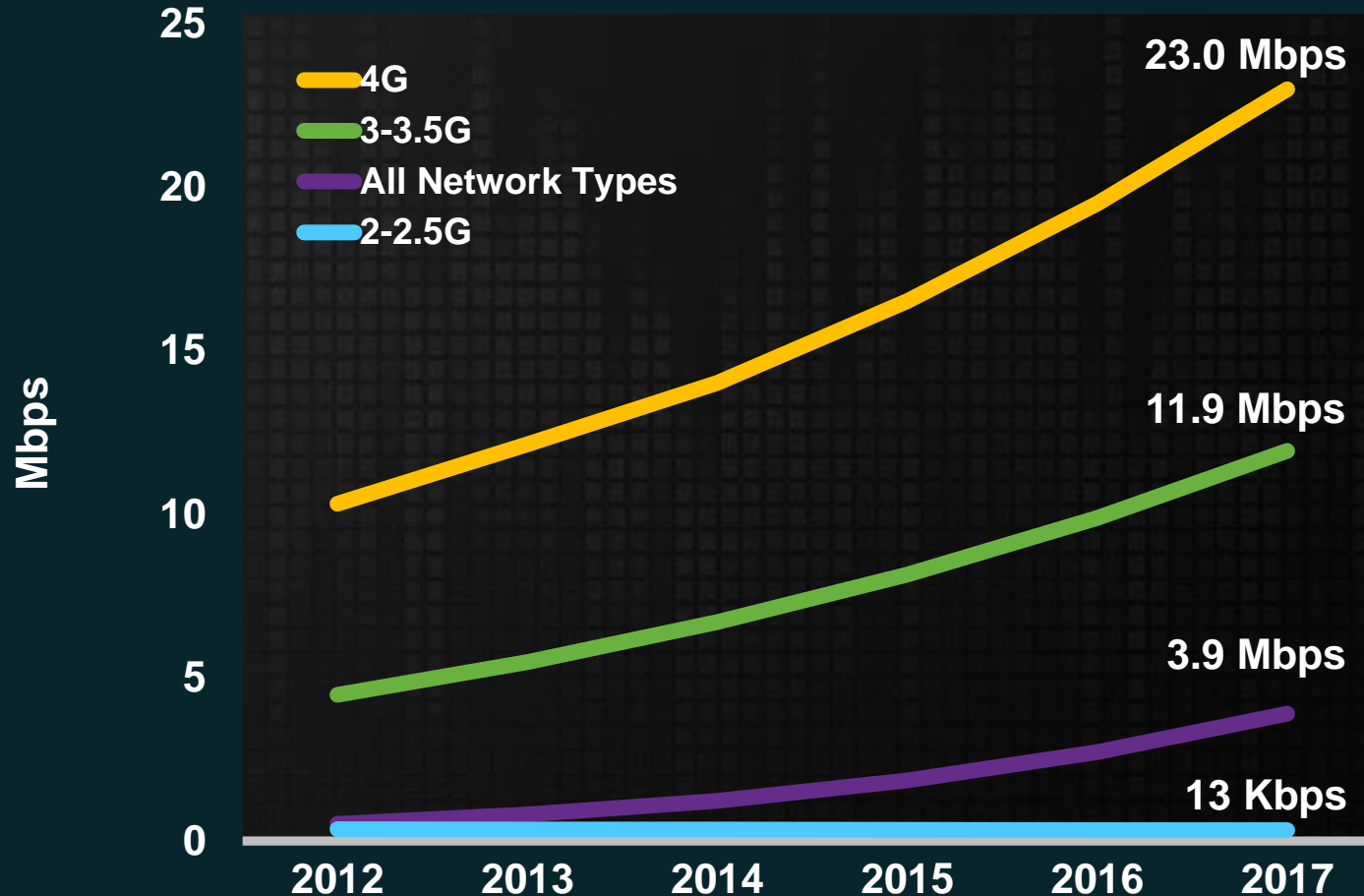
Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017



Global Mobile Speeds by Network Type

4G Speeds will be 6X Higher than Average by 2017

3-3.5G Speeds will be 3X Higher than Average by 2017



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017



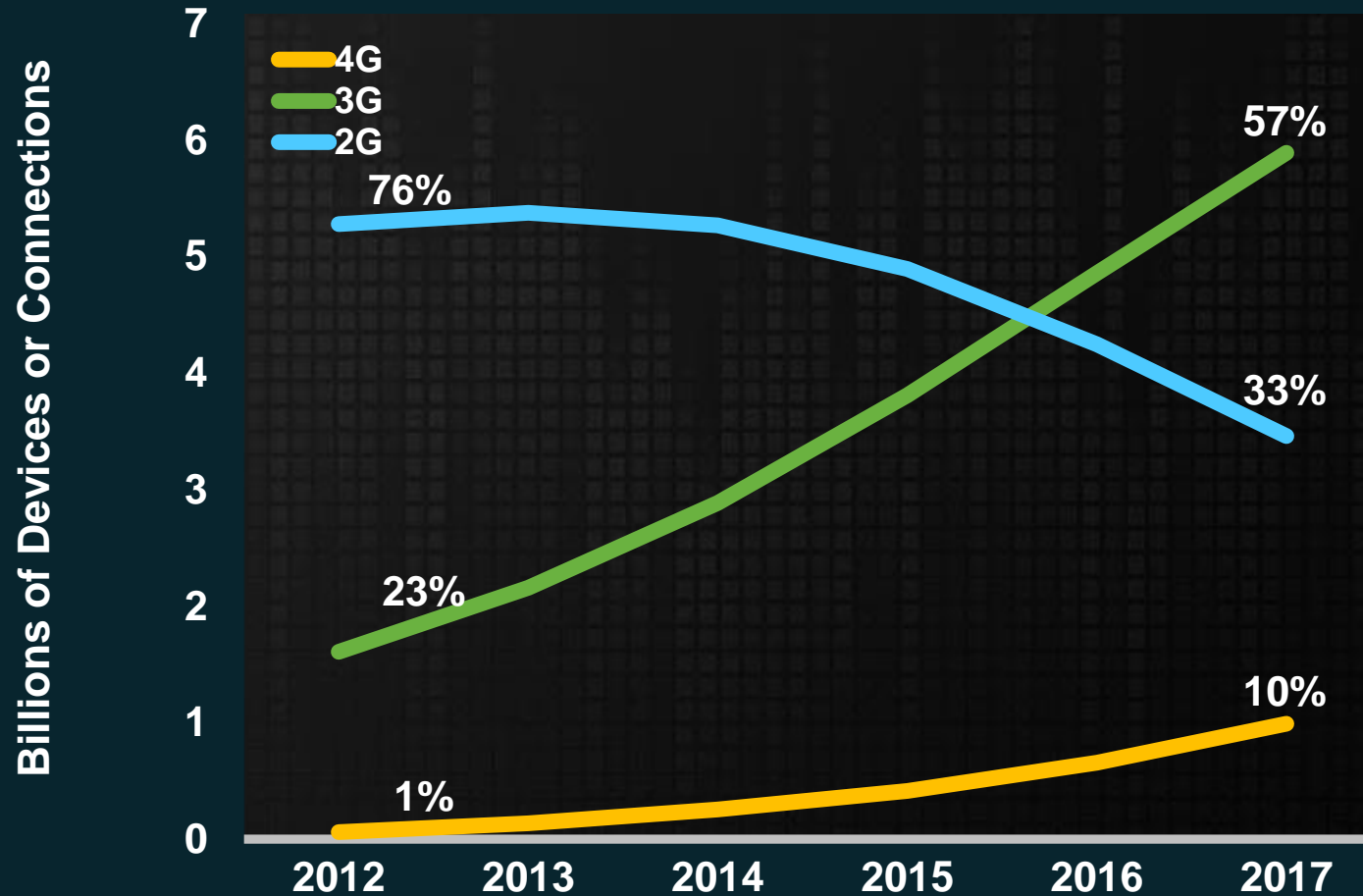
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Global Connections by Network Type

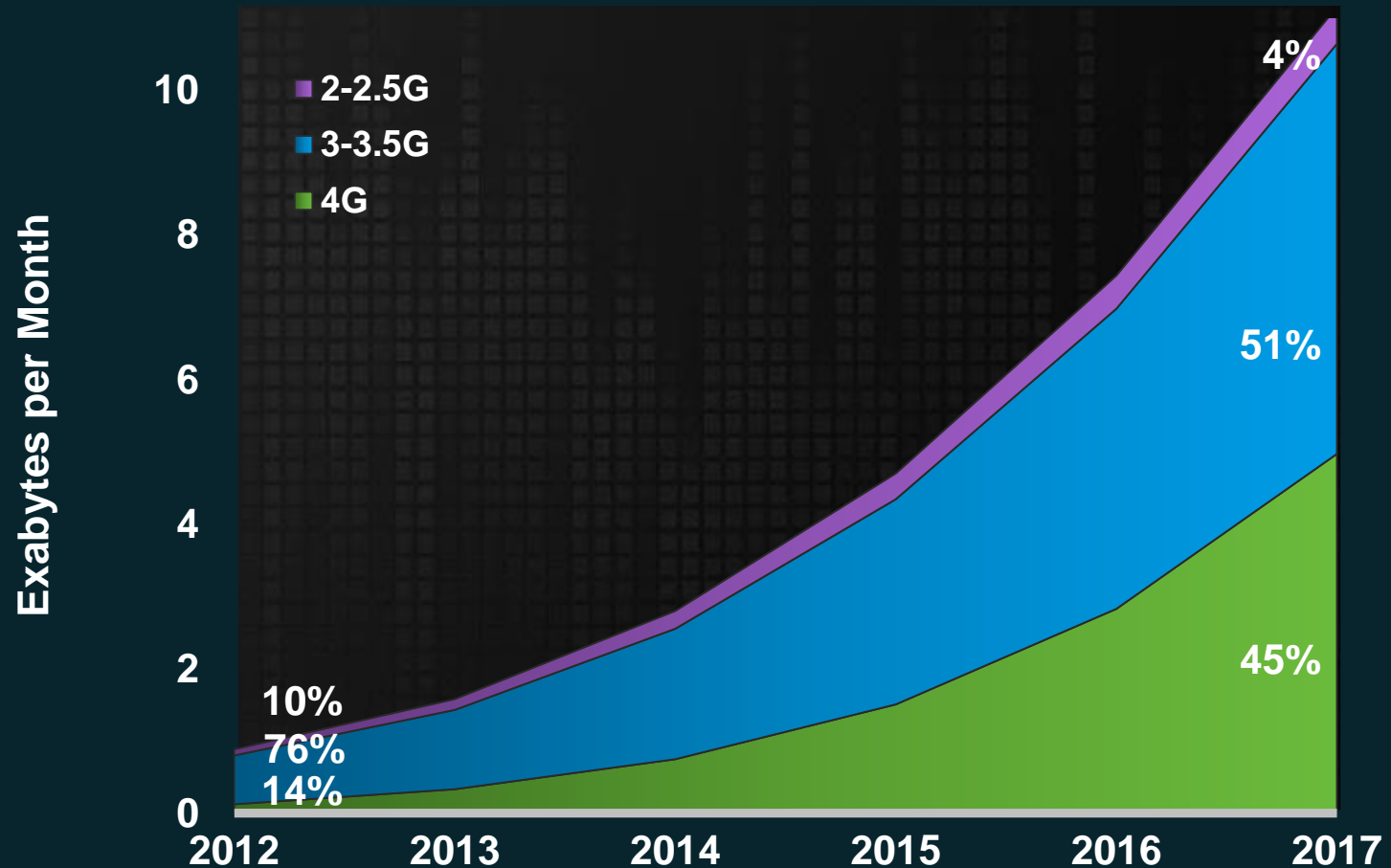
2G, 3G, and 4G Technology Connection Share



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Global Mobile Data Traffic Growth: 4G

4G Will Be 10% of Connections and 45% of Traffic in 2017



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Globally, in 2012, a 4G connection generated 2.1 GB/mo, **19X higher** than the 110 MB/mo for non-4G connections.



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

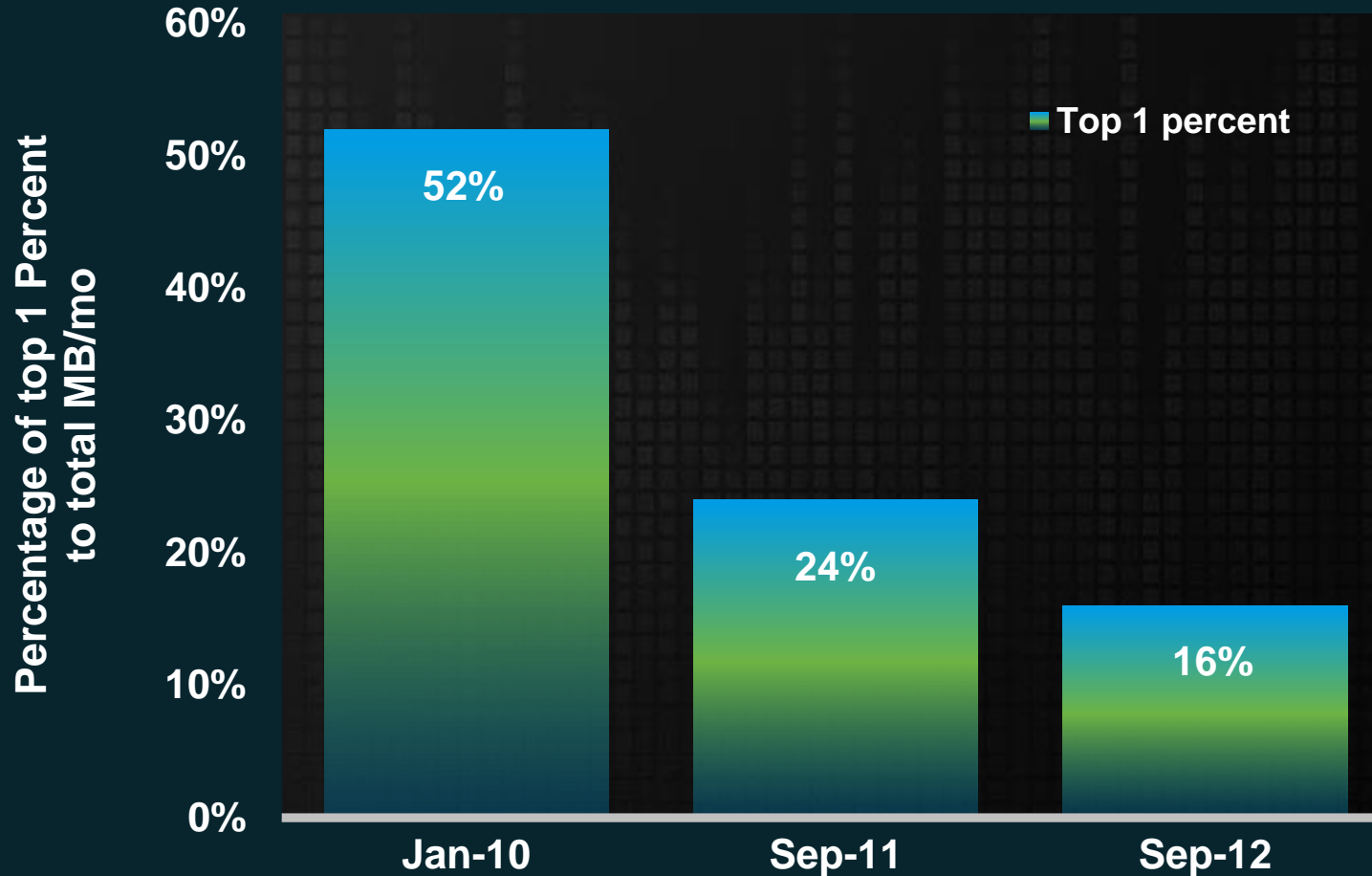
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Top Mobile User Profiles: 2010–2012

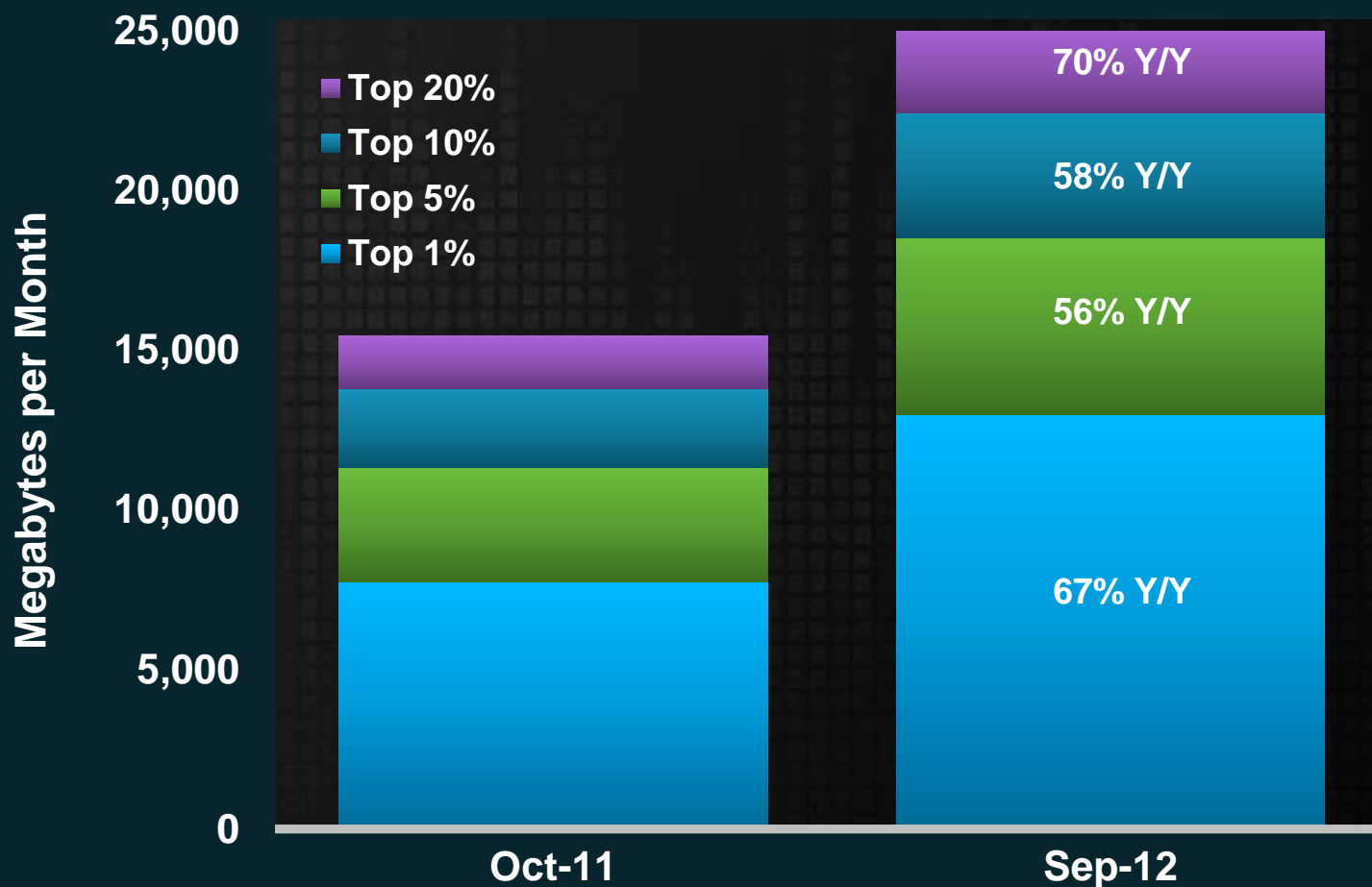
Top 1% Consumption Steadily Decreasing Compared to 99%



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Top User Profiles: 2011–2012

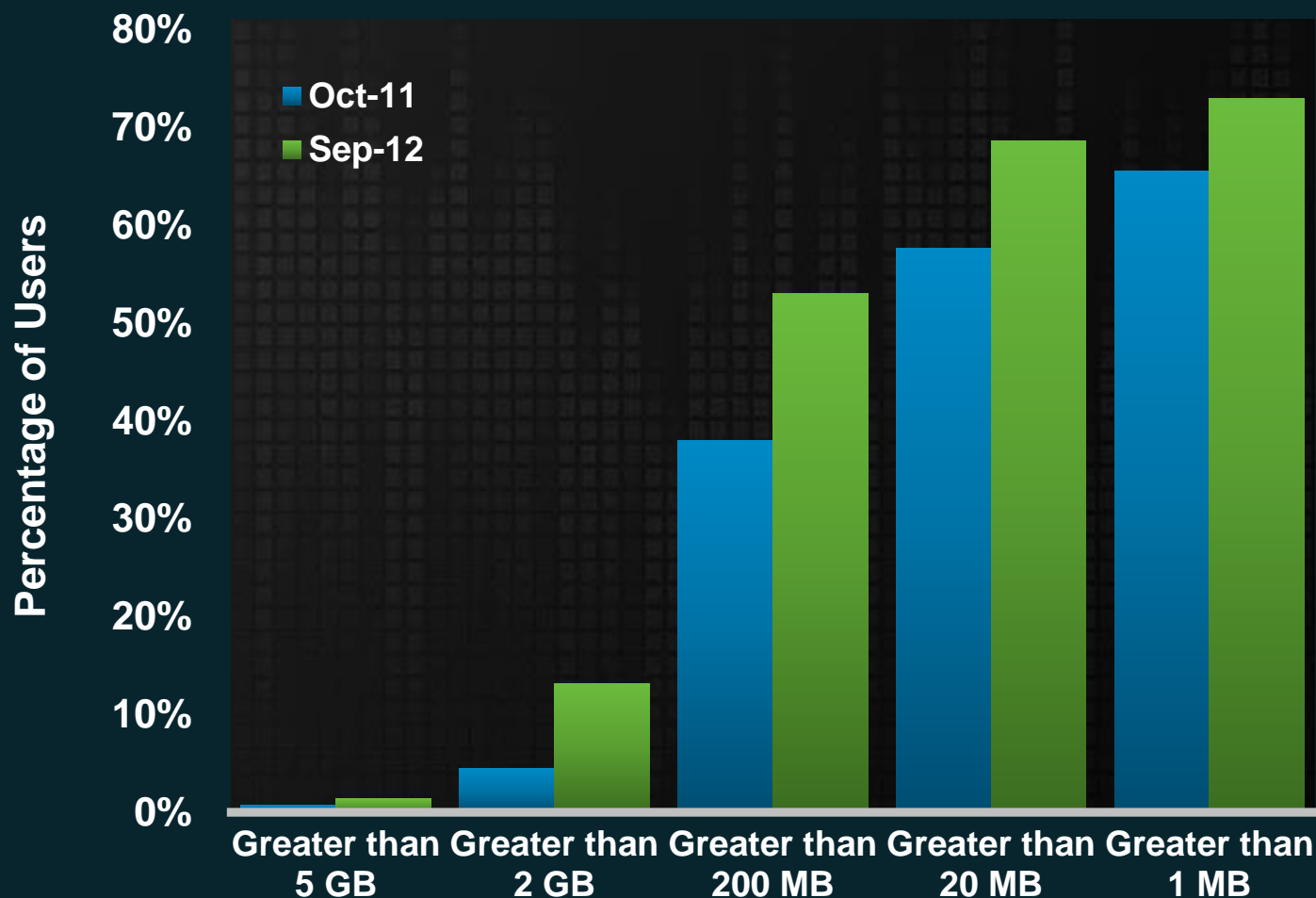
Top 20 Percent Growing Faster than Top 1 Percent



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Top User Bandwidth Profile: 2011-2012

One Percent of Mobile Data Users Consume 5 GB per Month



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Globally, 1.2 billion mobile users (24% of total mobile users) will generate over 2 gigabyte per month by 2017, up from 88 million mobile users (2% of total mobile users) in 2012.



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

VNI Mobile Forecast Update, 2012–2017

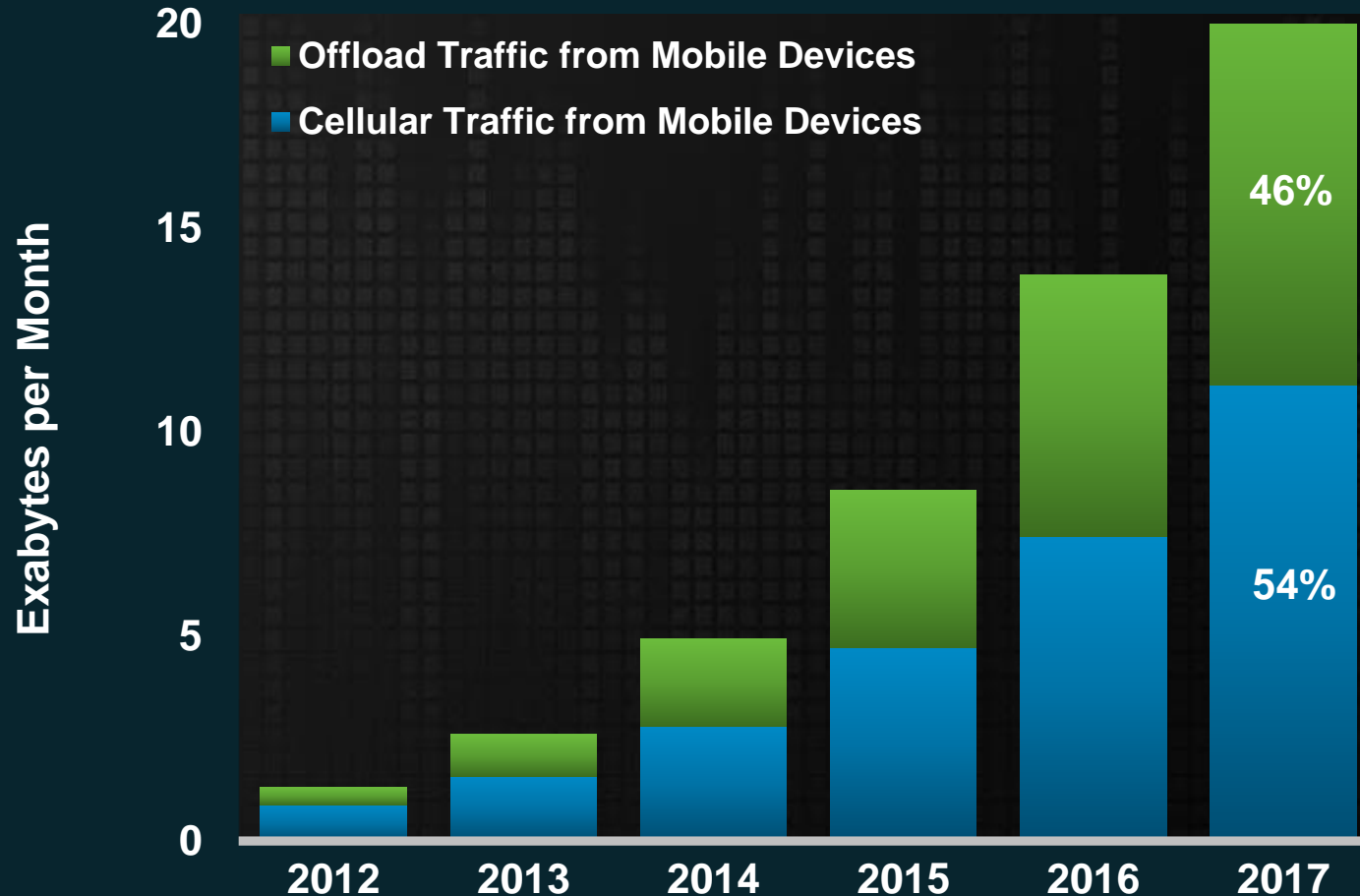
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Global Mobile Data Traffic Offload

46% of Mobile Traffic to be Offloaded in 2017

33% of Mobile Traffic Offloaded in 2012

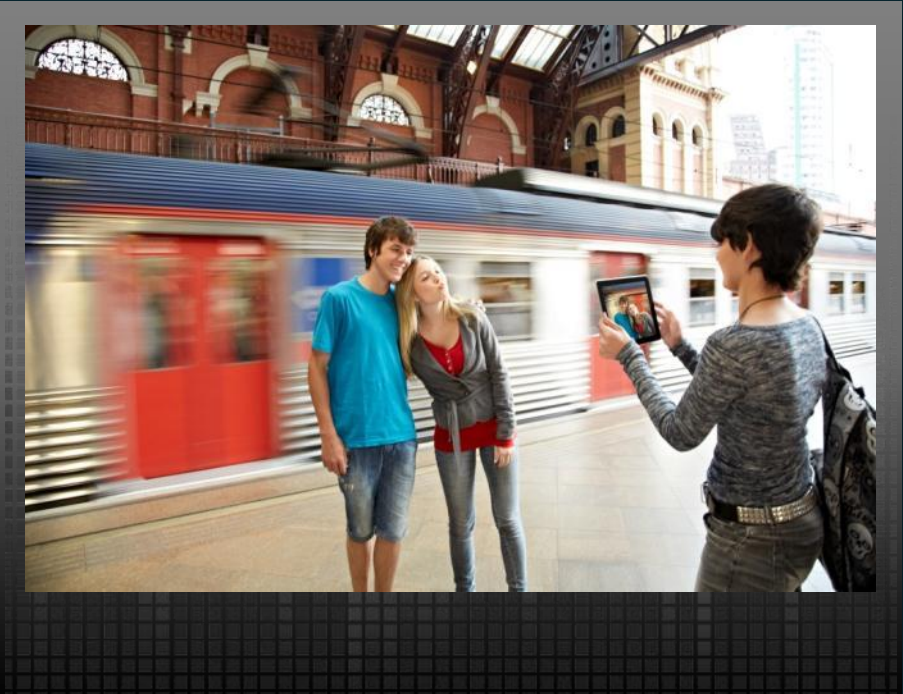


Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017



Globally, the amount of traffic offloaded from tablets will be 71% by 2017.

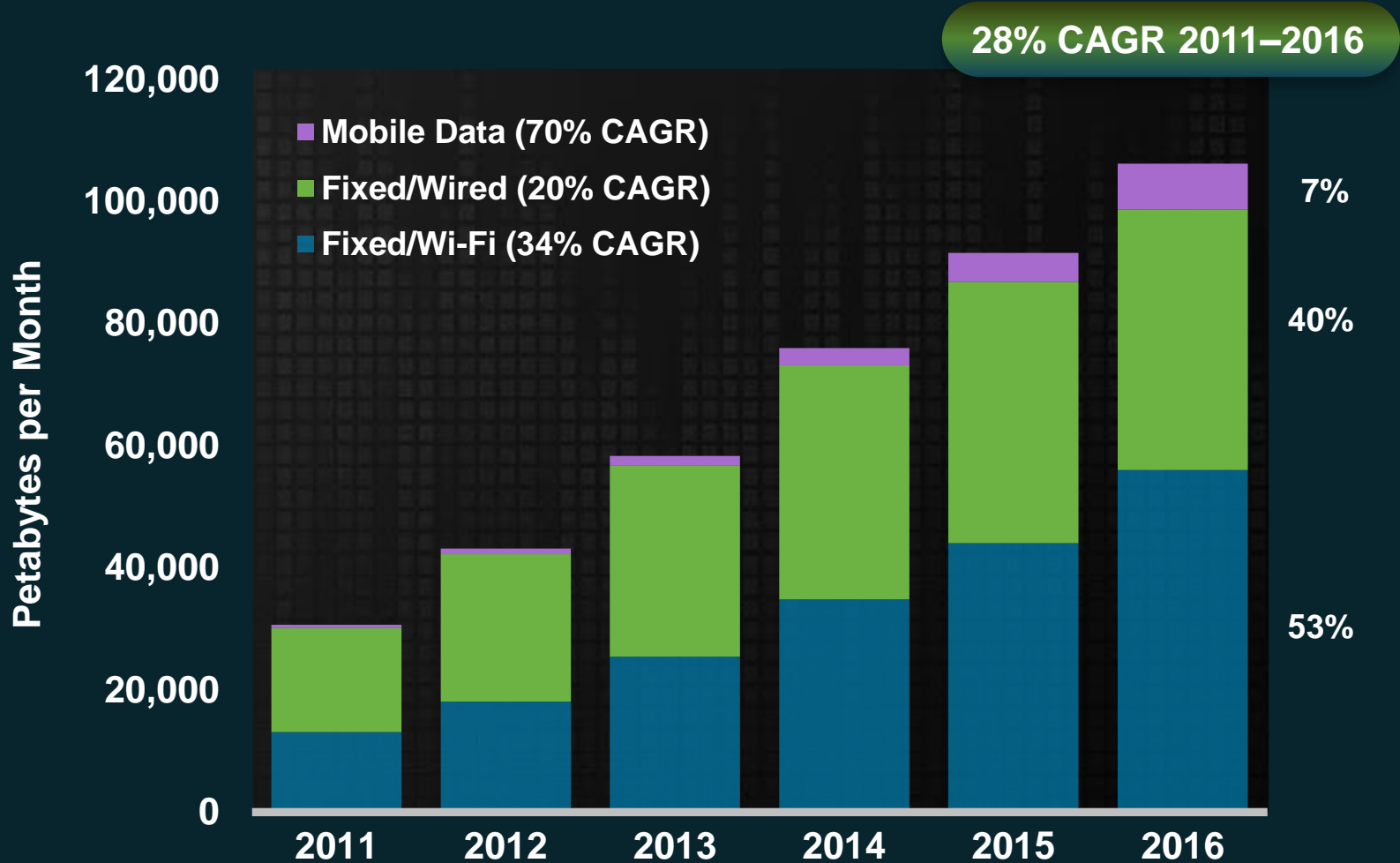
Globally, the amount of traffic offloaded from smartphones will be 46% by 2017.



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Global IP Traffic by Local Access Technology

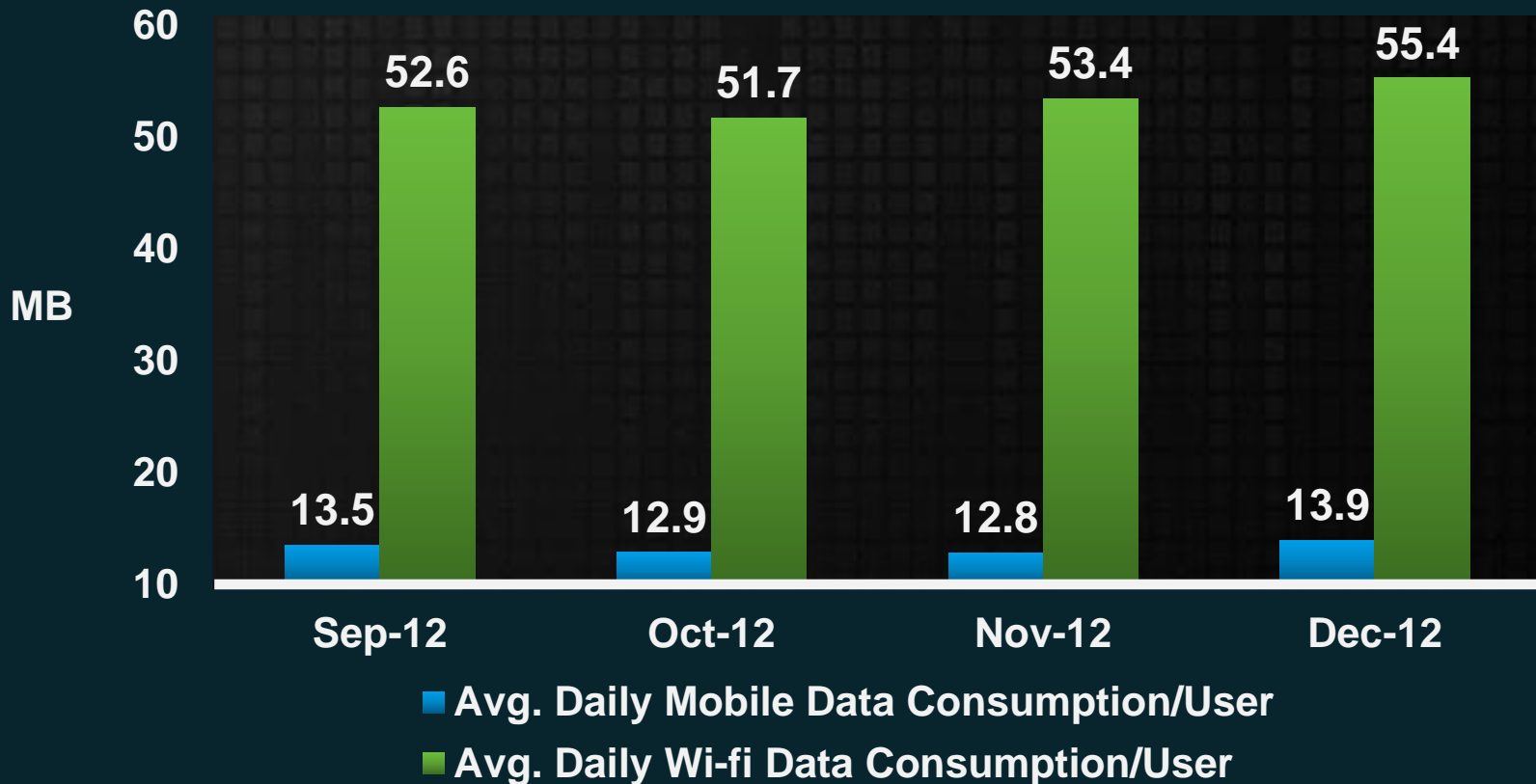
By 2016, Fixed/Wi-Fi Traffic Surpasses Fixed/Wired Traffic



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2011–2016

Average Daily Wi-Fi Data Consumption

4X Greater than Cellular Data Consumption



Source: Cisco Data Meter, Sep 2012–Dec 2012



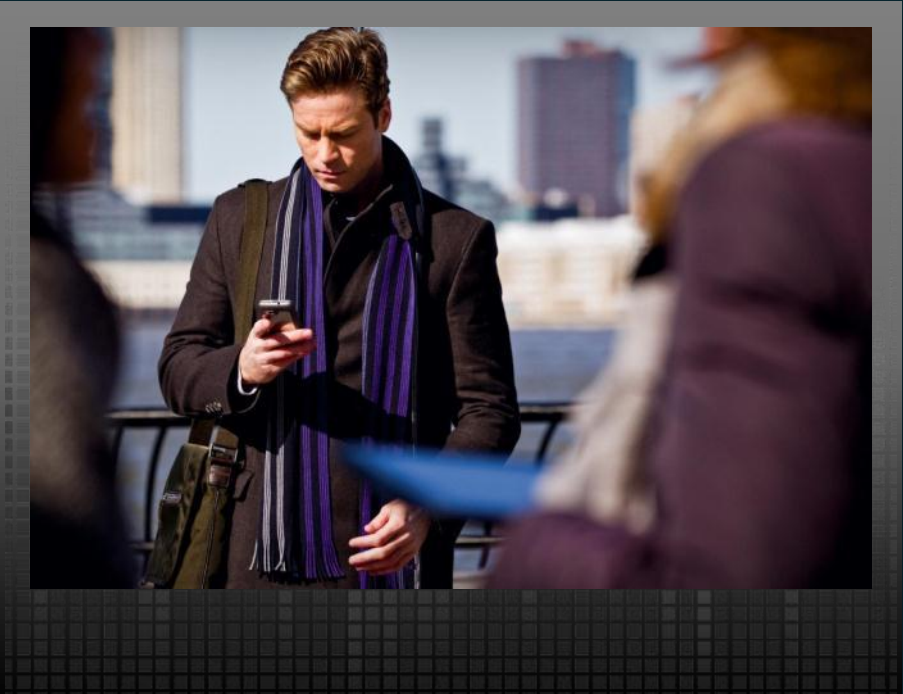
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By 2017, there will be 1.4 mobile connections (devices and M2M) for every member of the world's population.

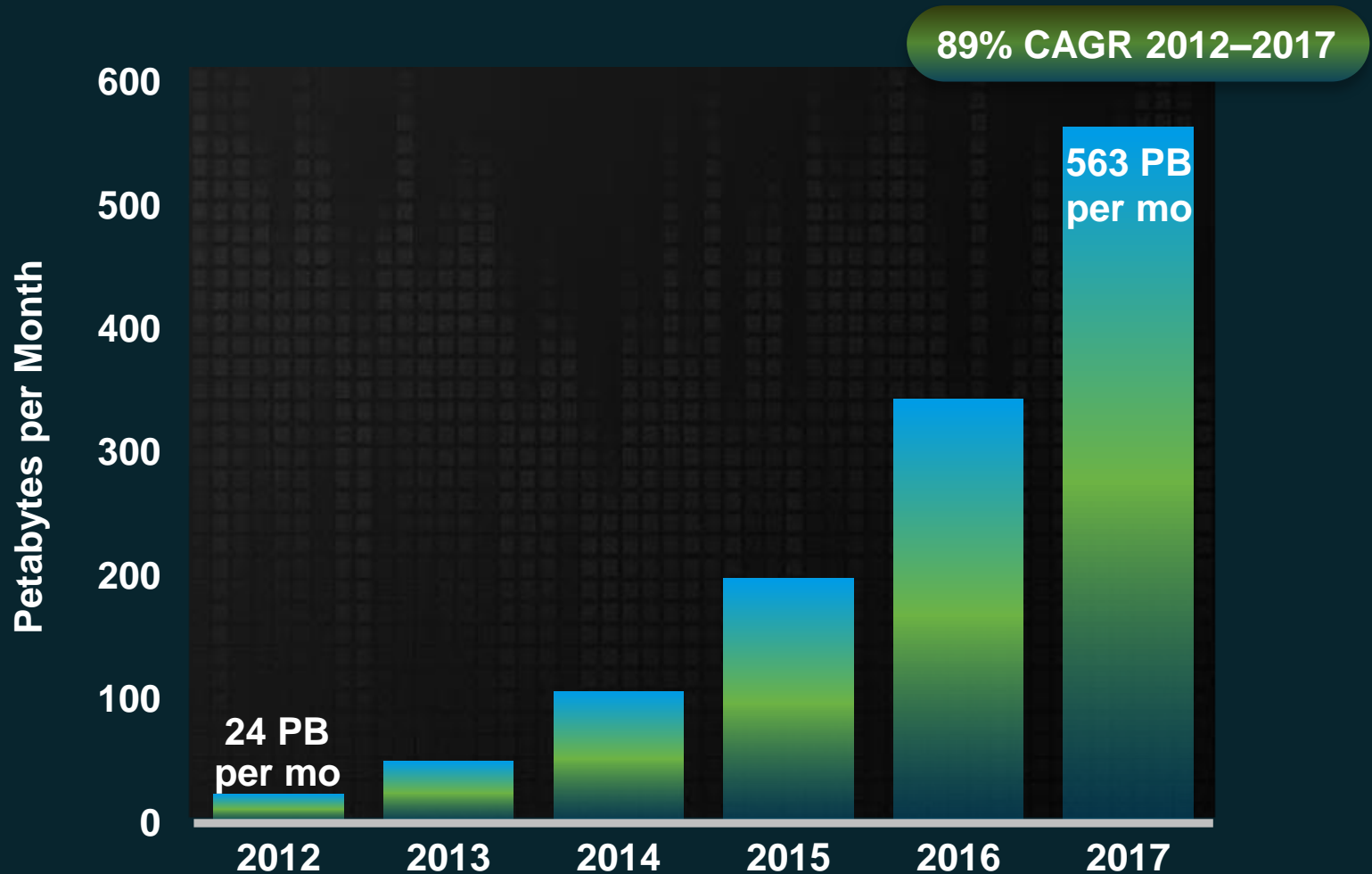
North America has the most mobile connections per capita (2.2). The Middle East & Africa has the least (1.1).



Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Machine-to-Machine Mobile Data Traffic Growth

M2M Data Traffic will Increase 24X from 2012 to 2017

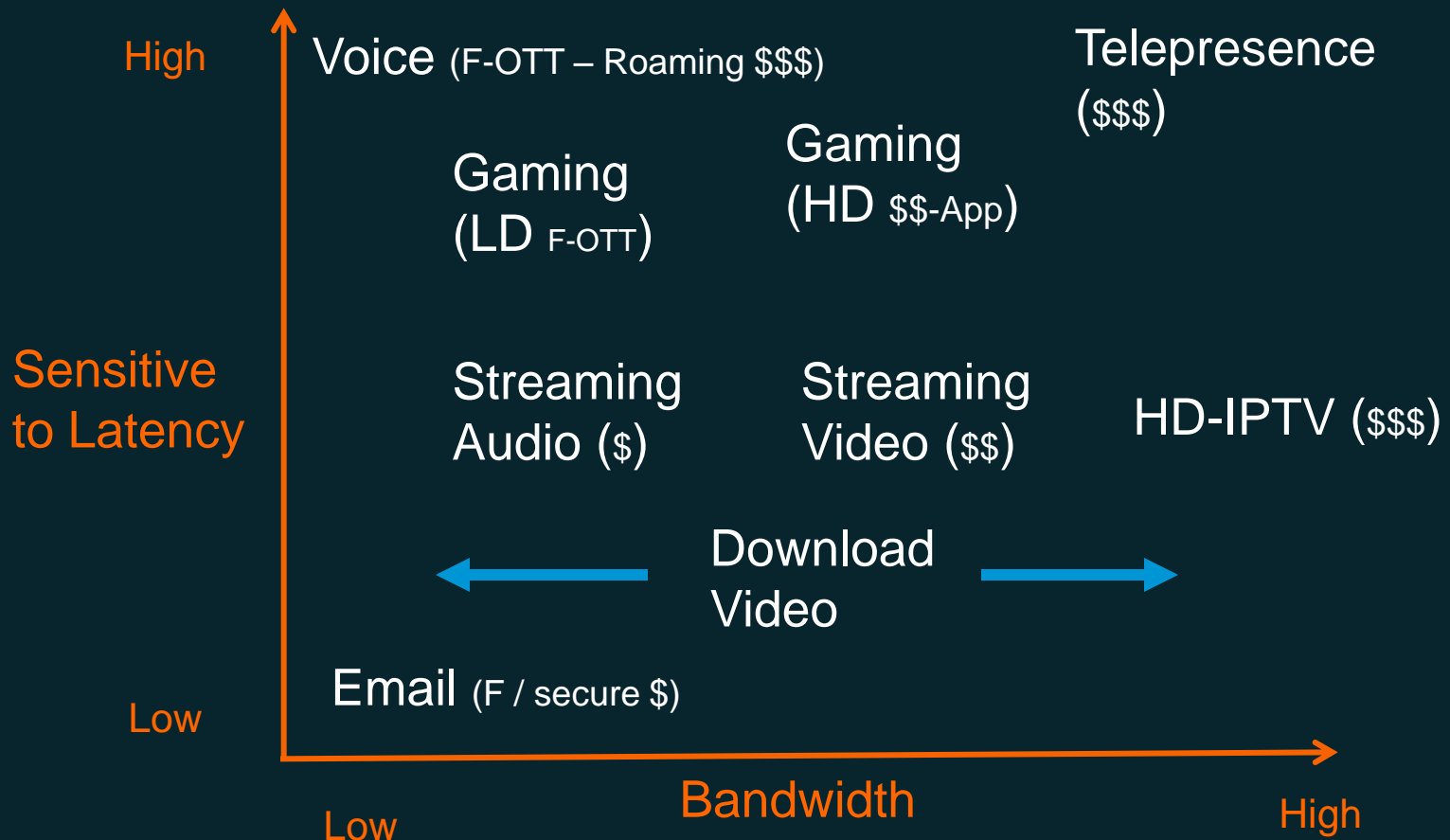


Source: Cisco VNI Global Mobile Data Traffic Forecast, 2012–2017

Business Applications / Models

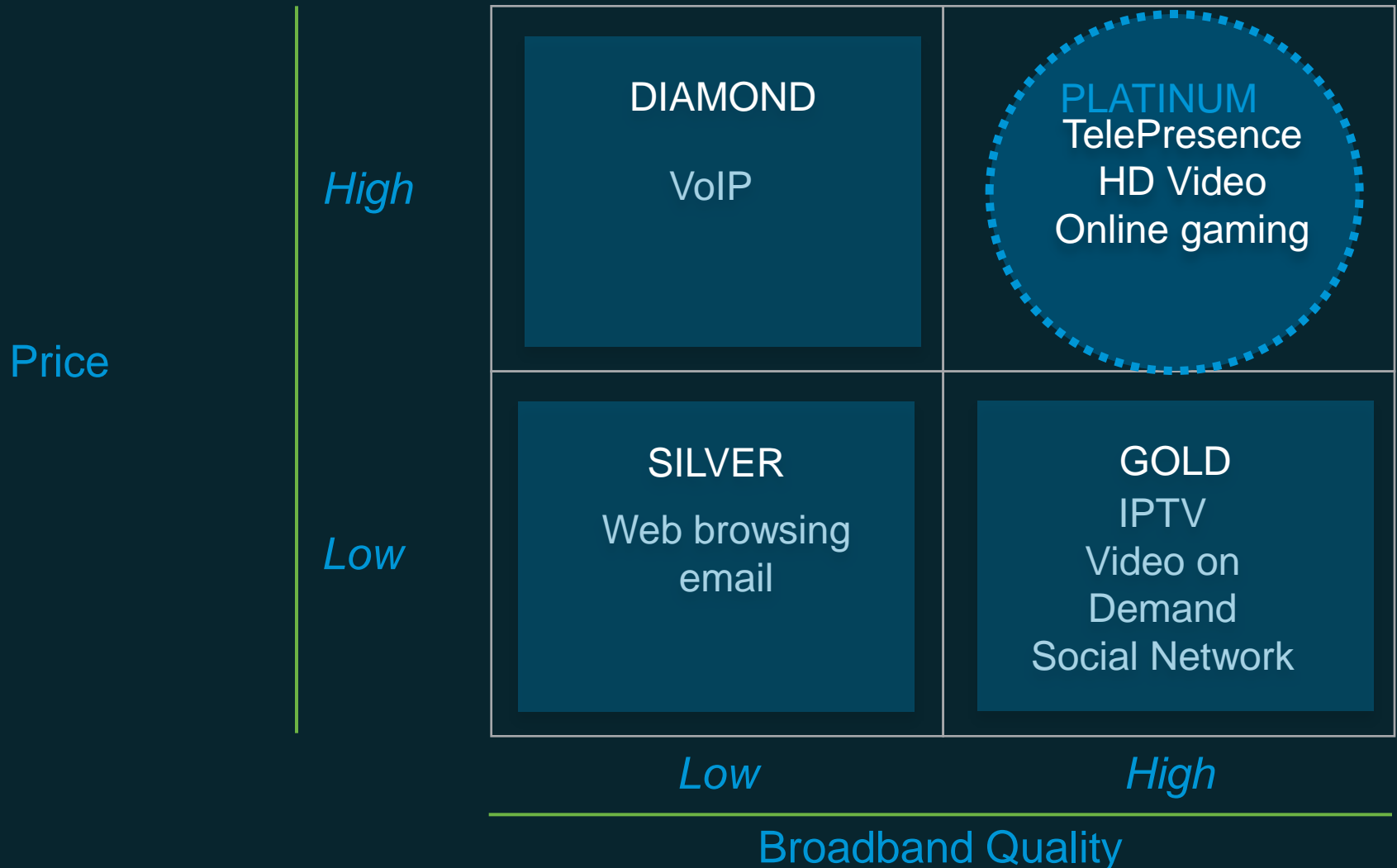
Bandwidth is not the only dimension of broadband

Bandwidth or "speed", Latency, Jitter, Symmetry, Availability

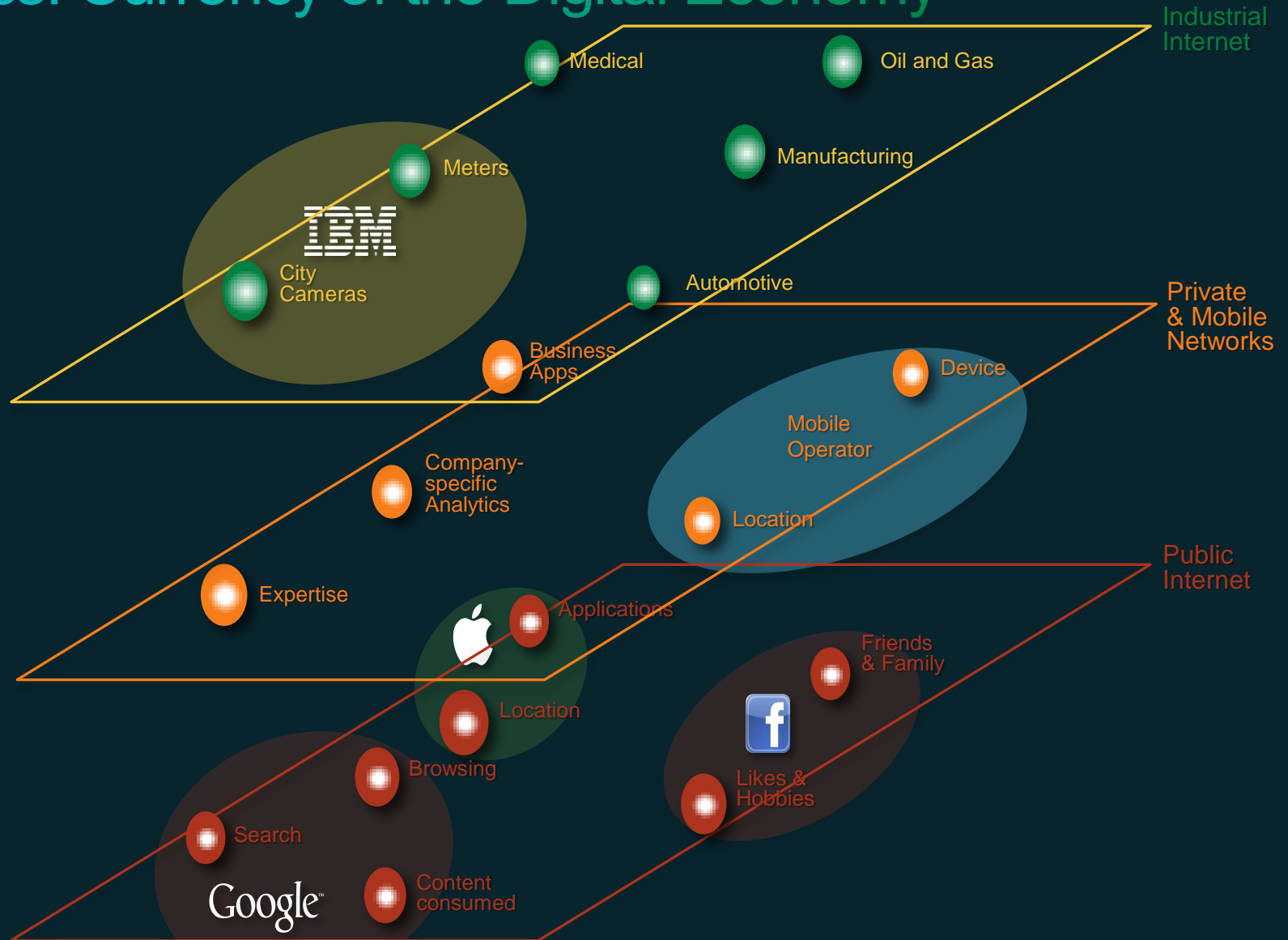


Broad Product Portfolio

Satisfy the needs of different users

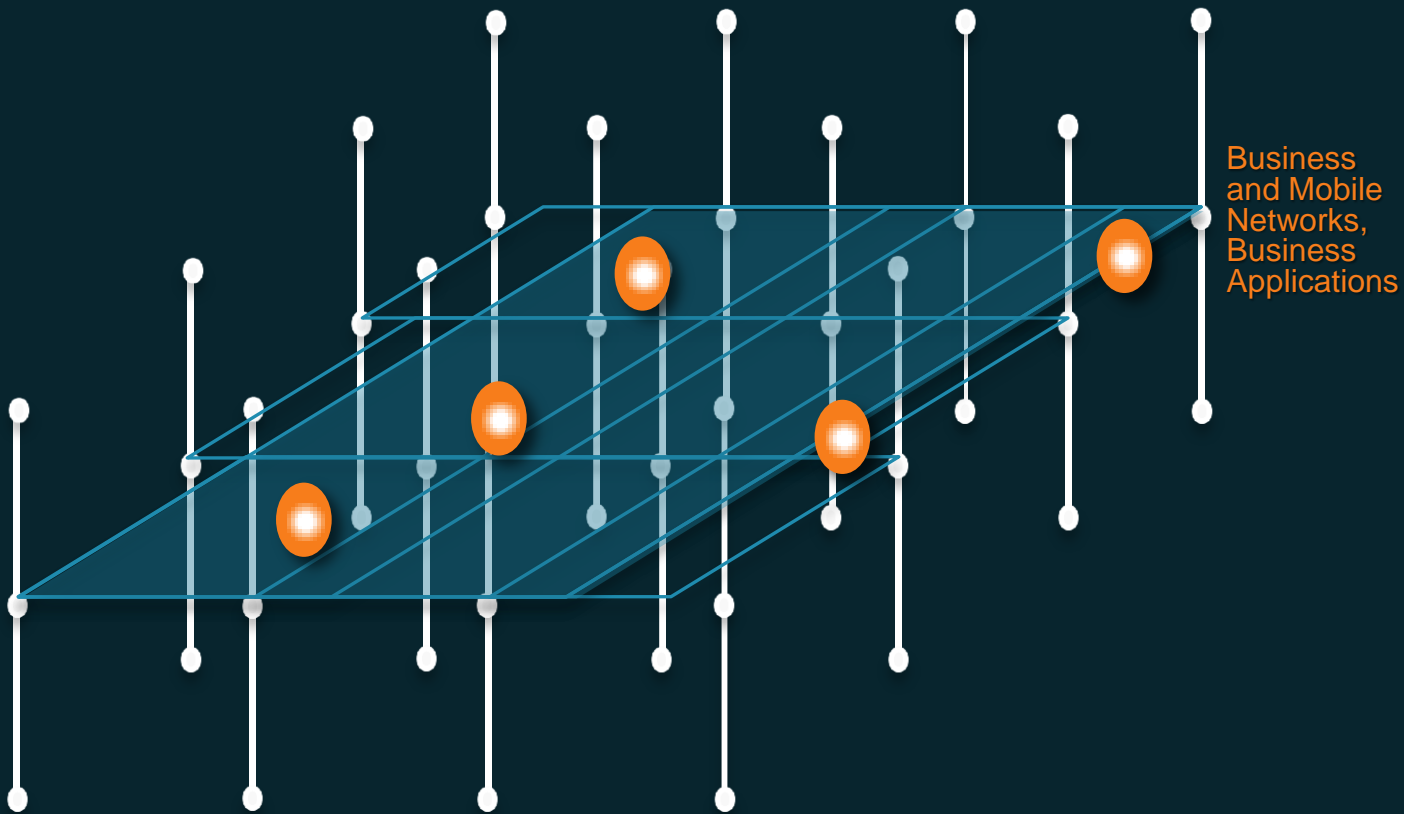


Analytics: Currency of the Digital Economy



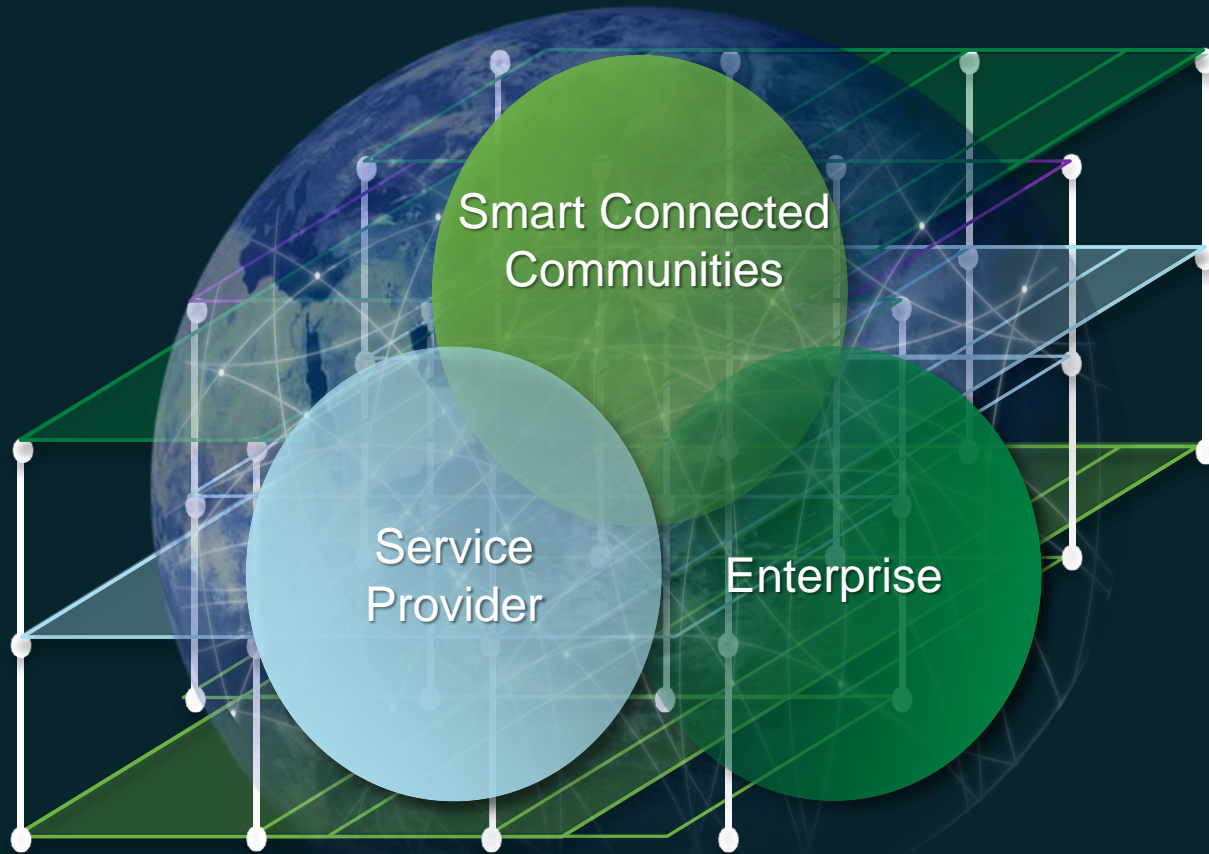
Network Is the Common Denominator

Can Become the Most Insightful Analytics Engine!



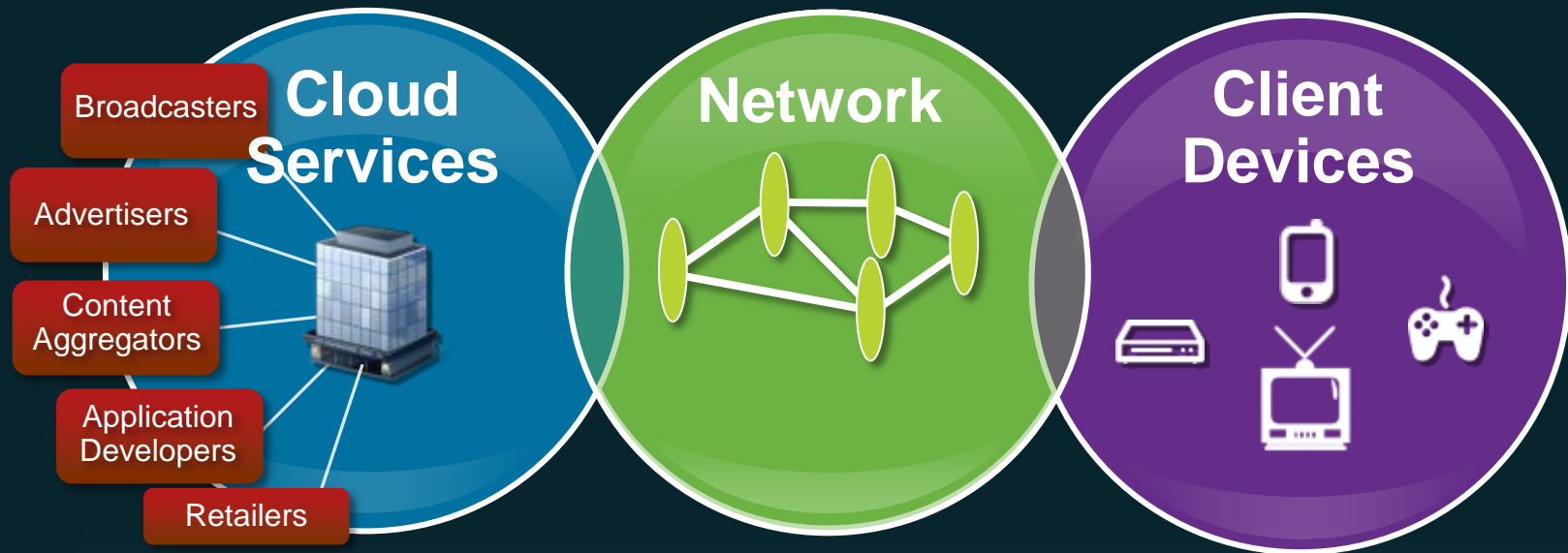
Adding the Fourth Dimension

The Network brings it all together



End-to-End Network Intelligence

Foundation of the Next-Generation Internet



Areas of convergence are the primary inflection points for service providers to **make money** and **save money**

More
Mobile

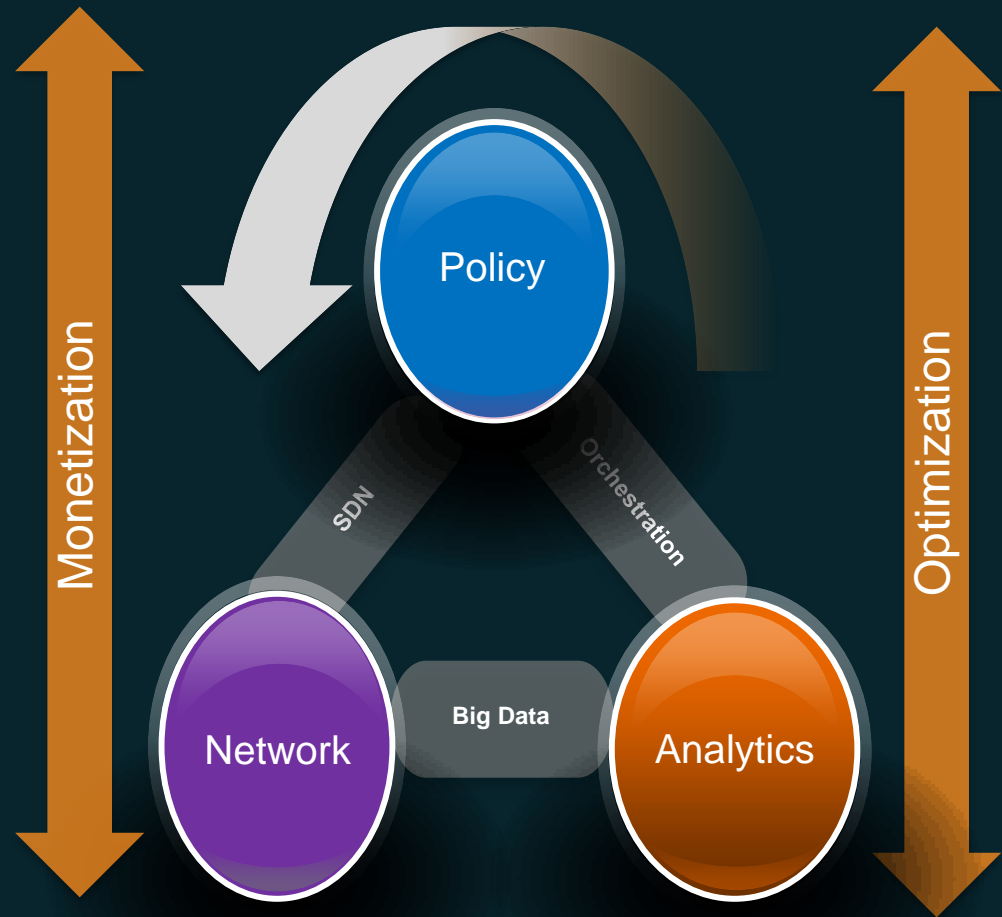
More
Visual

More
Simple

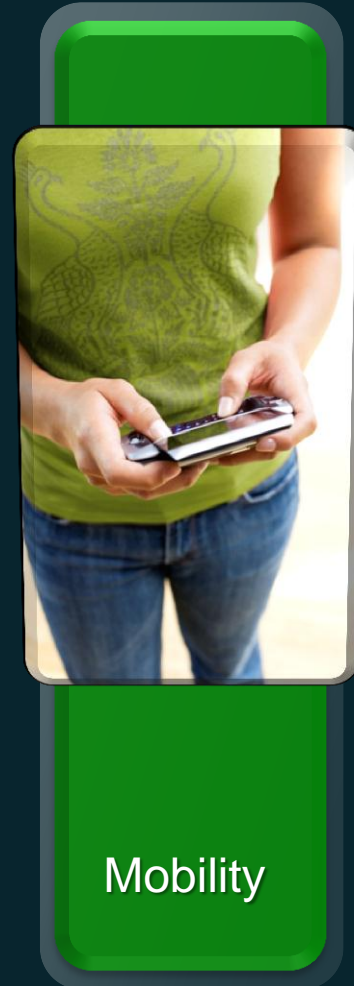
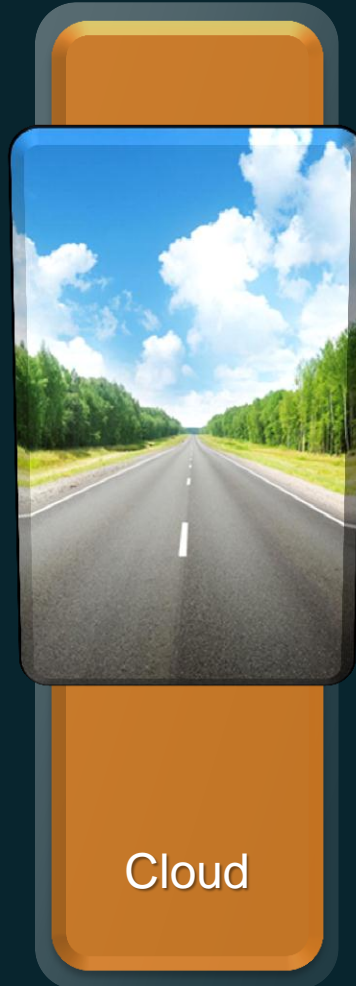
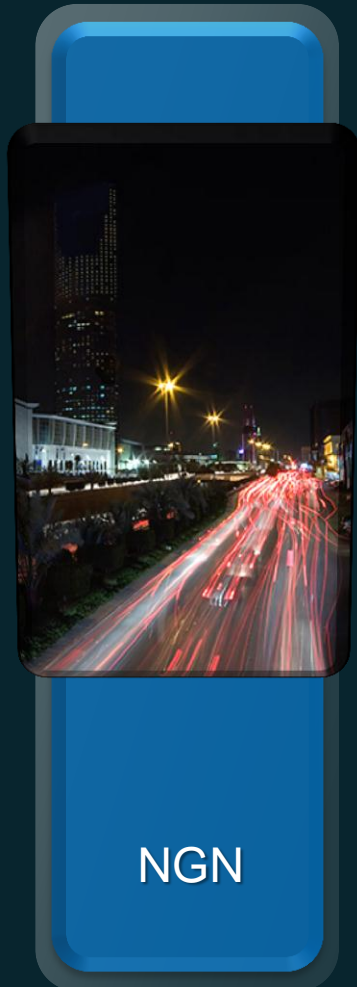
More
Virtual

Leveraging Network Value

- ✓ Network abstraction language / layer
- ✓ Orchestration layers enabling policy
- ✓ Network-based business analytics



Integration of Foundation Architectures



TeliaSonera Success Story

Exclusive partnership aims to drive increased revenue

Challenge

- Grow new and existing mobile broadband, broadband, and TV customers, with innovative services
- Make music service available on different platforms; incent bundled services

Partnership

- Spotify music streaming service to set-top boxes
- Spotify subscription bundled with Telia's mobile and broadband packages

Results

- Streams music regardless of location or device
- Attracts first-time subscribers; grows existing customer base
- Helps up-sell subscribers to higher-value packages
- Differentiates from competitors

When people can log on to Spotify right on their television set and enjoy music from the entire world, we believe it will attract new groups to the world's hottest music service today and what is probably Sweden's best digital television service."

Stefan Trampus, Head of Broadband Services,
TeliaSonera



Virgin Media Success Story

Transforming the network for broadband speed and video growth

Challenge

- Deliver on-demand video
- Provide high-speed broadband
- Differentiation from competition
- Prepare for future consumer services

Cisco Solution

- Cisco IP Next-Generation Network (NGN)
- Cisco Services
- Cisco Video Head End

Results

- Residential high-speed broadband of 50 Mbps
- Reaches 12.5M homes (half of U.K. households)
- Consumer revenue growth

"Two years ago, when we were testing 50 Mbps, you would have asked what that was needed for. In two years' time...they will be asking what is the take-up of 200 Mbps."

Neil Berkett, CEO, Virgin Media

Vodafone Success Story

Cross-platform solutions for social networking, apps, and content

Challenge

- Monetize Vodafone's Cisco networks
- Provide cross-platform services play that embraces Internet and social networking, mobile apps, and content
- Discover new ways to partner to generate revenue

Strategy

- Provide consistent user experience across a variety of networks, devices
- Increase customer retention and data plan uptake
- Present new revenue streams for provider

“...Vodafone 360 was the first step in the next phase of our mobile Internet journey, to provide a range of services that give customers a great mobile Internet experience.”

Pieter Knook, Internet Services Director,
Vodafone

Thank you.

