Mobile Networks in a Zettabyte World

Trends from Cisco's Visual Networking Index

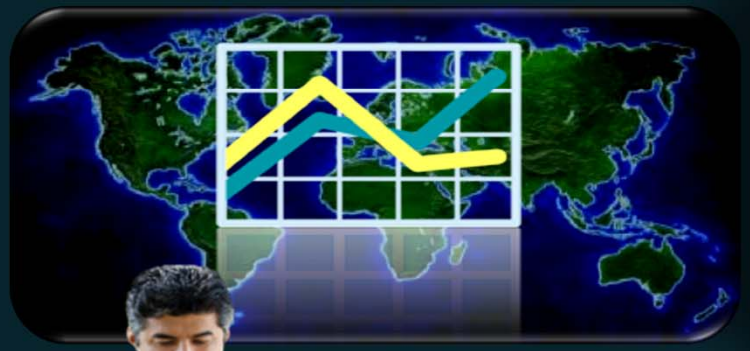
Robert Pepper
Vice President
Global Technology Policy

Public Policy Forum
Mobile Asia Expo 2012
June 2012

Cisco Visual Networking Index (VNI) Global Forecast Update 2011-2016

Cisco® VNI Forecast research is an ongoing initiative to predict global traffic growth. This study focuses on consumer and business mobile data traffic and its key drivers.

Global Forecast Data



VISUAL NETWORKING INDEX
VNI
GLOBAL TRAFFIC FORECAST

Global Speed Data
Sample Size > 1M

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

Establishing the Zettabyte Era

By 2016, global IP traffic will reach an annual run rate of 1.3 zettabytes per year

Put in perspective

In 2016, more traffic will traverse global networks than from the beginning of the Internet to today…combined

1984–2012: 1.2 Zettabytes

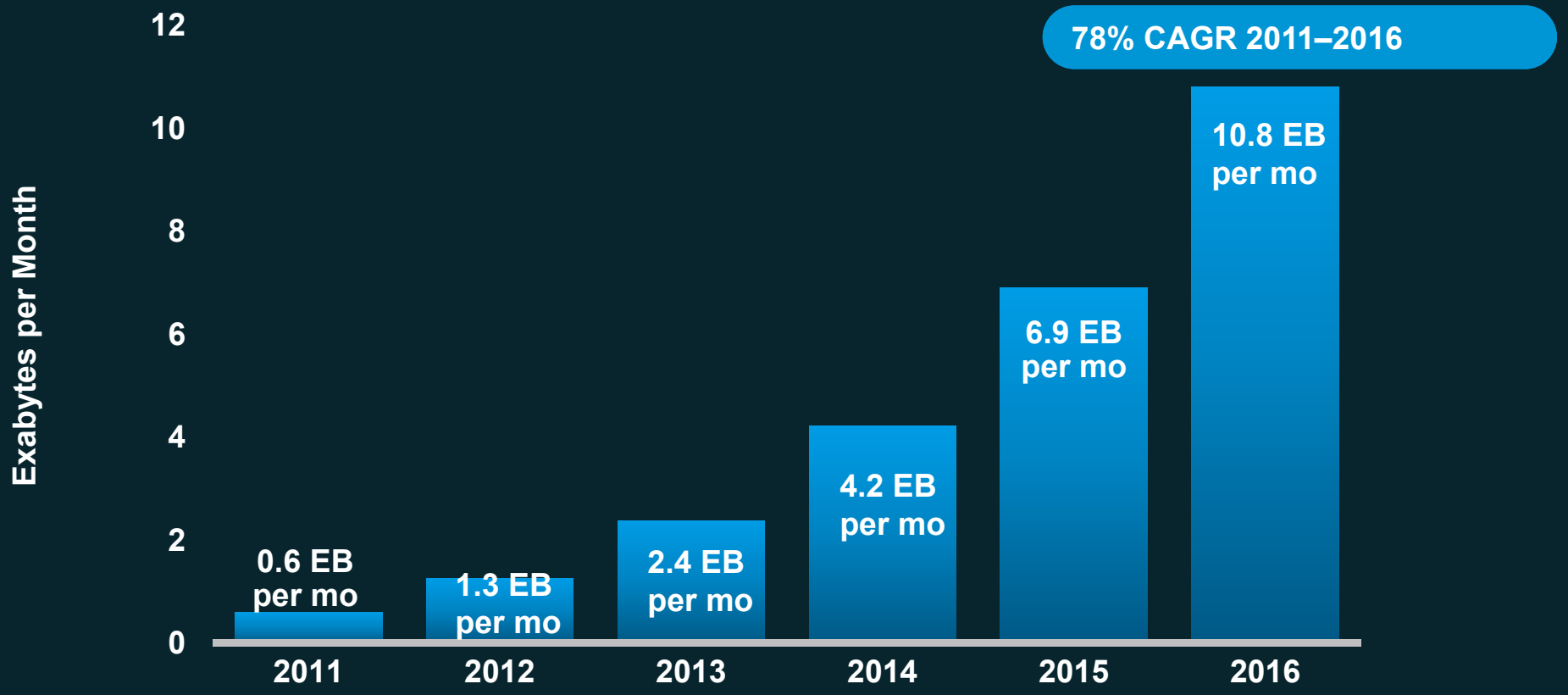
Source: Cisco VNI Global Forecast, 2011–2016

What is a zettabyte?

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

Global Mobile Data Traffic Growth

Global Mobile Data Traffic will Increase 18X from 2011 to 2016



Source: Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast, 2011–2016

Traffic & Service Adoption Drivers, 2011–2016

More Devices
Nearly 19 Billion Connections

Faster Broadband Speeds
4-Fold Speed Increase

Growth Catalysts

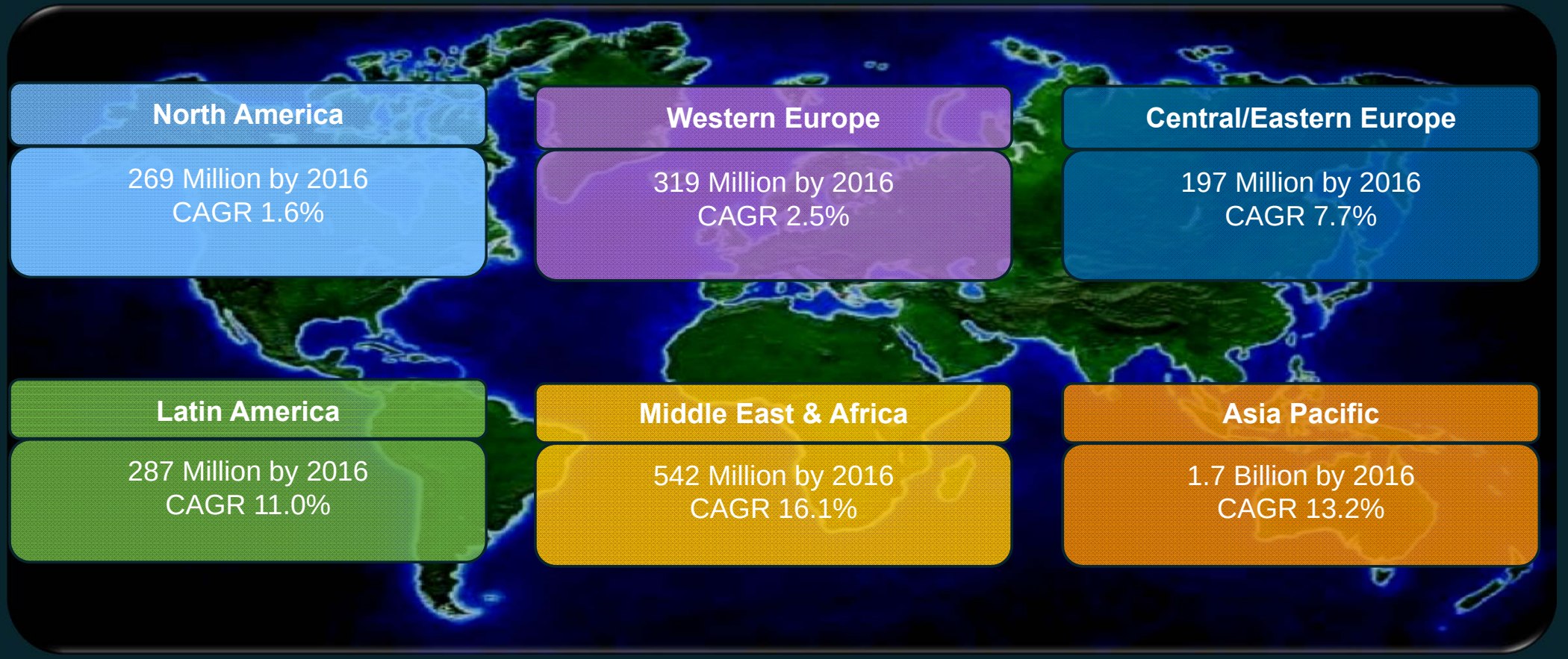
More Internet Users
3.4 Billion Internet Users

More Rich Media Content
1.2 Million Video Minutes/Second

Source: Cisco VNI Global Forecast, 2011–2016

Global Internet Users Growth

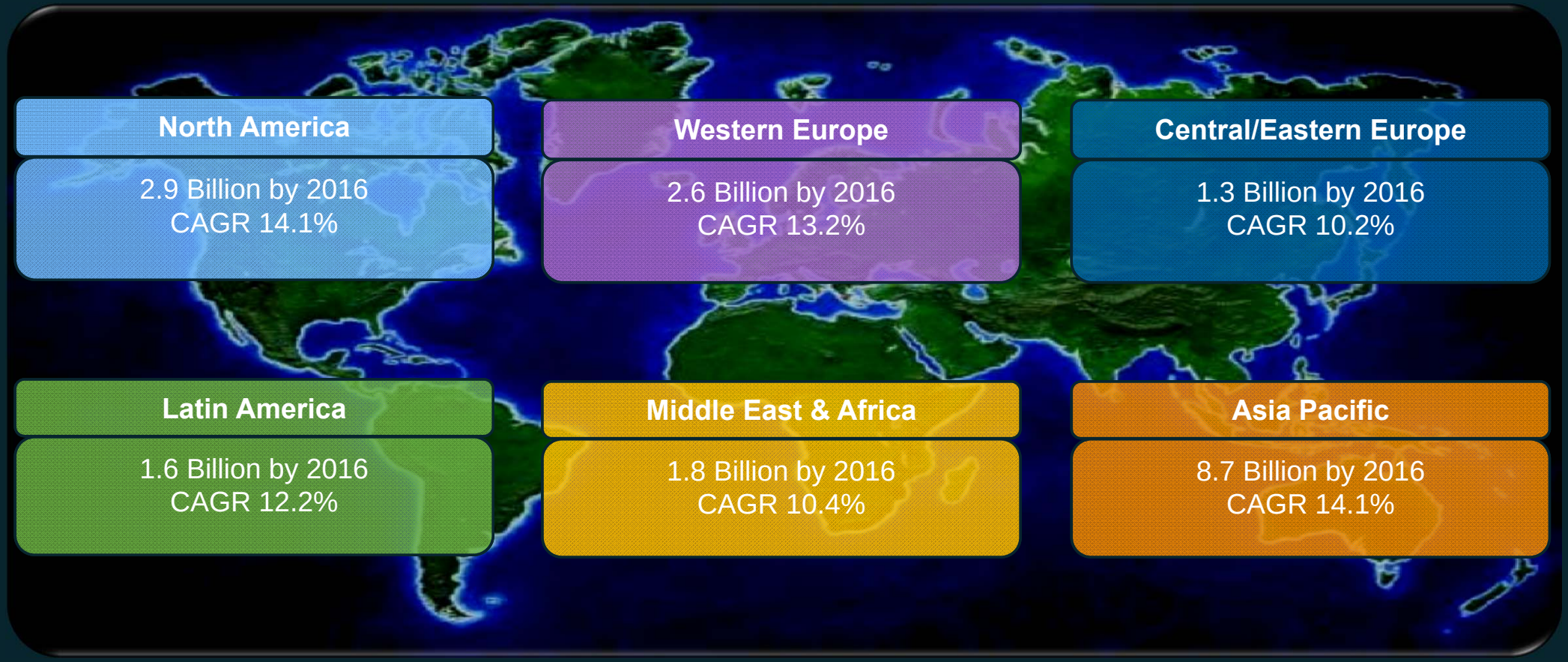
By 2016, There Will Be 3.4 Billion Internet Users—Half in Asia



Source: Cisco VNI Global Forecast, 2011–2016

Global Device Growth

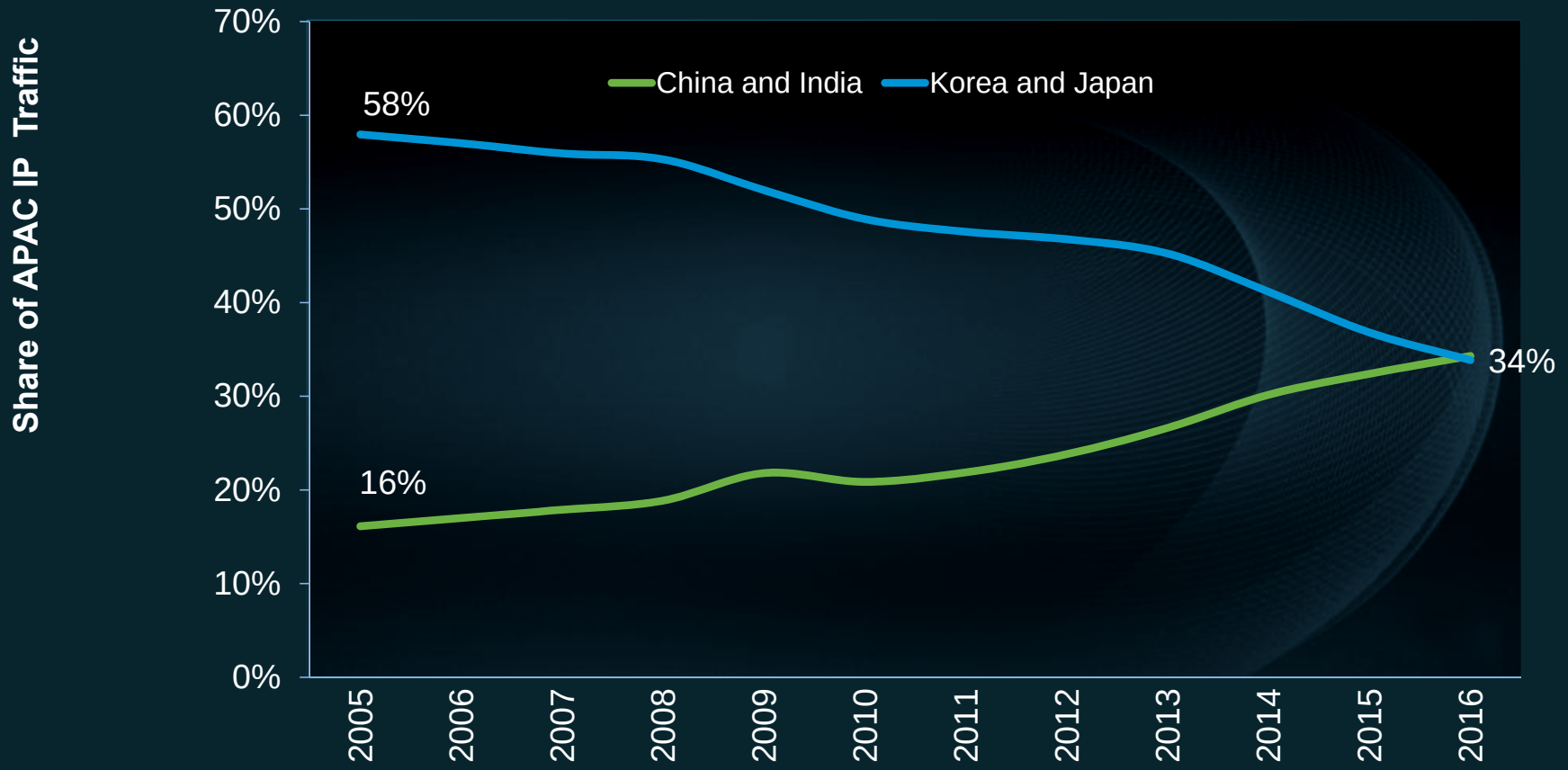
By 2016, There Will Be Nearly 19 Billion Network Connections—Half in Asia



Source: Cisco VNI Global Forecast, 2011–2016

Share of APAC Traffic

China and India to Represent One-Third of Traffic by 2016



Source: Cisco VNI Global Forecast, 2011–2016

Devices/Connections

Residential

2011: 2.4B devices/connections

2016: 5.4B devices/connections

(17.3% CAGR)

Consumer Mobile

2011: 5.6B devices/connections

2016: 8.4B devices/connections

(8.3% CAGR)

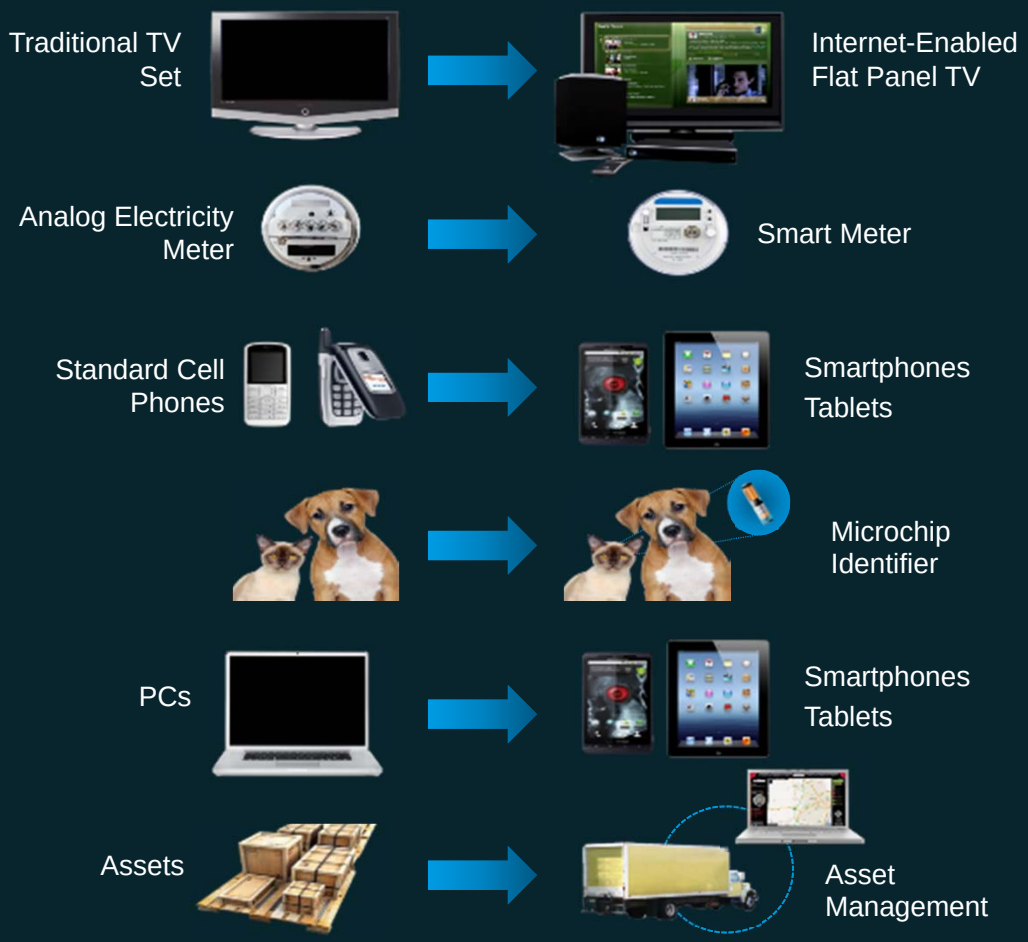
Business

2011: 2.2B devices/connections

2016: 5.1B devices/connections

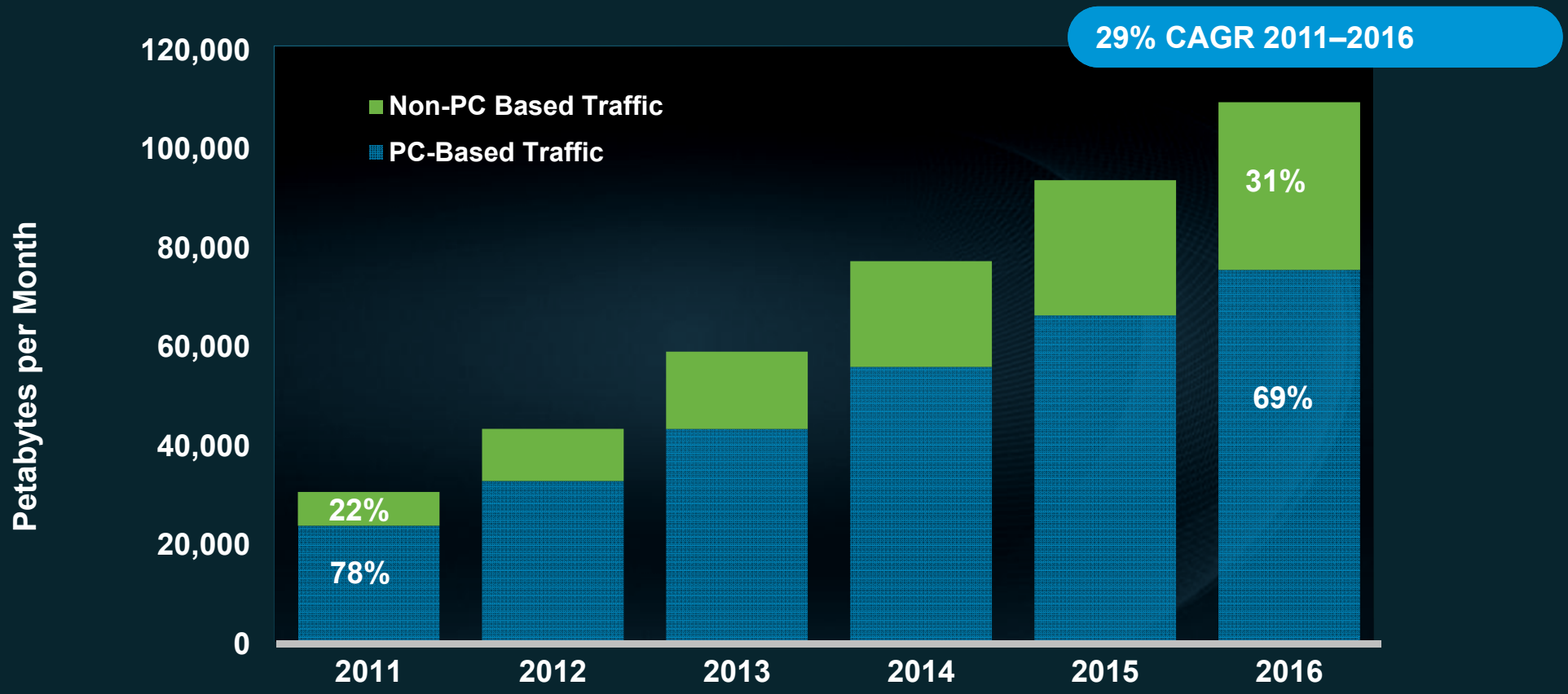
(18% CAGR)

Device/Connection Transitions



Global IP Traffic Growth by Device Type

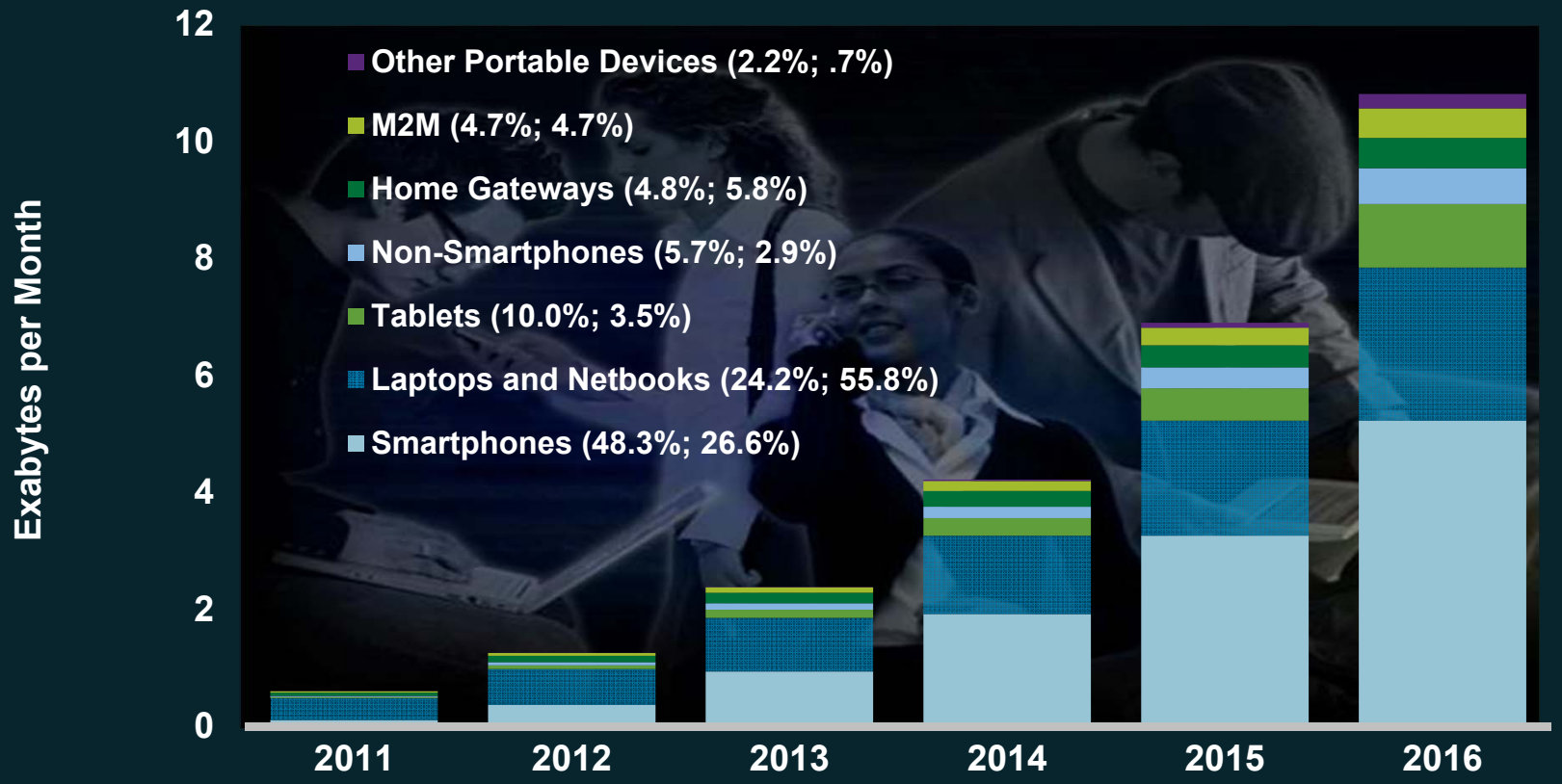
Non-PC Devices to Account for 31% in 2016



Source: Cisco VNI Global Forecast, 2011–2016

Global Mobile Data Traffic Growth / Devices

Laptops Dominate Today, but Smartphones Lead by 2016
Tablets Drive 10% of Traffic by 2016



(Figures in legend refer to traffic share in 2016; last year's projection for 2015)

Source: Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast, 2011–2016

VNI Service Adoption Forecast

Consumer Mobile: Global TAM/Devices & Service Rankings

TAM and Devices for Consumer Mobile Market

Mobile Consumers
2011: **3.7 Billion**
2016: **4.5 Billion**

Devices/Connections
2011: **5.6 Billion**
2016: **8.4 Billion**

Fastest Growing Consumer Mobile Services

Mobile Video—42.9% CAGR
2011: **271 Million**
2016: **1.6 Billion**

Mobile Service Demand Globally, consumer mobile segment has 7 of 9 services with CAGRs exceeding 20% from 2011 to 2016.

Highest Penetrated Consumer Mobile Services

SMS (Texting)
2011: **2.8 Billion**
74% of Mobile Consumers

2016: **4.1 Billion**
90% of Mobile Consumers

Mobile Service Maturity
SMS has the lowest CAGR (8.3 %) in the consumer mobile service category.

Source: Cisco VNI Global Forecast, 2011–2016

Global Average Traffic Per Device Type

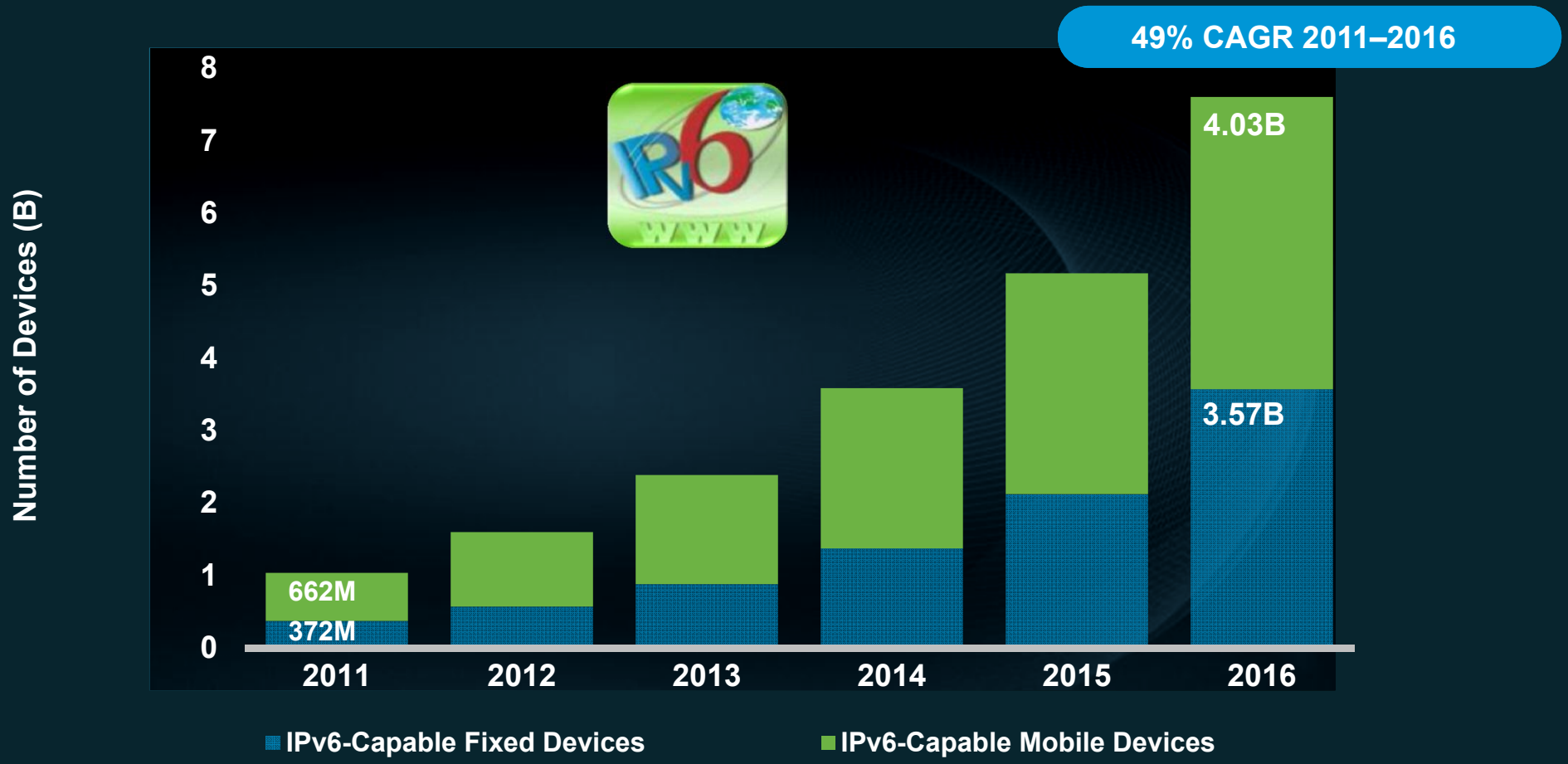
	2011 MBs per Month	2016 MBs per Month
Non-Smartphone 	4.3	108
M2M 	71	266
Smartphone 	150	2,576
E-Book Reader 	750	2,880
Tablet 	517	4,223
Laptop 	2,131	6,942

By 2016, the amount of annual mobile data traffic generated by tablets (13 EBs), globally, will be nearly 2X more than global mobile data traffic generated in 2011 (7 EBs).

Source: Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast, 2011–2016

IPv6-Capable Fixed and Mobile Devices

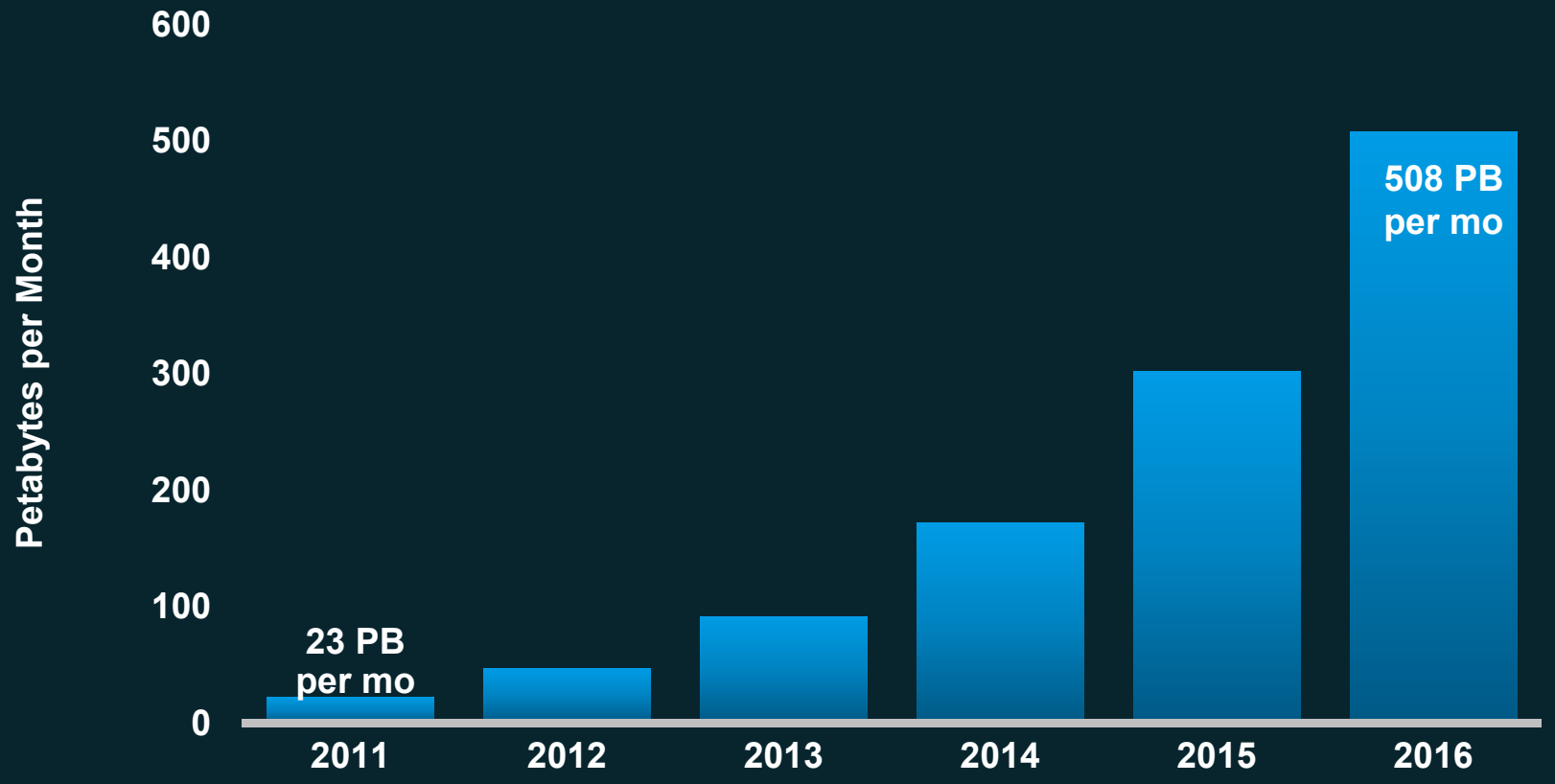
By 2016, 7.6B Fixed & Mobile Devices Will Be IPv6-Capable; 40.3% of All Fixed & Mobile Devices



Source: Cisco VNI Global Forecast, 2011–2016

Machine-to-Machine Mobile Data Traffic Growth

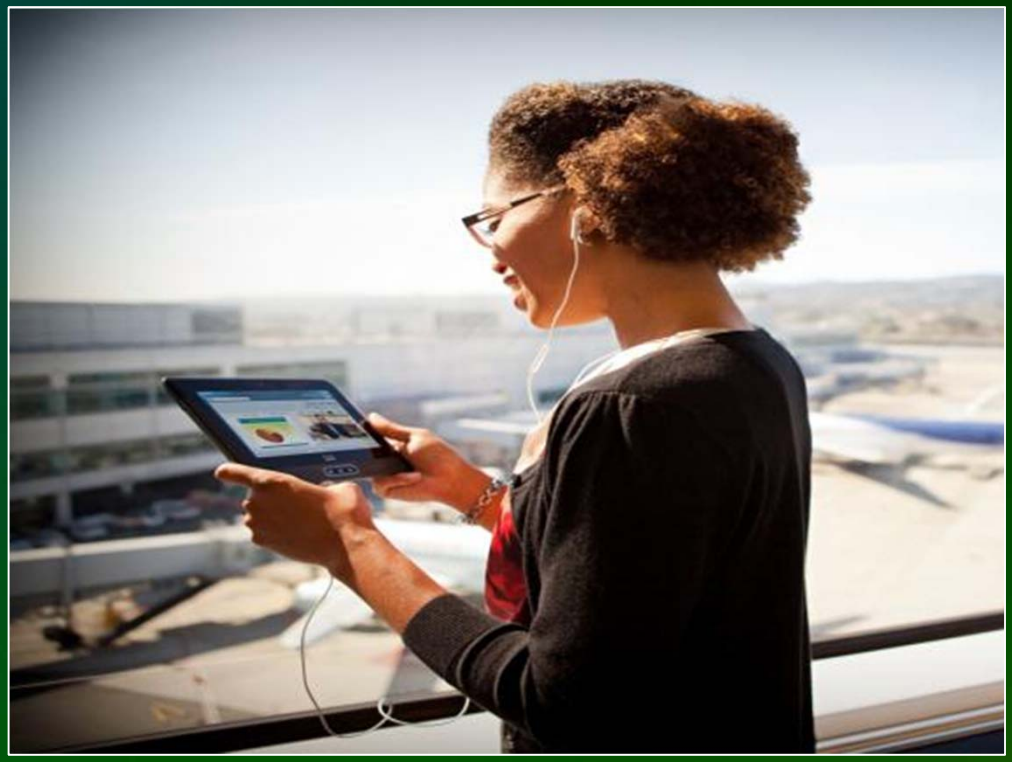
M2M Data Traffic will Increase 22X from 2011 to 2016



(Last year's projection: 296 PB/month in 2015.)

Source: Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast, 2011–2016

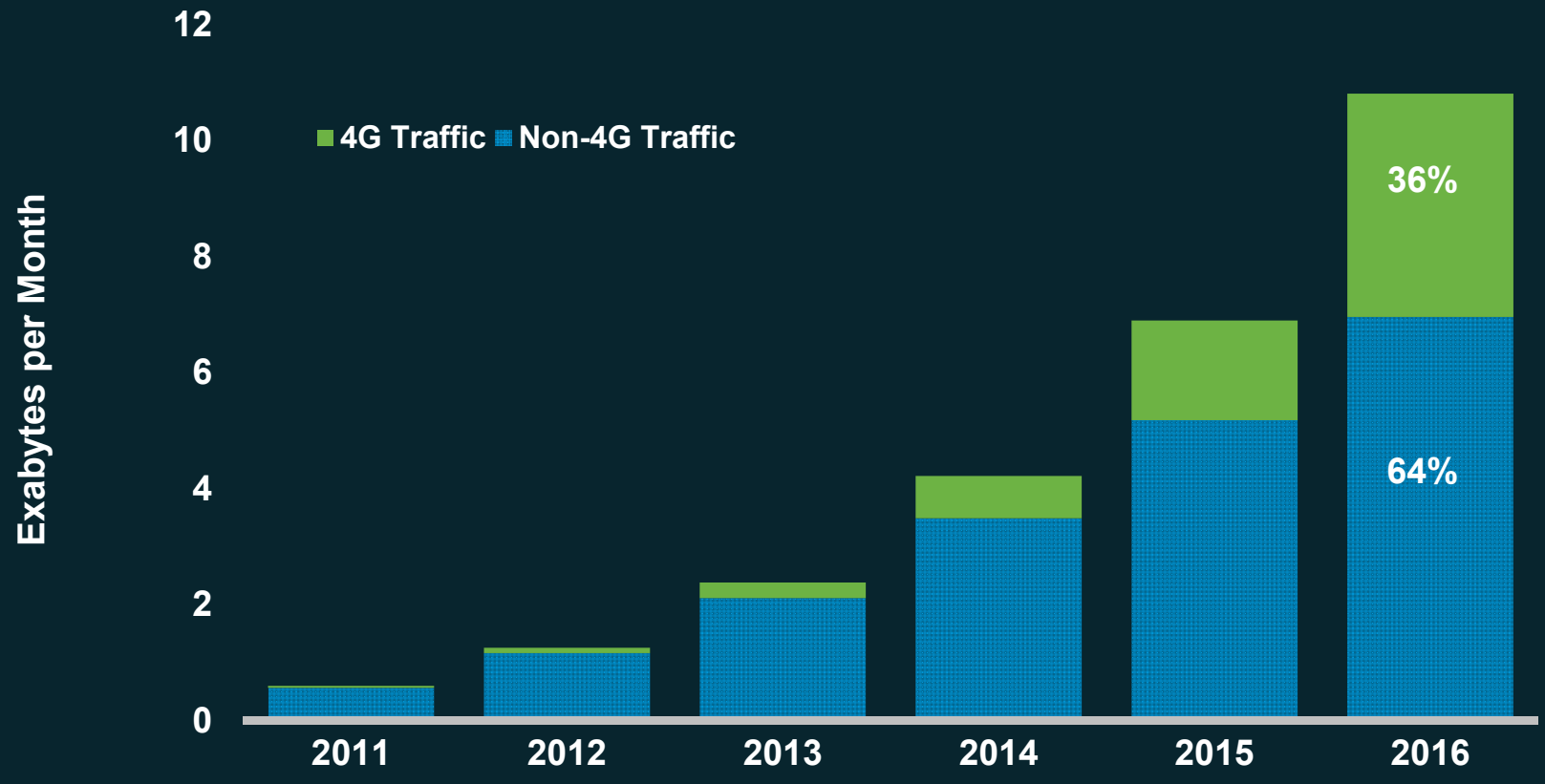
In 2011, a 4G connection generated 2.4 GB/mo, 28X more traffic than a non-4G connection (86 MB/mo).



Source: Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast, 2011–2016

Global Mobile 4G Traffic

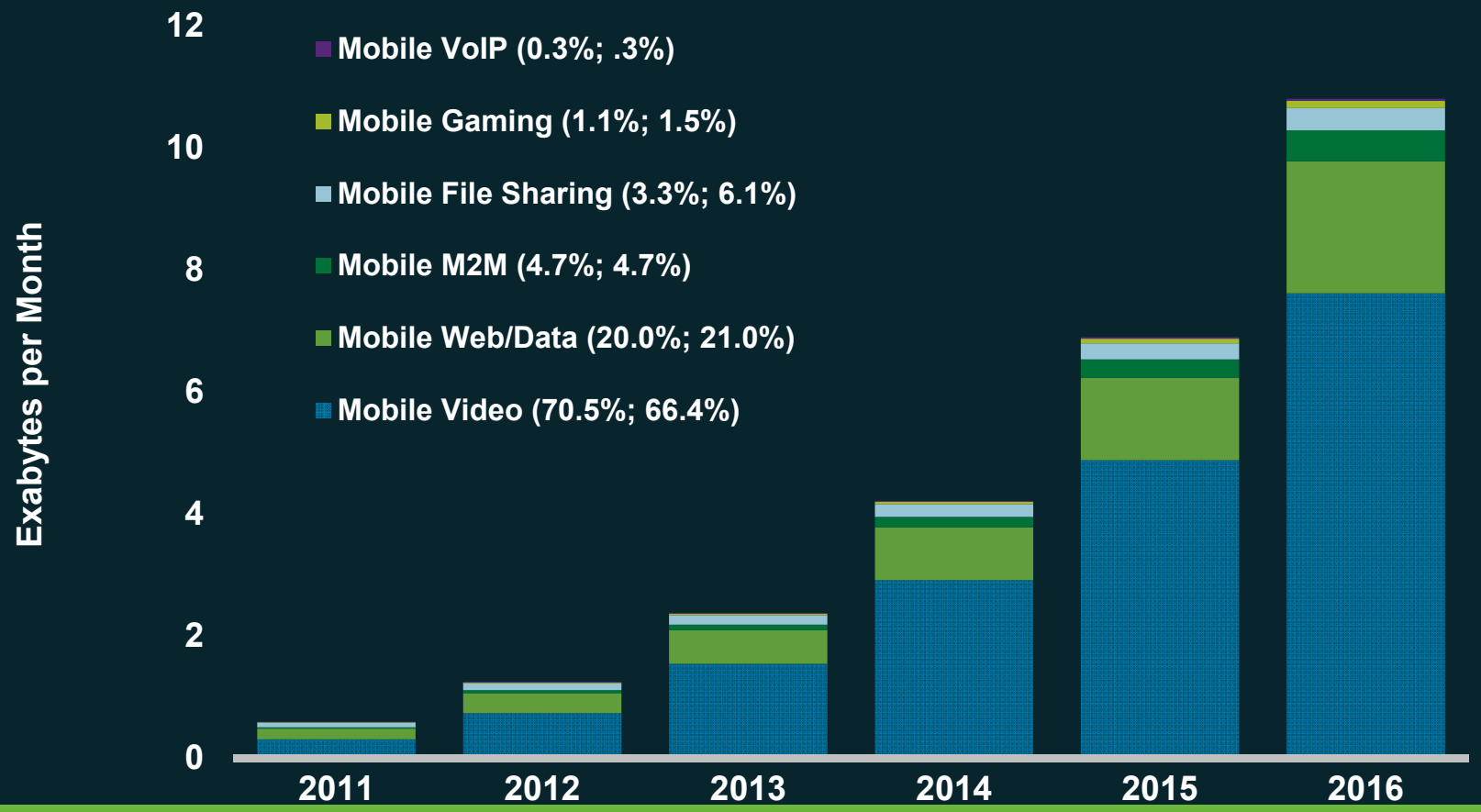
4G Traffic will Account for 36% of Total Traffic by 2016



Source: Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast, 2011–2016

Global Mobile Data Traffic Growth / Apps

Video to Exceed 70 Percent of Mobile Data Traffic in 2016

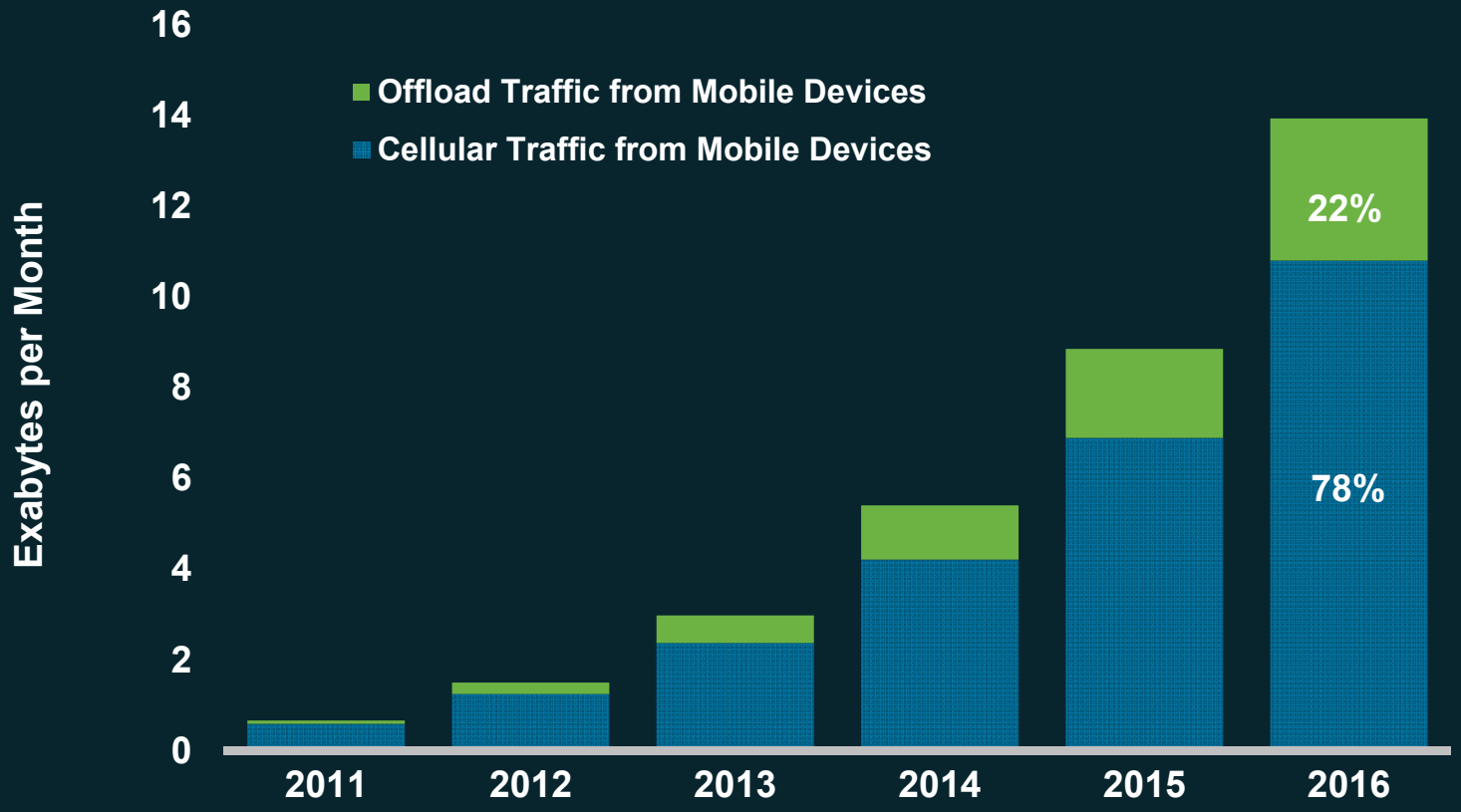


(Figures in legend refer to traffic share in 2016; last year's projection for 2015.)

Source: Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast, 2011–2016

Global Mobile Data Traffic Offload

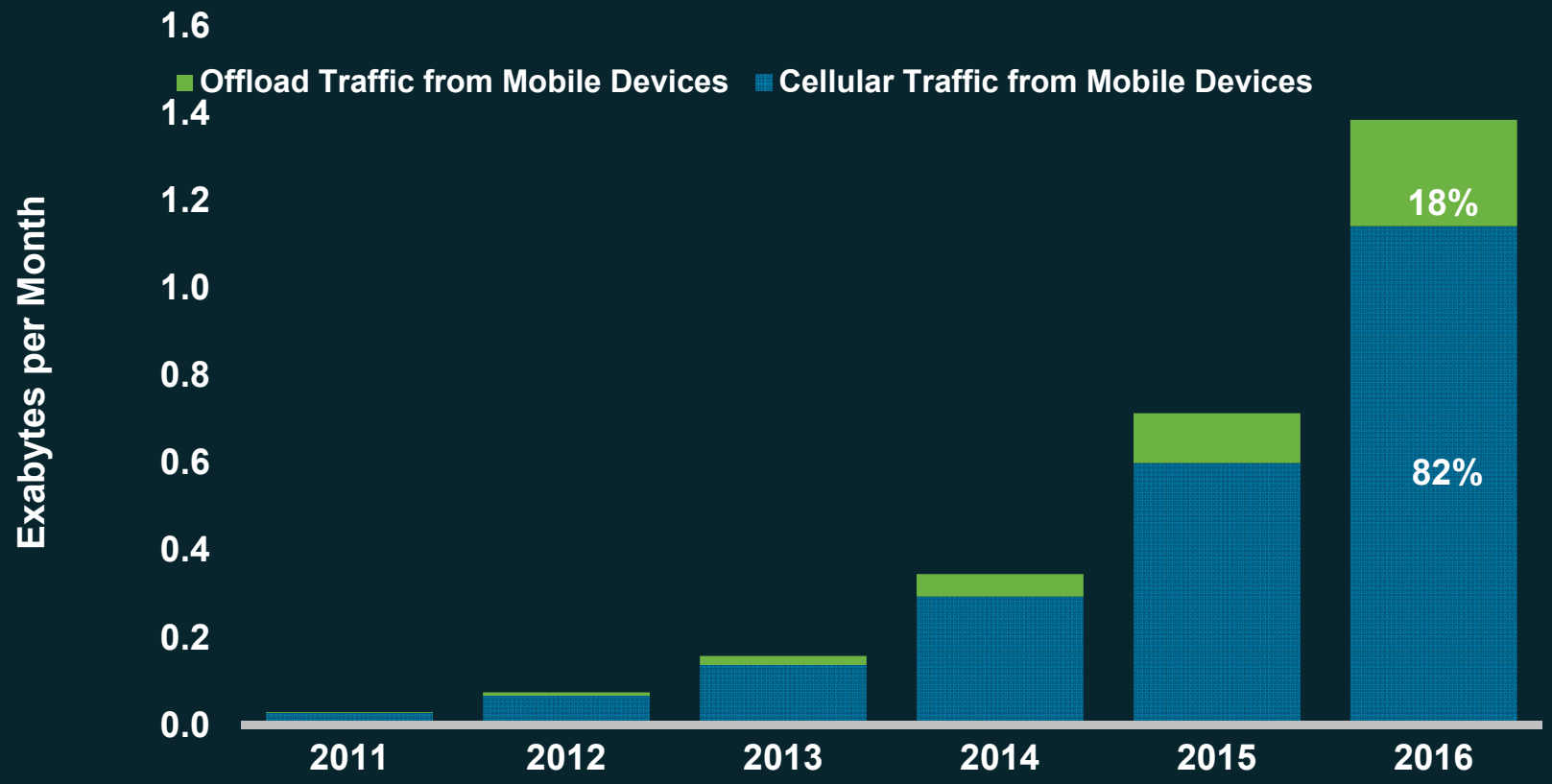
22% of Mobile Traffic to be Offloaded in 2016
11% of Mobile Traffic Offloaded in 2011



Source: Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast, 2011–2016

China Mobile Data Traffic Offload

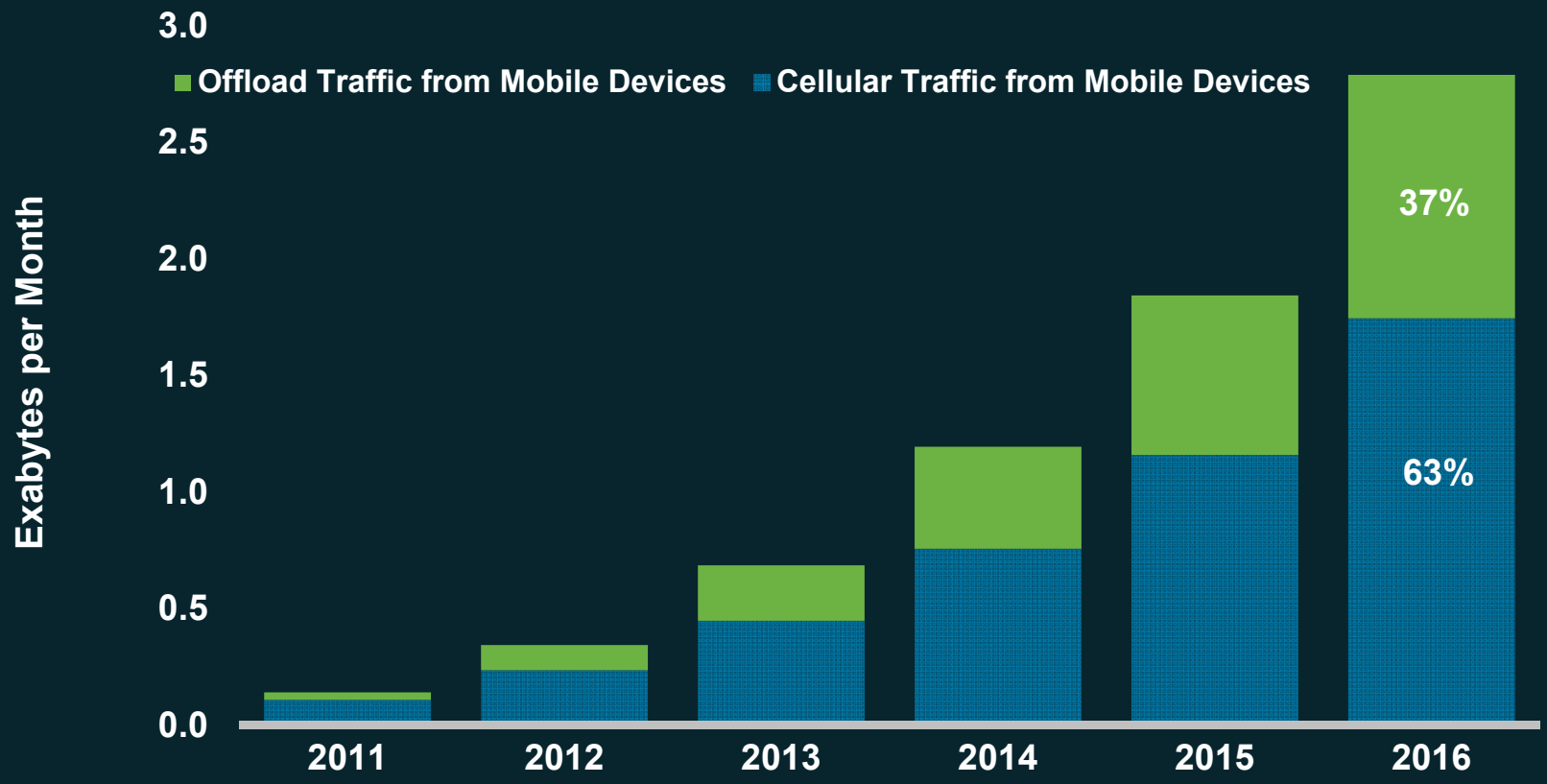
18% of Mobile Traffic to be Offloaded in 2016
6% of Mobile Traffic Offloaded in 2011



Source: Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast, 2011–2016

United States Mobile Data Traffic Offload

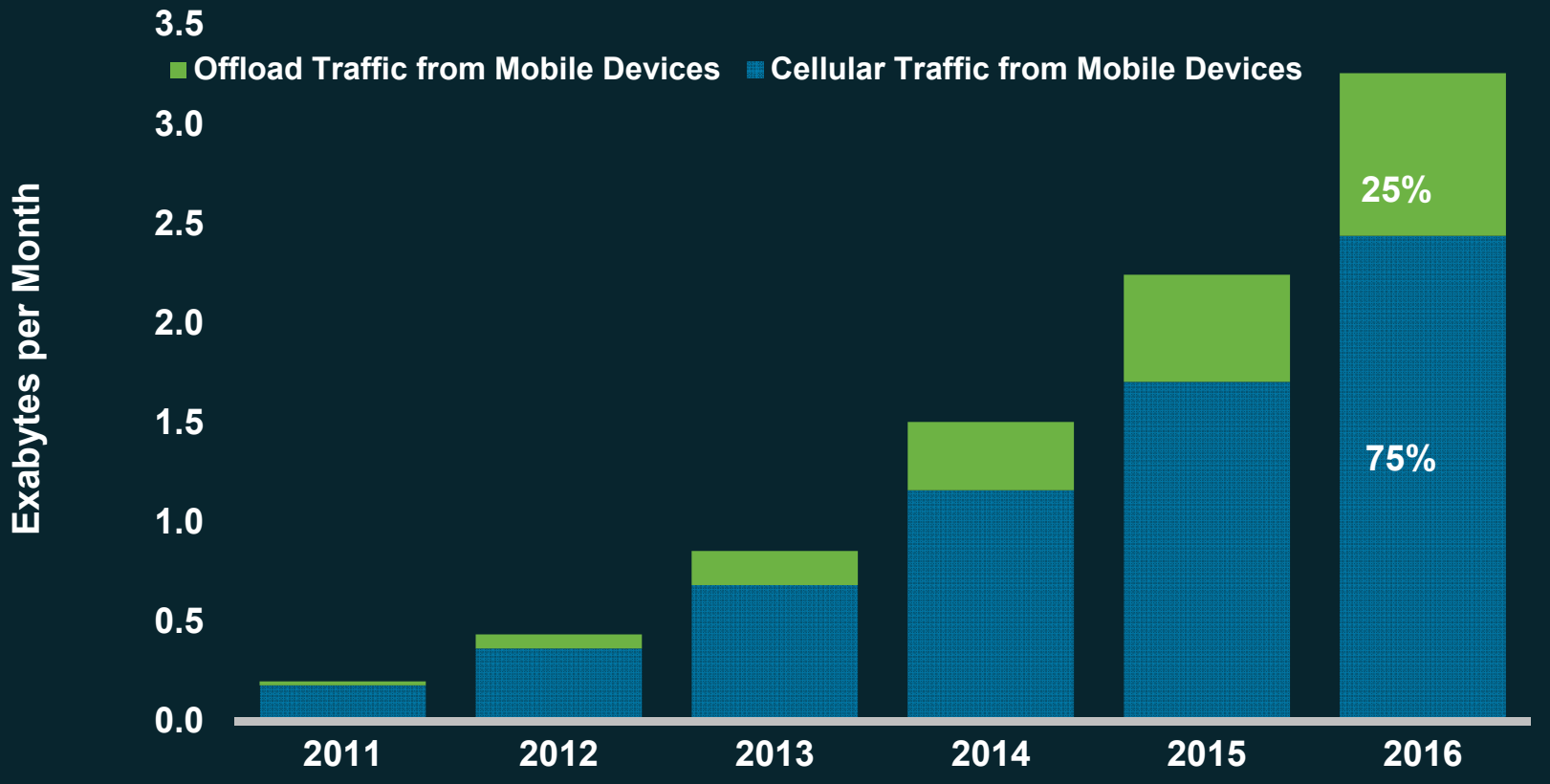
37% of Mobile Traffic to be Offloaded in 2016
23% of Mobile Traffic Offloaded in 2011



Source: Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast, 2011–2016

Western Europe Mobile Data Traffic Offload

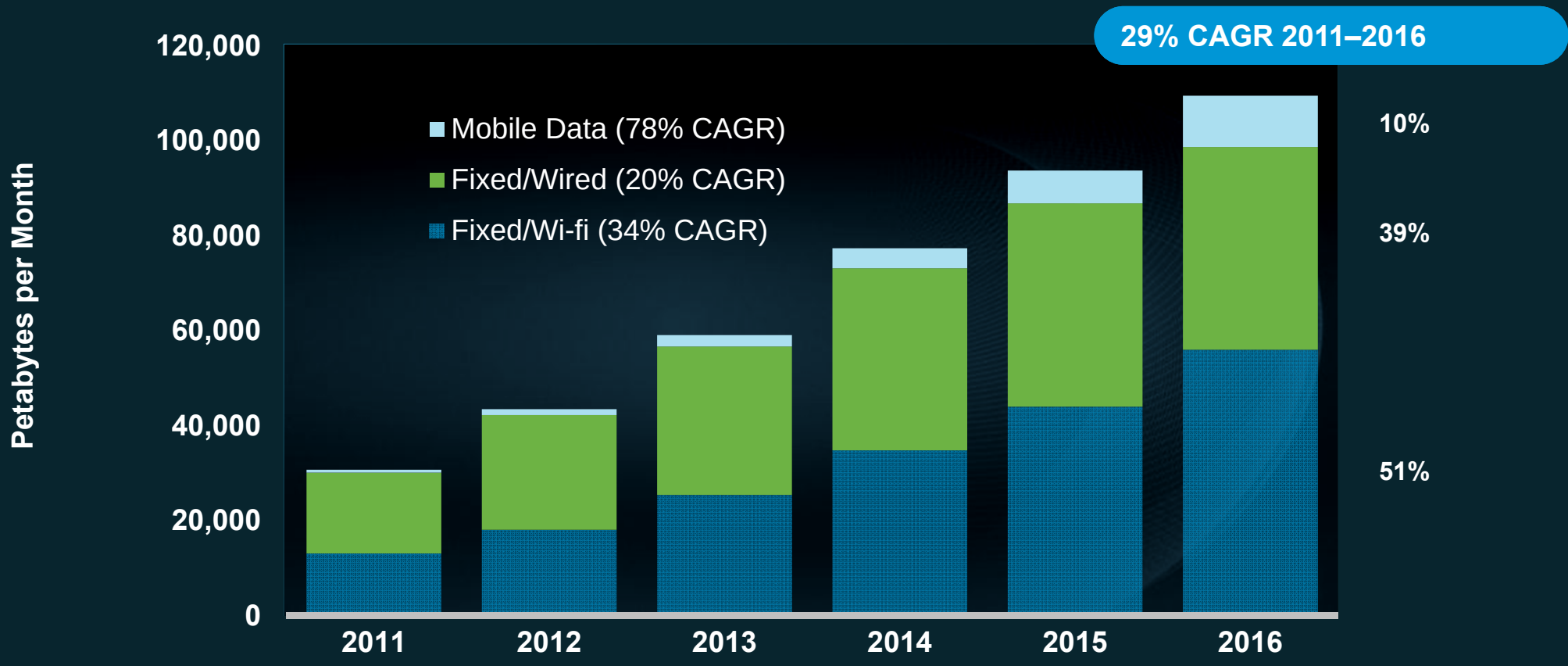
25% of Mobile Traffic to be Offloaded in 2016
10% of Mobile Traffic Offloaded in 2011



Source: Cisco Visual Networking Index (VNI) Global Mobile Data Traffic Forecast, 2011–2016

Global IP Traffic by Local Access Technology

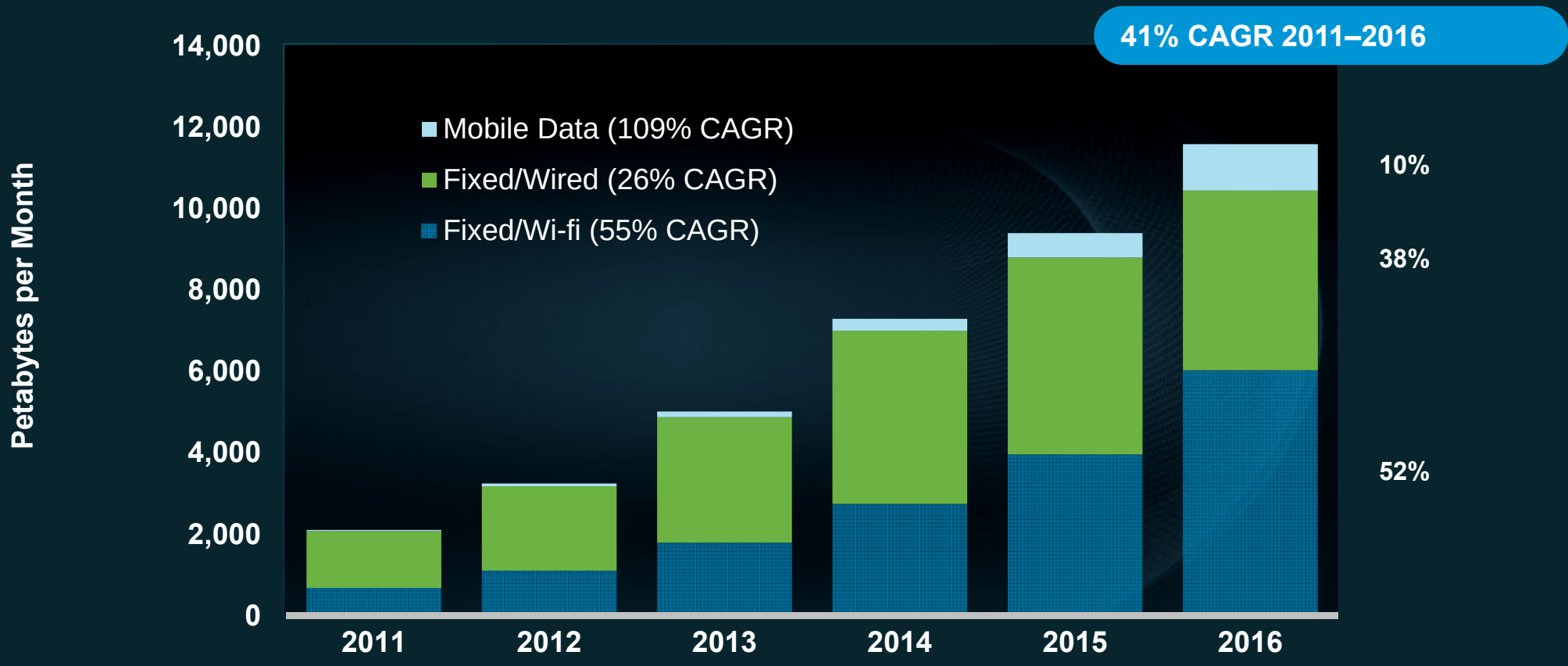
By 2016, Fixed/Wi-Fi Traffic Surpasses Fixed/Wired Traffic



Source: Cisco VNI Global Forecast, 2011–2016

China IP Traffic by Local Access Technology

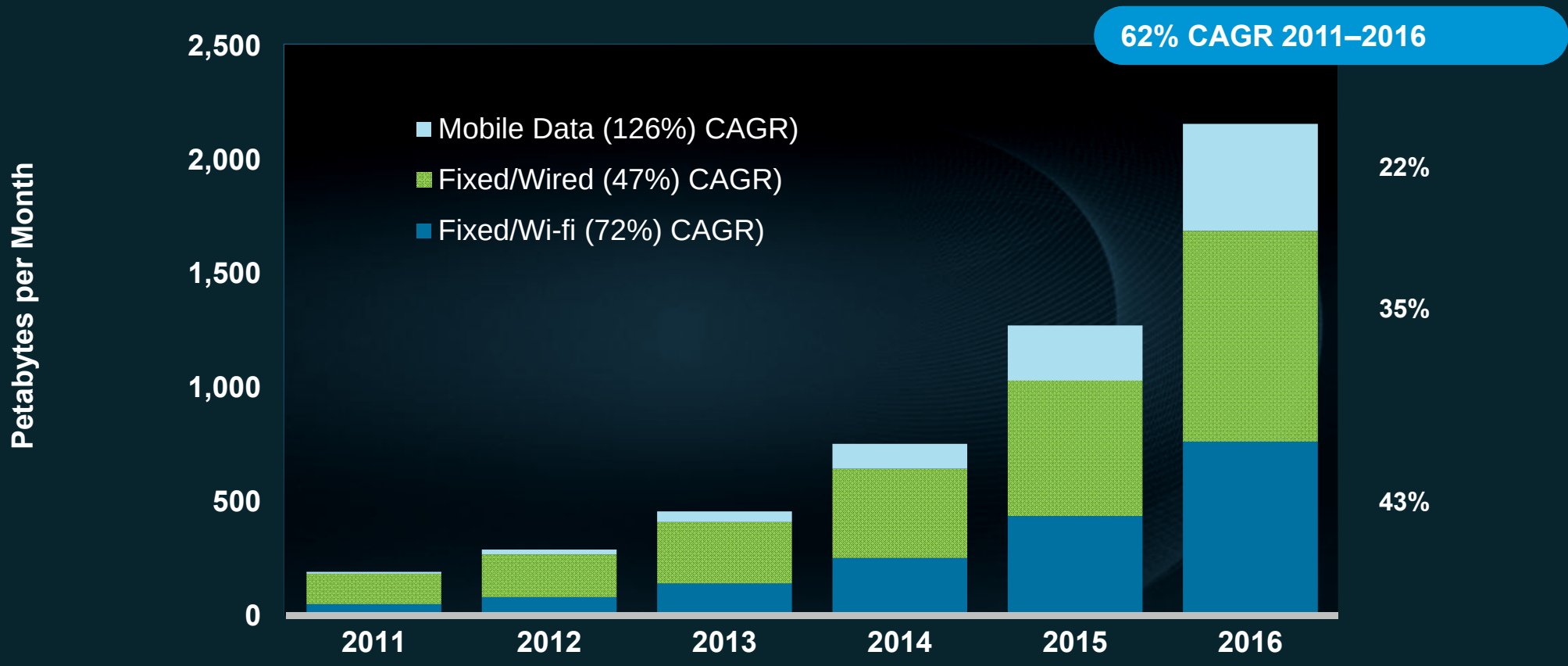
By 2016, Fixed/Wi-Fi Traffic To Surpass Fixed/Wired Traffic



Source: Cisco VNI Global Forecast, 2011–2016

India IP Traffic by Local Access Technology

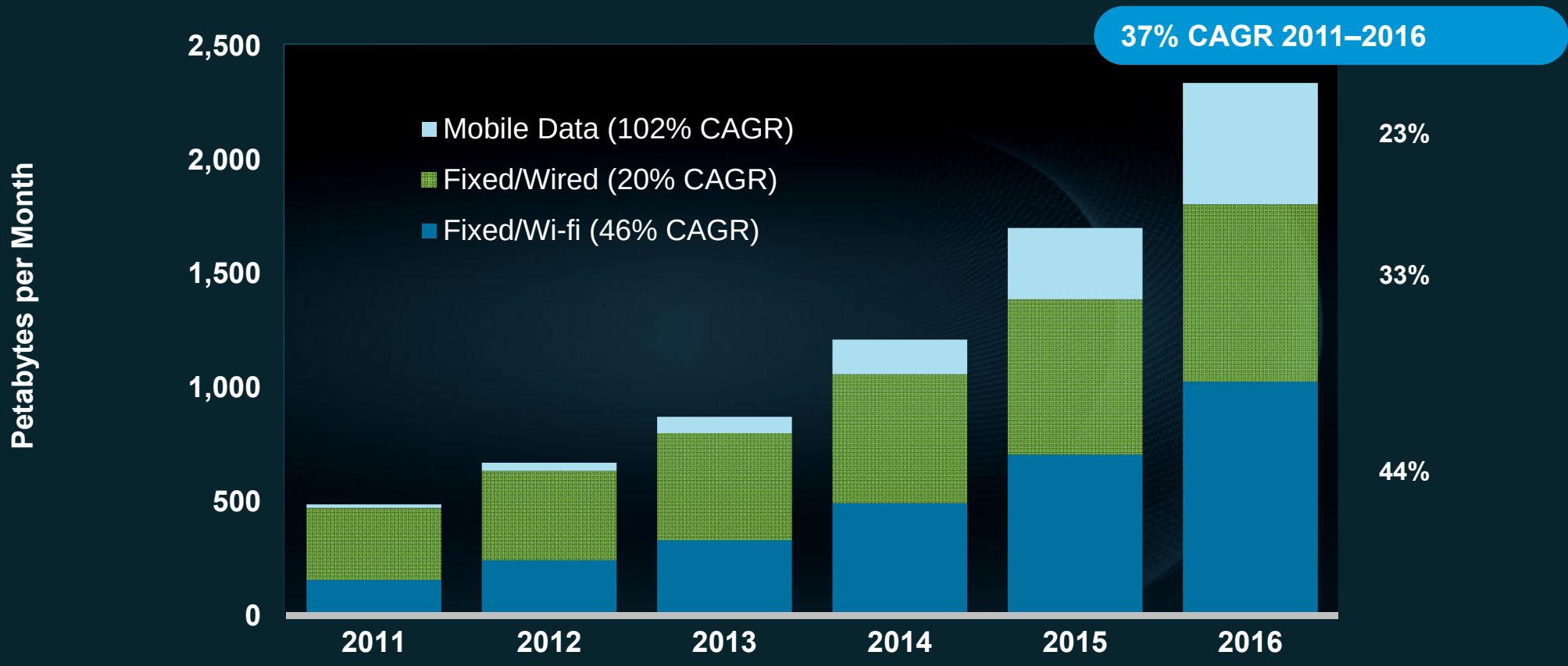
Fixed/Wi-Fi Traffic To Surpass Fixed/Wired Traffic beyond 2016



Source: Cisco VNI Global Forecast, 2011–2016

Africa IP Traffic by Local Access Technology

Fixed/Wi-Fi Traffic To Surpass Fixed/Wired In 2015
By 2016, Mobile Offload 5% of Fixed/Wi-Fi Traffic



Source: Cisco VNI Global Forecast, 2011–2016

Summary and Implications

During the next 5 years, global mobile data traffic will grow 18x

- More users, each using more bandwidth.
- Each user will have more/more powerful devices
- Video driving demand and consumption
- 4G will dramatically increase data consumption
- Off-load increasingly important—small cell complement
- Networks becoming heterogeneous
- Need more large blocks of spectrum—macro cell
- Need large blocks license-exempt spectrum—small cell
- Need fibre for backhaul
- Networks need to be managed to work

Thank you.

IP Traffic Forecast: http://www.cisco.com/go/vni

IP Traffic Forecast inquiries: traffic-inquiries@cisco.com
Service Adoption Forecast inquiries: ask-vnisa@cisco.com