



## Cisco Visual Networking Index: Forecast and Methodology, 2013–2018



June 10, 2014

This forecast is part of the Cisco® Visual Networking Index (VNI), an ongoing initiative to track and forecast the impact of visual networking applications. This document presents the details of the Cisco VNI global IP traffic forecast and the methodology behind it. For a more analytical look at the implications of the data presented in this paper, refer to the companion document, [The Zettabyte Era—Trends and Analysis](#), or the [VNI Forecast Highlights tool](#).

### Executive Summary

**Annual global IP traffic will surpass the zettabyte (1000 exabytes) threshold in 2016.** Global IP traffic will reach 1.1 zettabytes per year or 91.3 exabytes (one billion gigabytes) per month in 2016. By 2018, global IP traffic will reach 1.6 zettabytes per year, or 131.6 exabytes per month.

**Global IP traffic has increased more than fivefold in the past 5 years, and will increase threefold over the next 5 years.** Overall, IP traffic will grow at a compound annual growth rate (CAGR) of 21 percent from 2013 to 2018.

**Busy-hour Internet traffic is growing more rapidly than average Internet traffic.** Busy-hour (or the busiest 60-minute period in a day) Internet traffic increased 32 percent in 2013, compared with 25 percent growth in average traffic. Busy-hour Internet traffic will increase by a factor of 3.4 between 2013 and 2018, while average Internet traffic will increase 2.8-fold. Busy-hour Internet traffic will reach 1.0 petabits per second (Pbps) by 2018, the equivalent of 335 million people streaming a high-definition (HD) video continuously.

---

**Metro traffic will surpass long-haul traffic in 2015, and will account for 62 percent of total IP traffic by 2018.**

Metro traffic will grow nearly twice as fast as long-haul traffic from 2013 to 2018. The higher growth in metro networks is due in part to the increasingly significant role of content delivery networks, which bypass long-haul links and deliver traffic to metro and regional backbones.

**Content delivery networks will carry over half of Internet traffic by 2018.** Fifty-five percent of all Internet traffic will cross content delivery networks by 2018 globally, up from 36 percent in 2013. Global IP traffic will reach 1.1 zettabytes per year or 91.3 exabytes per month in 2016.

**Over half of all IP traffic will originate with non-PC devices by 2018.** In 2013, only 33 percent of total IP traffic originated with non-PC devices, but by 2018 the non-PC share of total IP traffic will grow to 57 percent. PC-originated traffic will grow at a CAGR of 10 percent, while TVs, tablets, smartphones, and machine-to-machine (M2M) modules will have traffic growth rates of 35 percent, 74 percent, 64 percent, and 84 percent, respectively.

**Traffic from wireless and mobile devices will exceed traffic from wired devices by 2018.** By 2018, wired devices will account for 39 percent of IP traffic, while Wi-Fi and mobile devices will account for 61 percent of IP traffic. In 2013, wired devices accounted for the majority of IP traffic at 56 percent.

**Global Internet traffic in 2018 will be equivalent to 64 times the volume of the entire global Internet in 2005.** Globally, Internet traffic will reach 14 gigabytes (GB) per capita by 2018, up from 5 GB per capita in 2013.

**The number of devices connected to IP networks will be nearly twice as high as the global population in 2018.** There will be nearly three networked devices per capita by 2018, up from nearly two networked devices per capita in 2013. Accelerated in part by the increase in devices and the capabilities of those devices, IP traffic per capita will reach 17 GB per capita by 2018, up from 7 GB per capita in 2013.

**Broadband speeds will nearly triple by 2018.** By 2018, global fixed broadband speeds will reach 42 Mbps, up from 16 Mbps in 2013.

#### Video Highlights

**It would take an individual over 5 million years to watch the amount of video that will cross global IP networks each month in 2018.** Every second, nearly a million minutes of video content will cross the network by 2018.

**Globally, IP video traffic will be 79 percent of all consumer Internet traffic in 2018, up from 66 percent in 2013.** This percentage does not include video exchanged through peer-to-peer (P2P) file sharing. The sum of all forms of video (TV, video on demand [VoD], Internet, and P2P) will be in the range of 80 to 90 percent of global consumer traffic by 2018.

**Internet video to TV doubled in 2013.** Internet video to TV will continue to grow at a rapid pace, increasing fourfold by 2018. Internet video to TV traffic will be 14 percent of consumer Internet video traffic by 2018, up from 11 percent in 2013.

**Consumer VoD traffic will double by 2018.** The amount of VoD traffic by 2018 will be equivalent to 6 billion DVDs per month.

**Content delivery network traffic will deliver over half of all internet video traffic by 2018.** By 2018, 67 percent of all Internet video traffic will cross content delivery networks, up from 53 percent in 2013.

---

## Mobile Highlights

**Globally, mobile data traffic will increase 11-fold between 2013 and 2018.** Mobile data traffic will grow at a CAGR of 61 percent between 2013 and 2018, reaching 15.9 exabytes per month by 2018.

**Global mobile data traffic will grow three times faster than fixed IP traffic from 2013 to 2018.** Global mobile data traffic was 3 percent of total IP traffic in 2013, and will be 12 percent of total IP traffic by 2018.

## Regional Highlights

**IP traffic is growing fastest in the Middle East and Africa,** followed by Asia Pacific. Traffic in the Middle East and Africa will grow at a CAGR of 38 percent between 2013 and 2018.

**IP traffic in North America will reach 40.5 exabytes per month by 2018, at a CAGR of 20 percent.** Monthly Internet traffic in North America will generate 7 billion DVDs' worth of traffic, or 26.4 exabytes per month.

**IP traffic in Western Europe will reach 19.3 exabytes per month by 2018, at a CAGR of 18 percent.** Monthly Internet traffic in Western Europe will generate 4 billion DVDs' worth of traffic, or 15.7 exabytes per month.

**IP traffic in Asia Pacific will reach 47.3 exabytes per month by 2018, at a CAGR of 21 percent.** Monthly Internet traffic in Asia Pacific will generate 10 billion DVDs' worth of traffic, or 38.3 exabytes per month.

**IP traffic in Latin America will reach 8.9 exabytes per month by 2018, at a CAGR of 21 percent.** Monthly Internet traffic in Latin America will generate 2 billion DVDs' worth of traffic, or 7.8 exabytes per month.

**IP traffic in Central and Eastern Europe will reach 10.2 exabytes per month by 2018, at a CAGR of 23 percent.** Monthly Internet traffic in Central and Eastern Europe will generate 2 billion DVDs' worth of traffic, or 9.1 exabytes per month.

**IP traffic in the Middle East and Africa will reach 5.3 exabytes per month by 2018, at a CAGR of 38 percent.** Monthly Internet traffic in the Middle East and Africa will generate 1 billion DVDs' worth of traffic, or 4.9 exabytes per month.

## Global Business Highlights

**Business IP traffic will grow at a CAGR of 18 percent from 2013 to 2018.** Increased adoption of advanced video communications in the enterprise segment will cause business IP traffic to grow by a factor of two between 2013 and 2018.

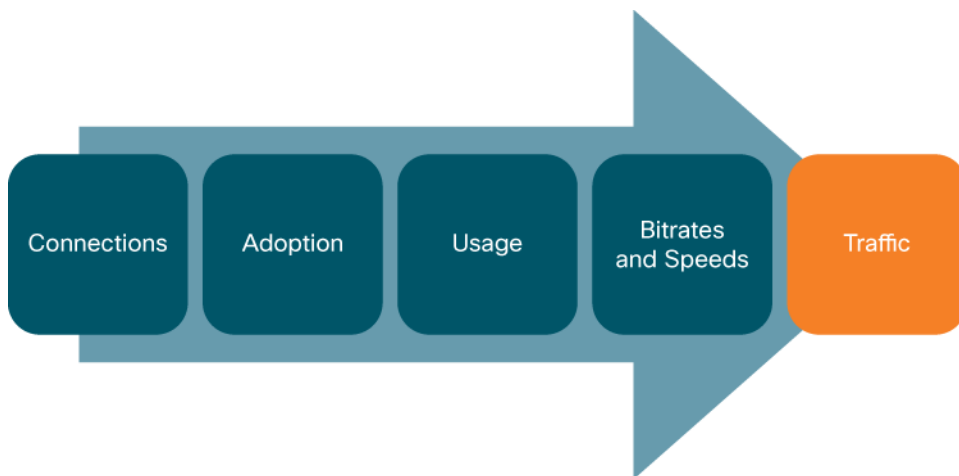
**Business Internet traffic will grow at a faster pace than IP WAN.** IP WAN will grow at a CAGR of 10 percent, compared with a CAGR of 21 percent for fixed business Internet and 55 percent for mobile business Internet.

**Business IP traffic will grow fastest in the Middle East and Africa.** Business IP traffic in the Middle East and Africa will grow at a CAGR of 23 percent, a faster pace than the global average of 18 percent. In volume, Asia Pacific will have the largest amount of business IP traffic in 2018, at 8.5 exabytes per month. North America will be the second at 6.2 exabytes per month.

## Overview of VNI Methodology

The Cisco Visual Networking Index Forecast methodology rests on a combination of analyst projections, in-house estimates and forecasts, and direct data collection. The analyst projections for broadband connections, video subscribers, mobile connections, and Internet application adoption come from SNL Kagan, Ovum, Informa Telecoms & Media, Infonetics, IDC, Gartner, AMI, Arbitron Mobile, Ookla Speedtest.net, Strategy Analytics, Screen Digest, Dell'Oro Group, Synergy, comScore, Nielsen, and others. Upon this foundation are layered Cisco's own estimates for application adoption, minutes of use, and kilobytes per minute. The adoption, usage, and bitrate assumptions are tied to fundamental enablers such as broadband speed and computing speed. All usage and traffic results are then validated using data shared with Cisco from service providers. Figure 1 shows the forecast methodology.

**Figure 1.** Cisco VNI Forecast Methodology Incorporates Fundamental Enablers of Adoption and Usage



Following the methodology through each step for a single application category (in this case, Internet video) illustrates the estimation process.

### Step 1: Number of Users

The forecast for Internet video begins with estimations of the number of consumer fixed Internet users. Even such a basic measure as consumer fixed Internet users can be difficult to assess, because few analyst firms segment the number of users by both segment (consumer versus business) and network (mobile versus fixed). This year, the number of consumer fixed Internet users was not taken directly from an analyst source but was estimated from analyst forecasts for consumer broadband connections, data on hotspot users from a variety of government sources, and population forecasts by age segment. The number of Internet video users was collected and estimated from a variety of sources, and the numbers were then reconciled with the estimate of overall Internet users.

---

## Step 2: Application Adoption

After the number of Internet video users has been established, the number of users for each video subsegment must be estimated. It was assumed that all Internet video users view short-form video in addition to other forms of video they may watch. The Internet video users that watch long form video (based partially on comScore Video Metrix figures for video sites whose average viewing time is longer than 5 minutes), live video, ambient video and Internet personal video recorder (PVR) is estimated.

## Step 3. Minutes of Use

For each application subsegment, minutes of use (MOU) are estimated. Multiple sources are used to determine MOU: the Cisco VNI Usage data collection program provides a minute-per-subscriber baseline for many applications, the Cisco Connected Life Market Watch survey provides MOU for markets that are not covered by the Usage program, and comScore Video Metrix provides PC-based MOU for online video. Special care is taken to help ensure that the total number of Internet video minutes is well within the total number of video minutes (including television broadcast) for each user. For example, if the average individual watches a total of 4 hours of video content per day, the sum of Internet, managed IP, and mobile video hours should be a relatively small portion of the total 4 hours.

## Step 4. Bitrates

After MOU have been estimated for each subsegment of video, the next step is to apply kilobytes (KB) per minute. To calculate KB per minute, first the regional and country average broadband speeds are estimated for the years 2013 through 2018. For each application category, a representative bitrate is established, and this representative bitrate grows at approximately the same pace as the broadband speed. For video categories, a 7-percent annual compression gain is applied to the bitrate. Local bitrates are then calculated based on how much the average broadband speed in the country differs from the global average, digital screen size in the country, and the computing power of the average device in the country. Combining these factors yields bitrates that are then applied to the MOU.

## Step 5: Rollup

The next step in the methodology is to multiply the bitrates, MOU, and users together to get average petabytes per month.

## Step 6: Traffic Migration Assessment

The next step is to reconcile the Internet, managed IP, and mobile segments of the forecast. The portion of mobile data traffic that has migrated from the fixed network is subtracted from the fixed forecast, and the amount of mobile data traffic offloaded onto the fixed network through dual-mode devices and femtocells is added back to the fixed forecast.

The sections that follow present quantitative results of the forecast and details of the methodology for each segment and type.

## Global IP Traffic Growth, 2013–2018

Table 1 shows the top-line forecast. According to this forecast, global IP traffic in 2013 stands at 51.2 exabytes per month and will nearly triple by 2018, to reach 131.6 exabytes per month. Consumer IP traffic will reach 108 exabytes per month and business IP traffic will surpass 23.6 exabytes per month.

**Table 1.** Global IP Traffic, 2013–2018

IP Traffic, 2013–2018							
	2013	2014	2015	2016	2017	2018	CAGR 2013–2018
<b>By Type (Petabytes [PB] per Month)</b>							
Fixed Internet	34,952	42,119	50,504	60,540	72,557	86,409	20%
Managed IP	14,736	17,774	20,898	23,738	26,361	29,305	15%
Mobile data	1,480	2,582	4,337	6,981	10,788	15,838	61%
<b>By Segment (PB per Month)</b>							
Consumer	40,905	50,375	61,439	74,361	89,689	107,958	21%
Business	10,263	12,100	14,300	16,899	20,016	23,595	18%
<b>By Geography (PB per Month)</b>							
Asia Pacific	17,950	22,119	26,869	32,383	39,086	47,273	21%
North America	16,607	20,293	24,599	29,377	34,552	40,545	20%
Western Europe	8,396	9,739	11,336	13,443	16,051	19,257	18%
Central and Eastern Europe	3,654	4,416	5,443	6,666	8,332	10,223	23%
Latin America	3,488	4,361	5,318	6,363	7,576	8,931	21%
Middle East and Africa	1,074	1,546	2,174	3,027	4,108	5,324	38%
<b>Total (PB per Month)</b>							
Total IP traffic	51,168	62,476	75,739	91,260	109,705	131,553	21%

Source: Cisco VNI, 2014

### Definitions

- **Consumer:** Includes fixed IP traffic generated by households, university populations, and Internet cafés
- **Business:** Includes fixed IP WAN or Internet traffic generated by businesses and governments
- **Mobile:** Includes mobile data and Internet traffic generated by handsets, notebook cards, and mobile broadband gateways
- **Internet:** Denotes all IP traffic that crosses an Internet backbone
- **Managed IP:** Includes corporate IP WAN traffic and IP transport of TV and VoD

The following tables show cross-tabulations of end-user segment and network type for the final year of the forecast period (2018). Consumer Internet remains the primary generator of IP traffic, but mobile data has the highest growth rate and begins to generate significant traffic by 2018 (Table 2).

**Table 2.** Exabytes per Month as of Year End 2018

	Consumer	Business	Total
Internet	70	16	86
Managed IP	25	5	29
Mobile data	13	3	16
<b>Total</b>	<b>108</b>	<b>24</b>	<b>132</b>

Source: Cisco VNI, 2014

Table 3 shows the same data as Table 2, but in terms of annual traffic run rates. These run rates are based on the monthly traffic at the end of 2018.

**Table 3.** Exabytes per Year as of Year End 2018

	Consumer	Business	Total
Internet	841	196	1,037
Managed IP	296	56	352
Mobile data	159	31	190
<b>Total</b>	<b>1,295</b>	<b>283</b>	<b>1,579</b>

Source: Cisco VNI, 2014

Consumer and business traffic are both dominated by Internet traffic, although business traffic is more evenly distributed across public Internet and managed IP (Table 4).

**Table 4.** Traffic Share by End-User Segment as of Year End 2018

	Consumer	Business
Internet	65%	69%
Managed IP	23%	20%
Mobile data	12%	11%
<b>Total</b>	<b>100%</b>	<b>100%</b>

Source: Cisco VNI, 2014

Consumer traffic accounts for the majority of IP traffic in every network type segment. Consumer traffic will be 81 percent of all Internet traffic, 84 percent of all of managed IP traffic, and 84 percent of all mobile data traffic (Table 5).

**Table 5.** Traffic Share by Network Type as of Year End 2018

	Consumer	Business	Total
Internet	81%	19%	100%
Managed IP	84%	16%	100%
Mobile data	84%	16%	100%

Source: Cisco VNI, 2014

Consumer Internet traffic will represent over half of all IP traffic, followed by consumer managed IP (VoD), which represents 19 percent of traffic (Table 6).

**Table 6.** Overall Traffic Share as of Year End 2018

	Consumer	Business	Total
Internet	53%	12%	66%
Managed IP	19%	4%	22%
Mobile data	10%	2%	12%
<b>Total</b>	<b>82%</b>	<b>18%</b>	<b>100%</b>

Source: Cisco VNI, 2014

### Metro and Long-Haul Traffic, 2013–2018

Metro-only traffic (traffic that traverses only the metro and bypasses long-haul traffic links) surpasses long-haul traffic in 2013, and will account for 62 percent of total IP traffic by 2018. Metro-only traffic will grow nearly twice as fast as long-haul traffic from 2013 to 2018 (Table 7).

**Table 7.** Metro and Long-Haul Traffic, 2013–2018

Metro and Long-Haul Traffic, 2013–2018							
	2013	2014	2015	2016	2017	2018	CAGR 2013–2018
<b>Metro-Only (PB per Month)</b>							
North America	12,194	15,573	19,634	24,298	29,790	36,148	24%
Asia Pacific	6,740	8,672	11,246	14,321	18,128	23,110	28%
Western Europe	4,569	5,706	7,137	8,986	11,342	14,438	26%
Central and Eastern Europe	720	978	1,414	1,984	2,818	3,901	40%
Latin America	637	844	1,210	1,638	2,150	2,793	34%
Middle East and Africa	148	206	298	431	602	812	41%
<b>Long-Haul (PB per Month)</b>							
Asia Pacific	11,210	13,447	15,623	18,063	20,958	24,163	17%
Central and Eastern Europe	2,933	3,438	4,029	4,682	5,514	6,322	17%
Latin America	2,851	3,517	4,108	4,724	5,426	6,137	17%
North America	4,413	4,720	4,965	5,079	4,761	4,397	-0.1%
Western Europe	3,827	4,033	4,198	4,458	4,709	4,819	5%
Middle East and Africa	926	1,341	1,876	2,596	3,507	4,512	37%
<b>Total (PB per Month)</b>							
Total IP traffic	51,168	62,476	75,739	91,260	109,705	131,553	21%

Source: Cisco VNI, 2014



## Content Delivery Network Traffic, 2013–2018

With the emergence of popular video-streaming services that deliver Internet video to the TV and other device endpoints, content delivery networks have prevailed as a dominant method to deliver such content. Globally, 55 percent of all Internet traffic will cross content delivery networks by 2018, up from 36 percent in 2013. Globally, 67 percent of all Internet video traffic will cross content delivery networks by 2018, up from 53 percent in 2013 (Table 8).

**Table 8.** Global Content Delivery Network Internet Traffic, 2013–2018

CDN Traffic, 2013–2018							
	2013	2014	2015	2016	2017	2018	CAGR 2013–2018
<b>By Geography (PB per Month)</b>							
North America	5,609	7,538	10,187	13,627	18,018	23,064	33%
Asia Pacific	3,310	4,446	6,171	8,474	11,631	15,909	37%
Western Europe	3,137	4,021	5,195	6,790	8,907	11,724	30%
Central and Eastern Europe	522	704	1,059	1,542	2,233	3,184	44%
Latin America	483	613	842	1,127	1,488	1,939	32%
Middle East and Africa	114	165	250	373	535	722	45%
<b>Total (PB per Month)</b>							
CDN Internet traffic	13,175	17,488	23,703	31,933	42,813	56,542	34%

Source: Cisco VNI, 2014

## Consumer IP Traffic, 2013–2018

As shown in Table 9, global consumer IP traffic is expected to reach 108 exabytes per month in 2018. Most of today's consumer IP traffic is Internet traffic.

**Table 9.** Global Consumer IP Traffic, 2013–2018

Consumer IP Traffic, 2013–2018							
	2013	2014	2,015	2,016	2,017	2,018	CAGR 2013–2018
<b>By Type (PB per Month)</b>							
Internet	27,882	33,782	40,640	48,861	58,703	70,070	20%
Managed IP	11,834	14,491	17,236	19,725	22,018	24,660	16%
Mobile data	1,189	2,102	3,563	5,774	8,968	13,228	62%
<b>By Geography (PB per Month)</b>							
Asia Pacific	14,369	17,766	21,662	26,249	31,850	38,745	22%
North America	14,059	17,269	20,998	25,040	29,326	34,319	20%
Western Europe	6,549	7,633	8,878	10,568	12,694	15,340	19%
Central and Eastern Europe	2,508	3,183	4,051	5,055	6,417	7,954	26%
Latin America	2,756	3,511	4,341	5,233	6,268	7,424	22%
Middle East and Africa	664	1,014	1,509	2,216	3,134	4,177	44%
<b>Total (PB per Month)</b>							
Consumer IP traffic	40,905	50,375	61,439	74,361	89,689	107,958	21%

Source: Cisco VNI, 2014

## Consumer Internet Traffic, 2013–2018

This category encompasses any IP traffic that crosses the Internet and is not confined to a single service provider's network. Internet video streaming and downloads are beginning to take a larger share of bandwidth and will grow to more than 76 percent of all consumer Internet traffic in 2018 (Table 10).

**Table 10.** Global Consumer Internet Traffic, 2013–2018

Consumer Internet Traffic, 2013–2018							
	2013	2014	2015	2016	2017	2018	CAGR 2013–2018
<b>By Network (PB per Month)</b>							
Fixed	27,882	33,782	40,640	48,861	58,703	70,070	20%
Mobile	1,189	2,102	3,563	5,774	8,968	13,228	62%
<b>By Subsegment (PB per Month)</b>							
Internet video	17,455	22,600	29,210	37,783	48,900	62,972	29%
Web, email, and data	5,505	6,706	8,150	9,913	11,827	13,430	20%
File sharing	6,085	6,548	6,803	6,875	6,856	6,784	2%
Online gaming	26	30	41	64	88	113	34%
<b>By Geography (PB per Month)</b>							
Asia Pacific	10,939	13,540	16,586	20,402	25,353	31,544	24%
North America	7,474	9,234	11,551	14,369	17,554	21,235	23%
Western Europe	5,117	5,948	6,936	8,372	10,259	12,625	20%
Central and Eastern Europe	2,309	2,909	3,696	4,612	5,833	7,237	26%
Latin America	2,602	3,280	3,972	4,722	5,606	6,569	20%
Middle East and Africa	630	973	1,461	2,158	3,067	4,087	45%
<b>Total (PB per Month)</b>							
Consumer Internet traffic	29,071	35,884	44,203	54,636	67,672	83,298	23%

Source: Cisco VNI, 2014

### Definitions

- **Web, email, and data:** Includes web, email, instant messaging, and other data traffic (excludes file sharing)
- **File sharing:** Includes peer-to-peer traffic from all recognized P2P systems such as BitTorrent and eDonkey, as well as traffic from web-based file-sharing systems
- **Gaming:** Includes casual online gaming, networked console gaming, and multiplayer virtual-world gaming
- **Internet video:** Includes short-form Internet video (for example, YouTube), long-form Internet video (for example, Hulu), live Internet video, Internet-video-to-TV (for example, Netflix through Roku), online video purchases and rentals, webcam viewing, and web-based video monitoring (excludes P2P video file downloads)

### Web, Email, and Data

This general category encompasses web browsing, email, instant messaging, data (which includes file transfer using HTTP and FTP), and other Internet applications (Table 11). Note that data may include the download of video files that are not captured by the Internet video to PC forecast. This category includes traffic generated by all individual Internet users. An Internet user is here defined as someone who accesses the Internet through a desktop or laptop computer at home, school, Internet café, or other location outside the context of a business.

**Table 11.** Global Consumer Web, Email, and Data Traffic, 2013–2018

Consumer Web, Email, and Data Traffic, 2013–2018							
	2013	2014	2015	2016	2017	2018	CAGR 2013–2018
<b>By Network (PB per Month)</b>							
Fixed web and data	4,939	5,625	6,385	7,183	7,858	8,061	10%
Mobile web and data	515	867	1,384	2,088	2,990	3,994	51%
<b>By Geography (PB per Month)</b>							
Asia Pacific	2,072	2,488	2,981	3,547	4,267	4,942	19%
North America	1,508	1,809	2,194	2,601	2,879	3,144	16%
Western Europe	1,023	1,101	1,189	1,317	1,458	1,505	8%
Central and Eastern Europe	287	384	545	766	1,025	1,225	34%
Middle East and Africa	137	221	331	465	597	610	35%
Latin America	427	489	530	575	622	629	8%
<b>Total (PB per Month)</b>							
Consumer web, email, and data	5,454	6,492	7,769	9,270	10,848	12,055	17%

Source: Cisco VNI, 2014

## File Sharing

This category includes traffic from P2P applications such as BitTorrent and eDonkey, as well as web-based file sharing. Note that a large portion of P2P traffic is due to the exchange of video files, so a total view of the impact of video on the network should count P2P video traffic in addition to the traffic counted in the Internet video to PC and Internet video to TV categories. Table 12 shows the forecast for consumer P2P traffic from 2013 to 2018. Note that the P2P category is limited to traditional file exchange and does not include commercial video-streaming applications that are delivered through P2P, such as PPStream or PPLive.

**Table 12.** Global Consumer File-Sharing Traffic, 2013–2018

Consumer File Sharing, 2013–2018							
	2013	2014	2015	2016	2017	2018	CAGR 2013–2018
<b>By Network (PB per Month)</b>							
Fixed	6,044	6,492	6,729	6,783	6,744	6,652	2%
Mobile	41	56	74	92	112	131	26%
<b>By Subsegment (PB per Month)</b>							
P2P file transfer	5,081	5,254	5,205	4,946	4,559	4,088	-4%
Other file transfer	1,004	1,294	1,598	1,929	2,297	2,696	22%
<b>By Geography (PB per Month)</b>							
Asia Pacific	2,560	2,794	2,935	3,009	3,041	3,020	3%
North America	802	878	951	1,018	1,073	1,124	7%
Western Europe	1,184	1,181	1,145	1,130	1,115	1,086	-2%
Central and Eastern Europe	872	951	992	956	923	891	0%
Latin America	567	634	673	672	649	608	1%
Middle East and Africa	100	110	107	90	55	54	-12%
<b>Total (PB per Month)</b>							
Consumer file sharing	6,085	6,548	6,803	6,875	6,856	6,784	2%

Source: Cisco VNI, 2014

## Internet Video

With the exception of the Internet video to TV subcategory, all of the Internet video subcategories consist of online video that is downloaded or streamed for viewing on a PC screen (Table 13). Internet video to TV is Internet delivery of video to a TV screen through a set-top box (STB) or equivalent device. Much of the video streamed or downloaded through the Internet consists of free clips, episodes, and other content offered by traditional content producers such as movie studios and television networks.

**Table 13.** Global Consumer Internet Video, 2013–2018

Consumer Internet Video 2013–2018							
	2013	2014	2015	2016	2017	2018	CAGR 2013–2018
<b>By Network (PB per Month)</b>							
Fixed	16,873	21,635	27,485	34,832	44,012	55,244	27%
Mobile	633	1,179	2,106	3,594	5,867	9,103	70%
<b>By Category (PB per Month)</b>							
Video	15,666	20,263	26,085	33,740	43,843	56,800	29%
Internet video to TV	1,840	2,551	3,505	4,686	6,036	7,547	33%
<b>By Geography (PB per Month)</b>							
Asia Pacific	6,302	8,253	10,665	13,837	18,032	23,566	30%
North America	5,153	6,533	8,388	10,721	13,562	16,917	27%
Western Europe	2,901	3,655	4,588	5,903	7,655	9,995	28%
Latin America	1,606	2,156	2,768	3,473	4,332	5,326	27%
Central and Eastern Europe	1,151	1,574	2,158	2,889	3,884	5,119	35%
Middle East and Africa	393	643	1,023	1,603	2,415	3,424	54%
<b>Total (PB per Month)</b>							
Consumer Internet video	17,506	22,814	29,590	38,426	49,879	64,347	30%

Source: Cisco VNI, 2014

## Definitions

- **Internet video to TV:** Video delivered through the Internet to a TV screen by way of an Internet-enabled set-top box (for example, Roku) or equivalent device (for example, Microsoft Xbox 360), Internet-enabled TV, or PC-to-TV connection
- **Video:** Video includes the following underlying categories:
  - **Short form:** User-generated video and other video clips generally less than 7 minutes in length
  - **Video calling:** Video messages or calling delivered on fixed Internet initiated by smartphones, non-smartphones, and tablets
  - **Long form:** Video content generally greater than 7 minutes in length
  - **Live Internet TV:** Peer-to-peer TV (excluding P2P video downloads) and live television streaming over the Internet
  - **Internet PVR:** Recording of live TV content for later viewing
  - **Ambient video:** Nannycams, petcams, home security cams, and other persistent video streams
  - **Mobile video:** All video that travels over a second-generation (2G), 3G, or 4G network

## Consumer Managed IP Traffic, 2013–2018

Managed IP video is IP traffic generated by traditional commercial TV services (Table 14). This traffic remains within the footprint of a single service provider, so it is not considered Internet traffic. (For Internet video delivered to the set-top box, see Internet video to TV in the previous section.)

**Table 14.** Global Consumer Managed IP Traffic, 2013–2018

Consumer Managed IP Traffic, 2013–2018							
	2013	2014	2015	2016	2017	2018	CAGR 2013–2018
<b>By Network (PB per Month)</b>							
Fixed	11,834	14,491	17,236	19,725	22,018	24,660	16%
<b>By Geography (PB per Month)</b>							
Asia Pacific	3,430	4,226	5,075	5,847	6,497	7,201	16%
North America	6,584	8,035	9,447	10,671	11,772	13,084	15%
Western Europe	1,432	1,685	1,942	2,196	2,435	2,714	14%
Central and Eastern Europe	199	274	355	443	584	717	29%
Latin America	155	231	369	511	662	854	41%
Middle East and Africa	34	41	48	58	67	90	21%
<b>Total (PB per Month)</b>							
Managed IP video traffic	11,834	14,491	17,236	19,725	22,018	24,660	16%

Source: Cisco VNI, 2014

## Business IP Traffic

The enterprise forecast is based on the number of network-connected computers worldwide. In our experience, this basis provides the most accurate measure of enterprise data usage. An average business user might generate 4 GB per month of Internet and WAN traffic. A large-enterprise user would generate significantly more traffic, 8–10 GB per month (Table 15).

**Table 15.** Business IP Traffic, 2013–2018

Business IP Traffic, 2013–2018							
	2013	2014	2015	2016	2017	2018	CAGR 2013–2018
<b>By Network Type (PB per Month)</b>							
Business Internet traffic	7,070	8,338	9,864	11,679	13,853	16,339	18%
Business managed IP traffic	2,902	3,283	3,661	4,013	4,343	4,645	10%
Business mobile data	291	480	774	1,207	1,820	2,610	55%
<b>By Geography (PB per Month)</b>							
Asia Pacific	3,581	4,353	5,207	6,134	7,236	8,529	19%
North America	2,548	3,025	3,601	4,337	5,225	6,225	20%
Western Europe	1,847	2,107	2,458	2,875	3,356	3,918	16%
Central and Eastern Europe	1,145	1,233	1,392	1,612	1,915	2,269	15%
Latin America	731	850	977	1,129	1,309	1,507	16%
Middle East and Africa	410	532	665	811	974	1,147	23%
<b>Total (PB per Month)</b>							
Business IP traffic	10,263	12,100	14,300	16,899	20,016	23,595	18%

Source: Cisco VNI, 2014

## Definitions

- **Business Internet traffic:** All business traffic that crosses the public Internet
- **Business managed IP traffic:** All business traffic that is transported over IP but remains within the corporate WAN
- **Business mobile data traffic:** All business traffic that crosses a mobile access point

## Mobile Data Traffic

Mobile data traffic includes handset-based data traffic, such as text messaging, multimedia messaging, and handset video services (Table 16). Mobile Internet traffic is generated by wireless cards for portable computers and handset-based mobile Internet usage.

**Table 16.** Mobile Data and Internet Traffic, 2013–2018

Mobile Data and Internet Traffic, 2013–2018							
	2013	2014	2015	2016	2017	2018	CAGR 2013–2018
<b>By Geography (PB per Month)</b>							
Asia Pacific	524	953	1,670	2,777	4,442	6,718	67%
North America	389	625	969	1,453	2,101	2,954	50%
Western Europe	254	389	593	888	1,310	1,900	50%
Central and Eastern Europe	117	231	420	705	1,115	1,619	69%
Latin America	92	177	308	505	789	1,158	66%
Middle East and Africa	106	207	378	651	1,031	1,490	70%
<b>Total (PB per Month)</b>							
Mobile data and Internet	1,480	2,582	4,337	6,981	10,788	15,838	61%

Source: Cisco VNI, 2014

## For More Information

For more information, refer to the companion document *The Zettabyte Era—Trends and Analysis*. Inquiries can be directed to [traffic-inquiries@cisco.com](mailto:traffic-inquiries@cisco.com).



**Americas Headquarters**  
Cisco Systems, Inc.  
San Jose, CA

**Asia Pacific Headquarters**  
Cisco Systems (USA) Pte. Ltd.  
Singapore

**Europe Headquarters**  
Cisco Systems International BV Amsterdam,  
The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at [www.cisco.com/go/offices](http://www.cisco.com/go/offices).

Cisco and the Cisco logo are trademarks or registered trademarks of Cisco and/or its affiliates in the U.S. and other countries. To view a list of Cisco trademarks, go to this URL: [www.cisco.com/go/trademarks](http://www.cisco.com/go/trademarks). Third party trademarks mentioned are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (1110R)