

**EXHIBIT 4**

UNITED STATES DISTRICT COURT  
DISTRICT OF MARYLAND

WIKIMEDIA FOUNDATION; NATIONAL ASSOCIATION OF CRIMINAL DEFENSE LAWYERS; HUMAN RIGHTS WATCH; AMNESTY INTERNATIONAL USA; PEN AMERICAN CENTER; GLOBAL FUND FOR WOMEN; THE NATION MAGAZINE; THE RUTHERFORD INSTITUTE; and WASHINGTON OFFICE ON LATIN AMERICA,

*Plaintiffs,*

v.

NATIONAL SECURITY AGENCY / CENTRAL SECURITY SERVICE; ADM. MICHAEL S. ROGERS, in his official capacity as Director of the National Security Agency and Chief of the Central Security Service; OFFICE OF THE DIRECTOR OF NATIONAL INTELLIGENCE; JAMES R. CLAPPER, in his official capacity as Director of National Intelligence; DEPARTMENT OF JUSTICE; and ERIC H. HOLDER, in his official capacity as Attorney General of the United States,

*Defendants.*

Hon. T. S. Ellis III

No. 15-cv-00662-TSE

**DECLARATION OF ROBERT T. LEE**

I, Robert Lee, do hereby state and declare as follows:

**Introduction**

1. I am an entrepreneur and consultant in the Washington, DC area, specializing in information security, incident response, and digital forensics. I am currently the curriculum lead and author for digital forensic and incident response training at the SANS Institute in addition to owning my own firm. I have more than 15 years of

experience in computer forensics, vulnerability, and exploit discovery, intrusion detection/prevention, and incident response. I graduated from the U.S. Air Force Academy and served in the U.S. Air Force as a founding member of the 609th Information Warfare Squadron, the first U.S. military operational unit focused on information warfare. Later, I was a member of the Air Force Office of Special Investigations (AFOSI) where I led a team conducting computer crime investigations, incident response, and computer forensics. Prior to starting my own firm, I directly worked with a variety of government agencies in the law enforcement, U.S. Department of Defense, and intelligence communities as the technical lead for a vulnerability discovery and an exploit development team, lead for a cyber-forensics branch, and lead for a computer forensic and security software development team. I was also a director for MANDIANT, a company focused on investigating advanced adversaries, such as the APT, for four years prior to starting my own business. I have also co-authored the book *Know Your Enemy*, 2nd Edition and MANDIANT threat intelligence report M-Trends: The Advanced Persistent Threat. I earned an MBA from Georgetown University in Washington DC.

2. The purpose of this declaration is to provide a basic explanation of the process by which Internet users typically view or download information available on a website, and thereby to explain that when users visit websites to view or download information, the operators of those sites generally do not obtain the individual users' identities unless the users themselves provide (or have provided) that information. In this declaration I also address various types of communications traffic carried on the Internet, and the extremely small

share of that Internet traffic that may be attributed to requests for information on websites operated by Wikimedia Foundation.

**The Internet, Internet Service Providers, and Public IP Addresses**

3. A group of two or more computers linked together to permit communication among them make up a network. Networks connected by intermediate devices that route information between them become an internetwork. The biggest internetwork is the Internet, the global communications network that allows computer networks worldwide to connect and exchange information.<sup>1</sup>
4. Users may engage in many activities on the Internet such as web browsing, sending and receiving e-mails, instant messaging, video conferencing (such as through Facetime and Skype), and video streaming. Web browsing, by way of example, involves access to the World Wide Web. The Web is a branch of the Internet, a system of computers housing a collection of publicly accessible documents (including text documents, images, audio and video files, etc.). A user accesses the World Wide Web through a “browser,” such as Internet Explorer or Google Chrome, which runs on the user’s computer, smartphone, or other device.
5. To communicate over the Internet (and therefore with the Web) a user must obtain a connection from an Internet Service Provider (“ISP”). Typically an ISP is a private company that provides a subscriber access to the Internet for a periodic fee. Subscribers to an ISP’s services can be individuals, businesses, educational institutions, government agencies, or other organizations. Access can be provided by the old telephone copper

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<sup>1</sup> In contrast, an *intranet* is a computer network internal to an organization that is frequently not connected to the Internet, or is connected to the Internet through a “firewall,” a network security system that blocks unauthorized incoming traffic while permitting outward communication.

wire, fiber-optic cable, coaxial cable, other types of data lines, or wireless satellite signal to the subscriber's home, place of business, or wherever the subscriber's computer device is physically present. Typically, in a setting such as a home or business, the connection is made through a device located at the subscriber's home or place of business (and often supplied by the ISP) called a router or modem. (If a subscriber is connecting to the Internet via the network associated with a smartphone, then access is provided through the cellular telephone network.) ISPs vary in size and the range of services provided, from nationwide providers such as Verizon and Comcast to much smaller regional and local providers.

6. To communicate with one another and exchange information, devices connected to the Internet use Internet Protocol ("IP") addressing. An IP address is a unique numeric (or, more recently, alphanumeric) string, such as 149.101.146.71 (the IP address of the Department of Justice website), that identifies one computer or other device to other computers or devices on a network or internetwork. When, for example, the user of one device seeks to retrieve information contained on another, the IP addresses allow the global communications network to route the user's request to the second device, and then to route the response from the second device, containing the requested information, back to the user's device. In this way, IP addresses act like the sender and recipient addresses on mail carried by the U.S. Postal Service (although IP addresses contain less identifying information than the outside of an envelope in the mail). IP addresses used for communication across the Internet are called public IP addresses.
7. Public IP addresses are assigned to Internet subscribers by their ISPs. An ISP may assign a subscriber a static public IP address or dynamic public IP addresses. A static public IP

address is one assigned to a subscriber on a long-term basis, in much the same way that a telecommunications company assigns telephone numbers to its subscribers. Dynamic public IP addresses, in contrast, are assigned to subscribers on a more intermittent basis—whether for a day, an hour, or some other period of time, depending on the needs, resources, and practices of a particular ISP—after which they are assigned to other subscribers. By way of example, if an ISP assigns a particular public IP address to a subscriber only for a specific length of time while the subscriber is connected to the Internet, then the IP address is assigned when the subscriber (or someone else making use of the subscriber's service) connects to the Internet, and may then be released and available to another subscriber when that period of time ends. Thus, the same public IP address may be used by numerous subscribers on the same day, or reassigned from subscriber to subscriber from one day to the next.

8. Web browsing, like other user activities conducted on the Internet, depends on public IP addressing. Websites usually consist of information contained on multiple web pages (for ease of organization, review, and downloading), and are hosted on one or more computers with assigned public IP addresses. When a user accesses the Internet, through a connection provided by an ISP, in order to read, download (or, if permitted, to edit) the contents of a website, a request is sent from the user's device. That request is associated with and contains a public IP address that was assigned by the ISP. The request is sent to the public IP address assigned to the website.
9. When the user's request to view or download content arrives at the website, the website's host computer(s) automatically generate a return message that includes the requested information, together with the public IP address associated with the request from the

user's device, so that the information may be routed, through the ISP, back to the requesting user. During this fully automated process, the global communications network relies on the public IP addresses associated with the user's request, and the website's host computers, in order to facilitate the transfer of the information via the Internet.

10. At no time during this process is the individual using a device to obtain information from a website (or to provide information to a website, as the case may be) identified by name or other personally identifying information unless that user has specifically provided that information to the site in some way. (For example, a user may provide identifying information, such as name, address, and credit card number to purchase an item from a website; that information may be sent in the request to the website, or the user may have previously supplied such information to the site.) Otherwise, the request or message sent from the user to the website's host computer is associated only with a public IP address assigned by an ISP. The ISP that assigned that address, be it static or dynamic, may review its logs to identify the subscribing individual (who may be different than the user) or organization to which the public IP address was assigned at the moment the user's message was sent.<sup>2</sup> But that identifying information is not transmitted to the website unless, as noted above, it is specifically provided by the user.
11. In short, when a user simply reads or downloads content from a website, the operators of that site know the public IP address, assigned by an ISP, that is associated with the

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<sup>2</sup> Indeed, a user also may hide the public IP address by subscribing to (or obtaining for free) an anonymizing service such as [www.the-cloak.com](http://www.the-cloak.com), [www.anonymouse.com](http://www.anonymouse.com), or [www.proxify.com](http://www.proxify.com). If the user subscribed to one of these services, the public IP address forwarded to the website's server would be one obtained on loan from the service and not the public IP address assigned by the ISP providing the connection to the Internet.

particular request from that user's device—but not the identity of the user. Moreover, the public IP addresses associated with future requests by the same user may change depending on when or where the user makes those requests, even if the requester uses the same device. The following examples illustrate these points in a variety of conventional circumstances:

- a. An individual located in a residence connects to the Internet via the homeowner's ISP. This person may be the homeowner, or a family member, using the homeowner's personal computer. Or the individual may be a visitor using his or her own laptop computer or tablet who connects through the owner's home Wi-Fi network. The public IP address associated with any request or other message sent by this individual, whether the homeowner, a family member, or a visitor, will be a static or dynamic public IP address assigned to the homeowner-subscriber at that time by the ISP.
- b. An individual located at his or her place of employment may connect to the Internet through the employer's ISP using a desktop computer provided by the employer. The public IP address associated with any requests or messages sent by the employee will be a public IP address assigned to the employer by the employer's ISP, and the next day, hour, or even moment, requests or messages from other individuals working for the same employer may be associated with the same public IP address.
- c. In much the same way, a student located at a university dorm or library may use his or her own laptop or tablet computer to connect to the Internet, through the university's Wi-Fi wireless network, via the university's ISP. The public IP address associated with the student's online communications will be one assigned by the ISP to the university, not the individual student, and, for example, may later be associated with other students' communications when they access the Internet through the university's Wi-Fi wireless network.
- d. Customers using laptops or tablets to access the Internet through public Wi-Fi service provided at an Internet café, such as a Starbucks, connect to the Internet through the ISP to whose service the Starbucks subscribes. The online requests and other communications of a Starbucks customer will be associated with a public IP address from among those assigned to the Starbucks by its ISP. If later that day the same customer connects to the Internet using the Wi-Fi service at a McDonald's, his or her communications, even though made on the same laptop or



tablet computer, will be associated with a different public IP address from among those allocated to the McDonald's by its own ISP.

- e. When a user seeks to access content from a website using a smart phone, her request is first routed via the cellular telephone network to her ISP (which is likely also her cellphone service provider). The ISP assigns a public IP address to the request and forwards it for routing over the Internet to the desired website. The address may be a dynamic public IP address assigned to the user's communications only for the duration of a particular Internet session. Moreover, depending on the needs, resources, and practices of the user's ISP, and because each ISP only has a finite block of public IP addresses that it may assign, the ISP may choose to simultaneously assign the same public IP address to multiple requests from different cellphone subscribers connected to the Internet at the same time. The ISP would then use internal identifiers (such as a user's cellphone number, IMEI number, or port number) to route return communications to the appropriate user's device. None of these internal identifiers are included, however, in a user's request sent to a website and so cannot be used by the website to identify the individual user as the originator of the request.

12. I have read the Privacy policy posted by the Wikimedia Foundation at

[http://wikimediafoundation.org/wiki/Privacy\\_policy](http://wikimediafoundation.org/wiki/Privacy_policy).<sup>3</sup> In that policy, Wikimedia informs individuals who read, contribute to, or edit information on its websites (whom it calls its "users") that it may acquire certain information automatically when a user accesses one of Wikimedia's websites. The policy indicates that this information includes the type of device used, the user's language preference, and perhaps the name of the Internet Service Provider. Additionally, the privacy policy states that various Wikimedia websites may also automatically and "actively collect some types of information with a variety of commonly-used technologies." The policy indicates that these technologies include "cookies" and "tracking pixels." A cookie is a small amount of data generated by a website that is stored on the user's device if the user's device is configured to allow the storage of cookies. Cookies may be used (for example) to store user login information

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<sup>3</sup> Exhibit A: [Privacy policy - Wikimedia Foundation.pdf](#)

and preferences, such as language preference. Tracking pixels are snippets of code that allow a website to track how a user interacts with the website (for example, which pages a user views and for how long). The information that Wikimedia automatically collects about its users, as indicated in its privacy policy, does not individually identify specific users.

**Wikimedia Users and Communications in the Context of Total Internet Usage**

13. It is important in any discussion of numbers of website users and website

“communications” to put that discussion into the context of global Internet usage. In the computer and related network technologies field, as with other professions, we look to and rely upon the best available statistical data sources. Regarding communications traffic on the Internet, there are various information technology and market research organizations that compile data upon which a person in the field may rely to understand the magnitude of the numbers involved. Paragraphs 14-20 of this declaration are based on the best publicly available data that I was able to locate for purposes of the declaration.

14. In terms of Internet users, various sources agree that there are now approximately 3.0

billion Internet users worldwide. See <http://www.internetlvestats.com><sup>4</sup> (last visited, May 24, 2015) (3.130 billion); <http://www.internetworldstats.com/stats.htm><sup>5</sup> (last visited May 24, 2015) (3.035 billion Internet users worldwide as of mid-2014); Internet Society, Global Internet Report 2014 at 3, 19

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<sup>4</sup> Exhibit B: [Internet Live Stats - Internet Usage & Social Media Statistics 10\\_30 pm.pdf](#)

<sup>5</sup> Exhibit C: [World Internet Users Statistics and 2014 World Population Stats.pdf](#)

[https://www.internetsociety.org/sites/default/files/Global\\_Internet\\_Report\\_2014\\_0.pdf](https://www.internetsociety.org/sites/default/files/Global_Internet_Report_2014_0.pdf),<sup>6</sup>

at 6, 7, 19 (last visited, May 24, 2015) (noting there were 2.893 billion Internet users in May 2014; estimating the number of users would exceed 3.0 billion by early 2015).

15. In terms of the volume of Internet traffic, Cisco, a worldwide leader in Information Technologies, reports that, whereas in 1992 global Internet traffic consisted of 100 gigabytes of information per day, in 2012 the same traffic reached 12,000 gigabytes of information per second. See [http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/VNI\\_Hyperconnectivity\\_WP.html](http://www.cisco.com/c/en/us/solutions/collateral/service-provider/visual-networking-index-vni/VNI_Hyperconnectivity_WP.html),<sup>7</sup> at 5-6 (last visited, May 24, 2015); see also <http://www.internetlivestats.com> (last visited, May 24, 2015) (Exhibit B) (tabulating the Internet traffic for May 24, 2015, alone as 2.239 billion gigabytes as of 10:30 p.m.). This traffic consists of a variety of communications and other Internet activity, including email, web browsing, social media, audio and video streaming, Voice Over Internet Protocol (VOIP) (Internet telephony), video conferencing, and peer-to-peer sharing of information. Video traffic comprises 66% of the total Internet traffic and is estimated by Cisco to be 79% by 2018. Exhibit E, at 3; see also Internet Society, Global Internet Report 2014 at 21, [https://www.internetsociety.org/sites/default/files/Global\\_Internet\\_Report\\_2014\\_0.pdf](https://www.internetsociety.org/sites/default/files/Global_Internet_Report_2014_0.pdf), at 7 (last visited, May 24, 2015) (in 2012, video was 50% of Internet traffic).

16. E-mails are one example of text-based communications that transit the Internet.

According to The Radicati Group, Inc., a technology market research firm, 182.9 billion emails were sent *per day* in 2013, that is, approximately 5.48 trillion emails per month.

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<sup>6</sup> Exhibit D: [Global\\_Internet\\_Report\\_2014\\_0.pdf](https://www.internetsociety.org/sites/default/files/Global_Internet_Report_2014_0.pdf)

<sup>7</sup> Exhibit E: [The Zettabyte Era—Trends and Analysis - Cisco.pdf](#)

See <http://www.radicati.com/wp/wp-content/uploads/2013/04/Email-Statistics-Report-2013-2017-Executive-Summary.pdf>,<sup>8</sup> at 4 (last visited, May 24, 2015); *see also* Internet 2012 in numbers in Tech Blog (Jan. 16, 2013), <http://royal.pingdom.com/2013/01/16/internet-2012-in-numbers/><sup>9</sup>, at (last visited, May 24, 2015) (relying on the Radicati Group's number of 144 billion mails sent worldwide every day in 2012). The figures reported by the Radicati Group are consistent with the 202 billion emails sent on May 24, 2015 as of 10:30 p.m.,<sup>10</sup> as reported by <http://www.internetlivestats.com> (last visited, May 24, 2015) (Exhibit B). Using the more conservative Radicati Group estimate of 5.48 trillion e-mails per month in 2013, Wikimedia's claimed 16 billion monthly page views by its users corresponds to less than three-tenths of one percent (0.29%) of just the monthly e-mail traffic carried on the Internet, and would represent a much smaller fraction of the total traffic carried on the Internet each month.

17. Web browsing is another component of Internet traffic. There are currently about 947 million websites, <http://www.internetlivestats.com> (last visited, May 24, 2015) (Exhibit B), down from over 1.0 billion in 2014, *see* <http://news.netcraft.com/archives/2014/10/10/october-2014-web-server-survey.html><sup>11</sup> (last visited, May 24, 2015); Internet Society, Global Internet Report 2014 at 24, [https://www.internetsociety.org/sites/default/files/Global\\_Internet\\_Report\\_2014\\_0.pdf](https://www.internetsociety.org/sites/default/files/Global_Internet_Report_2014_0.pdf)

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<sup>8</sup> Exhibit F: [Email-Statistics-Report-2013-2017-Executive-Summary.pdf](http://www.radicati.com/wp/wp-content/uploads/2013/04/Email-Statistics-Report-2013-2017-Executive-Summary.pdf)

<sup>9</sup> Exhibit G: [Internet 2012 in numbers \\_ Pingdom Royal.pdf](http://royal.pingdom.com/2013/01/16/internet-2012-in-numbers/)

<sup>10</sup> Assuming a month with 30 days, these 202 billion emails per day equate to about 6.0 trillion per month.

<sup>11</sup> Exhibit H: [October 2014 Web Server Survey \\_ Netcraft.pdf](http://news.netcraft.com/archives/2014/10/10/october-2014-web-server-survey.html)

(last visited, May 24, 2015) (Exhibit D). Although, according to Internet Live Stats, about 75% of these websites may be inactive, *see* <http://www.internetlivestats.com/total-number-of-websites><sup>12</sup> (last visited, May 24, 2015), that still means there are approximately 236 million active websites.

18. Certain commercial organizations track website usage on these websites. Alexa, a well-known company that provides commercial web tracking data, ranks the top one million websites. *See* <https://support.alexa.com/hc/en-us/articles/200449834-Does-Alexa-have-a-list-of-its-top-ranked-websites><sup>13</sup> (last visited, May 24, 2015). Wikipedia.org, Wikimedia's top-ranked site, is ranked number 7, behind Google.com (1), Facebook.com (2), Youtube.com (3), Yahoo.com (4), Baidu.com (5), and amazon.com (6). *See* <http://www.alexa.com/topsites><sup>14</sup> (last visited, May 24, 2015). Another well-known website traffic checker, Similar Web, posts its rankings as well as the number of website visits and the average webpage-views per visit. *See* <http://www.similarweb.com><sup>15</sup> (last visited, May 24, 2015).

19. In Similar Web's rankings, Wikipedia is globally ranked as the number seven website, as it is in Alexa's rankings, and is ranked number 11 (by Similar Web) in the U.S. *See* <http://www.similarweb.com/website/wikipedia.org><sup>16</sup> (last visited, May 24, 2015).

Similar Web estimates that Wikipedia (a project of Wikimedia) had 2.7 billion visits in

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<sup>12</sup> Exhibit I: [Total number of Websites - Internet Live Stats.pdf](#)

<sup>13</sup> Exhibit J: [Does Alexa have a list of its top-ranked websites – Alexa Support.pdf](#)

<sup>14</sup> Exhibit K: [Alexa Top 500 Global Sites.pdf](#)

<sup>15</sup> Exhibit L: [Website Traffic & Mobile App Analytics – SimilarWeb.pdf](#)

<sup>16</sup> Exhibit M: [Wikipedia-SimilarWeb.pdf](#)

April 2015 with an average of 3.3 page views per visit, which means that there were approximately 8.9 billion (2.7 X 3.3) web page views<sup>17</sup> for Wikipedia (not all Wikimedia projects) in April 2015. Facebook.com is ranked (by Similar Web) number one in the world (and number two in the U.S.) with an estimated 20.3 billion visits in April of 2015 and an average of 17.63 page views per visit, equating to approximately 357 billion (20.3 X 17.63) web page views per month. *See*

<http://www.similarweb.com/website/facebook.com><sup>18</sup> (last visited, May 24, 2015).

Google.com is globally ranked by Similar Web as number two (and number one in the U.S.) with an estimated 16.2 billion visits in April 2015, and an average of 12.89 page views per visit, amounting to approximately 208 billion (16.2 X 12.89) page views for that month. *See* <http://www.similarweb.com/website/google.com><sup>19</sup> (last visited, May 24, 2015).<sup>20</sup> Youtube, which is ranked number three by Similar Web (globally and in the U.S.), had an estimated 14.6 billion visits in April 2015 and an average of 10.10 page views per visit, which is to say approximately 147 billion (14.6 X 10.1) page views that

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<sup>17</sup> Additionally, in comparison to the 10,398 new Wikipedia articles posted each day, *see* <https://reportcard.wmflabs.org/#secondary-graphs-tab> (Exhibit N: [Wikimedia Report Card by WMflabs.org.pdf](#)) (last visited, May 24, 2015), there were more than 3.65 million blog posts made on May 24, 2015 (as of 10:30 p.m.) and more than 750 million tweets as of that time on the same day. *See* <http://www.internetlivestats.com> (last visited, May 24, 2015) (Exhibit B).

<sup>18</sup> Exhibit O: [Facebook - similarweb.pdf](#)

<sup>19</sup> Exhibit P: [Google - similarweb.pdf](#)

<sup>20</sup> Additionally, there were 3.9 billion Google searches (as opposed to using Gmail by signing on to Google.com or other uses of Google.com) on May 24, 2015, alone, as of 10:30 p.m. *See* <http://www.internetlivestats.com> (last visited, May 24, 2015 (Exhibit B)). And Google itself reports that there were 1.2 trillion searches in Google in 2012 (or 100 billion searches per month). *See* <http://www.google.com/zeitgeist/2012/#the-world> (last visited, May 24, 2015), Exhibit Q: [Zeitgeist 2012 - Google.pdf](#)).

month. See <http://www.similarweb.com/website/youtube.com><sup>21</sup> (last visited, May 24, 2015).<sup>22</sup> Wikimedia's claimed number of monthly page views amounts to just a tiny fraction of the monthly page views of these three websites, and would be a much smaller fraction of the total monthly page views of all 236 million currently active websites.

20. In sum, to be properly understood, any numbers referencing website users or webpage views must be placed in the context of global Internet usage and the volume of other global Internet traffic. Comparing the number of Wikimedia's international communications to the total amount of global Internet traffic, Wikimedia's share of that traffic is relatively small.

I declare under penalty of perjury that the foregoing is true and correct.

DATE: May 29, 2015

  
ROBERT T. LEE

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<sup>21</sup> Exhibit R: [Youtube-similarweb.pdf](#)

<sup>22</sup> Using a different metric, there were 8.2 billion Youtube videos watched on May 24, 2015, alone, as of 10:30 p.m., which is approximately 246 billion per month. See <http://www.internetlivestats.com> (last visited, May 24, 2015) (Exhibit B).

**Exhibit A:**  
**Privacy policy – Wikimedia Foundation**



# Privacy policy

From the Wikimedia Foundation

العربية | azərbaycanca | български | বাংলা | bosanski | català | нохчийн | ckh | čeština | català | Cymraeg | Deutsch | Deutsch (Sie-Form) | Zazaki | Ελληνικά | emiliàn e rumagnòl | **English** | Canadian English | British English | Esperanto | español | euskara | فارسی | suomi | français | Nordfriisk | galego | Avañe'ê | עברית | हिन्दी | hrvatski | magyar | Bahasa Indonesia | italiano | 日本語 | ქართული | ಕನ್ನಡ | Кыргызча | Lëtzebuergesch | lietuvių | മലയാളം | Bahasa Melayu | Napulitano | norsk bokmål | Nederlands | nl-formal | occitan | ਪੰਜਾਬੀ | polski | پښتو | português | português do Brasil | română | русский | scp | සිංහල | Soomaaliga | shqip | српски / srpski | svenska | Kiswahili | தமிழ் | తెలుగు | ไทย | Türkçe | українська | עברית | اردو | Yorùbá | 中文 | 中文 (简体)

This policy is approved by the Wikimedia Foundation Board of Trustees to apply to all Wikimedia projects.  
It may not be circumvented, eroded, or ignored by local policies.

**Want to help translate? Translate the missing messages.**

This is a summary of the Privacy Policy. To read the full terms, [click here](#).

*Disclaimer: This summary is not a part of the Privacy Policy and is not a legal document. It is simply a handy reference for understanding the full Privacy Policy. Think of it as the user-friendly interface to our Privacy Policy.*

**Because we believe that you shouldn't have to provide personal information to participate in the free knowledge movement, you may:**

- Read, edit, or use any Wikimedia Site without registering an account.
- Register for an account without providing an email address or real name.

**Because we want to understand how Wikimedia Sites are used so we can make them better for you, we collect some information when you:**

- Make public contributions.

- Register an account or update your user page.
- Use the Wikimedia Sites.
- Send us emails or participate in a survey or give feedback.

### **We are committed to:**

- Describing how your information may be used or shared in this Privacy Policy.
- Using reasonable measures to keep your information secure.
- Never selling your information or sharing it with third parties for marketing purposes.
- Only sharing your information in limited circumstances, such as to improve the Wikimedia Sites, to comply with the law, or to protect you and others.
- Retaining your data for the shortest possible time that is consistent with maintaining, understanding, and improving the Wikimedia Sites, and our obligations under law.

### **Be aware:**

- Any content you add or any change that you make to a Wikimedia Site will be publicly and permanently available.
- If you add content or make a change to a Wikimedia Site without logging in, that content or change will be publicly and permanently attributed to the IP address used at the time rather than a username.
- Our community of volunteer editors and contributors is a self-policing body. Certain administrators of the Wikimedia Sites, who are chosen by the community, use tools that grant them limited access to nonpublic information about recent contributions so they may protect the Wikimedia Sites and enforce policies.
- This Privacy Policy does not apply to all sites and services run by the Wikimedia Foundation, such as sites or services that have their own privacy policy (like the Wikimedia Shop (<https://shop.wikimedia.org>)) or sites or services run by third parties (like third-party developer projects on Wikimedia Labs (<https://labs.wikimedia.org/>)).
- As part of our commitment to education and research around the world, we occasionally release public information and aggregated or non-personal information to the general public through data dumps and data sets.
- For the protection of the Wikimedia Foundation and other users, if you do not agree with this Privacy Policy, you may not use the Wikimedia Sites.



[Introduction](#)



[Use of info](#)



[Sharing](#)



[Protection](#)



[Important info](#)

[Contents](#) [\[show\]](#)

## Introduction

### Welcome!

The Wikimedia Foundation is the nonprofit organization that operates collaborative, free knowledge websites, like Wikipedia, Wikimedia Commons, and Wiktionary.

This Policy explains how we collect, use, and share your personal information.

- We collect very little personal information about you.
- We do not rent or sell your information to third parties.

By using Wikimedia Sites, you consent to this Policy.

The Wikimedia movement is founded on a simple, but powerful principle: we can do more together than any of us can do alone. We cannot work collectively without gathering, sharing, and analyzing information about our users as we seek new ways to make the Wikimedia Sites more useable, safer, and more beneficial.

We believe that information-gathering and use should go hand-in-hand with transparency. This Privacy Policy explains how the Wikimedia Foundation, the non-profit organization that hosts the Wikimedia Sites, like Wikipedia, collects, uses, and shares information we receive from you through your use of the Wikimedia Sites. It is essential to understand that, by using any of the

Wikimedia Sites, you consent to the collection, transfer, processing, storage, disclosure, and use of your information as described in this Privacy Policy. That means that reading this Policy carefully is important.

We believe that you shouldn't have to provide personal information to participate in the free knowledge movement. You do not have to provide things like your real name, address, or date of birth to sign up for a standard account or contribute content to the Wikimedia Sites.

We do not sell or rent your nonpublic information, nor do we give it to others to sell you anything. We use it to figure out how to make the Wikimedia Sites more engaging and accessible, to see which ideas work, and to make learning and contributing more fun. Put simply: we use this information to make the Wikimedia Sites better for you.

After all, it's people like you, the champions of free knowledge, who make it possible for the Wikimedia Sites to not only exist, but also grow and thrive.

## Definitions

Because everyone (not just lawyers) should be able to easily understand how and why their information is collected and used, we use common language instead of more formal terms throughout this Policy. To help ensure your understanding of some particular key terms, here is a table of translations:

<b>When we say...</b>	<b>... we mean:</b>
"the Wikimedia Foundation" / "the Foundation" / "we" / "us" / "our"	The Wikimedia Foundation, Inc., the non-profit organization that operates the Wikimedia Sites.
"Wikimedia"	Wikimedia websites and services (regardless of language), including our main projects, such as Wikipedia and Wikimedia Commons, as well as mobile

Sites" / our services"	applications, APIs, emails, and notifications; excluding, however, sites and services listed in the "What This Privacy Policy Doesn't Cover" section below.
"you" / "your" / "me"	You, regardless of whether you are an individual, group, or organization, and regardless of whether you are using the Wikimedia Sites or our services on behalf of yourself or someone else.
"this Policy" / "this Privacy Policy"	This document, entitled the "Wikimedia Foundation Privacy Policy".
"contributions"	Content you add or changes you make to any Wikimedia Sites.
"personal information"	<p>Information you provide us or information we collect from you that could be used to personally identify you. To be clear, while we do not necessarily collect all of the following types of information, we consider at least the following to be “personal information” if it is otherwise nonpublic and can be used to identify you:</p> <ul style="list-style-type: none"> <li>(a) your real name, address, phone number, email address, password, identification number on government-issued ID, IP address, user-agent information, credit card number;</li> <li>(b) when associated with one of the items in subsection (a), any sensitive data such as date of birth, gender, sexual orientation, racial or ethnic origins, marital or familial status, medical conditions or disabilities, political affiliation, and religion; and</li> <li>(c) any of the items in subsections (a) or (b) when associated with your user account.</li> </ul>
"third party" / "third parties"	Individuals, entities, websites, services, products, and applications that are not controlled, managed, or operated by the Wikimedia Foundation. This includes other Wikimedia users and independent organizations or groups who help promote the Wikimedia movement such as Wikimedia chapters, thematic organizations, and user groups as well as volunteers, employees, directors, officers, grant recipients, and contractors of those organizations or groups.

We recognize that only a minority of you are familiar with technical terms like “tracking pixels” and “cookies” used in the Privacy Policy. Whether you are brand new to privacy terminology or you are an expert who just wants a refresher, you might find our Glossary of Key Terms helpful.

**What This Privacy Policy Does & Doesn't Cover**

Except as explained below, this Privacy Policy applies to our collection and handling of information about you that we receive as a result of your use of any of the Wikimedia Sites. This Policy also applies to information that we receive from our partners or other third parties. To understand more about what this Privacy Policy covers, please see below.

**Examples of What This Privacy Policy Covers****[Expand]**

This Privacy Policy, however, does not cover some situations where we may gather or process information. For example, some uses may be covered by separate privacy policies (like those of the Wikimedia Shop (<https://shop.wikimedia.org>)) or sites or services run by third parties (such as third-party developer projects on Wikimedia Labs (<https://labs.wikimedia.org>)). To understand more about what this Privacy Policy does not cover, please see below.

**More on what this Privacy Policy doesn't cover****[Expand]**

Where community policies govern information, such as the CheckUser policy, the relevant community may add to the rules and obligations set out in this Policy. However, they are not permitted to create new exceptions or otherwise reduce the protections offered by this Policy.

[Back to top](#) **Use of info****Types of Information We Receive From You, How We Get It, & How We Use It****Your Public Contributions**

Whatever you post on Wikimedia Sites can be seen and used by everyone.

The Wikimedia Sites were primarily created to help you share your knowledge with the world, and we share your contributions because you have asked us to do so.

When you make a contribution to any Wikimedia Site, including on user or discussion pages, you are creating a permanent, public record of every piece of content added, removed, or altered by you. The page history will show when your contribution or deletion was made, as well as your username (if you are signed in) or your IP address (if you are not signed in). We may use your public contributions, either aggregated with the public contributions of others or individually, to create new features or data-related products for you or to learn more about how the Wikimedia Sites are used.

Unless this Policy says otherwise, you should assume that information that you actively contribute to the Wikimedia Sites, including personal information, is publicly visible and can be found by search engines. Like most things on the Internet, anything you share may be copied and redistributed throughout the Internet by other people. Please do not contribute any information that you are uncomfortable making permanently public, like revealing your real name or location in your contributions.

You should be aware that specific data made public by you or aggregated data that is made public by us can be used by anyone for analysis and to infer information about users, such as which country a user is from, political affiliation, and gender.

[Back to top](#) 

## **Account Information & Registration**

You do not need to create an account to use any Wikimedia Site.

If you do create an account, you do not need to give us your name or email address.

If you do not create an account, your contributions will be publicly attributed to your IP address.

Want to create an account? Great! Don't want to create an account? No problem!

You are not required to create an account to read or contribute to a Wikimedia Site, except under rare circumstances. However, if you contribute without signing in, your contribution will be publicly attributed to the IP address associated with your device.

If you want to create a standard account, in most cases we require only a username and a password. Your username will be publicly visible, so please be careful about using your real name as your username. Your password is only used to verify that the account is yours. Your IP address is also automatically submitted to us, and we record it temporarily to help prevent abuse. No other personal information is required: no name, no email address, no date of birth, no credit card information.

Once created, user accounts cannot be removed entirely (although you can usually hide the information on your user page if you choose to). This is because your public contributions must be associated with their author (you!). So make sure you pick a name that you will be comfortable with for years to come.

To gain a better understanding of the demographics of our users, to localize our services, and to learn how we can improve our services, we may ask you for more demographic information, such as gender or age, about yourself. We will tell you if such information is intended to be public or private, so that you can make an informed decision about whether you want to provide us with that information. Providing such information is always completely optional. If you don't want to, you don't have to—it's as simple as that.

[Back to top](#) 

## Information Related to Your Use of the Wikimedia Sites

We may use common technologies to collect information about how you use Wikimedia Sites.



We use this information to enhance your user experience and to develop new features.

We want to make the Wikimedia Sites better for you by learning more about how you use them. Examples of this might include how often you visit the Wikimedia Sites, what you like, what you find helpful, how you get to the Wikimedia Sites, and whether you would use a helpful feature more if we explained it differently. We also want this Policy and our practices to reflect our community's values. For this reason, we keep information related to your use of the Wikimedia Sites confidential, except as provided in this Policy.

[Back to top](#) 

### **Information We Receive Automatically**

Like other websites, we receive some information about you automatically when you visit the Wikimedia Sites. This information helps us administer the Wikimedia Sites and enhance your user experience.

Because of how browsers work and similar to other major websites, we receive some information automatically when you visit the Wikimedia Sites. This information includes the type of device you are using (possibly including unique device identification numbers, for some beta versions of our mobile applications), the type and version of your browser, your browser's language preference, the type and version of your device's operating system, in some cases the name of your internet service provider or mobile carrier, the website that referred you to the Wikimedia Sites, which pages you request and visit, and the date and time of each request you make to the Wikimedia Sites.

Put simply, we use this information to enhance your experience with Wikimedia Sites. For example, we use this information to administer the sites, provide greater security, and fight vandalism; optimize mobile applications, customize content and set language preferences, test features to see

what works, and improve performance; understand how users interact with the Wikimedia Sites, track and study use of various features, gain understanding about the demographics of the different Wikimedia Sites, and analyze trends.

[Back to top](#) 

### Information We Collect

We use a variety of commonly-used technologies, like cookies, to understand how you use the Wikimedia Sites, make our services safer and easier to use, and to help create a better and more personalized experience for you.

We actively collect some types of information with a variety of commonly-used technologies. These generally include tracking pixels, JavaScript, and a variety of "locally stored data" technologies, such as cookies and local storage. We realize that some of these technologies do not have the best reputation in town and can be used for less-than-noble purposes. So we want to be as clear as we can about why we use these methods and the type of information we collect with them.

Depending on which technology we use, locally stored data can be anything from text, pictures, and whole articles (as we explain further below) to personal information (like your IP address) and information about your use of the Wikimedia Sites (like your username or the time of your visit).

We use this information to make your experience with the Wikimedia Sites safer and better, to gain a greater understanding of user preferences and their interaction with the Wikimedia Sites, and to generally improve our services. We will never use third-party cookies, unless we get your permission to do so. If you ever come across a third-party data collection tool that has not been authorized by you (such as one that may have been mistakenly placed by another user or administrator), please report it to us at [privacy@wikimedia.org](mailto:privacy@wikimedia.org) (<mailto:privacy@wikimedia.org>).

Locally stored data, JavaScript, and tracking pixels help us do things like:

- Provide you with a personalized experience, such as using cookies to know your language


preference, to remember the user preferences you set so we can provide you with the customized look and feel that you want, and to tell you about interesting Wikimedia issues and events in your area.

- Deliver more relevant content to you faster. For example, we may use local storage to store your most recently read articles directly on your device, so they can be retrieved quickly. Also, we may use cookies to learn about the topics searched so that we can optimize the search results we deliver to you.
- Understand how you use the Wikimedia Sites, so that we know what works and what is useful. For example, we might use cookies to learn about the list of articles you are following on your watchlist so that we can recommend similar articles that you may be interested in.
- Understand how you use the Wikimedia Sites across different devices, so that we can make our varied Wikimedia Sites more efficient and effective for you.
- Make the Wikimedia Sites more convenient to use, such as by using cookies to maintain your session when you log in or to remember your username in the login field.

Want to know even more? You can read more about some of the specific cookies we use, when they expire, and what we use them for in our FAQ.

We believe this data collection helps improve your user experience, but you may remove or disable some or all locally stored data through your browser settings, depending on your browser. You can learn more about some options you have in our FAQ. While locally stored data may not be necessary to use our sites, some features may not function properly if you disable locally stored data.

While the examples above concerning information about you collected through the use of data collection tools are kept confidential in accordance with this Policy, please note that some information about the actions taken by your username is made publicly available through public logs alongside actions taken by other users. For example, a public log may include the date your account was created on a Wikimedia Site along with the dates that other accounts were created on a Wikimedia Site. Information available through public logs will not include personal information about you.

[Back to top](#) 

## **Emails**

If you choose to provide your email address, we will keep it confidential, except as provided in this Policy.

We may occasionally send you emails about important information.

You may choose to opt out of certain kinds of notifications.

You have the option of providing an email address at the time of registration or in later interactions with the Wikimedia Sites. If you do so, your email address is kept confidential, except as provided in this Policy. We do not sell, rent, or use your email address to advertise third-party products or services to you.

We use your email address to let you know about things that are happening with the Foundation, the Wikimedia Sites, or the Wikimedia movement, such as telling you important information about your account, letting you know if something is changing about the Wikimedia Sites or policies, and alerting you when there has been a change to an article that you have decided to follow. Please note that if you email us, we may keep your message, email address, and any other information you provide us, so that we can process and respond to your request.

You can choose to limit some of these kinds of notifications, like those alerting you if an article changes. Others, such as those containing critical information that all users need to know to participate successfully in the Wikimedia Sites, you may not be able to opt out of. You can manage what kinds of notifications you receive and how often you receive them by going to your Notifications Preferences. You can learn more about email and notifications and how to change your preferences in our FAQ.

We will never ask for your password by email (but may send you a temporary password via email if you have requested a password reset). If you ever receive such an email, please let us know by sending it to [privacy@wikimedia.org](mailto:privacy@wikimedia.org) (<mailto:privacy@wikimedia.org>), so we can investigate the source of the email.

Direct communications between users (such as messages sent through the "Email this user" feature), to the extent such communications are nonpublic and stored in or in transit through Wikimedia Foundation systems, are kept confidential by us, except as provided in this Policy.

[Back to top](#) 

## Surveys & Feedback

We may ask you to provide us with information through a survey or provide feedback, but you will never be obligated to participate.

Participating in optional surveys or providing feedback helps us make the Wikimedia Sites better. Because every survey and request for feedback may be used for various purposes, we will tell you, at the time we give you the survey or request for feedback, how we plan on using your answers and any personal information you provide. If you don't feel comfortable with how we plan on using the survey or feedback results, you are not obligated to take the survey or give feedback.

[Back to top](#) 

## Location Information

### GPS & Other Location Technologies

If you consent, we can use commonly-used location technologies to show you more relevant content.

Some features we offer work better if we know what area you are in. But it's completely up to you whether or not you want us to use geolocation tools to make some features available to you. If you consent, we can use GPS (and other technologies commonly used to determine location) to show

you more relevant content. We keep information obtained by these technologies confidential, except as provided in this Policy. You can learn more by checking out the list of examples of how we use these technologies in our FAQ.

[Back to top](#) 

### Metadata

We may automatically receive location data from your device. For example, if you upload a photo using the Wikimedia Commons mobile app, please be aware that the default setting on your mobile device typically results in the metadata associated with your photo being included in the upload.

Sometimes, we may automatically receive location data from your device. For example, if you want to upload a photo on the Wikimedia Commons mobile app, we may receive metadata, such as the place and time you took the photo, automatically from your device. Please be aware that, unlike location information collected using GPS signals described above, the default setting on your mobile device typically includes the metadata in your photo or video upload to the Wikimedia Sites. If you do not want metadata sent to us and made public at the time of your upload, please change your settings on your device.

[Back to top](#) 

### IP Addresses

When you visit any Wikimedia Site, we automatically receive the IP address of the device you are using to

access the Internet, which can be used to infer your geographical location.

Finally, when you visit any Wikimedia Site, we automatically receive the IP address of the device (or your proxy server) you are using to access the Internet, which could be used to infer your geographical location. We keep IP addresses confidential, except as provided in this Policy. For example, if you make a contribution without signing into your account, your IP address used at the time will be publicly and permanently recorded. If you are visiting Wikimedia Sites with your mobile device, we may use your IP address to provide anonymized or aggregated information to service providers regarding the volume of usage in certain areas. We use IP addresses for research and analytics; to better personalize content, notices, and settings for you; to fight spam, identity theft, malware, and other kinds of abuse; and to provide better mobile and other applications.

[Back to top](#) 



## Sharing

### When May We Share Your Information?

We may share your information when you give us specific permission to do so.

#### With Your Permission

We may share your information for a particular purpose, if you agree. You can find more information in the list of examples in our FAQ.

[Back to top](#) 

## For Legal Reasons

We will disclose your information in response to an official legal process only if we believe it to be legally valid. We will notify you of such requests when possible.

We may access, preserve, or disclose your personal information if we reasonably believe it necessary to satisfy a valid and legally enforceable warrant, subpoena, court order, law or regulation, or other judicial or administrative order. However, if we believe that a particular request for disclosure of a user's information is legally invalid or an abuse of the legal system and the affected user does not intend to oppose the disclosure themselves, we will try our best to fight it. We are committed to notifying you via email at least ten (10) calendar days, when possible, before we disclose your personal information in response to a legal demand. However, we may only provide notice if we are not legally restrained from contacting you, there is no credible threat to life or limb that is created or increased by disclosing the request, and you have provided us with an email address.

Nothing in this Privacy Policy is intended to limit any legal objections or defenses you may have to a third party's request (whether it be civil, criminal, or governmental) to disclose your information. We recommend seeking the advice of legal counsel immediately if such a request is made involving you.

For more information, see our Subpoena FAQ.

[Back to top](#) 

## If the Organization is Transferred (Really Unlikely!)

In the unlikely event that the ownership of the Foundation changes, we will provide you 30 days notice



before any personal information is transferred to the new owners or becomes subject to a different privacy policy.

In the extremely unlikely event that ownership of all or substantially all of the Foundation changes, or we go through a reorganization (such as a merger, consolidation, or acquisition), we will continue to keep your personal information confidential, except as provided in this Policy, and provide notice to you via the Wikimedia Sites and a notification on WikimediaAnnounce-L (<https://lists.wikimedia.org/mailman/listinfo/wikimediaannounce-l>) or similar mailing list at least thirty (30) calendar days before any personal information is transferred or becomes subject to a different privacy policy.

[Back to top](#) 

### **To Protect You, Ourselves & Others**

We, or users with certain administrative rights, may disclose information that is reasonably necessary to:


- enforce or investigate potential violations of Foundation or community-based policies;
- protect our organization, infrastructure, employees, contractors, or the public; or
- prevent imminent or serious bodily harm or death to a person.

We, or particular users with certain administrative rights as described below, may need to share your personal information if it is reasonably believed to be necessary to enforce or investigate potential violations of our Terms of Use, this Privacy Policy, or any Foundation or user community-

based policies. We may also need to access and share information to investigate and defend ourselves against legal threats or actions.

Wikimedia Sites are collaborative, with users writing most of the policies and selecting from amongst themselves people to hold certain administrative rights. These rights may include access to limited amounts of otherwise nonpublic information about recent contributions and activity by other users. They use this access to help protect against vandalism and abuse, fight harassment of other users, and generally try to minimize disruptive behavior on the Wikimedia Sites. These various user-selected administrative groups that have their own privacy and confidentiality guidelines, but all such groups are supposed to agree to follow our Access to Nonpublic Information Policy. These user-selected administrative groups are accountable to other users through checks and balances: users are selected through a community-driven process and overseen by their peers through a logged history of their actions. However, the legal names of these users are not known to the Wikimedia Foundation.

We hope that this never comes up, but we may disclose your personal information if we believe that it's reasonably necessary to prevent imminent and serious bodily harm or death to a person, or to protect our organization, employees, contractors, users, or the public. We may also disclose your personal information if we reasonably believe it necessary to detect, prevent, or otherwise assess and address potential spam, malware, fraud, abuse, unlawful activity, and security or technical concerns. (Check out the list of examples in our FAQ for more information.)

[Back to top](#) 

## To Our Service Providers

We may disclose personal information to our third-party service providers or contractors to help run or improve the Wikimedia Sites and provide services in support of our mission.

As hard as we may try, we can't do it all. So sometimes we use third-party service providers or contractors who help run or improve the Wikimedia Sites for you and other users. We may give access to your personal information to these providers or contractors as needed to perform their services for us or to use their tools and services. We put requirements, such as confidentiality agreements, in place to help ensure that these service providers treat your information consistently with, and no less protective of your privacy than, the principles of this Policy. (Check out the list of examples in our FAQ.)

[Back to top](#) 

### **To Understand & Experiment**

We may give volunteer developers and researchers access to systems that contain your information to allow them to protect, develop, and contribute to the Wikimedia Sites.

We may also share non-personal or aggregated information with third parties interested in studying the Wikimedia Sites.

When we share information with third parties for these purposes, we put reasonable technical and contractual protections in place to protect your information consistent with this Policy.

The open-source software that powers the Wikimedia Sites depends on the contributions of volunteer software developers, who spend time writing and testing code to help it improve and evolve with our users' needs. To facilitate their work, we may give some developers limited access to systems that contain your personal information, but only as reasonably necessary for them to develop and contribute to the Wikimedia Sites.

Similarly, we may share non-personal or aggregated information with researchers, scholars, academics, and other interested third parties who wish to study the Wikimedia Sites. Sharing this information helps them understand usage, viewing, and demographics statistics and patterns. They then can share their findings with us and our users so that we can all better understand and improve the Wikimedia Sites.

When we give access to personal information to third-party developers or researchers, we put requirements, such as reasonable technical and contractual protections, in place to help ensure that these service providers treat your information consistently with the principles of this Policy and in accordance with our instructions. If these developers or researchers later publish their work or findings, we ask that they not disclose your personal information. Please note that, despite the obligations we impose on developers and researchers, we cannot guarantee that they will abide by our agreement, nor do we guarantee that we will regularly screen or audit their projects. (You can learn more about re-identification in our FAQ.)

[Back to top](#) 

## Because You Made It Public

Information that you post is public and can be seen and used by everyone.

Any information you post publicly on the Wikimedia Sites is just that – public. For example, if you put your mailing address on your talk page, that is public, and not protected by this Policy. And if you edit without registering or logging into your account, your IP address will be seen publicly. Please think carefully about your desired level of anonymity before you disclose personal information on your user page or elsewhere.

[Back to top](#) 




## Protection

## How Do We Protect Your Data?

We use a variety of physical and technical measures, policies, and procedures to help protect your information from unauthorized access, use, or disclosure.

We strive to protect your information from unauthorized access, use, or disclosure. We use a variety of physical and technical measures, policies, and procedures (such as access control procedures, network firewalls, and physical security) designed to protect our systems and your personal information. Unfortunately, there's no such thing as completely secure data transmission or storage, so we can't guarantee that our security will not be breached (by technical measures or through violation of our policies and procedures).

[Back to top](#) 

## How Long Do We Keep Your Data?

We only keep your personal information as long as necessary to maintain, understand, and improve the Wikimedia Sites or to comply with U.S. law.

Once we receive personal information from you, we keep it for the shortest possible time that is consistent with the maintenance, understanding, and improvement of the Wikimedia Sites, and our obligations under applicable U.S. law. Non-personal information may be retained indefinitely. (Check out the list of examples in our FAQ.)

Please remember that certain information is retained and displayed indefinitely, such as your IP address (if you edit while not logged in) and any public contributions to the Wikimedia Sites.

[Back to top](#) 



## Important info

**For the protection of the Wikimedia Foundation and other users, if you do not agree with this Privacy Policy, you may not use the Wikimedia Sites.**

### Where is the Foundation & What Does That Mean for Me?

You are consenting to the use of your information in the U.S. and to the transfer of that information to other countries in connection to providing our services to you and others.

The Wikimedia Foundation is a non-profit organization based in San Francisco, California, with servers and data centers located in the U.S. If you decide to use Wikimedia Sites, whether from inside or outside of the U.S., you consent to the collection, transfer, storage, processing, disclosure, and other uses of your information in the U.S. as described in this Privacy Policy. You also consent to the transfer of your information by us from the U.S. to other countries, which may have different or less stringent data protection laws than your country, in connection with providing services to you.

[Back to top](#)

### Our Response to Do Not Track (DNT) signals


We do not allow tracking by third-party websites you have not visited.

We do not share your data with third parties for marketing purposes.

We are strongly committed to not sharing nonpublic information with third parties. In particular, we do not allow tracking by third-party websites you have not visited (including analytics services, advertising networks, and social platforms), nor do we share your information with any third parties for marketing purposes. Under this Policy, we may share your information only under particular situations, which you can learn more about in the “When May We Share Your Information” section of this Privacy Policy.

Because we protect all users in this manner, we do not change our behavior in response to a web browser's "do not track" signal.

For more information regarding Do Not Track signals and how we handle them, please visit our FAQ.

[Back to top](#) 

## Changes to This Privacy Policy

Substantial changes to this Policy will not be made until after a public comment period of at least 30 days.

Because things naturally change over time and we want to ensure our Privacy Policy accurately reflects our practices and the law, it may be necessary to modify this Privacy Policy from time to time. We reserve the right to do so in the following manner:

- In the event of substantial changes, we will provide the proposed changes to our users in at least three (3) languages (selected at our discretion) for open comment period lasting at least thirty (30) calendar days. Prior to the start of any comment period, we will provide notice of such changes and the opportunity to comment via the Wikimedia Sites, and via a notification on WikimediaAnnounce-L (<https://lists.wikimedia.org/mailman/listinfo/wikimediaannounce-l>) or a similar mailing list.
- For minor changes, such as grammatical fixes, administrative or legal changes, or corrections of inaccurate statements, we will post the changes and, when possible, provide at least three (3) calendar days' prior notice via WikimediaAnnounce-L (<https://lists.wikimedia.org/mailman/listinfo/wikimediaannounce-l>) or similar mailing list.

We ask that you please review the most up-to-date version of our **Privacy Policy**. Your continued use of the Wikimedia Sites after this Privacy Policy becomes effective constitutes acceptance of this Privacy Policy on your part. Your continued use of the Wikimedia Sites after any subsequent version of this Privacy Policy becomes effective, following notice as outlined above, constitutes acceptance of that version of the Privacy Policy on your part.

## Contact Us

If you have questions or suggestions about this Privacy Policy, or the information collected under this Privacy Policy, please email us at [privacy@wikimedia.org](mailto:privacy@wikimedia.org) (mailto:privacy@wikimedia.org) or contact us directly.

## Thank You!

Thank you for reading our Privacy Policy. We hope you enjoy using the Wikimedia Sites and appreciate your participation in creating, maintaining, and constantly working to improve the largest repository of free knowledge in the world.

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**This privacy policy was approved by the board on April 25th 2014 and went into effect on June 6, 2014. Previous versions can be found below:**

- **Privacy policy (November 2008 - June 2014)**  
([https://wikimediafoundation.org/w/index.php?title=Privacy\\_policy&oldid=80023](https://wikimediafoundation.org/w/index.php?title=Privacy_policy&oldid=80023)):  
effective from November 25, 2008 until June 6, 2014
- **Privacy policy (August 2008 - November 2008)**  
([https://wikimediafoundation.org/w/index.php?title=Privacy\\_policy&oldid=28670](https://wikimediafoundation.org/w/index.php?title=Privacy_policy&oldid=28670)):  
effective from August 19, 2008 until November 25, 2008.
- **Privacy policy (June 2006 - August 2008)**  
([https://wikimediafoundation.org/w/index.php?title=Privacy\\_policy&oldid=14088](https://wikimediafoundation.org/w/index.php?title=Privacy_policy&oldid=14088)):  
effective from June 21, 2006 until August 19, 2008.
- **Privacy policy (April 2005 to June 2006)** ([https://wikimediafoundation.org/w/index.php?title=Privacy\\_policy&oldid=4834](https://wikimediafoundation.org/w/index.php?title=Privacy_policy&oldid=4834)): effective from April 2005 until June 21, 2006



**Please note that in the event of any differences in meaning or interpretation between the original English version of this Privacy Policy and a translation, the original English version takes precedence.**

[Back to top](#) 

[± \(https://wikimediafoundation.org/w/index.php?title=Template:Privacy\\_policy\\_navigation\\_2&action=edit\)](https://wikimediafoundation.org/w/index.php?title=Template:Privacy_policy_navigation_2&action=edit)

**Privacy-related pages**

**Privacy policy** • [FAQ](#) • [Glossary of key terms](#) • [Subpoena FAQ](#) • [Access to nonpublic information](#) • [Data retention guidelines](#) • [Donor policy](#) • [Requests for user information](#)

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Categories: [Privacy policy](#) | [English](#) | [Policy](#)

- This page was last modified on 3 December 2014, at 23:50.
- Text is available under the Creative Commons Attribution-ShareAlike License; additional terms may apply. See Terms of Use for details.

**Exhibit B: Internet Live Stats—Internet Usage and  
Social Media Statistics**

*internet live stats*

live

1 second

watch

trends & more



Enter any website to analyze

Search

**3,130,425,566**

Internet Users in the world

**947,387,416**

Total number of Websites

**202,166,797,124**

Emails sent [today](#)

**3,971,367,803**

Google searches [today](#)

**3,657,217**

Blog posts written [today](#)

**751,045,316**

Tweets sent [today](#)

**8,222,194,715**

Videos viewed **today**  
on YouTube

**173,047,356**

Photos uploaded **today**  
on Instagram

**158,602,545**

Tumblr posts **today**

**1,413,874,410**

Facebook active users

**1,116,262,854**

Google+ active users

**308,195,301**

Twitter active users

**71,821,147**

Pinterest active users

**142,603,121**

Skype calls **today**

**48,007**

Websites hacked **today**

659,913

Computers sold [today](#)

4,597,102

Smartphones sold [today](#)

861,625

Tablets sold [today](#)

2,239,964,652 GB

Internet traffic [today](#)

2,804,332 MWh

Electricity used [today](#)  
for the Internet

2,584,327 tons

CO<sub>2</sub> emissions [today](#)  
from the Internet



1.5k [g+](#) 3,621 [Tweet](#) 7.4k [Like](#)


[g+](#) [Follow](#) [Follow](#) [Follow](#)

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 **Tim Berners-Lee**  
@timberners\_lee Follow

[internetlivestats.com/watch/websites/](http://internetlivestats.com/watch/websites/) recently passed a billion websites by their count....

5:20 PM - 16 Sep 2014

322 131



The Official World Wide Web Anniversary Site  
World Wide Web Consortium (W3C)  
World Wide Web Foundation



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Live (home)

1 second

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Trends & More

### Internet Live Stats

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**Exhibit C: World Internet Users Statistics and 2014  
World Population Stats**



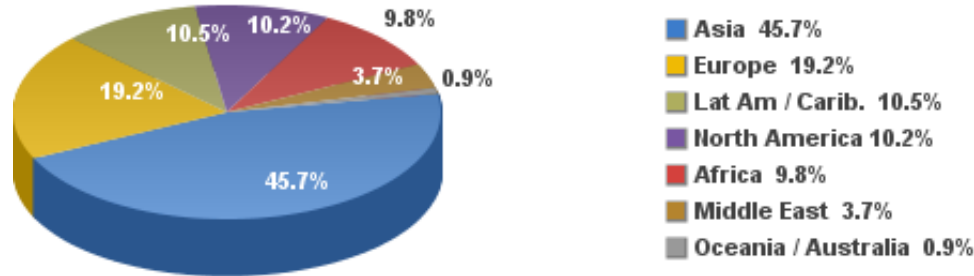


[Facebook Growth Stats](#)

2,787  
Tweet

[World Stats](#) | [Africa Stats](#) | [America Stats](#) | [Asia Stats](#) | [Europe Stats](#) | [EU Stats](#) | [Mid East Stats](#) | [Oceania Stats](#) | [Links](#)

### Internet Users in the World Distribution by World Regions - 2014 Q2



Source: Internet World Stats - [www.internetworldstats.com/stats.htm](http://www.internetworldstats.com/stats.htm)  
Basis: 3,035,749,340 Internet users on June 30, 2014  
Copyright © 2014, Miniwatts Marketing Group



## INTERNET USAGE STATISTICS The Internet Big Picture [World Internet Users and 2014 Population Stats](#)

## WORLD INTERNET USAGE AND POPULATION STATISTICS

### JUNE 30, 2014 - Mid-Year Update

World Regions	Population ( 2014 Est.)	Internet Users Dec. 31, 2000	Internet Users Latest Data	Penetration (% Population)	Growth 2000-2014	Users % of Table
<a href="#">Africa</a>	1,125,721,038	4,514,400	297,885,898	26.5 %	6,498.6 %	9.8 %
<a href="#">Asia</a>	3,996,408,007	114,304,000	1,386,188,112	34.7 %	1,112.7 %	45.7 %
<a href="#">Europe</a>	825,824,883	105,096,093	582,441,059	70.5 %	454.2 %	19.2 %
<a href="#">Middle East</a>	231,588,580	3,284,800	111,809,510	48.3 %	3,303.8 %	3.7 %
<a href="#">North America</a>	353,860,227	108,096,800	310,322,257	87.7 %	187.1 %	10.2 %
<a href="#">Latin America / Caribbean</a>	612,279,181	18,068,919	320,312,562	52.3 %	1,672.7 %	10.5 %
<a href="#">Oceania / Australia</a>	36,724,649	7,620,480	26,789,942	72.9 %	251.6 %	0.9 %
<b><a href="#">WORLD TOTAL</a></b>	<b>7,182,406,565</b>	<b>360,985,492</b>	<b>3,035,749,340</b>	<b>42.3 %</b>	<b>741.0 %</b>	<b>100.0 %</b>

NOTES: (1) Internet Usage and World Population Statistics are for June 30, 2014. (2) CLICK on each world region name for detailed regional usage information. (3) Demographic (Population) numbers are based on data from the [US Census Bureau](#) and local census agencies. (4) Internet usage information comes from data published by [Nielsen Online](#), by the [International Telecommunications Union](#), by [GfK](#), local ICT Regulators and other reliable sources. (5) For definitions, disclaimers, navigation help and methodology, please refer to the [Site Surfing Guide](#). (6) Information in this site may be cited, giving the due credit to [www.internetworldstats.com](http://www.internetworldstats.com). Copyright © 2001 - 2015, Miniwatts Marketing Group. All rights reserved worldwide.

## HALBERTOLOGY

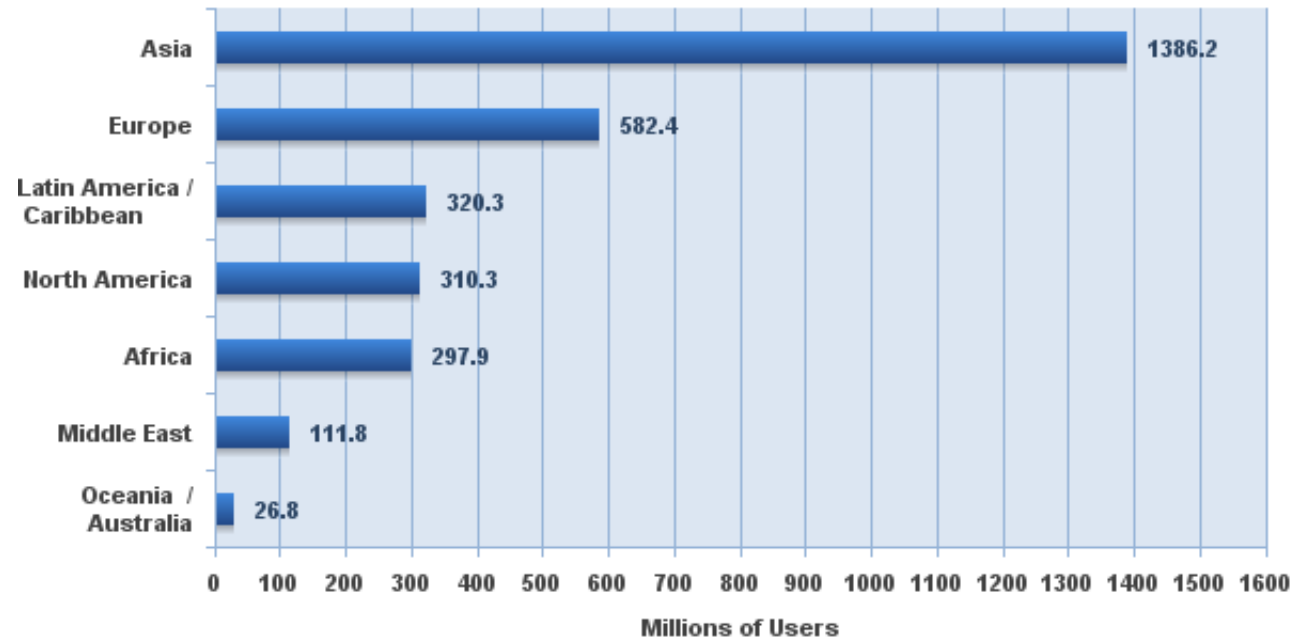
**[See Here](#)**

**The science of using powerful words and story  
to drive people to take action.**



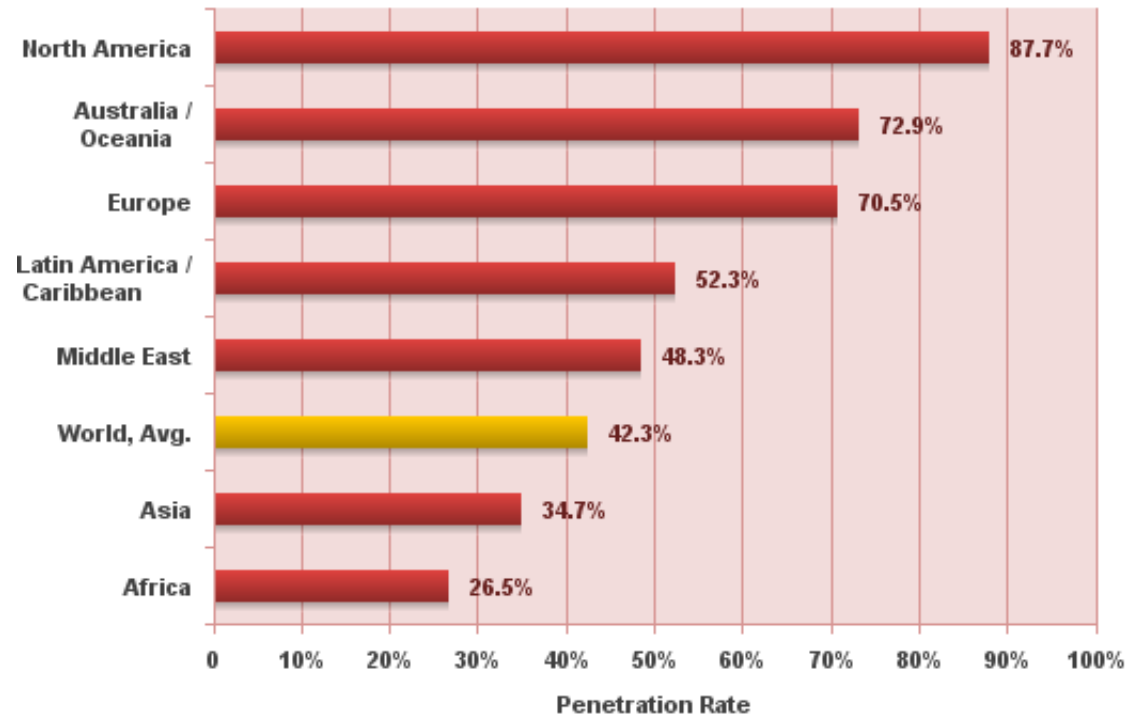
**[Intelligence Report on Wearable Devices, Trends and Statistics](#)**

# Internet Users in the World by Geographic Regions - 2014 Q2



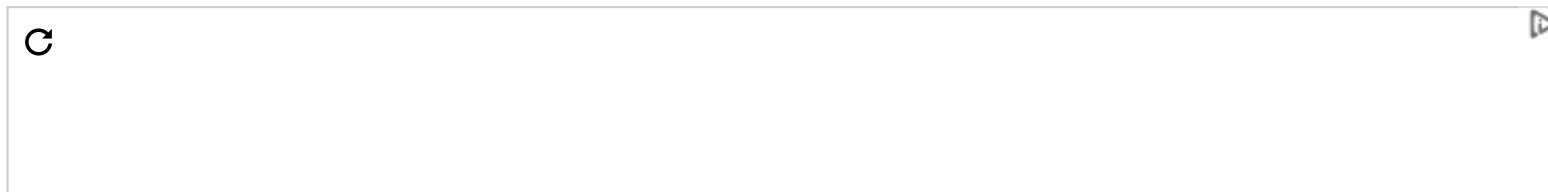
Source: Internet World Stats - [www.internetworldstats.com/stats.htm](http://www.internetworldstats.com/stats.htm)  
3,035,749,340 Internet users estimated for June 30, 2014  
Copyright © 2014, Miniwatts Marketing Group

## World Internet Penetration Rates by Geographic Regions - 2014 Q2



Source: Internet World Stats - [www.internetworldstats.com/stats.htm](http://www.internetworldstats.com/stats.htm)  
 Penetration Rates are based on a world population of 7,182,406,565 and 3,035,749,340 estimated Internet users on June 30, 2014.  
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## More Internet Information Sources and Usage Statistics



- [Internet](#)  
 Internet description from
- [Renesisys](#)  
 The Internet Intelligence Authority, Renesisys® is the leading

Wikipedia, history, creation, growth, structure, uses and other basic data.

- **[Internet Traffic Report](#)**

The Internet Traffic Report monitors the flow of data around the world. It then displays a value between zero and 100. Higher values indicate faster and more reliable connections.

- **[The CAIDA Web Site](#)**

CAIDA, the Cooperative Association for Internet Data Analysis, provides tools and analyses promoting the engineering and maintenance of a robust, scalable global Internet infrastructure.

- **[Internet News](#)**

Internet dot com provides enterprise IT and Internet Industry professionals with the news, information resources and community they need to succeed in today's rapidly evolving IT and business environment.

- **[Detailed Domain Count](#)**

Statistics on the number of active domains and those deleted from the Internet each day.

provider of objective, critical intelligence on the worldwide state of the Internet. Intensive data collection on every continent with innovative, proprietary software. Optimized algorithms gather real-time data from the Internet backbone, around-the-clock.

- **[ICANN](#)**

The Internet Corporation for Assigned Names and Numbers, better known as ICANN, is responsible for managing and coordinating the Domain Name System (DNS) to ensure that every address is unique and that all users of the Internet can find all valid addresses. It also ensures that each domain name maps to the correct IP address. ICANN is also responsible for accrediting the domain name registrars.

- **[Net Index Survey](#)**

The Net Index by Ookla gives Real-time global broadband and mobile data, based on the Ookla Speedtest and millions daily tests performed worldwide in over 2,600 testing servers.

- **[RIPE NCC](#)** One of the four Regional Internet Registries (RIRs) providing Internet resource allocations, registration services and co-ordination activities that support the operation of the Internet globally.

- **[APNIC](#)**

One of the four Regional Internet Registries (RIRs) APNIC provides allocation and registration services which support the Asia Pacific region.

- **[ARIN](#)**

One of the four Regional Internet Registries (RIRs), ARIN - the American Registry for Internet Numbers - manage the Internet numbering resources for North America, a portion of the Caribbean, and sub-equatorial Africa.

- **[LACNIC](#)**

One of the four Regional Internet Registries (RIRs), LANIC- The

- **[Web Browser Statistics](#)**  
Statistics and trends in browser usage, operating systems and screen resolution.
- **[Top Level Domain Count](#)**  
Statistics on distribution of Top-Level Domain Names by Host Count.
- **[ClickZ Stats](#)**  
ClickZ Stats is a guide to Internet statistics, Internet marketing demographics, Internet advertising research, e-commerce trends.
- **[RefDesk](#)**  
Reference source to Internet Usage.
- **[Net Craft](#)**  
Netcraft provides network security services, and market research on many aspects of the Internet.
- **[Internet History](#)**  
The Living Internet is recommended reading as a general reference to Internet history.
- **[Latin American and Caribbean Internet Addresses Registry](#)** - is the organization that administrates IP addresses space, Autonomous System Numbers (ASN), reverse resolution and other resources of the Latin American and Caribbean region (LAC).
- **[AfrINIC](#)**  
AfrINIC (in formation) for the purpose of managing the IP addressing in the African continent. In the future it is expected that African organizations that presently obtain IP address space from RIPE or ARIN will obtain the IP addresses space from the AfrINIC.
- **[Network Startup Resource Center](#)**  
The NSRC provides technical and engineering assistance to international networking initiatives building access to the public Internet, especially to academic/research institutions and non-governmental organizations (NGOs).
- **[W3C - World Wide Web Consortium](#)**  
The World Wide Web Consortium (W3C) develops interoperable technologies (specifications, guidelines, software, and tools) to lead the Web to its full potential. W3C is a forum for information, commerce, communication, and collective understanding.

[^ top of page](#)

## Premium Telecommunications Market Reports:



- 

### **[Internet World Overview Reports](#)**

The Internet is still growing at a good rate, but the growth rate is not the same all over the world. The growth rate will not increase again until broadband is further developed, and its price rates reduced. Revenues and language statistics are also discussed.

- **[African Telecommunications Overview](#)**

A large amount of telecommunications and Internet reports for the African Region, including telecom profiles, table of contents and summaries available.

- **[Asian Telecommunications Markets](#)**

Reports by global Asia region and also by individual country about telecommunications and Internet. Reports content includes: statistics, trends and developments relating to telecommunications, broadcasting, broadband, cable TV and information highways, Internet and e-commerce.

### **[Australian Telecommunications Market](#)**

A large amount of telecommunications and Internet reports for Australia, including telecom profiles, table of contents and summaries available.

### **[Wearable Devices Trends and Statistics Report](#)**

Wearable technology is currently a hot topic and the interest in this sector continues to grow. It will transform many sectors of society and the economy. Out of this environment new businesses and new industries will be born. [Read the Executive Summary.](#)

### **Internet Usage Reports**

- [Top Ten Languages in the Internet](#)
- [Africa Internet and Population Statistics](#)
- [America Internet and Population Statistics](#)
- [Asia Internet and Population Statistics](#)
- [Europe Internet and Population Statistics](#)
- [European Union Internet Usage Statistics](#)
- [Latin America Internet Usage Statistics](#)

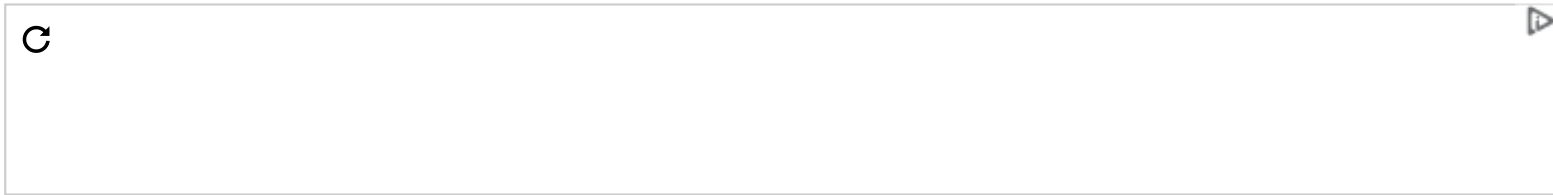
- [\*\*Canada Telecoms Overview and Statistics\*\*](#)  
A large amount of telecommunications and Internet reports for Canada telecoms, including telecom profiles, table of contents and summaries available.
- [\*\*Europe Telecom Market Overview\*\*](#)  
European telecommunications market overview, including alphabetical listing of European countries reports, companies in Europe, European Overview, profiles, table of contents and summaries available.
- [\*\*Latin America Telecom Market Overview\*\*](#)  
A large amount of telecommunications and Internet reports for the Latin American Region, including company profiles, table of contents and summaries available.
- [\*\*Middle East Telecommunications Market Overview\*\*](#)  
A large amount of telecommunications and Internet reports for the Middle East Region, including company profiles, table of contents and summaries available.
- [\*\*Global Telecommunications Statistics, Trends, Analysis and Overviews\*\*](#)  
Get latest reports on global overviews, statistics, trends and developments in fixed and mobile telecommunication, broadcasting, cable TV and information highways, Internet and e-commerce. See available reports list.
- [\*\*United States Telecommunications Market Statistics\*\*](#)  
Fixed-line subscribers and revenue continued to decline, while wireless revenues enjoyed strong growth, driven largely by increased SMS and other data revenues and by
- [\*\*Middle East Internet and Population Statistics\*\*](#)
- [\*\*Oceania Internet and Population Statistics\*\*](#)
- [\*\*Top Ten Countries with the Highest Population\*\*](#)
- [\*\*Countries with the Highest Internet Usage\*\*](#)
- [\*\*Facebook World Statistics by Geographic Regions\*\*](#)
- [\*\*Alphabetical World Country List\*\*](#)
- [\*\*Internet Stats Today Blog\*\*](#)
- [\*\*DNS and Networking Tools\*\*](#)  
This site has DNS and networking tools for network administrators, domain owners, users of DNS hosting services, whois, and other Internet research resources.
- [\*\*Middle East Broadband and the Digital Media Report\*\*](#)  
The analyses, statistics, trends and a comprehensive perspective of the market changes occurring in Middle East. [\*\*Read more in the Executive Summary.\*\*](#)



increased minutes of use. Broadband continued to experience solid growth, with the USA still boasting the world's largest broadband market. See other reports available.

 [Global Telecommunications, Key Reports Focus for Industry and Society](#)

 [Global Telecommunications reports, special offers](#)



**Internet World Stats - Web Site Directory**

[^ top of page](#)

**Internet Usage Stats and Population Statistics**

- [World Stats](#) | [Africa Stats](#) | [America Stats](#) | [Asia Stats](#) | [Europe Stats](#) | [EU Stats](#) | [Middle East Stats](#) | [Oceania Stats](#) | [Latin America Stats](#) | [Top Internet Usage](#) | [Top Internet Penetration](#) | [Top Internet Languages](#) | [Top Ten](#) | [Broadband](#) | [Internet Arabic Speakers](#) | [Internet Chinese Speakers](#) | [Internet English Speakers](#) | [Internet French Speakers](#) | [Internet German Speakers](#) | [Internet Portuguese Speakers](#) | [Internet Spanish Speakers](#) | [World Languages](#) | [Caribbean Stats](#) | [Central America Stats](#) | [North America Stats](#) | [South America Stats](#) | [Facebook Stats](#)

**Country Links and International Directory**

- [Africa](#) | [Asia](#) | [North America](#) | [Central America](#) | [Caribbean](#) | [Europe](#) | [European Union](#) | [EU Enlargement](#) | [Middle East](#) | [South America](#) | [South Pacific and Australia](#) | [World Population](#) | [Country List](#) | [United States](#)

**Internet Marketing Pages**

- [Broadband Usage](#) | [Mobile Internet](#) | [Internet Usage](#) | [Internet Divide](#) | [Internet Growth](#) | [Internet Coaching Library](#) | [Internet News](#) | [Internet Users Associations](#) | [Internet Security Stats](#) | [Market Reports](#) | [Internet Market Research](#) | [Press Release Coaching](#) | [SEM](#) | [SEO](#) | [Internet Search](#) | [Internet Browsers](#) | [B2B Trade Exchanges](#) | [Travel Stats](#)

**Site Resources and Services**

- [Media Kit](#) | [Blog](#) | [Dictionaries](#) | [Tools](#) | [Internet Telephone Calls](#) | [Conference Calls](#) | [Make Money Online](#) | [NFL Tickets](#) | [Privacy](#) | [ICT](#) | [Newsletter](#) | [Press Room](#) | [Software](#) | [Tutorials](#) | [Translations](#) | [Web Services](#) | [Web Stats](#) | [Time](#) | [Weather](#) | [Copyrights](#)

**Country Internet Usage Statistics, Travel Stats and Telecommunications Reports**

- [Africa](#) | [Asia](#) | [Americas](#) | [Caribbean](#) | [Europe](#) | [Middle East](#) | [South America](#) | [South Pacific](#) | [USA](#) | [Site Links](#) | [About Us](#)




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## **Exhibit D: Global Internet Report 2014**

# Internet Society Global Internet Report 2014

Open and Sustainable Access for All





# Contents

<b>4</b>	<b>Foreword</b>
<b>6</b>	<b>Executive Summary</b>
<b>14</b>	<b>Author's notes</b>
<b>16</b>	<b>Introduction</b>
<b>18</b>	<b>01. This is your Internet: Trends and Growth</b>
<b>42</b>	<b>02. Open and Sustainable Internet</b>
<b>64</b>	<b>03. Benefits of an Open and Sustainable Internet</b>
<b>96</b>	<b>04. Challenges to the Open and Sustainable Internet</b>
<b>128</b>	<b>05. Recommendations</b>
<b>134</b>	<b>Annex A. Definition of world regions</b>
<b>135</b>	<b>Annex B. GIUS survey 2013 methodology</b>
<b>137</b>	<b>References</b>
<b>144</b>	<b>Internet Society</b>

# Foreword

More than two decades ago, the Internet Society was formed to support the open development, evolution, and use of the Internet for the benefit of all mankind. Over the years, we have pursued that task with pride. We continue to be driven by the hope and promise of the benefits the Internet can bring to everyone.

In doing so, the Internet Society has fostered a diverse and truly global community. Internet Society Chapters and members represent the people of the world and the many and varied ways they use the Internet to enrich the lives of themselves and their peers. They use the Internet to create communities, to open new economic possibilities, to improve lives, and to participate in the world. We are inspired by their stories of innovation, creativity, and collaboration.

Thanks to the Internet's own success, we are now in an increasingly complex era where the stakes are much higher than before, and potential threats to the Internet's core principles loom larger. To protect your ability to use the Internet for your needs – to keep it open and sustainable – we must do more to measure impacts and present the strengths of the open Internet model in more compelling ways, to convince policy makers, influencers, and the general public of the importance of our mission.

To this end, I am pleased to launch this, the first in an annual series of *Global Internet Reports*. With this report, the Internet Society introduces a new level of integrated analysis, measurement, and reporting to Internet governance discussions at all levels.

The *Global Internet Reports* will become a showcase of topics that are at the heart of the Internet Society's work about the future of the Internet, weaving together the many threads of the diverse multistakeholder Internet community.

I commend our Chief Economist, Michael Kende, for his vision and hard work in creating this report, and I thank everyone else who committed their time and expertise to help.

The Internet Society is pleased to present our first report and trust that the *Global Internet Reports* will become an important contribution to the continued progress of Internet development.

**Kathy Brown**  
President and CEO



# Executive Summary

## Introduction

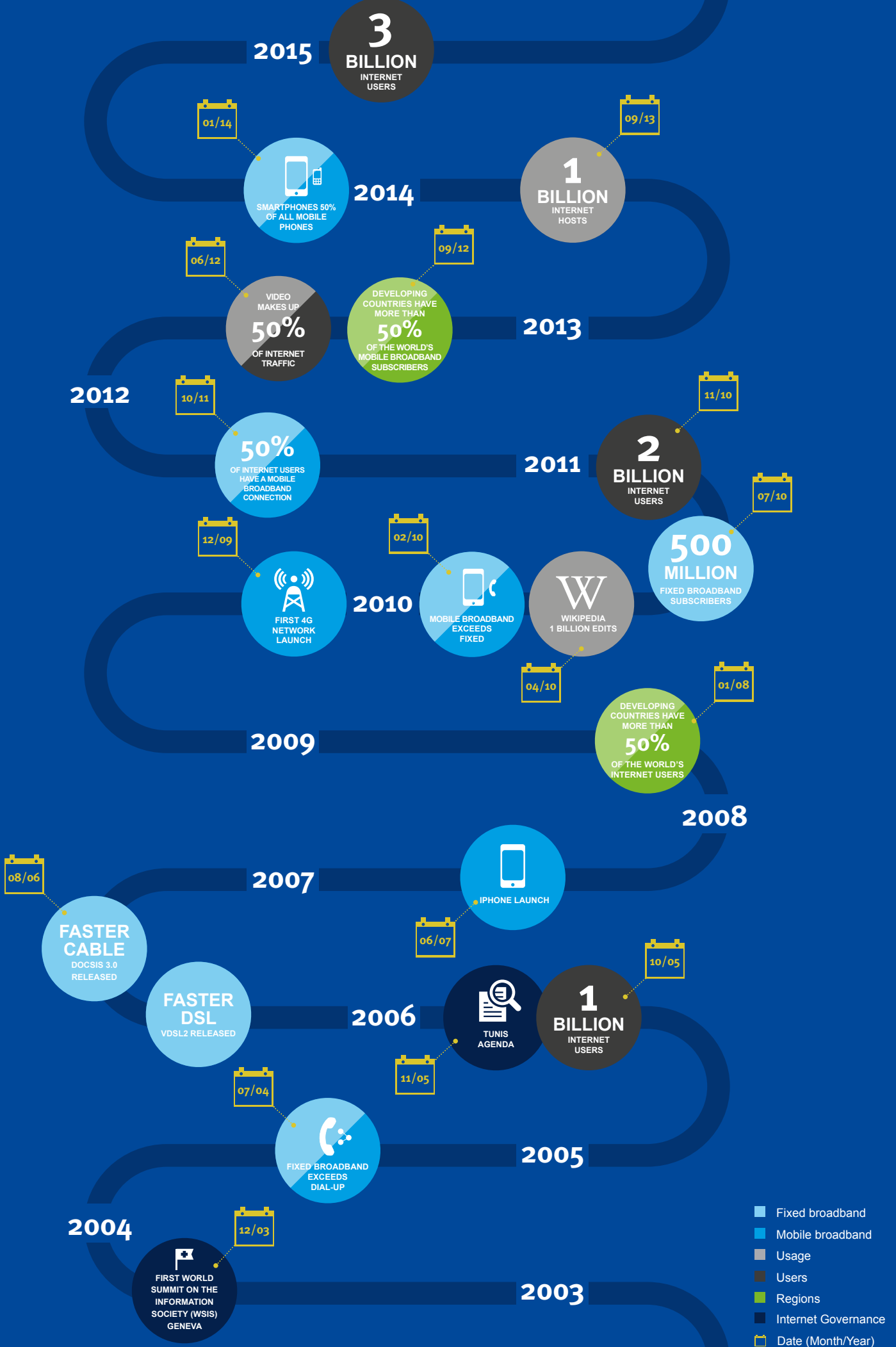
The Internet Society (ISOC) is a global not-for-profit organization founded in 1992 to provide leadership in Internet related standards, development and policy, with the guiding vision that 'The Internet is for Everyone'. This report is the first in a series meant to celebrate the progress of the Internet, highlight trends, and illustrate the principles that will continue to sustain the growth of the Internet.

This report focuses on the open and sustainable Internet – what we mean by that, what benefits it brings, and how to overcome threats that prevent those of us already online from enjoying the full benefits, and what keeps non-users from going online in the first place. Given the rapid pace of change, it is important to solidify and spread the benefits of the open Internet, rather than taking them for granted.

## This is your Internet: Trends and Growth

Against a backdrop of relentless growth, the Internet continues to change and evolve, as shown in the timeline below. It is remarkable that only in 2004 did fixed broadband connections exceed dial-up access, the number of users only exceeded one billion late in 2005, or that the first smartphone was only introduced in 2007. How many of us could have imagined back then that mobile broadband would so soon surpass fixed, developing country users surpass developed country users, video traffic surpass all other, and that we would be approaching three billion users in early 2015?

Throughout this process of constant change, the fundamental nature of the Internet has remained constant. The Internet is a uniquely universal platform that uses the same standards in every country, so that every user can interact with every other user in ways unimaginable 10 years ago, regardless of the multitude of changes taking place. This report shows why it is important to maintain, and strengthen, the open and sustainable Internet that has enabled not just the growth, but also the evolution of the Internet.



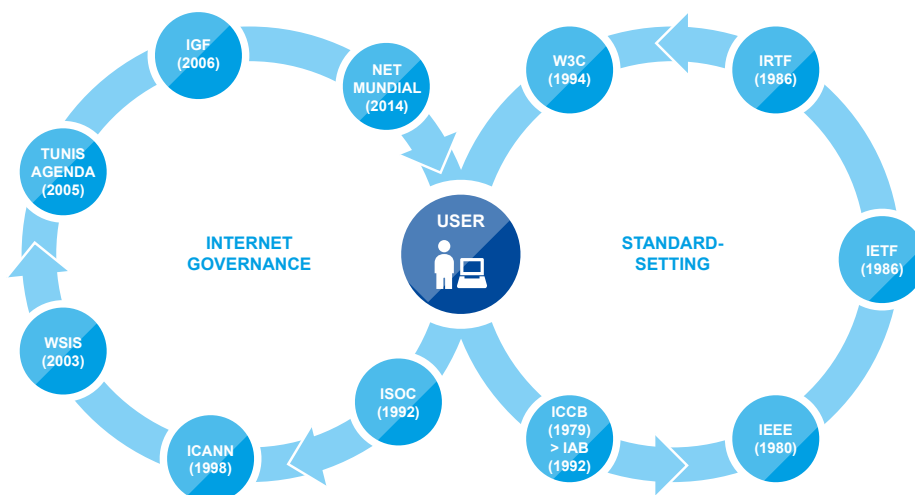
- Fixed broadband
- Mobile broadband
- Usage
- Users
- Regions
- Internet Governance
- Date (Month/Year)

## What is the Open and Sustainable Internet?

The Internet has changed the world. Open access to the Internet has revolutionized the way individuals communicate and collaborate, entrepreneurs and corporations conduct business, and governments and citizens interact. At the same time, the Internet established a revolutionary open model for its own development and governance, encompassing all stakeholders.

The development of the Internet relied critically on establishing an open process. Fundamentally, the Internet is a 'network of networks' whose protocols are designed to allow networks to interoperate. In the beginning, these networks represented different academic, government, and research communities whose members needed to cooperate to develop common standards and manage joint resources. Later, as the Internet was commercialized, vendors and operators joined the open protocol development process and helped unleash the unprecedented era of growth and innovation.

The cooperation between the communities of interest was itself made possible by tools that were enabled by this inter-network – email, file transfers, and then the World Wide Web. Thus came a vital feedback loop between the users of the network and the stewards, who were one and the same. This loop has ensured that the openness of the process developing the network is reflected in the open usage of the network, and vice versa.



The spirit of collaboration that lies at the foundation of the Internet has extended from standards to a multi-stakeholder governance model for shared Internet resources for naming and addressing. The multi-stakeholder approach now also covers policy in a variety of organizations and processes at the international and national level, creating an infinite loop of continuous improvement.

To illustrate, we show how the multi-stakeholder model is used to develop standards such as the Opus audio codec; how it has been applied to combat spam in developing countries; how Internet Exchange Points can be developed; and even how a multistakeholder approach has been adapted to provide wireless Internet access in rural India.

## **Benefits of an Open and Sustainable Internet**

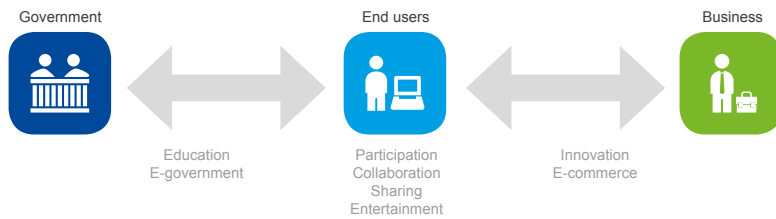
The open Internet has created a medium like no other, one that merges the most notable characteristics of traditional media such as broadcast and telecommunications, while also augmenting them in ways that have revolutionized aspects of civil society, business, and government.

The Internet allows these traditional forms of communications, but is more interactive than old-style broadcast, and more inclusive than a conventional telephone call. As a result, the nearly three billion Internet users are both creators of information as well as consumers. Websites, blogs, videos, tweets, can all be broadcast and accessed in the largest mass medium imaginable. Audio and video calls and conferences can be set up and received without regard to distance or cost.

However, these changes are not just limited to traditional media. Governments can use the Internet to deliver services and levy taxes and, in turn, can choose to enable citizens to elect, petition, and oversee their governments online. Entrepreneurs not only have new markets for their goods or services, but also a new means to raise money online to finance their dreams. Likewise, entertainers have a new global medium to share or sell their endeavours, while new artists can be discovered and grow online.

With open access to the Internet and an appropriate enabling environment, the resulting benefits of the Internet are limited only by the imagination and efforts of its users. Here we provide some examples that demonstrate the value of the open Internet for creating benefits among its global users.

**EXAMPLES OF THE OPEN AND SUSTAINABLE INTERNET**

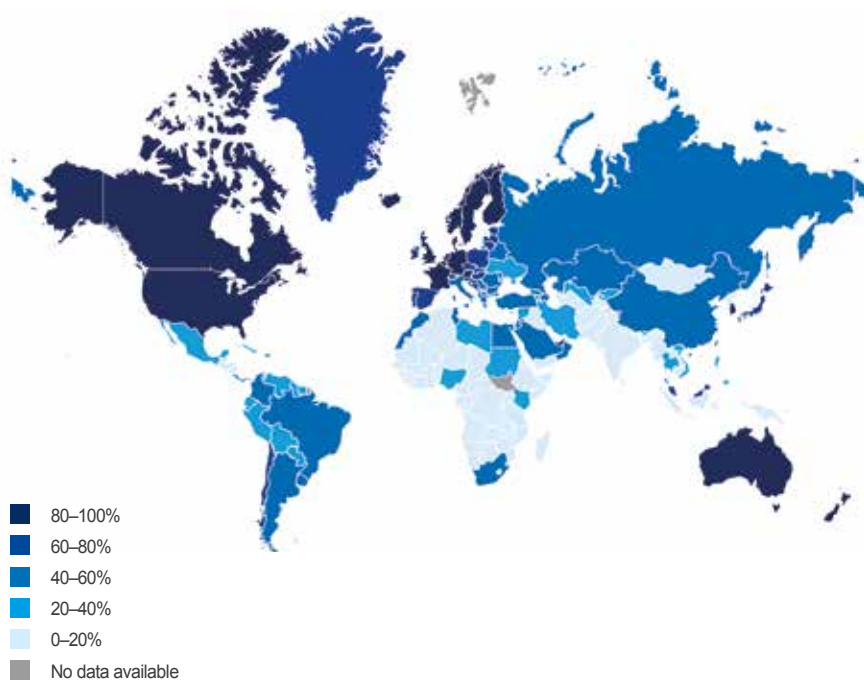


## Challenges to the Open and Sustainable Internet

The benefits of the open Internet flow from the development and adoption of a set of underlying protocols that are in use worldwide. These protocols help to create the base of nearly three billion users, allowing them to communicate with one another to generate the benefits described in the previous section. However, while the Internet is often called the ‘network of networks’, all networks are not created alike.

**GLOBAL INTERNET PENETRATION LEVELS IN 2012**

[Source: ITU]



Creating a global network of networks based on a standard platform is a foundational success of the Internet. That is not to say, however, that there are not significant differences between countries in terms of Internet access and usage. The first, highlighted above, relates to the penetration of Internet users between countries; the more users within a country and in neighboring countries, the more benefits to any other user in being online.

Further, for those users already online, the overall user experience can differ significantly by country. Any such differences, however, do not originate from technical standards, but rather from government policy and economic reality. In particular, these differences can arise at two layers of the Internet:

- Infrastructure. Countries can differ by the affordability and bandwidth of access networks, and by the resilience of their international connections to other countries, based on economic factors and policy and regulatory choices.
- Content and applications. Some governments require network operators to filter content or block applications, using political or legal justifications. In other cases, content may not be available or locally relevant for economic reasons.

While the open Internet is an unparalleled positive force for advancement, it is not immune from economic and political influences that act to limit benefits. An affordable and reliable Internet is not yet a reality for the majority of people in the world. At the same time, where access is available it should not be taken for granted. The mere fact of being connected does not guarantee one will be able to innovate or freely share information and ideas; these abilities require an enabling Internet environment, one that is based on unrestricted openness.

## **Recommendations**

Although the Internet is held together by a global set of standards, we have shown here that there are divisions in the user experience between countries. Further, in spite of the striking, once unimaginable, growth in Internet adoption and usage, the majority of the world population is still not online. Addressing the challenges in the previous section will not just improve the user experience of those currently online,

but will also contribute to the Internet Society’s overarching vision, that the Internet is for Everyone.

Progress towards our vision is proceeding quickly around the world, as access continues to grow at a significant pace. However, much development work remains to be done to bring the economic and social benefits of the Internet to everyone. Further, those who are online are experiencing significant variations in their user experience.

For non-Internet users, sitting on the other side of the so-called digital divide, Internet access is clearly a critical component. With the advent of mobile broadband, which can be rolled out faster and at lower cost than fixed broadband, access is no longer as critical an issue for those in the new service regions. Nonetheless, affordability remains as a significant roadblock. However, there is evidence that among those who have access to the Internet and are able to afford it, there are still many who choose not to go online.

<i>Have Internet already</i>	<ul style="list-style-type: none"> <li>• <b>Resilience:</b> Increase cross-border connectivity</li> <li>• <b>Security and privacy:</b> Use technology to promote trust and privacy</li> <li>• <b>Content availability:</b> Make sure content is widely and legally available</li> </ul>
<i>Could have Internet</i>	<ul style="list-style-type: none"> <li>• <b>Content access:</b> Provide access to locally relevant content</li> <li>• <b>Content creation:</b> Government lead in developing applications and creating demand for hosting infrastructure</li> </ul>
<i>Cannot have Internet</i>	<ul style="list-style-type: none"> <li>• <b>Access:</b> Remove barriers to deployment, and government invests where costs are high or incomes are low</li> <li>• <b>Affordability:</b> Remove taxes on equipment and services to lower costs, subsidize demand in targeted fashion</li> </ul>

As a result, when considering how to bridge the digital divide, it is important to differentiate those who could afford to go online, but choose not to, from those who do not have access or could not afford it anyway. It is also important to consider the issues that impact those already online, such as improved security and privacy measures. Addressing those concerns will not just impact those already online, but improve the experience for those considering going online.

## **Conclusion**

As we near three billion Internet users, it is appropriate to step back and marvel at the speed of adoption and changes that have taken place to date. It is clear that the open Internet model, which helped to fuel the growth and navigate all the bumps in the road, continues to be the best way to ensure that the Internet remains sustainable and continues to grow.

Working together – and honouring the Internet model – all stakeholders can meet the foreseen challenges outlined in this report – and others as they arise – to make the Internet yet more essential to end-users' lives as citizens, consumers, and innovators. At the same time, we can address the digital divide that separates regions and people, and make sure that once online, everyone has the same user experience. With open and universal online access, anything is possible.



# Author's Notes and Acknowledgements

As the Internet Society's first Chief Economist, it has been an honour for me to write the first of our *Global Internet Reports*. Our vision is for this to be the first in an annual series of reports, providing an overview of key data and trends showing the growth and development of the Internet worldwide, each year focusing on a particular theme. This year, in light of the revelations of 2013 and subsequent challenges for standards development and Internet governance, we chose the topic of the Open and Sustainable Internet – why it is worthwhile to protect and promote.

The report is largely written from the end-user perspective – how we benefit from an open Internet and why its sustainability is so important to so many aspects of civil life, business, and government. This report is dedicated to our members and their chapters, in recognition of their dedication to the Internet Society and to the broader mission of promoting our principles for the Internet. We hope that this report helps in that mission.

Preparing and delivering this report was a team effort across the entire Internet Society. First, I would like to thank Karen Rose, who had a vision several years ago to 'bring data to the dogma' and brought me on to help fulfill that vision, and also provided insight and experience on every aspect of the report. I would also like to thank Lynn St. Amour, under whom this project started, and Kathy Brown for her enthusiasm and support since taking over.

I would also specifically like to thank a number of my colleagues who helped with the content of the report. Markus Kummer, Sally Wentworth, Konstantinos Komaitis, Nicolas Seidler, Karen Mulberry, Leslie Daigle, Mat Ford, Dan York, Lucy Lynch, Jane Coffin, Rajnesh Singh, Duangthip Chomprang, Dawit Bekele, Michuki Mwangi, Sebastian Bellagamba, and Raquel Gatto all provided input at various stages of the project. Additional thanks to Carl Gahnberg, who provided research and analysis throughout the project.

In addition, a large team helped to prepare the report for distribution and the online material, including Walda Roseman, Greg Wood, Wende Cover, Howard Baggott, Dan Graham, Fernando Zarur, Nona Phinn, Lia Kiessling, Kathy Sebeck, Graham Minton, and Joyce Dogniez. Please visit the online material, where we will provide interactive maps, updates, and new material throughout the year, at [www.internetsociety.org/global-internet-report](http://www.internetsociety.org/global-internet-report).

Beyond the Internet Society staff, I would like to thank the following members of the global Internet community for their help and expertise:

- Bert Wijnen, research engineer, and Emile Aben, system architect at RIPE NCC, for programming the Atlas probes to provide the round trip times to YouTube and Facebook, used in section 4.
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- Gerard Ross for providing a thorough and engaging final review of the document.
- Blossom Communications for developing the infographics, design, and layout of the report.
- TeliaSonera, who generously covered the cost of Blossom Communications.

And finally, in the spirit of the Internet model, I welcome your feedback, comments, and suggestions to help guide and shape future reports.

**Michael Kende**  
Chief Economist

# Introduction

A characteristic of the Internet, which has allowed it to grow so quickly and made it sustainable, is that it is open – both for users to access and innovate, and for all stakeholders to participate in its development and governance. These two aspects of openness did not arise separately, but rather are closely linked, two sides of the same coin.

The founders of the Internet effectively acted as its first multi-stakeholder group. They were pragmatic, pioneering developers, guided by strong, shared foundational principles. They set standards, arranged for interconnection, provided service to their groups, determined policies, and managed resources. As users of the Internet themselves, they governed with a goal to keep the Internet open and make it sustainable, creating an early feedback loop between the users of the Internet and their usage.

Later, as the Internet quickly grew and then commercialized, the roles of the founders were filled by organizations that arose and specialized, but held firm to the principle of user involvement. These institutions developed first to set standards and coordinate resources, then later emerged to address broader Internet governance matters. In this fashion, the feedback loop binding the users of the Internet to its ongoing oversight created an infinite loop of continuous improvement.

Many of the founders of the Internet were also founders of the Internet Society in 1992, further contributing to the feedback loop by promoting engagement and collaboration on key issues facing the evolution and growth of the global Internet. This *Global Internet Report* is the first in a series meant to celebrate the progress of the Internet, highlight trends, and illustrate the principles that will continue to sustain the growth of the Internet.

This report focuses on the open and sustainable Internet – what we mean by that, what benefits it brings, and how to overcome threats that prevent those of us already online from enjoying the full benefits, or that keep non-users

from going online in the first place. Given the rapid pace of change, it is important to solidify and spread the benefits of the open Internet, rather than taking them for granted.

There are still significant differences dividing the Internet experience around the world. Some users are never out of range of a high-speed connection, while others may have to walk to the nearest access point to get online. Some have multiple smartphones, each with a mobile broadband connection, while others must share a phone among the whole family. And some are 'digital natives', for whom nothing is a surprise, while others of us – those who remember a time before the Internet – still marvel at what can, and is, being done online.

This report is part of the ongoing attempt to create a future in which everyone, everywhere is automatically a digital native, such that the term itself will become a redundant anachronism, and memories of a time without Internet will be a thing of the past. Together, we must ensure the day never comes when digital natives reminisce about how the Internet used to be governed by, and for, the end-users, and how it used to provide access to everyone and everything online.



SECTION 01

---

# This is your Internet: Trends and Growth

## 1.1 Introduction

Against a backdrop of relentless growth, the Internet continues to change and evolve, as highlighted in Figure 1.2. In just the past ten years, the number of Internet users shot past one billion and is nearing three billion; users migrated their fixed Internet access from dial-up to broadband; and their usage shifted from text-based to predominantly video traffic. Globally, the number of users in developing countries now exceeds those in developed countries; there are now more mobile broadband subscribers than fixed; and mobile access has shifted to smartphones.

Against this constant change, the fundamental nature of the Internet has remained constant. The Internet is a uniquely universal platform that uses the same standards in every country, so that every user can interact with every other user in ways unimaginable even 10 years ago. This report shows why it is important to maintain, and strengthen, the open and sustainable Internet that has enabled the growth and the changes, outlined in this section.

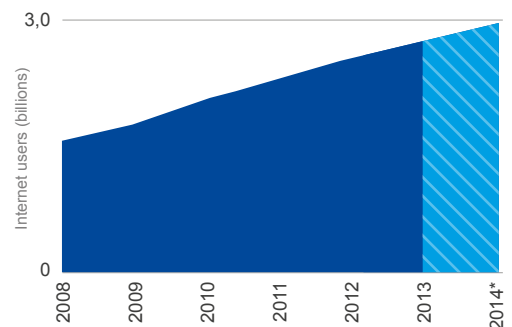
## 1.2 Overview

The Internet, both in terms of infrastructure and content, has grown rapidly since its inception, spurring enormous innovation, diverse network expansion, and increased user engagement in a virtuous circle of growth.

The number of Internet users has risen steadily as shown in Figure 1.1, reflecting the compelling draw and uptake of the growing and more diverse Internet services. We anticipate that the milestone of 3 billion users will be reached in early 2015, based on a recent International Telecommunication Union (ITU) forecast.<sup>1</sup>

**Figure 1.1: Global Internet users**

[Source: ITU,<sup>2</sup> 2014] (\* signifies a forecast)



# 2,893,587,260

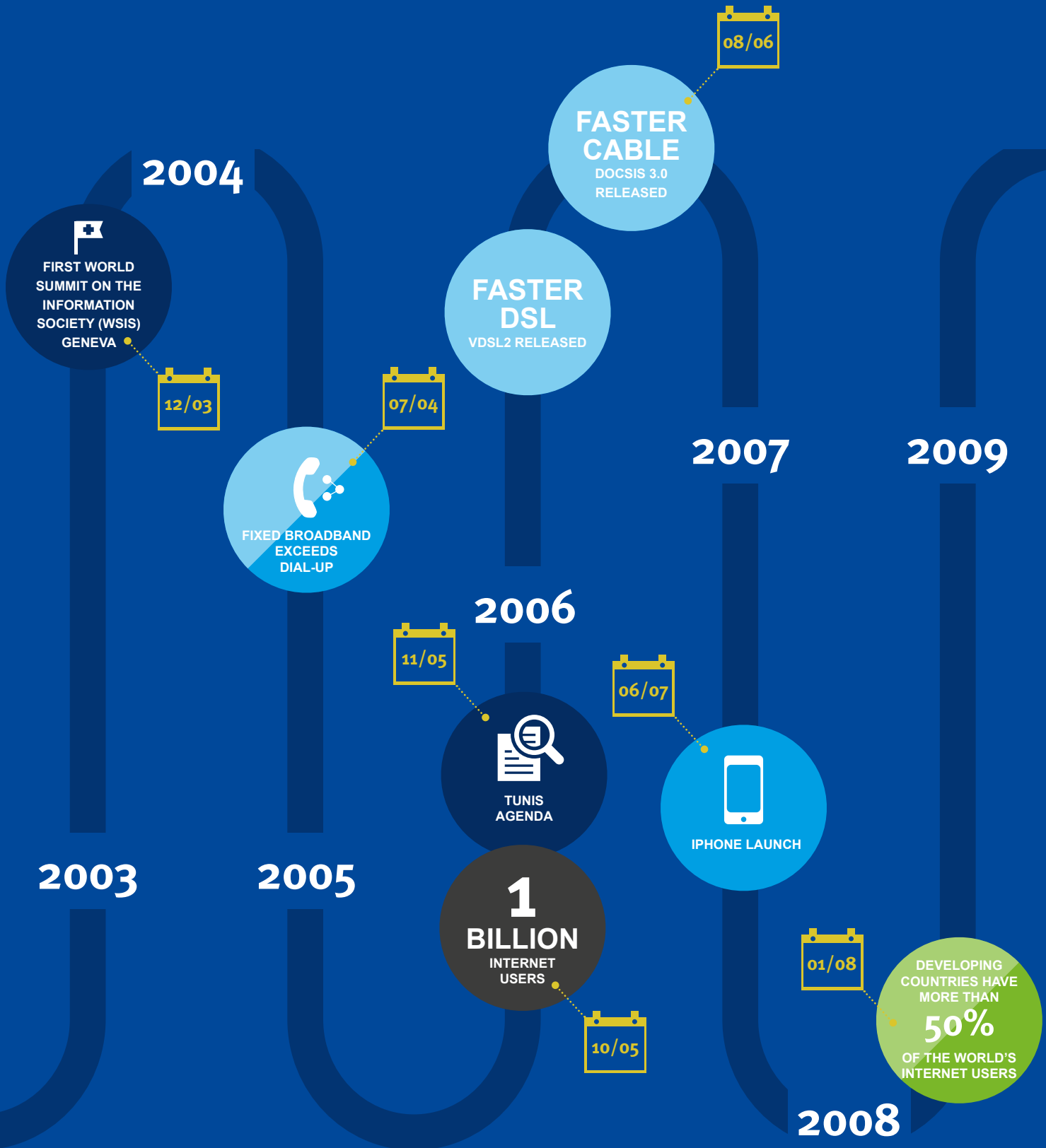
## Internet Users Worldwide

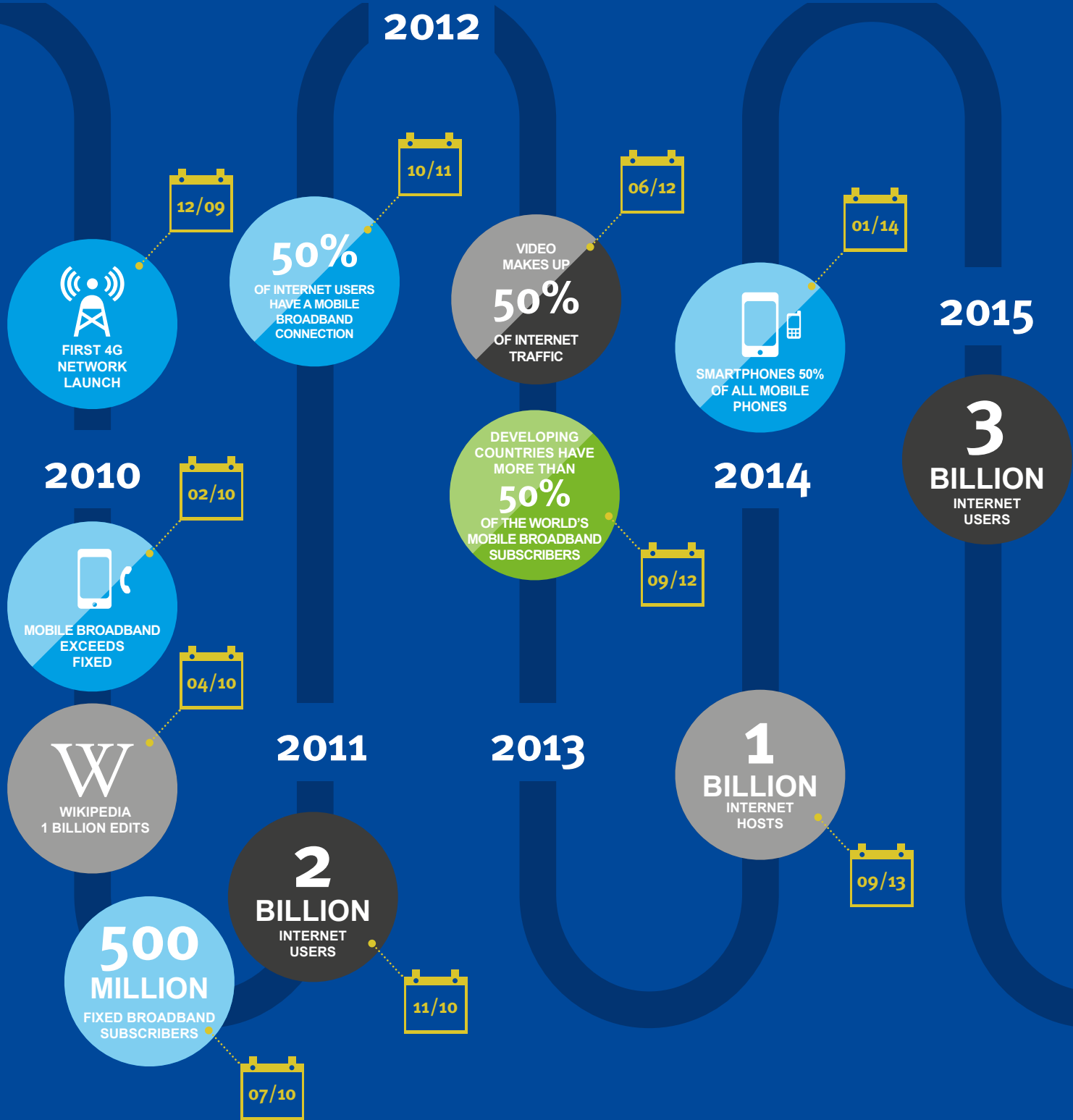
10 May 2014, 8:00 am CET

[Source: [internetlivestats.com](http://internetlivestats.com)]

**FIGURE 1.2: Timeline of milestones in development of the Internet**

[Source: Internet Society, Analysys Mason, 2014]



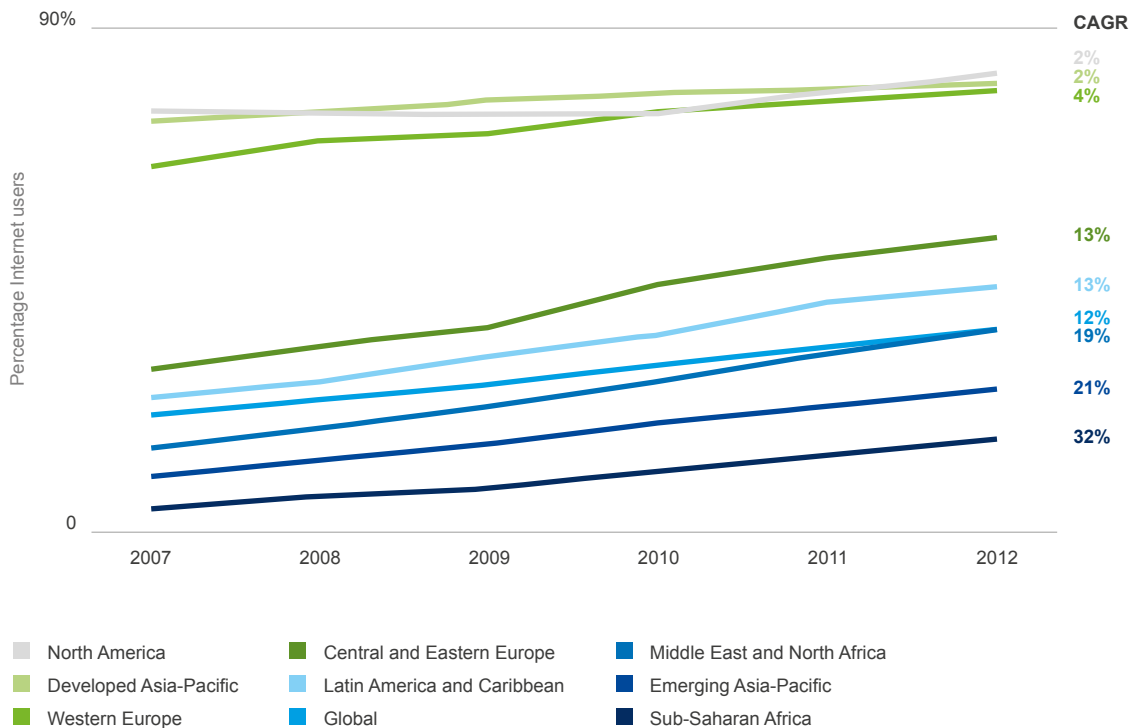




As shown in Figure 1.3, the global proportion of people using the Internet has risen at a compound annual growth rate (CAGR) of 12% in the period 2008-2012, reaching a level of 37.9% of the global population in 2013. The increase in usage is particularly evident in those regions that had lower levels of Internet usage in 2008, with the comparable growth rates for the period in sub-Saharan Africa and emerging Asia-Pacific exceeding 20%, as can be seen in Figure 1.3.<sup>3</sup>

**Figure 1.3: Proportion of population using the Internet**

[Source: ITU, 2013]



Every computer, mobile phone, and any other device connected to the Internet needs an IP address to communicate with other devices. Thus, underpinning the increase in the number of Internet users is an increase in the number of Internet Protocol (IP) addresses issued by the five international Regional Internet Registries (RIRs).<sup>4</sup>

IPv6 is the next-generation IP standard intended to replace IPv4, the protocol most Internet services use today. As can be seen in Figure 1.4 and Figure 1.5 below, while more IPv4 space has been issued by the RIRs in total, the volumes

**69.6%**

Local Internet Registries (LIRs) in the RIPE NCC area with IPv6 allocations

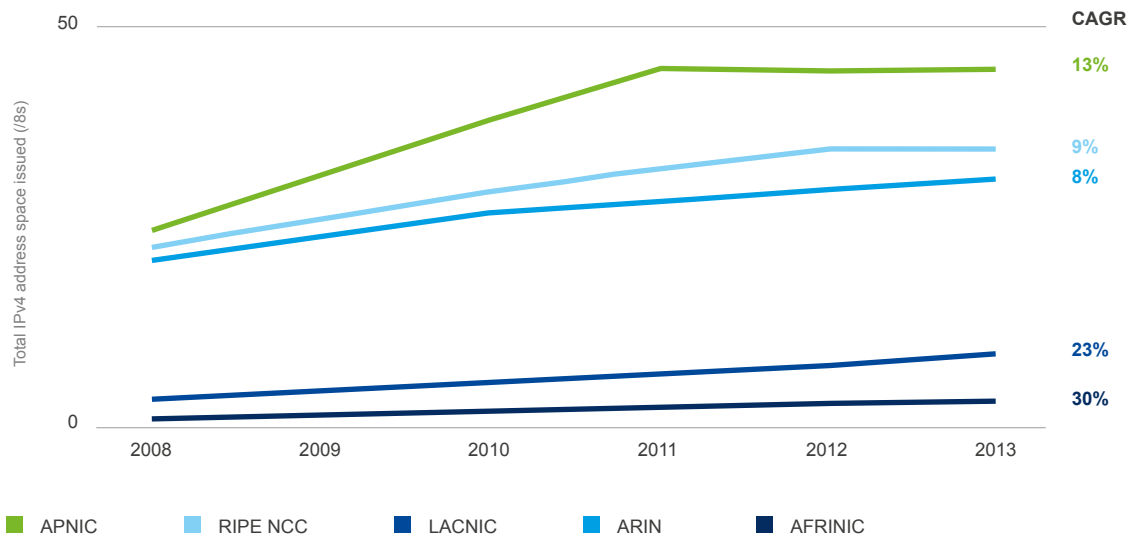
May 2014

[Source: labs.ripe.net/statistics]

of addresses being allocated for IPv6 are growing much more rapidly. This slowing in the volume of IPv4 address space being issued is explained by the near depletion of the IPv4 address pool (in fact, some regions have effectively exhausted their IPv4 resources). At the same time, IPv6 implementation is just beginning to take off.<sup>5</sup>

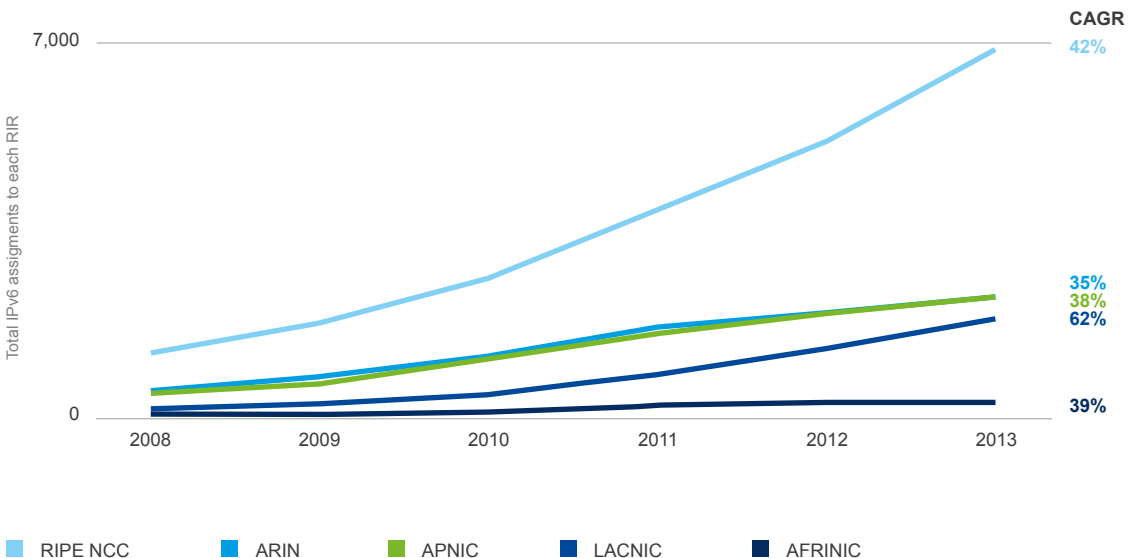
**Figure 1.4: Growth in IPv4 address space issued by each RIR in terms of /8s<sup>6</sup>**

[Source: The Number Resource Organization, 2014]



**Figure 1.5: IPv6 allocations made by each RIR**

[Source: The Number Resource Organization, 2014]



The growth and diversity of Internet infrastructure and its use can also be witnessed in the growth of key Internet identifiers, including autonomous system numbers (roughly measuring the number of distinct networks that interconnect to make up the Internet) and domain name registrations. As noted in Figure 1.6, nearly 70,000 autonomous systems were assigned and more than 135 million domain names registered in total by 2013. This diversity of networks and names serves the range of content and applications that have come to define the Internet experience of today, from education and government content to business, entertainment, and beyond.<sup>7</sup>

Similarly, Internet host numbers are growing, from just 1.3 million in January 1993 to 1.01 billion in January 2014.<sup>8</sup> Based on these numbers, we estimate that the threshold of 1 billion Internet hosts was passed in September 2013.<sup>9</sup> This growth in the number of computers connected directly to the Internet – at a yearly rate over 37% across 21 years – is a strong indicator of the huge rise in Internet connectivity and usage.

While Internet access continues to grow at significant rates, users are also rapidly shifting to broadband connections. Internet access can take many forms, from shared dial-up access in an Internet café to ultra-fast fibre-to-the-home broadband connections, and all forms are important to those users who rely on them for access. However, the clear trend is towards broadband access, both fixed and mobile, owing to the advantages of offering always-on access to ever-increasing amounts of bandwidth. Therefore, with an eye on the benefits to end-users, in this report we highlight advances in broadband Internet access.<sup>10</sup>

As shown in the next sections, both fixed and mobile broadband connections are expected to grow, with mobile connections already outnumbering fixed broadband connections. Of particular interest is the strong and accelerating growth in mobile broadband connections in the emerging regions that have low Internet penetration today.

While Internet adoption is growing worldwide, so is Internet traffic per connection, due to the increasing move to higher-bandwidth broadband access connections, the corresponding adoption of relatively data-heavy Internet applications (such as audio and video streaming) and increased adoption of devices, such as smartphones, that are optimized to access these applications. These themes are explored further in the next sections.

# 1,010,251,829

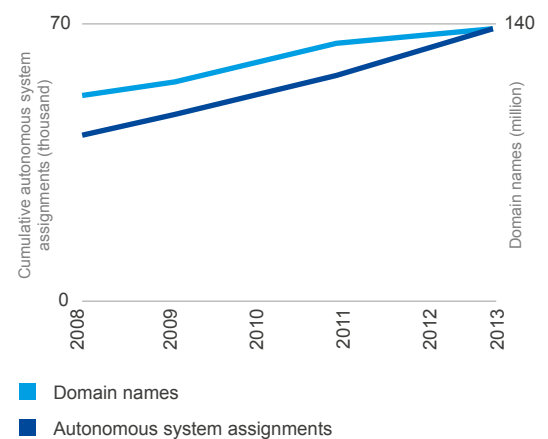
*Hosts advertised in the Domain Name System*

*January 2014*

[Source: Internet Systems Consortium, 2014]

**Figure 1.6: Growth in domain names and autonomous system assignments**

[Source: Regional Internet Registry, webhosting.info, 2014]

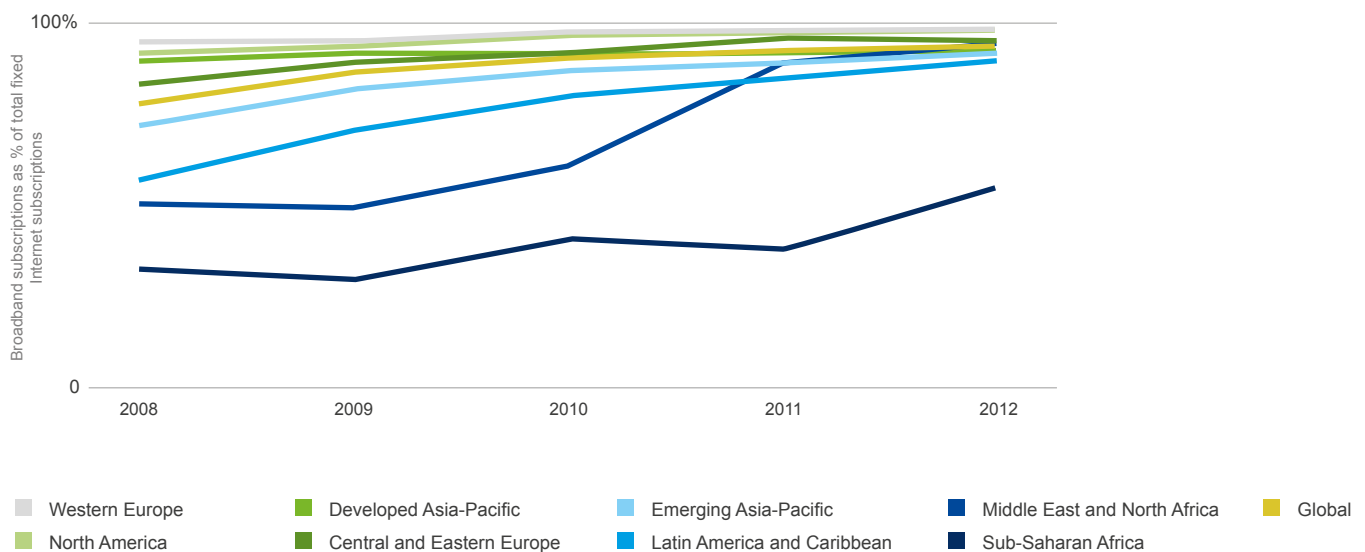


### 1.3 Fixed broadband Internet access

Fixed Internet subscriptions are increasingly dominated by broadband access. Broadband subscriptions reached 93% of total global fixed Internet subscriptions in 2012, as can be seen in Figure 1.7. All regions, aside from sub-Saharan Africa, had at least 90% of their fixed Internet access services at broadband speeds<sup>11</sup> by 2012. The 54% fixed broadband proportion in sub-Saharan Africa is not, however, a reflection of the total proportion of Internet access provided at broadband speeds in the region. This is because fixed access makes up only 4% of total Internet subscriptions in the region, while in North America, for example, 44% of total Internet subscriptions are fixed.

**Figure 1.7: Proportion of fixed Internet subscriptions that are broadband**

[Source: Analysys Mason, 2014]



The number of users with fixed broadband connections<sup>12</sup> has risen rapidly, as shown in Figure 1.8A. Connections are forecast to continue to rise, with particularly significant growth expected in the emerging Asia-Pacific region. However, the overall rate of global growth in fixed broadband connections will likely slow, from 10% annual growth for the period 2010-2013 to 5% for the forecast period 2013-2018, as developed fixed broadband markets approach saturation and mobile broadband continues to increase in importance.

While there is growth in fixed connections globally, in some regions the connections are starting from a very low base and are forecast to remain low relative to more developed regions. For example, despite the 20% annual growth forecast for sub-Saharan Africa, connections in that region will represent less than 10% of the connections forecast for North America, despite a 2.4 times larger population in sub-Saharan Africa. However, as shown in the next section, it is expected that mobile broadband connections will dominate, with 703 million 3G and 4G connections forecast for sub-Saharan Africa in 2018 (as compared to 11.9 million fixed connections).

Alongside the increase in the number of fixed broadband connections, total fixed broadband Internet traffic is expected to continue growing rapidly, with global traffic forecast to more than quadruple between 2013 and 2018, as shown in Figure 1.8B.

While both connections and Internet traffic will continue to rise, the increase in traffic is expected to be the more rapid, with a growth rate of 35% for the period 2013 to 2018 relative to 5% growth for connections over the same period. This is due to the global average traffic per connection being forecast to continue to grow significantly to reach an average 9.5GB per month per connection by 2018, as shown in Figure 1.8C below.

This increase in traffic per connection results from the rise in average bandwidth associated with the move to higher-bandwidth broadband connections, in combination with the rise in data-heavy Internet applications using rich media such as video. As can be seen in Figure 1.9, streaming one minute of video generates over 200 times more traffic than sending a single email. The proportion of fixed Internet traffic originating from video applications<sup>13</sup> has been forecast, by Cisco, to rise from 48% to 67% of total traffic between 2012 and 2017. Simultaneously, the proportion of traffic from web, email, and data applications is expected to fall from 23% to 18%, and the proportion from file sharing from 29% to 14%.<sup>14</sup>

This increase in video traffic is not at the expense of other Internet content and applications, however, as they are all forecast to experience a growth in total traffic. Within North America, traffic from the largest online video application, Netflix, makes up just over 28% of peak fixed traffic in North America, representing an average of 12.5 GB per month per fixed broadband subscriber, with YouTube representing another 16.8% of peak fixed traffic.<sup>15</sup>

# 673,295,648

*Fixed Broadband Subscribers  
Worldwide*

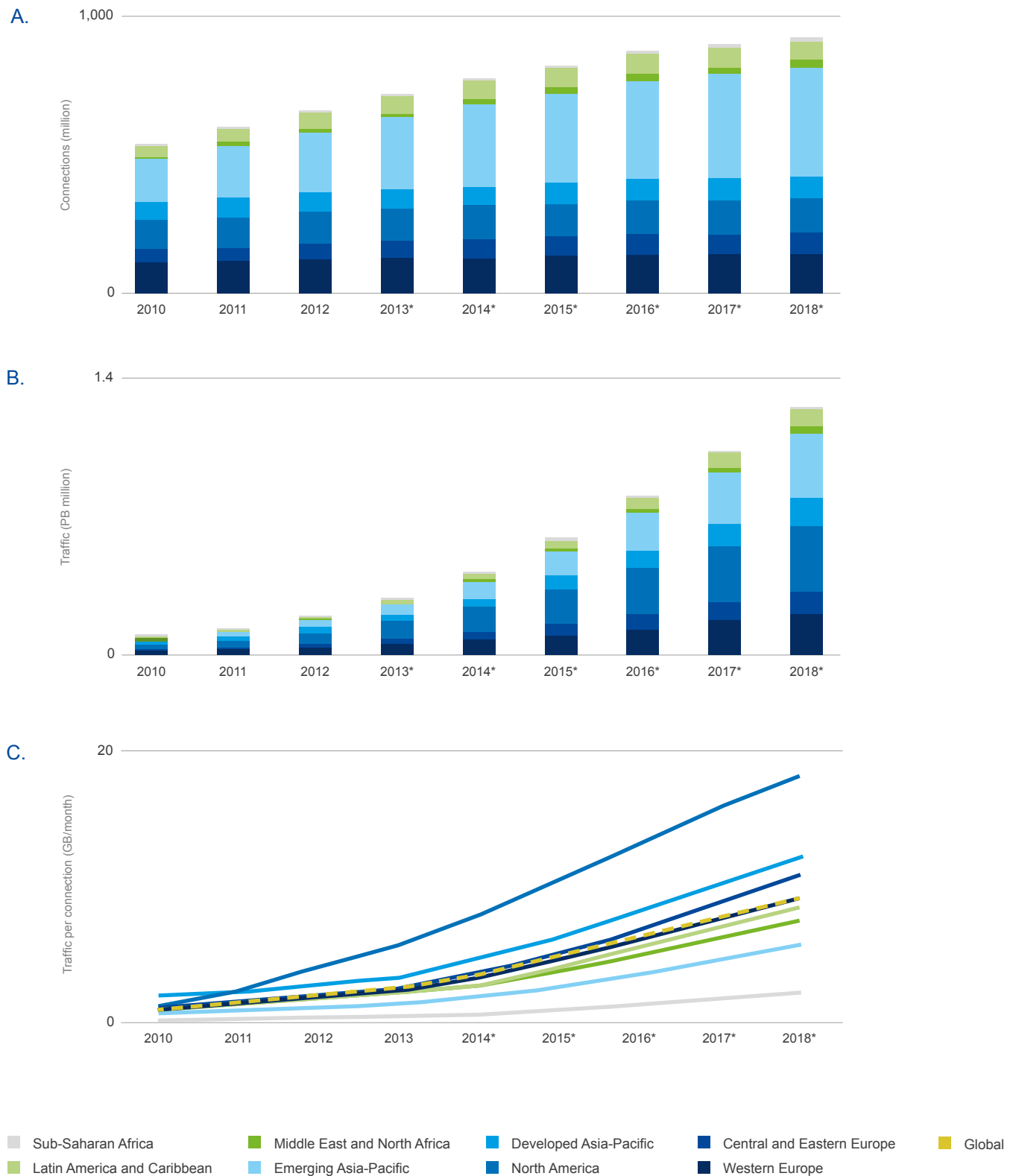
*December 2013*

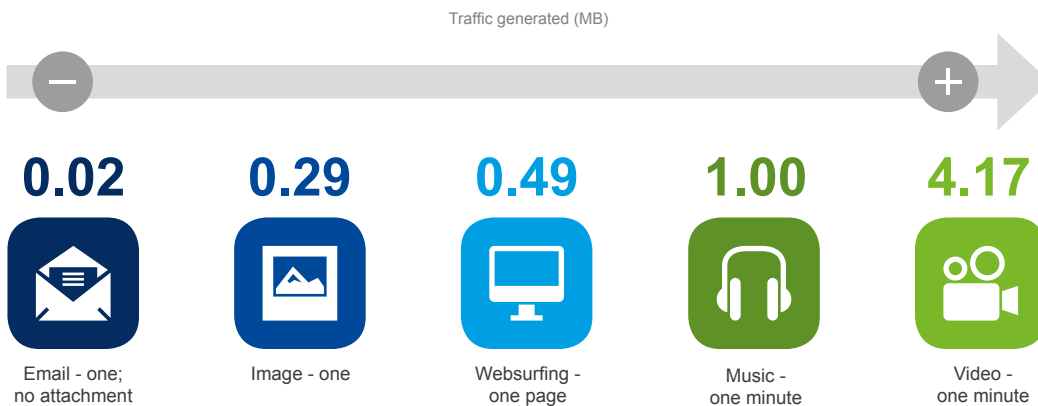
[Source: ITU, 2014]

**Figure 1.8: Fixed broadband**

- A. Global fixed broadband connections
- B. Global fixed broadband Internet traffic
- C. Monthly fixed broadband Internet traffic per connection

[Source: Analysys Mason, 2013]



**Figure 1.9: Traffic generated by different applications**[Source: Sprint, <http://shop.sprint.com/content/datacalculator/index2.html>, 2013]

One of the key issues for the future of the fixed broadband market will be how operators keep up with the demands for additional capacity arising from growing traffic and subscriber numbers. We would expect to see more investment in core network infrastructure, based on either new or existing technologies. Additionally, usage-based pricing, which restricts demand, may become more prevalent. The latter has already begun to be used, with 219 of the 691 broadband offers surveyed by the Organisation for Economic Co-operation and Development (OECD) in September 2012, including explicit data caps.<sup>16</sup>

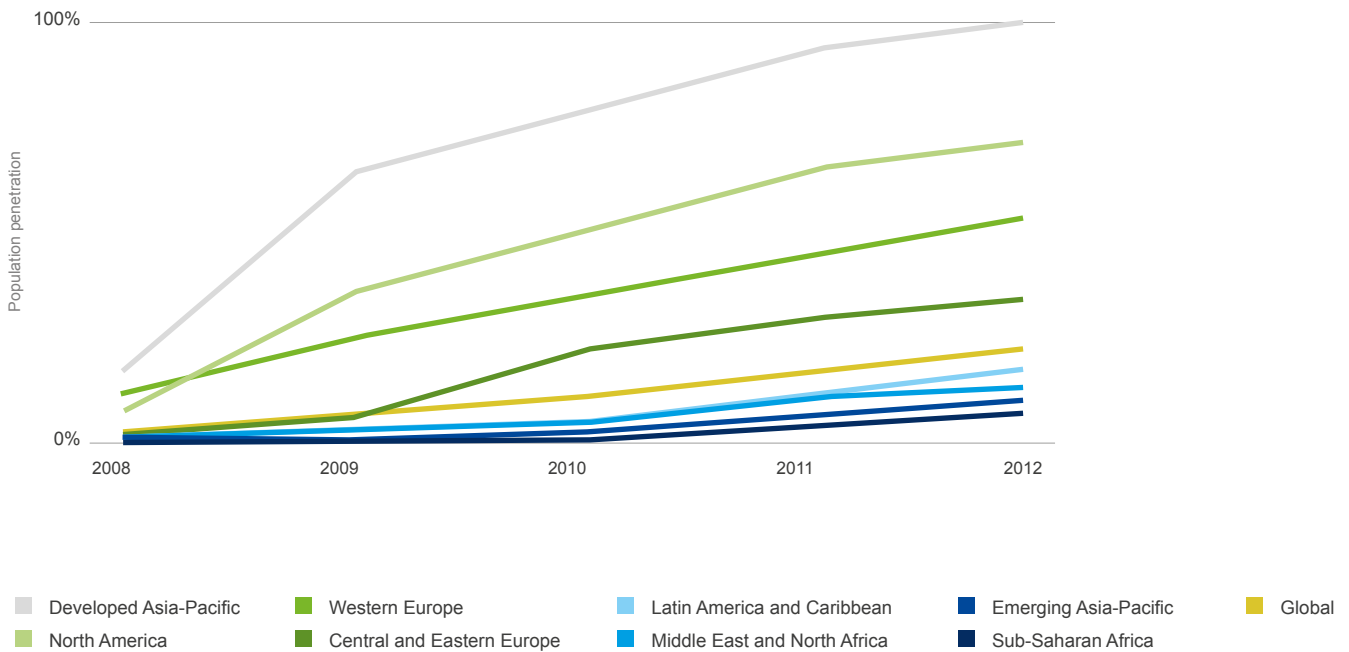
## 1.4 Mobile broadband Internet access

In the past several years, mobile broadband growth rates have exceeded even the significant rate of growth of fixed broadband access, particularly in developing regions. As shown in Figure 1.10, mobile broadband access has grown rapidly in the period 2008-2012. Of particular note is the developed Asia-Pacific region where the population penetration of mobile broadband exceeded 100% by year-end 2012, based on users with multiple subscriptions. Global penetration of mobile broadband subscriptions has grown at a yearly rate of 87% over the period shown, reaching 22% penetration in 2012.

In the next sections, we show that not only are there forecasts for significant growth in mobile broadband penetration, but the mobile broadband technology will be upgraded in many countries to meet users' demand for greater bandwidth speed.

**Figure 1.10: Mobile broadband population penetration**

[Source: ITU, 2013]



**1,930,257,214**

**Mobile Broadband  
Subscribers Worldwide**

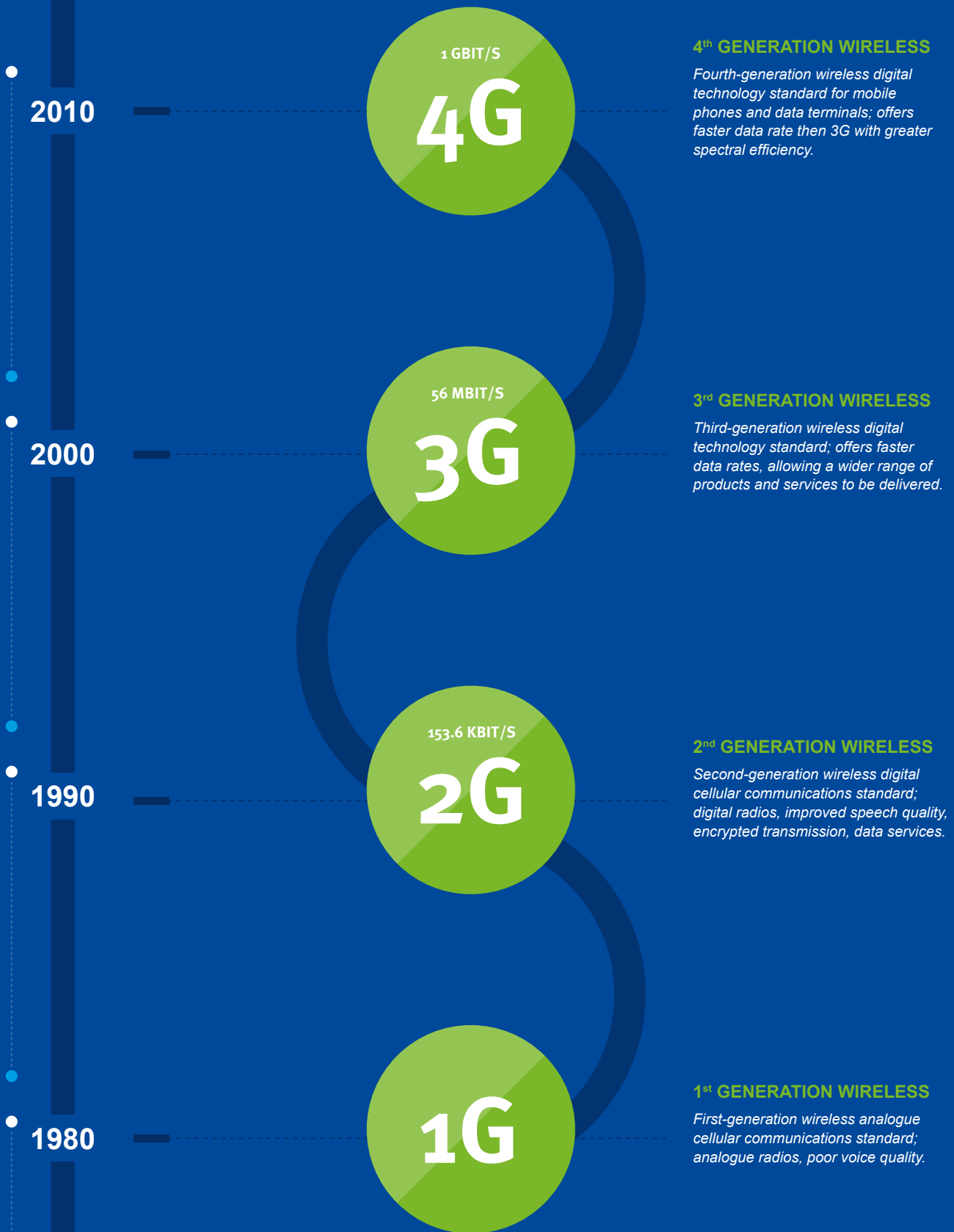
*December 2013*

[Source: ITU, 2014]



**FIGURE 1.11: Overview of the different mobile technology generations**

[Source: Analysys Mason, 2014]



● Start of standards development    ● Commercial system launch

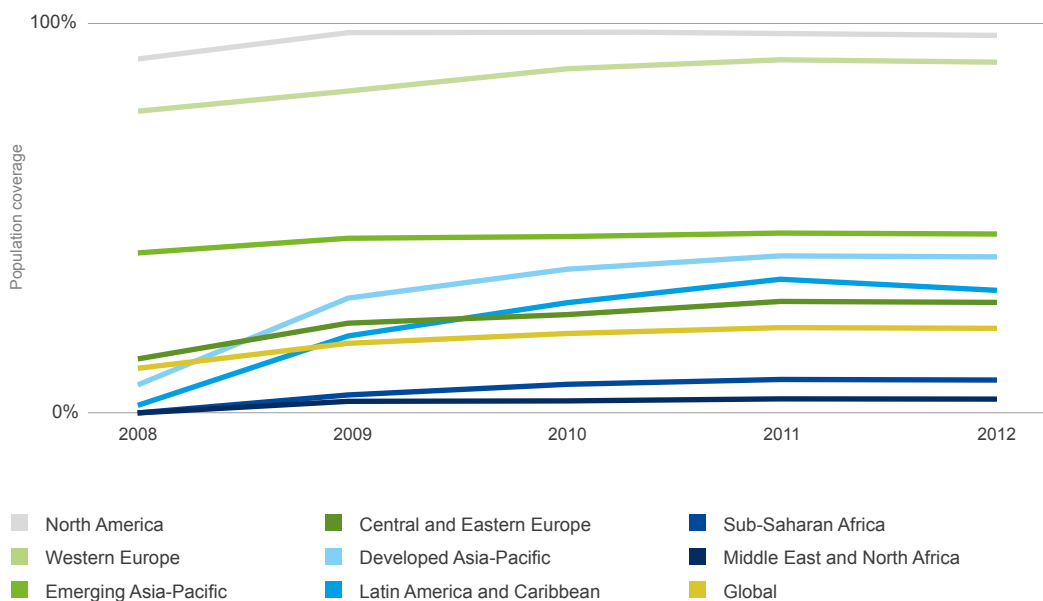
Note: 2G and 3G are widely available whilst 4G is in its early stages of deployment

### **Reach of mobile broadband access**

The coverage of mobile broadband access is expanding significantly, particularly in regions with lower fixed broadband coverage. As can be seen in Figure 1.12, the proportion of the global population covered by a mobile service of at least 3G standard rose from 12% in 2008 to 22% in 2012.

**Figure 1.12: Proportion of population covered by at least 3G**

[Source: ITU, 2013]



As shown in Figure 1.11, 3G networks offer several times greater bandwidth speed than the earlier 2G technology generation. This allows for Internet access at higher speeds, enabling applications such as audio and video streaming, video conferencing, and online TV. This greatly enhanced user experience for Internet services means that the significant majority of mobile Internet traffic today is carried over 3G or more advanced technologies.

Industry rollout of 4G (and more advanced future generations) serves to further increase the network capacity and bandwidth speeds available. Mobile access technologies are now even more capable of supporting the data-intensive Internet services demanded by users.

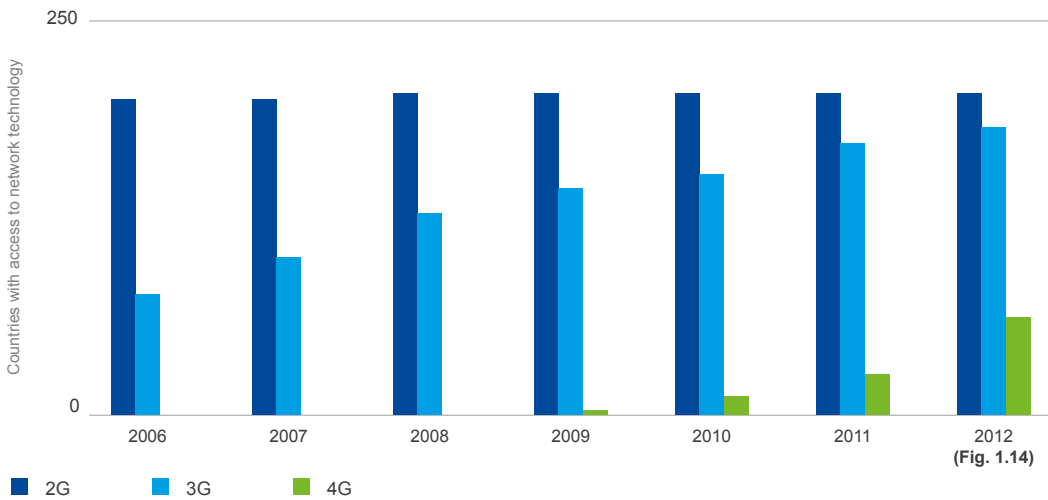
The increased coverage of these mobile network technologies with faster Internet speeds is not simply arising from expanding coverage of existing networks, but also

from the deployment of new, or upgraded, networks across a larger number of countries. As can be seen in Figure 1.13, by the end of 2012 3G networks were active in 181 countries. Meanwhile, 4G networks have been deployed in 63 countries.

These upgraded mobile networks are clustered across certain regions, with 100% of Western European, North American, and developed Asia-Pacific countries operating 3G networks, as can be seen in Figure 1.14. More than 50% of countries in these regions also operate 4G networks. A lower proportion of Middle-Eastern and North African, Central and Eastern European, sub-Saharan African, Latin American, and emerging Asia-Pacific countries have rolled out 3G and 4G networks.

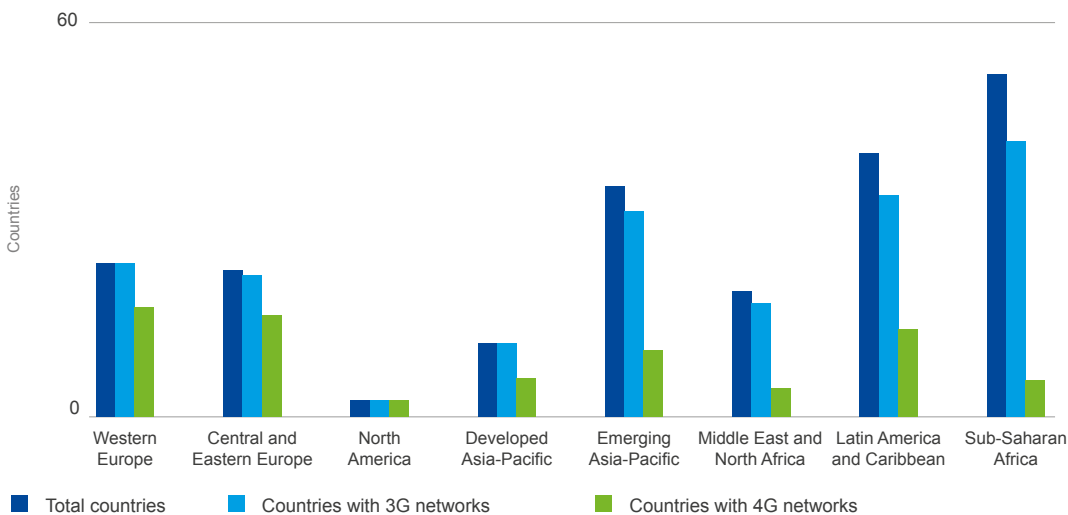
**Figure 1.13: Number of countries with mobile network deployments using different technologies**

[Source: Analysys Mason, 2013]



**Figure 1.14: 3G and 4G network deployments by region in 2012**

[Source: Analysys Mason, 2014]



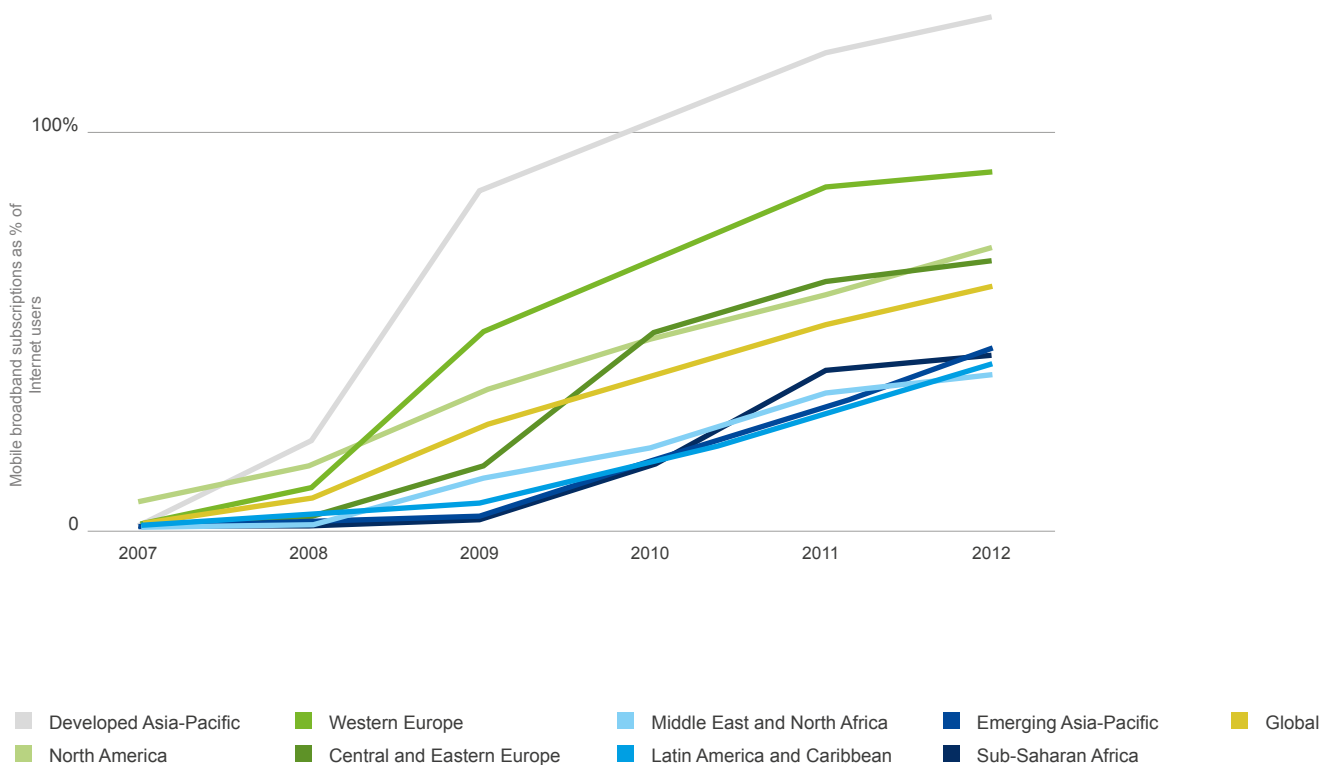
The increase in the deployment of 3G and 4G mobile networks across all geographies has led to a rise in the combined penetration of mobile broadband-compatible devices, including handsets. As a result, mobile broadband subscriptions are growing as a proportion of total Internet users, with the number of mobile broadband subscriptions reaching 60% of global Internet user numbers in 2012, as shown in Figure 1.15. This indicates that mobile broadband access is becoming increasingly important relative to all other forms of Internet access.<sup>17</sup>

As can be seen from the chart above, in the developed Asia-Pacific region, mobile broadband subscriptions have actually exceeded the number of Internet users, indicating that some users have multiple mobile broadband subscriptions. In developing regions, mobile broadband subscriptions have grown to roughly 40% of Internet users. However, we would expect there to be sharing of mobile broadband subscriptions in these regions, suggesting that more than 40% of Internet users may have access to such services.

In the next section, we examine further the breakdown in adoption and usage, with forecasts out to 2018.

**Figure 1.15: Relationship between Internet users and mobile broadband subscriptions**

[Source: Analysys Mason, 2014]



***Mobile broadband adoption and usage***

Mobile broadband connections are forecast to continue to grow across all geographies to 5.3 billion in 2018, as shown in Figure 1.16A below.<sup>18</sup> This will be approximately six times the number of fixed broadband connections forecast for 2018, reflecting in part the personal nature of mobile access devices,<sup>19</sup> but also the available range and wide appeal of these devices.

Mobile data traffic, from all connections, both those shown in Figure 1.16B and 2G handsets, is expected to continue growing rapidly, with global mobile Internet traffic forecast to increase more than six-fold over the period 2013-2018, as shown in Figure 1.16B.

As with fixed broadband access, mobile data traffic is forecast to grow faster than mobile broadband connections, due to the significant increases projected for mobile data traffic per device. This can be seen in Figure 1.16C below.

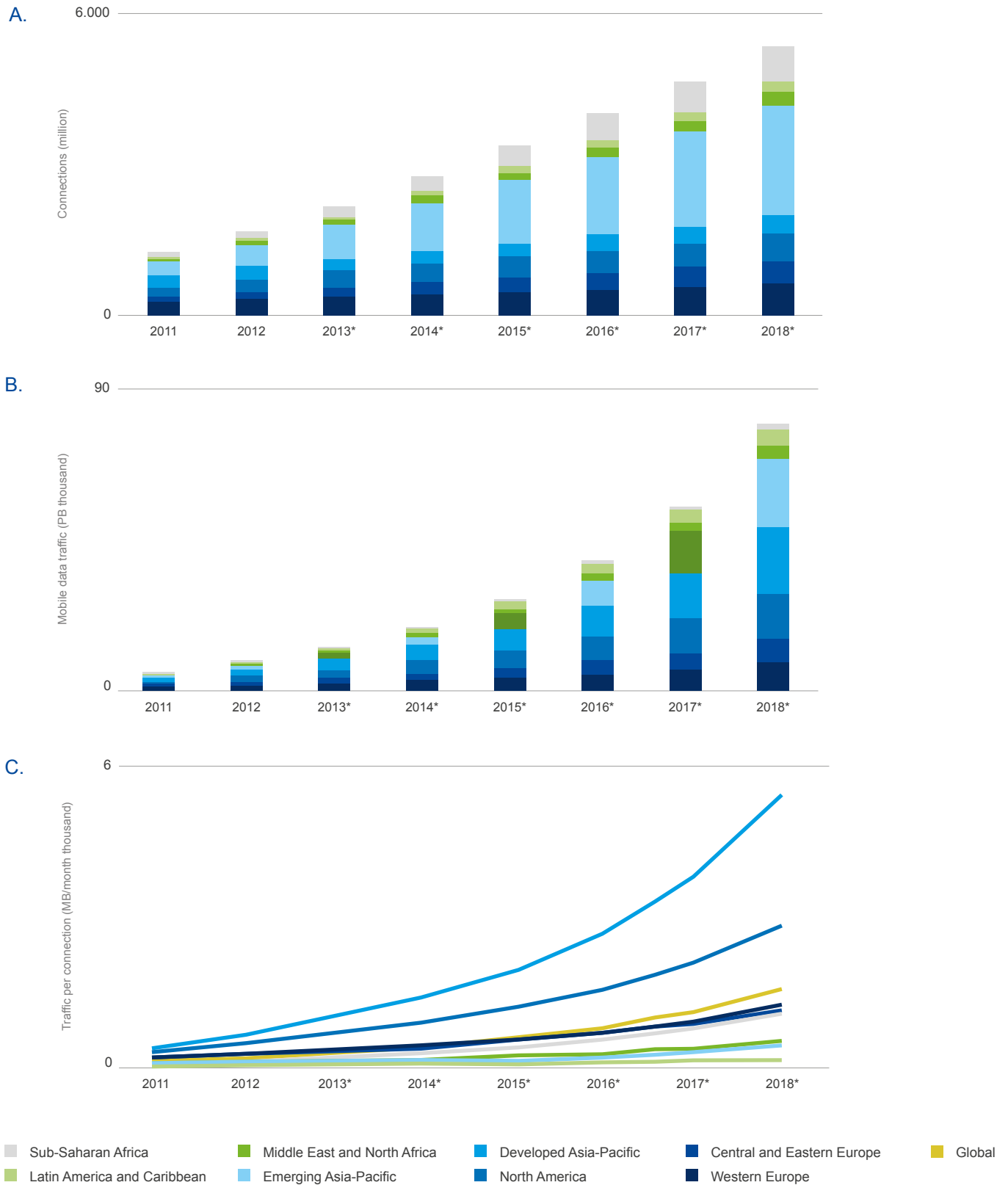
The rise of relatively data-heavy applications is one reason for the growth in mobile Internet traffic per connection. As with fixed Internet traffic, while traffic is expected to grow across all applications, video applications are expected to make up an increasingly large proportion of total consumer traffic, forecast by Cisco to rise from 33% to 56% over the period 2012-2017. In North America, YouTube<sup>20</sup> video traffic has grown to a monthly average level of nearly 74MB per mobile Internet subscriber per month, representing nearly 16.7% of peak mobile traffic.<sup>21</sup>

This increase in Internet traffic per device can also be partially attributed to the migration of users to devices more suited to mobile data, such as smartphones. The Analysys Mason forecasts in Figure 1.17 show that post-2013 the majority of mobile handsets shipped will be smartphones. Shipments of smartphones will increase steadily to reach 1.37 billion in 2017 compared to 0.59 billion for other handsets.

**Figure 1.16: Mobile broadband**

- A. Global mobile broadband connections
- B. Global mobile Internet traffic
- C. Monthly mobile Internet traffic per device

[Source: Analysys Mason, 2013]



The increase in the volume of smartphone shipments shown above is in part a result of price reductions. As shown in Figure 1.18 below, as the global average smartphone price has fallen, from around USD305 in 2011 to a forecast USD220 in 2014, the volume of smartphones shipped has risen from 491 million to a forecast of over one billion.

A number of companies provide low-cost smartphones for developing countries, for example MTN Zambia offers a 'Nokia Asha 210', with a variety of advanced features, for USD80.50.<sup>22</sup> Similarly, in Kenya, the 'Tecno M3' can be bought for USD102; and the 'Alcatel One Touch T'Pop', with the Android Gingerbread operating system and multitouch display, for USD68.<sup>23</sup>

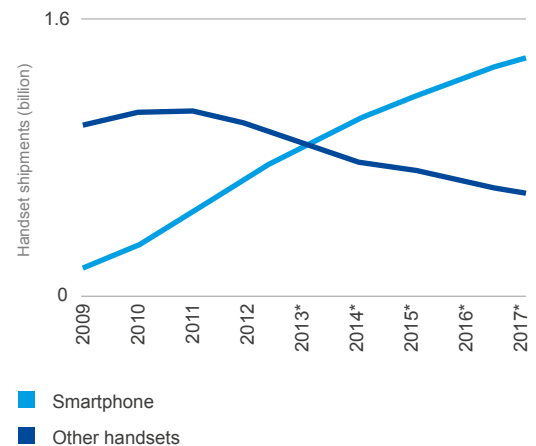
Smartphones provide a more data-intensive service to consumers than other handsets, with their ability to support Internet access via traditional applications such as web browsers and email clients, as well as a new category of mobile apps – application software written for smartphones and tablets – that enable a huge array of Internet services including video calling, games, and a variety of location-based services. In conjunction with high-speed mobile networks, the mobile broadband Internet service available via handsets and dongles can be a substitute for fixed broadband Internet access.

As with fixed broadband access, one of the significant challenges over the next few years for network operators and policy-makers will be addressing the increase in mobile Internet traffic volume. Mobile operators are assigned a finite amount of spectrum, which must be shared among all their users in the vicinity of the same cell tower. An increased number of users – each sending and receiving more Internet traffic – leads to more congestion, particularly in crowded areas of cities.

To address the resulting congestion, on the demand side it is already common to impose usage charges or caps, which may reduce usage, but tend not to be targeted to reduce congestion at peak times or in peak usage areas. As a result, they may also restrict usage in areas where there is no congestion; however, even where there is congestion, efforts to accommodate growing usage, rather than stifle it, should be encouraged.

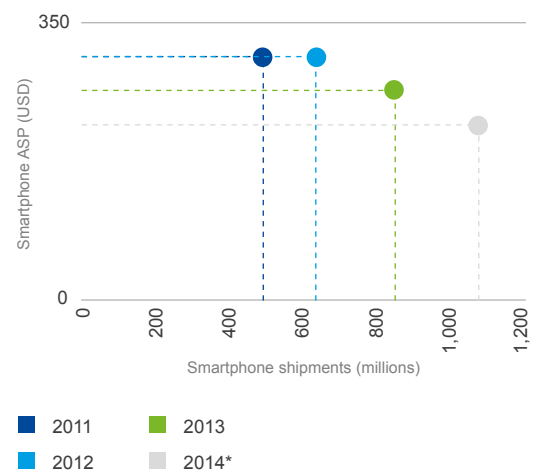
**Figure 1.17: Global shipments of handsets**

[Source: Analysys Mason, 2013]



**Figure 1.18: Relationship between global average smartphone prices and retail shipments**

[Source: Oppenheimer, Analysys Mason, 2014]

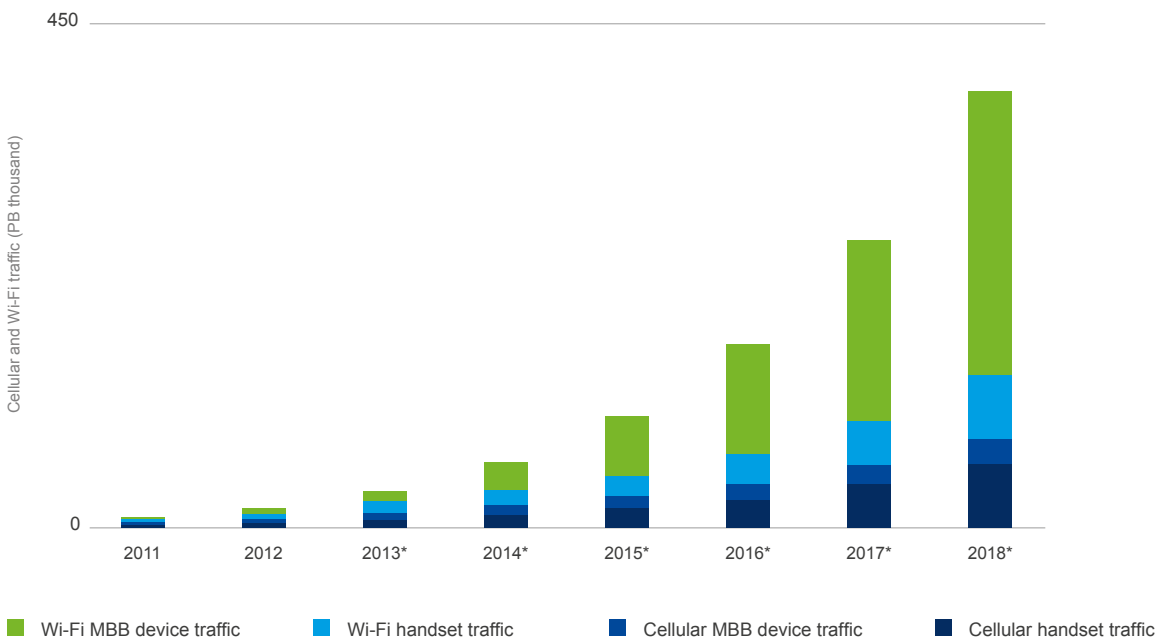


On the supply side, several efforts are underway to increase the capacity of mobile networks. First, in many countries significant efforts are underway to increase the amount of spectrum available. For example, the UK government in 2011 committed to releasing at least 500MHz of public sector spectrum holdings below 5GHz by 2020.<sup>24</sup> Additionally, the upgrade of networks to 4G allows operators to take advantage of the greater spectral efficiency provided by those bands to increase capacity on the existing spectrum bands.<sup>25</sup>

Another way to address the increase in traffic is to ‘offload’ the traffic to Wi-Fi, where it can be carried over a fixed-wired or wireless network. This trend is increasing globally, as illustrated in Figure 1.19. By 2018, the proportion of Internet traffic generated from mobile devices and carried over mobile networks is forecast to fall to just 20% of total mobile traffic from its 2013 level of around 38% (while the absolute level of traffic carried on mobile networks continues to rise).

**Figure 1.19: Total annual cellular and Wi-Fi Internet traffic originating from mobile devices**

[Source: Analysys Mason, 2013]



These efforts will help to accommodate and promote growth in mobile broadband access and usage, enabling a greater number of users around the world to benefit from the increasing amount of content and applications optimized for the broadband experience.



## 1.5 Trends

Currently, fixed and mobile broadband access methods are both extensively used, with mobile broadband appearing particularly important in regions such as sub-Saharan Africa where mobile infrastructure and access is more widely available than fixed networks. As a result, mobile broadband is following the trend of mobile telephony, and surpassing the uptake of comparable fixed services. In developed areas, where Internet penetration is already high, access is increasingly moving towards mobile broadband subscriptions, often alongside fixed broadband connections at home or in the office.

As shown in Figure 1.20, the past five years have brought increases in total Internet users and in global fixed and mobile broadband subscriptions. The rate of growth in mobile broadband subscriptions for the period 2008-2012 is significantly higher than the rate of growth in Internet users, with a marked difference in developing regions. This indicates that mobile broadband is becoming an increasingly common method of Internet access. On the other hand, fixed broadband subscription growth rates are approximately in line with those for overall Internet use. This suggests that fixed broadband, while maintaining its importance, is not dramatically increasing the share of Internet access it provides.

# 474%

*Annual growth rate in mobile broadband subscriptions in Emerging Asia-Pacific, 2008-2012*

[Source: Analysys Mason, 2014]

**Figure 1.20: Summary of growth in Internet users and broadband subscriptions, 2008-2012**

[Source: Analysys Mason, 2014]

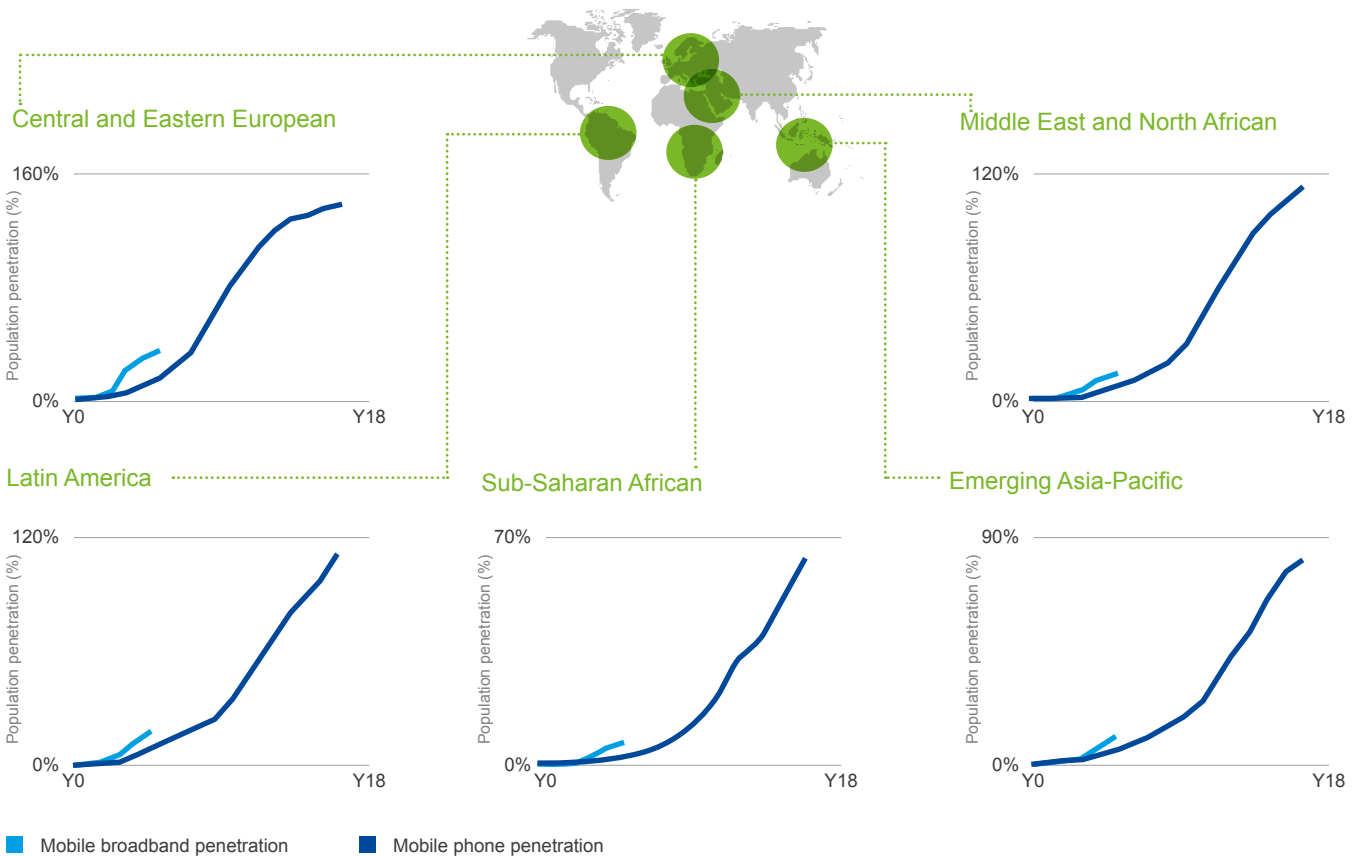
	Internet users		Fixed (wired) broadband		Mobile broadband	
	2012 users (million)	CAGR 2008-2012 (%)	2012 subscriptions (million)	CAGR 2008-2012 (%)	2012 subscriptions (million)	CAGR 2008-2012 (%)
Western Europe	326	4%	129	6%	227	50%
Central and Eastern Europe	210	12%	55	16%	140	161%
North America	286	3%	101	4%	253	76%
Developed Asia-Pacific	192	2%	70	4%	243	57%
Emerging Asia-Pacific	947	20%	214	22%	419	474%
Middle East and North Africa	140	20%	14	23%	54	256%
Latin America and Caribbean	262	14%	49	16%	109	129%
Sub-Saharan Africa	137	28%	2	26%	59	264%
<b>World</b>	<b>2500</b>	<b>12%</b>	<b>634</b>	<b>11%</b>	<b>1504</b>	<b>88%</b>

The impact of mobile networks in developing regions can hardly be overstated. In those regions, mobile phone penetration far exceeded early predictions, and in so doing became one of the fastest adopted technologies in history. In 1999, for example, Safaricom projected that Kenya would have a total of three million mobile subscriptions by 2020.<sup>26</sup> And yet, in November 2013, Safaricom alone reported 20.8 million subscribers.<sup>27</sup> Early indications are that mobile broadband is actually being adopted at an even faster pace than mobile cellular.

Figure 1.21 compares mobile broadband device penetration to that of mobile phone subscriptions for the regions in which mobile can be considered the dominant method of broadband access, with Y0 indicating the year in which services launched in that geography.<sup>28</sup> Thus, for instance for Central and Eastern Europe, Y0 is 1996 for mobile phone, and 2007 for mobile broadband.<sup>29</sup> By lining up the start point for the services, it is possible to compare their early growth rates, and see that mobile broadband is easily outpacing the earlier growth of mobile phones.

**Figure 1.21: Comparison of mobile broadband and mobile phone penetration**

[Source: Analysys Mason, 2013]



**Y0 is the year services were launched**  
 Y0=1996 for mobile phone (1994 for Latin America)  
 Y0=2007 for mobile broadband

As can be seen in Figure 1.21, the regional growth rates in mobile broadband population penetration appear to be significantly higher than the already high corresponding historical growth in mobile cellular penetration. By Y5 (which corresponds to 2012 for the mobile broadband data), mobile broadband penetration exceeds cellular penetration by between 5 and 19 percentage points. Given the increasing reach of mobile broadband networks, and upgrades to newer technologies, the fast uptake of mobile broadband access is very encouraging for increasing overall Internet penetration.

### Box 1: Global Internet User Survey

The Global Internet User Survey (GIUS) is a globally scoped survey developed by the Internet Society to provide reliable information relevant to issues important to the Internet's future.<sup>30</sup> The GIUS focuses solely on the views of users as the source of innovation that has driven the Internet's development, evolution, and dramatic growth over the past four decades.

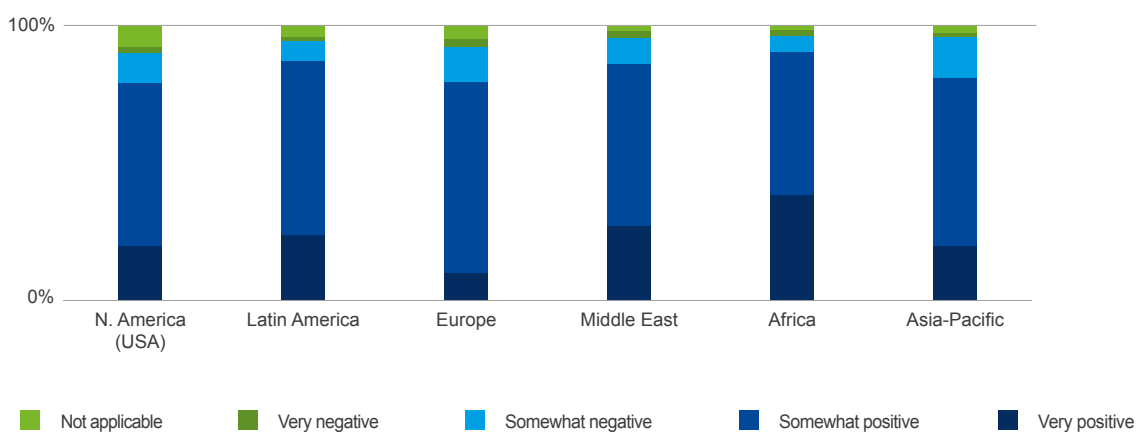
In 2013, the GIUS interviewed 10,500 Internet users in 20 countries around the world. Details about the countries, gender, and age distribution are contained in Annex B. We show results from this survey throughout this report, and note that the results represent the views of the users surveyed rather than the positions or views of the Internet Society, or its global community.

As a starting point, the following figure shows that, on average, the users surveyed are "very positive" or "somewhat positive" about the general state of the Internet today. In a theme that is consistent throughout the survey responses, users in Africa and Latin America express the most optimism about the general state of the Internet, as well as the specific impact that it can have on their lives, as shown further below in Section 3.

### Survey responses

How do you view the general state of the Internet today?

[Source: Internet Society, Global Internet User Survey, 2014]



## **1.6 Conclusion**

The number of Internet users is approaching 3 billion. Against the backdrop of an ever-increasing number of users, Internet access is increasingly shifting to broadband and, in particular, mobile broadband access using a smart device. As a result, users are generating more traffic in general and, specifically, more high bandwidth video traffic. At the same time, the geographic centre of gravity is shifting to developing countries, whose users now outweigh those in developed countries.

The result is a network of networks encompassing an increasing proportion of the world's population, engaged in an increasing amount of online activity. In the following sections of the report, we examine how the open Internet is sustained by open multi-stakeholder governance, the benefits that the resulting platform generates, and the emerging challenges to the intrinsic nature of the open and sustainable Internet.



SECTION 02

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# Open and Sustainable Internet