

3. ENHANCING ACCESS

3.4 | Internet infrastructure

The Internet is a key infrastructure for businesses, individuals, and the public sector alike and continues to expand rapidly. Originally designed as a research network, the Internet's subsequent commercialisation and expansion have necessitated updates to the data protocols that ensure its functioning. IPv6 was introduced in 1999 to succeed IPv4 and provides significantly greater address space but is being implemented relatively slowly. While around 50% of Internet traffic in Belgium uses the IPv6 data protocol, the share in most countries appears to be 20% or less.

The Internet of Things (IoT) includes all devices and objects whose state can be altered via the Internet, with or without the active involvement of individuals. While these connected objects may require the involvement of devices considered part of the “traditional Internet”, laptops, tablets and smartphones are excluded from this definition (OECD, 2018b). Such devices could soon be a fundamental part of the everyday lives of people in OECD countries and beyond. IoT applications span major economic sectors including health, education, agriculture, transportation, manufacturing, power generation and distribution, and many more. One part of the underlying infrastructure of the IoT is machine-to-machine (M2M) communication. Among OECD economies, Sweden has by far the highest penetration (number of M2M SIM cards per inhabitant), although this is chiefly because M2M SIM cards supplied and registered in Sweden are provided to companies throughout the European Union. The number of M2M SIM-cards is growing fast and has doubled in the OECD area between 2014 and 2017.

The rapid spread of digital technologies and the reliance on digitised information creates new challenges for the protection of sensitive data and ensuring the confidentiality of network communications. Secure servers used for the exchange of sensitive information, such as passwords and credit card numbers, are vital infrastructure underpinning e-commerce and many other online activities. According to data from the June 2018 Netcraft survey, 32.6 million secure servers (which implement SSL/TLS), were deployed worldwide in June 2018, up 72% from 19 million servers in June 2017. Growth rates accelerated markedly in 2014, having grown by around 20% year-on-year previously. In 2018, the United States accounted for the largest number of secure servers (12 million), representing 37% of the world total, followed by Germany (3.6 million, 11%) and the United Kingdom (1.6 million, 5%). The United Kingdom also has the highest rate of secure servers in comparison to the total number of servers in the country, at 33% in 2018, and up from 18% a year earlier. However, the share of secure servers in most countries is still low relative to the total number of servers. For example, in the United States less than 3% of all servers hosted use SSL/TLS, while the OECD average is only 3.2%. This is just one specific aspect of cybersecurity, further indicators can be found in Chapter 8.

DID YOU KNOW?

M2M SIM cards are an important foundational technology for the Internet of Things. The number of M2M subscriptions in the OECD doubled between 2014 and 2017.

Definitions

Internet Protocol (IP) consists of the rules and formats for data sent over the Internet. The newest iteration, IP version 6 (IPv6), was introduced in 1999 and offers significantly greater address space (number of potential web addresses) than the preceding IPv4.

Machine to machine (M2M) on mobile networks refers to SIM-cards that are assigned for use in machines and devices and which are not part of a consumer subscription. This includes SIM-cards in personal navigation devices, smart meters, trains, automobiles and so on. Dongles for mobile data and tablet subscriptions are excluded.

Secure servers are servers implementing Transport Layer Security (TLS) or Secure Sockets Layer (SSL) protocols. Internet browsers and web servers use these to exchange sensitive information. They rely on a certificate authority (trusted third parties such as Symantec and GoDaddy), which issues a digital certificate containing a public key and information about its owner, and can confirm that a given public key belongs to a specific website.

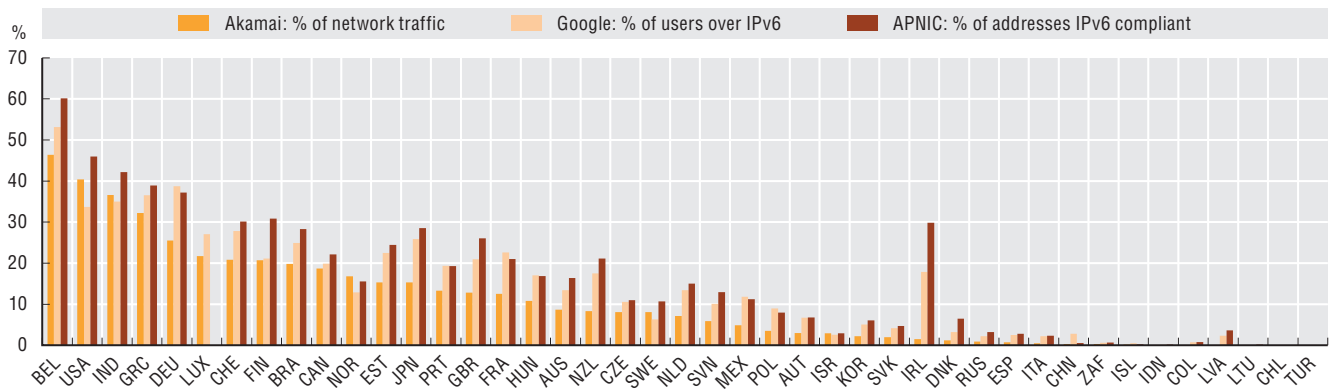
Measurability

Measuring an evolving process such as worldwide adoption of IPv6 requires the use of different methodologies to assess different parts of the Internet (OECD, 2014). These data present complementary information on the share of traffic transiting the Akamai Content Delivery Network that uses IPv6, the share of users accessing Google via IPv6, and the share of Internet addresses provided by APNIC and other Regional Internet Address Registries that are IPv6 compliant. Together, this provides a multi-faceted, albeit partial, view of IPv6 adoption.

The OECD Broadband Portal (<http://oe.cd/broadband>) publishes key telecommunication market indicators based on information from communication regulators and official statistical agencies in OECD countries. Within the set of indicators, most OECD countries now provide data on M2M SIM cards.

Netcraft carries out monthly secure server surveys covering public secure websites (excluding secure mail servers, intranet and non-public extranet sites) using electronic tools to ascertain whether public servers have implemented TLS or SSL.

IPv6 adoption by country, 2017

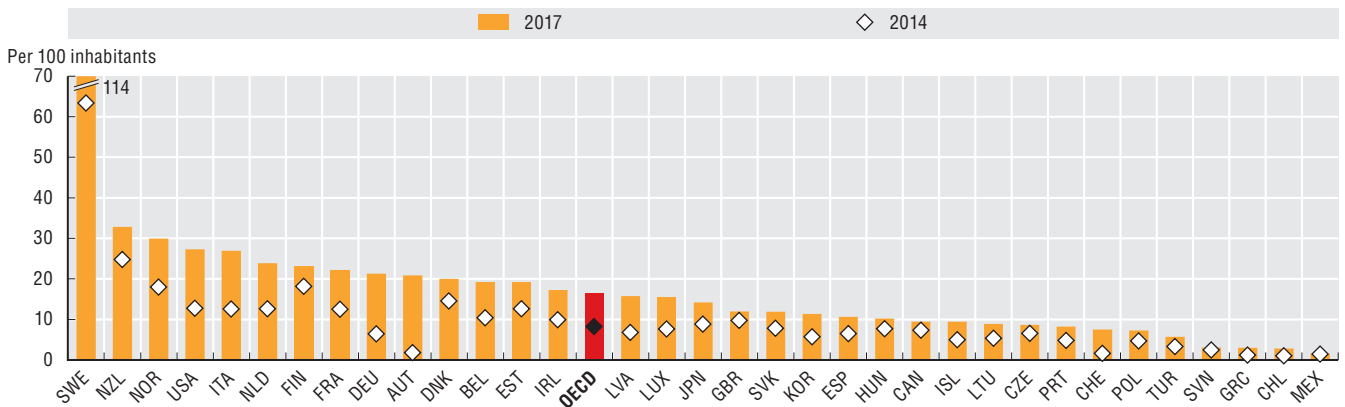


Source: OECD, based on Akamai, APNIC and Google data, 2018. See chapter notes.

StatLink <https://doi.org/10.1787/888933929661>

M2M SIM card penetration, 2017

Per 100 inhabitants

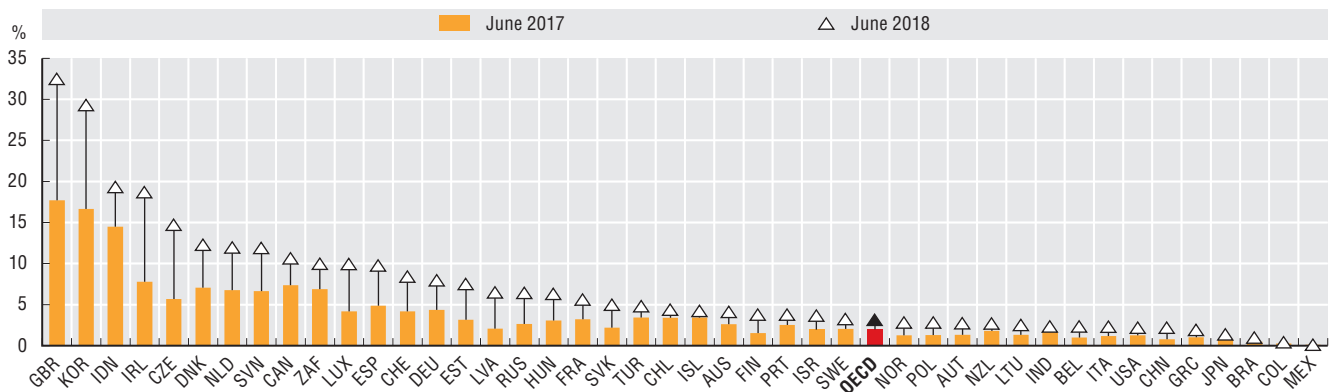


Source: OECD, Broadband portal, <http://www.oecd.org/sti/broadband/broadband-statistics>, September 2018. See chapter notes.

StatLink <https://doi.org/10.1787/888933929680>

Web servers using digital certificates, by host country, June 2018

Percentage of Internet hosts implementing TLS/SSL in each country



Source: OECD, based on Netcraft, www.netcraft.com, July 2018. See chapter notes.

StatLink <https://doi.org/10.1787/888933929699>



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