

CHAPTER 1 Introduction

2014.10.8/2015.7.3/2016.1.1/1.5/1.8/4.7/2020.7.14/2026.3.6/3.9

Kilnam Chon

The Internet began as ARPANET, a computer network for the US research community, in the late 1960s. It has since become an essential part of the global social infrastructure, without which the world could not function properly, with about three billion Internet users worldwide as of 2013 [Internet 2014]. We use the Internet for nearly every aspect of social life. It is expected that there will be 6 to 7 billion Internet users globally in the 2020s, constituting over 80% of the projected world population.

Asia, including Oceania and West Asia, started the 21st century with 125 million Internet users [Internet 2014]. This figure in 2001 accounted for about one-third of the 360 million global Internet users. The penetration rate was around 5%, compared to 9% worldwide. By 2010, the number of Internet users in Asia had increased to 909 million, or 46% of nearly 2 billion global Internet users. The number of Internet users in Asia exceeded one billion the following year.

Besides the growing number of users, there has been significant progress in Internet infrastructure, including telecommunications like fixed and wireless/mobile broadband services, along with widespread adoption of mobile phones, especially smartphones. In the realm of the Internet, a new Internet Protocol called IPv6 has been introduced. The deployment of the Internet of Things (IoT) began in the 1990s and may have surpassed the Internet for People in the 2010s. Meanwhile, cloud computing with large data centers became very popular starting in the 2000s. These developments will be briefly described in this chapter.

(1) Broadband Services

People have been accessing the Internet through local area networks like Ethernet in offices since the 1980s. However, they had to use dial-up connections over a telephone line at home, with speeds of 64 Kbps or less. In the mid-1990s, as the Internet gained popularity, high-speed dedicated services called wired broadband emerged, beginning with cable Internet from @Home in the USA in 1996. In Asia, Thrunet was founded in South Korea in 1996, and its cable Internet service started in 1997. @Home expanded its service to Australia in 1999. Asymmetric Digital Subscriber Line (ADSL), which uses telephone lines, was introduced in the late 1990s. Fiber-to-the-home (FTTH) and other optical fiber technologies appeared in the 2000s. Today, broadband services offer bandwidths from 256 Kbps to 1 Gbps and do not require dialing. By 2010, there were 555 million broadband subscriptions worldwide, with around 8% penetration, and 4.4 subscriptions per 100 people in developing countries and 24.6 in developed countries [ITU 2010].

Wireless broadband service for mobile phones, which also provided Internet access, began in the 1990s with 2G services, and higher-bandwidth services became available with 3G and

LTE in the 2000s. WiFi, a local area wireless technology, was standardized at IEEE as 802.11 in the 1990s, and the WiFi Alliance was formed in 1999 [Wikipedia 2014]. WiFi service became widely available worldwide in the 2000s. WiFi typically serves short distances of up to 10 to 20 meters indoors, but also extends to outdoor areas in some cases. WiMax was similarly standardized at IEEE as 802.16 in the 1990s and supports longer distances outdoors, including mobile environments, optionally. Its deployment has been limited due to the popularity of 3G and LTE services.

(2) Smartphones

The first mobile phones were developed in the 1970s and 1980s. These devices evolved into smartphones in 2007 with the release of the iPhone running iOS from Apple and Android OS from Google. Their precursors include i-mode from NTT DoCoMo in 1999 and Prada from LG in 2006.

Smartphones rapidly gained popularity after their introduction. They surpassed desktop and laptop computers as the main device for Internet access in the 2010s. Smartphones are especially popular as the primary Internet device in developing countries because of their lower cost. Many Internet applications that were originally designed for computers were adapted to work on smartphones.

Tablets were also created in the 2000s with the same operating systems as smartphones, such as Android and iOS. These tablets feature larger screens ranging from 6 to 12 inches but lack a telephone function. They have increasingly replaced laptop computers in the 2010s and are also developing their own applications.

We expect smartphones to be the main device for Internet access in the next decade. They will drive the growth of the Internet, increasing users from 3 billion worldwide in 2013 to over 6 billion in the 2020s. Other devices like tablets and computers will serve as additional access options in the coming decades.

(3) IPv4 and IPv6

Internet Protocol version 4 (IPv4), with over four billion addresses, replaced the Network Control Protocol (NCP) in 1983. However, it became clear in the 1990s that IPv4 would not provide enough address space in the coming decades, leading to the development and deployment of a new Internet Protocol version 6 (IPv6) starting in 1999. The IPv4 address space at IANA was exhausted in 2011. APNIC, which allocates IP addresses in the Asia-Pacific region, also ran out of IPv4 address space that same year. Many organizations have been using Network Address Translation (NAT) to address the shortage of IPv4 addresses instead of deploying IPv6, resulting in very slow adoption. However, deployment finally gained momentum with IPv6 adoption among Google users surpassing 8% in 2015-2016 [Google 2016]. Currently, mobile phones and IoT devices are driving major deployment of IPv6.

(4) IoT

The Internet of Things (IoT), or Machine-to-Machine (M2M) communications, involves connecting devices through the Internet. Research and development on IoT started in the 1990s. IoT deployment picked up speed in the 2000s, with 900 million devices in 2009. Gartner predicted that the number of connected devices would surpass 26 billion by 2020, exceeding the number of human Internet users, who are expected to reach around 6 to 7 billion by the 2020s. [Gartner 2013] IoT is expected to include a wide variety of physical objects across all areas of the real world.

(5) Cloud Computing

Cloud computing is another major trend that has significantly impacted the Internet in the 2000s. With the development of large-scale data centers supporting cloud services, it became a common practice during that decade. We can classify cloud computing as public, private, or hybrid. Its applications include Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS), among others. Large-scale data centers, especially those in the USA, also gained popularity in the 2000s.

(6) Structure of Book

In this book, we cover the following topics in eight chapters, starting from the introduction in this chapter:

- Chapter 1 Introduction
- Chapter 2 Commercial Internet Service
- Chapter 3 Social Media
- Chapter 4 Internet Governance
- Chapter 5 Cybersecurity
- Chapter 6 Civil Society
- Chapter 7 Snapshots of the Internet
- Chapter 8 Online Education
- Chapter 9 Retrospective

In Chapter 2, we cover the commercial use of the Internet, which started in the 1990s and grew in the 2000s. This includes Internet service providers that give access to the Internet. Another type is online service providers that offer application services, usually through the web. Some online services, like Skype and Twitter, do not depend on the web.

In Chapter 3, we discuss social media, including social networking services that emerged in the 2000s and mobile messaging services, which are a part of social networking platforms. In Section 3.1, we focus on social networking services, and in Section 3.2, we examine mobile messaging services, which began in the late 2000s. Asia, along with the USA, plays a significant role in this area.

In Chapter 4, we discuss Internet governance, which started in the 1990s and gained more attention from the mid-2000s onward, with the World Summit on the Information Society (WSIS) organized by the United Nations. In Section 4.1, we examine regional Internet governance activities, and in Sections 4.2-4.5, we include some selected local Internet

governance forums.

In Chapter 5, we discuss cybersecurity, which has gained significant attention in the 2000s. In Sections 5.1 and 5.2, we include regional cybersecurity organizations, and in Sections 5.3-5.7, we examine selected local cybersecurity organizations.

In Chapter 6, we examine civil societies with a focus on the Internet. In Section 6.1, we provide an overview of civil society activities in Asia, and in Sections 6.2-6.4, we discuss local civil societies.

In Chapter 7, we provide snapshots of the remaining regions. We discuss the Arab world in West Asia and North Africa in Section 7.1, and the Pacific Islands in Section 7.2. Section 7.3 covers Indonesia, with a full article in Appendix D available on the Asia Internet History Project website, <http://InternetHistory.asia>.

In Chapter 8, we provide an overview of online education in Section 8.1. The following two sections cover the Chinese region and India, with a focus on massive open online courses (MOOCs).

In the last chapter, we provide a retrospective of Internet development in Asia, which began in the 1980s and eventually became a vital part of society.

The appendices include the following:

Appendix A Year Table,

Appendix B List of regional Internet organizations in Asia,

Appendix C List of regional and local civil societies in Asia,

Appendix D History of Indonesian Internet.

[available in <http://InternetHistory.asia/Book3>]

References

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