CHAPTER 1 Introduction

Kilnam Chon

Overview

The Internet was 50 years old in 2019. It started in 1969 as ARPANET with four nodes [UCLA 2019]. The second decade of the 21st century started with two billion Internet users around the world, including one billion Internet users in Asia in 2011 [Internet 2020]. As of the beginning of 2020, we have over 4.6 billion Internet users in the world, 59% of the world population of 7.8 billion. China became the largest Internet country in the world, surpassing the USA in 2008. India became the second-largest Internet country in 2015, with USA as the third-largest Internet country. InternetWorldStats.com website updates the internet user populations in all countries in the world, and archive.org website keeps the past data of many websites since the late 20th century [Internet 2020; Archive 2020].

The milestones of the Internet in Asia and the world in the second decade of the 21st century (2011-2021) according to the InternetHistory.asia website are shown below [Asia 2020];

	Asia	**World**
2011	One billion Internet users in Asia	2 billion Internet users
	IPv4 exhaustion at APNIC	IPv4 exhaustion at IANA
	Asia Internet History Project	2 million monthly new malware sample
2012	DiDi Chuxing	Facebook with one billion users
2013	One billion messaging users in Asia	1 billion messaging users
	Alipay	Snowden revelation
		1 billion smartphones
2014	World Internet Conference	3 billion Internet users
		Marco Civil in Brazil
		10 ZB data creation per year
2015	India, Second largest Internet state	10 billion IoT devices
		1 billion WeChat users
2016	Electric World Trade Platform, Alibaba	IANA transfer
		Mirai, First IoT DDoS
2017	1 trillion-dollar e-commerce in China	4 billion Internet user
	Internet shutdown rule in India	2 billion Facebook users
2018	2 billion Internet users in Asia	GDPR
2019	5G Deployment; China, South Korea	5G Deployment; USA, UK, Germany,..
2020	Digital currency, Cambodia	Digital Market Acts/Digital Service Acts

	2 billion WhatsUp users
2021	Starlink

Some of the noteworthy developments related to the Internet are described briefly in the following five subsections.

Devices and Infrastructure

The smartphone was invented in 2007 [Apple 2007] and became the dominant Internet access device by replacing laptops and desktop computers in the second decade of the 21st century. The Internet of Thing (IoT) replaced human users as the primary Internet access device in the second decade, reaching more than 10 billion IoT devices in 2015. We expect around 125 billion IoT devices in 2030 globally [IHS 2017].

Optical telecommunication services provide backbone networks for international and domestic telecommunications. During this century, the final mile from backbone networks to homes are provided by optical cables and copper cables as well as wireless communications. Mobile telecommunication service companies among several countries in USA, Europe and East Asia started deployment of the fifth generation (5G) mobile services starting in 2019.

There are new developments in terms of Internet access by using 1,000 to 10,000 or more low Earth orbital satellites around 500 km above the earth [Low 2020; Lee 2020]. Starlink, and Project Kuiper are the leading satellite Internet constellation companies now sponsored by multi-national companies, SpaceX and Amazon, respectively. Starlink will offer commercial services globally starting from 2021. These low Earth orbital services could end access problems in remote areas in the world.

Cloud computing with data centers became the dominant Internet access environment in the 21st century. We also generate large amounts of data that tend to be stored at the data centers. In 2014, 4.4 zeta bytes were created globally, and the volume doubled every year in this decade to 44 zeta bytes in 2020 [IDC 2014].

Naming and Addressing

There were major milestones on both naming and addressing in the second decade of the twenty-first century. We finally ran out of IPv4 at Regional Internet Registries (RIRs) with the last pool at AfriNIC [APNIC 2014]. Deployment of IPv6 became eventually common around the world. IANA transition took place in 2016 as the contract with the US Government ended [ICANN 2016]. The transition took more than two decades to be realized.

The World Summit on the Information Society (WSIS) was held in two phases: the first phase in 2003 and the second phase in 2005 [WSIS 2005]. The first phase delivered the Geneva Declaration of Principles, and the second phase delivered the Tunis Agenda for the Information Society, which included sections on Internet Governance. They were revised at NETmundial in 2014, which was held in Brazil [NETmundial 2014].

Social Media

Social networking services became one of the dominant Internet services along e-commerce in this century. Social media websites including Facebook, Twitter and Weibo, and messaging services such as WhatsApp and WeChat among others are two major categories of social networking services [Social 2020]. Many major services attract one billion or more customers [Wu 2018].

The European Union came up with the General Data Protection Regulation (GDPR) in 2016 to protect data and privacy [EU 2016]. The European Union additionally came up with Digital Services Act and Digital Markets Act in 2020 [EC 2020].

Digital Currency

Bitcoin with block chain technology was introduced in the first decade of the 21st century [Nakamoto 2008]. Other cryptocurrencies followed in the second decade. Their total value exceeded one trillion US dollars in 2021 [Coinmarketcap 2021]. The governments of Cambodia, China and some other countries were introducing digital currencies in 2020. [Financial 2019].

Artificial Intelligence

Artificial Intelligence (AI) became very popular [Tegmark 2017; Russell 2019] and became a major user of the Internet during this century. Kai-Fu Lee coined the term "Internet AI" as the first wave of Artificial Intelligence [Lee 2018]. The Internet is increasingly becoming an important infrastructure for AI and other services such as social networking service and e-commerce.

Book Structure

Asia Internet History, Fourth Decade (2011-2020) has the following chapters and appendices:

Chapter 1 Introduction
Chapter 2 Digital Space and its Aspects
Chapter 3 Governances of Digital Space and Its Aspects
Chapter 4 Snapshots of the Internet around 2020
Chapter 5 Global Conferences
Chapter 6 E-Commerce
Chapter 7 Interview Projects
Chapter 8 Social Media – Updates
Chapter 9 Retrospective
Bibliography
Appendix A Year Table

Appendix B Addition to Asia Internet History, First Decade (1980s)
Appendix C Addition to Asia Internet History, Second Decade (1990s)
Appendix D Addition to Asia Internet History, Third Decade (2000s)
Appendix E What We Learned from Asia Internet History Project
Appendix F Coronavirus and the Internet
Appendix G African Internet Histories

References

[APNIC 2014] APNIC, IPv4 address exhaustion at APNIC, 2014.
[Archive 2020] Archive.org, 2020.
[Apple 2007] Apple, Apple reinvents the phone with iPhone, 2007.
[Asia 2020] Asia Internet History Project, Year Table, InternetHistory.asia, 2020.
[Benkler 2018] Yochai Benkler, et al., Network Propaganda, 2018.
[Coinmarketcap 2021] CoinMarketCap, Global Criptocurrency Charts, 2021.
[EU 2016] EU, General Data Protection Regulation, 2016.
[EU 2020] EU, Digital Services Act, 2020.
[Financial 2019] Financial Times, What is China's digital currency plan?, 2019.11.25.
[ICANN 2016] ICANN, Stewardship of IANA Functions Transitions to Global Internet Community as Contract with US Government ends, 2016.
[IDC 2014] IDC, The digital universe of opportunities, 2014.
[IETF 2019] IETF, Internet of Things Security: State of Art and Challenges, RFC 8576, 2019.
[IHS 2017] IHS Markit, The Internet of Things, 2017.
[Internet 2020] InternetWorldStats.com, 2020.
[Kaye 2019] David Kaye, Speech Police: Global Struggle to Govern the Internet, 2019.
[Lee 2018] Kai-Fu Lee, AI Superpowers, 2018.
[Lee 2020] Dave Lee, SpaceX Starlink Deep Dive, 2020.11.3.
[Low 2020] Low-Earth Satellite, Wikipedia, 2020.
[Nakamoto 2008] Satoshi Nakamoto, Bitcoin: A Peer-to-Peer Electronic Cash System, 2008.
[NETmundial 2014] NETmundial, 2014.
[Russell 2019] Stuart Russell, Human Compatible, 2019]
[Singer 2018] P.W. Singer, Like War: The Weaponization of Social Media, 2018.
[Social 2020] Social Media, Wikipedia, 2020.
[Tegmark 2017] Max Tegmark, Life 3.0, 2017.
[UCLA 2019] UCLA, 50th Anniversary of ARPANET, 2019.
[Visual 2020] Visual Capitalist, Where will the next billion Internet users come from?, 2020.
[WSIS 2005] WSIS, Tunis Agenda for the Information Society, 2005.
[Wu 2018] Tim Wu, Curse of Bigness, 2018.