Study Group on Network Neutrality Interim Report

Study Group on Network Neutrality
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Chapter 1 Introduction

The Internet is "the network of networks" where networks operated by diverse entities around the world in an autonomous, distributed, and cooperative manner are interconnected based on a standardized protocol. <u>With its openness as common infrastructure where anyone can operate freely, the Internet has fulfilled the following roles</u>:

(i) <u>Provision of advanced and inexpensive means of communication</u>

Now users can use diverse applications and terminals including VoIP, e-mails and video conference systems to exchange information with people/terminals around the world

(ii) <u>Provision of platforms for free and diverse expression</u>

Diverse entities including individuals can publish knowledge, ideas and works, share them with others and have discussions about them. Digitalization of past materials and works has enabled easy access to vast and diverse knowledge, ideas and works.

(iii) <u>Provision of platforms for innovation</u>

Diverse entities including individuals can provide diverse services and contents across borders and cooperate and co-create. For example, an entity who does not own any line facilities can provide diverse services including those similar to telephone service to users around the world by providing software.

By fulfilling these roles, the Internet has exerted far-reaching effects, which include not only streamlining of activities and businesses, enhancement of convenience and creation of new markets in the real world, but also contribution to enhancement of impartiality and fairness and progress of democracy through promotion of social participation (reduction/mitigation of physical limitations, etc.). <u>With its huge effects for society, it is now indispensable for economic activities and people's lives</u>.

<u>In order to maintain "openness" of the Internet, it is critically important to ensure so-called Network Neutrality[1], where telecommunication carriers treat internet traffic equitably (indiscriminately)</u>.

Through eight meetings and hearings, etc. since October 2018, the Study Group on Network Neutrality has studied appropriate network neutrality in Japan based on the past discussions on neutrality in the country, including those by the Panel on

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[1] Also called Net Neutrality.

Neutrality of Networks (2006-2007) and in light of the environmental changes and trends outside of Japan in recent years.

This Interim Report explains the issues and direction of future approaches, which were identified through the discussions and hearings by the Study Group. The Ministry of Internal Affairs and Communications (MIC) and stakeholders are expected to take necessary measures based on this Interim Report.

Chapter 2 Past Discussions and Approaches in Japan

Section 1 Panel on Neutrality of Networks (2006-2007)

In the early 2000s where broadband networks became popular and data traffic expanded, <u>Wu (2003) [2] proposed "Network Neutrality" rules regarding fair (indiscriminate) treatment of communications. This was one of the triggers for various discussions on network neutrality or open Internet in the United States and other countries</u> (Reference 2-1).

<u>In Japan, the Panel on Neutrality of Networks was held from 2006 to 2007</u>. In the context of the discipline of the Telecommunications Business Act (Act No.86 of 1984) – Article 4 Protection of the secrecy of communications, Article 6 Fairness in use, Article 26 Explanation of Terms and Conditions for the Service Provision, Article 29 Order to Improve Business Activities against unfair and discriminatory treatment and Article 30 Prohibited Acts of Telecommunications Carriers Installing Category I Designated Telecommunications Facilities - the Working Group discussed how to ensure the network neutrality while distinguishing between the next generation network (NGN) managed by carriers and the Internet (Reference 2-2 and 2-3).

The Panel compiled <u>the three principles for ensuring network neutrality</u>.[3]

(1)   Consumers are entitled to access the content/application layer freely

(2)   Consumers are entitled to connect to IP-based networks freely through terminals that comply with technical standards provided by laws and regulations and these terminals may connect to each other flexibly.

(3)   Consumers are entitled to use the communication layer and the platform layer free from discrimination at a reasonable price.

The Panel stated it would be appropriate to consider that Network Neutrality exists when the given network was maintained and operated in a manner satisfying these three principles.

The Panel discussed measures that carriers should or were allowed to take in order to ensure the neutrality, from<u> the two basic aspects of "fairness in network cost sharing" and "fairness in network use"</u> concerning specific examples in the telecommunication market at the time.

<u>The networks (IP networks) discussed by the Panel are mainly fixed broadband</u>

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[2] Wu, Tim., "Network Neutrality, Broadband Discrimination", Journal on Telecommunications and High Technology Law, Vol. 2, pp.141-175, 2003.
[3]http://warp.da.ndl.go.jp/info:ndljp/pid/286922/www.soumu.go.jp/menu_news/s-news/2007/pdf/070920_6_bt.pdf

networks. For example, regarding Internet traffic increase accompanying the spread of fixed broadband services, the report proposed a two-stage approach in order to address bandwidth consumption by a few heavy users and users of P2P file sharing software. The two stages are: establishment of guidelines for required minimum operation standards for bandwidth control, and development, implementation and provision of information of specific operation policy by individual internet service providers.

Based on the report, an association[4] set up by relevant business associations developed the Guidelines for Traffic Management in 2008. The guidelines present a basic framework where the principle is to address increasing traffic by reinforcing network facilities, and bandwidth control is implemented in exceptional cases, which include limitation of communication band for specific applications (example: P2P file sharing software) and heavy users exceeding predetermined traffic volume (Reference 2-4).

Section 2 Discussions on Network Quality

Separately from the discussions on network neutrality, Japan has worked to survey the Internet environment of the Internet and to provide users with information on network quality.

For example, in order to understand the reality of internet traffic, the MIC with cooperation of Internet Service Providers (ISPs), Internet Exchanges (EX) and researchers has been tabulating internet traffic in Japan since 2004. Mobile communication traffic (non-voice) has been tabulated since 2010 with cooperation of mobile communication providers. The results provide important basic data for discussions on telecommunication policies in Japan.

Based on the result of the study by "the Study Group Meetings on Ideal State of Internet Service Quality Measurements" held in 2013, the MIC developed the "Guidelines for the Effective Speed Measurement Method of Internet Connection Services Provided by Mobile Telecommunications Carriers and Information Providing Method for Users"[5]. The guidelines presented unified methods for speed measurement and information provision. Mobile Network Operators (MNO) endeavor to measure effective speed and provide information to users based on the guidelines so that users can sign a subscription based on accurate information (Reference 2-5).

Furthermore, in order to provide users with information of the change trend of

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[4] https://www.jaipa.or.jp/other/bandwidth/
[5] http://www.soumu.go.jp/main_content/000371346.pdf

effective speed of the Mobile Virtual Network Operator (MVNO), which varies widely depending on the time zone, in a manner easy-to-understand for users, the Telecom Service Promotion Conference formulated "Guidelines for the Effective Speed Measurement Method of Internet Connection Services Provided by MVNO and Information Providing Method for Users" in March 2019.

Chapter 3 Changes in Information Communication Environment in Recent Years

Section 1 Spread and Sophistication of Broadband Services and Increased Importance of Mobile Communication

Number of subscriptions to DSL, FTTH and other fixed broadband services started to gradually increase around 2000 and has been steadily increasing in recent years. Recently, there is a shift from DSL to FTTH that promises further increase of communication speed. Meanwhile, the number of mobile telephone subscriptions has been increasing by more than 5 million every year. Particularly the number of 3.9-4 generation mobile telephone (LTE: the service started in 2010) subscriptions rapidly increased to approximately 120 million or three times of fixed broadband service in 2018. Since 2010, the smartphone has spread rapidly and overtook computers in household ownership rate in 2017. The spread has greatly <u>increased the importance of mobile communication</u>.
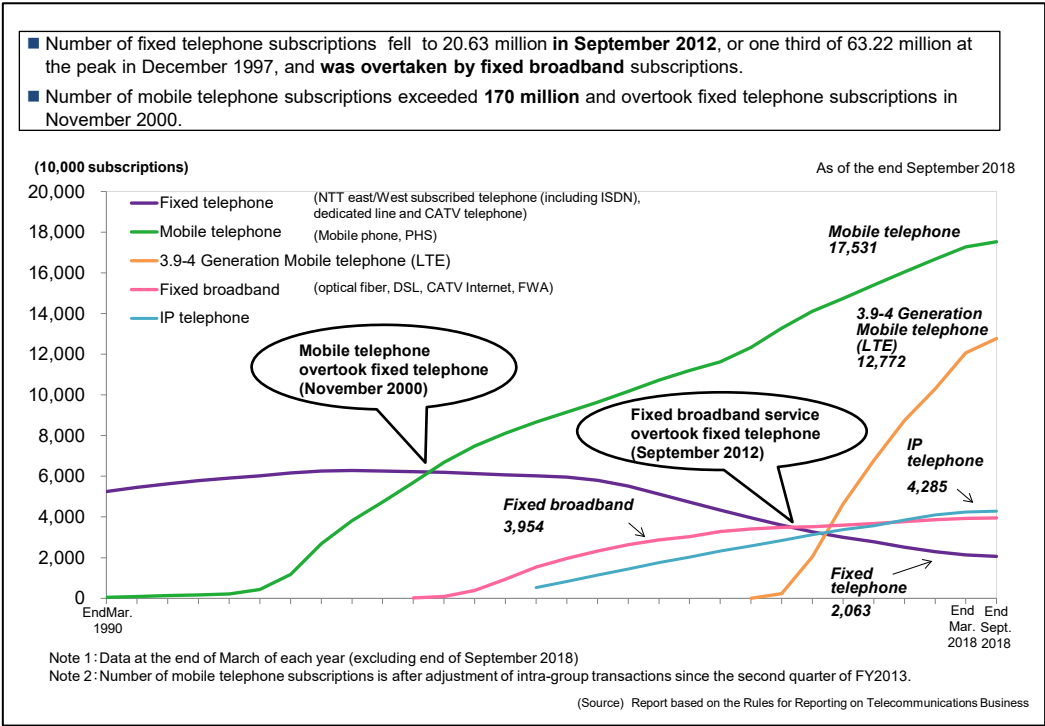

■ Number of fixed telephone subscriptions fell to 20.63 million **in September 2012**, or one third of 63.22 million at the peak in December 1997, and **was overtaken by fixed broadband** subscriptions.
■ Number of mobile telephone subscriptions exceeded **170 million** and overtook fixed telephone subscriptions in November 2000.

(10,000 subscriptions)   As of the end September 2018

Fixed telephone (NTT east/West subscribed telephone (including ISDN), dedicated line and CATV telephone)
Mobile telephone (Mobile phone, PHS)
3.9-4 Generation Mobile telephone (LTE)
Fixed broadband (optical fiber, DSL, CATV Internet, FWA)
IP telephone

Mobile telephone overtook fixed telephone (November 2000)

Fixed broadband service overtook fixed telephone (September 2012)

Mobile telephone 17,531
3.9-4 Generation Mobile telephone (LTE) 12,772
IP telephone 4,285
Fixed broadband 3,954
Fixed telephone 2,063

Note 1：Data at the end of March of each year (excluding end of September 2018)
Note 2：Number of mobile telephone subscriptions is after adjustment of intra-group transactions since the second quarter of FY2013.

(Source) Report based on the Rules for Reporting on Telecommunications Business

Figure 1 Changes in the number of telecommunication service subscriptions
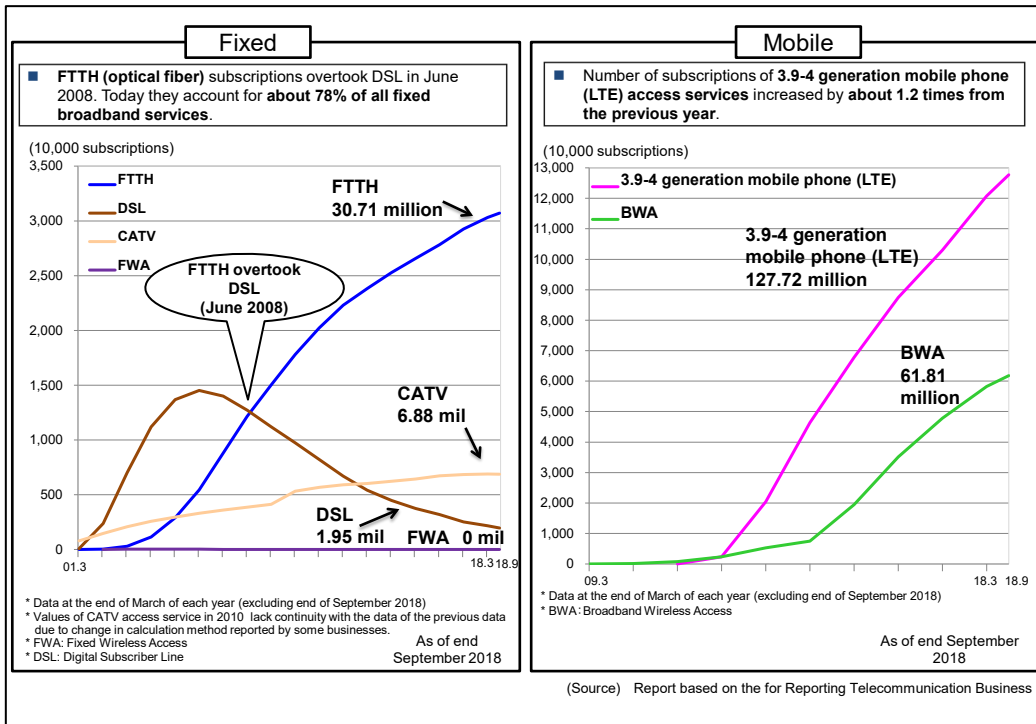
Figure 2 Changes in the number of broadband service subscriptions
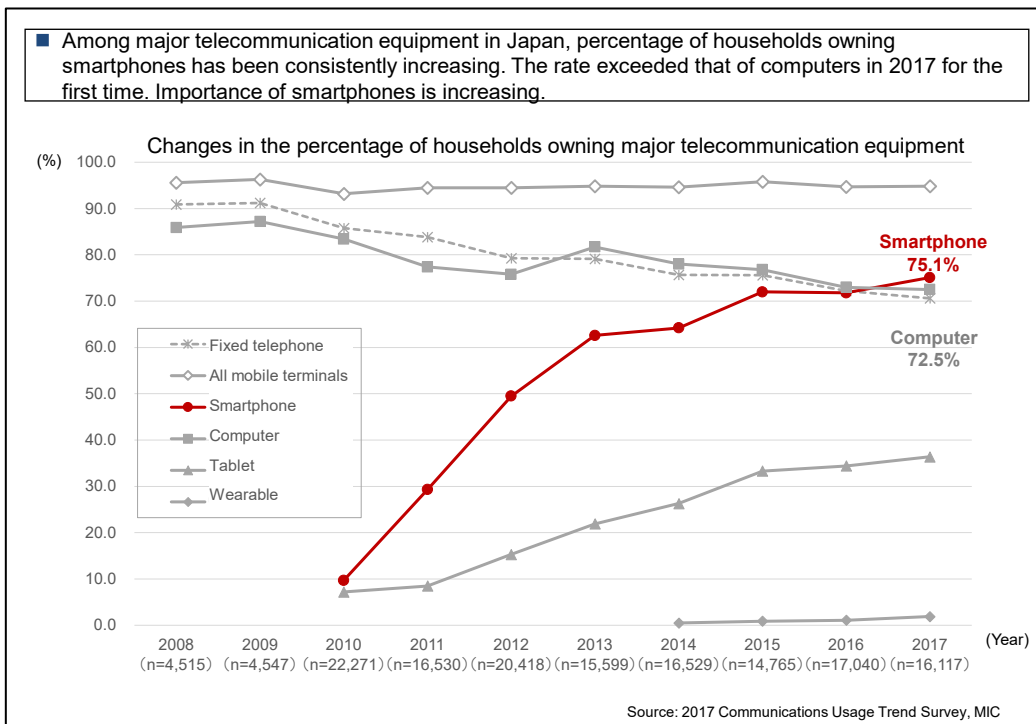

Figure 3 Spread of Smartphones

Section 2 Increase in Internet traffic

Total download traffic has been constantly increasing since 2004. In the latest

estimation (November 2018), the total download traffic of broadband service subscribers in Japan increased by 23.3% (about 11.0Tbps, or 119PB/day) year-on-year, and the total download traffic of mobile communication (September 2018) increased by 34.2% (about 2.6Tbps, or 28PB/day) year-on-year. There is no big change in the increasing trend.
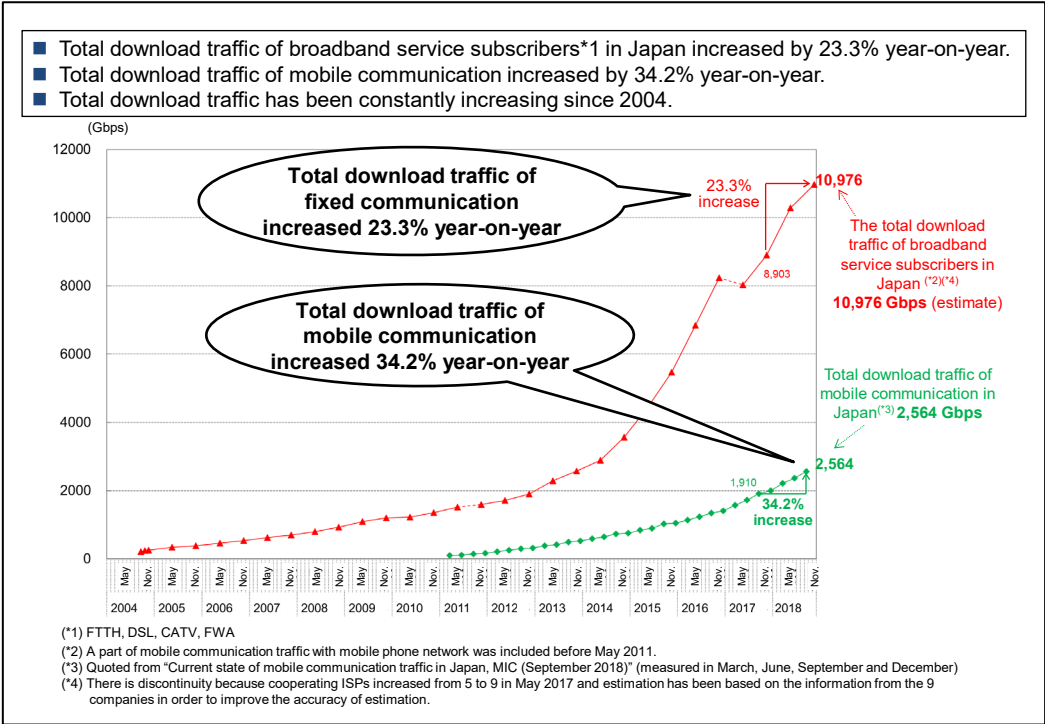

■ Total download traffic of broadband service subscribers*1 in Japan increased by 23.3% year-on-year.
■ Total download traffic of mobile communication increased by 34.2% year-on-year.
■ Total download traffic has been constantly increasing since 2004.

Total download traffic of fixed communication increased 23.3% year-on-year

Total download traffic of mobile communication increased 34.2% year-on-year

23.3% increase — 10,976

The total download traffic of broadband service subscribers in Japan (*2)(*4) 10,976 Gbps (estimate)

8,903

Total download traffic of mobile communication in Japan (*3) 2,564 Gbps

2,564

1,910

34.2% increase

(*1) FTTH, DSL, CATV, FWA
(*2) A part of mobile communication traffic with mobile phone network was included before May 2011.
(*3) Quoted from "Current state of mobile communication traffic in Japan, MIC (September 2018)" (measured in March, June, September and December)
(*4) There is discontinuity because cooperating ISPs increased from 5 to 9 in May 2017 and estimation has been based on the information from the 9 companies in order to improve the accuracy of estimation.

Figure 4 Changes in fixed and mobile communication traffic

Traffic per broadband service subscription has been also increasing: download traffic increased by 22.0% (about 277.0kbps, 3.0GB/day) year-on-year.
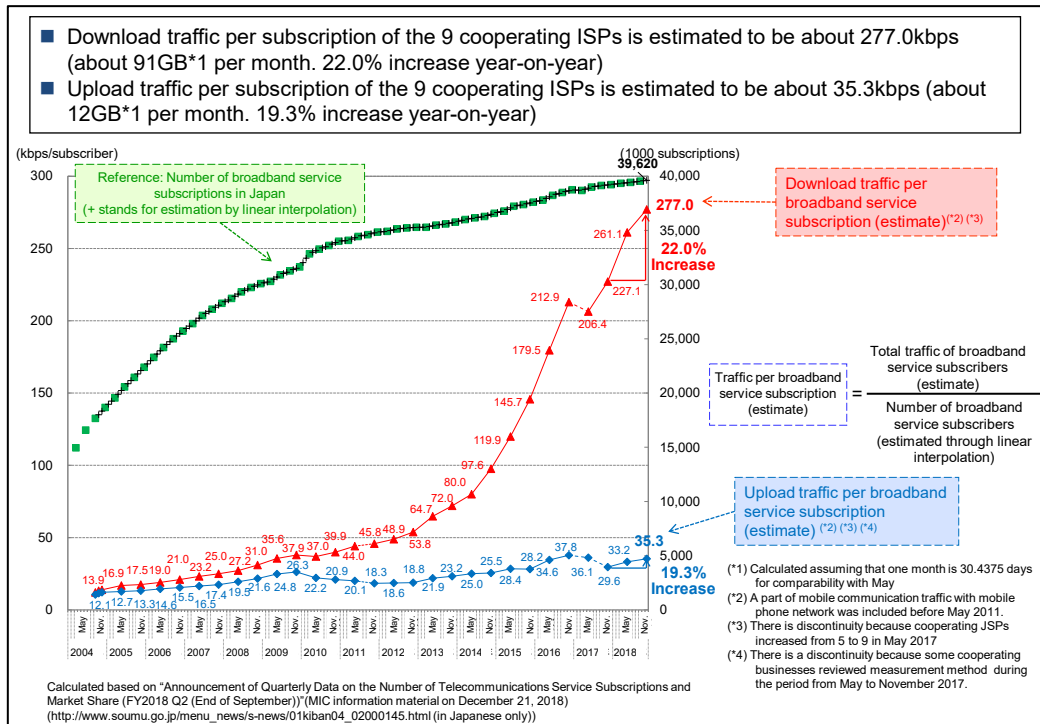
Figure 5 Changes in traffic per subscription

Based on the increase of broadband subscriptions, especially FTTH and LTE, and the rise of the penetration rate of smartphones, tablets and other information communication devices, it is assumed that traffic will continue to increase.

Section 3 Upgrading and volume increase of contents and appearance of new service models

Number of subscriptions to video delivery service is on the increase on the whole. Especially sales of flat-rate services without viewing limitation are rapidly increasing. Download charging was mainstream in music delivery services but sales of flat-rate services overtook sales of charging service in 2016.
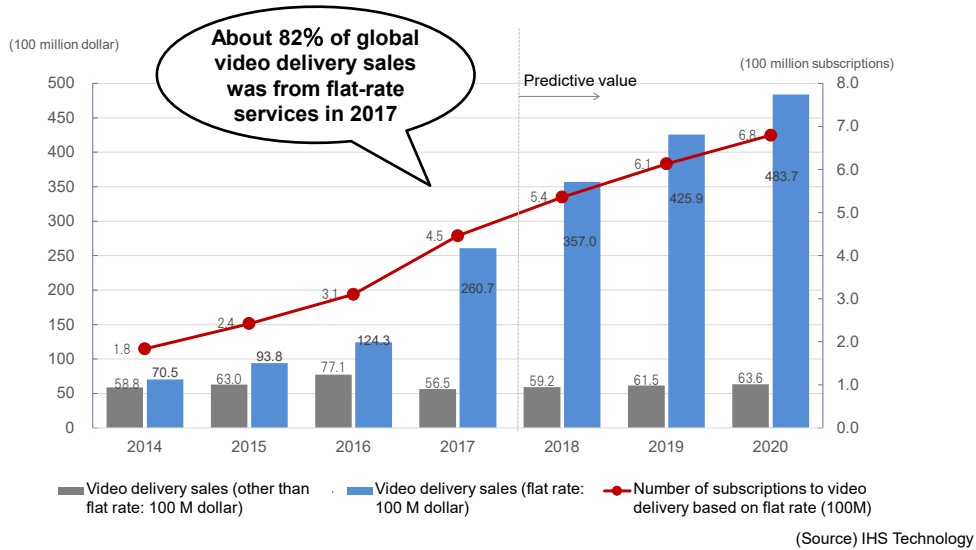
Figure 6 Worldwide changes and prediction of subscribers to video delivery services

Figure 7 Worldwide changes and prediction of the number of subscribers to music delivery services

Upgrading and volume increase of distributed content are also progressing. Further increase in traffic volume is expected from the spread of 4K/8K video delivery.

- In the past, pay music delivery services based on download charging were the main stream, but sales and subscriptions of flat-rate services are increasing as is the case with video delivery.
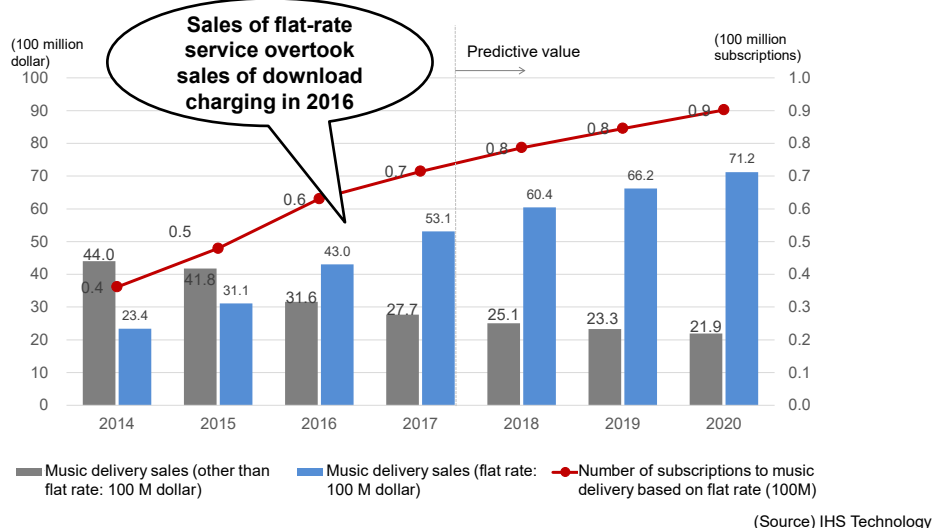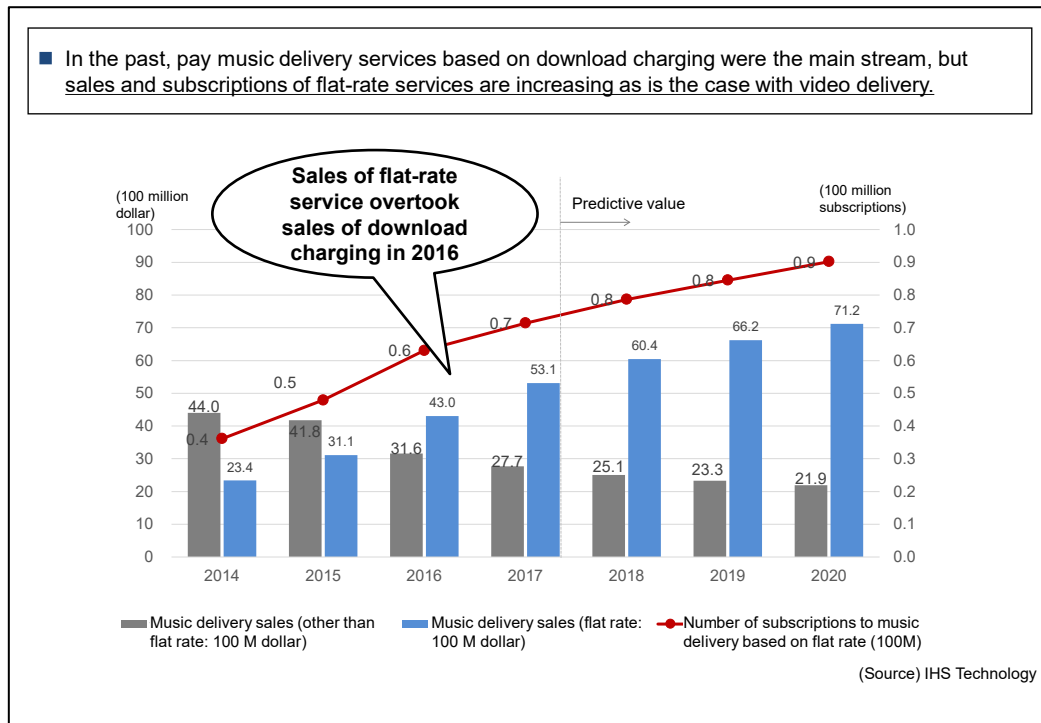
Figure 8 Upgrading and volume increase of contents

With regard to the Internet traffic share in the world, video viewing accounts for about 60% of downstream traffic. It shows that video content delivery services have a great impact on the Internet traffic and the importance of efficient way of content delivery including Content Delivery Network (CDN) using cache servers has further increased.

■ Among internet traffic, video viewing has increased to account for about 58% of downstream traffic. Among this NETFLIX accounts for the largest part at 26% of video viewing and about 15% of the entire downstream.
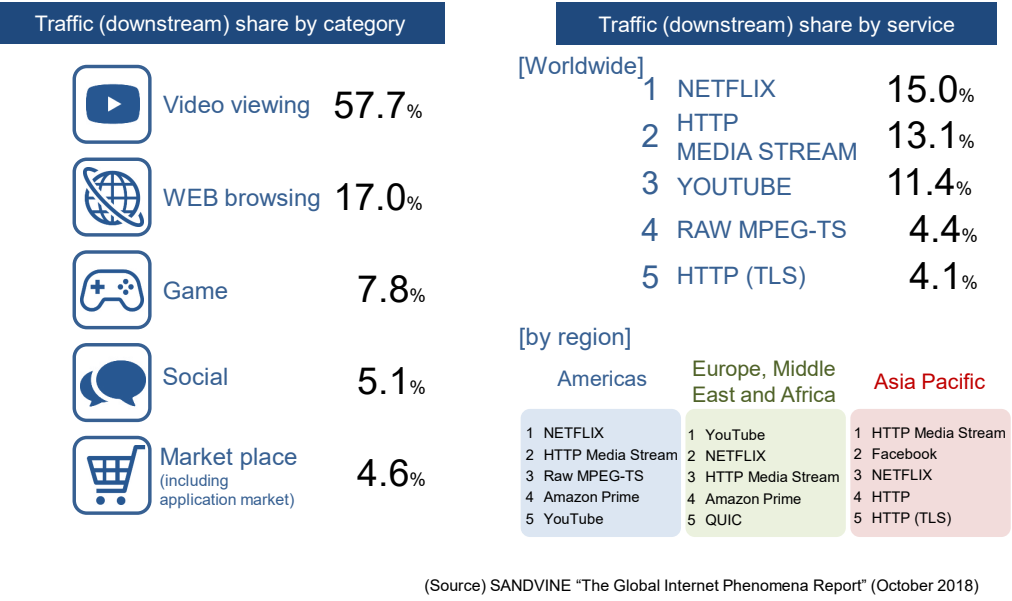
Traffic (downstream) share by category

▶	Video viewing	57.7%
🌐	WEB browsing	17.0%
🎮	Game	7.8%
💬	Social	5.1%
🛒	Market place (including application market)	4.6%

Traffic (downstream) share by service

[Worldwide]
1 NETFLIX   15.0%
2 HTTP MEDIA STREAM   13.1%
3 YOUTUBE   11.4%
4 RAW MPEG-TS   4.4%
5 HTTP (TLS)   4.1%

[by region]

Americas	Europe, Middle East and Africa	Asia Pacific
1 NETFLIX	1 YouTube	1 HTTP Media Stream
2 HTTP Media Stream	2 NETFLIX	2 Facebook
3 Raw MPEG-TS	3 HTTP Media Stream	3 NETFLIX
4 Amazon Prime	4 Amazon Prime	4 HTTP
5 YouTube	5 QUIC	5 HTTP (TLS)

(Source) SANDVINE "The Global Internet Phenomena Report" (October 2018)

Figure 9 Internet traffic in the world

In these circumstances, for mobile communication services where meter-rate charge or flat-rate charge with data cap are adopted, zero-rating services that do not count use of predetermined applications/contents as data usage are now provided in Japan.

Table 1 Zero-rating services as of January 2019

Company	Service	Monthly charge (yen (before tax))		Covered applications and sites *1	Limited to official applications, etc. *2	Data items to be confirmed (explanation for users on the Web)	Publicity concerning optimization of communication and bandwidth control *3	Disclosure of applicable packet volume
		Basis rate of the plan	Additional charge					
SoftBank	Flat-rate Data 50GB Plus (Ultra GIGA MONSTER Plus)	7480~ (50GB)		YouTube, AbemaTV, TVer, GYAO!, hulu, LINE, Twitter, Instagram, Facebook, Tik Tok	○	Applicable services and packet volume of each service	○	○ (disclosure is scheduled)
NTT Communications (OCN Mobile ONE)	Count Free (all plans)	900~ (110MB/day ~30GB)		050plus, My Pocket, OCN Mobile ONE Application, application site	○	Minimum necessary data (IP address, port number, a part of header of the packet (which does not include data such as text, video and image))	○	×
	MUSIC Count Free (Option)	900~ (110MB/day ~30GB)	0	Amazon Music, AWA, dHits, Google Play Music, LINE MUSIC, Spotify, Hikari TV Music, RecoChoku Best	○			
Optage (mineo)	(all plans)	700~ (500MB~30GB)		<when "mineo Switch" is off> LaLa Call, My Page, Support Page, etc. <when "mineo Switch" is on, or when contract capacity has run out> All communications	○ (only LaLaCall)	IP address	○	<when "mineo Switch" is off> × <when "mineo Switch" is on, or when contract capacity has run out> ○
BIGLOBE (BIGLOBE Mobile)	ENTERTAINMENT FREE (Option)	Voice call SIM: 1600~ (3GB~30GB)	480	YouTube, YouTube Music, Google Play Music, Apple Music, AbemaTV, Spotify, AWA, radiko.jp, Amazon Music, U-NEXT, YouTube Kids	△	Minimum necessary data (IP address, port number, a part of header of the packet (which does not include data such as text, video and image))	○	×
		Data SIM: 900~ (3GB~30GB)	980					
Jupiter Telecommunications (J:COM MOBILE)	J:COM MOBILE A Plan Smartphone set/ Tablet set	980~ (0.5GB~10GB)		J:COM on Demand, J:COM Music, J:COM Books	○	No special statement on the Web because users' IP address or the packet content (e.g. video or still image) is not confirmed.	○	×
LINE MOBILE (LINE MOBILE)	LINE FREE Plan	500 (1GB)		LINE	○	Minimum necessary data (IP address, port number, a part of header of the packet (which does not include data such as text, video and image))	○	×
	COMMUNICATION FREE Plan	1110~ (3GB~10GB)		LINE, Twitter, Facebook, Instagram	○			
	MUSIC+ Plan	1810~ (3GB~10GB)		LINE, Twitter, Facebook, Instagram, LINE MUSIC	○			
DMM.com (DMM mobile)	SNS Free (Option)	850~ (3GB~20GB)	250	LINE, Twitter, Facebook, Facebook Messenger, Instagram	△	Minimum necessary data (IP address, port number, a part of header of the packet)	○	○
Dream Train Internet (DTI SIM)	YouTube free viewing plan	2430 (7GB)		YouTube, Twitter, My Navi Site	○	Transmission destination (IP address, port, HTTP header, TLS header)	○	×
	20's SIM *4	2880 (7GB)			○			
LogicLinks (LinksMate)	Count-free Option (option)	500~ (1GB~30GB)	500	Twitter, Facebook, Instagram, AbemaTV, AWA, enza, OPENREC.tv, GRANBLUE FANTASY Sky Compass, GameWith, Cycomics, Abema manga, famitsuApp, famitsu.com , FRESHLIVE, Mirrativ, Arc The Lad R, THE IDOLM@STER Side M, THE IDOLM@STER Side M LIVE ON ST@GE!, THE IDOLM@STER SHINY COLORS, THE IDOLM@STER Cinderella Girls, THE IDOLM@STER Cinderella Girls: StarLight Stage, THE IDOLM@STER Million Live! Theater Days, Akane Sasu Sekai de Kimi to Utau, ENSEMBLE STARS!!, Icchibanketu-ONLINE-, Uchi no Hime-sama ga Ichiban Kawaii, ELEMENTAL STORY, Alternative Girls 2, Hortensia SAGA, Girl Friend BETA, Kaitō Royale, KAMURAI TRIBE, Granblue Fantasy, Grimoire A:school of wizards, Logres:Japanese RPG, sangokublaze, JIKKO POWERFUL SOCCER, Shadowverse, Gang road Joker, Space Debris, Sevens Story, Sengoku Enbu -KIZNA-, Sengoku Royal, COMPASS, Millennium War Aigis A, Tales of the Rays Mirage Prison, Touken Ranbu-ONLINE- Pocket, Dragalia Lost, Nouen Hokkorina, BanG Dream! Girls Band Party!, FINAL FANTASY BRAVE EXVIUS, FNTASY LIFE ONLINE, Princess Connect! Re:Dive, BOKU & DORAGONS, Pokoron Dungeons, Puella Magi Madoka Magica Side Story:Magia Record, MINGOL, 100 Sleeping Princes and the Kingdom of Dreams, Yokai Watch Puni, Yokai Watch World, Lineage Ⅱ REVOLUTION, AppStore, GooglePlay	△	Part of communication content (IP address, port number, a part of header of the packet (which does not include data such as text, video and image))	○	○

*1 Underlined applications and sites are provided by the company or group company

*2 ○: limited to official apps, etc.; △: official apps, etc. are recommended

*3 including the cases where publication is made not only for zero-rating service but all communication services

*4 with screen crack repair and public Wi-Fi services

(Created by the MIC based on the websites of the companies)

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In addition to the upgrading and volume increase of contents themselves described above, spread of service forms without additional charge for content use (content and communication fees) such as flat-rate content delivery and zero-rating is expected to spur the traffic increase.

Section 4 Diversification of the Utilization of the Internet

Today, major popular devices are computers and smartphones. In the future, user terminals will be further diversified and advanced, including AI speakers and other smart home appliances, and people will use various large-volume contents through these terminals. Furthermore, with the spread of IoT devices in a variety of fields including agriculture, forestry and fisheries, automobiles and infrastructure maintenance, a vast amount of diverse data will be accumulated in data centers through the Internet, and services using aggregated big data and AI will further spread.
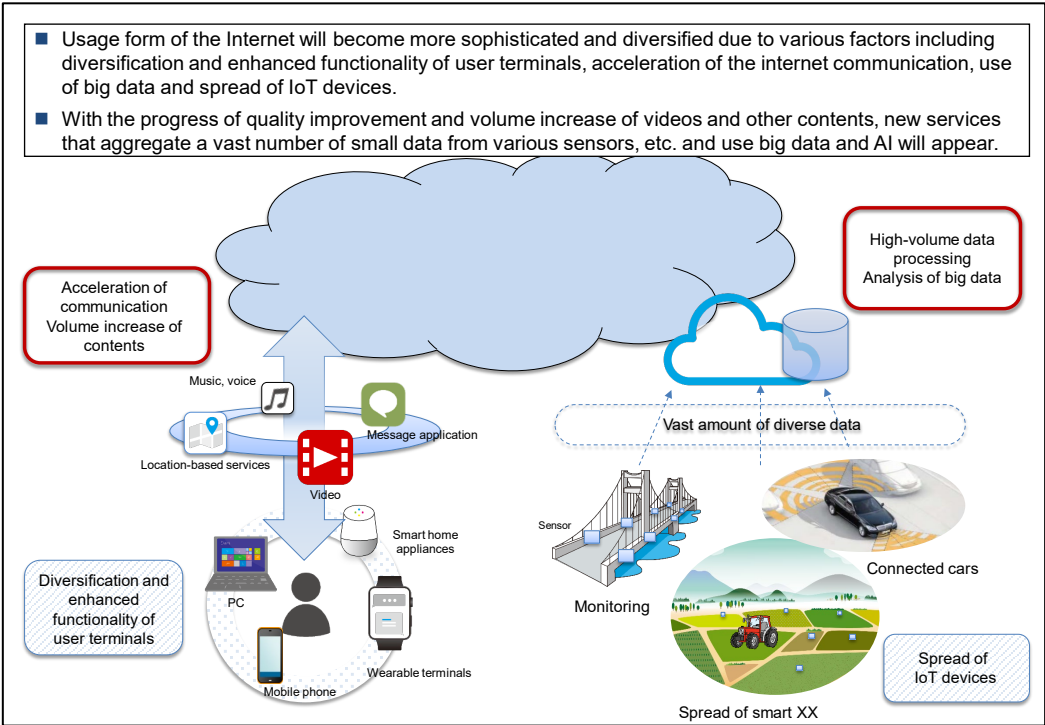

Figure 10 Changes in the environment surrounding the Internet

Section 5 Changing Utilization and Future Prospect

As shown in the chart below, the usage form of the Internet has changed since 2007 when the Panel on Neutrality of Networks was held. Diversification and advancement of relevant entities and services have proceeded in each layer.

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For example, telecommunication carriers providing MVNO service are increasing their presence in the mobile communication market. The number of MVNO service subscriptions has been increasing about 3 million annually and their sales are also on an upward trend. As described above, with the acceleration of networks due to the spread of LTE as well as spread of smartphones with operating systems such as iOS and Android, are beginning to be provided diverse services and contents adapted to these changes in the market environment.

There was a vertical ecosystem formed around MNOs, where contents and applications were provided through platforms provided by telecommunication carriers that are MNO. However, with the spread of smartphones in recent years, the ecosystem of mobile communication has greatly changed. For example, there are multi-layered partnerships that combine:

- Platform providers who have a market for contents and operate globally[6]

- Content providers who use platforms to offer video/music delivery services and various applications including SNS, and

- Telecommunication carriers (MNO, MVNO) who, while providing mobile communication services to users, are seeking new business models to provide contents, etc.

(Reference 3-1)

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[6] There is no fixed definition at the moment, but the Study Group defines them as "business operators who provide functions that serve as operation basis used by both providers of diverse services using ICT, and users who enjoy the services".
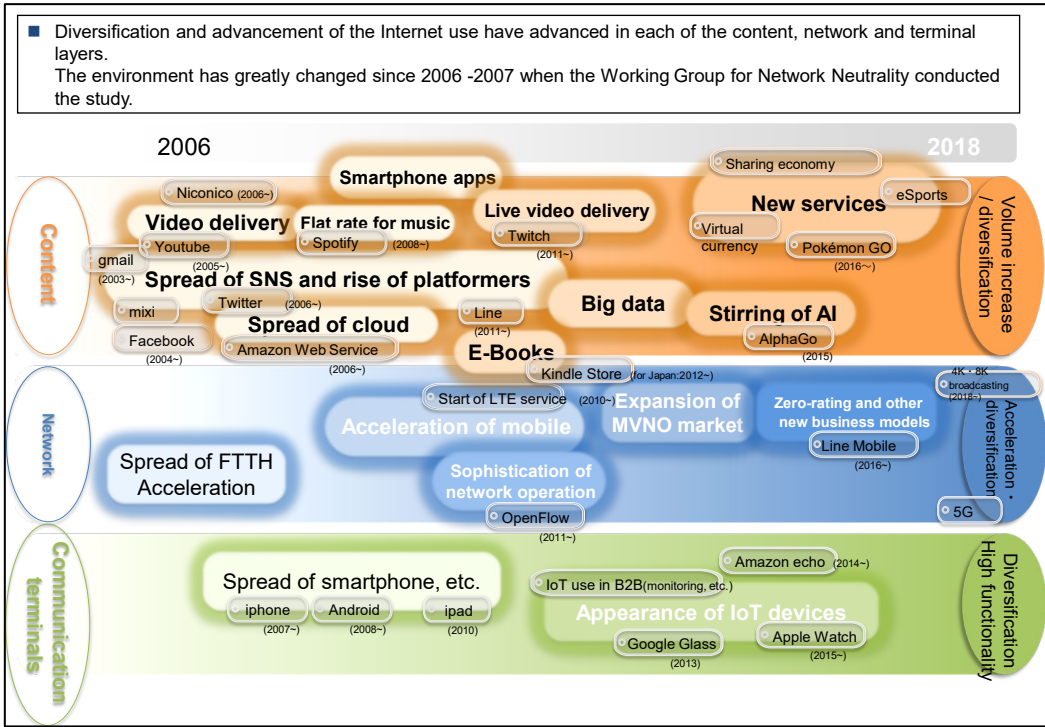
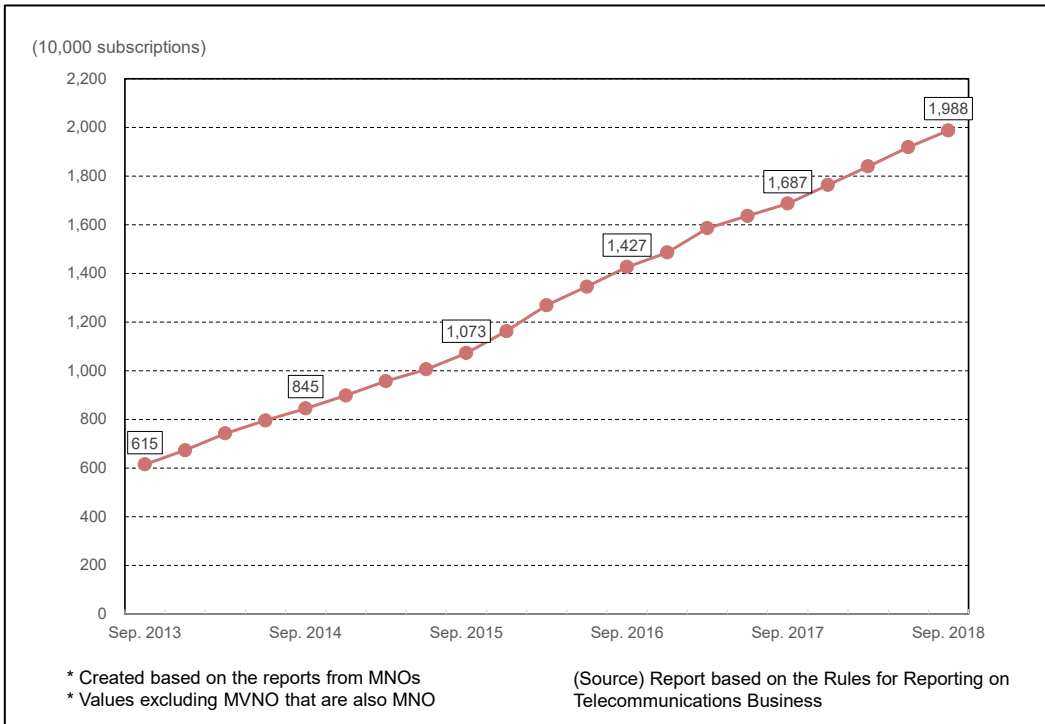**Figure 11 Diversification of the Internet usage form**

* Created based on the reports from MNOs
* Values excluding MVNO that are also MNO

(Source) Report based on the Rules for Reporting on Telecommunications Business

Figure 12 Change in the number of MVNO service subscriptions
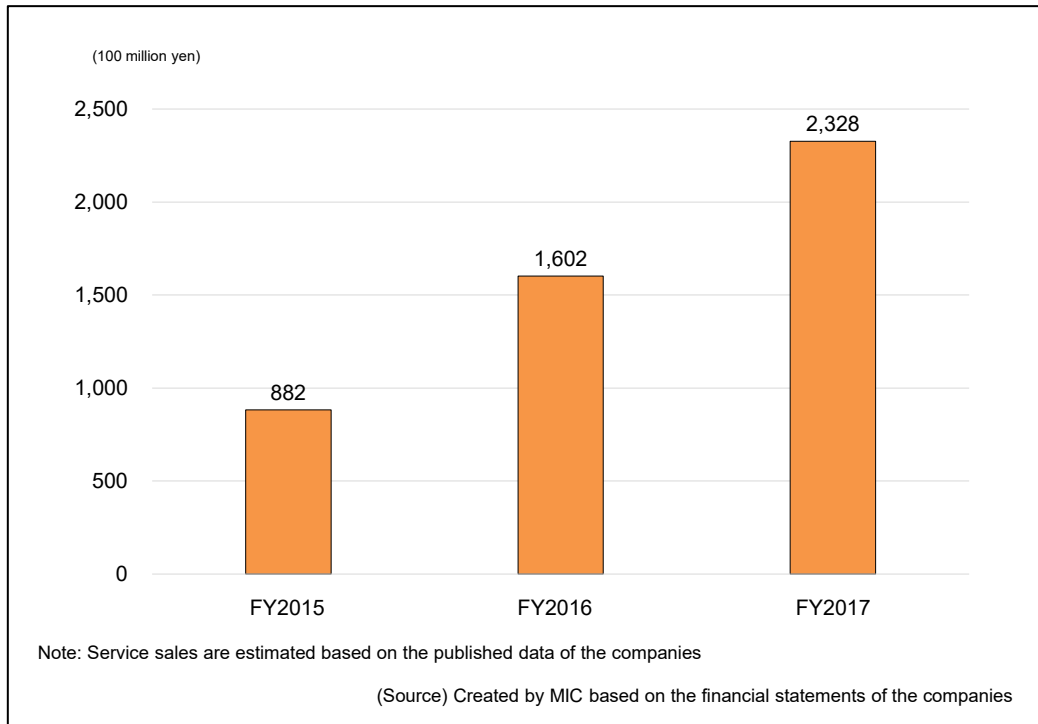
Figure 13 Change in the sales of MVNO services

It is expected that utilization of the Internet will become further advanced and diversified. In recent years, devices connectable to the Internet (IoT devices) have rapidly spread, reaching 27 billion in 2017. The number is expected to increase by half to 40 billion in 2020. Furthermore, the 5th generation mobile communication system (5G) will be introduced as the basis for continuous communication of a large number of devices. In the future, it is expected that various services will be generated using characteristics of 5G such as ultrahigh speed, multiple simultaneous connection and low latency (Reference 3-2). Regarding IoT, in particular, technologies such as Mobile Edge Computing (MEC) that processes information at a location nearer to user terminals compared with the existing cloud computing are expected to enable distributed, efficient and low-latency processing of information from a large number of IoT devices.

In order to support these diverse services, provision of Slicing Service is expected in the near future. By using Software Defined Networking (SDN) and Network Functions Virtualization technologies, the service freely slices out and combines parts of functions of 5G and communication equipment and logically divides a network.

Changes and prediction of the number of IoT devices in the world

* IoT devices in this chart refer to equipment that have a unique IP address and can be connected to the Internet and terminals that can be used at the end of a sensor network.
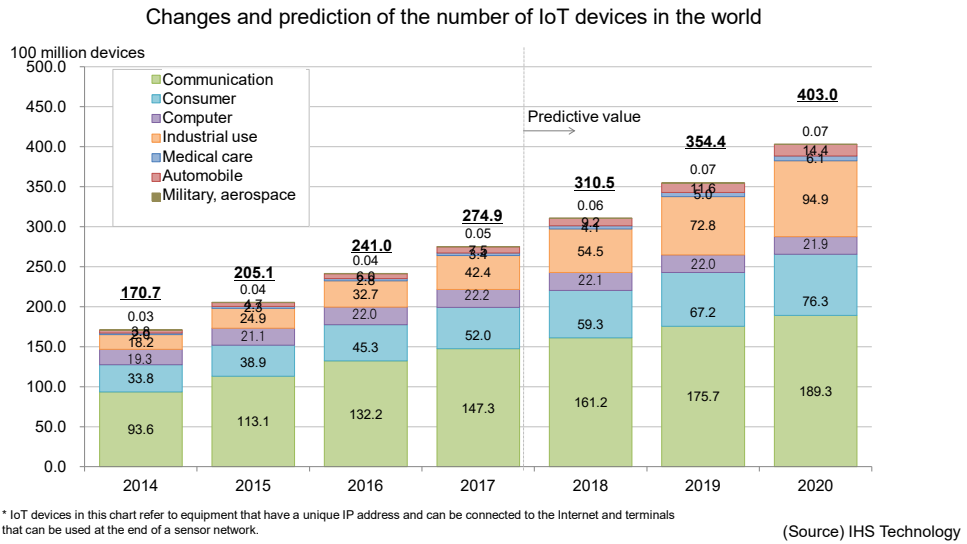
(Source) IHS Technology

Figure 14 Penetration of IoT devices and future prediction

Chapter 4 Trends of Policy Regarding Network Neutrality in Other Countries

Section 1 The United States

In 2004, then Chairman Powell of the Federal Communications Commission (FCC) urged, in his speech[7], internet business operators to voluntarily preserve "four principles for internet freedom": (i) freedom to access content, (ii) freedom to use applications, (iii) freedom to attach personal devices, and (iv) freedom to obtain service plan information.

In August 5, 2005, FCC adopted the order[8] to classify wireline broadband Internet access service for the public provided by Local Exchange Carriers not into telecommunication services subject to rigorous regulations including unreasonable discrimination (Title II of the Communications Act) but to "information services" (subject to Title I of the Act). On the same date, FCC adopted the Internet Policy Statement[9] stipulating four principles - (i) entitlement to access the lawful Internet content of consumers' choice, (ii) entitlement to run applications and user services of consumers' choice, subject to need of law enforcement, (iii) entitlement to connect consumers' choice of legal devices that do not harm the network, and (iv) entitlement to competition among network providers, application and service providers, and content providers - to ensure that broadband networks are widely deployed, and maintain and strengthen the open and interconnected nature of the Internet.

Later under the Democratic government, FCC adopted "Open Internet Rules"[10] in 2010. Specifically, without changing the classification of Broadband Internet Access Services (BIAS) as "information services" and allowing reasonable network management by BIAS providers, the rules include no blocking[11] and unreasonable discrimination by fixed BIAS in addition to ensuring of transparency.

In response to the nullification[12] of the major part of the 2010 Open Internet Order excluding the transparency by the Federal Court of Appeals in January 2014, <u>FCC adopted "New Open Internet Rules" [13] in February 2015</u>. <u>The rules </u>reclassified fixed and mobile BIAS to "telecommunication services" subject to Title II of the Communications Act (mobile BIAS was reclassified to "Commercial Mobile Services" that are also subject to Title II) and <u>incorporated rigorous regulations including: no</u>

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[7] https://docs.fcc.gov/public/attachments/DOC-243556A1.pdf
[8] FCC-05-150
[9] FCC-05-151
[10] FCC-10-201
[11] Blocking of traffic meeting certain conditions by Internet service providers
[12] Verizon v. FCC, 740 F.3d 623 (D.C. Cir. 2014).
[13] FCC-15-24

blocking, no throttling [14], no paid prioritization, introduction of general conduct standard [15] concerning unreasonable discrimination, establishment of complaint procedures and enhancement of transparency rules.

At the end of 2017 after regime change to the Republican Party, FCC adopted "Restoring Internet Freedom Order" [16] on the grounds that 2015 regulations based on Title II of the Communications Act deterred investment in speeding up and deployment of broadband. The order re-reclassified BIAS to "Information Services" subject to Title I of the Communications Act (re-reclassified mobile BIAS to "Private Mobile Services" that are also subject to Title I) and abolished most of the rules excluding ensuring of transparency. The rules regarding transparency require BIAS operators to disclose accurate information on their network management methods, quality, service provision conditions, etc. so that consumers can make informed choice. In May 2018 FCC set up ISP Transparency Disclosure Portal [17]. 34 companies are disclosing information on the FCC site as of January 2019.

In response to the abolishment of most obligations on BIAS operators at the federal level, attorney generals of 22 states and DC brought a case against FCC to the federal Courts of Appeals in January 2018. There were also some actions to nullify the Restoring Internet Freedom Order in the Congress. Furthermore, some states including Washington and California are moving to restore the neutrality order.

For example, in September 2018 the State of California established the California Internet Consumer Protection and Net Neutrality Act of 2018 [18] that requires business operators providing BIAS in the state to comply with the following network neutrality rules:

- No blocking
- No impairing or degrading
- No paid prioritization
- No paid zero-rating (zero-rating for all content in that category is tolerated)
- Publicly disclose accurate information regarding the network management practices
- No sneak-around services that degrade BIAS

The act was scheduled for enforcement in January 2019. However, in response to a lawsuit filed by the Department of Justice and telecommunication operator groups

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[14] Similarly, limiting communication speed of traffic that meets certain conditions
[15] Provision to prohibit BIAS operators from making unreasonable interference or disadvantageous treatment to end-users and edge providers (content/application providers, etc.) in their use of BIAS. FCC adopted a case-by-case approach to judgment on violations to the provision.
[16] FCC17-166
[17] https://www.fcc.gov/isp-disclosures
[18] Senate Bill No. 822

claiming that the act preoccupied the federal law's regulatory authority on interstate services, the state and the DOJ agreed to suspend the execution of the act for the time being[19] in October 2018.

This way, there have been heated debates on classification of BIAS and the federal-state regulatory authorities in the United States (References 4-1 to 4-3).

Section 2 European Union

The European Commission published the Commission Declaration on Net Neutrality[20] at the same time as the adoption of the Telecoms Reform package in December 2009. In the declaration, the commission clearly indicated the policy to monitor implementation of the provisions of the 2009 telecoms reform package (national regulatory authorities are given authority to obligate business operators to ensure transparency and minimum service quality).

Later, after public comment procedures, the EC presented "Proposal for the Regulation concerning the European single market for electronic communications" that includes provisions related to network neutrality in September 2013.[21] Based on the current state analysis that end-user protection rules different among the member states were increasing costs for operators, preventing cross-border services and spoiling users' incentives to use services, the EC proposed establishment of regulations applicable in all member states instead of directives that require domestic legislation by each member state.

After deliberation at the EU Council and European Parliament, the Open Internet Regulation[22] was adopted in November 2015 and enforced in April 2016.

Specifically, the regulation provides:

·   End-users' right concerning access to and delivery of information and contents, use and provision of applications and services and use of terminal equipment through Internet Access Services (IAS) (end-users include Content and Application Providers (CAP) and other business operators)

·   Prohibition of contract and commercial practices by IAS providers, which would undermine the end-users' rights

·   Obligation on IAS providers to ensure equal and non-discriminatory treatment

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[19] Until final settlement of the lawsuit that is pending at the federal court of appeal
[20] Commission declaration on net neutrality(2009/C 308/02)
[21] COM(2013)627final, " Proposal for a REGULATION OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL laying down measures concerning the European single market for electronic communications and to achieve a Connected Continent, and amending Directives"
[22] Regulation(EU)2015/2120 of the European Parliament and of the Council of 25 November 2015

of traffic and ban on blocking, speed reduction, degradation, etc. by them excluding reasonable traffic management measures

- Obligation on IAS providers to disclose information including the traffic management method, and download and upload speed.
- Provision of specialized service other than IAS is allowed only when certain requirements (sufficient capacity, not alternating IAS, not compromising the IAS quality) are met,
- Obligation on national regulatory authorities to ensure monitoring in order to promote non-discriminatory provision of IAS
- Obligation on business operators to provide information on network capacity and traffic management when requested by the relevant regulation authority.

The regulation stipulates rights of end-users and prohibits violation of the rights by IAS providers. In order to ensure consistent application of the regulation, the Body of European Regulators for Electronic Communications (BEREC) formulated the Guidelines on the Implementation by National Regulators of European Net Neutrality Rules[23] for national regulation authorities to monitor acts of IAS providers in August 2016.

The guidelines recognize that zero-rating could have effects on users' exercise of rights, but do not impose blanket prohibition and show the standard for case-by-case judgment.

BEREC Opinion for the evaluation of the application of Regulation (EU) 2015/2120 and the BEREC Net Neutrality Guidelines[24] published by BEREC in December 2018 found that the regulation and the guidelines were functioning, and it was not necessary to substantially change the Guidelines and stated to continue to ensure consistent application of the regulation by clarifying their language and providing zero-rating evaluation methods in 2019 (References 4-4 to 4-16).

> Key descriptions related to zero-rating in BEREC Guidelines on the Implementation by National Regulators of European Net Neutrality Rules.
> - When regulation authorities or BEREC assesses agreements or commercial practices concerning zero-rating, the assessment should take into account the aim of the Open Internet Regulation ("safeguard equal and non-discriminatory treatment of traffic" and "guarantee the continued functioning of the internet ecosystem as an engine of innovation"), the respective market positions of IAS providers and CAP, the extent to which end-users' choice is restricted, for example.

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[23] BoR(16)127
[24] BoR(18)244

> ・A zero-rating offer where all applications are blocked (or slowed down) once the data cap is reached except for the zero-rated application(s) would infringe the provision for equal treatment of all data traffic.
>
> ・Compared with zero-rating applied to an entire category of applications, zero-rating applied only to the company's or certain applications is more likely to reduce end-users' choice materially and undermine their rights.
>
> ・The lower the data cap, the stronger the incentive for the end-user to use the applications covered by zero-rating
>
> ・Price differentiation between individual applications within a category has an impact on competition between providers. It may therefore be more likely to undermine the goals of the Open Internet Regulation than would price differentiation between categories of application.

Section 3 India

In India, there were data communication services that were provided free of charge or at a discount for some websites or applications. However, The Telecom Regulatory Authority of India (TRAI) established a regulation not to offer or charge discriminatory tariffs for data services on the basis of content in February 2016.

In November 2017 TRAI issued recommendations to the Department of Telecommunications (DoT) to prohibit blocking, slowing down and preferential treatment of specific contents from Internet access, but allow reasonable traffic management and specialized services under certain conditions, and exclude designated important IoT services from the application of the prohibition.

Based on the TRAI Recommendations, the DoT decided the policy to amend license conditions of telecom operators providing internet access services by incorporating the non-discrimination principle in the service in July 2018.

India has introduced very strict regulations regarding network neutrality compared with Western countries.

Chapter 5 Key Issues and Basic Orientation

Section 1 Basic Points of View

In Japan, sustained investments have been made for advancement of networks under the competition among telecommunications carriers. As a result, the world-class broadband services are available in many regions.

Under the discipline of the Telecommunications Business Act that stipulates fairness in use, prohibition of an unfair and discriminatory treatment, etc. telecommunication carriers have made various efforts based on "the three principles for ensuring network neutrality" completed by the Panel on Neutrality of Networks in 2007. Thanks to these efforts, there has been no major problem to network neutrality such as unfair degradation of traffic quality for some contents by a carrier.

Meanwhile, increased importance of mobile communication, increasing traffic due to popularization of video contents, new business models including zero-rating service where communication pertaining to specified contents is free of charge, popularization of SNS, and expanded presence of the platform layer greatly changed the environment surrounding the Internet at home and abroad.

In response to this environmental change, it is necessary to review the past rules for network neutrality so that the Internet can continue to maintain its "openness" and fulfill its roles such as provision of (i) advanced and inexpensive communication means, (ii) platforms for free and diverse expressions and (iii) platforms for innovation, and thereby contribute to the enhancement of impartiality and fairness as a foundation of Society 5.0.

There are views that the three principles that are basic rules for network neutrality set forth by the Panel are still effective. However, in light of the environmental changes including diversification of entities involved in the Internet and increased importance to ensure network neutrality, the Study Group decided to replace "consumers" (the subject of the three principles in 2007) by "users" that include also business operators and clearly position the principles as "users' rights regarding use of the Internet". In addition, "entitled to access freely" stated in (1) is stipulated also in (2) for content providers.

Clear positioning as rights is expected to encourage stakeholders including telecommunication carriers to pay due respect to them.

◎"Rights of Users"

(1) free to access contents and applications (Users are entitled to use the Internet[25] flexibly and to access the contents and applications freely.)

(2) free to provide each other with their contents and applications (Users are entitled to provide their contents and applications freely to other Users.)

(3) free to use and connect terminals (Users are entitled to connect to the Internet freely through any terminal equipment that complies with the technical standards.)

(4) free to use communication and platform services (Users are entitled to use communication and platform services fairly for appropriate prices.)

<u>Based on the view that guaranteeing these users' rights will ensure network neutrality,</u> the Study Group <u>decided to study what rules are needed for guaranteeing the users' rights concerning specific matters expected today or in the near future.</u>

In light of the three roles that the Internet has fulfilled, characteristics of the Internet-related market (two-sided market [26], asymmetry of information [27] and difference of the bargaining power) and internal and external environmental changes, and based on the purpose of the Telecommunications Business Act including promotion of fair competition, smooth provision of telecommunications services, protection of the interests of the users, sound development of telecommunications and convenience for citizens, it is appropriate to adopt the following five basic viewpoints in considering specific rules for network neutrality, in addition to "fairness in network use" and "fairness in network cost sharing" of the Working Group.

In study based on the following viewpoints, it is important to pay attention to relations between individual entities not only within a layer but across layers[28].

◎<u>Basic viewpoints when considering rules</u>

  a. Ensure fairness in network use

  b. Ensure fairness in network cost sharing

  c. Realize consumers' choice based on sufficient information

  d. Ensure reliable and stable telecommunication services through development of a sound competitive environment (including prevention of unfair influence by

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[25] The subject of the Panel was "IP-based networks", which was replaced by "the Internet" in the principles above as well, because this discussion is on the rules regarding the Internet. [26] Not only consumers but also various stakeholders belonging to different layers (content and platform providers, etc.) exist as users across network layers while enjoying network effects.

[26] Not only consumers but also various stakeholders belonging to different layers (content and platform providers, etc.) exist as users across network layers while enjoying network effects.

[27] It is difficult for consumers to obtain knowledge and information on network quality, etc. (compared with ISP, etc.) and they may not be able to choose ISP and other services adequately.

[28] For example, it is necessary to consider competition between MNO and MVNO in the network layer, and cooperation and competition between telecommunication carriers in the network layer and business operators in the platform/content layer.

dominant business operators across the layer)

e. Promote innovations and sustained network investments

Section 2 Specific matters requiring rules

Today the Internet in Japan is in the midst of environmental changes as introduced in Chapter 3. In this context, some measures to address traffic increase and new commercial practices such as restriction to or prioritization of some Internet traffic <u>may appear as limiting users' rights described above or conflict with the provisions of the Telecommunications Business Act</u>. For this reason, parties involved are hesitating to work to solve the problem.

Therefore, <u>from the viewpoint of ensuring predictability, this section will discuss rules for network neutrality to clarify conditions to be allowed as reasonable measures or customary practices</u> concerning the following specific matters.

◎<u>Specific matters requiring rules for network neutrality</u>

(A) "Bandwidth control" that restricts communication bands for some traffic

(B) "Priority control" that gives priority to some traffic

(C) "Zero-rating" and "Sponsored data" where some traffic are not counted as data usage amount

Paragraph 1 Rules concerning bandwidth control

<Background>

As described above, the current Guidelines for Traffic Management were <u>formulated to address rapid increase of traffic mainly due to the spread of fixed broadband services</u> and occupation of network bandwidth by a few heavy users or P2P file sharing software. The guidelines <u>permit only three types of bandwidth control (heavy users, certain applications such as P2P file sharing software, and in times of disaster) as a legitimate act of business</u> (exemption from liability of violating secrecy of communication), <u>committed only in exceptional circumstances in order to ensure stable operation of network and communication quality</u> (smooth provision of communication services).

Based on the guidelines, <u>Some business operators</u>, in order to ensure stable network operation and communication quality for other users, <u>conduct bandwidth control where communication speed</u> of heavy users who made communications

exceeding a predetermined volume for a predetermined period is limited for a predetermined period of time (total volume control).[29]
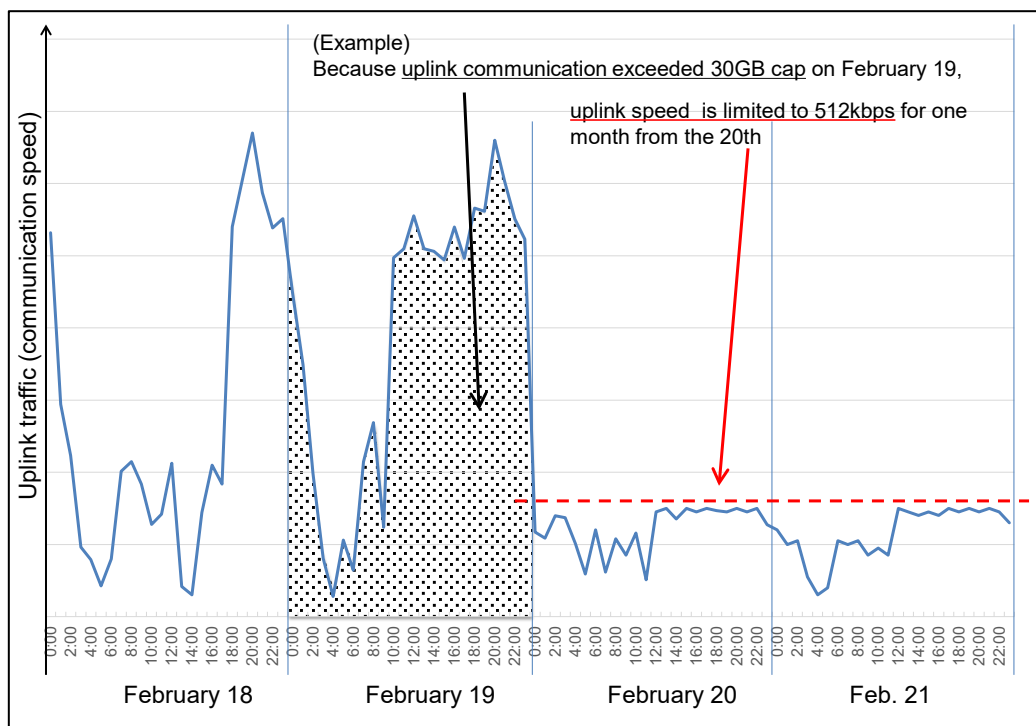

Figure 15 Example of current bandwidth control (total volume control)

In the current Guidelines for Packet Shaping, mobile communication (meter-rate or flat-rate with predetermined data communication volume) are not considered. In mobile communication, communications tend to concentrate to certain places and time zones due to use of limited and scarce frequencies (Reference 5-1).

Recently with the widespread use of video, music and other content delivery, a large number of general users are engaging in large-volume data communication. It is pointed out that the current bandwidth control targeting only heavy users is of limited effectiveness.

It is also pointed out that traffic due to frequent updating of smartphone OS and applications is offloaded from mobile communication to fixed broadband communication (access line of wireless LAN), and that traffic increase at the time of updating of OS of computers, etc. is causing a tight situation in the networks (Reference 5-2).

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[29] An example is to limit uplink speed to 512kbps for one month when uplink communication volume per day exceeded 30GB.

<Issues>

Depending on the target and manner, bandwidth control can <u>cause problems for fairness among users and content/application providers</u>. For example, implementation of bandwidth control targeting specific users such as heavy users requires attention to fairness among users. Bandwidth control targeting specific contents or applications <u>requires attention to fairness among content/application providers including potential entrants and its influence on competition.</u>

The following comments and discussions regarding bandwidth control were made at the Study Group:

・ <u>It may be necessary to revise the Guidelines for Traffic Management so that network operators can control bandwidth flexibly</u> when bandwidth is made tight by contents, etc. of Over the Top (OTT) businesses.

・ In the past there were many cases of a few heavy users occupying a large part of networks, but today <u>network use per user has increased</u>. We may as well consider a more flexible <u>approach to network control</u> while ensuring fairness among users.

・ Restricting the scope of network management could impair stable network operation. <u>Measures necessary for network management should be allowed based on users' consent and guarantee of transparency</u>.

・ Communication optimization is implemented from necessity for appropriate network management, but has also an effect to contribute to overall convenience for users. However, there is a need for rigorous information provision to users and a structure where users can make their own choice. <u>For this reason, we should examine the validity of consent regarding communication optimization and its relation with violation of secrecy of communication</u> (References 5-3 to 5-7).

・ The Guidelines for Consumer Protection Rules in Telecommunications Business Act and other rules <u>require telecommunication carriers to provide users with explanation on the bandwidth control, etc. but users may not understand the explanation well enough.</u>

<Future direction>

The current Guidelines for Traffic Management set forth <u>the basic principle: ISPs and others should cope with traffic increase by expanding and reinforcing network facilities including backbone lines and may implement bandwidth control</u>

only in exceptional circumstances[30]. It is appropriate to maintain the basic principle while studying requirements for being recognized as "reasonable traffic control". In this process, in order to ensure that users can make reasonable choice of services based on sufficient information, it is necessary to enhance and clarify the content of the information on specific operation policy and implementation status of bandwidth control, which should be known to all users and other business operators.

Specifically, traffic per subscription of broadband services is expected to further increase with upgrading and volume increase of contents. On the premise of transparency, it is desirable to revise the current Guidelines for Traffic Management to enable flexible network management as exemplified below:

- So-called Fairness Control [31] (restricting the bandwidth available for users to a certain level in decreasing order of the bandwidth they occupy at the time instead of restricting bandwidth of all users at a uniform rate) that is implemented to enable network use at a prescribed level or higher for as many users as possible at the time of network congestion

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[30] The Guidelines for Establishment of Special Base Stations to introduce Fifth Generation Mobile Communications Systems and other rules require introduction of technologies to ensure efficient use of radio waves pertaining to radio equipment of specified base stations.

[31] "Total volume control" is bandwidth control for a fixed period and targeting heavy users with communication volume above certain level for a fixed period of time. "Fairness Control" is implemented only at the time of network congestion and limits the bandwidth available for users (not necessarily heavy users) in decreasing order of the bandwidth they occupy at the time.
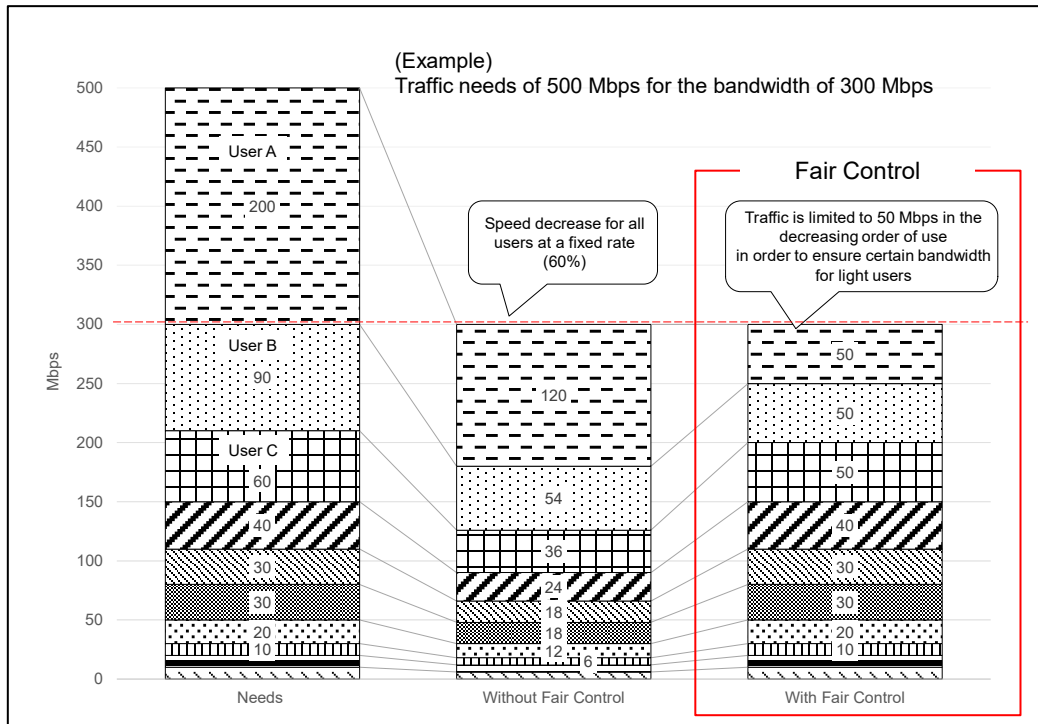
Figure 16 Schematic diagram of Fair Control

・ Control implemented by mobile communication carriers (MNO and MVNO) to secure QoE of users in mobile communication where communications tend to concentrate to certain places and time zones[32] (e.g. restricting burst traffic of streaming, limiting speed of OS updating)

Furthermore, it is necessary to consider clarification of rules (e.g. prior publicity to users and provision of opt-out measures) for the ideal level of communication speed limit after reaching the data cap and lossy compression regarding contents under the current mobile communication rate system (flat rate with data cap), while at the same time confirming intentions of users who will be affected, from the perspective of ensuring user convenience (Reference 5-8).

Paragraph 2 Rules on priority control

<Background>

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[32] When public comments on this Interim Report are invited, multiple business operators made suggestions that "similar control should be made possible also for fixed communication" concerning the description. However, the description intends consideration of requirements for being recognized as "reasonable traffic control" in mobile communication that has the tendency of communications concentrated to certain places and time zones, while maintaining the basic principle "bandwidth control should be implemented only in exceptional circumstances". When revising the Guidelines for Traffic Management, it is appropriate that relevant parties make careful examinations based on the basic principle.

Currently some telecommunication carriers are already implementing priority control mainly using NGN for telephone and other communications that require guarantee of consistent quality. To a certain extent it is considered rational that telecommunication carriers manage communication quality for limited users this way and provide services inside of the networks they have established.

However, priority control ensuring communication quality in connection with the Internet has many issues that should be considered, which include how to select specific services/contents subject to priority control and the control method, fairness among users and cost sharing. For example, if a telecommunication carrier implemented priority control of traffic concerning specific content and the control influenced access to the Internet by users who do not use the content, the control could injure their right to use the Internet. Implementing priority control requires careful operation (References 5-9 and 5-10).

As various services are expected to be provided through the Internet, securing of certain communication speed and quality is essential for some services such as automated driving and remote medical care. It is expected that need for priority control will increase for this kind of services. It is presumed that the spread of Network Slicing, Software Defined Networking (SDN), QoS management in 5G network (5QI), Mobile Edge Computing and other technologies will enable more flexible network management including management by entities other than telecommunication carriers.

<Issues>

If priority control is conducted without setting up a rule, there would be conflict of interest in terms of fair use of communication services between providers (and users) of the prioritized service/content and the providers (and users) of service/content that are not prioritized and the telecommunication carrier would implement prioritized control of traffic of certain industry types and services chosen for the control. As a result, it could affect users' free access to contents. Setting up rules of priority control requires study with consideration of this situation.

The following comments and discussions regarding priority control of traffic were made at the Study Group:

・ There is certain rationality in giving priority to traffic for automated driving and remote medical care. However, certain rules may be necessary for prioritized services/contents and technical conditions in order to ensure fairness in use.

・ Transparency, impartiality and fairness should be ensured concerning

・ prioritized content (businesses) and bandwidth and other conditions related to the control.

・ If prioritized control is implemented for the simultaneous online streaming by broadcasters currently under consideration and other communications that could apply significant load to the network, it may be necessary to reconsider the concept of "beneficiary" from the viewpoint of cost sharing.

・ It may be appropriate to recognize priority control as a distinctive service for providers to do business in the market. However, it may be necessary to prevent violation of basic rights that end-users should have.

・ From the viewpoint of how to control QoS in order to ensure QoE for users, we may need consensus building by stakeholders.

<Future directions>

With the spread of technologies such as Network Slicing and Software Defined Networking (SDN), telecommunication carriers will be able to manage bandwidth, etc. more flexibly also in terms of access to the Internet.

Selecting targets of priority control requires rational explanation on need for the control. It is also necessary to ensure transparency, impartiality and fairness by releasing technical conditions, for example, in order to ensure fairness in use and rights regarding the use of the Internet.

When a telecommunication carrier providing an Internet access service implements priority control for specific traffic, the carrier is required to appropriately examine the impact not only on users who use the prioritized traffic but also on other users and take sufficient measures to avoid providing an unfair service.

Specifically, when conducting prioritized control for a service that shares the same network for the Internet access service, the basic principles may include:

・ No excessive impact on the Internet access by users who do not use the services subject to the priority control from the viewpoint of securing others' right regarding the use of the Internet.

It is also necessary to study appropriate rules for services and contents for which priority control is allowed and their technical conditions, which include need for reasonable standards, securing of information disclosure and transparency and sharing of network cost for priority control.

However, use cases that require certain communication quality are not

necessarily made clear at present. In this context, setting rules that will be applied also to services that may appear in the future could excessively restrain business activities and nip business innovations in the bud.

Therefore, the MIC will begin with continuous information gathering and survey on services for which securing of certain communication speed and bandwidth is essential. When specific use cases appear, it is appropriate to set up discussion forums for multi-stakeholders involved in priority control, which include telecommunication carriers providing Internet access services, content providers covering a broad range of industries, platform providers and consumer groups, and work for consensus building. Because an intricate web of interests of the stakeholders is expected to appear in this process, the MIC should reconcile position differences between layers and business operators and strive to ensure appropriate discussions toward consensus building.

Paragraph 3 Rules on zero-rating and sponsored data[33]

<Background>

In mobile communication services based on meter-rate charge or flat-rate charge with data cap, some carriers are providing zero-rating services, where use of predetermined applications/contents does not count against the data cap (References 5-11 and 5-12).

Some telecommunication carriers expect that zero-rating and sponsored data can contribute to differentiation of service content and become a source of revenue for facility reinforcement to respond to traffic increase. For users, they are expected to expand the range of available services.

<Issues>

Regarding zero-rating and sponsored data, there are issues such as fair cost sharing between users of the covered service and non-users, fairness in network use between the covered contents and other contents, and impact on competition in the content/application layer.

Such business practice may be considered as giving preferential treatment to specific persons or services. As to whether they can be accepted in light of the disciplines such as Article 6 Fairness in use, Article 26 Explanation of Terms and Conditions for the Service Provision, Article 29 Order to Improve Business

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[33] System where the content provider bears the charge for data use so that the use does not affect data communication fee paid by the user or available communication volume of flat-rate

Activities against an unfair and discriminatory treatment and Article 30 Prohibited Acts of Telecommunications Carriers Installing Category I Designated Telecommunications Facilities of <u>the Telecommunications Business Act and the general principle of network neutrality</u>: "all Internet traffic should be treated equally", <u>comprehensive examination based on the basic viewpoints of Section 1 is necessary</u>.

The following comments and discussions regarding zero-rating and sponsored data were made at the Study Group:

- Zero-rating and sponsored data are <u>expected to have positive effects</u> such as promoting competition in the communication layer by contributing to acquiring users, and encouraging users to use contents. <u>However, negative effects are also expected</u>: telecommunication carriers may influence competition of content providers (selecting winners); if telecommunication carriers with market power and major content providers established exclusive relationship, it will restrain competition in the two layers.

- <u>Regarding zero-rating without cost burden on the content providers, there are issues of fairness in cost sharing of</u> data communication <u>between users of zero-rating and other users, and fairness between providers of contents covered by zero-rating and other providers</u>. On the other hand, <u>if excessive cost sharing for zero-rating is required</u> from the contents providers, it can form an entry barrier for small and medium content providers with less capital strength and <u>stifle competition in the content market</u>.

- In mobile communication where communications tend to concentrate to certain places and time zones due to use of limited and scarce frequencies, zero-rating service <u>could lead to capacity shortage through rapid increase in traffic</u>.

- In order to exclude contents covered by zero-rating from counting of data communication volume, it is necessary to <u>analyze the packets of the user</u>. It is suggested that <u>such act can violate secrecy of communication</u>. Specifically, it is possible to obtain specific consent about packet analysis from individual users of zero-rating at the time of subscription. However, analysis of packets of users who do not use zero-rating may violate secrecy of communication.

- It is suggested that, if a telecommunication carrier applying zero-rating only to its own content analyzes traffic of users of the zero-rating service and excludes the applicable volume from counting, it would not violate secrecy of communication. In this case, however, <u>there are issues whether or not applying zero-rating only to the company's contents poses a problem for fairness in use</u>

(unfair discriminative treatment), and <u>how to think about its impact on competition in the content market</u>.

The public comment and hearing about the draft agenda received various opinions from carriers, content provider associations and others.

From carriers: it is important that free charge setting and services including bundle discount, zero-rating and sponsored charge stimulate and create new demand and contribute to consumer interests. For smooth introduction of new business models, <u>approaches based on "secrecy of communication" and "fairness in use" should be explained in guidelines etc. toward the direction of minimum regulations</u>.

Another opinion is: if tie-up of mighty market power of MNO and major platform providers becomes a normal state, market competition is expected to stagnate and could greatly harm users' convenience in the medium to long term. <u>There should be certain restrictions on discriminatory treatment of carriers and platform providers by content holders</u> (Reference 5-13).

From the content provider association: schemes of zero-rating and sponsored data are solutions that are being established by private companies to respond to data demand from consumers. <u>It is necessary to maintain "principle of non-discrimination" and paid zero-rating should not be allowed</u> (Reference 5-14).

Lastly from consumers' point of view: <u>it is necessary to think about measures to prevent analysis of communication packets, narrowing of choice and leading to a certain direction without sufficient understanding by the consumer</u>. It is also pointed out that <u>actual packet counting of content covered by zero-rating is not disclosed to consumers and that they cannot examine suitability of charging (References 5-15 and 5-16)</u>.
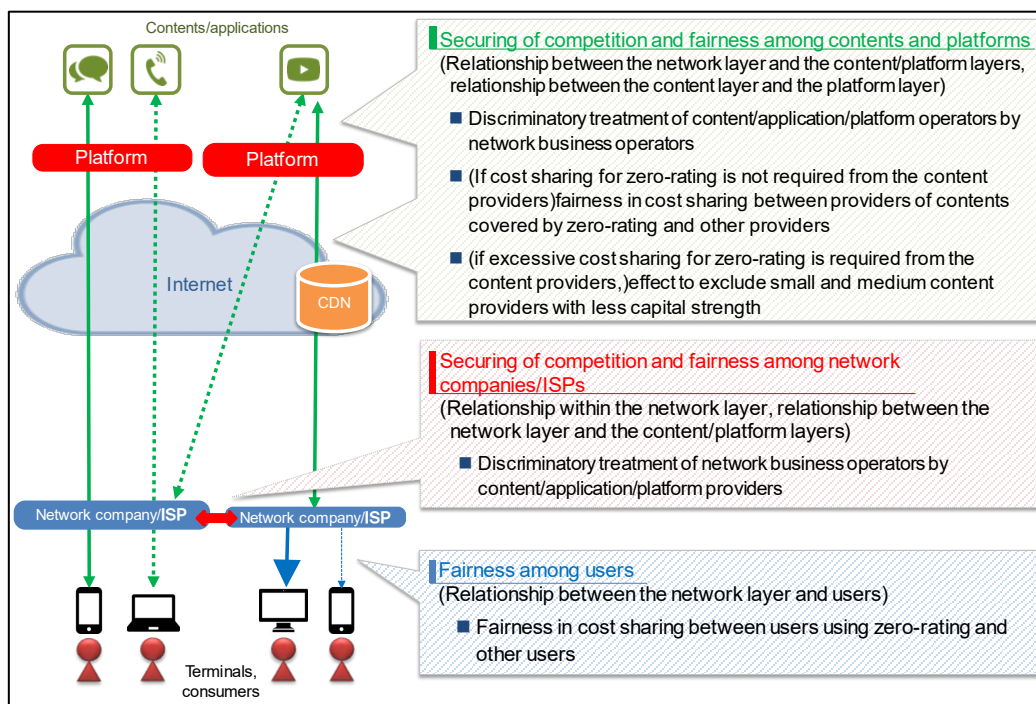
Figure 17 Structure of issues concerning zero-rating

<Future directions>

Zero-rating and sponsored data are emerging services. Uniform prohibition of such business practices is not advisable. It is effective to present certain criteria from the viewpoint of ensuring predictability, then examine and analyze individual cases and address problem cases ex post facto based on the Telecommunications Business Act, etc.

For the examination and analysis, it is important to compare positive and negative aspects from various points of view, such as maintenance of the Internet ecosystem, securing of users' rights, impact on the competition within a layer and between layers, and social and public values including promotion of information distribution.

Therefore, in order to increase predictability in the market and create an environment where telecommunication carriers and content providers can provide zero-rating and other services in proper and flexible partnership, it is appropriate for the MIC to compile and operate "Interpretation guidelines for application of the discipline of the Telecommunications Business Act regarding provision of zero-rating" with participation of telecommunication carriers, content providers, consumer groups and other parties, and after sorting out matters such as the following:

・ If a telecommunication carrier asks a content provider subject to zero-rating to sign a contract that makes it difficult for other carriers to provide a similar

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service, this may be inappropriate from the viewpoint of securing competition in the network layer.

- Regarding provision of zero-rating service by MNO, it may be necessary to monitor whether or not the provision is made under a condition that makes it impossible for MVNO using the MNO's network to provide an equivalent service.

- From the perspective of ensuring competition in the content and platform layers, it may be inappropriate that a telecommunication carrier with market power apply zero-rating only to contents of its related companies.

- In order to prevent unreasonable discriminative treatment of content providers by telecommunication carriers, it may be necessary to urge telecommunication carriers with market power to disclose the conditions, etc. regarding selection of contents covered by zero-rating.

- It may be necessary that telecommunication carriers with market power secure networks (facility investment, etc.) to handle traffic increase accompanying the spread of zero-rating.

- If a content provider with market power (who can be also a platform provider) asks a telecommunication carrier to sign a contract that makes it difficult to apply zero rating to competing contents, it may be unfair for other content providers (including platform providers) from the perspective of ensuring competition in the content/platform layers and fairness in use of telecommunication service of the carrier.

- In order to ensure consumers' choice based on sufficient information, telecommunication carriers may need to provide users with information on conditions (including charge) concerning contents covered by zero-rating and actual packet counting in an appropriate and easy-to-understand manner.

The MIC needs to ensure transparency through efforts such as gathering information on the conditions from companies providing zero-rating, examining the fairness and appropriateness of the conditions and making the results public.

It is desirable, through these efforts, to specify cases that violate the Telecommunications Business Act and cases that do not violate.

It is necessary to consider a system for telecommunication carriers and content/platform providers to file complaints, etc. in the event of dispute between them (including offering the opinion to the Minister for Internal Affairs and Communications and use of Telecommunications Dispute Settlement Committee

and other Alternative Dispute Resolution (ADR) systems)

In addition, it is necessary to sort out requirements for implementation of zero-rating to be found not violating secrecy of communication.

Paragraph 4 Mechanism to Ensure Sustained Investment in Networks

<Background>

The Internet traffic in Japan has been increasing 1.2 to 1.4 times every year. The trend is expected to continue due to increasing content volume including widespread use of 4K videos. In order to maintain and enhance the quality of Internet services in time with enrichment of contents and appearance of diverse new services, it is essential to make sustained investments in network infrastructure (References 5-17 and 5-18).

Contents and services provided using the Internet are increasing diversity and volume, but the business model of Internet access service has not changed basically from the age of narrowband. ISPs are operating and investing in enhancement of Internet infrastructure mainly by using fees from users who are direct "beneficiaries" of their Internet access service.

Top ISPs can charge additional fees from content/platform providers that are directly connected (Internet access service is provided), but lower ISPs usually pay transit fees to top ISPs in order to ensure Internet-wide connection[34].

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[34] In recent years, however, cases are increasing where OTT companies, etc. develop networks themselves and ensure connection not only with top ISPs but also with lower ISPs.
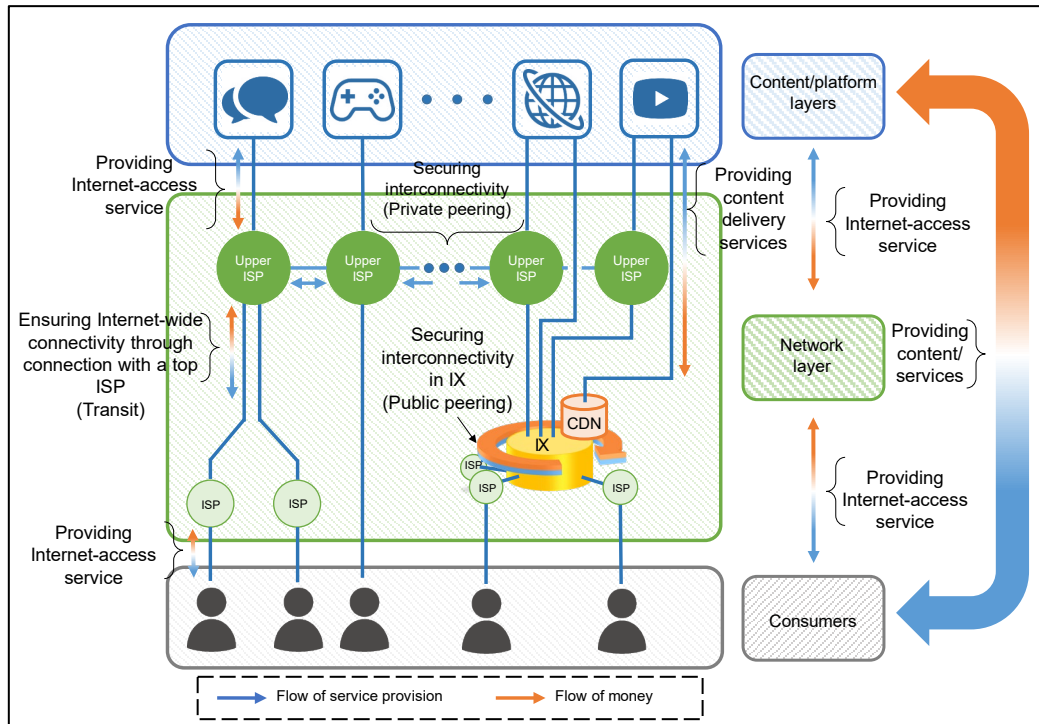
Figure 18 Image of Internet connectivity between companies

Below are examples of network investments in response to Internet traffic increase.

(i) When ISPs providing service on FLETS of NTT East and West reinforce the connection bandwidth with NTT East and West (extension of network terminations), they also reinforce connection line bandwidth with top ISPs.

(ii) When cable TV companies convert their access network to fiber optics and reinforce transmission equipment, they also reinforce connection line bandwidth with top ISPs (References 5-19 to 5-21).

(iii) When MVNOs reinforce connection bandwidth with MNOs they also reinforce connection line bandwidth with top ISPs.

There are suggestions that benefits of network reinforcement by lower ISPs as described above are enjoyed not only by users of the ISPs but also the top ISPs connected with the ISPs and content/platform providers directly connected to top ISPs in the form of quality improvement of content delivery.

Number of subscriptions to fixed Internet access services for consumers has reached a ceiling and it is difficult to raise the charge under the current severe competitive environment. Without a prospect for substantial increase in earnings, equipment investment to maintain the quality of internet access service and respond to increasing traffic is becoming a heavy burden on lower ISPs that do

not provide Internet access service directly to content providers and others (Reference 5-22).[35]

<Issues>

The following comments and discussions regarding response to network traffic were made at the Study Group:

· Business associations and content providers talked about network loads due to traffic of OS updates, etc., but the talk broke down due to differences between the two sides. Lack of sufficient communication between network operators and upper layers has prevented them from reaching a practical solution of the issue.

· There are traffic congestions with bottleneck at network terminations in the FLETS network of NTT East and West[36] (currently discussed at "the Study Group on Calculation of Interconnection Charges" of the MIC) but detail of the actual condition is not known (Reference 5-23).

· It is necessary to discuss appropriate sharing of network cost in order to upgrade networks and continue stable service for users. In this process, it may be necessary that a neutral organization in cooperation with telecommunication carriers measure traffic including so-called off-road traffic in order to precisely understand the current traffic.

· As further increase of traffic is expected with delivery of large-volume digital contents, it may be necessary to discuss how to ask relevant companies to share cost of services that increase traffic.

· Content providers are also making investment for more efficient content delivery including development of technologies to reduce content volume and utilization of CDN (References 5-24 and 5-25).

· Upgrading of communication services is desirable but how to share various burdens across society is a problem. We should discuss desirable cost sharing from the perspective of ensuring safe and secure use of communications by the public in the end.

· It may be necessary to maintain service quality not only in urban areas but also

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[35] When public comments on this Interim Report were invited, multiple companies, etc. made suggestion that fixed communication also needs considerations for flexible charge setting including introduction of meter-rate charge.

[36] It is also suggested that speed of broadband services is lowered during the time zone where use converges.

in rural areas.

<Future directions>

It is appropriate that the MIC with cooperation of relevant network operators survey and understand the actual state of traffic (not only total Internet traffic estimation but also analysis of uneven distribution among regions/companies, content types, etc.[37]) and make objective data public.

At the same time, it is necessary to promote voluntary disclosure of information pertaining to the quality of Internet access services (e.g. delay, effective speed) by telecommunication carriers.

Such "visualization" of Internet traffic is expected to clarify bottlenecks of the Internet (traffic concentration[38] to certain connection bandwidth[39] or by specific contents) and "beneficiaries", and thereby contribute to discussions on burden sharing and cooperation among parties concerned.

Both content providers (including OS venders) and network operators are seeking to enhance benefits of end-users. Therefore, in order to respond to expected increase in Internet traffic, we should establish a cooperative framework of a wide range of parties concerned towards efficient and stable content delivery, and promote measures to address the network tightness. In this process, the MIC should endeavor to reconcile difference of positions between layers/companies and ensure appropriate discussions towards consensus formation.

Currently, lower local ISPs secure their reachability to the Internet through transit with top ISPs in urban areas mainly in terms of cost. However, a deluge of small-scale Internet accesses from IoT devices are expected in the future not only in urban areas but also in rural areas. For their efficient and low-latency processing, technologies such as MEC that processes information at a location closer to users are believed to become important. As turning back of traffic within a region is expected to bring about various services contributing to solution of regional problems by using IoT devices, it is necessary to review the current network architecture and traffic exchange concentrated in urban areas. Shift to geographically-distributed network architecture is important also to prevent

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[37] Pay attention that analysis of Internet traffic may require consideration of secrecy of communication in some cases.

[38] It is suggested that OS update traffic and burst traffic of OTT providers are part of the reason for network tightening.

[39] It is suggested that connection bandwidth with top ISPs and PPPoE network terminations in FLETS network of NTT East and West have become bottlenecks in some ISPs. It is also suggested that connection bandwidth with MNO has become bottleneck in MVNO.

influence on network use across the country in the event of a large-scale disaster in an urban area.

In order to enhance communication quality and disaster resilience through promotion of traffic exchange in local areas, it is desirable that the MIC supports initiatives by business operators concerned for utilization of local IX and CDN, in addition to the current support for geographical distribution of data centers.

Section 3 Mechanism to Ensure Network Neutrality

As described above, in order to ensure network neutrality, it is necessary that business operators concerned respect and comply with the rules and systems proposed in the paragraphs of Section 2. In discussions on the discipline, the following two points require special attention:

(i) Highly fluid and difficult-to-predict environment surrounding the Internet, which includes technological innovations: Internet-related fields are always changing in a big way due to various innovations. It is difficult to fully predict their change. For this reason, it is desirable that their discipline has a certain flexibility and rapidity.

(ii) Diversity of stakeholders and asymmetry of their relationships: The Internet is already functioning as infrastructure and a wide variety of stakeholders including consumers and content/platform providers who are users as well as telecommunication carriers including ISPs are subject to influence of the discipline. Furthermore, the relationship between individual layers is highly fluid (also in connection with (i) above) and not necessarily symmetric. For this reason, it is necessary to consider fairness of discipline among parties concerned including cross-layer cases.

The following comments and discussions regarding mechanism to ensure network neutrality were made at the Study Group:

- Information disclosure is essential for maintaining fairness. It is necessary to study what information to disclose to what extent including consumers' point of view.

- Framework and system should be established where third-party organizations or other reliable organizations present accurate information to enable discussions based on the fact. For this purpose, it is necessary to prepare objective data. It is important to create and support a system to gather and

present continual data/facts with participation of multi-stakeholders.

· For judgment on whether the balance of users' rights, impediment to choice and other factors will be maintained, <u>we may need collection and publication of information on the market based on stationary observation and evaluation also considering competition between layers.</u>

<Future directions >

In the light of these discussions, co-<u>regulation approach (aims to realize optimum discipline through intermediate policy means that take advantage of both legal regulation and self-regulation) may be appropriate</u> to ensure discipline necessary for network neutrality.

Specifically, <u>on the premise of the discipline of the Telecommunication Business Act[40], it is appropriate to formulate guidelines as self-regulation with participation of all stakeholders</u> to present the minimum standard to be ensured as consumers' right, cases tolerated as justifiable measures and other matters. <u>Government will monitor its compliance status and get involved in response to violations.</u>

<u>In order to guarantee fairness in and between layers and enable consumers' choice based on sufficient information, appropriate information disclosure by telecommunication carriers is essential. For example, it is adequate to disclose the following information:</u>

· <u>Effective speed pertaining to Internet access</u> (including effective speed after reaching the data cap in the case of mobile communication)

· <u>Conditions, fees, etc. regarding contents covered by zero-rating service (including information on charging such as actual state of packet counting pertaining to covered content,)</u>

· <u>Specific operation policy regarding bandwidth control and implementation status</u>

In addition, based on the Guidelines for Consumer Protection Rules in Telecommunications Business Act, telecommunication carriers are required to provide clear explanation such as conveying information with content and ways that are easy to understand for consumers. It is appropriate for the MIC to consider review

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[40] e.g. Article 4 Protection of the secrecy of communications, Article 6 Fairness in use, Article 26 Explanation of Terms and Conditions for the Service Provision, Article 29 Order to Improve Business Activities against an unfair and discriminatory treatment and Article 30 Prohibited Acts of Telecommunications Carriers Installing Category I Designated Telecommunications Facilities

of the guidelines as needed.

Furthermore, in order to maintain fairness in and between layers and transparency of services, <u>it is necessary to establish a system for continuous monitoring and fair and impartial verification of the disclosed information</u>. In this process, <u>we should also consider its effectiveness</u>. For example, if verification result is different from the disclosed information, the system may request the telecommunication carrier <u>to improve the service quality and correct the disclosed information</u>.

Private bodies, international organizations and others are making various efforts for measurement and information disclosure of effective speed of broadband services but it is not easy to establish a fair, impartial and efficient measurement method. Chapter 2 Section 2 introduced initiatives for measurement and provision of effective speed concerning MNO. For data collection and disclosure, it is important to establish a fair, impartial and efficient measurement method and provide consumers with easy-to-understand information.

Regarding data disclosure, it is desirable to disclose data as Open Data[41] so that not only government but also diverse stakeholders including business operators and consumer groups can analyze and verify the data. Disclosing data this way is expected to make more entities interested in the state of network neutrality.

The MIC should strive for sustained functioning of the multi-stakeholder process described above.

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[41] Basic Principles on Open Data (May 30, 2017) defines open data as data which is published in a form to which all of the following applies: (i) Data published under a rule allowing secondary use, whether or not for commercial purposes, (ii) Data published in a machine-readable format, and (iii) Data that can be used free of charge

Chapter 6 Policy Initiatives in the Future

In light of the discussions in the previous chapters, it is appropriate for the MIC to promote the following initiatives in a multi-stakeholder approach and with cooperation of parties concerned in Japan and abroad.

(i) Revise of the Guidelines for Traffic Management

Revise the current Guidelines for Traffic Management formulated by industrial associations near the end of the year. The revision will enable operations such as so-called Fairness Control in order to ensure appropriate management and operation of networks and maintenance of the quality of Internet access services.

In this regard, however, incorporate also information disclosure necessary for choice by consumers so that consumers can correctly understand these network operations and choose service.

(ii) Formulation of guidelines concerning zero-rating

In order to increase predictability and create an environment where telecommunication carriers and content providers can provide zero-rating and other services in proper and flexible partnership, the MIC will compile and operate "Interpretation guidelines for application of the discipline of the Telecommunications Business Act regarding provision of zero-rating" (including matters concerning information disclosure to consumers) with participation of parties concerned near the end of the year.

(iii) Establish a monitoring system

Establish a system to continuously monitor compliance status of (i) and (ii) above and information disclosure status and urge business operators, etc. to make improvement if necessary (including "Monitoring Meeting concerning Network Neutrality (tentative name)" near summer of this year.

In addition, the MIC will collect information on and survey services requiring priority control and related technology trends, etc., and provide information to the Monitoring Meeting concerning Network Neutrality (tentative name). When specific needs are found, the ministry will set up forums for multi-stakeholder discussions to promote consensus building.

(iv) Establish a system for efficient and stable traffic processing

The MIC will set up early a system of cooperation by various related parties for efficient traffic processing, have cross-layer discussions on sustained investment in networks, and promote initiatives to address network tightness.

In order to improve communication quality and disaster resilience through promotion of local traffic exchange, the ministry will consider specific measures to support initiatives by relevant business operators to utilize local IX and CDN by summer of this year, in addition to the current support for geographical distribution of data centers.

Furthermore, it is important that not only telecommunication carriers but also diverse stakeholders including content/platform providers in Japan and abroad respect and comply with the users' rights regarding the use of the Internet described in Chapter 5 Section 1 and the rules of network neutrality (i) to (iv) above.

To this end, it is effective, based on the future directions put together by the Study Group, to agree to concrete rules for network neutrality as "norm" through a multi-stakeholder process with participation of wide-ranging entities including business operators, consumers and government, and to make the rules function as discipline based on the co-regulation under which stakeholders respect and comply with the rules.

The MIC needs to run PDCA cycle by operating the rules for network neutrality, continue monitoring and review the rules as needed.

As discussed in Chapter 1 diverse services and contents are provided on the Internet across borders. In recent years, platform/content providers are developing their own networks and global activities by OTT business operators are flourishing.

In Society 5.0 that will come in the near future, a structure called Cyber Physical System is expected to appear. This is a structure to analyze huge amounts of data from real space with AI and use them to create values in cyber space. Here, data plays the role of "blood" that circulates across the boundary of the two spaces. Cyber Physical System is not closed inside of Japan but can expand globally through cross-border data distribution.

Securing network neutrality is essential for maintaining "openness" of the Internet and realizing continuing innovations and global and free data distribution on the Internet. Therefore, it is important to ensure consistency of international systems by proposing the approach to network neutrality compiled by Japan to international conferences including OECD and work to build a consensus.