Broadband Competition Policy
to Address the Transition to IP-based Networks

----- Experiences and Challenges in Japan -----

Yasu Taniwaki

This paper outlines the recently emerging broadband market in Japan and provides an overview the policy agenda corresponding to the fast changing market environment, which includes policy issues addressing the recent network transition from PSTNs (Public Switched Telephone Networks) to IP (Internet Protocol)-based networks.

In this paper, the basic framework of the Japanese telecom market is described. Based on that, it outlines the current status of the broadband market in Japan. It is followed by the competition policy directions in the transition from legacy networks or PSTNs to IP-based networks.

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1. Introduction

Japan is now ranked as one of the most advanced countries in the deployment of broadband services. Several factors supporting this deployment can be found in policy measures for the promotion of broadband network infrastructure and promotion of competition in the broadband market.

This paper outlines the recently emerging broadband market in Japan and provides an overview on the policy agenda corresponding to the fast changing market environment, which includes policy issues addressing the recent network transition from PSTNs (Public Switched Telephone Networks) to IP (Internet Protocol)- based networks.

In this paper, Section 2 describes the basic framework of the Japanese telecom market. Based on that, Section 3 outlines the current status of the broadband market in Japan. In Section 4, in the transition from legacy networks or PSTNs to IP- based networks, the latest competition policy issues in Japan are summarized. Finally, in Section 5, the conclusion of this paper is shown.
2. Basic Framework of the Japanese Telecom Market

As the first phase of the competition policy, the Japanese telecommunications market was liberalized in 1985 and the NTT Public Corporation was privatized at the same time (See Fig. 1).

During the second phase, in July 1999, NTT was reorganized into one long distance company (NTT Communications) and two regional companies (NTT East and West) under the holding company (NTT). Around this time, a number of new competition policies were implemented, such as interconnection rules to open up bottleneck facilities owned by NTT regional companies to other competitive carriers.

Throughout the first and the second phases, the legacy telephone system always remained unchanged, even though vast market structure changes such as the transition from analog technology to digital technology occurred. However, the advent of IP technology is the sort of paradigm change that has a serious impact on telecom policy. Recognizing this, the MIC must take steps to implement the new IP based competition policies as soon as possible.

As shown in Fig. 2, the number of competitive carriers has been steadily increasing, but the local access market is still monopolized by NTT regional companies, NTT East and NTT West. Specifically, 94% of all the access lines are still owned by NTT regional companies.
Here, in the legal framework of the telecom related market in Japan, the Telecommunications Business Law (TBL) stipulates regulations pertaining to telecom carriers. In addition, CATV Law covers CATV service, but cable modem service is not covered by this law. In other words, the cable modem service is classified as a telecommunications service and the telecom regulations are applied (See Fig. 3).
3. Current Status of the Broadband Market in Japan

3-1. Overview

Looking at the number of broadband subscribers, about 23.3 million households are now enjoying broadband services in Japan. Among these broadband users, the current number of DSL subscribers amounts to about 14.5 million and the number of cable modem subscribers amounts to 3.3 million (as of the end of March 2006). Here, the speed of DSL service in Japan is normally 24 Mbps and more than 40 Mbps (sometimes up to 50 Mbps) in some metropolitan areas and the monthly charge is about 35 dollars (See Fig. 4).

In addition, a fiber optic service of 100 Mbps for mass users has been in operation since August 2001 provided by several common carriers in metropolitan areas such as Tokyo and Osaka. This service is offered for about 60 dollars a month and the number of subscribers has reached 5.5 million. One structural change can be found in the trend for the average monthly increase in number of broadband service subscribers. From the beginning of 2005, the monthly increase of subscribers to the fiber optic service has been exceeding that of DSL, making the fiber optic service the most popular broadband service in Japan.

![Fig. 4](image-url)

Along with this broadband service deployment, an ITU survey (November 2005) concludes that Japan is now ranked first with regard to price for broadband services per 100 kbps (See Fig. 5).
With regard to the deployment of fiber optic infrastructure, the Japanese government has compiled a plan to have common carriers install a nationwide FTTC (Fiber To The Curb) by FY 2005. Under FTTC, the last one-mile is left to a variety of competing paths such as DSL, fiber optics and FWB (Fixed Wireless Broadband). As a result, as of the end of March 2006, the installation rate of FTTC had reached about 86% (See Fig. 6).

At the same time, focusing on the deployment of broadband in rural areas is also an important issue. A substantial difference can be found in the installation rate of fiber optic cables between metropolitan and rural areas. Specifically, the installation rate for metropolitan areas has reached 98%, whereas the rate for rural areas remains at 70%.

3-3. Measures to Promote Broadband Deployment in Japan

3-3-1. DSL market

As already mentioned, in Japan, the number of DSL subscribers has grown very rapidly. Three main reasons can be found for this growth.
Firstly, it could be attributed to the price structure of legacy telephone services. That is, before the development of the DSL market, people had been using dial-up internet access with charges for local calls being *time sensitive*. The DSL service, however, was launched on a *fixed rate* basis and this has accelerated the transition from dial-up internet access to DSL service.

The second reason could be attributed to Japan’s geography. Japan has high population density in many areas, which is suitable to DSL service with technical constraints on transmission speed due to the distance from central offices.

A third and more important reason could be attributed to the establishment of interconnection rules such as collocation and unbundling rules for DSL service providers planning to provide their services using access networks of NTT East and NTT West.

As already mentioned, NTT regional companies have a 94% share of local access lines and this situation has contributed to the increase in the number of DSL subscribers compared with cable modem services.

As shown in Fig. 7, the number of subscribers started increasing dramatically in the autumn of 2000, which is exactly the same time that the interconnection rule for DSL service was enacted.

In this sense, the establishment of interconnection rules for the DSL market has worked quite well to promote service competition. As a result, the market share of NTT East and NTT West has decreased to less than 40%, which is quite different from DSL markets in other major countries.
3-3-2. Fiber Optic Networks

The installation of fiber optic networks is evidently the role of the private sector. The role of the government is limited only to easing the financial burden of the common carriers. More specifically, the government offers incentives to carriers such as:
- Loan systems with interest rates lower than the market rate, which are available to any carrier with a fiber network installation plan; and,
- Tax deductions for investment by carriers for digitization.
These policies are broadly recognized in Japan to have worked well especially during the “take-off” period since the year 1996.

In the early 2000s, the fiber optic service was not broadly recognized as the main service in the broadband market, although the installation of fiber optic cables at a nationwide level was set as a policy target to be completed by FY2005. Along with the growth of the DSL market, the fiber optic service has been gradually recognized as one of the main services with a higher transmission speed than DSL service.

Under these circumstances, however, a substantial difference can be found in the installation rate of fiber optic cables between metropolitan and rural areas. If this situation is left as it is, the domestic “digital divide” might become a serious social problem.

To address this situation, in January 2006, “IT New Reform Strategy” was decided by the government (IT Strategy Headquarters) and this strategy has set FY2010 as the new target which every household will be able to enjoy broadband services, the private sector will be assisted in the deployment of broadband infrastructure including fiber
optic networks. Based on this strategy, in August 2006, the MIC has decided “Next-Generation Broadband Strategy 2010.” Following this new strategy, the MIC will set up a follow-up group made up of the MIC and the local governments to exchange information and to develop broadband deployment programs planned by each local government, reflecting geographical situations in each community.

### 3-4. Mobile Market

Currently, the number of cell phone subscribers in Japan has reached 91.8 million (as of the end of March 2006). In this environment, mobile internet access services such as “i-mode”, provided by NTT DoCoMo, have become quite popular. In fact, 87% of cell phone users enjoy mobile internet access services. In addition, the number of 3G (third generation) service subscribers stood at 52.7% of the total number of cell phone subscribers (See Fig. 8).

**Fig. 8**

<table>
<thead>
<tr>
<th>Current Status of Mobile Market</th>
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<tbody>
<tr>
<td>As of the end of March 2006</td>
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<tr>
<td>Mobile: 91.8 million</td>
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<tr>
<td>Internet service: 79.8 million</td>
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<tr>
<td>3G: 48.3 million</td>
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</tbody>
</table>

With the rapidly growing popularity of cell phones and mobile internet access services and the development of technology, the function of cell phones has been shifting from “telephone” to “multimedia tool.” This can be described as cell phones replacing everything-in-the-pocket. When a cell phone subscriber accesses a service provider’s website via the internet, authentication of each subscriber is automatically made. This allows service providers to enhance functions of the cell phone.

These kinds of service developments turn cell phones into ID cards and credit cards. As shown in Fig. 9, for example, many new services have been launched to use a cell phone for many purposes such as a train ticket. Passengers place cellular phones over the ticket reading device for access into or out of wicket. In addition, many things can
already be purchased at many shops by using cell phones as a micro payment tool using electronic money.

**Fig. 9**

Mobile Phone as ID or Credit Cards (examples)

<table>
<thead>
<tr>
<th>Personal authentication +</th>
<th>Mobile phone as a tool for e-payment</th>
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<tr>
<td>Payment from account</td>
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3-5. **IP Telephony**

Based on the broadband infrastructure deployment, IP telephony is rapidly becoming quite popular. In Japan, the telephone numbering system is classified into the following two types. One is the IP telephony with the same quality with legacy telephones or IP based voice service over fiber optic networks, where specific IP-based networks is designated for transmitting the voice packets to keep the service quality. For this IP telephony, the same numbering system with legacy telephones is applied. The other is VoIP using the internet where the service quality is not as good as legacy telephones. For this VoIP service, prefix numbers of “050” are put to allow users to distinguish the difference between IP based voice service and VoIP.

The total number of IP telephony users stood at 11.5 million (as of the end of March 2006). This figure is about 20% of the current total PSTN telephone users. Compared with the previous year, the increase rate is 37.9%, among which the ratio of IP telephone over fiber optic networks has jumped up from 2.3% in FY2004 (as of the end of March 2005) to 12.4% in FY 2005.

3-6. **From “e-Japan” to “u-Japan”**

The deployment of broadband infrastructure in Japan has been progressing well so far. But the next stage of how to stimulate the demand for broadband services is extremely
challenging. In a sense, we have already built the information highways, but we need more cars and driving assistance technologies to increase the traffic on these information highways.

To share these policy directions among the people concerned, the development of an overall broadband deployment strategy at a national level is critical. The first national broadband deployment program called “e-Japan strategy” was decided upon in January 2001 by the Japanese government focusing on the promotion of broadband infrastructure. Keeping in mind the current situation, “e-Japan strategy II” was decided upon in July 2003, with the focus more on broadband content and applications.

To promote the development of broadband service markets as a whole, escaping from the chicken-and-egg situation, it is necessary to generate more interaction between the deployment of broadband infrastructure and the development of new applications.

Especially keeping in mind the emergence of vertically integrated business models, the function of the platform, including authentication and charging systems in Fig. 10, has become more and more important to generate better interaction between networks and applications.

For example, the copyright clearance system or the DRM (Digital Rights Management) mechanism and its relevant rules should be established as soon as possible to ensure the smooth and secure delivery of content over broadband networks.

Keeping in mind the policy issues to promote a “ubiquitous network” society, in December 2004, the MIC developed the “u-Japan” or “ubiquitous-net Japan” strategy. This strategy aims to establish the concept and policy goals of “u-Japan” to be realized
by 2010, where every device is connected to the network and can be managed anytime and anywhere. Here, communication becomes like air.

This “u-Japan” strategy tries to clarify the role of both the government and of the private sector to achieve the same goals. Although the deployment of ubiquitous networks is exactly the role of the private sector, if any institutional barrier hampering the efforts of the private sector exists, this must be eliminated by government initiatives.
4. New Competition Policies in the IP Age

Development of new telecom policies corresponding to the progress of IP technology is now one of the main issues in Japan as well. Japan has been tackling this difficult task on a two-staged approach.

As a first step, the Telecommunications Business Law, which stipulates the telecom competition regime, was revised quite dramatically and became effective in April 2004. The Japanese telecommunications market has been subject to the regulatory framework to classify telecom service providers based on facilities ownership. That is, focusing on the importance of network facilities as social infrastructure, relatively strict regulations have been imposed on Type-1 business carriers, which build and own infrastructure, unlike other service providers known as Type-2 business carriers.

This framework, however, has been losing its rationale due to the diversity of the business model along with the progress of IP technology. For this reason, it was decided to abolish Type-1 and Type-2 business categories altogether and adopt a more deregulated competition model to better correspond to the rapidly changing market environment.

Following this reform of the first stage, the second stage of the competition regime reform has been launched. In October 2005, the Study Group on a Framework for Competition Rules to Address the Transition to IP-Based Networks was set up and has studied the directions of competition rules to address the transition to IP-based networks in the telecommunications sector. The Study Group published a report in September 2006.

This Section outlines the new competition policies to be taken by the MIC based on the report of this Study Group.

Changes in the Competitive Environment

4-1-1. Changes in the competitive environments in the transition to IP-based networks

Major changes in the competitive environment can be summarized in the following three issues.

(1) The spread of broadband

Extensive competition in the broadband service market has brought about decreasing costs and higher-speed connection to the broadband services. As a result, Japan has become one of the countries in which its citizenry can enjoy the benefit of the cheapest and fastest broadband services in the world.
(2) Development of horizontal market integration

Market integration in the transition to IP-based networks has been eroding the traditional distinction among service categories. As a result, the competition within individual markets defined by conventional service distinction (intra-modal competition) has been steadily losing its rational, to be replaced by incremental realization of competition in integrated markets (inter-modal competition). Horizontal market integration is expected to be realized through convergence of transmission platforms.

(3) Development of vertical market integration

Along with the progress in the development of the broadband service market and the transition to IP-based networks, business models have been changing dramatically. Here, the layered competition model is used to analyze changes in these business models (See Fig. 11)

The layered competition model defines four layers for analysis: i) the physical network layer, ii) the telecommunications service layer, iii) the platform layer (functioning to smooth out distribution of content and application over the telecommunications service layer, e.g. authentication, charging, QoS management and copyright control and the like), and iv) the content/application layer.

Looking at the latest business models, it can be said that an integrated business model has been established that provides services ranging from upstream through to downstream layers. This vertical integration business model is offered either by a single player or by a combination of players. This approach is made possible by the separation or “unbundling” of layer functions to address progress in the transition to IP-based networks. Here, the functions provided in each layer are modularized and each module is combined to produce integrated services with greater added value.

Fig. 11

Impact of IP on the competitive environment

From PSTN to IP
The era of “Everything over IP”

From intra-model (competition within market) to inter-model (competition between markets)

Vertical integration is an increasingly common business model in the broadband era

Paradigm shift in market structure
4-1-2. The necessity for a revision of competition rules to address the transition to IP-based networks

Since the revised Telecommunications Business Law was enacted in 2004, the competition rules in the telecommunications market shifted from “ex ante” regulations to “ex post” regulations, whereby “ex ante” regulations are currently focusing mainly on dominant regulations to prevent abuse of market dominance.

After these changes in the competition model were implemented, however, horizontal and vertical market integrations have emerged quite rapidly and full-fledged progress in the transition to IP-based networks has been viewed as a realistic part of the road map for policy consideration. For this reason, it has become necessary to examine the framework for competition rules from the viewpoint of the broadband market as a whole by utilizing the layered competition model.

Given that Japan has developed the most advanced broadband infrastructure in the world, it stands to reason that Japan may also have to face up to new issues before other countries.

4-2. Basic Principles for Competition Policy

4-2-1. Basic principles for competition rules in the transition to IP-based networks

It is necessary to start with defining the basic principles, based on which competition rules are developed. The five principles for competition policy are thus summarized as follows:

i) Ensuring fair competition at the telecommunications layer (comprising the physical network layer and the telecommunications service layer);

ii) Ensuring fair competition focusing on the vertical integration business model;

iii) Ensuring competitive and technological neutrality;

iv) Protecting consumer interests; and

v) Ensuring that competition rules are flexible, transparent and consistent.

4-2-2. Time frames for the consideration

The framework of new competition policies sets the early 2010s as a milestone. There are three main reasons for this:

i) 2010 is the final target year of “New IT Reform Strategy” (adopted in January 2006 by the IT Strategy Headquarters of the government) and the “u-Japan Strategy” (released by the MIC in December 2004);

ii) The full-scale construction of IP-based next-generation networks (NGNs) by each carrier will be largely realized with substantial progress in the migration to IP-based networks by the early 2010s with IP services becoming the norm rather than the exception; and
iii) The convergence of telecommunications and broadcasting services is likely to be well advanced by this time.

4-3. A Framework for Interconnection Policy

4-3-1. Appropriate balance between facility-based competition and service-based competition

(1) Basic concept

There are two approaches to promoting competition in the telecommunications sector: facility-based competition where each carrier builds its own networks and other relevant facilities to provide services, and service-based competition where dominant carriers are forced to make their bottleneck facilities available to competitive carriers to provide services.

As of the end of March 2006, NTT East and NTT West accounted for some 94% of local telecommunications markets in Japan in terms of the number of subscriber lines. In the current market structure, then, NTT East and West are in a position, where there is a reason to be concerned about abuse of market dominance. The competition mode in the telecommunications market is thus in a transitional phase from monopoly to competition.

For this reason, the competition model in the transition to IP-based networks should seek to promote both facility-based and service-based competition as well as to achieve an appropriate balance between the two, for instance, by abolishing the dominant regulations once concerns about abuse of market dominance associated with “bottleneck” facilities have been judged to be eliminated.

(2) Market environment and competition policy in Europe and the United States

A variety of policy implications can be found in the competition rules employed in Europe and the United States. It is necessary, however, to view each policy direction based on understanding of differences in market structure and the historical background to the competition policy adopted.

In the United States, competition in the telecommunications layer mainly revolves around the CATV operators and RBOCs, and takes the form of facility-based competition predicated on direct rivalry between these two major groupings. In Japan, by way of contrast, NTT East and West continue to dominate the physical network layer with 94% of subscribers’ lines. Furthermore, the restructuring of NTT in 1999 retained the investment relationships between the various companies of the group, and NTT holding company and NTT East and West are still subject to regulations under the NTT Law. Thus, the development of telecommunications markets following the breakup of AT&T and the resulting current market structure in the United States are quite different from the situation in Japan.
In many ways, the market structure in EU member nations tends to be similar to that of Japan. However, one of the key characteristics of the EU market structure is the way in which the dominant carrier in one member nation often engages in investments and tie-ups with carriers in other member nations and/or resells services locally in competition with existing carriers. This approach helps to promote competition in the telecommunications sector throughout the EU as a whole. However, in the case of Japan, since cross market entry between NTT East and West has not been realized under the holding company system, there are different aspects in the form of competition in telecommunications market from that of the EU.

(3) Approaches to promoting facility-based competition

As the first step in encouraging facility-based competition, it is necessary to promote opening up of the line infrastructure. With respect to basic infrastructure such as telegraph poles and conduits that dates back to the time when NTT was still a public corporation, several trials are currently underway such as that of simplification of procedural requirements for laying out of optical fiber on telegraph poles. Followed by evaluation of the trials due to be drawn up in September 2006, the MIC will finalize the simplification procedures and incorporate them into “Guidelines for the Use of Infrastructure such as Telegraph Poles and Conduits by Public Utilities” and move to their full implementation by April 2007.

An associated follow-up system comprised by participating operators will also be set up, together with a database of disputes and other relevant information that will help to strengthen dispute settlement functions.

Secondly, with respect to optical fiber of local governments, the MIC will further encourage opening up of optical fiber networks in accordance with the “Next-Generation Broadband Strategy 2010” (released by the MIC in August 2006.).

Finally, it is important to promote introduction of new wireless access technology, such as the latest wireless LANs and mobile wireless broadband systems using the 2.5 GHz band.

4-3-2. Basic viewpoints concerning interconnection policy

(1) Background of interconnection policy

Interconnection policy has traditionally focused on bottleneck facilities owned by NTT East and West and on promoting open access to their bottleneck facilities so that NTT’s competitors can offer services under equivalent terms and conditions as NTT East and West. The ultimate objective of this approach is to create a fair competitive condition in the industry and thereby encourage service-based competition.

(2) Basic policy direction of interconnection policy

Given that NTT’s competitors are obliged to use bottleneck facilities owned by NTT East and West, the interconnection rules need to continue to play a key role in
promoting competition among operators.

4-3-3. A framework for designated telecommunications facilities system

(1) Outline of the system

Regulations imposed on dominant operators in the market as per the provisions of the Telecommunications Business Law, classified into Type 1 designation (for fixed-line markets) and Type 2 designation (for mobile markets) (See Fig. 12).

Type 1 designated facilities are subject to mandatory access provisions such as unbundling and interconnection pricing controls. Owners of designated facilities are also subject to a raft of practice regulations requiring, among other things, equal treatment for all operators. Only facilities that carry more than 50% of subscriber lines within a prefecture can be designated. NTT East and West currently have Type 1 designated facilities in every prefecture of Japan.

For Type 2 designated facilities, operators are required to submit interconnection stipulations. Facilities that serve more than 25% of terminals within the administrative zone can be designated. NTT DoCoMo Group, KDDI and Okinawa Cellular currently have Type 2 designated facilities. Additional regulations requiring equal treatment of operators apply to facilities that account for more than 25% of revenue. NTT DoCoMo Group is currently subject to these regulations.

Designation criteria for Type I (fixed-line) designated telecommunications facilities currently operate copper cable and optical fiber lines as one. This approach should be continued for the time being, in the absence of any convincing reason to distinguish between the two, particularly given that:

i) Copper cable and optical fiber are both used for the provision of broadband services, which are highly possible alternative (substitutable) services from the viewpoint of the users;

ii) Both are laid in existing line infrastructure; and

iii) NTT East and West effectively have the advantage in upgrading existing copper cable to optical fiber.

In light of the different characteristics of the fixed-line markets and mobile markets, it is not considered appropriate at this time to alter the designation criteria for Type II (mobile) designated telecommunications facilities by introducing a higher EU-style threshold of 40% - 50% and imposing dominant regulations as used on Type I (fixed-line) designated telecommunications facilities.
(2) Mid-term management strategy for the NTT Group and a framework for the designated telecommunications facilities system

1) Alliance between NTT East/West and NTT DoCoMo

While the provision of FMC (Fixed Mobile Convergence) services offered through the alliance between NTT East and West and NTT DoCoMo is basically considered desirable, the combined power of these two dominant presences raises concerns about the potential increase in factors that may act as a barrier to competition in the fixed-line and mobile markets respectively.

FMC services could be provided via interconnection between the two and/or the MVNO model (i.e., NTT East/West become MVNOs of NTT DoCoMo (MNO)), although such an approach is necessarily predicated on fair and equivalent treatment of competitors. FMC services through sharing facilities of NTT East and West and NTT DoCoMo should not be basically permitted from the viewpoint of ensuring fair competition. It is required for NTT East and West to get approval of their business expanding relief1 for providing those services, and could be imposed on NTT East and West adequate conditions that ensure fair competition.

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1 Under the NTT Law, NTT East/West are restricted to provide regional telecommunications (intra-prefecture telecommunications) and although, if there is no concern to do harm to fair competition, with the approval of the minister of MIC, NTT East and West are able to do business other than regional telecommunications, such as inter-prefecture telecommunications, using management resources for regional telecommunications.
2) Cooperation between NTT East and West and their subsidiaries/affiliates

NTT East and West have set up a number of subsidiaries and affiliates as a means of business development and expansion. In many cases, these involve establishments of subsidiaries for outsourcing purposes designed to achieve management efficiencies at NTT East and West. As a result, the total NTT East and West workforce has radically dropped from 127,000 (as of the timing of NTT’s reorganization in July 1999) to around 20,000 (as of March 2006).

In this case, even if dominant regulations are applied to NTT East and West, they may have no effect on subsidiaries and affiliates, potentially allowing NTT East and West to circumvent the dominant regulations and diminishing the actual effect of rules designed to ensure fair competition.

Accordingly, the MIC will commence immediately the study on new competition rules to prevent abuse of joint or collective market dominance created by NTT East and West in conjunction with their affiliates and subsidiaries.

3) Other Cooperation of the NTT Group

With respect to cooperation among NTT East and West and other companies in the NTT group, the MIC is to basically reorganize current competition safeguards comprehensively, and regularly conduct verification to ensure that fair competition requirements are met. (See the following section (5))

4) Flexible review of the coverage of designated telecommunications facilities

In order to allow flexible review of the coverage of designated telecommunications facilities to accompany progress in the transition to IP-based networks, it is necessary to operate the system by bearing in mind two key factors: (i) review designated telecommunications facilities focusing on a functionality perspective and (ii) designate telecommunications facilities taking into consideration “platform” functionality (e.g. authentication, charging, and QoS management).

5) Establishment of “competition safeguard system”

The establishment of “competition safeguard system” (See Fig. 13) in which the existing designated telecommunications facilities system is reorganized comprehensively and systematically implemented. Specifically, this included the following:
i) Coverage of designated telecommunications facilities should be reviewed annually in conjunction with a verification of the efficacy of the current fair competition requirements imposed on the NTT Group.

ii) Coverage of designated telecommunications facilities at the telecommunications layer should be predicated on functionality considerations in verification. Designation of platform layer functions should also be taken into consideration to prevent abuse of market dominance by NTT East and West at higher layers.

iii) In designating platform layer functions as designated telecommunications facilities, they should be monitored with a clear marking of “Watch List” when there is the likelihood of creating barriers to the competition. When a high likelihood of abuse of market dominance is found to exist, the relevant functions should be subject to telecommunications facility designation without any delay.

iv) If the review process concludes that the NTT Group has not satisfied the fair competition requirements to which it is subject, the government shall take any action considered appropriate.

v) Guidelines shall be formulated when this system is put into operation.

Toward this aim based on the considerations outlined above, supporting documentation such as “Guidelines for the Operation of a Competition Safeguard System” should be formulated as soon as practicable, and brought into operation in FY07 (starting from April 2007).

Similarly, study on the mechanism for preventing abuses of joint or collective market dominance involving NTT East and West and its subsidiaries and affiliates will be commenced as soon as practicable.
A comprehensive review of the designated telecommunications facilities designation system (See section (6) below), keeping in mind the relationship with the ongoing competition review system, should incorporate legislative amendments where appropriate.

(6) Comprehensive review of the designated telecommunications facilities system

The current basic framework for the designated telecommunications facilities system, with its distinction between Type I (fixed-line market) and Type II facilities (mobile market), should be reviewed as soon as practicable assuming the possible rapid development of market integration of fixed and mobile markets accompanying the progress in the transition to IP-based networks.

Specifically, the current approach is expected to be replaced with a new framework (See Fig. 14) involving:

i) Demarcation of markets based on the current competition review system; then

ii) Recognition of market dominance capabilities within and/or between layers in each market thus defined; and finally,

iii) Based on the recognition, designating telecommunications facilities subject to opening access and/or applying conduct regulations to operators in a market-dominant position as appropriate.

Further considerations should include improvement of the competition review system employed by MIC, particularly with respect to the recognition of market dominance, including joint (or collective) market dominance and leverage. The results of this analysis should be incorporated into a comprehensive review of the designated telecommunications facilities system (including development of a specific framework) to be introduced by FY 2010.

**Fig. 14**

<table>
<thead>
<tr>
<th>Comprehensive Review of Designated Telecommunications Facilities System</th>
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<tbody>
<tr>
<td>Market A</td>
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<tr>
<td>Identify market dominance in market C</td>
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<tr>
<td>Investigate potential abuse of joint market dominance and/or extension of dominance into adjacent markets</td>
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<tr>
<td>Market demarcation based on competition review taking into account the level of market integration</td>
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4-3-4. A framework for ensuring a competitive environment relative to NTT East and West’s next-generation networks (NGNs)

NTT East and West have stated that they plan to introduce full-scale next-generation network services in the latter half of FY2007. It is important to ensure that competitors are in a similar position to launch their own services at the same time. Toward this aim, MIC should begin study on interconnection rules for next-generation networks. Recommendations should then be submitted to the Information and Communications Council on new rule systems identified as important and necessary in order to generate informative outcomes as soon as possible.

One of the key considerations in the above-mentioned deliberations should be guaranteeing open access to video distribution platforms (keeping in mind the launch of IP multicast broadcasting services by terrestrial broadcasting companies).

Expanding relief to provide commercial NGNs needs the permission of NTT East and West's business. This permission requires taking measures to ensure fair competition based on related guidelines.

3-3-5. Revision of the accounting system related to Type I designated facilities

In light of the changes in the market structure, a study group of experts will be set up to discuss the future of the interconnection accounting system, including aspects such as cost allocation standards and official equipment life expectancy standards in the transition from PSTNs to IP-based networks. The study group should aim to have recommendations delivered by the summer of 2007.

4-3-6. A framework for calculating interconnection charges

(1) A framework for PSTNs interconnection charges

In light of the anticipated deduction of NTS (non-traffic-sensitive) costs to be completed by FY2009, the Information and Communications Council review of forthcoming PSTNs interconnection charges should aim to produce concrete recommendations for FY2008 – 09 predicated on modifications to the existing LRIC (Long-Run Incremental Cost) model. The review should also consider a future framework of calculating interconnection charges in FY2010 and beyond, with recommendations to be delivered during 2007. (See Fig. 15 and Fig. 16)

A comparative analysis should be performed on the three main options for calculating interconnection charges from FY2010 onwards — retaining the existing LRIC model, determining charges based on actual costs, or switching to a “bill and keep” model — in order to identify the best option.
In light of anticipated strong demand for optical fiber-based services in the medium term, the “forward-looking cost method” is still considered appropriate for optical fiber interconnection charges. Consideration should be given to future investment associated with the number of operating fibers and expected life of installed optical fibers.
(currently stipulated as 10 years), as well as investment risk associated with the demand by competitors. (See Fig. 17)

It is worth pointing out that regulations requiring NTT East and West to open up their optical fiber networks are not intended to prevent the operators from gaining a fair return on plant and equipment investment. Provided that investments are made on the basis of appropriate investment risk and fair rate of return, NTT East and West should be able to generate profits from leasing infrastructure to competitors.

MIC will start considering the interconnection charges for optical fiber based on the considerations outlined above, followed by the application by NTT East and West for approval to alter interconnection tariffs. In this consideration, accountability would be required of NTT East and West. Where reasonable grounds exist to warrant changes to interconnection charges, NTT East and West would be able to apply to MIC at any time deemed appropriate.

**Fig. 17**

<table>
<thead>
<tr>
<th>Interconnection charges for subscriber optical fiber</th>
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<tr>
<td>Calculation of interconnection charges for subscriber optical fiber</td>
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<td>Forward-looking cost method — based on unit price and demand forecasts for the seven-year period of FY01-07</td>
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<td>Structure designed to recoup investment costs (including capital remuneration)</td>
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<td>Cost per line</td>
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<td>Interconnection Fee = ¥5,074</td>
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</table>

**Interconnection charges for subscriber optical fiber**

- Subscribers optic fiber interconnection charges versus demand forecasts

Dotted lines represent scenario where 30 million households are using optical fiber services by the end of FY2010.

**4-3-7. Approach to Coping with the Diversification of Interconnection Types**

The interconnection among the ISPs making up the Internet uses a hierarchical configuration with the Tier-1 providers in the US at the top. In Japan as well, the configuration is also hierarchical, with the primary ISPs connected to Tier-1 and secondary ISPs connected to these primary ISPs. There are two types for interconnection between ISPs: peering (in which both ISPs exchange traffic with each other) and/or transit (in which the traffic from other ISPs is carried to “the Internet”). In general, peering is free, while a fee is charged for transit.

By paying for transit to interconnect to a higher level ISP, a lower level ISP can gain access to “the Internet”. Meanwhile, peering between two primary ISPs or secondary ISPs enables these ISPs to exchange traffic with one another. There are two types of
peering: public peering, which is conducted by an Internet exchange (IX), and private peering, which does not go through IXs.

Normally, a confidentiality agreement is concluded for such interconnection agreements among ISPs. For this reason, it is difficult to determine their actual status in any detail, but basically, competition among ISPs has functioned comparatively effectively up to now. With the transition to IP-based networks, it is possible that new problems relating to the interconnections among ISPs may occur, however, as a result of changes in market configuration.

(1) Issues for study

1) Potential for structural changes in the interconnection among ISPs

Firstly, there is a possibility that structural changes will occur in the interconnections among ISPs. Interconnection to the Internet in itself has been viewed as having value, and within the hierarchical tier system, the interconnection among ISPs has functioned well.

In recent years, however, many content delivery services for video and other rich content have appeared, and traffic has come to be concentrated at ISPs that have agreements with specific content providers. In other words, it has been recognized that securing pathways to specific popular sites has market value, and interconnections have been concentrated at ISPs that provide access to providers that provide access to content that is popular with users. For this reason, a situation is being created in which the market value of interconnections among ISPs change in accordance with user trends. This gives rise to the possibility of an increase in interconnection configurations that are different from the conventional tier configuration for the interconnections among ISPs.

In addition, as telecommunications carriers that own the facilities move forward with the construction of their own IP-based networks, these carriers may move in the direction of embedding ISP-like functions in their own networks. Once this happens, these carriers are likely to have an advantage over other ISPs in negotiating ability and a close watch will need to be kept to see whether or not interconnection agreements among ISPs can be concluded smoothly.

Moreover, in the era of IPv4 when there was an insufficient number of global addresses, to make up for the lack of IP addresses, ISPs were required to provide global addresses to their users each time they connected to the Internet. Users in turn needed to use Network Access Translation (NAT) functions to convert between global addresses and private addresses to enable internet connections from multiple terminals on the LAN. IPv6 will resolve, however, this insufficiency of global addresses, leading to a relative decline in the value of these address-providing functions.

Reflecting this situation, the structural changes in the ISP market will produce relationships among ISPs that are different from those that have been established up to now, and the possibility that new problems will arise in the interconnections among ISPs cannot be discounted.

2) Multi-stage interconnections among ISPs and ensuring QoS
Secondly, it is necessary to ensure quality of service (QoS) in multi-stage interconnections among ISPs. Many ISPs are currently interposed in the IP-based network and QoS has been secured on a "best effort" basis. In contrast, in case of closed IP-based networks such as IP-VPN, it is possible to ensure stable QoS within their own networks.

In case large-scale telecommunications carriers construct their own IP-based networks, they will be able to provide IP-based services that ensure QoS within their own networks. In contrast, ISPs will not be able to offer the same service and their QoS may be controlled by the higher level ISPs’ policy (relating to quality, security, etc.), leading to the situation that QoS to users may be affected by heteronomous factors.

(2) Directions for future study

The factors such as the change in the relationship between higher level ISPs and lower level ISPs and the transition to IP-based networks may cause problems related to the viability of settlement among companies through market mechanisms, leading to an increasing number of disputes in the area of interconnection among ISPs.

For this reason, to prevent abuse of market dominance in the ISP market and other barriers to fair competition, the regulatory authority should intensify and continue monitoring of this market and take necessary action as needed, such as preparing guidelines and the like for the use of dispute settlement functions to settle disputes relating to interconnections among ISPs.

It would also be appropriate to study technical aspects such as methods of measuring the amount of IP traffic. This is because interconnection conditions should be determined not only through mutual negotiations among carriers but based on objective traffic data. In addition, unlike the period in which IP-based networks were restricted for use by certain limited users in order for the IP-based network itself to become the main telecommunications network, it will be necessary to determine the total traffic volume passing through the IP-based networks in Japan and the traffic between IXs. These trends will need to be analyzed in order to plan for needed expansion of network equipment.

4-3-8. A framework for the promotion of competition in the mobile communication markets including MVNOs

It is appropriate to facilitate new entrants of MVNOs (Mobile Virtual Network Operators) to promote competition in the mobile market under the frequency restrictions. By promoting the entry of MVNOs into the mobile market from other business domains, while MNOs (Mobile Network Operators) advance to another business domain such as financial service, new business models will be birthed, and a new “win-win” relationship is expected to be generated through partnership between MNOs and MVNOs.

As for the legal relationship between MNOs and MVNOs, it can take either the form of wholesale telecommunications services or that of interconnections between the two. Basically, whichever form is taken is left up to the concerned parties. However, in order
to encourage healthy development of the MVNO market, MIC will revise the “MVNO Business Guideline” by the end of 2006 to clarify the terms and conditions concerning the relationship between MNOs and MVNOs in the Telecommunications Business Law.

4-4 **A Framework for Tariff Policy**

4-4-1. **Basic viewpoints concerning tariff policy**

Multi-staged deregulatory measures have been taken for telecommunications services pricing in order to move towards a “detariff” position and minimize the intervention of government authorities. At present, tariff policy represents a combination of two policy objectives: “preventing abuse of market dominance” and “protecting the interests of consumers”.

4-4-2. **A framework for price cap regulations**

Price cap regulations should be reviewed ahead of the forthcoming standard price index (“x” value or the efficiency index) review due in FY2009, particularly with respect to the standard price index during the transitional phase to IP-based networks and abolishment of the sub-basket for subscriber lines. The review should also consider the relationship between price cap regulation and the universal service system.

4-4-3. **A framework for new tariff structures**

Provided that the costs associated with providing telecommunications services are adequately recouped from user charges and advertising revenue, pricing structures for telecommunications services provided under newly emerging business models are considered appropriate in terms of tariff policy.

However, consideration should also be given to a review of a service-specific accounting system and the formulation of a set of guidelines on improper pricing criteria. In light of the diversification of pricing structures, discussions should encompass the following areas: (i) framework for “best-effort” service prices, (ii) upgrading of user protection legislation, and (iii) developing a standard price index.

4-5 **A Framework to Ensure Network Neutrality**

4-5-1. **Changes in network structure and network neutrality**

In the transition from public switched telephone networks (PSTNs) to IP-based networks, emergence of the vertical integration business models may occur. In such
vertical integration business models, each layer is modularized and services in the broadband market are provided with multiple players intertwined on multiple levels.

(1) Principle of network neutrality

In principle, the objective of the competition policy is to maximize user benefits. Thus, when looking at the vertical integration business models as well, network neutrality should be ensured from the perspective of users according to the use of the IP-based networks. Specifically, three principles should be ensured from the perspective of network neutrality:

i) IP-based networks should be accessible to users and easy to use, allowing ready access to content and application layer;

ii) IP-based networks should be accessible and available to any terminal that meets the relevant technical standards, and should support terminal-to-terminal (or "end-to-end") communication; and,

iii) Users should be provided with equality of access to telecommunications and platform layers at a reasonable price.

In this case, "users" refers not just to end users but also includes content providers and other related companies that conduct business using IP-based networks.

(2) Network neutrality as a policy evaluation parameter

The following two specific policy evaluation parameters are needed to ensure network neutrality:

(a) “Equal access to networks”: ensuring that the telecommunications layer (the physical network layer and the telecommunications services layer) has fair access to the layers above and below that layer; and

(b) “Equitable cost distribution of networks”: how the cost burden of enhancing the telecommunications network is borne fairly.

The need to ensure network neutrality is a basic principle for the use of IP-based networks represented by next-generation networks (NGNs). As the policy evaluation parameters that achieve this basic principle, specific policy issues shall be organized and verified in terms of (a) and (b) above, and the policies needed to ensure an environment enabling fair competition shall be comprehensively deployed. (See Fig. 18)
### 4-5-2. Equal access to networks

#### (1) Ensuring open interfaces between layers

In the conventional PSTNs, control of services on the telecommunications layer is carried out in an integrated manner. However, in an IP-based network, control of telecommunications services and use of content and applications on various layers will become possible. For example, the following two modes are thought to be applicable.

**1) IP-based network with intelligence at the network end side**

In the first mode, it is becoming possible to provide intelligence (service control functions, etc.) at the end of the network (“edge users” or the sections adjoining the telecommunications layer and platform layer). For example, on the terminal layer, the widespread use of PCs has resulted in a dramatic increase in aggregate intelligence, and modes are appearing in which additional services can be achieved by providing applications at the end of the network, as exemplified by the IP phone service that has been achieved at the application level.

With regard to the distribution of rich content as well, the use of peer-to-peer (P2P) technologies instead of the conventional mode of distributing content from the content distribution server to terminals is creating the mechanism by which it is common for user terminals to exchange distributed content among themselves and distribute content to other users. Naturally, in such cases, copyright clearance should be conducted for the digital content.

Changes are also evident in the business models on the content/application layer. For
example, modes that utilize applications on the web through the use of Ajax (Asynchronous JavaScript and XML) technology are beginning to show rapid growth, and SaaS (Software as a Service), in which network applications provided on the upper layer are used on the network without embedding applications on the terminal side, are also appearing. In this sense, as shown above, the concept of an "end user side" as opposed to the "network side" does not simply mean the terminal layer but also includes the content/application layer.

2) IP-based networks that provide intelligence to the network (telecommunications layer) side

In the second mode, as in the past, the construction of networks is being promoted in the direction of embedding intelligence into the IP-based networks. The NGNs being constructed by telecommunications carriers are expected to have bandwidth control functions, session control functions, authentication/security/accounting management and other platform/service provision functions on top of the access network, core network, and other transmission functions. The aim is to build in service control functions on the network side.

Up to now, one aspect of IP-based networks is that they have been constructed and operated based on the assumption that they will be used by users with technical knowledge. However, with the increasing transition to IP-based networks, general users will also use IP-based services, and so there will be a need to ensure high-quality service with stable security, and QoS by providing intelligence to not only the end user sides but the network side, as well. In particular, when delays, etc., occur in the data transmission due to insufficient capacity on the telecommunications layer, required of the network side are boosting transmission capacity, establishing active routing, and distributing traffic, and the like.

3) Achievement of free intelligence provision modes

One factor in the growth of the Internet is considered to be that technical innovation could be freely conducted on the end user sides as well, leading to an increase in intelligence. However, with the progress in the shift to IP-based networks, it is becoming possible to build in intelligence on the network side, and it is possible that providing intelligence to only the network side may limit the players involved in technical innovation and cause results to be confined to the network.

For this reason, it would be best to try to ensure the healthy development of the entire IP-based network by building a framework capable of possessing intelligence on both the network side and the end side.

Enabling intelligence to be built in on both the network side and the end side means that it will be necessary to exempt specific layers from unilaterally being controlled or governed by other layers in the vertical integration business model. To put it another way, by ensuring true openness in the interface between layers, equal access to networks in the IP-based network can be ensured. (See Fig. 19)
(2) Ensuring openness with upper layers

1) Openness of platform functions

To ensure the neutrality of the telecommunications layer with respect to other layers, telecommunications carriers shall build an environment enabling fair competition into their NGNs. When applying the principle that the NGNs being built by the telecommunications carriers are required to ensure openness with respect to upper layers, it is desirable that all of the telecommunications carriers that own their networks will respond to this requirement.

However, the requirements will be even more stringent for telecommunications carriers having market dominance in the telecommunications layer and whose abuse of market dominance with regard to upper layers is a concern. In this sense, a policy response to ensure the openness of platform layer functions and the openness of the interface between layers will be particularly important for the NGNs of NTT East and West in terms of ensuring smooth distribution for the content/application layer. (See Chapter 3, Section 4)

2) Validation of use restrictions on specific application functions

Related to this issue, it is a question of whether or not to allow network restrictions on specific application functions such as file exchange software.

When a few heavy users monopolize the network bandwidth so other users cannot secure sufficient bandwidth, with the result that overall quality of service (QoS) declines,
the bandwidth used by heavy users is usually restricted by telecommunications carriers
to maintain the overall QoS.

However, if telecommunications carriers should take action to restrict the bandwidth for
specific applications in terms of a business strategy, this would be recognized as an
action to restrict competition. Moreover, if the telecommunications carrier were to
determine that the user was using that application by detecting the content of individual
telecommunications packets of each user without obtaining the agreement of users, and
if the telecommunications carrier should be engaged in acts such as constantly
destroying packets and blocking this usage contrary to the wishes of the user, this would
infringe on the privacy of communications.

Nevertheless, in some ways it is difficult to establish clear guidelines for this kind of
problem, and it is possible that various other cases may occur in the future. For these
reasons, more detailed studies based on the opinions of relevant entities are needed.

3) Ensuring openness on the lower (terminal) layer

In IP-based networks, it is important to strive for openness of the interface between the
telecommunications layer and the terminal layer. Previously, in the business model for
the mobile telecommunications market, for example, the telecommunications services
and terminals were provided in an integrated manner. In the case of IP-based networks,
however, as long as there is consistency with the principle of causing no harm to the
network, it would be best to allow various terminals to be freely interconnected to the
network and allow the option of controlling service on the terminal side.

Moreover, not only in the mobile telecommunications market, but also in the NGNs
constructed by NTT East and West, it is considered to be inappropriate to allow the
addition of monitoring/control or restriction of functions equivalent to those on the
terminal side by means of the service control functions built into these networks if such
terminals are consistent with the above-mentioned principle of "no harm to the
network."

Based on this approach, in the technical requirements for NGNs, it will be necessary to
avoid situations in which the network side possesses functions that restrict terminal side
intelligence more than necessary, and to ensure basic functions (service quality,
safety/reliability, and interconnectivity and interoperability between the terminal and the
network) on the side of the terminals interconnected to the IP-based network. Studies
should also be conducted for the approach to terminal approval systems. (See Fig. 20)
4-5-3. Equitable cost distribution of networks

(1) Need to upgrade the telecommunications network to cope with rapid increase in IP traffic

With emergence of vertical integration business models, various functions are modularized and these functions are provided in combinations. However, a study is needed to determine who will bear the cost of upgrading the network in question, and in what way.

A comparison of the PSTNs and IP-based network configuration reveals that costs that should be borne by each company are clear in the case of the PSTNs. Actually, the routing is clear even if the interconnections between networks are via multiple telecommunications networks, and traffic management is possible.

In contrast, IP-based networks are based on autonomous routing, and at least at this point in time, it is difficult to determine clearly the packet distribution volume for each route. The reason that interconnections among ISPs are made through peering and transit is a reflection of this property of IP-based networks.

1) Accelerated increase of packet transmission volume

In recent years, IP traffic has been doubling every year (See Fig. 21). Reasons for this include the fact that the number of broadband subscribers and Internet users continues
to increase. In terms of the perspective of changes in market structure, however, the following two factors can be given as examples.

Firstly, the increase in IP traffic is the result of the full-fledged use of the Internet in socioeconomic activities, such as the rapid increase in file exchange using P2P networks. Moreover, IP traffic may be further increased by the structuring and advancement of the Internet itself, such as the increase in XML-based content (XML stands for "eXtensible Markup Language") and cross-referencing mechanisms using RSS (Really Simply Syndication), the emergence of the business model known as web 2.0, and increased network use by company systems such as SaaS.

Secondly, the construction of a broadband infrastructure on the telecommunications layer is progressing, and the distribution of rich content is increasing rapidly. In particular, subscribers to fiber-to-the-home (FTTH) services have increased dramatically in recent years, but in the case of FTTH services, expansion of the upload bandwidths and improvement of the use environment for P2P distribution of rich content are enabling not only content providers but also end users to distribute rich content.

2) Need for a neutral cost-sharing model

In this way, factors causing the rapid increase in IP traffic are present in various locations from upper layers to lower layers. However, the fact that it is difficult to determine the exact relationship between the causative entities and the increased traffic produced as a result is a problem.

For this reason, in order to deal with the question of who should bear the burden of transmission capacity upgrades that are required due to the increase in traffic, and in
what way, a neutral mechanism that will prevent specific market participants from causing an excessive burden is needed. This is the issue of the equitable cost distribution of networks.

(2) Approach to market mechanisms and cost distribution

In the multi-stage market configuration, as long as market mechanisms are functioning smoothly, the cost of maintaining an IP-based network is recovered in the way that reflects the balance of supply and demand among individual transaction participants. However, if packet distribution increases dramatically at a greater rate than expected as a result of rapid technical innovation, the popularization of the broadband infrastructure and increased intelligence on the terminal side, the businesses that reflect the appropriate balance between supply and demand may not be transacted in all transactional relationships.

In the vertical integration business model, it is particularly possible that market participants on specific layers may come to have an advantage over the market participants on other layers.

With regard to the approach to cost-sharing models for upgrading the telecommunications network, it would be appropriate to conduct a study focusing on several transaction relationships such as those noted below.

1) Validity of bandwidth-based fees

Firstly, a study of a framework to user fees for broadband service is needed. A fixed cost model is usually adopted for the usage fees for "best effort" broadband service. With this model, the telecommunications carrier envisions the average network usage and, based on this average usage, constructs a network with a certain level of redundancy. However, if some heavy users monopolize network bandwidth and the other users are unable to secure adequate bandwidth, as above-mentioned, the basic approach of "best effort" service may lose its validity.

Accordingly, based on the principle of beneficiary burden, a new approach has emerged in which users are divided into those users who are assured stable use of a greater amount of bandwidth and all other users, with the former group receiving greater benefit from the service in question as compared to the latter group. To put it another way, this is the approach of establishing bandwidth-based user fees that assess different fees depending on bandwidth usage (or by establishing a service menu with a guaranteed minimum bandwidth and then charging additional fees).

In this case, it must be verified whether the additional fees that users are charged by the telecommunications carrier are really being applied to the upgrades to the telecommunications network that is the ostensible reason for the additional fees. In other words, upgrading of the telecommunications network should not be done only by the telecommunications carrier to enable Internet access but, on the IP-based networks, should be accomplished through the addition of equipment on the part of the multiple ISPs interconnected to that network. For this reason, there must be healthy market competition among ISPs and settlements among companies must be conducted smoothly.

With regard to this point, companies that have the own networks are expected to build
full-fledged IP-based networks and use these networks to enter the Internet connection market that was formerly made up of ISPs. In such cases, verification of whether or not smooth settlement fees among companies are formed in this market will be needed.

2) Validity of collecting additional fees for rich content distribution

Secondly, there is a debate over whether, in addition to the usage fees paid by the content provider, etc., to the ISP and data center, a certain additional cost burden should be solicited or not. However, when soliciting an additional cost burden, it is thought that it is first necessary for the telecommunications carrier to show rational proof that the user fees in question are not being formed in a sound way through market mechanisms. In addition, the telecommunications carrier must also not unjustifiably discriminate against specific content providers in terms of fees.

Moreover, since content distribution modes themselves are no longer limited to batch distribution from a server but also now include P2P type distribution through users, there is an additional aspect in that it is expected to be difficult in practical terms to make a sharp distinction between the two types of distribution and charge additional fees for only the former.

Furthermore, the distribution of rich content is not limited to content providers and the like. With the deployment of a broadband infrastructure, it is becoming possible for ordinary users to easily provide videos and many other types of rich content on the Internet. In such cases, it would not be fair for only the content providers and other companies to charge additional fees. After all, the point of departure for discussion is that the above-mentioned additional fees are charged as expenses for upgrading the communications network for the distribution of rich content. It would be difficult to provide rational evidence for making a distinction between ordinary users and companies in this respect.

3) Cost-sharing models and rapid technological innovation

In this way, there is a great deal of debate concerning the fairness of cost-sharing models for the upgrading of telecommunications networks, and a one-size-fits-all approach to introducing rules for competition and ensuring fairness is not appropriate. Further study is needed regarding the relationship between the possibility of charging additional fees and the lowering of marginal expenses with regard to the introduction of new technologies, such as the introduction of bandwidth compression technologies as a result of rapid technological innovation. (See Fig. 22)
In the United States, there is a lively debate regarding network neutrality. In August 2005, the Federal Communications Commission (FCC) adopted "Four principles to encourage broadband deployment and preserve and promote the open and interconnected nature of the public Internet." Specifically, these principles are as follows:

(i) Consumers are entitled to access the lawful Internet contents of their choice;
(ii) Consumers are entitled to run applications and use services of their choice, subject to the needs of law enforcement;
(iii) Consumers are entitled to connect their choice of legal devices that do not harm the network; and
(iv) Consumers are entitled to competition among network providers, application and service providers, and content providers.

Accordingly, there is a move in Congress as well to legislate network neutrality. Several bills have been submitted to both houses of Congress, and debate is underway. Specific provisions currently being debated include provisions to prohibit network companies from altering network content, provisions to prevent content providers from establishing faster access "priority lanes" and charging users extra fees to access these lanes, and provisions to prohibit the establishment of restrictions on interconnection of terminals except in cases such as when this would cause physical harm to the network.

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2 FCC, “Policy statement” (September 23, 2005)
Opinion remains divided with regard to what degree of authority to grant the FCC, which is the regulatory agency. Specifically, there is debate over various proposals: the proposal to allow the FCC to handle disputes relating to network neutrality, the proposal to require the FCC to study and report on this question, the proposal to grant a certain degree of authority to the Justice Department.

4-5-5. **Approach to future study**

Accordingly, using the principle of network neutrality as a foundation, the major issues to study were compiled from the perspective of two policy evaluation parameters for achieving network neutrality: "Equal access to networks" and "Equitable cost distribution of networks".

The debate surrounding network neutrality has tended to grow diffuse because up to now the term has not been defined in a uniform manner. However, this report begins by attempting to summarize the scope of this debate and identify the constituent factors in the debate.

The importance of the debate over network neutrality is that it is not simply a conceptual debate. The network neutrality approach can be used as a framework for organizing various specific individual policy issues. Actually, as we have seen earlier, the issue of network neutrality is not limited to the conventional issues of ensuring smooth interconnections on the telecommunications layer, appropriate cost burdens among telecommunications carriers, and the imposition of appropriate fees for users. It also deals with issues not considered in the past, such as the openness of the interfaces between layers, from the terminal layer to the content/application layer, and the approach to the cost burden between and within layers. It also encompasses the range in which dominant regulations and other interconnection policies and tariff policies and the like relate to one another. Moreover, with the rapid progress of technological innovation, it is difficult in some ways to determine the approach to policy by means of static market analysis.

Japan is now a major power in terms of its broadband infrastructure. However, with the progress in broadband and IP-based network formation and the rapid spread of FTTH services in particular, there has been an increase in the upload bandwidth in particular, and the transmission volume on P2P networks is increasing at an accelerating rate. For this reason, issues relating to network neutrality are likely to be manifested sooner here than in any other country.

For this reason, the regulatory authority should conduct even more detailed interviews with regard to network neutrality to solicit the opinions of market participants on each layer, and a forum for studies by market players in each layer should be established. These efforts should be based on the principle of ensuring an environment that enables users to freely use the IP-based network to the extent that legitimate purposes allow. Phase I of the study should be conducted around summer 2007.

In the above-mentioned study, first the future trends in IP traffic should be predicted, and the approach to determining IP traffic, the trends in peering and transit interconnection modes, and the approach to broadband use fees should be examined
from a comprehensive perspective. Then, phase II of the study should be conducted giving attention to the status of the progress in such areas as the construction of NGNs by NTT East and West, the establishment of rules for competition, the progress of competition on the terminal layer, and the verification of tariff policies.

4-6 Other Policy Issues to be Considered in the Transition to IP-Based Networks

4-6-1. A framework for promoting competition at the terminal layer

Certification systems should be reappraised, starting from 2006, with a view to promoting competition in the area of IP-compatible terminal functionality (i.e., basic functions such as communication quality, security and reliability, and terminal and network connectivity). Recommendations should be delivered during 2007.

It is equally important to promote competition in mobile terminal markets through initiatives such as possible options to abolish sales subsidies and removal of SIM (Subscriber Identity Module) locking. Toward this aim, a forum for discussion among industry representatives and other interested parties will be set up, with recommendations to be delivered by summer 2007.

4-6-2. Strengthening dispute settlement functions

With IP technology expected to continue driving the diversification of business models, it is increasingly important to upgrade dispute settlement functions in the Telecommunications Dispute Settlement Committee. For this purpose, it is appropriate for the Committee to deal with the disputes between carriers and upper-layer players such as content providers. In addition, it is appropriate to add the mediation and arbitration processes as well as resolutions with regard to the disputes between competing operators and owners of facilities such as telegraph poles.

4-6-3. Revision of universal service system

(1) Outline of the universal service system

In Japan, universal service legislation was enacted in June 2002. The universal service system is designed to provide subsidies towards the costs associated with the provision of universal service (calculated using the LRIC model) where such costs exceed revenue. To date, however, there have been no cases of net costs in excess of revenue and thus the system has never been used.

In April 2006, however, amendments to the universal service mechanism introduced the concept of “unviable regions,” defined as those where costs exceed $2\sigma$ relative to the national average figure. In these unviable regions, net costs are recalculated using the LRIC model, with the sum total of portions in excess of the national average defined as
the net cost. The amended universal service scheme will be launched during FY2006.
As a result of the amendments, the calculation of compensation payable to each carrier
will now be based on the telecommunication numbers owned (This includes both fixed-
line, 050 base VoIP service, and mobile carriers.), rather than annual turnover.

(2) Need for review of universal service system accompanying the transition to
IP-based networks

The universal service system has not been activated thus far, although the system itself
was introduced in June 2002 after a major revision of the Telecommunications Business
Law. However, a review was conducted three years after the system was introduced,
and in April 2006, a revised system was put into effect.

Under the current universal service system, subscriber telephones, public telephones and
emergency calls are the scope of the universal service. In this revision, local telephone
calls were eliminated from the scope of the universal service, as competition has
developed. In this review, it was decided to review the system in three years (FY2009).
However, as there is expected to be rapid progress in the transition from PSTNs to IP-
based networks, it is required to begin work on studying the scope of the universal
service and the methodology of assessing costs.

(3) Basic perspective for review

The universal services are defined as services that are indispensable for people's daily
lives and should be provided fairly and stably nationwide under appropriate conditions
including tariffs that enable anyone to use the services (Telecommunications Business
Law Article 7).

There are three basic requirements for universal services:
(i) Essentiality: Services that are indispensable to people's daily lives;
(ii) Affordability: Services that can be used for tariffs that enable anyone to use them;
and
(iii) Availability: Services that can be used in any area with no variations

“Changes to market structure and review of universal services”

As mentioned above, the progress in the transition to IP-based networks is eliminating
the barriers between fixed and mobile services and the distance categorization of
telecommunications services. It is becoming difficult to continue to adopt the current
approach of specifying the scope of universal services and which is to be maintained.
On the other hand, even if broadband services faster than a certain transmission speed
were categorized as universal services, with rapid technological innovation, it may
become impossible to immediately say with certainty that these services are services
that must be ensured as a minimum for all users.

In other words, it is possible that, as long as the conventional concept of universal
services is adopted, it will be necessary to constantly update the definition of this term
to cope with rapid technological innovation, and there are concerns as to whether the
stable operation of the system will be adversely affected.

“Basic perspective for review”
In the review of the universal service system, there would be various options. For this reason, the review must be conducted carefully, while comparing the advantages and disadvantages of multiple options. As the universal service system is one that ensures the provision of the telecommunications services that are indispensable to people's daily lives, the opinions of a wide range of entities in various fields should be solicited in the review, with particular attention paid to ensuring that the process is fair and open.

In this review, deeper consideration is thought to be appropriate. For example, the concept of "universal service" should be modified so that in terms of broadband access, for example, it includes the concept of "universal access" that ensures a society in which anyone in any part of the country is able to enjoy the benefits of use with no disparities.

The universal access approach will require deeper consideration in the future, but the approach is a technologically neutral one in which, regardless of the type of service, whether subscriber phone service or IP phone service, when services that meet certain requirements can be accessed through the access network, a portion of the maintenance costs for that access network in unprofitable regions will be supported by the universal service system.

However, in such cases, careful study will also be needed for points such as the following.

Firstly, as the shift to IP-based networks progresses, the barriers between fixed and mobile market categories will be lost. In such cases, if services with mobility are included in the concept of universal access, the question of how to define the approach of "universal provision" must be resolved.

In the case of current fixed-line telephone lines, the location of use of the telephone service can be identified exactly. However, no such restrictions exist in services with mobility. For this reason, study is needed to determine what standards (business zones) will be needed as sufficient conditions for the range in which services with mobility are provided, from the perspective of universality that allows use with no disparity between locations.

Secondly, if all means of accessing broadband service are supported by the universal service system without specifying the transmission mode, it is possible that coverage under the system will be extended even in cases in which multiple companies provide overlapping services.

In such cases, the amount for the cost to be supported under the system will expand, and the burden on telecommunications carriers and even users may increase dramatically depending on the approach to the design of the system. Accordingly, an effort must be made to rigorously define the nature of and requirements for the broadband access that should truly be ensured, and a study of approaches to cost assessment models should also be conducted.

Thirdly, as tariff levels and the degree of penetration will differ for each service (unlike the existing fixed-line telephone service, which is a standard tariff nationwide), a study must be made to determine what judgment criteria would be appropriate for the affordable price that is a constituent requirement for universal service. In the case of
broadband service in particular, usage tariffs that involve a bundled type fixed price are charged, and a study is required for the methodology used to determine what portions of the service that is provided should be specified as supported by the universal service system.

(3) Study timeframe for the review

Following a review, the revised universal service system went into effect in April 2006. For this reason, conducting another complete review of the system would not be desirable in terms of system stability.

On the other hand, even the most recent review of the system calls for the system approach to be reviewed after three years. In addition, the New IT Reform Strategy establishes as a government objective the elimination of areas with no broadband access by fiscal year 2010, and this date will mark the completion of a national level broadband infrastructure. Accordingly, it would be desirable to conduct a full-fledged study in 2009.

The NTT midterm operations strategy notes that, by fiscal year 2010, there are expected to be approximately 30 million subscribers for fiber-optic IP phone using FTTH service. However, this means that roughly half of all households will still be using PSTNs fixed-line telephone service. For this reason, careful study will be needed for the review of the universal service system in a situation in which both PSTNs and IP-based networks exist.

Specifically, assuming that the "zero broadband" regions are eliminated at the beginning of the decade that starts in 2010, if the scope of universal service is limited to conventional PSTN-based fixed-line telephones, it is possible that PSTNs will remain to a greater degree than necessary. On the other hand, it would be appropriate to conduct a review of PSTN-based telephones and IP-based phones (for example, fiber-optic IP phones) as soon as possible, with particular attention given to market trends, and based on the assumption that the substitutability in the service market will increase.

Accordingly, to begin with, a forum should be established for study by experts regarding the approach to the review of the universal service system, bearing in mind the spread of broadband services, and a feasibility study should be conducted in order to identify and review specific points of contention. The findings should be released sometime in 2007.

4-7. Toward a Formulation of a New Competition Promotion Program

In September 2006, based on the report by the Study Group, MIC released “New Competition Promotion Program 2010” setting out a framework of competition rules to address progress in the transition to IP-based networks, based on the recommendations of the Study Group.

The Information and Communications Council, an advisory body to the Minister of Internal Affairs and Communications, will be provided with annual progress reports detailing implementation of the Program. A PDCA (“Plan, Do, Check and Action”)
process will be followed, including soliciting of opinions and suggestions from a broad range of sources. The program itself will be reviewed on a regular basis.

In addition, in June 2006, the Japanese government has decided “Basic Policies for Economic and Fiscal Management and Structural Reform 2006. (See Fig. 23)” In this decision, as one of the items for promoting structural reform in the IT sector, it was decided that the status of NTT will be concluded following consideration in 2010 based on the status of broadband deployment and the progress of NTT’s medium-term management strategy. With regard to the issue of convergence between telecommunications service and broadcasting service, it was determined that a comprehensive legal framework including telecommunications and broadcasting will be concluded by 2010.

**Fig. 23**

<table>
<thead>
<tr>
<th>Position of the “New Competition Promotion Program 2010”</th>
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<tbody>
<tr>
<td><strong>Present (2006–)</strong></td>
</tr>
<tr>
<td>Transition from PSTN to full IP-based networks</td>
</tr>
<tr>
<td>- Establishment fair competition rules*</td>
</tr>
<tr>
<td>- New Competition Promotion Program 2010</td>
</tr>
<tr>
<td>- Facility-based competition promoted by:</td>
</tr>
</tbody>
</table>
|     - Promote further opening of poles, etc. owned by NTT
|     - Promote further opening of poles, etc. owned by NTT
|     - Promotion of opening fiberoptic network installed by |
|     - Promotion of opening fiberoptic network installed by |
|     - Palmtop introduced by wireless access technology  |
| Competition environment improved by:                   |
|   - Progressive system of dominant legislations        |
|   - Establishment of competition safeguards in response to |
|   - Establishment of competition safeguards in response to |
|   - Establishment of competition safeguards in response to |
|   - Establishment of competition safeguards in response to |
|   - Review of access charge calculation method          |
|   - Review of access charge calculation method          |
|   - Review of access charge calculation method          |
|   - Promotion of MVNOs into the mobile market          |

| **Early 2010s**                                         |
| IP-based networks recognized as principal networks to replace PSTN |
| Comprehensive review                                      |
| Periodical review (on annual basis) and review of the program |

**Status of NTT**

will be concluded following consideration in 2010, based on the status of broadband deployment and the progress of NTT’s medium-term management strategy.

**Comprehensive legal framework including telecommunications and broadcasting**

will be concluded by 2010

*These items are included in the plan agreement between the government and ruling parties (June 20, 2006).
5. Conclusion

Currently, in Japan, broadband deployment has been well progressing including DSL, fiber optic service, and 3G services. Several factors can be found for this deployment. Regarding the DSL market, interconnection rules such as collocation and unbundling has worked well under the circumstance that 94% of local access lines are owned by NTT regional companies. In addition, reform of competition regimes with light-touch regulations was done in 2003, although dominant regulations such as interconnection rules are kept under the Japanese market structure where the local networks is monopolized by NTT regional companies.

The main issue to be addressed as competition policy is how to establish new competition models in response to horizontal and vertical market integration reflecting the transition from PSTN to IP-based networks. Recognizing this, in September 2006, MIC released “New Competition Promotion Program 2010” which covers many issues to be reviewed including dominant regulations, interconnection rules, universal service fund, and network neutrality.

As one of the most advanced countries in the broadband market, Japanese broadband competition policy has been entering into the new phase towards the early 2010s.