Regulation Policy and Economics of Regulation Class No. 11 (file 10): Regulatory Reform in Telecommunications Market

Objectives of Today's Class

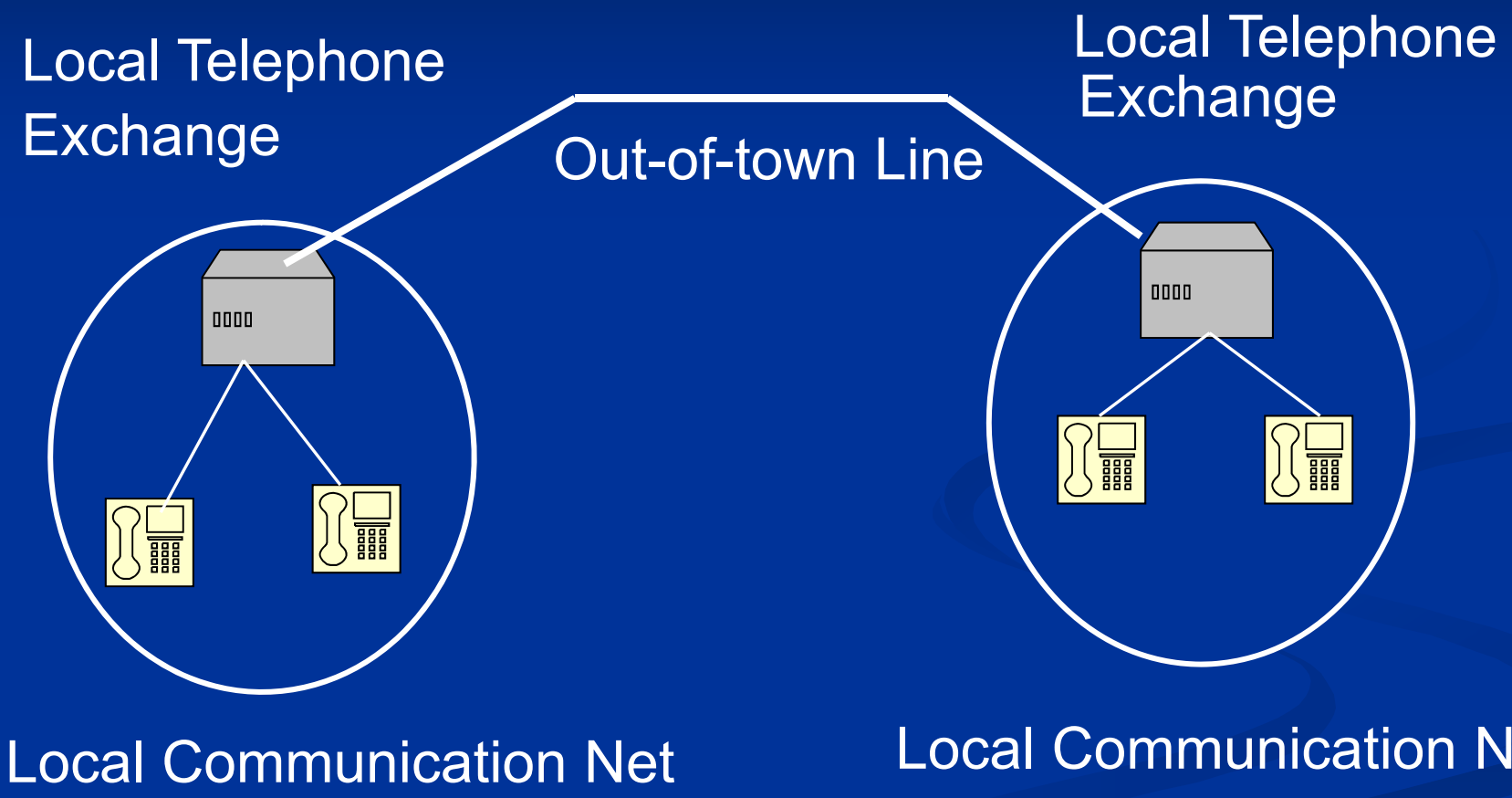
(1) To understand basic characteristics and problems of the telecommunications (telecom) market

(2) By taking the telecom market as an example, to reaffirm basic mechanism and effectiveness of the rules leaned up to now

Telecom Market

(1) Telegram
(2) Telephone service (via a switchboard)
(3) Internet connection, data communication, NGN
(4) IP telephony
(5) Mobile phone, mobile telecommunications
(6) Public wireless LAN service
(7) Services converged for mobile and fixed-line phones (FMC)
(8) LAN for one's home, remote control and security service regarding electric appliances; cf. supply services by city gas firms

Telephone Service (via Switchboard)



Situation before Regulatory Reform

- Monopoly by a state enterprise (Nippon Telegraph and Telephone Public Corporation, hereinafter shortened to NTT Public Co.)
- Price regulation based on overall fundamentalism
- Universal service
- Underdeveloped sectoral accounting
- R & D (cf. NHK)
- Relatively high profits (room for new entries); cf. Japan National Railways

Ground for Regulation over Telecom Industry

- Natural-monopoly disposition, the weight in the military aspect
- Public welfare ← Discussion on universal service

Change in Ground for Regulation

(1) Increase of the demand in the long-distance communication market → At least in the market of out-of-town call, the importance of economies of scale has gone down substantially; to have brought forth room for entry of multiple firms

(2) Technological innovation

→ With the advent of wireless technology and an optical fiber, a variety of entry formats has become possible.

(3) New demand like interenterprise data communications has come into being

(4) The weight (necessity) in the military aspect has disappeared.

Obstacle to Competition

- Local communications net remains to be in a natural monopoly situation.
- If a local communications net (and a telephone drop to each household) could not be used, an extent of services a new entrant is able to provide is extremely limited. ~ Essential facilities (file 7)

→ If the access system is not in place, it obviously does not work out to privatize NTT Public Co. and to promote competition by approving the new entry.

→ It is necessary to upgrade an open-door system for the local communications net.

Process of Regulatory Reform

- In 1985 the privatization of NTT Public Co. and adoption of competition, and the opening up of the local communication network

→ Three firms' entry in the long-distance communication market

- Upgrading of the access charge by the method of long run incremental cost (LRIC)
- Division of NTT by means of a holding company system (1999)
- Relaxation of (implicit) asymmetric regulations over NTT
- Introduction of a competitive assessment (since 2003)

Situation prior to Reform

- It was structured for the surplus gained in the long-distance call sector to fill the deficits in the sectors of local communication, basic charge, public phone, and directory assistance.

→ Situation being relatively easy for one to enter in the long-distance call sector (i.e., the situation where potentially cream skimming was easy to happen)

Situation in Early Stages of Liberalization

Preferential treatments in essence of new entrants

- A greater attention was paid to potential formation of a monopoly market without regulations where new entries would not work out, than to a concern on inefficient entries (cream skimming).
- It was intended to develop a competitive market within a short time by binding NTT hand and foot so as to prevent it from blocking new entries.

Effect of Development/Promotion of Competition

(1) Raising rates of the local-call sector—considered to occupy the majority of the deficits—was not approved.

= Disapproved rebalancing of the distorted price structure that was established during the time of a public corporation

→ Promoted new entrants' cream skimming

(2) The rates were under the approval system, and NTT's rates for long-distance calls were maintained at 20% higher than ones of new entrants.

→ Control over NTT's pricing aimed to restrain entriesC

Effect of Competition Development Still Maintained

- Upkeep and expansion of the regulation over accesses

→ Constituted the foundation of Softbank's entry in ADSL market

→ Giving rise to competitions in the sectors of local calls and a basic charge

- Imposing the access regulation even on such new facilities as an optical fiber (not applicable to competitive business entities)
- NTT is not free to effectively implement converged services allowed to other communications business entities.

Effect of Development/Promotion of Competition: Evaluation

- Criticism for preserving discretionary administration

→ Necessary to convert to a regulation policy with high transparency like the adoption of assessment of competition

- Distortion of competition attributable to asymmetrical regulations

＝ Possibility to have allowed the entry of business entities that are not really efficient

- Created an effectively competitive environment within a short time, and attained the generation of the decline in prices and the new market

Fixed-line Communications Market Hereafter

- Dissemination of a fiber-optic network, and development of new technologies

→ Room for a choice between a facilities-based competition and the maintenance of an open access

- Response to a world where a software and standard constitute a bottleneck

= Should the market power of a standard that has survived a competitive elimination match be brought into question? ← A problem having the same structure as a patent license

- Response to business merger, vertical integration

From Telephone to Telecommunications

- Voice → Data, analog → digital, drive for IP
- Increased importance of an Internet connection and telecommunications, as compared to telephone services
- Telephone services provided based on IP technology
- IP phone
- OABJ number: to demand quality close to the current telephone services, specifying the location ~ to give a regular number
- 050 number: location-free, a low level of quality regulation (best effort) ←Feature close to a cellphone

Broadband Access Service

Internet connection

DU → ISDN → ADSL → FTTH

Japan's total number of the subscriptions for broadband access services (as of June 2009): 15.89 mil for FTTH, 10.84 mil for ADSL, and 4.18 mil for CATV

Number of the net increase for ADSL peaked in the first quarter of 2003; its net decrease started in the second quarter of 2006, and which went into reverse in 2008.

In no other countries is there an optical fiber being widespread this much. ~ The reason for which is a puzzle.

Situation of Optical Fiber Servicing

As of March 2006

Urban districts with the population of 100,000 or more

~ 90%

Others ~ 70%

(not subscription percentages)

Neutrality of Network

Increase in the volume of communication → Technological innovation and capital investment → Speeding up → Increase in heavily-loaded communication → Further technological innovation and capital investment

Textual information → Photos → Animation

An increment in facilities' cost is growing to a height that cannot be paid off with the decrement in costs saved by technological innovation.

→ Carriers (communication business entities) demand burdens from content providers with heavy loads, and users.

→ Those content providers who reject such loads are restricted to a limited access to HP (a low-speed access only).

⇒ Opposition from consumers and content providers claiming that to be practical censorship

Congestion Charging

During a period of congestion, it is only fair to levy a charge in accordance with the degree of congestion.

→ An which in itself is nothing to do with such a fundamental human right issue as freedom of speech.

⇒ A certain type of congestion toll → file 11

Examples of Universal Service

To provide service anywhere in the nation universally

Originated from the catchphrase of business entities of logistics, communication, and public utility; e.g., a delivery/transmission across the whole country, xx% coverage, electric power service everywhere

The recognition has become firm that such service is the right to access as a fundamental human right.

Examples of universal service:

The conveyance of a postcard and sealed document at a standard rate anywhere in the nation ~ A postal clerk carries a newspaper as well.

Telephone service ~ A basic charge and communications charges by the rules even in an underpopulated area ← Even for broadband service, there is no rate differential in each region of NTT East Co. and West Co. in principle.

How to Finance Cost of Universal Service

(1) Internal supplementation with monopolistic returns
A definite exclusive domain ~ Rent of which is to pay out money-losing sector's costs

(2) Universal service fund
To add an extra amount on a basic charge and communications charges, whereby to compensate for the loss

(3) Subsidy
To cover the loss with a subsidy from the government and/or a municipality

Fixed-line Phone Service in Underpopulated Area

- Internal supplementation with profits of NTT Public Corp. and (current) NTT
- To cover with managerial efforts of NTT East & West

Relatively larger imposition on NTT West Co. ← To approve supplementation between East Co. and West Co.

- All communication business entities share the burden in proportion to each entity's amount of contracts, i.e., the amount of phone numbers (7 yen → 6 yen → 8 yen per phone number).

New system's merit:

Users come to know clearly how much they bear in order to maintain universal service.

Future Universal

Scheme of “copper wiring − switchboard” is bound to disappear rapidly. (?)

Broadband connection

Mobile telecommunications

Is the service needed as a universal one?

→ Necessary to change a concept of a national minimum standard of living, and to adopt a structure for each municipality to make a choice

Need to consider fairness in burdens as well

Cf. an amount to be borne for the facility installation ~ Why is it not possible to actualize an allotment disparity in consideration of running costs?

Features of Mobile Telecommunications

- Restriction on radio waves, an oligopolistic market of the three firms (albeit changing considerably; to be discussed in detail later)
- Being a new market, there exist almost no bottleneck facilities that were built in the Public Corp. years.

＝Relatively small disparity between NTT and new entrants (though NTT *DoCoMo*'s share at some 50%, and no big change with the introduction of MNP)

- Vertical integration model → Possible to change with MVNO
- High performance terminals, terminal incentives, high amount (?) of call/basic charges

Number of Cellphone Subscribers

As of November 2009

Cellphone: 110,176,700 subscriptions

IP access service: 92,045,400 subscriptions

Technology and Norm of Cellphone (W-CDMA)

Third generation (3G)

DoCoMo, Softbank ~ W-CDMA system (global standard that became widespread in Europe and Asia)

Developed with Japan's cooperation based on the second-generation technology of Europe

Investment in FOMA in 2001 before the rest of the world (the standard entirely different from the second generation) → Necessary to install the base station from scratch; FOMA's communications radius surpassed mova's in 2006.

DoCoMo's 2nd generation (*mova*) ~ PDC system (*DoCoMo*'s original standard) → Failed in spreading to the world and standardization

Technology and Norm of Cellphone (CDMA-2000)

- Third generation (3G)
- *au*CDMA2000 system
- Developed with the cooperation of Korea and Japan based on the second-generation technology of the U.S.(CDMA), which disseminated widely in Korea and the U.S.
- Continuity with the 2nd generation → Able to be handled with an improvement of the bases for the 2nd generation ~ Relatively wide communications areas ⇒ A rapid switching to the 3rd generation
- Japanese feature ~ Coexistence of multiple standards (same with China), not to venture into consolidation

Cellphone's Turning into Information and Composite Terminal

1997: Beginning of an e-mail use

1999: i-mode ⇒ full browser

2000: Loading of camera function

2002: Music ringtone ⇒ Music ringtone in full, LISMO (to manage music ringtone in full through a PC) ~ The amount downloaded being equivalent to the single CD's amount sold, a market size of 22.2 bln yen in the first half of 2006 (about 9 times as large as PC music distribution)

2003: Introduction of the packet flat-rate system, loading of FM radio (linkage with music ringtone)

Cellphone's Turning into Information and Composite Terminal

2004: Loading of *FeliCa* (contact-free IC chip) ~ Mobile wallet (electronic money) → Loading of a credit card ⇒ Taking in identification card function (student ID card, staff identity card)

2006: Loading of a one-segment tuner, loading of a digital radio

Additional loading of GPS, infrared communication function, wireless LAN function, etc.

Possible to make free use of information terminals, laptop computers, digital cameras, household remote controls

Reform in Cellphone Market

- Problem of the right to setting up charges

  The charges determined by cellphone business entities → Toward the access charge system
- New allocation of radio waves → Initially 3 firms, but ended up with two as one, Vodafone, was purchased by Softbank (the two being *EMOBILE* and *IPMobile)*
- MVNO
- Number portability

Number Portability

Traditional system:

When one changes a mobile business entity, so does the number. ~ Difficult to change a mobile entity → High switching cost

One can use the same number even after changing entities.
~ Number portability

→ To reduce the switching cost

Expected are impactful changes of the mobile market structure, and the business model.

~ At this stage, the state of affairs has proved disappointing.

← Business entities are able to control the switching costs to some extent.

Reform of Cellphone Market Hereafter

- MVNO

~ Firms without allotted radio waves are able to enter the market.

→ Emergence of a diversified business models

- Removal of SIM lock

~Terminals able to be used by other firms

What is SIM Lock?

SIM card: a card recording customer information

Intrinsically a terminal of the same system can be used for any one of mobile firms by replacing a SIM card.

SIM lock

- Terminal SIM lock: a terminal cannot be used if a SIM card is changed.

~ au

- SIM lock by a firm: a SIM card cannot be used if a mobile firm is changed.

~ *DoCoMo, Softbank*

With SIM Lock?

- Unable to make a terminal that can be used bestriding business entities
- No development of a secondhand market of terminals
- Barrier to MVNO's entry
- To raise switching costs

Removal of SIM lock → Expected is an effect that changes the structure of the mobile market from the bottom up.

On the other is a risk to ruin an incentive for the carriers' R & D and new services.

In the Western countries, there may be an occasion for SIM lock to function for a certain period (6-12 months).

PHS (Personal Handyphone System)

- Japan's original standard: a sense of carrying out a cordless phone
- An element of FMC from the outset ~ Easy to become merged with an extension telephone
- A weak radio signal: the arrangement of simple base stations in a large number to cover narrow areas ~ Able to effectively cut down blind spots as these base stations can be meticulously installed (a system that can be easily linked intrinsically)
- Unsuited to telephonic communication in high-speed movement (albeit headed for solution)
- Higher speed compared to a cellphone ~ Suited to data communication (before speeding up of a cellphone)

PHS (Personal Handyphone System)

Recognized as a low-cost cellphone ~ Failed to differentiate from a cellphone

Permeation of an image of qualitative disadvantage such as no connection possible while moving fast

→ Fell into a decline along with the depreciation of the cellphone price ~ Specialized in data communications

WILLCOM's reentry (breakaway from *KDDI* group)

Epoch-making price structure, new products, new technologies → Became the center of attention with the number of subscription in excess of 4 mil.

WILLCOM

- Introduced the flat-rate system for voice calls ~ Cellphone business entities, burdened with heavy loads of radio wave, could not venture that far at present (though followed by *Softbank*).
- Launched a new product equipped with a full keyboard, large-size liquid crystal, versatile operating system (and which was followed by *Softbank*).
- Positive usage of MVNO (e.g., JCOM)
- To attract business as a terminal of low electromagnetic waves and low output power ~ Use in hospitals
- W-SIM: to install a radio-wave-related device in a SIM card

→ To reduce terminal makers' burdens ⇒ Not only does it reduce terminal makers' burdens, but it also prompts the entry of such different lines of business as producers of toys and watch manufactures.

New Entries

- Two firms (*EMOBILE* and *IPMobile)* planned to enter in 2007 ~ For the first time in 13 years since ***Digital Phone*** **and** ***TU-KA*** ← Quite a slapstick goings-on; Disorder despite no bidding
- *EMOBILE* ~ A subsidiary of *eAccess,* ranking as the 4th in ADSL market
- Constituted the platform of MVNO
- *IPMobile* ~ Specialized in data communications → Abandoned
- There are such high barriers to entry as the procurement of terminals and the area expansion throughout the country. ← It's apparent that the reason for a limited number of entities is not necessary the limitation of radio waves.

Status Quo of Mobile Telecommunications Market in Japan

- Competitive market involving virtually 3 (5) firms
- Vertical integration model ⟷ Fixed-line Internet connection
- Low compatibility, high switching costs

→ Intense corralling competition in the initial phase

- Failure in international standardization for the 2nd generation, and international standardization in the 3rd generation
- Proceeding to the 3rd generation before the rest of the world
- Technological advancedness

Future Vision of Mobile Telecommunications Market in Japan

- Promotion of competition by new entries
- Diversification of company models
- Drop in switching costs with the adoption of number portability

→From the intense corralling competition to the competition over rates and services

- Progress in internationalization
- Full shift to IP, and a transition to the 4th and 5th generations

→Disappearance of fixed-line communications, the border with broadcasting

→Triple play, grand slam, FMC

Government-induced Depression? Galapagos?

Japanese mobile market has undergone a peculiar evolution:

Domestic cellphone producers ~ Overwhelming competitiveness in the original terminals at home, but none abroad.

Sales incentive ~ Terminals at 1 yen; attributable to the carrier buy-out system?

Not too logical grounding

The incentive being unjust ~ Adoption of alternative possibility

Sales decrement of 1 mil pieces or more → Government-induced depression

To begin with, weren't there a problem even before the sales decrease?

While terminal producers are not competitive, they do have competitiveness as the parts manufacturers.

Assessment of Competition

Assessment of competition begun in 2003

2003: Internet connection services, company-use network services

2004: mobile communications

2005: fixed-line phones (including IP phones)

Present ~ Implemented independent of the regulation

Future ~ Directly linked to the regulation

Discussion in Assessment of Competition: Market Demarcation

- Whether the broadband market to be grasped as a single entity, or FTTH and ADSL to be classified into separate markets
- Whether IP phones and regular fixed-line phones to be grasped as being in the same market
- In the cellphone market, whether incoming calls to be deemed as being in a separate market
- How to grasp areas

In general, a discussion that starts from market demarcation is insignificant. (Class No.3)

And which has been correctly recognized in the course of the assessment of competition.

While FTTH and ADSL belong to separate markets (once so deemed), FTTH market is under ADSL's competitive pressures at the present phase.

Discussion in Assessment of Competition: Concern over Market Ascendancy

- Pointing out of some areas where competition is sparse (FTTH in the areas excluding Kansai within NTT West Co.)
- International comparison of price structures
- Analysis of disputes over connections

⇒ In terms of competition policies, to clarify what ought to be evaluated in the affirmative; e.g., no price differentiation among areas ~ not exercising the ascendancy in prices in the monopoly areas

⇒ Role of a loose guideline

Access Charge and Access Regulation

- NTT's metal lines ~ Strict access-charge regulation based on LRIC (an asymmetrical regulation in a wary)
- NTT's optical fiber, etc. ~ The business entity (NTT) sets up charges based on its lump-sum costs: a certain degree of freedom as to the term of recovering the costs (a completely asymmetrical regulation; almost no regulations applied to other business entities except for one on mutual accesses)
- NTT *DoCoMo* ~ Thoroughly free once ~ To be restricted in terms a "cost base"

Stipulations in detail being up to the negotiation

→ Treatment by a dispute settlement committee principally consisting of neutral members

Proffer of Access and Wholesale Services

Access obligation ・To hook up on a cost basis

- Obligation for specified business entities to submit notice on access charges as a stipulation ← Subject of the change order by the Minister of Public Management, Home Affairs, Posts and Telecommunications
- Nondiscrimination (not allowed to act against specified business entities without reason)

Wholesale service ・Loose rules like nondiscrimination, the duty of continuation (not to discontinue a transaction once started on the basis of an agreement)

The regulation changes depending on the classification of a specific business as either an access or wholesale service. ~ Room for administrative discretion (a flexible regulation) → Serious abuse observed with MVNO

Issues on Regulatory Reform in Telecom Market

(1) Dramatically changing patterns of communications markets, and regulations to position technologies neutrally

(2) When to abolish the asymmetrical regulation applied to NTT

(3) What to do with universal services

(4) Response to a threat of new monopoly

(5) Competition between a vertically integrated model and separated model → To maintain the conventional open-access stand?

(6) Formation of a standard

(7) Effective utilization and allotment of a radio wave → To introduce a bid system → Dealing of vested interests held by the public sector

Fusion of Communications and Broadcasting

- To send broadcasting programs using communications infrastructures
- Internet contents compete with broadcasting.

Broadcasting ~ A typical two-sided market

Competition for gaining audiences

Competition for obtaining advertisements

→ Competitive relations growing in both fields

- Decrease in the advertising revenues on the broadcasting part
- Decrease in programs targeted at a niche

Neutrality of Competition and Equal Footing

Ideally, as a result of competition, a domain where broadcasting has an advantage gets serviced by broadcasting and the one where Internet is advantageous should be covered by Internet.

In order to materialize this, it is necessary to correct the system that brings forth distorted burdens of expenses.

~ The identical perspective is important as to the competition among energies.

Neutrality of Competition, Equal Footing, and Intellectual Property Rights

Treatment of copyright being asymmetrical between communications and broadcasting

IPTV

(1) Even in a case where a specialized channel firm already supplied a program to a broadcasting business entity, a consent needs to be obtained afresh from a current rightful claimant.

(2) Regarding concurrent retransmission of broadcasting, in addition to an approval of a broadcasting business entity, an assent of a claimant of rights neighboring on copyright needs to be obtained.

Distinguished handicaps against communications business entities

Neutrality of Competition, Equal Footing, and Vertical Integration

Regulations being asymmetrical between communications and broadcasting

NTT—owner of the transmission line—cannot conduct programing or the supply of programs.

TV business entities are allowed to integrate vertically.

Possible for CATV to simultaneously feed broadcasting and the core

Society of “Internet of Things”
and
Smart Grid, Smart Energy System

Background

BIPv4 IPv6 ~ To be relieved from the constraint of the exhaustion of address

Dissemination of broadband (upkeep of the optical fiber network)

NGN, 3.9th generation cellphone (LTE), ZigBee

Sensor technology ＋ Wireless communications technology

Society of “Internet of Things”

1st stage: a society where a person and another person are connected through a network (former Internet society)

2nd stage: a world where a person and a thing are connected through a network (A human being controls a connected thing through the Internet.) ~ the world already materialized

3rd stage: a world where a thing and another thing are directly connected through a network, and work jointly (Society of “Internet of Things”) ~ the world on the way to being materialized

By some definition, it’s a society materialized quite a while ago in the world of electricity. ~ Governor-free operation, etc.

Nevertheless the key is that the scheme is of a light load and able to get into a household as well.

Society of “Internet of Things”

A sensor for a local climate corresponds with an agricultural equipment. → Watering, fertilizer control

A blood-pressure check at home → Data base in a hospital → Transmission to a medical doctor at the time of danger

A home party → A cleaning robot → Refrigerator and a wine cellar → Automatic ordering of the stuff running short

Sensor nets along the road → Car navigation equipment → Pointing to routes with a less traffic jam

Key Technologies

(1) Sensor technology

(2) Stable communications for local areas with low electricity consumption

(3) Analysis of a behavioral pattern for information processing technology

(4) Information management and security

Both potential capacities and issues of DSM are common in a smart grid and a smart energy network.

Instead of looking at a smart grid only from the standpoint of a power network, it is important to have a different way of thinking to observe a power network from the viewpoint of the Internet. For a change in the social system, this is a one-in-a-million chance to bring about an upheaval once every century.