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Regional Network Access and its Inherent Problems

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Abstract
It has been said that in the next century tie-ups made possible by optical fiber cables will link our homes, schools, municipal offices and individual companies on a regional basis. Due to these kinds of tie-ups, it will become possible to transmit documents, voices and images at extremely high speeds. The "Information Super Highway" in the United States is already attracting much attention. When we put most of these forecasts together, it seems as if we will have no reason to leave our homes in the 21st century. Movie theaters, books, newspapers and magazines will no longer be necessary. We will no longer have any particular reason to go out and meet other people in person. Yet, in effect, this is actually nothing more than a dreary scenario as might be described by science fiction writers or futurologists.

In reality, and in light of all the noise that mass media is now creating about the form of the 21st century "Information Super Highway", whether it be in Japan or even in the United States, we should not expect it to arrive as soon as people are claiming it may. Rather, the future development of this highway should be a fairly slow process. That is because there are still so very many technical, social, business-related and legal problems that remain to be solved. In this article, I intend to give careful thought to many of these problems as we consider topics of importance for the construction of future network systems that will truly coincide with our anticipations.

1 Foreword

It is said that by the beginning of the next century two kinds of cables will connect houses, schools, city halls, prefectural offices and individual corporations on a regional basis. One of these will be coaxial cables, and the other will be optical fiber cables which have a hundredfold communicative capacity of present telephone wires. These two kinds of cables will enable us to communicate bi-directionally and to send and receive documents, voices and images at extremely high speeds using digital signals that computers can handle.

In the United States the "Information Super Highway" is now attracting much attention. Its formal designation, used by the Clinton administration, is the "National Information Infrastructure (NII)". The Information Super Highway that the American media has introduced includes nearly every kind of information network. Today, some journalists refer enthusiastically to the Internet as the "ISH". Some academic articles even refer to the cellular phone network as the "ISH".

If all of these expectations are to come true, we will no longer need leave our home in the coming century. We will no longer need movie theaters, books, newspapers, magazines or even to bother going out to meet anybody. This scenario, however, as described by science fiction writers or futurologists will undoubtedly prove to be an extremely dreary electronic society.

In reality, and in spite of all the hullabaloo that is currently being aroused by the mass media about the form of the 21st century "Information Super Highway", whether it be in Japan or even in the United States, we should probably not anticipate its arrival quite as soon as people are claiming. Rather, the future development of this highway should be a fairly slow process. That is because there are still so very many technical, social, business-related and legal problems that remain to be solved.

In this article, I intend to give careful thought to many of these problems as we propose an idea of "Regional Information Networking (RIN(1))" and consider the following topics of importance for the construction of future network systems that will truly coincide with our anticipations.

- The Definition of RIN
- Considerations on RIN With Reference to BBS Cases
- Inherent Problems in the Present Internet and Considerations of RIN
- Considerations on Information Technology for RIN
- Influences of RIN upon Local Activities
- Corporate Activities in RIN
- Considerations on Social and Political Problems of RIN

2 Definition Of RIN

(1) Voluntary Sending of Information by Individuals

The era of mass production is already over. People simply do not accept commercial advertisements any more. They seek individuality, not standardization. They are happy with options of their own choosing, as opposed to simply waiting for something to be given to them.

Although it has been said that a society of advanced information access will be able to realize improvements in our daily lives, the rationalization and activation of social functions and economical activities(2), in order to actually realize these things, the improvement of the information access systems themselves must be promoted on a regional basis in those locations where our lives are acutally carried out.

While there is a tendency to recognize progress of the information access systems in any region through the progress of the improvement of the communication of information, such as computer/personal computer, LAN or WAN communications in a region, personal computers or information communication networks exist only as environmental facilities for accessing information. In this article, "Regional Information Networking (RIN)" is considered to provide people in a region with opportunities to appreciate the following through available electronic information.

1. Truly valuable information come from within the lives of individuals in the region themselves.
2. This information takes on meaning only when its value is recognized by people or organizations within the region, and not when it is kept solely within individuals and not shared with others.

People are not happy with only receiving information that has been prepared by a central or local government for a certain purpose. They have a desire to respect the opinions of each individual within the region and to send out information of their own voluntarily in order to reflect their own opinions in economical and social activities. These are the processes by which formalism and authoritarianism can be made to collapse.(3)

(2) Regional Life Information Network

The reason for the failure of the CAPTAIN network is that it had no system of gathering life information. Regional life information would include personal information as well as the feelings of individuals in the region that can be obtained through their daily routines or activities. Life information can no longer be considered to be simply a flood of information provided by mass media or computers or raw statistical data. People can seek for their own lives and think positive only when they live in a society where individual life information is respected and the existence of the individual is valued. The regional life information network is a place for self-expression in which a person can have his/her own life information evaluated and respected by other people, and it should also provide an opportunity for obtaining and utilizing regional life information generated from others as well.(3)

RIN, referred to in this article, is based upon this idea of a "Regional Life Information Network".

Each piece of life information in a region is dispersed. Most individuals have only a limited ability to send out information of their own. Simply collecting and storing that information in one place would not make any difference. Each piece of information should not be treated individually; rather it should be

required to provide an immediate theoretical framework or method which, in turn, would form an organization linking together the entire volume of available information.

The existing systems engineering technology is useful for designing computer systems or information communication networks, but not for collecting life information or for building information circulation systems. Also, the framework to build such a system with a functional allocation to achieve the organizational goal, as in the business administration and the theory of organization, would not serve satisfactorily as a means of garnering the most benefit from the information of individuals in the region.

(3) Emerging from the Information Access Society

In a society which has emerged from industrialization, importance will be placed more upon software than hardware, and furthermore upon content rather than software. In as much as the existence of hardware is a premise for software and the existence of software is a premise for the existence of content, content then becomes a premise for a person to live with his/her own voluntary and independent will. The 21st century will experience a transition from a society emerging from industrialization towards a society emerging from information access. RIN is a place for self-expression where a person can have his/her life information evaluated and respected by others and can also enjoy the opportunity to obtain and utilize regional life information from others; it may be said to be a place for self-realization in the region which is preparing to emerge from the information access society.

3 Considerations Of RIN With Reference To BBS Cases

(1) Digital Information Technology

We are constantly receiving various information through TV and radio, information which is totally different from that referred to in this article. While the information we receive through TV or radio is transmitted in a single-direction via an analog signal through an antenna or cable, electronic information in RIN is digital data that computers can process, it is data which can be transmitted bi-directionally at the same time within the region. This would include all kinds of information from a variety of mass media sources such as movies, news, games and electronic newspapers to other kinds of data such as the personal information of individuals garnered through their daily routines and activities or their feelings as they are transmitted through electronic mail, etc. Digital data will change the role of TV on a large scale. Not longer will we be forced to watch it passively; it will be possible for us to have more options and enjoy many varied applications. In the future, it will allow us to search for and select data actively, and even to create data on our own and make it available for others. Thanks to this bi-directional function, RIN will change TV and personal computers into powerful tools for communication, learning and self-realization.

In the world of computer networks which is a combination of digital technology and computers, the potential for communication among human beings is making rapid progress.(4) Information communication technology that supports people is making it possible for them to transmit or share data and knowledge to the extent that no one could have even imagined.

(2) BBS in the United States

Anyone can open up his/her own BBS (Bulletin Board System) using a personal computer communications system provided that he/she has the appropriate communication software and hardware. In the United States, many individual users open a BBS and make it available to the community.(5) Every town with population of a few thousand or offers a BBS, and in many cases, it is free of charge. A simple personal computer makes this operation possible. System operations can be carried out by installing BBS software. BBS is utilized to exchange messages between users, such as personal information through their daily routines and activities as well as their feelings. In the U.S., the organizations utilizing BBS include user groups, social groups, political groups, religious groups and hobby groups. A BBS called "People's Electronic Exchange" provides a huge 'Want Ads" service on a field- and job-type basis. Another BBS called "Legal Ease" in Washington provides the whole texts of national laws and regulations. Many companies offer toll-free hot lines on BBS exclusive for their customers. The Internal Revenue Service, the Small Business Administration and NASA operate BBS and offer various information which is compatible for communications with other BBS through the FIDONET network and is accessible for Internet users.(6)

(3) BBS as the Central Pillar of RIN

Considering these cases in the United States, it is believed that BBS will serve as the central pillar of RIN in Japan as well. That is because individual computer users are able to open their own BBS and provide the community with their own personal information through their daily routines and activities as well as through an expression of their feelings. A BBS member can access BBS to read messages from other members on his/her own computer. This operation can be carried out on a simple computer installed with simple BBS software. The capacity of BBS is limited to the output and memory on the server's side. Most BBS have only limited telephone circuits and data storage. What makes it especially attractive for local residents is that provides them with an outlet for displaying personal information through their daily routines and activities and expressions of their feelings as well as facilitating an exchange of messages.

4 Inherent Problems In The Present Internet And Considerations Of RIN

(1) Inherent Problems in the Internet

The media in the U.S. maintains that the Internet is the "Information Super Highway" of today. Is this, however, really the case? Prior to thinking about regional information systems of the future, we need to fully understand what we can and cannot do, how we will use the Internet, who will be using it and what its limitations will be.

For those who criticize as well as support the Internet, the problems are obvious. They are as follows:

1. It is not easy to use.
2. It is not easy to understand.
3. There are some problems with data management and security.
4. Complicated procedures must be carried out in order to send graphics and other multimedia documents over the net.
5. It is not easy to search for data.
6. There are no cultural concepts which protect or assign trading values to the data obtained.
7. There is a possibility of a major collapse of data/news quality by the participation of gigantic media.

Although mass media has created a fantasy that the Internet is almighty, it needs to be strictly emphasized that the Internet is not primarily a medium of mass communication. Originally, it was created as a tool for scholars and scientists, not for sales promotion of commodities by profit-making corporations. It is true that there exist some anxiety that the rapid increase of data circulation among the general population on the Internet may weaken its original function as the state-of-the-art think tank through electronic communication.

However, the Internet will still play a major role in future networks. It has already enabled us to access an enormous number of data bases all around the world and to search for books by accessing university or public libraries anywhere. The number of schools utilizing the Internet is increasing worldwide. During the Olympic games in Atlanta, for the first time in Olympic history an official WWW was established to provide data concerning the results and schedules of the games, up-to-date ticket booking, images of the games by the Stream Technology and also sales of tickets linked to the booking data and various Olympic commodities.

The main reason that the Internet has spread and become so popular is due to its affordability. At offices or schools, individuals do not have to pay for their time on the Internet. Also, another significant feature of the Internet possesses is that it is not operated for profit by private companies. This public service feature is another reason for the global infiltration of the Internet.

For the purpose of RIN, it will be required to further strengthen this public service feature so that the Internet can truly become a grass-roots network that can be accessed by anyone at no charge. And, at the same time, it will also be required for local residents be able to access the Internet with no charge.

(2) RIN Organizations

Although the groups rushing to the Internet include entrepreneurs and profit-seeking companies searching for new business opportunities, we would like to form community networks made up of

grass-roots volunteers, educational organizations and local public groups who do not seek profits generated through access.(7)

Data suppliers for RIN would include people from corporations in the fields of recreation, publishing, broadcasting, computers and distribution industries as a matter of course. However, they would not be the only people who would make RIN interesting. In order to take full advantage of RIN in a region, a wide range of participants is essential, participants from new companies, schools, local public groups to writers, musicians, local residents, housewives, students, elderly residents, etc. Companies will be able to develop their business on RIN. But it is a bit difficult when we try to imagine what people such as workers in a small firm, individual amateur movie makers or painters, housewives and students might create on RIN.

It is expected to provide a system in which local residents can express personal information through their daily routines and activities as well as through an expression of their feelings, using teleconference or BBS services, in which they may discuss local matters and exchange information freely with other people throughout the world via the Internet.

People would consume commodities that were supplied by a company and provide that company with feedback. The company, in turn, would take full advantage of this feedback in order to supply future commodities and services most suited to the needs of their customers. This new relationship between the local consumers and manufacturers in a region is expected to create new production and service systems.

Also, teleconferences will be provided and connections made among universities, laboratories and schools via the Internet as well. It will can provide a medical database supplied by local hospitals, car assessment conferences sponsored by local auto dealers as well as local news, educational courses and communication projects for local citizens. The RIN will be managed mainly by volunteers and its funds will depend upon donations from local companies and groups.

The operation of RIN with various functions as mentioned above will prove to be fairly expensive and it will definitely require donations from the local community as well as its strong support.

5 Considerations On Information Technology For RIN

(1) The Necessity of a Broad Band

It is often said that the networks in the 21st century will be broad band networks, however, what this means is not really clear among the masses. A broad band is the state of being capable of transmitting a large amount of data within a certain amount of time. A broad band will be necessary in order to transmit bi-directional data, such as personal information of individuals through their daily routines and activities as well as an expression of their feelings, as well as various types of bi-directional data including movies, sounds, electric mail and orders on home-shopping television programs via computers and TV's at home. Therefore, RIN will require a broad band network and optical fiber cables to connect to each household in order to transmit large amounts of data with cables for telephone and cable TV. The RIN must be consist of cables and telephone wires mainly. Nicholas Negroponte, the president of the MIT Media Research Institute, sees the future usage of the radio waves as follows. "Although the frequency of radio airwaves is insufficient, optical fiber cables can be utilized to the same extent as these airwaves when it comes to the capacity for data processing. This means that the means for transmitting different types of data will be reversed in the future. For example, data now transmitted via aerial waves, such as TV broadcasting will be sent through underground cables, and data now transmitted via ground or underground cables, such as for telephones will be sent through aerial waves in the future.."(5)

Cables and telephone wires used today include twisted cable, coaxial cables for CATV and optical fiber cables which employ light waves and are capable of serving a considerably wide band.

However, the expectations for the popularization of bi-directional TV using optical fiber cables has become lower than it used to be. This is attributed to the difficulty of collecting construction funds for optical fiber networks despite the large scale promotions and the delay of the development of essential digital servers in the U.S. In Japan, aside from the optical fiber cables, simple bi-directional

TV's are being actively developed, such as the Intertext System which utilizes ground wave broadcasting and open TV using digital communication satellites.(8)

It has been pointed out in Japan as well that connecting optical fiber cables to individual houses is simply not practical from an economical stand point. The goal of the year 2010 that was established by the Ministry of Posts and Telecommunications which was influenced by the conception of the "Information Super Highway" of the U.S., is more of a competitive intention between nations rather than market demands. NTT expects to offer services of 1.5 megabit/second communication for households, which is not practical since it will cost ¥100,000 a month to connect an optical fiber cable to a house. Therefore, the 128 kilobit/second, which is offered by ISDN, will be the maximum for a household for some time to come.

(2) User-friendliness

It could be said that the user-friendliness of the information equipment and its technology are in inverse proportion. For example, personal computers by Macintosh, comparing to the IBM DOS, have more user-friendly systems that allow users to operate programs by simply selecting icons on the screen with a mouse, but the work of the programmers who deal with the OS that is supporting these systems is much more complicated and difficult.

The RIN must also have this same kind of inverse proportionality between user-friendliness and complicated technology. The RIN must have more user-friendliness, higher effectiveness and a wider applicable range so that sinlge-key operation can provide the user with the data that he/she wants from a huge database just like household appliances or automobiles. Portable information terminals with a color LCD(10), similar to the one now available from Sharp, may offer this kind of inverse proportionality.

It is necessary not to allow users to sense the complexity of the internal technology. The users of RIN should not be forced to purchase basic software for the Internet, such as Netscape or HTML.

Personal computers will soon serve as the "universal tool" in each household and be used by every member of the family. These computers will be connected not only to the computers among other households but also to the household appliances other than computers. Perhaps during the 21st century, several computers will be located throughout the home, one each in the kitchen and bedrooms and each member of the family will use them as often as they now use household appliances.

(3) Technologies for Hardware/Software/Contents

The basic technology to support RIN has inherent problems in hardware, software and content. For hardware, the problems deal with the devices which will form the networks in the region, things such as telephone wires and TV sets, and also all of the required mechanical equipment. The problems regarding software copncern the fact that the system must intermediate between the user and the machine when accessing and communicating to RIN from the screen of a TV or a personal computer. With regard to the problems of content, the major problem is the information itself from personal information of individuals through their daily routines and activities as well as the expression their feelings to various kinds of data in movies, TV games, TV programs, news, electronic newspapers, electronic magazines, etc. The following are some considerations with regard to these problems.

- Bi-directional technology

The most important factor of the broad band is bi-directionality. Users must be able to send to and receive various data via the network. Coaxial cables and telephone wires must be provided with an upstream band (to send out data, such as personal information of individuals, via E-mail upstream) as well as a downstream band to offer users information through movies, TV games, TV programs, news, electronic newspapers, electronic magazines, etc. The former may be handled sufficiently at first on a narrower band than the latter, but future communications using more moving images and graphics will lessen the difference.

- Software technology

Software used for RIN can be divided into two types, one for the operation at the main computers (server) which controls information to and from the users, and another for sending instructions to server's computers for operating the users' TV sets and/or personal computers. The former software requires a very high level of technology involving the same technology that is used by telephone companies in order to control telephone calls from each user. It usually requires a considerable amount of cost for an expert software engineer to develop such software in order to receive and deal with various complicated demands from the users.

User-friendliness is the most important point for software designed for the users for RIN. It may be found in operations using icons such as in Windows '95 or the OS of Macintosh or in other more visually significant ways, but the simplicity of operations for users must be designed ideally so that a single operation can be carried out simply by pushing one key, just like driving a vehicle or using a household appliance; for example, hitting a key to select one out of several icons displayed on the screen, each of them clearly representing an individual function.(5) Also, software will be required to have a feature which recognizes the operational patterns of the user and applies these patterns during operation. For example, it is favorable if software, for a user who reads a local electronic newspaper periodically, to be able to learn the operational patterns of this user and give priority to displaying the menu for the electronic newspaper.(11)

It is also desireable for the system to be able to cope with users' preferences depending on certain conditions or tastes, such as refusing access to home-shopping or pornography data for users under a certain age. Software for RIN must have a function to ensure security. Security for billing fees or on-line payment is very important as is the protection of the user's privacy.

- Content technology

The most important things for users of RIN consist of what operations can actually be carried out, what data can be obtained and how that data can be dispatched. When RIN is successful, it is not just because movies are available via video-on-demand. It should be providing a much larger scale of information which would included TV, movies, TV games, TV programs, news, E-mail, electric newspapers and electric magazines while, at the same time, providing users with opportunities to send and receive personal data and an exchange of feelings. One of the main subjects to be considered for the future will be how to secure and control this kind of information.

It is expected that public services by local public organizations will be accessible via RIN. Since these information services will be free of charge and will undoubtedly be accessed by many residents, the system for supplying this information should be well prepared for the onslaught.

6 Influences Of RIN On Local Activities

(1) Influences on Local Living

- Target users

How we deal with the problems of making RIN accessible to anyone at anytime from anywhere and, at the same time, satisfying various regulations will eventually determine whether RIN will serve only a limited group of people or be open to a wider range of citizens and corporations.

Considering its development, especially in the business field, RIN should not be limited solely to a certain group of people; access should be available to the general population in order to meet its basic concept.

- Influences on living

When considering RIN networks connected by optical fiber cables and broad bands, the potential activities that would be available to us are limitless. If these networks are connected to individuals, households, offices, factories, retailers, hospitals and/or schools, our way of life would never be the same again. In households or in offices, we would be able to access local public organizations or private company databases and enjoy animation videos and sounds live. At schools, research institutes all over the world would be accessible to help us search for electronic books, newspapers magazines, etc.

The Ministry of Posts and Telecommunications plans to commence the project of a Multimedia Virtual Lab System in the fall of 1996 in order to enable researchers in various areas to communicate and collaborate by establishing fible cable connections with laboratories both inside and outside the country. This will connect researchers from industry, universities and governmental organizations on thematic networks and enable them to exchange information without having to meet at an actual laboratory.

At laboratories, researchers will be able to utilize a large amount of data from research databases, and several researchers from different laboratories will be able to work on a single project employing the same data. Office workers will be able to work at home using the work files of the company, exchanging documents with coworkers at the office and participating in electronic meetings. Citizens will be able to carry out exchanges of personal information through their daily routines and activities as well as of their feelings on BBS with many people.

(2) Influences of RIN upon Corporate Activities

- Actual cases in the U.S.

Several corporations will surely declare their participation in RIN for the sake of productivity improvement. In the United States, some companies have already started services using optical fiber cables, such as electronic meetings and the distribution of electronic documents. According to research conducted by IBM, minor enterprises are showing a great interest in the services found on the Information Highway. The Wall Street Journal says, "What the minor enterprises expect is not only access to new ordering procedures, to electronic meetings, to the market conditions of raw materials and inventory management and fund analyses, but also the preparation and distribution of design specifications to employees, salespersons and customers, the preparing of documents for inventories and competitive bids, banking transactions, etc."(12)

In the state of Arizona, in the U.S., experiments have been conducted connecting manufacturers and their suppliers or contractors with optical fiber and coaxial cables in order to send images and sounds to each other. The users of this system share databases and electronic pictures which allow them to conduct electronic meetings. The subjects of the first experiment said to have been performed were the McDonnell Douglas Corp. and its contractor, who had worked on a design simultaneously by transmitting three-dimensional drawings of helicopter parts at the speed of 10 Mb/second. This system reduced the time necessary for problem-solving from several days to only a few minutes, and for the development of a new product from eight months to six weeks.(13)

In California, Pacific Bell is conducting a experiment in which it transmits digitalized movies directly to the local movie theaters. Direct transmission of digital movies from a central video server to hundreds of movie theaters would reduce an enormous amount of the distribution costs.(14)

- Marketing

Along with the spread of RIN, the ways of business development in the region, including the buying and selling of commodities and services and advertising, would change drastically. Advertisements employing outrageous expressions simply to attract attention would have to be changed to a formate in which the advertiser supplys details and precise information about the commodities themselves.

The format of catalogs for mail order purchases in the region will also change from paper to on-line, with the new catalogs containing abundant regional information. This will certainly reduce wasteful mail-order mailings, but on the other hand, the electric mailbox may be flooded with unnecessary E-mail transmissions. However, this could be settled by developing special software to sort E-mail that has been sent to the user and to discard mail that is deemed unnecessary.

The media involved in selling goods on-line would include electronic catalogs and bi-directional videos. The former is for pictures and documents dealing with high-quality goods and would serve as a substitute for current mail-order catalogs. The latter is more like the present home-shopping programs on TV, though they would be much easier for users to take advantage of since they would possess a bi-directional function. Audiences could select what they want from a list on the screen using their remote control devices. When a particular item is selected an introduction video of a group

of goods would be displayed If further details regarding a certain commodity are required, users could select the introduction video for that commodity.

- Security assurance

Secrecy observation is a major problem which remains to be solved in the development of business over the Internet. Security assurance is essential for business operations. The RIN will be required to have all of the features of a public network as well as a sound security assurance for transacting business.

(3) Telecommuting

The spread of telecommuting has been relatively slow. Neither the employers nor employees seem to have become accustomed to this new idea. It is nothing more than sending E-mail or facsimile transmissions. However, high-speed optical communication in broad bands of RIN will enable us to upgrade telecommuting to a totally different level, from simple electronic meetings with colleagues at the office to cooperation in working on the same documents together. A huge screen of a computer monitor will be used as an electronic board which accommodates drawings and letters using a high-speed circuit. The present ISDN is capable of this function, but employing optical fiber cables will provide functions of the much higher level.

However, this could lead to the hazard of extreme overworking for telecommuting employees. For the management, it is an appealing employment system to have part-time telecommuters engaged in such treadmill tasks as telephone canvassing in their own homes. Although it is not favorable when such overworking via telecommuting on a commission basis is accepted as a new type of employment, the appropriate operations of telecommuting with RIN by corporations could generate enormous merits.

(4) Bidirectionality

If the keyword for the new technology of RIN is "broad band", the keyword for RIN users should be "bi-directionality". Developments of bi-directional software are being rapidly promoted in the U.S. and many other places. This closely resembles the golden days of enthusiastic software development for personal computers. Bi-directional game hardware for both playing games and enjoying video or software with a user-participattion story will be produced in the future.

In sporting events, TV audiences will not only watch what has been made available by the media over the airwaves but will be pable of selecting camera angles and enjoying their own self-generated pictures. Also, RIN users will be able to "broadcast" their own personal information through expressions of their daily routines and activities and of their feelings directly to the public. For educational programs supplied by RIN, users will not only receive information but also be able to join the program actively and send out information of their own. Developments of these bi-directional software products on a commercial basis are now at a certain level. In the 21st century, broad band communication using optical fiber cables will make it possible to produce software of considerably different level.

However, the subject to be considered for these bi-directional functions is that it is not known exactly what general users might anticipate from these functions. No matter how many questionnairres might be sent out, we would still be unable to come up with an answer about discoverying the true needs of the users. We will be required to keep conducting experiments using up-to-date technologies and ideas until a solid practical way has finally been figured out.

(5) Potential Public Access

The completion of the establishment of broad bands using optical fiber cables for RIN may enable individuals to send out their own works, including publishing activities, to the public. It would quite interesting to know how local residents would react to access of this kind of information from the general public.

With regard to CATV, public access has not yet been successful. Although many eccentric characters have been introduced to the public via CATV, people have not shown much interests.(5)

This kind of public access is a new experiment and an important feature of RIN. Figuring out the system, the software and the kind of content that would appeal to local residents will be a major subject for consideration for RIN.

7 Considerations On Social And Political Problems Of RIN

(1) Restrictions on Contents of Information

As it has been considered in the article, RIN contains many technological problems that remain to be solved. However, there exist even more problems in the realm of various social aspects, problems which may be much more serious. Among those problems is one particularly difficult subject which concerns the "restrictions on the content of information".

For the purpose of RIN, telephone companies and CATV companies will develop business using several optical fiber cables over which they will share the same information. At this point the differences in the restrictions on the content of information first appears as a problem. Anyone can talk about anything on the phone with anyone anywhere throughout the world. Telephone companies charge their users commissions for the connections it provides, not for the information transmitted via optical fiber cables. On the other hand, for CATV-related companies whose operations are similar to those of radio or TV stations, the content of the information itself is the service they supply, and it is easy to control what they broadcast via their own networks.

When it becomes possible for us to send out our own regionally based personal information through our daily routines, our activities and our feelings through the networks of RIN, the problem that we will face first will be our 'freedom of speech'. The right of free discussion is one of the primary principles of democracy. Many problems yet to be solved will have to be confronted and dealt with, problems such as the pornography business, radical political activities, civil rights, privacy interference and subversive activities.

The freedom of expression is essential in RIN, and it has been a major issue for the Internet and personal computer communications as well. The right to exclude information or expressions that might insult or offend other people should be protected.

(2) Roles of Local Administrations

Although RIN requires private investments for its establishment, it cannot become a virtual shopping mall with high-priced goods on a commercial basis. Rather, it requires a mass-market oriented business that provides low priced goods for the masses in large quantities at small profits. The set fees for the services of RIN should be low.

The minimum duty for the local administrations is to provide administrative guidance so that anyone can readily use RIN anytime. Local public groups should give guidance to related corporations in oreder to provide equal services to each user at a reasonable fee rather than oppose the merging of corporations or, on the contrary, allow competition between them blindly. In order to accomplish this, an administrative guidance system in which corporations might reserve a certain amount (%) of their profits as a fund to support the constant utilization of RIN by the local residents is to be desired.

(3) Influences of RIN upon Education

One factor for the future success of RIN is how it will take part in the education process. The broad band should strengthen the possibility of telelearning for education not only at schools but also at offices within a region as well as between regions. Various types of new networks set up among colleges, colleges and local schools, and laboratories and colleges will encourage a system of mutual education and greatly influence the fields of social science, linguistics and music.

In New Brunswick, Canada, it has been shown that telelearning through networks is an effective educational system. The governments of Canada and the Province of New Brunswick had jointly invested 10.5 million dollars over a four-year period in a project called "Tele-Education" in order to establish a system to connect educational facilities including colleges and high schools to the local tele-educational bases at which students can attend classes in an electronic way. The Province of New Brunswick, with its relatively small population of 700,000, has tele-educational bases at public

places, such as libraries, community centers, hospitals, schools and colleges, but some are located in private companies.(15)

Although New Brunswick uses narrow band networks instead of broad band networks, the employment of optical fiber cables would lead to drastic improvements in the future.

(4) Delay of Introduction of Competitive System in Communication Fees and Communication Industries in Japan

Although the cost/capacity ratio of computers has been increased 10,000-fold in the last fifteen years, the cost/capacity ratio of communication fees has been increased only 100-fold. Also it is said that the introduction of competitive systems in the communication industry has been delayed in Japan.(16) According to Jim Clark, the chairman of Netscape Communications, the monthly fees for accessing the Internet are $15,000 (\1,500,000) for 45 Mbps in the U.S., $30,000 (\3,000,000) for 2 Mbps in France and $60,000 (\6,000,000) for 1.5 Mbps in Japan. When comparing the fees based on the same transmitting speed, the fee in France is 45 times that in the U.S. and in Japan, it is 120 times greater. He also pointed out that the introduction of the competitive system in the Japanese communication industry has been delayed considerably.

8 Afterword

In this article, I have given serious consideration to an ideal model of a Regional Information Networking (RIN) for the 21st century. Although it is said that, during the next century, optical fiber cables will cover the entire country of Japan, a major problem still remains: who will bear the brunt of the construction costs? Also, it is hard to figure out who will lead and who will follow in this business and how our society will be influenced by it. The ultimate goal of RIN should be to enable the local residents to have more fruitful lives. This can be achieved by enabling them to exchange information necessary for better and more fruitful lives and ti communicate for their own mutual understanding, and not by enabling them to simply enjoy home-shopping or video-on-demand. The true value of the RIN will be appreciated only when it really begins to improve the lives of the local residents.

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Notes and References

(1) RIN: Regional Information Networking
(2) Watanabe, S., Regional Information Access and Development of the Economy. (11/1995)
(3) Kaneko, I., Invitation to Networking. (Chuko Shinsho)
(4) The communication by human beings originally consists of two types, simultaneous and non-simultaneous communications. The information technology should have supported both of them, but actually simultaneous communication has been mainly supported. However, developments of the information technologies, mainly digital technologies, are making it possible to clear various restrictions on non-simultaneous communication which have been impossible. (Murai, J., The Internet, Iwanami Shinsho, 11/1995)
(5) Baran, N., Inside the Information Super Highway Revolution. (Coriolis Group Books, Inc, 1994)
(6) Rutten, Bayers and Maloni., Netguide, Your Map to the Services, Information and Entertainment on the Electronic Highway. (Random House, 1994)
(7) In Japan, a joint project called "Multimedia Internet Working Project" was initiated by a private corporation, Nihon Cisco Systems, and 15 organizations. The purpose of this project is to conduct experiments related to development, assessment and operation of frontier technologies dealing with multimedia data on the Internet. The participant corporations aim to develop new products and brush up existing products as well as to grasp opportunities to open up new businesses by improving interoperability between corporations. (Nikkei Multimedia News, 1/26/1996)
(8) Multimedia & Business, Diamond Institute of Management, 1/24/1996 and 6/26/1996
(9) Nikkei Multimedia, 8/1996
(10) Sharp started sales of portable information terminals with a 5-inch LCD screen, "Liquid Crystal Bencom Color Zaurus" which offers new functions, such as data inputting using a pen, accessing to the Internet and optional usage as a digital steal camera. It is capable of utilizing originally-developed WWW browser and E-mails and a function to on-line sign up to apply the Internet access service by Fujitsu, the "InfoWeb". Also, it

offers a new function to store hand-written data as they are and later accept the whole file as data of characters, which enable it to take notes using a pen and convert them later without inputting data every time. Further more, new functions were added including voice mailing that is capable of memorizing maximum 50 voice messages (20 seconds each) and fax receiving (added to fax sending function). (Nikkei Multimedia News, 5/9/1996)

(11) In the case of Medicom System, a bi-directional TV station in the U.S., it is possible to record who watched which programs and analyze the taste of each individual. Also, they are conducting an experiment to produce programs according to data obtained by having their audiences push a button either 'like' or 'dislike' provided on the remote control.

(12) The Wall Street Journal, 2/9/1994

(13) Computer World, 12/6/1993

(14) The Wall Street Journal, 2/9/1994

(15) Baran, N., Information Super Highway Shock. (Translated by Katsumata, M., Nihon Keizai Shinbun Sha, 1994)

(16) Nikkei Multimedia News, 10/20/1995