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Content Business

Mobile Content Flourishing Due to i-Mode Fever

Since the mobile Internet market took off in Japan thanks to tremendous success of i-Mode service, the mobile content business has been flourishing. All of the content holders in any category -- from banks and securities business to newspaper publishers and fortunetellers -- have rushed to the carrier's offices for permission to provide their content to the tiny cellular phone screens.

The number of i-Mode subscribers reached 5.49 million as of March 28, 2000. A total of 419 "official" content providers (CPs) and 7,925 unofficial CPs are offering i-Mode content. To catch up with DoCoMo's big success in its i-Mode, other carriers like J-Phone, IDO, as well as DDI Cellular and DDI Pocket -- launched new or strength-

ened their existing Internet access services.

Among the 419 "official" CPs for i-Mode, banks occupied 182, the largest group. But among these, Sakura Bank is one of the top CPs. Sakura Bank has been providing its mobile banking services since i-Mode service was launched in February 1999. Unlike most other banks, Sakura Bank is providing full services. Utilizing its own original simplified architecture to the maximum, Sakura is providing a wide variety of services: not only money transfer, account balance check, but also providing a variety of information services such as lost and found information, around-the-clock operating ATM information as well as new financial products and campaigning product information.

Due to such effort, 100,000 users registered to the Sakura's "Browser Banking Service" (this figure includes not only i-Mode users, but also some who use the Internet banking services), and their services are being used 100,000 times per month.

Masanao Oki, Assistant General Manager of Electronic Commerce Division of Sakura Bank Ltd., said that among the 100,000 times' use of Browser Banking, about half or 50,000 were done through i-Mode terminals.

Although the number of users increases, their revenues have not reached the break-even point. The Sakura Bank charges 100 yen fee for money transfer job. And the rest of its services are free

of charges. At the moment only 5,000 money transfer jobs are carried out through i-Mode per month. Oki said that if 10% of the 3 million money transfer jobs are done through the Browser Banking Service, then the bank can reduce operational costs. At the moment, Sakura is providing this service not for money-making, but as part of its comprehensive bank services in order to facilitate for user convenience, targeting the upcoming net society when every social service will be provided over the net. Sakura and Fujitsu have agreed to establish a virtual bank. NTT DoCoMo recently announced that it will take 10% of the stake in the bank.

Stock brokerage, as well as banking, was one of the most expected content services when i-Mode service was launched. According to Mamoru Takahashi, Deputy General Manager of Daiwa Direct, Daiwa Securities Co., Ltd., 25% of the total stock transactions of Daiwa Securities is being conducted through either the Internet or i-Mode. Among them, 13% are handled through i-Mode.

Takahashi confessed that only a small number of stock buyers use only i-Mode, and most of them are using both the Internet and i-Mode. "One of the reasons for that is it is difficult for beginners to transact stocks with i-Mode. It might be OK for experienced stockbrokers, though," he said.

Takahashi pointed out that since the screen of the current i-Mode is tiny, only one price for each stock is shown on the screen of i-Mode. In addition, users of i-Mode have to scroll pages in order to get more information, that means users have to pay more packet communications charges. Furthermore, the data transmission speed is limited to 9.6 kbps, very slow for doing the Internet.

But many of these problems might be cleared when an advanced i-Mode service will be launched. DoCoMo is scheduled to release JAVA i-Mode terminal in the fall of 2000, and will launch its 3G services in May 2001. Then stock companies can provide stock price chart, a vital tool for stock dealers deciding to buy or sell of the stock for JAVA i-Mode terminals. They can provide more variety of services for 3G terminals with a data transmission speed of initially 384 kbps. (The data transmission speed for

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NTT to Launch Power Generation Effort

By Yaeko Mitsumori

Nippon Telegraph and Telephone Corp. (NTT) will launch its electric power generation business in cooperation with Tokyo Gas and Osaka Gas by the end of this fiscal year (ending on March 31, 2001).

As a first step, these three firms will establish a joint venture company in June 2000 at the earliest. The Japanese electricity market for large corporate users was liberalized on March 21, 2000. Targeting this newly liberalized market, many companies announced their intention of entering the market. Meanwhile, conventional electric power companies such as the Tokyo Electric Power Co., Inc. (TEPCO) have been enhancing their telecommunications business since the telecommunications market was liberalized in 1985.

Upon liberalization of the electric power market, telecommunications firms and electric power firms are going to

compete with each other on an equal footing.

This time market liberalization of the electric power market was limited to the one for large corporate users: these particular users receive their electricity through special high-voltage power transmission lines and consume 2,000 kW per hour annually. New entrants are going to provide their services at lower prices than conventional power business targeting large corporate users such as department stores, supermarket chains and office buildings. A spokesperson of Tokyo Gas Co., Ltd. said that the new joint firm will provide its services at lower prices than these incumbent firms.

But they are not the only new entrants. Many other firms have announced their plans to enter the Japa-

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3G Mobile Telephony

MPT Starts Accepting Applications

MPT started accepting the third-generation (3G) mobile telephone application on April 3, 2000. After carefully screening all of the applicants, MPT will grant its 3G license to three carriers or three carrier groups by upcoming summer of 2000. The application will close on May 12.

In Japan, there are three cellular carriers or carrier groups -- NTT DoCoMo Group, Japan Telecom Group (JT) and DDI Group. Since the government said that it would emphasize experience and know-how of the carrier when it screens applicants, these three incumbent cellu-

lar carriers are believed ready to win the 3G license.

Among these three carriers, NTT DoCoMo and JT have already announced that they would launch their 3G services based on W-CDMA technologies in 2001. DoCoMo will launch its services in the spring of 2001 and JT will launch its services in the fall of 2001. DoCoMo has already selected its vendors for 3G machines and devices. These 11 vendors are now gearing up their efforts to develop commercial use machines and devices. They were supposed to submit the first model for

commercial-use equipment by March 2000. Upon winning the license in summer, DoCoMo will launch a series of field tests using the commercial-use machines in the fall of 2001, and will launch its services in the spring of 2001.

The JT Group is gearing up its efforts as well. In order to launch its 3G services in the fall of 2001, JT established IMT-2000 Planning in March 1999. The firm has reportedly selected its vendors for 3G services including NEC Corp., Ericsson and Nokia. These

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Content Business:

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the 3G will be increased to 2Mbps later)

When i-Mode service was launched, many people did not believe that any entertainment content for such a tiny screen will gain popularity. But it was actually entertainment content which won the largest popularity and created the current boom of i-Mode. Among total usage of i-Mode services, 60% are for entertainment content, which includes games, fortunetelling and quizzes.

Among the many content for i-Mode today, "itsudemo charappa" by Bandai is the most popular content with 1 million subscribers. The "itsudemo charappa" service is inexpensive, users pay only 100 yen per month — and simple — subscribers receive each character (different day by day) every day. Toshiki Hayashi, General Manager of Network Department of Bandai Co., Ltd., said that the service won popularity because every user wants to differentiate their cellular phone looks alike from others. Besides the "itsudemo charappa," Bandai is providing 15 entertainment content for i-Mode. All of them are popular and profitable.

When asked about the reason for Bandai's such success, Hayashi said that Bandai is creating its content for i-Mode with which users can spend five minutes on a train platform. It met the demands: Bandai's 85 servers at its headquarters get 4.8 million page views per day and 35 million hits per day. Not

only Bandai but also other all of the entertainment content providers are eagerly waiting for DoCoMo's JAVA terminal and 3G terminals. Bandai said that the firm will be able to provide moving or even speaking characters for JAVA terminal, instead of current motionless ones, and it will provide more exciting games for 3G terminals.

Unlike most of CPs for i-Mode, Cybird is taking a role of a mediator linking between content holders and NTT DoCoMo.

Cybird, a 18-month-old company in bit valley, finds out companies with attractive content and modify the content so as to fit for i-Mode and sell it to NTT DoCoMo.

The firm business strategy has been quite successful. Now Cybird is providing a total of 50 content for four platforms including i-Mode. Unlike Bandai's "itsudemo charappa," Cybird content is targeting niche market. For instance, "Nami Densetsu" (wave legend) is an information service for enthusiastic surfers. Cybird provides information about the condition of the surfing points around Japan and the world three times a day for its subscribers at 300 yen per month. The service is "In" among surfers: 45,000 surfers are subscribing to the services.

Kotaro Chiba, a spokesman of Cybird Co., Ltd., said that the service is winning many subscribers because the condition of the surfing points is vital information for surfers. "They willingly subscribe to our services. Some of them even purchase i-Mode for subscribing to

this service," he said.

Although Cybird has been quite successful in its mobile content services, Chiba said that Cybird is making effort to make a breakthrough because it foresees a stagnant market in the future. As part of its effort, Cybird established its R&D center with a dozen researchers. The lab is gearing up its studies on JAVA, MPEG IV as well as other advanced technologies such as Bluetooth.

Photonet Japan's President Iida shares the same anxiety for the future with Cybird's Chiba.

Photonet Japan Inc. is providing picture files for i-Mode terminals which most of the users use as wall paper for the screen.

Although it started its services with charges in the beginning of this year (2000), the firm already got 200,000 subscribers. Separately, Photonet Japan is providing service which users can put their own pictures on their i-Mode terminal screens, once they bring in their own film to a DNP service counter. So far both businesses are flourishing. But Iida said that she keenly feels that she should work out a different business model for i-Mode service. "Due to great success with i-Mode, more and more content providers enter the business, but users can not pay money for additional services forever. So we are now developing a kind of advertisement service that users can get content with free of charges, even without paying communications fees," she said.

Qualcomm

HDR Technology to Be Implemented

Carriers and vendors are gearing up their development efforts for the HDR (High Data Rate) technology. Qualcomm, Inc., the developer of the technology, said that carriers which already have cdmaOne infrastructure can provide further advanced services using the HDR.

Korea Telecom Freetel, a South Korean mobile operator, at a recent 3G international conference said that it would introduce the HDR by the end of 2001.

In Japan, the leading vendor, Hitachi, Ltd. has been promoting its studies for HDR in cooperation with Qualcomm.

Qualcomm said that carriers can provide up to 2.4 Mbps packet communications services once they apply the HDR over their cdmaOne infrastructure without IMT-2000. If it is true, the HDR may take the same role of the ADSL (Asymmetric digital subscriber line) in the wireless world.

The HDR technology has been developed by Qualcomm. In order to encourage carriers and vendors in the world to use the HDR technologies, Qualcomm in November 1999 carried an open field test of HDR in San Diego. Three Japanese carriers — DDI Corp., IDO Corp. and KDD Corp. — as well as many vendors participated to the field test.

Many carriers and vendors seemed to be impressed by the HDR technology at the experiment. However, only one carrier, KT Freetel, so far has declared that it will employ HDR by the end of 2001.

In Japan, Hitachi, Ltd., concluded a non-exclusive contract with Qualcomm last year under which Hitachi will manufacture HDR-based machines and devices for the world market.

According to Qualcomm, HDR-based service is beneficial for cdmaOne carriers because these carriers continue to use the radio transmission portion of their conventional infrastructure. In other words, carriers do not need to spend much money constructing new base transceiver station (BTS) and antenna that is the heaviest burden for any carrier. But these carriers have to construct new core network using routers. Under the HDR system, all data traffic is collected at BTS and is sent to the newly constructed network from the gateway called an access point. Since the data traffic bypasses the core networks for voice services, it does not impose any influence over the voice services even when huge data traffic is transmitted.

Since carriers can introduce the HDR system with smaller investment money compared with the IMT-2000 system, their service prices based on the HDR

might be much lower than that of IMT-2000. (It is said that carriers have to invest 1 trillion yen to launch nationwide IMT-2000 services.)

According to Ted Matsumoto, President of Qualcomm Japan Inc., the cost per subscriber for HDR-based services will be \$104, about one-fifth of that for IMT-2000.

He is predicting that carriers can provide data services with a total data transmission amount of 5 Mbyte at \$10 per month.

If his prediction is correct, a user will be able to get up to 2.4 Mbps services for descendent line and 300 kbps for ascendant lines at \$10 a month.

IMT-2000 has been developed for providing up to 2Mbps services. However, initially operators are going to provide up to 384 kbps services. Even if Qualcomm's estimate is exaggerated, an ordinary user seems capable of receiving several hundred kbps services at several thousand yen.

Another remarkable feature of the HDR is high efficiency for use of frequency. HDR services need 1.25 MHz, the same bandwidth as the current cdmaOne. On the other hand, IMT-2000 needs 5 MHz bandwidth for providing 384 kbps services. Such high efficiency for use of frequency is desirable for both carriers and users. Using the same bandwidth, carriers may be able to provide more a variety of services. And users can enjoy such a variety of services at a reasonable price.

HDR realizes such a high efficiency by focusing its services on data transmission services. The HDR system was designed to automatically select the optimal communication speed for the descendant lines upon considering congestion of the traffic and the quality of communications between a BTS and a terminal.

Still the HDR system has several issues to be cleared.

First, the size of a terminal might become larger than a current typical cellular terminal. In order to increase the data transmission power using the same bandwidth as the current services, makers have to enlarge the current terminals.

But Atsushi Konno, a spokesman of Hitachi, Ltd., said that vendors may be able to cope with the problems by arranging the design of a terminal. Another issue is that HDR has not been tried in urban (or densely populated) environment. There is no data available about how the system works in such a densely populated area.

In order to accumulate such data, Hitachi in cooperation with KT Freetel that will launch a field test in

Korea in the summer of 2001.

In Japan DDI Group and IDO are jointly providing cdmaOne services. (DDI Group and IDO are going to merge with each other in October 2000.)

Although DDI announced that it would increase its data transmission speed of their cdmaOne services to 144 kbps in the summer of 2001, the carrier has not disclosed which system they will employ. (DDI has not officially announced which system the carrier will employ for its 3G services.)

Qualcomm's Matsumoto stressed that using HDR carriers will enable provision of their further advanced services — the same level as or even exceeding IMT-2000 — at a much smaller cost than IMT-2000.

Dr. Kyung-Soo Lee, of KT Freetel, at the 3G conference said that the carrier decided to employ HDR because they consider that technology to be more cost efficient.

Cyberterrorism New War: New Weapon

Raisuke Miyawaki, former PR advisor to the Japanese Prime Minister's Office, briefed the Tokyo foreign press corps on cyberterrorism. With the recent publicity accorded the cracking of government-related websites as well as the discovery that the AUM religious sect that was behind the sarin gas attack had its net-savvy members infiltrating sensitive public- and private-sector computer systems, much attention was swung upon this issue.

Miyawaki expressed the view that with most everyday activities in Japan being controlled electronically, it was almost at par with the United States as a "cyber-society." However, he emphasized that in terms of awareness of security issues and measures for ensuring security in cyberspace, Japan was lagging behind many other countries. This, he noted, was due to the lack of Japanese leaders' awareness as regards the latest technological developments, thereby hampering the effort to promote information revolution. Thus he specifically identified the need for Japan to develop systems, both in public and private sectors, enabling realtime tracing as well as detecting and pursuing crackers.

Japanese Domain Names

To Relieve Complexity of URL

By Yaeko Mitsumori

As the number of websites increases, corporate website holders struggle with each others to attract as many as web surfers to their sites. A major hurdle for end-users is the complexity of URLs. These URLs -- usually long, complicated and hard to remember -- consist of alphabets and numbers. If these URLs are written in the Japanese language, web surfing must become much easier for the Japanese. Then corporate websites may obtain more access from end users.

To meet such demands, some net ventures started providing Japanese language URL services.

Internet One Japan (IOJ), a net venture based on Tokyo, since November 1999, started providing a Japanese language URL service called "Japanese Domain Index."

Users of the service can use an URL partially written in Japanese either with Chinese characters, kana or katakana once they register these URLs to the IOJ. This Japanese part of URLs should be followed by ".jp.io"

The system works as follows: the DNS neglects the Japanese characters on the URL and it passes the IP address for the Web server operated by the IOJ. The IOJ Web server will match the Japanese URL and the targeted server. Such a system works because the BIND, the standard DNS server software, only recognizes alphabets and numbers while neglecting other characters including Japanese.

One of the remarkable features of the "Japanese Domain Index" is that more

than one company can share a domain name. For instance, according to the IOJ, all ANA Hotels throughout Japan are sharing the same "ANA.jp.io" URL. When the URL is typed in, a list of all ANA Hotels around the country is displayed on-screen. Users can easily pick the one they need, for instance, located nearby one or one's destination.

Sharing one domain name may occasionally be detrimental for corporate users, though when many corporate users register the same domain name, then individual users may have difficulties finding the one that they actually need. But as far as the number of users for one URL remains small, it may be beneficial for individual users.

The ".io" is the national top domain allocated for British Indian Ocean Territory. Internet One, a non-profit organization in Britain, was assigned to manage and control the ".io" domain names. The Internet One opened all ".io" domain names to more than one user in an effort to relieve problems arising from the "first-come, first-serve" principle of domain name allocation. Under the contract with the British Internet One, the IOJ controls and manages the ".jp.io" domain names.

At present, the IOJ services are not available for all web surfers. The IOJ service is not available for end users who use Squid at their proxy servers and for users who use DNS server software rather than the BIND.

According to the IOJ, 5,000 Japanese URLs were being used by 1,500 corporations as of the April 24. The IOJ is charging a registration fee of 22,000 yen

and the annual usage fee of 10,000 yen.

RealNames Japan to start providing Japanese URL services from May 2000.

Users of the service, called "Internet Keyword", just need to type a company name or a product name in Japanese, and get through shortly to the required website. They even do not need to type "http:"

As of April 25, the service is available through RealNames Japan's homepage (<http://www.jp.realnames.com>). From mid-May, the service will be available through Microsoft Internet Explorer and MSN search. The firm said that it would increase its partner firms in the future.

The annual basic service charges for big corporation is 5 million yen. In addition, corporate users pay 10 - 50 yen per access and 100,000 - 1 million yen per "Internet Keyword" per year. The firm will provide simplified services for SOHO at 15,000 per "Internet Keyword" per year. Keisuke Kitano, of the marketing division at RealNames Japan, said these charges are lower than, for instance, that of banner ads.

RealNames Japan is a wholly-owned subsidiary of RealNames Corp. of the U.S. According to Kitano, 700 - 800 corporations in the U.S. are using the U.S. firm's "Internet Keyword" services.

Cybernet Corp., a net venture based in Niiza City, Saitama Prefecture, in January 1999 started providing Japanese-language URL services. The service called "Cyberwork" is free of charges. But users have to download specific software from the firm's homepage. The software is also provided free of charges.

According to Akio Kakita, president

of Cybernet, 100,000 corporate users register to the services and the firm's homepage gets 1 million page views per week. The Cybernet gets revenues from banner ads put on their homepage.

Barrier Free Inc., a venture business based on Yokohama, has been providing Japanese URL services since September 1998 on an experimental basis.

Their service called the "Chinese Character URL" is, in principle, employing the same system as the IOJ.

At the moment, only a limited number of governmental organizations and private firms are using the services in order to clarify the operability and functionality of the system. Tsuyoshi Hayashi, a company executive of the Barrier Free, said that the firm has not decided when it will launch commercial-based services.

JPNIC, Japan Network Information Center, in February 2000 announced that the organization would start accepting registration of Japanese-language URLs in March 2001 at the earliest. A taskforce with a dozen experts in domain names has been carrying out discussions on working out the most appropriate registration method for Japanese URLs and technologies that will not have a large impact on the current Internet environment. Internationally, IETF (Internet Engineering Task Force) established a working group called IDN (Internationalized Domain Name) which is going to standardize the domain names consisting of characters rather than alphabets and numbers. The JPNIC will work in cooperation with the IETF.

IT Industry

Okii, NTT Data, NTT Com, NTT DoCoMo, and Microsoft to Establish Internet Payment Services Company

Okii Electric Co. Ltd., NTT Data, NTT Communications, NTT DoCoMo, and Microsoft Co., Ltd. announced that in June they will jointly establish Payment First Corp., a company that will provide a simple, convenient and low-cost Internet payment infrastructure. This new company will provide the world's first payment-services system capable of both debit and credit transactions based on a secure electronic transaction (SET) protocol. This service guarantees end users with secure and convenient transaction settlements via the Internet from PCs, home-use computer-game machines and NTT DoCoMo's i-mode mobile phones.

Payment First will provide end users with wallet services that will enable easy-to-use SET-based payments. This will be achieved by carrying out the necessary SET services on behalf of credit card companies, financial institutions, and other similar companies, and by using ServerWalletTM, which centrally manages end-user's digital wallets at servers. ServerWallet is GlobeSet, Inc.'s centralized user-wallet management system, which eliminates the need for users to install wallets into their PCs. It meets the security requirements of Visa International and MasterCard International regarding account numbers and credit-card numbers. With Payment First's wallet service, end users can make SET-based payments via PCs, i-

mode mobile phones, and computer-game machines - without having to install wallet software. This means that only a Web browser is necessary. Also, end users can choose from among multiple credit card companies, financial institutions, and other similar companies when making their SET-based payments. At the same time, those companies can reduce by one-half the service costs normally incurred for SET-based payments.

In addition to the wallet service, Payment First will also offer its ServerPOSTM outsourcing service to operators of online malls. ServerPOSTM is GlobeSet, Inc.'s system, which centrally controls online shops' POSs (points of sales) at servers, and it enables the operators of online malls to provide multiple online shops with the SET-based payment system. This eliminates the need for operators of online malls to have their own POS system and reduces their costs relating to SET-based payments.

Payment First's SET-based payment system, which will be utilized by credit companies, financial institutions, and other similar companies, will be based on the global standard protocol SET Version 1.0.

The new company will provide the wallet service to end users on behalf of settlement companies beginning in October. At present, Fuji Bank, JCB, DC Card and Credit Saison, are already planning to use this wallet service. Also, Dai Nippon Printing and other companies are considering outsourcing their respective ServerPOS services to Payment First. The new company expects

that its wallet service will have more than 1 million users by 2003.

NEC

NEC Announces £60 million Investment in NEC Semiconductors (UK)

NEC Corp. will invest £ 60 million in its subsidiary NEC Semiconductors (UK) Ltd. in the current fiscal year, raising total investment in the company since its establishment in 1982 to over 1 billion.

The additional investment will go towards further strengthening the position of NEC Semiconductors (UK) as a key global production center in NEC's electron device business. Concretely, the fabrication plant will be upgraded to use leading-edge 0.18-micron process technology and raise total wafer output from 25k wafers/month to 27k wafers/month, guaranteeing the company's ability to meet the most demanding customer needs.

Together with these production upgrades, NEC Semiconductors (UK) will also take on production of driver ICs for liquid crystal displays (LCD), a move that will see logic products account for over 30% of total production output at the Scottish fab. Demand for LCD driver ICs is booming on the back of demand for LCD panels worldwide for application in mobile terminals, cellular phones, notebook PCs and a range of other systems. NEC Semiconductors (UK) will therefore play an important role in a market that NEC views as a significant field in its electron device business.

NEC Semiconductors (UK) is a key

production facility for NEC Electron Devices, the in-house company created by NEC Corp. from its former Semiconductor Group, and will play a major role in NEC's drive to build "win-win" relationships with its customers as an integrated electron devices solutions provider.

NEC Signs US\$ 800 million Contract for Asia Pacific Cable Network 2 Submarine Cable System

NEC Corp. (NEC) announced that it will sign a contract worth approximately US\$800 million for the supply of a submarine cable system for the Asia-Pacific Cable Network 2 (APCN2) project tomorrow. Once completed, this system will connect the Asia Pacific region with a bandwidth capacity of 2.56 terabits per second. This order represents the largest such project in the Asia Pacific region and is also the largest such order for NEC.

This cable project is spearheaded by 26 telecommunications companies namely Advantel, Cable & Wireless Global Network, Cable & Wireless HKT1, China Telecom, China Unicom, Chunghwa Telecom, Concert Global Network Services, Ltd., Global One, Japan Telecom, KDD Corp., Korea Telecom, KPN, Layer2, MCI WorldCom, Metromedia Fiber Network Services, NTT Com, New Century InfoComm, Onelink Cable Network, PLDT, Starhub, SingTel, Taiwan Fixed Network, Teleglobe, Telekom Malaysia, Telestra and Williams Communications.

Corporate R&D Series

NTT Information Sharing Platform Laboratories

Developing a Total Infrastructure

Seiichi Ido, Director, NTT Information Sharing Platform Laboratories,
Nippon Telegraph and Telephone Corp. (NTT)

NTT Information Sharing Platform Laboratories is the largest lab among NTT's 12 R&D centers. When NTT was reorganized in January 1999, some 420 top researchers in the field of Internet-related studies were gathered from all Internet-related laboratories -- Software Lab., Multimedia Network Lab., Network Service System Lab., and Information Communications Network Lab. to form this Information Sharing Platform Laboratories. Seiichi Ido, Director of the NTT Information Sharing Platform Laboratories, said that the mission of the lab is developing a total infrastructure -- from advanced application to IP network -- which meets the currently ongoing information-sharing revolution. NTT is changing itself from a telecommunications carrier into an information sharing business. It is recognizing that the Internet is a core technology for this evolution. NTT Corp. does not disclose its R&D budget for each lab. However, the total R&D budget for NTT's 12 labs in FY 2000 is 202 billion yen. A total of 3,000 researchers are promoting a variety of studies in communications at these NTT labs. The Information Sharing Platform Laboratories is in charge of studies on IP Networks, Information Sharing Platform, Network Applications Platform and Service-related Platform. Studies on another major platform -- Content Platform -- is being promoted by the Cyber Communications Laboratory Group.

Ido said that, the lab is going to develop more advanced Internet technologies and its platforms in order to realize the information sharing society.

Recent achievements:

1. Next generation IP network technologies = GMN-CL

GMN-CL (Connectionless Networking Technologies for Global Mega-media Networks) is an IP-based backbone network technology fully utilizing the MPLS (Multi-Protocol Label Switching). The architecture of the GMN-CL is illustrated in the Chart: the basic data transmission is realized by a system consisting of edge nodes and core relay nodes, while advanced services are realized by advanced function servers.

In order to provide highly secured services, the GMN-CL deals with traffic at its lower layers. In addition, by fully utilizing a resource controlling function of ATM, the GMN-CL guarantees bandwidth at the IP layers. NTT Communications Corp. (NTT Com) and NTT-ME are providing their services based on the GMN-CL.

2. Electronic money

The lab has developed two kinds of electronic money: "Internet Cash" and "Super Cash." The Internet Cash is electronic money being used for transaction over the Internet. The Super Cash is an IC card-type electronic money being used for both real and virtual mall shopping. A demonstration experiment for the Internet Cash has been carried out until March 2000 by the Cyber Business Association participated by 10,000 users and 60 virtual stores. Separately, a demonstration experiment for the Super Cash is being carried out by the Super Cash Association in the Shinjuku area in central Tokyo.

The lab has been continuously promoting functions of these two electronic cash systems.

According to Ido, the lab is gearing its studies in order to turn them into a contactless IC card, expand the memory and increase the CPU.

3. New encryption

In cooperation with Mitsubishi Electric Corp., the lab has developed a new encryption code called "Camellia." It is

a 128-bit common-key encryption algorithm.

According to Ido, these two firms -- both are the leading firms in encryption development -- decided to jointly work out the encryption because of both firms' strengths that are reciprocal: NTT is strong in developing software working at a high speed while Mitsubishi is good at miniaturization technologies.

Both firms have submitted the algorithm to the ISO as their effort to make the new algorithm an international standard for the next generation encryption. Commercial implementation plan has not been worked out. But Ido said that both NTT and Mitsubishi may develop their own encryption products based on the algorithm.

4. IP-over-DWDM

In order to meet demands for large capacity networks from ISPs and large corporations, the lab has developed technologies for IP over DWDM. The lab has carried out a series of field tests of the technologies. Now operation companies of NTT Groups are ready to provide services based on the technologies.

5. Connection of Intelligent Network (IN) and IP Networks

The lab has developed technologies to connect an ATM-based Intelligent Network (IN) and IP Networks. The technologies will enable a carrier to interconnect voice signals based on Voice-over-IP technologies and voice signals from conventional telephony networks. The technologies will also enable users of telephony networks to use content from IP networks. The technologies has been recognized as the international standard at the ITU-T and IETF (Internet Engineering Task Force). NTT will implement the technologies for in-company networks, and for other ones once the counterpart firms introduce the technologies.

6. AwarenessNet

Awareness Net is a tool for one-on-one marketing.

The system collects Internet users' Web browsing history and shopping history. Based on the information, the system predicts the taste of the users and provides information that matches to each users' taste.

NTT-E and NTT-W have been providing the Awareness Net services since April 14. These two NTT firms are also providing the technologies for Japan IBM.

Interview with Seiichi Ido, Director of NTT Information Sharing Platform Laboratories.



Network Service Systems Laboratories; and, Access Network Service Systems Laboratories. We are in charge of studies on the Internet and e-Commerce related studies. The Network Service Systems Laboratories is in charge of core network studies; and the Access Network Service Systems Laboratories is in charge of access lines studies. The Service Integration Laboratories is integrating all study results at these three R&D centers and bring these fruits to operation companies for commercial implementation.

TT: What is the policy for using the study results?

Ido: Regarding the results of studies released before July 1999, these are to be given away to NTT-E, NTT-W and NTT Com free of charge.

Regarding the results of studies released after July 1999, these are to be given away to five investing firms -- NTT-E, NTT-W, NTT Com, NTT Data and NTT DoCoMo -- as far as they invest in that particular field of study. All of the results are to be opened for non-NTT companies and NTT Group companies except these five in return for certain royalties.

TT: What is the future direction of the lab?

Ido: Our lab was founded in January 1999 collecting many researchers on the Internet-related studies from all related labs upon reorganization since we knew that demands for IP-related studies would swell further. Since we believe that our study direction is correct, we will gear up our study effort in the same line.

TT: NTT's R&D budget used to be around 300 billion yen. But the budget for FY 2000 is 202 billion yen. Did the firm cut off its R&D budget?

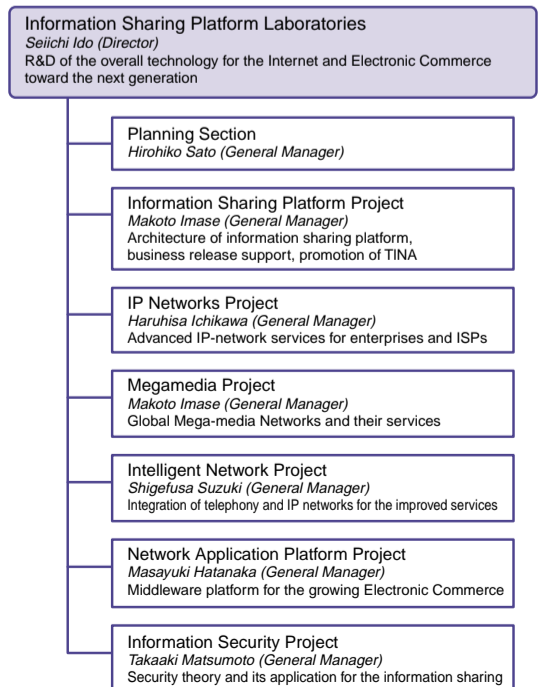
Ido: Upon reorganization of the NTT Group in July 1999, some researchers were transferred to newly established R&D centers at NTT's operating companies (NTT East and NTT West). Since the number of researchers and the research organization were changed, the R&D budget figure was changed. But the total R&D budget of the NTT has not changed.

TT: What is the mission of the lab?

Ido: We believe all of the networks except for the "last one mile" will be replaced with optical fiber networks in the near future. When this is realized, carriers can provide large capacity network at lower charges, so supply of these networks will exceed demand. When it happens, carriers may not be able to compete with each others in the simple network provision business. Then we should compete with each others in added value networks. For instance, we carriers have to provide platforms for e-commerce, electronic government, intracompany network and intercompany networks. NTT is now putting an emphasis on these fields, and our lab is in charge of these studies.

TT: How to share study fields among four R&D centers under the Information Sharing Laboratory Group?

Ido: There are four R&D centers at the Information Sharing Laboratory Group: Service Integration Laboratories; Information Sharing Platform Laboratories;



PRISM (Progressive and Revolutionary Integration on Service Media)

JT Launches All-IP Next-Generation Backbone System

Japan Telecom Co., Ltd. launched its first service based on an all-IP backbone called "PRISM." The new service, "SOLTERIA," is a kind of IP-VPN (Virtual Private Network) services for corporate users. Using SOLTERIA based the PRISM, users may construct the Intranet, and/or Extranet or even Multi-Extranet VPN.

Since voice services are reaching their ceiling, all of the carriers are now putting an emphasis on data transmission services in order to make a breakthrough. With the launch of SOLTERIA, the main battlefield among carriers will shift from conventional voice to data transmission services.

JT said that compared with conventional circuit switch based services, the IP-based services like SOLTERIA can provide services that exactly meet demands of the market at a higher data transmission speed, at a lower rate.

JT in December 1998 released the concept of its next generation all IP backbone network earlier than any other Japanese carrier. PRISM stands for "Progressive and Revolutionary Integration on Service Media."

In cooperation with 11 companies such as Oki Electric Industry Co., Ltd. and Toshiba Cable TV, JT has carried out a series of field tests on PRISM since July 1999. Finding high quality and functionality in the test results, JT decided to launch commercial services from April 2000.

JT is targeting to gain 2.5 billion yen in revenues from the new SOLTERIA services in FY 2001, and 15 billion yen in FY 2004.

JT said that the SOLTERIA services have higher flexibility and scalability; higher security and performance; easy network control; fixed rate charging system without any regional discrepan-

cies; and, lower service prices.

Unlike most of the conventional voice and data communications service whose prices depend upon the distance from the POI to each customer, SOLTERIA charges are fixed regardless of the distance (ATM based services are depending on the distance).

The service charges consist of two charges: the closed network communications charges and the access charges.

In case of the former, the charges are, for instance, 5,000 yen for up to 64 kbps, 50,000 yen for up to 1 Mbps, and 850,000 yen for up to 57 Mbps.

For the latter one, users have two choices: using either high-speed digital leased line or ATM leased line. In case of the high speed digital leased line, the charge is 67,000 yen for services up to 64 kbps, and 420,000 yen for up to 1Mbps. In case of the ATM leased line, charges are depend upon the distance.

SOLTERIA's service charges are lower than JT's conventional services. For instance, when a customer subscribes to 64 kbps Frame Relay service at 50 locations, it costs 2.1 millions yen. But when the same user subscribes to SOLTERIA, the cost will be 1.74 million, 17% lower than the Frame Relay services.

JT is planning on offering content provision services that fully utilize SOLTERIA.

Due to harsh competition among carriers, communications charges have been decreasing rapidly. Carriers are required to seek new revenue sources. Thus, content provision services are the most promising.

JT is to provide a package plan that will consist of conventional network services and information provision services.

One of the most remarkable features

of PRISM is low cost. Thanks to the all-IP system which consist of routers rather than expensive switches, JT can reduce its network construction cost.

In addition, using MPLS (Multi-Protocol Label Switching), JT said that PRISM maintains a high level of security that is the same as ATM and/or Frame Relay. Since each PRISM user is given a specific label and all of the packets for the user company is transferred with the allocated specific label, no data transaction will be mixed up with others. In addition, each router has independent routing tables that are allocated for each PRISM user, so no packet reaches a wrong VPN.

But JT said users also get benefit from the all IP networks. Corporate users benefit from all-IP networks because the total service prices are lower. In addition, corporate users are offered a more variety of multimedia content services.

Individual users get benefits from all IP services: users are provided an integrated service of telephony and the Internet. When the in-house network and PRISM are linked with each other, users can enjoy a futuristic life, for instance, controlling all consumer electronic items at home by just making a phone call from outside.

JT has been carrying out a series of experiments for linking PRISM with its telephony networks. At issue is how to reserve access network for the services. JT is planning on providing a variety of services using many different kinds of access networks such as WLL (Wireless Local Loop), optical fiber, cable TV as well as other carriers' networks.

Other carriers are gearing up their effort to launch all-IP services. Both DDI Corp. and KDD Corp. have announced their own all-IP backbone con-

struction plans. However, upon official agreement on their merger plan (also including IDO), these two carriers are now reconsidering their all-IP backbone plans.

Crosswave Communications Inc. (CWC), a joint venture of Internet Initiatives of Japan Inc. (IIJ), Sony Corp. and Toyota Corp., has been constructing IP networks fully utilizing the IRU system. The CWC, in cooperation with the IIJ, is going to construct data centers in six cities around the country in order to provide integrated services based on the IP backbone.

Powernets Japan Communications Co., Inc. (PNJ-C) is providing IP services fully utilizing IP backbone constructed by three regional telecommunications firms; these firms are owned by regional electric power companies. At the moment, the three telecom firms of TNet, OMP and CTC are running the PNJ-C. However, the firm is going to invite the remaining seven regional telecommunications firms owned by power companies to join the firm in order to launch nationwide all-IP network services.

There are some issues that these carriers have to clear. First since technological innovation is so rapid, these carriers have to make efforts to provide adequate support. But even doing so, carriers may not be able to gain the same level of revenues initially from the new IP-based services as the conventional circuit switched services. Furthermore, the management of these firms has to change their managerial concept in the all-IP era. In the new era, conventional carriers and new entrants can compete with each others on an equal footing. In other words, carriers that can cope with these issues may be able to survive the upcoming IP era.

IT Industry

Hitachi

Hitachi's Net Business Strategy

Hitachi, Ltd. announced that the company has formulated an Internet-driven net business strategy that is based on the "i.e. HITACHI" medium-term business plan disclosed last November.

The Internet is rapidly evolving into a social infrastructure that shows limitless potential with respect to changing the way people live and do business. To make the best of the convenience and choices offered by this new infrastructure requires platforms that can participate reliably and effortlessly, and a full range of business solutions.

To answer the needs of network communities, Hitachi is using its customer base, expertise, knowledge and Internet technology to build and provide network infrastructures that are secure and competitive.

For this, Hitachi is moving forward on two fronts: a business platform operation that provides secure, competitive net infrastructures, and a solutions business in which the focus is on providing support for the planning, implementation and operation of Internet businesses based on those infrastructures.

Hitachi's solutions business offers net business solutions for each industry or business model in the following five

market categories.

- 1) Business: Solutions for the financial, distribution, manufacturing and service sectors
- 2) Industry: Network services for industrial, transportation and electric power systems having a high public utility component
- 3) Consumer: Services oriented toward lifestyles of consumers in the net society
- 4) Government: Solutions for central and local government ministries and agencies
- 5) Academia: Total services for educational and research institutions

For these net businesses, on April 21st a new organization, the Information & Network Services, will be established under the direct control of President Shoyama. The Information & Network Services will work with the Electric Service & Business Development Division, which was established in February 2000, as well as with internal and third-party service providers and content holders to promote the net business of the Hitachi Group.

For business platform operations, a new company, called Hitachi netBusiness, Ltd. will be established, also on April 21st. Hitachi netBusiness, Ltd. will provide a full range of the type of services required for business platforms, including operation of Internet

data centers, proxy operation, collection of fees and charges, customer management, certification and encryption.

Working together, the aim of Hitachi's business platform operations and solutions business is to be the net society's best solutions partner able to create Internet-based value networks that surpass industry divisions and borders. By 2003, this is expected to increase annual net-related sales by the Hitachi Group, which now stand at 180 billion yen, to 900 billion yen.

Matsushita (Panasonic) Develops High Speed and Long Distance Optical Converter for IEEE1394

Matsushita Electric Industrial Co., Ltd. (MEI) has succeeded in developing the world's first optical converter based on LED, POF and H-PCF for IEEE1394 interface. This unique optical converter can transmit up to a 400Mbps digital signal over an extended distance.

This new development has been achieved using the "Hyper modulation technology" suitable for transmitting a 400Mbps digital signal by using an LED, and "High efficient coupling technology" ensures connectivity between an LED and a POF.

It features the following:

1. The world's first high speed long

distance optical converter based on an LED (50m transmission by a multi layer POF, 200m by GI type H-PCF)

2. Low-cost optical converter, resistant to optical reflection and temperature fluctuation
3. Upward compatibility with a commercial optical converter operated at 200Mbps.

This unique optical converter with IEEE1394 interface is ideally suited to digital monitoring systems and will be available for future home and office networks because of mass-productivity of LED, POF and H-PCF. [Commercialization]

Matsushita Electronic Components Co., Ltd. is planning to produce this new optical converter by the end of this year.

Because this optical converter includes the standardized 8B/10B code and the function to detect a signal of any speed, it can communicate with a commercial optical converter operated at 200Mbps.

Carrier News

NTT DoCoMo

Applies for Introduction of IMT-2000

NTT DoCoMo, Inc. applied to the Minister of Posts and Telecommunications

Continued on page 7

Slashing and Mashing Crackers

Interview with Mr. Yoshitaka TOUI,

Director, Office of IT Security Policy, Bureau of Information Industries,
Ministry of International Trade and Industry (MITI)

Hackers and crackers have attacked many Japanese governmental websites since January 2000. Damage from a series of attacks was not particularly very serious; however, they revealed vulnerability of governmental websites and reminded us of the importance of security measures in the Internet society.

MITI's IT Security Policy Office has been promoting security policies for many years. After the series of attacks, this Office, in cooperation with the Cabinet and the Liberal Democratic Party (LDP), as well as with other ministries and agencies, took a series of countermeasures.

According to Yoshitaka Toui, Director of the Office, in response to the request of the Minister of International Trade and Industry, his Office has mainly been promoting two measures: as a short-term measure, they checked all of the MITI system, applied necessary countermeasures and worked out the Security Policy Guidelines. As a longer-term measure, they will work out the "Policy Implementation Program" by the end of March 2001. The latter one ("Policy Implementation Program") will include an evaluation of cryptosystems, security goods and systems, technological development and establishment of JIS for security management.

The Government and the Cabinet have been promoting security policies.

The Information Security-related Director-General Commission, which was established in September 1999 under the Cabinet Office for National Security Affairs and Crisis Management, has been promoting revision of current laws so as to meet the coming information society, anti-cracker measures and anti-cyber-terrorism measures. Separately, as part of its effort to counter the recent attacks, the LDP established its own countermeasures project team. The team submitted an urgent policy statement to the government. Upon request from the LDP, the government is looking to strengthen the Information Security-related Director-General Commission and established the Information Security Countermeasure Promotion Office within the Cabinet Secretariat.

TT: What is the basic principle of MITI's information security policies?

Toui: MITI has been promoting information security policy for the past decades in order to improve security and reliability of e-business, putting an emphasis on three points: how to protect information, how to prevent the information from alteration (without any proper authorization) and how to keep the information system workable. The basic position of MITI's security policy is that the information society has been expanding rapidly because everybody can participate to it freely. So MITI will try to eliminate unnecessary regulation.

TT: What measures did MITI implement after the series of attacks on governmental websites this January?

Toui: We have compiled the "Security Policy Guideline." The guideline is a kind of manual that describes values that the MITI's information have, the most efficient protection measures for the information and countermeasures we should apply when an urgent incident occurs. We will submit this guideline to the Cabinet. Based on the guideline, other ministries and agencies will work out their own guidelines.

TT: What is the longer-term countermeasure?

Toui: As part of the Millennium Project, the Electronic Government will be established by 2003. We are responsible for making the Electronic Government a reliable one. As part of our effort to do so, we are going to compile the "Policy Implementation Program" by the end of March 2001. There are four major

policies in the program.

TT: I heard that evaluation of cryptogram is one of the four major policies.

Toui: We are going to establish a third-party evaluation system for encryption. Encryption technology is the key technology for information security. The Japanese industry has state-of-the-art encryption technology. However, there is no system for evaluating such technology by a third party. System users tend to let system vendors select encryption. We will establish a committee consisting of encryption experts including scholars and systems administrators that will evaluate encryption from many aspects such as decoding difficulties and ease of handling.

TT: I heard that MITI will promote evaluation of security goods and system in order to eventually let other ministries use the evaluation system for governmental procurement for computer systems.

Toui: In Japan there is no system for evaluating the quality of computer systems. Since other advanced nations already have a third party evaluation system for computer systems and an international evaluation system was approved at the ISO in June 1999, the Japanese government decided to introduce an evaluation system.

TT: When will you introduce such an evaluation system?

Toui: We have already started evaluating security products. We will add newly evaluated products to our list one by one. In cooperation with the Management and Coordination Agency, we will compile the "utilization guidelines" based on our list by the end of calendar or fiscal year 2000. Based on that, other ministries and agencies will procure computers and related goods.

TT: I also heard that MITI, in cooperation with MPT, will develop information security technologies from FY 2000.

Toui: Vendors have been promoting a variety of crucial security technologies such as technologies to prevent or detect unlawful access, or to detect and remove computer virus. We will carefully examine the current research status and promote studies in yet untouched areas and technologies that the government should promote.

TT: For instance, what kind of technologies will you promote?

Toui: We will invite research topics through the Information-technology Promotion Agency, Japan (IPA). (MPT will invite topics through the Telecommunications Advancement Organization of Japan (TAO).) They may include technologies for detecting cracker's approach and preventing them from cracking, technologies for tracing a cracker and reveal the identification of the cracker; technologies for detecting computer virus and removal thereof; and technologies for constructing websites invulnerable to attack. We have promoted similar studies in the past. From FY 2000, we will carry out studies in a more strategic manner.

TT: In addition, I heard MITI will establish a JIS (Japanese Industrial Standard) standard for security control technologies.

Toui: An international standard for total operational guidelines called Guidelines for the Management for IT Security (GMITS) has been established at the International Organization for Standardization (ISO).

We are now working for introducing the international standard (GMITS) into the Japanese market. The JIS standard for security control technologies will, for instance, describe in a certain way the management should better control ID and password or a certain way the computer management should construct and manage their information system.

TT: The Government and the Cabinet took emergency measures after a series of attacks in January 2000.

Toui: The Government and the Cabinet had taken security policies even before. In September the Information Security-related Director-General Commission was established under the Cabinet Office for National Security Affairs and Crisis Management. Under the leadership of the Commission, they have been promoting revision of current laws so as to meet the information society, anti-cracker measures and anti cyber-terrorism measures.

TT: What is the current status of these three measures?

Toui: Regarding the revision of current laws, the Commission is reconsidering the current systems. Since the current laws were established based on the real society, some of them are not applicable for the upcoming information society. For instance, the new Unlawful Access Law was enforced on February 13. Under the new law, unauthorized access is considered an illegal action and the criminal may be punished. However, the law is not applicable, for instance, to theft of digital data. Since the matter is

complicated, it may take some time for the Commission to compile a certain conclusion.

TT: How about the anti-cracker measures?

Toui: The government released anti-cracker measures on January 21. In the measures, MITI was assigned to promote necessary technological development.

TT: How about the anti-cyber-terrorism measures?

Toui: Since September 1999 the discussion has been promoted under the leadership of the Commission. Separately, MITI has been promoting anti-cyber-terrorism measures focusing on attacks on large-scale plants such as those for oil refining over the past three years. We are scheduled to compile the final report soon. Once releasing, we will submit the report to the Cabinet as part of our contribution to the Cabinet's discussion over the issue.

TT: The LDP established the Cyber Terrorism and Hacker Countermeasure Project Team on February 1 and submitted an emergency statement for the government.

Toui: Right. Upon receipt of the statement from the LDP, the government revised the Information Security-related Director-General Commission into the "Information Security Countermeasure Promotion Commission" and on February 29 established the Information Security Countermeasures Promotion Office within the Cabinet Secretariat. Separately, the government established the Information Security Division within the Advanced Information and Telecommunications Society Promotion Headquarters. The division which consists of intellectuals and representatives from major infrastructure business is going to work out security protection policies.

TT: The matter has been discussed and worked out at a variety of international organizations such as the OECD and the ISO. How is MITI contributing to such international efforts?

Toui: For such international activities, we have sent representatives at a variety of fora such as the OECD in order to reflect our policies and positions. As I mentioned before, our basic position is promotion of e-business. We have proposed that, for instance, the use of encryption should not be regulated and the market should be allowed to select the winners. At last our position was adopted into the international guidelines. Once international guidelines are worked out, then we will try to implement them into the Japanese policies.



Yoshitaka TOUI

Power Generation:*Continued from Page 1*

nese electric power market. Some foreign utility companies such as EnCom Corp., a U.S. utility company, and Vivendi, a French utility firm, are planning to enter the Japanese market through tie-ups with Japanese firms. Mitsubishi Corp. and Marubeni Corp. are entering the business, while Royal Dutch Shell and Texaco are also reportedly considering entry into the Japanese market.

To counter these new entrants, conventional electric power firms have adopted measures. Some of them have introduced new discount programs for customers who mainly use the services on weekends and at night.

TEPCO is planning to take further steps. It is going to introduce discount programs for individual users in April, while reducing service fees for every categories by the end of FY 2000.

Japanese electric power companies have been protected by regulations as part of governmental efforts to secure high quality, stable electricity supply. All of them have enjoyed monopolies in each region.

But upon the liberalization of the market, competition among electric power companies have started. For instance, Kansai Electric Power Co., Inc., an electric power company based on Osaka, recently unsuccessfully tried to win over Toyota Motor Co., Ltd., the largest customer for Chubu Electric Power Co., Inc., a Nagoya-based electric power company. Toyota decided to purchase electricity from Chubu Electric Power in FY 2000. However, the motor company said that it has no idea from which utility firm it will purchase energy after FY 2001.

The NTT Group is the largest user of electricity in Japan. The group with more than 100 subsidiaries consumes 5.2 billion kilowatt per hour a year (figure from FY 1998). Since the NTT Group is promoting its FTTH (Fiber-to-the-Home) project and multimedia services, NTT's electricity consumption is expected to expand further. The consumption is expected to reach 10 billion kW per hour by 2010.

NTT Facilities, a wholly-owned subsidiary of NTT charged with managing all energy use of the NTT Group, has been closely working with Tokyo Gas and Osaka Gas. As part of its efforts to reduce the energy expenses, NTT Facilities has developed cogeneration system with both Tokyo Gas and Osaka Gas.

Upon liberalization of telecommunications market in Japan in 1985, all of the electric power companies

entered the telecommunications market. Fully utilizing their fiber-optic networks which these (electric power companies) firms constructed along with their electricity networks, they have been providing telecommunications services for corporate users.

TEPCO, an incumbent electric power firm based in Tokyo, has been aggressively promoting its telecommunications business using TNet (Tokyo Telecommunication Network Inc.) as its core business. TEPCO's telecommunications business has not been very successful so far. For instance, both ASTEL Tokyo, TEPCO's PHS business, and Tokyo Telemessage, TEPCO's pager business, have gone bankrupt. But TNet's flagship product called Tokyo Denwa (Tokyo Telephone), a discount local telephony service, has been gaining popularity although it hardly makes money partly due to high interconnection charges imposed by NTT.

However, TEPCO seems intent on expanding its telecommunications business. TEPCO will start renting out from June its fiber-optic network to carriers that partially own the Japan-U.S. Cable Networks. In order to launch the business, TEPCO will invest more than 1 billion yen and will construct fiber-optic network from Maruyama City, Chiba Prefecture, to central Tokyo. TEPCO is planning to obtain 10% of its revenues from this new business in 2005.

Kansai Electric Power Co., Inc., an incumbent electric power company based in Osaka, will establish a new wholly-owning subsidiary in June, which will rent out Kansai Electric's fiber-optic networks to other firms such as cable TV operators and telecom carriers. The utility firm will construct a total of 40,000-km fiber-optic networks for the coming two years by pouring in 80 billion yen. Separate from the business of the subsidiary, Kansai Electric itself will launch data communications services.

Kyushu Electric Power Co., Inc., an incumbent electric power firm based in Fukuoka, also announced that it would start renting out its fiber-optic networks for carriers from April 2000 at the earliest. To launch the new business, Kyushu Electric will construct a total of 19,000 kilometers new fiber-optic networks spending a total of 40 billion yen.

Chubu Electric Power Co., Inc., another conventional electric power firm based in Nagoya, is also planning to provide telecommunications services in FY 2000 targeting 3.4 million households in major cities surrounding Nagoya.

(Asia Pacific Cable Network 2) Construction and Maintenance Agreement (C&MA), together with other 43 telecommunications carriers.

The APCN 2 is a 19,000 km long optical fiber submarine cable network which links Japan, Korea, China, Taiwan, Hong Kong, Philippines, Malaysia, and Singapore in a ring configuration, and its service is scheduled for the end of September 2001.

The APCN 2 is a highly reliable cable network suited for large capacity data transmission services, as the first cable system that has a self-healing function in Asia, and is capable of restoring itself instantly with its ring configuration when a failure occurs in a part of the system. On the Japan side, it is to be landed at the two locations: Chikura (Chiba Prefecture: KDD) and Kitaibaraki (Ibaraki Prefecture: NTT Com).

Making the most of the latest WDM (Wavelength Division Multiplexing) technology, its operation is to start with an initial circuit capacity of 80 Gbps or 160 Gbps (1,536 circuits or 3,072 circuits in 45 Mbps circuit equivalent), and the circuit capacity is upgradable up to 2.56 Tbps (49,152 circuits in 45 Mbps circuit equivalent) by augmenting landing station facilities gradually in the future.

In addition, by interconnecting it with the China-US Cable Network, the SEA-ME-WE 3 Cable, the Japan-US Cable Network under construction, and other cable systems, it is possible to construct a large-capacity, highly-reliable seamless network not only within the Asia-Pacific region but with the United States, Europe, and other areas.

With the APCN 2, KDD, NTT Com and Japan Telecom are intending to meet the demands for large-capacity and high-speed communications services including ATM service as well as the IP-related communications requirements between major Asian countries.

Technical Information Disclosure**Kumamoto Cable Network Corp. (KCN)**

On March 24, 2000, KCN disclosed technical conditions for its KCN Internet Service, a cable-LAN based, high-speed data transmission service.

Granted a Type I telecommunications license on March 15, 2000, the company plans to offer this service from October 1, 2000.

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Tokyo Telecommunication Network Co., Inc. (TNet)

On March 27, 2000, TNet made changes to two technical documents pertaining to its Hi-Vision image transmission service.

"Technical Document for Hi-Vision Image (Digital) Transmission Service" was renamed as "Technical Document for Hi-Vision Image Transmission Service (Ver. 2)" and revised to add the 1080-scanning line on the list of valid scanning line types, among others.

"Technical Document for Hi-Vision Image (Analog) Transmission Service" was renamed as "Technical Document for Hi-Vision Image Transmission Service — For Connecting Devices Having BTA S-001 Compatible User/Network interfaces (Ver. 2)."

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Osaka Media Port Corp. (OMP)

On March 31, OMP disclosed two technical documents pertaining to its planned digital leased line services. One is called "600 Mbps Digital Leased Circuit Service (provisional name) Ver. 1." The other is entitled "2.4 Gbps Digital Leased Circuit Service (provisional name) Ver. 2," which was revised to include the planned service expansion.

These documents describe interface specifications of terminal equipment to be connected to the service facilities.

Those wishing to obtain copies of the documents should provide the following information on a postcard, via fax or e-mail:

- Company name, address, telephone and fax numbers
- Name of person in charge
- Number of copies (limited to three copies per company free of charge)

For further information, contact:

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Continued from page 5

for business authorization of its IMT-2000 service and for licensing of radio stations that will be used to provide the service in Japan. The move comes in accordance with the Ministry of Posts and Telecommunications submission of policy for introducing IMT-2000, a next-generation mobile communications system, as well as licensing criteria for the IMT-2000 radio stations.

NTT DoCoMo group companies have also filed applications simultaneously.

1. Business units

NTT DoCoMo has applied for approval to launch IMT-2000 service in the Kanto and Shinsyu regions where the company has been already providing wireless telecommunications services. Other group companies also filed the same applications in their business areas. NTT DoCoMo group is planning to realize nationwide service by roaming between group companies.

2. Start date

The tentative start date for the new service is around the end of May 2001.

Plan of Group Companies

3. The first service area will tentatively include: Tokyo (23-City area), Yokohama City, Kawasaki City**KDD Corp.****NTT Communications Corp.****Japan Telecom Co., Ltd.****APCN 2 Construction and Maintenance Agreement Concluded**

KDD, NTT Communications Corp. (NTT Com), and Japan Telecom concluded in Singapore the APCN 2

Statistics

Records of Telecom Equipment (As of October 1999)

Production

Type	Oct. '99		Compared with Oct. '98 (%)
	¥1 Mil.	Sets	
Telecom Equipment	266,871		8.9
Terminal Equip.	140,087		8.1
Wire Telecommunications Equip.	41,222		-15.5
Telephones Sets	10,898	1,232,513	-3.3
Standard Type	1,509	59,499	160.2
Functional Type	390	164,386	-67.8
Wireless Phone	8,176	1,000,561	-2.6
Others	823	8,067	-24.2
Telephone Application Equip.	13,258		-5.8
Key Telephone Systems	5,722	262,014	-21.1
Small Capacity	402	25,664	-27.6
Medium/Large Capacity	5,320	236,350	-20.6
Telephone Auxiliary Equip.	116	39,935	-31.8
Interphones	3,919	328,151	-0.3
Others	777		-71.5
Telegraph & Picture Transmission Equip.	17,066		-27.3
Facsimile	14,267	325,393	-37.1
Super High-Speed Facsimile	80	218	-38.0
High-Speed Facsimile	13,949	324,102	-35.4
Other Facsimiles	238	1,073	-75.3
Others	2,799		266.4
Mobile Terminal Equip.	98,865	4,270,251	22.4
Land	98,209	4,249,565	26.0
• Automobile	81	6,048	-72.4
• Portable	89,453	3,657,520	36.9
• Pager	272	37,020	-65.1
• MCA	73	2,228	-25.5
• Public PHS Terminal	5,432	361,437	-13.6
• Others	2,898	185,312	-44.0
Maritime and Airplane	656	20,686	-76.7
Personal Radios (900 MHz)	-	-	-
Network-Related Equip.	123,731		10.5
Wire Network-Related Equip.	108,092		12.7
Switching Equip.	40,055		-2.6
Electronic Switches	27,060		-11.4
For Telephone Offices	20,926		4.4
For PBX	6,134		-41.6
Other Switching Equip.	12,995		23.0
Carrier Equip.	68,037		24.2
Code Transmission Equip.	46,046	11,834	34.5
MODEMs	3,988	12,569	6.7
Others	18,003		7.1
Mobile-Related Network Equip.	14,586	11,270	-9.6
Fixed Station Communications Equip.	8,998	2,731	-5.9
Terrestrial	7,879	2,489	-3.2
Satellite	1,119	242	-21.6
Base Stations	5,588	8,539	-14.9
Wire Telecommunications Parts	3,053		-12.2
Relays (1,000 units)	2,864	42,008	-13.1
Other Components	189		4.4

<For Reference>

Type	Oct. '99	Compared with Oct. '98 (%)	
¥1 Mil.	Sets		
Broadcast Equip.	3,614	1,155	25.0
Radio Application Equip.	7,767		-22.8
Radio Equip.	2,186	4,015	-38.0
Radio Measuring Equip.	312	5,269	-69.7
Others	5,269		-4.3
Telemetry/Telecontrol Equip.	2,735	868	13.4
Others	2,534		-18.1

Remarks: 1) Data are based on the Statistics of Actual Production by the Ministry of International Trade and Industry (MITI).
2) Radio Communications excludes the citizen band transceivers and the amateur telecom equipment.

Source: Communications Industry Association of Japan

Export

Type	Oct. '99		Compared with Oct. '98 (%)
	¥1 Mil.	Sets	
Telecom Equipment	51,149		-3.9
Wire Telecommunications Equip.	46,378		3.0
Telephones	3,511	442	-15.4
Cordless Telephones	2,453	296	-20.9
Other Types	1,057	146	0.8
Telephone Application Equip.	682	61	7.5
Key Telephone Systems	304	5	28.5
Automatic Answering Telephone Sets	131	7	0.9
Intercoms	195	40	35.2
Others	52	10	-58.2
Telegraph and Picture Transmission Equip.	6,855	176	-20.0
Facsimile Equip.	6,433	173	-24.9
Teleprinters		422	3
Others		1,680	-59.1
Switching Equip.		2,651	23
Carrier Equip.		31,000	22.6
Components			
Radio Communications Equip.	4,771	325	-41.9
Transmitter and Transmission/Receiving Equip.	4,215	155	-38.1
For Long/Medium/Short Waves	318	3	-63.4
For Ultra Short Waves	1,676	95	-29.2
For Other Waves	2,221	56	-37.9
Receivers	556	171	-60.2

<For Reference>

Type	Oct. '99	Compared with Oct. '98 (%)	
¥1 Mil.	Sets		
Broadcasting Equip.	139	120.8	
TV Camera	11,898	274	-37.5
Radio Application Equip.	2,724	608	-23.6
Radars	898	2	-34.8
For Navigation	1,185	18	-1.3
Direction Finders	72	1	88.5
Others	1,114	18	-4.3
Radio Remote Control Equip.	641	588	-35.0

Import

Type	Oct. '99		Compared with Oct. '98 (%)
	¥1 Mil.	Sets	
Telecom Equipment	38,419		-5.9
Wire Telecommunications Equip.	35,207		-7.6
Telephones	1,664	326	-12.8
Cordless Telephones	791	134	18.9
Other Types Telephone Sets	873	192	-29.7
Telephone Application Equip.	1,282	73	113.7
Automatic Answering Telephone Sets	64	5	39.1
Others	1,218	68	119.9
Telegraph and Picture Transmission Equip.	2,411	167	-36.4
Facsimile	2,322	160	-37.5
Teleprinter		88	8
Others		8,564	3
Switching Equip.		4,465	278
Carrier Equip.		16,822	14.9
Components		12,528	5.5
For Wire Telecom Only		4,294	55.1
Parts for Common Use in Wired/Radio Communication Equip.			
Radio Communications Equip.	3,212	78	17.7
Transmitter and Transmission/Receiving Equip.	3,060	52	23.2
Transmitting Equip.	79	12	-32.2
Transmitting and Receiving Equip.	2,888	30	31.1
For Aviation	67	2	44.3
For Mobile Telephone	59	2	-82.6
For Long/Medium/Short Waves	46	3	-4.1
For Ultra Short Waves	46	6	-60.3
For Other Waves	2,762	28	51.8
Receivers	153	25	-37.5

<For Reference>

Type	Oct. '99	Compared with Oct. '98 (%)	
¥1 Mil.	Sets		
Broadcasting Equip.	315	8	-42.1
TV Camera	141		108.9
Radio Application Equip.	226	2	-29.9
Radars	596	889	-45.2

Remarks: 1) Data are based on the Statistics of Custom Clearance by the Ministry of Finance.
2) Radio Communications excludes the citizen band transceivers and Cordless microphones.
3) There are cases in which the total value will not equal the components because the figures have been rounded one decimal place. Also, the comparative ratios are calculated in ¥1,000 units.

Source: Communications Industry Association of Japan

Current Electric & Electronic Machinery Statistics

(As of October 1999)

Products	Unit	Production			Sales			Stock		
		Sep. '99	Oct. '99	Oct. '99/Oct. '98 (%)	Sep. '99	Oct. '99	Oct. '99/Oct. '98 (%)	Sep. '99	Oct. '99	Oct. '99/Oct. '98 (%)
Video Tape Recorder	Sets	606,899	538,480	57.8	1,417,184	1,234,281	85.1	1,169,556	1,171,421	106.3
Video Disk Player	Sets	463	2,806	39.6	4,694	7,224	68.3	16,485	14,468	79.8
Video Camera	Sets	1,031,793	956,487	109.2	1,113,301	1,036,952	117.9	534,747	463,533	82.3
Car Navigation System	Sets	152,160	185,599	113.3	154,551	136,968	105.6	117,560	138,532	149.7
Digital Audio Disk Player	Sets	1,635,445	1,597,777	93.8	1,735,149	1,708,403	106.6	1,650,356	1,536,043	104.8
Active Liquid Crystal Device	1,000 units	5,212	5,344	129.6	4,361	4,442	133.5	948	869	98.9
Passive Liquid Crystal Device	1,000 units	42,492	42,078	121.9	38,983	38,062	115.4	20,877	21,726	96.3
Photoelectric Converter	1,000 units	1,027,497	1,025,454	127.6	1,188,525	1,124,301	133.3	395,711	432,833	109.7
Bipolar Semiconductor IC (logical element)	Mill. yen	8,608	7,465	116.3	6,547	6,154	121.7	-	-	-
MOS Semiconductor IC (memory element)	Mill. yen	162,763	157,463	113.2	147,284	137,805	117.0	-	-	-
MOS Semiconductor IC (memory element)	Mill. yen	75,163	85,321	128.9	81,251	84,105	129.5	-	-	-
Hybrid IC	Mill. yen	25,755	25,260	111.4	23,389	22,396	115.6	-	-	-
General Purpose Computer	Mill. yen	31,086	14,965	48.2	-	-	-	-	-	-
Mid-range Computer	Mill. yen	56,661	22,992	101.8	-	-	-	-	-	-
Personal Computer	Sets	947,582	798,010	102.4	-	-	-	-	-	-
Electrical measuring instrument (Except for semiconductor and IC measuring instruments)	Mill. yen	16,491	12,801	103.0	-	-	-	-	-	-
Semiconductor and IC measuring instrument	Mill. yen	22,959	15,954	177.8	-	-	-	-	-	-
Industry-use Measurement Control Unit	Mill. yen	23,869	13,521	89.6	-	-	-	-	-	-

Source: Machinery Statistics and Research Office, MITI

Cable Supply & Demand Classified by Type

(As of October 1999)

Type of Cables	Orders Received			Shipment		
	Oct. '99	Oct. '99/Sep. '99 (%)	Oct. '99/Oct. '98 (%)	Oct. '99	Oct. '99/Sep. '99 (%)	Oct. '99/Oct. '98 (%)
Open Wire (OW)	8,166	101.6	95.9	8,178	98.0	96.0
Winding Wire	15,323	103.2	95.5	15,187	96.8	92.6
Cable for Machinery	5,338	101.5	97.0	5,249	98.8	96.1
Communications Cable	3,558	99.2	83.4	3,691	92.6	89.5
Power Cable	23,019	98.5	92.9	22,977	96.8	87.0
Covered Wire	16,308	107.0	96.4	15,832	101.6	95.0
Cable for Transportation	4,440	90.2	98.0	4,474	88.9	97.7
Total	76,152 (86,188)	101.2 (99.2)	94.5 (92.2)	75,588 (85,250)	97.3 (95.4)	92.0 (86.4)
Aluminum Power Cable	5,325 (3,587)	93.2 (98.0)	62.3 (68.3)	3,375 (2,339)	51.3 (58.5)	64.1 (61.4)
Optical Cable				1,225,467 (28,167)	97.6 (76.9)	208.3 (152.6)

Remarks: 1) Figures of optical cable show "km Core."

2) Figures in parenthesis represent the amount in yen.

Source: The Japanese Electric Wire and Cable Makers' Association

Cable Supply & Demand Classified by Major Consumption Fields

(As of October 1999)

Fields	Orders Received				Shipment			
	Oct. '99 (Actual)	Oct. '99/Sep. '99 (%)	Oct. '99/Oct. '98 (%)	Nov. '99 (Estimated)	Oct. '99 (Actual)	Oct. '99/Sep. '99 (%)	Oct. '99/Oct. '98 (%)	Nov. '99 (Estimated)
Telecommunications	2,259	99.1	84.0	2,500	2,334	90.1	84.4	2,600
Electric Power	7,574 (4,459)	105.6 (89.3)	74.8 (61.0)	9,200 (5,200)	8,545 (2,465)	97.8 (43.5)	76.1 (56.7)	8,700 (2,900)
Electric Machinery	18,856 (300)	101.3 (94.0)	95.2 (103.1)	19,800	18,938 (320)	96.9 (90.9)	93.3 (107.0)	19,700
Automobile	5,979	92.0	95.2	6,300	5,961	89.8	96.8	6,200
Construction/Cable Shops	31,853 (46)	107.1 (92.0)	102.6 (170.4)	32,400	30,525 (41)	101.0 (83.7)	99.4 (164.0)	31,600
Others	5,689 (113)	89.0 (113.0)	82.8 (46.9)	6,200 (400)	5,971 (103)	94.2 (81.7)	88.0 (56.0)	5,800 (500)
Domestic Demand Total	72,210 (4,918)	102.2 (90.0)	93.9 (62.5)	76,400 (5,600)	72,274 (2,929)	97.6 (47.3)	92.7 (60.4)	74,600 (3,400)
Export	3,942 (407)	86.1 (164.8)	108.1 (60.7)	4,000 (700)	3,314 (446)	92.6 (117.1)	78.6 (107.5)	3,400 (200)
Total	76,152 (5,325)	101.2 (93.2)	94.5 (62.3)	80,400 (6,300)	75,588 (3,375)	97.3 (51.3)	92.0 (64.1)	78,000 (3,600)
Core Cable Sales	32,447 (157)	98.5 (122.7)	90.0 (89.2)	32,500 (100)	32,200 (161)	97.2 (251.6)	98.1 (104.5)	33,500 (100)