I-5-1 Improving the Internet environment (1) Protecting privacy

Concerns are rising about private information being intercepted over the Internet.

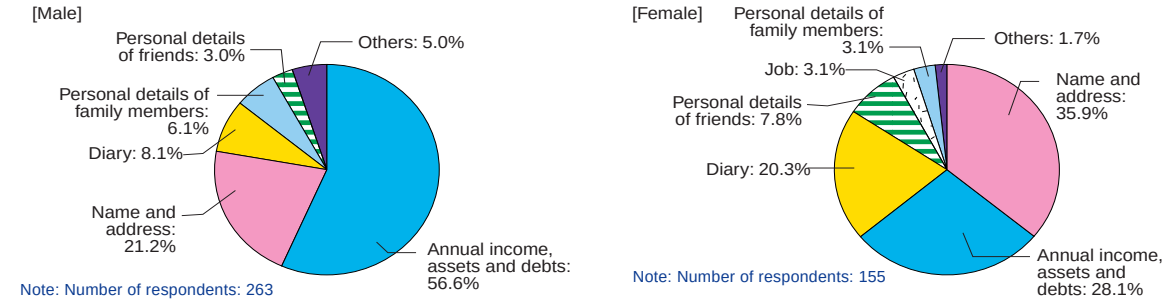
Because information distributed in electronic form is easier to copy or tamper with than data in paper documents, the possible leaking of private information over the Internet has become a matter of serious concern. According to a survey conducted by MPT in September 1997, among general consumers in Japan, 72.8% of respondents said further measures should be taken to protect personal data transmitted online (Fig. 2.). As a result, MPT hosted a Study Group on Privacy Protection in Telecommunications Services and in October 1998 compiled the study group's findings into a report. Based on the report, MPT established in December 1998 "Guidelines on the Protection of Personal Data in Telecommunications" (Refer to III-5-1-(3)).

Meanwhile, in April 1998 the Data Communications Association, Japan, opened a Private Information Protection Registration Center, aimed at heightening the awareness of the issue among both service providers and users. Service providers who offer to protect private information can register with the center and receive its mark of approval (Fig. 3), which helps users to choose a service provider that makes serious efforts in this area.

In the field of electronic commerce, advice on the handling of private information was outlined in the December 1997 "Guidelines for Protecting Personal Information in Cyber Business," produced by the Cyber Business Association, a private Japanese organization. The guidelines state that individual customers should be made aware when information, such as access logs, is gathered and how it might be used. They also say that explanations of how personal information is handled should be made public on companies' websites or by other means. The guidelines aim to help service providers engaged in electronic commerce to establish self-regulation systems for the protection of privacy in online transactions.

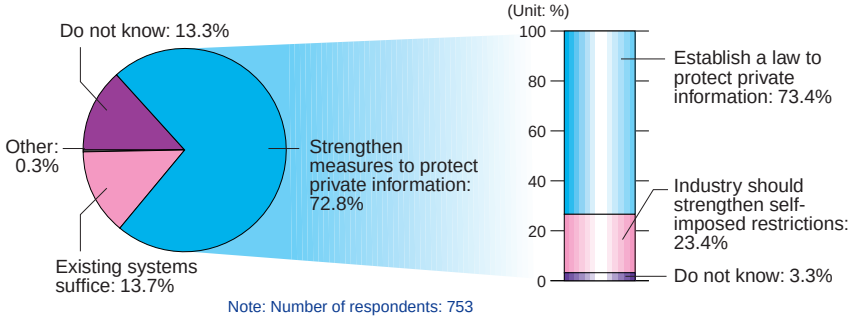
MPT will vigorously support such private-sector initiatives, and, taking account of the actual state of privacy protection in electronic commerce, will also consider implementing legal measures suitable for the network environment.

Fig. 1 Private Information seen as most in need of protection



Note: Number of respondents: 263
Note: Number of respondents: 155
Source: RSA Data Security Japan K.K. (http://www.rsa.com/japan/)

Fig. 2 Awareness of privacy protection issues and protection methods



Note: Number of respondents: 753

Fig. 3 Private Information Protection Mark

Source: "Report of the Study Group on Developing Legal Frameworks for an Advanced Info-Communications Society," MPT

Related sites: Guidelines on the Protection of Personal Data in Telecommunications Business (http://www.mpt.go.jp/whatsnew/guideline_privacy-e.html); Data Communications Association, Japan (http://www.dekyo.or.jp/); Private Information Protection Registration Center (http://www.dekyo.or.jp/hogo/kojin.htm); Cyber Business Association (CBA) (http://www.fmmc.or.jp/associations/cba/)

(2) Illegal or harmful information

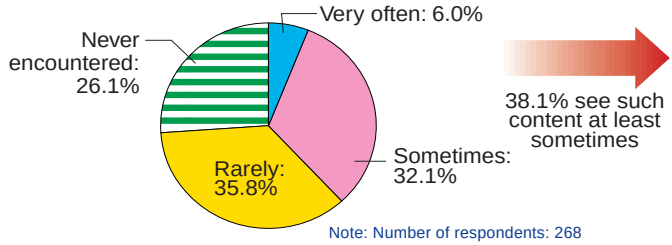
Nearly 40% of Internet users in Japan have encountered illegal or harmful information online.

According to the second Survey on Telecommunications Services in 1997, the combined number of respondents reporting that they had encountered illegal or harmful information in computer communications "very often" or "sometimes" accounted for 38.1% of all those surveyed. Asked about their feelings on seeing such content, 57.8% said they felt "annoyed" and 17.6% said "disgusted" (Figs. 1 and 2).

In an attempt to address such problems, since fiscal 1997, in collaboration with Yokohama City and the Yokohama Board of Education, MPT has been carrying out research and development on content filtering technology. This enables users to rate content on the Internet and to filter information upon accessing the network and downloading material from it. MPT also convened a Study Group on Rules for the Flow of Information in Telecommunications Services, which compiled its findings into a final report published in December 1997.

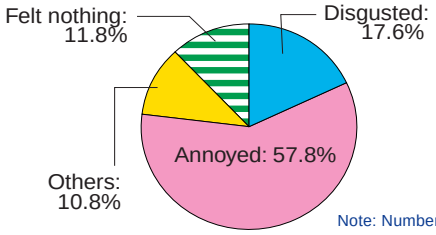
In February 1998, the Telecom Services Association, Japan, published a "Guideline on codes of practice for Internet Service Providers," which reflected comments and opinions requested from the public in May 1997. The guideline stipulates that when ISPs find illegal or harmful information distributed over the Internet, they must 1) ask the distributor to stop disseminating the information; 2) make such information inaccessible by, for example, removing it from a website, and 3) block the distributor's use of their service either temporarily or permanently.

Fig. 1 Rate of encountering illegal or harmful information on the Internet



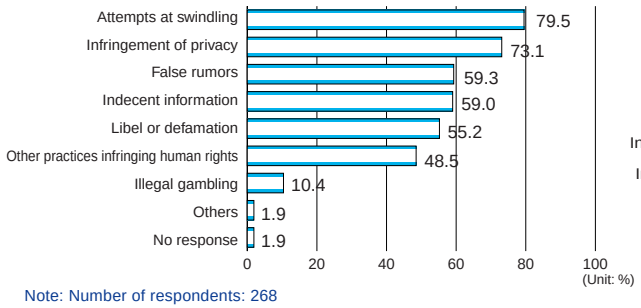
Note: Number of respondents: 268

Fig. 2 Impression of illegal and harmful information



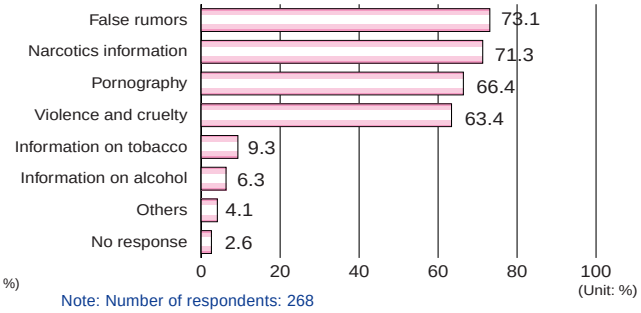
Note: Number of respondents: 102

Fig. 3 Information considered illegal (multiple replies possible)



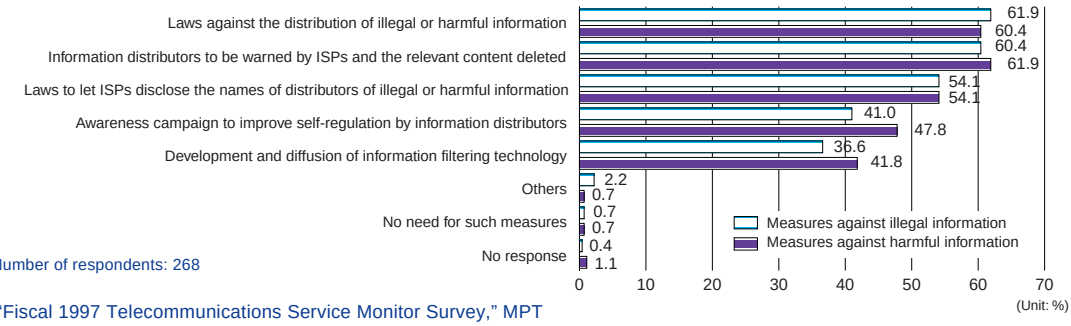
Note: Number of respondents: 268

Fig. 4 Information considered harmful (multiple replies possible)



Note: Number of respondents: 268

Fig. 5 Desired measures against illegal or harmful information (multiple replies possible)



Note: Number of respondents: 268

Source: "Fiscal 1997 Telecommunications Service Monitor Survey," MPT

Related sites: Telecom Services Association, Japan (http://www.telesa.or.jp/); Guideline for codes of practice for Internet Service Providers (http://www.telesa.or.jp/e_guide/e_guid01.html)

Column 5 Crime via the Internet

Online sales of "suicide pills" have fueled debate on the Internet's potential for harm.

In December 1998, a man in Sapporo, Hokkaido Prefecture, used a false name "Dr. Kiriko" to post on the Internet an advertisement for poison. It was bought by a woman in Suginami City, Tokyo, who used it to commit suicide. The seller also committed suicide in the same way.

The incident was extensively covered in the press and on television, with debate focusing on the potential dangers of a networked society in which the anonymity provided by the Internet makes it easier to spread information on suicide methods and harmful drugs.

Many bulletin boards were established, on which multifaceted discussions have continued, in addition to complaints against reports by the mass media being posted by another woman who supposedly purchased poison from the man who committed suicide.

Other incidents involving the Internet are listed in the table below.

Table Internet-related crimes

Incident	Outline
A threat case inviting a third party to assault a woman	A man in Kanagawa Prefecture around November 1998 posted a message on a bulletin board disclosing a woman's address and inviting a third party to assault her.
An attempted rape case using chloroform	A man in Saitama Prefecture around October 1998 unsuccessfully attempted to rape a woman by forcing her to inhale chloroform that had been purchased over the Internet.
Violation of the Horse Racing Law regarding taking a role of an agent to purchase horse race betting cards	A man in Ibaraki Prefecture around October and November 1998 illegally adopted the role of bookmaker by using his homepage to accept orders for the purchase of betting cards for horse races operated by the Japan Racing Association (JRA), and distributing the cards to customers.
Fraud, perpetrated under the guise of sales of telephone cards and psychotropic drugs	A junior-high school boy between August 1997 and January 1998 placed a fake advertisement on his own homepage entitled "underground pharmacy," stating that he would sell telephone cards depicting a popular animation as well as psychotropic drugs, and defrauded a total of some 70 victims that had sent in orders by e-mail for a sum of 1.25 million yen.
Fraud, perpetrated under the guise of computer mail order sales	An employee of a computer network access provider between March 1997 and July 1998 defrauded a total of 8.4 million yen from some 110 victims who sent orders by e-mail to a fake advertisement he had placed on a bulletin board offering computers and peripherals for sale.
Fraud, under the guise of postcard sales with big prize money originating from foreign countries	Representatives of a "paper" company established in foreign countries and elsewhere between May and December 1997 defrauded a total of 20 million yen from some 1,500 people by falsely advertising graphic art sold in aid of protecting the ocean environment, and offering big prizes in a lottery for purchasers.
A violation of the Pyramid Scheme Prevention Law regarding an international pyramid system, Pentagono	Future Strategies Corp., headquartered in Italy, collected members over the Internet by placing an advertisement on its website that said if a person becomes a member of Pentagono -- an international pyramid scheme operated by the firm -- by paying 13,200 yen, sells certificates issued by the firm to three new members, and becomes a top-ranked person on a seven-layered pyramid, then this person would get 9.62 million yen.
A violation of the Trademark Law, related to selling fake Stüssy-brand T-shirts over the Internet	A garment retailer in Iwate Prefecture between February and July 1998 sold fake Stüssy-brand T-shirts over the Internet homepage that the suspect obtained from a wholesaler.
A violation of the Copyright Law regarding duplication and sales of pirated music MDs over the Internet by a company employee	A company employee in Gifu Prefecture between December 22, 1997 and February 25, 1998 recorded a satellite digital broadcaster's music programs, duplicated them onto CDs and MDs then sold them to customers through his homepage while using several e-mail addresses and bank accounts.
A violation of the Copyright Law regarding duplication and sales of business-use software over the Internet by Chinese students studying in Japan	Between November 1996 and February 1998, Chinese students at a university in Miyagi Prefecture and others sold business software duplicated from a CD-ROM without permission, by advertising on a website they had created at the university under a false name.
A violation over the Internet by a civil servant of the Copyright Law regarding duplication and sales of duplicated videotapes of a popular artist	A civil servant in Toyama Prefecture between December 1997 and January 1998 recorded television programs featuring popular musicians "Dreams Come True" and sold duplicated tapes over the Internet
Violation of the Pharmaceutical Law regarding sales of unapproved medicine	Company executives and others in September 1998 opened their own homepage accessible by many and unspecified people, placing an advertisement for unapproved medicine in Japan by providing its name, efficacy information and promised results.

Sources: Various

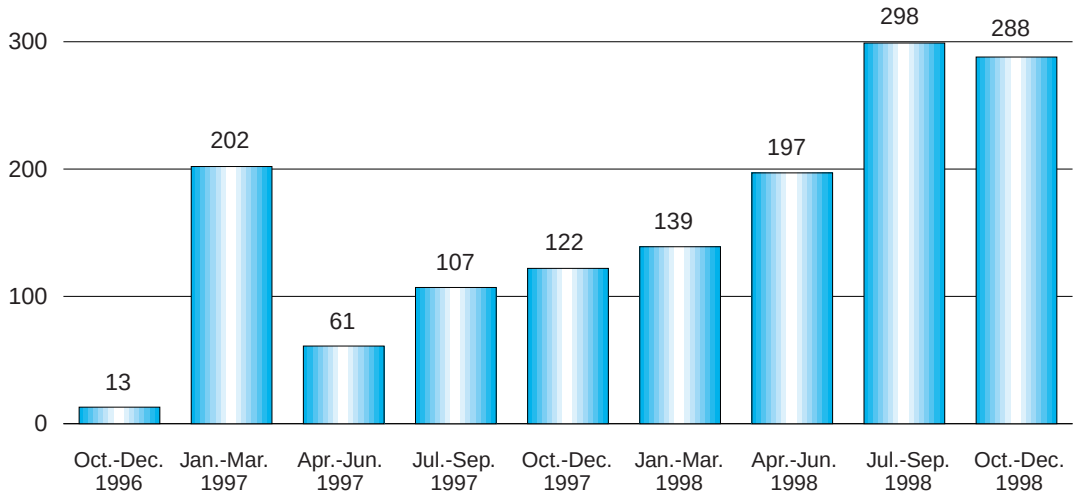
(3) Unauthorized access

Legal and technical measures are being considered to prevent unauthorized access to data on the Internet.

As the Internet becomes increasingly common in both business and everyday life, there are more and more cases of unauthorized access to data through the use of another person's identity or password. In 1998, the Japan Computer Emergency Response Team Coordination Center (JPCERT/CC) received reports of 923 cases of unauthorized access and other problems such as "spam" e-mail. This represented a rise of 87.6% over the previous year (Fig. 1). However, as many companies tend not to report incidents from fear of undermining their credibility and becoming the target of further attacks, the actual number of cases is thought to be much larger than those reported.

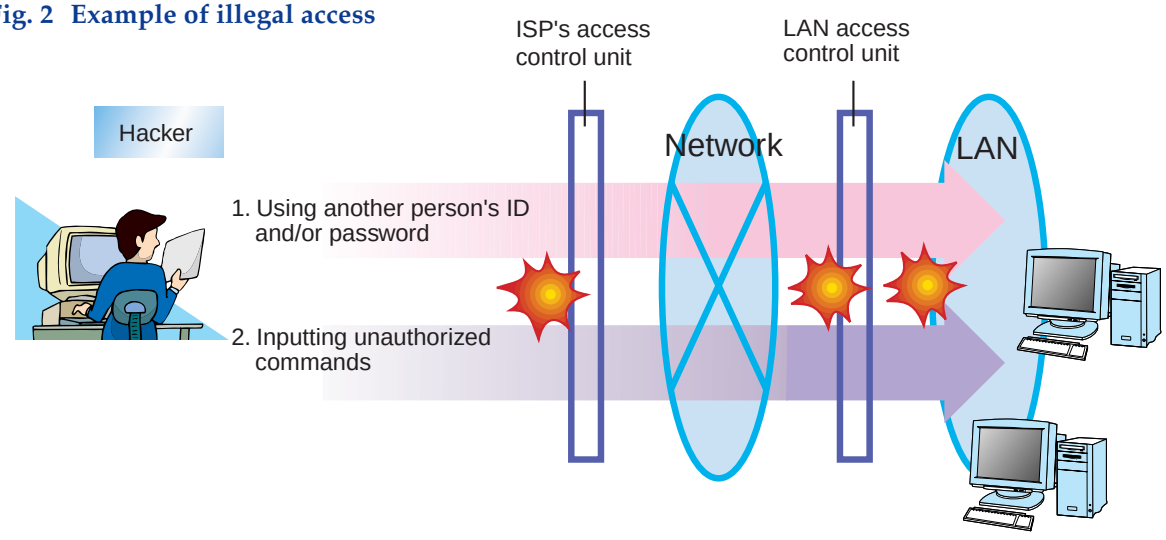
In May 1998, the members of the Group of Seven (G7) industrialized nations agreed at the Birmingham summit that they would revamp their legal systems to deal with sabotage of telecommunica-

Fig. 1 Number of illegal access reports received by JPCERT/CC



Source: Japan Computer Emergency Response Team Coordination Center (http://www.jpcert.or.jp/)

Fig. 2 Example of illegal access



Related site: Japan Computer Emergency Response Team Coordination Center (http://www.jpcert.or.jp/english/index.html)

tions and computer systems. All G7 nations except Japan already have some form of legal framework to punish those who illegally access information on the Internet. It is imperative for Japan to also establish such a framework as quickly as possible.

MPT has been considering how to deal with the problem of unauthorized access, through the Study Group on Security and Reliability of Information Telecommunications Networks, which met from November 1996 to June 1997, and by amending in July 1997 its Guidelines on the Security and Reliability of Information and Telecommunications Networks, originally formulated in 1987.

MPT continues to promote both legal and technical measures against unauthorized access. In April 1999, in conjunction with the National Police Agency and the Ministry of International Trade and Industry, MPT submitted to the 145th Diet session a bill to prohibit and take measures against unauthorized access. In addition, from fiscal 1999, MPT has undertaken research and development of technology of searching system for the origin of the unauthorized access, based on various tools for monitoring individual networks.

Table Gist of the bill to prohibit and take measures against unauthorized access

Items	Details
1. Objective of the bill	• Prevention of crimes involving computers connected via telecommunication lines and maintenance of public order concerning telecommunications
2. Outline (1) Prohibition and punishment of unauthorized access	• Prohibition of unauthorized access (unauthorized use of identification data, etc. belonging to a genuine user of a computer with access control functions, as a means of gaining access to that computer) and punishment of those infringing the prohibition
(2) Prohibition and punishment of abetting unauthorized access	• Prohibition and punishment of persons who offer identification data, etc. to a third party without obtaining the permission of the genuine user
(3) Security measures to be taken by access administrators at networked sites	• Regulation stipulating the need for access administrators to exercise diligence in taking security measures against unauthorized access to a specific computer at a networked site
(4) Support from prefectural public safety commissions i. Support from prefectural public safety commissions	• The commissions to take appropriate emergency measures upon the request of an access administrator
ii. Support from central government	• The National Public Safety Commission, the Minister of Posts and Telecommunications and the Minister of International Trade and Industry to make announcements on the status of R&D on access control technology

(4) Computer viruses

Infection via networks remains a serious problem.

The Information-technology SEcurity Center (ISEC) of the Information Technology Promotion Agency (IPA), Japan, received 2,035 reports of attacks by computer viruses in 1998, a slight fall from the previous year (Fig. 1). By infection route, while the 34.4% infection rate from floppy disks and other external media remained static during 1998, infection via e-mail and downloads from networks rose by 7.6 percentage points and 2.3 percentage points respectively. Thus, with the growing use of the network, Internet media are taking the place of external media as routes of infection by computer viruses (Fig. 2). According to MPT's "Fiscal 1998 Communications Usage Trend Survey (Enterprise Section)" 48.9% of corporations using the Internet said they are worried about virus infection (Fig. 3).

To help relieve the anxiety of network users about virus attacks and to improve the security and reli-

Fig. 1 Number of reports of virus infection

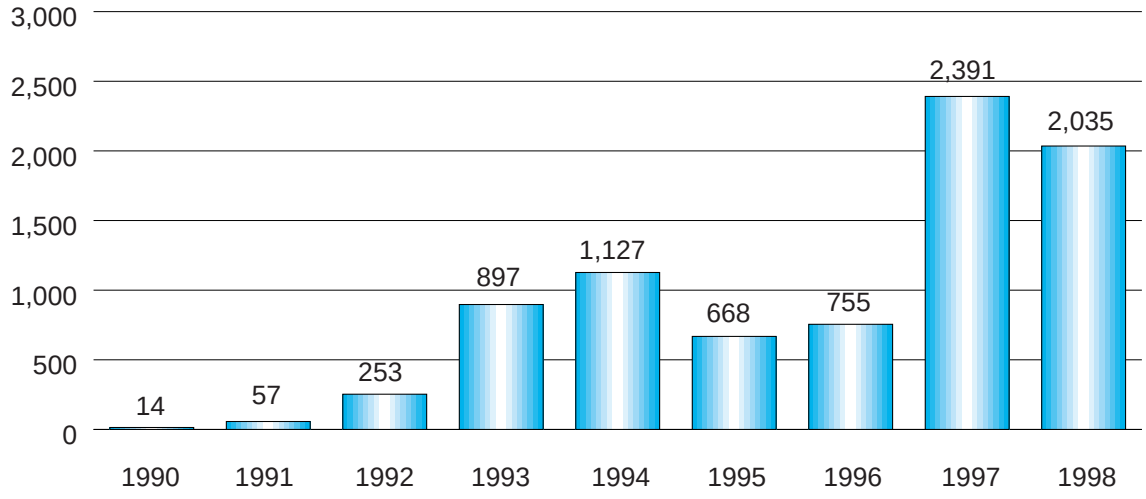
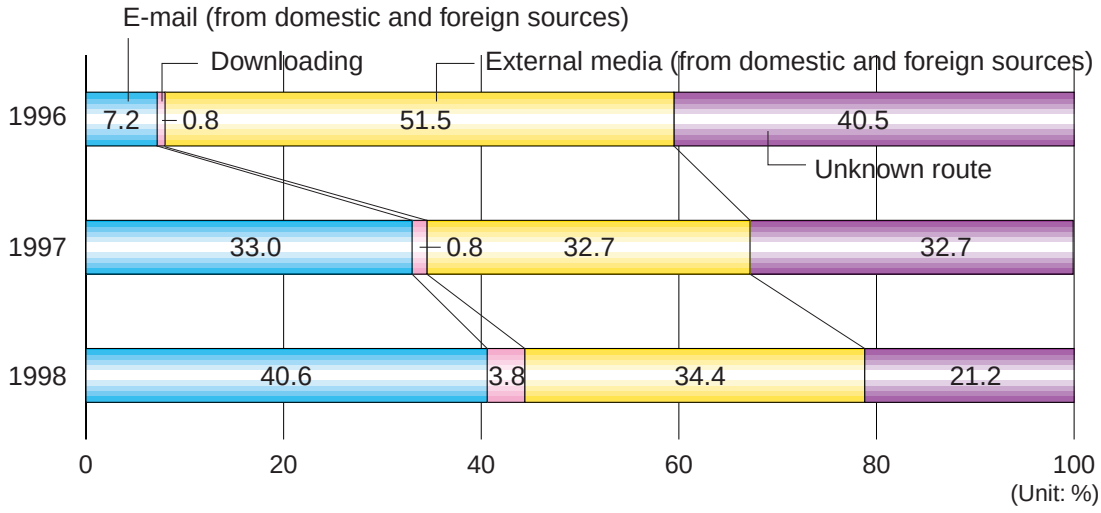


Fig. 2 Ratio of infection routes

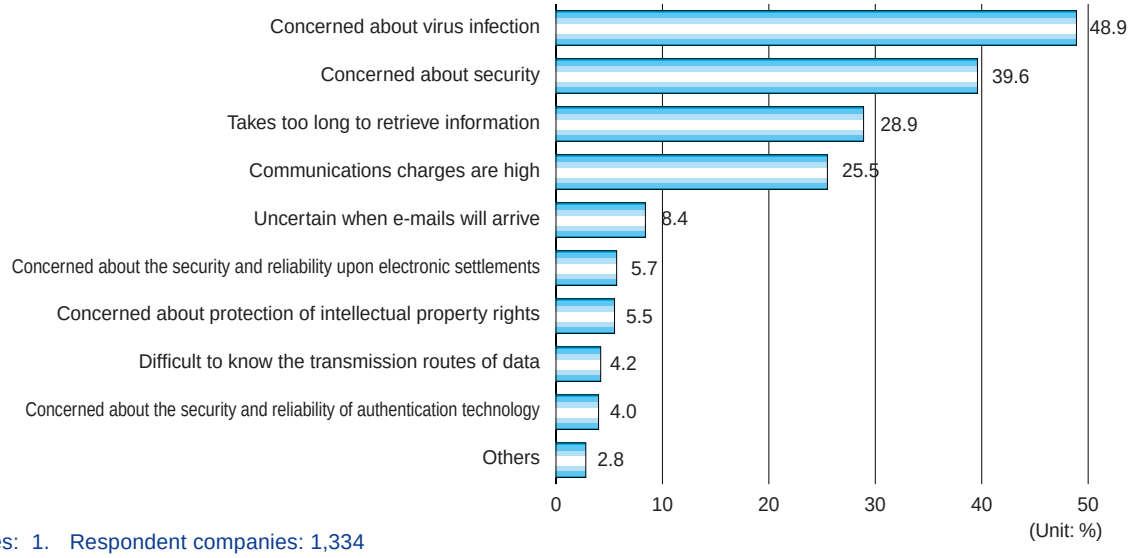


Source: Information-technology SEcurity Center (ISEC) (http://www.ipa.go.jp/).

Related site: Information-technology SEcurity Center (ISEC)
(http://www.ipa.go.jp/)

ability of communications networks, in June 1998 the Data Communications Association, Japan, and the Foundation for MultiMedia Communications jointly established a Virus Consulting Center (VCON). It offers the latest information on viruses and links to websites providing online diagnoses and disinfection, as well as information on vaccine software and first-aid treatments. Between June 1998 and March 1999, the number of times the VCON website was accessed each month rose from below 20,000 to 80,000. There was an especially high rate of access in August 1998, when the PE_CIH virus, which reformats hard disks on the 26th of every month, drew wide attention and network users turned to VCON for disinfection methods (Fig. 4).

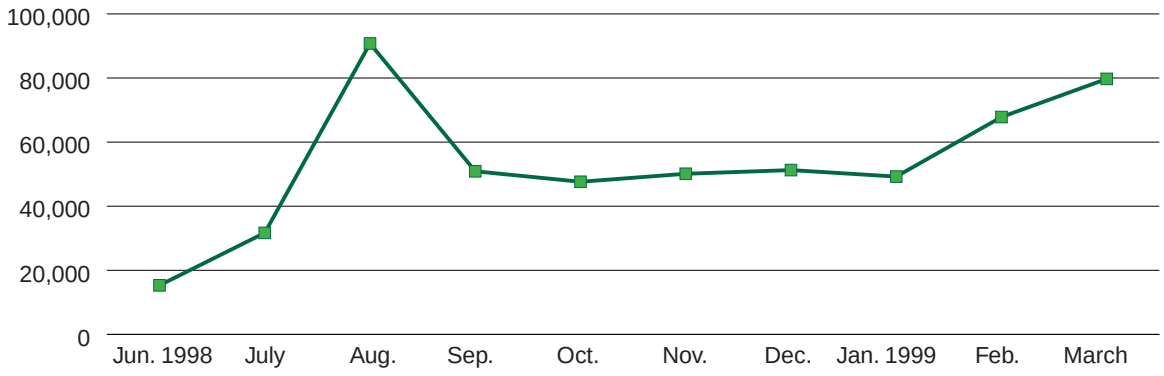
Fig. 3 Dissatisfaction with the Internet



Notes: 1. Respondent companies: 1,334
2. Respondents selected up to three replies in order of priority. The first priority was awarded 3 points, the second 2 points and the third 1 point, then each ratio was calculated based on those points divided by triple the number of respondents.

Source: "Fiscal 1998 Communications Usage Trend Survey (survey on corporations)," MPT

Fig. 4 Access rate to the VCON website



Source: Virus Consulting Center (VCON)

Related sites: Data Communications Association, Japan (http://www.dekyo.or.jp/); Foundation for MultiMedia Communications (http://www.fmmc.or.jp); Virus Consulting Center (VCON) (http://www.vcon.dekyo.or.jp/)

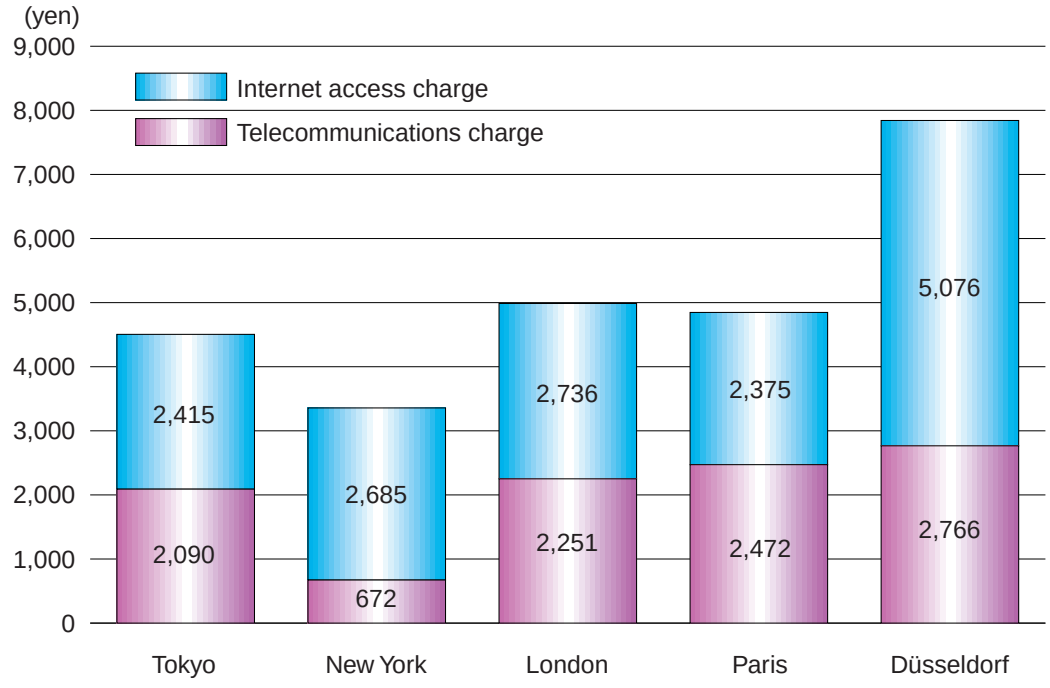
I-5-2 Toward diffusion of the Internet
(1) Costs

International comparison of Internet usage costs

In the "Seventh Survey of Active Internet Users" conducted by Nikkei Multimedia magazine in December 1998, about 34.0% of respondents said the biggest point of dissatisfaction they felt in using the Internet concerned telephone charges. However, when a comparison was made between charges in five major world cities for an individual's Internet usage for 15 hours per month, the rates in Tokyo were seen to be second lowest after New York.

According to the survey, Internet access charges were lowest in Paris, closely followed by Tokyo. As for telecommunications charges, those in New York were far lower than in any other city, with Tokyo's charges second lowest. Unlike all the other cities, in New York, local telephone calls are charged at a flat rate, irrespective of duration, making Internet usage cheaper. The lesson for Japan is that, in order to encourage the spread of Internet use, it is necessary to offer a variety of telecommunications charge systems and to lower charges overall.

Fig. International comparison of charges for Internet use (15 hours per month)



Notes: 1. Figures for Internet access charges are those covering 15 hours.
2. Telecommunications charges from users to access points are based on the local call rate charged by the relevant carrier.
3. Internet services and ISPs in each city are: OCN (NTT), Tokyo; AT&T World Net (AT&T), New York; BT Internet Plan Unlimited (British Telecom), London; Wanado (France Télécom), Paris; T-Online (Deutsche Telekom), Düsseldorf.

Source: "Fiscal 1997 International Telecommunications Rate Differentials Survey," MPT

(2) Electronic signatures and authentication

Electronic signature and authentication systems are being introduced in various countries.

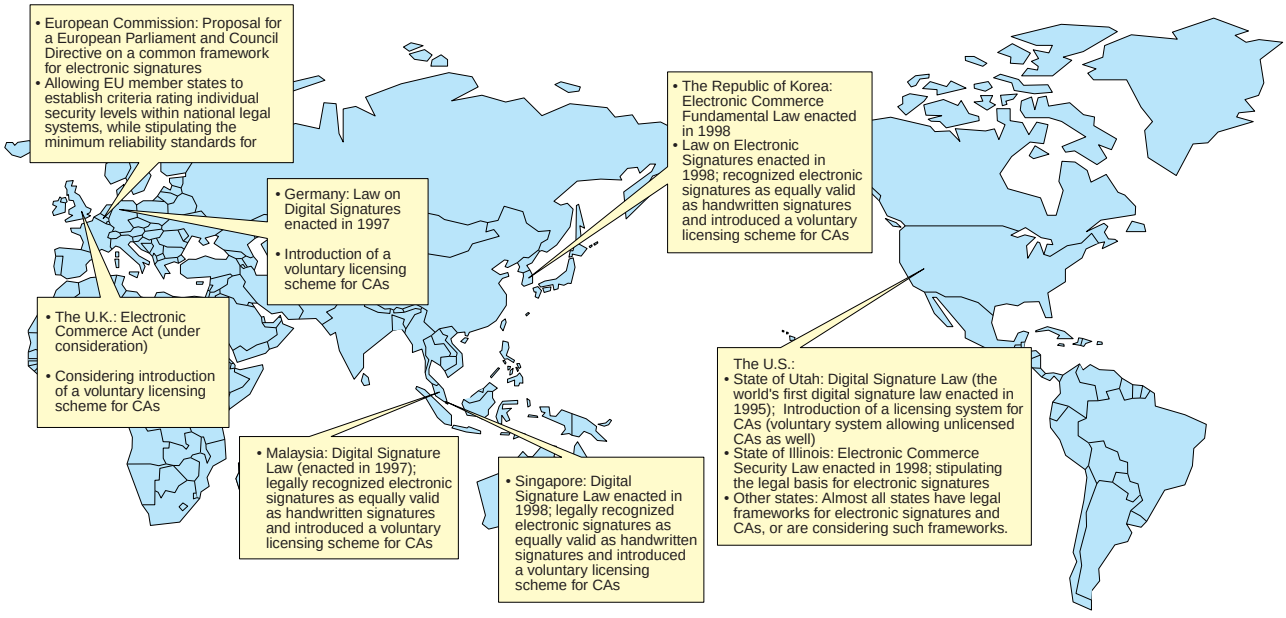
As electronic commerce enables transactions between two parties who never have to meet face-to-face, concerns have arisen over how to ensure the authenticity of the party at the other end of the line, and whether transferred data reach their destinations with their content intact. To address these concerns, it is very important to create a system by which a third party can certify the identities of the parties involved in a transaction and confirm that transferred data have not been intercepted or tampered with during transmission. In other words, a certification authority (CA) is required. Several companies in Japan have started providing electronic authentication services. Meanwhile, electronic certification systems were established in other countries (Fig.).

Since January 1999, MPT has been hosting a Study Group on Encrypted Communications, whose aim is to formulate cryptography policy, as well as to discuss the technological and legal structure of certification services using cryptography. The study group also takes account of the status of international harmonization of cryptography policies and certification services, from the standpoint of ensuring network security and reliability. Specific items the study group has been discussing include:

1) The status of cryptography use in communications and hurdles that must be cleared;
2) Other countries' cryptography policies and legal frameworks for certification services targeting encrypted communications;
3) Cryptography policy and legal framework preparations in Japan for certification services targeting encrypted communications;
4) Desirable systems for international encrypted communications systems.

In addition, MPT began a trial in March 1999 aimed at advancing One-Stop Administrative Services based at post offices, including the provision of e-mail services with their content certified as valid and the identity of the sender authenticated (Refer to III-8-1-(1)).

Fig. International moves to create legal frameworks for authentication systems



(3) Electronic Money

To overcome security concerns, electronic cash systems are being developed.

In Japan, the vast majority of payments for Internet shopping are made by directly remitting money into bank accounts or through cash-on-delivery (COD). This is because many customers do not feel comfortable about sending their credit card numbers over the network, or shops find online payment transaction charges fairly high, especially when selling goods or services worth a small sum of money. For these reasons, there are still not very many Japan-based Internet traders that accept credit cards or other electronic payment methods (Refer to Endnote 4) (Fig. 1).

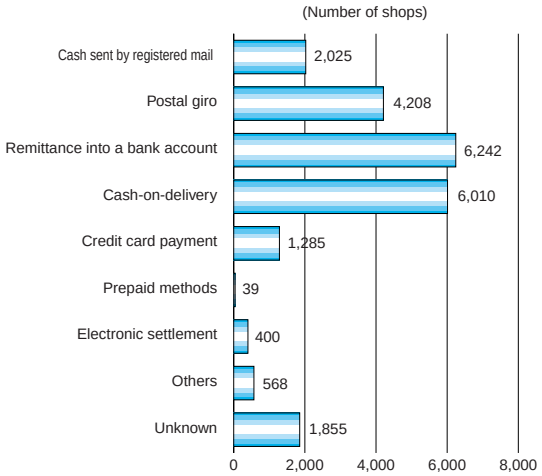
According to the "Seventh Survey of Active Internet Users" conducted by Nikkei Multimedia magazine in December 1998, more than two-thirds of those surveyed expressed concerns about the protection of private information in Internet shopping. This figure is comprised of 63.1% of respondents who said they had concerns about the interception of private data, including credit card numbers, plus 7.4% who were worried about traders using personal information for unauthorized purposes (Fig. 2).

To address such deep-rooted concerns, the Cyber Business Association, a private Japanese organization, commenced an Internet Cash trial service in September 1998 with 1,000 users, which distributed electronic money with features similar to real cash over the Internet. The second round of the Internet Cash service began in April 1999 with the participation of 10,000 users (Fig. 3). The main features of Internet Cash include: 1) availability for exchange between individuals; 2) it enables users to shop without disclosing their names, and 3) unused funds can be transferred to users' bank accounts.

Internet Cash is being promoted with the goal of establishing it as an international standard. For this purpose it has been demonstrated at international arenas, including the October 1998 Ottawa Conference on Electronic Commerce held by the OECD, as well as the 19th Meeting of the Asia Pacific Economic Co-operation (APEC) Telecommunications Working Group (APEC TEL 19), convened in Miyazaki Prefecture in March 1999.

Meanwhile, with the objective of developing various settlement methods for electronic commerce, the Integrated Next Generation Electronic Commerce Environment Project (INGECEP), an initiative by Japan's Telecom Services Association, was launched in October 1998. A world first, this official APEC project links Singapore and Japan, and is intended to create systems for online transactions using a bank transfer settlement method (Fig. 4). Activities of the project have focused on consumer protection efforts related to international electronic commerce.

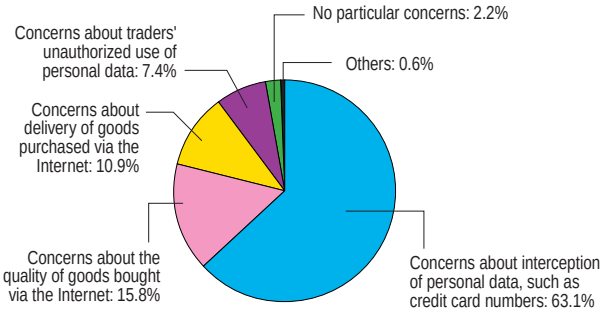
Fig. 1 Settlement methods used at Japan-based online traders (multiple replies possible)



Note: Respondent Japan-based traders: 13,523

Sources: NRI Cyber Business Case Bank (http://www.ccci.or.jp/cbcb/cb_about_e.html), the Center for Cyber Communities Initiative, February 24, 1999

Fig. 2 Japanese users' concerns about Internet shopping (December 1998)



Note: Respondents: 8,699

Source: "Seventh Survey of Active Internet Users" conducted by Nikkei Multimedia magazine in December 1998, (published in February 1999 issue)

Related sites: Cyber Business Association (http://www.fmmc.or.jp/associations/cba/); Internet Cash (http://www.icash.gr.jp/)

Fig. 3 Outline of Internet Cash system

1. Users withdraw electronic money from the issue center via a financial institution into an IC card.
2. Users buy goods from a member shop in a virtual mall using electronic money, or users can also transfer electronic money among themselves.
3. A member shop deposits the electronic money it receives into a financial institution, which transfers the same amount into the shop's bank account. The same procedure applies to for transfers to users' bank accounts.
4. Financial institutions return the electronic money received to the issue center.
5. The issue center checks whether the returned electronic money was illegally used or copied.

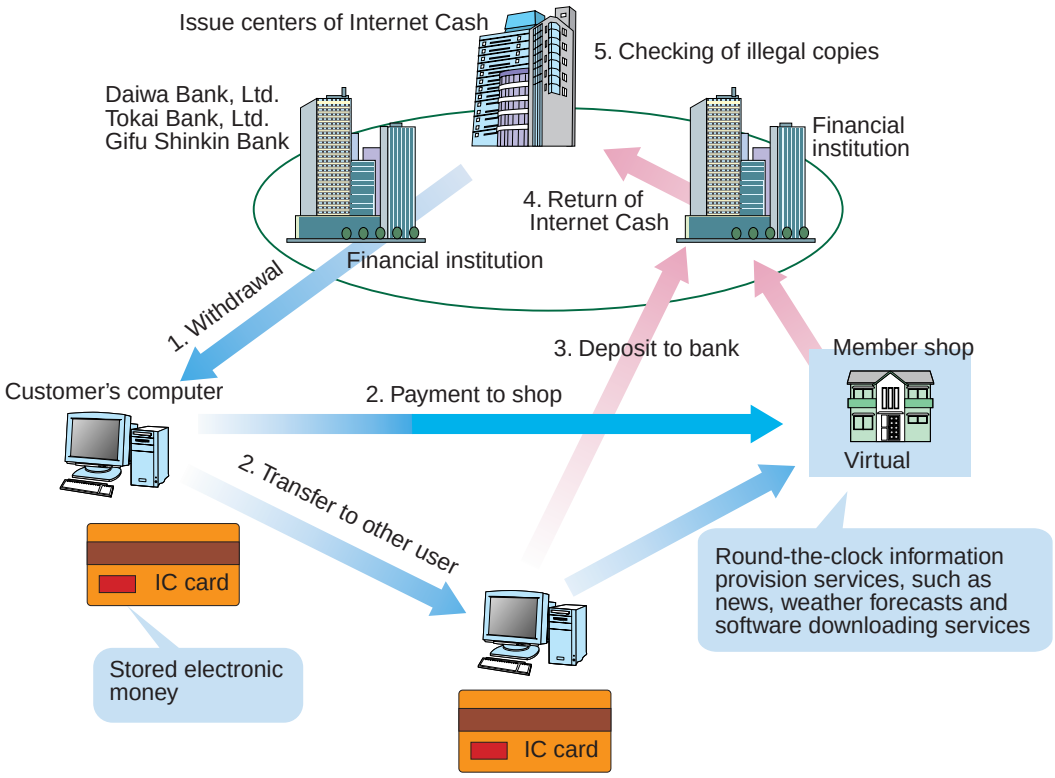
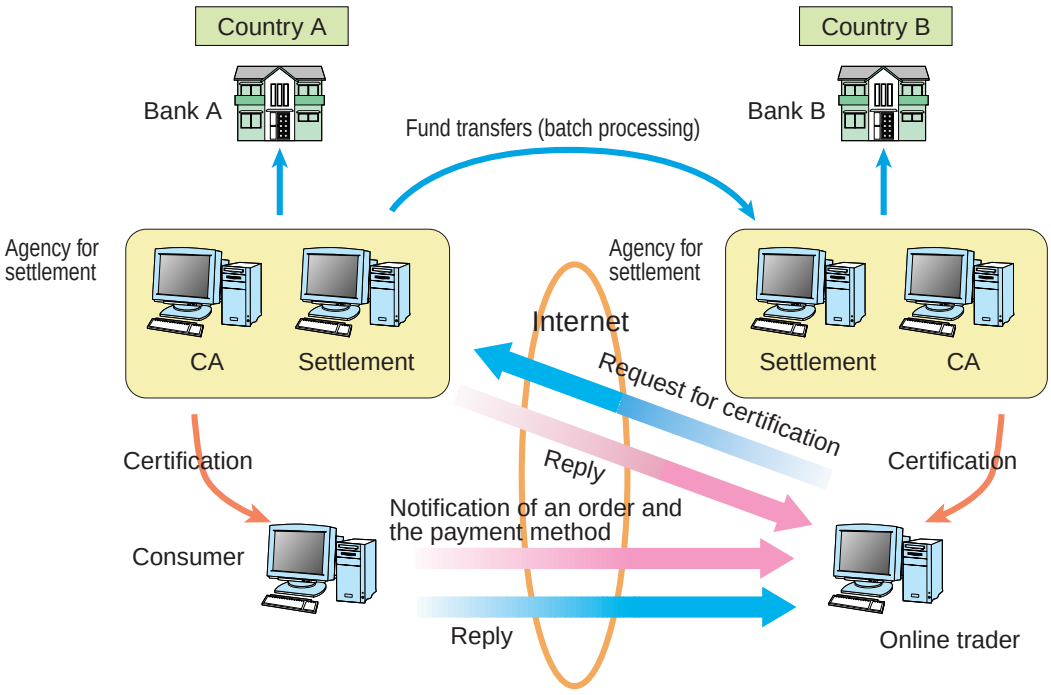


Fig. 4 Settlement by bank transfer



Related site: Telecom Services Association (http://www.telesa.or.jp/)

(4) Use of the Internet in schools

Aiming to establish an environment where children can freely use the Internet

Schools have a responsibility to develop in children as high a degree of information literacy as possible, to enable them to live successfully in the info-based society of the future. Among Japan's state schools, 18.7% had access to the Internet by the end of March 1998 (Table and Fig. 1). There are moves to connect all schools to the Internet by fiscal 2001, and new national curriculum standards will be put into practice in fiscal 2002 that include education in information technology.

Other countries are also promoting use of the Internet in education. For example, U.S. President Clinton has announced the objective of connecting all U.S. classrooms to the Internet by 2000 and enabling every child to have access to the network by the time they reach twelve. School Internet connection plans in other countries are outlined in Fig. 1.

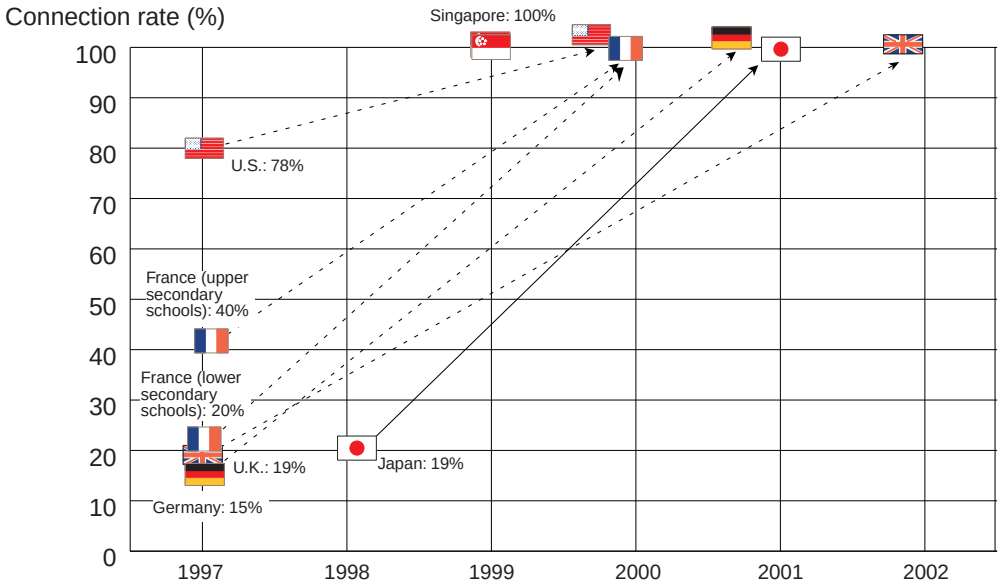
In Japan, MPT and the Ministry of Education launched the "Committee for Use of the Internet in Education," which produced a final report, aiming to establish an environment where children can freely use the Internet in June 1998. The report calls for every child to be able to use the Internet at advanced level, and for the establishment of an environment allowing Internet use not only in computer rooms but also in ordinary classrooms and libraries, without the need for concern about time

Table Number of state schools with Internet access (31 March 1998)

	Number of schools (A)	Schools connected (B)	Ratio of connected schools (B/A)	Schools with computers (C)	Ratio (B/C)
Elementary schools	23,811	3,230	13.6%	22,634	14.3%
Lower secondary schools	10,475	2,375	22.7%	10,455	22.7%
Upper secondary schools	4,162	1,557	37.4%	4,162	37.4%
Special schools	918	201	21.9%	905	22.2%
Total	39,366	7,363	18.7%	38,156	19.3%

Source: "Survey of IT Education in Schools (fiscal 1997)," Ministry of Education

Fig. 1 School Internet connection plans in foreign countries



Note: In the U.S., all classrooms will have access to the Internet by 2000.
In other countries, all schools will have access to the Internet by 2000.

Related sites: Aiming to establish an environment where children can freely use the Internet (http://www.mpt.go.jp/whatsnew/school/net9901.html); "Survey of IT Education in Schools (fiscal 1997)" (http://www.monbu.go.jp/special/media/00000017/)

limitations in accessing information. It also calls for advanced telecommunications circuits to be developed to improve Internet connections.

Following this report, and based on the "Law Regarding the Promotion of Research and Development on Joint Operation Initiatives Dealing with Network Technology" (Refer to III-6-3), MPT has embarked, jointly with the Ministry of Education, on research and development of technology that makes use of such components as fiber-optics, Digital Subscriber Lines (DSL) and satellite communications to provide high-speed access to the Internet at around 1,000 elementary, upper and lower secondary schools in 30 network areas throughout the country (Fig. 2). The system will include simultaneous Internet access from multiple computers in classrooms and is expected to make a major contribution to the expansion of Internet use in Japanese schools.

Moreover, to lessen the burden of telecommunications costs on schools, in September 1998 the Minister of Posts and Telecommunications asked carriers and ISPs to introduce discounts or other measures to reduce schools' Internet connection charges. In response, carriers have started offering various special discount rates for schools. For example, while NTT normally charges 10 yen per 3 minutes for local calls via its ISDN lines, a plan is being considered to allow schools to use 100 hours at about a 9,000-yen flat rate (Fig. 3). Also, schools are being offered Internet access charges of about half the normal level, mostly by major ISPs.

Fig. 2 Experimental advanced Internet access networks for schools

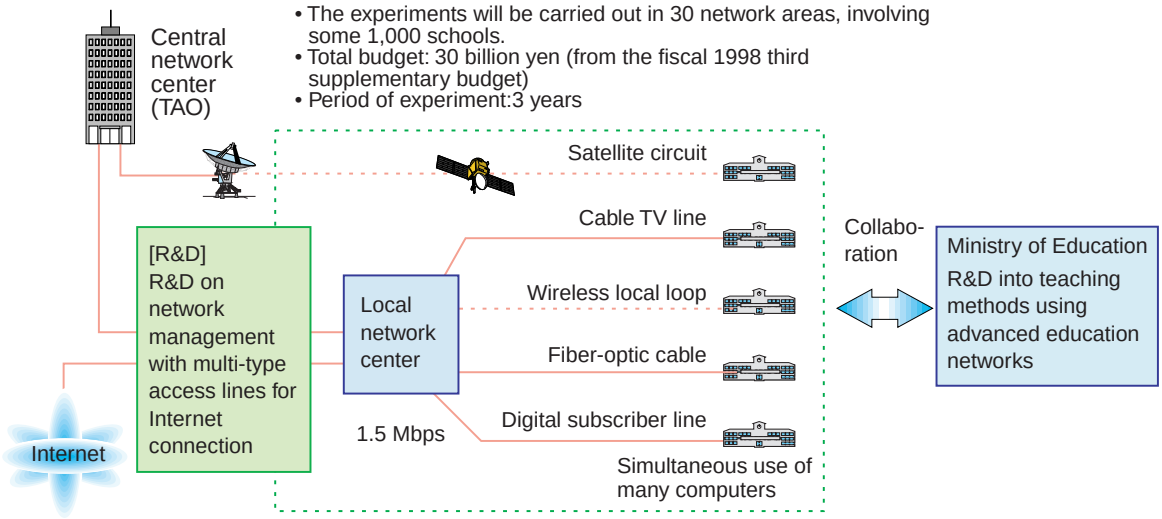
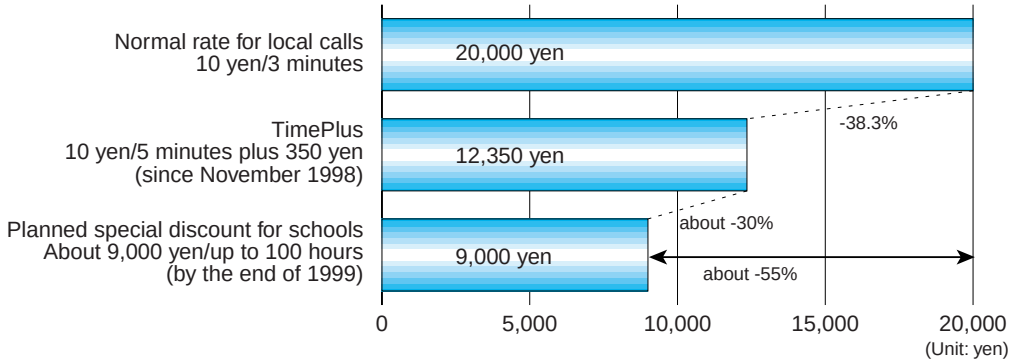


Fig. 3 Telecommunications charges for 100 hours Internet access at schools (using NTT's INS Net 64)



(5) The elderly and people with disabilities

A support system is being developed to improve information literacy.

According to the "Survey of the Elderly and People with Disabilities," conducted by the Promotion Committee of the Info-communications Support System for People with Disabilities, a joint initiative of MPT and the Ministry of Health and Welfare, about 80% of the elderly and 70% of disabled people said they do not use computers or the Internet.

Asked about the reasons, both groups expressed their uneasiness and lack of information, choosing replies that indicated their insufficient knowledge of the Internet, unfamiliarity with computers, lack of people to teach them about these things and lack of opportunity to use such equipment. Asked about what would motivate them to start using computers and the Internet, many of those surveyed said they would like to see subsidies for the purchase of computers and for telecommunications charges, support centers and instructors that they can turn to in trouble, and facilities where they can learn how to use computers (Figs. 1 and 2).

In addition, many elderly people and those with

Fig. 1 Reasons for not using the Internet (multiple replies possible)

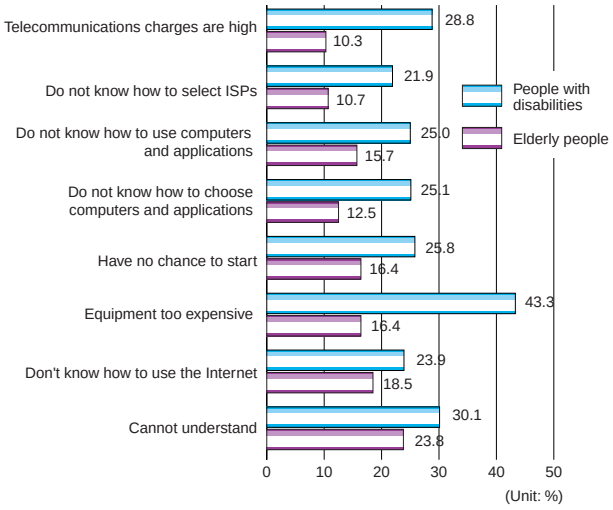


Fig. 2 Factors required for starting Internet use (multiple replies possible)

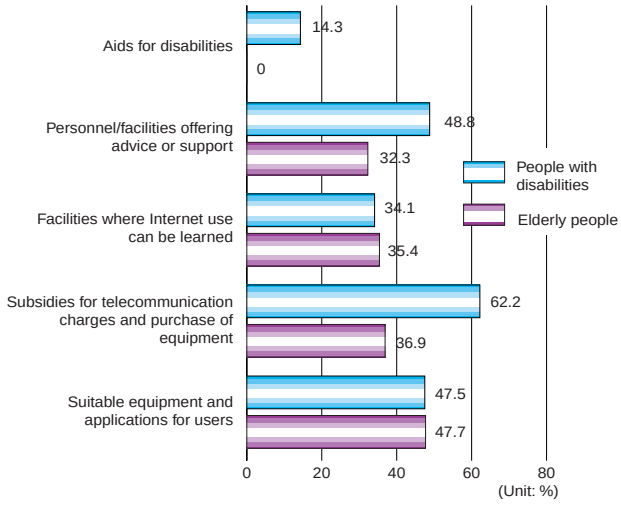


Fig. 3 Dissatisfaction in use of the Internet (multiple replies possible)

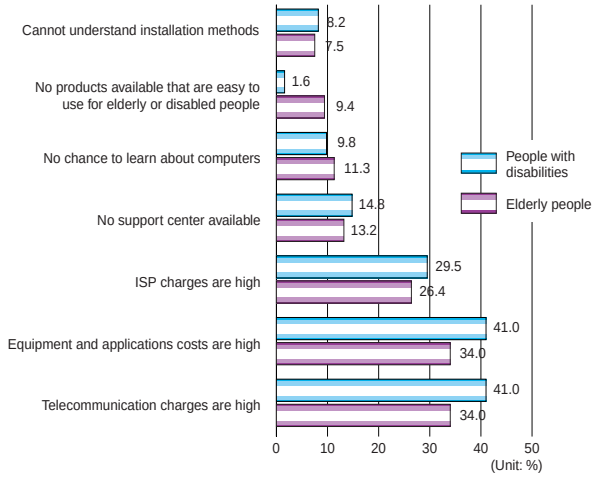
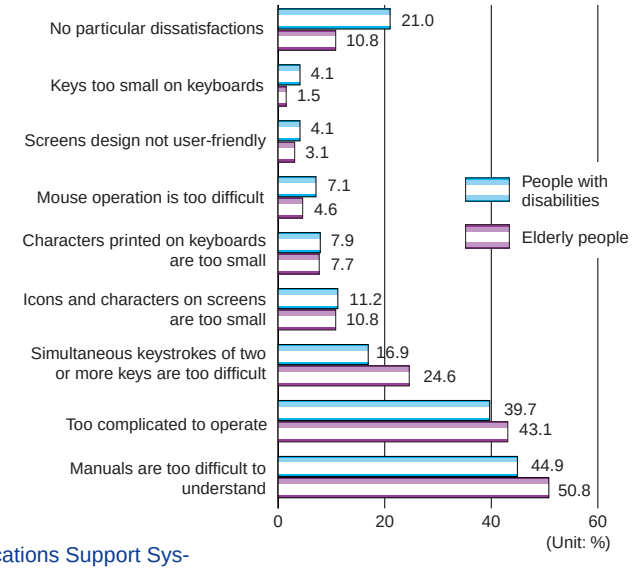


Fig. 4 Dissatisfactions in use of computers (multiple replies possible)



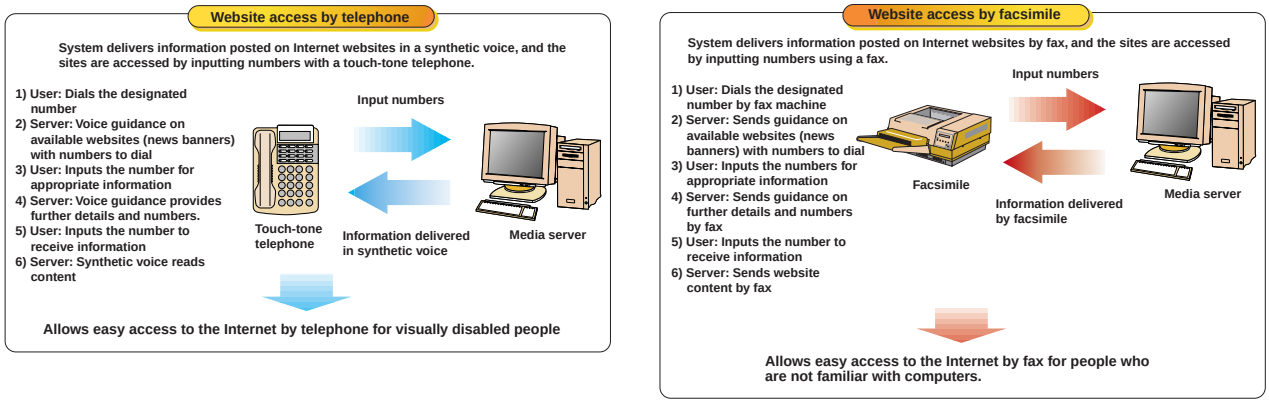
Source: "Report of the Promotion Committee of Info-communications Support System for People with Disabilities," MPT and Ministry of Health and Welfare.

disabilities who said they are already using the Internet indicated that they are dissatisfied with such cost-related factors as telecommunications and ISP charges, as well as equipment costs. Many also indicated that they find difficulties in using computer keyboards (Figs. 3 and 4).

As for the cost-related problems, some ISPs have already introduced discount packages for the elderly and people with disabilities. And to help those with keyboard problems, in October 1997 MPT tested a system that enables the Internet to be accessed by telephone or facsimile machine -- devices that are relatively easy to use for the elderly and individuals with disabilities (Fig. 5). Although there was still room for improvement, the test results clearly showed that the use of telephone in accessing the Internet was very effective for visually-impaired people, and use of facsimile machines made access easier for the elderly.

In addition, to help improve the information literacy of elderly people, from December 1998 to March 1999 MPT tested a model "Telelearning System" with the support of Kanazawa City, Ishikawa Prefecture. The system enabled people who have great difficulty going out of their homes to learn how to use the Internet easily and effectively from a lecturer in a remote location. With the system, the lecturer could operate computers installed in each person's house, including pointing to icons and menus on the monitor. A total of 40 elderly people took part in 12 training sessions and, by the end of the program, they had become able to design their own websites. It is anticipated that this system will be used throughout the country in Internet courses targeting the elderly.

Fig. 5 Experiment to facilitate Internet access by the elderly and people with disabilities



Photos Test of the Telelearning System to help older people learn how to use the Internet (left) and a computer screen of a learner (right)

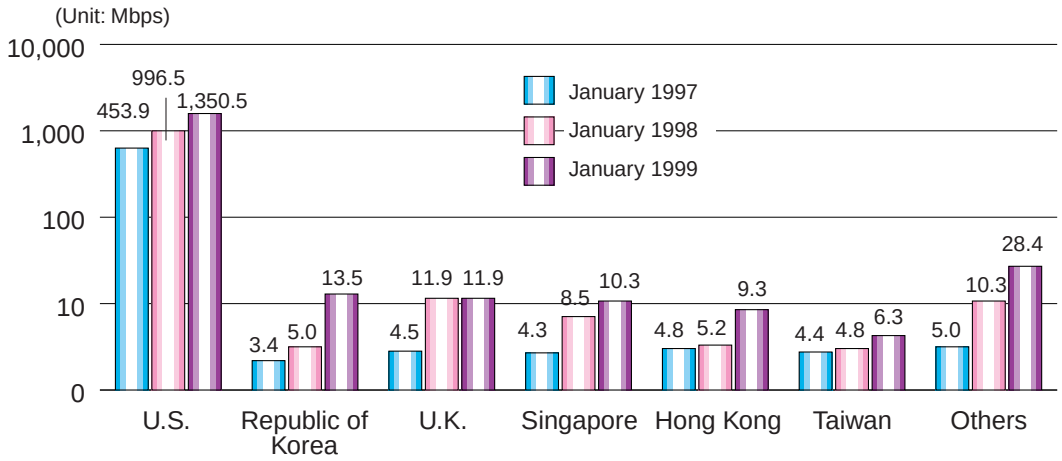
I-5-3 Advancement of the Internet
(1) Infrastructure

Much larger capacity is urgently needed in domestic and international communications circuits.

The total line capacity for commercially-based Internet links between Japan and other countries reached 1,430 Mbps in January 1999, up 37.2% from the previous January, rising continuously. In 1997, 1998 and 1999 the capacity of Internet communications circuits between Japan and the U.S. accounted for about 95% of the total (Fig. 1). Line capacity between the two countries in January 1998 had increased by 119.5% since January 1997 and it rose 35.5% up to January 1999.

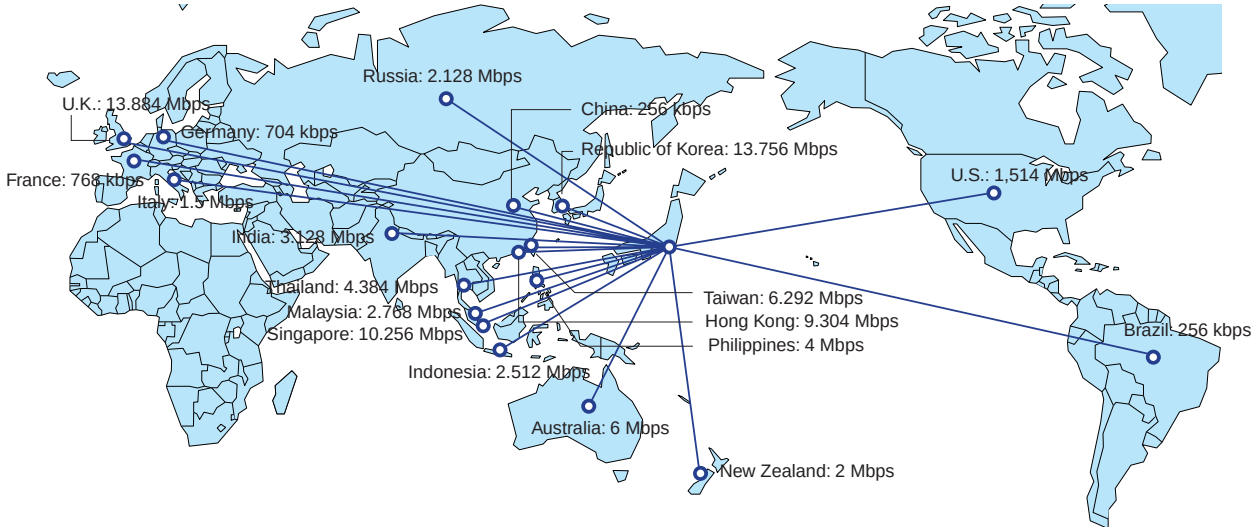
With the recent surge in the number of Internet users in Japan and increased use of multimedia, demand has been mounting for much higher speed communications circuits. This has driven ISPs to take various actions such as expanding line capacity and opening new communications lines to countries abroad. Nonetheless, ISPs apparently still have difficulty securing enough line capacity between Japan and the U.S., judging from the recent traffic congestion in the trans-Pacific submarine cables.

Fig. 1 Growth in line capacities for Internet links between Japan and other countries



Note: Figures indicate the total capacity of ISPs with international connections at the beginning of each year, but figures for variable line speeds and figures without announcement are excluded.
Sources: Impress Corp. and others

Fig. 2 Internet links between Japan and other countries



Note: Figures indicate the total capacity of ISPs with international connections at the beginning of each year, but figures for variable line speeds are excluded.
Sources: Impress Corp.; National Center for Science Information Systems, IMnet Secretariat (JST Office)

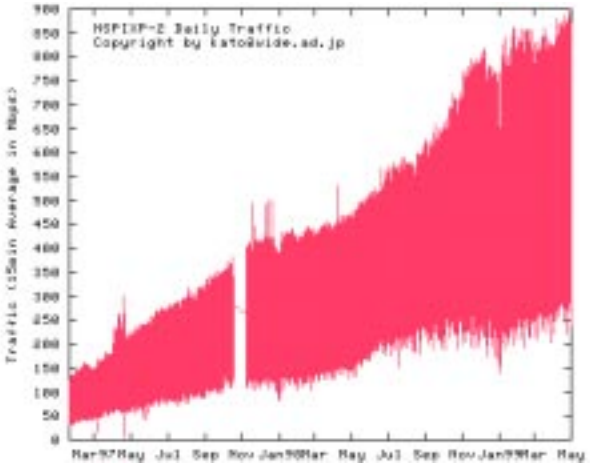
Meanwhile, the total capacity of Internet communications circuits linking Japan with places abroad other than the U.S. grew by 74.7% in 1998 (Fig. 1). As of January 1999, Japan had links with 19 countries and areas (Fig. 2).

As for efforts to expand the capacity of circuits for Internet use, KDD Corp. nearly doubled the capacity of its Japan-U.S. circuits from 135 Mbps to 245 Mbps in September 1998, besides opening up connections with France in June and with Russia, New Zealand and some other countries in September 1998. Cable & Wireless IDC (since August 31, 1999) also established a new 155-Mbps Japan-U.S. communications line in March 1999, increasing its total Japan-U.S. line capacity to 245 Mbps, almost the same as KDD's.

In Japan, many ISPs have adopted the Internet Exchange (IX) system, in order to secure enough line capacity by interconnecting their lines and exchanging part of their traffic. Internet traffic through the most prominent IX, NSPIXP-2, as well as a commercial one, IPIX, both increased by more than 100% from the previous year (Figs. 3 and 4). Each IX has largely increased its network capacity (Fig. 5), and the capacity of Internet links between Tokyo and Osaka tripled in 1998 (Fig. 6).

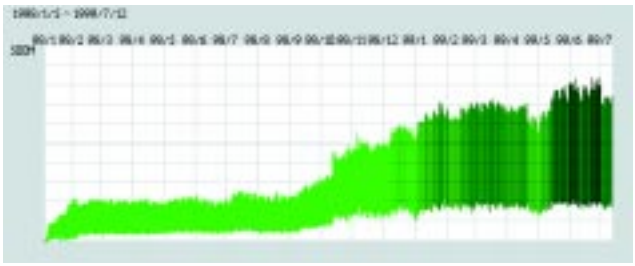
There are plans to lay submarine cables at speeds of between several ten to several hundred Gbps (Refer to II-3-1), and technology is being developed that should enable transmission speeds of some T (Tera: 10^{12}) bps. It is likely that establishment of Tbps-class backbone networks and R&D of P (Peta: 10^{15}) bps-class ultrahigh-speed transmission technology, will be necessary in the near future, if traffic continues to grow at the current pace.

Fig. 3 Trends in NSPIXP-2 traffic



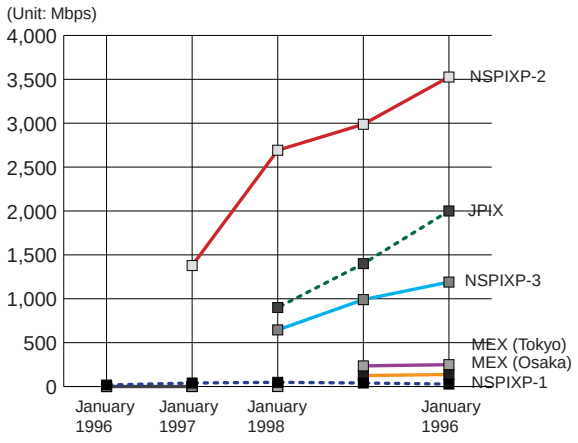
Source: WIDE Project (http://xroads.sfc.wide.ad.jp/NSPIXP/)

Fig. 4 Trend in JPIX traffic



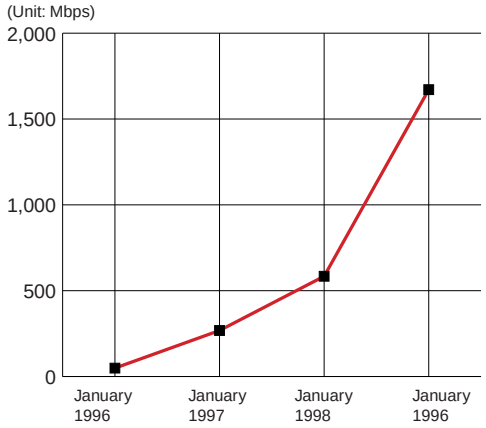
Source: Japan Internet Exchange (JPIX) (http://www.jpix.co.jp/)

Fig. 5 Growth in IX line capacity



Source: Impress Corp.

Fig. 6 Growth in line capacity between Tokyo and Osaka



Source: Impress Corp.

Related sites: WIDE Project (http://xroads.sfc.wide.ad.jp/NSPIXP/);
Japan Internet Exchange (JPIX) (http://www.jpix.co.jp/)

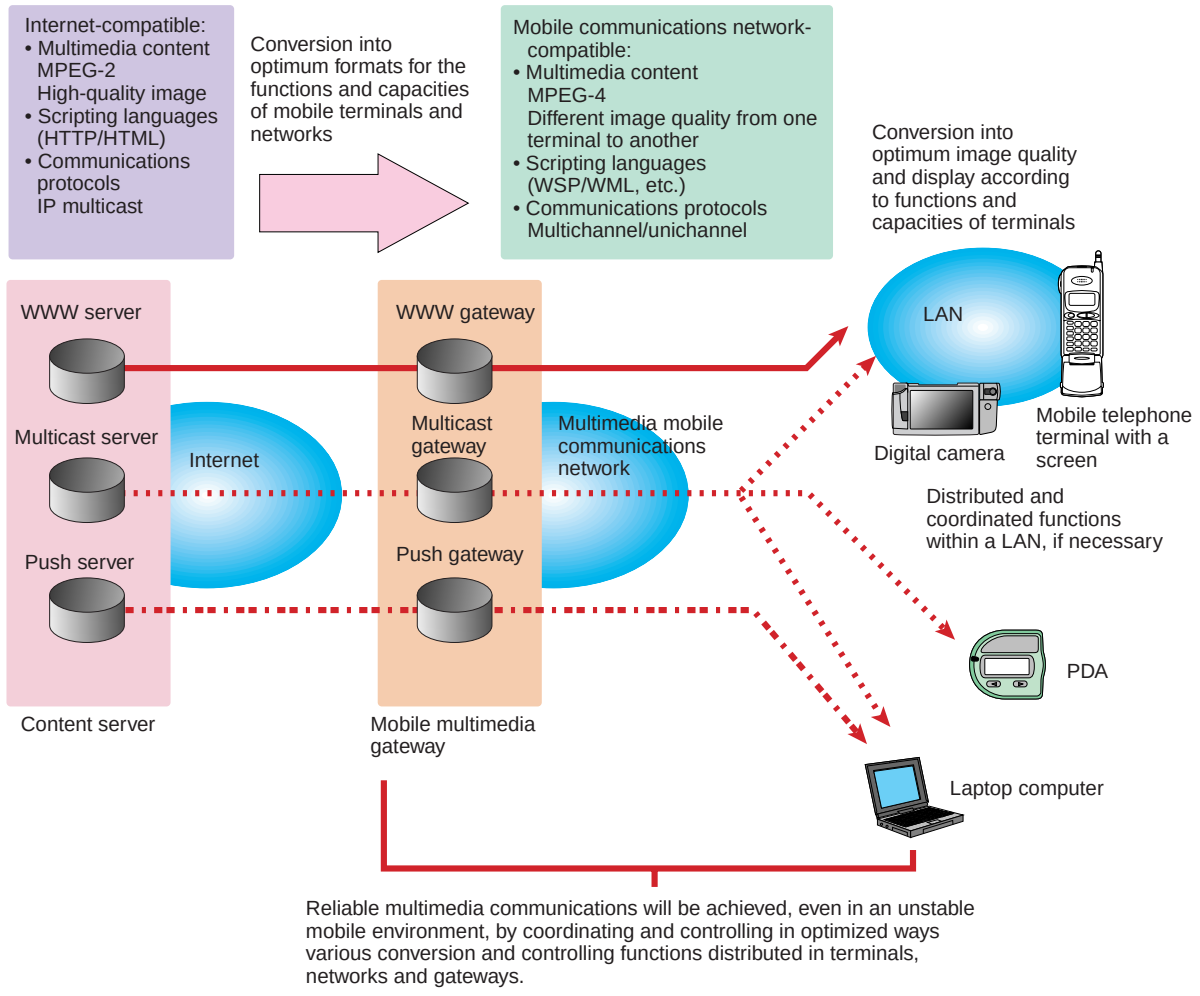
(2) Mobile Internet access

Preparation of an environment for stable mobile communications

Keen attention is being paid to the need to reflect developments in mobile communications to enable the Internet to be accessed efficiently at anytime from anywhere. As part of its effort in research and development of technology for ultra high-speed multimedia mobile communications, MPT is developing highly efficient multimedia information access technologies that will overcome limitations on today's mobile terminals and communications networks to enable users to search for information flexibly (Fig.; Refer to III-4-1-(4)). Specifically, R&D activities have focused on ways to convert the communications protocols and content display methods used in accessing websites and engaging in multicast communications over the Internet, as well as on ways to control those converted signals to make them best suited for each environment of mobile communications.

Through deliberations at the Telecommunications Technology Council, MPT is also making technical assessments of systems to create IMT-2000, a mobile communications system that will be compatible with the next-generation Internet (Refer to III-3-1-(3)). In the council's discussions of both general and technical requirements for IMT-2000, Internet accessibility was regarded as one of its important functions.

Fig. R&D of high-efficiency multimedia information access technologies



Column 6 Mobile communications

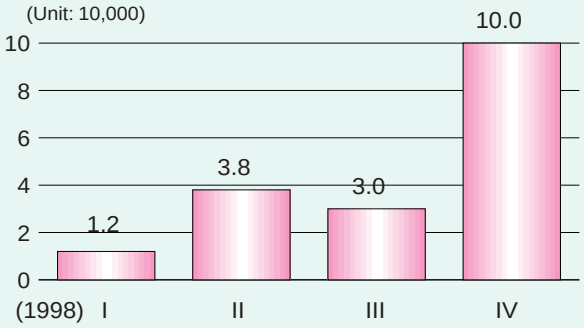
From voice, to e-mail, to online transactions -- the capabilities of mobile terminals are widening.

In recent years, Japan has seen a rapid rise in the use of mobile telecommunications services (cellular telephones and PHS), especially among young people. In 1998 in particular, mobile services that transmit data, such as text messages, have seen major developments, including the ability to exchange e-mail and the expansion of transmission capacity aimed at connection with the Internet. Now, almost all mobile communications carriers offer e-mail services.

The number of people using e-mail, for private communications as well as for business, has grown along with the Internet user population. This trend has been encouraged now that mobile terminals allow e-mail to be exchanged regardless of the location, including outdoors. The rapid growth in sales of the "Pocketboard" e-mail terminal from the NTT DoCoMo Group, as well as the rise in subscribers to the "10-yen mail" system, illustrate the great demand in the market (Figs. 1 and 2).

The "iMode" services launched by the NTT DoCoMo Group in February 1999 include not only an integrated e-mail terminal, but also offer Internet access without the need to use a computer (Fig. 3). The services available are mainly of four types: transactions, such as bank deposits; databases, containing information such as restaurant guides or transport details; daily information, such as news and weather forecasts, and entertainment, such as horoscopes and games. Other mobile communications carriers in Japan are expected to also offer similar services from April 1999 onward (Refer to II-4-1-13).

Fig. 1 Shipments of "Pocketboard" mobile e-mail terminal



Notes: 1. I, II, III and IV indicate the four quarters of 1998
2. The decline in the 3rd quarter reflects production delays.

Fig. 3 The "iMode" system

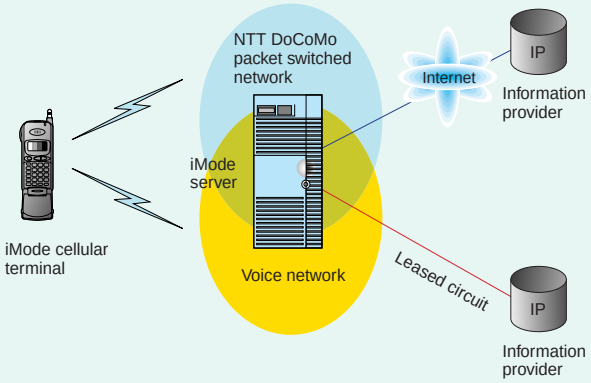
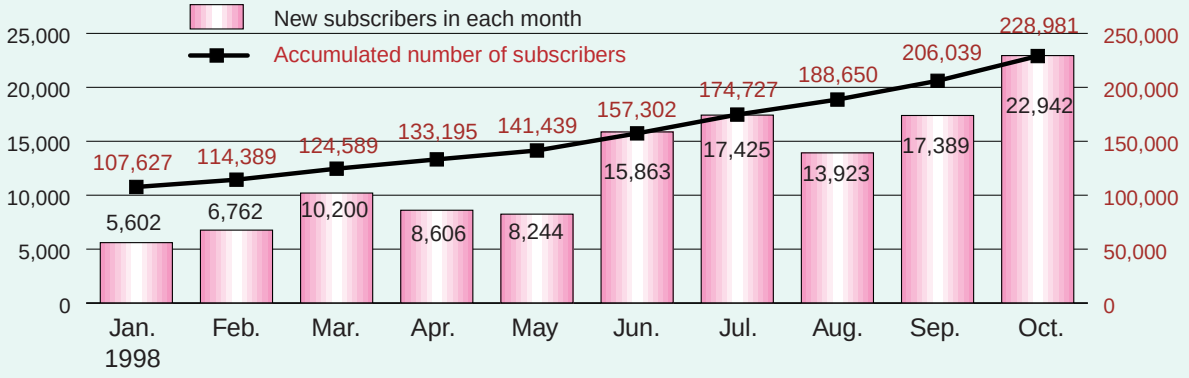


Fig. 2 Subscribers to the "10-yen mail" service



Source: Figs. 1 and 2 are based on "Nikkei Market Access."

(3) Next-generation Internet

Advanced, ultra high-speed and large-capacity communications are being developed.

The steep rise in the number of Internet users in recent years and the remarkable progress in multimedia have led to a surge in Japanese telecommunications traffic (Refer to I-5-3-(1)), making it imperative to achieve ultra high speed, large-capacity Internet communications as quickly as possible. To address this need, in January 1999 MPT inaugurated an "Executive Meeting on the Next-Generation Info-communications Infrastructure Initiative" to discuss the characteristics and essentials of the infrastructure expected to be created in the early 21st century, as well as the applications to be run on networks. The meeting also discussed ways to promote the construction of the infrastructure. In June 1999, the meeting compiled its findings into a final report.

Among specific measures, MPT is also promoting research and development of the next-generation Internet, which is expected to enable ultra high-speed and large-capacity communications, as well as much higher security and reliability than today's network. This initiative, aimed at making highly advanced applications available, is being promoted with the intention of turning relevant technologies into world standards.

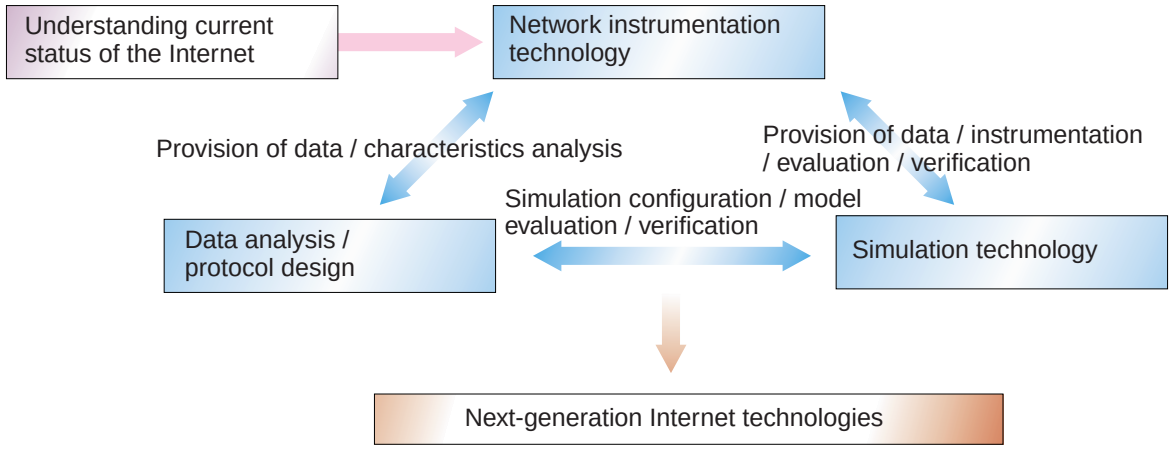
In the U.S., the Next-Generation Internet (NGI) development project has been under way since fiscal 1998, with a budget of approximately $100 million earmarked every fiscal year. Japan embarked on a similar initiative two years earlier, launching its five-year, next-generation Internet technology development plan in fiscal 1996. This initiative is expected to prepare a base for the full-fledged use of electronic commerce in the 21st century, and provide a driving force for the creation of new businesses.

During fiscal 1998, MPT built the high-speed research and development network, Japan Gigabit Network (JGN) as an open testbed for research and development of next-generation Internet technologies (Refer to III-4-1-(1)). With the aim of developing advanced communications systems for the next-generation Internet, in fiscal 1999, MPT will carry out R&D on basic technology for the development of new communications protocols, and technology for the development of quality-assurance systems for large-capacity networks. New technologies will be developed that enable precise tracking of information distribution routes and measurement of traffic congestion - tasks that are not possible with today's Internet. The instrumentation data obtained using these technologies will be analyzed and simulations and model evaluations will be created, based on the data (Fig. 1).

In fiscal 1999, MPT will also continue working on the following research themes, aiming at the enhancement and further diffusion of applications on the Internet.

1) Technologies relevant to ultra high-speed and large-capacity communications that enable multicasting of content over the Internet, including moving images

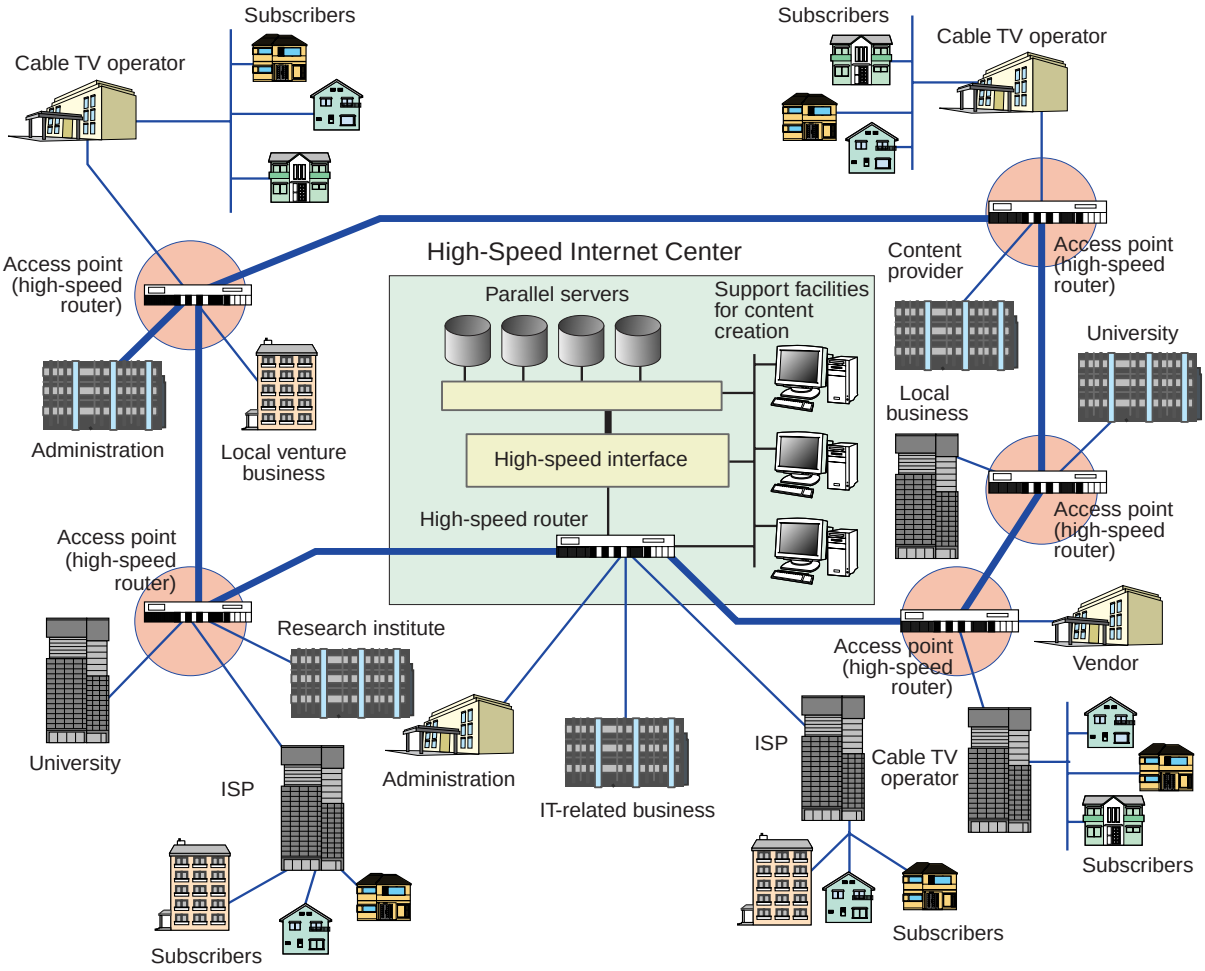
Fig. 1 R&D into advanced communications systems for the Internet



2) Technologies that support the reliability of the Internet as a whole, such as alternative routing at times of communications faults and traffic congestion.
3) Technologies for enhancing network security and reliability that will promote the distribution of electronic money, a promising method for making payments upon delivery of content
4) Digital watermark technologies aimed at the protection and distribution of content by protecting intellectual property rights, such as of images, video, and music
5) Technologies for certifying the authenticity of websites by affixing Internet marks with embedded authentication information

Using the fruits of such R&D, MPT will also construct a Next-Generation Internet Zone (Fig. 2) as a pilot project in its effort to help create a society that makes full use of the next-generation Internet in the 21st century. Construction of the zone will be carried out in cooperation with IT-related businesses in the area. Experiments will be conducted in ultra high-speed, large-capacity, end-to-end communications, through the coordinated efforts of local governments and businesses in the Internet Zone, which will encompass a high-speed Internet center storing a variety of local content.

Fig. 2 Next-Generation Internet Zone



Column 7 Post Office Services and the Internet

Internet usage has expanded in all the three Postal Services.

Since its website opened in September 1994, MPT has used the Internet as much as possible as a way to offer post office services by providing a variety of information widely to the general public. Electronic post offices were first opened on the Internet in April 1997 and they numbered 400 by the end of fiscal 1998, providing post office and regional information.

The system is used not only to disclose performance details of the mail, postal savings and postal life insurance services and offer information on products and services, but also to meet the needs of customers by using the interactive nature of the Internet. With just the click of a mouse, or simple input of a few words, users can gain easy access to a variety of services, as noted in the Tables below.

1. Postal services (http://www.postal.mpt.go.jp/)

Service name	Start	Outline
New postal code retrieval and download service	July 1997	Enables new seven-digit postal codes to be searched and download using addresses or business names
"Tashika"-mail	June 1997	Enables tracking and tracing of parcels, registered mail items (including simplified registered mail items and certification of delivery), overnight mail "Morning 10" items and EMS items

In addition, an incorporated foundation, Postal Service Centers provides a "Furusato (hometown) parcel service" through its website and the Association of Postal Culture Promotion offers an ordering service for stamps and postcards ordering through its website. By inputting the password given after registering with these sites, users can place orders for services or products and make payments with their credit cards over the Internet.

2. Postal savings service (http://www.yu-cho.mpt.go.jp/)

Service name	Start	Outline
Interest calculation simulation (http://www.yu-cho.mpt.go.jp/simulate/e_sim.htm)	February 1997	Simulation for savings yield by product for designated months

In addition, the website "Volunteer-Post Internet" provides information on the "Postal Savings for International Voluntary Aid" and "Disaster Voluntary Account" programs, as well as information on the activities of and events held by volunteer organizations.

3. Postal life insurance service (http://www.kampo.mpt.go.jp/)

Service name	Start	Outline
Kampo model plan simulation	January 1997	Users can make graphs to model insurance premiums, insured amounts, etc. based on their personal data and choice of product
Kampo products navigator	October 1998	Suitable insurance products can be recommended to potential policyholders who interactively input data on family members and other related questions
Vacancy information about policyholders' welfare facilities	January 1997	Policyholders can check room vacancy information for all welfare facilities.

Related sites: Digital Post Office (http://dpo.mpt.go.jp/); Furusato parcel service (http://www.furusato-tayori.or.jp/); Stamps/postcards ordering service (http://www.postage-stamp.or.jp/); Postal services (http://www.postal.mpt.go.jp/); Postal savings service (http://www.yu-cho.mpt.go.jp/); Volunteer-Post Internet (http://www.volunteer-post.mpt.go.jp/); Postal life insurance service (http://www.kampo.mpt.go.jp/)