

Creating a Ubiquitous Network Society -- Japan, a Nation Built on Technology

Thank you very much for your kind introduction. My name is Kunio Nakamura, I am the president of Matsushita Electric Industrial.

I would like to start my speech by expressing my heartfelt gratitude to you all on behalf of the CIAJ (the Communications and Information Network Association of Japan), one of the co-sponsors of CEATEC 2004, for turning up in such large numbers on the first day of the exhibition.

Now, the theme of this year's exhibition is "Ubiquitous Society -- Digitally Enriched, Accelerating to the Next Stage." It is only a few years since the word "ubiquitous" came into use, but we now hear it very frequently on various occasions. I'm going to focus on two questions today; the stage of evolution we have reached as a ubiquitous network society and what more is needed for ours to become a full-fledged ubiquitous society. I would like to offer my observations on these two questions.

As you know, the so-called "ubiquitous society" refers to a society where anyone can enjoy, anytime and anywhere, a broad array of services through various terminal devices and networks. It is now a common sight that people exchange E-mails or access information on the Net via mobile PCs, cell phones or car navigation systems.

Meanwhile, high in the skies above, Lufthansa started providing the world's first in-flight broadband services in May, prompting other airlines to follow suit. Indeed, "anytime and anywhere" now includes even "in the sky."

Including those in the stages of trial or service in limited areas, we already have all the functions and services, at least in their basic forms, which are likely to become common by 2010. In that sense, it is appropriate to say a full-fledged ubiquitous network society is close at hand.

Broadly speaking, three things are particularly important for the creation of a ubiquitous society. These are network infrastructure, terminal equipment, and service contents.

Specifically, network infrastructure needs to go broadband, mobile and IP. As to terminal devices, digital technologies are, of course, essential to them, but certain types of analogue technologies, especially those related to the ease of use and the quality of pictures and sound, should also be incorporated. They also should be smaller and more mobile-oriented. With regard to service contents, there should be more contents that are really useful for people's lives and work. And it is important that these contents are known and used more widely.

You can hardly discuss the issue of network infrastructure without touching on the government's "e-Japan Strategy" initiative, launched in 2001. As you know, the government and the private sector have been working hand in hand to build an always-on environment under the strategy. Its ultimate goal is to make Japan the world's IT leader by 2005.

In the current "e-Japan II" phase, the government is shifting its IT strategy focus to promoting uses of IT. Under this campaign, a new "u-Japan" program has been launched with the aim of developing a ubiquitous network that underpins the next-generation IT environment.

The e-Japan Strategy has dramatically changed the face of public services. In education, for instance, almost all public schools in Japan are now connected to the Internet and there is one PC for every 10 or so students at schools. Open-air classes using mobile terminals and Internet-based joint classes between schools are actually taking place.

In the arena of administration, a number of local governments have opened their own portal sites and started doing part of their paperwork online, such as procedures for bidding, administrative counseling and tax collection. Many local governments now allow residents to download various application forms from their sites. It will take a little more time before people can go through all the necessary procedures at home, but things are much easier today than in the old days when getting one piece of application

paper meant going over to a municipal office and standing in a queue at a counter.

There has been tremendous progress in the upgrading of telecommunications lines. Today, more than half of Japan's Internet population is using broadband lines like ADSL, CATV and FTTH. Communications charges in Japan, which used to be considerably higher than in other countries until a few years ago, have also come down sharply, to only 6% of those in the U.S. In terms of infrastructure, Japan is already one of the leading broadband powers in the world.

According to the technological roadmap to a ubiquitous society, by around 2010, fixed lines will be able to transmit data 10 times faster than ADSL and wireless transmissions will be 50 times faster than W-CDMA.

Meanwhile, the shift in TV broadcasting to digital technology is accelerating, with terrestrial digital broadcasting in place since last December, albeit on an experimental basis. TV stations have been gradually increasing the transmission power for their terrestrial digital broadcasting in the Tokyo metropolitan area. As a result, some 6.4 million households can now receive digital transmissions from 5 private broadcasters and Japan Broadcasting Corp. (NHK)'s educational channel. Cumulative shipments of TVs and tuners equipped for land-based digital broadcasting totaled 1.35 million units at the end of August, an indication that this service is enjoying smoother sailing than BS digital broadcasting.

Also notable is the fact that 60% of terrestrial digital TV sets come with flat-panel displays like LCD and PDP. These devices are contributing to the evolution of a digital network society.

With telecom lines gaining mega capacity and broadcasting going digital, telecommunications and broadcasting are converging rapidly. This digital convergence will create a new environment where you can receive a large variety of services, whether you are at home or outdoors, with devices ideally suited for the service received.

When the PC with a TV tuner first came out about 10 years ago, some people argued that TVs were meant for moving images and PCs for still images and data. This argument was based on a theory that TV should be watched from a distance of 3 m while a PC user should maintain a distance of 30 cm from the monitor screen. Now, convergence between telecom and broadcasting has made this argument about different roles for TV and PC irrelevant.

As many of you might know, there are an increasing number of people called "Broadband Drama Zoku (Broadband Drama Crowd)" in Japan who watch TV dramas on PCs instead of on TV. These people watch programs distributed online through FTTH and other broadband lines. This trend has been mainly driven by people who, infatuated with the South Korean mega-hit drama, "Winter Sonata," search the Internet for other South Korean dramas not available on TV.

To many people, the advantage of broadband dramas is that you can watch them or stop watching them whenever you like. They also tend to absorb your attention completely because you watch them alone, sitting intimately close to the screen. It is interesting to see the PC's design as a personal machine -- for a solitary user sitting at a 30 cm distance from the monitor-- is now working to its advantage when it is used to watch dramas.

Meanwhile, the exact opposite is happening to TV.

Our "T-navi service" is a broadband-based lifestyle information network service for digital TV. With this service, you can get useful information on, say, tickets to films and concerts and restaurants and shops by simply pressing on your remote controls. You can even do shopping or have food delivered from an eatery nearby. The TV is thus evolving from a simple device for watching programs into a multi-task tool.

The other day, I received encouraging words from one of the users of our T-navi service, who uses a PC but finds TV a perfect gadget for enjoying shopping, especially when he feels tired or is unwinding on his days off, as it allows him to watch the information on the screen in a leisurely manner. The 3-meter

distance attribute works to TVs' advantage here, with some people finding them easier to use when trying to get information.

I once had the opportunity to visit NHK Archives in Kawaguchi, Saitama Prefecture. The facility stores NHK's visual assets accumulated since the broadcaster's foundation; a valuable collection of more than 1 million news items and over 400,000 programs. Visitors can retrieve and watch any programs they like.

I've heard that the news and programs in the archives can also be viewed at 13 local stations of NHK via broadband lines. Thus the development of broadband technology has paved the way for "video on demand," which enables you to watch any program you want anytime you like.

One of the hot topics concerning terrestrial digital broadcasting is a planned cell phone broadcasting service called "one-segment broadcasting." It is so named because it utilizes one of the 13 segments of signals being used in land-based digital broadcasting.

The industry expects that one-segment broadcasting will be used, for instance, to check related information on programs on air or to participate in quizzes, rather than to watch drama or sport programs.

This new type of broadcasting will also play an important role during natural disasters, serving as a crucial means by which victims can obtain vital information. During major disasters in the past, victims were often unable to watch TV or get calls through, even with cell phones, while the rest of the country was receiving constant updates on the situation from emergency broadcasts. It is ironic that this kind of vital information, when it is needed most, is often out of reach of those who need it most. One-segment broadcasting will certainly help change all that.

I would like to mention here a mobile broadcasting project spearheaded by Toshiba Corp. as a notable example of broadcasting for mobile terminals. Toshiba, together with SK Telecom of South Korea, has launched a broadcasting satellite and is planning to use it to distribute music and video programs.

Subscribers will be able to receive a wide range of programs with special terminals, even when they are in moving vehicles or outdoors. The 40-channel service to be rolled out nationwide later this month offers voice programs, video programs and data broadcasting. Thanks to the advent of one-segment broadcasting and mobile broadcasting, cell phones and mobile terminals may gain new value for their ability to receive broadcast information.

The mobile phone has undergone a dramatic metamorphosis over the past 10 years. Only a decade or so ago, it was a voice-only device. It has since been transformed into a multi-functional communicator with computer-like features that can be used, besides as a simple voice phone, as a TV phone, E-mail transmitter, Web browser, camera and storage device.

The evolution of the mobile phone has resulted in an explosive growth of users. More than 80 percent of all the cell phones in Japan are now Internet-ready models, with some 70 million people having subscribed to wireless Net services over the last four years. This ratio is the highest or second highest in the world with Japan and South Korea competing for the top slot.

On top of all this, a new model with even more features, "i-mode FeliCa" was launched in July. This is a cell phone carrying contactless IC chips that enable it to function as a credit card, pre-paid card, membership card and even a ticket. NTT DoCoMo, Inc., its carrier, has nicknamed it "Mobile Wallet." Indeed, it is a cell phone with all the functions of a wallet. Some people may be concerned about the possibility that the phone could be stolen along with all the precious information it contains. NTT DoCoMo's Mr. Natsuno, however, brushes off the concern, saying young people take more care of their cell phones than their wallets. I myself have little idea how much money is in their wallets.

Services that Lead a Ubiquitous Society

Let me talk more about the services likely to lead a ubiquitous society.

Our consumer survey concerning home appliances' features showed very clearly that our customers regard functions ensuring safety and security as the most important elements for Net-ready appliances.

In another survey, carried out by the Ministry of Internal Affairs and Communications, 69% of the respondents, when asked what are the most important challenges confronting Japan in the period up to 2010, answered that creating a safe and secure living environment is Japan's top priority. While voicing strong concern over food safety, crime prevention and quick and accurate information sharing during natural disasters, they expressed the hope that the ubiquitous technology may offer solutions to those issues. I think it is our duty to respond to such demands for safety and security and provide solutions to the diverse challenges we all face in life.

In light of these consumer demands, I would like to introduce a few examples of services for households that have reached the stage of practical use.

The first example is a service based on "link between cell phones and moving networked cameras," which responds to some of the requests voiced in the survey. Many respondents wanted services ensuring safety and security at home, such as checking to see the doors are locked and monitoring of empty houses. This new service allows customers to remotely operate, via cell phones or mobile devices, the security cameras set up inside their houses and check pictures supplied by those cameras, wherever they are.

Customers can monitor from afar both the inside and the outside of their houses and also their pets. This service is aimed at reducing inconveniences in everyday life and giving customers a sense of reassurance while they are away on business and other trips. An even more advanced service in the near future is on the way using cameras that move around houses and trigger alarms when they detect anything abnormal.

There is also a "one-stop operation" system connecting all the electric appliances in the home. This system meets the high-priority consumer demands, as revealed by the survey, for products and services that enable them to remotely check or operate home appliances.

Currently, we are supposed to use different remote controls for different home appliances. So we have one remote for the TV and another for the air conditioner. In future, a single controller connecting all the appliances at home will allow us to operate them all whether we are in or out.

Much the same is true with service contents, as "seamless contents sharing within a house" illustrates.

DVD recorders have already made it possible to watch, anytime you choose, contents like films and TV programs that you recorded earlier. The next generation recorder will add "anywhere" to "anytime." Being connected to TVs and PCs, tomorrow's recorder will enable you, for instance, to start watching a film in the living room and finish it in the bedroom.

"Safe and secure" and "simple and convenient" are basic necessities for social life. In order to promise a really fulfilling ubiquitous lifestyle, it is also important to give people dreams and inspirations by making available a wide array of service contents.

Coexistence with the global environment is a major challenge for the 21st century. A ubiquitous society can make a big difference on this front, too. Network-based monitoring and energy-saving control are services that will probably make a particular contribution to energy and resource conservation.

Some notable services to be introduced in this area are:

- Service to monitor the use of home-use fuel cells, which are expected to come into widespread use in the future
- Networked-based service that allows automatic checking and control of electric appliances and consumables

- Sensor-based automatic control of energy consumption levels of electric appliances for maximum energy efficiency

These are some examples of services that may soon be available. There is, however, a myriad of hurdles to clear for such services to spread and find their place in society. They include the protection of personal information and privacy, the issue of copyrights and intellectual property and the problem of the "digital divide."

Closing the gaps in the availability of infrastructure is, of course, a vital step towards bridging the digital divide, but there should also be other kinds of approaches, including improving the user-friendliness or usability of terminal devices and services.

As I mentioned earlier when I talked about "simplicity and convenience," remote controls are an important tool for one-stop operation. It is crucial, therefore, for remote controls to become easy enough to use even for the elderly. Similarly, we need to commercialize, as swiftly as possible, devices like a voice-guided panel for visually-impaired people, a lightweight, ultra-portable paper display, and a power assist robot for supporting the elderly living alone so that we can promote universally designed products and services.

What we should try to realize is a ubiquitous society that provides everyone with a comfortable lifestyle, regardless of race, nationality, sex and age, disabled or not.

IC tag-based services will also play a vital role in the life and society of the 21st century.

Hitachi Ltd., for instance, has developed μ -chip (Mu Chip), an ultra-tiny IC tag with a size of only 0.4 mm square. An IC tag records all information concerning the production, processing and distribution of a product so the end user can instantly trace the history of that product. This is what we call traceability, an ability that is being tested and translated into practical applications in a number of fields.

Over the past few years, the Japanese food industry has been hit by a series of mislabeling scandals involving false information about places of origin and "consume by" dates. IC tags will without doubt have a part to play in guaranteeing the safety and security of foods.

These tags will be attached to everything in the future.

The IC tag will have broad applications, providing effective solutions to various social issues such as senile elderly people that have the tendency to wander about and the sorting and separation of garbage for recycling. With IC tag, there will be no such thing as lost property anymore!

The IC tag really has unlimited potential. As it comes into widespread use, many new, unanticipated applications will emerge.

As this chart shows, the electronic toll collection (ETC) system, the component of intelligent transportation systems (ITS) that has made the greatest progress, is rapidly coming into general use. The penetration rate of the ETC rose from mere 1% in 2001 to around 20% in 2004.

A study on the hidden costs traffic jams cause drivers shows that every one of us loses about 30 hours and 90,000 yen each year because of road congestion. The ETC will spare us such waste of time and money.

The ETC also contributes to alleviating global warming by helping reduce automobile exhaust. The Japan Automobile Manufacturers Association, Inc. (JAMA) has estimated that the ETC should be able to reduce CO₂ emissions by about 2.7 million tons, a quantity sufficient to fill more than 1,000 Tokyo Domes.

In the future, it will become possible to adjust traffic volumes by changing, road by road, discount rates

offered to ETC users. In this and other ways, the society at large, not just drivers, will eventually enjoy the benefits of the ETC.

Needless to say, the ETC is not the only component of ITS, and from October 19 through 24, there will be an exposition on state-of-the-art ITS technologies in Aichi Prefecture. Besides the ETC, numerous technologies are already in practical use, including telematics, an automatic payment system for use at parking facilities and gas stations, a system that tells us the location of buses on the road, and a system to aid old people while they are driving, which, among other things, helps them to maintain the right distance from other cars.

But the ITS's biggest mission is to reduce the number of deaths from traffic accidents, eventually close to zero, from the current 7,700 people a year. Integrated efforts on three fronts -- vehicles, highways and information and telecommunications -- are vital to achieve this goal.

Japanese Technologies and Their Roles in a Ubiquitous Society

In this last part of my speech, I would like to focus on the vital roles Japanese technologies should play in supporting a ubiquitous society. I will talk about the importance of our joint efforts on the technological front in leading the charge towards the realization of a ubiquitous society.

I think Japan has many core technologies that are indispensable for the creation of a ubiquitous society.

We have, first of all, technologies to guarantee safety and security.

Biometrics, a key technology for recognizing and identifying persons, has produced various applications using fingerprints, vein patterns, retinas, irises, and facial characteristics for identification. Monitoring and sensor technologies, another core area with a vast range of applications, can protect houses from intruders and ensure safe driving. Japan enjoys an overwhelming technological advantage in essential devices in this domain, including the CCD and the CMOS sensor used for surveillance cameras.

Information security cannot be realized without encryption technologies. Japan boasts world-class encryption algorithms such as MISTY and KASUMI, the latter adopted as an international standard. Various research projects are under way to explore other cutting-edge technologies, including the next-generation elliptic curve cryptography and quantum encryption, which provides complete protection against deciphering and eavesdropping.

Japan is also the frontrunner in the realm of eco-friendly energy technologies.

Fuel cells for mobile devices are one such technology. One of the characteristics of a ubiquitous society is that there is an insatiable appetite for ever-higher device performance. As a result, the battery capacity often imposes restrictions on product design. Fuel cells for mobile devices offer a promising solution to this problem. Japanese makers are closer than anybody else to prototype manufacturing and commercializing in this field.

Electronic books and electronic paper displays are expected to assume an increasing importance in resource saving, as they help reduce paper usage, timber consumption and garbage generation. According to some statistics, the average Japanese reads 54 books in 3 years. If you read our electronic books instead, you can save about 40 books worth of paper in terms of CO2 emissions.

Japan also possesses the core technologies for digital equipment. Not only for mainstream flat-panel TV technologies like LCD and PDP but for next-generation panels like SED and organic EL, Japan has a range of technologies and patents concerning everything from materials to manufacturing equipment.

Moreover, Japanese makers are leading the world on a long list of technologies in the area of semiconductors, the guts of digital equipment. Japan is a leader in countless number of memory technologies, media processor technologies, and system LSI technologies, or more specifically, in

NAND flash memory, FeRAM, next-generation recordable DVDs, next-generation hard disc drives, and vertical magnetic recording technologies.

Blessed with so many unrivaled or world's first class technologies in key areas, Japan should, as a Nation Built on Technology, lead the world to the threshold of the ubiquitous society.

Obviously, the key value that a ubiquitous society should be built on is that a variety of services are available for "anyone, anytime, and anywhere."

But at a time when the number of websites is growing at an exponential rate and expected to surpass 10 billion in 2010, doing exactly the opposite, that is, customizing communications partners and contents, presents a viable option to create value. In other words, each customer will be offered optimal services tailored to his or her needs under the watchword, "only now, only here, and only you."

Then, a question arises. Where in the world are we heading? My answer to the question is that we are heading to an age of "from now, from here, and from you," when individual needs are the origin of all products and services. It will be a world where you choose and create what you want yourselves, instead of receiving what somebody else chooses or creates for you. Where everybody is given a lead role, so to speak.

I also believe there should be a healthy co-existence of the "real" and the "virtual" in a ubiquitous society.

For instance, watching a baseball game at the stadium is a much more powerful experience than watching it on TV. You can also share the emotional experience with others at the stadium. The same is true with music. A majority of people would say that they want to attend concerts from time to time for live performances even if they usually enjoy music on CDs. There seems to be qualities and subtleties only the real things can provide, qualities and subtleties that the virtual world, no matter how much it becomes sophisticated, can never really offer.

I usually buy books on the Net. Convenience of home delivery is not the only reason. By buying must-read books on the Internet, I can enjoy the luxury only a bricks-and-mortar bookstore can offer when I go to one; leisurely browsing around and encountering books I wasn't previously aware of. So the synergy generated between the network world and the real world is perhaps the magic potion for creating a truly enriching lifestyle.

In a ubiquitous society, total strangers get to know each other in both the virtual and real worlds. As people meet people in both worlds, various new communities will emerge. A ubiquitous society is also a society that is friendly to its people and the environment, because people, goods and money often circulate in the form of information instead of moving around and being consumed physically.

Home appliances once liberated homemakers from household chores. The significance of this lies not just in shortening the hours of such chores but in increasing the opportunities for women dramatically: they became able to pursue hobbies or work outside the home in these newly acquired free hours. By the same token, the real significance of Japan's contribution to developing a ubiquitous society as a leading technological power lies in enriching people's lives in a unique new way. Thank you very much for your kind attention.