

Network Equipment and Cooling Fans

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1. Introduction

Due to the worldwide IT revolution, the evolution and spread of various networks in recent years are showing an almost explosive momentum, thus being a great driving force reactivating today's economy.

Highly advanced due to the IT revolution, these communications networks are now an indispensable means of business, so much so that they even affect people's lives in society.

We also enjoy the change of circumstances. Thanks to the biggest change in business. We can find many business chances in IT equipments, sections. They will help us increase the sales of cooling fans(" fans ")

This paper describes the relationship between devices used in networks in the wide sense, including telephone networks, the Internet, computer networks, and mobile communications (involving units constituting of an infrastructure and units used by users as terminals) on the one hand and fans on the other.

This paper also sets forth the specifications required for fans used in network equipment and considers their relationship with Sanyo Denki.

2. The spread of various networks

This section describes the spread of the Internet and mobile communications, both of which are spreading at particularly eye-catching rates these days.

2.1 Spread of the Internet

The Internet has been spreading rapidly on a worldwide scale. Taking the example of Japanese-U.S. traffic, the data traffic on the Internet is five times as high as that of telephony.

In Japan today, some 20 million people use the Internet, with almost 25% of households connected to it (Fig.1)⁽¹⁾.

This market is tending to expand because of further cost cuts, diversified services and uses, and higher user-friendliness. The Internet is used in various industries and is changing the business styles of many industries. The Internet is causing cost cuts, speedup, and various other effects, while producing new business models. Some examples are listed below.

- (1) Online shopping, music distribution business, online trading, online banking and online auctions
- (2) Business tie-ups with convenience stores
- (3) Archiving business, mail magazines, and Internet ads
- (4) Fusion with distribution business
- (5) Usage in education

(6) Internet election and electronic government

(7) Usage in medical care, etc.

2.2 Spread of cellular phones

In the field of communications, mobile communications is spreading quickly. With the diversification and increasing capacities of methods, like cellular phones, notebook PCs, and PDAs, subscribers to mobile communications outnumber those to fixed phones, topping 57 million in 1999 (Fig. 2)⁽²⁾.

One characteristic fact is that the center of use is shifting from sound to data communications on the Internet. The mobile Internet service launched last year enjoys overwhelming support and is projected to win 10 million subscribers.

In this field, the scheduled startup date of the broadband cellular service of the next generation is just around the corner (the year 2001). The diversification of such services, enhancement of functions, price cuts and other advantages will spread the services even further.

3. Equipment and cooling fans used in various networks

For the purpose of this section, the equipment used in networks is roughly divided into three categories:

3.1 Equipment used as an infrastructure

- Exchanges, transmitters, modems, base station equipment, servers and routers, etc.

These items are used as parts of an infrastructure by common carriers, service providers and users.

Because of their uses, general users rarely notice these items, but they are required to achieve high reliability because they are parts of an infrastructure. Fans are therefore also required to achieve high reliability. Since equipment heats up more due to increased data throughput, fans are required to achieve high cooling performance.

On the other hand, devices using near end users are increasingly required to achieve lower noise.

3.2 Equipment used as terminals

- PCs, workstations, faxes, various monitors, (PDAs, phones), etc. The devices in () currently use no fans.

These devices are used by general users, thus accounting for much of today's consumer products. Although numerous in number, they are required to be available at low-prices. In recent years, mobile performance has been improved.

Fans are usually required to achieve low noise. Devices designed mainly for consumers are sometimes required to be low-priced.

3.3 Equipment projected to be developed

- IMT2000 terminals, digital home electronics, Internet cars

Future equipment includes devices that will increase in functionality due to technical advances (such as the transmission of color pictures and video on the cellular phone) and devices currently in use which will be connectable to the Internet (such as Internet refrigerators having input/output functions and Internet cars connectable to the Internet). For both of these categories, cooling is projected to be a single challenge.

Please see [Fig. 3](#), you will find that many network-related devices need using fans for their devices to be performed normally. Sanyo Denki supplies fans for these numerous devices.

4. Requirements for cooling fans

The author considered the specifications that these network devices require for cooling fans.

① Large air volume

Involving the transmission of video and color images, data handled by network devices tends to increase even further. These trends make it even more important to provide equipment-cooling solutions. Fans are therefore required to achieve larger air volumes.

② Two-speed, thermal speed control

When multiple fans are used, they are usually run at low rpm rates. When one of them stops, the others are turned fast to compensate. Since the equipment tends to be installed near a place where people work or live, the equipment is required to achieve low noise. To achieve low noise, one may have to select fan rpm rates depending on the load of the equipment.

③ Conformity to 1U (1.75 inches)

1U (1.75 inches) is the standard thickness of the rack. When a device is required to be so small as to be contained within such a thickness, the fan has to be about 40mm. Equipment of that size is required to achieve a large air volume as mentioned in ① above.

④ Intelligence

It is not sufficient for fans to simply turn. They have been required to allow their operation states to be changed in response to information given to the outside from inside the fan or in response to external instructions to control the fan according to the condition of the equipment. Engineers are considering the incorporation of voltage controls, for example, and even more complex functions.

⑤ Long service life

In devices to be installed on the base of an infrastructure, a defect in the fan is not allowed to cause a network breakdown. The fan is therefore required to achieve high reliability and a long service life.

⑥ Splash proofing

For the spread of mobile communications, it is imperative to install base station devices. Some of these devices are placed outdoors exposed to the weather. In using fan cooling, contact with outside air cannot be avoided and splash proofing is required. Splash proofing standards include BellCore and UL.

⑦ Low noise

As the devices mentioned above are required to achieve low noise, fans are also required to achieve low noise.

Sanyo Denki has been taking technical measures to meet these new needs. Many of them are adopted in network equipment as products.

Examples include the larger air volumes of various fans, the line-up of various speed options, the development (higher intelligence) of various rotary controls, and the development of various series of long-life fans, various series of splash proof fans, and low noise fans with redesigned impellers and circuits.

5. Conclusion

As mentioned the above, the markets of the Internet, mobile communications and other networks are basically on a rapid, large expansion trend.

While the markets of individual devices are expanding, Internet home electronics, Internet cars and other new devices will presumably be developed, with their markets expected to expand accordingly.

Fans to be used in those devices are sure to grow in demand, but are required to meet various requirements as described in the preceding section. These are projected to be more advanced technically than before.

The author intends to remain committed to providing appropriate fans while meeting these requirements on a timely basis, thus contributing to the advancement of the network society.

Reference

(1). (2) The Internet Association of Japan. " Internet White Paper 2000, " Impress Co., Ltd.

Yoshimasa Matsumoto

Joined company in 1983

International Sales Dept

Worked on international and domestic sales, then on international sales

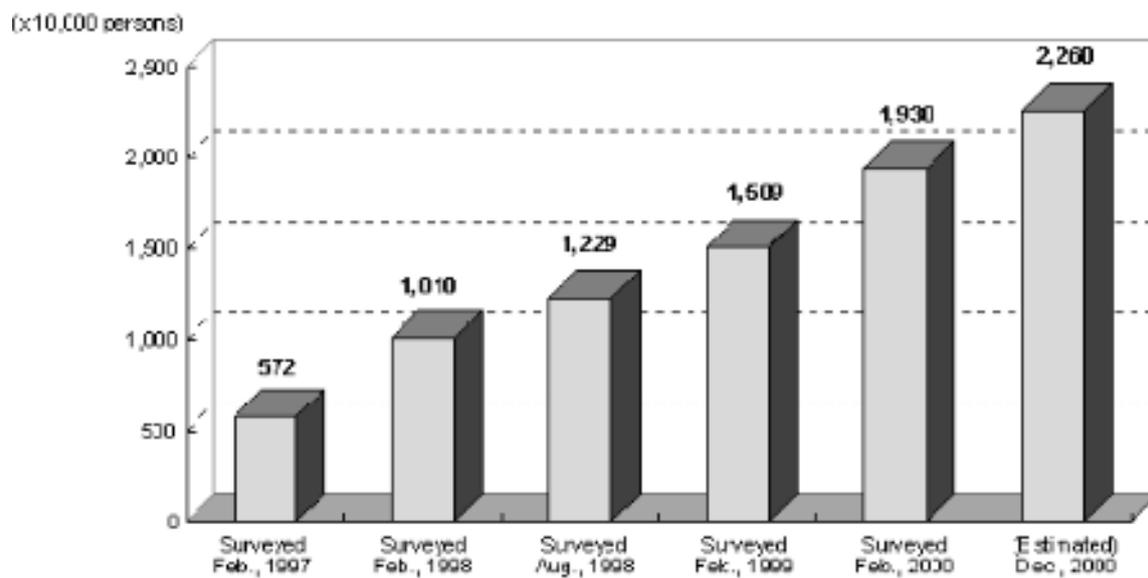


Fig. 1 Changes in the number of Internet users in Japan (1997-2000)

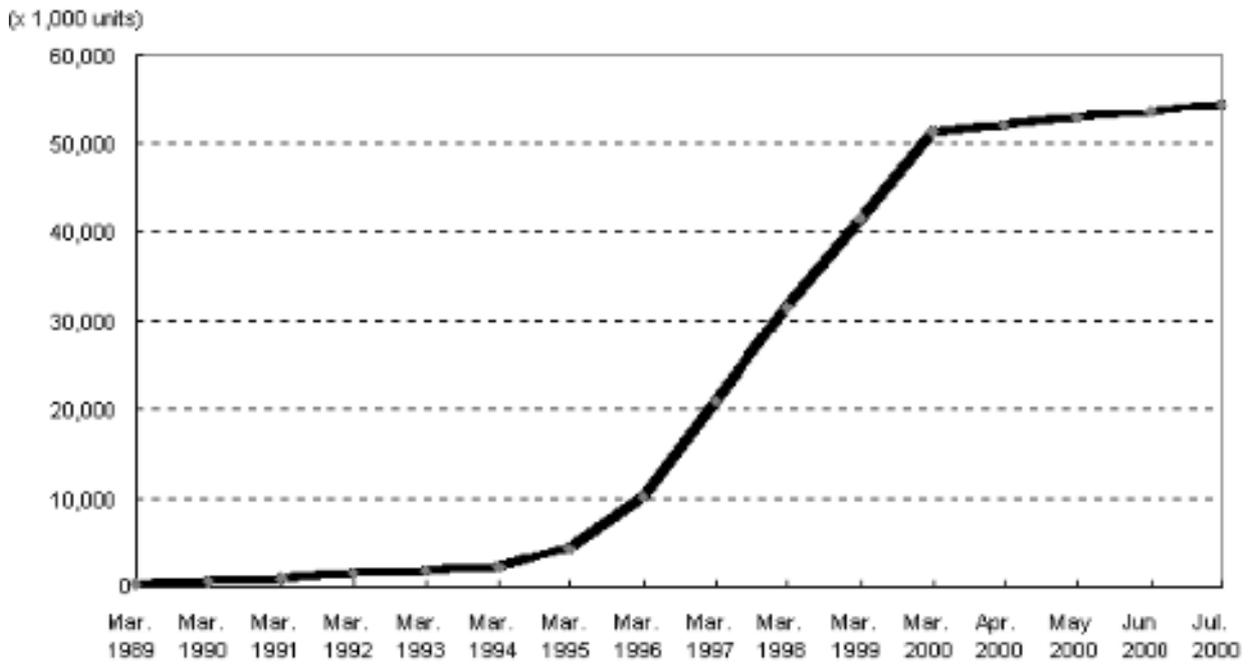


Fig. 2 Number of cellular phone subscribers in Japan

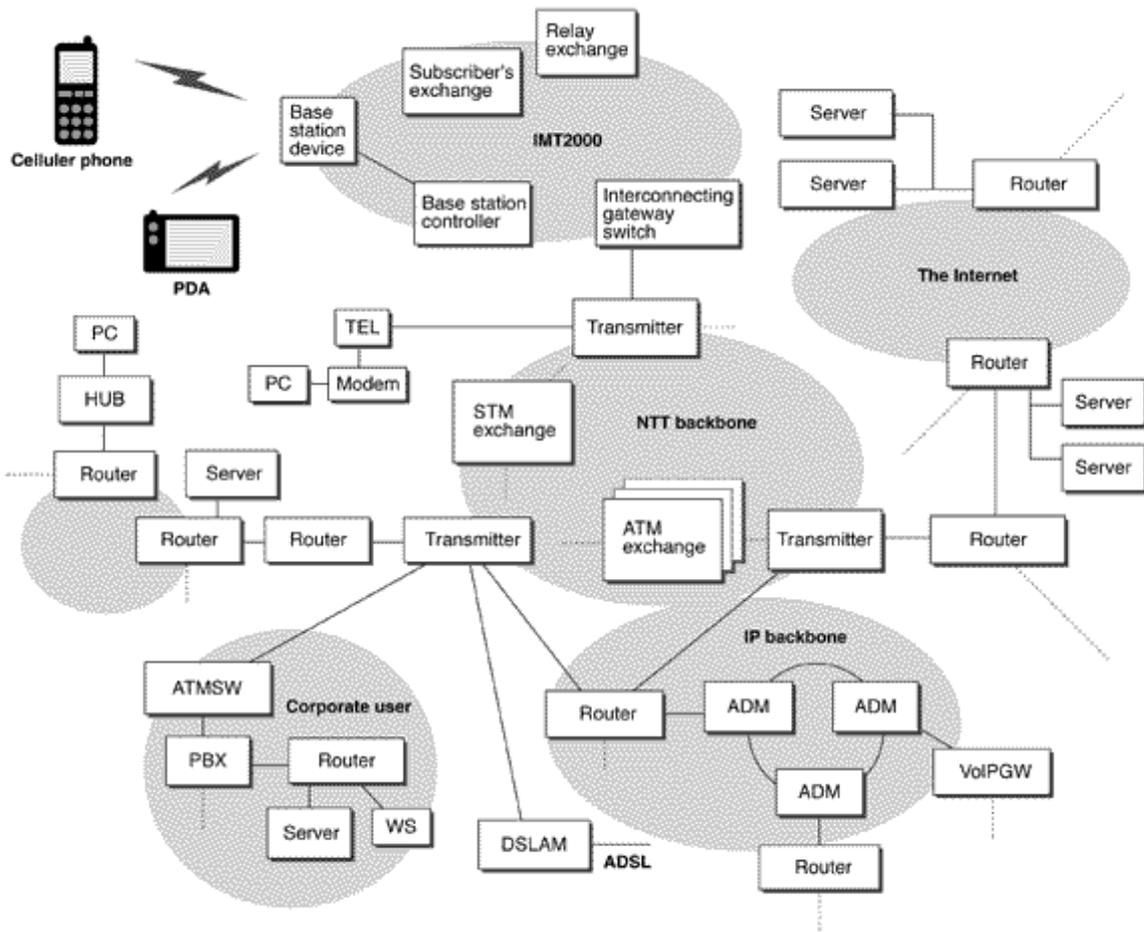


Fig. 3 Image chart of a typical communications network