

1982

Jipdec Report

**Japan Information Processing
Development Center**

General Survey

No. 48

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No. 48

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Japanese Computers: State of Utilization

Kenichi Kitagawa
The Most & More, Inc.

Size of Japanese information industry

The information industry is considered as consisting of the computer industry and the information processing service industry; in Japan the size of the information industry market as of the end of 1981 is an estimated ¥2.8 trillion. Of this total ¥2 trillion is accounted for by the computer industry, and therefore the computer service industry market is ¥800 billion.

The computer industry figure is the combined sales total for some 1,800 enterprises: manufacturers of mainframes, minicomputers, small business systems, personal computers, and I/O equipment, and sales companies, systems houses and distributors of imported equipment.

The computer service industry figure is the total for some 1,600 companies: computing centers, software houses, data communications service firms and data preparation companies.

The information industry in Japan--3,400 companies or so with sales of ¥2.8 trillion, is not so large as big industries go, such as automobiles, steel, and consumer appliances. Even if lumped together these 3,400 firms would still have much less income than the annual revenues of Nippon Telegraph and Telephone Public Corporation (NTT), and a mere one-sixth of IBM's.

However, it is expanding rapidly, by 15-20% each year, which ranks it as an extremely high-growth industry, and it is also recognized as central to the shift by Japanese industry to a creative knowledge-intensive structure. From many aspects the computer industry is expected to play a leading industrial role in future showing the way from the 1990s, in growth potential, providing employment, knowledge storage capability, technological ripple effect, conservation of energy and other resources and the expansion of people's areas of activities.

More ¥10 billion enterprises appearing

The high rate of growth of the information industry is demonstrated by the increasing number of ¥10 billion companies which are appearing. Just five years ago there were only 10 such companies, all mainframe manufacturers such as Fujitsu, IBM (Japan), Hitachi, Ltd., and NEC, but in fiscal 1980 small business computer manufacturers, including Sharp, Casio, Ricoh, and Uchida Yoko, entered the ranks of companies with sales of ¥10 billion or over. Three companies in the computer service industry also passed the ¥10 billion mark.

The final figures for fiscal 1981 are not in yet, but on the basis of estimates prepared by

the companies, firms seen as passing ¥10 billion in sales on the computer side include minicomputer manufacturers DEC and DG (Data General), Japan Business Computer, which makes small business computers, and Sord Computer Systems, Inc., a manufacturer of personal computers. On the computer service side, at least three firms not subsidiaries of a mainframe manufacturer are seen as reaching that sales mark. Canon and Matsushita Electric also have the potential to achieve the ¥10 billion mark in sales of business or personal computers.

So in a matter of just a few years ¥10 billion companies have doubled in number, a fact that attests not only to the rapid growth of the information industry but also to the underlying potential market. With the advent of the 1980s Japan is seeing a kind of boom in word processors and personal computers, new products resulting from what is being referred to as the office automation revolution, and other manufacturers are constantly entering this field.

The CAD (computer aided design) market is also starting to expand with a rush. American manufacturers hold the major rights to CAD systems, and U. S. manufacturers of minicomputers are racking up large increases in sales in the field. CAD is another field in which will be seen the emergence of ¥10 billion companies.

Table 1 shows the fiscal 1980 results of the 10 leading companies in Japan, which taken together account for 65% of the information industry market here. Four of the companies had sales of ¥200 billion or over, and the other six sales of ¥50-100 billion. As of now there are no enterprises with sales in the ¥20 billions (to be precise, in the ¥20 billion to

under 50 billion range), so the information industry in Japan can be divided into 4 groups, as in Fig. 1, by annual sales: ① Up to ¥10 billion (3,000 companies); ② ¥10-20 billion (10-15 companies); ③ ¥50-100 billion (6 companies); and ④ ¥200 billion or over (4 companies).

It is estimated that the fiscal 1981 sales total for the 10 leading firms will be some ¥1.85 trillion.

State of computer utilization

Data indicating the state of computer utilization can be drawn from the Ministry of International Trade & Industry's yearly survey on general-purpose computer deliveries and trade-ins. According to this survey, computers in operation as of the end of March, 1981 totaled 88,223 sets with a value of ¥4.1647 trillion. This represents an increase of 20.1% in the number of sets and 16.3% in total value, compared with March of 1980. Compared with 10 years ago, there are 9.3 times the sets and the value is 4.7 times greater.

However, it is difficult to conclude from these figures where Japan ranks worldwide, with reference to the scale of computer utilization, the reason being that although so-called small business computers are included in the survey, minicomputers are not, so international comparisons, such as with the IDC census (U. S.), are not possible. So, to approximate, if not precisely follow, the IDC standards, the statistics showing usage of general-purpose computers were taken from the MITI survey. In the IDC survey general-purpose computers are divided into 6 ranks, 2 through 7, classed by type. If these divisions are applied to the MITI classifications,

Table 1 Fiscal 1980 Results of Ten Leading Companies

Unit: ¥1 million, (F79-F80 Growth Rate)

Company	EDP Sales (A)	Total Sales (B)	A/B	Recurring Profit	Net Profit
Fujitsu	382,094 (16.9)	581,778 (16.1)	65.7	32,417 (▲3.0)	18,453 (17.9)
IBM	338,328 (4.3)	338,328 (4.3)	100.0	73,643 (0.9)	36,323 (0.2)
Hitachi, Ltd.	250,000 (15.7)	1,947,029 (14.7)	12.8	117,738 (10.4)	61,846 (16.5)
NEC	240,392 (19.8)	892,810 (24.0)	26.9	35,191 (49.7)	18,045 (37.4)
Toshiba	80,300 (16.0)	1,547,611 (8.4)	5.2	82,816 (9.9)	44,238 (7.8)
Oki Electric	78,793 (10.0)	186,075 (12.4)	42.3	7,506 (▲24.0)	3,909 (27.7)
Univac	78,605 (6.8)	78,605 (6.8)	100.0	2,425 (▲23.8)	1,403 (4.7)
Mitsubishi	62,000 (17.0)	1,221,397 (13.6)	5.1	47,072 (▲3.4)	23,192 (▲7.6)
Burroughs	50,470 (▲7.5)	50,470 (▲7.5)	100.0	—	2,302 (▲47.6)
NCR	48,214 (4.8)	72,198 (▲7.2)	66.8	10,010 (▲2.6)	4,575 (▲13.4)
Total, by domestic companies	1,093,579 (16.7)	6,376,700 (14.1)	17.1	322,740 (8.5)	169,683 (12.3)
Total, by foreign- capital companies	515,617 (3.4)	539,601 (1.8)	95.6	86,078 (▲0.4)	44,603 (▲5.6)
Total	1,609,196 (12.1)	6,916,301 (13.1)	23.3	408,818 (4.3)	214,286 (8.0)

• Domestic & Univac

April 1980—March 1981

• IBM

Jan. 1980—Dec. 1980

• Burroughs & NCR

Dec. 1979—Jan. 1980

classes 6 and 7 can be considered equivalent to MITI's large computers A (computer systems with a purchase-equivalent value of ¥500 million or more), class 5 would be MITI's large B (from ¥250 million up to less than ¥500 million), class 4, medium-size A (from ¥100 million up to less than ¥250 million), while classes 3 and 2 are, in part, equivalent to MITI's medium-size B

classification (from ¥40 million up to less than ¥100 million).

If IBM computers, which represent a standard indicator, are then compared with competitive Japanese mainframers' systems, the results gained will not be so very far from the actual situation.

In Table 2 the MITI survey classifications large A, large B, medium-size A and

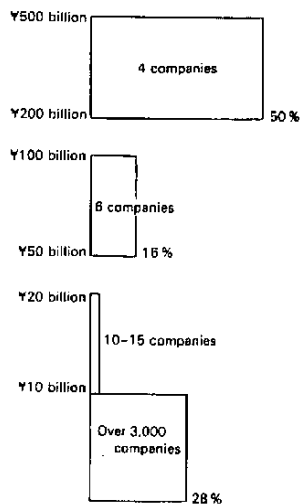


Figure 1 Japan's Information Industry, 1981 (By Sales Amount)

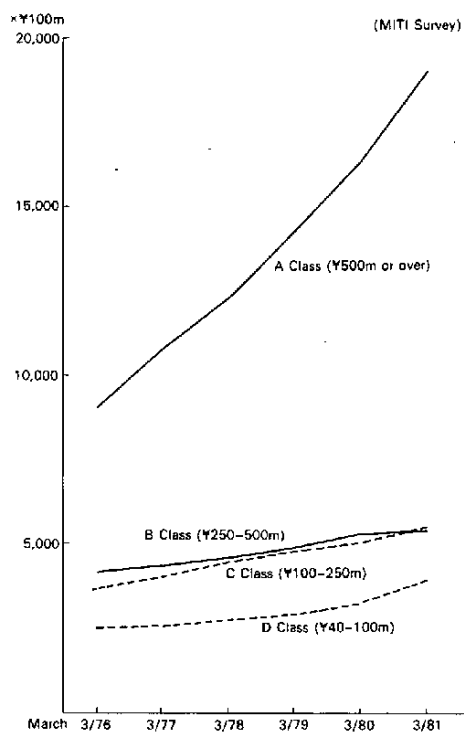


Figure 2 General Purpose Computers in Operation

medium-size B have been called A, B, C, D, respectively, and the number of computers in operation as of March, 1981 is shown, and the growth rate indicated as compared with 5 years before. IBM's 303X series is roughly equivalent to class A, the 4341 to B, the 4331 to C, and the System/38 and System/3 to class D.

According to this method, class A sets number 1,759 for a value of ¥1.8967 trillion, 2.1 times the value of 5 years previously; class B sets number 1,463, a value of ¥544.7 billion, an increase of 1.3 times; class C sets number 3,358, a value of ¥549.6 billion, an increase of 1.5 times; and class D has 6,164 sets, a value of ¥399.7 billion, an increase of 1.6.

The A to D total of computers in operation i.e. purchase-equivalent value of general-purpose computers of over ¥40 million, as of March, 1981 was ¥3.3907 trillion

for 12,744 systems; the average annual increase over the 5-year period was 12%.

According to the EDP Industry Report put out on June 26, 1980 and containing IDC survey data on the installations in the U. S. and overseas of U. S. mainframers, there were 56,515 general-purpose systems in the U. S. and 115,071 systems throughout the world. The value of installations in the U. S. was some \$58 billion. Comparison with these figures shows that in Japan the number of general-purpose sets is equivalent to 23% of the U. S. total, or roughly one-fifth, and by value, one-fourth.

Figure 2 shows that in Japan the rate of increase for class A large computers is higher than in America. Large systems are widely used, mainly by the financial and manufacturing industrial sectors, which are needing, more and more, larger and more highly reliable computers to keep pace with the increas-

Table 2 General Purpose Computers in Operation
As of 31 March 1981 (Source: MITI Survey)

Class	Sets in operation	Increase relative to 5 years before	Value of computers in operation	Increase relative to 5 years before
A (¥500m or over)	1,759	1.90	18,967	2.07
B (¥250-500m)	1,463	1.30	5,447	1.30
C (¥100-250m)	3,358	1.51	5,496	1.46
D (¥40-100m)	6,164	1.65	3,967	1.58
Total	12,744	1.59	33,877	1.73

Note Class A corresponds to IDC size classes 6 and 7

Class B corresponds to IDC size class 5

Class C corresponds to IDC size class 4

Class D corresponds in part to IDC size classes 3 and 2

ing scale of processes, expansion of on-line operations and the greater computerization of clerical tasks. Thus the outlook is that large computers will become larger and average system costs higher.

Emergency utilizations, such as for social systems, are seen as a new demand area for large computers, because such infrastructural social systems—e.g. systems for administration, for medical information, for traffic control—are areas in which Japan is particularly behind, so that improving these systems is becoming an urgent task.

In July, 1981 MITI came out with its draft proposal for a plan to upgrade computer utilization, in which the target is for large computer (Table 2, classes A and B together) installations to total of ¥4.95 trillion by the end of fiscal 1985 (March 31, 1986). This means an average annual growth of 15.2% is being considered, and a value of installations in operation that is twice that of March, 1981.

The C and D classes (the MITI survey's medium-sized systems) are seen as growing more slowly, on average 10.7% per year until the end of fiscal 1985. The target given for March, 1986 is ¥1.5 trillion, or 1.6 times the March, 1981 figure.

Medium-sized computers are seen as becoming smaller and easier to install in locations where ordinary clerical processing is carried out. For this, there will be a move away from the former type of centralized clerical processing format, where terminals were linked on-line to a large computer. Instead, a distributed format will be used in which medium-scale tasks will be processed by medium-sized computers, and host computers used only for the big jobs.

Rapid increase in SBCs

According to the Japan Electronic Industry Development Association's (JEIDA) market survey on utilization of SBC's (small business computers) in Japan, there were 97,219 SBCs in operation as of March, 1981. This is 24,644 sets more than the previous year's total, an increase of 34%.

JEIDA defines an SBC as a small or very small computer for office tasks which costs less than ¥30 million (market value of ¥40 million) for a standard system configuration, which includes file and I/O device. It is the manufacturers of such systems who are surveyed.

The performance capabilities of SBCs have risen considerably in line with improved semiconductor performance. In fact, an SBC can handle easy clerical processing tasks which hitherto were carried out by medium-sized systems.

Part of the reason for the rapidly growing demand is that an SBC does not need a special computer room; it can be used in an ordinary office without any changes. Another reason for the expansion of new areas of demand for SBCs is that they are low-priced enough to put them within the reach of small businesses, and they do not need to be operated by computer experts.

JEIDA survey figures show shipments (deliveries to end user) of SBCs first passed the 30,000 sets (32,831) ¥200 billion (¥229.6 billion) marks in fiscal 1980, 57.6% up on year-earlier quantities, and 57% on value. These rises also represent 14.5% (sets) and 12.3% (value of shipments) more than JEIDA predicted in 1979. JEIDA sees this as indicating that users realized the real need for SBCs.

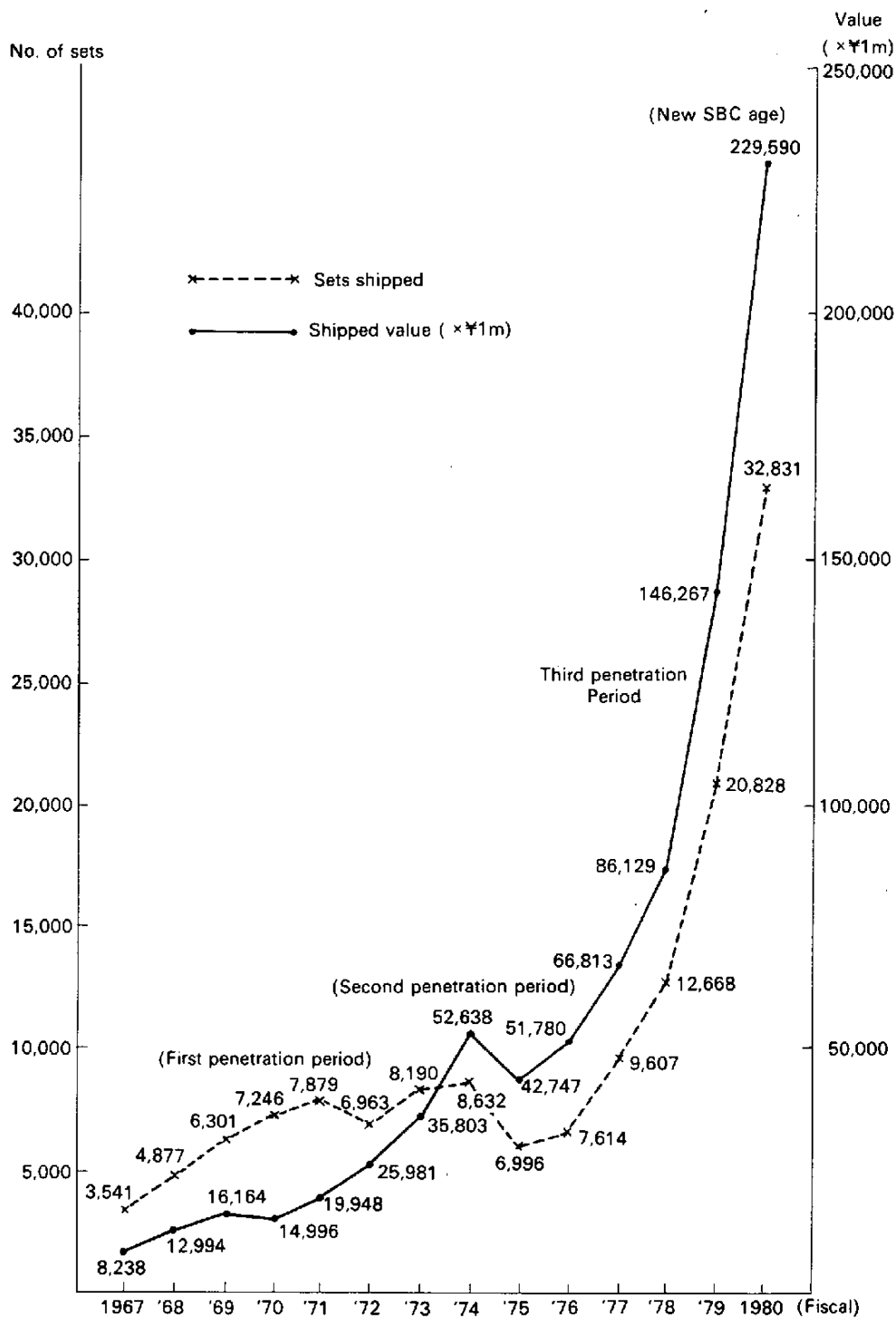


Figure 3 Shipments and Value of Small Business Computers (SBCs)

Growth has been considerable in each of the past five fiscal years, compared to the previous year: 1976, 21.1%; 1977, 29%; 1978, 28.9%; 1979, 69.8%; and 1980, 57%.

In these times of slower economic growth office overheads, especially personnel expenses, are a very heavy burden on all enterprises, while at the same time, in the intense competition of today it is becoming more and more important for companies to process complex and voluminous information speedily and accurately in order to arrive at decisions.

Management started looking to SBCs as a means to cope with all this, and a reason for the increase in demand for the SBC has been the spreading consciousness that it was a necessity for processing business data.

JEIDA also prepared estimates of SBC shipments in the mid-1980s and after 10 years (i.e. 1990), taking into account the social environment and technological trends. According to these estimates, the high rate of growth will continue up to 1985, in which year 105,000 SBCs will be shipped (i.e. an average annual growth of 26.2%), having a total value of ¥750 billion (26.7% average annual growth). Then, in the second half of the decade, SBCs will enter a period of stable growth, with 1990 shipments reaching 220,000, worth ¥1.66 trillion, for respective average annual growth rates of 15.9% and 17.2%—and achieving the status of a trillion-yen industry.

Minicomputers: Shipments top 10,000/year

The same JEIDA survey shows that in 1979 10,494 minicomputers were shipped, the first time the 10,000 mark has been

passed. The value of the shipments came to ¥130.2 billion. Some estimates for fiscal 1980 are also included: 12,651 sets worth ¥147.4 billion, an increase of 21% for the former figure, and 13% for the latter.

Deliveries are to either OEMs or end-users; in 1979 the ratio was 57% OEM and 43% end-user. In 1980 OEM deliveries increased 28% (to 7,661 sets), accounting for 61%; while end-user deliveries rose by 11% (to 4,990 sets).

By shipment value, however, the situation is the reverse, with the OEM: end user ratio in 1979 and 1981 being 19:81. The reason for this is the high proportion of direct deliveries to end-users of larger minicomputers with CPU internal memories of 128k-bit or more, and costing ¥5 million and up. Most end-users used the computer for process control (¥28.4 billion), control of communications information networks (¥14 billion), medical purposes (¥13.2 billion), and production line control (¥12.8 billion).

Personal computers pass the 200,000 mark

Around the Fall of 1980, office automation started a boom period, and in a twinkling drew in the Japanese nation, from end to end. Most prominent in all this was the personal computer. And those who let that opportunity slip past saw a string of new entries into the personal computer industry in 1981; in that year more than 20 new models went on sale, 7 of them 16-bit units. The IBM model has not yet been put on sale in Japan. All in all, it was a chaotic situation, with newcomers suddenly appearing.

The personal computer of the 1970s was limited, being used just for hobby purposes

or for scientific and technical calculating. In 1980 these computers started to be used for business, by youngsters and in the home. 1981 saw the appearance of the personal computer specially intended for business use, and for popular appeal, models at under ¥50,000.

According to the JEIDA survey 110,610 personal computers (worth ¥33.6 billion) were shipped in fiscal 1980; in 1981 the total is sure to be over 200,000, and the view is that the 1982 figures will show 300,000 sets, exceeding ¥100 billion in value.

Trends in Japan's Computer Service Industry

by Shohei Nishida
Computopia

Scale of Japan's computer service industry still small

Though in America the computer service industry may be considered to be "The Growth Industry's Growth Industry" (Forbes, July 6, 1981), it is not yet so highly evaluated in Japan.

Whereas the United States is said to have a \$13 billion computer service market, the scale of the market in Japan is a mere \$3 billion. Still, in view of the difference in strength between the Japanese and American computer industries, Japan's figure of \$3 billion, or about one quarter of the U.S. market, can be considered to be a fairly gallant showing. The real problem lies not so much in the difference in market scale as in the power of the individual industries in the field.

A comparison of Table 1 showing the rankings of Japanese computer service firms with Table 2 showing the rankings of those in America makes this difference in power obvious. Even setting aside IBM as being a special case, second ranked Control Data with sales of \$722.7 million still totally overshadows Japan's first ranked Nippon Business Consultatant with sales of only \$68.5 million. The difference is fully ten fold. Moreover, fewer than 10% of the Japanese computer service firms have sales exceeding \$5 million.

A number of reasons for the failure of Japan's computer service firms to show rapid growth can be given. The primary ones are the strong tendency for potential users to be reluctant to employ outside services and a deep-rooted feeling that software should be free (an unwillingness to pay money for software). Another factor that has hindered the expansion of the industry is that because of the restrictions imposed by the Electric Communications Law it has not been possible to make free use of communications circuits and this has prevented the development of large-scale on-line services.

To compensate for the small size of the individual firms, the industry has formed itself into groups.

The companies of Japan's computer service industry fall into three categories: maker related, user related and independent. Among these, the trend to form groups around maker-related computer centers is especially pronounced. What this amounts to is an attempt to make up for the weak points of the individual companies by, for example, grouping small, medium and local firms using Hitachi or NEC computers as their information processing services machines around Nippon Business Consultatant or NEC Information Service.

In most cases a group will consist of twenty to thirty companies in which the

Table 1 Fifty Top Japanese Computer Service Companies

Rank	Rank in Preceding Year	Company	Fiscal 1980			Growth in Sales in 1979 (%)	Corporate Income in Fiscal 1980 (¥ Mil.)
			Sales (¥ Mil.)	Sales per Employee (¥10,000)	Growth in Sales over Preceding Year (%)		
1	1	Nippon Business Consultant	15,075	1,406	12.3	14.5	1,896
2	2	NEC Software	13,309	1,676	34.3	39.6	144
3	4	Nomura Computer System	10,920	2,141	20.3	15.4	869
4	3	Computer Service Corporation	10,676	356	14.9	15.2	1,639
5	5	Japan Information Processing Service	9,569	1,068	14.0	17.1	404
6	9	Intec	8,682	769	23.1	35.9	142
7	10	Japan Information Service	8,400	1,286	21.7	15.0	280
8	7	Hitachi Software Engineering	8,093	579	11.0	28.9	846
9	8	NEC Information Service	7,283	2,305	11.4	21.3	132
10	13	Kyoei Information Processing Service Center	6,613	858	19.7	21.5	89
11	11	Century Research Center	6,599	1,083	13.9	21.8	198
12	16	Japan Business Automation	6,550	1,492	34.8	22.7	406
13	15	Toyo Information Systems	6,232	1,039	21.2	19.5	128
14	6	Mitsui Knowledge Industry	6,187	2,335	△15.3	△7.8	—
15	12	Facom Information Processing Co., Ltd.	6,139	860	7.0	19.4	—
16	14	T.K.C.	5,865	1,866	11.2	25.0	528
17	17	Sumisho Computer Service	5,220	2,047	8.9	13.6	287
18	21	Central Systems	5,146	973	35.6	2.1	546
19	20	Marketing Intelligence Corporation	4,856	847	23.4	1.4	—
20	23	Japan Computing Center Co., Ltd.	4,515	4,515	19.6	—	—
21	19	M.S.K. Systems	4,226	4,143	3.4	△10.0	493
22	—	Fujigin Computer Service, Ltd.	4,224	1,097	8.3	—	76
23	22	Daiwa Computer Service	3,652	2,435	0.3	△15.2	377
24	25	Tokyo Security Computer Center	3,470	2,103	8.8	5.0	440
25	27	C.E.C.	3,410	808	18.4	24.7	173
26	29	Mitsubishi Research Institute, Inc.	3,391	1,455	22.8	—	389
27	26	Nissei Computer Service	3,204	787	△15.2	14.2	287
28	28	Diamond Computer Service Co., Ltd.	3,151	1,154	13.3	—	234
29	31	Nippon System Development	3,090	460	22.1	25.1	91
30	32	Data Process Consultant	2,957	311	26.1	27.7	420
31	30	Kansai Electronic Computing Center	2,785	1,141	7.8	5.8	246
32	53	Nihon Traffic Computer Center	2,722	1,361	55.5	—	84
33	35	Hokkaido Business Automation	2,612	926	18.6	18.8	106
34	—	Computer Applications Co., Ltd.	2,579	984	35.0	—	207
35	47	Nippon Information Industry Corporation	2,400	429	33.3	33.3	357
36	40	The Kobe Computer Service Co., Ltd.	2,371	1,254	24.1	31.9	69
37	36	Chuo Computer Systems	2,362	1,312	10.3	5.9	252
38	45	Kozo Keikaku Engineering, Inc.	2,359	1,709	30.7	8.9	208
39	41	Data Processing Corporation	2,351	783	26.3	—	599
40	38	Seibu Joho Center	2,276	929	13.8	11.1	107
41	45	Nippon Timeshare Co., Ltd.	2,268	613	25.5	19.9	—
42	37	Japan Information Research Center	2,266	427	7.0	—	79
43	39	Tohoku Computer Service	2,174	1,098	13.9	14.0	—
44	44	Asahi Business Consultant Co., Ltd.	2,145	465	16.3	—	120
45	54	Nippon Information Development	2,062	385	25.5	—	61
46	59	Software Research Associates, Inc.	2,006	7	30.6	18.8	207
47	51	Ryoyu Computing Co., Ltd.	1,990	341	17.8	11.1	87
48	43	Fuyo Data Processing & Systems Development	1,971	639	6.5	18.4	92
49	47	TDC Co., Ltd.	1,963	755	9.1	9.1	84
50	49	Public Utility Computing Center	1,887	1,151	6.6	—	—

Source: Computopia Dec. 1981 Issue

Table 2 Twenty Top U.S. Computer Service Companies

Company	Sales (\$ Mil.)	Percentage of Total Sales	1979-1980 Growth Rate
International Business Machines	\$2,414.5	9.2%	21.9%
Control Data Corp	722.7	19.0	18.6
Computer Sciences Corp	560.3	100.0	34.9
Automatic Data Processing	505.0	100.0	24.1
Electronic Data Systems	408.5	98.7	31.1
Honeywell	349.7	7.1	21.0
General Electric (GEISCO)	299.3	1.2	19.3
Tymshare	211.0	89.5	19.7
System Development Corp*	186.8	100.0	14.6
McDonnell Douglas (McAuto)	160.7	2.6	-21.9
Bradford National Corp	142.7	100.0	18.8
Planning Research Corp	127.4	41.5	24.5
Informatics Inc	125.9	100.0	12.0
Boeing Computer Services	125.0	1.3	30.2
Burroughs Corp	123.9	4.3	26.8
General Instrument	115.3	14.0	15.2
United Telecommunications	115.1	6.0	20.0
Shared Medical Systems	105.6	99.1	28.3
Wyly Corp	99.0	84.0	13.6
TRW	94.2	1.9	32.7

*Acquired by Burroughs on Jan. 5, 1981.

central company or its parent company has made capital investments. The aim is to establish a close, cooperative system taking advantage of the amicable relationship rooted in the computer service firms' use of the maker's machines and enhanced by capital investments and in this way to upgrade services through the development of computer service technology and the formation of national networks. The group is thus much stronger both financially and in terms of machine power and manpower than the companies individually and is consequently

in a better position to tackle large-scale projects and the like.

The formation of groups is not limited to the maker-related companies. The movement toward group formation is also very active among the independent firms, especially the small and medium sized ones. The trend toward group formation is in particular stimulated by, for example, a desire to share costs in the case of introducing highcost systems (such as a Japanese language processing system) or a desire to develop the capability for accepting large orders from

local governments etc. There are also cases where small firms in the same area, each too financially weak to put in its own computer, join together in setting up a joint computer center. Grouping in this sense is extremely common and extends even to almost totally unknown software houses.

In 1980, 21.5% of the computer service firms engaged in joint order acceptances and/or joint job processing, 13.5% engaged in joint information activities and 1.1% engaged in operations employing jointly owned facilities.

The companies thus make up for their smallness by forming themselves into such various types of groups.

It should of course be noted that Table 1 does not include such firms as Nippon Telegraph & Telephone Public Corporation, which through its operation of the DRESS sales and inventory control system service and the DEMOS-E scientific and technological computation service has an underlying strength in the computer service field, or IBM (Japan) or CDC Japan, neither of which announces the number of its computer service users or its computer service sales.

Profile of Japan's computer service industry

An outline of Japan's computer service industry will now be given on the basis of the data contained in MITI's Survey on the State of the Computer Service Industry.

According to this Survey, Japan's computer service industry in 1980 encompassed 1,731 places of business, 93,271 employees, and annual sales of about \$3 billion (¥669,844 million). On the average this comes to 54 employees and \$1.76 million in

annual sales per place of business.

A breakdown of the employees by occupation is shown in Table 3. The number of systems engineers and programmers is rising steadily while the percentage of all employees accounted for by operators and key punchers is on the decline. This can be taken as one sign that the level of computer services in Japan is on the rise.

One problem is, however, that rapid progress in computers and electronics has created an acute shortage of engineers in Japan. Main frame manufacturers (which also produce semiconductors) are employing large numbers of engineers fresh out of university, particularly in the electronics field, while home electrical appliance and auto makers whose products are also coming to incorporate more electronics technology, have also begun to hire electronics engineers. As a result, the much less well known companies of the computer service industry are having a very difficult time meeting their personnel requirements. Japanese university students tend to prefer secure employment and most seek jobs at government offices and major corporations. One reason that the computer service industry has not been able to demonstrate its full growth potential is this problem in securing personnel—particularly the difficulty of securing high caliber university graduates.

Table 4 shows a breakdown of computer service industry sales by job category. The type of work accounting for the largest percentage of total sales is "business data processing" at 27.1%. Following this come "software development" at 23.0% and "personnel dispatch" at 15.5%. "Business data processing" has been declining year by

Table 3 Breakdown of Computer Service Industry Employees by Occupation

		Number		Percentage of total					
		79	80	76	77	78	79	80	
Places of business		1,761	1,731	—	—	—	—	—	
Information service division	Total	90,732	93,271	100.0	100.0	100.0	100.0	100.0	
	Family employees of proprietor or salaried officers	4,715	4,539	4.8	5.6	6.1	5.2	4.9	
	Full-time employees	86,017	88,732	95.2	94.4	93.9	94.8	95.1	
Occupation	Total	90,732	93,271	100.0	100.0	100.0	100.0	100.0	
	Managers	11,678	11,955	12.7	13.2	12.6	12.9	12.8	
	Reserchers	2,558	2,632	3.2	2.8	2.8	2.8	2.8	
	Systems engineers	12,451	13,673	11.9	13.1	13.4	13.7	14.7	
	Programmers	18,389	19,968	19.5	19.4	19.5	20.3	21.4	
	Operators	10,862	11,298	13.3	13.0	12.7	12.0	12.1	
	Key punchers	21,587	22,300	27.6	26.0	26.4	23.7	23.9	
	Others	13,207	11,445	11.8	12.5	12.6	14.6	12.3	
Male/ Female	Total	90,732	93,271	100.0	100.0	100.0	100.0	100.0	
	Male	58,264	59,546	60.9	62.1	61.5	64.2	63.8	
	Female	32,468	33,725	39.1	37.9	38.5	35.8	36.2	

Source: MITI

year while "software development" and "personnel dispatch" have been on the rise.

The most salient features of this table are, however, that the percentage of total sales accounted for by "information supply service" (i.e. database or databank service) is under 10% and that though the table includes a "software development" category, it does not include a "software sales" category.

Database services—the next area requiring attention

Although there have been a large number of companies interested in going into database services, little real progress has been made because of the restrictions on utili-

zation of communications circuits mentioned earlier and the weak business foundation of the industry. There are only about fifteen companies whose database services are well known to any degree. Moreover, almost all of the leading databases are operated either by agents of U.S. database service companies or by joint ventures in which one of the parties is an American firm. The number of purely Japanese databases is very small, consisting mainly of JOIS, a scientific literature and research theme database operated by the Japan Information Center of Science and Technology (JICST), NEEDS, an economic analysis database operated by Nihon Keizai Shimbun (Japan Economic

Table 4 Percentage Breakdown of Computer Service Industry Sales by Job Category

Year	Number of places of business	Total		Business Data Processing	Other Data Processing	Software development
76	1,276	(306,969)	100.0%	34.5	4.1	15.3
77	1,640	(412,581)	100.0%	30.0	3.6	18.7
78	1,672	(460,242)	100.0%	29.4	4.2	19.3
79	1,761	(596,613)	100.0%	28.3	3.7	21.6
80	1,731	(669,844)	100.0%	27.1	3.4	23.0

Card punching	Machine time sales	Personnel dispatch		Information supply service	Surveys	Others
		Software development	Others			
13.9	5.3	10.6		3.9	8.2	4.2
13.4	4.2	12.7		5.8	7.6	4.0
13.3	2.6	14.5		5.9	6.8	4.0
11.7	2.5	7.7	7.5	5.3	6.6	5.1
11.1	2.3	8.2	7.3	6.6	5.8	5.2

Source: MITI

Journal), and PATOLIS, a patent information database operated by the Japan Patent Information Center.

A fairly large number of firms have expressed interest in going into database services as distributors should the much-talked-about liberalization of the communication circuits proposed in 1981 be realized. On the other hand, almost no companies seem to be interested in becoming database producers.

The production of a database requires huge amounts of money, manpower and time for the collection of raw data and the development and maintenance of programs. The job is just too big for a small Japanese computer service firm. Nevertheless, the development of databases is highly important to Japan in order that the country can (1) incorporate Japan's own data into database systems so that through the creation of its own data-

bases Japan will be better prepared to fulfill its responsibilities to the international community and enhance its bargaining position in the acquisition of data from other countries, (2) more effectively promote the development of knowledge-intensive industries at the leading edge of technical progress, and (3) assure that its information sources will not be cut off completely during times of international trouble. These points have prompted the Government to take a serious look at the need for database development and it is hoped that measures of some type, possibly inclusive of financial aid, will be implemented.

The national and local governments are also studying how they should respond to the movement demanding free access to public information which grew particularly active during 1981. The data possessed by these government bodies will no doubt become an important raw data source for databases.

Package software market still undeveloped

Another weakness of the Japanese computer service industry that stands side by side with the underdeveloped state of database services is the virtual lack of a software market, i.e. the lack of a well developed package software market.

As was mentioned earlier, Japanese users are strongly inclined to think that software should be free. This inclination, which still persists although to a lesser degree than formerly, puls an aversion among users to ready-made software, has hindered the growth of the package software market. This aversion to ready-made products is especially strong among small business computer users.

Among the users of large machines, though there cannot be noted any particular reluctance to the use of ready-made utilities such as DBMS and communications control software, there is still a strong tendency for firms to develop their own application software. The tendency to think that one's own system and jobs are different from those of other companies is exceedingly strong. Also EDP personnel pride themselves on being able to produce better programs than those available on the market.

Because of these circumstances, Japan's package software market is all but invisible in comparison with the \$3 billion market of the United States. In fact, the market for Japanese-made packages is almost nonexistent. In order to overcome this situation and promote the smooth distribution of software, the Japan Software Industry association has established a Software Distribution Promotion Center through which it is positively implementing various counter-measures.

It must be noted, however, that the blame for the lack of a package software market cannot be placed on users alone. Another factor is the weak financial and business position of the computer service companies, particularly the software houses. Lacking their own business muscle, these firms tend to resign themselves to being subcontractors for computer makers or users and lack the money needed for carrying out the market surveys and software development required for breaking into package software sales.

Still, it cannot be denied that in this, the software era, there is being seen an expansion of the overall software market. This is clear from the fact that, as we saw earlier, the

percentage of computer service industry accounted for by "software and program development is on the rise. Only when the computer service firms advance a step beyond their subcontractor consciousness and become capable of promoting package software sales backed up by stronger business viability will it be possible to say that the software era has reached the computer service industry.

JIPCA and SIA

Let us now return to a more general discussion of the industry as a whole. A breakdown of the 1,731 places of business in Japan's computer service industry runs 202 in the software business, 1,137 in the data processing service business, 165 in the information supply service business and 227 in other businesses. In terms of sales, the software businesses account for 21.1% of the industry total, the data processing business for 64.6%, the information supply businesses for 6.7% and other businesses for 7.6%.

The mainstream of the industry is thus the data processing service and software businesses. Japan has no organization like ADAPSO in the U.S. covering the entire computer service industry. Instead there are two organizations, the Japan Information Processing Center Association (JIPCA) centering primarily on the data processing businesses and Japan Software Industry Association (SIA) centering primarily on the software businesses. Although these two organizations are under pressure from various quarters to merge, in view of various events and points of discord up to now, it does not seem likely that such a merger will be realized in the near future. There is, however, a

certain amount of intercourse between the organizations and some companies are members of both.

Topics for 1981

Report by Industrial Structure Council's Committee on Information Industry presents outlook on computerization in Japan and state of information industry in 1980's

The Committee on Information of the Industrial Structure Council, an advisory body to the Ministry of International Trade and Industry, in June of 1981 issued a far-reaching report on computerization and the state of the information industry in the 1980's as well as on measures which should be taken in respect of these. The report has drawn wide attention not only in the industry but also throughout the society in general.

In the report the Sub-Committee on the computer service industry recommends a basic policy aimed at modifying social conventions which hinder the development of the information processing industry and impede the computerization of the Japanese economy and at carrying out promotional measures focused on specific areas where most required. Concrete recommendations set forth were as follows:

- 1) Strengthening business foundation and financial power;
- 2) Promoting technological development and strengthening technical power;
- 3) Promoting software distribution;
- 4) Advancing database services;
- 5) Coping with trend toward systematization of hardware and software;
- 6) Unified promotion of standardization

- relating to information processing;
- 7) Establishing environmental conditions for information processing;
 - 8) Training information processing technicians;
 - 9) Improving communication circuit system;
 - 10) Promoting cooperation between government and private industry; and
 - 11) Responding to the international development of the Japanese information processing industry and the internationalization of the Japanese market.

System for certifying computer system security measures set up

With the wide spread of computer utilization, it has become increasingly important to implement measures to protect computer systems.

With a view to promoting such measures, the Ministry of International Trade and Industry has established a system for certifying information processing service firms which have implemented security measures for protecting their computer systems. Under the system, computer systems which meet standards set by the Ministry are publicly announced. That is to say, information processing service firms which have implemented prescribed security measures in respect of their computer systems receive the certification of the Minister of International Trade and Industry.

According to the Ministry, there are a total of 1,137 information processing service firms (places of business) in Japan, 600 of which use computer systems. Up till now, however, there has been no system for pub-

licly certifying firms on the basis of whether they have implemented data processing security measures in order to protect secret data they handle for their customers from unauthorized disclosure. Because of this situation, there was a rising cry among users for the formulation of standards. At the same time, many firms in the information processing service industry also expressed strong desires to have a system of certification set up.

Japan Software Industry Association sends first study group to China

The first study group to be sent to China by the Japan Software Industry Association received a warm welcome from the Chinese and returned to Japan convinced that it had been well rewarded for its efforts.

The group of seventeen was in China for ten days between October 28 and November 7, 1981, during which time it visited seven key Chinese computer organization including the State Scientific and Technological Commission and the Fourth Ministries of Machine Building and held discussions with the authorities concerned. The visit helped to deepen China's understanding of Japan's software industry and the Japanese side's understanding of Chinese desires.

Of special interest was an unscheduled meeting with Vice Premier Fang Yi. At this time the group was asked to make a concrete proposal from the Japanese side concerning technical guidance. The Association is currently preparing its reply to this request, the first positive expression of interest by the Chinese in Japanese software technology.

Interest in Japanese software has risen rapidly over the past year, with symposiums,

seminars and conventions being held one after another. Particularly notable was the Software Show '81 which turned out to be much larger in scale than the first event held in 1980.

Software maintenance technology development project gets under way

Joint System Development Corp., a research company jointly financed by 17 software companies, has begun work under a 5-year software maintenance technology development project scheduled to be brought to completion in fiscal 1985. As the problem of software maintenance has now become even more important than that of upgrading

the efficiency of software development, the results of the company's work is already being anxiously awaited.

Joint System Development Corp. is a joint project company established through the cooperation of 124 companies including seventeen representative Japanese software firms and the firms which have formed groups with these seventeen. The company strives to strengthen the foundation of the software industry, in part by soliciting orders for the development of large-scale information systems that are too big for individual firms to accept. Up till now, the company has been carrying out a software production technology development project.

Data Communications in Japan: State of Utilization and Main Events of 1981

Yoshinori Takeda
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Introduction

There are more than 88,223 computer systems in Japan, with a value of some ¥4.16 trillion. This has moved Japan into second place, behind America, in the international ranks of computer nations. The construction of an information society here in Japan is also progressing rapidly. This means that in the space of a few years the spotlight will be on data communications. Data communications involves the integration of data processing and transmission, with computers being linked to telecommunication lines. Data communications therefore form the equivalent of a central nervous system for such an information society. The key question to all this is how to proceed with data communications set-ups from now on so as to enhance and upgrade the information society here in Japan.

At present, rapid innovation in telecommunication technology, in electronics, as typified by computers and semiconductors, and in software technology is leading to a move away from the centralized centrally-controlled processing format, and towards distributed processing systems where control has moved to regional locations. The computer manufacturers have consequently started announcing their own network architecture, and even CCITT has

started work on standardizing data communication protocols. The Ministry of Posts and Telecommunications announced as a recommended system its "Computer Communication Network Protocol (CCNP)," and NTT (Nippon Telephone and Telegraph Public Corp.) has commenced its circuit and packet switching service utilizing its digital transmission exchange technology.

In line with these qualitative changes in data communication systems attention has begun to focus on linking disparate systems for joint use, making more efficient use of computer processing capabilities and databases; that is to say, resource-sharing computer network architectures are being adapted to the requirements of the times, i.e. energy and resource conservation. The key to such a network architecture lies in the freeing of communication lines. Freeing communication lines constitutes a major problem and has a direct bearing on the direction the information society will take, and as such even the ordinary man in the street is displaying a keen interest in the outcome.

State of data communications utilization

As of the end of fiscal 1980 the number of data communication lines in Japan had reached 134,703, a major increase of 25.8%

over the 1979 figure. Some figures for other fiscal years, with percentage increases over year-earlier levels: 1977, 71,094 (16.2% up); 1978, 83,639 (17.6% up); 1979, 107,086 (27.6% up). Leased lines accounted for 74.4% of the total, the remainder being public switched network lines.

Of leased line use, the D-I classification, which allows voice frequency bands to be freely utilized, accounted for 49% of the total, a remarkable increase. Of the public lines, 89% were of the telephone type (public telephone lines). Use of the telegraph type (public telegraph lines) is continuing to decline year by year.

As of the end of fiscal 1980 international data communications lines in use numbered 430, an increase of 25.4% over the previous year. With 199 lines in 1977 (9.9% up), 253 lines in 1978 (27.1% up) and 343 in 1979 (35.6% up), the pace of the rise is clear and attests to Japan's move towards internationalization.

Transmission capability in bits per second (as obtained by multiplying the number of lines by each line's transmission speed) was 381,125 b/s, 1.8 times the total three years previously.

Of the international data communications lines, there was an increase in fiscal 1980 of 9 voice-grade lines for a total of 67 voice-grade lines. The number of voice-grade lines is low but the quantity of information transmitted is high, which is why such lines now account for 98% of the international leased lines total. Major users are trading firms (12 lines), transportation companies (9 lines) and government agencies (7 lines).

Domestically, the volume of transmitted information as of the end of fiscal 1980 was

equivalent to 146,683,850 b/s, meaning that in the space of 2 or 3 years the quantity of information being transmitted has doubled as Japan's data transmission lines strive to cope, domestically and internationally, with soaring demand.

Domestic data communications systems

As of the end of fiscal 1980 Japan had 5,879 data communications systems, an increase of 25.9% over the 1979 total. These systems are also increasing rapidly: in 1977, 2,749 systems (33.6% up); in 1978, 3,468 (26.2% up); in 1979, 4,668 systems (34.6% up). These are healthy growth rates. In fact, from 1969 to 1974 growth stayed at over 50%.

There are three types of data communications systems: ① privately-operated (i.e. customer provided or owned), ② NTT (or KDD) systems, and ③ privately-owned.

A privately-operated system is a system in which a line provided by NTT or KDD (Japan's international telephone company) is tied into the customer's own computer or terminal. At the end of fiscal 1980 such systems totaled 5,807, an increase of 26.3% over 1979 figure. Such systems numbered 1,999 in 1976, so in 4 years there has been a nearly fourfold increase. Up to fiscal 1972 all systems in this category used leased lines (own-use lines, up to September 1, 1971). From fiscal 1973 use of public lines was allowed and that is what gave privately operated systems their rapid growth impetus. Of the 1980 figure of 5,807 systems, leasedline types came to 3,628 (of which 350 also used public lines), and public line systems numbered 2,179 (2,529 when those

also using leased lines are included).

An NTT (or KDD) system is one in which NTT (or KDD) provides the computer and terminal equipment as well as the telecommunication lines. This system service started in fiscal 1968 and by the end of fiscal 1980 there were 72 such systems in use. The increase has been steady: 60 systems in 1977; 65 in 1978 and 70 in 1979.

A privately-owned system is one in which everything from the telecommunication lines to the computer and terminal are installed by the user. Legally, the basis for this type of system is the Wired Telecommunication Law. Electric power companies make use of the system for automatic power distribution, transportation enterprises use it for their seat reservation systems, and local governments for pollution monitoring systems.

Domestically, then, the overwhelming majority of data communication systems are privately operated. As of fiscal 1980, 3,816 systems, or 66.7% of the total, were used for office administration purposes, by manufacturers and trading companies. Of these, 3,440 were related to production, inventory and sales administration, or 59.2% of all systems. They are used by managers to rationalize production systems, reduce inventory adjustment and for sales information control to minimize lost sales opportunities. This all indicates extremely energetic moves to modernize management. Systems used for securities transactions, transportation administration, scientific/technical calculations and consigned computing work totaled 911, or 15.7% of the total. Financial establishments used 521 systems (9% of total) for deposits, currency exchange, loans, and trusts. Government offices used 499 systems (8.6%)

for pollution monitoring, traffic control, etc.

The top 7 system users, ranked by number of systems so employed, are shown below.

- ① Production, inventory and sales administration
- ② Financial
- ③ Consigned computing work
- ④ Business administration
- ⑤ Pollution monitoring
- ⑥ Scientific/technical calculation
- ⑦ Traffic control

The first two on the list have not changed. Of note is the fact that since 1979 pollution control slipped from third to fifth, to be replaced by consigned computing.

A breakdown of the privately-operated category (1980) shows that the manufacturing and construction industries were the top users, with 2,246 systems (28.7% of the total). In second place came trading companies with 1,463 systems (25.2%). Third came financial institutions, with 521 systems (9%). Thus the 4,230 systems of the top three account for 72.8% of all systems (5,807). The information communication and software industry had 341 systems (5.9%); local governments 318 systems (5.5%), and communication/publishing/services 283 systems (4.9%).

Of industries using public lines, manufacturing and construction used 991 systems; trading companies used 660 systems; information communication and software companies 126 systems; communication/publishing/services and financial establishments each used 101 systems.

International data communications systems

Systems for international data com-

Privately-operated data communications systems installed domestically

FY	1976		1977		1978		1979		1980	
	No. of systems	percentage	No. of systems	percentage	No. of systems	percentage	No. of systems	percentage	No. of systems	percentage
Manufacturing and Construction	739	37.0	1,005	37.4	1,319	38.8	1,758	38.2	2,246	38.7
Commerce	323	16.2	475	17.6	669	19.7	983	21.4	1,463	25.2
Finance	291	14.6	363	13.5	399	11.7	494	10.7	521	9.0
Securities	18	0.9	18	0.7	19	0.6	23	0.5	28	0.5
Insurance	30	1.5	35	1.3	44	1.3	47	1.0	43	0.7
Transportation	56	2.8	68	2.5	88	2.6	120	2.6	153	2.6
Electricity & Gas	20	1.0	21	0.8	20	0.6	30	0.6	25	0.4
Communications,										
Publishing & Service	92	4.6	125	4.6	151	4.4	203	4.4	283	4.9
Warehouse, Real estate	18	0.9	29	1.1	45	1.3	67	1.5	85	1.5
Remote computing service,										
Software	95	4.7	151	5.6	211	6.2	294	6.4	341	5.9
Government	52	2.6	64	2.4	76	2.2	86	1.9	101	1.7
Local Government	202	10.1	241	9.0	253	7.4	308	6.7	318	5.5
State Universities	24	1.2	37	1.4	45	1.3	53	1.2	48	0.8
Associations	33	1.6	49	1.8	62	1.8	118	2.6	136	2.3
Other	6	0.3	8	0.3	2	0.1	14	0.3	16	0.3
Total	1,999	100.0	2,689	100.0	3,403	100.0	4,598	100.0	5,807	100.0

Ministry of Posts and Telecommunications

Data communications systems installations

FY		1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
Domestic	Privately operated	295	441	706	1,126	1,429	1,999	2,689	3,403	4,598	5,807
	NTT system	13	27	38	42	50	58	60	65	70	72
	Total	308	468	744	1,168	1,479	2,057	2,749	3,468	4,668	5,879
International	Privately operated	20	25	34	39	42	47	60	80	116	150
	KDD system	0	1	1	1	1	2	2	4	5	6
	Total	20	26	35	40	43	49	62	84	121	156

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munications are divided into two types, by computer location: Type I, where a computer located in Japan is hooked up with an overseas terminal of the foreign organization concerned; and Type II, where a computer in another country is linked to a terminal in Japan.

As of fiscal 1980 such systems numbered 156, a 28.9% increase from the 1979 figure (121). Figures for previous years (with year-earlier comparisons): 1977, 62 systems (26.5% up); 1978, 84 systems (35.9% up); 1979, 121 systems (44% up). Growth has thus been good.

KDD systems number a mere 6, the rest being privately-operated systems of which 115 are Type I and the remaining 35 are Type II. There are no privately-owned systems.

Of the 150 privately-operated systems 123 are used for message switching. The remainder are as follows: timesharing systems of the information communication industry, 7 systems; data processing for machinery

manufacturers, 6 systems; airline company seat reservations, 5 systems; marine transportation companies and banks, 3 data-processing systems each; and 1 system each for the Meteorological Agency (for compilation of weather data), a securities company (for data-processing), and a travel agency (for hotel reservations).

A breakdown of users of owned systems by type of business as of fiscal 1980 shows manufacturing at the top of the list with 48 systems (32%) out of the 150, followed by the 31 systems of financial institutions (20.6%), the trading industry's 30 systems (20%), then the transportation industry, information communication industry and software industry, in that order.

Remote computing service

In Japan information is transmitted by NTT, KDD, and private-sector enterprises. Details for 1980 are as follows.

NTT provides two public data com-

International Privately-Operated data communications systems

Industry \ FY	1974	1975	1976	1977	1978	1979	1980
Manufacturing	13(1)	14(2)	13(2)	17(6)	23(11)	33(18)	48(33)
Commerce	10(9)	10(9)	11(9)	14(11)	16(13)	25(22)	30(27)
Finance	2(2)	2(2)	4(4)	7(5)	13(9)	22(18)	31(27)
Securities	1(1)	1(1)	1(1)	1(1)	1(1)	3(3)	4(4)
Transportation	6(5)	8(5)	10(5)	10(5)	15(9)	18(13)	24(19)
Communications, publishing & Service	2(0)	2(0)	2(0)	3(1)	3(1)	3(1)	3(1)
Remote computing service, software	2(0)	2(0)	3(1)	5(1)	6(1)	9(1)	7(1)
Government	3(3)	3(3)	3(3)	3(3)	3(3)	3(3)	3(3)
Total	39(21)	42(22)	47(25)	60(33)	80(48)	116(79)	150(115)

Note: Type I ()

Ministry of Posts and Telecommunications

International data communications systems installation

Type of systems \ FY	1974	1975	1976	1977	1978	1979	1980
Privately operated systems	I	21	22	25	33	48	79
	II	18	20	22	27	32	37
	Total	39	42	47	60	80	116
KDD systems	1	1	2	2	4	5	6
Total	40	43	49	62	84	121	156

Ministry of Posts and Telecommunications

munications services: ① a sales and inventory management service (called DRESS), and ② a scientific and technical computing system service (DEMOS-E). These are ready-made services utilizing the same systems already made available by NTT.

DRESS was started in September 1970 and is for preparing slips needed for sales

management and inventory control, and updating files, etc. Users as of fiscal 1980 numbered 1,458, a 4.1% increase over 1979. Terminals numbered 5,679, a 36.4% increase. The 3.9 average terminals per user represents an increase of 0.9 terminals, and indicates an upscaling of system configuration.

The trading industry accounted for 51% and manufacturing/construction for 34% of

International privately-operated data communications systems by application

FY Category	1974	1975	1976	1977	1978	1979	1980
Message switching	31(17)	32(18)	35(20)	44(27)	59(42)	90(73)	123(107)
Data processing	2(2)	2(2)	3(2)	5(3)	8(3)	11(3)	14(5)
Seat, hotel reservation	4(2)	5(2)	6(2)	6(2)	7(2)	6(2)	6(2)
Remote computing service	2(0)	2(0)	3(1)	5(1)	6(1)	9(1)	7(1)
Total	39(21)	42(22)	47(25)	60(33)	80(48)	116(79)	150(115)

Note: Type I ()

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the total, so these alone accounted for 85% of all users. Seventy percent of user enterprises are capitalized at no more than ¥50 million and 67% had less than 100 employees.

DEMOS-E enables high-level calculations for scientific, technical and business purposes to be carried out; appearing in March 1971, it was Japan's first commercial time-sharing system. As of 1980 users numbered 1,794, an increase of 22.9%, while terminals, at 2,107, were up 22.7%. The number of terminals per user, at 1.2, was more or less the same.

Communication/publishing/services accounted for 52%, followed by the manufacturing and construction industries, at 35%.

While twenty-two percent of user enterprises were capitalized at less than ¥10 million, 26% had a capitalization of ¥100 million or over. In number of employees, too, 36% of the enterprises had less than 25 employees, but 18% had 500 or more employees. Thus DEMOS-E users are clearly polarized, in terms of size.

Another type of communication service

provided by NTT is one tailored to fit the specific requirements of users. At the end of 1980 such systems numbered 55, of which 29 (52.8%) were for financial businesses. Next came 15 systems (27.4%) used for information related to medical emergencies and hospitals. Thus, together these categories account for 80% of the total. Other users, such as for tax work, credit, purchasing, and sales, account for about 3% each.

KDD offers two types of service. The International AUTOMEX, which is a ready-made service for the joint use of its customers. The other type is an order-made system tailored to meet individual customer requirements.

The AUTOMEX service consists of a computer installed at the KDD center and linked to terminals located in Japan and overseas. Principal uses are internal message-switching, and relaying and retransmission of messages. As of 1980 users stood at 25 and terminals at 246.

Order-made systems (5 systems as of 1980)

are used to switch messages between the user's head office (in Japan) and overseas branches and for sending messages to, and receiving messages from, business clients etc. in Japan.

As of 1980 there were 124 private enterprises engaged in remote computing services. Service systems numbered 198, including 33 systems used exclusively for affiliated company groups. Actual uses cover a wide spectrum; 19 are for sales management and inventory control, 7 are for banking work, and 51 are for what is classified as special tasks.

By region served, 69 systems are operated on a national scale, followed by 43 systems in Tokyo, 14 systems in Osaka and 11 in Nagoya. Many systems are therefore concentrated in major cities. On average each system has 2,892 users and 149.1 terminals.

Deregulating data communications

Data communications utilization is becoming more sophisticated in line with the upgrading of the information society, and at the same time this utilization is rapidly becoming more widespread. The diversification taking place in the utilization also forms a step and a spur to the building of a more advanced information society.

At present, however, there are stringent restrictions on the way data communications may be utilized, and because of this, industrial and other circles have been constantly calling for liberalization in this area. While the Ministry of Posts and Telecommunications (MPT) have started tackling this issue, it is MITI's view that full liberalization is still some way off; that the need to obtain ministerial permission will remain, in

part. Industry is watching closely to see what form liberalization takes from now on.

Pressure to liberalize has grown stronger and stronger these past few years. The nation's industries see liberalization as the way to the establishment of high-level data processing systems; that is, they feel that along with the promotion of the rationalization of business management, the establishment of an enhanced business-decision-making apparatus and the boosting of international competitiveness, the full-scale entry of private enterprise into this field would produce a new information industry and give a tremendous boost to the expansion of existing industries.

With liberalization being thus regarded as of major importance in that it will decide the future direction of the nation, it is a subject attracting much debate.

In December 1980, for example, "Policy Forum," a policy advisory group consisting of progressive management experts, stated that the present NTT-led data communications system constituted a barrier to the building of a free information society; that what was needed for the sound development of data communications was the doing-away of NTT's monopolistic control of lines and a liberalization which would allow private enterprises to enter the field.

Business has a direct interest, but disinterested groups of intellectuals have also spoken out for liberalization, and proposals from such groups have had a major effect: in January 1981 the MPT directed NTT to start studies on such liberalization. In today's society, information means power. A monopoly on information confers immense power, and with the dangers this entails in mind, the

call for liberalization has the support of the general public, so prevailing opinion has mounted considerably.

In February 1981 the Liberal-Democratic Party's (LDP) policy group on matters relating to the information industry, the Congressional Federation for the Promotion of the Information Industry decided to set up a committee to tackle the subject of freeing data communications of restrictions.

In April, the Japan Information Processing Center Association, made up of members of the information processing service industry, approached MPT, MITI, and the LDP, urging the deregulation of leased lines, stating that although demand for on-line data processing services linking computers and telecommunication lines is rising rapidly, present legislation such as the Public Telecommunications Law, overly restricts line utilization by the private sector; and that such being the case the relevant laws should be revised in line with changes in the economic and social situation, and deregulation implemented with all dispatch.

In May, the Federation of Economic Organizations' Information Processing Discussion Group decided to press strongly for liberalization, and called for ① restrictions on data communications to be lifted and new data communications laws drawn up, ② total elimination on regulations governing joint and third party use of data communications lines, ③ the easing of restrictive conditions on links between leased lines, public lines and private lines.

As if in response to such demands, in June the Industrial Structure Council, an advisory organization of MITI, convened a sub-committee meeting on the information in-

dustry, and drew up a reply to the "Vision of Informationalization and the Information Industry in the 1980s." This stated in part that "... informationalization is a powerful means of solving such national problems as the contribution by a major economic power to the international community, or conquering the restrictions of being a resource-poor country; for informationalization and to foster the information industry government needs to play an active role. To cite a specific example, what has first to be done is to provide an infrastructure by doing away with restrictions on communication line utilization." Again, this clearly supports deregulation.

Moreover, in July, the Administrative Management Agency (AMA) made a strong recommendation that, with deregulation in mind, structural improvements of NTT be carried out. This was part of the results of the AMA's study of data communications, and the recommendation was directed at MPT and NTT. The AMA reported that "Development of data communications is being held back by the severity of the conditions needed to get approval to use data communications lines. Moreover, excessive investment and staffing by NTT has led to a deficit, for fiscal 1979, of ¥50.1 billion in its data communications division. In view of this, what is needed is ① scrapping of regulations on use of lines, except in special cases, ② maintenance of conditions for fair competition in data communications equipment services, ③ the abolition/amalgamation of existing NTT centers."

This all shows a national sentiment for deregulation, and was a factor behind NTT's

"Proposal for Liberalizing Data Communications" which appeared in June, and contained outlines of a major easing of regulations, concerning linking of different types of communication lines, with message switching being allowed. This showed that NTT was adopting a positive approach towards deregulation.

This all goes to show that the general mood is increasingly for deregulation.

In June the Telecommunication Policy Committee, a private advisory group to the MPT, came out with an interim report on the course telecommunications policy should take in the 1980s. The report recommended telecommunications lines be freed of all restrictions which have up to now regulated joint and third-party (re-lease) utilization and interconnections between different types of line.

Nearly all enterprises, for instance, want to be able to jointly utilize lines, without restriction. If an information processing firm leases a line from NTT and wants to re-lease it to a third party, the permission of the Minister of Posts and Telecommunications must be obtained if message switching is involved. If message switching is not involved the third party can use the line freely, after the necessary paperwork is filed. Connecting a public network line and a leased line also needs individual ministerial approval, and the report proposes that in principle this utilization be liberalized.

The MPT, acting in line with these proposed changes, started paving the way for liberalization by drafting, in December, an amendment of the Public Telecommunications Law, and a new data communications law called the Value Added

Data Transmission Law.

The main points of these drafts were ① "liberalization, in principle" of utilization of telecommunications lines for processing information by computer, which has hitherto been practically prohibited, and ② allowing private enterprises to participate in the field of communication services, so far the monopoly of NTT.

The drafts also made joint utilization of lines considerably easier, something which the business world had expressed a strong wish for. Standards for third-party use were also eased, and connections between different lines would also be freed, in principle.

While it certainly seems at a glance that this represents progress toward liberalization, the drafts do not go beyond the advisory group's proposals, but retain in a new form the system of obtaining permission or of having to file documents, so that in fact the legislation still smacks of restriction to a considerable degree. These drafts, then, are a far call from complete liberalization. MITI is actively pushing for full liberalization and as such is opposing the MPT's drafts as being too restrictive. MITI is severely criticizing MPT's thinking on a number of grounds: ① With technological advances in computer utilization proceeding at a tremendous pace, the information society should be made a reality by removing restrictions on operations, introducing market principles into the field and using to the full private sector creativity and vigor; ② MPT's regulation of "value added data transmission" as communication operations entails a risk of hindering the effective utilization of computers; ③ MPT wants to enact the new legislation,

introducing a system of approvals and filing by users of details, for the sake of regulating operations, but there is no basis for this; ④ in fact, amendment to the MPT charter or Public Telecommunications Law might have the opposite effect; ⑤ the system of approvals and filing of details is out of step with the times.

In addition, the 3rd Sub-committee of the Provisional Commission for Administrative Reform carried out deliberations concerning the organization and rationalization of the system of approval, and in its December report stated, with regard to restrictions on transmission of data, that except in the case of systems solely for message switching among unspecified numbers of parties, liberalization should be carried out.

The proposed introduction of a new system of approval by MPT would appear to be against the spirit of the intention of the Provisional Commission for Administrative Reform.

Private enterprise, while praising MPT for taking a positive approach to liberalization, is at the same time unhappy with the strongly restrictive nature of the drafts.

MPT plans to submit the Value Added Data Transmission Law bill to the next regular Diet session after reaching an accord with MITI, but in view of MITI's strong opposition, it seems probable that such an accord will take some time to achieve.

Main Events of 1981

(1) KDD eases restrictions on third-party use of international leased lines (January)

The Ministry of Posts and Telecom-

munications (MPT) approved the application submitted by the international telephone public corporation, KDD, to ease criteria restricting international leased line use by third parties, i.e. the sub-leasing (or re-leasing) to a third party by a primary lessee.

Whereas previously data transmission was only allowed between one computer and one terminal, under the new criteria connections will be permitted with a number of computers in any one region of operations, such as Japan and America, or the U.K., etc. This marks a major contribution to the widening of the international scope of Japan's information processing services.

(2) Start of international financial information service (March)

SWIFT, the international inter-bank data communications service organization, has now extended its network to Japan. The aim of this service is the speedy handling of foreign exchange business by computer.

SWIFT was started in 1973, mainly by European and American banks, and links banks into an on-line system for remitting money, transferring letters of credit, conducting foreign currency transactions, and so forth. At present it has over 700 members, worldwide. In Japan 45 banks have joined SWIFT, among them 13 city banks and 18 regional banks.

(3) Committee set up on deregulation of lines (February)

The Liberal-Democratic Party's advisory body on information industry matters, the Congressional Federation for the Promotion of the Information Industry (consisting of

170 Diet members) has established a Telecommunications Lines Committee whose job is to tackle the liberalization of communication lines. The committee will arrange regular meeting at which reports will be presented; it is also maintaining a close liaison with the Federation of Economic Organization's Information Processing Committee and has already started work on the subject of liberalization.

(4) NTT concept for digital communications network (February)

NTT has decided to start full-scale tests from fiscal 1982 aimed at changing the present analog communication network, which consists mainly of the telephone system, to an integrated digital service system network (ISDN). A pilot plant is scheduled to be constructed at the Mitaka Telephone Office, Tokyo. For the trial network data telephones or data terminals will be installed in the homes of ordinary telephone subscribers and in offices. The most advanced communication technology will be incorporated, such as fiber optics, the object being to test out digital communications in practice.

In America and Europe there are plans afoot to move to a digital communication network, but NTT is the first to start actual field trials.

(5) Private sector DDX use begins (April, July)

In April began the first private-sector use of the packet switching service of NTT's DDX public communications network (a new data network). The first user was Showa Neoprene, which with a monthly data quantity of 10,000 items initially considered using

public lines, but decided finally to use the packet switching service as the charges were lower. The service started between Tokyo, Osaka and Nagoya.

Kao Soap Company in July became the first private user to link the DDX service to a leased line, when the company obtained the necessary approval from MPT. This means that Kao uses the DDX service to send information to its Osaka office on sales in and around Osaka. This data is then sent by leased line to a computer in the firm's head office, in Tokyo. The company says this will help to rationalize its sales management and inventory control.

(6) MPT starts electronic mail service on a trial basis (July)

On July 20 MPT started a trial electronic mail service. Details of the service are as follows. ① High-speed facsimile equipment has been installed in the central post offices of Tokyo, Nagoya and Osaka. ② To use the service, mail is handed in at the counter of the post office, sent by facsimile and at the other end is handled as special delivery mail. ③ Delivery areas are Tokyo (the 23 wards), Osaka City and Nagoya City. ④ Charges are ¥500 for the first page (A4) and ¥300 for each subsequent page.

MPT is using this trial operation to study in detail what an electronic mail service should entail, demand level, the economics of operating such a system, and the performance capabilities of the equipment.

(7) NTT starts facsimile communication network services (September)

NTT, in a move to popularize com-

munications by facsimile, on September 16 started a facsimile communications network service and its Minifax service. The Minifax system attracted particularly widespread popularity because of its simplified function, economical cost and compact size, resulting in booming demand. NTT planned to install some 6,000 units during fiscal 1981, but even then the order backlog is over 10,000.

(8) MPT starts second phase of CAPTAIN system trials (August)

With fiscal 1983 targeted for implementing the CAPTAIN system on a practical basis, on August 1 MPT began the second phase trial (to run 1981-1982). With 2,000 monitors, this second phase will reflect results of evaluations obtained during the first phase trial which ran from December 1979 to March 1981. With this second phase, the functional capabilities of the system will be expanded more or less to the level of practical application. An overall study is planned,

involving checks of the system technology and utility, trial link-ups with outside systems, considerations of service charges, on the legal requirements and on all other subjects having a bearing on putting the system into practical service.

(9) MPT draws up draft of Value Added Data Transmission Law (December)

On December 18, MPT finished drafting the Value Added Data Transmission Law, which it plans to submit to the next regular Diet. The main points of the law are: ① use of telecommunication lines to process data by computer, in practice not allowed at present, will "in principle, be freed;" ② private enterprises will be allowed to participate in the field of communication services, previously the exclusive prerogative of NTT. Such participation will be for the "business of transmitting value added data."

News in Brief

Computer crime

September 5

A 32-year-old female employee of the Sanwa Bank's Ibaragi branch used the bank's on-line system to move ¥130 million into fictitious accounts, withdrew ¥50 million from the accounts in cash and the other ¥80 million in the form of certified checks, then fled the same day to Manila, via Narita.

Investigations have revealed that the woman, Motoko Ito, had started preparing for the theft in early March by opening accounts at four Sanwa branches—Suita, Toyonaka, Shimbashi and Toranomon, the last two in Tokyo. Ito chose the morning of March 25, the bank's busiest time of the year, for the next move, operating an on-line terminal to deposit a total of ¥130 million into the four accounts. ...

In Manila, in line with requests from Japan, the authorities were alerted to look for Ito and apprehend her as she was wanted on suspicion of fraud. At 4 p.m. on the 8th Japan time, in a street in Manila, she revealed her identity when questioned about her working status by Philippine immigration officials and was arrested and held on a charge of violating the immigration control law.

On the 10th the National Police Agency set up a committee to study measures to combat computer crimes. The committee is to look at preventive policies and legislative

aspects. Four specific subject areas the committee will concentrate on are 1) analysis of computer-related crimes in the U.S. and other countries, 2) policies to prevent such crimes, 3) means of detecting the occurrence of such crimes, and methods of apprehending the perpetrators, and 4) legislation designed to deal with this problem. Some of this work will be assigned to the private sector, for which the necessary funds will be included in the budget for the next fiscal year.

Nippon Telegraph & Telephone Public Corporation (NTT): International procurement of 16 items

September 13

NTT (Hisashi Shinto, President) is moving ahead, from this fiscal year, with international procurement of materials. So far tenders have been completed for 16 items.

From fiscal 1981 NTT will lift restrictions on all materials procurement, so manufacturers in other countries will be able to sell their products to the corporation.

Total purchases will amount to some ¥671.7 billion, and a three-tier classification system is to be used: I, products which are on the market; II, products which although on the market need improvements to meet NTT requirements; and III, products not on the open market which need to be produced through joint research with NTT.

Class 1 products have already been tendered for, with inspection now being carried out on 34 items, for 16 of which contracts have already been awarded. Five of these are going to American companies, through their Japanese agents; one of the five is Sumitomo 3M, a U.S.-Japan joint venture. The items include magnetic tape, drafting machines and reduced pressure CVD devices. A total of 52 companies participated in the bidding, of which 10 were West German and American.

Ministry of International Trade & Industry (MITI) carries out survey of information service industry

September 20

MITI recently completed its survey of the information industry. A total of 1,731 firms formed the survey sample. The combined sales of these firms came to ¥669.8 billion. Employees totaled 93,271, or an average of 54 per firm. Annual sales averaged ¥387 million, or ¥7.2 million per employee.

Establishments with sales of ¥100 million or more accounted for 60.6 percent of the total; 8.4 percent registered sales of ¥1 billion or more. 25.4 percent of the sample reported sales in the ¥30 million to less than ¥100 million bracket, while 13.1 percent had sales of less than ¥30 million.

Analysis of size of establishment as measured by number of employees shows that the biggest single category, at 30.6 percent, was formed by establishments employing 50 or more people, followed by the 10-29 employee category (28.9 percent) and those with 30-49 em-

ployees (16.9 percent). Also 76.4 percent of the total had 10 or more employees.

Establishments with 50 or more employees accounted for 76.7 percent of the sales total of the sample.

Japanese and American tariff cuts on semiconductors

September 30

On the 30th the Ministry of Finance announced specific details of new tariff rates for semiconductor products in line with a mutual agreement between Japan and the U.S. to reduce tariffs.

10th Information Week starts October 1

October 1-7

The 10th Information Week gets under way on October 1, sponsored by the Information Week Promotion Committee and with "Life and Information" as the major theme. Held each year since 1972, this year's Information Week consists of 143 events held throughout the nation. This is 7 times the number 10 years ago (21 events) and 16 more than in 1980.

Most of the events are exhibitions, lectures and Symposium, while 73 post offices (57 in 1980) will be showing mail being sorted according to zip codes.

Events to be held in Tokyo include the opening ceremony at the Hotel New Otani, on the 1st. Awards will be presented to 9 individuals for their contributions to furthering informationalization, and to 9 companies for the same reason; also to be awarded are prizes for (9) outstanding information pro-

cessing systems, for "Life and Information" slogans submitted by school students and members of the public, and selected computer programs.

In addition the Shibuya branch of the Seibu Department Store will show an exhibition on the computer as part of everyday life, co-sponsored by JIPDEC, the Visual Information System Development Association and the Medical Information System Development Center. The exhibition features various information systems and projects, plus examples of computer art.

Other Tokyo events include "Travel and Information Systems" (Japan National Railways Head Office, PR Corner), "Microcomputer-controlled Gauge Operation" (Transportation Museum), "Telecommunications '81" (NTT Display Center, Kasumigaseki Building, 30th fl.), and "Software Show" (Keio Plaza Hotel).

The other 17 cities involved are Sapporo, Hakodate, Sendai, Fukushima, Nagoya, Kyoto, Osaka, Toyama, Kanazawa, Okayama, Hiroshima, Yamaguchi, Matsuyama, Tokushima, Kitakyushu, Oita, Naha.

Fujitsu, ICL agree on tie-up

October 7

Fujitsu announced on the 7th that basic agreement has been reached on a tie-up with International Computers Ltd, Europe's largest computer manufacturer. Under the agreement ① Fujitsu will provide manufacturing technology for a large computer designed and developed by ICL, ② Fujitsu will supply its giant FACOM M380/M382 computers to ICL for sale under the ICL brand, and ③ Fujitsu will develop and supply LSIs for ICL's small computers. The agreement

will be signed within 1981.

ICL brought up the subject of a tie-up; confidential negotiations started in spring, and became in earnest in the two months leading up to the announcement. Sales by ICL in the previous year totaled £716 million, of which 40 percent were export sales. However, ICL's business took a rapid turn for the worse during the latter half of the year, a result of the deepening British recession and an export slump accompanying exchange rate fluctuations; the company therefore showed a major loss in its September accounting, and started planning a recovery.

Fujitsu will also be providing future technical cooperation for the development of ICL computers. The agreement calls for ICL to give preference to Fujitsu products in its purchase of semiconductors and parts, and terminals and peripherals such as POS systems. ICL's recovery is based on an overall relationship with Fujitsu.

International Conference on 5th Generation Computer Systems

October 19-22

The International Conference on 5th Generation Computer Systems got under way on the 19th at the Keidanren Hall in Tokyo, under the sponsorship of JIPDEC (Yoshihito Shimada, President).

MITI, computer manufacturers, universities and research institutions are working together to attain the objective of developing a practical 5th generation computer by the 1990s. In line with this a survey committee was set up two years previously (headed by Tokyo University's Prof. Tohru

Moto-oka) and has been proceeding with its task, ultimately concerned with the development of an knowledge information processing system.

Of the 300 computer experts participating, some 80 were research staff from universities and research institutes in the U.S., Europe and India, and from companies such as IBM, Univac and Olivetti.

In a speech on the first day, Prof. Moto-oka outlined the survey results the committee has gained so far, stating that ①in Japan productivity in the primary and tertiary industries remains low, compared with secondary industries; ②with Japan lacking much in the way of natural resources, it is necessary to continue imports of raw materials and maintain international competitiveness; ③it was necessary to move ahead with conservation of energy and resources; ④it was necessary to respond to the aging of the Japanese population. All this, he stated, required the development of a 5th generation computer systems.

Mr Moto-oka then went on to name four functional attributes such a computer would need: ①a high level of intelligence and sufficient "friendliness" to function as a partner to humans; ②sufficient sensory and deductive capabilities to cooperate in the exploration of new, unknown fields; ③an information processing capability allowing simple, prompt I/O of different forms of information; ④the capacity to be used for large-scale simulation for solutions to scientific/technical, business and social problems.

Following this came reports on survey results in the three major areas of systems technology, basic theory and architecture.

The conference continued until the 22nd.

NTT announces on-line utilization as of end of fiscal 1980

October 25

As of the end of fiscal 1980 there were some 6,000 data systems using NTT lines. Of these systems, 3,400 used NTT leased or exclusive lines, 2,300 systems used public telephone lines, while some 300 systems utilized both public and exclusive lines.

At the end of fiscal 1979 there were 4,668 data communications systems, so the 1980 figure represented an increase of 30 percent. The annual rate of increase in the period 1965-75 was over 50 percent, but since 1975 it has remained around 20-30 percent.

While the majority of lines are exclusive or public lines, use of the new public network (DDX) designed exclusively for data communications is on the increase, being used by 42 circuit switching systems and 28 packet switching service systems. Further expansion in the use of this system can be expected.

Of systems utilizing public lines, in the past few years there has been a rapid increase in systems using remotely-located terminals to input data to a central host computer. Most of these were for stock control, between a company head office and its branches and sales offices; next came use for scientific and technical calculations and communication of data and notices concerning currency exchanges and money transfers. Of note among bank customer services were voice recognition response systems involving voice input eliciting a spoken output from the computer.

In some instances modems were used with

exclusive circuits to attain higher transmission speeds than the 48k-bit maximum provided by NTT.

Japan Institute of Office Automation makes a survey of white collar productivity

November 1

The Japan Institute of Office Automation is surveying office productivity to gain data for planning office automation.

The survey is in association with the American firm of consultants, Booz · Allen & Hamilton, the survey technique developed by this firm to measure office productivity being employed. This will be Japan's first full-scale survey in this field. Fifteen firms are to be surveyed (multi-client system is used), and the survey entails a thorough study of how office workers used their time during a single day. The results will be used to propose ways and schedules for automating offices.

In all, the survey takes 3 weeks, the first week being for preparations and the other 2 weeks for the actual survey.

Samples per person per day will be 20 to 30, and 10 to 20 people per firm are scheduled to form the survey sample.

The aim of the survey is to use close analysis of the results to provide forecasts of the effect of implementing the automation of offices.

This analysis involves the steps of ① sorting out which tasks are directly related to productivity and which are not; ② finding out how much time will be saved if OA equipment is introduced; and ③ conversion of this time saving into terms of amount of pay involved, for an index of OA equipment

investment.

Clients are then provided with individual, detailed proposals for automation of their offices. Also drawn up is an overall report on all the firms which take part, which is given to the firms, which are also shown the measurement methods and means used.

The expense of participation is ¥4,500,000 for user and ¥6,000,000 for manufacturer.

NTT and IBM sign cross-licensing accord

November 19

On the 19th, at NTT's head office in Tokyo, NTT and IBM signed a cross-licensing agreement and exchanged memoranda on technical information interchanges.

Under the terms of the agreement NTT and IBM can use free of charge each other's patents relating to the information processing field; it also opens the way for the free exchange of technical personnel and information between the two companies.

NTT states that as of fiscal 1980 it owned some 9,800 patent rights, while IBM has more than 30,000. Access to patents under this agreement is limited to those relating to information processing equipment, including electronic switchboards, and excludes communications devices.

IBM, with its 30,000-plus patents, is undoubtedly the world leader in technology related to information processing, but it was IBM which pressed strongly for the agreement. Initially IBM wanted the agreement to cover all fields, including communications, but it was because IBM has not advanced very far into this field that the final agree-

ment excluded technology related to communications equipment.

The memoranda exchanged at the same time were aimed at promoting a flow of technology through staff exchange programs, discussions, seminars, and the like.

Electronic Industries association of Japan (EIAJ) forecasts industrial electronic equipment demand through fiscal 1985

November 23

According to EIAJ's forecast of industrial demand for electronic machinery and equipment up to and including fiscal 1985, demand in 1985 (excluding wired communication equipment and desk-top calculators) will be some ¥3,799 billion, or about 90.7 percent more than the ¥1,992.4 billion actually registered in fiscal 1980. The average demand over the five years is expected to be 13.8 percent.

Production of Japan's electronic industries in fiscal 1980 came to ¥9,159.6 billion, 24.5 percent up on the previous year's total, with new highs being registered in each production area—industrial and consumer electronic machinery and equipment, and electronic parts. Production in 1981, moreover, is now certain to exceed the trillion-yen mark.

When wired communication, equipment and desk-top calculators are included, production of electronic equipment for industrial use came to ¥3,199.6 billion in 1980, or 34.9 percent of the total production of all electronic industries, an increase of 17.1 percent over the previous year's figure. Growth has thus been double-digit for five years in a

row.

Electronic industry exports during 1980 came to ¥4,301.5 billion, an increase of 29.9 percent. Of the total ¥781.1 billion was for industrial use, an increase of 31 percent, and 18.2 percent of the total.

The estimates for 1985, by category, are ¥639.9 billion for wireless communication equipment (average growth of 10.3%), ¥179 billion for electronic application equipment (average growth of 13.3%), ¥281 billion for electrical measuring instruments (average growth of 14.4%), and ¥2,700 billion for computers and related equipment (average growth of 14.7%), so all these categories are seen as doing well.

Technical innovation and an increasing need for information processing is expected to be very good with regard to computers and related equipment, and shipments of a new generation of giant computers in 1981 and 1982 is expected to boost growth to a level far above the estimated average.

Computers in operation in fiscal 1980 reach 88, 223

December 2

According to MITI figures for computer deliveries and trade-ins for the final quarter of 1980, there were 88,223 general-purpose computers in operation as of March 31, 1981, with a value of ¥4,164 billion. Compared with December 1980, these figures represent respective increases of 5.4 percent and 4.2 percent. In terms of value, 58.6 percent were large systems, 22.8 percent medium-sized, 11.7 percent small machines and 7 percent very small. By quantity, however, very small machines accounted for

more than half the total, 55.7 percent, to be precise.

By industry, the biggest users on a value basis were financial institutions (¥672.2 billion), followed by wholesalers, distributors and retailers (¥593.1 billion), electrical machine manufacturing (¥437.3 billion),

services (¥329.3 billion), and government-related organizations (¥327.5 billion). By quantity wholesalers etc. easily topped the list with 36,658 machines, followed by services (6,951) financial organizations (5,945), electrical machine manufacturing (3,920), and cooperatives and other groups (3,706).



Japan Information Processing Development Center

