CENTRAL COMPUTER

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Computer and network system at Research Center for Nuclear Physics (RCNP) provide very high performance for data analysis and theoretical calculations. A part of this system is used also as an on-line data acquisition system for experiments at the RING cyclotron.

The computing facility of RCNP is composed of the central computer complex, the super-computer system located at Osaka University computation center for the large scale scientific calculations, and various computer subsystems. Those computers can be accessed from personal computers, X terminals and workstations in RCNP through the site-wide network. Research collaborators around the world can also access them through the worldwide network.

The RCNP network consists of "Nuclear science network", "Accelerator science network", "Computing network" and "General purpose network". The nuclear science network is mainly used for the data acquisition at the cyclotron facility. The accelerator science network is mainly used for the accelerator control and monitoring. The computing network connects computers in the RCNP central computer system. The general-purpose network is used for connecting the former three networks. PCs, X terminals and workstations in offices are also connected through the general-purpose network.

The server computers in the central computer system and 20 workstations are linked with ATM network. Four DEC GIGA-switch/ATM switches, which are connected with 622Mbps optical fiber links, located at the computer room, the cyclotron laboratory, the experiment area and the main office building. A Memory Channel hub connects server machines in the central computer system. It reduces communication latency and overhead and expands available bandwidth.

The central computer system comprises 6 SMP (Symmetric Multi Processor) servers and 5 tape library systems with the total capacity of 12.9TB. Two of 6 SMP servers are Alpha-server 8400 5/440. Each of them has 12 Alpha CPUs, 4GB Memory, a Memory Channel interface and a 622 Mbps ATM interface. The computing performance of one server is 751.88 SPECfp92, 209958 SPECrate_fp92. They are used for general data processing and computing.

The other four sub-servers are Alpha-server 4100 5/400. Each of them has 4 Alpha CPUs, 1GB Memory, a Memory Channel interface and a 156 Mbps ATM interface. The computing performance of one server is 656 SPECfp92, 61037 SPECrate_fp92. One of 4100 server is used for on-line data acquisition. The other three servers with huge disk space are allocated for data processing of the experimental data. Total amount of 600GB RAID-5 disk provides large and reliable storage area to the users.

One TL822 automated tape library provides up to 7.3 TB of data storage with three TZ88 drives. Featuring 264 media slots, the 3-drive TL822 library provides a sustained transfer rate of up to 6.3 MB per second. Four TL812 automated tape libraries connected to sub-servers provide up to 1.4 TB of data storage with 4 TZ88 drives. Featuring 48 data media slots and 4 I/O slots, the 4-drive TL812 library provides a sustained transfer rate of up to 8.4 MB per second. These values are obtained assuming 1.4:1 compression rate on the contents.

Integrated CPU time listed in the table 1. Since the server machines have 12 CPUs, total CPU time exceeds 30 days for each month. Because of the trouble on the monitoring system, a part of the table is missing. The number of active users, who uses those server more than one minute CPU time, is also listed.

Table 1
The CPU time and active users on 2 major servers

Year	Month	CPU time (days)		Active users (user)	
		miho	miho2	miho	miho2
1998	April	186	140	159	46
	May	222		153	
	June	293	253	155	52
	July	219	305	135	59
	August	282	254	147	46
	September		278		53
	October	198		149	
	November	241	249	154	27
	December	246	240	148	43
1999	January	228	238	132	37
	February	183	175	142	37
	March	252	213	145	36