

Present Status of the Information Network System for SPring-8

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Introduction

As the central administration building (main building), the accelerator and beamline R&D facility, the machine laboratory, the biomedical imaging center, and the structural biology facility (Harima Riken) in SPring-8 have been completed this year. A faster

network system has been constructed during 1997. In addition, the beamline users network was upgraded to a Fast Ethernet system.

1) Network system

As category-5 UTP cables were implemented in the Premises Distribution System (PDS)¹⁾ for the SPring-8 buildings, a Fast Ethernet system could be achieved. Five Fast Ethernet V-LAN²⁾ switches (CISCO: Catalyst-5000 or Catalyst-2900) and ten Fast Ethernet switches were connected to the central network switch (Catalyst 5500), which is connected to a CISCO-7507 main router via two sets of 100M bps full duplexes as shown as Figure 1.

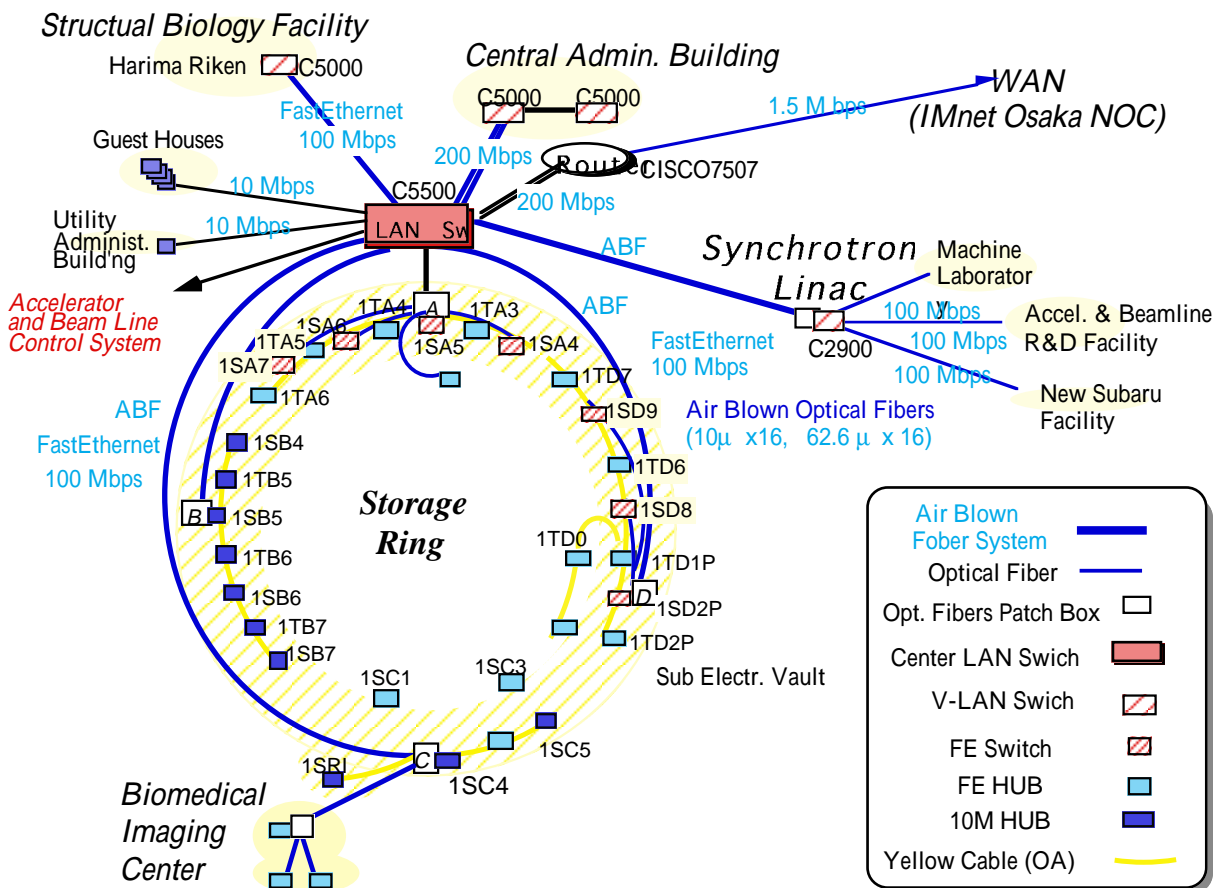


Fig. 1. The present network system of SPring-8 (1997).

1-1) Storage Ring Network

The beamline users network was upgraded to a Fast Ethernet system in the beamline experimental hall and preservation rooms of the Storage Ring (SR). Seven Ethernet LAN switches (eight ports of the 100/10 Mbps auto-negotiation, Netgear: FS-508) for the SR A- and D-zones were adopted in August 1997 yellow cable (10 Mbps) Ethernet was constructed. Plans are being made to extend to these B- and C-zones in February 1998 using seven Fast Ethernet switches as well as to the A- and D- zones.

1-2) Linac and Sychrotron

A backbone network (for the OA-LAN)

(Fig. 2). These are located in the sub-electricity supply rooms, and connected to a center V-LAN switch through optical fibers. The conventional yellow cable (10 Mbps) Ethernet is used as a general purpose network (OA-LAN).³⁾

The SR B- and C-zones were completed in March 1997, a general purpose network with a system to the Linac and Sychrotron from the CVCF network center room was upgraded to a Fast Ethernet. A V-LAN switch (Catalyst-2900) was set in the Li-Sy Kryston preparation room. The accelerator & beamline R&D facility and the machine laboratory network are connected to this C-2900 switch through the Fast Ethernet.

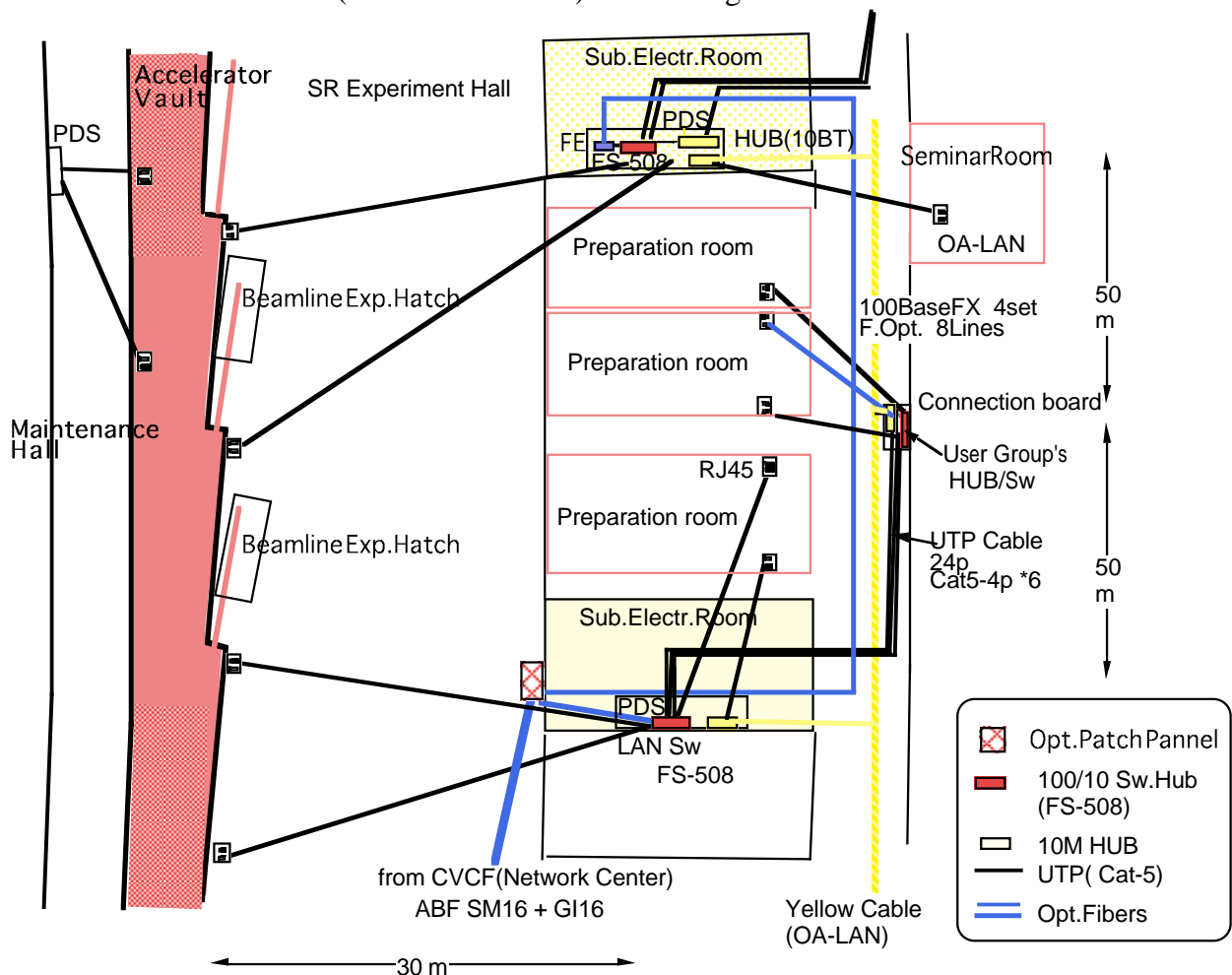


Fig. 2 Storage Ring beamline users network (100Mbps) and OA-LAN system.

1-3) Main Building Network

Eight sets of Fast Ether (16 ports) HUBs and twelve sets of 10 Mbps (16 ports) HUBs were installed in the (Center Administration) main building. Those HUBs are concentrated on two V-LAN Switches (Catalyst-5000). An Apple Talk gateway (FastPath-V) and a Phone-net Star-controller have been adopted in this building. Half of the rooms on the 3rd and 4th floors can be used with a Fast Ethernet (Fig. 3).

1-4) Structural Biology Facility

Four sets of Fast Ether (16 ports) HUBs and four sets of 10 Mbps (16 ports) HUBs were installed in the main building. These HUBs are concentrated on one V-LAN Switch (Catalyst-5000).

1-5) Guest Houses

For the new guest houses (B, C, D) built this year, an Ethernet switch and twelve (16 ports) HUBs were adopted in September 1997.

2) Internet Connection

The outside network connection media to the Inter Ministry Network (IM-Net) at the Osaka Network Operation Center was upgraded to 1500k bps from 512k bps on the 25th of September to be able to handle an expected increase in network traffic, due to preparations for full-scale operations of the SPring-8 facility in October 1997.

3) Optical Fiber Network

For the main building, an Air Blown Fiber (ABF) system has been adopted. This ABF system contains sixteen 62.5 micron (GI) fibers and eight 10 micron (SM) fibers.

For the structural biology facility (Harima Riken) building, eighteen GI (62.5 micron) fibers and twelve SM (10 micron) fibers are used and eight of those are welded to connectors. The SM fibers are used for a PBX network and can also be used for a Gigabit Ethernet in the future. Table 1 shows a list of the optical fiber cables installed this year, as an extension engineering work on a PBX for telephones.

Table 1. Optical fiber installation this year.

From	To	*Amnt. (Core: μm)
CVCF	Main Build	8/12(10), 16/18(62.5)
CVCF	Struct.Bio.Bldg	8/12(10), 8/18(62.5)
SR-C	Medical Imag.	6/12(10), 12/18(62.5)
Linac	Machine Lab.	4/4 (50), 4/4 (62.5)
Linac	Acc.BL R&D	4/4 (50), 4/4 (62.5)
Linac	New Subaru.	4/4 (50), 4/4 (62.5)
Guest-H.	GH center	4/4 (50)
SR-A, D	Sub.Elec.rooms	8/8 (62.5)

* Amnt : With connector / Fibers only (Core diameter).

4) Computer System

The official WWW server, mail server, domain name sever, PROXY servers, meeting room reservation system, and kernel system server for Guest house reservations are managed by the Information network and computer administration group.

The total number of workstations and personal computers exceeded 1000 in December 1997, while the number of SPring-8 staff is about 500.

A WWW site for the SPring-8 was set up in March 1996 to provide information on SPring-8, and the number of hits for the SPring-8 home page in Japanese and English reached about 90,000 during 1997.

Central Administration Building (Main Building)

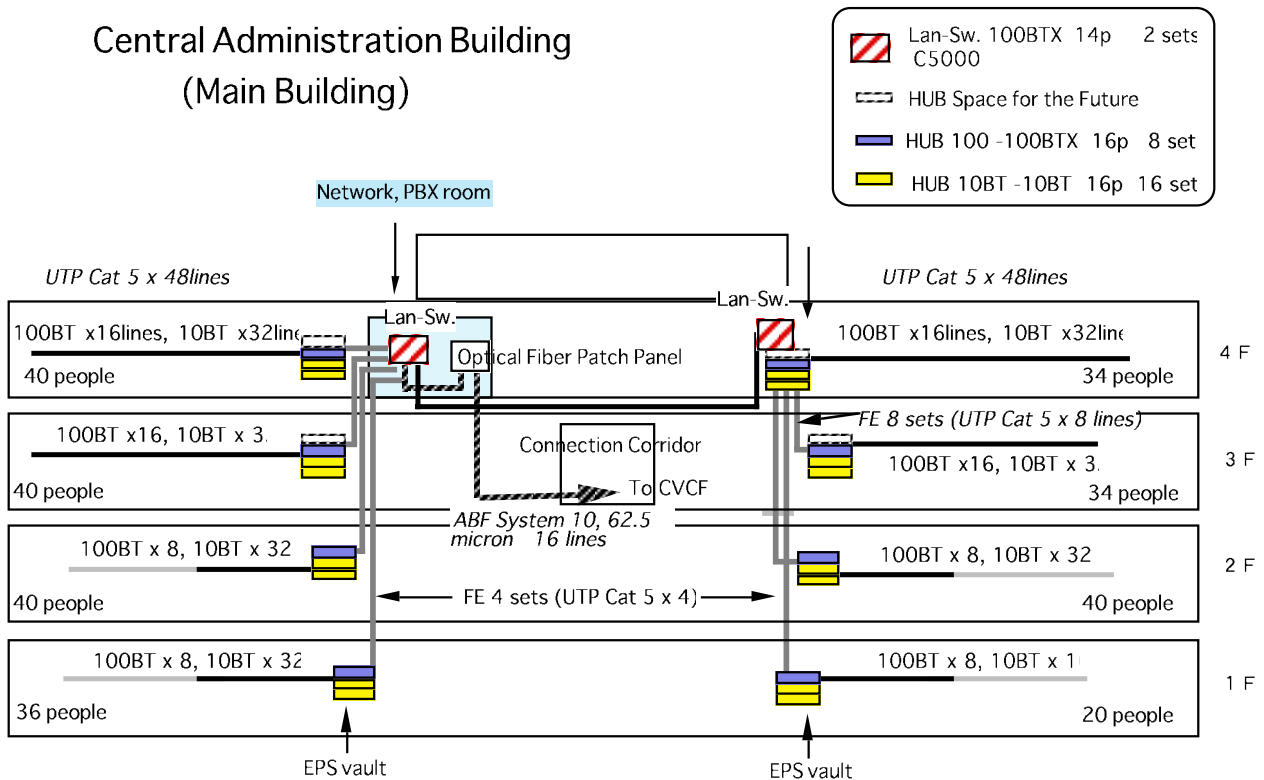


Fig. 3. Main building network system.

5) Future Plans of the Network

To handle increasing network traffic, a Fast Ethernet or a Gigabit Ethernet will be installed all over the SPring-8 buildings. Preparations are currently under development.

In 1998, fourteen sets of Fast Ethernet Virtual-LAN Switches will be installed for each beamline group. A number of 1000 and 100 Mbps Virtual-LAN ports will be distributed in the SR building for the beamlines groups. A Giga-bit Ethernet, or a 400~800 Mbps Fast Ethernet, will be installed as a network backbone for the main administration building, the SR experimental hall's concentration node (Sub. Electr. room), and the Structural Biology facility of Harima Riken in 1998~1999 using Single Mode (10 micron) optical fibers. A direct Gigabit connection is feasible between the beamline

experimental hall and fast processing computer by an optical patch panel system.

References

- [1] Takebe et. al., SPring-8 Ann. Rep. 1995, p. 211 (1995).
- [2] Virtual LAN system: CISCO Co. Ltd.
- [3] Takebe et. al., SPring-8 Ann. Rep. 1996, p. 243 (1996).