KEKB Control System

for KEKB Review Committee
Feb. 11, 2000
presented by Noboru Yamamoto

KEKB Control System Status

- KEKB control system in FY1999
  - Operation statistics
  - Upgrade/improvement
- Future Plans

Statistics:IOC

EPICS Records

- Total 242,597records on 94 IOCs [was 208,716 records on 90 IOCs]
- Max. 25,147 records on IOCMGD06
- Average 2,788.5 records [was 2,319]

Memory Usage on IOCs

- Allocated memory max. 48,149 KB(was 54,429 KB)
- Allocated memory min. 1,324 KB(was 1,309 KB)
- Allocated memory ave. 12,142 KB (4,594 KB)

Statistics: Host Computers and Network

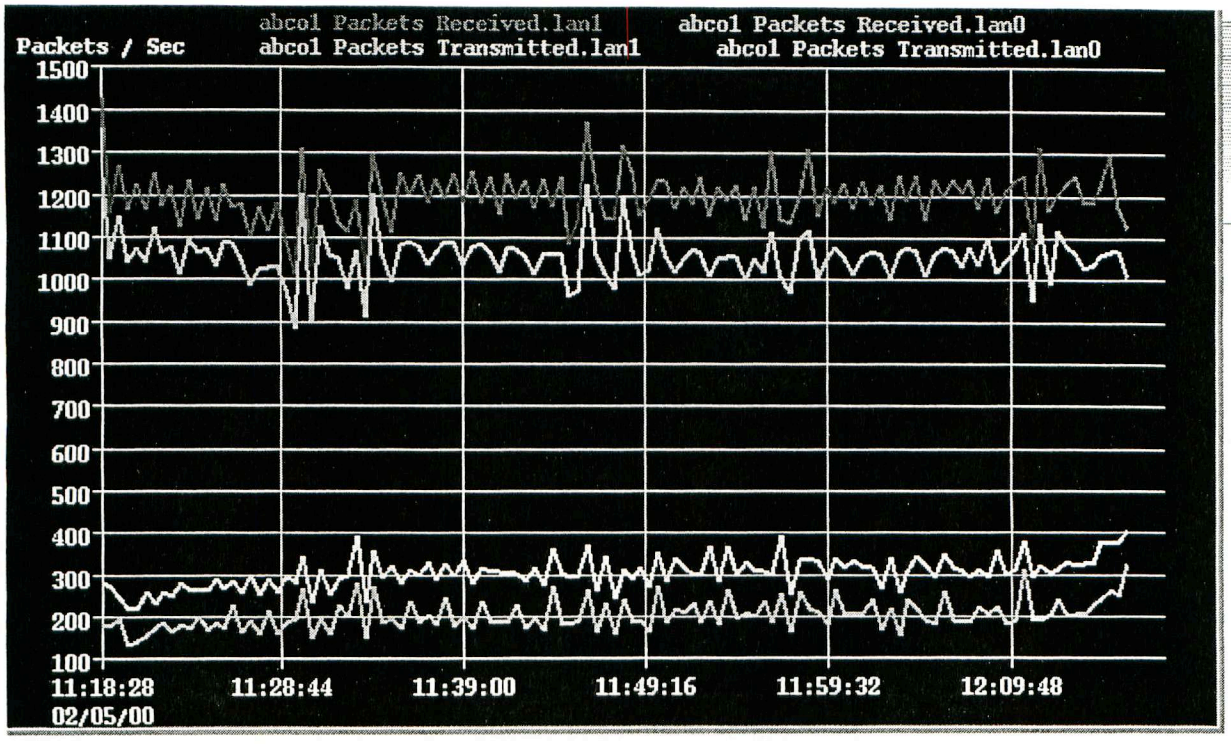
CPU load

- Load average 4-6 (was 15-20)
- Users 160
- Processes 900

Network Load

- around 2000 Packets/sec

Typical Network Traffic



Statistics:Software

Applications and Operator Display

	SAD	medm	python	misc	Total
In Top level Applications	141	74	42	6	263

EPICS Sequencer, device/Record Supports

Changes:HW

No Major change in HW

ARCNET HUB

It enhanced stability of ARCNET operation(reduced number of automatic network reconfiguration)

Additional WS and Storage for Operation

- Current WS in Control/Operation
  - 1 HP-UX WS
    - ORACLE
    - EPICS development
    - Operator interface
  - 3 Digital Unix WS and 1 Linux WS
    - Operator interface
    - Most optics related calculation

ARCNET --- Magnet Power Supply Control

ARCNET HUBs were introduced for more stable operation.

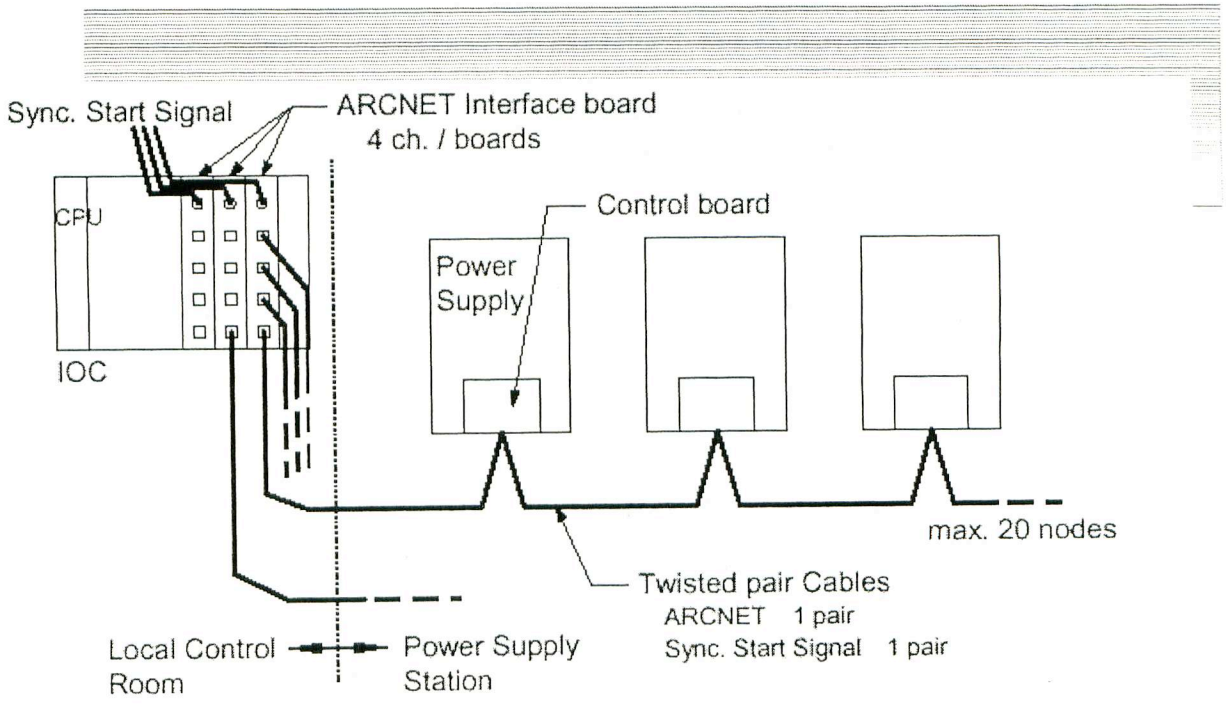
Installation of HUBs

- A "HUB Box" contains 3 HUBs
- 33 HUB Boxes were installed for 97 ARCNET lines (mainly for the steering magnet power supplies)

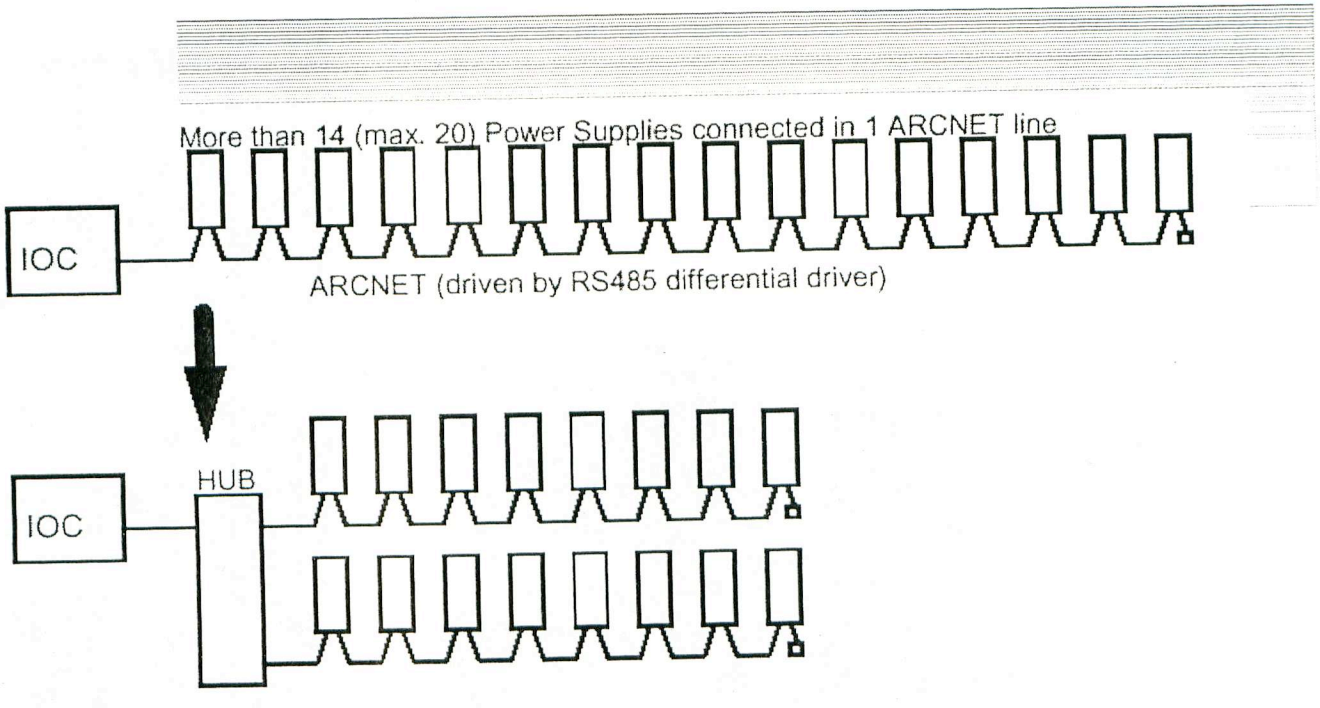
Number of ARCNET reconfiguration (by lost token)

- Without HUBs :10^2 times / day / 1 ARCNET line (worst case) (ARCNET reconfiguration does not mean loss of communication.)
- With HUBs :No reconfiguration observed

Configuration of Magnet Power Supply Control System



ARCNET HUB



Changes:Software

Moved to EPICS R3.13.1

- Enhanced stability of the system
- RISC specific problem hung a CA process on IOC. Fix was offered by J. Hill (LANL)

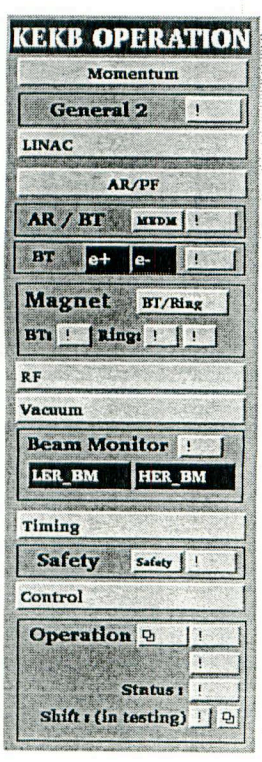
Synchronized operation of Magnets.

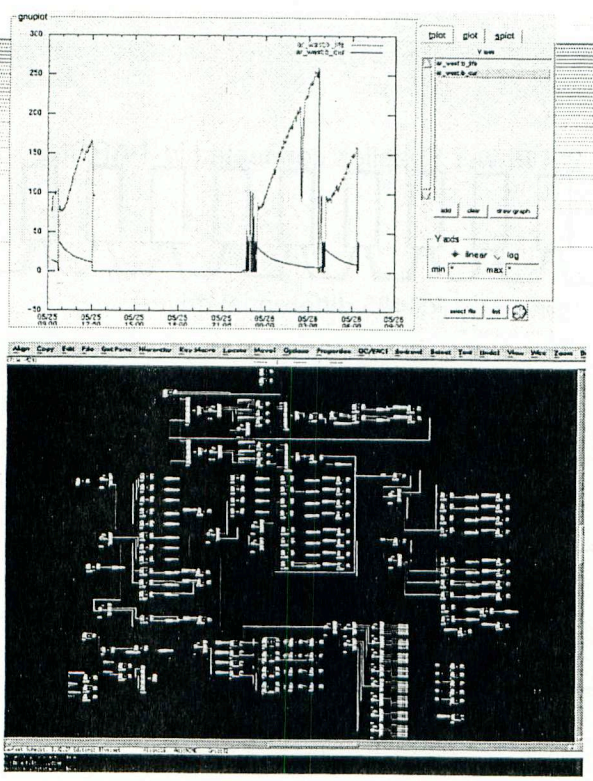
- Synchronization of applications on the distributed system.

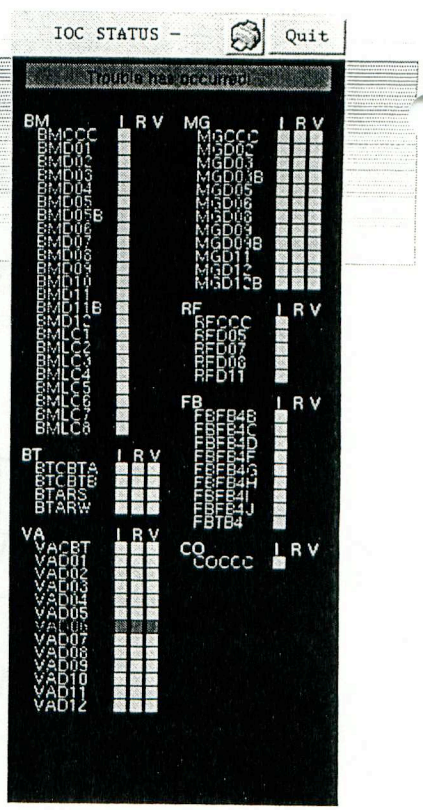
Many tools and Applications

- iocStatus/iocLogViewer,...
- improved Python-CA interface, ...

Examples of New/Improved Software







Soon..

Update FPGA program on ARCNET driver board

- The bug in the program prevents us from the operation of 8 ARCNET driver boards in the same IOC.
- Detailed analysis of signals on VME bus using an oscilloscope was needed to identify the source of the problem.

Later...

Widen the Network Bandwidth

- In the control room
  - More terminals, more fast update of information on the display

Dual host for stable operation.

More data storage for data archiving.

More displays/TV screens in the control room.

Beyond ....

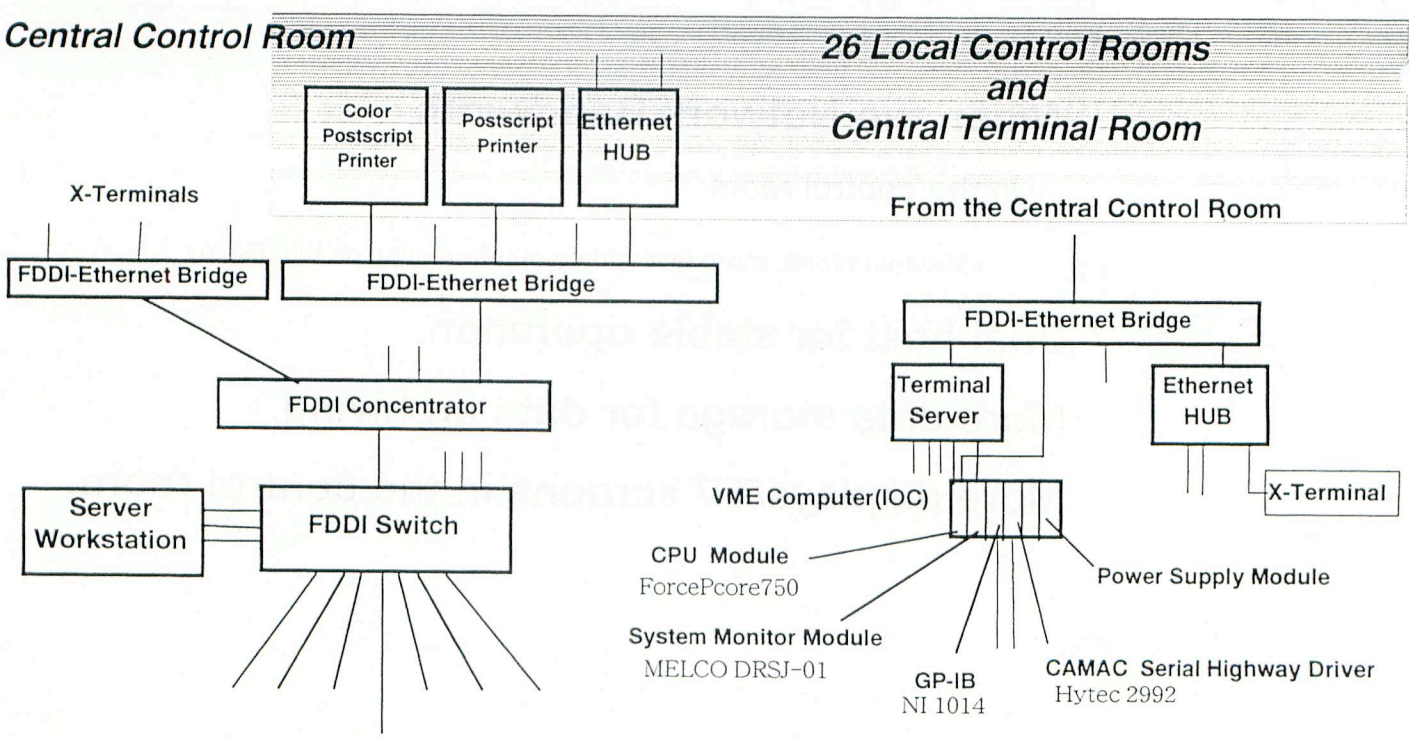
More Automation of Accelerator Operation.

More Data Archive/Analysis tools.

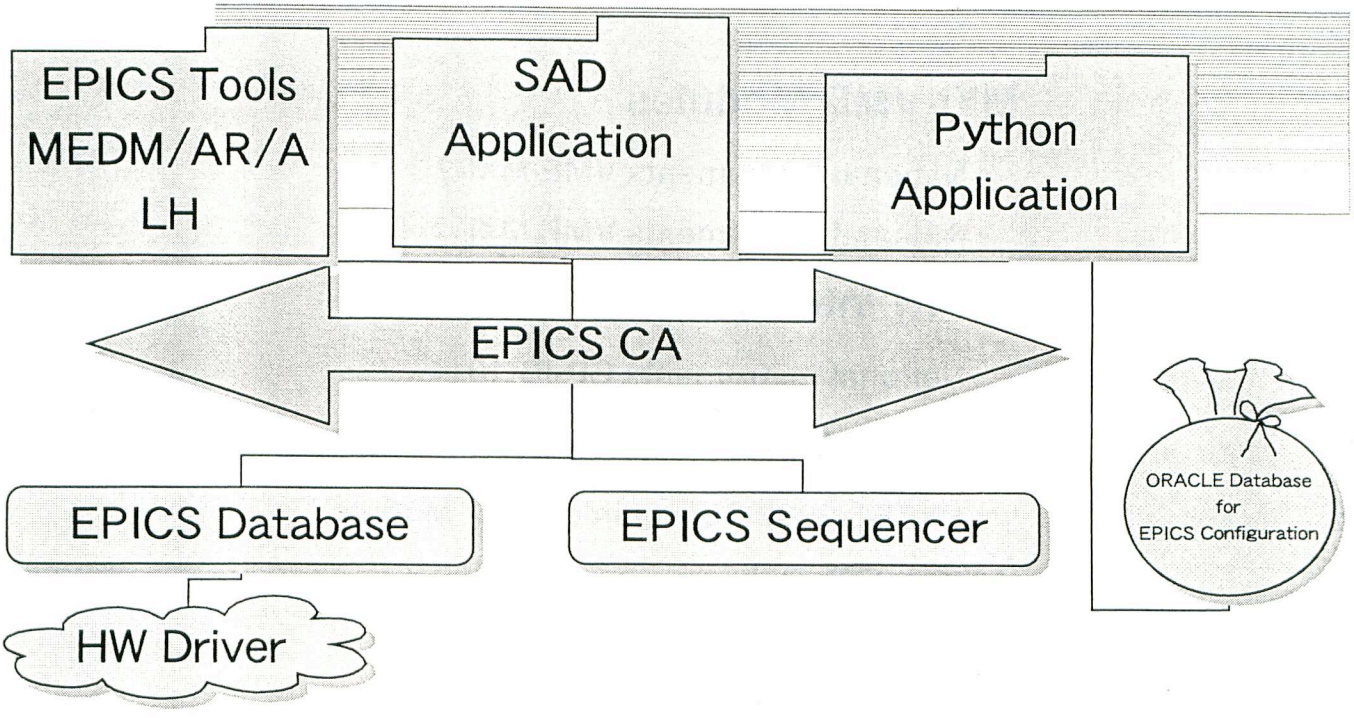
Electronic Log-Note

- to share the knowledge of KEKB accelerators.
- for easy data mining.

Appendix:System Overview



System Overview (cont'd)



IOC Hardware-1

CPU Module

- Force PowerCore6750
  - Add-in board PPC/IOBP-6750 for Serial interface(RS-232)
- Force PowerCore6603e
- Force CPU64/CPU40
- 98(93) IOCs in KEKB control system

System Monitor Module

- MELCO DRSJ-VME reset from a remote terminal

IOC Hardware-2

MXI-VME Modules

- National Instruments VME-MXI-2
- National Instruments VME MXI

GP-IB Interface

- National Instruments GP-IB 1014

CAMAC Serial Highway Driver

- HYTEC 2992 Serial Link Driver Module

ARCNET Driver

- Advanet ARCNET-4

Modbus+ Interface

- Modicon SV 85

ARCNET

ARCNET Interface Boards

- Magnet Power Supplies (2517 PS in total)
- Video Switchers
- Abort Signal Status Monitors

ARCNET Network

- 176 ARCNET Networks for Magnet Power Supplies
- Upto 20 Power Supplies in an ARCNET Network

Network & Host Computer

Network

- Switched FDDI Backbone : DEC Gigaswitch
- FDDI-10Mbits Ethernet Switch : Cisco Catalyst 1200
- Terminal Servers : Cisco 2500 Access Server
- Ethernet Hubs
  - Baynetworks Model 810M
  - HP AdvanceStack 10BT
- FDDI Concentrator: Cisco Workgroup Stack CDDI/FDDI
- Extended Ethernet segment using optical fiber cable in Tsukuba and Fuji experimental halls.

Host Computer

Mitsubishi ME/RK 460

- 4 CPUs
- 2GB memory
- 20GB disk space
- FDDI Interface
- OS: HP-UX 10.2