KEKB Archiving

Dec. 2004 Tatsuro NAKAMURA @ KEK

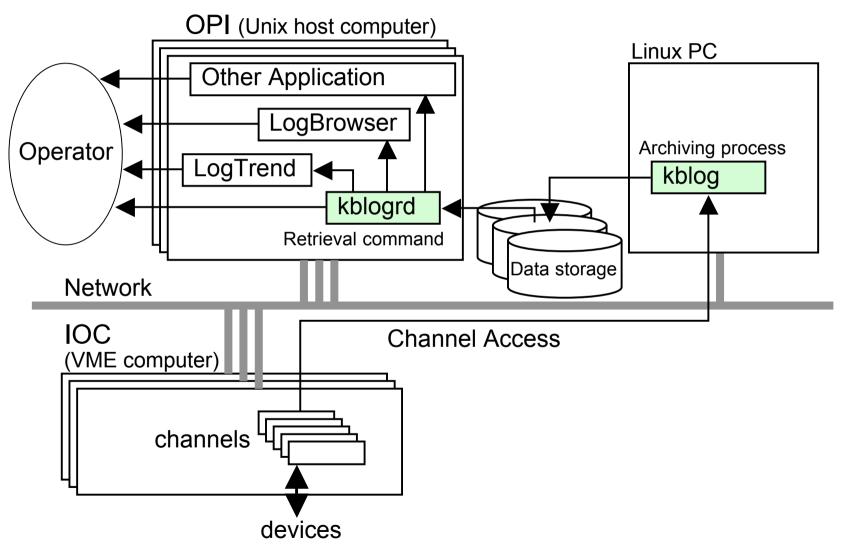
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1. Overview of "KEKBLog"

- "**KEKBLog**" is a data archiving system for KEKB control system.
- It was developed by N. Akasaka in KEK since 1999. (Channel Archiver is not available then.)
- KEKBLog consists of
 - "kblog" : Data archiving program
 - "kblogrd" : Data retrieval program (command line tool)

KEKBLog Overview



Data archiving

- The **kblog** reads a list of channel names from a configuration file at startup.
- The kblog monitors channels. If the value of the channel is changed, the kblog writes the value with time stamp to a file.
- **kblog** is simple and robust.

Data format

- The **kblog** produces a control file and a data file.
- The control file contains the channel information (and some misc. info.).
- Channel values and time stamps are simply written to the data file sequentially.
- The data format is simple but not efficient for retrieval.

Data retrieval

- "kblogrd" is a command-line program to retrieve data from archive data files.
- Example:

kblogrd –**r** <u>channel names</u> –**d** <u>start time</u>–<u>end time</u> –**f** <u>output format</u> <u>archive data name</u>

• All of the application programs which read archive data use **kblogrd** command.

2. Status of "KEKBLog"

- 31 kblog programs are running.
 - RF
 Magnet
 Vacuum
 Beam Monitor
 Beam Transport line
 Linac
 Others
 6

Number of monitoring points

• Number of channels

– Total	88117
– Others	1335
– Linac	1733
 Beam Transport line 	8001
 Beam Monitor 	3263
– Vacuum	5896
– Magnet	60380
– RF	7509

Amount of data

- Amount of archive data
 - RF 430 MB/day
 - Magnet 300 MB/day
 - Vacuum 400 MB/day
 - Beam Monitor 1470 MB/day
 - Beam Transport line150 MB/day
 - Linac 280 MB/day
 - Others 110 MB/day
 - Total 3140 MB/day

Data storage

- The kblogs produce about 800GB /year.
- Currently we have 4 NAS (Network Attached Storage) 2560GB storage.
- We need new storage device every year.
 - Old data (>1year old) are not necessary in most case. But in some case they are requested.

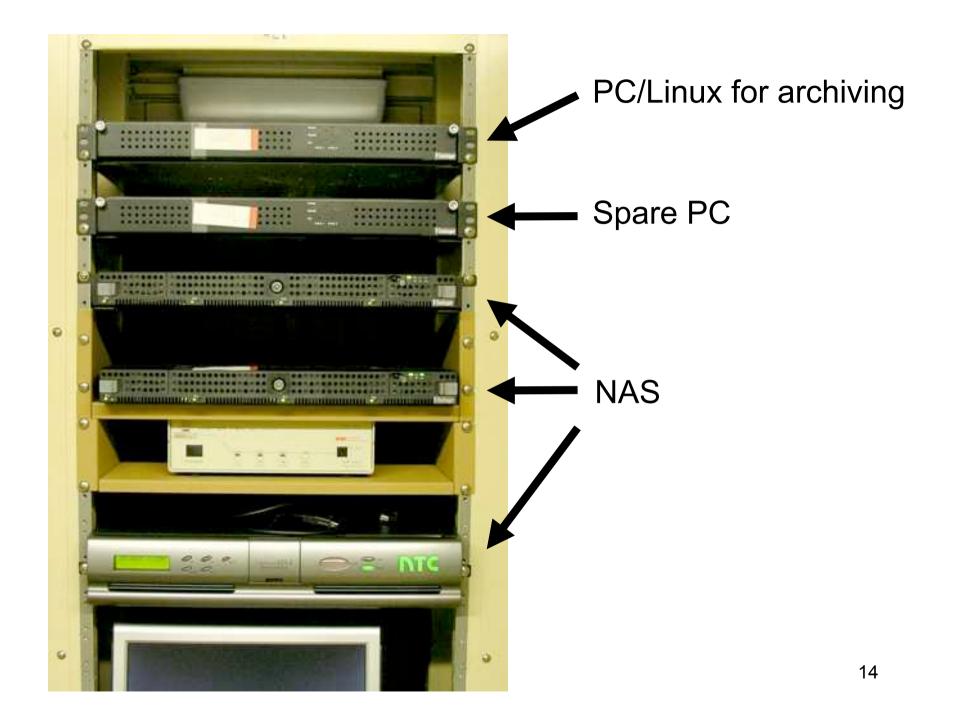
Data Backup

- We use HPSS system in KEK computer center.
- HPSS (High Performance Storage System)
 - Hierarchy Storage
 - It consists of tape library and disks
 - Migration/Staging between tapes and disks
 - 120TB tape library

(Main users are physics experiment groups)

Hardware setup

- We have a PC/Linux which is dedicated to archiving.
- We have another same type PC which is a spare.
- Data retrieval is available from any OPI computers in KEKB (Linux, Alpha, HP-UX, Darwin).



3. Application programs

In KEKB, most of the application programs are written in **SAD script** and **Python**.

SAD script libraries to access archive data :

• "KEKBLog Library"

- SAD script library to retrieve archive data
- "LogTrend Library"
 - SAD script library to build trend graph (automatically updating plots)

General purpose browser

General purpose browser programs are available. They are written in SAD script.

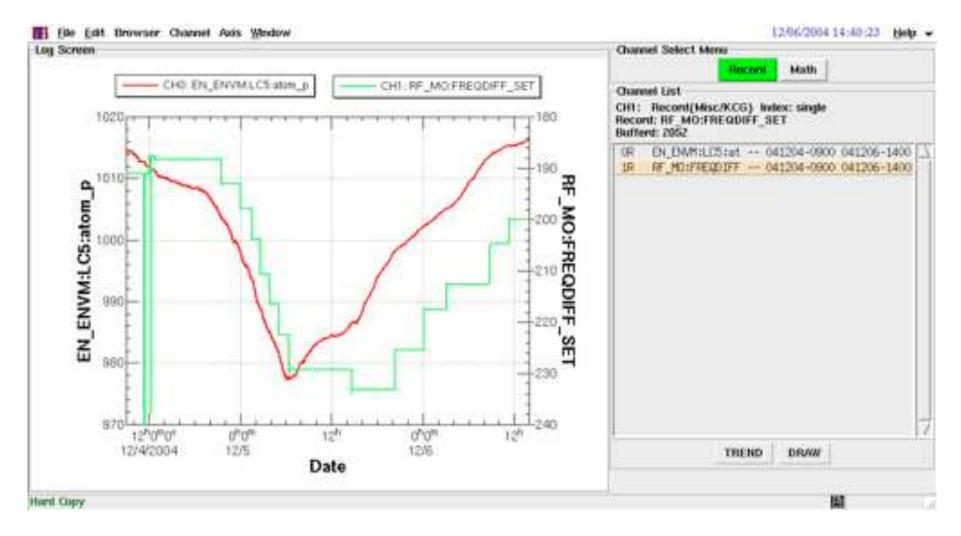
"LogBrowser"

a graphical browser of the KEKBLog archive data (developed by A. Morita)

"LogView"

another graphical browser (developed by N. Akasaka; Not maintained anymore)

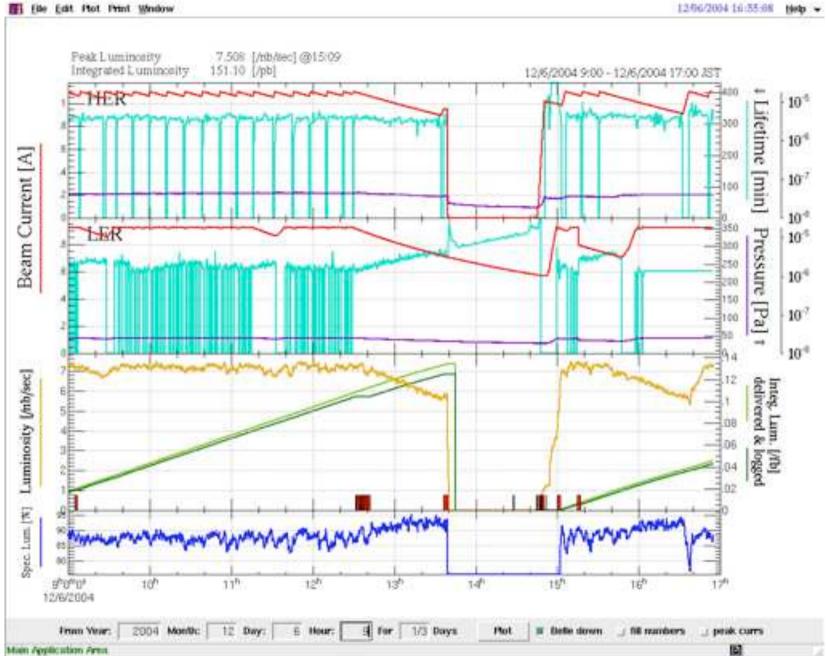
LogBrowser



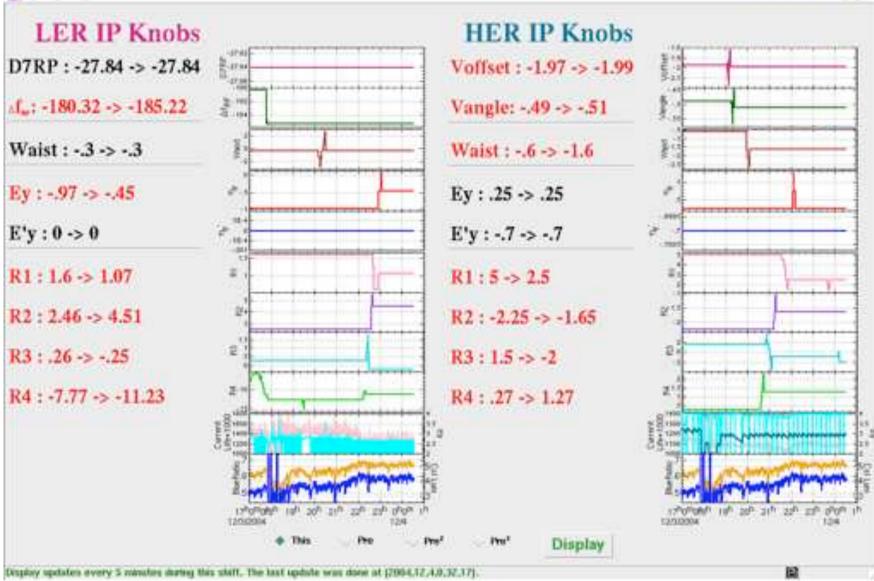
SAD program examples

Many SAD programs for KEKB operation uses the archive data.

- Ring Daily Snap
 - Summary plot of operation
- IP Knobs History
 - History plot of optics parameters at IP



12/04/2004 00:32:30 Help -

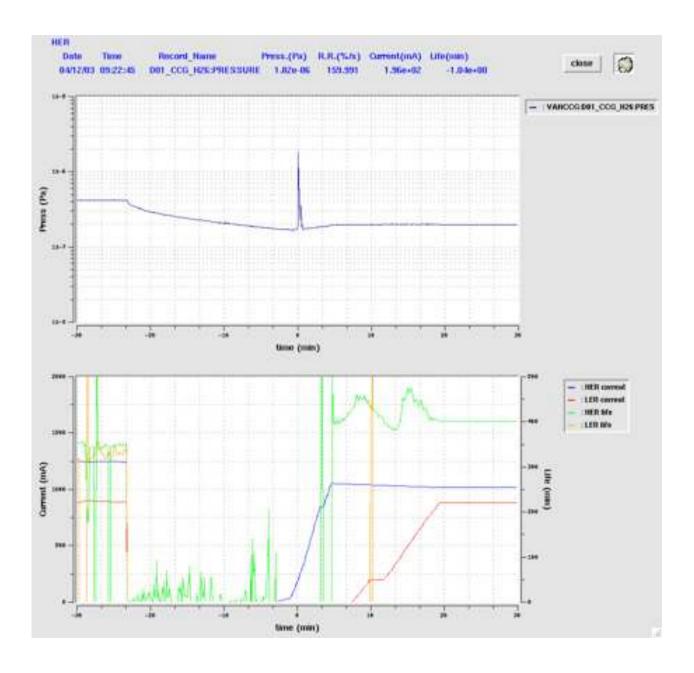


File Edit Window

Python program example

- CCG_Patrol
 - Search sharp peaks in the CCG data
 - On demand search
 - Automatic (periodically scheduled) search

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# DOI # DO2 # DO3 # DO4	04/12/03	06:24:20	D12_CCG_HI3:PRESSURE	2.39e-06	36.875	1.25e+03	3,72e+02	
# D05 # D06 # D07 # D08	04/12/03	05:29:40	D07_CCG_N12:PRESSURE	2.17e-06	01,854	1.240+03	3.96e+82	
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4. Summary

- "KEKBLog" was developed and is used in KEKB control system for historical reason.
- Archiving program "kblog" is simple and robust. But retrieving is not efficient.
- New storage is added every year for archive data. HPSS is used for data backup.
- KEKB commissioning group have developed many application programs using archive data. Most of them are written in SAD script. Python programs are also developed.