

KEKB Archiving

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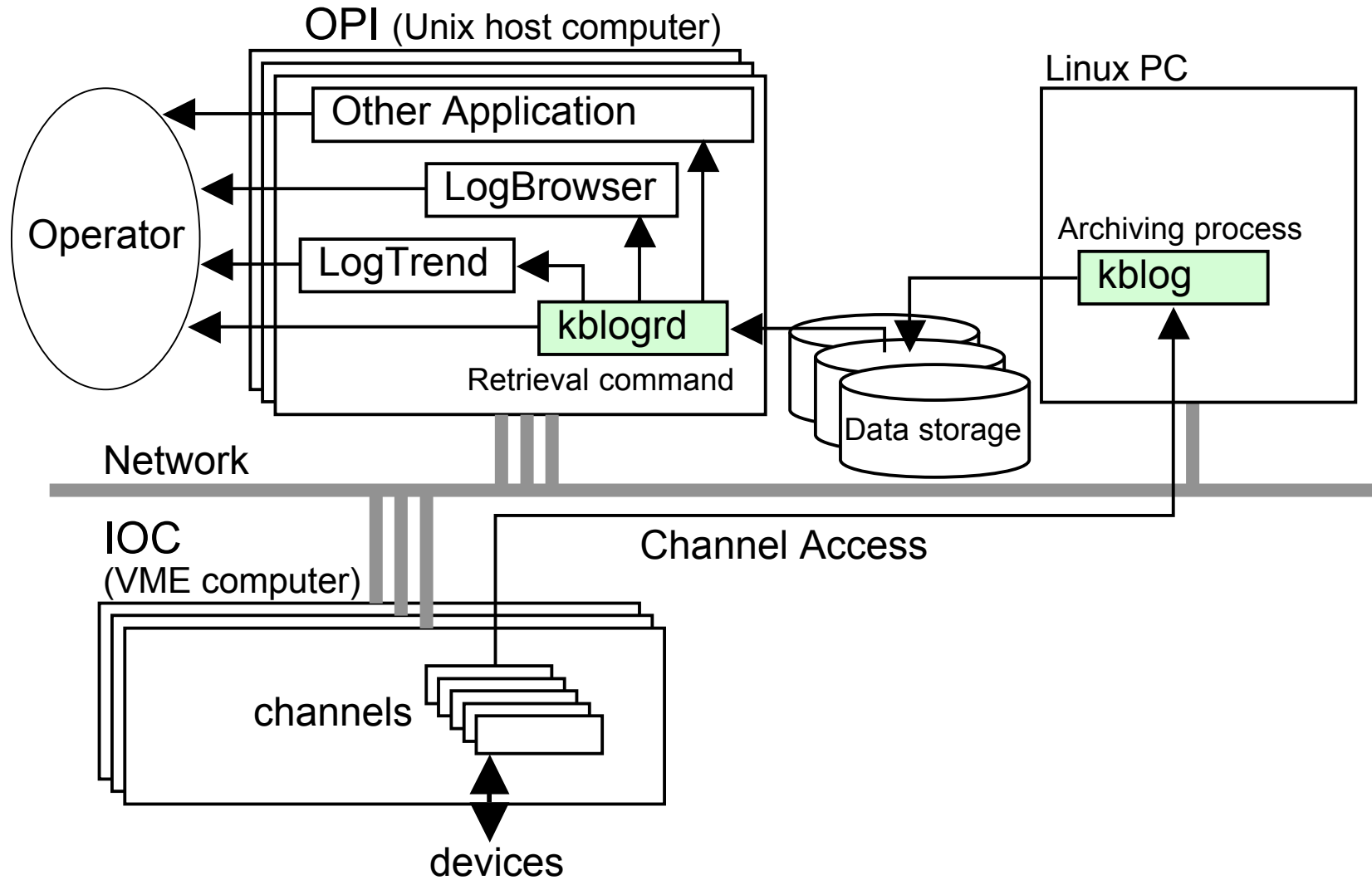
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1. Overview of “KEKBLog”

- “**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 channel names -d start time-end time -f output format  
archive data name
```

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

2. Status of “KEKBlog”

- 31 kblog programs are running.
 - RF 2
 - Magnet 4
 - Vacuum 6
 - Beam Monitor 9
 - Beam Transport line 3
 - Linac 1
 - Others 6

Number of monitoring points

- Number of channels
 - RF 7509
 - Magnet 60380
 - Vacuum 5896
 - Beam Monitor 3263
 - Beam Transport line 8001
 - Linac 1733
 - Others 1335
 - **Total 88117**

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 line 150 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).



PC/Linux for archiving

Spare PC

NAS

3. Application programs

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

SAD script libraries to access archive data :

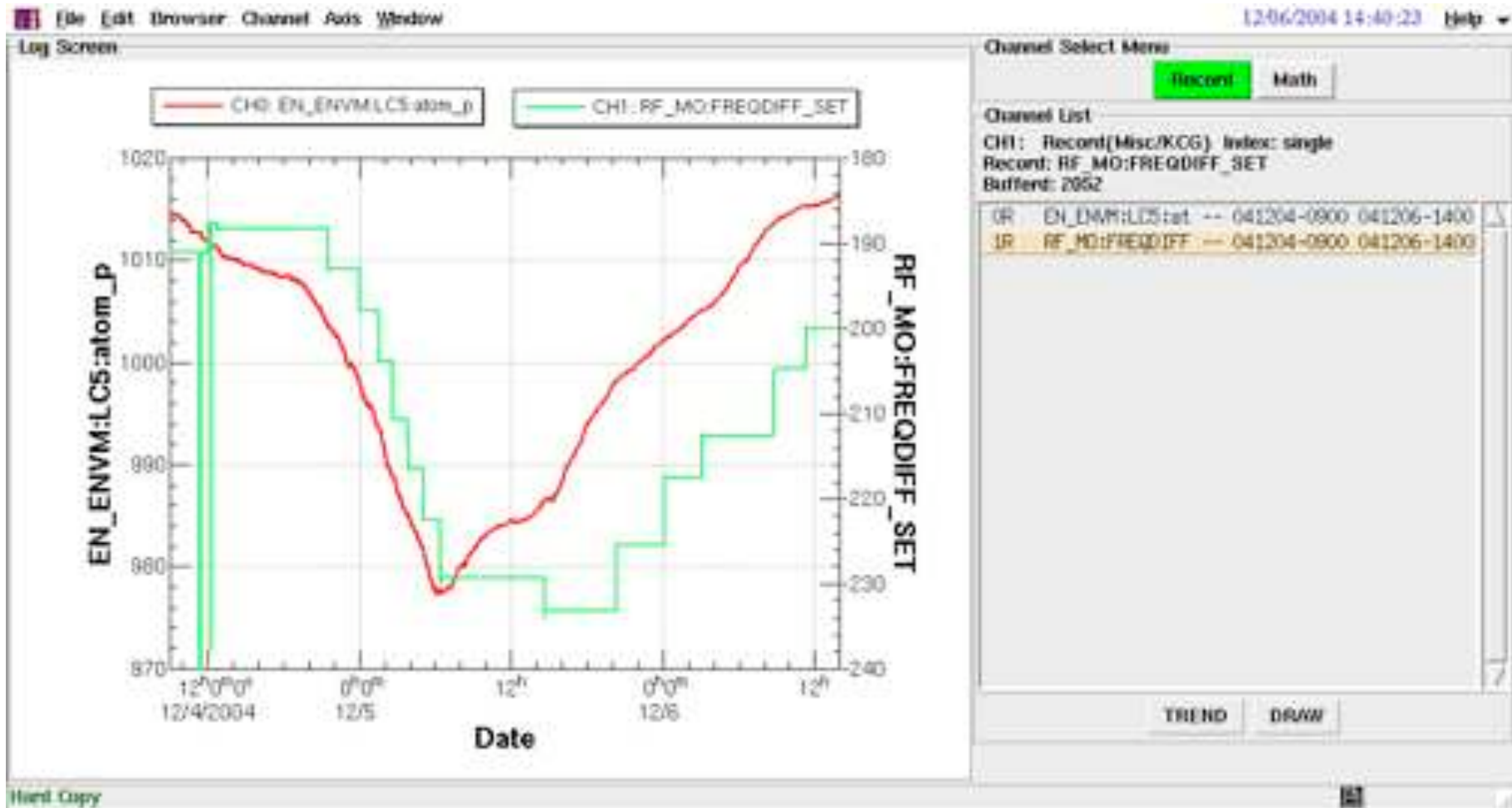
- **“KEKBLog Library”**
 - SAD script library to retrieve archive data
- **“LogTrend Library”**
 - SAD script library to build trend graph (automatically updating plots)

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)

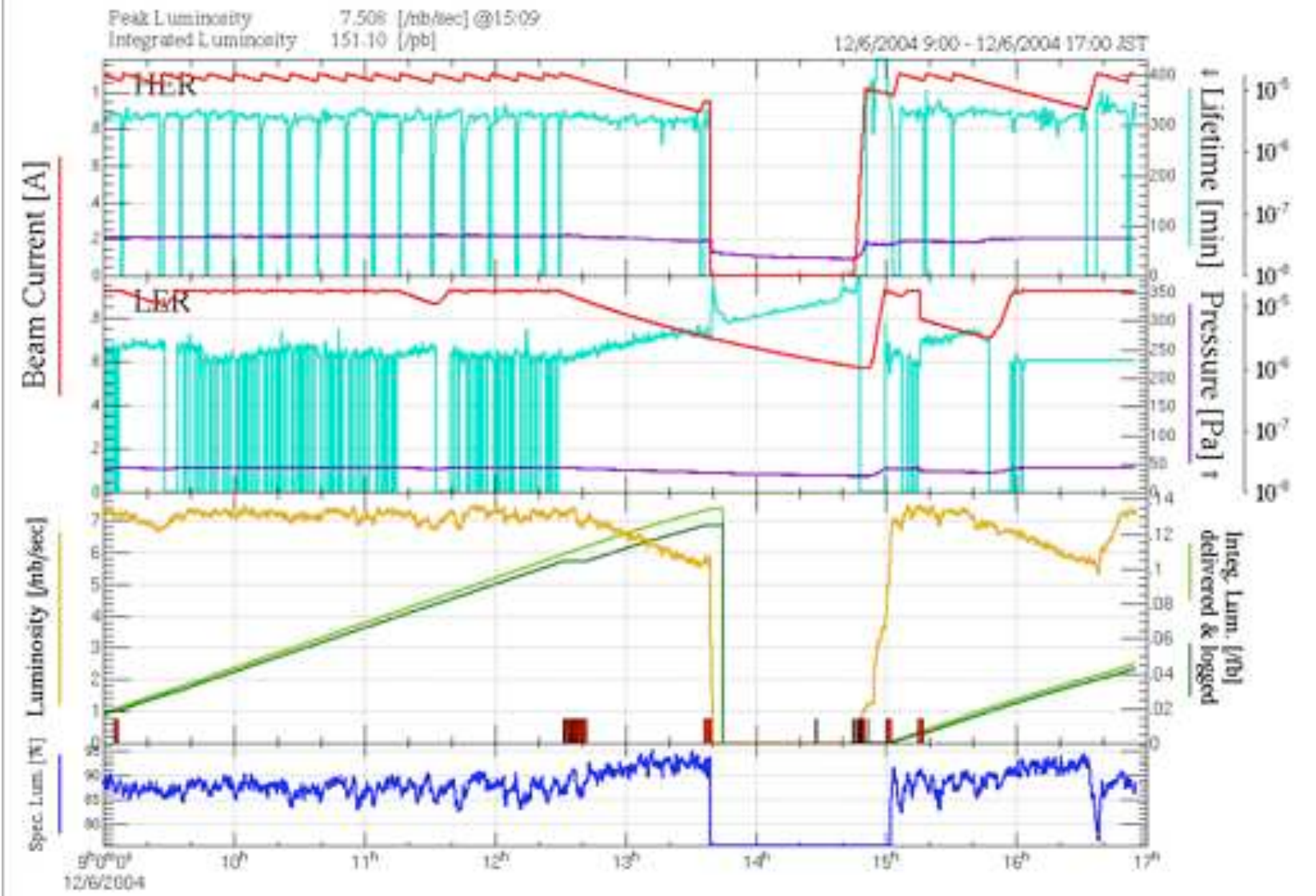
LogBrowser



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



LER IP Knobs

D7RP : -27.84 -> -27.84

Δf_{ω} : -180.32 -> -185.22

Waist : -.3 -> -.3

Ey : -.97 -> -.45

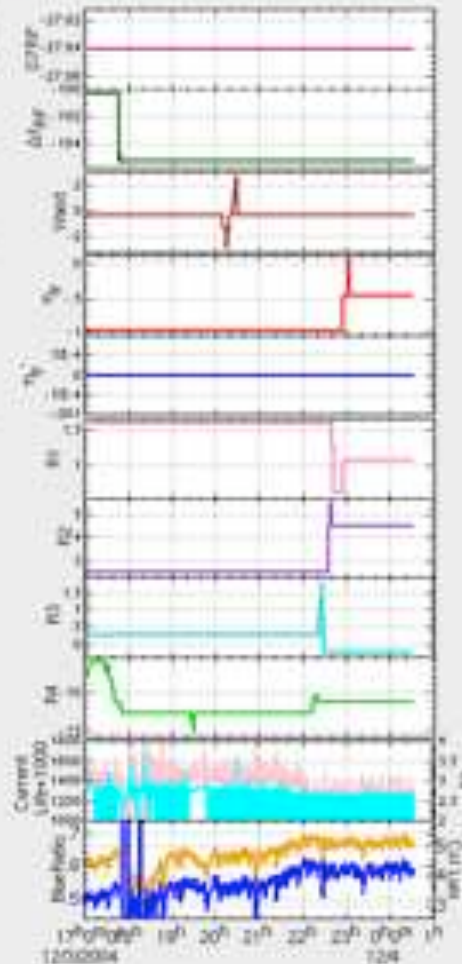
E'y : 0 -> 0

R1 : 1.6 -> 1.07

R2 : 2.46 -> 4.51

R3 : .26 -> -.25

R4 : -7.77 -> -11.23



HER IP Knobs

Voffset : -1.97 -> -1.99

Vangle: -.49 -> -.51

Waist : -.6 -> -1.6

Ey : .25 -> .25

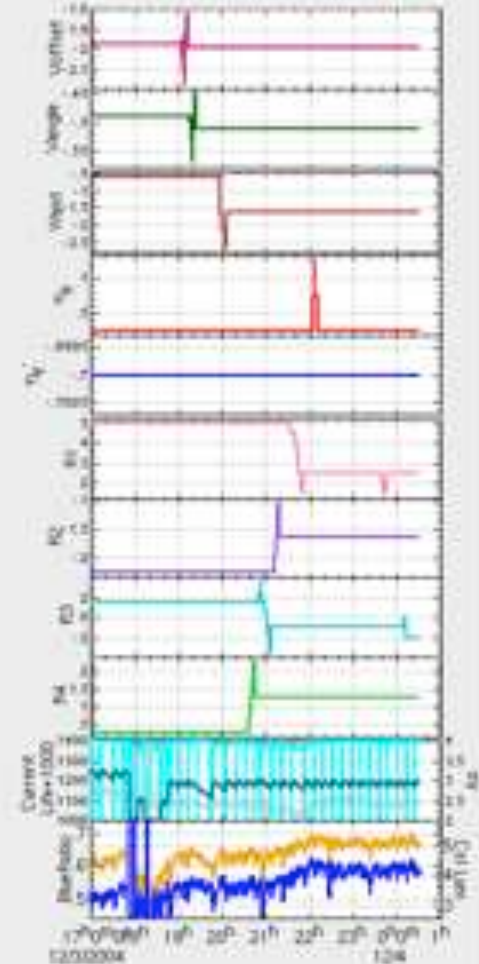
E'y : -.7 -> -.7

R1 : 5 -> 2.5

R2 : -2.25 -> -1.65

R3 : 1.5 -> -2

R4 : .27 -> 1.27



◆ This Pre Pre² Pre³ Display

Display updates every 5 minutes during this shift. The last update was done at [2004.12.4.0.32.17].

Python program example

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

CCG_Patrol

HER

D01 D02 D03 D04
 D05 D06 D07 D08
 D09 D10 D11 D12

LEI

D01 D02 D03 D04
 D05 D06 D07 D08
 D09 D10 D11 D12

start time :

y: 2004 m: 12 d: 02 H: 17 M: 01

stop time :

y: m: d: H: M: S:

sampling time interval:

1 2 3 4 5 (min)

threshold:

pressure (Pa) : 2.0e-7

raising rate (%/s) : 12

status : waiting

04/12/03 09:40 - 04/12/03 09:42

■ : waiting (both rings)
■ : waiting (one ring)
■ : finished (both rings)
■ : finished (one ring)
■ : pass
■ : error

counter : 501

error counter : 0

Date	Time	Record Name	Press.(Pa)	R.R.(%/s)	Current(mA)	Life(min)
04/12/03	09:22:45	D12_CCG_H01-PRESSURE	3.69e-07	397.530	1.96e+02	-1.04e+00
04/12/03	09:22:45	D01_CCG_H26-PRESSURE	1.82e-06	159.991	1.96e+02	-1.04e+00
04/12/03	06:30:35	D06_CCG_H18-PRESSURE	3.41e-07	236.299	1.25e+03	-3.49e+01
04/12/03	06:24:20	D12_CCG_H14-PRESSURE	2.96e-07	103.403	1.25e+03	3.72e+02
04/12/03	06:24:20	D12_CCG_H13-PRESSURE	2.39e-06	36.875	1.25e+03	3.72e+02
04/12/03	05:29:40	D07_CCG_H12-PRESSURE	2.17e-06	81.894	1.24e+03	3.96e+02
04/12/03	05:29:35	D07_CCG_H12-PRESSURE	4.25e-07	164.633	1.24e+03	3.99e+02
04/12/03	04:47:50	D07_CCG_H02-PRESSURE	7.37e-07	159.663	1.20e+03	-4.30e+02
04/12/03	03:13:10	D01_CCG_H26-PRESSURE	4.30e-07	39.993	1.25e+03	3.54e+02
04/12/03	02:51:05	D07_CCG_H02-PRESSURE	7.88e-07	206.659	1.23e+03	3.36e+01
04/12/03	00:56:40	D11_CCG_H08-PRESSURE	2.36e-07	45.353	1.11e+03	-5.65e+01
04/12/02	23:17:00	D10_CCG_H28-PRESSURE	3.53e-07	199.955	1.06e+03	3.73e+02
04/12/02	22:09:25	D08_CCG_H16A-PRESSURE	5.13e-07	14.288	6.25e+02	-2.63e+00
04/12/02	17:06:35	D08_CCG_H17-PRESSURE	1.07e-05	12.098	-3.24e+03	0.00e+00

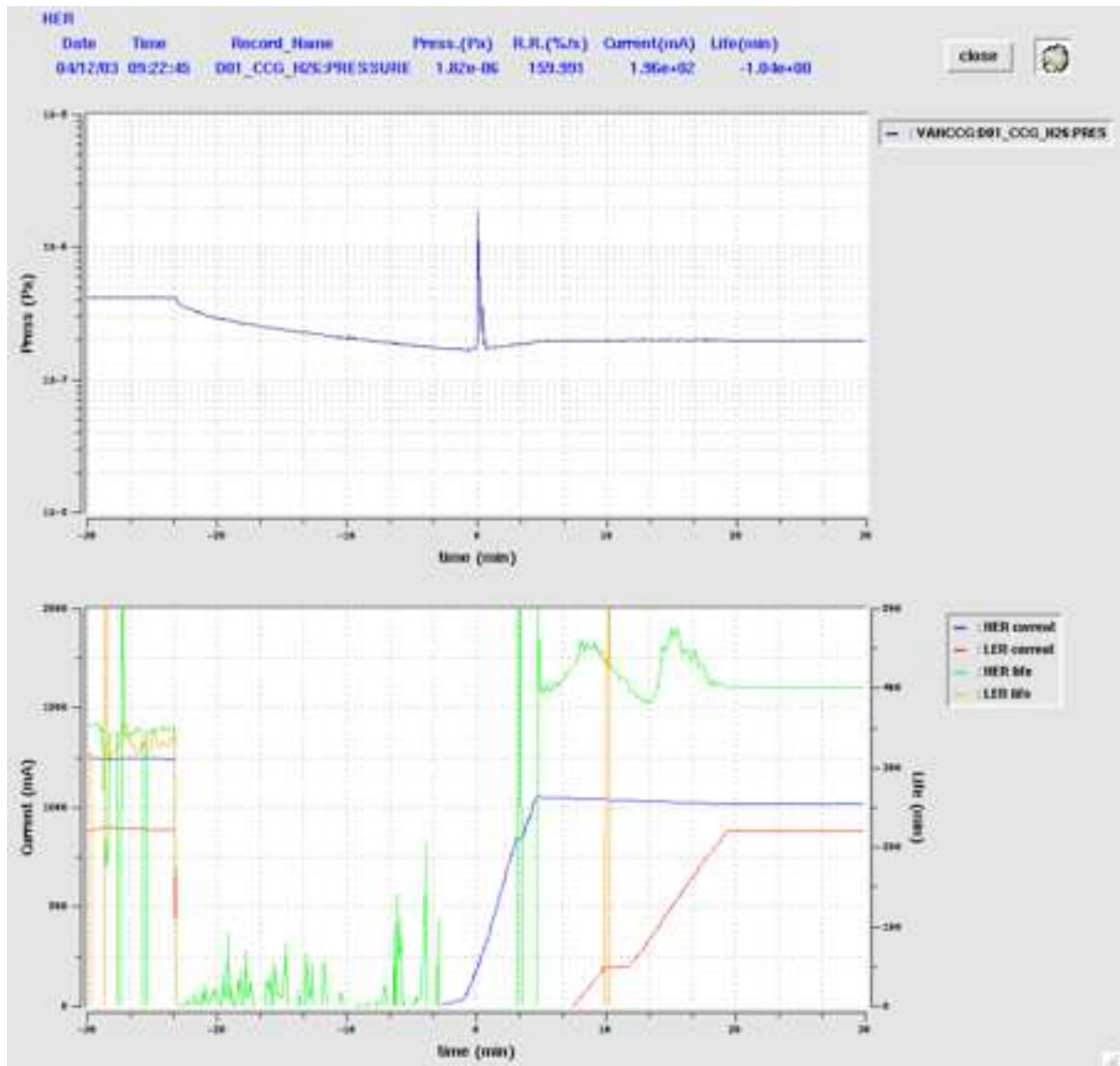
data name : 04/12/03 09:22:45 D01_CCG_H26-PRESSURE

range (-/+): 15 30 60 90 120 (min)

Date	Time	Record Name	Press.(Pa)	R.R.(%/s)	Current(mA)	Life(min)
04/12/03	09:06:35	D02_CCG_L03-PRESSURE	2.29e-07	14.936	-1.64e-02	0.00e+00
04/12/03	05:04:10	D02_CCG_L03-PRESSURE	2.12e-07	14.259	8.97e+02	4.00e+02
04/12/03	04:28:55	D02_CCG_L03-PRESSURE	2.00e-07	14.259	8.93e+02	4.23e+02
04/12/03	02:32:40	D02_CCG_L03-PRESSURE	2.08e-07	15.627	8.99e+02	4.32e+02
04/12/03	01:58:05	D02_CCG_L03-PRESSURE	2.16e-07	12.623	8.64e+02	-4.68e+01
04/12/02	21:02:15	D02_CCG_L03-PRESSURE	2.34e-07	12.944	2.97e+01	1.31e+03
04/12/02	20:00:55	D02_CCG_L03-PRESSURE	2.43e-07	14.259	-8.84e-03	0.00e+00
04/12/02	19:39:45	D07_CCG_L00-PRESSURE	2.27e-07	113.509	-9.34e-03	0.00e+00
04/12/02	19:32:45	D02_CCG_L15-PRESSURE	2.27e-07	434.308	-1.49e-02	0.00e+00
04/12/02	19:32:45	D01_CCG_L07-PRESSURE	5.98e-07	1176.771	-1.49e-02	0.00e+00
04/12/02	17:55:05	D02_CCG_L03-PRESSURE	2.51e-07	13.925	4.63e+02	1.07e+02

data name : 04/12/02 17:55:05 D02_CCG_L03-PRESSURE

range (-/+): 15 30 60 90 120 (min)



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.