

Data Storage and Retrieval

Data storage and retrieval tools are an important factor for the reliability of a facility. For accelerator studies and in case of a failure, an efficient and fast access to logged machine data is necessary. In this presentation we describe the implementation at the PSI proton accelerator facility of the data storage and retrieval system with the associated tools.

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Data Storage and Retrieval ("Logging")

- Important source of data used by many people for many purposes.
 - History plots: study trends, ...
 - Correlation plots: dependencies
 - Statistics: number of trips, availability, integral of charge, activation, ...
 - Dataset retrieval: settings of machine at for a given date and time
- Requirements:
 - Data have to cover many years and should not be lost
 - All data have to be archived
 - Everybody should have access to it
 - Retrieval must be fast (nobody wants to wait for it)
 - Postprocessing with any tools

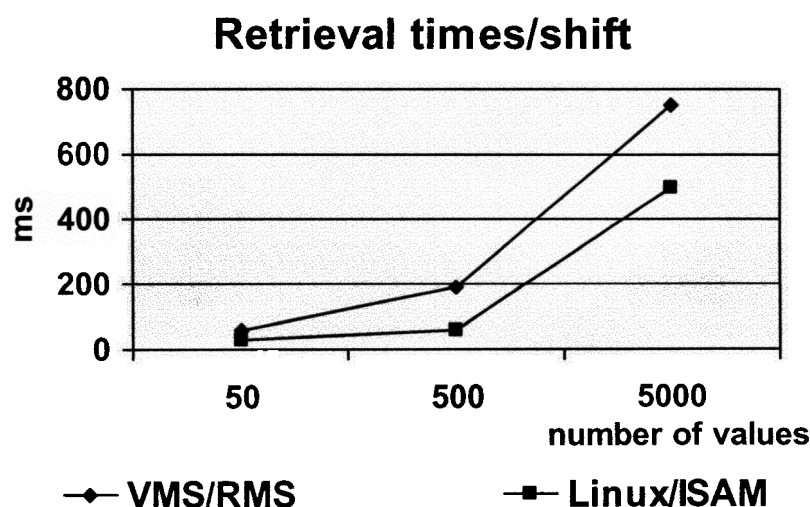
- Realisation: (actual code is already running over 10 years on OpenVMS systems)
- Acquisition by a process reading out all datapoints every 10 minutes, important datapoints every minute and very important datapoints every 5 seconds.
- Storage in index sequential filestructures (1 headerfile/year and 1 datafile/shift)

Header structure

| | | | | |
|------------|------------|----------------|-----------|---------|
| DeviceName | RecordName | RecordPosition | TimeStart | TimeEnd |
|------------|------------|----------------|-----------|---------|

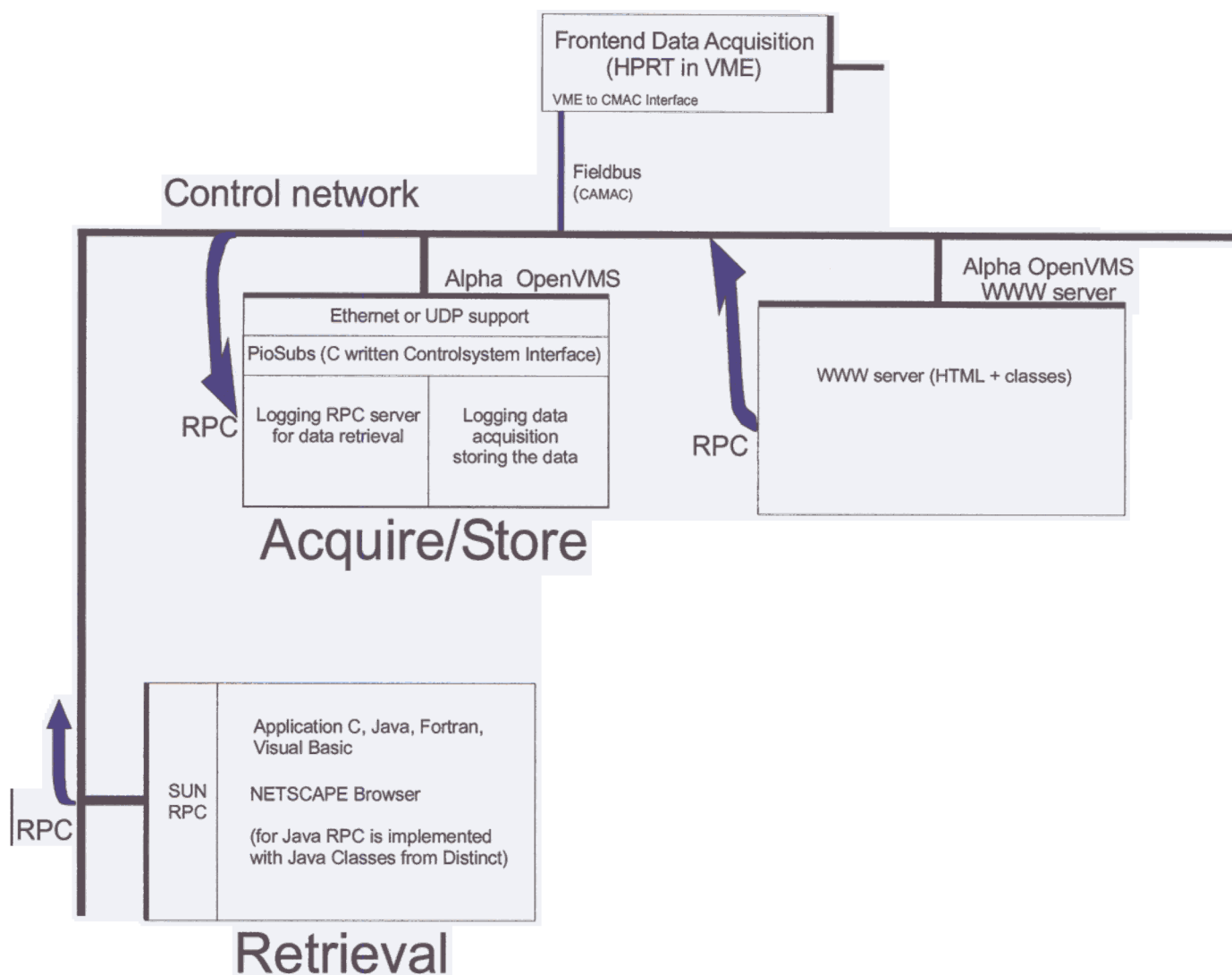
Data structure

| | | | | | |
|------------|-----------|-------------|--------|--------|-----|
| RecordName | Timestamp | NumOfValues | Value1 | Value2 | ... |
| RecordName | Timestamp | NumOfValues | Value1 | Value2 | ... |



- to improve speed, organize in such a way that you get values/shift in one read access

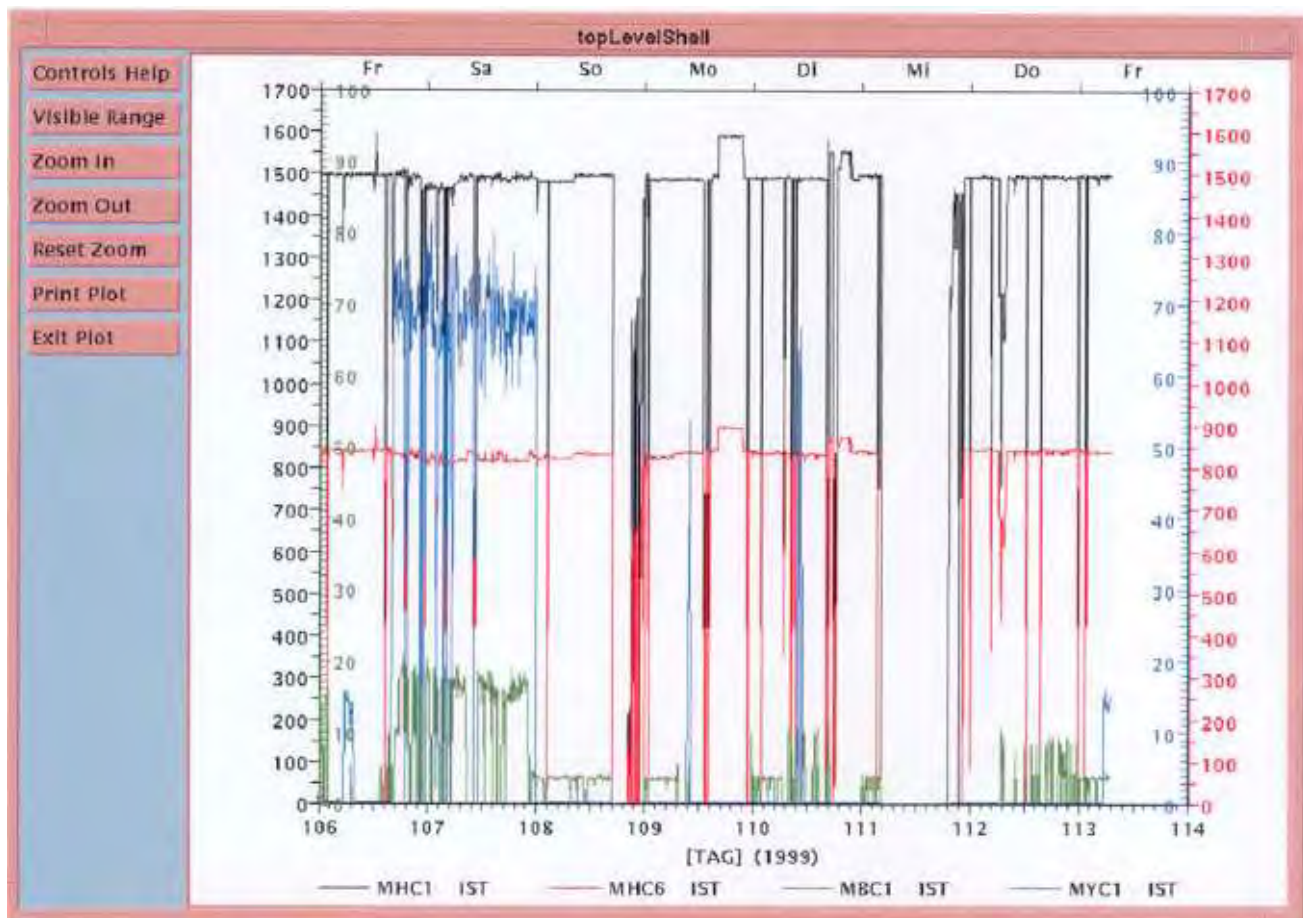
➤ Data Storage and Retrieval Implementation



- Site wide access for users through RPC (remote procedure calls) . For WWW data querying, for Applets and embedded in user built applications (based on Visual Basic, C or Fortran)
- Support is available for many languages
- 20 year of accelerator data available

Data Storage and Retrieval

Example of history plot (X Window application)



Note

up to 4 device: colour plot

horizontal time axis and 4 vertical axis

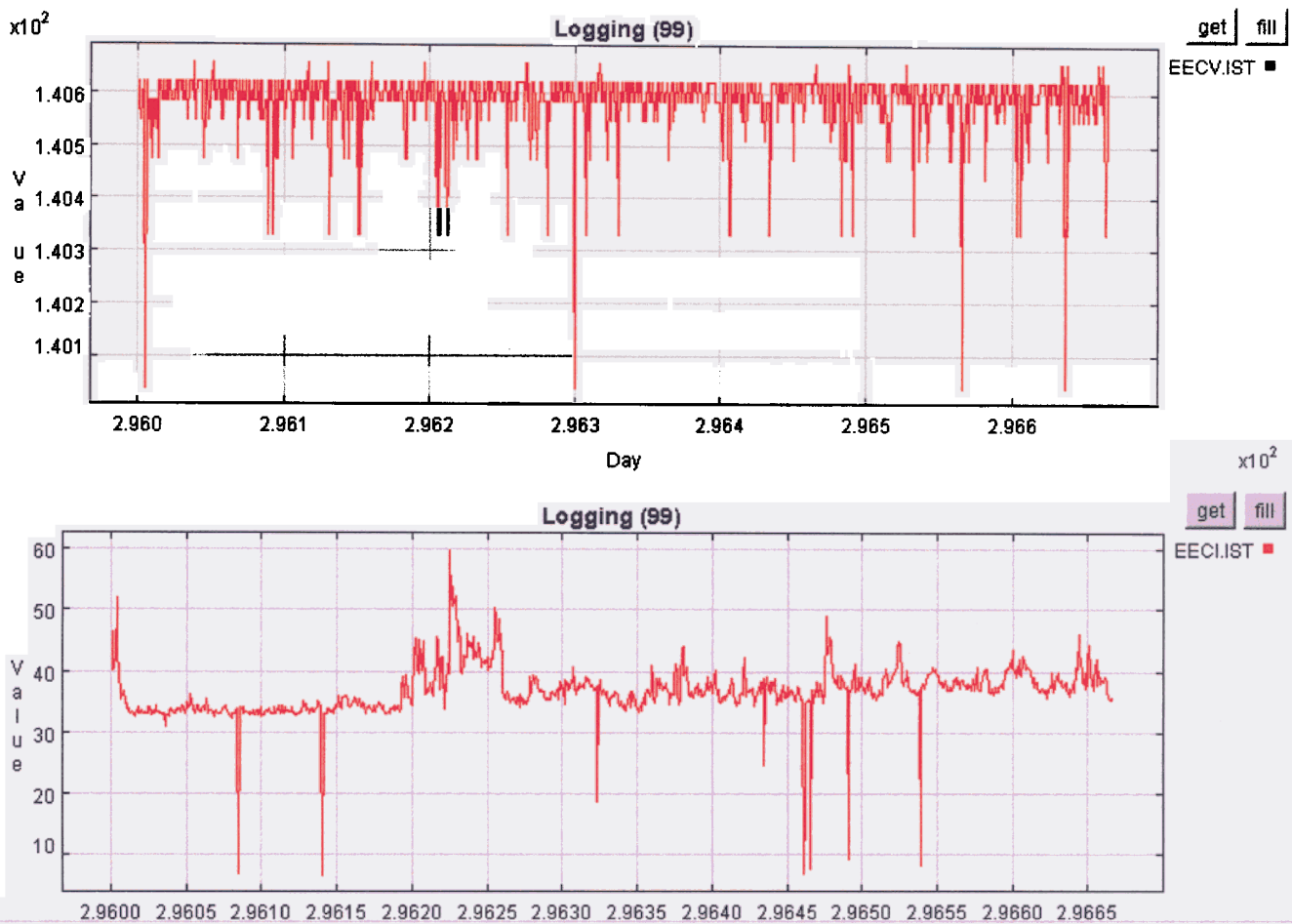
time zoom through mouse **click** or mouse drag

setting of horizontal vertical limits before displaying

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Example of history plot from WWW

EEC Verhalten in den letzten 48 Stunden



html code :

```
<APPLET
code=PlotLiveDemoApplet

Codebase = "logretrieval/"
width=800

height=300

archive="ptplot.zip">
  <PARAM name="Past" value="2">
  <PARAM name="Logid" value="F">
  <PARAM name="Device1" value="EECV.IST">
</APPLET>
```