The MIDAS Data Acquisition System

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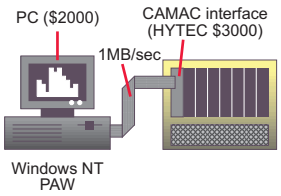
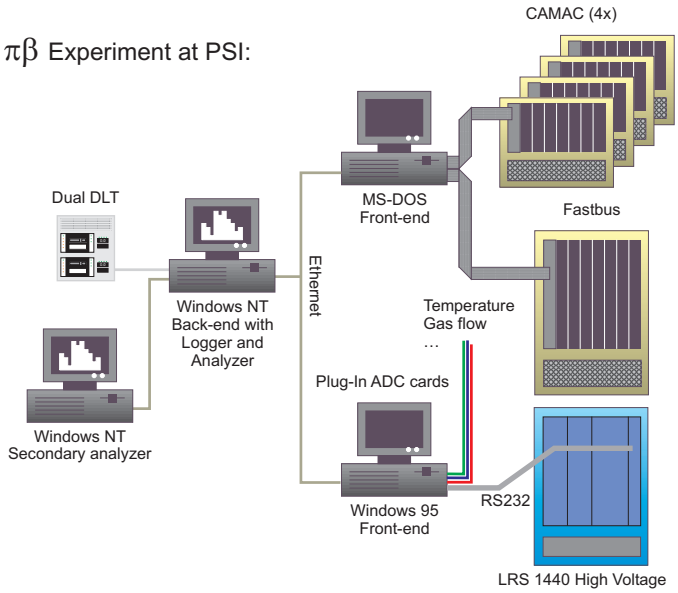
The **M**axiumum **I**ntegrated **D**ata **A**cquisition **S**ystem is suited for small and medium scale experiments. The complexity ranges from test systems, where a single PC is directly connected to CAMAC, to experiments with several front-end computers and analysis. Workstations.

Minimum System:



πβ Experiment at PSI:



Supported operating systems:

- Windows NT
- Unix (OSF/1, Ultrix, Linux, FreeBSD)
- VxWorks (front-end only)
- VMS

Performace:

- 8 μs trigger response time
- Continuous data rate:
  - 980 kB/s Ethernet
  - 4.5 MB/s Fast Ethernet
  - 15 MB/s locally
- Online database access:
  - 20 μs local
  - 2 ms remote

Integrated slow control system

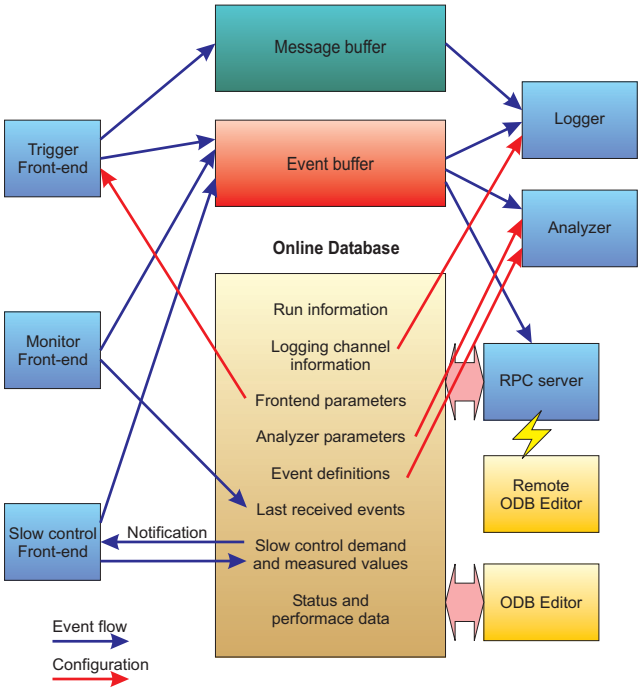
- SC data and event data are combined on tape.
- All applications can have full access to the SC system. They can read measured values and set demand values. Only one line of C code is necessary to access a ODB value.
- Demand values can be locked during a run.
- A specially developed history system stores SC data on disk and can be queried to produce value-over-time plots.
- For hardware access a class driver / device driver concept is used.
- Drivers are available for RS232, GPIB, HV systems, PC plug-in boards.

Basic concepts

The MIDAS library consists of a buffer manager (BM) and an online database (ODB). The BM receives streams of events from producers and distributes them to consumers. Specific events and event rates can be requested by every consumer. A message system is based on the BM. The ODB is a central storage for all experiment relevant data like run parameters, slow control variables, event definitions etc. It is hierarchically structured and kept entirely in shared memory for fastest access. Applications can be automatically notified when a value in the ODB has been changed.

Based on the MIDAS library, following applications have been written:

- An ODB Editor can be used to control a complete experiment.
- A logger supports writing to disk/tape/FTP on multiple channels in different formats: ASCII, YBOS, MIDAS.
- A front-end and analyzer framework can be combined with user code to readout hardware and analyze data. Presently PAW is used as a data presenter.
- MIDAS server for remote client/server access.



MIDAS was used successfully in these experiments:

Experiment	Location	Number of channels	Used hardware
CHAOS	TRIUMF	4500	VME, Fastbus, CAMAC, FERA 4300, System 4290 TDC, PCOS, HV CAEN 170A, HV LRS 4032
Pion-Beta decay	PSI	2000	Fastbus, CAMAC, PCOS, LRS 1440, PC plug-in boards
E614 test	TRIUMF	200	VME, Fastbus, CAMAC
Tisol	TRIUMF	20	VME, CAMAC
Mine detection	PSI	8	CAMAC, PCOS
CMS crystal tests	PSI	2	CAMAC, PCOS

For more information