

# Proposal for a DAQ system

The core of the DAQ system will consist of a buffer manager, which uses a layer which makes OS calls transparent. This way, it can easily be adapted to any operation system which fulfills following requirements:

- Multitasking
- 32 bit flat address space
- Shared memory
- Semaphores or Mutexes
- Event flags or any inter-process notification mechanism

In a first stage this will be Windows NT, VMS and POSIX. The buffer manager will have following features:

- Multistream, multiproducer, multiconsumer
- Different event types with individual trigger mask
- Flexible data format: contents of events may have variable length and must not be known to the system.
- 100% consumers and random consumers
- Flexible routing of events, several analyzers may sit on different computers
- Callable from C and FORTRAN
- Performance: local 3 MB/s (typical buffer size of 1kB), Network 0.5 MB/s
- Save: a consumer cannot crash the others

The buffer manager will have transparent network access on any system offering TCP/IP sockets, so the same functions for copying events can be used locally or over the network.

Based on the buffer manager, following components will be developed. The buffer manager can be used together with them or without them:

- BOS - like data format with different banks of data in one event
- Online-database which holds all experiment-specific data like event definition, histogram definition etc.
- Command interface: each buffer manager client can send commands to other clients. This will be used for starting/stopping runs etc. Based on this command interface, RPC-like calls will be implemented for transparent CAMAC access and a slow control systems.
- Message system for exchange and logging of information and error messages.
- History system which lets users display values like scalars over time.
- Analyzer system consisting of user-written routines and a test and histogram package. A PAW interface will be provided but is not necessary. Histogram package will support: 1-dim histograms, 2-dim and maybe real 3-dim histograms, gate cuts, box cuts and any logical combination. Additional, vector histograms and test will be supported (several identical histograms sitting on adjacent data values)
- As frontend computer any system can be used which supports sockets and can read data from hardware. Ready-to-run systems will be PC under MS-DOS accessing CAMAC (1.5 MB/s), FASTBUS (2 MB/s), IEEE and RT-VAX. Network transfer rate between PC and server will be larger than 800 kB/sec. Network data buffering will be done transparently inside the buffer manager calls.
- Control program running under MS-Windows 3.1 or Windows NT giving a graphical user interface to the whole system. Through this control program, the experiment can be controlled (starting runs, controlling taping etc.), the analyzer can be controlled (defining histograms and tests, analyzer parameters can be accessed) and all graphical data can be viewed. A user interface for main slow control systems like LeCroy High Voltage and beamline control will be supplied. A Motif version of this program will NOT be supplied.

Please tell me any suggestions  
Stefan Ritt, Aug 17, 1993