UNIDAQ

UNIX based data acquisition system

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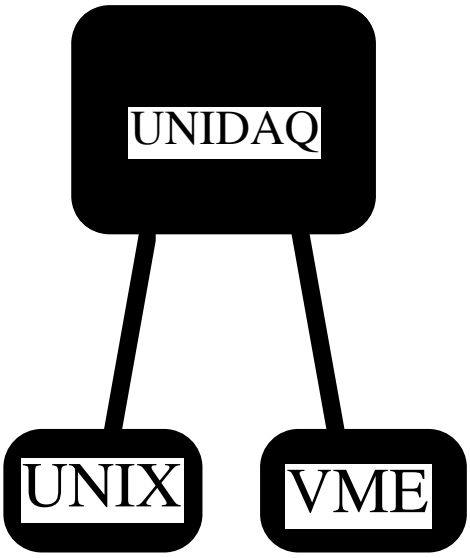
UNIDAQ collaboration

KEK
University of Michigan
SSCL
Tokyo Institute of Technology
LBL/SACLAY

UNIDAQ stands on industrial standard

Minimum requirements on computer environment

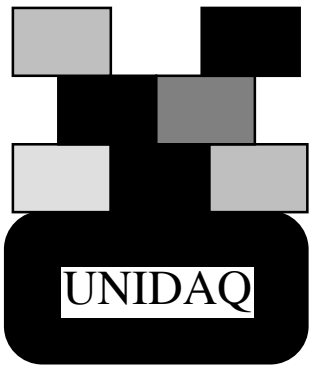
Good Portability



UNIDAQ is modular system

UNIDAQ can be customized for the applications.

Minimum requirements on computer environment



UNIDAQ collaboration

SDC Portable DAQ

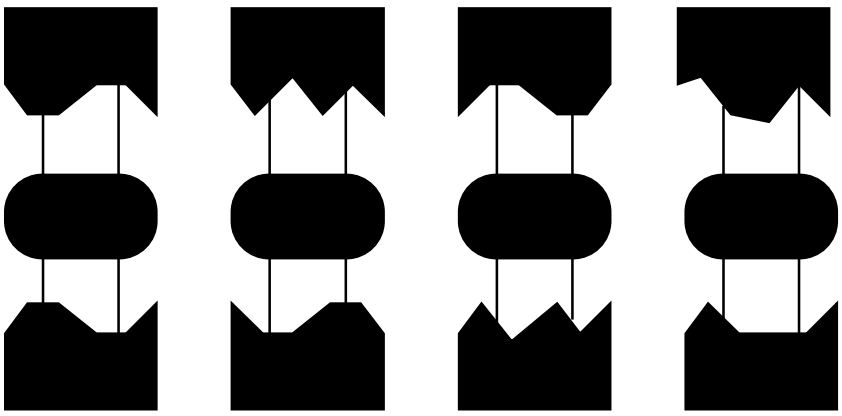
detector development
beam test

Various requirements

Various computer environments

Common feature

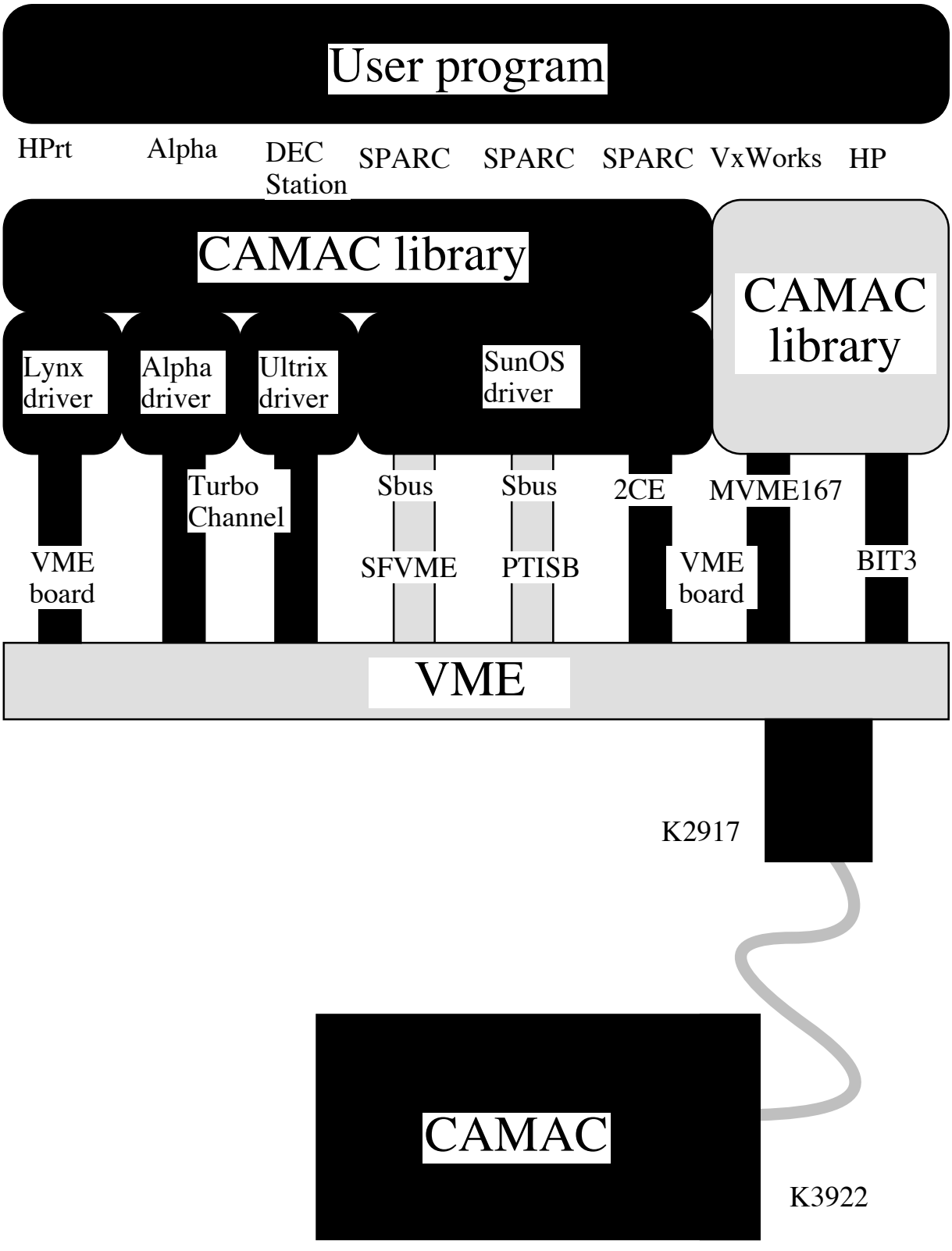
various applications



UNIDAQ

various computer environment

CAMAC access



Real-time response

Response to interrupt

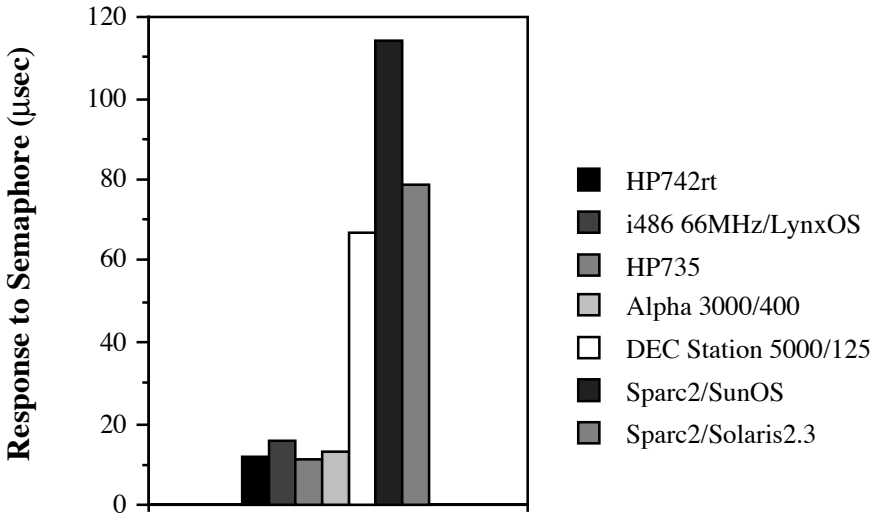
Response to inter-process communication

Context switching time

DAQ benchmark program

CHEP94 presentation, "VMEbus based computer and Real-time UNIX as infrastructure of DAQ, Y.Yasu et al., KEK

Poster #10



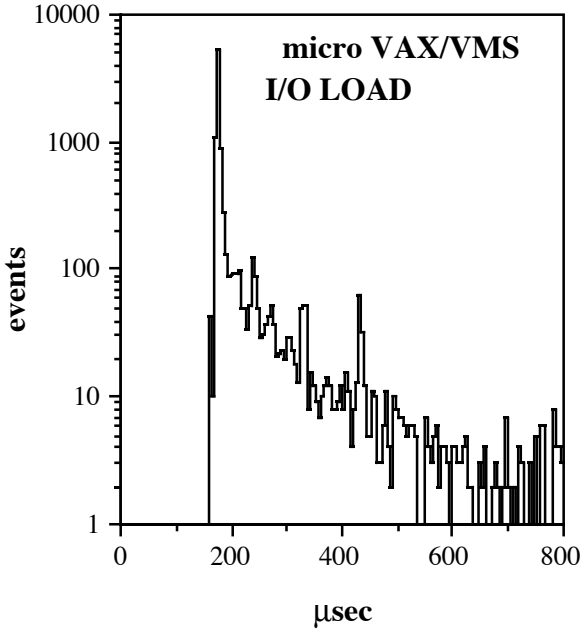
UNIX machines are fast !

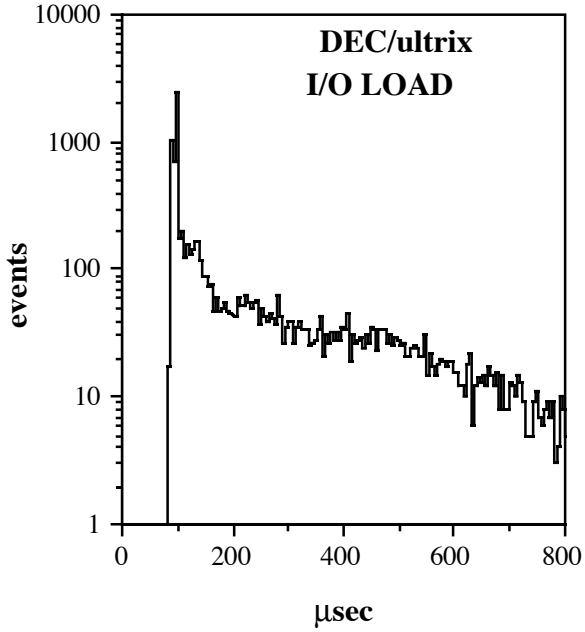
Real-time OS

guaranteed response
fast response

Do we need guaranteed response?

Interrupt response while 2 busy I/O processes running.



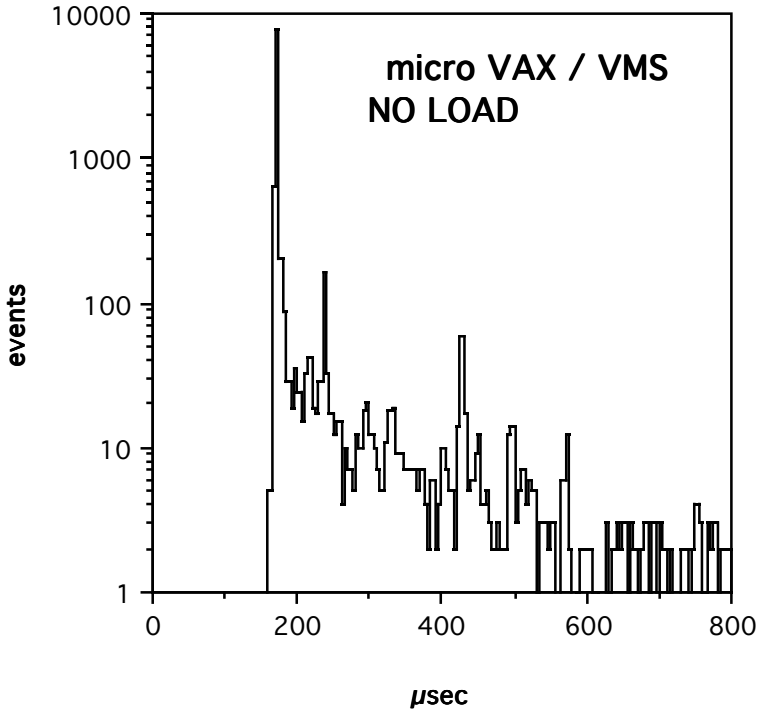


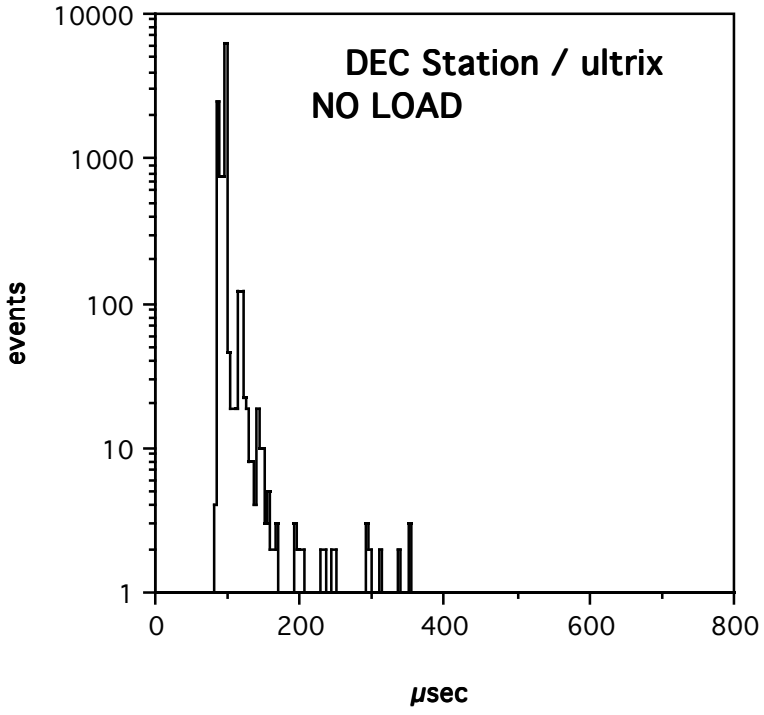
Delayed Response

Dead time → $\int T_{delay} P_{probability} \, dt = \langle T_{delay} \rangle$

Fatal Problem → $\int_{\text{Time limit}} P_{probability} \, dt$ → Probability of fatal failure

We need faster response.


micro VAX / VMS
NO LOAD
events
10000
1000
100
10
1
0
200
400
600
800
μsec


DEC Station / ultrix
NO LOAD
events
10000
1000
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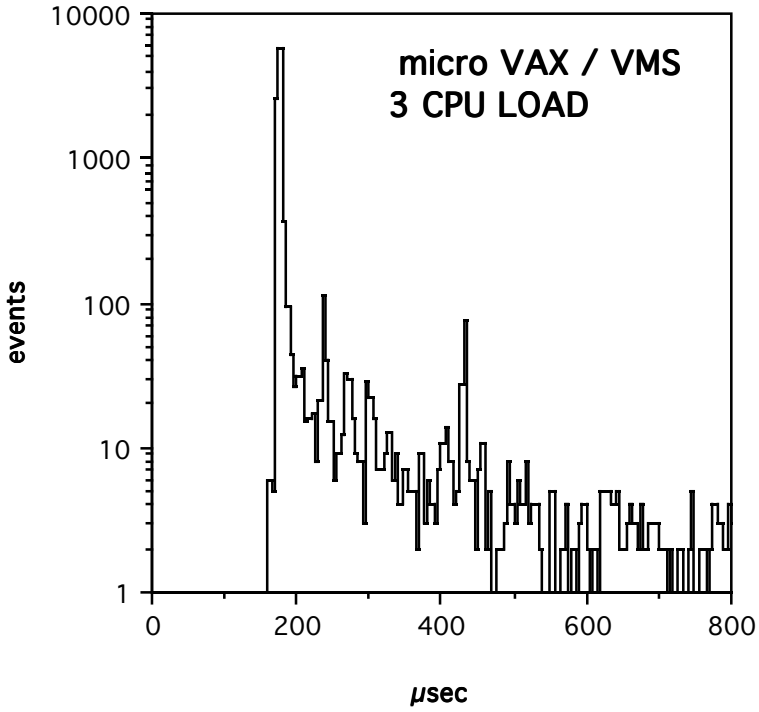
μsec


micro VAX / VMS
3 CPU LOAD
events
10000
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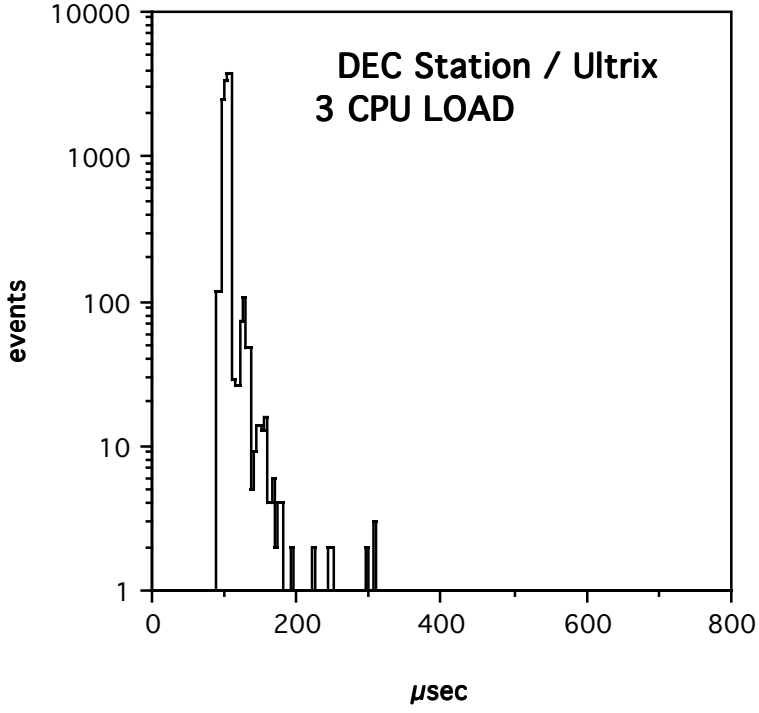
μsec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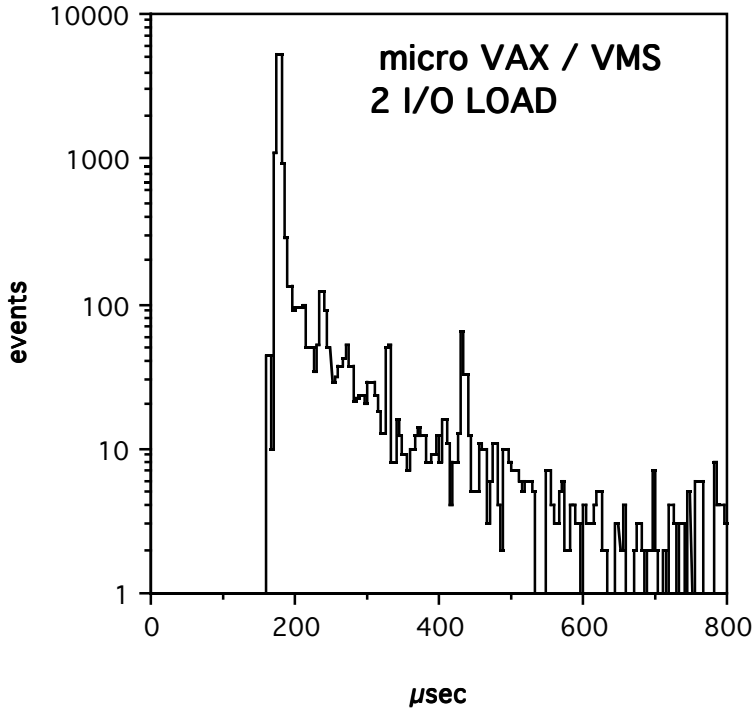
micro VAX / VMS
2 I/O LOAD
events
μsec
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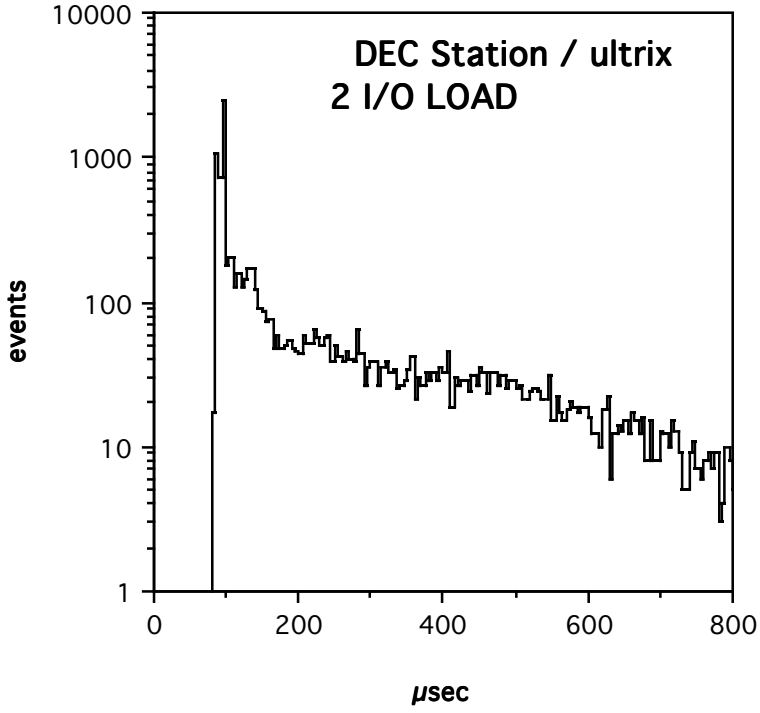
DEC Station / ultrix
2 I/O LOAD
events
μsec
10000
1000
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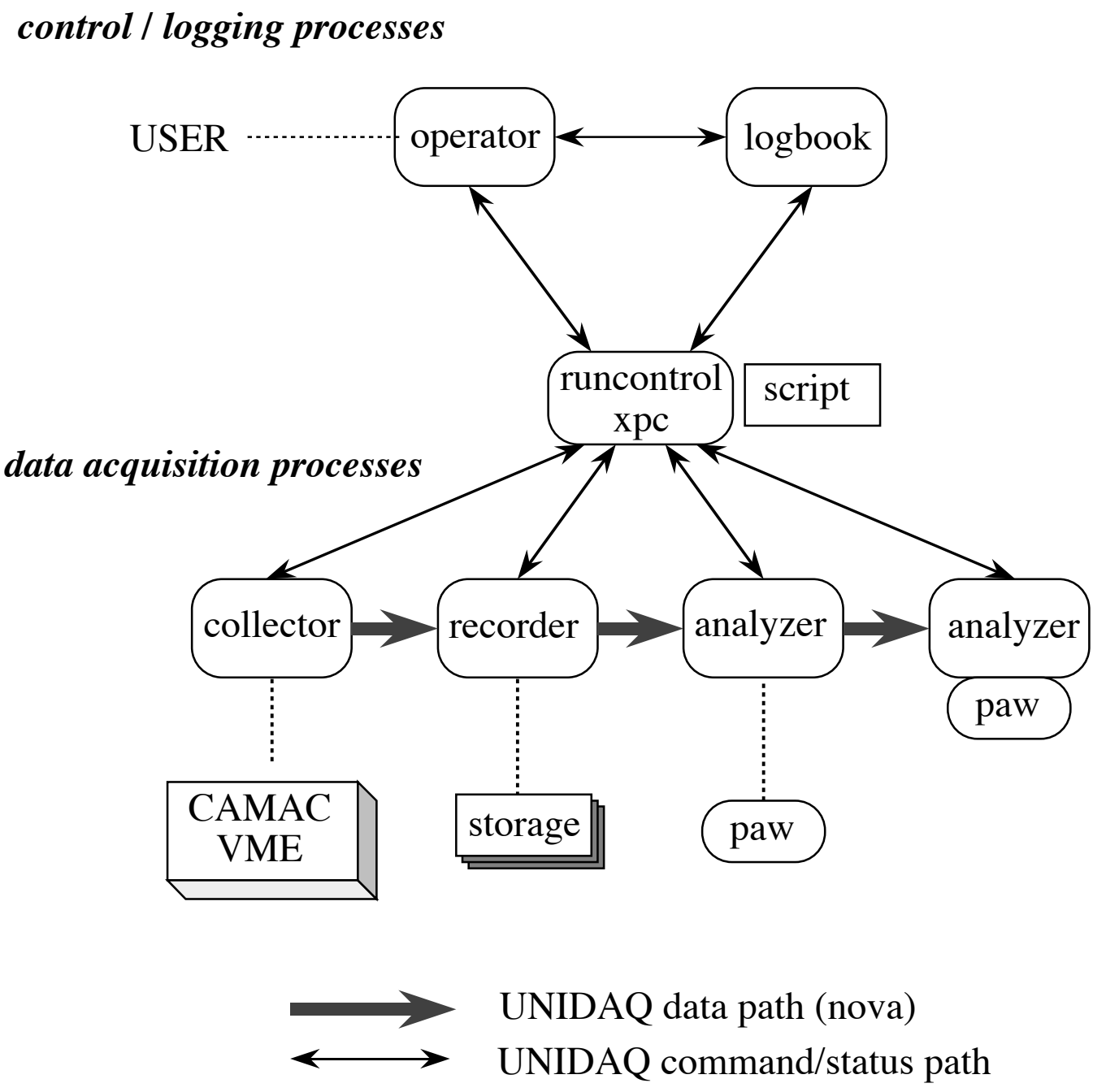
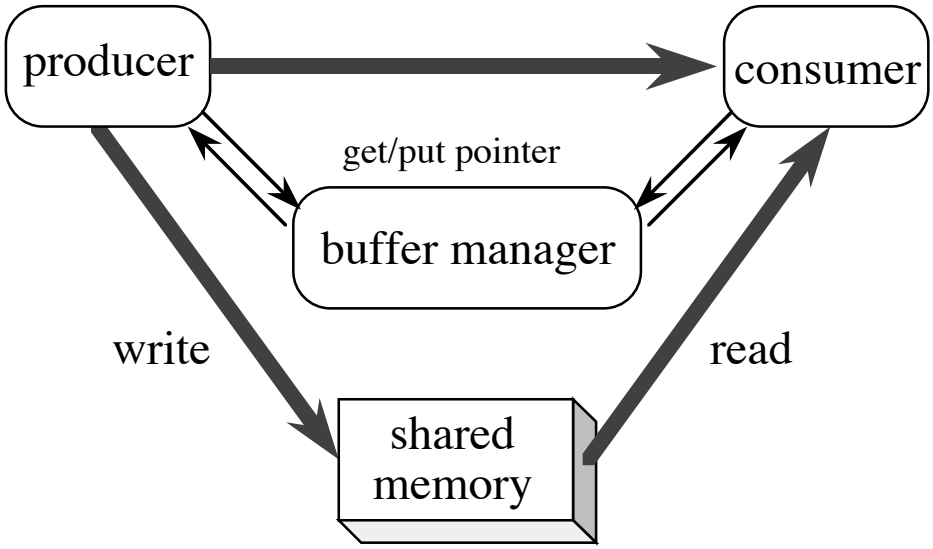
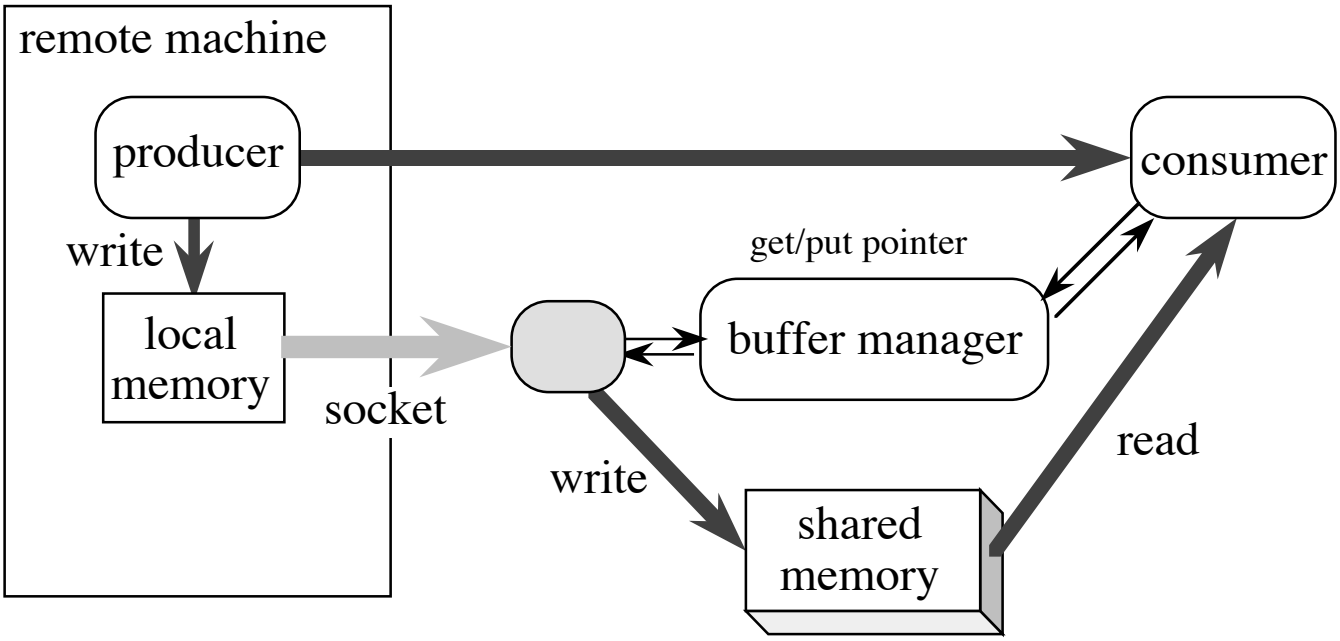
UNIDAQ processes



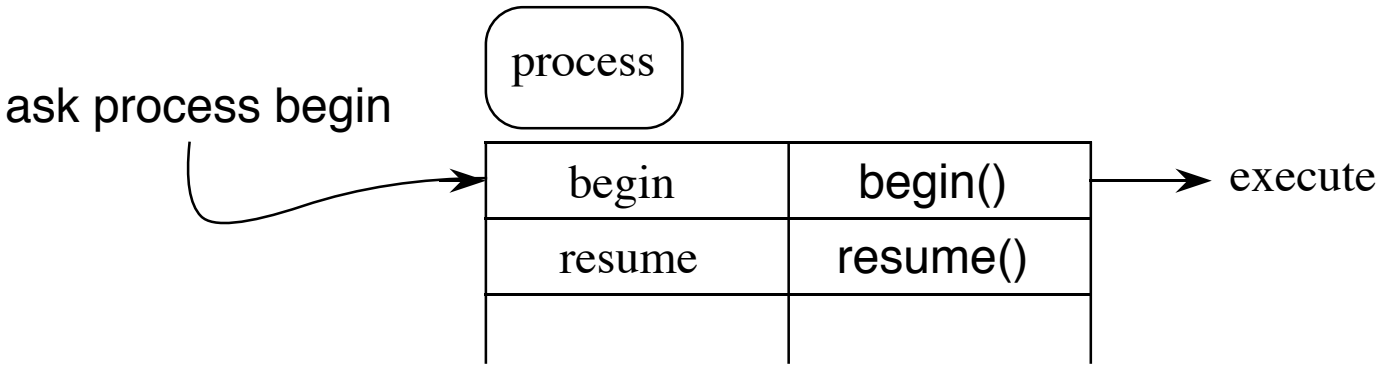
Data path
(buffer manager NOVA)

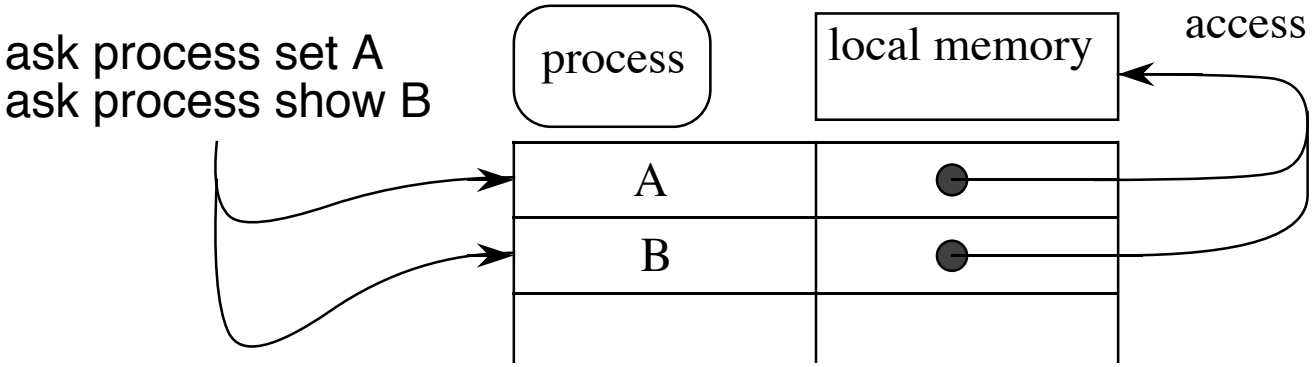


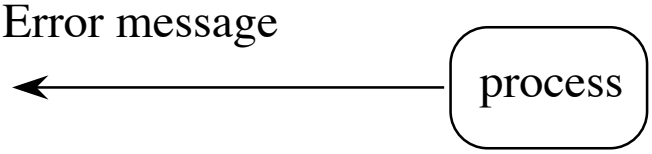


Command path

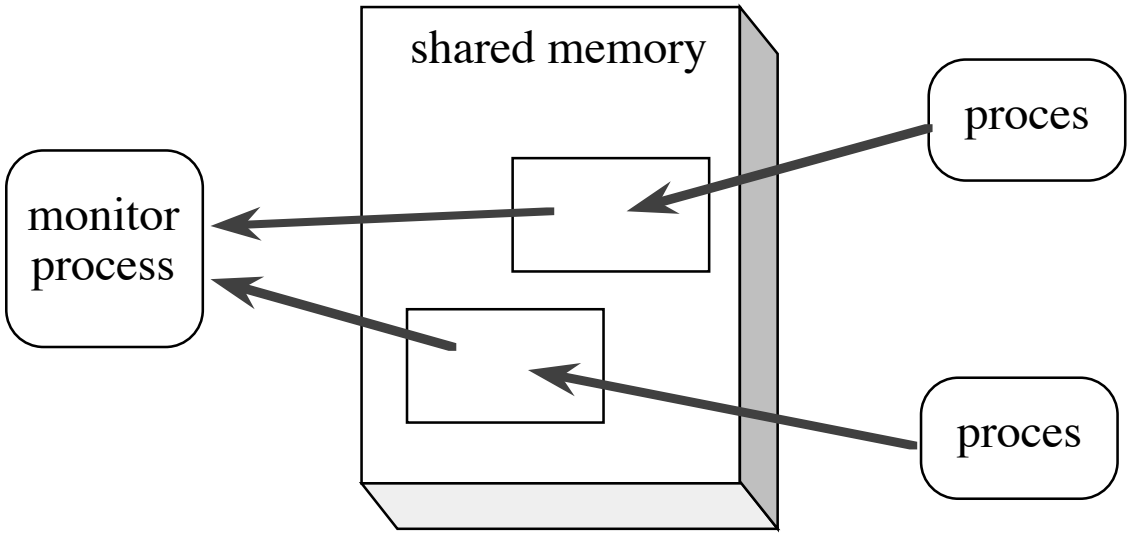
message queue







Status path



UNIDAQ development

UNIDAQ is successfully developed

It is used for SDC detector development.

Beam tests at KEK, BNL, CERN.

Set-up at LBL, U.Michigan, Indiana U., U.Toronto, Tokyo Inst. Tech., SSCL.

It is used for g-2 detector development at BNL

KEK chooses UNIDAQ as a standard DAQ at KEK proton synchrotron.

UNIDAQ is portable system

It supports DEC ultrix, SPARC SunOS, HP-UX, SGI, and VxWorks.

It also works on LynxOS(HP) and Alpha OSF

UNIDAQ is modular system

Add more options

murmur
tcl/tk GUI