

EVENT BUILDER MINI-REVIEW

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for the
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Contents

Pending from last February's review

- VME readout performance
- Use of real VRBs
- ATM driver code review
- ATM card obsolescence
- VPI/VCI range problem
- Throughput hysteresis problem

Additional

- Monitoring code development
- Scanner Manager and Trigger Manager

VME readout performance

200 MHz 2603 with Universe I

- Maxed out at 31 MB/s
- Surpassed by 66 MHz CPU with VMEChip2 (45 MB/s)
- Both measurements used 32 KB DMAs

200 MHz 2603 with Universe II

- 37 MB/s (normal mode)
- 55 MB/s (fast mode)

Problem solved

Now upgrading all 2603s to Universe II in batches of five

Universe II fast mode

- (1) Reduces DTACK* filtering
- (2) Reduces wait between DTACK* and latching
- (3) Reduces idle time for DS0* and DS1*

Above features individually selectable

Our performance test used all three

2 and 3 violate VME64 standard

No errors during a 20-hour reliability test in VIPA crate reading from a VRB

Reading from a real VRB

200 MHz 2603, Universe II in fast mode

Calorimeter VRB emulating 10 channels

Event size ~ 5 KB

Stand-alone test gets 39 MB/s

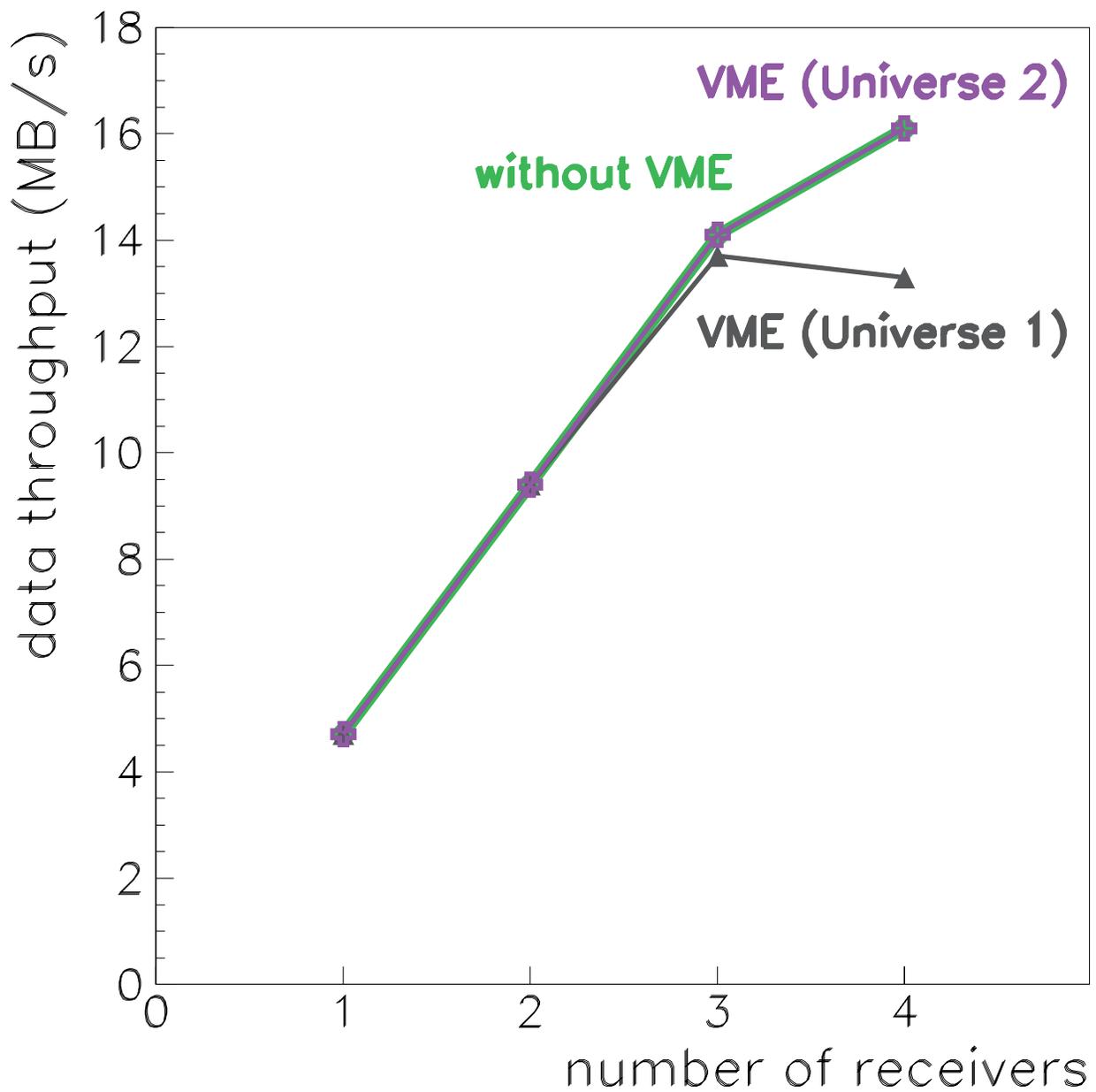
- Two DMA reads per event
- Poll for end of first DMA (event size)
- Interrupt for end of second DMA (event)

Minimum requirement 20 MB/s

Also tested one VRB in event builder

- Sending to 1, 2, 3, or 4 destinations

Noticeable improvement in EVB performance



W/o VME and VME U-II are superimposed

ATM driver code review

We completed such a review just before the code's author graduated

A document is in the works

ATM card obsolescence

It happened: the 4515 is officially obsolete

Newer models not compatible with our driver (we have developer's manuals)

We bought 20 additional cards, bringing our total to 30 (all in hand)

This should be enough for anything

Interphase will repair but not replace

**Looked a little at NICstar chipset:
it can do our kind of traffic shaping**

VPI / VCI range problem

Reception using the 4515 had a noticeable error rate

Occurred when

- (VPI or VCI > 15) AND
- Transmission rate > 9 MB/s

Would have limited EVB size to 16 x 16

Reception using NICstar-based card never had errors

Traced problem to cell loss by packet reassembly chip in 4515

This chip won't be used in the real event builder

Non-problem

Throughput hysteresis problem

When fragment size variation got too large, throughput would nose-dive

Reducing variation did not restore throughput

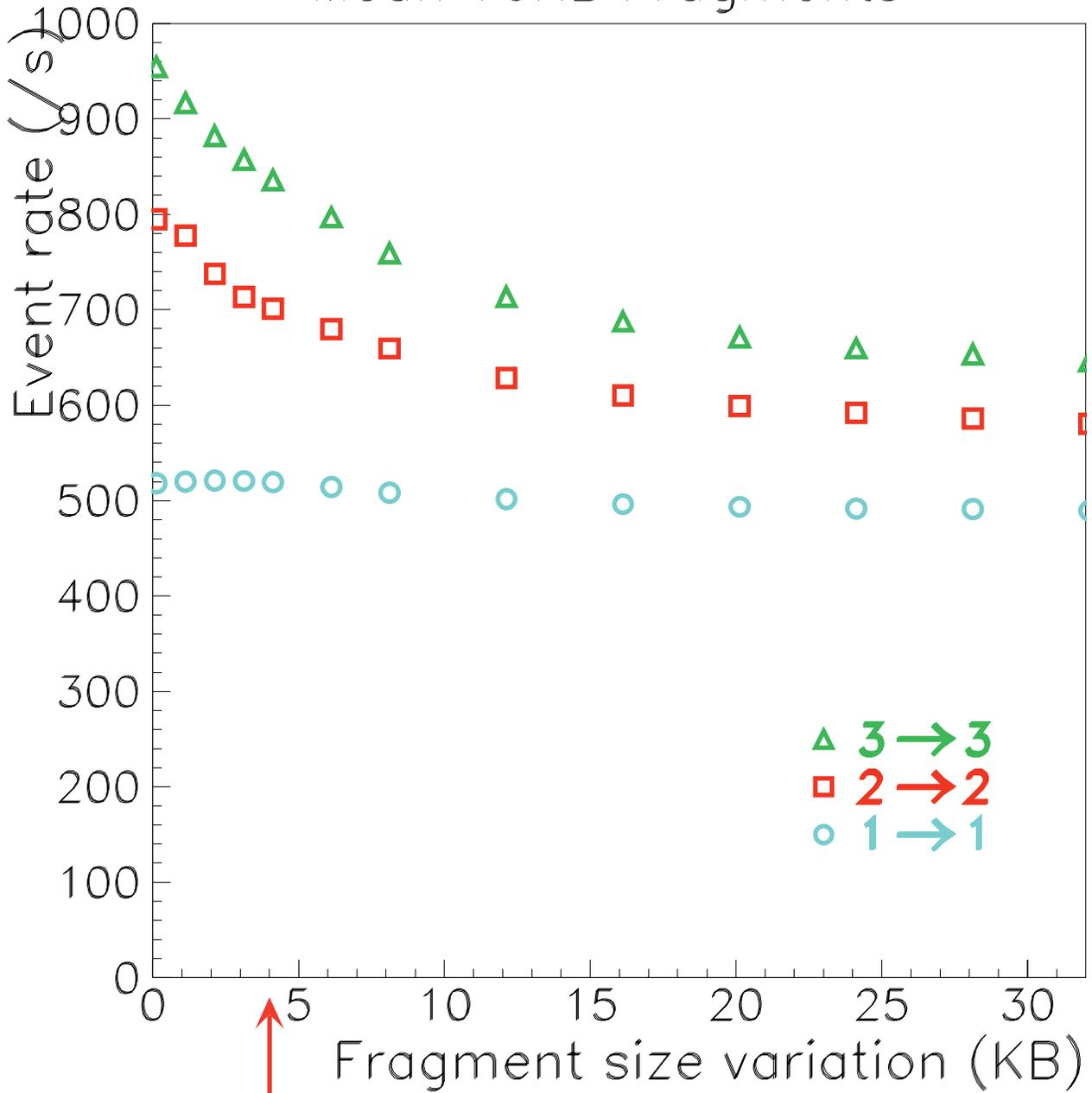
Fixed a bug in the ATM-card driver

Some DMA-completion interrupts were being lost when fragments were very small

Code waited on wrong semaphores, etc.

Problem solved

Mean 16KB Fragments



Run 1 SVX
($\sigma = 25\%$)

Event Builder Monitoring

ScannerControl application

Last run

- Written in Tcl
- Used Sun RPC (small C program)

Next run

- Java Swing component (JPanel)
- ROBIN ORB

Already have an old AWT-style GUI

- Needs to be updated

"The guts" are being worked on

Needed for summer DAQ tests

Not needed for wedge test

Scanner Manager monitoring

Performance counter display (per partition)

- L2 triggers OK & errors (comm errors)
- Events with timeouts sending to L3
- No. of L3 buffers ready
- Events discarded
- Events sent to L3
- Per SCPU in partition
 - Events loaded OK & errors
 - Events sent OK & errors
 - Events discarded
 - Time spent loading, sending, idle

Event rate during last N seconds

Internal state display

- Booted?
- Major tasks running?
- LAN connection to Run Control?
- SCPU registered to partitions?

Message logging over LAN

Panic dump file

- All internal state relevant to debugging

Scanner CPU monitoring

Performance counter display

- Same as reported by Scanner Manager

Internal state display

- Fragment buffer states (empty, filling, ...)
- Event network connections to L3
- Partition membership
- Major tasks running?
- Semaphores, other internal objects

Message logging over LAN

Panic dump file

- All internal state relevant to debugging

Scanner Manager link to Trigger Manager

Communication via SCRAMNet

Have tested a version of the SM driven by a dummy TM

Have draft description of messages

Need final description of messages

Need to propagate TM info to event

Needed for wedge test

EVB milestones

Wedge test

- Link to Trigger Manager

Summer DAQ tests

- New ScannerControl application