SFO Options
with decisions in RED
and new comments in BLUE

James T. Linnemann
Michigan State University
May 22, 1998
Criteria for Decisions

- Meet Performance Criteria
  bandwidth, deadtime, acceptance, rejection
  - with adequate margin (for occupancy e.g.)

- Acceptable Schedule Risk
  (Includes complexity)
  specification
  resources
  prototype and construction
  commissioning

- Maintenance and Repair
  resources, complexity, card variants...

- Parts and Engineering Costs
  within constraints

- Expansion Capability
  beyond planned scope
MBT

- 16-deep FIFOs all channels
- either G-link or Cypress
- 128b Mbus broadcast
- SCL Mezzanine
  - Send L1 to FIFO
  - Queue L2
  - SCL Initialize
- 2 Cypress Outputs
- Digital I/O (e.g. to Framework)
- VME slave (&Mbus programmed I/O)
  - download
  - control
  - monitor
SLIC

- 16 FIFO’s
- either G-link or Cypress inputs
- FPGA routing
- 4 TI C6x Integer DSP’s per card
- Master DSP for readout
- 2 Cypress outputs
  hope can send even L3 Unbias data via Cypress outputs

- SCL Mezzanine
  receive SCL Initialize
  send L1 SCL (e.g. Qualifiers) to FIFO
  L2 Accept/Reject?
    • Irrelevant if readout only via Worker Alpha
SCL Fanout to SLIC

- **SCL Initialize**
  - force clearance of buffers, even if partial events
  - Admin could send by VME int or write
  - Admin could/should read back “all clear”

- **L1 Qualifiers**
  - how to process this event
  - probably needs to get in FIFO

- **L1 Accept number**
  - enough to be sure event synched

- **L2 accept/reject info?**
  - probably NOT needed if
    - Administrator in full control of L3 readout
    - L3 readout only from alphas, not SLIC
Classic SFO

- Special Card
  made of blocks from MBT design
  Fan out via Cypress
  SCL Initialize via VME

- DECIDE: MBT output (Daisy chain OR SFO Lite) are better alternatives
  + uses simple interface (Cypress)
  + naturally FIFO'd for processing of event

- extra card to build just for SLIC crates
- cables running across cards
- ? if needed to steer processing
  treat differently from other inputs
  read first Decide purely an advantage
SFO Lite

- Special Card
  - Receive L1 SCL info via Cypress from MBT
  - Fan out via Cypress
  - SCL Initialize via VME
  + uses simple interface (Cypress)
  + naturally FIFO'd for processing of event
  + simpler than Classic SFO
    (JUST Cypress)
    less engineering, less delay

Decision: a Candidate, with Daisy Chain
- extra card to build just for SLIC crates
- cables running across cards
- extra output on MBT (real estate)
  can be on front
- if fiber, extra input type for SLIC
SFO Lite with Fiber

- Special Card
  - Receive L1 SCL info via Cypress from MBT
    - MBT driver is laser, not LED
  - Fan out passively or by amplifier
  - SCL Initialize via VME
  - uses simple interface (Cypress)
  - naturally FIFO'd for processing of event
  - simpler than SFO Lite
    - (JUST fiber, maybe passive)
    - less engineering, less delay

DECISION: not ruled out, await Cu/Fiber decision

- extra card to build just for SLIC crates
- cables running across cards
- extra output on MBT (real estate)
SFO by backplane bus

- 16b qualifiers
- 1b SCL initialize (?)
- 4b L1 Accept

DECIDE: NO, others more attractive
+ eliminate SFO card
+? Naturally different from other inputs

- more (complex) function on SLIC
- more function on MBT
- MBT MUST be in same crate

J2:
- new source of noise
- custom wiring

OR
- extra front-panel cable bus
- time to negotiate bus protocol
SFO by Cypress daisy chain on SLIC transition card

- Extra output on MBT
- Special input on SLIC for L1 info
- Extra output on SLIC
- SCL Initialize via VME (Administrator)
- **Decision: real option, esp if Cu Cypress**
  - eliminate SFO card
  - no protocol negotiation
  - more function on MBT
  - more function on SLIC (simple: can be all on transition card)
  - connector real estate on both cards
  - more cables running across cards
  - ? time delay for arrival of inputs
SCL Receiver on SLIC

+ eliminate SFO card

- $500 per SLIC for Mezzanine
  20K$ total
- more for extra modules at hub end
- bend SCL protocol even further
- more function on SLIC
  real estate

Decision: NO