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GET System Overview

Shebli Anvar, CEA Irfu

GET Workshop, Caen, France
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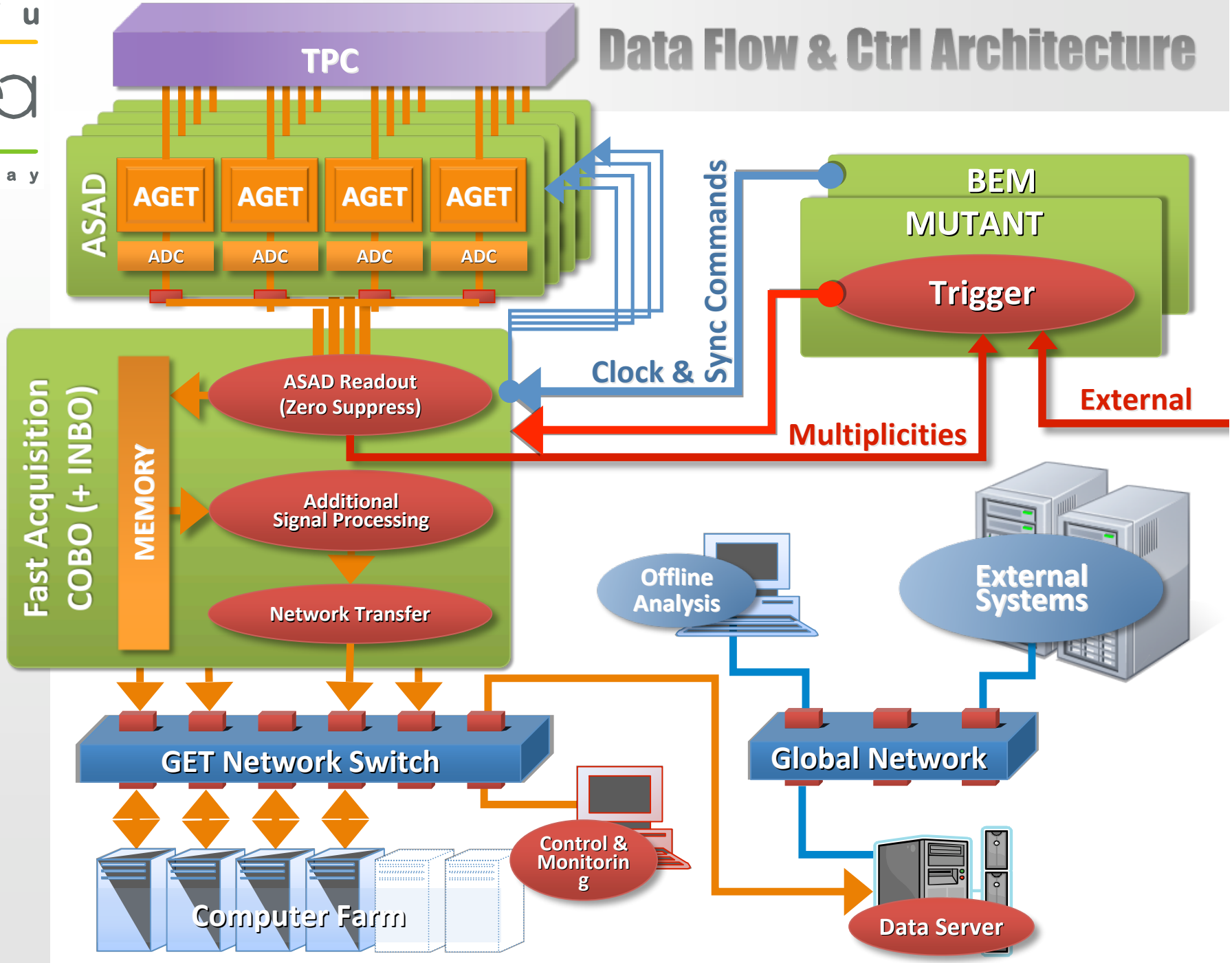
Data Flow & Ctrl Architecture



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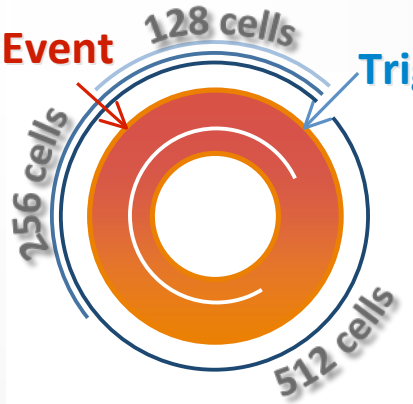
Synchronous Domain



AGET Circular Memory: 10 ns × 512 = 5.12 µs

⇒ L1 trigger roundtrip ≤ 5 µs (smallest case)

- The later the trigger, the more cells to read
- Trigger must be late enough to allow for drift

⇒ Trigger I/O timing: deterministic and configurable

- Clock distribution : 100 MHz, jitter ~1ns
- At least one full precision synchronous « start » necessary
- Timing calibration

⇒ Same infrastructure for synchronous commands?
e.g. trigger I/O, readout, roundtrip timing calibration

\+ integration of clock and trigger I/O cabling

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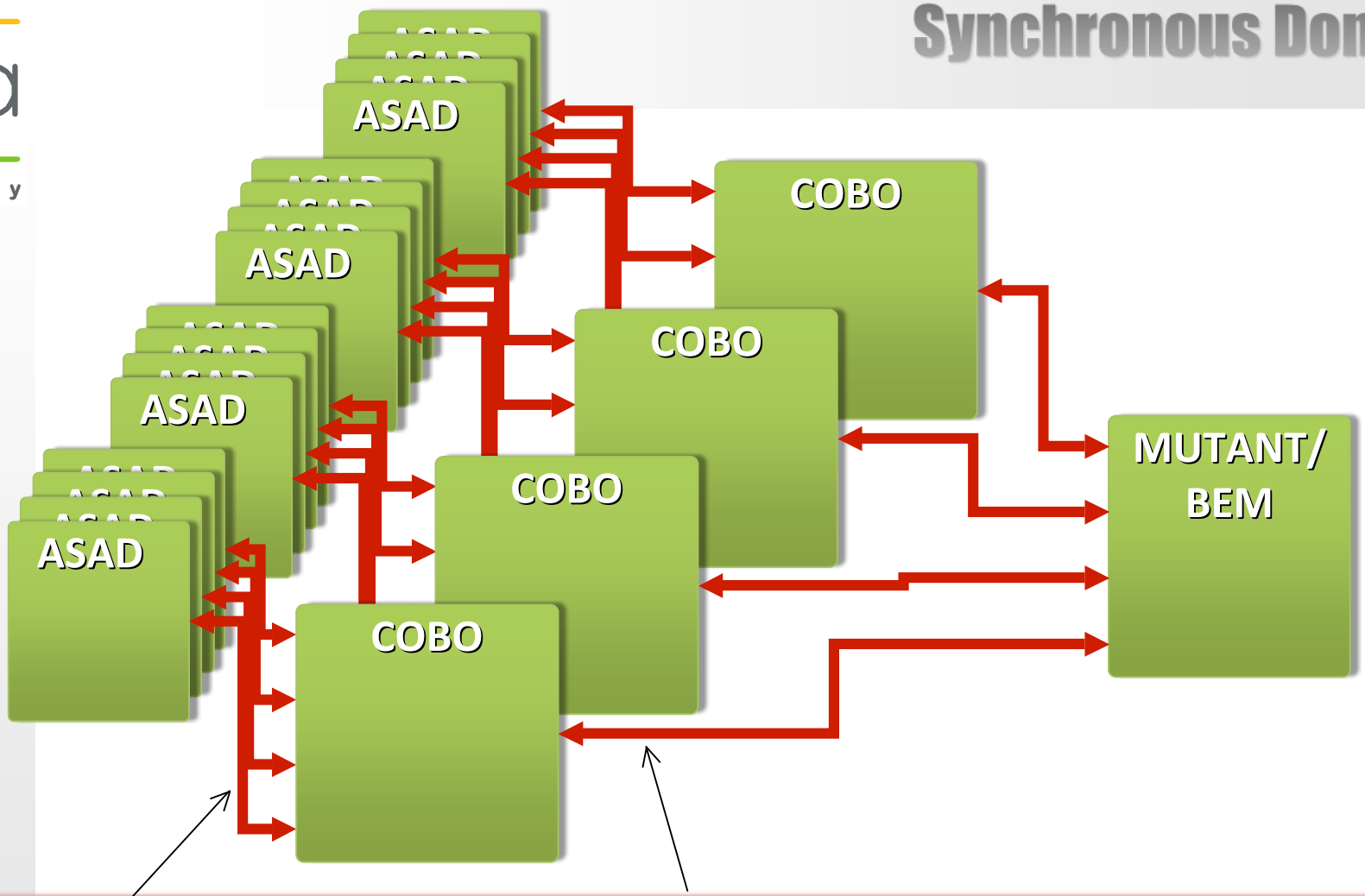
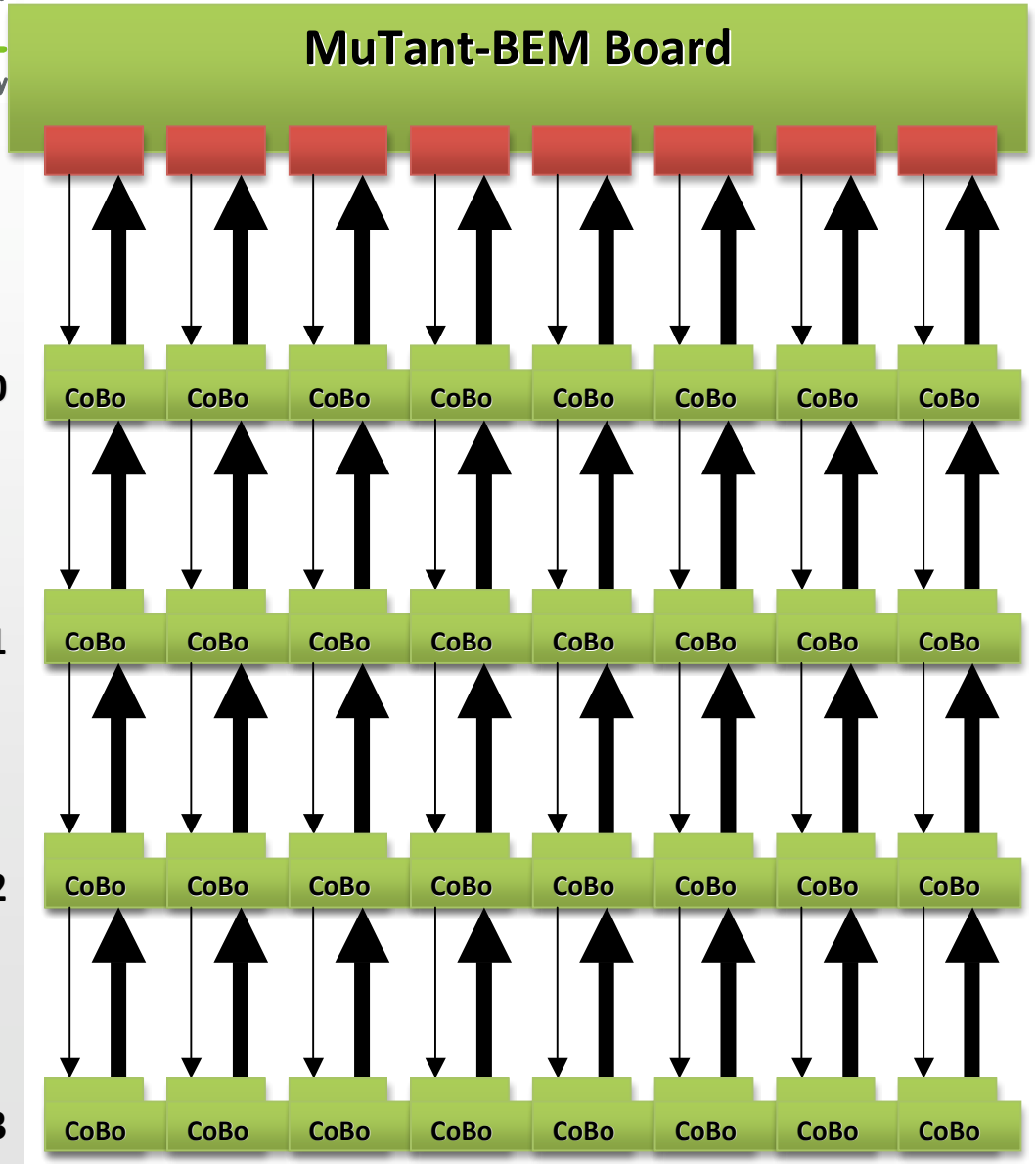
Synchronous Domain

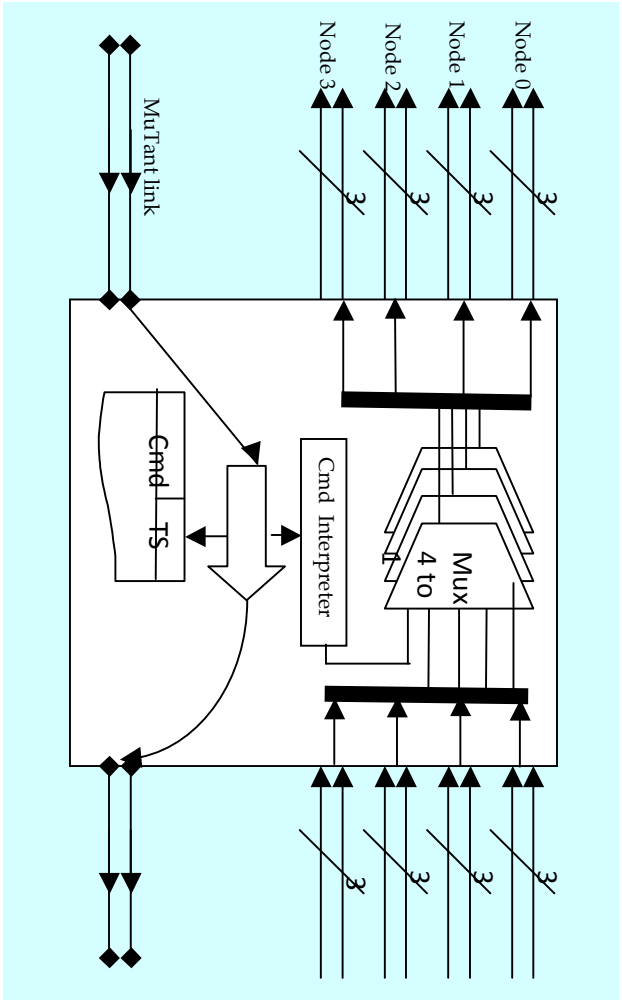


Same infrastructure for clock and trigger I/O

Max number of COBOS: 32 ⇔ 36864 channels
Front panel & crate limits : daisy chaining MUTANTS or COBOs

Synchronous Domain: Daisy-chaining COBOs





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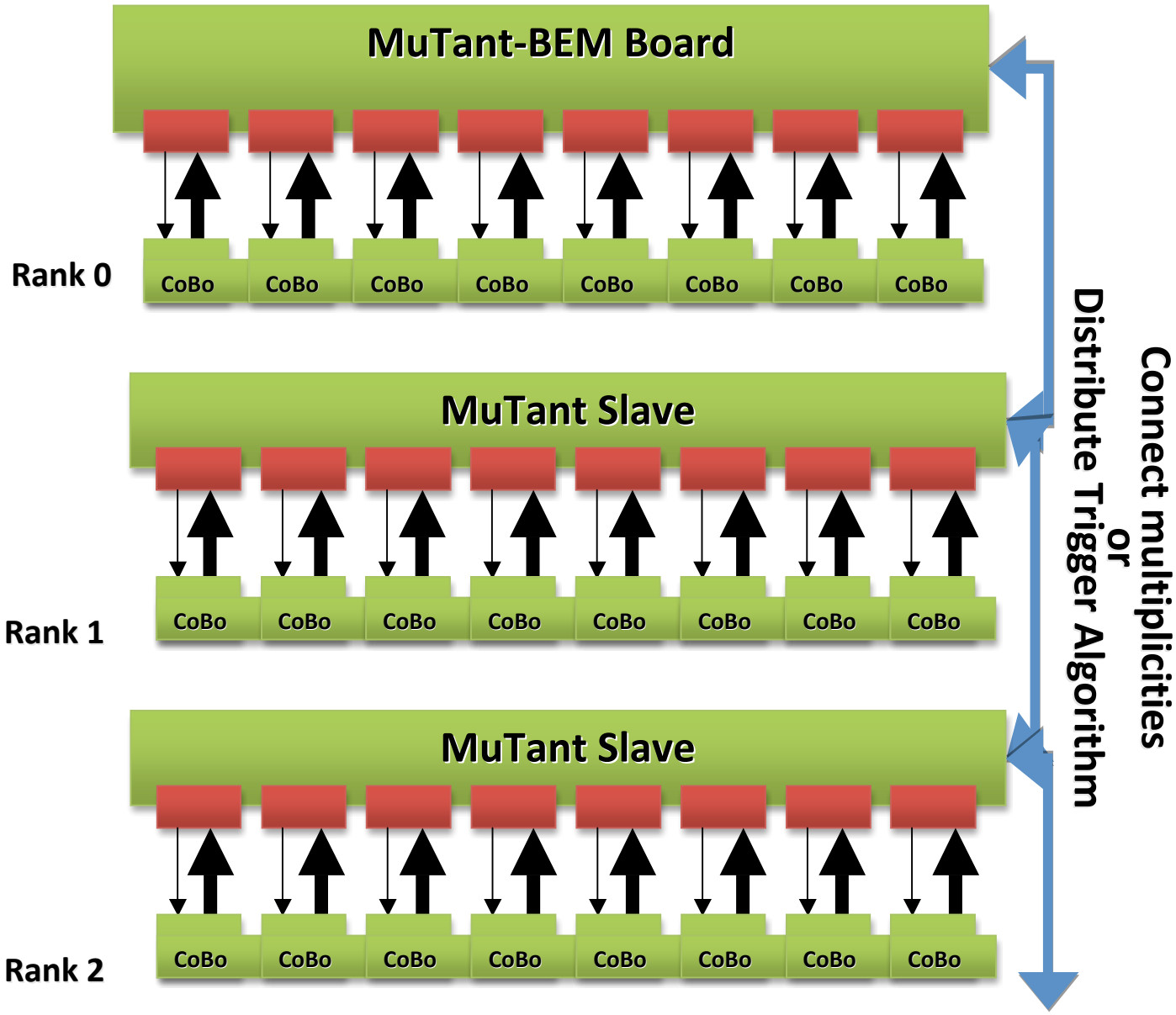
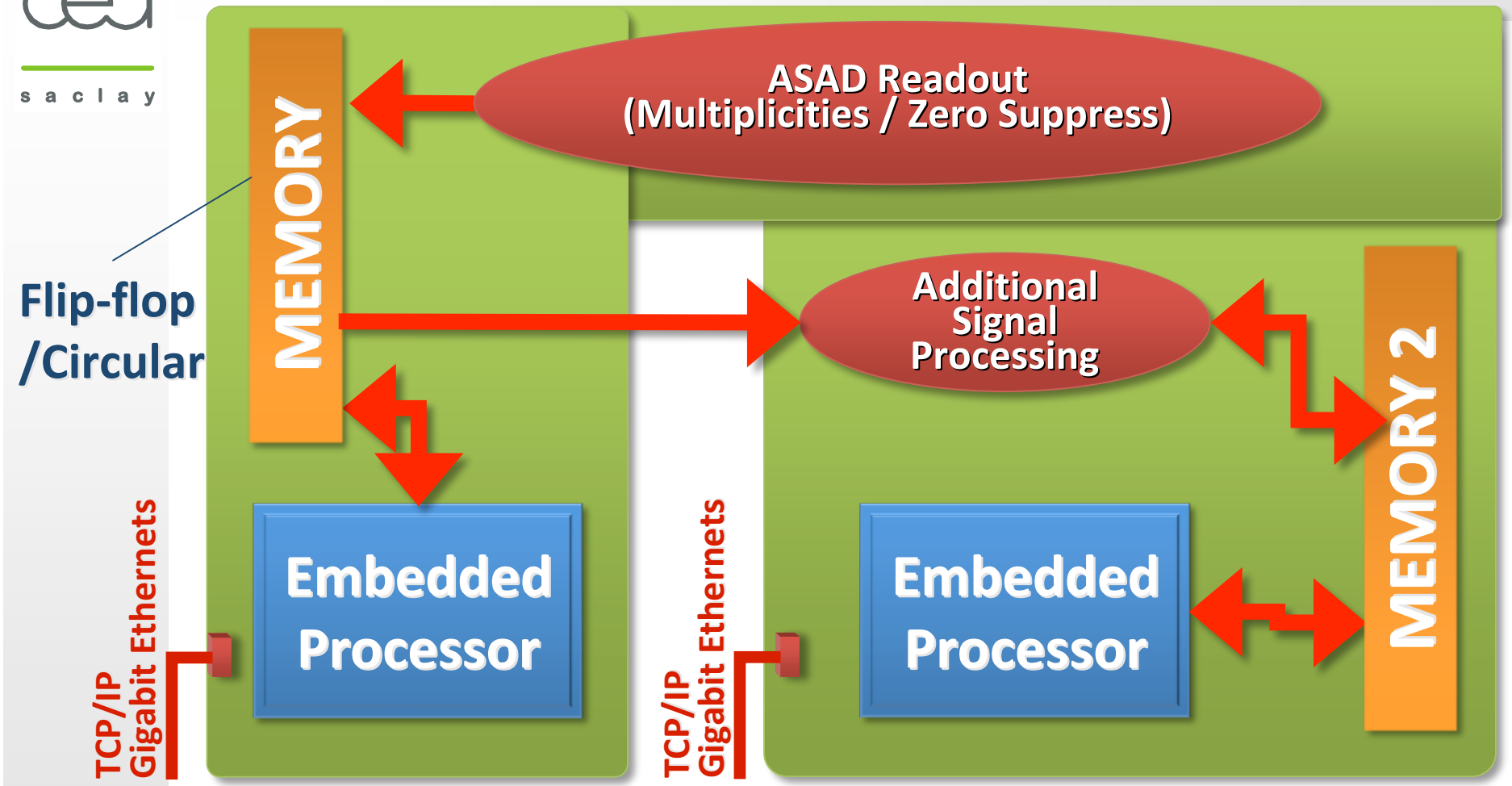
Synchronous Domain: Daisy-chaining MUTANTs

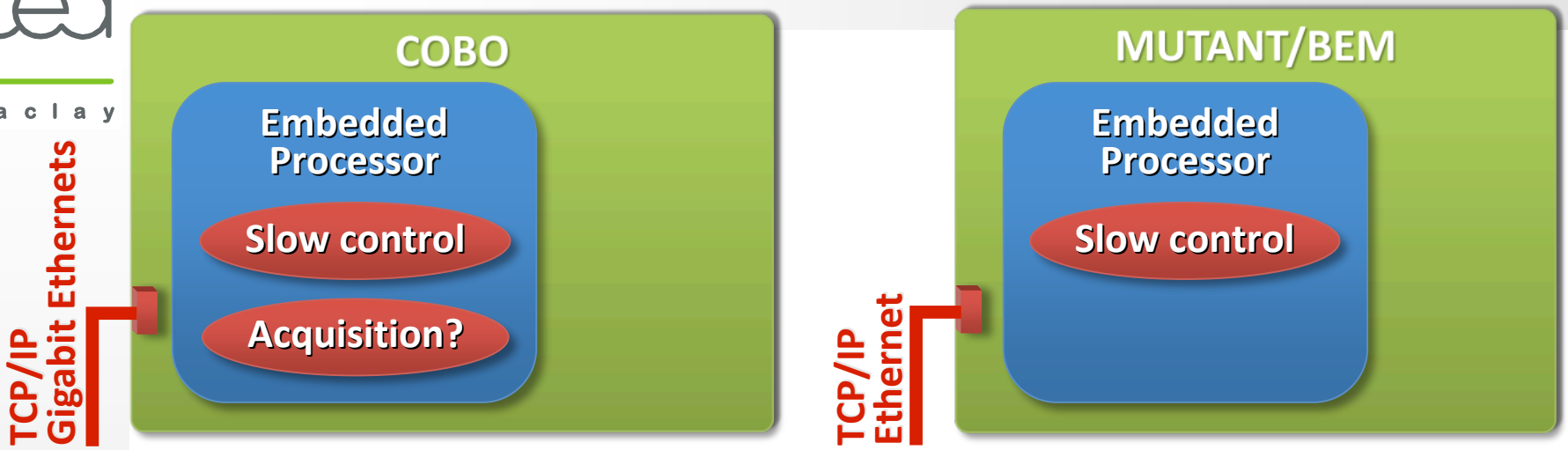


Some Design Alternatives



Memory bus is probably the limiting factor
Consider TCP/IP firmware co-processing, DSP?
→ Modular design for the COBO acquisition subsystem

Embedded Software



- At least for slow control
- Possibly for data acquisition
  (70 MByte/s under VxWorks over embedded processor)
- Choice of operating system
  - Linux
    - « free »
    - « same » as desktop
  - Real-time (VxWorks, RTEMS…)
    - driver development much easier
    - better control through strict prioritization
    - VxWork is not « free » (development licence and runtime)
    - RTEMS is « free »

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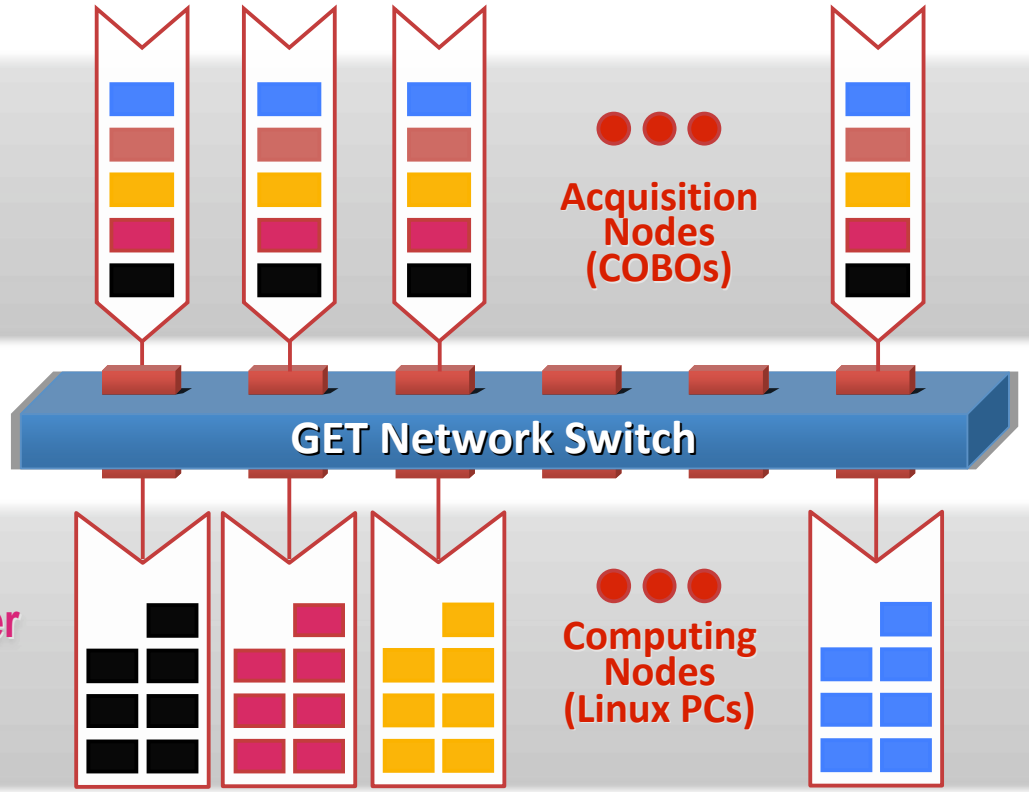
Routing Data over Network According to « Time Slice »

- **Intrinsic parallelism**
  - Relates to detector spread
  - Static configuration
  - High reliability
- **Performance parallelism**
  - Relates to available computing power
  - Dynamic configuration
  - Scalability, lower reliability



Routing baProbablksed on Time stamp / Event number given by MUTANT
→ Some Adapted Data Frame Format (COBO firmware)

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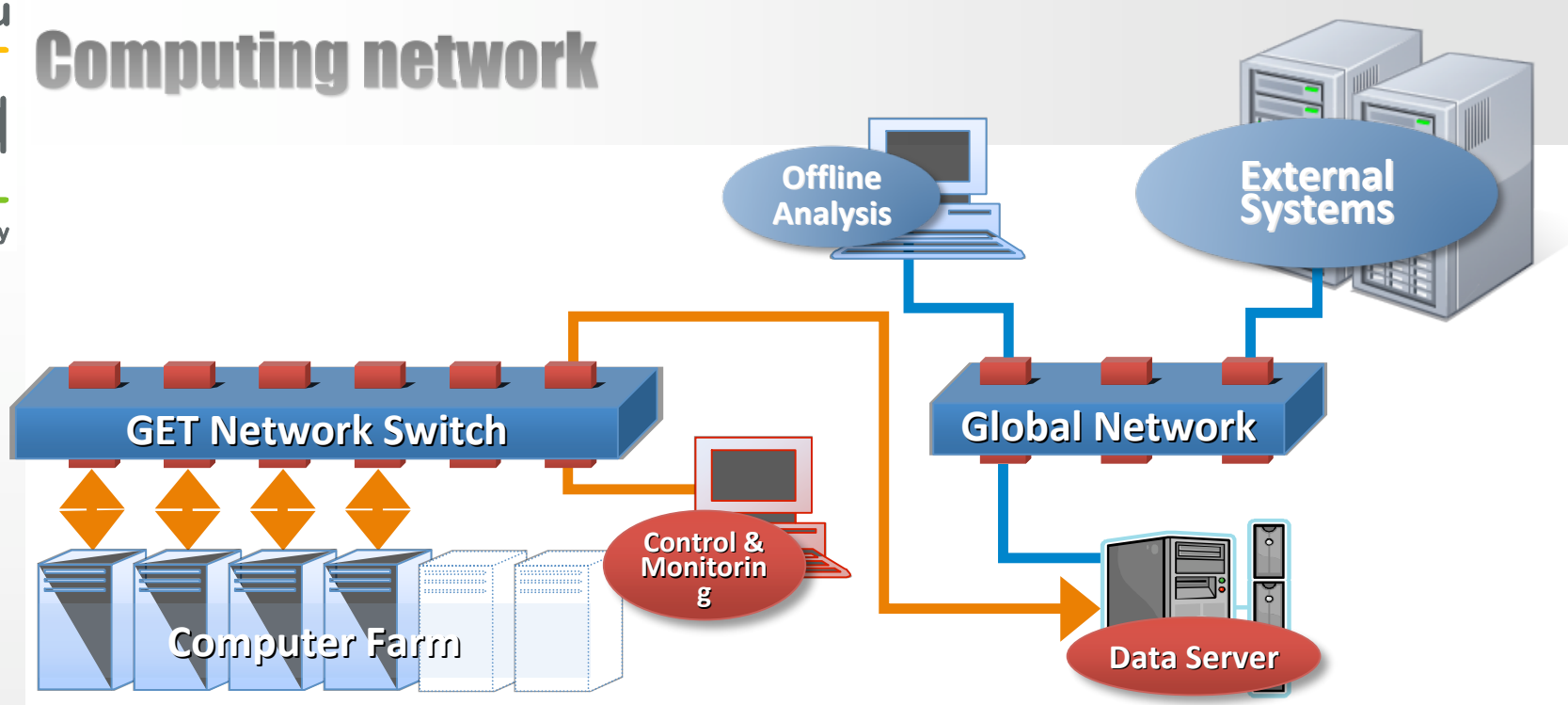
Computing network



- Distributed application
- Adaptable to different detector contexts
- Adaptable to different facility contexts

Use of middleware for distributed applications
Modular components
Deliver libraries (C++ and/or Java) for context integration