

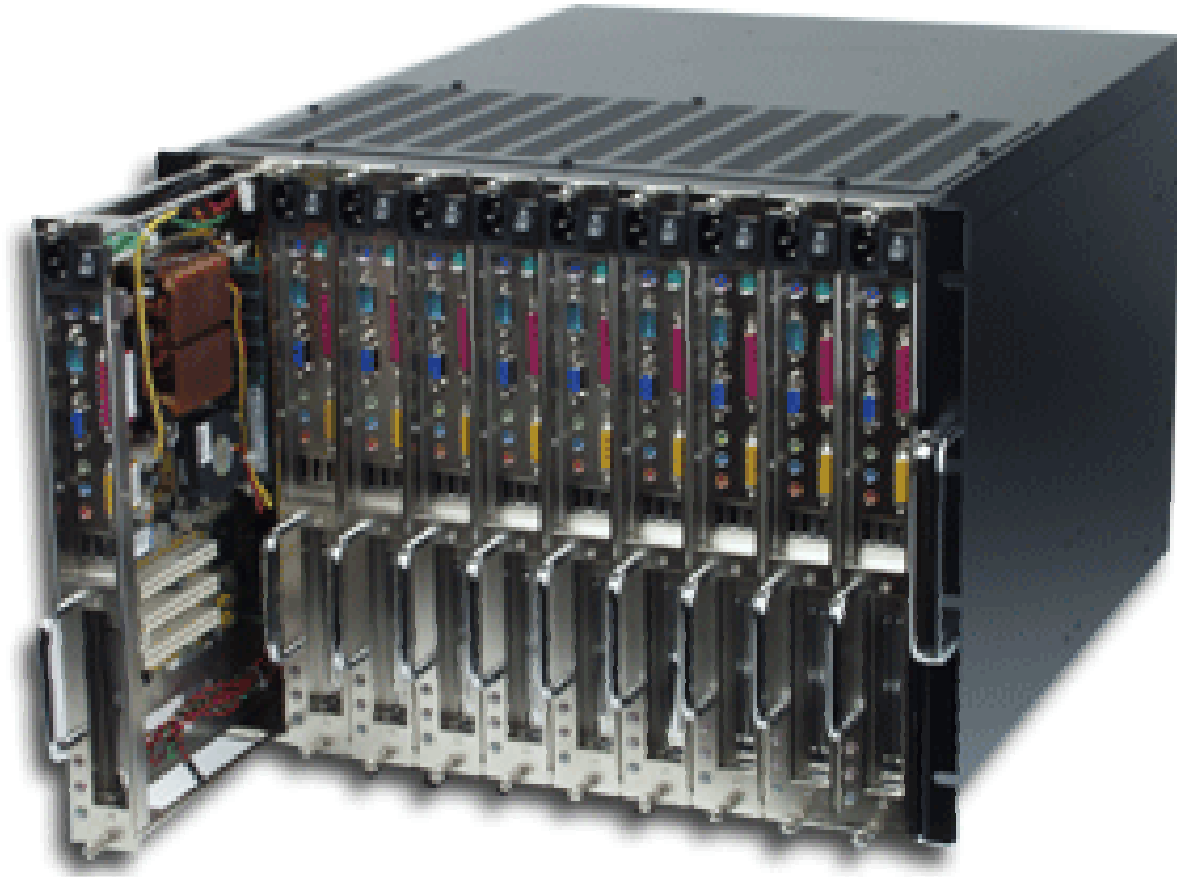
# **CBE configurations; correlator network**

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## Outline

- CBE configurations.
  - Based on some blade server technology...seems to have the highest cost/performance ratio, compared to 1U “pizza boxes” or desk-tops.
  - Several configurations developed for increasing performance...further refinement required when final performance requirements known.
  - Performance based on Martin’s performance tests (~dual-3 GHz Xeon blade to handle full data rate from one Baseline Board—110 kframes/sec).
  - BB-CBE switches: Cisco Catalyst 4948, 48-port wire-speed GigE switch.
  - Must be mindful of total rack power dissipation.
  
- Correlator network.

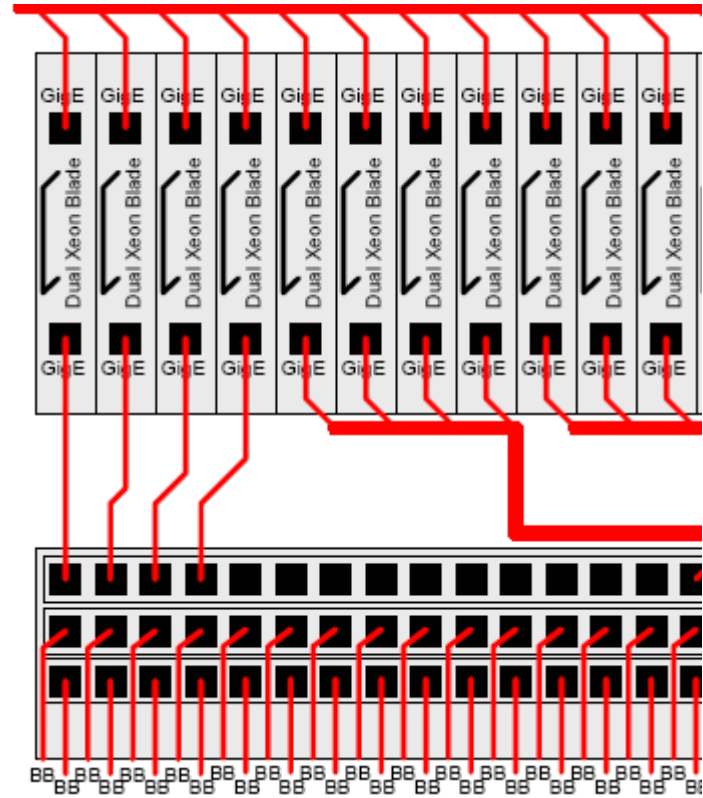
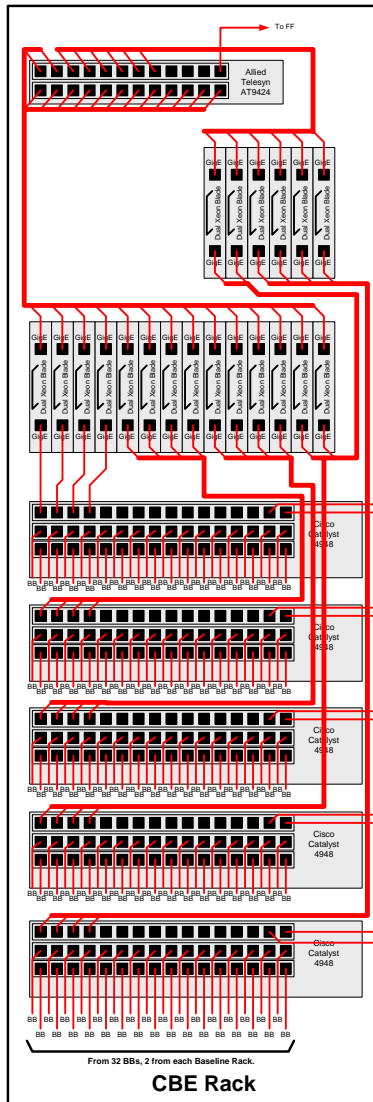




Intel SBXD132,  
2, dual-core  
Xeon CPUs;  
dual GigE ports



# CBE Config #0



# CBE Config #0

## CBE Configuration #0: Minimum Configuration

-1 x 14-blade crate, 1 x 6-blade crate \$XXk ea (each blade: Intel SBX82, with SBCE chassis, 2, 2.8 GHz Xeon CPUs, 2 Gb RAM, dual GigE ports 80 Gb HD)

-5 x 48-port GigE wire-speed switch: Cisco wsc4948s, \$8k ea. (300 W ea)

-1 x 24-port GigE switch: Allied Telesyn 9424, \$1k ea. (100 W ea)

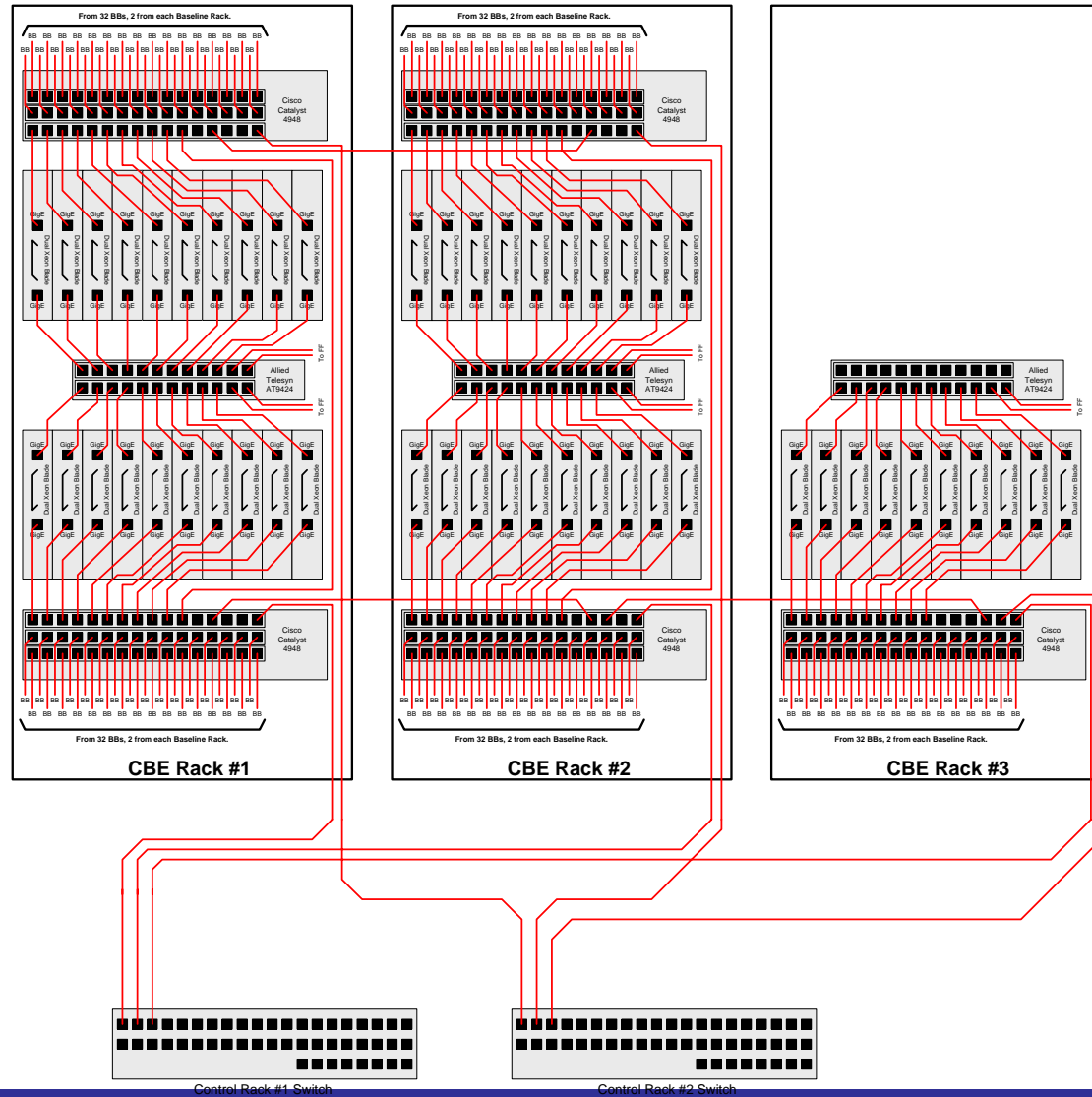
Total CPUs: 40 2.8 GHz Xeon.  
Power per full blade crate: 2.8 kW  
Power per Cisco switch: 300 W  
Power per rack: 5.6 kW  
Voltage input: 208 VAC  
Total system power: 5.6 kW

Minimum sustained correlator H/W integration time into CBE: ~100 msec.  
(based on 2 Xeon CPUs per BB required for 10 msec H/W int time @ full GigE O/P)

Total output data rate to FF: ~80 Mbytes/sec; ~10 Mvis/sec (could be greater, depending on performance of AT9424 switch, or less, depending on lag-processing requirements).

**TOTAL Cost: ~\$xxk USD (likely <\$80k)**

# CBE Config #1



# CBE Config #1

## CBE Configuration #1:

-5 x 10-blade crate: \$15.7k ea (each blade: 2, 2.8 GHz Xeon CPUs, 2 Gb RAM, dual GigE ports 80 Gb HD, 300W)

-5 x 48-port GigE wire-speed switch: Cisco wsc4948s, \$8k ea. (300 W)

-3 x 24-port GigE switch: Allied Telesyn 9424, \$1k ea. (100 W)

Total CPUs: 100 2.8 GHz Xeon.  
Power per blade crate: ~3kW  
Power per Cisco switch: 300 W  
Power per rack: ~6.7 kW  
Voltage input: 208 VAC  
Total system power: ~16.8 kW(?)

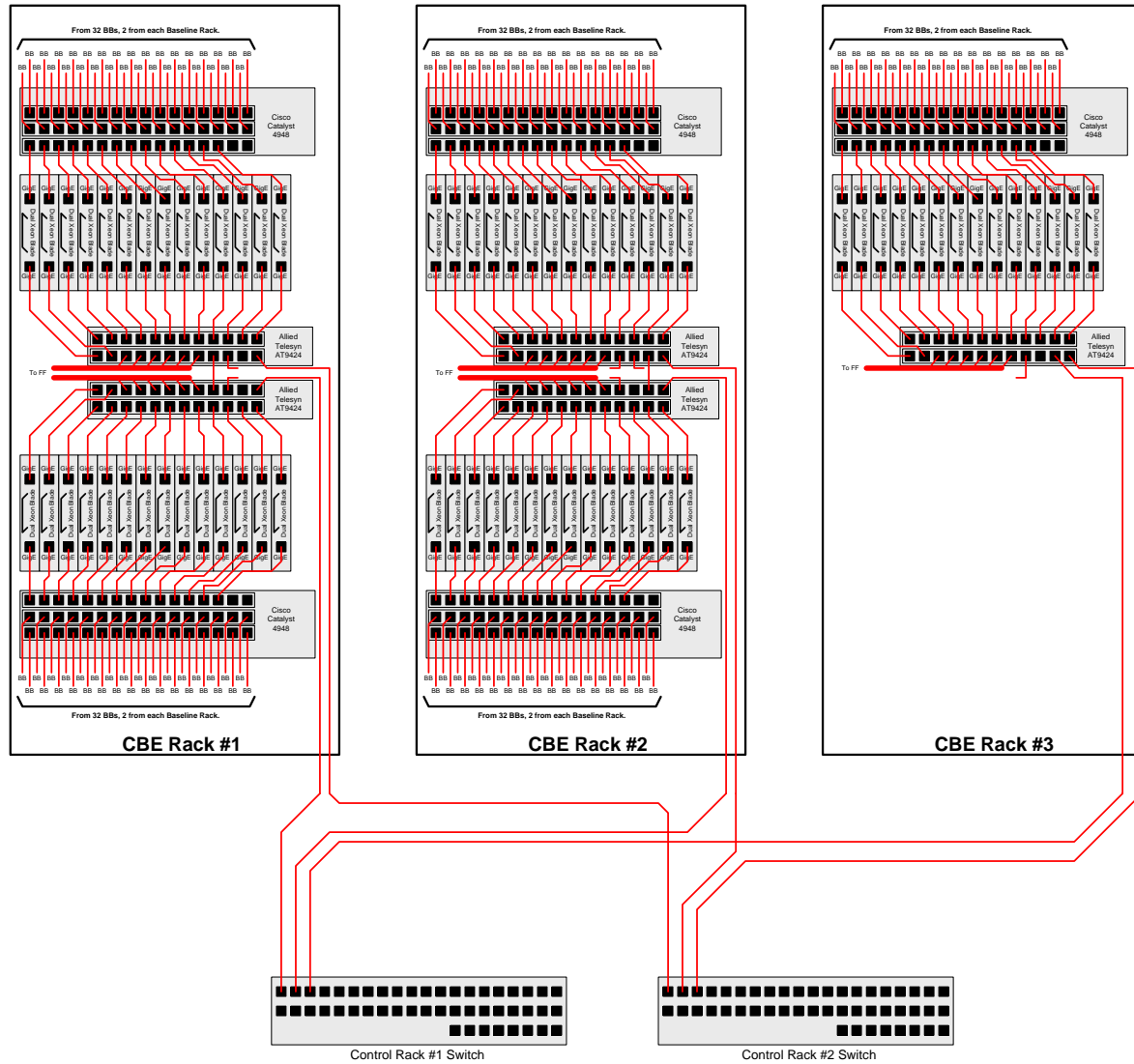
Minimum sustained correlator H/W integration time into CBE: ~30 msec.  
(based on 2 Xeon CPUs per BB required for 10 msec H/W int time @ full GigE O/P)

Total output data rate to FF: ~100 Mbytes/sec; ~12.5 Mvis/sec (could be greater, depending on performance of AT9424 switch, or less, depending on lag-processing requirements).

**TOTAL Cost: ~\$122k USD**



# CBE Config #1a



# CBE Config #1a

## CBE Configuration #1a:

-5 x 14-blade crate: \$XXk ea (each blade: Intel SBX82, with SBCE chassis, 2, 2.8 GHz Xeon CPUs, 2 Gb RAM, dual GigE ports 80 Gb HD)

-5 x 48-port GigE wire-speed switch: Cisco wsc4948s, \$8k ea. (300 W ea)

-5 x 24-port GigE switch: Allied Telesyn 9424, \$1k ea. (100 W ea)

Total CPUs: 140 2.8 GHz Xeon.

Power per blade crate: 2.8kW

Power per Cisco switch: 300 W

Power per rack: 6.4 kW

Voltage input: 208 VAC

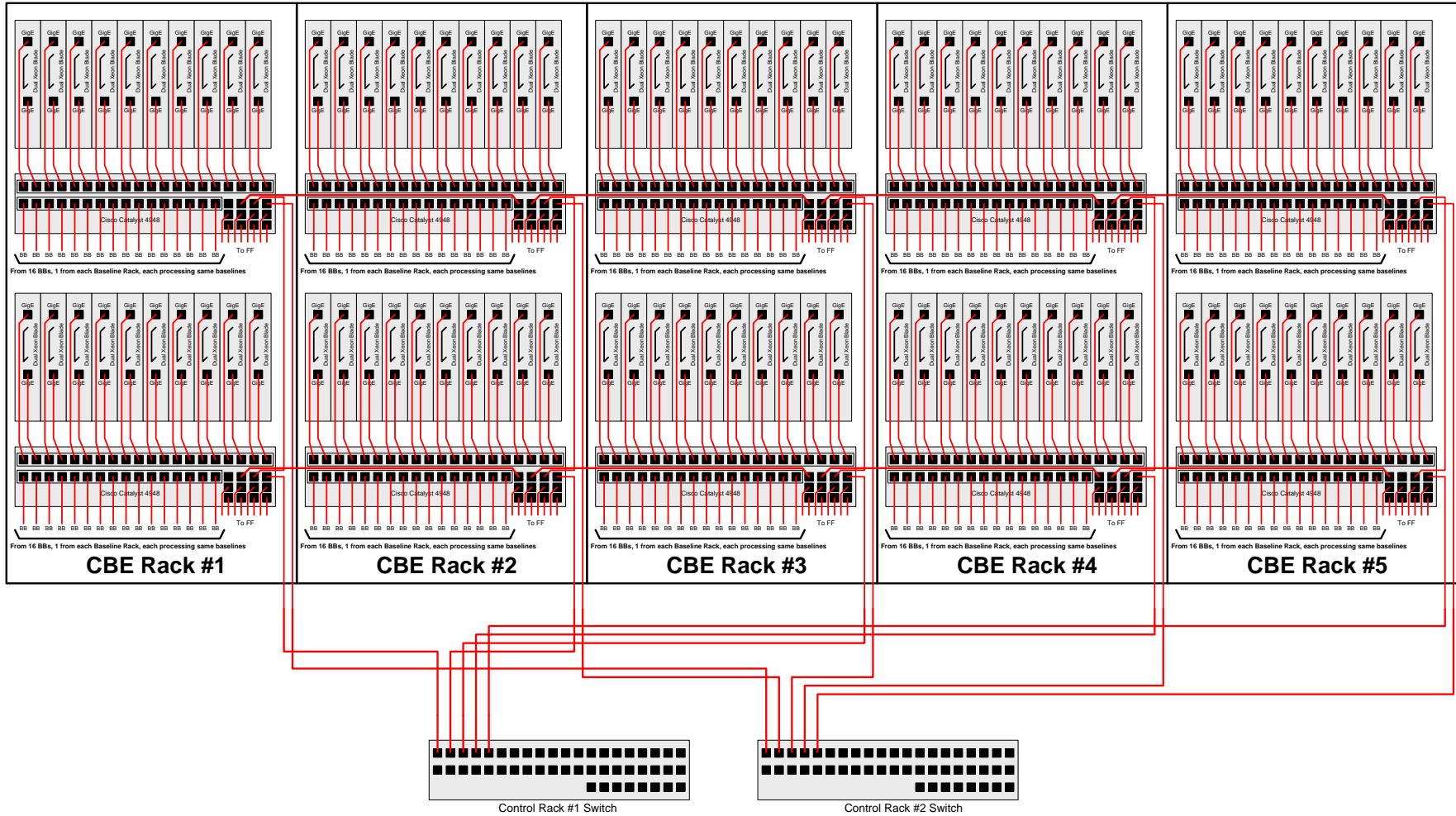
Total system power: 16 kW

Minimum sustained correlator H/W integration time into CBE: ~25 msec.  
(based on 2 Xeon CPUs per BB required for 10 msec H/W int time @ full GigE O/P)

Total output data rate to FF: ~300 Mbytes/sec; ~37.5 Mvis/sec (could be greater, depending on performance of AT9424 switch, or less, depending on lag-processing requirements).

**TOTAL Cost: ~\$xxk USD**

# CBE Config #2



## CBE Config #2

### CBE Configuration #2:

-10 x 10-blade crate: \$15.7k ea (each blade: 2, 2.8 GHz Xeon CPUs, 2 Gb RAM, dual GigE ports 80 Gb HD, 300 W)

-10 x 48-port GigE wire-speed switch: Cisco wsc4948s, \$8k ea. (300 W ea)

Total CPUs: 200 2.8 GHz Xeon.

Power per blade crate: 3 kW

Power per Cisco switch: 300 W

Power per rack: 6.6 kW

Voltage input: 208 VAC

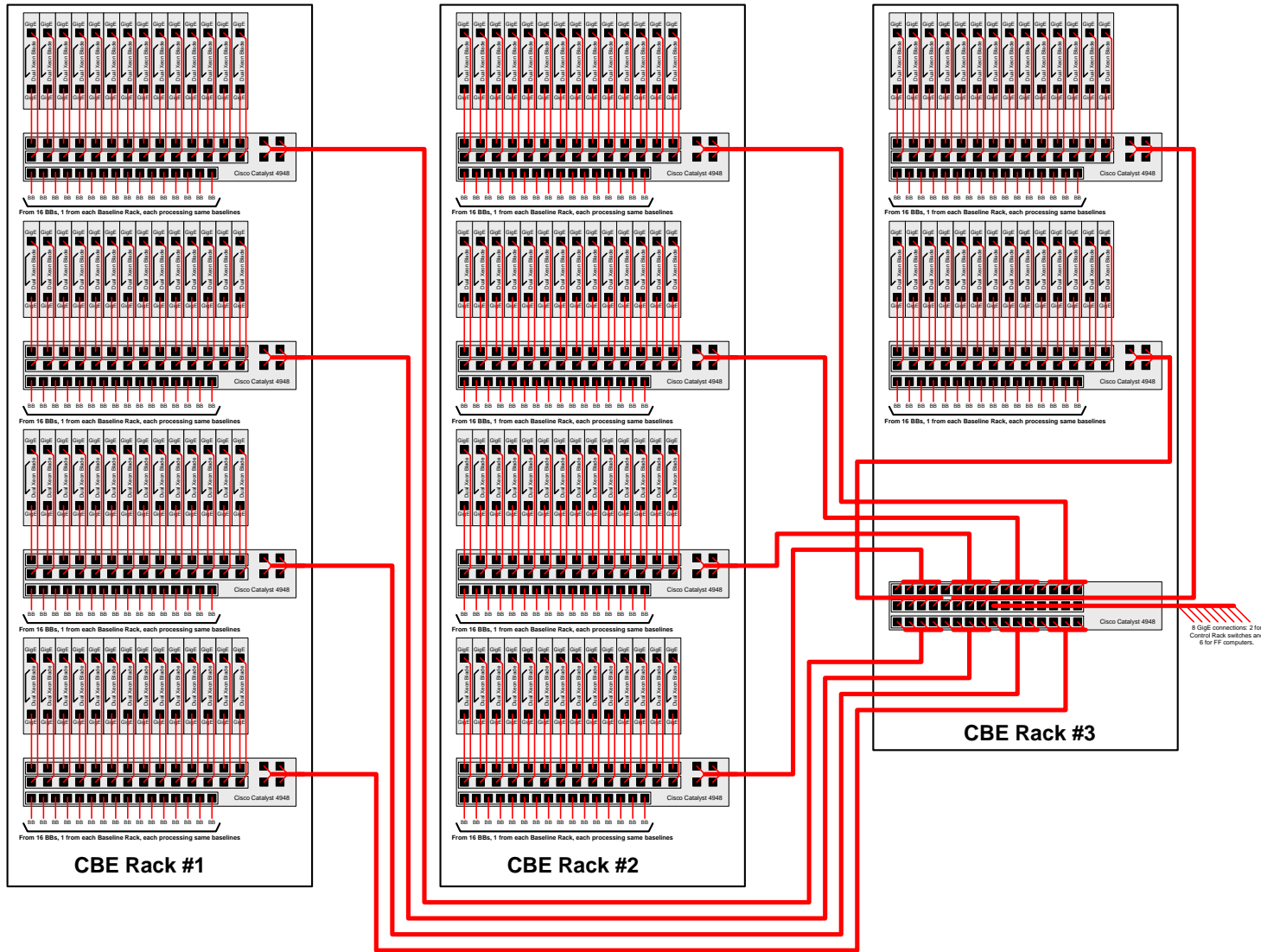
Total system power: 33 kW

Minimum sustained correlator H/W integration time into CBE: ~16 msec  
(based on 2 Xeon CPUs per BB required for 10 msec H/W int time @ full GigE O/P)

Total output data rate to FF: ~8 Gbytes/sec; ~1 Gvis/sec (could be less depending on lag-processing requirements).

**TOTAL Cost: \$237k USD**

# CBE Config #3



## CBE Config #3

### CBE Configuration #3:

-10 x 14-blade crate: \$XXk ea (each blade: Intel SBX82, with SBCE chassis, 2, 2.8 GHz Xeon CPUs, 2 Gb RAM, dual GigE ports 80 Gb HD)

-11 x 48-port GigE wire-speed switch: Cisco wsc4948s, \$8k ea. (300 W ea)

Total CPUs: 280 2.8 GHz Xeon.  
Power per blade crate: 2.8 kW  
Power per Cisco switch: 300 W  
Power per rack: 12.4 kW  
Voltage input: 208 VAC  
Total system power: 31.3 kW

Minimum sustained correlator H/W integration time into CBE: ~12 msec.  
(based on 2 Xeon CPUs per BB required for 10 msec H/W int time @ full GigE O/P)

Total output data rate: 600 Mbytes/sec; 75 Mvis/sec (could be less, depending on lag-processing requirements). 2 Gbytes/sec possible without final Cisco switch.

Note: likely have to distribute hardware across 5 racks.

**TOTAL Cost: \$xxk USD**

## Correlator Network

- Dual GigE M&C lines to each rack to support Control Rack switch and CPU redundancy.
  - Within rack, M&C from switch to each CMIB is 100 Mbps Ethernet.
- Dedicated Station rack GigE to FF.
- GigE from each Baseline Board to CBE.

CBE Configuration #1

