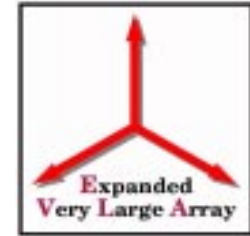


Correlator Backend Computing

Bruce Rowen
EVLA Computing



Correlator Backend Computing



WIDAR Correlator

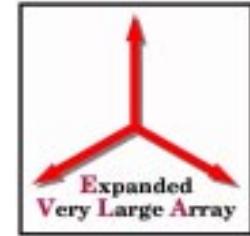
- 160 data pipes from the baseline boards
- Potential for > 1 gigabyte per second data rate per pipe
- Hardware performance is “fixed” upon delivery

Backend Computer Configuration

- Probably a loosely coupled cluster to handle data rates
- Use COTS computers to reduce costs
- Keep hardware upgrade path flexible to adapt to new technologies



Correlator Backend Computing

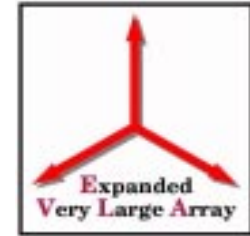


Goals

- Decouple backend computing from the correlator hardware
- Design correlator data pipes with future COTS systems in mind and build for best data rates
- Provide ability to direct data pipes into arbitrary backend computing topology
- Design backend computing topology with near real time self healing capability



Correlator Backend Computing

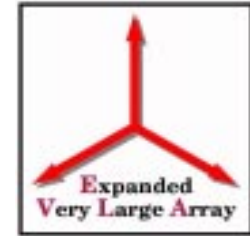


Correlator Hardware Decoupling

- Use industry standard protocols and media
 - Fast, Gigabit, and 10 Gigabit Ethernet, InfiniBand, SONET
 - Fiber Optics, Copper,
- Have ability to tailor protocol as back end computing scales with technology
 - Use Fast Ethernet until cost of Gigabit Ethernet hardware becomes affordable
 - Use parallel data pipes or single firehose to scale data rates.
 - “Wrap” data frames so data can be sent in packets (i.e. UDP packets)
- Allow for hardware design to be “set” now and allow backend computing hardware decisions to be deferred until later



Correlator Backend Computing



Backend Computing Topology

- Use packet switching devices so arbitrary data flow connects can be made
- Have computer “hot spares” available for alternative parallel data processing and near real time swapping with failed systems
- Allow arbitrary paths for data dumping to short term storage (disks), long term storage (archive), or real time image pipelines (or all three).
- Upgrade hardware as new technology becomes available or data rate needs increase
- Allow for a small number of high speed computers or a large number of “throw-away” computers (or both)



Correlator Backend Computing

