Hi Bill:

> Food for thought (as opposed to thoughts of food) over the
> Thanksgiving weekend - 240 computers accepting data from the
> correlator baseline boards just doesn't seem workable. Some
> percentage of the computers would always be down, out-of-synch
> or some such problem. Is there any way to reduce the number ?
> Some scheme for "steering" the data from the LTAs ? Some of
> our thoughts re the backend interface go in that direction,
> i.e. the possibility of onboard PPMC cards using an interface
> that is switchable, but we're not "there" yet.

I have been working on refined (i.e. more detailed) architecture
diagrams for the 3 main boards in the correlator (Station, Baseline,
Phasing Boards). I have produced two sets of drawings...a) one set with
an FPDP interface and no processor on the board, and b) one set with a
PPMC card and a Gbit FibreChannel interface.

Here's my current thoughts on the backend for both scenarios.

a) (FPDP interface). Commercial PC backends with multiple FPDP PCI
cards in each PC. So, each PC can handle ~4 boards for a total of ~100
PCs (at $2k each = $200k). Is 100 networked PCs a problem? I don't
know...I've heard of Beowulf clusters that are bigger...and how many
millions of people use cheap and dirty PCs everyday? Except for the
Gates-OS, they don't break down all the time. We have a Beowulf cluster
here consisting of 16 commercial dual-Pentium 450 machines running Linux
which runs like snot all the time. The only time it breaks down is when
Willis does things like chews up all system memory or hammers it with
some bizarre "DRAMA-ism". What happens when one PC does crash? Tony
Willis says that the system should be able to be configured so that if a
PC crashes, then only it must be rebooted (or, if it fails, only it has
to be replaced without touching or affecting the others). So, in this
case, we would lose an antenna or 4 Baseline Boards until the affected
PC is replaced. Because of FPDP cable length limitations, this would
probably have to be a rack-mount PC (although there are cost and
ease-of-replacement advantages to a desk-top if a suitable installation
configuration could be devised).

a).1. In each correlator rack exists a CompactPCI rack (or two). In
each one, a minimum of 1 CPU and maybe more depending on performance
requirements. This CompactPCI rack contains multiple FPDP interface

boards (presumably one for each correlator board). A FiberChannel
network card in the CompactPCI rack is the gateway for data to the
outside world. I'm looking at Motorola CompactPCI cards and I'm going
to price out this option. The system performance can be upgraded by
replacing CPU cards and/or adding more CPU cards.

b) All of the real/quasi-real time processing is done by the PPMC
cards. They write data to big network drives via network switches.
Image processing/archiving machines access these drives via the network
switches as well. To replace the PPMC cards (i.e. for upgrade) requires
pulling each correlator board out, popping out the old, and installing
the new. It may be difficult to get an affordable PPMC card with
FibreChannel. The latest soon-to-be-released Motorola PPMC card (which
has tons of performance, memory etc -- the PrPMC800) has a 100 Mbit
Ethernet interface and sells for ~$1700 (x 400 boards = $680k). Still,
100 Mbit Ethernet is 2.4 Gbytes/sec system wide. FibreChannel would
provide 24 Gbytes/sec system wide.

>   The ALMA correlator has some sort of steering that _may_
> address this issue. The data converges onto a total of 16
> backend interface ports. I will try to get additional
> information.

Ok, but I'm still going on the premise that we want the correlator to
have a wide data pipeline going out and only the backend CPU H.P. limits
its performance. In that case, option a) is probably the best. Also, I
don't think there data handling requirements (after the LTA) are as
severe because of dump times and fewer spectral channels.

>   Is Thanksgiving a Canadian holiday ? If yes, have a happy
> one. (I will be out of the office Thur & Fri, 11/23-24.)

We have thanksgiving in October...by the end of November, its pretty
much winter conditions in Canada (except where we are...the snow usually
doesn't show up until Xmax...if at all).

I'll see you in December and we can talk about the back-end some more.

Have a good one!

Brent.