

## ToDo (9/03/02)

### Items identified by CosyLab review:

#### General design issues:

- Make a “family” container for magnets on a common power supply, so magnets can know their siblings etc.. This “container” class will be separate from the main accelerator tree structure. The bulksuite may be obviated with this construct.
- Create a “lattice-view” space for the probe-algorithm optics calculations to take place in. This new view is another edit-context built off of the static machine data-graph. Multiple lattice views per accelerator should be possible.

#### Other changes”

- check node types for naming uniformity. Also – do we even need H & V quads???
- Add static constants interface
- Make predefined sets of common group actions (e.g. get all xAvg for set of BPMs)
- Need to add status field for PV’s (not in our channel adaptor now)
- Need to connect our device “status” to a monitor/database? (it is dangling now).
- Construct predefined sets of commonly used device sets, instead of making these collections at run time (priority?)
- Make a “virtual accelerator” out of probe algorithm model (priority?)
- Use a sorted list for the nodes (do this at the xml parse) to ensure proper order by position.
- Break up xal structure into separate jar files by functionality

### Lattice Generation

Data adaptor tool for lattice file generation form the data graph. The drifts will be added in this adaptor, or in the probe (if adaptor is not used). This is part of the lattice-view architecture. Start with Trace-3D

### Sequences

Have sequence level helper methods for group actions on impl types. E.g. get the average horizontal position for all bpms in a sequence.

### Value Added Service(s)

Incorporate client/server based messaging. Some examples would eventually be model servers, a BPM orbit server (see below) that each application would go to for information, rather than each app repeating tasks. The first use was thought to be an xml server (can’t remember exactly what this was going to do – tell what xml file was used, and whether the machine has changed since the data-graph was invoked?)

### Links to other software

The idea is to see whether we can provide a link to Matlab tools somehow. Also look into using Numerical python, plotting etc....

## Probe / Algorithm Model

Continue the development of the probe / algorithm architecture for the online modeling. Probes could be something like an envelope, or a collection of macro-particles. The algorithm is the method to advance the probe throughout the machine (e.g. transfer matrix)... – *Chris/ Nick*

- Set algorithm up from machine data (vs. design data).
- Use “LatticeView” or composite nodes?
- Provide fresh TM between any 2 nodes

## Database

There is a continual need to update information in the database and to be able to parse it into the xml file (with the xal data-graph hierarchy). This will evolve as new sequence types are defined. – Paul, John

## New Apps

Xal structure:

- Re-write MEBT apps for setting RF and quads for (Sasha’s stuff)
- Write a DTL phase setting app (work with Dong-O)
- 3-bump , 4-bump correction app
- Beam-based alignment (twiddle quads and look at downstream bpms + reconstruct beam position in quad).

General purpose app

- Histogram application: open monitor on a PV, build up histogram and display stripchart of histogram statistics (mean, sigma).

## Node Implementations

- Timing (new)
  - E.g., macro-pulse length, chopper waveform, etc.
  - Attributes of Accelerator?
- Wire-scanner
  - Check with diagnostics for features such as profile fits etc.
  - Also check PVs

## Archiving / Save-restore

- Figure out how to use ChannelManager save / restore with BURT. Issues related to saving other stuff not related to xal
- More/expanded attribute sets (diagnostic output, TBT data, etc.) (wait for edit context)
- Use XML
- Store application settings (e.g. which algorithm used – how many pulses were averaged over, etc.)
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## Plotting / GUI / Etc.

- Lattice plot with “marks” for different Node implementation types

## Misc.

- Add model energy, Emittance to a node attribute set & database
- Polarity check
- GetNode(“nodeName”)
- Versioning
  - o Xal source (version ??)
  - o Xml data
  - o Xml structure
- Make a table of the possible choices for node types + qualifiers (magnets, dhc, bpm, ...)
- Channel “settable” attribute setting in xal vs. database?
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## Specific Changes to Apps:

### X-Y Correlator:

- Input for buffer length
- Threshold for a third variable.
- Turn autoscale on/off
- Option to just use points (no lines)

### Orbit Difference

- Legend for curves (red/blue)
- Use dots for BPMs (not lines)
- Show aperture
- How to compare with an old orbit (previous day) edit context?
- Show date/time

### XioDiag

- Have pop-up description of components
- Set precision (too many numbers in tables)
- Multiple curves on a single plot
- Incorporate arrays as a function of time
- Save data to file
- (use correlator?)

### Orbit Correction

- Display app settings (e.g. whether virtual accelerator is being used)
- Note – we need to get virtual accelerator to use proper units
- Calibration setting: should this be absolute value, or say fraction of (hi limit – lo limit)
- Emphasize more uniform corrector strengths
- Minimize angles in addition to position for smoother orbits (don't just drop to zero)

- Veto bpms with small signal amplitude
- Correct the orbit in the background (e.g. every 10 minutes)
- Incorporate alignment data into definition of zero
- update the detector/corrector response calibration on the fly