

GM/CA Plans for the Eiger 16M

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GM/CA Detectors

- Two ID lines for MX
- Detectors
 - Pilatus 6M and MAR300
 - Received Eiger X 16M earlier this month
 - First Eiger users in mid-June
- Eiger image consumers
 - JBluIce-EPICS acquisition software contains an integrated viewer
 - SpotFinder for data collection and raster
 - GMCAProc and fast_dp automated processing
 - Need to support XDS, HKL2000, MOSFLM



Rayonix MAR 300



Dectris Pilatus 6M



Dectris Eiger 16M

JBlulce viewer

- Previously we used the SSRL Image Server which loads MAR (TIFF) and CBF images
- Decided to add native image loading to JBluIce
 - Image directory is polled at 2Hz
 - Latest image is loaded as available
 - We are testing various data file sizes from single image to 100/file



JBluIce with integrated HDF5 viewer (in development)



JBluIce viewer plans

- Comparison of HDF5 to the Eiger Monitor
 - Advantages
 - One pipeline can read images during collection and previous images
 - Less load on the DCU
 - No proxy is needed to read images from the Eiger monitor and re-serve them
 - Disadvantages
 - May introduce lag but doesn't seem noticeable
 - Adds a small amount of file system
 usage
 - Requires limiting the number of frames per data file until the Eiger is upgraded with HDF5-1.10 and SWMR support
 - Requires the file system to keep up with collection
- We may still use the Eiger monitor if testing shows it's necessary



SIMPLON reference including Monitor



HDF5 reference

JBluIce: Loading HDF5

- HDF5-1.10 Java library
 - Added LZ4 and bitshuffle plugins
- Image loads into a 32-bit int[] array
 - Referred to for displaying pixel values
- Values are mapped to 24-bit color
 - For now we're mapping to 8-bit grayscale
 - Later, other maps will be added
- Finally, drawImage applies pan and zoom, and writes to the screen-sized buffer



JBluIce Eiger image pipeline



Processing: CBF conversion

- HDF5 files will be converted to CBF for processing software that requires it, using eiger2cbf
- The data directory will be polled, and as data files are available an eiger2cbf process will be started
 - Decision about the number of frames per HDF5 data file will be based on testing



Raster

- Raster operation
 - User sets up 2D grid of cells to take diffraction images at
 - Each row is collected without closing the shutter
 - SpotFinder is run on each image to determine spot count and resolution estimate
- Plans
 - Run SpotFinder on
 8 cores x 4 workstations as before,
 using the Apache server version
 - At most, CBF conversion will need to wait until a row is collected to start, but we may use smaller image counts per data file



JBlulce Raster tab



SpotFinder graph

- A few images per second are processed to assess crystal quality
- Helps to diagnose issues like misalignment or radiation damage
- As data files are converted to CBF, SpotFinder will be run

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JBluIce SpotFinder graph



GMCAProc/fast_dp and XDS

- We are following instructions from the XDSwiki
 - eiger2cbf is listed as a converter which works with XDS
 - We are using the XDS_from_H5.py converter
- We will point XDS to our converted CBF files
 - Unless using H5ToXds is faster
- GMCAProc
 - Minimal other changes are needed
 - Ready to test with our own diffraction images
- fast_dp
 - Awaiting a new version which supports eiger2cbf-converted images

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GMCAProc output in JBlulce

HKL2000 and MOSFLM

 We will test HKL2000 and MOSFLM on converted CBF images





Thanks

<u>GM/CA</u> Sergey Stepanov Oleg Makarov Michael Becker Craig Ogata Ruslan Sanishvili Nagarajan Venugopalan Robert F. Fischetti SpotFinder Nick Sauter

<u>fast_dp</u> Graeme Winter

