

The background is a light blue gradient with several realistic water droplets of various sizes scattered across the surface. The droplets have highlights and shadows, giving them a three-dimensional appearance.

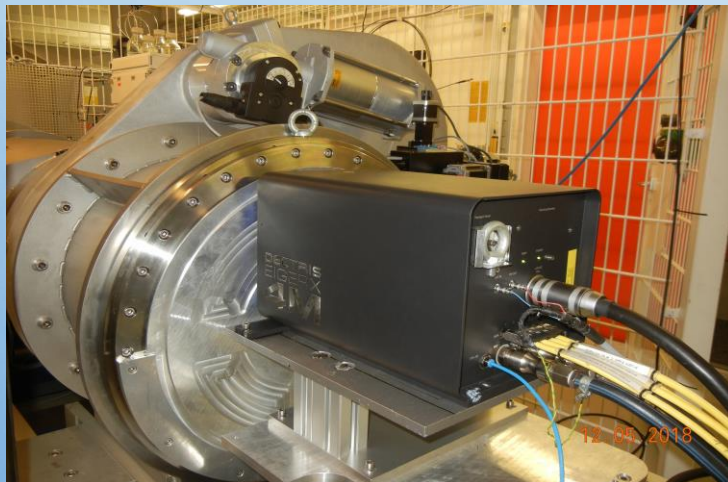
EMBL-HH EIGER INTEGRATION AND DATA HANDLING

STATUS REPORT

Marina Nikolova
December 5, 2018

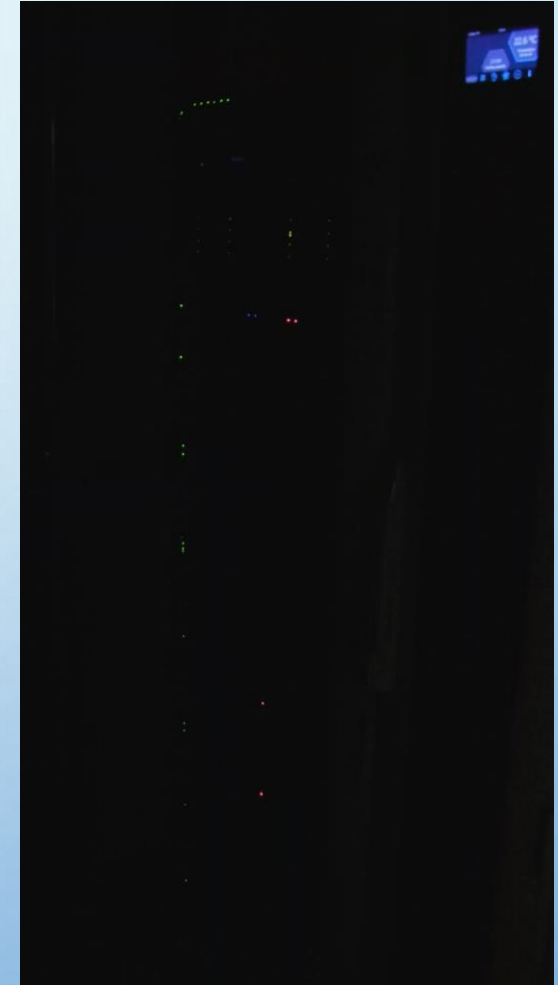
FACILITY SNAPSHOT

- EMBL-HH:
 - 3 Beamlines at PETRA III, DESY campus, Hamburg, DE
 - 4 End Stations
 - New Dedicated Serial Crystallography End Station
 - 2 Eiger Detectors: 16M, 4M



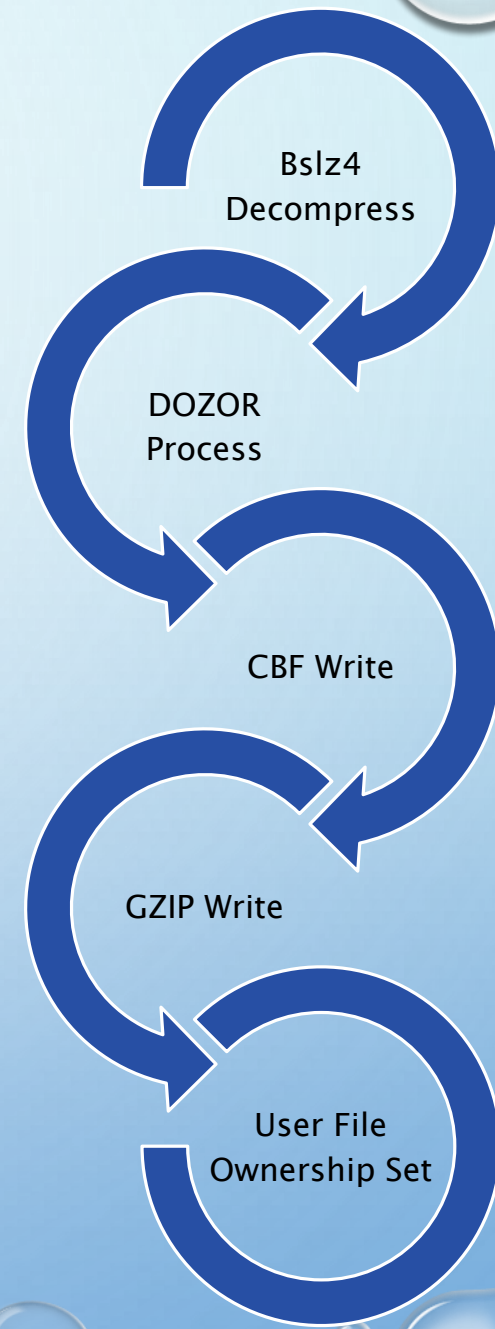
DATA HANDLING

- HDF5 Abolished
- Data Stream
 - MX: cbf (characterizations), gzipped cbf
 - SAXS: compressed tiff
- Processing Programs (CRYSTFEL, T. White, DESY)
 - Trained to use cbf.gz with fast unzip in memory
- Streaming Client Server
 - 16M – 176 Hyper-Threaded DELL Power Edge R830
 - 4M – 72 Hyper-Threaded DELL Power Edge R730xd
- Data Storage
 - Parallel Cluster File System Storage – 1 PB BeeGFS



STREAMING CLIENT: TIOGA

- Tioga: “where it forks”/”swift current”, zmq
- 176 (16M)/72 (4M) stream receiving threads
- 1 InfiniBand + 2 10 Gbit connections
- Fully integrated in Control System – TINE
- “There is no DOZOR anymore. It got swallowed.”
- DOZOR processing via library routines
- No intermediate DOZOR and CBF files – all in memory
- DOZOR results exported every 300ms via TINE
 - Spot Count; DOZOR Score; Resolution Limit
- Max frame rate – over 500 DOZOR processed and written fps
- Max on-the-dozor results: 1,000,000

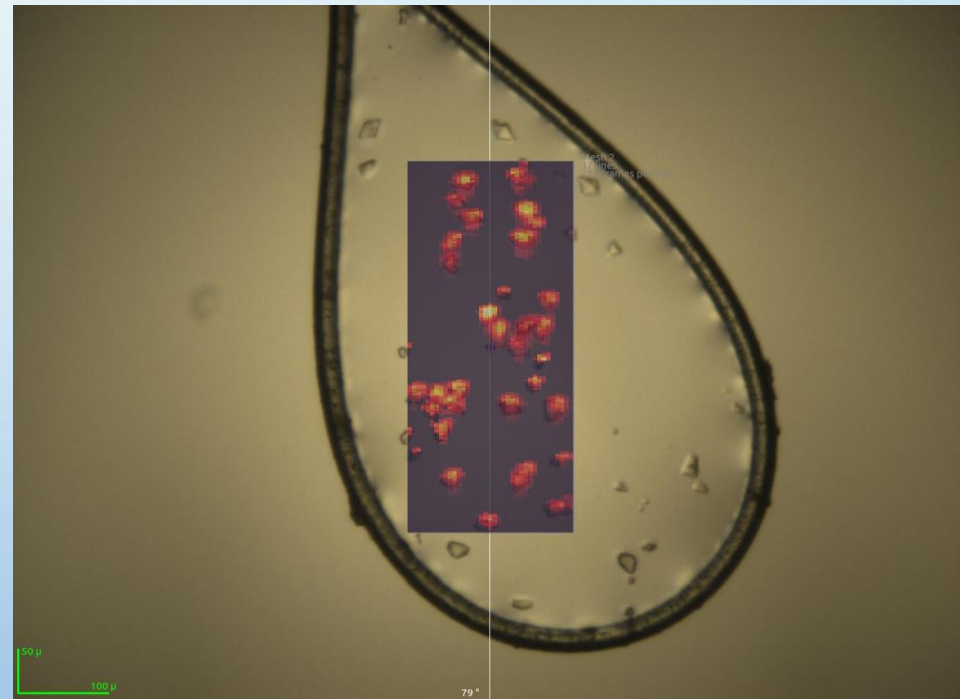


LIVE FRAME DISPLAY

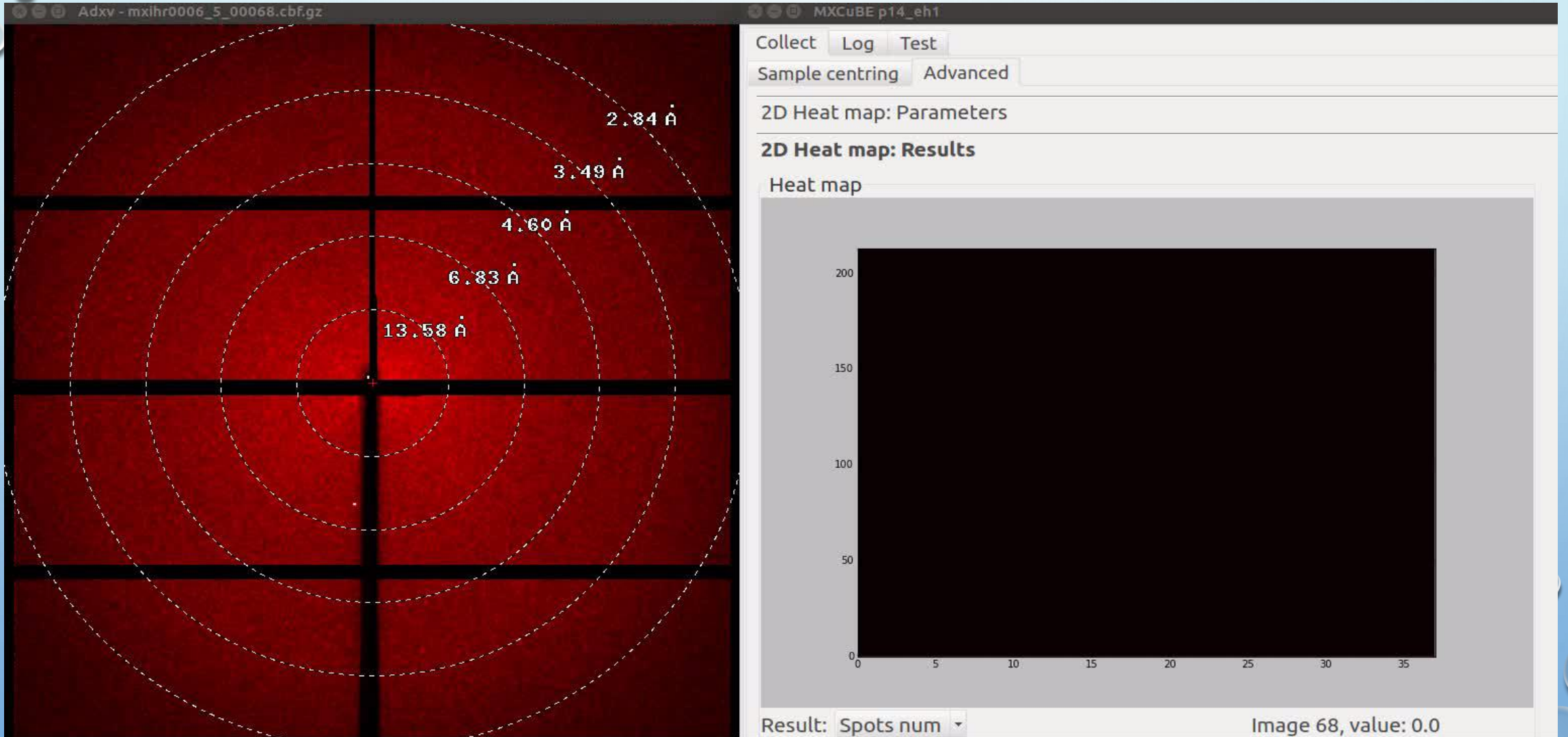
- ADXV – data read from BeeGFS on the fly during scan
- Image Tracking Server
 - Connected to Tioga
 - Learns which frames are written to disk
 - Gets DOZOR Scores as they become available
 - Sorts Frames by Highest Score
 - Send Requests to ADXV to display frame with the highest score
- Advantage for Serial Crystallography Experiments
 - Few empty frames to look at
 - Quick and Easy Spotting of Diffraction

RASTER SCAN

- Raster Lines: 37
- Frames per Line: 213
- Total Frame Count: 7881
- Exposure Time per Frame: 0.00134s



RASTER SCAN



OUTLOOK

- Tioga Additions
 - Export real-time SSX stats
 - number of hits, hit rate, average diffraction resolution ...
 - Create real-time DOZOR spot lists for downstream processing
- Integration of a 2288 Hyper-Threaded Cluster for downstream processing
 - delivery started today

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