brightness

EUROPEAN SPALLATION SOURCE

ESS Data Acquisition

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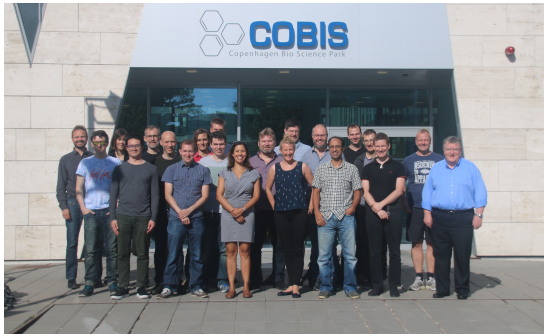
ESS Lund, Sweden

BrightnESS is funded by the European Union Framework Programme for Research and Innovation Horizon 2020, under grant agreement 676548

Data Management and Software Centre

Provide world leading scientific software and scientific computing support for neutron scattering at ESS



DMSC offices located at COBIS.
Copenhagen University north campus

Scientific Software development.

- ➢ The ESS experiment control system
- ➢ Data acquisition software.
- ➢ Data correction software.
- ➢ Data visualization software.
- ➢ Software to model and analyze experimental data sets.

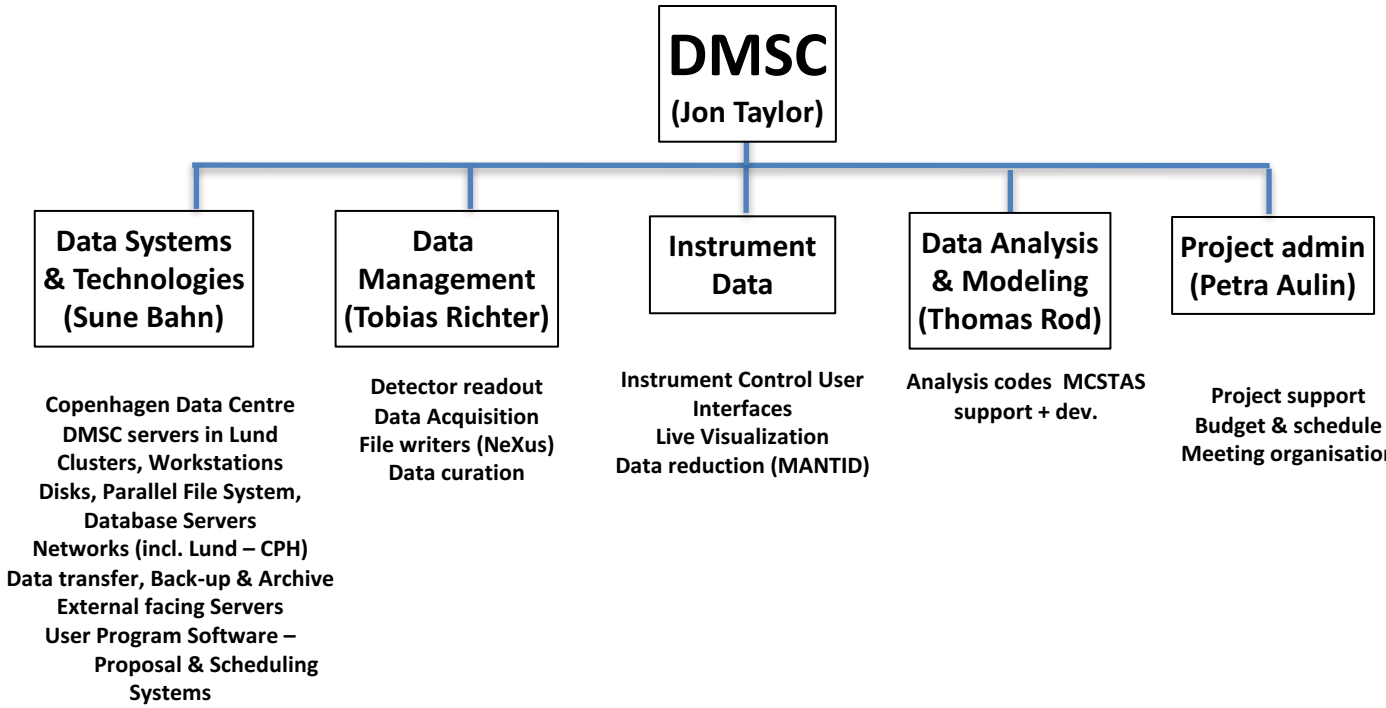
Data centre operations.

- ➢ Store & catalogue ESS neutron datasets.
- ➢ Provide ESS users remote access to their data
- ➢ Compute provisioning for live data correction, visualization and analysis software during and after experiments.

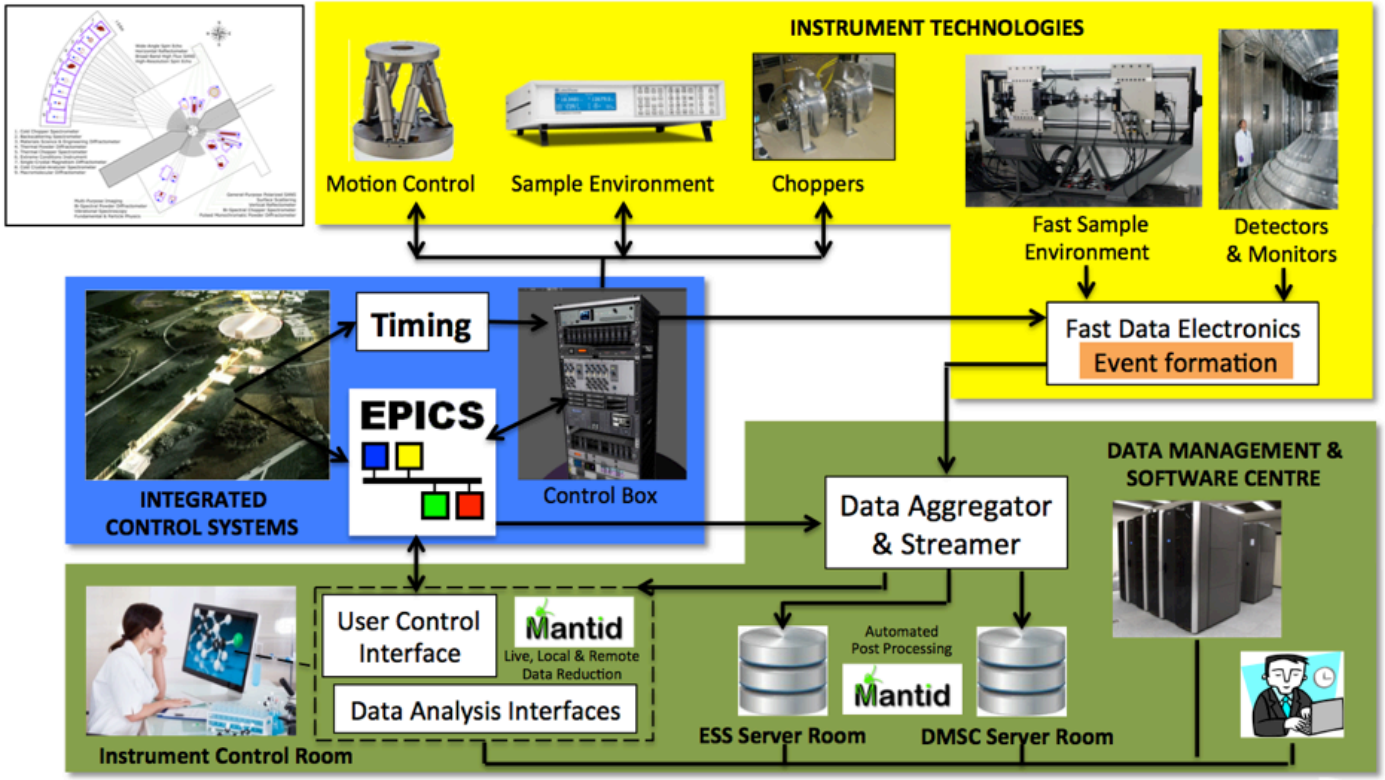
User programme support (operations phase)

- ➢ Provide support & assistance to ESS users for data treatment and data analysis.

DMSC Organization



Overview of ESS Data Pipelines



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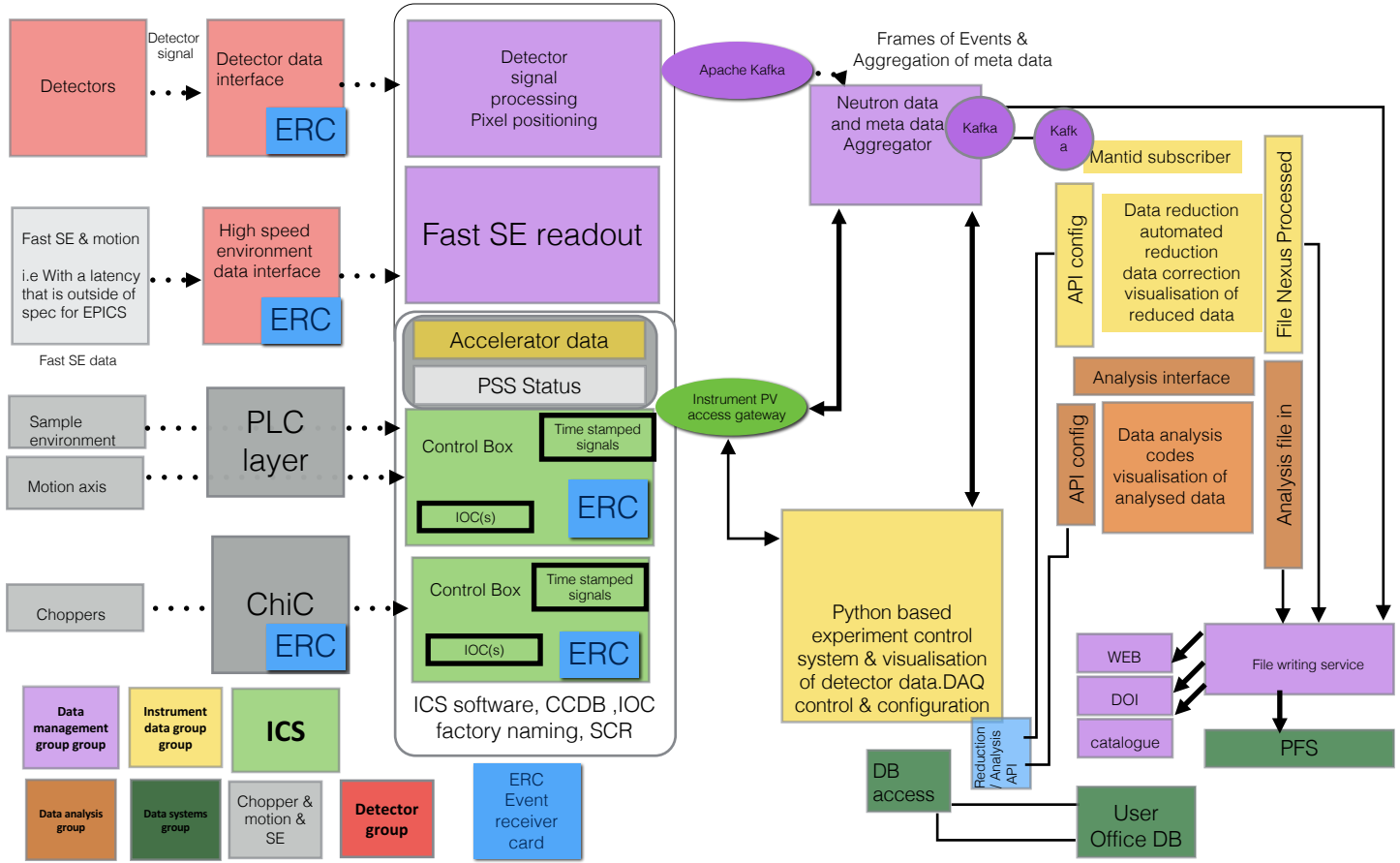
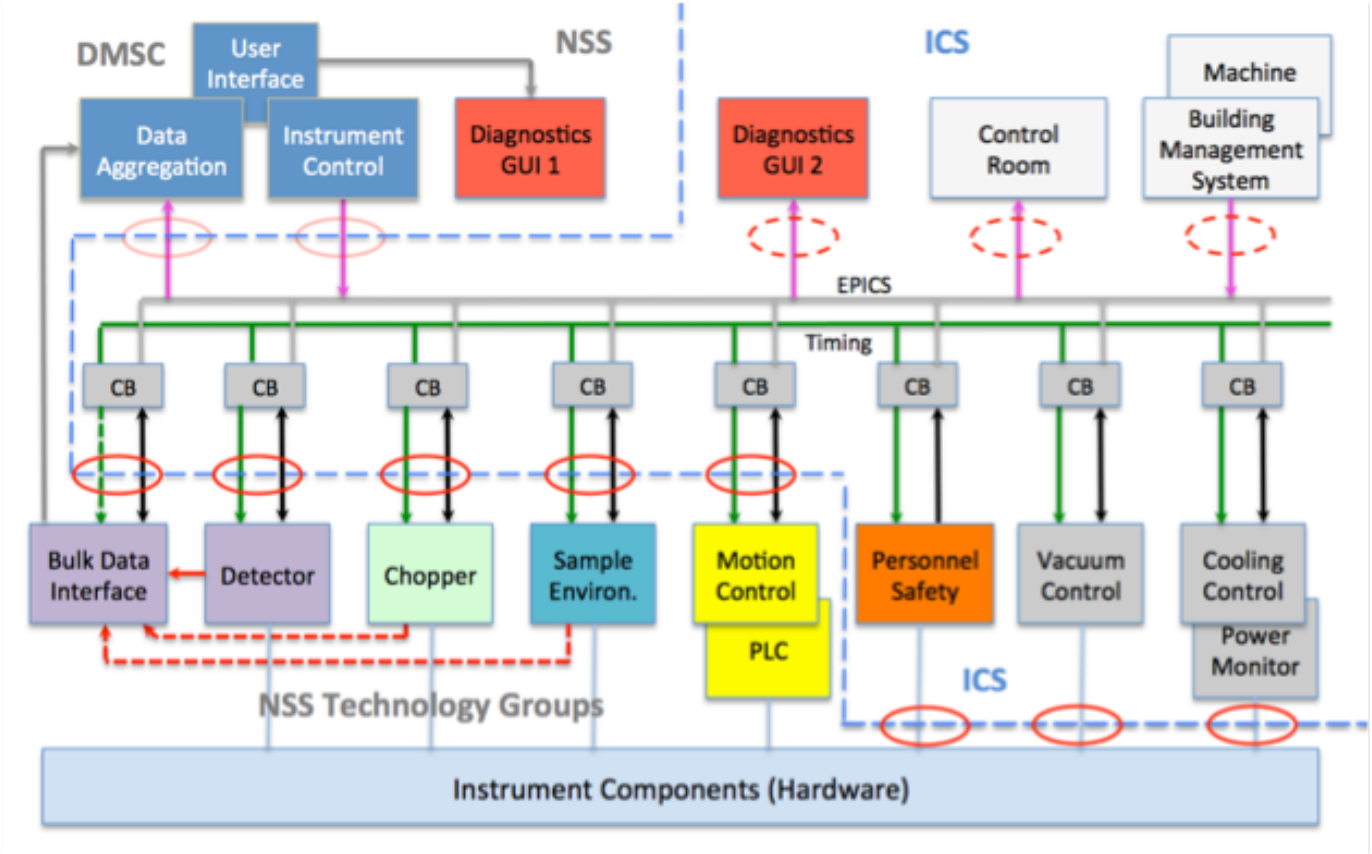
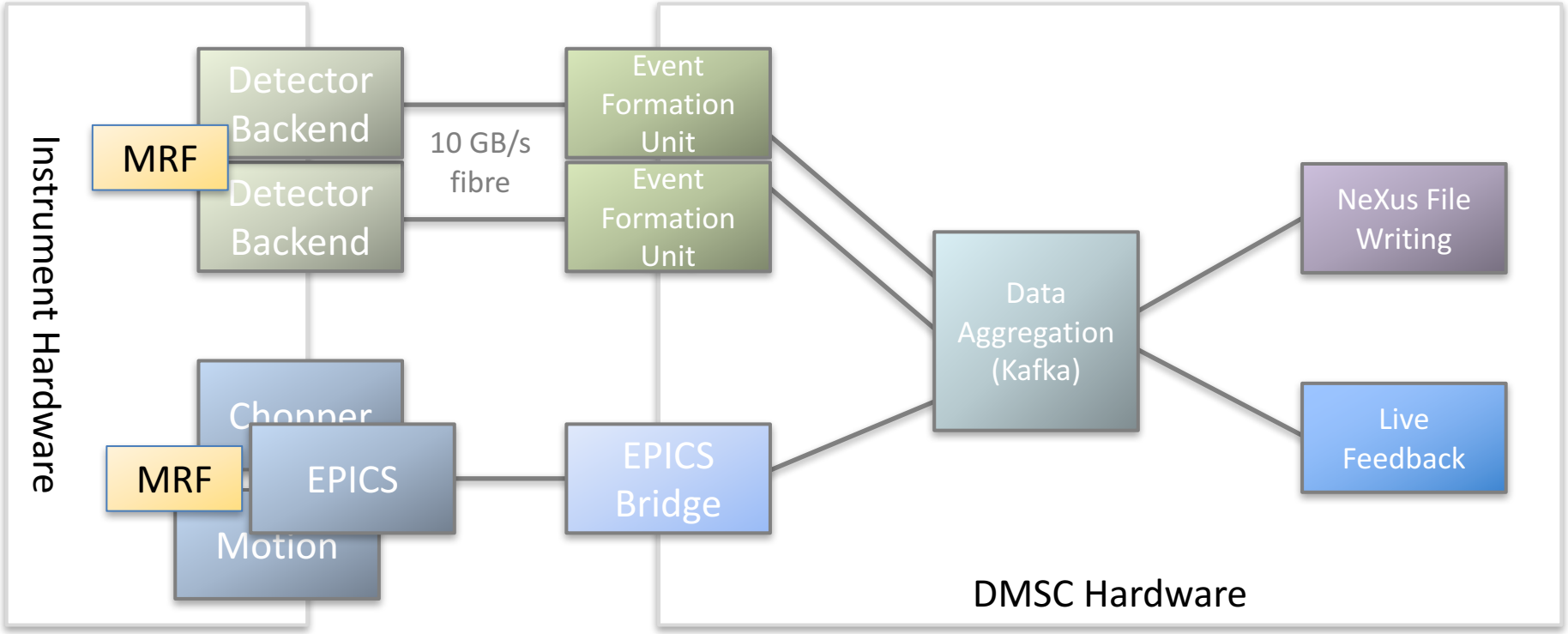
Data acquisition overview



Controls layout



Readout Architecture



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EUROPEAN SPALLATION SOURCE

PUBLISH & SUBSCRIBE

to streams of data like a messaging system

STORE

streams of data safely in a distributed replicated cluster

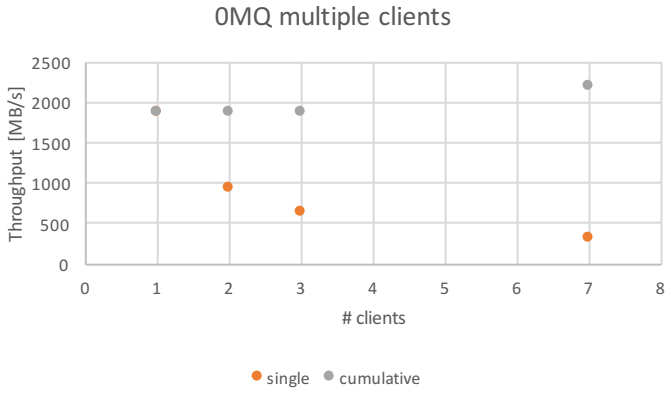
NETFLIX

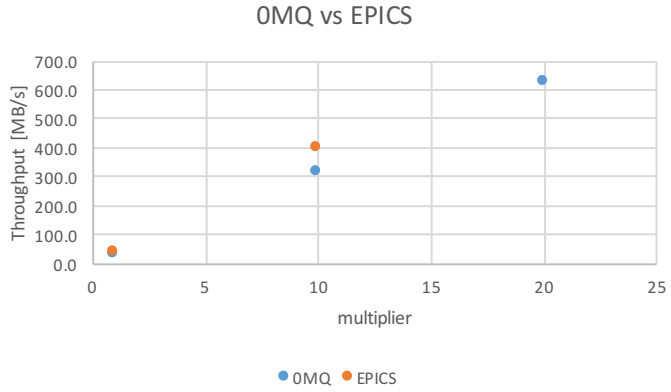
LinkedIn

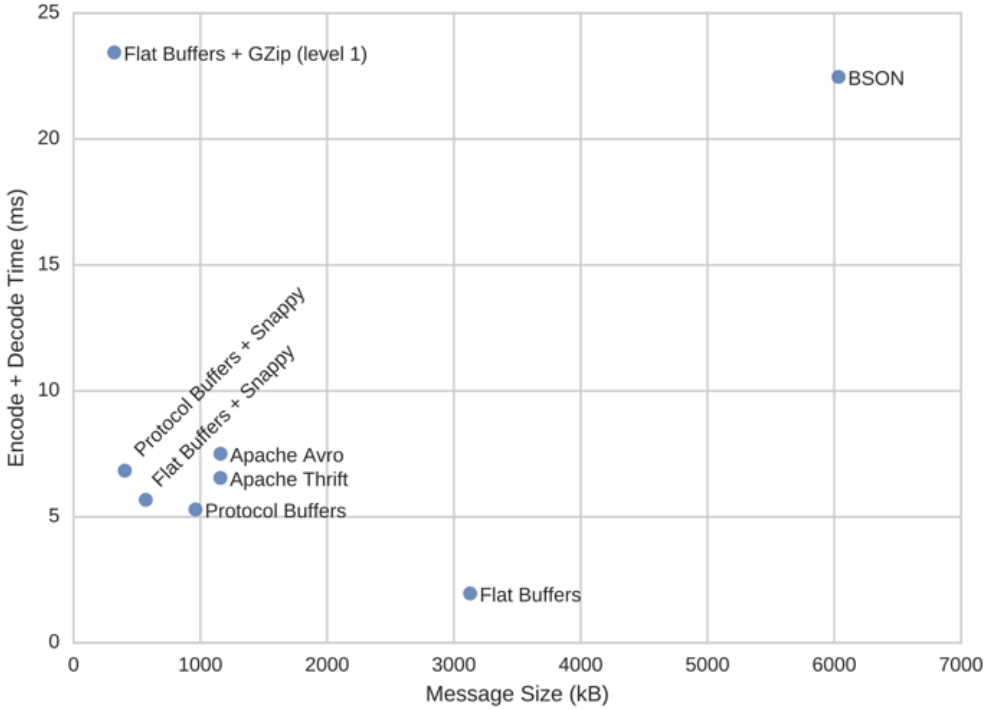
ORACLE

bing

Performance and Efficiency Tests







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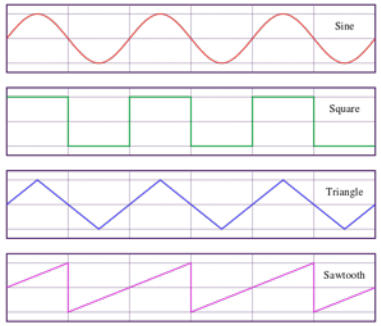
Metadata (EPICS Devices)

What does that cover?

At least all devices controlled through the experiment control system.
Most are integrated by ICS or an NSS technology group (Motion, Detectors, Choppers).

- Detector Settings (not raw data)
- Choppers (ChiC)
- Motion & Automation
- Slits etc
- (Fast?) Sample Environments
  - Temperature
  - Magnetic Field
  - Pressure
  - …
- …

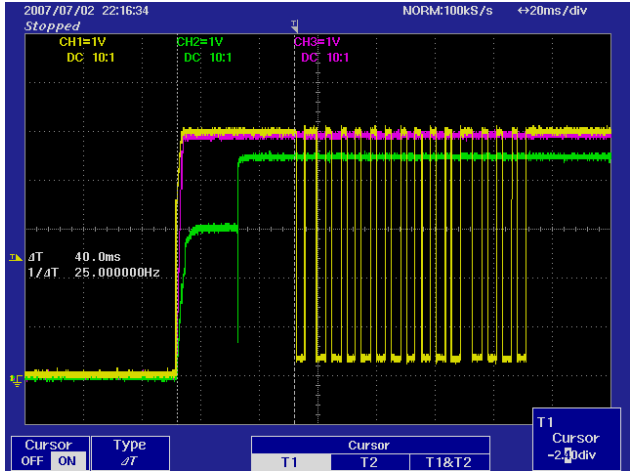
Task 5.2 – Fast Field Data



DMSC/ESS staff member:
Jonas

Joint Task with PSI.

- Collecting Metadata from fast Sample Environments
- High Speed – up to MHz
- Lots of data, close to neutron events
- No turn key solution available that includes accurate timing
- Evaluating partial technical solutions that can be combined
- Integration into data stream



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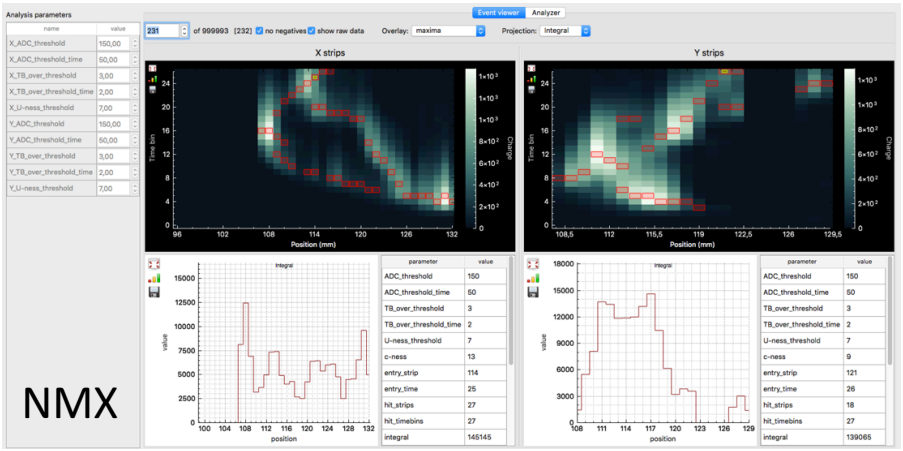
Event Formation (5.1)

What does it do?

- Convert digitized raw detector signals to **pixel ID & timestamp** per event in a detector type specific way
- Like detector electronics in software running on commercial of the shelf hardware
- Reduces technical risks associated with developing and maintaining custom hardware
- Provides flexibility and extensibility of a software package
- Shared responsibility of DMSC and Detector Group
- Challenging task to get right in terms of performance and correctness



Conclusion

We have to achieve the required performance.

We are keen to help with diagnostics and detector commissioning.

People

DMSC
- Tobias Richter
- Morten Jagd Christensen
- Afonso Mukai
- Jonas Nilsson
- Martin Shetty

KU (BrightnESS)
- Stig Skelboe + 2

PSI (BrightnESS)
- Mark Könnecke + 2

ISIS (in Kind)
- Matt Clarke + 2