



ScreamingUdder: Live Visualisation of Experiment Data at ISIS and the European Spallation Source

Introduction

ISIS is working alongside the ESS, PSI and Elettra to develop a new data streaming system for managing and distributing neutron experiment data, code name: ScreamingUdder.

The new data streaming system is based on the distributed streaming platform Apache Kafka.

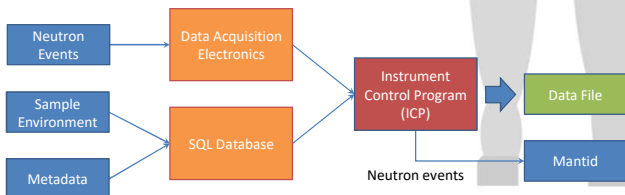
Official blurb:

“Kafka is used for building real-time data pipelines and streaming apps. It is horizontally scalable, fault-tolerant, wicked fast, and runs in production in thousands of companies.”

Kafka appears to be a natural fit for the ESS's needs.

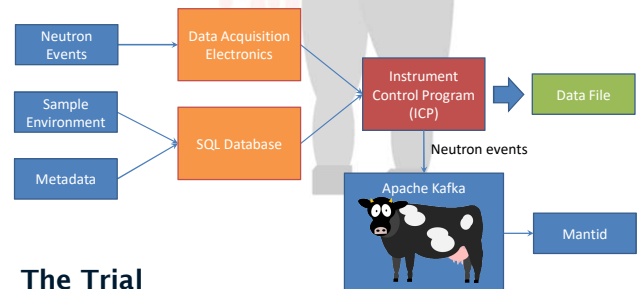
Key Objectives

- On-the-fly data analysis/visualisation via the Mantid data analysis framework
- Fully test the new system at ISIS prior to use at the ESS
- Permanently replace the existing system at ISIS



The Existing System at ISIS

- Data file generated by ICP
- Neutron data streamed via TCP socket(s)
- Neutron event data only
- Not scalable
- Late joining clients cannot catch up
- No knowledge of data lost on-the-wire



The Trial

- Neutron data streamed via Kafka
- Using Kafka means:
 - Scalability
 - Late joining clients can “replay” data
 - Delivery guarantees
- Successfully used on the LARMOR beamline

Moo-ving towards the future

The long term goal is to adapt the prototype Kafka-based data streaming system used at ISIS to closer match the system planned for the ESS. This requires providing a mechanism for streaming all experiment data through Kafka, e.g. neutron event data, sample environment measurements, camera images, metadata etc.

The next steps at ISIS will be to:

- Add sample environment data to the Kafka data stream
- Enable Mantid to access and display sample environment data
- Run the new system in parallel to the existing system

