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Data Management & Software Centre

A view from the STAP



Science, ESS and the DMSC

Data Management & Software Centre

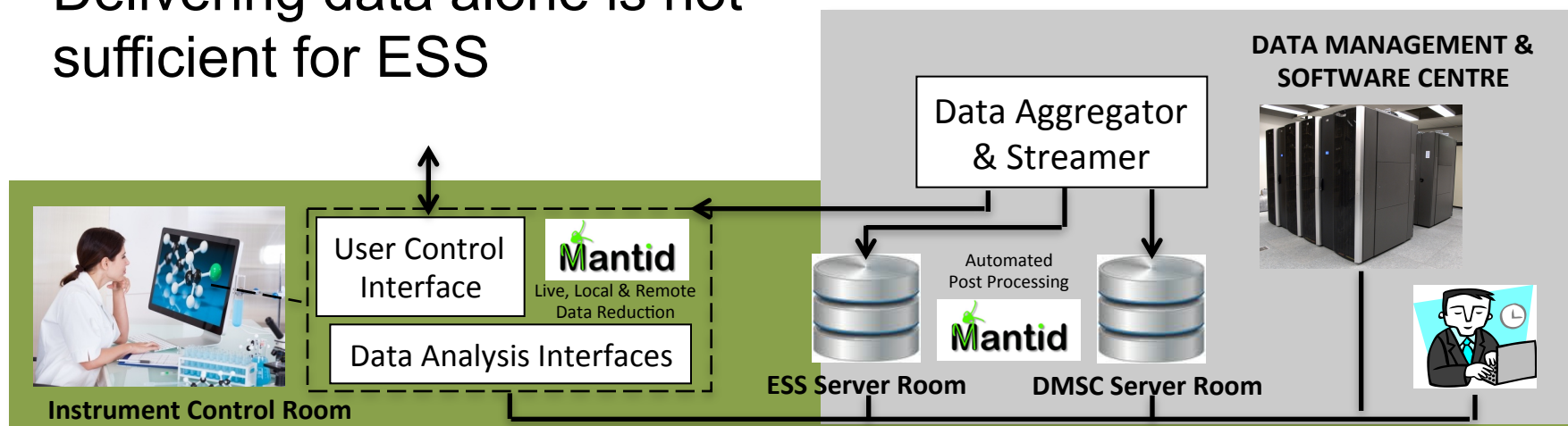
Data Systems
& Technologies

Data
Management

Inst. Data (Control
& Reduction)

Data Analysis
& Modeling

Delivering data alone is not
sufficient for ESS





DMSC - Structure

Data Management & Software Centre

Data Systems
& Technologies

Hardware,
servers,
backup, etc

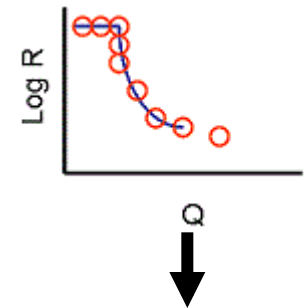
Data
Management

Detector signals,
timing, etc
to Aggregator

Inst. Data (Control
& Reduction)

Control,
interfaces
and counts
to e.g.
 $d\Sigma(\mathbf{Q}, E)/d\Omega$

Data Analysis
& Modeling





ESS and science

Ideas

Sample Environment

Materials / Sample

Instruments

Data

Facility
Responsibility
(Traditionally)

Some components of an experiment



ESS must deliver science

Ideas

Sample Environment

Materials / Sample

Instruments

Analysed Data

- Correctly reduced
- Available metadata
- Analysed data

**Shared Responsibility – Analysis
(Special sample environments)**



Core Software Frameworks with In-Kind

(Live) Data Analysis



Instr.	LOKI, SKADI – ESTIA, FREIA	C-SPEC, TREX – BIFROST, MIRACLES, VESPA	DREAM, HEIMDAL – MAGIC, NMX – BEER	ODI N
Instr. Class	Large Scale Structures (SANS - Reflectometry)	Spectroscopy (Direct – Indirect)	Diffraction (Powder – Xtal – Eng)	Imag -ing

(Live) Data Reduction Framework



Instr. Class	Large Scale Structures (SANS - Reflectometry)	Spectroscopy (Direct – Indirect)	Diffraction (Powder – Xtal – Eng)	Imag -ing
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(Live) Data Management



NeXus

EPICS

ICAT



ZeroMQ



Experiment Control Framework



EPICS

Instr. Class	Large Scale Structures (SANS - Reflectometry)	Spectroscopy (Direct – Indirect)	Diffraction (Powder – Xtal – Eng)	Imag -ing
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Challenges with data & software

Evolving User Community

Many (perhaps most) will be specialists in fields other than neutron scattering

Optimised model fitting (regularization) needs collaboration

Experimental Complexity

Measure small differences

Time varying, applied fields, chemical changes

Detectors deliver more information (e.g. energy)



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Discuss

Selected comments from STAP

Themes directly related to science



Some STAP comments

Priorities

Work with greatest impact on scientific output should be completed and optimized first

External Funding

Collaboration gives added value. Further resource can be driven by new science opportunities e.g. fully exploit event mode data,

...



Some STAP comments

Data Policy

STAP welcomes the policy document but identifies an anomaly in requiring a proposal for access to archived data – inconsistent with current ‘open access’ requirements

Project Management & Integration

Development and production of software underway but instruments not yet under construction. Staff turnover, Scheduling ...



Some STAP comments

Reliability – Planning for operations

Many short experiments at ESS. Need to define expected levels of reliability for both hardware and software. Level of support out of regular working hours needs to be planned.

Agile Methods

Agile development should not mean loss of focus



Status and Readiness of DMSC

Challenges

Time plan and activities depend on schedule of work elsewhere – what instruments?

In-kind contributions



Outlook

Prepare

- New science software
- ‘Genetic’ diversity in software – not just one package (point of failure)
- Adapt to new methods – standardised interfaces and accepted data formats need to be exploited



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Thank you for your attention

Discussion, Questions?