SKA Regional Centres

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SWISS SKA Meeting September 2021

SKA Regional Centres

- Role of SRCs
- Expectations of capabilities
- Development plan

The Role of SRCs: Data Intensity vs. User Flexibility

"Size" or Data intensity

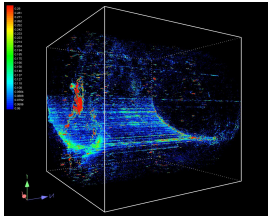


Image cubes

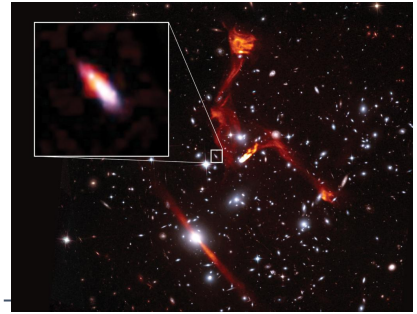
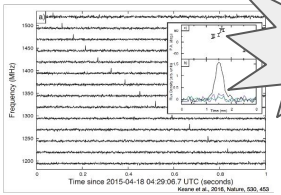


Image cut-outs

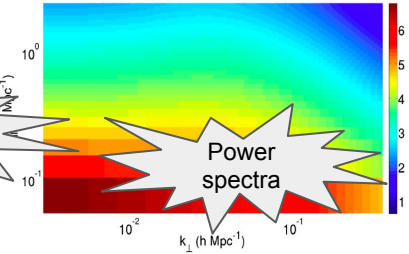
Credit: Heywood et al.; Sophia Dagnello, NRAO/AUI/NSF; STScI.

Paul, Sourabh et al. (2016). ApJ 833. 10.3847/1538-4357/833/2/213.



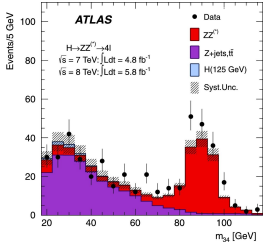
Time series data

Catalogues / Source List



Power spectra

Plots and scripts for publication



"Pre-defined" (Observatory Data Products)

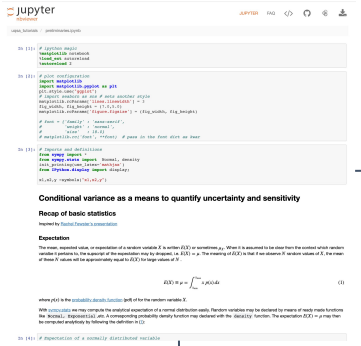
"User-defined" (Advanced Data Products)

The Role of SRCs: Collaboration platform

Most SKA projects will be collaborative

SRCs will provide collaborative tools backed up by powerful compute and data management

Workflows / notebooks



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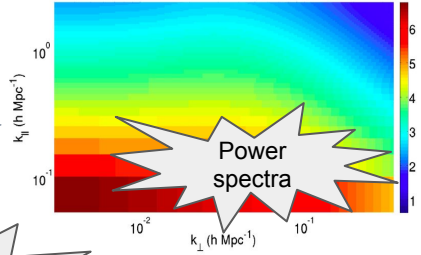

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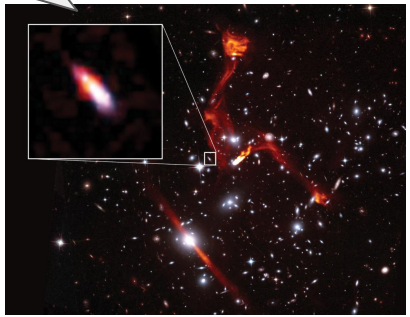

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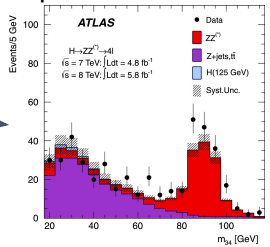
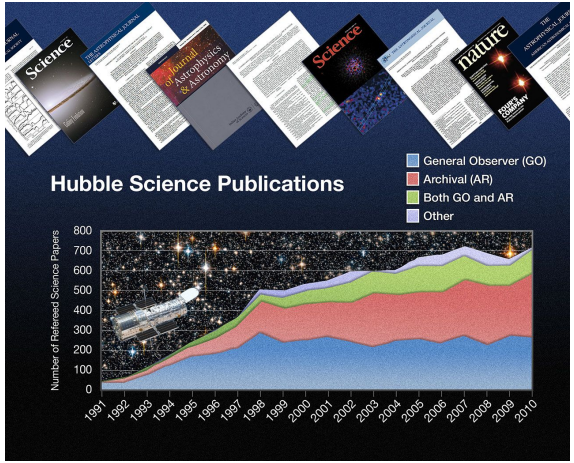
Plots for publication



The Role of SRCs: Support data product (re-)use

- All SKA Data Products will (in time) become public - this is likely to be the biggest science generator
  - Build SKA science archive around IVOA standards
  - Ensure interoperability with other archives and other experiments
- Strong adherence to the FAIR principles
- Give credit appropriately to all contributors to a team



SKA Regional Centres: SKAO data ingest

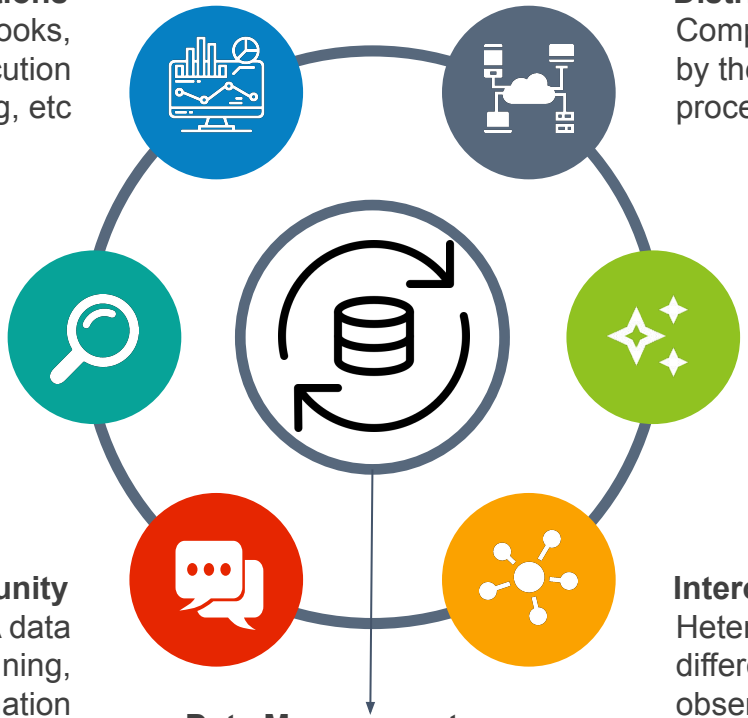
SKAO

SKA Regional Centre Capabilities

Science Enabling Applications
Analysis Tools, Notebooks, Workflows execution Machine Learning, etc

Distributed Data Processing
Computing capabilities provided by the SRCNet to allow data processing

Data Discovery
Discovery of SKA data from the SRCNet, local or remote, transparently to the user



Visualization
Advanced visualizers for SKA data and data from other observatories

Support to Science Community
Support community on SKA data use, SRC services use, Training, Project Impact Dissemination

Interoperability
Heterogeneous SKA data from different SRCs and other observatories

Data Management
Dissemination of Data to SRCs and Distributed Data Storage

SKA Regional Centers: Data management

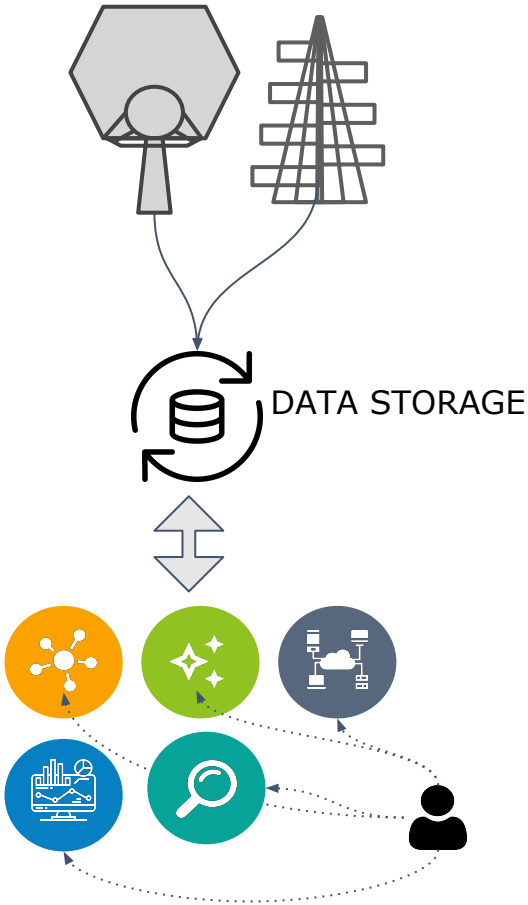
Storing SKAO data growing at up to 700 PBytes each year will be a challenge (plus user-generated data too).

Roughly 5-10 million dollars per year in new data, for one copy

Global data management within SRCNet should enable best possible use to be made of available storage resources

Avoid unnecessary duplication

Support mirroring of popular data products to enhance user experience



SRC Network global capabilities

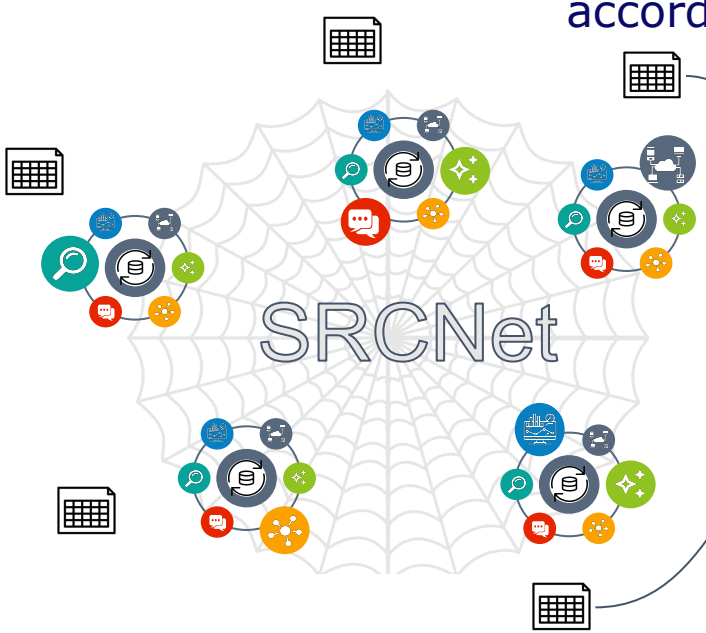
Collectively meet the needs of the global community of SKA users

Anticipate heterogeneous SRCs, with different strengths

Pledging

Each SRC to pledge resources into global pool to support SRCNet activities

Users can access resources across SRCNet according to their research needs and permissions

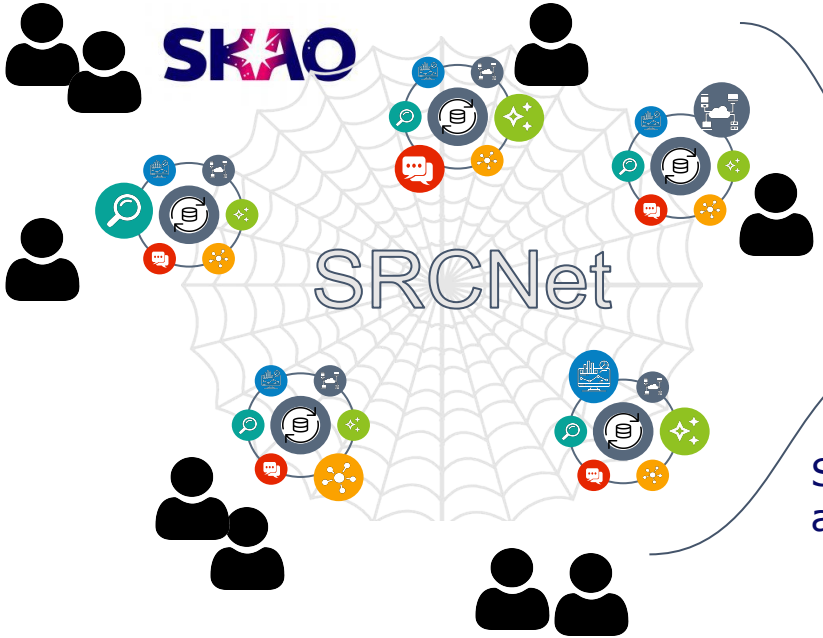


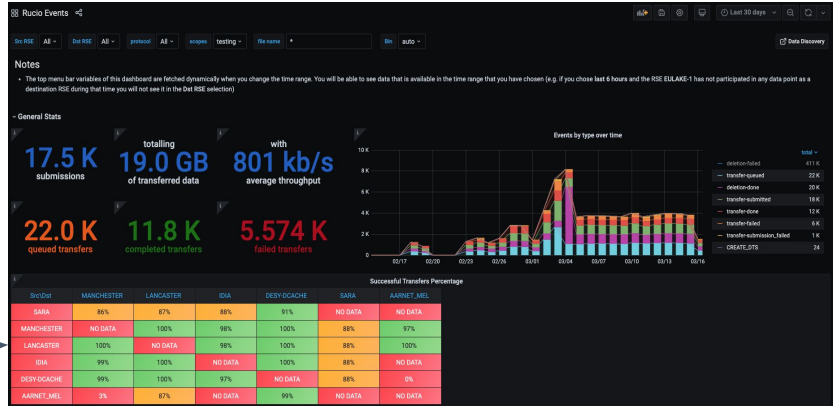
Hope is that each SRC will be able to contribute a total effort that is proportional to their SKA fraction

Additional resources at an SRC could be given to the pool or prioritised to support national interests

Operations

Personnel within each SRC project will be identified to be part of the SRC Operations Group (SOG) - meeting regularly to discuss issues, share tasks, see and test global system health

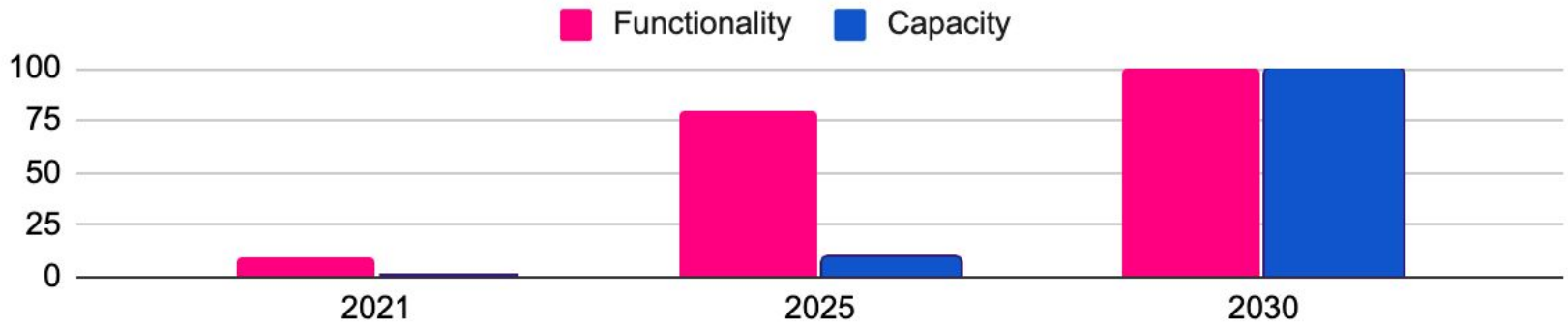


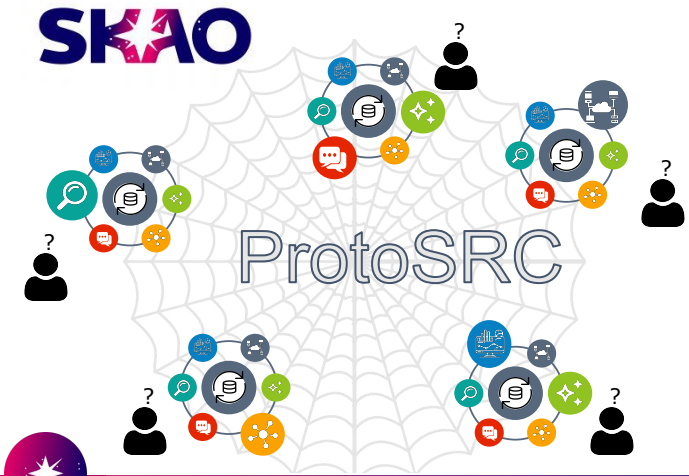


Src\Dst	MANCHESTER	LANCASTER	IDIA	DESY-DCACHE	SARA	AARNET_MEL
SARA	86%	87%	88%	91%	NO DATA	NO DATA
MANCHESTER	NO DATA	100%	98%	100%	88%	97%
LANCASTER	100%	NO DATA	98%	100%	88%	100%
IDIA	99%	100%	NO DATA	100%	88%	NO DATA
DESY-DCACHE	99%	100%	97%	NO DATA	88%	0%
AARNET_MEL	3%	87%	NO DATA	99%	NO DATA	NO DATA

SOG will be led from SKAO Ops, with a team from across each SRC project and SKAO.

Timeline





SRC Steering Committee has established 6+1 working groups to focus on technical development of SRCs

Several national SRC pre-cursor projects are now funded

Requirements and high-level architecture under development now

Established team at SKAO, including members of Operations group and new SRC Architect (Jesús)

Many countries now have SRC development projects in planning or already funded

Identifying real effort available to support SRC prototyping

Considering adoption of SAFe SW development practices, building on expertise within SKAO

End