CASDA's Implementation of SODA for Multi-Dimensional Data

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Outline

1. ASKAP Background
2. Current SODA Implementation
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4. Summary

1/4 CASDA Background

Australian SKA Pathfinder (ASKAP)

- 36 x 12 m dishes
- Max baseline = 6 km
- Phased array feeds – 188 elements
- 30 deg^2 FOV

- 700 – 1800 MHz
- 300 MHz Bandwidth
- 16,384 channels

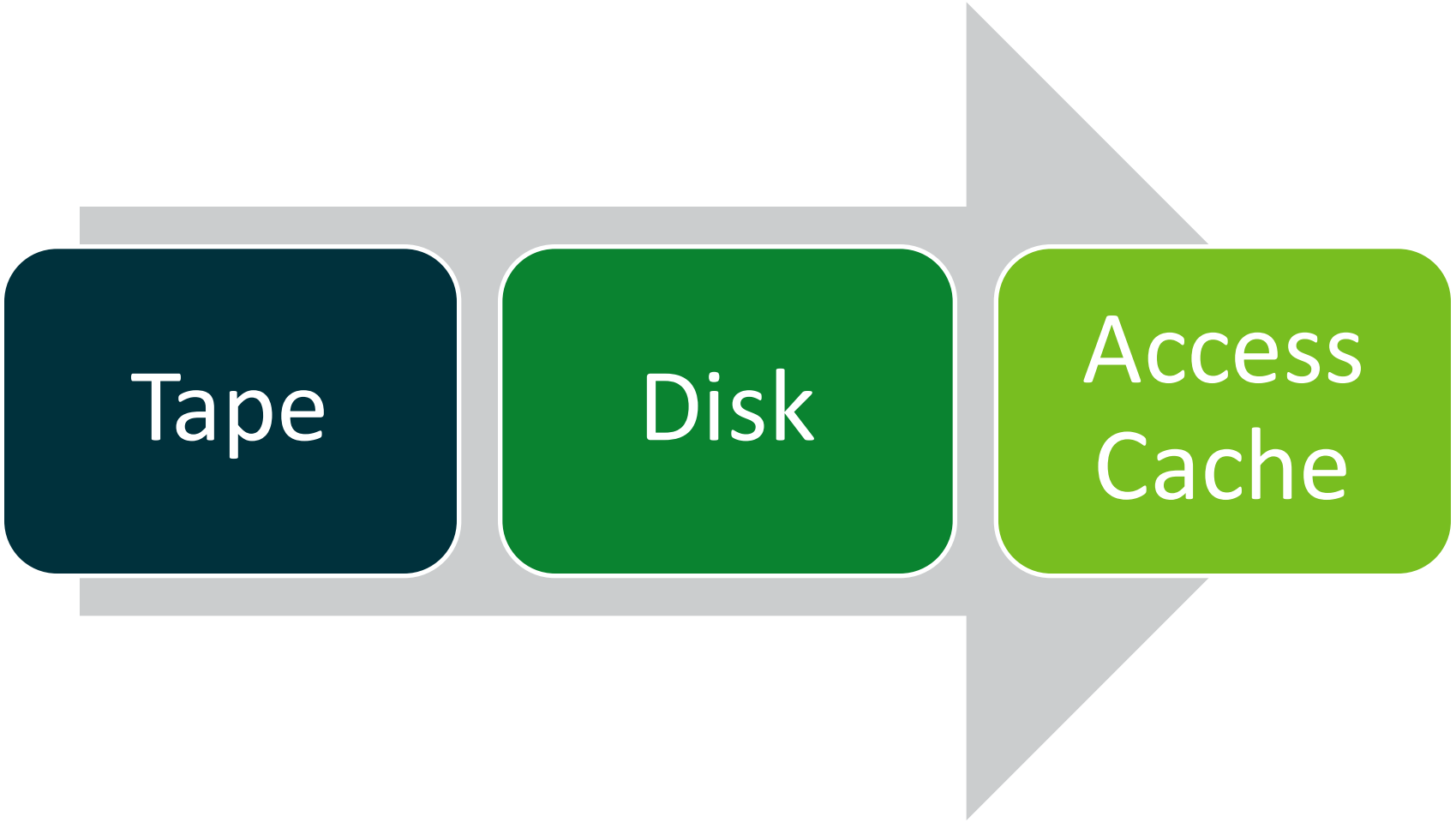
ASKAP Data Products

- Calibrated visibility data files (CASA)
- Image cubes (FITS)
- Single plane images (FITS)
- Catalogues

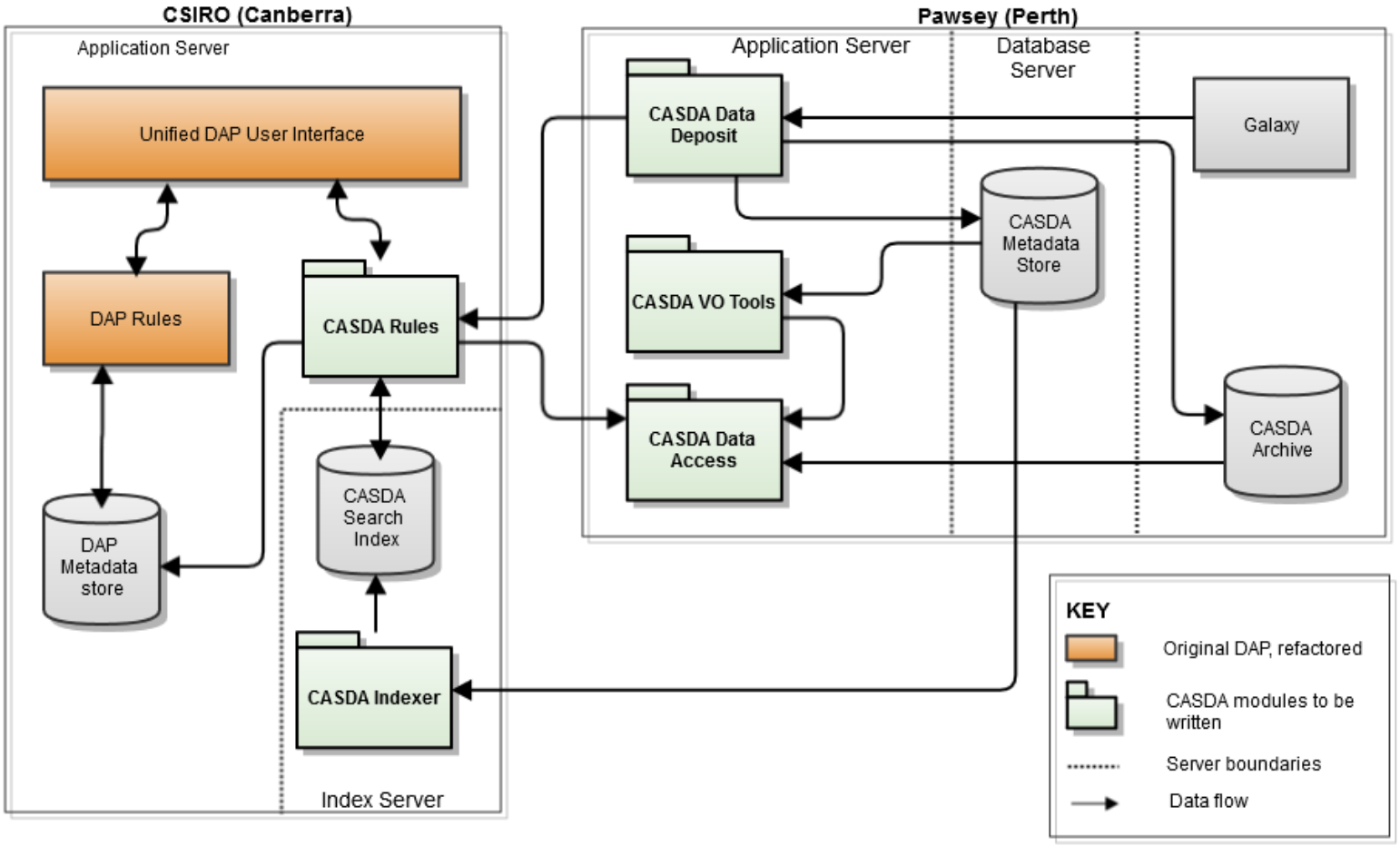
ASKAP Data Products – Images/Cubes

- 2D images
  - Continuum
  - Moment maps
- 3D image cubes
  - Continuum – polarisation, broad frequency bands
  - Spectral line – high resolution frequency or velocity
  - Transients – time series
- 4D image cubes
  - Combinations of above e.g. polarisation plus frequency

Data Storage



Application Architecture



2/4 Current SODA Implementation

SODA – Server Operations for Data Access

- Full file downloads (no filter params)
- Spatial and plane cut-outs

- Only implemented async currently
  - Data on tape
  - Large data files

SODA Async Pattern

1. Create job
2. Add parameters
   - Validate isolated params
3. Phase – Run
   - Validate params as a whole
   - Calculate cut-outs (spatial and plane overlaps of images/cubes)
   - Retrieve data
   - Create cut-outs (Montage)

Supported Parameters

- ID – Allow multiple

Filters

- POS
- BAND
- POL
- COORD (which is no longer in the standard)

Future Parameters

- Time
- Velocity – galactic, extragalactic
- Rotation measure

Challenges

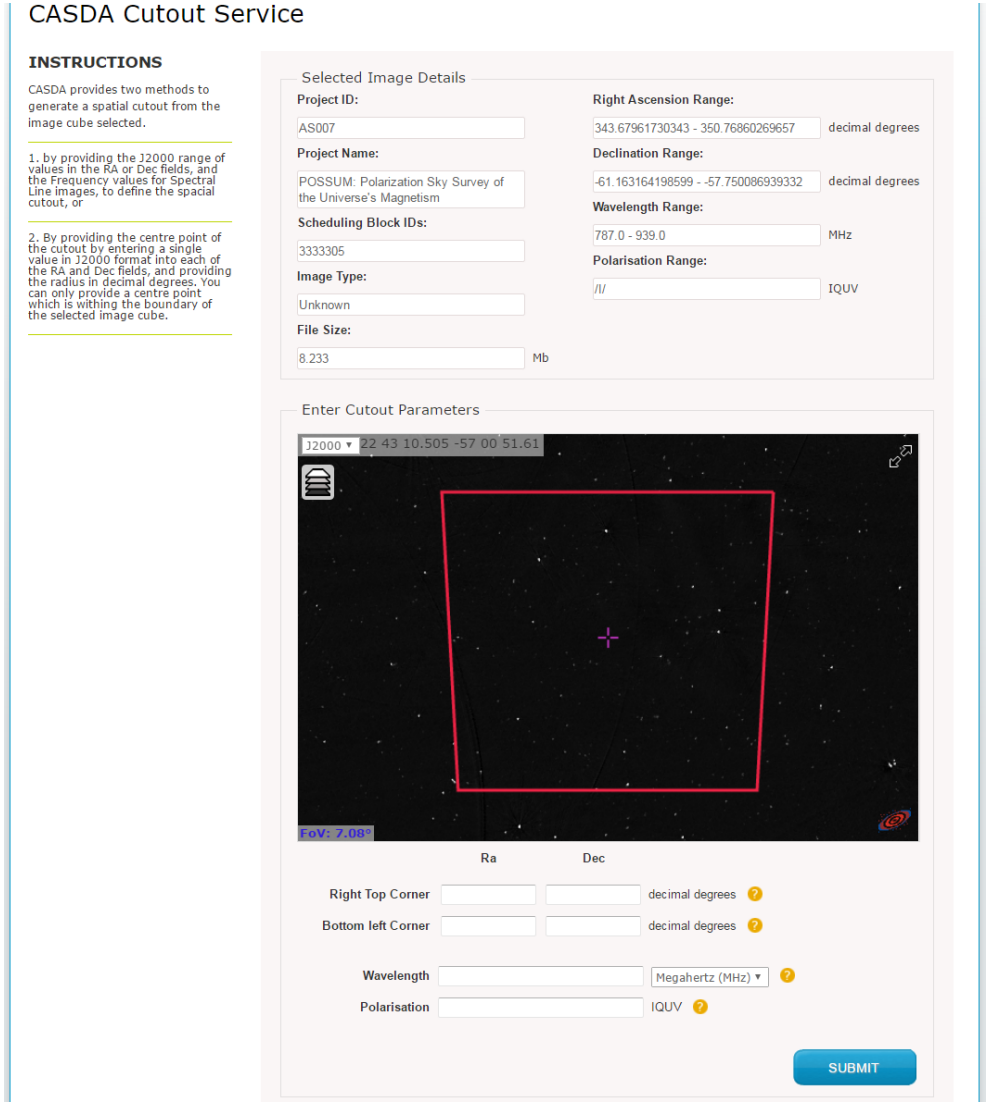
- Data access is different to data discovery
- Removal of COORD
  - Need to consider new axis types
- Multiple axis calculations
- Naming (multiple) cut-outs

Current Status

Capability	Status
SIA2 Queries: POS and BAND	Ready
SIA2 Queries: Other	Ready
DataLink: Web access and direct download	Ready
DataLink: Services	Ready
SODA: Sync - Online FITS data by ID	Retired
SODA: Async - Offline and online FITS data by ID	Ready
SODA: Filtering (i.e. cutouts)	Ready

3/4 Future Plans

Upcoming Web UI



Parameter Ranges

- Informing the client what the valid ranges are for each parameter

- Metadata not easily available in data link (our TAP module)
- Would be straight forward in SODA (our Data Access module)

Future Work

- Immediate access via sync
- Other image/cube types
- Cache cut-outs, or access pregenerated cut-outs
- Parameter ranges
- Future services e.g. image stacking

Needs for the future

- New ‘SODA triples’
- Parameter range endpoints
- Stability

4/4 Summary

Summary

- Open Source
  - https://github.com/csiro-rds/casda_data_access
- Operational and being expanded

Thank you

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