L'applicazione del VO Data Model all'archivio INAF dei dati radio

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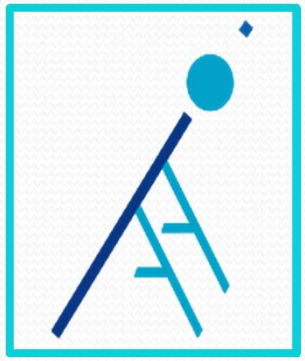
The present @ SRT, Med, Noto

- Common Single-Dish Control System (DISCOS): integrated backends, common data format
- SRT in operation + expertise in software cross correlation: «Italian» VLBI Network experiments (EVN subarrays)

⇨ Need for a modern, public radio archive

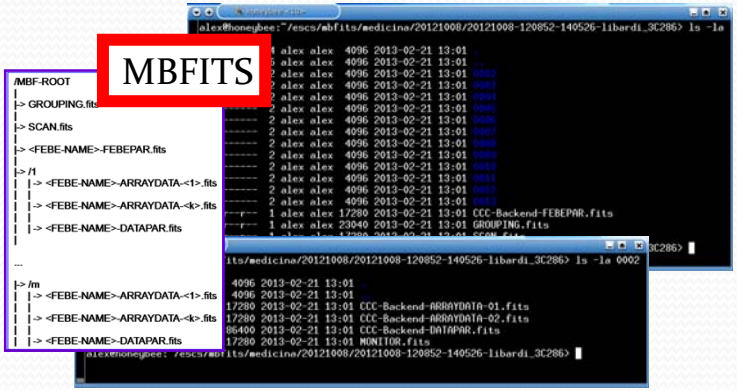
Towards a public Radio Archive

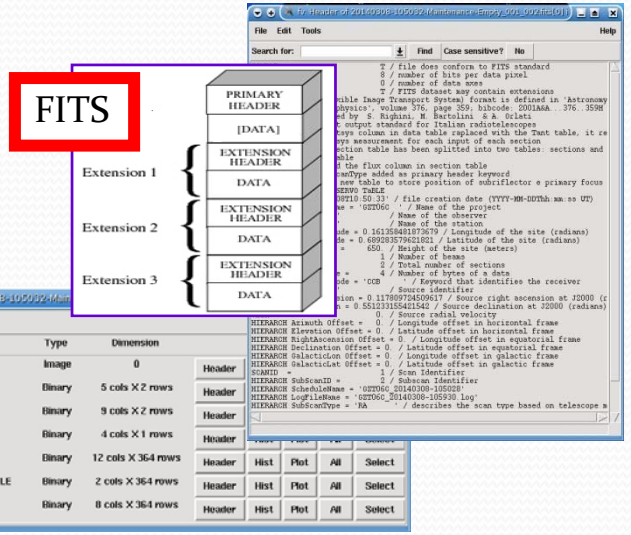
- Collaboration with the INAF Italian Astronomical Archive Data Centre

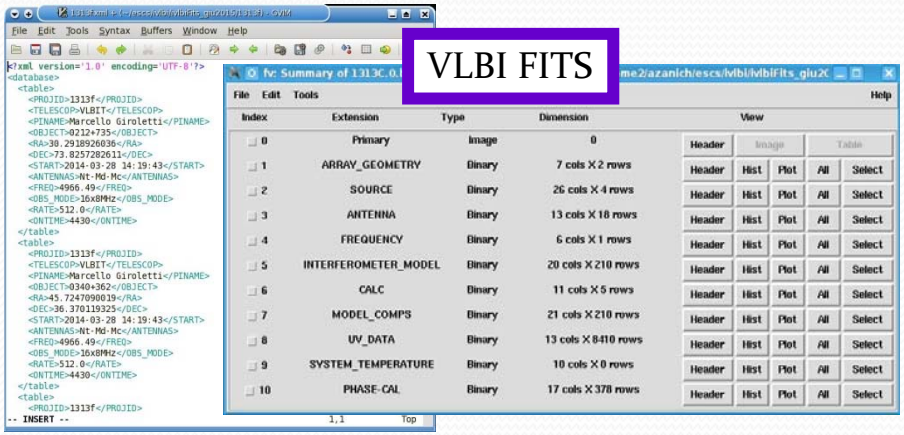


- In 2012 start to define the requirements for a radio data archive:
  - Common data model for SD and VLBI
  - Archive architecture
  - Web interface
  - Virtual Observatory

Data formats @ SRT, Med, Noto

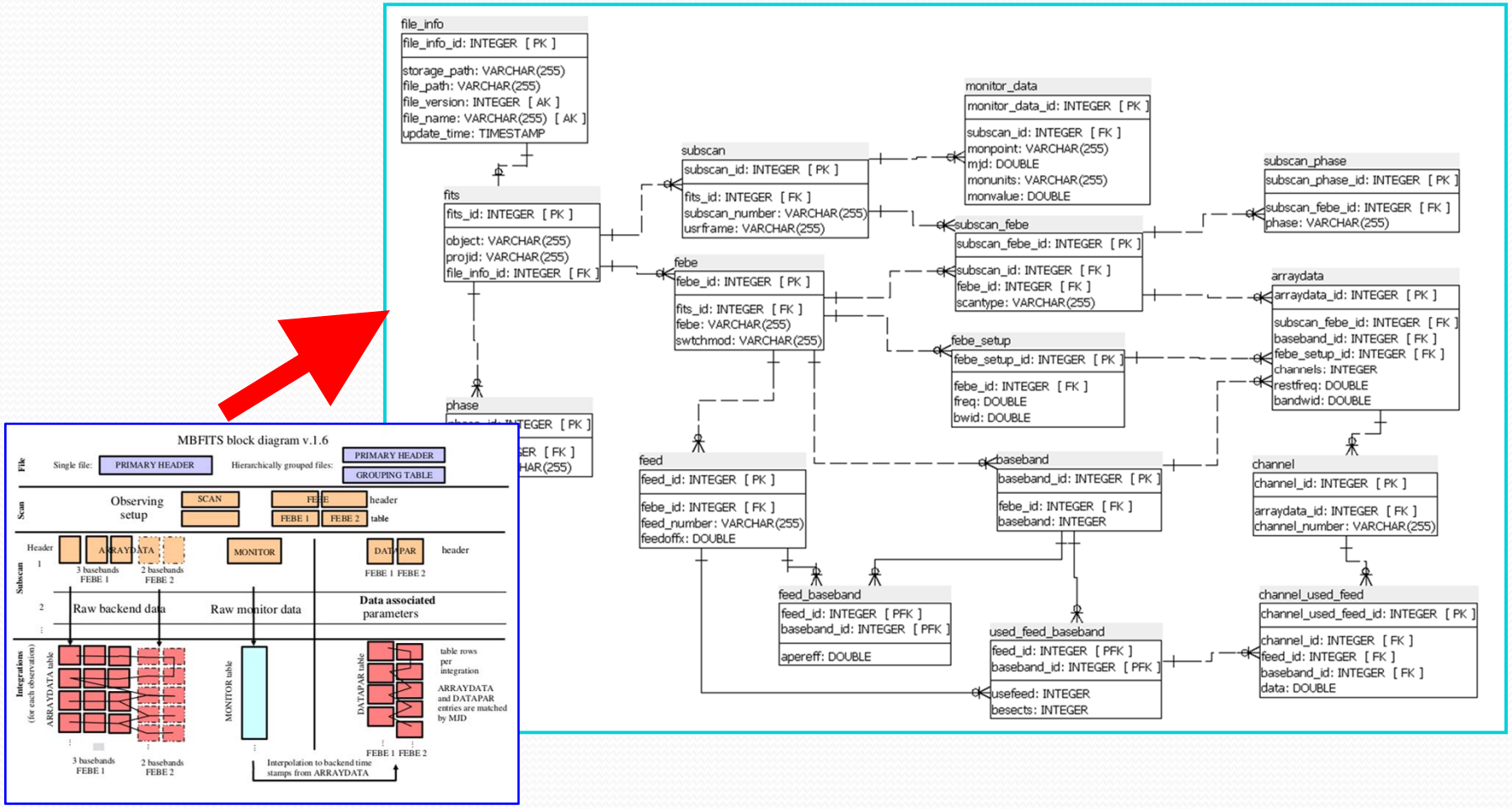






Pulsar data

A common data model



Astronomical data preservation

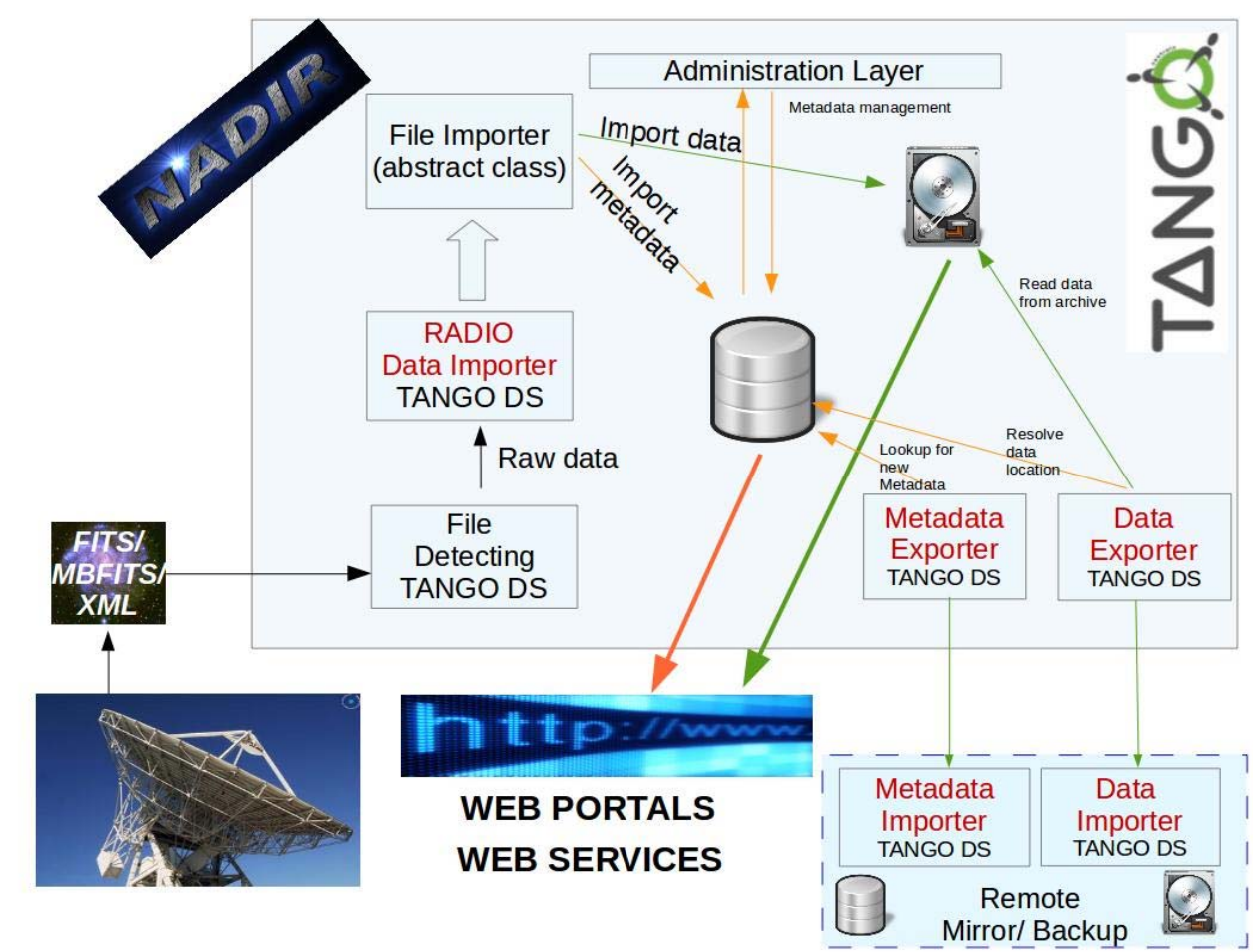
Observations comprise:

- The scientific exposures
- The data+instrument+site metadata
- The observing schedule
- The observing and telescope(s) logs

All this information is needed (and archived!) to guarantee data reuse, preservation and curation

⇨**scientific exploitation**

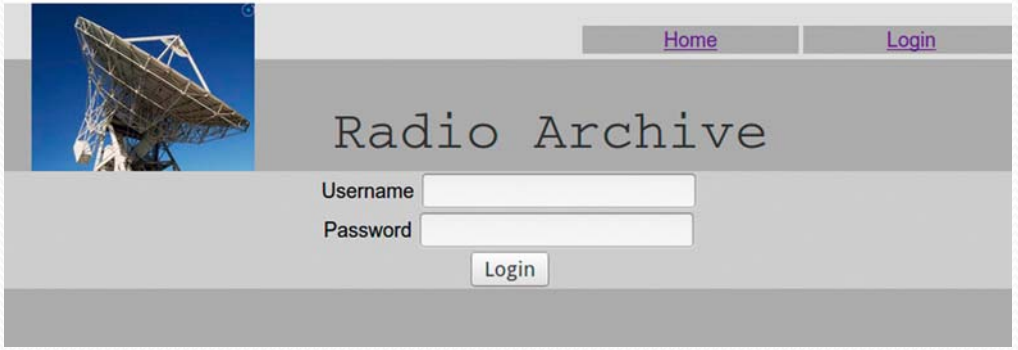
Radio Archive architecture



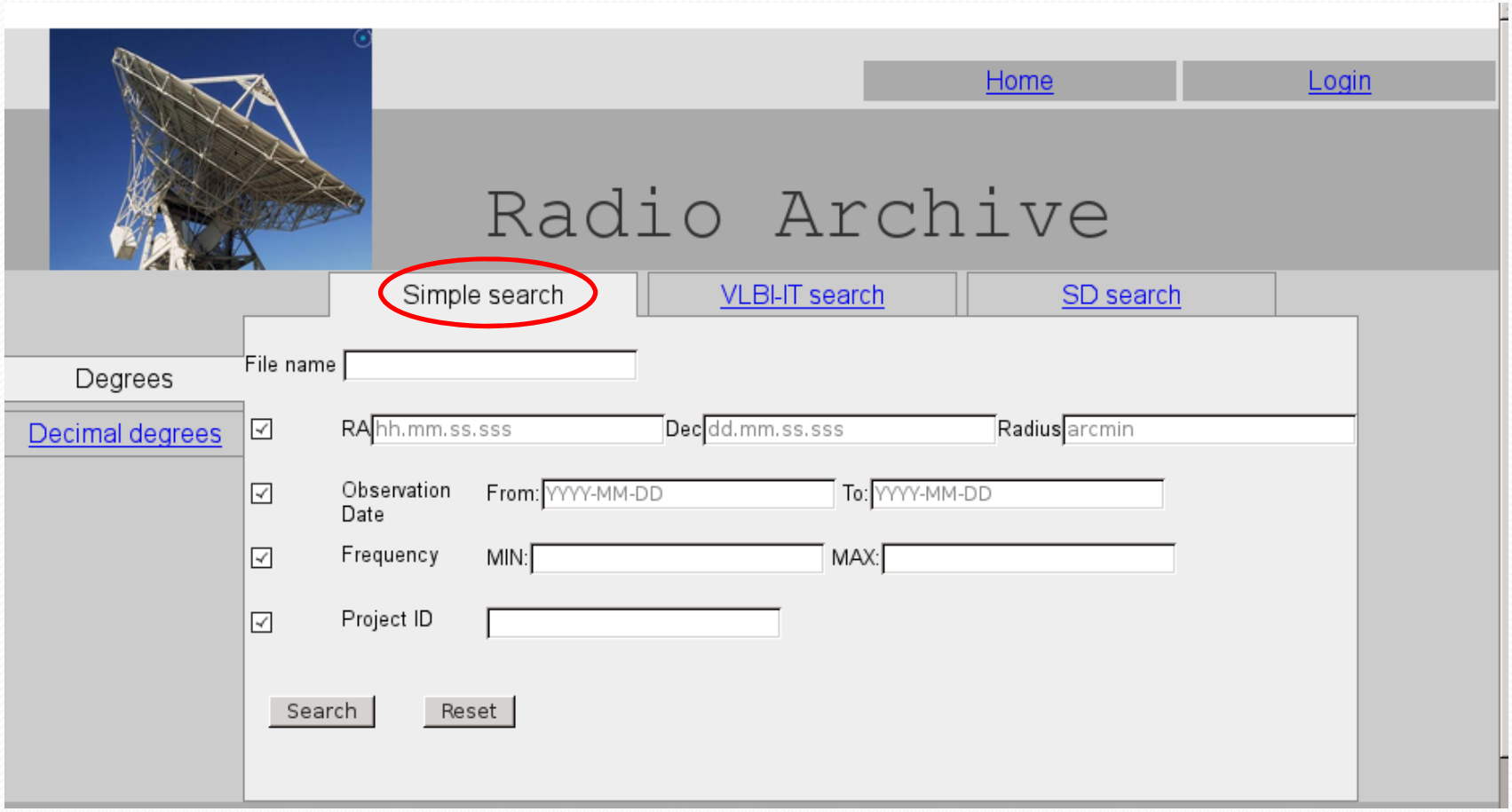
Radio Archive features

- Web GUI
- All data public after a proprietary period: INAF policy
- Who are the users? PI, general public, telescope staff. Authentication & Authorization (SSO)
- VO-compliant services

The Radio Archive Web Interface



The Radio Archive Web Interface



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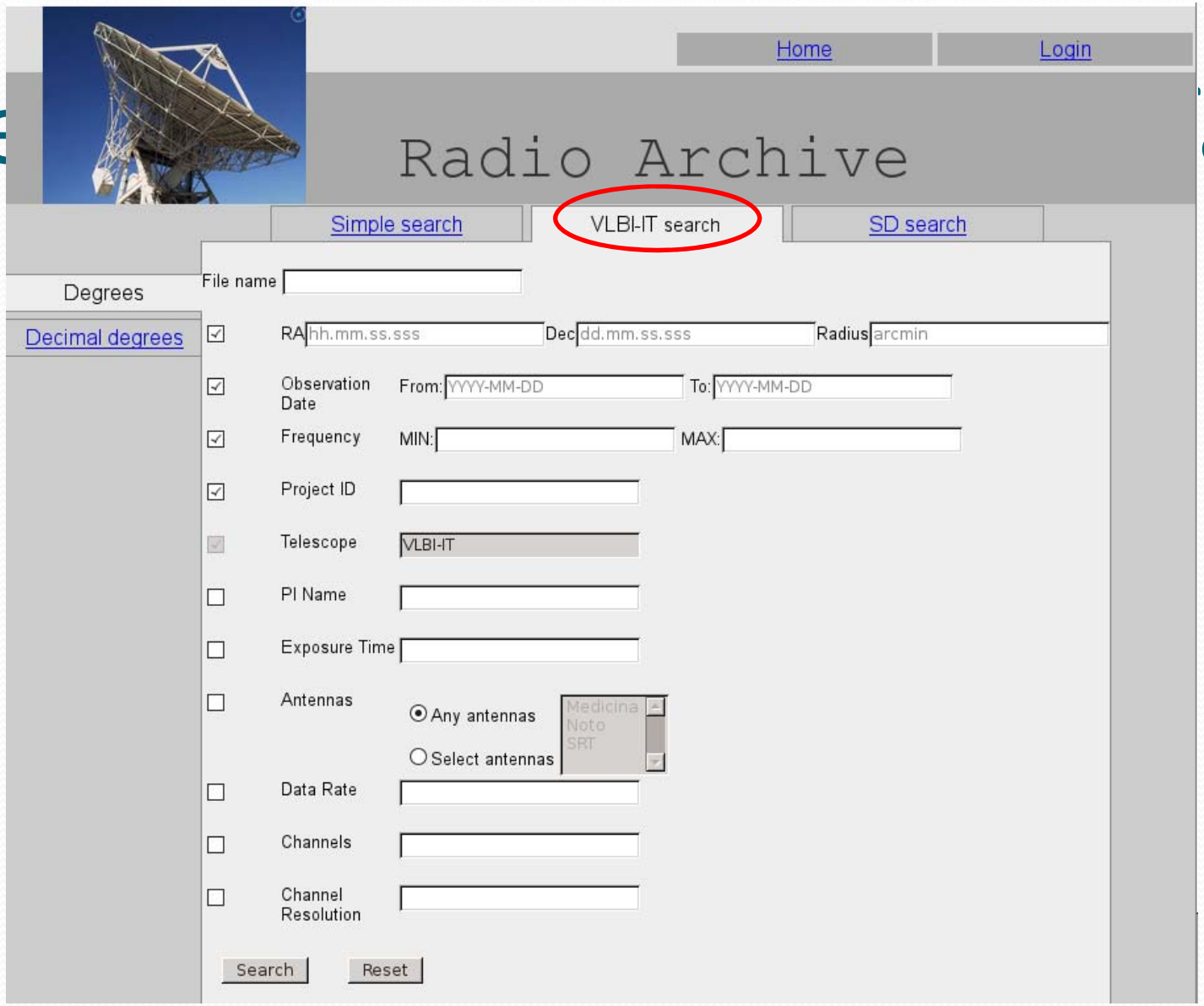
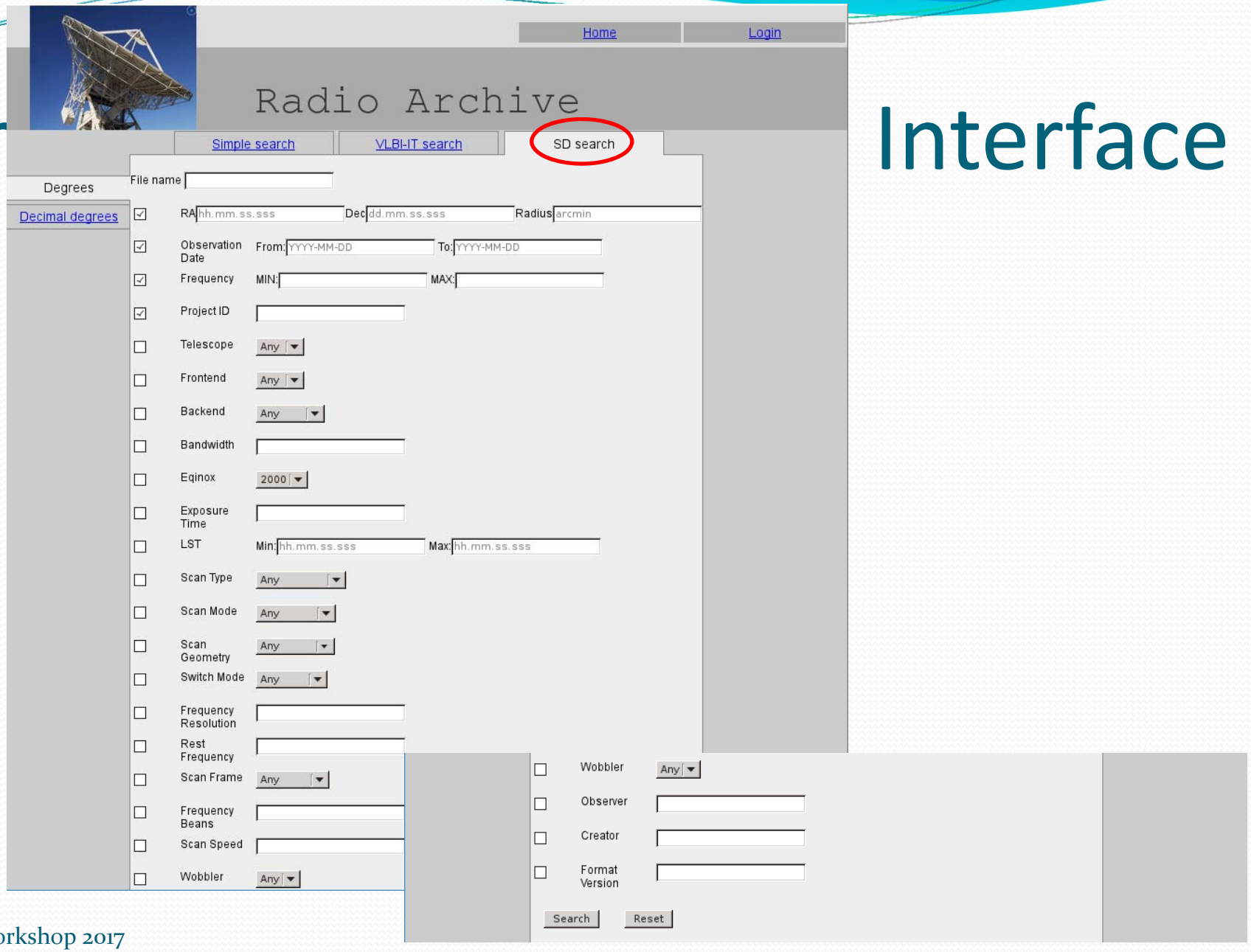

Home
Login
Radio Archive
Simple search
VLBI-IT search
SD search
Degrees
Decimal degrees
File name
RA hh.mm.ss.sss
Dec dd.mm.ss.sss
Radius arcmin
Observation Date
From: YYYY-MM-DD
To: YYYY-MM-DD
Frequency
MIN:
MAX:
Project ID
Telescope
VLBI-IT
PI Name
Exposure Time
Antennas
Any antennas
Select antennas
Medicina
Noto
SRT
Data Rate
Channels
Channel Resolution
Search
Reset

Th Interface



Th ace

Home | Login

Radio Archive

Degrees

Decimal degrees

	File	dateobs	ra_char	dec_char	projid	min_freq	max_freq
☐	20100128-221111-3C286.tar.gz	2010-01-28T22:11:11	13:31:08.287	30:30:32.96	13-10	5000	5150
		2010-01-28T22:11:11	13:31:08.287	30:30:32.96	13-10	7000	7330
		2010-01-28T22:11:11	13:31:08.287	30:30:32.96	13-10	12000	12330
☐	20120229-030455-test.tar.gz	2012-02-29T03:04:55	04:37:04.375	29:40:13.82	23-12	5800	6400
		2012-02-29T03:04:55	04:37:04.375	29:40:13.82	23-12	6500	7100
☐	20120229-040455-3C123.tar.gz	2012-02-29T04:04:55		29:40:13.82	23-12	5800	6400
		2012-02-29T04:04:55		29:40:13.82	23-12	6500	8548
☐	20120728-030455-test.tar.gz	2012-07-28T03:04:55	00:27:00.000	31:35:00.00	13-10	5200	5530
		2012-07-28T03:04:55	00:27:00.000	31:35:00.00	13-10	4800	4950
		2012-07-28T03:04:55	00:27:00.000	31:35:00.00	13-10	5000	5330
☐	20150129-221111-3C286.tar.gz	2015-01-29T22:11:11	13:31:08.287	30:30:32.96	13-10	18000	18150
		2015-01-29T22:11:11	13:31:08.287	30:30:32.96	13-10	20000	20330
		2015-01-29T22:11:11	13:31:08.287	30:30:32.96	13-10	22000	22330
☐	20150303-210000-source1.tar.gz	2015-03-03T21:00:00	09:41:57.300	87:48:17.77	3-15	4800	4950
☐	20150603-210000-source1.tar.gz	2015-06-03T21:00:00	09:41:57.300	87:48:17.77	3-15		
☐	20140128-211111-3C286.tar.gz	2014-01-28T21:11:11	13:31:08.287	30:30:32.96	13-10	4800	4950
		2014-01-28T21:11:11	13:31:08.287	30:30:32.96	13-10	5000	5330
		2014-01-28T21:11:11	13:31:08.287	30:30:32.96	13-10	5200	5530
☐	20150917-132441-maintenance-w3oh.tar.gz	2015-09-17T13:24:41	10:05:26.074	73:20:00.06	15-17	22000	22600
		2015-09-17T13:24:41	10:05:26.074	73:20:00.06	15-17	22100	22550
☐	20150917-142836-maintenance-w3oh.tar.gz	2015-09-17T14:31:15	02:27:04.100	61:52:27.10	15-15	22000	22600
		2015-09-17T14:31:15	02:27:04.100	61:52:27.10	15-15	22100	22550
		2015-09-17T14:31:15	02:27:04.100	61:52:27.10	15-15	22150	22450
☐	20150917-143104-maintenance-w3oh.tar.gz	2015-09-17T15:11:15	02:27:04.100	61:52:27.10	15-21	2900	4900
☐	20150917-145106-maintenance-w3oh.tar.gz	2015-09-17T15:21:15	02:27:04.100	00:00:01.74	15-08	2900	4900
☐	20150917-145943-maintenance-w3oh.tar.gz	2015-09-17T01:30:45	02:27:04.100	00:00:01.74	15-03	20900	22900
☐	20150917-150250-maintenance-w3oh.tar.gz	2015-09-17T11:30:45	02:27:04.100	00:00:01.74	15-14	20900	22900
☐	20150917-132644-maintenance-w3oh.tar.gz	2015-09-17T13:26:41	10:05:26.074	73:20:00.06	15-03	22000	22600
		2015-09-17T13:26:41	10:05:26.074	73:20:00.06	15-03	22100	22550
☐	20150917-125302-maintenance-w3oh.tar	2015-09-17T13:11:15	02:27:04.100	61:52:27.10	15-01	22100	22550
		2015-09-17T13:11:15	02:27:04.100	61:52:27.10	15-01	22150	22450
		2015-09-17T13:11:15	02:27:04.100	61:52:27.10	15-01	22000	22600

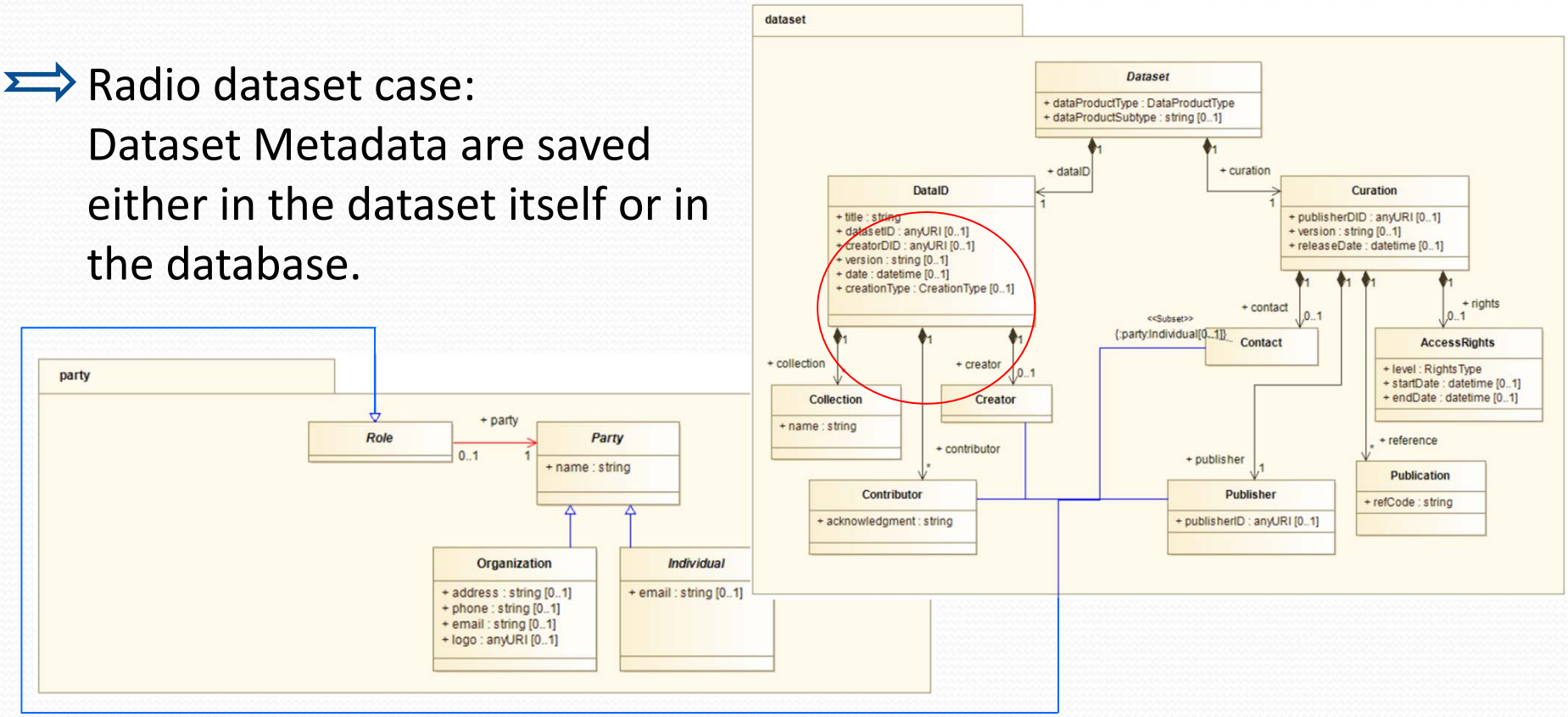
The VO perspective

- Analysis of VO Dataset Metadata Model
- Analysis of VO ObsCore mandatory components
- A look at the CAOM model
- TAP service and data access via DataLink

VO Dataset Metadata Model

Generic high-level metadata needed to describe a file or files which are considered to be a single deliverable (IVOA Dataset).

⇒ Radio dataset case:
Dataset Metadata are saved either in the dataset itself or in the database.

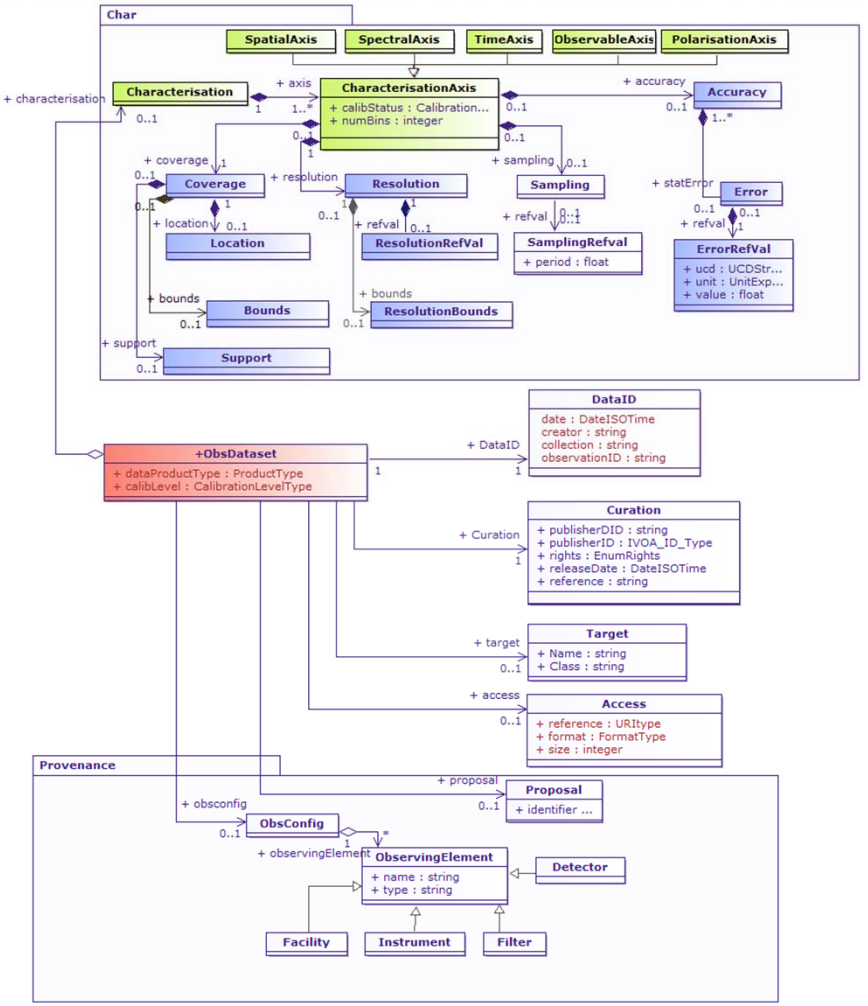


VO ObsCore

Global data discovery and access (multiple TAP, many archives) requires to expose
a uniform, standard data model.

Analysis of the VO ObsCore **mandatory** components.

For (at least) data discovery purposes, all the required metadata core components are present in the radio data model.



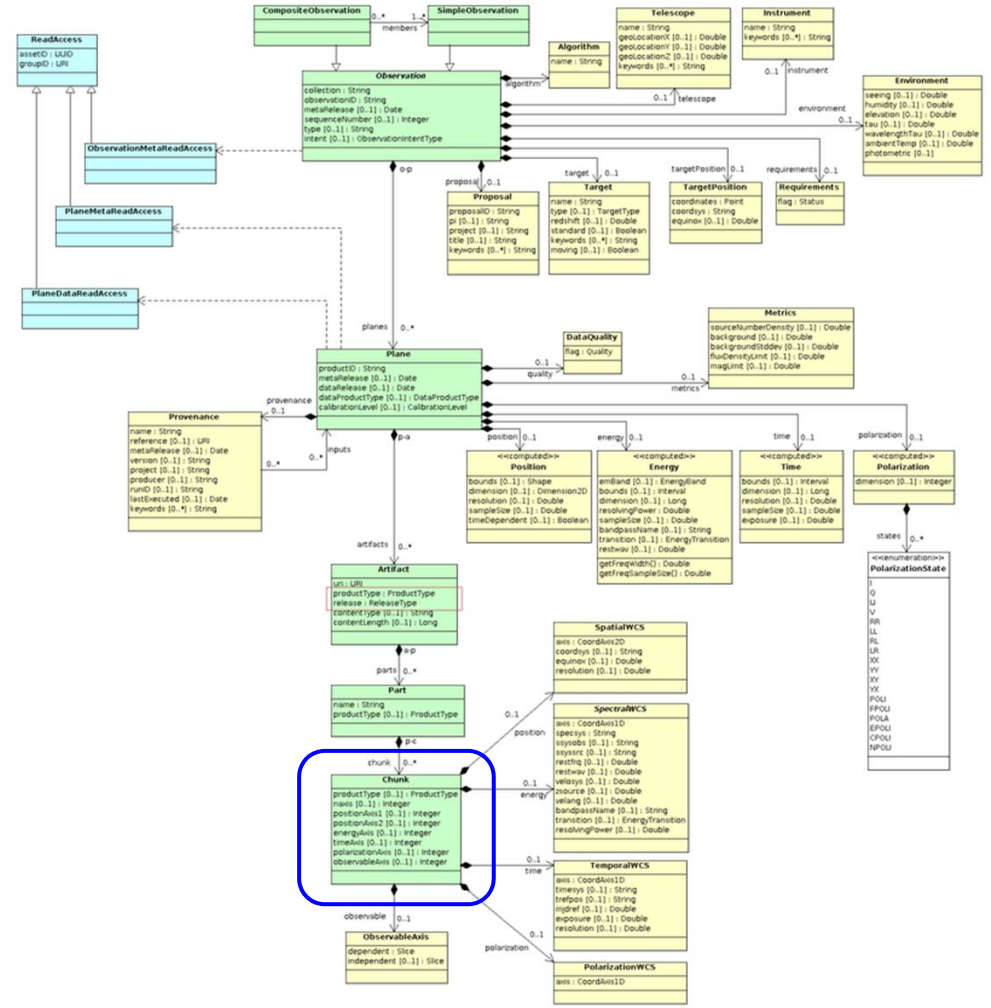
The CAOM Model

Common Archival Observation Model @ CADC

CompositeObservation
-> Observing Project

Artifacts -> tar files / MBFits

Chunk -> single subscan or file denormalized



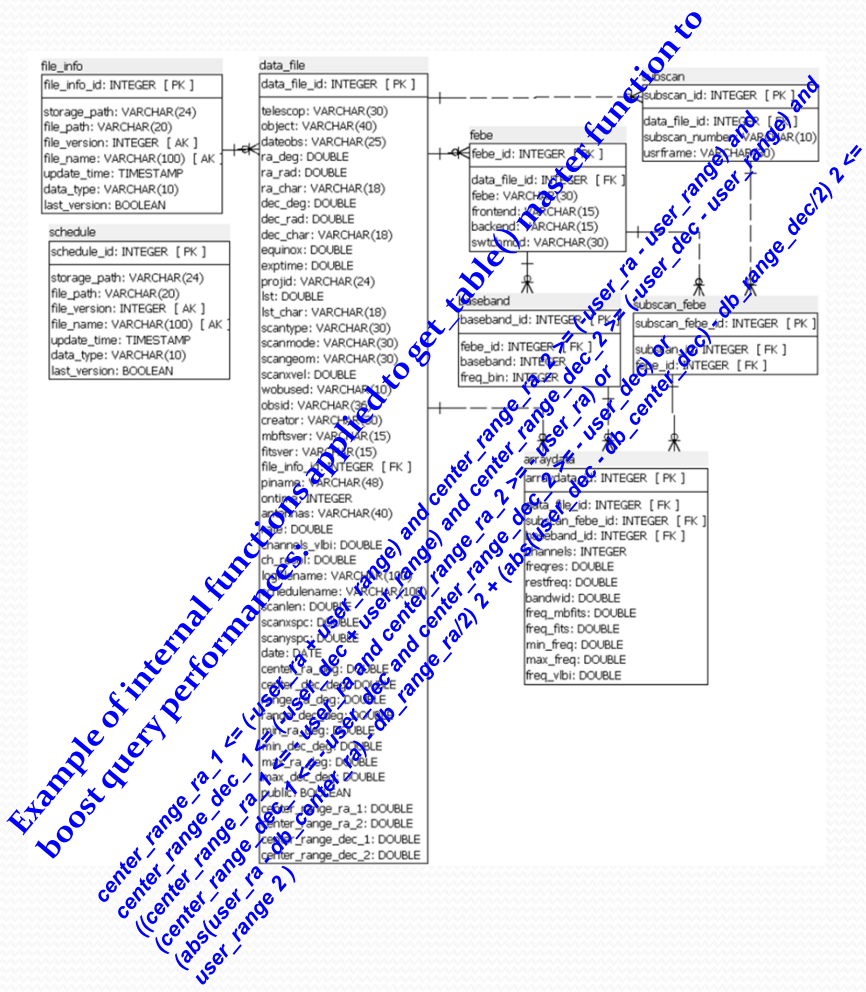
TAP and DataLink

- TAP service:
  - IA2 implementation
  - custom User Defined Functions to improve query performance

    get_table = f(**pos**, freq,...);

    pos= f(ra,dec,rad,..);
  - UDF at TAP level? (TBD)

- DataLink access to datasets
  - Access to complex datasets: content list, ancillary resources (related datasets)
  - additional metadata (provenance, data quality, etc.)



Conclusions

- Public Archive for the Italian radio telescopes: definition of a common data model, flexible architecture
- Web interface: definition of query parameters, SSO
- The Radio Archive and the VO: ready to go

AI 17-18