Why Publish to the VO?

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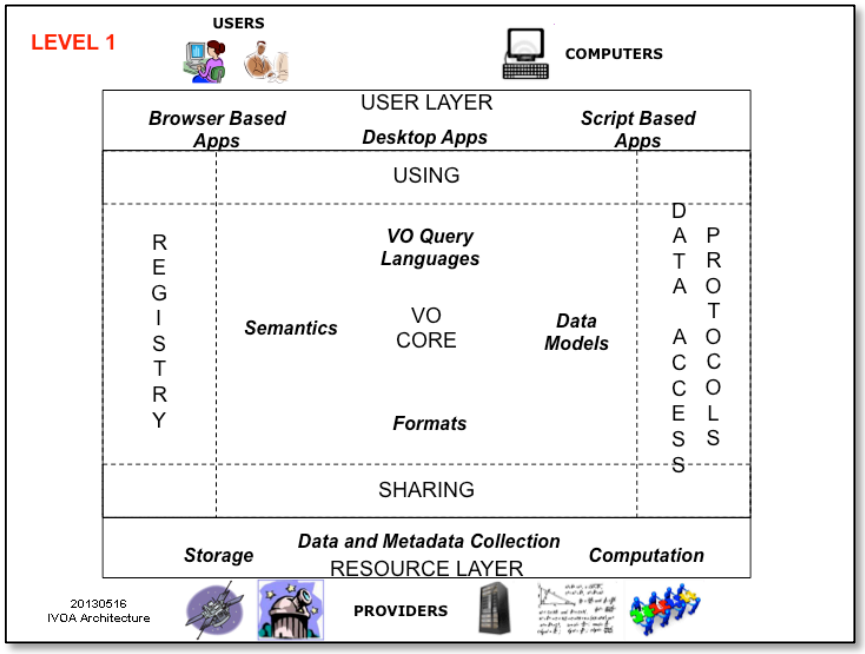
Canadian Astronomy Data Centre
Canadian Advanced Network for Astronomical Research

IVOA Mission Statement

- *"Allow **astronomers** to interrogate multiple data centers in a seamless and transparent way"*
- *"Provide new powerful analysis and visualization **tools** within that system"*
- *"Give **data centers** a standard framework for publishing and delivering services using their data."*

IVOA Framework

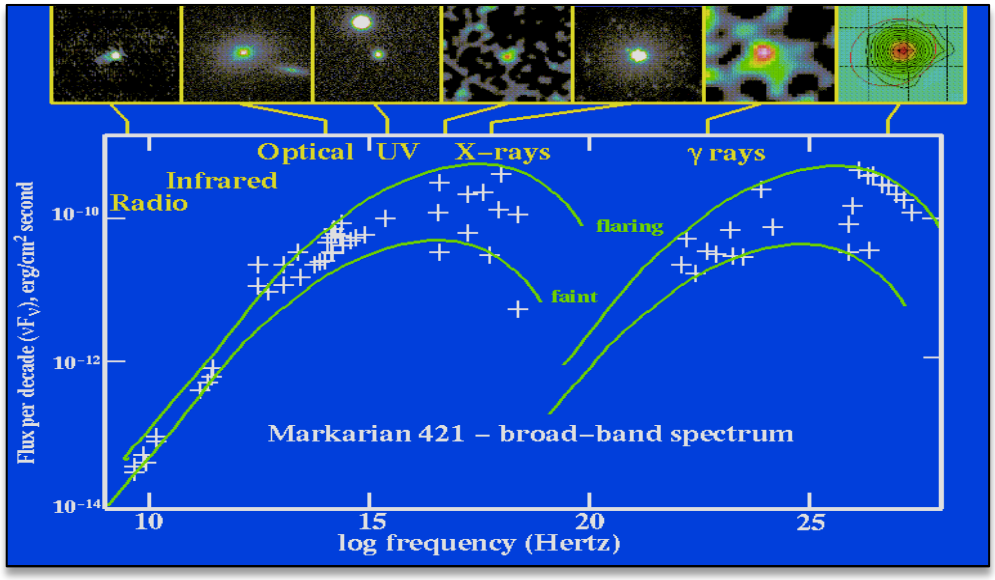
- *"Standardization of data and metadata"*
- *"Standardization of data exchange methods"*
- *"Use of a service registry…"*
- *"A framework which enables data centers to provide competing and co-operating data services…"*



IVOA Goal

To enable science!

- Data discovery
- Efficient data access
- Interoperable analysis tools
- Interoperable data
- Scalable visualization and computing
- Data Mining



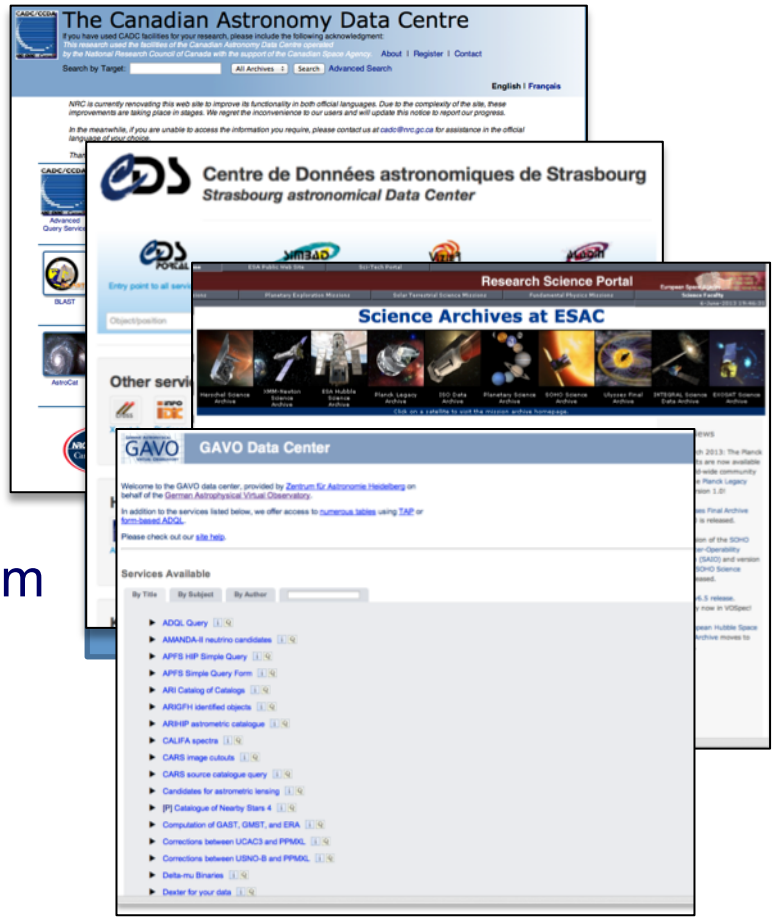
The Data Centre Reality

Mission focus

- Serving primary users
- Requirements from user committees

Perception of VO services

- Increased scope
- An extra layer of software to build
- A secondary service delivery mechanism to be maintained
- Retrofitting is expensive
- Data engineering is hard



A Different Perspective

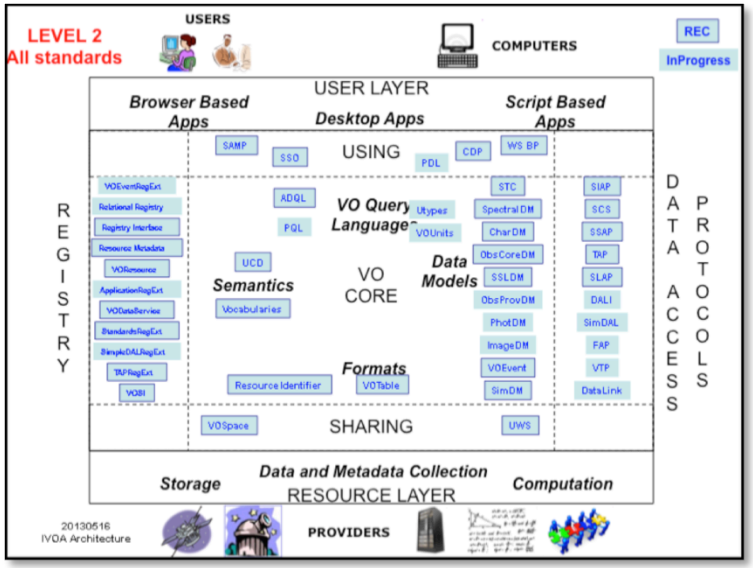
Why Publish ~~in~~ the VO?

Why Publish with the VO?

Why Publish with the VO

Use VO technologies in the data centre software stack

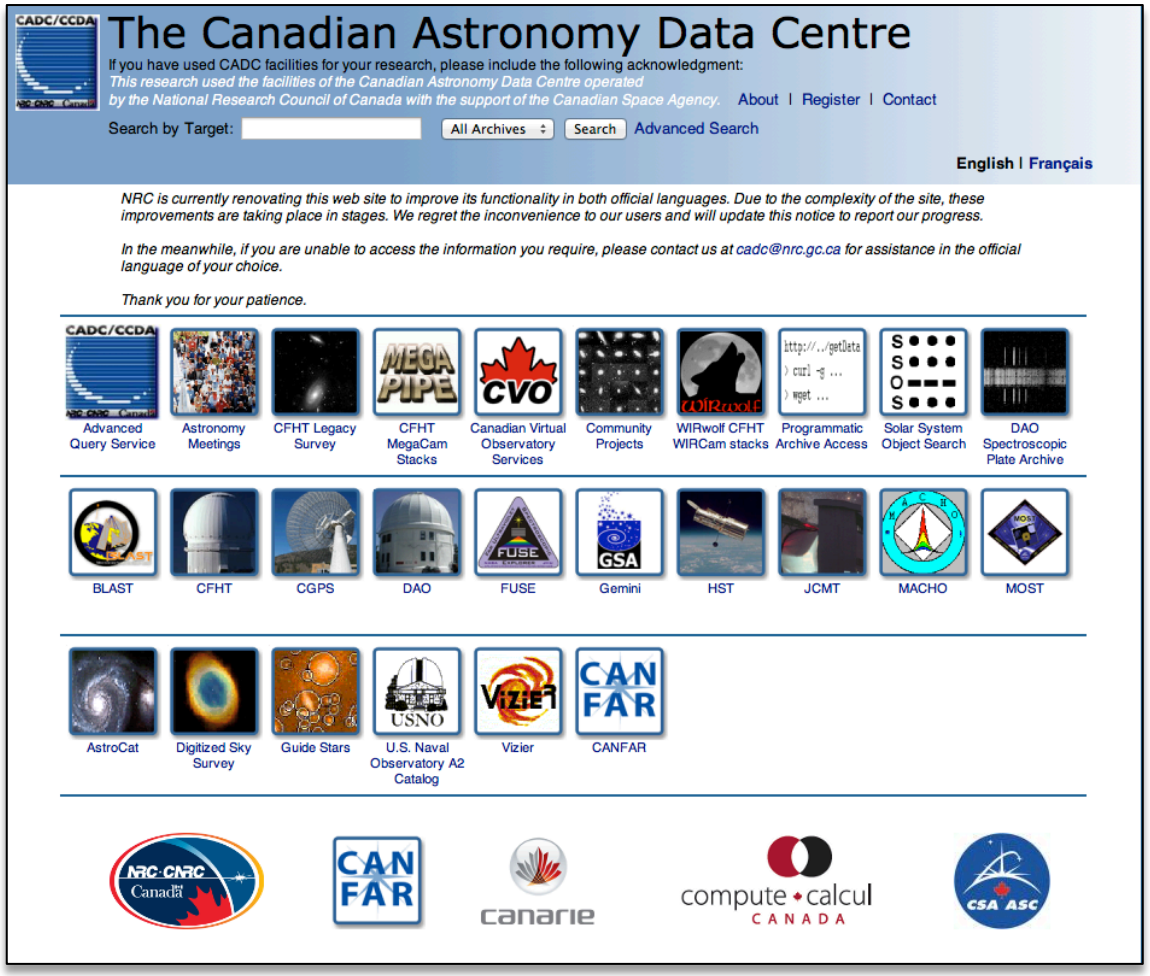
- Technical standards
- Format standards
- Data models
- Existing code bases
- Existing tools



Why?

- Leverage the intellectual investment from a wide community
  - Scientific
  - Technical
- Fundamental components for data centres
- No longer an “extra” layer

An example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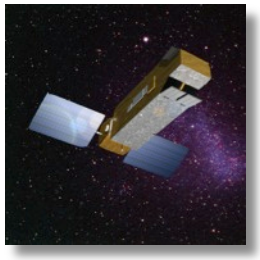
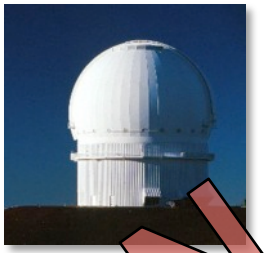


FUSE

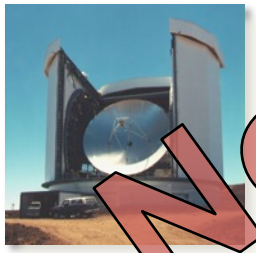
MOST



CFHT

Gemini

BLAST



JCMT

CGPS

MACHO

Heterogeneous collection:

- multiple missions and facilities
- multiple wavelengths

Pointed and survey observations

Many different data models

Continuous evolution

No Integration!

No Interoperability!

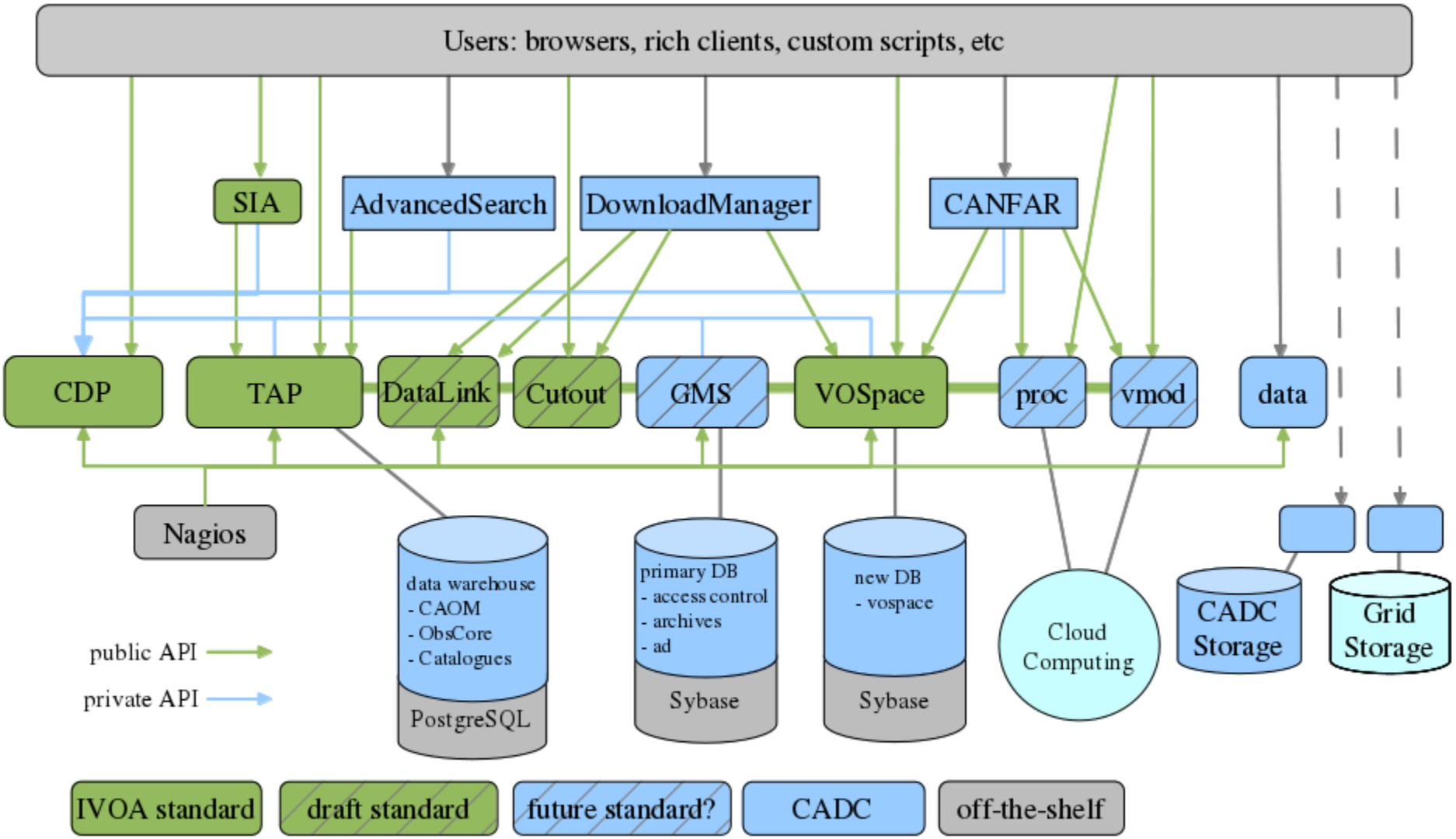
New approach

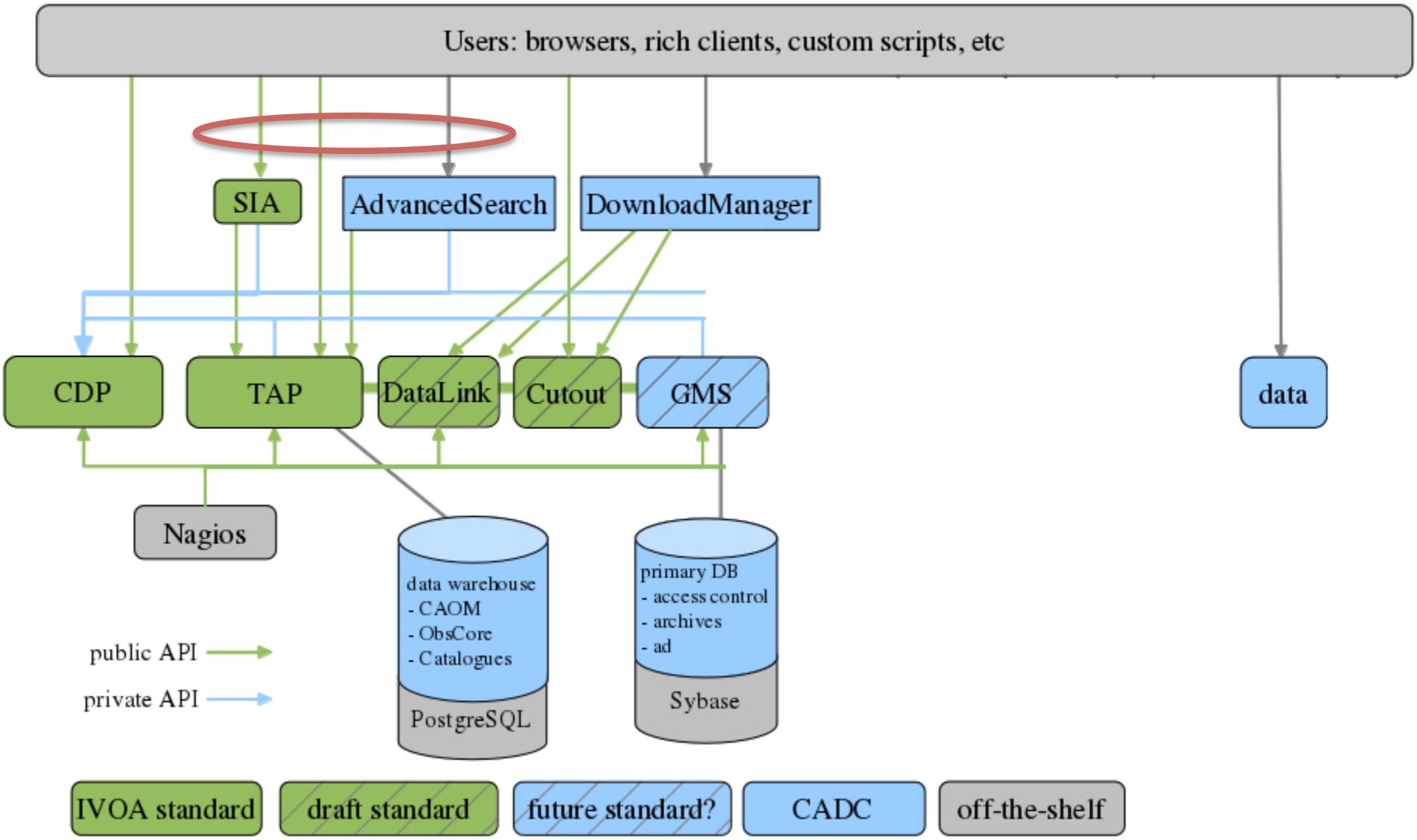
New perspective on VO standards

- VO has moved from periphery to core
- Re-using the intellectual investment of the IVOA

Applying to new CADC use cases:

- PI distribution: VOSpace, GMS, SSO
- Collaboration repositories: VOSpace, GMS, SSO
- Virtual machine repositories: VOSpace, GMS, SSO
- Sharing virtual machines: VOSpace, GMS, SSO
- Data publishing: VOSpace, GMS, SSO
- User databases: TAP, GMS, SSO


Users: browsers, rich clients, custom scripts, etc
SIA
AdvancedSearch
DownloadManager
CANFAR
CDP
TAP
DataLink
Cutout
GMS
VOSpace
proc
vmod
data
Nagios
data warehouse
- CAOM
- ObsCore
- Catalogues
PostgreSQL
primary DB
- access control
- archives
- ad
Sybase
new DB
- vospace
Sybase
Cloud Computing
CADC Storage
Grid Storage
public API
private API
IVOA standard
draft standard
future standard?
CADC
off-the-shelf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- ad
Sybase
public API
private API
IVOA standard
draft standard
future standard?
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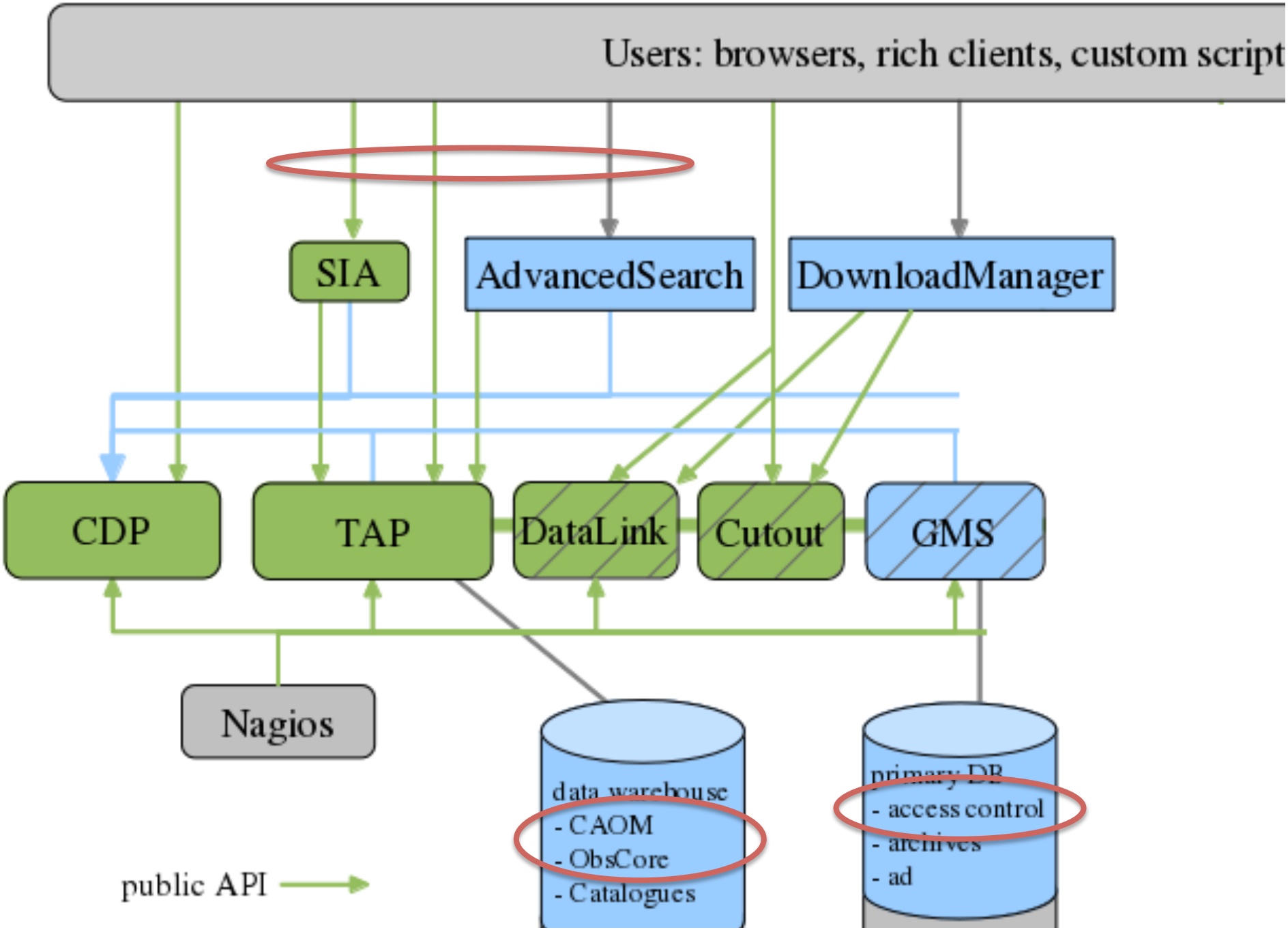
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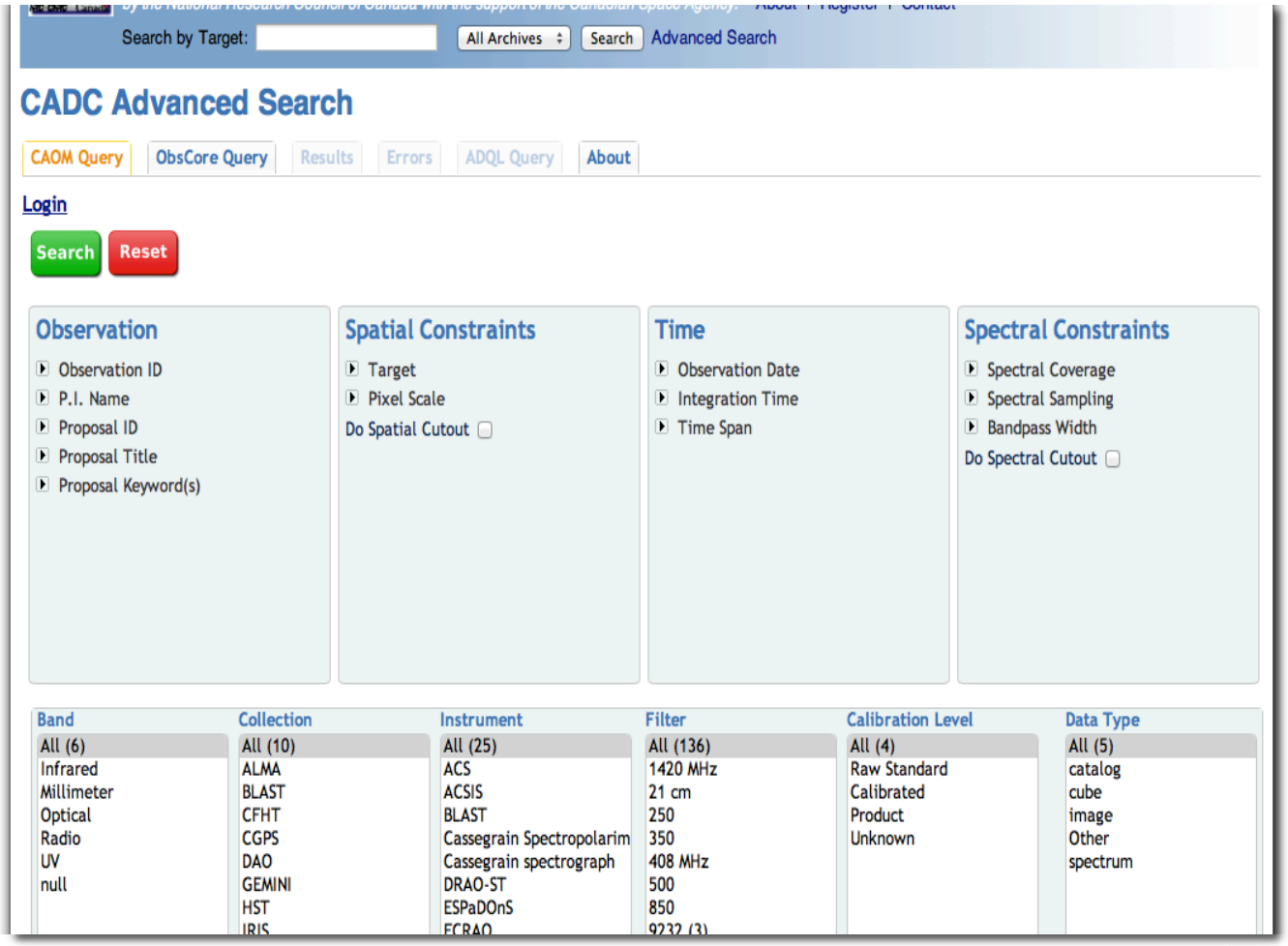
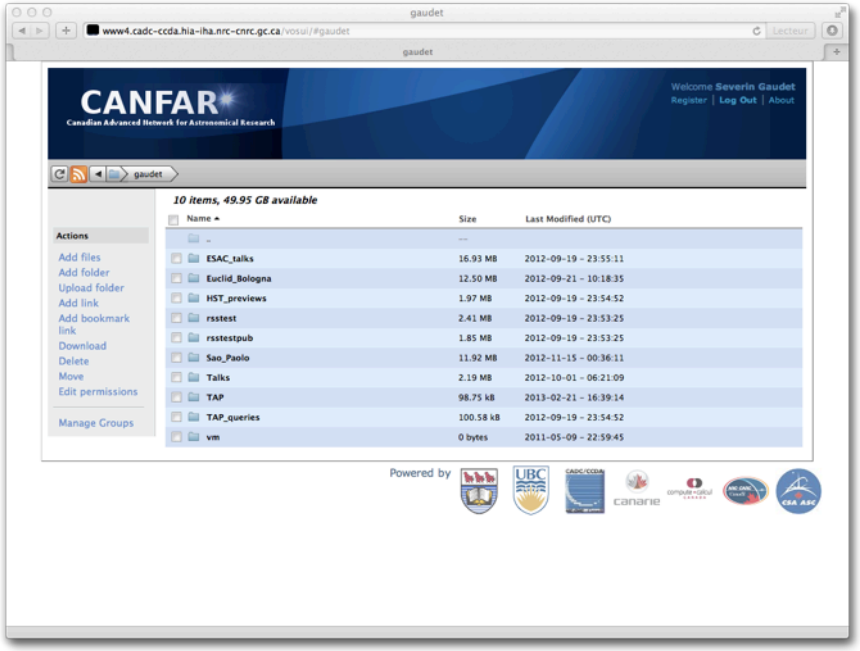
public API

New approach



VOSpace – User Storage

- User storage
  - Programmatic access
  - Browser UI
- TAP query input and output
- Data publishing (DOI)
- Project shared repository
- Virtual machine image repository
- Cloud processing file persistence
- Telescope PI data distribution



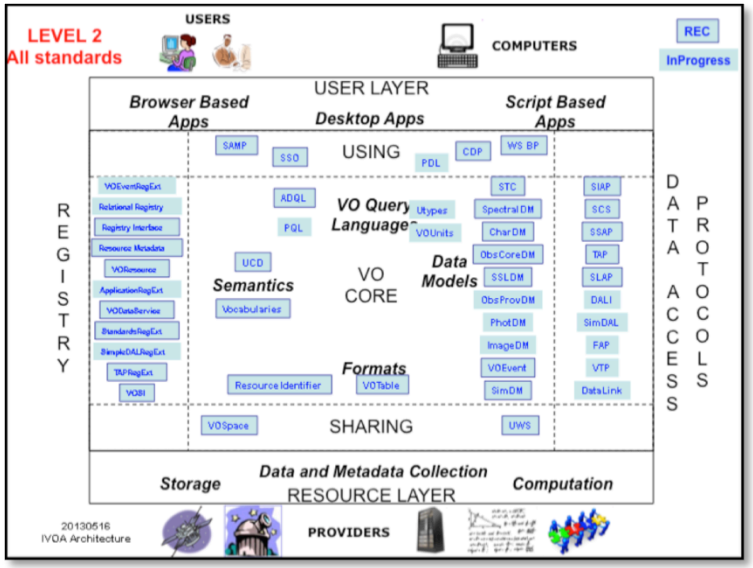
The Challenges

New projects (designing)

- Look to VO technologies
- Participate to inform new standards

Existing projects (retrofitting)

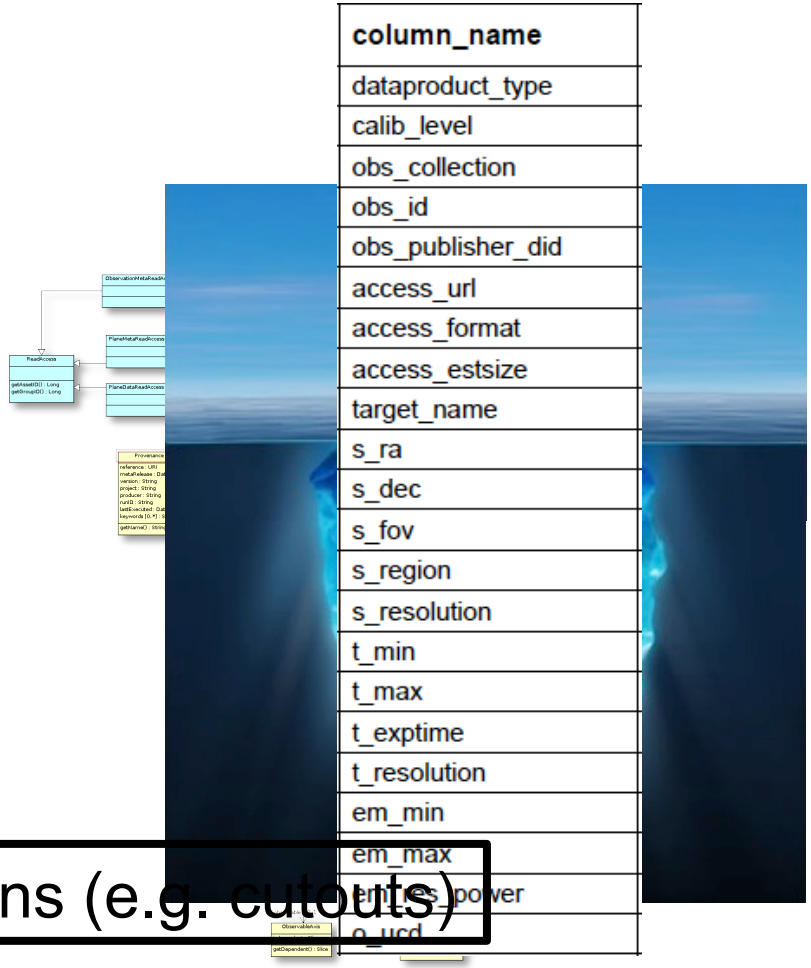
- Look for opportunities for incremental additions
  - Adding new functionality
  - Upgrading capacity
  - New use cases
- Participate to inform new standards



The Challenges

Data engineering

- For discovery and access
- Internal data models vs. VO data models
- Data model translation: pre-generated or on the fly?
- The only path to interoperability
- ObsCore is a good starting point



Discovery and Operations (e.g. cutouts)

The Next Generation Virgo Cluster Survey