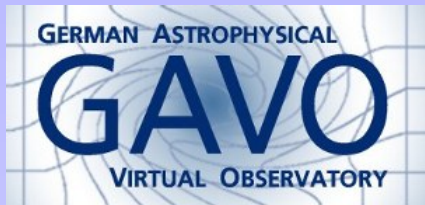


The Virtual Observatory



Markus Demleitner
msdemlei@ari.uni-heidelberg.de



- What is the Virtual Observatory?
- Findable?
- Accessible?
- Interoperable?
- Re-usable. . . Reproducible?



What's the VO?

It is...

not a website (“platform”),

not a bunch of websites,

not a programme that does all things astronomy.

Instead...

The VO is...

Standards for finding, accessing, using, and describing data

plus

~ 50 data centers worldwide adhering to these standards

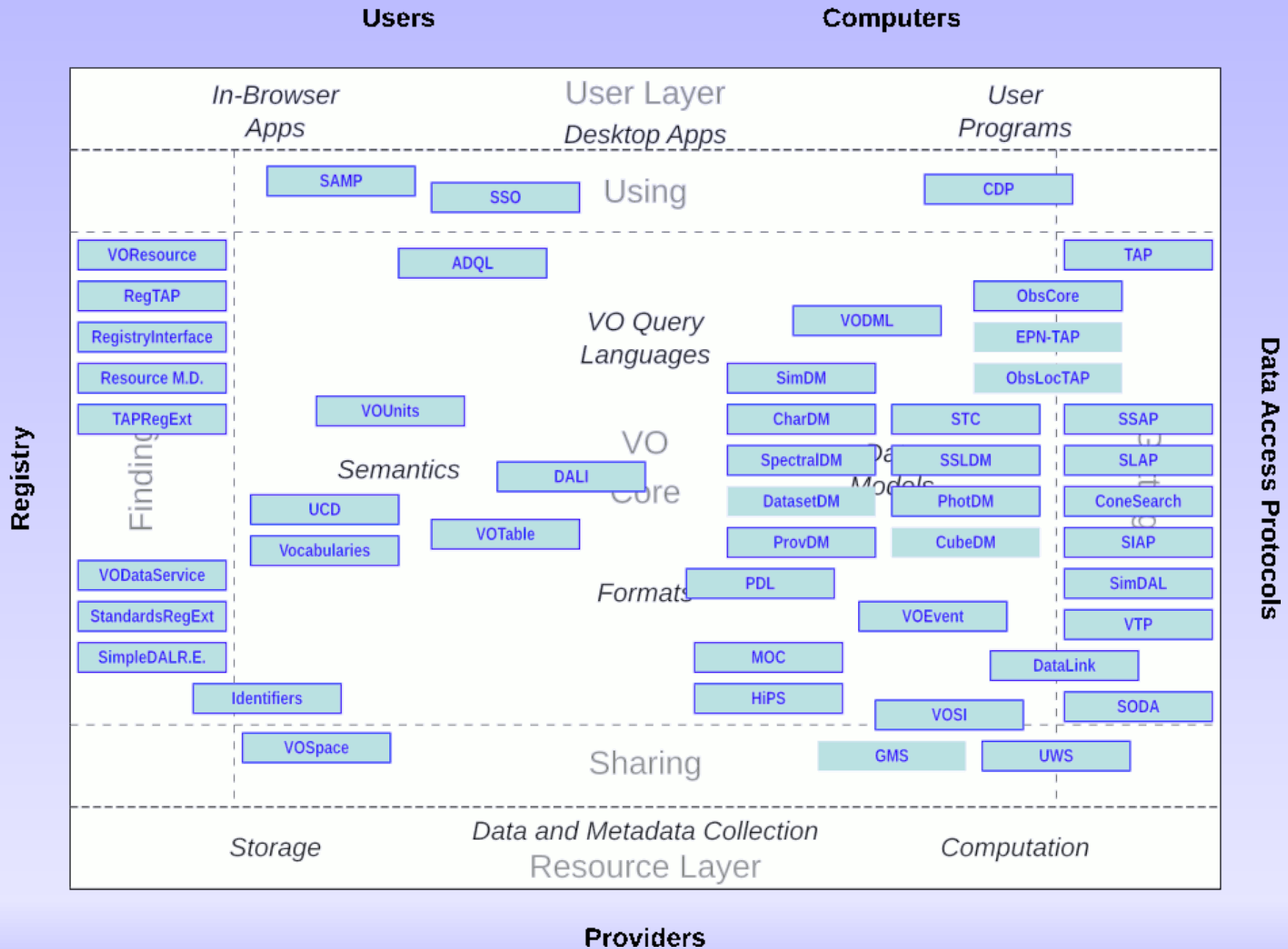
plus

a few volunteers operating some \pm central infrastructure

plus

authors of client software, libraries, and web pages making these resources available to astronomers and the public.

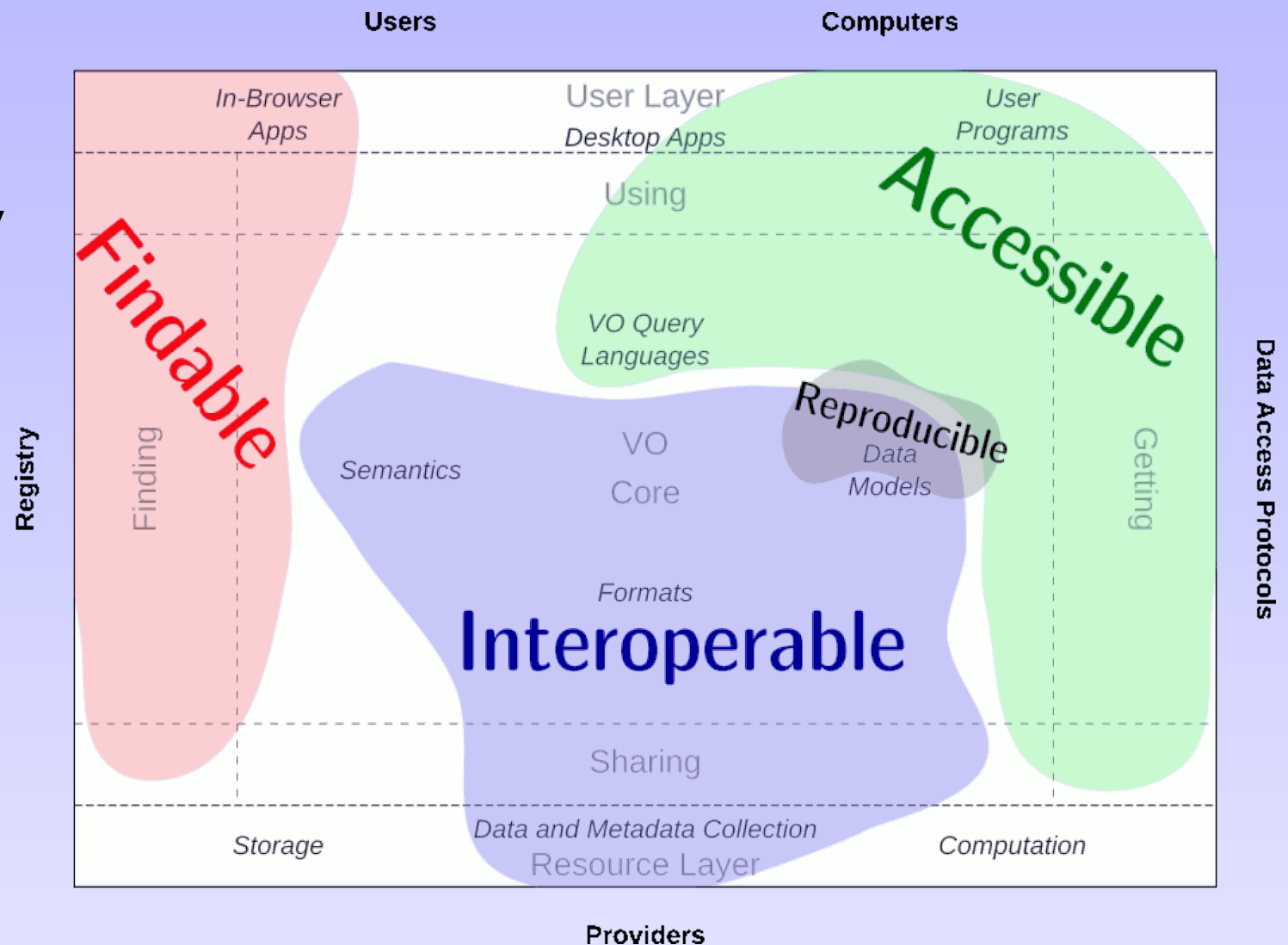
Standards



Mapping to FAIR

The IVOA standards landscape maps rather nicely to the FAIR principles.

Specifically...

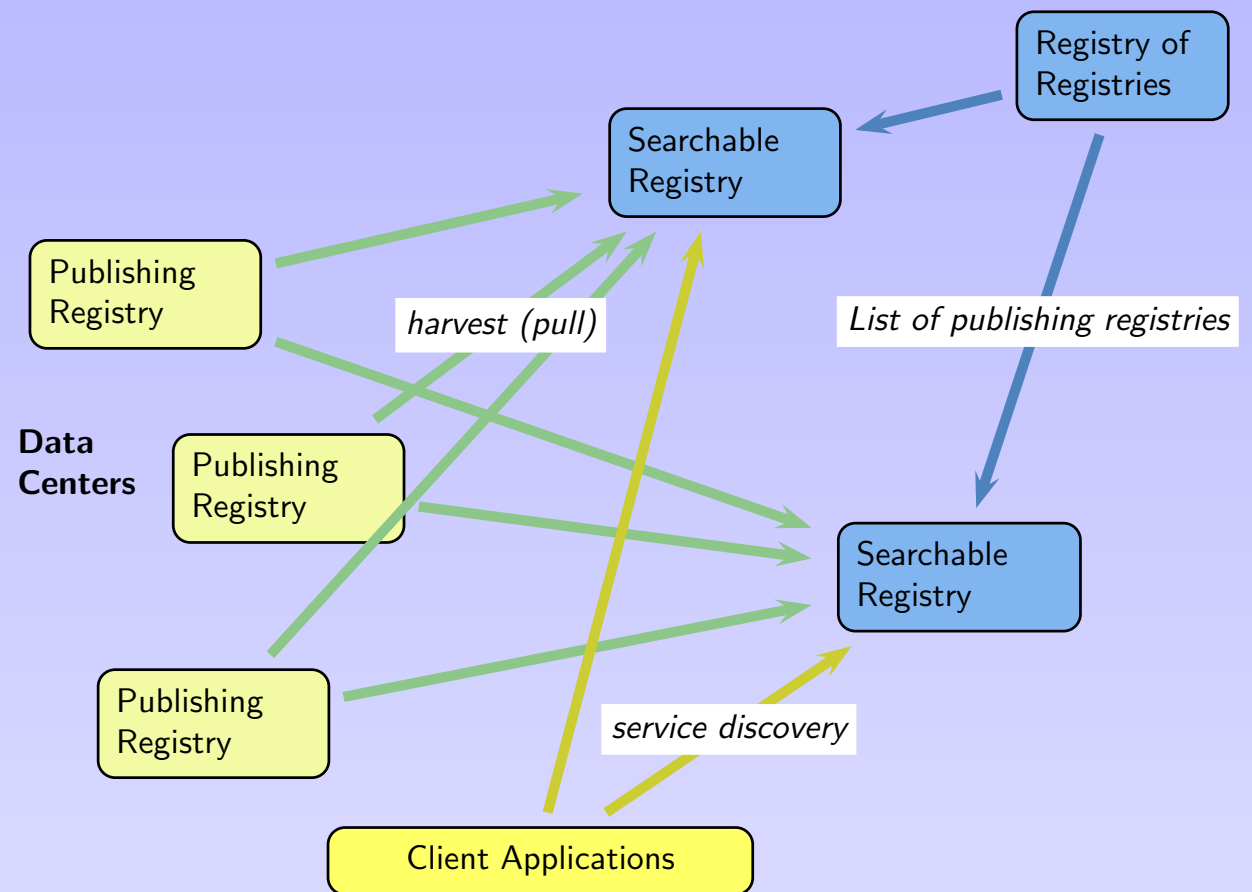


Findable

To find resources, the VO has the Registry.

Conceptually, that's just a big bunch of detailed metadata.

Technically, data centers operate publishing registries that are harvested by full registries which are then queried by client programmes.



Accessible

In the VO, people access data by first discovering services that *might* have data they want and then have a machine query these services.

Query protocols can be

- “typed”: SIAP for images, SSAP for spectra, SCS for catalogue data...
- “untyped”: ObsTAP for observational data, SimDAL for theory data... Most of these are based on transporting real database queries (TAP/ADQL).

Interoperable

Interoperability has many faces. Among them:

- Rich metadata in VOTable
- Light semantics to mark up “physics” in UCDs
- Machine-readable unit strings
- Agreed-upon vocabularies, possibly with hierarchy
- Data models... have been painful for us so far
- Authentication and Authorisation become really tricky (who runs the central parts?)
- ...and lots more

Reproducible

That's a hard one, depending on what one is aiming for.

Straightforward answer: Provenance DM, to at least have a chance to trace problems when they surface.

Takeup is... an uphill battle.

That's it

... unless you're curious about just *why* we're doing things in this way.

In case you haven't touched the VO yet, try any research-level tutorial from <https://dc.g-vo.org/VOTT>.

Thanks.

Why?

Why has the VO been built this way? In the world out there, everyone does “platforms”, no?

Well...

- Funding
- User freedom
- Operator efficiency
- Evolvability