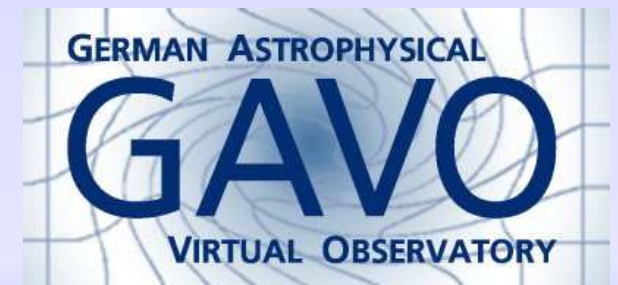# The Virtual Observatory

Your science in the Net

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- Why VO?

- What does it look like?

- Getting started

- Contribute!

Why VO?

Fringe Benefits

- Locate data useful to you (like ADS search)

- . . . relatively easily

- Access it (like PDF download)

- . . . with as little manual work as possible

The real #1 reason

Because we must – CCDs and CPU grow faster than the bandwidth at your desk: Data can no longer move to programs but the programs must go to the data:
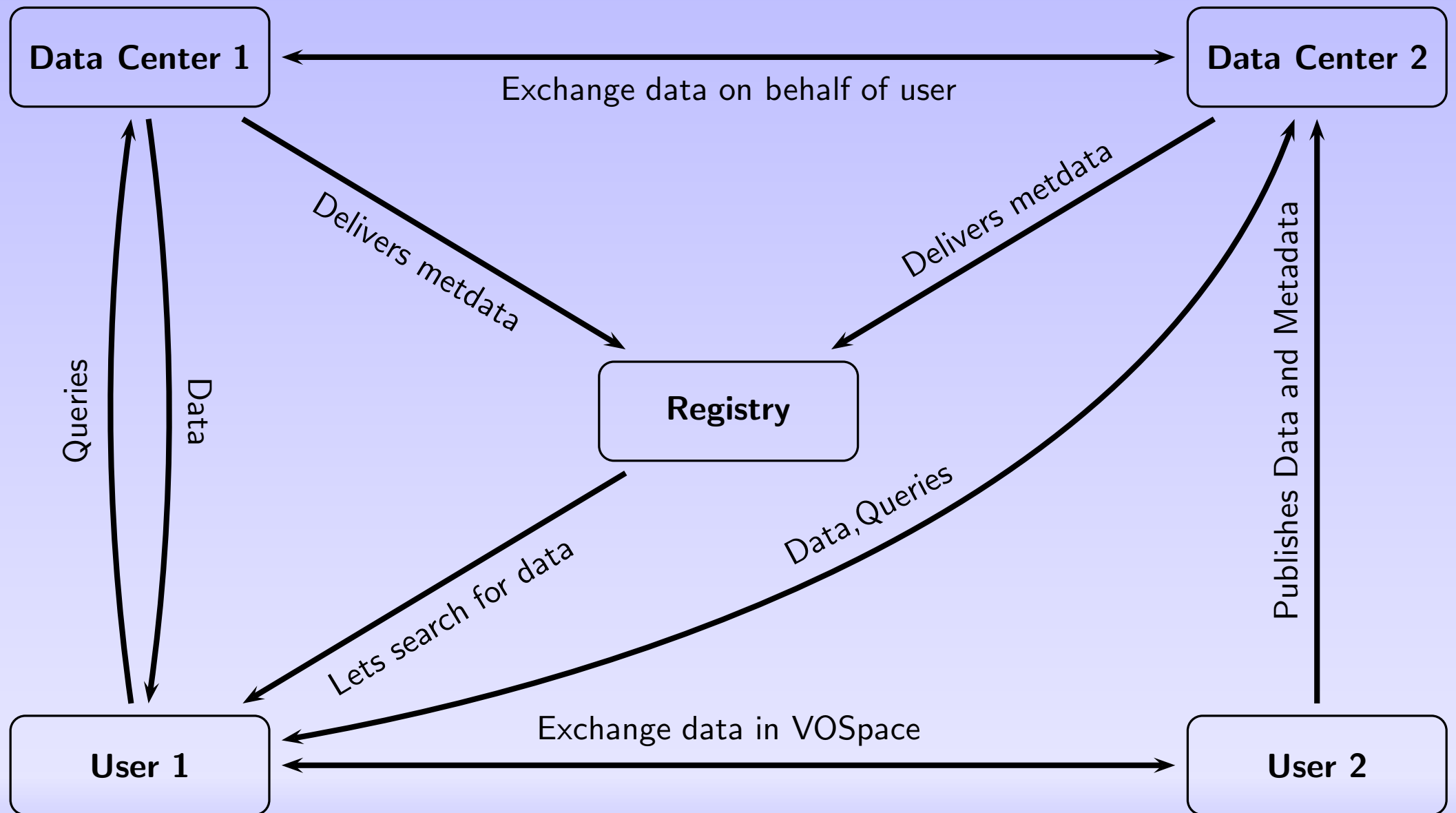
"Smarts must follow data"

Move the Mouse

Let's see the (fledgling) VO in action; example: we suspect some interesting property of infrared SEDs of carbon stars.

We will be using:

- VO Desktop and Topcat (desktop applications by Astrogrid UK)

- The Registry (an index of the services in the VO)

- A "custom" service at GAVO's data center (as a shortcut)

The VO is...

...a network of interoperating computers.

Representing Data

Within the VO, data is preferably represented in **VOTable**s.

To let machines figure out data (to some extent), VOTables for each column may declare

- **UCD** for saying "what is this?", and

- **utype**s for saying "what's it for?".

A popular program to manipulate VOTables (and convert them to other formats) is topcat.

Transferring Data

Some useful protocols you may want to use include:

- SCS – search in object catalogs (VODesktop)

- SIAP – search for images (VODesktop, Aladin)

- SSAP – search for spectra (splat, VOSpec)

- TAP – remote querying (soon VODesktop)

- PLASTIC – exchange data between programs

- VOSpace – storing and transmitting data server-side

ADQL

The Astronomical Data Query Language is just SQL with some
extensions. Queries look like this:

```
SELECT * FROM (
  SELECT ALL q.name, q.raj2000, q.dej2000, p.alphaFloat,
    p.deltaFloat, p.vmag FROM (
    SELECT TOP 100 raj2000, dej2000, name, z
    FROM veronqsos.data
      WHERE notRadio!='*'
      AND z BETWEEN 0.5 AND 1
      AND dej2000<-40) AS q JOIN
    ppmx.data AS p ON (1=CONTAINS(
      POINT('ICRS', q.raj2000, q.dej2000),
      CIRCLE('ICRS', p.alphaFloat, p.deltaFloat, 0.3))))
  WHERE vmag BETWEEN 10 and 11
```

Next steps

- ⟨NVO Registry Interface⟩ – Discover VO services from your Browser

- ⟨DataScope⟩ – Cone search from your browser

- ⟨VO software for your desktop⟩ – Collected by EuroVO

- ⟨GAVO data center⟩ – Publish your data to the VO

- Check out this afternoon's workshop.

. . . Thanks for your attention