VAMDC

Guy Rixon
IVOA meeting, ESO, November 2009

VAMDC redux
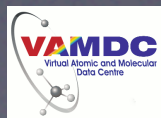
- **V**irtual **A**tomic and **M**olecular **D**ata **C**entre

- EU FP7 project

- July 2009 to December 2012

- http://vamdc.eu/

Mission (official)

"VAMDC ... an interoperable e-Infrastructure ... exchange of atomic and molecular data. ... 15 administrative partners representing 24 teams ... scientists from a wide spectrum of disciplines in [AM] Physics ... users of their AM data (astrochemistry, atmospheric physics, plasmas) ..."

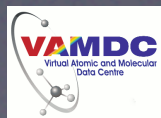*(Abstracted from the project summary on vamdc.eu)*

Mission (translated)

- Make AM data exchangable

- Common data-transfer formats

- Common data models

- Common dictionaries

- Promote data publishing

- Promote user programming

- Service standard protocols

Partners

(1) **Centre National de Recherche Scientifique (CNRS)** (Paris, Reims, Grenoble, Bordeaux, Dijon, Toulouse)

(2) **The Chancellor, Masters and Scholars of the University of Cambridge** (CMSUC)

(3) **University College London** (UCL)

(4) **Open University** (OU)

(5) **Universitaet Wien** (UNIVIE)

(6) **Uppsala Universitet** (UU)

(7) **Universitaet zu Koeln** (KOLN)

(8) **Istituto Nazionale di Astrofisica** (INAF)

(9) **Queen's University Belfast** (QUB)

(10) **Astronomska Opservatorija** (AOB)

(11) **Institute of Spectroscopy RAS** (ISRAN)

(12) **Russian Federal Nuclear Center - All-Russian Institute of Technical Physics** (RFNC-VNIITF)

(13) **Institute of Atmospheric Optics** (IAO)

(14) **Corporacion Parque tecnologico de Merida** (IVIC)

(15) **Institute for Astronomy RAS** (INASAN)

The Atomic Spectroscopy Group from NIST (Gaithersburg, USA)

The Centre for Astrophysics from Harvard University (Boston, USA)

VAMDC databases

- Spectra of frozen molecules (CO, CO2, H2O, CH4, CH3OH, XCN)

- Spectra and or Raman spectra of solids such as graphite, amorphous carbon, silicates, meteorites)

- STARK-B: "Stark" widths and shifts of isolated atomic and ionic spectral lines broadened by collisions with electrons and ions.

- Spectr-W^3 for plasma spectroscopy and other applications

- CDMS: Cologne database for molecular spectroscopy

- UMIST Database for Astrochemistry

- Spectroscopic properties of PAHs and carbon clusters

Databases (2)

- eMOL: electron molecule collision database

- Carbon Dioxide Data Bank (CDSD).

- Ozone line list (S&MPO).

- GhoSST : "Grenoble Astrophysics and Planetology Solid Spectroscopy and Thermodynamics" database service

- Line lists for the ozone isotopologues in MW and IR range and UV cross-sections

- VALD

Databases (3)

- Methane line lists

- KInetic Database for Astrochemistry

- CHIANTI

- TOPbase

- TIPbase

- OP monochromatic opacities

- XSTARdb

VAMDC applications

- Time dependent chemical kinetic models of molecular clouds

- absorption / emission high-resolution spectra simulation at given experimental conditions from ro-vibration line lists

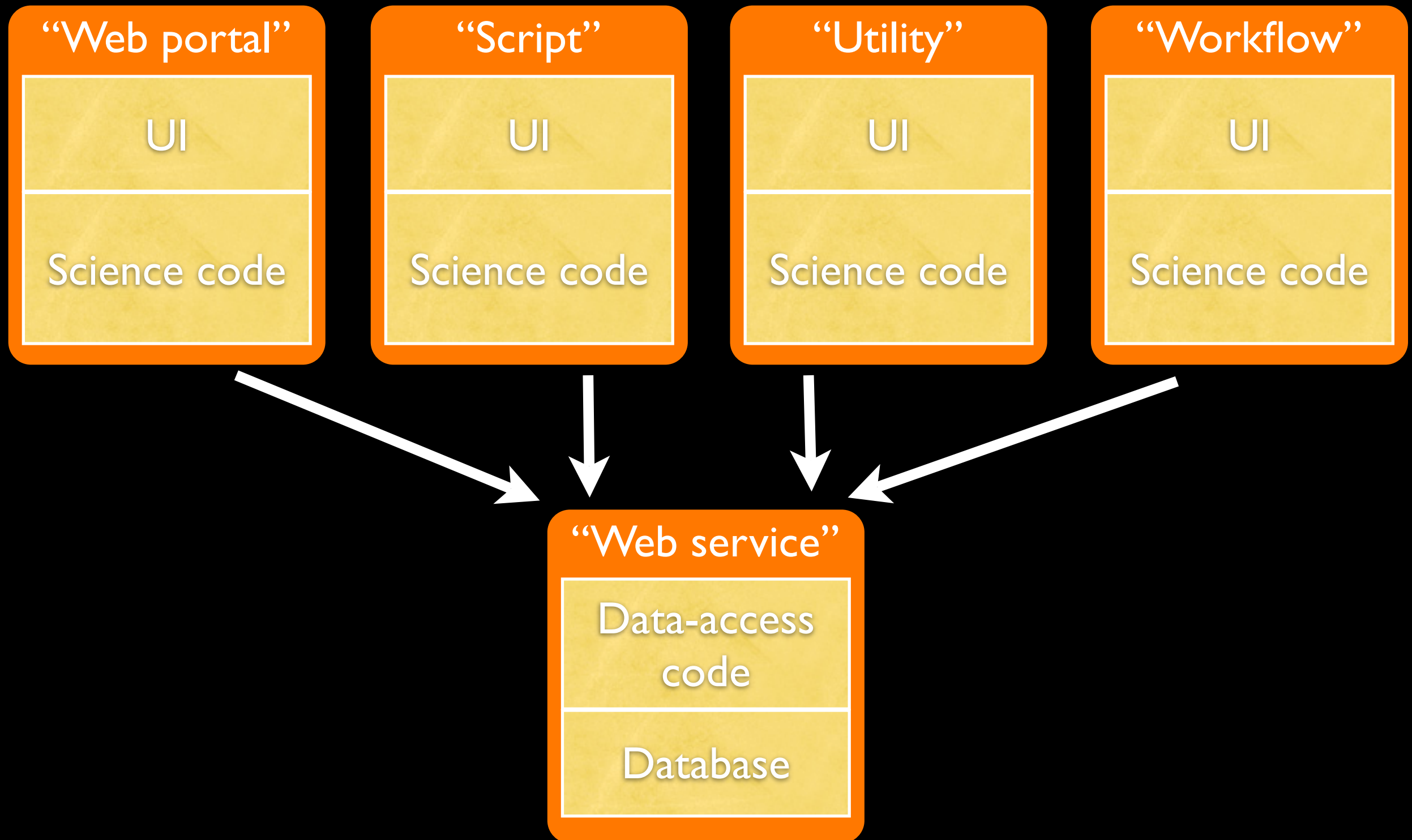- VALD extraction tools

- XTDS

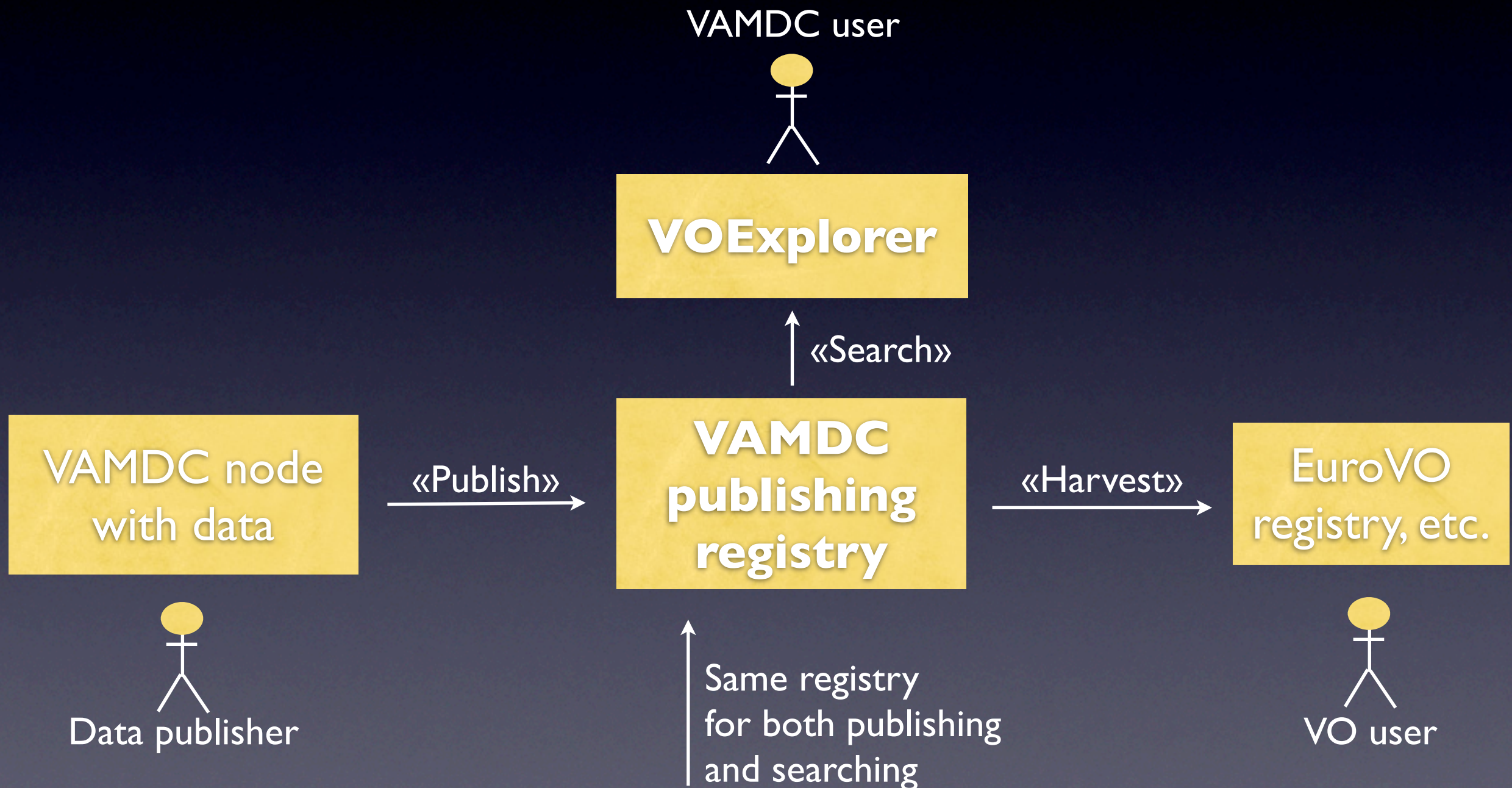- SPVIEW

- OPserver

- XSTAR

Why does this matter to IVOA?

- Astronomy is a consumer of AM data

- IVOA ideas reused in VAMDC

- VAMDC ideas reused in IVOA?

Commonality: web services

"Web portal"	"Script"	"Utility"	"Workflow"
UI	UI	UI	UI
Science code	Science code	Science code	Science code

"Web service"

Data-access code

Database

Commonality: registry

VAMDC user

VOExplorer

«Search»

VAMDC node with data → «Publish» → **VAMDC publishing registry** → «Harvest» → EuroVO registry, etc.

Data publisher

Same registry for both publishing and searching

VO user

Commonality: desktop

- VAMDC will reuse and extend VODesktop

- VAMDC will be using SAMP

- VAMDC will probably be using TopCat

- ...and VOSpec, presumably

New ideas: XQuery on DM

- XSAMS is one of VAMDC's data models

- XML Schema for Atoms, Molecules & Solids

- http://www-amdis.iaea.org/xsams/about.html

- XML schema ⇒ hierarchical, not relational

- Proposed to use XQuery instead of SQL

New ideas: fine-grain citation

- Consider a response from a VAMDC data-service

  - Many records

  - each can be data from a different provider;

  - service is data aggregator

- VAMDC want to get recognition and citations for data *providers*, not just for aggregators