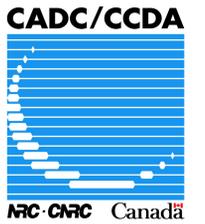


Infrastructure and Virtual Observatory Standards



Implementing IVOA services saves time

For all the custom parts of the system architecture, **we must design and implement.**

With IVOA standards, the designs are done by a broad community and the prototyping has proven the designs; **we just have to implement** and open-source software can help.

Shameless plug for open source software from CADCC:
<http://code.google.com/p/opencadc/>

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Client Software

Using IVOA standards for web services allows users to use many third-party client tools that understand these protocols (see <http://www.ivoa.net/newsletter/> for news about these tools). Power users can write their own scripts and tools to automate their interactions with web services; using IVOA standards helps these users by letting them use libraries and example code from the community.

Once users become familiar with the system by using the Web UI, they often move on to using the web services directly. By using these web services at the core, we easily insure a consistent experience for our users. For example, a user can put a file into VOSpace using a command-line tool and see it through the associated Web UI, or they can perform a simple query through the SIA service, the Web UI, or TAP and get consistent results.

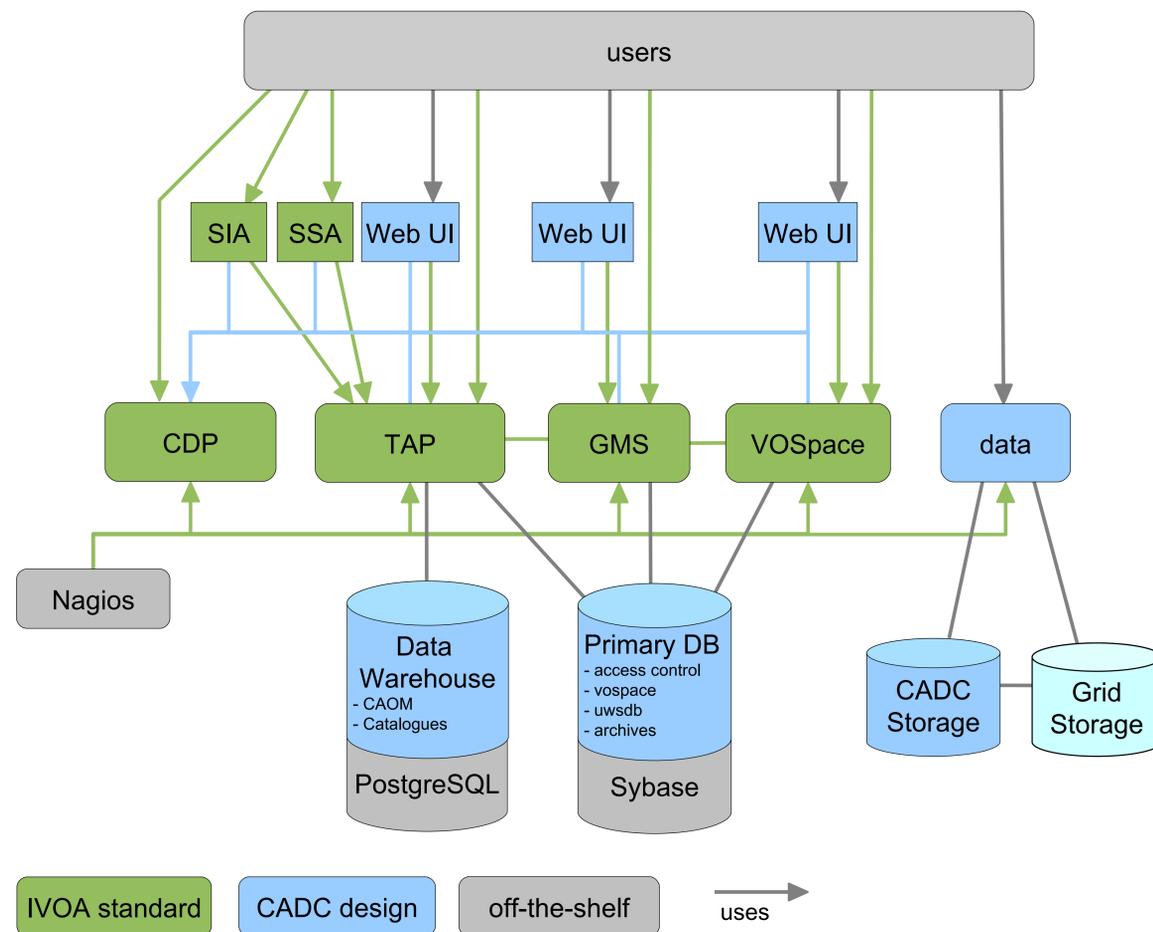
User Interface

Web UI applications use web services to perform most of the heavy lifting and concentrate in presentation. Since they interact with web services using standard protocols, they are isolated from implementation details and do not have to worry about protocol changes.

AdvancedSearch (web UI for a CAOM tables in TAP) generates an ADQL query from form input and executes the query using the TAP service; it is isolated from many technical details that are death with entirely in TAP. The query result is displayed using an off-the-shelf VOTable viewer based on XSLT and Javascript. This gives us rich query and result display with low effort by using standards: TAP, ADQL, VOTable.

Group Management (web UI for GMS) allows users to create and maintain groups of users.

VOSpaceBrowser (web UI for VOSpace) allows users to graphically browse the VOSpace and download files. Although owners of content in VOSpace must have X509 certificates, users who browse via the UI can login via certificate or username/password; in either case, the UI uses CDP to get the necessary credentials to access the VOSpace service on their behalf: VOSpace users can safely share their files with team members who do not have X509 certificates (but do have CADCC accounts and are members of the team).



Core Services

CDP, GMS, TAP, and VOSpace form the core infrastructure for new CADCC user services.

Users query the archives using TAP – directly or via a user interface (web pages) or one of the simpler IVOA services. All data found via query is delivered by the data web service.

Users store, browse, and retrieve files using VOSpace. Project teams are defined in GMS; teams collaborate by sharing files in VOSpace.

CDP allows users with X509 certificates to create and store a short-term proxy certificate so that CADCC web services can perform actions on their behalf. Examples: TAP can persist query results directly to VOSpace, SIA can query TAP in authenticated fashion in order to see proprietary content (tables or rows) visible to that user.

The CADCC implementation of CDP allows users who login with username and password to use internally generated certificates; this allows the Web UI applications to access web services like TAP, GMS, and VOSpace in authenticated fashion.

Operational Support

VOSI defines an availability resource that is embedded in each web service and reports on the current health and functionality of the service; services implement internal diagnostic tests.

Operations staff configure Nagios to monitor VOSI-availability resources and issue alerts as necessary.

Authentication

Web UIs support anonymous access (http), login (username/password authentication on http), and X509 Certificate Authentication (https).

Web Services support anonymous (http) and X509 Certificate Authentication (https).

The Sea of Acronyms

ADQL – Astronomical Data Query Language	CADC – Canadian Astronomy Data Centre	CAOM – Common Archive Observation Model
CDP – Credential Delegation Protocol	GMS – Group Membership Service	TAP – Table Access Protocol
VOSI – Virtual Observatory Support Interface	VOSpace – Virtual Observatory Space	VOTable – Virtual Observatory Table
UI – User Interface	XSLT – Extensible Stylesheet Language Transformations	