

TAP Development at the Chandra X-ray Center

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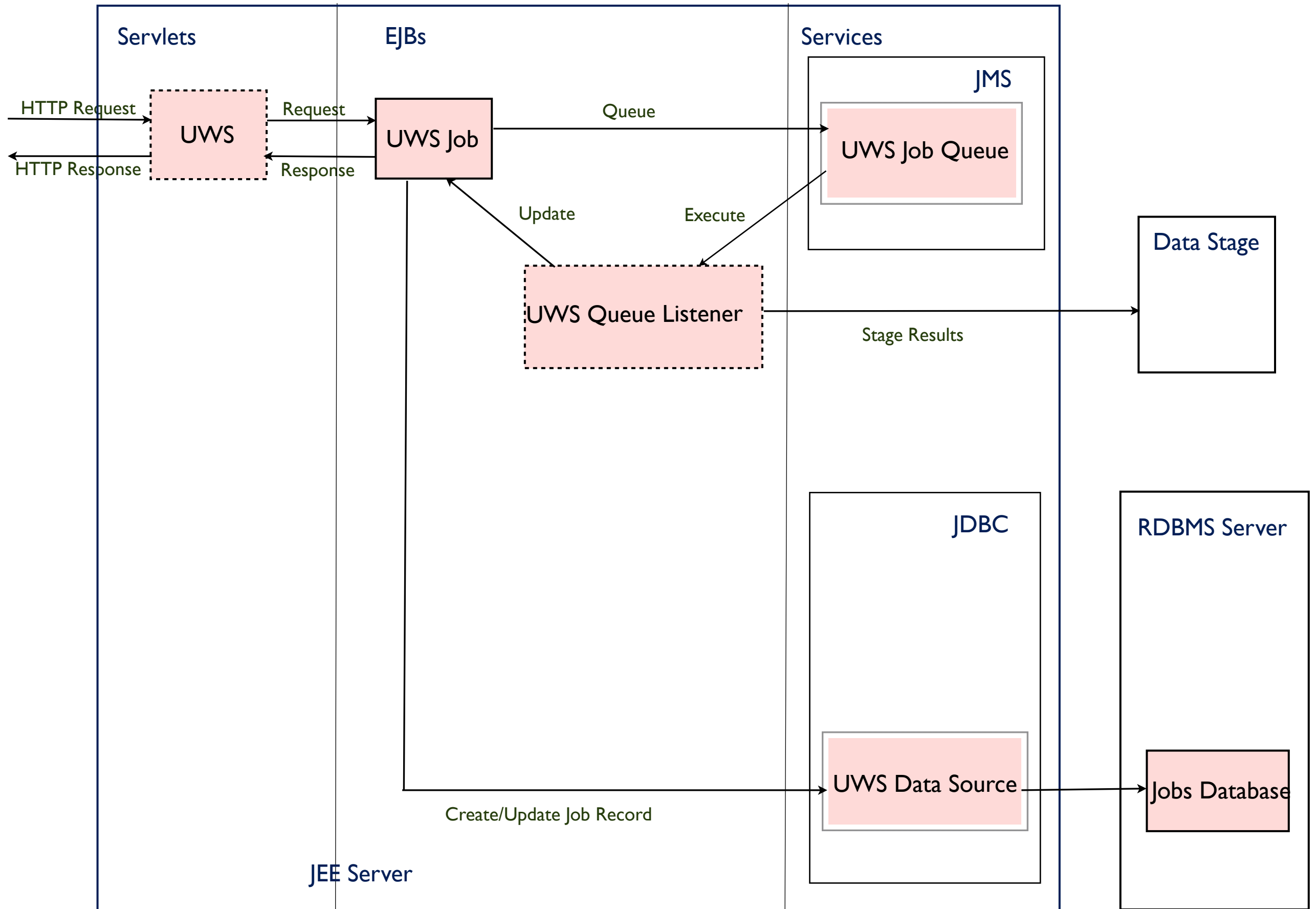
Overview

- Introduction
- Universal Worker Service implementation
- TAP development for the Chandra Source Catalog and integration with existing capabilities
- Compliance with the documents and standards
- Demo
- Conclusion

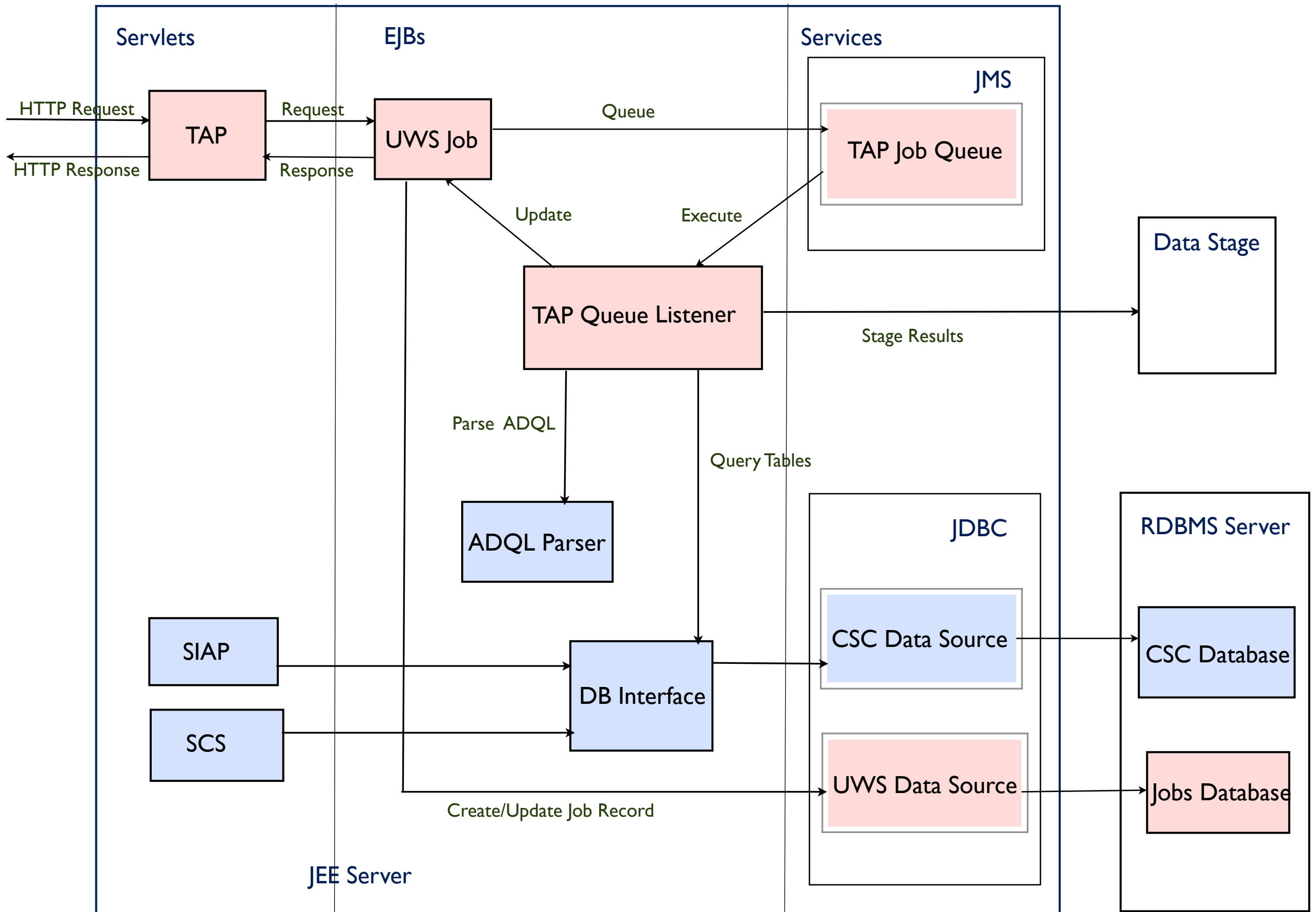
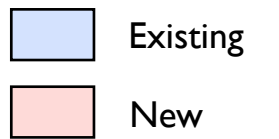
Introduction

- Consolidate and standardize custom archive interfaces, internal and external.
- Improve availability of the data through VO enabled clients.
- Team worked with the published documents, no prior involvement in the standards development.

UWS



TAP



UWS Compliance

- Implements UWS Pattern V1.0
- Complete hierarchy of URI's for web resources
- **job-id, phase, error, results, parameters** fully implemented
- **executionduration, destruction** cannot be set during execution but this seems to be allowed
- **quote** cannot be estimated, “don't know” is allowed
- **owner** will be implemented together with security
- **sync** job implemented by internally setting **phase** to **run** and blocking endpoint until completed, it can be started by a POST or a GET

TAP Compliance

- Implements TAP V1.0 recommendation
- VOSI V1.0 availability, capabilities, tables
- No TAP version yet
- ADQL V2.0 from astrogrid, no geometrical functions yet
- `async`, `sync` queries following UWS pattern
- Format VOTable V1.2, TSV
- `runid`, `maxrec`, `overflows`
- Case insensitive and order independent parameters
- No `upload` yet
- Complete TAP_SCHEMA
- HTTP and TAP errors

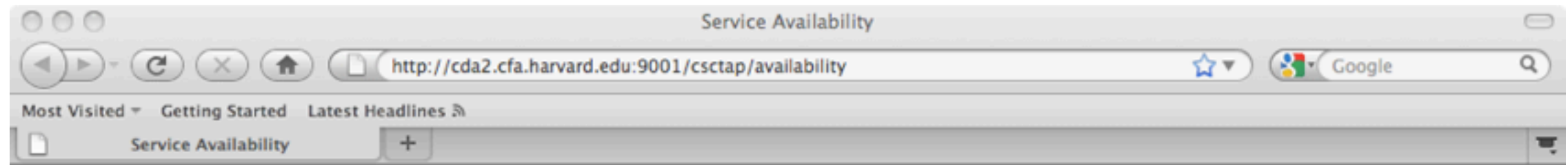
Demo

- Access the service directly
- Access through a TAP client

Conclusion

- Overall not too much coding when using existing frameworks and off the shelf components but needed an experienced developer.
- Many specs to interpret when first starting, some questions still remain.
- Reference implementations were very useful.
- UWS can be re-used in other applications like data products download.
- Planning to continue with TAP for the Chandra Observation Catalog and try ObsTAP.

Demo: VOSI availability

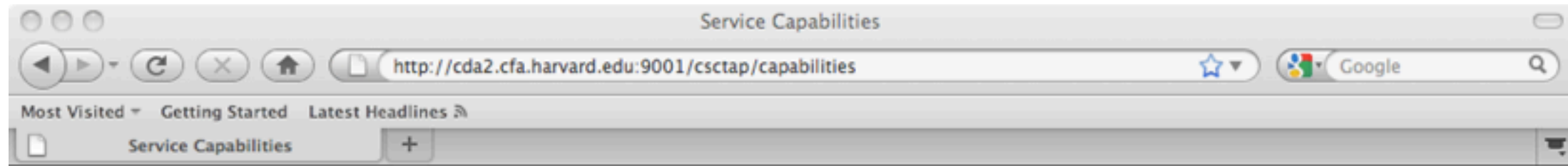


Service Availability

The Chandra Source Catalog service has been up since 2010-05-13T19:57:49Z.

Done

Demo: VOSI Capabilites



Service Capabilities

Standard ID	Type	Interface role	Interface type	Access URL	Query type	Result type
ivo://ivoa.net/std/TAP			vs:ParamHTTP	http://cda.cfa.harvard.edu/csctap		
ivo://ivoa.net/std/VOSI#capabilities		std	vs:ParamHTTP	http://cda.cfa.harvard.edu/csevosi/capabilities	GET	application/xml
ivo://ivoa.net/std/VOSI#availability		std	vs:ParamHTTP	http://cda.cfa.harvard.edu/csevosi/availability	GET	application/xml
ivo://ivoa.net/std/VOSI#tables			vs:ParamHTTP	http://cda.cfa.harvard.edu/csevosi/tables	GET	application/xml

Done

Demo: VOSI Tables

Table Metadata

http://cda2.cfa.harvard.edu:9001/csctap/tables

Table Metadata

Table Metadata

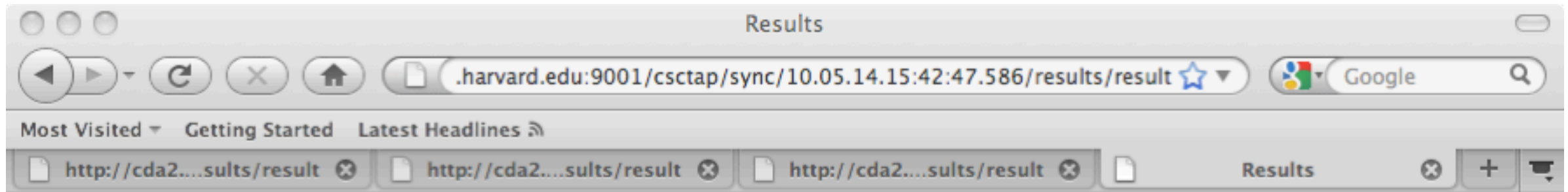
Table list	
Table	Description
columns	Per TAP spec PR-TAP-1.0-20100225
key_columns	Per TAP spec PR-TAP-1.0-20100225
keys	Per TAP spec PR-TAP-1.0-20100225
schemas	Per TAP spec PR-TAP-1.0-20100225
tables	Per TAP spec PR-TAP-1.0-20100225
master_obi_assoc	Chandra Master Source/Source Observations Association
master_source	Chandra Master Sources
obi_source	Chandra Source Observations

Foreign keys			
Source table	Target table	From column	Target column
columns	tables	table_name	table_name
key_columns	columns	from_column	column_name
key_columns	columns	target_column	column_name
key_columns	keys	key_id	key_id
keys	tables	from_table	table_name
keys	tables	target_table	table_name
tables	schemas	schema_name	schema_name
master_obi_assoc	master_source	msid	msid
master_obi_assoc	obi_source	posid	posid
master_source	master_obi_assoc	msid	msid
obi_source	master_obi_assoc	posid	posid

Columns					
Table	Column	Datatype	Unit	UCD	Description
columns	column_name	VARCHAR			Column name...
columns	datatype	VARCHAR			ADQL datatype as in...
columns	description	VARCHAR			Brief description o...
columns	indexed	INTEGER			An indexed column (...)
columns	principal	INTEGER			A principal column ...
columns	size	INTEGER			Length of variable ...

Done

Demo: sync job



Results

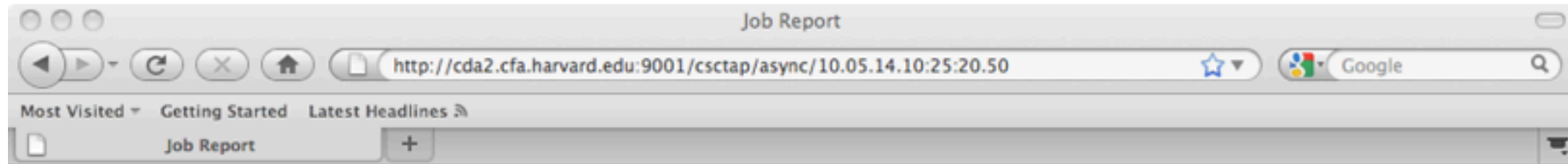
name	ra	dec
CXO J080220.3-395159	120.58473446	-39.86654314
CXO J080231.8-395141	120.63273741	-39.86152295
CXO J080224.2-395843	120.60087465	-39.97886081
CXO J080244.5-395512	120.68547619	-39.92025562
CXO J080156.1-400112	120.48380778	-40.0200342
CXO J080259.5-400508	120.74827687	-40.08573269
CXO J080151.9-400541	120.46654703	-40.09485081
CXO J080304.2-395320	120.76748457	-39.88891425
CXO J080322.7-395158	120.84490329	-39.86628492
CXO J080214.2-395443	120.55914631	-39.91211983

Demo: async job submit and run

```
Terminal — bash — 80x24  
Data:tapdemo pz$ curl 'http://cda2.cfa.harvard.edu:9001/csctap/async?request=doQ  
uery&lang=adql&query=select top 10 m.name, m.ra, m.dec from master_source m'  
Data:tapdemo pz$
```

```
Terminal — bash — 80x24  
Data:tapdemo pz$ curl -d PHASE=RUN 'http://cda2.cfa.harvard.edu:9001/csctap/asyn  
c/10.05.14.10:25:20.50'  
Data:tapdemo pz$
```

Demo: job report



Job Report

Job ID	10.05.14.10:25:20.50
Phase	COMPLETED
Execution duration	0
Destruction	
Owner ID	
Quote	
Error	
Parameters	
query	select top 10 m.name, m.ra, m.dec from master_source m
lang	adql
request	doQuery
Results	
result	result

Done

Demo: discovery from a TAP client

The screenshot shows the VO Explorer - TAP interface. On the left, there is a sidebar with 'Resource Lists' including 'Recent Changes', 'Examples', 'Sandpit', 'Chandra', and 'TAP'. Below this are sections for 'New Smart List', 'Actions' (Position Query, Multi Query, Table Query), and 'About' (Selection: CatalogService, Further Info, Email Curator).

The main window displays 'Contents of TAP - 2 resources' with a table:

Flag...	Title	Capability	Valida...	Date
	Chandra Source Catalogue			2010-05-06
	Hipparcos catalogue			2010-05-07

Below the table, there are tabs for 'Information' and 'Table Metadata'. The 'Information' tab is active, showing a detailed description of the Chandra Source Catalogue (CSC) and its search services. The text describes the Chandra spacecraft and the CSC's features, including its high-resolution mirror and imaging detectors. It also provides a 'Further Information...' link.

Below the description, there are sections for 'Relationships derived-from' (linking to [ivo://cxc.harvard.edu/cda](http://vo://cxc.harvard.edu/cda)), 'Show Table Metadata', and three service descriptions:

- Catalog cone search service**: Chandra source catalogue simple cone search. Verbose Parameter supported. Maximum Search Radius 100.0. Maximum Results Returned 10000000. Test Query: RA 148.0 Dec 69.3 SR 0.5. Interface Type Http Query Role std Access URL <http://cda2.cfa.harvard.edu:9001/cscvo/coneSearch?>
- Image access service (SIAP)**: Chandra source catalogue simple image access search. Interface Type Http Query Role std Access URL <http://cda2.cfa.harvard.edu:9001/cscsiap/queryImages?>
- Table/Database access service (TAP)**: Interface Type Http Query Access URL <http://cda2.cfa.harvard.edu:9001/csctap>

On the right side of the main window, there are 'Tags' and 'Availability' sections. The 'Availability' section shows a green circle and the text 'Service OK'.

Demo: query from a TAP client

The screenshot displays the 'Task Runner for Chandra Source Catalogue' application. The main window is titled 'Chandra Source Catalogue' and shows a query editor on the left and a table of columns on the right. The query is: 'Select Top 10 m.name, m.ra, m.dec From master_source as m'. The table lists columns such as '1 acis_hetg_...', '2 acis_hetg_...', and '3 acis_letg_n...'. The interface includes buttons for 'Edit', 'Comment', 'Validate Edit', 'Execute!', 'Diagnostics', and 'History stack'. A right-hand sidebar shows a 'COMPLETED' status for the query and options to 'View' or 'Download...' the result.

Task Runner for Chandra Source Catalogue - untitled

Chandra Source Catalogue

Interface: Basic

Execute!

Edit Comment

Select Top 10 m.name, m.ra, m.dec From master_source as m

Chandra Source Catalogue

Catalogue

Table master_source Filter columns

Chandra Master Sources

#	Column Na...	Description	Dataty...	UCD	Units
1	acis_hetg_...	Total number of ACIS/HETG observations contributing to the Master int Sources Table record of the source		meta.num...	
2	acis_hetg_...	Total ACIS/HETG observation exposure time (seconds of good time) for all ACIS/HETG observations contributing to the Master Sources Table record of the source	double		
3	acis_letg_n...	Total number of ACIS/LETG observations contributing to the Master int Sources Table record of the source			
		Total ACIS/LETG			

Validate Edit

COMPLETED

result

Actions

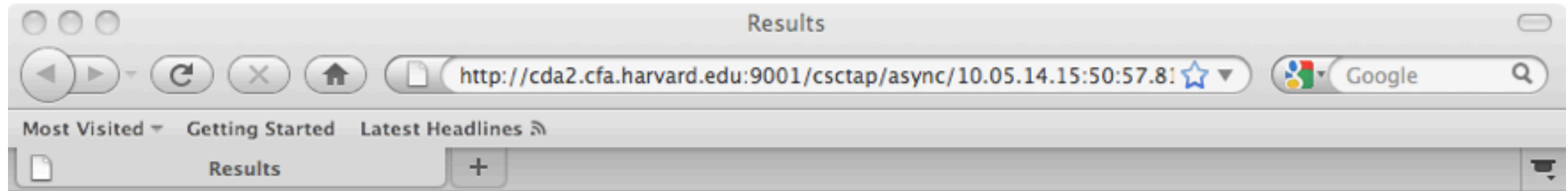
- View
- Download...

About

file

Diagnostics History stack

Demo: results from a TAP client



Results

name	ra	dec
CXO J080220.3-395159	120.58473446	-39.86654314
CXO J080231.8-395141	120.63273741	-39.86152295
CXO J080224.2-395843	120.60087465	-39.97886081
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