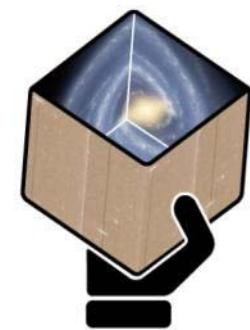


GENIUS

The Gaia archive



gaia



X. Luri
Universitat de Barcelona



GENIUS March 2017

Archive current contents

External Catalogues

• Hipparcos & Hipparcos new red.	1.2×10^6	rows
• IGSL (Initial Gaia Source List)	1.2×10^9	rows
• 2MASS	4.7×10^8	rows
• Tycho2	2.5×10^6	rows
• UCAC4	1.1×10^8	rows
• Hubble Source Catalogue v1.0	2.9×10^7	rows

Gaia

• Gaia DR1 catalogue	1.1×10^9	rows
• TGAS	2.0×10^6	rows

Crossmatches

• Crossmatch tables between Hipparcos, 2MASS, Tycho2... and Gaia expressed as neighbourhood and best neighbour, e.g:		
• AllWise-Gaia neighbourhood	3.1×10^8	rows

Archive simple form

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Jesus Salgado ([jsalgado](#)) 

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Simple Form ADQL Form Query Results

Position File

Name Equatorial

Target in Circle Box

Name for Radius deg

pleiades resolved by Simbad

Search in: Gaia Source Tycho-Gaia Astrometric Solution (TGAS)

▼ Extra conditions

Filter: If all conditions

>=

► Display columns

Max. number of results:

 Reset Form  Show Query  Submit Query



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Archive ADQL form

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Simple Form ADQL Form Query Results



Job name:

Query examples

```
1 SELECT DISTANCE(POINT('ICRS',ra,dec), POINT('ICRS',266.41683,-29.00781)) AS dist, *  
2 FROM gaiaadr1.gaia_source  
3 WHERE 1=CONTAINS(POINT('ICRS',ra,dec),CIRCLE('ICRS',266.41683,-29.00781, 0.08333333)) ORDER BY dist ASC
```

Reset Form

Submit Query

Status	Job	Creation date	Num. rows	Size	Actions
✓	xmatch	26-Oct-2016, 17:36:52	106	40 KB	
✓	xmatch_m45cluster_tmass_original_valid	26-Oct-2016, 17:32:26		0 KB	
✓	m45clusterParallaxAvg	26-Oct-2016, 17:28:23	1	0 KB	
✗	m45clusterParallaxAvg	26-Oct-2016, 17:28:13		0 KB	
✓	m45PmFilter	26-Oct-2016, 17:27:04	106	32 KB	
✓	m45PmFilter	26-Oct-2016, 17:23:45	218	64 KB	
✓	m45	26-Oct-2016, 17:16:12	98538	17 MB	
✓	14774943764530	26-Oct-2016, 17:06:16	157	12 KB	
✓	xmatch_lgal_source_dwarfs	26-Oct-2016, 17:04:18		0 KB	
✓	14774937322810	26-Oct-2016, 16:55:32	100	8 KB	
✓	14789544367770	20-Oct-2016, 11:07:16	194	36 KB	

1-20 of 86

Apply jobs filter Select all jobs Delete selected jobs

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Archive user schemas

Galaxy icon bar:

- ④ Gaia tables
- ⑤ User tables
 - ⊕ user_jsalgado.cata
 - ⊕ user_jsalgado.dwarfs
 - ⊕ user_jsalgado.early_stars
 - ⊕ user_jsalgado.radial_velocities
 - ⊕ user_jsalgado.t1404481668974d
 - ⊕ user_jsalgado.visual_binaries
 - ⊕ user_jsalgado.xmatch_cata_lgsi_source
 - ⊕ user_jsalgado.xmatch_lgsi_source_dwarfs
 - ⊕ user_jsalgado.xmatch_lgsi_source_radial_velocities
 - ⊕ user_jsalgado.xmatch_lgsi_source_visual_binaries_2
- ⑥ Shared to me (from satgalia)
 - ⊕ user_satgalia.lgsi_tmass_15s_bestneighbour
 - ⊕ user_satgalia.lgsi_tmass_15s_neighbourhood
 - ⊕ user_satgalia.lgsi_tmass_1s_bestneighbour
 - ⊕ user_satgalia.lgsi_tmass_1s_neighbourhood
 - ⊕ user_satgalia.lgsi_tmass_5s_bestneighbour
 - ⊕ user_satgalia.lgsi_tmass_5s_neighbourhood
 - ⊕ user_satgalia.lgsi_tycho2_15s_bestneighbour
 - ⊕ user_satgalia.lgsi_tycho2_15s_neighbourhood
 - ⊕ user_satgalia.lgsi_tycho2_1s_bestneighbour
 - ⊕ user_satgalia.lgsi_tycho2_1s_neighbourhood
 - ⊕ user_satgalia.lgsi_tycho2_5s_bestneighbour
 - ⊕ user_satgalia.lgsi_tycho2_5s_neighbourhood
 - ⊕ user_satgalia.mdb00

Persistent Upload



GAIA Cross-Match

Table in: com_j2000.cat Target table: my_sources

Match

Server Crossmatch

GAIA Share Item

user_jsalgado.radial_velocities

Description:

Shared to group: None

Share item to group: Watch Group Share

Update Cancel

Table sharing

Archive CLI

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gaia archive

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Help content
Web interface
Tutorials
White dwarfs exploration
Cluster analysis
Java client
Command-line access
ADQL syntax
FAQ

GAIA Archive Widgets
TGAS Search Widget

Command Line access

The entry point is a TAP (Table Access Protocol) server.

You may use HTTP protocol to execute TAP requests at <http://gea.esac.esa.int/tap-server/tap>.

TAP provides two operation modes: Synchronous and Asynchronous:

- Synchronous: the response to the request will be generated as soon as the request received by the server.
- Asynchronous: the server will start a job that will execute the request. The first response to the request is the required information (a link) to obtain the job status. Once the job is finished, the results can be retrieved.

Our TAP server provides two access mode: public and authenticated:

- Public: this is the standard TAP access. A user can execute ADQL queries and upload tables to be used in a query 'on-the-fly' (these tables will be removed once the query is executed). The results are available to any other user and they will remain in the server for a limited space of time.
- Authenticated: some functionalities are restricted to authenticated users only. The results are saved in a private user space and they will remain in the server forever (they can be removed by the user).
 - ADQL queries and results are saved in a user private area.
 - Cross-match operations: a catalogue cross-match operation can be executed. Cross-match operations results are saved.
 - Persistence of uploaded tables: a user can upload a table in a private space. These tables can be used in queries as external tables.

Here you can find some examples about how to interact with a TAP server (we are using the curl tool):

- Non authenticated access
- Getting all public tables
- Synchronous query

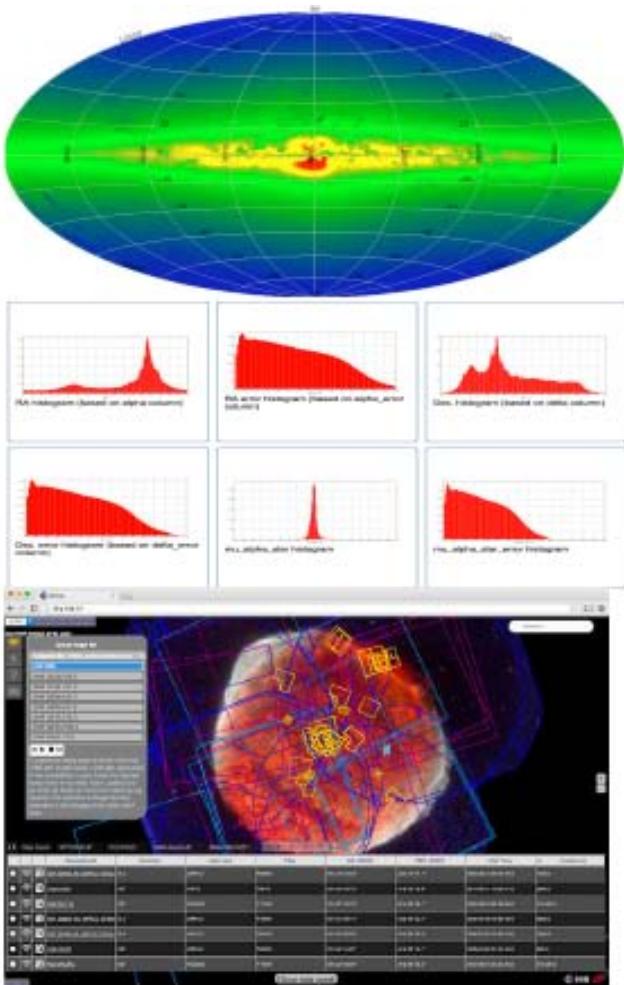
```
curl "http://gea.esac.esa.int/tap-server/tap/tables"
```



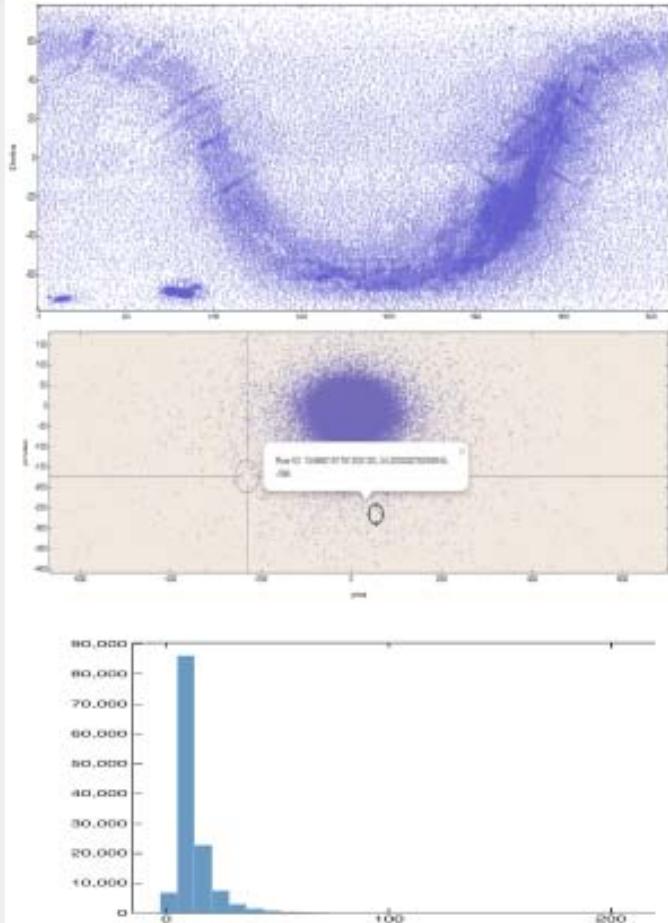
```
jsalgado@jsgal: ~ - bash - 80x24
Last login: Mon Oct 31 12:01:12 on ttys004
jsalgado@jsgal: ~ - curl -i -X POST --data "PHASE=run&LANG=ADQL&REQUEST=doQuery&QUERY=select+top+5++from+gatadri.gaia_source" "http://gea.esac.esa.int/tap-server/tap/async"
HTTP/1.1 303 303
Date: Mon, 31 Oct 2016 16:28:26 GMT
Server: Apache/2.2.15 (Red Hat)
Cache-Control: no-cache, no-store, max-age=0, must-revalidate
Pragma: no-cache
Expires: 0
X-XSS-Protection: 1; mode=block
X-Frame-Options: SAMEORIGIN
X-Content-Type-Options: nosniff
Set-Cookie: JSESSIONID=571AA9438CE1329D0646FF917F748201;path=/tap-server/;HttpOnly
Location: http://gea.esac.esa.int/tap-server/tap/async/14779313069470
Connection: close
Transfer-Encoding: chunked
Content-Type: text/plain;charset=ISO-8859-1

jsalgado@jsgal: ~
```

Archive visualization



- ❑ Visualization is a need
 - ❑ Statistics provide holistic views. Big data techniques
 - ❑ Validated static stats
 - ❑ On-the-fly visualization
(Lisbon University)
 - ❑ ESASky



gaia archive visualization

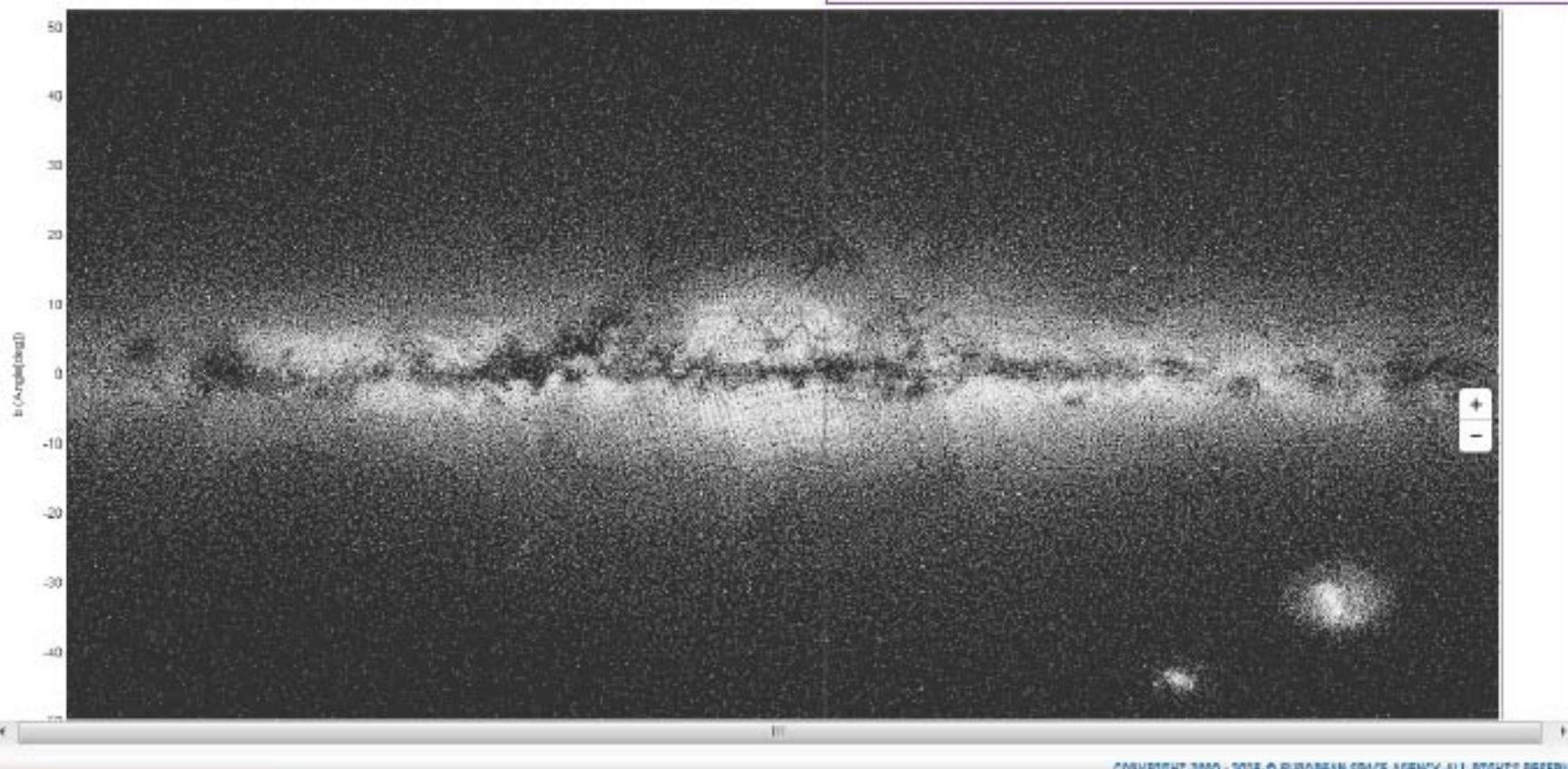


New window

 Regions -

Galactic Coord.

Plenary, splinter: A. Moitinho



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Table Access Protocol (TAP) Query

Window TAP Registry Edit Interop Help

Select Service Use Service Resume Job Running jobs

Metadata

Find: Name Descrip Or

galadr1 (8)

- galadr1_aux_qso_icrf2_1
- galadr1_cephid
- galadr1_gaia_source
- galadr1_phot_variable_1f
- galadr1_phot_variable_1t
- galadr1_rhyme
- galadr1_tgas_source
- galadr1_variable_summary

Service	Schema	Table	Columns	FKeys	Hints
		source_id	BIGINT	<input checked="" type="checkbox"/>	Unique source id
		ra	DOUBLE	<input checked="" type="checkbox"/>	deg Right ascension
		dec	DOUBLE	<input checked="" type="checkbox"/>	deg Declination
		b	DOUBLE	<input checked="" type="checkbox"/>	deg Galactic longitude
		ed_lon	DOUBLE	<input checked="" type="checkbox"/>	deg Ecliptic longitude
		ed_lat	DOUBLE	<input checked="" type="checkbox"/>	deg Ecliptic latitude
		parallax	DOUBLE	<input checked="" type="checkbox"/>	mas Parallax
		pmra	DOUBLE	<input checked="" type="checkbox"/>	mas/yr Proper motion in RA
		pmdec	DOUBLE	<input checked="" type="checkbox"/>	mas/yr Proper motion in Dec

Service Capabilities

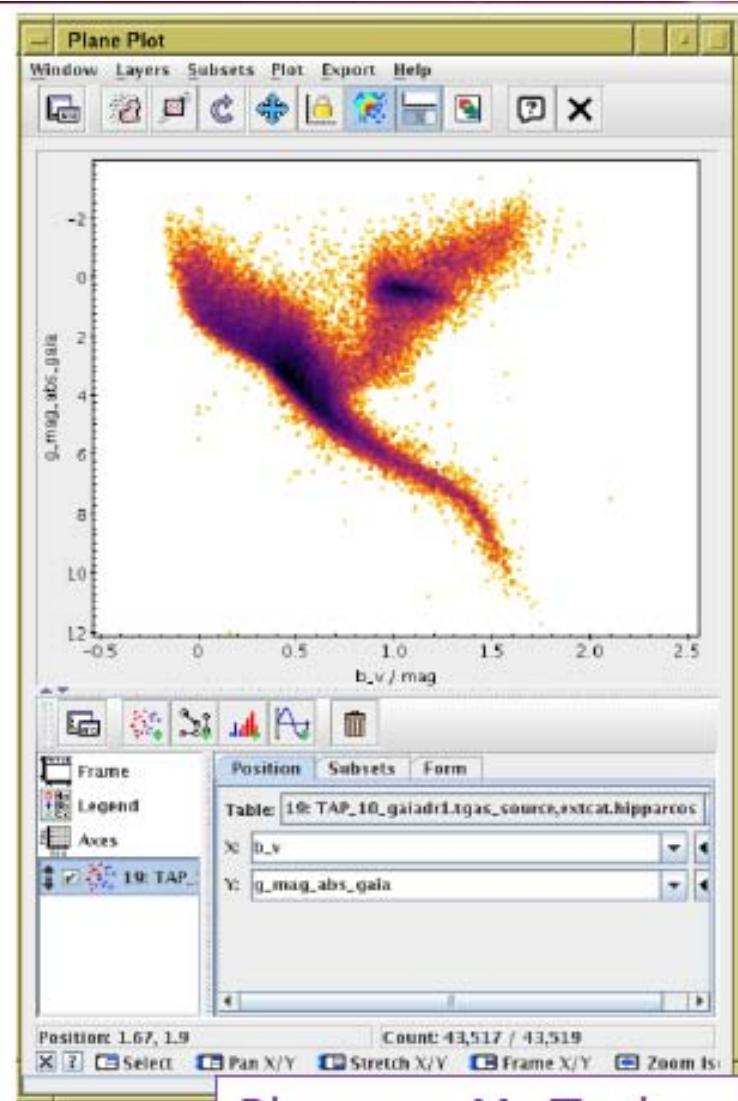
Query Language: ADQL 2.0 Max Rows: 100000 (default) Uploads: 1000krow/

ADQL Text

Mode: Synchronous

```

1
SELECT TOP 50000
    galadr1.source_id,
    galadr1.hip,
    galadr1.phot,
    galadr1.phot,
    hip.b_v
FROM galadr1.tgas
INNER JOIN 0
    GalADR1 - Color and magnitude 1/2
    GalADR1 - Color and magnitude 2/2
    GalADR1 - Density by magnitude
    GalADR1 - Pleiades density by parallax
    Get the 5 astrometric parameters
    Cone Search with Galactic coordinates
    Getting Healpix Indices
    3-D plot
    p.hip
    p.hip
    and magnitude 1/2
    Info
Run Query
  
```



Archive documentation

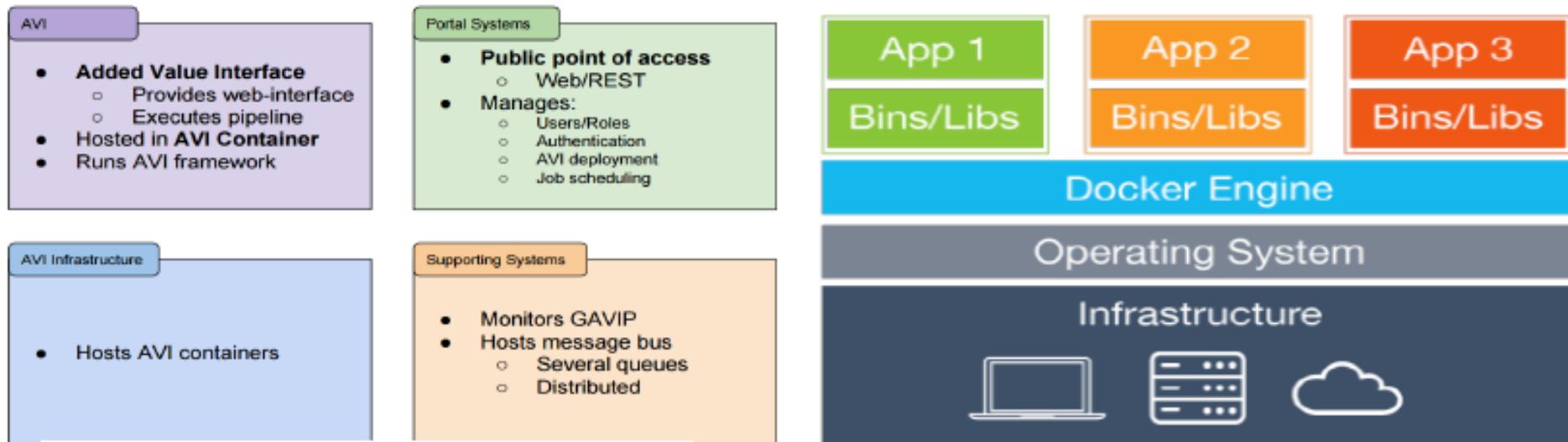
- Gaia Archive. Includes help and tutorials
 - <https://archives.esac.esa.int/gaia>
- Gaia DR1 papers <http://www.cosmos.esa.int/web/gaia/dr1#A&A>
- Online documentation (361 pages)
 - <http://gaia.esac.esa.int/documentation/GDR1/index.html>
- Data model documentation
 - <https://gaia.esac.esa.int/documentation/GDR1/datamodel/>
- ADQL: GAVO short course, UK ROE cookbook
 - <http://docs.g-vo.org/adql-gaia/html/index.html>
 - <https://gaia.ac.uk/science/gaia-data-release-1/adql-cookbook>
- Gaia Helpdesk. <https://support.cosmos.esa.int/gaia/>



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Future: data mining



1. Improve “code to the data” paradigm
 2. GAVI portal
 3. Data mining (Spark? Hadoop?)