Tutorial Session :

Setting-up a VESPA service « Starter pack »

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Setting-up an EPN-TAP service

- VO server (mainly DaCHS)
  - Virtual Machine
  - Docker Container
- Build a Resource Descriptor (RD) – xml-like
  - Map the source information to the epn_core schema
    - Mandatory / optional columns
    - Columns added manually
    - Post-treatment using python scripts
- Import the service
- Register the service

VO Server

Virtual Machine / Docker

- Debian
- Install DaCHS + postgres + Apache 2
- DaCHS Configuration
  - (gavo.rc, defaultmeta.txt)

    (for production)

    https://voparis-wiki.atlassian.net/wiki/spaces/VES/pages/56899266/EPN-TAP+Server+Installation+for+VESPA+Data+Provider+Tutorial

Trainings : VO Server
1 - DOCKER

For those who know a little bit docker and have docker / docker compose installed :

- **TUTORIAL**

- git clone https://voparis-gitlab.obspm.fr/vespa/dachs/docker_dachs_server.git
- cd docker_dachs_server/conf
- docker compose up --build -d (or docker-compose depending on your version)
- docker exec -ti dachs_voparis bash

Trainings : VO Server
2 - EOSC

EOSC

Pre-set machines

Warning :

Shared

Server name	Connection / ip	Teams (in person / remotely)
vespatuto 1	ssh dachsroot@134.158.151.238	
vespatuto 2	ssh dachsroot@134.158.151.178	
vespatuto 3	ssh dachsroot@134.158.151.33	
Other	Their own server	

DaCHS configuration files

```
[general]
rootDir: /var/gavo
maintainerAddress: support.epntap@obspm.fr

[web]
bindAddress:
serverPort: 80
serverURL: http://voparis-tap-example.obspm.fr
sitename: Example TAP Server on voparis-tap-example.obspm.fr
corsOriginPat: http.*
logFormat: combined

[ivoa]
authority: padc.obspm.example
```

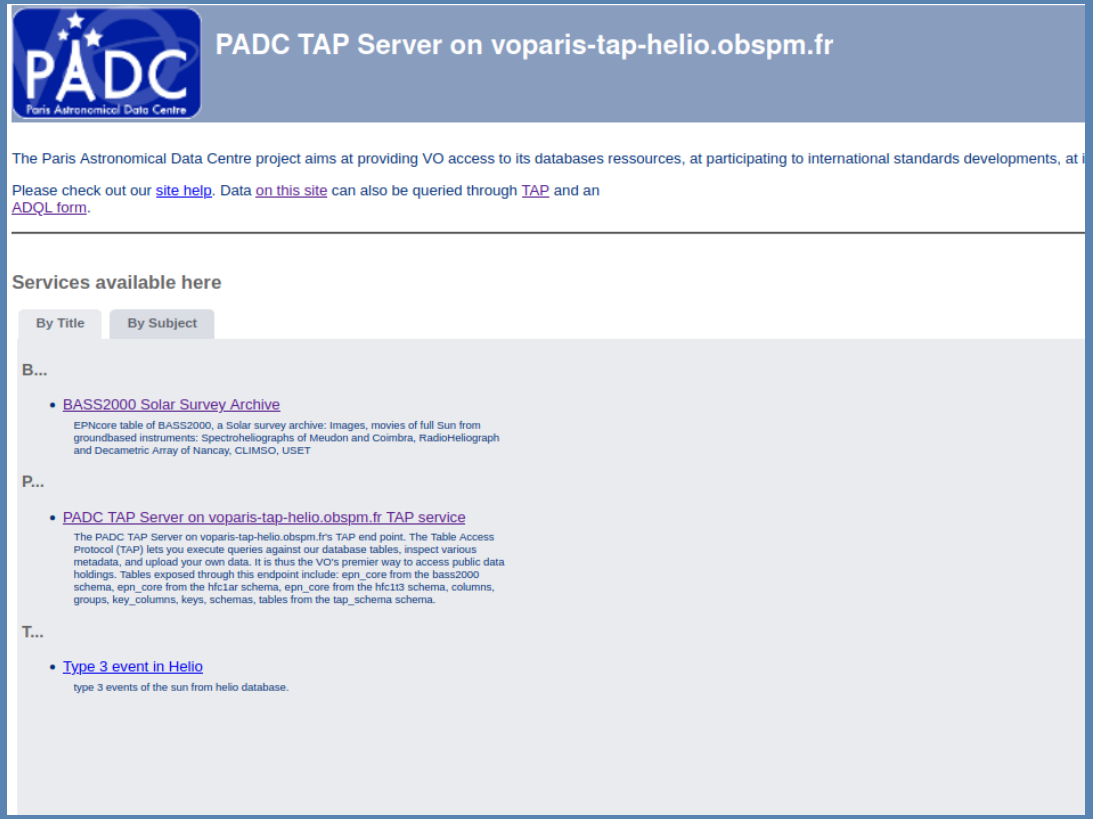
- Gavo.rc
  - */etc/gavo.rc*

DaCHS configuration files

Logos

logo_big.png
logo_medium.png
logo_tiny.png

/var/gavo/web/nv_static/img/



DaCHS configuration files

publisher: Paris Astronomical Data Centre

publisherID: ivo://padc.obspm

contact.name: PADC support team

contact.address: 77 av. Denfert Rochereau, 75014 Paris, FRANCE

contact.email: vo.paris@obspm.fr

contact.telephone: 0033140512082

creator.name: PADC

creator.logo: http://voparis-srv-paris.obspm.fr/logos/PADC_small.png

authority.creationDate: 2022-03-24T12:53:33

authority.title: Paris Astronomical Data Centre Authority

authority.shortName: PADCC

authority.description: The Paris Astronomical Data Centre project aims at providing VO access to its databases ressources, at participating to international standards developments, at implementing VO compliant simulation codes, data visualization and analysis software.

authority.referenceURL: http://padc.obspm.fr

authority.managingOrg: ivo://padc.obspm.example

organization.title: Observatoire de Paris

organization.description: Founded in 1667, the Observatoire de Paris is the largest national research center for astronomy.

organization.referenceURL: http://www.obspm.fr

site.description: The Paris Astronomical Data Centre project aims at providing VO access to its databases ressources, at participating to international standards developments, at implementing VO compliant simulation codes, data visualization and analysis softwares.

- *Defaultmeta.txt*
  - */var/gavo/etc/defaultmeta.txt*

Create the service

Where is the information ?

- CSV : map and post-treated in the Resource Descriptor

```
column A, column B, column C
valueA1, valueB1 , valueB1
valueA2, valueB2 , valueB2
```

The easyest, create it with your favourite langage

- From a SQL database :
  - Create your connection chain to access the database
  - Map an post-treat it in the Resource Descriptor
- Other : Fits, Python script, Mongodb ...

The Resource Descriptor

Generate a template with instructions with the command :

‘dachs start epntap’

From */var/gavo/inputs/{Your shema name}*

Tutorial : CSV example « planets »

https://voparis-wiki.atlassian.net/wiki/spaces/VES/pages/56900060/Setting-up+an+EPN-TAP+service+Tutorial+for+Beginners

Tutorial : CSV example « planets »

name	mean radius (km)	mean radius uncertainty (km)	equatorial radius (km)	equatorial radius uncertainty (km)	polar radius (km)	polar radius uncertainty (km)	rms deviation (km)	elevation max (km)	elevation min (km)	mass (kg)	distance to primary (km)	sideral rotation period (h)
Mercury	2439.7	1.0	2439.7	1.0	2439.7	1.0	1	4.6	2.5	3.3014E23	57909227.	1407.504
Venus	6051.8	1.0	6051.8	1.0	6051.8	1.0	1	11	2	4.86732E24	108209475.	-5832.432
Earth	6371.00	0.01	6378.14	0.01	6356.75	0.01	3.57	8.85	11.52	5.97219E24	149598262.	23.93447232
Mars	3389.5	0.2	3396.19	0.1	3376.	0.1	3.0	22.64	7.55	6.41693E23	227943824.	24.624
Jupiter	69911.	6	71492.	4	66854.	10	62.1	31	102	1.89813E27	778340821.	9.92496
Saturn	58232.	6	60268.	4	54364.	10	102.9	8	205	5.68319E26	1426666422.	10.656
Uranus	25362.	7	25559.	4	24973.	20	16.8	28	0	8.68103E25	2870658186.	-17.232
Neptune	24622.	19	24764.	15	24341.	30	8	14	0	1.0241E26	4498396441.	16.104

Tutorial : CSV example « planets »

- Define Granules – Epn-Core parameters
- CSV file
- Resource Descriptor

Tutorial : CSV example « planets »

- *cd /var/gavo/inputs*
- *git clone https://voparis-gitlab.obspm.fr/vespa/dachs/services/padc/voparis-tap-example/planets_tuto*

Masses2.csv

CSV file

q.rd

Resource Descriptor

Tutorial : CSV example « planets »

Resource Descriptor

```
<resource schema="...">
   <meta .../>
       ...
   <meta .../>

   <table ...>
      <mixin .../>

      <column .../>
          ...
      <column .../>
   </table>

   <data id="import">
      <sources .../>

      <csvGrammar> <rowfilter procDef="//products#define"> <bind name="table">"\schema.epn_core"</bind> </rowfilter> </csvGrammar>

      <make table="epn_core">
         <rowmaker idmaps="*">
            <map key="...">...</map>
                ...
            <map key="...">...</map>

         </rowmaker>
      </make>
   </data>
</resource>
```

https://voparis-gitlab.obspm.fr/vespa/dachs/services/padc/voparis-tap-example/planets_tuto/-/blob/master/q.rd

Tutorial : CSV example « planets »

Meta tags

Subject :

Exoplanet astronomy

Solar system astronomy

Solar physics

Meta tags

The first part is a set of meta tags with different attributes which defines global characteristics of the table. Meta tags aim to describe the service in the registry.

```
<resource schema="planets">
    <meta name="title">Characteristics of Planets (demo)</meta>
    <meta name="description" format="plain">
    Main characteristics of planets. Data are included in the table, therefore most relevant parameters are non-standard in EPN-TAP
    <meta name="creationDate">2015-08-16T09:42:00Z</meta>
    <meta name="subject">solar-system-astronomy</meta>
    <meta name="subject">planetary-science</meta>
    <meta name="subject">solar-system-planets</meta>
    <meta name="subject">periodic-orbit</meta>
    <meta name="copyright">LESIA-Obs Paris</meta>
    <meta name="creator.name">Stephane Erard</meta>
    <meta name="publisher">Paris Astronomical Data Centre - LESIA</meta>
    <meta name="contact.name">Stephane Erard</meta>
    <meta name="contact.email">vo.paris@obspm.fr</meta>
    <meta name="contact.address">Observatoire de Paris VOPDC, bat. Perrault, 77 av. Denfert Rochereau, 75014 Paris, FRANCE</meta>
    <meta name="source">2000asqu.book.....C</meta>
    <meta name="contentLevel">General</meta>
    <meta name="contentLevel">University</meta>
    <meta name="contentLevel">Research</meta>
    <meta name="contentLevel">Amateur</meta>
```

Most of the attributes are easy to understand, see this page for detailed explanations and more meta elements.

Meta attribute "subject" is defined several times by different keywords defining data from UAT (Unified Astronomy Thesaurus). At least one of them must refer to a global topic listed in this page. In the context of VESPA, the 3 appropriate global topics are : "Exoplanet astronomy", "Solar physics" and "Solar system astronomy". The attribute "source" refers to the resource-related paper. Here, "contentLevel" takes the four values "General", "University", "Research", "Amateur" but it could take only some of these.

Tutorial : CSV example « planets »

- Table definition
  - epn_core : collection of columns
    - Mandatory
    - Optional

```
<table id="epn_core" onDisk="true" adql="True">

   <mixin spatial_frame_type="none"
   optional_columns= "time_scale publisher bib_reference" >//epntap2#table-2_0</mixin>
```

  - Defined by the data provider

```
   <column name="distance_to_primary" type="double precision"
   tablehead="Distance_to_primary" unit="km"
   description="Extra: Mean heliocentric distance (semi-major axis)"
   ucd="pos.distance;stat.min"
   verbLevel="2"/>
   <column name= ... />
   ...
   <column name= ... />

</table>
```

Tutorial : CSV example « planets »

- Data ingestion
  - Path to the Sources
  - Grammar
  - Mapping – associate columns previously defined on the RD to columns from the source (CSV, database, etc)

```
<data id="import">
   <sources>Masses2.csv</sources>
   <csvGrammar>
      <rowfilter procDef="//products#define">
         <bind name="table">"\schema.epn_core"</bind>
      </rowfilter>
   </csvGrammar>
```

```
<make table="epn_core">
   <rowmaker idmaps="*">
      <var key="obs_id" source="obs_id" />
      ...
      <map key="measurement_type">"phys.mass#phys.size.radius"</map>
```

Tutorial : CSV example « planets »

Install and check tables

- *dachs val q.rd*
- *dachs imp q.rd*
- *dachs serve reload*

http://<vm name or ip address>:<port>

For Docker

http://localhost:81/__system__/adql/query/form

For EOSC

http://<ip>:8080/__system__/adql/query/form

SELECT * FROM planets_tuto.epn_core

From a SQL database :

odbcGrammar

- python3-pyodbc must be installed on the server

  (already done on EOSC machines)

  - *apt-get install python3-pyodbc*
  - *apt-get install odbc-postgresql*

- In this example we set the psql database locally, but in general we connect remotely.

  - git clone https://voparis-gitlab.obspm.fr/workshop-material/hfc1t3_dump.git
  - psql -d gavo < view_t3_hqi.sql

Resource descriptor from a SQL Database

Clone and import a service from an SQL database

- *cd /var/gavo/inputs*
- *git clone https://voparis-gitlab.obspm.fr/vespa/dachs/services/padc/voparis-tap-helio/hfc1t3.git*

Resource descriptor from SQL DB

Contains the connection chain

```
<sources pattern="data/driver.txt">
<odbcGrammar  query="SELECT * FROM hfc1.view_t3_hqi">
```

Your SQL Query

From a SQL database

- Using a Chaincode to access the database (instead of the CSV)

  ex : Helio services
  https://voparis-gitlab.obspm.fr/vespa/dachs/services/padc/voparis-tap-helio

  - MySQL (BASS2000): Driver={MySQL ODBC 8.0 Unicode Driver};Server=145.238.155.92;Database=bass2000prod;User=guest;Password=guest;Option=3;
  - PostgreSQL (HFC1AR): Driver={PostgreSQL Unicode};Server=bdd-lesia.obspm.fr;Port=5432;Database=hfcdb;Uid=guest;Pwd=guest;

Connection chain

Change the connection chain to access local database :

- *nano data/driver.txt*
- ***Driver={PostgreSQL Unicode};***
  Server=localhost;Port=5432;Database=hfc;Uid=gavoadmin;
  Pwd=oh6v/HAbyLwPKdWIoP2zfUttzVo=;
- *Take the password from*

➔ *cat /var/gavo/etc/feed*

- Import the service

➔ *dachs imp hfc1t3/q*

Resource Descriptors

- Other examples of features on RD (no matters the grammar) :
  - <data id="import" updating="True">
  - <rowfilter procDef="//products#define">
    <bind key="table">"\schema.epn_core"</bind>
    <code> … post-treatment with python code … </code>
    </rowfilter>
  - Make functions, import modules, etc
- See hfc1ar service

Publish /register

- When your EPN-TAP service is ready to be published :
  - Register your server into the Registry of Registries
  - Add a <publish> tag to your service
  - Publish it using DaCHS :
    - ‘dachs pub service/q’
    - dachs pub //services
    - dachs pub //tap
  - To have your EPN-TAP available on VESPA portal , your service have to be reviewed first : contact support.epntap@obspm.fr.

Create and share you own service and dachs configuration files using voparis-gitlab

https://voparis-wiki.atlassian.net/wiki/spaces/VES/pages/56901748/Share+your+server+s+configuration+and+service+using+voparis-gitlab