EPN-TAP and EPNcore v2.0

S. Erard, B. Cecconi, P. Le Sidaner, M. Demleitner, M. Taylor
and the VESPA/Europlanet team

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EPN-TAP / Motivation

- Europlanet EU programme(s): consistent access to Solar System data (including derived data)?

VO framework seemed appropriate. Scope = Planetary Science, Heliophysics, exoplanets

- Difficulties:
  - Moving objects / targets, seldom clearly identified in existing archives
  - Targets are resolved: many coordinate systems - related to targets or configurations
  - More diverse types of measurements:
    Not only (reflected) light, but also particles, e-m fields + laboratory samples

- TAP is adapted to searches in catalogues (one of the main expected usages)
- ObsCore provides similar concepts for general parameters
  Missing vocabulary to name observing and configuration parameters
  but this exists to some extent in PDS (space archives) and SPASE (plasma related)
- Missing UCDs for reflected light, in-situ measurements and samples

EPN-TAP = Usual TAP mechanism
EPNCore metadata vocabulary + associated UCDs
Set of rules related to services and tables

EPN-TAP status

- First published in Astronomy and Computing (Erard et al 2014) — v1.0
- Proto-version 2.0 presented by Baptiste Cecconi at Interop 2015, Sesto
- **Mature v2.0 submitted as a Working Draft to DAL WG, October 2020**

  Presented at Interop, Nov 2020
- **Passed PR after July 2021 Interop**

  Big update in June / July: doc, UCDs, units, lists of values, some parameter names
- **Finalized version, October 22, 2021**

  With detailed check for consistency based on validator, mixin, clients, and 20+ existing services
  Relies on 63 published data services worldwide (~ 20 teams)
- **RFC dec 2021 — https://ivoa.net/documents/EPNTAP/**

Europlanet VESPA: Data services connected via EPN-TAP / field

Open
Open in test | upgrade required
Drafted
Scheduled 2024 (selection)
• New or upgraded in 2021/22
• New content in 2021/22

Atmospheres

- Titan profiles - CIRS (Cassini, LESIA)
- *Venus spectroscopy - VIRTIS (VEx, LESIA)*
- Mars & Venus Climate Databases (modeling, LMD)
- GEM_Mars (modeling, IASB-BIRA)
- Venus profiles - SPICAV/SOIR (VEx, IASB-BIRA)
- Mars profiles - SPICAM (MEx, LATMOS)
- *All MEx derived atmospheric products (via MEx IDS)*
- *Venus cloud products (LATMOS)*
- *ExoMars/NOMAD (BIRA-IASB)*

Small bodies

- *M4ast (ground based spectroscopy, IMCCE)*
- 1P/Halley spectroscopy (IKS / Vega-1, LESIA)
- BaseCom (Nançay Obs, LESIA)
- TNOs are cool (Herchel & Spitzer + compilation, LESIA & LAM & Utinam)
- SBNAF (from H2020 prog, Konkoly Obs)
- *MP3C: Small body properties (OCA)*
- *Vesta & Ceres spectroscopy - VIR/DAWN (IAPS)*
- DynAstVO: NEO refined parameters (IMCCE)
- *MPCorb: Small bodies orbital cat (MPC/Heidelberg)*
- *Rosetta ground-based support (Edinburgh)*
- 67P illumination config (IRAP)
- Meteor_showers predictions (IMCCE)
- *Occultations predictions, ast & sat (IMCCE)*
- *LuckyStar, occultations (ERC prog, LESIA)*
- *Natural satellites db (IMCCE)*
- VizieR asteroid spectra (CDS / LESIA)

Solid spectroscopy

- SSHADE ices & minerals spectro (IPAG & network)
- *Planetary Spectral Library (DLR)*
- PDS spectral library (LESIA)
- *Berlin Reflectance Spectral Lib (DLR)*
- *Hoserlab (Winnipeg U)*

Surfaces

- Mars craters (Jacobs U, + update by GEOPS)
- USGS planetary maps WMS (Jacobs U)
- PlanMap: geol maps (H2020 prg, Jacobs U)
- CRISM WCS service (MRO, Jacobs U)
- *M3 WMS service (Chandrayaan-1, Jacobs U)*
- HRSC nadir images, WMS (MEx, Frei Univ)
- OMEGA cubes and maps (MEx, IAS)
- VIMS satellites, w/geometry (Cassini, LPG)
- Mars topo preTharsis (GEOPS)
- *Global spectral param of Mercury (DLR)*

Magnetospheres / radio

- APIS (HST/Cassini, LESIA)
- NDA (Jupiter & Sun radio, LESIA/CDN)
- AMDA (CDPP / IRAP)
- MAG data (VEx, IWF Graz)
- MASER & related services (LESIA)
- *RadioJove (LESIA & US amateur network)*
- Iitate HF data of Jupiter (Tohoku Univ, Jap)
- *UTR-2 Juno ground support (Kharkiv)*
- MDISC & JASMIN (modeling, UCL)
- Cluster & Themis data (IAP, Prague)
- IMPEx models (from FP7 prog, IWF Graz)
- *Hisaki (Tohoku Univ., Jap)*
- Transplanet (CDPP / IRAP)
- LOFAR Jupiter (CBK/PAS, Warsaw)
- *Magnetic field simus (LMSU)*
- *ASPERA & MARSIS atm obs (MEx, Iowa U)*

Solar

- *HELIO AR & 1T3 solar features* (FP7 prog, LESIA)
- Bass2000 (LESIA)
- *Radio Solar db (Nançay, LESIA)*
- CLIMSO (Pic du Midi, IRAP)
- IPRT/AMATERAS (Tohoku Univ, Jap)
- Gaia-DEM (SDO, IAS)
- EIT_syn (SoHO, IAS)
- *e-Callisto (Windisch, Sw)*

Generic / interdisciplinary

- BDIP (LESIA)
- PVOL (UPV/EHU & amateur network)
- Telescopic planetary spectra collection (LESIA)
- PSA complete archive (ESA)
- HST planetary data (LESIA, to CADC archive)
- *Catalogues of planetary maps (Budapest)*
- VizieR_planets: Planetary Science catalogues (CDS)
- *Gas absorption cross-sections* (Granada)
- Planets *then satellites properties* (LESIA/IMCCE)
- *Nasa dust catalogue (IAPS)*
- *Stellar spectra, support for observations (LESIA)*
- *DARTS (JAXA - currently via PDAP)*
- *ESAsky planetary data (ESA)*
- *Interface with VAMDC ?*

Exoplanets

- Encyclopedia of exoplanets (LUTH/LESIA)
- *Catalogue of exo disks (LESIA)*
- *Interface with DACE (Geneva)*
- *ARTECS climate simulations (AOTS/INAF)*
- *Atmospheric studies (UCL)*
- Exotopo: exoplanet surface simulations (GEOPS)

EPN-TAP news

- Comments collected since last Interop on RFC page, all processed
  answers in March, 2022 + further fixes — thank you all!

  https://wiki.ivoa.net/twiki/bin/view/IVOA/EPNTAPV20RFC

- External inputs (Europlanet, CNES, providers, users, new services) also addressed

Support:

- EPN-TAP validator in taplint / stilts (minor corrections after 3.4-2)
- Several reference implementations
- Existing mixin in DaCHS, checked and completed (from v2.5)
- EPN-TAP tutorial in DaCHS:
  http://docs.g-vo.org/DaCHS/tutorial.html#epn-tap
- Existing services are updated using the new mixin, checked with taplint, then manually with VESPA portal & TOPCAT

Open issues

1- How do we handle **MOC vs s_region**?

There are reasons to keep them separated:
Some services may require both (with s_region output as geoJSON for OGC tools)
[note: geoJSON here is an output format parameter in the TAP query]
MOC parameter currently called *shape*, will be changed
ST-MOC may be used for dataproducts (not only collections)

=> maintain 2 parameters for MOC / ST-MOC and s_region?

Open issues

2- Extensions

- Some parameters are defined as groups to support specific types of services or fields
  => extensions, defined from at least 2 services from different teams

- Currently defined extension parameters are expected to be permanent

- But more will be added, and living extensions can't be in the document

- We propose to maintain extensions outside the doc on web pages
  => A master page with a PID includes links to discussion areas
  http://www.europlanet-vespa.eu/EPN_TAP.shtml

- Shall we maintain the current extension parameters in the doc?

Open issues

3- **Vocabularies** / lists

- Can be maintained like extensions
- See presentation in semantics on Friday

Work Plan

- All existing services are in v2.0, being reviewed and updated to latest version
- Most servers now updated to DaCHS 2.5
- Most services preserved on a gitlab at Obs Paris (definition files only)

- Registration procedure is now ~ OK (see Chloé's presentation on Friday)
- EPN-TAP services declared in the registry being reviewed
  (many remnants of older versions)