Paris Observatory Data Center (OPAR)

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Abstract This report summarizes the OPAR Data Center activities in 2023–2024. Included is information about functions, architecture, status, future plans, and staff members.

1 General Information

The Paris Observatory (OPAR) has been hosting a primary Data Center for the International VLBI Service for Geodesy and Astrometry (IVS) since 1999. OPAR is one of the three primary IVS Data Centers, along with BKG and CDDIS. Their activities are done in close collaboration for collecting files (data and analysis files) and making them available to the community as soon as they are submitted. The three Data Centers have a common protocol and each of them:

- has the same directory structure (with the same control file),
- has the same script,
- is able to receive all IVS files (auxiliary, database, products, documents),
- mirrors the other ones every three hours,
- gives free FTP access to the files.

This protocol gives the IVS community a transparent access to a Data Center through the same directory and a permanent access to files in case of a Data Center breakdown (see Figure 1). The mirroring between OPAR and CDDIS has been made with the new secured LFTP SSL since October 2020.

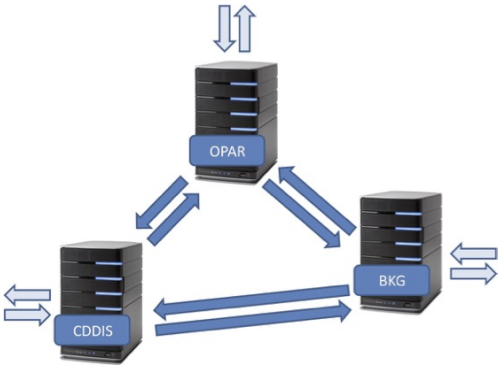

Fig. 1 The three Data Centers: dark blue arrows indicate the mirroring between them, while the light blue arrows indicate the input and output data from other IVS components such as Analysis Centers or users outside the IVS.

2 Architecture

To be able to put a file in a Data Center, Operation and Analysis Centers have to be registered by the IVS Coordinating Center. The file names have to conform to the name conventions. A script checks the file and puts it in the right directory. The uploading protocol to submit files to the ivsincoming directory of ivsopar assumes that cURL is set up on the client. For Windows users, there exist cURL versions for Windows. You can, e.g., search for a version compatible with your version of Windows in https://curl.haxx.se/download.html.

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Here is the submission protocol in use since 2017. The user is provided by us with a script, say it is named submitopar. To make the script active, the user has to replace the relevant two lines by the login and password that will be provided by us.

For UNIX-like system users, the following command submits files xxxyyyyz.eops and xxxyyyyz.eops.txt to the Data Center (actually pushes them to ivsincoming):

```
submitopar –upload xxxyyyyz.eops
                   xxxyyyyz.eops.txt
```

To list the files that are currently present in the ivsincoming directory:

```
submitopar –display
```

For Windows users, the cURL command line is

```
curl.exe –k –u LOGIN:PASSWD –F
"fichier=@"FILENAME –F
"mode=upload"
https://ivsopar.obspm.fr/upload/
```

where LOGIN and PASSWD should be replaced by the provided login and password, and FILENAME is the name of the file the user wants to upload. Note that there is NO SPACE between '@' and the '"' (double quotes) sign before FILENAME. One can also submit files directly via a web browser at the address https://ivsopar.obspm.fr/upload/. The script undergoes permanent improvement and takes into account the IVS components' requests.

The structure of the IVS Data Centers is:

- RECENT\ used for the new mirror method,
- ivscontrol\ provides the control files needed by the Data Center (session code, station code, solution code...),
- ivsdocuments\ provides documents about IVS products,
- ivsdata\ provides files related to the observations,
- ivsdata\aux\ provides auxiliary files (schedule, master, log...),
- ivsdata\db\ contains observation files in database CALC format,
- ivsdata\vgosdb\ contains observation files in vgosDb format,
- ivsdata\ngs\ contains observation files in NGS format,
- ivsdata\sinex\ contains observation files in SINEX format,
- ivsproducts\ provides Analysis Center results,
- ivsproducts\eopi\ provides Earth Orientation Parameter results from Intensive sessions,
- ivsproducts\eops\ provides Earth Orientation Parameter results from sessions of 24 hours,
- ivsproducts\crf\ provides Celestial Reference Frame results,
- ivsproducts\trf\ provides Terrestrial Reference Frame results,
- ivsproducts\daily_sinex\ gives solutions in SINEX format of Earth orientation and site positions, mainly designed for combination,
- ivsproducts\int_sinex\ gives daily Intensive solutions in SINEX format, mainly designed for combination,
- ivsproducts\trop\ contains tropospheric time series (starting July 2003).

Table 1 User activity of the OPAR Data Center.

	No. unique visitors	No. visits	No. hits	Bandwidth (GB)
2023				
FTP	1,390	13,905	1,282,374	664
WWW	7,934	13,984	164,493	6
2024				
FTP	1,429	16,928	3,102,788	2
WWW	10,421	24,701	251,494	294

3 Current Status and Future Plans

The OPAR Data Center has been operated on a PC Server with a Debian 10 Linux operating system since October 2020, and it is located at Paris Observatory. To make all IVS products available on-line, the disk storage capacity was significantly increased to 500 Go. The OPAR server is accessible 24 hours per day, seven days per week, through a 2 MBit/s Internet connection. Users can get the IVS products by using the new secured FTP protocol. Access to this server is free.

We will continue to update validation scripts using versions provided by the BKG and/or CDDIS Data Centers to ensure consistency between the three centers. Table 1 summarizes the user activity on the OPAR Data Center. To obtain information about the OPAR Data Center, please contact ivs.opa@obspm.fr.