

# EUROLAS Data Center (EDC) – Recent developments of the EDC

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## Introduction

In 2015, the “Deutsches Geodätisches Forschungsinstitut” (DGFI) maintaining the EUROLAS Data Center (EDC) became part of the “Technische Universität München” (TUM), now DGFI-TUM. In this process, the complete IT infrastructure of the EDC was moved to the local computing center (“Leibniz Supercomputing Centre”, LRZ) which leads to an improved internet connection and backup system. Furthermore, the website of the EDC (<http://edc.dgfi.tum.de>) also has to be revised with respect to the corporate design of the TUM. In this poster, the updated website and their functionalities are presented.

In addition to the new design, also an updated functionality of the application programming interface (API) accessing the data holding of the EDC is introduced. The new EDC-API for example allows SLR stations to access the current satellite list, station list, CPF predictions, etc. directly by using their own scripts. Also an access of the data holding to get information about the most-recently submitted SLR data is possible. In this poster, the new functionality of the improved EDC-API is shown in detail.

## New IT-Infrastructure of the EDC

In 2016, the complete IT-Infrastructure of the EDC has been moved to the “Leibniz Supercomputing Centre of the Bavarian Academy of Sciences and Humanities” (LRZ) which operates the Munich Scientific Network (MWN).

Figure 1 shows the changes of the IT-infrastructure with respect to the former and new EDC servers. The internet connection improved significantly from 1GB/s to 10GB/s with an additional backup internet connection. The data backup system improved also by using RAID systems and the daily archiving of the LRZ.

### Former IT-Infrastructure

- Daily backup on 2<sup>nd</sup> server
- No RAID system for hard disks
- Internet connection: 1GBit/s
- Hardware: 2x desktop computer

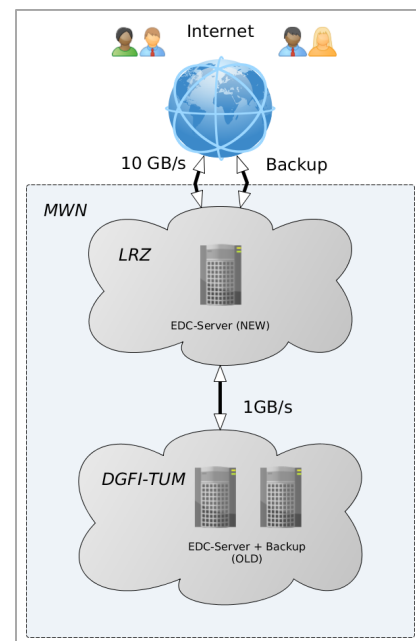


Figure 1: Former and new IT-infrastructure at the EDC

## New IT-Infrastructure:

- Daily backup on tapes
- Raid system for hard disks
- Daily security updates for operating system
- Internet connection: 10Gbit/s (incl. backup)
- Hardware: Scalable virtual server

The changeover to the new system is an important step to preserve the system stability of the SLR data management at the EDC for the ILRS community.

## The EDC website

In 2016, the EDC website was redesigned using the corporate design of the “Technische Universität München”. Figure 2 shows a screenshot of the EDC’s welcome page.

The new EDC website now provides new information about the SLR data holding and its products for the ILRS community.

- The current lists of satellites and stations can now be accessed directly in the machine-readable ASCII format which is helpful for station managers or analysts.
- The EDC website now provides a live tracking status of SLR stations on the welcome page.
- For stations with quarantine status, a new view is available on the website which provides information about the validation process. It provides statistics about the tracking activities in the validation process.
- An “Application Programming Interface” (EDC-API) was implemented which allows users to access the EDC data holding directly by using their own scripts.

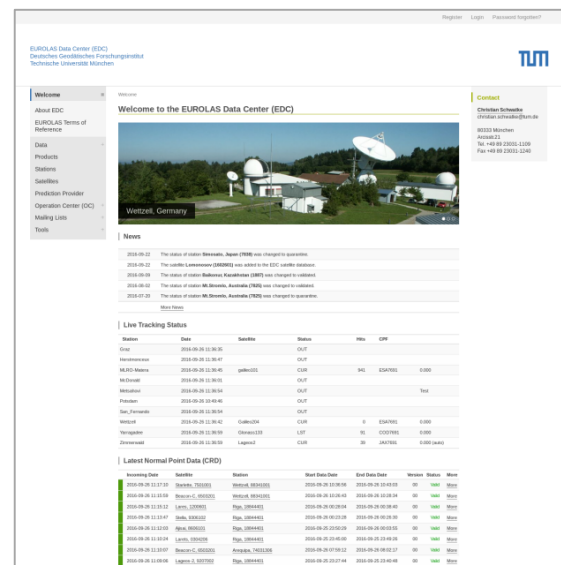


Figure 2: Screenshot of the redesigned EDC website

## EUROLAS Data Center – Application Programming Interface (EDC-API)

The new EDC-API enables the ILRS community to access the EDC data holding by using their own scripts. The EDC-API is realized by sending POST or GET requests to the EDC server (<http://edc.dgfi.tum.de/api/v1/>). The response of the EDC-API is sent in JSON (JavaScript Object Notation) format. The advantage of this implementation is that sending requests and receiving responses can be realized language-independent on the client-side (e.g Python, cURL, etc).

Until now, the following types of requests are implemented:

- “*list-stations*” – Returns a list of the stations
- “*list-satellites*” – Returns a list of the satellites
- “*list-predictions*” – Returns a list of the current valid CPF predictions
- “*data-query*” – Search in the data holding using user-defined criteria
- “*data-info*” – Get detailed information about a certain dataset of the EDC data holding
- “*data-download*” – Download data from the EDC data holding directly

The following selected example shows the usage of EDC-API for the action “*list-predictions*”.

```
import requests
import json
url = 'http://edc.dgfi.tum.de/api/v1/'
args = {}
""" required options """
args['username'] = 'username'
args['password'] = 'password'
args['action'] = 'list-predictions'
""" send request as method POST """
response = requests.post(url, data=args)
""" convert json string in python list """
data = json.loads(response.text)
```

Figure 3: Example of using the EDC-API in Python

The response of the EDC-API server provides a status code which tells the user if the request was successful or not. Furthermore, the response data is delivered as JSON string which is programming language independent and can be simply converted.

The response of the example in Figure 5 provides a list with a dictionary for each record which is shown in Figure 6.

```
[
  {
    'id': '495214',
    'satellite': '1501901',
    'eph_seq': '7621',
    'start_data_date': '2016-09-18 00:00:00',
    'end_data_date': '2016-09-29 22:40:00',
    'provider': 'SHA'
  },
  ... ,
  {
    'id': '496471',
    'satellite': '0000100',
    'eph_seq': '7721',
    'start_data_date': '2016-09-28 00:00:00',
    'end_data_date': '2016-10-02 23:45:00',
    'provider': 'UTX'
  }
]
```

Figure 4: Example of a EDC-API response

A detailed documentation with examples in Python and cURL for the EDC-API is available on the EDC-website under <http://edc.dgfi.tum.de/en/api/doc/>.

## References

- *Pearlman M.R., Degnan J.J., Bosworth J.M.:* “The International Laser Ranging Service”, *Advances in Space Research*, Vol.30, No. 2, 135-143, 2002