ILRS Data Centers – Overview, Current Status, and Future Work

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Abstract

The International Laser Ranging Service (ILRS) Data Centers are composed of two primary data centers, the Crustal Dynamics Data Information Systems (CDDIS) and the EUROLAS Data Center (EDC) and other associate data centers. Each serves a role in accessibility by providing quality assurance, tools, and reports among other resources to the ILRS community. In recent years, there has been several updates at the data centers to provide additional quality assurance and beneficial tools to the community including the addition of the new Consolidated Laser Ranging Data Format (CRD) and Consolidated Laser Ranging Prediction Format (CPF) and new quality assurance for the International Terrestrial Reference Frame 2020 (ITRF2020) Solution Independent Exchange (SINEX) products. The data centers are also at the starting phases of addressing community needs such as creating citations for data and products. These items, among others will be discussed in this poster along with current and future work.

Overview of Flow to Data Centers

CRD Data Flow
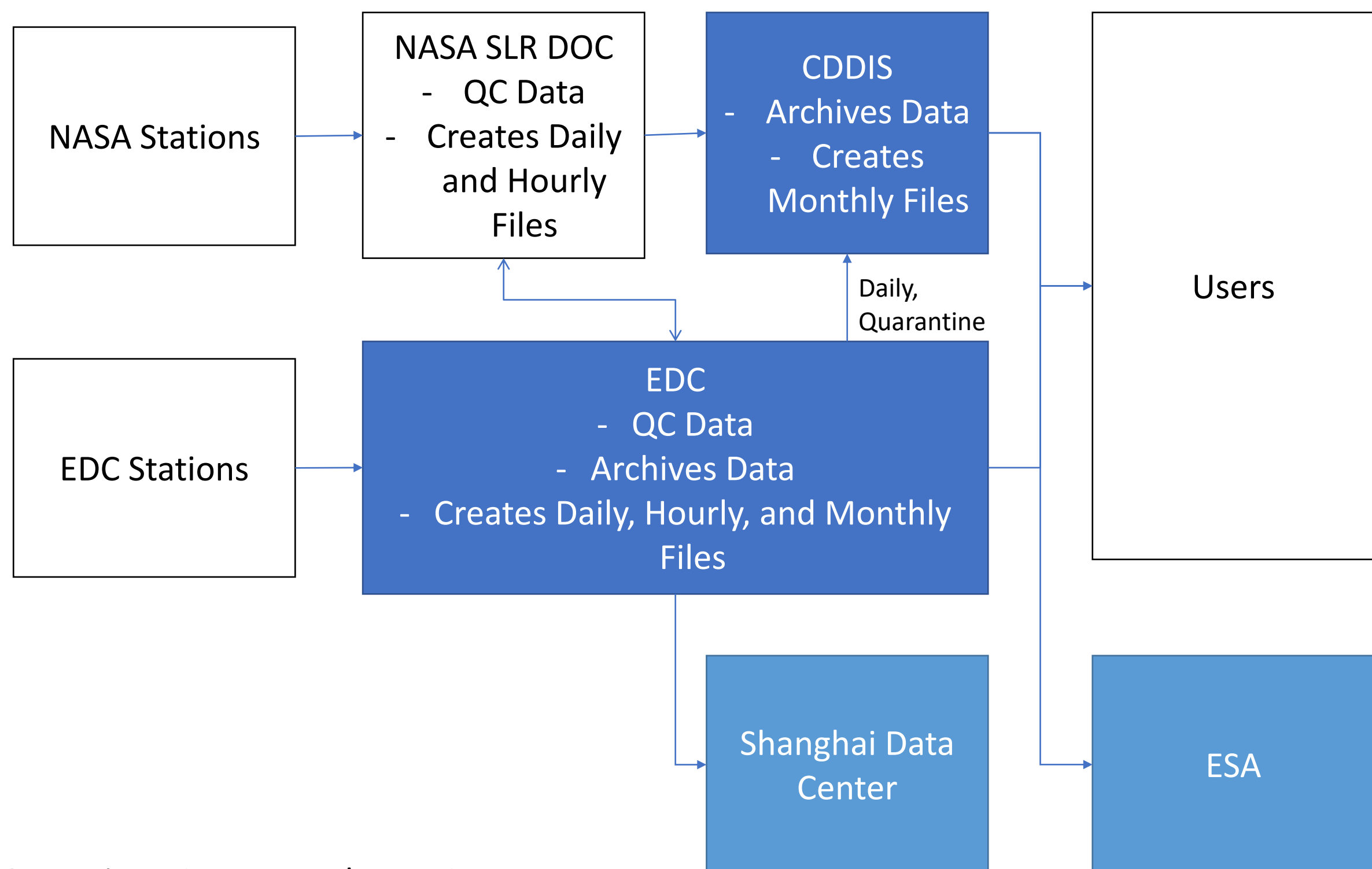
Operations Centers and Data Centers
- EDC serves the role of operations and data center
- Separated for the NASA Satellite Laser Ranging Data Operation Center (SLR DOC) and CDDIS
EDC serves EDC stations and NASA SLR DOC serves the NASA stations
- Communicate and fix any errors
- Exchange of data

EDC and NASA SLR DOC send QC'd CRD files to the CDDIS
- Passes between the files received from the EDC and NASA SLR DOC are compared for discrepancies

Hourly, Daily, Quarantine – add this detailed information
Merge the charts together if not enough room
- Highlight the colors differently
- Depends on how much space is left

### Primary Data Centers (CDDIS and EDC)
- Provide an archive of and access to laser ranging data, products, satellite predictions, and related information (1)
- Data QC'd by Operations Center
- Products QC'd by Data Center

### ILRS Mirror Data Center (European Space Agency and Shanghai Data Center)
- Mirrors directories from the Primary Data Center
- Additional access point to ILRS data, derived products, and service operational and status information (1)
- Shanghai Data Center
  - Operations currently suspended
  - FTP: ftp://82.157.207.76/ [under construction]
  - CPFs, FR CRD V2, NPT CRD V2
  - Synchronize at 00:00 UTC
- European Space Agency (ESA)
  - Primary Page with Data Explorer: https://gssc.esa.int/
  - FTP: ftp://gssc.esa.int/
  - FRD and NPT (all versions)
  - Synchronize at:
    - 15:00 Daily
    - Wednesday and Sunday (repro-check last 7 days)
    - 1st and 15th of the month (repro-check last 30 days)

Product Flow
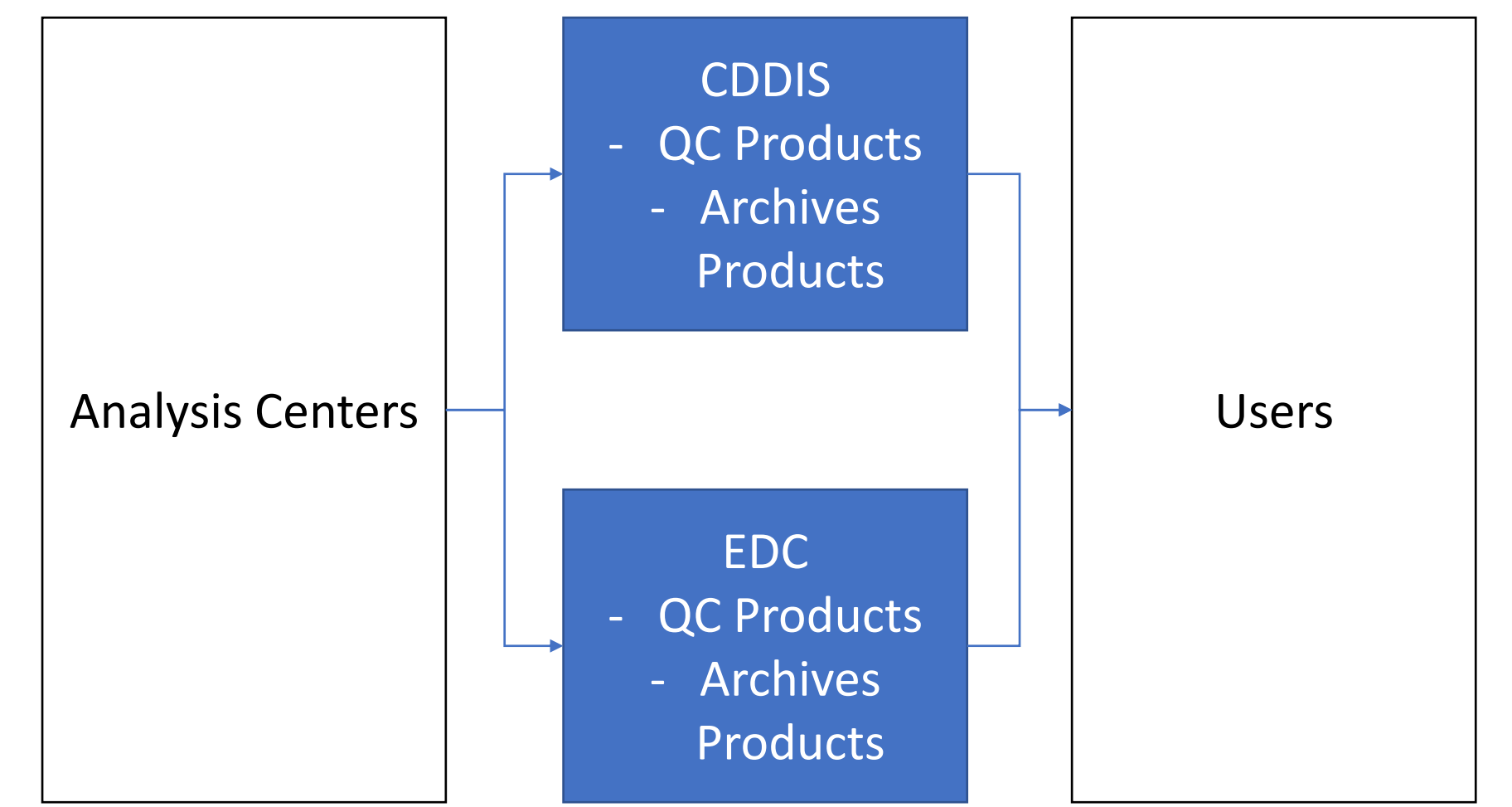
Predictions Flow
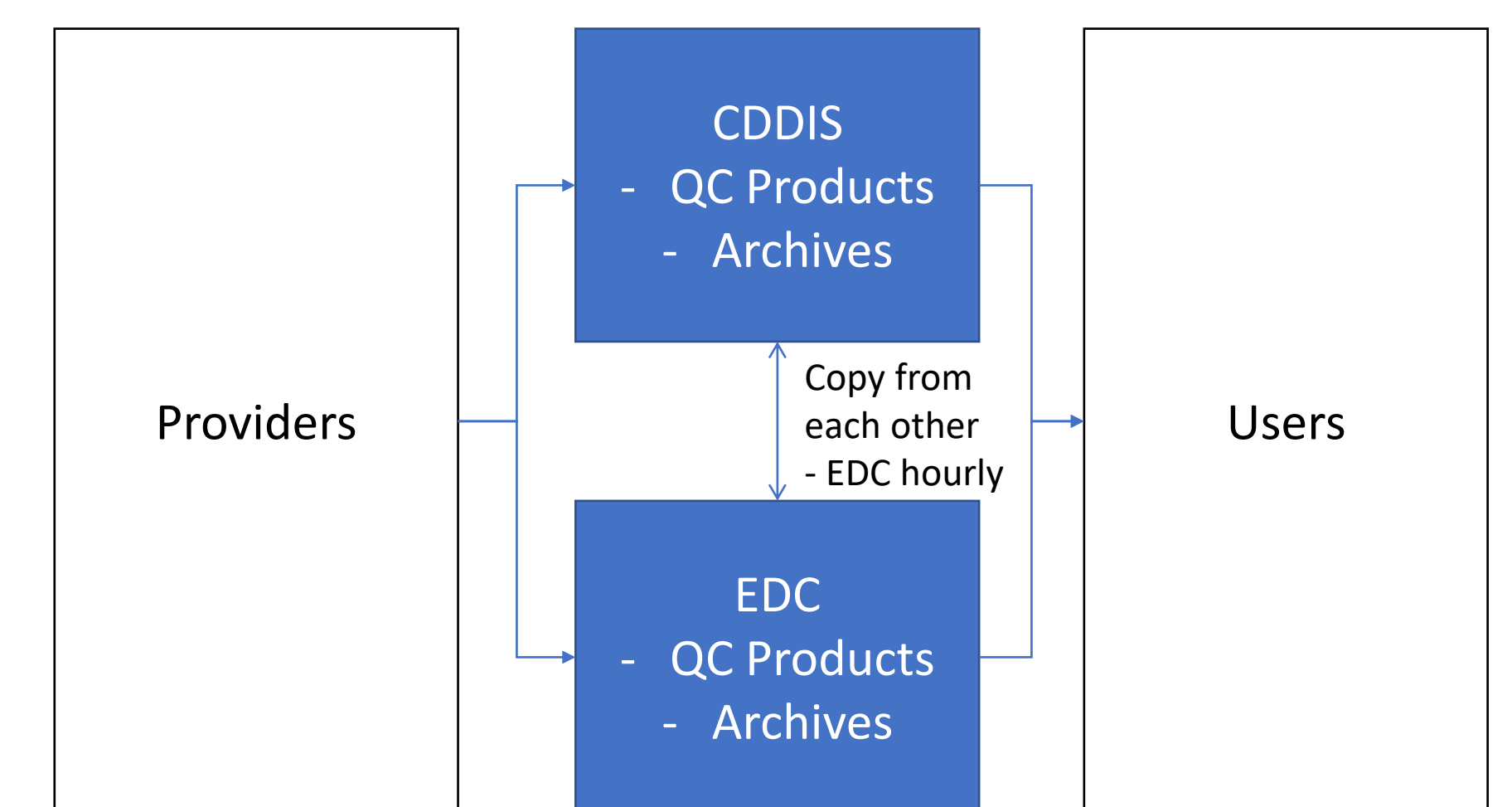
Some providers only upload CPFs to the CDDIS or the EDC. The data centers correct for this by checking for predictions from each other

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Current Status

Transition to CPF V2

- Official transition date: March 1, 2022
- CPF V2 Format: https://ilrs.gsfc.nasa.gov/docs/2018/cpf_2.00h-1.pdf
- All providers and users have changed over to the CPF V2 format
- Primary Data Centers:
  - Removed current directory from /slr/cpf_predicts/
  - Created current directory in /slr/cpf_predicts_v2/
- DOI: 10.5067/SLR/SLR_ILRSORBPRED_001

Transition to CRD V2

- Official transition date: August 1, 2022
- Availability of CRD V1 files ended: October 1, 2022
  - Stations are no longer required to send CRD V1 data
- CRD V2 Format: https://ilrs.gsfc.nasa.gov/docs/2021/crd_v2.01e2.pdf
- Station: majority have changed over to the new format
- DOIs:
  - NPT Hourly: 10.5067/SLR/SLR_DATA_HOURLY_NPT_001
  - NPT Daily: 10.5067/SLR/SLR_DATA_DAILY_NPT_001
  - NPT Monthly: 10.5067/SLR/SLR_DATA_MONTHLY_NPT_001
  - FRD Daily: 10.5067/SLR/SLR_DATA_DAILY_FR_001
  - FRD Monthly: 10.5067/SLR/SLR_DATA_MONTHLY_FR_001

CRD NPT Links   CRD FRD Links

- 8 Stations haven't transitioned to the CRD V2 format yet
  - The EDC is converting their data for them to the CRD V2 format automatically
  - The affected stations are in quarantine due to other issues
  - Once the station transitions to the CRD V2 format, their data needs to be verified/approved in addition to approval for the primary reason why they are in quarantine

SINEX ITRF2020

- New SINEX Checks (Temporarily Warnings):
  - File begins with "%=SNX"
  - File ends with "%ENDSNX"
  - Required Blocks for all SINEX:
    - FILE/REFERENCE
    - INPUT/HISTORY
    - SITE/ID
    - SITE/ECCENTRICITY
    - SOLUTION/EPOCHS
    - SOLUTION/STATISTICS
    - SOLUTION/ESTIMATE
    - SOLUTION/MATRIX_ESTIMATE
  - Required Blocks for ITRF2020
    - MODEL/RANGE_BIAS
    - MODEL/TARGET_SIGNATURE_GEOMETRY
    - MODEL/TIME_BIAS
- DOI: 10.5067/SLR/slr_itrf20200_repro2020_001

- Former ITRFs will be moved to https://cddis.nasa.gov/archive/slr/products/REPRO_SERIES/ directory
  - The CDDIS will create landing pages and DOIs
- Formalization of SINEX Checks
  - DFPWG talk at the IWLR – discuss in person
  - Work with providers on corrections prior to release where files would be rejected
- Brief review of future work at the DFPWG

Future Work

Digital Object Identifiers (DOIs) – Citing Data

- Chronicles the origin of data providing identification, discovery, accessibility, and citation of data and derived products to give proper credit to providers, data centers, and beyond
- The CDDIS currently is registering DOIs for new data/products and working to register DOIs for existing files
- The EDC is working to integrate DOIs into their workflow; a release date will be given at a future time

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For more information on additional contributions from the EDC and CDDIS to the ILRS community please see posters:
1. CDDIS Services to the ILRS
2. EUROLAS Data Center (EDC) – Status Report 2018-2022

References

1. ILRS Report for 2016: https://ilrs.gsfc.nasa.gov/docs/2020/ilrsreport_2016.pdf