An overview of STIX Data Center
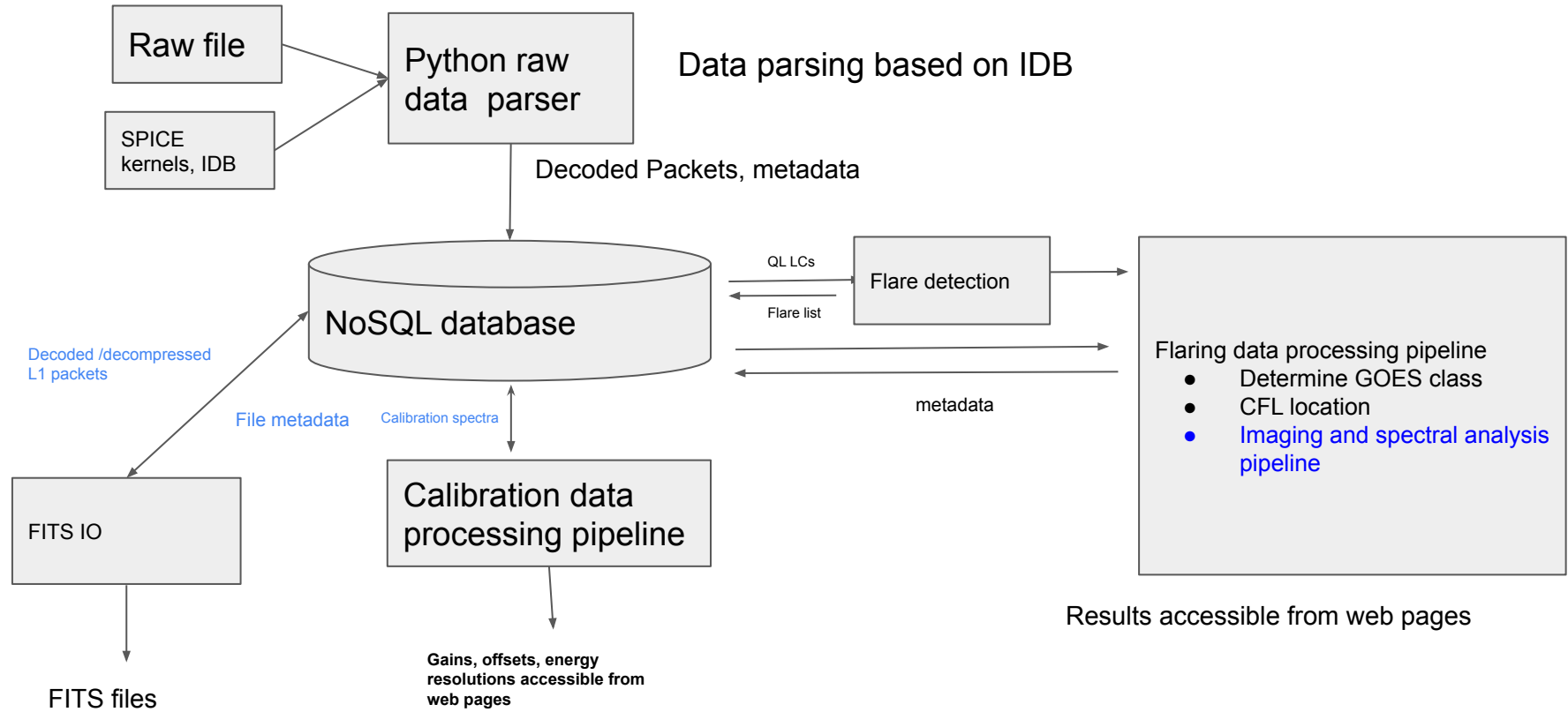
Hualin Xiao

FHNW

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STIX data center responsibilities

- Reception of data from the mission operation center
- Telemetry data processing
- Generating high-level data products
- Monitoring data quality and instrument health status
- Providing data products, data browsing & analysis tools for users
- Managing and archiving telemetry data
- Supporting STIX operations
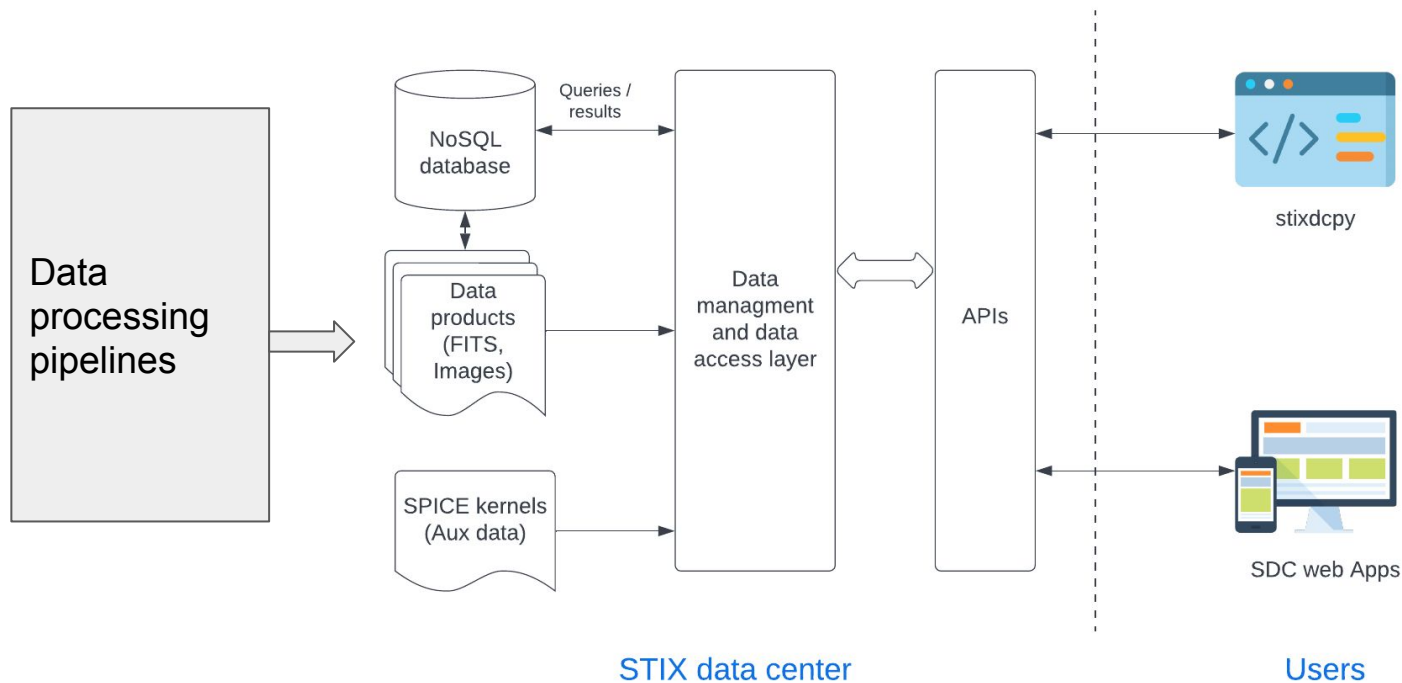
STIX data center software subsystems

- Data processing pipelines
- Data management and visualization software
- Software for instrument operations

Data processing pipelines at STIX data center

Raw file

SPICE kernels, IDB

Python raw data parser

Data parsing based on IDB

Decoded Packets, metadata

NoSQL database

Decoded /decompressed L1 packets

File metadata

Calibration spectra

QL LCs

Flare list

Flare detection

metadata

Flaring data processing pipeline
- Determine GOES class
- CFL location
- Imaging and spectral analysis pipeline

FITS IO

Calibration data processing pipeline

FITS files

Gains, offsets, energy resolutions accessible from web pages

Results accessible from web pages

The data processing is fully automatic.
Database is the core of the system

STIX data center user interfaces

Queries / results

NoSQL database

Data products (FITS, Images)

SPICE kernels (Aux data)

Data processing pipelines

Data managment and data access layer

APIs

stixdcpy

SDC web Apps

STIX data center

Users

Users can interactive with STIX data center via stixdcpy or web apps

STIX data center Web Apps

- STIX data center website provides web apps to preview various STIX data
  - Level-1 telemetry data
  - Data products generated by data processing pipelines
- STIX data center provides tools for
  - Data query
  - Data management
  - Operations

STIX data center website: https://datacenter.stix.i4ds.net/

stixdcpy

- stixdcpy is a python package that facilitates access and analysis of STIX data. It provides APIs to query and download data from and a set of tools for visualizing data and performing common analysis tasks.
- With stixdcpy, users can query and download
  - FITS products
  - ELUTs, calibration parameters
  - Flare list
  - CFL locations
  - S/C orbit, altitude
  - Tools for time conversion
  - Providing interfaces to MongoDB
  - everything available on STIX data center

Github Repo: https://github.com/drhlxiao/stixdcpy
Try stixdcpy on Google Colab:
https://colab.research.google.com/drive/17fQfbWjL0s0TpblbPL1Ysy_zFXj40FBf?usp=sharing

How to contribute code

- Contributing code to SDC is welcome
- User code can be integrated into
  - STIX data center pipelines
  - stixdcpy
  - STIX data center web pages
- Scripts running on the server side can be written in
  - Python
  - C++/C
  - IDL
- Scripts running on client side must be written in Javascript
- Your scripts will have access to all resources available on STIX data center

- Any issues about STIX data products, email to hualin.xiao@fhwn.ch

- Want more features, have suggestions, or find issues, please create issues on the github repo at   https://github.com/drhlxiao/stix-data-center/issues