ES-DOC for CMIP6 and ES-DOC Services: ESGF-ERRATA

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ESGF Earth System Grid Federation

es-doc Earth System Documentation

ES-DOC for CMIP6 status

- **Different collect process than CMIP5's:**
  - About half of the documents (experiments, simulations, ensembles,...) automated (following ESGF publishing)
  - The remaining (model, conformance to protocol, forcings, responsible party,...) produced by groups when ready – joined together via the "further_info_URL" attribute
  - Multiple tools to create these documents (python library or notebooks, questionnaire,…).
- **Ready for community review (Dec 2016):**
  - Documentation work-flow for CMIP6,
  - Type of information to be collected,
  - WIP white paper describing the above.
- **Currently in internal review:**
  - Document creation tools: automated and UIs (py-esdoc, questionnaire, cdf2cim,…)
  - Ocean, atmosphere, sea-ice and top level realms
- **Working on:**
  - Forcings description (with Tim Johns et al. e.g. IPCC Table 12.1) – timeline: Nov 2016
  - Short model tables for papers (draft for ocean available) – Jan 2017
  - Update science contents of other realms (with the community/WGCM) – Feb 2017

ES-DOC for CMIP6 status

- Project to document CMIP6 well under-way.
- Building on CMIP5 experience (both good and bad !)
- Clear set of use cases
- Community review formalised (internal, WIP/WGCM, wider)
- More user friendly for groups:
    - Large fraction is automated
    - Starting model description from CMIP5 version
    - Beta testing for a period of 5 months (Oct 2016 – Feb 2017) with various actors (UKMO, GFDL, IPSL)
        - Possibility of adding two new groups (suggestions ?)
    - Documentation for all steps (+ overview as WIP white paper)
- Full scheduled community release: March 2017

- Looking ahead (posts CMIP6) to include other « realms »:
    - Regional models, downscaling
    - Evaluation & metrics, obs4MIP

ES-DOC and Errata Service

- **Ensures** data quality by providing issue status tracking.

- Relies on the **PID Handle service** for retracing past and future versions of datasets and/or files.

- Divided into two major pieces: Remote server and associated webservices and local client/Front-end.
- Currently in **alpha phase**, heading towards a community **beta**.

- Full community release: March 2017
- **Prospective:**
- Exposing API to other services (such as ESGF CoG front-end and Synda) to ensure real time feedback on data status.
- Incorporating the issue declaration process in the conventional publishing workflow, technically or through enforcement.

ES-DOC Errata Service

- **Issues are stored within the PID service handles using Unique Identifiers (uid):**

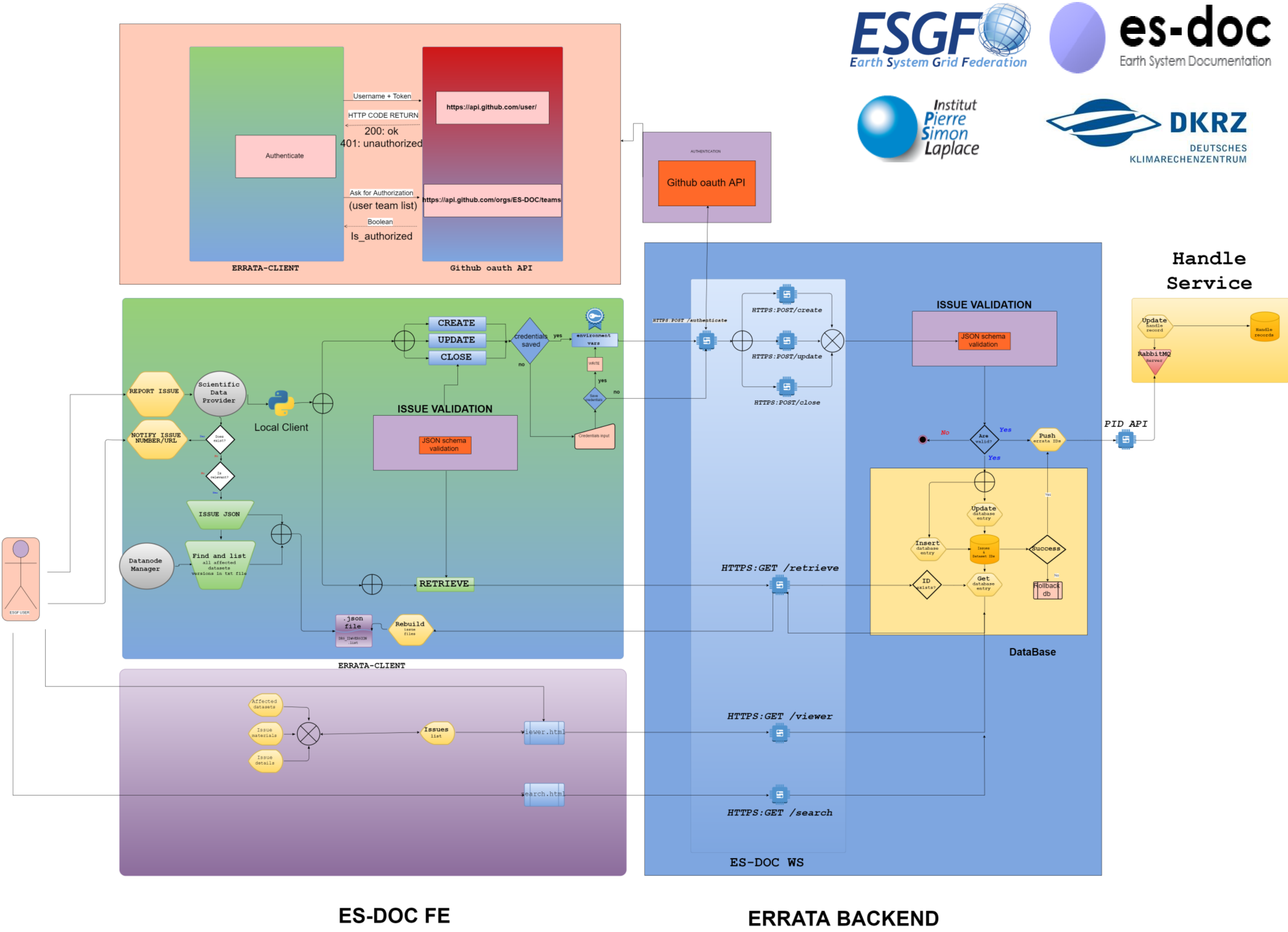
Each handle has a new attribute on the dataset level identifying the issue id (set to none if there's no issue with the dataset in hands).

- **Errata service queries the PID service and proceeds to extract its issue id:**

Using the PIDs genealogy tree structure, finding whether the queried version of dataset/file is safe to use or is affected by a running issue.

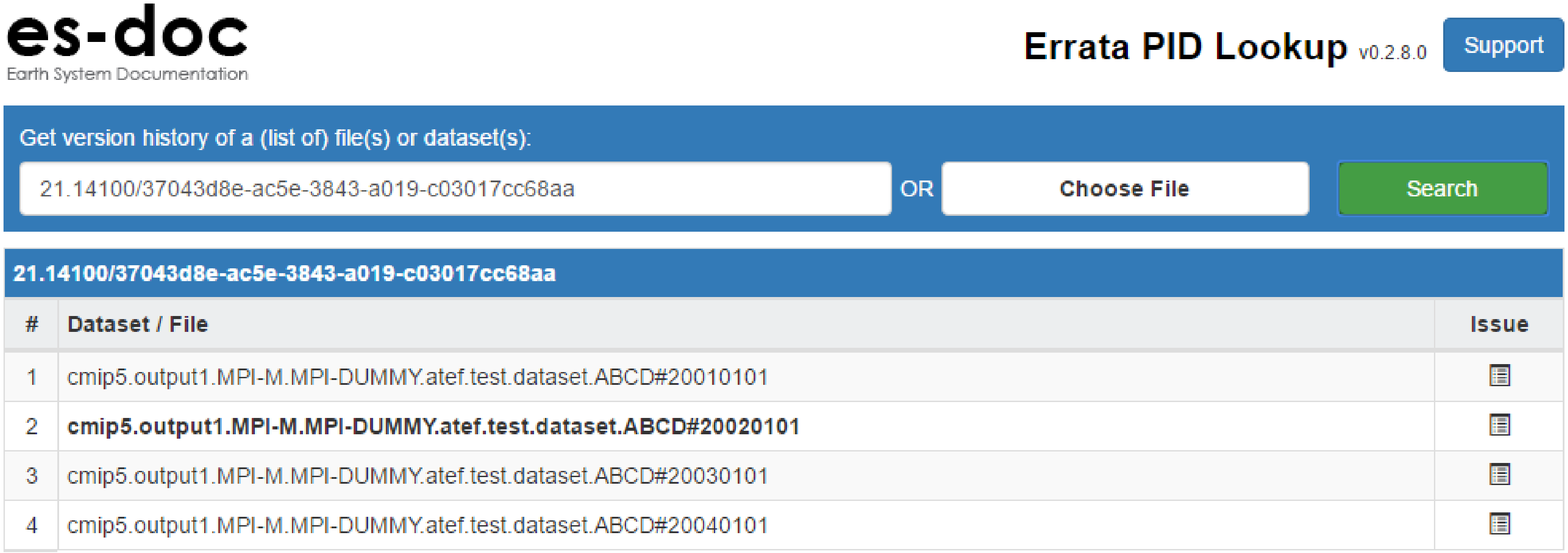
- **Alpha release (Dec 2016) includes:**
  - Errata Web-service suite and the related issue inspection algorithm.
  - Errata Service Front-End with search/filters features.
  - Errata-client enabling user interaction (data providers especially).

- **Currently in** internal **review/ Working on:**
  - Authorization and security issues:
    - Delegated to 3rd party: Github Oauth2.0
    - Implemented a security policy currently in internal review


Username + Token
HTTP CODE RETURN
200: ok
401: unauthorized
Ask for Authorization
(user team list)
Boolean
Is_authorized
Authenticate
https://api.github.com/user/
https://api.github.com/orgs/ES-DOC/teams
ERRATA-CLIENT
Github oauth API
AUTHENTICATION
Github oauth API
REPORT ISSUE
Scientific Data Provider
Local Client
NOTIFY ISSUE NUMBER/URL
Does exist?
Yes
No
Is relevant?
No
Yes
ISSUE JSON
Datanode Manager
Find and list all affected datasets versions in txt file
CREATE
UPDATE
CLOSE
credentials saved
yes
no
environment vars
WRITE
yes
Save credentials
no
Credentials input
ISSUE VALIDATION
JSON schema validation
RETRIEVE
.json file
DRS_ID#VERSION .list
Rebuild issue files
ERRATA-CLIENT
ESGF USER
Affected datasets
Issues materials
Issue details
Issues list
viewer.html
search.html
HTTPS:POST /authenticate
HTTPS:POST/create
HTTPS:POST/update
HTTPS:POST/close
ISSUE VALIDATION
JSON schema validation
No
Are valid?
Yes
Yes
Push errata IDs
PID API
Update database entry
Insert database entry
Issues & Dataset IDs
Success
Yes
No
ID exists?
Get database entry
Rollback db
DataBase
HTTPS:GET /retrieve
HTTPS:GET /viewer
HTTPS:GET /search
ES-DOC WS
Handle Service
Update handle record
Handle records
RabbitMQ Server
ES-DOC FE
ERRATA BACKEND

ERRATA CRAWLER WORKFLOW:

Expectations:



Errata PID Lookup v0.2.8.0

Get version history of a (list of) file(s) or dataset(s):

21.14100/37043d8e-ac5e-3843-a019-c03017cc68aa

21.14100/37043d8e-ac5e-3843-a019-c03017cc68aa

#	Dataset / File	Issue
1	cmip5.output1.MPI-M.MPI-DUMMY.atef.test.dataset.ABCD#20010101	▤
2	**cmip5.output1.MPI-M.MPI-DUMMY.atef.test.dataset.ABCD#20020101**	▤
3	cmip5.output1.MPI-M.MPI-DUMMY.atef.test.dataset.ABCD#20030101	▤
4	cmip5.output1.MPI-M.MPI-DUMMY.atef.test.dataset.ABCD#20040101	▤

Expected output

ERRATA CRAWLER WORKFLOW:

Expectations:

- **Available input:**
  - Dataset/File PID
  - Dataset/File id and version number
  - List of PIDs

- **Expected output:**
  - Data issue history
  - For file or dataset
  - List of datasets/files history

- **Constraints:**
  - Needs to be scalable
  - Tolerable complexity

ERRATA CRAWLER WORKFLOW:

Expected Input:

Dataset A : {u'**VERSION_NUMBER': '20010101,** …, 'DRS_ID': 'cmip5.output1.MPI-M.MPI-DUMMY.atef.test.dataset.ABCD', u'FIXED_CONTENT': 'TRUE', **u'REPLACED_BY': 'hdl:21.14100/37043d8e-ac5e-3843-a019-c03017cc68aa'**, u'**AGGREGATION_LEVEL': 'DATASET'**, …, u'**HAS_PARTS': 'hdl:21.14100/d9053480-0e0d-11e6-a148-3e1d05defe78;hdl:21.14100/63fa73be-0e10-11e6-a148-4r1d05defe78;hdl:21.14100/28ju73be-0e10-11e6-a148-a7751ce7ec0c'**}

Dataset B : {**u'VERSION_NUMBER': '20020101'**, **u'REPLACES': '21.14100/AAE01BA2-8436-378D-84ED-5A06B9FBEE46'**, …, u'DRS_ID': 'cmip5.output1.MPI-M.MPI-DUMMY.atef.test.dataset.ABCD', **u'REPLACED_BY': 'hdl:21.14100/e0560a9d-2227-3175-b943-fc26c427a923'**, **u'AGGREGATION_LEVEL': 'DATASET'**, …, **u'HAS_PARTS': 'hdl:21.14100/d9053480-0e0d-11e6-a148-3e1d05defe78;hdl:21.14100/2a1d100e-0e13-11e6-a148-3e1d05koki66;hdl:21.14100/28ju73be-0e10-11e6-a148-a7751ce7ec0c'**}

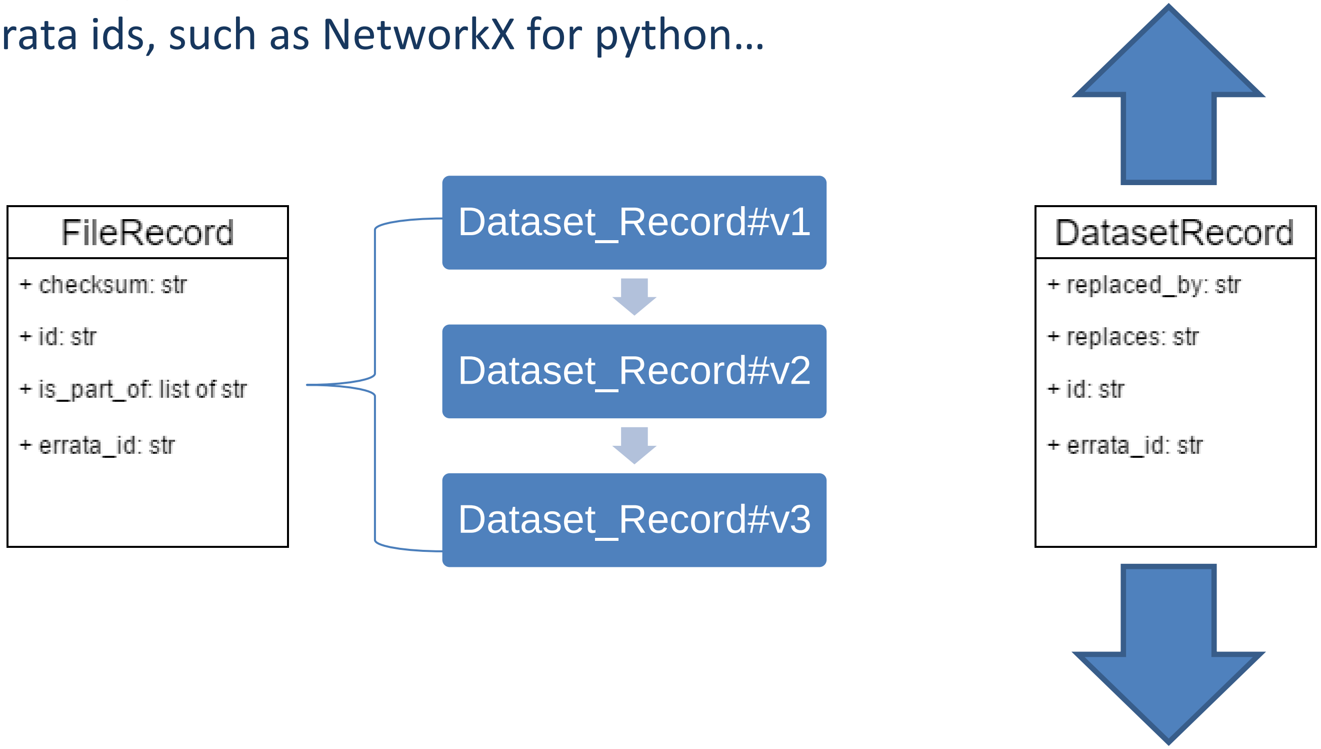
File.nc : {u'CHECKSUM_METHOD': 'SHA256', u'**IS_PART_OF': 'hdl:21.14100/aae01ba2-8436-378d-84ed-5a06b9fbee46;hdl:21.14100/37043d8e-ac5e-3843-a019-c03017cc68aa'**,…, **u'FILE_NAME': 'atef_esgf_testfile_temperature.nc'**, u'FILE_VERSION': 'fv1',…, u'FILE_SIZE': '1291743184', **u'CHECKSUM': 'fbab91863fcc67cf118d698c0ac210f79c6e7118a3f3c585f311c0d5d36cacf2'**, **u'AGGREGATION_LEVEL': 'FILE'**, …}

ES-DOC Errata Service:

ERRATA CRAWLER WORKFLOW:

- A file handle has no information about the next version of the file or the preceding version

- 3rd part logical tree libraries were considered to reconstruct the tree and easily extract the errata ids, such as NetworkX for python…



FileRecord

+ checksum: str
+ id: str
+ is_part_of: list of str
+ errata_id: str

Dataset_Record#v1

Dataset_Record#v2

Dataset_Record#v3

DatasetRecord

+ replaced_by: str
+ replaces: str
+ id: str
+ errata_id: str

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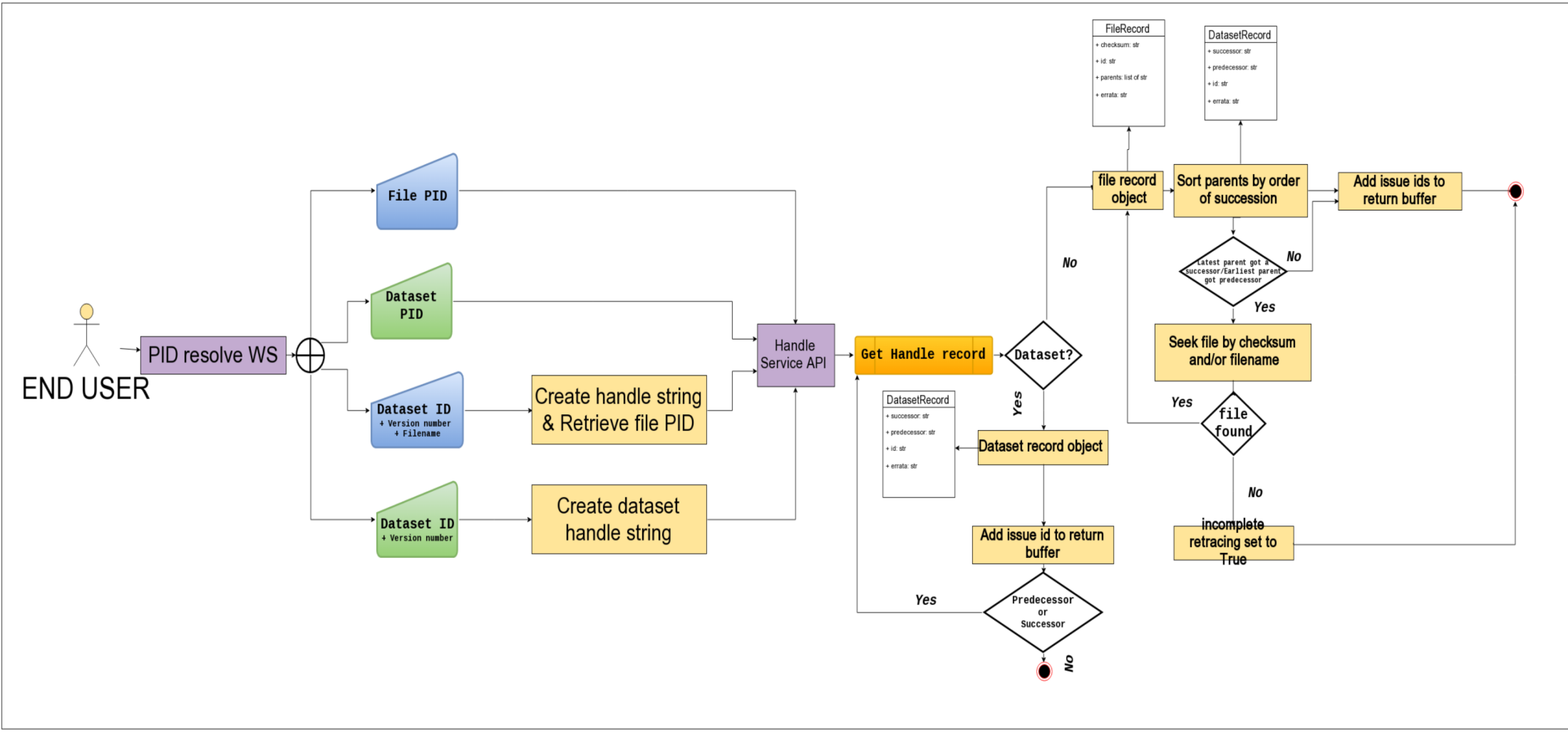
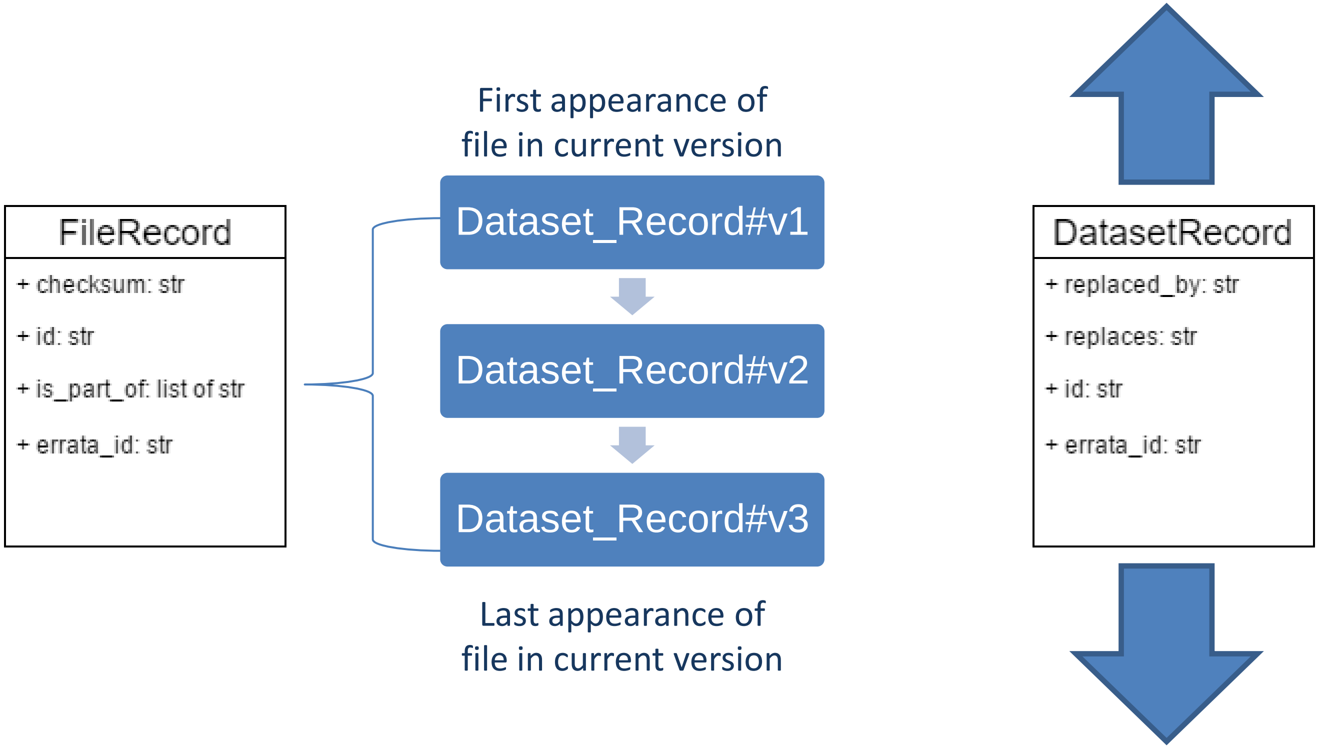


ERRATA CRAWLER

ES-DOC Errata Service:

ERRATA CRAWLER WORKFLOW:

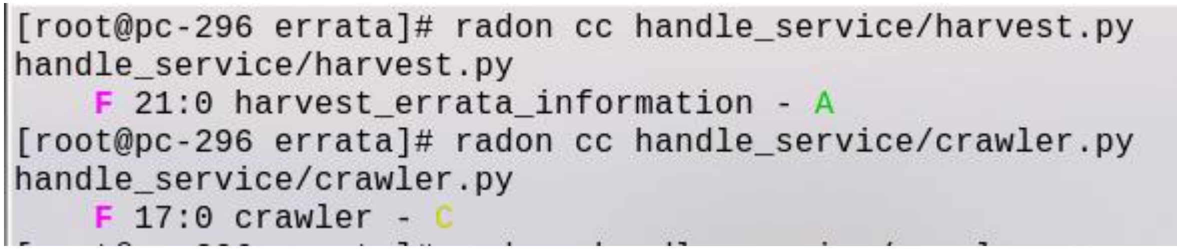


ES-DOC Errata Service:

ERRATA CRAWLER WORKFLOW

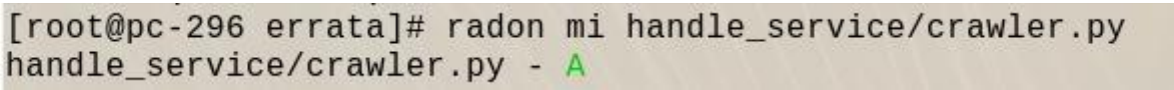
- Medium complexity, scales up to million files/datasets resolution with little trouble (theoretical worse case scenario O(n²))

- Average cyclomatic complexity and great maintainability index:



```
[root@pc-296 errata]# radon cc handle_service/harvest.py
handle_service/harvest.py
    F 21:0 harvest_errata_information - A
[root@pc-296 errata]# radon cc handle_service/crawler.py
handle_service/crawler.py
    F 17:0 crawler - C
```

Radon Cyclomatic Complexity



```
[root@pc-296 errata]# radon mi handle_service/crawler.py
handle_service/crawler.py - A
```

Radon Maintainability Index

ES-DOC Errata Service

Errata Crawler limits, perspectives

- Inherits sequential behaviour from PID handle server.
- Straightforward for datasets, but not for files.
- Open room for improvements, according to community needs and expectations, update the WIP paper accordingly.

ES-DOC Errata Service

Errata Crawler limits, perspectives

- Github backend repository: https://github.com/ES-DOC/esdoc-errata-ws.
- Github client repository: https://github.com/ES-DOC/esdoc-errata-client
- Docs: http://esdoc-errata-client.readthedocs.io/en/latest/

ES-DOC Errata Service

- ✓Ask away...