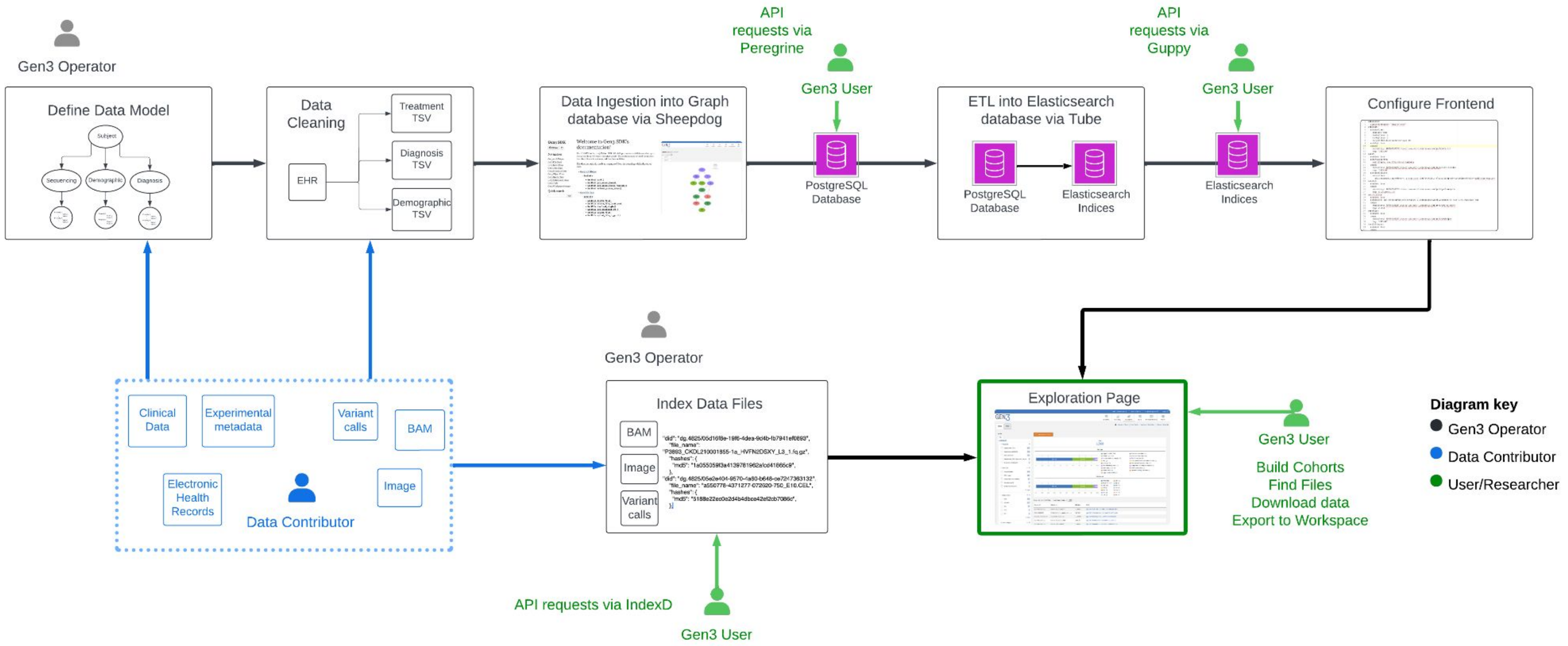
Understanding ETL and ETL mapping to power the Gen3 Exploration Page

Gen3 Community Forum
September 3, 2025

The Agenda

- Data submission overview
- Gen3 ETL (Tube)
  - Data model, ETL mapping, and searching for data – all connected
  - How Tube creates ElasticSeach indices for Guppy to use
  - Review of demonstration data model
  - ETL mapping types and subtypes (with examples)
  - Troubleshooting Gen3 ETL

Overall data flow in a Gen3 data commons

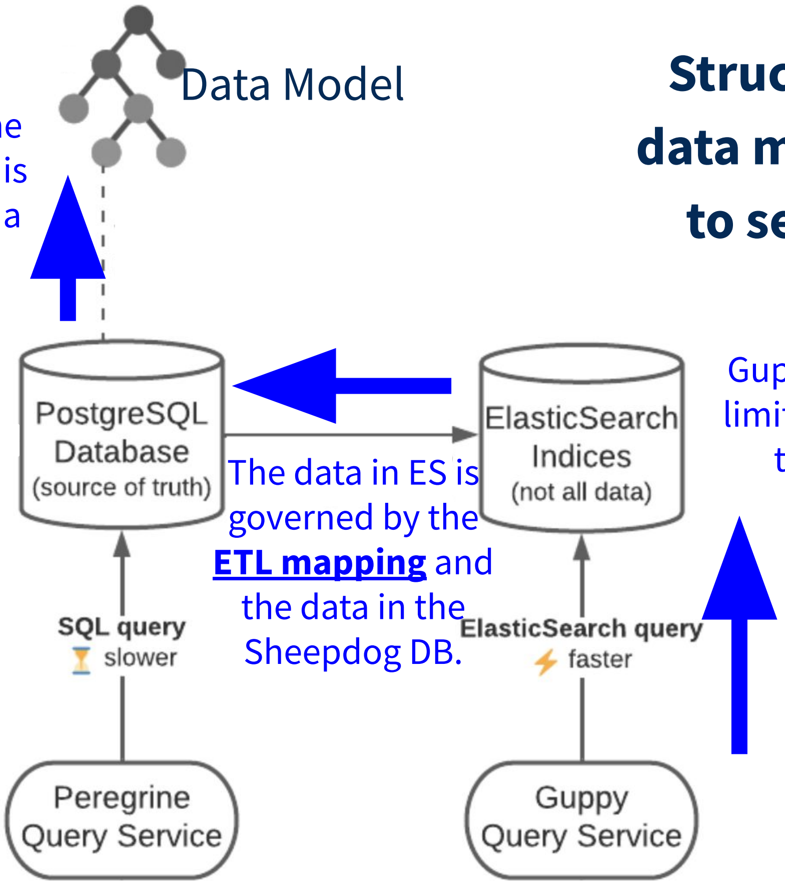


```
"did": "dg.4825/05d16f8e-19f6-4dea-9d4b-fb7941ef0893",
  "file_name":
"P3893_CKDL210001855-1a_HVFN2DSXY_L3_1.fq.gz",
  "hashes": {
   "md5": "1a055059f3a4139781962a1cd41865c9",
  },
"did": "dg.4825/05e2e404-8570-4a80-b648-ce7247383132",
  "file_name": "a550778-4371277-072520-750_E10.CEL",
  "hashes": {
   "md5": "5188e22ec0e2d4b4dbce42ef2cb7086c",
  }}
```

Data Model, ETL Mapping, and Data Search

Structure your ETL mapping (and your data model) based on what you will want to search for on the Exploration page

The data in the Sheepdog DB is structured as a result of the data model.

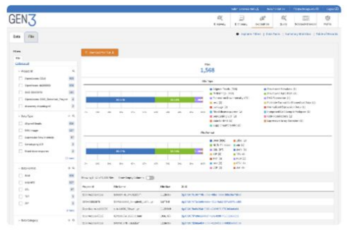


The data in ES is governed by the **[ETL mapping]()** and the data in the Sheepdog DB.

Guppy queries are limited by the data that is in ES.

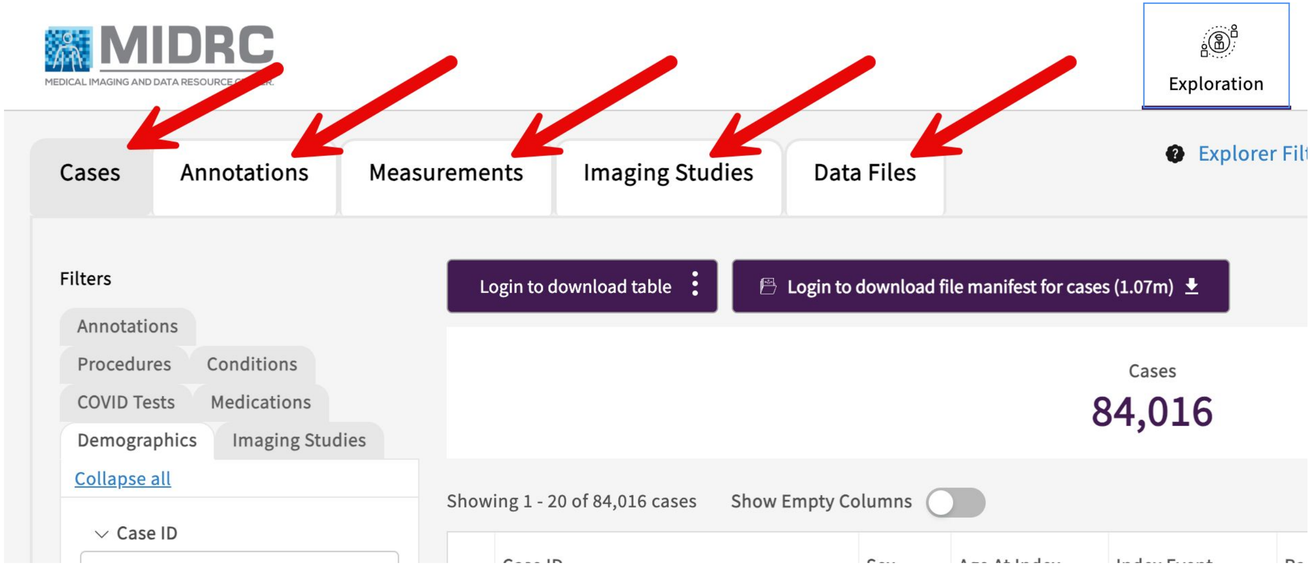
Exploration page results are controlled by what Guppy can query.

Exploration Page

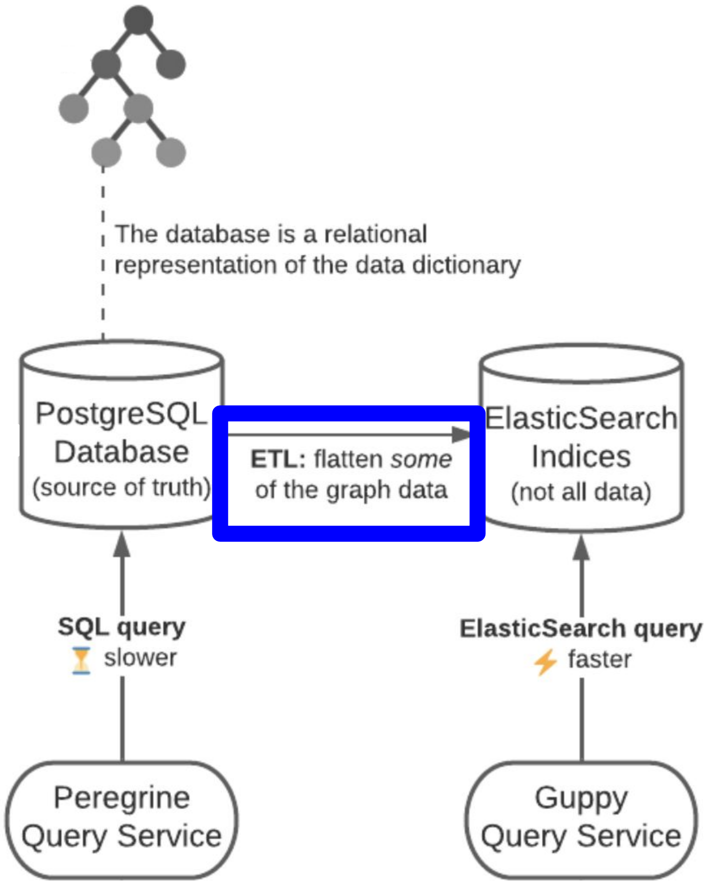


Data Model, ETL Mapping, and Data Search

Each tab requires a separate index created in ETL



What is Tube? Why use it?


The database is a relational representation of the data dictionary
PostgreSQL Database (source of truth)
ETL: flatten *some* of the graph data
ElasticSearch Indices (not all data)
SQL query
slower
ElasticSearch query
faster
Peregrine Query Service
Guppy Query Service

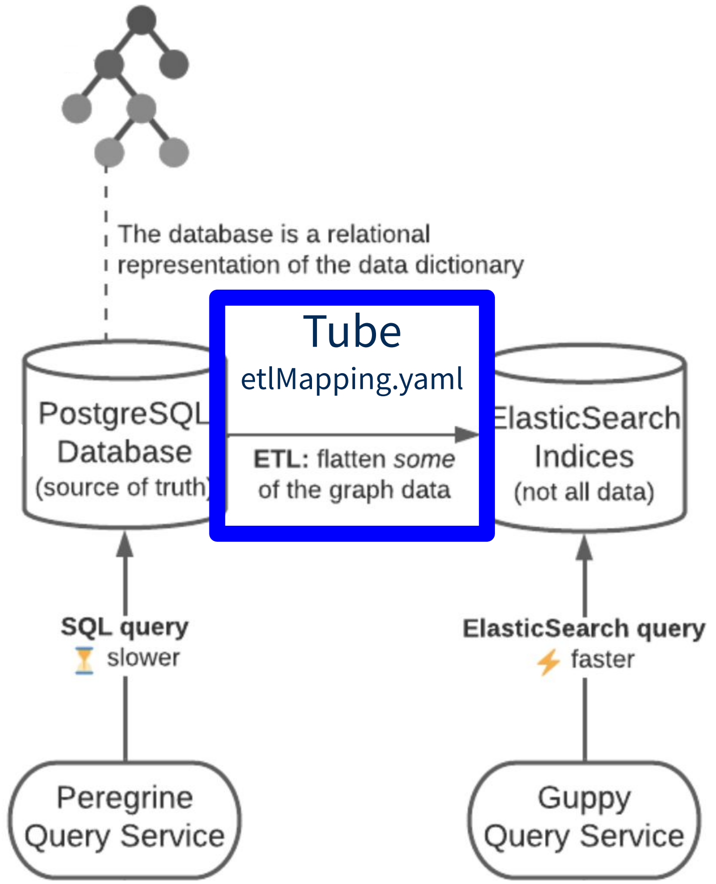
What is Tube?

- Tube is the microservice that travels across the graph to find and grab data in a PostgreSQL DB, then transforms it into ElasticSearch (ES) indexed documents (indices)

Why use Tube (or any ETL)?

- The indices in ES allow the microservice Guppy to quickly and efficiently query data.
- Used by the front-end and other Gen3 services.

ETL - What does Tube do?


The database is a relational representation of the data dictionary
Tube
etlMapping.yaml
PostgreSQL Database (source of truth)
ETL: flatten *some* of the graph data
ElasticSearch Indices (not all data)
SQL query
slower
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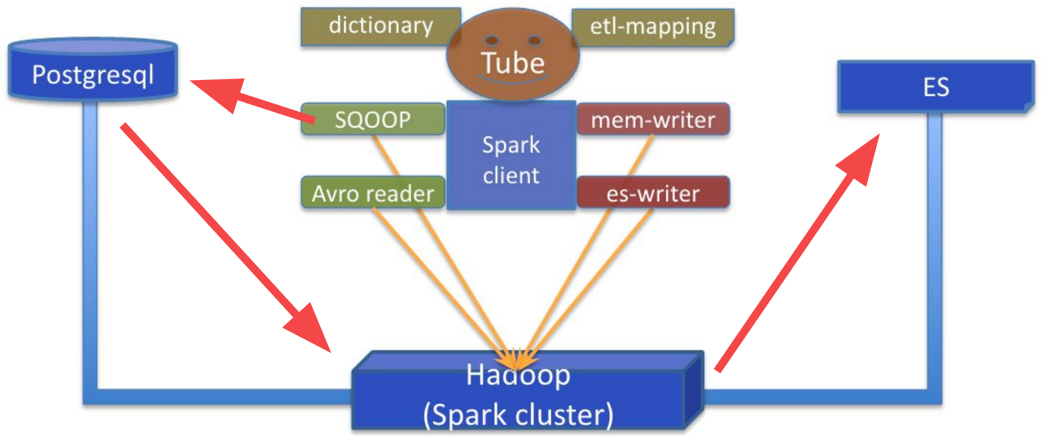
Guppy Query Service

Tube controls what data is gathered in the ES indices by configuration through the etlMapping.yaml file, which tells Tube which data tables and fields to ETL from Sheepdog into ElasticSearch indices.

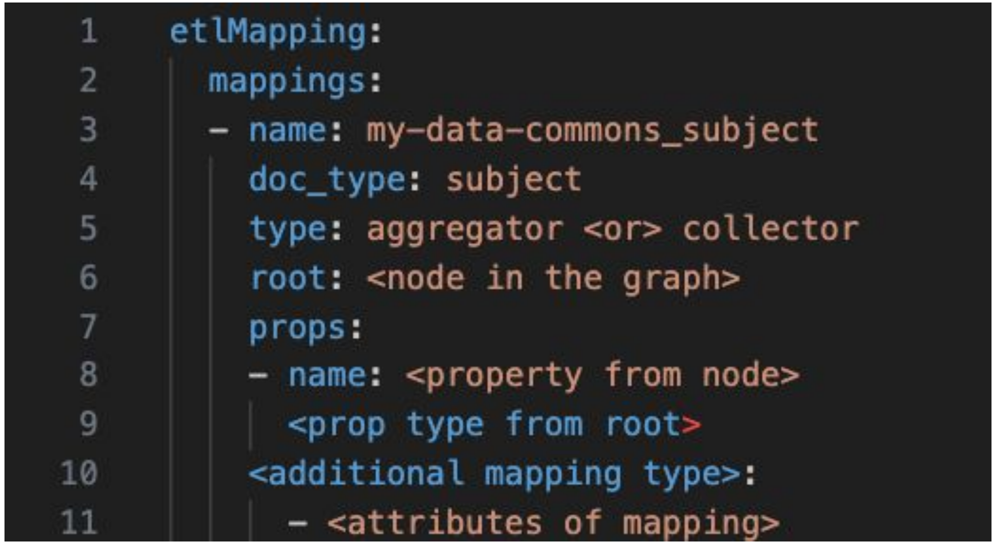
Tube Infrastructure and Mechanics



Tube (simplified)

- uses SQOOP to **extract data from the Sheepdog** PostgreSQL DB
- SQOOP temporarily dumps it into **Hadoop**
- Apache Spark then reads data from Hadoop and **transforms it** according to ETL config, **creating indices in ElasticSearch**.

ETL - Mapping Syntax Base Syntax



```
etlMapping:
  mappings:
  - name: my-data-commons_subject
    doc_type: subject
    type: aggregator <or> collector
    root: <node in the graph>
    props:
    - name: <property from node>
      <prop type from root>
    <additional mapping type>:
      - <attributes of mapping>
```

- Yaml based schema
- "–" is the start of a new concept and indentation preserves that concept
- Multiple props can be combined for flexibility in index creation

ETL - Mapping Syntax: Mappings

Mappings

For every mapping:

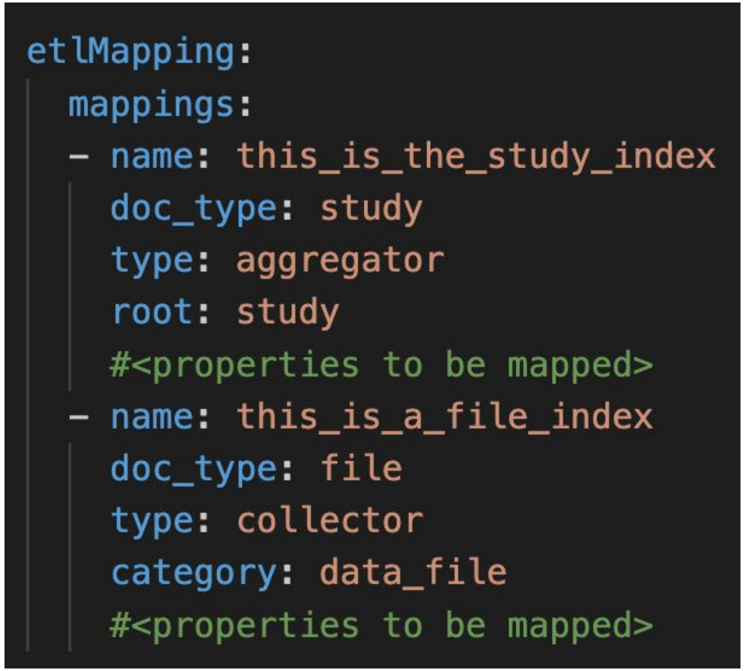
- You must specify the name the index will have in ES (**`name`**)
- You must specify the name that Guppy will use to query the index (**`doc_type`**)
- You must specify the type of mapping used for the index (**`type`**)

For `type: aggregator`

Must also indicate **`root`** node name in the DB

For `type: collector`

Indicate node **`category`** to collect properties from



```
etlMapping:
  mappings:
  - name: this_is_the_study_index
    doc_type: study
    type: aggregator
    root: study
    #<properties to be mapped>
  - name: this_is_a_file_index
    doc_type: file
    type: collector
    category: data_file
    #<properties to be mapped>
```

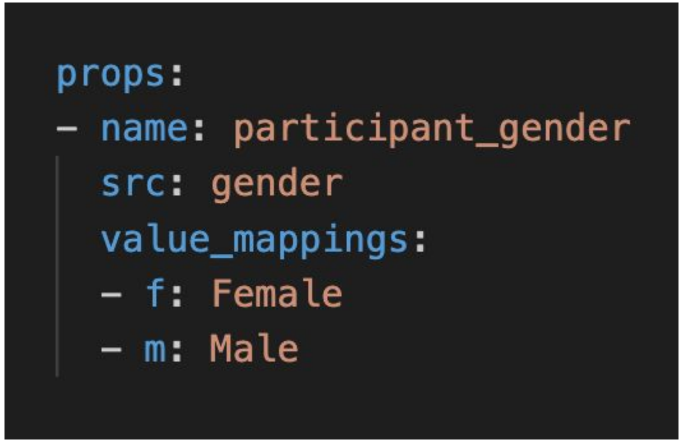
ETL - Mapping Syntax: Props

Properties (props)

- Props are all the fields that are expected to be in the final ElasticSearch index

For every property:

- You must specify the name the property will have in the ES index (**`name`**)
- If the prop name is different in the graph, you must also specify the name of the property in the source DB (**`src`**)
- You can use **`value_mappings`** to map new value names to the existing values in the DB



```
props:
- name: participant_gender
  src: gender
  value_mappings:
  - f: Female
  - m: Male
```

ETL - Mapping Functions

ETL mapping supports 6 functions (`fn`):

- **fn: count** - counting how many nodes have values for that prop per case/root
- **fn: max** - reporting the max value among records for that property for a case/root
- **fn: min** - reporting the min value among records for that property for a case/root
- **fn: sum** - reporting the sum of values for records for that property
- **fn: list** - the full set of values (including any duplicates) for records for that property
- **fn: set** - reporting all the unique values for records for that property

(you can use these in either aggregators or collectors)

ETL - Mapping Syntax: Mapping Types

Two types of mapping:

Aggregation (creates an aggregator)

Traveling from a single root node, aggregators gather data from properties on connected nodes into a single index in ES

Example: a case aggregator that collects selected clinical data properties from the case node through the clinical nodes on a data model

Injection (creates a collector)

Collectors travel across multiple nodes of the same node category to gather data from shared properties on the nodes, and “inject” a parent node's ID into downstream nodes for faster joining

Example: a data file collector that collects data from properties on many different file nodes

ETL - Aggregation Mapping Subtypes

Aggregation - travels from root to multiple connected nodes

General approaches for creating an aggregator index:

With a “Root” node in mind:

- **flatten_props:**
  Get props from lower nodes
- **parent_props:**
  Get props from upper nodes
- **nested_props:**
  Get props from multiple lower nodes
- **aggregated_props:**
  Add statistics into indices
- **joining_props:**
  Join properties between indices

ETL - Collector Mapping Syntax

Injection - collects props from nodes of the same category, injecting parent node ID into lower nodes

General approaches for creating a collector index:

With a “category” of node in mind:

- **injecting_props:**
  Properties from parent nodes are injected into an index made up of lower nodes of a specified category

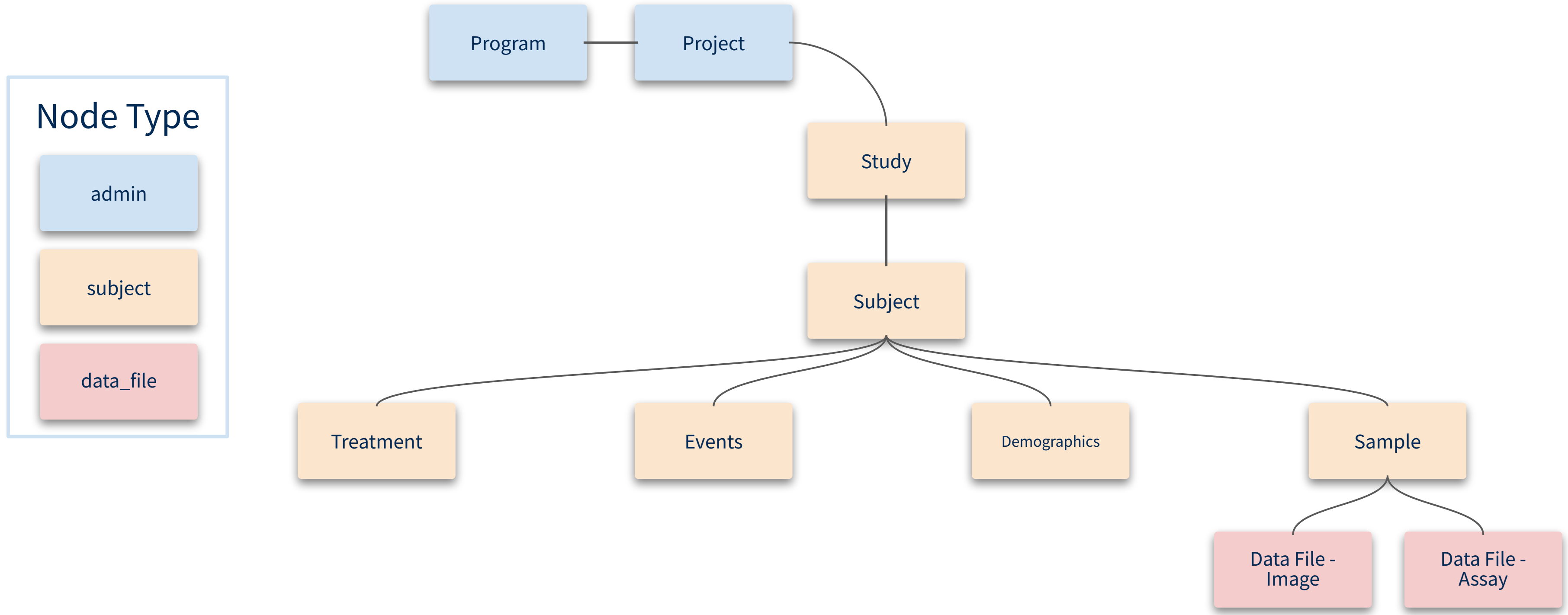
ETL - Mappings Explanation and Examples

The following slides contain examples of each of the mappings subtypes

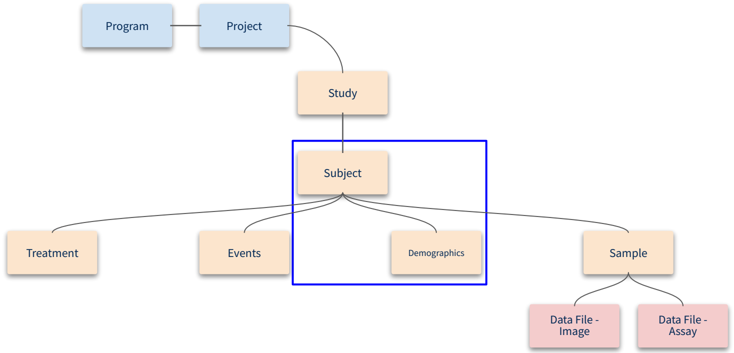
- For each mapping, there is a selection of the data model
- Example Mapping
- Example Index

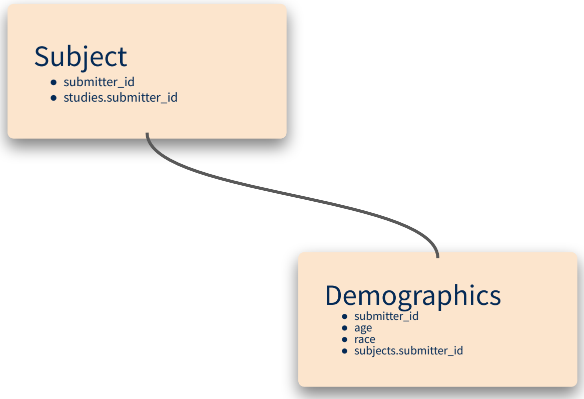
For our purposes, indices will be displayed as tables where simple enough to do so, and as JSON where more complex.

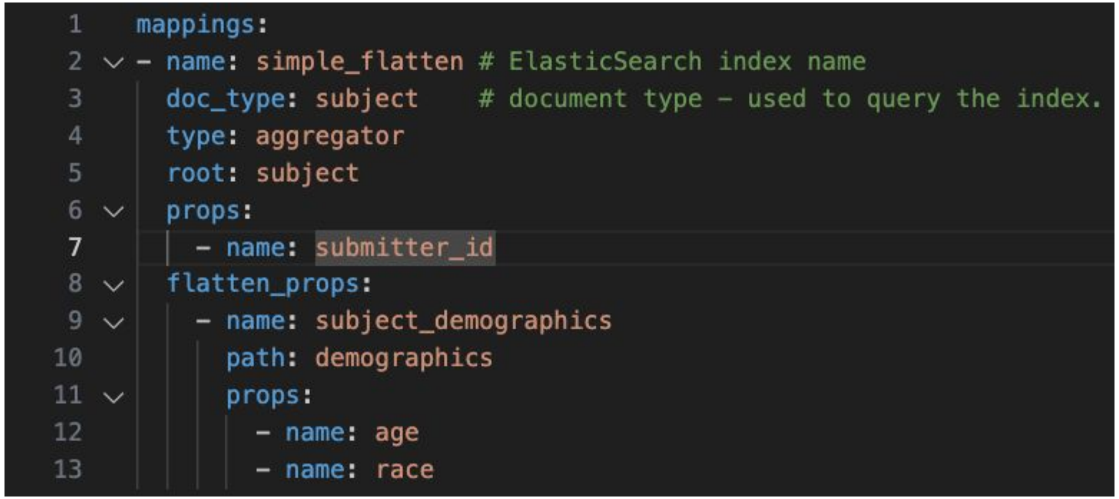
ETL - Example Data Model



ETL - Creating a Mapping - Flatten Props (one-to-one)







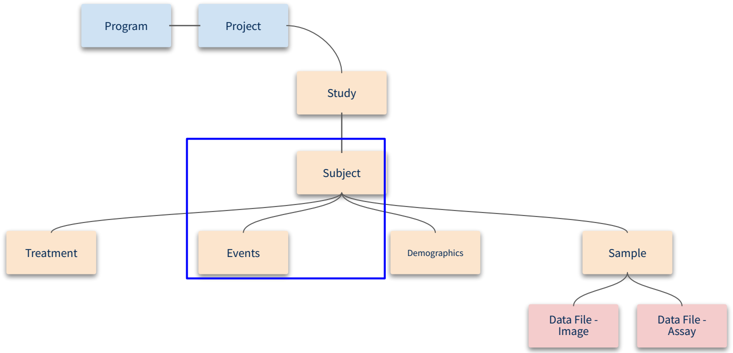
```yaml
mappings:
- name: simple_flatten # ElasticSearch index name
  doc_type: subject    # document type – used to query the index.
  type: aggregator
  root: subject
  props:
    - name: submitter_id
  flatten_props:
    - name: subject_demographics
      path: demographics
      props:
        - name: age
        - name: race
```

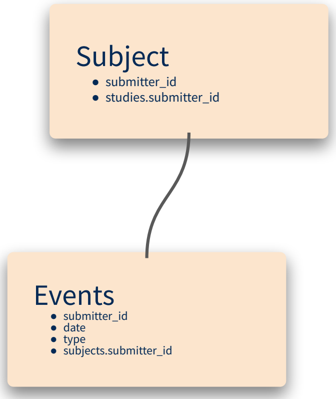
Example Index:

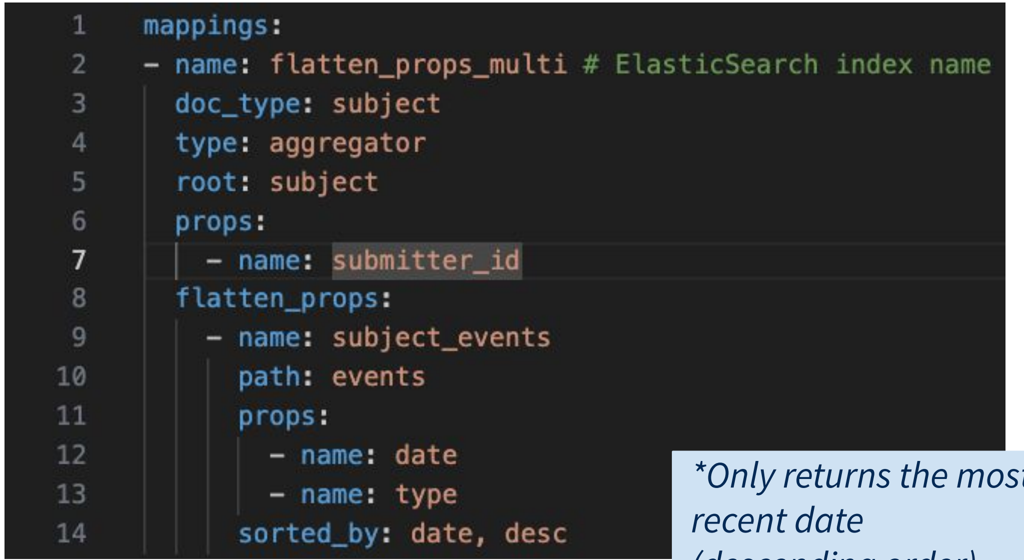
Subject.submitter_id	demographics.age	demographics.race
sub_123	18	Black or African American
sub_456	89	Asian

Flatten_props: Get props from lower nodes

ETL - Creating a Mapping - Flatten Props (many-to-*)







```
mappings:
- name: flatten_props_multi # ElasticSearch index name
  doc_type: subject
  type: aggregator
  root: subject
  props:
    - name: submitter_id
  flatten_props:
    - name: subject_events
      path: events
      props:
        - name: date
        - name: type
      sorted_by: date, desc
```

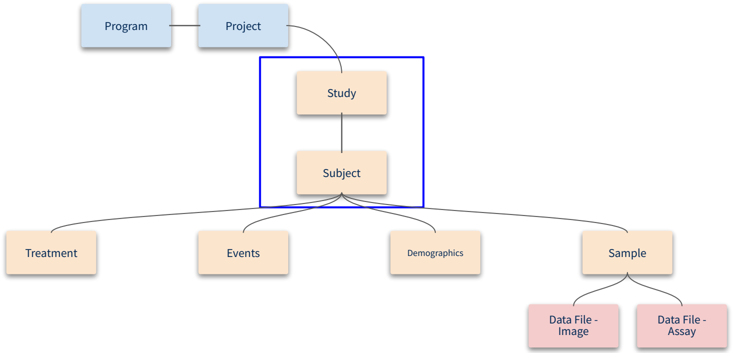
**Only returns the most recent date (descending order)*

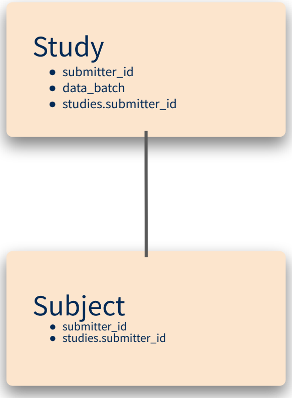
Example Index:

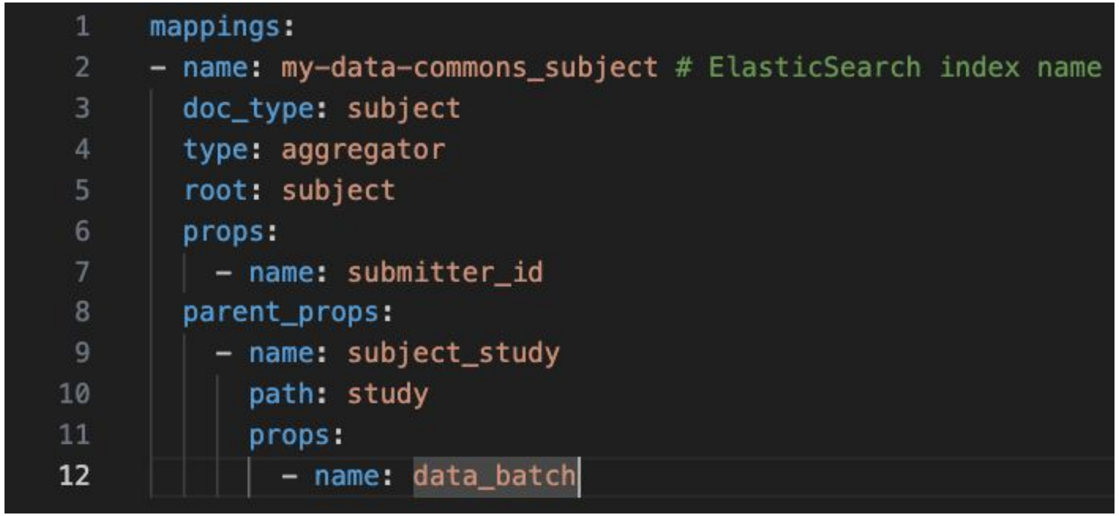
Subject.submitter_id	date	type
~~sub_123~~	~~03/20/1986~~	~~birth~~
sub_123	03/20/2009	hospitalization
~~sub_456~~	~~07/26/2025~~	~~hospitalization~~
sub_456	08/26/2025	death

Flatten_props: Get props from lower nodes

ETL - Creating a Mapping - Parent Props







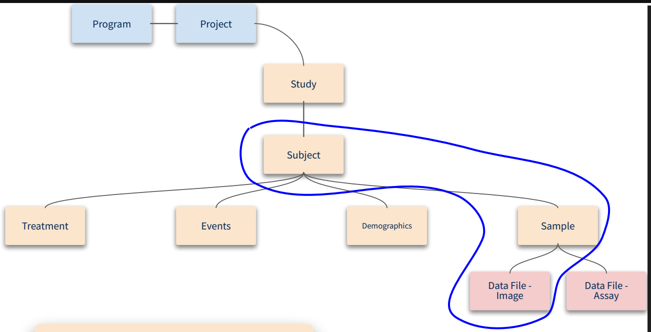
```yaml
mappings:
- name: my-data-commons_subject # ElasticSearch index name
  doc_type: subject
  type: aggregator
  root: subject
  props:
    - name: submitter_id
  parent_props:
    - name: subject_study
      path: study
      props:
        - name: data_batch
```

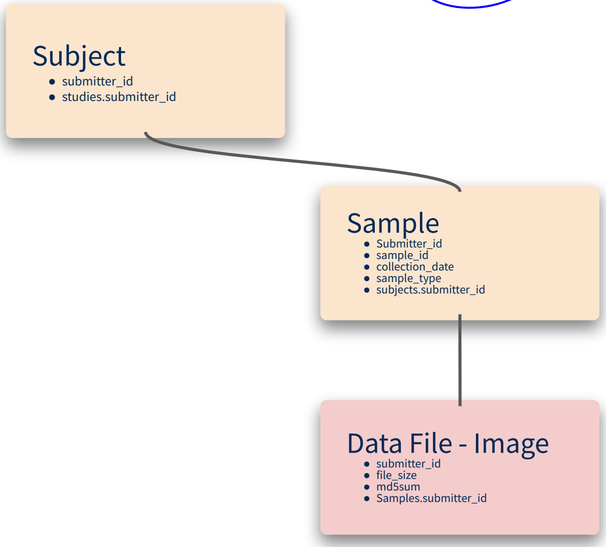
Example Index:

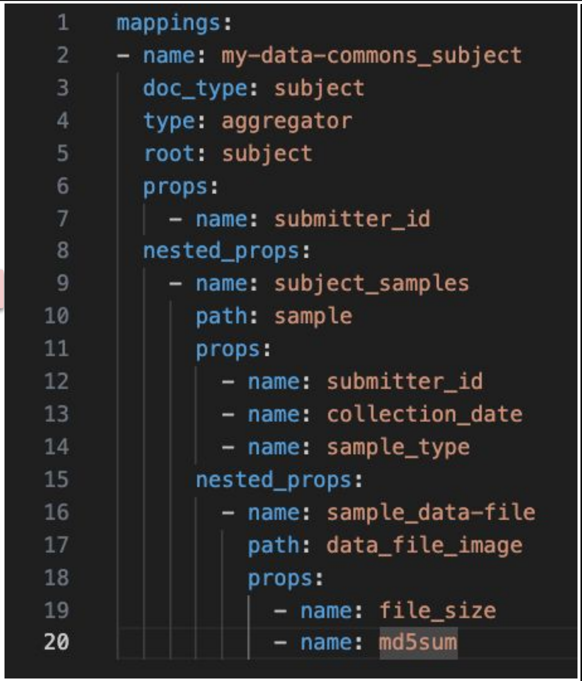
Subject.submitter_id	data_batch
sub_123	NIH_08262025
sub_456	NSRR_08272025

Parent_props: Get props from upper nodes

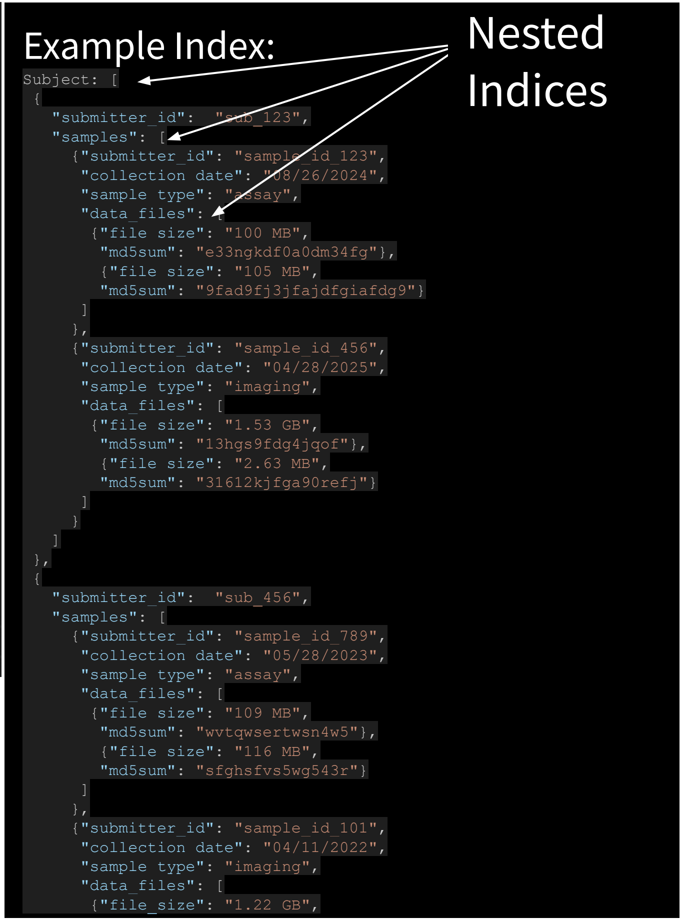
ETL - Creating a Mapping - Nested Props







```
mappings:
- name: my-data-commons_subject
  doc_type: subject
  type: aggregator
  root: subject
  props:
    - name: submitter_id
  nested_props:
    - name: subject_samples
      path: sample
      props:
        - name: submitter_id
        - name: collection_date
        - name: sample_type
      nested_props:
        - name: sample_data-file
          path: data_file_image
          props:
            - name: file_size
            - name: md5sum
```

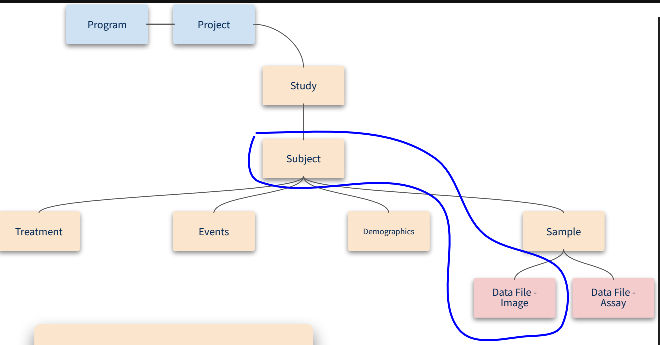


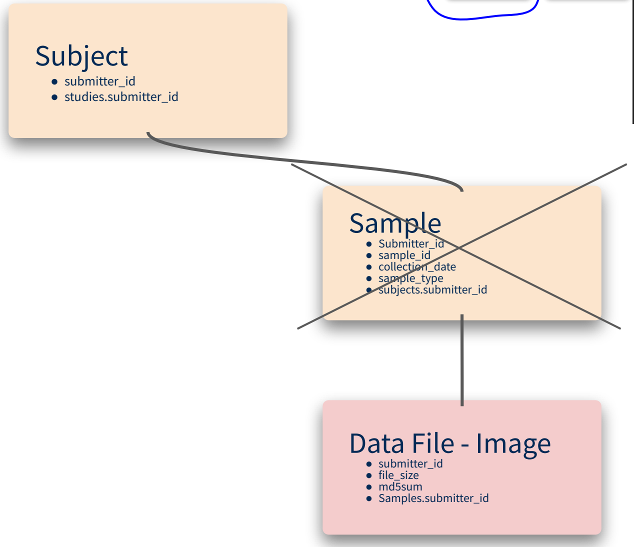
Example Index:

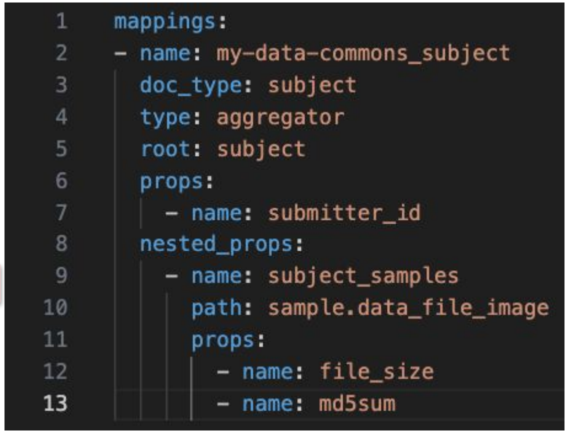
```
Subject: [
 {
  "submitter_id":  "sub_123",
  "samples": [
    {"submitter_id": "sample_id_123",
     "collection_date": "08/26/2024",
     "sample_type": "assay",
     "data_files": [
      {"file_size": "100 MB",
       "md5sum": "e33ngkdf0a0dm34fg"},
       {"file_size": "105 MB",
       "md5sum": "9fad9fj3jfajdfgiafdg9"}
     ]
    },
    {"submitter_id": "sample_id_456",
     "collection_date": "04/28/2025",
     "sample_type": "imaging",
     "data_files": [
      {"file_size": "1.53 GB",
       "md5sum": "13hgs9fdg4jqof"},
       {"file_size": "2.63 MB",
       "md5sum": "31612kjfga90refj"}
     ]
    }
  ]
 },
 {
  "submitter_id":  "sub_456",
  "samples": [
    {"submitter_id": "sample_id_789",
     "collection_date": "05/28/2023",
     "sample_type": "assay",
     "data_files": [
      {"file_size": "109 MB",
       "md5sum": "wvtqwsertwsn4w5"},
       {"file_size": "116 MB",
       "md5sum": "sfghsfvs5wg543r"}
     ]
    },
    {"submitter_id": "sample_id_101",
     "collection_date": "04/11/2022",
     "sample_type": "imaging",
     "data_files": [
      {"file_size": "1.22 GB",
```

Nested_props: Get props from multiple lower nodes

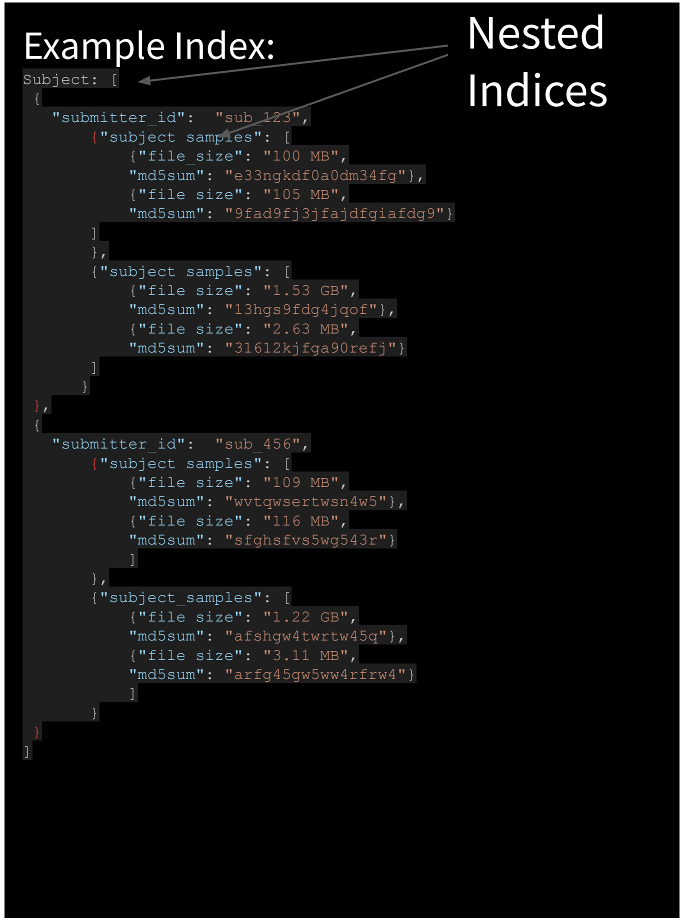
ETL - Mapping - Nested Props (skipping nodes)







```yaml
mappings:
- name: my-data-commons_subject
  doc_type: subject
  type: aggregator
  root: subject
  props:
    - name: submitter_id
  nested_props:
    - name: subject_samples
      path: sample.data_file_image
      props:
        - name: file_size
        - name: md5sum
```



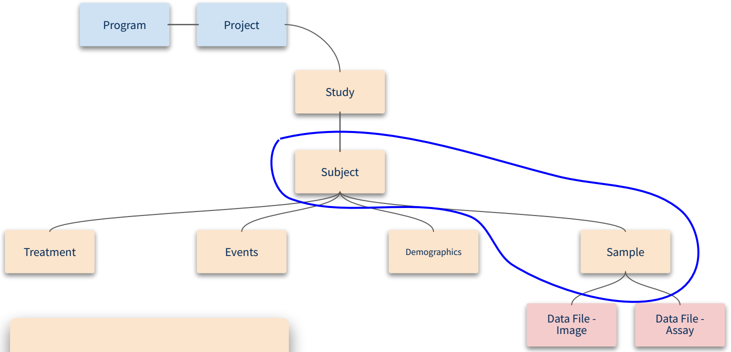
Example Index:

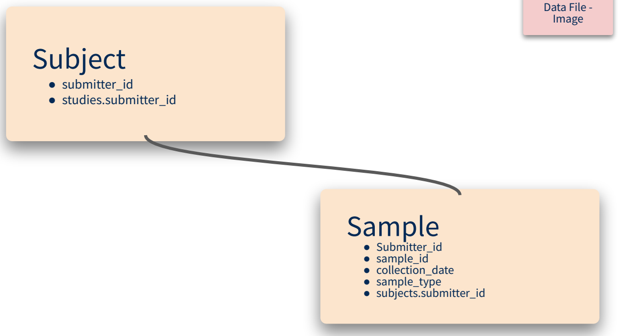
Nested Indices

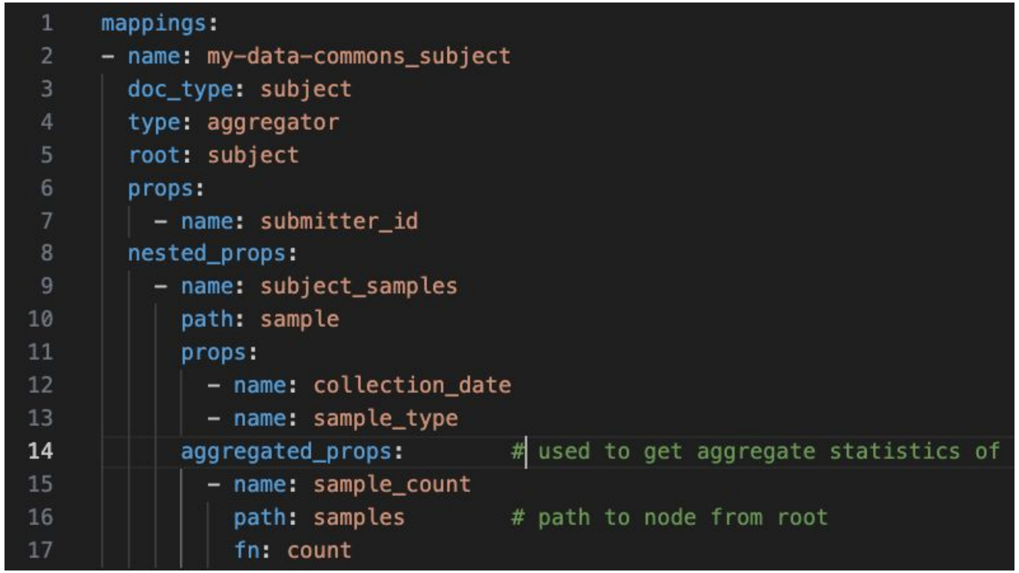
```
Subject: [
 {
   "submitter_id":  "sub_123",
       {"subject samples": [
           {"file_size": "100 MB",
           "md5sum": "e33ngkdf0a0dm34fg"},
           {"file size": "105 MB",
           "md5sum": "9fad9fj3jfajdfgiafdg9"}
       ]
       },
       {"subject samples": [
           {"file size": "1.53 GB",
           "md5sum": "13hgs9fdg4jqof"},
           {"file size": "2.63 MB",
           "md5sum": "31612kjfga90refj"}
       ]
      }
 },
 {
   "submitter_id":  "sub_456",
       {"subject samples": [
           {"file size": "109 MB",
           "md5sum": "wvtqwsertwsn4w5"},
           {"file size": "116 MB",
           "md5sum": "sfghsfvs5wg543r"}
           ]
       },
       {"subject_samples": [
           {"file size": "1.22 GB",
           "md5sum": "afshgw4twrtw45q"},
           {"file size": "3.11 MB",
           "md5sum": "arfg45gw5ww4rfrw4"}
           ]
       }
 }
]
```

Nested_props: Get props from multiple lower nodes

ETL - Mapping - Aggregated Props







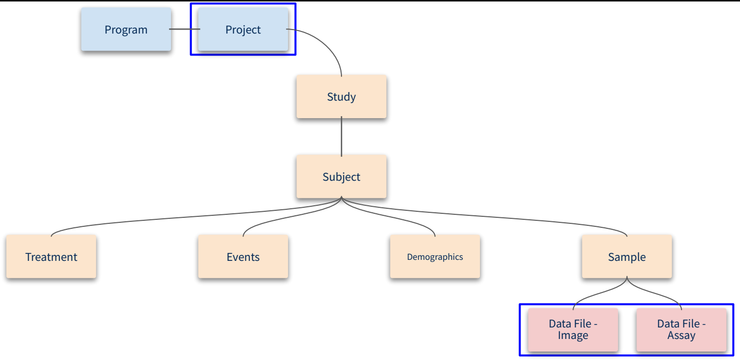
```
mappings:
- name: my-data-commons_subject
  doc_type: subject
  type: aggregator
  root: subject
  props:
    - name: submitter_id
  nested_props:
    - name: subject_samples
      path: sample
      props:
        - name: collection_date
        - name: sample_type
      aggregated_props:        # used to get aggregate statistics of
        - name: sample_count
          path: samples        # path to node from root
          fn: count
```

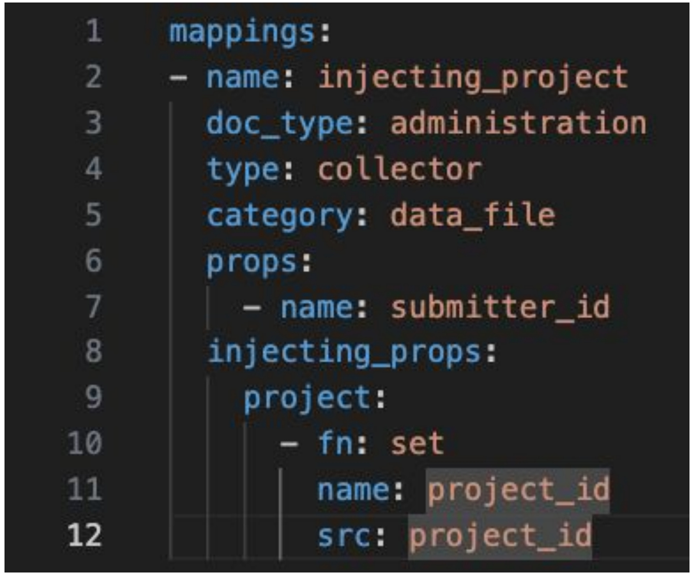
Example Index:

Subject.submitter_id	collection_date	sample_type	sample_count
sub_123	08/26/2025	assay	3
	08/26/2025	imaging	3
	09/01/2025	assay	3
sub_456	07/26/2024	imaging	3
	08/23/2025	imaging	3
	08/23/2025	assay	3

Aggregated_props: Add statistics into indices

ETL - Mapping - Injecting (Collector)





```
mappings:
- name: injecting_project
  doc_type: administration
  type: collector
  category: data_file
  props:
    - name: submitter_id
  injecting_props:
    project:
      - fn: set
        name: project_id
        src: project_id
```

Project
- submitter_id
- project_id

Data File - Image
- submitter_id
- project_id

Data File - Assay
- submitter_id
- project_id

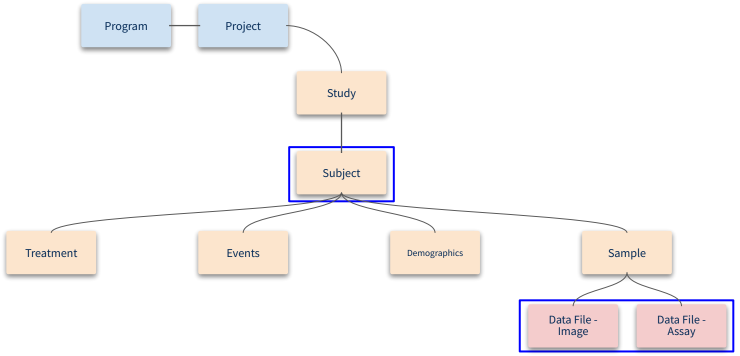
Example Index:

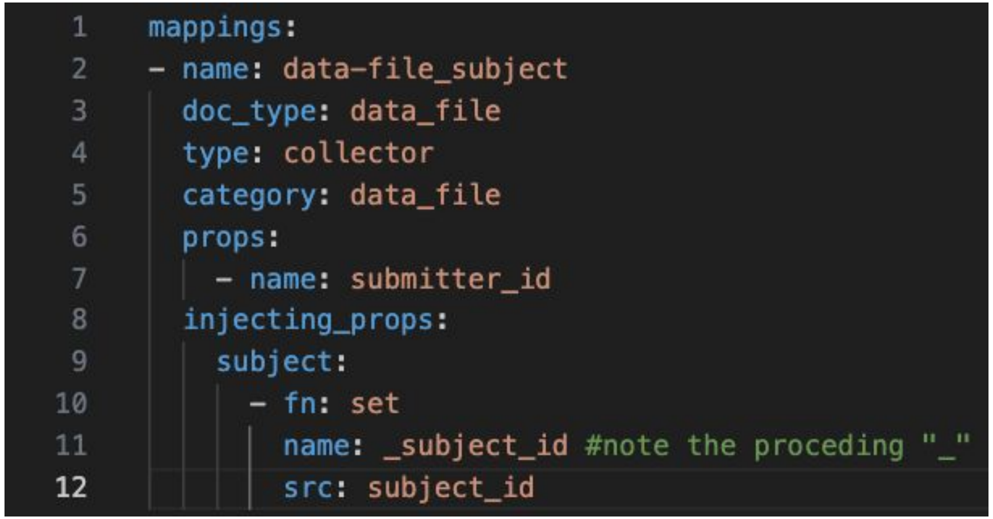
Data_files_image.submitter_id	project_id
image_123	project_1
image_234	project_1
image_345	project_1
image_456	project_2
image_567	project_2
image_678	project_2

Data_files_assay.submitter_id	project_id
assay_123	project_1
assay_234	project_1
assay_345	project_1
assay_456	project_2
assay_567	project_2
assay_678	project_2

Injecting_props: Objects from nodes are injected into an index made up of nodes from that category

ETL - Mapping - Injection





```
mappings:
- name: data-file_subject
  doc_type: data_file
  type: collector
  category: data_file
  props:
    - name: submitter_id
  injecting_props:
    subject:
      - fn: set
        name: _subject_id #note the proceding "_"
        src: subject_id
```

Subject
- submitter_id
- studies.submitter_id

Data File - Image
- submitter_id
- project_id

Data File - Assay
- submitter_id
- project_id

Example Index:

Data_files_image.submitter_id	_subject_id
image_123	subject_123
image_234	subject_123
image_345	subject_123
image_456	subject_345
image_567	subject_345
image_678	subject_345

Data_files_assay.submitter_id	_subject_id
assay_123	subject_567
assay_234	subject_567
assay_345	subject_567
assay_456	subject_789
assay_567	subject_789
assay_678	subject_789

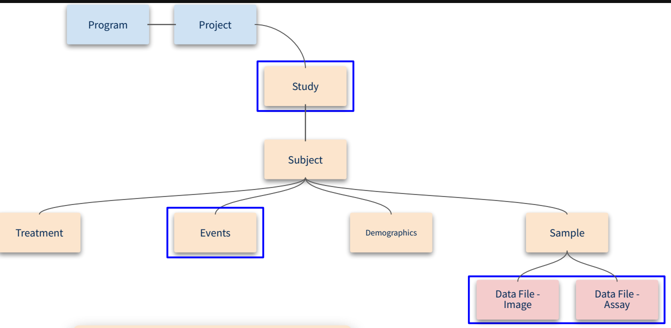
Injecting_props: Objects from nodes are injected into an index made up of nodes from that category

ETL - Mapping - Collector default functions

In collectors, the default function is `set`

- **fn: set** - reporting all the unique values for records for that property

ETL - Mapping - Joining Props (Combination)



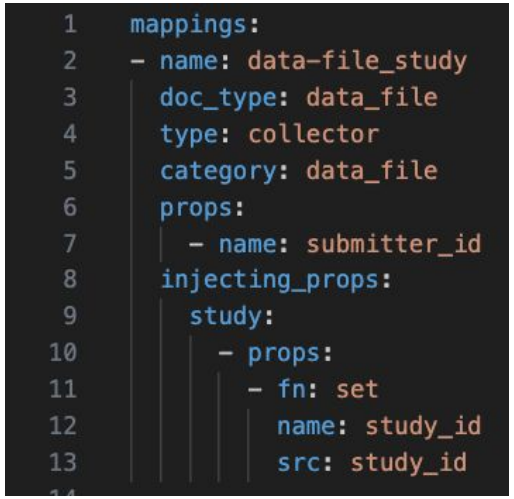
Study
- Submitter_id
- Data_batch

Events
- submitter_id
- date
- type
- subjects.submitter_id

Data File - Image
- submitter_id
- project_id

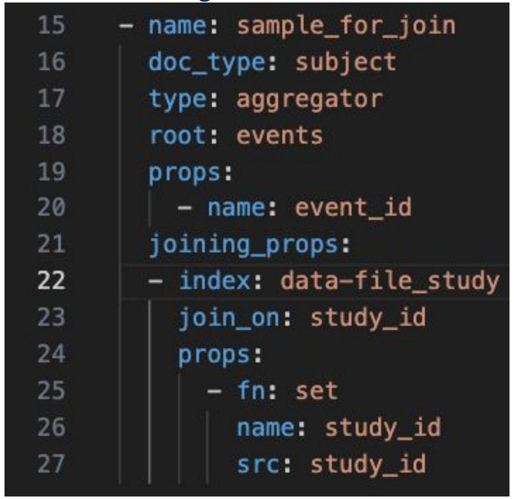
Data File - Assay
- submitter_id
- project_id

Injected index



```
mappings:
- name: data-file_study
  doc_type: data_file
  type: collector
  category: data_file
  props:
    - name: submitter_id
  injecting_props:
    study:
      - props:
        - fn: set
          name: study_id
          src: study_id
```

Joining indices



```
- name: sample_for_join
  doc_type: subject
  type: aggregator
  root: events
  props:
    - name: event_id
  joining_props:
  - index: data-file_study
    join_on: study_id
    props:
      - fn: set
        name: study_id
        src: study_id
```

Example Index:

events.submitter_id	study_id	data_file.submitter_id
event_1	study_1	wb54yt4byw5b3
event_2	study_1	sasdffcvsfdgsrg
event_3	study_1	gd4qbg5gw545s
event_1	study_2	ds43w5bgb45try
event_2	study_2	aq4bqbtqnbq4wt4
event_3	study_2	45q4g5w5rgw545

Joining_props: Join properties between indices

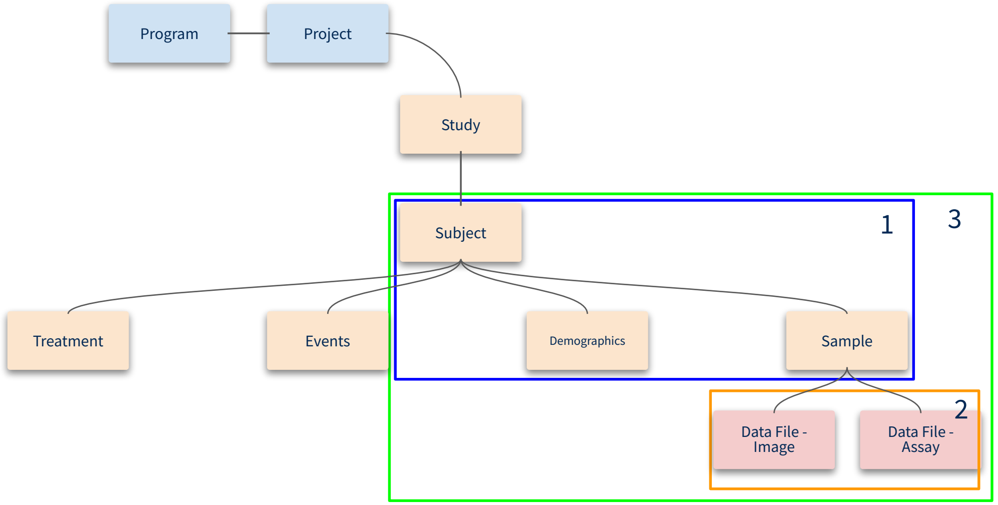
ETL - Mapping - Putting it all together

Goal: Create a File Manifest

We want a search to be able to capture what data files are present for studies, subjects and demographics

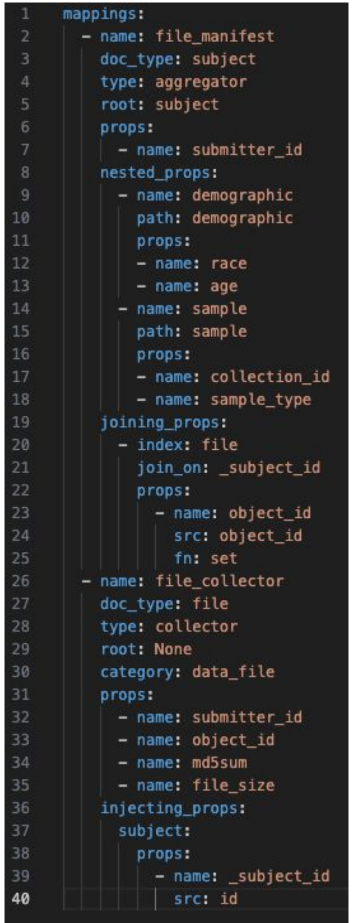
Steps:

1. Create an Aggregator index connecting Subject with Demographics and Sample (nested)
2. Create an collector (injected) index with the Data File nodes
3. Join the file index to the aggregator to build a file manifest*



** File manifests must have (at least) the object_id of the files to be useful. So, remember to add* `object_id` *to the joining_props of the aggregator indices*

ETL - Mapping - Putting it all together - Subject File Manifest



1.

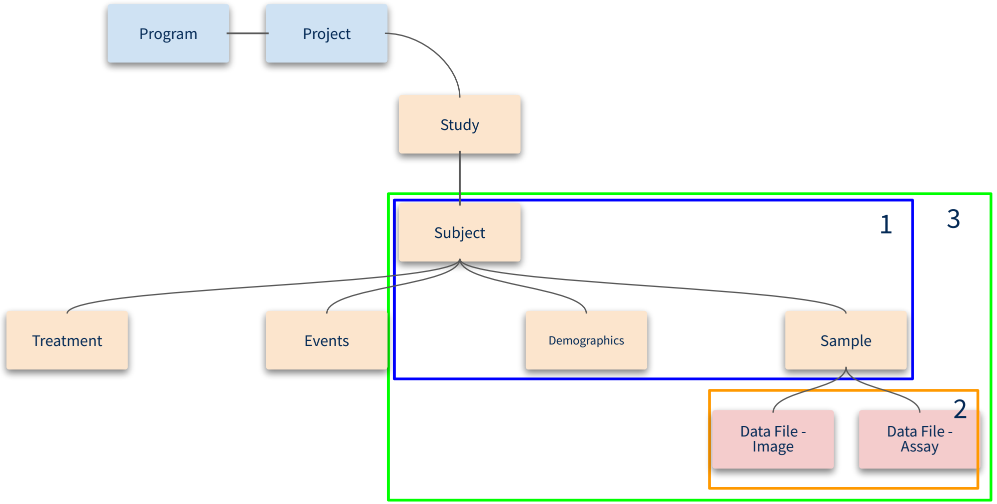
```
mappings:
  - name: file_manifest
    doc_type: subject
    type: aggregator
    root: subject
    props:
      - name: submitter_id
    nested_props:
      - name: demographic
        path: demographic
        props:
          - name: race
          - name: age
      - name: sample
        path: sample
        props:
          - name: collection_id
          - name: sample_type
```

3.

```
    joining_props:
      - index: file
        join_on: _subject_id
        props:
          - name: object_id
            src: object_id
            fn: set
```

2.

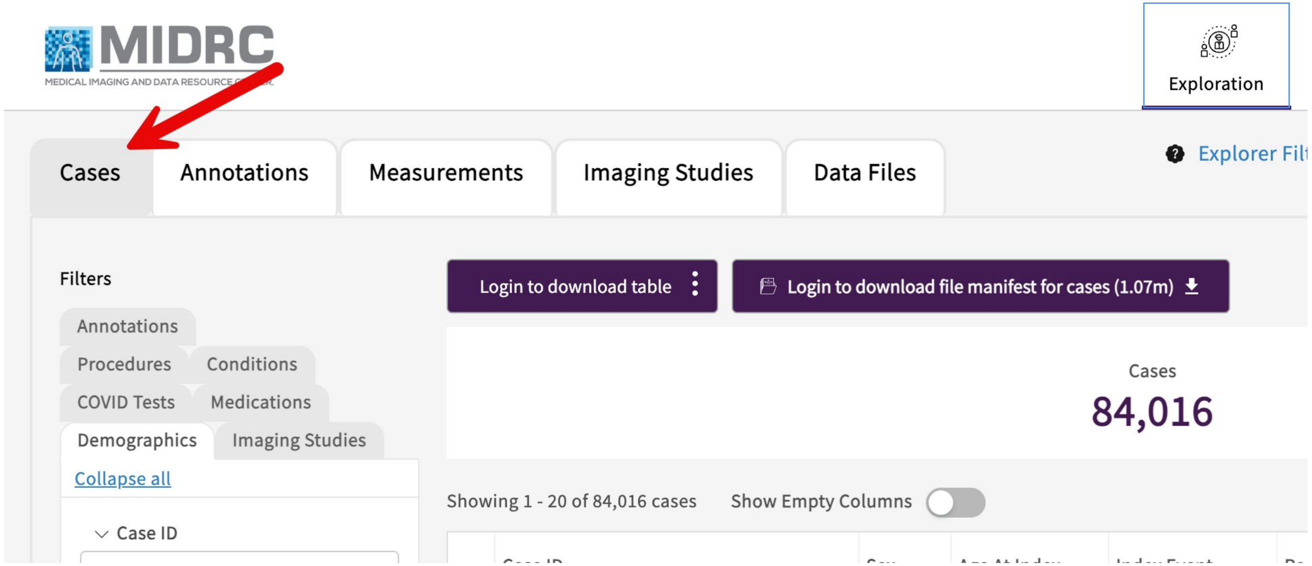
```
  - name: file_collector
    doc_type: file
    type: collector
    root: None
    category: data_file
    props:
      - name: submitter_id
      - name: object_id
      - name: md5sum
      - name: file_size
    injecting_props:
      subject:
        props:
          - name: _subject_id
            src: id
```



ETL - Mapping - Putting it all together (Part 2)

GEN3 DATA COMMONS

We showed you how the MIDRC exploration page has tabs created from indices generated by ETL



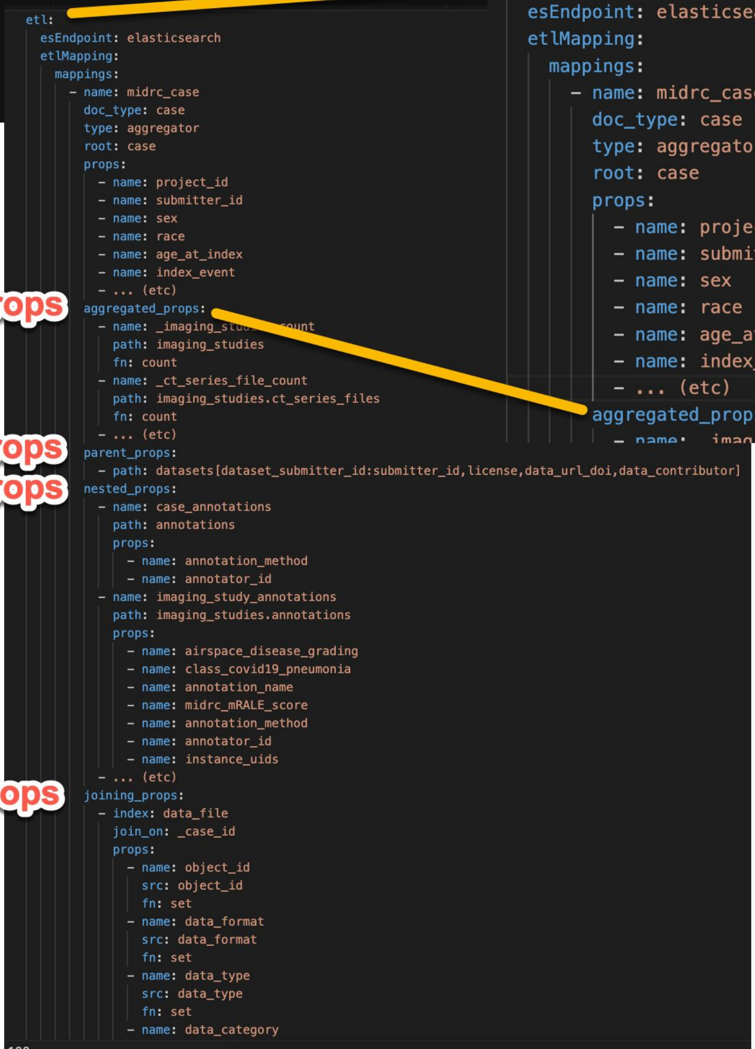
Putting it all together (Part 2)

Here is an abridged version of the midrc_case index ETL mapping.

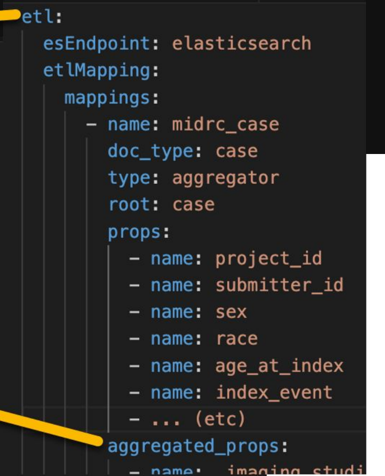
- Called `midrc_case` in ES
- Called `case` in Guppy
- This is an aggregator with the case node as a root.

This index includes:

- Props
- Aggregated_props
- Parent_props
- Nested_props
- Joining_props



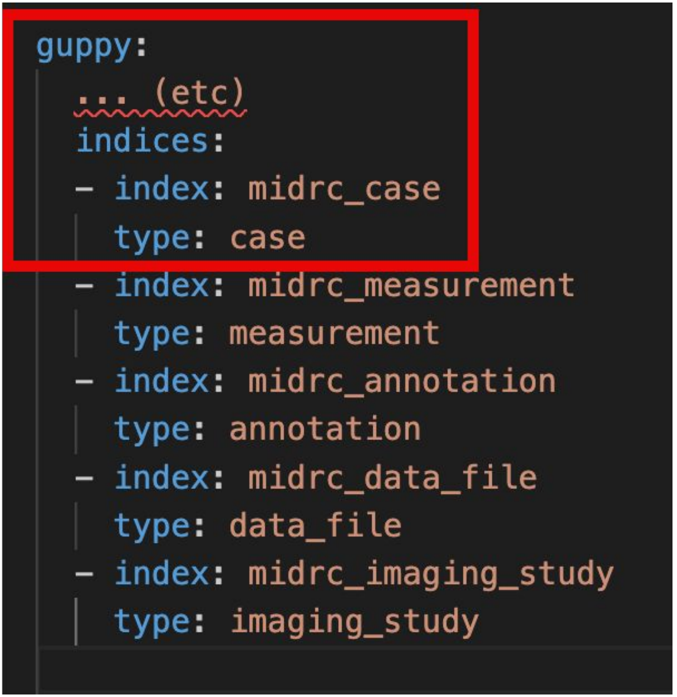
```yaml
etl:
  esEndpoint: elasticsearch
  etlMapping:
    mappings:
      - name: midrc_case
        doc_type: case
        type: aggregator
        root: case
        props:
          - name: project_id
          - name: submitter_id
          - name: sex
          - name: race
          - name: age_at_index
          - name: index_event
          - ... (etc)
        aggregated_props:
          - name: _imaging_stu[illegible]count
            path: imaging_studies
            fn: count
          - name: _ct_series_file_count
            path: imaging_studies.ct_series_files
            fn: count
          - ... (etc)
        parent_props:
          - path: datasets[dataset_submitter_id:submitter_id,license,data_url_doi,data_contributor]
        nested_props:
          - name: case_annotations
            path: annotations
            props:
              - name: annotation_method
              - name: annotator_id
          - name: imaging_study_annotations
            path: imaging_studies.annotations
            props:
              - name: airspace_disease_grading
              - name: class_covid19_pneumonia
              - name: annotation_name
              - name: midrc_mRALE_score
              - name: annotation_method
              - name: annotator_id
              - name: instance_uids
          - ... (etc)
        joining_props:
          - index: data_file
            join_on: _case_id
            props:
              - name: object_id
                src: object_id
                fn: set
              - name: data_format
                src: data_format
                fn: set
              - name: data_type
                src: data_type
                fn: set
              - name: data_category
```



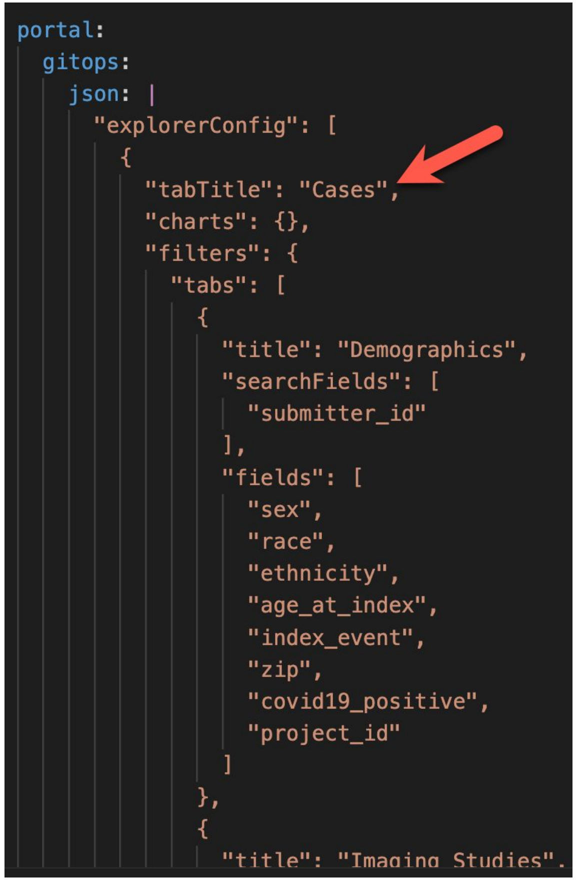
```yaml
etl:
  esEndpoint: elasticsearch
  etlMapping:
    mappings:
      - name: midrc_case
        doc_type: case
        type: aggregator
        root: case
        props:
          - name: project_id
          - name: submitter_id
          - name: sex
          - name: race
          - name: age_at_index
          - name: index_event
          - ... (etc)
        aggregated_props:
          - name: _imaging_studi
```

ETL - Mapping - Putting it all together (Part 2)

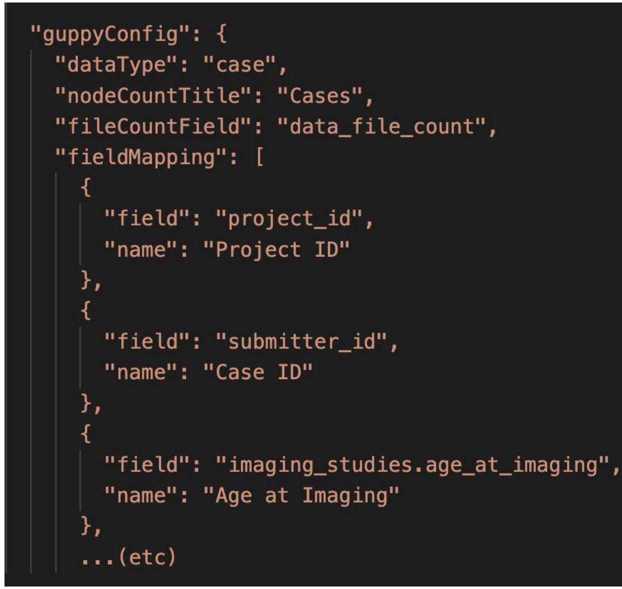
Sneak peek at how ETL mapping connects to Exploration page



```
guppy:
  ... (etc)
  indices:
  - index: midrc_case
    type: case
  - index: midrc_measurement
    type: measurement
  - index: midrc_annotation
    type: annotation
  - index: midrc_data_file
    type: data_file
  - index: midrc_imaging_study
    type: imaging_study
```



```
portal:
  gitops:
    json: |
      "explorerConfig": [
        {
          "tabTitle": "Cases",
          "charts": {},
          "filters": {
            "tabs": [
              {
                "title": "Demographics",
                "searchFields": [
                  "submitter_id"
                ],
                "fields": [
                  "sex",
                  "race",
                  "ethnicity",
                  "age_at_index",
                  "index_event",
                  "zip",
                  "covid19_positive",
                  "project_id"
                ]
              },
              {
                "title": "Imaging Studies",
```



```
"guppyConfig": {
  "dataType": "case",
  "nodeCountTitle": "Cases",
  "fileCountField": "data_file_count",
  "fieldMapping": [
    {
      "field": "project_id",
      "name": "Project ID"
    },
    {
      "field": "submitter_id",
      "name": "Case ID"
    },
    {
      "field": "imaging_studies.age_at_imaging",
      "name": "Age at Imaging"
    },
    ...(etc)
```

Questions?

Questions? (before our ETL Troubleshooting part of the presentation)

Reminders:

- Slides and the recording will be available as a resource
- Code snippets of examples shown here will be available as individual files in the same location as the slides
- Gen3-gitops has the ETL mappings for all Gen3 commons supported by CTDS
  - At the end of this presentation, there is a slide that specifically links to ETL mapping, Guppy values.yaml, explorerConfig, guppyConfig, and exploration page for 2 different open-access Gen3 data commons
- Additional documentation is coming soon

Troubleshooting your ETL*

***** *And processes happening between your ETL and the data showing up on your Exploration page***

Troubleshooting Part 1: Sanity Check

- Did you deploy the new ETL mapping?
- Did you make sure to run the ETL after deploying the new ETL mapping?
- Did you re-roll Guppy after your ETL run?
- If so – were there any Guppy errors at startup? Check both your Guppy and Portal/FEF logs to see if there are any errors (eg, new portal pod may not be deployed because of a simple JSON parsing error).
- Did you update the Portal/FEF explorer config to make sure it is aligned with any new data in ES and accessed by Guppy?

Special thanks to Joshua Harris from Australian BioCommons for developing a substantial part of this troubleshooting guide

Troubleshooting Part 2: Check ETL and ES

Check the ETL log *(assuming you are using Tube for ETL)*

- Will explicitly say that the ETL succeeded, even if there are lots of other warnings
- To check the ETL log:

```
kubectl logs <etl pod name> -c tube -f
```

Special thanks to Joshua Harris from Australian BioCommons for developing a substantial part of this troubleshooting guide

Troubleshooting Part 2: Check ETL and ES (con't)

Log on to the ES pod and check the data there after running ETL

- To log onto your ES pod:

  ```
  kubectl exec -it <es proxy pod> -- sh
  ```
- To check what indices are present in your ES:
  - In two terminals, do the following:
    - port forward ES service:

      ```
      kubectl port-forward svc/elasticsearch 9200:9200
      ```
    - See data in all indices in ES:

      ```
      curl -X GET http://localhost:9200/_cat/indices
      ```
    - See data in a specific index:

      ```
      curl -X GET http://localhost:9200/<index name>
      ```

Special thanks to Joshua Harris from Australian BioCommons for developing a substantial part of this troubleshooting guide

Troubleshooting Part 2: Check ETL and ES (con’t)

If your data is in ES:

If your data is in ES - you know ETL is working and data is being created in ES

If your data is NOT in ES:

Your ETL has a problem. The ETL log should provide a clue about what’s wrong - you can tell from the logging before it failed where in the ETL mapping it had the failure.

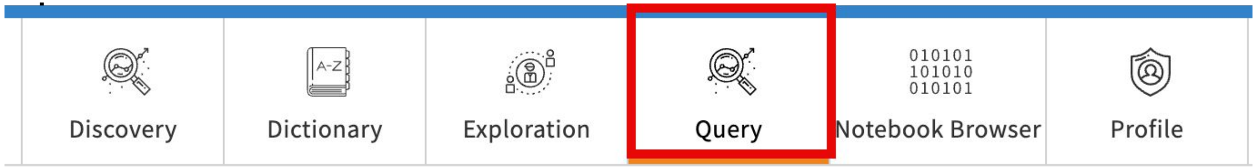
- Examine your ETL mapping; check if there's anything that could be a typo or an incorrect prop name or path.
- Look at your data in Sheepdog. Particularly look for “special characters” (backslash and non-ASCII characters), especially if it’s a particular data column missing.
- Confirm with Peregrine queries that the path to the prop you included in the mapping is a valid path.

Troubleshooting Part 3: Check Guppy

Check the data can be queried by Guppy - Frontend

Once you know the data is in ES - restart Guppy, and check that Guppy can pull data from ES. This will help you determine whether the data in ES is queryable by Guppy from the /graphql API.

- You can work from the query page on the front end and submit your queries



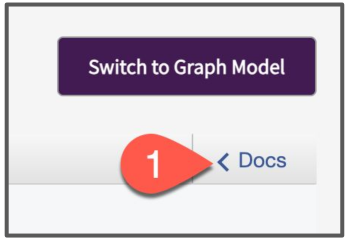
Special thanks to Joshua Harris from Australian BioCommons for developing a substantial part of this troubleshooting guide

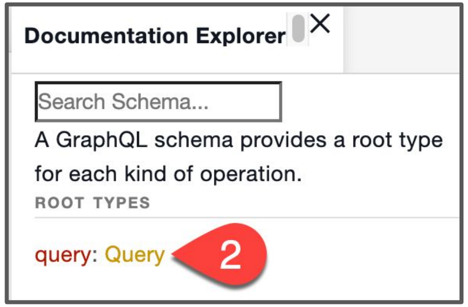
Troubleshooting Part 3: Check Guppy (con't)

View the Guppy Schema - Frontend

Looking at the Guppy schema could help you see misalignments between ETL/ES and Guppy configuration. There are 2 ways you can view the Guppy schema from the frontend.

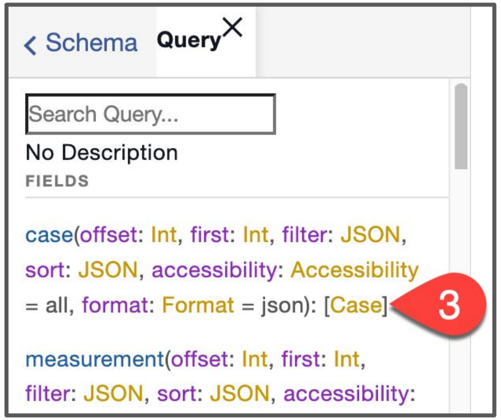
- **Through Docs:** On the Query page, click "Docs" on the upper right side of the graphiQL interface, then click "query" to view the indices available. Click on an index to view the fields available for each index.





A GraphQL schema provides a root type for each kind of operation.

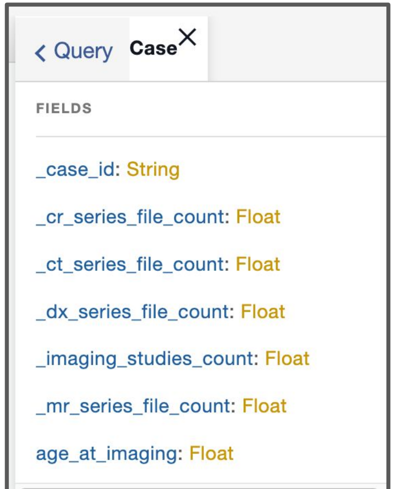
query: Query



No Description

case(offset: Int, first: Int, filter: JSON, sort: JSON, accessibility: Accessibility = all, format: Format = json): [Case]

measurement(offset: Int, first: Int, filter: JSON, sort: JSON, accessibility:



_case_id: String

_cr_series_file_count: Float

_ct_series_file_count: Float

_dx_series_file_count: Float

_imaging_studies_count: Float

_mr_series_file_count: Float

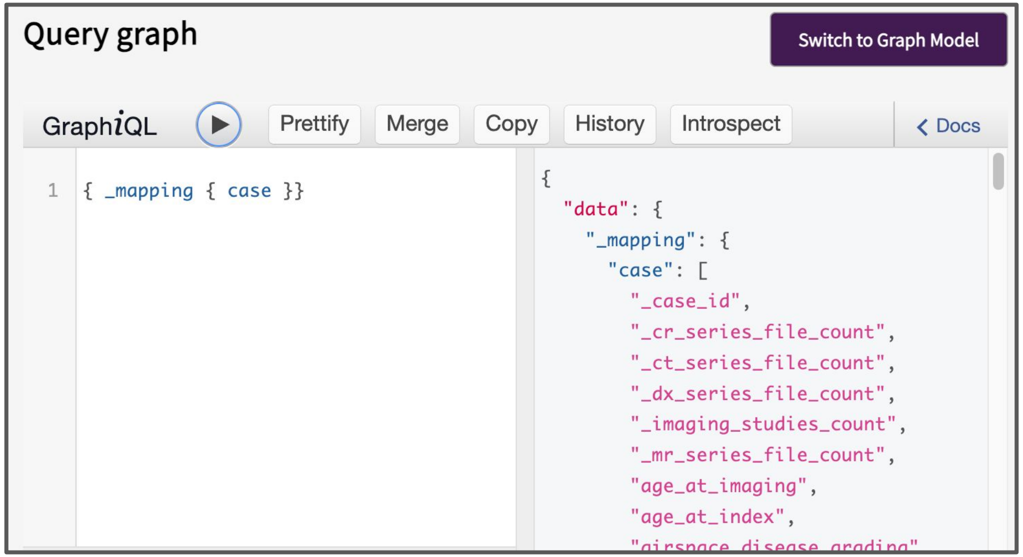
age_at_imaging: Float

Troubleshooting Part 3: Check Guppy (con’t)

View the Guppy Schema - Frontend

- **Through Query page:** You can also get the guppy schema using a "mapping" guppy query on the Query page (flat model) with this query :

```
{ _mapping { <guppy_index> }}
```



```
{ _mapping { case }}
```

```
{
  "data": {
    "_mapping": {
      "case": [
        "_case_id",
        "_cr_series_file_count",
        "_ct_series_file_count",
        "_dx_series_file_count",
        "_imaging_studies_count",
        "_mr_series_file_count",
        "age_at_imaging",
        "age_at_index",
```

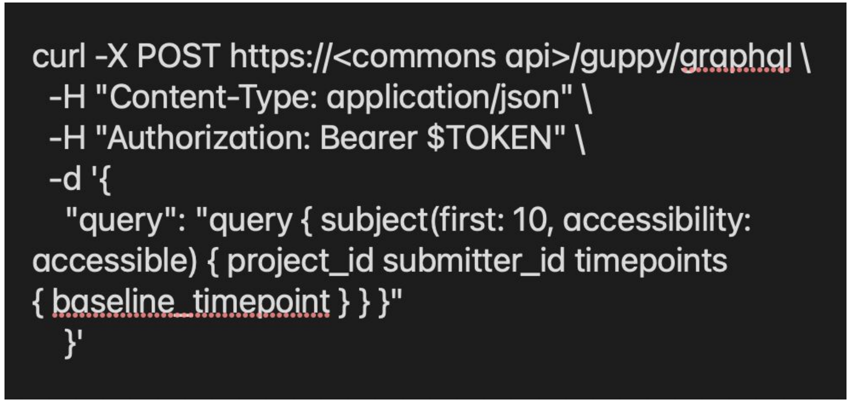
Troubleshooting Part 3: Check Guppy (con't)

Check the data can be queried by Guppy (Backend)

- To log onto your Guppy pod:

```
kubectl exec -it <guppy pod> -- sh
```

- Use curl to create a graphql query. For example, here is a sample Guppy query (*h/t Joshua Harris*)



```
curl -X POST https://<commons api>/guppy/graphql \
  -H "Content-Type: application/json" \
  -H "Authorization: Bearer $TOKEN" \
  -d '{
    "query": "query { subject(first: 10, accessibility: 
accessible) { project_id submitter_id timepoints 
{ baseline_timepoint } } }"
   }'
```

Special thanks to Joshua Harris from Australian BioCommons for developing a substantial part of this troubleshooting guide

Troubleshooting Part 3: Check Guppy (con't)

GEN3 DATA COMMONS

If the data cannot be queried by Guppy:

- Guppy logs should be helpful here.
- Check your Guppy config. Make sure the index names (**`type`**) in the Guppy config match up, with no typos, to the **`doc_type`** fields in the ETL mapping config. Check the JSON structure for problems. (Remember to re-roll Guppy after any config changes before testing if it fixed the problem).
- Check your Guppy config for appropriate **`tier_access_level`**

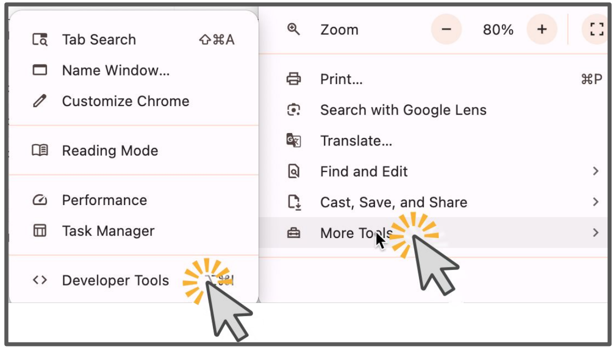
Special thanks to Joshua Harris from Australian BioCommons for developing a substantial part of this troubleshooting guide

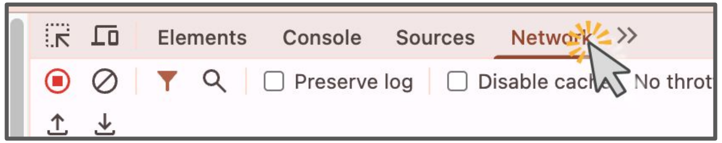
Troubleshooting Part 4: Check Front End

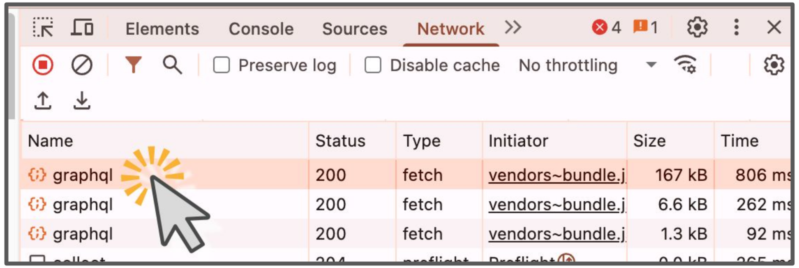
GEN3 DATA COMMONS

Check the front end

1. Go to your Exploration page and then open Developer Tools
2. Click on the Network tab
3. On the Exploration page, select the filter of interest.
4. In the dev tools window, you should see /graphql API calls appear in the list. Look at the status - 200 indicates successful call, anything else indicates trouble.
5. Click on one of the graphql calls







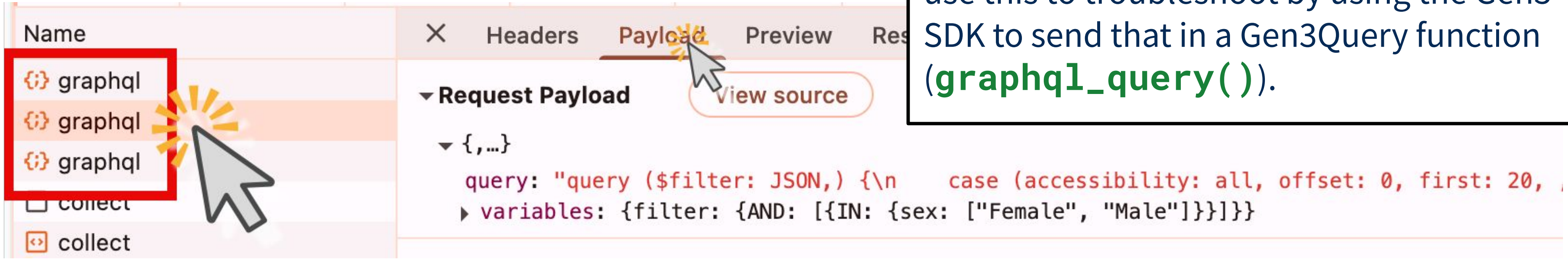
Name	Status	Type	Initiator	Size	Time
graphql	200	fetch	vendors~bundle.j	167 kB	806 ms
graphql	200	fetch	vendors~bundle.j	6.6 kB	262 ms
graphql	200	fetch	vendors~bundle.j	1.3 kB	92 ms

Troubleshooting Part 4: Check Front End (con't)

Look at the index the query is calling

5. Click on the Payload tab (can also click "View Source" - see box below)
6. Now, you can see the query that is being used. Check the index and make sure it's what you expect it to be.
7. Check the other graphql queries, as well.

"View source" will let you see/copy the exact query text being sent to Guppy. You use this to troubleshoot by using the Gen3 SDK to send that in a Gen3Query function (`graphql_query()`).



```
▾ {,…}
  query: "query ($filter: JSON,) {\n    case (accessibility: all, offset: 0, first: 20,
 ▸ variables: {filter: {AND: [{IN: {sex: ["Female", "Male"]}}]}}
```

Troubleshooting: Final thoughts

Look at CTDS open-source examples

Gen3-gitops is open access now. When in doubt, look through the etlConfig sections in the values.yaml's for any commons run by CTDS.

MIDRC

MIDRC ETL mapping

MIDRC Guppy indices

MIDRC Explorer config

MIDRC Guppy config

MIDRC Exploration page

Gen3 Data Hub

G3DH ETL mapping

G3DH Guppy indices

G3DH Explorer config

G3DH Guppy config

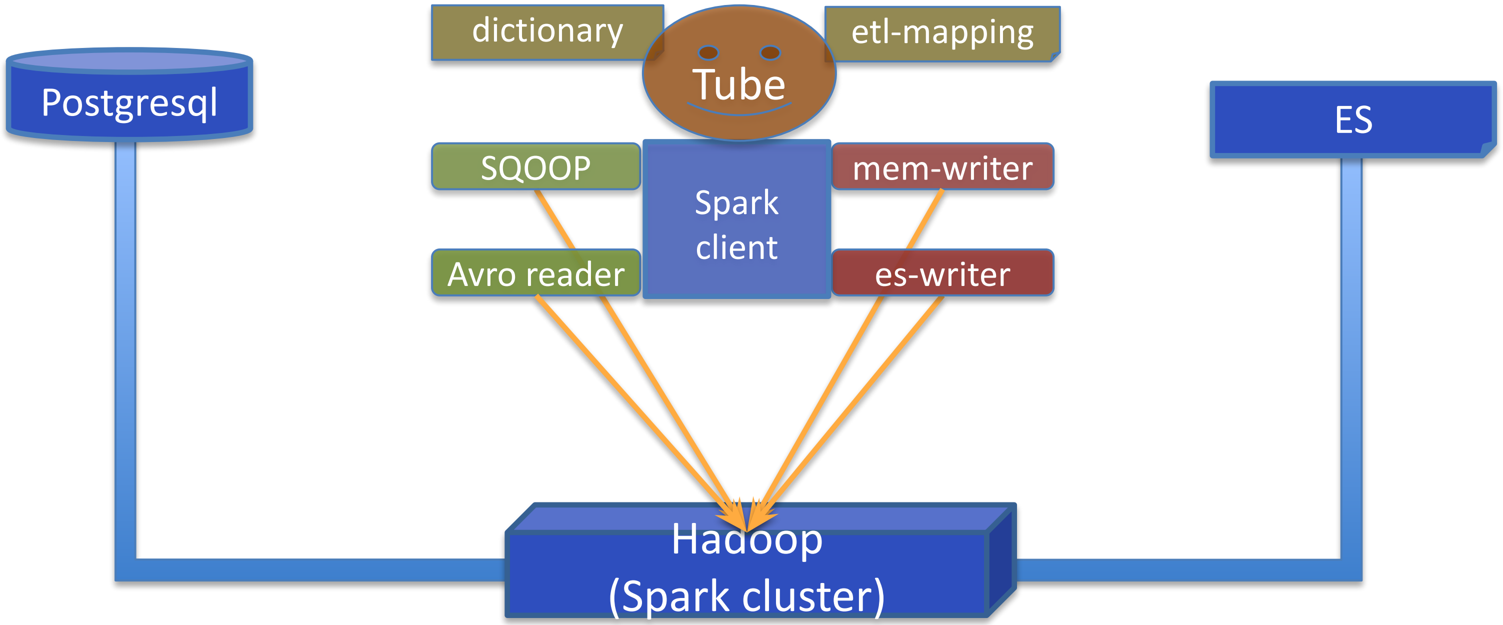
G3DH Exploration page

Q & A

Acknowledgements

- Speakers
  - Michael Fitzsimons - Center for Translational Data Science, University of Chicago
  - Dan Biber - Center for Translational Data Science, University of Chicago
  - Sara Volk de Garcia - Center for Translational Data Science, University of Chicago
- Gen3 Forum Steering Committee
  - Robert Grossman - Center for Translational Data Science, University of Chicago
  - Steven Manos - Australian BioCommons
  - Claire Rye - New Zealand eScience Infrastructure
  - Plamen Martinov - Open Commons Consortium
  - Michael Fitzsimons - Center for Translational Data Science, University of Chicago

Architecture of ETL


dictionary
Tube
etl-mapping
Postgresql
SQOOP
Spark client
mem-writer
Avro reader
es-writer
ES
Hadoop
(Spark cluster)