ClaimStore Documentation

Release 0.1.0

Invenio Collaboration

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Contents

CHAPTER 1

About

This document describes ClaimStore, a new proposed mini service that permits to exchange information about information claims within a set of collaborating heterogeneous information services.

A primary use case example is the exchange of information about persistent identifiers (such as DOI) in the domain of astrophysics and particle physics among ADS, arXiv, and INSPIRE services. This would permit to better track and disambiguate papers, offer cross-linking between services, or offer cross-search between services.

The driving idea behind ClaimStore is to offer a neutral micro-service that would be (1) storing claims that various collaborating services perform and (2) answering questions about claims.

CHAPTER 2

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2.1 Installation

2.1.1 Using Docker

```
$ docker-compose build
$ docker-compose run --rm web bower install
$ docker-compose run --rm web claimstore database create
$ docker-compose run --rm web claimstore database populate  # optional
$ docker-compose run --rm web /code/run-tests.sh
$ docker-compose up
```

2.1.2 Using command line

```
$ mkvirtualenv claimstore --python=$(which python3.4)
$ sudo apt-get install npm  # install nodejs
$ sudo npm install -g bower
$ pip install -e .[tests,docs]
$ bower install
$ export SQLALCHEMY_DATABASE_URI=postgres://postgres:postgres@db:5432/postgres
$ claimstore database create
$ claimstore database populate  # optional
$ python setup.py test
$ claimstore run
```

2.2 Description

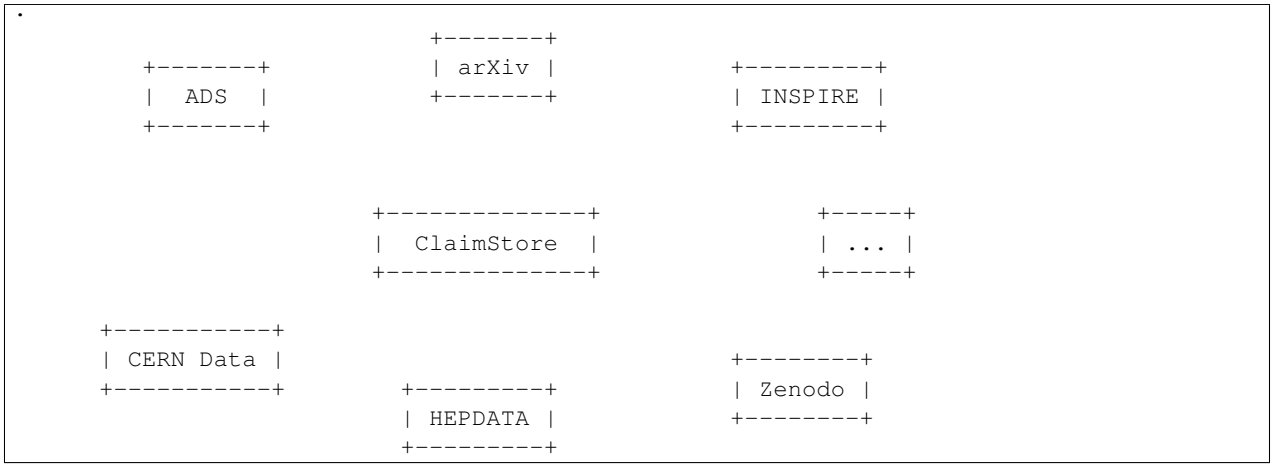
This part of the documentation presents technical description of the ClaimStore system.

> *Consider a collaborative system of independent digital library heterogeneous services (S1, S2, ...) that want to exchange information about the data objects (O1, O2, ...) of various types (T1, T2, ...) that they manage.*

For example, the collaborative network of ADS, arXiv, and INSPIRE that exchanges information about papers and people using arXiv IDs, ADS bibcodes, ORCID, DOI persistent identifier types.

2.2.1 Defining collaborative network

The collaborative network of services is defined means of describing each service and each persistent object types that they usually manage. Each participating service in the network, such as:



will describe the assets it manages, for example, INSPIRE manages record IDs and person IDs:

```
{
  "service": "INSPIRE",
  "url": "http://inspirehep.net",
  "persistent_identifiers": [
     {
       "type": "INSPIRE_RECORD_ID",
       "description": "INSPIRE record",
       "url": "http://inspirehep.net/record/<INSPIRE_RECORD_ID>",
       "example_value": "123",
       "example_url": "http://inspirehep.net/record/123",
     },
     {
       "type": "INSPIRE_AUTHOR_ID",
       "description": "INSPIRE author",
       "url": "http://inspirehep.net/author/<INSPIRE_AUTHOR_ID>",
       "example_value": "J.R.Ellis.1",
       "example_url": "http://inspirehep.net/author/J.R.Ellis.1",
     },
  ],
}
```

Optionally, the service can also expose some information about how the claims are asserted, for example:

```
{
  "service": "INSPIRE",
  "url": "http://inspirehep.net",
  "persistent_identifiers": [
     {
       "type": "INSPIRE_RECORD_ID",
       "description": "INSPIRE record",
       "url": "http://inspirehep.net/record/<INSPIRE_RECORD_ID>",
       "example_value": "123",
       "example_url": "http://inspirehep.net/record/123",
     },
     {
       "type": "INSPIRE_AUTHOR_ID",
```

```
        "description": "INSPIRE author",
        "url": "http://inspirehep.net/author/<INSPIRE_AUTHOR_ID>",
        "example_value": "J.R.Ellis.1",
        "example_url": "http://inspirehep.net/author/J.R.Ellis.1",
      },
  ],
  "certainty_levels": [
    {
      "1.0": "human approved"
    },
    {
      "0.5": "trusted algorithm"
    },
    {
      "0.1": "less trusted algorithm"
    },
    {
      "0.0": "guess"
    }
  ]
}
```

Defining all services in this way will define our (1) operational service nework (ADS, arXiv, INSPIRE, HEPDATA, etc), (2) data objects (papers, people, software, data, etc) and (3) persistent identifier types (arXIv ID, ADS bibcode, ORCID, DOI, etc) that the network uses.

2.2.2 Making claims

Each service can make claims about objects, for example:

> *Service S1 says that object O1 of type T1 is the same as the object O2 of type T2 with a certainty of C.*

For example, ADS can claim that `arXiv:astro-ph/0501001` is having bibcode `2005astro.ph..1001H`:

```
{
  "claimant": "ADS",
  "subject": {
      "type": "ARXIV_ID",
      "value": "astro-ph/0501001"
   },
  "predicate": "is_same_as",
  "certainty": 1,
  "object": {
      "type": "ADS_BIBCODE",
      "value": "2005astro.ph..1001H"
  },
  "created": "2015-05-26T11:00:00Z"
}
```

Each individual claim can optionally include a free set of additional parameters detailing the claim, for example:

> *... as was asserted on day D1 using algorithm A1 with parameters P1, P2, P3 and subsequently verified by humans H1 and H2 using external databases E1 and E2.*

For example, we can say that the ADS bibcode was added automatically by a trusted program:

```
{
  "claimant": "ADS",
  "subject": {
```

```
      "type": "ARXIV_ID",
      "value": "astro-ph/0501001"
   },
  "predicate": "is_same_as",
  "certainty": 0.9,
  "object": {
      "type": "ADS_BIBCODE",
      "value": "2005astro.ph..1001H"
  },
  "arguments": {
      "human": 0,
      "actor": "ADS_record_generator"
  },
  "created": "2015-05-26T11:00:00Z"
}
```

A service would usually claim something about the objects it manages. In the following example, CDS claims that "CMS-PAS-HIG-14-008" has a persistent CDS record ID 2001192:

```
{
  "claimant": "CDS",
  "subject": {
      "type": "CDS_REPORT_NUMBER",
      "value": "CMS-PAS-HIG-14-008"
   },
  "predicate": "is_same_as",
  "certainty": 1,
  "object": {
      "type": "CDS_RECORD_ID",
      "value": "2001192"
  },
  "arguments": {
      "human": 0,
      "actor": "CDS_submission"
  },
  "created": "2015-05-26T11:00:00Z"
}
```

A service can claim statements about holdings of other services in the the collaborative network. For example, INSPIRE can claim that the arXiv paper "cond-mat/9906097" is having DOI of "10.1103/PhysRevE.62.7422" with high certainty, as it was confirmed by an apprentice cataloguer:

```
{
  "claimant": "INSPIRE",
  "subject": {
      "type": "ARXIV_ID",
      "value": "cond-mat/9906097"
   },
  "predicate": "is_same_as",
  "certainty": 0.8,
  "object": {
      "type": "DOI",
      "value": "10.1103/PhysRevE.62.7422"
  },
  "arguments": {
      "human": 1,
      "actor": "John Doe",
      "role": "cataloguer"
  },
```

```
  "created": "2015-05-26T11:00:00Z"
}
```

2.2.3 Using claims

Each participating service can ask questions about claims related to individual objects, such as:

> *Who knows anything about DOI "10.1103/PhysRevE.62.7422"?*

which would be asked via:

```
GET /claims/?type=DOI&value=10.1103/PhysRevE.62.7422
```

Upon seeing this query, the ClaimStore would return a list of claims about this DOI (whether found as a subject or an object of the claim), in chronological order, for example:

```
[
  {
    "claimant": "INSPIRE",
    "subject": {
        "type": "ARXIV_ID",
        "value": "cond-mat/9906097"
     },
    "predicate": "is_same_as",
    "certainty": 0.8,
    "object": {
        "type": "DOI",
        "value": "10.1103/PhysRevE.62.7422"
    },
    "arguments": {
        "human": 1,
        "actor": "John Doe",
        "role": "cataloguer"
    },
    "created": "2015-05-26T11:00:00Z",
    "recieved": "2015-05-26T11:00:00Z"
  },
  {
    "claimant": "ARXIV",
    "subject": {
        "type": "ARXIV_ID",
        "value": "cond-mat/9906097"
     },
    "predicate": "is_same_as",
    "certainty": 1.0,
    "object": {
        "type": "DOI",
        "value": "10.1103/PhysRevE.62.7422"
    },
    "arguments": {
        "human": 1,
        "actor": "John Doe",
        "role": "author"
    },
    "created": "2015-05-26T11:00:00Z",
    "recieved": "2015-05-26T11:00:00Z"
  },
]
```

ClaimStore will faithfully return the list of any claims it knows about this DOI without manipulating them.

Each service can ask summary questions as well, such as:

> *What did CERN Open Data ever said about software packages with high confidence?*

which would be asked via:

```
GET /claims/?claimant=CERNOPENDATA&type=SOFTWARE&confidence=50+
```

More complex querying on the JSON structure of claims can be done, for example:

```
*Which claims were done by John Doe from INSPIRE between 2012-01-23
and 2012-08-07?*
```

which would be asked via:

```
GET /claims/?claimant=INSPIRE&since=2012-01-03&until=2012-08-07&claim.arguments.actor=John%20Doe
```

e.g. because we learned that the procedure was buggy at the time and would like to clean it.

Any such possible evolution depends on the further uses of the system beyond simple persistent ID exchange.

2.2.4 Managing claims

ClaimStore is a neutral application dedicated to efficiently storing individual claims and answering questions about them. ClaimStore *does not* attempt to impose any workflow or resolve any possible conflicts, such as when service S1 claims that object O1 is the same as object O2 with certainty C1, while service S2 claims that object O1 is the same as object O3 with certainty C2. The resolution of conflicts and is left upon each participating service that can implement a solution fitting its own workflows and quality standards.

For example, when INSPIRE receives an arXiv paper of the "astro-ph" category, it can ask ClaimStore about all the claims related to it:

```
GET /claims/?type=ARXIV_ID&value=arXiv:1505.06718&claimant=ADS
```

as it may decide to trust ADS's claims more than author claims or publisher claims in this subject domain.

If a service wants to revoke an old claim, it can make a new claim with higher certainty.

The bottom line is that ClaimStore does not attempt to do any judgement about claims, nor does it do any management of claims beyond simply storing what the services claimed and answering questions about stored assets.

2.2.5 Notifications

The usual usage of ClaimStore by the services is (1) pushing own claim information to the ClaimStore in order to register new claims and (2) pulling information about others' claims from the ClaimStore as the service needs them.

Alternatively, another mode of service operation could include (3) registering to be automatically notified via push notifications in case somebody claims something about a certain object types. This could come as a later extension.

2.2.6 Authorisations

After a service registers in the collaborative network, it is given a secret key that the service could use to push the claim information.

Each participating service is allowed to read claims made by others.

This would be sufficient for a simple start of the service. A possible extension could include (1) opening parts of the claim database for other non-participating clients, or (2) introducing trusted partners making claims on others' behalf, etc.

2.3 Design

This part of the documentation presents general architecture, design and implementation guidelines.

2.3.1 Architecture

ClaimStore is an independent mini-application built upon our usual Flask ecosystem:

- Flask-RESTful for REST API
- Flask-Notifications for optional alerts
- OAuth for authorisation needs
- SQLAlchemy for DB abstraction
- JSON Schema for JSON object description
- PostgreSQL for DB persistence and JSON search

2.3.2 Database

The information about network of services, data objects and persistent identifier types, and claims about them is described via JSON snippets.

The JSON data is stored in several tables for `claimants`, `object_types` etc. The individual claims are stored in a `claims` table that uses both regular RDBMS and JSONB columns, permitting some fast inter-table JOINs as well as free-format additional claim parameters, for example:

```
claims
======================
uuid            integer
created         date
claimant        ref ->
subject_type    ref ->
subject_value   text
claim           ref ->
certainty       number
claim_details   jsonb
status          ref ->  e.g. to mark revoked claims
object_type     ref ->
object_value    text
```

The JSON format of claims is also checked against a formal JSON schema to verify its validity upon claim submission. There are several JSON Schemata describing the system: one JSON schema describes a service, another JSON schema describes a persistent ID type, another JSON schema describes a claim, etc.

For searching the claim database, PostgreSQL/JSONB column type can be used which offers efficient querying out of the box. In case of extended usage needs, JSON claims can be propagated to an Elasticsearch cluster. that can increase query speed and query language further.

2.3.3 Claim types

The primary motivation behind ClaimStore was the exchange of information about persistent identifiers, hence the typical claim types are:

- *is_same_as*: used when there is a 100% equivalence, e.g. a local copy of an arXiv record, with either the same or enriched metadata, e.g. ORCID corresponds to this INSPIRE ID
- *is_variant_of*: lesser claim, e.g. arXiv preprint and DOI of a published paper, e.g. when INSPIRE merges two sources into one

However, the system is generic enough to accept any kind of claims, so the ClaimStore can also be used to store information about other types of relations, such as:

- *is_author_of*: this person is the author of this document
- *is_contributor_to*: this person is supervisor/translator/spokesperson of this document
- *is_erratum_of*: e.g. if INSPIRE record R1 is variant of DOI1, and DOI2 is erratum of DOI1, but INSPIRE merges all these in the same record, then there would be three claims: R1 is variant of DOI1, DOI2 is erratum of DOI1, R1 is variant of DOI2

Examples of other possible relations that could be included in the future are:

- `is_cited_by`
- `is_superseded_by`
- `is_software_for_paper`
- `is_dataset_for_paper`
- `is_dataset_for_software`

For example, imagine the following table of claims:

```
subject               predicate      object
--------------------  -----------    -------------------
arXiv:hep-th/0101001  is_variant_of  DOI:10.1234/foo.bar
arXiv:hep-th/0101001  is_same_as     arXiv:1506.07188
```

One could then ask queries like *who does know about DOI 10.1234/foo.bar?* and the system could return only direct claims:

```
GET /claims/?type=DOI&value=10.1234/foo.bar
```

listing only the first relation, or else we could also ask to include all indirect claims:

```
GET /claims/?type=DOI&value=10.1234/foo.bar&include=indirect&certainty=0.5+
```

which would return both relations.

2.4 Releases

This part of the documentation presents history of ClaimStore releases.

2.4.1 Changes

Version 0.1.0 (released TBD)

- Initial public release.

2.5 Restful Resources

2.5.1 Submit a claimant

Register a new claimant in the ClaimStore.

POST /api/claimants

This resource is expecting JSON data with all the necessary information of a new claimant.

Request:

```
POST /api/claimants HTTP/1.1
Content-Type: application/json
Host: localhost:5000

{
    "name": "INSPIRE",
    "url": "http://inspirehep.net"
}
```

Request Headers

- Content-Type – application/json

JSON Parameters

- **body** – JSON with the information of the claimant. The JSON data should be valid according to the JSON Schema for claimants.

Responses:

```
HTTP/1.0 200 OK
Content-Length: 80
Content-Type: application/json

{
    "status": "success",
    "uuid": "ab19c98b-xxxx-xxxx-xxxx-1d6af3bf58b4"
}
```

```
HTTP/1.0 400 BAD REQUEST
Content-Length: 95
Content-Type: application/json

{
    "extra": null,
    "message": "This claimant is already registered",
    "status": 400
}
```

Response Headers

- Content-Type – application/json

Status Codes

- 200 OK – no error - the claimant was subscribed
- 400 Bad Request – invalid request - problably a malformed JSON

- 403 Forbidden – access denied

Usage:

- From python:

```
import json
import requests

url = "http://localhost:5000/api/claimants/
headers = {"Content-Type": "application/json"}
with open(
    '$PROJECT_HOME/tests/config/claimants/cds.json'
) as f:
    data=json.dumps(f.read())
r = requests.post(url, data=data, headers=headers)
```

- From httpie:

```
$ http POST http://localhost:5000/api/claimants < tests/myclaimstore/config/claimants/cds.js
```

- From curl:

```
$ curl http://localhost:5000/api/claimants \
       -H "Content-Type: application/json" \
       -d @tests/myclaimstore/config/claimants/inspire.json -X POST -v
```

2.5.2 List claimants

GET service that returns all the available claimants.

GET /api/claimants/ (**uuid:** *claimant_id*)
Returns a JSON list with all the claimants.

Request:

```
GET /api/claimants HTTP/1.1
Accept: */*
Host: localhost:5000
```

```
GET /api/claimants/0e64606e-68ce-482e-ad59-1e99... HTTP/1.1
Accept: */*
Host: localhost:5000
```

Request Headers

- Content-Type – application/json

Response:

```
HTTP/1.0 200 OK
Content-Length: 108
Content-Type: application/json

[
    {
        "name": "ADS",
        "url": "http://adsabs.harvard.edu/",
        "uuid": "00000000-be54-45c0-89fa-00000000"
```

```
        },
        {
            "name": "ARXIV",
            "url": "http://arxiv.org/",
            "uuid": "00000000-87a6-4095-99a9-00000000"
        },
        {
            "name": "CDS",
            "url": "http://cds.cern.ch",
            "uuid": "00000000-602e-4912-8a9b-00000000"
        },
        {
            "name": "INSPIRE",
            "url": "http://inspirehep.net",
            "uuid": "00000000-42a5-4d3f-b54a-00000000"
        }
]
```

Response Headers

- Content-Type – application/json

Status Codes

- 200 OK – no error
- 400 Bad Request – invalid request
- 403 Forbidden – access denied

Usage:

- From python:

```
import requests
response = requests.get("http://localhost:5000/api/claimants")
print response.json()
```

- From httpie:

```
$ http GET http://localhost:5000/api/claimants
```

- From curl:

```
$ curl http://localhost:5000/api/claimants
```

2.5.3 Submit a claim

Record a new claim.

POST /api/claims

This resource is expecting JSON data with all the necessary information of a new claim.

Request:

```
POST /api/claims HTTP/1.1
Accept: application/json
Content-Length: 336
Content-Type: application/json
```

```
{
    "arguments": {
        "actor": "CDS_submission",
        "human": 0
    },
    "certainty": 1.0,
    "claimant": "CDS",
    "created": "2015-03-25T11:00:00Z",
    "object": {
        "type": "CDS_REPORT_NUMBER",
        "value": "CMS-PAS-HIG-14-008"
    },
    "predicate": "is_same_as",
    "subject": {
        "type": "CDS_RECORD_ID",
        "value": "2003192"
    }
}
```

Request Headers

- Content-Type – application/json

JSON Parameters

- **body** – JSON with the information of the claimt. The JSON data should be valid according to the JSON Schema for claims.

Responses:

```
HTTP/1.0 200 OK
Content-Length: 80
Content-Type: application/json

{
    "status": "success",
    "uuid": "fad4ec9f-0e95-4a22-b65c-d01f15aba6be"
}
```

```
HTTP/1.0 400 BAD REQUEST
Content-Length: 9616
Content-Type: application/json
Date: Tue, 22 Sep 2015 09:02:25 GMT
Server: Werkzeug/0.10.4 Python/3.4.3

{
    "extra": "'claimant' is a required property. Failed
              validating 'required' in schema...",
    "message": "JSON data is not valid",
    "status": 400
}
```

Response Headers

- Content-Type – application/json

Status Codes

- 200 OK – no error - the claim was recorded

- 400 Bad Request – invalid request - problably a malformed JSON
- 403 Forbidden – access denied

Usage:

- From python:

```
import json
import requests

url = "http://localhost:5000/api/claims/
headers = {"Content-Type": "application/json"}
with open(
    '$PROJECT_HOME/tests/config/claims/cds.1.json'
) as f:
    data=json.dumps(f.read())
r = requests.post(url, data=data, headers=headers)
```

- From httpie:

```
$ http POST http://localhost:5000/api/claims < tests/myclaimstore/data/claims/cds.1.json
```

- From curl:

```
$ curl http://localhost:5000/api/claims \
       -H "Content-Type: application/json" \
       -d @tests/myclaimstore/data/claims/inspire.1.json -X POST -v
```

2.5.4 List claims

GET service that returns the stored claims.

GET /api/claims/ (**uuid:** *claim_id*)
Returns a JSON list with all the claims matching the query parameters.

Request:

```
GET /api/claims?type=CDS_RECORD_ID&value=cond-mat/9906097&
recurse=1 HTTP/1.1
Accept: */*
Host: localhost:5000
```

```
GET /api/claims/0e64606e-68ce-482e-ad59-1e9981394f HTTP/1.1
Accept: */*
Host: localhost:5000
```

Request Headers

- Content-Type – application/json

Query Parameters

- **since** (*datetime*) – it must have the format 'YYYY-MM-DD'. It fetches claims that were created from this given datetime.
- **until** (*datetime*) – it must have the format 'YYYY-MM-DD'. It fetches claims that were created up to this given datetime.
- **claimant** (*string*) – claimant's unique name. It fetches claims submitted by the specified claimant.

- **predicate** (*string*) – predicate's unique name. It finds claims using this predicate (e.g. is_same_as).
- **certainty** (*float*) – float number between 0 and 1.0. It will search for claims with at least the specified certainty.
- **human** (*int*) – enter 1 if searching for human-created claims, 0 for algorithms and nothing in order to retrieve all.
- **actor** (*string*) – it filters claims by their actor's name (one can use %).
- **role** (*string*) – it filters claims by their actor's role (one can use %).
- **type** (*string*) – it finds claims using a certain identifier type (either subject or object). For instance: DOI.
- **value** (*string*) – it fetches all the claims with that identifier value.
- **recurse** (*boolean*) – used in combination with *type* and *value* will find all the equivalent identifiers to the specified one.
- **subject** (*string*) – it fetches claims using the given identifier type as a subject type.
- **object** (*string*) – it fetches claims using the given identifier type as an object type.
- **page** (*int*) – page from which to fetch data.
- **per_page** (*int*) – amount of data per page.

Response:

```
HTTP/1.0 200 OK
Content-Length: 1166
Content-Type: application/json

[
    {
        "arguments": {
            "actor": "CDS_submission",
            "human": 0
        },
        "certainty": 1.0,
        "claimant": "CDS",
        "created": "2015-03-25T11:00:00Z",
        "object": {
            "type": "CDS_REPORT_NUMBER",
            "value": "CMS-PAS-HIG-14-008"
        },
        "predicate": "is_same_as",
        "recieved": "2015-09-22T08:18:30.606912+00:00",
        "subject": {
            "type": "CDS_RECORD_ID",
            "value": "2003192"
        },
        "uuid": "44103ee2-0d87-47f9-b0e4-77673d297cdb"
    },
    {
        "arguments": {
            "actor": "John Doe",
            "human": 1,
            "role": "cataloguer"
        },
```

```
                "certainty": 0.5,
                "claimant": "INSPIRE",
                "created": "2015-05-25T11:00:00Z",
                "object": {
                    "type": "CDS_RECORD_ID",
                    "value": "2003192"
                },
                "predicate": "is_variant_of",
                "recieved": "2015-09-22T08:18:30.638933+00:00",
                "subject": {
                    "type": "INSPIRE_RECORD_ID",
                    "value": "cond-mat/9906097"
                },
                "uuid": "27689445-02b9-4d5d-8f9b-da21970e2352"
            }
        ]
```

Response Headers

- Content-Type – application/json

Status Codes

- 200 OK – no error
- 400 Bad Request – invalid request
- 403 Forbidden – access denied

Usage:

- From python:

```
import requests
response = requests.get("http://localhost:5000/api/claims")
print response.json()
```

- From httpie:

```
$ http GET http://localhost:5000/api/claims
```

- From curl:

```
$ curl http://localhost:5000/api/claims
```

2.5.5 List identifiers

GET service that returns the stored identifiers.

GET /api/identifiers
Returns a JSON list with all the available identifiers.

Request:

```
GET /api/identifiers HTTP/1.1
Accept: */*
Host: localhost:5000
```

Request Headers

- Content-Type – application/json

Response:

```
HTTP/1.0 200 OK
Content-Length: 147
Content-Type: application/json

[
    "ARXIV_ID",
    "CDS_AUTHOR_ID",
    "CDS_RECORD_ID",
    "CDS_REPORT_NUMBER",
    "DOI",
    "INSPIRE_AUTHOR_ID",
    "INSPIRE_RECORD_ID"
]
```

Response Headers

- Content-Type – application/json

Status Codes

- 200 OK – no error
- 400 Bad Request – invalid request
- 403 Forbidden – access denied

Usage:

- From python:

```
import requests
response = requests.get("http://localhost:5000/api/identifiers")
print response.json()
```

- From httpie:

```
$ http GET http://localhost:5000/api/identifiers
```

- From curl:

```
$ curl http://localhost:5000/api/identifiers
```

2.5.6 List predicates

GET service that returns all the available predicates.

GET /api/predicates
Returns a JSON list with all the predicates.

Request:

```
GET /api/predicates HTTP/1.1
Accept: */*
Host: localhost:5000
```

Request Headers

- Content-Type – application/json

Response:

```
HTTP/1.0 200 OK
Content-Length: 108
Content-Type: application/json

[
    "is_author_of",
    "is_contributor_to",
    "is_erratum_of",
    "is_same_as",
    "is_variant_of"
]
```

Response Headers

- Content-Type – application/json

Status Codes

- 200 OK – no error
- 400 Bad Request – invalid request
- 403 Forbidden – access denied

Usage:

- From python:

```
import requests
response = requests.get("http://localhost:5000/api/predicates")
print response.json()
```

- From httpie:

```
$ http GET http://localhost:5000/api/predicates
```

- From curl:

```
$ curl http://localhost:5000/api/predicates
```

2.5.7 List equivalent identifiers

GET service that returns all the stored Equivalent Identifiers.

GET /api/eqids/ (**uuid:** *eqid*)
Returns all the type/value entries in the index grouped by their equivalent identifiers.

Requests:

```
GET /api/eqids HTTP/1.1
Accept: */*
Host: localhost:5000
```

```
GET /api/eqids/0e64606e-68ce-482e-ad59-1e9981394f8 HTTP/1.1
Accept: */*
Host: localhost:5000
```

Request Headers

- Content-Type – application/json

Parameters

- **eqid** – query by a specific uuid which is shared by some equivalent identifiers

Response:

```
HTTP/1.0 200 OK
Content-Length: 592
Content-Type: application/json

{
    "36dfb125-5c35-4d3a-870c-76eb4bad498e": [
        {
            "type": "ARXIV_ID",
            "value": "cond-mat/9906097"
        },
        {
            "type": "DOI",
            "value": "C10.1103/PhysRevE.62.7422"
        }
    ],
    "77c4a5eb-3ed8-4c80-ba0d-644d6bc397a3": [
        {
            "type": "CDS_RECORD_ID",
            "value": "2003192"
        },
        {
            "type": "CDS_REPORT_NUMBER",
            "value": "CMS-PAS-HIG-14-008"
        },
        {
            "type": "INSPIRE_RECORD_ID",
            "value": "cond-mat/9906097"
        }
    ]
}
```

Response Headers

- Content-Type – application/json

Status Codes

- 200 OK – no error
- 400 Bad Request – invalid request - problably a malformed UUID
- 403 Forbidden – access denied

Usage:

- From python:

```
import requests
response = requests.get("http://localhost:5000/api/eqids")
print response.json()
```

- From httpie:

```
$ http GET http://localhost:5000/api/eqids
```

- From curl:

```
$ curl http://localhost:5000/api/eqids
```

2.6 Developers

This part of the documentation presents meta-information useful for ClaimStore developers and development process.

2.6.1 Contributing

Bug reports, feature requests, and other contributions are welcome. If you find a demonstrable problem that is caused by the code of this library, please:

1. Search for already reported problems.
2. Check if the issue has been fixed or is still reproducible on the latest *master* branch.
3. Create an issue with **a test case**.

If you create a feature branch, you can run the tests to ensure everything is operating correctly:

```
$ ./run-tests.sh
```

You can also test your feature branch using Docker:

```
$ docker-compose build
$ docker-compose run --rm web /code/run-tests.sh
```

2.6.2 Authors

Contact us at info@invenio-software.org

- Jose Benito Gonzalez Lopez <jose.benito.gonzalez@cern.ch>
- Tibor Simko <tibor.simko@cern.ch>

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```
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```

```
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```

```
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```

```
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```

2.7 claimstore

2.7.1 claimstore package

Subpackages

claimstore.core package

Subpackages

claimstore.core.db package

Submodules

claimstore.core.db.types module Custom database types.

class claimstore.core.db.types.**UTCDateTime**(**args*, ***kwargs*)

Bases: sqlalchemy.sql.type_api.TypeDecorator

Custom UTC DateTime type.

impl

alias of DateTime

Process binding.

Process result.

Module contents Database related modules.

Submodules

claimstore.core.datetime module DateTime related tools.

claimstore.core.datetime.**loc_date_utc**(*date*)
Localise a naive date in UTC.

Parameters **date** (*datetime.*) – naive date

Returns date with UTC tzinfo

Return type datetime.

claimstore.core.datetime.**now_utc**()
Return UTC datetime with tzinfo.

claimstore.core.exception module Definition of specific exceptions.

exception claimstore.core.exception.**InvalidJSONData**(*message*, *status_code=None*, *extra=None*)
Bases: *claimstore.core.exception.RestApiException*

Invalid JSON Data.

This exception is raised when there is some JSON data that does not follow its associated JSON schema.

exception claimstore.core.exception.**InvalidRequest**(*message*, *status_code=None*, *extra=None*)
Bases: *claimstore.core.exception.RestApiException*

REST request could not be fulfilled.

exception claimstore.core.exception.**RestApiException**(*message*, *status_code=None*, *extra=None*)
Bases: Exception

Generic Rest API exception.

status_code = 400

Return exception as a dictionary.

claimstore.core.json module Useful JSON-related methods.

claimstore.core.json.**get_json_schema**(*schema*)
Return a given json schema.

Parameters **schema** (*str.*) – schema to be fetched. It must be a string with the format: module.schema_name (e.g. claims.claimants).

Returns a str with the requested json schema.

Return type str.

claimstore.core.json.**validate_json**(*json_input*, *schema*)
Validate JSON against a given schema.

Parameters

- **json_input** (*dict.*) – a dict with the full json to be validated.
- **schema** (*str.*) – JSON schema to use in the validation. It must be a string with the format module.schema_name (e.g. claims.claimants).

Raises `ValidationError` if the instance is invalid.

claimstore.core.pagination module Restful pagination.

class `claimstore.core.pagination.`**`RestfulSQLAlchemyPaginationMixIn`**
Bases: `object`

Implement Restful pagination for SQLAlchemy model and Flask-Restful.

It creates an instance of RequestParser that should be used by the Restful Resource implementation. By default, it adds two query fields to the Restful Resource:

Parameters

- **`page`** – page from which to fetch the data
- **`per_page`** – amout of data per page

Paginate query.

Parameters

- **`query`** – query object from SQLAlchemy.
- **`page`** – page from which to fetch data.
- **`per_page`** – amount of data per page.

Set Link details in the response header.

Parameters **`response`** – Flask Response object.

Module contents Core module for ClaimStore.

Submodules

claimstore.app module

Flask app creation.

`claimstore.app.`**`create_app`**`()`
Create Flask app using the factory.

`claimstore.app.`**`handle_restful_exceptions`**`(`*error*`)`
Handle invalid restful request exception.

claimstore.cli module

claimstore.config module

ClaimStore configuration.

claimstore.models module

ClaimStore data model.

class claimstore.models.**Claim**(***kwargs*)
Bases: flask_sqlalchemy.Model

Model representing a Claim.

Each claim is associated to a specific Claimant and references some already existing Identifier Types and predicate.

actor
Human that has performed the claim.

certainty
Certainty of the claim. It must be a float between 0 and 1.0.

claim_details
JSONB representation of the full claim as received.

claimant_id
Id of the associated Claimant.

created
Datetime in which the claim has been created by the claimant.

Get claims with the all the equivalent subjects or objects.

human
Whether the claims has been done by a human (1) or not (0).

id
Unique id of the claim.

object_eqid
Unique identifier for this object (type, value).

object_type_id
Id of the associated IdentifierType used as an object.

object_value
Value of the object.

predicate_id
Id of the associated Predicate.

received
Datetime in which the claim has been received and stored.

role
Role of the *human* who has performed the claim.

subject_eqid
Unique identifier for this subject (type, value).

subject_type_id
Id of the associated IdentifierType used as a subject.

subject_value
Value of the subject.

uuid
Universally Unique Identifier that represents a single claim.

class claimstore.models.**Claimant**(***kwargs*)
Bases: flask_sqlalchemy.Model

Represents a Claimant.

Claimants are the main providers of claims. Each claimant may be associated to many different claims.

claim
Claim associated with this claimant.

id
Unique id of the claimant.

joined
Datetime when the claimant subscribed to ClaimStore.

name
Claimant name. It must be unique and preferably short.

url
URL of the claimant.

uuid
Universally unique id of the claimant.

class claimstore.models.**EquivalentIdentifier**(***kwargs*)
Bases: flask_sqlalchemy.Model

Model that defines equivalent identifiers.

A given tuple (IdentifierType1, value1), e.g. (DOI, 1234) will have associated a unique id (*eqid*) that will be shared by the other tuple, e.g. (IdentifierType2, value2) in the relationship, in case the two IDs are equivalent (e.g. related via is_same_as predicate). If new equality claims are done in which existing identifiers are used, they will take the *eqid* from them.

For instance, if we have some claims like:

SubjectType	SubjectValue	Predicate	ObjectType	ObjectValue
Type1	Value1	is_same_as	Type2	Value2
Type3	Value3	is_same_as	Type4	Value4
Type1	Value1	is_same_as	Type4	Value4
Type5	Value5	is_same_as	Type6	Value6

Then, in the EquivalentIdentifier table there will be something like:

type	value	uuid
Type1	Value1	01
Type2	Value2	01
Type3	Value3	01
Type4	Value4	01
Type5	Value4	02
Type6	Value4	02

This table will enable and facilitate several use cases:

1. We could very easily get a list of the different identifiers for the same data resource.
2. It will simplify the recursive query by type/value in any subject/object claim.

Delete all the entries of the table equivalent_identifiers.

eqid
Universally Unique Identifier that represents a single data resource.

Return the identifiers of all the equivalent entities.

This method fetches the eqid for a given (type_name, value) and uses it to find all the equivalent identifiers. It returns a list with *EquivalentIdentifier.id*.

Return all the equivalent identifiers.

This method fetches the eqid for a given (type_name, value) and uses it to find all the equivalent identifiers.

id
Unique id of the data resource.

Rebuild index based on claims.

Store and return the equivalent identifiers as required.

type_id
The id of a given IdentifierType.

value
A given value for the IdentifierType.

class claimstore.models.**IdentifierType**(***kwargs*)
Bases: flask_sqlalchemy.Model

Represents an identifier type.

An Identifier Type is a persistent identifier type that can be used in claims by claimants.

claimant_id
Id of the associated claimant that registered this identifier.

description
Description of the identifier type.

eqid
Backref in equivalent_identifier to reach this identifier_type.

example_url
Example of a full URL in which the identifier is being used.

example_value
Example of a possible value for an identifier.

id
Unique id of the Identifier.

name
Unique name of the identifier type. Preferably one word in caps.

object
Backref in claim to reach this identifier_type.

subject
Backref in claim to reach this identifier_type.

url
URL in which the identifier is used.

class claimstore.models.**Predicate**(***kwargs*)
Bases: flask_sqlalchemy.Model

Represents a predicate.

The predicate defines the type of claim. An example of predicate could be: is_same_as.

claim
Backref in claim to reach this predicate.

description
Description of the predicate.

id
Unique id of the predicate.

name
Unique name of a predicate.

claimstore.restful module

Restful resources for the claims module.

class claimstore.restful.**ClaimResource**
Bases: *claimstore.restful.ClaimStoreResource*, *claimstore.core.pagination.RestfulSQLAlchemy*

Resource that handles all claims-related requests.

endpoint = 'claims'

GET service that returns the stored claims.

GET /api/claims/ (**uuid:** *claim_id*)
Returns a JSON list with all the claims matching the query parameters.

Request:

```
GET /api/claims?type=CDS_RECORD_ID&value=cond-mat/9906097&
recurse=1 HTTP/1.1
Accept: */*
Host: localhost:5000
```

```
GET /api/claims/0e64606e-68ce-482e-ad59-1e9981394f HTTP/1.1
Accept: */*
Host: localhost:5000
```

Request Headers

- Content-Type – application/json

Query Parameters

- **since** (*datetime*) – it must have the format 'YYYY-MM-DD'. It fetches claims that were created from this given datetime.
- **until** (*datetime*) – it must have the format 'YYYY-MM-DD'. It fetches claims that were created up to this given datetime.
- **claimant** (*string*) – claimant's unique name. It fetches claims submitted by the specified claimant.
- **predicate** (*string*) – predicate's unique name. It finds claims using this predicate (e.g. is_same_as).
- **certainty** (*float*) – float number between 0 and 1.0. It will search for claims with at least the specified certainty.
- **human** (*int*) – enter 1 if searching for human-created claims, 0 for algorithms and nothing in order to retrieve all.
- **actor** (*string*) – it filters claims by their actor's name (one can use %).
- **role** (*string*) – it filters claims by their actor's role (one can use %).

- **type** (*string*) – it finds claims using a certain identifier type (either subject or object). For instance: DOI.
- **value** (*string*) – it fetches all the claims with that identifier value.
- **recurse** (*boolean*) – used in combination with *type* and *value* will find all the equivalent identifiers to the specified one.
- **subject** (*string*) – it fetches claims using the given identifier type as a subject type.
- **object** (*string*) – it fetches claims using the given identifier type as an object type.
- **page** (*int*) – page from which to fetch data.
- **per_page** (*int*) – amount of data per page.

Response:

```
HTTP/1.0 200 OK
Content-Length: 1166
Content-Type: application/json

[
    {
        "arguments": {
            "actor": "CDS_submission",
            "human": 0
        },
        "certainty": 1.0,
        "claimant": "CDS",
        "created": "2015-03-25T11:00:00Z",
        "object": {
            "type": "CDS_REPORT_NUMBER",
            "value": "CMS-PAS-HIG-14-008"
        },
        "predicate": "is_same_as",
        "recieved": "2015-09-22T08:18:30.606912+00:00",
        "subject": {
            "type": "CDS_RECORD_ID",
            "value": "2003192"
        },
        "uuid": "44103ee2-0d87-47f9-b0e4-77673d297cdb"
    },
    {
        "arguments": {
            "actor": "John Doe",
            "human": 1,
            "role": "cataloguer"
        },
        "certainty": 0.5,
        "claimant": "INSPIRE",
        "created": "2015-05-25T11:00:00Z",
        "object": {
            "type": "CDS_RECORD_ID",
            "value": "2003192"
        },
        "predicate": "is_variant_of",
        "recieved": "2015-09-22T08:18:30.638933+00:00",
        "subject": {
            "type": "INSPIRE_RECORD_ID",
```

```
                    "value": "cond-mat/9906097"
                },
                "uuid": "27689445-02b9-4d5d-8f9b-da21970e2352"
            }
        ]
```

Response Headers

- Content-Type – application/json

Status Codes

- 200 OK – no error
- 400 Bad Request – invalid request
- 403 Forbidden – access denied

json_schema = 'claims.claim'

methods = ['GET', 'POST']

Record a new claim.

POST /api/claims

This resource is expecting JSON data with all the necessary information of a new claim.

Request:

```
POST /api/claims HTTP/1.1
Accept: application/json
Content-Length: 336
Content-Type: application/json

{
    "arguments": {
        "actor": "CDS_submission",
        "human": 0
    },
    "certainty": 1.0,
    "claimant": "CDS",
    "created": "2015-03-25T11:00:00Z",
    "object": {
        "type": "CDS_REPORT_NUMBER",
        "value": "CMS-PAS-HIG-14-008"
    },
    "predicate": "is_same_as",
    "subject": {
        "type": "CDS_RECORD_ID",
        "value": "2003192"
    }
}
```

Request Headers

- Content-Type – application/json

JSON Parameters

- **body** – JSON with the information of the claimt. The JSON data should be valid according to the JSON Schema for claims.

Responses:

```
HTTP/1.0 200 OK
Content-Length: 80
Content-Type: application/json

{
    "status": "success",
    "uuid": "fad4ec9f-0e95-4a22-b65c-d01f15aba6be"
}
```

```
HTTP/1.0 400 BAD REQUEST
Content-Length: 9616
Content-Type: application/json
Date: Tue, 22 Sep 2015 09:02:25 GMT
Server: Werkzeug/0.10.4 Python/3.4.3

{
    "extra": "'claimant' is a required property. Failed
              validating 'required' in schema...",
    "message": "JSON data is not valid",
    "status": 400
}
```

Response Headers

- Content-Type – application/json

Status Codes

- 200 OK – no error - the claim was recorded
- 400 Bad Request – invalid request - problably a malformed JSON
- 403 Forbidden – access denied

class claimstore.restful.**ClaimStoreResource**

Bases: flask_restful.Resource

Base class for REST resources.

json_schema = None

method_decorators = [<function error_handler at 0x7f7a2c4d1950>, <function check_ip at 0x7f7a2c4d19d8>]

Validate that json_data follows the appropiate JSON schema.

Parameters **json_data** – JSON data to be validated.

Raises InvalidJSONData if the instance is invalid.

class claimstore.restful.**ClaimantResource**

Bases: *claimstore.restful.ClaimStoreResource*

Resource related to claimant subscription in the ClaimStore.

This POST service expects JSON data following the JSON schema defined for claimants.

endpoint = 'claimants'

GET service that returns all the available claimants.

GET /api/claimants/(**uuid:** *claimant_id*)

Returns a JSON list with all the claimants.

Request:

```
GET /api/claimants HTTP/1.1
Accept: */*
Host: localhost:5000
```

```
GET /api/claimants/0e64606e-68ce-482e-ad59-1e99... HTTP/1.1
Accept: */*
Host: localhost:5000
```

Request Headers

- Content-Type – application/json

Response:

```
HTTP/1.0 200 OK
Content-Length: 108
Content-Type: application/json

[
    {
        "name": "ADS",
        "url": "http://adsabs.harvard.edu/",
        "uuid": "00000000-be54-45c0-89fa-00000000"
    },
    {
        "name": "ARXIV",
        "url": "http://arxiv.org/",
        "uuid": "00000000-87a6-4095-99a9-00000000"
    },
    {
        "name": "CDS",
        "url": "http://cds.cern.ch",
        "uuid": "00000000-602e-4912-8a9b-00000000"
    },
    {
        "name": "INSPIRE",
        "url": "http://inspirehep.net",
        "uuid": "00000000-42a5-4d3f-b54a-00000000"
    }
]
```

Response Headers

- Content-Type – application/json

Status Codes

- 200 OK – no error
- 400 Bad Request – invalid request
- 403 Forbidden – access denied

json_schema = 'claims.claimant'

methods = ['GET', 'POST']

Register a new claimant in the ClaimStore.

POST /api/claimants

This resource is expecting JSON data with all the necessary information of a new claimant.

Request:

```
POST /api/claimants HTTP/1.1
Content-Type: application/json
Host: localhost:5000

{
    "name": "INSPIRE",
    "url": "http://inspirehep.net"
}
```

Request Headers

- Content-Type – application/json

JSON Parameters

- **body** – JSON with the information of the claimant. The JSON data should be valid according to the JSON Schema for claimants.

Responses:

```
HTTP/1.0 200 OK
Content-Length: 80
Content-Type: application/json

{
    "status": "success",
    "uuid": "ab19c98b-xxxx-xxxx-xxxx-1d6af3bf58b4"
}
```

```
HTTP/1.0 400 BAD REQUEST
Content-Length: 95
Content-Type: application/json

{
    "extra": null,
    "message": "This claimant is already registered",
    "status": 400
}
```

Response Headers

- Content-Type – application/json

Status Codes

- 200 OK – no error - the claimant was subscribed
- 400 Bad Request – invalid request - problably a malformed JSON
- 403 Forbidden – access denied

class claimstore.restful.**EquivalentIdResource**

Bases: *claimstore.restful.ClaimStoreResource*

Resource that handles Equivalent Identifier requests.

endpoint = 'eqids'

GET service that returns all the stored Equivalent Identifiers.

GET /api/eqids/ (**uuid:** *eqid*)

Returns all the type/value entries in the index grouped by their equivalent identifiers.

Requests:

```
GET /api/eqids HTTP/1.1
Accept: */*
Host: localhost:5000
```

```
GET /api/eqids/0e64606e-68ce-482e-ad59-1e9981394f8 HTTP/1.1
Accept: */*
Host: localhost:5000
```

Request Headers

- Content-Type – application/json

Parameters

- **eqid** – query by a specific uuid which is shared by some equivalent identifiers

Response:

```
HTTP/1.0 200 OK
Content-Length: 592
Content-Type: application/json

{
    "36dfb125-5c35-4d3a-870c-76eb4bad498e": [
        {
            "type": "ARXIV_ID",
            "value": "cond-mat/9906097"
        },
        {
            "type": "DOI",
            "value": "C10.1103/PhysRevE.62.7422"
        }
    ],
    "77c4a5eb-3ed8-4c80-ba0d-644d6bc397a3": [
        {
            "type": "CDS_RECORD_ID",
            "value": "2003192"
        },
        {
            "type": "CDS_REPORT_NUMBER",
            "value": "CMS-PAS-HIG-14-008"
        },
        {
            "type": "INSPIRE_RECORD_ID",
            "value": "cond-mat/9906097"
        }
    ]
}
```

Response Headers

- Content-Type – application/json

Status Codes

- 200 OK – no error
- 400 Bad Request – invalid request - problably a malformed UUID
- 403 Forbidden – access denied

methods = ['GET']

class claimstore.restful.**IdentifierResource**
Bases: *claimstore.restful.ClaimStoreResource*

Resource that handles Identifier requests.

endpoint = 'identifiers'

GET service that returns the stored identifiers.

GET /api/identifiers
Returns a JSON list with all the available identifiers.

Request:

```
GET /api/identifiers HTTP/1.1
Accept: */*
Host: localhost:5000
```

Request Headers

- Content-Type – application/json

Response:

```
HTTP/1.0 200 OK
Content-Length: 147
Content-Type: application/json

[
    "ARXIV_ID",
    "CDS_AUTHOR_ID",
    "CDS_RECORD_ID",
    "CDS_REPORT_NUMBER",
    "DOI",
    "INSPIRE_AUTHOR_ID",
    "INSPIRE_RECORD_ID"
]
```

Response Headers

- Content-Type – application/json

Status Codes

- 200 OK – no error
- 400 Bad Request – invalid request
- 403 Forbidden – access denied

methods = ['GET']

class claimstore.restful.**PredicateResource**
Bases: *claimstore.restful.ClaimStoreResource*

Resource that handles Predicate requests.

endpoint = 'predicates'

GET service that returns all the available predicates.

GET /api/predicates
Returns a JSON list with all the predicates.

Request:

```
GET /api/predicates HTTP/1.1
Accept: */*
Host: localhost:5000
```

Request Headers

- Content-Type – application/json

Response:

```
HTTP/1.0 200 OK
Content-Length: 108
Content-Type: application/json

[
    "is_author_of",
    "is_contributor_to",
    "is_erratum_of",
    "is_same_as",
    "is_variant_of"
]
```

Response Headers

- Content-Type – application/json

Status Codes

- 200 OK – no error
- 400 Bad Request – invalid request
- 403 Forbidden – access denied

methods = ['GET']

claimstore.restful.**check_ip**(*f*)
Decorator to control the access to the API.

If the client's IP matches the list of IPs defined in the environment variable *CLAIMSTORE_ALLOWED_IPS*, then the access will be granted. Otherwise, an access denied code 403 will be raised.

claimstore.restful.**error_handler**(*f*)
Decorator to handle restful exceptions.

If this decorator is not used, Flask-RestFul will always raise a 500 code, independently of your Flask app error handler registration.

claimstore.version module

ClaimStore version number.

claimstore.views module

ClaimStore views.

`claimstore.views.`**`claimsubmit`**`()`
Render the claim submission form page.

`claimstore.views.`**`contact`**`()`
Render the contact page.

`claimstore.views.`**`index`**`()`
Render the home page for ClaimStore.

`claimstore.views.`**`subscription`**`()`
Render the subscription form page.

claimstore.wsgi module

WSGI app creation.

Module contents

Main claimstore module.

CHAPTER 3

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/api