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# **Python USI submission REST API Documentation**

***Release 0.3.1***

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# CHAPTER 1

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## Python USI submission REST API

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Python USI submission REST API contain all methods to interact with EMBL-EBI Unified Submissions Interface

- Free software: GNU General Public License v3
- Documentation: <https://pyusirest.readthedocs.io>.

## 1.1 Features

- Deal with EBI [AAP](#) (Authentication, Authorisation and Profile) service, generating tokens and dealing with User and Groups
- Interact with EBI USI (Unified Submission Interface) in order to submit data to biosample as described by this [guide](#). In details:
  - Getting [USI API root](#)
  - Selecting a [Team](#)
  - Creating a [Submission](#)
  - Adding [items to Submission](#)
  - Checking Biosample [Validation](#)

- [Finalising a Submission](#)

## 1.2 API Endpoints

`pyUSIrest` is written to exploit the BioSamples test environment endpoints. You are encouraged to understand how BioSamples submission works before do a real submission in BioSamples production servers. You can find more information on how to do a real submission in BioSamples production servers in readthedocs documentation: <https://pyusirest.readthedocs.io>

## 1.3 Credits

This package was created with [Cookiecutter](#) and the [audreyr/cookiecutter-pypackage](#) project template.

### 2.1 Stable release

To install Python USI submission REST API, run this command in your terminal:

```
$ pip install pyUSIrest
```

This is the preferred method to install Python USI submission REST API, as it will always install the most recent stable release.

If you don't have `pip` installed, this [Python installation guide](#) can guide you through the process.

### 2.2 From sources

The sources for Python USI submission REST API can be downloaded from the [Github repo](#).

You can either clone the public repository:

```
$ git clone git://github.com/cnr-ibba/pyUSIrest
```

Or download the [tarball](#):

```
$ curl -OJL https://github.com/cnr-ibba/pyUSIrest/tarball/master
```

Once you have a copy of the source, you can install it with:

```
$ python setup.py install
```



## CHAPTER 3

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### Usage

---

To use Python USI submission REST API in a project, you should import *Root* and *Auth* in order to interact with USI endpoint and EBI AAP:

```
from pyUSIrest.auth import Auth
from pyUSIrest.usi import Root
```

**Warning: Using the BioSamples production endpoints:** pyUSIrest is written in order to exploit the BioSamples testing environment. You are encouraged to understand the whole process of data submission in the test environment. In order to do a real submission, you have to override the submission endpoints after importing modules before modifying submission objects:

```
pyUSIrest.settings.AUTH_URL = "https://api.aai.ebi.ac.uk"
pyUSIrest.settings.ROOT_URL = "https://submission.ebi.ac.uk"
```

### 3.1 Creating an Auth object

With an *Auth* object, you're able to generate a AAP token from EBI and use it in browsing USI endpoint. You can instantiate a new *Auth* providing your AAP username and password:

```
auth = Auth(user=<usi_username>, password=<usi_password>)
```

Alternatively you can create an *Auth* object starting from a valid token:

```
auth = Auth(token=<token_string>)
```

### 3.2 Creating an USI User

In order to create a new USI user, with pyUSIrest you can use the method *create\_user* of the *User* class:

```
from pyUSIrest.usi import User

user_id = User.create_user(
    user=<new_usi_username>,
    password=<new_password>,
    confirmPwd=<new_password>,
    email=<your_email>,
    full_name=<your full name>,
    organization=<your_organization>
)
```

## 3.3 Creating a Team

To create a team, you will need to create a new *User* from a valid *Auth* object, then you could create a team using the *create\_team* method:

```
from pyUSIrest.usi import User
user = User(auth)
team = user.create_team(description="Your description")
```

**Warning:** remember to re-generate the token in order to see the new generated team using *pyUSIrest* objects

### 3.3.1 Add Profile to Domain

**Warning:** You don't need to do this with a new generated user. You should use this method only if you experience problems when *creating a submission*.

To create a profile for a team:

```
domain = user.get_domain_by_name(<team name>)
domain.create_profile(attributes={"centre name": "My Institution"})
```

For more informations, take a look to [creating a domain profile](#)

## 3.4 Adding User to Team

To add a user to a team, you need to provide a *user\_id*, like the one obtained by creating a user, or by calling *get\_my\_id* from a *User* instance:

```
user = User(auth)
user_id = user.get_my_id()
```

Next, you need to find out the domain reference of a team using a team name and *get\_domain\_by\_name* method:

```
domain = user.get_domain_by_name(team.name)
domain_id = domain.domainReference
```

To add user to a team call `add_user_to_team`:

```
user.add_user_to_team(user_id=user_id, domain_id=domain_id)
```

## 3.5 Create a Submission

From a valid `Root` object, get the `Team` object providing the `team_name` in which the submission will be created. Then create a new `Submission` using the `create_submission` method:

```
team = root.get_team_by_name(<your team name>)
submission = team.create_submission()
```

If you got a `ConnectionError` exception during last command, you need to add a profile to your domain as described in `add_profile_to_domain`.

### 3.5.1 Add Samples to a Submission

In order to add sample to a submission, define a `dict` for sample data, then add them using `create_sample`. In the following example, a test animal and a sample from that animal are created:

```
# define data as dictionaries. Ensure that mandatory keys
# are provided or biosample will throw an error
animal_data = {
    'alias': 'animal_1',
    'title': 'A Sample Organism',
    'releaseDate': '2018-06-19',
    'taxonId': 9940,
    'taxon': 'Ovis aries',
    'attributes': {'material': [{'value': 'organism',
    'terms': [{'url': 'http://purl.obolibrary.org/obo/OBI_0100026'}]}]},
    'project': [{'value': 'A Sample Project'}]},
    'sampleRelationships': []}

# add this animal to submission
sample = submission.create_sample(animal_data)

# Now generate a sample derived from the previous one.
# This link is provided by sampleRelationships key
sample_data = {'alias': 'sample_1',
    'title': 'A Sample Specimen',
    'releaseDate': '2018-06-19',
    'taxonId': 9940,
    'taxon': 'Ovis aries',
    'description': 'A Useful Description',
    'attributes': {'material': [{'value': 'specimen from organism',
    'terms': [{'url': 'http://purl.obolibrary.org/obo/OBI_0001479'}]}]},
    'project': [{'value': 'A Sample Project'}]},
    'sampleRelationships': [{'alias': 'animal_1',
    'relationshipNature': 'derived from'}]}

# add this sample to the submission
sample = submission.create_sample(sample_data)
```

## 3.6 Check and finalize a Submission

### 3.6.1 Querying for biosample validation status

After submitting all data, before finalize a submission, you need to ensure that all the validation steps performed by USI are done with success. You can query status with `get_status`:

```
status = submission.get_status()
print(status)  # Counter({'Complete': 2})
```

status will be a `collections.Counter` object. In order to finalize a submission to biosample, `get_status` need to return only Complete as status (not Pending), with a number equal to the number of samples attached to submission

### 3.6.2 Checking errors

Another method to check submission status before finalizing it is to check for errors with `has_errors` method:

```
errors = submission.has_errors()
print(errors)  # Counter({'False': 1, 'True': 1})
```

If there is any True in this `collections.Counter` object, submission has errors and can't be finalized. You will need to search for sample with errors in order to remove or update it. Only when this function return False with a number equal to the number of attached samples, a submission can be finalized.

### 3.6.3 Finalize a Submission

After managing sample and validation statuses, if everything is ok you can finalize your submission with `finalize`:

```
submission.finalize()
```

After finalization, you can't add more data to this submission. You may want to reload your data in order to retrieve the *biosample ids*, as described by *get samples from a submission*.

## 3.7 Fetch a submission by name

In order to get a submission by name, call `get_submission_by_name` from a valid `Root` object:

```
root = Root(auth=auth)
submission = root.get_submission_by_name(
    'c3a7e663-3a37-48d3-a041-8c18088e3185')
```

## 3.8 Get Sample from a submission

In order to get all samples for a submission, you can call the method `get_samples` on a `Submission` object:

```
samples = submission.get_samples()
```

You can also filter out samples by validationResult or if they have errors or not. For a list of validationResult, check the output of `get_status`:

```
# fetching pending samples
samples_pending = submission.get_samples(validationResult='Pending')

# get samples with errors
samples_error = submission.get_samples(has_errors=True)
```



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## Advanced Usage

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The Python USI submission REST API could be used to manage multiple submissions and samples in the same time. Most of its functions returns iterator objects, in such way some time consuming tasks can be executed lazily and can be filtered and sorted using the appropriate methods. Here there are described some useful tips useful to manage user submission data

### 4.1 Retrieving Submission Objects

You could retrieve all submission objects from *Root* using *get\_user\_submissions*: such method returns an iterator object:

```
from pyUSIrest.auth import Auth
from pyUSIrest.usi import Root

auth = Auth(user=<usi_username>, password=<usi_password>)
root = Root(auth)

for submission in root.get_user_submissions():
    print(submission)
```

*Submission* objects could be also filtered by status or by team name:

```
for submission in root.get_user_submissions(status="Draft", team='subs.test-team-19'):
    print(submission)
```

Submission could be sorted using attributes, as described in [Sorting HOW TO](#):

```
from operator import attrgetter

for submission in sorted(root.get_user_submissions(), key=attrgetter('lastModifiedDate'), reverse=True):
    print(submission)
```

In a similar way, submission could be filtered relying their attributes, for example you can retrieve the recent modified submissions in a similar way:

```
from datetime import datetime, timezone
from dateutil.relativedelta import relativedelta

recent_submission = lambda submission: submission.lastModifiedDate + \
    relativedelta(months=+1) > datetime.now(timezone.utc)

for submission in filter(recent_submission, root.get_user_submissions()):
    print(submission)
```

Submission could be derived also from `get_submissions` from a *Team* instance. In this case, the submission will be filtered accordingly to the team, and can be filtered or sorted in the same way as described before:

```
team = root.get_team_by_name('subs.test-team-19')

for submission in team.get_submissions():
    print(submission)
```

## 4.2 Working with samples

The `get_samples` method from *Submission* returns an iterator of *Sample* instances, and so can be filtered in a similar way as *Submission* instances:

```
submission = root.get_submission_by_name('40549619-7797-4672-b703-93a72c3f984a')

# get all samples in 'Pending' validation status
for sample in submission.get_samples(status="Pending"):
    print(sample)

# get all samples with errors in USI validation
for sample in submission.get_samples(has_errors=True):
    print(sample)

# returning samples with errors in other checks than Ena
for sample in submission.get_samples(has_errors=True, ignorelist=['Ena']):
    print(sample)
```

You can also filter a *Sample* by an attribute, like you can do with *Submission* objects, for example you can retrieve a sample in a submission by title:

```
for sample in filter(lambda sample: sample.title == 'SampleTitle', submission.get_
    samples()):
    print(sample)
```

## 5.1 pyUSIrest package

### 5.1.1 Submodules

### 5.1.2 pyUSIrest.auth module

Created on Thu May 24 15:46:37 2018

@author: Paolo Cozzi <cozzi@ibba.cnr.it>

**class** pyUSIrest.auth.Auth (user=None, password=None, token=None)

Bases: object

Deal with EBI AAP tokens. Starts from a token object or by providing user credentials. It parse token and provide methods like checking expiration times.

**auth\_url**

Default url for EBI AAP.

**Type** str

**expire**

when token expires

**Type** datetime.datetime

**issued**

when token was requested

**Type** datetime.datetime

**header**

token header read by python\_jwt.process\_jwt

**Type** dict

**claims**

token claims read by `python_jwt.process_jwt`

**Type** `dict`

**\_\_init\_\_** (*user=None, password=None, token=None*)

Instantiate a new python EBI AAP Object. You can generate a new object providing both user and password, or by passing a valid token string

**Parameters**

- **user** (*str*) – your aap username
- **password** (*str*) – your password
- **token** (*str*) – a valid EBI AAP jwt token

**auth\_url** = `None`

**get\_domains** ()

Returns a list of domain managed by this object

**Returns** a list of managed domains

**Return type** `list`

**get\_duration** ()

Get token remaining time before expiration

**Returns** remaining time as `timedelta` object

**Return type** `datetime.timedelta`

**is\_expired** ()

Return True if token is expired, False otherwise

**Returns** True if token is expired

**Return type** `bool`

**token**

Get/Set token as a string

### 5.1.3 pyUSIrest.client module

Created on Thu Dec 19 16:28:46 2019

@author: Paolo Cozzi <paolo.cozzi@ibba.cnr.it>

**class** `pyUSIrest.client.Client` (*auth*)

Bases: `object`

A class to deal with EBI submission API. It perform request modelling user token in request headers. You need to call this class after instantiating an `Auth` object:

```
import getpass
from pyUSIrest.auth import Auth
from pyUSIrest.client import Client
auth = Auth(user=<you_aap_user>, password=getpass.getpass())
client = Client(auth)
response = client.get("https://submission-test.ebi.ac.uk/api/")
```

**headers**

default headers for requests

Type `dict`

**last\_response**

last response object read by this class

Type `requests.Response`

**last\_satus\_code**

last status code read by this class

Type `int`

**session**

a session object

Type `request.Session`

**auth**

a pyUSIrest Auth object

Type `Auth`

**\_\_init\_\_** (*auth*)

Instantiate the class

Parameters **auth** (`Auth`) – a valid `Auth` object

**auth**

Get/Set `Auth` object

**check\_headers** (*headers=None*)

Checking headers and token

Parameters **headers** (`dict`) – custom header for request

Returns an update headers token

Return type `headers (dict)`

**check\_status** (*response, expected\_status=200*)

Check response status. See [HTTP status codes](#)

Parameters

- **response** (`requests.Reponse`) – the reponse returned by requests
- **method** –

**delete** (*url, headers={}, params={}*)

Generic DELETE method

Parameters

- **url** (`str`) – url to request
- **headers** (`dict`) – custom header for request
- **params** (`dict`) – custom params for request

Returns a response object

Return type `requests.Response`

**get** (*url, headers={}, params={}*)

Generic GET method

Parameters

- **url** (*str*) – url to request
- **headers** (*dict*) – custom headers for get request
- **params** (*dict*) – custom params for get request

**Returns** a response object

**Return type** `requests.Response`

```
headers = {'Accept': 'application/hal+json', 'User-Agent': 'pyUSIrest 0.3.1'}
```

```
patch(url, payload={}, headers={}, params={})
```

Generic PATCH method

**Parameters**

- **url** (*str*) – url to request
- **payload** (*dict*) – data to send
- **headers** (*dict*) – custom header for request
- **params** (*dict*) – custom params for request

**Returns** a response object

**Return type** `requests.Response`

```
post(url, payload={}, headers={}, params={})
```

Generic POST method

**Parameters**

- **url** (*str*) – url to request
- **payload** (*dict*) – data to send
- **headers** (*dict*) – custom header for request
- **params** (*dict*) – custom params for request

**Returns** a response object

**Return type** `requests.Response`

```
put(url, payload={}, headers={}, params={})
```

Generic PUT method

**Parameters**

- **url** (*str*) – url to request
- **payload** (*dict*) – data to send
- **params** (*dict*) – custom params for request
- **headers** (*dict*) – custom header for request

**Returns** a response object

**Return type** `requests.Response`

```
class pyUSIrest.client.Document (auth=None, data=None)
```

Bases: `pyUSIrest.client.Client`

Base class for pyUSIrest classes. It models common methods and attributes by calling `Client` and reading json response from biosample API

**\_link**

\_links data read from USI response

Type `dict`

**\_embeddedd**

\_embeddedd data read from USI response

Type `dict`

**page**

page data read from USI response

Type `dict`

**name**

name of this object

Type `str`

**data**

data from USI read with `response.json()`

Type `dict`

**\_\_init\_\_** (*auth=None, data=None*)

Instantiate the class

Parameters **auth** (`Auth`) – a valid `Auth` object

**classmethod clean\_url** (*url*)

Remove stuff like `{?projection}` from url

Parameters **url** (`str`) – a string url

Returns the cleaned url

Return type `str`

**follow\_self\_url** ()

Follow *self* url and update class attributes. For instance:

```
document.follow_self_url()
```

will reload document instance by requesting with `Client.get()` using `document.data['_links']['self']['href']` as url

**follow\_tag** (*tag, force\_keys=True*)

Pick a url from data attribute relying on tag, perform a request and returns a document object. For instance:

```
document.follow_tag('userSubmissions')
```

will return a document instance by requesting with `Client.get()` using `document._links['userSubmissions']['href']` as url

Parameters

- **tag** (`str`) – a key from USI response dictionary
- **force\_keys** (`bool`) – set a new class attribute if not present

Returns a document object

Return type `Document`

**get** (*url*, *force\_keys=True*)

Override the Client.get method and read data into object:

```
document = Document(auth)
document.get(settings.ROOT_URL + "/api/")
```

**Parameters**

- **url** (*str*) – url to request
- **force\_keys** (*bool*) – If True, define a new class attribute from data keys

**Returns** a response object

**Return type** `requests.Response`

**paginate** ()

Follow all the pages. Return an iterator of document objects

**Parameters** **response** (`requests.Response`) – a response object

**Yields** *Document* – a new Document instance

**read\_data** (*data*, *force\_keys=False*)

Read data from a dictionary object and set class attributes

**Parameters**

- **data** (*dict*) – a data dictionary object read with `response.json()`
- **force\_keys** (*bool*) – If True, define a new class attribute from data keys

**classmethod read\_url** (*auth*, *url*)

Read a url and returns a *Document* object

**Parameters**

- **auth** (*Auth*) – an Auth object to pass to result
- **url** (*str*) – url to request

**Returns** a document object

**Return type** *Document*

`pyUSIrest.client.is_date` (*string*, *fuzzy=False*)

Return whether the string can be interpreted as a date.

**Parameters**

- **string** – str, string to check for date
- **fuzzy** – bool, ignore unknown tokens in string if True

## 5.1.4 pyUSIrest.exceptions module

Created on Fri Jan 10 16:44:49 2020

@author: Paolo Cozzi <paolo.cozzi@ibba.cnr.it>

**exception** `pyUSIrest.exceptions.NotReadyError`

Bases: `RuntimeError`

Raised when doing stuff on not ready data (ex finalizing a Submission after validation)

**exception** `pyUSIrest.exceptions.TokenExpiredError`  
Bases: `RuntimeError`

Raised when token expires while using pyUSIrest

**exception** `pyUSIrest.exceptions.USIConnectionError`  
Bases: `ConnectionError`

Deal with connection issues with API

**exception** `pyUSIrest.exceptions.USIDataError`  
Bases: `Exception`

Deal with issues in USI data format

### 5.1.5 pyUSIrest.settings module

Created on Mon Nov 18 11:47:42 2019

@author: Paolo Cozzi <paolo.cozzi@ibba.cnr.it>

### 5.1.6 pyUSIrest.usi module

Created on Thu May 24 16:41:31 2018

@author: Paolo Cozzi <cozzi@ibba.cnr.it>

**class** `pyUSIrest.usi.Domain` (*auth*, *data=None*)  
Bases: `pyUSIrest.client.Document`

A class to deal with AAP domain objects

**name**  
domain name

**Type** `str`

**data**  
data (dict): data from AAP read with `response.json()`

**Type** `dict`

**domainName**  
AAP domainName

**Type** `str`

**domainDesc**  
AAP domainDesc

**Type** `str`

**domainReference**  
AAP domainReference

**Type** `str`

**link**  
links data read from AAP response

**Type** `dict`

**\_\_init\_\_** (*auth*, *data=None*)

Instantiate the class

**Parameters**

- **auth** (*Auth*) – a valid *Auth* object
- **data** (*dict*) – instantiate the class from a dictionary of user data

**create\_profile** (*attributes={}*)

Create a profile for this domain

**Parameters** **attributes** (*dict*) – a dictionary of attributes

**users**

Get users belonging to this domain

**class** `pyUSIrest.usi.Root` (*auth*)

Bases: `pyUSIrest.client.Document`

Models the USI API *Root* endpoint

**api\_root**

The base URL for API endpoints

**Type** *str*

**\_\_init\_\_** (*auth*)

Instantiate the class

**Parameters** **auth** (*Auth*) – a valid *Auth* object

**api\_root** = `None`

**get\_submission\_by\_name** (*submission\_name*)

Got a specific submission object by providing its name

**Parameters** **submission\_name** (*str*) – input submission name

**Returns** The desired submission as instance

**Return type** *Submission*

**get\_team\_by\_name** (*team\_name*)

Get a *Team* object by name

**Parameters** **team\_name** (*str*) – the name of the team

**Returns** a team object

**Return type** *Team*

**get\_user\_submissions** (*status=None*, *team=None*)

Follow the userSubmission url and returns all submission owned by the user

**Parameters**

- **status** (*str*) – filter user submissions using this status
- **team** (*str*) – filter user submissions belonging to this team

**Returns** A list of *Submission* objects

**Return type** *list*

**get\_user\_teams** ()

Follow userTeams url and returns all teams belonging to user

**Yields** *Team* – a team object

```
class pyUSIrest.usi.Sample (auth, data=None)  
    Bases: pyUSIrest.usi.TeamMixin, pyUSIrest.client.Document
```

A class to deal with USI *Samples*

**alias**

The sample alias (used to reference the same object)

**Type** *str*

**team**

team data

**Type** *dict*

**title**

sample title

**Type** *str*

**description**

sample description

**Type** *str*

**attributes**

sample attributes

**Type** *dict*

**sampleRelationships**

relationship between samples

**Type** *list*

**taxonId**

taxon id

**Type** *int*

**taxon**

taxon name

**Type** *str*

**releaseDate**

when this sample will be relased to public

**Type** *str*

**createdDate**

created date

**Type** *str*

**lastModifiedDate**

last modified date

**Type** *str*

**createdBy**

user\_id who create this sample

**Type** *str*

**lastModifiedBy**

last user\_id who modified this sample

**Type** `str`

**accession**

the biosample\_id after submission to USI

**Type** `str`

**\_\_init\_\_** (*auth*, *data=None*)

Instantiate the class

**Parameters**

- **auth** (*Auth*) – a valid *Auth* object
- **data** (*dict*) – instantiate the class from a dictionary of user data

**delete** ()

Delete this instance from a submission

**get\_validation\_result** ()

Return validation results for submission

**Returns** the *ValidationResult* of this sample

**Return type** *ValidationResult*

**has\_errors** (*ignorelist=[]*)

Return True if validation results throw an error

**Parameters** **ignorelist** (*list*) – ignore errors in these databanks

**Returns** True if sample has an errors in one or more databank

**Return type** `bool`

**patch** (*sample\_data*)

Update sample by patching data with `Client.patch()`

**Parameters** **sample\_data** (*dict*) – sample data to update

**read\_data** (*data*, *force\_keys=False*)

Read data from a dictionary object and set class attributes

**Parameters**

- **data** (*dict*) – a data dictionary object read with `response.json()`
- **force\_keys** (*bool*) – If True, define a new class attribute from data keys

**reload** ()

call `Document.follow_self_url()` and reload class attributes

**class** `pyUSIrest.usi.Submission` (*auth*, *data=None*)

Bases: `pyUSIrest.usi.TeamMixin`, `pyUSIrest.client.Document`

A class to deal with USI Submissions

**id**

submission id (*name ()* for compatibility)

**Type** `str`

**createdDate**

created date

**Type** `str`

**lastModifiedDate**  
last modified date

**Type** `str`

**lastModifiedBy**  
last user\_id who modified this submission

**Type** `str`

**submissionStatus**  
submission status

**Type** `str`

**submitter**  
submitter data

**Type** `dict`

**createdBy**  
user\_id who create this submission

**Type** `str`

**submissionDate**  
date when this submission is submitted to biosample

**Type** `str`

**\_\_init\_\_** (*auth*, *data=None*)  
Instantiate the class

**Parameters**

- **auth** (`Auth`) – a valid `Auth` object
- **data** (`dict`) – instantiate the class from a dictionary of user data

**check\_ready** ()  
Test if a submission can be submitted or not (Must have completed validation processes)

**Returns** True if ready for submission

**Return type** `bool`

**create\_sample** (*sample\_data*)  
Create a sample from a dictionary

**Parameters** **sample\_data** (`dict`) – a dictionary of data

**Returns** a `Sample` object

**Return type** `Sample`

**delete** ()  
Delete this submission instance from USI

**finalize** (*ignorelist=[]*)  
Finalize a submission to insert data into biosample

**Parameters** **ignorelist** (`list`) – ignore samples with errors in these databanks

**Returns** output of finalize submission as a `Document` object

**Return type** `Document`

**get\_samples** (*status=None, has\_errors=None, ignorelist=[]*)

Returning all samples as a list. Can filter by errors and error types:

```
# returning samples with errors in other checks than Ena
submission.get_samples(has_errors=True, ignorelist=['Ena'])

# returning samples which validation is still in progress
submission.get_samples(status='Pending')
```

Get all sample with errors in other fields than *Ena* databank

**Parameters**

- **status** (*str*) – filter samples by validation status (Pending, Complete)
- **has\_errors** (*bool*) – filter samples with errors or none
- **ignore\_list** (*list*) – a list of errors to ignore

**Yields** *Sample* – a *Sample* object

**get\_status** ()

Count validation statues for submission

**Returns** A counter object for different validation status

**Return type** `collections.Counter`

**get\_validation\_results** ()

Return validation results for submission

**Yields** *ValidationResult* – a *ValidationResult* object

**has\_errors** (*ignorelist=[]*)

Count sample errors for a submission

**Parameters** **ignorelist** (*list*) – ignore samples with errors in these databanks

**Returns** A counter object for samples with errors and with no errors

**Return type** `collections.Counter`

**name**

Get/Set Submission *id*

**read\_data** (*data, force\_keys=False*)

Read data from a dictionary object and set class attributes

**Parameters**

- **data** (*dict*) – a data dictionary object read with `response.json()`
- **force\_keys** (*bool*) – If True, define a new class attribute from data keys

**reload** ()

call `Document.follow_self_url()` and reload class attributes

**status**

Return *submissionStatus* attribute. Follow *submissionStatus* link and update attribute is such attribute is None

**Returns** submission status as a string

**Return type** `str`

**update\_status** ()

Update *submissionStatus* attribute by following *submissionStatus* link

```
class pyUSIrest.usi.Team(auth, data=None)
    Bases: pyUSIrest.client.Document

    A class to deal with USI Team objects

    name
        team name

        Type str

    data
        data (dict): data from USI read with response.json()

        Type dict

    __init__(auth, data=None)
        Instantiate the class

        Parameters

        • auth (Auth) – a valid Auth object

        • data (dict) – instantiate the class from a dictionary of user data

    create_submission()
        Create a new submission

        Returns the new submission as an instance

        Return type Submission

    get_submissions(status=None)
        Follows submission url and get submissions from this team

        Parameters status (str) – filter submission using status

        Returns A list of Submission objects

        Return type list

class pyUSIrest.usi.TeamMixin
    Bases: object

    __init__()
        Instantiate the class

    team
        Get/Set team name

class pyUSIrest.usi.User(auth, data=None)
    Bases: pyUSIrest.client.Document

    Deal with EBI AAP endpoint to get user information

    name
        Output of Auth.claims['nickname']

        Type str

    data
        data (dict): data from AAP read with response.json()

        Type dict

    userName
        AAP username
```

Type `str`

**email**

AAP email

Type `str`

**userReference**

AAP userReference

Type `str`

**\_\_init\_\_** (*auth, data=None*)

Instantiate the class

**Parameters**

- **auth** (*Auth*) – a valid *Auth* object
- **data** (*dict*) – instantiate the class from a dictionary of user data

**add\_user\_to\_team** (*user\_id, domain\_id*)

Add a user to a team

**Parameters**

- **user\_id** (*str*) – the required user\_id
- **domain\_id** (*str*) –

**Returns** the updated *Domain* object

**Return type** *Domain*

**create\_team** (*description, centreName*)

Create a new team

**Parameters**

- **description** (*str*) – team description
- **centreName** (*str*) – team center name

**Returns** the new team as a *Team* instance

**Return type** *Team*

**classmethod create\_user** (*user, password, confirmPwd, email, full\_name, organisation*)

Create another user into biosample AAP and return its ID

**Parameters**

- **user** (*str*) – the new username
- **password** (*str*) – the user password
- **confirmPwd** (*str*) – the user confirm password
- **email** (*str*) – the user email
- **full\_name** (*str*) – Full name of the user
- **organisation** (*str*) – organisation name

**Returns** the new user\_id as a string

**Return type** `str`

**get\_domain\_by\_name** (*domain\_name*)

Get a domain by name

**Parameters** **domain\_name** (*str*) – the required team

**Returns** the desired *Domain* instance

**Return type** *Domain*

**get\_domains** ()

Get domains belonging to this instance

**Returns** a list of *Domain* objects

**Return type** *list*

**get\_my\_id** ()

Get user id using own credentials, and set userReference attribute

**Returns** the user AAP reference as a string

**Return type** *str*

**get\_team\_by\_name** (*team\_name*)

Get a team by name

**Parameters** **team\_name** (*str*) – the required team

**Returns** the desired *Team* instance

**Return type** *Team*

**get\_teams** ()

Get teams belonging to this instance

**Returns** a list of *Team* objects

**Return type** *list*

**get\_user\_by\_id** (*user\_id*)

Get a *User* object by user\_id

**Parameters** **user\_id** (*str*) – the required user\_id

**Returns** a user object

**Return type** *User*

**user\_url** = None

**class** pyUSIrest.usi.**ValidationResult** (*auth, data=None*)

Bases: *pyUSIrest.client.Document*

**\_\_init\_\_** (*auth, data=None*)

Instantiate the class

**Parameters**

- **auth** (*Auth*) – a valid *Auth* object
- **data** (*dict*) – instantiate the class from a dictionary of user data

**has\_errors** (*ignorelist=[]*)

Return True if validation has errors

**Parameters** **ignorelist** (*list*) – ignore errors in these databanks

**Returns** True if sample has errors for at least one databank

Return type `bool`

`pyUSIrest.usi.check_relationship(sample_data, team)`

Check relationship and add additional fields if missing

`pyUSIrest.usi.check_releasedate(sample_data)`

Add release date to sample data if missing

### 5.1.7 Module contents

Top-level package for Python EBI submission REST API.

Contributions are welcome, and they are greatly appreciated! Every little bit helps, and credit will always be given. You can contribute in many ways:

## 6.1 Types of Contributions

### 6.1.1 Report Bugs

Report bugs at <https://github.com/cnr-ibba/pyUSIrest/issues>.

If you are reporting a bug, please include:

- Your operating system name and version.
- Any details about your local setup that might be helpful in troubleshooting.
- Detailed steps to reproduce the bug.

### 6.1.2 Fix Bugs

Look through the GitHub issues for bugs. Anything tagged with “bug” and “help wanted” is open to whoever wants to implement it.

### 6.1.3 Implement Features

Look through the GitHub issues for features. Anything tagged with “enhancement” and “help wanted” is open to whoever wants to implement it.

### 6.1.4 Write Documentation

Python USI submission REST API could always use more documentation, whether as part of the official Python USI submission REST API docs, in docstrings, or even on the web in blog posts, articles, and such.

### 6.1.5 Submit Feedback

The best way to send feedback is to file an issue at <https://github.com/cnr-ibba/pyUSIrest/issues>.

If you are proposing a feature:

- Explain in detail how it would work.
- Keep the scope as narrow as possible, to make it easier to implement.
- Remember that this is a volunteer-driven project, and that contributions are welcome :)

## 6.2 Get Started!

Ready to contribute? Here's how to set up *pyUSIrest* for local development.

1. Fork the *pyUSIrest* repo on GitHub.
2. Clone your fork locally:

```
$ git clone git@github.com:your_name_here/pyUSIrest.git
```

3. Install your local copy into a virtualenv. Assuming you have virtualenvwrapper installed, this is how you set up your fork for local development:

```
$ mkvirtualenv pyUSIrest
$ cd pyUSIrest/
$ pip install -r requirements_dev.txt
$ python setup.py develop
```

4. Create a branch for local development:

```
$ git checkout -b name-of-your-bugfix-or-feature
```

Now you can make your changes locally.

5. When you're done making changes, check that your changes pass flake8 and the tests, including testing other Python versions with tox:

```
$ flake8 pyUSIrest tests
$ python setup.py test # or pytest
$ tox
```

To get flake8 and tox, just pip install them into your virtualenv.

6. Commit your changes and push your branch to GitHub:

```
$ git add .
$ git commit -m "Your detailed description of your changes."
$ git push origin name-of-your-bugfix-or-feature
```

7. Submit a pull request through the GitHub website.

## 6.3 Pull Request Guidelines

Before you submit a pull request, check that it meets these guidelines:

1. The pull request should include tests.
2. If the pull request adds functionality, the docs should be updated. Put your new functionality into a function with a docstring, and add the feature to the list in README.rst.
3. The pull request should work for Python 3.5, 3.6, 3.7 and 3.8, and for PyPy. Check [https://travis-ci.org/cnr-ibba/pyUSIrest/pull\\_requests](https://travis-ci.org/cnr-ibba/pyUSIrest/pull_requests) and make sure that the tests pass for all supported Python versions.

## 6.4 Tips

To run a subset of tests:

```
$ pytest tests.test_pyUSIrest
```

## 6.5 Deploying

Current development version is created using:

```
$ bump2version patch # possible: major / minor / patch
```

Other development version (dev1, `dev2) are managed using:

```
$ bump2version build
```

A reminder for the maintainers on how to deploy. Make sure all your changes are committed (including an entry in HISTORY.rst). Then run:

```
$ bump2version patch # possible: major / minor / patch
$ git push
$ git push --tags
```

Travis will then deploy to PyPI if tests pass.



### 7.1 Development Lead

- Paolo Cozzi <[paolo.cozzi@ibba.cnr.it](mailto:paolo.cozzi@ibba.cnr.it)>

### 7.2 Contributors

None yet. Why not be the first?



## 8.1 TODO

- get a `Team` instance from `Submission` instance
- `Submission.has_errors` make two identical queries, one to determine the status and one to search errors, simplify it by doing only a query
- filtering sample by status or error make a lot of queries. Consider writing coroutines or reading `ValidationResult` as pages

## 8.2 0.3.1 (2020-01-27)

- fix a bug when patching a sample: deal with team in relationship
- raise `USIDataError` on 40x status code
- Change `Auth.__str__()`: now it returns `Token for Foo Bar will expire in HH:MM:SS`
- add `Auth.get_domains` which returns `self.claims['domains']`

## 8.3 0.3.0 (2020-01-14)

### 8.3.1 Features

- modelled custom exceptions
- Set a default date if `releaseDate` attribute is missing
- improved documentation by describing how to sort and filter objects
- fix bug when adding samples to a submission retrieved with `team.get_submission()`

- Update documentation. Set `taxon` in sample data (mandatory attribute)
- displaying dates when `print (Submission)` instances
- `Root.get_user_submissions()` and other methods which returned list of objects now return iterator objects
- `str(auth)` will report duration in `hh:mm:ss`
- compiling PDF using PNG images (change badges)
- raise no exceptions where no team is found (using `Root.get_user_teams`)
- Using namespaces to configure API endpoints (`pyUSIrest.settings`)
- move `Root`, `User`, `Domain`, `Team`, `Submission`, `Sample ValidationResult` classes inside `pyUSIrest.usi` module

## 8.4 0.2.2 (2019-03-28)

### 8.4.1 Features

- Deal with API errors (50x, 40x)

## 8.5 0.2.1 (2019-01-15)

### 8.5.1 Features

- test for an empty submission (no samples)
- updated *root.json*, *userSubmission.json* test data
- `submissionStatus` is no longer an attribute, when fetching submission by name is present when getting user submissions
- follow `submissionStatus` link (if necessary)
- update submission status after create a new submission
- update submission status after `get_submission_by_name`
- update submission status after reload a just finalized submission
- `Domain.users` returns `User` objects in a list
- improved `Submission.get_samples` method

## 8.6 0.2.0 (2018-10-23)

### 8.6.1 Features

- Fetch submission by name
- changed library name to `pyUSIrest`
- published to pypi

- Finalize submission with *PUT*

## 8.7 0.1.0 (2018-10-17)

### 8.7.1 Features

- submit into biosample with python methods



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