

---

# **Federation Documentation**

***Release 0.20.0***

**Jason Robinson**

**Dec 20, 2020**



---

## Contents

---

<b>1</b>	<b>Introduction</b>	<b>3</b>
1.1	Status . . . . .	4
1.2	Additional information . . . . .	4
<b>2</b>	<b>Install</b>	<b>7</b>
2.1	Dependencies . . . . .	7
2.2	Installation . . . . .	7
<b>3</b>	<b>Protocols</b>	<b>9</b>
3.1	Diaspora . . . . .	9
3.2	ActivityPub . . . . .	10
<b>4</b>	<b>Usage</b>	<b>11</b>
4.1	Entities . . . . .	11
4.2	Discovery . . . . .	13
4.3	Fetchers . . . . .	16
4.4	Inbound . . . . .	16
4.5	Outbound . . . . .	17
4.6	Django . . . . .	18
4.7	Protocols . . . . .	19
4.8	Utils . . . . .	20
4.9	Exceptions . . . . .	22
<b>5</b>	<b>Development</b>	<b>23</b>
5.1	Environment setup . . . . .	23
5.2	Running tests . . . . .	23
5.3	Building local documentation . . . . .	23
5.4	Contact for help . . . . .	24
<b>6</b>	<b>Projects using federation</b>	<b>25</b>
<b>7</b>	<b>Changelog</b>	<b>27</b>
7.1	[0.20.0] - 2020-12-20 . . . . .	27
7.2	[0.19.0] - 2019-12-15 . . . . .	28
7.3	[0.18.1] - 2019-10-06 . . . . .	29
7.4	[0.18.0] - 2019-10-06 . . . . .	29
7.5	[0.17.0] - 2018-08-11 . . . . .	31

7.6	[0.16.0] - 2018-07-23	32
7.7	[0.15.0] - 2018-02-12	33
7.8	[0.14.1] - 2017-08-06	34
7.9	[0.14.0] - 2017-08-06	34
7.10	[0.13.0] - 2017-07-22	35
7.11	[0.12.0] - 2017-05-22	36
7.12	[0.11.0] - 2017-05-08	36
7.13	[0.10.1] - 2017-03-09	37
7.14	[0.10.0] - 2017-01-28	38
7.15	[0.9.1] - 2016-12-10	38
7.16	[0.9.0] - 2016-12-10	38
7.17	[0.8.2] - 2016-10-23	38
7.18	[0.8.1] - 2016-10-18	39
7.19	[0.8.0] - 2016-10-09	39
7.20	[0.7.0] - 2016-09-15	39
7.21	[0.6.1] - 2016-09-14	40
7.22	[0.6.0] - 2016-09-13	40
7.23	[0.5.0] - 2016-09-05	41
7.24	[0.4.1] - 2016-09-04	41
7.25	[0.4.0] - 2016-07-24	41
7.26	[0.3.2] - 2016-05-09	42
7.27	[0.3.1] - 2016-04-13	43
7.28	[0.3.0] - 2016-04-13	43
7.29	[0.2.0] - 2016-04-09	43
7.30	[0.1.1] - 2016-04-03	44
<b>8</b>	<b>Indices and tables</b>	<b>45</b>
	<b>Index</b>	<b>47</b>

Python library to abstract social web federation protocols like ActivityPub and Diaspora.

Contents:



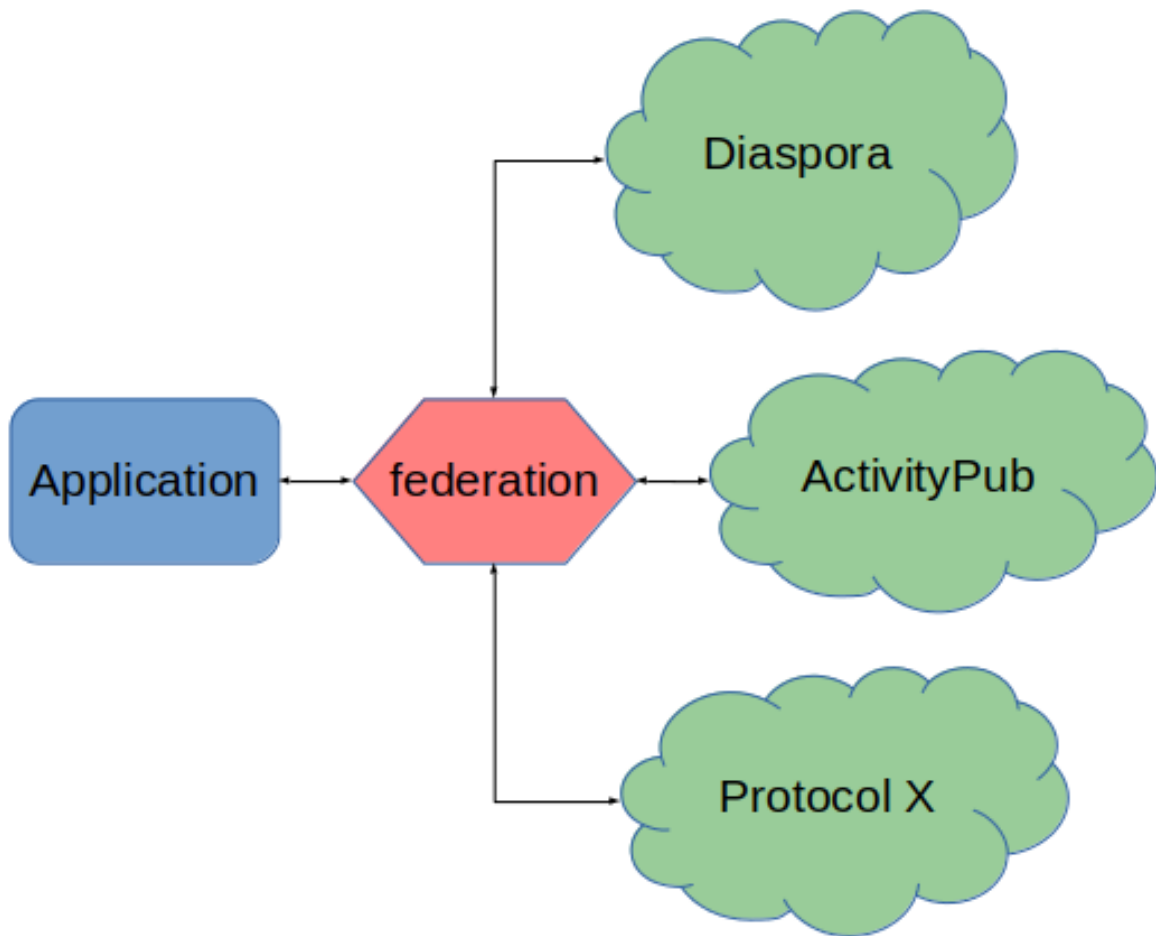
# CHAPTER 1

---

## Introduction

---

The aim of `federation` is to provide and abstract multiple social web protocols like ActivityPub and Diaspora in one package, over an easy to use and understand Python API. This way applications can be built to (almost) transparently support many protocols without the app builder having to know everything about those protocols.



## 1.1 Status

Currently two protocols are being focused on. Diaspora is considered to be stable with most of the protocol implemented. ActivityPub support should be considered as alpha - all the basic things work but there are likely to be a lot of compatibility issues with other ActivityPub implementations.

The code base is well tested and in use in several projects. Backward incompatible changes will be clearly documented in changelog entries.

## 1.2 Additional information

### 1.2.1 Installation and requirements

See [installation documentation](#).



## 1.2.2 Usage and API documentation

See [usage documentation](#).

## 1.2.3 Support and help

See [development and support documentation](#).

## 1.2.4 License

BSD 3-clause license.

## 1.2.5 Author

Jason Robinson / [jasonrobinson.me](#) / [GitLab](#) / [GitHub](#)



## 2.1 Dependencies

Depending on your operating system, certain dependencies will need to be installed.

### 2.1.1 lxml

lxml itself is installed by pip but the dependencies need to be installed [as per lxml instructions](#).

## 2.2 Installation

Install with pip or include in your requirements file.

```
pip install federation
```



Currently two protocols are being focused on. Diaspora is considered to be stable with most of the protocol implemented. ActivityPub support should be considered as alpha - all the basic things work but there are likely to be a lot of compatibility issues with other ActivityPub implementations.

For example implementations in real life projects check *[Projects using federation](#)*.

### 3.1 Diaspora

This library only supports the [current renewed version](#) of the protocol. Compatibility for the legacy version was dropped in version 0.18.0.

The feature set supported is the following:

- Webfinger, hCard and other discovery documents
- NodeInfo 1.0 documents
- Social-Relay documents
- Magic envelopes, signatures and other transport method related necessities
- Entities as follows:
  - Comment
  - Like
  - Photo
  - Profile
  - Retraction
  - StatusMessage
  - Contact
  - Reshare

## 3.2 ActivityPub

Features currently supported:

- Webfinger
- Objects and activities as follows:
  - Actor (Person outbound, Person, Organization, Service inbound)
  - Note, Article and Page (Create, Delete, Update) \* These become a `Post` or `Comment` depending on `inReplyTo`.
  - Attachment images from the above objects
  - Follow, Accept Follow, Undo Follow
  - Announce

### 3.2.1 Namespace

All payloads over ActivityPub sent can be identified with by checking `@context` which will include the `pyfed:` <https://docs.jasonrobinson.me/ns/python-federation-namespace>.

### 3.2.2 Content media type

The following keys will be set on the entity based on the `source` property existing:

- if the object has an `object.source` property: \* `_media_type` will be the source media type \* `_rendered_content` will be the object content \* `raw_content` will be the source content
- if the object has no `object.source` property: \* `_media_type` will be `text/html` \* `_rendered_content` will be the object content \* `raw_content` will object content run through a `HTML2Markdown` renderer

For outbound entities, `raw_content` is expected to be in `text/markdown`, specifically `CommonMark`. When sending payloads, `raw_content` will be rendered via the `commonmark` library into `object.content`. The original `raw_content` will be added to the `object.source` property.

### 3.2.3 Images

Any images referenced in the `raw_content` of outbound entities will be extracted into `object.attachment` objects, for receivers that don't support inline images. These attachments will have a `pyfed:inlineImage` property set to `true` to indicate the image has been extrated from the content. Receivers should ignore the inline image attachments if they support showing `<img>` HTML tags or the markdown content in `object.source`.

For inbound entities we do this automatically by not including received attachments in the entity `_children` attribute.

## 4.1 Entities

Federation has its own base entity classes. When incoming messages are processed, the protocol specific entity mappers transform the messages into our base entities. In reverse, when creating outgoing payloads, outgoing protocol specific messages are constructed from the base entities.

Entity types are as follows below.

```
class federation.entities.base.Comment (*args, **kwargs)
    Represents a comment, linked to another object.
```

```
class federation.entities.base.Follow (*args, **kwargs)
    Represents a handle following or unfollowing another handle.
```

```
class federation.entities.base.Image (*args, **kwargs)
    Reflects a single image, possibly linked to another object.
```

```
class federation.entities.base.Post (*args, **kwargs)
    Reflects a post, status message, etc, which will be composed from the message or to the message.
```

```
class federation.entities.base.Profile (*args, **kwargs)
    Represents a profile for a user.
```

```
class federation.entities.base.Reaction (*args, **kwargs)
    Represents a reaction to another object, for example a like.
```

```
class federation.entities.base.Relationship (*args, **kwargs)
    Represents a relationship between two handles.
```

```
class federation.entities.base.Retraction (*args, **kwargs)
    Represents a retraction of content by author.
```

```
class federation.entities.base.Share (*args, **kwargs)
    Represents a share of another entity.
```

`entity_type` defaults to “Post” but can be any base entity class name. It should be the class name of the entity that was shared.

The optional `raw_content` can be used for a “quoted share” case where the sharer adds their own note to the share.

### 4.1.1 Protocol entities

Each protocol additionally has its own variants of the base entities, for example Diaspora entities in `federation.entities.diaspora.entities`. All the protocol specific entities subclass the base entities so you can safely work with for example `DiasporaPost` and use `isinstance(obj, Post)`.

When creating incoming objects from messages, protocol specific entity classes are returned. This is to ensure protocol specific extra attributes or methods are passed back to the caller.

For sending messages out, either base or protocol specific entities can be passed to the outbound senders.

If you need the correct protocol specific entity class from the base entity, each protocol will define a `get_outbound_entity` function.

```
federation.entities.diaspora.mappers.get_outbound_entity(entity: federation.entities.mixins.BaseEntity,
                                                         private_key: Crypto.PublicKey.RSA.RsaKey)
```

Get the correct outbound entity for this protocol.

We might have to look at entity values to decide the correct outbound entity. If we cannot find one, we should raise as conversion cannot be guaranteed to the given protocol.

Private key of author is needed to be passed for signing the outbound entity.

#### Parameters

- **entity** – An entity instance which can be of a base or protocol entity class.
- **private\_key** – Private key of sender as an RSA object

**Returns** Protocol specific entity class instance.

**Raises** **ValueError** – If conversion cannot be done.

### 4.1.2 Federation identifiers

All entities have an `id` to guarantee them a unique name in the network. The format of the `id` depends on the protocol in question.

- ActivityPub: maps to the object `id` (whether wrapped in an Activity or not)
- Diaspora: maps to `guid` for the entity.

### Profiles

Profiles are uniquely identified by the `id` as above. Additionally for Diaspora they always have a `handle`. ActivityPub profiles can also have a `handle` but it is optional.

A handle will always be in email like format, without the `@` prefix found on some platforms. This will be added to outgoing payloads where needed.



### 4.1.3 Creator and owner identifiers

All entities except `Profile` have an `actor_id` which tells who created this object or activity. The format depends on the protocol in question.

- ActivityPub: maps to `Object attributedTo` or `Activity actor_id`.
- Diaspora: maps to entity `author`

### 4.1.4 Activity identifiers

Entities which are an activity on something, for example creating, updating, deleting, following, etc, should have an `activity_id` given to be able to send out to the ActivityPub protocol.

### 4.1.5 Mentions

Entities store mentions in the list `_mentions`. The list is a simple list of strings which will be either an URL format `profile.id` or `handle`, as per above examples.

The syntax for a mention in text is URL format `@{<profile.id>}` or `@{<profile.handle>}`. The GUID format `profile.id` cannot be used for a mention.

Examples:

```
# profile.handle
Hello @{user@domain.tld}!

# profile.id in URL format
Hello @{https://domain.tld/user}
```

It is suggested `profile.handle` syntax is used always for textual mentions unless handles are not available.

### Inbound

Mentions are added to the entity `_mentions` list when processing inbound entities. For ActivityPub they will be extracted from `Mention` tags and for Diaspora extracted from the text using the Diaspora mention format.

### Outbound

Mentions can be given in the `_mentions` list. If not given, they will be extracted from the textual content using the above formats in the example.

For ActivityPub they will be added as `Mention` tags before sending. If the mention is in handle format, a `WebFinger` fetch will be made to find the profile URL format ID.

For Diaspora they will be added to the text in the correct format, if not found. If they are found in the text in non-Diaspora format, they will be converted before sending.

## 4.2 Discovery

Federation provides many generators to allow providing discovery documents. They have been made as Pythonic as possible so that library users don't have to meddle with the various documents and their internals.

The protocols themselves are too complex to document within this library, please consult protocol documentation on what kind of discovery documents are expected to be served by the application.

## 4.2.1 Generators

### Helper methods

`federation.hostmeta.fetchers.fetch_nodeinfo_document(host)`

`federation.hostmeta.fetchers.fetch_nodeinfo2_document(host)`

`federation.hostmeta.fetchers.fetch_statisticsjson_document(host)`

`federation.hostmeta.generators.generate_host_meta(template=None, *args, **kwargs)`  
Generate a host-meta XRD document.

Template specific key-value pairs need to be passed as `kwargs`, see classes.

**Parameters** `template` – Ready template to fill with args, for example “diaspora” (optional)

**Returns** Rendered XRD document (str)

`federation.hostmeta.generators.generate_legacy_webfinger(template=None, *args, **kwargs)`

Generate a legacy webfinger XRD document.

Template specific key-value pairs need to be passed as `kwargs`, see classes.

**Parameters** `template` – Ready template to fill with args, for example “diaspora” (optional)

**Returns** Rendered XRD document (str)

`federation.hostmeta.generators.generate_hcard(template=None, **kwargs)`  
Generate a hCard document.

Template specific key-value pairs need to be passed as `kwargs`, see classes.

**Parameters** `template` – Ready template to fill with args, for example “diaspora” (optional)

**Returns** HTML document (str)

`federation.hostmeta.generators.generate_nodeinfo2_document(**kwargs)`  
Generate a NodeInfo2 document.

Pass in a dictionary as per NodeInfo2 1.0 schema: <https://github.com/jaywink/nodeinfo2/blob/master/schemas/1.0/schema.json>

#### Minimum required schema:

```
{server: baseUrl name software version
  } openRegistrations
```

Protocols default will match what this library supports, ie “diaspora” currently.

**Returns** dict

**Raises** `KeyError` on missing required items

`federation.hostmeta.generators.get_nodeinfo_well_known_document(url, document_path=None)`

Generate a NodeInfo .well-known document.

See spec: <http://nodeinfo.diaspora.software>

**Parameters**

- **url** – The full base url with protocol, ie <https://example.com>
- **document\_path** – Custom NodeInfo document path if supplied (optional)

**Returns** dict

## Generator classes

**class** `federation.hostmeta.generators.DiasporaHostMeta` (\*args, \*\*kwargs)  
Diaspora host-meta.

Required keyword args:

- **webfinger\_host** (str)

**class** `federation.hostmeta.generators.DiasporaWebFinger` (handle, host, guid, public\_key, \*args, \*\*kwargs)

Diaspora version of legacy WebFinger.

Required keyword args:

- **handle** (str) - eg `user@domain.tld`
- **host** (str) - eg `https://domain.tld`
- **guid** (str) - guid of user
- **public\_key** (str) - public key

**class** `federation.hostmeta.generators.DiasporaHCard` (\*\*kwargs)  
Diaspora hCard document.

Must receive the *required* attributes as keyword arguments to init.

**class** `federation.hostmeta.generators.NodeInfo` (software, protocols, services, open\_registrations, usage, meta\_data, skip\_validate=False, raise\_on\_validate=False)

Generate a NodeInfo document.

See spec: <http://nodeinfo.diaspora.software>

NodeInfo is unnecessarily restrictive in field values. We wont be supporting such strictness, though we will raise a warning unless validation is skipped with `skip_validate=True`.

For strictness, `raise_on_validate=True` will cause a `ValidationError` to be raised.

See schema document `federation/hostmeta/schemas/nodeinfo-1.0.json` for how to instantiate this class.

**class** `federation.hostmeta.generators.RFC7033Webfinger` (id: str, handle: str, guid: str, base\_url: str, profile\_path: str, hcard\_path: str = '/hcard/users/', atom\_path: str = None, search\_path: str = None)

RFC 7033 webfinger - see <https://tools.ietf.org/html/rfc7033>

A Django view is also available, see the child `django` module for view and url configuration.

### Parameters

- **id** – Profile ActivityPub ID in URL format
- **handle** – Profile Diaspora handle

- **guid** – Profile Diaspora guid
- **base\_url** – The base URL of the server (protocol://domain.tld)
- **profile\_path** – Profile path for the user (for example `/profile/johndoe/`)
- **hcard\_path** – (Optional) hCard path, defaults to `/hcard/users/`.
- **atom\_path** – (Optional) atom feed path

**Returns** dict

```
class federation.hostmeta.generators.SocialRelayWellKnown (subscribe,      tags=(),
                                                         scope='all',      *args,
                                                         **kwargs)
```

A *.well-known/social-relay* document in JSON.

For apps wanting to announce their preferences towards relay applications.

See WIP spec: [https://wiki.diasporafoundation.org/Relay\\_servers\\_for\\_public\\_posts](https://wiki.diasporafoundation.org/Relay_servers_for_public_posts)

Schema see *schemas/social-relay-well-known.json*

**Parameters**

- **subscribe** – bool
- **tags** – tuple, optional
- **scope** – Should be either “all” or “tags”, default is “all” if not given

## 4.3 Fetchers

High level utility functions to fetch remote objects. These should be favoured instead of protocol specific utility functions.

```
federation.fetchers.retrieve_remote_content (id: str, guid: str = None, handle: str = None,
                                              entity_type: str = None, sender_key_fetcher:
                                              Callable[[str], str] = None)
```

Retrieve remote content and return an Entity object.

*sender\_key\_fetcher* is an optional function to use to fetch sender public key. If not given, network will be used to fetch the profile and the key. Function must take federation id as only parameter and return a public key.

```
federation.fetchers.retrieve_remote_profile (id: str)      →      Op-
                                              tional[federation.entities.base.Profile]
```

High level retrieve profile method.

Retrieve the profile from a remote location, using protocols based on the given ID.

## 4.4 Inbound

High level utility functions to pass incoming messages to. These should be favoured instead of protocol specific utility functions.

```
federation.inbound.handle_receive(request: federation.types.RequestType, user: federation.types.UserType = None, sender_key_fetcher: Callable[[str], str] = None, skip_author_verification: bool = False) → Tuple[str, str, List[T]]
```

Takes a request and passes it to the correct protocol.

**Returns a tuple of:**

- sender id
- protocol name
- list of entities

NOTE! The returned sender is NOT necessarily the *author* of the entity. By sender here we're talking about the sender of the *request*. If this object is being relayed by the sender, the author could actually be a different identity.

#### Parameters

- **request** – Request object of type `RequestType` - note not a HTTP request even though the structure is similar
- **user** – User that will be passed to `protocol.receive` (only required on private encrypted content) MUST have a `private_key` and `id` if given.
- **sender\_key\_fetcher** – Function that accepts sender handle and returns public key (optional)
- **skip\_author\_verification** – Don't verify sender (test purposes, false default)

**Returns** Tuple of sender id, protocol name and list of entity objects

## 4.5 Outbound

High level utility functions to pass outbound entities to. These should be favoured instead of protocol specific utility functions.

```
federation.outbound.handle_send(entity: federation.entities.mixins.BaseEntity, author_user: federation.types.UserType, recipients: List[Dict[KT, VT]], parent_user: federation.types.UserType = None, payload_logger: callable = None) → None
```

Send an entity to remote servers.

Using this we will build a list of payloads per protocol. After that, each recipient will get the generated protocol payload delivered. Delivery to the same endpoint will only be done once so it's ok to include the same endpoint as a receiver multiple times.

Any given user arguments must have `private_key` and `fid` attributes.

#### Parameters

- **entity** – Entity object to send. Can be a base entity or a protocol specific one.
- **author\_user** – User authoring the object.
- **recipients** – A list of recipients to delivery to. Each recipient is a dict containing at minimum the “endpoint”, “fid”, “public” and “protocol” keys.

For ActivityPub and Diaspora payloads, “endpoint” should be an URL of the endpoint to deliver to.

The “fid” can be empty for Diaspora payloads. For ActivityPub it should be the recipient federation ID should the delivery be non-private.

The “protocol” should be a protocol name that is known for this recipient.

The “public” value should be a boolean to indicate whether the payload should be flagged as a public payload.

TODO: support guessing the protocol over networks? Would need caching of results

For private deliveries to Diaspora protocol recipients, “public\_key” is also required.

For example [

```
{ "endpoint": "https://domain.tld/receive/users/1234-5678-0123-4567", "fid": "",
  "protocol": "diaspora", "public": False, "public_key": <RSAPublicKey object> |
  str,
}, {
  "endpoint": "https://domain2.tld/receive/public", "fid": "", "protocol": "dias-
  pora", "public": True,
}, {
  "endpoint": "https://domain4.tld/sharedinbox/", "fid": "https://domain4.tld/
  profiles/jack/", "protocol": "activitypub", "public": True,
}, {
  "endpoint": "https://domain4.tld/profiles/jill/inbox", "fid": "https://domain4.tld/
  profiles/jill", "protocol": "activitypub", "public": False,
},
]
```

- **parent\_user** – (Optional) User object of the parent object, if there is one. This must be given for the Diaspora protocol if a parent object exists, so that a proper `parent_author_signature` can be generated. If given, the payload will be sent as this user.
- **payload\_logger** – (Optional) Function to log the payloads with.

## 4.6 Django

Some ready provided views and URL configuration exist for Django.

Note! Django is not part of the normal requirements for this library. It must be installed separately.

### 4.6.1 Configuration

To use the Django views, ensure a modern version of Django is installed and add the views to your URL config for example as follows. The URL's must be mounted on root if Diaspora protocol support is required.

```
url(r'', include("federation.hostmeta.django.urls")),
```

Some settings need to be set in Django settings. An example is below:

```
FEDERATION = {
    "base_url": "https://myserver.domain.tld",
    "get_object_function": "myproject.utils.get_object",
    "get_private_key_function": "myproject.utils.get_private_key",
    "get_profile_function": "myproject.utils.get_profile",
    "nodeinfo2_function": "myproject.utils.get_nodeinfo2_data",
    "process_payload_function": "myproject.utils.process_payload",
    "search_path": "/search?q=",
    "tags_path": "/tags/:tag:",
}
```

- `base_url` is the base URL of the server, ie `protocol://domain.tld`.
- `get_object_function` should be the full path to a function that will return the object matching the ActivityPub ID for the request object passed to this function.
- `get_private_key_function` should be the full path to a function that will accept a federation ID (url, handle or guid) and return the private key of the user (as an RSA object). Required for example to sign outbound messages in some cases.
- `get_profile_function` should be the full path to a function that should return a `Profile` entity. The function should take one or more keyword arguments: `fid`, `handle`, `guid` or `request`. It should look up a profile with one or more of the provided parameters.
- `nodeinfo2_function` (optional) function that returns data for generating a [NodeInfo2 document](#). Once configured the path `/.well-known/x-nodeinfo2` will automatically generate a NodeInfo2 document. The function should return a `dict` corresponding to the NodeInfo2 schema, with the following minimum items:

```
{server:
    baseUrl
    name
    software
    version
}
openRegistrations
```

- `process_payload_function` (optional) function that takes in a request object. It should return `True` if successful (or placed in queue for processing later) or `False` in case of any errors.
- `search_path` (optional) site search path which ends in a parameter for search input, for example `"/search?q="`
- `tags_path` (optional) path format to view items for a particular tag. `:tag:` will be replaced with the tag (without #).

## 4.7 Protocols

The code for opening and creating protocol messages lives under each protocol module in `federation.protocols`.

Each protocol defines a `protocol.Protocol` class under its own module. This is expected to contain certain methods that are used by the higher level functions that are called on incoming messages and when sending outbound messages. Everything that is needed to transform an entity into a message payload and vice versa should be here.

Instead of calling methods directly for a specific protocol, higher level generic functions should be normally used.

## 4.8 Utils

Various utils are provided for internal and external usage.

### 4.8.1 ActivityPub

### 4.8.2 Diaspora

`federation.utils.diaspora.fetch_public_key(handle)`

Fetch public key over the network.

**Parameters** `handle` – Remote handle to retrieve public key for.

**Returns** Public key in str format from parsed profile.

`federation.utils.diaspora.get_fetch_content_endpoint(domain, entity_type, guid)`

Get remote fetch content endpoint.

See: [https://diaspora.github.io/diaspora\\_federation/federation/fetching.html](https://diaspora.github.io/diaspora_federation/federation/fetching.html)

`federation.utils.diaspora.get_private_endpoint(id: str, guid: str) → str`

Get remote endpoint for delivering private payloads.

`federation.utils.diaspora.get_public_endpoint(id: str) → str`

Get remote endpoint for delivering public payloads.

`federation.utils.diaspora.parse_profile_from_hcard(hcard: str, handle: str)`

Parse all the fields we can from a hCard document to get a Profile.

**Parameters**

- **hcard** – HTML hcard document (str)
- **handle** – User handle in `username@domain.tld` format

**Returns** `federation.entities.diaspora.entities.DiasporaProfile` instance

`federation.utils.diaspora.retrieve_and_parse_content(id: str, guid: str, handle: str, entity_type: str, sender_key_fetcher: Callable[[str], str] = None)`

Retrieve remote content and return an Entity class instance.

This is basically the inverse of receiving an entity. Instead, we fetch it, then call “handle\_receive”.

**Parameters** `sender_key_fetcher` – Function to use to fetch sender public key. If not given, network will be used to fetch the profile and the key. Function must take handle as only parameter and return a public key.

**Returns** Entity object instance or None

`federation.utils.diaspora.retrieve_and_parse_diaspora_webfinger(handle)`

Retrieve a and parse a remote Diaspora webfinger document.

**Parameters** `handle` – Remote handle to retrieve

**Returns** dict

`federation.utils.diaspora.retrieve_and_parse_profile(handle)`

Retrieve the remote user and return a Profile object.

**Parameters** `handle` – User handle in `username@domain.tld` format



**Returns** `federation.entities.Profile` instance or `None`

`federation.utils.diaspora.retrieve_diaspora_hcard(handle)`  
Retrieve a remote Diaspora hCard document.

**Parameters** `handle` – Remote handle to retrieve

**Returns** `str` (HTML document)

`federation.utils.diaspora.retrieve_diaspora_host_meta(host)`  
Retrieve a remote Diaspora host-meta document.

**Parameters** `host` – Host to retrieve from

**Returns** `XRD` instance

### 4.8.3 Network

`federation.utils.network.fetch_country_by_ip(ip)`  
Fetches country code by IP

Returns empty string if the request fails in non-200 code.

Uses the `ipdata.co` service which has the following rules:

- Max 1500 requests per day

See: <https://ipdata.co/docs.html#python-library>

`federation.utils.network.fetch_document(url=None, host=None, path='/', timeout=10, raise_ssl_errors=True, extra_headers=None)`

Helper method to fetch remote document.

Must be given either the `url` or `host`. If `url` is given, only that will be tried without falling back to http from https. If `host` given, `path` will be added to it. Will fall back to http on non-success status code.

**Parameters**

- **url** – Full url to fetch, including protocol
- **host** – Domain part only without path or protocol
- **path** – Path without domain (defaults to “/”)
- **timeout** – Seconds to wait for response (defaults to 10)
- **raise\_ssl\_errors** – Pass False if you want to try HTTP even for sites with SSL errors (default True)
- **extra\_headers** – Optional extra headers dictionary to add to requests

**Returns** Tuple of document (`str` or `None`), status code (`int` or `None`) and error (an exception class instance or `None`)

**Raises** **ValueError** – If neither `url` nor `host` are given as parameters

`federation.utils.network.fetch_host_ip_and_country(host: str) → Tuple`  
Fetch ip and country by host

`federation.utils.network.send_document(url, data, timeout=10, *args, **kwargs)`  
Helper method to send a document via POST.

Additional `*args` and `**kwargs` will be passed on to `requests.post`.

**Parameters**

- **url** – Full url to send to, including protocol
- **data** – Dictionary (will be form-encoded), bytes, or file-like object to send in the body
- **timeout** – Seconds to wait for response (defaults to 10)

**Returns** Tuple of status code (int or None) and error (exception class instance or None)

#### 4.8.4 Protocols

`federation.utils.protocols.identify_recipient_protocol(id: str) → Optional[str]`

### 4.9 Exceptions

Various custom exception classes might be returned.

**exception** `federation.exceptions.EncryptedMessageError`  
Encrypted message could not be opened.

**exception** `federation.exceptions.NoSenderKeyFoundError`  
Sender private key was not available to sign a payload message.

**exception** `federation.exceptions.NoSuitableProtocolFoundError`  
No suitable protocol found to pass this payload message to.

**exception** `federation.exceptions.SignatureVerificationError`  
Authenticity of the signature could not be verified given the key.

Help is more than welcome to extend this library. Please see the following resources.

- [Source code repo](#)
- [Issue tracker](#)
- [Kanban board](#)

## 5.1 Environment setup

Once you have your (Python 3.6+) virtualenv set up, install the development requirements:

```
pip install -r dev-requirements.txt
```

## 5.2 Running tests

```
py.test
```

## 5.3 Building local documentation

```
cd docs
make html
```

Built documentation is available at `docs/_build/html/index.html`.

## 5.4 Contact for help

Easiest via Matrix on room `#socialhome:feneas.org`. There is a bridged Freenode channel as well found at `#socialhome`.

You can also ask questions or give feedback via issues.

## CHAPTER 6

---

### Projects using federation

---

For examples on how to integrate this library into your project, check these examples:

- [Socialhome](#) - a federated home page builder slash personal social network server with high emphasis on card style content visualization.
- [Social-Relay](#) - a reference server for the public content relay system that uses the Diaspora protocol.
- [The Federation info](#) - statistics and node list for the federated web.



### 7.1 [0.20.0] - 2020-12-20

#### 7.1.1 Added

- Entities with a `raw_content` field now have URL syntax mentions rendered into a link. ([related issue](#))

If Django is configured, a profile will be retrieved using the configured profile getter function and the profile name or username will be used for the link.

- Add `process_text_links` text utility to linkify URL's in text.
- Add `find_tags` text utility to find hashtags from text. Optionally the function can also replace the tags through a given `replacer` function. This utility is used to improve the tag extraction logic from entities text fields. ([related issue](#))
- Outbound functions `handle_send` and `handle_create_payload` now accept an optional `payload_logger` parameter. If given it should be a function that takes three parameters:
  - `str` or `dict` payload
  - `str` protocol name
  - `str` sender id

The function will be called for each generated payload.

- Cross-protocol improvements:
  - Extract Diaspora guid from ActivityPub payloads implementing the Diaspora extension.
  - Add Diaspora extension and guid to outbound ActivityPub payloads, if available. For profiles, also add handle.
  - Extract ActivityPub ID from Diaspora payloads if found as the `activitypub_id` property.
  - Add ActivityPub ID to outbound Diaspora payloads of types comment, post and profile, if an URL given as id.

### 7.1.2 Changed

- The NodeInfo2 hostmeta parser now cleans the port out of the host name.
- URL's in outgoing text content are now linkified for the HTML representation of the content for ActivityPub payloads.
- Don't include OStatus for Mastodon 3.0+ protocols list. ([related issue](#))
- **Backwards incompatible:** Stop markdownifying incoming ActivityPub content. Instead copy it as is to the `raw_content` attribute on the entity, setting also the `_media_type` to `text/html`.

### 7.1.3 Fixed

- Don't crash loudly when fetching webfinger for Diaspora that does not contain XML.
- Add missing `response.raise_for_status()` call to the `fetch_document` network helper when fetching with given URL. Error status was already being raised correctly when fetching by domain and path.
- Don't crash when parsing an invalid NodeInfo document where the usage dictionary is not following specification.
- Ensure Pixelfed, Kroeg and Kibou instances that emulate the Mastodon API don't get identified as Mastodon instances.
- Loosen validation of `TargetIDMixin`, it now requires one of the target attributes to be set, not just `target_id`. This fixes follows over the Diaspora protocol which broke with stricter send validation added in 0.19.0.
- Fix some edge case crashes of `handle_send` when there are Diaspora protocol receivers.
- Fix reading `sharedInbox` from remote ActivityPub profiles. This caused public payloads not to be deduplicated when sending public payloads to remote ActivityPub servers. Refetching profiles should now fix this. ([related issue](#))
- Don't always crash generating payloads if Django is installed but not configured.
- Don't try to relay AP payloads to Diaspora receivers and vice versa, for now, until cross-protocol relaying is supported.
- Fix some characters stopping tags being identified ([related issue](#))
- Fix tags separated by slashes being identified ([related issue](#))

## 7.2 [0.19.0] - 2019-12-15

### 7.2.1 Added

- The fetcher `retrieve_remote_profile` now also supports handle based fetching for the ActivityPub protocol.

### 7.2.2 Changed

- All outgoing entities are now validated before sending. This stops the sending of invalid entities to the network, for example a Share of a Post from ActivityPub to the Diaspora protocol network.



### 7.2.3 Fixed

- Allow ActivityPub HTTP Signature verification to pass if signature is at most 24 hours old.

Previously requirement was 30 seconds, which caused loss of messages where signature validation didn't happen immediately, but in a background worker which didn't immediately process the job.

### 7.2.4 Internal changes

- Improve performance of generating ActivityPub payloads for a large number of receivers in `handle_send`.
- Fail early in outbound `handle_send` if a payload cannot be generated for a payload which doesn't depend on recipient attributes.

## 7.3 [0.18.1] - 2019-10-06

### 7.3.1 Changed

- Removed possibility to deactivate ActivityPub support. It is now always enabled by default.

## 7.4 [0.18.0] - 2019-10-06

### 7.4.1 Added

- Base entities `Post`, `Comment` and `Image` now accept an `url` parameter. This will be used when serializing the entities to AS2 for ActivityPub.
- RFC7033 webfinger generator now has compatibility to platforms using it with ActivityPub. It now lists aliases pointing to the ActivityPub entity ID and profile URL. Also there is a `rel=self` to point to the `application/activity+json` AS2 document location.
- Added a Django view decorator that makes any Profile or Post view ActivityPub compatible. Right now basic AS2 serialization is supported when the view is called using the supported content types in the Accept header. If the content types are not in the header, the view will render normally.

When used, a few extra settings must be given in the Django `FEDERATION` configuration dictionary.

- `get_object_function` should contain the Python path to a function that takes a request object and returns an object matching the ActivityPub ID for the request or `None`.
- `process_payload_function` should contain the Python path to a function that takes in a request object. It should return `True` if successful (or placed in queue for processing later) or `False` in case of any errors.
- Added network utility `network.fetch_host_ip` to fetch IP by hostname.
- Entities of type `Profile` now have a dictionary of `inboxes`, with two elements, `private` and `public`. These should be URL's indicating where to send payloads for the recipient.  
  
ActivityPub profiles will parse these values from incoming profile documents. Diaspora entities will default to the inboxes in the specification.
- Added support for Diaspora `Comment` entity `thread_parent_guid` attribute.

- Added `root_target_id` and `root_target_guid` to Comment base entity. This allows referring to a parent object up the hierarchy chain for threaded comments.
- The high level fetcher `retrieve_remote_content` now supports ActivityPub ID's.
- All ActivityPub payloads are added a `pyfed:` `https://docs.jasonrobinson.me/ns/python-federation` context to identify payloads sent by this library.
- Entities with `raw_content` now also contain a `_media_type` and `rendered_content`.

The default `_media_type` is `text/markdown` except for ActivityPub originating posts it defaults to `text/html`. If the ActivityPub payload contains a `source`, that `mediaType` will be used instead.

- Host meta fetchers now support NodeInfo 2.1

## 7.4.2 Changed

- **Backwards incompatible.** Lowest compatible Python version is now 3.6.
- **Backwards incompatible.** Internal refactoring to allow adding ActivityPub support as the second supported protocol. Highlights of changes below.
  - Reversal of all the work previously done to use Diaspora URL format identifiers. Working with the Diaspora protocol now always requires using handles and GUID's as before the changes introduced in v0.15.0. It ended up impossible to construct a Diaspora URL in all cases in a way that apps only need to store one identifier.
  - The `id` and possible `target_id` are now either URL format identifiers (ActivityPub) or a handle or GUID (Diaspora, depending on entity). Additionally a new `actor_id` has been added which for ActivityPub is an URL and for Diaspora a handle. Note, Diaspora entities always have also the `guid`, `handle`, `target_guid` and `target_handle` as before v0.15.0, depending on the entity. When creating Diaspora entities, you must pass these in for sending to work.
  - The high level fetchers `retrieve_remote_content` signature has changed. It now expects an `id` for fetching from AP protocol and `handle`, `guid` and `entity_type` to fetch from Diaspora. Additionally a `sender_key_fetcher` can be passed in as before to optimize public key fetching using a callable.
  - The high level fetchers `retrieve_remote_profile` signature has changed. It now expects as first parameter an `id` which for ActivityPub objects is the URL ID and for Diaspora objects is the handle. Additionally a `sender_key_fetcher` can be passed in as before to optimize public key fetching using a callable.
  - The generator class `RFC7033Webfinger` now expects instead of an `id` the `handle` and `guid` of the profile.
  - `NodeInfo2` parser now returns the admin user in `handle` format instead of a Diaspora format URL.
  - The high level inbound and outbound functions `inbound.handle_receive`, `outbound.handle_send` parameter `user` must now receive a `UserType` compatible object. This must have the attribute `id`, and for `handle_send` also `private_key`. If Diaspora support is required then also `handle` and `guid` should exist. The type can be found as a class in `types.UserType`.
  - The high level inbound function `inbound.handle_receive` first parameter has been changed to `request` which must be a `RequestType` compatible object. This must have the attribute `body` which corresponds to the old `payload` parameter. For ActivityPub inbound requests the object must also contain `headers`, `method` and `url`.
  - The outbound function `outbound.handle_send` parameter `recipients` structure has changed. It must now be a list of dictionaries, containing at minimum the following: `endpoint` for the recipient

endpoint, fid for the recipient federation ID (ActivityPub only), protocol for the protocol to use and public as a boolean whether the payload should be treated as visible to anyone.

For Diaspora private deliveries, also a public\_key is required containing the receiver public key. Note that passing in handles as recipients is not any more possible - always pass in a url for endpoint.

- The outbound function `outbound.handle_create_payload` now requires an extra third parameter for the protocol to use. This function should rarely need to be called directly - use `handle_send` instead which can handle both ActivityPub and Diaspora protocols.
- The Image base entity has been made more generic.

The following were removed: `remote_path`, `remote_name`, `linked_type`, `linked_guid`, `public`.

The following were added: `url`, `name`.

- **Backwards incompatible.** Generator `RFC3033Webfinger` and the related `rfc3033_webfinger_view` have been renamed to `RFC7033Webfinger` and `rfc7033_webfinger_view` to reflect the right RFC number.
- Network helper utility `fetch_document` can now also take a dictionary of headers. They will be passed to the underlying `requests` method call as is.
- Retraction entity can now also have an `entity_type` of `Object`. Receivers will need to find the correct object using `target_id` only. This is currently only relevant for ActivityPub where retraction messages do not refer to object type.
- **Backwards incompatible.** Inbound entities now have a list of receivers.  
Entities processed by inbound mappers will now have a list of receivers in `_receivers`. This replaces the `_receiving_actor_id` which was previously set for Diaspora entities.
- `UserType` now has a `receiver_variant` which is one of `ReceiverVariant` enum. `ACTOR` means this receiver is a single actor ID. `FOLLOWERS` means this is the followers of the ID in the receiver.

### 7.4.3 Fixed

- Ensure Diaspora mentions are extracted when they don't have a display name part.

### 7.4.4 Removed

- **Backwards incompatible.** Support for Legacy Diaspora payloads have been removed to reduce the amount of code needed to maintain while refactoring for ActivityPub.

## 7.5 [0.17.0] - 2018-08-11

### 7.5.1 Fixed

- Switch crypto library `pycrypto` to `pycryptodome`, which is a more up to date fork of the former. This fixes CVE-2018-6594 found in the former.

**Deployment note.** When updating an application, you *must* uninstall `pycrypto` first, otherwise there will be a conflict if both the versions are installed at the same time. To uninstall, do `pip uninstall pycrypto`.

## 7.6 [0.16.0] - 2018-07-23

### 7.6.1 Added

- Enable generating encrypted JSON payloads with the Diaspora protocol which adds private message support. ([related issue](#))

JSON encrypted payload encryption and decryption is handled by the Diaspora `EncryptedPayload` class.

- Add RFC7033 webfinger generator ([related issue](#))

Also provided is a Django view and url configuration for easy addition into Django projects. Django is not a hard dependency of this library, usage of the Django view obviously requires installing Django itself. For configuration details see documentation.

- Add fetchers and parsers for NodeInfo, NodeInfo2, StatisticsJSON and Mastodon server metainfo documents.
- Add NodeInfo2 generator and Django view. See documentation for details. ([related issue](#))
- Added new network utilities to fetch IP and country information from a host.

The country information is fetched using the free `ipdata.co` service. NOTE! This service is rate limited to 1500 requests per day.

- Extract mentions from Diaspora payloads that have text content. The mentions will be available in the entity as `_mentions` which is a set of Diaspora ID's in URI format.

### 7.6.2 Changed

- Send outbound Diaspora payloads in new format. Remove possibility to generate legacy MagicEnvelope payloads. ([related issue](#))

- **Backwards incompatible.** Refactor `handle_send` function

Now `handle_send` high level outbound helper function also allows delivering private payloads using the Diaspora protocol. ([related issue](#))

The signature has changed. Parameter `recipients` should now be a list of recipients to delivery to. Each recipient should either be an `id` or a tuple of (`id`, `public key`). If public key is provided, Diaspora protocol delivery will be made as an encrypted private delivery.

- **Backwards incompatible.** Change `handle_create_payload` function signature.

Parameter `to_user` is now `to_user_key` and thus instead of an object containing the `key` attribute it should now be an RSA public key object instance. This simplifies things since we only need the key from the user, nothing else.

- Switch Diaspora protocol to send new style entities ([related issue](#))

We've already accepted these on incoming payloads for a long time and so do all the other platforms now, so now we always send out entities with the new property names. This can break federation with really old servers that don't understand these keys yet.

### 7.6.3 Fixed

- Change unquote method used when preparing Diaspora XML payloads for verification ([related issue](#))

Some platforms deliver payloads not using the `urlsafe base64` standard which caused problems when validating the unquoted signature. Ensure maximum compatibility by allowing non-standard `urlsafe` quoted payloads.

- Fix for empty values in Diaspora protocol entities sometimes ending up as `None` instead of empty string when processing incoming payloads.
- Fix validation of `Retraction` with entity type `Share`
- Allow port in Diaspora handles as per the protocol specification

Previously handles were validated like emails.

- Fix Diaspora `Profile` mapping regarding `last_name` property

Previously only `first_name` was used when creating the `Profile.name` value. Now both `first_name` and `last_name` are used.

When creating outgoing payloads, the `Profile.name` will still be placed in `first_name` to avoid trying to artificially split it.

## 7.7 [0.15.0] - 2018-02-12

### 7.7.1 Added

- Added base entity `Share` which maps to a `DiasporaReshare` for the Diaspora protocol. (related issue)

The `Share` entity supports all the properties that a Diaspora reshare does. Additionally two other properties are supported: `raw_content` and `entity_type`. The former can be used for a “quoted share” case where the sharer adds their own note to the share. The latter can be used to reference the type of object that was shared, to help the receiver, if it is not sharing a `Post` entity. The value must be a base entity class name.

- Entities have two new properties: `id` and `target_id`.

Diaspora entity ID's are in the form of the [Diaspora URI scheme](#), where it is possible to construct an ID from the entity. In the future, ActivityPub object ID's will be found in these properties.

- New high level fetcher function `federation.fetchers.retrieve_remote_content`. (related issue)

This function takes the following parameters:

- `id` - Object ID. For Diaspora, the only supported protocol at the moment, this is in the [Diaspora URI](#) format.
- `sender_key_fetcher` - Optional function that takes a profile `handle` and returns a public key in `str` format. If this is not given, the public key will be fetched from the remote profile over the network.

The given ID will be fetched from the remote endpoint, validated to be from the correct author against their public key and then an instance of the entity class will be constructed and returned.

- New Diaspora protocol helpers in `federation.utils.diaspora`:
  - `retrieve_and_parse_content`. See notes regarding the high level fetcher above.
  - `fetch_public_key`. Given a `handle` as a parameter, will fetch the remote profile and return the `public_key` from it.
  - `parse_diaspora_uri`. Parses a Diaspora URI scheme string, returns either `None` if parsing fails or a tuple of `handle`, `entity_type` and `guid`.
- Support fetching new style Diaspora protocol Webfinger (RFC 3033) (related issue)

The legacy Webfinger is still used as fallback if the new Webfinger is not found.

## 7.7.2 Changed

- Refactoring for Diaspora `MagicEnvelope` class.

The class init now also allows passing in parameters to construct and verify `MagicEnvelope` instances. The order of init parameters has not been changed, but they are now all optional. When creating a class instance, one should always pass in the necessary parameters depending on whether the class instance will be used for building a payload or verifying an incoming payload. See class docstring for details.

- Diaspora protocol receive flow now uses the `MagicEnvelope` class to verify payloads. No functional changes regarding verification otherwise.
- Diaspora protocol receive flow now fetches the sender public key over the network if a `sender_key_fetcher` function is not passed in. Previously an error would be raised.

Note that fetching over the network for each payload is wasteful. Implementers should instead cache public keys when possible and pass in a function to retrieve them, as before.

## 7.7.3 Fixed

- Converting base entity `Profile` to `DiasporaProfile` for outbound sending missed two attributes, `image_urls` and `tag_list`. Those are now included so that the values transfer into the built payload.
- Fix fallback to HTTP in the `fetch_document` network helper in the case of `ConnectionError` when trying HTTPS. Thanks @autogestion.
- Ensure `handle` is always lower cased when fetching remote profile using `retrieve_remote_profile`. Warning will be logged if an upper case `handle` is passed in.

## 7.8 [0.14.1] - 2017-08-06

### 7.8.1 Fixed

- Fix regression in handling Diaspora relayables due to security fix in 0.14.0. Payload and entity `handle` need to be allowed to be different when handling relayables.

## 7.9 [0.14.0] - 2017-08-06

### 7.9.1 Security

- Add proper checks to make sure Diaspora protocol payload `handle` and entity `handle` are the same. Even though we already verified the signature of the sender, we didn't ensure that the sender isn't trying to fake an entity authored by someone else.

The Diaspora protocol functions `message_to_objects` and `element_to_objects` now require a new parameter, the payload sender `handle`. These functions should normally not be needed to be used directly.

### 7.9.2 Changed

- **Breaking change.** The high level federation.outbound functions `handle_send` and `handle_create_payload` signatures have been changed. This has been done to better represent the objects that are actually sent in and to add an optional `parent_user` object.

For both functions the `from_user` parameter has been renamed to `author_user`. Optionally a `parent_user` object can also be passed in. Both the user objects must have `private_key` and `handle` attributes. In the case that `parent_user` is given, that user will be used to sign the payload and for Diaspora relayables an extra `parent_author_signature` in the payload itself.

## 7.10 [0.13.0] - 2017-07-22

### 7.10.1 Backwards incompatible changes

- When processing Diaspora payloads, entity used to get a `_source_object` stored to it. This was an `etree.Element` created from the source object. Due to serialization issues in applications (for example pushing the object to a task queue or saving to database), `_source_object` is now a byte string representation for the element done with `etree.tostring()`.

### 7.10.2 Added

- New style Diaspora private encrypted JSON payloads are now supported in the receiving side. Outbound private Diaspora payloads are still sent as legacy encrypted payloads. (issue)
  - No additional changes need to be made when calling `handle_receive` from your task processing. Just pass in the full received XML or JSON payload as a string with recipient user object as before.
- Add `created_at` to Diaspora Comment entity XML creator. This is required in renewed Diaspora protocol. (related issue)

### 7.10.3 Fixed

- Fix getting sender from a combination of legacy Diaspora encrypted payload and new entity names (for example `author`). This combination probably only existed in this library.
- Correctly extend entity `_children`. Certain Diaspora payloads caused `_children` for an entity to be written over by an empty list, causing for example status message photos to not be saved. Correctly do an extend on it. (issue)
- Fix parsing Diaspora profile `tag_string` into `Profile.tag_list` if the `tag_string` is an empty string. This caused the whole `Profile` object creation to fail. (issue)
- Fix processing Diaspora payload if it is passed to `handle_receive` as a bytes object. (issue)
- Fix broken Diaspora relayables after latest 0.2.0 protocol changes. Previously relayables worked only because they were reverse engineered from the legacy protocol. Now that XML order is not important and tag names can be different depending on which protocol version, the relayable forwarding broke. To fix, we don't regenerate the entity when forwarding it but store the original received object when generating a `parent_author_signature` (which is optional in some cases, but we generate it anyway for now). This happens in the previously existing `entity.sign_with_parent()` method. In the sending part, if the original received object (now with a parent author signature) exists in the entity, we send that to the remote instead of serializing the entity to XML.
  - To forward a relayable you must call `entity.sign_with_parent()` before calling `handle_send` to send the entity.

#### 7.10.4 Removed

- `Post.photos` entity attribute was never used by any code and has been removed. Child entities of type `Image` are stored in the `Post._children` as before.
- Removed deprecated user private key lookup using `user.key` in Diaspora receive processing. Passed in `user` objects must now have a `private_key` attribute.

### 7.11 [0.12.0] - 2017-05-22

#### 7.11.1 Backwards incompatible changes

- Removed exception class `NoHeaderInMessageError`. New style Diaspora protocol does not have a custom header in the Salmon magic envelope and thus there is no need to raise this anywhere.

#### 7.11.2 Added

- New style Diaspora public payloads are now supported (see [here](#)). Old style payloads are still supported. Payloads are also still sent out old style.
- Add new `Follow` base entity and support for the new Diaspora “contact” payload. The simple `Follow` maps to Diaspora contact entity with following/sharing both true or false. Sharing as a separate concept is not currently supported.
- Added `_receiving_guid` to all entities. This is filled with `user.guid` if `user` is passed to `federation.inbound.handle_receive` and it has a `guid`. Normally in for example Diaspora, this will always be done in private payloads.

#### 7.11.3 Fixed

- Legacy Diaspora retraction of sharing/following is now supported correctly. The end result is a `DiasporaRetraction` for entity type `Profile`. Since the payload doesn’t contain the receiving user for a sharing/following retraction in legacy Diaspora protocol, we store the `guid` of the user in the entity as `_receiving_guid`, assuming it was passed in for processing.

### 7.12 [0.11.0] - 2017-05-08

#### 7.12.1 Backwards incompatible changes

Diaspora protocol support added for `comment` and `like` relayable types. On inbound payloads the signature included in the payload will be verified against the sender public key. A failed verification will raise `SignatureVerificationError`. For outbound entities, the author private key will be used to add a signature to the payload.

This introduces some backwards incompatible changes to the way entities are processed. Diaspora entity mappers `get_outbound_entity` and entity utilities `get_full_xml_representation` now requires the `author_private_key` as a parameter. This is required to sign outgoing `Comment` and `Reaction` (like) entities.

Additionally, Diaspora entity mappers `message_to_objects` and `element_to_objects` now take an optional `sender_key_fetcher` parameter. This must be a function that when called with the sender handle will



return the sender public key. This allows using locally cached public keys instead of fetching them as needed. NOTE! If the function is not given, each processed payload will fetch the public key over the network.

A failed payload signature verification now raises a `SignatureVerificationError` instead of a less specific `AssertionError`.

## 7.12.2 Added

- Three new attributes added to entities.
  - Add protocol name to all entities to attribute `_source_protocol`. This might be useful for applications to know which protocol payload the entity was created from once multiple protocols are implemented.
  - Add source payload object to the entity at `_source_object` when processing it.
  - Add sender public key to the entity at `_sender_key`, but only if it was used for validating signatures.
- Add support for the new Diaspora payload properties coming in the next protocol version. Old XML payloads are and will be still supported.
- `DiasporaComment` and `DiasporaLike` will get the order of elements in the XML payload as a list in `xml_tags`. For implementers who want to recreate payloads for these relayables, this list should be saved for later use.
- High level `federation.outbound.handle_send` helper function now allows sending entities to a list of recipients without having to deal with payload creation or caring about the protocol (in preparation of being a multi-protocol library).
  - The function takes three parameters, `entity` that will be sent, `from_user` that is sending (note, not necessarily authoring, this user will be used to sign the payload for Diaspora for example) and a list of recipients as tuples of recipient handle/domain and optionally protocol. In the future, if protocol is not given, it will be guessed from the recipient handle, and if necessary a network lookup will be made to see what protocols the receiving identity supports.
  - Payloads will be delivered to each receiver only once. Currently only public messages are supported through this helper, so multiple recipients on a single domain will cause only one delivery.

## 7.12.3 Changed

- Refactor processing of Diaspora payload XML into entities. Diaspora protocol is dropping the `<XML><post></post></XML>` wrapper for the payloads. Payloads with the wrapper will still be parsed as before.

## 7.13 [0.10.1] - 2017-03-09

### 7.13.1 Fixes

- Ensure tags are lower cased after collecting them from entity `raw_content`.

## 7.14 [0.10.0] - 2017-01-28

### 7.14.1 Added

- Add support for new Diaspora protocol ISO 8601 timestamp format introduced in protocol version 0.1.6.
- Tests are now executed also against Python 3.6.

### 7.14.2 Fixes

- Don't crash `federation.utils.diaspora.retrieve_diaspora_webfinger` if XRD parse raises an `xml.parsers.expat.ExpatError`.

## 7.15 [0.9.1] - 2016-12-10

### 7.15.1 Fixes

- Made `Profile.raw_content` optional. This fixes validating profiles parsed from Diaspora hCard's.

## 7.16 [0.9.0] - 2016-12-10

### 7.16.1 Backwards incompatible changes

- `Image` no longer has a `text` attribute. It is replaced by `raw_content`, the same attribute as `Post` and `Comment` have. Unlike the latter two, `Image.raw_content` is not mandatory.

### 7.16.2 Added

- Entities can now have a children. These can be accessed using the `_children` list. Acceptable children depends on the entity. Currently, `Post`, `Comment` and `Profile` can have children of entity type `Image`. Child types are validated in the `.validate()` entity method call.

### 7.16.3 Fixed

- Diaspora protocol `message_to_objects` method (called through inbound high level methods) now correctly parses Diaspora `<photo>` elements and creates `Image` entities from them. If they are children of status messages, they will be available through the `Post._children` list.

## 7.17 [0.8.2] - 2016-10-23

### 7.17.1 Fixed

- Remove legacy splitting of payload to 60 chars when creating Diaspora payloads. Diaspora 0.6 doesn't understand these any more.

## 7.18 [0.8.1] - 2016-10-18

### 7.18.1 Fixed

- `federation.utils.network.send_document` incorrectly passed in `kwargs` to `requests.post`, causing an error when sending custom headers.
- Make sure `federation.utils.network.send_document` headers are treated case insensitive before passing then onwards to `requests.post`.

## 7.19 [0.8.0] - 2016-10-09

### 7.19.1 Library is now called `federation`

The name Social-Federation was really only an early project name which stuck. Since the beginning, the main module has been `federation`. It makes sense to unify these and also shorter names are generally nicer.

#### What do you need to do?

Mostly nothing since the module was already called `federation`. Some things to note below:

- Update your requirements with the new library name `federation`.
- If you hook to the old logger `social-federation`, update those to listen to `federation`, which is now the standard logger name used throughout.

### 7.19.2 Other backwards incompatible changes

- `federation.utils.diaspora.retrieve_and_parse_profile` will now return `None` if the `Profile` retrieved doesn't validate. This will affect also the output of `federation.fetchers.retrieve_remote_profile` which is the high level function to retrieve profiles.
- Remove unnecessary `protocol` parameter from `federation.fetchers.retrieve_remote_profile`. We're miles away from including other protocols and ideally the caller shouldn't have to pass in the protocol anyway.

### 7.19.3 Added

- Added `Retraction` entity with `DiasporaRetraction` counterpart.

## 7.20 [0.7.0] - 2016-09-15

### 7.20.1 Backwards incompatible changes

- Made `guid` mandatory for `Profile` entity. Library users should always be able to get a full validated object as we consider `guid` a core attribute of a profile.

- Always validate entities created through `federation.entities.diaspora.mappers.message_to_objects`. This is the code that transforms federation messages for the Diaspora protocol to actual entity objects. Previously no validation was done and callers of `federation.inbound.handle_receive` received entities that were not always valid, for example they were missing a `guid`. Now validation is done in the conversion stage and errors are pushed to the `federation` logger in the event of invalid messages.
  - Note Diaspora Profile XML messages do not provide a GUID. This is handled internally by fetching the `guid` from the remote hCard so that a valid `Profile` entity can be created.

## 7.20.2 Added

- Raise a warning if unknown parameters are passed to entities.
- Ensure entity required attributes are validated for `None` or empty string values. Required attributes must not only exist but also have a value.
- Add validation to entities with the attribute `public`. Only `bool` values are accepted.

## 7.20.3 Changed

- Function `federation.utils.diaspora.parse_profile_from_hcard` now requires a second argument, `handle`. Since in the future Diaspora hCard is not guaranteed to have username and domain, we now pass `handle` to the parser directly.

## 7.21 [0.6.1] - 2016-09-14

### 7.21.1 Fixed

- New style Diaspora Magic Envelope didn't require or like payload data to be cut to 60 char lines, as the legacy protocol does. Fixed to not cut lines.

## 7.22 [0.6.0] - 2016-09-13

### 7.22.1 Added

- New style Diaspora Magic Envelope support. The magic envelope can be created using the class `federation.protocols.diaspora.magic_envelope.MagicEnvelope`. By default this will not wrap the payload message in `<XML><post></post></XML>`. To provide that functionality the class should be initialized with `wrap_payload=True`. No changes are made to the protocol send methods yet, if you need this new magic envelope you can initialize and render it directly.

### 7.22.2 Changed

- Deprecate receiving user `key` attribute for Diaspora protocol. Instead correct attribute is now `private_key` for any user passed to `federation.inbound.handle_receive`. We already use `private_key` in the message creation code so this is just to unify the user related required attributes.

- DEPRECATION: There is a fallback with `key` for user objects in the receiving payload part of the Diaspora protocol until 0.8.0.

### 7.22.3 Fixes

- Loosen up hCard selectors when parsing profile from hCard document in `federation.utils.diaspora.parse_profile_from_hcard`. The selectors now match Diaspora upcoming federation documentation.

## 7.23 [0.5.0] - 2016-09-05

### 7.23.1 Breaking changes

- `federation.outbound.handle_create_payload` parameter `to_user` is now optional. Public posts don't need a recipient. This also affects Diaspora protocol `build_send` method where the change is reflected similarly. [#43](#)
  - In practise this means the signature has changed for `handle_create_payload` and `build_send` from **`from_user, to_user, entity`** to **`entity, from_user, to_user=None`**.

### 7.23.2 Added

- `Post.provider_display_name` is now supported in the entity outbound/inbound mappers. [#44](#)
- Add utility method `federation.utils.network.send_document` which is just a wrapper around `requests.post`. User agent will be added to the headers and exceptions will be silently captured and returned instead. [#45](#)
- Add `Diaspora` entity utility `federation.entities.diaspora.utils.get_full_xml_representation`. Renders the entity XML document and wraps it in `<XML><post>...</post></XML>`. [#46](#)

## 7.24 [0.4.1] - 2016-09-04

### 7.24.1 Fixes

- Don't quote/encode `Protocol.build_send` payload. It was doing it wrongly in the first place and also it's not necessary since Diaspora 0.6 protocol changes. [#41](#)
- Fix identification of Diaspora protocol messages. This was not working in the case that the attributes in the tag were in different order. [#41](#)

## 7.25 [0.4.0] - 2016-07-24

### 7.25.1 Breaking changes

- While in early stages, doing some renaming of modules to suit the longer term. `federation.controllers` has been split into two, `federation.outbound` and `federation.inbound`. The following methods have new import locations:

- `federation.controllers.handle_receive` -> `federation.inbound.handle_receive`
- `federation.controllers.handle_create_payload` -> `federation.outbound.handle_create_payload`

- Class `federation.hostmeta.generators.DiasporaHCard` now requires `guid`, `public_key` and `username` for initialization. Leaving these out was a mistake in the initial implementation. Diaspora has these in at least 0.6 development branch.

## 7.25.2 Added

- Relationship base entity which represents relationships between two handles. Types can be following, sharing, ignoring and blocking. The Diaspora counterpart, `DiasporaRequest`, which represents a sharing/following request is outwards a single entity, but incoming a double entity, handled by creating both a sharing and following version of the relationship.
- Profile base entity and Diaspora counterpart `DiasporaProfile`. Represents a user profile.
- `federation.utils.network.fetch_document` utility function to fetch a remote document. Returns document, status code and possible exception. Takes either `url` or a `host + path` combination. With `host`, `https` is first tried and optionally fall back to `http`.
- Utility methods to retrieve Diaspora user discovery related documents. These include the host-meta, webfinger and hCard documents. The utility methods are in `federation.utils.diaspora`.
- Utility to fetch remote profile, `federation.fetchers.retrieve_remote_profile`. Currently always uses Diaspora protocol. Returns a `Profile` entity.

## 7.25.3 Changed

- Unlock most of the direct dependencies to a certain version range. Unlock all of test requirements to any version.
- Entities passed to `federation.controllers.handle_create_payload` are now converted from the base entity types (`Post`, `Comment`, `Reaction`, etc) to Diaspora entity types (`DiasporaPost`, `DiasporaComment`, `DiasporaLike`, etc). This ensures actual payload generation has the correct methods available (for example `to_xml`) whatever entity is passed in.

## 7.25.4 Fixes

- Fix fetching sender handle from Diaspora protocol private messages. As it is not contained in the header, it needs to be read from the message content itself.
- Fix various issues with `DiasporaHCard` template after comparing to some real world hCard templates from real pods. Old version was based on documentation in Diaspora project wiki.

## 7.26 [0.3.2] - 2016-05-09

### 7.26.1 Changed

- Test factories and other test files are now included in the package installation. Factories can be useful when creating project tests.
- Bump allowed `lxml` to 3.6.0

- Bump allowed `python-dateutil` to 2.5.3

## 7.26.2 Fixes

- Don't raise on `Post.tags` if `Post.raw_content` is `None`

## 7.27 [0.3.1] - 2016-04-13

### 7.27.1 Added

- Support for generating `.well-known/nodeinfo` document, which was forgotten from the 0.3.0 release. Method `federation.hostmeta.generators.get_nodeinfo_well_known_document` does this task. It requires an `url` which should be the full base url of the host. Optionally `document_path` can be specified, but it is optional and defaults to the one in the `NodeInfo` spec.

## 7.28 [0.3.0] - 2016-04-13

### 7.28.1 Added

- Support for generating `NodeInfo` documents using the generator `federation.hostmeta.generators.NodeInfo`. Strict validation is skipped by default, but can be enabled by passing in `raise_on_validate` to the `NodeInfo` class. By default a warning will be generated on documents that don't conform with the strict `NodeInfo` values. This can be disabled by passing in `skip_validate` to the class.

## 7.29 [0.2.0] - 2016-04-09

### 7.29.1 Backwards incompatible changes

- Any implementations using the `Diaspora` protocol and `Post` entities must now use `DiasporaPost` instead. See "Changed" below.

### 7.29.2 Added

- Support for using `validate_field()` methods for entity fields and checking missing fields against `_required`. To use this validation, `validate()` must specifically be called for the entity instance.
- Base entities `Comment` and `Reaction` which subclass the new `ParticipationMixin`.
- `Diaspora` entity `DiasporaComment`, a variant of `Comment`.
- `Diaspora` entity `DiasporaLike`, a variant of `Reaction` with the `reaction = "like"` default.

### 7.29.3 Changed

- Refactored `Diaspora XML` generators into the `Diaspora` entities themselves. This introduces `Diaspora` versions of the base entities called `DiasporaPost`, `DiasporaComment` and `DiasporaLike`. **Any implementations using the `Diaspora` protocol and `Post` entities must now use `DiasporaPost` instead.**

### 7.29.4 Fixes

- Entities which don't specifically get passed a `created_at` now get correct current time in `created_at` instead of always having the time part as `00:00`.

## 7.30 [0.1.1] - 2016-04-03

### 7.30.1 Initial package release

Supports well Post type object receiving over Diaspora protocol.

Untested support for crafting outgoing protocol messages.



## CHAPTER 8

---

### Indices and tables

---

- `genindex`
- `modindex`
- `search`



## C

Comment (class in *federation.entities.base*), 11

## D

DiasporaHCard (class in *federation.hostmeta.generators*), 15

DiasporaHostMeta (class in *federation.hostmeta.generators*), 15

DiasporaWebFinger (class in *federation.hostmeta.generators*), 15

## E

EncryptedMessageError, 22

## F

fetch\_country\_by\_ip() (in module *federation.utils.network*), 21

fetch\_document() (in module *federation.utils.network*), 21

fetch\_host\_ip\_and\_country() (in module *federation.utils.network*), 21

fetch\_nodeinfo2\_document() (in module *federation.hostmeta.fetchers*), 14

fetch\_nodeinfo\_document() (in module *federation.hostmeta.fetchers*), 14

fetch\_public\_key() (in module *federation.utils.diaspora*), 20

fetch\_statisticsjson\_document() (in module *federation.hostmeta.fetchers*), 14

Follow (class in *federation.entities.base*), 11

## G

generate\_hcard() (in module *federation.hostmeta.generators*), 14

generate\_host\_meta() (in module *federation.hostmeta.generators*), 14

generate\_legacy\_webfinger() (in module *federation.hostmeta.generators*), 14

generate\_nodeinfo2\_document() (in module *federation.hostmeta.generators*), 14

get\_fetch\_content\_endpoint() (in module *federation.utils.diaspora*), 20

get\_nodeinfo\_well\_known\_document() (in module *federation.hostmeta.generators*), 14

get\_outbound\_entity() (in module *federation.entities.diaspora.mappers*), 12

get\_private\_endpoint() (in module *federation.utils.diaspora*), 20

get\_public\_endpoint() (in module *federation.utils.diaspora*), 20

## H

handle\_receive() (in module *federation.inbound*), 16

handle\_send() (in module *federation.outbound*), 17

## I

identify\_recipient\_protocol() (in module *federation.utils.protocols*), 22

Image (class in *federation.entities.base*), 11

## N

NodeInfo (class in *federation.hostmeta.generators*), 15

NoSenderKeyFoundError, 22

NoSuitableProtocolFoundError, 22

## P

parse\_profile\_from\_hcard() (in module *federation.utils.diaspora*), 20

Post (class in *federation.entities.base*), 11

Profile (class in *federation.entities.base*), 11

## R

Reaction (class in *federation.entities.base*), 11

Relationship (class in *federation.entities.base*), 11

Retraction (class in *federation.entities.base*), 11

`retrieve_and_parse_content()` (in module *federation.utils.diaspora*), [20](#)  
`retrieve_and_parse_diaspora_webfinger()`  
(in module *federation.utils.diaspora*), [20](#)  
`retrieve_and_parse_profile()` (in module *federation.utils.diaspora*), [20](#)  
`retrieve_diaspora_hcard()` (in module *federation.utils.diaspora*), [21](#)  
`retrieve_diaspora_host_meta()` (in module *federation.utils.diaspora*), [21](#)  
`retrieve_remote_content()` (in module *federation.fetchers*), [16](#)  
`retrieve_remote_profile()` (in module *federation.fetchers*), [16](#)  
`RFC7033Webfinger` (class in *federation.hostmeta.generators*), [15](#)

## S

`send_document()` (in module *federation.utils.network*), [21](#)  
`Share` (class in *federation.entities.base*), [11](#)  
`SignatureVerificationError`, [22](#)  
`SocialRelayWellKnown` (class in *federation.hostmeta.generators*), [16](#)