Ngenea Hub

Ngenea Hub harnesses to power of Ngenea to provide global workflows, enabling your data to to be where you need it, when you need it.

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Installation

A deployment of Ngenea Hub comprises two main components:

- **Ngenea Hub** - the central management point, from which all tasks are managed
- **Ngenea Worker** - worker agents, installed on individual Ngenea servers, that execute the Ngenea tasks

Ngenea Worker are installed on one or more nodes in a Site, which typically represents a single Ngenea cluster or location.

Ngenea Hub needs to be accessible from all Ngenea Workers on the following ports:

- `6379/tcp`
- `5672/tcp`

Installing Ngenea Hub

Ngenea Hub can be installed in a number of ways, use one of the methods described below.

CentOS / Redhat - Online Installation

Configure Docker Authentication

> **Note:** This step is not required on PixStor systems

Configure Docker authentication for `eurepo.arcapix.com`.

```
docker login eurepo.arcapix.com
```

Installing Ngenea Hub

Transfer the `ngenea-hub` rpm to the target system.

Install the `ngenea-hub` package via yum.

```
yum install ngenea-hub-<version>.rpm
```

Create an initial Ngenea Hub configuration file at `/etc/sysconfig/ngeneahub`. This file contains the credentials which will be required for deploying workers.

```
ngeneahubctl createconfig
```

Enable and start the Ngenea Hub service.

```
systemctl enable --now ngeneahub
```

Check the status of the service with:

```
ngeneahubctl status
```

CentOS / Redhat - Offline installation

The `ngeneahub` service will attempt to pull the required docker images from the Ngenea software repository servers. In situations where this is not possible (due to network restrictions, for instance), the containers can be installed via additional RPM: `ngenea-hub-images`, available at the same location as the main RPM.

Once the RPMs are transferred to the target system, they can be installed using rpm.

```
rpm -ivh ngenea-hub-<version>.rpm ngenea-hub-images-<version>.rpm
```

Cloud Deployment

Coming soon: image-based deployment of Ngenea Hub in the cloud.

Container Native Deployment

It is possible to deploy Ngenea Hub using standard container management tools and processes.

Please contact us to discuss.

Ngenea Worker

Pre-requisite: Ngenea Server software installed and configured

Install the `ngenea-worker` package via rpm.

```
yum install ngenea-worker
```

Add the appropriate worker configuration.

Enable and start the `ngenea-worker@SITENAME` systemd unit. Replace `SITENAME` with the reference which will be used for this site.

```
systemctl enable --now ngenea-worker@SITENAME
```

Configuration

Hub Initial Configuration

Once all services are up, create an admin user with:

```
ngeneahubctl adduser
```

Register an initial site (replacing `SITENAME`) (see Worker Installation for enabling a si te's worker agents).

```
ngeneahubctl  addsite SITENAME
```

Log into the UI at http://server.address:8000.

Hub Configuration

Settings

The main configuration file for Ngenea Hub is at `/etc/sysconfig/ngeneahub`. This is an environment file which holds the information required for connecting to the various backend services.

Mandatory Settings

Setting	Description
DJANGO_SECRET	Secret string used secure signed data within django
POSTGRES_DB	Internal database name
POSTGRES_USER	Internal database username
POSTGRES_PASSWORD	Internal database password
BROKER_USER	Queue username
BROKER_PASSWORD	Queue password

Optional settings

Setting	Description
RABBITMQ_USER	User to use when connecting to the rabbitmq broker. Overrides `BROKER_USER`.
RABBITMQ_PASSWORD	Password to use when connecting to the rabbitmq broker. Overrides `BROKER_PASSWORD`.
RABBITMQ_HOST	Address of the RabbitMQ broker service. Defaults to the container service address.
REDIS_PASSWORD	User to connect to the rabbitmq broker. Overrides `BROKER_PASSWORD`.
REDIS_HOST	Address of the Redis queue results store. Defaults to the container service address.
RABBITMQ_DEFAULT_USER	Username to use when initializing the RabbitMQ broker. Not used after the service has been initialised.
RABBITMQ_DEFAULT_PASS	Password to use when initializing the RabbitMQ broker. Not used after the service has been initialised. Overrides `BROKER_PASSWORD`.
WORKERS	The number of gunicorn workers to spawn for serving API requests. Default to 8.
CONSUMER_TIMEOUT	The timeout for rabbitmq consumer delivery acknowledgement in seconds. Default: 10800000 (3 hours)
SEARCH_BACKEND	Backend to use when performing searches. Currently supported backends: `analytics`. Default: `analytics`
SEARCH_RESULTS_TTL	How long search results should be stored, in days. Default: 7
SEARCH_MAX_RESULTS	Maximum number of search results to fetch from the search backend, per site. Fetching more results will

Setting	Description
	make queries slower and will require more storage space. Fetching fewer results may lead to some files being missing. Note, some backends have a hard limit of 10,000 results. Default: 100

Docker Compose configuration

The `docker-compose` file is stored in `/usr/share/ngeneahub/docker/docker-compose.yml`.

This can be extended by creating an override file at `/usr/share/ngeneahub/docker/docker-compose.override.yml`.

Worker Configuration

The Ngenea Worker configuration should be added to `/etc/ngenea/ngenea-worker.conf`. The configuration is in ini format. For example:

```
[settings]
broker_url = amqp://user:password@localhost
result_backend = redis://:password@localhost:6379
```

The following is a list of available settings:

Option	Type	Default	Required	Description
threads	int	10	No	The number of concurrent tasks that can be run.
result_backend	string		Yes	The URI for the Ngenea Hub results backend
broker_url	string		Yes	The URI for the Ngenea Hub broker

Note: The initial access credentials can be found in the `/etc/sysconfig/ngeneahub` configuration file on the Ngenea Hub server. By default, the `BROKER_PASSWORD` is used for both the `broker_url` and the `result_backend` passwords, and the `BROKER_USER` is used for the `broker_url` username.

Usage

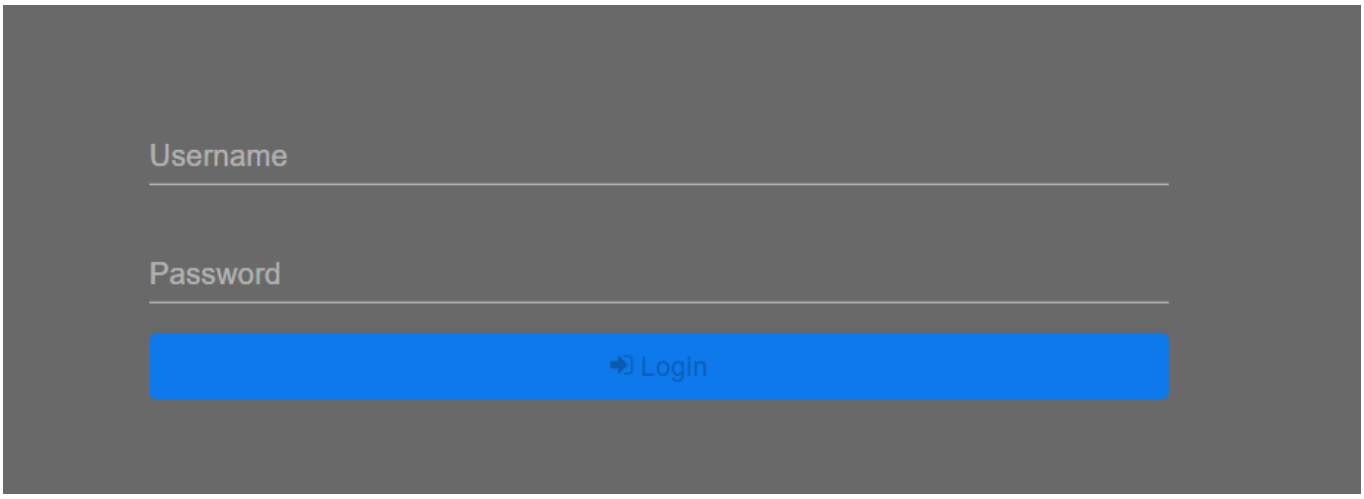
Web Interface

To access Ngenea Hub, go to http://example.com:8000/.

Authentication

Login

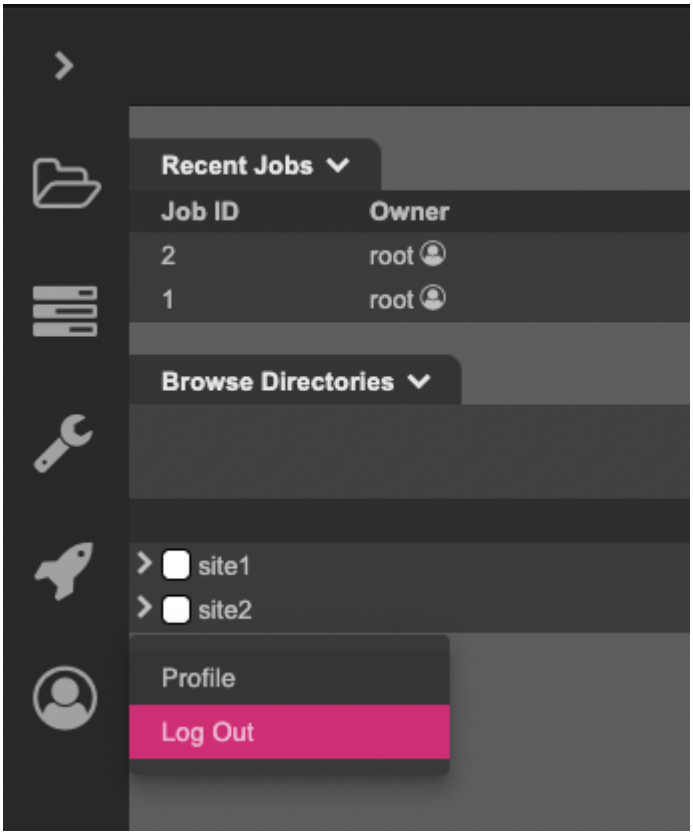
Upon navigating to the Ngenea Hub UI a login screen is presented.



Enter a valid username and password before pressing the `Login` button to authenticate.

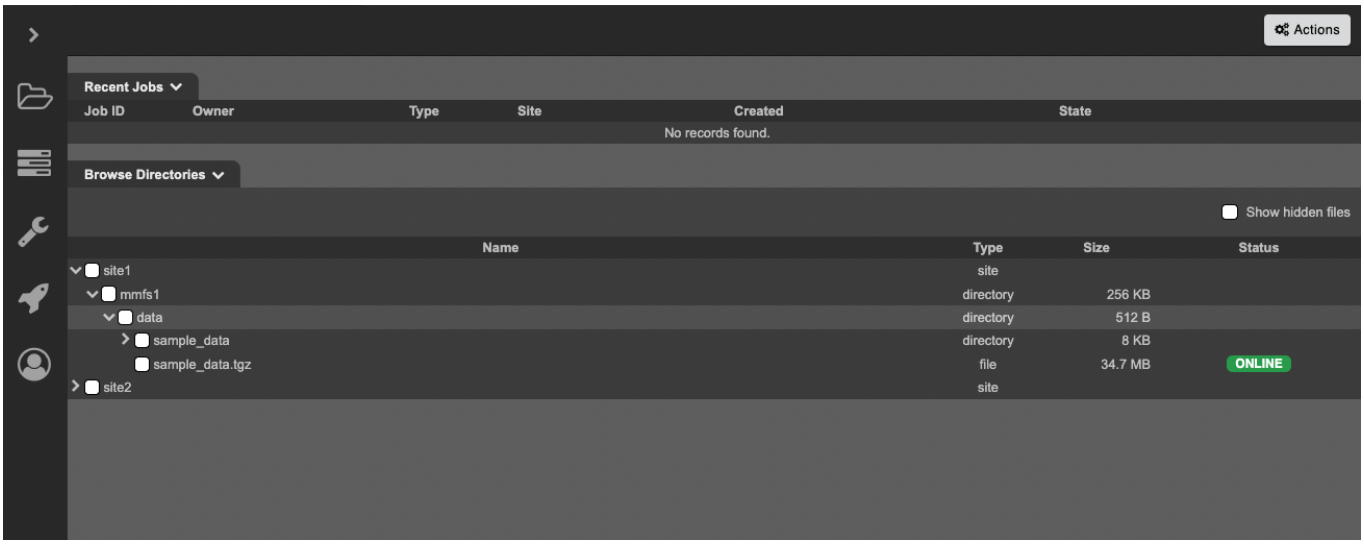
Logout

To end your session, select Logout from the `Man Icon` at the bottom left hand corner of the UI.



Browser

Upon logging in, select the directory icon on the left hand side of the UI. This takes to the Browser page.



The Browser page allows users to see a list of recent jobs as well as browse all available directories across all Sites for the purpose of either migrating, pre-migrating, recalling, or sending files.

Recent Jobs

The Recent Jobs section shows a list of the 5 most recent jobs that were initiated via the UI.

The view presents several columns:

Option	Description
Job ID	Shows the identification number associated with the job
Owner	Name of the user who created the job
Type	Shows the job's type, i.e. Migrate, Recall, Premigrate, or Send
Site	Name of the Site where files were migrated from
Created	Shows the job's creation time
State	Shows the job's state, i.e. success or failure

Browse Directories

The Browse Directories section contains a list of configured Sites and correspondent directories under the Sites' filesystems.

The view presents several columns:

Option	Description
Name	Shows the name of the Site, directories, and files
Type	Shows whether the listed item is a Site, directory, or file
Size	Shows the directories and files size

Option	Description
Status	Shows whether files are online or offline

User can select one or multiple directories, or one or multiple files to migrate, premigrate, recall them or send them to a different Site.

Migrate

To Migrate a directory or file, expand the Site containing said directory and file. Select the directory or file you wish to Migrate by ticking their relevant boxes.

Click the "Actions" button at the top right hand side of the page and select "Migrate".

A new Job is created and it is shown at the top of the "Recent Jobs" list. Job's State will display a progress bar until completion.

Once job is complete, the State will either show as Success or Failed.

Premigrate

To Premigrate a directory or file, expand the Site containing said directory and file. Select the directory or file you wish to Premigrate by ticking their relevant boxes.

Click the "Actions" button at the top right hand side of the page and select "Premigrate".

A new Job is created and it is shown at the top of the "Recent Jobs" list. Job's State will display a progress bar until completion.

Once job is complete, the State will either show as Success or Failed.

Recall

To Recall a directory or file, expand the Site containing said directory and file. Select the directory or file you wish to Recall by ticking their relevant boxes.

Click the "Actions" button at the top right hand side of the page and select "Recall".

A new Job is created and it is shown at the top of the "Recent Jobs" list. Job's State will display a progress bar until completion.

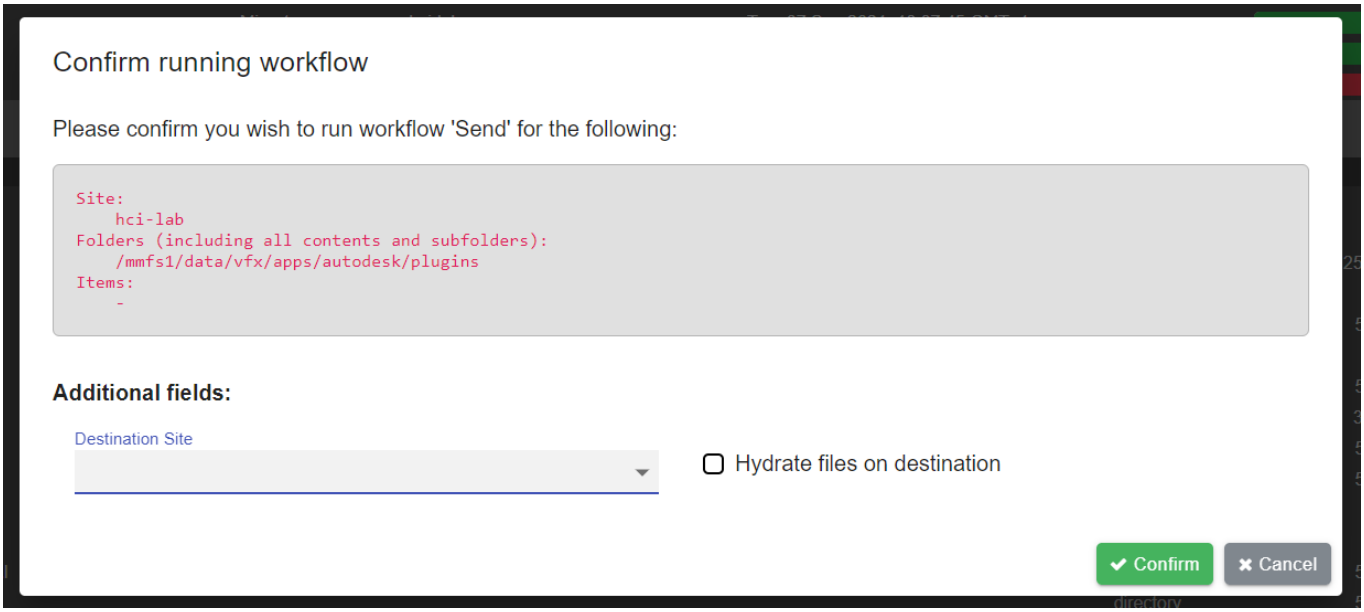
Once job is complete, the State will either show as Success or Failed.

Send

To Send a directory or file from one Site to another, expand the Site containing said directory and file. Select the directory or file you wish to Send by ticking their relevant boxes.

Click the "Actions" button at the top right hand side of the page and select "Send".

Select the Site you wish to send the directory and/or files to. Tick the "Hydrate files on destination" if required, and click "Confirm".



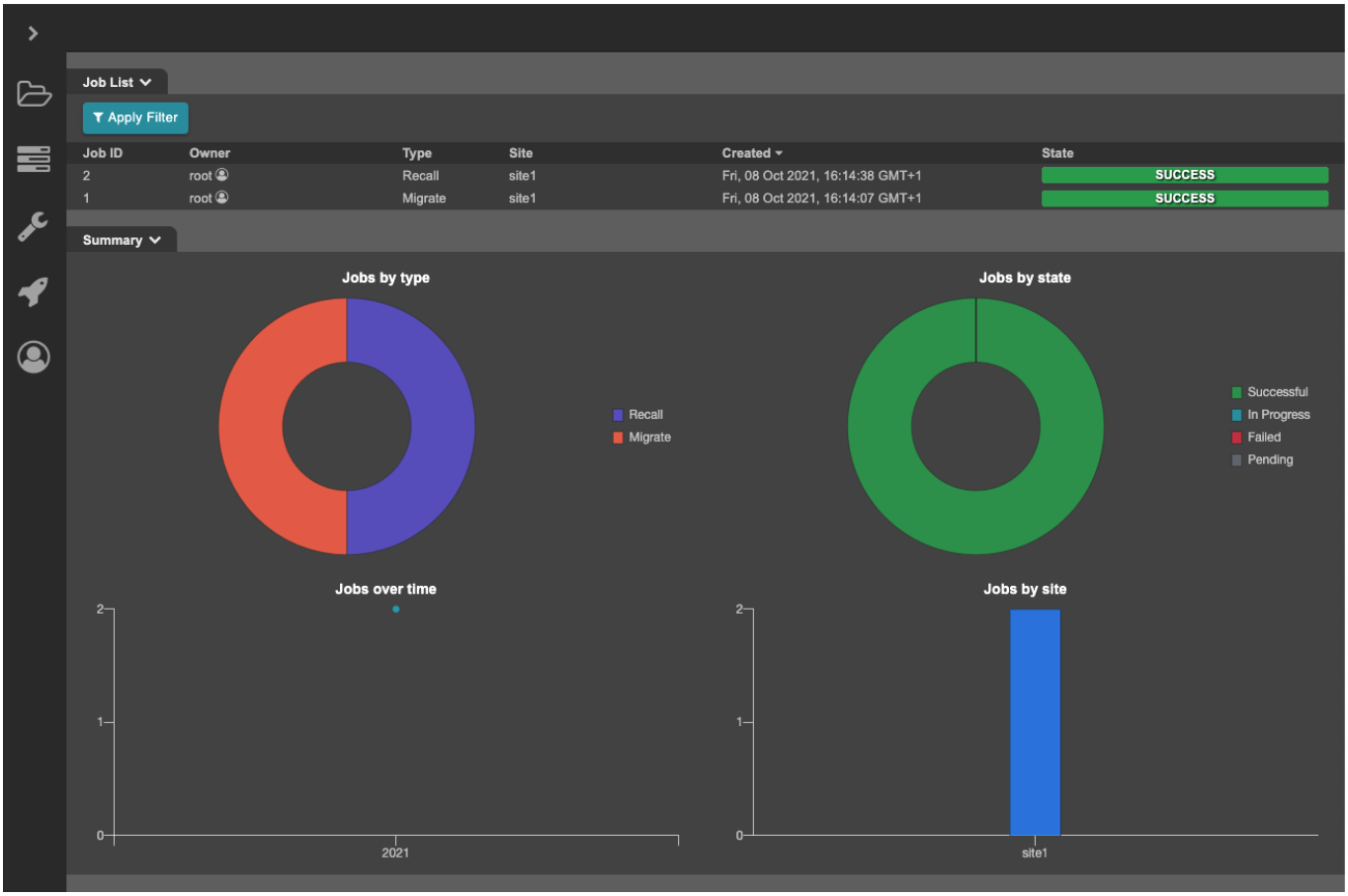
A new Job is created and it is shown at the top of the "Recent Jobs" list. Job's State will display a progress bar until completion.

Once job is complete, the State will either show as Success or Failed.

Expanding the receiving Site's Directories now shows the path that was replicated from the sending Site.

Jobs

The Jobs page shows a list of all the jobs that were initiated via the UI.



The view presents several columns:

Option	Description
Job ID	Shows the identification number associated with the job
Owner	Name of the user who created the job
Type	Shows the job's type, i.e. Migrate, Recall, Premigrate, or Send
Site	Name of the Site where files were migrated from
Created	Shows the job's creation time
State	Shows the job's state, i.e. success or failure

Each column can be sorted in ascending and descending order.

Pagination

To select whether to view 20, 50, or 100 Jobs at the time, choose the relevant option in the "Items per Page" dropdown.

Clicking on the right and left arrow next to "Items per Page" will take you to the next/previous pages.

Apply Filter

Jobs list can be filtered by time period, job type, and job state.

To filter the list, select the "Apply Filter" button on the top left hand side of the UI.

Select one or a combination of filters, and click "Apply".

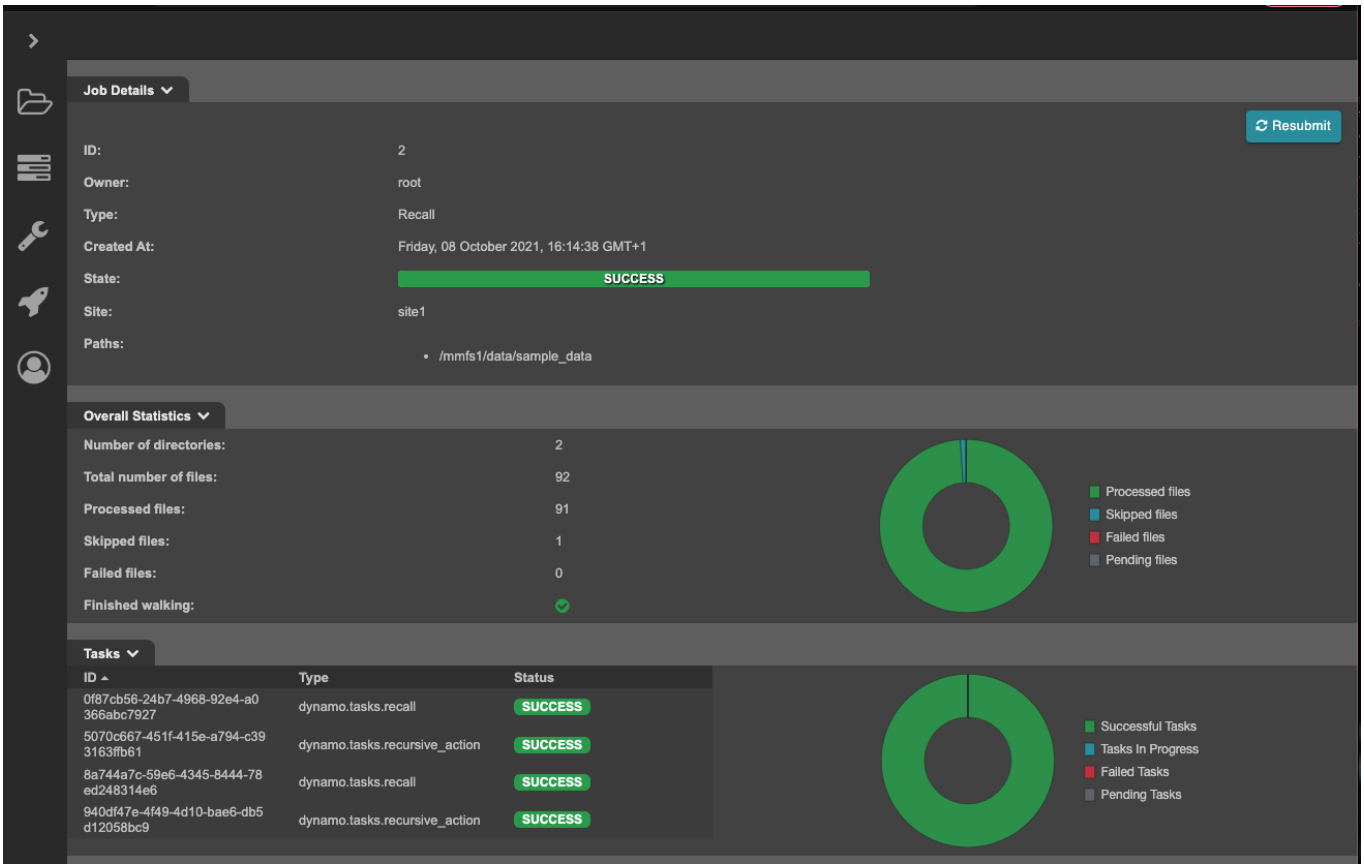
Job are now filtered as per your selection.

To remove a filter, simply select the "x" next to the applied filter.

Job ID

On the Jobs page, click on a Job ID to see additional information regarding the Job.

The Job Details, Overall Statistics, and Tasks tab are displayed.



Each tab shows specific Job details, some of which are clickable:

- Overall Statistics --> Total number of files, processed files, skipped files, and failed files.
- Tasks --> ID

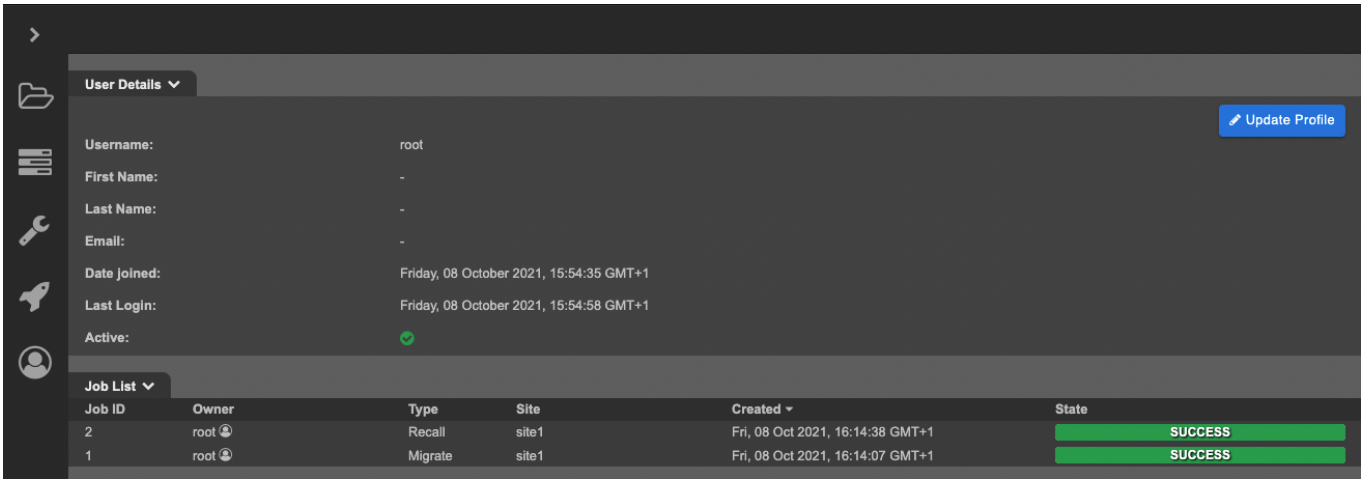
Selecting any of the clickable items opens a dialogue showing the relevant output.

Jobs can also be resubmitted by clicking the "Resubmit" button at the top right hand side of the page.

Owner

On the Jobs page, click on any Owner to see additional information regarding the user who initiated the Job.

Selecting an Owner takes to a page that shows details about the user, as well as a list of Jobs initiated by said user.



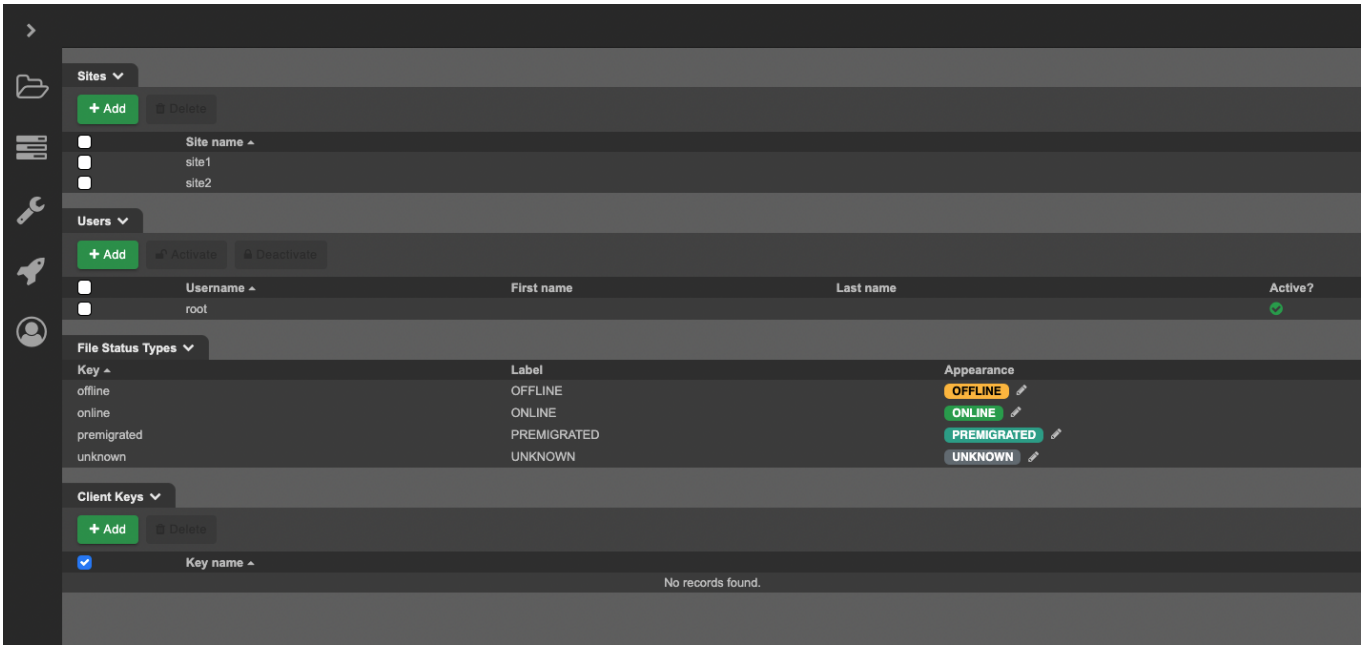
If you selected your own user, you will see an "Update Profile" on the top right hand side of the page.

This takes you to the "Update User" page where you can change your own password, email, first name and last name.

The Job List's layout is the same as the one shown in Jobs page and has the same functionalities.

Administration

The Administration page allows you to add and delete Sites, add, activate and deactivate Users, as well as changing the name and colours of the labels found in the Browse Directories section.



Sites

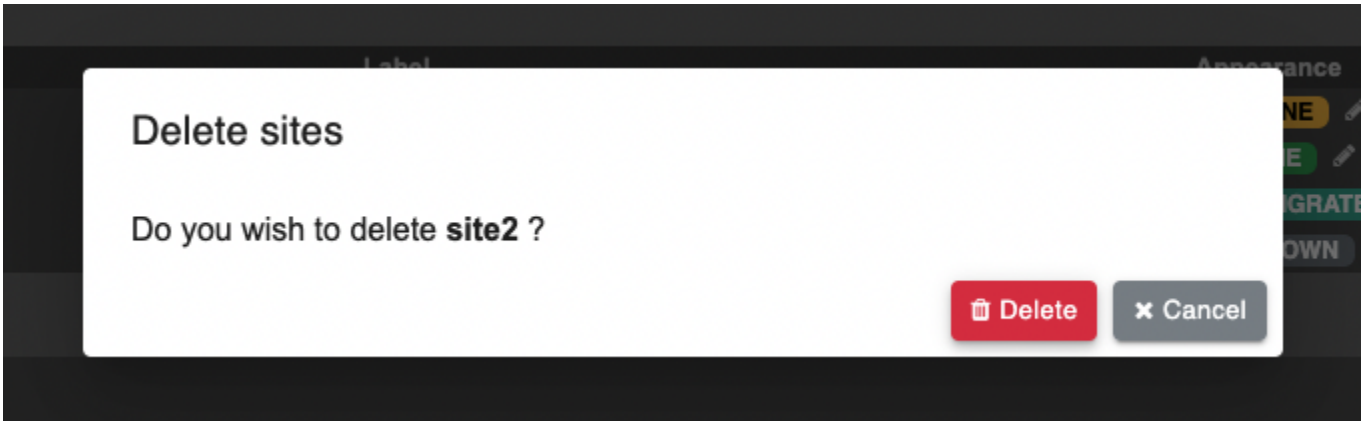
The Sites tab contains the list of Sites that have been configured. This list can be sorted by Site name in ascending and descending order.

Add Site

To add a Site, select the "Add" button, enter a Site name, and confirm by clicking "Add"

Delete Site

To delete a Site, select one or multiple Sites by ticking their correspondent boxes. Click "Delete" and then confirm deletion once the "Delete Site" dialogue is presented.

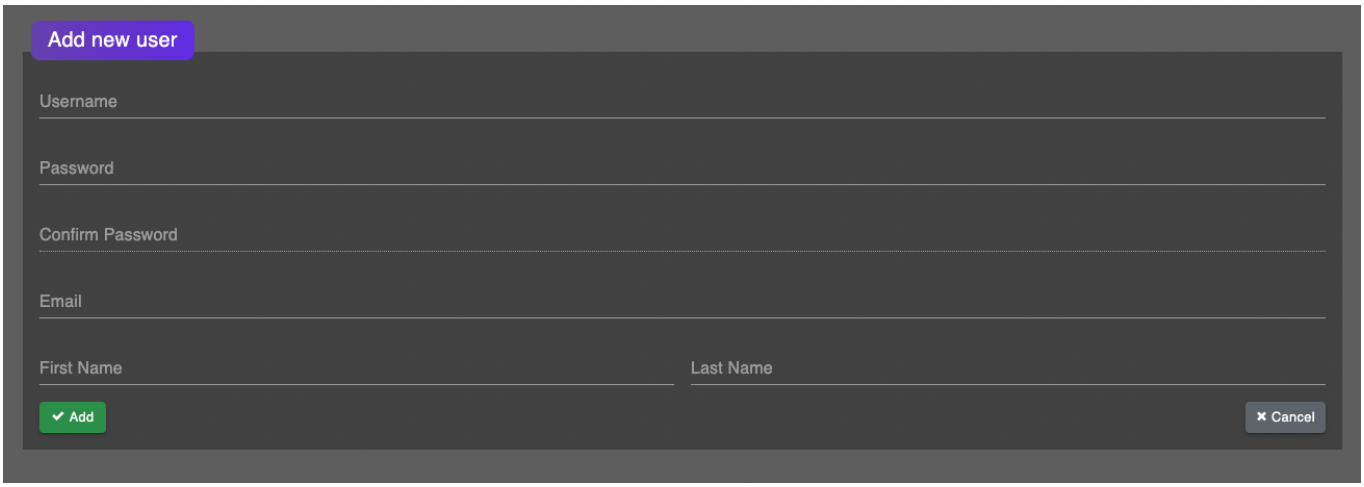


Users

The Users tab contains the list of Users who are allowed to use the UI. This list can be sorted by Username in ascending and descending order.

Add User

To add a new User, select the "Add" button, then enter a Username, Password, Email, First Name, and Last Name.



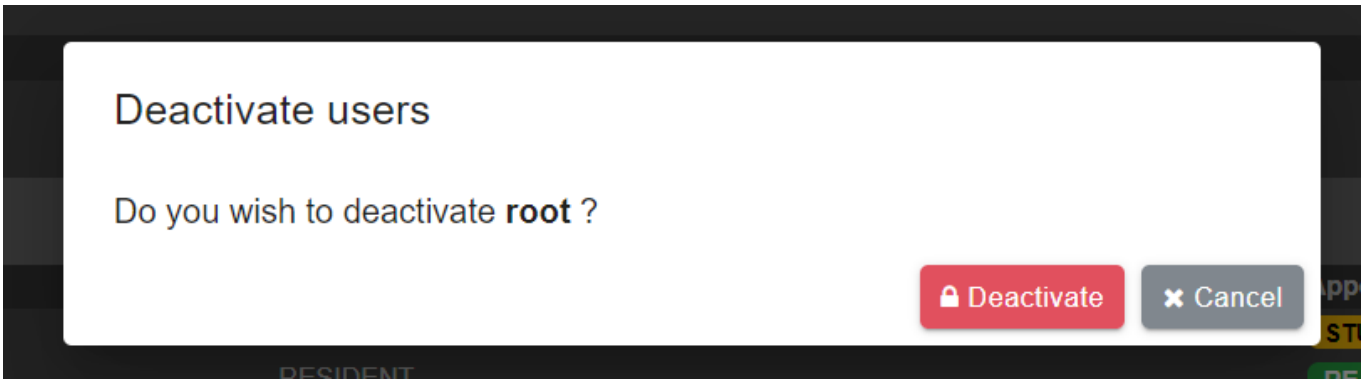
Confirm by clicking "Add".

Activate User

To activate an existing User, select the "Activate" button, and then confirm activation once the "Activate user" dialog is presented.

Deactivate User

To deactivate a User, select one or multiple Users by ticking their correspondent boxes. Click "Deactivate" and then confirm deactivation once the "Deactivate user" dialogue is presented.



User will no longer have access to the UI but still exists and can be reactivated at any time.

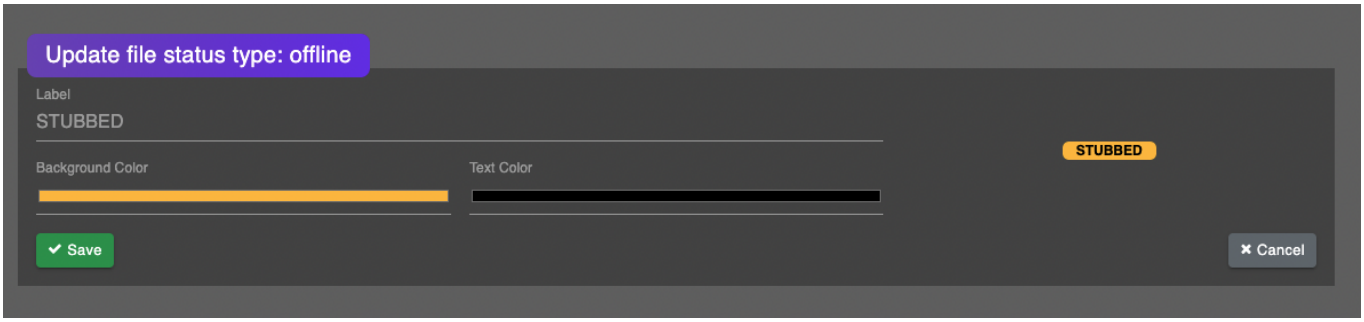
File Status Types

The File Status Types tab lists the labels that are used to indicate a file's status.

The labels are customisable as both colour and label name can be changed.

To change the appearance of a label, select the pencil symbol next to the label that needs updating.

"Update File Status Type" page is displayed:



Change label name, background colour, or text colour as per your preference.

Click "Save" to confirm the update.

API

Reference

The API reference can be found at your Ngenea Hub install at `/api/docs/`. This section does not attempt to duplicate the reference, but instead provide some usage examples.

Authentication

Authentication to the API can be performed in 2 ways

- JWT Authentication
- Client Keys

The first one is for interacting with the API interactivly and is therefore most likely not suitable for building automated workflows. On the other hand, client keys are valid until they are revoked and are more suitable for automation.

JWT Authentication

To use the API directly, authentication tokens should be generated to prevent sending the username and password repeatedly. You need to generate these tokens by sending you username-password pair to the login endpoint: `/auth/token`

```
curl -s -X POST 'http://localhost:8000/api/auth/token/'  -H 'Accept:
application/json'  -H 'Content-Type: application/json' -d '{"username
": "dfoster",  "password": "******"}' | jq -r
{
  "access": <access_token>,
  "refresh": <refresh_token>,
}
```

There are 2 types of authentication tokens:

- Access token
- Refresh token

Access tokens are used for doing API requests. You need to include the token in the Authorization header to use any other endpoint:

```
curl -s -X GET 'http://localhost:8000/api/jobs/'  -H 'Accept:
application/json'  -H 'Content-Type: application/json'  -H "Authoriza
tion: Bearer $JWT_ACCESS_TOKEN" | jq
{
  "count": 0,
  "next": null,
  "previous": null,
  "results": [],
  "stats": {
    "type": {
      "migrate": 0,
      "premigrate": 0,
      "recall": 0
    },
    "state": {
      "SUCCESS": 0,
      "FAILURE": 0,
      "STARTED": 0,
      "PENDING": 0,
      "ERROR": 0
    },
    "created": {},
    "site": {}
  }
}
```

On the other hand, refresh tokens are used for refreshing the access token. For security purposes, access tokens expire in 1 hour and refresh tokens expire in 1 day. When an expired token is used, one of `HTTP 401 Unauthorized` and `HTTP 403 Forbidden` errors is received. In that case, you need to refresh the access token with `/api/token/refresh/` endpoint:

```
curl -s -X POST 'http://localhost:8000/api/auth/token/refresh/'  -H '
Accept: application/json'  -H 'Content-Type: application/json' -d '{"
refresh": "<refresh_token>"}' | jq -r
{
  "access": <new_access_token>,
}
```

Refresh tokens can also be expired too. In that case, you need to send your credentials (username and password) again to obtain new token pair.

Client Keys

Creating Client Keys

> **Note:** The UI does not currently support creating client keys and therefore have to be done via the API directly

Before we can authenticate using the client key, we need to temporarily authenticate using JWT to be able to create a client key.

To get a valid JWT access token using curl and `jq`:

```
export JWT_TOKEN=$(curl -s -X POST 'http://localhost:8000/api/auth/
token/'  -H 'Accept: application/json'  -H 'Content-Type:
application/json' -d '{"username": "dfoster",  "password":
"******"}' | jq -r .access)
echo $JWT_TOKEN
<token>
```

This can now be used to create a client key:

```
curl -s -X POST 'http://localhost:8000/api/auth/clientkeys/'  -H 'Acc
ept: application/json'  -H 'Content-Type: application/json'  -H "Auth
orization: Bearer $JWT_TOKEN" -d '{"name": "my_automation_key"}' | jq
'.'
{
  "url": "http://localhost:8000/api/auth/clientkeys/1/",
  "id": 1,
  "name": "my_automation_key",
  "api_key": "YOUR_API_KEY"
}
```

```
{warning} This is the only time the client key will be visible, make
sure it is recorded.
```

Using Client Keys

The key created in the previous section can now be used by setting the header `Authorization: Api-Key YOUR_API_KEY` against an API endpoint. For example:

```
export API_KEY=YOUR_API_KEY

curl -s -X GET 'http://localhost:8000/api/jobs/'  -H 'Accept:
application/json'  -H 'Content-Type: application/json'  -H "Authoriza
tion: Api-Key $API_KEY" | jq
{
  "count": 0,
  "next": null,
  "previous": null,
  "results": [],
  "stats": {
```

```
    "type": {
      "migrate": 0,
      "premigrate": 0,
      "recall": 0
    },
    "state": {
      "SUCCESS": 0,
      "FAILURE": 0,
      "STARTED": 0,
      "PENDING": 0,
      "ERROR": 0
    },
    "created": {},
    "site": {}
  }
}
```


Submitting Workflow

To submit a workflow, the following parameters are required:

name	description
`workflow`	The name of the workflow to submit
`paths`	A list of paths to execute the workflow on
`site`	The name of the site where the workflow should be started from. Steps within a workflow may run on different sites.

In additional, the following optional parameters may be provided:

name	description
`discovery`	Name of the file discovery technique to use. Currently the only supported discovery is `recursive`. If no discovery is specified, `recursive` will be used as the default. If explicitly set to `null`, no discovery will be performed and the provided paths will be used 'as is'.
`fields`	Additional parameter for the workflow, typically used by custom workflows.

Migrate

Using a Client Key stored in a environment variable `TOKEN`, the following is an example of migrating a file using curl.

```
curl -s -X POST 'http://example.com/api/file/workflow/'  -H 'Accept:
application/json'  -H 'Content-Type: application/json'  -H "Authoriza
```

```
tion: Api-Key $TOKEN"  -d '{"paths": ["/mmfs1/data/
sample_data.tgz"], "site": "dfoster1", "workflow": "migrate",
"discovery": null}'
```

Note: Since we're only migrating a single file, we don't need recursive discovery, so discovery has been set to `null` to disable it.

Monitoring and Management

systemd service

Ngenea Hub is controlled via the `ngeneahub` systemd service

ngeneahubctl cli tool

The `ngeneahubctl` tool can be used to manually stop/start the services, outside of systemd, for debugging

Docker containers

Ngenea Hub uses a collection of docker containers, which can be managed by standard Docker monitoring/management tools and processes:

Container Name	Description
`ngeneahub_app_1`	Web application
`ngeneahub_jobrefresh_1`	Maintenance task controller
`ngeneahub_db_1`	Application database (Postgres)
`ngeneahub_rabbitmq_1`	Task queue broker
`ngeneahub_redis_1`	Task results backend

Custom Workflows

Defining workflows

It's possible to define custom workflows which use pre-defined rules as building blocks to create your workflow.

Note: Custom workflows are not currently exposed via the UI. Use the API `/api/workflows/` endpoint to create custom workflows

A workflow definition requires the following parameters:

Name	Description
`name`	The unique name for this workflow. For easy of submission again the API, this should not contain spaces.
`label`	The human readable name for this workflow, can contain spaces.
`icon_classes`	List of icon classes to represent the workflow in the UI. Font Awesome is useful here.
`filter_rules`	A list of rules to apply to provided files that match defined states. Described in more detail below.
`fields`	A list of runtime fields. Described in more detail below.

Additionally, you can optionally provide:

Name	Description
`discovery`	Which discovery task the workflow should be used by default, this can be either recursive or snapdiff.

Filter Rules

Filter rules are defined in JSON. They are a list of individual rules in a mapping format that will be performed on each matching file result when a discovery task is complete. If called through the API with no discovery task provided, rules will be applied to any states provided in the workflow input.

Steps are defined in JSON. Steps is a list of individual steps that will be performed serially. Each rule must contain the following:

Name	Description	Required
`state`	The state of a result provided by the discovery task with any given path, an example of that could be "processed" or "modified" more details about this are in the discovery section.	Yes
`type`	The type of result the rule will apply to, the only valid types are: `file|directory|symlink|all`	Yes
`action`	A list of tasks to perform on files that match the state and type	Yes
`include`		No

Name	Description	Required
	A list of globs to apply to provided files to limit actions to just them.	
`exclude`	A list of globs to apply to provided files. Described in more detail below.	No

These rules control which actions will be performed on certain files based on their given state that they have been given following specific discovery tasks such as `snapdiff` or provided in the initial input of a workflow. These states can allow direct control of workflows performed on files provided, allowing multiple workflow paths within the same job by utilizing multiple rules controlling specific states with additional control with include and exclude path rules.

Alongside rules bound to a state, there are two special states that rules can be used, these being `default` and `all`. Rule sets cannot have both `default` and `all` rules within them, but it is possible to have multiple of one type with different sets of exclude and include rules to allow for more granular control.

Rules defined with `default` as their `state` and `type` will perform their action on paths that have not been captured by all other rules within a given rule set. This means that if there are specific file states that need to be actioned differently, paths that do not match any other rules actioned against without ignoring those non-matching paths.

The other special rule type is rules with the `state` and `type` of `all`. This rule will perform its action on all paths regardless of their provided type and state. This is an additional operation so if another rule has an explicit rule provided it will perform multiple actions on the same path, for each matching rule in rule set. Simple workflows are typically composed of a single rule with the state and type of `all` as this will simply process all paths provided to it.

Within each rule, there must be a list of actions to perform on the resulting file provided within the `action` key. These actions will be performed serially. Each action must be a mapping that contain the following in each entry:

Name	Description	Required
`name`	The name of the task to run, e.g. `dynamo.tasks.migrate`	Yes
`site`	The name of the site to run against, if this is not provided it will use the site provided within the workflow call.	No

If steps have optional arguments, these can be passed as additional key:value pairs in these step definition mapping to pass those optional arguments.

As an example we can define a generic rule that captures every type of file and state and sends it to a second site, this would be useful for a bulk move using the `recursive` discovery task to cover all types of files in directories provided to the task:

Example 1 - Send to london

```
{
    "state": "all",
    "type": "all",
    "action": [
        {
            "name": "dynamo.tasks.migrate"
        },
        {
            "name": "dynamo.tasks.reverse_stub",
            "site": "london"
        }
    ]
}
```

Runtime fields

A workflow needs to be able to accept parameters as it submitted. Taking example #1 above, "london" doesn't want to be hardcoded as the destination site, as that would mean a new workflow would need to be defined for each possible destination.

Instead, fields can be defined, that in turn will need to be provided at workflow submission time. Fields are defined as a mapping with the following keys:

Name	Description	Required
`name`	The name of the field.	Yes
`label`	The fiendly name for this field, used for presenting in the UI	Yes
`type`	The type of the field, valid options are: • `string` - a free text field • `int` - a free text field that will be validated a integer • `bool` - a checkbox • `choices` - A dropdown box representing a list of choices, populated from choices list of objects. • `enum[enum_type]` - A dropdown box	Yes

Name	Description	Required
	representing a choice of option, populated from enum_type. `enum_type` can be one of the following ◦ `site` - A list of all the sites Ngenea Hub has defined	
`default`	The default value for runtime fields	optional

The following is an example of a custom field definition for providing a site to an action step:

Example 2 - Custom field definition

```
[
    {
        "name": "target_site",
        "label": "Site to migrate to",
        "type": "enum[site]"
    }
]

---
caption: Custom field defintion with default value
---
[
    {
        "name": "target_site",
        "label": "site to migrate to",
        "type": "enum[site]",
        "default": "london"
    }
]
```

If default value is specified in runtime fields, it will take the default value for fields while running workflow if the user input is not given otherwise it will always use the user input.

Back in the definition of an action step, any value that is prefixed with a `*` will be used as a field name and the value replaced instead of a literal string.

The following example, modifies example #1 to use the custom field as defined in example #3:

Example 3 - Updated rule now using custom fields

```
{
    "state": "all",
    "type": "all",
    "action": [
        {
```

```
            "name": "dynamo.tasks.migrate"
        },
        {
            "name": "dynamo.tasks.reverse_stub",
            "site": "*target_site"
        }
    ]
}
```

So, a complete request to create a workflow that will process all file and state types with a dynamic "site" field will look like:

Example 4 - Full workflow request

```
{
    "name": "send_file",
    "label": "Send files from one site to another",
    "icon_classes": ["fa fa-cloud fa-stack-2x text-primary", "fa fa-refresh fa-stack-1x text-light"],
    "filter_rules": [
        {
            "state": "all",
            "type": "all",
            "action": [
                {
                    "name": "dynamo.tasks.migrate"
                },
                {
                    "name": "dynamo.tasks.reverse_stub",
                    "site": "*target_site"
                }
            ]
        }
    ],
    "fields": [
        {
            "name": "target_site",
            "label": "Site to migrate to",
            "type": "enum[site]"
        }
    ]
}
```

The following is an example of a custom field definition for providing a choices to an action step:

Example 5 - Custom field definition

```
[
    {
        "name": "sync_policy",
        "label": "sync_policy",
        "type": "choices",
        "choices": [
            {
```

```
                "label": "Newest",
                "value": "newest"
            },
            {
                "label": "Sourcesite",
                "value": "sourcesite"
            }
        ]
    }
]

choices support both string and integer type values.
```

Back in the definition of an action step, any value that is prefixed with a `*` will be used as a field name and the value replaced instead of a literal string.

The following example, uses the custom field in action:

Example 6 - Updated rule now using custom fields

```
{
    "state": "all",
    "type": "all",
    "action": [
        {
            "name": "dynamo.tasks.migrate"
        },
        {
            "name": "dynamo.tasks.reverse_stub",
            "sync_policy": "*sync_policy"
        }
    ]
}
```

So, a complete request to create a workflow that will process all file and state types with a static choices field will look like:

Example 7 - Full workflow request

```
{
    "name": "send_file",
    "label": "Send files from one site to another",
    "icon": "<span class='fa-stack'><i class='fa fa-cloud fa-
stack-2x text-primary'></i><i class='fa fa-angle-right fa-stack-2x
text-light'></i></span>"
    "filter_rules": [
        {
            "state": "all",
            "type": "all",
            "action": [
                {
                    "name": "dynamo.tasks.migrate"
                },
                {
                    "name": "dynamo.tasks.reverse_stub",
```

```
                    "sync_policy": "*sync_policy"
                }
            ]
        }
    ],
    "fields": [
        {
            "name": "sync_policy",
            "label": "sync_policy",
            "type": "choices",
            "choices": [
               {
                  "label": "Newest",
                  "value": "newest"
               },
               {
                  "label": "Sourcesite",
                  "value": "sourcesite"#
               }
            ]
        }
    ]
}
```

Running Workflows

Once a workflow has been defined, it can be performed through the file browser by selecting files and directories and clicking the actions button. It is then possible to select the workflow you wish to call, this workflow call will not use a discovery task unless a directory is selected, in that case it will make use of the `recursive` discovery step.

This can also be performed via a POST request to `/api/file/workflow`. When called through the API, you have the option to provide a discovery step, these steps can expand the initial paths provided to them to either recursively perform actions or perform something like a file difference scan.

Name	Description	Type	Required
`paths`	A list of paths to perform the workflows against, these can be just strings of file absolute file paths or can be JSON with the keys of "path" and "state", detailed example in example 7	JSON List	Yes
`site`		String	Yes

Name	Description	Type	Required
	The site to perform the workflow against		
`fields`	The runtime fields for a workflow	String	Yes
`discovery`	The discovery phase to use for this workflow run, this will override any defaults	String	No
`job`	The ID of a job that this workflow should be run within	Integer	No

Following the example workflow defined above, you can call the workflow to recursively send all files within any paths provided using the following POST to `/api/file/workflow`:

Example 8 - Calling example workflow

```
{
    "paths": [
        "/mmfs1/data/project_one",
        "/mmfs1/data/project_two"
    ],
    "site": "london",
    "workflow": "send_file",
    "discovery": "recursive",
    "fields": {
        "target_site": "dublin",
    }
}
```

This will now migrate all files within `/mmfs1/data/project_one` and `/mmfs1/data/project_two` and then recall them at the site defined as `dublin`.

If there is a more complex workflow that have been defined that includes rules for specific states, the input paths can include this state information. This behaviour can be only be used when no discovery state is provided, an example of a custom rule set using could be:

Example 9 - Calling workflow with state data

```
{
    "name": "migrate_state",
    "label": "Stateful file migration",
    "filter_rules": [
        {
            "type": "all",
            "state": "modified",
            "action": {
```

```
                "name": "dynamo.tasks.migrate"
            }
        {
            "type": "all",
            "state": "moved",
            "action": {
                "name": "dynamo.tasks.delete_paths_from_gpfs"
            }
        }
    ],
    "discovery": null,
    "fields": []
}
```

Here is a simple rule set that will migrate all paths provided with the state `modified` and will delete all paths provided with the state `moved`. With this example workflow provided you can perform a POST to `/api/file/workflow` with the following JSON:

Example 10 - Calling workflow with state data

```
{
    "paths": [
        {
            "path": "/mmfs1/data/project_one",
            "state": "modified"
        {
            "path": "/mmfs1/data/project_two",
            "state": "moved"
        }
    ],
    "site": "london",
    "workflow": "migrate_state",
    "discovery": null,
    "fields": {}
}
```

Using multiple state based rules with different include and exclude path filters, you could achieve more complex behaviour in workflow calls for more finite control.

Discovery Steps

Discovery steps can make complex large bulk operations much more manageable to call, allowing you to provide a single path that expands to cover all the contents of a path, or to see time based differences for a given path.

Note: If a workflow is submitted without a discovery task explicitly provided, it will default to using the discovery task defined as the default during the workflow's creation, visible via the workflow's "discovery" attribute. To avoid this, it is possible to explicIty pass `null` as the discovery task via the API to skip any discovery phase and additional processing on the paths provided and instead process the actions specified using the rules, without any additional checks.

Name	Description	Supported states
`recursive`	Performs a recursive expansion of the initial provided paths. This allows paths to be expanded to cover all sub file and directories, it will then perform the defined action for all the generic rules in a workflow against all resulting files.	`all`
`snapdiff`	Performs a time based file scan on an independant fileset between the last time a scan was performed. It will retrieve all file differences between those moments in time and the state of that file.	`created|updated|moved|deleted|all`

For more complex discovery steps such as `snapdiff`, there are defined states that files, directories and links can be in once it has completed its scan. This allows more explicit control of file and state control within a single call to a workflow. If for example you want all results with the type of `file` that have the state `created` to be sent to another site without any temporary files, a rule to cover that could be:

Example 11 - Custom rule for filtering snapdiff discovery results

```
{
    "state": "created",
    "type": "file",
    "exclude": ["*.temp"],
    "action": [
        {
            "name": "dynamo.tasks.migrate"
        },
        {
            "name": "dynamo.tasks.reverse_stub",
            "site": "*target_site"
        }
    ]
}
```

Search

The search endpoint provides the ability to search for files across multiple sites, and aggregate the results.

Search is performed in two steps - submitting a query, and retrieving the results.

Submitting a query

Search performs a query by submitting asynchronous tasks to each requested site. The sites then perform the actual search and return results as available.

A search is initiated by `POST`ing a query to the search endpoint

```
curl -s -X POST 'http://example.com/api/search/'  -H 'Accept: application/json'  -H 'Content-Type: application/json'  -H "Authorization: Api-Key $TOKEN"  -d '{"path": "/mmfs1/data", "sites": ["site1"], "recursive": true, "filters": {"hsm.status": "migrated"}}'
```

The search request payload is made of

name	description
`path`	Directory to query
`sites`	List of one or more sites to search. Default: all sites
`recursive`	Whether to search the `path` recursively. Default: false, only immediate children of `path` will be returned.
`filters`	A collection of filters against arbitrary metadata, see below. Default: None
`merge`	If the same file exists on multiple site, this will cause them to be merged in the results (see below). Default: false

Upon successful submission, the request will return status `201 (Created)`, and a response body which includes the url for retrieving search results (see below)

```
{"id":1,"url":"http://example.com/api/search/1/"}
```

Filters

Filters are a collection of filters to apply to arbitrary file metadata.

The specific metadata available to be filtered on depends on the search backend being used. The fields in the following examples may not be available for all backends.

At a minimum, one can expect to be able to filter on `core.filename`, the file basename. For example to filter only jpeg files, `{"core.filename": "*.jpg"}`

Possible filter types are

type	description	example
exact match	match a value exactly	`{"core.filename": "cats-01.jpg"}`, `{"core.size": 0}`
match list		`{"core.group.name": ["editor", "admin"]}`

type	description	example
	match any of the values in the list (value1 OR value2 OR ...)	
wildcard	any string value containing an asterisk (`*`) is treated as a wildcard	`{"core.filename", "*.jpg"}`
range	numerical or date range, using any combination of less-than (`lt`), less-than-equal (`lte`), greater-than (`gt`), greater-than-equal (`gte`)	`{"core.modificationtime": {"gte": "2021-01-01", "lt": "2021-02-01"}}, {"core.size": {"gt": 1000000000}}`
negation	exclude anything matching a given filter	`{"not": {"core.filename": ".DS_Store"}}`

Filters are combined as AND, e.g. `{"core.extension": ".jpg", "hsm.status": "migrated"}` matches `.jpg` files which are HSM migrated.

Retrieving results

When search results are read, they can be retrieved using the url returned when the query was submitted.

```
$ curl 'http://example.com/api/search/1/' -H "Authorization: Api-Key
$TOKEN"
{
  "count": 1,
  "next": null,
  "previous": null,
  "items": [
    {
      "href": "http://example.com/api/file/?
path=%2Fmmfs1%2Fdata%2Fhello.txt&site=site1",
      "site": "site1",
      "path": "/mmfs1/data",
      "name": "hello.txt",
      "metadata": {
          "core.accesstime": "2021-10-12T16:27:28",
          "core.changetime" : "2021-10-12T16:28:45",
          "core.directory" : "/mmfs1/data",
          "core.extension" : ".txt",
          "core.filename" : "hello.txt",
          "core.group.id" : 0,
          "core.group.name" : "root",
          "core.hash.sha512": "db3974a97...94d2434a593",
          "core.modificationtime" : "2021-10-12T16:28:45",
          "core.pathname": "/mmfs1/data/hello.txt",
          "core.size" : 12,
```

```
          "core.user.id" : 0,
          "core.user.name" : "root",
          "gpfs.filesetname" : "root",
          "gpfs.filesystem" : "mmfs1",
          "gpfs.kballocated" : 0,
          "gpfs.poolname" : "sas1",
          "hsm.status" : "migrated"
          "ngenea.pathname" : "data/hello.txt",
          "ngenea.size" : 12,
          "ngenea.target" : "awss3",
          "ngenea.uuid": "acf1a307-5b6a-43b0-8fb2-d2b366e88008",
      }
    }
  ],
  "metadata_fields": ["core.accesstime", ...],
  "complete": true,
  "errors": {"site2": "Search backend is offline"}
}
```

Results from different sites may not arrive at the same time. The `complete` field indicates whether all sites what returned their results. This includes when a site returns with an error.

Results from different sites are 'concatenated', meaning if the same file exists on multiple sites, there will be separate result items for the file for each site.

The `metadata` field on each item contains arbitrary file metadata. The specific metadata will vary depending on the search backend being used. In the case of the PixStor Search backend, the available fields will vary depending on file type, and which plugins were used when the files were ingested.

The `metadata_fields` entry lists all the available metadata fields which could be returned from the search backend. Individual files may not have all the listed fields.

All search backends format results to be namespaced, similar to PixStor Search, for consistency.

If an error occurs while performing the search on any of the sites, the `errors` entries will provide a mapping of site names and error messages.

Parameters

Search results are paginated. The following parameters can be used to control what results are returned

name	description
`page`	Numbered page of results to fetch. Default: 1
`page_size`	Maximum number of results to return per page. Default: 20
`sort`	One or more fields to sort results on, separated by commas, e.g. `?`

name	description
	`sort=name,site`. Field names can be prefixed with `-` to reverse order. For fields in `metadata`, the field name is specified as is, e.g. `?sort=-core.accesstime`. Default: arbitrary order.

Merged results

When a search is submitted with `"merge": true`, the search results will be 'merged'.

This means that entries for matching files from different sites will be combine. An entry is considered to be matching if it has the same full path.

```
$ curl 'http://example.com/api/search/2/' -H "Authorization: Api-Key
$TOKEN"
{
  "count": 1,
  "next": null,
  "previous": null,
  "items": [
    {
      "path": "/mmfs1/data",
      "name": "hello.txt",
      "metadata": {
          "core.accesstime": "2021-10-12T16:27:28",
          "core.changetime" : "2021-10-12T16:28:45",
          "core.directory" : "/mmfs1/data",
          "core.extension" : ".txt",
          "core.filename" : "hello.txt",
          "core.group.id" : 0,
          "core.group.name" : "root",
          "core.hash.sha512": "db3974a97...94d2434a593",
          "core.modificationtime" : "2021-10-12T16:28:45",
          "core.pathname": "/mmfs1/data/hello.txt",
          "core.size" : 12,
          "core.user.id" : 0,
          "core.user.name" : "root",
          "gpfs.filesetname" : "root",
          "gpfs.filesystem" : "mmfs1",
          "gpfs.kballocated" : 0,
          "gpfs.poolname" : "sas1",
          "hsm.status" : "migrated"
          "ngenea.pathname" : "data/hello.txt",
          "ngenea.size" : 12,
          "ngenea.target" : "awss3",
          "ngenea.uuid": "acf1a307-5b6a-43b0-8fb2-d2b366e88008",
      },
      "status": {
         "site1": true,
         "site2": false
```

```
      }
    }
  ],
  "metadata_fields": ["core.accesstime", ...],
  "complete": true
}
```

Merged results no longer have the `site` and `href` fields. In their place is a `status` field, which maps sites to whether the file is 'resident' on that site.

A file is considered resident if the file is not migrated, or is premigrated ('hydrated'). A file is considered not resident if the file is migrated (stubbed), or not present at all.

Housekeeping

The results from a query are stored, so they can be retrieved multiple times without performing a new query.

However, over time, the files on each site will change, and the stored results may no longer accurately reflect the active file system.

Therefore, old results are periodically culled. The housekeeping process runs once a day, and removes results for any search which was submitted more than a week ago (by default). A different 'time-to-live' (TTL) can be set using the `SEARCH_RESULT_TTL` configuration - see Hub Configuration for more information.

Results can also be manually removed by performing a `DELETE` request against the given search result endpoint

```
curl -X DELETE 'http://example.com/api/search/1/' -H "Authorization: Api-Key $TOKEN"
```

Feature Flags

Feature flags control whether selected pre-release features are enabled.

Certain features may be included in a release which aren't yet fully implemented, or fully tested. By default, these features are disabled and 'hidden', so should not affect normal functionality.

However, these features may be enabled on a 'preview' basis, on the understanding that they may be incomplete or unstable.

Warning: **Do not** enable preview features unless you are willing to accept the potential risks.

Once a feature is finalised and stable, it will be released officially, and the corresponding feature flag will be removed.

Available Features

The following features are currently available.

name	description	stability	default
`searchui`	Enable search features in the Ngenea Hub UI	inprogress	False

REST API

Features can be listed, enabled, or disabled via the Ngenea Hub REST API.

To list the available features, and whether they're currently enabled

```
$ curl -s 'http://example.com/api/features/'  -H 'Accept:
application/json'  -H "Authorization: Api-Key $TOKEN"
{
    "count": 1,
    "next": null,
    "results": [
        {
            "name": "searchui",
            "description": "Enable search features in the Ngenea Hub
UI",
            "enabled": false
        }
    ]
}
```

Individual features are keyed by their name, e.g. `http://example.com/api/features/searchui/`

To enable a feature, make a `PATCH` request against the desired feature

```
$ curl -s -X PATCH 'http://example.com/api/features/searchui/'  -H 'A
ccept: application/json'  -H "Authorization: Api-Key $TOKEN" -H 'Cont
ent-Type: application/json' -d '{"enabled": true}'
[
    {
        "name": "searchui",
        "description": "Enable search features in the Ngenea Hub UI",
        "enabled": true
    },
    ...
]
```

And similarly, to disable a feature

```
curl -s -X PATCH 'http://example.com/api/features/searchui/'  -H 'Accept: application/json'  -H "Authorization: Api-Key $TOKEN" -H 'Content-Type: application/json' -d '{"enabled": false}'
```

Note: It may be necessary to restart the Ngenea Hub service for a feature change to take effect.

Reference

Workflow Steps

This section documents all the currently supported steps in Ngenea Hub. See Custom Workflows for guidance on how to use these steps in your own workflows.

dynamo.tasks.migrate

Migrates a list of files to a pre-defined remote target using Ngenea.

Argument	Type	Default	Description
premigrate	bool	False	retain the content of every migrated file and do not set the OFFLINE flag for the file.migrating.
stub_size	int	0	retain a segment of every migrated file starting from its beginning and having a specified approximate length in bytes.
overwrite	bool	False	overwrite remote objects if they already exist--do not create remote object instances with various UUID suffixes

dynamo.tasks.recall

Recalls a list of files to a pre-defined remote target using Ngenea.

Argument	Type	Default	Description
skip_hash	bool	False	If the recall should skip checking the hash of the file
endpoint	string		specify which endpoint(site) to recall from

dynamo.tasks.reverse_stub

Recalls a list of files to a pre-defined remote target using Ngenea.

Argument	Type	Default	Description
hydrate	bool	False	If the file should be premigrated instead of a regular stub
stub_size	int	0	The max file size before files will be stubbed for this task

Argument	Type	Default	Description
`skip_hash`	`bool`	`False`	If the recall should skip checking the hash of the file
`overwrite`	`bool`	`False`	overwrite local files if they already exist.
`endpoint`	`string`		specify which endpoint(site) to recall from.

dynamo.tasks.delete_paths_from_gpfs

Removes a list of files from a GPFS filesystem.

This step takes no additional arguments.

dynamo.tasks.check_sync_state

Checks a provided site against the calling sites to ensure that the local file is in a specified state compared to another site. Using this task will also perform `dynamo.tasks.stat_paths` on the provided site before execution.

Argument	Type	Default	Description
`sync_preference`	`string`	`None`	Dictates what state the local file should be to pass the check. Options are "newest" which passes if the local file is the latest version of the file on either site, "local" which accepts the local file version regardless of the check and "ignore" which always uses the other sites file version.

API

`GET /auth/clientkeys/`

API endpoint for managing client keys

Query Parameters:

- **page** (integer) -- A page number within the paginated result set. When not given, first page is retrieved by default.
- **page_size** (integer) -- Number of results to return per page. Page size parameter can be a number between `20` and `100`. For disabling pagination and retrieving all results, `0` should be given. When page size parameter is empty or `<20`, `20` results are returned by default. When page size parameter `>100`, `100` results are returned by default.

Status Codes:

- 200 OK --

Response JSON Object:

- **count** (integer) -- (required)
- **next** (string) --
- **previous** (string) --
- **results[].id** (integer) -- (read only)
- **results[].name** (string) -- Name of the client key (required)

- **results[].url** (string) -- (read only)

`POST /auth/clientkeys/`

API endpoint for managing client keys

Request JSON Object:

- **api_key** (string) -- (read only)
- **id** (integer) -- (read only)
- **name** (string) -- Name of the client key (required)
- **url** (string) -- (read only)

Status Codes:

- 201 Created --

Response JSON Object:

- **api_key** (string) -- (read only)
- **id** (integer) -- (read only)
- **name** (string) -- Name of the client key (required)
- **url** (string) -- (read only)

`GET /auth/clientkeys/{id}/`

API endpoint for managing client keys

Parameters:

- **id** (string) --

Status Codes:

- 200 OK --

Response JSON Object:

- **id** (integer) -- (read only)
- **name** (string) -- Name of the client key (required)
- **url** (string) -- (read only)

`PATCH /auth/clientkeys/{id}/`

API endpoint for managing client keys

Parameters:

- **id** (string) --

Request JSON Object:

- **id** (integer) -- (read only)
- **name** (string) -- Name of the client key (required)
- **url** (string) -- (read only)

Status Codes:

- 200 OK --

Response JSON Object:

- **id** (integer) -- (read only)
- **name** (string) -- Name of the client key (required)
- **url** (string) -- (read only)

`DELETE /auth/clientkeys/{id}/`

API endpoint for managing client keys

Parameters:

- **id** (string) --

Status Codes:

- 204 No Content --

POST /auth/token/

Request JSON Object:

- **password** (string) -- (required)
- **username** (string) -- (required)

Status Codes:

- 201 Created --

Response JSON Object:

- **password** (string) -- (required)
- **username** (string) -- (required)

GET /auth/token/publickey/

API endpoint for retrieving public key that is used for token verification.

Status Codes:

- 200 OK --

POST /auth/token/refresh/

Takes a refresh type JSON web token and returns an access type JSON web token if the refresh token is valid.

Request JSON Object:

- **access** (string) -- (read only)
- **refresh** (string) -- (required)

Status Codes:

- 201 Created --

Response JSON Object:

- **access** (string) -- (read only)
- **refresh** (string) -- (required)

POST /auth/token/verify/

Verifies that the token is not expired AND the token owner exists in the database AND the token owner is an active user.

Request JSON Object:

- **token** (string) -- (required)
- **type** (string) -- Token type e.g: access or refresh (required)

Status Codes:

- 201 Created --

Response JSON Object:

- **token** (string) -- (required)
- **type** (string) -- Token type e.g: access or refresh (required)

GET /features/

API endpoint for managing feature flags.

Query Parameters:

- **page** (integer) -- A page number within the paginated result set. When not given, first page is retrieved by default.

- **page_size** (integer) -- Number of results to return per page. Page size parameter can be a number between `20` and `100`. For disabling pagination and retrieving all results, `0` should be given. When page size parameter is empty or `<20`, `20` results are returned by default. When page size parameter `>100`, `100` results are returned by default.

Status Codes:

- 200 OK --

Response JSON Object:

- **count** (integer) -- (required)
- **next** (string) --
- **previous** (string) --
- **results[].description** (string) -- Description of what the feature does (read only)
- **results[].enabled** (boolean) -- Whether the feature has been enabled
- **results[].name** (string) -- Name of the feature (read only)

`GET /features/{name}/`

API endpoint for managing feature flags.

Parameters:

- **name** (string) --

Status Codes:

- 200 OK --

Response JSON Object:

- **description** (string) -- Description of what the feature does (read only)
- **enabled** (boolean) -- Whether the feature has been enabled
- **name** (string) -- Name of the feature (read only)

`PATCH /features/{name}/`

API endpoint for managing feature flags.

Parameters:

- **name** (string) --

Request JSON Object:

- **description** (string) -- Description of what the feature does (read only)
- **enabled** (boolean) -- Whether the feature has been enabled
- **name** (string) -- Name of the feature (read only)

Status Codes:

- 200 OK --

Response JSON Object:

- **description** (string) -- Description of what the feature does (read only)
- **enabled** (boolean) -- Whether the feature has been enabled
- **name** (string) -- Name of the feature (read only)

`GET /file/`

Retrieves list of files under given path for given site.

Query Parameters:

- **path** (string) -- Target directory path
- **site** (string) -- Site name
- **details** (boolean) -- Show details of children objects

Status Codes:

- 200 OK --

`GET /file/test/`

API endpoint for managing files.

Status Codes:

- 200 OK --

`POST /file/workflow/`

Performs a workflow on a list of files

Request JSON Object:

- **discovery** (string) -- Discovery name
- **fields** (object) --
- **job** (integer) -- Job ID
- **paths[]** (object) --
- **site** (string) -- Site name (required)
- **workflow** (string) -- Workflow name (required)

Status Codes:

- 201 Created --

Response JSON Object:

- **discovery** (string) -- Discovery name
- **fields** (object) --
- **job** (integer) -- Job ID
- **paths[]** (object) --
- **site** (string) -- Site name (required)
- **workflow** (string) -- Workflow name (required)

`GET /filesets/`

Retrieve list of filesets on a given site.

Query Parameters:

- **site** (string) -- Site name

Status Codes:

- 200 OK --

`GET /filestatustypes/`

API endpoint for managing file status types.

Query Parameters:

- **page** (integer) -- A page number within the paginated result set. When not given, first page is retrieved by default.
- **page_size** (integer) -- Number of results to return per page. Page size parameter can be a number between `20` and `100`. For disabling pagination and retrieving all results, `0` should be given. When page size parameter is empty or `<20`, `20` results are returned by default. When page size parameter `>100`, `100` results are returned by default.

Status Codes:

- 200 OK --

Response JSON Object:

- **count** (integer) -- (required)
- **next** (string) --
- **previous** (string) --
- **results[].background_color** (string) -- (required)
- **results[].key** (string) -- (required)
- **results[].label** (string) -- (required)
- **results[].text_color** (string) -- (required)
- **results[].url** (string) -- (read only)

`GET /filestatustypes/{key}/`

API endpoint for managing file status types.

Parameters:

- **key** (string) --

Status Codes:

- 200 OK --

Response JSON Object:

- **background_color** (string) -- (required)
- **key** (string) -- (required)
- **label** (string) -- (required)
- **text_color** (string) -- (required)
- **url** (string) -- (read only)

`PATCH /filestatustypes/{key}/`

API endpoint for managing file status types.

Parameters:

- **key** (string) --

Request JSON Object:

- **background_color** (string) -- (required)
- **label** (string) -- (required)
- **text_color** (string) -- (required)

Status Codes:

- 200 OK --

Response JSON Object:

- **background_color** (string) -- (required)
- **label** (string) -- (required)
- **text_color** (string) -- (required)

`GET /groups/`

API endpoint for managing groups.

Query Parameters:

- **page** (integer) -- A page number within the paginated result set. When not given, first page is retrieved by default.
- **page_size** (integer) -- Number of results to return per page. Page size parameter can be a number between `20` and `100`. For disabling pagination and retrieving all results, `0` should be given. When page size parameter is empty or `<20`, `20` results are returned by default. When page size parameter `>100`, `100` results are returned by default.

Status Codes:

- 200 OK --

Response JSON Object:

- **count** (integer) -- (required)
- **next** (string) --
- **previous** (string) --
- **results[].name** (string) -- (required)
- **results[].permissions[]** (string) --
- **results[].users** (string) -- (required)

`POST /groups/`

API endpoint for managing groups.

Request JSON Object:

- **name** (string) -- (required)
- **permissions[]** (string) --
- **users** (string) -- (required)

Status Codes:

- 201 Created --

Response JSON Object:

- **name** (string) -- (required)
- **permissions[]** (string) --
- **users** (string) -- (required)

`GET /groups/{id}/`

API endpoint for managing groups.

Parameters:

- **id** (string) --

Status Codes:

- 200 OK --

Response JSON Object:

- **name** (string) -- (required)
- **permissions[]** (string) --
- **users** (string) -- (required)

`PATCH /groups/{id}/`

API endpoint for managing groups.

Parameters:

- **id** (string) --

Request JSON Object:

- **name** (string) -- (required)
- **permissions[]** (string) --
- **users** (string) -- (required)

Status Codes:

- 200 OK --

Response JSON Object:

- **name** (string) -- (required)
- **permissions[]** (string) --
- **users** (string) -- (required)

DELETE /groups/{id}/

API endpoint for managing groups.

Parameters:

- **id** (string) --

Status Codes:

- 204 No Content --

GET /ipaddresses/

API endpoint for managing IP addresses.

Query Parameters:

- **page** (integer) -- A page number within the paginated result set. When not given, first page is retrieved by default.
- **page_size** (integer) -- Number of results to return per page. Page size parameter can be a number between `20` and `100`. For disabling pagination and retrieving all results, `0` should be given. When page size parameter is empty or `<20`, `20` results are returned by default. When page size parameter `>100`, `100` results are returned by default.
- **site** (integer) -- Site id that the IP is assigned to

Status Codes:

- 200 OK --

Response JSON Object:

- **count** (integer) -- (required)
- **next** (string) --
- **previous** (string) --
- **results[].id** (integer) -- (read only)
- **results[].ipaddr** (string) -- IP Address (IPv4) (required)
- **results[].site.id** (integer) -- (read only)
- **results[].site.name** (string) -- Site Name (required)
- **results[].site.url** (string) -- (read only)

POST /ipaddresses/

API endpoint for managing IP addresses.

Request JSON Object:

- **id** (integer) -- (read only)
- **ipaddr** (string) -- IP Address (IPv4) (required)
- **site** (integer) -- (required)

Status Codes:

- 201 Created --

Response JSON Object:

- **id** (integer) -- (read only)
- **ipaddr** (string) -- IP Address (IPv4) (required)
- **site** (integer) -- (required)

GET /ipaddresses/{ipaddr}/

API endpoint for managing IP addresses.

Parameters:

- **ipaddr** (string) --

Status Codes:

- 200 OK --

Response JSON Object:

- **id** (integer) -- (read only)
- **ipaddr** (string) -- IP Address (IPv4) (required)
- **site.id** (integer) -- (read only)
- **site.name** (string) -- Site Name (required)
- **site.url** (string) -- (read only)

`PATCH /ipaddresses/{ipaddr}/`

API endpoint for managing IP addresses.

Parameters:

- **ipaddr** (string) --

Request JSON Object:

- **id** (integer) -- (read only)
- **ipaddr** (string) -- IP Address (IPv4) (required)
- **site** (integer) -- (required)

Status Codes:

- 200 OK --

Response JSON Object:

- **id** (integer) -- (read only)
- **ipaddr** (string) -- IP Address (IPv4) (required)
- **site** (integer) -- (required)

`DELETE /ipaddresses/{ipaddr}/`

API endpoint for managing IP addresses.

Parameters:

- **ipaddr** (string) --

Status Codes:

- 204 No Content --

`GET /jobs/`

API endpoint for managing jobs.

Query Parameters:

- **page** (integer) -- A page number within the paginated result set. When not given, first page is retrieved by default.
- **page_size** (integer) -- Number of results to return per page. Page size parameter can be a number between `20` and `100`. For disabling pagination and retrieving all results, `0` should be given. When page size parameter is empty or `<20`, `20` results are returned by default. When page size parameter `>100`, `100` results are returned by default.
- **created** (string) -- Time period string for filtering jobs by time. Leave `null` for displaying jobs in all times.
- **created_time_from** (string) -- Start time for filtering jobs by time in UTC. Discarded when `created` parameter is given.
- **created_time_to** (string) -- End time for filtering jobs by time in UTC. Discarded when `created` parameter is given.
- **jobtype** (string) -- Job type

- **state** (array) --
- **owner** (string) -- Job owner's username
- **clientkey** (string) -- Job clientkey information if the owner is an automated process
- **schedule** (string) -- Job schedule information if the job is scheduled
- **clientkeyId** (integer) -- Job clientkey ID
- **scheduleId** (integer) -- Job schedule ID
- **siteId** (integer) -- Job site ID
- **pathPrefix** (string) -- Path prefix for the job paths

Status Codes:

- 200 OK --

Response JSON Object:

- **count** (integer) -- (required)
- **next** (string) --
- **previous** (string) --
- **results[].clientkey** (string) -- (read only)
- **results[].completed** (string) -- Time of the job completion
- **results[].created** (string) -- Time of the job creation
- **results[].dir_walk_complete** (string) -- (read only)
- **results[].id** (integer) -- (read only)
- **results[].jobtype** (string) -- (required)
- **results[].num_dir_tasks** (string) -- (read only)
- **results[].numfailedfiles** (integer) --
- **results[].numfiles** (integer) --
- **results[].numprocessedfiles** (integer) --
- **results[].numskippedfiles** (integer) --
- **results[].owner** (string) -- (read only)
- **results[].runtime** (string) -- (read only)
- **results[].schedule** (string) -- (read only)
- **results[].site** (string) -- Site Name (required)
- **results[].started** (string) -- Time the job started executing
- **results[].state** (string) --
- **results[].url** (string) -- (read only)

`POST /jobs/`

API endpoint for managing jobs.

Request JSON Object:

- **discovery** (string) -- Path discovery method
- **jobtype** (string) -- (required)
- **paths[]** (string) --
- **site** (string) -- Site Name (required)
- **state** (string) --

Status Codes:

- 201 Created --

Response JSON Object:

- **discovery** (string) -- Path discovery method
- **jobtype** (string) -- (required)
- **paths[]** (string) --
- **site** (string) -- Site Name (required)

- **state** (string) --

GET /jobs/recent/

Retrieves last N jobs as recent jobs. N = 5 by default (defined in dynamohub/settings/base.py).

Query Parameters:

- **page** (integer) -- A page number within the paginated result set. When not given, first page is retrieved by default.
- **page_size** (integer) -- Number of results to return per page. Page size parameter can be a number between `20` and `100`. For disabling pagination and retrieving all results, `0` should be given. When page size parameter is empty or `<20`, `20` results are returned by default. When page size parameter `>100`, `100` results are returned by default.

Status Codes:

- 200 OK --

Response JSON Object:

- **count** (integer) -- (required)
- **next** (string) --
- **previous** (string) --
- **results[].clientkey** (string) -- (read only)
- **results[].completed** (string) -- Time of the job completion
- **results[].created** (string) -- Time of the job creation
- **results[].dir_walk_complete** (string) -- (read only)
- **results[].discovery** (string) -- Path discovery method
- **results[].id** (integer) -- (read only)
- **results[].jobtype** (string) -- (required)
- **results[].num_dir_tasks** (string) -- (read only)
- **results[].numfailedfiles** (integer) --
- **results[].numfiles** (integer) --
- **results[].numprocessedfiles** (integer) --
- **results[].numskippedfiles** (integer) --
- **results[].owner** (string) -- (read only)
- **results[].paths** (string) -- (read only)
- **results[].runtime** (string) -- (read only)
- **results[].schedule** (string) -- (read only)
- **results[].site** (string) -- Site Name (required)
- **results[].started** (string) -- Time the job started executing
- **results[].state** (string) --
- **results[].url** (string) -- (read only)

GET /jobs/stats/

API endpoint for managing jobs.

Query Parameters:

- **page** (integer) -- A page number within the paginated result set. When not given, first page is retrieved by default.
- **page_size** (integer) -- Number of results to return per page. Page size parameter can be a number between `20` and `100`. For disabling pagination and retrieving all results, `0` should be given. When page size parameter is

empty or `<20`, `20` results are returned by default. When page size parameter `>100`, `100` results are returned by default.

- **created** (string) -- Time period string for filtering jobs by time. Leave `null` for displaying jobs in all times.
- **created_time_from** (string) -- Start time for filtering jobs by time in UTC. Discarded when `created` parameter is given.
- **created_time_to** (string) -- End time for filtering jobs by time in UTC. Discarded when `created` parameter is given.
- **jobtype** (string) -- Job type
- **state** (array) --
- **owner** (string) -- Job owner's username
- **clientkey** (string) -- Job clientkey information if the owner is an automated process
- **schedule** (string) -- Job schedule information if the job is scheduled
- **clientkeyId** (integer) -- Job clientkey ID
- **scheduleId** (integer) -- Job schedule ID
- **siteId** (integer) -- Job site ID
- **pathPrefix** (string) -- Path prefix for the job paths

Status Codes:

- 200 OK --

Response JSON Object:

- **count** (integer) -- (required)
- **next** (string) --
- **previous** (string) --
- **results[].clientkey** (string) -- (read only)
- **results[].completed** (string) -- Time of the job completion
- **results[].created** (string) -- Time of the job creation
- **results[].dir_walk_complete** (string) -- (read only)
- **results[].discovery** (string) -- Path discovery method
- **results[].id** (integer) -- (read only)
- **results[].jobtype** (string) -- (required)
- **results[].num_dir_tasks** (string) -- (read only)
- **results[].numfailedfiles** (integer) --
- **results[].numfiles** (integer) --
- **results[].numprocessedfiles** (integer) --
- **results[].numskippedfiles** (integer) --
- **results[].owner** (string) -- (read only)
- **results[].paths** (string) -- (read only)
- **results[].runtime** (string) -- (read only)
- **results[].schedule** (string) -- (read only)
- **results[].site** (string) -- Site Name (required)
- **results[].started** (string) -- Time the job started executing
- **results[].state** (string) --
- **results[].url** (string) -- (read only)

GET /jobs/{id}/

API endpoint for managing jobs.

Parameters:

- **id** (string) --

Status Codes:

- 200 OK --

Response JSON Object:

- **clientkey** (string) -- (read only)
- **completed** (string) -- Time of the job completion
- **created** (string) -- Time of the job creation
- **dir_walk_complete** (string) -- (read only)
- **discovery** (string) -- Path discovery method
- **id** (integer) -- (read only)
- **jobtype** (string) -- (required)
- **num_dir_tasks** (string) -- (read only)
- **numfailedfiles** (integer) --
- **numfiles** (integer) --
- **numprocessedfiles** (integer) --
- **numskippedfiles** (integer) --
- **owner** (string) -- (read only)
- **paths** (string) -- (read only)
- **runtime** (string) -- (read only)
- **schedule** (string) -- (read only)
- **site** (string) -- Site Name (required)
- **started** (string) -- Time the job started executing
- **state** (string) --
- **url** (string) -- (read only)

`PATCH /jobs/{id}/`

API endpoint for managing jobs.

Parameters:

- **id** (string) --

Request JSON Object:

- **discovery** (string) -- Path discovery method
- **jobtype** (string) -- (required)
- **paths[]** (string) --
- **site** (string) -- Site Name (required)
- **state** (string) --

Status Codes:

- 200 OK --

Response JSON Object:

- **discovery** (string) -- Path discovery method
- **jobtype** (string) -- (required)
- **paths[]** (string) --
- **site** (string) -- Site Name (required)
- **state** (string) --

`DELETE /jobs/{id}/`

API endpoint for managing jobs.

Parameters:

- **id** (string) --

Status Codes:

- 204 No Content --

GET /jobs/{id}/files/

Retrieves the files related with a job, with their execution status.

Parameters:

- **id** (string) --

Query Parameters:

- **category** (string) --

Status Codes:

- 200 OK --

Response JSON Object:

- **clientkey** (string) -- (read only)
- **completed** (string) -- Time of the job completion
- **created** (string) -- Time of the job creation
- **dir_walk_complete** (string) -- (read only)
- **discovery** (string) -- Path discovery method
- **id** (integer) -- (read only)
- **jobtype** (string) -- (required)
- **num_dir_tasks** (string) -- (read only)
- **numfailedfiles** (integer) --
- **numfiles** (integer) --
- **numprocessedfiles** (integer) --
- **numskippedfiles** (integer) --
- **owner** (string) -- (read only)
- **paths** (string) -- (read only)
- **runtime** (string) -- (read only)
- **schedule** (string) -- (read only)
- **site** (string) -- Site Name (required)
- **started** (string) -- Time the job started executing
- **state** (string) --
- **url** (string) -- (read only)

POST /jobs/{id}/resubmit/

Resubmits the job with given id. If the job is not finished yet, this action will not have an effect.

Parameters:

- **id** (string) --

Status Codes:

- 201 Created --

GET /schedules/

Query Parameters:

- **page** (integer) -- A page number within the paginated result set. When not given, first page is retrieved by default.
- **page_size** (integer) -- Number of results to return per page. Page size parameter can be a number between `20` and `100`. For disabling pagination and retrieving all results, `0` should be given. When page size parameter is

empty or `<20`, `20` results are returned by default. When page size parameter `>100`, `100` results are returned by default.

Status Codes:

- 200 OK --

Response JSON Object:

- **count** (integer) -- (required)
- **next** (string) --
- **previous** (string) --
- **results[].day_of_month** (string) -- The day setting for the cron schedule
- **results[].day_of_week** (string) -- The week setting for the cron schedule
- **results[].enabled** (boolean) -- If the schedule should be enabled
- **results[].hour** (string) -- The hour setting for the cron schedule
- **results[].id** (integer) -- (read only)
- **results[].managed_paths** (object) -- Path of managed filesystem elements
- **results[].minute** (string) -- The minute setting for the cron schedule
- **results[].month_of_year** (string) -- The month setting for the cron schedule
- **results[].name** (string) -- Schedule Name (required)
- **results[].site** (string) -- Related site to the schedule (required)
- **results[].url** (string) -- (read only)
- **results[].workflow** (string) -- The target workflow for the schedule
- **results[].workflow_fields** (object) -- Mapping of path to operation for task usage
- **results[].workflow_kwargs** (object) -- The key word arguments to provide a workflow call

`POST /schedules/`

Request JSON Object:

- **day_of_month** (string) -- The day setting for the cron schedule
- **day_of_week** (string) -- The week setting for the cron schedule
- **enabled** (boolean) -- If the schedule should be enabled
- **hour** (string) -- The hour setting for the cron schedule
- **id** (integer) -- (read only)
- **minute** (string) -- The minute setting for the cron schedule
- **month_of_year** (string) -- The month setting for the cron schedule
- **name** (string) -- Schedule Name (required)
- **site** (string) -- Related site to the schedule (required)
- **url** (string) -- (read only)

Status Codes:

- 201 Created --

Response JSON Object:

- **day_of_month** (string) -- The day setting for the cron schedule
- **day_of_week** (string) -- The week setting for the cron schedule
- **enabled** (boolean) -- If the schedule should be enabled
- **hour** (string) -- The hour setting for the cron schedule
- **id** (integer) -- (read only)
- **minute** (string) -- The minute setting for the cron schedule
- **month_of_year** (string) -- The month setting for the cron schedule
- **name** (string) -- Schedule Name (required)
- **site** (string) -- Related site to the schedule (required)
- **url** (string) -- (read only)

GET /schedules/{id}/

Parameters:

- **id** (string) --

Status Codes:

- 200 OK --

Response JSON Object:

- **day_of_month** (string) -- The day setting for the cron schedule
- **day_of_week** (string) -- The week setting for the cron schedule
- **enabled** (boolean) -- If the schedule should be enabled
- **hour** (string) -- The hour setting for the cron schedule
- **id** (integer) -- (read only)
- **managed_paths** (object) -- Path of managed filesystem elements
- **minute** (string) -- The minute setting for the cron schedule
- **month_of_year** (string) -- The month setting for the cron schedule
- **name** (string) -- Schedule Name (required)
- **site** (string) -- Related site to the schedule (required)
- **url** (string) -- (read only)
- **workflow** (string) -- The target workflow for the schedule
- **workflow_fields** (object) -- Mapping of path to operation for task usage
- **workflow_kwargs** (object) -- The key word arguments to provide a workflow call

PATCH /schedules/{id}/

Parameters:

- **id** (string) --

Request JSON Object:

- **day_of_month** (string) -- The day setting for the cron schedule
- **day_of_week** (string) -- The week setting for the cron schedule
- **enabled** (boolean) -- If the schedule should be enabled
- **hour** (string) -- The hour setting for the cron schedule
- **id** (integer) -- (read only)
- **minute** (string) -- The minute setting for the cron schedule
- **month_of_year** (string) -- The month setting for the cron schedule
- **name** (string) -- Schedule Name (required)
- **site** (string) -- Related site to the schedule (required)

Status Codes:

- 200 OK --

Response JSON Object:

- **day_of_month** (string) -- The day setting for the cron schedule
- **day_of_week** (string) -- The week setting for the cron schedule
- **enabled** (boolean) -- If the schedule should be enabled
- **hour** (string) -- The hour setting for the cron schedule
- **id** (integer) -- (read only)
- **minute** (string) -- The minute setting for the cron schedule
- **month_of_year** (string) -- The month setting for the cron schedule
- **name** (string) -- Schedule Name (required)
- **site** (string) -- Related site to the schedule (required)

DELETE /schedules/{id}/

Parameters:

- **id** (string) --

Status Codes:

- 204 No Content --

POST /schedules/{id}/job/

Parameters:

- **id** (string) --

Request JSON Object:

- **discovery** (string) -- (required)
- **fields** (object) -- (required)
- **paths[]** (string) --
- **workflow** (string) -- (required)

Status Codes:

- 201 Created --

Response JSON Object:

- **discovery** (string) -- (required)
- **fields** (object) -- (required)
- **paths[]** (string) --
- **workflow** (string) -- (required)

GET /search/

API endpoint for file search

Query Parameters:

- **page** (integer) -- A page number within the paginated result set. When not given, first page is retrieved by default.
- **page_size** (integer) -- Number of results to return per page. Page size parameter can be a number between `20` and `100`. For disabling pagination and retrieving all results, `0` should be given. When page size parameter is empty or `<20`, `20` results are returned by default. When page size parameter `>100`, `100` results are returned by default.

Status Codes:

- 200 OK --

Response JSON Object:

- **count** (integer) -- (required)
- **next** (string) --
- **previous** (string) --
- **results[].id** (integer) -- (read only)
- **results[].url** (string) -- (read only)

POST /search/

API endpoint for file search

Request JSON Object:

- **filters** (object) -- Metadata filters to apply to search
- **merge** (boolean) -- Whether matching files should be merged
- **path** (string) -- Directory to search (required)
- **recursive** (boolean) -- Search the target path recursively
- **sites[]** (string) --

Status Codes:

- 201 Created --

Response JSON Object:

- **filters** (object) -- Metadata filters to apply to search
- **merge** (boolean) -- Whether matching files should be merged
- **path** (string) -- Directory to search (required)
- **recursive** (boolean) -- Search the target path recursively
- **sites[]** (string) --

`GET /search/{id}/`

Get paginated results for a given search id.

Parameters:

- **id** (string) --

Query Parameters:

- **page** (integer) -- Number of the page of results to return
- **page_size** (integer) -- Number of results to return per page
- **sort** (string) -- One or more fields to sort results by

Status Codes:

- 200 OK --

Response JSON Object:

- **href** (string) -- (read only)
- **metadata** (object) -- File metadata
- **name** (string) -- Directory or file name (required)
- **path** (string) -- Directory or file path (required)
- **site** (string) -- Site Name

`DELETE /search/{id}/`

API endpoint for file search

Parameters:

- **id** (string) --

Status Codes:

- 204 No Content --

`GET /sites/`

API endpoint for managing sites.

Query Parameters:

- **page** (integer) -- A page number within the paginated result set. When not given, first page is retrieved by default.
- **page_size** (integer) -- Number of results to return per page. Page size parameter can be a number between `20` and `100`. For disabling pagination and retrieving all results, `0` should be given. When page size parameter is empty or `<20`, `20` results are returned by default. When page size parameter `>100`, `100` results are returned by default.

Status Codes:

- 200 OK --

Response JSON Object:

- **count** (integer) -- (required)
- **next** (string) --

- **previous** (string) --
- **results[].id** (integer) -- (read only)
- **results[].name** (string) -- Site Name (required)
- **results[].url** (string) -- (read only)

`POST /sites/`

API endpoint for managing sites.

Request JSON Object:
- **id** (integer) -- (read only)
- **name** (string) -- Site Name (required)
- **url** (string) -- (read only)

Status Codes:
- 201 Created --

Response JSON Object:
- **id** (integer) -- (read only)
- **name** (string) -- Site Name (required)
- **url** (string) -- (read only)

`GET /sites/{id}/`

API endpoint for managing sites.

Parameters:
- **id** (string) --

Status Codes:
- 200 OK --

Response JSON Object:
- **id** (integer) -- (read only)
- **name** (string) -- Site Name (required)
- **url** (string) -- (read only)

`PATCH /sites/{id}/`

API endpoint for managing sites.

Parameters:
- **id** (string) --

Request JSON Object:
- **id** (integer) -- (read only)
- **name** (string) -- Site Name (required)
- **url** (string) -- (read only)

Status Codes:
- 200 OK --

Response JSON Object:
- **id** (integer) -- (read only)
- **name** (string) -- Site Name (required)
- **url** (string) -- (read only)

`DELETE /sites/{id}/`

API endpoint for managing sites.

Parameters:

- **id** (string) --

Status Codes:

- 204 No Content --

GET /tasks/

API endpoint for viewing tasks.

Query Parameters:

- **page** (integer) -- A page number within the paginated result set. When not given, first page is retrieved by default.
- **page_size** (integer) -- Number of results to return per page. Page size parameter can be a number between `20` and `100`. For disabling pagination and retrieving all results, `0` should be given. When page size parameter is empty or `<20`, `20` results are returned by default. When page size parameter `>100`, `100` results are returned by default.
- **tasktype** (string) -- Task type
- **state** (string) -- Task state
- **job** (integer) -- Job ID

Status Codes:

- 200 OK --

Response JSON Object:

- **count** (integer) -- (required)
- **next** (string) --
- **previous** (string) --
- **results[].job** (integer) -- (required)
- **results[].state** (string) -- (required)
- **results[].taskid** (string) -- Job task ID (required)
- **results[].tasktype** (string) -- (required)
- **results[].url** (string) -- (read only)

GET /tasks/{taskid}/

API endpoint for viewing tasks.

Parameters:

- **taskid** (string) --

Status Codes:

- 200 OK --

Response JSON Object:

- **completed** (string) -- Time of the task completion
- **job** (integer) -- (required)
- **moved_data** (string) -- (read only)
- **numfailedfiles** (integer) --
- **numfiles** (integer) --
- **numprocessedfiles** (integer) --
- **numskippedfiles** (integer) --
- **paths** (string) -- (read only)
- **results** (string) -- (read only)
- **runtime** (string) -- (read only)
- **started** (string) -- Time that the task started running

- **state** (string) -- (required)
- **taskid** (string) -- Job task ID (required)
- **tasktype** (string) -- (required)
- **url** (string) -- (read only)

`GET /users/`

API endpoint for managing users.

Query Parameters:

- **page** (integer) -- A page number within the paginated result set. When not given, first page is retrieved by default.
- **page_size** (integer) -- Number of results to return per page. Page size parameter can be a number between `20` and `100`. For disabling pagination and retrieving all results, `0` should be given. When page size parameter is empty or `<20`, `20` results are returned by default. When page size parameter `>100`, `100` results are returned by default.

Status Codes:

- 200 OK --

Response JSON Object:

- **count** (integer) -- (required)
- **next** (string) --
- **previous** (string) --
- **results[].date_joined** (string) --
- **results[].email** (string) --
- **results[].first_name** (string) --
- **results[].groups[].id** (integer) -- (read only)
- **results[].groups[].name** (string) -- (required)
- **results[].groups[].url** (string) -- (read only)
- **results[].id** (integer) -- (read only)
- **results[].is_active** (boolean) -- Designates whether this user should be treated as active. Unselect this instead of deleting accounts.
- **results[].last_login** (string) --
- **results[].last_name** (string) --
- **results[].url** (string) -- (read only)
- **results[].username** (string) -- Required. 150 characters or fewer. Letters, digits and @/./+/-/_ only. (required)

`POST /users/`

API endpoint for managing users.

Request JSON Object:

- **email** (string) --
- **first_name** (string) --
- **groups[]** (string) --
- **last_name** (string) --
- **password** (string) -- (required)
- **username** (string) -- Required. 150 characters or fewer. Letters, digits and @/./+/-/_ only. (required)

Status Codes:

- 201 Created --

Response JSON Object:

- **email** (string) --
- **first_name** (string) --
- **groups[]** (string) --
- **last_name** (string) --
- **password** (string) -- (required)
- **username** (string) -- Required. 150 characters or fewer. Letters, digits and @/./+/-/_ only. (required)

`GET /users/{username}/`

API endpoint for managing users.

Parameters:

- **username** (string) --

Status Codes:

- 200 OK --

Response JSON Object:

- **date_joined** (string) --
- **email** (string) --
- **first_name** (string) --
- **groups[].id** (integer) -- (read only)
- **groups[].name** (string) -- (required)
- **groups[].url** (string) -- (read only)
- **id** (integer) -- (read only)
- **is_active** (boolean) -- Designates whether this user should be treated as active. Unselect this instead of deleting accounts.
- **last_login** (string) --
- **last_name** (string) --
- **url** (string) -- (read only)
- **username** (string) -- Required. 150 characters or fewer. Letters, digits and @/./+/-/_ only. (required)

`PATCH /users/{username}/`

API endpoint for managing users.

Parameters:

- **username** (string) --

Request JSON Object:

- **email** (string) --
- **first_name** (string) --
- **groups[]** (string) --
- **last_name** (string) --
- **password** (string) --

Status Codes:

- 200 OK --

Response JSON Object:

- **email** (string) --
- **first_name** (string) --
- **groups[]** (string) --
- **last_name** (string) --

- **password** (string) --

DELETE /users/{username}/

API endpoint for managing users.

Parameters:

- **username** (string) --

Status Codes:

- 204 No Content --

POST /users/{username}/activate/

Activates user account with given username.

Parameters:

- **username** (string) --

Status Codes:

- 201 Created --

POST /users/{username}/deactivate/

Deactivates user account with given username.

Parameters:

- **username** (string) --

Status Codes:

- 201 Created --

GET /workflows/

API endpoint for viewing workflows.

Query Parameters:

- **page** (integer) -- A page number within the paginated result set. When not given, first page is retrieved by default.
- **page_size** (integer) -- Number of results to return per page. Page size parameter can be a number between `20` and `100`. For disabling pagination and retrieving all results, `0` should be given. When page size parameter is empty or `<20`, `20` results are returned by default. When page size parameter `>100`, `100` results are returned by default.

Status Codes:

- 200 OK --

Response JSON Object:

- **count** (integer) -- (required)
- **next** (string) --
- **previous** (string) --
- **results[].discovery** (string) --
- **results[].enabled** (boolean) -- Is the workflow available for use?
- **results[].fields** (object) --
- **results[].filter_rules** (object) --
- **results[].icon_classes** (object) --
- **results[].id** (integer) -- (read only)
- **results[].label** (string) -- Friendly name of the workflow (required)
- **results[].name** (string) -- Name of Workflow (required)

- **results[].visible** (boolean) -- Is the workflow visible on the UI?

POST /workflows/

API endpoint for viewing workflows.

Request JSON Object:

- **discovery** (string) --
- **enabled** (boolean) -- Is the workflow available for use?
- **fields** (object) --
- **filter_rules** (object) --
- **icon_classes** (object) --
- **id** (integer) -- (read only)
- **label** (string) -- Friendly name of the workflow (required)
- **name** (string) -- Name of Workflow (required)
- **visible** (boolean) -- Is the workflow visible on the UI?

Status Codes:

- 201 Created --

Response JSON Object:

- **discovery** (string) --
- **enabled** (boolean) -- Is the workflow available for use?
- **fields** (object) --
- **filter_rules** (object) --
- **icon_classes** (object) --
- **id** (integer) -- (read only)
- **label** (string) -- Friendly name of the workflow (required)
- **name** (string) -- Name of Workflow (required)
- **visible** (boolean) -- Is the workflow visible on the UI?

GET /workflows/{id}/

API endpoint for viewing workflows.

Parameters:

- **id** (string) --

Status Codes:

- 200 OK --

Response JSON Object:

- **discovery** (string) --
- **enabled** (boolean) -- Is the workflow available for use?
- **fields** (object) --
- **filter_rules** (object) --
- **icon_classes** (object) --
- **id** (integer) -- (read only)
- **label** (string) -- Friendly name of the workflow (required)
- **name** (string) -- Name of Workflow (required)
- **visible** (boolean) -- Is the workflow visible on the UI?

PATCH /workflows/{id}/

API endpoint for viewing workflows.

Parameters:

- **id** (string) --

Request JSON Object:

- **discovery** (string) --
- **enabled** (boolean) -- Is the workflow available for use?
- **fields** (object) --
- **filter_rules** (object) --
- **icon_classes** (object) --
- **id** (integer) -- (read only)
- **label** (string) -- Friendly name of the workflow (required)
- **name** (string) -- Name of Workflow (required)
- **visible** (boolean) -- Is the workflow visible on the UI?

Status Codes:

- 200 OK --

Response JSON Object:

- **discovery** (string) --
- **enabled** (boolean) -- Is the workflow available for use?
- **fields** (object) --
- **filter_rules** (object) --
- **icon_classes** (object) --
- **id** (integer) -- (read only)
- **label** (string) -- Friendly name of the workflow (required)
- **name** (string) -- Name of Workflow (required)
- **visible** (boolean) -- Is the workflow visible on the UI?

`DELETE /workflows/{id}/`

API endpoint for viewing workflows.

Parameters:

- **id** (string) --

Status Codes:

- 204 No Content --

Tools

The following sections document add-on tools for Ngenea Hub

ngclient

NGCLIENT

SYNOPSIS

ngclient authenticate (-u USERNAME [-p PASSWORD] | -T TOKEN) [-k NAME]

ngclient migrate path... [-s site] [-r] [-p] [options...]

ngclient recall path... [-s site] [-r] [options...]

ngclient send path... [-s source] -t target [options...]

ngclient workflows COMMAND

ngclient features COMMAND

DESCRIPTION

ngclient is a CLI wrapper for the default Ngenea Hub workflows - migrate, recall, and send. It also provides a mechanism for generating authentication tokens.

ngclient settings can be read from a config file, rather than being passed on the command line. See **ngenea-client.conf(5)** for more information on the configuration format. CLI flags take precedence over config file settings.

The authenticate command can be used to generate a client key from a username or access token. The generated client key will be printed to stdout. That client key can then be used with the workflow sub-commands, either via the --client-key flag, or by saving it to the **ngenea-client.conf(5)** configuration file.

The workflows command group contains sub-commands for interacting with workflows, such as listing workflows and importing new one. See **ngclient-workflows(1)** for more details.

The features command group contains sub-commands for listing, enabling, or disabling feature flags. See **ngclient-features(1)** for more details.

OPTION SUMMARY

```
      path...                 One paths to call the workflow on

-T, --access-token TOKEN      Access token to authenticate with
-u, --username USERNAME       Username to authenticate with
-p, --password PASSWORD       Password for the authentication username
-k, --key-name NAME           Unique name for the client key

    --base-url                Base URL of the {{ brand_name }} API

-c, --config CONFIG           Alternative configuration file path
    --client-key KEY          Client API key to authenticate with

-s, --site SITE               Site to perform the workflow on
-t, --target TARGET           Site to send files to

-d, --no-wait                 Exit after job is submitted, don't wait
for it to complete
    --timeout SECONDS         wait for completion timeout. If not set, w
ait indefinitely

-r, --recursive               Perform task recursively.
-p, --premigrate              Premigrate files from site
-H, --hydrate                 Hydrate files on the send target site
```

```
-h, --help                  Print help message and exit
```

OPTIONS

- **-T**, **--access-token**

  An access token to generate a client key with.

- **-u**, **--username**

  Username to generate a client key with.

- **-p**, **--password**

  Password to use in combination with --username

  If --username is specified and --password isn't, you will be prompted to enter a password interactively. This may be preferrable so that the password doesn't appear in shell history.

- **-k**, **--key-name**

  A unique name to assign when generating a client key.

  This will be displayed in the Ngenea Hub UI

  If not specified, a random uuid will be generated for the key name.

- **--base-url**

  Base URL of the Ngenea Hub API, which operations will be performed against.

  This can be used to perform Ngenea Hub operations on a remote server.

  If not specified, the default is http://localhost:8000/api

- **-c**, **--config**

  The path to an alternative configuration file.

  If not specified, the default configuration paths will be used. The default paths are in the user's HOME directory $HOME/.config/ngenea/ngenea-client.conf, and the global configuration at /etc/ngenea/ngenea-client.conf

  See **ngenea-client.conf(5)** for more information on the configuration format.

  Command line options take precedence over any corresponding config file settings.

- **--client-key**

  Ngenea Hub authentication client key.

This can be generated via the Ngenea Hub REST API, or using **ngclient(1)** aut henticate

- **-s**, **--site**

  Site to use for workflows.

  For migrate and recall, this is the site where the workflows execute. For send, this is the source site, from which files are sent.

  Site does not have to match the node where **ngclient** is being called. This can be used to migrate/recall/send files from a remote site.

  Note - shell-globbing will be evaluated on the local node. For a remote site, the files that the glob would match may differ.

- **-t**, **--target**

  Target site for the send workflow

- **-d**, **--no-wait**

  Don't wait for workflows to complete.

  By default, **ngclient** will wait for the workflow to complete, subject to --timeout.

  With this flag, **ngclient** will exit immediately. The workflow will continue to execute independently. In that case, the workflow can be monitored in the Ngenea Hub UI

- **--timeout**

  How long to wait for workflows to complete, in seconds.

  If not specified, **ngclient** will wait indefinitely.

  If the workflow doesn't complete within the timeout, the client will exit with an error. The workflow itself may continue to execute.

- **-r**, **--recursive**

  Migrate or recall files and directories recursively.

- **-p**, **--premigrate**

  Premigrate files

  Premigrated files are migrated, but the data is kept resident.

- **-H**, **--hydrate**

  Controls whether the send workflow 'hydrates' files on the target.

  If false, files are only reverse stubbed on the target.

- **-h**, **--help**

  Prints the help message.

EXAMPLES

GENERATE A CLIENT KEY

```
$ ngclient authenticate --username pixadmin -k ngclient-pixadmin
pixadmin's password:

jDBh2cRk6.LswQfylT2BtGiqtYUWhMB1iipJmQNgr
```

RECALL A FILE

```
ngclient recall /mmfs1/data/hello.txt -s site1 --client-key
jDBh2cRk6.LswQfylT2BtGiqtYUWhMB1iipJmQNgr
```

For brevity, the site and client-key can be saved to the config file

PREMIGRATE A DIRECTORY RECURSIVELY

Assuming the site and client key has been saved to the config file

```
ngclient migrate /mmfs1/data/sample_data/cats -p -r
```

SEND A FILE TO A REMOTE SITE

```
ngclient send /mmfs1/data/hello.txt -s site1 -t site2 --hydrate
```

AVAILABILITY

Distributed as part of the ngenea-hub-client rpm, or the ngclient wheel (Python) for non-Red Hat based systems.

The ngclient wheel can be installed and run on any operating system.

Note - transparent_recall(1) is packaged along with ngclient, but transparent_recall will only work on Unix-based operating systems.

SEE ALSO

ngenea-client.conf(5), ngclient-workflows(1), ngclient-features(1), transparent_recall(1), ngmigrate(1), ngrecall(1)

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ngclient-workflows

NGCLIENT-WORKFLOWS

SYNOPSIS

ngclient workflows list [workflow-id] [options...]

ngclient workflows import workflow-file [options...]

ngclient workflows update workflow-id workflow-file [options...]

ngclient workflows delete workflow-id [options...]

DESCRIPTION

The list command is used to list one or more existing workflows from Ngenea Hub. By default, workflows are output in json format, one per line. The --yaml flag can be used to output as yaml.

The import command can be used to import a new, custom workflow from a json or yaml formatted file.

Currently it is not possible to invoke these custom workflows from **ngclient**, once created. They can be invoked from the Ngenea Hub UI or via the REST API.

The update command can be used to update an existing workflow from a json or yaml formatted file. The file can contain only the fields you want to change to perform a partial update, or a whole workflow definition for a full replacement.

NOTE - it's not possible to make partial changes to the fields or filter_rules blocks. They can only be replaced as a whole.

The delete command can be used to delete an existing workflow, by id.

Base URL and API key settings can be read from a config file, rather than being passed on the command line. See **ngenea-client.conf(5)** for more information on the configuration format. CLI flags take precedence over config file settings.

Interacting with workflows requires Ngenea Hub authentication. The **ngclient(1)** au thenticate command can be used to generate a client key from a username or access token.

OPTION SUMMARY

```
      workflow-id           Unique workflow identifier
      workflow-file         File containing a custom workflow definiti
on

    --yaml                  List workflows in yaml format

    --base-url              Base URL of the {{ brand_name }} API

-c, --config CONFIG         Alternative configuration file path
    --client-key KEY        Client API key to authenticate with

-h, --help                  Print help message and exit
```

OPTIONS

- **workflow-file**

  Path to a json or yaml formatted file, containing a workflow definition.

  If '-' is used, the workflow definition will be read from stdin.

  The workflow format is described in the main documentation, section '4.4. Custom Workflows'

- **--yaml**

  List workflows in yaml format.

  By default, workflows are output in json format, one per line (jsonl).

  The --yaml flag will output the workflows in structured yaml format. If multiple workflows are being listed, each one will be separated by a blank line.

- **--base-url**

  Base URL of the Ngenea Hub API, which operations will be performed against.

  This can be used to perform Ngenea Hub operations on a remote server.

  If not specified, the default is http://localhost:8000/api

- **-c**, **--config**

  The path to an alternative configuration file.

  If not specified, the default configuration paths will be used. The default paths are in the user's HOME directory $HOME/.config/ngenea/ngenea-client.conf, and the global configuration at /etc/ngenea/ngenea-client.conf

  See **ngenea-client.conf(5)** for more information on the configuration format.

Command line options take precedence over any corresponding config file settings.

- **--client-key**

  Ngenea Hub authentication client key.

  This can be generated via the Ngenea Hub REST API, or using **ngclient(1)** aut henticate

- **-h**, **--help**

  Prints the help message.

EXAMPLES

GENERATE A CLIENT KEY

```
$ ngclient authenticate --username pixadmin -k ngclient-pixadmin
pixadmin's password:

jDBh2cRk6.LswQfylT2BtGiqtYUWhMB1iipJmQNgr
```

The following examples assume that the client key has been saved in the default config file.

GET AN EXISTING WORKFLOW

```
$ ngclient workflows list 1
{"id": 1, "name": "migrate", "label": "Migrate", "icon_classes":
["fa fa-cloud fa-stack-2x text-success", "fa fa-angle-up fa-stack-2x
text-light"], "discovery": "recursive", "enabled": true, "visible":
true, "fields": [], "filter_rules": [{"type": "all", "state": "all",
"action": [{"name": "dynamo.tasks.migrate"}], "description": "Migrate
s a file off from a given path"}]}
```

LIST ALL EXISTING WORKFLOWS IN YAML FORMAT

```
$ ngclient workflows list --yaml
id: 1
name: migrate
label: Migrate
discovery: recursive
...
enabled: true
visible: true

id: 2
name: premigrate
label: Premigrate
discovery: recursive
...
```

```
enabled: true
visible: true

...
```

(the above example output has been truncated)

IMPORT A CUSTOM WORKFLOW

Using the following workflow definition in json format

```
$ cat overwrite_workflow.json
{"name": "recall_overwrite", "label": "Overwrite On Recall", "icon_cl
asses": ["fa fa-cloud fa-stack-2x text-primary", "fa fa-caret-down
fa-stack-2x text-light"], "filter_rules": [{"type": "all", "state": "
all", "action": [{"name": "dynamo.tasks.reverse_stub", "site": "*dest
inationsite", "overwrite": true}]}], "fields": [{"name": "destination
site", "type": "enum[site]", "label": "Destination Site", "value": "s
ite"}]}
```

Import the workflow as follows

```
ngclient workflows import overwrite_workflow.json
```

RENAME A WORKFLOW

With the change in yaml format, using '-' to read from stdin

```
echo "name: overwrite_on_recall" | ngclient workflows update 6 -
```

DELETE A WORKFLOW

```
ngclient workflows delete 6
```

AVAILABILITY

Distributed as part of the ngenea-hub-client rpm, or the ngclient wheel (Python) for non-Red Hat based systems.

The ngclient wheel can be installed and run on any operating system.

SEE ALSO

ngclient(1), ngenea-client.conf(5)

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ngclient-features

NGCLIENT-FEATURES

SYNOPSIS

ngclient features list [options...]

ngclient features enable name [options...]

ngclient features disable name [options...]

DESCRIPTION

The list command is used to list available feature flags for .

The enable and disable commands can be used to enable a named feature in Ngenea Hub.

Base URL and API key settings can be read from a config file, rather than being passed on the command line. See **ngenea-client.conf(5)** for more information on the configuration format. CLI flags take precedence over config file settings.

Interacting with features requires Ngenea Hub authentication. The **ngclient(1)** aut henticate command can be used to generate a client key from a username or access token.

OPTION SUMMARY

```
      name                  Name of the feature to enable or disable

    --json                  List features in json format

    --base-url              Base URL of the {{ brand_name }} API

-c, --config CONFIG         Alternative configuration file path
    --client-key KEY        Client API key to authenticate with

-h, --help                  Print help message and exit
```

OPTIONS

- **--json**

  List features in json format.

  By default, the list command will report features in a table-based format. The --json flag will report features in json format instead, one per line.

- **--base-url**

  Base URL of the Ngenea Hub API, which operations will be performed against.

  This can be used to perform Ngenea Hub operations on a remote server.

  If not specified, the default is http://localhost:8000/api

- **-c**, **--config**

  The path to an alternative configuration file.

  If not specified, the default configuration paths will be used. The default paths are in the user's HOME directory $HOME/.config/ngenea/ngenea-client.conf, and the global configuration at /etc/ngenea/ngenea-client.conf

  See **ngenea-client.conf(5)** for more information on the configuration format.

  Command line options take precedence over any corresponding config file settings.

- **--client-key**

  Ngenea Hub authentication client key.

  This can be generated via the Ngenea Hub REST API, or using **ngclient(1)** aut henticate

- **-h**, **--help**

  Prints the help message.

EXAMPLES

The following examples assume that the client key has been saved in the default config file.

LIST AVAILABLE FEATURES

```
$ ngclient features list
 [X]  searchui    Enable search features in the UI
 [ ]  rbac        Enable role-based access controls
```

(The above are just examples and may not reflect actual feature flags)

ENABLE A FEATURE

```
ngclient features enable rbac
```

DISABLE A FEATURE

```
ngclient features disable searchui
```

AVAILABILITY

Distributed as part of the ngenea-hub-client rpm, or the ngclient wheel (Python) for non-Red Hat based systems.

The ngclient wheel can be installed and run on any operating system.

SEE ALSO

ngclient(1), ngenea-client.conf(5)

LICENSE

---

ngenea-client.conf

NGENEACLIENTCONF

SYNOPSIS

The Ngenea Hub client configuration files is used to configure **ngclient(1)** and **transparent_recall(1)**

The default config file locations are in the user's HOME directory $HOME/.config/ngenea/ngenea-client.conf, with a global config at /etc/ngenea/ngenea-client.conf.

If both configuration files exist, the user config will take precedence, with the global config used for any values not specified in the user config.

For example

```
# global config
[settings]
base_url = http://10.172.0.23:8000/api
```

```
site = default

# user config
[settings]
site = mysite
```

would result in base_url = http://10.172.0.23:8000/api, since it's not specified in the user config, and site = mysite since the value from the user config takes precedence.

NOTE - unless explicitly specified with the --config flag, both ngclient(1) and transparent_recall(1) will use this same default config files.

If a config file is explicitly specified with --config, the default configs will not be considered at all.

Command line options take precedence over any corresponding config file settings.

FILE FORMAT

ngenea-client.conf(5) uses an ini-style format.

It is made up of key = value lines under the [settings] section header.

```
[settings]
client_key = mykey
```

Boolean type values can be either true, false, yes, or no (case-insensitive)

Additional sections, or unrecognised keys are ignored.

PARAMETERS

- **base_url**

  Base URL of the Ngenea Hub API, which operations will be performed against.

  This can be used to perform Ngenea Hub operations on a remote server.

  If not specified, the default is http://localhost:8000/api

- **client_key**

  Ngenea Hub authentication client key.

  This can be generated via the Ngenea Hub REST API, or using **ngclient(1)** aut henticate

- **site**

  The default site to use for workflows.

For migrate and recall, this is the site where the workflows execute. For send, this is the source site, from which files are sent.

- **wait**

  Whether to wait for workflows to complete.

  If true (default), tools will wait for the workflow to complete, subject to timeout.

  If false, tools will exit immediately. The workflow will continue to execute independently. In that case, the workflow can be monitored in the Ngenea Hub UI

- **timeout**

  How long to wait for workflows to complete, in seconds.

  If not set, tools will wait indefinitely.

  If the workflow doesn't complete within the timeout, the client will exit with an error. The workflow itself may continue to execute.

- **hydrate**

  For **ngclient(1)** send, controls whether sent files are hydrated on the target.

  If false, files are only reverse stubbed on the target.

EXAMPLE

```
[settings]
base_url = http://mypixserver:8000/api
client_key = ...
site = mysite
wait = true
timeout = 180
hydrate = true
```

SEE ALSO

ngclient(1), transparent_recall(1)

LICENSE

transparent_recall

TRANSPARENT_RECALL

SYNOPSIS

transparent_recall file [--config CONF]

DESCRIPTION

transparent_recall is a tool for recalling individual files via Ngenea Hub

Performing recalls via Ngenea Hub allows for monitoring progress via the Ngenea Hub UI. Individual recall tasks performed on demand, but for reporting are grouped together into one job per hour.

transparent_recall can be called directly to recall files, but typically would be installed as a filesystem policy rule. See **TRANSPARENT RECALL POLICY** for more info.

OPTION SUMMARY

```
      file           One or more directory to export events from

    --config CONF    Alternative configuration file location
-h, --help           Print help message and exit
```

OPTIONS

- **--config**

  The path to an alternative configuration file.

  If not specified, the default configuration paths will be used. The default paths are in the user's HOME directory $HOME/.config/ngenea/ngenea-client.conf, and the global configuration at /etc/ngenea/ngenea-client.conf

  See the **CONFIGURATION** section below and ngenea-client.conf(5) for more information.

  Command line options take precedence over any corresponding config file settings.

- **-h**, **--help**

  Prints the help message.

CONFIGURATION

transparent_recall requires authentication to be able to perform recalls via Ngenea Hub. To authenticate, a valid client_key must be placed in the configuration file.

A client key can be generated via the Ngenea Hub REST API, or using the **ngclient(1)** authenticate command.

Minimally, the configuration must include this client_key, as well as the site where recalls are performed.

```
[settings]
client_key = ...
site = thissite
```

The site must match the the node where the recall was triggered.

transparent_recall will respect any **ngclient(1)** recall configuration options, except for recursive. This includes timeout; by default it will wait indefinitely for the recall to complete.

See **ngenea-client.conf(5)** for more information on the configuration format and additional options.

TRANSPARENT RECALL POLICY

Transparent recall, by definition, is intended to be triggered automatically when an offline file is opened for reading or writing.

To enable transparent recall functionality using **transparent_recall**, the following rules can be added to the filesystem placement policy.

```
define(xattr_stbsz,[INTEGER(XATTR('dmapi.APXstbsz'))])

RULE FileOpen EVENT 'OPEN'
     ACTION(SetDataEvent(0, OP_READ, CASE WHEN xattr_stbsz IS NULL
THEN 0 ELSE xattr_stbsz END) AND
            SetDataEvent(1, OP_WRITE+OP_TRUNC, 0))
     WHERE XATTR('dmapi.APXguuid') IS NOT NULL AND
CountSubstr(MISC_ATTRIBUTES,'V')>0

RULE FileOpen_else EVENT 'OPEN' DIRECTORIES_PLUS

RULE FileData EVENT 'DATA'
     ACTION(system('/usr/bin/python3 /usr/bin/transparent_recall '''
|| getDetail('path_name') || ''')=0)
     WHERE XATTR('dmapi.APXguuid') IS NOT NULL AND
CountSubstr(MISC_ATTRIBUTES,'V')>0

RULE FileData_else EVENT 'DATA' DIRECTORIES_PLUS
```

If transparent recall (EVENT) rules are already installed for ngenea (native), these rules should replace those equivalent rules.

Don't replace any rules besides the ngenea EVENT rules, e.g. don't replace any SET POOL rules.

See **mmchpolicy(1)** for how to change the filesystem placement policy

TROUBLESHOOTING

When attempting to read an offline file, if the read process reports "Operation not permitted", and it's not due to permissions, the most likely cause is that the recall failed.

Logs for the **transparent_recall** command invocation can be found at /var/adm/ras/mmfs.log.latest

Logs for the transparent recall job can be viewed via Ngenea Hub.

WARNING - if reading a file triggers a recall, the read request will block until recall exits; it can't be interrupted (Ctrl+C) or killed (kill -9). If the recall job is 'stuck' and no timeout is set, the only way to make the read process exit is to kill the recall job via Ngenea Hub.

AVAILABILITY

Distributed as part of the ngenea-hub-client rpm, or the ngclient wheel (Python) for non-Red Hat based systems.

Note - **transparent_recall** makes use of flock(2), so can only be used on Unix-base operating systems.

SEE ALSO

ngclient(1), ngenea-client.conf(5), ngrecall(1), mmchpolicy(1)

LICENSE

Contact

Ngenea Hub is provided and supported by:

Pixit Media: https://pixitmedia.com/contact-us/

Arcastream: https://www.arcastream.com/contact/

Ngenea Hub Changelog

```
Ngenea Hub 1.7.0 (2022-01-24)
=============================

Features
--------

- feature improvement added for runtime fields to have default
values for choices type (DYNAMOHUB-153)
- feature added for choices runtime field to support list of objects
(DYNAMOHUB-154)
- Added support for providing file states for non-discovery
workflows (DYNAMOHUB-344)
- Allowed the use of multiple generic rules within the recursive
discovery task (DYNAMOHUB-476)
- API endpoint for feature flags (DYNAMOHUB-482)
- Search UI is a configurable feature now. (DYNAMOHUB-483)
- ngclient sub-commands for listing and setting feature flags
(DYNAMOHUB-484)
- Feature API is used for enabling and disabling the usage of UI
elements. (DYNAMOHUB-485)


Bugfixes
--------

- Number of search results per site is 200 results by default
(DYNAMOHUB-374)
- fixed issue by adding fields in job model instance for resubmit
tasks (DYNAMOHUB-465)
- Performance improvements on the Jobs page (DYNAMOHUB-466)
- A timeout is added for failed search operations. If no results are
found in 100 seconds, the error will show up and the search will
halt. (DYNAMOHUB-498)
- Search results can be sorted by metadata fields. (DYNAMOHUB-557)


Ngenea Hub 1.6.0 (2021-12-21)
=============================

Features
--------

- Set graceful timeout on stat requests, default to 10 seconds.
(DYNAMOHUB-338)
- JWTs are created by using RS256 algorithm (DYNAMOHUB-353)
- Use search result to jump to directory in file browser
(DYNAMOHUB-380)
- Expose JWK set used in token verification via API endpoint
```

(DYNAMOHUB-430)
- Use Hub authentication for Grafana access (DYNAMOHUB-431)
- Initial framework and metrics for Grafana dashboads (DYNAMOHUB-432)
- ngclient command to import and export custom workflows
(DYNAMOHUB-434)
- NgeneaHub UI management of scheduled workflows (DYNAMOHUB-435)

Bugfixes

- Migration path not correct when upgrading from 1.3.0
(DYNAMOHUB-397)
- Fix incorrect PDF Documention download link (DYNAMOHUB-440)
- Fixed issue with task start time formatting (DYNAMOHUB-441)
- Custom workflow steps can get wiped on upgrade (DYNAMOHUB-442)
- Fix incorrect download link for ngenea client (DYNAMOHUB-444)
- Mark tasks as completed when skipped (DYNAMOHUB-477)
- Fix date string parsing error in update_task celery task
(DYNAMOHUB-508)

Ngenea Hub 1.5.0 (2021-11-22)
=============================

Features

- Workflows can be enabled/disabled. Also, workflows can be
available to use via the API only. (DYNAMOHUB-167)
- File browser can be filtered by filetype, size, change date,
accessed date. (DYNAMOHUB-196)
- Job list filtering options are extended. Jobs can be filtered by
site and path prefix information too. (DYNAMOHUB-299)
- Endpoint to submit search requests (DYNAMOHUB-319)
- Endpoint for retrieving search results (DYNAMOHUB-320)
- Submit async search tasks and store results (DYNAMOHUB-321)
- Periodically remove old search results (DYNAMOHUB-328)
- Support for search backend configurations (DYNAMOHUB-329)
- Added the option to provide the django secret key via the
environment (DYNAMOHUB-342)
- Include available metadata fields with search results
(DYNAMOHUB-382)
- Add job completion and run time to metadata (DYNAMOHUB-63)

Bugfixes

- Set task status to ERROR if any file failed (DYNAMOHUB-161)
- Fixed job processed and failed files incorrectly returning empty
lists (DYNAMOHUB-264)
- Fix transparent recall policy to handle paths with whitespace
(DYNAMOHUB-324)

```
- Retry on error when waiting for transparent recall (DYNAMOHUB-336)


Improved Documentation
----------------------

- Clarify transparent recall documentation (DYNAMOHUB-324)


Ngenea Hub 1.4.0 (2021-10-15)
=============================

Features
--------

- Consolidate the 3 ngenea-worker systemd services to a single
service for easier management. (DYNAMOHUB-149)


Dynamohub 1.3.0 (2021-09-22)
============================

Features
--------

- “live” changes to file status (DYNAMOHUB-105)
- Transparent Recall logging (DYNAMOHUB-100)
- Expose Groups model via REST API (DYNAMOHUB-277)
- Option to show/hide hidden objects in the filebrowser
(DYNAMOHUB-262)
- UI for setting IP addresses against Site (DYNAMOHUB-232)
- Extend site model to store it's IP addresses (DYNAMOHUB-229)
- ClientKey UI (DYNAMOHUB-143)
- PATCH support for /workflow/ endpoint (DYNAMOHUB-285)
- Spinners on UI components waiting for API response (DYNAMOHUB-281)
- Having visible alerts or redirects according to the websocket
warnings (DYNAMOHUB-276)
- Websocket request should wait for response before sending another
request (DYNAMOHUB-272)
- Reconsider websockets broadcast approach (DYNAMOHUB-271)
- Revamp 404 page (DYNAMOHUB-252)
- Allow the client-key to access all routes excluding user and
client-key (DYNAMOHUB-243)
- Control number of worker threads (DYNAMOHUB-237)
- Change colours for paginated table (DYNAMOHUB-218)
- Make action dropdown wider (DYNAMOHUB-212)
- Make task table sortable (DYNAMOHUB-202)
- Execute the production code via gunicorn (DYNAMOHUB-129)
- Task for checking the current filesets residing on a site
(DYNAMOHUB-251)
- Site worker snapdiff celery discovery task (DYNAMOHUB-245)
- Ability to submit tasks to an existing job (DYNAMOHUB-215)
- Ngenea Hub remote client (DYNAMOHUB-213)
```

```
Bugfixes
--------

- Workers can timeout on waiting for response from rabbitmq
(DYNAMOHUB-291)
- Fails to open directories with strange file names (DYNAMOHUB-288)
- Swagger logs exception (DYNAMOHUB-283)
- Prevent resubmitting a job multiple times in quick succession
(DYNAMOHUB-274)
- "Failure" job filter only shows failures for one site
(DYNAMOHUB-273)
- Actions button visible on the user profile page (DYNAMOHUB-270)
- Unable to deactivate users (DYNAMOHUB-269)
- Update user profile "save" button is always enabled (DYNAMOHUB-268)
- Inaccurate "last login" info (DYNAMOHUB-267)
- Sort order of jobs (DYNAMOHUB-266)
- Browser tries to show contents of a non-directory (DYNAMOHUB-260)
- Fix frontend issue when submitting large number of files to a
workflow (DYNAMOHUB-259)
- Clicking on "Owner" for a clientkey gives a 404 (DYNAMOHUB-253)
- Include ngeneahub-frontend in ngeneahub-images RPM (DYNAMOHUB-242)
- Resubmitting a job doesn't use the same discovery method
(DYNAMOHUB-239)
- Some overall job stats don't update until the dir walk is complete
(DYNAMOHUB-210)
- Files without a file extension are listed as both directory and
folder (DYNAMOHUB-200)

Dynamohub 1.2.0 (2021-08-11)
============================

Features
--------

- Update RabbitMQ to 3.9 (DYNAMOHUB-223)
- paginate tasks in  /api/jobs/<id> (DYNAMOHUB-204)
- Group transparent recall tasks (DYNAMOHUB-216)
- Ability to submit non-recursive tasks (DYNAMOHUB-214)

Bugfixes
--------

- Rest API can not be authenticated with an access token
(DYNAMOHUB-227)
- Fix client side pagination for task list in job details
(DYNAMOHUB-219)
- List of files is job details is empty (DYNAMOHUB-211)
- Using a boolean as a workflow step parameter fails (DYNAMOHUB-208)

Dynamohub 1.1.0 (2021-06-19)
============================

Features
```

```
--------

- Send data between different sites via the UI (DYNAMOHUB-124)
- Rework ngenea output parsing (DYNAMOHUB-115)
- Rebuild UI using React (DYNAMOHUB-103)
- Improve stat task to make directory handling explicit
(DYNAMOHUB-188)
- step argument: skip-check-hash (DYNAMOHUB-176)
- step argument: overwrite-remote (DYNAMOHUB-175)
- step argument: overwrite-local (DYNAMOHUB-174)
- step argument: stub-size (DYNAMOHUB-173)
- React 404 should not change URL (DYNAMOHUB-166)
- Support file delete workflow (DYNAMOHUB-164)
- Recent jobs list should show the most recent jobs, nevermind what
state they are in (DYNAMOHUB-147)
- Job reporting scaling improvements (DYNAMOHUB-84)

Bugfixes
--------

- `api/users/` endpoint throwing errror when a username containing
"." exists (DYNAMOHUB-187)
- "failed to acquire a DMAPI lock EXCL immediately; keeping
trying..." is treated as an error (DYNAMOHUB-186)
- Job reporting not providing correct counts (DYNAMOHUB-185)
- Resubmit button should not be enabled when not usable
(DYNAMOHUB-184)
- Using UI to trigger workflow fails (DYNAMOHUB-177)
- Attempting to post to /api/file/workflow with only a token causes
500 (DYNAMOHUB-171)
- Bug when a directory is in intermediate selection state and closed
(DYNAMOHUB-170)

Dynamohub 1.0.4 (2021-06-10)
============================

Features
--------

- Allow overriding the site on a per-step basis (DYNAMOHUB-151)
- Submission time arguments to workflow support (DYNAMOHUB-150)
- Validate runtime fields (DYNAMOHUB-136)
- Show verbose error information on failure (DYNAMOHUB-156)
- New task: reverse stub (DYNAMOHUB-155)
- Report task types with more meaningful names (DYNAMOHUB-152)

Bugfixes
--------

- Fix bug where sub-directories can fail to be processed
(DYNAMOHUB-148)
- recursive_action failures report as success (DYNAMOHUB-142)

Dynamohub 1.0.3 (2021-05-19)
```

```
============================

Features
--------

- Refactor existing ngenea hub tasks to message passing format
(DYNAMOHUB-140)
- Support static arguments to a step (DYNAMOHUB-137)
- Provide existing actions as default workflows (DYNAMOHUB-131)
- enable easy access to dbshell (DYNAMOHUB-134)
- Workflows are now defined dynamically (DYNAMOHUB-132)
- Allow users to create (API) client keys (DYNAMOHUB-141)

Bugfixes
--------

- Fixed an issue with submitting workflows with Client Key
(DYNAMOHUB-144)
- Fixed warnings generated from auto field (DYNAMOHUB-133)

Dynamohub 1.0.2 (2021-04-26)
============================

Features
--------

- Expose JWT Login API endpoints (DYNAMOHUB-90)
- Add Swagger API Documentation (DYNAMOHUB-94)
- Validate that site names do not end with the suffix we use to
identify queue types (DYNAMOHUB-85)
- Allow middle-click/right-click to open navbar links in new tabs
(DYNAMOHUB-83)
- Ship ngeneahub cli tool as a venv with docker-compose included
(DYNAMOHUB-81)
- Improve performance of job page by doing pagination server-side
(DYNAMOHUB-56)

Dynamohub 1.0.1 (2021-04-01)
============================

Bugfixes
--------

- Symlinks cause file browser to fail (DYNAMOHUB-86)
- "Creation time" should be "ctime" - "Last changed
time" (DYNAMOHUB-78)
- Files and folders with newlines in their names fails, with console
error (DYNAMOHUB-55)

Features
--------

- Standalone UI providing interfaces for core Ngenea/Dynamo
workflows (DYNAMOHUB-1)
```

```
- Positioning and content of UI buttons (DYNAMOHUB-38)
- Show percentage completion of job based on # of files transferred
vs remaining (DYNAMOHUB-34)
- Remove redundant environment settings (DYNAMOHUB-82)
- Show a user view page when clicking on a user link (DYNAMOHUB-79)
- Pop-up confirmation of job actions (DYNAMOHUB-57)
- Support for premigrate task (DYNAMOHUB-50)
- Allow viewing directories from different sites (DYNAMOHUB-12)
```

Ngenea Worker Changelog

```
Ngenea Worker 1.7.0 (2022-01-24)
================================

Features
--------

- Tasks for moving files and directories within cloud storage
(DYNAMOHUB-355)


Bugfixes
--------

- added exception for permission errors (DYNAMOHUB-345)
- Policy error in snapdiff (DYNAMOHUB-450)
- fixed issue raised when submitting a workflow with multiple
filters in recursive task (DYNAMOHUB-476)


Ngenea Worker 1.6.0 (2021-12-21)
================================

Features
--------

- Added task for checking the existence of files in remote storage
(DYNAMOHUB-421)
- Task to remove remote location xattrs if a premigrated file was
moved (DYNAMOHUB-422)


Bugfixes
--------

- Don't require ArcaPix policy driver to be executable
(DYNAMOHUB-419)
- Check for no paths passed to recall and reverse_stub tasks
(DYNAMOHUB-438)
- fixed the status of snapdiff tasks processed files to created
instead of created and deleted (DYNAMOHUB-492)
- Fix issue with parsing ngenea config file when the [General]
section is present (DYNAMOHUB-506)
```

```
- Ensured that all chained tasks parse results correctly
(DYNAMOHUB-511)


Ngenea Worker 1.5.0 (2021-11-22)
================================

Features
--------

- Added support for ngenea-hub to delete GPFS files (DYNAMOHUB-164)
- Added support for ngrecall --skip-check-hash in workflows
(DYNAMOHUB-176)
- Snapdiff discovery task (DYNAMOHUB-245)
- Task to enumerate independent filesets on a site (DYNAMOHUB-251)
- AP-Analytics based search backend task (DYNAMOHUB-321)
- Accept configuration settings for search backend tasks
(DYNAMOHUB-329)
- Compatibility with ngenea 1.12 (DYNAMOHUB-333)
- Added argument "delete_remote_xattrs" to the move_paths task to
remove remote location metadata (DYNAMOHUB-346)
- Provide available metadata fields with search results
(DYNAMOHUB-382)
- Size-aware file list chunking in recursive_action (DYNAMOHUB-53)
- Track size of files being processed for reporting (DYNAMOHUB-63)


Bugfixes
--------

- Don't treat individual file failures as a task failure
(DYNAMOHUB-161)
- Don't treat ngenea warnings as errors (DYNAMOHUB-186)
- Disable task late ack to try to mitigate consumer timeouts
(DYNAMOHUB-291)
- Friendlier error response when Elasticsearch is unavailable
(DYNAMOHUB-364)


Ngenea Worker 0.6.0 (2021-03-26)
================================

Features
--------

- DYNAMO-99 - Dynamo now deletes provided empty folders
- DYNAMO-119 - Ngenea 1.9 character escaping support
- Updated EULA
- Rename dynamod service to ngenea-worker
- Support for use as an ngenea-hub worker agent

Bugfixes
--------
```

```
- DYNAMO-112 - Dynamo now uses unique names for each transient .acl
and .link file

Ngenea Worker 0.5.2 (2020-12-22)
================================

Feature
-------

- DYNAMO-111 - Ngenea 1.9 stdout results are now supported

Ngenea Worker 0.5.1 (2020-12-18)
================================

Bugfixes
--------

- DYNAMO-110 - AWS Credentials not correctly pass signature_version
correctly


Ngenea Worker 0.5.0 (2020-12-16)
================================

Features
--------

- DYNAMO-107 - AWS credentials can now specify endpoint_url, verify
and signature_version

Bugfixes
--------

- DYNAMO-108 - Dynamo now uses migration arguments when only the
source queue is specified

Ngenea Worker 0.4.0 (2020-12-11)
================================

- DYNAMO-94 - Ability to specify AWS credentials

Ngenea Worker 0.3.0 (2020-12-01)
================================

Features
--------

- DYNAMO-81 - Migrate-only workflow
- DYNAMO-92 - Ability to specify GCP credentials
- DYNAMO-93 - Delete-from-remote workflow


Ngenea Worker 0.2.0 (2020-11-09)
================================
```

```
- Refactored GA release


Ngenea Worker 0.1.0 (2020-04-06)
================================

- Initial Release
```

License

Ngenea Hub is licensed under the ArcaPix EULA: https://www.arcapix.com/licenses/EULA.txt

```
ArcaPix EULA
January 2021
http://www.arcapix.com/licenses/EULA.txt
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applicable):

* the computer software described in the order form, proof of
entitlement (POE), invoice or other document linking to this EULA
(in each case as issued by or agreed in writing with us), or which
otherwise incorporates or is governed by this EULA and the data
supplied with that software (collectively, Software);

* the application programming interface described in the order form,
proof of entitlement (POE), invoice or other document linking to
this EULA (in each case as issued by or agreed in writing with us),
or which otherwise incorporates or is governed by this EULA and the
data supplied with that application programming interface, in each
case whether provided on a standalone basis or alongside the
Software (collectively, API) and

* printed materials and electronic documents associated with that
Software or API (Documents).

The Software, API and Documents are collectively the "Work" and such
term includes each of the Software, API and Documents as applicable.

We license use of the Work to you on the basis of this EULA. We do
not sell the Work to you. We remain the owners of the Work at all
times. By using the Work, or otherwise by clicking "accept" or
otherwise indicating acceptance of this EULA, you confirm you accept
the terms of this EULA. If you do not accept this EULA you may not
use the Work.
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Any services we provide, including but not limited to maintenance, support, development and hosting, will be under separate terms of business, but any software we provide to you incidentally in the course of those services, will also be governed by this EULA unless expressly stated that other licence terms will apply.

You should print a copy of this EULA for future reference.

1 Grant and scope of licence

1.1 In consideration of payment by you of the agreed licence fee and you agreeing to abide by the terms of this EULA, we grant to you a non-exclusive, non-transferable licence to use the Work on the terms of this EULA for the duration of your subscription. Your subscription will only be valid during the period for which you have a valid POE from us to use the Software and when your subscription expires this EULA will automatically terminate without the need for notice. Any termination of this EULA will also terminate your subscription and your POE will be invalidated.

1.2 You may download, install and use the Software for your own internal business purposes only on the systems, either physical or virtual detailed in the accompanying POE as identified in your purchase order (if applicable) or otherwise approved by us or our authorised representatives.

1.3 You may not use the Work for the purposes of making its functionality available to third parties as a service, whether directly or indirectly, without our express written agreement.

1.4 You may access and use the API solely for the purposes of

1.4.1 internally developing applications which communicate and interoperate with software or systems detailed in (and for the purposes detailed in) the accompanying POE as identified in your purchase order (if applicable) or otherwise approved by us or our authorised representatives; and

1.4.2 making calls to the systems or software permitted under clause 1.4.1, subject to any limits detailed in the accompanying POE as identified in your purchase order (if applicable) or otherwise agreed with us or our authorised representatives.

1.5 Your display and use information received through the API or data derived from that information is in each case subject to any limits detailed in the accompanying POE as identified in your purchase order (if applicable) or otherwise agreed with us or our authorised representatives).

1.6 You may use any Documents in support of the use permitted under condition 1.2 and make copies of the Documents as are reasonably necessary for their lawful use.

1.7 This EULA does not grant you permission to use the trade names,

trademarks, service marks, or product names of us or our contributors or licensors, except as required for reasonable and customary use in describing the origin of the Work and reproducing the content of any "licence" files.

2 Restrictions

2.1 Except as expressly set out in this EULA or as permitted by any local law, you undertake:

2.1.1 not to copy the Work except where such copying is incidental to normal use of the Software, or where it is strictly necessary for the purpose of back-up or operational security;

2.1.2 not to rent, lease, sub-license, loan, translate, merge, adapt, vary or modify the Work;

2.1.3 not to make alterations to, or modifications of, the whole or any part of the Work, nor permit the Work or any part of them to be combined with, or become incorporated in, any other programs or other documentation as applicable, other than as expressly permitted in writing by us;

2.1.4 not to disassemble, decompile, reverse-engineer or create derivative works based on the whole or any part of the Software or API (except as expressly permitted by us in writing or clearly provided for within the functionality of the Software or any accompanying API we provide) nor attempt to do any such thing except to the extent that (by virtue of section 296A of the Copyright, Designs and Patents Act 1988) such actions cannot be prohibited because they are essential for the purpose of achieving inter-operability of the Software or API with another software program, and provided that the information obtained by you during such activities:

2.1.4.1 is used only for the purpose of achieving inter-operability of the Software or API with another software program; and

2.1.4.2 is not unnecessarily disclosed or communicated without our prior written consent to any third party; and

2.1.4.3 is not used to create any software which is substantially similar to the Software or API;

2.1.5 to keep all copies of the Work secure and to maintain accurate and up-to-date records of the number and locations of all copies of the Work;

2.1.6 to supervise and control use of the Work and ensure that the Work are only used by your employees (or such other individuals or entities are you may be expressly permitted in writing by us to allow to access or use the Work) in accordance with the terms of this EULA;

2.1.7 to include our copyright notice on and any "licence" text files in all entire and partial copies you make of the Work on any medium, however you may not use any component parts of the Work outside of or separately from the Work;

2.1.8 not to provide or otherwise make available the Work in whole or in part (including but not limited to program listings, object and source program listings, object code and source code), in any form to any person other than your employees without prior written consent from us; and

2.1.9 to comply with all applicable technology control or export laws and regulations.

2.2 Without prejudice to the restrictions in this EULA on copying, modifying or creating derivative works from the Work, where you (or someone on your behalf) creates (solely or in conjunction with others, and whether in object or source code form) any software or other work which is based on or derived from the Work (Derivative Work) in breach of this EULA or otherwise, then in consideration of the sum of 1 GBP (receipt and sufficiency of which you acknowledge), you hereby:

2.2.1 assign to us (by way of present assignment of future rights) all intellectual property rights in such Derivative Work and waive (and shall procure a waiver of) all moral rights arising under the Copyright, Designs and Patents Act 1988 in relation to the Derivative Work and, so far as is legally possible, any broadly equivalent rights that may exist in any territory of the world; and

2.2.2 In the event that any rights in such Derivative Work are not assigned to us pursuant to clause 2.2.1, you hereby grant to us an exclusive, royalty-free, worldwide, transferrable, irrevocable, perpetual licence (together with the right to grant sub-licences) to use in any manner as we determine, any such Derivative Work.

2.3 For the avoidance of doubt, for the purposes of clause 2.2, Derivative Work shall not include works which merely link or bind by name an existing third party application to the interfaces of the Software or API but does include works which are created to integrate with, or to be processed using, the interface of the Software or any API which we provide.

2.4 You agree not to (by your act or omission) do, or permit to be done, any act that will or may weaken, damage or be detrimental to the Work or any of our intellectual property rights or our or any of our contributors or licensors' rights in such, or seek to register any rights in the Work or any part of it or seek to commence litigation against any third party in respect of any intellectual property infringement in relation to the Work or any part of it.

3 Intellectual property rights

3.1 You acknowledge that all intellectual property rights in the

Work anywhere in the world belong to us or our licensors or contributors, that rights in the Work are licensed (not sold) to you, and that you have no rights in, or to, the Work other than the right to use them in accordance with the terms of this EULA.

3.2 You acknowledge (unless explicitly agreed in writing by us) that you have no right to have access to the Software in source code form.

4 Liability

4.1 You acknowledge that the Work has not been developed to meet your individual requirements, including any particular cybersecurity requirements you might be subject to under law or otherwise, and that it is therefore your responsibility to ensure that the facilities and functions of the Software and API as described in the Documents meet your requirements.

4.2 We only supply the Work for internal use by your business, and you agree not to use the Work for any other purposes unless expressly permitted in writing by us.

4.3 We shall not in any circumstances whatever be liable to you, whether in contract, tort (including negligence), breach of statutory duty, or otherwise, arising under or in connection with this EULA for:

4.3.1 loss of profits, sales, business, or revenue;

4.3.2 business interruption;

4.3.3 loss of anticipated savings;

4.3.4 loss or corruption of data or information or any loss arising from misconfiguration or incorrect implementation or use of any API;

4.3.5 loss of business opportunity, goodwill or reputation;

where any of the losses set out in condition 4.3.1 to condition 4.3.5 are direct or indirect; or

4.3.6 any special, indirect or consequential loss, damage, charges or expenses.

4.4 Other than the losses set out in condition 4.3 (for which we are not liable), our maximum aggregate liability under or in connection with this EULA whether in contract, tort (including negligence) or otherwise, shall in all circumstances not exceed a sum equal to the Licence Fee paid in the 12 months prior to the event first giving rise to any liability. This maximum cap does not apply to condition 4.5.

4.5 Nothing in this EULA shall limit or exclude our liability for:

4.5.1 death or personal injury resulting from our negligence;

4.5.2 fraud or fraudulent misrepresentation;

4.5.3 any other liability that cannot be excluded or limited by English law.

4.6 Save as required by applicable law or agreed to in writing, we provide the Work on an "AS IS" basis, without conditions, warranties, representations or other terms of any kind, either express or implied (and any such implied conditions, warranties, representations or other terms, whether implied by statute, common law or otherwise, are excluded to the fullest extent permitted by law), including, without limitation, any conditions, warranties, representations or other terms relating to title, non-infringement, merchantability, or fitness for a particular purpose. You are solely responsible for determining the appropriateness of using the Work and for any configuration or interface necessary for you to effectively use the Work and assume any risks associated with your exercise of permissions under this EULA.

4.7 Without prejudice to clause 4.6, where the API interacts with any software or system which is not provided by us, we are not responsible and shall have no liability in any way for such software or system.

5 Termination

5.1 We may terminate this EULA immediately by written notice to you if you commit a breach of this EULA which you fail to remedy (if remediable) within 14 days after the service of written notice requiring you to do so. Without prejudice to our rights under this clause 5.1, your rights under this EULA will terminate automatically without the need for notice if you commit a material breach of any of the terms of this EULA.

5.2 On termination for any reason:

5.2.1 all rights granted to you under this EULA shall cease;

5.2.2 you must immediately cease all activities authorised by this EULA; and

5.2.3 you must immediately and permanently delete or remove the Work from all computer equipment in your possession, and immediately destroy or return to us (at our option) all copies of the Work then in your possession, custody or control and, in the case of destruction, certify to us that you have done so.

6 Communications between us

6.1 We may update the terms of this EULA at any time on notice to you in accordance with this condition 6. Your continued use of the Work following the deemed receipt and service of the notice under condition 6.3 shall constitute your acceptance to the terms of this

EULA, as varied. If you do not wish to accept the terms of the EULA (as varied) you must immediately stop using and accessing the Work on the deemed receipt and service of the notice.

6.2 If we have to contact you, we will do so by email or by pre-paid post to the address you provided in accordance with your order for or registration of the Work.

6.3 Note that any notice:

6.3.1 given by us to you will be deemed received and properly served 24 hours after it is first posted on our website, 24 hours after an email is sent, or three days after the date of posting of any letter; and

6.3.2 given by you to us will be deemed received and properly served 24 hours after an email is sent, or three days after the date of posting of any letter.

6.4 In proving the service of any notice, it will be sufficient to prove, in the case of posting on our website, that the website was generally accessible to the public for a period of 24 hours after the first posting of the notice; in the case of a letter, that such letter was properly addressed, stamped and placed in the post to the address of the recipient given for these purposes; and, in the case of an email, that such email was sent to the email address of the recipient given for these purposes.

7 Events outside our control

7.1 We will not be liable or responsible for any failure to perform, or delay in performance of, any of our obligations under this EULA that is caused by an Event Outside Our Control. An Event Outside Our Control is defined below in condition 7.2.

7.2 An Event Outside Our Control means any act or event beyond our reasonable control, including without limitation failure of public or private telecommunications networks.

7.3 If an Event Outside Our Control takes place that affects the performance of our obligations under this EULA:

7.3.1 our obligations under this EULA will be suspended and the time for performance of our obligations will be extended for the duration of the Event Outside Our Control; and

7.3.2 we will use our reasonable endeavours to find a solution by which our obligations under this EULA may be performed despite the Event Outside Our Control.

8 Third Party Software

8.1 Any part or component of the Software which has been contributed or created by any third party (including any open-source software)

and which is not owned by us (Third Party Software) shall be deemed to be incorporated within the Software for the purposes of this EULA (except where expressly provided to the contrary) and use of the Third Party Software shall be subject to (and you shall comply with) such additional terms as relate to such Third Party Software from time to time (Third Party Additional Terms), and such Third Party Additional terms shall take precedence over this EULA in relation to such Third Party Software. You shall indemnify and hold us harmless against any loss or damage which we may suffer or incur as a result of your breach of any Third Party Additional Terms howsoever arising, and we may treat your breach of any Third Party Additional Terms as a material breach of this EULA.

8.2 For the avoidance of doubt, the performance of, and any issues caused by or arising from, any Third Party Software shall be considered an Event Outside Our Control and (without prejudice to the provisions of this EULA in relation to warranties regarding the Software generally) all Third Party Software is provided on an "AS IS" basis and without conditions, warranties, representations or other terms of any kind, either express or implied (and any such implied conditions, warranties, representations or other terms, whether implied by statute, common law or otherwise, are excluded to the fullest extent permitted by law), including, without limitation, any conditions, warranties, representations or other terms relating to title, non-infringement, merchantability, or fitness for a particular purpose.

9 Other important terms

9.1 We may transfer our rights and obligations under this EULA to another organisation, but this will not affect your rights or our obligations under this EULA.

9.2 You may only transfer your rights or your obligations under this EULA to another person if we agree in writing.

9.3 This EULA and any document expressly referred to in it constitutes the entire agreement between us and supersedes and extinguishes all previous agreements, promises, assurances, warranties, representations and understandings between us, whether written or oral, relating to its subject matter. You agree that you shall have no remedies in respect of any statement, representation, assurance or warranty (whether made innocently or negligently) that is not set out in this EULA or any document expressly referred to in it. You agree that you shall have no claim for innocent or negligent misrepresentation or negligent misstatement based on any statement in this EULA or any document expressly referred to in it.

9.4 If we fail to insist that you perform any of your obligations under this EULA, or if we do not enforce our rights against you, or if we delay in doing so, that will not mean that we have waived our rights against you and will not mean that you do not have to comply with those obligations. If we do waive a default by you, we will only do so in writing signed by us, and that will not mean that we

will automatically waive any later default by you.

9.5 Each of the conditions of this EULA operates separately. If any court or competent authority decides that any of them are unlawful or unenforceable, the remaining conditions will remain in full force and effect.

9.6 This EULA, its subject matter and its formation (and any non-contractual disputes or claims) are governed by English law. We both irrevocably agree to the exclusive jurisdiction of the courts of England and Wales.