
gcsfs Documentation

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Othoz GmbH

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A Python filesystem abstraction of Google Cloud Storage (GCS) implemented as a [PyFilesystem2](#) extension. With GCSFS, you can interact with [Google Cloud Storage](#) as if it was a regular filesystem.

Apart from the nicer interface, this will highly decouple your code from the underlying storage mechanism: Exchanging the storage backend with an [in-memory filesystem](#) for testing or any other filesystem like [S3FS](#) becomes as easy as replacing `gs://bucket_name` with `mem://` or `s3://bucket_name`.

For a full reference on all the PyFilesystem possibilities, take a look at the [PyFilesystem Docs](#)!

CHAPTER 1

Documentation

- [GCSFS Documentation](#)
- [PyFilesystem Wiki](#)
- [PyFilesystem Reference](#)

CHAPTER 2

Installing

Install the latest GCSFS version by running:

```
$ pip install fs-gcsfs
```

Or in case you are using conda:

```
$ conda install -c conda-forge fs-gcsfs
```


CHAPTER 3

Examples

Instantiating a filesystem on Google Cloud Storage (for a full reference visit the [Documentation](#)):

```
from fs_gcsfs import GCSFS
gcsfs = GCSFS(bucket_name="mybucket")
```

Alternatively you can use a FS URL to open up a filesystem:

```
from fs import open_fs
gcsfs = open_fs("gs://mybucket/root_path?strict=False")
```

You can use GCSFS like your local filesystem:

```
>>> from fs_gcsfs import GCSFS
>>> gcsfs = GCSFS(bucket_name="mybucket")
>>> gcsfs.tree()
├── foo
│   ├── bar
│   │   ├── file1.txt
│   │   └── file2.csv
│   └── baz
│       └── file3.txt
└── file4.json
>>> gcsfs.listdir("foo")
["bar", "baz"]
>>> gcsfs.isdir("foo/bar")
True
```

Uploading a file is as easy as:

```
from fs_gcsfs import GCSFS
gcsfs = GCSFS(bucket_name="mybucket")
with open("local/path/image.jpg", "rb") as local_file:
    with gcsfs.open("path/on/bucket/image.jpg", "wb") as gcs_file:
        gcs_file.write(local_file.read())
```

You can even sync an entire bucket on your local filesystem by using PyFilesystem's utility methods:

```
from fs_gcsfs import GCSFS
from fs.osfs import OSFS
from fs.copy import copy_fs

gcsfs = GCSFS(bucket_name="mybucket")
local_fs = OSFS("local/path")

copy_fs(gcsfs, local_fs)
```

For exploring all the possibilities of GCSFS and other filesystems implementing the PyFilesystem interface, we recommend visiting the official [PyFilesystem Docs](#)!

CHAPTER 4

Development

To develop on this project make sure you have `pipenv` installed and run the following from the root directory of the project:

```
$ pipenv install --dev --three
```

This will create a virtualenv with all packages and dev-packages installed.

All CI tests run against an actual GCS bucket provided by [Othoz](#). In order to run the tests against your own bucket, make sure to set up a [Service Account](#) with all necessary permissions:

- `storage.buckets.get`
- `storage.objects.get`
- `storage.objects.list`
- `storage.objects.create`
- `storage.objects.update`
- `storage.objects.delete`

Expose your bucket name as an environment variable `$TEST_BUCKET` and run the tests via:

```
$ pipenv run pytest
```

Note that the tests mostly wait for I/O, therefore it makes sense to highly parallelize them with `xdist`.

CHAPTER 6

Credits

Credits go to [S3FS](#) which was the main source of inspiration and shares a lot of code with GCSFS.

Limitations

A filesystem built on top of an object store like GCS suffers from the same limitations as the ones mentioned in S3FS.

GCS does not offer true directories which is why GCSFS (as well as S3FS) will simulate the existence of a directory called `foo` by adding an empty blob called `foo/`. Any filesystem content that was not created via GCSFS will lack these directory markers which may lead to wrong behaviour. For example `gcsfs.isdir("bar")` will return `False` if the marker blob `bar/` does not exist, even though there might exist a blob called `bar/baz.txt`.

To overcome this you can call the utility method `fix_storage()` on your GCSFS instance which will walk the entire filesystem (i.e. the entire bucket or the “subdirectory” you specified via `root_path`) and add all missing directory markers.

Warning: Listing and fixing large buckets may take some time!

For a full reference of all available methods of GCSFS visit the documentation of [fs.base.FS!](#)

```
class fs_gcsfs.GCSFS (bucket_name: str, root_path: str = None, create: bool = False, client:
                       google.cloud.storage.client.Client = None, strict: bool = True)
    A GCS filesystem for PyFilesystem
```

This implementation is based on [S3FS](#)

Args: `bucket_name`: The GCS bucket name. `root_path`: The root directory within the GCS Bucket
`create`: Whether to create `root_path` on initialization or not. If `root_path` does not yet exist and
`create=False` a `CreateFailed`

exception will be raised. To disable `root_path` validation entirely set `strict=False`.

`client`: A `google.storage.Client` exposing the google storage API. `strict`: When `True` (default)
GCSFS will follow the `PyFilesystem` specification exactly. Set to `False` to disable validation of destina-
tion paths

which may speed up some operations.

fix_storage () → None

Utility function that walks the entire `root_path` and makes sure that all intermediate directories are correctly
marked with empty blobs.

As GCS is no real file system but only a key-value store, there is also no concept of folders. `S3FS` and
`GCSFS` overcome this limitation by adding empty files with the name “<path>/” every time a directory is
created, see <https://fs-gcsfs.readthedocs.io/en/latest/#limitations>.

CHAPTER 9

Powered By

This PyFilesystem extension was created by [Othoz GmbH](#)

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