
B2_Python_SDK

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Backblaze

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CONTENTS

1	Why use b2sdk?	3
2	Documentation index	5
2.1	Installation Guide	5
2.2	Tutorial	5
2.3	Quick Start Guide	8
2.4	Server-Side Encryption	14
2.5	Advanced usage patterns	15
2.6	Glossary	23
2.7	About API interfaces	24
2.8	API Reference	26
2.9	Contributors Guide	103
3	Indices and tables	107
	Python Module Index	109
	Index	111

b2sdk is a client library for easy access to all of the capabilities of B2 Cloud Storage.

B2 command-line tool is an example of how it can be used to provide command-line access to the B2 service, but there are many possible applications (including **FUSE filesystems**, storage backend drivers for backup applications etc).

WHY USE B2SDK?

When building an application which uses B2 cloud, it is possible to implement an independent B2 API client, but using **b2sdk** allows for:

- reuse of code that is already written, with hundreds of unit tests
- use of **Syncronizer**, a high-performance, parallel rsync-like utility
- developer-friendly library *api version policy* which guards your program against incompatible changes
- **B2 integration checklist** is passed automatically
- **raw_simulator** makes it easy to mock the B2 cloud for unit testing purposes
- reporting progress of operations to an object of your choice
- exception hierarchy makes it easy to display informative messages to users
- interrupted transfers are automatically continued
- **b2sdk** has been developed for 3 years before it version 1.0.0 was released. It's stable and mature.

DOCUMENTATION INDEX

2.1 Installation Guide

2.1.1 Installing as a dependency

b2sdk can simply be added to `requirements.txt` (or equivalent such as `setup.py`, `.pipfile` etc). In order to properly set a dependency, see *versioning chapter* for details.

Note: The stability of your application depends on correct *pinning of versions*.

2.1.2 Installing a development version

To install **b2sdk**, checkout the repository and run:

```
pip install b2sdk
```

in your python environment.

2.2 Tutorial

2.2.1 AccountInfo

`AccountInfo` object holds information about access keys, tokens, upload urls, as well as a bucket id-name map.

It is the first object that you need to create to use **b2sdk**. Using `AccountInfo`, we'll be able to create a `B2Api` object to manage a B2 account.

In the tutorial we will use `b2sdk.v1.InMemoryAccountInfo`:

```
>>> from b2sdk.v1 import InMemoryAccountInfo
>>> info = InMemoryAccountInfo() # store credentials, tokens and cache in memory
```

With the `info` object in hand, we can now proceed to create a `B2Api` object.

Note: *AccountInfo* section provides guidance for choosing the correct `AccountInfo` class for your application.

2.2.2 Account authorization

```
>>> from b2sdk.v1 import B2Api
>>> b2_api = B2Api(info)
>>> application_key_id = '4a5b6c7d8e9f'
>>> application_key = '001b8e23c26ff6efb941e237deb182b9599a84bef7'
>>> b2_api.authorize_account("production", application_key_id, application_key)
```

Tip: Get credentials from B2 website

To find out more about account authorization, see `b2sdk.v1.B2Api.authorize_account()`

2.2.3 B2Api

B2Api allows for account-level operations on a B2 account.

Typical B2Api operations

<code>authorize_account</code>	Perform account authorization.
<code>create_bucket</code>	Create a bucket.
<code>delete_bucket</code>	Delete a chosen bucket.
<code>list_buckets</code>	Call <code>b2_list_buckets</code> and return a list of buckets.
<code>get_bucket_by_name</code>	Return the Bucket matching the given <code>bucket_name</code> .
<code>get_bucket_by_id</code>	Return a bucket object with a given ID.
<code>create_key</code>	Create a new <i>application key</i> .
<code>list_keys</code>	List application keys.
<code>delete_key</code>	Delete <i>application key</i> .
<code>download_file_by_id</code>	Download a file with the given ID.
<code>list_parts</code>	Generator that yields a <i>b2sdk.v1.Part</i> for each of the parts that have been uploaded.
<code>cancel_large_file</code>	Cancel a large file upload.

```
>>> b2_api = B2Api(info)
```

to find out more, see `b2sdk.v1.B2Api`.

The most practical operation on *B2Api* object is `b2sdk.v1.B2Api.get_bucket_by_name()`.

Bucket allows for operations such as listing a remote bucket or transferring files.

2.2.4 Bucket

Initializing a Bucket

Retrieve an existing Bucket

To get a Bucket object for an existing B2 Bucket:

```
>>> b2_api.get_bucket_by_name("example-mybucket-b2-1",)
Bucket<346501784642eb3e60980d10,example-mybucket-b2-1,allPublic>
```

Create a new Bucket

To create a bucket:

```
>>> bucket_name = 'example-mybucket-b2-1'
>>> bucket_type = 'allPublic' # or 'allPrivate'

>>> b2_api.create_bucket(bucket_name, bucket_type)
Bucket<346501784642eb3e60980d10,example-mybucket-b2-1,allPublic>
```

You can optionally store bucket info, CORS rules and lifecycle rules with the bucket. See `b2sdk.v1.B2Api.create_bucket()` for more details.

Note: Bucket name must be unique in B2 (across all accounts!). Your application should be able to cope with a bucket name collision with another B2 user.

Typical Bucket operations

<code>download_file_by_name</code>	Download a file by name.
<code>upload_local_file</code>	Upload a file on local disk to a B2 file.
<code>upload_bytes</code>	Upload bytes in memory to a B2 file.
<code>ls</code>	Pretend that folders exist and yields the information about the files in a folder.
<code>hide_file</code>	Hide a file.
<code>delete_file_version</code>	Delete a file version.
<code>get_download_authorization</code>	Return an authorization token that is valid only for downloading files from the given bucket.
<code>get_download_url</code>	Get file download URL.
<code>update</code>	Update various bucket parameters.
<code>set_type</code>	Update bucket type.
<code>set_info</code>	Update bucket info.

To find out more, see `b2sdk.v1.Bucket`.

2.2.5 Summary

You now know how to use `AccountInfo`, `B2Api` and `Bucket` objects.

To see examples of some of the methods presented above, visit the [quick start guide](#) section.

2.3 Quick Start Guide

2.3.1 Prepare b2sdk

```
>>> from b2sdk.v1 import *
>>> info = InMemoryAccountInfo()
>>> b2_api = B2Api(info)
>>> application_key_id = '4a5b6c7d8e9f'
>>> application_key = '001b8e23c26ff6efb941e237deb182b9599a84bef7'
>>> b2_api.authorize_account("production", application_key_id, application_key)
```

Tip: Get credentials from B2 website

2.3.2 Synchronization

```
>>> from b2sdk.v1 import ScanPoliciesManager
>>> from b2sdk.v1 import parse_sync_folder
>>> from b2sdk.v1 import Synchronizer
>>> from b2sdk.v1 import SyncReport
>>> import time
>>> import sys

>>> source = '/home/user1/b2_example'
>>> destination = 'b2://example-mybucket-b2'

>>> source = parse_sync_folder(source, b2_api)
>>> destination = parse_sync_folder(destination, b2_api)

>>> policies_manager = ScanPoliciesManager(exclude_all_symlinks=True)

>>> synchronizer = Synchronizer(
    max_workers=10,
    policies_manager=policies_manager,
    dry_run=False,
    allow_empty_source=True,
)

>>> no_progress = False
>>> encryption_settings_provider = BasicSyncEncryptionSettingsProvider({
    'bucket1': EncryptionSettings(mode=EncryptionMode.SSE_B2),
    'bucket2': EncryptionSettings(
        mode=EncryptionMode.SSE_C,
        key=EncryptionKey(secret=b'VkYp3s6v9y$B&E)H@McQfTjWmZq4t7w!',
        id='user-generated-key-id')
    },
```

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```

        'bucket3': None,
    })
>>> with SyncReport(sys.stdout, no_progress) as reporter:
    synchronizer.sync_folders(
        source_folder=source,
        dest_folder=destination,
        now_millis=int(round(time.time() * 1000)),
        reporter=reporter,
        encryption_settings_provider=encryption_settings_provider,
    )
upload some.pdf
upload som2.pdf

```

Tip: Sync is the preferred way of getting data into and out of B2 cloud, because it can achieve *highest performance* due to parallelization of scanning and data transfer operations.

To learn more about sync, see [Synchronizer](#).

Sync uses an encryption provider. In principle, it's a mapping between file metadata (bucket_name, file_info, etc) and *EncryptionSetting*. The reason for employing such a mapping, rather than a single *EncryptionSetting*, is the fact that users of Sync do not necessarily know up front what files it's going to upload and download. This approach enables using unique keys, or key identifiers, across files. This is covered in greater detail in [Server-Side Encryption](#).

In the example above, Sync will assume *SSE-B2* for all files in *bucket1*, *SSE-C* with the key provided for *bucket2* and rely on bucket default for *bucket3*. Should developers need to provide keys per file (and not per bucket), they need to implement their own `b2sdk.v1.AbstractSyncEncryptionSettingsProvider`.

2.3.3 Bucket actions

List buckets

```

>>> b2_api.list_buckets()
[Bucket<346501784642eb3e60980d10,example-mybucket-b2-1,allPublic>]
>>> for b in b2_api.list_buckets():
    print('%s %-10s %s' % (b.id_, b.type_, b.name))
346501784642eb3e60980d10  allPublic  example-mybucket-b2-1

```

Create a bucket

```

>>> bucket_name = 'example-mybucket-b2-1' # must be unique in B2 (across all_
↪accounts!)
>>> bucket_type = 'allPublic' # or 'allPrivate'

>>> b2_api.create_bucket(bucket_name, bucket_type)
Bucket<346501784642eb3e60980d10,example-mybucket-b2-1,allPublic>

```

You can optionally store bucket info, CORS rules and lifecycle rules with the bucket. See `b2sdk.v1.B2Api.create_bucket()`.

Delete a bucket

```
>>> bucket_name = 'example-mybucket-b2-to-delete'
>>> bucket = b2_api.get_bucket_by_name(bucket_name)
>>> b2_api.delete_bucket(bucket)
```

returns *None* if successful, raises an exception in case of error.

Update bucket info

```
>>> new_bucket_type = 'allPrivate'
>>> bucket_name = 'example-mybucket-b2'

>>> bucket = b2_api.get_bucket_by_name(bucket_name)
>>> bucket.update(bucket_type=new_bucket_type,
                  default_server_side_
↪ encryption=EncryptionSetting(mode=EncryptionMode.SSE_B2))
{'accountId': '451862be08d0',
 'bucketId': '5485a1682662eb3e60980d10',
 'bucketInfo': {},
 'bucketName': 'example-mybucket-b2',
 'bucketType': 'allPrivate',
 'corsRules': [],
 'lifecycleRules': [],
 'revision': 3,
 'defaultServerSideEncryption': {'isClientAuthorizedToRead': True,
                                  'value': {'algorithm': 'AES256', 'mode': 'SSE-B2'}}},
 }
```

For more information see `b2sdk.v1.Bucket.update()`.

2.3.4 File actions

Tip: Sync is the preferred way of getting files into and out of B2 cloud, because it can achieve *highest performance* due to parallelization of scanning and data transfer operations.

To learn more about sync, see [Synchronizer](#).

Use the functions described below only if you *really* need to transfer a single file.

Upload file

```
>>> local_file_path = '/home/user1/b2_example/new.pdf'
>>> b2_file_name = 'dummy_new.pdf'
>>> file_info = {'how': 'good-file'}

>>> bucket = b2_api.get_bucket_by_name(bucket_name)
>>> bucket.upload_local_file(
    local_file=local_file_path,
    file_name=b2_file_name,
    file_infos=file_info,
```

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```

    )
    <b2sdk.file_version.FileVersionInfo at 0x7fc8cd560550>

```

This will work regardless of the size of the file - `upload_local_file` automatically uses large file upload API when necessary.

For more information see `b2sdk.v1.Bucket.upload_local_file()`.

Upload file encrypted with SSE-C

```

>>> local_file_path = '/home/user1/b2_example/new.pdf'
>>> b2_file_name = 'dummy_new.pdf'
>>> file_info = {'how': 'good-file'}
>>> encryption_setting = EncryptionSetting(
    mode=EncryptionMode.SSE_C,
    key=EncryptionKey(secret=b'VkYp3s6v9y$B&E)H@McQfTjWmZq4t7w!', id='user-
↳ generated-key-id'),
    )

>>> bucket = b2_api.get_bucket_by_name(bucket_name)
>>> bucket.upload_local_file(
    local_file=local_file_path,
    file_name=b2_file_name,
    file_infos=file_info,
    encryption=encryption_setting,
    )

```

Download file

By id

```

>>> from b2sdk.v1 import DownloadDestLocalFile
>>> from b2sdk.v1 import DoNothingProgressListener

>>> local_file_path = '/home/user1/b2_example/new2.pdf'
>>> file_id = '4_z5485a1682662eb3e60980d10_f1195145f42952533_d20190403_m130258_c002_
↳ v0001111_t0002'
>>> download_dest = DownloadDestLocalFile(local_file_path)
>>> progress_listener = DoNothingProgressListener()

>>> b2_api.download_file_by_id(file_id, download_dest, progress_listener)
{'fileId': '4_z5485a1682662eb3e60980d10_f1195145f42952533_d20190403_m130258_c002_
↳ v0001111_t0002',
 'fileName': 'som2.pdf',
 'contentType': 'application/pdf',
 'contentLength': 1870579,
 'contentShal': 'd821849a70922e87c2b0786c0be7266b89d87df0',
 'fileInfo': {'src_last_modified_millis': '1550988084299'}}

>>> print('File name: ', download_dest.file_name)
File name:      som2.pdf
>>> print('File id: ', download_dest.file_id)
File id:        4_z5485a1682662eb3e60980d10_f1195145f42952533_d20190403_m130258_c002_
↳ v0001111_t0002

```

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```
>>> print('File size: ', download_dest.content_length)
File size: 1870579
>>> print('Content type:', download_dest.content_type)
Content type: application/pdf
>>> print('Content sha1:', download_dest.content_shal)
Content sha1: d821849a70922e87c2b0786c0be7266b89d87df0
```

By name

```
>>> bucket = b2_api.get_bucket_by_name(bucket_name)
>>> b2_file_name = 'dummy_new.pdf'
>>> local_file_name = '/home/user1/b2_example/new3.pdf'
>>> download_dest = DownloadDestLocalFile(local_file_name)
>>> bucket.download_file_by_name(b2_file_name, download_dest)
{'fileId': '4_z5485a1682662eb3e60980d10_f113f963288e711a6_d20190404_m065910_c002_
↪v0001095_t0044',
 'fileName': 'dummy_new.pdf',
 'contentType': 'application/pdf',
 'contentLength': 1870579,
 'contentShal': 'd821849a70922e87c2b0786c0be7266b89d87df0',
 'fileInfo': {'how': 'good-file'}}
```

Downloading encrypted files

Both methods (*By name* and *By id*) accept an optional *encryption* argument, similarly to *Upload file*. This parameter is necessary for downloading files encrypted with SSE-C.

List files

```
>>> bucket_name = 'example-mybucket-b2'
>>> bucket = b2_api.get_bucket_by_name(bucket_name)
>>> for file_info, folder_name in bucket.ls(show_versions=False):
>>>     print(file_info.file_name, file_info.upload_timestamp, folder_name)
f2.txt 1560927489000 None
som2.pdf 1554296578000 None
some.pdf 1554296579000 None
test-folder/.bzEmpty 1561005295000 test-folder/

# Recursive
>>> bucket_name = 'example-mybucket-b2'
>>> bucket = b2_api.get_bucket_by_name(bucket_name)
>>> for file_info, folder_name in bucket.ls(show_versions=False, recursive=True):
>>>     print(file_info.file_name, file_info.upload_timestamp, folder_name)
f2.txt 1560927489000 None
som2.pdf 1554296578000 None
some.pdf 1554296579000 None
test-folder/.bzEmpty 1561005295000 test-folder/
test-folder/folder_file.txt 1561005349000 None
```

Note: The files are returned recursively and in order so all files in a folder are printed one after another. The folder_name is returned only for the first file in the folder.


```
# Within folder
>>> bucket_name = 'example-mybucket-b2'
>>> bucket = b2_api.get_bucket_by_name(bucket_name)
>>> for file_info, folder_name in bucket.ls(folder_to_list='test-folder', show_
↳ versions=False):
>>>     print(file_info.file_name, file_info.upload_timestamp, folder_name)
test-folder/.bzEmpty 1561005295000 None
test-folder/folder_file.txt 1561005349000 None

# list file versions
>>> for file_info, folder_name in bucket.ls(show_versions=True):
>>>     print(file_info.file_name, file_info.upload_timestamp, folder_name)
f2.txt 1560927489000 None
f2.txt 1560849524000 None
som2.pdf 1554296578000 None
some.pdf 1554296579000 None
```

For more information see `b2sdk.v1.Bucket.ls()`.

Get file metadata

```
>>> file_id = '4_z5485a1682662eb3e60980d10_f113f963288e711a6_d20190404_m065910_c002_
↳ v0001095_t0044'
>>> b2_api.get_file_info(file_id)
{'accountId': '451862be08d0',
 'action': 'upload',
 'bucketId': '5485a1682662eb3e60980d10',
 'contentLength': 1870579,
 'contentSha1': 'd821849a70922e87c2b0786c0be7266b89d87df0',
 'contentType': 'application/pdf',
 'fileId': '4_z5485a1682662eb3e60980d10_f113f963288e711a6_d20190404_m065910_c002_
↳ v0001095_t0044',
 'fileInfo': {'how': 'good-file', 'sse_c_key_id': 'user-generated-key-id'},
 'fileName': 'dummy_new.pdf',
 'uploadTimestamp': 1554361150000,
 'serverSideEncryption': {'algorithm': 'AES256',
                           "mode": "SSE-C"},
 }
```

Copy file

Please switch to `b2sdk.v1.Bucket.copy()`.

```
>>> file_id = '4_z5485a1682662eb3e60980d10_f118df9ba2c5131e8_d20190619_m065809_c002_
↳ v0001126_t0040'
>>> bucket.copy(file_id, 'f2_copy.txt')
{'accountId': '451862be08d0',
 'action': 'copy',
 'bucketId': '5485a1682662eb3e60980d10',
 'contentLength': 124,
 'contentSha1': '737637702a0e41dda8b7be79c8db1d369c6eef4a',
 'contentType': 'text/plain',
 'fileId': '4_z5485a1682662eb3e60980d10_f1022e2320daf707f_d20190620_m122848_c002_
↳ v0001123_t0020',
```

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```
'fileInfo': {'src_last_modified_millis': '1560848707000'},
'fileName': 'f2_copy.txt',
'uploadTimestamp': 1561033728000,
'serverSideEncryption': {'algorithm': 'AES256',
                          'mode': 'SSE-B2'}}
```

If the `content_length` is not provided and the file is larger than 5GB, `copy` would not succeed and error would be raised. If length is provided, then the file may be copied as a large file. Maximum copy part size can be set by `max_copy_part_size` - if not set, it will default to 5GB. If `max_copy_part_size` is lower than *absoluteMinimumPartSize*, file would be copied in single request - this may be used to force copy in single request large file that fits in server small file limit.

Copying files allows for providing encryption settings for both source and destination files - *SSE-C* encrypted source files cannot be used unless the proper key is provided.

If you want to copy just the part of the file, then you can specify the offset and content length:

```
>>> file_id = '4_z5485a1682662eb3e60980d10_f118df9ba2c5131e8_d20190619_m065809_c002_
↳v0001126_t0040'
>>> bucket.copy(file_id, 'f2_copy.txt', offset=1024, length=2048)
```

Note that content length is required for offset values other than zero.

For more information see `b2sdk.v1.Bucket.copy()`.

Delete file

```
>>> file_id = '4_z5485a1682662eb3e60980d10_f113f963288e711a6_d20190404_m065910_c002_
↳v0001095_t0044'
>>> file_info = b2_api.delete_file_version(file_id, 'dummy_new.pdf')
>>> print(file_info)
{'file_id': '4_z5485a1682662eb3e60980d10_f113f963288e711a6_d20190404_m065910_c002_
↳v0001095_t0044',
 'file_name': 'dummy_new.pdf'}
```

Cancel large file uploads

```
>>> bucket = b2_api.get_bucket_by_name(bucket_name)
>>> for file_version in bucket.list_unfinished_large_files():
    bucket.cancel_large_file(file_version.file_id)
```

2.4 Server-Side Encryption

2.4.1 Cloud

B2 cloud supports *Server-Side Encryption*. All read and write operations provided by **b2sdk** accept encryption settings as an optional argument. Not supplying this argument means relying on bucket defaults - for **SSE-B2** and for no encryption. In case of **SSE-C**, providing a decryption key is required for successful downloading and copying.

2.4.2 API

Methods and classes that require encryption settings all accept an *EncryptionSetting* object, which holds information about present or desired encryption (mode, algorithm, key, key_id). Some, like copy operations, accept two sets of settings (for source and for destination). Sync, however, accepts an *EncryptionSettingsProvider* object, which is an *EncryptionSetting* factory, yielding them based on file metadata. For details, see

- [Encryption Settings](#)
- [Encryption Types](#)
- [Sync Encryption Settings Providers](#)

2.4.3 High security: use unique keys

B2 cloud does not promote or discourage either reusing encryption keys or using unique keys for *SEE-C*. In applications requiring enhanced security, using unique key per file is a good strategy. **b2sdk** follows a convention, that makes managing such keys easier: *EncryptionSetting* holds a key identifier, aside from the key itself. This key identifier is saved in the metadata of all files uploaded, created or copied via **b2sdk** methods using *SSE-C*, under *sse_c_key_id* in *fileInfo*. This allows developers to create key managers that map those ids to keys, stored securely in a file or a database. Implementing such managers, and linking them to [b2sdk.v1.AbstractSyncEncryptionSettingsProvider](#) implementations (necessary for using Sync) is outside of the scope of this library.

There is, however, a convention to such managers that authors of this library strongly suggest: if a manager needs to generate a new key-key_id pair for uploading, it's best to commit this data to the underlying storage before commencing the upload. The justification of such approach is: should the key-key_id pair be committed to permanent storage after completing an IO operation, committing could fail after successfully upload the data. This data, however, is now just a random blob, that can never be read, since the key to decrypting it is lost.

This approach comes an overhead: to download a file, its *fileInfo* has to be known. This means that fetching metadata is required before downloading.

2.4.4 Moderate security: a single key with many ids

Should the application's infrastructure require a single key (or a limited set of keys) to be used in a bucket, authors of this library recommend generating a unique key identifier for each file anyway (even though these unique identifiers all point to the same key value). This obfuscates confidential metadata from malicious users, like which files are encrypted with the same key, the total number of different keys, etc.

2.5 Advanced usage patterns

B2 server API allows for creation of an object from existing objects. This allows to avoid transferring data from the source machine if the desired outcome can be (at least partially) constructed from what is already on the server.

The way **b2sdk** exposes this functionality is through a few functions that allow the user to express the desired outcome and then the library takes care of planning and executing the work. Please refer to the table below to compare the support of object creation methods for various usage patterns.

2.5.1 Available methods

Method / supported options	Source	Range overlap	Streaming interface	<i>Continuation</i>
<code>b2sdk.v1.Bucket.upload()</code>	local	no	no	automatic
<code>b2sdk.v1.Bucket.copy()</code>	remote	no	no	automatic
<code>b2sdk.v1.Bucket.concatenate()</code>	any	no	no	automatic
<code>b2sdk.v1.Bucket.concatenate_stream()</code>	any	no	yes	manual
<code>b2sdk.v1.Bucket.create_file()</code>	any	yes	no	automatic
<code>b2sdk.v1.Bucket.create_file_stream()</code>	any	yes	yes	manual

Range overlap

Some methods support overlapping ranges between local and remote files. **b2sdk** tries to use the remote ranges as much as possible, but due to limitations of `b2_copy_part` (specifically the minimum size of a part) that may not be always possible. A possible solution for such case is to download a (small) range and then upload it along with another one, to meet the `b2_copy_part` requirements. This can be improved if the same data is already available locally - in such case **b2sdk** will use the local range rather than downloading it.

Streaming interface

Some object creation methods start writing data before reading the whole input (iterator). This can be used to write objects that do not have fully known contents without writing them first locally, so that they could be copied. Such usage pattern can be relevant to small devices which stream data to B2 from an external NAS, where caching large files such as media files or virtual machine images is not an option.

Please see *advanced method support table* to see where streaming interface is supported.

Continuation

Please see *here*

2.5.2 Concatenate files

`b2sdk.v1.Bucket.concatenate()` accepts an iterable of upload sources (either local or remote). It can be used to glue remote files together, back-to-back, into a new file.

`b2sdk.v1.Bucket.concatenate_stream()` does not create and validate a plan before starting the transfer, so it can be used to process a large input iterator, at a cost of limited automated continuation.

Concatenate files of known size

```
>>> bucket = b2_api.get_bucket_by_name(bucket_name)
>>> input_sources = [
...     CopySource('4_z5485a1682662eb3e60980d10_f113f963288e711a6_d20190404_m065910_
↪c002_v0001095_t0044', offset=100, length=100),
...     UploadSourceLocalFile('my_local_path/to_file.txt'),
...     CopySource('4_z5485a1682662eb3e60980d10_f1022e2320daf707f_d20190620_m122848_
↪c002_v0001123_t0020', length=2123456789),
... ]
>>> file_info = {'how': 'good-file'}
>>> bucket.concatenate(input_sources, remote_name, file_info)
<b2sdk.file_version.FileVersionInfo at 0x7fc8cd560551>
```

If one of remote source has length smaller than *absoluteMinimumPartSize* then it cannot be copied into large file part. Such remote source would be downloaded and concatenated locally with local source or with other downloaded remote source.

Please note that this method only allows checksum verification for local upload sources. Checksum verification for remote sources is available only when local copy is available. In such case *b2sdk.v1.Bucket.create_file()* can be used with overlapping ranges in input.

For more information about `concatenate` please see `b2sdk.v1.Bucket.concatenate()` and `b2sdk.v1.CopySource`.

Concatenate files of known size (streamed version)

`b2sdk.v1.Bucket.concatenate()` accepts an iterable of upload sources (either local or remote). The operation would not be planned ahead so it supports very large output objects, but continuation is only possible for local only sources and provided unfinished large file id. See more about continuation in *b2sdk.v1.Bucket.create_file()* paragraph about continuation.

```
>>> bucket = b2_api.get_bucket_by_name(bucket_name)
>>> input_sources = [
...     CopySource('4_z5485a1682662eb3e60980d10_f113f963288e711a6_d20190404_m065910_
↪c002_v0001095_t0044', offset=100, length=100),
...     UploadSourceLocalFile('my_local_path/to_file.txt'),
...     CopySource('4_z5485a1682662eb3e60980d10_f1022e2320daf707f_d20190620_m122848_
↪c002_v0001123_t0020', length=2123456789),
... ]
>>> file_info = {'how': 'good-file'}
>>> bucket.concatenate_stream(input_sources, remote_name, file_info)
<b2sdk.file_version.FileVersionInfo at 0x7fc8cd560551>
```

Concatenate files of unknown size

While it is supported by B2 server, this pattern is currently not supported by **b2sdk**.

2.5.3 Synthethize an object

Using methods described below an object can be created from both local and remote sources while avoiding downloading small ranges when such range is already present on a local drive.

Update a file efficiently

`b2sdk.v1.Bucket.create_file()` accepts an iterable which *can contain overlapping destination ranges*.

Note: Following examples *create* new file - data in bucket is immutable, but **b2sdk** can create a new file version with the same name and updated content

Append to the end of a file

The assumption here is that the file has been appended to since it was last uploaded to. This assumption is verified by **b2sdk** when possible by recalculating checksums of the overlapping remote and local ranges. If copied remote part sha does not match with locally available source, file creation process would be interrupted and an exception would be raised.

```
>>> bucket = b2_api.get_bucket_by_name(bucket_name)
>>> input_sources = [
...     WriteIntent(
...         data=CopySource(
...             '4_z5485a1682662eb3e60980d10_f113f963288e711a6_d20190404_m065910_c002_
↪v0001095_t0044',
...             offset=0,
...             length=5000000,
...         ),
...         destination_offset=0,
...     ),
...     WriteIntent(
...         data=UploadSourceLocalFile('my_local_path/to_file.txt'), # of length_
↪60000000
...         destination_offset=0,
...     ),
... ]
>>> file_info = {'how': 'good-file'}
>>> bucket.create_file(input_sources, remote_name, file_info)
<b2sdk.file_version.FileVersionInfo at 0x7fc8cd560552>
```

LocalUploadSource has the size determined automatically in this case. This is more efficient than `b2sdk.v1.Bucket.concatenate()`, as it can use the overlapping ranges when a remote part is smaller than *absoluteMinimumPartSize* to prevent downloading a range (when concatenating, local source would have destination offset at the end of remote source)

For more information see `b2sdk.v1.Bucket.create_file()`.

Change the middle of the remote file

```
>>> bucket = b2_api.get_bucket_by_name(bucket_name)
>>> input_sources = [
...     WriteIntent(
...         CopySource('4_z5485a1682662eb3e60980d10_f113f963288e711a6_d20190404_
↪m065910_c002_v0001095_t0044', offset=0, length=4000000),
...         destination_offset=0,
...     ),
...     WriteIntent(
...         UploadSourceLocalFile('my_local_path/to_file.txt'), # length=1024, here_
↪not passed and just checked from local source using seek
...         destination_offset=4000000,
...     ),
...     WriteIntent(
...         CopySource('4_z5485a1682662eb3e60980d10_f113f963288e711a6_d20190404_
↪m065910_c002_v0001095_t0044', offset=4001024, length=123456789),
...         destination_offset=4001024,
...     ),
... ]
>>> file_info = {'how': 'good-file'}
>>> bucket.create_file(input_sources, remote_name, file_info)
<b2sdk.file_version.FileVersionInfo at 0x7fc8cd560552>
```

LocalUploadSource has the size determined automatically in this case. This is more efficient than `b2sdk.v1.Bucket.concatenate()`, as it can use the overlapping ranges when a remote part is smaller than *absoluteMinimumPartSize* to prevent downloading a range.

For more information see `b2sdk.v1.Bucket.create_file()`.

Synthesize a file from local and remote parts

This is useful for expert usage patterns such as:

- *synthetic backup*
- *reverse synthetic backup*
- mostly-server-side cutting and gluing uncompressed media files such as *wav* and *avi* with rewriting of file headers
- various deduplicated backup scenarios

Please note that `b2sdk.v1.Bucket.create_file_stream()` accepts **an ordered iterable** which *can contain overlapping ranges*, so the operation does not need to be planned ahead, but can be streamed, which supports very large output objects.

Scenarios such as below are then possible:

```
A          C          D          G
|          |          |          |
| cloud-AC |          | cloud-DG |
|          |          |          |
v          v          v          v
#####          #####
^                      ^
|                      |
+---- desired file A-G -----+
```

(continues on next page)

(continued from previous page)



```
>>> bucket = b2_api.get_bucket_by_name(bucket_name)
>>> def generate_input():
...     yield WriteIntent(
...         CopySource('4_z5485a1682662eb3e60980d10_f113f963288e711a6_d20190404_
↳ m065910_c002_v0001095_t0044', offset=0, length=lengthC),
...         destination_offset=0,
...     )
...     yield WriteIntent(
...         UploadSourceLocalFile('my_local_path/to_file.txt'), # length = offsetF -
↳ offsetB
...         destination_offset=offsetB,
...     )
...     yield WriteIntent(
...         CopySource('4_z5485a1682662eb3e60980d10_f113f963288e711a6_d20190404_
↳ m065910_c002_v0001095_t0044', offset=0, length=offsetG-offsetD),
...         destination_offset=offsetD,
...     )
...
>>> file_info = {'how': 'good-file'}
>>> bucket.create_file(generate_input(), remote_name, file_info)
<b2sdk.file_version.FileVersionInfo at 0x7fc8cd560552>
```

In such case, if the sizes allow for it (there would be no parts smaller than *absoluteMinimumPartSize*), the only uploaded part will be *C-D*. Otherwise, more data will be uploaded, but the data transfer will be reduced in most cases. *b2sdk.v1.Bucket.create_file()* does not guarantee that outbound transfer usage would be optimal, it uses a simple greedy algorithm with as small look-aheads as possible.

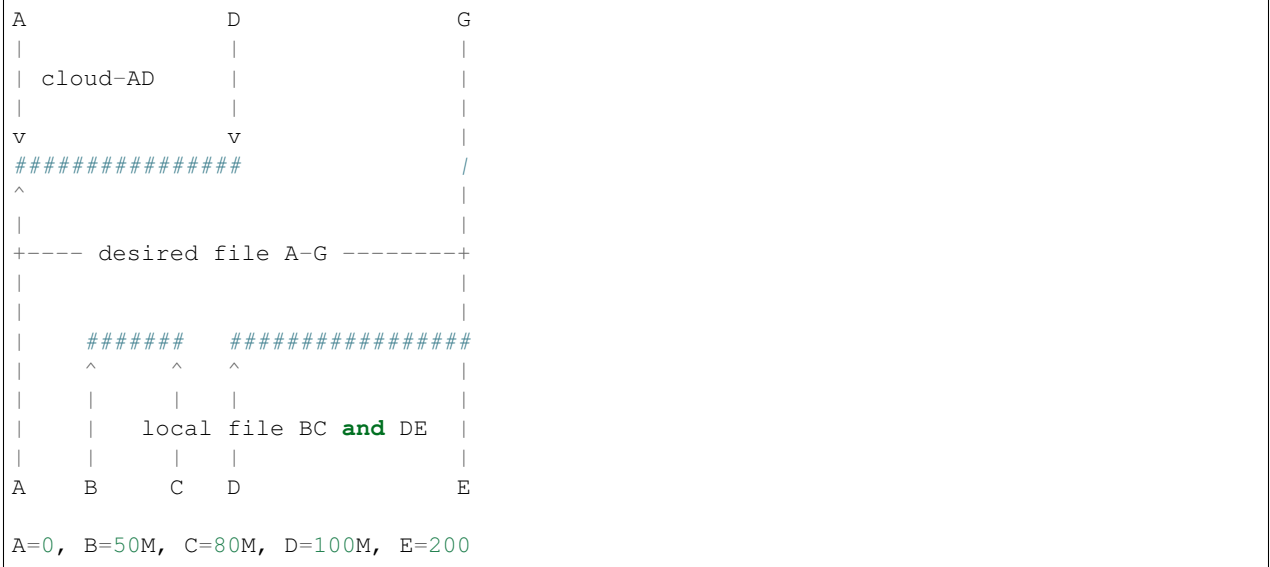
For more information see *b2sdk.v1.Bucket.create_file()*.

Encryption

Even if files *A-C* and *D-G* are encrypted using *SSE-C* with different keys, they can still be used in a single *b2sdk.v1.Bucket.create_file()* call, because *b2sdk.v1.CopySource* accepts an optional *b2sdk.v1.EncryptionSetting*.

Prioritize remote or local sources

`b2sdk.v1.Bucket.create_file()` and `b2sdk.v1.Bucket.create_file_stream()` support source/origin prioritization, so that planner would know which sources should be used for overlapping ranges. Supported values are: *local*, *remote* and *local_verification*.



```
>>> bucket.create_file(input_sources, remote_name, file_info, prioritize='local')
# planner parts: cloud[A, B], local[B, C], remote[C, D], local[D, E]
```

Here the planner has only used a remote source where remote range was not available, minimizing downloads.

```
>>> planner.create_file(input_sources, remote_name, file_info, prioritize='remote')
# planner parts: cloud[A, D], local[D, E]
```

Here the planner has only used a local source where remote range was not available, minimizing uploads.

```
>>> bucket.create_file(input_sources, remote_name, file_info)
# or
>>> bucket.create_file(input_sources, remote_name, file_info, prioritize='local_
↳ verification')
# planner parts: cloud[A, B], cloud[B, C], cloud[C, D], local[D, E]
```

In *local_verification* mode the remote range was artificially split into three parts to allow for checksum verification against matching local ranges.

Note: *prioritize* is just a planner setting - remote parts are always verified if matching local parts exists.

2.5.4 Continuation

Continuation of upload

In order to continue a simple upload session, **b2sdk** checks for any available sessions with of the same `file_name`, `file_info` and `media_type`, verifying the size of an object as much as possible.

To support automatic continuation, some advanced methods create a plan before starting copy/upload operations, saving the hash of that plan in `file_info` for increased reliability.

If that is not available, `large_file_id` can be extracted via callback during the operation start. It can then be passed into the subsequent call to continue the same task, though the responsibility for passing the exact same input is then on the user of the function. Please see [advanced method support table](#) to see where automatic continuation is supported. `large_file_id` can also be passed if automatic continuation is available in order to avoid issues where multiple matchin upload sessions are matching the transfer.

Continuation of create/concantenate

`b2sdk.v1.Bucket.create_file()` supports automatic continuation or manual continuation. `b2sdk.v1.Bucket.create_file_stream()` supports only manual continuation for local-only inputs. The situation looks the same for `b2sdk.v1.Bucket.concatenate()` and `b2sdk.v1.Bucket.concatenate_stream()` (streamed version supports only manual continuation of local sources). Also `b2sdk.v1.Bucket.upload()` and `b2sdk.v2.Bucket.copy()` support both automatic and manual continuation.

Manual continuation

```
>>> def large_file_callback(large_file):
...     # storage is not part of the interface - here only for demonstration purposes
...     storage.store({'name': remote_name, 'large_file_id': large_file.id})
>>> bucket.create_file(input_sources, remote_name, file_info, large_file_
↳callback=large_file_callback)
# ...
>>> large_file_id = storage.query({'name': remote_name})[0]['large_file_id']
>>> bucket.create_file(input_sources, remote_name, file_info, large_file_id=large_
↳file_id)
```

Manual continuation (streamed version)

```
>>> def large_file_callback(large_file):
...     # storage is not part of the interface - here only for demonstration purposes
...     storage.store({'name': remote_name, 'large_file_id': large_file.id})
>>> bucket.create_file_stream(input_sources, remote_name, file_info, large_file_
↳callback=large_file_callback)
# ...
>>> large_file_id = storage.query({'name': remote_name})[0]['large_file_id']
>>> bucket.create_file_stream(input_sources, remote_name, file_info, large_file_
↳id=large_file_id)
```

Streams that contains remote sources cannot be continued with `b2sdk.v1.Bucket.create_file()` - internally `b2sdk.v1.Bucket.create_file()` stores plan information in file info for such inputs, and verifies it before any copy/upload and `b2sdk.v1.Bucket.create_file_stream()` cannot store this information. Local source only inputs can be safely continued with `b2sdk.v1.Bucket.create_file()` in auto continue mode or manual continue mode (because plan information is not stored in file info in such case).

Auto continuation

```
>>> bucket.create_file(input_sources, remote_name, file_info)
```

For local source only input, `b2sdk.v1.Bucket.create_file()` would try to find matching unfinished large file. It will verify uploaded parts checksums with local sources - the most completed, having all uploaded parts matched candidate would be automatically selected as file to continue. If there is no matching candidate (even if there are unfinished files for the same file name) new large file would be started.

In other cases plan information would be generated and `b2sdk.v1.Bucket.create_file()` would try to find unfinished large file with matching plan info in its file info. If there is one or more such unfinished large files, `b2sdk.v1.Bucket.create_file()` would verify checksums for all locally available parts and choose any matching candidate. If all candidates fails on uploaded parts checksums verification, process is interrupted and error raises. In such case corrupted unfinished large files should be cancelled manually and `b2sdk.v1.Bucket.create_file()` should be retried, or auto continuation should be turned off with `auto_continue=False`

No continuation

```
>>> bucket.create_file(input_sources, remote_name, file_info, auto_continue=False)
```

Note, that this only forces start of a new large file - it is still possible to continue the process with either auto or manual modes.

2.6 Glossary

absoluteMinimumPartSize The smallest large file part size, as indicated during authorization process by the server (in 2019 it used to be 5MB, but the server can set it dynamically)

account ID An identifier of the B2 account (not login). Looks like this: 4ba5845d7aaf.

application key ID Since every *account ID* can have multiple access keys associated with it, the keys need to be distinguished from each other. *application key ID* is an identifier of the access key. There are two types of keys: *master application key* and *non-master application key*.

application key The secret associated with an *application key ID*, used to authenticate with the server. Looks like this: N2Zug0evLcHDlh_L0Z0AJhiGGdY or 0a1bce5ea463a7e4b090ef5bd6bd82b851928ab2c6 or K0014pbw01zxcIVMnqSNTfWHRU/O3s

b2sdk version Looks like this: v1.0.0 or 1.0.0 and makes version numbers meaningful. See *Pinning versions* for more details.

b2sdk interface version Looks like this: v2 or b2sdk.v2 and makes maintaining backward compatibility much easier. See *interface versions* for more details.

master application key This is the first key you have access to, it is available on the B2 web application. This key has all capabilities, access to all *buckets*, and has no file prefix restrictions or expiration. The *application key ID* of the master application key is equal to *account ID*.

non-master application key A key which can have restricted capabilities, can only have access to a certain *bucket* or even to just part of it. See https://www.backblaze.com/b2/docs/application_keys.html to learn more. Looks like this: 0014aa9865d6f0000000000b0

bucket A container that holds files. You can think of buckets as the top-level folders in your B2 Cloud Storage account. There is no limit to the number of files in a bucket, but there is a limit of 100 buckets per account. See <https://www.backblaze.com/b2/docs/buckets.html> to learn more.

2.7 About API interfaces

2.7.1 Semantic versioning

b2sdk follows [Semantic Versioning](#) policy, so in essence the version number is `MAJOR.MINOR.PATCH` (for example `1.2.3`) and:

- we increase *MAJOR* version when we make **incompatible** API changes
- we increase *MINOR* version when we add functionality **in a backwards-compatible manner**, and
- we increase *PATCH* version when we make backwards-compatible **bug fixes** (unless someone relies on the undocumented behavior of a fixed bug)

Therefore when setting up **b2sdk** as a dependency, please make sure to match the version appropriately, for example you could put this in your `requirements.txt` to make sure your code is compatible with the **b2sdk** version your user will get from pypi:

```
b2sdk>=1.0.0,<2.0.0
```

2.7.2 Interface versions

You might notice that the import structure provided in the documentation looks a little odd: `from b2sdk.v1 import ...`. The `.v1` part is used to keep the interface fluid without risk of breaking applications that use the old signatures. With new versions, **b2sdk** will provide functions with signatures matching the old ones, wrapping the new interface in place of the old one. What this means for a developer using **b2sdk**, is that it will just keep working. We have already deleted some legacy functions when moving from `.v0` to `.v1`, providing equivalent wrappers to reduce the migration effort for applications using pre-1.0 versions of **b2sdk** to fixing imports.

It also means that **b2sdk** developers may change the interface in the future and will not need to maintain many branches and backport fixes to keep compatibility of for users of those old branches.

2.7.3 Interface version compatibility

A *numbered interface* will not be exactly identical throughout its lifespan, which should not be a problem for anyone, however just in case, the acceptable differences that the developer must tolerate, are listed below.

Exceptions

The exception hierarchy may change in a backwards compatible manner and the developer must anticipate it. For example, if `b2sdk.v1.ExceptionC` inherits directly from `b2sdk.v1.ExceptionA`, it may one day inherit from `b2sdk.v1.ExceptionB`, which in turn inherits from `b2sdk.v1.ExceptionA`. Normally this is not a problem if you use `isinstance()` and `super()` properly, but your code should not call the constructor of a parent class by directly naming it or it might skip the middle class of the hierarchy (`ExceptionB` in this example).

Extensions

Even in the same interface version, objects/classes/enums can get additional fields and their representations such as `to_dict()` or `__repr__` (but not `__str__`) may start to contain those fields.

Methods and functions can start accepting new **optional** arguments. New methods can be added to existing classes.

Performance

Some effort will be put into keeping the performance of the old interfaces, but in rare situations old interfaces may end up with a slightly degraded performance after a new version of the library is released. If performance target is absolutely critical to your application, you can pin your dependencies to the middle version (using `b2sdk>=X.Y.0, <X.Y+1.0`) as **b2sdk** will increment the middle version when introducing a new interface version if the wrapper for the older interfaces is likely to affect performance.

2.7.4 Public interface

Public interface consists of **public** members of modules listed in [Public API](#) section. This should be used in 99% of use cases, it's enough to implement anything from a [console tool](#) to a [FUSE filesystem](#).

Those modules will generally not change in a backwards-incompatible way between non-major versions. Please see [interface version compatibility](#) chapter for notes on what changes must be expected.

Hint: If the current version of **b2sdk** is 4.5.6 and you only use the *public* interface, put this in your `requirements.txt` to be safe:

```
b2sdk>=4.5.6, <5.0.0
```

Note: `b2sdk.*._something` and `b2sdk.*.*._something`, while having a name beginning with an underscore, are **NOT** considered public interface.

2.7.5 Internal interface

Some rarely used features of B2 cloud are not implemented in **b2sdk**. Tracking usage of transactions and transferred data is a good example - if it is required, additional work would need to be put into a specialized internal interface layer to enable accounting and reporting.

b2sdk maintainers are *very supportive* in case someone wants to contribute an additional feature. Please consider adding it to the sdk, so that more people can use it. This way it will also receive our updates, unlike a private implementation which would not receive any updates unless you apply them manually (but that's a lot of work and we both know it's not going to happen). In practice, an implementation can be either shared or will quickly become outdated. The license of **b2sdk** is very permissive, but when considering whether to keep your patches private or public, please take into consideration the long-term cost of keeping up with a dynamic open-source project and/or the cost of missing the updates, especially those related to performance and reliability (as those are being actively developed in parallel to documentation).

Internal interface modules are listed in [API Internal](#) section.

Note: It is OK for you to use our internal interface (better than copying our source files!), however, if you do, please pin your dependencies to **middle** version, as backwards-incompatible changes may be introduced in a non-major version.

Furthermore, it would be greatly appreciated if an issue was filed for such situations, so that **b2sdk** interface can be improved in a future version in order to avoid strict version pinning.

Hint: If the current version of **b2sdk** is 4.5.6 and you are using the *internal* interface, put this in your requirements.txt:

```
b2sdk>=4.5.6,<4.6.0
```

Hint: Use *Quick Start Guide* to quickly jump to examples

2.8 API Reference

2.8.1 Interface types

b2sdk API is divided into two parts, *public* and *internal*. Please pay attention to which interface type you use.

Tip: *Pinning versions* properly ensures the stability of your application.

2.8.2 Public API

AccountInfo

AccountInfo stores basic information about the account, such as *Application Key ID* and *Application Key*, in order to let *b2sdk.v1.B2Api* perform authenticated requests.

There are two usable implementations provided by **b2sdk**:

- *b2sdk.v1.InMemoryAccountInfo* - a basic implementation with no persistence
- *b2sdk.v1.SqliteAccountInfo* - for console and GUI applications

They both provide the full *AccountInfo interface*.

Note: Backup applications and many server-side applications should *implement their own AccountInfo*, backed by the metadata/configuration database of the application.

AccountInfo implementations

InMemoryAccountInfo

AccountInfo with no persistence.

class `b2sdk.v1.InMemoryAccountInfo`
Implements all methods of *AccountInfo* interface.

Hint: Usage of this class is appropriate for secure Web applications which do not wish to persist any user data.

Using this class for applications such as CLI, GUI or backup is discouraged, as `InMemoryAccountInfo` does not write down the authorization token persistently. That would be slow, as it would force the application to retrieve a new one on every command/click/backup start. Furthermore - an important property of *AccountInfo* is caching the `bucket_name:bucket_id` mapping; in case of `InMemoryAccountInfo` the cache will be flushed between executions of the program.

`__init__()`
The constructor takes no parameters.

SqliteAccountInfo

class `b2sdk.v1.SqliteAccountInfo`
Implements all methods of *AccountInfo* interface.

Uses a [SQLite database](#) for persistence and access synchronization between multiple processes. Not suitable for usage over NFS.

Underlying database has the following schema:

account		bucket		bucket_upload_url		update_done	
○ account_auth_token	TEXT	○ bucket_id	TEXT	○ bucket_id	TEXT	○ update_number	INTEGER
○ account_id	TEXT	○ bucket_name	TEXT	○ upload_auth_token	TEXT		
○ account_id_or_app_key_id	TEXT			○ upload_url	TEXT		
○ allowed	TEXT						
○ api_url	TEXT						
○ application_key	TEXT						
○ download_url	TEXT						
○ minimum_part_size	INTEGER						
○ realm	TEXT						

generated by sadisplay v0.4.9

Hint: Usage of this class is appropriate for interactive applications installed on a user's machine (i.e.: CLI and GUI applications).

Usage of this class **might** be appropriate for non-interactive applications installed on the user's machine, such as backup applications. An alternative approach that should be considered is to store the *AccountInfo* data alongside the configuration of the rest of the application.

`__init__` (*file_name=None, last_upgrade_to_run=None*)

If *file_name* argument is empty or None, path from B2_ACCOUNT_INFO environment variable is used. If that is not available, a default of `~/ .b2_account_info` is used.

Parameters

- **file_name** (*str*) – The sqlite file to use; overrides the default.
- **last_upgrade_to_run** (*int*) – For testing only, override the auto-update on the db.

Implementing your own

When building a server-side application or a web service, you might want to implement your own *AccountInfo* class backed by a database. In such case, you should inherit from *b2sdk.v1.UrlPoolAccountInfo*, which has groundwork for url pool functionality). If you cannot use it, inherit directly from *b2sdk.v1.AbstractAccountInfo*.

```
>>> from b2sdk.v1 import UrlPoolAccountInfo
>>> class MyAccountInfo(UrlPoolAccountInfo):
...     ...
```

b2sdk.v1.AbstractAccountInfo describes the interface, while *b2sdk.v1.UrlPoolAccountInfo* and *b2sdk.v1.UploadUrlPool* implement a part of the interface for in-memory upload token management.

AccountInfo interface

class `b2sdk.v1.AbstractAccountInfo`

get_s3_api_url ()

Return s3_api_url or raises MissingAccountData exception.

Return type `str`

get_bucket_name_or_none_from_bucket_id (*bucket_id: str*) → Optional[`str`]

Look up the bucket name for the given bucket id.

get_recommended_part_size ()

Return the recommended number of bytes in a part of a large file.

Returns number of bytes

Return type `int`

get_absolute_minimum_part_size ()

Return the absolute minimum number of bytes in a part of a large file.

Returns number of bytes

Return type `int`

abstract get_minimum_part_size ()

Return the minimum number of bytes in a part of a large file.

Returns number of bytes

Return type `int`

abstract `_set_auth_data` (*account_id, auth_token, api_url, download_url, minimum_part_size, application_key, realm, s3_api_url, allowed, application_key_id*)

Actually store the auth data. Can assume that ‘allowed’ is present and valid.

All of the information returned by `b2_authorize_account` is saved, because all of it is needed at some point.

`_abc_impl = <_abc_data object>`

AccountInfo helper classes

class `b2sdk.v1.UrlPoolAccountInfo`

Caution: This class is not part of the public interface. To find out how to safely use it, read [this](#).

BUCKET_UPLOAD_POOL_CLASS

A url pool class to use for small files.

alias of `b2sdk.account_info.upload_url_pool.UploadUrlPool`

LARGE_FILE_UPLOAD_POOL_CLASS

A url pool class to use for large files.

alias of `b2sdk.account_info.upload_url_pool.UploadUrlPool`

class `b2sdk.account_info.upload_url_pool.UploadUrlPool`

For each key (either a bucket id or large file id), hold a pool of (url, auth_token) pairs.

Caution: This class is not part of the public interface. To find out how to safely use it, read [this](#).

put (*key, url, auth_token*)

Add the url and auth token to the pool for the given key.

Parameters

- **key** (*str*) – bucket ID or large file ID
- **url** (*str*) – bucket or file URL
- **auth_token** (*str*) – authentication token

take (*key*)

Return a (url, auth_token) if one is available, or (None, None) if not.

Parameters **key** (*str*) – bucket ID or large file ID

Return type `tuple`

clear_for_key (*key*)

Remove an item from the pool by key.

Parameters **key** (*str*) – bucket ID or large file ID

Cache

b2sdk caches the mapping between bucket name and bucket id, so that the user of the library does not need to maintain the mapping to call the api.

```
class b2sdk.v1.AbstractCache
```

```
    get_bucket_name_or_none_from_bucket_id (bucket_id: str) → Optional[str]
```

```
class b2sdk.v1.AuthInfoCache
```

A cache that stores data persistently in `StoredAccountInfo`.

```
    __init__ (info)
```

Initialize self. See `help(type(self))` for accurate signature.

```
    get_bucket_id_or_none_from_bucket_name (name)
```

```
    get_bucket_name_or_none_from_bucket_id (bucket_id) → Optional[str]
```

```
    get_bucket_name_or_none_from_allowed ()
```

```
    save_bucket (bucket)
```

```
    set_bucket_name_cache (buckets)
```

```
class b2sdk.v1.DummyCache
```

A cache that does nothing.

```
    get_bucket_id_or_none_from_bucket_name (name)
```

```
    get_bucket_name_or_none_from_bucket_id (bucket_id: str) → Optional[str]
```

```
    get_bucket_name_or_none_from_allowed ()
```

```
    save_bucket (bucket)
```

```
    set_bucket_name_cache (buckets)
```

```
class b2sdk.v1.InMemoryCache
```

A cache that stores the information in memory.

```
    __init__ ()
```

Initialize self. See `help(type(self))` for accurate signature.

```
    get_bucket_id_or_none_from_bucket_name (name)
```

```
    get_bucket_name_or_none_from_bucket_id (bucket_id: str) → Optional[str]
```

```
    get_bucket_name_or_none_from_allowed ()
```

```
    save_bucket (bucket)
```

```
    set_bucket_name_cache (buckets)
```

B2 Api client

class `b2sdk.v1.B2Api`

SESSION_CLASS

alias of `b2sdk.v1.session.B2Session`

BUCKET_FACTORY_CLASS

alias of `b2sdk.v1.bucket.BucketFactory`

BUCKET_CLASS

alias of `b2sdk.v1.bucket.Bucket`

get_bucket_by_id (*bucket_id*)

Return a bucket object with a given ID. Unlike `get_bucket_by_name`, this method does not need to make any API calls.

Parameters `bucket_id` (*str*) – a bucket ID

Returns a Bucket object

Return type `b2sdk.v1.Bucket`

check_bucket_restrictions (*bucket_name*)

Check to see if the allowed field from `authorize-account` has a bucket restriction.

If it does, checks if the `bucket_name` for a given api call matches that. If not, it raises a `b2sdk.v1.exception.RestrictedBucket` error.

Parameters `bucket_name` (*str*) – a bucket name

Raises `b2sdk.v1.exception.RestrictedBucket` – if the account is not allowed to use this bucket

Exceptions

exception `b2sdk.v1.exception.CommandError` (*message*)

b2 command error (user caused). Accepts exactly one argument: `message`.

We expect users of shell scripts will parse our `__str__` output.

B2 Bucket

class `b2sdk.v1.Bucket`

FILE_VERSION_FACTORY

alias of `b2sdk.v1.file_version.FileVersionInfoFactory`

copy_file (*file_id*, *new_file_name*, *bytes_range=None*, *metadata_directive=None*, *content_type=None*, *file_info=None*, *destination_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None*, *source_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None*, *file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None*, *legal_hold: Optional[b2sdk.file_lock.LegalHold] = None*)

Creates a new file in this bucket by (server-side) copying from an existing file.

Parameters

- **file_id** (*str*) – file ID of existing file

- **new_file_name** (*str*) – file name of the new file
- **bytes_range** (*tuple[int, int]*, *None*) – start and end offsets (**inclusive!**), default is the entire file
- **metadata_directive** (*b2sdk.v1.MetadataDirectiveMode*, *None*) – default is *b2sdk.v1.MetadataDirectiveMode.COPY*
- **content_type** (*str*, *None*) – content_type for the new file if metadata_directive is set to *b2sdk.v1.MetadataDirectiveMode.REPLACE*, default will copy the content_type of old file
- **file_info** (*dict*, *None*) – file_info for the new file if metadata_directive is set to *b2sdk.v1.MetadataDirectiveMode.REPLACE*, default will copy the file_info of old file
- **destination_encryption** (*b2sdk.v1.EncryptionSetting*) – encryption settings for the destination (None if unknown)
- **source_encryption** (*b2sdk.v1.EncryptionSetting*) – encryption settings for the source (None if unknown)
- **file_retention** (*b2sdk.v1.FileRetentionSetting*) – retention setting for the new file
- **legal_hold** (*bool*) – legalHold setting for the new file

start_large_file (*file_name*, *content_type=None*, *file_info=None*, *file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None*, *legal_hold: Optional[b2sdk.file_lock.LegalHold] = None*)

Start a large file transfer.

Parameters

- **file_name** (*str*) – a file name
- **content_type** (*str*, *None*) – the MIME type, or None to accept the default based on file extension of the B2 file name
- **file_info** (*dict*, *None*) – a file info to store with the file or None to not store anything
- **file_retention** (*b2sdk.v1.FileRetentionSetting*) – retention setting for the new file
- **legal_hold** (*bool*) – legalHold setting for the new file

create_file (*write_intents*, *file_name*, *content_type=None*, *file_info=None*, *progress_listener=None*, *recommended_upload_part_size=None*, *continue_large_file_id=None*, *encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None*, *file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None*, *legal_hold: Optional[b2sdk.file_lock.LegalHold] = None*)

Creates a new file in this bucket using an iterable (list, tuple etc) of remote or local sources.

Source ranges can overlap and remote sources will be prioritized over local sources (when possible). For more information and usage examples please see [Advanced usage patterns](#).

Parameters

- **write_intents** (*list[b2sdk.v1.WriteIntent]*) – list of write intents (remote or local sources)
- **new_file_name** (*str*) – file name of the new file

- **content_type** (*str*, *None*) – content_type for the new file, if *None* content_type would be automatically determined or it may be copied if it resolves as single part remote source copy
- **file_info** (*dict*, *None*) – file_info for the new file, if *None* it will be set to empty dict or it may be copied if it resolves as single part remote source copy
- **progress_listener** (*b2sdk.v1.AbstractProgressListener*, *None*) – a progress listener object to use, or *None* to not report progress
- **recommended_upload_part_size** (*int*, *None*) – the recommended part size to use for uploading local sources or *None* to determine automatically, but remote sources would be copied with maximum possible part size
- **continue_large_file_id** (*str*, *None*) – large file id that should be selected to resume file creation for multipart upload/copy, *None* for automatic search for this id
- **encryption** (*b2sdk.v1.EncryptionSetting*) – encryption settings (*None* if unknown)
- **file_retention** (*b2sdk.v1.FileRetentionSetting*) – file retention setting
- **legal_hold** (*bool*) – legal hold setting

```
create_file_stream(write_intents_iterator, file_name, content_type=None, file_info=None,
                    progress_listener=None, recommended_upload_part_size=None,
                    continue_large_file_id=None, encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None,
                    file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None, legal_hold: Optional[b2sdk.file_lock.LegalHold] = None)
```

Creates a new file in this bucket using a stream of multiple remote or local sources.

Source ranges can overlap and remote sources will be prioritized over local sources (when possible). For more information and usage examples please see [Advanced usage patterns](#).

Parameters

- **write_intents_iterator** (*iterator* [*b2sdk.v1.WriteIntent*]) – iterator of write intents which are sorted ascending by destination_offset
- **new_file_name** (*str*) – file name of the new file
- **content_type** (*str*, *None*) – content_type for the new file, if *None* content_type would be automatically determined or it may be copied if it resolves as single part remote source copy
- **file_info** (*dict*, *None*) – file_info for the new file, if *None* it will be set to empty dict or it may be copied if it resolves as single part remote source copy
- **progress_listener** (*b2sdk.v1.AbstractProgressListener*, *None*) – a progress listener object to use, or *None* to not report progress
- **recommended_upload_part_size** (*int*, *None*) – the recommended part size to use for uploading local sources or *None* to determine automatically, but remote sources would be copied with maximum possible part size
- **continue_large_file_id** (*str*, *None*) – large file id that should be selected to resume file creation for multipart upload/copy, if *None* in multipart case it would always start a new large file
- **encryption** (*b2sdk.v1.EncryptionSetting*) – encryption settings (*None* if unknown)
- **file_retention** (*b2sdk.v1.FileRetentionSetting*) – file retention setting

- **legal_hold** (*bool*) – legal hold setting

copy (*file_id*, *new_file_name*, *content_type=None*, *file_info=None*, *offset=0*,
length=None, *progress_listener=None*, *destination_encryption:* *Op-*
tional[b2sdk.encryption.setting.EncryptionSetting] = *None*, *source_encryption:* *Op-*
tional[b2sdk.encryption.setting.EncryptionSetting] = *None*, *source_file_info:* *Op-*
tional[dict] = *None*, *source_content_type:* *Optional[str]* = *None*, *file_retention:*
Optional[b2sdk.file_lock.FileRetentionSetting] = *None*, *legal_hold:* *Op-*
tional[b2sdk.file_lock.LegalHold] = *None*)

Creates a new file in this bucket by (server-side) copying from an existing file.

Parameters

- **file_id** (*str*) – file ID of existing file to copy from
- **new_file_name** (*str*) – file name of the new file
- **content_type** (*str, None*) – *content_type* for the new file, if *None* and *b2_copy_file* will be used *content_type* will be copied from source file - otherwise *content_type* would be automatically determined
- **file_info** (*dict, None*) – *file_info* for the new file, if *None* will and *b2_copy_file* will be used *file_info* will be copied from source file - otherwise it will be set to empty dict
- **offset** (*int*) – offset of existing file that copy should start from
- **length** (*int, None*) – number of bytes to copy, if *None* then *offset* have to be 0 and it will use *b2_copy_file* without *range* parameter so it may fail if file is too large. For large files *length* have to be specified to use *b2_copy_part* instead.
- **progress_listener** (*b2sdk.v1.AbstractProgressListener, None*) – a progress listener object to use for multipart copy, or *None* to not report progress
- **destination_encryption** (*b2sdk.v1.EncryptionSetting*) – encryption settings for the destination (*None* if unknown)
- **source_encryption** (*b2sdk.v1.EncryptionSetting*) – encryption settings for the source (*None* if unknown)
- **source_file_info** (*dict, None*) – source file's *file_info* dict, useful when copying files with SSE-C
- **source_content_type** (*str, None*) – source file's *content_type*, useful when copying files with SSE-C
- **file_retention** (*b2sdk.v1.FileRetentionSetting*) – file retention setting for the new file.
- **legal_hold** (*bool*) – legal hold setting for the new file.

File locks

class `b2sdk.v1.LegalHold`

Enum holding information about legalHold switch in a file.

ON = 'on'

legal hold set to “on”

OFF = 'off'

legal hold set to “off”

UNSET = **None**

server default, as for now it is functionally equivalent to OFF

UNKNOWN = 'unknown'

the client is not authorized to read legal hold settings

is_on()

Is the legalHold switch on?

is_off()

Is the legalHold switch off or left as default (which also means off)?

is_unknown()

Is the legalHold switch unknown?

class `b2sdk.v1.FileRetentionSetting`

Represent file retention settings, i.e. whether the file is retained, in which mode and until when

__init__ (*mode: b2sdk.file_lock.RetentionMode, retain_until: Optional[int] = None*)

Initialize self. See help(type(self)) for accurate signature.

class `b2sdk.v1.RetentionMode`

Enum class representing retention modes set in files and buckets

GOVERNANCE = 'governance'

retention settings for files in this mode can be modified by clients with appropriate application key capabilities

COMPLIANCE = 'compliance'

retention settings for files in this mode can only be modified by extending the retention dates by clients with appropriate application key capabilities

NONE = **None**

retention not set

UNKNOWN = 'unknown'

the client is not authorized to read retention settings

class `b2sdk.v1.BucketRetentionSetting`

Represent bucket's default file retention settings, i.e. whether the files should be retained, in which mode and for how long

__init__ (*mode: b2sdk.file_lock.RetentionMode, period: Optional[b2sdk.file_lock.RetentionPeriod] = None*)

Initialize self. See help(type(self)) for accurate signature.

class `b2sdk.v1.RetentionPeriod`

Represent a time period (either in days or in years) that is used as a default for bucket retention

KNOWN_UNITS = ['days', 'years']

__init__ (*years: Optional[int] = None, days: Optional[int] = None*)

Create a retention period, provide exactly one of: days, years

classmethod `from_period_dict` (*period_dict*)

Build a RetentionPeriod from an object returned by the server, such as:

```
{
    "duration": 2,
    "unit": "years"
}
```

as_dict ()

class `b2sdk.v1.FileLockConfiguration`

Represent bucket's file lock configuration, i.e. whether the file lock mechanism is enabled and default file retention

__init__ (*default_retention*: `b2sdk.file_lock.BucketRetentionSetting`, *is_file_lock_enabled*: *Optional[bool]*)

Initialize self. See help(type(self)) for accurate signature.

`b2sdk.v1.UNKNOWN_BUCKET_RETENTION`

Commonly used "unknown" default bucket retention setting

`b2sdk.v1.UNKNOWN_FILE_LOCK_CONFIGURATION`

Commonly used "unknown" bucket file lock setting

`b2sdk.v1.NO_RETENTION_BUCKET_SETTING`

Commonly used "no retention" default bucket retention

`b2sdk.v1.NO_RETENTION_FILE_SETTING`

Commonly used "no retention" file setting

`b2sdk.v1.UNKNOWN_FILE_RETENTION_SETTING`

Commonly used "unknown" file retention setting

Data classes

class `b2sdk.v1.FileVersionInfo` (*id_*, *file_name*, *size*, *content_type*, *content_sha1*, *file_info*, *upload_timestamp*, *action*, *content_md5*=None, *server_side_encryption*: *Optional[b2sdk.encryption.setting.EncryptionSetting]* = None, *file_retention*: *Optional[b2sdk.file_lock.FileRetentionSetting]* = None, *legal_hold*: *Optional[b2sdk.file_lock.LegalHold]* = None)

LS_ENTRY_TEMPLATE = '%83s %6s %10s %8s %9d %s'

format_ls_entry ()

classmethod `format_folder_ls_entry` (*name*)

id_

file_name

size

content_type

content_sha1

content_md5

file_info


```

upload_timestamp
action
server_side_encryption
legal_hold
file_retention
__dict__ = mappingproxy({'__module__': 'b2sdk.v1.file_version', 'LS_ENTRY_TEMPLATE':
class b2sdk.v1.FileIdAndName (file_id, file_name)
    A structure which represents a B2 cloud file with just file_name and fileId attributes.

    Used to return data from calls to b2sdk.v1.Bucket.delete_file_version().

    Variables
        • file_id (str) – fileId
        • file_name (str) – full file name (with path)

    as_dict ()
        represents the object as a dict which looks almost exactly like the raw api output for delete_file_version

    __dict__ = mappingproxy({'__module__': 'b2sdk.file_version', '__doc__': '\n A struct
class b2sdk.v1.UnfinishedLargeFile
    A structure which represents a version of a file (in B2 cloud).

    Variables
        • file_id (str) – fileId
        • file_name (str) – full file name (with path)
        • account_id (str) – account ID
        • bucket_id (str) – bucket ID
        • content_type (str) – RFC 822 content type, for example "application/octet-stream"
        • file_info (dict) – file info dict

class b2sdk.v1.Part (file_id, part_number, content_length, content_sha1)
    A structure which represents a part of a large file upload.

    Variables
        • file_id (str) – fileId
        • part_number (int) – part number, starting with 1
        • content_length (str) – content length, in bytes
        • content_sha1 (str) – checksum

```

Enums

```
class b2sdk.v1.MetadataDirectiveMode (value)
    Mode of handling metadata when copying a file

    COPY = 401
        copy metadata from the source file

    REPLACE = 402
        ignore the source file metadata and set it to provided values

class b2sdk.v1.NewerFileSyncMode (value)
    Mode of handling files newer on destination than on source

    SKIP = 101
        skip syncing such file

    REPLACE = 102
        replace the file on the destination with the (older) file on source

    RAISE_ERROR = 103
        raise a non-transient error, failing the sync operation

class b2sdk.v1.CompareVersionMode (value)
    Mode of comparing versions of files to determine what should be synced and what shouldn't

    MODTIME = 201
        use file modification time on source filesystem

    SIZE = 202
        compare using file size

    NONE = 203
        compare using file name only

class b2sdk.v1.KeepOrDeleteMode (value)
    Mode of dealing with old versions of files on the destination

    DELETE = 301
        delete the old version as soon as the new one has been uploaded

    KEEP_BEFORE_DELETE = 302
        keep the old versions of the file for a configurable number of days before deleting them, always keeping
        the newest version

    NO_DELETE = 303
        keep old versions of the file, do not delete anything
```

Progress reporters

Note: Concrete classes described in this chapter implement methods defined in `AbstractProgressListener`

```
class b2sdk.v1.AbstractProgressListener
    Interface expected by B2Api upload and download methods to report on progress.

    This interface just accepts the number of bytes transferred so far. Subclasses will need to know the total size if
    they want to report a percent done.
```

abstract set_total_bytes (*total_byte_count*)

Always called before `__enter__` to set the expected total number of bytes.

May be called more than once if an upload is retried.

Parameters `total_byte_count` (*int*) – expected total number of bytes

abstract bytes_completed (*byte_count*)

Report the given number of bytes that have been transferred so far. This is not a delta, it is the total number of bytes transferred so far.

Transfer can fail and restart from beginning so byte count can decrease between calls.

Parameters `byte_count` (*int*) – number of bytes have been transferred

close ()

Must be called when you're done with the listener. In well-structured code, should be called only once.

class `b2sdk.v1.TqdmProgressListener` (*description, *args, **kwargs*)

Progress listener based on tqdm library.

class `b2sdk.v1.SimpleProgressListener` (*description, *args, **kwargs*)

Just a simple progress listener which prints info on a console.

class `b2sdk.v1.DoNothingProgressListener`

This listener gives no output whatsoever.

class `b2sdk.v1.ProgressListenerForTest` (**args, **kwargs*)

Capture all of the calls so they can be checked.

`b2sdk.v1.make_progress_listener` (*description, quiet*)

Return a progress listener object depending on some conditions.

Parameters

- **description** (*str*) – listener description
- **quiet** (*bool*) – if `True`, do not output anything

Returns a listener object

Synchronizer

Synchronizer is a powerful utility with functionality of a basic backup application. It is able to copy entire folders into the cloud and back to a local drive or even between two cloud buckets, providing retention policies and many other options.

The **high performance** of sync is credited to parallelization of:

- listing local directory contents
- listing bucket contents
- uploads
- downloads

Synchronizer spawns threads to perform the operations listed above in parallel to shorten the backup window to a minimum.

Sync Options

Following are the important optional arguments that can be provided while initializing *Synchronizer* class.

- `compare_version_mode`: When comparing the source and destination files for finding whether to replace them or not, `compare_version_mode` can be passed to specify the mode of comparison. For possible values see `b2sdk.v1.CompareVersionMode`. Default value is `b2sdk.v1.CompareVersionMode.MODTIME`
- `compare_threshold`: It's the minimum size (in bytes)/modification time (in seconds) difference between source and destination files before we assume that it is new and replace.
- `newer_file_mode`: To identify whether to skip or replace if source is older. For possible values see `b2sdk.v1.NewerFileSyncMode`. If you don't specify this the sync will raise `b2sdk.v1.exception.DestFileNewer` in case any of the source file is older than destination.
- `keep_days_or_delete`: specify policy to keep or delete older files. For possible values see `b2sdk.v1.KeepOrDeleteMode`. Default is `DO_NOTHING`.
- `keep_days`: if `keep_days_or_delete` is `b2sdk.v1.CompareVersionMode.KEEP_BEFORE_DELETE` then this specify for how many days should we keep.

```
>>> from b2sdk.v1 import ScanPoliciesManager
>>> from b2sdk.v1 import parse_sync_folder
>>> from b2sdk.v1 import Synchronizer
>>> from b2sdk.v1 import KeepOrDeleteMode, CompareVersionMode, NewerFileSyncMode
>>> import time
>>> import sys

>>> source = '/home/user1/b2_example'
>>> destination = 'b2://example-mybucket-b2'

>>> source = parse_sync_folder(source, b2_api)
>>> destination = parse_sync_folder(destination, b2_api)

>>> policies_manager = ScanPoliciesManager(exclude_all_symlinks=True)

>>> synchronizer = Synchronizer(
    max_workers=10,
    policies_manager=policies_manager,
    dry_run=False,
    allow_empty_source=True,
    compare_version_mode=CompareVersionMode.SIZE,
    compare_threshold=10,
    newer_file_mode=NewerFileSyncMode.REPLACE,
    keep_days_or_delete=KeepOrDeleteMode.KEEP_BEFORE_DELETE,
    keep_days=10,
)
```

We have a file (hello.txt) which is present in destination but not on source (my local), so it will be deleted and since our mode is to keep the delete file, it will be hidden for 10 days in bucket.

```
>>> no_progress = False
>>> with SyncReport(sys.stdout, no_progress) as reporter:
    synchronizer.sync_folders(
        source_folder=source,
        dest_folder=destination,
        now_millis=int(round(time.time() * 1000)),
        reporter=reporter,
```

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```

    )
upload f1.txt
delete hello.txt (old version)
hide    hello.txt

```

We changed f1.txt and added 1 byte. Since our compare_threshold is 10, it will not do anything.

```

>>> with SyncReport(sys.stdout, no_progress) as reporter:
    synchronizer.sync_folders(
        source_folder=source,
        dest_folder=destination,
        now_millis=int(round(time.time() * 1000)),
        reporter=reporter,
    )

```

We changed f1.txt and added more than 10 bytes. Since our compare_threshold is 10, it will replace the file at destination folder.

```

>>> with SyncReport(sys.stdout, no_progress) as reporter:
    synchronizer.sync_folders(
        source_folder=source,
        dest_folder=destination,
        now_millis=int(round(time.time() * 1000)),
        reporter=reporter,
    )
upload f1.txt

```

Let's just delete the file and not keep - keep_days_or_delete = DELETE You can avoid passing keep_days argument in this case because it will be ignored anyways

```

>>> synchronizer = Synchronizer(
    max_workers=10,
    policies_manager=policies_manager,
    dry_run=False,
    allow_empty_source=True,
    compare_version_mode=CompareVersionMode.SIZE,
    compare_threshold=10, # in bytes
    newer_file_mode=NewerFileSyncMode.REPLACE,
    keep_days_or_delete=KeepOrDeleteMode.DELETE,
)

>>> with SyncReport(sys.stdout, no_progress) as reporter:
    synchronizer.sync_folders(
        source_folder=source,
        dest_folder=destination,
        now_millis=int(round(time.time() * 1000)),
        reporter=reporter,
    )
delete f1.txt
delete f1.txt (old version)
delete hello.txt (old version)
upload f2.txt
delete hello.txt (hide marker)

```

As you can see, it deleted f1.txt and it's older versions (no hide this time) and deleted hello.txt also because now we don't want the file anymore. also, we added another file f2.txt which gets uploaded.

Now we changed `newer_file_mode` to `SKIP` and `compare_version_mode` to `MODTIME`. also uploaded a new version of `f2.txt` to bucket using B2 web.

```
>>> synchronizer = Synchronizer(
    max_workers=10,
    policies_manager=policies_manager,
    dry_run=False,
    allow_empty_source=True,
    compare_version_mode=CompareVersionMode.MODTIME,
    compare_threshold=10, # in seconds
    newer_file_mode=NewerFileSyncMode.SKIP,
    keep_days_or_delete=KeepOrDeleteMode.DELETE,
)
>>> with SyncReport(sys.stdout, no_progress) as reporter:
    synchronizer.sync_folders(
        source_folder=source,
        dest_folder=destination,
        now_millis=int(round(time.time() * 1000)),
        reporter=reporter,
    )
```

As expected, nothing happened, it found a file that was older at source but did not do anything because we skipped.

Now we changed `newer_file_mode` again to `REPLACE` and also uploaded a new version of `f2.txt` to bucket using B2 web.

```
>>> synchronizer = Synchronizer(
    max_workers=10,
    policies_manager=policies_manager,
    dry_run=False,
    allow_empty_source=True,
    compare_version_mode=CompareVersionMode.MODTIME,
    compare_threshold=10,
    newer_file_mode=NewerFileSyncMode.REPLACE,
    keep_days_or_delete=KeepOrDeleteMode.DELETE,
)
>>> with SyncReport(sys.stdout, no_progress) as reporter:
    synchronizer.sync_folders(
        source_folder=source,
        dest_folder=destination,
        now_millis=int(round(time.time() * 1000)),
        reporter=reporter,
    )
delete f2.txt (old version)
upload f2.txt
```

Handling encryption

The *Synchronizer* object may need *EncryptionSetting* instances to perform downloads and copies. For this reason, the *sync_folder* method accepts an *EncryptionSettingsProvider*, see [Server-Side Encryption](#) for further explanation and [Sync Encryption Settings Providers](#) for public API.

Public API classes

class b2sdk.v1.ScanPoliciesManager

Policy object used when scanning folders for syncing, used to decide which files to include in the list of files to be synced.

Code that scans through files should at least use *should_exclude_file()* to decide whether each file should be included; it will check include/exclude patterns for file names, as well as patterns for excluding directories.

Code that scans may optionally use *should_exclude_directory()* to test whether it can skip a directory completely and not bother listing the files and sub-directories in it.

```
__init__(exclude_dir_regexes=(),          exclude_file_regexes=(),          include_file_regexes=(),
          exclude_all_symlinks=False,      exclude_modified_before=None,      ex-
          clude_modified_after=None)
```

Parameters

- **exclude_dir_regexes** (*tuple*) – a tuple of regexes to exclude directories
- **exclude_file_regexes** (*tuple*) – a tuple of regexes to exclude files
- **include_file_regexes** (*tuple*) – a tuple of regexes to include files
- **exclude_all_symlinks** (*bool*) – if True, exclude all symlinks
- **exclude_modified_before** (*int*, *optional*) – optionally exclude file versions modified before (in millis)
- **exclude_modified_after** (*int*, *optional*) – optionally exclude file versions modified after (in millis)

class b2sdk.v1.Synchronizer

```
__init__(max_workers, policies_manager=<b2sdk.v1.sync.scan_policies.ScanPoliciesManager ob-
ject>, dry_run=False, allow_empty_source=False, newer_file_mode=<NewerFileSyncMode.RAISE_ERROR:
103>, keep_days_or_delete=<KeepOrDeleteMode.NO_DELETE: 303>,
compare_version_mode=<CompareVersionMode.MODTIME: 201>, com-
pare_threshold=None, keep_days=None)
```

Initialize synchronizer class and validate arguments

Parameters

- **max_workers** (*int*) – max number of workers
- **policies_manager** – policies manager object
- **dry_run** (*bool*) – test mode, does not actually transfer/delete when enabled
- **allow_empty_source** (*bool*) – if True, do not check whether source folder is empty
- **newer_file_mode** (*b2sdk.v1.NewerFileSyncMode*) – setting which determines handling for destination files newer than on the source

- **keep_days_or_delete** (`b2sdk.v1.KeepOrDeleteMode`) – setting which determines if we should delete or not delete or keep for *keep_days*
- **compare_version_mode** (`b2sdk.v1.CompareVersionMode`) – how to compare the source and destination files to find new ones
- **compare_threshold** (`int`) – should be greater than 0, default is 0
- **keep_days** (`int`) – if *keep_days_or_delete* is `b2sdk.v1.KeepOrDeleteMode.KEEP_BEFORE_DELETE`, then this should be greater than 0

make_folder_sync_actions (*source_folder*, *dest_folder*, *now_millis*, *reporter*, *policies_manager*=<`b2sdk.v1.sync.scan_policies.ScanPoliciesManager` object>, *encryption_settings_provider*=<`b2sdk.sync.encryption_provider.ServerDefaultSync` object>)

Yield a sequence of actions that will sync the destination folder to the source folder.

Parameters

- **source_folder** (`b2sdk.v1.AbstractFolder`) – source folder object
- **dest_folder** (`b2sdk.v1.AbstractFolder`) – destination folder object
- **now_millis** (`int`) – current time in milliseconds
- **reporter** (`b2sdk.v1.SyncReport`) – reporter object
- **policies_manager** – policies manager object
- **encryption_settings_provider** (`b2sdk.v1.AbstractSyncEncryptionSettingsProvider`) – encryption setting provider

class `b2sdk.v1.SyncReport`

Handle reporting progress for syncing.

Print out each file as it is processed, and puts up a sequence of progress bars.

The progress bars are:

- Step 1/1: count local files
- Step 2/2: compare file lists
- Step 3/3: transfer files

This class is THREAD SAFE, so it can be used from parallel sync threads.

UPDATE_INTERVAL = 0.1

__init__ (*stdout*, *no_progress*)

Parameters

- **stdout** – standard output file object
- **no_progress** (`bool`) – if True, do not show progress

close ()

Perform a clean-up.

error (*message*)

Print an error, gracefully interleaving it with a progress bar.

Parameters *message* (`str`) – an error message

print_completion (*message*)

Remove the progress bar, prints a message, and puts the progress bar back.

Parameters `message` (*str*) – an error message

update_total (*delta*)

Report that more files have been found for comparison.

Parameters `delta` (*int*) – number of files found since the last check

end_total ()

Total files count is done. Can proceed to step 2.

update_compare (*delta*)

Report that more files have been compared.

Parameters `delta` (*int*) – number of files compared

end_compare (*total_transfer_files*, *total_transfer_bytes*)

Report that the comparison has been finished.

Parameters

- **total_transfer_files** (*int*) – total number of transferred files
- **total_transfer_bytes** (*int*) – total number of transferred bytes

update_transfer (*file_delta*, *byte_delta*)

Update transfer info.

Parameters

- **file_delta** (*int*) – number of files transferred
- **byte_delta** (*int*) – number of bytes transferred

local_access_error (*path*)

Add a file access error message to the list of warnings.

Parameters `path` (*str*) – file path

local_permission_error (*path*)

Add a permission error message to the list of warnings.

Parameters `path` (*str*) – file path

symlink_skipped (*path*)

property `local_file_count`

property `local_done`

update_local (*delta*)

Report that more files have been found for comparison.

Parameters `delta` (*int*) – number of files found since the last check

end_local ()

Total files count is done. Can proceed to step 2.

Sync Encryption Settings Providers

class b2sdk.v1.AbstractSyncEncryptionSettingsProvider

Object which provides an appropriate EncryptionSetting object for sync, i.e. complex operations with multiple sources and destinations

abstract `get_setting_for_upload` (*bucket*: b2sdk.bucket.Bucket, *b2_file_name*: str, *file_info*: Optional[dict], *length*: int) → Optional[b2sdk.encryption.setting.EncryptionSetting]

Return an EncryptionSetting for uploading an object or None if server should decide.

abstract `get_source_setting_for_copy` (*bucket*: b2sdk.bucket.Bucket, *source_file_version_info*: b2sdk.file_version.FileVersionInfo) → Optional[b2sdk.encryption.setting.EncryptionSetting]

Return an EncryptionSetting for a source of copying an object or None if not required

abstract `get_destination_setting_for_copy` (*bucket*: b2sdk.bucket.Bucket, *dest_b2_file_name*: str, *source_file_version_info*: b2sdk.file_version.FileVersionInfo, *target_file_info*: Optional[dict] = None) → Optional[b2sdk.encryption.setting.EncryptionSetting]

Return an EncryptionSetting for a destination for copying an object or None if server should decide

abstract `get_setting_for_download` (*bucket*: b2sdk.bucket.Bucket, *file_version_info*: b2sdk.file_version.FileVersionInfo) → Optional[b2sdk.encryption.setting.EncryptionSetting]

Return an EncryptionSetting for downloading an object from, or None if not required

class b2sdk.v1.ServerDefaultSyncEncryptionSettingsProvider

Encryption settings provider which assumes setting-less reads and a bucket default for writes.

class b2sdk.v1.BasicSyncEncryptionSettingsProvider

Basic encryption setting provider that supports exactly one encryption setting per bucket for reading and one encryption setting per bucket for writing

__init__ (*read_bucket_settings*: Dict[str, Optional[b2sdk.encryption.setting.EncryptionSetting]], *write_bucket_settings*: Dict[str, Optional[b2sdk.encryption.setting.EncryptionSetting]])

Initialize self. See help(type(self)) for accurate signature.

B2 Utility functions

b2sdk.v1.b2_url_encode(*s*)

URL-encode a unicode string to be sent to B2 in an HTTP header.

Parameters *s* (str) – a unicode string to encode

Returns URL-encoded string

Return type str

b2sdk.v1.b2_url_decode(*s*)

Decode a Unicode string returned from B2 in an HTTP header.

Parameters *s* (str) – a unicode string to decode

Returns a Python unicode string.

Return type str

`b2sdk.v1.choose_part_ranges` (*content_length*, *minimum_part_size*)

Return a list of (offset, length) for the parts of a large file.

Parameters

- **content_length** (*int*) – content length value
- **minimum_part_size** (*int*) – a minimum file part size

Return type `list`

`b2sdk.v1.fix_windows_path_limit` (*path*)

Prefix paths when running on Windows to overcome 260 character path length limit. See [https://msdn.microsoft.com/en-us/library/windows/desktop/aa365247\(v=vs.85\).aspx#maxpath](https://msdn.microsoft.com/en-us/library/windows/desktop/aa365247(v=vs.85).aspx#maxpath)

Parameters **path** (*str*) – a path to prefix

Returns a prefixed path

Return type `str`

`b2sdk.v1.format_and_scale_fraction` (*numerator*, *denominator*, *unit*)

Pick a good scale for representing a fraction, and format it.

Parameters

- **numerator** (*int*) – a numerator of a fraction
- **denominator** (*int*) – a denominator of a fraction
- **unit** (*str*) – an arbitrary unit name

Returns scaled and formatted fraction

Return type `str`

`b2sdk.v1.format_and_scale_number` (*x*, *unit*)

Pick a good scale for representing a number and format it.

Parameters

- **x** (*int*) – a number
- **unit** (*str*) – an arbitrary unit name

Returns scaled and formatted number

Return type `str`

`b2sdk.v1.hex_sha1_of_stream` (*input_stream*, *content_length*)

Return the 40-character hex SHA1 checksum of the first *content_length* bytes in the input stream.

Parameters

- **input_stream** – stream object, which exposes `read()` method
- **content_length** (*int*) – expected length of the stream

Return type `str`

`b2sdk.v1.hex_sha1_of_bytes` (*data*: *bytes*) → *str*

Return the 40-character hex SHA1 checksum of the data.

class `b2sdk.v1.TempDir`

Context manager that creates and destroys a temporary directory.

__enter__ ()

Return the unicode path to the temp dir.

```
__exit__(exc_type, exc_val, exc_tb)
```

Write intent

class `b2sdk.v1.WriteIntent`

Wrapper for outbound source that defines destination offset.

```
__init__(outbound_source, destination_offset=0)
```

Parameters

- **outbound_source** (`b2sdk.v1.OutboundTransferSource`) – data source (remote or local)
- **destination_offset** (`int`) – point of start in destination file

property `length`

Length of the write intent.

Return type `int`

property `destination_end_offset`

Offset of source end in destination file.

Return type `int`

is_copy()

States if outbound source is remote source and requires copying.

Return type `bool`

is_upload()

States if outbound source is local source and requires uploading.

Return type `bool`

classmethod `wrap_sources_iterator(outbound_sources_iterator)`

Helper that wraps outbound sources iterator with write intents.

Can be used in cases similar to concatenate to automatically compute destination offsets

Param `iterator[b2sdk.v1.OutboundTransferSource]` `outbound_sources_iterator`: iterator of outbound sources

Return type `generator[b2sdk.v1.WriteIntent]`

Outbound Transfer Source

class `b2sdk.v1.OutboundTransferSource`

Abstract class for defining outbound transfer sources.

Supported outbound transfer sources are:

- `b2sdk.v1.CopySource`
- `b2sdk.v1.UploadSourceBytes`
- `b2sdk.v1.UploadSourceLocalFile`
- `b2sdk.v1.UploadSourceLocalFileRange`
- `b2sdk.v1.UploadSourceStream`
- `b2sdk.v1.UploadSourceStreamRange`

abstract get_content_length()

Return the number of bytes of data in the file.

abstract is_upload()

Return if outbound source is an upload source. :rtype bool:

abstract is_copy()

Return if outbound source is a copy source. :rtype bool:

Download destination

Note: Concrete classes described in this chapter implement methods defined in `AbstractDownloadDestination`

class `b2sdk.v1.AbstractDownloadDestination`

Interface to a destination for a downloaded file.

abstract make_file_context (*file_id*, *file_name*, *content_length*, *content_type*, *content_shal*, *file_info*, *mod_time_millis*, *range_=None*)

Return a context manager that yields a binary file-like object to use for writing the contents of the file.

Parameters

- **file_id** (*str*) – the B2 file ID from the headers
- **file_name** (*str*) – the B2 file name from the headers
- **content_length** (*str*) – the content length
- **content_type** (*str*) – the content type from the headers
- **content_shal** (*str*) – the content shal from the headers (or "none" for large files)
- **file_info** (*dict*) – the user file info from the headers
- **mod_time_millis** (*int*) – the desired file modification date in ms since 1970-01-01
- **range** (*None*, *tuple[int, int]*) – starting and ending offsets of the received file contents. Usually `None`, which means that the whole file is downloaded.

Returns

`None`

class `b2sdk.v1.DownloadDestLocalFile`

Store a downloaded file into a local file and sets its modification time.

__init__ (*local_file_path*)

Initialize self. See `help(type(self))` for accurate signature.

class `b2sdk.v1.DownloadDestBytes`

Store a downloaded file into bytes in memory.

__init__ ()

Initialize self. See `help(type(self))` for accurate signature.

class `b2sdk.v1.DownloadDestProgressWrapper`

Wrap a `DownloadDestination` and report progress to a `ProgressListener`.

__init__ (*download_dest*, *progress_listener*)

Initialize self. See `help(type(self))` for accurate signature.

class `b2sdk.v1.PreSeekedDownloadDest`

Store a downloaded file into a local file and sets its modification time. Does not truncate the target file, seeks to a given offset just after opening a descriptor.

__init__ (*local_file_path*, *seek_target*)

Initialize self. See help(type(self)) for accurate signature.

Encryption Settings

class `b2sdk.v1.EncryptionKey`

Hold information about encryption key: the key itself, and its id. The id may be None, if it's not set in encrypted file's fileInfo. The secret may be None, if encryption metadata is read from the server.

__init__ (*secret*: *Optional[bytes]*, *key_id*: *Optional[str]*)

Initialize self. See help(type(self)) for accurate signature.

class `b2sdk.v1.EncryptionSetting`

Hold information about encryption mode, algorithm and key (for bucket default, file version info or even upload)

__init__ (*mode*: `b2sdk.encryption.types.EncryptionMode`, *algorithm*: *Optional[b2sdk.encryption.types.EncryptionAlgorithm]* = *None*, *key*: *Optional[b2sdk.encryption.setting.EncryptionKey]* = *None*)

Parameters

- **mode** (`b2sdk.v1.EncryptionMode`) – encryption mode
- **algorithm** (`b2sdk.v1.EncryptionAlgorithm`) – encryption algorithm
- **key** (`b2sdk.v1.EncryptionKey`) – encryption key object for SSE-C

as_dict ()

Represent the setting as a dict, for example:

```
{
    'mode': 'SSE-C',
    'algorithm': 'AES256',
    'customerKey': 'U3hWbVlxM3Q2djl5JEImRS1IQE1jUWZUalduWnIOdTc=',
    'customerKeyMd5': 'SWx9GFv5BTt1jdwf48Bx+Q=='
}
```

```
{
    'mode': 'SSE-B2',
    'algorithm': 'AES256'
}
```

or

```
{
    'mode': 'none'
}
```

`v1.SSE_NONE = <EncryptionSetting(EncryptionMode.NONE, None, None)>`

Commonly used “no encryption” setting

`v1.SSE_B2_AES = <EncryptionSetting(EncryptionMode.SSE_B2, EncryptionAlgorithm.AES256, None)>`

Commonly used SSE-B2 setting

Encryption Types

```
class b2sdk.encryption.types.EncryptionAlgorithm(value)
    Encryption algorithm.

    AES256 = 'AES256'

class b2sdk.encryption.types.EncryptionMode(value)
    Encryption mode.

    UNKNOWN = None
        unknown encryption mode (sdk doesn't know or used key has no rights to know)

    NONE = 'none'
        no encryption (plaintext)

    SSE_B2 = 'SSE-B2'
        server-side encryption with key maintained by B2

    SSE_C = 'SSE-C'
        server-side encryption with key provided by the client

    can_be_set_as_bucket_default()
```

2.8.3 Internal API

Note: See [Internal interface](#) chapter to learn when and how to safely use the Internal API

b2sdk.session – B2 Session

```
class b2sdk.session.TokenType(value)
    Bases: enum.Enum

    An enumeration.

    API = 'api'

    API_TOKEN_ONLY = 'api_token_only'

    UPLOAD_PART = 'upload_part'

    UPLOAD_SMALL = 'upload_small'

class b2sdk.session.B2Session(account_info=None, cache=None, raw_api=None)
    Bases: object

    A facade that supplies the correct api_url and account_auth_token to methods of underlying raw_api and reauthorizes if necessary.

    SQLITE_ACCOUNT_INFO_CLASS
        alias of b2sdk.account_info.sqlite_account_info.SqliteAccountInfo

    __init__(account_info=None, cache=None, raw_api=None)
        Initialize Session using given account info.

        Parameters
```

- **account_info** – an instance of *UrlPoolAccountInfo*, or any custom class derived from *AbstractAccountInfo* To learn more about Account Info objects, see here *SqliteAccountInfo*
- **cache** – an instance of the one of the following classes: *DummyCache*, *InMemoryCache*, *AuthInfoCache*, or any custom class derived from *AbstractCache* It is used by B2Api to cache the mapping between bucket name and bucket ids. default is *DummyCache*
- **raw_api** – an instance of one of the following classes: *B2RawApi*, *RawSimulator*, or any custom class derived from *AbstractRawApi* It makes network-less unit testing simple by using *RawSimulator*, in tests and *B2RawApi* in production. default is *B2RawApi*

authorize_automatically()

Perform automatic account authorization, retrieving all account data from account info object passed during initialization.

authorize_account (*realm*, *application_key_id*, *application_key*)

Perform account authorization.

Parameters

- **realm** (*str*) – a realm to authorize account in (usually just “production”)
- **application_key_id** (*str*) – *application key ID*
- **application_key** (*str*) – user’s *application key*

cancel_large_file (*file_id*)

create_bucket (*account_id*, *bucket_name*, *bucket_type*, *bucket_info*=None, *cors_rules*=None, *lifecycle_rules*=None, *default_server_side_encryption*=None, *is_file_lock_enabled*: *Optional[bool]* = None)

create_key (*account_id*, *capabilities*, *key_name*, *valid_duration_seconds*, *bucket_id*, *name_prefix*)

delete_key (*application_key_id*)

delete_bucket (*account_id*, *bucket_id*)

delete_file_version (*file_id*, *file_name*)

download_file_from_url (*url*, *range*=None, *encryption*: *Optional[b2sdk.encryption.setting.EncryptionSetting]* = None) *Op-*

finish_large_file (*file_id*, *part_sha1_array*)

get_download_authorization (*bucket_id*, *file_name_prefix*, *valid_duration_in_seconds*)

get_file_info_by_id (*file_id*: *str*) → Dict[*str*, Any]

get_file_info_by_name (*bucket_name*: *str*, *file_name*: *str*) → Dict[*str*, Any]

get_upload_url (*bucket_id*)

get_upload_part_url (*file_id*)

hide_file (*bucket_id*, *file_name*)

list_buckets (*account_id*, *bucket_id*=None, *bucket_name*=None)

list_file_names (*bucket_id*, *start_file_name*=None, *max_file_count*=None, *prefix*=None)

list_file_versions (*bucket_id*, *start_file_name*=None, *start_file_id*=None, *max_file_count*=None, *prefix*=None)


```

list_keys (account_id, max_key_count=None, start_application_key_id=None)

list_parts (file_id, start_part_number, max_part_count)

list_unfinished_large_files (bucket_id, start_file_id=None, max_file_count=None, prefix=None)

start_large_file (bucket_id, file_name, content_type, file_info, server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None, file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None, legal_hold: Optional[b2sdk.file_lock.LegalHold] = None)

update_bucket (account_id, bucket_id, bucket_type=None, bucket_info=None, cors_rules=None, lifecycle_rules=None, if_revision_is=None, default_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None, default_retention: Optional[b2sdk.file_lock.BucketRetentionSetting] = None)

upload_file (bucket_id, file_name, content_length, content_type, content_sha1, file_infos, data_stream, server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None, file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None, legal_hold: Optional[b2sdk.file_lock.LegalHold] = None)

upload_part (file_id, part_number, content_length, sha1_sum, input_stream, server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None)

get_download_url_by_id (file_id)

get_download_url_by_name (bucket_name, file_name)

copy_file (source_file_id, new_file_name, bytes_range=None, meta_data_directive=None, content_type=None, file_info=None, destination_bucket_id=None, destination_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None, source_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None, file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None, legal_hold: Optional[b2sdk.file_lock.LegalHold] = None)

copy_part (source_file_id, large_file_id, part_number, bytes_range=None, destination_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None, source_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None)

update_file_retention (file_id, file_name, file_retention: b2sdk.file_lock.FileRetentionSetting, bypass_governance: bool = False)

update_file_legal_hold (file_id, file_name, legal_hold: b2sdk.file_lock.LegalHold)

```

b2sdk.raw_api – B2 raw api wrapper

```

class b2sdk.raw_api.MetadataDirectiveMode (value)
    Bases: enum.Enum

    Mode of handling metadata when copying a file

    COPY = 401
        copy metadata from the source file

    REPLACE = 402
        ignore the source file metadata and set it to provided values

```

```
class b2sdk.raw_api.AbstractRawApi
```

```
    Bases: object
```

```
    Direct access to the B2 web apis.
```

```
    abstract authorize_account (realm_url, application_key_id, application_key)
```

```
    abstract cancel_large_file (api_url, account_auth_token, file_id)
```

```
    abstract copy_file (api_url, account_auth_token, source_file_id, new_file_name,
                        bytes_range=None, metadata_directive=None,
                        content_type=None, file_info=None, destination_bucket_id=None,
                        destination_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting]
                        = None, source_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None, file_retention:
                        Optional[b2sdk.file_lock.FileRetentionSetting] = None, legal_hold: Optional[b2sdk.file_lock.LegalHold] = None)
```

```
    abstract copy_part (api_url, account_auth_token, source_file_id, large_file_id,
                        part_number, bytes_range=None, destination_server_side_encryption:
                        Optional[b2sdk.encryption.setting.EncryptionSetting]
                        = None, source_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None)
```

```
    abstract create_bucket (api_url, account_auth_token, account_id, bucket_name,
                            bucket_type, bucket_info=None, cors_rules=None, life-cycle_rules=None,
                            default_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None,
                            is_file_lock_enabled: Optional[bool] = None)
```

```
    abstract create_key (api_url, account_auth_token, account_id, capabilities, key_name,
                        valid_duration_seconds, bucket_id, name_prefix)
```

```
    abstract download_file_from_url (account_auth_token_or_none, url,
                                    range_=None, encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] =
                                    None)
```

```
    abstract delete_key (api_url, account_auth_token, application_key_id)
```

```
    abstract delete_bucket (api_url, account_auth_token, account_id, bucket_id)
```

```
    abstract delete_file_version (api_url, account_auth_token, file_id, file_name)
```

```
    abstract finish_large_file (api_url, account_auth_token, file_id, part_sha1_array)
```

```
    abstract get_download_authorization (api_url, account_auth_token, bucket_id,
                                        file_name_prefix, valid_duration_in_seconds)
```

```
    abstract get_file_info_by_id (api_url: str, account_auth_token: str, file_id: str) → Dict[str, Any]
```

```
    abstract get_file_info_by_name (download_url: str, account_auth_token: str, bucket_name:
                                    str, file_name: str) → Dict[str, Any]
```

```
    abstract get_upload_url (api_url, account_auth_token, bucket_id)
```

```
    abstract get_upload_part_url (api_url, account_auth_token, file_id)
```

```
    abstract hide_file (api_url, account_auth_token, bucket_id, file_name)
```

```
    abstract list_buckets (api_url, account_auth_token, account_id, bucket_id=None,
                          bucket_name=None)
```

```

abstract list_file_names (api_url, account_auth_token, bucket_id, start_file_name=None,
                           max_file_count=None, prefix=None)

abstract list_file_versions (api_url, account_auth_token, bucket_id,
                               start_file_name=None, start_file_id=None,
                               max_file_count=None, prefix=None)

abstract list_keys (api_url, account_auth_token, account_id, max_key_count=None,
                     start_application_key_id=None)

abstract list_parts (api_url, account_auth_token, file_id, start_part_number, max_part_count)

abstract list_unfinished_large_files (api_url, account_auth_token, bucket_id,
                                       start_file_id=None, max_file_count=None,
                                       prefix=None)

abstract start_large_file (api_url, account_auth_token, bucket_id, file_name,
                             content_type, file_info, server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None,
                             file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None, legal_hold: Optional[b2sdk.file_lock.LegalHold] = None)

abstract update_bucket (api_url, account_auth_token, account_id,
                           bucket_id, bucket_type=None, bucket_info=None,
                           cors_rules=None, lifecycle_rules=None,
                           if_revision_is=None, default_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None,
                           default_retention: Optional[b2sdk.file_lock.BucketRetentionSetting] = None)

abstract update_file_retention (api_url, account_auth_token, file_id, file_name,
                                  file_retention: b2sdk.file_lock.FileRetentionSetting,
                                  bypass_governance: bool = False)

abstract upload_file (upload_url, upload_auth_token, file_name, content_length, content_type,
                        content_sha1, file_infos, data_stream, server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None,
                        file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None, legal_hold: Optional[b2sdk.file_lock.LegalHold] = None)

abstract upload_part (upload_url, upload_auth_token, part_number, content_length,
                        sha1_sum, input_stream, server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None)

get_download_url_by_id (download_url, file_id)

get_download_url_by_name (download_url, bucket_name, file_name)

```

```

class b2sdk.raw_api.B2RawApi (b2_http)
    Bases: b2sdk.raw_api.AbstractRawApi

```

Provide access to the B2 web APIs, exactly as they are provided by b2.

Requires that you provide all necessary URLs and auth tokens for each call.

Each API call decodes the returned JSON and returns a dict.

For details on what each method does, see the B2 docs: <https://www.backblaze.com/b2/docs/>

This class is intended to be a super-simple, very thin layer on top of the HTTP calls. It can be mocked-out for testing higher layers. And this class can be tested by exercising each call just once, which is relatively quick.

```

__init__ (b2_http)
    Initialize self. See help(type(self)) for accurate signature.

```

```
authorize_account (realm_url, application_key_id, application_key)

cancel_large_file (api_url, account_auth_token, file_id)

create_bucket (api_url, account_auth_token, account_id, bucket_name,
                bucket_type, bucket_info=None, cors_rules=None, life-
                cycle_rules=None, default_server_side_encryption: Op-
                tional[b2sdk.encryption.setting.EncryptionSetting] = None, is_file_lock_enabled:
                Optional[bool] = None)

create_key (api_url, account_auth_token, account_id, capabilities, key_name,
             valid_duration_seconds, bucket_id, name_prefix)

delete_bucket (api_url, account_auth_token, account_id, bucket_id)

delete_file_version (api_url, account_auth_token, file_id, file_name)

delete_key (api_url, account_auth_token, application_key_id)

download_file_from_url (account_auth_token_or_none, url, range_=None, encryption: Op-
                        tional[b2sdk.encryption.setting.EncryptionSetting] = None)
    Issue a streaming request for download of a file, potentially authorized.
```

Parameters

- **account_auth_token_or_none** (*str*) – an optional account auth token to pass in
- **url** (*str*) – the full URL to download from
- **range** (*tuple*) – two-element tuple for http Range header
- **encryption** (*b2sdk.v1.EncryptionSetting*) – encryption settings for down-
loading

Returns b2_http response

```
finish_large_file (api_url, account_auth_token, file_id, part_sha1_array)

get_download_authorization (api_url, account_auth_token, bucket_id, file_name_prefix,
                             valid_duration_in_seconds)

get_file_info_by_id (api_url: str, account_auth_token: str, file_id: str) → Dict[str, Any]

get_file_info_by_name (download_url: str, account_auth_token: str, bucket_name: str,
                        file_name: str) → Dict[str, Any]

get_upload_url (api_url, account_auth_token, bucket_id)

get_upload_part_url (api_url, account_auth_token, file_id)

hide_file (api_url, account_auth_token, bucket_id, file_name)

list_buckets (api_url, account_auth_token, account_id, bucket_id=None, bucket_name=None)

list_file_names (api_url, account_auth_token, bucket_id, start_file_name=None,
                 max_file_count=None, prefix=None)

list_file_versions (api_url, account_auth_token, bucket_id, start_file_name=None,
                     start_file_id=None, max_file_count=None, prefix=None)

list_keys (api_url, account_auth_token, account_id, max_key_count=None,
            start_application_key_id=None)

list_parts (api_url, account_auth_token, file_id, start_part_number, max_part_count)

list_unfinished_large_files (api_url, account_auth_token, bucket_id, start_file_id=None,
                              max_file_count=None, prefix=None)
```

start_large_file (*api_url*, *account_auth_token*, *bucket_id*, *file_name*, *content_type*, *file_info*,
server_side_encryption: *Optional*[*b2sdk.encryption.setting.EncryptionSetting*]
= *None*, *file_retention*: *Optional*[*b2sdk.file_lock.FileRetentionSetting*] = *None*,
legal_hold: *Optional*[*b2sdk.file_lock.LegalHold*] = *None*)

update_bucket (*api_url*, *account_auth_token*, *account_id*, *bucket_id*, *bucket_type*=*None*,
bucket_info=*None*, *cors_rules*=*None*, *lifecycle_rules*=*None*,
if_revision_is=*None*, *default_server_side_encryption*: *Optional*[*b2sdk.encryption.setting.EncryptionSetting*] = *None*,
default_retention: *Optional*[*b2sdk.file_lock.BucketRetentionSetting*] = *None*)

update_file_retention (*api_url*, *account_auth_token*, *file_id*, *file_name*, *file_retention*:
b2sdk.file_lock.FileRetentionSetting, *bypass_governance*: *bool* = *False*)

update_file_legal_hold (*api_url*, *account_auth_token*, *file_id*, *file_name*, *legal_hold*:
b2sdk.file_lock.LegalHold)

unprintable_to_hex (*string*)

Replace unprintable chars in string with a hex representation.

Parameters *string* – an arbitrary string, possibly with unprintable characters.

Returns the string, with unprintable characters changed to hex (e.g., “”)

check_b2_filename (*filename*)

Raise an appropriate exception with details if the filename is unusable.

See <https://www.backblaze.com/b2/docs/files.html> for the rules.

Parameters *filename* – a proposed filename in unicode

Returns *None* if the filename is usable

upload_file (*upload_url*, *upload_auth_token*, *file_name*, *content_length*, *content_type*,
content_sha1, *file_infos*, *data_stream*, *server_side_encryption*: *Optional*[*b2sdk.encryption.setting.EncryptionSetting*] = *None*,
file_retention: *Optional*[*b2sdk.file_lock.FileRetentionSetting*] = *None*, *legal_hold*: *Optional*[*b2sdk.file_lock.LegalHold*] = *None*)

Upload one, small file to b2.

Parameters

- **upload_url** – the *upload_url* from *b2_authorize_account*
- **upload_auth_token** – the auth token from *b2_authorize_account*
- **file_name** – the name of the B2 file
- **content_length** – number of bytes in the file
- **content_type** – MIME type
- **content_sha1** – hex SHA1 of the contents of the file
- **file_infos** – extra file info to upload
- **data_stream** – a file like object from which the contents of the file can be read

Returns

upload_part (*upload_url*, *upload_auth_token*, *part_number*, *content_length*,
content_sha1, *data_stream*, *server_side_encryption*: *Optional*[*b2sdk.encryption.setting.EncryptionSetting*] = *None*)

```
copy_file (api_url, account_auth_token, source_file_id, new_file_name, bytes_range=None,
            metadata_directive=None, content_type=None, file_info=None,
            destination_bucket_id=None, destination_server_side_encryption:
            Optional[b2sdk.encryption.setting.EncryptionSetting] = None,
            source_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] =
            None, file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None, legal_hold:
            Optional[b2sdk.file_lock.LegalHold] = None)
```

```
copy_part (api_url, account_auth_token, source_file_id, large_file_id,
            part_number, bytes_range=None, destination_server_side_encryption:
            Optional[b2sdk.encryption.setting.EncryptionSetting] = None,
            source_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] =
            None)
```

```
b2sdk.raw_api.test_raw_api()
```

Exercise the code in B2RawApi by making each call once, just to make sure the parameters are passed in, and the result is passed back.

The goal is to be a complete test of B2RawApi, so the tests for the rest of the code can use the simulator.

Prints to stdout if things go wrong.

Returns 0 on success, non-zero on failure

```
b2sdk.raw_api.test_raw_api_helper(raw_api)
```

Try each of the calls to the raw api. Raise an exception if anything goes wrong.

This uses a Backblaze account that is just for this test. The account uses the free level of service, which should be enough to run this test a reasonable number of times each day. If somebody abuses the account for other things, this test will break and we'll have to do something about it.

b2sdk.b2http – thin http client wrapper

```
class b2sdk.b2http.ResponseContextManager(response)
```

A context manager that closes a requests.Response when done.

```
class b2sdk.b2http.HttpCallback
```

A callback object that does nothing. Overrides pre_request and/or post_request as desired.

```
pre_request (method, url, headers)
```

Called before processing an HTTP request.

Raises an exception if this request should not be processed. The exception raised must inherit from B2HttpCallbackPreRequestException.

Parameters

- **method** (*str*) – str, one of: 'POST', 'GET', etc.
- **url** (*str*) – the URL that will be used
- **headers** (*dict*) – the header sent with the request

```
post_request (method, url, headers, response)
```

Called after processing an HTTP request. Should not raise an exception.

Raises an exception if this request should be treated as failing. The exception raised must inherit from B2HttpCallbackPostRequestException.

Parameters

- **method** (*str*) – one of: 'POST', 'GET', etc.

- **url** (*str*) – the URL that will be used
- **headers** (*dict*) – the header sent with the request
- **response** – a response object from the requests library

class b2sdk.b2http.ClockSkewHook

post_request (*method, url, headers, response*)

Raise an exception if the clock in the server is too different from the clock on the local host.

The Date header contains a string that looks like: “Fri, 16 Dec 2016 20:52:30 GMT”.

Parameters

- **method** (*str*) – one of: ‘POST’, ‘GET’, etc.
- **url** (*str*) – the URL that will be used
- **headers** (*dict*) – the header sent with the request
- **response** – a response object from the requests library

class b2sdk.b2http.B2Http (*requests_module=None, install_clock_skew_hook=True, user_agent_append=None*)

A wrapper for the requests module. Provides the operations needed to access B2, and handles retrying when the returned status is 503 Service Unavailable, 429 Too Many Requests, etc.

The operations supported are:

- **post_json_return_json**
- **post_content_return_json**
- **get_content**

The methods that return JSON either return a Python dict or raise a subclass of B2Error. They can be used like this:

```
try:
    response_dict = b2_http.post_json_return_json(url, headers, params)
    ...
except B2Error as e:
    ...
```

TIMEOUT = 900

add_callback (*callback*)

Add a callback that inherits from HttpCallback.

Parameters **callback** (*callable*) – a callback to be added to a chain

post_content_return_json (*url, headers, data, try_count=5, post_params=None*)

Use like this:

```
try:
    response_dict = b2_http.post_content_return_json(url, headers, data)
    ...
except B2Error as e:
    ...
```

Parameters

- **url** (*str*) – a URL to call

- **headers** (*dict*) – headers to send.
- **data** – bytes (Python 3) or str (Python 2), or a file-like object, to send

Returns a dict that is the decoded JSON

Return type *dict*

post_json_return_json (*url, headers, params, try_count=5*)

Use like this:

```
try:
    response_dict = b2_http.post_json_return_json(url, headers, params)
    ...
except B2Error as e:
    ...
```

Parameters

- **url** (*str*) – a URL to call
- **headers** (*dict*) – headers to send.
- **params** (*dict*) – a dict that will be converted to JSON

Returns the decoded JSON document

Return type *dict*

get_content (*url, headers, try_count=5*)

Fetches content from a URL.

Use like this:

```
try:
    with b2_http.get_content(url, headers) as response:
        for byte_data in response.iter_content(chunk_size=1024):
            ...
except B2Error as e:
    ...
```

The response object is only guarantee to have:

- headers
- iter_content()

Parameters

- **url** (*str*) – a URL to call
- **headers** (*dict*) – headers to send
- **try_count** (*int*) – a number of retries

Returns Context manager that returns an object that supports iter_content()

head_content (*url: str, headers: Dict[str, Any], try_count: int = 5*) → Dict[str, Any]

Does a HEAD instead of a GET for the URL. The response's content is limited to the headers.

Use like this:


```

try:
    response_dict = b2_http.head_content(url, headers)
    ...
except B2Error as e:
    ...

```

The response object is only guaranteed to have:

- headers

Parameters

- **url** (*str*) – a URL to call
- **headers** (*dict*) – headers to send
- **try_count** (*int*) – a number of retries

Returns the decoded response

Return type *dict*

`b2sdk.b2http.test_http()`

Run a few tests on error diagnosis.

This test takes a while to run and is not used in the automated tests during building. Run the test by hand to exercise the code.

b2sdk.utils

`b2sdk.utils.interruptible_get_result(future)`

Wait for the result of a future in a way that can be interrupted by a KeyboardInterrupt.

This is not necessary in Python 3, but is needed for Python 2.

Parameters **future** (*Future*) – a future to get result of

`b2sdk.utils.b2_url_encode(s)`

URL-encode a unicode string to be sent to B2 in an HTTP header.

Parameters **s** (*str*) – a unicode string to encode

Returns URL-encoded string

Return type *str*

`b2sdk.utils.b2_url_decode(s)`

Decode a Unicode string returned from B2 in an HTTP header.

Parameters **s** (*str*) – a unicode string to decode

Returns a Python unicode string.

Return type *str*

`b2sdk.utils.choose_part_ranges(content_length, minimum_part_size)`

Return a list of (offset, length) for the parts of a large file.

Parameters

- **content_length** (*int*) – content length value
- **minimum_part_size** (*int*) – a minimum file part size

Return type `list`

`b2sdk.utils.hex_sha1_of_stream(input_stream, content_length)`

Return the 40-character hex SHA1 checksum of the first `content_length` bytes in the input stream.

Parameters

- `input_stream` – stream object, which exposes `read()` method
- `content_length (int)` – expected length of the stream

Return type `str`

`b2sdk.utils.hex_sha1_of_unlimited_stream(input_stream, limit=None)`

`b2sdk.utils.hex_sha1_of_bytes(data: bytes) → str`

Return the 40-character hex SHA1 checksum of the data.

`b2sdk.utils.hex_md5_of_bytes(data: bytes) → str`

Return the 32-character hex MD5 checksum of the data.

`b2sdk.utils.md5_of_bytes(data: bytes) → bytes`

Return the 16-byte MD5 checksum of the data.

`b2sdk.utils.b64_of_bytes(data: bytes) → str`

Return the base64 encoded representation of the data.

`b2sdk.utils.validate_b2_file_name(name)`

Raise a `ValueError` if the name is not a valid B2 file name.

Parameters `name (str)` – a string to check

`b2sdk.utils.is_file_readable(local_path, reporter=None)`

Check if the local file has read permissions.

Parameters

- `local_path (str)` – a file path
- `reporter` – reporter object to put errors on

Return type `bool`

`b2sdk.utils.get_file_mtime(local_path)`

Get modification time of a file in milliseconds.

Parameters `local_path (str)` – a file path

Return type `int`

`b2sdk.utils.set_file_mtime(local_path, mod_time_millis)`

Set modification time of a file in milliseconds.

Parameters

- `local_path (str)` – a file path
- `mod_time_millis (int)` – time to be set

`b2sdk.utils.fix_windows_path_limit(path)`

Prefix paths when running on Windows to overcome 260 character path length limit. See [https://msdn.microsoft.com/en-us/library/windows/desktop/aa365247\(v=vs.85\).aspx#maxpath](https://msdn.microsoft.com/en-us/library/windows/desktop/aa365247(v=vs.85).aspx#maxpath)

Parameters `path (str)` – a path to prefix

Returns a prefixed path

Return type `str`

```
class b2sdk.utils.TempDir
```

Bases: `object`

Context manager that creates and destroys a temporary directory.

```
b2sdk.utils.format_and_scale_number(x, unit)
```

Pick a good scale for representing a number and format it.

Parameters

- **x** (*int*) – a number
- **unit** (*str*) – an arbitrary unit name

Returns scaled and formatted number

Return type `str`

```
b2sdk.utils.format_and_scale_fraction(numerator, denominator, unit)
```

Pick a good scale for representing a fraction, and format it.

Parameters

- **numerator** (*int*) – a numerator of a fraction
- **denominator** (*int*) – a denominator of a fraction
- **unit** (*str*) – an arbitrary unit name

Returns scaled and formatted fraction

Return type `str`

```
b2sdk.utils.camelcase_to_underscore(input_)
```

Convert a camel-cased string to a string with underscores.

Parameters **input** (*str*) – an input string

Returns string with underscores

Return type `str`

```
class b2sdk.utils.B2TraceMeta(name, bases, attrs, **kwargs)
```

Bases: `logfury.v0_1.meta.DefaultTraceMeta`

Trace all public method calls, except for ones with names that begin with `get_`.

```
class b2sdk.utils.B2TraceMetaAbstract(name, bases, namespace, **kwargs)
```

Bases: `logfury.v0_1.meta.DefaultTraceAbstractMeta`

Default class for tracers, to be set as a metaclass for abstract base classes.

```
class b2sdk.utils.ConcurrentUsedAuthTokenGuard(lock, token)
```

Bases: `object`

Context manager preventing two tokens being used simultaneously. Throws `UploadTokenUsedConcurrently` when unable to acquire a lock Sample usage:

```
with ConcurrentUsedAuthTokenGuard(lock_for_token, token): # code that uses the token exclusively
```

```
    __init__(lock, token)
```

Initialize self. See `help(type(self))` for accurate signature.

b2sdk.cache

```
class b2sdk.cache.AbstractCache
    Bases: object

    clear()

    abstract get_bucket_id_or_none_from_bucket_name(name)

    abstract get_bucket_name_or_none_from_allowed()

    abstract get_bucket_name_or_none_from_bucket_id(bucket_id: str) → Optional[str]

    abstract save_bucket(bucket)

    abstract set_bucket_name_cache(buckets)

class b2sdk.cache.DummyCache
    Bases: b2sdk.cache.AbstractCache

    A cache that does nothing.

    get_bucket_id_or_none_from_bucket_name(name)

    get_bucket_name_or_none_from_bucket_id(bucket_id: str) → Optional[str]

    get_bucket_name_or_none_from_allowed()

    save_bucket(bucket)

    set_bucket_name_cache(buckets)

class b2sdk.cache.InMemoryCache
    Bases: b2sdk.cache.AbstractCache

    A cache that stores the information in memory.

    __init__()
        Initialize self. See help(type(self)) for accurate signature.

    get_bucket_id_or_none_from_bucket_name(name)

    get_bucket_name_or_none_from_bucket_id(bucket_id: str) → Optional[str]

    get_bucket_name_or_none_from_allowed()

    save_bucket(bucket)

    set_bucket_name_cache(buckets)

class b2sdk.cache.AuthInfoCache(info)
    Bases: b2sdk.cache.AbstractCache

    A cache that stores data persistently in StoredAccountInfo.

    __init__(info)
        Initialize self. See help(type(self)) for accurate signature.

    get_bucket_id_or_none_from_bucket_name(name)

    get_bucket_name_or_none_from_bucket_id(bucket_id) → Optional[str]

    get_bucket_name_or_none_from_allowed()

    save_bucket(bucket)

    set_bucket_name_cache(buckets)
```

b2sdk.download_dest – Download destination

class b2sdk.download_dest.**AbstractDownloadDestination**

Bases: `object`

Interface to a destination for a downloaded file.

abstract `make_file_context` (*file_id*, *file_name*, *content_length*, *content_type*, *content_shal*,
file_info, *mod_time_millis*, *range_=None*)

Return a context manager that yields a binary file-like object to use for writing the contents of the file.

Parameters

- **file_id** (*str*) – the B2 file ID from the headers
- **file_name** (*str*) – the B2 file name from the headers
- **content_length** (*str*) – the content length
- **content_type** (*str*) – the content type from the headers
- **content_shal** (*str*) – the content shal from the headers (or "none" for large files)
- **file_info** (*dict*) – the user file info from the headers
- **mod_time_millis** (*int*) – the desired file modification date in ms since 1970-01-01
- **range** (*None*, *tuple[int, int]*) – starting and ending offsets of the received file contents. Usually None, which means that the whole file is downloaded.

Returns None

class b2sdk.download_dest.**DownloadDestLocalFile** (*local_file_path*)

Bases: `b2sdk.download_dest.AbstractDownloadDestination`

Store a downloaded file into a local file and sets its modification time.

MODE = 'wb+'

__init__ (*local_file_path*)

Initialize self. See help(type(self)) for accurate signature.

make_file_context (*file_id*, *file_name*, *content_length*, *content_type*, *content_shal*, *file_info*,
mod_time_millis, *range_=None*)

Return a context manager that yields a binary file-like object to use for writing the contents of the file.

Parameters

- **file_id** (*str*) – the B2 file ID from the headers
- **file_name** (*str*) – the B2 file name from the headers
- **content_length** (*str*) – the content length
- **content_type** (*str*) – the content type from the headers
- **content_shal** (*str*) – the content shal from the headers (or "none" for large files)
- **file_info** (*dict*) – the user file info from the headers
- **mod_time_millis** (*int*) – the desired file modification date in ms since 1970-01-01
- **range** (*None*, *tuple[int, int]*) – starting and ending offsets of the received file contents. Usually None, which means that the whole file is downloaded.

Returns None

write_to_local_file_context (*mod_time_millis*)

```
class b2sdk.download_dest.PreSeekedDownloadDest (local_file_path, seek_target)
```

Bases: *b2sdk.download_dest.DownloadDestLocalFile*

Store a downloaded file into a local file and sets its modification time. Does not truncate the target file, seeks to a given offset just after opening a descriptor.

MODE = 'rb+'

```
__init__ (local_file_path, seek_target)
```

Initialize self. See help(type(self)) for accurate signature.

```
write_to_local_file_context (*args, **kwargs)
```

```
class b2sdk.download_dest.DownloadDestBytes
```

Bases: *b2sdk.download_dest.AbstractDownloadDestination*

Store a downloaded file into bytes in memory.

```
__init__ ()
```

Initialize self. See help(type(self)) for accurate signature.

```
make_file_context (file_id, file_name, content_length, content_type, content_sha1, file_info,
                    mod_time_millis, range_=None)
```

Return a context manager that yields a binary file-like object to use for writing the contents of the file.

Parameters

- **file_id** (*str*) – the B2 file ID from the headers
- **file_name** (*str*) – the B2 file name from the headers
- **content_length** (*str*) – the content length
- **content_type** (*str*) – the content type from the headers
- **content_sha1** (*str*) – the content sha1 from the headers (or "none" for large files)
- **file_info** (*dict*) – the user file info from the headers
- **mod_time_millis** (*int*) – the desired file modification date in ms since 1970-01-01
- **range** (*None, tuple[int, int]*) – starting and ending offsets of the received file contents. Usually None, which means that the whole file is downloaded.

Returns None

```
capture_bytes_context ()
```

Remember the bytes written in self.bytes_written.

```
get_bytes_written ()
```

```
class b2sdk.download_dest.DownloadDestProgressWrapper (download_dest,
                                                         progress_listener)
```

Bases: *b2sdk.download_dest.AbstractDownloadDestination*

Wrap a DownloadDestination and report progress to a ProgressListener.

```
__init__ (download_dest, progress_listener)
```

Initialize self. See help(type(self)) for accurate signature.

```
make_file_context (file_id, file_name, content_length, content_type, content_sha1, file_info,
                    mod_time_millis, range_=None)
```

Return a context manager that yields a binary file-like object to use for writing the contents of the file.

Parameters

- **file_id** (*str*) – the B2 file ID from the headers

- **file_name** (*str*) – the B2 file name from the headers
- **content_length** (*str*) – the content length
- **content_type** (*str*) – the content type from the headers
- **content_shal** (*str*) – the content sha1 from the headers (or "none" for large files)
- **file_info** (*dict*) – the user file info from the headers
- **mod_time_millis** (*int*) – the desired file modification date in ms since 1970-01-01
- **range** (*None, tuple[int, int]*) – starting and ending offsets of the received file contents. Usually None, which means that the whole file is downloaded.

Returns None

write_file_and_report_progress_context (*file_id, file_name, content_length, content_type, content_shal, file_info, mod_time_millis, range_*)

b2sdk.stream.chained ChainedStream

class b2sdk.stream.chained.ChainedStream(*stream_openers*)

Bases: b2sdk.stream.base.ReadOnlyStreamMixin, io.IOBase

Chains multiple streams in single stream, sort of what `itertools.chain` does for iterators.

Cleans up buffers of underlying streams when closed.

Can be seeked to beginning (when retrying upload, for example). Closes underlying streams as soon as they reaches EOF, but clears their buffers when the chained stream is closed for underlying streams that follow `b2sdk.v1.StreamOpener` cleanup interface, for example `b2sdk.v1.CachedBytesStreamOpener`

__init__ (*stream_openers*)

Parameters **stream_openeres** (*list*) – list of callables that return opened streams

property stream

Return currently processed stream.

seekable ()

Return whether object supports random access.

If False, `seek()`, `tell()` and `truncate()` will raise `OSError`. This method may need to do a test `seek()`.

tell ()

Return current stream position.

seek (*pos, whence=0*)

Resets stream to the beginning.

Parameters

- **pos** (*int*) – only allowed value is 0
- **whence** (*int*) – only allowed value is 0

readable ()

Return whether object was opened for reading.

If False, `read()` will raise `OSError`.

read (*size=None*)

Read at most *size* bytes from underlying streams, or all available data, if *size* is None or negative. Open the streams only when their data is needed, and possibly leave them open and part-way read for further reading - by subsequent calls to this method.

Parameters *size* (*int*, *None*) – number of bytes to read. If omitted, None, or negative data is read and returned until EOF from final stream is reached

Returns data read from the stream

close ()

Flush and close the IO object.

This method has no effect if the file is already closed.

class b2sdk.stream.chained.**StreamOpener**

Bases: *object*

Abstract class to define stream opener with cleanup.

cleanup ()

Clean up stream opener after chained stream closes.

Can be used for cleaning cached data that are stored in memory to allow resetting chained stream without getting this data more than once, eg. data downloaded from external source.

b2sdk.stream.hashing StreamWithHash

class b2sdk.stream.hashing.**StreamWithHash** (*stream*, *stream_length=None*)

Bases: *b2sdk.stream.base.ReadOnlyStreamMixin*, *b2sdk.stream.wrapper.StreamWithLengthWrapper*

Wrap a file-like object, calculates SHA1 while reading and appends hash at the end.

__init__ (*stream*, *stream_length=None*)

Parameters *stream* – the stream to read from

seek (*pos*, *whence=0*)

Seek to a given position in the stream.

Parameters *pos* (*int*) – position in the stream

read (*size=None*)

Read data from the stream.

Parameters *size* (*int*) – number of bytes to read

Returns read data

Return type bytes|None

classmethod **get_digest** ()

b2sdk.stream.progress Streams with progress reporting

class `b2sdk.stream.progress.AbstractStreamWithProgress` (*stream*, *progress_listener*, *offset=0*)

Bases: `b2sdk.stream.wrapper.StreamWrapper`

Wrap a file-like object and updates a ProgressListener as data is read / written. In the abstract class, read and write methods do not update the progress - child classes shall do it.

__init__ (*stream*, *progress_listener*, *offset=0*)

Parameters

- **stream** – the stream to read from or write to
- **progress_listener** (`b2sdk.v1.AbstractProgressListener`) – the listener that we tell about progress
- **offset** (*int*) – the starting byte offset in the file

class `b2sdk.stream.progress.ReadingStreamWithProgress` (**args*, ***kwargs*)

Bases: `b2sdk.stream.progress.AbstractStreamWithProgress`

Wrap a file-like object, updates progress while reading.

__init__ (**args*, ***kwargs*)

Parameters

- **stream** – the stream to read from or write to
- **progress_listener** (`b2sdk.v1.AbstractProgressListener`) – the listener that we tell about progress
- **offset** (*int*) – the starting byte offset in the file

read (*size=None*)

Read data from the stream.

Parameters **size** (*int*) – number of bytes to read

Returns data read from the stream

seek (*pos*, *whence=0*)

Seek to a given position in the stream.

Parameters **pos** (*int*) – position in the stream

Returns new absolute position

Return type *int*

class `b2sdk.stream.progress.WritingStreamWithProgress` (*stream*, *progress_listener*, *offset=0*)

Bases: `b2sdk.stream.progress.AbstractStreamWithProgress`

Wrap a file-like object; updates progress while writing.

write (*data*)

Write data to the stream.

Parameters **data** (*bytes*) – data to write to the stream

b2sdk.stream.range **RangeOfInputStream****class** b2sdk.stream.range.**RangeOfInputStream** (*stream, offset, length*)Bases: b2sdk.stream.base.ReadOnlyStreamMixin, *b2sdk.stream.wrapper.StreamWithLengthWrapper*

Wrap a file-like object (read only) and read the selected range of the file.

__init__ (*stream, offset, length*)**Parameters**

- **stream** – a seekable stream
- **offset** (*int*) – offset in the stream
- **length** (*int*) – max number of bytes to read

seek (*pos, whence=0*)

Seek to a given position in the stream.

Parameters **pos** (*int*) – position in the stream relative to stream offset**Returns** new position relative to stream offset**Return type** *int***tell** ()

Return current stream position relative to offset.

Return type *int***read** (*size=None*)

Read data from the stream.

Parameters **size** (*int*) – number of bytes to read**Returns** data read from the stream**Return type** *bytes*b2sdk.stream.range.**wrap_with_range** (*stream, stream_length, range_offset, range_length*)**b2sdk.stream.wrapper** **StreamWrapper****class** b2sdk.stream.wrapper.**StreamWrapper** (*stream*)Bases: *io.IOBase*

Wrapper for a file-like object.

__init__ (*stream*)**Parameters** **stream** – the stream to read from or write to**seekable** ()

Return whether object supports random access.

If False, seek(), tell() and truncate() will raise OSError. This method may need to do a test seek().

seek (*pos, whence=0*)

Seek to a given position in the stream.

Parameters **pos** (*int*) – position in the stream**Returns** new absolute position

Return type `int`

tell()

Return current stream position.

Return type `int`

truncate (*size=None*)

Truncate file to size bytes.

File pointer is left unchanged. Size defaults to the current IO position as reported by tell(). Returns the new size.

flush()

Flush the stream.

readable()

Return whether object was opened for reading.

If False, read() will raise OSError.

read (*size=None*)

Read data from the stream.

Parameters **size** (*int*) – number of bytes to read

Returns data read from the stream

writable()

Return whether object was opened for writing.

If False, write() will raise OSError.

write (*data*)

Write data to the stream.

Parameters **data** – a data to write to the stream

close()

Flush and close the IO object.

This method has no effect if the file is already closed.

class `b2sdk.stream.wrapper.StreamWithLengthWrapper` (*stream, length=None*)

Bases: `b2sdk.stream.wrapper.StreamWrapper`

Wrapper for a file-like object that supports `__len__` interface

__init__ (*stream, length=None*)

Parameters

- **stream** – the stream to read from or write to
- **length** (*int*) – length of the stream

b2sdk.sync.action**class** b2sdk.sync.action.**AbstractAction**Bases: `object`

An action to take, such as uploading, downloading, or deleting a file. Multi-threaded tasks create a sequence of Actions which are then run by a pool of threads.

An action can depend on other actions completing. An example of this is making sure a CreateBucketAction happens before an UploadFileAction.

run (*bucket*, *reporter*, *dry_run=False*)

Main action routine.

Parameters

- **bucket** (*b2sdk.bucket.Bucket*) – a Bucket object
- **reporter** – a place to report errors
- **dry_run** (*bool*) – if True, perform a dry run

abstract **get_bytes** ()

Return the number of bytes to transfer for this action.

Return type `int`**abstract** **do_action** (*bucket*, *reporter*)

Perform the action, returning only after the action is completed.

Parameters

- **bucket** (*b2sdk.bucket.Bucket*) – a Bucket object
- **reporter** – a place to report errors

abstract **do_report** (*bucket*, *reporter*)

Report the action performed.

Parameters

- **bucket** (*b2sdk.bucket.Bucket*) – a Bucket object
- **reporter** – a place to report errors

```
class b2sdk.sync.action.B2UploadAction (local_full_path, relative_name,  
                                         b2_file_name, mod_time_millis,  
                                         size, encryption_settings_provider:  
                                         b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider)
```

Bases: `b2sdk.sync.action.AbstractAction`

File uploading action.

```
__init__ (local_full_path, relative_name, b2_file_name, mod_time_millis, size, encryp-  
          tion_settings_provider: b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider)
```

Parameters

- **local_full_path** (*str*) – a local file path
- **relative_name** (*str*) – a relative file name
- **b2_file_name** (*str*) – a name of a new remote file
- **mod_time_millis** (*int*) – file modification time in milliseconds
- **size** (*int*) – a file size

• **encryption_settings_provider** (`b2sdk.v1.AbstractSyncEncryptionSettingsProvider`) – encryption setting provider

get_bytes()
Return file size.

Return type `int`

do_action(bucket, reporter)
Perform the uploading action, returning only after the action is completed.

Parameters

- **bucket** (`b2sdk.v1.Bucket`) – a Bucket object
- **reporter** – a place to report errors

do_report(bucket, reporter)
Report the uploading action performed.

Parameters

- **bucket** (`b2sdk.bucket.Bucket`) – a Bucket object
- **reporter** – a place to report errors

class `b2sdk.sync.action.B2HideAction(relative_name, b2_file_name)`
Bases: `b2sdk.sync.action.AbstractAction`

__init__(relative_name, b2_file_name)

Parameters

- **relative_name** (`str`) – a relative file name
- **b2_file_name** (`str`) – a name of a remote file

get_bytes()
Return file size.

Returns always zero

Return type `int`

do_action(bucket, reporter)
Perform the hiding action, returning only after the action is completed.

Parameters

- **bucket** (`b2sdk.bucket.Bucket`) – a Bucket object
- **reporter** – a place to report errors

do_report(bucket, reporter)
Report the hiding action performed.

Parameters

- **bucket** (`b2sdk.bucket.Bucket`) – a Bucket object
- **reporter** – a place to report errors

class `b2sdk.sync.action.B2DownloadAction(source_file: b2sdk.sync.file.B2File, b2_file_name: str, local_full_path: str, encryption_settings_provider: b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider)`
Bases: `b2sdk.sync.action.AbstractAction`

```
__init__(source_file: b2sdk.sync.file.B2File, b2_file_name: str, local_full_path: str, encryption_settings_provider: b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider)
```

Parameters

- **source_file** (*b2sdk.v1.B2File*) – the file to be downloaded
- **b2_file_name** (*str*) – b2_file_name
- **local_full_path** (*str*) – a local file path
- **encryption_settings_provider** (*b2sdk.v1.AbstractSyncEncryptionSettingsProvider*) – encryption setting provider

```
get_bytes()
```

Return file size.

Return type *int*

```
do_action(bucket, reporter)
```

Perform the downloading action, returning only after the action is completed.

Parameters

- **bucket** (*b2sdk.v1.Bucket*) – a Bucket object
- **reporter** – a place to report errors

```
do_report(bucket, reporter)
```

Report the downloading action performed.

Parameters

- **bucket** (*b2sdk.bucket.Bucket*) – a Bucket object
- **reporter** – a place to report errors

```
class b2sdk.sync.action.B2CopyAction(b2_file_name: str, source_file: b2sdk.sync.file.B2File,
                                     dest_b2_file_name, source_bucket: b2sdk.bucket.Bucket, destination_bucket:
                                     b2sdk.bucket.Bucket, encryption_settings_provider:
                                     b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider)
```

Bases: *b2sdk.sync.action.AbstractAction*

File copying action.

```
__init__(b2_file_name: str, source_file: b2sdk.sync.file.B2File,
         dest_b2_file_name, source_bucket: b2sdk.bucket.Bucket, destination_bucket:
         b2sdk.bucket.Bucket, encryption_settings_provider:
         b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider)
```

Parameters

- **b2_file_name** (*str*) – a b2_file_name
- **source_file** (*b2sdk.v1.B2File*) – the file to be copied
- **dest_b2_file_name** (*str*) – a name of a destination remote file
- **source_bucket** (*Bucket*) – bucket to copy from
- **destination_bucket** (*Bucket*) – bucket to copy to
- **encryption_settings_provider** (*b2sdk.v1.AbstractSyncEncryptionSettingsProvider*) – encryption setting provider

get_bytes()

Return file size.

Return type `int`

do_action() (*bucket, reporter*)

Perform the copying action, returning only after the action is completed.

Parameters

- **bucket** (*b2sdk.bucket.Bucket*) – a Bucket object
- **reporter** – a place to report errors

do_report() (*bucket, reporter*)

Report the copying action performed.

Parameters

- **bucket** (*b2sdk.bucket.Bucket*) – a Bucket object
- **reporter** – a place to report errors

class `b2sdk.sync.action.B2DeleteAction` (*relative_name, b2_file_name, file_id, note*)

Bases: `b2sdk.sync.action.AbstractAction`

__init__ (*relative_name, b2_file_name, file_id, note*)

Parameters

- **relative_name** (*str*) – a relative file name
- **b2_file_name** (*str*) – a name of a remote file
- **file_id** (*str*) – a file ID
- **note** (*str*) – a deletion note

get_bytes()

Return file size.

Returns always zero

Return type `int`

do_action() (*bucket, reporter*)

Perform the deleting action, returning only after the action is completed.

Parameters

- **bucket** (*b2sdk.bucket.Bucket*) – a Bucket object
- **reporter** – a place to report errors

do_report() (*bucket, reporter*)

Report the deleting action performed.

Parameters

- **bucket** (*b2sdk.bucket.Bucket*) – a Bucket object
- **reporter** – a place to report errors

class `b2sdk.sync.action.LocalDeleteAction` (*relative_name, full_path*)

Bases: `b2sdk.sync.action.AbstractAction`

__init__ (*relative_name, full_path*)

Parameters

- **relative_name** (*str*) – a relative file name
- **full_path** – a full local path

Type *str*

get_bytes ()

Return file size.

Returns always zero

Return type *int*

do_action (*bucket, reporter*)

Perform the deleting of a local file action, returning only after the action is completed.

Parameters

- **bucket** (*b2sdk.bucket.Bucket*) – a Bucket object
- **reporter** – a place to report errors

do_report (*bucket, reporter*)

Report the deleting of a local file action performed.

Parameters

- **bucket** (*b2sdk.bucket.Bucket*) – a Bucket object
- **reporter** – a place to report errors

b2sdk.sync.exception

exception *b2sdk.sync.exception.EnvironmentEncodingError* (*filename, encoding*)

Bases: *b2sdk.exception.B2Error*

Raised when a file name can not be decoded with system encoding.

__init__ (*filename, encoding*)

Parameters

- **filename** (*str, bytes*) – an encoded file name
- **encoding** (*str*) – file name encoding

exception *b2sdk.sync.exception.InvalidArgument* (*parameter_name, message*)

Bases: *b2sdk.exception.B2Error*

Raised when one or more arguments are invalid

__init__ (*parameter_name, message*)

Parameters

- **parameter_name** – name of the function argument
- **message** – brief explanation of misconfiguration

exception *b2sdk.sync.exception.IncompleteSync* (**args, **kwargs*)

Bases: *b2sdk.exception.B2SimpleError*

exception *b2sdk.sync.exception.UnSyncableFilename* (*message, filename*)

Bases: *b2sdk.exception.B2Error*

Raised when a filename is not supported by the sync operation


```
__init__(message, filename)
```

Parameters

- **message** – brief explanation of why the filename was not supported
- **filename** – name of the file which is not supported

```
b2sdk.sync.exception.check_invalid_argument (parameter_name: str, message: str, *exceptions: Type[Exception]) → Iterator[None]
```

Raise *InvalidArgument* in case of one of given exception was thrown.

```
exception b2sdk.sync.exception.BaseDirectoryError (path)
```

Bases: `b2sdk.exception.B2SimpleError`

```
__init__(path)
```

Python 2 does not like it when you pass unicode as the message in an exception. We like to use file names in exception messages. To avoid problems, if the message has any non-ascii characters in it, they are replaced with backslash-uNNNN.

<https://pythonhosted.org/kitchen/unicode-frustrations.html#frustration-5-exceptions>

```
exception b2sdk.sync.exception.EmptyDirectory (path)
```

Bases: `b2sdk.sync.exception.BaseDirectoryError`

```
exception b2sdk.sync.exception.UnableToCreateDirectory (path)
```

Bases: `b2sdk.sync.exception.BaseDirectoryError`

```
exception b2sdk.sync.exception.NotADirectory (path)
```

Bases: `b2sdk.sync.exception.BaseDirectoryError`

b2sdk.sync.file

```
class b2sdk.sync.file.File (name, versions: List[b2sdk.sync.file.FileVersion])
```

Bases: `object`

Hold information about one file in a folder.

The name is relative to the folder in all cases.

Files that have multiple versions (which only happens in B2, not in local folders) include information about all of the versions, most recent first.

```
__init__(name, versions: List[b2sdk.sync.file.FileVersion])
```

Parameters

- **name** (*str*) – a relative file name
- **versions** (*List [FileVersion]*) – a list of file versions

name

versions

```
latest_version () → b2sdk.sync.file.FileVersion
```

Return the latest file version.

```
class b2sdk.sync.file.B2File (name, versions: List[b2sdk.sync.file.B2FileVersion])
```

Bases: `b2sdk.sync.file.File`

Hold information about one file in a folder in B2 cloud.

```
__init__(name, versions: List[b2sdk.sync.file.B2FileVersion])
```

Parameters

- **name** (*str*) – a relative file name
- **versions** (*List [B2FileVersion]*) – a list of file versions

latest_version () → *b2sdk.sync.file.B2FileVersion*

Return the latest file version.

name

versions

class *b2sdk.sync.file.FileVersion* (*id_, file_name, mod_time, action, size*)

Bases: *object*

Hold information about one version of a file.

__init__ (*id_, file_name, mod_time, action, size*)

Parameters

- **id** (*str*) – the B2 file id, or the local full path name
- **file_name** (*str*) – a relative file name
- **mod_time** (*int*) – modification time, in milliseconds, to avoid rounding issues with millisecond times from B2
- **action** (*str*) – “hide” or “upload” (never “start”)
- **size** (*int*) – a file size

id_

name

mod_time

action

size

class *b2sdk.sync.file.B2FileVersion* (*file_version_info: b2sdk.file_version.FileVersionInfo*)

Bases: *b2sdk.sync.file.FileVersion*

__init__ (*file_version_info: b2sdk.file_version.FileVersionInfo*)

Parameters

- **id** (*str*) – the B2 file id, or the local full path name
- **file_name** (*str*) – a relative file name
- **mod_time** (*int*) – modification time, in milliseconds, to avoid rounding issues with millisecond times from B2
- **action** (*str*) – “hide” or “upload” (never “start”)
- **size** (*int*) – a file size

file_version_info

property id_

property name

property mod_time

property action

property size

b2sdk.sync.folder

class b2sdk.sync.folder.**AbstractFolder**

Bases: `object`

Interface to a folder full of files, which might be a B2 bucket, a virtual folder in a B2 bucket, or a directory on a local file system.

Files in B2 may have multiple versions, while files in local folders have just one.

abstract all_files (*reporter, policies_manager=<b2sdk.sync.scan_policies.ScanPoliciesManager object>*)

Return an iterator over all of the files in the folder, in the order that B2 uses.

It also performs filtering using policies manager.

No matter what the folder separator on the local file system is, “/” is used in the returned file names.

If a file is found, but does not exist (for example due to a broken symlink or a race), reporter will be informed about each such problem.

Parameters

- **reporter** – a place to report errors
- **policies_manager** – a policies manager object

abstract folder_type ()

Return one of: ‘b2’, ‘local’.

Return type `str`

abstract make_full_path (*file_name*)

Return the full path to the file.

Parameters **file_name** (`str`) – a file name

Return type `str`

b2sdk.sync.folder.**join_b2_path** (*b2_dir, b2_name*)

Like os.path.join, but for B2 file names where the root directory is called ‘.’.

Parameters

- **b2_dir** (`str`) – a directory path
- **b2_name** (`str`) – a file name

class b2sdk.sync.folder.**LocalFolder** (*root*)

Bases: `b2sdk.sync.folder.AbstractFolder`

Folder interface to a directory on the local machine.

__init__ (*root*)

Initialize a new folder.

Parameters **root** (`str`) – path to the root of the local folder. Must be unicode.

folder_type ()

Return folder type.

Return type `str`

all_files (*reporter*, *policies_manager*=<*b2sdk.sync.scan_policies.ScanPoliciesManager* object>)
Yield all files.

Parameters

- **reporter** – a place to report errors
- **policies_manager** – a policy manager object, default is DE-FAULT_SCAN_MANAGER

make_full_path (*file_name*)
Convert a file name into an absolute path, ensure it is not outside self.root

Parameters **file_name** (*str*) – a file name

ensure_present ()
Make sure that the directory exists.

ensure_non_empty ()
Make sure that the directory exists and is non-empty.

class *b2sdk.sync.folder.B2Folder* (*bucket_name*, *folder_name*, *api*)
Bases: *b2sdk.sync.folder.AbstractFolder*

Folder interface to b2.

__init__ (*bucket_name*, *folder_name*, *api*)

Parameters

- **bucket_name** (*str*) – a name of the bucket
- **folder_name** (*str*) – a folder name
- **api** (*b2sdk.api.B2Api*) – an API object

all_files (*reporter*, *policies_manager*=<*b2sdk.sync.scan_policies.ScanPoliciesManager* object>)
Yield all files.

Parameters

- **reporter** – a place to report errors
- **policies_manager** – a policies manager object, default is DE-FAULT_SCAN_MANAGER

folder_type ()
Return folder type.

Return type *str*

make_full_path (*file_name*)
Make an absolute path from a file name.

Parameters **file_name** (*str*) – a file name

b2sdk.sync.folder_parser

```
b2sdk.sync.folder_parser.parse_sync_folder(folder_name, api, local_folder_class=<class
                                          'b2sdk.sync.folder.LocalFolder'>,
                                          b2_folder_class=<class
                                          'b2sdk.sync.folder.B2Folder'>)
```

Take either a local path, or a B2 path, and returns a Folder object for it.

B2 paths look like: b2://bucketName/path/name. The '/' is optional, because the previous sync command didn't use it.

Anything else is treated like a local folder.

Parameters

- **folder_name** (*str*) – a name of the folder, either local or remote
- **api** (*B2Api*) – an API object
- **local_folder_class** (*~b2sdk.v1.AbstractFolder*) – class to handle local folders
- **b2_folder_class** (*~b2sdk.v1.AbstractFolder*) – class to handle B2 folders

b2sdk.sync.policy

```
class b2sdk.sync.policy.NewerFileSyncMode(value)
```

Bases: `enum.Enum`

Mode of handling files newer on destination than on source

SKIP = 101

skip syncing such file

REPLACE = 102

replace the file on the destination with the (older) file on source

RAISE_ERROR = 103

raise a non-transient error, failing the sync operation

```
class b2sdk.sync.policy.CompareVersionMode(value)
```

Bases: `enum.Enum`

Mode of comparing versions of files to determine what should be synced and what shouldn't

MODTIME = 201

use file modification time on source filesystem

SIZE = 202

compare using file size

NONE = 203

compare using file name only

```
class b2sdk.sync.policy.AbstractFileSyncPolicy(source_file, source_folder,
                                              dest_file, dest_folder, now_millis,
                                              keep_days, newer_file_mode,
                                              compare_threshold, compare_version_mode=<CompareVersionMode.MODTIME:
                                              201>, encryption_settings_provider:
                                              b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider
                                              = <b2sdk.sync.encryption_provider.ServerDefaultSyncEncryptionSettingsProvider
                                              object>)
```

Bases: `object`

Abstract policy class.

DESTINATION_PREFIX = `NotImplemented`

SOURCE_PREFIX = `NotImplemented`

```
__init__(source_file, source_folder, dest_file, dest_folder, now_millis,
         keep_days, newer_file_mode, compare_threshold, compare_version_mode=<CompareVersionMode.MODTIME: 201>, encryption_settings_provider: b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider
         = <b2sdk.sync.encryption_provider.ServerDefaultSyncEncryptionSettingsProvider object>)
```

Parameters

- **source_file** (`b2sdk.v1.File`) – source file object
- **source_folder** (`b2sdk.v1.AbstractFolder`) – source folder object
- **dest_file** (`b2sdk.v1.File`) – destination file object
- **dest_folder** (`b2sdk.v1.AbstractFolder`) – destination folder object
- **now_millis** (`int`) – current time in milliseconds
- **keep_days** (`int`) – days to keep before delete
- **newer_file_mode** (`b2sdk.v1.NEWER_FILE_MODES`) – setting which determines handling for destination files newer than on the source
- **compare_threshold** (`int`) – when comparing with size or time for sync
- **compare_version_mode** (`b2sdk.v1.COMPARE_VERSION_MODES`) – how to compare source and destination files
- **encryption_settings_provider** (`b2sdk.v1.AbstractSyncEncryptionSettingsProvider`) – encryption setting provider

```
classmethod files_are_different(source_file, dest_file, compare_threshold=None, compare_version_mode=<CompareVersionMode.MODTIME: 201>, newer_file_mode=<NewerFileSyncMode.RAISE_ERROR: 103>)
```

Compare two files and determine if the the destination file should be replaced by the source file.

Parameters

- **source_file** (`b2sdk.v1.File`) – source file object
- **dest_file** (`b2sdk.v1.File`) – destination file object
- **compare_threshold** (`int`) – compare threshold when comparing by time or size
- **compare_version_mode** (`b2sdk.v1.CompareVersionMode`) – source file version comparator method
- **newer_file_mode** (`b2sdk.v1.NewerFileSyncMode`) – newer destination handling method

```
get_all_actions()
```

Yield file actions.

```
class b2sdk.sync.policy.DownPolicy(source_file,          source_folder,          dest_file,
                                   dest_folder,          now_millis,          keep_days,
                                   newer_file_mode,      compare_threshold,      com-
                                   pare_version_mode=<CompareVersionMode.MODTIME:
                                   201>,                  encryption_settings_provider:
                                   b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider
                                   = <b2sdk.sync.encryption_provider.ServerDefaultSyncEncryptionSettingsProvider
                                   object>)
```

Bases: *b2sdk.sync.policy.AbstractFileSyncPolicy*

File is synced down (from the cloud to disk).

DESTINATION_PREFIX = 'local:/'

SOURCE_PREFIX = 'b2:/'

```
class b2sdk.sync.policy.UpPolicy(source_file, source_folder, dest_file, dest_folder, now_millis,
                                   keep_days, newer_file_mode, compare_threshold, com-
                                   pare_version_mode=<CompareVersionMode.MODTIME:
                                   201>,                  encryption_settings_provider:
                                   b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider
                                   = <b2sdk.sync.encryption_provider.ServerDefaultSyncEncryptionSettingsProvider
                                   object>)
```

Bases: *b2sdk.sync.policy.AbstractFileSyncPolicy*

File is synced up (from disk the cloud).

DESTINATION_PREFIX = 'b2:/'

SOURCE_PREFIX = 'local:/'

```
class b2sdk.sync.policy.UpAndDeletePolicy(source_file,          source_folder,          dest_file,
                                   dest_folder,          now_millis,          keep_days,
                                   newer_file_mode,      compare_threshold,      com-
                                   pare_version_mode=<CompareVersionMode.MODTIME:
                                   201>,                  encryption_settings_provider:
                                   b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider
                                   = <b2sdk.sync.encryption_provider.ServerDefaultSyncEncryptionSettingsProvider
                                   object>)
```

Bases: *b2sdk.sync.policy.UpPolicy*

File is synced up (from disk to the cloud) and the delete flag is SET.

```
class b2sdk.sync.policy.UpAndKeepDaysPolicy(source_file,          source_folder,          dest_file,
                                   dest_folder,          now_millis,          keep_days,
                                   newer_file_mode,      compare_threshold,      com-
                                   pare_version_mode=<CompareVersionMode.MODTIME:
                                   201>,                  encryption_settings_provider:
                                   b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider
                                   = <b2sdk.sync.encryption_provider.ServerDefaultSyncEncryptionSettingsProvider
                                   object>)
```

Bases: *b2sdk.sync.policy.UpPolicy*

File is synced up (from disk to the cloud) and the keepDays flag is SET.

```
class b2sdk.sync.policy.DownAndDeletePolicy(source_file,      source_folder,      dest_file,
                                             dest_folder,      now_millis,      keep_days,
                                             newer_file_mode, compare_threshold, compare_version_mode=<CompareVersionMode.MODTIME:
201>,      encryption_settings_provider:
b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider
= <b2sdk.sync.encryption_provider.ServerDefaultSyncEncryptionSettingsProvider
object>)
```

Bases: *b2sdk.sync.policy.DownPolicy*

File is synced down (from the cloud to disk) and the delete flag is SET.

```
class b2sdk.sync.policy.DownAndKeepDaysPolicy(source_file,      source_folder,
                                                dest_file,      dest_folder,      now_millis,
                                                keep_days,      newer_file_mode,
                                                compare_threshold,      compare_version_mode=<CompareVersionMode.MODTIME:
201>,      encryption_settings_provider:
b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider
= <b2sdk.sync.encryption_provider.ServerDefaultSyncEncryptionSettingsProvider
object>)
```

Bases: *b2sdk.sync.policy.DownPolicy*

File is synced down (from the cloud to disk) and the keepDays flag is SET.

```
class b2sdk.sync.policy.CopyPolicy(source_file,      source_folder,      dest_file,
                                   dest_folder,      now_millis,      keep_days,
                                   newer_file_mode,      compare_threshold,      compare_version_mode=<CompareVersionMode.MODTIME:
201>,      encryption_settings_provider:
b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider
= <b2sdk.sync.encryption_provider.ServerDefaultSyncEncryptionSettingsProvider
object>)
```

Bases: *b2sdk.sync.policy.AbstractFileSyncPolicy*

File is copied (server-side).

DESTINATION_PREFIX = 'b2:/'

SOURCE_PREFIX = 'b2:/'

```
class b2sdk.sync.policy.CopyAndDeletePolicy(source_file,      source_folder,      dest_file,
                                              dest_folder,      now_millis,      keep_days,
                                              newer_file_mode, compare_threshold, compare_version_mode=<CompareVersionMode.MODTIME:
201>,      encryption_settings_provider:
b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider
= <b2sdk.sync.encryption_provider.ServerDefaultSyncEncryptionSettingsProvider
object>)
```

Bases: *b2sdk.sync.policy.CopyPolicy*

File is copied (server-side) and the delete flag is SET.


```
class b2sdk.sync.policy.CopyAndKeepDaysPolicy (source_file,          source_folder,
                                              dest_file,    dest_folder,    now_millis,
                                              keep_days,    newer_file_mode,
                                              compare_threshold,    com-
                                              pare_version_mode=<CompareVersionMode.MODTIME:
                                              201>,    encryption_settings_provider:
                                              b2sdk.sync.encryption_provider.AbstractSyncEncryptionPr
                                              = <b2sdk.sync.encryption_provider.ServerDefaultSyncEncryption
                                              object>)
```

Bases: *b2sdk.sync.policy.CopyPolicy*

File is copied (server-side) and the keepDays flag is SET.

```
b2sdk.sync.policy.make_b2_delete_note (version, index, transferred)
```

Create a note message for delete action.

Parameters

- **version** (*b2sdk.v1.FileVersionInfo*) – an object which contains file version info
- **index** (*int*) – file version index
- **transferred** (*bool*) – if True, file has been transferred, False otherwise

```
b2sdk.sync.policy.make_b2_delete_actions (source_file, dest_file, dest_folder, transferred)
```

Create the actions to delete files stored on B2, which are not present locally.

Parameters

- **source_file** (*b2sdk.v1.File*) – source file object
- **dest_file** (*b2sdk.v1.File*) – destination file object
- **dest_folder** (*b2sdk.v1.AbstractFolder*) – destination folder
- **transferred** (*bool*) – if True, file has been transferred, False otherwise

```
b2sdk.sync.policy.make_b2_keep_days_actions (source_file, dest_file, dest_folder, trans-
                                              ferred, keep_days, now_millis)
```

Create the actions to hide or delete existing versions of a file stored in b2.

When keepDays is set, all files that were visible any time from keepDays ago until now must be kept. If versions were uploaded 5 days ago, 15 days ago, and 25 days ago, and the keepDays is 10, only the 25-day old version can be deleted. The 15 day-old version was visible 10 days ago.

Parameters

- **source_file** (*b2sdk.v1.File*) – source file object
- **dest_file** (*b2sdk.v1.File*) – destination file object
- **dest_folder** (*b2sdk.v1.AbstractFolder*) – destination folder object
- **transferred** (*bool*) – if True, file has been transferred, False otherwise
- **keep_days** (*int*) – how many days to keep a file
- **now_millis** (*int*) – current time in milliseconds

b2sdk.sync.policy_manager**class** b2sdk.sync.policy_manager.SyncPolicyManagerBases: `object`

Policy manager; implement a logic to get a correct policy class and create a policy object based on various parameters.

__init__ ()

Initialize self. See help(type(self)) for accurate signature.

get_policy (*sync_type*, *source_file*: `b2sdk.sync.file.File`, *source_folder*, *dest_file*: `b2sdk.sync.file.File`, *dest_folder*, *now_millis*, *delete*, *keep_days*, *newer_file_mode*, *compare_threshold*, *compare_version_mode*, *encryption_settings_provider*)

Return a policy object.

Parameters

- **sync_type** (*str*) – synchronization type
- **source_file** (`b2sdk.v1.File`) – source file name
- **source_folder** (*str*) – a source folder path
- **dest_file** (`b2sdk.v1.File`) – destination file name
- **dest_folder** (*str*) – a destination folder path
- **now_millis** (*int*) – current time in milliseconds
- **delete** (*bool*) – delete policy
- **keep_days** (*int*) – keep for days policy
- **newer_file_mode** (`b2sdk.v1.NewerFileSyncMode`) – setting which determines handling for destination files newer than on the source
- **compare_threshold** (*int*) – difference between file modification time or file size
- **compare_version_mode** (`b2sdk.v1.CompareVersionMode`) – setting which determines how to compare source and destination files
- **encryption_settings_provider** (`b2sdk.v1.AbstractSyncEncryptionSettingsProvider`) – an object which decides which encryption to use (if any)

Returns a policy object

get_policy_class (*sync_type*, *delete*, *keep_days*)

Get policy class by a given sync type.

Parameters

- **sync_type** (*str*) – synchronization type
- **delete** (*bool*) – if True, delete files and update from source
- **keep_days** (*int*) – keep for *keep_days* before delete

Returns a policy class

b2sdk.sync.scan_policies

class b2sdk.sync.scan_policies.RegexSet(*regex_iterable*)

Bases: `object`

Hold a (possibly empty) set of regular expressions and know how to check whether a string matches any of them.

__init__(*regex_iterable*)

Parameters *regex_iterable* – an iterable which yields regexes

matches(*s*)

Check whether a string matches any of regular expressions.

Parameters *s* (*str*) – a string to check

Return type `bool`

b2sdk.sync.scan_policies.convert_dir_regex_to_dir_prefix_regex(*dir_regex*)

The patterns used to match directory names (and file names) are allowed to match a prefix of the name. This ‘feature’ was unintentional, but is being retained for compatibility.

This means that a regex that matches a directory name can’t be used directly to match against a file name and test whether the file should be excluded because it matches the directory.

The pattern ‘photos’ will match directory names ‘photos’ and ‘photos2’, and should exclude files ‘photos/kitten.jpg’, and ‘photos2/puppy.jpg’. It should not exclude ‘photos.txt’, because there is no directory name that matches.

On the other hand, the pattern ‘photos\$’ should match ‘photos/kitten.jpg’, but not ‘photos2/puppy.jpg’, nor ‘photos.txt’

If the original regex is valid, there are only two cases to consider: either the regex ends in ‘\$’ or does not.

Parameters *dir_regex* (*str*) – a regular expression string or literal

class b2sdk.sync.scan_policies.IntegerRange(*begin*, *end*)

Bases: `object`

Hold a range of two integers. If the range value is None, it indicates that the value should be treated as -Inf (for begin) or +Inf (for end).

__init__(*begin*, *end*)

Parameters

- **begin** (*int*) – begin position of the range (included)
- **end** (*int*) – end position of the range (included)

class b2sdk.sync.scan_policies.ScanPoliciesManager(*exclude_dir_regexes=()*, *exclude_file_regexes=()*, *include_file_regexes=()*, *exclude_all_symlinks=False*, *exclude_modified_before=None*, *exclude_modified_after=None*)

Bases: `object`

Policy object used when scanning folders for syncing, used to decide which files to include in the list of files to be synced.

Code that scans through files should at least use `should_exclude_file()` to decide whether each file should be included; it will check include/exclude patterns for file names, as well as patterns for excluding directories.

Code that scans may optionally use `should_exclude_directory()` to test whether it can skip a directory completely and not bother listing the files and sub-directories in it.

```
__init__ (exclude_dir_regexes=(),          exclude_file_regexes=(),          include_file_regexes=(),
          exclude_all_symlinks=False,      exclude_modified_before=None,      ex-
          clude_modified_after=None)
```

Parameters

- **exclude_dir_regexes** (*tuple*) – a tuple of regexes to exclude directories
- **exclude_file_regexes** (*tuple*) – a tuple of regexes to exclude files
- **include_file_regexes** (*tuple*) – a tuple of regexes to include files
- **exclude_all_symlinks** (*bool*) – if True, exclude all symlinks
- **exclude_modified_before** (*int*, *optional*) – optionally exclude file versions modified before (in millis)
- **exclude_modified_after** (*int*, *optional*) – optionally exclude file versions modified after (in millis)

should_exclude_file (*file_path*)

Given the full path of a file, decide if it should be excluded from the scan.

Parameters **file_path** – the path of the file, relative to the root directory being scanned.

Type *str*

Returns True if excluded.

Return type *bool*

should_exclude_file_version (*file_version*)

Given the modification time of a file version, decide if it should be excluded from the scan.

Parameters **file_version** – the file version object

Type `b2sdk.v1.FileVersion`

Returns True if excluded.

Return type *bool*

should_exclude_directory (*dir_path*)

Given the full path of a directory, decide if all of the files in it should be excluded from the scan.

Parameters **dir_path** (*str*) – the path of the directory, relative to the root directory being scanned. The path will never end in '/'.

Returns True if excluded.

b2sdk.sync.sync

`b2sdk.sync.sync.next_or_none` (*iterator*)

Return the next item from the iterator, or None if there are no more.

```
b2sdk.sync.sync.zip_folders (folder_a,          folder_b,          reporter,          poli-
                           cies_manager=<b2sdk.sync.scan_policies.ScanPoliciesManager
                           object>)
```

Iterate over all of the files in the union of two folders, matching file names.

Each item is a pair (file_a, file_b) with the corresponding file in both folders. Either file (but not both) will be None if the file is in only one folder.

Parameters

- **folder_a** (`b2sdk.sync.folder.AbstractFolder`) – first folder object.
- **folder_b** (`b2sdk.sync.folder.AbstractFolder`) – second folder object.
- **reporter** – reporter object
- **policies_manager** – policies manager object

Returns yields two element tuples

`b2sdk.sync.sync.count_files` (*local_folder, reporter, policies_manager*)

Count all of the files in a local folder.

Parameters

- **local_folder** (`b2sdk.sync.folder.AbstractFolder`) – a folder object.
- **reporter** – reporter object

class `b2sdk.sync.sync.KeepOrDeleteMode` (*value*)

Bases: `enum.Enum`

Mode of dealing with old versions of files on the destination

DELETE = 301

delete the old version as soon as the new one has been uploaded

KEEP_BEFORE_DELETE = 302

keep the old versions of the file for a configurable number of days before deleting them, always keeping the newest version

NO_DELETE = 303

keep old versions of the file, do not delete anything

class `b2sdk.sync.sync.Synchronizer` (*max_workers, policies_manager=<b2sdk.sync.scan_policies.ScanPoliciesManager object>, dry_run=False, allow_empty_source=False, newer_file_mode=<NewerFileSyncMode.RAISE_ERROR: 103>, keep_days_or_delete=<KeepOrDeleteMode.NO_DELETE: 303>, compare_version_mode=<CompareVersionMode.MODTIME: 201>, compare_threshold=None, keep_days=None*)

Bases: `object`

Copies multiple “files” from source to destination. Optionally deletes or hides destination files that the source does not have.

The synchronizer can copy files:

- From a B2 bucket to a local destination.
- From a local source to a B2 bucket.
- From one B2 bucket to another.
- Between different folders in the same B2 bucket. It will sync only the latest versions of files.

By default, the synchronizer:

- Fails when the specified source directory doesn’t exist or is empty. (see `allow_empty_source` argument)
- Fails when the source is newer. (see `newer_file_mode` argument)
- Doesn’t delete a file if it’s present on the destination but not on the source. (see `keep_days_or_delete` and `keep_days` arguments)

- Compares files based on modification time. (see `compare_version_mode` and `compare_threshold` arguments)

__init__ (*max_workers*, *policies_manager*=<`b2sdk.sync.scan_policies.ScanPoliciesManager` object>, *dry_run*=False, *allow_empty_source*=False, *newer_file_mode*=<`NewerFileSyncMode.RAISE_ERROR: 103`>, *keep_days_or_delete*=<`KeepOrDeleteMode.NO_DELETE: 303`>, *compare_version_mode*=<`CompareVersionMode.MODTIME: 201`>, *compare_threshold*=None, *keep_days*=None)
Initialize synchronizer class and validate arguments

Parameters

- **max_workers** (*int*) – max number of workers
- **policies_manager** – policies manager object
- **dry_run** (*bool*) – test mode, does not actually transfer/delete when enabled
- **allow_empty_source** (*bool*) – if True, do not check whether source folder is empty
- **newer_file_mode** (`b2sdk.v1.NewerFileSyncMode`) – setting which determines handling for destination files newer than on the source
- **keep_days_or_delete** (`b2sdk.v1.KeepOrDeleteMode`) – setting which determines if we should delete or not delete or keep for *keep_days*
- **compare_version_mode** (`b2sdk.v1.CompareVersionMode`) – how to compare the source and destination files to find new ones
- **compare_threshold** (*int*) – should be greater than 0, default is 0
- **keep_days** (*int*) – if *keep_days_or_delete* is `b2sdk.v1.KeepOrDeleteMode.KEEP_BEFORE_DELETE`, then this should be greater than 0

sync_folders (*source_folder*, *dest_folder*, *now_millis*, *reporter*, *encryption_settings_provider*: `b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider` = <`b2sdk.sync.encryption_provider.ServerDefaultSyncEncryptionSettingsProvider` object>)

Syncs two folders. Always ensures that every file in the source is also in the destination. Deletes any file versions in the destination older than *history_days*.

Parameters

- **source_folder** (`b2sdk.sync.folder.AbstractFolder`) – source folder object
- **dest_folder** (`b2sdk.sync.folder.AbstractFolder`) – destination folder object
- **now_millis** (*int*) – current time in milliseconds
- **reporter** (`b2sdk.sync.report.SyncReport`, None) – progress reporter
- **encryption_settings_provider** (`b2sdk.v1.AbstractSyncEncryptionSettingsProvider`) – encryption setting provider

make_folder_sync_actions (*source_folder*, *dest_folder*, *now_millis*, *reporter*, *policies_manager*=<`b2sdk.sync.scan_policies.ScanPoliciesManager` object>, *encryption_settings_provider*: `b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider` = <`b2sdk.sync.encryption_provider.ServerDefaultSyncEncryptionSettingsProvider` object>)

Yield a sequence of actions that will sync the destination folder to the source folder.

Parameters

- **source_folder** (*b2sdk.v1.AbstractFolder*) – source folder object
- **dest_folder** (*b2sdk.v1.AbstractFolder*) – destination folder object
- **now_millis** (*int*) – current time in milliseconds
- **reporter** (*b2sdk.v1.SyncReport*) – reporter object
- **policies_manager** – policies manager object
- **encryption_settings_provider** (*b2sdk.v1.AbstractSyncEncryptionSettingsProvider*) – encryption setting provider

make_file_sync_actions (*sync_type, source_file, dest_file, source_folder, dest_folder, now_millis, encryption_settings_provider:*
b2sdk.sync.encryption_provider.AbstractSyncEncryptionSettingsProvider
= <b2sdk.sync.encryption_provider.ServerDefaultSyncEncryptionSettingsProvider
object>)

Yields the sequence of actions needed to sync the two files

Parameters

- **sync_type** (*str*) – synchronization type
- **source_file** (*b2sdk.v1.File*) – source file object
- **dest_file** (*b2sdk.v1.File*) – destination file object
- **source_folder** (*b2sdk.v1.AbstractFolder*) – a source folder object
- **dest_folder** (*b2sdk.v1.AbstractFolder*) – a destination folder object
- **now_millis** (*int*) – current time in milliseconds
- **encryption_settings_provider** (*b2sdk.v1.AbstractSyncEncryptionSettingsProvider*) – encryption setting provider

b2sdk.transfer.inbound.downloader.abstract – Downloader base class

class *b2sdk.transfer.inbound.downloader.abstract.AbstractDownloader* (*force_chunk_size=None, min_chunk_size=None, max_chunk_size=None*)

Bases: *object*

__init__ (*force_chunk_size=None, min_chunk_size=None, max_chunk_size=None*)

Initialize self. See help(type(self)) for accurate signature.

abstract is_suitable (*metadata, progress_listener*)

Analyze metadata (possibly against options passed earlier to constructor to find out whether the given download request should be handled by this downloader).

abstract download (*file, response, metadata, session, encryption:* *Optional[b2sdk.encryption.setting.EncryptionSetting] = None*)
 @returns (bytes_read, actual_sha1)

b2sdk.transfer.inbound.downloader.parallel – ParallelTransferer

```
class b2sdk.transfer.inbound.downloader.parallel.ParallelDownloader(max_streams,
                                                                    min_part_size,
                                                                    *args,
                                                                    **kwargs)
```

Bases: *b2sdk.transfer.inbound.downloader.abstract.AbstractDownloader*

FINISH_HASHING_BUFFER_SIZE = 1048576

```
__init__(max_streams, min_part_size, *args, **kwargs)
```

Parameters

- **max_streams** – maximum number of simultaneous streams
- **min_part_size** – minimum amount of data a single stream will retrieve, in bytes

is_suitable (*metadata, progress_listener*)

Analyze metadata (possibly against options passed earlier to constructor to find out whether the given download request should be handled by this downloader).

download (*file, response, metadata, session, encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None*)

Download a file from given url using parallel download sessions and stores it in the given download_destination.

Parameters

- **file** – an opened file-like object to write to
- **response** – the response of the first request made to the cloud service with download intent

Returns

```
class b2sdk.transfer.inbound.downloader.parallel.WriterThread(file,
                                                             max_queue_depth)
```

Bases: *threading.Thread*

A thread responsible for keeping a queue of data chunks to write to a file-like object and for actually writing them down. Since a single thread is responsible for synchronization of the writes, we avoid a lot of issues between userspace and kernelspace that would normally require flushing buffers between the switches of the writer. That would kill performance and not synchronizing would cause data corruption (probably we'd end up with a file with unexpected blocks of zeros preceding the range of the writer that comes second and writes further into the file).

The object of this class is also responsible for backpressure: if items are added to the queue faster than they can be written (see GCP VMs with standard PD storage with faster CPU and network than local storage, https://github.com/Backblaze/B2_Command_Line_Tool/issues/595), then `obj.queue.put(item)` will block, slowing down the producer.

The recommended minimum value of `max_queue_depth` is equal to the amount of producer threads, so that if all producers submit a part at the exact same time (right after network issue, for example, or just after starting the read), they can continue their work without blocking. The writer should be able to store at least one data chunk before a new one is retrieved, but it is not guaranteed.

Therefore, the recommended value of `max_queue_depth` is higher - a double of the amount of producers, so that spikes on either end (many producers submit at the same time / consumer has a latency spike) can be accommodated without sacrificing performance.

Please note that a size of the chunk and the queue depth impact the memory footprint. In a default setting as of writing this, that might be 10 downloads, 8 producers, 1MB buffers, 2 buffers each = $8*2*10 = 160$ MB (+ python buffers, operating system etc).

__init__ (*file*, *max_queue_depth*)

This constructor should always be called with keyword arguments. Arguments are:

group should be None; reserved for future extension when a ThreadGroup class is implemented.

target is the callable object to be invoked by the run() method. Defaults to None, meaning nothing is called.

name is the thread name. By default, a unique name is constructed of the form “Thread-N” where N is a small decimal number.

args is the argument tuple for the target invocation. Defaults to ().

kwargs is a dictionary of keyword arguments for the target invocation. Defaults to {}.

If a subclass overrides the constructor, it must make sure to invoke the base class constructor (Thread.__init__()) before doing anything else to the thread.

run()

Method representing the thread’s activity.

You may override this method in a subclass. The standard run() method invokes the callable object passed to the object’s constructor as the target argument, if any, with sequential and keyword arguments taken from the args and kwargs arguments, respectively.

```
class b2sdk.transfer.inbound.downloader.parallel.AbstractDownloaderThread(session,
                                                                           writer,
                                                                           part_to_download,
                                                                           chunk_size,
                                                                           en-
                                                                           cryp-
                                                                           tion:
                                                                           Op-
                                                                           tional[b2sdk.encryption.
                                                                           =
                                                                           None)
```

Bases: `threading.Thread`

```
__init__(session, writer, part_to_download, chunk_size, encryption: Op-
         tional[b2sdk.encryption.setting.EncryptionSetting] = None)
```

Parameters

- **session** – raw_api wrapper
- **writer** – where to write data
- **part_to_download** – PartToDownload object
- **chunk_size** – internal buffer size to use for writing and hashing

abstract run()

Method representing the thread’s activity.

You may override this method in a subclass. The standard run() method invokes the callable object passed to the object’s constructor as the target argument, if any, with sequential and keyword arguments taken from the args and kwargs arguments, respectively.

```
class b2sdk.transfer.inbound.downloader.parallel.FirstPartDownloaderThread(response,
                                                                           hasher,
                                                                           *args,
                                                                           **kwargs)
```

Bases: `b2sdk.transfer.inbound.downloader.parallel.AbstractDownloaderThread`

```
__init__(response, hasher, *args, **kwargs)
```

Parameters

- **response** – response of the original GET call
- **hasher** – hasher object to feed to as the stream is written

```
run()
```

Method representing the thread's activity.

You may override this method in a subclass. The standard `run()` method invokes the callable object passed to the object's constructor as the target argument, if any, with sequential and keyword arguments taken from the args and kwargs arguments, respectively.

```
class b2sdk.transfer.inbound.downloader.parallel.NonHashingDownloaderThread(url,
                                                                           *args,
                                                                           **kwargs)
```

Bases: `b2sdk.transfer.inbound.downloader.parallel.AbstractDownloaderThread`

```
__init__(url, *args, **kwargs)
```

Parameters **url** – url of the target file

```
run()
```

Method representing the thread's activity.

You may override this method in a subclass. The standard `run()` method invokes the callable object passed to the object's constructor as the target argument, if any, with sequential and keyword arguments taken from the args and kwargs arguments, respectively.

```
class b2sdk.transfer.inbound.downloader.parallel.PartToDownload(cloud_range,
                                                                local_range)
```

Bases: `object`

Hold the range of a file to download, and the range of the local file where it should be stored.

```
__init__(cloud_range, local_range)
```

Initialize self. See `help(type(self))` for accurate signature.

```
b2sdk.transfer.inbound.downloader.parallel.gen_parts(cloud_range,    local_range,
                                                       part_count)
```

Generate a sequence of `PartToDownload` to download a large file as a collection of parts.

b2sdk.transfer.inbound.downloader.range – transfer range toolkit

```
class b2sdk.transfer.inbound.downloader.range.Range(start, end)
```

Bases: `object`

HTTP ranges use an *inclusive* index at the end.

```
__init__(start, end)
```

Initialize self. See `help(type(self))` for accurate signature.

```
classmethod from_header(raw_range_header)
```

Factory method which returns an object constructed from Range http header.

raw_range_header example: 'bytes=0-11'

size()

subrange (*sub_start*, *sub_end*)

Return a range that is part of this range.

Parameters

- **sub_start** – index relative to the start of this range.
- **sub_end** – (Inclusive!) index relative to the start of this range.

Returns a new Range

as_tuple()

b2sdk.transfer.inbound.downloader.simple – SimpleDownloader

class b2sdk.transfer.inbound.downloader.simple.**SimpleDownloader** (*args, **kwargs)

Bases: *b2sdk.transfer.inbound.downloader.abstract.AbstractDownloader*

__init__ (*args, **kwargs)

Initialize self. See help(type(self)) for accurate signature.

is_suitable (*metadata*, *progress_listener*)

Analyze metadata (possibly against options passed earlier to constructor to find out whether the given download request should be handled by this downloader).

download (*file*, *response*, *metadata*, *session*, *encryption*: *Optional[b2sdk.encryption.setting.EncryptionSetting] = None*)
@returns (bytes_read, actual_sha1)

b2sdk.transfer.inbound.download_manager – Manager of downloaders

class b2sdk.transfer.inbound.download_manager.**DownloadManager** (*services*)

Bases: *object*

Handle complex actions around downloads to free raw_api from that responsibility.

DEFAULT_MAX_STREAMS = 8

DEFAULT_MIN_PART_SIZE = 104857600

MIN_CHUNK_SIZE = 8192

MAX_CHUNK_SIZE = 1048576

__init__ (*services*)

Initialize the DownloadManager using the given services object.

Parameters **services** (*b2sdk.v1.Services*) –

download_file_from_url (*url*, *download_dest*, *progress_listener=None*, *range_=None*, *encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None*)

Parameters

- **url** – url from which the file should be downloaded
- **download_dest** – where to put the file when it is downloaded
- **progress_listener** – where to notify about progress downloading
- **range** – 2-element tuple containing data of http Range header

- **encryption** (`b2sdk.v1.EncryptionSetting`) – encryption setting (None if unknown)

`b2sdk.transfer.inbound.file_metadata`

```
class b2sdk.transfer.inbound.file_metadata.FileMetadata (file_id, file_name, content_type, content_length, content_sha1, file_info)
```

Bases: `object`

Hold information about a file which is being downloaded.

UNVERIFIED_CHECKSUM_PREFIX = 'unverified:'

```
__init__ (file_id, file_name, content_type, content_length, content_sha1, file_info)  
    Initialize self. See help(type(self)) for accurate signature.
```

file_id

file_name

content_type

content_length

content_sha1

content_sha1_verified

file_info

classmethod **from_response** (*response*)

as_info_dict ()

`b2sdk.transfer.outbound.upload_source`

```
class b2sdk.transfer.outbound.upload_source.AbstractUploadSource
```

Bases: `b2sdk.transfer.outbound.outbound_source.OutboundTransferSource`

The source of data for uploading to b2.

```
abstract get_content_sha1 ()
```

Return a 40-character string containing the hex SHA1 checksum of the data in the file.

```
abstract open ()
```

Return a binary file-like object from which the data can be read. :return:

```
is_upload ()
```

Return if outbound source is an upload source. :rtype bool:

```
is_copy ()
```

Return if outbound source is a copy source. :rtype bool:

```
is_sha1_known ()
```

```
class b2sdk.transfer.outbound.upload_source.UploadSourceBytes (data_bytes, content_sha1=None)
```

Bases: `b2sdk.transfer.outbound.upload_source.AbstractUploadSource`

```
__init__ (data_bytes, content_sha1=None)
```

Initialize self. See help(type(self)) for accurate signature.

```

get_content_length()
    Return the number of bytes of data in the file.

get_content_sha1()
    Return a 40-character string containing the hex SHA1 checksum of the data in the file.

open()
    Return a binary file-like object from which the data can be read. :return:

is_sha1_known()

class b2sdk.transfer.outbound.upload_source.UploadSourceLocalFile(local_path,
                                                                    con-
                                                                    tent_sha1=None)

Bases: b2sdk.transfer.outbound.upload_source.AbstractUploadSource

__init__(local_path, content_sha1=None)
    Initialize self. See help(type(self)) for accurate signature.

check_path_and_get_size()

get_content_length()
    Return the number of bytes of data in the file.

get_content_sha1()
    Return a 40-character string containing the hex SHA1 checksum of the data in the file.

open()
    Return a binary file-like object from which the data can be read. :return:

is_sha1_known()

class b2sdk.transfer.outbound.upload_source.UploadSourceLocalFileRange(local_path,
                                                                    con-
                                                                    tent_sha1=None,
                                                                    off-
                                                                    set=0,
                                                                    length=None)

Bases: b2sdk.transfer.outbound.upload_source.UploadSourceLocalFile

__init__(local_path, content_sha1=None, offset=0, length=None)
    Initialize self. See help(type(self)) for accurate signature.

open()
    Return a binary file-like object from which the data can be read. :return:

class b2sdk.transfer.outbound.upload_source.UploadSourceStream(stream_opener,
                                                                    stream_length=None,
                                                                    stream_sha1=None)

Bases: b2sdk.transfer.outbound.upload_source.AbstractUploadSource

__init__(stream_opener, stream_length=None, stream_sha1=None)
    Initialize self. See help(type(self)) for accurate signature.

get_content_length()
    Return the number of bytes of data in the file.

get_content_sha1()
    Return a 40-character string containing the hex SHA1 checksum of the data in the file.

open()
    Return a binary file-like object from which the data can be read. :return:

is_sha1_known()

```

```
class b2sdk.transfer.outbound.upload_source.UploadSourceStreamRange(stream_opener,  
                                                                    offset,  
                                                                    stream_length,  
                                                                    stream_sha1=None)
```

Bases: *b2sdk.transfer.outbound.upload_source.UploadSourceStream*

```
__init__(stream_opener, offset, stream_length, stream_sha1=None)
```

Initialize self. See help(type(self)) for accurate signature.

```
open()
```

Return a binary file-like object from which the data can be read. :return:

b2sdk.raw_simulator – B2 raw api simulator

```
b2sdk.raw_simulator.get_bytes_range(data_bytes, bytes_range)
```

Slice bytes array using bytes range

```
class b2sdk.raw_simulator.KeySimulator(account_id, name, application_key_id, key,  
                                       capabilities, expiration_timestamp_or_none,  
                                       bucket_id_or_none, bucket_name_or_none,  
                                       name_prefix_or_none)
```

Bases: *object*

Hold information about one application key, which can be either a master application key, or one created with create_key().

```
__init__(account_id, name, application_key_id, key, capabilities, expiration_timestamp_or_none,  
        bucket_id_or_none, bucket_name_or_none, name_prefix_or_none)
```

Initialize self. See help(type(self)) for accurate signature.

```
as_key()
```

```
as_created_key()
```

Return the dict returned by b2_create_key.

This is just like the one for b2_list_keys, but also includes the secret key.

```
get_allowed()
```

Return the ‘allowed’ structure to include in the response from b2_authorize_account.

```
class b2sdk.raw_simulator.PartSimulator(file_id, part_number, content_length, content_sha1,  
                                       part_data)
```

Bases: *object*

```
__init__(file_id, part_number, content_length, content_sha1, part_data)
```

Initialize self. See help(type(self)) for accurate signature.

```
as_list_parts_dict()
```

```
class b2sdk.raw_simulator.FileSimulator(account_id, bucket, file_id, action,  
                                       name, content_type, content_sha1,  
                                       file_info, data_bytes, upload_timestamp,  
                                       range_=None, server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting]  
                                       = None, file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] =  
                                       None, legal_hold: b2sdk.file_lock.LegalHold =  
                                       <LegalHold.UNSET: None>)
```

Bases: *object*

One of three: an unfinished large file, a finished file, or a deletion marker.

```

CHECK_ENCRYPTION = True

__init__(account_id, bucket, file_id, action, name, content_type, content_sha1, file_info,
          data_bytes, upload_timestamp, range_=None, server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None, file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None, legal_hold: b2sdk.file_lock.LegalHold = <LegalHold.UNSET: None>)
    Initialize self. See help(type(self)) for accurate signature.

classmethod dont_check_encryption()

sort_key()
    Return a key that can be used to sort the files in a bucket in the order that b2_list_file_versions returns them.

as_download_headers(account_auth_token_or_none, range_=None)

as_upload_result(account_auth_token)

as_list_files_dict(account_auth_token)

is_allowed_to_read_file_retention(account_auth_token)

is_allowed_to_read_file_legal_hold(account_auth_token)

as_start_large_file_result(account_auth_token)

add_part(part_number, part)

finish(part_sha1_array)

is_visible()
    Does this file show up in b2_list_file_names?

list_parts(start_part_number, max_part_count)

check_encryption(request_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting])

class b2sdk.raw_simulator.FakeRequest(url, headers)
    Bases: tuple

    headers
        Alias for field number 1

    url
        Alias for field number 0

class b2sdk.raw_simulator.FakeResponse(account_auth_token_or_none, file_sim, url, range_=None)
    Bases: object

    __init__(account_auth_token_or_none, file_sim, url, range_=None)
        Initialize self. See help(type(self)) for accurate signature.

    iter_content(chunk_size=1)

    property request

    close()

class b2sdk.raw_simulator.BucketSimulator(api, account_id, bucket_id, bucket_name, bucket_type, bucket_info=None, cors_rules=None, life-cycle_rules=None, options_set=None, default_server_side_encryption=None, is_file_lock_enabled: Optional[bool] = None)

```

```
Bases: object

FIRST_FILE_NUMBER = 9999

FIRST_FILE_ID = '9999'

FILE_SIMULATOR_CLASS
    alias of b2sdk.raw_simulator.FileSimulator

RESPONSE_CLASS
    alias of b2sdk.raw_simulator.FakeResponse

__init__ (api, account_id, bucket_id, bucket_name, bucket_type, bucket_info=None, cors_rules=None,
        lifecycle_rules=None, options_set=None, default_server_side_encryption=None,
        is_file_lock_enabled: Optional[bool] = None)
    Initialize self. See help(type(self)) for accurate signature.

is_allowed_to_read_bucket_encryption_setting (account_auth_token)

is_allowed_to_read_bucket_retention (account_auth_token)

bucket_dict (account_auth_token)

cancel_large_file (file_id)

delete_file_version (file_id, file_name)

download_file_by_id (account_auth_token_or_none, file_id, url, range_=None, encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None)

download_file_by_name (account_auth_token_or_none, file_name, url, range_=None, encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None)

finish_large_file (account_auth_token, file_id, part_shal_array)

get_file_info_by_id (account_auth_token, file_id)

get_file_info_by_name (account_auth_token, file_name)

get_upload_url (account_auth_token)

get_upload_part_url (account_auth_token, file_id)

hide_file (account_auth_token, file_name)

update_file_retention (account_auth_token, file_id, file_name, file_retention: b2sdk.file_lock.FileRetentionSetting, bypass_governance: bool = False)

update_file_legal_hold (account_auth_token, file_id, file_name, legal_hold: b2sdk.file_lock.LegalHold)

copy_file (file_id, new_file_name, bytes_range=None, metadata_directive=None, content_type=None, file_info=None, destination_bucket_id=None, destination_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None, source_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None, file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None, legal_hold: Optional[b2sdk.file_lock.LegalHold] = None)

list_file_names (account_auth_token, start_file_name=None, max_file_count=None, prefix=None)

list_file_versions (account_auth_token, start_file_name=None, start_file_id=None, max_file_count=None, prefix=None)

list_parts (file_id, start_part_number, max_part_count)
```



```

list_unfinished_large_files (account_auth_token, start_file_id=None,
                               max_file_count=None, prefix=None)

start_large_file (account_auth_token, file_name, content_type, file_info, server_side_encryption:
                    Optional[b2sdk.encryption.setting.EncryptionSetting] = None, file_retention:
                    Optional[b2sdk.file_lock.FileRetentionSetting] = None, legal_hold:
                    Optional[b2sdk.file_lock.LegalHold] = None)

upload_file (upload_id, upload_auth_token, file_name, content_length, content_type,
               content_sha1, file_infos, data_stream, server_side_encryption:
               Optional[b2sdk.encryption.setting.EncryptionSetting] = None, file_retention:
               Optional[b2sdk.file_lock.FileRetentionSetting] = None, legal_hold:
               Optional[b2sdk.file_lock.LegalHold] = None)

upload_part (file_id, part_number, content_length, sha1_sum, input_stream, server_side_encryption:
               Optional[b2sdk.encryption.setting.EncryptionSetting] = None)

class b2sdk.raw_simulator.RawSimulator
    Bases: b2sdk.raw_api.AbstractRawApi

    Implement the same interface as B2RawApi by simulating all of the calls and keeping state in memory.

    The intended use for this class is for unit tests that test things built on top of B2RawApi.

    BUCKET_SIMULATOR_CLASS
        alias of b2sdk.raw_simulator.BucketSimulator

    API_URL = 'http://api.example.com'

    S3_API_URL = 'http://s3.api.example.com'

    DOWNLOAD_URL = 'http://download.example.com'

    MIN_PART_SIZE = 200

    MAX_DURATION_IN_SECONDS = 86400000

    UPLOAD_PART_MATCHER = re.compile('https://upload.example.com/part/([^\s]*)')

    UPLOAD_URL_MATCHER = re.compile('https://upload.example.com/([^\s]*)/([^\s]*)')

    DOWNLOAD_URL_MATCHER = re.compile('http://download.example.com(?:/b2api/v[0-9]+)/b2_download')

    __init__ ()
        Initialize self. See help(type(self)) for accurate signature.

    expire_auth_token (auth_token)
        Simulate the auth token expiring.

        The next call that tries to use this auth token will get an auth_token_expired error.

    create_account ()
        Return (accountId, masterApplicationKey) for a newly created account.

    set_upload_errors (errors)
        Store a sequence of exceptions to raise on upload. Each one will be raised in turn, until they are all gone.
        Then the next upload will succeed.

    authorize_account (realm_url, application_key_id, application_key)

    cancel_large_file (api_url, account_auth_token, file_id)

```

```
create_bucket (api_url,          account_auth_token,          account_id,          bucket_name,
                bucket_type,          bucket_info=None,          cors_rules=None,          life-
                cycle_rules=None,          default_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None, is_file_lock_enabled:
                Optional[bool] = None)

create_key (api_url,          account_auth_token,          account_id,          capabilities,          key_name,
            valid_duration_seconds, bucket_id, name_prefix)

delete_file_version (api_url, account_auth_token, file_id, file_name)

update_file_retention (api_url, account_auth_token, file_id, file_name, file_retention:
                        b2sdk.file_lock.FileRetentionSetting, bypass_governance: bool =
                        False)

update_file_legal_hold (api_url, account_auth_token, file_id, file_name, legal_hold: bool)

delete_bucket (api_url, account_auth_token, account_id, bucket_id)

download_file_from_url (account_auth_token_or_none, url, range_=None, encryption: Op-
                        tional[b2sdk.encryption.setting.EncryptionSetting] = None)

delete_key (api_url, account_auth_token, application_key_id)

finish_large_file (api_url, account_auth_token, file_id, part_shal_array)

get_download_authorization (api_url, account_auth_token, bucket_id, file_name_prefix,
                            valid_duration_in_seconds)

get_file_info_by_id (api_url, account_auth_token, file_id)

get_file_info_by_name (api_url, account_auth_token, bucket_name, file_name)

get_upload_url (api_url, account_auth_token, bucket_id)

get_upload_part_url (api_url, account_auth_token, file_id)

hide_file (api_url, account_auth_token, bucket_id, file_name)

copy_file (api_url, account_auth_token, source_file_id, new_file_name, bytes_range=None, meta-
            data_directive=None, content_type=None, file_info=None, destination_bucket_id=None,
            destination_server_side_encryption=None, source_server_side_encryption=None,
            file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None, legal_hold:
            Optional[b2sdk.file_lock.LegalHold] = None)

copy_part (api_url,          account_auth_token,          source_file_id,          large_file_id,
            part_number,          bytes_range=None,          destination_server_side_encryption:
            Optional[b2sdk.encryption.setting.EncryptionSetting] = None,
            source_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] =
            None)

list_buckets (api_url, account_auth_token, account_id, bucket_id=None, bucket_name=None)

list_file_names (api_url, account_auth_token, bucket_id, start_file_name=None,
                max_file_count=None, prefix=None)

list_file_versions (api_url, account_auth_token, bucket_id, start_file_name=None,
                    start_file_id=None, max_file_count=None, prefix=None)

list_keys (api_url,          account_auth_token,          account_id,          max_key_count=1000,
            start_application_key_id=None)

list_parts (api_url, account_auth_token, file_id, start_part_number, max_part_count)

list_unfinished_large_files (api_url, account_auth_token, bucket_id, start_file_id=None,
                            max_file_count=None, prefix=None)
```

```

start_large_file (api_url, account_auth_token, bucket_id, file_name, content_type, file_info,
                  server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting]
                  = None, file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None,
                  legal_hold: Optional[b2sdk.file_lock.LegalHold] = None)

update_bucket (api_url, account_auth_token, account_id, bucket_id, bucket_type=None,
                bucket_info=None, cors_rules=None, lifecycle_rules=None,
                if_revision_is=None, default_server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None,
                default_retention: Optional[b2sdk.file_lock.BucketRetentionSetting] = None)

upload_file (upload_url, upload_auth_token, file_name, content_length, content_type,
              content_sha1, file_infos, data_stream, server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None,
              file_retention: Optional[b2sdk.file_lock.FileRetentionSetting] = None, legal_hold: Optional[b2sdk.file_lock.LegalHold] = None)

upload_part (upload_url, upload_auth_token, part_number, content_length, sha1_sum, input_stream,
              server_side_encryption: Optional[b2sdk.encryption.setting.EncryptionSetting] = None)

```

2.9 Contributors Guide

We encourage outside contributors to perform changes on our codebase. Many such changes have been merged already. In order to make it easier to contribute, core developers of this project:

- provide guidance (through the issue reporting system)
- provide tool assisted code review (through the Pull Request system)
- maintain a set of unit tests
- maintain a set of integration tests (run with a production cloud)
- maintain development automation tools using `nox` that can easily:
 - format the code using `yapf`
 - runs linters to find subtle/potential issues with maintainability
 - run the test suite on multiple Python versions using `pytest`
- maintain Continuous Integration (by using GitHub Actions) that:
 - runs all sorts of linters
 - checks if the Python distribution can be built
 - runs all tests on a matrix of 6 versions of Python (including pypy) and 3 operating systems (Linux, Mac OS X and Windows)
 - checks if the documentation can be built properly
- maintain other Continuous Integration tools (coverage tracker)

You'll need to have `nox` installed:

- `pip install nox`

With `nox`, you can run different sessions (default are `lint` and `test`):

- `format` -> Format the code.
- `lint` -> Run linters.

- `test` (`test-3.5`, `test-3.6`, `test-3.7`, `test-3.8`, `test-3.9`) -> Run test suite.
- `cover` -> Perform coverage analysis.
- `build` -> Build the distribution.
- `deploy` -> Deploy the distribution to the PyPi.
- `doc` -> Build the documentation.
- `doc_cover` -> Perform coverage analysis for the documentation.

For example:

```
$ nox -s format
nox > Running session format
nox > Creating virtual environment (virtualenv) using python3.9 in .nox/format
...

$ nox -s format
nox > Running session format
nox > Re-using existing virtual environment at .nox/format.
...

$ nox --no-venv -s format
nox > Running session format
...
```

Sessions `test`, `unit`, and `integration` can run on many Python versions, 3.5-3.9 by default.

Sessions other than `test` use the last given Python version, 3.9 by default.

You can change it:

```
export NOX_PYTHONS=3.6,3.7
```

With the above setting, session `test` will run on Python 3.6 and 3.7, and all other sessions on Python 3.7.

Given Python interpreters should be installed in the operating system or via [pyenv](#).

2.9.1 Linting

To run all available linters:

```
$ nox -s lint
```

2.9.2 Testing

To run all tests on every available Python version:

```
$ nox -s test
```

To run all tests on a specific version:

```
$ nox -s test-3.9
```

To run just unit tests:

```
$ nox -s unit-3.9
```

To run just integration tests:

```
$ export B2_TEST_APPLICATION_KEY=your_app_key
$ export B2_TEST_APPLICATION_KEY_ID=your_app_key_id
$ nox -s integration-3.9
```

2.9.3 Documentation

To build the documentation and watch for changes (including the source code):

```
$ nox -s doc
```

To just build the documentation:

```
$ nox --non-interactive -s doc
```


INDICES AND TABLES

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

PYTHON MODULE INDEX

b

- b2sdk.b2http, 58
- b2sdk.cache, 64
- b2sdk.download_dest, 65
- b2sdk.encryption.types, 51
- b2sdk.raw_api, 53
- b2sdk.raw_simulator, 98
- b2sdk.session, 51
- b2sdk.stream.chained, 67
- b2sdk.stream.hashing, 68
- b2sdk.stream.progress, 69
- b2sdk.stream.range, 70
- b2sdk.stream.wrapper, 70
- b2sdk.sync.action, 72
- b2sdk.sync.exception, 76
- b2sdk.sync.file, 77
- b2sdk.sync.folder, 79
- b2sdk.sync.folder_parser, 81
- b2sdk.sync.policy, 81
- b2sdk.sync.policy_manager, 86
- b2sdk.sync.scan_policies, 87
- b2sdk.sync.sync, 88
- b2sdk.transfer.inbound.download_manager, 95
- b2sdk.transfer.inbound.downloader.abstract, 91
- b2sdk.transfer.inbound.downloader.parallel, 92
- b2sdk.transfer.inbound.downloader.range, 94
- b2sdk.transfer.inbound.downloader.simple, 95
- b2sdk.transfer.inbound.file_metadata, 96
- b2sdk.transfer.outbound.upload_source, 96
- b2sdk.utils, 61
- b2sdk.v1.exception, 31

Symbols

`__dict__` (*b2sdk.v1.FileIdAndName* attribute), 37
`__dict__` (*b2sdk.v1.FileVersionInfo* attribute), 37
`__enter__` () (*b2sdk.v1.TempDir* method), 47
`__exit__` () (*b2sdk.v1.TempDir* method), 47
`__init__` () (*b2sdk.cache.AuthInfoCache* method), 64
`__init__` () (*b2sdk.cache.InMemoryCache* method), 64
`__init__` () (*b2sdk.download_dest.DownloadDestBytes* method), 66
`__init__` () (*b2sdk.download_dest.DownloadDestLocalFile* method), 65
`__init__` () (*b2sdk.download_dest.DownloadDestProgressWrapper* method), 66
`__init__` () (*b2sdk.download_dest.PreSeekedDownloadDest* method), 66
`__init__` () (*b2sdk.raw_api.B2RawApi* method), 55
`__init__` () (*b2sdk.raw_simulator.BucketSimulator* method), 100
`__init__` () (*b2sdk.raw_simulator.FakeResponse* method), 99
`__init__` () (*b2sdk.raw_simulator.FileSimulator* method), 99
`__init__` () (*b2sdk.raw_simulator.KeySimulator* method), 98
`__init__` () (*b2sdk.raw_simulator.PartSimulator* method), 98
`__init__` () (*b2sdk.raw_simulator.RawSimulator* method), 101
`__init__` () (*b2sdk.session.B2Session* method), 51
`__init__` () (*b2sdk.stream.chained.ChainedStream* method), 67
`__init__` () (*b2sdk.stream.hashing.StreamWithHash* method), 68
`__init__` () (*b2sdk.stream.progress.AbstractStreamWithProgress* method), 69
`__init__` () (*b2sdk.stream.progress.ReadingStreamWithProgress* method), 69
`__init__` () (*b2sdk.stream.range.RangeOfInputStream* method), 70
`__init__` () (*b2sdk.stream.wrapper.StreamWithLengthWrapper* method), 71
`__init__` () (*b2sdk.stream.wrapper.StreamWrapper* method), 70
`__init__` () (*b2sdk.sync.action.B2CopyAction* method), 74
`__init__` () (*b2sdk.sync.action.B2DeleteAction* method), 75
`__init__` () (*b2sdk.sync.action.B2DownloadAction* method), 73
`__init__` () (*b2sdk.sync.action.B2HideAction* method), 73
`__init__` () (*b2sdk.sync.action.B2UploadAction* method), 72
`__init__` () (*b2sdk.sync.action.LocalDeleteAction* method), 75
`__init__` () (*b2sdk.sync.exception.BaseDirectoryError* method), 77
`__init__` () (*b2sdk.sync.exception.EnvironmentEncodingError* method), 76
`__init__` () (*b2sdk.sync.exception.InvalidArgument* method), 76
`__init__` () (*b2sdk.sync.exception.UnSyncableFilename* method), 76
`__init__` () (*b2sdk.sync.file.B2File* method), 77
`__init__` () (*b2sdk.sync.file.B2FileVersion* method), 78
`__init__` () (*b2sdk.sync.file.File* method), 77
`__init__` () (*b2sdk.sync.file.FileVersion* method), 78
`__init__` () (*b2sdk.sync.folder.B2Folder* method), 80
`__init__` () (*b2sdk.sync.folder.LocalFolder* method), 79
`__init__` () (*b2sdk.sync.policy.AbstractFileSyncPolicy* method), 82
`__init__` () (*b2sdk.sync.policy_manager.SyncPolicyManager* method), 86
`__init__` () (*b2sdk.sync.scan_policies.IntegerRange* method), 87
`__init__` () (*b2sdk.sync.scan_policies.RegexSet* method), 87
`__init__` () (*b2sdk.sync.scan_policies.ScanPoliciesManager* method), 88
`__init__` () (*b2sdk.sync.sync.Synchronizer* method), 90

`__init__()` (`b2sdk.transfer.inbound.download_manager.DownloadManager` (`b2sdk.v1.PreSeekedDownloadDest` method), 95
`__init__()` (`b2sdk.transfer.inbound.downloader.abstract.AbstractDownloader` (`b2sdk.v1.RetentionPeriod` method), 35
`__init__()` (`b2sdk.transfer.inbound.downloader.parallel.AbstractDownloaderThread` method), 93
`__init__()` (`b2sdk.transfer.inbound.downloader.parallel.FirstPartDownloadThread` (`b2sdk.v1.SyncReport` method), 44
`__init__()` (`b2sdk.transfer.inbound.downloader.parallel.NonFlushingDownloadThread` (`b2sdk.v1.AuthToken` method), 48
`__init__()` (`b2sdk.transfer.inbound.downloader.parallel.ParallelDownloader` method), 92
`__init__()` (`b2sdk.transfer.inbound.downloader.parallel.PartToDownload` method), 28
`__init__()` (`b2sdk.transfer.inbound.downloader.parallel.WriterThread` method), 93
`__init__()` (`b2sdk.transfer.inbound.downloader.range.Range` method), 94
`__init__()` (`b2sdk.transfer.inbound.downloader.simple.SimpleDownloader` method), 95
`__init__()` (`b2sdk.transfer.inbound.file_metadata.FileMetadata` method), 96
`__init__()` (`b2sdk.transfer.outbound.upload_source.UploadSourceBytes` method), 96
`__init__()` (`b2sdk.transfer.outbound.upload_source.UploadSourceLocalFile` method), 97
`__init__()` (`b2sdk.transfer.outbound.upload_source.UploadSourceLocalFileRange` method), 97
`__init__()` (`b2sdk.transfer.outbound.upload_source.UploadSourceStream` method), 97
`__init__()` (`b2sdk.transfer.outbound.upload_source.UploadSourceStreamRange` method), 98
`__init__()` (`b2sdk.utils.ConcurrentUsedAuthTokenGuard` method), 63
`__init__()` (`b2sdk.v1.AuthInfoCache` method), 30
`__init__()` (`b2sdk.v1.BasicSyncEncryptionSettingsProvider` method), 46
`__init__()` (`b2sdk.v1.BucketRetentionSetting` method), 35
`__init__()` (`b2sdk.v1.DownloadDestBytes` method), 49
`__init__()` (`b2sdk.v1.DownloadDestLocalFile` method), 49
`__init__()` (`b2sdk.v1.DownloadDestProgressWrapper` method), 49
`__init__()` (`b2sdk.v1.EncryptionKey` method), 50
`__init__()` (`b2sdk.v1.EncryptionSetting` method), 50
`__init__()` (`b2sdk.v1.FileLockConfiguration` method), 36
`__init__()` (`b2sdk.v1.FileRetentionSetting` method), 35
`__init__()` (`b2sdk.v1.InMemoryAccountInfo` method), 27
`__init__()` (`b2sdk.v1.InMemoryCache` method), 30
`absoluteMinimumPartSize`, 23
`AbstractAccountInfo` (class in `b2sdk.v1`), 28
`AbstractAction` (class in `b2sdk.sync.action`), 72
`AbstractCache` (class in `b2sdk.cache`), 64
`AbstractDownloadDestination` (class in `b2sdk.download_dest`), 65
`AbstractDownloadDestination` (class in `b2sdk.v1`), 49
`AbstractDownloader` (class in `b2sdk.transfer.inbound.downloader.abstract`), 35
`AbstractDownloaderThread` (class in `b2sdk.transfer.inbound.downloader.parallel`), 93
`AbstractFilePolicy` (class in `b2sdk.sync.policy`), 81
`AbstractFolder` (class in `b2sdk.sync.folder`), 79
`AbstractProgressListener` (class in `b2sdk.v1`), 38
`AbstractRawApi` (class in `b2sdk.raw_api`), 53
`AbstractStreamWithProgress` (class in `b2sdk.stream.progress`), 69
`AbstractSyncEncryptionSettingsProvider` (class in `b2sdk.v1`), 46
`AbstractUploadSource` (class in `b2sdk.transfer.outbound.upload_source`), 96
`account ID`, 23
`action` (`b2sdk.sync.file.FileVersion` attribute), 78
`action` (`b2sdk.v1.FileVersionInfo` attribute), 37
`action()` (`b2sdk.sync.file.B2FileVersion` property), 78
`add_callback()` (`b2sdk.b2http.B2Http` method), 59
`add_part()` (`b2sdk.raw_simulator.FileSimulator` method), 99
`AES256` (`b2sdk.encryption.types.EncryptionAlgorithm` attribute), 51
`all_files()` (`b2sdk.sync.folder.AbstractFolder` method), 79

all_files() (b2sdk.sync.folder.B2Folder method), 80
 all_files() (b2sdk.sync.folder.LocalFolder method), 79
 API (b2sdk.session.TokenType attribute), 51
 API_TOKEN_ONLY (b2sdk.session.TokenType attribute), 51
 API_URL (b2sdk.raw_simulator.RawSimulator attribute), 101
 application key, 23
 application key ID, 23
 as_created_key() (b2sdk.raw_simulator.KeySimulator method), 98
 as_dict() (b2sdk.v1.EncryptionSetting method), 50
 as_dict() (b2sdk.v1.FileIdAndName method), 37
 as_dict() (b2sdk.v1.RetentionPeriod method), 36
 as_download_headers() (b2sdk.raw_simulator.FileSimulator method), 99
 as_info_dict() (b2sdk.transfer.inbound.file_metadata.FileMetadata method), 96
 as_key() (b2sdk.raw_simulator.KeySimulator method), 98
 as_list_files_dict() (b2sdk.raw_simulator.FileSimulator method), 99
 as_list_parts_dict() (b2sdk.raw_simulator.PartSimulator method), 98
 as_start_large_file_result() (b2sdk.raw_simulator.FileSimulator method), 99
 as_tuple() (b2sdk.transfer.inbound.downloader.range.Range module), 95
 as_upload_result() (b2sdk.raw_simulator.FileSimulator method), 99
 AuthInfoCache (class in b2sdk.cache), 64
 AuthInfoCache (class in b2sdk.v1), 30
 authorize_account() (b2sdk.raw_api.AbstractRawApi method), 54
 authorize_account() (b2sdk.raw_api.B2RawApi method), 55
 authorize_account() (b2sdk.raw_simulator.RawSimulator method), 101
 authorize_account() (b2sdk.session.B2Session method), 52
 authorize_automatically() (b2sdk.session.B2Session method), 52
 b2_url_encode() (in module b2sdk.utils), 61
 b2_url_encode() (in module b2sdk.v1), 46
 B2Api (class in b2sdk.v1), 31
 B2CopyAction (class in b2sdk.sync.action), 74
 B2DeleteAction (class in b2sdk.sync.action), 75
 B2DownloadAction (class in b2sdk.sync.action), 73
 B2File (class in b2sdk.sync.file), 77
 B2FileVersion (class in b2sdk.sync.file), 78
 B2Folder (class in b2sdk.sync.folder), 80
 B2HideAction (class in b2sdk.sync.action), 73
 B2Http (class in b2sdk.b2http), 59
 B2RawApi (class in b2sdk.raw_api), 55
 b2sdk interface version, 23
 b2sdk version, 23
 b2sdk.b2http module, 58
 b2sdk.cache module, 64
 b2sdk.download_dest module, 65
 b2sdk.encryption.types module, 51
 b2sdk.raw_api module, 53
 b2sdk.raw_simulator module, 98
 b2sdk.session module, 51
 b2sdk.stream.chained module, 67
 b2sdk.stream.hashing module, 68
 b2sdk.stream.progress module, 69
 b2sdk.stream.range module, 70
 b2sdk.stream.wrapper module, 70
 b2sdk.sync.action module, 72
 b2sdk.sync.exception module, 76
 b2sdk.sync.file module, 77
 b2sdk.sync.folder module, 79
 b2sdk.sync.folder_parser module, 81
 b2sdk.sync.policy module, 81
 b2sdk.sync.policy_manager module, 86
 b2sdk.sync.scan_policies module, 87

B

b2sdk.sync.sync
 module, 88
b2sdk.transfer.inbound.download_manager
 module, 95
b2sdk.transfer.inbound.downloader.abstract
 module, 91
b2sdk.transfer.inbound.downloader.parallel
 module, 92
b2sdk.transfer.inbound.downloader.range
 module, 94
b2sdk.transfer.inbound.downloader.simple
 module, 95
b2sdk.transfer.inbound.file_metadata
 module, 96
b2sdk.transfer.outbound.upload_source
 module, 96
b2sdk.utils
 module, 61
b2sdk.v1.exception
 module, 31
B2Session (class in *b2sdk.session*), 51
B2TraceMeta (class in *b2sdk.utils*), 63
B2TraceMetaAbstract (class in *b2sdk.utils*), 63
B2UploadAction (class in *b2sdk.sync.action*), 72
b64_of_bytes() (in module *b2sdk.utils*), 62
BaseDirectoryError, 77
BasicSyncEncryptionSettingsProvider
 (class in *b2sdk.v1*), 46
bucket, 23
Bucket (class in *b2sdk.v1*), 31
BUCKET_CLASS (*b2sdk.v1.B2Api* attribute), 31
bucket_dict() (*b2sdk.raw_simulator.BucketSimulator*
 method), 100
BUCKET_FACTORY_CLASS (*b2sdk.v1.B2Api* at-
 tribute), 31
BUCKET_SIMULATOR_CLASS
 (*b2sdk.raw_simulator.RawSimulator* attribute),
 101
BUCKET_UPLOAD_POOL_CLASS
 (*b2sdk.v1.UrlPoolAccountInfo* attribute),
 29
BucketRetentionSetting (class in *b2sdk.v1*), 35
BucketSimulator (class in *b2sdk.raw_simulator*), 99
bytes_completed()
 (*b2sdk.v1.AbstractProgressListener* method),
 39
C
camelcase_to_underscore() (in module
 b2sdk.utils), 63
can_be_set_as_bucket_default()
 (*b2sdk.encryption.types.EncryptionMode*
 method), 51
cancel_large_file()
 (*b2sdk.raw_api.AbstractRawApi* method),
 54
cancel_large_file() (*b2sdk.raw_api.B2RawApi*
 method), 56
cancel_large_file()
 (*b2sdk.raw_simulator.BucketSimulator*
 method), 100
cancel_large_file()
 (*b2sdk.raw_simulator.RawSimulator* method),
 101
cancel_large_file() (*b2sdk.session.B2Session*
 method), 52
capture_bytes_context()
 (*b2sdk.download_dest.DownloadDestBytes*
 method), 66
ChainedStream (class in *b2sdk.stream.chained*), 67
check_b2_filename() (*b2sdk.raw_api.B2RawApi*
 method), 57
check_bucket_restrictions()
 (*b2sdk.v1.B2Api* method), 31
CHECK_ENCRYPTION (*b2sdk.raw_simulator.FileSimulator*
 attribute), 98
check_encryption()
 (*b2sdk.raw_simulator.FileSimulator* method),
 99
check_invalid_argument() (in module
 b2sdk.sync.exception), 77
check_path_and_get_size()
 (*b2sdk.transfer.outbound.upload_source.UploadSourceLocalFile*
 method), 97
choose_part_ranges() (in module *b2sdk.utils*), 61
choose_part_ranges() (in module *b2sdk.v1*), 46
cleanup() (*b2sdk.stream.chained.StreamOpener*
 method), 68
clear() (*b2sdk.cache.AbstractCache* method), 64
clear_for_key() (*b2sdk.account_info.upload_url_pool.UploadUrlPool*
 method), 29
ClockSkewHook (class in *b2sdk.b2http*), 59
close() (*b2sdk.raw_simulator.FakeResponse* method),
 99
close() (*b2sdk.stream.chained.ChainedStream*
 method), 68
close() (*b2sdk.stream.wrapper.StreamWrapper*
 method), 71
close() (*b2sdk.v1.AbstractProgressListener* method),
 39
close() (*b2sdk.v1.SyncReport* method), 44
CommandError, 31
CompareVersionMode (class in *b2sdk.sync.policy*),
 81
CompareVersionMode (class in *b2sdk.v1*), 38
COMPLIANCE (*b2sdk.v1.RetentionMode* attribute), 35
ConcurrentUsedAuthTokenGuard (class in

b2sdk.utils), 63
 content_length (b2sdk.transfer.inbound.file_metadata.FileMetadata attribute), 96
 content_md5 (b2sdk.v1.FileVersionInfo attribute), 36
 content_sha1 (b2sdk.transfer.inbound.file_metadata.FileMetadata attribute), 96
 content_sha1 (b2sdk.v1.FileVersionInfo attribute), 36
 content_sha1_verified (b2sdk.transfer.inbound.file_metadata.FileMetadata attribute), 96
 content_type (b2sdk.transfer.inbound.file_metadata.FileMetadata attribute), 96
 content_type (b2sdk.v1.FileVersionInfo attribute), 36
 convert_dir_regex_to_dir_prefix_regex() (in module b2sdk.sync.scan_policies), 87
 COPY (b2sdk.raw_api.MetadataDirectiveMode attribute), 53
 COPY (b2sdk.v1.MetadataDirectiveMode attribute), 38
 copy() (b2sdk.v1.Bucket method), 34
 copy_file() (b2sdk.raw_api.AbstractRawApi method), 54
 copy_file() (b2sdk.raw_api.B2RawApi method), 57
 copy_file() (b2sdk.raw_simulator.BucketSimulator method), 100
 copy_file() (b2sdk.raw_simulator.RawSimulator method), 102
 copy_file() (b2sdk.session.B2Session method), 53
 copy_file() (b2sdk.v1.Bucket method), 31
 copy_part() (b2sdk.raw_api.AbstractRawApi method), 54
 copy_part() (b2sdk.raw_api.B2RawApi method), 58
 copy_part() (b2sdk.raw_simulator.RawSimulator method), 102
 copy_part() (b2sdk.session.B2Session method), 53
 CopyAndDeletePolicy (class in b2sdk.sync.policy), 84
 CopyAndKeepDaysPolicy (class in b2sdk.sync.policy), 84
 CopyPolicy (class in b2sdk.sync.policy), 84
 count_files() (in module b2sdk.sync.sync), 89
 create_account() (b2sdk.raw_simulator.RawSimulator method), 101
 create_bucket() (b2sdk.raw_api.AbstractRawApi method), 54
 create_bucket() (b2sdk.raw_api.B2RawApi method), 56
 create_bucket() (b2sdk.raw_simulator.RawSimulator method), 101
 create_bucket() (b2sdk.session.B2Session method), 52
 create_file() (b2sdk.v1.Bucket method), 32
 create_file_stream() (b2sdk.v1.Bucket method), 33
 create_key() (b2sdk.raw_api.AbstractRawApi method), 54
 create_key() (b2sdk.raw_api.B2RawApi method), 56
 create_key() (b2sdk.raw_simulator.RawSimulator method), 102
 create_key() (b2sdk.session.B2Session method), 52
D
 DEFAULT_MAX_STREAMS (b2sdk.transfer.inbound.download_manager.DownloadManager attribute), 95
 DEFAULT_MIN_PART_SIZE (b2sdk.transfer.inbound.download_manager.DownloadManager attribute), 95
 DELETE (b2sdk.sync.sync.KeepOrDeleteMode attribute), 89
 DELETE (b2sdk.v1.KeepOrDeleteMode attribute), 38
 delete_bucket() (b2sdk.raw_api.AbstractRawApi method), 54
 delete_bucket() (b2sdk.raw_api.B2RawApi method), 56
 delete_bucket() (b2sdk.raw_simulator.RawSimulator method), 102
 delete_bucket() (b2sdk.session.B2Session method), 52
 delete_file_version() (b2sdk.raw_api.AbstractRawApi method), 54
 delete_file_version() (b2sdk.raw_api.B2RawApi method), 56
 delete_file_version() (b2sdk.raw_simulator.BucketSimulator method), 100
 delete_file_version() (b2sdk.raw_simulator.RawSimulator method), 102
 delete_file_version() (b2sdk.session.B2Session method), 52
 delete_key() (b2sdk.raw_api.AbstractRawApi method), 54
 delete_key() (b2sdk.raw_api.B2RawApi method), 56
 delete_key() (b2sdk.raw_simulator.RawSimulator method), 102
 delete_key() (b2sdk.session.B2Session method), 52
 destination_end_offset() (b2sdk.v1.WriteIntent property), 48
 DESTINATION_PREFIX (b2sdk.sync.policy.AbstractFileSyncPolicy attribute), 82
 DESTINATION_PREFIX (b2sdk.sync.policy.CopyPolicy attribute), 82

84
DESTINATION_PREFIX
(b2sdk.sync.policy.DownPolicy attribute),
83
DESTINATION_PREFIX (b2sdk.sync.policy.UpPolicy
attribute), 83
do_action() (b2sdk.sync.action.AbstractAction
method), 72
do_action() (b2sdk.sync.action.B2CopyAction
method), 75
do_action() (b2sdk.sync.action.B2DeleteAction
method), 75
do_action() (b2sdk.sync.action.B2DownloadAction
method), 74
do_action() (b2sdk.sync.action.B2HideAction
method), 73
do_action() (b2sdk.sync.action.B2UploadAction
method), 73
do_action() (b2sdk.sync.action.LocalDeleteAction
method), 76
do_report() (b2sdk.sync.action.AbstractAction
method), 72
do_report() (b2sdk.sync.action.B2CopyAction
method), 75
do_report() (b2sdk.sync.action.B2DeleteAction
method), 75
do_report() (b2sdk.sync.action.B2DownloadAction
method), 74
do_report() (b2sdk.sync.action.B2HideAction
method), 73
do_report() (b2sdk.sync.action.B2UploadAction
method), 73
do_report() (b2sdk.sync.action.LocalDeleteAction
method), 76
DoNothingProgressListener (class in b2sdk.v1),
39
dont_check_encryption()
(b2sdk.raw_simulator.FileSimulator class
method), 99
DownAndDeletePolicy (class in b2sdk.sync.policy),
83
DownAndKeepDaysPolicy (class in
b2sdk.sync.policy), 84
download() (b2sdk.transfer.inbound.downloader.abstract.
AbstractDownloader method), 91
download() (b2sdk.transfer.inbound.downloader.parallel.
ParallelDownloader method), 92
download() (b2sdk.transfer.inbound.downloader.simple.
SimpleDownloader method), 95
download_file_by_id()
(b2sdk.raw_simulator.BucketSimulator
method), 100
download_file_by_name()
(b2sdk.raw_simulator.BucketSimulator
method), 100
download_file_from_url()
(b2sdk.raw_api.AbstractRawApi method),
54
download_file_from_url()
(b2sdk.raw_api.B2RawApi method), 56
download_file_from_url()
(b2sdk.raw_simulator.RawSimulator method),
102
download_file_from_url()
(b2sdk.session.B2Session method), 52
download_file_from_url()
(b2sdk.transfer.inbound.download_manager.DownloadManager
method), 95
DOWNLOAD_URL (b2sdk.raw_simulator.RawSimulator
attribute), 101
DOWNLOAD_URL_MATCHER
(b2sdk.raw_simulator.RawSimulator attribute),
101
DownloadDestBytes (class in
b2sdk.download_dest), 66
DownloadDestBytes (class in b2sdk.v1), 49
DownloadDestLocalFile (class in
b2sdk.download_dest), 65
DownloadDestLocalFile (class in b2sdk.v1), 49
DownloadDestProgressWrapper (class in
b2sdk.download_dest), 66
DownloadDestProgressWrapper (class in
b2sdk.v1), 49
DownloadManager (class in
b2sdk.transfer.inbound.download_manager),
95
DownPolicy (class in b2sdk.sync.policy), 82
DummyCache (class in b2sdk.cache), 64
DummyCache (class in b2sdk.v1), 30

E

EmptyDirectory, 77
EncryptionAlgorithm (class in
b2sdk.encryption.types), 51
EncryptionKey (class in b2sdk.v1), 50
EncryptionMode (class in b2sdk.encryption.types),
51
EncryptFile (class in b2sdk.v1), 50
end_compare() (b2sdk.v1.SyncReport method), 45
end_total() (b2sdk.v1.SyncReport method), 45
end_total() (b2sdk.v1.SyncReport method), 45
ensure_not_empty()
(b2sdk.sync.folder.LocalFolder method),
80
ensure_present() (b2sdk.sync.folder.LocalFolder
method), 80
EnvironmentEncodingError, 76
error() (b2sdk.v1.SyncReport method), 44

expire_auth_token() (b2sdk.raw_simulator.RawSimulator method), 101
F
 FakeRequest (class in b2sdk.raw_simulator), 99
 FakeResponse (class in b2sdk.raw_simulator), 99
 File (class in b2sdk.sync.file), 77
 file_id (b2sdk.transfer.inbound.file_metadata.FileMetadata attribute), 96
 file_info (b2sdk.transfer.inbound.file_metadata.FileMetadata attribute), 96
 file_info (b2sdk.v1.FileVersionInfo attribute), 36
 file_name (b2sdk.transfer.inbound.file_metadata.FileMetadata attribute), 96
 file_name (b2sdk.v1.FileVersionInfo attribute), 36
 file_retention (b2sdk.v1.FileVersionInfo attribute), 37
 FILE_SIMULATOR_CLASS (b2sdk.raw_simulator.BucketSimulator attribute), 100
 FILE_VERSION_FACTORY (b2sdk.v1.Bucket attribute), 31
 file_version_info (b2sdk.sync.file.B2FileVersion attribute), 78
 FileIdAndName (class in b2sdk.v1), 37
 FileLockConfiguration (class in b2sdk.v1), 36
 FileMetadata (class in b2sdk.transfer.inbound.file_metadata), 96
 FileRetentionSetting (class in b2sdk.v1), 35
 files_are_different() (b2sdk.sync.policy.AbstractFileSyncPolicy class method), 82
 FileSimulator (class in b2sdk.raw_simulator), 98
 FileVersion (class in b2sdk.sync.file), 78
 FileVersionInfo (class in b2sdk.v1), 36
 finish() (b2sdk.raw_simulator.FileSimulator method), 99
 FINISH_HASHING_BUFFER_SIZE (b2sdk.transfer.inbound.downloader.parallel.ParallelDownloader attribute), 92
 finish_large_file() (b2sdk.raw_api.AbstractRawApi method), 54
 finish_large_file() (b2sdk.raw_api.B2RawApi method), 56
 finish_large_file() (b2sdk.raw_simulator.BucketSimulator method), 100
 finish_large_file() (b2sdk.raw_simulator.RawSimulator method), 102
 finish_large_file() (b2sdk.session.B2Session method), 52
 FIRST_FILE_ID (b2sdk.raw_simulator.BucketSimulator attribute), 100
 FIRST_FILE_NUMBER (b2sdk.raw_simulator.BucketSimulator attribute), 100
 FirstPartDownloaderThread (class in b2sdk.transfer.inbound.downloader.parallel), 93
 fix_windows_path_limit() (in module b2sdk.utils), 62
 fix_windows_path_limit() (in module b2sdk.v1), 47
 flush() (b2sdk.stream.wrapper.StreamWrapper method), 71
 folder_type() (b2sdk.sync.folder.AbstractFolder method), 79
 folder_type() (b2sdk.sync.folder.B2Folder method), 80
 folder_type() (b2sdk.sync.folder.LocalFolder method), 79
 format_and_scale_fraction() (in module b2sdk.utils), 63
 format_and_scale_fraction() (in module b2sdk.v1), 47
 format_and_scale_number() (in module b2sdk.utils), 63
 format_and_scale_number() (in module b2sdk.v1), 47
 format_folder_ls_entry() (b2sdk.v1.FileVersionInfo class method), 36
 format_ls_entry() (b2sdk.v1.FileVersionInfo method), 36
 from_header() (b2sdk.transfer.inbound.downloader.range.Range class method), 94
 from_period_dict() (b2sdk.v1.RetentionPeriod class method), 36
 from_response() (b2sdk.transfer.inbound.file_metadata.FileMetadata class method), 96
G
 gen_parts() (in module b2sdk.transfer.inbound.downloader.parallel), 94
 get_absolute_minimum_part_size() (b2sdk.v1.AbstractAccountInfo method), 28
 get_all_actions() (b2sdk.sync.policy.AbstractFileSyncPolicy method), 82
 get_allowed() (b2sdk.raw_simulator.KeySimulator method), 98
 get_bucket_by_id() (b2sdk.v1.B2Api method), 31

get_bucket_id_or_none_from_bucket_name() get_bytes() (b2sdk.sync.action.B2HideAction
 (b2sdk.cache.AbstractCache method), 64 method), 73
 get_bucket_id_or_none_from_bucket_name() get_bytes() (b2sdk.sync.action.B2UploadAction
 (b2sdk.cache.AuthInfoCache method), 64 method), 73
 get_bucket_id_or_none_from_bucket_name() get_bytes() (b2sdk.sync.action.LocalDeleteAction
 (b2sdk.cache.DummyCache method), 64 method), 76
 get_bucket_id_or_none_from_bucket_name() get_bytes_range() (in module
 (b2sdk.cache.InMemoryCache method), 64 b2sdk.raw_simulator), 98
 get_bucket_id_or_none_from_bucket_name() get_bytes_written() (b2sdk.download_dest.DownloadDestBytes
 (b2sdk.v1.AuthInfoCache method), 30 method), 66
 get_bucket_id_or_none_from_bucket_name() (b2sdk.v1.DummyCache method), 30 get_content() (b2sdk.b2http.B2Http method), 60
 get_bucket_id_or_none_from_bucket_name() get_content_length() (b2sdk.transfer.outbound.upload_source.UploadSourceBytes
 (b2sdk.v1.InMemoryCache method), 30 method), 96
 get_bucket_name_or_none_from_allowed() get_content_length() (b2sdk.transfer.outbound.upload_source.UploadSourceLocalFile
 (b2sdk.cache.AbstractCache method), 64 method), 97
 get_bucket_name_or_none_from_allowed() (b2sdk.cache.AuthInfoCache method), 64 get_content_length() (b2sdk.transfer.outbound.upload_source.UploadSourceStream
 (b2sdk.cache.DummyCache method), 64 method), 97
 get_bucket_name_or_none_from_allowed() (b2sdk.cache.InMemoryCache method), 64 get_content_length() (b2sdk.v1.OutboundTransferSource method),
 (b2sdk.v1.AuthInfoCache method), 30 48
 get_bucket_name_or_none_from_allowed() get_content_shal() (b2sdk.transfer.outbound.upload_source.AbstractUploadSource
 (b2sdk.v1.DummyCache method), 30 method), 96
 get_bucket_name_or_none_from_allowed() (b2sdk.v1.InMemoryCache method), 30 get_content_shal() (b2sdk.transfer.outbound.upload_source.UploadSourceBytes
 get_bucket_name_or_none_from_bucket_id() (b2sdk.cache.AbstractCache method), 64 method), 97
 get_bucket_name_or_none_from_bucket_id() get_content_shal() (b2sdk.transfer.outbound.upload_source.UploadSourceLocalFile
 (b2sdk.cache.AuthInfoCache method), 64 method), 97
 get_bucket_name_or_none_from_bucket_id() (b2sdk.cache.DummyCache method), 64 get_content_shal() (b2sdk.transfer.outbound.upload_source.UploadSourceStream
 (b2sdk.cache.InMemoryCache method), 64 method), 97
 get_bucket_name_or_none_from_bucket_id() get_destination_setting_for_copy() (b2sdk.v1.AbstractSyncEncryptionSettingsProvider
 (b2sdk.v1.AbstractAccountInfo method), 28 method), 46
 get_bucket_name_or_none_from_bucket_id() (b2sdk.v1.AbstractCache method), 30 get_digest() (b2sdk.stream.hashing.StreamWithHash
 get_bucket_name_or_none_from_bucket_id() (b2sdk.v1.AuthInfoCache method), 30 class method), 68
 get_bucket_name_or_none_from_bucket_id() (b2sdk.v1.DummyCache method), 30 get_download_authorization() (b2sdk.raw_api.AbstractRawApi method),
 (b2sdk.v1.InMemoryCache method), 30 54
 get_bucket_name_or_none_from_bucket_id() get_download_authorization() (b2sdk.raw_api.B2RawApi method), 56
 get_bytes() (b2sdk.sync.action.AbstractAction method), 72 get_download_authorization() (b2sdk.raw_simulator.RawSimulator method),
 get_bytes() (b2sdk.sync.action.B2CopyAction method), 74 102
 get_bytes() (b2sdk.sync.action.B2DeleteAction method), 75 get_download_authorization() (b2sdk.session.B2Session method), 52
 get_bytes() (b2sdk.sync.action.B2DownloadAction method), 74 get_download_url_by_id() (b2sdk.raw_api.AbstractRawApi method),
 55

[get_download_url_by_id\(\)](#) (*b2sdk.session.B2Session method*), 53
[get_download_url_by_name\(\)](#) (*b2sdk.raw_api.AbstractRawApi method*), 55
[get_download_url_by_name\(\)](#) (*b2sdk.session.B2Session method*), 53
[get_file_info_by_id\(\)](#) (*b2sdk.raw_api.AbstractRawApi method*), 54
[get_file_info_by_id\(\)](#) (*b2sdk.raw_api.B2RawApi method*), 56
[get_file_info_by_id\(\)](#) (*b2sdk.raw_simulator.BucketSimulator method*), 100
[get_file_info_by_id\(\)](#) (*b2sdk.raw_simulator.RawSimulator method*), 102
[get_file_info_by_id\(\)](#) (*b2sdk.session.B2Session method*), 52
[get_file_info_by_name\(\)](#) (*b2sdk.raw_api.AbstractRawApi method*), 54
[get_file_info_by_name\(\)](#) (*b2sdk.raw_api.B2RawApi method*), 56
[get_file_info_by_name\(\)](#) (*b2sdk.raw_simulator.BucketSimulator method*), 100
[get_file_info_by_name\(\)](#) (*b2sdk.raw_simulator.RawSimulator method*), 102
[get_file_info_by_name\(\)](#) (*b2sdk.session.B2Session method*), 52
[get_file_mtime\(\)](#) (*in module b2sdk.utils*), 62
[get_minimum_part_size\(\)](#) (*b2sdk.v1.AbstractAccountInfo method*), 28
[get_policy\(\)](#) (*b2sdk.sync.policy_manager.SyncPolicyManager method*), 86
[get_policy_class\(\)](#) (*b2sdk.sync.policy_manager.SyncPolicyManager method*), 86
[get_recommended_part_size\(\)](#) (*b2sdk.v1.AbstractAccountInfo method*), 28
[get_s3_api_url\(\)](#) (*b2sdk.v1.AbstractAccountInfo method*), 28
[get_setting_for_download\(\)](#) (*b2sdk.v1.AbstractSyncEncryptionSettingsProvider method*), 46
[get_setting_for_upload\(\)](#) (*b2sdk.v1.AbstractSyncEncryptionSettingsProvider method*), 46
[get_source_setting_for_copy\(\)](#) (*b2sdk.v1.AbstractSyncEncryptionSettingsProvider method*), 46
[get_upload_part_url\(\)](#) (*b2sdk.raw_api.AbstractRawApi method*), 54
[get_upload_part_url\(\)](#) (*b2sdk.raw_api.B2RawApi method*), 56
[get_upload_part_url\(\)](#) (*b2sdk.raw_simulator.BucketSimulator method*), 100
[get_upload_part_url\(\)](#) (*b2sdk.raw_simulator.RawSimulator method*), 102
[get_upload_part_url\(\)](#) (*b2sdk.session.B2Session method*), 52
[get_upload_url\(\)](#) (*b2sdk.raw_api.AbstractRawApi method*), 54
[get_upload_url\(\)](#) (*b2sdk.raw_api.B2RawApi method*), 56
[get_upload_url\(\)](#) (*b2sdk.raw_simulator.BucketSimulator method*), 100
[get_upload_url\(\)](#) (*b2sdk.raw_simulator.RawSimulator method*), 102
[get_upload_url\(\)](#) (*b2sdk.session.B2Session method*), 52
GOVERNANCE (*b2sdk.v1.RetentionMode attribute*), 35

H

[head_content\(\)](#) (*b2sdk.b2http.B2Http method*), 60
[headers](#) (*b2sdk.raw_simulator.FakeRequest attribute*), 99
[hex_md5_of_bytes\(\)](#) (*in module b2sdk.utils*), 62
[hex_shal_of_bytes\(\)](#) (*in module b2sdk.utils*), 62
[hex_shal_of_bytes\(\)](#) (*in module b2sdk.v1*), 47
[hex_shal_of_stream\(\)](#) (*in module b2sdk.utils*), 62
[hex_shal_of_stream\(\)](#) (*in module b2sdk.v1*), 47
[hex_shal_of_unlimited_stream\(\)](#) (*in module b2sdk.v1*), 47
[hide_file\(\)](#) (*b2sdk.raw_api.AbstractRawApi method*), 54
[hide_file\(\)](#) (*b2sdk.raw_api.B2RawApi method*), 56
[hide_file\(\)](#) (*b2sdk.raw_simulator.BucketSimulator method*), 100
[hide_file\(\)](#) (*b2sdk.raw_simulator.RawSimulator method*), 102
[hide_file\(\)](#) (*b2sdk.session.B2Session method*), 52
[HttpCallback](#) (*class in b2sdk.b2http*), 58
[id_](#) (*b2sdk.sync.file.FileVersion attribute*), 78
[id_](#) (*b2sdk.v1.FileVersionInfo attribute*), 36
[id_\(\)](#) (*b2sdk.sync.file.B2FileVersion property*), 78
[IncompleteSync](#), 76
[InMemoryAccountInfo](#) (*class in b2sdk.v1*), 27

InMemoryCache (class in b2sdk.cache), 64
 InMemoryCache (class in b2sdk.v1), 30
 IntegerRange (class in b2sdk.sync.scan_policies), 87
 interruptible_get_result() (in module b2sdk.utils), 61
 InvalidArgument, 76
 is_allowed_to_read_bucket_encryption_setting() (b2sdk.raw_simulator.BucketSimulator method), 100
 is_allowed_to_read_bucket_retention() (b2sdk.raw_simulator.BucketSimulator method), 100
 is_allowed_to_read_file_legal_hold() (b2sdk.raw_simulator.FileSimulator method), 99
 is_allowed_to_read_file_retention() (b2sdk.raw_simulator.FileSimulator method), 99
 is_copy() (b2sdk.transfer.outbound.upload_source.AbstractUploadSource method), 96
 is_copy() (b2sdk.v1.OutboundTransferSource method), 49
 is_copy() (b2sdk.v1.WriteIntent method), 48
 is_file_readable() (in module b2sdk.utils), 62
 is_off() (b2sdk.v1.LegalHold method), 35
 is_on() (b2sdk.v1.LegalHold method), 35
 is_shal_known() (b2sdk.transfer.outbound.upload_source.AbstractUploadSource method), 96
 is_shal_known() (b2sdk.transfer.outbound.upload_source.UploadSourceBytes method), 97
 is_shal_known() (b2sdk.transfer.outbound.upload_source.UploadSourceLocalFile method), 97
 is_shal_known() (b2sdk.transfer.outbound.upload_source.UploadSourceStream method), 97
 is_suitable() (b2sdk.transfer.inbound.downloader.abstract.AbstractDownloader method), 91
 is_suitable() (b2sdk.transfer.inbound.downloader.parallel.ParallelDownloader method), 92
 is_suitable() (b2sdk.transfer.inbound.downloader.simple.SimpleDownloader method), 95
 is_unknown() (b2sdk.v1.LegalHold method), 35
 is_upload() (b2sdk.transfer.outbound.upload_source.AbstractUploadSource method), 96
 is_upload() (b2sdk.v1.OutboundTransferSource method), 49
 is_upload() (b2sdk.v1.WriteIntent method), 48
 is_visible() (b2sdk.raw_simulator.FileSimulator method), 99
 iter_content() (b2sdk.raw_simulator.FakeResponse method), 99

J

join_b2_path() (in module b2sdk.sync.folder), 79

K

KEEP_BEFORE_DELETE (b2sdk.sync.sync.KeepOrDeleteMode attribute), 89
 KEEP_BEFORE_DELETE (b2sdk.v1.KeepOrDeleteMode attribute), 38
 KeepOrDeleteMode (class in b2sdk.sync.sync), 89
 KeepOrDeleteMode (class in b2sdk.v1), 38
 KeySimulator (class in b2sdk.raw_simulator), 98
 KNOWN_UNITS (b2sdk.v1.RetentionPeriod attribute), 35

L

LARGE_FILE_UPLOAD_POOL_CLASS (b2sdk.v1.UrlPoolAccountInfo attribute), 29
 latest_version() (b2sdk.sync.file.B2File method), 78
 latest_version() (b2sdk.sync.file.File method), 77
 legal_hold (b2sdk.v1.FileVersionInfo attribute), 37
 LegalHold (class in b2sdk.v1), 35
 length() (b2sdk.v1.WriteIntent property), 48
 list_buckets() (b2sdk.raw_api.AbstractRawApi method), 54
 list_buckets() (b2sdk.raw_api.B2RawApi method), 56
 list_buckets() (b2sdk.raw_simulator.RawSimulator method), 102
 list_buckets() (b2sdk.session.B2Session method), 52
 list_file_names() (b2sdk.raw_api.AbstractRawApi method), 54
 list_file_names() (b2sdk.raw_api.B2RawApi method), 56
 list_file_names() (b2sdk.raw_simulator.BucketSimulator method), 100
 list_file_names() (b2sdk.raw_simulator.RawSimulator method), 102
 list_file_names() (b2sdk.session.B2Session method), 52
 list_file_versions() (b2sdk.raw_api.AbstractRawApi method), 55
 list_file_versions() (b2sdk.raw_api.B2RawApi method), 56
 list_file_versions() (b2sdk.raw_simulator.BucketSimulator method), 100
 list_file_versions() (b2sdk.raw_simulator.RawSimulator method), 102

`list_file_versions()` (*b2sdk.session.B2Session method*), 52
`list_keys()` (*b2sdk.raw_api.AbstractRawApi method*), 55
`list_keys()` (*b2sdk.raw_api.B2RawApi method*), 56
`list_keys()` (*b2sdk.raw_simulator.RawSimulator method*), 102
`list_keys()` (*b2sdk.session.B2Session method*), 52
`list_parts()` (*b2sdk.raw_api.AbstractRawApi method*), 55
`list_parts()` (*b2sdk.raw_api.B2RawApi method*), 56
`list_parts()` (*b2sdk.raw_simulator.BucketSimulator method*), 100
`list_parts()` (*b2sdk.raw_simulator.FileSimulator method*), 99
`list_parts()` (*b2sdk.raw_simulator.RawSimulator method*), 102
`list_parts()` (*b2sdk.session.B2Session method*), 53
`list_unfinished_large_files()` (*b2sdk.raw_api.AbstractRawApi method*), 55
`list_unfinished_large_files()` (*b2sdk.raw_api.B2RawApi method*), 56
`list_unfinished_large_files()` (*b2sdk.raw_simulator.BucketSimulator method*), 100
`list_unfinished_large_files()` (*b2sdk.raw_simulator.RawSimulator method*), 102
`list_unfinished_large_files()` (*b2sdk.session.B2Session method*), 53
`local_access_error()` (*b2sdk.v1.SyncReport method*), 45
`local_done()` (*b2sdk.v1.SyncReport property*), 45
`local_file_count()` (*b2sdk.v1.SyncReport property*), 45
`local_permission_error()` (*b2sdk.v1.SyncReport method*), 45
`LocalDeleteAction` (class in *b2sdk.sync.action*), 75
`LocalFolder` (class in *b2sdk.sync.folder*), 79
`LS_ENTRY_TEMPLATE` (*b2sdk.v1.FileVersionInfo attribute*), 36

M

`make_b2_delete_actions()` (in module *b2sdk.sync.policy*), 85
`make_b2_delete_note()` (in module *b2sdk.sync.policy*), 85
`make_b2_keep_days_actions()` (in module *b2sdk.sync.policy*), 85
`make_file_context()` (*b2sdk.download_dest.AbstractDownloadDestination method*), 65
`make_file_context()` (*b2sdk.download_dest.DownloadDestBytes method*), 66
`make_file_context()` (*b2sdk.download_dest.DownloadDestLocalFile method*), 65
`make_file_context()` (*b2sdk.download_dest.DownloadDestProgressWrapper method*), 66
`make_file_context()` (*b2sdk.v1.AbstractDownloadDestination method*), 49
`make_file_sync_actions()` (*b2sdk.sync.sync.Synchronizer method*), 91
`make_folder_sync_actions()` (*b2sdk.sync.sync.Synchronizer method*), 90
`make_folder_sync_actions()` (*b2sdk.v1.Synchronizer method*), 44
`make_full_path()` (*b2sdk.sync.folder.AbstractFolder method*), 79
`make_full_path()` (*b2sdk.sync.folder.B2Folder method*), 80
`make_full_path()` (*b2sdk.sync.folder.LocalFolder method*), 80
`make_progress_listener()` (in module *b2sdk.v1*), 39
master application key, 23
`matches()` (*b2sdk.sync.scan_policies.RegexSet method*), 87
`MAX_CHUNK_SIZE` (*b2sdk.transfer.inbound.download_manager.Download attribute*), 95
`MAX_DURATION_IN_SECONDS` (*b2sdk.raw_simulator.RawSimulator attribute*), 101
`md5_of_bytes()` (in module *b2sdk.utils*), 62
`MetadataDirectiveMode` (class in *b2sdk.raw_api*), 53
`MetadataDirectiveMode` (class in *b2sdk.v1*), 38
`MIN_CHUNK_SIZE` (*b2sdk.transfer.inbound.download_manager.Download attribute*), 95
`MIN_PART_SIZE` (*b2sdk.raw_simulator.RawSimulator attribute*), 101
`mod_time` (*b2sdk.sync.file.FileVersion attribute*), 78
`mod_time()` (*b2sdk.sync.file.B2FileVersion property*), 78
`MODE` (*b2sdk.download_dest.DownloadDestLocalFile attribute*), 65
`MODE` (*b2sdk.download_dest.PreSeekedDownloadDest attribute*), 66
`MODTIME` (*b2sdk.sync.policy.CompareVersionMode attribute*), 81
`MODTIME` (*b2sdk.v1.CompareVersionMode attribute*), 38

module

b2sdk.b2http, 58
 b2sdk.cache, 64
 b2sdk.download_dest, 65
 b2sdk.encryption.types, 51
 b2sdk.raw_api, 53
 b2sdk.raw_simulator, 98
 b2sdk.session, 51
 b2sdk.stream.chained, 67
 b2sdk.stream.hashing, 68
 b2sdk.stream.progress, 69
 b2sdk.stream.range, 70
 b2sdk.stream.wrapper, 70
 b2sdk.sync.action, 72
 b2sdk.sync.exception, 76
 b2sdk.sync.file, 77
 b2sdk.sync.folder, 79
 b2sdk.sync.folder_parser, 81
 b2sdk.sync.policy, 81
 b2sdk.sync.policy_manager, 86
 b2sdk.sync.scan_policies, 87
 b2sdk.sync.sync, 88
 b2sdk.transfer.inbound.download_manager, 95
 b2sdk.transfer.inbound.downloader.abstract, 91
 b2sdk.transfer.inbound.downloader.parallel, 92
 b2sdk.transfer.inbound.downloader.range, 94
 b2sdk.transfer.inbound.downloader.simple, 95
 b2sdk.transfer.inbound.file_metadata, 96
 b2sdk.transfer.outbound.upload_source, 96
 b2sdk.utils, 61
 b2sdk.v1.exception, 31

N

name (*b2sdk.sync.file.B2File attribute*), 78
 name (*b2sdk.sync.file.File attribute*), 77
 name (*b2sdk.sync.file.FileVersion attribute*), 78
 name () (*b2sdk.sync.file.B2FileVersion property*), 78
 NewerFileSyncMode (*class in b2sdk.sync.policy*), 81
 NewerFileSyncMode (*class in b2sdk.v1*), 38
 next_or_none () (*in module b2sdk.sync.sync*), 88
 NO_DELETE (*b2sdk.sync.sync.KeepOrDeleteMode attribute*), 89
 NO_DELETE (*b2sdk.v1.KeepOrDeleteMode attribute*), 38
 NO_RETENTION_BUCKET_SETTING (*in module b2sdk.v1*), 36

NO_RETENTION_FILE_SETTING (*in module b2sdk.v1*), 36
 non-master application key, 23
 NONE (*b2sdk.encryption.types.EncryptionMode attribute*), 51
 NONE (*b2sdk.sync.policy.CompareVersionMode attribute*), 81
 NONE (*b2sdk.v1.CompareVersionMode attribute*), 38
 NONE (*b2sdk.v1.RetentionMode attribute*), 35
 NonHashingDownloaderThread (*class in b2sdk.transfer.inbound.downloader.parallel*), 94

NotADirectory, 77

O

OFF (*b2sdk.v1.LegalHold attribute*), 35
 ON (*b2sdk.v1.LegalHold attribute*), 35
 open () (*b2sdk.transfer.outbound.upload_source.AbstractUploadSource method*), 96
 open () (*b2sdk.transfer.outbound.upload_source.UploadSourceBytes method*), 97
 open () (*b2sdk.transfer.outbound.upload_source.UploadSourceLocalFile method*), 97
 open () (*b2sdk.transfer.outbound.upload_source.UploadSourceLocalFileK method*), 97
 open () (*b2sdk.transfer.outbound.upload_source.UploadSourceStream method*), 97
 open () (*b2sdk.transfer.outbound.upload_source.UploadSourceStreamRange method*), 98
 OutboundTransferSource (*class in b2sdk.v1*), 48

P

ParallelDownloader (*class in b2sdk.transfer.inbound.downloader.parallel*), 92
 parse_sync_folder () (*in module b2sdk.sync.folder_parser*), 81
 Part (*class in b2sdk.v1*), 37
 PartSimulator (*class in b2sdk.raw_simulator*), 98
 PartToDownload (*class in b2sdk.transfer.inbound.downloader.parallel*), 94
 post_content_return_json () (*b2sdk.b2http.B2Http method*), 59
 post_json_return_json () (*b2sdk.b2http.B2Http method*), 60
 post_request () (*b2sdk.b2http.ClockSkewHook method*), 59
 post_request () (*b2sdk.b2http.HttpCallback method*), 58
 pre_request () (*b2sdk.b2http.HttpCallback method*), 58
 PreSeekedDownloadDest (*class in b2sdk.download_dest*), 65

PreSeekedDownloadDest (class in b2sdk.v1), 49
 print_completion() (b2sdk.v1.SyncReport method), 44
 ProgressListenerForTest (class in b2sdk.v1), 39
 put() (b2sdk.account_info.upload_url_pool.UploadUrlPool method), 29

R

RAISE_ERROR (b2sdk.sync.policy.NewerFileSyncMode attribute), 81
 RAISE_ERROR (b2sdk.v1.NewerFileSyncMode attribute), 38
 Range (class in b2sdk.transfer.inbound.downloader.range), 94
 RangeOfInputStream (class in b2sdk.stream.range), 70
 RawSimulator (class in b2sdk.raw_simulator), 101
 read() (b2sdk.stream.chained.ChainedStream method), 67
 read() (b2sdk.stream.hashing.StreamWithHash method), 68
 read() (b2sdk.stream.progress.ReadingStreamWithProgress method), 69
 read() (b2sdk.stream.range.RangeOfInputStream method), 70
 read() (b2sdk.stream.wrapper.StreamWrapper method), 71
 readable() (b2sdk.stream.chained.ChainedStream method), 67
 readable() (b2sdk.stream.wrapper.StreamWrapper method), 71
 ReadingStreamWithProgress (class in b2sdk.stream.progress), 69
 RegexSet (class in b2sdk.sync.scan_policies), 87
 REPLACE (b2sdk.raw_api.MetadataDirectiveMode attribute), 53
 REPLACE (b2sdk.sync.policy.NewerFileSyncMode attribute), 81
 REPLACE (b2sdk.v1.MetadataDirectiveMode attribute), 38
 REPLACE (b2sdk.v1.NewerFileSyncMode attribute), 38
 request() (b2sdk.raw_simulator.FakeResponse property), 99
 RESPONSE_CLASS (b2sdk.raw_simulator.BucketSimulator attribute), 100
 ResponseContextManager (class in b2sdk.b2http), 58
 RetentionMode (class in b2sdk.v1), 35
 RetentionPeriod (class in b2sdk.v1), 35
 RFC
 RFC 822, 37
 run() (b2sdk.sync.action.AbstractAction method), 72
 run() (b2sdk.transfer.inbound.downloader.parallel.AbstractDownloader method), 93

S

run() (b2sdk.transfer.inbound.downloader.parallel.FirstPartDownloader method), 94
 run() (b2sdk.transfer.inbound.downloader.parallel.NonHashingDownloader method), 94
 run() (b2sdk.transfer.inbound.downloader.parallel.WriterThread method), 93
 S3_API_URL (b2sdk.raw_simulator.RawSimulator attribute), 101
 save_bucket() (b2sdk.cache.AbstractCache method), 64
 save_bucket() (b2sdk.cache.AuthInfoCache method), 64
 save_bucket() (b2sdk.cache.DummyCache method), 64
 save_bucket() (b2sdk.cache.InMemoryCache method), 64
 save_bucket() (b2sdk.v1.AuthInfoCache method), 30
 save_bucket() (b2sdk.v1.DummyCache method), 30
 save_bucket() (b2sdk.v1.InMemoryCache method), 30
 ScanPoliciesManager (class in b2sdk.sync.scan_policies), 87
 ScanPoliciesManager (class in b2sdk.v1), 43
 seek() (b2sdk.stream.chained.ChainedStream method), 67
 seek() (b2sdk.stream.hashing.StreamWithHash method), 68
 seek() (b2sdk.stream.progress.ReadingStreamWithProgress method), 69
 seek() (b2sdk.stream.range.RangeOfInputStream method), 70
 seek() (b2sdk.stream.wrapper.StreamWrapper method), 70
 seekable() (b2sdk.stream.chained.ChainedStream method), 67
 seekable() (b2sdk.stream.wrapper.StreamWrapper method), 70
 server_side_encryption (b2sdk.v1.FileVersionInfo attribute), 37
 ServerDefaultSyncEncryptionSettingsProvider (class in b2sdk.v1), 46
 SESSION_CLASS (b2sdk.v1.B2Api attribute), 31
 set_bucket_name_cache() (b2sdk.cache.AbstractCache method), 64
 set_bucket_name_cache() (b2sdk.cache.AuthInfoCache method), 64
 set_bucket_name_cache() (b2sdk.cache.DummyCache method), 64
 set_bucket_name_cache() (b2sdk.cache.InMemoryCache method), 64

set_bucket_name_cache() (b2sdk.v1.AuthInfoCache method), 30
 set_bucket_name_cache() (b2sdk.v1.DummyCache method), 30
 set_bucket_name_cache() (b2sdk.v1.InMemoryCache method), 30
 set_file_mtime() (in module b2sdk.utils), 62
 set_total_bytes() (b2sdk.v1.AbstractProgressListener method), 38
 set_upload_errors() (b2sdk.raw_simulator.RawSimulator method), 101
 should_exclude_directory() (b2sdk.sync.scan_policies.ScanPoliciesManager method), 88
 should_exclude_file() (b2sdk.sync.scan_policies.ScanPoliciesManager method), 88
 should_exclude_file_version() (b2sdk.sync.scan_policies.ScanPoliciesManager method), 88
 SimpleDownloader (class in b2sdk.transfer.inbound.downloader.simple), 95
 SimpleProgressListener (class in b2sdk.v1), 39
 size (b2sdk.sync.file.FileVersion attribute), 78
 SIZE (b2sdk.sync.policy.CompareVersionMode attribute), 81
 SIZE (b2sdk.v1.CompareVersionMode attribute), 38
 size (b2sdk.v1.FileVersionInfo attribute), 36
 size() (b2sdk.sync.file.B2FileVersion property), 78
 size() (b2sdk.transfer.inbound.downloader.range.Range method), 95
 SKIP (b2sdk.sync.policy.NewerFileSyncMode attribute), 81
 SKIP (b2sdk.v1.NewerFileSyncMode attribute), 38
 sort_key() (b2sdk.raw_simulator.FileSimulator method), 99
 SOURCE_PREFIX (b2sdk.sync.policy.AbstractFileSyncPolicy attribute), 82
 SOURCE_PREFIX (b2sdk.sync.policy.CopyPolicy attribute), 84
 SOURCE_PREFIX (b2sdk.sync.policy.DownPolicy attribute), 83
 SOURCE_PREFIX (b2sdk.sync.policy.UpPolicy attribute), 83
 SQLITE_ACCOUNT_INFO_CLASS (b2sdk.session.B2Session attribute), 51
 SqliteAccountInfo (class in b2sdk.v1), 27
 SSE_B2 (b2sdk.encryption.types.EncryptionMode attribute), 51
 SSE_B2_AES (b2sdk.v1 attribute), 50
 SSE_C (b2sdk.encryption.types.EncryptionMode attribute), 51
 SSE_NONE (b2sdk.v1 attribute), 50
 start_large_file() (b2sdk.raw_api.AbstractRawApi method), 55
 start_large_file() (b2sdk.raw_api.B2RawApi method), 56
 start_large_file() (b2sdk.raw_simulator.BucketSimulator method), 101
 start_large_file() (b2sdk.raw_simulator.RawSimulator method), 102
 start_large_file() (b2sdk.session.B2Session method), 53
 start_large_file() (b2sdk.v1.Bucket method), 32
 stream() (b2sdk.stream.chained.ChainedStream property), 67
 StreamOpener (class in b2sdk.stream.chained), 68
 StreamWithHash (class in b2sdk.stream.hashing), 68
 StreamWithLengthWrapper (class in b2sdk.stream.wrapper), 71
 StreamWrapper (class in b2sdk.stream.wrapper), 70
 subrange() (b2sdk.transfer.inbound.downloader.range.Range method), 95
 symlink_skipped() (b2sdk.v1.SyncReport method), 45
 sync_folders() (b2sdk.sync.sync.Synchronizer method), 90
 Synchronizer (class in b2sdk.sync.sync), 89
 Synchronizer (class in b2sdk.v1), 43
 SyncPolicyManager (class in b2sdk.sync.policy_manager), 86
 SyncReport (class in b2sdk.v1), 44

T

take() (b2sdk.account_info.upload_url_pool.UploadUrlPool method), 29
 tell() (b2sdk.stream.chained.ChainedStream method), 67
 tell() (b2sdk.stream.range.RangeOfInputStream method), 70
 tell() (b2sdk.stream.wrapper.StreamWrapper method), 71
 TempDir (class in b2sdk.utils), 62
 TempDir (class in b2sdk.v1), 47
 test_http() (in module b2sdk.b2http), 61
 test_raw_api() (in module b2sdk.raw_api), 58
 test_raw_api_helper() (in module b2sdk.raw_api), 58
 TIMEOUT (b2sdk.b2http.B2Http attribute), 59
 TokenType (class in b2sdk.session), 51
 TqdmProgressListener (class in b2sdk.v1), 39
 truncate() (b2sdk.stream.wrapper.StreamWrapper method), 71

U

- UnableToCreateDirectory, 77
- UnfinishedLargeFile (class in *b2sdk.v1*), 37
- UNKNOWN (*b2sdk.encryption.types.EncryptionMode* attribute), 51
- UNKNOWN (*b2sdk.v1.LegalHold* attribute), 35
- UNKNOWN (*b2sdk.v1.RetentionMode* attribute), 35
- UNKNOWN_BUCKET_RETENTION (in module *b2sdk.v1*), 36
- UNKNOWN_FILE_LOCK_CONFIGURATION (in module *b2sdk.v1*), 36
- UNKNOWN_FILE_RETENTION_SETTING (in module *b2sdk.v1*), 36
- unprintable_to_hex() (*b2sdk.raw_api.B2RawApi* method), 57
- UNSET (*b2sdk.v1.LegalHold* attribute), 35
- UnSyncableFilename, 76
- UNVERIFIED_CHECKSUM_PREFIX (*b2sdk.transfer.inbound.file_metadata.FileMetadata* attribute), 96
- UpAndDeletePolicy (class in *b2sdk.sync.policy*), 83
- UpAndKeepDaysPolicy (class in *b2sdk.sync.policy*), 83
- update_bucket() (*b2sdk.raw_api.AbstractRawApi* method), 55
- update_bucket() (*b2sdk.raw_api.B2RawApi* method), 57
- update_bucket() (*b2sdk.raw_simulator.RawSimulator* method), 103
- update_bucket() (*b2sdk.session.B2Session* method), 53
- update_compare() (*b2sdk.v1.SyncReport* method), 45
- update_file_legal_hold() (*b2sdk.raw_api.B2RawApi* method), 57
- update_file_legal_hold() (*b2sdk.raw_simulator.BucketSimulator* method), 100
- update_file_legal_hold() (*b2sdk.raw_simulator.RawSimulator* method), 102
- update_file_legal_hold() (*b2sdk.session.B2Session* method), 53
- update_file_retention() (*b2sdk.raw_api.AbstractRawApi* method), 55
- update_file_retention() (*b2sdk.raw_api.B2RawApi* method), 57
- update_file_retention() (*b2sdk.raw_simulator.BucketSimulator* method), 100
- update_file_retention() (*b2sdk.raw_simulator.RawSimulator* method), 102
- update_file_retention() (*b2sdk.session.B2Session* method), 53
- UPDATE_INTERVAL (*b2sdk.v1.SyncReport* attribute), 44
- update_local() (*b2sdk.v1.SyncReport* method), 45
- update_total() (*b2sdk.v1.SyncReport* method), 45
- update_transfer() (*b2sdk.v1.SyncReport* method), 45
- upload_file() (*b2sdk.raw_api.AbstractRawApi* method), 55
- upload_file() (*b2sdk.raw_api.B2RawApi* method), 57
- upload_file() (*b2sdk.raw_simulator.BucketSimulator* method), 101
- upload_file() (*b2sdk.raw_simulator.RawSimulator* method), 103
- upload_file() (*b2sdk.session.B2Session* method), 53
- UPLOAD_PART (*b2sdk.session.TokenType* attribute), 51
- upload_part() (*b2sdk.raw_api.AbstractRawApi* method), 55
- upload_part() (*b2sdk.raw_api.B2RawApi* method), 57
- upload_part() (*b2sdk.raw_simulator.BucketSimulator* method), 101
- upload_part() (*b2sdk.raw_simulator.RawSimulator* method), 103
- upload_part() (*b2sdk.session.B2Session* method), 53
- UPLOAD_PART_MATCHER (*b2sdk.raw_simulator.RawSimulator* attribute), 101
- UPLOAD_SMALL (*b2sdk.session.TokenType* attribute), 51
- upload_timestamp (*b2sdk.v1.FileVersionInfo* attribute), 36
- UPLOAD_URL_MATCHER (*b2sdk.raw_simulator.RawSimulator* attribute), 101
- UploadSourceBytes (class in *b2sdk.transfer.outbound.upload_source*), 96
- UploadSourceLocalFile (class in *b2sdk.transfer.outbound.upload_source*), 97
- UploadSourceLocalFileRange (class in *b2sdk.transfer.outbound.upload_source*), 97
- UploadSourceStream (class in *b2sdk.transfer.outbound.upload_source*), 97
- UploadSourceStreamRange (class in *b2sdk.transfer.outbound.upload_source*), 97

UploadUrlPool (class in *b2sdk.account_info.upload_url_pool*), 29
UpPolicy (class in *b2sdk.sync.policy*), 83
url (*b2sdk.raw_simulator.FakeRequest* attribute), 99
UrlPoolAccountInfo (class in *b2sdk.v1*), 29

V

validate_b2_file_name() (in module *b2sdk.utils*), 62
versions (*b2sdk.sync.file.B2File* attribute), 78
versions (*b2sdk.sync.file.File* attribute), 77

W

wrap_sources_iterator() (*b2sdk.v1.WriteIntent* class method), 48
wrap_with_range() (in module *b2sdk.stream.range*), 70
writable() (*b2sdk.stream.wrapper.StreamWrapper* method), 71
write() (*b2sdk.stream.progress.WritingStreamWithProgress* method), 69
write() (*b2sdk.stream.wrapper.StreamWrapper* method), 71
write_file_and_report_progress_context() (*b2sdk.download_dest.DownloadDestProgressWrapper* method), 67
write_to_local_file_context() (*b2sdk.download_dest.DownloadDestLocalFile* method), 65
write_to_local_file_context() (*b2sdk.download_dest.PreSeekedDownloadDest* method), 66
WriteIntent (class in *b2sdk.v1*), 48
WriterThread (class in *b2sdk.transfer.inbound.downloader.parallel*), 92
WritingStreamWithProgress (class in *b2sdk.stream.progress*), 69

Z

zip_folders() (in module *b2sdk.sync.sync*), 88