
sphobjinv

Release 2.1

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A toolkit for inspection/manipulation of Sphinx objects inventories

When documentation is built using, e.g., Sphinx’s `StandaloneHTMLBuilder`, an inventory of the named objects in the documentation set is **dumped** to a file called `objects.inv` in the `html` build directory. (One common location is, `doc/build/html`, though the exact location will vary depending on the details of how Sphinx is configured.) This file is read by `intersphinx` when generating links in other documentation.

Since version 1.0 of Sphinx (~July 2010), the data in these `objects.inv` inventories is compressed by `zlib` (presumably to reduce storage requirements and improve download speeds; “version 2”), whereas prior to that date the data was left uncompressed (“version 1”). This compression renders the files non-human-readable. **It is the purpose of this package to enable quick and simple compression/decompression and inspection of these “version 2” inventory files.**

In particular, was developed to satisfy two primary use cases:

1. Searching and inspection of `objects.inv` contents in order to identify how to properly construct `intersphinx` references.
2. Assembly of new `objects.inv` files in order to allow `intersphinx` cross-referencing of other documentation sets that were not created by Sphinx.

For more background on the mechanics of the Sphinx data model and Sphinx cross-references generally, see [this talk](#) from PyOhio 2019.

Install via pip:

```
$ pip install sphobjinv
```

Alternatively, is packaged with [multiple POSIX distributions](#), including:

- Alpine Linux: `py3-sphobjinv` ([info](#))
- Arch Linux: `python-sphobjinv` ([info](#))
- Fedora: `python-sphobjinv` ([info](#))
- Gentoo GURU: `dev-python/sphobjinv` ([info](#))
- Manjaro: `python-sphobjinv`
- OpenEuler: `python-sphobjinv`
- openSUSE: `python-sphobjinv` ([info](#))
- Parabola: `python-sphobjinv` ([info](#))
- pkgsrc: `textproc/py-sphobjinv` ([info](#))

The package is configured for use both as a *command-line script* and as a *Python package*.

Installing the optional dependency `python-Levenshtein` substantially accelerates the the “suggest” functionality; see [here](#) for more information.

The project source repository is on GitHub: [bskinn/sphobjinv](#).

COMMAND-LINE USAGE

The CLI for is implemented using two subparsers, one each for the *convert* and *suggest* sub-functions. More information about the implementation of these features can be found [here](#) and in the documentation for the *Inventory* object, in particular the *data_file()* and *suggest()* methods.

Some notes on these CLI docs:

- CLI examples are executed in a sandboxed directory pre-loaded with *objects_attrs.inv* (from, e.g., [here](#)).
- *Path* (from *pathlib*) is imported into the namespace before all tests.
- *cli_run* is a helper function that enables doctesting of CLI examples by mimicking execution of a shell command. It is described in more detail [here](#).
- *file_head* is a helper function that retrieves the head of a specified file.

The options for the parent command are:

-h, --help
Show help message and exit

```
usage: sphobjinv [-h] [-v] {convert,suggest} ...

Format conversion for and introspection of intersphinx 'objects.inv' files.

optional arguments:
  -h, --help            show this help message and exit
  -v, --version          Print package version & other info

Subcommands:
  {convert,suggest}      Execution mode. Type 'sphobjinv [mode] -h' for more
                           information on available options. Mode names can be
                           abbreviated to their first two letters.
  convert (co)           Convert intersphinx inventory to zlib-compressed,
                           plaintext, or JSON formats.
  suggest (su)           Fuzzy-search intersphinx inventory for desired object(s).
```

-v, --version
Print package version & other info

```
sphobjinv v2.1

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Bug reports & feature requests: https://github.com/bskinn/sphobjinv
Documentation: https://sphobjinv.readthedocs.io
```

1.1 Command-Line Usage: “convert” Mode

The convert subparser is used for all conversions of “version 2” Sphinx inventory files among plaintext, zlib-compressed, and (unique to) JSON formats. The CLI can read and write inventory data from local files in any of these three formats, as well as read the standard zlib-compressed format from files in remote locations (see `--url`).

As of v2.1, the CLI can also read/write inventories at `stdin/stdout` in the plaintext and JSON formats; see *below*.

Basic file conversion to the default output filename is straightforward:

```
>>> Path('objects_attrs.txt').is_file()
False
>>> cli_run('sphobjinv convert plain objects_attrs.inv')

Conversion completed.
'...objects_attrs.inv' converted to '...objects_attrs.txt' (plain).

>>> print(file_head('objects_attrs.txt', head=6))
# Sphinx inventory version 2
# Project: attrs
# Version: 17.2
# The remainder of this file is compressed using zlib.
attr.Attribute py:class 1 api.html#$ -
attr.Factory py:class 1 api.html#$ -
```

A different target filename can be specified, to avoid overwriting an existing file:

```
>>> cli_run('sphobjinv convert plain objects_attrs.inv', inp='n\n')
File exists. Overwrite (Y/N)? n

Exiting...

>>> cli_run('sphobjinv convert plain objects_attrs.inv objects_attrs_foo.txt')

Conversion completed.
'...objects_attrs.inv' converted to '...objects_attrs_foo.txt' (plain).
```

If you don’t provide an output file extension, the defaults (*.inv/.txt/.json*) will be used.

If you want to pull an input file directly from the internet, use `--url` (note that the base filename is **not** inferred from the indicated URL):

```
>>> cli_run('sphobjinv convert plain -u https://github.com/bskinn/sphobjinv/raw/
↪master/tests/resource/objects_attrs.inv')

Remote inventory found.

Conversion completed.
'https://github.com/b[...]ce/objects_attrs.inv' converted to '...objects.txt' (plain).

>>> print(file_head('objects.txt', head=6))
# Sphinx inventory version 2
```

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```
# Project: attrs
# Version: 17.2
# The remainder of this file is compressed using zlib.
attr.Attribute py:class 1 api.html#$ -
attr.Factory py:class 1 api.html#$ -
```

The URL provided **MUST** have the leading protocol specified (here, `https://`).

It is not necessary to locate the `objects.inv` file before running ; for most Sphinx documentation sets, if you provide a URL to any page in the docs, it will automatically find and use the correct `objects.inv`:

```
>>> cli_run('sphobjinv convert plain -ou https://docs.python.org/3/library/urllib.
↳error.html#urllib.error.URLError')

No inventory at provided URL.
Attempting "https://docs.python.org/3/library/urllib.error.html/objects.inv" ...
Attempting "https://docs.python.org/3/library/objects.inv" ...
Attempting "https://docs.python.org/3/objects.inv" ...
Remote inventory found.

Conversion completed.
'...objects.inv' converted to '...objects.txt' (plain).
```

only supports download of zlib-compressed `objects.inv` files by URL. Plaintext download by URL is unreliable, presumably due to encoding problems. If processing of JSON files by API URL is desirable, please [submit an issue](#).

New in version 2.1: The URL at which a remote inventory is found is now included in JSON output:

```
>>> cli_run('sphobjinv convert json -qu https://docs.python.org/3/ objects.json')

>>> data = json.loads(Path('objects.json').read_text())
>>> data["metadata"]["url"]
'https://docs.python.org/3/objects.inv'
```

New in version 2.1: JSON and plaintext inventories can now be read from `stdin` and written to `stdout`, by using the special value `-` in the invocation. E.g., to print to `stdout`:

```
>>> cli_run('sphobjinv co plain objects_attrs.inv -')
# Sphinx inventory version 2
# Project: attrs
# Version: 17.2
# The remainder of this file is compressed using zlib.
attr.Attribute py:class 1 api.html#$ -
attr.Factory py:class 1 api.html#$ -
attr.asdict py:function 1 api.html#$ -
...
```

Usage

```
$ sphobjinv convert --help
usage: sphobjinv convert [-h] [-e | -c] [-o] [-q] [-u]
                        {zlib,plain,json} infile [outfile]

Convert intersphinx inventory to zlib-compressed, plaintext, or JSON formats.
...
```

Positional Arguments

1.1. Command-Line Usage: “convert” Mode

mode

Conversion output format.

Must be one of *plain*, *zlib*, or *json*

infile

Path (or URL, if `--url` is specified) to file to be converted.

If passed as `-`, will attempt import of a plaintext or JSON inventory from `stdin` (incompatible with `--url`).

outfile

(*Optional*) Path to desired output file. Defaults to same directory and main file name as input file but with extension `.inv/.txt/.json`, as appropriate for the output format.

A bare path is accepted here, using the default output file name/extension.

If passed as `-`, or if omitted when *infile* is passed as `-`, will emit plaintext or JSON (but *not* *zlib*-compressed) inventory contents to `stdout`.

Flags**-h, --help**

Display *convert* help message and exit.

-o, --overwrite

If the output file already exists, overwrite without prompting for confirmation.

-q, --quiet

Suppress all status message output, regardless of success or failure. Useful for scripting/automation. Implies `--overwrite`.

-u, --url

Treat *infile* as a URL for download. Cannot be used when *infile* is passed as `-`.

-e, --expand

Expand any abbreviations in *uri* or *dispname* fields before writing to output; see [here](#). Cannot be specified with `--contract`.

-c, --contract

Contract *uri* and *dispname* fields, if possible, before writing to output; see [here](#). Cannot be specified with `--expand`.

1.2 Command-Line Usage: “suggest” Mode

The *suggest* subcommand is used to query an inventory for objects fuzzy-matching a given search string. Fuzzy-matching is carried out via the `fuzzywuzzy` library, against the Restructured Text-like representation of each object exposed by `SuperDataObj.as_rst`:

```
$ sphobjinv suggest objects_attrs.inv instance

:py:exception:`attr.exceptions.FrozenInstanceError`
:py:function:`attr.validators.instance_of`
```

The `fuzzywuzzy` match score and the index of the object within the inventory can be printed by passing the `--score` and `--index` options, respectively:

```
$ sphobjinv suggest objects_attrs.inv instance -s -i
```

Name	Score	Index
:py:exception:`attr.exceptions.FrozenInstanceError`	90	9
:py:function:`attr.validators.instance_of`	90	23

If too few or too many matches are returned, the reporting threshold can be changed via `--thresh:`

```
$ sphobjinv suggest objects_attrs.inv instance -s -i -t 48
```

Name	Score	Index
:py:exception:`attr.exceptions.FrozenInstanceError`	90	9
:py:function:`attr.validators.instance_of`	90	23
:std:doc:`license`	51	47
:py:function:`attr.filters.include`	48	13

Remote objects.inv files can be retrieved for inspection by passing the `--url` flag:

```
$ sphobjinv suggest https://github.com/bskinn/sphobjinv/raw/master/tests/resource/
↳objects_attrs.inv instance -u -t 48
```

Remote inventory found.

```
:py:exception:`attr.exceptions.FrozenInstanceError`
:py:function:`attr.validators.instance_of`
:std:doc:`license`
:py:function:`attr.filters.include`
```

The URL provided **MUST** have the leading protocol specified (here, `https://`).

It is usually not necessary to locate the objects.inv file before running ; for most Sphinx documentation sets, if you provide a URL to any page in the docs, it will automatically find and use the correct objects.inv:

```
$ sphobjinv suggest -u https://sphobjinv.readthedocs.io/en/v2.0rc1/cmdline.html_
↳compress
```

No inventory at provided URL.

Attempting "https://sphobjinv.readthedocs.io/en/v2.0rc1/cmdline.html/objects.inv" ...

Attempting "https://sphobjinv.readthedocs.io/en/v2.0rc1/objects.inv" ...

Remote inventory found.

```
:py:function:`sphobjinv.zlib.compress`
:py:function:`sphobjinv.zlib.decompress`
```

only supports download of zlib-compressed objects.inv files by URL. Plaintext download by URL is unreliable, presumably due to encoding problems. If download of JSON files by URL is desirable, please [submit an issue](#).

New in version 2.1: The CLI can now read JSON and plaintext inventories from `stdin` by passing the special `-` argument for *infile*:

```
$ sphobjinv suggest -s - valid < objects_attrs.txt
```

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Name	Score
-----	-----
:py:function:`attr.get_run_validators`	90
:py:function:`attr.set_run_validators`	90
:py:function:`attr.validate`	90
:py:function:`attr.validators.and_`	90
:py:function:`attr.validators.in_`	90
:std:label:`api_validators`	90
:std:label:`examples_validators`	90

Usage

```
$ sphobjinv suggest --help
usage: sphobjinv suggest [-h] [-a] [-i] [-s] [-t {0-100}] [-u] infile search

Fuzzy-search intersphinx inventory for desired object(s).

...
```

Positional Arguments

infile

Path (or URL, if `--url` is specified) to file to be searched.

If passed as `-`, will attempt import of a plaintext or JSON inventory from `stdin` (incompatible with `--url`).

search

Search term for `fuzzywuzzy` matching.

Flags

-h, --help

Display *suggest* help message and exit.

-a, --all

Display all search results without prompting, regardless of the number of hits. Otherwise, prompt if number of results exceeds `SUGGEST_CONFIRM_LENGTH`.

-i, --index

Display the index position within the `Inventory.objects` list for each search result returned.

-s, --score

Display the `fuzzywuzzy` match score for each search result returned.

-t, --thresh <#>

Change the `fuzzywuzzy` match quality threshold (0-100; higher values yield fewer results). Default is specified in `DEF_THRESH`.

-u, --url

Treat *infile* as a URL for download. Cannot be used when *infile* is passed as `-`.

API USAGE

In all of the below, the package has been imported as `soi`, and the working temp directory has been populated with the `objects_attrs.inv` inventory.

2.1 Inspecting an Inventory

Inspecting the contents of an existing inventory is handled entirely by the *Inventory* class:

```
>>> inv = soi.Inventory('objects_attrs.inv')
>>> print(inv)
<Inventory (fname_zlib): attrs v17.2, 56 objects>
>>> inv.version
'17.2'
>>> inv.count
56
```

The location of the inventory file to import can also be provided as a `pathlib.Path`, instead of as a string:

```
>>> soi.Inventory(Path('objects_attrs.inv')).project
'attrs'
```

The individual objects contained in the inventory are represented by instances of the *DataObjStr* class, which are stored in a *list* in the *objects* attribute:

```
>>> len(inv.objects)
56
>>> dobj = inv.objects[0]
>>> dobj
DataObjStr(name='attr.Attribute', domain='py', role='class', priority='1', uri='api.
↳html#$', dispname='-')
>>> dobj.name
'attr.Attribute'
>>> dobj.domain
'py'
>>> [d.name for d in inv.objects if 'validator' in d.uri]
['api_validators', 'examples_validators']
```

Inventory objects can also import from plaintext or zlib-compressed inventories, as *bytes*:

```
>>> inv2 = soi.Inventory(inv.data_file())
>>> print(inv2)
<Inventory (bytes_plain): attrs v17.2, 56 objects>
```

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```
>>> inv3 = soi.Inventory(soi.compress(inv.data_file()))
>>> print(inv3)
<Inventory (bytes_zlib): attrs v17.2, 56 objects>
```

Remote objects.inv files can also be retrieved via URL, with the *url* keyword argument:

```
>>> inv4 = soi.Inventory(url='https://github.com/bskinn/sphobjinv/raw/master/tests/
↳ resource/objects_attrs.inv')
>>> print(inv4)
<Inventory (url): attrs v17.2, 56 objects>
```

2.2 Comparing Inventories

Inventory instances compare equal when they have the same *project* and *version*, and when all the members of *objects* are identical between the two instances:

```
>>> inv = soi.Inventory("objects_attrs.inv")
>>> inv2 = soi.Inventory(inv.data_file())
>>> inv is inv2
False
>>> inv == inv2
True
>>> inv2.project = "foo"
>>> inv == inv2
False
```

Individual *DataObjStr* and (*DataObjBytes*) instances compare equal if all of *name*, *domain*, *role*, *priority*, *uri*, and *dispname* are equal:

```
>>> obj1 = inv.objects[0]
>>> obj2 = inv.objects[1]
>>> obj1 == obj1
True
>>> obj1 == obj2
False
>>> obj1 == obj1.evolve(name="foo")
False
```

Changed in version 2.1: Previously, *Inventory* instances would only compare equal to themselves, and comparison attempts on *SuperDataObj* subclass instances would raise *RecursionError*.

2.3 Modifying an Inventory

The *DataObjStr* instances can be edited in place:

```
>>> inv = soi.Inventory('objects_attrs.inv')
>>> inv.objects[0]
DataObjStr(name='attr.Attribute', domain='py', role='class', priority='1', uri='api.
↳ html#$', dispname='-')
>>> inv.objects[0].uri = 'attribute.html'
>>> inv.objects[0]
DataObjStr(name='attr.Attribute', domain='py', role='class', priority='1', uri=
↳ 'attribute.html', dispname='-')
```

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New instances can be easily created either by direct instantiation, or by `evolve()`:

```
>>> inv.objects.append(inv.objects[0].evolve(name='attr.Generator', uri='generator.
↳html'))
>>> inv.count
57
>>> inv.objects[-1]
DataObjStr(name='attr.Generator', domain='py', role='class', priority='1', uri=
↳'generator.html', dispname='-')
```

The other attributes of the *Inventory* instance can also be freely modified:

```
>>> inv.project = 'not_attrs'
>>> inv.version = '0.1'
>>> print(inv)
<Inventory (fname_zlib): not_attrs v0.1, 57 objects>
```

2.4 Formatting Inventory Contents

The contents of the *Inventory* can be converted to the plaintext objects.inv format as *bytes* via `data_file()`:

```
>>> inv = soi.Inventory('objects_attrs.inv')
>>> print(*inv.data_file().splitlines()[4:6], sep='\n')
b'# Sphinx inventory version 2'
b'# Project: attrs'
b'# Version: 17.2'
b'# The remainder of this file is compressed using zlib.'
b'attr.Attribute py:class 1 api.html#$ -'
b'attr.Factory py:class 1 api.html#$ -'
```

This method makes use of the *DataObjStr.data_line* method to format each of the object information lines.

If desired, the *shorthand* used for the *uri* and *dispname* fields can be expanded:

```
>>> print(*inv.data_file(expand=True).splitlines()[4:6], sep='\n')
b'attr.Attribute py:class 1 api.html#attr.Attribute attr.Attribute'
b'attr.Factory py:class 1 api.html#attr.Factory attr.Factory'
>>> do = inv.objects[0]
>>> do.data_line(expand=True)
'attr.Attribute py:class 1 api.html#attr.Attribute attr.Attribute'
```

2.5 Exporting an Inventory

Inventory instances can be written to disk in three formats: zlib-compressed objects.inv, plaintext objects.txt, and JSON. The API does not provide single-function means to do this, however.

To start, load the source objects.inv:

```
>>> from pathlib import Path
>>> inv = soi.Inventory('objects_attrs.inv')
```

To export plaintext:

```
>>> df = inv.data_file()
>>> soi.writebytes('objects_attrs.txt', df)
>>> print(*Path('objects_attrs.txt').read_text().splitlines()[:6], sep='\n')
# Sphinx inventory version 2
# Project: attrs
# Version: 17.2
# The remainder of this file is compressed using zlib.
attr.Attribute py:class 1 api.html#$ -
attr.Factory py:class 1 api.html#$ -
```

For zlib-compressed:

```
>>> dfc = soi.compress(df)
>>> soi.writebytes('objects_attrs_new.inv', dfc)
>>> print(*Path('objects_attrs_new.inv').read_bytes().splitlines()[:4], sep='\n')
b'# Sphinx inventory version 2'
b'# Project: attrs'
b'# Version: 17.2'
b'# The remainder of this file is compressed using zlib.'
>>> print(Path('objects_attrs_new.inv').read_bytes().splitlines()[6][:10])
b'5\xcb0\xd7\x9f>\xf3\x84\x89'
```

For JSON:

```
>>> jd = inv.json_dict()
>>> soi.writejson('objects_attrs.json', jd)
>>> print(Path('objects_attrs.json').read_text()[:51])
{"project": "attrs", "version": "17.2", "count": 56
```


CREATING AND USING A CUSTOM OBJECTS.INV

The workflow presented here is introduced in the context of manually assembling an objects inventory, but the functionality is mainly intended for use downstream of a web-scraping or other automated content-extraction tool.

A (possibly obsolete) representative example of such a custom objects.inv can be found at the GitHub repo [here](#).

Note: These instructions are for v2.0; the prior instructions for v1.0 can be found [here](#).

1. Identify the head of the URI to the documentation.
2. Construct an *Inventory* containing all of the objects of interest. The *uri* and *dispname* values can be entered with or without the *standard abbreviations*.

- Create an empty *Inventory*:

```
>>> import sphobjinv as soi
>>> inv = soi.Inventory()
>>> print(inv)
<Inventory (manual): <no project> <no version>, 0 objects>
```

- Define the *project* and *version* attributes:

```
>>> inv.project = 'foobar'
>>> inv.version = '1.5'
>>> print(inv)
<Inventory (manual): foobar v1.5, 0 objects>
```

- Append new *DataObjStr* instances to *objects* as needed to populate the inventory:

```
>>> o = soi.DataObjStr(name='baz', domain='py', role='class',
... priority='1', uri='api.html#$', dispname='-')
>>> print(o)
<DataObjStr:: :py:class:`baz`>
>>> inv.objects.append(o)
>>> print(inv)
<Inventory (manual): foobar v1.5, 1 objects>
>>> inv.objects.append(soi.DataObjStr(name='baz.quux', domain='py',
... role='method', priority='1', uri='api.html#$', dispname='-'))
>>> inv.objects.append(soi.DataObjStr(name='quuux', domain='py',
... role='function', priority='1', uri='api.html#$', dispname='-'))
>>> print(inv)
<Inventory (manual): foobar v1.5, 3 objects>
```

Note: The *role* values here must be the **full** role names (“*block directives*”), described as the

“directives” in the [Sphinx documentation for domains](#), and not the abbreviated forms (“*inline directives*”) used when constructing cross-references.

Thus, for example, a `DataObjStr` corresponding to a method on a class should be constructed with `role='method'`, not `role='meth'`.

3. Export the `Inventory` in compressed form.

- Generate the text of the inventory file with `data_file()`, optionally *contracting* the `uri` and `dispname` fields:

```
>>> text = inv.data_file(contract=True)
```

- Compress the file text:

```
>>> ztext = soi.compress(text)
```

- Save to disk:

```
>>> soi.writebytes('objects_foobar.inv', ztext)
```

4. Transfer the compressed file to its distribution location.

- If only local access is needed, it can be kept local.
- If external access needed, upload to a suitable host.

5. Add an element to the `intersphinx_mapping` parameter in `conf.py`.

- The key of the element is an arbitrary name, which can be used to specify the desired documentation set to be searched for the target object, in the event of a *name* collision between one or more documentation projects; e.g.:

```
:meth:`python:str.join`
```

- The value of the element is a `tuple` of length two:
 - The first element of the value tuple is the head URI for the documentation repository, identified in step (1), to which the `uri` of given object is appended when constructing an `intersphinx` cross-reference.
 - The second element of the value tuple can be `None`, in which case the `objects.inv` file is assumed to be at the repository head URI. Otherwise, this element is the complete address of the distribution location of the compressed inventory file, from step (4), whether a local path or a remote URL.

Examples:

```
intersphinx_mapping = {
    # Standard reference to web docs, with web objects.inv
    'python': ('https://docs.python.org/3.5', None),

    # Django puts its objects.inv file in a non-standard location
    'django': ('https://docs.djangoproject.com/en/dev/', 'https://
↪docs.djangoproject.com/en/dev/_objects/'),

    # Drawing the Sphinx objects.inv from a local copy, but
↪referring to the 1.7 web docs
```

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```
'sphinx': ('https://www.sphinx-doc.org/en/1.7/', '/path/to/  
↔local/objects.inv',  
}
```


SPEEDING UP “SUGGEST” WITH PYTHON-LEVENSHTEIN

uses `fuzzywuzzy` for fuzzy-match searching of object names/domains/roles as part of the `Inventory.suggest()` functionality, also implemented as the CLI `suggest` subcommand.

By default, `fuzzywuzzy` uses `difflib.SequenceMatcher` from the Python standard library for its fuzzy searching. However, it also can use `python-Levenshtein`, a Python C extension providing similar functionality. Thus, has been implemented with `python-Levenshtein` as an *optional* dependency: it will be used if it is available.

4.1 Installation

On Linux and MacOS, installing with the `speedup` extra should work properly to install `python-Levenshtein` in the vast majority of cases:

```
$ pip install sphobjinv[speedup]
```

If you need to work with a version of prior to v2.1, the `speedup` extra is not available and direct installation is required:

```
$ pip install sphobjinv==2.0.1 python-Levenshtein
```

On Windows, as of this writing [no binary wheel is available on PyPI](#). So, the easiest way to install is to download a wheel from [Christoph Gohlke's repository](#) and run `pip install C:\path\to\wheel`. Just make sure to match Python version and CPU type (win32 vs win_amd64) when you download.

4.2 Performance Benchmark

The chart below presents one dataset illustrating the performance enhancement that can be obtained by installing `python-Levenshtein`. The timings plotted here are from execution of `timeit.repeat()` in the Python standard library around a `suggest()` call, searching for the term “function”, for a number of `objects.inv` files from different projects (see [here](#)).

The timings were collected using the following code:

```
import sphobjinv as soi

durations = {}
obj_counts = {}

for fn in os.listdir():
```

(continues on next page)

(continued from previous page)

```

if fn.endswith('.inv'):
    inv = soi.Inventory(fn)

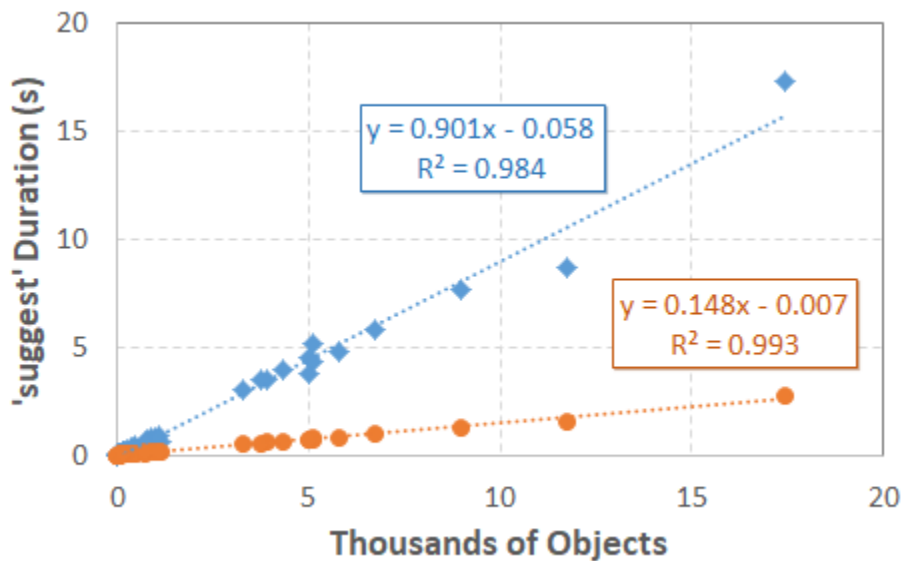
    # Execute the 'suggest' operation 20 times for each file
    timings = timeit.repeat("inv.suggest('function')", repeat=20, number=1,
→globals=globals())

    # Store the average timing for each file
    durations.update({fn: sum(timings) / len(timings)})

    # Store the number of objects
    obj_counts.update({fn: inv.count})

```

As can be seen, the fifty-two objects.inv files in this dataset contain widely varying numbers of objects n :



Unsurprisingly, larger inventories require more time to search. Also relatively unsurprisingly, the time required appears to be roughly $O(n)$, since the fuzzy search must be performed once on the `as_rst` representation of each object.

For this specific search, using `python-Levenshtein` instead of `difflib` decreases the time required from 0.90 seconds per thousand objects down to 0.15 seconds per thousand objects, representing a performance improvement of almost exactly six-fold. Other searches will likely exhibit somewhat better or worse improvement from the use of `python-Levenshtein`, depending on the average length of the reST-like representations of the objects in an `objects.inv` and the length of the search term.

4.3 Variations in Matching Behavior

Note that the matching scores calculated by `difflib` and `python-Levenshtein` can often differ appreciably. (This is illustrated in [issue #128](#) of the `fuzzywuzzy` GitHub repo.) This difference in behavior doesn't have much practical significance, save for the potential of causing some confusion between users with/without `python-Levenshtein` installed.

As an example, the following shows an excerpt of the results of a representative CLI `suggest` call **without** `python-Levenshtein`:

```
$ sphobjinv suggest objects_scipy.inv surface -asit 40
```

Name	Score	Index
-----	-----	-----
:py:function:`scipy.misc.face`	64	1018
:py:function:`scipy.misc.source`	64	1032
:std:doc:`generated/scipy.misc.face`	64	4042
:std:doc:`generated/scipy.misc.source`	64	4056
:py:data:`scipy.stats.rice`	56	2688
:std:label:`continuous-rice`	56	2896
:py:method:`scipy.integrate.complex_ode.successful`	51	156
:py:method:`scipy.integrate.ode.successful`	51	171
:py:function:`scipy.linalg.lu_factor`	51	967
... more with score 51 ...		
:py:attribute:`scipy.LowLevelCallable.signature`	50	5
:py:function:`scipy.constants.convert_temperature`	50	53
:py:function:`scipy.integrate.quadrature`	50	176
... more with score 50 and below ...		

This is a similar excerpt with `python-Levenshtein`:

Name	Score	Index
-----	-----	-----
:py:function:`scipy.misc.face`	64	1018
:py:function:`scipy.misc.source`	64	1032
:std:doc:`generated/scipy.misc.face`	64	4042
:std:doc:`generated/scipy.misc.source`	64	4056
:py:method:`scipy.integrate.ode.successful`	51	171
:py:function:`scipy.linalg.lu_factor`	51	967
:py:function:`scipy.linalg.subspace_angles`	51	1003
... more with score 51 ...		
:py:function:`scipy.cluster.hierarchy.fcluster`	49	23
:py:function:`scipy.cluster.hierarchy.fclusterdata`	49	24
:py:method:`scipy.integrate.complex_ode.successful`	49	156
... more with score 49 and below ...		

SPHINX OBJECTS.INV V2 SYNTAX

After decompression, “version 2” Sphinx objects.inv files follow a syntax that, to the best of this author’s ability to determine, is not included in the Sphinx documentation. The below syntax is believed to be accurate as of Feb 2021 (Sphinx v3.4.3).

Based upon a quick `git diff` of the [Sphinx repository](#), it is thought to be valid for all Sphinx versions $\geq 1.0b1$ that make use of this “version 2” objects.inv format.

NOTE that the previous version of the syntax presented here has been shown to be inaccurate (see [#181](#)), in that it is permitted for the `{name}` field to contain whitespace. The descriptions below have been updated to reflect this and to provide more detailed information on the constraints governing each field of an objects.inv data line.

The first line must be exactly:

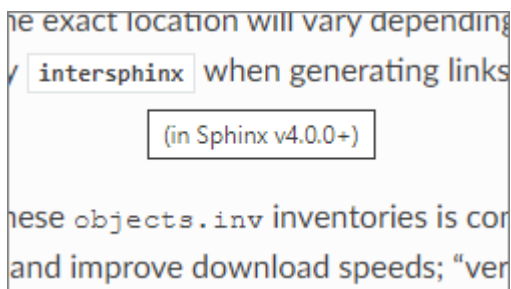
```
# Sphinx inventory version 2
```

The second and third lines must obey the template:

```
# Project: <project name>
# Version: <full version number>
```

The version number should *not* include a leading “v”.

The above project name and version are used to populate mouseovers for the [intersphinx](#) cross-references:



The fourth line must contain the string `zlib` somewhere within it, but for consistency it should be exactly:

```
# The remainder of this file is compressed using zlib.
```

All remaining lines of the file are the objects data, each laid out in the following syntax:

`{name} {domain}:{role} {priority} {uri} {dispname}`

`{name}`

The object name used when cross-referencing the object (falls between the backticks).

Constraints

- **MUST** have nonzero length
- **MUST NOT** start with #
- **SHOULD** have no leading or trailing whitespace
- **MAY** contain internal whitespace

{domain} The Sphinx domain used when cross-referencing the object (falls between the first and second colons; omitted if using the [default domain](#)).

Constraints

- **MUST** have nonzero length
- **MUST** match a built-in or installable Sphinx domain
- **MUST NOT** contain whitespace or a colon
 - **RECOMMENDED** to contain only ASCII word characters (a-z, A-Z, 0-9, and _)

{role} The Sphinx role used when cross-referencing the object (falls between the second and third colons; or, between the first and second colons if using the [default domain](#)).

Constraints

- **MUST** have nonzero length
- **MUST** match a role defined in the domain referenced by `{domain}`
- **MUST NOT** contain whitespace or a colon
 - **RECOMMENDED** to consist of only ASCII word characters (a-z, A-Z, 0-9, and _)

{priority} Flag for [placement in search results](#). Most will be 1 (standard priority) or -1 (omit from results) for documentation built by Sphinx.

To note, as of Feb 2021 this value is **not** used by `intersphinx`; it is only used internally within the search function of the static webpages built by *Sphinx* ([here](#) and [here](#)). Thus, custom inventories likely **MAY** use this field for arbitrary content, if desired, as long as the integer constraint is observed. Such use *would* run the risk of a future change to Sphinx/intersphinx breaking compatibility with `objects.inv` files having non-standard `{priority}` values.

Constraints

- **MUST** have nonzero length
- **MUST** be a positive or negative integer, or zero, *without* a decimal point
- **MUST NOT** contain whitespace (implicit in the integer constraint)

{uri} Relative URI for the location to which cross-references will point. The base URI is taken from the relevant element of the `intersphinx_mapping` configuration parameter in `conf.py`.

Constraints

- **MAY** have zero length, but typically has nonzero length

- A zero-length `{uri}` can occur for the root/index documentation page in certain instances; see [sphinx-doc/sphinx#7096](https://www.sphinx-doc.org/en/master/development/changes/7096.html)

- **MUST NOT** contain whitespace

`{dispname}` Default cross-reference text to be displayed in compiled documentation.

Constraints

- **MUST** have nonzero length
- **MAY** contain internal whitespace (leading/trailing whitespace is ignored)

Unicode characters appear to be valid for all fields except `{uri}` (where they are [specifically forbidden](#)) and `{priority}`. However, it is **RECOMMENDED** that they *only* be used in `{dispname}`, as their use in `{name}`, `{domain}` and `{role}` would complicate construction of cross-references from other documentation source.

For illustration, the following is the entry for the `join()` method of the `str` class in the Python 3.9 `objects.inv`, broken out field-by-field:

```
str.join py:method 1 library/stdtypes.html#$ -
{name}      = str.join
{domain}    = py
{role}      = method
{priority}  = 1
{uri}       = library/stdtypes.html#$
{dispname}  = -
```

The above illustrates two shorthand notations that were introduced to shrink the size of the inventory file:

1. If `{uri}` has an anchor (technically a “[fragment identifier](#),” the portion following the # symbol) and the tail of the anchor is identical to `{name}`, that tail is [replaced](#) with \$.
2. If `{dispname}` is identical to `{name}`, it is [stored](#) as -.

Thus, a standard `intersphinx` reference to this method would take the form (the leading `:py` could be omitted if `py` is the default domain):

```
:py:meth:`str.join`
```

The cross-reference would show as `str.join()` and link to the relative URI:

```
library/stdtypes.html#str.join
```

Other intersphinx Syntax Examples

To show as only `join()`:

```
:py:meth:`~str.join`
```

To suppress the hyperlink as in `str.join()`:

```
:py:meth:`~!str.join`
```

To change the cross-reference text and omit the trailing parentheses as in `This is join!`:

```
:py:obj:`This is join! <str.join>`
```

Most (all?) of the objects documented in the below submodules are also exposed at the package root. For example, both of the following will work to import the *Inventory* class:

```
>>> from sphobjinv import Inventory
>>> from sphobjinv.inventory import Inventory
```

6.1 sphobjinv.data

sphobjinv data classes for individual objects.

sphobjinv is a toolkit for manipulation and inspection of Sphinx objects.inv files.

Author Brian Skinn (bskinn@alum.mit.edu)

File Created 7 Nov 2017

Copyright (c) Brian Skinn 2016-2021

Source Repository <https://github.com/bskinn/sphobjinv>

Documentation <https://sphobjinv.readthedocs.io/en/latest>

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Members

class `DataFields` (*value*)

`Enum` for the fields of objects.inv data objects.

DispName = `'dispname'`

Default display name for the object in rendered documentation when referenced as `:domain:role:`name``

Domain = `'domain'`

Sphinx domain housing the object

Name = `'name'`

Object name, as recognized internally by Sphinx

Priority = `'priority'`

Object search priority

Role = `'role'`

Full name of Sphinx role to be used when referencing the object

URI = `'uri'`

URI to the location of the object's documentation, relative to the documentation root

class DataObjBytes (*name, domain, role, priority, uri, dispname, as_str=NOTHING, as_bytes=NOTHING*)
SuperDataObj subclass generating *bytes* object data.

Two *DataObjBytes* instances will test equal if all of *name, domain, role, priority, uri*, and *dispname* are equal between them.

```
>>> obj = soi.DataObjBytes(  
...     name=b"foo",  
...     domain=b"py",  
...     role=b"method",  
...     priority=b"1",  
...     uri=b"$",  
...     dispname=b"-",  
... )  
>>> obj == obj  
True  
>>> obj == obj.evolve(name=b"quux")  
False
```

Changed in version 2.1: Previously, attempts to compare instances resulted in a *RecursionError*.

class DataObjStr (*name, domain, role, priority, uri, dispname, as_bytes=NOTHING, as_str=NOTHING*)
SuperDataObj subclass generating *str* object data.

Two *DataObjStr* instances will test equal if all of *name, domain, role, priority, uri*, and *dispname* are equal between them.

```
>>> obj = soi.DataObjStr(  
...     name="foo",  
...     domain="py",  
...     role="method",  
...     priority="1",  
...     uri="$",  
...     dispname="-",  
... )  
>>> obj == obj  
True  
>>> obj == obj.evolve(name="quux")  
False
```

Changed in version 2.1: Previously, attempts to compare instances resulted in a *RecursionError*.

class SuperDataObj

Abstract base superclass defining common methods &c. for data objects.

Intended only to be subclassed by *DataObjBytes* and *DataObjStr*, to allow definition of common methods, properties, etc. all in one place.

Where marked with [†], *DataObjBytes* instances will return *bytes* values, whereas *DataObjStr* instances will return *str* values.

abstract property as_bytes

DataObjBytes version of instance.

property as_rst

str reST reference-like object representation.

Typically will NOT function as a proper reST reference in Sphinx source (e.g., a *role* of function must be referenced using :func: for the *py* domain).

abstract property as_str*DataObjStr* version of instance.**data_line** (*, *expand=False*, *contract=False*)

Compose plaintext objects.inv data line from instance contents.

The format of the resulting data line is given by *data_line_fmt*. *DataObjBytes* and *DataObjStr* instances generate data lines as *bytes* and *str*, respectively.

Calling with both *expand* and *contract* as *True* is invalid.

Parameters

- **expand** – *bool* (*optional*) – Return data line with any *uri* or *dispname* abbreviations expanded
- **contract** – *bool* (*optional*) – Return data line with abbreviated *uri* and *dispname*

Returns *dl* – *bytes* (for *DataObjBytes*) or *str* (for *DataObjStr*) – Object data line

Raises **ValueError** – If both *expand* and *contract* are *True*

data_line_fmt = '{name} {domain}:{role} {priority} {uri} {dispname}'

Helper *str* for generating plaintext objects.inv data lines. The field names MUST match the *str* values of the *DataFields* members.

abstract property dispnameObject default name in rendered documentation[†].

Possibly abbreviated; see *here*.

abstract property dispname_abbrevAbbreviation character(s) for display name[†].

'-' or b'-' for *version 2* objects.inv files.

property dispname_contractedObject display name, contracted with *dispname_abbrev*.**property dispname_expanded**Object display name, with *dispname_abbrev* expanded.**abstract property domain**Sphinx domain containing the object[†].**evolve** (**kwargs)

Create a new instance with changes applied.

This helper method provides a concise means for creating new instances with only a subset of changed data fields.

The names of any *kwargs* MUST be keys of the *dicts* generated by *json_dict* ().

Parameters **kwargs** – *str* or *bytes* – Revised value(s) to use in the new instance for the passed keyword argument(s).

Returns *dobj* – *DataObjBytes* or *DataObjStr* – New instance with updated data

json_dict (*, *expand=False*, *contract=False*)Return the object data formatted as a flat *dict*.

The returned *dict* is constructed such that it matches the relevant subschema of *sphobjinv.schema.json_schema*, to facilitate implementation of *Inventory.json_dict* ().

The `dicts` returned by `DataObjBytes` and `DataObjStr` both have `str` keys, but they have `bytes` and `str` values, respectively. The `dict` keys are identical to the `str` values of the `DataFields` Enum members.

Calling with both `expand` and `contract` as `True` is invalid.

Parameters

- **expand** – `bool` (*optional*) – Return `dict` with any `uri` or `dispname` abbreviations expanded
- **contract** – `bool` (*optional*) – Return `dict` with abbreviated `uri` and `dispname`

Returns `d – dict` – Object data

Raises `ValueError` – If both `expand` and `contract` are `True`

abstract property name

Object name, as recognized internally by Sphinx[†].

abstract property priority

Object search priority[†].

abstract property role

Sphinx role to be used when referencing the object[†].

rst_fmt = ':{domain}:{role}:`{name}`'

`str.format()` template for generating reST-like representations of object data for `as_rst` (used with `Inventory.suggest()`).

abstract property uri

Object URI relative to documentation root[†].

Possibly abbreviated; see [here](#).

abstract property uri_abbrev

Abbreviation character(s) for URI tail[†].

'\$' or b'\$' for *version 2* objects.inv files.

property uri_contracted

Object-relative URI, contracted with `uri_abbrev`.

property uri_expanded

Object-relative URI, with `uri_abbrev` expanded.

6.2 sphobjinv.enum

Helper enums for sphobjinv.

`sphobjinv` is a toolkit for manipulation and inspection of Sphinx objects.inv files.

Author Brian Skinn (bskinn@alum.mit.edu)

File Created 4 May 2019

Copyright (c) Brian Skinn 2016-2021

Source Repository <https://github.com/bskinn/sphobjinv>

Documentation <https://sphobjinv.readthedocs.io/en/latest>

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Members

class HeaderFields (*value*)

Enum for various inventory-level data items.

A subset of these *Enum* values is used in various Regex, JSON, and string formatting contexts within class:~*sphobjinv.inventory.Inventory* and *schema.json_schema*.

Count = 'count'

Number of objects contained in the inventory

Metadata = 'metadata'

The *str* value of this *Enum* member is accepted as a root-level key in a *dict* to be imported into an *Inventory*. The corresponding value in the *dict* may contain any arbitrary data. Its possible presence is accounted for in *schema.json_schema*.

The data associated with this key are **ignored** during import into an *Inventory*.

Project = 'project'

Project name associated with an inventory

Version = 'version'

Project version associated with an inventory

class SourceTypes (*value*)

Enum for the import mode used in instantiating an *Inventory*.

Since *Enum* keys iterate in definition order, the definition order here defines the order in which *Inventory* objects attempt to parse a source object passed to *Inventory.__init__()* either as a positional argument or via the generic *source* keyword argument.

This order **DIFFERS** from the documentation order, which is alphabetical.

BytesPlaintext = 'bytes_plain'

Instantiation from a plaintext objects.inv *bytes*.

BytesZlib = 'bytes_zlib'

Instantiation from a zlib-compressed objects.inv *bytes*.

DictJSON = 'dict_json'

Instantiation from a *dict* validated against *schema.json_schema*.

FnamePlaintext = 'fname_plain'

Instantiation from a plaintext objects.inv file on disk.

FnameZlib = 'fname_zlib'

Instantiation from a zlib-compressed objects.inv file on disk.

Manual = 'manual'

No source; *Inventory* was instantiated with *project* and *version* as empty strings and *objects* as an empty *list*.

URL = 'url'

Instantiation from a zlib-compressed objects.inv file downloaded from a URL.

6.3 sphobjinv.error

Custom errors for sphobjinv.

sphobjinv is a toolkit for manipulation and inspection of Sphinx objects.inv files.

Author Brian Skinn (bskinn@alum.mit.edu)

File Created 5 Nov 2017

Copyright (c) Brian Skinn 2016-2021

Source Repository <https://github.com/bskinn/sphobjinv>

Documentation <https://sphobjinv.readthedocs.io/en/latest>

License The MIT License; see [LICENSE.txt](#) for full license terms

Members

exception SphobjinvError

Custom sphobjinv error superclass.

exception VersionError

Raised when attempting an operation on an unsupported version.

The current version of sphobjinv only supports ‘version 2’ objects.inv files (see [here](#)).

6.4 sphobjinv.fileops

File I/O helpers for sphobjinv.

sphobjinv is a toolkit for manipulation and inspection of Sphinx objects.inv files.

Author Brian Skinn (bskinn@alum.mit.edu)

File Created 5 Nov 2017

Copyright (c) Brian Skinn 2016-2021

Source Repository <https://github.com/bskinn/sphobjinv>

Documentation <https://sphobjinv.readthedocs.io/en/latest>

License The MIT License; see [LICENSE.txt](#) for full license terms

Members

readbytes (*path*)

Read file contents and return as `bytes`.

Changed in version 2.1: *path* can now be `Path` or `str`. Previously, it had to be `str`.

Parameters *path* – `str` or `Path` – Path to file to be opened.

Returns *b* – `bytes` – Contents of the indicated file.

readjson (*path*)

Create `dict` from JSON file.

No data or schema validation is performed.

Changed in version 2.1: *path* can now be `Path` or `str`. Previously, it had to be `str`.

Parameters *path* – `str` or `Path` – Path to JSON file to be read.

Returns `d` – `dict` – Deserialized JSON.

urlwalk (*url*)

Generate a series of candidate objects.inv URLs.

URLs are based on the seed *url* passed in. Ensure that the path separator in *url* is the standard **forward** slash ('/').

Parameters `url` – `str` – Seed URL defining directory structure to walk through.

Yields `inv_url` – `str` – Candidate URL for objects.inv location.

writebytes (*path*, *contents*)

Write indicated file contents.

Any existing file at *path* will be overwritten.

Changed in version 2.1: *path* can now be `Path` or `str`. Previously, it had to be `str`.

Parameters

- **path** – `str` or `Path` – Path to file to be written.
- **contents** – `bytes` – Content to be written to file.

writejson (*path*, *d*)

Create JSON file from `dict`.

No data or schema validation is performed. Any existing file at *path* will be overwritten.

Changed in version 2.1: *path* can now be `Path` or `str`. Previously, it had to be `str`.

Parameters

- **path** – `str` or `Path` – Path to output JSON file.
- **d** – `dict` – Data structure to serialize.

6.5 sphobjinv.inventory

sphobjinv data class for full inventories.

sphobjinv is a toolkit for manipulation and inspection of Sphinx objects.inv files.

Author Brian Skinn (bskinn@alum.mit.edu)

File Created 7 Dec 2017

Copyright (c) Brian Skinn 2016-2021

Source Repository <https://github.com/bskinn/sphobjinv>

Documentation <https://sphobjinv.readthedocs.io/en/latest>

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Members

class Inventory (*source=None*, *plaintext=None*, *zlib=None*, *fname_plain=None*, *fname_zlib=None*, *dict_json=None*, *url=None*, *count_error=True*)

Entire contents of an objects.inv inventory.

All information is stored internally as `str`, even if imported from a `bytes` source.

All arguments except *count_error* are used to specify the source from which the *Inventory* contents are to be populated. **At most ONE** of these source arguments may be other than `None`.

The `count_error` argument is only relevant to the `dict_json` source type.

Equality comparisons between `Inventory` instances will return `True` if `project`, `version`, and **all** contents of `objects` are identical, even if the instances were created from different sources:

```
>>> inv1 = soi.Inventory(  
...     url="https://sphobjinv.readthedocs.io/en/latest/objects.inv"  
... )  
>>> inv2 = soi.Inventory(inv1.data_file())  
>>> inv1 is inv2  
False  
>>> inv1 == inv2  
True
```

Changed in version 2.1: Previously, an `Inventory` instance would compare equal only to itself.

source

The `Inventory` will attempt to parse the indicated source object as each of the below types in sequence, **except** for `url`.

This argument is included mainly as a convenience feature for use in interactive sessions, as invocations of the following form implicitly populate `source`, as the first positional argument:

```
>>> inv = Inventory(src_obj)
```

In most cases, for clarity it is recommended that programmatic instantiation of `Inventory` objects utilize the below format-specific arguments.

plaintext

Object is to be parsed as the UTF-8 `bytes` plaintext contents of an `objects.inv` inventory.

zlib

Object is to be parsed as the UTF-8 `bytes` zlib-compressed contents of an `objects.inv` inventory.

fname_plain

Object is the `str` or `Path` path to a file containing the plaintext contents of an `objects.inv` inventory.

Changed in version 2.1: Previously, this argument could only be a `str`.

fname_zlib

Object is the `str` or `Path` path to a file containing the zlib-compressed contents of an `objects.inv` inventory.

Changed in version 2.1: Previously, this argument could only be a `str`.

dict_json

Object is a `dict` containing the contents of an `objects.inv` inventory, conforming to the JSON schema of `schema.json_schema`.

If `count_error` is passed as `True`, then a `ValueError` is raised if the number of objects found in the `dict` does not match the value associated with its `count` key. If `count_error` is passed as `False`, an object count mismatch is ignored.

url

Object is a `str` URL to a zlib-compressed `objects.inv` file. Any URL type supported by `urllib.request` SHOULD work; only `http` and `file` have been directly tested, however.

No authentication is supported at this time.

Members

property count

Count of objects currently in inventory.

data_file (*, expand=False, contract=False)

Generate a plaintext objects.inv as UTF-8 bytes.

`bytes` is used here as the output type since the most common use cases are anticipated to be either (1) dumping to file via `sphobjinv.fileops.writebytes()` or (2) compressing via `sphobjinv.zlib.compress()`, both of which take `bytes` input.

Calling with both `expand` and `contract` as `True` is invalid.

Parameters

- **expand** – `bool (optional)` – Generate `bytes` with any `uri` or `dispname` abbreviations expanded
- **contract** – `bool (optional)` – Generate `bytes` with abbreviated `uri` and `dispname` values

Returns `b – bytes` – Inventory in plaintext objects.inv format

Raises `ValueError` – If both `expand` and `contract` are `True`

header_preamble = '# Sphinx inventory version 2'

Preamble line for v2 objects.inv header

header_project = '# Project: {project}'

Project line `str.format()` template for objects.inv header

header_version = '# Version: {version}'

Version line `str.format()` template for objects.inv header

header_zlib = '# The remainder of this file is compressed using zlib.'

zlib compression line for v2 objects.inv header

json_dict (expand=False, contract=False)

Generate a flat `dict` representation of the inventory.

The returned `dict` matches the schema of `sphobjinv.schema.json_schema`.

Calling with both `expand` and `contract` as `True` is invalid.

Parameters

- **expand** – `bool (optional)` – Return `dict` with any `uri` or `dispname` abbreviations expanded
- **contract** – `bool (optional)` – Return `dict` with abbreviated `uri` and `dispname` values

Returns `d – dict` – Inventory data; keys and values are all `str`

Raises `ValueError` – If both `expand` and `contract` are `True`

objects

`list` of `DataObjStr` representing the data objects of the inventory. Can be edited directly to change the inventory contents. Undefined/random behavior/errors will result if the type of the elements is anything other than `DataObjStr`.

property objects_rst

`list` of objects formatted in a `str` reST-like representation.

The format of each `str` in the `list` is given by `data.SuperDataObj.rst_fmt`.

Calling with both *expand* and *contract* as `True` is invalid.

Parameters

- **expand** – `bool` (*optional*) – Return `strs` with any *uri* or *dispname* abbreviations expanded
- **contract** – `bool` (*optional*) – Return `strs` with abbreviated *uri* and *dispname* values

Returns *obj_l* – `list` of *str* – Inventory object data in reST-like format

Raises **ValueError** – If both *expand* and *contract* are `True`

project

str project display name for the inventory (see [here](#)).

source_type

SourceTypes `Enum` value indicating the type of source from which the instance was generated.

suggest (name, *, thresh=50, with_index=False, with_score=False)

Suggest objects in the inventory to match a name.

suggest() makes use of the powerful pattern-matching library *fuzzywuzzy* to identify potential matches to the given *name* within the inventory. The search is performed over the `list` of *str* generated by *objects_rst()*.

thresh defines the minimum *fuzzywuzzy* match quality (an integer ranging from 0 to 100) required for a given object to be included in the results list. Can be any float value, but best results are generally obtained with values between 50 and 80, depending on the number of objects in the inventory, the confidence of the user in the match between *name* and the object(s) of interest, and the desired fidelity of the search results to *name*.

This functionality is provided by the ‘*suggest*’ *subparser* of the command-line interface.

Parameters

- **name** – *str* – Object name for *fuzzywuzzy* pattern matching
- **thresh** – `float` – *fuzzywuzzy* match quality threshold
- **with_index** – `bool` – Include with each matched name its index within *Inventory.objects*
- **with_score** – `bool` – Include with each matched name its *fuzzywuzzy* match quality score

Returns

res_l – `list`

If both *with_index* and *with_score* are `False`, members are the *str* *SuperDataObj.as_rst()* representations of matching objects.

If either is `True`, members are `tuples` of the indicated match results:

with_index == `True`: (*as_rst*, *index*)

with_score == `True`: (*as_rst*, *score*)

with_index == *with_score* == `True`: (*as_rst*, *score*, *index*)

version

str project display version for the inventory (see [here](#)).

6.6 sphobjinv.re

Helper regexes for sphobjinv.

sphobjinv is a toolkit for manipulation and inspection of Sphinx objects.inv files.

Author Brian Skinn (bskinn@alum.mit.edu)

File Created 5 Nov 2017

Copyright (c) Brian Skinn 2016-2021

Source Repository <https://github.com/bskinn/sphobjinv>

Documentation <https://sphobjinv.readthedocs.io/en/latest>

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Members

`p_data = re.compile('\n ^ # Start of line\n (?P<name>.+?) # --> Name\n \\s+ # Dividing space\n')`
Compiled `re str` regex pattern for data lines in `str` decompressed inventory files

`pb_comments = re.compile(b'^#.*$', re.MULTILINE)`
Compiled `re bytes` pattern for comment lines in decompressed inventory files

`pb_data = re.compile(b'\n ^ # Start of line\n (?P<name>.+?) # --> Name\n \\s+ # Dividing space\n')`
Compiled `re bytes` regex pattern for data lines in `bytes` decompressed inventory files

`pb_project = re.compile(b'\n ^ # Start of line\n [#] []Project:[] # Preamble\n (?P<project>.+?) # Project name\n')`
Compiled `re bytes` pattern for project line

`pb_version = re.compile(b'\n ^ # Start of line\n [#] []Version:[] # Preamble\n (?P<version>.+?) # Version\n')`
Compiled `re bytes` pattern for version line

`ptn_data = '\n ^ # Start of line\n (?P<name>.+?) # --> Name\n \\s+ # Dividing space\n (?P<project>.+?) # Project name\n'`
Regex pattern string used to compile `p_data` and `pb_data`

6.7 sphobjinv.schema

JSON schema to validate inventory dictionaries.

This module is part of sphobjinv, a toolkit for manipulation and inspection of Sphinx objects.inv files.

Author Brian Skinn (bskinn@alum.mit.edu)

File Created 7 Dec 2017

Copyright (c) Brian Skinn 2016-2021

Source Repository <https://github.com/bskinn/sphobjinv>

Documentation <https://sphobjinv.readthedocs.io/en/latest>

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Members

`json_schema = {'$schema': 'https://json-schema.org/draft-04/schema#', 'additionalProperties': False}`
JSON schema for validating the `dict` forms of Sphinx objects.inv inventories as generated from or expected by `Inventory` classes.

6.8 sphobjinv.zlib

zlib (de)compression helpers for sphobjinv.

sphobjinv is a toolkit for manipulation and inspection of Sphinx objects.inv files.

Author Brian Skinn (bskinn@alum.mit.edu)

File Created 5 Nov 2017

Copyright (c) Brian Skinn 2016-2021

Source Repository <https://github.com/bskinn/sphobjinv>

Documentation <https://sphobjinv.readthedocs.io/en/latest>

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Members

compress (*bstr*)

Compress a version 2 `intersphinx` objects.inv bytestring.

The #-prefixed comment lines are left unchanged, whereas the plaintext data lines are compressed with `zlib`.

Parameters `bstr` – `bytes` – Binary string containing the decompressed contents of an objects.inv file.

Returns `out_b` – `bytes` – Binary string containing the compressed objects.inv content.

decompress (*bstr*)

Decompress a version 2 `intersphinx` objects.inv bytestring.

The #-prefixed comment lines are left unchanged, whereas the `zlib`-compressed data lines are decompressed to plaintext.

Parameters `bstr` – `bytes` – Binary string containing a compressed objects.inv file.

Returns `out_b` – `bytes` – Decompressed binary string containing the plaintext objects.inv content.

SPHOBJINV.CLI (NON-API)

7.1 sphobjinv.cli.core

sphobjinv *CLI core execution module.*

sphobjinv is a toolkit for manipulation and inspection of Sphinx objects.inv files.

Author Brian Skinn (bskinn@alum.mit.edu)

File Created 15 Nov 2020

Copyright (c) Brian Skinn 2016-2021

Source Repository <https://github.com/bskinn/sphobjinv>

Documentation <https://sphobjinv.readthedocs.io/en/latest>

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Members

do_convert (*inv, in_path, params*)

Carry out the conversion operation, including writing output.

If *OVERWRITE* is passed and the output file (the default location, or as passed to *OUTFILE*) exists, it will be overwritten without a prompt. Otherwise, the user will be queried if it is desired to overwrite the existing file.

If *QUIET* is passed, nothing will be printed to stdout (potentially useful for scripting), and any existing output file will be overwritten without prompting.

Parameters

- **inv** – *Inventory* – Inventory object to be output in the format indicated by *MODE*.
- **in_path** – *str* – For a local input file, its absolute path. For a URL, the (possibly truncated) URL text.
- **params** – *dict* – Parameters/values mapping from the active subparser

do_suggest (*inv, params*)

Perform the suggest call and output the results.

Results are printed one per line.

If neither *INDEX* nor *SCORE* is specified, the results are output without a header. If either or both are specified, the results are output in a lightweight tabular format.

If the number of results exceeds *SUGGEST_CONFIRM_LENGTH*, the user will be queried whether to display all of the returned results unless *ALL* is specified.

No `-q` option is available here, since a silent mode for suggestion output is nonsensical.

Parameters

- **inv** – *Inventory* – Inventory object to be output in the format indicated by *MODE*.
- **params** – *dict* – Parameters/values mapping from the active subparser

main()

Handle command line invocation.

Parses command line arguments, handling the no-arguments and *VERSION* cases.

Creates the *Inventory* from the indicated source and method.

Invokes *do_convert()* or *do_suggest()* per the subparser name stored in *SUBPARSER_NAME*.

7.2 sphobjinv.cli.load

Module for sphobjinv *CLI |Inventory| loading*.

sphobjinv is a toolkit for manipulation and inspection of Sphinx objects.inv files.

Author Brian Skinn (bskinn@alum.mit.edu)

File Created 17 Nov 2020

Copyright (c) Brian Skinn 2016-2021

Source Repository <https://github.com/bskinn/sphobjinv>

Documentation <https://sphobjinv.readthedocs.io/en/latest>

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Members**import_infile(in_path)**

Attempt import of indicated file.

Convenience function wrapping attempts to load an *Inventory* from a local path.

Parameters **in_path** – *str* – Path to input file

Returns *inv* – *Inventory* or *None* – If instantiation with the file at *in_path* succeeds, the resulting *Inventory* instance; otherwise, *None*

inv_local(params)

Create *Inventory* from local source.

Uses *resolve_inpath()* to sanity-check and/or convert *INFILE*.

Calls *sys.exit()* internally in error-exit situations.

Parameters **params** – *dict* – Parameters/values mapping from the active subparser

Returns

- *inv* – *Inventory* – Object representation of the inventory at *INFILE*
- *in_path* – *str* – Input file path as resolved/checked by *resolve_inpath()*

inv_stdin(params)

Create *Inventory* from contents of stdin.

Due to stdin's encoding and formatting assumptions, only text-based inventory formats can be sanely parsed.

Thus, only plaintext and JSON inventory formats can be used as inputs here.

Parameters `params` – `dict` – Parameters/values mapping from the active subparser

Returns `inv` – `Inventory` – Object representation of the inventory provided at stdin

`inv_url (params)`

Create `Inventory` from file downloaded from URL.

Initially, treats `INFILE` as a download URL to be passed to the `url` initialization argument of `Inventory`.

If an inventory is not found at that exact URL, progressively searches the directory tree of the URL for `objects.inv`.

Injects the URL at which an inventory was found into `params` under the `FOUND_URL` key.

Calls `sys.exit()` internally in error-exit situations.

Parameters `params` – `dict` – Parameters/values mapping from the active subparser

Returns

- `inv` – `Inventory` – Object representation of the inventory at `INFILE`
- `ret_path` – `str` – URL from `INFILE` used to construct `inv`. If URL is longer than 45 characters, the central portion is elided.

7.3 sphobjinv.cli.parser

`sphobjinv` CLI parser definition module.

`sphobjinv` is a toolkit for manipulation and inspection of Sphinx `objects.inv` files.

Author Brian Skinn (bskinn@alum.mit.edu)

File Created 15 Nov 2020

Copyright (c) Brian Skinn 2016-2021

Source Repository <https://github.com/bskinn/sphobjinv>

Documentation <https://sphobjinv.readthedocs.io/en/latest>

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Members

class `PrsConst`

Container for CLI parser constants.

ALL = `'all'`

Optional argument name for use with the `SUGGEST` subparser, indicating to print all returned objects, regardless of the number returned, without asking for confirmation

CONTRACT = `'contract'`

Optional argument name for use with the `CONVERT` subparser, indicating to contract URIs and display names to abbreviated forms in the generated output file

CONVERT = `'convert'`

Subparser name for inventory file conversions; stored in `SUBPARSER_NAME` when selected

DEF_BASENAME = `'objects'`

Default base name for an unspecified `OUTFILE`

DEF_OUT_EXT = `{'json': '.json', 'plain': '.txt', 'zlib': '.inv'}`

Default extensions for an unspecified `OUTFILE`

DEF_THRESH = 75

Default match threshold for *sphobjinv suggest --thresh*

EXPAND = 'expand'

Optional argument name for use with the *CONVERT* subparser, indicating to expand URI and display name abbreviations in the generated output file

FOUND_URL = 'found_url'

Dict key for URL at which an inventory was actually found

HELP_CONV_EXTS = "'.inv/.txt/.json'"

Help text for default extensions for the various conversion types

HELP_CO_PARSER = 'Convert intersphinx inventory to zlib-compressed, plaintext, or JSON'

Help text for the *CONVERT* subparser

HELP_SU_PARSER = 'Fuzzy-search intersphinx inventory for desired object(s).'

Help text for the *SUGGEST* subparser

INDEX = 'index'

Optional argument name for use with the *SUGGEST* subparser, indicating to print the location index of each returned object within *INFILE* along with the object domain/role/name (may be specified with *SCORE*)

INFILE = 'infile'

Required positional argument name for use with both *CONVERT* and *SUGGEST* subparsers, holding the path (or URL, if *URL* is specified) to the input file

JSON = 'json'

Argument value for *CONVERT MODE*, to output an inventory as JSON

MODE = 'mode'

Positional argument name for use with *CONVERT* subparser, indicating output file format (*ZLIB*, *PLAIN* or *JSON*)

OUTFILE = 'outfile'

Optional positional argument name for use with the *CONVERT* subparser, holding the path to the output file (*DEF_BASENAME* and the appropriate item from *DEF_OUT_EXT* are used if this argument is not provided)

OVERWRITE = 'overwrite'

Optional argument name for use with the *CONVERT* subparser, indicating to overwrite any existing output file without prompting

PLAIN = 'plain'

Argument value for *CONVERT MODE*, to output a plaintext inventory

QUIET = 'quiet'

Optional argument name for use with the *CONVERT* subparser, indicating to suppress console output

SCORE = 'score'

Optional argument name for use with the *SUGGEST* subparser, indicating to print the *fuzzywuzzy* score of each returned object within *INFILE* along with the object domain/role/name (may be specified with *INDEX*)

SEARCH = 'search'

Positional argument name for use with the *SUGGEST* subparser, holding the search term for *fuzzywuzzy* text matching

SUBPARSER_NAME = 'sprs_name'

Param for storing subparser name (*CONVERT* or *SUGGEST*)

SUGGEST = 'suggest'

Subparser name for inventory object suggestions; stored in `SUBPARSER_NAME` when selected

SUGGEST_CONFIRM_LENGTH = 30

Number of returned objects from a `SUGGEST` subparser invocation above which user will be prompted for confirmation to print the results (unless `ALL` is specified)

THRESH = 'thresh'

Optional argument name for use with the `SUGGEST` subparser, taking the minimum desired `fuzzywuzzy` match quality as one required argument

URL = 'url'

Optional argument name for use with both `CONVERT` and `SUGGEST` subparsers, indicating that `INFILE` is to be treated as a URL rather than a local file path

VERSION = 'version'

Optional argument name for use with the base argument parser, to show version &c. info, and exit

VER_TXT = '\nsphobjinv v2.1\n\nCopyright (c) Brian Skinn 2016-2021\nLicense: The MIT License'

Version &c. output blurb

ZLIB = 'zlib'

Argument value for `CONVERT_MODE`, to output a `zlib`-compressed inventory

getparser()

Generate argument parser.

Returns `prs` – `ArgumentParser` – Parser for commandline usage of `sphobjinv`

7.4 sphobjinv.cli.paths

`sphobjinv` CLI path resolution module.

`sphobjinv` is a toolkit for manipulation and inspection of Sphinx objects.inv files.

Author Brian Skinn (bskinn@alum.mit.edu)

File Created 19 Nov 2020

Copyright (c) Brian Skinn 2016-2021

Source Repository <https://github.com/bskinn/sphobjinv>

Documentation <https://sphobjinv.readthedocs.io/en/latest>

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Members

resolve_inpath(*in_path*)

Resolve the input file, handling invalid values.

Currently, only checks for existence and not-directory.

Parameters `in_path` – `str` – Path to desired input file

Returns `abs_path` – `str` – Absolute path to indicated file

Raises `FileNotFoundError` – If a file is not found at the given path

resolve_outpath(*out_path*, *in_path*, *params*)

Resolve the output location, handling mode-specific defaults.

If the output path or basename are not specified, they are taken as the same as the input file. If the extension is unspecified, it is taken as the appropriate mode-specific value from `DEF_OUT_EXT`.

If `URL` is passed, the input directory is taken to be `os.getcwd()` and the input basename is taken as `DEF_BASENAME`.

Parameters

- **out_path** – `str` or `None` – Output location provided by the user, or `None` if omitted
- **in_path** – `str` – For a local input file, its absolute path. For a URL, the (possibly truncated) URL text.
- **params** – `dict` – Parameters/values mapping from the active subparser

Returns `out_path` – `str` – Absolute path to the target output file

7.5 sphobjinv.cli.ui

sphobjinv *CLI UI functions*.

sphobjinv is a toolkit for manipulation and inspection of Sphinx objects.inv files.

Author Brian Skinn (bskinn@alum.mit.edu)

File Created 19 Nov 2020

Copyright (c) Brian Skinn 2016-2021

Source Repository <https://github.com/bskinn/sphobjinv>

Documentation <https://sphobjinv.readthedocs.io/en/latest>

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Members

err_format (*exc*)

Pretty-format an exception.

Parameters **exc** – `Exception` – Exception instance to pretty-format

Returns `pretty_exc` – `str` – Exception type and message formatted as ‘{type}: {message}’

log_print (*thing, params*)

Print *thing* to stderr if not in quiet mode.

Quiet mode is indicated by the value at the `QUIET` key within *params*.

Quiet mode is not implemented for the “*suggest*” CLI mode.

Parameters

- **thing** – *any* – Object to be printed
- **params** – `dict` – Parameters/values mapping from the active subparser

yesno_prompt (*prompt*)

Query user at *stdin* for yes/no confirmation.

Uses `input()`, so will hang if used programmatically unless *stdin* is suitably mocked.

The value returned from `input()` must satisfy either `resp.lower() == 'n'` or `resp.lower() == 'y'`, or else the query will be repeated *ad infinitum*. This function does **NOT** augment *prompt* to indicate the constraints on the accepted values.

Parameters `prompt` – `str` – Prompt to display to user that requests a ‘Y’ or ‘N’ response

Returns `resp` – `str` – User response

7.6 sphobjinv.cli.write

Module for sphobjinv *CLI |Inventory| writing*.

sphobjinv is a toolkit for manipulation and inspection of Sphinx objects.inv files.

Author Brian Skinn (bskinn@alum.mit.edu)

File Created 19 Nov 2020

Copyright (c) Brian Skinn 2016-2021

Source Repository <https://github.com/bskinn/sphobjinv>

Documentation <https://sphobjinv.readthedocs.io/en/latest>

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Members

write_file (`inv`, `in_path`, `params`)

Write the inventory contents to a file on disk.

Parameters

- `inv` – *Inventory* – Objects inventory to be written to stdout
- `in_path` – `str` – For a local input file, its absolute path. For a URL, the (possibly truncated) URL text.
- `params` – dict – *argparse* parameters

Raises **ValueError** – If both `params[“expand”]` and `params[“contract”]` are `True`

write_json (`inv`, `path`, `params`)

Write an *Inventory* to JSON.

Writes output via `fileops.writejson()`.

Calling with both *expand* and *contract* as `True` is invalid.

Parameters

- `inv` – *Inventory* – Objects inventory to be written zlib-compressed
- `path` – `str` – Path to output file
- `params` – dict – *argparse* parameters

Raises **ValueError** – If both `params[“expand”]` and `params[“contract”]` are `True`

write_plaintext (`inv`, `path`, *, `expand=False`, `contract=False`)

Write an *Inventory* to plaintext.

Newlines are inserted in an OS-aware manner, based on the value of `os.linesep`.

Calling with both *expand* and *contract* as `True` is invalid.

Parameters

- `inv` – *Inventory* – Objects inventory to be written as plaintext
- `path` – `str` – Path to output file

- **expand** – `bool (optional)` – Generate output with any `uri` or `dispname` abbreviations expanded
- **contract** – `bool (optional)` – Generate output with abbreviated `uri` and `dispname` values

Raises `ValueError` – If both `expand` and `contract` are `True`

write_stdout (`inv`, `params`)

Write the inventory contents to stdout.

Parameters

- **inv** – `Inventory` – Objects inventory to be written to stdout
- **params** – dict – `argparse` parameters

Raises `ValueError` – If both `params[“expand”]` and `params[“contract”]` are `True`

write_zlib (`inv`, `path`, *, `expand=False`, `contract=False`)

Write an `Inventory` to zlib-compressed format.

Calling with both `expand` and `contract` as `True` is invalid.

Parameters

- **inv** – `Inventory` – Objects inventory to be written zlib-compressed
- **path** – `str` – Path to output file
- **expand** – `bool (optional)` – Generate output with any `uri` or `dispname` abbreviations expanded
- **contract** – `bool (optional)` – Generate output with abbreviated `uri` and `dispname` values

Raises `ValueError` – If both `expand` and `contract` are `True`

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