
sdjson

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**Custom JSON Encoder for Python utilising
functools singledispatch to support custom encoders for
both Python's built-in classes and user-created classes,
without as much legwork.**

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Based on <https://treyhunner.com/2013/09/singledispatch-json-serializer/> and Python's `json` module.

Installation

1.1 from PyPI

```
$ python3 -m pip install sdjson --user
```

1.2 from Anaconda

First add the required channels

```
$ conda config --add channels https://conda.anaconda.org/conda-forge  
$ conda config --add channels https://conda.anaconda.org/domdfcoding
```

Then install

```
$ conda install sdjson
```

1.3 from GitHub

```
$ python3 -m pip install git+https://github.com/domdfcoding/singledispatch-json@master --user
```


API Reference

JSON encoder utilising `functools singledispatch` to support custom encoders for both Python's built-in classes and user-created classes, without as much legwork.

Creating and registering a custom encoder is as easy as:

```
>>> import sdjson
>>>
>>> @sdjson.register_encoder(MyClass)
>>> def encode_myclass(obj):
...     return dict(obj)
>>>
```

In this case, `MyClass` can be made JSON-serializable simply by calling `dict` on it. If your class requires more complicated logic to make it JSON-serializable, do that here.

Then, to dump the object to a string:

```
>>> class_instance = MyClass()
>>> print(sdjson.dumps(class_instance))
'{"menu": ["egg and bacon", "egg sausage and bacon", "egg and spam", "egg bacon and_
↪spam"],
"today\'s special": "Lobster Thermidor au Crevette with a Mornay sauce served in a_
↪Provencale
manner with shallots and aubergines garnished with truffle pate, brandy and with a_
↪fried egg
on top and spam."}'
>>>
```

Or to dump to a file:

```
>>> with open("spam.json", "w") as fp:
...     sdjson.dumps(class_instance, fp)
...
>>>
```

`sdjson` also provides access to `load()`, `loads()`, `JSONDecoder`, `JSONDecodeError`, and `JSONEncoder` from the `json` module, allowing you to use `sdjson` as a drop-in replacement for `json`.

If you wish to dump an object without using the custom encoders, you can pass a different `JSONEncoder` subclass, or indeed `JSONEncoder` itself to get the stock functionality.

```
>>> sdjson.dumps(class_instance, cls=sdjson.JSONEncoder)
>>>
```

When you've finished, if you want to unregister the encoder you can run:

```
>>> sdjson.unregister_encoder(MyClass)
>>>
```

to remove the encoder for `MyClass`. If you want to replace the encoder with a different one it is not necessary to call this function: the `@sdjson.register_encoder` decorator will replace any existing decorator for the given class.

Classes:

<code>JSONDecoder(*args, **kwargs)</code>	Alias of <code>json.JSONDecoder</code> .
<code>JSONEncoder(*args, **kwargs)</code>	Alias of <code>json.JSONEncoder</code> .

Functions:

<code>dump(obj, fp, **kwargs)</code>	Serialize custom Python classes to JSON.
<code>dumps(obj, *[, skipkeys, ensure_ascii, ...])</code>	Serialize custom Python classes to JSON.
<code>load(*args, **kwargs)</code>	Alias of <code>json.load()</code> .
<code>loads(*args, **kwargs)</code>	Alias of <code>json.loads()</code> .
<code>register_encoder(cls[, func])</code>	Registers a new handler for the given type.
<code>unregister_encoder(cls)</code>	Unregister the handler for the given type.

class `JSONDecoder(*args, **kwargs)`

Bases: `JSONDecoder`

Alias of `json.JSONDecoder`.

Simple JSON <<http://json.org>> decoder

Performs the following translations in decoding by default:

JSON	Python
object	dict
array	list
string	str
number (int)	int
number (real)	float
true	True
false	False
null	None

It also understands NaN, Infinity, and -Infinity as their corresponding `float` values, which is outside the JSON spec.

Methods:

<code>decode(*args, **kwargs)</code>	Return the Python representation of <code>s</code> (a <code>str</code> instance containing a JSON document).
<code>raw_decode(*args, **kwargs)</code>	Decode a JSON document from <code>s</code> (a <code>str</code> beginning with a JSON document) and return a 2-tuple of the Python representation and the index in <code>s</code> where the document ended.

decode (*args, **kwargs)

Return the Python representation of *s* (a `str` instance containing a JSON document).

raw_decode (*args, **kwargs)

Decode a JSON document from *s* (a `str` beginning with a JSON document) and return a 2-tuple of the Python representation and the index in *s* where the document ended.

This can be used to decode a JSON document from a string that may have extraneous data at the end.

class JSONEncoder (*args, **kwargs)

Bases: `JSONEncoder`

Alias of `json.JSONEncoder`.

Extensible JSON <<http://json.org>> encoder for Python data structures.

Supports the following objects and types by default:

Python	JSON
dict	object
list, tuple	array
str	string
int, float	number
True	true
False	false
None	null

To extend this to recognize other objects, subclass and implement a `default()` method with another method that returns a serializable object for *o* if possible, otherwise it should call the superclass implementation (to raise `TypeError`).

Methods:

<code>default(o)</code>	Implement this method in a subclass such that it returns a serializable object for <i>o</i> , or calls the base implementation (to raise a <code>TypeError</code>).
<code>encode(o)</code>	Return a JSON string representation of a Python data structure.
<code>iterencode(o[, _one_shot])</code>	Encode the given object and yield each string representation as available.

default (*o*)

Implement this method in a subclass such that it returns a serializable object for *o*, or calls the base implementation (to raise a `TypeError`).

For example, to support arbitrary iterators, you could implement `default` like this:

```
def default(self, o):
    try:
        iterable = iter(o)
    except TypeError:
        pass
    else:
        return list(iterable)
    # Let the base class default method raise the TypeError
    return JSONEncoder.default(self, o)
```

Return type `Any`

encode (*o*)

Return a JSON string representation of a Python data structure.

```
>>> from json.encoder import JSONEncoder
>>> JSONEncoder().encode({"foo": ["bar", "baz"]})
'{"foo": ["bar", "baz"]}'
```

Return type `Any`

iterencode (*o*, *_one_shot=False*)

Encode the given object and yield each string representation as available.

For example:

```
for chunk in JSONEncoder().iterencode(bigobject):
    mysocket.write(chunk)
```

Return type `Iterator[str]`

dump (*obj*, *fp*, ***kwargs*)

Serialize custom Python classes to JSON. Custom classes can be registered using the `@encoders.register(<type>)` decorator.

Serialize *obj* as a JSON formatted stream to *fp* (a `.write()`-supporting file-like object).

If *skipkeys* is true then `dict` keys that are not basic types (`str`, `int`, `float`, `bool`, `None`) will be skipped instead of raising a `TypeError`.

If *ensure_ascii* is false, then the strings written to *fp* can contain non-ASCII characters if they appear in strings contained in *obj*. Otherwise, all such characters are escaped in JSON strings.

If *check_circular* is false, then the circular reference check for container types will be skipped and a circular reference will result in an `OverflowError` (or worse).

If *allow_nan* is false, then it will be a `ValueError` to serialize out of range `float` values (`nan`, `inf`, `-inf`) in strict compliance of the JSON specification, instead of using the JavaScript equivalents (`NaN`, `Infinity`, `-Infinity`).

If *indent* is a non-negative integer, then JSON array elements and object members will be pretty-printed with that indent level. An indent level of 0 will only insert newlines. `None` is the most compact representation.

If specified, *separators* should be an (*item_separator*, *key_separator*) tuple. The default is (`' , '`, `' : '`) if *indent* is `None` and (`' , ' '`, `' : ' '`) otherwise. To get the most compact JSON representation, you should specify (`' , ' '`, `' : ' '`) to eliminate whitespace.

default (*obj*) is a function that should return a serializable version of *obj* or raise `TypeError`. The default simply raises `TypeError`.

If *sort_keys* is true (default: `False`), then the output of dictionaries will be sorted by key.

To use a custom `JSONEncoder` subclass (e.g. one that overrides the `default()` method to serialize additional types), specify it with the `cls` kwarg; otherwise `JSONEncoder` is used.

dumps (*obj*, ***, *skipkeys=False*, *ensure_ascii=True*, *check_circular=True*, *allow_nan=True*, *cls=None*, *indent=None*, *separators=None*, *default=None*, *sort_keys=False*, ***kwargs*)

Serialize custom Python classes to JSON. Custom classes can be registered using the `@encoders.register(<type>)` decorator.

Serialize *obj* to a JSON formatted `str`.

If `skipkeys` is true then `dict` keys that are not basic types (`str`, `int`, `float`, `bool`, `None`) will be skipped instead of raising a `TypeError`.

If `ensure_ascii` is false, then the return value can contain non-ASCII characters if they appear in strings contained in `obj`. Otherwise, all such characters are escaped in JSON strings.

If `check_circular` is false, then the circular reference check for container types will be skipped and a circular reference will result in an `OverflowError` (or worse).

If `allow_nan` is false, then it will be a `ValueError` to serialize out of range `float` values (`nan`, `inf`, `-inf`) in strict compliance of the JSON specification, instead of using the JavaScript equivalents (`NaN`, `Infinity`, `-Infinity`).

If `indent` is a non-negative integer, then JSON array elements and object members will be pretty-printed with that indent level. An indent level of 0 will only insert newlines. `None` is the most compact representation.

If specified, `separators` should be an (`item_separator`, `key_separator`) tuple. The default is (`' , ' , ' : '`) if `indent` is `None` and (`' , ' , ' : '`) otherwise. To get the most compact JSON representation, you should specify (`' , ' , ' : '`) to eliminate whitespace.

`default(obj)` is a function that should return a serializable version of `obj` or raise `TypeError`. The default simply raises `TypeError`.

If `sort_keys` is true (default: `False`), then the output of dictionaries will be sorted by key.

To use a custom `JSONEncoder` subclass (e.g. one that overrides the `default()` method to serialize additional types), specify it with the `cls` kwarg; otherwise `JSONEncoder` is used.

load (*args, **kwargs)

Alias of `json.load()`.

Deserialize `fp` (a `.read()`-supporting file-like object containing a JSON document) to a Python object.

`object_hook` is an optional function that will be called with the result of any object literal decode (a `dict`). The return value of `object_hook` will be used instead of the `dict`. This feature can be used to implement custom decoders (e.g. JSON-RPC class hinting).

`object_pairs_hook` is an optional function that will be called with the result of any object literal decoded with an ordered list of pairs. The return value of `object_pairs_hook` will be used instead of the `dict`. This feature can be used to implement custom decoders. If `object_hook` is also defined, the `object_pairs_hook` takes priority.

To use a custom `JSONDecoder` subclass, specify it with the `cls` kwarg; otherwise `JSONDecoder` is used.

loads (*args, **kwargs)

Alias of `json.loads()`.

Deserialize `s` (a `str`, `bytes` or `bytearray` instance containing a JSON document) to a Python object.

`object_hook` is an optional function that will be called with the result of any object literal decode (a `dict`). The return value of `object_hook` will be used instead of the `dict`. This feature can be used to implement custom decoders (e.g. JSON-RPC class hinting).

`object_pairs_hook` is an optional function that will be called with the result of any object literal decoded with an ordered list of pairs. The return value of `object_pairs_hook` will be used instead of the `dict`. This feature can be used to implement custom decoders. If `object_hook` is also defined, the `object_pairs_hook` takes priority.

`parse_float`, if specified, will be called with the string of every JSON float to be decoded. By default this is equivalent to `float(num_str)`. This can be used to use another datatype or parser for JSON floats (e.g. `decimal.Decimal`).

`parse_int`, if specified, will be called with the string of every JSON int to be decoded. By default this is equivalent to `int(num_str)`. This can be used to use another datatype or parser for JSON integers (e.g. float).

`parse_constant`, if specified, will be called with one of the following strings: `-Infinity`, `Infinity`, `NaN`. This can be used to raise an exception if invalid JSON numbers are encountered.

To use a custom `JSONDecoder` subclass, specify it with the `cls` kwarg; otherwise `JSONDecoder` is used.

The `encoding` argument is ignored and deprecated since Python 3.1.

`register_encoder` (*cls*, *func*=None)

Registers a new handler for the given type.

Can be used as a decorator or a regular function:

```
@register_encoder(bytes)
def bytes_encoder(obj):
    return obj.decode("UTF-8")

def int_encoder(obj):
    return int(obj)

register_encoder(int, int_encoder)
```

Parameters

- **`cls`** (Type)
- **`func`** (Optional[Callable]) – Default None.

Return type Callable

`unregister_encoder` (*cls*)

Unregister the handler for the given type.

```
unregister_encoder(int)
```

Parameters **`cls`** (Type)

Raises **`KeyError`** – if no handler is found.

Contributing

`sdjson` uses `tox` to automate testing and packaging, and `pre-commit` to maintain code quality.

Install `pre-commit` with `pip` and install the git hook:

```
$ python -m pip install pre-commit
$ pre-commit install
```

3.1 Coding style

`formate` is used for code formatting.

It can be run manually via `pre-commit`:

```
$ pre-commit run formate -a
```

Or, to run the complete autoformatting suite:

```
$ pre-commit run -a
```

3.2 Automated tests

Tests are run with `tox` and `pytest`. To run tests for a specific Python version, such as Python 3.6:

```
$ tox -e py36
```

To run tests for all Python versions, simply run:

```
$ tox
```

3.3 Type Annotations

Type annotations are checked using `mypy`. Run `mypy` using `tox`:

```
$ tox -e mypy
```

3.4 Build documentation locally

The documentation is powered by Sphinx. A local copy of the documentation can be built with `tox`:

```
$ tox -e docs
```


Downloading source code

The `sdjson` source code is available on GitHub, and can be accessed from the following URL: <https://github.com/domdfcoding/singledispatch-json>

If you have `git` installed, you can clone the repository with the following command:

```
$ git clone https://github.com/domdfcoding/singledispatch-json
```

```
Cloning into 'singledispatch-json'...
remote: Enumerating objects: 47, done.
remote: Counting objects: 100% (47/47), done.
remote: Compressing objects: 100% (41/41), done.
remote: Total 173 (delta 16), reused 17 (delta 6), pack-reused 126
Receiving objects: 100% (173/173), 126.56 KiB | 678.00 KiB/s, done.
Resolving deltas: 100% (66/66), done.
```

Alternatively, the code can be downloaded in a ‘zip’ file by clicking:

Clone or download → Download Zip

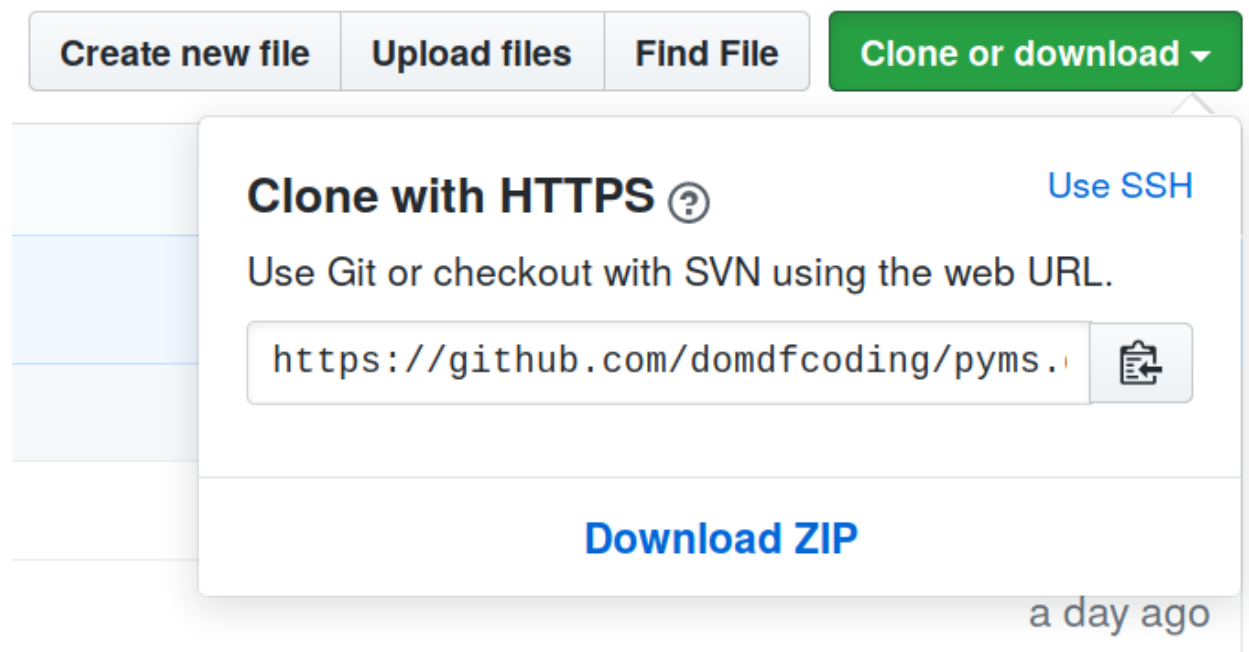


Fig. 1: Downloading a ‘zip’ file of the source code

4.1 Building from source

The recommended way to build `sdjson` is to use `tox`:

```
$ tox -e build
```

The source and wheel distributions will be in the directory `dist`.

If you wish, you may also use `pep517.build` or another **PEP 517**-compatible build tool.

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