
Booby Documentation

Release 0.7.0

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December 03, 2014

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Booby is a standalone data *modeling* and *validation* library written in Python. Booby is under active development (visit [this blog post](#) for more info and the roadmap) and licensed under the [Apache2 license](#), so feel free to [contribute](#) and [report errors and suggestions](#).

Usage

See the sample code below to get an idea of the main features.

```
from booby import Model, fields

class Token(Model):
    key = fields.String()
    secret = fields.String()

class Address(Model):
    line_1 = fields.String()
    line_2 = fields.String()

class User(Model):
    login = fields.String(required=True)
    name = fields.String()
    email = fields.Email()
    token = fields.Embedded(Token, required=True)
    addresses = fields.Collection(Address)

jack = User(
    login='jack',
    name='Jack',
    email='jack@example.com',
    token={
        'key': 'vs7dfxxx',
        'secret': 'ds5ds4xxx'
    },
    addresses=[
        {'line_1': 'Main Street'},
        {'line_1': 'Main St'}
    ]
)

if jack.is_valid:
    print jack.to_json(indent=2)
else:
    print json.dumps(dict(jack.validation_errors))

{
    "email": "jack@example.com",
```

```
"login": "jack",
"token": {
  "secret": "ds5ds4xxx",
  "key": "vs7dfxxx"
},
"name": "Jack",
"addresses": [
  {
    "line_1": "Main St",
    "line_2": null
  },
  {
    "line_1": "Main Street",
    "line_2": null
  }
]
}
```

Installation

You can install the last stable release of Booby from PyPI using pip or easy_install.

```
$ pip install booby
```

Also you can install the latest sources from Github.

```
$ pip install -e git+git://github.com/jaimegildesagredo/booby.git#egg=booby
```

Tests

To run the Booby test suite you should install the development requirements and then run nosetests.

```
$ pip install -r test-requirements.txt
$ nosetests tests/unit
$ nosetests tests/integration
```

Changes

See [Changes](#).

5.1 Installation

You can install Booby directly from PyPI using pip or easy_install:

```
$ pip install booby
```

Or install the latest sources from Github:

```
$ pip install -e git+git://github.com/jaimegildesagredo/booby.git#egg=booby
```

Also you can download a source code package from [Github](#) and install it using setuptools:

```
$ tar xvf booby-{version}.tar.gz
$ cd booby
$ python setup.py install
```

5.2 Models

The *models* module contains the *booby* highest level abstraction: the *Model*.

To define a model you should subclass the `Model` class and add a list of `fields` as attributes. And then you could instantiate your *Model* and work with these objects.

Something like this:

```
class Repo(Model):
    name = fields.String()
    owner = fields.Embedded(User)

booby = Repo(
    name='Booby',
    owner={
        'login': 'jaimegildesagredo',
        'name': 'Jaime Gil de Sagredo'
    })

print booby.to_json()
'{"owner": {"login": "jaimegildesagredo", "name": "Jaime Gil de Sagredo"}, "name": "Booby"}'
```

```
class models.Model(**kwargs)
    The Model class. All Booby models should subclass this.
```

By default the *Model*'s `__init__()` takes a list of keyword arguments to initialize the *fields* values. If any of these keys is not a *field* then raises `errors.FieldError`. Of course you can overwrite the *Model*'s `__init__()` to get a custom behavior.

You can get or set *Model* *fields* values in two different ways: through object attributes or dict-like items:

```
>>> booby.name is booby['name']
True
>>> booby['name'] = 'booby'
>>> booby['foo'] = 'bar'
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
errors.FieldError: foo
Traceback (most recent call last):
  File "<stdin>", line 1, in <module>
errors.FieldError: foo
```

Parameters `**kwargs` – Keyword arguments with the fields values to initialize the model.

is_valid

This property will be *True* if there are not validation errors in this *model* fields. If there are any error then will be *False*.

This property wraps the `Model.validate()` method to be used in a boolean context.

to_json (*args, **kwargs)

This method returns the *model* as a *json string*. It receives the same arguments as the builtin `json.dump()` function.

To build a json representation of this *model* this method iterates over the object to build a *dict* and then serializes it as json.

update (*args, **kwargs)

This method updates the *model* fields values with the given *dict*. The model can be updated passing a dict object or keyword arguments, like the Python's builtin `dict.update()`.

validate ()

This method validates the entire *model*. That is, validates all the *fields* within this model.

If some *field* validation fails, then this method raises the same exception that the `field.validate()` method had raised.

validation_errors

Generator of field name and validation error string pairs for each validation error on this *model* fields.

5.3 Fields

The `fields` module contains a list of *Field* classes for model's definition.

The example below shows the most common fields and builtin validations:

```
class Token(Model):
    key = String()
    secret = String()

class User(Model):
    login = String(required=True)
    name = String()
```

```
role = String(choices=['admin', 'moderator', 'user'])
email = Email(required=True)
token = Embedded(Token, required=True)
is_active = Boolean(default=False)
```

class `fields.Boolean(*args, **kwargs)`
 Field subclass with builtin *bool* validation.

class `fields.Collection(model, *args, **kwargs)`
 Field subclass with builtin *list* of `models.Model` validation, encoding and decoding.

Example:

```
class Token(Model):
    key = String()
    secret = String()
```

```
class User(Model):
    tokens = Collection(Token)
```

```
user = User({
    'tokens': [
        {
            'key': 'xxx',
            'secret': 'yyy'
        },
        {
            'key': 'zzz',
            'secret': 'xxx'
        }
    ]
})
```

```
user.tokens.append(Token(key='yyy', secret='xxx'))
```

class `fields.Email(*args, **kwargs)`
 Field subclass with builtin *email* validation.

class `fields.Embedded(model, *args, **kwargs)`
 Field subclass with builtin embedded `models.Model` validation.

class `fields.Field(*validators, **kwargs)`
 This is the base class for all booby.fields. This class can also be used as field in any `models.Model` declaration.

Parameters

- **default** – This field *default*'s value.
 If passed a callable object then uses its return value as the field's default. This is particularly useful when working with *mutable objects*.
 If *default* is a callable it can optionally receive the owner *model* instance as its first positional argument.
- **required** – If *True* this field value should not be *None*.
- **choices** – A *list* of values where this field value should be in.
- **name** – Specify an alternate key name to use when decoding and encoding.

- **read_only** – If *True*, the value is treated normally in decoding but omitted during encoding.
- ***validators** – A list of field `validators` as positional arguments.

class `fields.Float` (**args, **kwargs*)
`Field` subclass with builtin *float* validation.

class `fields.Integer` (**args, **kwargs*)
`Field` subclass with builtin *integer* validation.

class `fields.List` (**args, **kwargs*)
`Field` subclass with builtin *list* validation and default value.

class `fields.String` (**args, **kwargs*)
`Field` subclass with builtin *string* validation.

5.4 Validators

The `validators` module contains a set of `fields` validators.

A validator is any callable *object* which receives a *value* as the target for the validation. If the validation fails then should raise an `errors.ValidationError` exception with an error message.

Validators are passed to `fields.Field` and subclasses as positional arguments.

class `validators.Boolean`
This validator forces fields values to be an instance of *bool*.

class `validators.Email`
This validator forces fields values to be strings and match a valid email address.

class `validators.Float`
This validator forces fields values to be an instance of *float*.

class `validators.In` (*choices*)
This validator forces fields to have their value in the given list.

Parameters *choices* – A list of possible values.

class `validators.Integer`
This validator forces fields values to be an instance of *int*.

class `validators.List` (**validators*)
This validator forces field values to be a *list*. Also a list of inner `validators` could be specified to validate each list element. For example, to validate a list of `models.Model` you could do:

```
books = fields.Field(validators.List(validators.Model(YourBookModel)))
```

Parameters **validators* – A list of inner validators as positional arguments.

class `validators.Model` (*model*)
This validator forces fields values to be an instance of the given `models.Model` subclass and also performs a validation in the entire *model* object.

Parameters *model* – A subclass of `models.Model`

class `validators.Required`
This validator forces fields to have a value other than *None*.

class `validators.String`
This validator forces fields values to be an instance of *basestring*.

5.5 Inspection

The `inspection` module provides users and 3rd-party library developers a public api to access booby objects and classes internal data, such as defined fields, and some low-level type validations.

This module is based on the Python `inspect` module.

`inspection.get_fields(model)`

Returns a *dict* mapping the given *model* field names to their *fields.Field* objects.

Parameters `model` – The *models.Model* subclass or instance you want to get their fields.

Raises `TypeError` if the given *model* is not a model.

`inspection.is_model(obj)`

Returns *True* if the given object is a *models.Model* instance or subclass. If not then returns *False*.

5.6 Errors

The *errors* module contains all exceptions used by Booby.

exception errors.BoobyError

Base class for all Booby exceptions.

exception errors.FieldError

This exception is used as an equivalent to `AttributeError` for *fields*.

exception errors.ValidationError

This exception should be raised when a *value* doesn't validate. See *validators*.

5.7 Changes

5.7.1 0.7.0 (Dec 3, 2014)

Backwards-incompatible

- The `List` encoder no longer encodes models. To achieve the old behavior pass the `Model` encoder as an argument instead:

```
class User(Model):
    tokens = fields.Field(encoders=[encoders.List(encoders.Model())])
```

Highlights

- Added a `Collection` field that works like `Embedded` for lists of models:

```
class User(Model):
    tokens = fields.Collection(Token)
```

```
user = User({
    'tokens': [
        {
            'key': 'xxx',
            'secret': 'yyy'
```

```
        }
    ]
})

user.tokens.append(Token(key='zzz', secret='www'))
user.validate()
```

See [the docs](#) for more info.

5.7.2 0.6.0 (Oct 12, 2014)

Backwards-incompatible

- The *List* validator now accepts *None* as a valid value allowing not required list fields. Before this a field with a *List* validator couldn't be *None*.

Highlights

- The *Model* class now defines a *decode* and *encode* methods with serialization/deserialization support.
- A *Field* now can receive lists of callable objects, *encoders* and *decoders*, to perform serialization/deserialization.
- Added a *List* field that can be used to create fields containing lists of objects (even models).
- Datetime validator, encoder, and decoder were added.

5.7.3 0.5.2 (Mar 22, 2014)

Highlights

- Added readable *Field* instances repr. See [issue 20](#).
- Added readable *Model* classes and instances repr.

5.7.4 0.5.1 (Jan 31, 2014)

Highlights

- The *Email* validator now only performs a basic sanity check instead of the more restrictive previous check. See [issue 17](#).
- The *List* validator now accepts any object that implements the *list* interface (`collections.MutableSequence`). See [issue 18](#).
- Any object implementing the *dict* interface (`collections.MutableMapping`) can be used as a value for an *Embedded* field. See [issue 18](#).
- When iterating a *Model* object all objects implementing the *list* interface are treated as lists. See [issue 18](#).

5.7.5 0.5.0 (Jan 4, 2014)

Backwards-incompatible

- Now field *validators* must be callable objects. Before this release validators had a *validate* method that is not longer used to perform a validation. This change only affects to custom user validators with a *validate* method.

Highlights

- The *FieldError* exception now is raised only with the field name as argument. See [issue 12](#).
- Fields *default* argument callables can now optionally receive the model as argument.
- Added the *inspection* module which provides the *get_fields* and *is_model* functions as a public api to get access to *models* fields and type validation.

5.7.6 0.4.0 (Ago 4, 2013)

Backwards-incompatible

- Moved the *Model.to_dict* functionality to *dict(model)*.
- The *Model.validation_errors* method now is an iterable of field name and validation error pairs.
- Removed the *Field* suffix for all Booby fields. Now use the module as namespace: *fields.String*.

Highlights

- Added an *is_valid* property to *Model*.
- The *Model* instances now are iterables of field name, value pairs.

5.7.7 0.3.0 (Jun 20, 2013)

Highlights

- When passed a *callable* object as a field *default* then the default value for this field in a model instance will be the return value of the given callable.
- Added the `models.Model.validation_errors()` method to get a dict of field name and error message pairs for all invalid model fields.

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