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CHAPTER 1

About

DoJSON is a simple Pythonic JSON to JSON converter.
DoJSON is on PyPI so all you need is:

```bash
$ pip install dojson
```
Documentation is readable at https://dojson.readthedocs.io/ or it can be built using Sphinx:

```
$ pip install dojson[docs]
$ python setup.py build_sphinx
```
Running the test suite is as simple as:

```bash
$ python setup.py test
```
A simple example on how to convert MARCXML to JSON:

```python
from dojson.contrib.marc21.utils import create_record, split_stream
from dojson.contrib.marc21 import marc21

[marc21.do(create_record(data)) for data in split_stream(open('/tmp/data.xml', 'r'))]
```

## 5.1 User’s Guide

This part of the documentation will show you how to get started in using DoJSON.

### 5.1.1 Usage

DoJSON is a simple Pythonic JSON to JSON converter.

The main goal of this package is to help with managing a set of rules for manipulation of Python dictionaries with focus on JSON serialization. Each rule is associated with regular expression and key. The regular expression has to match a key in the source mapping and produces a new value that is added to the output mapping under the new key.

**Initialization**

First create an `Overdo` object that is holding the index with rules.

```python
>>> import dojson
>>> simple = dojson.Overdo()
```

Next step is to create rules that will manipulate a source object.
And now we can try to match the source object and produce new data.

```python
>>> data = simple.do({'1st': 1, '2nd': 2})
>>> assert 2 == data['first']
>>> assert 4 == data['second']
```

**Command line interface**

Command line interface script is installed as `dojson`.

The easiest way to get started by applying already registered rule to a JSON data.

```json
{"245__": {"a": "Test title"}}
```

DoJSON comes with set of rules for processing MARC21 fields.

```bash
$ echo '{"245__": {"a": "Test title"}}' | dojson do marc21
{"title_statement": {"title": "Test title"}}
```

Sometimes one can get input with fields that does not match any rule. To get such a list of fields one can use the `missing` command.

```bash
$ echo '{"999__": {"a": "Test title"}}' | dojson missing marc21
999__
```

The usual problem comes with reading different file formats such as XML.

```xml
<?xml version='1.0' encoding='UTF-8'?><collection xmlns="http://www.loc.gov/MARC21/slim"><record>  <datafield tag="245" ind1=" " ind2=" ">    <subfield code="a">Test title</subfield>  </datafield></record></collection>
```

You can specify registered loader using `-l <NAME>` argument. Save the above example as `example.xml` and check following command.

```bash
$ dojson -i example.xml -l marcxml do marc21
{"title_statement": {"title": "Test title"}}
```

In similar way it is possible to specify different output serializer `-d`.

```bash
$ echo '{"title_statement": {"title": "Test title"}}' | dojson -d marcxml do marc21
<?xml version='1.0' encoding='UTF-8'?><collection xmlns="http://www.loc.gov/MARC21/slim"><record>
```

(continues on next page)
Command chaining

This makes JSON manipulation even easier. For first example see schema command that accept string argument containing URL of JSON-Schema that should be added to $schema field.

```bash
$ dojson -i example.xml -l marcxml do marc21 \
    schema http://example.org/schema/marc21.json
..."schema": "http://example.org/schema/marc21.json"...
```

Second example shows easy verification that rules produce an identity function.

```bash
$ dojson -l marcxml -d marcxml do marc21 do to_marc21 < example.xml | \ 
    diff - example.xml
```

Extensibility

New commands, loaders, dumpers, or rules can be provided via entry points.

- `dojson.cli` commands that return a processor acception an iterator;
- `dojson.cli.load` functions expecting a stream and returning Python dict or iterator;
- `dojson.cli.dump` functions expecting a Python object and returning `str`;
- `dojson.cli.rule` instances of `dojson.overdo.Overdo` with loaded rules.

### 5.2 API Reference

If you are looking for information on a specific function, class or method, this part of the documentation is for you.

#### 5.2.1 API

Do JSON translation.

```python
class dojson.overdo.Index(rules=None, flags=0, branch_size=99)
    Index implementation based on build-in Python SRE module.

    query(key)
        Return data matching the key.

class dojson.overdo.Overdo(bases=None, entry_point_group=None)
    Translation index.

    build()
        Build.
```
DoJSON Documentation, Release 1.4.0

\[
do (blob, \text{ignore\_missing}=True, \text{exception\_handlers}=None)
\]
Translates blob values and instantiates a new model instance.

Raises \texttt{MissingRule} when no rule matched and \texttt{ignore\_missing} is \texttt{False}.

**Parameters**

- \texttt{blob} – \texttt{dict}-like object on which the matching rules are going to be applied.
- \texttt{ignore\_missing} – Set to \texttt{False} if you prefer to raise an exception \texttt{MissingRule} for the first key that it is not matching any rule.
- \texttt{exception\_handlers} – Give custom exception handlers to take care of non-standard codes that are installation specific.

Changed in version 1.0.0: \texttt{ignore\_missing} allows to specify if the function should raise an exception.

Changed in version 1.1.0: \texttt{exception\_handlers} allows to set custom handlers for non-standard MARC codes.

\[
\text{missing}(blob)
\]
Return keys with missing rules.

\[
\text{over}(name, *\text{source\_tags})
\]
Register creator rule.

**Errors**

Define all DoJSON exceptions.

\[
\text{exception dojson.errors.DoJSONException}
\]
Parent for all DoJSON exceptions.

New in version 1.0.0.

\[
\text{exception dojson.errors.IgnoreItem}
\]
The corresponding item from the current iterable has been ignored.

New in version 1.3.0.

\[
\text{exception dojson.errors.IgnoreKey}
\]
The corresponding key has been ignored.

New in version 0.2.0.

\[
\text{exception dojson.errors.MissingRule}
\]
Raise when no matching rule was found.

New in version 1.0.0.

**CLI**

Define chainable commands for processing loaded data.

\[
\text{dojson.cli.command.process\_do} = <\text{click.core.Command object}>
\]
Process data using given rule.

\[
\text{dojson.cli.command.process\_missing} = <\text{click.core.Command object}>
\]
List fields with missing rules.

\[
\text{dojson.cli.command.process\_schema} = <\text{click.core.Command object}>
\]
Add $schema to an item.
Utility function to manage CLI entry points

```python
dojson.cli.utils.open_entry_point(group_name)
   Open entry point.
dojson.cli.utils.with_plugins(group_name)
   Register external CLI commands.
```

**Contrib**

There are set of rules to manage translation from other formats.

**MARC21**

MARC standards based on [www.loc.gov/marc/](http://www.loc.gov/marc/).

### 5.3 Additional Notes

Notes on how to contribute, legal information and changes are here for the interested.

#### 5.3.1 Contributing

Bug reports, feature requests, and other contributions are welcome. If you find a demonstrable problem that is caused by the code of this library, please:

1. Search for already reported problems.
2. Check if the issue has been fixed or is still reproducible on the latest master branch.
3. Create an issue with a test case.

If you create a feature branch, you can run the tests to ensure everything is operating correctly:

```
$ python setup.py test
...
====== 31 passed, 23 skipped in 1.37 seconds ======
```

You can also test your feature branch using Docker:

```
$ docker-compose build
$ docker-compose run web python setup.py test
$ docker-compose run web python setup.py build_sphinx
$ docker-compose run web pydocstyle --match-dir='dojson'
```

#### 5.3.2 Changes

**Version 1.4.0 (released 2018-03-12):**

- Changes subfield codes to be case-insensitive by always forcing subfield codes to be lowercase.
Version 1.3.2 (released 2017-08-07):

- Removes experimental warning from MARC21 Undo feature.

Version 1.3.1 (released 2017-03-14):

Bug fixes

- Removes duplicate fields in MARC 21 JSON Schemas (closes #189).

Version 1.3.0 (released 2017-02-14):

New features

- Adds the possibility to skip individual items when using the `for_each_value` decorator by raising the `IgnoreElement` exception.
- Adds `@flatten` decorator that joins iterable results. (#147)
- Adds to_marc21 conversion functions.

Improved features

- Updates MARC21 schema and conversion functions to the latest Library of Congress standard.
- Clarifies in its docstring that `force_list` may returns a tuple, not a list. (#154)
- Adds order to existing marc21 conversion functions.
- Updates authority schema with new fields and corrects some existing ones.

Bug fixes

- Addresses issues with STDIN encoding on Python 3.
- Removes `@utils.for_each_value decorator` from conversion function for MARC21 field 044, which is not repeatable. (#181)
- Adds `tuples` to recognize types in `reverse_force_list` so it behaves correctly as an inverse function to `force_list`.
- Adds missing default argument to `__deepcopy__` method on GroupableOrderedDict. (#167)
- Implements GroupableOrderedDict.__repr__() so that `eval(repr(god)) == god`. (#162)
- Removes invalid check for length of yielded value causing exception when value is dictionary with one item. (#150)
- Removes list definition from `main_entry_uniform_title` as according to Library of Congress is a non repeatable field.
- Removes invalid subfield from `data/test_7.xml`. 

Chapter 5. Example
Version 1.2.1 (released 2016-05-02):

Improved features

• Improves support for leader field conversion to and from MARC21 and adds JSON Schema for this field. (#133)
• Adds conversion support for leader field in authority records, as well as schema support.
• Adds support for dashes in keys. (#139)

Bug fixes

• Fixes bug in string formatting, and pads integer fields with zeros (as per MARC standard).
• Removes list definition from main_entry_personal_name as according to Library of Congress is a non repeatable field.

Version 1.2.0 (released 2016-03-21):

Incompatible changes

• Removes automatic wrapping to <collection/> for single record passed to dumps_etree.

Improved features

• Adds new argument to specify namespace prefix in generated MARCXML.

Version 1.1.1 (released 2016-03-15):

Bug fixes

• Adds missing schemas for fields bd388, bd370, bd348, bd884.

Version 1.1.0 (released 2016-03-10):

Incompatible changes

• Moves –load and –dump options to global group.

New features

• Adds schema command to enhance JSON with ‘$schema’ field. (#73)
• Adds rules and schemas for MARC 21 Format for Authority Data. (#7)
• Adds rules and schemas for MARC 21 Format for Holdings Data. (#21)
• Adds support for parsing <leader/> tag in MARCXML.
• Adds new parameter `exception_handlers` to `dojson.Overdo.do` and `dojson.contrib.to_marc21.model.Underdo.do`. It can be given to the translation process to deal with non-standard fields in a custom way (#26).

• Adds new utility `map_order` function to ease renaming of subfields.

Improved features

• Adds more detailed usage examples. (#117)
• Refactors CLI to allow commands chaining.
• Adds support preserving the order of subfields.

Bug fixes

• Fixes support for Python 3.5.1.

Version 1.0.0 (released 2016-01-14):

Incompatible changes

• Removes support for single key matching multiple rules. Please make your rules mutually exclusive!
• controlfields 00x are expected to be the element or a list of multiple elements.

New features

• Adds new keyword argument `ignore_missing` to `Overdo.do` method to specify if method should raise `MissingRule` exception when there is no matching rule for a key.

• Adds new CLI option `-strict` to the `do` command that sets the `ignore_missing` argument to `False`. (#51)
• MARC XML serialization from `to_marc21`.

Improved features

• Adds support for Python 3+.
• Uses an OrderedDict to let the external tools working on `dict` (like json) behave correctly.
• All results from rules using `for_each_value` decorator are being automatically extended. This is useful for repeatable MARC21 fields with different indicators. (#53)
• Record are stored in an immutable sorted structure which enables to keep the intended order while offering easy ways to access, index and manipulate.
• Adds two records to be tested.
• Reorders some of the assertion: `expected == actual`. 
Version 0.4.0 (released 2015-11-18):

New features

- Improves dojson.contrib.marc2.utils.load() to read the input by iterating of the open stream, rather than loading it all in memory in one go. (#45) (#46)
- Renames OverUndo to Underdo following same name convention as for Overdo.

Bug fixes

- Fixes indicator extraction from value in Underdo model.

Version 0.3.0 (released 2015-11-09):

New features

- Adds experimental rules for converting human readable JSON into a JSON representation of the MARC21 Format.
- Adds do and missing commands for dojson command line interface (see dojson --help for more information).

Improved features

- Adds missing mapping for the first indicator of field 856.

Version 0.2.0 (released 2015-10-07):

New features

- Adds the possibility to use base DoJSON model so the rules are “inherited” from them.
- Adds new decorator ignore_value that remove the key in the resulting json for None value.

Improved features

- Uses entry points instead of plain imports to load the creator rules.

Bug fixes

- Removes calls to PluginManager consider_setuptools_entrypoints() removed in PyTest 2.8.0.

Version 0.1.1 (released 2015-07-27):

- Sorts and removes duplicated enum values.
- Swaps wrongly defined repeatable and non-repeatable subfields. (#23)
- Addresses issue when allowed indicators where defined as a range. (#22)
5.3.3 License

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