dabmodel

User Manual

chacha

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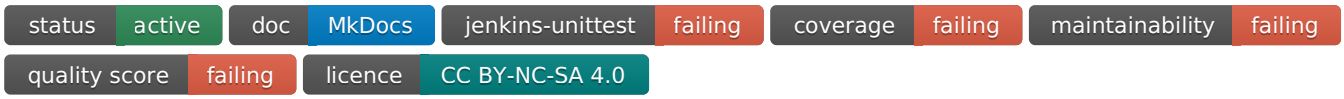

1. Python project template

A nice template to start blank python projets.

This template automate a lot of handy things and allow CI/CD automatic releases generation.

It is also collectings data to feed Jenkins build.

Checkout Latest Documentation.

1.1 Features

1.1.1 Generic pipeline skeleton:

```
- Prepare
- GetCode
- BuildPackage
- Install
- CheckCode
- PlotMetrics
- RunUnitTests
- GenDOC
- PostRelease
```

1.1.2 CI/CD Environment

```
- Jenkins
- Gitea (with patch for dynamic Readme variables: https://chacha.ddns.net/gitea/chacha/GiteaMarkupVariable)
- Docker
- MkDocsWeb
```

1.1.3 CI/CD Helper libs

```
- VirtualEnv
- Changelog generation based on commits
- copier
- pylint + pylint_json2html
- mypy
- unittest + xmlrunner + junitparser + junit2htmlreport
- mkdocs
```

1.1.4 Python project

```
- Full .toml implementation
- .whl automatic generation
- dynamic versionning using git repository
- embedded unit-test
```

2. Usage

2.1 Pulvinar dolor

Donec dapibus est fermentum justo volutpat condimentum. Integer quis nunc neque. Donec dictum vehicula justo, in facilisis ex tincidunt in. Vivamus sollicitudin sem dui, id mollis orci facilisis ut. Proin sed pulvinar dolor. Donec volutpat commodo urna imperdiet pulvinar. Fusce eget aliquam risus. Vivamus viverra luctus ex, in finibus mi. Nullam elementum dapibus mollis. Ut suscipit volutpat ex, quis feugiat lacus consectetur eu.

2.2 Condimentum faucibus

Quisque auctor egestas sem, luctus suscipit ex maximus vitae. Duis facilisis augue et condimentum faucibus. Donec cursus, enim a sagittis egestas, lectus lorem eleifend libero, at tincidunt leo magna at libero. Nunc eros velit, suscipit luctus tempor vel, finibus et est. Curabitur efficitur pretium pulvinar. Donec urna lectus, vulputate quis turpis sed, placerat congue urna. Phasellus aliquet fermentum quam, non auctor elit porta nec. Morbi eu ligula at nisl ultricies condimentum vitae id ante.

2.3 Aliquam lacinia

In volutpat lorem ex, et fringilla nibh faucibus quis. Mauris et arcu elementum, auctor dui vitae, egestas arcu. Duis sit amet aliquam quam. Phasellus a odio turpis. Etiam tristique mi eu enim varius, eget facilisis est vestibulum. Aliquam lacinia nec purus sed luctus. Cras at laoreet erat.

3. Reference

3.1 Dabmodel

3.1.1 metadata

Metadata module module

Attributes

__Name__ `module-attribute`

```
__Name__ = metadata['Name']
```

__Summuary__ `module-attribute`

```
__Summuary__ = metadata['Summary']
```

__version__ `module-attribute`

```
__version__ = version('dabmodel')
```

dist `module-attribute`

```
dist = distribution('dabmodel')
```

3.1.2 Appliance

Classes

Appliance

Bases: `IAppliance`

BaseFeature class Base class for Appliance. An appliance is a server configuration / image that is built using appliance's code and Fields.

Functions

validate_schema

```
validate_schema()
```

validate_schema_class `classmethod`

```
validate_schema_class()
```

3.1.3 Base element

Classes

BaseElement

Attributes

__lam_class_mutable__ `class-attribute` `instance-attribute`

```
__lam_class_mutable__ = False
```

__lam_initialized__ `class-attribute` `instance-attribute`

```
__lam_initialized__ = False
```

__lam_object_mutable__ `class-attribute` `instance-attribute`

```
__lam_object_mutable__ = False
```

__lam_options__ `class-attribute` `instance-attribute`

```
__lam_options__ = {}
```

def get_model_spec(self, name: str, module: str, memo: dict[str, Any]) -> ElementView: # memo[self.**name**] = {} init_fieldvalues = {} init_fieldtypes = {} for k, v in self.**lam_schema**.items(): if isinstance(v, LAMField_Element): memo[k] = {} init_fieldvalues[k] = v.value.get_model_spec(memo[k]) # clone = v.clone_unfrozen().value elif isinstance(v, LAMField): clone = deepcopy(v.value) init_fieldvalues[k] = clone else: pass init_fieldtypes[k] = v.annotations return ElementView(init_fieldvalues, init_fieldtypes)

@classmethod def get_model_spec_cls(cls, memo: dict[str, Any]) -> ElementView: # memo[self.**name**] = {} init_fieldvalues = {} init_fieldtypes = {} for k, v in cls.**lam_schema**.items(): if isinstance(v, LAMField_Element): memo[k] = {} init_fieldvalues[k] = v.value.get_model_spec(k, memo[k]) # clone = v.clone_unfrozen().value elif isinstance(v, LAMField): clone = deepcopy(v.value) init_fieldvalues[k] = clone else: pass init_fieldtypes[k] = v.annotations return ElementViewCls(init_fieldvalues, init_fieldtypes, cls.**name**, cls.**modules**)

__lam_schema__ `class-attribute` `instance-attribute`

```
__lam_schema__ = {}
```

frozen `property`

```
frozen: bool
```

frozen_cls `classmethod` `property`

```
frozen_cls: bool
```

mutable_obj `classmethod` `property`

```
mutable_obj: bool
```

Functions

__setattr__

```
__setattr__(key: str, value: Any) -> None
```

clone_as_mutable_variant

```
clone_as_mutable_variant(*, deep: bool = True, _memo: Dict[int, Self] | None = None) -> Self
```

freeze

```
freeze(force: bool = False) -> None
```

freeze_class `classmethod`

```
freeze_class(force: bool = False) -> None
```

validate_schema

```
validate_schema() -> None
```

validate_schema_class `classmethod`

```
validate_schema_class() -> None
```

Functions

3.1.4 Defines

Attributes

ALLOWED_ANNOTATIONS `module-attribute`

```
ALLOWED_ANNOTATIONS: dict[str, Any] = {'Union': Union, 'Optional': Optional, 'List': List, 'Dict': Dict, 'Tuple': Tuple, 'Set': Set, 'FrozenSet': FrozenSet,
'Annotated': Annotated, 'int': int, 'str': str, 'float': float, 'bool': bool, 'complex': complex, 'bytes': bytes, 'None': type(None), 'list': list, 'dict': d
ict, 'set': set, 'frozenset': frozenset, 'tuple': tuple}
```

ALLOWED_HELPERS_DEFAULT `module-attribute`

```
ALLOWED_HELPERS_DEFAULT: dict[str, object] = {'math': ALLOWED_HELPERS_MATH, 'print': print, 'abs': abs, 'round': round, 'min': min, 'max': max, 'sum': sum, '
len': len, 'sorted': sorted, 'tuple': tuple, 'list': list, 'dict': dict, 'set': set, 'int': int, 'float': float, 'str': str, 'bool': bool, 'bytes': bytes, 'c
omplex': complex, 'range': range}
```

ALLOWED_HELPERS_MATH `module-attribute`

```
ALLOWED_HELPERS_MATH = SimpleNamespace(sqrt=sqrt, floor=floor, ceil=ceil, trunc=trunc, fabs=fabs, copysign=copysign, hypot=hypot, exp=exp, log=log, log10=log
10, sin=sin, cos=cos, tan=tan, atan2=atan2, radians=radians, degrees=degrees)
```

ALLOWED_MODEL_FIELDS_TYPES `module-attribute`

```
ALLOWED_MODEL_FIELDS_TYPES: set[type[Any], ...] = {str, int, float, complex, bool, bytes}
```

JSONPrimitive `module-attribute`

```
JSONPrimitive = Union[str, int, float, bool, None]
```

JSONType `module-attribute`

```
JSONType = Union[JSONPrimitive, List[Any], Dict[str, Any]]
```

3.1.5 Element

Classes

Element

Bases: `IElement`

Element class Base class to apply metaclass and set common Fields.

3.1.6 Exception

Classes

BrokenInheritance

Bases: `DABModelException`

BrokenInheritance Exception class inheritance chain is broken

ClosureForbidden

Bases: `FunctionForbidden`

ClosureForbidden Exception class

DABModelException

Bases: `Exception`

DABModelException Exception class Base Exception for DABModelException class

ExternalCodeForbidden

Bases: `FunctionForbidden`

ExternalCodeForbidden Exception class

FeatureAlreadyBound

Bases: `DABModelException`

FeatureAlreadyBound Exception class Feature can only be bind once

FeatureBoundToIncompatibleAppliance

Bases: `DABModelException`

FeatureBoundToWrongAppliance Exception class Feature have to be bound to correct appliance

FeatureBoundToNonAppliance

Bases: `DABModelException`

FeatureBoundToNonAppliance Exception class Feature can only be bind to Appliance class

FeatureNotBound

Bases: `DABModelException`

FeatureNotBound Exception class a Feature must be bound to the appliance (or parent)

FeatureWrongBound

Bases: `DABModelException`

FeatureWrongBound Exception class Feature can be bind to one and only one Appliance

FunctionForbidden

Bases: `DABModelException`

FunctionForbidden Exception class

ImportForbidden

Bases: `DABModelException`

ImportForbidden Exception class Imports are forbidden

IncompletelyAnnotatedField

Bases: `InvalidFieldAnnotation`

IncompletelyAnnotatedField Exception class The field annotation is incomplete

InvalidFeatureInheritance

Bases: `DABModelException`

InvalidFeatureInheritance Exception class Features of same name in child appliance need to be from same type

InvalidFieldAnnotation

Bases: `AttributeError`, `DABModelException`

InvalidFieldAnnotation Exception class The field annotation is invalid

InvalidFieldName

Bases: `AttributeError`, `DABModelException`

InvalidFieldName Exception class The Field name is invalid

InvalidFieldValue

Bases: `SchemaViolation`

InvalidFieldValue Exception class The Field value is invalid

InvalidInitializerType

Bases: `DABModelException`

InvalidInitializerType Exception class The initializer is not a valid type

MultipleInheritanceForbidden

Bases: `DABModelException`

MultipleInheritanceForbidden Exception class Multiple inheritance is forbidden when using dabmodel

NonExistingField

Bases: `SchemaViolation`

NonExistingField Exception class The given Field is non existing

NotAnnotatedField

Bases: `InvalidFieldAnnotation`

NotAnnotatedField Exception class The Field is not Annotated

ReadOnlyField

Bases: `AttributeError`, `DABModelException`

ReadOnlyField Exception class The used Field is ReadOnly

ReadOnlyFieldAnnotation

Bases: `AttributeError`, `DABModelException`

ReadOnlyFieldAnnotation Exception class Field annotation connot be modified

ReservedFieldName

Bases: `AttributeError`, `DABModelException`

ReservedFieldName Exception class Base Exception for DABModelException class

SchemaViolation

Bases: `AttributeError`, `DABModelException`

SchemaViolation Exception class The Element Schema is not respected

UnsupportedFieldType

Bases: `InvalidFieldAnnotation`

UnsupportedFieldType Exception class The field type is unsupported

WrongUsage

Bases: `DABModelException`, `RuntimeError`

3.1.7 Feature

Classes

Feature

Bases: `IFeature`

Feature class Base class for Appliance's Features. Features are optional traits of an appliance.

Attributes

Enabled `class-attribute` `instance-attribute`

```
Enabled: bool = False
```

__lam_bound_appliance__ `class-attribute` `instance-attribute`

```
__lam_bound_appliance__ = None
```

Functions

bind_appliance `classmethod`

```
bind_appliance(appliance_cls)
```

check_appliance_bound `classmethod`

```
check_appliance_bound()
```

check_appliance_compatibility `classmethod`

```
check_appliance_compatibility(appliance_cls)
```

3.1.8 Interfaces

Attributes

TV_Freezable `module-attribute`

```
TV_Freezable = TypeVar('TV_Freezable')
```

Classes

FreezableElement

Bases: `Protocol`, `Generic[TV_Freezable]`

Attributes

frozen `property`

```
frozen: bool
```

frozen_cls `classmethod` `property`

```
frozen_cls: bool
```

mutable_obj `classmethod` `property`

```
mutable_obj: bool
```

Functions

clone_as_mutable_variant

```
clone_as_mutable_variant(*, deep: bool = True, _memo: Dict[int, Self] | None = None) -> Self
```

freeze

```
freeze(force: bool = False) -> None
```

freeze_class `classmethod`

```
freeze_class(force: bool = False) -> None
```

validate_schema

```
validate_schema() -> None
```

validate_schema_class `classmethod`

```
validate_schema_class() -> None
```

3.1.9 Tools

library's internal tools

Attributes

Classes

LAMJSONEncoder

Bases: `JSONEncoder`

allows to JSON encode non supported data type

Functions

default

```
default(o)
```

Functions

LAMdeepfreeze

```
LAMdeepfreeze(value)
```

recursive freeze helper function

is_data_attribute

```
is_data_attribute(name: str, value: any) -> bool
```

3.1.10 Lam field

Constraint

ATTRIBUTES

T_Field `module-attribute`

```
T_Field = TypeVar('T_Field')
```

CLASSES

Constraint

```
Constraint()
```

Bases: `Generic[T_Field]`

Constraint class Base class for Field's constraints

Functions
check

```
check(value: T_Field) -> bool
```

Check if a Constraint is completed

Lam field

ATTRIBUTES

TV_LABField module-attribute

```
TV_LABField = TypeVar('TV_LABField')
```

CLASSES

LAMField

```
LAMField(name: str, val: Optional[TV_LABField], ann: Any, i: LAMFieldInfo)
```

Bases: `Generic[TV_LABField]`

This class describe a Field in Schema

Attributes

__annotations `instance-attribute`

```
__annotations: Any
```

__frozen `instance-attribute`

```
__frozen: bool = False
```

__frozen_value_set `instance-attribute`

```
__frozen_value_set: True = False
```

__info `instance-attribute`

```
__info: LAMFieldInfo = deepcopy(i)
```

__name `instance-attribute`

```
__name: str = name
```

__source `instance-attribute`

```
__source: Optional[type] = None
```

annotations `property`

```
annotations: Any
```

Returns Field's annotation

constraints `property`

```
constraints: list[Constraint]
```

Returns Field's constraint

default_value `property`

```
default_value: Any
```

Returns Field's default value (frozen)

doc `property`

```
doc: str
```

Returns Field's documentation

frozen_value property

```
frozen_value: Any
```

info property

```
info: LAMFieldInfo
```

Returns Field's info

name property

```
name: str
```

raw_value property

```
raw_value: Optional[TV_LABField]
```

Returns Field's value

value property

```
value: Any
```

Returns Field's value (frozen)

Functions
add_constraint

```
add_constraint(cons: Constraint) -> None
```

Adds constraint to the Field

add_source

```
add_source(src: type) -> None
```

Adds source Appliance to the Field

clone_unfrozen

```
clone_unfrozen() -> Self
```

freeze

```
freeze()
```

is_frozen

```
is_frozen() -> bool
```

update_value

```
update_value(val: Optional[TV_LABField] = None) -> None
```

Updates Field's value

validate

```
validate(val: Optional[TV_LABField])
```

validate_self

```
validate_self()
```

LAMFieldFactory

Functions

create_field `staticmethod`

```
create_field(name: str, val: Optional[TV_LABField], anno: Any, info: LAMFieldInfo) -> LAMField
```

LAMField_Element

```
LAMField_Element(name: str, val: Optional[TV_LABField], ann: Any, i: LAMFieldInfo)
```

Bases: `LAMField[FreezableElement]`

Attributes
default_value `property`

```
default_value: Any
```

Functions
update_value

```
update_value(val: Optional[FreezableElement] = None) -> None
```

validate

```
validate(val: Optional[FreezableElement])
```

FUNCTIONS

Lam field info

CLASSES

LAMFieldInfo

```
LAMFieldInfo(*, doc: str = '', constraints: Optional[list[Constraint]] = None)
```

This Class allows to describe a Field in Appliance class

Attributes

__constraints `instance-attribute`

```
__constraints: list[Constraint]
```

__doc `instance-attribute`

```
__doc: str = doc
```

constraints `property`

```
constraints: list[Constraint[Any]]
```

Returns Field's constraints

doc `property`

```
doc: str
```

Returns Field's documentation

Functions

add_constraint

```
add_constraint(constraint: Constraint)
```

3.1.11 Meta

Appliance

CLASSES

FUNCTIONS

Element

ATTRIBUTES

T_BE module-attribute

```
T_BE = TypeVar('T_BE', bound='BaseElement')
```

T_Meta module-attribute

```
T_Meta = TypeVar('T_Meta', bound='_MetaElement')
```

CLASSES

ClassMutable

Bases: `ElementOptions`

ElementOptions

IAppliance

Bases: `IBaseElement`

IBaseElement

Bases: `BaseElement`

Functions
clone_as_mutable_variant

```
clone_as_mutable_variant(*, deep: bool = True, _memo: Dict[int, BaseElement] | None = None) -> BaseElement
```

IElement

Bases: `IBaseElement`

IFeature

Bases: `IBaseElement`

IMutableVariant

ModelSpecView

```
ModelSpecView(values: dict[str, Any], types_map: dict[str, type], name: str, module: str)
```

ModelSpecView class A class that will act as fake BaseElement proxy to allow setting values

Attributes
__module__ `property` `writable`

```
__module__: str
```

returns proxified module's name

__name__ `property`

```
__name__: str
```

returns proxified class' name

__slots__ `class-attribute` `instance-attribute`

```
__slots__ = ('_vals', '_types', '_touched', '_name', '_module')
```

Functions
__getattr__

```
__getattr__(name: str) -> Any
```

internal proxy getattr

__setattr__

```
__setattr__(name: str, value: Any)
```

internal proxy setattr

export

```
export() -> dict
```

exports all proxified values

ObjectMutable

Bases: `ElementOptions`

FUNCTIONS

get_mutable_variant

```
get_mutable_variant(base: Type[BaseElement]) -> Type[BaseElement]
```

Return a subclass of `base` that behaves the same except that instances are created object-mutable (because the class was defined with options=(ObjectMutable,)).

Feature