Happyly Documentation

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CONTENTS:

Happyly is a scalable solution for systems which handle any kind of messages.

Happyly helps to abstract your business logic from messaging stuff, so that your code is maintainable and ensures separation of concerns.

Have you ever seen a codebase where serialization, message queue managing and business logic are mixed together like a spaghetti? I have. Imagine switching between Google Pub/Sub and Django REST Framework. Or Celery. This shouldn't be a nightmare but it often is.

Here's the approach of Happyly:

- Write you business logic in universal *Handlers*, which don't care at all how you serialize things or send them over network etc.
- Describe your schemas using ORM/Framework-agnostic technology.
- Plug-in any details of messaging protocol, serialization and networking. Change them with different drop-in replacements at any time.

Happyly can be used with Flask, Celery, Django, Kafka or whatever technology which can be utilized for messaging. Happyly also provides first-class support of Google Pub/Sub.

CHAPTER

ONE

USE CASES

1.1 Google Pub/Sub

Let’s be honest, the official Python client library is too low-level. You must serialize and deserialize things manually, as well as to `ack` and `nack` messages.

Usual way:

```python
def callback(message):
    attributes = json.loads(message.data)
    try:
        result = process_things(attributes['ID'])
        encoded = json.dumps(result).encode('utf-8')
        PUBLISHER.publish(TOPIC, encoded)
    except NeedToRetry:
        _LOGGER.info('Not acknowledging, will retry later.')
    except Exception:
        _LOGGER.error('An error occured')
        message.ack()
    else:
        message.ack()
```

Happyly way:

```python
def handle_my_stuff(message: dict):
    try:
        return process_things(message['ID'])
    except NeedToRetry as error:
        raise error from error
    except Exception:
        _LOGGER.error('An error occured')
```

`handle_my_stuff` is now also usable with Celery or Flask. Or with yaml serialization. Or with `message.attributes` instead of `message.data`. Without any change.

1.2 Painless transport change

Let’s say you are prototyping your project with Flask and are planning to move to Celery for better fault tolerance then. Or to Google Pub/Sub. You just haven’t decided yet.

Easy! Here’s how Happyly can help.

1. Define your message schemas.

```
class MyInputSchema(happyly.Schema):
    request_id = marshmallow.fields.Str(required=True)

class MyOutputSchema(happyly.Schema):
    request_id = marshmallow.fields.Str(required=True)
    result = marshmallow.fields.Str(required=True)
    error = marshmallow.fields.Str()
```

2. Define your handler

```
def handle_things(message: dict):
    try:
        req_id = message['request_id']
        if req_id in ALLOWED:
            result = get_result_for_id(req_id)
        else:
            result = 'not allowed'
        return {
            'request_id': req_id
            'result': result
        }
    except Exception as error:
        return {
            'request_id': message['request_id']
            'result': 'error',
            'error': str(error)
        }
```

3. Plug it into Flask:

```
@app.route('/', methods=['POST'])
def root():
    executor = happyly.Executor(
        handler=handle_things,
        deserializer=DummyValidator(schema=MyInputSchema()),
        serializer=JsonifyForSchema(schema=MyOutputSchema()),
    )
    request_data = request.get_json()
    return executor.run_for_result(request_data)
```

3. Painlessly switch to Celery when you need:

```
@celery.task('hello')
def hello(message):
    result = happyly.Executor(
        handler=ProcessThings(),
        serializer=happyly.DummyValidator(schema=MyInputSchema()),
        deserializer=happyly.DummyValidator(schema=MyOutputSchema()),
    ).run_for_result(
        message
    )
    return result
```

4. Or to Google Pub/Sub:

```
happyly.Listener(
    subscriber=happyly.google_pubsub.GooglePubSubSubscriber(
```

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```
        project='my_project',
        subscription_name='my_subscription',
    ),
    handler=ProcessThings(),
    deserializer=happyly.google_pubsub.JSONDeserializerWithRequestIdRequired(
        schema=MyInputSchema()
    ),
    serializer=happyly.google_pubsub.BinaryJSONSerializer(
        schema=MyOutputSchema()
    ),
    publisher=happyly.google_pubsub.GooglePubSubPublisher(
        topic='my_topic',
        project='my_project',
    ),
).start_listening()
```

5. Move to any other technology. Or swap serializer to another. Do whatever you need while your handler and schemas remain absolutely the same.

CHAPTER TWO

INSTALLATION

Happyly is hosted on PyPI, so you can use:

```
pip install happyly
```

There are extra dependencies for some components. If you want to use Happyly's components for Flask, install it like this:

```
pip install happyly[flask]
```

There is also an extra dependency which enables cached components via Redis. If you need it, install Happyly like this:

```
pip install happyly[redis]
```

CHAPTER

THREE

KEY CONCEPTS

3.1 Handler

Handler is the main concept of all Happyly library. Basically a handler is a callable which implements business logic, and nothing else:

- No serialization/deserialiation here
- No sending stuff over the network
- No message queues' related stuff

Let the handler do its job!

To create a handler you can simply define a function which takes a `dict` as an input and returns a `dict`:

```
def handle_my_stuff(message: dict):
    try
        db.update(message['user'], message['status'])
        return {
            'request_id': message['request_id'],
            'action': 'updated',
        }
    except Exception:
        return {
            'action': 'failed'
        }
```

Done! This handler can be plugged into your application: whether it uses Flask or Celery or whatever.

Note that you are allowed to return nothing if you don't actually need a result from your handler. This handler is also valid:

```
def handle_another_stuff(message: dict):
    try
        neural_net.start_job(message['id'])
        _LOGGER.info('Job created')
    except Exception:
        _LOGGER.warning('Failed to create a job')
```

If you prefer class-based approach, Happyly can satisfy you too. Subclass `happyly.Handler()` and implement the following methods:

```
class MyHandler(happyly.Handler):

```

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```
    def handle(message: dict)
        db.update(message['user'], message['status'])
        return {
            'request_id': message['request_id'],
            'action': 'updated',
        }

    def on_handling_failed(message: dict, error)
        return {
            'action': 'failed'
        }
```

Instance of `MyHandler` is equivalent to `handle_my_stuff`

3.2 Executor

To plug a handler into your application you will need `happyly.Executor()` (or one of its subclasses).

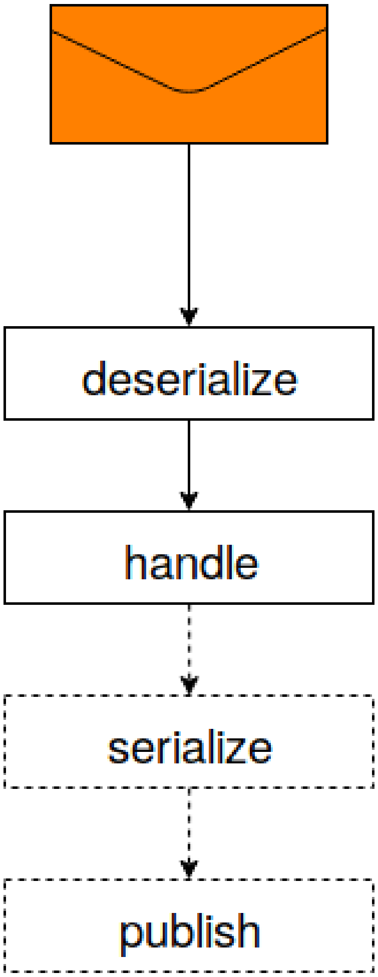
Executor brings the handler into a context of more pipeline steps:

- deserialization
- handling itself
- serialization (optional)
- publishing (optional)

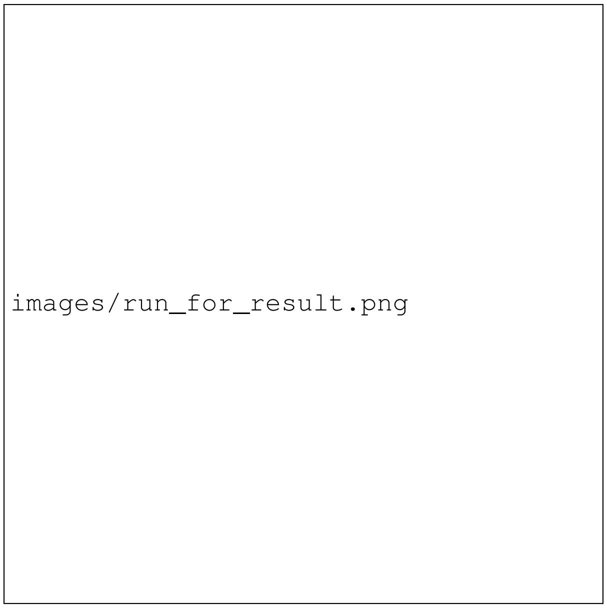
So a typical construction of an Executor looks like this:

```
my_executor = Executor(
  deserializer=...
  handler=...
  serializer=...
  publisher=...
)
```

Executor implements two crucial methods: `run()` and `run_for_result()`. `run(message)` starts an execution pipeline for the provided message. `run()` returns nothing but can optionally publish a serialized result of handling.



If you'd like to deal with the result by yourself, use `run_for_result()` which returns a serialized result of handling.



Executor manages all the stages of the pipeline, including situation when some stage fails. But the implementation of any stage itself (deserialization, handling, serialization, publishing) is provided to a constructor during executor instantiation.

You can use pre-made implementation of stages provided by Happyly or create you own (see *Stages*)

To customize what happens between the stages use *Callbacks*.

3.3 Listener

Probably you don't want to invoke `run()` each time. You can bind an executor to some event by creating a `BaseListener()`. `BaseListener` is a subsclass of `Executor` which is all the same but has two additions:

- the constructor requires one more parameter - subscriber;
- one more method added - `BaseListener.start_listening()`.

CHAPTER

FOUR

STAGES

4.1 Deserializer

The simplest deserializer is a function which takes a received message and returns a dict of attributes.

Here is an imaginary example:

```
def get_attributes_from_my_message(message):
    data = message.get_bytes().decode('utf-8')
    return json.loads(data)
```

You’ll need a different deserializer for different message transport technologies or serialization formats.

The same deserializer can be written as a class:

```
class MyDeserializer(happyly.Deserializer):
    def deserialize(self, message):
        data = message.get_bytes().decode('utf-8')
        return json.loads(data)
```

A class-based deserializer can implement a fallback method that constructs an error result:

```
class MyDeserializer(happyly.Deserializer):
    def deserialize(self, message):
        data = message.get_bytes().decode('utf-8')
        return json.loads(data)

    def build_error_result(self, message, error):
        return {'status': 'failed', 'error': repr(error)}
```

Note that if deserialization fails, then handling is skipped and the return value of `build_error_result` is used as a result of handling.

Class-based deserializer are also useful for parametrization, e.g. with message schemas.

4.2 Serializer

Serialization happens to the result provided by handler. This step is optional. It is useful when publishing occurs, or when the value is retrieved with `Executor.run_for_result()`.

The simplest serializer is a function that takes `dict` as an input and returns. . . well, whatever you need.

```
def prepare_response(message_attributes):
    resp = flask.jsonify(message_attributes)
    if 'error' in attributes:
        resp.status = 400
    return resp
```

As usual, there is a class-based approach:

```
class MySerializer(happyly.Serializer):

    def serialize(message_attributes):
        resp = flask.jsonify(message_attributes)
        if 'error' in attributes:
            resp.status = 400
        return resp
```

4.3 Publisher

After result is serialized it can be either returned (if `Executor.run_for_result()` is used) or published (if `Executor.run()` is used). Note that publishing is an optional step - executor that just does the things without sending a message is a valid one too.

Publisher can be defined as a function which takes the only argument - a serialized message.

```
def publish_my_result(serialized_message):
    my_client.publish_a_message(serialized_message)
```

If you'd like a class-based approach, please subclass `happyly.BasePublisher()`. Here's how one of the Happyly's components is implemented:

```
class GooglePubSubPublisher(happyly.BasePublisher):
    def publish(self, serialized_message: Any):
        future = self._publisher_client.publish(
            f'projects/{self.project}/topics/{self.to_topic}', serialized_message
        )
        try:
            future.result()
            return
        except Exception as e:
            raise e

    def __init__(self, project: str, to_topic: str):
        super().__init__()
        self.project = project
        self.to_topic = to_topic
        self._publisher_client = pubsub_v1.PublisherClient()
```

CHAPTER

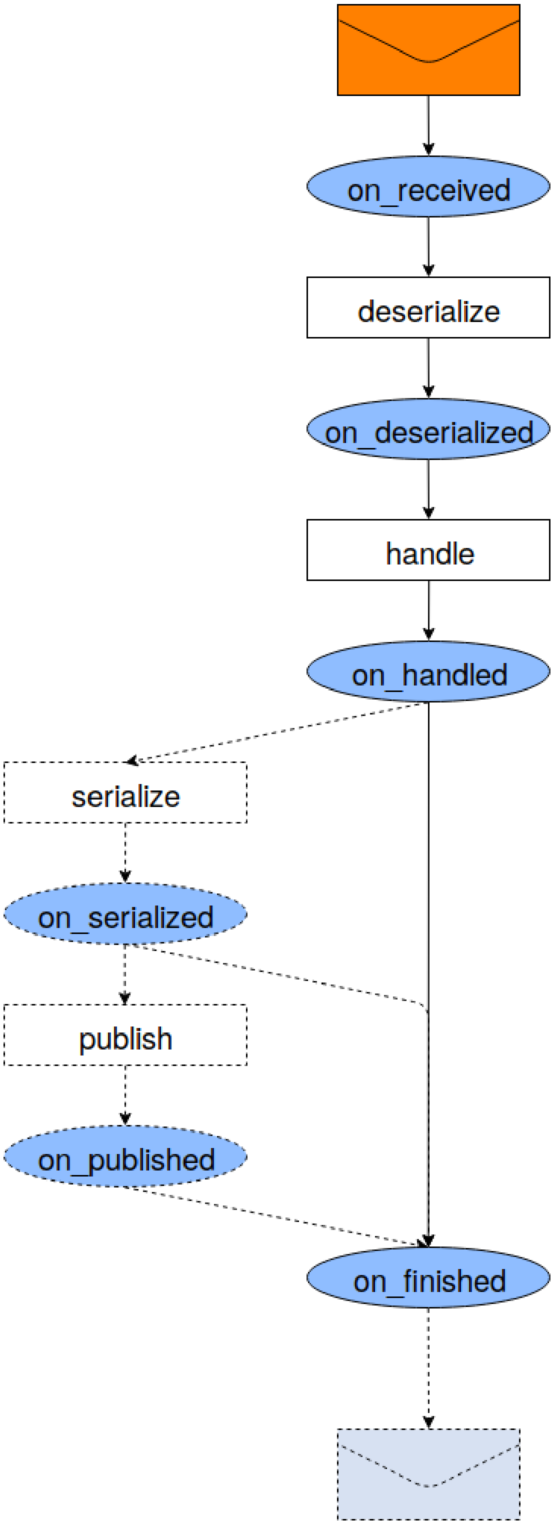
FIVE

CALLBACKS

5.1 Overview

Executor (as well as BaseListener) provides a rich pipeline which manages stages, their failures and actions between stages.

A simplified representation of the pipeline (omitting any failures) looks like this:



Deserialization, handling, serialization and publishing are provided by *Stages*.

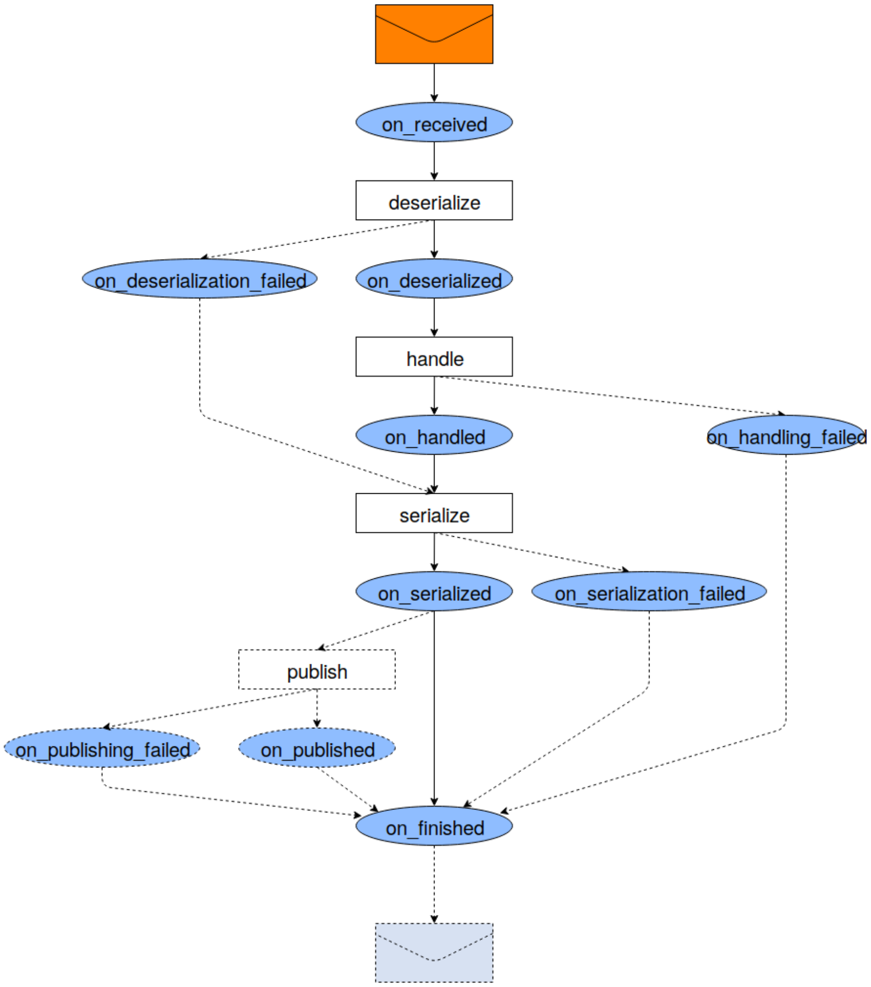
Each step of the pipeline emits an event which can be handled by the corresponding callback. Base classes (Executor and BaseListener) do nothing but logging inside their callbacks. You can customize any step by overriding any callback in a child class:

```
class MyExecutor(happyly.Executor):

    def on_received(original_message):
        original_message.ack()

    def on_handling_failed(
        self,
        original_message: Any,
        deserialized_message: Mapping[str, Any],
        error: Exception,
    ):
        if isinstance(error, NeedToRetry):
            original_message.nack()
```

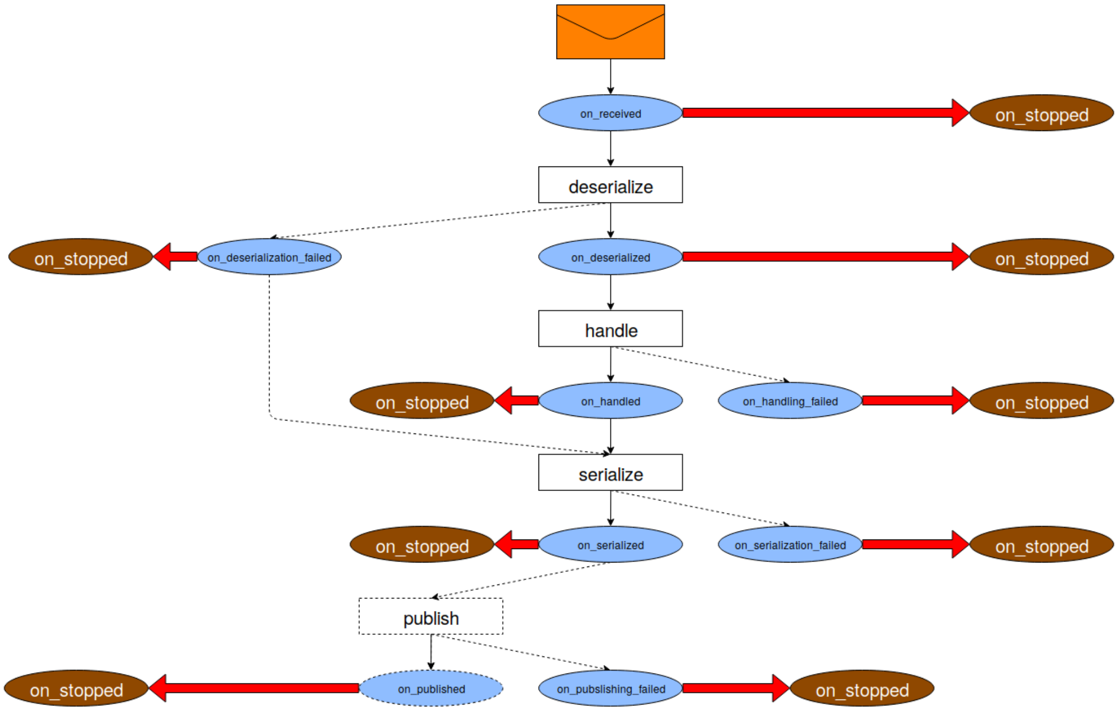
The example above uses on_handling_failed which is called whenever handler raises an exception. Actually, here's the full picture with failures:



Note that in case deserialization fails, handling is not conducted. Instead executor tries to get a fallback result via `Deserializer.build_error_result` and this result is used instead of the result of handling.

5.2 What if I need an emergency stop?

You can raise `happyly.StopPipeline` inside any callback - and the pipeline will be stopped immediately. Well, actually `on_stopped` will be invoked then, as the last resort to finish up.



At the rest of the cases, i.e. if pipeline is not stopped, `on_finished` is guaranteed to be called at the very end.

CHAPTER

SIX

API REFERENCE

happyly.listening.executor	
happyly.listening.listener	*BaseListener* and its subclasses.
happyly.schemas.schema	
happyly.caching.cacher	
happyly.caching.mixins	
happyly.serialization.serializer	
happyly.serialization.deserializer	
happyly.handling.handler	
happyly.handling.handling_result	
happyly.handling.dummy_handler._DummyHandler	
happyly.exceptions	

6.1 happyly.listening.executor

Description

Classes

Executor([handler, deserializer, publisher, . . .])	Component which is able to run handler as a part of more complex pipeline.
ResultAndDeserialized(result, deserialized)	Create new instance of ResultAndDeserialized(result, deserialized)

6.1.1 happyly.listening.executor.Executor

class happyly.listening.executor.**Executor**(*handler=<happyly.handling.dummy_handler._DummyHandler object>*, *deserializer=None*, *publisher=None*, *serializer=None*)

Bases: `typing.Generic`

Component which is able to run handler as a part of more complex pipeline.

Implements managing of stages inside the pipeline (deserialization, handling, serialization, publishing) and introduces callbacks between the stages which can be easily overridden.

Executor does not implement stages themselves, it takes internal implementation of stages from corresponding components: `Handler`, `Deserializer`, `Publisher`.

It means that *Executor* is universal and can work with any serialization/messaging technology depending on concrete components provided to executor's constructor.

on_deserialization_failed(original_message, ...)	Callback which is called right after deserialization failure.
on_deserialized(original_message, ...)	Callback which is called right after message was deserialized successfully.
on_finished(original_message, error)	Callback which is called when pipeline finishes its execution.
on_handled(original_message, ...)	Callback which is called right after message was handled (successfully or not, but without raising an exception).
on_handling_failed(original_message, ...)	Callback which is called if handler's on_handling_failed raises an exception.
on_published(original_message, ...)	Callback which is called right after message was published successfully.
on_publishing_failed(original_message, ...)	Callback which is called when publisher fails to publish.
on_received(original_message)	Callback which is called as soon as pipeline is run.
on_serialization_failed(original, ...)	
on_serialized(original_message, ...)	
on_stopped(original_message[, reason])	Callback which is called when pipeline is stopped via *StopPipeline*
run([message])	Method that starts execution of pipeline stages.
run_for_result([message])	

handler = None

Provides implementation of handling stage to Executor.

Type: Union[*Handler*, Callable[[Mapping[str, Any]], Optional[Mapping[str, Any]]]]

deserializer = None

Provides implementation of deserialization stage to Executor.

If not present, no deserialization is performed.

Type: ~D

publisher = None

Provides implementation of serialization and publishing stages to Executor.

If not present, no publishing is performed.

Type: Optional[~P]

on_received(*original_message*)

Callback which is called as soon as pipeline is run.

Override it in your custom Executor/Listener if needed, but don't forget to call implementation from base class.

Parameters original_message (Any) – Message as it has been received, without any deserialization

on_deserialized(*original_message*, *deserialized_message*)

Callback which is called right after message was deserialized successfully.

Override it in your custom Executor/Listener if needed, but don't forget to call implementation from base class.

Parameters

- **`original_message`** (`Any`) – Message as it has been received, without any deserialization
- **`deserialized_message`** (`Mapping[str, Any]`) – Message attributes after deserialization

`on_deserialization_failed`(*original_message*, *error*)
Callback which is called right after deserialization failure.

Override it in your custom Executor/Listener if needed, but don't forget to call implementation from base class.

Parameters

- **`original_message`** (`Any`) – Message as it has been received, without any deserialization
- **`error`** (`Exception`) – exception object which was raised

`on_handled`(*original_message*, *deserialized_message*, *result*)
Callback which is called right after message was handled (successfully or not, but without raising an exception).

Override it in your custom Executor/Listener if needed, but don't forget to call implementation from base class.

Parameters

- **`original_message`** (`Any`) – Message as it has been received, without any deserialization
- **`deserialized_message`** (`Mapping[str, Any]`) – Message attributes after deserialization
- **`result`** (`Optional[Mapping[str, Any]]`) – Result fetched from handler

`on_handling_failed`(*original_message*, *deserialized_message*, *error*)
Callback which is called if handler's `on_handling_failed` raises an exception.

Override it in your custom Executor/Listener if needed, but don't forget to call implementation from base class.

Parameters

- **`original_message`** (`Any`) – Message as it has been received, without any deserialization
- **`deserialized_message`** (`Mapping[str, Any]`) – Message attributes after deserialization
- **`error`** (`Exception`) – exception object which was raised

`on_published`(*original_message*, *deserialized_message*, *result*, *serialized_message*)
Callback which is called right after message was published successfully.

Override it in your custom Executor/Listener if needed, but don't forget to call implementation from base class.

Parameters

- **`original_message`** (`Any`) – Message as it has been received, without any deserialization

- **deserialized_message** (Optional[Mapping[str, Any]]) – Message attributes after deserialization
- **result** (Optional[Mapping[str, Any]]) – Result fetched from handler

on_publishing_failed(*original_message*, *deserialized_message*, *result*, *serialized_message*, *error*)

Callback which is called when publisher fails to publish.

Override it in your custom Executor/Listener if needed, but don't forget to call implementation from base class.

Parameters

- **original_message** (Any) – Message as it has been received, without any deserialization
- **deserialized_message** (Optional[Mapping[str, Any]]) – Message attributes after deserialization
- **result** (Optional[Mapping[str, Any]]) – Result fetched from handler
- **error** (Exception) – exception object which was raised

on_finished(*original_message*, *error*)

Callback which is called when pipeline finishes its execution. Is guaranteed to be called unless pipeline is stopped via StopPipeline.

Parameters

- **original_message** (Any) – Message as it has been received, without any deserialization
- **error** (Optional[Exception]) – exception object which was raised or None

on_stopped(*original_message*, *reason=''*)

Callback which is called when pipeline is stopped via *StopPipeline*

Parameters

- **original_message** (Any) – Message as it has been received, without any deserialization
- **reason** (str) – message describing why the pipeline stopped

run(*message=None*)

Method that starts execution of pipeline stages.

To stop the pipeline raise StopPipeline inside any callback.

Parameters **message** (Optional[Any]) – Message as is, without deserialization. Or message attributes if the executor was instantiated with neither a deserializer nor a handler (useful to quickly publish message attributes by hand)

6.1.2 happyly.listening.executor.ResultAndDeserialized

class happyly.listening.executor.**ResultAndDeserialized**(*result*, *deserialized*)

Bases: tuple

Create new instance of ResultAndDeserialized(result, deserialized)

deserialized	Alias for field number 1

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Table 4 – continued from previous page

result	Alias for field number 0

deserialized
Alias for field number 1

result
Alias for field number 0

6.2 happyly.listening.listener

Description

BaseListener and its subclasses. Listener is a form of Executor which is able to run pipeline by an event coming from a subscription.

Classes

BaseListener(subscriber, handler, deserializer)	Listener is a form of Executor which is able to run pipeline by an event coming from a subscription.
EarlyAckListener(subscriber, handler, . . . [, . . .])	Acknowledge-aware *BaseListener*, which performs *ack()* right after *on_received()* callback is finished.
LateAckListener(subscriber, handler, . . . [, . . .])	Acknowledge-aware listener, which performs *ack()* at the very end of pipeline.
ListenerWithAck(subscriber, handler, . . . [, . . .])	Acknowledge-aware listener.

6.2.1 happyly.listening.listener.BaseListener

class happyly.listening.listener.**BaseListener**(*subscriber*, *handler*, *deserializer*, *serializer=<happyly.serialization.dummy.DummySerde object>*, *publisher=None*)

Bases: *happyly.listening.executor.Executor*, typing.Generic

Listener is a form of Executor which is able to run pipeline by an event coming from a subscription.

Listener itself doesn't know how to subscribe, it subscribes via a provided subscriber.

As any executor, implements managing of stages inside the pipeline (deserialization, handling, serialization, publishing) and contains callbacks between the stages which can be easily overridden.

As any executor, listener does not implement stages themselves, it takes internal implementation of stages from corresponding components: handler, deserializer, publisher.

It means that listener is universal and can work with any serialization/messaging technology depending on concrete components provided to listener's constructor.

start_listening()

subscriber = None
Provides implementation of how to subscribe.

Type: ~S

6.2.2 happyly.listening.listener.EarlyAckListener

class happyly.listening.listener.**EarlyAckListener**(*subscriber*, *handler*, *deserializer*, *serializer=<happyly.serialization.dummy.DummySerde object>*, *publisher=None*)

Bases: `happyly.listening.listener.ListenerWithAck`, `typing.Generic`

Acknowledge-aware `BaseListener`, which performs `ack()` right after `on_received()` callback is finished.

—

6.2.3 happyly.listening.listener.LateAckListener

class happyly.listening.listener.**LateAckListener**(*subscriber*, *handler*, *deserializer*, *serializer=<happyly.serialization.dummy.DummySerde object>*, *publisher=None*)

Bases: `happyly.listening.listener.ListenerWithAck`, `typing.Generic`

Acknowledge-aware listener, which performs `ack()` at the very end of pipeline.

`on_finished`(original_message, error)	Callback which is called when pipeline finishes its execution.

on_finished(*original_message*, *error*)

Callback which is called when pipeline finishes its execution. Is guaranteed to be called unless pipeline is stopped via StopPipeline.

Parameters

- **original_message** (`Any`) – Message as it has been received, without any deserialization
- **error** (`Optional`[`Exception`]) – exception object which was raised or None

6.2.4 happyly.listening.listener.ListenerWithAck

class happyly.listening.listener.**ListenerWithAck**(*subscriber*, *handler*, *deserializer*, *serializer=<happyly.serialization.dummy.DummySerde object>*, *publisher=None*)

Bases: `happyly.listening.listener.BaseListener`, `typing.Generic`

Acknowledge-aware listener. Defines `ListenerWithAck.ack()` method. Subclass `ListenerWithAck` and specify when to ack by overriding the corresponding callbacks.

`ack`(message)	Acknowledge the message using implementation from subscriber, then log success.
`on_acknowledged`(message)	Callback which is called write after message was acknowledged.

on_acknowledged(*message*)

Callback which is called write after message was acknowledged.

Override it in your custom Executor/Listener if needed, but don't forget to call implementation from base class.

Parameters **`message`** (`Any`) – Message as it has been received, without any deserialization

`ack`(*message*)

Acknowledge the message using implementation from subscriber, then log success.

Parameters **`message`** (`Any`) – Message as it has been received, without any deserialization

6.3 happyly.schemas.schema

Description

Classes

`Schema`(*args, **kwargs)	Marshmallow schema, which raises errors on mismatch (extra fields provided also raise exception).

6.3.1 happyly.schemas.schema.Schema

`class` `happyly.schemas.schema.`**`Schema`**(**args*, ***kwargs*)

Bases: `marshmallow.schema.Schema`

Marshmallow schema, which raises errors on mismatch (extra fields provided also raise exception).

Subclass it just like any marshmallow `Schema` to describe schema.

Instantiation with no arguments is a good strict default, but you can pass any arguments valid for `marshmallow.Schema`

`opts`
`check_unknown_fields`(data, original_data)

6.4 happyly.caching.cacher

Description

Classes

`Cacher`	Abstract base class which defines interface of any caching component to be used via *`CacheByRequestIdMixin`* or similar mixin.

6.4.1 happyly.caching.cacher.Cacher

`class` `happyly.caching.cacher.`**`Cacher`**

Bases: `abc.ABC`

Abstract base class which defines interface of any caching component to be used via

CacheByRequestIdMixin or similar mixin.

add(data, key)	Add the provided data to cache and store it by the provided key.
get(key)	Returns data which is stored in cache by the provided key.
remove(key)	Remove data from cache which is stored by the provided key.

add(*data*, *key*)
Add the provided data to cache and store it by the provided key.

remove(*key*)
Remove data from cache which is stored by the provided key.

get(*key*)
Returns data which is stored in cache by the provided key.

6.5 happyly.caching.mixins

Description

Classes

CacheByRequestIdMixin(cacher)	Mixin which adds caching functionality to Listener.

6.5.1 happyly.caching.mixins.CacheByRequestIdMixin

class happyly.caching.mixins.**CacheByRequestIdMixin**(*cacher*)
Bases: object

Mixin which adds caching functionality to Listener. Utilizes notions of listener's topic and request id of message – otherwise will not work.

To be used via multiple inheritance. For example, given some component SomeListener you can define its caching equivalent by defining SomeCachedListener which inherits from both SomeListener and CacheByRequestIdMixin.

on_deserialization_failed(message, error)	
on_published(original_message, ...)	
on_received(message)	

6.6 happyly.serialization.serializer

Description

Classes

Serializer	Abstract base class for Serializer.
SerializerWithSchema(schema)	

6.6.1 happyly.serialization.serializer.Serializer

class happyly.serialization.serializer.**Serializer**

Bases: abc.ABC

Abstract base class for Serializer. Provides `serialize()` method which should be implemented by subclasses.

from_function(func)

serialize(message_attributes)

rtype Any

6.6.2 happyly.serialization.serializer.SerializerWithSchema

class happyly.serialization.serializer.**SerializerWithSchema**(*schema*)

Bases: *happyly.serialization.serializer.Serializer*, abc.ABC

schema

6.7 happyly.serialization.deserializer

Description

Classes

Deserializer	
DeserializerWithSchema(schema)	

6.7.1 happyly.serialization.deserializer.Deserializer

class happyly.serialization.deserializer.**Deserializer**

Bases: abc.ABC

build_error_result(message, error)

rtype Mapping[str, Any]

deserialize(message)

rtype Mapping[str, Any]

from_function(func)

6.7.2 happyly.serialization.deserializer.DeserializerWithSchema

class happyly.serialization.deserializer.**DeserializerWithSchema**(*schema*)

Bases: *happyly.serialization.deserializer.Deserializer*, abc.ABC

schema

6.8 happyly.handling.handler

Description

Classes

Handler	A class containing logic to handle a parsed message.

6.8.1 happyly.handling.handler.Handler

class happyly.handling.handler.**Handler**

Bases: abc.ABC

A class containing logic to handle a parsed message.

handle(message)	Applies logic using a provided message, optionally gives back one or more results.
on_handling_failed(message, error)	Applies fallback logic using a provided message when *handle()* fails, optionally gives back one or more results.

handle(*message*)

Applies logic using a provided message, optionally gives back one or more results. Each result consists of message attributes which can be serialized and sent. When fails, calls *on_handling_failed()*

Parameters **message** (Mapping[str, Any]) – A parsed message as a dictionary of attributes

Return type Optional[Mapping[str, Any]]

Returns None if no result is extracted from handling, a dictionary of attributes for single result

on_handling_failed(*message*, *error*)

Applies fallback logic using a provided message when *handle()* fails, optionally gives back one or more results. Enforces users of *Handler* class to provide explicit strategy for errors.

If you want to propagate error further to the underlying Executor/Handler, just re-raise an `error` here:

```
def on_handling_failed(self, message, error):
    raise error
```

Parameters

- **message** (Mapping[str, Any]) – A parsed message as a dictionary of attributes
- **error** (Exception) – Error raised by *handle()*

Return type Optional[Mapping[str, Any]]

Returns None if no result is extracted from handling, a dictionary of attributes for single result

6.9 happyly.handling.dummy_handler._DummyHandler

class happyly.handling.dummy_handler.**_DummyHandler**

Bases: *happyly.handling.handler.Handler*

handle(message)	Applies logic using a provided message, optionally gives back one or more results.
on_handling_failed(message, error)	Applies fallback logic using a provided message when *handle()* fails, optionally gives back one or more results.

handle(*message*)

Applies logic using a provided message, optionally gives back one or more results. Each result consists of message attributes which can be serialized and sent. When fails, calls *on_handling_failed()*

Parameters **message** (Mapping[str, Any]) – A parsed message as a dictionary of attributes

Returns None if no result is extracted from handling, a dictionary of attributes for single result

on_handling_failed(*message*, *error*)

Applies fallback logic using a provided message when *handle()* fails, optionally gives back one or more results. Enforces users of `Handler` class to provide explicit strategy for errors.

If you want to propagate error further to the underlying Executor/Handler, just re-raise an `error` here:

```
def on_handling_failed(self, message, error):
    raise error
```

Parameters

- **message** (Mapping[str, Any]) – A parsed message as a dictionary of attributes
- **error** (Exception) – Error raised by *handle()*

Returns None if no result is extracted from handling, a dictionary of attributes for single result

6.10 happyly.exceptions

Description

Exceptions

FetchedNoResult()	Exception thrown by `Executor.run_for_result()` when it is unable to fetch a result
StopPipeline([reason])	This exception should be raised to stop a pipeline.

6.10.1 happyly.exceptions.FetchedNoResult

exception `happyly.exceptions.`**`FetchedNoResult`**

Exception thrown by `Executor.run_for_result()` when it is unable to fetch a result

6.10.2 happyly.exceptions.StopPipeline

exception `happyly.exceptions.`**`StopPipeline`**(*reason=”*)

This exception should be raised to stop a pipeline. After raising it, `Executor.on_stopped()` will be called.

CHAPTER

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