django-river Documentation

Release 3.2.0

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Contents

River is an open source and always free workflow framework for `Django` which support on the fly changes instead of hardcoding states, transitions and authorization rules.

The main goal of developing this framework is **to be able to edit any workflow item on the fly.** This means that all the elements in a workflow like states, transitions or authorizations rules are editable at any time so that no changes requires a re-deploying of your application anymore.

CHAPTER 1

Donations

This is a fully open source project and it can be better with your donations.

If you are using `django-river` to create a commercial product, please consider becoming our sponsor , patron or donate over PayPal

1.1 Advance Admin

A very modern admin with some user friendly interfaces that is called River Admin has been published.

CHAPTER 2

Getting Started

You can easily get started with `django-river` by following *Getting Started*.

CHAPTER 3

Contents

3.1 Getting Started

1. Install and enable it

```
pip install django-river
```

```
INSTALLED_APPS=[
    ...
    river
    ...
]
```

2. Create your first state machine in your model and migrate your db

```
from django.db import models
from river.models.fields.state import StateField

class MyModel(models.Model):
    my_state_field = StateField()
```

3. Create all your `states` on the admin page
4. Create a `workflow` with your model (`MyModel` - `my_state_field`) information on the admin page
5. Create your `transition metadata` within the workflow created earlier, source and destination states
6. Create your `transition approval metadata` within the workflow created earlier and authorization rules along with their priority on the admin page
7. Enjoy your `django-river` journey.

```
my_model=MyModel.objects.get(....)

my_model.river.my_state_field.approve(as_user=transactioner_user)
```

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```
my_model.river.my_state_field.approve(as_user=transactioner_user, next_
↪state=State.objects.get(label='re-opened'))

# and much more. Check the documentation
```

Note: Whenever a model object is saved, it's state field will be initialized with the state is given at step-4 above by `django-river`.

3.2 Overview

Main goal of developing this framework is **to be able to edit any workflow item on the fly.** This means, all elements in workflow like states, transitions, user authorizations(permission), group authorization are editable. To do this, all data about the workflow item is persisted into DB. **Hence, they can be changed without touching the code and re-deploying your application.**

There is ordering aprovments for a transition functionality in `django-river`. It also provides skipping specific transition of a specific objects.

Playground: There is a fake jira example repository as a playground of django-river. https://github.com/javrasya/fakejira

3.2.1 Requirements

- Python (`2.7`, `3.4`, `3.5`, `3.6`)
- Django (`1.11`, `2.0`, `2.1`, `2.2`, `3.0`)
- `Django` >= 2.0 is supported for `Python` >= 3.5

3.2.2 Supported (Tested) Databases:

PostgreSQL	Tested	Support
9		
10		
11		
12		

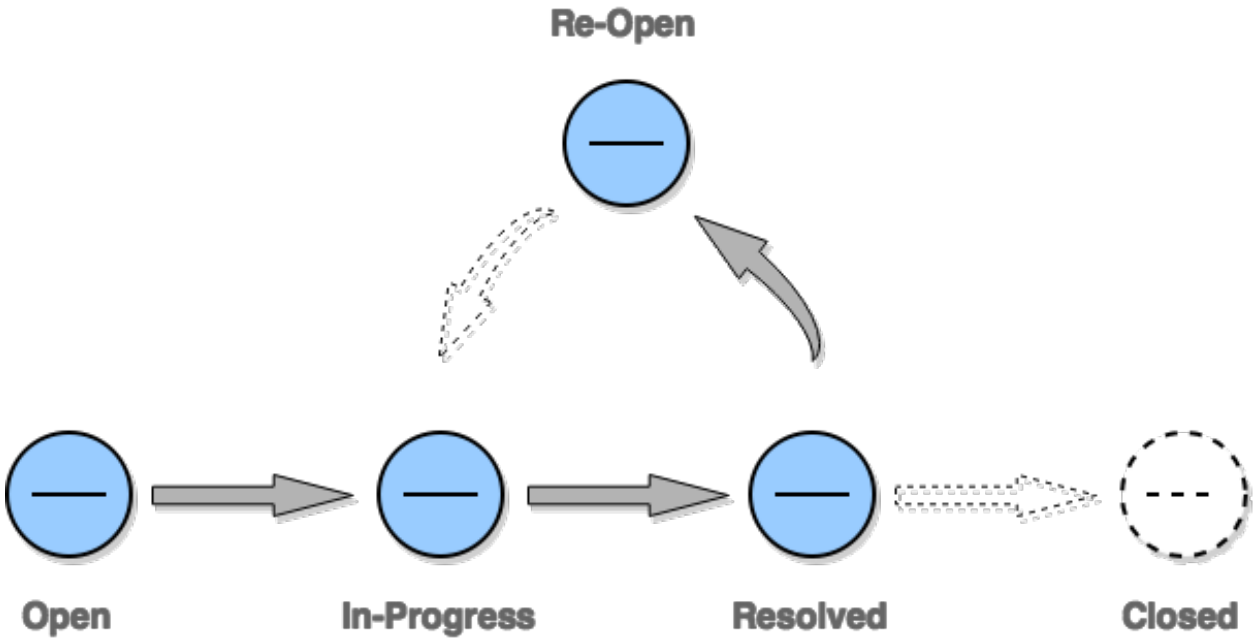
MySQL	Tested	Support
5.6		
5.7		
8.0		

MSSQL	Tested	Support
19		
17		

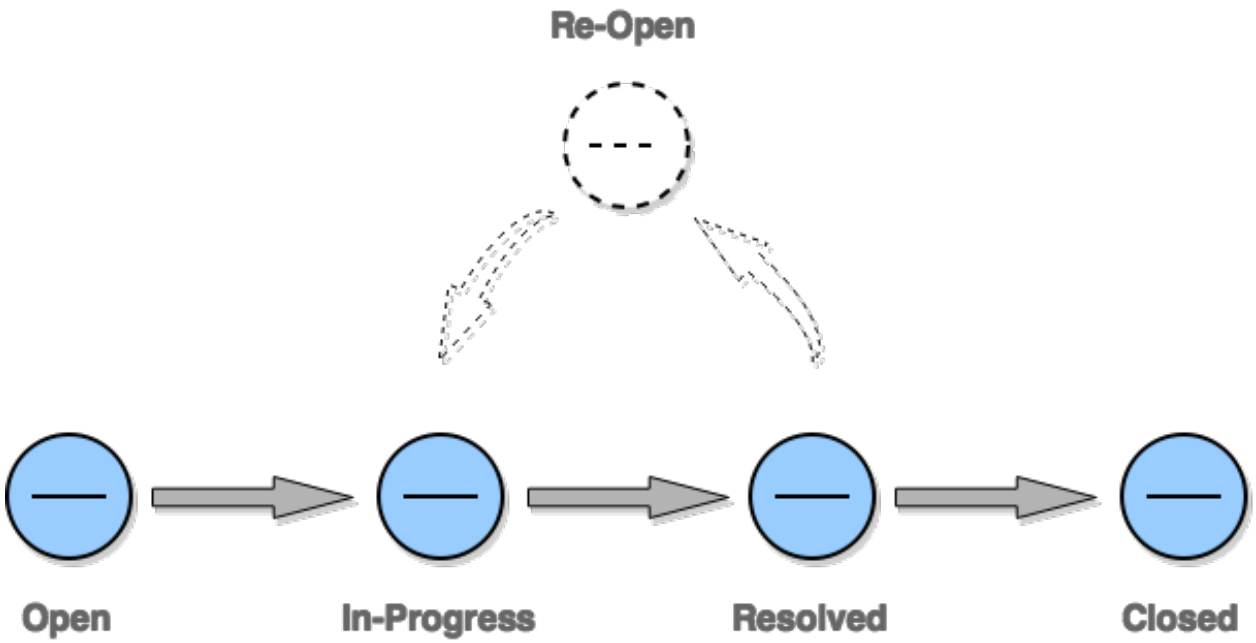
3.2.3 Example Scenarios

Simple Issue Tracking System

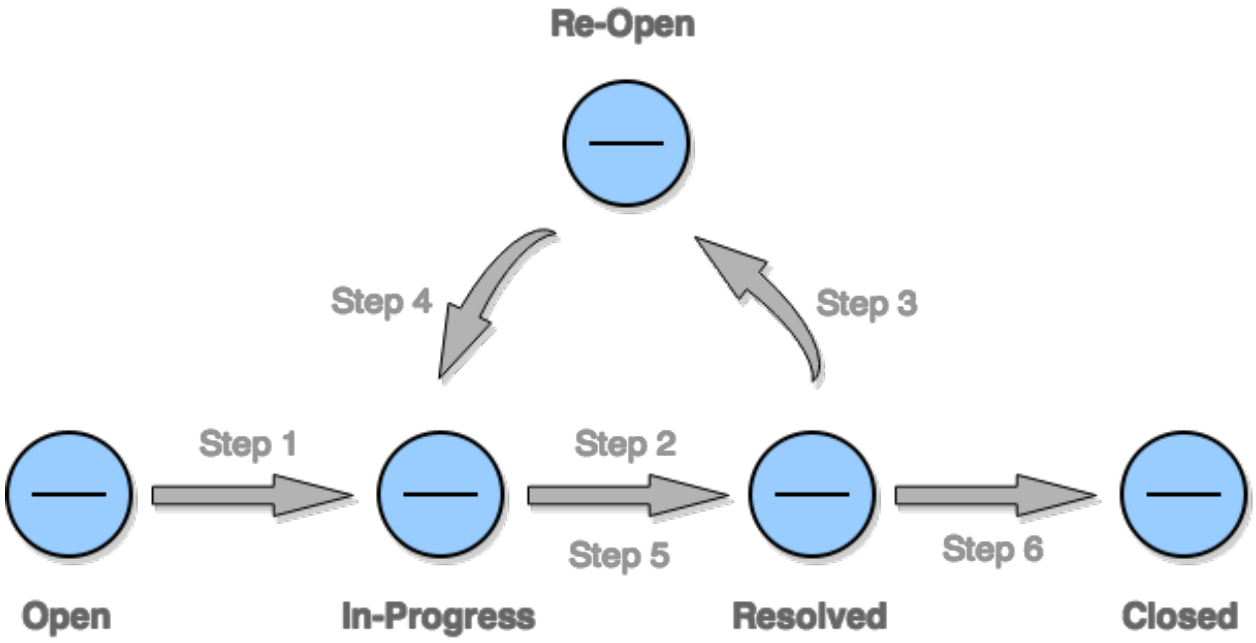
Re-Open case



Closed without Re-Open case



Closed with Re-Open case



3.3 Administration

Since `django-river` keeps all the data needed in a database, those should be pre-created before your first model object is created. Otherwise **your app will crash first time you create a model object.** Here are all needed models that you need to provide. `django-river` will register an Administration for those model for you. All you need to do is to provide them by using their Django admin pages.

3.3.1 State Administration

Field	Default	Optional	Format	Description
label	NaN	False	String (w+)	A name for the state
description	Empty string	True	String (w+)	A description for the state

3.3.2 Transition Meta Administration

Field	Default	Optional	Format	Description
workflow		False False	Choice of Strings	Your model class along with the field that you want to use this transition approval meta for. `django-river` will list all the possible model and fields you can pick on the admin page
source_state		False	State	Source state of the transition
destination_state		False	State	Destination state of the transition

3.3.3 Transition Approval Meta Administration

Field	Default	Optional	Format	Description
workflow		False	Choice of Strings	Your model class along with the field that you want to use this transition approval meta for. `django-river` will list all the possible model and fields you can pick on the admin page
transition_meta		False	TransitionMete	Transition information that contains source and destination states
permissions	Empty List	True	List<Permission>	List of permissions which will be authorized to approve this transition
groups	Empty List	True	List<UserGroup>	List of use groups which will be authorized to approve this transition
priority	0	False	Number	The priority of the transition approval. Since there can be more than one transition approval to make that transition which means that some users should approve before some other users can approve the same transition. The closer to zero, the more priort the transition approval is.

3.4 API Guide

3.4.1 Class API

This page will be covering the class level API. It is all the function that you can access through your model class like in the example below;

```
>>> MyModel.river.my_state_field.<function>(*args)
```

get_on_approval_objects

This is the function that helps you to fetch all model objects waitig for a users approval.

```
>>> my_model_objects == MyModel.river.my_state_field.get_on_approval_objects(as_
↪user=team_leader)
True
```

	Type	Default	Optional	Format	Description
as_user	input	NaN	False	Django User	A user to find all the model objects waiting for a user's approvals
	Output			List<MyModel>	List of available my model objects

initial_state

This is a property that is the initial state in the workflow

```
>>> State.objects.get(label="open") == MyModel.river.my_state_field.initial_state
True
```

Type	Format	Description
Output	State	The initial state in the workflow

final_states

This is a property that is the list of final state in the workflow

```
>>> State.objects.filter(Q(label="closed") | Q(label="cancelled")) == MyModel.river.
↪my_state_field.final_states
True
```

Type	Format	Description
Output	List<State>	List of the final states in the workflow

3.4.2 Instance API

This page will be covering the instance level API. It is all the function that you can access through your model object like in the example below;

```
my_model=MyModel.objects.get(....)

my_model.river.my_state_field.<function>(*args)
```

approve

This is the function that helps you to approve next approval of the object easily. `django-river` will handle all the availability and the authorization issues.

```
>>> my_model.river.my_state_field.approve(as_user=team_leader)
>>> my_model.river.my_state_field.approve(as_user=team_leader, next_state=State.
↪objects.get(name='re_opened_state'))
```

	Type	Default	Optional	Format	Description
as_user	input	NaN	False	Django User	A user to make the transaction. `django-river` will check if this user is authorized to make next action by looking at this user's permissions and user groups.
next_state	input	NaN	True/False	State	This parameter is redundant as long as there is only one next state from the current state. But if there is multiple possible next state in place, `django-river` is naturally is unable know which one is actually supposed to be picked. If the given next state is not a valid next state a *RiverException* will be thrown.

get_available_approvals

This is the function that helps you to fetch all available approvals waiting for a spesific user according to given source and destination states. If the source state is not provided, `django-river` will pick the current objects source state.

```
>>> transition_approvals = my_model.river.my_state_field.get_available_approvals(as_
↪user=manager)
>>> transition_approvals = my_model.river.my_state_field.get_available_approvals(as_
↪user=manager, source_state=State.objects.get(name='in_progress'))
>>> transition_approvals = my_model.river.my_state_field.get_available_approvals(
        as_user=manager,
        source_state=State.objects.get(name='in_progress'),
        destination_state=State.objects.get(name='resolved'),
    )
```

	Type	Default	Optional	Format	Description
as_user	input	NaN	False	Django User	A user to find all the approvals by user's permissions and groups
source_state	input	Current Object's Source State	True	State	A base state to find all available approvals comes after. Default is current object's source state
destination_state	input	NaN	True	State	A spesific destination state to fetch all available state. If it is not provided, the approvals will be found for all available destination states
	Output			List<TransitionApproval>	List of available transition approvals

recent_approval

This is a property that the transition approval which has recently been approved for the model object.

```
>>> transition_approval = my_model.river.my_state_field.last_approval
```

Type	Format	Description
Output	TransitionApproval	Last approved transition approval for the model object

next_approvals

This is a property that the list of transition approvals as a next step.

```
>>> transition_approvals == my_model.river.my_state_field.next_approvals
True
```

Type	Format	Description
Output	List<TransitionApproval>	List of transition approvals comes after last approved transition approval

on_initial_state

This is a property that indicates if object is on initial state.

```
>>> my_model.river.my_state_field.on_initial_state
True
```

Type	Format	Description
Output	Boolean	True if object is on initial state

on_final_state

This is a property that indicates if object is on final state.

```
>>> my_model.river.my_state_field.on_final_state
True
```

Type	Format	Description
Output	Boolean	True if object is on final state which also means that the workflow is complete

jump_to

This is the function that allows to jump to a specific future state from the current state of the workflow object. It is good for testing purposes.

```
>>> in_progress_state = State.object.get(label="In Progress")
>>> transition_approvals = my_model.river.my_state_field.jump_to(in_progress_state)
```

	Type	Format	Description
target_state	input	State	The target state that the workflow object will jump to. It is supposed to be a possible state in the future of the workflow object

3.5 Authorization

`django-river` provides system users an ability to configure the authorizations at three level. Those are permissions, user group or a specific user at any step. If the user is not authorized, they are not entitled to see and approve those approvals. These three authorization mechanisms are also not blocking each other. An authorized user by any of them is entitled to see and approve the approvals.

3.5.1 Permission Based Authorization

Multiple permission can be specified on the *transition approval metadata* admin page and `django-river` will allow only the users who have the given permission. Given multiple permissions are issued in `OR` fashion meaning that it is enough to have one of the given permissions to be authorized for the user. This can be configurable on the admin page provided by *django-river*

3.5.2 User Group Based Authorization

Multiple user group can be specified on the *transition approval metadata* admin page and `django-river` will allow only the users who are in the given user groups. Like permission based authorization, given multiple user groups are issued in `OR` fashion meaning that it is enough to be in one of the given user groups to be authorized for the user.This can be configurable on the admin page provided by *django-river*

3.5.3 User Based Authorization

Only one specific user can be assigned and no matter what permissions the user has or what user groups the user is in, the user will be authorized. Unlike the other methods, `django-river` doesn't provide an admin interface for that. But this can be handled within the repositories that is using *django-river*. The way how to do this is basically setting the `transactioner` column of the related `TransitionApproval` object as the user who is wanted to be authorized on this approval either programmatically or through a third party admin page on this model.

3.6 Hooking Guide

3.6.1 Functions

Functions are the description in `Python` of what you want to do on certain events happen. So you define them once and you can use them with multiple hooking up. Just go to `/admin/river/function/` admin page and create your functions there.‘‘django-river‘‘ function admin support python code highlighting as well if you enable the `codemirror2` app. Don't forget to collect statics for production deployments.

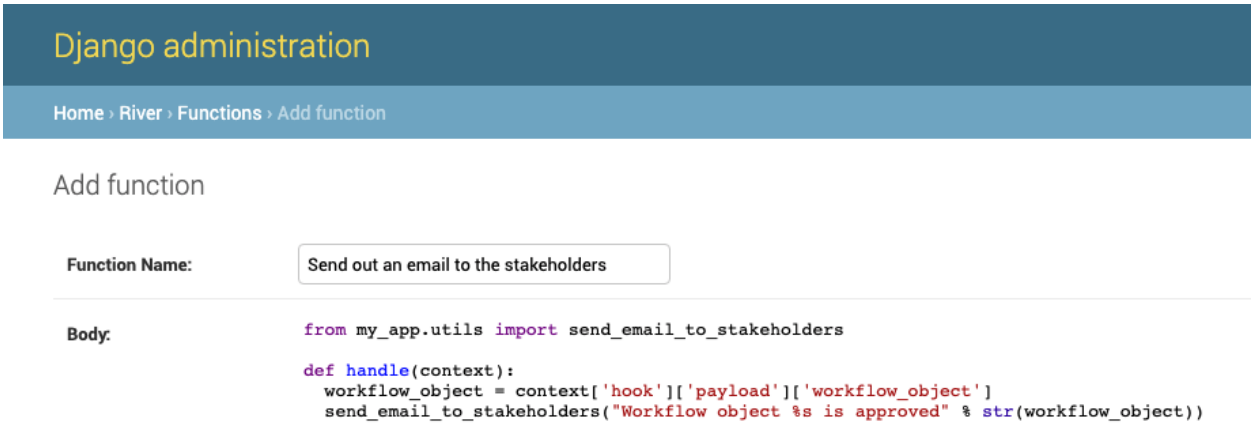
```
INSTALLED_APPS=[
    ...
    codemirror2
    river
    ...
]
```

Here is an example function;

```
from datetime import datetime

def handle(context):
    print(datetime.now())
```

Important: YOUR FUNCTION SHOULD BE NAMED AS `handle`. Otherwise `django-river` won't execute your function.



Context Parameter

`django-river` will pass a `context` down to your function in order for you to know why the function is triggered or for which object or so. And the `context` will look different for different type of events. But it also has some common parts for all the events. Let's look at how it looks;

`context.hook ->>`

Key	Type	Format	Description
type	String	* on-approved * on-transit * on-complete	The event type that is hooked up. The payload will likely differ according to this value
when	String	* BEFORE * AFTER	Whether it is hooked right before the event happens or right after
payload	dict		This is the context content that will differ for each event type. The information that can be gotten from payload is describe in the table below

Context Payload

On-Approved Event Payload

Key	Type	Description
workflow	Workflow Model	The workflow that the transition currently happening
workflow_object	Your Workflow Object	The workflow object of the model that has the state field in it
transition_approval	Transition Approval	The approval object that is currently approved which contains the information of the transition(meta) as well as who approved it etc.

On-Transit Event Payload

Key	Type	Description
workflow	Workflow Model	The workflow that the transition currently happening
workflow_object	Your Workflow Object	The workflow object of the model that has the state field in it
transition_approval	Transition Approval	The last transition approval object which contains the information of the transition(meta) as well as who last approved it etc.

On-Complete Event Payload

Key	Type	Description
workflow	Workflow Model	The workflow that the transition currently happening
workflow_object	Your Workflow Object	The workflow object of the model that has the state field in it

Example Function

```
from river.models.hook import BEFORE, AFTER

def _handle_my_transitions(hook):
    workflow = hook['payload']['workflow']
    workflow_object = hook['payload']['workflow_object']
    source_state = hook['payload']['transition_approval'].meta.source_state
    destination_state = hook['payload']['transition_approval'].meta.
↪destination_state
    last_approved_by = hook['payload']['transition_approval'].transactioner
    if hook['when'] == BEFORE:
        print('A transition from %s to %s will soon happen on the object␣
↪with id:%s and field_name:%s!' % (source_state.label, destination_state.
↪label, workflow_object.pk, workflow.field_name))
    elif hook['when'] == AFTER:
        print('A transition from %s to %s has just happened on the object␣
↪with id:%s and field_name:%s!' % (source_state.label, destination_state.
↪label, workflow_object.pk, workflow.field_name))
    print('Who approved it lately is %s' % last_approved_by.username)

def _handle_my_approvals(hook):
    workflow = hook['payload']['workflow']
    workflow_object = hook['payload']['workflow_object']
    approved_by = hook['payload']['transition_approval'].transactioner
    if hook['when'] == BEFORE:
        print('An approval will soon happen by %s on the object with id:%s␣
↪and field_name:%s!' % ( approved_by.username, workflow_object.pk, workflow.
↪field_name ))
    elif hook['when'] == AFTER:
        print('An approval has just happened by %s  on the object with id:%s␣
↪and field_name:%s!' % ( approved_by.username, workflow_object.pk, workflow.
↪field_name ))

def _handle_completions(hook):
    workflow = hook['payload']['workflow']
    workflow_object = hook['payload']['workflow_object']
    if hook['when'] == BEFORE:
        print('The workflow will soon be complete for the object with id:%s␣
↪and field_name:%s!' % ( workflow_object.pk, workflow.field_name ))
    elif hook['when'] == AFTER:
        print('The workflow has just been complete for the object with id:%s␣
↪and field_name:%s!' % ( workflow_object.pk, workflow.field_name ))
```

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```
def handle(context):
    hook = context['hook']
    if hook['type'] == 'on-transit':
        _handle_my_transitions(hook)
    elif hook['type'] == 'on-approved':
        _handle_my_approvals(hook)
    elif hook['type'] == 'on-complete':
        _handle_completions(hook)
    else:
        print("Unknown event type %s" % hook['type'])
```

3.6.2 Hook it Up

The hookings in `django-river` can be created both specifically for a workflow object or for a whole workflow. `django-river` comes with some model objects and admin interfaces which you can use to create the hooks.

- To create one for whole workflow regardless of what the workflow object is, go to
  - `/admin/river/onapprovedhook/` to hook up to an approval
  - `/admin/river/ontransithook/` to hook up to a transition
  - `/admin/river/oncompletehook/` to hook up to the completion of the workflow
- To create one for a specific workflow object you should use the admin interface for the workflow object itself. One amazing feature of `django-river` is now that

it creates a default admin interface with the hookings for your workflow model class. If you have already defined one, `django-river` enriches your already defined admin with the hooking section. It is default disabled. To enable it just define `RIVER_INJECT_MODEL_ADMIN` to be `True` in the `settings.py`.

Note: They can programmatically be created as well since they are model objects. If it is needed to be at workflow level, just don't provide the workflow object column. If it is needed to be for a specific workflow object then provide it.

Here are the list of hook models;

- OnApprovedHook
- OnTransitHook
- OnCompleteHook

3.7 FAQ

3.7.1 What does "supporting on-the-fly changes" mean?

It means that the changes require neither a code change nor a deployment. In other words it is called as `Dynamic Workflow`.

3.7.2 What are the advantages of dynamic workflows?

Ease of modifications on workflows. People most of the time lack of having easily modifying workflow capability with their system. Especially when to often workflow changes are needed. Adding up one more step, creating a callback

function right away and deleting them even for a specific workflow object when needed by just modifying it in the Database is giving to much flexibility. It also doesn't require any code knowledge to change a workflow as long as some user interfaces are set up for those people.

3.7.3 What are the disadvantages of dynamic workflows?

Again, ease of modifications on workflows. Having too much freedom sometimes may not be a good idea. Very critical workflows might need more attention and care before they get modified. Even though having a workflow statically defined in the code brings some bureaucracy, it might be good to have it to prevent accidental modifications and to lessen human errors.

3.7.4 What are the differences between `django-river` and `viewflow`?

There are different kind of workflow libraries for `django`. It can be working either with dynamically defined workflows or with statically defined workflows. `django-river` is one of those that works with dynamically defined workflows (what we call that it supports on-the-fly changes) where as `viewflow` is one of those that works with statically defined workflows in the code.

3.7.5 What are the differences between `django-river` and `django-fsm`?

There are different kind of workflow libraries for `django`. It can be working either with dynamically defined workflows or with statically defined workflows. `django-river` is one of those that works with dynamically defined workflows (what we call that it supports on-the-fly changes) where as `django-fsm` is one of those that works with statically defined workflows in the code.

3.7.6 Can I have multiple initial states in a workflow?

No. The way how `django-river` works is that, whenever one of your workflow object is created, the state field of the workflow inside that object is set by the initial field you specified. So it would be ambiguous to have more than one initial state.

3.7.7 Can I have a workflow that circulates?

Yes. `django-river` allows that and as it circulates, `django-river` extends the lifecycle of a particular workflow object with the circular part of it.

3.7.8 Is there a limit on how many states I can have in a workflow?

No. You can have as many as you like.

3.7.9 Can I have an authorization rule consist of two user groups? (`Horizontal Authorization Rules`)

Yes. It functions like an or operator. One authorization rule is defined with multiple user groups or permissions and anyone who is any of the groups or who has any of the permissions defined in that authorization rule can see and approve that transition.

3.7.10 Can I have two authorization rules for one transition and have one of them wait the other? (Vertical Authorization Rules)

Yes. django-river has some kind of a prioritization mechanism between the authorization rules on the same transitions. One that is with more priority will be able to be seen and approved before the one with less priority on the same transitions. Let's say you have a workflow with a transition which should be approved by a team leader before it bothers the manager. That is so possible with django-river.

3.7.11 Can I have two state fields in one Django model?

Yes. The qualifier of a workflow for django-river is the model class and field name. You can have as many workflow as you like in a Django model.

3.7.12 Can I have two workflow in parallel?

Yes. The qualifier of a workflow for django-river is the model class and field name. You can have as many workflow as you like in a Django model.

3.7.13 Can I have two workflow in different Django models?

Yes. The qualifier of a workflow for django-river is the model class and field name. So it is possible to qualify yet another workflow with a different model class.

3.7.14 Does it support all the databases that are supported by Django?

Theoretically yes but it is only tested with sqlite3 and all PostgreSQL versions.

3.7.15 What happens to the existing workflow object if I add a new transition to the workflow?

Simply nothing. Existing workflow objects are not affected by the changes on the workflow (Except the hooks). The way how django-river works is that, it creates an isolated lifecycle for an object when it is created out of it's workflow specification once and remain the same forever. So it lives in it's world. It is very hard to predict what is gonna happen to the existing objects. It requires more manual interference of the workflow owners something like a migration process. But for the time being, we rather don't touch the existing workflow objects due to the changes on the workflow.

3.7.16 Can I add a new hook on-the-fly?

The answer has ben yes since django-river version 3.0.0.

3.7.17 Can I delete an existing hook on-the-fly?

The answer has ben yes since django-river version 3.0.0.

3.7.18 Can I modify a the source code of the function that is used in the hooks on-the-fly?

The answer has ben yes since `django-river` version `3.0.0`. `django-river` also comes with an input component on the admin page that supports basic code highlighting.

3.7.19 Is there any delay for functions updates?

There is none. It is applied immediately.

3.7.20 Can I use `django-river` with `sqlalchemy`?

The answer is no unless you can make `Django` work with `sqlalchemy`. `django-river` uses `Django`'s orm heavily. So it is probably not a way to go.

3.7.21 What is the difference between `Class API` and `Instance API`?

`django-river` provides two kinds of API. One which is for the object and one which is for the class of the object. The `Class API` is the API that you can access via the class whereas the `Instance API` is the API that you can access via the instance or in other words via the workflow object. The APIs on both sides differ from each other So don't expect to have the same function on both sides.

```
# Instance API
from models import Shipping

shipping_object = Shipping.objects.get(pk=1)
shipping_object.river.shipping_status.approve(as_user=someone)
```

```
# Class API
from models import Shipping

Shipping.river.shipping_status.get_on_approval_objects(as_user=someone)
```

You can see all class api functions at Class API and all instance api functions at Instance API.

3.7.22 What is the error `'ClassWorkflowObject' object has no attribute 'approve'`?

`approve` is a function of Instance API not a Class API one.

3.7.23 What is the error `There is no available approval for the user.`?

It means the user that you are trying to approve with is not really authorized to approve the next step of the transition. Catch the error and turn it to a more user friendly error if you would like to warn your user about that.

3.8 Migration Guide

3.8.1 2.X.X to 3.0.0

`django-river` v3.0.0 comes with quite number of migrations, but the good news is that even though those are hard to determine kind of migrations, it comes with the required migrations out of the box. All you need to do is to run;

```
python manage.py migrate river
```

3.8.2 3.1.X to 3.2.X

`django-river` started to support **Microsoft SQL Server 17 and 19** after version 3.2.0 but the previous migrations didn't get along with it. We needed to reset all the migrations to have fresh start. If you have already migrated to version *3.1.X* all you need to do is to pull your migrations back to the beginning.

```
python manage.py migrate --fake river zero
python manage.py migrate --fake river
```

3.9 Change Logs

3.9.1 3.2.0 (Stable):

- **Improvement** - # 140 141: Support Microsoft SQL Server 17 and 19

3.9.2 3.1.4

- **Bug** - # 137: Fix a bug with jumping to a state

3.9.3 3.1.3:

- **Improvement** - # 135: Support Django 3.0

3.9.4 3.1.2:

- **Improvement** - # 133: Support MySQL 8.0

3.9.5 3.1.1

- **Bug** - # 128: Available approvals are not found properly when primary key is string
- **Bug** - # 129: Models with string typed primary keys violates integer field in the hooks

3.9.6 3.1.0

- **Imrovement** - # 123: Jump to a specific future state of a workflow object
- **Bug** - # 124: Include some BDD tests for the users to understand the usages easier.

3.9.7 3.0.0

- **Bug** - # 106: It crashes when saving a workflow object when there is no workflow definition for a state field
- **Bug** - # 107: next_approvals api of the instance is broken
- **Bug** - # 112: Next approval after it cycles doesn't break the workflow anymore. Multiple cycles are working just fine.
- **Improvement** - # 108: Status column of transition approvals are now kept as string in the DB instead of number to maintain readability and avoid mistakenly changed ordinals.
- **Improvement** - # 109: Cancel all other peer approvals that are with different branching state.
- **Improvement** - # 110: Introduce an iteration to keep track of the order of the transitions even the cycling ones. This comes with a migration that will assess the iteration of all of your existing approvals so far. According to the tests, 250 workflow objects that have 5 approvals each will take ~1 minutes with the slowest django *v1.11*.
- **Improvement** - # 111: Cancel all approvals that are not part of the possible future instead of only impossible the peers when something approved and re-create the whole rest of the pipeline when it cycles
- **Improvement** - # 105: More dynamic and better way for hooks.On the fly function and hook creations, update or delete are also supported now. It also comes with useful admin interfaces for hooks and functions. This is a huge improvement for callback lovers :-)
- **Improvement** - # 113: Support defining an approval hook with a specific approval.
- **Improvement** - # 114: Support defining a transition hook with a specific iteration.
- **Drop** - # 115: Drop skipping and disabling approvals to cut the unnecessary complexity.
- **Improvement** - # 116: Allow creating transitions without any approvals. A new TransitionMeta and Transition models are introduced to keep transition information even though there is no transition approval yet.

3.9.8 2.0.0

- **Improvement** - [# 90,# 36]: Finding available approvals has been speeded up ~x400 times at scale
- **Improvement** - # 92 : It is mandatory to provide initial state by the system user to avoid confusion and possible mistakes
- **Improvement** - # 93 : Tests are revisited, separated, simplified and easy to maintain right now
- **Improvement** - # 94 : Support class level hooking. Meaning that, a hook can be registered for all the objects through the class api
- **Bug** - # 91 : Callbacks get removed when the related workflow object is deleted
- **Improvement** - Whole `django-river` source code is revisited and simplified
- **Improvement** - Support `Django v2.2`
- **Deprecation** - `Django v1.7`, `v1.8`, `v1.9` and `v1.10` supports have been dropped

3.9.9 1.0.2

- **Bug** - # 77 : Migrations for the models that have state field is no longer kept getting recreated.
- **Bug** - It is crashing when there is no workflow in the workspace.

3.9.10 1.0.1

- **Bug** - # 74 : Fields that have no transition approval meta are now logged correctly.
- **Bug** - `django` version is now fixed to 2.1 for coverage in the build to make the build pass

3.9.11 1.0.0

`django-river` is finally having it's first major version bump. In this version, all code and the APIs are revisited and are much easier to understand how it works and much easier to use it now. In some places even more performant. There are also more documentation with this version. Stay tuned :-)

- **Improvement** - Support `Django2.1`
- **Improvement** - Support multiple state fields in a model
- **Improvement** - Make the API very easy and useful by accessing everything via model objects and model classes
- **Improvement** - Simplify the concepts
- **Improvement** - Migrate ProceedingMeta and Transition into TransitionApprovalMeta for simplification
- **Improvement** - Rename Proceeding as TransitionApproval
- **Improvement** - Document transition and on-complete hooks
- **Improvement** - Document transition and on-complete hooks
- **Improvement** - Imrove documents in general
- **Improvement** - Minor improvements on admin pages
- **Improvement** - Some performance improvements

3.9.12 0.10.0

- # 39 - **Improvement** - Django has dropped support for pypy-3. So, It should be dropped from django itself too.
- **Remove** - `pypy` support has been dropped
- **Remove** - `Python3.3` support has been dropped
- **Improvement** - `Django2.0` support with `Python3.5` and `Python3.6` is provided

3.9.13 0.9.0

- # 30 - **Bug** - Missing migration file which is `0007` because of `Python2.7` can not detect it.
- # 31 - **Improvement** - unicode issue for Python3.
- # 33 - **Bug** - Automatically injecting workflow manager was causing the models not have default `objects` one. So, automatic injection support has been dropped. If anyone want to use it, it can be used explicitly.
- # 35 - **Bug** - This is huge change in django-river. Multiple state field each model support is dropped completely and so many APIs have been changed. Check documentations and apply changes.

3.9.14 0.8.2

- **Bug** - Features providing multiple state field in a model was causing a problem. When there are multiple state field, injected attributes in model class are owerriten. This feature is also unpractical. So, it is dropped to fix the bug.
- **Improvement** - Initial video tutorial which is Simple jira example is added into the documentations. Also repository link of fakejira project which is created in the video tutorial is added into the docs.
- **Improvement** - No proceeding meta parent input is required by user. It is set automatically by django-river now. The field is removed from ProceedingMeta admin interface too.

3.9.15 0.8.1

- **Bug** - ProceedingMeta form was causing a problem on migrations. Accessing content type before migrations was the problem. This is fixed by defining choices in init function instead of in field

3.9.16 0.8.0

- **Deprecation** - ProceedingTrack is removed. ProceedingTracks were being used to keep any transaction track to handle even circular one. This was a workaround. So, it can be handled with Proceeding now by cloning them if there is circle. ProceedingTracks was just causing confusion. To fix this, ProceedingTrack model and its functions are removed from django-river.
- **Improvement** - Circular scenario test is added.
- **Improvement** - Admins of the workflow components such as State, Transition and ProceedingMeta are registered automatically now. Issue #14 is fixed.

3.9.17 0.7.0

- **Improvement** - Python version 3.5 support is added. (not for Django1.7)
- **Improvement** - Django version 1.9 support is added. (not for Python3.3 and PyPy3)

3.9.18 0.6.2

- **Bug** - Migration `0002` and `0003` were not working properly for postgresql (maybe oracle). For these databases, data can not be fixed. Because, django migrates each in a transactional block and schema migration and data migration can not be done in a transactional block. To fix this, data fixing and schema fixing are seperated.
- **Improvement** - Timeline section is added into documentation.
- **Improvement** - State slug field is set as slug version of its label if it is not given on saving.

3.9.19 0.6.1

- **Bug** - After `content_type` and `field` are moved into `ProceedingMeta` model from `Transition` model in version `0.6.0`, finding initial and final states was failing. This is fixed.
- **Bug** - `0002` migrations was trying to set default slug field of State model. There was a unique problem. It is fixed. `0002` can be migrated now.

- **Improvement** - The way of finding initial and final states is changed. ProceedingMeta now has parent-child tree structure to present state machine. This tree structure is used to define the way. This requires to migrate `0003`. This migration will build the tree of your existed ProceedingMeta data.

3.9.20 0.6.0

- **Improvement** - `content_type` and `field` are moved into `ProceedingMeta` model from `Transition` model. This requires to migrate `0002`. This migrations will move value of the fields from `Transition` to `ProceedingMeta`.
- **Improvement** - Slug field is added in `State`. It is unique field to describe state. This requires to migrate `0002`. This migration will set the field as slug version of `label` field value. (Re Opened -> re-opened)
- **Improvement** - `State` model now has `natural_key` as `slug` field.
- **Improvement** - `Transition` model now has `natural_key` as (`source_state_slug` , `destination_state_slug`) fields
- **Improvement** - `ProceedingMeta` model now has `natural_key` as (`content_type`, `field`, `transition`, `order`) fields
- **Improvement** - Changelog is added into documentation.

3.9.21 0.5.3

- **Bug** - Authorization was not working properly when the user has irrelevant permissions and groups. This is fixed.
- **Improvement** - User permissions are now retreived from registered authentication backends instead of `user.user_permissions`

3.9.22 0.5.2

- **Improvement** - Removed unnecessary models.
- **Improvement** - Migrations are added
- **Bug** - `content_type__0002` migrations cause failing for `django1.7`. Dependency is removed
- **Bug** - `DatabaseHandlerBacked` was trying to access database on django setup. This cause `no table in db` error for some django commands. This was happening; because there is no db created before some commands are executed; like `makemigrations`, `migrate`.

3.9.23 0.5.1

- **Improvement** - Example scenario diagrams are added into documentation.
- **Bug** - Migrations was failing because of injected `ProceedingTrack` relation. Relation is not injected anymore. But property `proceeing_track` remains. It still returns current one.

CHAPTER 4

Indices and tables

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- search