
Distributed data in Django services
Pavel Lonkin, Team Leader
MORE AS A SERVICE

Hi, there!

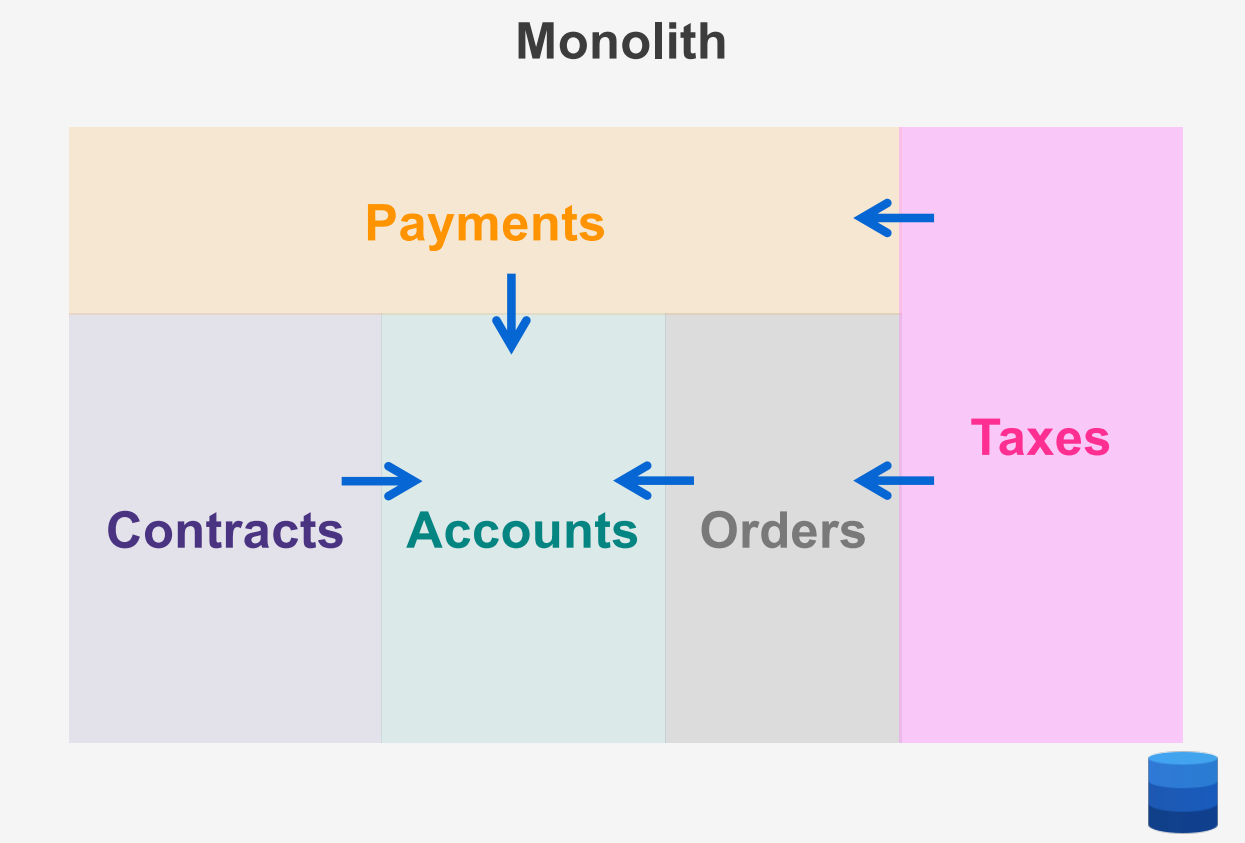
Pavel “Pasha” Lonkin

https://www.linkedin.com/in/plonkin

@pavel_lonkin

@d3rky

What’s the problem?



Example of API call

```
GET /payments

{
 "id": "P-001",
 ...
 "account": {
    "id": "AC-002",
    "name": "Pavel"
 }
 ...
}
```

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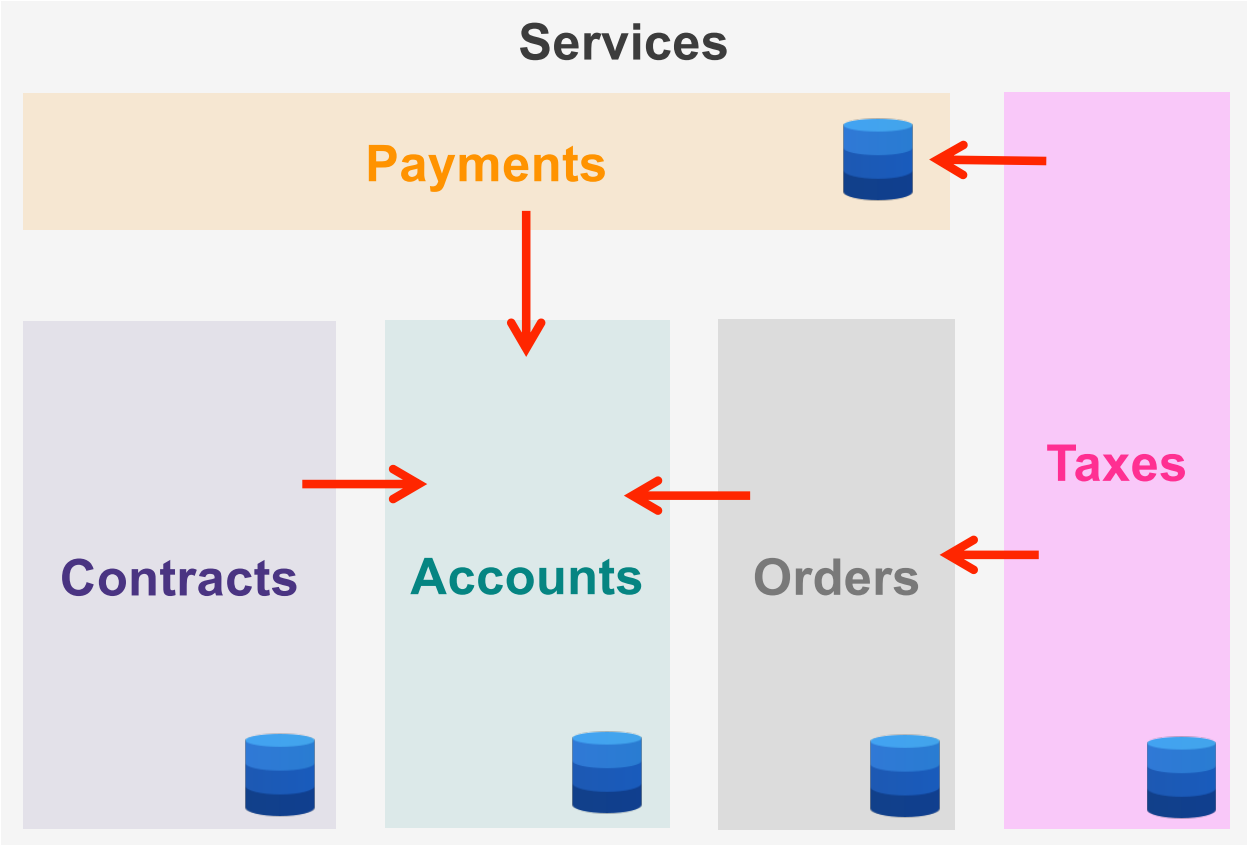
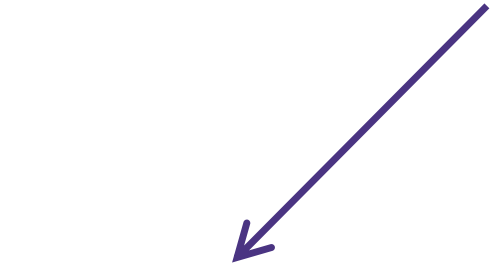


How to break the "ice"?
How to join data then?

How to break the ”ice”?



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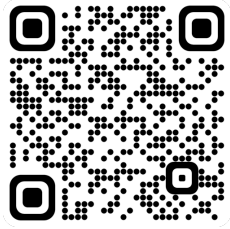
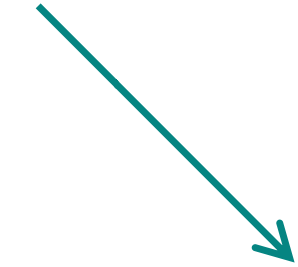


https://microservices.io/patterns/data/api-composition.html



CQRS

(Command Query Responsibility Segregation)

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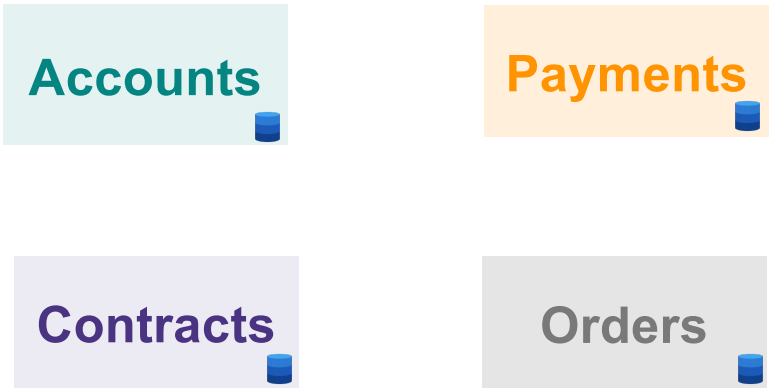
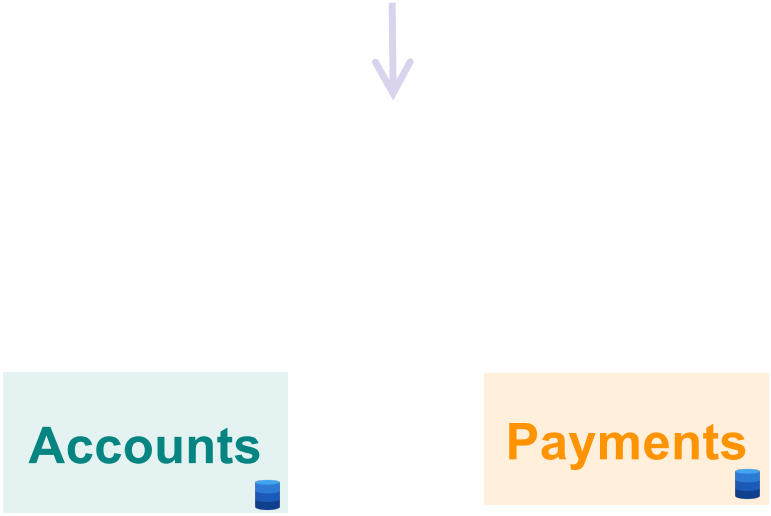


API Composition

GET /payments?account.name=Pavel



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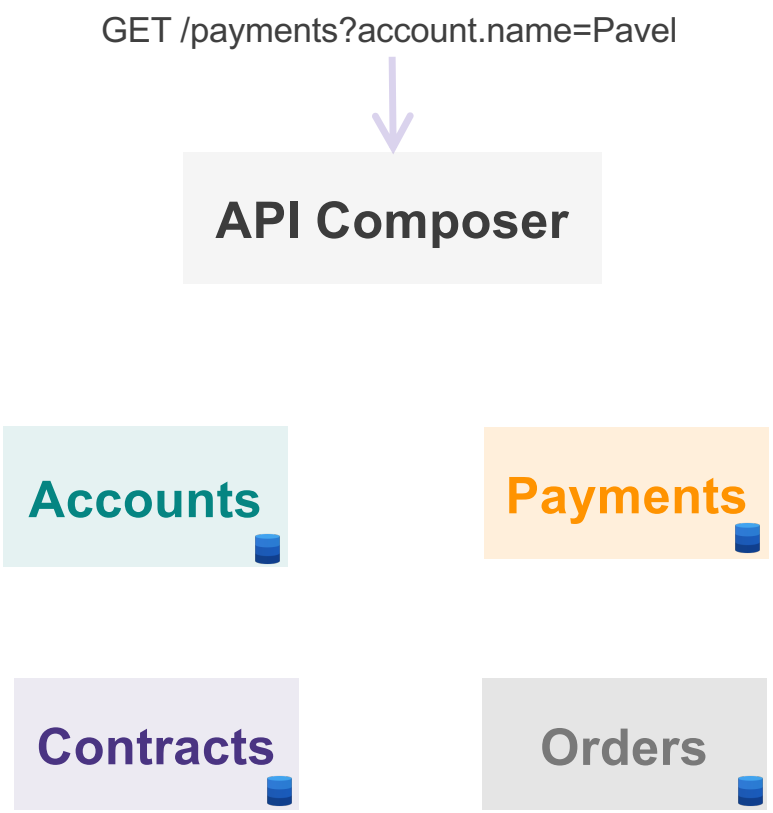

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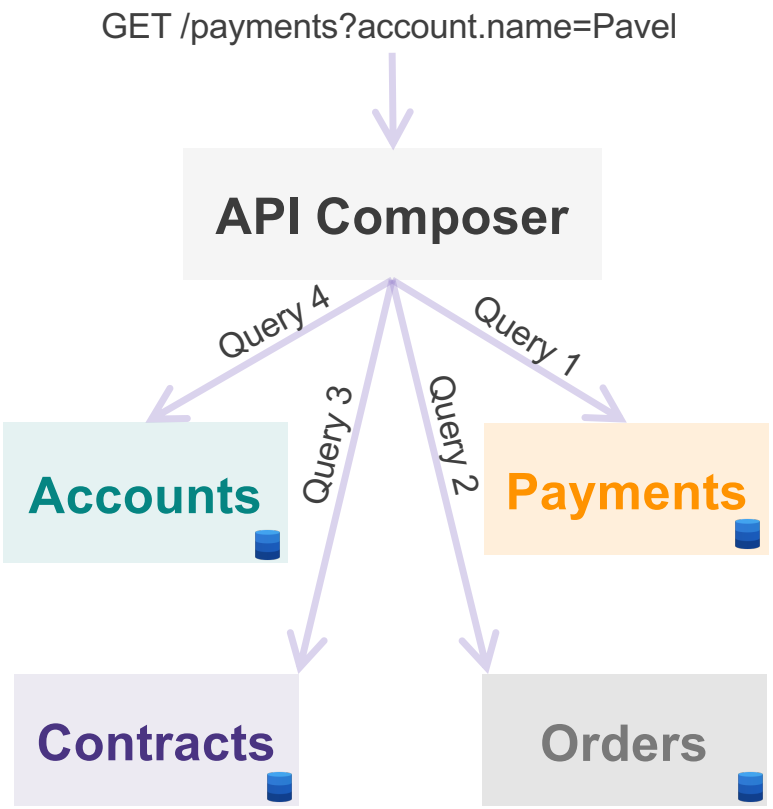

- ✗ Inefficient
- ✗ In-memory joins of large data sets

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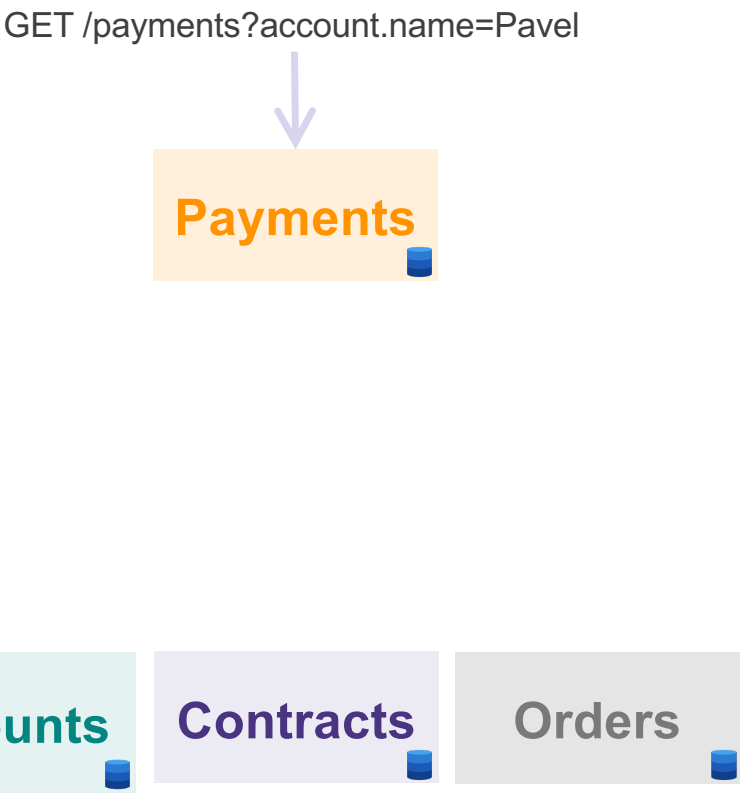

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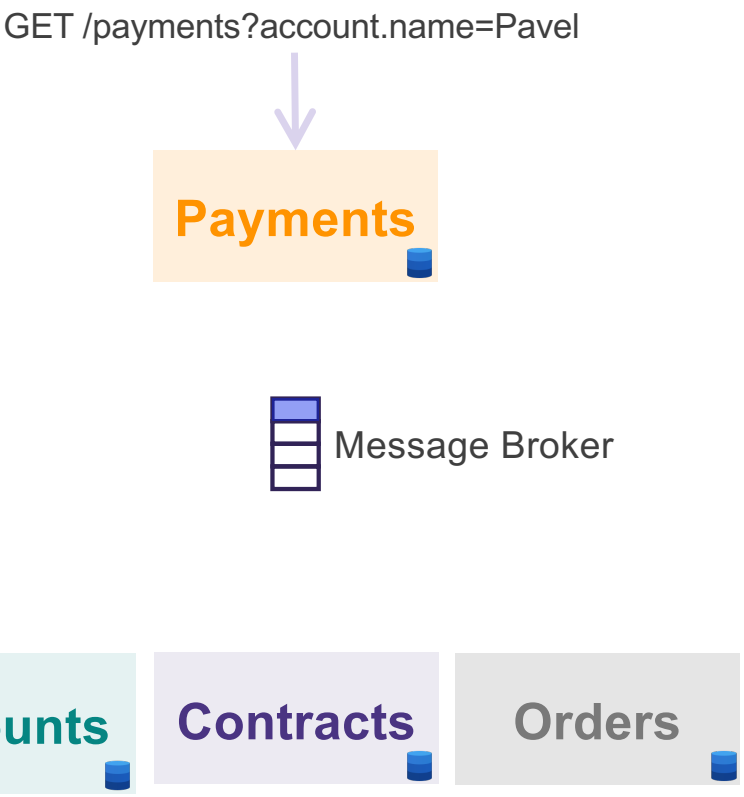

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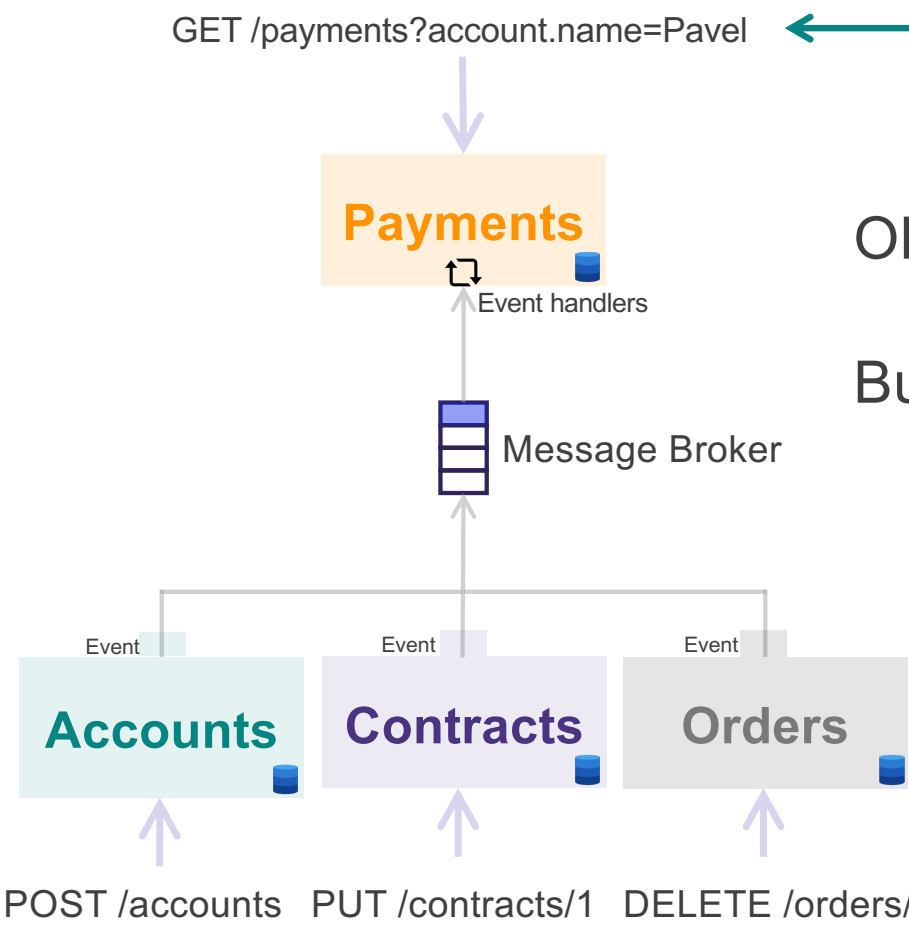

Ok, Pasha, that's cool.

But where are **queries** and **commands**?

CQRS

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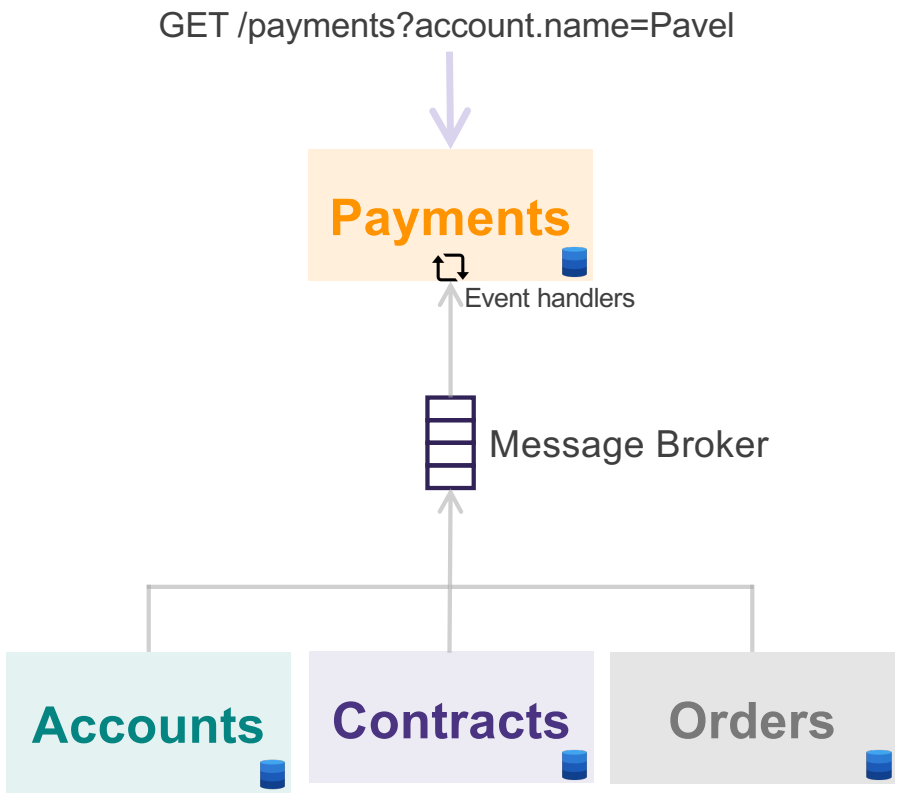

- ✓ Only needed data is on the destination side
- ✓ Low coherence
- ✓ Guaranteed consistency
- ✗ Replication lag or eventual consistency
- ✗ Code & data duplication

API Composition

✗ Inefficient

✗ In-memory joins of large data sets

CQRS ✓

(Command Query Responsibility Segregation)

✓ Only needed data is on the destination side

✓ Low coherence

✓ Guaranteed consistency

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What did we have at that moment?

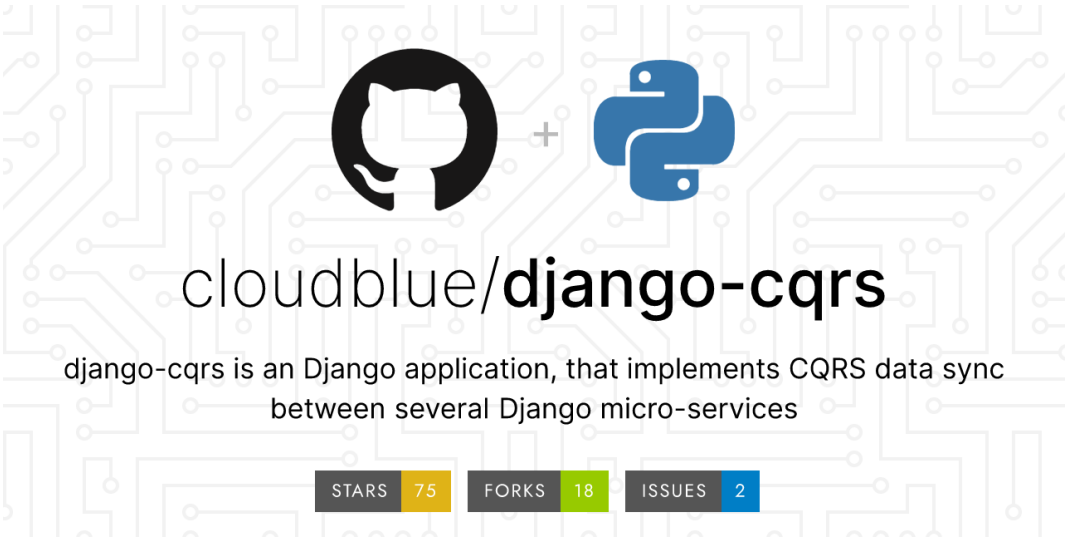
- 😄 We were young and full of energy
- 😄 Django
- 😄 Different databases (MySQL, Postgres)
- 😢 Nothing reasonable for CQRS pattern in Django

But…

We have a Team and Max!

Maxim Kolyubyakin

Django CQRS


cloudblue/django-cqrs
django-cqrs is an Django application, that implements CQRS data sync between several Django micro-services
STARS 75
FORKS 18
ISSUES 2

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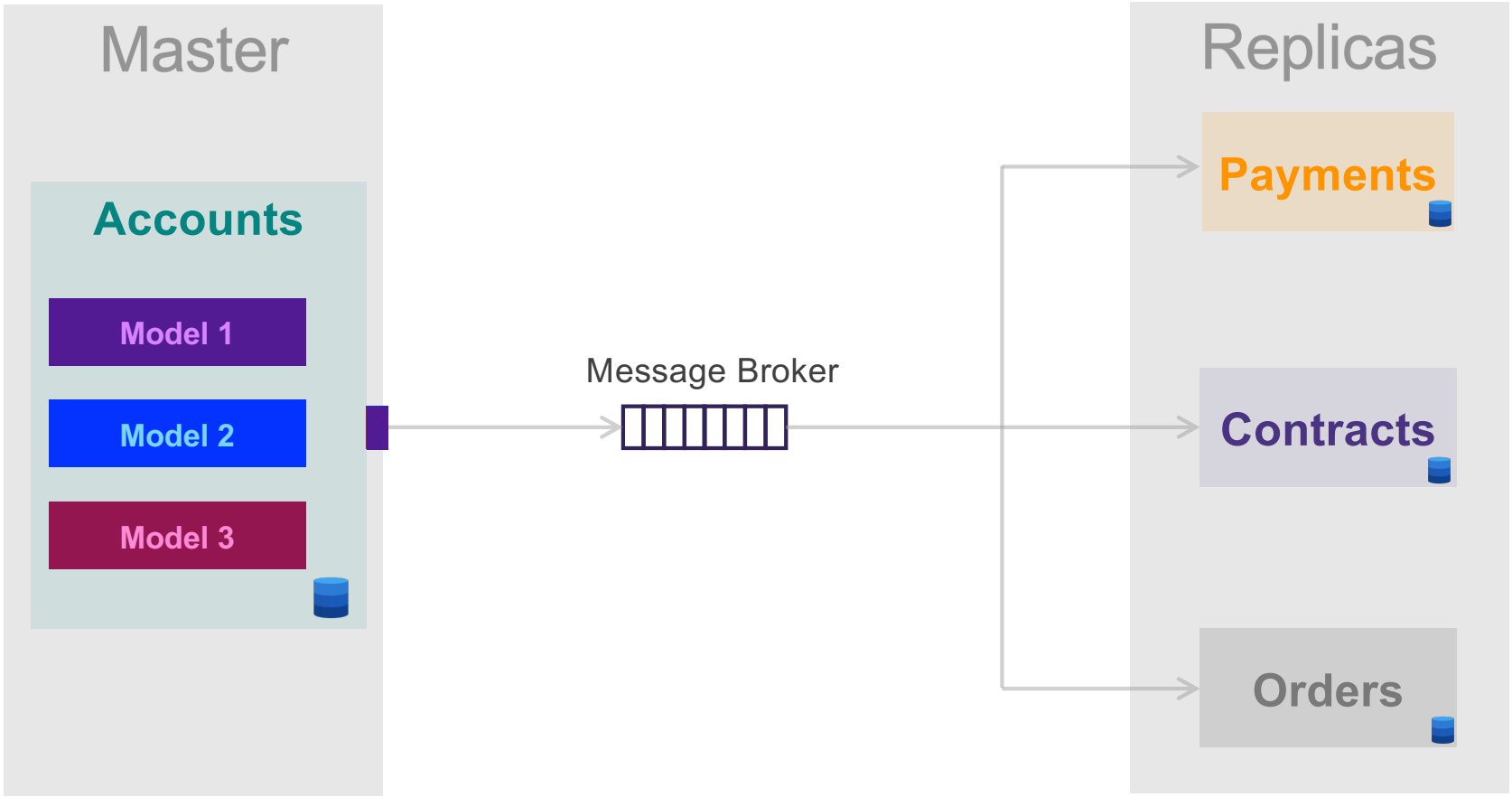
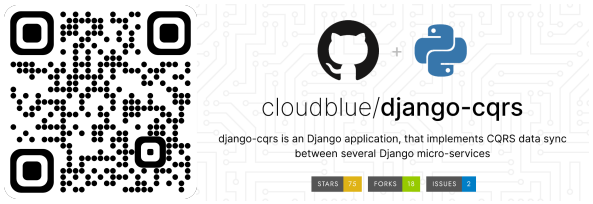
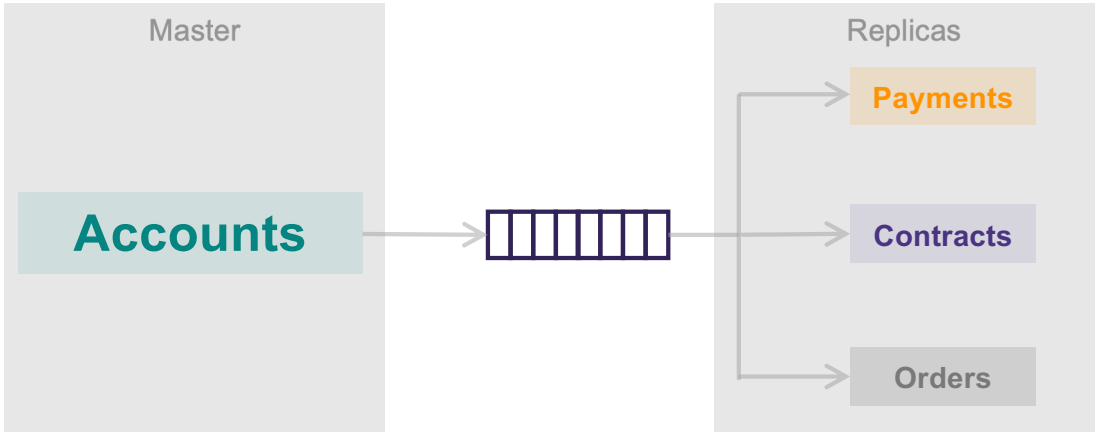
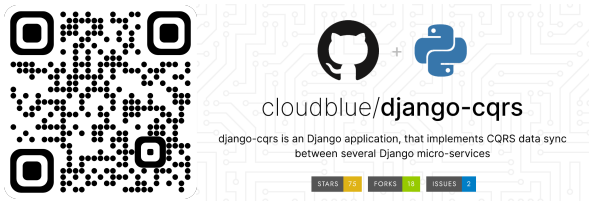






Key Features

- You need 5 steps to run it in your Django app
- You don’t need to dramatically change your code
- Supports different databases from out of the box
- Production ready



5 steps to run Django CQRS

1. Define Master Settings

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# settings.py

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2. Update Master Models

Update Master Models

```
# models.py

from django.db import models
from dj_cqrs.mixins import MasterMixin, RawMasterMixin


class Account(MasterMixin, models.Model):
    CQRS_ID = 'account'
    CQRS_PRODUCE = True  # set this to False to prevent sending instances to
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3. Define Replica Settings

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5. Run Replica Consumers

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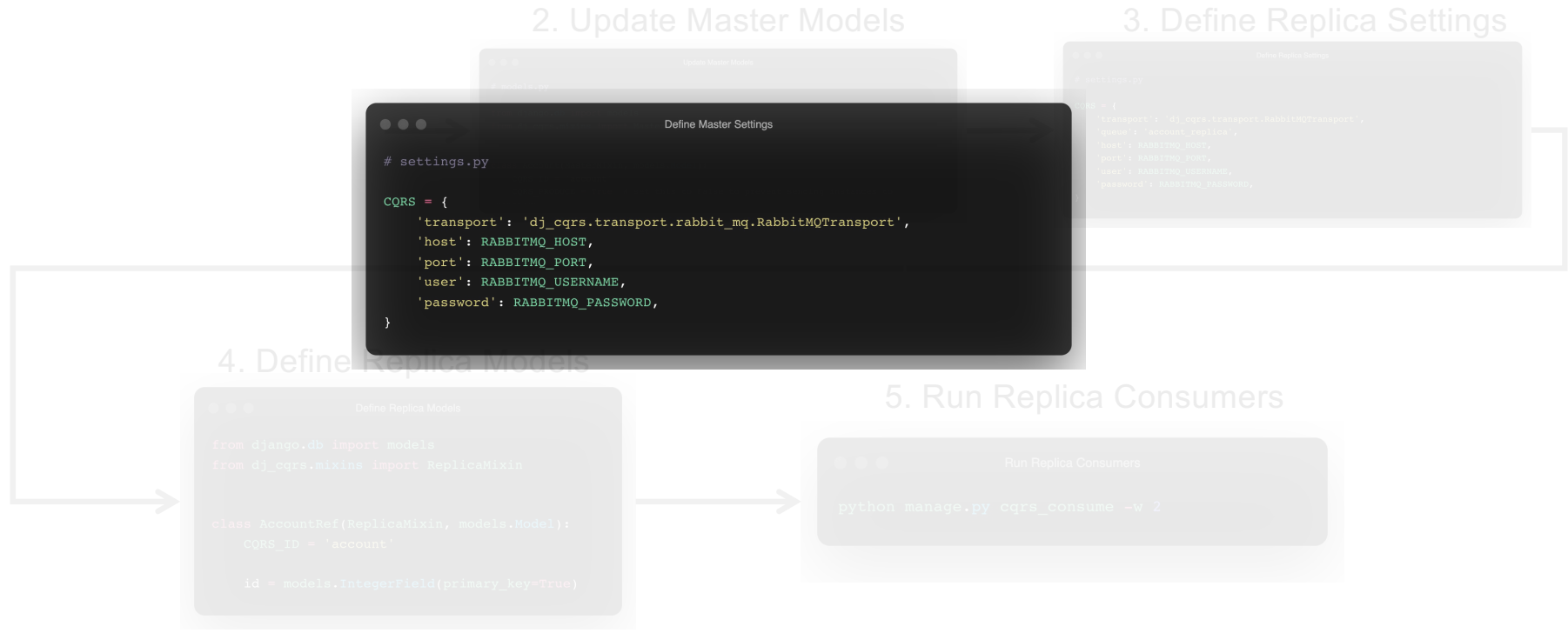

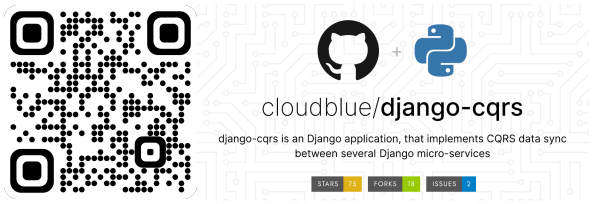

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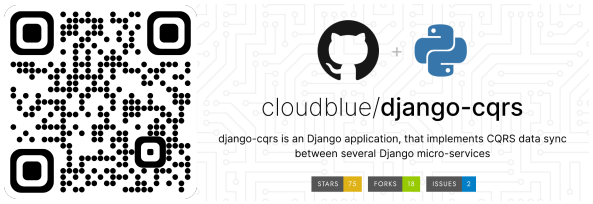

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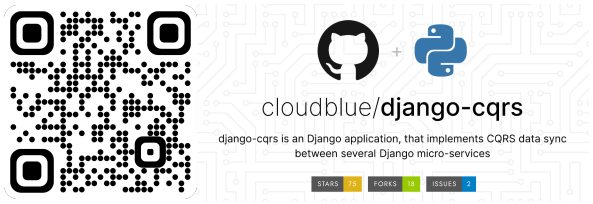

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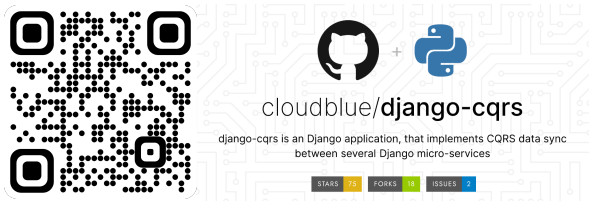

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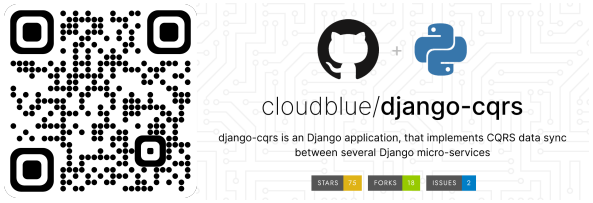

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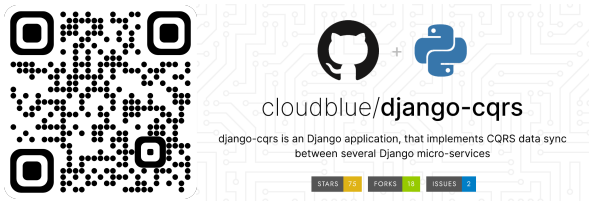

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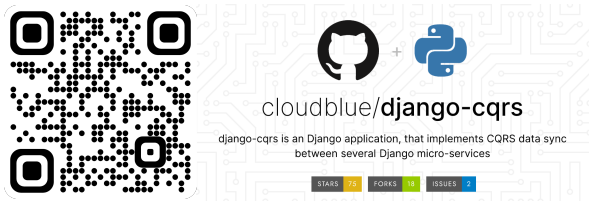

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    id = models.IntegerField(primary_key=True)
```
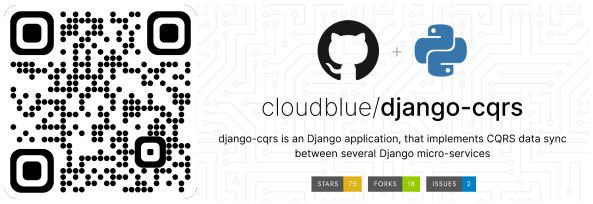



5 steps to run Django CQRS

1. Define Master Settings

Define Master Settings

```python
# settings.py

CQRS = {
    'transport': 'dj_cqrs.transport.rabbit_mq.RabbitMQTransport',
    'host': RABBITMQ_HOST,
    'port': RABBITMQ_PORT,
    'user': RABBITMQ_USERNAME,
    'password': RABBITMQ_PASSWORD,
}
```

2. Update Master Models

Update Master Models

```python
# models.py

from django.db import models
from dj_cqrs.mixins import MasterMixin, RawMasterMixin


class Account(MasterMixin, models.Model):
    CQRS_ID = 'account'
    CQRS_PRODUCE = True  # set this to False to prevent sending instances to
```

3. Define Replica Settings

Define Replica Settings

```python
# settings.py

CQRS = {
    'transport': 'dj_cqrs.transport.RabbitMQTransport',
    'queue': 'account_replica',
    'host': RABBITMQ_HOST,
    'port': RABBITMQ_PORT,
    'user': RABBITMQ_USERNAME,
    'password': RABBITMQ_PASSWORD,
}
```

4. Define Replica Models

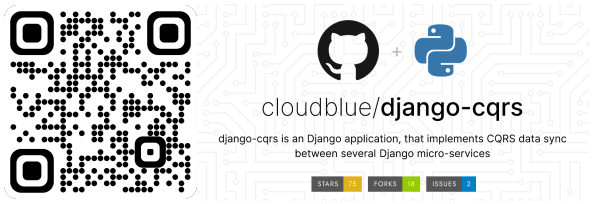
Define Replica Models

```python
from django.db import models
from dj_cqrs.mixins import ReplicaMixin


class AccountRef(ReplicaMixin, models.Model):
    CQRS_ID = 'account'

    id = models.IntegerField(primary_key=True)
```

5. Run Replica Consumers

Run Replica Consumers

```
python manage.py cqrs_consume -w 2
```



5 steps to run Django CQRS

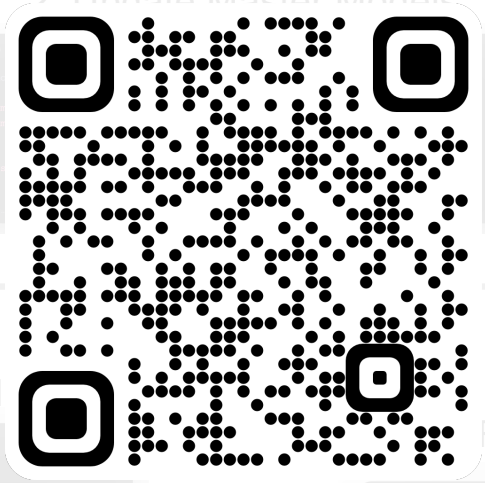
1. Define Master Settings

2. Update Master Models

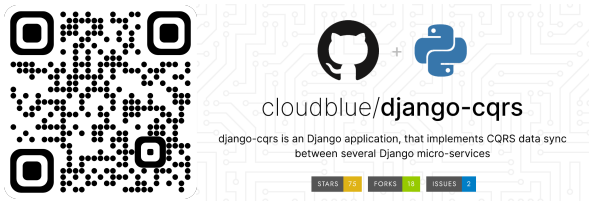
3. Define Replica Settings

4. Define Replica M

Run Replica Consumers



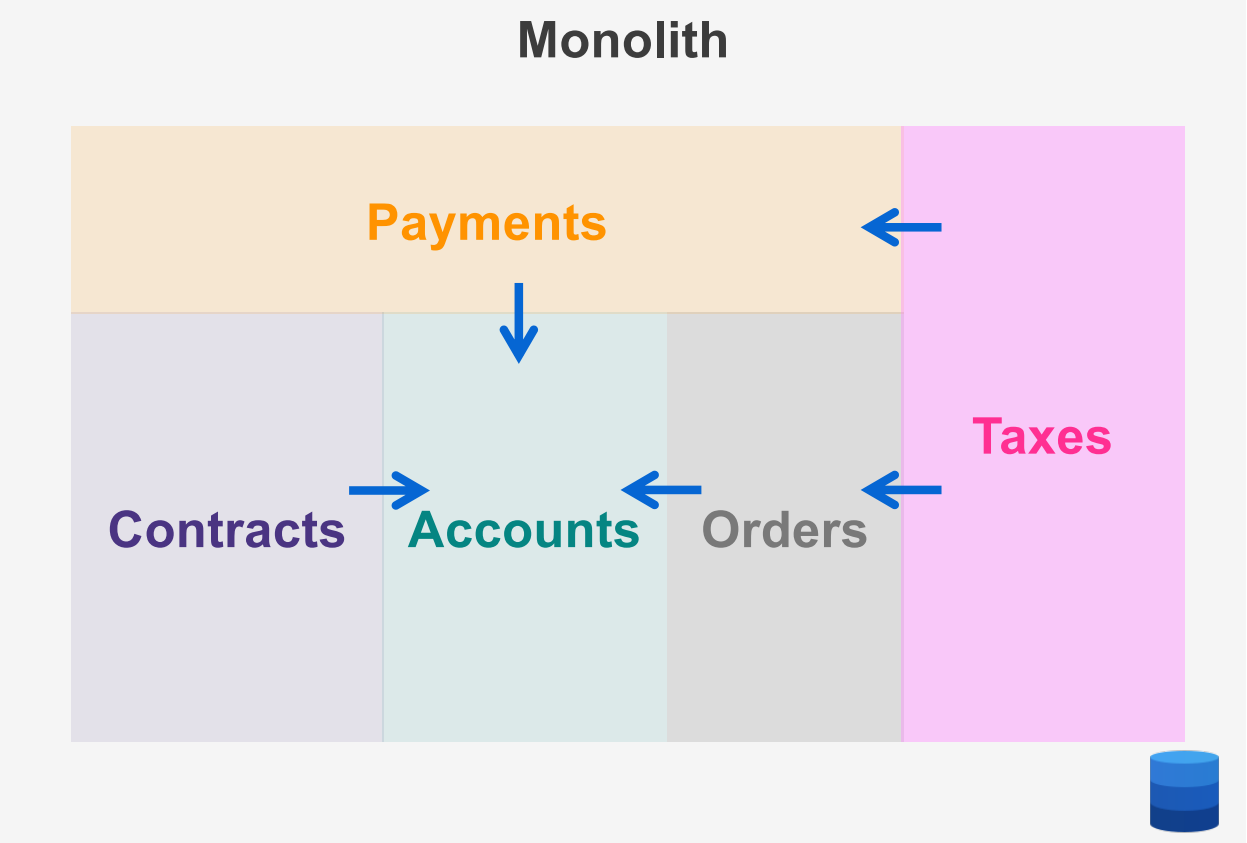
Demo example



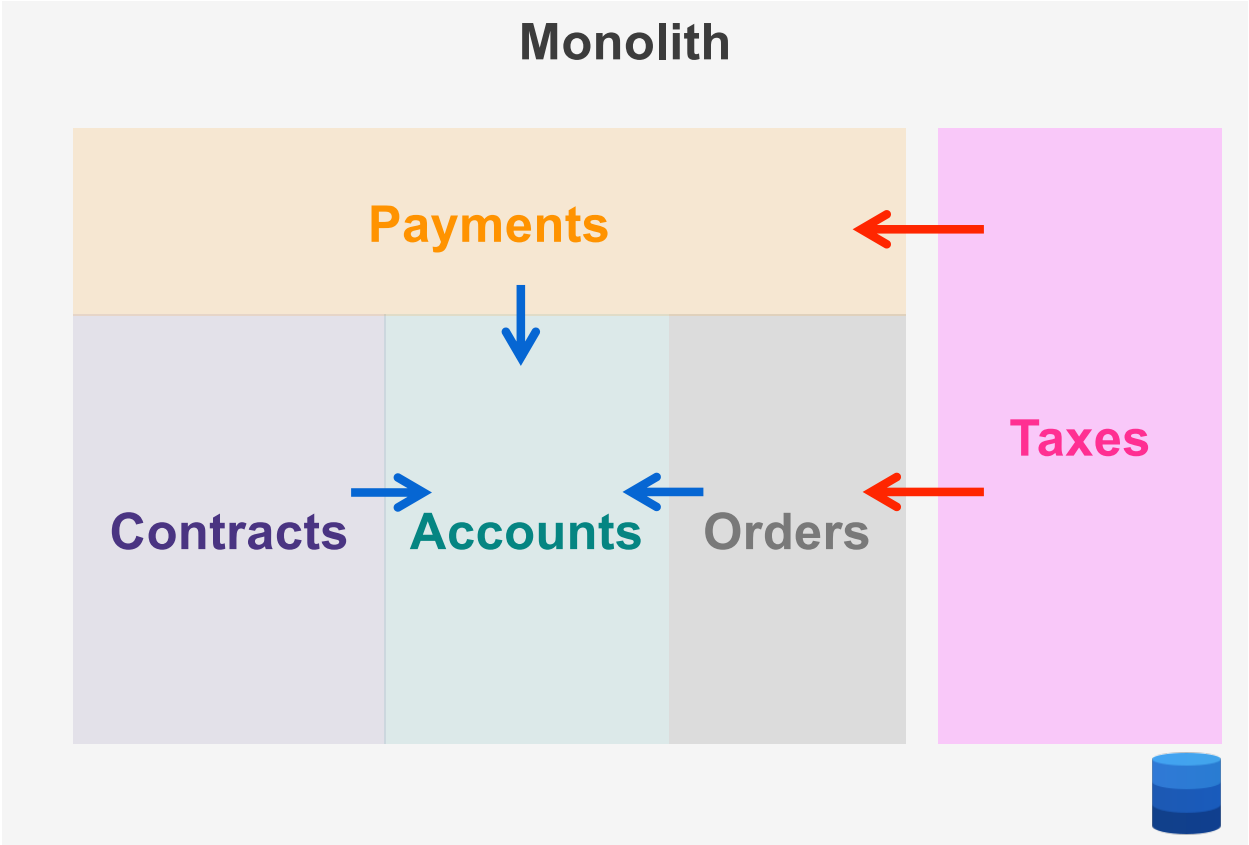
Other Features

- ✓ Retry and Dead Letters Queues
- ✓ Administration tools to sync, check diff between master and replicas, etc
- ✓ Support of multiple transports (you can use your own)

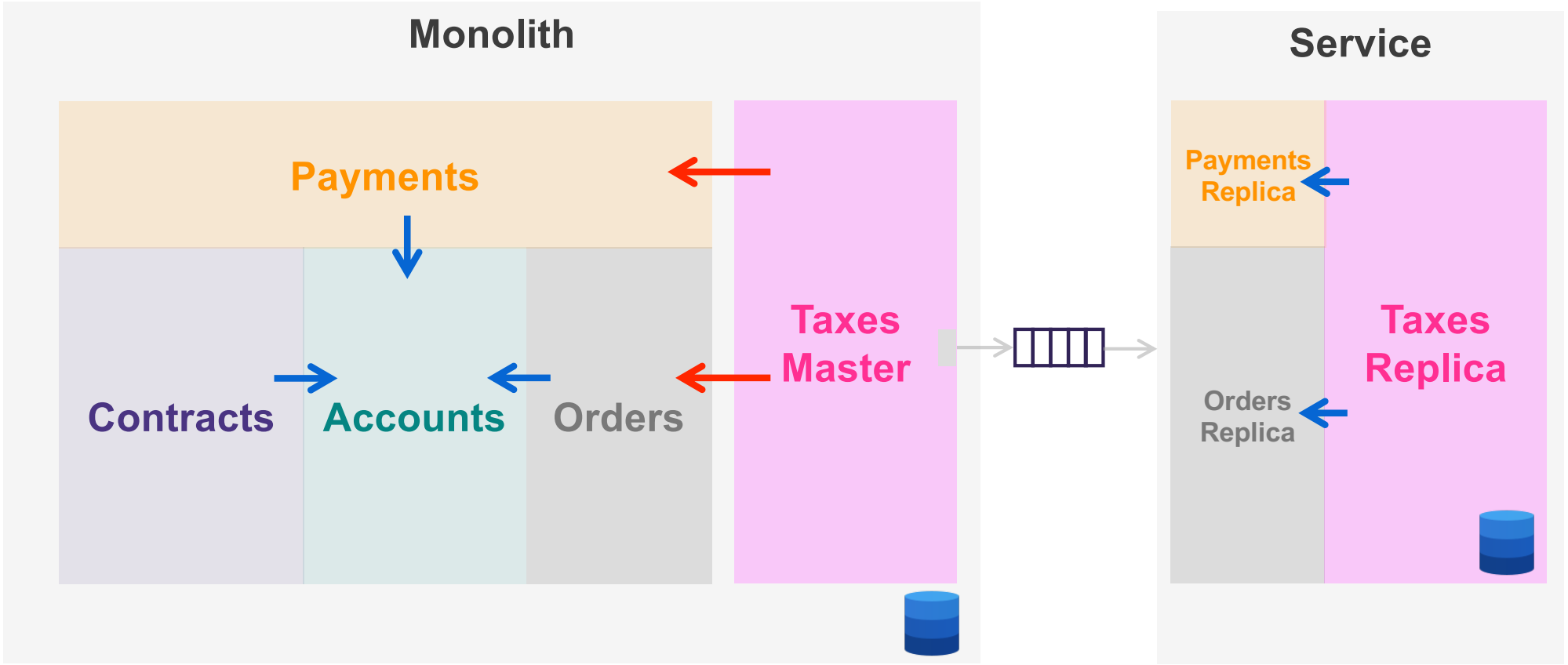
Bonus! Zero downtime data migrations



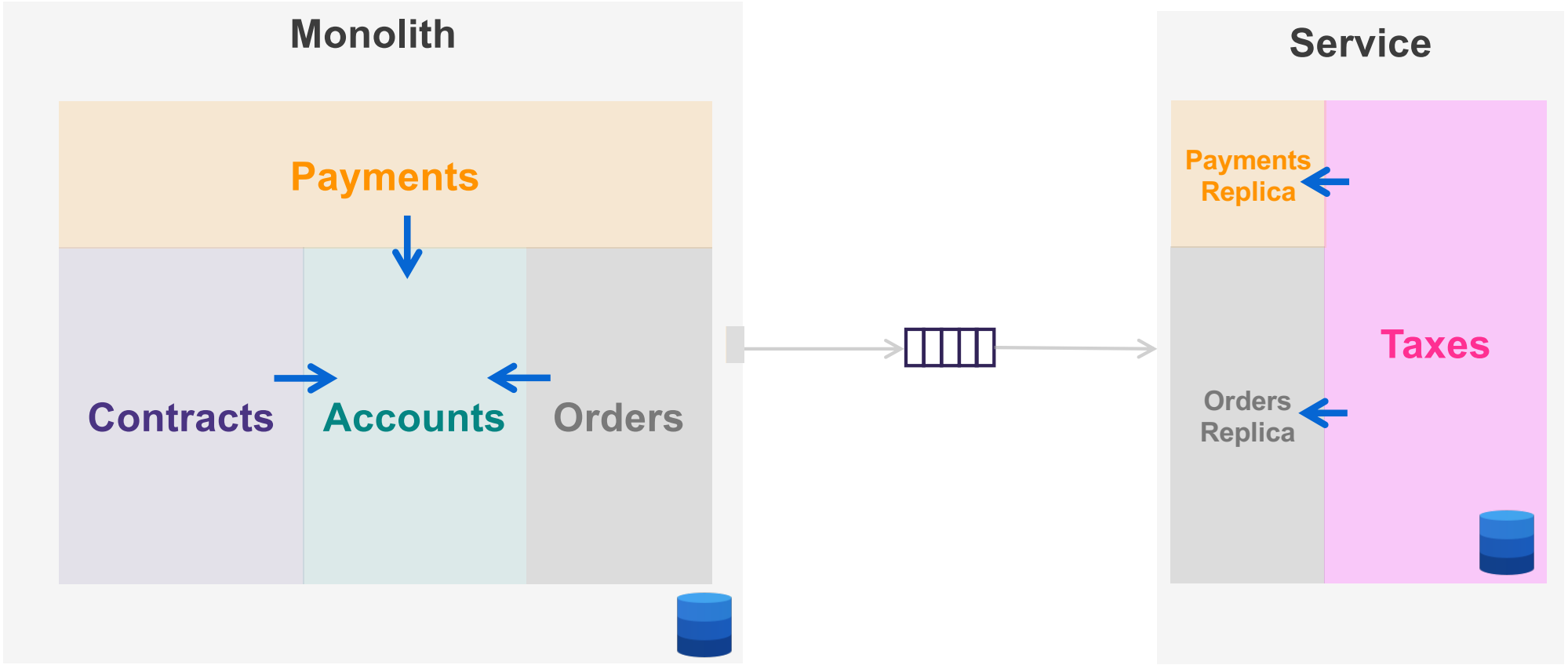
Bonus! Zero downtime data migrations

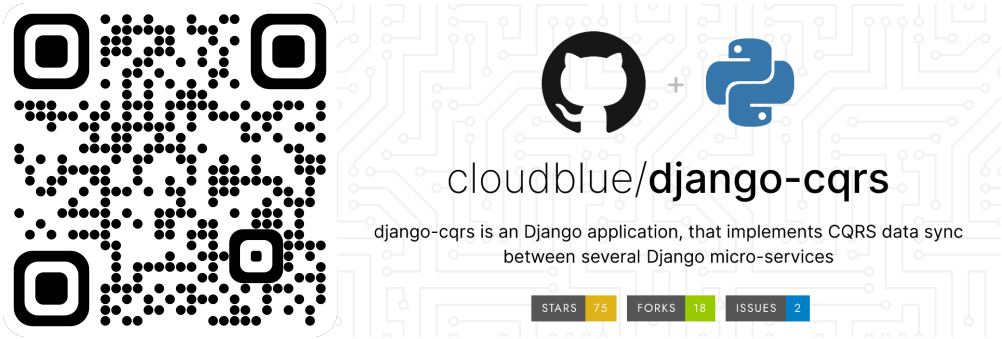


Bonus! Zero downtime data migrations

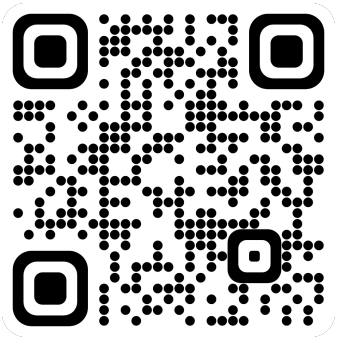


Bonus! Zero downtime data migrations





Careers



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