DJANGO + CELERY

Do More with your Data with Less Code

"Torture the data, and it will confess to anything."

–Ronald Coase

THE DATA PIPELINE

Each 6 phases of the Pipeline are ideally decoupled - independent services

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For each step, make sure you are using the right tool for the job

—

The Goal is always to gain Insight

THE PROBLEMS

I. Retrieving Data

II. Distributing the Workload on Data

III. Managing when Data Processes are Run

IV. Maintaining Data / Service Resiliency

ENTER TASK QUEUES

I. Asynchronous Processing

II. Decouples from a Specific Service

III. Event Driven or Scheduled

IV. Communication Between Systems (Messaging)

V. Increased Data Resiliency

THE PROJECT

Let's build a Super Simple Message Service

I. *Django* + *DRF* to expose RESTful Services to Clients

II. *Celery* to handle Data Ingestion, Scheduling, and Distributed Processing

III. *SQLite* and *Redis* as our Data Storage

DJANGO + DRF

I. Representational State Transfer (REST)

II. Setup to productivity barrier is very low

III. The Django Admin is Powerful

IV. We like Python (a lot)

V. Lots of great Community Support

CODE STRUCTURE

I. Urls - Router, maps function/resource to browsable address

II. Views - An exposed function; Akin to Controller in MVC

III. Serializers - Data Validation and Formatting

IV. Models - Data Definition, ORM Work Horse

CODE SNIPPETS

```
# Create a router and register our ViewSets

router = DefaultRouter()

router.register(r'messages', views.MessageViewSet)

router.register(r'images', views.ImageAttachmentViewSet)

router.register(r'users', views.UserViewSet)


urlpatterns = [

    url(r'^', include(router.urls)),

    path('celery/count_to_ten/<int:number_of_tasks>', views.CountToTen.as_view()),

    path('celery/scrape_image', views.ScrapeImage.as_view())

]
```

CODE SNIPPETS

```
class MessageViewSet(viewsets.ModelViewSet):
    """
    Provides List, Detail, Retrieve, Create, Update, Delete for Model
    """
    queryset = Message.objects.all()
    serializer_class = MessageSerializer
    permission_classes = (permissions.IsAuthenticated, )


    def perform_create(self, serializer):
        serializer.save(author=self.request.user)
```

CODE SNIPPETS

```
class MessageSerializer(serializers.HyperlinkedModelSerializer):

    author = serializers.ReadOnlyField(source='author.username')

    image_attachment = serializers.HyperlinkedRelatedField(view_name='image-detail',
                                                           many=True,
                                                           read_only=True)


    class Meta:

        model = Message

        fields = '__all__'
```

CODE SNIPPETS

```python
class Message(models.Model):
    """
    A message from one user to another
    """
    subject = models.CharField(max_length=50, blank=True, default='')
    body = models.CharField(max_length=2000, blank=True, default='')
    author = models.ForeignKey(User, on_delete=models.CASCADE, related_name='messages')
    to_user = models.ForeignKey(User, on_delete=models.DO_NOTHING, null=True)
    active = models.BooleanField(default=True)
    modified_date = models.DateTimeField(auto_now_add=True)
    created_date = models.DateTimeField(auto_now_add=True)

    def __str__(self):
        return self.subject

    class Meta:
        managed = True
        ordering = ('created_date', )
        db_table = 'message'
        verbose_name = 'User Message'
        verbose_name_plural = 'User Messages'
```

CELERY

I. Distributed Asynchronous Task Management

II. Decoupled Self-Monitoring Processes

III. Task Scheduling (Celery-Beat)

IV. Feature Rich

V. Well Supported Community

CODE STRUCTURE

I. Views - Exposed Service

II. Tasks - Defines the High Level Processes

III. Queues - A list of ordered Tasks for Workers

IV. Workers - Subscribe to a Queue, the Work Horse

CODE SNIPPETS

```python
class ScrapeImage(APIView):
    """
    Dispatches a task for a given image url.
    """
    def get(self, request):
        image_url = request.GET.get('image_url')
        scrape_image.delay(user=request.user.pk, image_url=image_url)
        return Response(f'Dispatched a task to grab the image at {image_url}.')
```

CODE SNIPPETS

```python
@task
def scrape_image(user, image_url):

    print(f'Grabbing the image at: {image_url}')

    sleep(5)

    # Get the user

    user_obj = User.objects.get(pk=user)

    Image.objects.create(owner=user_obj, url=image_url)

    print('Finished grabbing and storing image in the db.')
```

CODE SNIPPETS

```
app = Celery()

@app.on_after_configure.connect
def setup_periodic_tasks(user, image_url):
    # Executes every Monday morning at 8:30 a.m.
    sender.add_periodic_task(
        crontab(hour=8, minute=30, day_of_week=1),
        scrape_image(user, url),
    )
```

DEMO

CONCLUSIONS

I. Modern Systems ask *a lot* of their Data at almost every layer, so be prepared to handle it.

II. Decouple Services from Data Processes

III. Django + Celery is awesome because it is Powerful

IV. Django + Celery is awesome because it is Simple

ADDENDUM

I. kombu-fernet-serializers from Heroku to add Security

II. Celery supports a wide range of Brokers, Results Stores, and Data Serialization Tools

III. Celery has integrations with other popular web frameworks

IV. We got through this without a *single* Django Unchained joke (maybe)…

CREDITS

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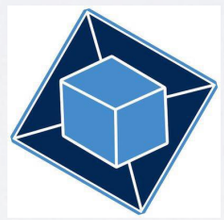
Sponsors



Morgantown Codes

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THANKS FOR LISTENING

QUESTIONS?