Wandering and getting lost:

the architecture of an app activating local communities on dementia issues

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Outline

1 Sammen Om Demens

2 Implementation

3 Experimental Setup

4 Results

5 Conclusion & Future Work

Sammen Om Demens (SOD)

- Introduction

- What is SOD?
  - An app implemented for a Danish municipality

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- Goals:
  - Create awareness about dementia among ordinary citizens
  - Involve ordinary citizens in helping persons with dementia
  - Alleviate the anxiety of persons with dementia and caregivers

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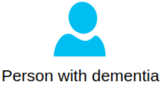

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Person with dementia

Relative or caregiver

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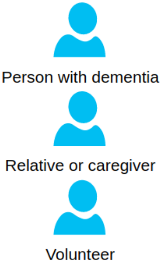

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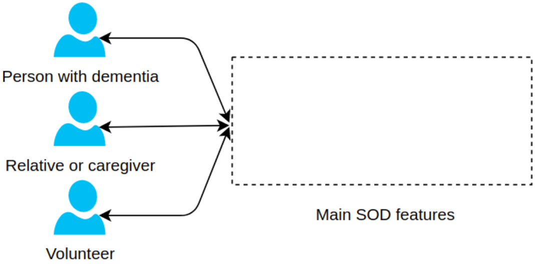

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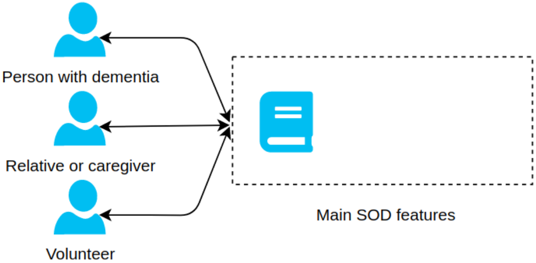

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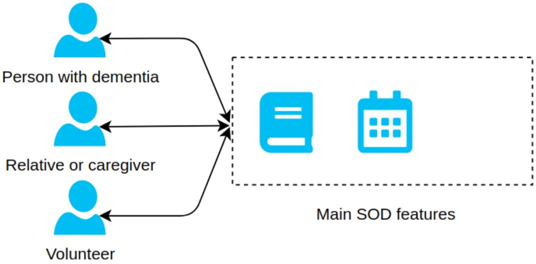

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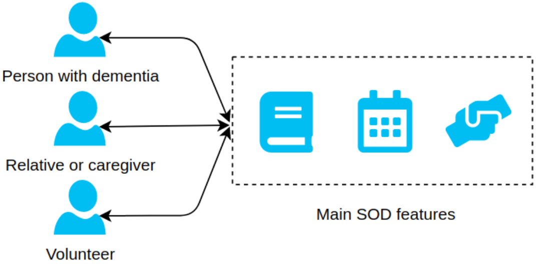

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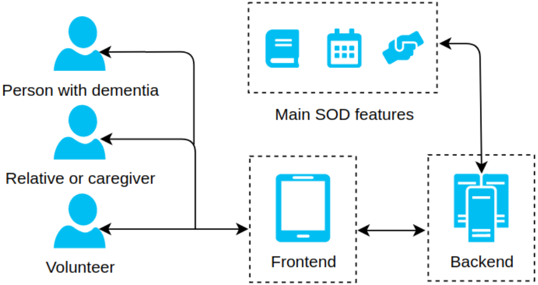

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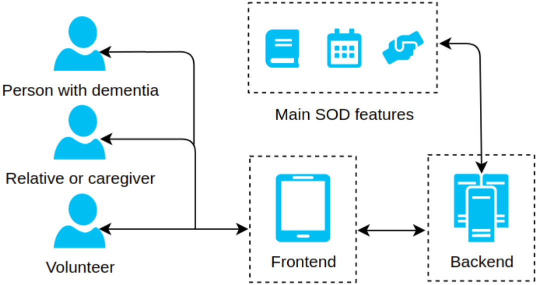

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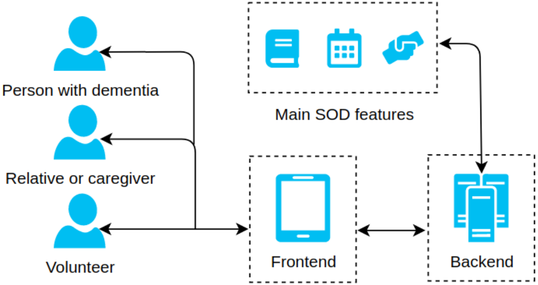

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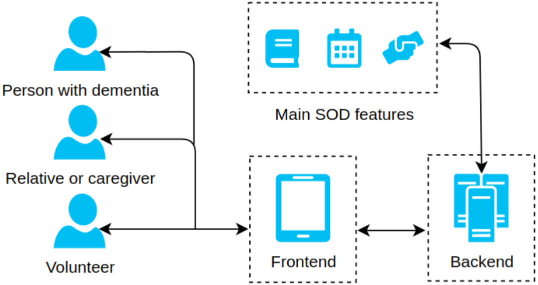

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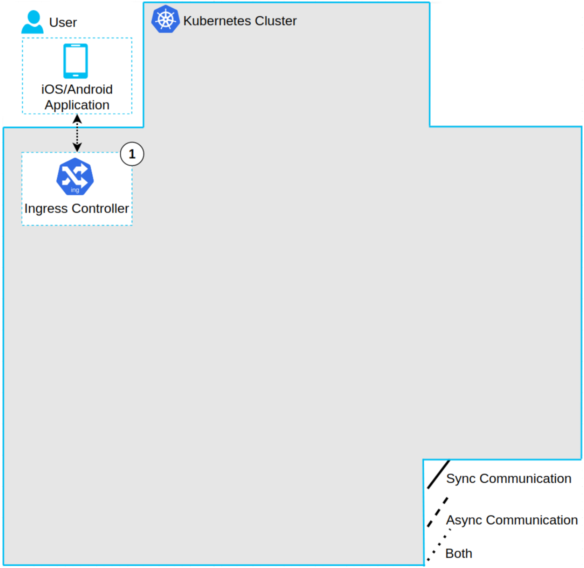

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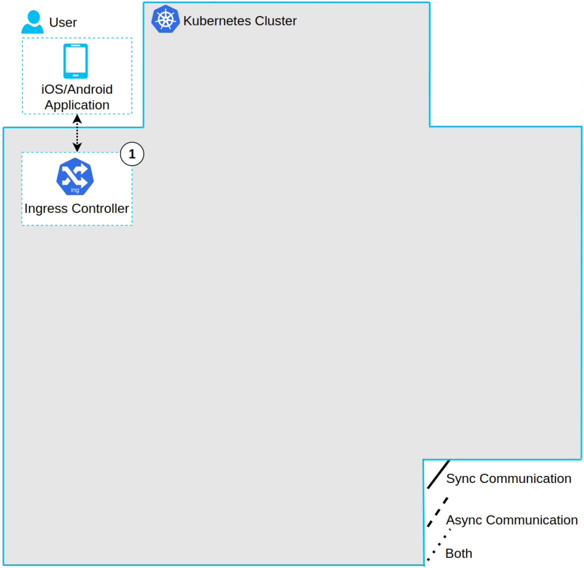
- The entry point of the system is an Ingress Controller ①



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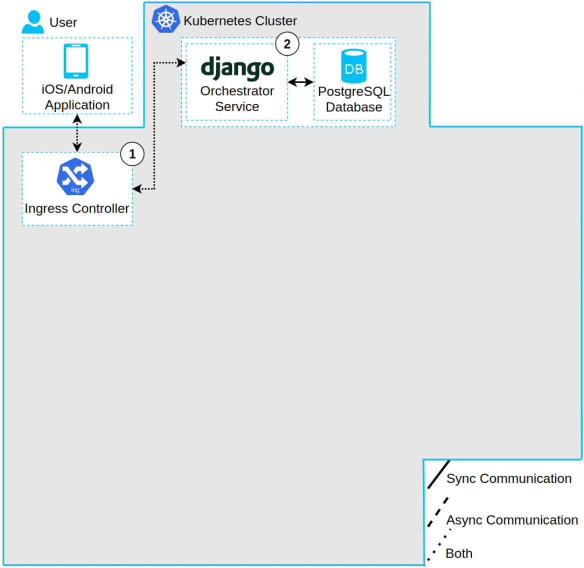

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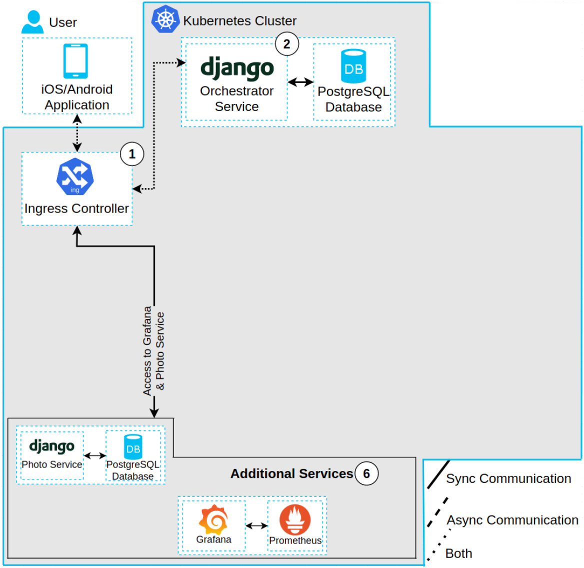
- It also reserves a direct route to Additional Services ⑥



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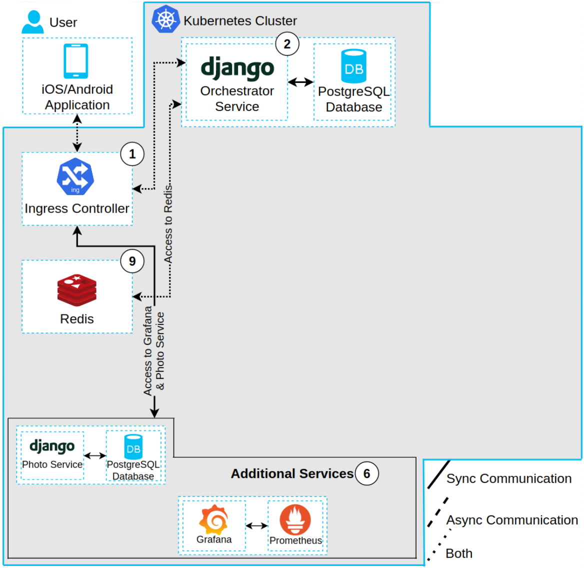
- The Orchestrator ② routes requests to other microservices through Redis ⑨



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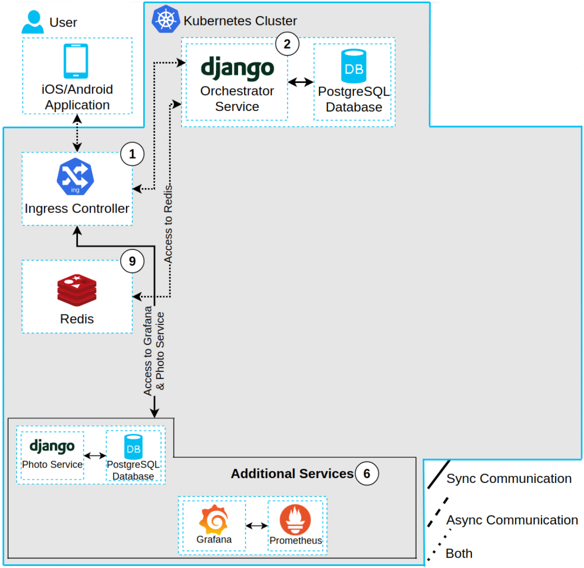

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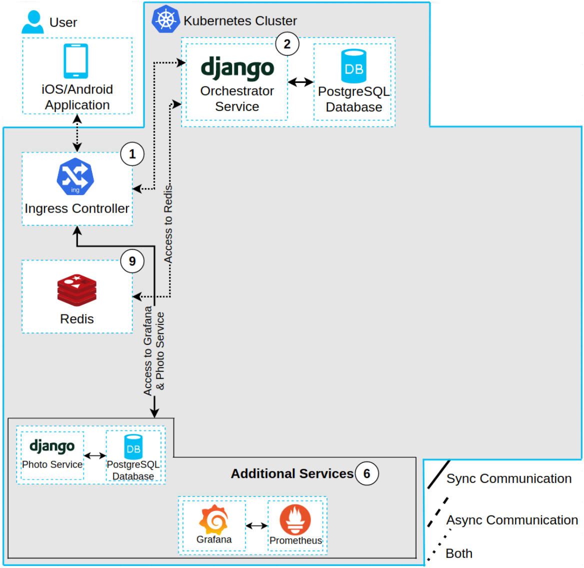

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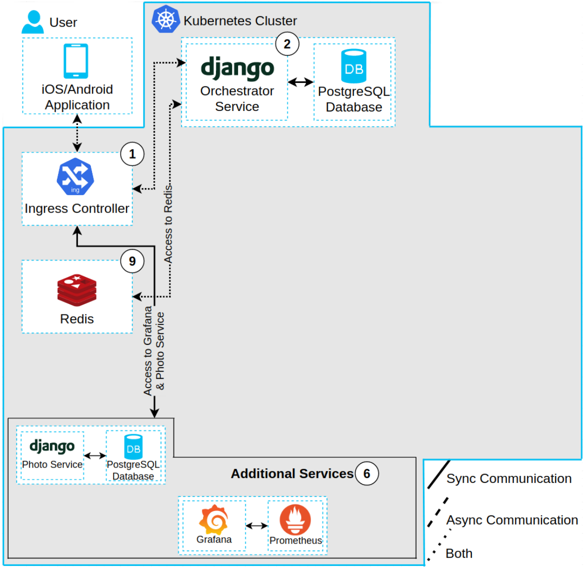
- It makes it easy to authorize and authenticate a user in a single place
- It handles WebSocket connections



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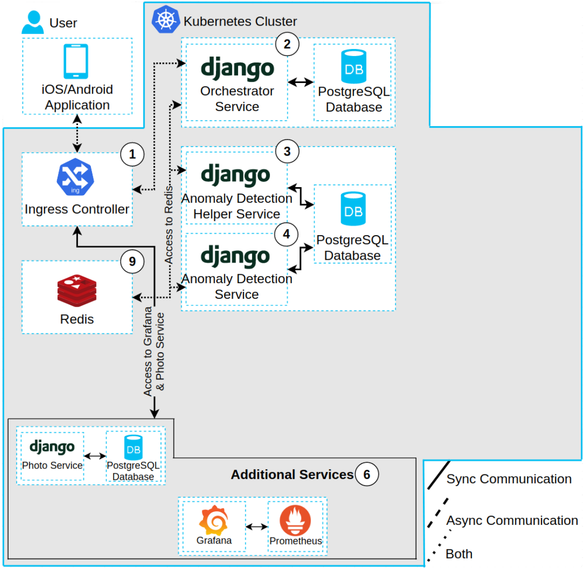

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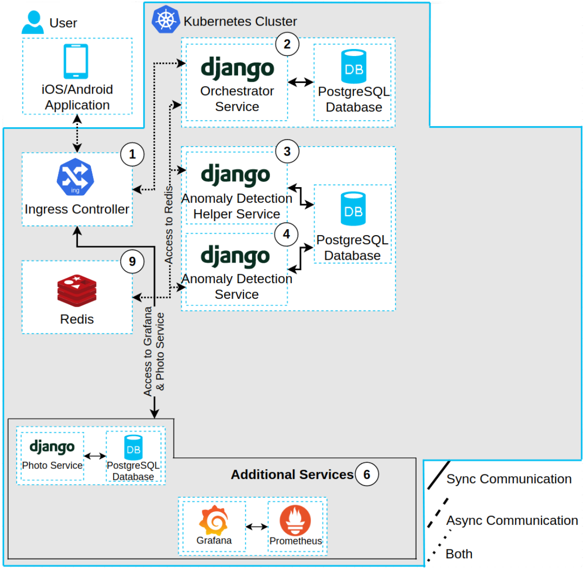

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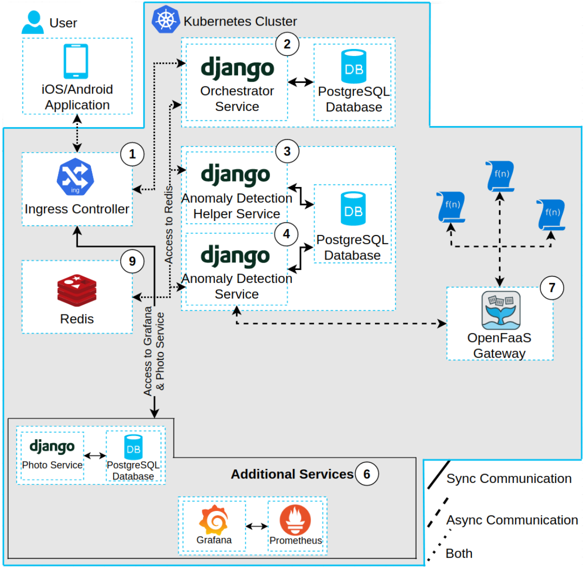

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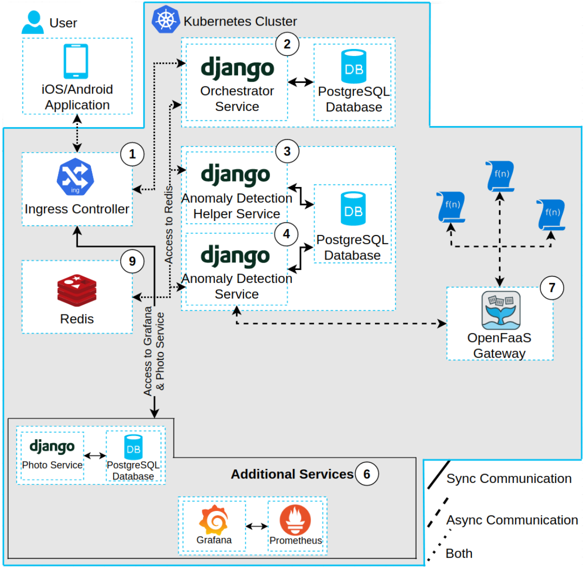
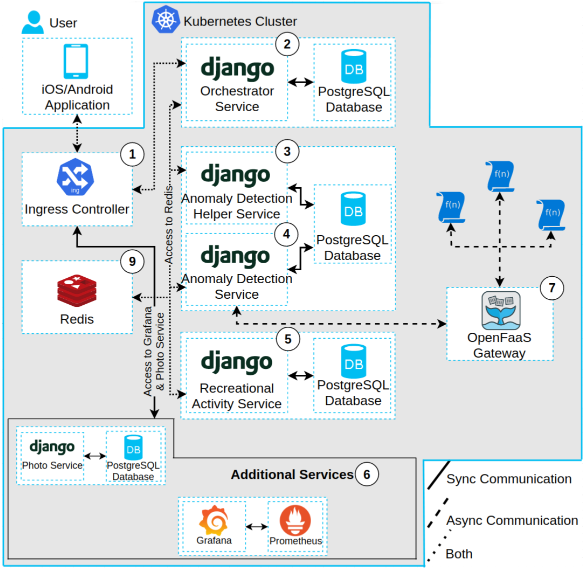
- OpenFaaS provides the infrastructure for implementing the detection algorithms



Implementation

- The recreational activity calendar is implemented by ⑤



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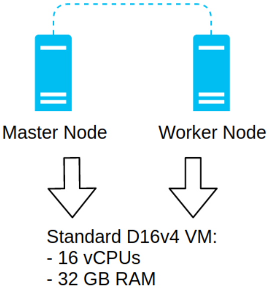

Standard D16v4 VM:
- 16 vCPUs
- 32 GB RAM

Experimental Setup
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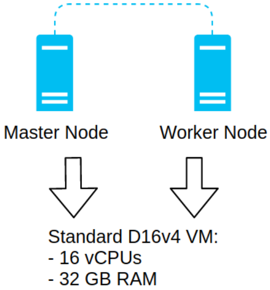
  - Kubernetes cluster consisting of a master and a worker node



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- Microsoft Azure Setup:
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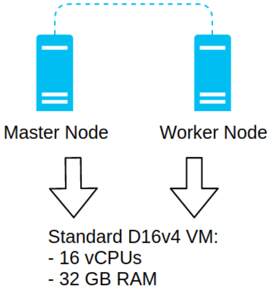

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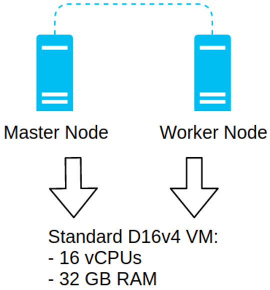

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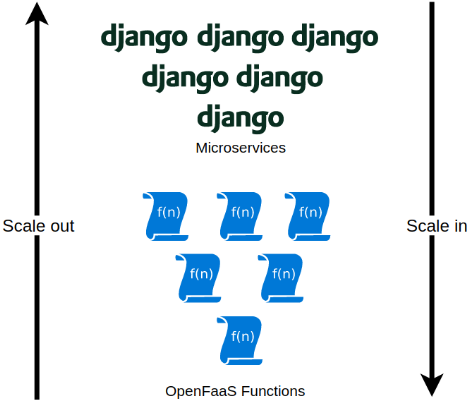

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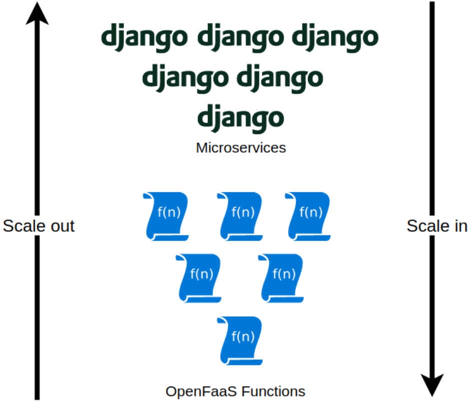

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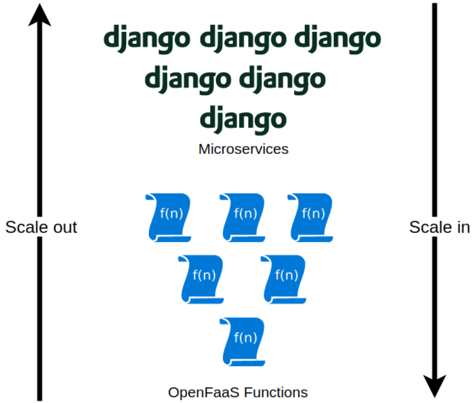

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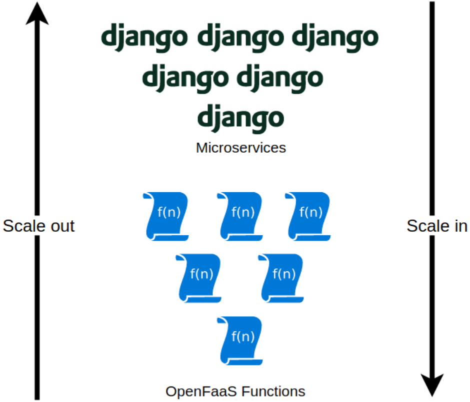

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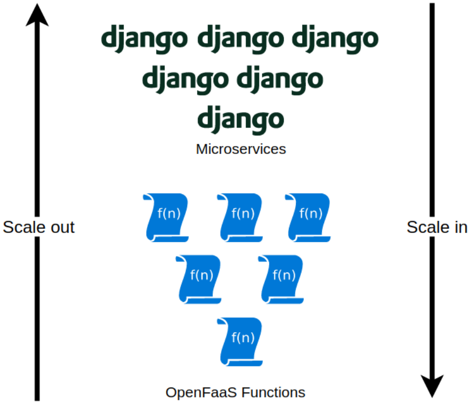
    - Requests per second for OpenFaaS functions



Experimental Setup

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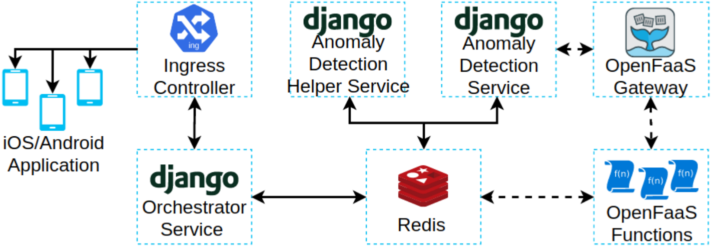
Ingress Controller
django Anomaly Detection Helper Service
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OpenFaaS Gateway
iOS/Android Application
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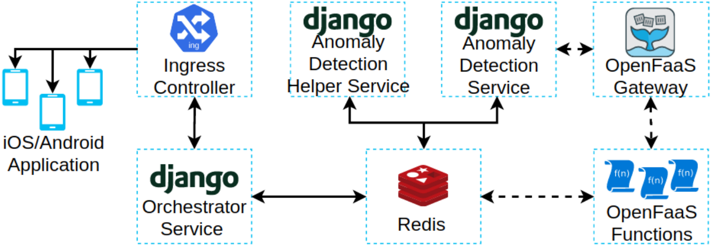

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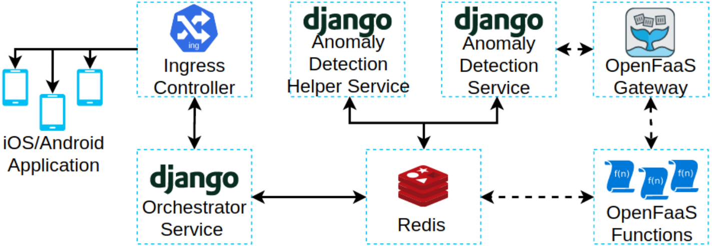

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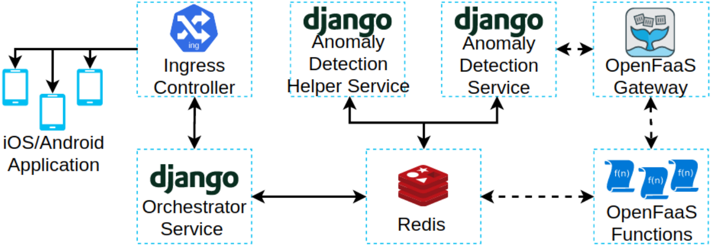

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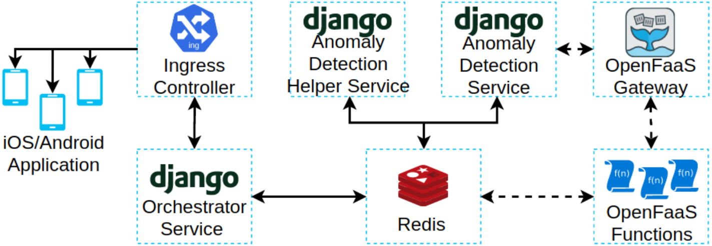
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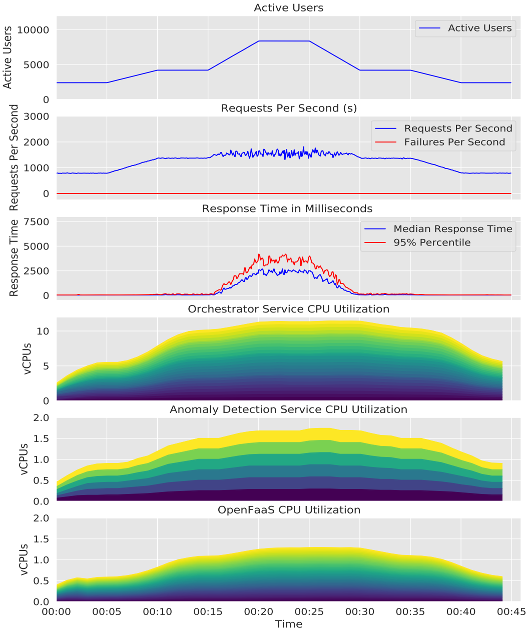
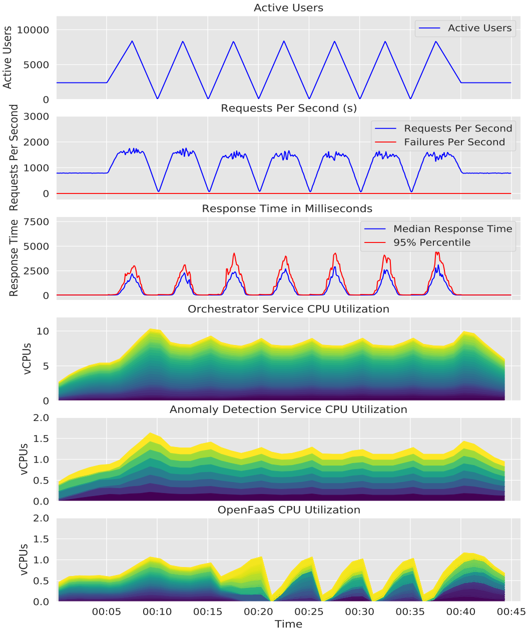

Active Users
Active Users
10000
5000
0
Active Users
Requests Per Second (s)
Requests Per Second
3000
2000
1000
0
Requests Per Second
Failures Per Second
Response Time in Milliseconds
Response Time
7500
5000
2500
0
Median Response Time
95% Percentile
Orchestrator Service CPU Utilization
vCPUs
10
5
0
Anomaly Detection Service CPU Utilization
vCPUs
2.0
1.5
1.0
0.5
0.0
OpenFaaS CPU Utilization
vCPUs
2.0
1.5
1.0
0.5
0.0
00:00
00:05
00:10
00:15
00:20
00:25
00:30
00:35
00:40
00:45
Time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Anomaly Detection Service CPU Utilization
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1.5
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0.0
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2.0
1.5
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00:05
00:10
00:15
00:20
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00:30
00:35
00:40
00:45
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  - Implement artificial intelligence techniques
  - Build out the OpenFaaS function execution pipeline

Thank you for your attention!