The Fifteenth International Conference
on Software Engineering Advances
ICSEA 2020

MARKA: A Microservice Architecture - Based Application, Performance Comparison Between Docker Swarm and Kubernetes

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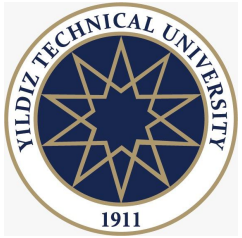
Presenter: Göker Cebeci - goker.cebeci@std.yildiz.edu.tr - Yildiz Technical University



Presenter Resume

integrated finance.

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GÖKER CEBECİ

- From Edirne, TURKEY
- Works on web development more than 10 years
- Senior Web Developer at evet.com
- PhD Student at Computer Engineering in Yildiz Technical University
- LinkedIn: https://www.linkedin.com/in/gokercebeci/
- GitHub: https://github.com/gokercebeci

Research Interests

GÖKER CEBECİ

- Software Development and Architecture
- Code Quality
- Reusability
- NLP
- Machine Learning

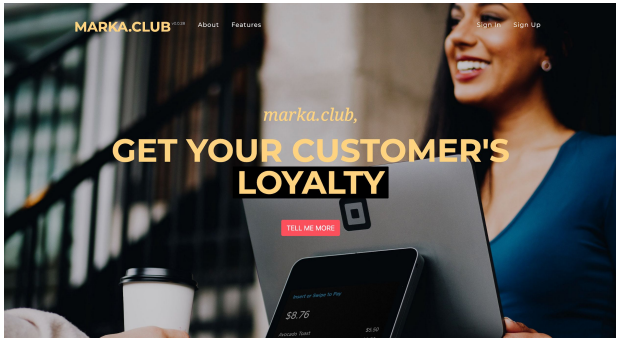
CURRENT PROJECTS

- https://kodkafa.com
- https://github.com/kodkafa/fern-stack

Outline

MARKA.CLUB

- MARKA Application
- Test Scenario
- Docker Swarm and Kubernetes Test Results
- Discussion



MARKA Application

MARKA.CLUB

- What is “MARKA”?
- Culture of drinking black tea
- MARKA is a token in Turkish

MARKA Application

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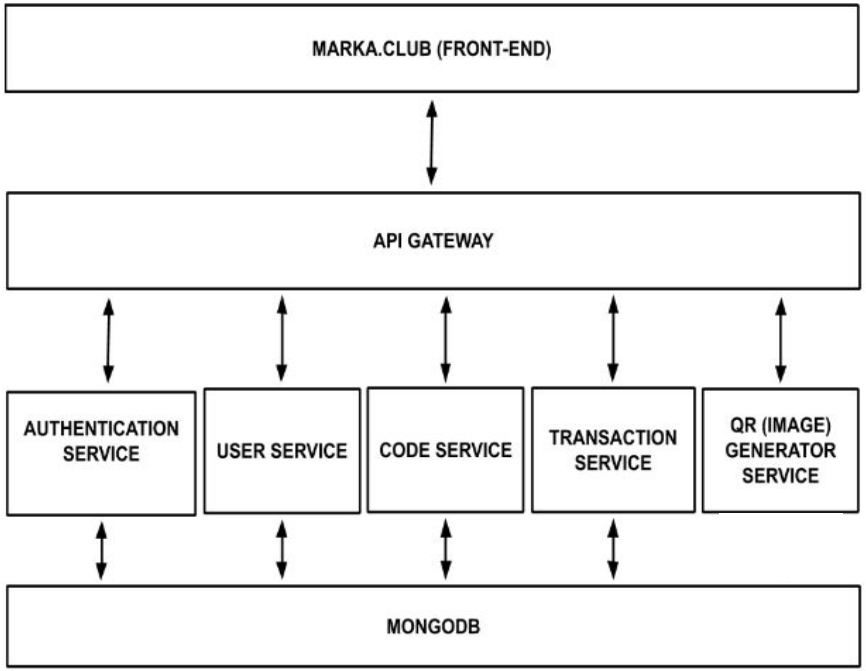
MARKA.CLUB

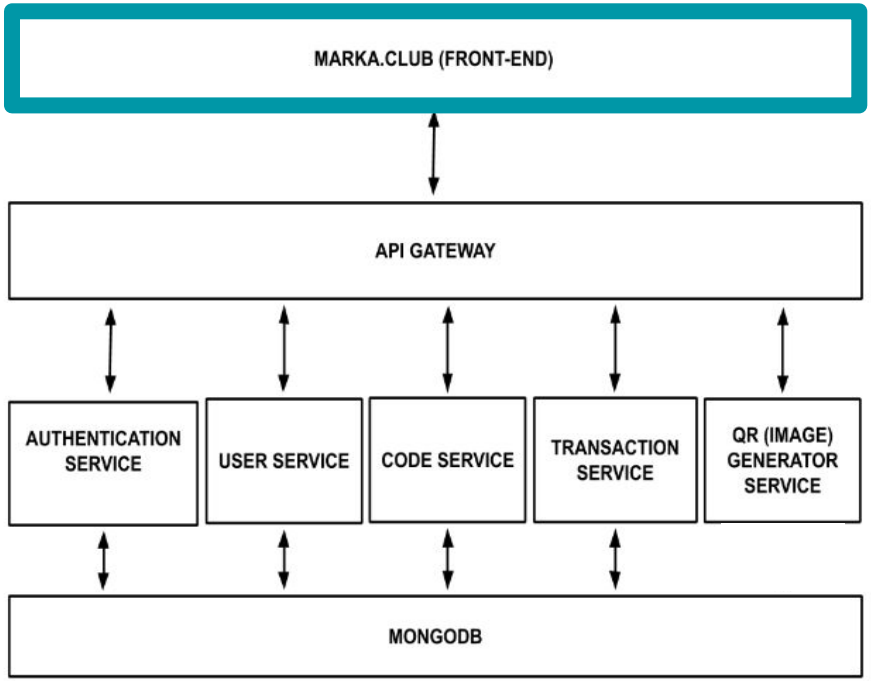
- Web based loyalty application
- 6 microservices, 1 DB (MongoDB), 1 front-end
- HTTP communication
- ReactJS
- Node.js



MARKA.CLUB (Front-End)

MARKA.CLUB

- ReactJS
- https://marka.club
- login/register by roles
- create codes/use codes by roles



API Gateway

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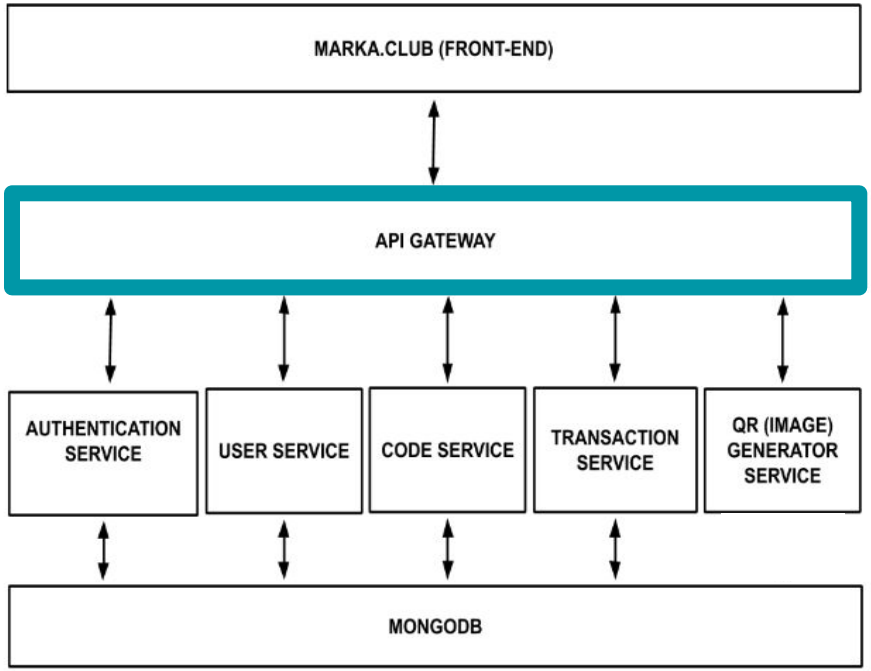
- Communicates all of microservices and front-end.
- Provides communication between each other



Authentication Service

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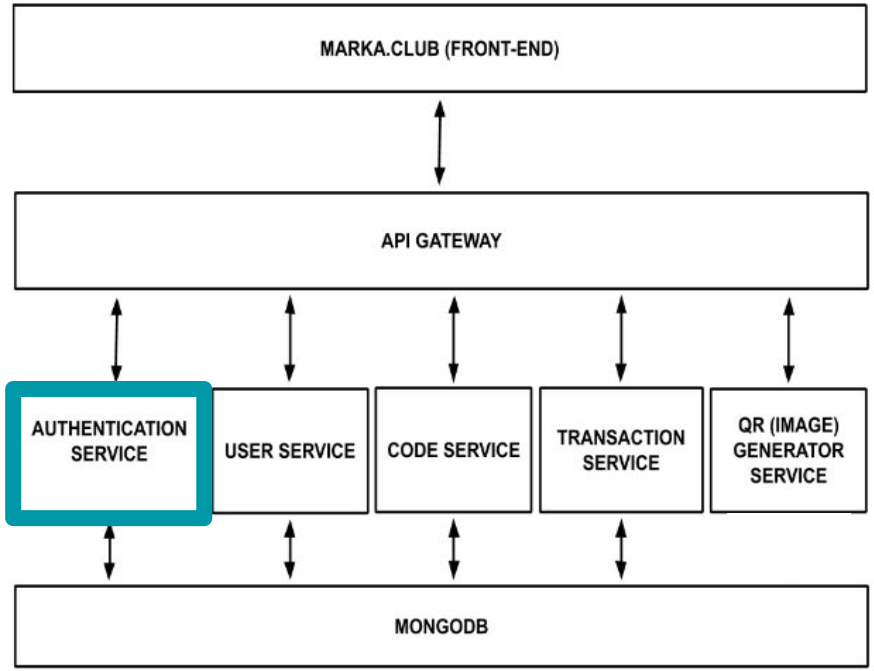
- Registration and login service



User Service

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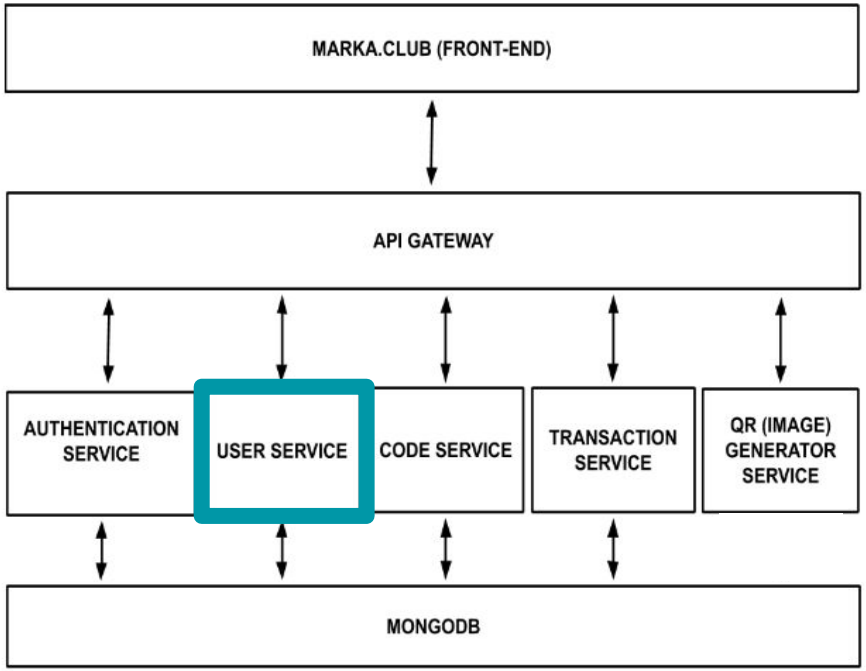
- The service keeps the user information
  - name
  - email etc.
  - and user role
    (company or customer)



Code Service

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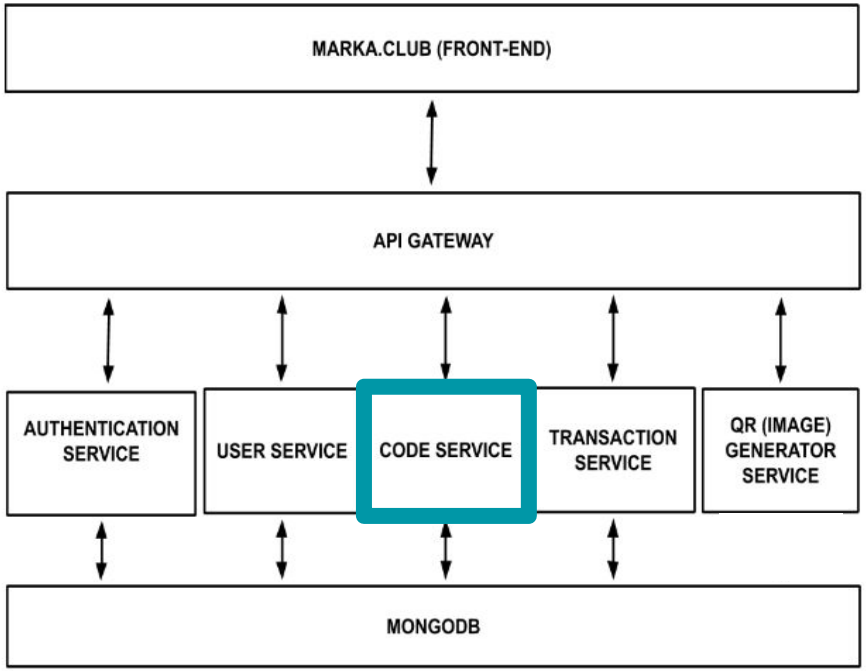
MARKA.CLUB

- Generates the codes
- Cannot use own code



Transaction Service

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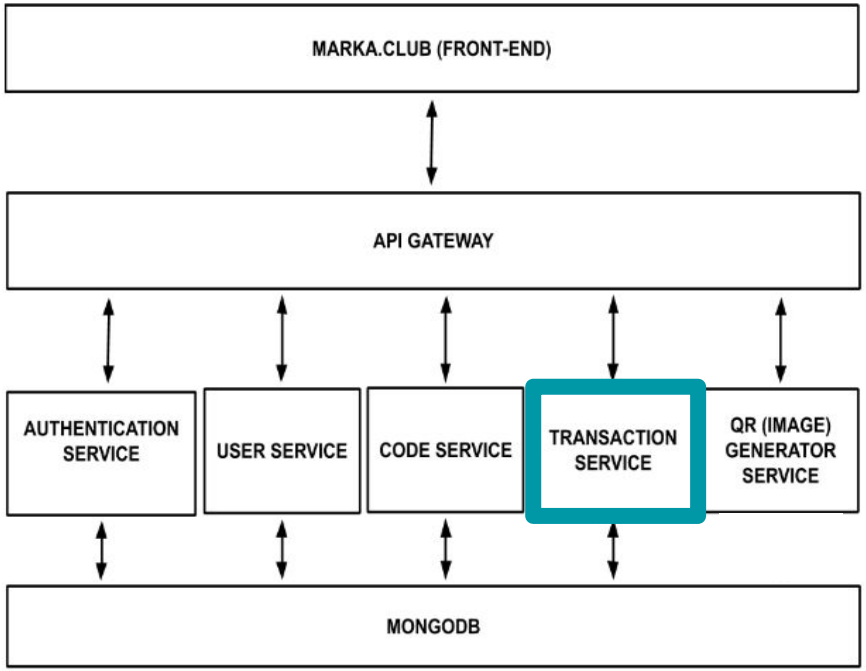
- Keeps the code transaction information



QR Generator Service

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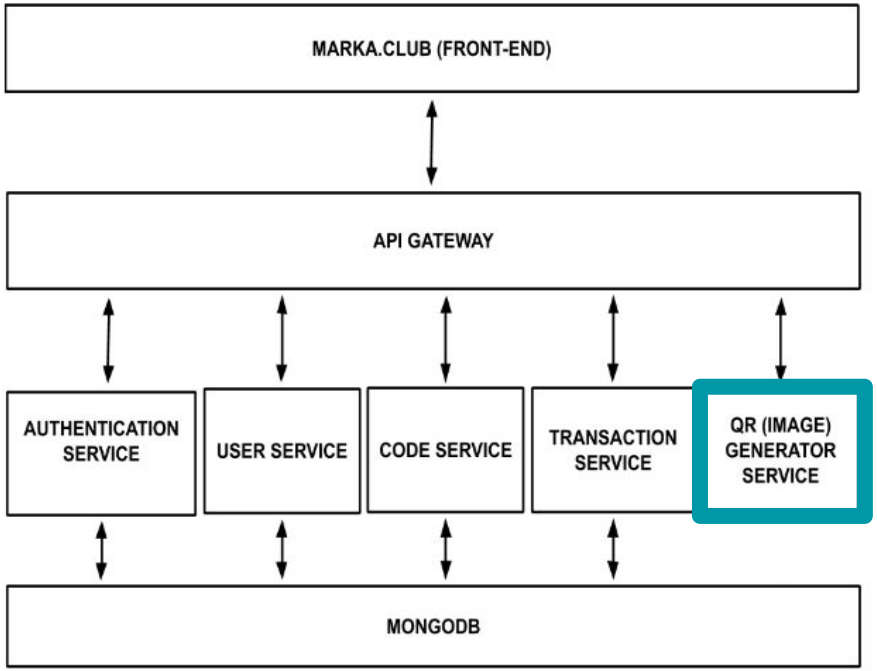
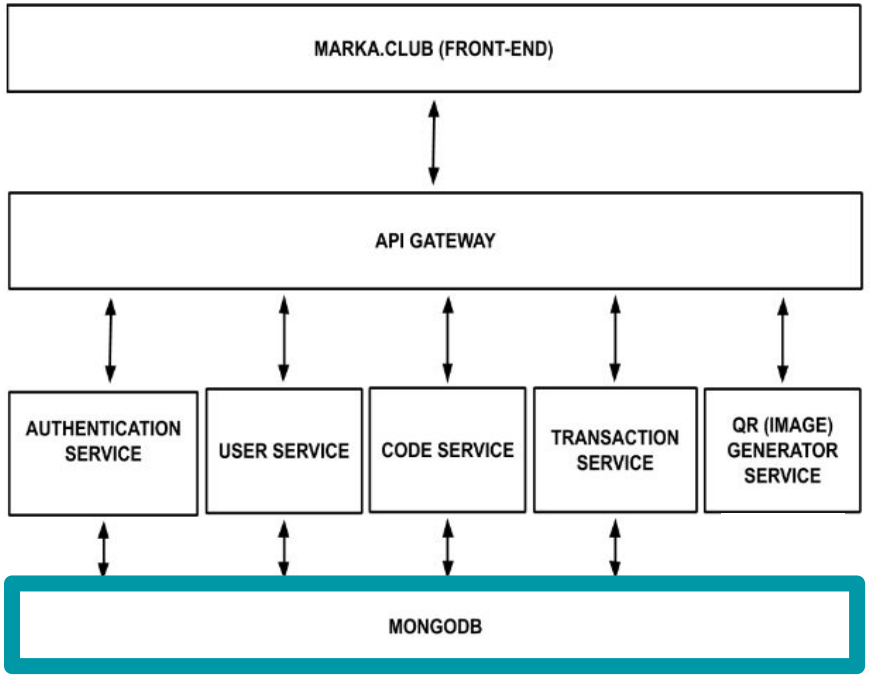
- Turns a hash code to a QR code image



Database

MARKA.CLUB

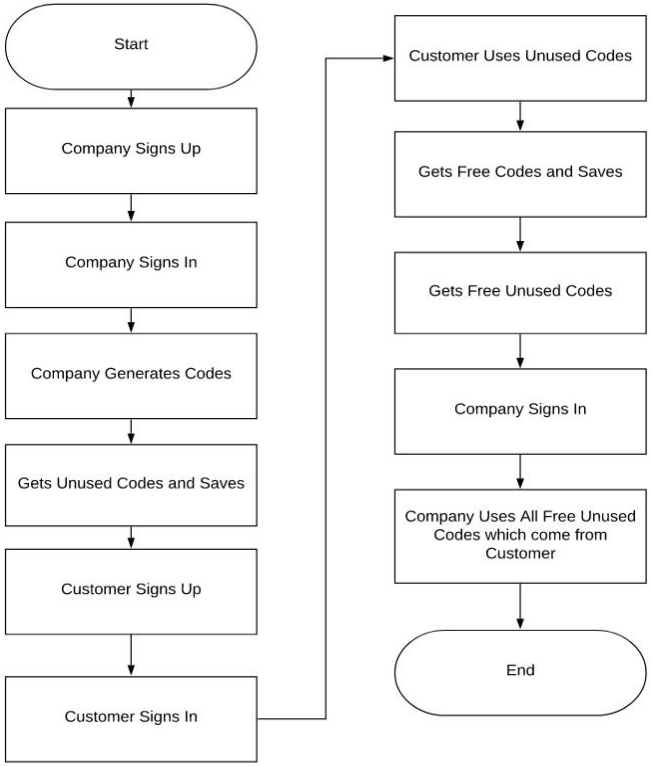
- MongoDB
- Each service communicates with its own collection



Test Scenario

MARKA.CLUB

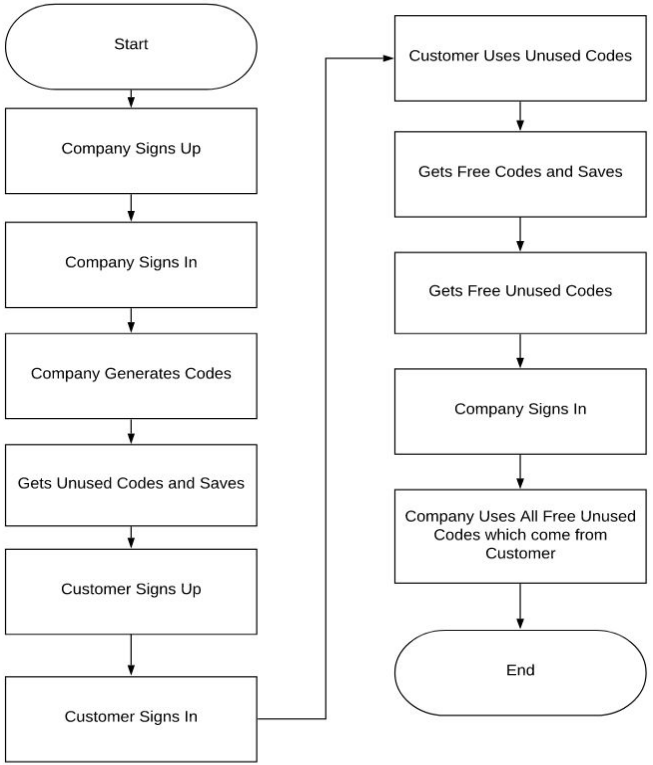
- Test tool: JMeter
- Test without an orchestrator (TWO) *(without any container)*
- Docker Swarm
- Kubernetes
- Docker Desktop



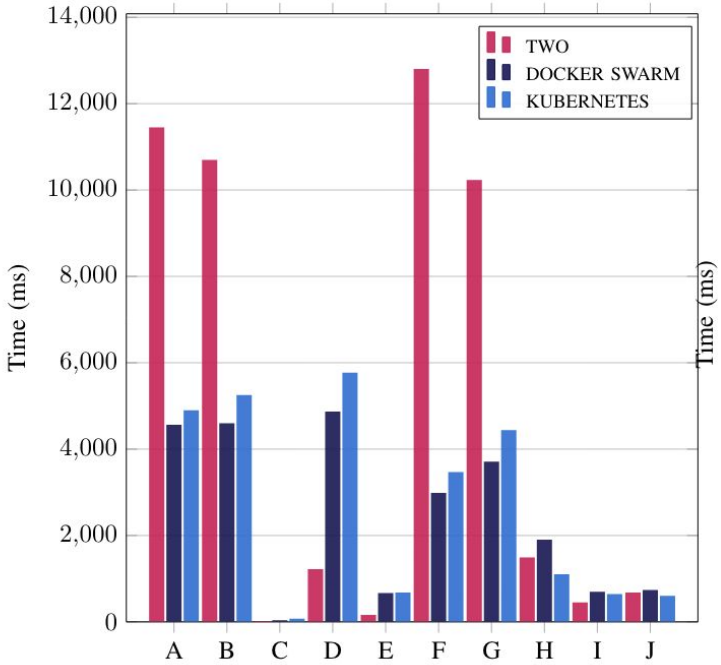
Test Scenario

MARKA.CLUB

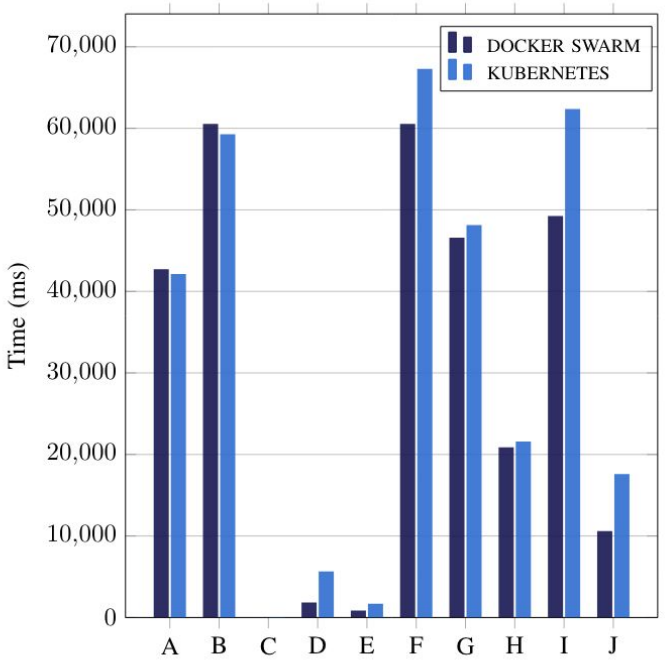
- Simulation of all steps (real life)
- Load test for 10, 20, 50, 100, 200, 400 and 500 users



Test Results



Comparison of Average Response Time with 50 threads



Comparison of Average Response Time with 500 threads

Test Results

MARKA.CLUB

Docker Swarm

- 10 users: 52 seconds
- 20 users: 1 minute 42 seconds
- 50 users: 4 minutes 7 seconds
- 100 users: 6 minutes 53 seconds
- 200 users: 12 minutes 18 seconds
- 400 users: 34 minutes 51 seconds
- 500 users: 44 minutes 16 seconds

Kubernetes

- 10 users: 51 seconds
- 20 users: 1 minute 6 seconds,
- 50 users: 2 minutes 36 seconds
- 100 users: 5 minutes 40 seconds
- 200 users: 12 minutes 20 seconds
- 400 users: 40 minutes 25 seconds
- 500 users: 48 minutes 33 seconds

Discussion

- TWO failed more than 50 users
- Docker Swarm is worse than Kubernetes in fewer users
- Docker Swarm is better than Kubernetes in a lot of users
- 3 replicas for each of them

Thank You

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ANY QUESTION?

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