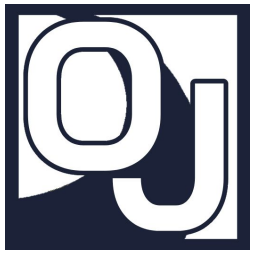
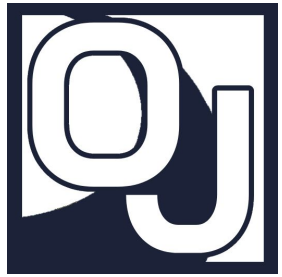


# Online Code Grader DOnlineJudge

# About DOnlineJudge (DOJ)

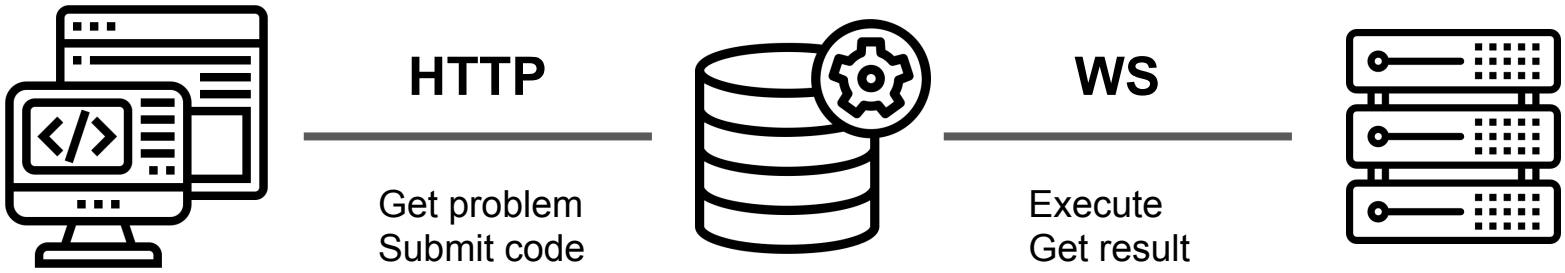


- **DOJ is an automatic code grader (online judge)**
  - User pick a Problem and submit their code Submission
  - System automatically Compile, Execute and Grade User's submission

- **Purpose**

  Serves the needs of wanting to learn and hone one's programming skill and algorithmic thinking

# DOJ System Component

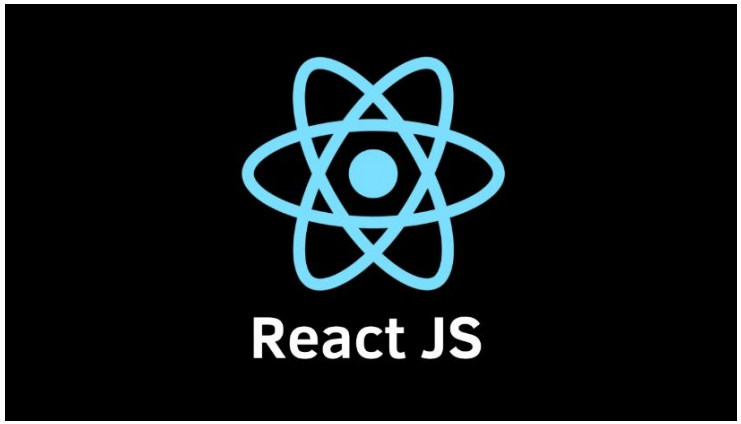



**Client**
Front End

**API Server**
Back End

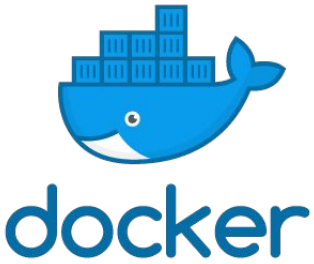
**Judge Server**

# Technologies Used




**Front End**
React JS


**API Server**
Django REST API Framework

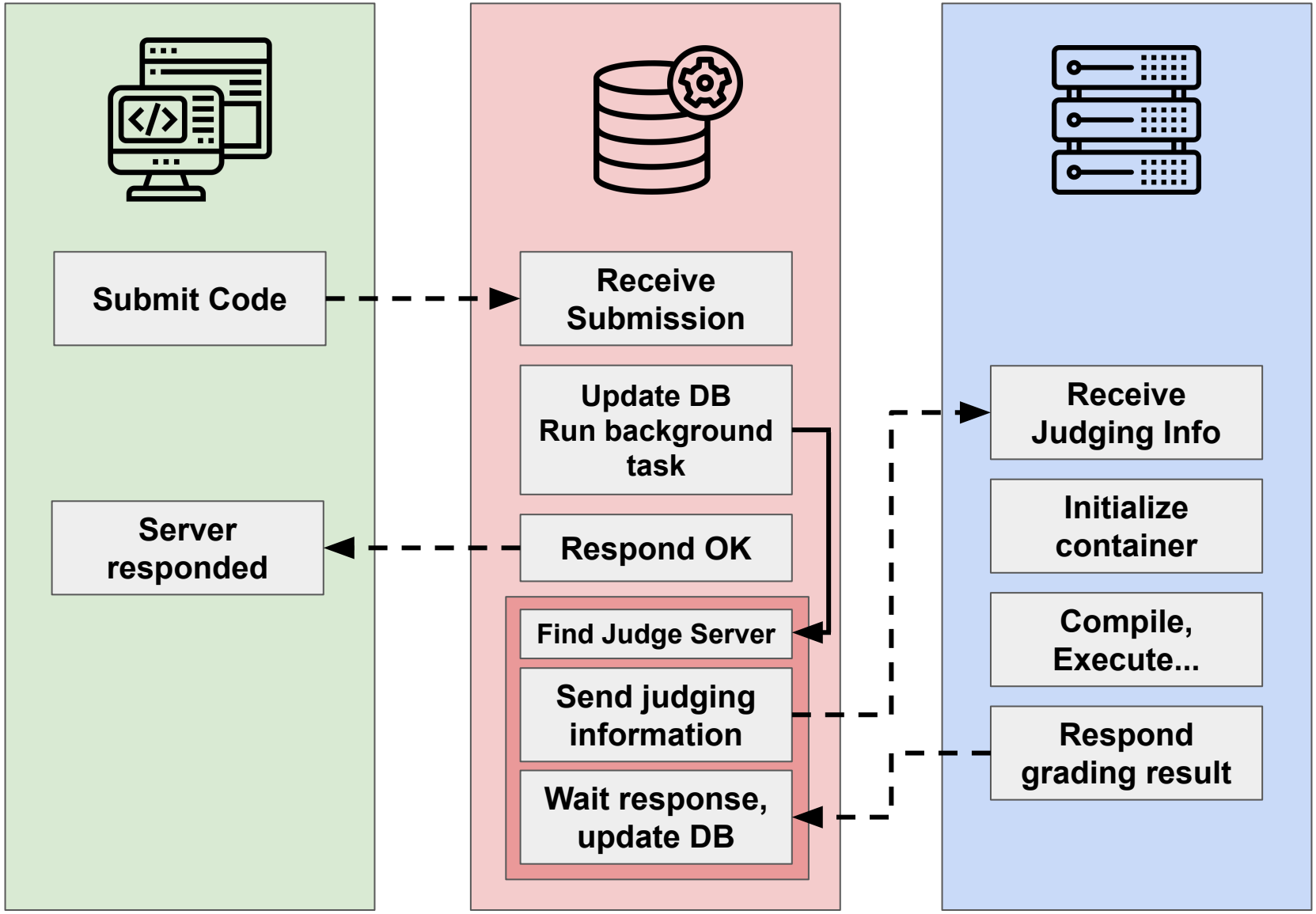



**Judge Server**
Make use of Docker to isolate a program

# Main Data

- **Announcement (or Post)**
  Bulletin board of the system
- **Problem**
  Programming problems on the system
  - *Problem requirements*
  - *Time, memory constraints*
  - *Input set*
  - *Result set*
- **Submission**
  Users' submitted code
  - *Source code*
  - *Execute result*
  - *Grading result*

# Submission Handling Process



# Main Actor

System consists of 3 main actors:

- User
- Admin
- Super Admin

# > User

An User can:

- View Announcement
- View Problem
- View and Send Submission

# > Admin

An Admin can:

- Functionality of User
- Create, Delete, Update Announcements
- Create, Delete, Update Problems (if allows)
- Create, Delete, Update Judge Servers

# > Super Admin

A Super Admin can:

- Functionality of Admin
- Mass create User
- Edit, Delete User
- Delete, Update **all** Problem
- Rejudge, Deny, Delete Submission

# Performance Testing

Benchmark two most called requests:

- **Get Problem, Submission**

  Response time, number of Requests per sec, …
- **Judge Submission**

  Average time

  *Hard to accurately benchmark*
  - *Execute time depends on time restraint of a Problem*
  - *Depends on Judge Server*

# Performance Testing

**Time it takes to retrieve data from Problem, Submission**

- Use **Apache Bench**
- Send 500 GET requests, send 5 RQ at a time

| | Problem | Submission |
|---|---|---|
| **Average time*** | ~39 ms | ~291 ms |
| **Fastest time*** | ~19 ms | ~106 ms |
| **Longest time*** | ~83 ms | ~439 ms |
| **# RQ/s** | **24.7 RQ/s** | **3.42 RQ/s** |

**To handle one submission*

# Performance Testing

**Time it takes to Judge a Submission**

- Send 100 **POST** requests to Submission.
- Using one Judge Server.
- Using logger, calculate time from when the first Submission is judged until when the last one is done judging
- Executing time is neglectable (10ms~50ms)

| | |
|---|---|
| Sent Problems: | **# 100** |
| Judged problems*: | **# 84** |
| Total time: | **~177s** |
| Average time: | **~2.1s** |

**System automatically abandons submissions if there are no ready judge servers*

# Conclusion

**Functional:**

- CRUD
- Tools to Paginate, Search, Filter
- Judging gives correct results
- Web user, web Admin

**Non-functional:**

- Website operates stably, not too slow
- UI is clear, user-friendly, responsive

# Todo

**Functional:**

- Ranking
- Contest creation
- Manage users as groups
- Filter using tags
- Users interactions

# Todo

**Non-functional:**

- Improve response time of Backend.

  Increase RQ/s upto ~100
- Improve judging time

# Thank you for listening