

Layered Architecture Model of an Online Judge System :

1. Presentation layer

- Role : User interaction interface
- Components : Web/mobile app for problem browsing, code submission,
- Tech : React, Angular, or Vue.

2. Application layer

- Role : Core business logic for submissions.
- Components : Problem and contest management modules,
- Tech : Django, Node.js.

3. Execution Layer.

4. Data layer.

5. Integration Layer

6. Security Layer

7. Monitoring & Logging Layer.

- Role : Track system health, logs, and alerts
- Tech : Prometheus, Grafana, ELK Stack.

Diagram Representation :-

Presentation Layer

Frontend : User Interfaces for submission, problems,

Application Layer

Business Logic : Submissions, contests, etc

Execution Layer

Code compilation and sandboxed execution

Data Layer

Databases : Users, problems, test cases, results

Integration Layer

APIs : communication between components

Security Layer

Authentication, authorization, and threat mitigation

Monitoring and Logging Layer

(System health, logs, alerts for administrators)