

Online Judge(OJ) system:

The 'layered' architecture model is a design pattern that organizes software into layers, each with specific responsibilities. For an Online Judge(OJ) system, this approach improves maintainability, scalability and clarity by separating concerns into distinct layers.

- 1) Presentation layer: Handles user interaction through the UI, providing features like problem browsing, code submission, contest participation.
- 2) Application layer: Manages the core functionalities, including problem and contest management, user authentication and submission workflows.
- 3) Business logic layer: Executes, evaluates and scores user submissions safely in isolated environments.

4) Data access layer: Handle data persistence for users, problems, submissions, results with caching for performance optimization.

5) Infrastructure layer: provides system support, including sandboxing, load balancing, monitoring and deployment pipelines

