Case Study

Non-Functional Requirements (NFRs)

Topic: Understanding, identifying, and selecting the right NFRs for a real-world system.

Business Scenario

You are hired as a **Solution Architect** to design an online learning platform similar to Udemy/Coursera.

The platform must provide:

- Video streaming (pre-recorded lessons)

- Quizzes and online tests

- Student profiles and progress tracking

- Course purchases

- Instructor dashboards

- Reporting and analytics

The company expects **10 lakh users in the first year**, with traffic spikes during new course launches.

Your role is to **identify the relevant Non-Functional Requirements (NFRs) for this platform**.

Business Expectations

Business Expectation 1 – Ability to Handle Sudden Traffic Increase

- During major course launches, the system must scale from 1,000 to 50,000 concurrent users within 5 minutes without failure or degradation.

Business Expectation 2 – Zero Tolerance for Downtime

- The customer states:
    - "Even 1 minute of downtime during peak hours will make us lose revenue."
    - The system must remain fully operational during critical periods.

Business Expectation 3 – Protection of Sensitive User Information

- The platform handles:
    - Student personal information
    - Instructor financial/bank details
    - Card payment data
- The compliance team mandates strict data protection and auditability.

Business Expectation 4 – Ability to Recover from Regional Outages

- If a major disaster causes the primary region to fail, the platform must resume operations within 1 hour without major data loss.

Business Expectation 5 – Frequent Feature Releases Without Downtime

- Developers release updates 2–3 times daily.
- Business requires zero-downtime deployments with minimal rollback risk.

Business Expectation 6 – Fast & Smooth User Experience

- Users expect:
    - Fast page loading
    - Quick video startup
    - No delays during peak usage
    - Any UX friction increases drop-offs.

Business Expectation 7 – Seamless Integration with External Systems

- The platform must work with:
    - Payment gateways
    - Marketing automation tools
    - CRM platforms
- All integrations must be reliable and consistent.

Business Expectation 8 – Deep Observability Across the System

- Operations team requires visibility into:
    - API response performance
    - Error rates
    - Video streaming quality
    - Resource usage (CPU, RAM)
- Database performance
- They require real-time alerts on anomalies.

Business Expectation 9 – Performance Under Strict Budget Limits

- Customer states:
- "We want strong performance, but must stay within our monthly cloud budget."
- Optimized architecture and cost governance are required.

Task — Identify NFR Categories

Review the given system scenario and **identify** which **Non-Functional Requirements (NFRs)** are essential.

For each selected NFR, **explain why it is needed** and provide **a technical approach** that could be used to fulfill that NFR.

At minimum, consider:

- Availability
- Scalability
- Performance
- Security
- Reliability
- Disaster Recovery
- Maintainability
- Usability