Project Review I – Sample Submission

# 2. Azure Deployment Strategy – Detailed

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| Category | Detail |
| Architecture Model | Cloud Model: Public Cloud (Microsoft Azure) Service Model: PaaS for App Service, SQL DB; SaaS for Power BI Embedded. Hosting Region: Central India (Primary), South India (DR). |
| System Design | App Tier: Azure App Service Premium v2 (P1v2) Data Tier: Azure SQL Database (S2) & Blob Storage (Hot Tier, GRS) Network Tier: Azure Front Door + CDN for static content. |
| Reliability | High Availability: App Service SLA 99.95%, geo-replication for DB, GRS for Blob Storage. Disaster Recovery: SQL DB backups every 12h (7-day retention), Blob snapshots every 24h, DR failover in South India. |
| Security Measures | Authentication: Azure AD B2C with MFA. Authorization: RBAC for student/admin roles. Encryption: AES-256 at rest, TLS 1.2 in transit. Network Security: NSGs, private endpoints for DB & storage. |
| Operational Excellence | DevOps: Azure DevOps Pipelines integrated with GitHub. Deployment: Blue-Green via deployment slots. Monitoring: Azure Monitor & Application Insights with performance alerts. |
| Cost Optimization | Auto-scale App Service 1–3 instances based on CPU >70%. Blob Lifecycle: Move files >1 year old to Cool tier. Reserved Instance pricing for predictable workloads. |

# 3. Infrastructure Requirements – Functional

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| Feature | Expected Usage | Azure Spec | Scaling Method |
| User Registration & Login | 5,000 logins/day, 100 concurrent | App Service (P1v2), Azure AD B2C (10k MAUs) | Auto-scale 1–3 instances |
| Record Achievements | 1M records/year | Azure SQL DB (S2, 50 DTUs, 250 GB) | Index optimization |
| Attach Certificates & Media | 50MB/student/year × 5,000 | Azure Blob Storage (Hot Tier, 1 TB) | Hot → Cool tier after 1 year |
| Generate Reports | 100 concurrent views | Power BI Embedded (A1 SKU) | Dataset refresh 8x/day |
| Search & Filter | <1 sec response for 1M rows | SQL Full-Text Search | Index tuning |
| Admin Approval Workflow | ~2,000 executions/month | Azure Functions (Consumption Plan) | Event-driven scaling |

# 3. Infrastructure Requirements – Non-Functional

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| NFR | Metric Target | Azure Configuration | Reasoning |
| Scalability | Handle 3x load spikes | App Service Auto-scale 1–3 instances | Elastic scaling for exams/events |
| Performance | <500 ms API response | SQL indexing, caching | Smooth user experience |
| Availability | 99.9% uptime | Geo-replication, GRS | Resiliency against failure |
| Security | MFA, TLS 1.2 | Azure AD B2C, Private endpoints | Data protection |
| Cost | ₹8,000/month cap | Azure Cost Management alerts | Budget control |
| Compliance | India data residency | Central India + DR in South India | Regulatory compliance |

# 4. Azure Services Mapping – Expanded

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| Requirement | Azure Service | SKU/Tier | Purpose | Justification | Est. Monthly Cost (₹) |
| Web App Hosting | Azure App Service | Premium v2 (P1v2) | Host UI + APIs | High performance, SLA 99.95%, supports auto-scale | 3,500 |
| Database | Azure SQL Database | Standard S2 | Achievement records | Scalable relational DB, automated backups | 1,200 |
| File Storage | Azure Blob Storage | Hot Tier, GRS | Certificates & media | High availability, redundancy | 800 |
| Authentication | Azure AD B2C | 10k MAUs | Secure login | Supports MFA, RBAC, social logins | 500 |
| Workflow Automation | Azure Functions | Consumption Plan | Approval process | Event-driven, pay-per-use | 200 |
| Reporting | Power BI Embedded | A1 SKU | Dashboards/reports | Embedded analytics, no per-user license | 1,000 |
| Load Balancing | Azure Front Door | Standard | Traffic routing | Improves latency, HA | 600 |
| Monitoring | Azure Monitor + App Insights | Standard | Track performance | Centralized monitoring | 400 |
| Backup & DR | Azure Backup | Vault (250 GB) | SQL & Blob backup | DR compliance | 300 |
| CI/CD | Azure DevOps | Basic Plan | Deployment automation | Seamless GitHub integration | Free |

# 5. High-Level Architecture Diagram

Diagram shows: End Users → Azure Front Door → App Service → SQL DB & Blob Storage → Azure Functions → Power BI Embedded; monitored via Azure Monitor & backed up via Azure Backup.