# Solution Architecture

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| Date | 24 JUNE 2025 |
| Team ID | LTVIP2025TMID30609 |
| Project Name | workforce administration solution (dev) |
| Maximum Marks |  |

# 1. Architecture Layers

## A. Presentation Layer (User Interface)

* Web Portals & Mobile Apps (Responsive UI)

○ Employee Self-Service (ESS)

○ Manager Self-Service (MSS)

○ Admin Console

* **Tech Stack:** React.js / Angular / Flutter for mobile

## B. Application Layer (Business Logic)

* **Microservices handling:** 
  1. Employee Onboarding / Offboarding

○ Leave & Attendance

○ Organization Hierarchy Management

○ Benefits & Compensation

○ Timesheets / Scheduling

* **Tech Stack:** 
  1. Node.js / Spring Boot (Java)

○ REST/GraphQL APIs

○ Message Queues (Kafka / RabbitMQ)

## C. Integration Layer

* Enterprise Integration Bus (EIB) or iPaaS (MuleSoft, Boomi)

* **APIs to integrate with:**

○ Payroll Systems (ADP, Workday, etc.)

○ ERP (SAP, Oracle)

○ Compliance/Tax Services

○ Identity Providers (SSO/OAuth)

## D. Data Layer

* **Databases:**

**○ Relational:** PostgreSQL / MS SQL Server

**○ NoSQL:** MongoDB for flexible document structures

* **Data Lake / Warehouse:** Snowflake / BigQuery for analytics
* Master Data Management (MDM) for workforce data consistency

## E. Analytics & Reporting

* Embedded BI (Power BI / Tableau / Looker)

* **Prebuilt dashboards for:**

○ Attrition rates

○ Workforce distribution

○ Overtime trends

## F. Security & Compliance

* Role-Based Access Control (RBAC)
* Data encryption (at rest and in transit)
* GDPR / HIPAA / SOC2 compliance checks

# 2. Dev Environment Considerations

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| --- | --- |
| **Aspect** | **Solution** |
| CI/CD | GitHub Actions / Jenkins / Azure DevOps |
| Containerization | Docker |
| Orchestration | Kubernetes / OpenShift |
| Environment | Dev, QA, UAT — separated with feature toggling |
| Test Automation | Selenium, Postman, JUnit |
| Logging & Monitoring | ELK Stack / Grafana + Prometheus |

**3. High-Level Component Diagram**

[UI Layer]

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[API Gateway] ←→ [Auth Service]

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[Microservices (HR Core, Time Mgmt, Leave Mgmt)]

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[Service Bus / Queue]

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[Data Layer (RDBMS / NoSQL / DW)]

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[Analytics / Reporting]

# 4. Key Features to Include in Workforce Admin Dev

* Modular HRIS features for flexibility in development

* DevOps-enabled CI/CD with rollback and environment promotion

* Mock Services for external system integration

* Testing Harness for simulated workforce data