

## Project Design Phase-II

### Technology Stack (Architecture & Stack)

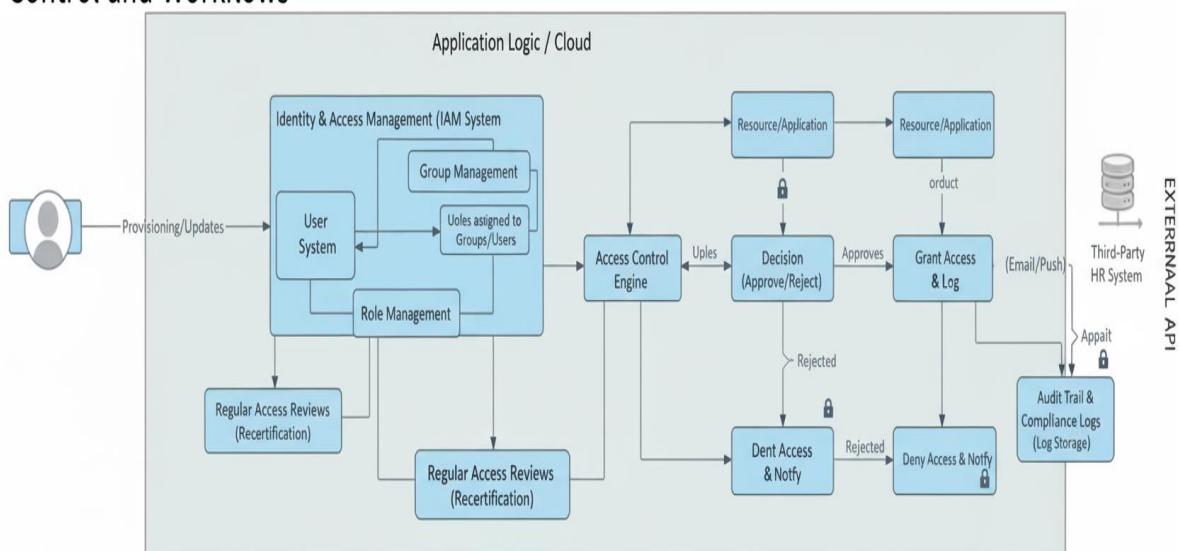
<b>Date</b>	29 October 2025
<b>Team ID</b>	NM2025TMID00560
<b>Project Name</b>	Optimizing User, Group, and Role Management with Access Control and Workflows
<b>Maximum Marks</b>	4 Marks

## Technical Architecture

The project architecture focuses on creating a **secure, automated, and scalable environment** for managing users, groups, and roles through **access control and workflow automation**.

It combines frontend interfaces, workflow engines, backend logic, and access control layers to ensure secure and efficient role management.

### Optimizing User, Group, and Role Management with Access Control and Workflows



**Table 1: Components & Technologies**

S.No	Component Description	Technology Used
1.	<b>User Interface (UI)</b> – Admin and users interact through a responsive dashboard for user, group, and role operations.	React.js / HTML / CSS / JavaScript
2.	<b>Application Logic Layer – 1:</b> Handles user creation, validation, and group-role assignment.	Node.js / Express.js
3.	<b>Application Logic Layer – 2:</b> Implements dependency validation between user, group, and role relationships.	Server-side scripting (JavaScript / Node.js)
4.	<b>Workflow Engine:</b> Automates approval processes for user access requests.	ServiceNow Flow Designer / Node Workflow Library
5.	<b>Access Control Engine (RBAC):</b> Enforces access restrictions and role-based permissions dynamically.	Role-Based Access Control (RBAC) Logic / Middleware
6.	<b>Database Layer:</b> Stores user profiles, group details, roles, and access history.	MySQL / PostgreSQL
7.	<b>Cloud Infrastructure:</b> Provides scalability, hosting, and backup support for the application.	AWS / Azure Cloud Services
8.	<b>API Gateway:</b> Facilitates communication between frontend, backend, and external integrations.	RESTful APIs
9.	<b>Audit and Logging Service:</b> Tracks workflow and access control events for monitoring and compliance.	MongoDB / Elasticsearch / ServiceNow Logs
10.	<b>Notification System:</b> Sends alerts and status updates after workflow approval or access changes.	NodeMailer / Firebase Cloud Messaging (FCM)
11.	<b>External Integration (Optional):</b> Connects with third-party HRMS or LDAP for user verification.	LDAP Integration / REST API
12.	<b>Infrastructure (Deployment):</b> Deployed on scalable cloud environments for continuous availability.	AWS EC2 / Azure App Service

**Table 2: Application Characteristics**

S.No	Characteristic	Description	Technology / Implementation
1.	<b>Open-Source Frameworks</b>	Uses open-source frameworks for scalability and ease of customization.	Node.js, React.js
2.	<b>Security Implementations</b>	Incorporates Role-Based Access Control (RBAC), secure session handling, and encrypted communications.	JWT Authentication, ACLs, HTTPS
3.	<b>Scalable Architecture</b>	Built with a modular and microservice-ready structure to handle large-scale enterprise workloads.	Node.js, AWS Auto Scaling
4.	<b>Availability</b>	High availability ensured through load balancing and failover redundancy.	AWS Elastic Load Balancer / Azure Cloud Load Balancing
5.	<b>Performance</b>	Optimized through asynchronous workflows, caching, and efficient database indexing.	Redis Cache / Indexed SQL Queries
6.	<b>Auditability</b>	Each user action, role change, or workflow approval is logged for compliance and traceability.	MongoDB Logs / CloudWatch
7.	<b>Maintainability</b>	Designed with modular components for easy updates and debugging.	Docker Containers / CI-CD Pipelines
8.	<b>Interoperability</b>	Supports integration with identity management systems and third-party applications.	REST APIs / LDAP / OAuth 2.0