

Project Documentation

Project Title: PixelForge Nexus – Role-Based Project Management System

1. Introduction

The PixelForge Nexus system is a full-stack web application designed to manage software development projects efficiently using role-based access control. The system enables administrators to create and manage projects, assign team members, upload project documents, and track project status. Developers can view assigned projects and access project resources, while project leads manage assignments and monitor progress.

The main objective of this system is to provide a centralized project management platform that ensures secure collaboration, efficient task allocation, and structured document handling.

2. Objectives

The main objectives of the system include:

- Provide role-based secure authentication and authorization
- Allow administrators to create and manage projects
- Enable project leads to assign developers
- Allow developers to view assigned projects
- Provide document upload and sharing functionality
- Display dashboard analytics for project tracking
- Maintain centralized project information storage

3. System Architecture

The application follows the **MERN stack architecture**:

- **Frontend:** React.js with Tailwind CSS for responsive UI
- **Backend:** Node.js and Express.js REST API
- **Database:** MongoDB for persistent storage
- **Authentication:** JWT-based authentication system

The system is divided into three layers:

1. Presentation Layer (React UI)

2. Application Layer (Express API)
3. Data Layer (MongoDB database)

4. Features Implemented

4.1 Authentication and Authorization

The system uses JWT-based authentication to verify users. Role-based access control ensures:

- Admin: Create projects, assign developers
 - Lead: Manage project assignments
 - Developer: View assigned projects
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4.2 Project Management

Administrators can:

- Create new projects
 - Set deadlines and descriptions
 - Update project status (active / completed)
 - Monitor project statistics via dashboard
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4.3 Developer Assignment

Project leads and administrators can assign developers to specific projects, ensuring efficient task allocation.

4.4 Document Management

Users can upload and view project-related documents, enabling centralized resource sharing and collaboration.

4.5 Dashboard Analytics

The dashboard displays:

- Total projects
- Active projects
- Completed projects

This provides quick insights into project progress.

5. Technologies Used

| Technology | Purpose |
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|----------|-------------|
| React.js | Frontend UI |
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| Tailwind | CSS Styling |
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| Node.js | Backend runtime |
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| Express.js | REST API |
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| MongoDB | Database |
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| JWT | Authentication |
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| Axios | API communication |
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| Multer | File upload handling |
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6. Workflow

1. User logs in using credentials
2. System verifies JWT token
3. Role-based permissions determine available features
4. Admin creates projects
5. Leads assign developers
6. Developers access assigned projects
7. Documents uploaded and shared
8. Dashboard displays project statistics

7. Advantages of the System

- Secure role-based authentication
- Centralized project tracking
- Efficient team collaboration
- Real-time dashboard analytics

- Scalable MERN architecture
- Document sharing integration

8. Future Enhancements

- Email notifications for assignments
- Real-time chat collaboration
- Project timeline visualization
- AI-based workload balancing
- Cloud storage integration

9. Conclusion

PixelForge Nexus successfully implements a scalable role-based project management solution using the MERN stack. The system enhances collaboration, improves project tracking, and ensures secure access control for different user roles. With further enhancements, the system can be extended into a full enterprise-level project management platform.