



IJEAST

INTERNATIONAL JOURNAL
OF ENGINEERING APPLIED SCIENCE
AND TECHNOLOGY



VOLUME : 10 ISSUE : 10 Print / Issue Publication Date: 08-Apr-2026



ISSN : 2455-2143



DOI : 10.33564/IJEAST.2026.v10i10.006

Indexed In



WWW.IJEAST.COM

editor@ijeast.com



SECURE INTEGRATED PROJECT MANAGEMENT SYSTEM

Chinchu Mohanan K
Engineer – C
Indian Institute of Astrophysics(IIA),
Koramangala, Bengaluru, India

V. Reddy Ganesh, V. HariKrishna
Internship Student
Indian Institute of Astrophysics(IIA)
Koramangala, Bengaluru, India

Abstract— In modern organizational environments, efficient project coordination, task tracking, issue management, and timely notifications are essential for successful project execution. This paper introduces the design and implementation of an Integrated Project Management (IPM) web application developed using the Python Django framework. The proposed system consolidates project management, work-item (granular tasks) tracking, ticketing, and automated reminders into an integrated and secure platform. Users can create and manage projects, create and assign work items with priorities and deadlines, raise and resolve tickets, and receive automated notifications, thereby improving transparency, accountability, and collaboration. The system follows a modular, three-tier architecture comprising a presentation layer, an application layer, and a data layer supported by MySQL for persistent storage. IPM incorporates role-based access control, interactive dashboards, data visualization, accessibility support, and reporting features. Functional evaluation demonstrates improved task traceability, reduced response delays, and effective project monitoring.

Keywords— Integrated Project Management (IPM) System, Dashboard Analytics, Traceability, Accessibility, Ticketing, Work Item Tracking, Automated Alerts, Authorization, Web Application Hardening.

I. INTRODUCTION

Project management in modern academic, research, and enterprise environments increasingly depends on digital platforms to coordinate tasks, track issues, and ensure timely project completion. As projects become more complex and collaborative, the absence of an integrated system often leads to fragmented workflows, reduced visibility, and delays caused by unmonitored tasks. Many existing tools focus on isolated functionalities such as task tracking or ticket handling, but lack a integrated approach that combines project

management, fine-grained work items, notifications, and reporting within a single secure platform. This paper presents a web-based Integrated Project Management (IPM) system developed using the Python Django framework to address these limitations. The proposed system integrates project management, work item tracking, ticketing, and automated reminders into a centralized application. It enables users to create and manage projects, assign tasks with priorities and deadlines, raise and resolve tickets, and receive automated notifications, thereby improving transparency, accountability, and team collaboration. The system follows a modular three-tier architecture consisting of presentation, application, and data layers, supported by a MySQL database. Role-based access control, dashboards, data visualization, accessibility support, and security mechanisms further enhance usability and reliability.

The objectives of this study are:

- To design a scalable and modular architecture for an IPM system.
- To implement secure functional modules for project, work item, ticket, and reminder management.
- To evaluate system effectiveness in improving task traceability and monitoring.

II. RELATED WORK

Several studies have explored Project Management Information Systems (PMIS):

- Rebuglio et al. (2025) conducted a systematic review of PMIS research, highlighting the importance of integration in complex projects.
- Ghorbani and Shafaghat (2020) proposed a conceptual model for integrating PMIS in project-based organizations.
- TaDaa (Feng et al., 2022) applied machine learning for ticket assignment in support systems.
- Slack supports reminders and notifications through bots but lacks native ticket and work-item management.



- Existing commercial tools such as Jira, Trello, and Asana provide ticketing and task tracking but often lack seamless integration of reminders or atomic work items.

The proposed IPM introduces a modular architecture that natively integrates ticketing, granular work-item management, and automated reminders within a single platform, extending functionality beyond conventional project management implementations. In contrast to JIRA and Slack, which predominantly depend on platform-level security mechanisms, the proposed system embeds application-level controls such as session management, rate limiting, and privilege enforcement directly into its core workflow logic

III. SYSTEM ARCHITECTURE

The system is designed as a three-tier architecture that separates concerns, supports scalability, and facilitates maintainability:

3.1 Presentation Layer

The user interface provides interactive dashboards for ticket navigation, task breakdown, progress monitoring. User interface implemented using HTML 5, bootstrap5, CSS3, JavaScript and django crispy-forms, it supports responsive interaction and real-time updates. The web-based dashboard facilitates the management of tickets, work items, and reminders. Its functionalities include the ability to create projects, teams, and project teams. Additionally, users can create, assign, and update the status of tickets as well as work items. The dashboard also provides real-time reminders and notifications.

3.2 Application Layer

The Application Layer encapsulates the core business logic, workflow management, and application-level security of the IPM system. This layer is implemented using the Python Django framework and follows the Model–View–Template (MVT) architectural pattern, which ensures clear separation between data models, business logic, and presentation. It manages all functional operations related to project execution and coordination. The system supports comprehensive project management by enabling the creation, configuration, and monitoring of projects, assignment of team members, and tracking of overall progress. Work item management functionality allows tasks to be decomposed into granular units with defined priorities, deadlines and progress tracking. The ticket management component supports the creation, categorization, assignment, progress tracking and resolution of issues and service requests. In addition, a reminder module provides automated, schedule-based notifications to ensure timely completion of tasks and deadlines. Authentication and authorization are enforced through role-based access control, supporting roles such as Administrator, Project Manager, Team Lead, and Team Member. The application layer also includes reporting and analytics capabilities, generating

interactive dashboards and visual insights using Chart.js. Robust security mechanisms are incorporated, including two factor authentication, session management, rate limiting through django defender, CSRF protection, reCAPTCHA integration, secure password hashing, and fine-grained permission enforcement to protect application data and operations.

3.3 Data Layer

The Data Layer is responsible for persistent data storage, data integrity, and efficient retrieval of data. The system utilizes MySQL 8.x as the relational database management system, seamlessly integrated with Django's Object–Relational Mapping (ORM) to ensure secure, optimized, and maintainable database interactions. This layer stores all critical operational data, including user profiles and authentication and authorization details, project metadata and configurations, work items, tickets, reminders and system activity logs. The database schema is normalized to minimize redundancy and maintain consistency across entities, while indexing and query optimization techniques are employed to enhance performance and scalability. A logical schema structure includes entities such as Users, Projects, Tickets, WorkItems, Reminders and Teams, each capturing essential attributes required for system functionality. Audit logging plays a vital role in maintaining traceability, compliance, and accountability by recording significant user actions and system events, thereby supporting monitoring, debugging, and security analysis.

3.4 External Integrations

To support real-world deployment and usability, the system integrates with external services including:

- Email Services (SMTP): Used for all task notifications, ticket updates, reminders, account activation, and password recovery.
- Excel Export (openpyxl): Generates formatted Excel reports for work items and tickets using the openpyxl library.
- Accessibility Tools: Integration of accessibility widgets to support users with disabilities.
- Visualization Libraries: Chart.js for interactive dashboards and reporting.

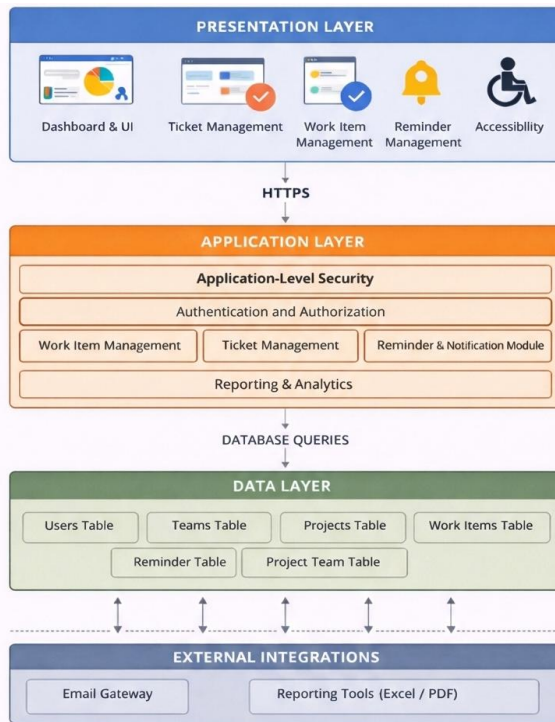


Fig 1. System Architecture Diagram

IV. IMPLEMENTATION

The IPM was implemented using a full-stack approach:

- Frontend: Developed with Bootstrap 5 to provide dynamic dashboards and responsive interaction.
- Backend: Django framework.
- Database: MySQL 8 serves as the robust relational data store.

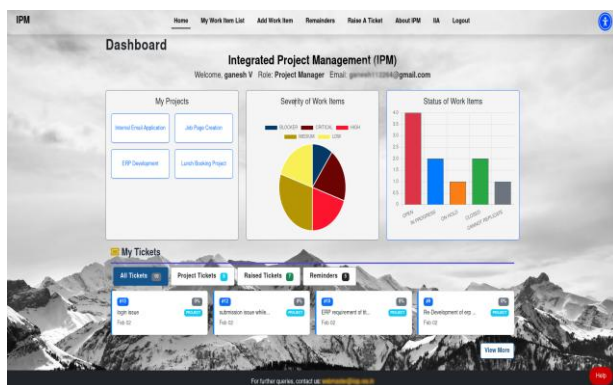


Fig 2. Role-based dashboard

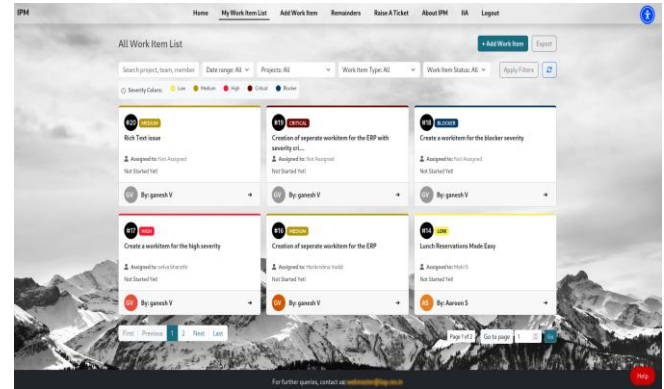


Fig 3. List of work items

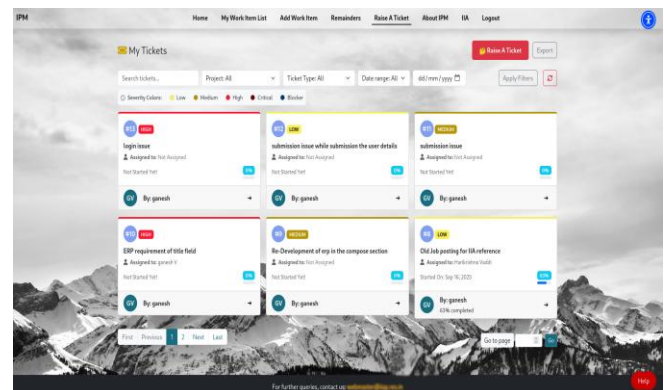


Fig 4. List of tickets

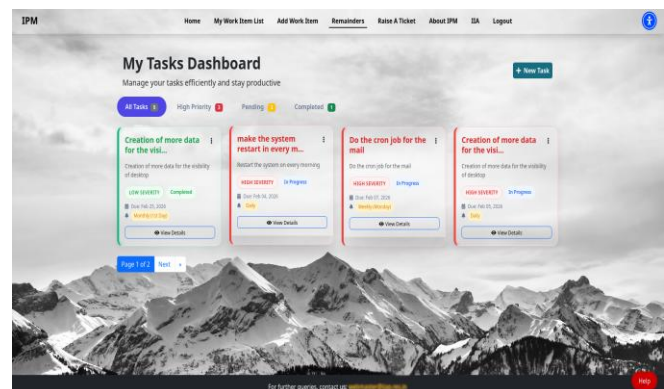


Fig 5. Reminders

V. EVALUATION

5.1 Functional Evaluation

Modules were tested with 20 sample tasks; the success rate was 100% for task creation, dashboard loading, and reminder triggering.

5.2 Usability Evaluation

A small usability study was conducted with 5 users over a period of 2 weeks. Users interacted with the system and completed a feedback survey on a 1–5 scale (1 = Poor, 5 = Excellent).

5.3 Performance Evaluation

Performance evaluation was conducted using Apache JMeter on Fedora Linux with increasing user loads. Login and dashboard request flows were simulated, and response times were recorded. From actual test runs:

- 100 users (Ramp-up 50): Avg = 82 ms
- 200 users (Ramp-up 100): Avg = 83 ms
- Error Rate: 0% for all tests
- Throughput: ~58 requests/second

Metric	Average Score
Ease of Use	4.6
Clarity of Dashboard	4.8
Reminder Effectiveness	4.4

Table 1: Usability Survey Results

Concurrent Users	Avg Ticket Creation Time(ms)	Reminder Trigger Time (ms)
5	70	40
10	72	45
20	75	48
50	78	50
100	82	55
200	83	58

Table 2: Performance Results

VI. FEATURES

The proposed IPM System is developed as a single, modular web application that integrates project coordination capabilities. It incorporates accessibility support and enhanced security mechanisms at the application layer.

6.1 Granular Work-Item Management and Ticketing System

The IPM system breaks projects into granular, manageable work items with priorities, deadlines, and progress tracking, improving visibility and coordination. It also provides a centralized ticketing system to record, assign, and track issues with defined priorities, statuses, ownership, and detailed descriptions throughout their lifecycle.

6.2 Automated Reminder and Notification System

The IPM system includes an automated reminder and notification mechanism based on predefined schedules, task deadlines, and status updates. Notifications are delivered through integrated email services using SMTP, ensuring users receive timely reminders for pending work items, tickets, and task reminders, thereby reducing delays and missed deadlines.

6.3 Dashboard, Visual Analytics and Reporting

The IPM system provides role-based dashboards that offer real-time visibility into project progress, work-item status,

ticket resolution, and pending reminders using visual components such as pie charts, bar charts, and task lists. Interactive data visualizations and charts enable users and administrators to efficiently monitor project health and support informed decision-making. Built-in reporting and Excel export functionality supports detailed analysis and documentation.

6.4 Role-Based Access Control (RBAC), Secure Authentication and Authorization

The platform implements secure authentication mechanisms including encrypted password storage, session management, and optional two-factor authentication using time-based onetime passwords (TOTP). Authorization checks are enforced at the application level to prevent privilege escalation and unauthorized access.

6.5 Accessibility and Usability Support

The system incorporates accessibility features such as keyboard navigation support, screen reader compatibility, and UI customization options to ensure inclusive usage for users with different abilities. Responsive design principles further enhance usability across devices.

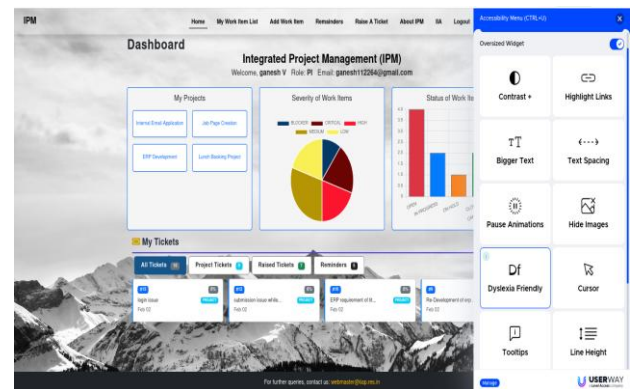


Fig 6. Accessibility widget

6.6 Data Integrity and Audit Logging

All critical system activities, including ticket updates, work item changes, assignments, and user actions, are recorded through audit logging. This ensures traceability, accountability, and compliance with organizational and security requirements, while also supporting system monitoring and debugging.

VII. CONCLUSION AND FEATURE WORK

This paper describes the development and validation of an integrated project management platform that enhances operational visibility and responsiveness. The implemented system demonstrates improvements in task traceability and stakeholder coordination. Future enhancements will explore AI-driven task prioritization, collaborative real-time editing, and predictive analytics for risk forecasting.



VIII. REFERENCE

- [1]. Rebuglio, Massimo; Zenezini, Giovanni; Ottaviani, Filippo Maria; De Marco, Alberto, 2025, Project Management Information Systems: A Systematic Review, *Procedia Computer Science*, vol. 256, pp. 1739–1747, DOI: 10.1016/j.procs.2025.02.313. [Online]. Available: <https://linkinghub.elsevier.com/retrieve/pii/S1877050925006817>
- [2]. Ghorbani, Saeed; Shafaghat, Ali, 2020, Representing a Conceptual Model for Integrating Project Management Information Systems in Project-Based Organizations, *Annals of Management and Organization Research*, vol. 1, no. 3, pp. 235–249, DOI: 10.35912/amor.v1i3.446. [Online]. Available: <https://pdfs.semanticscholar.org/81e5/4d4cfa76d46d24a7217ab495b67d0e1eb6a3.pdf>
- [3]. Feng, Li; Senapati, Jitendra; Liu, Bin, 2022, TaDaa: Real-Time Ticket Assignment Deep Learning Auto Advisor for Customer Support, *arXiv preprint arXiv:2207.11187*. [Online]. Available: <https://arxiv.org/abs/2207.11187>
- [4]. van Besouw, John; Bond-Barnard, Taryn Jane, 2021, Smart Project Management Information Systems (SPMIS) for Engineering Projects – Project Performance Monitoring & Reporting, *International Journal of Information Systems and Project Management*, vol. 9, no. 1, pp. 78–97, DOI: 10.12821/ijispm090104. [Online]. Available: <https://www.sciencesphere.org/ijispm/archive/ijispm-090104.pdf>
- [5]. Aglibar, Kent Darryl M.; Alegre, Garret Christopher T.; Del Mundo, Gerald I.; Duro, Kenny Francis O.; Rodelas, Nelson C., 2022, Ticketing System: A Descriptive Research on the Use of Ticketing System for Project Management and Issue Tracking in IT Companies, *International Journal of Computing Sciences Research*, vol. 7, pp. 1066–1075, DOI: 10.25147/ijcsr.2017.001.1.90. [Online].
- [6]. Atlassian Corporation, 2023, JIRA Software Documentation, Product Documentation, URL: <https://www.atlassian.com/software/jira>
- [7]. Slack Technologies, 2023, Slack Platform Overview, Product Documentation, URL: <https://slack.com/platform>
- [8]. Cockburn, Alistair, 2006, Agile Software Development, Addison-Wesley Professional, ISBN: 978-0321482754.
- [9]. Apache Software Foundation, 2023, Apache JMeter User Manual, Performance Testing Tool Documentation, URL: <https://jmeter.apache.org>
- [10]. Oracle Corporation, 2023, MySQL 8.0 Reference Manual, Database Documentation, URL: <https://dev.mysql.com/doc/refman/8.0/en/>
- [11]. Django Software Foundation, 2023, Django Documentation, Web Framework Documentation, URL: <https://docs.djangoproject.com/en/4.2/>
- [12]. OWASP Foundation, 2023, OWASP Top 10: Web Application Security Risks, Security Standard Report, URL: <https://owasp.org/www-project-top-ten/>
- [13]. National Institute of Standards and Technology (NIST), 2024, Digital Identity Guidelines (SP 800-63-3 Rev. 4), Authentication and Access Control Standards, URL: <https://pages.nist.gov/800-63-3/>
- [14]. Al-Shargabi, Abdullah; Sabri, Ahmad; Al-Maatouk, Qasem, 2023, Web-Based Project Management Systems: Architecture and Challenges, *IEEE Access*, vol. 11, pp. 48721–48735, DOI: 10.1109/ACCESS.2023.3274612, URL: <https://ieeexplore.ieee.org/document/10119584>
- [15]. World Wide Web Consortium (W3C), 2023, Web Content Accessibility Guidelines (WCAG) 2.2, Accessibility Standard, URL: <https://www.w3.org/TR/WCAG22/>
- [16]. UserWay Inc., 2024, UserWay Web Accessibility Platform, Accessibility Tool Documentation, URL: <https://userway.org>
- [17]. Google LLC, 2024, reCAPTCHA: Protect Your Websites from Fraud and Abuse, Security Service Documentation, URL: <https://www.google.com/recaptcha>

IJEAST

INTERNATIONAL JOURNAL
OF ENGINEERING APPLIED SCIENCE
AND TECHNOLOGY

ABOUT IJEAST

International Journal of Engineering Applied Science and Technology (IJEAST) is a peer-reviewed, open access journal that publishes high-quality research papers in the field of Engineering, Applied Science and Technology.

IJEAST aims to provide a platform for researchers, academicians, and professionals to share their innovative ideas, research findings, and practical experiences with the global scientific community.

FOCUS AREAS

- Engineering
- Applied Science
- Technology
- Innovation & Development
- Interdisciplinary Studies



PEER REVIEWED

All submissions are rigorously peer reviewed to ensure quality.



OPEN ACCESS

Free and unrestricted access to research for all.



GLOBAL REACH

Connecting researchers and professionals worldwide.



TIMELY PUBLICATION

We ensure a swift and efficient publication process.



For more information, visit our website

www.ijeast.com



INTERNATIONAL JOURNAL
OF ENGINEERING APPLIED SCIENCE
AND TECHNOLOGY

✉ editor@ijeast.com

🌐 www.ijeast.com

📍 India



2455-2143