Pega-Based Insurance Claims Processing System

A project report Submitted in partial fulfillment of the requirements for the award of degree of

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING

by

R. Venkat Kalyan (2100030959)

Under the esteemed guidance of

Cognizant Technology Solutions

&

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

KONERU LAKSHMAIAH EDUCATION FOUNDATION

Green Fields, Vaddeswaram, Guntur(Dist)- 522502

Andhra Pradesh, India.

KONERU LAKSHMAIAH EDUCATION FOUNDATION

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Declaration

The Project Report entitled "**Pega-Based Insurance Claims Processing System**" is a record of bon-a-fide work of **R. Venkat Kalyan (2100030959)** submitted in partial fulfillment for the award of Bachelor of Technology in Computer Science and Engineering to K L Deemed to be a university during the academic year 2024-25.

We also declare that this report is of our own effort, and it has not been submitted to any other university for the award of any degree.

R. Venkat Kalyan 2100030959

Approval of Internship

07-Jan-2025

Candidate ID: 29016931

Reddy Venkat Kalyan
B.Tech CSE - Cloud & Edge Computing
Koneru Lakshmaiah Education Foundation, Guntur

Dear **Reddy Venkat Kalyan,**

Further to our Letter of Intent for the position of Programmer Analyst Trainee / Programmer Analyst aligned to the hiring category, we are pleased to offer you an internship with us at Cognizant office for **a period of 3 to 6 months**. Your internship on-boarding will be scheduled based on your availability factoring your college exam schedule, availability of your Provisional Certificate and our business requirements.

During this period, you will be provided with a stipend of **INR 12,000** per month equated to the planned duration of the Internship curriculum and will be paid only subject to successful completion of milestones as defined in the curriculum, prior to the monthly stipend processing window, for a given month based on your performance and attendance.

Though Cognizant Internship is a skilling program aimed at enhancing technical acumen , it does not guarantee employment and there is no employer – employee relationship during the course of this internship program. However, the successful completion of internship will form a critical part of your eligibility for employment with Cognizant if an opportunity arises in future.

Below are the **mandatory documents** to be submitted as part of your **Pre- joining formalities:**

- 2 Passport sized Photographs preferably with a White background
- Personal individual bank account from a nationalized bank for processing stipend

In case of additional queries or concerns, you can raise a query at
https://campus2Cognizant.cognizant.com

We wish you good luck.

Yours sincerely,
For **Cognizant Technology Solutions India Pvt. Ltd.,**

Maya Sreekumar
Vice President - Human Resources

KONERU LAKSHMAIAH EDUCATION FOUNDATION

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

Certificate

This is to certify that the Internship Report entitled "**Pega-Based Insurance Claims Processing System**" is being submitted by **R. Venkat Kalyan (2100030959)** in partial fulfillment for the award of Bachelor of Technology in Computer Science and Engineering to K L Deemed to be a university during the academic year 2024-25.

Signature of Fourth Year Coordinator **Signature of the Professor-I/C Placements**

Signature of the HOD-CSE **Signature of the External Examiner**

ACKNOWLEDGEMENTS

It is great pleasure for me to express my gratitude to our honorable President **Sri. Koneru Satyanarayana**, for giving the opportunity and platform with facilities in accomplishing the Internship based report.

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Internship Project Associate

Name	**Student ID**
R. Venkat Kalyan	**2100030959**

ABSTRACT

During my three-month internship, I had the opportunity to work on a live project focused on insurance claim management using Pega. The internship began with foundational training on web services, where I was introduced to high-level concepts of SOAP and REST APIs. Following this, I received intensive hands-on training on Pega System Architect topics, which included both theoretical sessions and real-time implementation tasks. Our trainer monitored our progress through scenario-based exercises, ensuring I could apply the concepts in practice.

Once the training phase concluded, I was assigned a business domain and paired with a project lead and mentor to work on a real-world Pega application for a client in the insurance domain. The project involved building a workflow for automating insurance claim processes, including claim entry, reserve processing, payment approvals, and claim closures. I implemented role-based portals for claim adjusters and managers, integrated approval workflows, and developed alternate stages for handling rejections.

Throughout the project, my mentor provided guidance and regular feedback, and the lead conducted a final evaluation of my implementation. This internship significantly enhanced my understanding of workflow automation using Pega, strengthened my skills in business process modelling, and gave me real-world experience in delivering enterprise solutions.

About the Company

Cognizant is a global leader in technology and business services, providing innovative digital, technology, consulting, and operations solutions to clients across various industries. With a strong focus on digital transformation, Cognizant empowers businesses to become more agile, responsive, and competitive in an ever-evolving market. Cognizant's commitment to technological excellence is evident through its continuous investment in emerging technologies, including cloud, automation, AI, and low-code platforms like PEGA.

The company serves hundreds of global enterprises by delivering customized, scalable, and secure solutions that solve complex business challenges. Its emphasis on client satisfaction, technological foresight, and operational excellence has made it a trusted transformation partner for some of the world's most recognized brands.

Commitment to Technology and Innovation

Cognizant sees technology as a vital pillar for delivering enhanced client value and operational efficiency. As a technology-driven organization, Cognizant leverages modern tools and platforms to help clients streamline workflows, improve customer engagement, and accelerate time-to-market. One of the key areas of focus is low-code development, particularly through PEGA, which enables rapid application delivery, dynamic case management, and end-to-end process automation.

Cognizant's collaboration with PEGA is a testament to its forward-thinking approach. By integrating PEGA into enterprise solutions, Cognizant helps businesses design scalable, user-centric applications with minimal coding effort. The company also ensures its associates are well-versed in these technologies by offering structured training programs and practical learning opportunities. Its investments in DevOps, containerization, and AI/ML further support a culture of experimentation and rapid innovation.

Employee Empowerment: Teams, Managers, and Workflows

At Cognizant, people are at the heart of every project. The organization fosters a culture of continuous learning and growth by providing hands-on project experience, mentoring, and learning paths aligned with future-ready skills. Team collaboration, effective leadership, fixed working hours and open communication are hallmarks of the workplace culture at cognizant.

Interns and associates alike are encouraged to take initiative, solve problems, and contribute meaningfully to ongoing development efforts. Managers and mentors offer strong guidance and ensure that individuals are equipped with both the technical knowledge and soft skills required for success in a client-facing environment. Employees are also given access to a range of certifications, learning platforms, internal hackathons, and communities of practice that promote upskilling and innovation.

Additionally, the company places a strong emphasis on work-life balance, providing flexible working arrangements and offering opportunities for both professional and personal growth. Employees are encouraged to take part in continuous learning, with access to various training programs, mentorship opportunities, and career development initiatives.

Global Presence and Domain Expertise

The Cognizant has a strong global footprint, operating in over 35 countries with more than 300 delivery centers and offices worldwide. Headquartered in Teaneck, New Jersey, the company has major development centers in India (Hyderabad, Chennai, Bengaluru, Pune, and Kolkata), as well as significant offices across North America, Europe, Latin America, and Asia-Pacific.

Its domain expertise spans across diverse industries such as banking and financial services, healthcare and life sciences, retail and consumer goods, insurance, manufacturing, energy, telecommunications, and public sector services. This breadth of experience allows Cognizant to offer tailored solutions that meet specific industry needs while maintaining global quality standards.

The company’s globally distributed teams ensure round-the-clock service delivery, seamless collaboration, and cultural diversity. This global presence not only enhances Cognizant’s ability to support its multinational clients effectively but also provides associates with opportunities to work on cross-border projects, enhancing their exposure and career development. Employees benefit from interacting with clients and teams across geographies, gaining a holistic understanding of global business environments. This international exposure fosters adaptability, cross-cultural communication, and a broader professional outlook.

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INTRODUCTION

This report provides a comprehensive account of my three-month internship at Cognizant Technology Solutions, a global leader in digital transformation, technology services, and consulting. During my final year even semester, I had the opportunity to intern as a PEGA GenC Intern, where I gained hands-on experience in low-code application development and intelligent automation. This internship allowed me to bridge the gap between academic learning and industry practices, sharpening both my technical capabilities and my understanding of enterprise-level project delivery.

I was assigned to Cognizant's PEGA practice, which focuses on building workflow-centric applications for various domains such as healthcare, banking, and insurance. My responsibilities involved working on case management, rule-based process automation, and UI development using the PEGA platform. Through structured training and project-based learning, I developed skills in designing business logic, integrating data models, and streamlining customer-centric processes using PEGA's low-code environment.

In addition to technical training, I actively engaged in peer learning sessions and discussions with mentors, which enriched my understanding of best practices in solution design, process optimization, and agile development. The internship also emphasized the importance of communication, teamwork, and adaptability in a fast-paced, client-driven environment.

Cognizant's global presence and cross-functional teams provided a unique platform to understand how large-scale enterprises manage digital transformation initiatives. I had the chance to interact with professionals from diverse backgrounds, gaining insight into how distributed teams collaborate across time zones and cultural boundaries.

One of the most rewarding aspects of the internship was the structured learning pathway provided by Cognizant. As part of the PEGA GenC onboarding, I was enrolled in an intensive training module that covered key concepts such as application design, data modeling, user interface configuration, decision rules, and process flows. The training also included practical lab sessions and assessments that helped reinforce theoretical knowledge with hands-on application. This well-curated curriculum ensured that I was industry-ready before transitioning into real-time project tasks.

Cognizant's work culture deeply impressed me. The open communication channels, accessible mentors, and collaborative work environment created a space where I could freely seek help, share ideas, and contribute actively to the team. I particularly appreciated how my contributions were valued, even as an intern. Whether it was debugging an automation flow or configuring a case type in PEGA, each task came with learning opportunities that gradually boosted my confidence and technical independence.

Furthermore, this internship experience offered valuable exposure to global project structures and client-focused delivery models. Cognizant's presence in over 40 countries and its strong portfolio across domains like BFSI, healthcare, retail, and manufacturing gave me a broader perspective on how IT services scale and adapt to business needs across regions. I gained an appreciation for time zone coordination, documentation standards, and the importance of quality assurance in client deliverables. These insights have not only enhanced my technical understanding but also prepared me to work effectively in diverse, multicultural, and distributed teams.

This report outlines the key tasks and learnings from my internship, the tools and technologies I worked with, and the personal and professional growth I achieved during this period. My time at Cognizant has significantly shaped my interest in low-code development, automation, and enterprise-level solution delivery, reinforcing my aspiration to build impactful technology solutions in the future using PEGA low-code development approach.

PROJECT ANALYSIS

During my three-month summer internship at Cognizant as a PEGA Developer Intern, I had the opportunity to work on a real-time enterprise-grade application using PEGA, a low-code platform that supports intelligent business process management. The project exposed me to various facets of application development, from backend data configuration and frontend UI customization to integration and access control. It helped me understand how large-scale BPM systems are designed, implemented, and managed in a corporate environment.

Backend Development: PEGA Data Modeling

As part of the backend development, I worked extensively with PEGA's data modeling tools such as Data Types, Report Definitions, Data Pages, and Savable Data Pages. These allowed me to structure and persist application data effectively while maintaining reusability and performance.

- Data Types and Saveable Data Pages were configured to handle reusable business entities and support custom save operations that align with the application's workflow needs.
- I used Report Definitions to fetch and filter records efficiently, which helped drive dashboards and dynamic UI tables.
- Data Pages were instrumental in managing data sourcing strategies and reducing redundant database hits.
- I actively worked with Flow Rules, Data Transforms, and Decision Tables to control and customize the application's case progression, ensuring flexible routing and outcome-driven logic throughout.
- Leveraged **pyWorkPage,** the primary clipboard page for a case, to store key case-level properties. I accessed and updated **pyWorkPage** throughout the case lifecycle to ensure data consistency and used its values across assignments, decision shapes, and correspondence rules as needed.

Integration and Authentication

During the internship, I explored PEGA's capabilities in integrating with external systems and handling secure, role-based access management. Integration plays a crucial role in BPM systems, allowing applications to exchange data and automate actions across various platforms.

- I worked on **PEGA System of Record (SOR)** configurations to fetch and synchronize data from existing legacy systems. This ensured data consistency while preserving source authority.
- Learned about and experimented with **Connectors** (SOAP/REST), which are used in PEGA to establish communication with external services. Although I didn't configure full integrations independently, I gained insight into how endpoints, authentication headers, and data mapping are handled in real-world projects.
- Used **Activities** to perform customized tasks during case transitions, including calling external systems or manipulating data sets in conjunction with flow actions.
- Explored PEGA's **Robotic Process Automation (RPA)** concepts at a high level, understanding how bots can be orchestrated to perform repetitive tasks such as document scanning, form filling, or validation checks.
- On the authentication side, I configured multiple **Operator IDs**, each associated with distinct **Access Groups**, **Access Roles**, and **portals** to simulate different levels of access like Admin, Case Manager, and Customer Service Representative.
- Customized **dashboards and navigation menus** for each access group to provide personalized views, enhancing user experience and security.

Challenges Faced

While the overall experience was enriching, I encountered several challenges that helped deepen my understanding of PEGA's complexity and flexibility:

1. **Embedding Custom HTML & External Styling:** Integrating HTML within PEGA sections to achieve unique UI behaviour required overriding some default behaviours. Ensuring responsiveness across devices while maintaining a professional appearance was tricky, especially when PEGA's design templates conflicted with custom styles.

2. **Complex Routing and Flow Configuration:** Designing flows that could handle multiple routing conditions, assignments, and escalation scenarios involved careful orchestration. Debugging why a flow failed or took the wrong path was sometimes tedious and required analysing Audit Logs, Tracer output, and Clipboard data.

3. **Role-Specific Access and Dashboard Configuration:** Ensuring the correct access levels and views for each operator role introduced complications. A minor misconfiguration in access roles or privileges could lead to unauthorized access or blocked functionality, which had to be traced and resolved efficiently.

4. **Report Definitions and Data Pages Synchronization:** Generating real-time reports using Report Definitions was initially overwhelming due to the various filtering conditions and joins required. Ensuring that these reports were correctly backed by Data Pages and reflected up-to-date information was critical for dashboard accuracy.

5. **Email Templates and Correspondence Setup:** Configuring dynamic email templates that adapt to different case stages or decision outcomes involved combining rules like Correspondence, Paragraph, and Property references. Testing these in different environments and roles posed a learning curve.

6. **Frontend and Backend Integration:** Ensuring that the frontend and backend worked smoothly together after the migration was a challenging task. I had to ensure that the changes in the backend did not disrupt the frontend's functionality and vice versa. This required close communication with the backend team to ensure the data structures were compatible.

7. **Real-Time Data Updates:** Ensuring real-time data updates in the frontend, such as dynamically updating the properties without refreshing the page, presented challenges in ensuring the system was responsive while maintaining performance.

8. **Testing Difficulties as a Beginner:** One of the toughest challenges was testing every rule—be it data pages, decision tables, or UI logic—without having a strong understanding initially. As a beginner, it was overwhelming to navigate PEGA's layered rule hierarchy, and this led to frequent oversight or missed validations during early testing phases. It taught me the importance of breaking down test scenarios and validating each component independently to validate each and every rule available in the ruleset.

Key Learnings

1. **Holistic Understanding of PEGA Architecture:** Developed a strong grasp of how PEGA combines rules, case types, integrations, and user interfaces into a unified development model suitable for enterprise-grade solutions.
2. **Low-Code Doesn't Mean Low Control:** Despite being a low-code platform, PEGA provides developers with granular control over UI/UX, logic, and process flow. This balance between abstraction and customization was a significant learning point.
3. **Backend Efficiency with Data Pages and Activities:** Mastered the use of various data handling tools like Saveable Data Pages, Report Definitions, and Data Transforms to ensure optimal performance and maintainability of backend processes.
4. **Frontend Enhancement with Customization:** Understood how to extend out-of-the-box UI components using HTML, paragraph rules, and dynamic layouts. Also gained familiarity with how Theme Cosmos and Constellation differ in terms of flexibility and structure.
5. **Security and Access Control:** Gained hands-on experience in implementing robust access control mechanisms using Access Roles, Access Groups, Privilege Settings, and portal configurations to deliver a secure multi-user application.
6. **Real-World Collaboration and Debugging:** Learned to work collaboratively in a simulated corporate environment, used PEGA tools like Tracer, Clipboard, and Live UI for efficient debugging, and appreciated the importance of documenting every rule for maintainability.
7. **Business Process Thinking:** Most importantly, learned to think in terms of business processes, understanding how cases flow, escalate, pause, and resolve in real-world BPM systems, a mindset essential for any PEGA developer.

LATEST TOOLS LEARNED

During the early weeks of my internship, I took the initiative to reinforce foundational knowledge while simultaneously picking up advanced tools and frameworks necessary for modern application development. The progression of my learning is outlined below:

- **HTML5:** Refreshed my understanding of semantic HTML elements, form validations, and responsive layout structuring to build clean and accessible front-end interfaces.
- **MySQL:** Revised key SQL operations including data retrieval, joins, and subqueries, along with learning about efficient schema design and query optimization for backend operations.
- **Java Collections Framework:** Brushed up on essential data structures like Lists, Maps, Sets, and their respective implementations (e.g., ArrayList, HashMap), which laid the groundwork for writing efficient logic in both traditional and low-code platforms**.**

- **Web Services (SOAP & REST):**

  - Understood the architecture and working of **SOAP** (Simple Object Access Protocol) and **REST** (Representational State Transfer) APIs.
  - Learned about **WSDL**, **SOAP envelopes**, and **HTTP methods (GET, POST, PUT, DELETE)** while exploring these protocols.
  - Gained hands-on experience with **JAX-WS** (for SOAP) and **JAX-RS** (for REST) Java APIs to create and consume web services.

- **Low-Code Development using PEGA:**
  - Transitioned into **low-code application development** using the PEGA platform, which streamlined the development of workflows and business process applications.
  - Explored core PEGA components such as data types, case types, data pages (including saveable ones), activities, decision rules, integrations, and UI rules using Theme Cosmos and Constellation UI.
  - Built logic-heavy flows with case routing, flow controls, and correspondence emails while also customizing UI using embedded HTML

CONCLUSION & RECOMMENDATIONS

My internship experience with **PEGA at Cognizant Technology Solutions** was deeply enriching and provided me with a strong foundation in **low-code enterprise application development**. I was part of a project aimed at creating scalable business workflows using PEGA's Case Management system. This involved working with various rule types like data pages, flow actions, integrations, and UI rules.

I had the opportunity to apply my backend development skills while also exploring front-end configuration using PEGA App Studio and Dev Studio. From learning PEGA integrations (Connect-SOAP/REST) and authentication mechanisms to implementing case data persistence through pyWorkPage, the experience helped me strengthen my **problem-solving**, **collaboration**, and **real-world enterprise development** skills.

This internship also gave me a closer look at corporate work culture—helping me develop professionalism, effective communication, and teamwork in a fast-paced environment. It boosted my confidence in pursuing a full-time career in **enterprise-grade software development**, and project management, which are essential skills for a successful career in the tech industry.

As part of the backend development tasks, I implemented logic for automating case progressions and managing state transitions using decision tables and activities. I learned how to effectively manipulate clipboard data, manage SLA rules, and perform validations through declarative and procedural rules. I also contributed to maintaining application rulesets and understanding the importance of versioning and branching in large-scale PEGA applications.

On the integration side, I implemented and tested both SOAP and REST connectors and services using PEGA’s inbuilt wizard-based configurations. I used Postman extensively to simulate API calls and validate integration behaviour.

Moreover, the learning curve as a beginner in PEGA was steep. However, overcoming that taught me how to explore and understand complex enterprise-grade systems. The hands-on experience with **debugging using Tracer**, reviewing logs, and interpreting rule execution helped me grow immensely. The exposure to agile practices and frequent standups also improved my communication and time management skills within a collaborative development setting.

Recommendations for Future Development

- **Adopt Modular Application Architecture:** Enhance case reusability and rule maintainability by adopting modular rulesets and applying best practices for rule versioning.
- **Improve UI Consistency:** Leverage Cosmos Design System or Material-style UI templates to maintain a consistent and responsive user interface across the application.
- **Implement Automated Testing in PEGA:** Make use of PEGA's Unit Testing Rules and Test Cases to improve test coverage and reduce manual verification effort.
- **Introduce CI/CD Pipelines:** Use tools like Deployment Manager in PEGA or integrate with Jenkins to streamline rule migration and automate environment deployment processes.
- **Strengthen Authentication & Security:** Enhance role-based access controls, and review authentication mechanisms (e.g., SSO/OAuth2) to align with enterprise security standards.
- **Improve Documentation:** Maintain a centralized Confluence or PEGA Knowledge Base to document rule logic, case design decisions, and integrations for better collaboration.
- **Collect User Feedback:** Implement feedback flows or user surveys within the app to collect insights from business users for continuous case improvement.

REFERENCES

1. TekStac: Official learning platform used during internship at Cognizant. It provided structured modules and hands-on labs for Java, Spring Boot, MySQL, and web services. Helped me reinforce fundamentals and gradually transition into enterprise-level development. Available at TekStac.
2. Udemy Courses: I enrolled in multiple courses including Spring Boot & Hibernate, RESTful Web Services with Spring Boot, and Complete Web Developer Bootcamp. These covered both back-end and front-end skills and included real-world project applications to strengthen my development approach. Available at Udemy.
3. PEGA Documentation: Official PEGA platform documentation providing comprehensive references for rule types, case management, integrations, and UI configuration. Used regularly while working on real-time project implementations. Available at PDN.
4. PEGA Academy: PEGA's official learning portal containing certification paths and interactive tutorials. Help me understand key concepts like data pages, connectors, decision rules, and case lifecycle management. Available at PEGA Academy.
5. PEGAhut YouTube Channel: Ultimate guide to mastering system architect concepts with comprehensive theory and hands-on tutorials. Available on YouTube.