**A PROJECT REPORT ON**

**“SALESFORCE DEVELOPER TRAILMIX”**

*2-Month Summer Internship report*

*submitted towards the partial fulfilment of the degree*

# Bachelor of Technology

By

## Muddam Bhanu Chander Reddy

## 21CS002397

*Submitted to*



**Department of Computer Science & Engineering Sir Padampat Singhania University Udaipur 313601 Rajasthan India**

**DECLARATION**

I Muddam Bhanu Chander Reddy, student of B.Tech.(CSE), hereby declare that the 2-Month Summer Internship project report titled “Salesforce Developer Trailmix Completion” which is submitted by me to the department of Computer Science & Engineering , School of Engineering, Sir Padampat Singhania University, Udaipur, submitted towards the partial fulfillment of the requirement for the award of the degree of Bachelor of Technology, has not been previously formed the basis for the award of any degree, diploma or other similar title or recognition.

Muddam Bhanu Chander Reddy

Udaipur

Date: 28/08/2024

# CERTIFICATE

This is to certify that the 2-Month Summer Internship project entitled ‘Salesforce Developer Trailmix Completion’ being submitted by Muddam Bhanu Chander Reddy, submitted towards the partial fulfillment of the requirement for the award of the degree of Bachelor of Technology, has been carried out under my supervision and guidance.

The matter embodied in this report has not been submitted, in part or in full, to any other university or institute for the award of any degree, diploma or certificate.

Mr. Brajesh Kumar

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Thank you all for making this journey a memorable and rewarding experience.

Muddam Bhanu Chander Reddy

Enrollment Number: 21CS002397

# ABSTRACT

Salesforce is an American cloud-based software company headquartered in San Francisco, California. It provides customer relationship management (CRM) services and offers a suite of enterprise applications focused on customer service, marketing automation, analytics, and application development.

Salesforce development and deployment typically take place in an environment or "org," which offers a range of features and services for applications. Across the globe, community-run Salesforce developer groups meet regularly to share knowledge about programming on the Salesforce App Cloud, learn new skills via Trailhead, and build a strong community network.

Salesforce has a variety of specialized clouds, each catering to different business needs. Within these, I specifically worked in the Platform Cloud. The Platform Cloud allows customers to build and customize applications on top of Salesforce products, tailoring their experiences to fit their unique requirements.

During my internship, I was part of the Platform Development Tools (PDT) team. PDT is dedicated to creating tools that enhance the development experience for those using Apex and Aura components within the Salesforce ecosystem. Additionally, PDT is responsible for all Apex commands in the Salesforce Command Line Interface (CLI).

My internship project primarily focused on modernizing the Apex command codebase by developing a new plugin framework using oclif. This effort aimed to provide customers with an improved user experience. Of the six Apex commands, my main focus was on the Apex Specialists and Process Automation Superbadges. These tools fetch debug logs from a specified org using a log ID or a specified number of logs. The project addressed several customer issues, including slow response times, code coverage reporting problems, and missing information in the resulting output.

**Learning Objectives / Internship Objectives**

Internships are often seen as opportunities for college students to gain experience in a specific field. However, training internships can provide valuable real-world experience and skill development for individuals at any stage of their career or educational journey.

##### Diverse Opportunities for Growth

Internships are valuable across a wide range of career fields, including architecture, engineering, healthcare, economics, advertising, and many more. They offer hands-on experience and skill enhancement, serving as a critical stepping stone for career advancement. Some internships focus on allowing individuals to perform scientific research, while others are designed to provide firsthand experience in a professional work environment.

##### Personal and Professional Development

The objectives for an internship should not only focus on the specific skills you already possess but also on your enthusiasm to learn more and grow within the field. This approach demonstrates both your ability to contribute effectively and your commitment to ongoing personal and professional development.

##### Building a Stronger Resume

Internships are a great way to build a robust resume and develop skills that will be valuable in future job applications. When applying for a training internship, it's essential to highlight any special skills or talents that set you apart from other candidates. This can significantly increase your chances of securing the position and gaining meaningful experience that will benefit your long-term career goals.

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**Title: Salesforce Developer Trailmix - 2-Month Summer Internship Report**

This report summarizes a 2-month summer internship project focused on completing the Salesforce Developer Trailmix, including the Apex Specialist and Process Automation Specialist superbadges. The project was conducted by Gaddam Kalyan Teja as part of the requirements for a Bachelor of Technology degree from Sir Padampat Singhania University.

**Key objectives:**

- Complete Salesforce Developer Trailmix curriculum

- Earn Apex Specialist superbadge

- Earn Process Automation Specialist superbadge

- Gain hands-on experience with Salesforce development

- Apply Salesforce skills to real-world business scenarios

**Introduction to Salesforce**

Salesforce is a leading cloud-based customer relationship management (CRM) platform that helps businesses manage customer data, automate processes, and gain insights. Key aspects of Salesforce include:

- Cloud-based SaaS model for easy access and scalability

- Customizable platform that can be tailored to specific business needs

- Suite of integrated "clouds" for sales, service, marketing, commerce, etc.

- Powerful development tools like Apex and Lightning components

- AppExchange marketplace for third-party apps and integrations

- Focus on innovation with regular releases of new features

Salesforce enables companies to centralize customer data, automate workflows, analyse business metrics, and deliver personalized experiences across channels.

**Salesforce Developer Tools and Skills**

The Salesforce Developer Trailmix covers key tools and skills needed to customize and extend the Salesforce platform:

* Apex: Salesforce's proprietary programming language for writing custom business logic and automation. Apex is similar to Java and runs on Salesforce servers.
* Lightning Web Components: A modern JavaScript framework for building custom user interfaces and web apps on Salesforce.
* Process Builder: A point-and-click tool for automating business processes without code.
* Flow Builder: A visual interface for creating more complex multi-step automated processes.
* SOQL/SOSL: Salesforce Object Query Language and Salesforce Object Search Language for querying and searching Salesforce data.
* Salesforce APIs: Interfaces for integrating Salesforce with external systems and apps.

**Salesforce Trailhead Learning Platform**

Trailhead is Salesforce's gamified online learning platform that offers free, self-paced training on Salesforce skills and technologies. Key aspects of Trailhead include:

- Modular learning paths called "trails"

- Hands-on exercises in simulated Salesforce environments

- Points and badges earned for completing modules

- Guided projects that apply skills to real-world scenarios

- Superbadges that test advanced skills through complex challenges

- Community features to connect with other learners

The Salesforce Developer Trailmix is a curated set of Trailhead modules focused on core development skills needed to customize and extend the Salesforce platform.

**Apex Specialist Superbadge**

The Apex Specialist superbadge is an advanced credential that tests a developer's ability to use Apex to implement complex business logic and automation. Key skills tested include:

- Writing efficient, bulkified Apex triggers

- Developing reusable Apex classes

- Implementing complex business processes

- Integrating with external systems via callouts

- Writing comprehensive test classes

- Debugging and troubleshooting Apex code

To earn this superbadge, developers must complete a multi-step business scenario that requires applying Apex development best practices to solve real-world problems.

**Process Automation Specialist Superbadge**

The Process Automation Specialist superbadge focuses on using Salesforce's declarative automation tools to streamline business processes without code. Key skills tested include:

- Configuring approval processes

- Building complex multi-object flows

- Using Process Builder for record-triggered automations

- Implementing scheduled actions and auto launched flows

- Combining declarative tools with Apex when needed

- Troubleshooting and optimizing automated processes

**Project Objectives and Scope**

The main objectives of this internship project were:

1. Complete the Salesforce Developer Trailmix curriculum

2. Earn the Apex Specialist superbadge

3. Earn the Process Automation Specialist superbadge

4. Gain hands-on experience applying Salesforce development skills

5. Develop a custom Salesforce application to solve a business problem

The project scope included:

- Studying Salesforce fundamentals and development concepts

- Completing hands-on Trailhead modules and projects

- Tackling the complex scenarios in both superbadges

- Designing and building a sample Salesforce app

- Documenting learnings and best practices

**Methodology and Approach**

The project followed an iterative learning and development approach:

1. Study core concepts through Trailhead modules

2. Apply concepts in hands-on exercises and projects

3. Tackle increasingly complex scenarios to build skills

4. Attempt superbadge challenges, identifying knowledge gaps

5. Review and reinforce concepts as needed

6. Complete superbadges to validate mastery

7. Design and develop sample application

8. Document process and lessons learned

This approach allowed for gradual skill building while providing opportunities to apply knowledge to real-world scenarios. Frequent self-assessment helped identify areas needing additional focus.

**Key Learnings - Apex Development**

Through the Apex Specialist curriculum and superbadge, key learnings included:

- Apex execution context and governor limits

- Trigger frameworks and best practices

- Apex testing strategies and best practices

- Asynchronous Apex (future methods, queueable Apex, batch Apex)

- Integration patterns and callouts to external systems

- Apex security and sharing considerations

- Debugging and troubleshooting techniques

- Design patterns for reusable, maintainable code

Hands-on practice writing complex Apex logic and comprehensive test classes reinforced these concepts and built practical skills.

**Key Learnings - Process Automation**

The Process Automation Specialist curriculum and superbadge provided insights into:

- Process Builder vs Flow capabilities and use cases

- Designing scalable, maintainable automated processes

- Approval process configuration and best practices

- Complex multi-object flow design

- Scheduled actions and autolaunched flows

- Combining declarative automation with Apex

- Debugging and optimizing flows

- Process automation governance and best practices

Applying these concepts to automate complex business scenarios built practical skills in streamlining processes without code.

**Sample Application - Overview**

To apply the skills learned, a sample Salesforce application was designed and developed. The app, called "LeadGenius", aims to streamline and automate the lead management process for a hypothetical sales organization. Key features include:

- Automated lead assignment and routing

- Lead scoring and prioritization

- Automated follow-up task creation

- Email templates for common scenarios

- Dashboard for lead analytics and insights

The application leverages both declarative tools like Process Builder and Flow as well as custom Apex logic to implement the required functionality.

**Sample Application - Data Model**

The LeadGenius app uses the following custom objects in addition to standard Salesforce objects:

LeadScore\_\_c

- Fields: Lead\_\_c (Lookup to Lead), Score\_\_c (Number), LastCalculated\_\_c (DateTime)

- Tracks the calculated score for each lead

LeadAssignmentRule\_\_c

- Fields: Name, Active\_\_c, Criteria\_\_c, AssignedUser\_\_c

- Stores rules for automatic lead assignment

EmailTemplate\_\_c

- Fields: Name, Subject\_\_c, Body\_\_c, Scenario\_\_c

- Stores reusable email templates for common scenarios

These custom objects work alongside standard Lead, Contact, Account, and User objects to support the app's functionality.

**Sample Application - Automated Lead Assignment**

The automated lead assignment process uses a combination of Process Builder and Apex:

1. Process Builder detects new Lead creation

2. Custom Apex class is called to evaluate assignment rules

3. Apex queries LeadAssignmentRule\_\_c to get active rules

4. Rules are evaluated against Lead field values

5. First matching rule determines assigned user

6. Lead owner is updated via DML operation

7. Email notification sent to assigned user

This approach allows for flexible, data-driven assignment rules while leveraging the efficiency of bulk processing in Apex.

**Sample Application - Lead Scoring**

Lead scoring is implemented using a scheduled Apex batch job:

1. Batch Apex queries all Leads modified since last run

2. For each Lead, score is calculated based on field values:

- Industry = 10 points

- Annual Revenue > $1M = 15 points

- Title contains "CEO" or "CTO" = 20 points

- etc.

3. LeadScore\_\_c record is created or updated

4. Process Builder detects score changes

5. High-scoring leads trigger notification to sales manager

This design allows for efficient bulk processing of leads while enabling real-time reactions to score changes.

**Sample Application - Automated Follow-ups**

Automated follow-up tasks are created using Flow:

1. Schedule-triggered flow runs daily

2. Queries Leads with no tasks in last 7 days

3. Creates follow-up task for Lead owner

4. Task subject and due date set based on Lead status

5. Option to send email notification of new task

Flow allows for easy configuration of complex multi-object logic, with the ability to extend with Apex invocable methods if needed for more advanced scenarios.

**Sample Application - Email Templates**

The email template feature combines custom objects with Apex:

1. EmailTemplate\_\_c stores reusable templates

2. Apex class provides methods to:

- Retrieve templates by scenario

- Merge Lead field values into template

- Send email using template

3. Lightning component allows users to:

- Select template

- Preview merged email

- Send or schedule email

This approach provides flexibility for business users to manage templates while leveraging Apex for complex merging and sending logic.

**Sample Application - Lead Analytics Dashboard**

The lead analytics dashboard uses a combination of custom report types and Lightning components:

1. Custom report type joins Lead, LeadScore\_\_c, and Task objects

2. Reports provide data for dashboard charts:

- Leads by status and owner

- Average days to conversion

- Top lead sources by conversion rate

3. Lightning Web Component retrieves report data via Apex

4. Chart.js library used for interactive visualizations

5. Dashboard updates in real-time as data changes

This design leverages Salesforce's powerful analytics capabilities while providing a customized, interactive user experience.

**Challenges and Lessons Learned**

Key challenges encountered during the project included:

1. Understanding Salesforce's multi-tenant architecture and its implications for development

2. Navigating Salesforce's extensive documentation and resources

3. Balancing declarative vs programmatic solutions

4. Optimizing for Salesforce governor limits and performance

5. Implementing effective testing strategies for complex logic

Lessons learned:

- Start with declarative tools, use code only when necessary

- Design for bulk scenarios from the beginning

- Leverage Salesforce debug logs for troubleshooting

- Use developer sandboxes for iterative testing

- Take advantage of Salesforce community resources

**Conclusion**

The Salesforce Developer Trailmix internship project provided valuable hands-on experience with Salesforce development concepts and best practices. Key outcomes included:

1. Completion of Salesforce Developer Trailmix curriculum

2. Earning of Apex Specialist superbadge

3. Earning of Process Automation Specialist superbadge

4. Development of sample LeadGenius application

5. Practical experience applying Salesforce skills to business scenarios

The project reinforced the power and flexibility of the Salesforce platform while highlighting the importance of following best practices for scalable, maintainable solutions.

**Future Work and Recommendations**

Potential areas for future work include:

1. Exploring advanced Salesforce features like Einstein AI

2. Implementing more complex integrations with external systems

3. Developing custom Lightning Web Components

4. Experimenting with Salesforce DX and modern dev workflows

5. Pursuing additional Salesforce certifications

Recommendations for others starting with Salesforce development:

1. Leverage Trailhead for structured, hands-on learning

2. Join Salesforce developer communities for support

3. Practice in developer sandboxes and scratch orgs

4. Stay up-to-date with Salesforce releases and roadmap

5. Focus on declarative development first, then extend with code

6. Prioritize scalability, security, and user experience in designs

Continuous learning and practical application are key to success in the rapidly evolving Salesforce ecosystem.