# Recent Open Source Lab Mini Project Report

*On*

# Issues in Recent Open Source Project

### Submitted to

**MUMBAI UNIVERSITY**

***In partial fulfillment of requirement for the award of degree of***

# Bachelor of Engineering

Information Technology Semester-VII

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**UNIVERSITY OF MUMBAI**

**(AY 2024-25)**

**CERTIFICATE**

This is to certify that the project entitled **“Issues in Recent Open Source Project”** is bonafide work of Vidha Naik (VU4F2021040), Akanksha Bele(VU4F2021124),Razaan Rizvi (VU4F2122110),Atharva Gajakos(VU4F2122125) submitted to University of Mumbai in partial fulfillment of requirement for the award of degree of “**Bachelor of Engineering in Information Technology-Semester-VII”**

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# INTRODUCTION

# 1.1) Fundamentals of OSS

# OSS is a term used to describe the information processing systems used by operators to manage their communications networks. Originally known as Telecommunication Network Management tools, these solutions are now so much more sophisticated. They allow an organisation to coordinate customers, services, resources, processes and activities. They assist operators to design, build, operate and maintain communications networks. Traditionally, OSS tended to provide network-facing or network-operations-facing functionality. This includes fault and performance management (assurance), customer activations (fulfillment), asset / inventory / configuration management, network security and so much more.

# Characteristics of Open Source Software:

# Transparency - The source code is publicly accessible, allowing full visibility into the software's functionality ; Freedom to Modify - Users can modify the software to meet their specific needs, making it highly customizable; Collaboration - OSS encourages contributions from a global community of developers, leading to continuous innovation.

# Licensing:

# OSS is governed by licenses that determine how the software can be used, modified, and distributed. Some of the most common OSS licenses include: GNU General Public License (GPL): Requires derivative works to be distributed under the same open-source terms; MIT License: A permissive license that allows almost unrestricted reuse, including in proprietary software.

# Benefits of OSS:

# Cost-Effective: OSS eliminates the need for expensive software licenses, making it an economical choice for organizations; Flexibility: The ability to modify the software provides users with a high degree of customization.

# Popular OSS Projects:

# Some widely-used OSS projects include: Linux: A leading open-source operating system; Apache HTTP Server: A popular web server software; Git: A distributed version control system for managing code.

# Collaboration in OSS:

# OSS thrives on collaboration, with platforms like GitHub and GitLab enabling developers to contribute to projects, track changes, and manage different versions of code. Tools like Git allow for efficient version control and conflict resolution when multiple developers work on the same codebase.

# 1.2) GPL

# The GNU General Public License (GPL) is one of the most widely used open-source licenses, created by the Free Software Foundation. It is designed to ensure that software remains free and open for all users by granting the freedom to run, study, modify, and distribute the software. A key feature of the GPL is its copyleft requirement, meaning that any modified versions or derivative works of the software must also be distributed under the same GPL license. This ensures that the software and any improvements made to it remain open source, preventing anyone from converting the code into proprietary software. The GPL aims to promote software freedom and collaboration while protecting the open-source nature of the original work.

# 1.3) Different ways to contribute to OSP

# Contributing to open source isn’t just for coders. There are dozens of ways to contribute to open source projects. Some require a bit more technical know-how, while others just demand a bit of time, love, and care. Some of them include-

# Code contributions: This is the most obvious form of contribution. Fix bugs, add new features, contribute code, and improve the existing codebase to enrich functionality and performance.

# Testing: Test existing features for bugs and report or help fix them.

# Design: Open source projects often need help making their applications visually pretty and easy to use. Contribute by improving or creating graphics, user interfaces, or user experiences.

# Answering questions: Participate in forums, mailing lists, and chat channels to help others solve problems.

# Reviewing code: If you’re an experienced programmer, review others’ code. Your expertise can help guarantee the quality and reliability of the codebase.

# Organizing events: Help organize meetups, conferences, or workshops about the project.

# Marketing and outreach: Help spread the word about the project through social media, blogging, or speaking at conferences. Raising awareness can attract more contributors and users.

# Legal assistance: If you have legal expertise, you can help the project handle licensing issues or other legal challenges.

# Accessibility auditing: Help make the project more accessible by auditing for accessibility issues and recommending improvements.

# Community management: Help manage the community by organizing discussions, managing conflict, and keeping the community members engaged.

# 2. CONTRIBUTION TO OPEN SOURCE IN OPERATING

# SYSTEM

# 2.1) Introduction

# Contributing to open-source operating systems like Linux, FreeBSD, or Android allows developers and enthusiasts to collaborate on improving core technologies. These contributions can include writing code, fixing bugs, enhancing performance, or developing new features. Non-coding contributions are also valuable, such as updating documentation, translating content, and testing software to ensure stability. Engaging with these projects offers a chance to learn, gain hands-on experience, and connect with a vibrant community. Open-source contributions not only improve widely-used systems but also empower individuals to shape the future of technology.

# 2.1) Problem Definition :

# Increasing Participation and Contribution to Open Source in Operating System Projects

# Operating systems are critical software that power devices ranging from personal computers to mobile phones and servers. However, maintaining and improving these systems requires continuous effort, including fixing bugs, enhancing security, adding features, and updating documentation. With limited resources, many open-source operating systems like Linux or FreeBSD rely heavily on community contributions. The challenge lies in encouraging more individuals—both developers and non-developers—to participate meaningfully. Ensuring smooth collaboration, managing contributions, and maintaining high software quality are essential for these projects to thrive and meet evolving technological demands.

# 2.2) Objectives

**Objectives of Contributing to Open Source in Operating Systems:**

* **Improve Software Quality:** Identify and fix bugs, enhance performance, and ensure stability across different devices and platforms.
* **Enhance Security:** Address vulnerabilities promptly to protect systems from cyber threats.
* **Develop New Features:** Introduce innovative functionalities to meet user needs and adapt to technological advancements.
* **Foster Collaboration:** Encourage global participation, enabling diverse perspectives and expertise to shape the operating system.

# 2.4) Submission of contribution snapshots (Results)

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# 2.5) Source code:

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# 3. CONTRIBUTE TO OPEN SOURCE IN TECHNOLOGIES.

# 3.1) Introduction

# Contributing to open source technologies allows developers and tech enthusiasts to collaborate on software projects that are open to the public. Open source software (OSS) is software with source code that anyone can inspect, modify, and enhance. Popular projects like Linux, Python, and TensorFlow are examples of open source work. When you contribute to these projects, you’re joining a global community of developers working to improve the software we all use.

# Common Technologies in Open Source

# Programming Languages:Python, JavaScript, Java, C++, Ruby.

# Frameworks:React, Angular, Django, Ruby on Rails.

# Cloud and DevOps:Kubernetes, Docker, Terraform.

# Machine Learning and Data Science:TensorFlow, PyTorch, Scikit-learn.

# Web Development:WordPress, Bootstrap, Next.js.

# 3.2) Problem Definition :

# The Need for Active Participation in Open Source in various Technology

# In the rapidly evolving field of technology, innovation and software development often rely on collaborative efforts. Open source technologies provide a platform where developers, technologists, and organizations around the world can collaboratively build, improve, and maintain software that is accessible to all. Despite the vast potential of open source, there are several challenges that limit both its adoption and the active contribution of developers, particularly new contributors.

# 3.3) Objectives

# Objectives for Working on Open Source in Technologies-

# Increase Active Participation in Open Source

# Enhance Onboarding and Support for New Contributors

# Ensure Sustainability of Open Source Promote Collaboration Across Technologies

# Foster Inclusivity and Diversity in Open Source Communities

# Raise Awareness and Recognition of Open Source Contributions

# 3.4) Submission of contribution snapshots (Results)

# 

# 

# 3.5) Source code

# 

# 

# 4. CONTRIBUTE TO OPEN SOURCE IN NETWORK

# MANAGEMENT

# 4.1) Introduction

# Contributing to open source in network management is a valuable opportunity to enhance the way modern networks are monitored, optimized, and secured. Network management involves overseeing the operation, configuration, and maintenance of networks, ensuring that data flows smoothly between devices while maintaining performance and security. Open source network management tools provide scalable, customizable solutions for network administrators, allowing them to monitor network traffic, detect anomalies, manage configurations, and troubleshoot issues efficiently.

# 4.2) Problem Definition :

# Challenges in Network Management and the Need for Open Source Contributions

# As organizations increasingly rely on complex and distributed networks to support their operations, the demand for effective network management solutions has surged. Managing networks requires constant monitoring, configuration, troubleshooting, and security enforcement, which can be resource-intensive and expensive. While several proprietary tools are available for network management, they often come with high costs, limited customization, and scalability challenges. Open source network management tools offer an alternative by providing flexible, scalable, and cost-effective solutions, but these tools face their own set of challenges.

# 4.3) Objectives

# Objectives for Contributing to Open Source in Network Management

# Enhance the Scalability and Feature Set of Open Source Network Management Tools

# Increase Community Engagement and Contributions

# Improve Usability and Onboarding for New Users

# Strengthen Security and Maintenance Practices

# Foster Collaboration and Integration Among Open Source Tools

# 4.4) Submission of contribution snapshots (Results)

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# 4.5) Source Code

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# 5. CONTRIBUTE TO OPEN SOURCE IN APPLICATION AND

# CLOUD SERVICES

# 5.1) Introduction

# Contributing to open-source projects in applications and cloud services allows individuals to help shape the technologies that drive software tools, platforms, and infrastructure. Applications like LibreOffice and VLC, or cloud platforms such as Kubernetes and OpenStack, rely on community involvement to enhance functionality, security, and scalability. Contributions go beyond coding and can include tasks like writing documentation, testing new releases, reporting bugs, or improving cloud automation. Engaging with these projects provides valuable learning opportunities, fosters collaboration with a global community, and helps build innovative, accessible software and cloud ecosystems.

# 5.2) Problem Statement

# Modern applications and cloud services are essential to businesses and individuals, powering everything from productivity tools to large-scale infrastructure. However, the rapid evolution of technology, along with increasing demands for security, scalability, and performance, poses challenges. Open-source projects in these areas depend on community contributions to keep pace with advancements, address bugs, improve documentation, and ensure compatibility across platforms. The challenge lies in attracting skilled contributors, coordinating efforts efficiently, and maintaining high software quality while fostering innovation. Without continuous support, these projects risk stagnation, making it difficult to meet the growing needs of users and organizations worldwide.

# 5.3) Objectives

# Enhance Software Functionality

# Improve Security and Reliability.

# Ensure Scalability

# Promote InnovationSupport Interoperability

# 5.4) Submission of contribution snapshots (Results)

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# 5.5) Source Code

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# 6. CONCLUSION

# This project, “Issues in Recent Open Source Projects" highlights the collaborative and innovative spirit of open-source development. By addressing a range of issues—from enhancing book and course recommendation systems to improving network management and application features— we have gained critical insights into software engineering practices, including effective debugging, code optimization, and user experience enhancement.

# Throughout these contributions, we not only refined our technical skills but also engaged with the vibrant open-source community, receiving valuable feedback that helped us improve our solutions. This experience emphasized the importance of open-source contributions in advancing technology and demonstrated our ability to make meaningful impacts in diverse projects.

# Ultimately, this journey has deepened our understanding of collaborative development and its role in shaping the future of software.

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# 'Forge Your Future with Open Source' Recommended book