

Open Source & Self-Hosting Report

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Academic Year: 2025–26

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1 About the Linux Distribution Used

For this project, I used the **Ubuntu** Linux distribution, one of the most popular and beginner-friendly open-source operating systems. Ubuntu is built on the Linux kernel and provides a stable, secure, and customizable environment suitable for development, server deployment, and daily computing tasks. Its strong package management system (APT), large community support, and frequent security updates make it a reliable choice for open-source learning and practical implementation. Ubuntu also includes essential tools and libraries out-of-the-box, making it convenient for tasks like encryption, server hosting, and software experimentation.

System Information

The following commands were executed to gather system details:

```
cat /etc/os-release  
uname -r  
lsb_release -a
```

Added screenshot here:

A terminal window with a black background and white text. It displays the output of the 'cat /etc/os-release' command. The text includes: PRETTY_NAME='Ubuntu 25.04', NAME='Ubuntu', VERSION='25.04', VERSION_ID='25.04', VERSION_CODENAME='lucky', ID='Ubuntu', ID_LIKE='debian', HOME_URL='https://www.ubuntu.com/', SUPPORT_URL='https://help.ubuntu.com/', BUG_REPORT_URL='https://bugs.launchpad.net/ubuntu/', PRIVACY_POLICY_URL='https://www.ubuntu.com/legal/terms-and-policies/privacy-policy', LOGO='https://ubuntu.com/logo'.

```
domalay.sravant@cherukuru-sravant:~$ cat /etc/os-release
PRETTY_NAME="Ubuntu 25.04"
NAME="Ubuntu"
VERSION="25.04"
VERSION_ID="25.04" (Lucky Puffin)
VERSION_CODENAME="lucky"
ID="Ubuntu"
ID_LIKE=debian
HOME_URL="https://www.ubuntu.com/"
SUPPORT_URL="https://help.ubuntu.com/"
BUG_REPORT_URL="https://bugs.launchpad.net/ubuntu/"
PRIVACY_POLICY_URL="https://www.ubuntu.com/legal/terms-and-policies/privacy-policy"
LOGO="https://ubuntu.com/logo"
cherukuru-sravant@cherukuru-sravant:~$
```

Figure 1.1: Linux System Info

2 Encryption and GPG

GNU Privacy Guard (GPG) is a free and open-source tool for encryption, decryption, and digital signatures. It implements the OpenPGP standard and provides both symmetric and asymmetric cryptography.

Generating Keys

```
gpg --full-generate-key  
gpg --list-keys  
gpg --export -a "<your-email>" > publickey.asc
```

Screenshot

```

cherukuru-sravani@cherukuru-sravani-HP-15-6-inch-Laptop-PC: $ gpg --full-generate-key
gpg (GnuPG) 2.4.4; Copyright (C) 2024 g10 Code GmbH
This is free software: you are free to change and redistribute it.
There is NO WARRANTY, to the extent permitted by law.

Please select what kind of key you want:
 (1) RSA and RSA
 (2) DSA and Elgamal
 (3) DSA (sign only)
 (4) RSA (sign only)
 (9) ECC (sign and encrypt) *default*
 (10) ECC (sign only)
 (14) Existing key from card
Your selection? 1
RSA keys may be between 1024 and 4096 bits long.
What keysize do you want? (3072) 4096
Requested keysize is 4096 bits
Please specify how long the key should be valid.
      0 = key does not expire
 <n>  = key expires in n days
 <n>w = key expires in n weeks
 <n>m = key expires in n months
 <n>y = key expires in n years
Key is valid for? (0) 0
Key does not expire at all
Is this correct? (y/N) y

GnuPG needs to construct a user ID to identify your key.

Real name: cherukuru sravani
Email address: sravanicherukuru@gmail.com
Comment: Work key
You selected this USER-ID:
  "cherukuru sravani (Work key) <sravanicherukuru@gmail.com>"

Change (N)ame, (C)omment, (E)mail or (O)key/(Q)uit? 0
We need to generate a lot of random bytes. It is a good idea to perform
some other action (type on the keyboard, move the mouse, utilize the
disks) during the prime generation; this gives the random number
generator a better chance to gain enough entropy.
We need to generate a lot of random bytes. It is a good idea to perform
some other action (type on the keyboard, move the mouse, utilize the
disks) during the prime generation; this gives the random number
generator a better chance to gain enough entropy.
gpg: revocation certificate stored as '/home/cherukuru-sravani/.gnupg/openpgp-revocs.d' created
gpg: public and secret key created and signed.

pub    rsa4096 2025-11-25 [SC]
      8003D89FCC5D11CB3EF34B3312BBB6428673566D
uid            cherukuru sravani (Work key) <sravanicherukuru@gmail.com>
sub    rsa4096 2025-11-25 [E]

cherukuru-sravani@cherukuru-sravani-HP-15-6-inch-Laptop-PC: $

```

Figure 2.1: GPG Key Generation

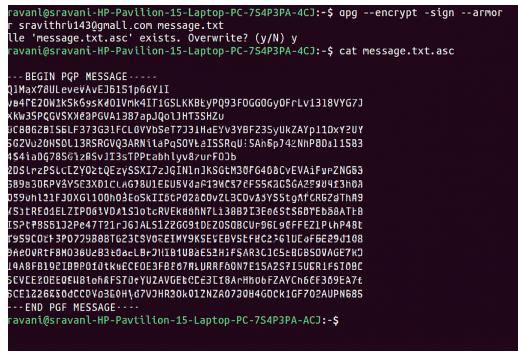
3 Sending Encrypted Email

To ensure privacy and secure communication, I used **GPG encryption** to send an encrypted email. The message was first written in a text file and then encrypted using the recipient's public key. This process ensures that only the intended receiver can decrypt and read the contents. The encrypted output was then copied and sent through my email client safely.

Command Used

```
gpg --encrypt --sign --armor -r <receiver-email> message  
.txt
```

Screenshot



```
ravani@srajan-HP-Pavilion-15-Laptop-PC-7S4P3PA-4C]:-$ gpg --encrypt --sign --armor  
r srajan@ravani143@gmail.com message.txt  
u "Message.txt.asc" exists. Overwrite? (y/n) y  
ravani@srajan-HP-Pavilion-15-Laptop-PC-7S4P3PA-4C]:-$ cat message.txt.asc  
  
-----BEGIN PGP MESSAGE-----  
QIMax7RULevevAveJlR151p6yV1  
/s44FEZD0MksKsK6ssxKd0IVmk4IT1GSLKKBeYpQ93F0G0G0GyDFrLvi318VYG7J  
Khw3SPCGVGSXk63PQVA13B7apJqo1HTSHZu  
uGBB62B15BLF373G31FCLOVbSeT731ldEVy3BF235yuKZAy110xY2UY  
SG2Vu2NS0L13RSRGVQ3ARN11aPjS0V1a1SSRqU5Anh6p742Nhp80119B3  
1541ad97856128svIJ3sTPPtabhly8urFO3  
2D5LrzPSllZYQz1QezysSXIZj2G1n1nJKSGM30FG408cEVAlFurZNGB3  
6B9n30RPV3y5E53X01c1wG7B1UEEU5Vd4f19Mc7CFSSAAC5GA2Z9u443h0A  
059uhi11F30XGl100h03e5x7I6CP02a20v2l3C0vA5ySStgAFGR6Z9Thm9  
/S1tRE01ELZ1P001VD1S10tRVEk4dnN71i38B13E65STS6DPEb8ATB  
ES7tP8BS1J2P647721J3G1ALs12Z6G99DEZ0508CU969yFF21pLhP48t  
r595C003P072988BTG23tsV0eIM9KSEVEVSFHC2c36UeJ6e29J108  
9ae0URTFBMOH03B12B31dcLBjIIIB1u8aEsRHfFSAR31c5sEBGB50VAGE7tK  
1aABFB19c1BPPD10tkvEc0E3FBf07MLURRF00N7E15A257f156R1fSt0B  
5tVE2E0810E0fB10hfKST0YUZAVGEHCE316A-Hm06f2AVC6h6F309EA7t  
SC1226510dCCVg36OHd7VJHR20k01ZN2a07304AGGCK1GF702aUPN685  
-----END PGP MESSAGE-----  
ravani@srajan-HP-Pavilion-15-Laptop-PC-7S4P3PA-4C]:-$
```

Figure 3.1: Encrypted Email Output

4 Five Privacy Tools from PRISM-Break

Below are five privacy-respecting tools selected from prism-break.org.

4.1 Privacy Tools From Prism Break

1. Tor Browser (Web Browsers / Anonymizing Networks)

- **What it is:** A web browser built on Firefox that routes your internet traffic through the Tor network, a volunteer-operated network of relays.
- **Privacy Focus:** Provides **strong anonymity** by obscuring your IP address and location from the websites you visit. It also includes anti-fingerprinting measures.
- **PRISM Break Note:** PRISM Break strongly recommends using Tor Browser for all web surfing when maximum anonymity is required.

2. Debian (Operating Systems)

- **What it is:** A popular and highly ethical GNU/Linux distribution known for its strict adherence to Free Software principles and ethical manifesto.
- **Privacy Focus:** Unlike proprietary operating systems like Windows and macOS (which PRISM Break generally avoids), Debian is fully open-source, allowing for audits. It has a long tradition of software freedom and transparency.

- **PRISM Break Note:** It's recommended as a top GNU/Linux choice for users transitioning from proprietary systems, highlighting its commitment to free software and its stable nature.

3. Thunderbird (Email Clients)

- **What it is:** A free, open-source, and cross-platform email client developed by Mozilla.
- **Privacy Focus:** Thunderbird is the top choice for desktop email due to its open-source nature and its long-standing **native support for OpenPGP** (GPG) encryption and digital signatures. This allows users to easily encrypt and authenticate their emails end-to-end.
- **PRISM Break Note:** It is highly recommended for securely managing email with built-in PGP features.

4. KeePassXC (Password Managers)

- **What it is:** A free, open-source, and cross-platform password manager.
- **Privacy Focus:** It stores all your passwords in a single, highly encrypted database file that is stored **locally** on your device, giving you total control over your sensitive data. It does not rely on a cloud service.
- **PRISM Break Note:** It is preferred for its strong encryption, open-source license, and local-only storage, minimizing exposure to third-party services.

5. Firefox (Web Browsers)

What it is: A fast, flexible, and secure web browser developed by the non-profit Mozilla Foundation.

Privacy Focus: Firefox is open-source and provides extensive privacy controls, including enhanced tracking protection (ETP), container technology, and a robust add-on ecosystem for further hardening security (like uBlock Origin).

PRISM Break Note: While Tor Browser is for anonymity, Firefox is the recommended alternative for general web use when a site doesn't work well with Tor, provided the user configures its settings and replaces the default search engine with a privacy-focused one.

5 Open Source License Used

I used the **GNU GENERAL PUBLIC LICENSE** license for my project.

Why This License?

- Allows anyone to use, modify, and distribute.
- Encourages open collaboration.
- Compatible with open-source communities.

License Text

Open Source License Certainly. Here is the information about the **GNU General Public License (GPL)** organized into clear, descriptive headings, strictly maintaining a paragraph-only format within each section.

5.0.1 The Core Purpose and Classification

The GNU General Public License (GPL), developed by the Free Software Foundation (FSF) under the leadership of Richard Stallman, is one of the most influential and widely used open-source licenses in the world. The core purpose of the GPL is to guarantee end-users the essential software freedoms: the freedom to run, study, share, and modify the software. It is formally classified as a **strong copyleft license**, meaning any distributed derivative work must also be licensed under the GPL. This copyleft mechanism ensures that improvements and modifications remain free for all users, preserving the long-term openness and accessibility of the software ecosystem.

5.0.2 Granted Rights and Permissions

The GPL grants users comprehensive rights to copy, modify, distribute, and run the software for any purpose, without restriction. Users can access and change the source code, integrate it into their own projects, and even distribute modified versions, provided they comply with the copyleft rules. These permissions promote collaborative improvement and foster a global community dedicated to maintaining free and open software. Unlike permissive licenses, however, the GPL ensures that any redistributed work that incorporates GPL code must also remain open-source, maintaining an unbroken chain of software freedom.

5.0.3 The Conditions and Copyleft Requirements

The GPL introduces more rigorous conditions than permissive licenses, designed to uphold its philosophy of software freedom. The most important condition is the requirement that any derivative or redistributed version of GPL-licensed software must also be licensed under the **same GPL license**, including the obligation to release the complete corresponding source code. When distributing binaries or modified versions, distributors must make the source code available in an accessible form. Additionally, the license text and original copyright notice must be included with every distribution. These copyleft conditions ensure that all improvements remain free and that no one can take GPL-licensed software and turn it into proprietary software.

5.0.4 Disclaimer of Warranty and Liability

Like most open-source licenses, the GPL includes a strong disclaimer of warranty to protect authors from legal liability. The software is provided “**AS IS**”, without any express or implied warranties, including merchantability, fitness for a particular purpose, or non-infringement. The license clarifies that the authors and copyright holders cannot be held responsible for damages, losses, or legal claims arising from the use, modification, or distribution of the software. This places the responsibility of use entirely on the recipient, ensuring that developers can contribute freely without fear of legal repercussions.

6 Self-Hosted Server

I self-hosted the service: **CalDAV , CardDAV Server.**

About the Service

CalDAV and CardDAV are open-standard server technologies widely used for synchronizing personal data such as calendars and contacts across multiple devices. They were developed to provide a platform-independent and vendor-neutral method of managing digital information without depending on proprietary services. These protocols allow organizations and individuals to host their own data securely, making them popular in self-hosted environments, open-source systems, and privacy-focused platforms. The working mechanism of CalDAV and CardDAV is straightforward. A server stores the user's calendar or contact information, and devices connect to it using secure login credentials. Whenever changes are made—such as adding a new event, editing a phone number, or deleting a contact—the server updates the information and synchronizes it across every connected device. This bi-directional synchronization ensures consistency and reliability.

Installation Commands

```
sudo apt update
sudo apt install apache2 mariadb-server libapache2-mod-
    php \
    php-mysql php-zip php-dom php-curl php-xml php-gd \
    php-simplxml php-mbstring php-ftp php-intl php-bcmath
    php-gmp
sudo mysql -u root -p
```

```

cd /var/www/
sudo wget https://download.nextcloud.com/server/releases
    /latest.zip
sudo apt install unzip
sudo unzip latest.zip
sudo chown -R www-data:www-data nextcloud/
sudo a2enmod rewrite
sudo systemctl restart apache2
sudo apt update
sudo apt install apache2 php php-sqlite3 php-curl php-
    mbstring unzip git
cd /var/www/
sudo git clone https://github.com/sabre-io/Baikal.git
sudo chown -R www-data:www-data Baikal/
sudo a2enmod rewrite
sudo systemctl restart apache2
sudo apt update
sudo apt install radicale
sudo systemctl enable radicale
sudo systemctl start radicale
/etc/radicale/config

```

Screenshot

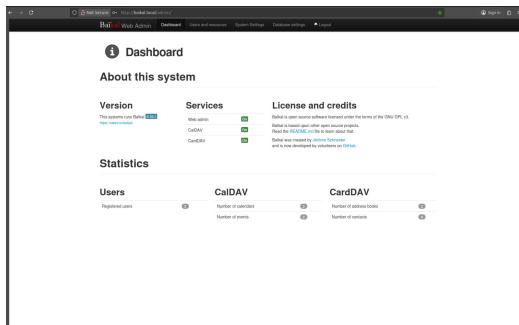


Figure 6.1: Self Hosted Server Running

Localized Document (Translated)

Self Hosting Localized document: Self Hosting

Poster

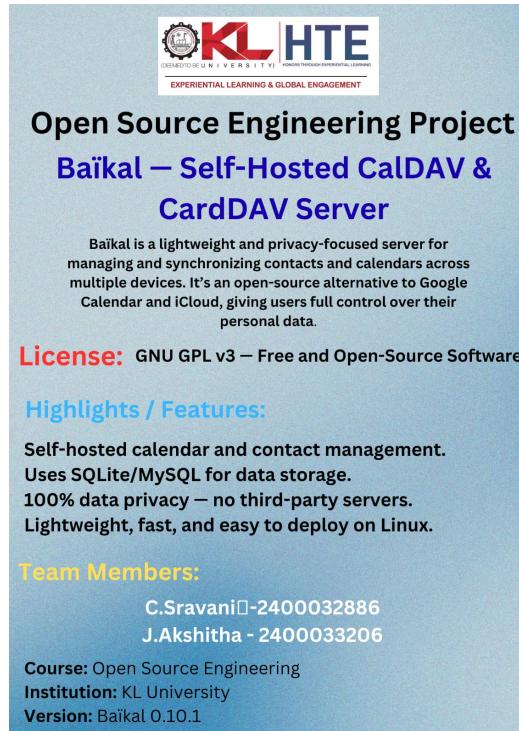


Figure 6.2: Poster

7 Open Source Contributions (PRs)

Below are the open-source contributions I made.

PR 1

Issue Solved: Required to convert the alt text from English to Egyptian Spanish . **Fix Made:** Changed the text in README.md file. **Status:** Merged

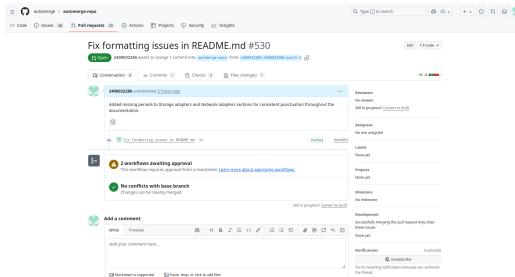


Figure 7.1: Issue for PR1

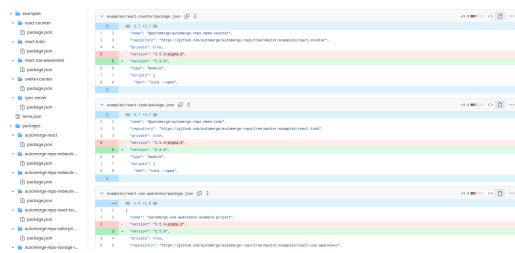


Figure 7.2: Code Changes for PR1

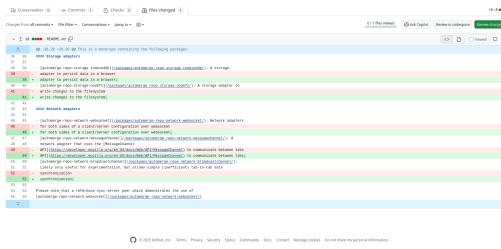


Figure 7.3: PR1 Merge Status

PR 2

Issue Solved: Required to update phrasing based on review. **Fix Made:** updated phrasing based on review. **Status:** Merged

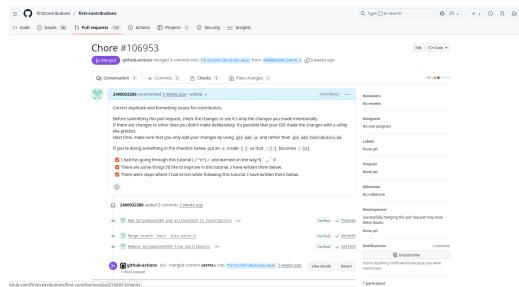


Figure 7.4: Code Changes for PR2

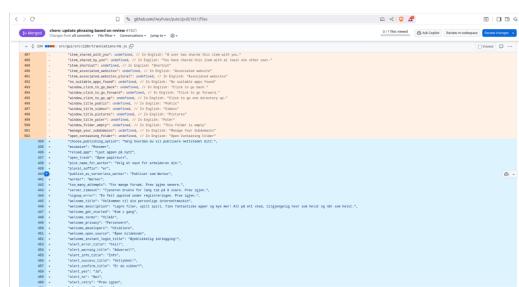


Figure 7.5: PR2 Merge Status

PR 3

Issue Solved: Required to Add MIT license badge to README. **Fix Made:** Added MIT license badge to README. **Status:** Merged

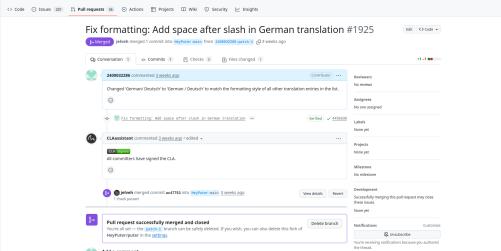


Figure 7.6: Code Changes for PR3

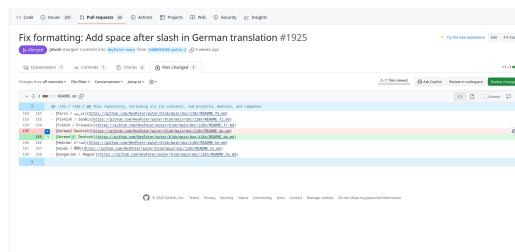


Figure 7.7: PR3 Merge Status

PR 4

Issue Solved: Required to Fix typo in README - change 'exprience' to 'experience'. **Fix Made:** Fixed typo in README - change 'exprience' to 'experience'. **Status:** Merged

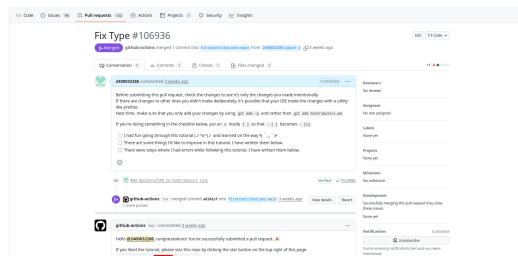


Figure 7.8: Code Changes for PR4

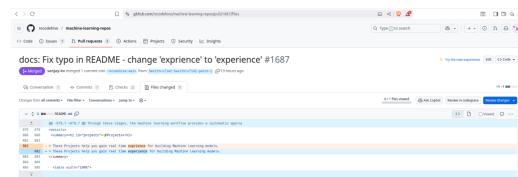


Figure 7.9: PR4 Merge Status

8 LinkedIn Posts

Below are the links to the required posts:

- **Self Hosting Post:** [Click Here](#)
- **PR Merge Post:** [Click Here](#)
- **Blog Post:** [Click Here](#)

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