



Bansilal Ramnath Agarwal Charitable Trust's  
**Vishwakarma Institute of Technology**

(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Department of Computer Engineering

# Major Project NEXUS



**Guide: Prof. (Dr.) Sandip Shinde**

Group Number: 18



Bansilal Ramnath Agarwal Charitable Trust's

# Vishwakarma Institute of Technology

(An Autonomous Institute affiliated to Savitribai Phule Pune University)

Department of Computer Engineering

Name	Class	Roll Number	GR. Number
Aniruddha Kulkarni	CS-B	10	11910240
Shreyas Habade	CS-B	01	11910447
Niharika Rathi	CS-C	09	11910555
Anushka Shinde	CS-D	09	11910334

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## Nexus

(A software authentication checker tool for computer networks)

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- Domain: Smart Systems, Computer Networks
- Technology:
  - Python3,
  - REST API Development,
  - Shell Scripting,
  - Networking Fundamentals
  - Database Integration

# Problem Statement

Users might sometimes install applications from untrustworthy sources which might unknowingly cause piracy.

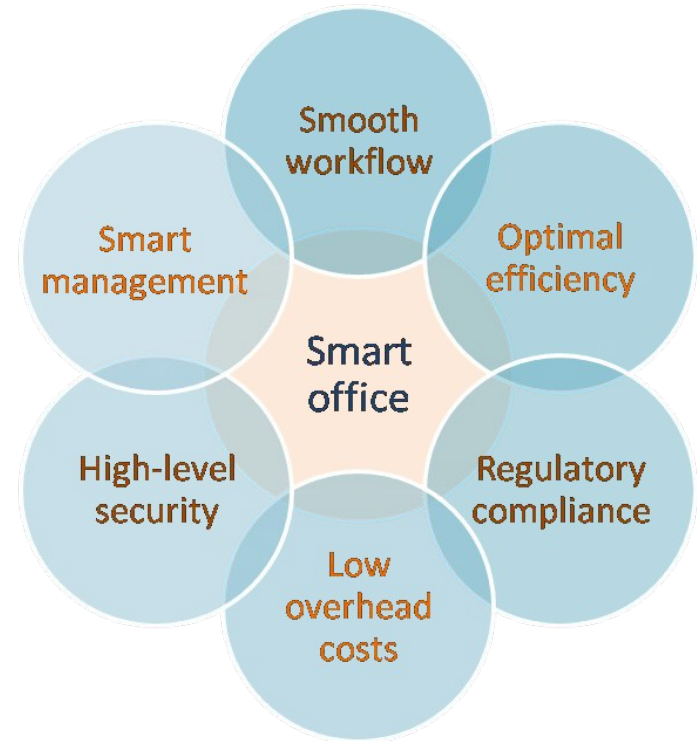
Third party applications might not always comply with the prerequisites set by an operating system.

***The proposed system hopes to monitor the devices on a network by keeping a track of authentic/un-authentic applications.***

# Project Objective

- To create a novel system that on a network of computers keeps a track of all devices their details and any applications that might not comply with operating system standards.
- The proposed system will:
  - Register users into the system
  - Help users to login to computers and push device data into an API hosted online
  - The system will also on windows and unix based systems keep a track of applications on basis of their authenticity.

- Smart Management Systems: The “SMART” in Smart Management systems refers to criteria for setting goals and objectives, namely that these goals are:  
Specific, Measurable, Attainable, Relevant, and Time-bound.



- Network Management Systems: A network management system, or NMS, is an application or set of applications that lets network engineers manage a network's independent components inside a bigger network management framework and performs several key functions.





1. In the thesis paper (Software Licensing Analysis Tool, Tomáš Radej, 2013 ([link](#))), Tomáš Radej has explained about the problems faced for detection and scanning of open licenses.
2. In the research paper (Comparison of Open Source License Scanning Tools, Hailing Zhang ([Link](#))), authors have provided insights for popular FOSS (Free and Open Source Software) license scanning tools.
3. In the paper (Automated software license analysis, Timo Tuunanen, Jussi Koskinen & Tommi Kärkkäinen, 2009 ([link](#))), authors have described an automated approach for OSS(Open source software) license analysis.

- **Python3**
- **Shell Scripting**
- **REST API Development**
- **API Hosting (GitHub → Heroku)**
- **GUI Design & Development**
- **Database Management**

## Progress Report

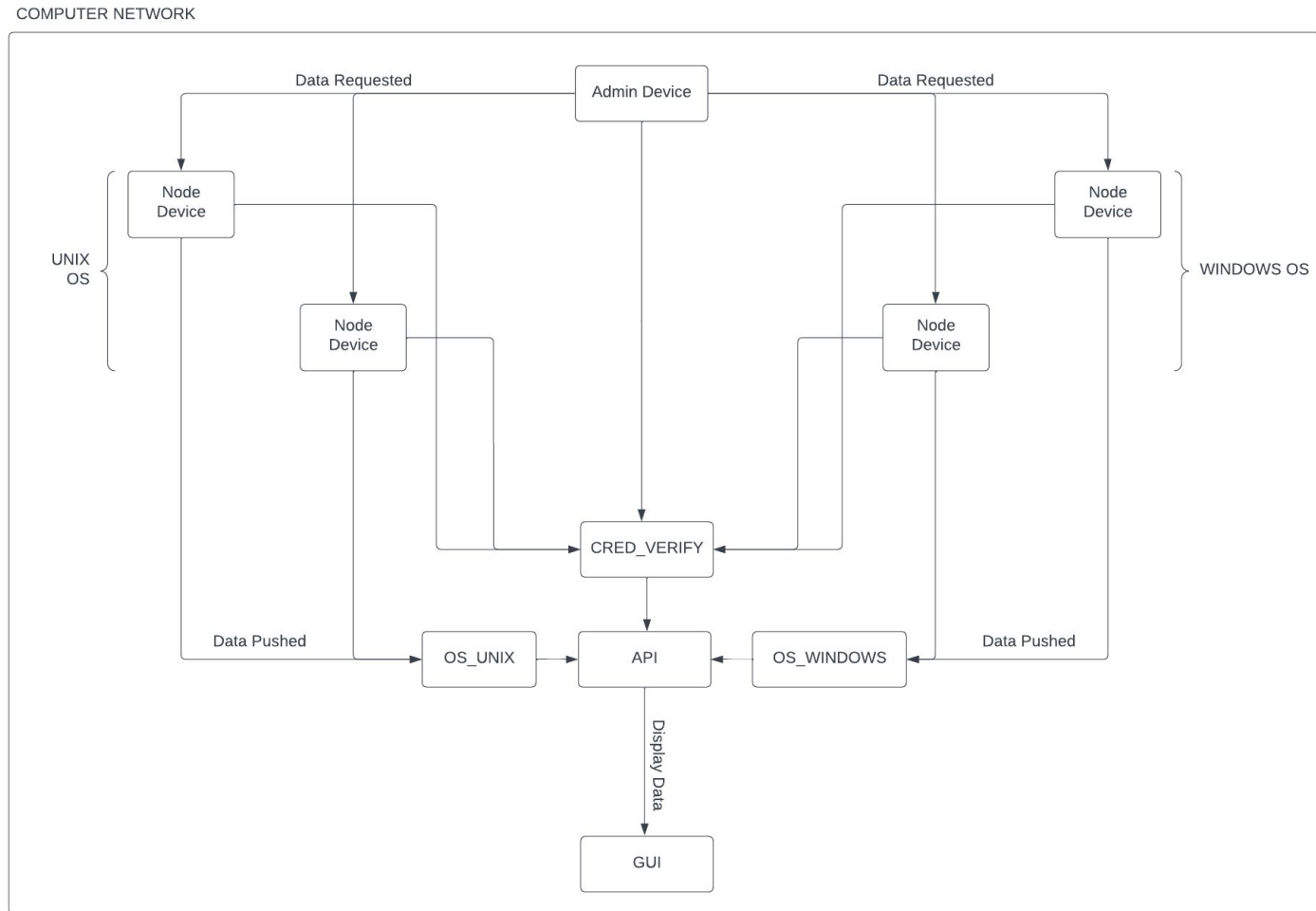
### Before mid-semester examination

- Project flow complete
- Technologies finalised
- API bridge flow with database connectivity ideated
- MAC/IP networking codes ready for deployment

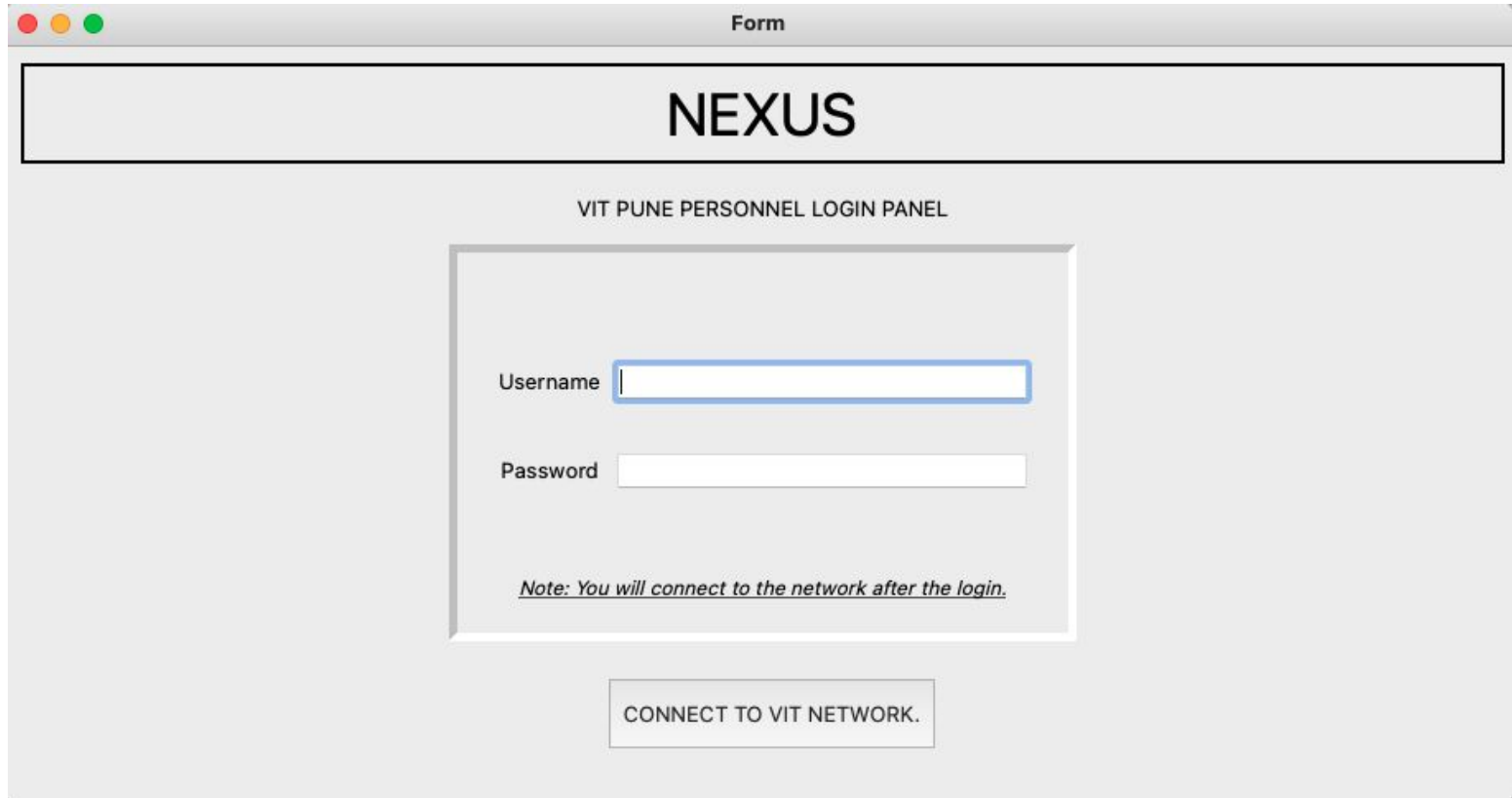
### Before end-semester examination

- Project Deployment
- Project testing on various operating systems
- Project completion
- Documentation

- Flow for the system



- Graphical User Interface created



Form

## NEXUS

VIT PUNE PERSONNEL LOGIN PANEL

Username

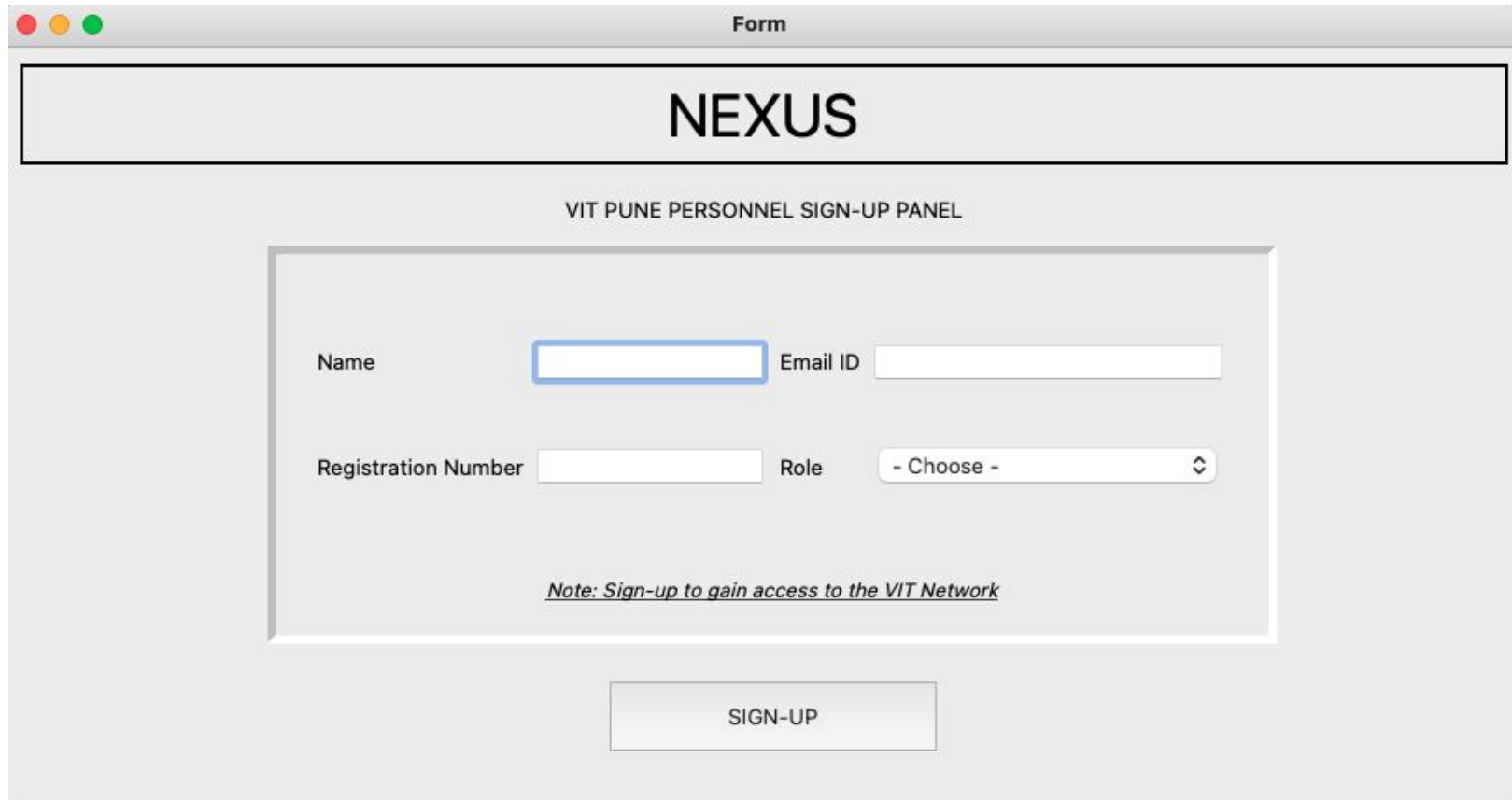
Password

*Note: You will connect to the network after the login.*

CONNECT TO VIT NETWORK.

GUI created using Python & PyQt5

- Graphical User Interface created



Form

## NEXUS

VIT PUNE PERSONNEL SIGN-UP PANEL

Name  Email ID

Registration Number  Role

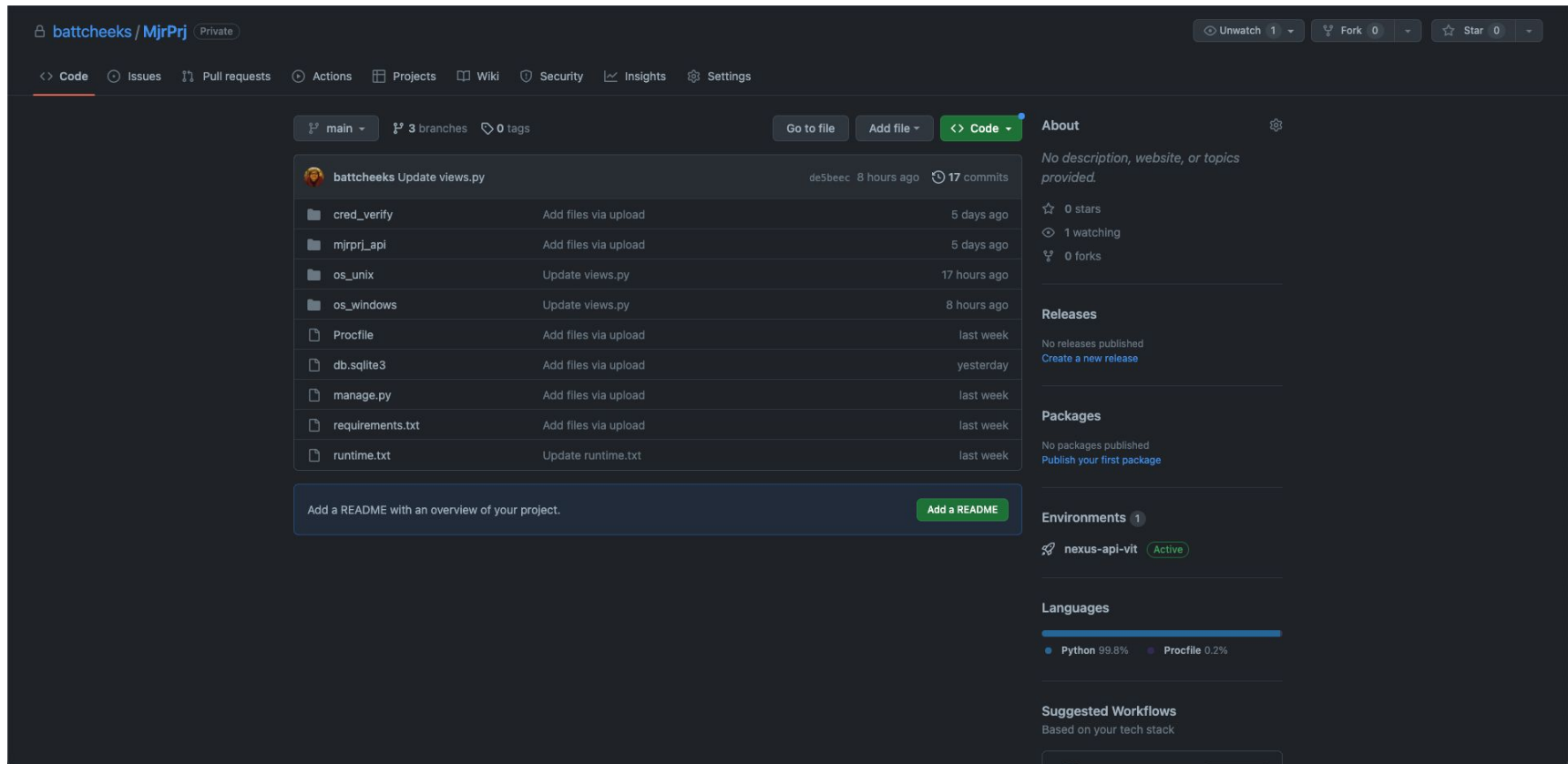
*Note: Sign-up to gain access to the VIT Network*

SIGN-UP

GUI created using Python & PyQt5

# Results

- API created using **Django** → **GitHub** → **Heroku Pipeline**



The screenshot shows a GitHub repository page for 'battcheeks / MjrPrj'. The repository is private and has 3 branches and 0 tags. The main branch is selected. The file list shows the following files and their last update times:

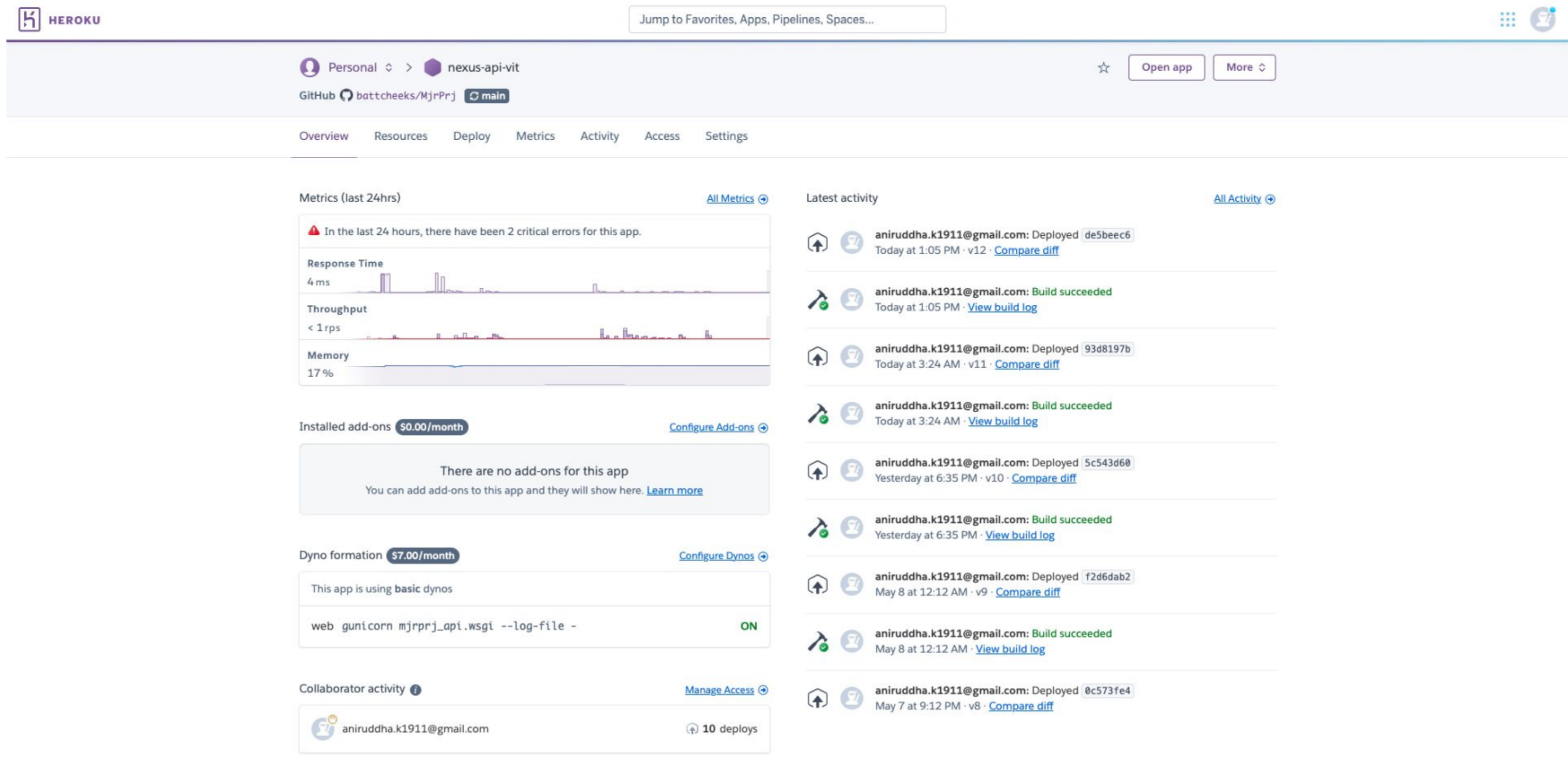
File	Update	Time
cred_verify	Add files via upload	5 days ago
mjrprj_api	Add files via upload	5 days ago
os_unix	Update views.py	17 hours ago
os_windows	Update views.py	8 hours ago
Procfile	Add files via upload	last week
db.sqlite3	Add files via upload	yesterday
manage.py	Add files via upload	last week
requirements.txt	Add files via upload	last week
runtime.txt	Update runtime.txt	last week

The repository also has a README section with a button to 'Add a README'. On the right side, there are sections for 'About', 'Releases', 'Packages', 'Environments', 'Languages', and 'Suggested Workflows'. The 'Languages' section shows a bar chart with Python at 99.8% and Procfile at 0.2%.

API Files stored on GitHub

# Results

- API created using **Django** → **GitHub** → **Heroku Pipeline**



Heroku app connected to GitHub Repository



# Results

- API created using **Django** → **GitHub** → **Heroku Pipeline**

Django administration

Home » Os\_Unix » O s\_unixes » OS\_UNIX object (6)

WELCOME, VIT\_ADMIN. [VIEW SITE](#) / [CHANGE PASSWORD](#) / [LOG OUT](#)

**Change o s\_unix**

**OS\_UNIX object (6)** [HISTORY](#) [VIEW ON SITE](#)

Username:

Computer name:

Os version:

Serial number:

Build version:

Hardware uuid:

Provisioning uuid:

Hostname:

Ip address:

Mac address:

Softwares Installed:

Software count:

Authentic software count:

Unauthentic software count:

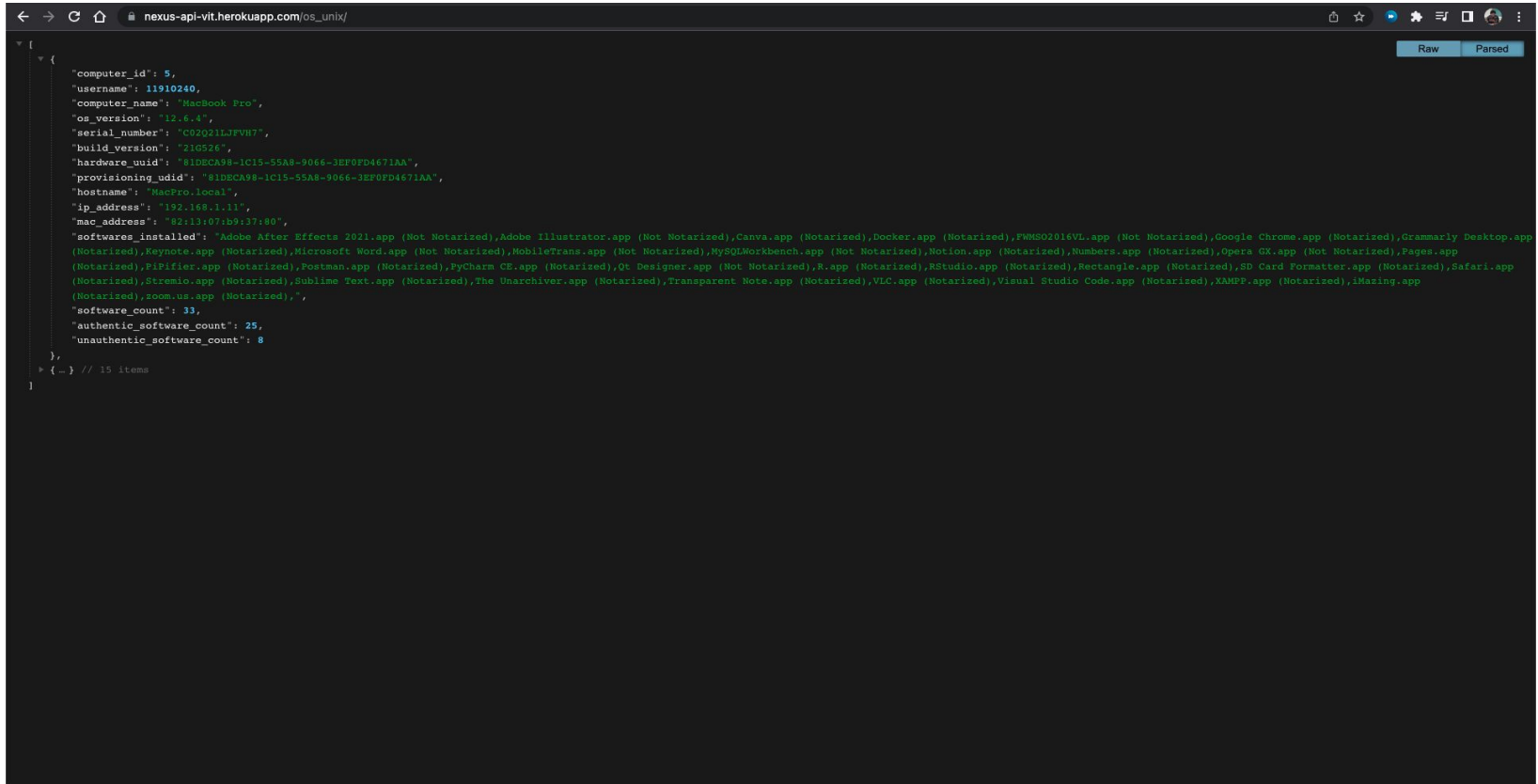
[Delete](#) [Save and add another](#) [Save and continue editing](#) [SAVE](#)

API Hosted Successfully

<https://nexus-api-vit.herokuapp.com/>

# Results

- API created using **Django** → **GitHub** → **Heroku Pipeline**



```

{
  "computer_id": 5,
  "username": "11910240",
  "computer_name": "MacBook Pro",
  "os_version": "12.6.4",
  "serial_number": "C07021LJFVW7",
  "build_version": "21G526",
  "hardware_uuid": "81DECA98-1C15-55A8-9066-3E90FD4671AA",
  "provisioning_uuid": "81DECA98-1C15-55A8-9066-3E90FD4671AA",
  "hostname": "MacPro.local",
  "ip_address": "192.168.1.11",
  "mac_address": "82:11:07:b9:37:80",
  "softwares_installed": "Adobe After Effects 2021.app (Not Notarized), Adobe Illustrator.app (Not Notarized), Canva.app (Notarized), Docker.app (Notarized), FWMISO2016VL.app (Not Notarized), Google Chrome.app (Notarized), Grammarly Desktop.app (Notarized), Keynote.app (Notarized), Microsoft Word.app (Not Notarized), MobileTrans.app (Not Notarized), MySQLWorkbench.app (Not Notarized), Notion.app (Notarized), Numbers.app (Notarized), Opera GX.app (Not Notarized), Pages.app (Notarized), PiPifier.app (Notarized), Postman.app (Notarized), PyCharm CE.app (Notarized), Ot Designer.app (Not Notarized), R.app (Notarized), RStudio.app (Notarized), Rectangle.app (Notarized), SD Card Formatter.app (Notarized), Safari.app (Notarized), Streamio.app (Notarized), Sublime Text.app (Notarized), The Unarchiver.app (Notarized), Transparent Note.app (Notarized), VLC.app (Notarized), Visual Studio Code.app (Notarized), XAMPP.app (Notarized), iMazing.app (Notarized), zoom.us.app (Notarized),",
  "software_count": 33,
  "authentic software_count": 25,
  "unauthentic software_count": 8
},
> { - } // 15 items

```

Data pushed into the API

<https://nexus-api-vit.herokuapp.com/>

# Results

- Details fetched for a UNIX system

Form

NEXUS

ADMIN DEVICE DATA

Computer Name

MacBook Pro

OS Version

12.6.4

Serial Number

C02Q21LJFVH7

Build Version

21G526

UUID/UDID

81DECA98-1C15-58

Hostname

MacPro.local

IP Address

192.168.1.11

MAC Address

82:13:07:b9:37:80

Notarized Applications

Canva

Docker

Google Chrome

Grammarly Desktop

Keynote

Notion

Numbers

Pages

PiPifier

Un-Notarized Applications

Adobe After Effects 2021

Adobe Illustrator

FWMSO2016VL

Microsoft Word

MobileTrans

MySQLWorkbench

Opera GX

Qt Designer

Software Count

33

Authorized Applications

25

Un-Authorized Applications

8

Fetches data for a UNIX System

# Results

- Details fetched for a Windows system

Form

NEXUS

FETCHED WINDOWS DATA FOR DEVICE NODE

Username

11910447

Computer Name

shrh18

Product Key

00327-35851-42301-AAOEM

Hostname

shrh18

IP Address

192.168.0.102

MAC Address

83:8d:1b:31:5d:98

Authentic Applications

Android Studio

Docker Desktop

Git

Intel® Hardware Accelerated Execution Manager

Microsoft Office Home and Student 2019 - en-us

Microsoft 365 Apps for enterprise - en-us

Microsoft OneDrive

Quick Heal Total Security

Un-Authentic Applications

HP LaserJet Professional P1100-P1560-P1600 Series

Arduino

GnuWin32: Flex version 2.5.4a

heroku

Kubernetes - Minikube - A Local Kubernetes Development Environment

Microsoft Edge Update

Windows 11 Installation Assistant

Send ALERT Email

Software Count

50

Authorized Applications

42

Un-Authorized Applications

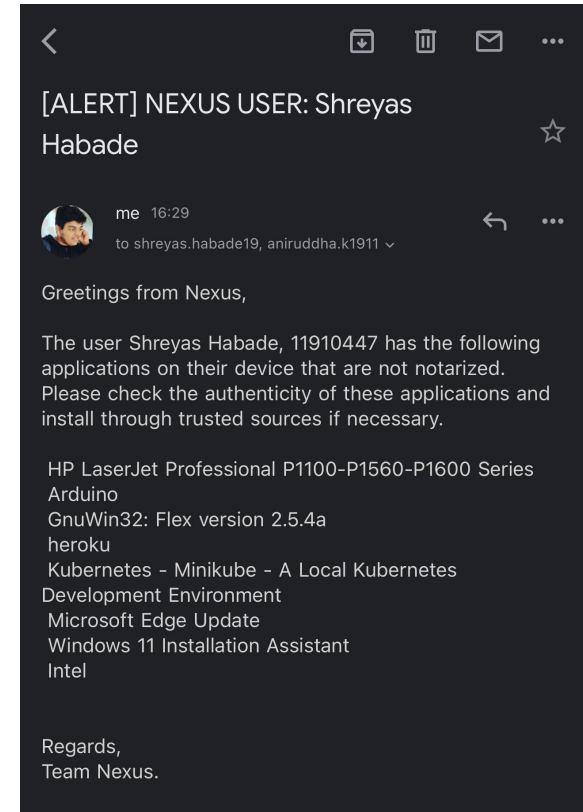
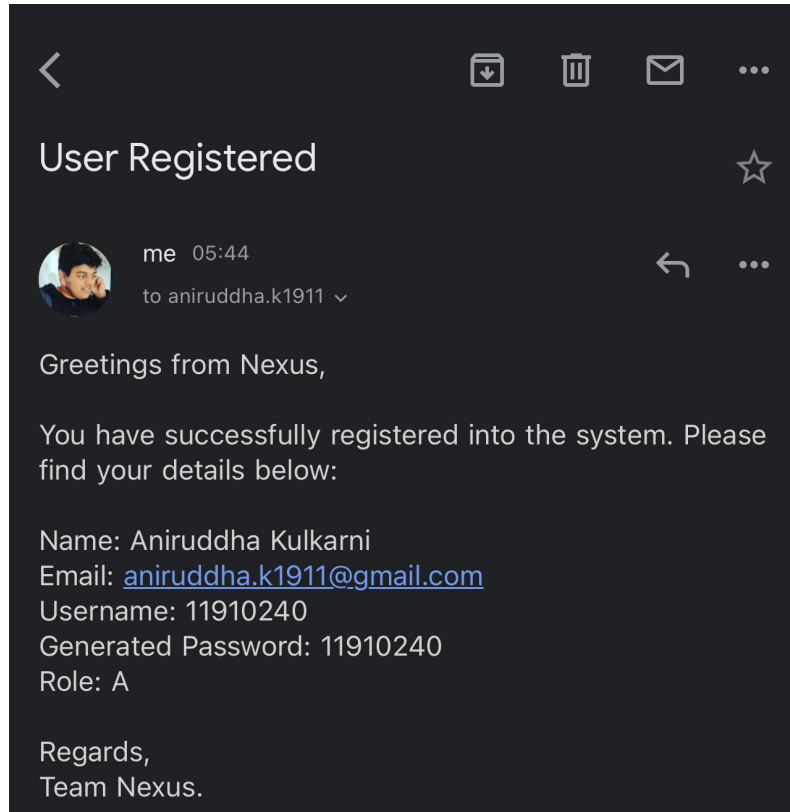
8

Fetches data for a Windows System

Vishwakarma Institute of Technology

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- Email Notification System set-up



Mail Notification Chain to Admin & Node Devices

- Software Licensing Analysis Tool, Tomáš Radej, 2013 ([link](#))
- Comparison of Open Source License Scanning Tools, Hailing Zhang ([Link](#))
- Automated software license analysis, Timo Tuunanen, Jussi Koskinen & Tommi Kärkkäinen, 2009 ([link](#))
- <https://www.geeksforgeeks.org/build-an-application-to-search-installed-application-using-python/>
- <https://cryptolens.io/2019/01/python-code-for-software-licensing/>

**Thank You**