RWANDA POLYTECHNIC

KARONGI COLLEGE

Project Title: One Click Partition Creator and Storage Manager

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Course Instructor:

Submission Date:…/…../2025

1. Introduction

The **OneClick System** is a LAN-based storage partition management platform designed to simplify disk management tasks for administrators and authorized users within a local network. The system provides features for creating, modifying, and managing storage partitions across multiple machines, while also supporting **offline operation** and **automatic synchronization** through a centralized local server database.

The system was developed to address critical challenges in managing distributed machines, ensuring secure data consistency, and enabling administrators to control devices from a central environment efficiently.

2. Project Objectives

The primary objectives that guided the system's design, development, and testing were:

- To design and implement a **LAN-based storage partition manager** that works offline and synchronizes data locally.
- To enable administrators to create, modify, and manage partitions on both their own and users' machines within the LAN.
- To allow users to create and manage partitions on their own machines and other authorized devices on the same network.
- To ensure data consistency through a centralized **Local Server (XAMPP/MySQL)** database.
- To implement a secure **one-click cloud backup** triggered only by administrators when internet access is available.
- To provide a user-friendly interface for both admins and users to simplify complex storage management tasks.

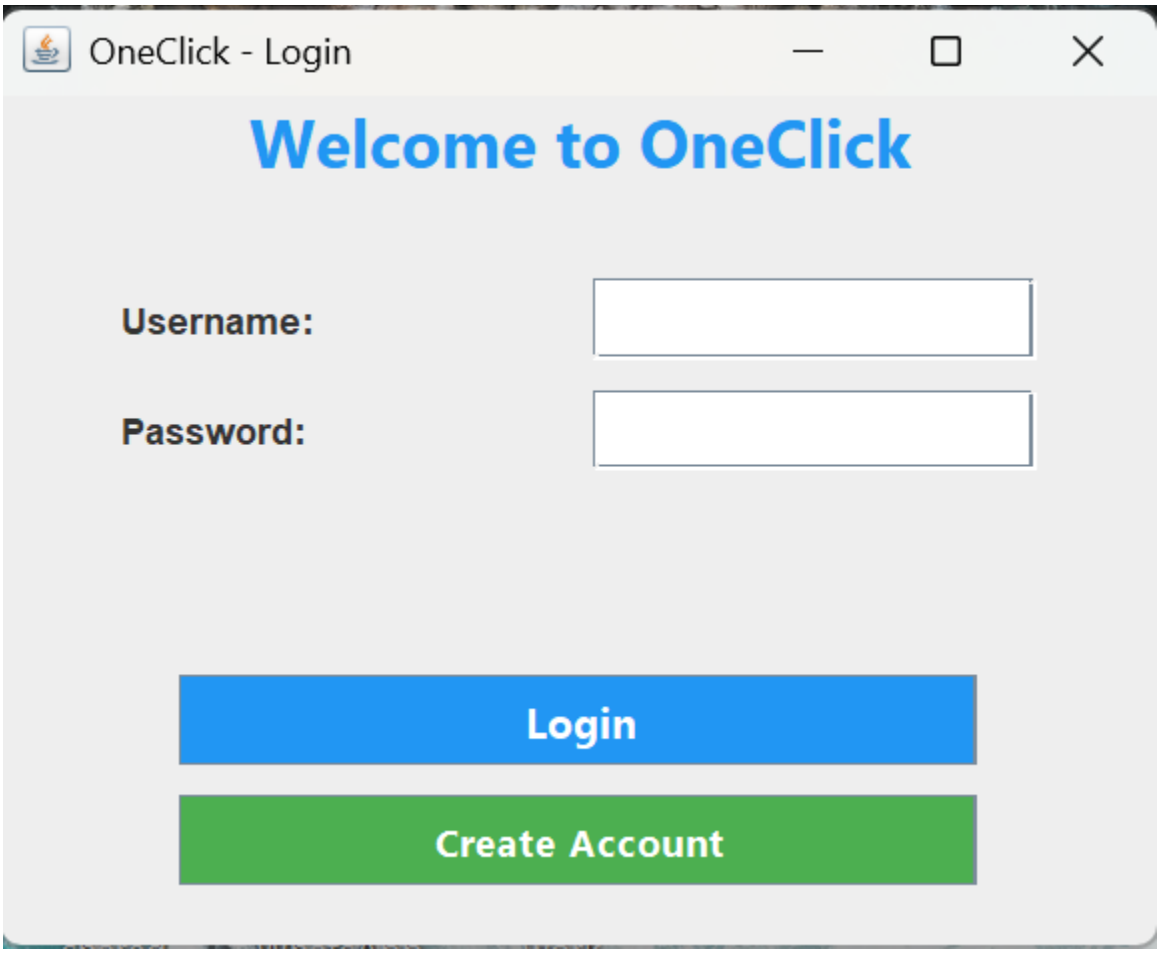
3. System Architecture

The OnClick System follows a **Client–Server architecture** with the following key components:

a) Frontend Interface

- Built as a lightweight user interface allowing admins and users to access system functionality.

- Designed for simplicity and ease of use.



b) Backend Logic

- Developed in **Java** (server-side/desktop logic) to manage core system functions.
- Handles CRUD (Create, Read, Update, Delete) operations for partitions, machines, users, and logs.

c) Centralized Database

- **Local Server (XAMPP/MySQL)** was used to store:
    - User accounts and roles
    - Machine configurations and details
    - Partition specifications and history
    - Activity logs
- Ensures data synchronization and consistency across the LAN.

d) LAN Connectivity

- The system is specifically engineered to function **offline** inside the Local Area Network.
- All connected client devices communicate with the central server using standard local network protocols.

e) One-Click Cloud Backup

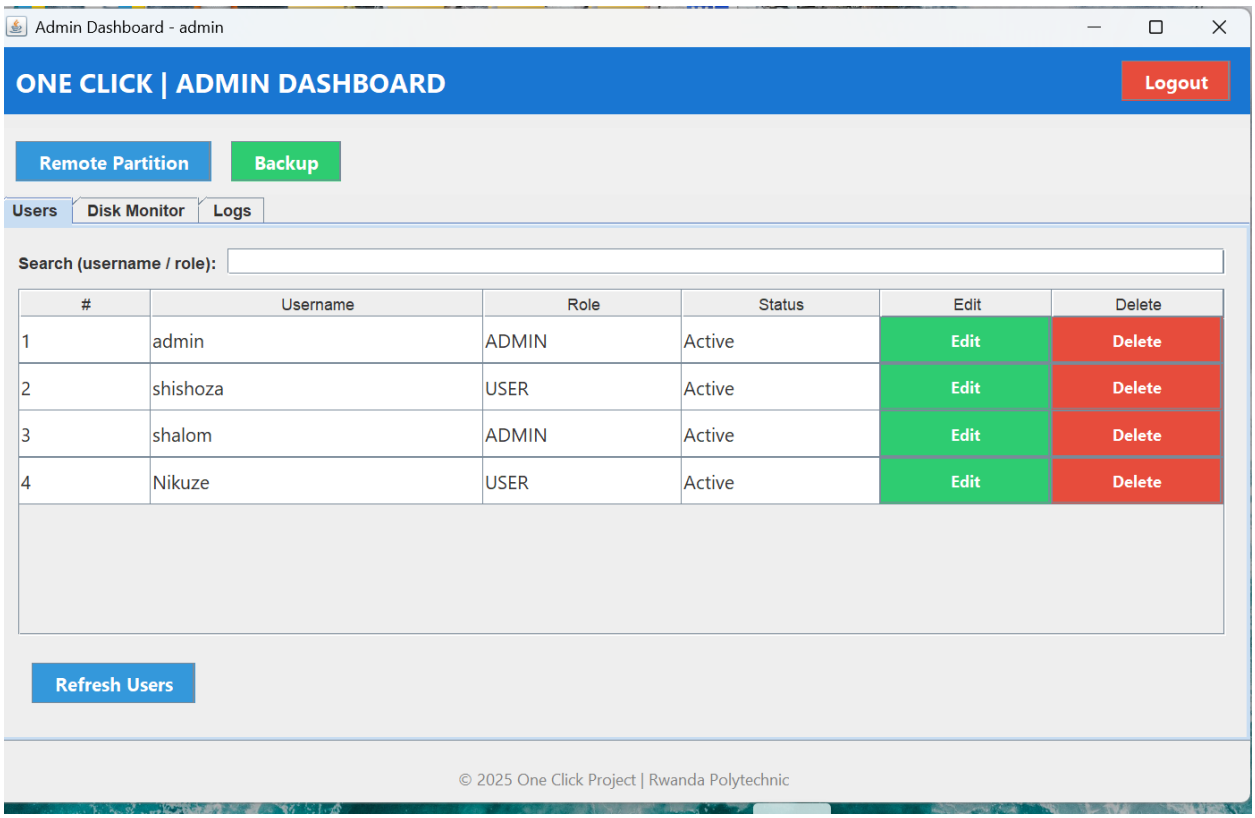
- Backup is a manual, admin-only function performed only when internet connectivity is detected.
- Designed to protect critical system data by uploading snapshots to a designated cloud service.

4. System Modules and Implementation

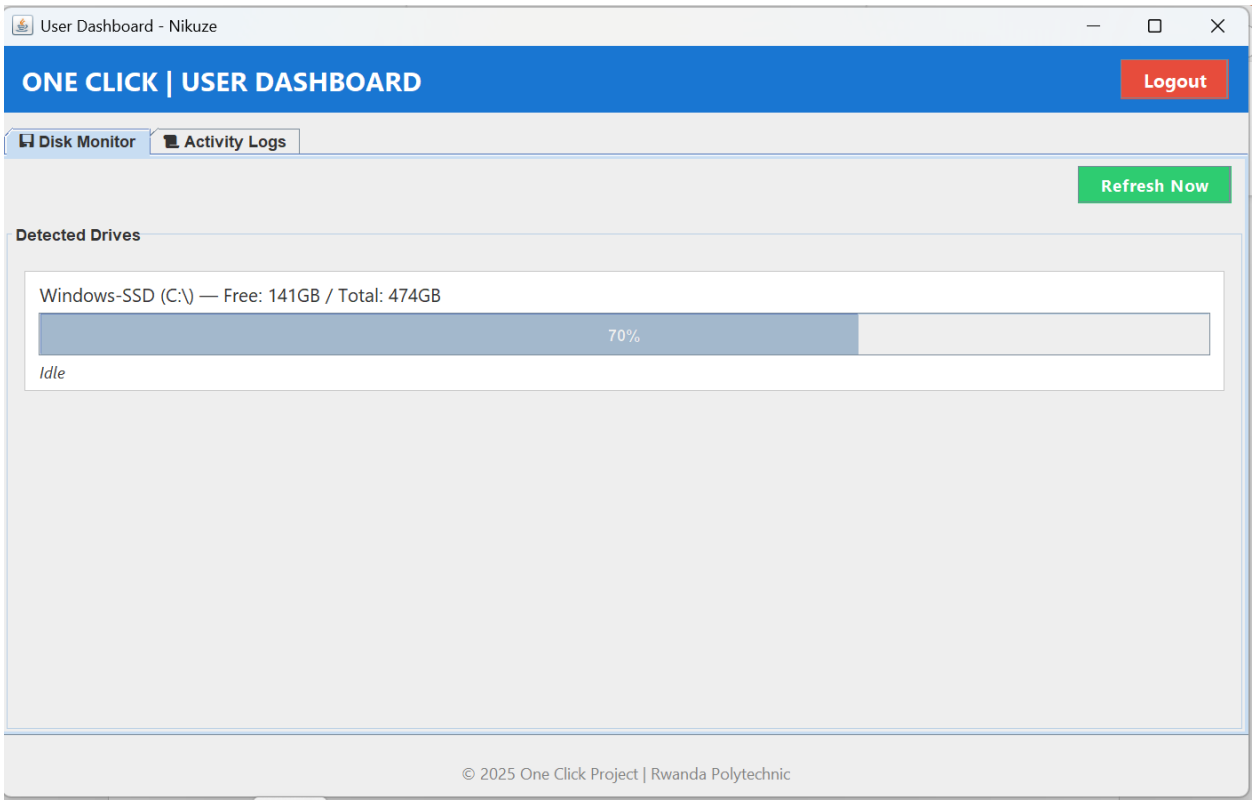
The system was divided into distinct modules for efficient development and testing:

4.1 User Management Module (Developed by Gilbert)

- **Roles: Admin** (Full control over users , back up and see logs)



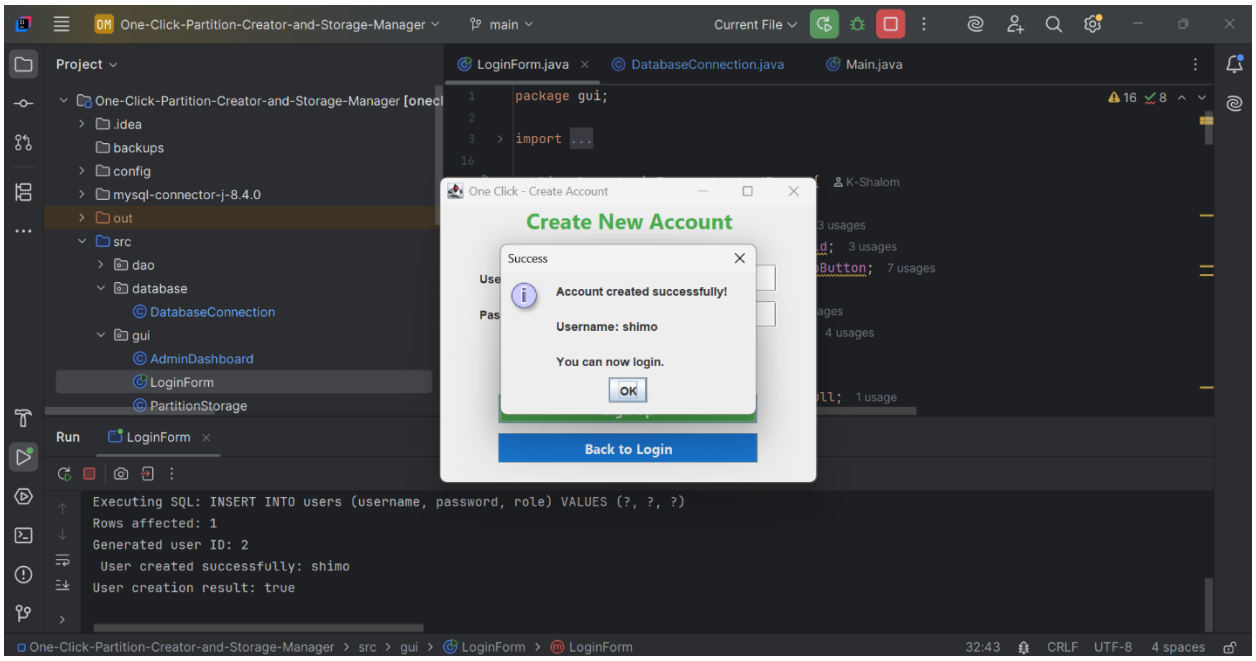
- **User** (Limited control to their own machines just make Partitions only.).



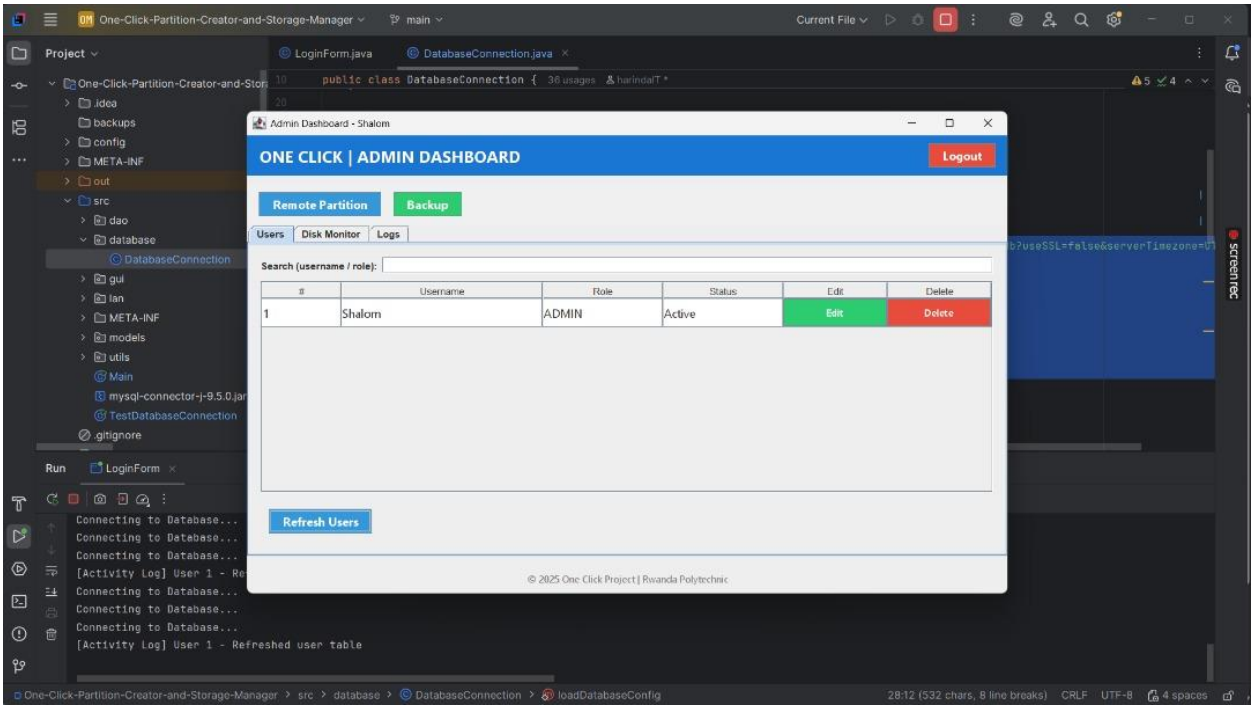
- Data validation and secure authentication mechanisms were implemented.

4.2 Machine Management Module (Developed by Shalom)

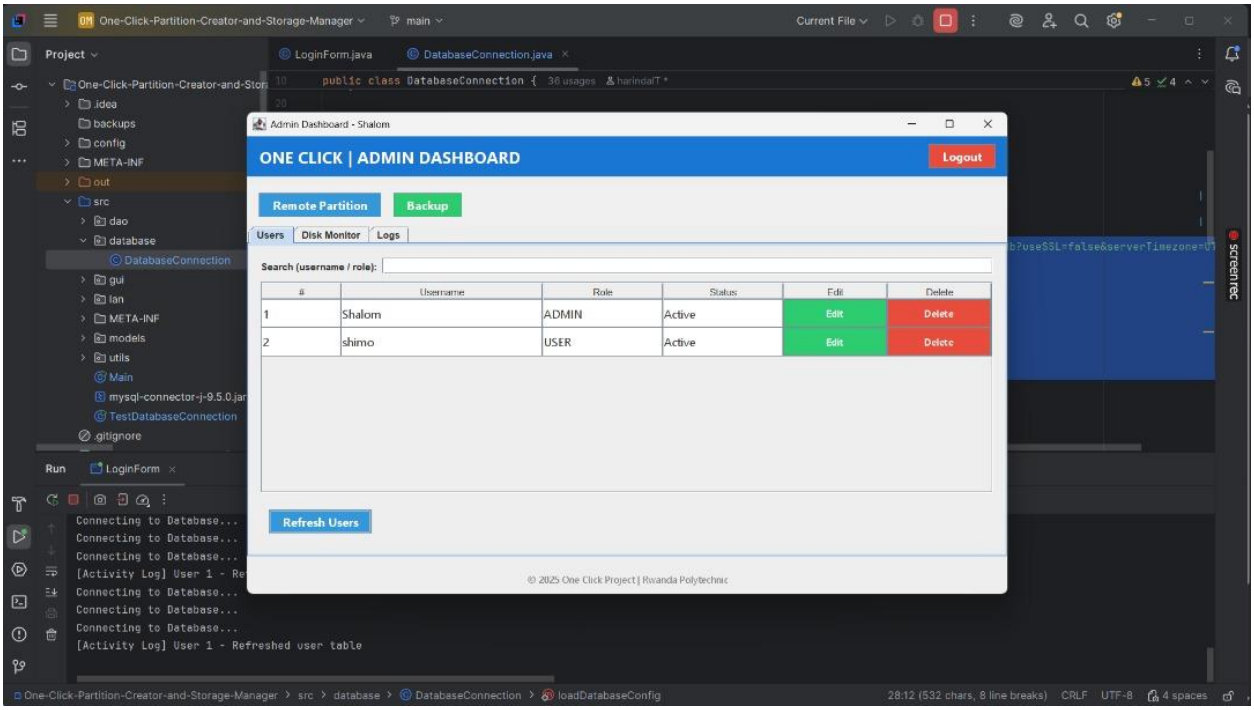
- Allows registration and tracking of machines connected to the LAN.
- User registered :



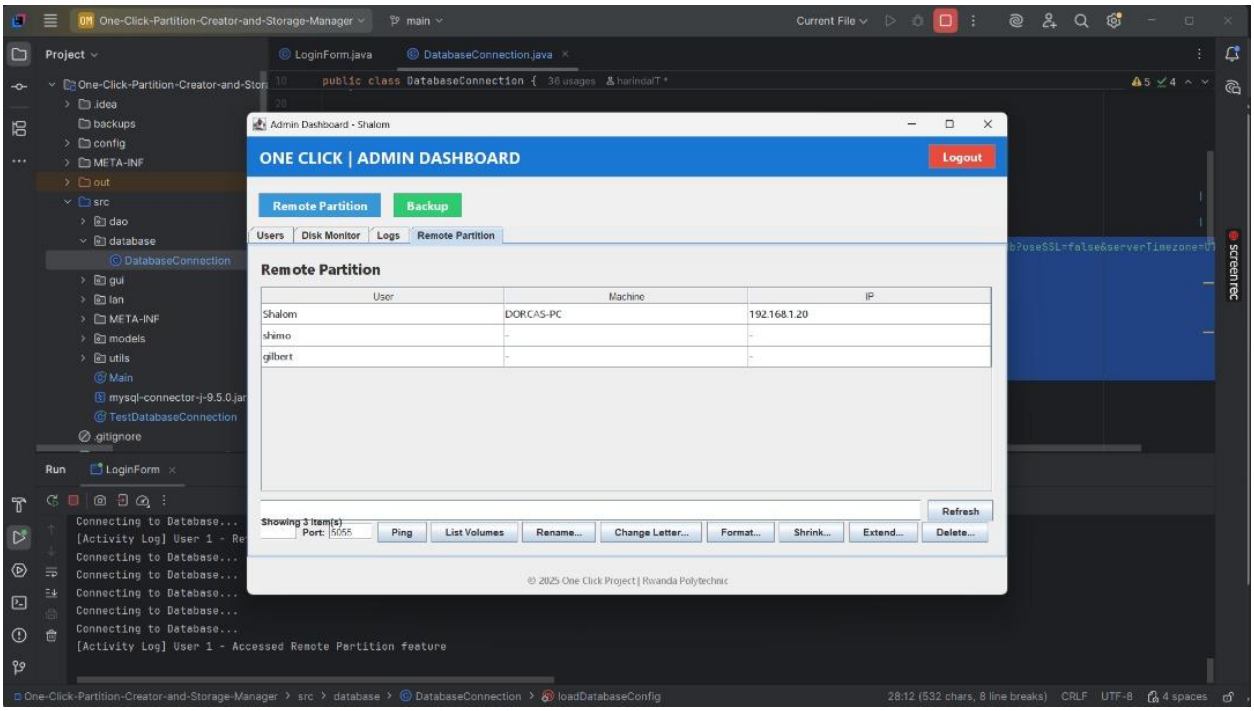
- And admin directly sees the new user on his dashboard
- Before other user:



After other user:



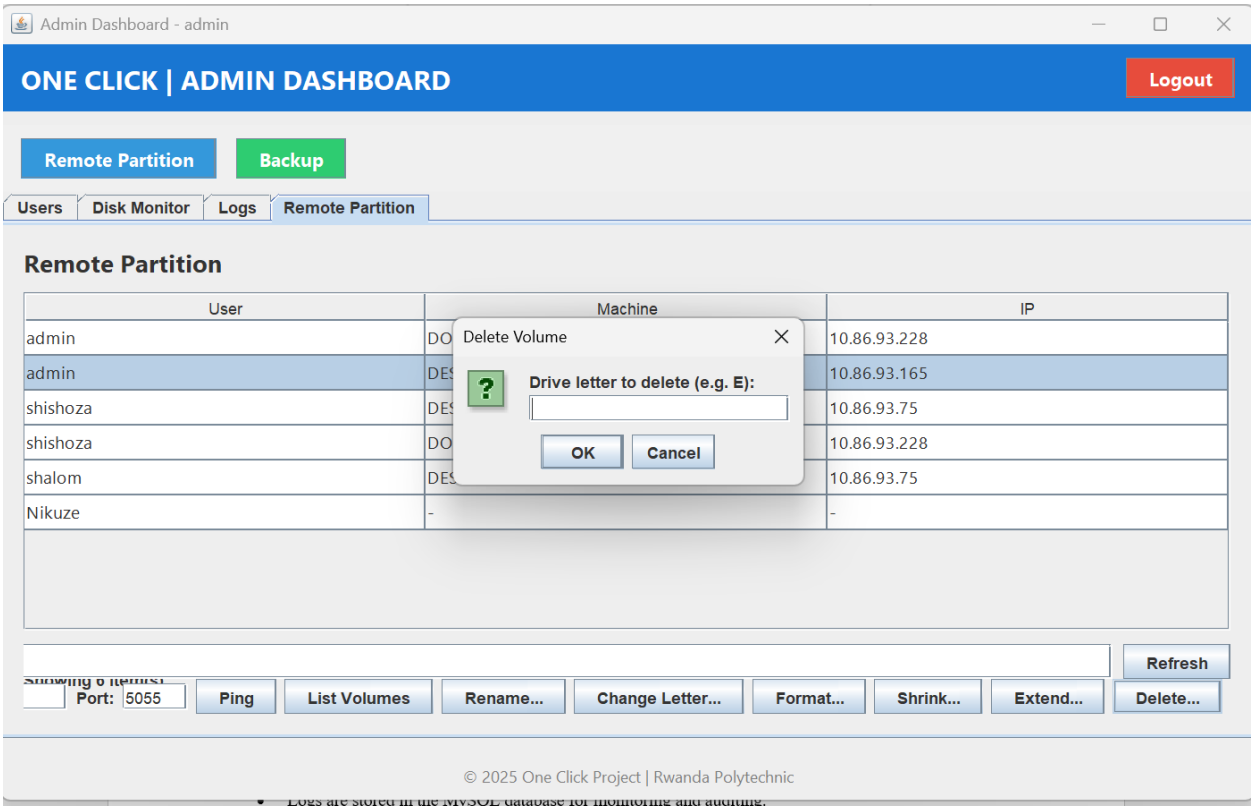
- Admins can view machine details (IP, Hostname) and assign users.



- Machines are uniquely identified within the database.

4.3 Partition Management Module (Developed by Shimo)

- This is the core functionality of the system.
- Admins can create, resize, rename, and delete partitions remotely on authorized machines.


Admin Dashboard - admin
ONE CLICK | ADMIN DASHBOARD
Logout
Remote Partition
Backup
Users
Disk Monitor
Logs
Remote Partition
Remote Partition
User
Machine
IP
admin
10.86.93.228
admin
10.86.93.165
shishoza
10.86.93.75
shishoza
10.86.93.228
shalom
10.86.93.75
Nikuze
Delete Volume
Drive letter to delete (e.g. E):
OK
Cancel
Refresh
Port:
5055
Ping
List Volumes
Rename...
Change Letter...
Format...
Shrink...
Extend...
Delete...
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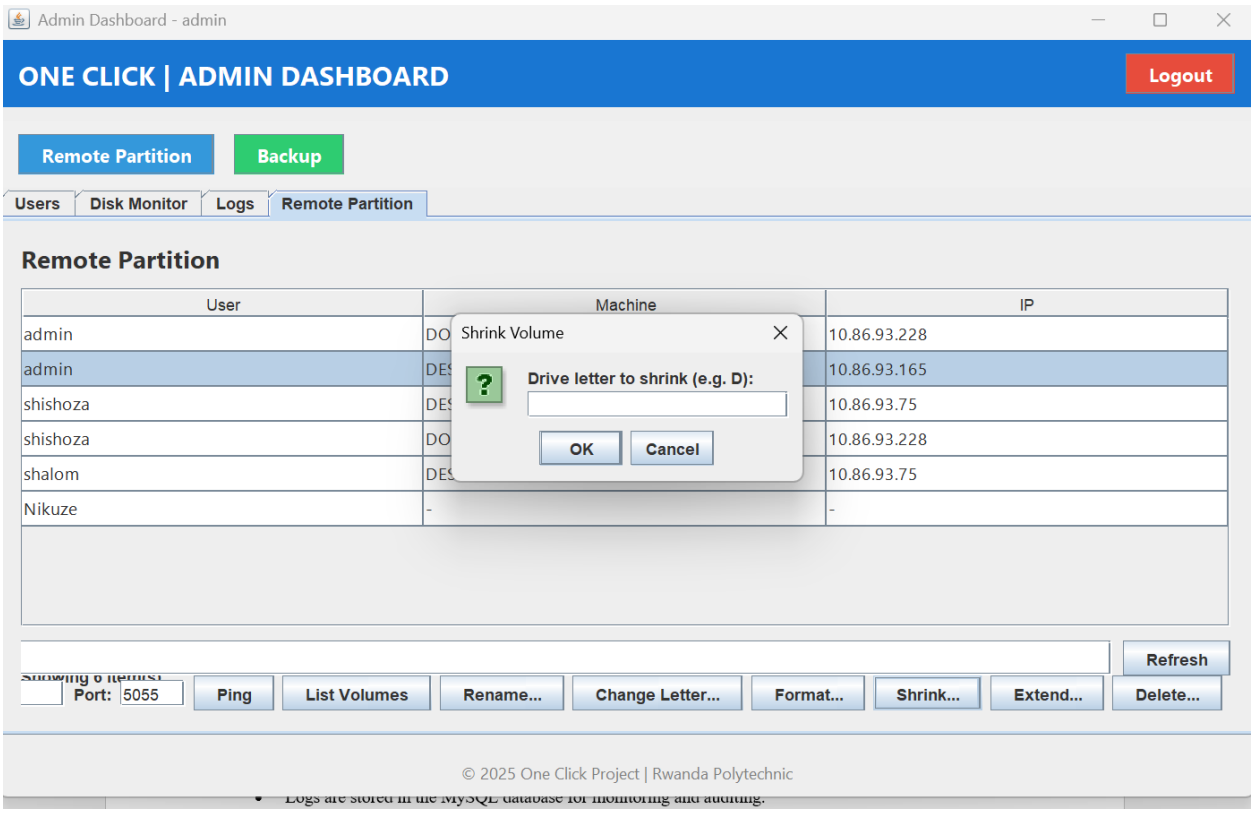
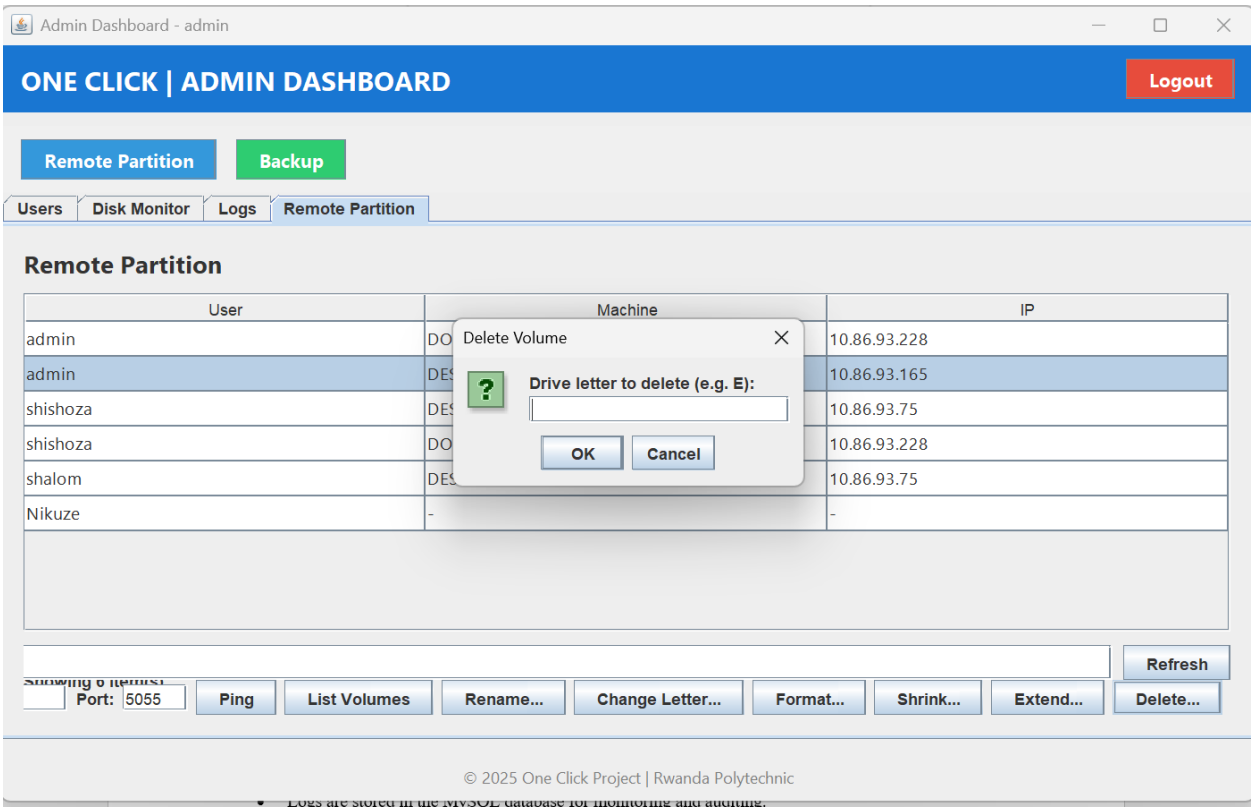
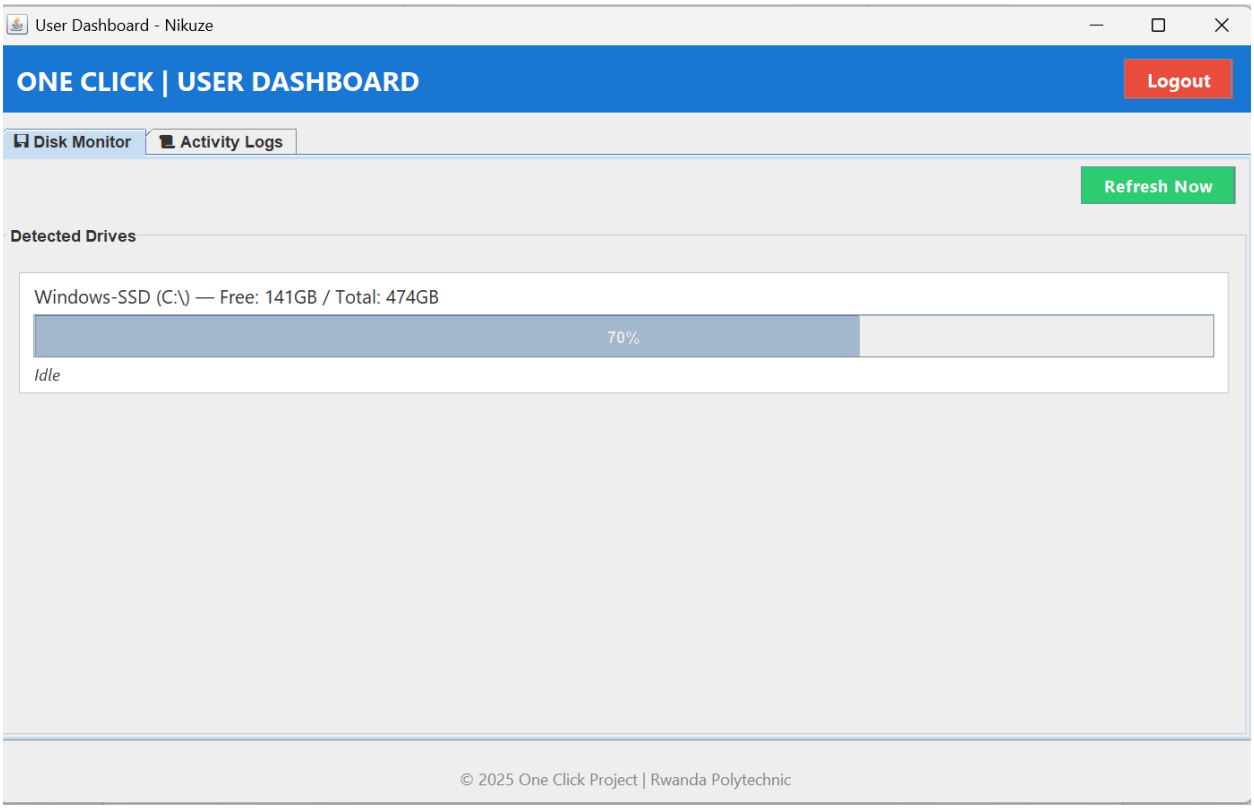




- Users can manage partitions only on their own assigned machines.


User Dashboard - Nikuze
ONE CLICK | USER DASHBOARD
Logout
Disk Monitor
Activity Logs
Refresh Now
Detected Drives
Windows-SSD (C:\) — Free: 141GB / Total: 474GB
70%
Idle
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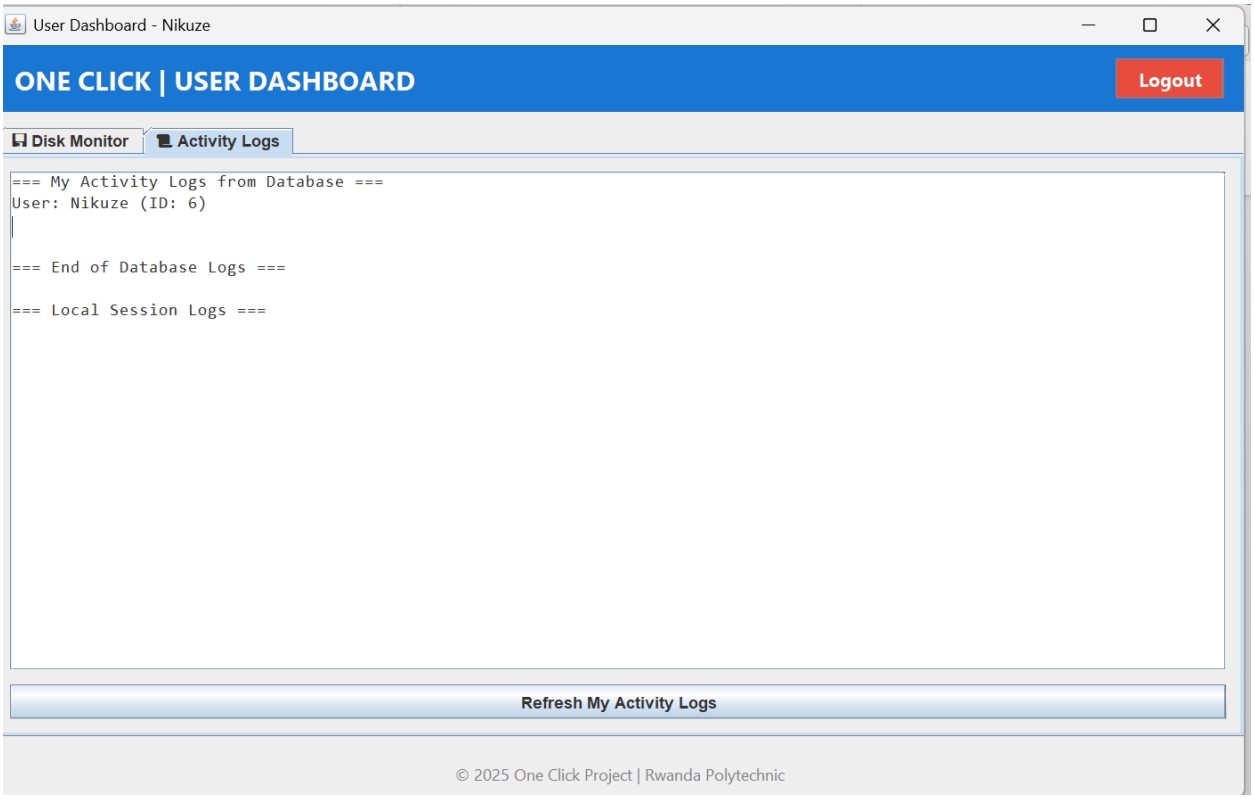
User Dashboard - Nikuze
ONE CLICK | USER DASHBOARD
Logout
Disk Monitor
Activity Logs
=== My Activity Logs from Database ===
User: Nikuze (ID: 6)
=== End of Database Logs ===
=== Local Session Logs ===
Refresh My Activity Logs
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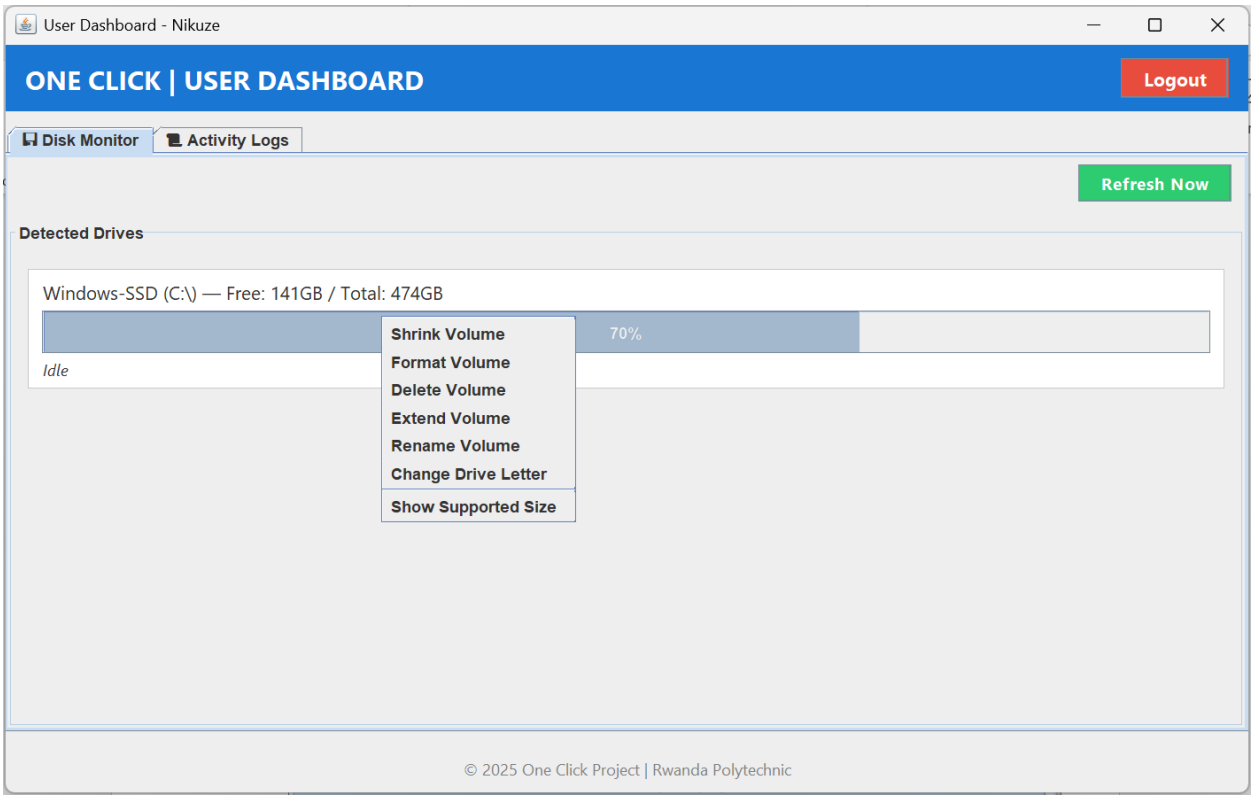
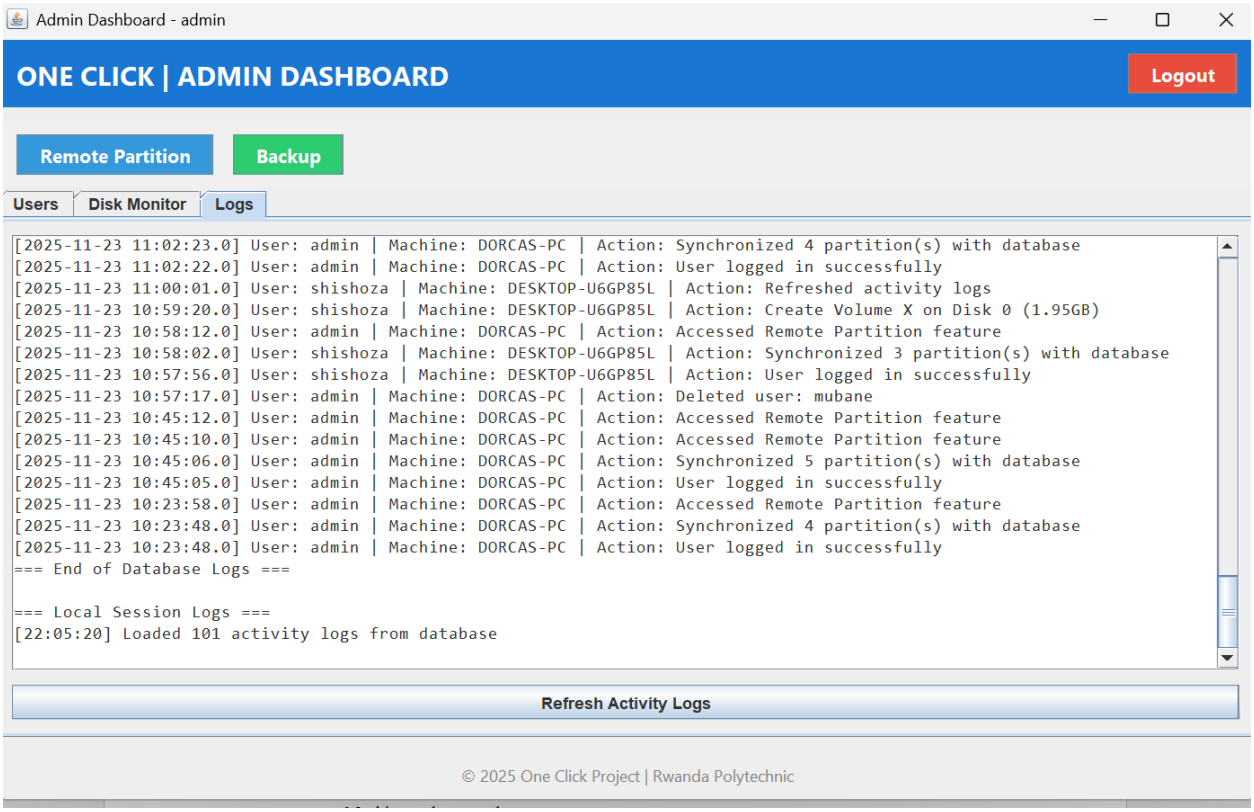
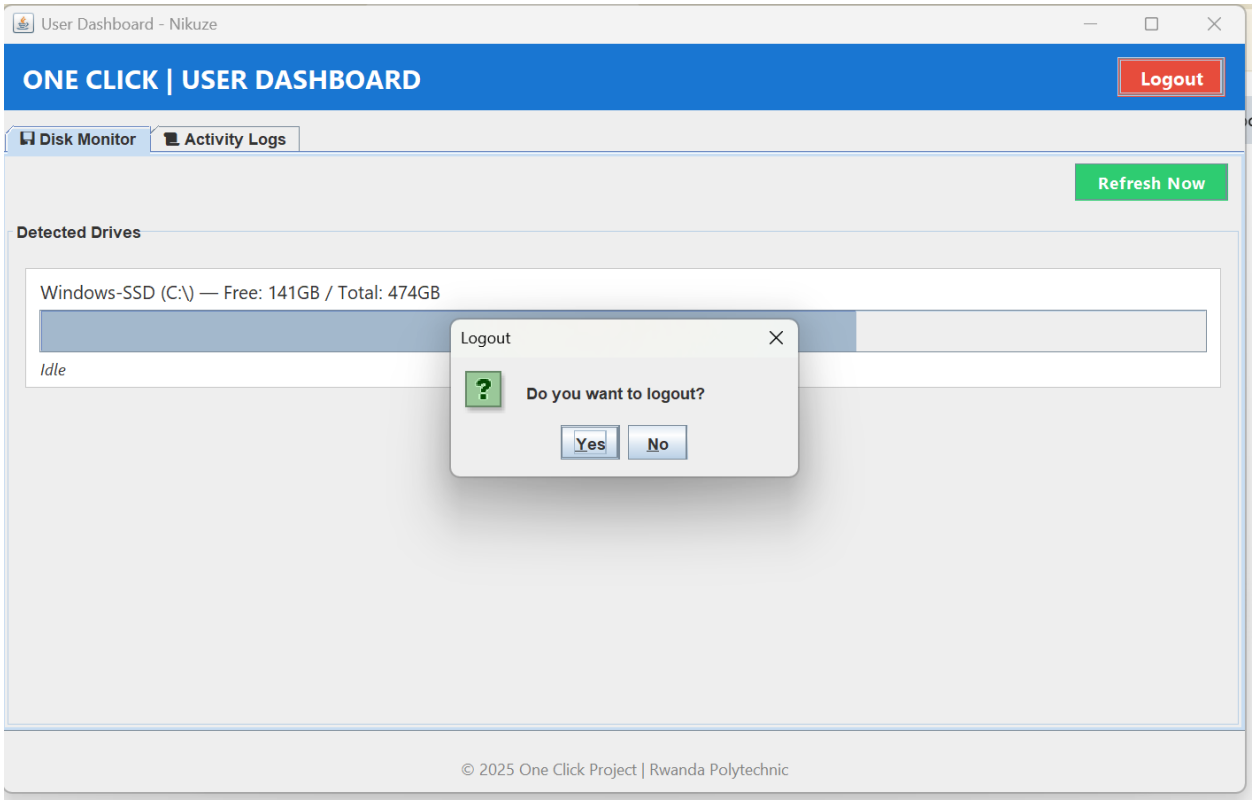


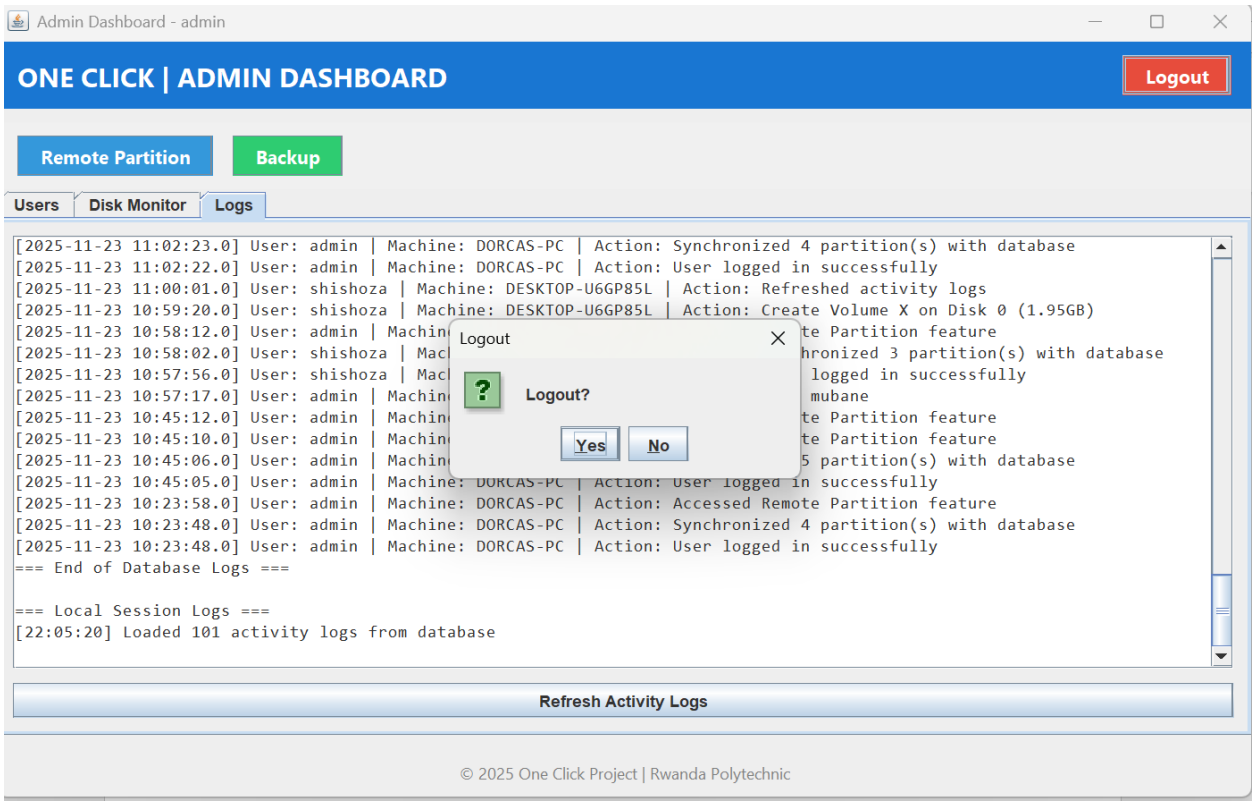
- All partition actions are meticulously logged for auditing purposes.



4.4 Activity Log Module (Developed by Shishoza)

- Tracks all significant events within the system:
    - Login/Logout activities




Admin Dashboard - admin
ONE CLICK | ADMIN DASHBOARD
Logout
Remote Partition
Backup
Users
Disk Monitor
Logs
[2025-11-23 11:02:23.0] User: admin | Machine: DORCAS-PC | Action: Synchronized 4 partition(s) with database
[2025-11-23 11:02:22.0] User: admin | Machine: DORCAS-PC | Action: User logged in successfully
[2025-11-23 11:00:01.0] User: shishoza | Machine: DESKTOP-U6GP85L | Action: Refreshed activity logs
[2025-11-23 10:59:20.0] User: shishoza | Machine: DESKTOP-U6GP85L | Action: Create Volume X on Disk 0 (1.95GB)
[2025-11-23 10:58:12.0] User: admin | Machin te Partition feature
[2025-11-23 10:58:02.0] User: shishoza | Mac hronized 3 partition(s) with database
[2025-11-23 10:57:56.0] User: shishoza | Mac logged in successfully
[2025-11-23 10:57:17.0] User: admin | Machin mubane
[2025-11-23 10:45:12.0] User: admin | Machin te Partition feature
[2025-11-23 10:45:10.0] User: admin | Machin te Partition feature
[2025-11-23 10:45:06.0] User: admin | Machin 5 partition(s) with database
[2025-11-23 10:45:05.0] User: admin | Machine: DORCAS-PC | Action: User logged in successfully
[2025-11-23 10:23:58.0] User: admin | Machine: DORCAS-PC | Action: Accessed Remote Partition feature
[2025-11-23 10:23:48.0] User: admin | Machine: DORCAS-PC | Action: Synchronized 4 partition(s) with database
[2025-11-23 10:23:48.0] User: admin | Machine: DORCAS-PC | Action: User logged in successfully
=== End of Database Logs ===
=== Local Session Logs ===
[22:05:20] Loaded 101 activity logs from database
Logout
Logout?
Yes
No
Refresh Activity Logs
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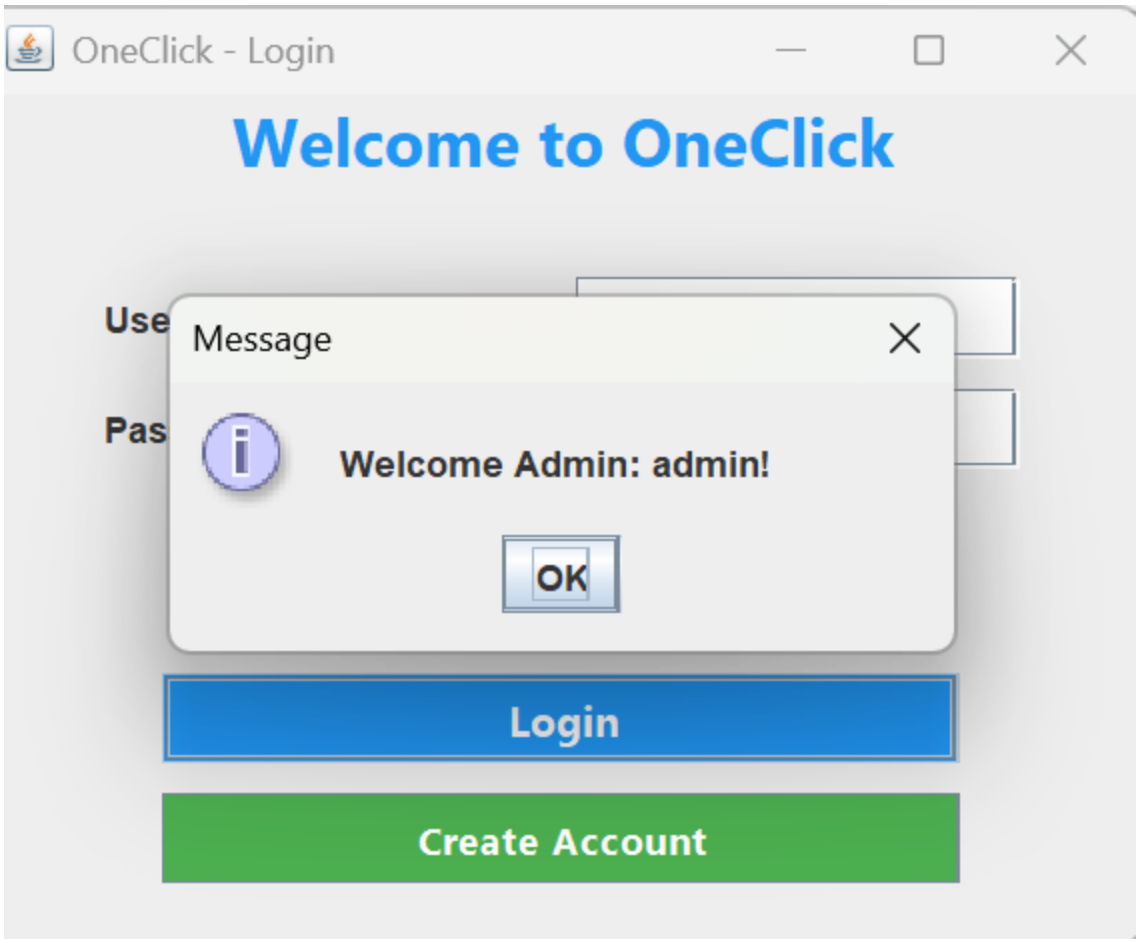
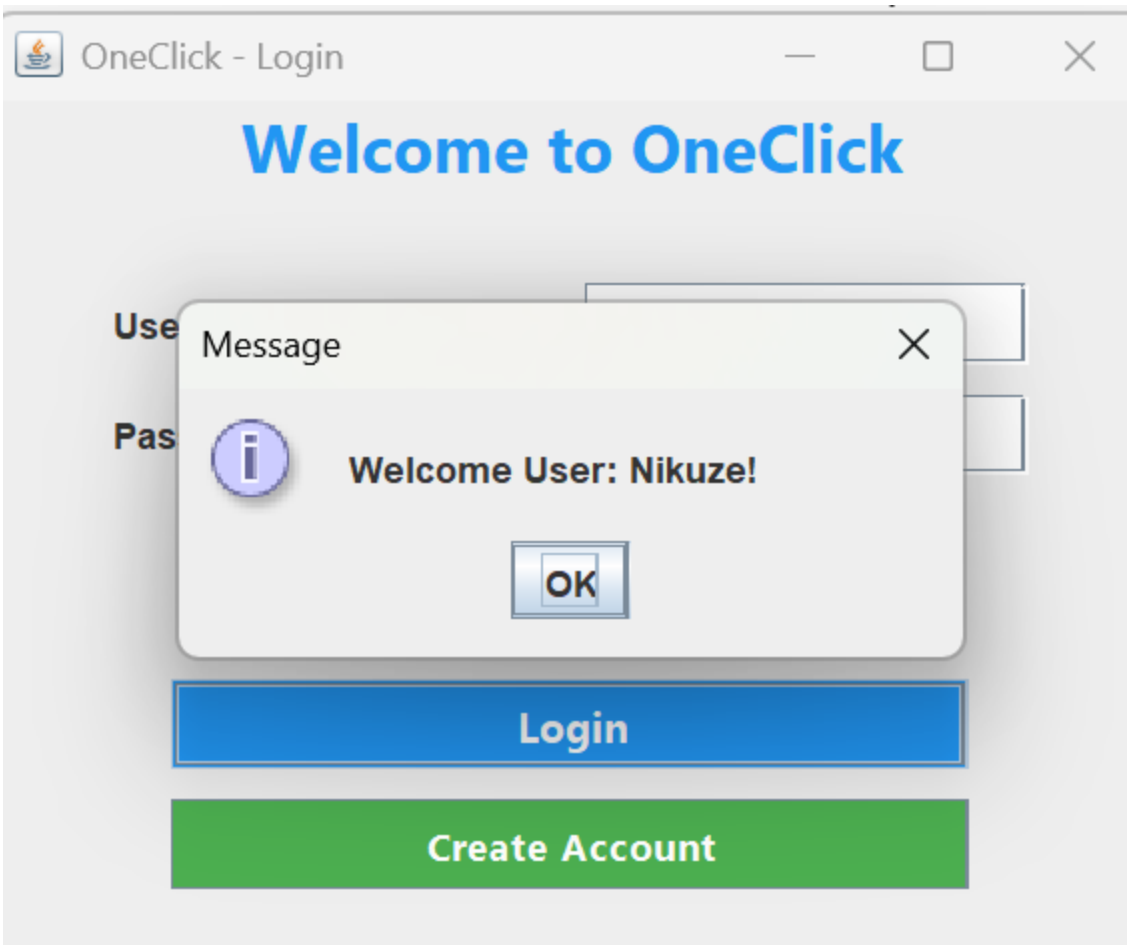
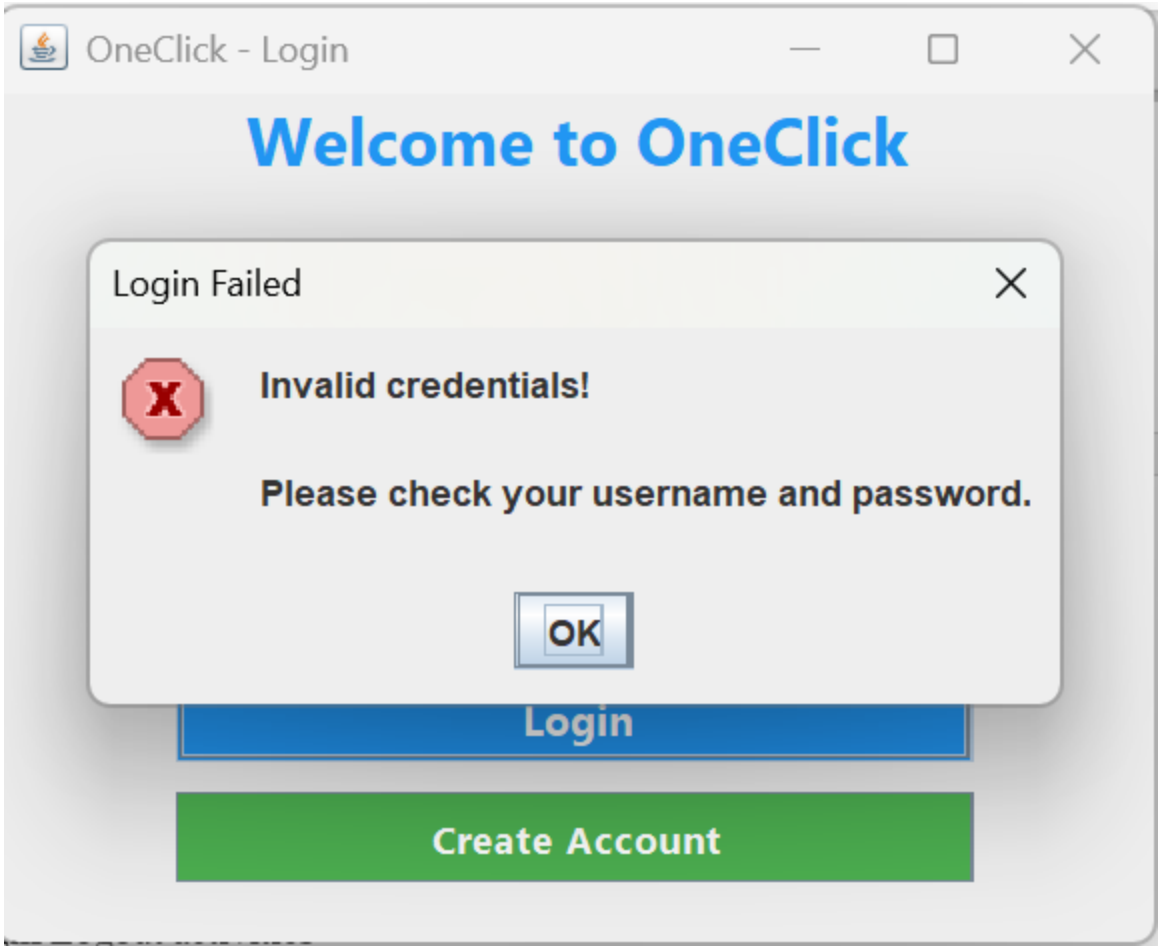
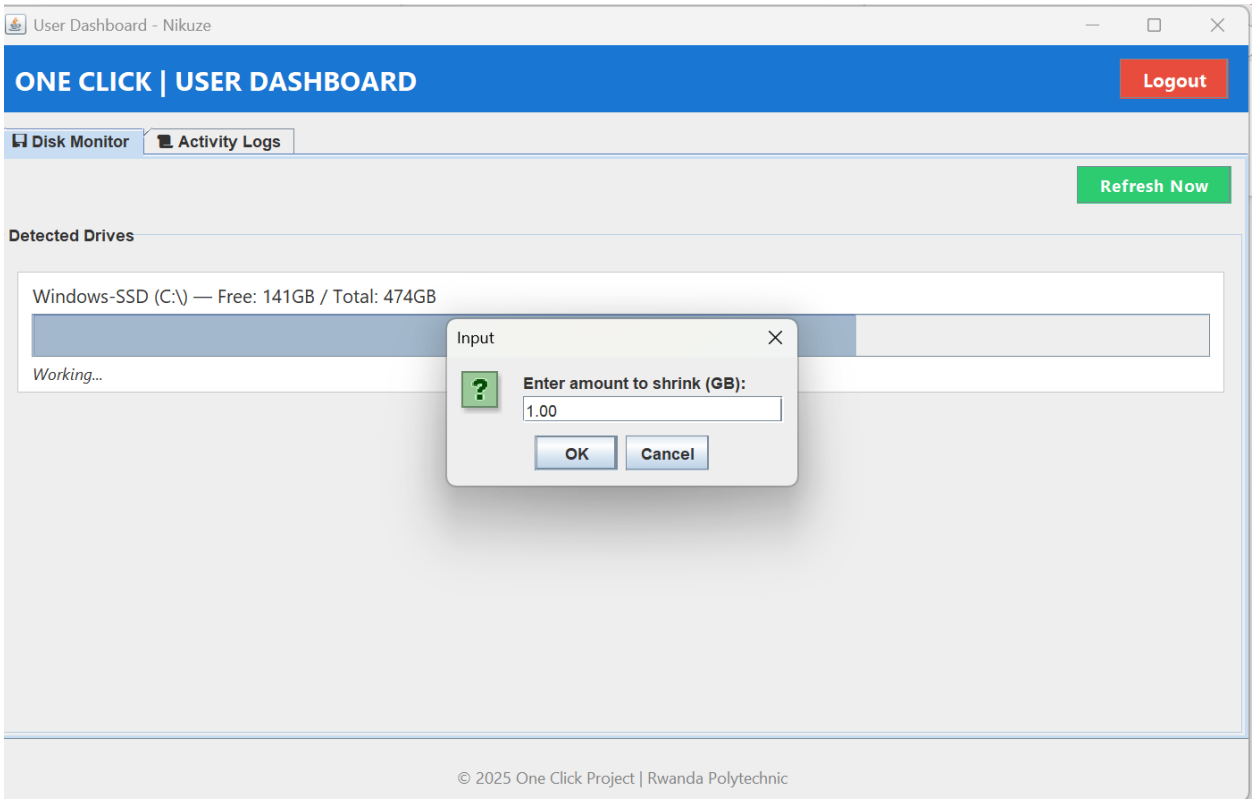

OneClick - Login
Welcome to OneClick
Use
Pas
Message
Welcome Admin: admin!
OK
Login
Create Account


OneClick - Login
Welcome to OneClick
Use
Pas
Message
Welcome User: Nikuze!
OK
Login
Create Account



- Partition modifications (creation, deletion, resize)


User Dashboard - Nikuze
ONE CLICK | USER DASHBOARD
Logout
Disk Monitor
Activity Logs
Refresh Now
Detected Drives
Windows-SSD (C:\) — Free: 141GB / Total: 474GB
Working...
Input
Enter amount to shrink (GB):
1.00
OK
Cancel
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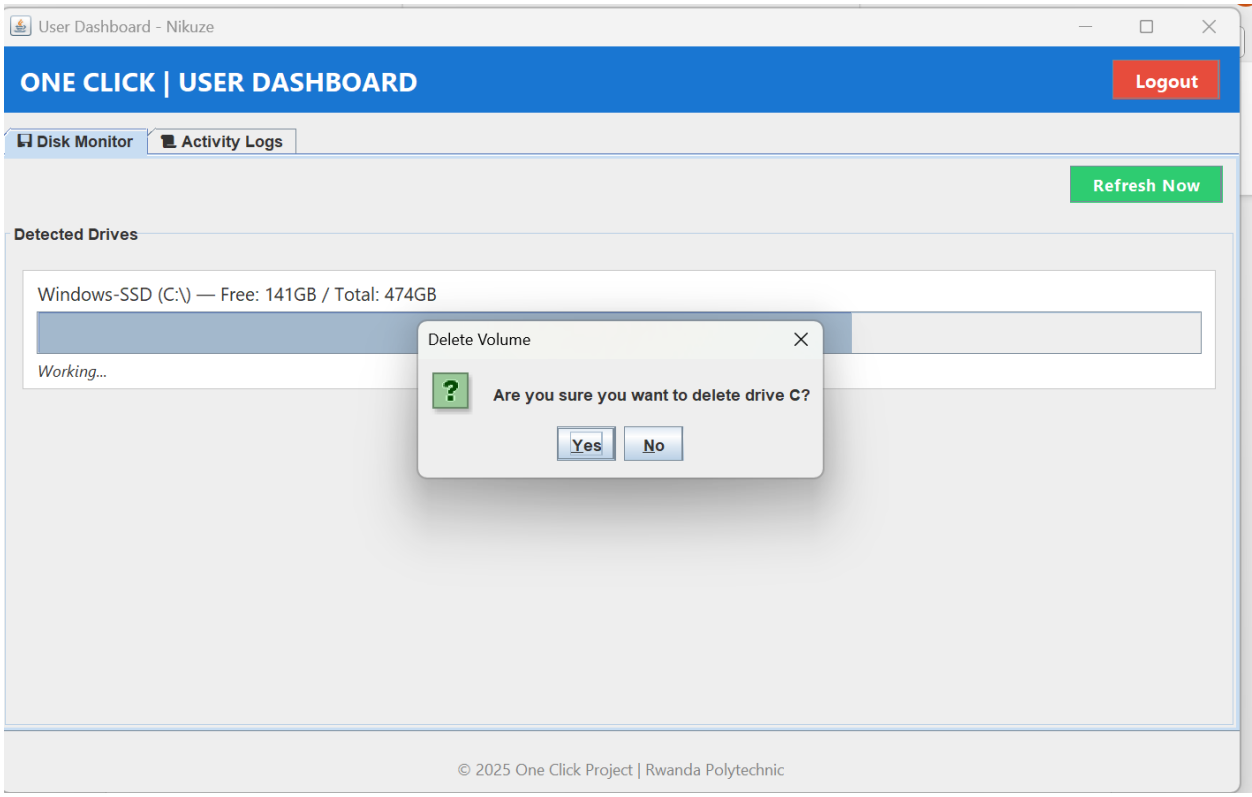
User Dashboard - Nikuze
ONE CLICK | USER DASHBOARD
Logout
Disk Monitor
Activity Logs
Refresh Now
Detected Drives
Windows-SSD (C:\) — Free: 141GB / Total: 474GB
Working...
Delete Volume
Are you sure you want to delete drive C?
Yes
No
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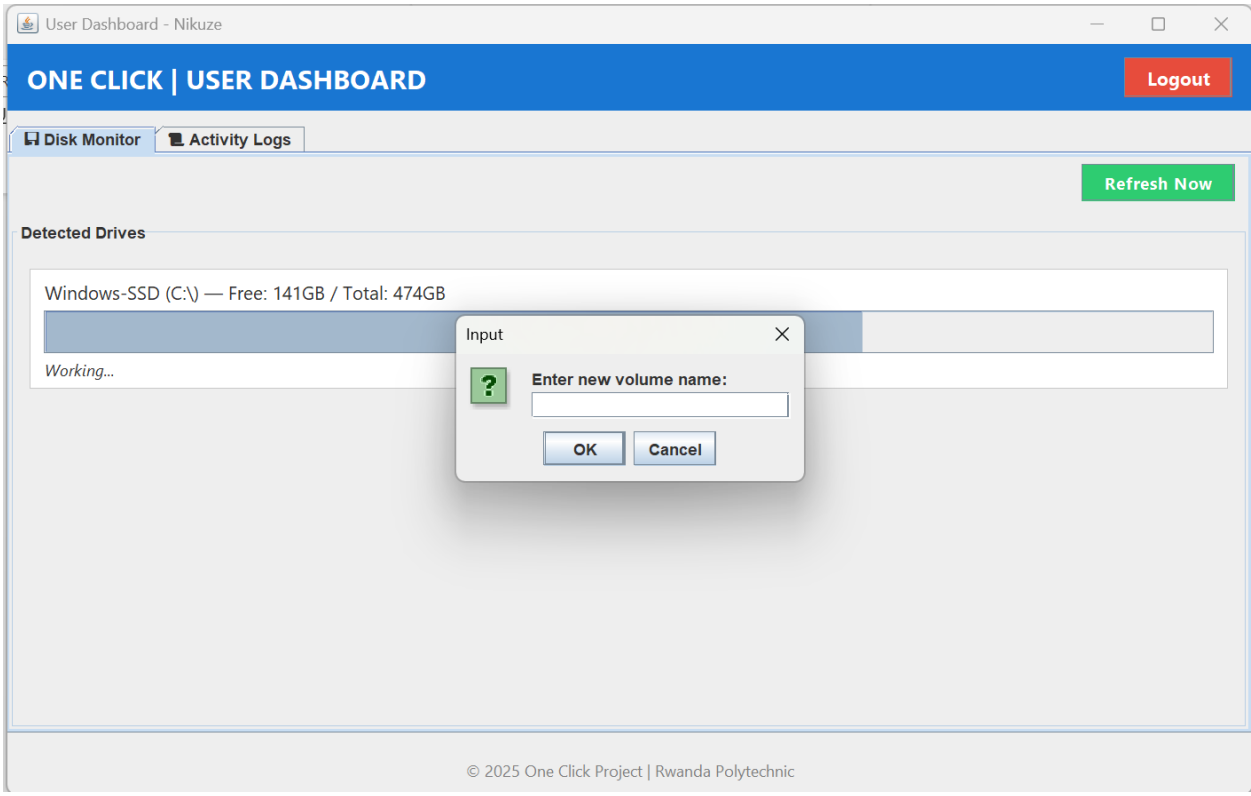
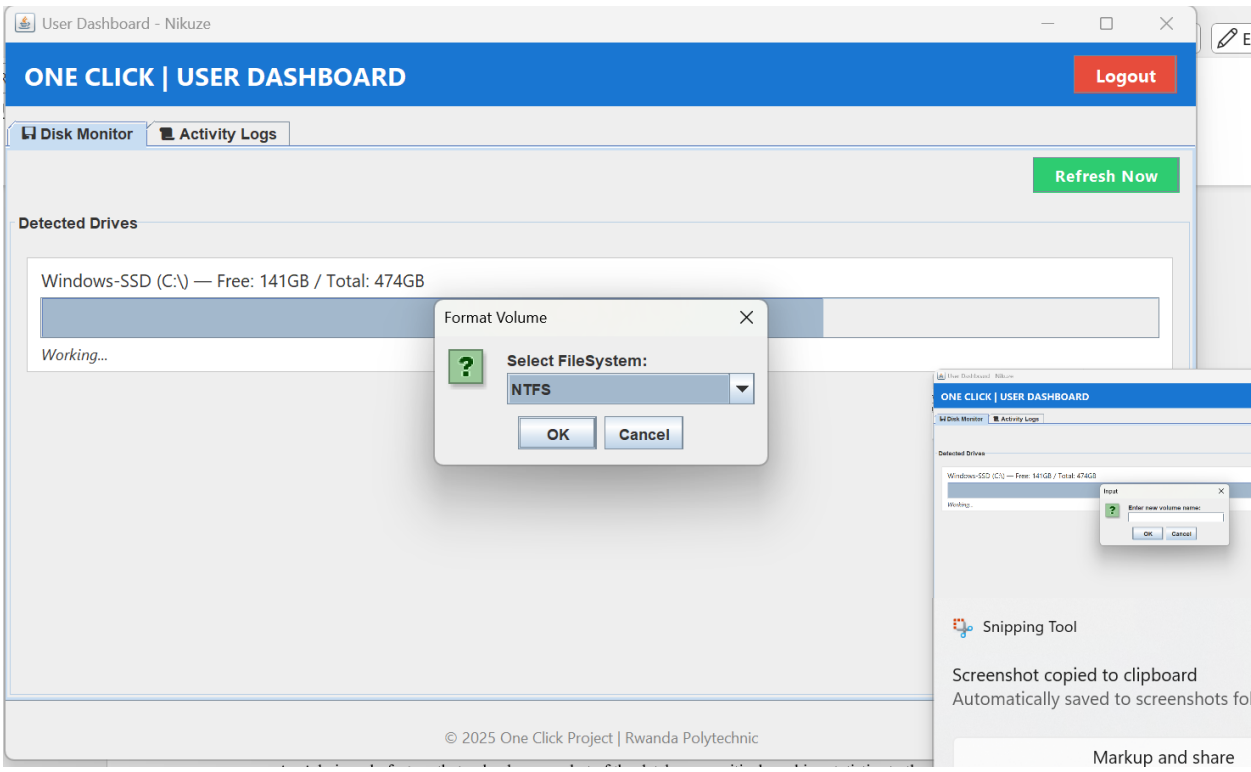
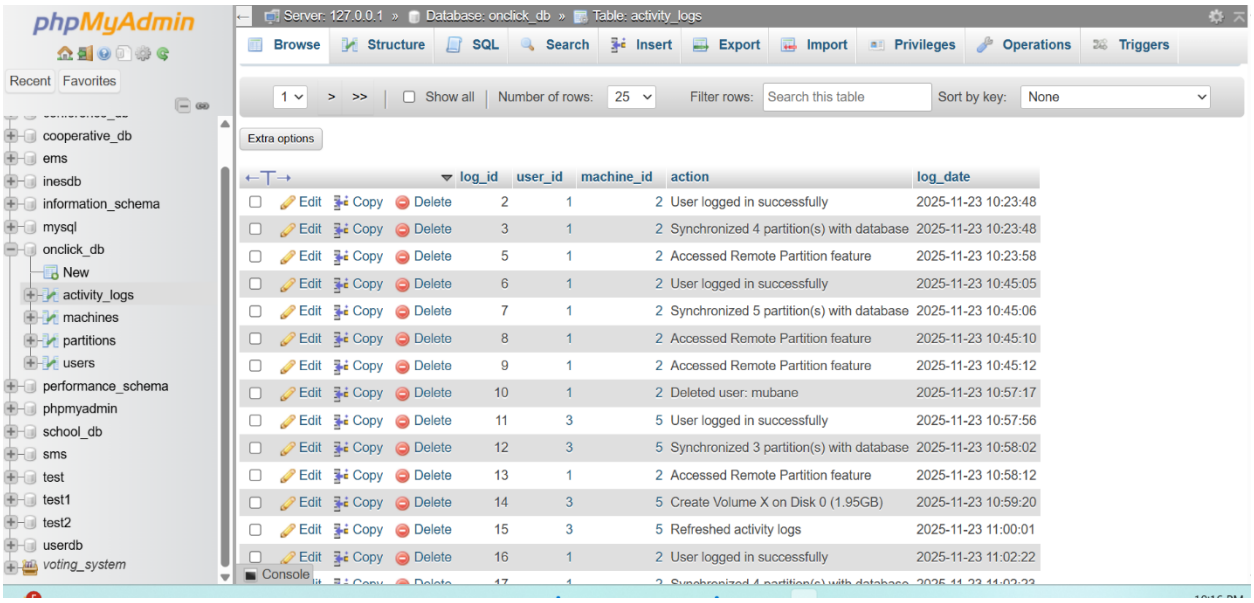




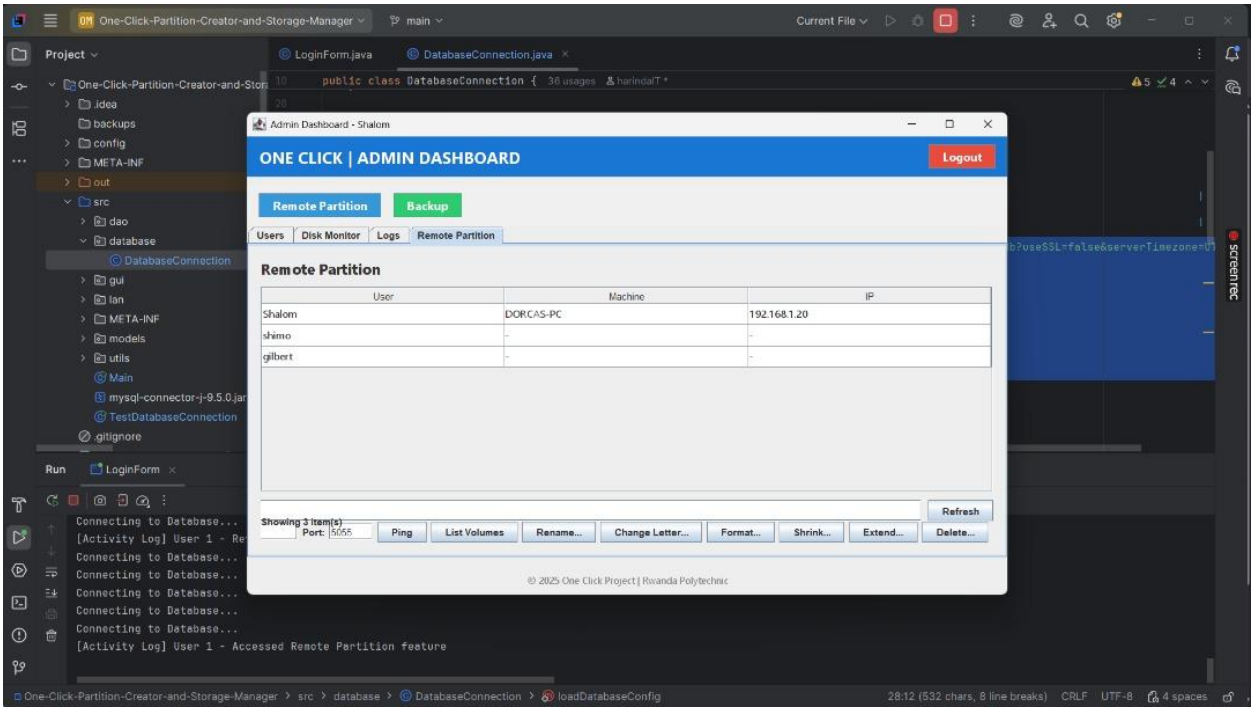
  - Machine and user updates

- Logs are stored in the MySQL database for monitoring and auditing.



4.5 Local Synchronization

- All device operations are saved locally and immediately synced with the centralized MySQL database over the LAN.

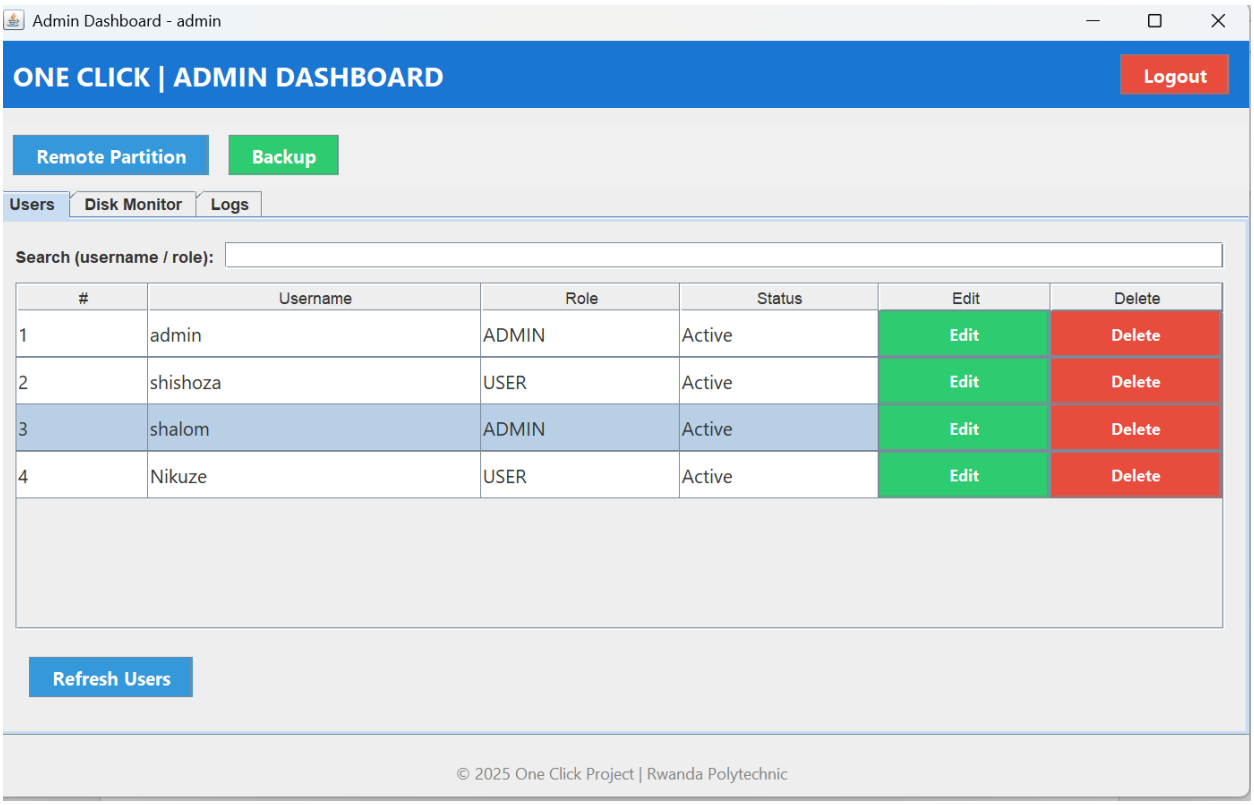


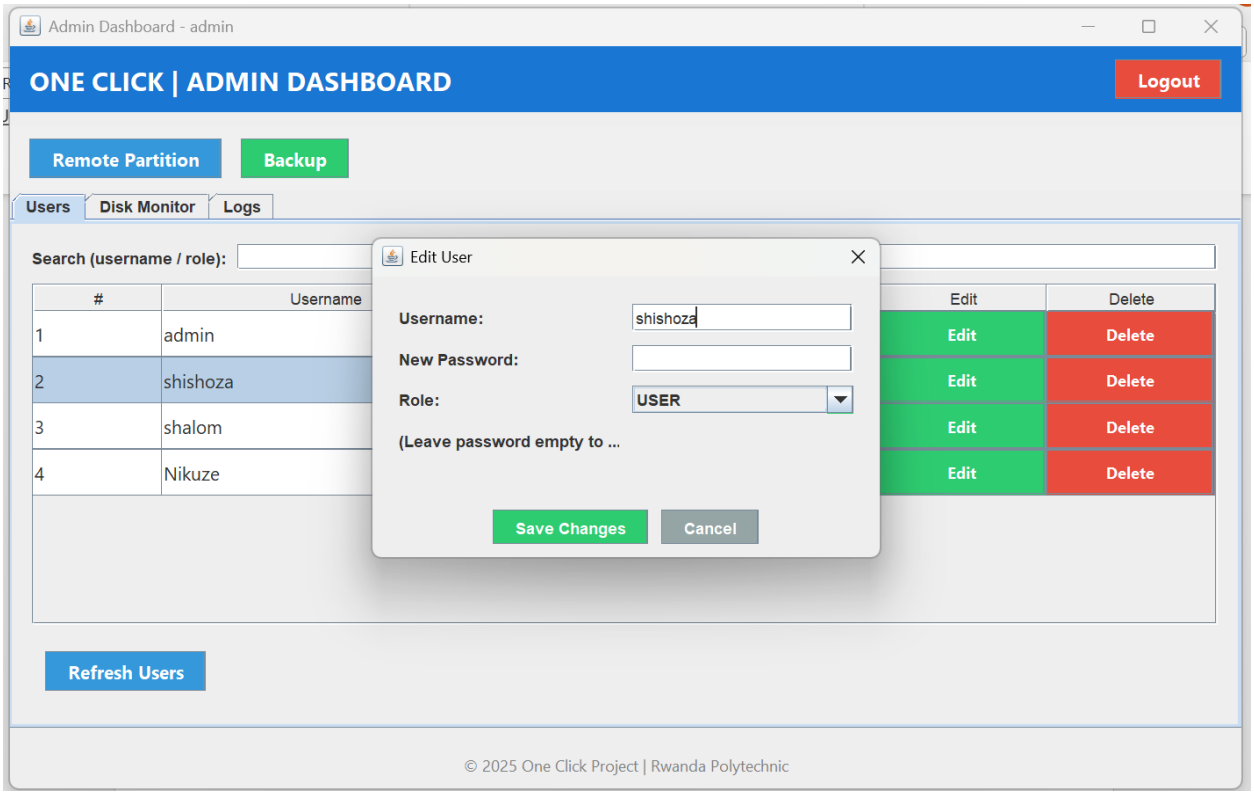
- This mechanism is crucial for ensuring the system's robust offline operation capability.

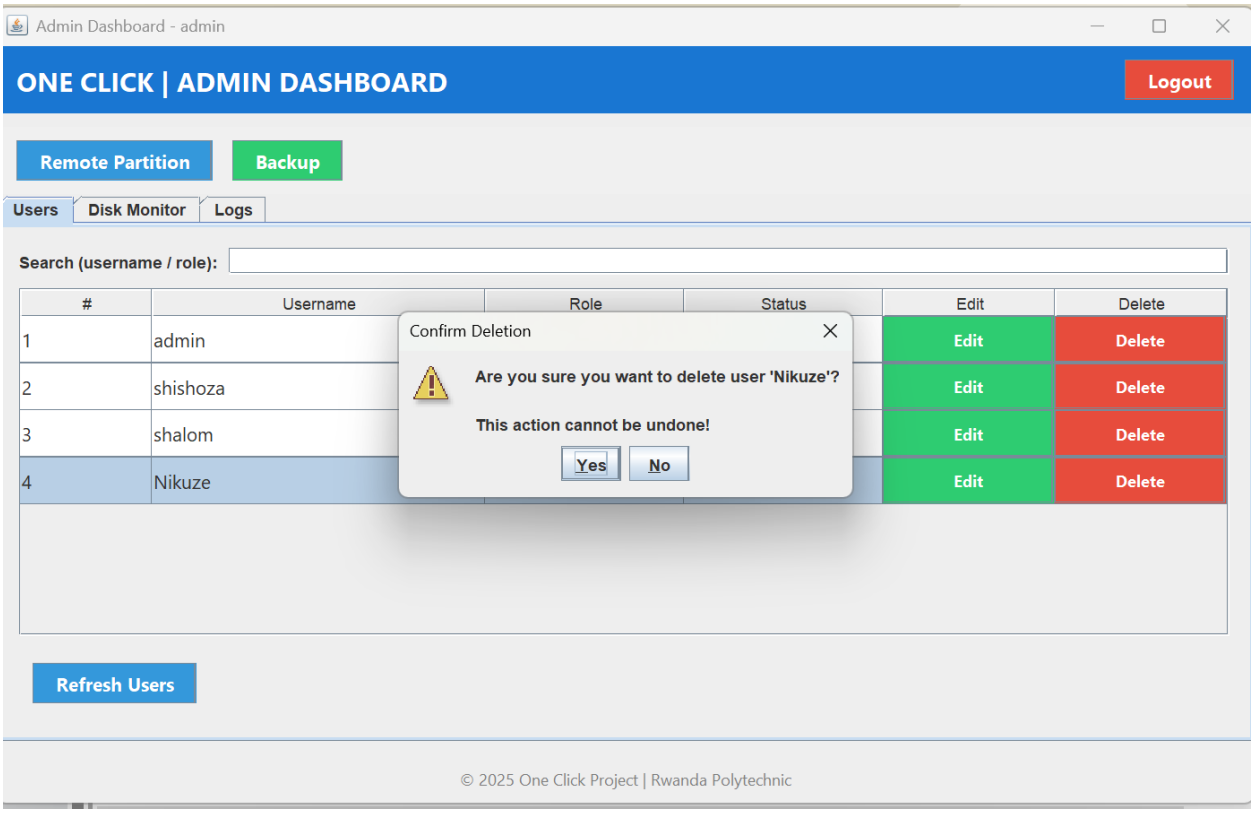
4.6 Cloud Backup Module (Developed by Emillien)

- An Admin-only feature that uploads a snapshot of the database or critical machine statistics to the cloud.

- It is triggered manually by the administrator to control and minimize unnecessary external internet usage.





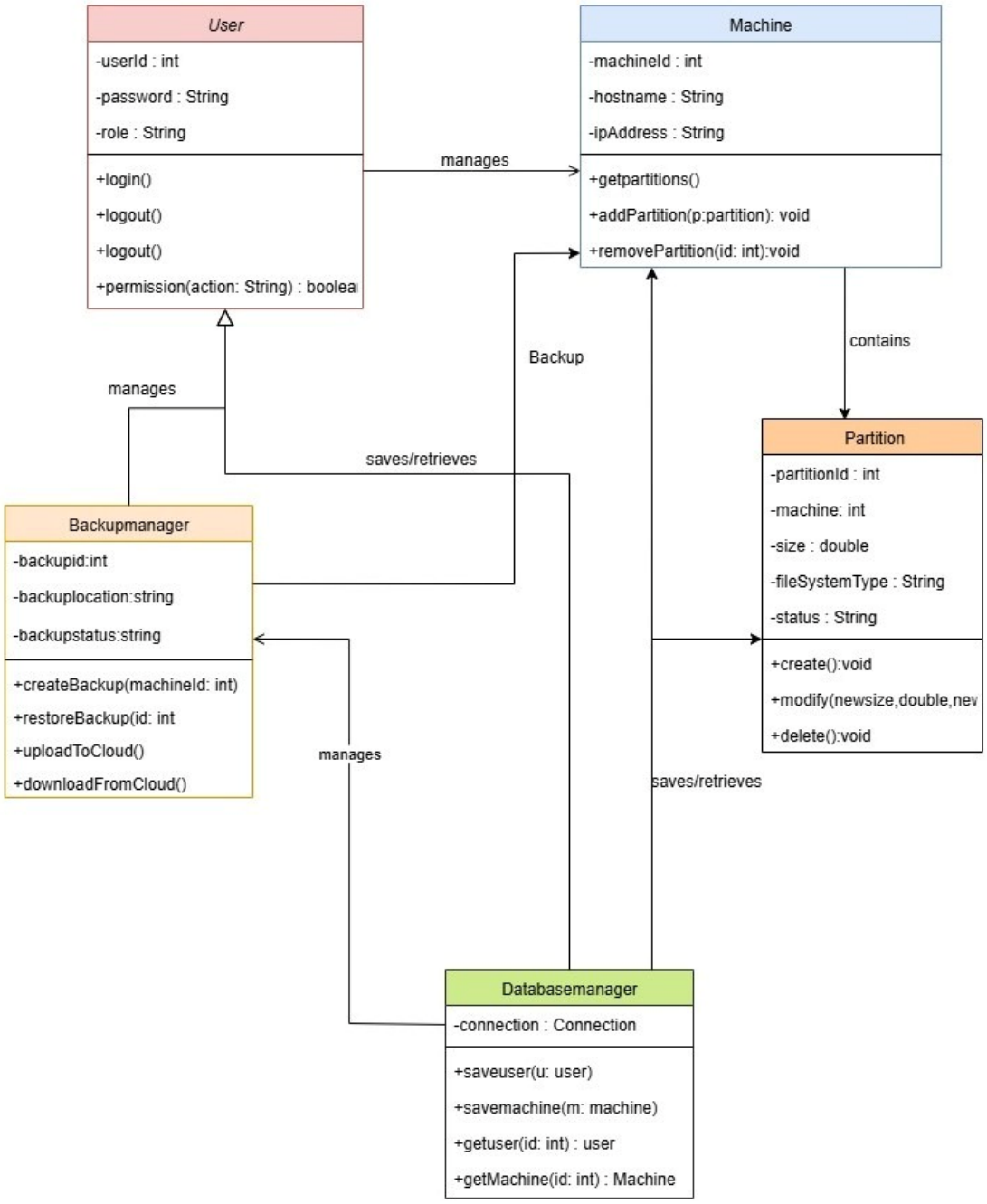


5. Database Design

The system utilizes a relational database structure, managed via **MySQL/MariaDB on the XAMPP local server**, ensuring high performance and data integrity. Key tables include:

Table Name	Description	Key Fields
USERS	Stores account and role information.	user_id, username, role, password
MACHINES	Stores physical machine information and ownership.	machine_id, owner_id, hostname, IP, status
PARTITIONS	Stores details of managed partitions.	partition_id, machine_id, size, type, status
ACTIVITY_LOGS	Records all system actions for auditing.	log_id, user_id, action, target, timestamp

All entities were normalized to avoid redundancy and improve system performance.



6. Testing and Validation

The system underwent rigorous testing across multiple phases to validate all objectives:

6.1 Unit Testing

Each module was tested in isolation to verify its independent functionality: User CRUD operations, machine registration, partition handling, and activity logging.

6.2 Integration Testing

Modules were combined and tested together to ensure: Smooth communication between components and correct real-time syncing with the MySQL database

6.3 LAN Functionality Testing

The system was tested extensively under various **offline LAN conditions** to verify local data consistency and communication reliability.

6.4 Backup Testing

The admin-triggered cloud backup feature (developed by Emillien) was tested for successful snapshot creation and upload under limited and sporadic internet access conditions.

Module	**Input**	**Expected output**
Login	➢ With correct credentials ➢ With wrong credentials	➢ Access dashboard role based ➢ Getting Error message
Disk partition	➢ When user shrink ➢ Admin can shrink	➢ The disk will be shrinked and that activity will be recorded in database. ➢ Also his disk and any other disk he is editing also that activity is recorded in database.
LAN Based	➢ After user registration	➢ Admin will see on his dashboard the user name , PC name and

		its IP addresss. And this activity is done offline.
Backup	➢ Admin whenever he or she gets internet	➢ All activities that have been recorded in the database will be synchronized . it will make back up automatically.
Logout	➢ If any user clicks on logout button	➢ The system will confirm if he or she surely wants to logout and if it is yes it will be back in login form and saves all activities done by that use in the database.

7. Challenges Encountered

The development team successfully navigated several technical challenges:

- **XAMPP/MySQL database configuration and connectivity issues** in a multi-client LAN environment.
- Ensuring consistent and reliable data synchronization during offline mode and resolving conflicts upon re-synchronization.
- Handling machine permissions and secure remote execution in a Java-based LAN setting.
- Designing a simplified, intuitive, yet powerful interface for non-technical administrators and users.

8. Achievements

The OnClick System successfully achieved all initial project objectives, demonstrating its readiness for deployment:

✓ Full offline LAN operation capability.

✓ Real-time data synchronization with the centralized Local Server (XAMPP/MySQL) database.

✓ Implementation of secure remote partition management controls.

✓ Robust, trackable system activity logs.

✓ Successfully implemented Admin-controlled cloud backup functionality.

✓ Clear and enforced separation of roles (Admin vs. User).

9. Conclusion

The OnClick System successfully provides a complete, robust, **LAN-based solution** for managing storage partitions. Its modular architecture, centralized **MySQL database on XAMPP**, and secure synchronization mechanisms allow both administrators and users to manage machines efficiently within a local network environment. The project demonstrates strong teamwork and effective use of modern technologies (**Java, MySQL**) and practical problem-solving skills, achieving all initial objectives and providing a solid foundation for future enhancements.