

# Bash System Maintenance Suite

## 1. Project Overview

The Bash System Maintenance Suite is a professional, menu-driven Linux automation tool designed to simplify and automate routine system maintenance tasks. It is targeted at system administrators, IT professionals, and organizations seeking efficient and error-free system upkeep.

This suite performs:

- **Automated backups** of files and folders.
- **System updates and cleanup** to maintain optimal performance.
- **System log monitoring** to detect warnings, errors, or critical failures.

## Technologies Used:

- Linux OS (Ubuntu/Debian-based systems)
- Bash Scripting
- File handling and logging

## 2. Problem Statement

Routine Linux system maintenance tasks—such as data backups, package updates, and log monitoring—are critical for system reliability but are often time-consuming, repetitive, and error-prone when performed manually.

The challenge is to develop a robust, automated solution that allows administrators to efficiently manage these tasks, ensuring data safety, system performance, and proactive error detection. The solution should be user-friendly, reliable, and scalable, suitable for enterprise environments.

## 3. Codes :

### 2.1. backup\_Script.sh

```
#!/bin/bash
set -e # Stop script on any error

LOG_FILE="../logs/backup.log"
BACKUP_DIR="../backups"

timestamp() {
    date +"%Y-%m-%d %H:%M:%S"
}

echo "[INFO] Backup started at $(timestamp)" | tee -a "$LOG_FILE"
```

```

# Ensure backups directory exists
[ -d "$BACKUP_DIR" ] || mkdir -p "$BACKUP_DIR"

# Ask which file/folder to back up
echo -n "Enter FULL PATH of file or folder to backup: "
read TARGET

[ -z "$TARGET" ] && { echo "[ERROR] Nothing entered" | tee -a "$LOG_FILE"; exit 1; }
[ -e "$TARGET" ] || { echo "[ERROR] Target not found" | tee -a "$LOG_FILE"; exit 1; }

# Confirm backup
echo -n "Do you want to back up '$TARGET'? (yes/no): "
read CONFIRM

# Convert to lowercase for easy checking
CONFIRM=$(echo "$CONFIRM" | tr 'A-Z' 'a-z')

if [ "$CONFIRM" != "yes" ] && [ "$CONFIRM" != "y" ]; then
    echo "[INFO] Backup cancelled" | tee -a "$LOG_FILE"
    exit 0
fi

# Create backup file name
BACKUP_NAME="backup_${(basename "$TARGET")}_$(date +%Y%m%d_%H%M%S).tar.gz"

# Perform backup
tar -czf "$BACKUP_DIR/$BACKUP_NAME" "$TARGET"

echo "[SUCCESS] Backup saved as $BACKUP_NAME" | tee -a "$LOG_FILE"

```

### **3.2. update\_Clean.sh**

```

#!/bin/bash
# update_clean.sh - System update and cleanup
set -e # Exit script if any command fails

log_error() {
    echo "Error: $1"
    exit 1
}

echo "Updating system..."
sudo apt update -y || log_error "Failed to update package lists. Check network connection."
sudo apt upgrade -y || log_error "Failed to upgrade packages. Resolve package conflicts or broken dependencies."

# Prompting the user for permission to remove unnecessary packages
while true; do

```

```

echo "Do you want to remove deprecated packages that were installed as dependencies but are no
longer needed? (y/n)"
read -r response
if [[ "$response" =~ ^([yY][eE][sS]|([yY])$ ) ]]; then
    sudo apt autoremove -y || log_error "Failed to remove deprecated packages."
    sudo apt autoclean -y || log_error "Failed to clean package cache."
    break
elif [[ "$response" =~ ^[Nn](o)?$ ]]; then
    echo "Skipping package removal and cleanup."
    break
else
    echo "Invalid input. Please enter 'y' or 'n'."
fi
done

echo "System updated and cleaned successfully."

```

### 3.3. Log\_monitoring.sh

```

#!/bin/bash
set -e # Stop if any real error happens

BASE_DIR="$HOME/bash_maintenance_suite"
LOG_DIR="$BASE_DIR/logs"
LOG_FILE="$LOG_DIR/monitor.log"
ALERT_FILE="$LOG_DIR/alerts.txt"
SYSTEM_LOG="/var/log/syslog"

# Create logs directory if missing
mkdir -p "$LOG_DIR"

timestamp() {
    date +"%Y-%m-%d %H:%M:%S"
}

echo "[INFO] Monitoring started at $(timestamp)" | tee -a "$LOG_FILE"

# Check if system log exists
if [ ! -f "$SYSTEM_LOG" ]; then
    echo "[ERROR] System log file not found" | tee -a "$LOG_FILE"
    exit 1
fi

# Run grep but prevent it from breaking the script if no results
grep -iE "error|warning|critical|fail" "$SYSTEM_LOG" > "$ALERT_FILE" || true

echo "[SUCCESS] Alerts saved to: $ALERT_FILE" | tee -a "$LOG_FILE"

```

#### 4.1 menu.sh

```
#!/bin/bash
set -e # Stop on any error

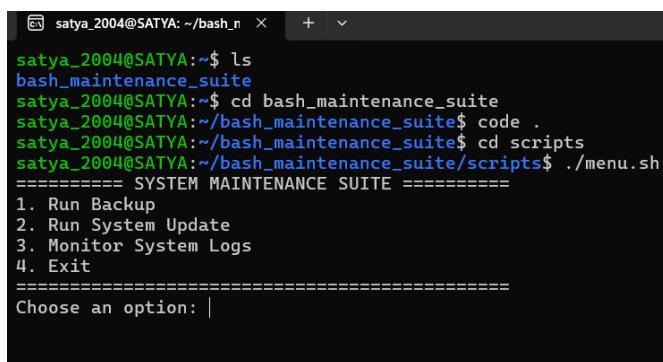
# Menu file does not need logs
# It simply calls other scripts

echo "===== SYSTEM MAINTENANCE SUITE ====="
echo "1. Run Backup"
echo "2. Run System Update"
echo "3. Monitor System Logs"
echo "4. Exit"
echo "====="
echo -n "Choose an option: "
read CHOICE

case $CHOICE in
    1)
        ./backup_Script.sh
        ;;
    2)
        ./update_Clean.sh
        ;;
    3)
        ./log_monitoring.sh
        ;;
    4)
        echo "Exiting..."
        exit 0
        ;;
    *)
        echo "Invalid option. Exiting."
        exit 1
        ;;
esac
```

#### 4. Output Screenshots

##### 4.1 Main Menu



The screenshot shows a terminal window with the following content:

```
satya_2004@SATYA:~/bash_n ~ + 
satya_2004@SATYA:~$ ls
bash_maintenance_suite
satya_2004@SATYA:~$ cd bash_maintenance_suite
satya_2004@SATYA:/bash_maintenance_suite$ code .
satya_2004@SATYA:~/bash_maintenance_suite$ cd scripts
satya_2004@SATYA:~/bash_maintenance_suite/scripts$ ./menu.sh
===== SYSTEM MAINTENANCE SUITE =====
1. Run Backup
2. Run System Update
3. Monitor System Logs
4. Exit
=====
Choose an option: |
```

##### 4.2 Backup Script

```

satya_2004@SATYA:~/bash_n ~ + | 
satya_2004@SATYA:~$ ls
bash_maintenance_suite
satya_2004@SATYA:~$ cd bash_maintenance_suite
satya_2004@SATYA:~/bash_maintenance_suite$ ls
backups logs scripts
satya_2004@SATYA:~/bash_maintenance_suite$ ls -la
total 20
drwxr-xr-x 5 satya_2004 satya_2004 4096 Nov  8 06:38 .
drwxr-x--- 6 satya_2004 satya_2004 4096 Nov  8 20:09 ..
drwxr-xr-x 2 satya_2004 satya_2004 4096 Nov  8 20:07 backups
drwxr-xr-x 2 satya_2004 satya_2004 4096 Nov  8 16:58 logs
drwxr-xr-x 2 satya_2004 satya_2004 4096 Nov  8 16:01 scripts
satya_2004@SATYA:~/bash_maintenance_suite$ cd scripts
satya_2004@SATYA:~/bash_maintenance_suite/scripts$ ./menu.sh
===== SYSTEM MAINTENANCE SUITE =====
1. Run Backup
2. Run System Update
3. Monitor System Logs
4. Exit
=====
Choose an option: 1
[INFO] Backup started at 2025-11-08 20:16:05
Enter FULL PATH of file or folder to backup: /mnt/c/Users/jenas/Desktop/TATA/CERTIFICATE
Do you want to back up '/mnt/c/Users/jenas/Desktop/TATA/CERTIFICATE'? (yes/no): y
tar: Removing leading '/' from member names
[SUCCESS] Backup saved as backup_CERTIFICATE_20251108_201632.tar.gz
satya_2004@SATYA:~/bash_maintenance_suite/scripts$ ./menu.sh
===== SYSTEM MAINTENANCE SUITE =====
1. Run Backup
2. Run System Update
3. Monitor System Logs
4. Exit
=====
Choose an option: 1
[INFO] Backup started at 2025-11-08 20:16:42
Enter FULL PATH of file or folder to backup: /mnt/c/Users/jenas/Desktop/TATA/CERTIFICATE
Do you want to back up '/mnt/c/Users/jenas/Desktop/TATA/CERTIFICATE'? (yes/no): n
[INFO] Backup cancelled
satya_2004@SATYA:~/bash_maintenance_suite/scripts$ |

```

### 4.3 Update & Cleanup Script

```

satya_2004@SATYA:~/bash_maintenance_suite/scripts$ ./menu.sh
===== SYSTEM MAINTENANCE SUITE =====
1. Run Backup
2. Run System Update
3. Monitor System Logs
4. Exit
=====
Choose an option: 2
Updating system...
Hit:1 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:2 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
All packages are up to date.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Do you want to remove deprecated packages that were installed as dependencies but are no longer needed? (y/n)
y
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
System updated and cleaned successfully.

```

```
satya_2004@SATYA:~/bash_maintenance_suite/scripts$ ./menu.sh
===== SYSTEM MAINTENANCE SUITE =====
1. Run Backup
2. Run System Update
3. Monitor System Logs
4. Exit
=====
Choose an option: 2
Updating system...
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
All packages are up to date.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Do you want to remove deprecated packages that were installed as dependencies but are no longer needed? (y/n)
n
Skipping package removal and cleanup.
System updated and cleaned successfully.
satya_2004@SATYA:~/bash_maintenance_suite/scripts$ |
```

#### 4.4 Log Monitoring Script

```
satya_2004@SATYA:~/bash_maintenance_suite/scripts$ ./menu.sh
===== SYSTEM MAINTENANCE SUITE =====
1. Run Backup
2. Run System Update
3. Monitor System Logs
4. Exit
=====
Choose an option: 2
Updating system...
Hit:1 http://archive.ubuntu.com/ubuntu noble InRelease
Hit:2 http://security.ubuntu.com/ubuntu noble-security InRelease
Hit:3 http://archive.ubuntu.com/ubuntu noble-updates InRelease
Hit:4 http://archive.ubuntu.com/ubuntu noble-backports InRelease
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
All packages are up to date.
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
Calculating upgrade... Done
0 upgraded, 0 newly installed, 0 to remove and 0 not upgraded.
Do you want to remove deprecated packages that were installed as dependencies but are no longer needed? (y/n)
n
Skipping package removal and cleanup.
System updated and cleaned successfully.
satya_2004@SATYA:~/bash_maintenance_suite/scripts$ |
```