



# **Automated System Update Management with Bash Scripts**

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# Technology Stack

Ubuntu-Client – The operating system where the scripts were developed and tested.

Bash – The scripting language used to automate system updates.

APT (Advanced Package Tool) – The package management tool used for installing and updating software packages on Debian-based systems.

Cron – A scheduling service used to run the scripts regularly.

Logging – Implemented to track the update process and identify potential issues.

## Project Overview

Welcome to my project!

Thank you for taking the time to explore my portfolio. Regular system updates are crucial to patch security vulnerabilities, ensure stability, and integrate new features. In this project, I developed Bash scripts to automate the system update process. The scripts perform the following tasks:

- Update the package lists.
- Install the latest updates.
- Log the entire process to ensure all steps are traceable.

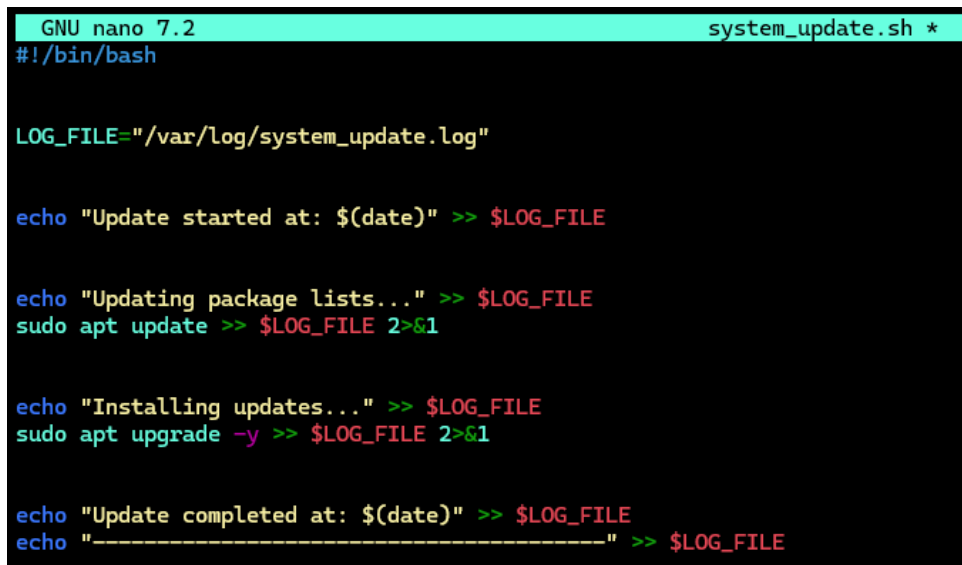
Automation reduces manual effort, minimizes human error, and ensures systems are always up to date.

# Implementation Steps

I wrote a Bash script that performs the following tasks:

- Updates the package lists using apt update.
- Installs available updates using apt upgrade.
- Logs the results to a log file.

The script saves all output to the file /var/log/system\_update.log. See Figure 1.



```
GNU nano 7.2 system_update.sh *
#!/bin/bash

LOG_FILE="/var/log/system_update.log"

echo "Update started at: $(date)" >> $LOG_FILE

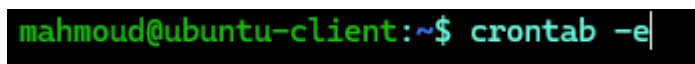
echo "Updating package lists..." >> $LOG_FILE
sudo apt update >> $LOG_FILE 2>&1

echo "Installing updates..." >> $LOG_FILE
sudo apt upgrade -y >> $LOG_FILE 2>&1

echo "Update completed at: $(date)" >> $LOG_FILE
echo "-----" >> $LOG_FILE
```

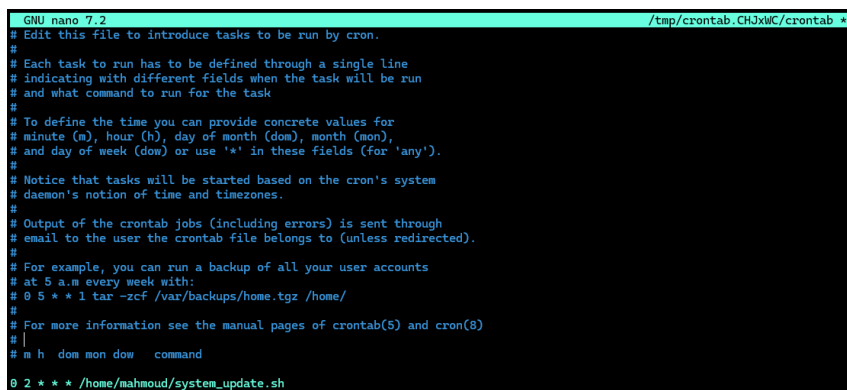
Figure 1: Bash Script for System Updates

To ensure the script runs regularly, I set up a Cron job. The Cron job runs the script daily at 2:00 AM. See Figure 2 and 3.



```
mahmoud@ubuntu-client:~$ crontab -e
```

Figure 2: New Cronjob for updates



```
GNU nano 7.2 /tmp/crontab.CHJxwC/crontab *
# Edit this file to introduce tasks to be run by cron.
#
# Each task to run has to be defined through a single line
# indicating with different fields when the task will be run
# and what command to run for the task
#
# To define the time you can provide concrete values for
# minute (m), hour (h), day of month (dom), month (mon),
# and day of week (dow) or use '*' in these fields (for 'any').
#
# Notice that tasks will be started based on the cron's system
# daemon's notion of time and timezones.
#
# Output of the crontab jobs (including errors) is sent through
# email to the user the crontab file belongs to (unless redirected).
#
# For example, you can run a backup of all your user accounts
# at 5 a.m every week with:
# 0 5 * * 1 tar -zcf /var/backups/home.tgz /home/
#
# For more information see the manual pages of crontab(5) and cron(8)
#
# m h dom mon dow   command
0 2 * * * /home/mahmoud/system_update.sh
```

Figure 3: Add Bash script path

After implementation, I tested the script to ensure it worked as expected. I simulated the Cron job and checked the log file to verify that all steps were executed correctly. See Figure 4 and 5.

```
mahmoud@ubuntu-client:~$ sudo bash /home/mahmoud/system_update.sh
```

Figure 4: Run Bash script

```
mahmoud@ubuntu-client:~$ cat /var/log/system_update.log
Update started at: Mon Jun 30 01:29:05 PM CEST 2025
Updating package lists...

WARNING: apt does not have a stable CLI interface. Use with caution in scripts.

Hit:1 http://de.archive.ubuntu.com/ubuntu noble InRelease
Get:2 http://de.archive.ubuntu.com/ubuntu noble-updates InRelease [126 kB]
Hit:3 http://de.archive.ubuntu.com/ubuntu noble-backports InRelease
Get:4 http://de.archive.ubuntu.com/ubuntu noble-updates/main amd64 Packages [1,170 kB]
Get:5 http://de.archive.ubuntu.com/ubuntu noble-updates/main Translation-en [246 kB]
Get:6 http://de.archive.ubuntu.com/ubuntu noble-updates/restricted amd64 Packages [1,279 kB]
Get:7 http://de.archive.ubuntu.com/ubuntu noble-updates/restricted Translation-en [272 kB]
Hit:8 http://security.ubuntu.com/ubuntu noble-security InRelease
Fetched 3,093 kB in 1s (2,067 kB/s)
Reading package lists...
Building dependency tree...
Reading state information...
All packages are up to date.
```

Figure 5: The Contents of system\_update.log file