

Linux Lab Midterm Project

Daily User Log Archiver

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Course: B.Tech CSE

Project Type: Shell Scripting

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Goal

Create a **shell script** that:

- Logs current system information (user, date, processes, disk usage)
- Rotates and archives old logs weekly
- Runs automatically every day using a **cron job**

Implementation Details

1. Identify User

The script identifies the user executing it using:

```
whoami
```

Example:

```
echo "User: $(whoami)"
```

2. File Management

Logs are stored in:

`~/daily_logs/log_YYYY-MM-DD.txt`

A new file is created every day, containing:

- Current date and time
- Logged-in user
- System uptime
- Top 5 CPU-consuming processes
- Disk usage summary
- Kernel/system messages (via `dmesg`)

3. Archiving

- Logs older than **7 days** are moved to `~/daily_logs/archive`
- Every **Sunday**, the archive directory is compressed into:

`weekly_logs_YYYY-WW.tar.gz`

4. Loop and Conditions

The script uses a loop to check each log's age and move it if older than 7 days:

```
for file in log_*.txt; do
    if [ condition-to-check-age ]; then
        mv "$file" archive/
    fi
done
```

Optimized version uses:

```
find "${LOG_DIR}" -maxdepth 1 -type f -name 'log_*.txt' -mtime +7 -print0 | while IFS= read -r file; do mv "$file" "${ARCHIVE_DIR}"/"${file##*_}" done
```

Full Shell Script

```
#!/usr/bin/env bash
# daily_log.sh Daily User Log Archiver

set -u
BASE_DIR="${HOME}/daily_logs"
LOG_DIR="${BASE_DIR}/logs"
ARCHIVE_DIR="${BASE_DIR}/archive"
LOCKDIR="${BASE_DIR}/.lock"
WEEKLY_DIR="${BASE_DIR}"
TODAY="$(date +%Y-%m-%d)"
LOGFILE="log_${TODAY}.txt"
LOGPATH="${LOG_DIR}/${LOGFILE}"
WEEK_TAG="$(date +%Y-%V)"

mkdir -p "${LOG_DIR}" "${ARCHIVE_DIR}" || { echo "Failed to create log dirs"; exit 1; }

acquire_lock() {
    if mkdir "${LOCKDIR}" 2>/dev/null; then
        return 0
    else
        echo "Another instance is running."
        exit 1
    fi
}
release_lock() {
    rm -rf "${LOCKDIR}"
}

write_log() {
{
    echo "==== Daily User Log ==="
    echo "Date: $(date --iso-8601=seconds)"
    echo "User: $(whoami)"
    echo
    echo "--- Uptime ---"
    uptime
    echo
    echo "--- Top 5 CPU processes ---"
    ps -eo pid,comm,%cpu,%mem --sort=-%cpu | head -n 6
    echo
}
```

```

echo "--- Disk Usage ---"
df -h
echo
echo "--- Log Directory Size ---"
du -sh "${LOG_DIR}" 2>/dev/null
echo
echo "--- Recent Kernel Messages ---"
if command -v dmesg >/dev/null 2>&1; then
    dmesg | tail -n 50
else
    echo "(dmesg not available)"
fi
echo
echo "==== End of Log ===="
} > "${LOGPATH}"
echo "Log written: ${LOGPATH}"
}

rotate_old_logs() {
    find "${LOG_DIR}" -maxdepth 1 -type f -name 'log_*.txt' -mtime +7 -print0 | while IFS= read -r file
    mv -v "$file" "${ARCHIVE_DIR}/"
done
}

weekly_archive_if_sunday() {
    if [ "$(date +%u)" -eq 7 ]; then
        if [ "$(find "${ARCHIVE_DIR}" -type f | wc -l)" -gt 0 ]; then
            TARNAME="${WEEKLY_DIR}/weekly_logs_${WEEK_TAG}.tar.gz"
            tar -czf "${TARNAME}" -C "${ARCHIVE_DIR}" .
            echo "Created weekly archive: ${TARNAME}"
            find "${ARCHIVE_DIR}" -type f -delete
            echo "Cleared archive directory."
        else
            echo "No files to archive."
        fi
    fi
}

show_menu() {
    cat <<MENU
Daily Log Archiver Menu:
1) Create today's log
2) Rotate old logs

```

```

3) Create weekly archive
4) View latest log
0) Exit
MENU

read -r choice
case "${choice}" in
  1) main ;;
  2) rotate_old_logs ;;
  3) weekly_archive_if_sunday ;;
  4) ls -1t "${LOG_DIR}" | head -n1 | xargs -I{} cat "${LOG_DIR}/{}" ;;
  0) release_lock; exit 0 ;;
  *) echo "Invalid choice." ;;
esac
}

main() {
  acquire_lock
  write_log
  rotate_old_logs
  weekly_archive_if_sunday
  release_lock
}

if [ "${1:-}" = "menu" ]; then
  acquire_lock
  show_menu
  release_lock
  exit 0
fi

main
exit 0

```

Cron Job Setup

To schedule the script to run daily at 8 PM:

```
crontab -e
```

Add the line:

```
0 20 * * * /home/user/daily_log.sh >/dev/null 2>&1
```

Confirm with:

```
crontab -l
```

Directory Structure

```
~/daily_logs/
|
+-- logs/
|   +- log_2025-10-01.txt
|   +- log_2025-10-02.txt
|   +- ...
|
+-- archive/
|   +- log_2025-09-25.txt
|   +- ...
|
+-- weekly_logs_2025-42.tar.gz
```

Optional Enhancements

1. Email Logs Automatically

```
echo "Log attached" | mail -s "Daily Log" -a "$LOGPATH" user@example.com
```

2. Error Handling

- Script checks if directories exist before writing.
- Uses a lock (.lock) to avoid concurrent runs.

3. Interactive Menu

- Case-based menu allows manual logging, archiving, and viewing.

Commands Used

Feature	Command	Purpose
Identify User	whoami	Get current username
Date Format	date +%Y-%m-%d	Create timestamped filenames
Disk Usage	df -h	Human-readable disk usage
Process List	`ps -eo pid,comm,%cpu,%mem --sort=-%cpu	head -n 6`
File Search	find . -name "log_*.txt" -mtime +7	Find logs older than 7 days
Archiving	tar -czf	Compress weekly logs
Scheduling	crontab -e	Automate daily execution

Learning Outcomes

- Practical experience with **shell scripting**, **loops**, and **conditions**
- Understanding of **cron jobs** for automation
- Use of **system commands** (ps , df , find , tar)
- Managing **file I/O** and **directory structures**
- Basic **error handling** and **process synchronization**

Conclusion

The *Daily User Log Archiver* efficiently:

- Automates daily system monitoring
- Reduces manual log management
- Demonstrates file handling, archiving, scheduling, and automation concepts

This project encapsulates key Linux administration skills through scripting.