Linux_Lab_Midterm_Project_Hrithvik_Bhardwaj

📓 Linux Lab Midterm Project

Daily User Log Archiver

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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)"
```

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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`)

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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
```

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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 -d $'' file; do
  mv "$file" "${ARCHIVE_DIR}/"
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 -d $'' file; do
    mv -v "$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
```

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.