Time: 1 Hour

Project Overview: Develop a comprehensive shell script for sysops to automate system monitoring and generate detailed reports. The script will leverage advanced Linux shell scripting techniques to monitor system metrics, capture logs, and provide actionable insights for system administrators.

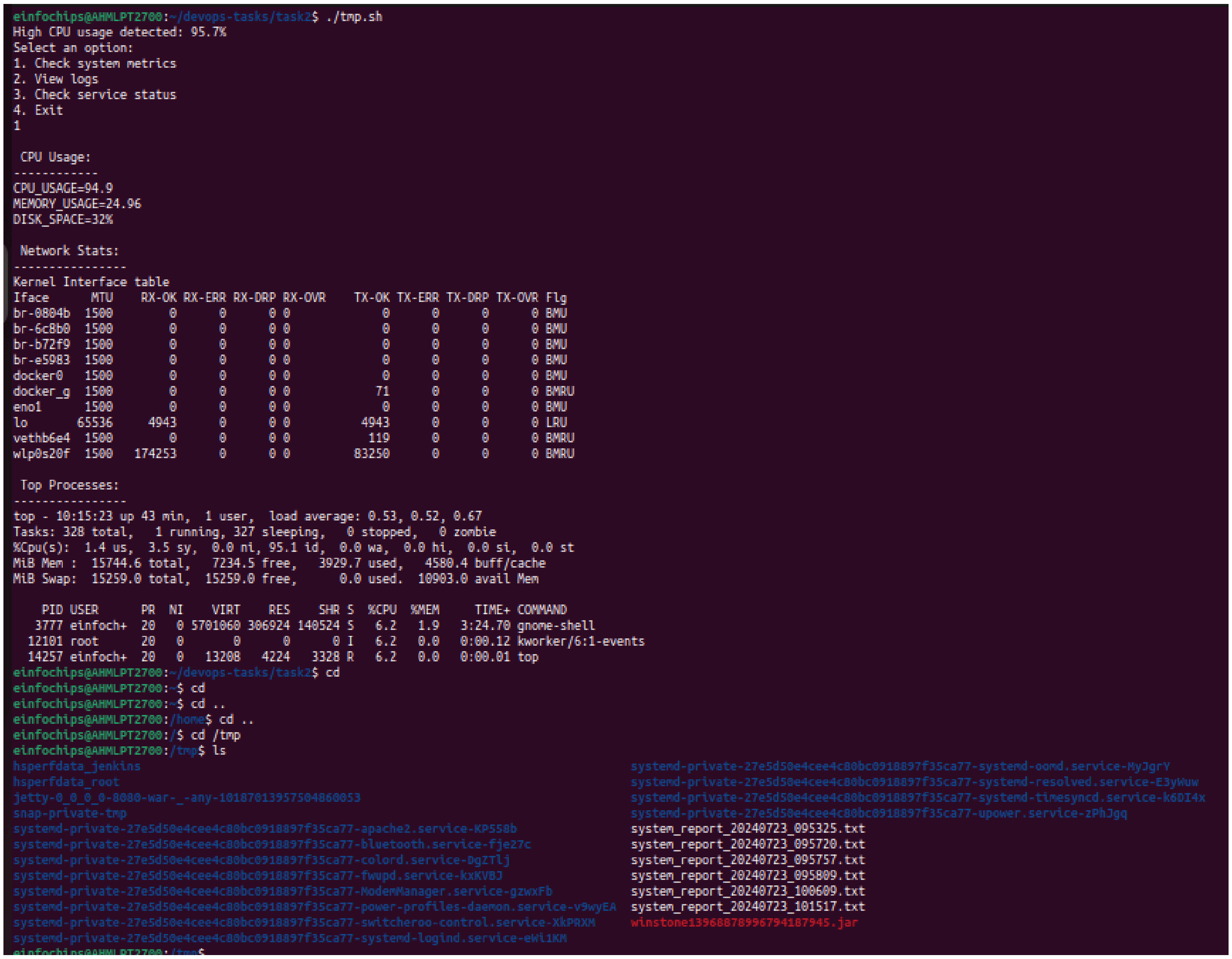
Deliverables:

1. **Script Initialization:**
   - Initialize script with necessary variables and configurations.
   - Validate required commands and utilities availability.
2. **System Metrics Collection:**
   - Monitor CPU usage, memory utilization, disk space, and network statistics.
   - Capture process information including top processes consuming resources.
3. **Log Analysis:**
   - Parse system logs (e.g., syslog) for critical events and errors.
   - Generate summaries of recent log entries based on severity.
4. **Health Checks:**
   - Check the status of essential services (e.g., Apache, MySQL).
   - Verify connectivity to external services or databases.
5. **Alerting Mechanism:**
   - Implement thresholds for critical metrics (CPU, memory) triggering alerts.
   - Send email notifications to sysadmins with critical alerts.
6. **Report Generation:**
   - Compile all collected data into a detailed report.
   - Include graphs or visual representations where applicable.
7. **Automation and Scheduling:**
   - Configure the script to run periodically via cron for automated monitoring.
   - Ensure the script can handle both interactive and non-interactive execution modes.
8. **User Interaction:**
   - Provide options for interactive mode to allow sysadmins to manually trigger checks or view specific metrics.
   - Ensure the script is user-friendly with clear prompts and outputs.
9. **Documentation:**
   - Create a README file detailing script usage, prerequisites, and customization options.
   - Include examples of typical outputs and how to interpret them.

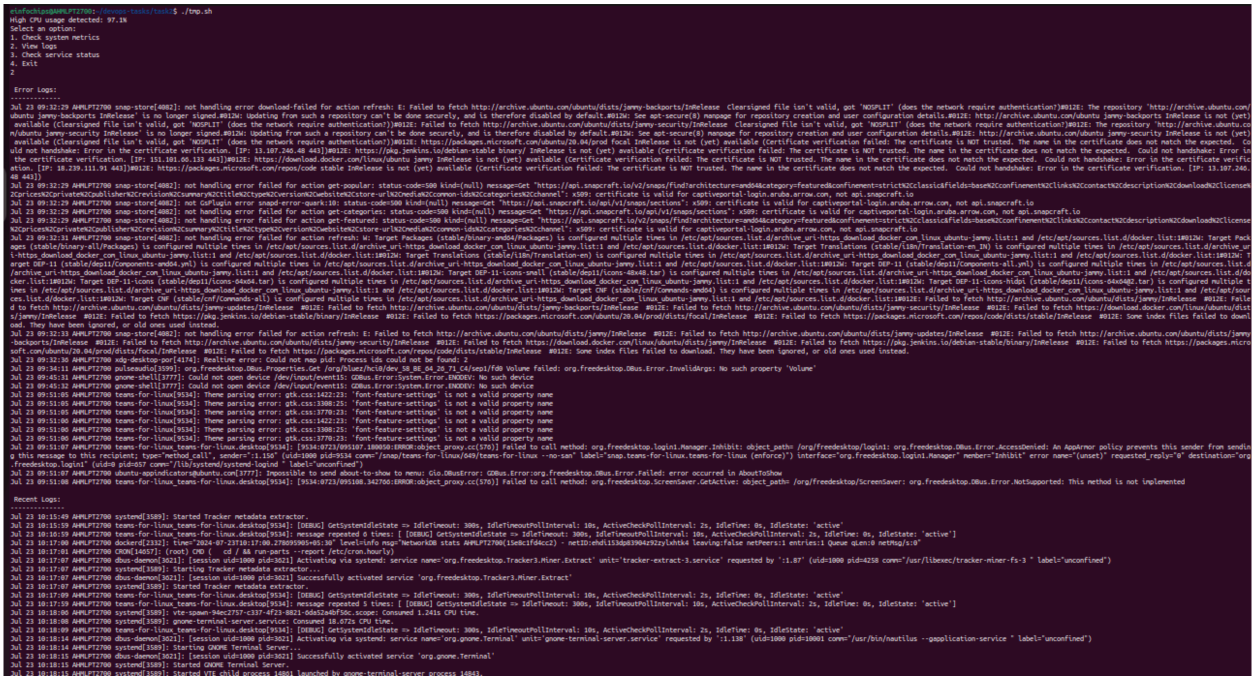
Optional Enhancements (if time permits):

- **Database Integration:**
  - Store collected metrics in a database for historical analysis.

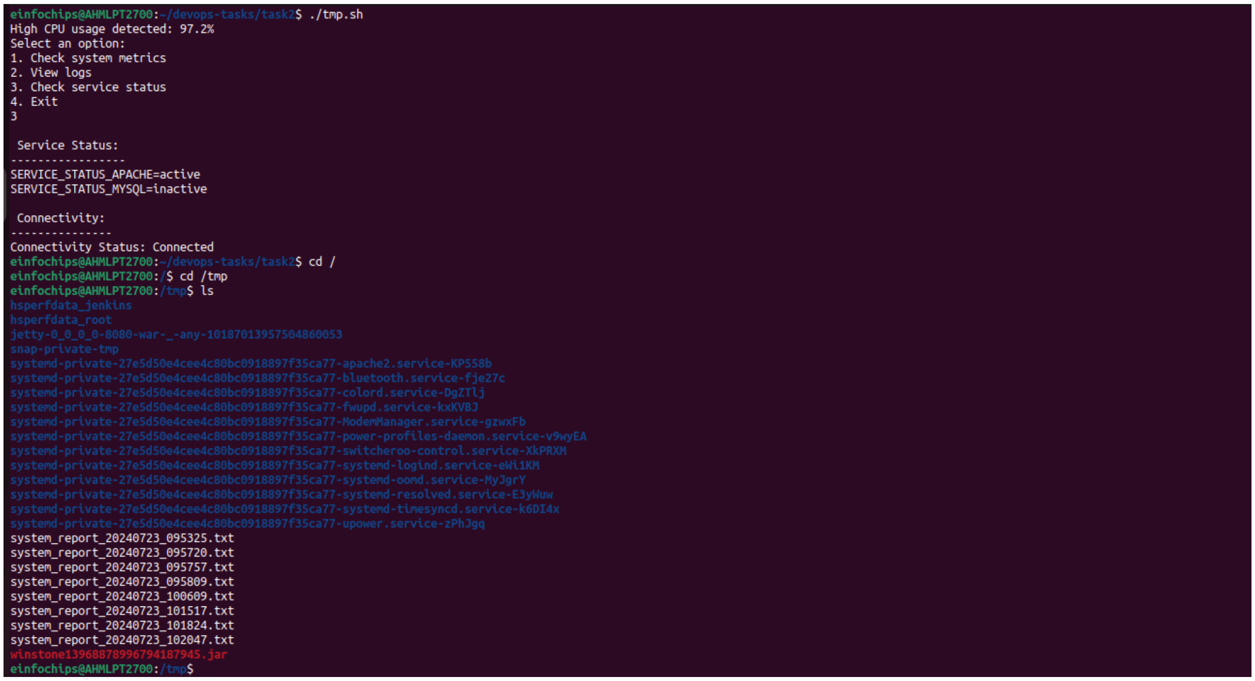
- **Web Interface:**
  - Develop a basic web interface using shell scripting (with CGI) for remote monitoring and reporting.
- **Customization:**
  - Allow customization of thresholds and monitoring parameters via configuration files.



```
einfochips@AHMLPT2700:~/devops-tasks/task2$ ./tmp.sh
High CPU usage detected: 95.7%
Select an option:
1. Check system metrics
2. View logs
3. Check service status
4. Exit
1

 CPU Usage:
------------
CPU_USAGE=94.9
MEMORY_USAGE=24.96
DISK_SPACE=32%

 Network Stats:
----------------
Kernel Interface table
Iface      MTU    RX-OK RX-ERR RX-DRP RX-OVR    TX-OK TX-ERR TX-DRP TX-OVR Flg
br-0804b  1500        0      0      0 0             0      0      0      0 BMU
br-6c8b0  1500        0      0      0 0             0      0      0      0 BMU
br-b72f9  1500        0      0      0 0             0      0      0      0 BMU
br-e5983  1500        0      0      0 0             0      0      0      0 BMU
docker0   1500        0      0      0 0             0      0      0      0 BMU
docker_g  1500        0      0      0 0            71      0      0      0 BMRU
eno1      1500        0      0      0 0             0      0      0      0 BMU
lo       65536     4943      0      0 0          4943      0      0      0 LRU
vethb6e4  1500        0      0      0 0           119      0      0      0 BMRU
wlp0s20f  1500   174253      0      0 0         83250      0      0      0 BMRU

 Top Processes:
----------------
top - 10:15:23 up 43 min,  1 user,  load average: 0.53, 0.52, 0.67
Tasks: 328 total,   1 running, 327 sleeping,   0 stopped,   0 zombie
%Cpu(s):  1.4 us,  3.5 sy,  0.0 ni, 95.1 id,  0.0 wa,  0.0 hi,  0.0 si,  0.0 st
MiB Mem :  15744.6 total,   7234.5 free,   3929.7 used,   4580.4 buff/cache
MiB Swap:  15259.0 total,  15259.0 free,      0.0 used.  10903.0 avail Mem

    PID USER      PR  NI    VIRT    RES    SHR S  %CPU  %MEM     TIME+ COMMAND
   3777 einfoch+  20   0 5701060 306924 140524 S   6.2   1.9   3:24.70 gnome-shell
  12101 root      20   0       0      0      0 I   6.2   0.0   0:00.12 kworker/6:1-events
  14257 einfoch+  20   0   13208   4224   3328 R   6.2   0.0   0:00.01 top
einfochips@AHMLPT2700:~/devops-tasks/task2$ cd
einfochips@AHMLPT2700:~$ cd
einfochips@AHMLPT2700:~$ cd ..
einfochips@AHMLPT2700:/home$ cd ..
einfochips@AHMLPT2700:/$ cd /tmp
einfochips@AHMLPT2700:/tmp$ ls
hsperfdata_jenkins                                                                     systemd-private-27e5d50e4cee4c80bc0918897f35ca77-systemd-oomd.service-MyJgrY
hsperfdata_root                                                                        systemd-private-27e5d50e4cee4c80bc0918897f35ca77-systemd-resolved.service-E3yWuw
jetty-0_0_0_0-8080-war-_-any-10187013957504860053                                      systemd-private-27e5d50e4cee4c80bc0918897f35ca77-systemd-timesyncd.service-k6DI4x
snap-private-tmp                                                                       systemd-private-27e5d50e4cee4c80bc0918897f35ca77-upower.service-zPhJgq
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-apache2.service-KP558b                system_report_20240723_095325.txt
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-bluetooth.service-fje27c              system_report_20240723_095720.txt
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-colord.service-DgZTlj                 system_report_20240723_095757.txt
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-fwupd.service-kxKVBJ                  system_report_20240723_095809.txt
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-ModemManager.service-gzwxFb           system_report_20240723_100609.txt
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-power-profiles-daemon.service-v9wyEA  system_report_20240723_101517.txt
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-switcheroo-control.service-XkPRXM     winstone13968878996794187945.jar
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-systemd-logind.service-eWi1KM
einfochips@AHMLPT2700:/tmp$
```



```
einfochips@AHMLPT2700:~/devops-tasks/task2$ ./tmp.sh
High CPU usage detected: 97.1%
Select an option:
1. Check system metrics
2. View logs
3. Check service status
4. Exit
2

 Error Logs:
-------------
Jul 23 09:32:29 AHMLPT2700 snap-store[4082]: not handling error download-failed for action refresh: E: Failed to fetch http://archive.ubuntu.com/ubuntu/dists/jammy-backports/InRelease  Clearsigned file isn't valid, got 'NOSPLIT' (does the network require authentication?)#012E: The repository 'http://archive.ubuntu.com/
ubuntu jammy-backports InRelease' is no longer signed.#012W: Updating from such a repository can't be done securely, and is therefore disabled by default.#012W: See apt-secure(8) manpage for repository creation and user configuration details.#012E: http://archive.ubuntu.com/ubuntu jammy-backports InRelease is not (yet)
 available (Clearsigned file isn't valid, got 'NOSPLIT' (does the network require authentication?))#012E: Failed to fetch http://archive.ubuntu.com/ubuntu/dists/jammy-security/InRelease  Clearsigned file isn't valid, got 'NOSPLIT' (does the network require authentication?)#012E: The repository 'http://archive.ubuntu.co
m/ubuntu jammy-security InRelease' is no longer signed.#012W: Updating from such a repository can't be done securely, and is therefore disabled by default.#012W: See apt-secure(8) manpage for repository creation and user configuration details.#012E: http://archive.ubuntu.com/ubuntu jammy-security InRelease is not (yet)
 available (Clearsigned file isn't valid, got 'NOSPLIT' (does the network require authentication?))#012E: https://packages.microsoft.com/ubuntu/20.04/prod focal InRelease is not (yet) available (Certificate verification failed: The certificate is NOT trusted. The name in the certificate does not match the expected.  Co
uld not handshake: Error in the certificate verification. [IP: 13.107.246.48 443])#012E: https://pkg.jenkins.io/debian-stable binary/ InRelease is not (yet) available (Certificate verification failed: The certificate is NOT trusted. The name in the certificate does not match the expected.  Could not handshake: Error in
 the certificate verification. [IP: 151.101.66.133 443])#012E: https://download.docker.com/linux/ubuntu jammy InRelease is not (yet) available (Certificate verification failed: The certificate is NOT trusted. The name in the certificate does not match the expected.  Could not handshake: Error in the certificate verific
ation. [IP: 18.239.111.91 443])#012E: https://packages.microsoft.com/repos/code stable InRelease is not (yet) available (Certificate verification failed: The certificate is NOT trusted. The name in the certificate does not match the expected.  Could not handshake: Error in the certificate verification. [IP: 13.107.246.
48 443])
Jul 23 09:32:29 AHMLPT2700 snap-store[4082]: not handling error failed for action get-popular: status-code=500 kind=(null) message=Get "https://api.snapcraft.io/v2/snaps/find?architecture=amd64&category=featured&confinement=strict%2Cclassic&fields=base%2Cconfinement%2Clinks%2Ccontact%2Cdescription%2Cdownload%2Clicense%
2Cprices%2Cprivate%2Cpublisher%2Crevision%2Csummary%2Ctitle%2Ctype%2Cversion%2Cwebsite%2Cstore-url%2Cmedia%2Ccommon-ids%2Ccategories%2Cchannel": x509: certificate is valid for captiveportal-login.aruba.arrow.com, not api.snapcraft.io
Jul 23 09:32:29 AHMLPT2700 snap-store[4082]: not GsPlugin error snapd-error-quark:10: status-code=500 kind=(null) message=Get "https://api.snapcraft.io/api/v1/snaps/sections": x509: certificate is valid for captiveportal-login.aruba.arrow.com, not api.snapcraft.io
Jul 23 09:32:29 AHMLPT2700 snap-store[4082]: not handling error failed for action get-categories: status-code=500 kind=(null) message=Get "https://api.snapcraft.io/api/v1/snaps/sections": x509: certificate is valid for captiveportal-login.aruba.arrow.com, not api.snapcraft.io
Jul 23 09:32:29 AHMLPT2700 snap-store[4082]: not handling error failed for action get-featured: status-code=500 kind=(null) message=Get "https://api.snapcraft.io/v2/snaps/find?architecture=amd64&category=featured&confinement=strict%2Cclassic&fields=base%2Cconfinement%2Clinks%2Ccontact%2Cdescription%2Cdownload%2Clicense
%2Cprices%2Cprivate%2Cpublisher%2Crevision%2Csummary%2Ctitle%2Ctype%2Cversion%2Cwebsite%2Cstore-url%2Cmedia%2Ccommon-ids%2Ccategories%2Cchannel": x509: certificate is valid for captiveportal-login.aruba.arrow.com, not api.snapcraft.io
Jul 23 09:32:31 AHMLPT2700 snap-store[4082]: not handling error failed for action refresh: W: Target Packages (stable/binary-amd64/Packages) is configured multiple times in /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-jammy.list:1 and /etc/apt/sources.list.d/docker.list:1#012W: Target Pack
ages (stable/binary-all/Packages) is configured multiple times in /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-jammy.list:1 and /etc/apt/sources.list.d/docker.list:1#012W: Target Translations (stable/i18n/Translation-en_IN) is configured multiple times in /etc/apt/sources.list.d/archive_ur
i-https_download_docker_com_linux_ubuntu-jammy.list:1 and /etc/apt/sources.list.d/docker.list:1#012W: Target Translations (stable/i18n/Translation-en) is configured multiple times in /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-jammy.list:1 and /etc/apt/sources.list.d/docker.list:1#012W: T
arget DEP-11 (stable/dep11/Components-amd64.yml) is configured multiple times in /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-jammy.list:1 and /etc/apt/sources.list.d/docker.list:1#012W: Target DEP-11 (stable/dep11/Components-all.yml) is configured multiple times in /etc/apt/sources.list.d
/archive_uri-https_download_docker_com_linux_ubuntu-jammy.list:1 and /etc/apt/sources.list.d/docker.list:1#012W: Target DEP-11-icons-small (stable/dep11/icons-48x48.tar) is configured multiple times in /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-jammy.list:1 and /etc/apt/sources.list.d/do
cker.list:1#012W: Target DEP-11-icons (stable/dep11/icons-64x64.tar) is configured multiple times in /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-jammy.list:1 and /etc/apt/sources.list.d/docker.list:1#012W: Target DEP-11-icons-hidpi (stable/dep11/icons-64x64@2.tar) is configured multiple t
imes in /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-jammy.list:1 and /etc/apt/sources.list.d/docker.list:1#012W: Target CNF (stable/cnf/Commands-amd64) is configured multiple times in /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-jammy.list:1 and /etc/apt/sour
ces.list.d/docker.list:1#012W: Target CNF (stable/cnf/Commands-all) is configured multiple times in /etc/apt/sources.list.d/archive_uri-https_download_docker_com_linux_ubuntu-jammy.list:1 and /etc/apt/sources.list.d/docker.list:1#012E: Failed to fetch http://archive.ubuntu.com/ubuntu/dists/jammy/InRelease  #012E: Faile
d to fetch http://archive.ubuntu.com/ubuntu/dists/jammy-updates/InRelease  #012E: Failed to fetch http://archive.ubuntu.com/ubuntu/dists/jammy-backports/InRelease  #012E: Failed to fetch http://archive.ubuntu.com/ubuntu/dists/jammy-security/InRelease  #012E: Failed to fetch https://download.docker.com/linux/ubuntu/dist
s/jammy/InRelease  #012E: Failed to fetch https://pkg.jenkins.io/debian-stable/binary/InRelease  #012E: Failed to fetch https://packages.microsoft.com/ubuntu/20.04/prod/dists/focal/InRelease  #012E: Failed to fetch https://packages.microsoft.com/repos/code/dists/stable/InRelease  #012E: Some index files failed to downl
oad. They have been ignored, or old ones used instead.
Jul 23 09:32:33 AHMLPT2700 snap-store[4082]: not handling error failed for action refresh: E: Failed to fetch http://archive.ubuntu.com/ubuntu/dists/jammy/InRelease  #012E: Failed to fetch http://archive.ubuntu.com/ubuntu/dists/jammy-updates/InRelease  #012E: Failed to fetch http://archive.ubuntu.com/ubuntu/dists/jammy
-backports/InRelease  #012E: Failed to fetch http://archive.ubuntu.com/ubuntu/dists/jammy-security/InRelease  #012E: Failed to fetch https://download.docker.com/linux/ubuntu/dists/jammy/InRelease  #012E: Failed to fetch https://pkg.jenkins.io/debian-stable/binary/InRelease  #012E: Failed to fetch https://packages.micro
soft.com/ubuntu/20.04/prod/dists/focal/InRelease  #012E: Failed to fetch https://packages.microsoft.com/repos/code/dists/stable/InRelease  #012E: Some index files failed to download. They have been ignored, or old ones used instead.
Jul 23 09:32:36 AHMLPT2700 xdg-desktop-por[4174]: Realtime error: Could not map pid: Process ids could not be found: 2
Jul 23 09:34:11 AHMLPT2700 pulseaudio[3599]: org.freedesktop.DBus.Properties.Get /org/bluez/hci0/dev_58_BE_64_26_71_C4/sep1/fd0 Volume failed: org.freedesktop.DBus.Error.InvalidArgs: No such property 'Volume'
Jul 23 09:45:31 AHMLPT2700 gnome-shell[3777]: Could not open device /dev/input/event15: GDBus.Error:System.Error.ENODEV: No such device
Jul 23 09:45:32 AHMLPT2700 gnome-shell[3777]: Could not open device /dev/input/event15: GDBus.Error:System.Error.ENODEV: No such device
Jul 23 09:51:05 AHMLPT2700 teams-for-linux[9534]: Theme parsing error: gtk.css:1422:23: 'font-feature-settings' is not a valid property name
Jul 23 09:51:05 AHMLPT2700 teams-for-linux[9534]: Theme parsing error: gtk.css:3308:25: 'font-feature-settings' is not a valid property name
Jul 23 09:51:05 AHMLPT2700 teams-for-linux[9534]: Theme parsing error: gtk.css:3770:23: 'font-feature-settings' is not a valid property name
Jul 23 09:51:06 AHMLPT2700 teams-for-linux[9534]: Theme parsing error: gtk.css:1422:23: 'font-feature-settings' is not a valid property name
Jul 23 09:51:06 AHMLPT2700 teams-for-linux[9534]: Theme parsing error: gtk.css:3308:25: 'font-feature-settings' is not a valid property name
Jul 23 09:51:06 AHMLPT2700 teams-for-linux[9534]: Theme parsing error: gtk.css:3770:23: 'font-feature-settings' is not a valid property name
Jul 23 09:51:07 AHMLPT2700 teams-for-linux_teams-for-linux.desktop[9534]: [9534:0723/095107.180050:ERROR:object_proxy.cc(576)] Failed to call method: org.freedesktop.login1.Manager.Inhibit: object_path= /org/freedesktop/login1: org.freedesktop.DBus.Error.AccessDenied: An AppArmor policy prevents this sender from sendin
g this message to this recipient; type="method_call", sender=":1.156" (uid=1000 pid=9534 comm="/snap/teams-for-linux/649/teams-for-linux --no-san" label="snap.teams-for-linux.teams-for-linux (enforce)") interface="org.freedesktop.login1.Manager" member="Inhibit" error name="(unset)" requested_reply="0" destination="org
.freedesktop.login1" (uid=0 pid=657 comm="/lib/systemd/systemd-logind " label="unconfined")
Jul 23 09:51:07 AHMLPT2700 ubuntu-appindicators@ubuntu.com[3777]: Impossible to send about-to-show to menu: Gio.DBusError: GDBus.Error:org.freedesktop.DBus.Error.Failed: error occurred in AboutToShow
Jul 23 09:51:08 AHMLPT2700 teams-for-linux_teams-for-linux.desktop[9534]: [9534:0723/095108.342766:ERROR:object_proxy.cc(576)] Failed to call method: org.freedesktop.ScreenSaver.GetActive: object_path= /org/freedesktop/ScreenSaver: org.freedesktop.DBus.Error.NotSupported: This method is not implemented

 Recent Logs:
--------------
Jul 23 10:15:49 AHMLPT2700 systemd[3589]: Started Tracker metadata extractor.
Jul 23 10:15:59 AHMLPT2700 teams-for-linux_teams-for-linux.desktop[9534]: [DEBUG] GetSystemIdleState => IdleTimeout: 300s, IdleTimeoutPollInterval: 10s, ActiveCheckPollInterval: 2s, IdleTime: 0s, IdleState: 'active'
Jul 23 10:16:59 AHMLPT2700 teams-for-linux_teams-for-linux.desktop[9534]: message repeated 6 times: [ [DEBUG] GetSystemIdleState => IdleTimeout: 300s, IdleTimeoutPollInterval: 10s, ActiveCheckPollInterval: 2s, IdleTime: 0s, IdleState: 'active']
Jul 23 10:17:00 AHMLPT2700 dockerd[2332]: time="2024-07-23T10:17:00.278095905+05:30" level=info msg="NetworkDB stats AHMLPT2700(15e8c1fd4cc2) - netID:ehdi153dp83904z92zylxhtk4 leaving:false netPeers:1 entries:1 Queue qLen:0 netMsg/s:0"
Jul 23 10:17:01 AHMLPT2700 CRON[14657]: (root) CMD (   cd / && run-parts --report /etc/cron.hourly)
Jul 23 10:17:07 AHMLPT2700 dbus-daemon[3621]: [session uid=1000 pid=3621] Activating via systemd: service name='org.freedesktop.Tracker3.Miner.Extract' unit='tracker-extract-3.service' requested by ':1.87' (uid=1000 pid=4258 comm="/usr/libexec/tracker-miner-fs-3 " label="unconfined")
Jul 23 10:17:07 AHMLPT2700 systemd[3589]: Starting Tracker metadata extractor...
Jul 23 10:17:07 AHMLPT2700 dbus-daemon[3621]: [session uid=1000 pid=3621] Successfully activated service 'org.freedesktop.Tracker3.Miner.Extract'
Jul 23 10:17:07 AHMLPT2700 systemd[3589]: Started Tracker metadata extractor.
Jul 23 10:17:09 AHMLPT2700 teams-for-linux_teams-for-linux.desktop[9534]: [DEBUG] GetSystemIdleState => IdleTimeout: 300s, IdleTimeoutPollInterval: 10s, ActiveCheckPollInterval: 2s, IdleTime: 0s, IdleState: 'active'
Jul 23 10:17:59 AHMLPT2700 teams-for-linux_teams-for-linux.desktop[9534]: message repeated 5 times: [ [DEBUG] GetSystemIdleState => IdleTimeout: 300s, IdleTimeoutPollInterval: 10s, ActiveCheckPollInterval: 2s, IdleTime: 0s, IdleState: 'active']
Jul 23 10:18:06 AHMLPT2700 systemd[3589]: vte-spawn-94ec2757-c337-4f23-8821-6da52a4bf56c.scope: Consumed 1.241s CPU time.
Jul 23 10:18:08 AHMLPT2700 systemd[3589]: gnome-terminal-server.service: Consumed 18.672s CPU time.
Jul 23 10:18:09 AHMLPT2700 teams-for-linux_teams-for-linux.desktop[9534]: [DEBUG] GetSystemIdleState => IdleTimeout: 300s, IdleTimeoutPollInterval: 10s, ActiveCheckPollInterval: 2s, IdleTime: 0s, IdleState: 'active'
Jul 23 10:18:14 AHMLPT2700 dbus-daemon[3621]: [session uid=1000 pid=3621] Activating via systemd: service name='org.gnome.Terminal' unit='gnome-terminal-server.service' requested by ':1.138' (uid=1000 pid=10001 comm="/usr/bin/nautilus --gapplication-service " label="unconfined")
Jul 23 10:18:14 AHMLPT2700 systemd[3589]: Starting GNOME Terminal Server...
Jul 23 10:18:15 AHMLPT2700 dbus-daemon[3621]: [session uid=1000 pid=3621] Successfully activated service 'org.gnome.Terminal'
Jul 23 10:18:15 AHMLPT2700 systemd[3589]: Started GNOME Terminal Server.
Jul 23 10:18:15 AHMLPT2700 systemd[3589]: Started VTE child process 14861 launched by gnome-terminal-server process 14843.
```



```
einfochips@AHMLPT2700:~/devops-tasks/task2$ ./tmp.sh
High CPU usage detected: 97.2%
Select an option:
1. Check system metrics
2. View logs
3. Check service status
4. Exit
3

 Service Status:
----------------
SERVICE_STATUS_APACHE=active
SERVICE_STATUS_MYSQL=inactive

 Connectivity:
---------------
Connectivity Status: Connected
einfochips@AHMLPT2700:~/devops-tasks/task2$ cd /
einfochips@AHMLPT2700:/$ cd /tmp
einfochips@AHMLPT2700:/tmp$ ls
hsperfdata_jenkins
hsperfdata_root
jetty-0_0_0_0-8080-war-_-any-10187013957504860053
snap-private-tmp
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-apache2.service-KP558b
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-bluetooth.service-fje27c
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-colord.service-DgZTlj
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-fwupd.service-kxKVBJ
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-ModemManager.service-gzwxFb
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-power-profiles-daemon.service-v9wyEA
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-switcheroo-control.service-XkPRXM
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-systemd-logind.service-eWi1KM
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-systemd-oomd.service-MyJgrY
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-systemd-resolved.service-E3yWuw
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-systemd-timesyncd.service-k6DI4x
systemd-private-27e5d50e4cee4c80bc0918897f35ca77-upower.service-zPhJgq
system_report_20240723_095325.txt
system_report_20240723_095720.txt
system_report_20240723_095757.txt
system_report_20240723_095809.txt
system_report_20240723_100609.txt
system_report_20240723_101517.txt
system_report_20240723_101824.txt
system_report_20240723_102047.txt
winstone13968878996794187945.jar
einfochips@AHMLPT2700:/tmp$
```

1. Continuous Integration and Continuous Deployment (CI/CD)

- **Scenario**: A software development team wants to automate the build, test, and deployment process to ensure faster and more reliable releases.

- **Solution**: Jenkins can be configured to automatically pull code from a version control system (like Git), build the code, run tests, and deploy the application to various environments (staging, production, etc.).
- **Steps**:
    1. Configure Jenkins to trigger a build when changes are pushed to the repository.
    2. Set up build steps to compile the code and run unit tests.
    3. Integrate with tools like JUnit for test reporting.
    4. Deploy the built application to the desired environment using plugins for Docker, Kubernetes, or cloud services like AWS, Azure, or GCP.

2. Automating Code Quality Checks

- **Scenario**: A team wants to ensure that every code commit meets specific quality standards before merging it into the main branch.
- **Solution**: Use Jenkins to run static code analysis tools like SonarQube, Checkstyle, or PMD as part of the CI pipeline.
- **Steps**:
    1. Configure Jenkins to trigger a build on pull request creation.
    2. Integrate static code analysis tools into the build process.
    3. Generate reports and fail the build if code quality metrics do not meet predefined thresholds.
    4. Send feedback to the development team via email or Slack.

3. Automated Testing

- **Scenario**: A QA team wants to run automated tests on multiple environments and devices to ensure the software works as expected.
- **Solution**: Jenkins can run automated test suites using tools like Selenium, JUnit, TestNG, or Appium.
- **Steps**:
    1. Configure Jenkins to trigger test runs on schedule or after a build.
    2. Use Jenkins agents to run tests on different platforms (Windows, Linux, macOS) or devices (emulators, real devices).
    3. Collect and publish test results and logs.
    4. Notify stakeholders of test results via email or chat.

4. Infrastructure as Code (IaC)

- **Scenario**: A DevOps team wants to manage infrastructure using code and automate the provisioning of resources.
- **Solution**: Use Jenkins to automate the execution of IaC scripts written in tools like Terraform, Ansible, or CloudFormation.
- **Steps**:
    1. Store IaC scripts in a version control repository.

2. Configure Jenkins to trigger a job when changes are made to the IaC scripts.
3. Run the IaC scripts to provision or update infrastructure.
4. Monitor the job for successful completion and handle any errors.

5. Automated Deployment of Microservices

- **Scenario**: A team is developing a microservices-based architecture and needs to deploy multiple services independently.
- **Solution**: Jenkins can manage the build and deployment pipeline for each microservice.
- **Steps**:
    1. Configure a separate Jenkins job for each microservice.
    2. Trigger builds based on changes to individual repositories.
    3. Build Docker images for each microservice.
    4. Use Jenkins to deploy the images to a Kubernetes cluster or other container orchestration platform.

6. Monitoring and Alerting

- **Scenario**: An operations team wants to monitor the health and performance of Jenkins jobs and receive alerts for failures.
- **Solution**: Integrate Jenkins with monitoring and alerting tools like Grafana, Prometheus, or ELK Stack.
- **Steps**:
    1. Use Jenkins plugins to expose metrics to Prometheus.
    2. Set up Grafana dashboards to visualize Jenkins job performance.
    3. Configure alerting rules to notify the team of job failures or performance issues via email, Slack, or other communication tools.

7. Security and Compliance Automation

- **Scenario**: An organization needs to ensure that all code and deployments adhere to security and compliance standards.
- **Solution**: Use Jenkins to run security scans and compliance checks as part of the CI/CD pipeline.
- **Steps**:
    1. Integrate security tools like OWASP ZAP, Snyk, or Clair into the Jenkins pipeline.
    2. Run security scans on application code and container images.
    3. Generate reports and fail builds if vulnerabilities are detected.
    4. Automate compliance checks using scripts or tools like OpenSCAP.