

Overview of the problem:

Need to create a command designed for managing system resources and tasks. The new command will be called `sysopctl` and will focus on managing system services, processes, and system health.

General Instructions

1. Problem Solving Approach: The approach to solving the problem is at the discretion of the candidate.
2. Documentation: Use Draw.io to create workflow diagrams and system architecture visuals.
3. Version Control: All code and configuration files should be committed to a private Git repository.
4. Confidentiality: The documentation and code must not be shared with anyone outside of the project team, including colleagues.

Scenario

A customer requires a custom command to enhance their system administration capabilities. Your task is to develop a Bash script that acts as a Linux command to manage system resources effectively.

Command Specifications

- Command Name: `sysopctl`
- Command Version: `v0.1.0`

Section A: Documentation and Basic Features

- Manual Page:
 - o Create a detailed manual page for `sysopctl` so users can access full documentation using `man sysopctl`.
- Help Option:
 - o Implement a `--help` option that outlines usage and examples, akin to `sysopctl`

--help.

- Version Information:

- o Users should be able to view the command version with: `sysopctl --version`.

Section B: System Management Operations

Part 1 | Level Easy

- List Running Services:

- o Command: `$ sysopctl service list`

- o Expected Output: List of all active services, similar to `systemctl list-units --type=service`.

- View System Load:

- o Command: `$ sysopctl system load`

- o Expected Output: Current system load averages, akin to the output from the `uptime` command.

Part 2 | Level Intermediate

- Manage System Services:

- o Start a service: `$ sysopctl service start <service-name>`

- o Stop a service: `$ sysopctl service stop <service-name>`

- o Expected Output: Status updates confirming the start or stop of services, similar to `systemctl start/stop`.

- Check Disk Usage:

- o Command: `$ sysopctl disk usage`

- o Expected Output: Disk usage statistics by partition, similar to `df -h`.

Part 3 | Advanced Level

- Monitor System Processes:

- o Command: `$ sysopctl process monitor`

- o Expected Output: Real-time process activity, akin to `top` or `htop`.

- Analyze System Logs:

- o Command: `$ sysopctl logs analyze`

o Expected Output: Summary of recent critical log entries, utilizing tools like journalctl.

- Backup System Files:

o Command: `$ sysopctl backup <path>`

o Expected Output: Confirmation of backup initiation and status, potentially using rsync for file transfers.

CODE

```
#!/bin/bash
```

```
VERSION="v0.1.0"
```

```
show_help() {  
    echo "sysopctl - A command for managing system resources and tasks."  
    echo "Version: $VERSION"  
    echo ""  
    echo "Usage: sysopctl [command] [options]"  
    echo "Commands:"  
    echo "  --help           Show this help message"  
    echo "  --version        Show the command version"  
    echo "  service list     List all active services"  
    echo "  system load      View current system load"  
    echo "  service start <service-name> Start a service"  
    echo "  service stop <service-name> Stop a service"  
    echo "  disk usage       Check disk usage"  
    echo "  process monitor  Monitor system processes"  
    echo "  logs analyze     Analyze system logs"  
    echo "  backup <path>   Backup system files"  
}
```

```

case "$1" in
    --help)
        show_help
        ;;
    --version)
        echo "sysopctl version $VERSION"
        ;;
    service)
        case "$2" in
            list)
                systemctl list-units --type=service
                ;;
            start)
                if [ -n "$3" ]; then
                    systemctl start "$3"
                else
                    echo "Service name is required"
                fi
                ;;
            stop)
                if [ -n "$3" ]; then
                    systemctl stop "$3"
                else
                    echo "Service name is required"
                fi
                ;;
            *)
                echo "Invalid service command. Use 'list', 'start <service-name>', or 'stop
<service-name>'"
                ;;
        esac
    ;;

```

system)

```
if [ "$2" == "load" ]; then
    uptime
else
    echo "Invalid system command. Use 'load'"
fi
;;
```

disk)

```
if [ "$2" == "usage" ]; then
    df -h
else
    echo "Invalid disk command. Use 'usage'"
fi
;;
```

process)

```
if [ "$2" == "monitor" ]; then
    top
else
    echo "Invalid process command. Use 'monitor'"
fi
;;
```

logs)

```
if [ "$2" == "analyze" ]; then
    journalctl -p 3 -b
else
    echo "Invalid logs command. Use 'analyze'"
fi
;;
```

backup)

```
if [ -n "$2" ]; then
    rsync -av --progress "$2" /backup/
else
```

```
    echo "Path is required for backup"
fi
;;
*)
    echo "Invalid command. Use --help for usage information."
    exit 1
;;
Esac
```

COMMANDS

1. **Help Output:**
 - Command: `./sysopctl.sh -help`
2. **Version Output:**
 - Command: `./sysopctl.sh --version`
3. **List Active Services:**
 - Command: `./sysopctl.sh service list`
4. **Start a Service:**
 - Command: `./sysopctl.sh service start <service-name>`
5. **Stop a Service:**
 - Command: `./sysopctl.sh service stop <service-name>`
6. **System Load:**
 - Command: `./sysopctl.sh system load`
7. **Disk Usage:**
 - Command: `./sysopctl.sh disk usage`
8. **Process Monitoring:**
 - Command: `./sysopctl.sh process monitor`
9. **Log Analysis:**
 - Command: `./sysopctl.sh logs analyse`
10. **Backup Command:**
 - Command: `./sysopctl.sh backup /path/to/folder`

OUTPUT

```
aerraj@switch:~$ touch sysopctl
aerraj@switch:~$ chmod +x sysopctl
```

```
invoked command: use --help for usage information.
aerraj@switch:~$ ./sysopctl --help
sysopctl - A command for managing system resources and tasks.
Version: v0.1.0
```

Usage: sysopctl [command] [options]

Commands:

--help	Show this help message
--version	Show the command version
service list	List all active services
system load	View current system load
service start <service-name>	Start a service
service stop <service-name>	Stop a service
disk usage	Check disk usage
process monitor	Monitor system processes
logs analyze	Analyze system logs
backup <path>	Backup system files


```

logs analyze          Analyze system logs
backup <path>         Backup system files
aerraj@switch: $ ./sysopctl --version
sysopctl version v0.1.0
aerraj@switch: $ ./sysopctl service list

```

UNIT	LOAD	ACTIVE	SUB	DESCRIPTION
accounts-daemon.service	loaded	active	running	Accounts Service
acpid.service	loaded	active	running	ACPI event daemon
alsa-restore.service	loaded	active	exited	Save/Restore Sound Card State
apache2.service	loaded	active	running	The Apache HTTP Server
apparmor.service	loaded	active	exited	Load AppArmor profiles
apport.service	loaded	active	exited	LSB: automatic crash report gen
avahi-daemon.service	loaded	active	running	Avahi mDNS/DNS-SD Stack
bluetooth.service	loaded	active	running	Bluetooth service
colord.service	loaded	active	running	Manage, Install and Generate Co
console-setup.service	loaded	active	exited	Set console font and keymap
containerd.service	loaded	active	running	containerd container runtime
cron.service	loaded	active	running	Regular background program proc
cups-browsed.service	loaded	active	running	Make remote CUPS printers avail
cups.service	loaded	active	running	CUPS Scheduler
dbus.service	loaded	active	running	D-Bus System Message Bus
docker.service	loaded	active	running	Docker Application Container En
fwupd.service	loaded	active	running	Firmware update daemon
gdm.service	loaded	active	running	GNOME Display Manager
irqbalance.service	loaded	active	running	irqbalance daemon
kerneloops.service	loaded	active	running	Tool to automatically collect a
keyboard-setup.service	loaded	active	exited	Set the console keyboard layout
kmod-static-nodes.service	loaded	active	exited	Create List of Static Device No
ModemManager.service	loaded	active	running	Modem Manager
mysql.service	loaded	active	running	MySQL Community Server
networkd-dispatcher.service	loaded	active	running	Dispatcher daemon for systemd-n
NetworkManager-wait-online.service	loaded	active	exited	Network Manager Wait Online
NetworkManager.service	loaded	active	running	Network Manager
nvidia-persistenced.service	loaded	active	running	NVIDIA Persistence Daemon
openvpn.service	loaded	active	exited	OpenVPN service
packagekit.service	loaded	active	running	PackageKit Daemon
plymouth-quit-wait.service	loaded	active	exited	Hold until boot process finishe
plymouth-read-write.service	loaded	active	exited	Tell Plymouth To Write Out Runt

```

aerraj@switch: $ sysopctl system load
sysopctl: command not found
aerraj@switch: $ ./sysopctl system load
17:50:54 up 1:42, 1 user, load average: 0.03, 0.22, 0.25

```

```

aerraj@switch: $ sysopctl system load
sysopctl: command not found
aerraj@switch: $ ./sysopctl system load
17:50:54 up 1:42, 1 user, load average: 0.03, 0.22, 0.25
aerraj@switch: $ ./sysopctl service start mysql.service
aerraj@switch: $ SHOW DB
SHOW: command not found
aerraj@switch: $ ./sysopctl service stop mysql.service
aerraj@switch: $ ./sysopctl disk usage

```

Filesystem	Size	Used	Avail	Use%	Mounted on
tmpfs	736M	2.4M	734M	1%	/run
/dev/nvme0n1p8	47G	23G	23G	51%	/
tmpfs	3.6G	30M	3.6G	1%	/dev/shm
tmpfs	5.0M	4.0K	5.0M	1%	/run/lock
efivarfs	128K	35K	89K	29%	/sys/firmware/efi/efivars
/dev/nvme0n1p1	256M	50M	207M	20%	/boot/efi
/dev/nvme0n1p9	71G	35G	33G	52%	/home
tmpfs	736M	116K	736M	1%	/run/user/1000

```
aerraj@switch: $ ./sysopctl process monitor
```

```
top - 17:55:51 up 1:47, 1 user, load average: 0.02, 0.09, 0.18
Tasks: 389 total, 1 running, 388 sleeping, 0 stopped, 0 zombie
%Cpu(s): 0.5 us, 0.3 sy, 0.0 ni, 99.3 id, 0.0 wa, 0.0 hi, 0.0 si, 0.0 st
MiB Mem : 7354.4 total, 1398.4 free, 2893.1 used, 3062.9 buff/cache
MiB Swap: 1907.0 total, 1907.0 free, 0.0 used. 4111.3 avail Mem
```

PID	USER	PR	NI	VIRT	RES	SHR	S	%CPU	%MEM	TIME+	COMMAND
2971	aerraj	20	0	5365864	318096	150216	S	4.0	4.2	0:33.04	gnome-shell
2762	aerraj	20	0	25.0g	180372	119264	S	2.3	2.4	0:29.85	Xorg
4396	aerraj	20	0	891060	53016	40676	S	2.3	0.7	0:05.16	gnome-terminal-
252	root	-51	0	0	0	0	S	0.7	0.0	0:01.91	irq/37-ELAN1201:00
998	root	20	0	2465912	45904	31872	S	0.7	0.6	0:08.58	containerd
764	systemd+	20	0	14836	6784	6016	S	0.3	0.1	0:01.99	systemd-oomd
3179	aerraj	20	0	162756	8192	7424	S	0.3	0.1	0:00.25	at-spi2-registr
6871	aerraj	20	0	13356	4352	3328	R	0.3	0.1	0:00.04	top
1	root	20	0	167144	11828	8116	S	0.0	0.2	0:01.84	systemd
2	root	20	0	0	0	0	S	0.0	0.0	0:00.01	kthreadd
3	root	20	0	0	0	0	S	0.0	0.0	0:00.00	pool_workqueue_release
4	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-rcu_g
5	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-rcu_p
6	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-slub_
7	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-netns
9	root	20	0	0	0	0	I	0.0	0.0	0:00.12	kworker/0:1-mm_percpu_wq
10	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/0:0H-events_highpri
11	root	20	0	0	0	0	I	0.0	0.0	0:01.58	kworker/u32:0-gfx_low
12	root	0	-20	0	0	0	I	0.0	0.0	0:00.00	kworker/R-mm_pe
13	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_tasks_kthread
14	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_tasks_rude_kthread
15	root	20	0	0	0	0	I	0.0	0.0	0:00.00	rcu_tasks_trace_kthread
16	root	20	0	0	0	0	S	0.0	0.0	0:00.02	ksoftirqd/0
17	root	20	0	0	0	0	I	0.0	0.0	0:01.04	rcu_preempt
18	root	rt	0	0	0	0	S	0.0	0.0	0:00.00	migration/0
19	root	-51	0	0	0	0	S	0.0	0.0	0:00.00	idle_inject/0
20	root	20	0	0	0	0	S	0.0	0.0	0:00.00	cpuhp/0