Monitoring the Kernel

LPIC-2: Linux Engineer (201-450)

Objectives:

At the end of this episode, I will be able to:

1. Describe the structure of the /proc folder and its uses.
2. Use sysctl to view and modify kernel parameters.

> Additional resources used during the episode can be obtained using the download link on the overview episode.

- Kernel Characteristics
    - Version
    - Loaded Modules
    - Detected Hardware
    - Performance
- `/proc` folder
    - Virtual folder
    - Represents various metrics and settings
    - Example: What version is my kernel?
        - `cat /proc/sys/kernel/version`
    - Example: Tell me about a process
        - `ps aux | grep <executable_name>`
        - `ls /proc/<pid>`
        - `cmdline` Command line input
        - `cwd` Current working directory (Simlink)
        - `exe` Location of executable (Simlink)
        - `environ` Variables
        - `status` General status information
    - Example: What variables were passed to the kernel at boot
        - `cat /proc/cmdline`
- Accessing kernel details with utilities
    - Example 1:
        - `cat /proc/sys/kernel/version`
        - `uname -v`
    - Example 2:
        - `cat /proc/uptime`
        - `uptime`
    - Example 3:
        - `cat /proc/modules`
        - `lsmod`
- Changing settings in /proc
    - It is possible

    - Use any text editor
        - You will need to own the affected processes or be root
    - Useful if a proper tool doesn't exist
    - Generally not advised
- Changing settings with *sysctl*
    - *sysctl* allows you to change system parameters
    - Example 1:
        - Determine maximum open file count:
            - `cat /proc/sys/fs/file-max`
            - `sysctl fs.file-max`
        - Determine quantity of currently open files
            - `cat /proc/sys/fs/file-nr`
            - `sysctl fs.file-nr`
        - Change maximum open file limit
            - `sudoedit /proc/sys/fs/file-max`
            - `sysctl -w fs.file-max=1000000`
- Making permanent settings
    - Modify `/etc/sysctl.conf` or add a file to `/etc/sysctl.d/`
        - `sudoedit /etc/sysctl.d/00-custom-settings.conf`
        - `fs.file-max=1000000`
    - Apply the changes
        - `sudo sysctl -p`