# lesson notes Intro to Linux

## System Management

1.7.2 Software Configuration

### Lesson Overview:

#### Students will:

• Understand how kernels are configured

Guiding Question: How can the kernel be configured?

Suggested Grade Levels: 9 - 12

Technology Needed: None

## CompTIA Linux+ XK0-005 Objective:

1.7 - Given a scenario, manage software configurations

- Configure kernel options
  - Parameters
    - sysctl
    - /etc/sysctl.conf
  - Modules
    - lsmod
    - imsmod
    - rmmod
    - insmod
    - modprobe
    - modinfo

This content is based upon work supported by the US Department of Homeland Security's Cybersecurity & Infrastructure Security Agency under the Cybersecurity Education Training and Assistance Program (CETAP).





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# **Software Configuration**

## **Configuring Kernel Options**

**Configuring kernel options** refers to the process of customizing the settings and features of the OS's kernel, which is the core component responsible for managing system resources and providing a bridge between software and hardware. Kernel configuration involves selecting various options, modules, and parameters that determine how the kernel interacts with hardware, what features are enabled or disabled, and how the system behaves in different scenarios. This process is crucial for tailoring the operating system to specific hardware, optimizing performance, and ensuring compatibility with various devices and software.

**Parameters** are settings and options that can be adjusted to customize the behavior of the Linux kernel. They are often set during the kernel compilation process and stored in the kernel configuration file. The command-line utility **sysctl** allows users to interact with the Linux kernel runtime parameters. This enables users to view or modify the kernel parameters at runtime. The configuration file **/etc/sysctl.conf** is where users can set various kernel parameters that persist across reboots. This is a text file that holds keyvalue pairs, each representing a specific kernel parameter and its value.

*Kernel modules* are pieces of code that can be loaded and unloaded into the kernel of an OS at runtime. Unlike monolithic kernels where all the necessary functionalities are included in a single, static kernel image, modular kernels allow the addition and removal of specific functionalities as needed, without rebooting the entire system.

To list all currently loaded kernel modules, use *lsmod*. The command *modprobe* allows the automatic loading or unloading of modules based on dependency information. It reads from a configuration file, typically located in **/etc/modprobe.conf** or **/etc/modprobe.d/**. The command *modinfo* provides information about a kernel module, such as its description, dependencies, and parameters. To manually insert a module into the kernel, use *insmod*. To unload a kernel module, use *rmmod*.