Implement a Generic Linux Device Driver (USB) as a Linux Kernel Module

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Abstract

A. Introduction-What is device driver?

One class of Linux Kernel module is the device driver, which provides functionality for hardware like a TV card or a serial port. On UNIX, each piece of hardware is represented by a file located in */dev* named a device file which provides the means to communicate with the hardware. The device driver provides the communication on behalf of a user program.

A device driver is a computer program that operates or controls a particular type of device that is attached to a computer. A driver provides a software interface to hardware devices, enabling operating systems and other computer programs to access hardware functions without needing to know precise details of the hardware being used. It hides implementation and hardware-specific details from a user program. A device driver has three sides: one side talks to the rest of the kernel, one talks to the hardware, and one talks to the user.

We can add or remove Linux device driver from kernel. A user can access the device via file name. Device driver manages data flow between a user program and devices.

To create a USB device that works with the generic USB serial driver, all that is needed is two bulk USB endpoints on the device, one IN and one OUT. The generic USB serial driver will bind those two endpoints together into a single TTY device that can be read from and written to from user space.

USB devices are implemented as USB modules but can show up as char devices, block devices (USB sticks), or network interfaces (a USB Ethernet interface).

B. Goals of the project

Every time the kernel boot up the USB device driver module is not called up and executed within the boot process. Instead whenever a USB device is plugged into the system the driver is installed from its respective directory.
We will try and implement this by running the USB device driver module being executed when the kernel boots up.