Device Drivers- Lab Exercise 8

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SNULL (Simple Network Utility for Loading Localities):

Snull is similar to a loopback interface, however snull is not a loopback interface. It simulates conversations with real remote hosts in order to better demonstrate the task of writing a network driver. The Linux loopback driver is actually quite simple; it can be found in drivers/net/loopback.c.

Another feature of snull is that it supports only IP traffic. This is a consequence of the internal workings of the interface—snull has to look inside and interpret the packets to properly emulate a pair of hardware interfaces. Real interfaces don't depend on the protocol being transmitted, and this limitation of snull doesn't affect the fragments of code shown in this chapter.

The snull module creates two interfaces. These interfaces are different from a simple loopback, in that whatever you transmit through one of the interfaces loops back to the other one, not to itself. It looks like you have two external links, but actually your computer is replying to itself.

Unfortunately, this effect can't be accomplished through IP number assignments alone, because the kernel wouldn't send out a packet through interface A that was directed to its own interface B. Instead, it would use the loopback channel without passing through snull. To be able to establish a communication through the snull interfaces, the source and destination addresses need to be modified during data transmission. In other words, packets sent through one of the interfaces should be received by the other, but the receiver of the outgoing packet shouldn't be recognized as the local host. The same applies to the source address of received packets.

To achieve this kind of “hidden loopback,” the snull interface toggles the least significant bit of the third octet of both the source and destination addresses; that is, it changes both the network number and the host number of class C IP numbers. The net effect is that packets sent to network A (connected to sn0, the first interface) appear on the sn1 interface as packets belonging to network B.