Linux Installation Instructions

Pervasive Communications Lab

April 17, 2003

This document enumerates the step-wise procedure to be carried out to re-compile an existing version of the Linux kernel to enable the installation of the Click router. The re-compilation is necessary to enable the Click modular router to manipulate the packets in the userspace of the kernel, and re-insert the packets the packets into the kernel stack.

1. Install a version of Red Hat version preferably the one with kernel version greater than or equal to 2.4.18. Make sure to select the Custom option during installation. The "Kernel Development" option should be selected from the installation menu.

2. If the 2.4.18 kernel version does not exist with the linux installation, download the 2.4.18 or higher kernel version from $http://kernel.org$.

3. Go to the /usr/src directory and unpack the downloaded kernel version. On successful unpacking, go the /usr/src/linux sub-directory that is created.

4. Make sure to download the latest version of the airo.c driver in the /usr/src/linux/drivers/net/wireless directory. The latest version of the airo.c should be downloaded from the CVS repository.

5. In the /usr/src/linux directory, enter the command *make xconfig* and carry out the following modifications to the options present. These are the only options that need to be modified. The other options should be maintained in the same state.

   Code Maturity Level: Yes
   Processor type and features

   (a) Symmetric multi-processor support: No

   General Setup

   (a) Networking Support : Yes

   (b) PCI support : Yes

   Networking options

   (a) Netlink device emulation: Yes

   Network device support

   (a) Universal TUN/TAP device driver: Yes — These two options are selected to enable packet processing.

   (b) Ethertap network tap : Yes

   (c) Ethernet (10 or 100 Mbit) — These options are selected to handle the built-in wired-ethernet card facility. In our case, we selected 3COM cards to suit our ethernet cards.

      i. 3COM cards: Yes

      ii. Other ISA cards: Yes

   (d) PCMCIA network device support

i. NE2000 compatible PCMCIA support: No
ii. Aviator/Raytheon 2.4GHz wireless support:No

6. Edit the Makefile and add unique extenstion to the "EXTRAVERSION" field. This will identify this new compiled version. In our case we add the string "-tap".
7. make dep — This command sets up all the dependencies correctly.
8. make bzImage — This command builds the kernel.
9. make modules — This command builds the modules that were configured.
10. Run the command, make modules_install — This command installs the kernel modules.
11. Run the command, make install — This command copies the new kernel and its associated files to the proper directories.
12. Copy this kernel image using the command, cp ./arch/i386/boot/bzImage /boot/vmlinuz-2.4.18-tap. The vmlinuz-2.4.18-tap is our new kernel image.
13. Copy the system map using the command, cp System.map /boot/System.map-2.4.18-tap. The System.map-2.4.18-tap is our new system map.
14. Edit the /etc/lilo.conf to add the following lines to the end of the file.
    image=/boot/vmlinuz-2.4.18-tap
    label=linux-tap — This label will appear when you reboot.
    read-only
    root=/dev/hda1 — e.g hda1 is the device where the root is loaded. To find this out, enter the command `df` and find out where the root is loaded.
15. Run the command /sbin/lilo -v -v to install the kernel loader.
16. Boot in the new kernel.
17. Setting up the tap0 interface
    (a) `mknod /dev/tap0 c 36 0 + 16`
    (b) insmod ethertap