# DIPC 2.1 INSTALATION GUIDE

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## 1.0) Introduction

The purpose of this guide is to help with the installation of DIPC. Its goal is to explain the installation process as quickly as possible and in as simplist terms as possible. This guide should is written with the assumption that the person installing DIPC has only a basic understanding of how to use Linux and will not assume any knowledge of more advanced subjects. With this guide anyone should be able to install a kernel with DIPC.

1.1) Pre-Installation checklist

Before proceeding with the installation of DICP one should check that they meet the requirements of the following list:

a) Have a compatible flavor of Linux running on your system (or in a virtual machine).

b) Make sure you have 'root' access to Linux. Also make sure that every computer that will be added to the DIPC network has the same user.

c) Make sure you have the downloaded the proper kernel source for the installation of DIPC. This can be downloaded from http://www.kernel.org/pub/linux/kernel/v2.6/. Look for the file "linux-2.6.15.1.tar.bz2" and download and save it to your computer. You must have the source for linux kernel 2.6.15.1 in order to install DIPC.

d) Download and install the ncurses-devel package for you flavor of Linux. This is needed to run the 'make menuconfig' command. This can be found either at http://rpm.pbone.net if your using a RPM-based system, or in the Symaptic Package Manager if your using Debian based system (Note: If using Mandriva 2007, it can be found and installed in "Installable Package Option" in the Mandriva Linux Control Center.)

 e) The GCC C compiler. Once again this can be found either at http://rpm.pbone.net if your using a RPM-based system, or in the Symaptic Package Manager if your using Debian based system.

After all condition on the list are satisfied, it will be time to set up DIPC.

## 2.0) Installation

Step 1 - Become the root or super user on your system.

Step 2 - Extract the kernel from the file "linux-2.6.15.1.tar.bz2" that you downloaded during the pre-installation phase. After extraction you should have a directory named "linux-2.6.15.1", proceed to copy this directory to "/usr/src". Next go to "/usr/src". Check if there is a directory there named "linux", if there is rename it to something else. Proceed to remain directory "linux-2.6.15.1" that should be located in "/usr/src" to "linux".

Step 3 - Now run the dipc.install script that is included in "dipc-2.1-beta1". dipc.install should be ran in the terminal. Follow the instructions it gives.

Step 4 - Create a new user called for DIPC to use. This user should be named "dipcd". The password, group id values do not matter. (Note: Do not ever log in as user dipcd or save any files in it directory. This user is for DIPC to use only.)

Step 5 - Go to the terminal. All of the following instructions should will be executed in the Linux terminal. Go to the directory "/usr/src/linux". Enter 'make menuconfig'. This will load a program    to configure the new kernel to be compiled. Select the entry "General Setup", then scrole down to the entry 'DIPC (Distributed IPC)' and hit the spacebar to add to the features that will be built into the new linux kernel. A '*' should appear next to 'DIPC (Distributed IPC)' if it was selected. If 'DIPC (Distributed IPC)' is not found then that means dipc.install was either not run or the directory it patched to was changed, go over Steps 2 and 3 and make sure they were done correctly. The 'make menuconfig' should automaticly set up alot of the things for your new kernel, but feel free to browse some of the various menu to make sure everything nessary for the kernel to run on your system is selected.

Step 6 - Now enter the following commands in sequence:
> make dep
> make clean
> make bzImage
> make modules
> make modules_install
> make install

Executing all of these commands make take a while so be prepared.

**Important Note:** (This paragraph applies to the 64-bit kernel patch available for download separately, as the kernel patch in DIPC 2.1 beta 1 does not compile in a 64-bit environment). Depending on the version of DIPC patch you are using, you may have to change line 518 in the file '/usr/src/linux/ipc/msg.c' from reading '__unused4' to '__unused1' *if you are using a 32bit system, or if you are using an Intel 64-bit CPU*. As well you may have to change line 648 in the file '/usr/src/linux/ipc/shm.c' from reading '__unused4' to '__unused1' if you are using a 32bit system.

Step 7 - The command 'make install' will set your system up so that you can boot either the current kernel or the new kernel with DIPC installed. You should go to the file 'grub.config' or 'menu.1st' found in either '/boot' or '/boot/grub' and rename the title of the entry for the kernel you just installed to something you will recognize as having DIPC installed on it. Your new kernel will have a name like 2.6.15.1 or something similar and will be the last entry in the 'grub.config' or 'menu.1st' file.

Step 8 - Copy the files 'dipc.conf' and 'dipc.allow' from '/dipc-2.1-beta1/config-files' to '/etc'. Then open '/etc/dipc.conf'. Next to the heading 'this_machine = ' enter the IP address of this machine. It can be found by typing 'ifconfig' in the terminal. One machine (and only one machine) will have to be dedicated the 'referee', enter the IP address of the referee system in the field 'referee = '. You can enter 'referee = this_machine' if the machine currently being worked on is going to be the referee.

Step 9 - Next open '/etc/dipc.allow'. Add the IP address of any computers with that are going to be  part of your DIPC network including the one you are working on.

Step 10 - Open the file '/etc/rc.d/rc.local' with a text editor. You will need to add the line '/usr/sbin/dipcd 2>/tmp/dipcd_mess' to the file

Step 11 - Copy the file '/dipc-2.1-beta1/dipcd/dipcd' to '/usr/sbin/dipcd'

Step 12 - Now reboot the system, and in the bootloader select the kernel that you installed DIPC on. If everything was done correctly you should be ready to start to write and run DIPC programs on this computer.

Step 13 - Proceed to repeats the pre-install phase and steps 1 - 11 on any computer you want to be part of your DIPC network. Remember to make sure all computers have the same referee in dipc.conf and to make sure all IP address are found in all the dipc.allow file in all systems.

## 3.0) Testing

First thing you will want to do to see if everything is running corrently is to open up the system monitor and check if there is a process call 'dipcd' running, if there is not then you probably made an error somewhere in Steps 8 - 12. A simple test to see if your DIPC system is working correctly is to run some of the examples included in '/dipc-2.1-beta1/examples'.

The simplest one to run is '/dipc-2.1-beta1/examples/hello'. In the terminal go to '/dipc-2.1-beta1/examples/hello' and then type 'make'. This will generate a number of files to run a test with. Type './hello1' on one computer to start the first half of the program. You can either open another terminal and go to '/dipc-2.1-beta1/examples/hello' then type './hello2' to watch a message be passed from terminal 2 to terminal 1, or you can go to another computer on your DIPC network and 'make' the hello example then run 'hello2' and watch a message being passed from one computer to another.

If the computer to computer test fails this can mean either you are not running the kernel with DIPC on it, or there is an error in the IP addresses in dipc.conf and dipc.allow.