

# **WANPIPE™**

## **Multi-protocol WANPIPE Driver for Linux®**

### **INSTALLATION M A N U A L**

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# Introduction

The WANPIPE routing/API solution is comprised of Sangoma "S" series intelligent adapters/cards, Linux device drivers and shell/GUI configuration and startup scripts. The Sangoma "S" adapters along with the WANPIPE device drivers provide a physical and WAN data link layer (OSI model) to the Linux IP Routing Stack. The Linux IP stack, using its internal routing table, routes packets to and from the WANPIPE drivers.

## Installing WANPIPE Driver Package

### Obtaining The Wanpipe Software

#### 1. Sangoma FTP

URL: <ftp://ftp.sangoma.com> /linux directory.

##### Source Package

Location: "/linux/current\_wanpipe" directory

The latest software version is under the following name:

wanpipe-beta-X.Y.Z.tgz: Latest Development Release

wanpipe-X.Y.Z.tgz: Latest Stable Release

where XY.Z is a product version number. This archive should always be installed on a CLEAN Kernel.

##### RPM Binary Package

Location: "/linux/RPM" directory

Binary packages for Red Hat distributions

##### LRP Package

Location: "/linux/LRP" directory

Binary packages for Linux Routing Project distribution

The WANPIPE binary packages can be downloaded from the "/linux/RPM"

Directory located on S

#### 2. Sangoma CD-ROM

Mount the CD-ROM

Ex: mount /dev/cdrom /mnt

Copy the Wanpipe-X.Y.Z.tgz release from the CD-ROM Linux/ directory into the / directory of your system

Ex: cp /mnt/Unix-type\ systems/Linux/wanpipe-X.Y.Z.tgz /

WARNING: THIS VERSION ONLY SUPPORTS S508/S514 and 508/S514/FT1 cards.

PLEASE CONTACT SANGOMA TECHNOLOGIES INC. IF YOU WANT TO UPGRADE YOUR OLD S502E or S503 CARD.

## Choosing the Kernel Version

The latest WANPIPE packages contain patches for 2.0.X, 2.2.X and 2.4.X kernels. Please read the README files for more update information.

## Unpack distribution archive

1. Log in as super user (root) and change your current directory to any temporary directory.

Eg: /root/tmp

You can also use the 'su -' command to log in as root from any other user account.

2. Copy the WANPIPE distribution package, previously downloaded from Sangoma ftp site, or CD-ROM, to the temporary directory and un-tar it.

ex: tar xvfz wanpipe-x.y.z.tgz

The source distribution will create the wanpipe/ directory.

## Package Components

The WANPIPE Driver package includes the following components:

Driver Installation script	(./Setup)
Driver start-up script	(/usr/sbin/wanrouter)
Driver configuration utility	(/usr/sbin/wanconfig)
Driver configuration files	(/etc/wanpipe/wanrouter.rc)

Interface configuration files	(/etc/wanpipe/interfaces/*)
Firmware modules	(/etc/wanpipe/firmware/*)
Kernel patch files	(./patches)
Frame Relay Debug Monitor	(/usr/sbin/fpipemon)
Cisco HDLC Debug Monitor	(/usr/sbin/cpipemon)
PPP Debug Monitor	(/usr/sbin/ppipemon)
X25 Debug Monitor	(/usr/sbin/xpipemon)
WANPIPE Keyboard Led Debugger	(/usr/sbin/wpkbdmon)
WANPIPE PPP Backup Daemon	(/usr/sbin/wpbackupd)
Adapter's Memory Viewer	(/usr/sbin/sdladump)
FT1 CSU/DSU Configuration Util.	(/usr/sbin/cfgft1)
Wanpipe Configuration Utility	(/usr/sbin/wancfg)
Sample files	(/etc/wanpipe/samples)
X25 API sample code	(/usr/lib/wanpipe/api/x25)
CHDLC API sample code	(/usr/lib/wanpipe/api/chdlc)
Frame Relay API sample code	(/usr/lib/wanpipe/api/fr)
Bit Streaming API sample code	(/usr/lib/wanpipe/api/bitstrm)

# WANPIPE Package Setup

## Source Installation

The WANPIPE source package can be installed in two ways:

1. A first time WANPIPE installation with a clean, un-patched kernel.
2. An Upgrade to the latest WANPIPE release.

The **Setup** installation script, located in wanpipe temporary directory, will guide you through either installation procedure, whether it's a fresh install or an upgrade. The installation utility will probe the kernel for previous WANPIPE installations and will offer appropriate installation options.

Furthermore, the **Setup** installation utility can also re-compile and install new WANPIPE device driver modules based on the currently running Linux kernel, thus eliminating manual kernel/module recompilation.

To start WANPIPE installation, run the **Setup** installation program.

```
cd wanpipe/  
./Setup install
```

This script will perform the following functions:

### 1. WANPIPE INSTALLATION

- Verify distribution integrity and fix file permissions
- Check for required packages, bash2, libncurses and GCC.  
Note: Wanpipe GUI utilities require BASH version 2 or greater.  
If the Setup fails the bash check, make sure bash is installed before attempting to configure WANPIPE.

### 2. UPDATING WANPIPE DEVICE DRIVERS: LINUX KERNEL

- Probe the Linux kernel for previous WANPIPE installation
- If the kernel is clean, appropriate patches will be used to update WANPIPE drivers.
- If the kernel already has WANPIPE installed, drivers will be upgraded to the latest version.

### 3. WANPIPE KERNEL DRIVER SETUP

- This option will attempt to compile currently installed WANPIPE device drivers located in the Linux source tree and update/install WANPIPE modules.
- Note: the kernel source in /usr/src/linux must have the same configuration and version number of the currently running image. Otherwise, module dependencies will fail.

#### 4. WANPIPE BOOTSTRAP CONFIGURATION

- Option to install bootstrap startup and shutdown scripts that will start and stop WANPIPE drivers on system startup and shutdown.

#### 5. WANPIPE META CONFIGURATION

- Wanpipe utilities depend on a wanrouter.rc META file that defines locations of WANPIPE lock, configuration and interface files.
- You will be prompted to define these paths. If unsure leave everything as default.

#### 6. WANPIPE UTILITES SETUP

- This option will compile all WANPIPE utilities necessary to run WANPIPE devices.

#### 7. WANPIPE INSTALATION : COMPLETE

- This is the last message in the installation process. This message will ONLY be displayed if the WANPIPE device driver modules have been compiled. In this case, the next step is to configure a WANPIPE driver and start the router.

PLEASE SKIP THE NEXT SECTION AND PROCEED TO WANPIPE CONFIGURATION.

#### 8. WANPIPE INSTALLATION: INCOMPLETE

- This is also the last message in the installation process. This message will ONLY be displayed if the WANPPIE device drivers HAVE NOT been compiled, thus you are required to proceed with the kernel/module re-compilation in order to finish up the WANPIPE installation.

PLEASE REFER TO THE LINUX COMPILATON INSTRUCTIONS BELOW

## RPM Binary Installation

Before installing the RPM, make sure that you have downloaded the appropriate package for your distribution, smp support and kernel. Once you have verified that you do indeed have the correct RPM, install Wanpipe by:

```
rpm -i --force <wanpipe_rpm_package_name>
```

```
ex: rpm -i --force wanpipe-2.2.2-rh7.1-smp-1-1.i386.rpm
```

## LRP Binary Installation

Package Contents:

wanpipe.lrp: Wanpipe utilities and startup scripts  
modules.lrp: Wanpipe kernel modules

1. Copy the lrp packages onto a DOS formatted disk.
2. Boot the system with the LRP boot up disk
3. Insert the disk containing Wanpipe lrp packages
4. Mount the disk: eg: mount.boot /mnt
5. Change directory to /mnt and install each package  
Eg: `lrpkg -i modules`  
`lrpkg -i wanpipe`
6. Create the Wanpipe configuration file in /etc/wanpipe directory.

# Linux Kernel Configuration/Compilation

Note: If the modules were recompiled by the Setup installation script this step is not necessary !!!

This does not apply for the API device drivers.

## Configure Linux Kernel

Change your current directory to /usr/src/linux:

make menuconfig' (menu- driven configuration)  
or make xconfig' (if you are running X-Windows.)

### Note:

If you have never configured Linux kernel before, please read /usr/src/linux/README or ask someone who did for assistance. In short, the Linux configuration script will ask you a series of questions regarding your system configuration. Most questions require single-letter answer: 'y' to enable feature, 'n' to disable it or 'm' to implement feature as a module. Entering 'h' brings up a help text (if available).

### IMPORTANT:

When configuring the kernel, **MAKE SURE YOU ANSWER NO** to the following questions when they come up:

- Set version information on all symbols for modules (CONFIG\_MODVERSIONS)
- Frame relay DLCI support (CONFIG\_DLCI)

When configuring kernel, **MAKE SURE YOU ANSWER YES or M** to the following questions when they come up:

### Code maturity level options

Prompt for development drivers (CONFIG\_EXPERIMENTAL)

### Loadable Module Support

Enable loadable module support (CONFIG\_MODULES)

Kernel daemon support (CONFIG\_KERNELD)

(CONFIG\_KMOD)

**2.0.X kernels only**

**2.2.X/2.4.X kernels only**

### General Setup

Networking support (CONFIG\_NET)

PCI support (CONFIG\_PCI)



## Networking Options

Packet Socket	(CONFIG_PACKET)	<b>2.2.X / 2.4.X</b>
<b>kernel only</b>		
Unix domain sockets	(CONFIG_UNIX)	
TCP/IP networking	(CONFIG_INET)	
IP: forwarding/gatewaying	(CONFIG_IP_FORWARD)	<b>2.0.X kernel only</b>
IP: optimize as router not host	(CONFIG_IP_ROUTER)	
802.1d Ethernet Bridging	(CONFIG_BRIDGE)	<b>2.2.X kernel only,</b>

used by WANPIPE frame relay Ethernet bridging.

WAN Router	(CONFIG_WAN_ROUTER)
	set to "M" for 2.2.X or 2.4.X kernels
	set to "Y" for 2.0.X kernels.

## Network Device Support

Network device support	(CONFIG_NETDEVICES)
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## Wan Interfaces

WAN Drivers	(CONFIG_WAN_DRIVERS)
Vendor Sangoma	(CONFIG_VENDOR_SANGOMA)
	set to "M" for 2.2.X kernels / set to "Y" for 2.0.X kernels.

In previous version of WANPIPE, a maximum number of WANPIPE devices needed to be defined (CONFIG\_WANPIPE\_CARDS). In this release, all Sangoma devices are probed during module startup. Devices found are dynamically setup.

### WANPIPE Frame Relay support (CONFIG\_WANPIPE\_FR)

Say 'Y' to this option, if you are planning to connect WANPIPE card to a frame relay network. If you say 'N', the frame relay support will not be included in the driver (saves about 16K of kernel memory).

### WANPIPE Cisco HDLC support (CONFIG\_WANPIPE\_CHDLC)

Say 'Y' to this option, if you are planning to connect WANPIPE card to a leased line using Cisco HDLC protocol (WANPIPE or API). If you say 'N', the Cisco HDLC support will not be included in the driver.

### WANPIPE PPP support (CONFIG\_WANPIPE\_PPP)

Say 'Y' to this option, if you are planning to connect WANPIPE card to a leased line using PPP protocol (WANPIPE). If you say 'N', the PPP support will not be included in the driver.

### WANPIPE X25 support (CONFIG\_WANPIPE\_X25)

Say 'Y' to this option, if you are planning to connect WANPIPE card to a leased line using X25 protocol (WANPIPE or API). If you say 'N', the X25 support will

not be included in the driver.

WANPIPE Multi-Port PPP support (CONFIG\_WANPIPE\_MULTPPP)

Say 'Y' to this option, if you are planning to connect WANPIPE card to multiple leased line, using the kernel PPP protocol (WANPIPE). Since the protocol is implemented in the kernel PPP protocol can run on both adapter ports. If you say 'N', the Multi-Port PPP support will not be included in the driver.

## Filesystems

/proc filesystem support (CONFIG\_PROC\_FS)

## Re-build Linux kernel

If you never compiled Linux kernel before, please read /usr/src/linux/README or ask someone who did for assistance. Note that if your machine is slow and/or has little memory, re-building Linux kernel may take several hours.

After successfully configuring the kernel using 'make menuconfig' perform the following (from /usr/src/linux directory):

make dep :to rebuild source code dependencies,

make clean :to delete all stale object files,

### Note:

Save your '/usr/src/linux/.conf' file to some other location and rename it to (ex: conf\_old). This file contains your linux configuration; thus, if you ever have to reconfigure a fresh kernel, copy this file back into the linux directory, rename it to '.config' and run 'make menuconfig'.

make bzImage (2.2.X / 2.4.X kernels) to build new kernel.

or make zImage (2.0.X kernels) to build new kernel.

### Note:

'make zImage' will fail if the kernel size is too big. Thus, use 'make bzImage'. (for 2.2.x kernels)

## IMPORTANT:

Before we proceed to build new modules, it's advisable to remove the old, already existing modules.

- Change directory to /lib/modules
- Rename the "kernel\_name" directory to "kernel\_name.old".  
(Ex. If we are working with kernel 2.2.14, then rename the 2.2.14 directory to 2.2.14.old)
- Change directory back to /usr/src/linux.

make modules                      to build kernel modules,  
make modules\_install            to install modules.

## Updating LILO

This section only applies if the kernel was compiled using bzImage or zImage.

After successful compilation, copy the new image `usr/src/linux/arch/i386/boot/zImage` (or `bzImage` which ever was compiled) into the `/boot` directory and rename it to `vmlinuz_2.2.X` (where `X` is the kernel number.)  
(ex. `cp /usr/src/linux/arch/i386/boot/bzImage /boot/vmlinuz-2.2.14`)

### **Note:**

Before you copy the new kernel into the `/boot` directory rename the old kernel image in `/boot`. (ex. `mv vmlinuz-2.2.10 vmlinuz-2.2.10.old`)

In `/etc` directory, edit the `lilo.conf` file and update the changes. For more info run '`man lilo`'.

`lilo`                      :execute lilo to update the changes to `/etc/lilo.conf`

When all this is done, reboot your machine to load the new image !!!