

# F R E E S C O

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v 0.2.6

## ***FREESCO* v0.2.6**

### **Single floppy Router.**

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Primary site - <http://www.freesco.org/>

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## **4. Typical configurations or HOWTO build:**

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## 1. Introduction

### 1.1 Introduction

*FREESCO* is a small (single floppy) distribution of Linux intended to be a replacement for minor models of Cisco routers. NOTE: *FREESCO* stands for *FREE* ciSCO and has nothing common with SCO Unix.

Both, CISCO and FREESCO, have their positive and negative features. The main advantage of FREESCO is its price. Hehehe, you know this word, you like this word, you love this word, what can be sweeter then this word. :) FREESCO will cost you only your old dust-collecting 386 computer you were going to throw out few years ago. The main disadvantage of FREESCO - it doesn't have dynamic routing feature, it can be only a static router. Somebody can ask - "Why do we need FREESCO project? There is already [LRP](#) (Linux Router Project) which is more complex then FREESCO." Well, the answer is - because most people don't need so complex solution as LRP is and because FREESCO has the easiest setup you've ever dreamt of. Just wipe out a dust from your 386 PC, connect it to network and after 10 minutes of setting up (of course including a break for a cup of coffee) your router will be ready.

FREESCO supports up to 3 ethernet cards and up to 2 modems. Other features of FREESCO are:

- Bridge mode
- Firewalling and Network Address Translation
- DNS Server
- DHCP Server
- HTTP Server (public and control purpose)
- Telnet server (only one connection per time)
- Print Server
- Remote Access Server (up to 2 modems)
- Time Server

So you can build a simple bridge or a simple router or a very complex router/server which includes all these features. Setup procedure offers few basic configurations. Choose one and tune it by adding or removing features.

### 1.2 Requirements

- CPU - any 386 or better
- FPU - not required
- RAM - min (with swap) 6 MB, normal (on the edge between swap/no swap) 8 MB, recommended 16 MB
- FDD - 1.44 MB
- HDD - not required for 8-16 MB RAM system, but recommended (for swap and for future extensions)

- HDD - not required for 8-16 MB RAM system, but recommended (for swap and for future extensions)
- Ethernet adapter(s) - 3COM509, 3COM595, 3COM905, Realtek NE2000 compatible, Realtek NE2000 PCI compatible, ISA/PCI NE2000 compatible supported out of box. Many more other adapters supported via additional drivers you have to add manually from supplementary pack (it's easy, just choose appropriate driver and drop it in a:\router\drv directory).
- Modem(s). Beware of winmodems, they will not work with FREESCO. If you have old 386/486 computer w/o FIFO'ed COM ports it's recommended to use internal modems as they come with built-in fast FIFO'ed port.
- Read this manual at least once.
- Some brains
- TCP/IP networking knowledge (**a must**)

### 1.3 Definitions

- ISP - Internet Service Provider
- DNS - Domain Name Service (Server)
- DHCP - Dynamic Host Control Protocol
- WINS - Windows Internet Name Service (Server)
- client - (usually in this manual) computer connected to local network
- NAT - Network Address Translation

### 1.4 Warnings

- *Don't be lazy, read this manual carefully.*
- *Never edit any config files from DOS. Always edit them from FREESCO or from another linux(unix).*
- *Read manual*
- *Before installation make sure your computer (router) is in a proper working condition and all hardware (ethernet cards, modems etc installed in it) work proper in this computer.*
- *RTFM*
- *Never use winmodems.*
- *Before reporting of bugs and problems read this manual and a [web support forum](#).*
- *We do not provide help by e-mail, use the [web support forum](#) for getting help.*

### 1.5 License

Freeware.



## 2. Installation

### 2.1 Installing on a floppy disk.

Download a file frescoXYZ.zip (XYZ - is a version number), unpack it in a temporary folder. There you will find:

- folder TCLIENT.W9x, containing Time Server client for Windows 95/98
- folder TCLIENT.UIX, containing Time Server client for linux(unix)
- fresco.scp - script for modem connection to FREESCO from Windows 95/98
- fresco.XYZ - floppy disk image of XYZ version of FREESCO
- rawrite.exe - program that copies image on floppy disk

Then make a floppy disk using rawrite program under DOS or DOS box in Windows 9x:

```
rawrite.exe fresco.XYZ
```

or using dd program under linux:

```
dd if=fresco.XYZ of=/dev/fd0
```

Now boot from your floppy and at a prompt type

```
setup
```

and set up your router as it's described in section 4.

### 2.2 Installing on a hard disk.

Prepare bootable hard disk drive with MS DOS (or compatible OS) on it.

Prepare floppy as it's said in section 2.1, boot from it, login as root (*username: root, password: root*) and execute:

```
move2hdd
```

Remove floppy disk and boot from hard disk. At DOS prompt type

```
router.bat setup
```

and setup your router as it's described in section 4.

and setup your router as it's described in section 4.

**NOTE:** See [Troubleshooting](#) section.

### 3. Services and their settings

During setting up the router you'll be asked about different services. Here I'll try briefly describe them.

#### 3.1 DNS Server

DNS server converts internet addresses between human readable form (example: www.aha.ru) and computer readable form (example: 195.2.83.113) and back. This local caching DNS server can reduce traffic between your local network and your ISP and increase speed of connections to servers on the internet. If you don't have DNS server on your local network it's highly recommended enable this feature.

To set up DNS server you have to know the only one thing - your ISP DNS address.

Optional you may want to give good (human readable) names to computers on your local network(s), then edit files:

```
a:\rc_named
a:\named.hst
a:\named10.rev
a:\named172.rev
a:\named192.rev
```

Consult manual at <http://www.isc.org/> regarding BIND v4

#### 3.2 DHCP Server

DHCP server provides automatic configurations of your local network(s) computers. It makes life of network administrator much easy.

Every computer on network must have his own IP address and it must also know DNS address, gateway address and probably WINS address (should you have it). DHCP server supply every computer on your network with this information. All you need is just enable using DHCP for configuration on your local clients and DHCP server will do the rest, otherwise you have to enter all this addresses manually. Briefly DHCP was invented by lazy people for lazy people.

It's a good idea to enable this service and never switch off your router as any other servers.

NOTE: Don't enable this service if you already have DHCP server on your network, there mustn't be more then one DHCP server on network.

You may optional provide WINS address to DHCP server (if you have WINS).

#### 3.3 Time and Control Server

Time service.

What a nice idea to have time synchronized at all computer on your network and even synchronized with atomic clock on

What a nice idea to have time synchronized at all computer on your network and even synchronized with atomic clock on internet. Huh? You like it? Either do I. For setting up this function you must know host Time Server address and time offset between your local time and UTC (GMT) time. Most ISPs have such service and you can use their time server as a host for yours, ask your ISP about it. Otherwise you have to use one of the free servers providing such service. For-instance you can use this one:

<http://www.clock.org/>

A lot of servers can be found at <http://www.eecis.udel.edu/~mills/ntp/clock2.htm>, choose closest to you.

Unfortunately FREESCO doesn't support daylight saving time changes, so if it's used in your country you will have to correct "time offset" manually twice a year.

Control service.

It gives you an ability to control your router from web browser. Again for lazy people :) You will have an ability to issue almost all Linux commands (of course I'm talking about ones implemented in this router) from your web browser, you will have almost full access to Linux shell. It's restricted to non dialog command, for example you can't use *edit* command, but anyway you will have a very good tool for maintaining your router. There is also possibility to give limited control to trusted users, so they will be able to bring up or down link to ISP in case of dialup router.

Both functions are non standard and realized via http server. If you enable one of this functions you automatically enable the other one.

### 3.4 Telnet server

You can have full access to your router via telnet connection. Unlike http control service it doesn't have any restrictions and you can edit your config files from your workstation via telnet connection.

### 3.5 Web Server

Originally this router was not intended to act as a web server, but since there is a http server for control and time purpose I've decided to run one more copy of http server for user's purpose. So you can keep some html documents on the router for your local network or even for whole world. Unfortunately there are no any tools for uploading your documents in the router, you have to bring your html files on a floppy disk and copy them manually.

### 3.6 Print Server

Steve Flynn donated me his Line Printer Server for this project. Let's all together say - Thank you, Steve.

Setting up Windows clients is quite easy. Download windows driver and run it, then follow instructions on the screen, you have to know your FREESCO IP address and lp queue name (queue name is *nt* or *lp*).

### 3.7 Remote Access Server

How I'm lazy. I even made this thing to have access my router from home and I also use it for free internet access from home through my permanent office ISDN connection.

What can I say - be a provider, small but provider. Provide internet for yourself and for your best friends. :)

## 4. Typical configurations or HOW TO build:

Build your router in 2 steps. You will be offered to choose a type of router:



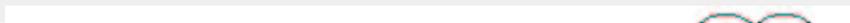
and then you will pass through standard setup procedure for chosen type. After that you can change same or all settings via "Advanced settings" menu. Some of settings don't appear during standard setup procedure and you can change them only from "Advanced settings" menu, but default setting are suitable for most cases. All settings are numbered and if you don't understand any setting you can ask help by number. All settings are also colored. **Green settings are required, yellow - optional, red - if you aren't guru better don't touch it.** Most questions have default answers enclosed in brackets and you can pass default answer by pressing <Enter> key. However sometimes it's required to pass empty string instead of default answer, in such cases user must reply with "n".

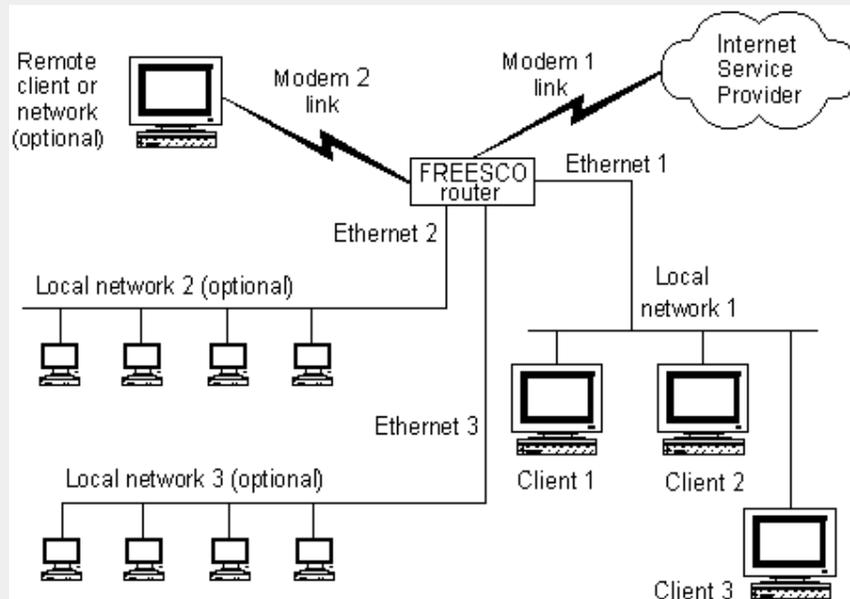
### 4.1 Modem-to-Ethernet router in dial-on-demand mode (analog or ISDN modem).

*NOTE: ISDN modems are external modems connected via serial port. ISDN cards are not supported.*

Since I've issued FREESCO router Ballantain became obsolete. FREESCO replaces Ballantain fully.

Here is a picture of typical network with FREESCO as Modem-to-Ethernet router:





Let's pass step by step setup for this type of router.

```
711 Hostname of this computer [router]? Press <Enter>
```

Give a name to your router, default is router

```
712 Domain name [inet]? Press <Enter>
```

Give a name to your whole local network (domain), default - inet

```
How many ethernet cards do you have [1-3]? 3
```

Let's say for example you have 1 cards and 1 local network respectively.

```
811 I/O port address of 1st ethernet card [0x300]?
```

Enter hexadecimal address here. Some ethernet cards are plug-n-play and their Linux drivers don't require this address and you can leave it default.

```
812 IRQ line of 1st ethernet card [11]?
```

Some drivers require this parameter, some don't.

```
720 Use DHCP client for configuring 1st network interface y/n [n]? n
```

If you have Analog modem or ISDN modem answer "n" here. This feature is for Ethernet-to-Ethernet or Cable Modem-to-Ethernet router.

```
721 IP address of 1st network interface [10.0.0.1]? Press <Enter>
```

If you already assigned IP addresses in your network choose one which belongs to your network. If you build your network from a scratch default answer will be a good choice.

```
722 Network mask [255.0.0.0]? Press <Enter>
723 IP range [10.0.0.100 10.0.0.150]? Press <Enter>
```

Answer "n" will disable DHCP service on this interface.

```
14 Screen saver, in minutes. 0 - disable [0]? Press <Enter>
15 Swap file size in kbytes (on boot device). 0 - disable [0]? <Enter>
41 Enable caching DNS server y/n [y]? Press <Enter>
421 Enable DHCP server y/n [y]? Press <Enter>
```

This option enable or disable DHCP server at whole.

```
422 WINS address (if you have one, otherwise - n) []? Press <Enter>
```

If you don't have WINS server (Windows NT server or Samba-on-Unix server) or if you aren't sure answer "n" here.

```
431 Enable public HTTP server y/n [n]? Press <Enter>
441 Enable time server and router control via HTTP y/n [y]? <Enter>
442 Control HTTP server IP port [81]? Press <Enter>
451 Enable Print Server y/n [y]? Press <Enter>
452 Print server IP port [515]? Press <Enter>
453 Output device name [lp1]? Press <Enter>
```

Then FREESCO will try to detect your modem(s) and will show the result. Rarely auto detect procedure fails, try to set up your modem(s) manually in "Advanced settings" menu, usually it happens when you start setup program from normally booted system. Modem auto detecting procedure works proper only when you boot system in setup mode.

```
32 Host DNS address (usually your provider's DNS) []? Enter
    your ISP DNS address
16 Keep up ppp link for N sec. 0 - use filter.cfg; 1 - forever. [600]? Press <Enter>
```

This option defines how long dialing daemon will keep link up after last packet passed. If you going to use filter.cfg which describes how to bring up link and how long to keep link up for different types of packets please read diald manual at its home page - <http://www.loonie.net/~eschenk/diald.html>. If you set this parameter to any value differ from 0 or 1 it means diald will bring up a link for any packet and will keep link up N seconds after last packet. Value 1 is good when you have absolutely unlimited connection.

```
31 ISP phone numbers [T4004444 T5004444]?
```

Dialing method and phone number. T - stands for tone dialing, P - stands for pulse dialing.

```
331 Does your ISP give you dynamic IP address [y]? Press <Enter>
```

Usually yes, otherwise answer "n" and enter IP addresses of local and remote sides of ppp link.

```
341 Authentication method - pap/chap/script []? script
```

If your ISP starts ppp daemon on his side right after connection it means it uses pap or chap method and you must provide login name and password. If after connection with ISP you must login before pppd starts it means you must use script method. For this method you must describe chat sequence.

Let's for example describe chat sequence with my provider. After connection my ISP output login prompt:

Username:

and waits my login name, then it output another prompt:

Password:

and waits my password, then it output third prompt:

emirates-xyz>

and waits until I type *ppp* followed by <Enter>, and only after all this ppp daemon starts on ISP side. So chat sequence will be - wait for "*name:*" and enter *my login name*, then wait for "*word:*" and enter *my password*, then wait for ">" (*xyz* - usually varies, it depends on which router I've connected to) and enter *ppp*, then start ppp daemon on my side. There are four pairs "Wait For" and "Reply With", if it's more then you need leave last pair(s) blank. You may need to use some control symbols in chat sequence, use these back slashed symbols:

- \c - suppresses the new line at the end of the reply string. This is the only method to send a string without a trailing return character. It must be at the end of the send string.
  - \b - represents a backspace character.
  - \d - delay for one second (not valid in expect).
  - \K - insert a BREAK (not valid in expect).
  - \n - send a new line or linefeed character.
  - \r - send or expect a carriage return.
    - \N - send a null character.
    - \t - send or expect a tab character.
    - \\ - send or expect a backslash character.
- \ddd - collapse the octal digits into a single ASCII (some characters are not valid in expect).
- ^C - send control character represented by C (some characters are not valid in expect).

```
Q0 Waitfor []? name:
R0 Reply []? martin
Q1 Waitfor []? word:
R1 Reply []? my_secret_password
Q2 Waitfor []? >
R2 Reply []? ppp
Q3 Waitfor []? Press <Enter>
R3 Reply []? Press <Enter>
```

**Warning!!! At this step internet passwords will be saved without prompt.**

That's all. You will be again in main menu, now you can save your new config file reboot system and router is ready. This setup is very similar to Ballantains setup and if you set up your router as it was just described you will get a full replacement of Ballantain router + DNS server + Print server + Time&Control server.

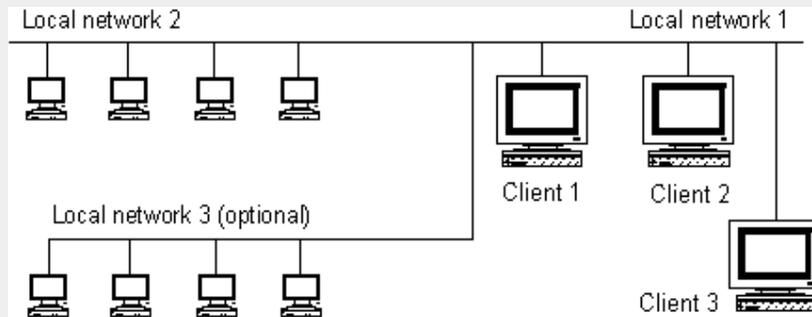
## 4.2 Modem-to-Ethernet router in leased line mode (analog or ISDN modem).

Setting up of this type of router is very similar to process described in section 4.1, but you may need to edit file *rc\_lease* according your specific conditions.

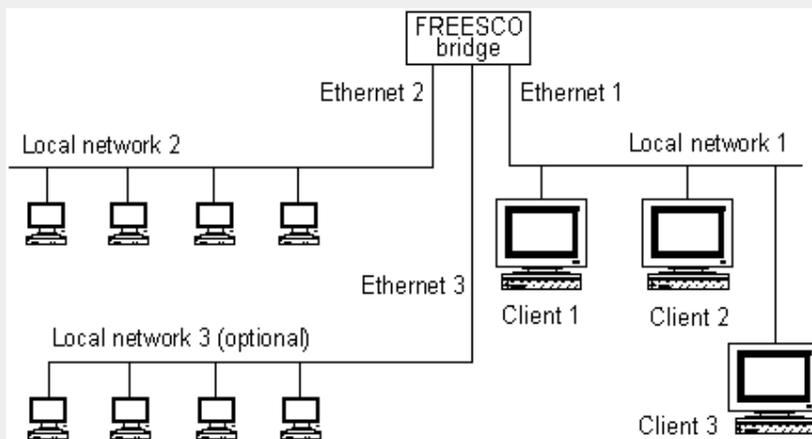
## 4.3 Ethernet bridge

Ethernet bridge separates two or three parts of network. Bridge remembers in which parts are located computers and if one computer sends packet to another computer and both are situated in the same part of network bridge will not pass this packet to another parts of network. This device reduce traffic within and between different parts of network.

In network without bridge:



every packet sent from one computer reaches every computer on every part of network.  
 What will happen if we connect FREESCO as a bridge?



For instance, let Client #3 sends packet to Client #1. Packet will reach Client #1, Client #2 and FREESCO bridge. FREESCO knows that Client #1 is situated in the same part (local net 1) and will not pass this packet in other parts on network (local net 2 and local net 3). If packet sent by Client #3 addressed to computer on other part of network FREESCO will pass it to respective part.

The most simplest device and setup procedure. This device doesn't require maintaining. Bridge works with MAC ethernet addresses and can be used in network with any protocol.

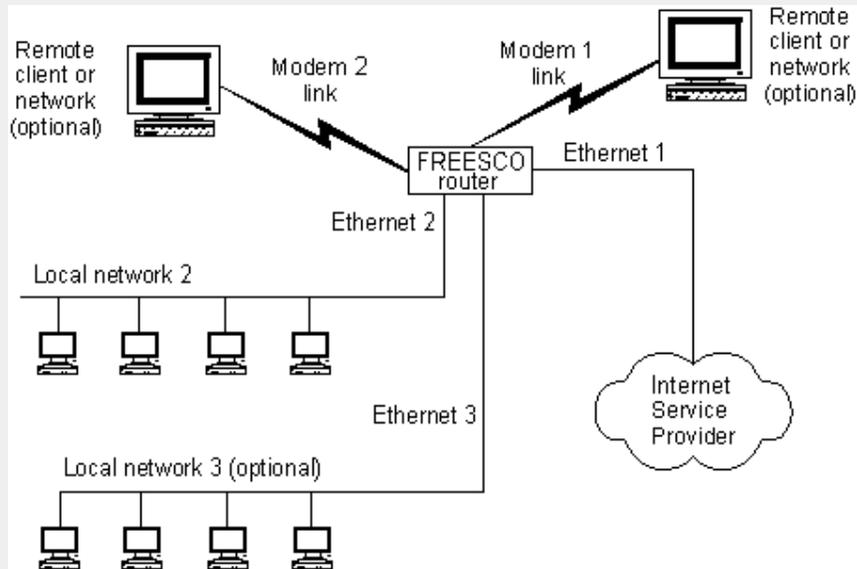
```

How many ethernet cards do you have [2-3]? 3
811 I/O port address of 1st ethernet card [0x300]?
812 IRQ line of 1st ethernet card [11]?
821 I/O port address of 2nd ethernet card [0x320]?
822 IRQ line of 2nd ethernet card [7]?
831 I/O port address of 3rd ethernet card [0x340]?
832 IRQ line of 3rd ethernet card [13]?
  
```

That's all. Easy, isn't it?

#### 4.4 Ethernet-to-Ethernet router

In this configuration 1st ethernet is used as link to ISP, the rest (ethernets and modems) are used as links to local or remote computers and networks.



Let's have a look what setup procedure will do for us.

```

711 Hostname of this computer [router]?
    712 Domain name [inet]?
How many ethernet cards do you have [1-3]? 3
811 I/O port address of 1st ethernet card [0x300]?
    812 IRQ line of 1st ethernet card [11]?
821 I/O port address of 2nd ethernet card [0x320]?
    822 IRQ line of 2nd ethernet card [7]?
831 I/O port address of 3rd ethernet card [0x340]?
    832 IRQ line of 3rd ethernet card [13]?
720 Use DHCP client for configuring 1st network interface y/n [y]?

```

1st ethernet interface has ability to be configured through DHCP, it's very useful when you use cable modem.

```

721 IP address of 1st network interface [10.0.0.1]?
    722 Network mask [255.0.0.0]?
    723 IP range [10.0.0.100 10.0.0.150]?
731 IP address of 2nd network interface [192.168.168.1]?
    732 Network mask [255.255.255.0]?
    733 IP range [192.168.168.100 192.168.168.150]?
741 IP address of 3rd network interface [172.22.0.1]?
    742 Network mask [255.255.0.0]?
    743 IP range [172.22.0.100 172.22.0.150]?
14 Screen saver, in minutes. 0 - disable [0]?
15 Swap file size in kbytes (on boot device). 0 - disable [0]?
    41 Enable caching DNS server y/n [y]?
    421 Enable DHCP server y/n [y]?
422 WINS address (if you have one, otherwise - n) [10.0.0.2]?
    431 Enable public HTTP server y/n [y]?
    432 Public HTTP server IP port [80]?
441 Enable time server and router control via HTTP y/n [y]?
    442 Control HTTP server IP port [82]?
    451 Enable Print Server y/n [y]?
    452 Print server IP port [515]?
    453 Output device name [lp1]?
32 Host DNS address (usually your provider's DNS) [123.123.123.123]?

```

75 Host gateway (if exist, otherwise - n) [233.233.233.233]?

## 4.5 Cable Modem-to-Ethernet router

This section to be done with your help. Who will try to write it? It's very similar to section 4.4

## 4.6 Print server

Configuring this type of device similar to configuring Ethernet-to-Ethernet router.

```
711 Hostname of this computer [router]?
    712 Domain name [inet]?
        How many ethernet cards do you have [1-3]? 2
811 I/O port address of 1st ethernet card [0x300]?
    812 IRQ line of 1st ethernet card [11]?
821 I/O port address of 2nd ethernet card [0x320]?
    822 IRQ line of 2nd ethernet card [7]?
720 Use DHCP client for configuring 1st network interface y/n [y]? n
    721 IP address of 1st network interface [10.10.0.1]?
        722 Network mask [255.255.0.0]?
            723 IP range [ ]?
731 IP address of 2nd network interface [192.168.168.1]?
    732 Network mask [255.255.255.0]?
733 IP range [192.168.168.200 192.168.168.240]?
14 Screen saver, in minutes. 0 - disable [0]?
15 Swap file size in Kbytes (on boot device). 0 - disable [0]?
    41 Enable caching DNS server y/n [y]?
        421 Enable DHCP server y/n [y]?
422 WINS address (if you have one, otherwise - n) [10.10.10.2]?
    431 Enable public HTTP server y/n [y]?
        432 Public HTTP server IP port [80]?
441 Enable time server and router control via HTTP y/n [y]?
    442 Control HTTP server IP port [81]?
        451 Enable Print Server y/n [y]?
            452 Print server IP port [515]?
            453 Output device name [lp1]?
32 Host DNS address (usually your provider's DNS) [194.170.1.6]?
    75 Host gateway (if exist, otherwise - n) [ ]?
```

You see here a lot of questions not concerning to Print server just because Print server can be DHCP server and/or HTTP server and/or Time server and/or DNS server and/or Remote Access server at the same time.

## 5. Advanced settings and Security

### 5.1 Advanced settings

Here is the "Advanced settings" menu:

```

ADVANCED SETTINGS MENU

[ System ]           [ Services ]           [ #1   Modems   #2 ]
11. On/Off NAT/Firewall  41. DNS server       50. Autoconfigure  50.
12. On/Off Bridging mode 42. DHCP server      51. COM port       61.
13. On/Off ppp compression 43. Public HTTP     52. Port speed    62.
14. Screen saver         44. Control HTTP    53. Init string   63.
15. Swap file            45. Print server    54. MTU/MRU       64.
16. "keep up link" rule  46. Time server     55. IP address    65.

[ Security ]         [ Networks ]           [ Ethernet cards ]
21. Int. security      71. Host/Domain      81. 1st card
22. Ext. security      72. 1st network      82. 2nd card
23. Remote access     73. 2nd network      83. 3rd card
                        74. 3rd network
[ Internet ]         75. Gateway
31. Phone numbers
32. DNS address
33. IP address
34. Login/Password

Your banner could be here!
( just a joke :o)
Reserved for future use.

[Advanced settings (x - back to main menu)]?

```

Some of this settings you already know, some of rest I'll describe.

11 Enable IP masquerad y/n [y]?

At the moment only one method of Network Address Translation (NAT) is implemented in FREESCO. It's IP Masquerade. You can read about IP Masquerade at its home page - [Linux 2.x Masq Site - http://ipmasq.cjb.net/](http://ipmasq.cjb.net/)  
If you have to connect your local network(s) to the internet and you don't have real IP addresses for all your computers you must enable this option.

12 Enable bridging y/n [n]?

12 Enable bridging y/n [n]?

This router can be a bridge while being a router.

If you not a Super Guru (!!!) never enable this option, even forget about it. Unpredictable behavior.

NOTE: Enabling this option will set "211.Trust local nets option to y"

13 Do you have more then 8Mb RAM y/n [n]?

If you have more then 8Mb RAM it's possible to load few additional modules:

ppp compression : bsdcomp.o, ppp\_deflate.o

ip tunnel : ipip.o, new\_tunnel.o

NOTE: If you have problems with ppp compression just answer n here. You may disable this option when communicating with MS Windows because this compressions and MS compressions aren't compatible.

54x MTU for link on 1st modem (n for default) []?

WARNING!!! Setting MTU/MRU other then default may cause problems.

I've applied MTU/MRU kernel patch since version 0.2, but didn't test it.

## 5.2 Security

211 Trust local networks y/n/p [p]?

N - for paranoid sysadmins, this will disable cross forwarding between networks and modems, all networks and modems will be able only to communicate with the internet but not between each other.

Y - will enable cross forwarding at whole and switch off IP spoofing check.

P - will enable cross forwarding but apply more firewalling against IP spoofing. Recommended.

212 Trust modem links y/n [y]?

Y - trust modems as we trust local nets.

N - don't trust modems, modem links will not have access to local networks.

If you aren't going to connect to your MS Windows networks it's recommended to set this options to N.

221 Router accepts only ISP's DNS and deny all other y/n [y]?

222 Router accepts only local telnet connection y/n [y]?

223 Print server accepts only local clients y/n [y]?

224 Public HTTP servers accept only local clients y/n [n]?

225 Control HTTP server and Time server

accept only local clients y/n [y]?

I guess all this things are clear. Default settings will be good for most users. You may need to change it if you use FREESCO as a router between two your local network.

Next few settings concern only dial-in users and regulate allowed login time.

230 Number of rings before answer during LOGIN,NOLOGIN time [1,5]?

Currents setting for nologin time(s):

1. Mon - 1000-1200

2. Tue -

3. Wed -

4. Thu -

5. Fri -

6. Sat -

7. Sun -

Enter number of day to change setting or 0 to exit []? 1

Enter time range in format hhmm-hhmm  
You may specify few ranges separated by space.  
Example: 1000-1100 1405-1450  
system will be closed from 10:00 till 11:00,  
and from 14:05 till 14:50

231 Time range or n to clear [1000-1200]?

## 5.2 Passwords

Preset passwords are:

Login name	Status	Password	Comment
root	administrator	root	Change it immediately
admin	administrator (via http)	admin	Change it immediately
up	Disabled, change password and give it to trusted user.		
down			
block			
unblock			
force			
unforce			
wuser	trusted user (via http)	user	Change it immediately
ppp	modem user	ppp	Change it immediately

## 6. Complex configurations

Modem-to-Ethernet router can be simultaneously:

- DNS Server
- DHCP Server
- Time and Control Server
- Telnet Server
- Web Server
- Print Server
- Remote Access Server with one dial-in modem

Ethernet-to-Ethernet router, Cable Modem-to-Ethernet router, Print server can be simultaneously:

- DNS Server
- DHCP Server
- Time and Control Server
- Telnet Server
- Web Server
- Print Server
- Remote Access Server with two dial-in modems

Ethernet bridge can be only a plain bridge.



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## 7. Setting up local network(s) and clients

Coming soon. @@@@

## 8. Troubleshooting

Should you find a bug or have a problem reboot your router and issue command:

*report*

then find a file *report* on your boot device, e-mail me this file with detailed explanation of problem. Did I tell you read manual again before reporting about bugs or asking help?

- I have 8 MB RAM (or less) and I'd like to run router from hard disk, but I can't execute move2hdd. Console and say something like: "can't fork blablabla" or "Bus error". What do I do?
- Boot your router from floppy disk in **setup** mode. When it starts switch to second console (press ALT+F2), login as root and execute move2hdd. Then boot from hard disk in setup mode and add/switch on swap file.
- I have 8 MB RAM (or less) and I can't use router. It doesn't work and I continue receive on console something like: "can't fork blablabla" or "Bus error". What do I do?
- It means your system is out of memory. One way to increase amount of memory is switch on swap file. It is usable if you start your router from hard disk. If you don't have hard disk or don't want to use it there is another way. You have to disable unneeded services like public http server etc. Of course adding some more memory isn't forbidden. :)

This section will grow after your replies and reports.

## 9. FAQ (Frequently Asked Questions)

Q. After boot system asks me a password. What is that password?

A. login: *root* password: *root* By the way read manual.

Q. I'm tired having sex with FREESCO. Nothing comes out. What should I do?

A. Read manual and search for word **report**.

Q. I've just read it eighty times and still have same problem. What is next?

A. Reboot your router and issue command *report* . Then find a file report and send me this file by e-mail with detailed explanation of problem.

Q. Can I use both modems as one link to ISP to increase bandwidth?

A. No you can't. This must be supported on ISP side for such feature, but very few providers have it. You can count such providers on one hand fingers so better forget about it.

Q. I just gave Freesco/Ballantain a go on my old 486 Gateway 33MHz DX. It makes it up where it loads the kernel, but then no further text is visibly written to the screen (cursor moves some). The floppy lights up on and off for another minute or so, but I never seem to gain access of any kind. What is the problem?

A. Remove all "vga=4" from a file syslinux.cfg (if you boot router from floppy disk) and from router.bat (if you boot it from hard disk)

Q. Is there a way to add support for Net2Phone with this distribution of Freesco?

A. Consult with IP masquerad manual at <http://ipmasq.cjb.net/>

Q. I have Freesco loaded on a 500meg HD and I am wondering how can I upload to the http server that is included with Freesco.

A. You must use FloppyNET :) Bring your files on a floppy disk and copy them manually.

Q. When I log into my win 98 machine my router automatically logs onto my ISP even though I have not tried to access any internet resources.

A. Use NetBEUI or IPX/SPX as default protocol in your local network and use TCP/IP protocol only for internet or configure (manually) DNS server for all computers on local networks.

The rest of this section will grow after your replies and reports.



## 10. Miscellaneous

### 10.1 IP addresses for private networks

This is a quote from "RFC 1918 Address Allocation for Private Internets February 1996":

#### 3. Private Address Space

The Internet Assigned Numbers Authority (IANA) has reserved the following three blocks of the IP address space for private internets:

10.0.0.0 - 10.255.255.255 (10/8 prefix)

172.16.0.0 - 172.31.255.255 (172.16/12 prefix)

192.168.0.0 - 192.168.255.255 (192.168/16 prefix)

## 11. List of available Freesco Linux commands

**This list is permanently out of date!**

### External commands.

Command	Origin	Comment/Syntax
adduser	own	<b>adduser</b> then follow instructions
agetty	std	Open a tty port, prompts for a login name and invokes the /bin/login command. It is normally invoked by <i>init</i> . Extra: man 8 agetty
basename	ltd	Strip directory and suffix from filenames. <b>basename name [suffix]</b> <b>basename /etc/system.cfg .cfg</b> Result: system
block_device	?	Return device name where given file is situated. <b>block_device name</b> <b>block_device /mnt/ramdisk</b> Result: /dev/fd0
brcfg	std	Enable/disable bridging mode. <b>brcfg enable disable</b>
chat	std	Automate conversational script with a modem. Extra: man 8 chat
chpass	std	Renamed passwd.
chuser	own	Invoke editor for changing dialup user's allowed time. <b>chuser</b>
clear	std	Clear screen. <b>clear</b>
clock	std	Manipulate with CMOS clock. Extra: clock -?
compress	std	Reduces the size of the named file. <b>compress name</b> compress file <b>compress -d name</b> decompress file Extra: man 1 compress
control	own	Control dialing daemon. <b>control</b>
cp	ltd	Copy program. <b>cp [-f] src [src] ... [src] dst</b> copy source to destination, -f force to overwrite
crond	std	---
daemon	own	Shell script for starting programs in daemon mode
date	ltd	Print/set date. <b>date [date]</b> Very poor implementation.
/bin/date	std	Print/set date. <b>date [-a time]date1</b> Extra: man 4 date

/bin/date	std	Print/set date. <b>date [-s time date]</b> Extra: man 1 date
dd	ltd	Copy from stdin to stdout according to the options. <b>dd [options]</b> Extra: dd -?
df	std	Report filesystem disk space usage. <b>df [name]</b>
dhcpcd	std	DHCP client
dhcpcd	std	DHCP server
diald	std	Dialing daemon
dirname	own	Strip non-directory suffix from file name. Very limited and work with absolute path. <b>dirname name</b> <b>dirname /etc/system.cfg</b> Result: /etc
dmesg	ltd	Print kernel messages. <b>dmesg</b>
edit	ltd	Editor + sync;sync. <b>edit name</b> If you lack of <ALT>+<key> combination (possible when using via telnet) use <ESC><key> instead of.
edt	ltd	Editor itself. Don't use, but use <b>edit</b>
false	std	Do nothing, unsuccessfully. <b>false</b>
fdflush	ltd	
find	ltd	It seems do nothing
free	own	Report free memory and space on mounted disks. <b>free</b>
grep	ltd	Print lines matching a pattern. <b>grep pattern [file]</b>
halt	ltd	Shutdown and stop system. <b>halt</b>
hostname	ltd	Get/set host name. <b>hostname [name.domain]</b>
ifconfig	std	Is used to set up (and maintain thereafter) the kernel-resident network interfaces. Extra: man 8 ifconfig
ile	muLnx	Command line editor.
init	nstd	1st system process, a parent of all processes.
ipautofw	std	
ipcalc	std	IP calculator. <b>ipcalc netmask ipaddr</b> Result: broadcast addr, network addr
ipfwadm	std	IP firewall and accounting administration. Extra: <a href="http://simba.xos.nl/linux/ipfwadm/paper/">http://simba.xos.nl/linux/ipfwadm/paper/</a>
ipportfw	std	IP port forwarding administration. Extra: <a href="http://www.ox.compsoc.org.uk/~steve/portforwarding.html">http://www.ox.compsoc.org.uk/~steve/portforwarding.html</a>
klogd	std	Kernel messages log daemon
length	ltd	Count number of chars in given string. <b>length string</b>
load	own	Run gzipped files. <b>load dir name params</b>
logger	std	Send messages to log file. Extra: man 1 logger
login	std	Sign on. Extra man 1 login
losetup	std	set up and control loop devices. <b>losetup /dev/loop0 file</b> attach file to device loop0, <b>losetup -d /dev/loop1</b> detach device loop0 from file. Extra: man 8 losetup
lpd	nstd	Line printer daemon.
ls	ltd	List files (well known in other OSes as dir command). <b>ls [name]</b> or <b>ls -la [name]</b>

lsmod	own	List installed modules(AKA drivers). <b>lsmod</b>
minicom	own	Terminal program. <b>minicom [-s speed] [-l line]</b>
mitern	muLnx	Terminal program itself.
mkswap	std	set up a Linux swap area. Extra: man 8 mkswap
modemd	own	Simulate modem&interface LEDs. Extra: modemd -?
more	ltd	More is a filter for paging through text one screenful at a time. <b>more [file]</b>
mount	std	Mount disk to a given directory point. <b>mount -t filesystem device pointdir</b> <b>mount -t vfat /dev/hda1 /Cdisk</b> Result: drive C: will be mounted in directory Cdisk as FAT32 disk. Filesystems are: vfat - FAT32, msdos - FAT16, etx2 - linux standard, umsdos - linux over msdos fs. Extra: man 8 mount
move2hdd	own	Copy and prepare FREESCO to run from hard disk. <b>move2hdd</b>
mv	ltd	Move command. Work within one filesystem. If you need to move file from one disk to another you must copy and delete it. <b>mv [-f] src [src] ... [src] dst</b> copy source to destination, -f force to overwrite
named	std	DNS daemon
nc	std	netcat program. Open port and work with it. Extra: nc -h
ntpdate	std	set the date and time via NTP (net time protocol). <b>ntpdate -s -b timeserver</b>
open	std	Start a program on a new virtual terminal. <b>open [-c vtnumber] command</b> <b>open -c 5 sh</b> Result: new shell on console #5
passwd	own	Change password for current or given user. <b>passwd [username]</b>
ping	std	Send ICMP ECHO_REQUEST packets to network hosts. <b>ping [-c count] [-n] host</b> sends "count" packets.
pppd	std	ppp daemon.
ps	own	List processes. <b>ps</b>
psh	own	Is used as a shell for dialup users. Test allowed time and start pppd program for user.
pwd	std	Print Working(current) Directory. <b>pwd</b>
reboot	nstd	Shutdown and reboot the computer. <b>reboot</b>
report	own	Generate bug report containing all system info and settings except (of course) your passwords. <b>report</b>
route	std	Show/manipulate the IP routing table. <b>route [-n]</b> show route table. Extra: man 8 route
sed	ltd	Stream EDitor. Extra: man 1 sed, man 1 ed.
sedit	own	Edit file in ramdisk and also replace its copy in floppy/hard disk. <b>sedit name</b> <b>sedit /etc/system.cfg</b> Result: edit file /etc/system.cfg and then save copy in /mnt/router/etc/system.cfg
setserial	std	Get/set Linux serial port information. Extra: man 8 setserial
setup	own	I tell you a secret - in russian it will be also setup :) <b>setup</b>
sh	std	A shell. It's kinda command.com
sleep	nstd	Delay for a specified amount of seconds.

split	nstd	Copy the source file to the destination, splitting into 1400kB chunks. <b>split source-file destination-file-prefix</b>
star	nstd	Untar from stdin to stdout. <b>star</b>
swapoff	nstd	Switch off using swap file. <b>swapoff filename</b>
swapon	nstd	Switch on using swap file. <b>swapon filename</b>
synctime	own	Synchronize system time with preset (in system.cfg) time server and time offset. <b>synctime</b>
sysedit	own	Edit system.cfg and then save copy to /mnt/router/etc/system.cfg. <b>sysedit</b> Actually this command is an alias for sedit /etc/system.cfg
syslogd	std	System log daemon.
tail	std	Output the last part of files. <b>tail [-f] [-l lines] file</b> Extra: man 1 tail
tcpdump	std	Dump traffic on a network. Extra: <a href="http://www.it.kth.se/edu/gru/Internet/tcpdump.html">http://www.it.kth.se/edu/gru/Internet/tcpdump.html</a>
telnet	ltd	Very limited telnet client. <b>telnet host [port]</b>
telnetd	ltd	telnet daemon.
thttpd	nstd	http server.
touch	ltd	Update the last-modified date on the given file[s]. <b>touch file [file ...]</b>
traceroute	std	Print the route packets take to network host. <b>traceroute host</b> Extra: man 8 traceroute
true	std	Do nothing, successfully. <b>true</b>
tryopen	nstd	I don't know.
tty	std	Print the file name of the terminal connected to standard input. <b>tty [-s]</b>
udosctl	std	UMSDOS control program (part of UMSDOS fs). Extra: udosctl --h
umount	std	Unmount file systems. <b>umount device mount_point</b>
umssetup	std	Set the default permissions and owner of files in DOS directories. Extra: umssetup
umssync	std	Synchronize MSDOS and UMSDOS directory. Extra: umssync
update	?	I'm not sure.
zcat	nstd	Expand compressed stream from stdin to stdout. <b>zcat</b>

**Shell and builtin commands. Extra: man 1 ash**

cd		Change directory. <b>cd /new/directory/path</b>
exit		Terminate the shell process. <b>exit [exitstatus]</b>
read		Read variable(s) from stdin. <b>read var1 [var2 ...]</b>
echo		Output a parameter to stdout. <b>echo par</b>

and many many more. Read man pages.



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## 12. Links

<a href="http://www.freesco.org/">http://www.freesco.org/</a>	FREESCO primary site
<a href="http://www.linuxsupportline.com/~router/">http://www.linuxsupportline.com/~router/</a>	FREESCO mirror site
<a href="http://ipmasq.cjb.net/">http://ipmasq.cjb.net/</a>	home of Linux IP Masquerade
<a href="http://www.isc.org/">http://www.isc.org/</a>	home of BIND (DNS server)
<a href="http://www.loonie.net/~eschenk/diald.html">http://www.loonie.net/~eschenk/diald.html</a>	home of diald (dialing daemon)
<a href="http://www.eecis.udel.edu/~mills/ntp/clock2.htm">http://www.eecis.udel.edu/~mills/ntp/clock2.htm</a>	list of free time servers
<a href="http://shadowland.hf.utexas.edu/acitslpr.htm">http://shadowland.hf.utexas.edu/acitslpr.htm</a> <a href="http://www.utexas.edu/academic/otl/software/lpr/">http://www.utexas.edu/academic/otl/software/lpr/</a> <a href="ftp://ftp.cs.umn.edu/pub/LPRng/WINDOWS/acitsplr/">ftp://ftp.cs.umn.edu/pub/LPRng/WINDOWS/acitsplr/</a> or search here - <a href="http://www.download32.com/">http://www.download32.com/</a>	win-32 client for print server (it's not free!!!)
<a href="http://linuxcentral.com/linux/man-pages/manbook.html">http://linuxcentral.com/linux/man-pages/manbook.html</a>	Linux Central Man Pages
<a href="http://www.sex.com/">http://www.sex.com/</a>	funny pictures site

# F R E E S C O

```
Tera Term - 10.10.10.8 VT
File Edit Setup Control Window Help
Welcome to Freesco Router v (C) 1999 by S Storojevych
serg@mailandnews.com
IP masquerad
(Powered by Linux)

Legend: green - required parameters;
yellow - optional parameters;
red - just don't touch it.

Three steps of setup:
1) choose router type and set it up
2) change advanced settings
3) save config, exit and reboot system

[ Press ENTER to continue!?
```

Screen Shot 1

```
Tera Term - 10.10.10.8 VT
File Edit Setup Control Window Help
MAIN MENU

d) Dialup line router: ISP <- modem0 -> router <- eth0 -> local net 1
1) Leased line router: |-- <- eth1 -> local net 2
|-- <- eth2 -> local net 3
|-- <- modem1 -> remote net 1

e) Ethernet router: ISP <- eth0 -> router <- eth1 -> local net 1
|-- <- eth2 -> local net 2
|-- <- modem0 -> remote net 1
|-- <- modem1 -> remote net 2

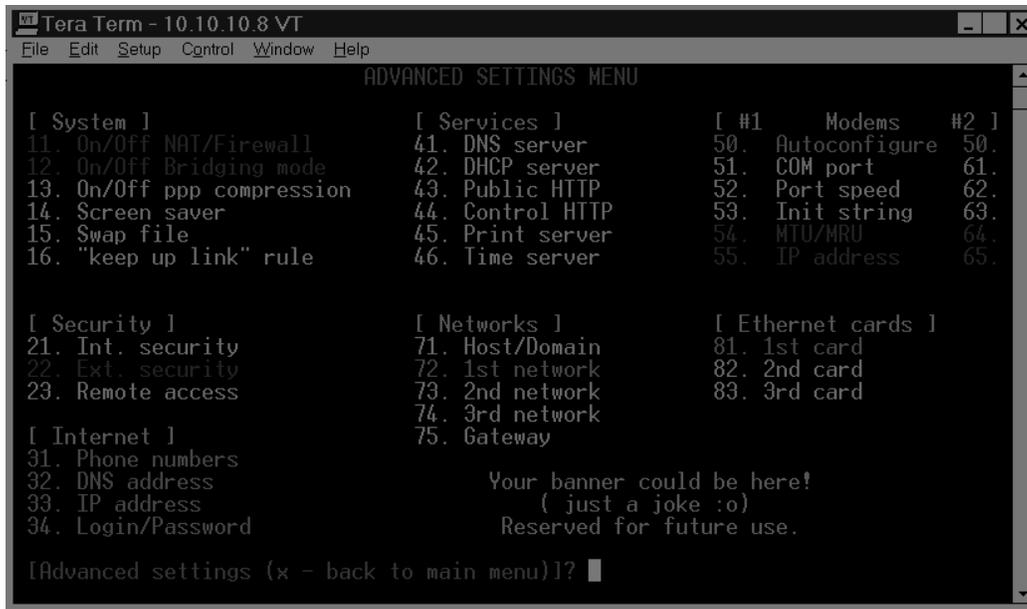
b) ethernet Bridge: net 1 <- eth0 -> bridge <- eth1 -> net 2
|-- <- eth2 -> net 3

p) Print server printer <- -> print-server <- -> network(s)

a) Advanced settings
v) View current config w) view previous config
s) Save current config and exit q) Quit without saving

[Choose router]?
```

Screen Shot 2



Screen Shot 3

