Configuration (CLI) of InfiNet Wireless

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1 Initial settings configuration procedure

Before starting new device, one should perform initial configuration. The configuration can be performed either using serial console port or using Telnet protocol. In order to configure the device using Console port, follow the instructions below:

- Device should be connected with host serial interface, using InfiNet Console cable

- Start any terminal emulation software (e.g. Hyper Terminal)

- Set serial interface properties to 38400 baud rate, 8 bit, 1 stop bit, parity off, flow control disabled

- Enable emulation mode ANSI or VT100, keyboard VT100

To connect using Telnet protocol from the wired LAN run Telnet with 10.10.10.1 svi-interface IP-address or with Ethernet interface (*eth0*) IP-address 10.10.20.1.

If all above procedures are completed correctly, you will see the **WanFlex OS** prompt:

Login:

Every new device has no initial login and password settings, so you can use any non-zero length login and password to enter the device:

Login: root

Password: 1234

After default authorization there will be standard console prompt:

console>

Now the device is ready for the initial configuration procedure. The most relevant thing to be done at this phase is to define device name/user/password:

- **sys**tem name Test Base Station

- **sys**tem user root

- **sys**tem password qwerty

> **NOTE**
>
> Part of commands in **bold** must be typed in CLI (Command Line Interface). The rest of the command name is optional and can be skipped while typing.

2 Device interfaces

The Device has several physical and logical interfaces:

- "*lo0*" - loopback interface, used for system interaction needs.

- "*null0*" – logical interface, can be used for auxiliary addresses assignation (for NAT module, for example); for routes aggregation for RIP protocol. Addresses (subnets) are announced to the network but every packet transmitted through this interface is destroyed.

- "*eth0*" - Ethernet 10/100 Mbit interface.

- "*rfX.0*" - radio interfaces. See device's labeling or use "*ifconfig -a*" command to learn your radio interfaces.

- "*svi1*" – switch group interface enables device remote management via any interface from the group.

All configured interfaces of the Device can be reviewed using the following command:

```
ifconfig -a
```

3 Command Line inteface (CLI)

For device's management and configuration a Unix-like command line language is used. Every command starts having the power right after Enter key is pressed. However, each command lifetime duration is limited within one configuration session. In order to save a current configuration "*config save*" command is used.

Several commands can be grouped in one line using ";" character. If a wrong-syntax line is met in the group, the rest of the string is checked anyway and the wrong command is ignored. Command name can be shortened unless the ambiguity occurs.

If your terminal supports VT100 or ANSI standard you can move around the list of recently executed commands using cursor keys. Numbered list of these commands can be reviewed by " *!h*" command. Any command from this list can be available using "*!<NUMBER>*" command. **TAB** key performs substring search of recently executed commands.

Ctrl/R combination refreshes the command string if its content was disturbed by system messages.

The command executed with no arguments prints a short hint about its keys, parameters and syntax.

Context help can be obtained by printing "**?**" in any position of the line.

In addition, the router setting can be performed using protocols Telnet and HTTP. The device supports simultaneously up to 7 Telnet sessions (port 23). The setting could be performed only via one HTTP connection (port 80), but it is possible to create other connections for read only.

4 Configuration manipulations

4.1 Printing and saving your configuration

You can easily review your current device's configuration by executing "*config show*" command. The output of the command is sorted by the configuration sections (e.g. "System parameters", "Interfaces configuration" etc).

You can review some particular parts of the configuration specifying the part of the configuration you want to see.

Example:

```
config show ifc
```

This command will print the interfaces configuration. You can specify several parts of the configuration separating them with a space bar.

Example:

```
config show rip nat
```

In order to save your configuration "*config save*" command is used. It saves the current system configuration in the Device's flash memory for subsequent permanent use. All modifications to the system parameters, if not saved by this command, are valid only during the current session (until the system reset occurs).

4.2 Import/Export

Export/import of the device's configuration is performed using "*config export*" and *"config import*" commands correspondingly. "*config export*" saves the Device configuration on a remote server and "config import" reloads it from a remote server. The information is transferred using FTP.

Syntax:

config export login:password@host/ftppath/filename

config import login:password@host/filename

"*Config import*" command writes the uploaded file directly into the Flash memory without changing the active configuration in RAM. In order to make a new configuration active, right after "*config import*" command implementation finishes the device should be rebooted. If "*config save*" command is run before rebooting, Flash memory is overwritten by the copy of the active configuration. This action will erase the uploaded configuration file.

4.3 Uploading firmware

The latest firmware version can be downloaded from InfiNet ftp-server: ftp://ftp.infinet.ru.

Command "*flashnet*" uploads specified firmware version to the device. Download is performed using FTP and FTP server should be installed somewhere in the network or on a local host from where download being performed.

Syntax:

flashnet get ftp:ftp@91.191.225.246/ftppath/name

Example:

```
 flashnet get ftp:ftp@ftp://91.191.225.246/pub/Firmware/XG/H12
/firmware.H11S01v1.6.6.bin
```

where instead "*H11S01v1.6.6*" insert the latest firmware version in InfiNet ftp-server, and set:

Username: ftp

Password: ftp

The download process has two phases:

- File uploading into RAM of InfiNet device
- Programming InfiNet device flash memory from RAM firmware image.

Both phases are indicated with symbol ".".

During installation process all system events should be observed in the system journal (command "*sys log*"). After firmware updating, restart the unit with the command "*restart yes*"

4.4 IP address formats

Many commands of the operating system require specification of IP addresses.

In **OS WANFleX**, the IP-addressees may be specified in traditional numeric format. Optionally, the mask may be specified either by its bit length (the specified number of leading bits in the mask are set to 1, the remaining bits are reset to 0) or numeric value. The IP address 0.0.0.0/0 denotes all possible IP-addresses.

Therefore, the possible formats to specify IP-addresses are:

nn.nn.nn.nn (no mask is used)

nn.nn.nn.nn/N (N is the bit length of the mask)

nn.nn.nn.nn:xxx.xxx.xxx.xxx (xxx.xxx.xxx.xxx is the numerical value of the mask)

Example:

The **192.168.9.0/24** address describes the network address 192.168.9.0 and the mask with leading 24 bits on.

The same set of addresses may be denoted as **192.168.9.0:255.255.255.0**.

5 Ethernet interface configuration

In the most basic form Ethernet interface can be configured as follows:

***ifc**onfig eth0 1.1.1.1/24 up*

"*up*" flag means than the interface is turned to UP state.

Also you can specify the following parameters for the Ethernet interface:

- Media type. By default media type is selected automatically ("*media auto"* parameter).
- Assign aliases to the Ethernet interface ("*alias"* key word)

Full information about interfaces configuration can be reviewed in WanFleX OS User Guide – "*ifconfig"* command.

6 Radio interface configuration

Radio interface configuration is performed using "*rfconfig*" command. In its most basic form one need to configure the following parameters of the radio interface:

- Frequency ("*freq*" parameter) in MHz. For example, 5260.

- Bit-rate ("*bitr*" parameter). Bit transfer rate in kBits/sec.

- System identifier ("*SID*" parameter). A hexadecimal number in the range of 1H to FFFFFFH. All Devices that are supposed to see each other on the same radio link must have the same identifier.

> **NOTE**
>
> Radio interface state is not saved in the configuration. That means that if you put radio interface to the **down** state after rebooting it will be in the **up** state.

Example:

```
rfconfig rf5.0 freq 5260 bitr 130000 sid 01010101
```

Additional important parameters and settings for the radio interface:

- "*Rf5.0*" – radio interface name in this case. In order to obtain radio interface name either see the ODU/Device labeling or execute "*ifc -a*" command.

- "*txpwr*" – transmitting power selection. Available power levels can be obtained using "*capabilities*" parameter as shown above

- "*burst*" – enables burst mode. BURST protocol means grouping several short packets with the same destination address on a radio link into larger packets, thus cardinally decreasing the response time for applications generating streams of short packets. Burst enabling relates to a radio interface as a whole, and means only that you want to use this mode in this device; but the BURST protocol can only work for destinations where it is also enabled at the other end, and only if the MINT protocol is used at both sides.

Burst enabling does not induce any changes in the work of other devices in the network. To disable "burst" mode use "*-burst*" parameter in "*rfconfig*" command.

- "*distance*": this parameter is used to set the exact distance value between two devices (in kilometers). This parameter changes time values for some delays and time-outs of 802.11a/b/g protocol thus making possible to work on longer distances with smooth adjustment.

There are several ways to manage this parameter:

- ▪
  - ○ if you set an exact value, this value is used no matter what the connection method is used

  - ○ If the CPE has auto value instead of a number (by default), the CPE will configure its parameters using "Base Station" commands. It is enough to set a numeric value on a Base Station (the distance to the remotest CPE); all other CPEs will automatically adjust their work. While configuration showing, there might be the current distance value after "*auto*" parameter: "*auto (XX)*"

  - ○ when knowing exact device's geographical coordinates (e.g. using GPS) you can specify their values in "*sys gpsxy*" command and distance parameter set as auto on all devices including the "Base Station". In this case devices will automatically adjust their settings selecting an optimal value for the "*distance*" parameter. "Base Station" will calculate a distance to the remotest subscriber, and subscriber will calculate a distance to the base station. If the CPE has a link coordinates information it will use this information, otherwise it will use the "*distance*" parameter value got from the base station.

  - ○ If "*distance*" parameter is set to 0 radio module will use default settings.

- ▪ "*pwrctl*" – automatic transmitting power control mode. In this mode the output power is set up automatically within the values available for the radio module. Used for CPE only.

Example:

```
rfconfig rf5.0 freq 5260 bitr 130000 sid 10203040 burst
rfconfig rf5.0 txpwr 18 distance auto
```

To learn your device's radio module capabilities type the command:

```
rfconfig <IF-NAME> capabilitites
```

- ▪ "*<IF-NAME>*" - radio interface name. Can be read on the device's labeling located on the case.

7 Diagnostic card creation

To create a diagnostic card use the following command set:

```
co sh; sys log show; ifc -a; mint map det; ps; mem; sys cpu; switc
h stat; qm stat full; mb; sys info -f; netstat -r; lic -
show=full; muf stat; rf rf5.0 capabilities full; rf rf5.0
calibrate show_caltbl; rf rf5.0 calibrate vpd_calc_show; rf rf5.0
stat full vpd_calc_show;
```

8 Network topology setup

At the core of the system is a MINT protocol, which acts as a topology defining architecture of InfiNet Wireless system. Please refer to the WANFleX OS User Guide for a detailed description of MINT protocol.