RIP configuration

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Description

The InfiNet devices of the InfiLINK 2x2, InfiMAN 2x2, InfiLINK Evolution, InfiMAN Evolution families have two modules for configuring RIP: rip and arip. The difference between them is in the interoperability with the OSPF protocol, which is not present in the rip module, thus it is recommended to configure the devices using the arip module. Due to the recommendation, this article will describe the RIP configuration using the arip module.

The RIP configuration is performed only via CLI. A separate command shell with several modes is used to configure the RIP protocol (Figure 1). The transition to each mode is performed using the commands with the same name. A detailed description of the commands is available in the Technical documentation.

NOTE

An configuration example is given for the InfiLINK 2x2, InfiMAN 2x2 families devices, pay attention to the name of the radio interface on your devices during the scheme implementation.

Mode name	Description

Basic	The basic RIP mode is used to analyze the output of the diagnostic commands and to switch to the configuration mode.
	
	The switching to the basic mode is performed from the WANFleX command shell using the "arip" command.
	
	`BS_1#1> arip`
	`RIP>`

RIP configuration	The configuration mode allows to manage the RIP service running on the device and proceed to the configuration modes: router, interfaces or route-maps.
	
	The switching to the RIP configuration mode is performed from the basic mode using the "config" command.
	
	`RIP> config`
	`RIP(config)#`

RIP router configuration	In the router configuration mode, basic RIPF settings can be made. The mode allows to configure the announced networks, router ID, etc.
	
	The switching to the RIP router configuration mode is performed from the configuration mode using the "router" command.
	
	`RIP(config)# router`
	`RIP(config-router)#`

RIP interface configuration	The RIP interface configuration mode allows to configure the protocol settings related to a specific interface.
	
	The switching to the RIP interface configuration mode is performed from the configuration mode using the "interface IFNAME" command.
	
	`RIP(config)# interface rf5.0`
	`RIP(config-if)#`

Route-maps configuration	The route-maps configuration mode allows to configure the rules that should be applied to the advertised or received RIP routes.
	
	The switching to the RIP route-map configuration mode is performed from the configuration mode using the rule creation command "route-map WORD (deny|permit) <1-65535>".
	
	`RIP(config)# route-map MAP permit 10`
	`RIP(config-route-map)#`

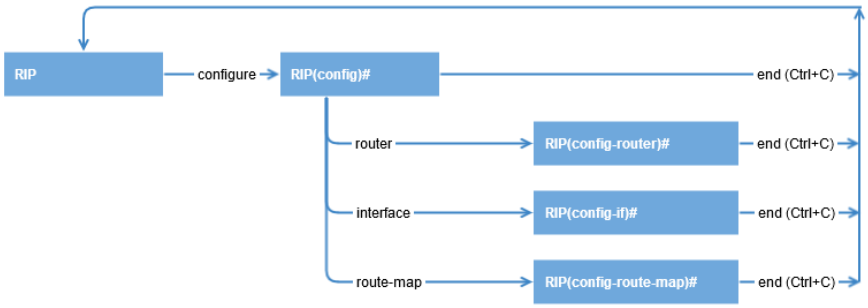


Figure 1 - Switching between the RIP command shell modes

Each RIP shell mode provides help by displaying the full list of supported commands. To display the list, use the "help" command.

The routing table can be displayed using one of the following commands:

```
from the WANFleX cli:
BS_1#1> netstat -r

from the RIP basic shell mode:
RIP> show route

from the ARDA shell mode:
ARDA> show route
```

Task

Let's take a look at the step by step configuration of the RIP protocol on the InfiNet devices, using the following scheme (Figure 2):

- the network consists of three wireless devices: BS1, CPE2 and CPE3 which are connected through wireless links;
- subnet 172.16.0.0/29 is assigned to the wireless network;
- each wireless device has a connection to a wired segment: BS1 is connected to the 10.10.10.0/24 network, CPE2 - to the 10.10.20.0/24 network, CPE3 - to the 10.10.30.0/24 network;
- three static routes are configured on the CPE3 wireless device towards the networks 192.168.6.0/28, 192.168.7.0/28 and 192.168.8.0/28. The third-party router R1 is used as a gateway;
- an IP address from the 192.168.0.0/24 network is assigned to the loopback interface of each wireless device.

Task: configure the RIP protocol on the wireless devices in order to add information about all the networks in the scheme to the routing table of each router. The BS1 device should be used as default gateway on the CPE2 and CPE3 devices.

Title

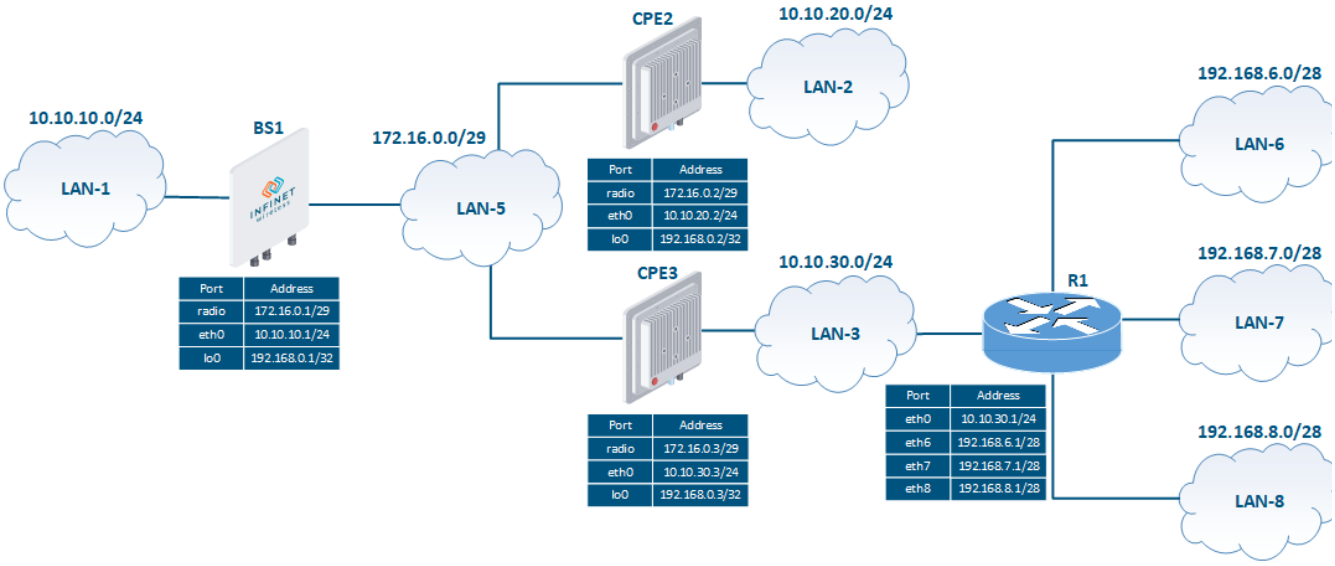


Figure 2 - Network scheme for the RIP configuration

Solution

The devices will be configured step-by-step. In addition to the RIP configuration, static routes will be used (see Static routing) for providing connectivity with LAN-6, LAN-7 and LAN-8.

In order to highlight several available features, different approaches will be used when configuring RIP on the wireless devices.

Pre-configuration

Description	Perform a preliminary configuration of the devices, consisting of the following steps: • Configure the device IDs. • Remove the svi1 interface. • Assign IP addresses to the network interfaces, according to the scheme. • Add static entries to the routing table. • Disable switching. • Establish the wireless links.

BS1	`Set the device ID`
	`system prompt BS_1`
	
	`Remove the svi1 interface`
	`ifc svi1 destroy`
	
	`Assign IP addresses`
	`ifc eth0 10.10.10.1/24`
	`ifc rf5.0 172.16.0.1/29`
	`ifc lo0 192.168.0.1/32`
	
	`Disable switching`
	`switch stop`
	
	`Establish the radio link`
	`rf rf5.0 band 20`
	`rf rf5.0 freq 5000`
	
	`mint rf5.0 -name "BS_1"`
	`mint rf5.0 -type master`

CPE2	`Set the device ID`
	`system prompt CPE_2`
	
	`Remove the svi1 interface`
	`ifc svi1 destroy`
	
	`Assign IP addresses`
	`ifc eth0 10.10.20.2/24`
	`ifc rf5.0 172.16.0.2/29`
	`ifc lo0 192.168.0.2/32`
	
	`Disable switching`
	`switch stop`
	
	`Establish the radio link`
	`mint rf5.0 -name "CPE_2"`
	`mint rf5.0 -type slave`
	`mint rf5.0 prof 1 -band 20 -freq 5000 -type slave`

CPE3	`Set the device ID`
	`system prompt CPE_3`
	
	`Remove the svi1 interface`
	`ifc svi1 destroy`
	
	`Assign IP addresses`
	`ifc eth0 10.10.30.3/24`
	`ifc rf5.0 172.16.0.3/29`
	`ifc lo0 192.168.0.3/32`
	
	`Add static routes`
	`route add 192.168.5.0/28 10.10.30.1`
	`route add 192.168.6.0/28 10.10.30.1`
	
	`Disable switching`
	`switch stop`
	
	`Establish the radio link`
	`mint rf5.0 -name "CPE_3"`
	`mint rf5.0 -type slave`
	`mint rf5.0 prof 1 -band 20 -freq 5000 -type slave`

RIP configuration

Title

Description	Configure the RIP protocol according to the scheme. **Step 1:** start the RIP daemon. **Step 2:** define the interfaces where RIP should be started: • BS1: the lo0 and radio interfaces; • CPE2: all interfaces; • CPE3: all interfaces. In CPE2's configuration, the range of networks used in RIP will be set as a single entry: 0.0.0.0/0. This entry includes all networks and enables the RIP support on all router's interfaces; when one of the CPE2's interfaces is connected to a new network, this network will be immediately announced via RIP. This approach doesn't require any additional RIP configuration, but decreases the control over the announcements. On the BS1 and CPE3 routers, we will set only those networks that are associated with the interfaces participating in the RIP's operation. **Step 3:** redistribute the directly connected networks on BS1 and the static routes on the CPE3 router. **Step 4:** configure passive interfaces. The eth0 interface of CPE3 is connected to the external router R1, therefore it is necessary to block the transmission of the routing information between them. To ensure this, the eth0 interface of CPE3 must be configured as passive. **Step 5:** announce the default route, specifying BS1 as the gateway.

BS1	`Start the RIP daemon`
	`arip start`
	
	`Start RIP on the interfaces`
	`arip`
	`config`
	`router`
	`network 172.16.0.0/29`
	
	`Connected routes redistribution`
	`arip`
	`config`
	`router`
	`redistribute connected`
	
	`Default route announcement`
	`arip`
	`config`
	`router`
	`default-information originate`

CPE2	`Start the RIP daemon`
	`arip start`
	
	`Start RIP on the interfaces`
	`arip`
	`config`
	`router`
	`network 0.0.0.0/0`

CPE3

```
Start the RIP daemon
arip start

Start RIP on the interfaces
arip
config
router
network 10.10.30.0/24
network 172.16.0.0/29
network 192.168.0.3/32

Static routes redistribution
arip
config
router
redistribute kernel

Configuration of the passive interfaces
passive-interface eth0
```

Command output analysis

Routing table

Description

The routing tables of the wireless devices contain entries about each subnet shown in the scheme. This means that the devices have successfully exchanged routing information and added it to the FIB.

Note that the routing tables contain also routes to the addresses assigned to the loopback interfaces of the other wireless devices. These interfaces have been added to RIP in various ways:

- BS1: redistribution of a directly connected network;
- CPE2: the device advertises all the networks to which it is connected because of the configuration of the 0.0.0.0/0 network;
- CPE3: the network assigned to the loopback interface is explicitly announced.

Also pay attention to the default route on the CPE2 and CPE3 devices. According to the configuration, BS1 announces the default route to all the devices that support RIP, indicating itself as a gateway. At the same time, the default route is absent from the BS1's routing table.

The CPE3 router redistributes the static routes, therefore, the routing tables of BS1 and CPE2 contain paths towards the networks 192.168.6.0 /24, 192.168.7.0/24 and 192.168.8.0/24.

BS1

```
BS_1#1> netstat -r
Routing tables
Destination        Gateway            Flags     Refs     Use  Interface
10.10.10.0/24      link#2             UC           0       0  eth0
10.10.20.0/24      172.16.0.2         UG3          0       0  rf5.0
10.10.30.0/24      172.16.0.3         UG3          0       0  rf5.0
127.0.0.1          127.0.0.1          UH           3     106  lo0
172.16.0.0/29      link#3             UC           0       0  rf5.0
192.168.0.1        192.168.0.1        UH           0       0  lo0
192.168.0.2        172.16.0.2         UGH3         0       0  rf5.0
192.168.0.3        172.16.0.3         UGH3         0       0  rf5.0
192.168.6.0/28     172.16.0.3         UG3          0       0  rf5.0
192.168.7.0/28     172.16.0.3         UG3          0       0  rf5.0
192.168.8.0/28     172.16.0.3         UG3          0       0  rf5.0
224.0.0.0/8        127.0.0.1          UGS          0     346  lo0
```

CPE2

```
AS_2#1> netstat -r
Routing tables
Destination        Gateway            Flags     Refs     Use  Interface
default            172.16.0.1         UG3          0       0  rf5.0
10.10.10.0/24      172.16.0.1         UG3          0       0  rf5.0
10.10.20.0/24      link#2             UC           0       0  eth0
10.10.30.0/24      172.16.0.3         UG3          0       0  rf5.0
127.0.0.1          127.0.0.1          UH           3     100  lo0
172.16.0.0/29      link#3             UC           0       0  rf5.0
192.168.0.1        172.16.0.1         UGH3         0       0  rf5.0
192.168.0.2        192.168.0.2        UH           0       0  lo0
192.168.0.3        172.16.0.3         UGH3         0       0  rf5.0
192.168.6.0/28     172.16.0.3         UG3          0       0  rf5.0
192.168.7.0/28     172.16.0.3         UG3          0       0  rf5.0
192.168.8.0/28     172.16.0.3         UG3          0       0  rf5.0
224.0.0.0/8        127.0.0.1          UGS          0     703  lo0
```

CPE3

```
AS_3#1> netstat -r
Routing tables
Destination        Gateway            Flags     Refs     Use  Interface
default            172.16.0.1         UG3          0       0  rf5.0
10.10.10.0/24      172.16.0.1         UG3          0       0  rf5.0
10.10.20.0/24      172.16.0.2         UG3          0       0  rf5.0
10.10.30.0/24      link#2             UC           0       0  eth0
127.0.0.1          127.0.0.1          UH           3      84  lo0
172.16.0.0/29      link#3             UC           0       0  rf5.0
192.168.0.1        172.16.0.1         UGH3         0       0  rf5.0
192.168.0.2        172.16.0.2         UGH3         0       0  rf5.0
192.168.0.3        192.168.0.3        UH           0       0  lo0
192.168.6.0/28     10.10.30.1         UGS          0       0  eth0
192.168.7.0/28     10.10.30.1         UGS          0       0  eth0
192.168.8.0/28     10.10.30.1         UGS          0       0  eth0
224.0.0.0/8        127.0.0.1          UGS          0     349  lo0
```

Additional materials

Online courses

1. InfiLINK 2x2 / InfiMAN 2x2: Initial Link Configuration and Installation.

Other

1. Ifconfig command (interfaces configuration)
2. route command (static routes configuration)
3. ARDA (Aqua Router Daemon)
4. arip command
5. rip command