

ODR protocol configuration



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Task description

Let's look at an example of ODR configuration using the following scheme (Figure 1):

- wireless links are established between the BS1, CPE2 and CPE3 devices. BS1 is configured as Master and CPE2, CPE3 - as Slaves;
- each wireless device is connected to a wired network segment and each segment uses its own IP addressing;
- router R1 is also connected to LAN-3, as well as to the LAN-6, LAN-7, LAN-8 networks;
- it is necessary to establish connectivity between all the networks by configuring the ODR protocol on the BS1, CPE2 and CPE3 wireless devices.

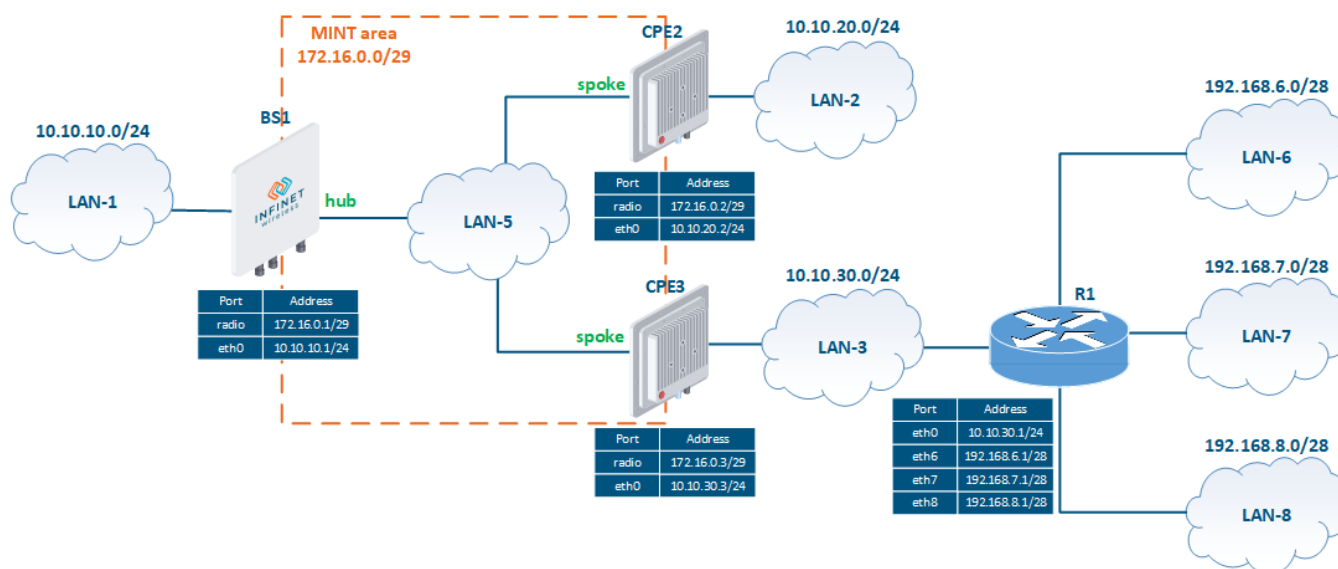


Figure 1 - ODR configuration scheme

Solution

Let's perform a step by step configuration of the devices. In addition to the ODR configuration, in order to establish the communication with LAN-6, LAN-7 and LAN-8, static routing will be used (see [Static routing](#)).

The ODR configuration will be performed via CLI and after each step, the routing information will be displayed for analysis.



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.

Pre-configuration

Description	Perform the pre-configuration of the devices: establish the wireless connections.
BS1	<pre> Set IP addresses ifc eth0 10.10.10.1/24 ifc rf5.0 172.16.0.1/29 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 </pre>
CPE2	<pre> Set IP addresses ifc eth0 10.10.20.2/24 ifc rf5.0 172.16.0.2/29 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 </pre>
CPE3	<pre> Set IP addresses ifc eth0 10.10.30.3/24 ifc rf5.0 172.16.0.3/29 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 </pre>

Description	Analyze the routing table on each device. There are two entries added in the routing table, one for each directly connected networks associated with the eth0 and radio interfaces.
BS1	<pre> BS_1#1> netstat -r Routing tables Destination Gateway Flags Refs Use Interface 10.10.10.0/24 link#2 UC 0 0 eth0 127.0.0.1 127.0.0.1 UH 1 473 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 224.0.0.0/8 127.0.0.1 UGS 0 15780 lo0 </pre>

CPE2	<pre>CPE_2#2> netstat -r Routing tables Destination Gateway Flags Refs Use Interface 10.10.20.0/24 link#2 UC 0 0 eth0 127.0.0.1 127.0.0.1 UH 1 432 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 224.0.0.0/8 127.0.0.1 UGS 0 18457 lo0</pre>
CPE3	<pre>CPE_3#1> netstat -r Routing tables Destination Gateway Flags Refs Use Interface 10.10.30.0/24 link#2 UC 0 0 eth0 127.0.0.1 127.0.0.1 UH 1 560 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 224.0.0.0/8 127.0.0.1 UGS 0 10686 lo0</pre>

ODR configuration

Description	Enable the ODR protocol's operation on the wireless devices: assign the hub role to the BS1 device and the spoke role to the CPE2 and CPE3 devices
BS1	<pre>mint rf5.0 -odr hub</pre>
CPE2	<pre>mint rf5.0 -odr spoke</pre>
CPE3	<pre>mint rf5.0 -odr spoke</pre>

Description	Analyze the information about the ODR's protocol operation: • BS1: there are two subscriber devices, CPE2 and CPE3 added in the spoke devices list. The device does not export any routes, because it has the hub role. • CPE2: BS1 has been added to the list of devices having the hub role, while there is no list of spoke devices. The device exports a route to the 10.10.20.0/24 network, but does not export the 172.16.0.0/29 network, because the ODR protocol is running on the radio interface, which is associated with the 172.16.0.0/29 network. • CPE3: the same as for CPE2.
BS1	<pre>BS_1#1> mint rf5.0 -odr show rf5.0: ODR state - HUB List of active Spokes: 00043513724E "AS_3" 10.10.30.3/24 000435109CC0 "AS_2" 10.10.20.2/24 Total Spokes: 2</pre>

CPE2	<pre> CPE_2#2> mint rf5.0 -odr show rf5.0: ODR state - SPOKE Preffered HUB: 00043510E5B9 "BS_1" List of HUBs: 00043510E5B9 "BS_1", cost 51, hops 1 Exported routes: 10.10.20.2/24 </pre>
CPE3	<pre> CPE_3#1> mint rf5.0 -odr show rf5.0: ODR state - SPOKE Preffered HUB: 00043510E5B9 "BS_1" List of HUBs: 00043510E5B9 "BS_1", cost 51, hops 1 Exported routes: 10.10.30.3/24 </pre>
Description	Analyze the routing table of the wireless devices: • BS1: two new entries have been added to the routing table for networks 10.10.20.0/24 and 10.10.30.0/24. This routing information is received from the subscriber stations and the MAC address of the corresponding wireless device is specified as the gateway for each entry. • CPE2: a default route has been added to the routing table and BS1 is used as a gateway. Note that CPE2 does not have any routing information about the 10.10.30.0/24 and 10.10.40.0/24 networks connected to CPE3 and CPE4. • CPE3: same as for CPE2.
BS1	<pre> 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 00:04:35:10:9c:c0 UL0 0 0 rf5.0 10.10.30.0/24 00:04:35:13:72:4e UL0 0 0 rf5.0 127.0.0.1 127.0.0.1 UH 1 473 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 224.0.0.0/8 127.0.0.1 UGS 0 15780 lo </pre>
CPE2	<pre> CPE_2#2> netstat -r Routing tables Destination Gateway Flags Refs Use Interface mintGateway BS_1 rf5.0 10.10.20.0/24 link#2 UC 0 0 eth0 127.0.0.1 127.0.0.1 UH 1 432 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 224.0.0.0/8 127.0.0.1 UGS 0 18457 lo0 </pre>
CPE3	<pre> CPE_3#1> netstat -r Routing tables Destination Gateway Flags Refs Use Interface mintGateway BS_1 rf5.0 10.10.30.0/24 link#2 UC 0 0 eth0 127.0.0.1 127.0.0.1 UH 1 560 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 224.0.0.0/8 127.0.0.1 UGS 0 10686 lo </pre>

Add static routes

The network segments LAN-6, LAN-7, LAN-8 are connected to router R1, while CPE3 does not have interfaces connected to these networks, so there is no routing information about these networks in its routing table. One way to fix this is to add static routes at CPE3 and at R1. Let's assume that the configuration of R1 has already been completed, so it is necessary to make changes to the configuration of CPE3.

Description	Add static routes for the LAN-6, LAN-7 and LAN-8 networks to CPE3's routing table.
BS1	Changes are not required.
CPE2	Changes are not required.
CPE3	<pre>route add 192.168.6.0/28 10.10.30.1 route add 192.168.7.0/28 10.10.30.1 route add 192.168.8.0/28 10.10.30.1</pre>

Description	Changes in the routing tables of the devices: • BS1: without changes. • CPE2: without changes. • CPE3: three new static entries for the LAN-6, LAN-7, LAN-8 networks.
BS1	<pre>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 00:04:35:10:9c:c0 ULO 0 0 rf5.0 10.10.30.0/24 00:04:35:13:72:4e ULO 0 0 rf5.0 127.0.0.1 127.0.0.1 UH 1 473 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 224.0.0.0/8 127.0.0.1 UGS 0 15780 lo</pre>
CPE2	<pre>CPE_2#2> netstat -r Routing tables Destination Gateway Flags Refs Use Interface mintGateway BS_1 rf5.0 10.10.20.0/24 link#2 UC 0 0 eth0 127.0.0.1 127.0.0.1 UH 1 432 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 224.0.0.0/8 127.0.0.1 UGS 0 18457 lo</pre>
CPE3	<pre>CPE_3#1> netstat -r Routing tables Destination Gateway Flags Refs Use Interface mintGateway BS_1 rf5.0 10.10.30.0/24 link#2 UC 0 0 eth0 127.0.0.1 127.0.0.1 UH 1 560 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 192.168.6.0/28 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 10686 lo</pre>

Exporting the static routes

In order to transmit the routing information about LAN-6, LAN-7 and LAN-8 to all the wireless devices, it is necessary to export the static records to ODR. This operation can be performed using CPE3's configuration, since the routing table of this device contains the static entries and the radio interface supports ODR.

Description	Export the static routes to ODR.
BS1	Changes are not required.
CPE2	Changes are not required.
CPE3	<pre>mint rf5.0 -odr spoke kernel</pre>

Description	Analyze the ODR's protocol operation at CPE3. Network routes to the 192.168.6.0/28, 192.168.7.0/28 and 192.168.8.0/28 networks have been added to the list of exported routes.
BS1	Changes are not required.
CPE2	Changes are not required.
CPE3	<pre>CPE_3#1> mint rf5.0 -odr show rf5.0: ODR state - SPOKE Preferred HUB: 00043510E5B9 "BS_1" List of HUBs: 00043510E5B9 "BS_1", cost 51, hops 1 Exported routes: 10.10.30.3/24 192.168.6.0/28 192.168.7.0/28 192.168.8.0/28</pre>

Description	Analyze the changes in the routing tables of the devices: • BS1: three new entries for LAN-6, LAN-7, and LAN-8 have been added to the routing table. The MAC address of CPE3 is specified as the gateway for these networks. • CPE2: without changes. The path from CPE2 to any of the LAN-6, LAN-7 or LAN-8 networks goes through BS1, so there is no need to add these entries to the routing table. In accordance with the ODR's protocol logic, spoke devices send routing information only to the devices having hub roles. • CPE3: without changes.
BS1	<pre>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 00:04:35:10:9c:c0 ULO 0 0 rf5.0 10.10.30.0/24 00:04:35:13:72:4e ULO 0 0 rf5.0 127.0.0.1 127.0.0.1 UH 1 473 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 192.168.6.0/28 00:04:35:13:72:4e ULO 0 0 rf5.0 192.168.7.0/28 00:04:35:13:72:4e ULO 0 0 rf5.0 192.168.8.0/28 00:04:35:13:72:4e ULO 0 0 rf5.0 224.0.0.0/8 127.0.0.1 UGS 0 15780 lo</pre>

CPE2	<pre>CPE_2#2> netstat -r Routing tables Destination Gateway Flags Refs Use Interface mintGateway BS_1 0 0 rf5.0 10.10.20.0/24 link#2 UC 0 0 eth0 127.0.0.1 127.0.0.1 UH 1 432 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 224.0.0.0/8 127.0.0.1 UGS 0 18457 lo</pre>
CPE3	<pre>CPE_3#1> netstat -r Routing tables Destination Gateway Flags Refs Use Interface mintGateway BS_1 0 0 rf5.0 10.10.30.0/24 link#2 UC 0 0 eth0 127.0.0.1 127.0.0.1 UH 1 560 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 192.168.6.0/28 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 10686 lo</pre>

ACL application

Filters can be applied to the routing information exported by the spoke devices. Let's look at some examples on how to filter the exported information.

Description	Configure the routing information filtering on CPE3 to allow the device to export only a static route to the 192.168.6.0/28 network.
BS1	Changes are not required.
CPE2	Changes are not required.
CPE3	<pre>acl add \$ODR net 192.168.6.0/28 mint rf5.0 -odr spoke kernel \$ODR</pre>

Description	Analyze the ODR's protocol operation at CPE3. The entries about the 192.168.7.0/28 and 192.168.8.0/28 networks have been removed from the exported routes list due to the filtering rule. The information about the 10.10.30.0/24 network is exported because the created filter was applied only to the static routes (kernel), and network 10.10.30.0/24 is directly connected.
BS1	Changes are not required.
CPE2	Changes are not required.
CPE3	<pre>CPE_3#1> mint rf5.0 -odr show rf5.0: ODR state - SPOKE Preferred HUB: 00043510E5B9 "BS_1" List of HUBs: 00043510E5B9 "BS_1", cost 51, hops 1 Exported routes: 10.10.30.3/24 192.168.6.0/28</pre>

Description	Analyze the changes in the routing tables of the devices: • BS1: the routes to the networks 192.168.7.0/28 and 192.168.8.0/28 were removed from the routing table. • CPE2: without changes. • CPE3: without changes.
BS1	<pre>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 00:04:35:10:9c:c0 ULO 0 0 rf5.0 10.10.30.0/24 00:04:35:13:72:4e ULO 0 0 rf5.0 127.0.0.1 127.0.0.1 UH 1 473 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 192.168.6.0/28 00:04:35:13:72:4e ULO 0 0 rf5.0 224.0.0.0/8 127.0.0.1 UGS 0 15780 lo</pre>
CPE2	<pre>CPE_2#2> netstat -r Routing tables Destination Gateway Flags Refs Use Interface mintGateway BS_1 rf5.0 10.10.20.0/24 link#2 UC 0 0 eth0 127.0.0.1 127.0.0.1 UH 1 432 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 224.0.0.0/8 127.0.0.1 UGS 0 18457 lo</pre>
CPE3	<pre>CPE_3#1> netstat -r Routing tables Destination Gateway Flags Refs Use Interface mintGateway BS_1 rf5.0 10.10.30.0/24 link#2 UC 0 0 eth0 127.0.0.1 127.0.0.1 UH 1 560 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 192.168.6.0/28 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 10686 lo</pre>

Description	Let's look at the opposite situation. Configure the filtering of the routing information on CPE3 to allow the device to export all static routes, except for the route to the 192.168.6.0/28 network.
BS1	Changes are not required.
CPE2	Changes are not required.
CPE3	<pre>mint rf5.0 -odr spoke -kernel \$ODR</pre>

Description	Analyze the ODR protocol's operation at CPE3. CPE3 exports static routes to the 192.168.7.0/28 and 192.168.8.0/28 networks and filters the route information about 192.168.6.0/28.
BS1	Changes are not required.
CPE2	Changes are not required.

CPE3	<pre>CPE_3#1> mint rf5.0 -odr show rf5.0: ODR state - SPOKE Preffered HUB: 00043510E5B9 "BS_1" List of HUBs: 00043510E5B9 "BS_1", cost 51, hops 1 Exported routes: 10.10.30.3/24 192.168.7.0/28 192.168.8.0/28</pre>
Description	Analyze the changes in the routing tables of the devices: • BS1: the route towards the 192.168.6.0/28 network was removed from the routing table, while the routes to the 192.168.7.0/28 and 192.168.8.0/28 networks were added. • CPE2: without changes. • CPE3: without changes.
BS1	<pre>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 00:04:35:10:9c:c0 ULO 0 0 rf5.0 10.10.30.0/24 00:04:35:13:72:4e ULO 0 0 rf5.0 127.0.0.1 127.0.0.1 UH 1 473 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 192.168.7.0/28 00:04:35:13:72:4e ULO 0 0 rf5.0 192.168.8.0/28 00:04:35:13:72:4e ULO 0 0 rf5.0 224.0.0.0/8 127.0.0.1 UGS 0 15780 lo0</pre>
CPE2	<pre>CPE_2#2> netstat -r Routing tables Destination Gateway Flags Refs Use Interface mintGateway BS_1 rf5.0 10.10.20.0/24 link#2 UC 0 0 eth0 127.0.0.1 127.0.0.1 UH 1 432 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 224.0.0.0/8 127.0.0.1 UGS 0 18457 lo0</pre>
CPE3	<pre>CPE_3#1> netstat -r Routing tables Destination Gateway Flags Refs Use Interface mintGateway BS_1 rf5.0 10.10.30.0/24 link#2 UC 0 0 eth0 127.0.0.1 127.0.0.1 UH 1 560 lo0 172.16.0.0/29 link#3 UC 0 0 rf5.0 192.168.6.0/28 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 10686 lo0</pre>

Additional materials

Online courses

Title

1. [InfiLINK 2x2 / InfiMAN 2x2: Initial Link Configuration and Installation.](#)
2. [InfiLINK 2x2 and InfiMAN 2x2: Switching](#)

Webinars

1. [Typical scenario of routing setting using Infinet Wireless devices. Part I.](#)

Other

1. [Network configuration via web interface for InfiLINK 2x2, InfiMAN 2x2.](#)
2. [Network configuration via Web interface for InfiLINK Evolution, InfiMAN Evolution families devices.](#)
3. [Ifconfig command \(interfaces configuration\)](#)
4. [route command \(static routes configuration\)](#)
5. [mint command \(MINT version\)](#)
6. [mint command \(TDMA version\)](#)