



ADVANTECH Protocol PIM-SM Router App User Guide

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ADVANTECH Protocol PIM-SM Router App



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Used symbols



Danger – Information regarding user safety or potential damage to the router.



Attention – Problems that can arise in specific situations.



Information – Useful tips or information of special interest.



Example – Example of function, command or script.

Changelog

Protocol PIM-SM Changelog

v1.0.0 (2012-06-11)

- **First release**

v1.1.0 (2013-11-13)

- **Added support of timer period settings – hello, join/prune, bootstrap**

v1.2.0 (2017-03-20)

- **Recompiled with new SDK**

v1.2.1 (2018-09-27)

- **Added expected ranges of values to JavaScript error messages**

v1.2.2 (2019-01-02)

- **Added license information**

v1.3.0 (2020-10-01)

- **Updated CSS and HTML code to match firmware 6.2.0+**

v1.3.1 (2022-03-24)

- **Removed hoard-coded settings path**

v1.4.0 (2022-11-03)

- **Reworked license information**

v1.5.0 (2023-07-24)

- Upgraded pimd to version 2.3.2

Description of router app

Router app Protocol PIM-SM is not contained in the standard router firmware. Uploading of this router app is described in the Configuration manual (see Chapter Related Documents). Due to this module, the PIM-SM (Protocol Independent Multicast – Sparse Mode) protocol is available. It is the most commonly used multicast routing protocol that is designed on the assumption that recipients for any particular multicast group will be sparsely distributed throughout the network. To receive multicast data, routers must explicitly tell their upstream neighbours about their interest in particular groups and sources. PIM-SM by default uses shared trees, which are multicast distribution trees rooted at some selected node (this router is called the Rendezvous Point, RP) and used by all sources sending to the multicast group.

For configuration PIM SM router app is available web interface, which is invoked by pressing the module name on

the Router apps page of the router web interface. The left part of the web interface contains the menu with pages for Configuration, monitoring (Status) and Customization of the module. Customization block contains only the Return item, which switches this web interface to the interface of the router. In the configuration part of the web interface is possible to find the form that includes the following:

- **Enable PIM-SM**

Enables activation of the module (particularly runs the application – pimd demon) implementing PIM-SM protocol.

- **Network Interfaces**

List of network interfaces ethX and greX in which the PIM-SM protocol will be activated. The setting of this item is set the “all multi” flag for the ethX interface (e.g. eth0) and the “multicast” flag for the greX interface (e.g. gre1). TTL (Time to Live) value is 64. Return path filtering for all types of network interfaces mentioned in the list is forbidden. This is done by setting the appropriate rp_filter item in the proc file system (e.g. echo 0 > /proc/sys/net/ipv4/conf/eth0/rp_filter).

Example:

eth0 gre1

- **Disable Vifs**

Corresponds to -N, or –(see [3]), in the process of running the application (pimd daemon) implementing PIM-SM protocol. If this item is checked, all network interfaces in terms of PIM-SM are inactive and must be enabled selectively (enable option of paying command in Chapter 3 Configuration on page 4). If this item is not checked, then the situation is reversed and all network interfaces that should not have active PIM-SM protocol (e.g. ppp0) must be explicitly forbidden. Details can be found in the documentation for the pimd daemon (see [3]).

- **Timer Hello Period**

PIM hello messages are sent periodically on each interface that has PIM enabled in the configuration file of the pimd daemon (it's possible to define it in pimd.conf field). This item specifies the period of sending these messages. The default value is 30 seconds.

- **Timer Join/Prune Period**

Using this item can be specified the time interval at which the router sends the PIM join/prune message to the upstream RPF (Reverse Path Forwarding) neighbour. The default join/prune message interval is 60 seconds.

- **Timer Bootstrap Period**

This item specifies a period of sending bootstrap messages. The default value is 60 seconds.

- **pimd.conf**

Configuration file of pimd daemon. Details and examples can be found in the documentation for the pimd daemon. The changes will apply after pressing the Apply button.

Configuration

The following list mentions commands that can be used when editing pimd.conf file (represented by the same name item in the configuration web interface) and a detailed description of these commands.

- **default_source_preference <preference>**

The preference value is used when the forwarder and upstream router are selected for the LAN. Due to the unreliability of obtaining preferences from unicast routing protocols is allowed to enter the default value via this command. It is entered at the beginning of the file. The lower the value, the more likely the router will be

selected for the above-mentioned purposes. But dedicated applications such as pimd shouldn't be selected to the extent of more general applications, so it is suitable to set the preference value somewhat higher (it can be for example 101).

- `default_source_metric <metric>`

Sets the cost of sending data through this router. The preferred default value is 1024.

- `phyint <local-addr|ifname> [disable/enable] [altnet <network> masklen <masklen>] [scoped <network> maskin <masklen>] [threshold thr] [preference pref] [metric cost]`
- Specifies interfaces either by their IP address or name. If you want to activate this interface with default values, you don't need to put anything else. Otherwise, enter additional values (a detailed description is in the pimd daemon documentation [3]).
- `cand_rp [<local-addr>] [priority <number>] [time <number>]` The rendezvous point (RP) is the key element in networks with the PIM-SM protocol. This is the point (router) that brings together data from multicast sources and requirements for taking this data from multicast recipients. The rendezvous point in the PIM can be selected statically or dynamically.
- For dynamic selection is used bootstrap mechanism. Several candidates for the bootstrap router (BSR) is selected by simple algorithm one BSR. This router ensures the selection of one RP from a set of CRP (Candidate Rendezvous Point). The result should be one RP for the multicast group in the PIM domain. If you use the `cand_rp` command in `pimd.conf` file, the corresponding router will become CRP. Parameters are the address of the network interface that is used for reporting parameters of this CRP, priority of CRP (lower number means higher priority) and reporting period. `cand_bootstrap_router [<local-addr>] [priority <number>]` If you use the `cand_bootstrap_router` command in `pimd.conf` file, the corresponding router will become CBSR (see `cand_rp` description). The parameters of this command are similar to those of `cand_rp` command.
- `rp_address <rp-addr> [<group-addr> [masklen <masklen>] [priority <number>]]` This command is applied when the static method of RP selection is used (see description of `cand_rp`). A required parameter is the IP (unicast) address of RP or a multicast group. Additional parameters can limit the use of RP.
- `group_prefix <group-addr> [masklen <masklen>] [priority <number>]` This command is applied when the dynamic method of RP selection is used. Specifies the multicast group for which the router acts as an RP in case this router is selected from the set of CRPs. The maximum number of these specifications in the `pimd.conf` file is 255.
- `switch_data_threshold [rate <number> interval <number>]` PIM-SM protocol uses several ways to transfer packets with multicast addresses between sources (transmitters) and recipients (receivers). Each of these ways is a characteristic logical network topology. This topology is established by reports that are sent between PIM-SM routers.
Each of these topologies – tree structures – has its name. There is also an RP tree (RPT) that is the same as the shared tree. Another option is a source-specific tree and finally, there is a source-specific shortest-path tree.
- These types of tree structures are listed in the order in which they increase the overhead required for their assembly and maintenance. Likewise in most cases also increases its transmission capacity.
- The `switch_data_threshold` command sets a limit for the transition to a logical topology with higher throughput.
- `switch_register_threshold [rate <number> interval <number>]` Opposite to the previous command.

Configuration example – Static selection of RP

Below is an example of configuring with a static selection of RP (Rendezvous Point). Configuration is entered into the `pimd.conf` field in the web interface of this router app.

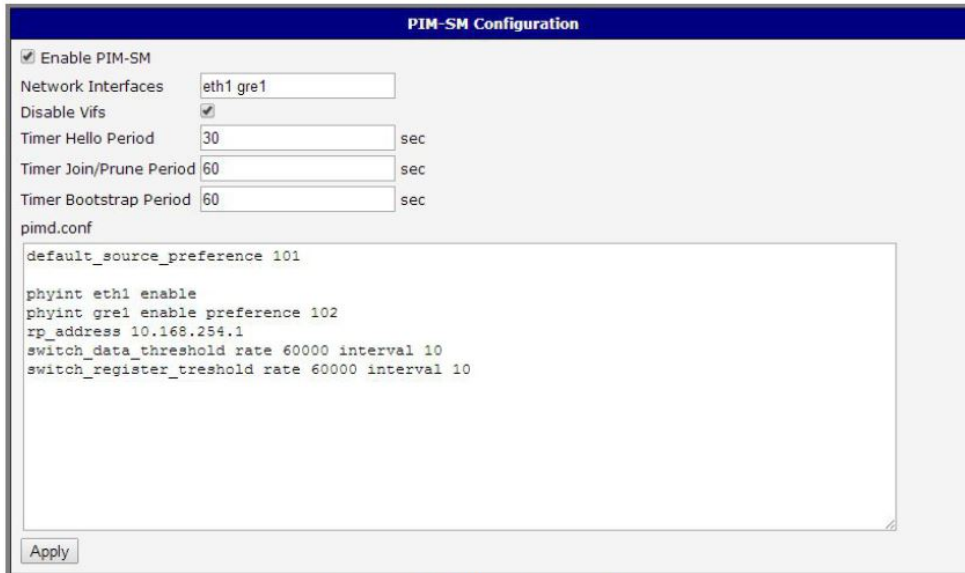
```

default_source_preference 101

phyint eth1 enable
phyint gre1 enable preference 102
rp_address 10.168.254.1
switch_data_threshold rate 60000 interval 10
switch_register_threshold rate 60000 interval 10

```

Configuration example – Dynamic selection of RP



The screenshot shows the 'PIM-SM Configuration' window. It includes a checkbox for 'Enable PIM-SM' which is checked. Below it, 'Network Interfaces' is set to 'eth1 gre1'. 'Disable Vifs' is checked. Three timer fields are present: 'Timer Hello Period' (30 sec), 'Timer Join/Prune Period' (60 sec), and 'Timer Bootstrap Period' (60 sec). A text area labeled 'pimd.conf' contains the following configuration:

```

default_source_preference 101

phyint eth1 enable
phyint gre1 enable preference 102
rp_address 10.168.254.1
switch_data_threshold rate 60000 interval 10
switch_register_treshhold rate 60000 interval 10

```

An 'Apply' button is located at the bottom left of the configuration area.

Figure 1: Static selection of RP

Below is an example of configuring with a dynamic selection of RP (Rendezvous Point). Configuration is entered into the pimd.conf field in the web interface of this router app.

```

default_source_preference 101

phyint eth1 enable
phyint gre1 enable preference 102
cand_rp 10.168.254.1 priority 10
cand_bootstrap_router 10.168.254.1 priority 10
group_prefix 239.0.0.0 masklen 8 priority 10
switch_data_threshold rate 60000 interval 10
switch_register_threshold rate 60000 interval 10

```

System Log

In case of any problems it is possible to view the system log by pressing the System Log menu item. In the window are displayed detailed reports from individual applications running in the router including possible reports relating to the PIM SM module.

PIM-SM Configuration

☒ Enable PIM-SM

Network Interfaces:

Disable Vifs: ☒

Timer Hello Period: sec

Timer Join/Prune Period: sec

Timer Bootstrap Period: sec

pimd.conf

```
default_source_preference 101

phyint eth1 enable
phyint gre1 enable preference 102
cand_rp 10.168.254.1 priority 10
cand_bootstrap_router 10.168.254.1 priority 10
group_prefix 239.0.0.0 masklen 8 priority 10
switch_data_threshold rate 60000 interval 10
switch_register_treshold rate 60000 interval 10
```

Figure 2: Dynamic selection of RP

Interoperability

Pimd can work with other software products that meet the specifications of the PIM-SM protocol. The exceptions are some older versions of IOS (Cisco) that do not meet this specification at one point. More specifically, the issue is the calculation of the checksum of PIM_REGISTER messages. In newer versions of IOS, this problem is already resolved.

Licenses

Summarizes Open-Source Software (OSS) licenses used by this module.

PIM-SM Licenses		
Project	License	More Information
pimd	Pimd	License
mrouted	Mrouted	License

Figure 3: Licenses

Related Documents

Internet: manpages.ubuntu.com/manpages/maverick/man8/pimd.8.html You can obtain product-related documents on the Engineering Portal at icr.Advantech.cz address. To get your router's Quick Start Guide, User Manual, Configuration Manual, or Firmware go to the Router Models page, find the required model, and switch to the Manuals or Firmware tab, respectively. The Router Apps installation packages and manuals are available on the Router Apps page. For the Development Documents, go to the DevZone page.

Documents / Resources

	<p>ADVANTECH Protocol PIM-SM Router App [pdf] User Guide</p> <p>Protocol PIM-SM Router App, Protocol PIM-SM, Router App, App, App Protocol PIM-SM</p>
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References

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- [A Router Apps - Cellular Routers Engineering Portal](#)
- [A Router Models - Cellular Routers Engineering Portal](#)
- [User Manual](#)