RBFS Subscriber Filters User Guide

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1. RBFS Subscriber Filters

1.1. Overview

RBFS Subscriber Filters, also referred to as subscriber ACLs, consist of a set of rules defining packet match criteria and actions. There are separate rules for IPv4 and IPv6 downstream (egress to subscriber) and upstream (ingress from subscriber) packets. These rules support various match criteria and actions, some of which are specific to address families or directions. Each rule is assigned a priority, and the decision between multiple matching rules is based on these priorities, where lower values take precedence.

The available actions include accept, drop, or http-redirect where the last one refers to the RBFS HTTP Redirect Service. When the action is drop, matching traffic is silently discarded. The filters are categorized into two primary types, namely l3v4 for IPv4 and l3v6 for IPv6, applicable to either ingress or egress direction.

To apply these filters to subscribers, there are two ways. They can be applied through the access service-profile or directly using the corresponding RADIUS attributes with the second method taking priority.

1.2. About the Match Criteria

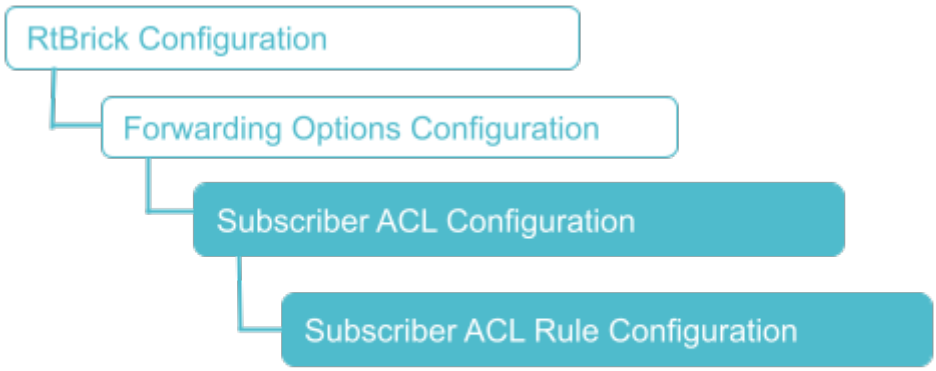
When multiple match criteria are defined within a single rule, they are treated as a logical AND operation, requiring all criteria to be met for the rule to be considered as a match. However, using unsupported match criteria, such as destination-ipv4-subscriber-prefix in ingress (upstream), can potentially lead to session termination. In the case of CoA (Change of Authorization), the filter assignment is rejected using CoA NAK, if such unsupported criteria are encountered.

Even if filters are assigned to a subscriber, those filters are applied globally, indicating that all traffic from all interfaces and subscribers is evaluated against all rules. Consequently, RBFS has introduced specific options to restrict rules to individual subscribers. For ingress (upstream) rules, it is recommended to enable the subscriber-ifl option, ensuring that only traffic received from the corresponding subscriber is matched. With the subscriber-ifl option, packets are matched based on incoming subscriber IFL. However, this option is not supported in egress(downstream), requiring the limitation of traffic using subscriber address prefix information. Thus, RBFS introduced the options source-ipv4-subscriber-prefix, source-ipv6-subscriber-prefix, destination-ipv4-subscriber-prefix, destination-ipv6-subscriber-prefix, source-ipv6-delegated-subscriber-prefix, and destination-ipv6-delegated-subscriber-prefix. With these options enabled, the dynamically assigned subscriber address prefix is automatically integrated into the corresponding filter instance to constrain those rules to a specific subscriber.

Improperly configured filters assigned to one subscriber may create a negative impact on other subscribers as well.

2. Subscriber Filters Configuration

The configuration hierarchy for Subscriber ACL is illustrated in the diagram.



2.1. Configure Subscriber Filters

Syntax:

set forwarding-options subscriber-acl <l3v4|l3v6> **rule** <rule-name> **ordinal** <ordinal-value> <option> <attribute> <value>

Attribute	Description
<l3v4 | l3v6>	Specify l3v4 for IPv4 and l3v6 for IPv6.
<rule-name>	Subscriber ACL rule name.
<ordinal-value>	The mandatory ordinal value is used to differentiate multiple rules within the rule set.
action	The desired action, which can be either permit, drop or http-redirect.
priority <priority-value>	The priority of the rule, where the lower value has a higher priority.
match	The match criteria.

2.1.1. Configuring Subscriber Filter Match Criteria

Syntax:

set forwarding-options subscriber-acl <l3v4|l3v6> **rule** <rule-name> **ordinal** <ordinal-value> **match** <attribute> <value>

Attribute	Description
destination-ipv4-prefix <destination-ipv4-prefix>	Packets are matched when the IPv4 destination address is within the defined prefix.
destination-ipv4-prefix-list <destination-ipv4-prefix-list>	Packets are matched when the IPv4 destination address is within one of the prefixes listed in the defined prefix list.
destination-ipv4-subscriber-prefix <true>	Packets are matched when the IPv4 destination address is within the dynamically assigned subscriber IPv4 address prefix (sometimes, referred to framed prefix). Consequently, this option shares similarity to the destination-ipv4-prefix, where the prefix is automatically set to the dynamic subscriber prefix. This option is allowed only in the egress (downstream) direction.
destination-ipv6-prefix <destination-ipv6-prefix>	Packets are matched when the IPv6 destination address is within the defined prefix.
destination-ipv6-prefix-list <destination-ipv6-prefix-list>	Packets are matched when the IPv6 destination address is within one of the prefixes listed in the defined prefix list.
destination-ipv6-subscriber-prefix <true>	Packets are matched when the IPv6 destination address is within the dynamically assigned subscriber IPv6 address prefix (sometimes, referred to framed prefix). Consequently, this option shares similarity to the destination-ipv4-prefix, where the prefix is automatically set to the dynamic subscriber prefix. This option is allowed only in the egress (downstream) direction.
destination-ipv6-delegated-subscriber-prefix <destination-ipv6-delegated-subscriber-prefix>	This option is similar to the destination-ipv6-subscriber-prefix using the dynamically delegated prefix instead.
source-ipv4-prefix <source-ipv4-prefix>	Packets are matched when the IPv4 source address is within the defined prefix.
source-ipv4-prefix-list <source-ipv4-prefix-list>	Packets are matched when the IPv4 source address is within one of the prefixes listed in the defined prefix list.

Attribute	Description
source-ipv4-subscriber-prefix <source-ipv4-subscriber-prefix>	Packets are matched when the IPv4 source address is within the dynamically assigned subscriber IPv4 address prefix (sometimes, referred to framed prefix). Consequently, this option shares similarity to source-ipv4-prefix, where the prefix is automatically set to the dynamic subscriber prefix. This option is allowed only in the ingress (upstream) direction.
source-ipv6-prefix <source-ipv6-prefix>	Packets are matched when the IPv6 source address is within the defined prefix.
source-ipv6-prefix-list <source-ipv6-prefix-list>	Packets are matched when the IPv6 source address is within one of the prefixes listed in the defined prefix list.
source-ipv6-subscriber-prefix <source-ipv6-subscriber-prefix>	Packets are matched when the IPv6 source address is within the dynamically assigned subscriber IPv6 address prefix (sometimes, referred to framed prefix). Consequently, this option shares similarity to source-ipv4-prefix, where the prefix is automatically set to the dynamic subscriber prefix. This option is allowed only in the ingress (upstream) direction only.
source-ipv6-delegated-subscriber-prefix true	This option is similar to the source-ipv6-subscriber-prefix using the dynamically delegated prefix instead. Note: To disable this configuration, use the delete form of the command.
source-l4-port <source-l4-port>	Packets are matched based on the layer 4 source port (TCP or UDP port).
destination-l4-port <destination-l4-port>	Packets are matched based on the layer 4 destination port (TCP or UDP port).
ip-protocol <ip-protocol>	Packets are matched depending on the IP protocol (TCP or UDP). However, this option is not compatible with the MPLS-encapsulated traffic. Consequently, filtering based on IP protocol is not possible for MPLS traffic received from the core. For instance, it is feasible to drop all traffic to port 80, but it is not possible to selectively drop only TCP traffic while permitting UDP traffic when receiving traffic with an MPLS label.
subscriber-ifl <true>	Packets are matched based on incoming subscriber IFL. This option is allowed only in the ingress (upstream) direction.

2.1.2. Configuring Subscriber Filter Actions

Syntax:

set forwarding-options subscriber-acl <l3v4|l3v6> **rule** <rule-name> **ordinal** <ordinal-value> **action** <attribute> <value>

Attribute	Description
permit	Forward packets.
drop	Silently discard packets.
http-redirect true	Specify true to enable the redirect service. Note: To disable http-redirect, use the delete form of the command.

The following example shows an IPv4 subscriber filter configuration in which the applied ACL is ipv4-acl-in.

```
supervisor@rtbrick: cfg> show config forwarding-options subscriber-acl l3v4
{
  "rtbrick-config:l3v4": {
    "rule": [
      {
        "rule-name": "ipv4-acl-in",
        "ordinal": [
          {
            "ordinal-value": 1,
            "match": {
              "destination-l4-port": 80,
              "ip-protocol": "TCP"
            },
            "action": {
              "http-redirect": "true"
            },
            "priority": 1001
          }
        ]
      }
    ]
  }
}
```

2.1.3. Attaching the ACL Rule

Syntax:

set access service-profile profile-name <profile-name> <attribute> <value>

Attribute	Description
<profile-name>	Service profile name.

Attribute	Description
<http-redirect>	HTTP redirect service configuration.
<url>	HTTP redirect target URL.
<acl>	Subscriber ACL (filter) configuration.
<ipv4-acl-in>	IPv4 upstream ACL (ingress from subscriber).
<ipv4-acl-out>	IPv4 downstream ACL (egress to subscriber).
<ipv6-acl-in>	IPv6 upstream ACL (ingress from subscriber).
<ipv6-acl-out>	IPv6 downstream ACL (egress to subscriber).

3. Operational Commands

3.1. Subscriber Filter Show Commands

The show commands provide detailed information about the subscriber filter.

3.1.1. Subscriber ACL (Filter) Information

The show subscriber <id> acl command provides a comprehensive list of all ACL instances initiated for the subscriber, including RBFS Subscriber Filters and Ascend Data Filters (ADF). Additionally, this command provides the option to view detailed information for each filter instance by appending the corresponding filter name. Consequently, the filters are displayed with all variables, such as destination-ipv4-subscriber-prefix, replaced by their actual prefixes for clarity.

Syntax:

show subscriber <subscriber-id> **acl** <acl-name>

Example:

```
supervisor@rtbrick: op> show subscriber 1369375761697341441 acl ipv4-acl-in-ipoe-
lag-1/1369375761697341441
Rule: ipv4-acl-in-ipoe-lag-1/1369375761697341441
  ACL type: l3v4
  Ordinal: 1
  Priority: 1001
    Match:
      Direction: ingress
      Destination L4 port: 80
      IP protocol: TCP
    Action:
      HTTP-redirect: True       URL: www.rtbrick.com
```