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S. Hares
Q. Wu
Huawei
J. Tantsura
R. White
Ericsson
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An Information Model for Basic Network Policy and Filter Rules
draft-hares-i2rs-bnp-info-model-02

Abstract

This document contains the Basic Network Policy and Filters (BNP IM) Information Model which provides a generic model for representing an ordered list of routing policy or filter rules. Filter rules which combine match-condition with action (forwarding or sets) are supported by this policy.

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[1.](#) Introduction

This generic network policy provide a model to support an ordered list of routing policy or an ordered list of filter rule. An ordered list of policy can be used in protocols such as BGP. An ordered list of filters can be used in filtering for routing data traffic or flows. Two examples of the ordered-based filters is the I2RS Filter-based RIBS or flow specification filtering. This generic model can be used to combine filter rules such as: ACLs, Prefix-filtering, and complex filter match-actions rules (match, set, modify, set).

This generic model combines rules for filter/policy into groups of groups. project.

Antecedents to this generic policy are the generic policy work done in PCIM WG. The PCIM work contains a Policy Core Information Model (PCIM) [[RFC3060](#)], Policy Core Informational Model Extensions [[RFC3460](#)] and the Quality of Service (QoS) Policy Information Model (QPIM) ([[RFC3644](#)]) From PCIM comes the concept that policy rules which are combined into policy groups. PCIM also refined a concept of policy sets that allowed the nesting and aggregation of policy groups. This generic model did not utilize the concept of sets of groups, but could be expanded to include sets of gorups in the future.

Policy rules may include specific filters such as ACL or prefix

filters by simple reference. The following drafts provide these more specific filters;

- o ACL policy [[I-D.ietf-netmod-acl-model](#)]

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- o BGP Prefix filter policy [[I-D.zhdankin-idr-bgp-cfg](#)]

[2.](#) Definitions and Acronyms

BGP: Border Gateway Protocol

CLI: Command Line Interface

IGP: Interior Gateway Protocol

Information Model: An abstract model of a conceptual domain, independent of a specific implementations or data representation

INSTANCE: Routing Code often has the ability to spin up multiple copies of itself into virtual machines. Each Routing code instance or each protocol instance is denoted as Foo_INSTANCE in the text below.

NETCONF: The Network Configuration Protocol

PCIM - Policy Core Information Model

RESTconf - http programmatic protocol to access yang modules

[3.](#) Generic Route Filters/Policy Overview

This generic policy model represents filter or routing policies as rules and groups of rules.

The basic concept are:

Rule Group

A rule group is is an ordered set of rules .

Rule

A Rule is represented by the semantics "If Condition then Action".
A Rule may have a priority assigned to it.

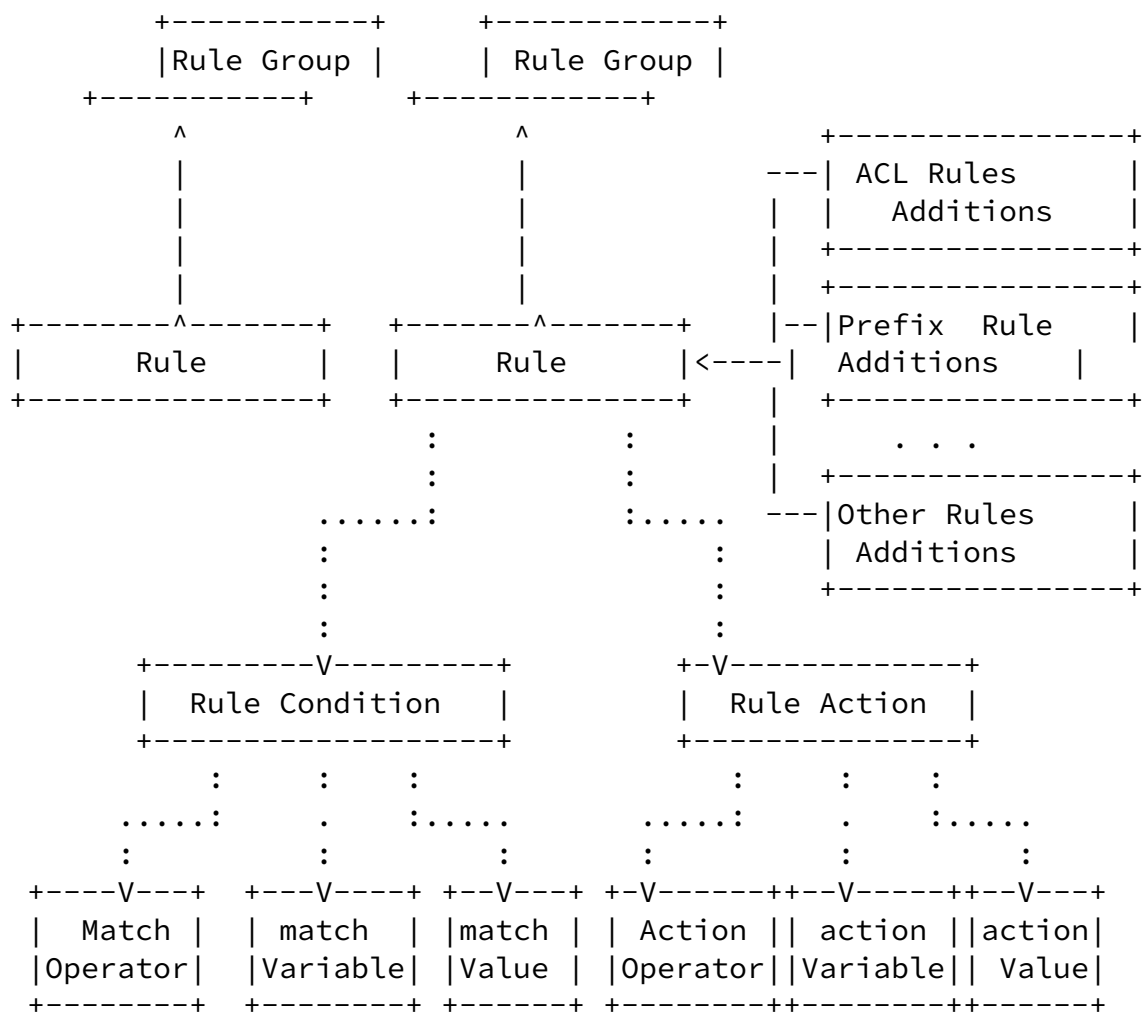


Figure 1: BNP structure

[4.](#) BNP Rule Groups

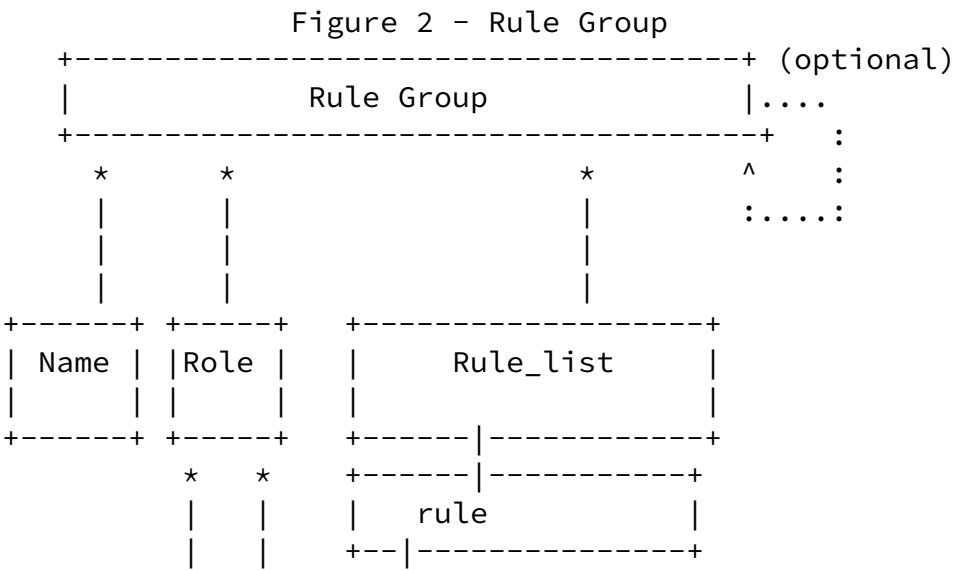
Rule groups have the following elements:

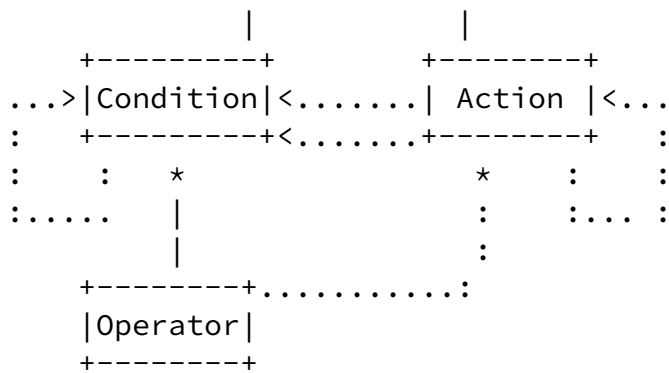
- o name that identifies the grouping of policy rules
- o role - that is a combination of target resource (E.g. IPv4 FB-FIB filters) and a scope (read, read-write, write-only).
- o list of rules

The rule has the following elements: name, order, status, priority, reference cnt, and match-action as shown as shown in figure 2. The order indicates the order of the rule within the list. The status of the rule is (active, inactive). The priority is the priority within a specific order of policy/filter rules. A reference count (refcnt) indicates the number of entities (E.g. network modules) using this policy. The generic rule match-action conditions have match

operator, a match variable and a match value. The rule actions have an action operator, action variable, and an action value.

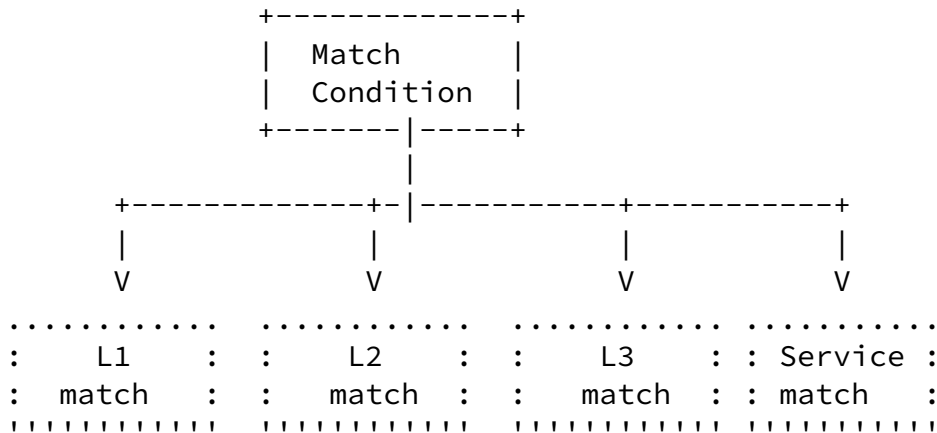
The generic rules can be included with other types of rules as figure 2 shows.





The generic match conditions are specific to a particular layer are refined by matches to a specific layer (as figure 4 shows), and figure 5's high-level yang defines. The general actions may be generic actions that are specific to a particular layer (L1, L2, L3, service layer) or general forwarding by interface or nexthop. The high-level yang diagram for the matches in figure 5.

Figure 4



5. BNP Generic Info Model in High Level Yang

Below is the high level yang diagram for the

Figure 5


```

module:bnp-generic-rules
  import ietf-acl
  import ietf-interface
  +--rw rule-group* [group-name]
    +--rw group-name
    +--rw group-scope
      | +--resource tree-identity
      | +--access access-identity
  +--rw group-installer install-identity
  +--rw rule* [rule-name]
    +--rw rule-name string
    +--rw order unit16
      +--rw installer
  +--rw status enumeration
    | +--ro rules-status
    | +--ro rule-inactive-reason
    | +--ro rule-installer
  +--rw priority unit16
  +--rw refcnt unit16
  +--rw rule-match-act
    +--rw match-act-type match-act-type-identity
      +--case: BNP-GENERIC-MATCH-ACTION
        | +--rw bnp-term-match
        | | +--case: interface-match
        | | +--case: L1-header-match
        | | +--case: L2-header-match
        | | +--case: L3-header-match
        | | +--case: L4-header-match
        | | +--case: Service-header-match
        | +--rw bnp-action
        | | +--rw genric-actions [nbr-act]
        | | | +--rw n-acts
        | | | +--rw qos-action
        | | | | +--case L1-action
        | | | | +--case L2-action
        | | | | +--case L3-action
        | | | | +--case L4-action
        | | | | +--case service-action
        | +--rw bnp-forward
        | | +--rw forward
        | | | +--rw interface interface-ref
        | | | +--rw next-hop rib-nexthop-ref
        | | | +--rw route-attributes
        | | | +--rw rib-route-attributes-ref
        | | +--rw fb-std-drop
      +--case: ACL-MATCH-ACTION
        +--rw acl-match-act acl-list-entry-name

```

6. Example of use in filters

The following is an example is an example structure for the rrule match-condition applied to Filter-Based RIB containing a list of routes

```
figure 6
module: FB-RIB
+--rw FB-RIB-instance-name
+--rw RB-RIB-router-id  uint32
   +--rw FB-RIB-interface*
   |   +--rw FB-RIB-interface interface-ref-id
   +--rw FB-Default-RIB rib-ref
+--rw FB-RIB
   +--rw FB-RIB-Name
   +--rw FB-RIB-AFI
   +--rw FB-RIB-intf*
   +--rw FB-FIB-status-info
   |   +--rw fb-rib-update-ref uint64
   +--rw FB-RIB-Ordered-Filters  rule-group-list-ref
uses /nt:bnp-generic-rules
```

rule-group-list-ref points to rule-group-list

7. IANA Considerations

This draft includes no request to IANA.

8. Security Considerations

These generic filters are used in the I2RS FB-RIBs to filter packets in a traffic stream, act to modify packets, and forward data packets. These I2RS filters operate dynamically at same level as currently deployed configured filter-based RIBs to filter, change, and forward traffic. The dynamic nature of this protocol requires that I2RS Filters track the installer of group information and rules.

This section will be augmented after a discussion with security experts.

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Authors' Addresses

Susan Hares
Huawei
7453 Hickory Hill
Saline, MI 48176
USA

Email: shares@ndzh.com

Qin Wu
Huawei
101 Software Avenue, Yuhua District
Nanjing, Jiangsu 210012
China

Email: bill.wu@huawei.com

Jeff Tantsura
Ericsson

Email: Jeff Tantsura jeff.tantsura@ericsson.com

Russ White
Ericsson

Email: russw@riw.us

