A YANG Model for SAVNET

draft-li-savnet-sav-yang

@IETF 117 SAVNET WG
This Yang model provides a base framework for configuring and managing an SAV subsystem, including SAV table and SAV rules, and also specifies the model for the static SAV rules application.

The data model is designed by referring to the SAVNET functions defined in related drafts. [draft-li-savnet-intra-domain-architecture, draft-wu-savnet-inter-domain-architecture, draft-huang-savnet-sav-table]

The model includes 3 parts: SAVNET configuration, state information, event notifications.
The data model is designed based on implementation experience and Yang rules.

The 02-Version is an initial version (and not the final version). It will be updated continuously according to the comments.

Edited in compliance with RFC8407.
Source address validation (SAV) table is constituted by a list of SAV rules. The table will take effect in data plane for checking the validity of source addresses.

The Yang model makes a reference to RFC8349 [Yang model for RIB].
Operation of SAVNET Feature

Management Plane (NMS)
- SAVNET Configuration
  - Global Parameters
  - Interface Parameters
- SAV Entry Mgmt
  - Static SAV Rules
- SAVNET Event Mgmt
  - Notifications

Router
- SAVNET
  - SAVNET Configuration
  - SAV Table
  - Dynamic SAV Rules
  - SAVNET Event
Tree Diagram Overview

**SAVNET YANG**

1. SAVNET Global/Interface Configuration
2. Static SAV Rules Configuration
3. SAV Table
4. SAV Interface Information
5. SAV Notifications

**Configuration**

**State**

**Event**

module: ietf-sav

```
---rw sav
  +--rw router-id? yang:dotted-quad
  +--rw v4sav-entry-limits
  +--rw sav-controls
  |   ...

augment /if:interfaces/if:interface:
  +--rw sav-control
  |   +--rw sav-enabled? boolean
  |   |   ...
  |   +--rw static-savs
  |       +--rw v4sav:ipv4
  |       |   ...
  |       +--rw v6sav:ipv6
  |       |   ...
  +--rw sav-tables
  |   +--rw sav-table* [name]
  |   |   +--ro sav-rules
  |   |   |   ...
  |   +--ro interfaces
  |       +--ro interface* [name]
  |       |   ...
  +----n sav-event
  |   +--ro router-id? yang:dotted-quad
  |   |   ...
```
Global configuration:
• Control for SAVNET (function enable/disable), SAV mode, sav-table capacity, SAV information source priorities.

Interface configuration:
• Control for SAVNET (function enable/disable), SAV mode, action of resetting SAV-statistics.
SAVNET Configuration-Static SAV Rules

Static SAV rules configuration in the SAV table:
• SAV entries: “Source prefix” and “Incoming interface”, including IPv4 and IPv6 SAV rules.
• Capacity of SAV table and upper limitation of IPv4 or IPv6 SAV rules.

```
+++rw static-savs
  | +++rw v4sav:ipv4
  |   | +++rw v4sav:sav-entry-limits
  |   |     | +++rw v4sav:number? uint32
  |   |     | +++rw v4sav:percent? uint8
  |   |     | +++rw v4sav:sav-rule* [source-prefix]
  |   |     |     | +++rw v4sav:source-prefix inet:ipv4-prefix
  |   |     | +++rw v4sav:description? string
  |   |     | +++rw v4sav:incoming-interfaces
  |   |     |        | if:interface-ref
  | +++rw v6sav:ipv6
  |   | +++rw v6sav:sav-entry-limits
  |   |     | +++rw v6sav:number? uint32
  |   |     | +++rw v6sav:percent? uint8
  |   |     | +++rw v6sav:sav-rule* [source-prefix]
  |   |     |     | +++rw v6sav:source-prefix inet:ipv6-prefix
  |   |     | +++rw v6sav:description? string
  |   |     | +++rw v6sav:incoming-interfaces
  |   |     |        | if:interface-ref
```
SAVNET State-Sav Table

The SAV table state:
- All SAV rules of IPv4 or IPv6 address families.
- Filtered SAV rules by the specified source prefix.
- SAV rule statistics and packets counts.

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The interface state:
• SAV statistics and packets counts. (valid/invalid /drop packets)

++-ro interfaces
| ++-ro interface* [name] |
|   | ++-ro name if:interface-ref |
|   | ++-ro drop-packets? uint64 |
|   | ++-ro drop-bytes? uint64 |
|   | ++-ro sav-invalid-packets? uint64 |
|   | ++-ro sav-invalid-bytes? uint64 |
|   | ++-ro sav-valid-packets? uint64 |
|   | ++-ro sav-valid-bytes? uint64 |
| +---n sav-event                      |
| | +---ro router-id?      yang:dotted-quad |
| | +---ro address-family  identityref     |
| | +---ro sav-limit-reached?  boolean      |

Over-limitation of SAV table capacity should be notified.
SAVNET YANG Modules

- **ietf-sav** *(sav)*
  (SAVNET basic component)

- **ietf-ipv4-sav-rule** *(v4sav)*
  (Additional data specific to IPv4 SAV)

- **ietf-ipv6-sav-rule** *(v6sav)*
  (Additional data specific to IPv6 SAV)

Base framework for SAVNET operation

draft-li-savnet-sav-yang

- Structures of all nodes in tree diagram are defined in the above 3 modules (sav, v4sav, v6sav).
- Expected to be augmented by other SAV-related function modules accordingly.
- Division of the 3 modules also refers to the similar approach of RIB Yang in RFC8349.
Example: Static SAV Rules Configuration

Example: Static SAV rule on Router-A is used to validating source prefixes of customer subnets attached to the edge Router-B

```
"ietf-sav:sav": {
  "router-id": "193.0.2.2",
  "static-savs": {
    "ietf-ipv4-sav-rule:ipv4": {
      "sav-rule": [
        {
          "source-prefix": "198.51.100.0/24",
          "incoming.interfaces": {
            "incoming-interface": "eth0"
          }
        }
      ]
    },
    "ietf-ipv6-sav-rule:ipv6": {
      "sav-rule": [
        {
          "source-prefix": "2000:db8:0:2::/64",
          "incoming.interfaces": {
            "incoming-interface": "eth0"
          }
        }
      ]
    }
  }
}
```
Example-Run Data

```
"sav-tables": {
  "sav-table": [
    {
      "name": "ipv4-master",
      "address-family": "ietf-sav:ipv4",
      "sav-rules": {
        "sav-rule": [
          {
            "ietf-ipv4-sav-rule:source-prefix": "198.51.100.0/24",
            "incoming-interfaces": {
              "incoming-interface": "eth0"
            },
            "rule-preference": 5,
            "source-protocol": "ietf-sav:static",
            "last-updated": "2023-5-20T17:11:27+02:00",
            "drop-packets": 0,
            "drop-bytes": 0,
            "sav-invalid-packets": 0,
            "sav-invalid-bytes": 0,
            "sav-valid-packets": 10,
            "sav-valid-bytes": 100
          }
        ]
      }
    }
  ]
}
Next Steps

- SAV rules from more types of control-plane-protocol. [SAVNET architecture updates]

- Request more review.

- Any comments welcomed.

Thanks!