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YANG Data Model for RPKI to Router Protocol  
draft-ietf-sidrops-rtr-yang-00

Abstract

This document defines YANG data models for configuring and managing Resource Public Key Infrastructure (RPKI) to Router Protocol (RFC6810 and RFC8210).

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## 1. Introduction

[RFC6810] and [RFC8210] describes a protocol to deliver Resource Public Key Infrastructure (RPKI) prefix origin data and router keys from a trusted cache server to a router, referred to as RPKI-Router protocol.

This document defines YANG [RFC7950] data models for configuring and managing RPKI-Router Protocol ([RFC6810], [RFC8210], and [I-D.ietf-sidrops-8210bis]).

### 1.1. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in

BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

## 2. Model Overview

Two YANG data models are defined in this document.

The `ietf-rpki-rtr.yang` data model provides the methods for configuring and managing RPKI-Router Protocol. It includes:

- o Connectivity parameters, such as RPKI cache server IP address and destination port.
- o Session parameters, such as purge time, refresh time, response time.
- o Session status and statistics, such as session ID, serial number, number of received and transmitted messages.

The `ietf-rpki-table.yang` data model provides the methods for managing records of RPKI-Router Protocol. It includes:

- o ROA records.
- o Router-key records.
- o ASPA records.

## 3. RPKI to Router YANG Module

### 3.1. Tree View

The complete tree of the `ietf-rpki-rtr.yang` data model is represented as following. See [RFC8340] for an explanation of the symbols used.

```

module: ietf-rpki-rtr

augment /rt:routing/rt:control-plane-protocols
  /rt:control-plane-protocol:
    +--rw rpki-rtr
      +--rw sessions
        +--rw session* [server-address]
          +--rw server-address      inet:ip-address
          +--rw server-port?        inet:port-number
          +--rw local-address?      union
          +--rw local-port?         inet:port-number
          +--rw enabled?            boolean
          +--rw preference?         uint32
          +--rw description?        string
          +--ro session-state?      enumeration
          +--rw enable-authentication? boolean
          +--rw authentication
            +--rw (option)?
              +--:(md5)
                +--rw md5-password?  ianach:crypt-hash
              +--:(ssh)
                +--rw client-identity
                  +--rw username?    string
                  +--rw public-key!   {userauth-publickey}?
                  +--rw password!     {userauth-password}?
                  +--rw hostbased!    {userauth-hostbased}?
                  +--rw none?         empty {userauth-none}?
                  +--rw certificate!  {sshcmn:ssh-x509-certs}?
                +--rw server-authentication
                  +--rw ssh-host-keys!
                  +--rw ca-certs!     {sshcmn:ssh-x509-certs}?
                  +--rw ee-certs!     {sshcmn:ssh-x509-certs}?
                +--rw transport-params
                  {ssh-client-transport-params-config}?
                +--rw keepalives!     {ssh-client-keepalives}?
                  +--rw max-wait?      uint16
                  +--rw max-attempts?  uint8
              +--:(tcp-ao-keychain)
                +--rw keychain-name?  key-chain:key-chain-ref
            +--rw roa-limit
              +--rw max-number?       uint64
              +--rw threshold-percentage? uint8
              +--rw over-threshold-action? enumeration
              +--rw reconnect-interval? uint32

```

```

+--rw aspa-limit
|   +--rw max-number?          uint64
|   +--rw threshold-percentage? uint8
|   +--rw over-threshold-action? enumeration
|   +--rw reconnect-interval?   uint32
+--ro statistics
|   +--ro total-roa-records? yang:zero-based-counter64
|   +--ro ipv4-roa-records?  yang:zero-based-counter64
|   +--ro ipv6-roa-records?  yang:zero-based-counter64
|   +--ro router-key-records?
|   |                               yang:zero-based-counter64
|   +--ro aspa-records? yang:zero-based-counter64
+--ro connection-data
|   +--ro flaps?                uint32
|   +--ro last-session-up-down? yang:timestamp
|   +--ro last-update-sync-timestamp? yang:timestamp
|   +--ro last-full-sync-timestamp?  yang:timestamp
|   +--ro last-serial-query-timestamp? yang:timestamp
|   +--ro last-reset-query-timestamp? yang:timestamp
|   +--ro last-eod-received?         yang:timestamp
|   +--ro last-config-change-timestamp? yang:timestamp
|   +--ro last-error-timestamp?      yang:timestamp
|   +--ro last-connection-error-timestamp?
|   |                               yang:timestamp
|   +--ro last-connection-timestamp? yang:timestamp
|   +--ro error-reason?             string
+--ro protocol-data
|   +--ro protocol-version?  uint32
|   +--ro refresh-time?      yang:timestamp
|   +--ro response-time?     yang:timestamp
|   +--ro purge-time?        yang:timestamp
|   +--ro hold-time?         yang:timestamp
|   +--ro record-lifetime?   yang:timestamp
|   +--ro retry-interval?    uint32
|   +--ro expire-interval?   uint32
|   +--ro session-id?        uint16
|   +--ro serial-full?       uint32
|   +--ro serial-incremental? uint32
|   +--ro in-total-messages? yang:zero-based-counter64
|   +--ro out-total-messages? yang:zero-based-counter64
+--ro pdu-counters
|   +--ro serial-notify?     yang:zero-based-counter64
|   +--ro cache-response?   yang:zero-based-counter64
|   +--ro ipv4-prefix?      yang:zero-based-counter64
|   +--ro ipv6-prefix?      yang:zero-based-counter64
|   +--ro end-of-data?       yang:zero-based-counter64
|   +--ro cache-reset?       yang:zero-based-counter64
|   +--ro reset-query?       yang:zero-based-counter64

```

```
|  +--ro serial-query?      yang:zero-based-counter64
+--ro error-pdu-counters
|  +--ro corrupt-data?      yang:zero-based-counter64
|  +--ro internal-error?    yang:zero-based-counter64
|  +--ro unsupported-protocol-version?
|  |                        yang:zero-based-counter64
|  +--ro unsupported-pdu-type?
|  |                        yang:zero-based-counter64
|  +--ro unexpected-protocol-version?
|  |                        yang:zero-based-counter64
|  +--ro no-data-available? yang:zero-based-counter64
|  +--ro invalid-request?   yang:zero-based-counter64
|  +--ro withdrawal-unknown-record?
|  |                        yang:zero-based-counter64
|  +--ro duplicate-announcement-received?
|  |                        yang:zero-based-counter64
```

### 3.2. Yang Module

```
<CODE BEGINS> file "ietf-rpki-rtr@2022-10-18.yang"

module ietf-rpki-rtr {
  yang-version "1.1";
  namespace "urn:ietf:params:xml:ns:yang:ietf-rpki-rtr";
  prefix "rpki-rtr";
  import ietf-yang-types {
    prefix "yang";
    reference
      "RFC 6991: Common YANG Data Types.";
  }
  import ietf-inet-types {
    prefix "inet";
    reference
      "RFC 6991: Common YANG Data Types";
  }
  import ietf-routing {
    prefix rt;
    reference
      "RFC 8349: A YANG Data Model for Routing Management
      (NMDA Version).";
  }
  import iana-crypt-hash {
    prefix "ianach";
    reference
      "RFC 7317: A YANG Data Model for System Management";
  }
  import ietf-ssh-client {
    prefix "ssh";
    reference
      "RFC XXXX: YANG Groupings for SSH Clients and SSH Servers";
  }
  import ietf-interfaces {
    prefix "if";
    reference
      "RFC 8343, A YANG Data Model for Interface Management.";
  }
  import ietf-key-chain {
    prefix key-chain;
    reference
      "RFC 8177: YANG Key Chain.";
  }
  organization
    "IETF SIDROPS Working Group";
  contact
    "TBD";
```

## description

"This module describes a YANG model for the Resource Public Key Infrastructure (RPKI) to Router Protocol configuration. This YANG model conforms to the Network Management Datastore Architecture (NMDA) as described in RFC 8342. Copyright (c) 2022 IETF Trust and the persons identified as authors of the code. All rights reserved. Redistribution and use in source and binary forms, with or without modification, is permitted pursuant to, and subject to the license terms contained in, the Revised BSD License set forth in Section 4.c of the IETF Trust's Legal Provisions Relating to IETF Documents (<https://trustee.ietf.org/license-info>). This version of this YANG module is part of RFC XXXX; see the RFC itself for full legal notices. The key words 'MUST', 'MUST NOT', 'REQUIRED', 'SHALL', 'SHALL NOT', 'SHOULD', 'SHOULD NOT', 'RECOMMENDED', 'NOT RECOMMENDED', 'MAY', and 'OPTIONAL' in this document are to be interpreted as described in BCP 14 (RFC 2119) (RFC 8174) when, and only when, they appear in all capitals, as shown here.";

reference "RFC 8210";

revision 2022-10-18 {

description

"Initial Version";

reference

"RFC 8210, YANG Data Model for RPKI to Router Protocol";

}

typedef ipv4-pfx-len {

type uint8 {

range "0 .. 32";

}

description

"IPv4 Prefix Length.";

}

typedef ipv6-pfx-len {

type uint8 {

range "0 .. 128";

}

description

"IPv6 Prefix Length.";

}

typedef subject-key-id {

type binary {

length 20;

}

description

"Subject Key Identifier.";

}



```
identity rpki-rtr {
  base rt:routing-protocol;
  description
    "RPKI to Router protocol.";
}
grouping records-limit {
  description
    "Limit of records that can be received from the RPKI
    cache server.";
  leaf max-number {
    type uint64;
    description
      "Configures the maximum number of ROAs that can be
      received from the RPKI cache server.";
  }
  leaf threshold-percentage {
    type uint8 {
      range "0..100";
    }
    units "percent";
    description
      "Configures the threshold percentage for ROA maximum
      number.";
  }
  leaf over-threshold-action {
    type enumeration {
      enum alert-only {
        description
          "Generates alert messages.";
      }
      enum discard {
        description
          "Discards excess ROAs.";
      }
      enum reconnect {
        description
          "Diconncets with the RPKI cache server,
          and tries to reconnect after reconnection
          timer expires.";
      }
      enum idle-forever {
        description
          "Diconncets with the RPKI cache server
          forever.";
      }
    }
    description
      "The action to taken when ROA number exceeds
```

```
        threshold.";
    }
    leaf reconnect-interval {
        type uint32 {
            range "1..30000";
        }
        units "minutes";
        description
            "Time interval for the reconnection timer.";
    }
}
grouping aspa-overall-records {
    description
        "ASPAs received from all RPKI cache servers.";
    list aspas {
        key "customer-asn";
        description
            "An entry of ASPA.";
        leaf customer-asn {
            type inet:as-number;
            description
                "The AS number of a customer.";
        }
        leaf server-address {
            type inet:ip-address;
            description
                "IP address of the RPKI cache server.";
        }
        list provider-asns {
            key "provider-asn";
            description
                "Providers of the customer.";
            leaf provider-asn {
                type inet:as-number;
                description
                    "The AS number of a provider.";
            }
        }
    }
}
grouping aspa-server-records {
    description
        "ASPAs received from a RPKI cache server.";
    list aspas {
        key "customer-asn";
        description
            "An entry of ASPA.";
        leaf customer-asn {
```

```
    type inet:as-number;
    description
      "The AS number of a customer.";
  }
  list provider-asns {
    key "provider-asn";
    description
      "Providers of the customer.";
    leaf provider-asn {
      type inet:as-number;
      description
        "The AS number of a provider.";
    }
  }
}
}
augment "/rt:routing/rt:control-plane-protocols/"
  + "rt:control-plane-protocol" {
  when "derived-from-or-self(rt:type, 'rpki-rtr')" {
    description
      "This augmentation is valid for a routing protocol
      instance of RPKI to Router.";
  }
  description
    "RPKI to Router protocol augmentation of ietf-routing module
    control-plane-protocol.";
  container rpki-rtr {
    description
      "Configuration parameters for the RPKI to Router Protocol.";
    container sessions {
      description
        "Parameters of RPKI sessions to cache servers.";
      list session {
        key "server-address";
        description
          "Each entry contains parameters for a RPKI session
          identified by the 'server-address' key.";
        leaf server-address {
          type inet:ip-address;
          mandatory true;
          description
            "The IP address of the RPKI cache server resembling
            a session";
        }
        leaf server-port {
          type inet:port-number;
          description
            "The remote port for the connection";
        }
      }
    }
  }
}
```

```
        to the RPKI cache server";
    }
    leaf local-address {
        type union {
            type inet:ip-address;
            type if:interface-ref;
        }
        description
            "The local IP (either IPv4 or IPv6) address to use for
            the connection to the RPKI cache server. This may be
            expressed as either an IP address or reference to the
            name of an interface.";
    }
    leaf local-port {
        type inet:port-number;
        description
            "The local port for the connection
            to the RPKI cache server";
    }
    leaf enabled {
        type boolean;
        default "true";
        description
            "Whether the RPKI cache server is enabled.";
    }
    leaf preference {
        type uint32;
        description
            "The router's preference to connect to that cache.
            The lower the value, the more preferred.";
    }
    leaf description {
        type string;
        description
            "Textual description of the RPKI cache server";
    }
    leaf session-state {
        type enumeration {
            enum idle {
                description
                    "The session is down.";
            }
            enum connect {
                description
                    "The session is waiting for the underlying
                    transport session to be established.";
            }
            enum establish {
```

```
        description
            "The session is up.";
    }
    enum ex-incr {
        description
            "Incremental update of ROAs in progress.";
    }
    enum ex-full {
        description
            "Full update of ROA records in progress.";
    }
}
config false;
description
    "The session state.";
}
leaf enable-authentication {
    type boolean;
    default "false";
    description
        "Whether the session is secured.";
}
container authentication {
    when "../enable-authentication = 'true'";
    description
        "Container for describing how a particular session
        is to be secured.";
    choice option {
        description
            "Choice for session securing methods.";
        case md5 {
            leaf md5-password {
                type ianach:crypt-hash;
                description
                    "The password for md5 authentication.";
            }
            description
                "Uses TCP-MD5 to secure the session.";
        }
        case ssh {
            uses ssh:ssh-client-grouping {
                reference
                    "RFC XXXX: YANG Groupings for SSH Clients and
                    SSH Servers";
            }
            description
                "Uses SSH to secure the session.";
        }
    }
}
```

```
    case tcp-ao-keychain {
      leaf keychain-name {
        type key-chain:key-chain-ref;
        description
          "Name of key chain.";
        reference
          "RFC 8177: YANG Key Chain.";
      }
      description
        "Uses key-chain to secure the session.";
    }
  }
}
container roa-limit {
  description
    "Limit of ROA records that can be received from the
    RPKI cache server.";
  uses records-limit;
}
container aspa-limit {
  description
    "Limit of ASPA records that can be received from the
    RPKI cache server.";
  uses records-limit;
}
container statistics {
  config false;
  description
    "Statistics of the RPKI cache server.";
  leaf total-roa-records {
    type yang:zero-based-counter64;
    description
      "The total number of ROAs received
      from the RPKI cache server.";
  }
  leaf ipv4-roa-records {
    type yang:zero-based-counter64;
    description
      "The number of ROAs for IPv4 prefixes received
      from the RPKI cache server.";
  }
  leaf ipv6-roa-records {
    type yang:zero-based-counter64;
    description
      "The number of ROAs for IPv6 prefixes received
      from the RPKI cache server.";
  }
  leaf router-key-records {
```

```
    type yang:zero-based-counter64;
    description
      "The number of router keys received from the RPKI
      cache server.";
  }
  leaf aspa-records {
    type yang:zero-based-counter64;
    description
      "The number of ASPAs received from the RPKI
      cache server.";
  }
}
container connection-data {
  config false;
  description
    "State information relating to the connection
    with the RPKI cache server.";
  leaf flaps {
    type uint32;
    description
      "Count for number of flaps observed on the
      session.";
  }
  leaf last-session-up-down {
    type yang:timestamp;
    description
      "This timestamp indicates the time that the
      RPKI-RTR session last transitioned in or out
      of the UP state. The value is the timestamp in
      microseconds relative to the Unix Epoch (Jan 1,
      1970 00:00:00 UTC). The RPKI-RTR session uptime
      can be computed by clients as the difference
      between this value and the current time
      in UTC (assuming the session is in the UP
      state, per the session-state leaf).";
    reference
      "RFC 6810: The Resource Public Key Infrastructure.";
  }
  leaf last-update-sync-timestamp {
    type yang:timestamp;
    description
      "Time of last serial sync with cache server.";
  }
  leaf last-full-sync-timestamp {
    type yang:timestamp;
    description
      "Time of last reset sync with cache server.";
  }
}
```

```
leaf last-serial-query-timestamp {
  type yang:timestamp;
  description
    "Time of last serial query sent to cache server.";
}
leaf last-reset-query-timestamp {
  type yang:timestamp;
  description
    "Time of last reset query sent to cache server.";
}
leaf last-eod-received {
  type yang:timestamp;
  description
    "Time in microseconds at which last EOD was
    received.";
}
leaf last-config-change-timestamp {
  type yang:timestamp;
  description
    "Time of last host, port, VRF or local interface
    change.";
}
leaf last-error-timestamp {
  type yang:timestamp;
  description
    "Time of sending/receiving protocol error to/from
    cache server.";
}
leaf last-connection-error-timestamp {
  type yang:timestamp;
  description
    "Time of last connection error to cache server.";
}
leaf last-connection-timestamp {
  type yang:timestamp;
  description
    "Time of last connection to cache server.";
}
leaf error-reason {
  type string;
  description
    "Reason for error in connection.";
}
}
container protocol-data {
  config false;
  description
    "State parameters related to the RPKI to router
```



```
    protocol";
  leaf protocol-version {
    type uint32;
    description
      "The version number of the RPKI to Router
      Protocol.";
  }
  leaf refresh-time {
    type yang:timestamp;
    description
      "Configures the time a router waits in between
      sending periodic serial queries to the RPKI
      cache server.";
  }
  leaf response-time {
    type yang:timestamp;
    description
      "Configures the time a router waits for a response
      after sending a serial or reset query to the RPKI
      cache server.";
  }
  leaf purge-time {
    type yang:timestamp;
    description
      "Configures the time a router waits to keep data
      from the RPKI cache server after the session
      drops.";
  }
  leaf hold-time {
    type yang:timestamp;
    description
      "Hold-time for this session.";
  }
  leaf record-lifetime {
    type yang:timestamp;
    description
      "Record-lifetime this session.";
  }
  leaf retry-interval {
    type uint32;
    description
      "Number of seconds between poll error and cache
      server poll";
  }
  leaf expire-interval {
    type uint32;
    description
      "Number of seconds to retain data synced from
```

```
        cache server";
    }
    leaf session-id {
        type uint16;
        config false;
        description
            "When a cache server is started, it generates a
            Session ID to identify the instance of the cache
            and to bind it to the sequence of Serial Numbers
            that cache instance will generate.";
        reference
            "RFC 6810, The Resource Public Key Infrastructure
            (RPKI) to Router Protocol
            RFC 8210, The Resource Public Key Infrastructure
            (RPKI) to Router Protocol, Version 1";
    }
    leaf serial-full {
        type uint32;
        config false;
        description
            "A 32-bit strictly increasing unsigned integer which
            wraps from 2^32-1 to 0. It denotes the logical
            version of a cache. It resembles the latest full
            query.";
        reference
            "RFC 6810, The Resource Public Key Infrastructure
            (RPKI) to Router Protocol
            RFC 8210, The Resource Public Key Infrastructure
            (RPKI) to Router Protocol, Version 1";
    }
    leaf serial-incremental {
        type uint32;
        config false;
        description
            "A 32-bit strictly increasing unsigned integer which
            wraps from 2^32-1 to 0. It denotes the logical
            version of a cache. It resembles the latest
            incremental query.";
        reference
            "RFC 6810, The Resource Public Key Infrastructure
            (RPKI) to Router Protocol
            RFC 8210, The Resource Public Key Infrastructure
            (RPKI) to Router Protocol, Version 1";
    }
    leaf in-total-messages {
        type yang:zero-based-counter64;
        description
            "The total number of messages received from the
```

```
        RPKI cache server.";
    }
    leaf out-total-messages {
        type yang:zero-based-counter64;
        description
            "The total number of messages transmitted to the
            RPKI cache server.";
    }
}
container pdu-counters {
    config false;
    description
        "Counters of PDUs that are received from cache";
    leaf serial-notify {
        type yang:zero-based-counter64;
        description
            "Serial notify PDU count";
    }
    leaf cache-response {
        type yang:zero-based-counter64;
        description
            "Cache response PDU count";
    }
    leaf ipv4-prefix {
        type yang:zero-based-counter64;
        description
            "IPv4 prefix PDU count";
    }
    leaf ipv6-prefix {
        type yang:zero-based-counter64;
        description
            "Ipv6 prefix PDU count";
    }
    leaf end-of-data {
        type yang:zero-based-counter64;
        description
            "End of data PDU count";
    }
    leaf cache-reset {
        type yang:zero-based-counter64;
        description
            "Cache reset PDU count";
    }
    leaf reset-query {
        type yang:zero-based-counter64;
        description
            "Reset query PDU count";
    }
}
```

```
    leaf serial-query {
      type yang:zero-based-counter64;
      description
        "Serial query PDU count";
    }
  }
  container error-pdu-counters {
    config false;
    description
      "Counters of error PDUs that originate from router
or cache server";
    leaf corrupt-data {
      type yang:zero-based-counter64;
      description
        "Corrupt data PDU count";
    }
    leaf internal-error {
      type yang:zero-based-counter64;
      description
        "Internal error PDU count";
    }
    leaf unsupported-protocol-version {
      type yang:zero-based-counter64;
      description
        "Unsupported protocol version PDU count";
    }
    leaf unsupported-pdu-type {
      type yang:zero-based-counter64;
      description
        "Unsupported PDU type count";
    }
    leaf unexpected-protocol-version {
      type yang:zero-based-counter64;
      description
        "Unexpected protocol version PDU count";
    }
    leaf no-data-available {
      type yang:zero-based-counter64;
      description
        "No data available PDU count";
    }
    leaf invalid-request {
      type yang:zero-based-counter64;
      description
        "Invalid request PDU count";
    }
    leaf withdrawal-unknown-record {
      type yang:zero-based-counter64;
```

```
        description
            "Withdrawal of unknown record PDU count";
    }
    leaf duplicate-announcement-received {
        type yang:zero-based-counter64;
        description
            "Duplicate announcement received PDU count";
    }
}
}
}
}
}
```

<CODE ENDS>

#### 4. RPKI Table YANG Module

##### 4.1. Tree View

The complete tree of the `ietf-rpki-table.yang` data model is represented as following. See [RFC8340] for an explanation of the symbols used.

```
module: ietf-rpki-table
```

```
augment /rt:routing:
```

```

+--ro roa-tables
|   +--ro roa-table* [name]
|   |   +--ro name      string
|   |   +--ro ipv4
|   |   |   +--ro roas
|   |   |   |   +--ro roa* [prefix max-len asn source]
|   |   |   |   |   +--ro prefix      inet:ipv4-prefix
|   |   |   |   |   +--ro max-len     ipv4-pfx-len
|   |   |   |   |   +--ro asn        inet:as-number
|   |   |   |   |   +--ro source      union
|   |   |   +--ro total-records?      yang:gauge32
|   |   |   +--ro records-added?      yang:counter64
|   |   |   +--ro records-deleted?    yang:counter64
|   |   +--ro ipv6
|   |   |   +--ro roas
|   |   |   |   +--ro roa* [prefix max-len asn source]
|   |   |   |   |   +--ro prefix      inet:ipv6-prefix
|   |   |   |   |   +--ro max-len     ipv6-pfx-len
|   |   |   |   |   +--ro asn        inet:as-number
|   |   |   |   |   +--ro source      union
|   |   |   +--ro total-records?      yang:gauge32
|   |   |   +--ro records-added?      yang:counter64
|   |   |   +--ro records-deleted?    yang:counter64
|   +--ro router-key-tables
|   |   +--ro router-key-table* [name]
|   |   |   +--ro name      string
|   |   |   +--ro router-keys
|   |   |   |   +--ro router-key* [ski asn key server-address]
|   |   |   |   |   +--ro ski      subject-key-id
|   |   |   |   |   +--ro asn      inet:as-number
|   |   |   |   |   +--ro key      string
|   |   |   |   |   +--ro server-address  inet:ip-address
|   +--ro aspa-tables
|   |   +--ro aspa-table* [name]
|   |   |   +--ro name      string
|   |   |   +--ro aspas* [customer-asn]
|   |   |   |   +--ro customer-asn      inet:as-number
|   |   |   |   +--ro server-address?    inet:ip-address
|   |   |   |   +--ro provider-asns* [provider-asn]
|   |   |   |   |   +--ro provider-asn    inet:as-number

```

#### 4.2. Yang Module

```
<CODE BEGINS> file "ietf-rpki-table@2022-10-18.yang"
```

```
module ietf-rpki-table {
  yang-version "1.1";
  namespace "urn:ietf:params:xml:ns:yang:ietf-rpki-table";
  prefix "rpki-table";
  import ietf-yang-types {
    prefix "yang";
    reference
      "RFC 6991: Common YANG Data Types.";
  }
  import ietf-inet-types {
    prefix "inet";
    reference
      "RFC 6991: Common YANG Data Types";
  }
  import ietf-routing {
    prefix rt;
    reference
      "RFC 8349: A YANG Data Model for Routing Management
      (NMDA Version).";
  }
  organization
    "IETF SIDROPS Working Group";
  contact
    "TBD";
  description
    "This module describes a YANG model for the Resource Public
    Key Infrastructure (RPKI) to Router Protocol configuration.
    This YANG model conforms to the Network Management
    Datastore Architecture (NMDA) as described in RFC 8342.
    Copyright (c) 2022 IETF Trust and the persons identified as
    authors of the code. All rights reserved.
    Redistribution and use in source and binary forms, with or
    without modification, is permitted pursuant to, and subject to
    the license terms contained in, the Revised BSD License set
    forth in Section 4.c of the IETF Trust's Legal Provisions
    Relating to IETF Documents
    (https://trustee.ietf.org/license-info).
    This version of this YANG module is part of RFC XXXX;
    see the RFC itself for full legal notices.
    The key words 'MUST', 'MUST NOT', 'REQUIRED', 'SHALL', 'SHALL
    NOT', 'SHOULD', 'SHOULD NOT', 'RECOMMENDED', 'NOT RECOMMENDED',
    'MAY', and 'OPTIONAL' in this document are to be interpreted as
    described in BCP 14 (RFC 2119) (RFC 8174) when, and only when,
    they appear in all capitals, as shown here.";
  reference "RFC 8210";
  revision 2022-10-18 {
    description
      "Initial Version";
```

```
    reference
      "RFC 8210, YANG Data Model for RPKI to Router Protocol";
  }
  typedef ipv4-pfx-len {
    type uint8 {
      range "0 .. 32";
    }
    description
      "IPv4 Prefix Length.";
  }
  typedef ipv6-pfx-len {
    type uint8 {
      range "0 .. 128";
    }
    description
      "IPv6 Prefix Length.";
  }
  typedef subject-key-id {
    type binary {
      length 20;
    }
    description
      "Subject Key Identifier.";
  }
  grouping aspa-overall-records {
    description
      "ASPAs received from all RPKI cache servers.";
    list aspas {
      key "customer-asn";
      description
        "An entry of ASPA.";
      leaf customer-asn {
        type inet:as-number;
        description
          "The AS number of a customer.";
      }
      leaf server-address {
        type inet:ip-address;
        description
          "IP address of the RPKI cache server.";
      }
      list provider-asns {
        key "provider-asn";
        description
          "Providers of the customer.";
        leaf provider-asn {
          type inet:as-number;
          description

```



```
        "The AS number of a provider.";
    }
}
}

augment "/rt:routing" {
    description
        "RPKI tables augmentation of ietf-routing module.";
    container roa-tables {
        config false;
        description
            "List of tables containing ROAs received from all RPKI
            cache servers.";
        list roa-table {
            key "name";
            description
                "Table of ROAs received from all RPKI cache servers.";
            leaf name {
                type string;
                description
                    "Name of the ROA table.";
            }
        }
        container ipv4 {
            config false;
            description
                "Container for IPv4 ROAs table.";
            container roas {
                config false;
                description
                    "ROAs received from the RPKI cache server.";
                list roa {
                    key "prefix max-len asn source";
                    description
                        "An entry of ROA.";
                    leaf prefix {
                        type inet:ipv4-prefix;
                        description
                            "The IPv4 prefix of the ROA.";
                    }
                    leaf max-len {
                        type ipv4-pfx-len;
                        description
                            "Denotes the longest prefix allowed. This
                            MUST NOT be less than the prefix length.";
                    }
                    leaf asn {
                        type inet:as-number;
                    }
                }
            }
        }
    }
}
```

```
        description
            "The origin AS number of the ROA.";
    }
    leaf source {
        type union {
            type string;
            type inet:ip-address;
        }
        description
            "String representing the source of the records
            in this record-set.";
    }
}
}
leaf total-records {
    type yang:gauge32;
    description
        "Number of prefix policy records.";
}
leaf records-added {
    type yang:counter64;
    description
        "Number of prefix policy records cumulatively added.";
}
leaf records-deleted {
    type yang:counter64;
    description
        "Number of prefix policy records cumulatively
        deleted.";
}
}
container ipv6 {
    config false;
    description
        "Container for IPv6 ROAs table.";
    container roas {
        config false;
        description
            "ROAs received from the RPKI cache server.";
        list roa {
            key "prefix max-len asn source";
            description
                "An entry of ROA.";
            leaf prefix {
                type inet:ipv6-prefix;
                description
                    "The IPv6 prefix of the ROA.";
            }
        }
    }
}
```

```
    leaf max-len {
      type ipv6-pfx-len;
      description
        "Denotes the longest prefix allowed. This
        MUST NOT be less than the prefix length.";
    }
    leaf asn {
      type inet:as-number;
      description
        "The origin AS number of the ROA.";
    }
    leaf source {
      type union {
        type string;
        type inet:ip-address;
      }
      description
        "Representing the source of the records in this
        record-set. Either a server IP or a source file
        of static records.";
    }
  }
}
leaf total-records {
  type yang:gauge32;
  description
    "Number of prefix policy records.";
}
leaf records-added {
  type yang:counter64;
  description
    "Number of prefix policy records cumulatively added.";
}
leaf records-deleted {
  type yang:counter64;
  description
    "Number of prefix policy records cumulatively
    deleted.";
}
}
}
}
container router-key-tables {
  config false;
  description
    "List of router key table received from all RPKI cache
    servers.";
  list router-key-table {
```

```
key "name";
description
  "Table of router keys received from all RPKI cache
  servers.";
leaf name {
  type string;
  description
    "Name of the router-key-table.";
}
container router-keys {
  config false;
  description
    "Router keys received from the RPKI cache server.";
  list router-key {
    key "ski asn key server-address";
    description
      "An entry of router key.";
    leaf ski {
      type subject-key-id;
      description
        "A router key's Subject Key Identifier (SKI).";
      reference
        "RFC 6487: A Profile for X.509 PKIX Resource
        Certificates";
    }
    leaf asn {
      type inet:as-number;
      description
        "The AS number of the router which the key
        belongs to.";
    }
    leaf key {
      type string;
      description
        "A router key's subjectPublicKeyInfo value.";
      reference
        "RFC 8608: BGPsec Algorithms, Key Formats, and
        Signature Formats";
    }
    leaf server-address {
      type inet:ip-address;
      description
        "IP address of the RPKI cache server.";
    }
  }
}
}
```

```
container aspa-tables {
  config false;
  description
    "List of tables of ASPAs received from all RPKI cache
    servers.";
  list aspa-table {
    key "name";
    description
      "Table of ASPAs received from all RPKI cache servers.";
    leaf name {
      type string;
      description
        "Name of the ASPA-table.";
    }
    uses aspa-overall-records;
  }
}
}
}

<CODE ENDS>
```

## 5. Security Considerations

TBD

## 6. IANA Considerations

TBD

## 7. References

### 7.1. Normative References

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## 7.2. Informative References

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