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A YANG Data Model for BGP Communities
draft-ietf-grow-yang-bgp-communities-08

Abstract

This document defines a YANG data model for the structured specification of BGP communities. The model provides operators with a way to publish their locally defined BGP communities in a standardized format.

Two YANG modules are defined in this document. The first is designed for stand-alone usage. The second is used to augment the "ietf-bgp" YANG module[I-D.ietf-idr-bgp-model] with BGP community annotations.

Additionally, this document provides an optional discovery mechanism based on publishing of community definition locations through the Resource Public Key Infrastructure (RPKI).

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1. Introduction

ISPs use BGP communities to add information to their prefix announcements or to let customers influence routing behaviour inside the network of the ISP. Each ISP defines for itself which BGP communities to support and how the structure of these communities should be interpreted. This document provides a YANG[RFC7950] module for describing the structure and meaning of BGP communities[RFC1997], Extended BGP communities[RFC4360] and Large BGP communities[RFC8092]. ISPs can use this standardized format to publish their community definitions. Section 3 elaborates on further advantages of using such a standardized format.

Section 4 and Section 5 describe the base module. Section 6 describes a module which augments the "ietf-bgp" YANG module[I-D.ietf-idr-bgp-model] with BGP community annotations.

Section 8 describes an optional discovery mechanism based on publishing of community definition locations through the Resource Public Key Infrastructure (RPKI) [RFC6480].

2. 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.

The meaning of the symbols in tree diagrams are defined in [RFC8340].

3. Rationale

ISPs may define various BGP communities that have local significance within their network. These communities could be used to add miscellaneous information to a prefix announcement. For example, a community "64501:1:528" may signify that the AS with ASN 64501 is originating a prefix from a point of presence in The Netherlands (ISO 3166-1 code 528). Communities could be used to allow customers of an ISP to control the routing behavior of their prefixes inside the ISP. For example, a community "64501:4:64498" attached to a prefix advertised to AS64501 by a customer may be interpreted by AS64501 to mean that this prefix must not be propagated to AS64498.

For both use cases it is necessary for the ISP to communicate the meaning of their locally defined communities to others. Currently this is typically done by publishing a list of communities on a web page, or as a remark inside an "autnum" object in the Internet

Routing Registry. This makes it cumbersome to determine whether and where an ISP publishes community information. The lack of a well-defined structure makes it hard to create a standardized publishing mechanism, and to develop tools for automatically parsing community information and eventually triggering configuration actions.

The purpose of the YANG model defined in this document is to provide a standardized format for publishing community definitions. These definitions help applications to interpret the structure and purpose of BGP communities. For example, looking glasses may use the published definitions to parse communities seen in BGP announcements and display their meaning. Another potential use case is in generating routing policy configurations based on community definitions published by an upstream ASN. This could be achieved automatically using external tooling to generate router configurations, or inside a router's command-line interface by importing the definitions and providing the CLI-user with available choices for manual configuration.

This document describes a data model for the publishing format of community definitions. The data model does not make any assumption about the protocol used to publish/retrieve formatted data following the model. Section 8 describes an optional discovery mechanism using the RPKI, which requires publishing at an HTTPS Uniform Resource Identifier (URI)[RFC9110]. Other publishing locations and publishing mechanisms are outside the scope of this specification.

4. Tree view

The following tree diagram provides an overview of the "ietf-bgp-communities" data model.

```
module: ietf-bgp-communities
  +--ro bgp-communities
     +--ro serial?                 uint32
     +--ro autonomous-system-id?   inet:as-number
     +--ro uri?                    inet:uri
     +--ro description?            string
     +--ro contact-url?            inet:uri
     +--ro contact* [email-address]
     |  +--ro email-address          inet:email-address
     |  +--ro name?                  string
     |  +--ro role?                  string
     |  +--ro organization?          string
     |  +--ro organizational-unit?   string
     +--ro regular* [name]
     |  +--ro name            community-name
     |  +--ro category?       community-category
```

```
|  +--ro description?    community-description
|  +--ro global-admin    two-octet-as-number
|  +--ro local-admin
|     +--ro format?   local-admin-format
|     +--ro field* [name]
|        +--ro name           field-name
|        +--ro length?        uint8
|        +--ro pattern        field-pattern
|        +--ro description?   field-description
+--ro extended* [name]
|  +--ro name           community-name
|  +--ro category?      community-category
|  +--ro description?   community-description
|  +--ro type           uint8
|  +--ro subtype        uint8
|  +--ro (global-admin)
|  |  +--:(asn)
|  |  |  +--ro asn?     two-octet-as-number
|  |  +--:(asn4)
|  |     +--ro asn4?    inet:as-number
|  +--ro local-admin
|     +--ro format?   local-admin-format
|     +--ro field* [name]
|        +--ro name           field-name
|        +--ro length?        uint8
|        +--ro pattern        field-pattern
|        +--ro description?   field-description
+--ro large* [name]
   +--ro name                 community-name
   +--ro category?            community-category
   +--ro description?         community-description
   +--ro global-admin         inet:as-number
   +--ro local-data-part-1
   |  +--ro format?   local-admin-format
   |  +--ro field* [name]
   |     +--ro name           field-name
   |     +--ro length?        uint8
   |     +--ro pattern        field-pattern
   |     +--ro description?   field-description
   +--ro local-data-part-2
      +--ro format?   local-admin-format
      +--ro field* [name]
         +--ro name           field-name
         +--ro length?        uint8
         +--ro pattern        field-pattern
         +--ro description?   field-description
```

5. Base Module

This section contains the base YANG module for BGP community definitions.

Several elements in this module use data types from [RFC9911]. These data types are represented with the prefix "inet".

<CODE BEGINS> file "ietf-bgp-communities@2026-01-05.yang"

```
module ietf-bgp-communities {
  yang-version 1.1;
  namespace
    "urn:ietf:params:xml:ns:yang:ietf-bgp-communities";
  prefix bgp-comm;

  import ietf-inet-types {
    prefix inet;
    reference
      "RFC 9911: Common YANG Data Types";
  }

  organization
    "IETF GROW Working Group";
  contact
    "WG Web:   <https://datatracker.ietf.org/wg/grow/>
     WG List:  <mailto:grow@ietf.org>

     Author:   Martin Pels
       <mailto:mpels@ripe.net>";
  description
    "This module describes a structure for BGP Communities

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     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
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     Relating to IETF Documents
     (https://trustee.ietf.org/license-info).

     This version of this YANG module is part of RFC YYYY; 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.";

      // RFC-EDITOR: please update YYYY with this RFC ID

      revision 2026-01-05 {
        description
          "Initial revision.";
        reference
          "RFC YYYY: A YANG Data Model for BGP Communities
           RFC-EDITOR: please update YYYY with this RFC ID";
      }

      typedef two-octet-as-number {
        type uint16;
        description
          "This type represents autonomous system numbers, which
           identify an Autonomous System (AS).

           Autonomous system numbers were originally limited to 16
           bits.  BGP extensions have enlarged the autonomous system
           number space to 32 bits.  The two-octet-as-number type uses
           an uint16 base type for use cases where the enlarged number
           space is not supported.";
        reference
          "RFC 1930: Guidelines for creation, selection, and
           registration of an Autonomous System (AS)";
      }

      typedef community-name {
        type string {
          length "1..255";
          pattern '[^\s]+';
        }
        description
          "This type restricts values for the name of a BGP community.";
        reference
          "RFC YYYY: A YANG Data Model for BGP Communities
           RFC-EDITOR: please update YYYY with this RFC ID";
      }

      typedef community-category {
        type enumeration {
          enum informational {
            value 0;
            description
              "Informational community";
```

```
        }
        enum action {
          value 1;
          description
            "Action community";
        }
      }
      description
        "This type restricts values for the category of a BGP
         community.";
      reference
        "RFC 8195: Use of BGP Large Communities";
    }

    typedef community-description {
      type string {
        length "1..65535";
      }
      description
        "This type restricts values for the description of a BGP
         community.";
      reference
        "RFC YYYY: A YANG Data Model for BGP Communities
         RFC-EDITOR: please update YYYY with this RFC ID";
    }

    typedef local-admin-format {
      type enumeration {
        enum decimal {
          value 0;
          description
            "Decimal number string";
        }
        enum binary {
          value 1;
          description
            "Bit string";
        }
      }
      description
        "This type defines the format options for a BGP community
         Local Administrator/Local Data field encoding";
      reference
        "RFC YYYY: A YANG Data Model for BGP Communities
         RFC-EDITOR: please update YYYY with this RFC ID";
    }

    typedef field-name {
```

```
        type string {
          length "1..255";
          pattern '[^\s]+';
        }
        description
          "This type restricts values for the name leaf of a BGP
           community Local Administrator/Local Data field.";
        reference
          "RFC YYYY: A YANG Data Model for BGP Communities
           RFC-EDITOR: please update YYYY with this RFC ID";
      }

      typedef field-pattern {
        type string {
          length "1..4095";
          pattern '[-0-9.,*?^$+|(){}\[\]]+';
        }
        description
          "This type restricts values for the pattern leaf of a BGP
           community Local Administrator/Local Data field.  Patterns
           are described as POSIX Extended Regular Expressions";
        reference
          "IEEE 1003.2-1992: Information Technology - Portable
           Operating System Interface (POSIX) - Part 2: Shell and
           Utilities (Vol. 1)";
      }

      typedef field-description {
        type string {
          length "1..65535";
          pattern '(\*)|([^*]+)';
        }
        description
          "This type restricts values for the description leaf of a BGP
           community Local Administrator/Local Data field.  The string
           containing a single asterisk '*' indicates that the value of
           the field should be used as description.";
        reference
          "RFC YYYY: A YANG Data Model for BGP Communities
           RFC-EDITOR: please update YYYY with this RFC ID";
      }

      grouping local-admin-fields {
        description
          "A group of subfields inside the Local Administrator/Local
           Data section of a BGP Community";
        list field {
          key "name";
```

```
        ordered-by user;
        description
          "Ordered list of fields with their meanings";
        leaf name {
          type field-name;
          description
            "The name of the field";
        }
        leaf length {
          type uint8;
          description
            "Length of the field.  If local-admin-format is 'decimal',
             this is a number of digits.  In case local-admin-format is
             'binary', it is a number of bits.

             Parsers use the field length to determine how many
             decimals or bits from the Local Administrator part of the
             community are used by this field.  If this leaf is not
             defined, the length is assumed to be the maximum allowed
             length of the entire field list.  In this case the field
             list MUST NOT contain more than one element.";
        }
        leaf pattern {
          type field-pattern;
          mandatory true;
          description
            "Used by parsers to match on the content of the field.
             This could be a single value or a regular expression
             pattern matching multiple values.";
        }
        leaf description {
          type field-description;
          description
            "A text description of the field pattern.  This description
             can be used to provide meaning to specific values for a
             field.";
        }
      }
    }

    grouping maintainer-contact {
      description
        "A maintainer contact entry";
      leaf email-address {
        type inet:email-address;
        description
          "Maintainer contact e-mail address";
      }
```

```
        leaf name {
          type string {
            length "1..255";
          }
          description
            "Maintainer contact name";
        }
        leaf role {
          type string {
            length "1..255";
          }
          description
            "Maintainer contact role";
        }
        leaf organization {
          type string {
            length "1..255";
          }
          description
            "Maintainer contact organization";
        }
        leaf organizational-unit {
          type string {
            length "1..255";
          }
          description
            "Maintainer contact organizational unit";
        }
      }

      grouping regular-community {
        description
          "A Regular BGP community definition";
        leaf name {
          type community-name;
          description
            "Community name";
        }
        leaf category {
          type community-category;
          description
            "Category of the community";
        }
        leaf description {
          type community-description;
          description
            "Description for the community";
        }
```

```
        leaf global-admin {
          type two-octet-as-number;
          mandatory true;
          description
            "Global Administrator field";
        }
        container local-admin {
          description
            "Local Administrator Field";
          leaf format {
            type local-admin-format;
            default "decimal";
            description
              "Format used for parsing Local Administrator subfields";
          }
          uses local-admin-fields;
        }
        reference
          "RFC 1997: BGP Communities Attribute";
      }

      grouping extended-community {
        description
          "An Extended BGP community definition";
        leaf name {
          type community-name;
          description
            "Community name";
        }
        leaf category {
          type community-category;
          description
            "Category of the community";
        }
        leaf description {
          type community-description;
          description
            "Description for the community";
        }
        leaf type {
          type uint8 {
            range "0|2|64|66";
          }
          mandatory true;
          description
            "High-order Type of the community.  Supported values are 0
             (0x00) for Transitive Two-Octet AS-Specific Extended
             Communities, 2 (0x02) for Transitive Four-Octet
```

```
            AS-Specific Extended Communities, 64 (0x40) for
            Non-Transitive Two-Octet AS-Specific Extended Communities
            and 66 (0x42) for Non-Transitive Four-Octet AS-Specific
            Extended Communities.";
        }
        leaf subtype {
          type uint8;
          mandatory true;
          description
            "Low-order Sub-Type of the community";
        }
        choice global-admin {
          mandatory true;
          description
            "Global Administrator Field";
          case asn {
            leaf asn {
              type two-octet-as-number;
              must "../type = 0 or ../type = 64" {
                error-message
                  "../type must match Two-Octet AS-Specific Community";
              }
              description
                "Two-Octet AS";
            }
          }
          case asn4 {
            leaf asn4 {
              type inet:as-number;
              must "../type = 2 or ../type = 66" {
                error-message
                  "../type must match Four-Octet AS-Specific Community";
              }
              description
                "Four-Octet AS";
            }
          }
        }
        container local-admin {
          description
            "Local Administrator Field";
          leaf format {
            type local-admin-format;
            default "decimal";
            description
              "Format used for parsing Local Administrator subfields";
          }
          uses local-admin-fields;
```

```
      }
      reference
        "RFC 4360: BGP Extended Communities Attribute";
    }

    grouping large-community {
      description
        "A Large BGP community definition";
      leaf name {
        type community-name;
        description
          "Community name";
      }
      leaf category {
        type community-category;
        description
          "Category of the community";
      }
      leaf description {
        type community-description;
        description
          "Description for the community";
      }
      leaf global-admin {
        type inet:as-number;
        mandatory true;
        description
          "Global Administrator field";
      }
      container local-data-part-1 {
        description
          "Local Data Part 1 Field";
        leaf format {
          type local-admin-format;
          default "decimal";
          description
            "Format used for parsing Local Data Part 1 subfields";
        }
        uses local-admin-fields;
      }
      container local-data-part-2 {
        description
          "Local Data Part 2 Field";
        leaf format {
          type local-admin-format;
          default "decimal";
          description
            "Format used for parsing Local Data Part 2 subfields";
```

```
        }
        uses local-admin-fields;
      }
      reference
        "RFC 8092: BGP Large Communities Attribute";
    }

    container bgp-communities {
      config false;
      description
        "A community set";
      leaf serial {
        type uint32;
        must ". > 0" {
          error-message "serial must not be 0";
        }
        description
          "Version number of the community set.  This value wraps and
           should be compared using sequence space arithmetic.
           Publishing implementations are free to decide how to
           generate this value.  One example method is to use the
           YYYYMMDDnn syntax as commonly used inside the DNS.";
        reference
          "RFC 1912: Common DNS Operational and Configuration Errors";
      }
      leaf autonomous-system-id {
        type inet:as-number;
        description
          "Autonomous System authoritative for the community set";
      }
      leaf uri {
        type inet:uri;
        description
          "Publication point for the community set";
      }
      leaf description {
        type string {
          length "1..65535";
        }
        description
          "A description for the community set";
      }
      leaf contact-url {
        type inet:uri;
        description
          "A reference to a webpage with maintainer contact
           information";
      }
```

```
      list contact {
        key "email-address";
        description
          "A list of contacts for the community set maintainer(s)";
        uses maintainer-contact;
      }
      list regular {
        must
          "(./global-admin = ../autonomous-system-id) or
           (./global-admin >= 64512 and ./global-admin <= 65534)" {
            error-message
              "global-admin must be private ASN or match
               autonomous-system-id";
        }
        key "name";
        ordered-by user;
        description
          "A list of objects describing RFC 1997 BGP Communities";
        uses regular-community;
      }
      list extended {
        must
          "(./asn = ../autonomous-system-id) or
           (./asn4 = ../autonomous-system-id) or
           (./asn >= 64512 and ./asn <= 65534) or
           (./asn4 >= 4200000000 and ./asn4 <= 4294967294)" {
          error-message
            "global-admin must be private ASN or match
             autonomous-system-id";
        }
        key "name";
        ordered-by user;
        description
          "A list of objects describing RFC 4360 Extended BGP
           Communities.  Two-Octet and Four-Octet AS Specific
           communities are supported by this model.";
        uses extended-community;
      }
      list large {
        must
          "(./global-admin = ../autonomous-system-id) or
           (./global-admin >= 64512 and ./global-admin <= 65534) or
           (./global-admin >= 4200000000 and
            ./global-admin <= 4294967294)" {
          error-message
            "global-admin must be private ASN or match
             autonomous-system-id";
        }
```

```
        key "name";
        ordered-by user;
        description
          "A list of objects describing RFC 8092 Large BGP
           Communities";
        uses large-community;
      }
    }
  }
  <CODE ENDS>
```

6. Augmentation Module

This section contains a YANG module defining augmentations for the "ietf-bgp" YANG module. It can be used to annotate BGP communities in a BGP RIB.

<CODE BEGINS> file "ietf-bgp-communities-annotate@2026-04-14.yang"

```
module ietf-bgp-communities-annotate {
  yang-version 1.1;
  namespace
    "urn:ietf:params:xml:ns:yang:ietf-bgp-communities-annotate";
  prefix bgp-comm-an;

  import ietf-bgp-communities {
    prefix bgp-comm;
    reference
      "draft-ietf-grow-yang-bgp-communities-08: A YANG Data
       Model for BGP Communities";
  }
  import ietf-routing {
    prefix rt;
    reference
      "RFC 8349: A YANG Data Model for Routing Management
       (NMDA Version).";
  }
  import ietf-bgp {
    prefix bgp;
    reference
      "draft-ietf-idr-bgp-model-19: YANG Model for Border
       Gateway Protocol (BGP-4)";
  }

  organization
    "IETF GROW Working Group";
  contact
    "WG Web:   <https://datatracker.ietf.org/wg/grow/>
```

```
        WG List:  <mailto:grow@ietf.org>

        Author:   Martin Pels
          <mailto:mpels@ripe.net>";
      description
        "This module augments the ietf-bgp module with support for
        community annotations.

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        authors of the code.  All rights reserved.

        Redistribution and use in source and binary forms, with or
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        (https://trustee.ietf.org/license-info).

        This version of this YANG module is part of RFC YYYY; 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.";

      // RFC-EDITOR: please update YYYY with this RFC ID

      revision 2026-04-14 {
        description
          "Initial revision.";
        reference
          "RFC YYYY: A YANG Data Model for BGP Communities
           RFC-EDITOR: please update YYYY with this RFC ID";
      }

      augment "/rt:routing/rt:control-plane-protocols/"
            + "rt:control-plane-protocol/bgp:bgp/bgp:rib/"
            + "bgp:communities/bgp:community" {
        description
          "Augments a Regular BGP community from the
           ietf-bgp module with an optional annotation.";
        container annotation {
          presence "true";
          description
            "The presence of this container indicates
             that a community definition is available";
```

```
        uses bgp-comm:regular-community;
      }
    }

    augment "/rt:routing/rt:control-plane-protocols/"
          + "rt:control-plane-protocol/bgp:bgp/bgp:rib/"
          + "bgp:ext-communities/bgp:ext-community" {
      description
        "Augments an Extended BGP community from the
         ietf-bgp module with an optional annotation.";
      container annotation {
        presence "true";
        description
          "The presence of this container indicates
           that a community definition is available";
        uses bgp-comm:extended-community;
      }
    }

    augment "/rt:routing/rt:control-plane-protocols/"
          + "rt:control-plane-protocol/bgp:bgp/bgp:rib/"
          + "bgp:large-communities/bgp:large-community" {
      description
        "Augments a Large BGP community from the
         ietf-bgp module with an optional annotation.";
      container annotation {
        presence "true";
        description
          "The presence of this container indicates
           that a community definition is available";
        uses bgp-comm:large-community;
      }
    }
  }
  <CODE ENDS>
```

7. Operational guidelines

7.1. Publishing guidelines

Operators SHOULD only publish BGP community definitions for networks they control. This may include communities where the Global Administrator field contains a private ASN, if this community has a local meaning inside the network of the publisher.

When publishing community definitions with overlapping field patterns, these definitions MUST be ordered from most to least preferred. This ensures parsers can perform deterministic matching

(see Section 7.2). For example, a definition for a single community "64500:123" needs to be specified before a definition that matches a covering range of communities "64500:*".

7.2. Parsing guidelines

A published BGP community definition can be used by parsers to display information about a received community. If a received community matches multiple published community definitions, the first matching definition in the published order takes precedence.

Parsers that use published community definitions from multiple operators SHOULD NOT attempt to match received communities where the Global Administrator field contains a private ASN, unless they have some method to determine which published definition is the authoritative one.

By default, communities are compared using the decimal representation of the fields. If "format" for a Local Administrator or Local Data Part is set to "binary", the fields in the received community are converted to strings of zeros and ones before comparison.

See Section 11.2 for security considerations when parsing community definitions.

8. RPKI-based Community Definition References

Autonomous System operators MAY publish the location of JSON encoded community definitions through the Resource Public Key Infrastructure (RPKI) [RFC6480]. This section defines a Cryptographic Message Syntax (CMS) [RFC5652] protected content type, termed a Community Definition Reference (CDR), to facilitate discovery of online publication locations of BGP community definitions.

8.1. ASN.1 Notation

The eContent of a Community Definition Reference is formally defined using ASN.1 ([X.680]) as follows:

```
RPKI-CDR-2026
  { iso(1) member-body(2) us(840) rsadsi(113549) pkcs(1)
     pkcs-9(9) smime(16) modules(0) id-mod-rpki-cdr-2026(TBD1) }

DEFINITIONS EXPLICIT TAGS ::=
BEGIN

IMPORTS
  CONTENT-TYPE
  FROM CryptographicMessageSyntax-2010 -- From [RFC6268]
    { iso(1) member-body(2) us(840) rsadsi(113549) pkcs(1)
       pkcs-9(9) smime(16) modules(0) id-mod-cms-2009(58) }

  AccessDescription
  FROM PKIX1Implicit-2009 -- From [RFC5912]
    { iso(1) identified-organization(3) dod(6) internet(1)
      security(5) mechanisms(5) pkix(7) id-mod(0)
      id-mod-pkix1-implicit-02(59) } ;

id-ct-CDR OBJECT IDENTIFIER ::=
  { iso(1) member-body(2) us(840) rsadsi(113549) pkcs(1)
    pkcs-9(9) id-smime(16) id-ct(1) CDR(TBD2) }

ct-CDR CONTENT-TYPE ::=
  { TYPE CommunityDefinitionReference IDENTIFIED BY id-ct-CDR }

CommunityDefinitionReference ::= SEQUENCE {
  version       [0] INTEGER DEFAULT 0,
  asID              INTEGER (1..4294967295),
  yangRevision      IA5String (SIZE(10)) DEFAULT YangRevision,
  location          AccessDescription }

YangRevision IA5String ::= "2026-01-05" -- From [RFCYYYY]

END
```

8.1.1. version

The version field contains the format version for the CommunityDefinitionReference structure, in this version of the specification it MUST be 0.

8.1.2. asID

The asID field contains a positive integer that represents the Autonomous System number of the authorizing entity.

Consumers of the JSON encoded community definition referenced in Section 8.1.4 MUST check that the ASN contained in the asID field of the eContent matches the ASN value in the autonomous-system-id leaf of the community definition.

8.1.3. yangRevision

The yangRevision field contains the revision identifier for the applicable YANG model, in this version of the specification it MUST be 2026-01-05.

8.1.4. location

The location field contains an instance of AccessDescription with an accessMethod of id-ad-communityDefinition and an accessLocation which MUST be an HTTPS Uniform Resource Identifier (URI) as defined in [RFC9110] that points to the JSON encoded BGP community definition for the Autonomous System identified in the asID field.

Consumers of the community definition MUST check that the URI contained in the accessLocation of the eContent exactly matches the URI contained in the uri leaf of the community definition.

8.2. CDR publication guidelines

To avoid proliferation of CDRs in RPKI repositories, Certification Authorities (CAs) SHOULD maintain a single CDR object for a given Autonomous System for each YANG model revision supported by the CA. RPs SHOULD pass on to consumer applications a deduplicated list of community definition locations annotated with revision identifiers for each Autonomous System. CAs SHOULD anticipate RPs to impose an upper bound on the number of CDRs for a given Autonomous System and that if such thresholds are exceeded, RP implementations will treat all CDR objects related to the AS as invalid, i.e., not emit a partial list of community definition locations.

CAs are RECOMMENDED to generate a new key pair for each new CDR and only sign one CDR with each EE certificate. This type of EE certificate is termed a "one-time-use" EE certificate (see Section 3 of [RFC6487]).

CAs are RECOMMENDED to follow the guidelines for naming CDR objects based on Section 2.2 of [RFC6481], i.e., convert the 160-bit hash of the EE’s public key value into a 27-character string using Base 64 Encoding with the URL and Filename Safe Alphabet (see Section 5 of [RFC4648]). See Section 8.7 of [I-D.ietf-sidrops-publication-server-bcp] for more information and considerations.

8.3. CDR validation guidelines

To validate a CDR, the RPKI Relying Party (RP) MUST perform all the validation checks specified in [RFC6488] as well as the following additional CDR-specific validation steps:

* The Autonomous System Identifier Delegation Extension [RFC3779] MUST be present in the end-entity (EE) certificate (contained within the CDR), and the asID in the CDR eContent MUST match the ASId specified by the EE certificate’s Autonomous System Identifier Delegation Extension.

* The Autonomous System Identifier Delegation Extension MUST contain exactly one "id" element (Section 3.2.3.6 of [RFC3779]) and MUST NOT contain any "inherit" elements (Section 3.2.3.3 of [RFC3779]) or "range" elements (Section 3.2.3.7 of [RFC3779]).

* The IP Address Delegation Extension [RFC3779] MUST be absent.

9. IANA considerations

9.1. YANG Namespace Registration

This document registers the following XML namespace URN in the "IETF XML Registry", following the format defined in [RFC3688]:

URI: urn:ietf:params:xml:ns:yang:ietf-bgp-communities
Registrant Contact: The IESG.
XML: N/A, the requested URI is an XML namespace.

9.2. YANG Module Registration

This document registers the following YANG module in the "YANG Module Names" registry [RFC6020]:

Name: ietf-bgp-communities
Maintained by IANA? N
Namespace: urn:ietf:params:xml:ns:yang:ietf-bgp-communities
Prefix: bgp-comm
Reference: RFCYYYY

9.3. YANG SID Allocation

This document registers the following entry in the "IETF YANG SID" registry [RFC9595]:

SID range entry point: TBD
SID range size: 100
YANG module name: ietf-bgp-communities
Reference: RFCYYYY

9.4. RPKI Identifiers

9.4.1. SMI Security for S/MIME Module Identifier registry

This document registers the following entry in the "SMI Security for S/MIME Module Identifier (1.2.840.113549.1.9.16.0)" registry [RFC7107]:

Decimal	Description	Specification
TBD1	RPKI-CDR-2026	RFCYYYY

Table 1: SMI Security for S/MIME Module Identifier

9.4.2. SMI Security for S/MIME CMS Content Type registry

This document registers the following entry in the "SMI Security for S/MIME CMS Content Type (1.2.840.113549.1.9.16.1)" registry [RFC7107]:

Decimal	Description	Specification
TBD2	id-ct-CDR	RFCYYYY

Table 2: SMI Security for S/MIME CMS Content Type

9.4.3. SMI Security for PKIX Access Descriptor

This document registers the following entry in the "SMI Security for PKIX Access Descriptor" registry [RFC7299]:

Decimal	Description	Specification
TBD3	id-ad-communityDefinition	RFCYYYY

Table 3: SMI Security for PKIX Access Descriptor

9.4.4. RPKI Signed Object registry

This document registers the following entry in the "RPKI Signed Object" registry [RFC6488]:

Name	OID	Specification
Community Definition Reference	1.2.840.113549.1.9.16.1.TBD2	RFCYYYY

Table 4: RPKI Signed Object

9.4.5. RPKI Repository Name Scheme registry

This document registers the following entry in the "RPKI Repository Name Scheme" registry [RFC6481]:

Filename Extension	RPKI Object	Reference
.cdr	Community Definition Reference	RFCYYYY

Table 5: RPKI Repository Name Scheme

9.4.6. Media Type registry

This document registers the the media type application/rpki-cdr in the "Media Type" registry [RFC6838]:

```
Type name: application
Subtype name: rpki-cdr
Required parameters: N/A
Optional parameters: N/A
Encoding considerations: binary
Security considerations: Carries an RPKI CDR [RFCYYYY].
    This media type contains no active content. See
    Section XYZ of [RFCYYYY] for further information.
Interoperability considerations: None
Published specification: [RFCYYYY]
Applications that use this media type: RPKI operators
Additional information:
  Content: This media type is a signed object, as defined
      in [RFC6488], which contains as payload a reference
      to an online publication of a Community Definition
      as defined in [RFCYYYY].
  Magic number(s): None
  File extension(s): .cdr
  Macintosh file type code(s):
Person & email address to contact for further information:
  Job Snijders <job@bsd.nl>
Intended usage: COMMON
Restrictions on usage: None
Change controller: IETF
```

10. Implementation status

This section records the status of known implementations of the protocol defined by this specification at the time of posting of this Internet-Draft, and is based on a proposal described in [RFC7942]. The description of implementations in this section is intended to assist the IETF in its decision processes in progressing drafts to RFCs. Please note that the listing of any individual implementation here does not imply endorsement by the IETF. Furthermore, no effort has been spent to verify the information presented here that was supplied by IETF contributors. This is not intended as, and must not be construed to be, a catalog of available implementations or their features. Readers are advised to note that other implementations may exist.

According to [RFC7942], "this will allow reviewers and working groups to assign due consideration to documents that have the benefit of running code, which may serve as evidence of valuable experimentation and feedback that have made the implemented protocols more mature. It is up to the individual working groups to use this information as they see fit".

10.1. Publishing implementations

The following networks are known to publish BGP community definitions according to this specification.

ASN	Publication URI	YANG model revision
197000	as197000.json (https://web.admindns.ripe.net/draft-ietf-grow-yang-bgp-communities/as197000.json)	2026-01-05
25152	as25152.json (https://web.admindns.ripe.net/draft-ietf-grow-yang-bgp-communities/as25152.json)	2026-01-05

Table 6: Publishing implementations

10.2. Parser implementations

The following known parser implementations exist.

Name	YANG model revision
NLNOG Looking Glass (https://github.com/NLNOG/lg.ring.nlnog.net/)	2025-07-04

Table 7: Parser implementations

10.3. CDR implementations

No Community Definition Reference implementations are known at this time.

11. Security considerations

11.1. Publishing considerations

This section is modeled after the template described in Section 3.7.1 of [RFC9907].

The "ietf-bgp-communities" YANG module defines a data model that is designed to be accessed via YANG-based management protocols, such as the Network Configuration Protocol (NETCONF) [RFC6241] and RESTCONF [RFC8040]. These YANG-based management protocols (1) have to use a secure transport layer (e.g., Secure Shell (SSH) [RFC4252], TLS [RFC8446], and QUIC [RFC9000]) and (2) have to use mutual authentication.

The Network Configuration Access Control Model (NACM) [RFC8341] provides the means to restrict access for particular NETCONF or RESTCONF users to a preconfigured subset of all available NETCONF or RESTCONF protocol operations and content.

There are no data nodes defined in this YANG module that are writable/creatable/deletable.

Some of the readable data nodes in this YANG module may be considered sensitive or vulnerable in some network environments. Specifically, the following subtrees and data nodes have particular sensitivities/ vulnerabilities:

* bgp-communities/contact/email-address

* bgp-communities/contact/name

Disclosing this information may be misused, e.g., for tracking and data correlation. Publishers MUST NOT populate these elements with Personally Identifiable Information (PII). For example, these elements may be set with information that refers to generic contact information, not pointing to specific individuals.

11.2. Parsing considerations

The YANG module described in this document may be used to specify BGP community definitions in different serialization formats, such as XML, JSON or CBOR. Applications that parse these community definitions SHOULD reject objects that do not conform to the YANG model. Furthermore, parsers SHOULD check that the sum of the specified Local Administrator or Local Data Part field lengths in each community definition does not exceed the local part size of the specified community type. For example, a Regular BGP community definition with format "decimal" containing a field of length 4 and a field of length 2 would be illegal, as the Local Administrator field has a maximum length of 65535 (5 digits).

The "bgp-communities/contact-url" element may contain a link to an untrusted webpage. Parsers MAY opt to render the URL as plain text rather than a clickable link, to prevent inadvertent exposure of information by users of the rendered output.

Several elements with the "string" data type may be used to display information in a web page or application. Parsers should take care that the appropriate escaping is performed to protect against cross-site scripting attacks.

11.3. CDR considerations

Operators publishing CDRs in the RPKI MUST specify an accessLocation that points to a web object under their own control.

Applications retrieving the location of community definitions through the RPKI MUST perform all checks specified in Section 8.1 and Section 8.3. When downloading a definition from this location via HTTPS, applications MUST perform HTTPS (TLS) validation.

12. Normative References

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Appendix A. JSON Examples

This section shows example use cases for the YANG module defined in this document, using JSON encoding (see [RFC7951]). The examples contain long lines that may be folded, as described in [RFC8792].

A.1. RFC8195 Selective NO_EXPORT definition

A JSON definition for the example Large BGP community described in Section 4.1.1 of [RFC8195] looks as follows.

```
   =============== NOTE: '\' line wrapping per RFC 8792 ================

   {
     "ietf-bgp-communities:bgp-communities": {
       "autonomous-system-id": 64497,
       "serial": 2023080101,
       "uri": "http://example.net/peering/communities",
       "description": "BGP Community example for ASN-Based Selective \
   NO_EXPORT",
       "contact": [
         {
           "email-address": "noc@example.net",
           "name": "Example.net contact",
           "role": "Administrative contact",
           "organization": "Example.net",
           "organizational-unit": "NOC"
         }
       ],
       "large": [
         {
           "name": "RFC8195-NOEXPORT-ASN",
           "category": "action",
           "description": "Do not export route to ASN",
           "global-admin": 64497,
           "local-data-part-1": {
             "field": [
               {
                 "name": "Function",
                 "pattern": "4",
                 "description": "ASN-No-Export"
               }
             ]
           },
           "local-data-part-2": {
             "field": [
               {
                 "name": "ASN",
                 "pattern": ".*",
                 "description": "*"
               }
             ]
           }
         }
       ]
     }
   }
```

A.2. RFC4384 Data Collection definition

A JSON definition for the example Regular and Extended BGP communities described in Section 4 of [RFC4384] looks as follows.

```
=============== NOTE: '\' line wrapping per RFC 8792 ================

{
  "ietf-bgp-communities:bgp-communities": {
    "autonomous-system-id": 10876,
    "serial": 2023080101,
    "uri": "http://example.net/peering/communities",
    "description": "BGP Community example for Data Collection",
    "contact-url": "https://example.net/contact",
    "regular": [
      {
        "name": "RFC4384-REGULAR-ORIGIN-OC/FJ",
        "description": "A national route over a terrestrial link \
from the Fiji Islands",
        "global-admin": 10876,
        "local-admin": {
          "format": "binary",
          "field": [
            {
              "name": "Region",
              "length": 5,
              "pattern": "00010",
              "description": "OC"
            },
            {
              "name": "Satellite",
              "length": 1,
              "pattern": "0",
              "description": "*"
            },
            {
              "name": "Country",
              "length": 10,
              "pattern": "0011110010",
              "description": "FJ"
            }
          ]
        }
      }
    ],
    "extended": [
      {
        "name": "RFC4384-EXTENDED-ORIGIN-OC/FJ",
```

```
          "description": "A national route over a terrestrial link \
   from the Fiji Islands",
          "type": 0,
          "subtype": 8,
          "asn": 10876,
          "local-admin": {
            "format": "binary",
            "field": [
              {
                "name": "Reserved",
                "length": 16,
                "pattern": "0000000000000000"
              },
              {
                "name": "Region",
                "length": 5,
                "pattern": "00010",
                "description": "OC"
              },
              {
                "name": "Satellite",
                "length": 1,
                "pattern": "0",
                "description": "*"
              },
              {
                "name": "Country",
                "length": 10,
                "pattern": "0011110010",
                "description": "FJ"
              }
            ]
          }
        }
      ]
    }
  }
```

Appendix B. Acknowledgements

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