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YANG-CBOR: Allocating SID ranges for PEN holders
draft-ietf-core-yang-sid-pen-04

Abstract

YANG-CBOR (RFC 9254) defines YANG Schema Item iDentifiers (YANG SID), globally unique 63-bit unsigned integers used to identify YANG items. RFC 9595 defines ways to allocate these SIDs on the basis of IANA registries.

The present specification employs these SID allocation mechanisms to allocate ranges with 100 000 63-bit SIDs each for each of the first 1 000 000 holders of IANA-registered Private Enterprise Numbers (PENs), as well as ranges with 10 000 32-bit SIDs each for each of the first 100 000 holders.

// The present revision 04 is intended to address the feedback from
// the AD review and the IETF last call. Note that due to a
// regression in the bib.ietf.org service (https://github.com/ietf-
// tools/bibxml-service/issues/489 (https://github.com/ietf-tools/
// bibxml-service/issues/489)), the reference
// [IANA.enterprise-numbers] may come out as "*** BROKEN REFERENCE
// ***" in some CI systems; this will certainly be fixed in the
// course of further processing.

About This Document

This note is to be removed before publishing as an RFC.

Status information for this document may be found at https://datatracker.ietf.org/doc/draft-ietf-core-yang-sid-pen/.

Discussion of this document takes place on the CoRE Working Group mailing list (mailto:core@ietf.org), which is archived at https://mailarchive.ietf.org/arch/browse/core/. Subscribe at https://www.ietf.org/mailman/listinfo/core/.

Source for this draft and an issue tracker can be found at https://github.com/core-wg/sid-pen.

Status of This Memo

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1. Introduction

YANG-CBOR [RFC9254] defines YANG Schema Item iDentifiers (YANG SID), globally unique 63-bit unsigned integers used to identify YANG items. [RFC9595] defines ways to allocate these SIDs on the basis of IANA registries.

The present specification employs these SID allocation mechanisms to allocate ranges with 100 000 63-bit SIDs each for each of the first 1 000 000 holders of IANA-registered Private Enterprise Numbers (PENs), as well as ranges with 10 000 32-bit SIDs each for each of the first 100 000 holders.

IANA [is requested to allocate/has allocated] a mega-range with 100 billion 63-bit SIDs, for the SID numbers 300 000 000 000 to 399 999 999 999.

IANA also [is requested to allocate/has allocated] a mega-range with 1 billion 32-bit SIDs, for the SID numbers 3 000 000 000 to 3 999 999 999.

Private Enterprise Numbers (PENs) are registered in [IANA.enterprise-numbers] in a low-threshold, low-overhead registration process. At the time of writing (~ 37 years after creating this registry), around 65000 PENs are registered. In this document, the registrant for a PEN is referred to as the "PEN holder".

The present specification makes the following SID ranges available to certain (current or future) PEN holders for allocation in a scheme defined by the holder:

* The holder of a PEN ppp ppp (< 1000000) can use the SID numbers 3pp ppp p00 000 to 3pp ppp p99 999.

* The holder of a PEN pp ppp (< 100000) can use the SID numbers 3 ppp pp0 000 to 3 ppp pp9 999.

2. Example

The Department for Mathematics and Computer Science of Universitt Bremen holds PEN 30810.

To this PEN holder, the present specification confers control over the SID ranges:

* 3*03 081 0*00 000 up to 3*03 081 0*99 999, and

* 3 *308 10*0 000 up to 3 *308 10*9 999.

(The plaintext form of this document shows "*" characters around the digits conveying the PEN, which are shown in *boldface* in the typographic forms.)

3. Discussion

This allocation provides an extremely-low-threshold (zero-interaction) way for PEN holders to get number space for the YANG SIDs used in their YANG modules. If a PEN is not already available to the entity needing such number space, it can be obtained in a very low-threshold process. Employing this number space is, however, not always the approach to recommend to a module author:

* The larger of the two spaces uses 64-bit numbers. The larger representation size of the absolute value of the SID is of comparatively little consequence due to the delta-encoding used for SIDs in YANG-CBOR.

* For the first 100 000 PEN holders, there also is a smaller space that uses 32-bit numbers. PEN numbers that have access to this space are likely to run out before or around 2040; the expectation is that by that time there will be enough opportunities to request SID ranges within mega-ranges allocated by other registrants that this mechanism is less needed.

* This space has no infrastructure to discover the YANG module behind a SID. Of course, each PEN holder can provide such infrastructure, but even then the problem remains of how to find that infrastructure for a SID. (Search engines may mitigate this somewhat.) On the other hand, in some cases this relative obscurity may be exactly what a PEN holder wants to achieve by using this mechanism.

  If obscurity is not the intention, one or both of the following approaches are encouraged:

  - The PEN holder can provide a public repository where their YANG models can be found alongside the applicable SID files. Such a repository may be easy to set up using a popular git forge such as, at the time of writing, GitHub.

  - Implementations that employ PEN-based SIDs can facilitate information discovery by providing [I-D.ietf-core-yang-library] or another form of YANG library [RFC8525].

Relying on the PEN registry might theoretically trigger a land-grab by prospective writers of YANG modules. However, PENs have been around for decades (see Section 3.1.4 of [RFC1065], which continues to be in force with no technical changes as Section 3.1.4 of RFC 1155 [STD16]), and such a land-grab has not occurred for the other allocations implicitly provided by obtaining a PEN.

4. IANA Considerations

// RFC Ed.: throughout this section, please replace RFC-XXXX with the
// RFC number of this specification and remove this note.

As per Section 6.3 of [RFC9595], in the YANG-SID Mega-Ranges registry within the YANG SIDs registry group, this document allocates two mega-ranges, one with 1 billion SIDs ranging from 3000000000 up to 3999999999 (32-bit representation size), and one with 100 billion SIDs ranging from 300000000000 up to 399999999999 (64-bit representation size), as summarized in Table 1.

Entry Point	Size	Allocation	Org Name	URL
3000000000	1000000000	Private	IANA	https://rfc-editor.org/info/rfcxxxx
300000000000	100000000000	Private	IANA	https://rfc-editor.org/info/rfcxxxx

Table 1: YANG-SID Mega-Range Allocations for use by PEN holders

An additional contact for the allocation is: IETF CORE Working Group (core@ietf.org) or IETF Applications and Real-Time Area (art@ietf.org).

The allocation policy inside the mega-range is "private". The URL is that of the present specification.

The management of the SID block of 100 000 SIDs each, ranging from 3pp ppp p00 000 to 3pp ppp p99 999, is delegated to the PEN holder for PEN ppp ppp (i.e., the PEN holder for ppp ppp controls SID 3pp ppp p00 000 to 3pp ppp p99 999).

Similarly, the management of the SID block of 10 000 SIDs each, ranging from 3 ppp pp0 000 to 3 ppp pp9 999, is delegated to the PEN holder for PEN pp ppp (i.e., the PEN holder for pp ppp controls SID 3 ppp pp0 000 to 3 ppp pp9 999).

Section 6.3.2 of [RFC9595] requires an organization that requests an entry in the "YANG-SID Mega-Ranges" registry to ensure the technical capacity to manage the SID ranges within those mega-ranges for a period of at least 10 years (Private ranges). The individual SID ranges within the mega-ranges allocated in this document are assigned through the registration of PEN numbers. The technical capacity to ensure the sustained operation of the PEN number registry is derived from the demonstrated capacity of IANA to maintain this registry as well as the importance of a functioning PEN number registry in other contexts.

5. Security Considerations

Section 5 (Security Considerations) of [RFC9595] applies, as well as Section 8 (Security Considerations) of [RFC9254]. In particular, the fact that a certain Private Enterprise Number appears in a SID is not an indicator of provenance, i.e., it does not guarantee that the SID or underlying YANG model actually does originate from the holder of that PEN. The requirement to ascertain the authoritative source of this information, as discussed in the above security considerations, remains.

6. References

6.1. Normative References

[IANA.enterprise-numbers]
"*** BROKEN REFERENCE ***".

[RFC9254] Veillette, M., Ed., Petrov, I., Ed., Pelov, A., Bormann, C., and M. Richardson, "Encoding of Data Modeled with YANG in the Concise Binary Object Representation (CBOR)", RFC 9254, DOI 10.17487/RFC9254, July 2022, <https://www.rfc-editor.org/rfc/rfc9254>.

[RFC9595] Veillette, M., Ed., Pelov, A., Ed., Petrov, I., Ed., Bormann, C., and M. Richardson, "YANG Schema Item iDentifier (YANG SID)", RFC 9595, DOI 10.17487/RFC9595, July 2024, <https://www.rfc-editor.org/rfc/rfc9595>.

6.2. Informative References

[I-D.ietf-core-yang-library]
Veillette, M. and I. Petrov, "Constrained YANG Module Library", Work in Progress, Internet-Draft, draft-ietf-core-yang-library-03, 11 January 2021, <https://datatracker.ietf.org/doc/html/draft-ietf-core-yang-library-03>.

[RFC1065] McCloghrie, K. and M. Rose, "Structure and identification of management information for TCP/IP-based internets", RFC 1065, DOI 10.17487/RFC1065, August 1988, <https://www.rfc-editor.org/rfc/rfc1065>.

[RFC8525] Bierman, A., Bjorklund, M., Schoenwaelder, J., Watsen, K., and R. Wilton, "YANG Library", RFC 8525, DOI 10.17487/RFC8525, March 2019, <https://www.rfc-editor.org/rfc/rfc8525>.

[STD16] Internet Standard 16, <https://www.rfc-editor.org/info/std16>.
At the time of writing, this STD comprises the following:

Rose, M. and K. McCloghrie, "Structure and identification of management information for TCP/IP-based internets", STD 16, RFC 1155, DOI 10.17487/RFC1155, May 1990, <https://www.rfc-editor.org/info/rfc1155>.

Rose, M. and K. McCloghrie, "Concise MIB definitions", STD 16, RFC 1212, DOI 10.17487/RFC1212, March 1991, <https://www.rfc-editor.org/info/rfc1212>.

Acknowledgments

This document was inspired by the discussion of the authors of [RFC9254] and [RFC9595] on how to handle Rob Wilton’s feedback.

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