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YANG-CBOR: Allocating SID ranges for PEN holders
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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.

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// The present revision 02 is intended to be ready for Working-  
// Group last call, after addressing a brief discussion of 01 at the  
// 2025-09-24 interim meeting of CoRE WG. 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

This Internet-Draft is submitted in full conformance with the provisions of BCP 78 and BCP 79.

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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. 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.

IANA [is requested to allocate/has allocated] 100 000 mega-ranges, for the SID numbers 300 000 000 000 to 399 999 999 999.

IANA also [is requested to allocate/has allocated] 1000 mega-ranges, 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. We speak of the registrant for a PEN 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 large space uses 64-bit numbers. While this is of relatively little consequence due to the delta-encoding used for SIDs in YANG-CBOR, a few further bytes can be saved by allocating the SIDs in one of the mega-ranges that are specifically allocated by an organization (which, for the first 2000 or so, will lead to 32-bit outer deltas).
- * For the first 100 000 PEN holders, there also is a smaller space that uses 32-bit numbers. This space is likely to run out before or around 2040; the expectation is that by that time there will be enough opportunities to request ranges from a megarange operator that this mechanism is no longer 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 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 hasn't occurred for the other allocations implicitly provided by obtaining a PEN.

4. IANA Considerations

This document allocates 100 000 63-bit and 1000 32-bit SID mega-ranges as per Section 7.4 of [RFC9595].

The 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 blocks of 100 000 SIDs each, 10 such blocks for each mega-range 3nn nnn 000 000, is delegated to the PEN holder for nnn nnx, where x is the sequence number of the SID block in the mega-range (i.e., the PEN holder for nnn nnx controls SID 3nn nnn x00 000 to 3nn nnn x99 999).

Similarly, the management of the SID blocks of 10 000 SIDs each, 100 such blocks for each mega-range 3 nnn 000 000, is delegated to the PEN holder for nn nxx, where x is the sequence number of the SID block in the mega-range (i.e., the PEN holder for nn nxx controls SID 3 nnn xx0 000 to 3 nnn xx9 999).

The technical capacity to ensure the sustained operation of the registry for a period of at least 10 years (as required for registries of class "private") is derived from the capacity of IANA to maintain the PEN number registry.

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]
IANA, "Enterprise Numbers",
<<http://www.iana.org/assignments/enterprise-numbers>>.
- [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>>.

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