

Network Working Group  
Internet-Draft  
Intended status: Informational  
Expires: January 7, 2016

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July 6, 2015

Private Enterprise Number (PEN) practices and Internet Assigned Numbers  
Authority (IANA) registration considerations  
[draft-liang-iana-pen-06](#)

## Abstract

Private Enterprise Numbers (PENs) are a technical protocol parameter frequently assigned for use in the management of network connected equipment or software via SNMP-based network management systems, LDAP, DIAMETER or GSS-API. This document discusses what a Private Enterprise Number (PEN) is, common uses of PENs, and registration procedures for IANA Considerations. The registration procedures include instructions and requirements for obtaining a new Private Enterprise Number, modifying existing numbers, and the removal of existing numbers.

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Table of Contents

- [1.](#) Introduction . . . . . [2](#)
- [2.](#) Introduction to Private Enterprise Numbers . . . . . [3](#)
  - [2.1.](#) Various uses of PENS "in the wild" . . . . . [3](#)
- [3.](#) PEN Assignment . . . . . [5](#)
  - [3.1.](#) Assignment of a New PEN . . . . . [5](#)
  - [3.2.](#) Update of an Assigned PEN . . . . . [7](#)
  - [3.3.](#) Removals of Private Enterprise Numbers . . . . . [8](#)
- [4.](#) Registration in the Private Enterprise Number registry . . . [8](#)
  - [4.1.](#) Registration of PEN . . . . . [8](#)
  - [4.2.](#) Syntax for Private Enterprise Names and PENS . . . . . [9](#)
- [5.](#) Acknowledgements . . . . . [9](#)
- [6.](#) IANA Considerations . . . . . [9](#)
  - [6.1.](#) Historical Assignments . . . . . [10](#)
- [7.](#) Security Considerations . . . . . [10](#)
- [8.](#) References . . . . . [10](#)
  - [8.1.](#) Normative References . . . . . [10](#)
  - [8.2.](#) Informative References . . . . . [11](#)
- Authors' Addresses . . . . . [11](#)

**1. Introduction**

A Private Enterprise Number (also known as a "PEN"), is a non-negative integer, unique within the iso.org.dod.internet.private.enterprise (1.3.6.1.4.1) Object Identifiers (OIDs) subtree of the ISO Object Identifier (OID) hierarchy. This hierarchy, jointly developed by ITU-T and ISO/IEC was developed to name "any type of object, concept or 'thing' with a globally unambiguous name which requires a persistent name" (See <http://www.oid-info.com/#oid>). The sub-tree for which the IETF is the Registration Authority, originally defined in [[RFC1065](#)], is used to allow any entity to obtain a globally unique identifier to reference an organization ("enterprise") in protocols.

To date, the procedures for the assignment of new PENS and the modification of assigned PENS have not been clearly documented. Private Enterprise Numbers are referenced in RFCs [[RFC1157](#)] [[RFC1213](#)]



and [\[RFC2578\]](#). These documents primarily define Simple Network Management Protocol (SNMP), Management Information Base (MIB) and Structure of Management Information (SMI) structures. As such, none of these RFCs clearly describe PENs nor do they define PEN registration procedures.

As a result of the lack of documented process, updates to assigned PENs can be challenging. Given there are no clear registration requirements, it can be difficult to validate change requests, particularly in cases such as updates to organization names or legal ownership, changes to email addresses of the registered PEN owner, etc.

This document introduces PENs, how they are commonly used, and their registration and update procedures.

## **2. Introduction to Private Enterprise Numbers**

PENs are frequently embedded in OIDs (Object Identifiers) , which are most often used in Simple Network Management Protocol (SNMP) Management Information Base (MIB) configurations. However, PENs are not designed to be used exclusively for SNMP purposes, but rather they can be and are used by a variety protocols and Data Manipulation Languages. There is no restriction for using private enterprise numbers for other protocols or data models than SNMP or MIB.

If the OID is only to be used privately, then enterprise numbers are to be used. PEN is a number under the prefix 1.3.6.1.4.1. and PEN appears as follows:

```
Prefix: iso.org.dod.internet.private.enterprise.(Your node)
1.3.6.1.4.1.xxxx
```

IANA only manages and maintain this hierarchy tree under the IESG guidelines. There are many other prefixes, such as 2.16.840.1113883, 1.2.840.113549.1.9.16.2.21, etc., under completely different arcs and managed by other repositories (which might or might not be managed by IANA). This document doesn't cover management of these other repositories.

### **2.1. Various uses of PENs "in the wild"**

As some examples documented on Wikipedia, the most common OIDs seen "in the wild" usually belong to the private enterprise numbers allocated by IANA under the 1.3.6.1.4.1 (iso.org.dod.internet.private.enterprise) tree. Increasingly, an OID with health care and public health informatics in the United States is being used. Health Level Seven (HL7), a standards-developing



organization in the area of electronic health care data exchange is an assigning authority at the 2.16.840.1.113883 (joint-iso-itu-t.country.us.organization.hl7) tree.

It is important to note that despite the name PENS do not necessarily represent a manufacturer or Vendor ID. For example they can represent organizations and even independent developers.

The registrant of a Private Enterprise Number can create sub-trees by appending a "." along with unique numbers at the end of their PEN, i.e. to perform its own sub-allocations. For example, for LDAP, the registrant of PEN <PEN> can use:

iso.org.dod.internet.private.enterprise.<PEN>.1 for LDAP Object Classes

iso.org.dod.internet.private.enterprise.<PEN>.2 for LDAP attribute types

iso.org.dod.internet.private.enterprise.<PEN>.3 for LDAP syntaxes

A particular Object class can have OID:

iso.org.dod.internet.private.enterprise.<PEN>.1.100

iso.org.dod.internet.private.enterprise.<PEN>.1.200 for subsidiaries an/or divisions

In general any number of additional levels are permitted, for example:

iso.org.dod.internet.private.enterprise.<PEN>.1.1 can be used as a parent OID for all email related object classes, and

iso.org.dod.internet.private.enterprise.<PEN>.1.2 can be used for web related object classes.

iso.org.dod.internet.private.enterprise.<PEN>.1.3 can be used for instant messaging related object classes, etc.

Below are more example uses of PENS:

Distinguished Names and other components in X.509 certificates;

Various schema elements in X.500/LDAP directories;

GSS-API



extensions to DIAMETER

PA-TNC [[RFC5792](#)] and PB-TNC [[RFC5793](#)]

Important to note that how the numbers are used is up to the various implementers and companies building products. Neither ICANN or the IETF can police how people use the numbers out in the wild. The parties in question should resolve any inappropriate usage among themselves, and ICANN and the IETF have no role in such disputes.

### **3. PEN Assignment**

Assignments of PENs are done by the Internet Assigned Numbers Authority (IANA). This section provides information relating to the assignment of new PENs and the requirements associated with updating already assigned PENs.

#### **3.1. Assignment of a New PEN**

PENs are assigned through a "First Come First Served" registration policy as described in [[RFC5226](#)]. They are assigned sequentially. There is no opportunity to request a particular private enterprise number.

A PEN can be requested by individuals or organizations in order to obtain a unique value for their "enterprise". Requests for new PENs can be submitted via an automated form at IANA.

In order to facilitate appropriate registration, and in particular, subsequent update of an assigned PEN, a small amount of information is required. This information includes the name and contact information of the requesting organization (or individual), the name of the contact person for the PEN, and an e-mail address of the contact.

Historically, users submit a program name, product, project, and random abbreviation as the organization name to when applying for a PEN. This practice is discouraged since multiple programs, product, and/or projects can have their own sub-trees under the PEN assigned to the organization (or individual), thus there is rarely a need for an organization to have multiple IANA-assigned PENs.

Before requesting additional OIDs, IANA encourages the identification of any existing OID assignment(s) to the requesting organization (or individual) and the creation of sub-trees where possible and appropriate. IANA may decline the allocation of new PENs to organizations that have existing registrations unless justification for multiple allocations is provided.





The following information will be requested for a new registration:

Registrant (Company/Organization) Name in ASCII (REQUIRED)

UTF-8 version of the Registrant (Company/Organization) Name (OPTIONAL)

Registrant (Company/Organization) E-mail Address (REQUIRED)

Registrant Postal Address (REQUIRED)

Contact Name (REQUIRED)

Contact E-mail Address (REQUIRED)

Contact Postal Address (OPTIONAL)

Contact Phone Number (OPTIONAL)

Reference (OPTIONAL)

Comments (OPTIONAL)

Registrant (Company/Organization) Name: The name of the organization or individual responsible for the registration of Private Enterprise Number. If the organization is a company, it should be the full legal name including "Inc.", "Ltd.", etc.

UTF-8 version: If a UTF-8 version of the company name is available, the requester can provide the UTF-8 name. This will be listed in the registry.

Registrant (Company/Organization) E-mail Address: An e-mail address belonging to the organization that requests the PEN. This e-mail address will be publicly available in the IANA PEN Registry. The E-mail address should be a valid email address and can be a role account e-mail address.

Registrant Postal Address: The postal address/location of the organization/individual requesting the PEN. This information is only used by IANA for verification and will be kept private.

Contact Name: Name of the individual who will be responsible for the PEN on behalf of the company. This Contact person is authorized to submit changes on behalf of the Registrant (Company/Organization) described above.



**Contact E-Mail Address:** The e-mail address of the individual responsible for the PEN. The e-mail address must be one the Contact person can email confirmation from. This e-mail address will be publicly available in the IANA PEN Registry. The Contact E-mail Address can be the same one as the Registrant's E-mail address.

**Contact Postal Address:** The full postal address of the individual responsible the PEN, including state/province, zip/postal code, country, etc.

**Contact Phone:** The telephone number (with extension where appropriate) of the individual responsible for the PEN, including country code.

**Reference:** A document associated with the implementation of the OID can be referenced with the registration.

**Comments:** This field will contain the old Registrant/Company Name associated with a PEN if applicable.

It is recommended that a single PEN is granted per organization. IANA does not expect to allocate additional PENs to the same Registrants (Companies/Organizations) that have existing PEN records listed in the IANA PEN registry.

### **3.2. Update of an Assigned PEN**

When a Company/Organization has been merged or acquired by another enterprise, the Registrant (Company/Organization) Name can be annotated in the registry. IANA will verify the requested changes, and, if it deems to be necessary, official letters from the existing owner might be required. It is not guarantee that the request will be granted if IANA does not have sufficient information to verify the changes, or if there is legacy use of the PEN out in the wild.

All information associated with existing PEN records, excluding the Registrant (Company/Organization) Name, shall be updated if the information is obsoleted. (See the preceding section to update the Registrant (Company/Organization) Name.) A request to update Contact information associated with an existing PEN record shall be submitted via an automated form at IANA. Requests can only be fulfilled upon verification by IANA and/or subject matter experts. Additional documentations will be required if it deems to be necessary to validate the request.

A change to the Contact Name of existing PEN records can be made to IANA in case of personnel changes, change of employment, acquisitions, etc. It would be ideal that new requests shall be



completed by the existing Contacts for the PEN records. E-mail verifications of the requested changes are required. Alternatively, supplemental documentations and/or letters issued by the Company/Organization (Registrant Name) will be required if E-mail verifications cannot be fulfilled and if it deems to be necessary.

### **3.3. Removals of Private Enterprise Numbers**

Such request does not happen often and regularly.

Considering the fact that there might be legacy uses of any existing allocation, registrations SHOULD NOT be removed.

A Contact Name can request to remove the corresponding Contact information if the company is no longer in operation, the Contact does not wish to be listed in the IANA PEN registry and if the PEN is no longer believed to be in use. The Modification procedure described above SHOULD be followed.

Requests can only be fulfilled upon verification by IANA and/or subject matter experts if it deems to be necessary.

IF the removal request is honoured, the entry is marked as "Unassigned" and annotated as "returned on yyyy-mm-dd by xxxxxxx". A future update to this document can allow IANA to reallocate such returned PEN, however this document doesn't allow for that.

## **4. Registration in the Private Enterprise Number registry**

### **4.1. Registration of PEN**

The registry table consists of a list of the following properties:

PEN number

Registrant (Company/Organization) Name (in ASCII)

UTF-8 version of the Registrant (Company/Organization) Name

Registrant (Company/Organization) E-mail Address (REQUIRED)

Contact Name

Contact E-mail Address

Date Assigned

Date Modified



## Reference

## Comments

NOTE: See [Section 3.1](#) for definition of these properties.

o Values marked as "Reserved" (excluding value zero) in the registry can not be reassigned to a new company or individual without consulting IESG (or expert(s) designated by IESG). Reserved entries mark entries with unclear ownership.

o Value "Unassigned" SHOULD NOT be re-assigned unless specified otherwise, i.e. when the available pool of PENS runs out.

### **4.2. Syntax for Private Enterprise Names and PENS**

o UTF-8 Names of Private Enterprises MUST satisfy the requirements of the NicknameFreeformClass [[I-D.ietf-precis-nickname](#)]. ( Basically, this means that all ASCII letters, ASCII digits, ASCII punctuation characters, Unicode symbols are allowed.)

o Names of Private Enterprises MUST NOT begin or end with a hyphen

o Maximum value for PENS is hereby defined within  $2^{32}-1$  with 0 and 0xFFFFFFFF (in hex) marked as Reserved. (Note that while the original PEN definition has no upper bound, this document defines the upper bound, because some protocol make assumptions about how big PENS can be. For example, DIAMETER [[RFC3588](#)] assumes that this value is no bigger than  $2^{32}-1$ .)

### **5. Acknowledgements**

The authors would like to thank Dan Romascanu, Michelle Cotton, and Bert Wijnen for their contributions to this document.

### **6. IANA Considerations**

This document requests IANA to update the PEN online template forms both NEW and Modification as defined in sections [Section 3.1](#) and [Section 3.2](#).

The PEN registry should be updated to include the information as defined in [Section 4.1](#).





## **6.1. Historical Assignments**

This document will correct the missing historical assignments that predates ICANN's management of the existing registry. These entries will be marked as "Reserved" and annotated as "Returned on yyyy-mm-dd" in the registry. These numbers MAY be re-assigned when the available pool of PENs runs out upon instructions from IESG (or IESG assigned expert(s)).

2187, 2188, 3513, 4164, 4565, 4600, 4913, 4999, 5099, 5144, 5201, 5683, 5777, 6260, 6619, 14827, 16739, 26975

The range from 11670 to 11769

## **7. Security Considerations**

See the Security Considerations section in [BCP 26 \[RFC5226\]](#), and note that improper definition and application of IANA registration policies can introduce both interoperability and security issues. It is critical that registration policies be considered carefully and separately for each registry. Overly restrictive policies can result in the lack of registration of code points and parameters that need to be registered, while overly permissive policies can result in inappropriate registrations. Striking the right balance is an important part of document development.

As mentioned in a preceding section, given there are no clear registration requirements in the past, only limited information is recorded, significant out-of-date information is listed in the registry, and there is no strong authentication mechanism in place, the implications (if any) of the theft of PENs is possible. There is a possibility that the registration data can be transferred to someone else unintentionally.

## **8. References**

### **8.1. Normative References**

[I-D.ietf-precis-nickname]

Saint-Andre, P., "Preparation and Comparison of Nicknames", [draft-ietf-precis-nickname-09](#) (work in progress), January 2014.

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.



- [RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", [BCP 26](#), [RFC 5226](#), May 2008.

## **8.2. Informative References**

- [RFC1065] Rose, M. and K. McCloghrie, "Structure and identification of management information for TCP/IP-based internets", [RFC 1065](#), August 1988.
- [RFC1157] Case, J., Fedor, M., Schoffstall, M., and J. Davin, "Simple Network Management Protocol (SNMP)", STD 15, [RFC 1157](#), May 1990.
- [RFC1213] McCloghrie, K. and M. Rose, "Management Information Base for Network Management of TCP/IP-based internets:MIB-II", STD 17, [RFC 1213](#), March 1991.
- [RFC2578] McCloghrie, K., Ed., Perkins, D., Ed., and J. Schoenwaelder, Ed., "Structure of Management Information Version 2 (SMIV2)", STD 58, [RFC 2578](#), April 1999.
- [RFC3588] Calhoun, P., Loughney, J., Guttman, E., Zorn, G., and J. Arkko, "Diameter Base Protocol", [RFC 3588](#), September 2003.
- [RFC5792] Sangster, P. and K. Narayan, "PA-TNC: A Posture Attribute (PA) Protocol Compatible with Trusted Network Connect (TNC)", [RFC 5792](#), March 2010.
- [RFC5793] Sahita, R., Hanna, S., Hurst, R., and K. Narayan, "PB-TNC: A Posture Broker (PB) Protocol Compatible with Trusted Network Connect (TNC)", [RFC 5793](#), March 2010.

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