

Internet Architecture Board (IAB)  
Request for Comments: 7500  
Category: Informational  
ISSN: 2070-1721

R. Housley, Ed.  
Vigil Security  
O. Kolkman, Ed.  
Internet Society  
April 2015

Principles for Operation of  
Internet Assigned Numbers Authority (IANA) Registries

Abstract

This document provides principles for the operation of Internet Assigned Numbers Authority (IANA) registries.

Status of This Memo

This document is not an Internet Standards Track specification; it is published for informational purposes.

This document is a product of the Internet Architecture Board (IAB) and represents information that the IAB has deemed valuable to provide for permanent record. It represents the consensus of the Internet Architecture Board (IAB). Documents approved for publication by the IAB are not a candidate for any level of Internet Standard; see Section 2 of RFC 5741.

Information about the current status of this document, any errata, and how to provide feedback on it may be obtained at <http://www.rfc-editor.org/info/rfc7500>.

Copyright Notice

Copyright (c) 2015 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust's Legal Provisions Relating to IETF Documents (<http://trustee.ietf.org/license-info>) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document.

## Table of Contents

1. Introduction .....	2
2. Principles for the Operation of IANA Registries .....	3
3. Discussion .....	4
3.1. Ensuring Uniqueness, Stability, and Predictability .....	4
3.2. Public .....	4
3.3. Open and Transparent .....	4
3.4. Accountable .....	5
4. Security Considerations .....	5
5. Informative References .....	6
IAB Members at the Time of Approval .....	7
Contributors and Acknowledgements .....	7
Authors' Addresses .....	7

## 1. Introduction

The Internet Engineering Task Force (IETF) and its predecessors have traditionally separated the publication of protocol specifications in immutable Request for Comments (RFCs) and the registries containing protocol parameters. Traditionally, the registries are maintained by a set of functions known collectively as the Internet Assigned Numbers Authority (IANA). Dating back to the earliest days of the Internet, specification publication and the registry operations were tightly coupled: Jon Postel of the Information Sciences Institute (ISI) of the University of Southern California (USC) was responsible for both RFC publication and IANA registry operation. This tight coupling had advantages, but it was never a requirement. Indeed, today the RFC Editor and IANA registry operation are provided by different entities.

Internet registries are critical to the operation of the Internet, because they provide a definitive record of the value and meaning of identifiers that protocols use when communicating with each other. Almost every Internet protocol makes use of registries in some form. At the time of writing, the IANA maintains more than two thousand protocol parameter registries.

Internet registries hold protocol identifiers consisting of constants and other well-known values used by Internet protocols. These values can be numbers, strings, addresses, and so on. They are uniquely assigned for one particular purpose or use. Identifiers can be maintained in a central list (such as a list of cryptographic algorithms) or they can be hierarchically allocated and assigned by separate entities at different points in the hierarchy (such as IP addresses and domain names). To maximize trust and usefulness of the IANA registries, the principles in this document should be taken into consideration for centralized registries as well as hierarchically

delegated registries. In hierarchically delegated registries, entries nearest to top level have broad scope, but lower-level entries have narrow scope. The Internet Architecture Board (IAB) will encourage support for these principles in all delegations of Internet identifiers.

The registry system is built on trust and mutual cooperation. The use of the registries is voluntary and is not enforced by mandates or certification policies. While the use of registries is voluntary, it is noted that the success of the Internet creates enormous pressure to use Internet protocols and the identifier registries associated with them.

This document provides principles for the operation of IANA registries, ensuring that protocol identifiers have consistent meanings and interpretations across all implementations and deployments, and thus providing the necessary trust in the IANA registries.

## 2. Principles for the Operation of IANA Registries

The following key principles underscore the successful functioning of the IANA registries, and they provide a foundation for trust in those registries:

**Ensure Uniqueness:** The same protocol identifier must not be used for more than one purpose.

**Stable:** Protocol identifier assignment must be lasting.

**Predictable:** The process for making assignments must not include unexpected steps.

**Public:** The protocol identifiers must be made available in well-known locations in a manner that makes them freely available to everyone.

**Open:** The process that sets the policy for protocol identifier assignment and registration must be open to all interested parties.

**Transparent:** The protocol registries and their associated policies should be developed in a transparent manner.

**Accountable:** Registry policy development and registry operations need to be accountable to the affected community.

### 3. Discussion

The principles discussed in Section 2 provide trust and confidence in the IANA registries. This section expands on these principles.

#### 3.1. Ensuring Uniqueness, Stability, and Predictability

Protocol identifier assignment and registration must be unique, stable, and predictable. Developers, vendors, customers, and users depend on the registries for unique protocol identifiers that are assigned in a stable and predictable manner.

A protocol identifier may only be reassigned for a different purpose after due consideration of the impact of such a reassignment, and if possible, with the consent of the original assignee.

Recognizing that some assignments involve judgment, such as those involving a designated expert [RFC5226], a predictable process does not require completion in a predetermined number of days. Rather, it means that no unexpected steps are introduced in the process of making an assignment.

#### 3.2. Public

Once assigned, the protocol identifiers must be made available in a manner that makes them freely available to everyone without restrictions. The use of a consistent publication location builds confidence in the registry. This does not mean that the publication location can never change, but it does mean that it must change infrequently and only after adequate prior notice.

#### 3.3. Open and Transparent

The process that sets the policy for protocol identifier assignment and registration must be open to all interested parties and operate in a transparent manner.

When a registry is established, a policy is set for the addition of new entries and the updating of existing entries. While making additions and modifications, the registry operator may expose instances where policies lack clarity. When this occurs, the registry operator should provide helpful feedback to allow those policies to be improved. In addition, the registry operator not being involved in establishing registry policy avoids the risks associated with (perceptions of) favoritism and unfairness.

Recognizing that some assignments involve judgment, such as those involving a designated expert [RFC5226], the recommendations by designated experts must be visible to the public to the maximum extent possible and subject to challenge or appeal.

### 3.4. Accountable

The process that sets the policy for IANA registries and the operation of the registries must be accountable to the parties that rely on the protocol identifiers. Oversight is needed to ensure these are properly serving the affected community.

In practice, accountability mechanisms for the registry operator may be defined by contract, memoranda of understanding, or service level agreements (SLAs). An oversight body uses these mechanisms to ensure that the registry operator is meeting the needs of the affected community. The oversight body is held accountable to the affected community by vastly different mechanisms, for instance recall and appeal processes.

For protocol parameters [RFC6220], the general oversight of the IANA function is performed by the IAB as a chartered responsibility from [RFC2850]. In addition, the IETF Administrative Oversight Committee (IAOC), a body responsible for IETF administrative and financial matters [BCP101], maintains an SLA with the current registry operator, the Internet Corporation for Assigned names and Numbers (ICANN), thereby specifying the operational requirements with respect to the coordination, maintenance, and publication of the protocol parameter registries. Both the IAB and the IAOC are accountable to the larger Internet community and are being held accountable through the IETF Nomcom process [BCP10].

For the Internet Number Registries [RFC7249], oversight is performed by the Regional Internet Registries (RIRs) as described RFC 7020 [RFC7020]. The RIRs are member-based organizations, and they are accountable to the affected community by elected governance boards. Furthermore, per agreement between the RIRs and ICANN, the policy development for the global IANA number registries is coordinated by a community-elected number council and subject to process review before ratification by the ICANN Board of Trustees [ASOMOU].

## 4. Security Considerations

Internet Registries are critical to elements of Internet security. The principles described in this document are necessary for the Internet community to place trust in the IANA registries.

RFC 7500

TITLE\*

April 2015

## 5. Informative References

- [ASOMOU] ICANN, "ICANN Address Supporting Organization (ASO) MoU", October 2004, <<http://archive.icann.org/en/aso/aso-mou-29oct04.htm>>.
- [BCP10] Kucherawy, M., Ed., "IAB, IESG, and IAOC Selection, Confirmation, and Recall Process: Operation of the Nominating and Recall Committees", BCP 10, RFC 7437, January 2015, <<http://www.rfc-editor.org/info/bcp10>>.
- [BCP101] Austein, R., Ed., and B. Wijnen, Ed., "Structure of the IETF Administrative Support Activity (IASA)", BCP 101, RFC 4071, April 2005.  
  
Carpenter, B., Ed., and L. Lynch, Ed., "BCP 101 Update for IPR Trust", BCP 101, RFC 4371, January 2006.  
  
<<http://www.rfc-editor.org/info/bcp101>>
- [RFC2850] Internet Architecture Board and B. Carpenter, Ed., "Charter of the Internet Architecture Board (IAB)", BCP 39, RFC 2850, May 2000, <<http://www.rfc-editor.org/info/rfc2850>>.
- [RFC2860] Carpenter, B., Baker, F., and M. Roberts, "Memorandum of Understanding Concerning the Technical Work of the Internet Assigned Numbers Authority", RFC 2860, June 2000, <<http://www.rfc-editor.org/info/rfc2860>>.
- [RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an IANA Considerations Section in RFCs", BCP 26, RFC 5226, May 2008, <<http://www.rfc-editor.org/info/rfc5226>>.
- [RFC6220] McPherson, D., Ed., Kolkman, O., Ed., Klensin, J., Ed., Huston, G., Ed., and Internet Architecture Board, "Defining the Role and Function of IETF Protocol Parameter Registry Operators", RFC 6220, April 2011, <<http://www.rfc-editor.org/info/rfc6220>>.
- [RFC7020] Housley, R., Curran, J., Huston, G., and D. Conrad, "The Internet Numbers Registry System", RFC 7020, August 2013, <<http://www.rfc-editor.org/info/rfc7020>>.
- [RFC7249] Housley, R., "Internet Numbers Registries", RFC 7249, May 2014, <<http://www.rfc-editor.org/info/rfc7249>>.

## IAB Members at the Time of Approval

Jari Arkko (IETF Chair)  
 Mary Barnes  
 Marc Blanchet  
 Joel Halpern  
 Ted Hardie  
 Joe Hildebrand  
 Russ Housley  
 Eliot Lear  
 Xing Li  
 Erik Nordmark  
 Andrew Sullivan  
 Dave Thaler  
 Brian Trammell

## Contributors and Acknowledgements

This text has been developed within the IAB IANA Evolution Program. The ideas and many text fragments, and corrections came from or were inspired on comments from: Bernard Aboba, Jaap Akkerhuis, Jari Arkko, Marcelo Bagnulo, Mark Blanchet, Brian Carpenter, David Conrad, Steve Crocker, John Curran, Alissa Cooper, Leslie Daigle, Elise Gerich, John Klensin, Bertrand de La Chapelle, Eliot Lear, Danny McPherson, George Michaelson, Thomas Narten, Andrei Robachevsky, Andrew Sullivan, Dave Thaler, Brian Trammell, and Greg Wood. Further inspiration and input was drawn from various meetings with IETF and other Internet community (RIRs, ISOC, W3C, IETF, and IAB) leadership.

Please do not assume those acknowledged endorse the resulting text.

## Authors' Addresses

Russ Housley  
 918 Spring Knoll Drive  
 Herndon, VA 20170  
 USA  
 EMail: housley@vigilsec.com

Olaf Kolkman  
 Science Park 400  
 Amsterdam 1098 XH  
 The Netherlands  
 EMail: kolkman@isoc.org

