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# Guidelines for Writing an IANA Considerations Section in RFCs
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## Abstract

Many protocols make use of points of extensibility that use constants to identify various protocol parameters. To ensure that the values in these fields do not have conflicting uses and to promote interoperability, their allocations are often coordinated by a central record keeper. For IETF protocols, that role is filled by the Internet Assigned Numbers Authority (IANA).

To make assignments in a given registry prudently, guidance describing the conditions under which new values should be assigned, as well as when and how modifications to existing values can be made, is needed. This document defines a framework for the documentation of these guidelines by specification authors, in order to assure that the provided guidance for the IANA Considerations is clear and addresses the various issues that are likely in the operation of a registry.

This is the fourth edition of this document; it obsoletes RFC 8126.

## 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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This Internet-Draft will expire on 25 August 2026.

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# 1. Introduction

Many protocols make use of points of extensibility that use constants to identify various protocol parameters. To ensure that the values in these fields do not have conflicting uses and to promote interoperability, their allocations are coordinated by a central record keeper known as the Internet Assigned Numbers Authority (IANA) [RFC2860]. The Protocol field in the IP header [RFC0791] and media types [RFC6838] are two examples of such coordination.

In this document, we call the range of possible values for such a field a "namespace". The binding or association of a specific value with a particular purpose within a namespace is called an assignment (or, variously: an assigned number, assigned value, code point, protocol constant, or protocol parameter). The act of assignment is called a registration, and it takes place in the context of a registry. The terms "assignment" and "registration" are used interchangeably throughout this document.

To make assignments in a given namespace prudently, guidance describing the conditions under which new values should be assigned, as well as when and how modifications to existing values can be made, is needed. This document defines a framework for the documentation of these guidelines by specification authors, in order to assure that the guidance for the IANA Considerations is clear and addresses the various issues that are likely in the operation of a registry.

Typically, this information is recorded in a dedicated section of the specification with the title "IANA Considerations".

## 1.1. Keep IANA Considerations for IANA

The purpose of having a dedicated IANA Considerations section is to provide a single place to collect clear and concise information and instructions for IANA. Technical documentation should reside in other parts of the document; the IANA Considerations should refer to these other sections by reference only (as needed). Using the IANA Considerations section as primary technical documentation both hides it from the target audience of the document and interferes with IANA’s review of the actions they need to take.

An ideal IANA Considerations section clearly enumerates and specifies each requested IANA action; includes all information IANA needs, such as the full names of all applicable registries; and includes clear references to elsewhere in the document for other information.

The IANA actions are normally phrased as requests for, or instructions to, IANA (such as, "IANA is asked to assign the value TBD1 from the Frobozz registry..."); the RFC Editor will change those sentences to reflect the actions taken ("IANA has assigned the value 83 from the Frobozz registry...").

### 1.2. For Updated Information

IANA maintains a web page at https://iana.org/help/protocol-registration that includes additional clarification information beyond what is provided here, such as minor updates and summary guidance. Document authors should check that page. Any significant updates to the best current practice will have to feed into updates to BCP 26 (this document), which is definitive.

### 1.3. A Quick Checklist Up Front

It’s useful to be familiar with this document as a whole. But when you return for quick reference, here are checklists for the most common things you’ll need to do and references to help with the less common ones.

In general...

1. Put all the information that IANA will need to know into the "IANA Considerations" section of your document (see Section 1.1).

2. Try to keep that section only for information to IANA and to designated expert reviewers; put significant technical information in the appropriate technical sections of the document (see Section 1.1).

3. Note that the IESG has the authority to resolve issues with IANA registrations (see Section 5.3). If you have any questions or problems, you should consult your document shepherd and/or working group chair, who may ultimately involve an Area Director (see Section 3.3). See Section 12 for more information on IESG responsibilities.

4. Contact IANA if you have any questions about writing an IANA Considerations section. In particular, contact IANA if your document may need special IANA resources such as if IANA would have to host a new type of module, or coordinate with another organization, or process a high volume of registration requests, and so on.

If you are creating a new registry...

1. Give the registry a descriptive name and provide a brief description of its use (see Section 2.2).

2. Identify the registry group that it should be part of (see Section 2.1). Your document might create a new registry group; that would need to be called out separately from the creation of the registries in the group.

3. Clearly specify the information required in order to register new items (see Section 2.2). Be sure to specify data types, lengths, and valid ranges for fields.

4. Specify the initial set of items for the registry, if applicable (see Section 2.2).

5. Make sure the change control policy for the registry is clear to IANA, in case changes to the format or policies need to be made later (see Sections 2.3 and 9.5).

6. Select a registration policy -- or a set of policies -- to use for future registrations (see Section 4, and especially note Sections 4.12 and 4.13).

7. If you’re using a policy that requires a designated expert (Expert Review or Specification Required), understand Section 5 and provide review guidance to the designated expert (see Section 5.3).

8. If any items or ranges in your registry need to be reserved for special use or are otherwise unavailable for assignment, see Section 6.

If you are registering into an existing registry...

1. Clearly identify the registry by its exact name and optionally by its URL (see Section 3.1).

2. If the registry has multiple ranges from which assignments can be made, make it clear which range is requested (see Section 3.1).

3. Unless an early allocation has already been secured, avoid using specific values for numeric or bit assignments, and let IANA pick a suitable value at registration time (see Section 3.1). This will avoid registration conflicts among multiple documents.

4. If you need an early assignment during document development, see [RFC7120]. If the registry does not require RFC publication, you can request values from IANA directly without invoking the process from RFC 7120.

5. For "reference" fields, use the document that provides the best and most current documentation for the item being registered. Include section numbers to make it easier for readers to locate the relevant text (see Sections 3.1 and 7).

6. Use both the IANA website and the registry's reference document(s) to determine what the registry requires so you can accurately provide all the necessary information (see Section 3.1). In particular, documents published after the original one may add fields, change the registration requirements, or other such actions that would affect your registration.

7. Similarly, check for any special registry-specific rules or processes, such as posting to a particular mailing list for comment (see Section 3.1).

8. If the registration policy for the registry does not already dictate the change control policy, make sure to make the change control policy clear, in case the registration needs to be updated or modified later (see Section 9.5).

If you're writing a "bis" document or otherwise making older documents obsolete, see Section 8.

If you need to change the format/contents or policies for an existing registry, see Section 2.4.

If you need to update an existing registration, see Section 3.2.

If you need to close down a registry because it is no longer needed, see Section 9.6.

## 2. Creating and Revising Registries

Defining a registry involves describing the namespaces to be created, listing an initial set of assignments (if applicable), and documenting guidelines on how future assignments are to be made.

When defining a registry, consider structuring the namespace in such a way that only top-level assignments need to be made with central coordination, and those assignments can delegate lower-level assignments so coordination for them can be distributed. This

lessens the burden on IANA for dealing with assignments, and is particularly useful in situations where distributed coordinators have better knowledge of their portion of the namespace and are better suited to handling those assignments.

## 2.1. Organization of Registries

All registries are anchored from the IANA "Protocol Registries" page at https://www.iana.org/protocols. That page lists registries in protocol category groups, placing related registries together and making it easier for users of the registries to find the necessary information. Clicking on the title of one of the registries on the IANA Protocol Registries page will take the reader to the details page for that registry.

Registry A collection of entries whose assigned, available, and/or reserved values are presented in a single table. Entries in the table may also be referred to as "assignments", "allocations" (that is, allocations from a pool of values), or "registrations" (a term that is more commonly applied to strings). Entries consist of at least an identifier and a reference to a specification and/or one or more responsible parties.

Registry group A set of related registries that share a common base URL, with each registry distinguished by a fragment identifier. When creating a registry, document authors must tell IANA which registry group it belongs in, citing the name of the group and the base URL. If no suitable group exists, the document must create one. While most protocols require only a single registry group (which is typically named for the protocol and its abbreviation), multiple groups might be appropriate. Protocol category groups listed in the "Protocol Registries" page typically map to a single registry group, but exceptions are possible.

Subregistry A registry "for" one or more registrations in a parent registry. Examples include "Error Code 1 Subcodes," a subregistry for value 1 ("Common Header Parse Error") in the "GIST Error Codes" registry [RFC5971], and "Code Values for RADIUS Attribute 241.1, Frag-Status" [RFC7499].

In the past, documents have sometimes referred to registry groups as "top-level registries," or referred to the groups as "registries" and called all of the tables within them "subregistries." However, the term "subregistry" is more useful as an indicator of a parent-child relationship between registries, and "top-level registry" suggests a sort of permanence or natural order that doesn’t reflect the fact that working groups can choose to reorganize those groups. With AD

approval, IANA can move registries and expand or delete groups, leaving tombstones and pointers as appropriate. (If one URL replaces another, IANA will make sure the original will always redirect to the new one.)

IANA strongly prefers that the registry of "Foo" types be named simply "Foo Types", rather than "Foo Type Registry". A registry group for the BAR protocol should be named "Beyond All Recognition (BAR)" rather than "BAR Parameters." An exception for the former might be made when, for example, several widely-used unofficial versions of the registry exist outside the IETF. In that case, it might be useful to indicate that the version on the IANA website is the official one.

## 2.2. Documentation Requirements for Registries

Documents that create a new namespace (or modify the definition of an existing space) and that expect IANA to play a role in maintaining that space (serving as a repository for registered values) must provide clear instructions on details of the namespace, either in the IANA Considerations section or referenced from it. In particular, such instructions must include:

The name of the registry group
: When creating a registry, the group that it is a part of must be identified by its full name. See Section 2.1. Providing a URL that precisely identifies that group helps IANA understand the request.

The name of the registry
: This name will appear on the IANA web page and will be referred to in future documents that allocate values from the new space. The full name (which can include an acronym) must be provided; you cannot leave this to IANA to determine.

  It is highly desirable that the name not be easily confused with the name of another registry. IANA’s preferred solution is to use the protocol name as a prefix if possible. Examples of registries that use this naming pattern include "TLS Cipher Suites", "MASQUE URI Suffixes", and "HTTP/2 Settings". Each of these are part of a registry group which has the protocol name in the registry group name.

Size, format, and syntax of registry entries
: What fields to record in the registry, any technical requirements on registry entries (valid ranges for integers, length limitations on strings, and such), and the exact format in which registry

values should be displayed. For numeric assignments, one should specify whether values are to be recorded in decimal, in hexadecimal, or in some other format.

Strings are expected to be ASCII, and it should be clearly specified whether case matters, and whether, for example, strings should be shown in the registry in uppercase or lowercase.

Strings that represent protocol parameters will rarely, if ever, need to contain non-ASCII characters. If non-ASCII characters are really necessary, instructions should make it very clear that they are allowed and that the non-ASCII characters should be represented as Unicode characters using the "(U+XXXX)" convention. Anyone creating such a registry should think carefully about this and consider internationalization advice such as that in [RFC7564], Section 10.

Applicable registration policy
: The policy that will apply to all future requests for registration. See Section 4.

Required information for registrations
: This tells registrants what information they have to include in their registration requests. Some registries require only the requested value and a reference to a document where use of the value is defined. Other registries require a more detailed registration template that describes relevant security considerations, internationalization considerations, and other such information.

When a template is required, consider whether IANA should post every field from the template in the registry, or post only specified fields, or post only specified fields in the registry while also providing a link to the template (typically as a plain-text document) hosted on the IANA website. Examples of the latter approach include the URI scheme [RFC7595] and media type [RFC6838] registries (at the time this document is published).

Initial assignments and reservations
: Any initial assignments or registrations to be included. In addition, any ranges that are to be reserved for "Private Use", "Reserved", "Unassigned", etc. (see Section 6) should be indicated.

If IANA is to assign numeric values, the IANA Considerations section must specify the range of values available for assignment, including the lower and upper bounds. The text should say whether to use decimal, hexadecimal, binary, or octal representation. The representation should be used consistently throughout the registry.

The example below registers a value in an existing registry and creates a subregistry (as defined in Section 2.1) for that value:

```
|  X.  IANA Considerations
|
|  This document registers a DHCP option and creates a subregistry
|  for that option.
|
|  X.1.  FooBar Option
|
|  This document defines a new DHCP option called "FooBar" (see
|  Section y) and assigns a value of TBD1 from the "BOOTP Vendor
|  Extensions and DHCP Options" registry at
|  https://www.iana.org/assignments/bootp-dhcp-parameters
|  [RFC2132] [RFC2939]:
|
|     +======+========+=============+===============+===========+
|     | Tag  | Name   | Data Length | Meaning       | Reference |
|     +======+========+=============+===============+===========+
|     | TBD1 | FooBar | N           | FooBar server | this RFC  |
|     +------+--------+-------------+---------------+-----------+
|
|                              Table 1
|
|  X.2.  DHCP FooBar FooType Value Registry
|
|  The FooBar option (TBD1) also defines an 8-bit FooType field,
|  for which IANA is to create and maintain a new registry titled
|  "DHCP FooBar FooType Values."  This registry will be located in
|  the "Dynamic Host Configuration Protocol (DHCP) and Bootstrap
|  Protocol (BOOTP) Parameters" registry group at
|  https://www.iana.org/assignments/bootp-dhcp-parameters.
|
|  Initial values for the DHCP FooBar FooType registry are given
|  below.  Future assignments are to be made through Expert Review
|  [BCP26].  Assignments consist of a DHCP FooBar FooType name and
|  its associated value.
|
```

| Value | Name | Reference |
|---|---|---|
| 0 | Reserved | RFCXXXX |
| 1 | Frobnitz | RFCXXXX, Section y.1 |
| 2 | NitzFrob | RFCXXXX, Section y.2 |
| 3-254 | Unassigned | |
| 255 | Reserved | RFCXXXX |

Table 2

X.2.1. Guidance for Designated Experts

The designated expert is expected to [...]

For examples of documents that establish registries, consult [RFC9546], [RFC9516], and [RFC9454].

## 2.3. Specifying Change Control for Registries and Registrations

Registry definitions and registrations within registries often need to be changed after they are created. The process of making such changes can be complicated when the registry doesn't identify the party authorized to approve them.

By default, change control for registries and registrations that originate with IETF stream RFCs lies with the IETF, via the IESG. IETF stream registrations that need to populate a registry's "Change Controller" field should name the IETF rather than the IESG, except where the reference document for a registry requires that the IESG be named as the change controller instead (as in the port [RFC6335] and IETF XML [RFC3688] registries, among others).

IANA will add a "Change Controller" field to all registries that don't require an IETF stream RFC for registration (i.e., "First Come First Served", "Expert Review", "Specification Required", and "RFC Required" registries). However, authors can initialize "IETF Review" and "Standards Action" registries with a "Change Controller" field if they anticipate that a future IETF stream document might make an assignment on behalf of another change controller.

All registries created by documents outside of the IETF stream should specify a change controller for the registry itself and instruct IANA to note the identity of that change controller at the top of the registry. Documents that come from the Independent Submissions stream may require special handling; see [RFC8726]. As of this writing, no special instructions have been declared for registries created by other streams.

### 2.4. Revising Existing Registries

Updating the registration process or making changes to the format of an already existing (previously created) registry (whether created explicitly or implicitly) follows a process similar to that used when creating a new registry. That is, a document is produced that makes reference to the existing namespace and then provides detailed guidance for handling assignments in the registry or detailed instructions about the changes required.

If a change requires a new column in the registry, the instructions need to be clear about how to populate that column for the existing registrations. Typically, the document will populate that new column itself. However, if compiling that information at the time of writing is impractical, the document could set a column-specific registration procedure (such as Expert Review) that allows the information to be assembled and provided to IANA after publication. Other changes to the structure of an existing registry may require similar clarity.

Registry modification requires approval from the change controller. Modifying a registry created by an IETF Stream RFC does not automatically require an IETF Stream RFC of the same type (e.g. Standards Track or Informational), although the change controller could choose to require it.

Under some circumstances, such as with a straightforward change that is clearly needed (such as adding a "status" column), or when an earlier error needs to be corrected, the IESG may approve an update to a registry without requiring a new RFC. Example documents that updated the guidelines for assignments in pre-existing registries include: [RFC6195], [RFC6929], and [RFC8615].

## 3. Registering New Values in an Existing Registry

### 3.1. Documentation Requirements for Registrations

Often, documents request an assignment in an existing registry (one created by a previously published document).

Such documents should clearly identify the registry into which each value is to be registered. Use the exact registry name as listed on the IANA web page, and cite the RFC where the registry is defined. When referring to an existing registry, providing a URL to precisely identify the registry is helpful (see Section 2.2).

There is no need to mention what the assignment policy is when making new assignments in existing registries, as that should be clear from the references. However, if multiple assignment policies might apply, as in registries with different ranges that have different policies, it is important to make it clear which range is being requested, so that IANA will know which policy applies and can assign a value in the correct range.

Be sure to provide all the information required for a registration, and follow any special processes that are set out for the registry. Registries sometimes require the completion of a registration template for registration or ask registrants to post their request to a particular mailing list for discussion prior to registration. Look up the registry's reference document: the required information and special processes should be documented there.

Normally, numeric values to be used are chosen by IANA when the document is approved; drafts should not specify final values. Instead, placeholders such as "TBD1" and "TBD2" should be used consistently throughout the document, giving each item to be registered a different placeholder. The RFC Editor will replace the placeholder names with the IANA-assigned values. When drafts need to specify numeric values for testing or early implementations, they will either request early allocation (see Section 3.4) or use values that have already been set aside for testing or experimentation (if the registry in question allows that without explicit assignment). It is important that drafts not declare that specific numeric values will be assigned to them before IANA has actually made the assignments.

If a draft requests a specific value, the fact that the value has not been secured and could be assigned for another purpose before the draft has been approved should be indicated as clearly as possible. For example, if value "5" is preferred, and the value is presented in a table, it should be listed as "5 (suggested)" (Section 14).

Normally, text-string values to be used are specified in the document, as collisions are less likely with text strings. IANA will consult with the authors if there is, in fact, a collision, and a different value has to be used. When drafts need to specify string values for testing or early implementations, they sometimes use the expected final value. But it is often useful to use a draft value

instead, possibly including the draft version number. This allows the early implementations to be distinguished from those implementing the final version. A document that intends to use "foobar" in the final version might use "foobar-testing-draft-05" for the -05 version of the draft, for example.

For some registries, there is a long-standing policy prohibiting assignment of names or codes on a vanity or organization-name basis. For example, codes might always be assigned sequentially unless there is a strong reason for making an exception. Nothing in this document is intended to change those policies or prevent their future application.

As an example, the following text could be used to request assignment of a DHCPv6 option number:

> IANA is asked to assign an option code value of TBD1 to the DNS Recursive Name Server option and an option code value of TBD2 to the Domain Search List option from the DHCP option code space defined in Section 24.3 of RFC 3315.

The IANA Considerations section should summarize all of the IANA actions, with pointers to the relevant sections elsewhere in the document as appropriate. Including section numbers is especially useful when the reference document is large; the section numbers will make it easier for those searching the reference document to find the relevant information.

When multiple values are requested, it is generally helpful to include a summary table of the additions/changes. It is also helpful for this table to be in the same format as it appears or will appear on the IANA web site. For example:

| Value | Description | Reference |
|---|---|---|
| TBD1 | FooBar | this RFC, Section 3.2 |
| TBD2 | Gumbo | this RFC, Section 3.3 |
| TBD3 | Banana | this RFC, Section 3.4 |

Table 3

If the authors feel that including the full table of changes is too verbose or repetitive, authors should still include the table in the draft, but may include a note asking that the table be removed prior to publication of the final RFC.

### 3.2. Updating Existing Registrations

Even after a number has been assigned, some types of registrations contain additional information that may need to be updated over time.

For example, media types and URN namespaces [RFC8141] typically include more information than just the registered value itself, and may need updates to items such as point-of-contact information, security issues, pointers to updates, and literature references.

In such cases, the document defining the namespace must clearly state who is responsible for maintaining and updating a registration. Depending on the registry, it may be appropriate to specify one or more of:

* Letting registrants and/or nominated change controllers update their own registrations, subject to the same constraints and review as with new registrations.

* Allowing attachment of comments to the registration, as with a "Notes" or "Comment" field (Section 13.1.3). This can be useful in cases where others have significant objections to a registration, but the author does not agree to change the registration.

* Designating the IETF (as represented by the IESG), a designated expert, or another entity as having the right to change the registrant associated with a registration and any requirements or conditions on doing so. This ensures that necessary updates can be made even if the original registrant cannot be reached.

Unless otherwise specified, the following will hold true:

* The applicable registration procedure will also serve as the modification procedure.

* Unless the registration was made by an RFC, IANA can confirm and approve requests to update contact and change controller information. However, IANA may request advice from experts or Area Directors.

### 3.3. Overriding Registration Procedures

Experience has shown that the documented IANA considerations for individual protocols do not always adequately cover the reality of registry operation or are not sufficiently clear. In addition, documented IANA considerations are sometimes found to be too stringent to allow even working group documents (for which there is strong consensus) to perform a registration in advance of actual RFC publication.

In order to allow assignments in such cases, the IESG can override registration procedures and approve assignments on a case-by-case basis. The intention here is not to overrule properly documented procedures or to obviate the need for protocols to properly document their IANA considerations. Rather, it is to permit assignments in specific cases where it is obvious that the assignment should just be made, but updating the IANA process beforehand is too onerous.

When the IESG takes such action, this is a strong indicator that the applicable registration procedures should be updated, possibly in parallel with the work that instigated it.

IANA always has the discretion to ask the IESG for advice or intervention when they feel it is needed, such as in cases where policies or procedures are unclear to them, where they encounter issues or questions they are unable to resolve, or where registration requests or patterns of requests appear to be unusual or abusive.

### 3.4. Early Allocations

IANA normally takes its actions when a document is approved for publication. There are times, though, when early allocation of a value is important for the development of a technology, for example, when early implementations are created while the document is still under development.

IANA has a mechanism for handling such early allocations in some cases. See [I-D.ietf-ianabis-rfc7120bis] for details. It is usually not necessary to explicitly mark a registry as allowing early allocation, because the general rules will apply.

%% TO BE UPDATED %% It is not ordinarily possible to create registries before a document has been approved for publication. However, IANA is proposing a procedure that will make early registry creation available to working groups (and, with AD approval, to AD-sponsored documents) that need to coordinate allocations for other documents or organizations while the document that would create the registry is still in development.

# 4. Choosing a Registration Policy and Well-Known Policies

%% NOTE FOR IANABIS: %%

Remaining Specification Required issues:

* I-D eligibility: see Section 4.6.1 for proposed text and remaining questions.

* Early allocation for SDOs: [I-D.ietf-ianabis-rfc7120bis] is proposing a procedure. Added a pointer to it in Section 4.6.1.

FCFS/Spec hybrid:

* The charter calls for "a registration policy between 'First Come First Served' and 'Specification Required'" that would work for registries where a lightweight specification that DOESN'T need technical review should be required, but a version of this called "First Come First Served With URL" was initally rejected. The impression we received in Montreal is that such a procedure would be useful, but it needs a better name.

%% END NOTES %%

A registration policy is the policy that controls how new assignments in a registry are accepted. There are several issues to consider when defining the registration policy.

If the registry's namespace is limited, assignments will need to be made carefully to prevent exhaustion.

Even when the space is essentially unlimited, it is still often desirable to have at least a minimal review prior to assignment in order to:

* prevent the hoarding of or unnecessary wasting of values. For example, if the space consists of text strings, it may be desirable to prevent entities from obtaining large sets of strings that correspond to desirable names (existing company names, for example).

* provide a sanity check that the request actually makes sense and is necessary. Experience has shown that some level of minimal review from a subject matter expert is useful to prevent assignments in cases where the request is malformed or not actually needed (for example, an existing assignment for an essentially equivalent service already exists). IANA cannot review requests or specifications for technical content.

Perhaps most importantly, unreviewed extensions can impact interoperability and security. See [RFC6709].

When the namespace is essentially unlimited and there are no potential interoperability or security issues, assigned numbers can usually be given out to anyone without any subjective review. In such cases, IANA can make assignments directly, provided that IANA is provided all of the information necessary to screen requests without the application of technical expertise or subjective judgment.

When this is not the case, some level of review is required. However, it's important to balance adequate review and ease of registration. In many cases, those making registrations will not be IETF participants; requests often come from other standards organizations, from organizations not directly involved in standards, from ad-hoc community work (from an open-source project, for example), and so on. Registration must not be unnecessarily difficult, unnecessarily costly (in terms of time and other resources), nor unnecessarily subject to denial.

While it is sometimes necessary to restrict what gets registered (e.g., for limited resources such as bits in a byte, or for items for which unsupported values can be damaging to protocol operation), in many cases having what's in use represented in the registry is more important. Overly strict review criteria and excessive cost (in time and effort) discourage people from even attempting to make a registration. If a registry fails to reflect the protocol elements actually in use, it can adversely affect deployment of protocols on the Internet, and the registry itself is devalued.

Therefore, it is important to think specifically about the registration policy, and not just pick one arbitrarily nor copy text from another document. Working groups and other document developers should use care in selecting appropriate registration policies when their documents create registries. They should select the least strict policy that suits a registry's needs and look for specific justification for policies that require significant community involvement (those stricter than Expert Review or Specification Required, in terms of the well-known policies). The needs here will vary from registry to registry, and, indeed, over time, and this BCP will not be the last word on the subject.

The following policies are defined for common usage. These cover a range of typical policies that have been used to describe the procedures for assigning new values in a namespace. It is not strictly required that documents use these terms; the actual requirement is that the instructions to IANA be clear and unambiguous. However, use of these terms is strongly recommended

because their meanings are widely understood. Newly-minted policies, including ones that combine the elements of procedures associated with these terms in novel ways, may be used if none of these policies are suitable; it will help the review process if an explanation is included as to why that is the case. The terms are fully explained in the following subsections.

1. Private Use
2. Experimental Use
3. Hierarchical Allocation
4. First Come First Served
5. Expert Review
6. Specification Required
7. RFC Required
8. IETF Review
9. Standards Action
10. IESG Approval

It often makes sense to partition a namespace into multiple categories, with assignments within each category handled differently. Many protocols now partition namespaces into two or more parts, with one range reserved for Private or Experimental Use (or both) while other ranges are reserved for globally unique assignments assigned following some review process. Dividing a namespace into ranges makes it possible to have different policies in place for different ranges and different use cases.

Similarly, it will often be useful to specify multiple policies in parallel, with each policy being used under different circumstances. For more discussion of that topic, see Section 4.13.

Examples of RFCs that specify multiple policies in parallel:

LDAP [RFC4520]
TLS ClientCertificateType Identifiers [RFC5246] (as detailed in the subsections below)
MPLS Pseudowire Types Registry [RFC4446]

## 4.1. Private Use

Private Use is for private or local use only, with the type and purpose defined by the local site. No attempt is made to prevent multiple sites from using the same value in different (and incompatible) ways. IANA does not record assignments from registries or ranges with this policy (and therefore there is no need for IANA to review them) and assignments are not generally useful for broad interoperability. It is the responsibility of the sites making use of the Private Use range to ensure that no conflicts occur (within

the intended scope of use).

Examples:

Site-specific options in DHCP [RFC2939]
Fibre Channel Port Type Registry [RFC4044]
TLS ClientCertificateType Identifiers 224-255 [RFC5246]

### 4.2. Experimental Use

Experimental Use is similar to Private Use, but with the purpose being to facilitate experimentation. See [RFC3692] for details. IANA does not record assignments from registries or ranges with this policy (and therefore there is no need for IANA to review them) and assignments are not generally useful for broad interoperability. Unless the registry explicitly allows it, it is not appropriate for documents to select explicit values from registries or ranges with this policy. Specific experiments will select a value to use during the experiment.

When code points are set aside for Experimental Use, it’s important to make clear any expected restrictions on experimental scope. For example, say whether it’s acceptable to run experiments using those code points over the open Internet or whether such experiments should be confined to more closed environments. See [RFC6994] for an example of such considerations.

Example:

Experimental Values in IPv4, IPv6, ICMPv4, ICMPv6, UDP, and TCP Headers [RFC4727]

### 4.3. Hierarchical Allocation

With Hierarchical Allocation, delegated administrators are given control over part of the namespace and can assign values in that part of the namespace. IANA makes allocations in the higher levels of the namespace according to one of the other policies.

Examples:

* DNS names - IANA manages the top-level domains (TLDs), and, as [RFC1591] says:

> Under each TLD may be created a hierarchy of names. Generally, under the generic TLDs the structure is very flat. That is, many organizations are registered directly under the TLD, and any further structure is up to the individual organizations.

* Object Identifiers - defined by ITU-T recommendation X.208. According to the informal site at http://www.alvestrand.no/objectid, some registries include

  - IANA, which hands out OIDs under the "Private Enterprises" branch,
  - ANSI, which hands out OIDs under the "US Organizations" branch, and
  - BSI, which hands out OIDs under the "UK Organizations" branch.

* URN namespaces - IANA registers URN Namespace IDs (NIDs [RFC8141]), and the organization registering an NID is responsible for allocations of URNs within that namespace.

### 4.4. First Come First Served

For the First Come First Served policy, assignments are made to anyone on a first come, first served basis. There is no substantive review of the request, other than to ensure that it is well-formed and doesn't duplicate an existing assignment. However, requests must include a minimal amount of clerical information, such as a point of contact (including an email address, and sometimes a postal address) and a brief description of how the value will be used. Additional information specific to the type of value requested may also need to be provided, as defined by the namespace. For numbers, IANA generally assigns the next in-sequence unallocated value, but other values may be requested and assigned if an extenuating circumstance exists. With names, specific text strings can usually be requested.

IANA will add a change controller field to all registries that use the First Come First Served procedure. Having a change controller for each entry for these types of registrations makes authorization of future modifications more clear. See Section 2.3.

It is important that changes to the registration of a First Come First Served code point retain compatibility with the current usage of that code point, so changes need to be made with care. IANA cannot review change requests for content, but will check that the request has been authorized by the change controller's listed contact or the change controller itself, and the change controller should not, in most cases, be requesting incompatible changes nor repurposing a registered code point. See also Sections 9.4 and 9.5.

A working group or any other entity that is developing a protocol based on a First Come First Served code point has to be extremely careful that the protocol retains wire compatibility with current use of the code point. Once that is no longer true, the new work needs to change to a different code point (and register that use at the appropriate time).

It is also important to understand that First Come First Served really has no filtering. Essentially, any well-formed request is accepted.

If a specification needs to be checked for any quality other than availability, the First Come First Served procedure is not appropriate, and the Specification Required procedure (which includes an expert review) should be used instead. If registration should require only a lightweight review, the document's instructions to the designated experts should note this.

Examples:

SASL mechanism names [RFC4422]
LDAP Protocol Mechanisms and LDAP Syntax [RFC4520]

### 4.5. Expert Review

For the Expert Review policy, review and approval by a designated expert (see Section 5) is required. While this does not necessarily require formal documentation, information needs to be provided with the request for the designated expert to evaluate. The registry's definition needs to make clear to registrants what information is necessary. The actual process for requesting registrations is administered by IANA (see Section 1.2 for details).

(This policy was also called "Designated Expert" in earlier editions of this document. The current term is "Expert Review".)

The document must provide clear guidance for the designated expert, ideally in a dedicated subsection that describes documentation requirements (if any) and review criteria. It is particularly important to lay out what should be considered when performing an evaluation and reasons for rejecting a request.

It is also a good idea to include, when possible, a sense of whether many registrations are expected over time, or if the registry is expected to be updated infrequently or in exceptional circumstances only.

Thorough understanding of Section 5 is important when deciding on an Expert Review policy and designing the guidance to the designated expert.

Good examples of guidance to designated experts:

Extensible Authentication Protocol (EAP) [RFC3748], Sections 6 and 7.2
North-Bound Distribution of Link-State and TE Information Using BGP [RFC7752], Section 5.1

IANA will add a change controller field to all registries that use the Expert Review procedure. See Section 2.3.

Examples:

EAP Method Types [RFC3748]
HTTP Digest AKA algorithm versions [RFC4169]
URI schemes [RFC7595]
GEOPRIV Location Types [RFC4589]

### 4.6. Specification Required

For the Specification Required policy, review and approval by a designated expert (see Section 5) is required, and the values and their meanings must be documented in a permanent and readily available public specification, in sufficient detail so that interoperability between independent implementations is possible. This policy is the same as Expert Review, with the additional requirement of a formal public specification. In addition to the normal review of such a request, the designated expert will review the public specification and evaluate whether it is sufficiently stable and permanent, and sufficiently clear and technically sound to allow interoperable implementations.

The intention behind "permanent and readily available" is that a document can reasonably be expected to be findable and retrievable long after IANA assignment of the requested value. Publication of an RFC is an ideal means of achieving this requirement, but Specification Required is intended to also cover the case of a document published outside of the RFC path, including informal documentation.

For RFC publication, formal review by the designated expert is still requested, but the normal RFC review process is expected to provide the necessary review for interoperability. The designated expert's review is still important, but it's equally important to note that when there is IETF consensus, the expert can sometimes be "in the rough" (see also the last paragraph of Section 5.4).

As with Expert Review (Section 4.5), clear guidance to the designated expert should be provided when defining the registry, and thorough understanding of Section 5 is important.

When specifying this policy, just use the term "Specification Required". Some specifications have chosen to refer to it as "Expert Review with Specification Required", and that only causes confusion.

Examples:

Diffserv-aware TE Bandwidth Constraints Model Identifiers [RFC4124]
TLS ClientCertificateType Identifiers 64-223 [RFC5246]
ROHC Profile Identifiers [RFC5795]

#### 4.6.1. Common Specification Issues

The subsections below describe approaches to common specification eligibility issues.

##### 4.6.1.1. Internet-Drafts as Specifications

The working group or document that creates a "Specification Required" registry can declare that Internet-Drafts qualify for permanent registration within that registry. In the absence of such a declaration, however, Internet-Drafts are not eligible for permanent "Specification Required" registration. IETF stream Internet-Drafts can obtain temporary-but-renewable early allocations regardless, as described in [I-D.ietf-ianabis-rfc7120bis], but that process is not available to Internet-Drafts published in other streams.

If a WG that created a registry has been closed, and a Designated Expert feels that an existing registry (or set of related registries) should be modified to allow I-Ds as valid specifications, they should consult with the relevant Area Directors. The ADs may consult with the entire IESG if they want to. If the ADs ultimately concur with the request, an announcement stating the policy MUST be sent to the former WG mailing list, if it still exists, and the IETF last-call mailing list.

%% QUESTIONS/NOTES FOR IANABIS: this section needs 1) reasons WGs should/shouldn't consider making I-Ds eligible for permanent registration and, probably, 2) information about how a WG can declare I-Ds eligible. Is an RFC required? If the registry has already been created, can the expert/chairs simply poll the WG? Should IANA record decisions to allow I-Ds in Specification Required registries? %%

#### 4.6.1.2. Purchase-Only Specifications

If obtaining the specification requires a fee, the organization must provide a free copy for the expert to review. However, if the expert considers a purchase-only specification inappropriate for that registry or proposed registration, the expert can reject the request and require a freely-available specification.

#### 4.6.1.3. Publication Requirements for Non-IETF Standards

The "Specification Required" policy requires both IESG-designated expert approval and a permanent and readily available public specification, but some standards-related organizations may be unable to publish any version of a specification until they receive code point assignments. [I-D.ietf-ianabis-rfc7120bis] proposes a policy that can make early allocations available to those organizations, provided the expert believes the allocation is appropriate and the IESG recognizes the source of the specification as a standards-related organization. For more information, see Section 2.3 of that document.

### 4.7. RFC Required

With the RFC Required policy, the registration request, along with associated documentation, must be published in an RFC. The RFC need not be in the IETF stream, but may be in any RFC stream (currently an RFC may be in the IETF, IRTF, IAB, or Independent Submission streams [RFC5742]).

Unless otherwise specified, any type of RFC is sufficient (currently Standards Track, BCP, Informational, Experimental, or Historic).

Examples:

DNSSEC DNS Security Algorithm Numbers [RFC6014]
Media Control Channel Framework registries [RFC6230]
DANE TLSA Certificate Usages [RFC6698]

### 4.8. IETF Review

(Formerly called "IETF Consensus" in the first edition of this document.) With the IETF Review policy, new values are assigned only through RFCs in the IETF Stream -- those that have been shepherded through the IESG as AD-Sponsored or IETF working group documents [RFC2026] [RFC5378], have gone through IETF Last Call, and have been approved by the IESG as having IETF consensus.

The intent is that the document and proposed assignment will be reviewed by the IETF community (including appropriate IETF working groups, directorates, and other experts) and by the IESG, to ensure that the proposed assignment will not negatively affect interoperability or otherwise extend IETF protocols in an inappropriate or damaging manner.

Unless otherwise specified, any type of RFC is sufficient (currently Standards Track, BCP, Informational, Experimental, or Historic).

Examples:

IPSECKEY Algorithm Types [RFC4025]
Accounting-Auth-Method AVP values in DIAMETER [RFC4005]
TLS Extension Types [RFC5246]

### 4.9. Standards Action

For the Standards Action policy, values are assigned only through Standards Track or Best Current Practice RFCs in the IETF Stream.

Examples:

BGP message types [RFC4271]
Mobile Node Identifier option types [RFC4283]
TLS ClientCertificateType Identifiers 0-63 [RFC5246]
DCCP Packet Types [RFC4340]

### 4.10. IESG Approval

New assignments may be approved by the IESG. Although there is no requirement that the request be documented in an RFC, the IESG has the discretion to request documents or other supporting materials on a case-by-case basis.

IESG Approval is not intended to be used often or as a "common case"; indeed, it has seldom been used in practice. Rather, it is intended to be available in conjunction with other policies as a fallback mechanism in the case where one of the other allowable approval

mechanisms cannot be employed in a timely fashion or for some other compelling reason. IESG Approval is not intended to circumvent the public review processes implied by other policies that could have been employed for a particular assignment. IESG Approval would be appropriate, however, in cases where expediency is desired and there is strong consensus (such as from a working group) for making the assignment.

Before approving a request, the IESG might consider consulting the community, via a "call for comments" that provides as much information as is reasonably possible about the request.

Examples:

Assigned Internet Protocol Numbers [RFC5237]
IPv4 IGMP Type and Code values [RFC3228]
Mobile IPv6 Mobility Header Type and Option values [RFC6275]

### 4.11. With Expert Review

IANA does not ordinarily ask IESG-designated registry experts to review requests for registration in "Standards Action," "IETF Review," "RFC Required," and "IESG Approval" registries. If a registry requires both expert review and either RFC publication or IESG approval, the following expert-augmented hybrid procedures are available:

* Standards Action With Expert Review
* IETF Review With Expert Review
* RFC and Expert Review Required
* IESG Approval With Expert Review

As described in Section 5.4, IANA will initiate the expert review request during IETF Last Call or, if applicable, the document's conflict review. If the IESG and the expert disagree, the IESG can choose to override the expert.

If the submission is intended for direct approval for the IESG, as described in Section 12, IANA will submit the request to both the expert and the IESG.

Most registries that require RFC publication do not require an additional expert review. An expert-augmented procedure might be appropriate, however, if registry designers want to be sure that a specialist checks every proposal for intra-registry consistency, particularly if the relevant working group is unable to review it.

Examples:

* "ACE Groupcomm Policies" [RFC9594]

* "Option Codes" (DHCPv6) [RFC8415]

### 4.12. Using the Well-Known Registration Policies

Because the well-known policies benefit from both community experience and wide understanding, their use is encouraged, and the creation of new policies needs to be accompanied by reasonable justification.

It is also acceptable to cite one or more well-known policies and include additional guidelines for what kind of considerations should be taken into account by the review process.

For example, for media-type registrations [RFC6838], a number of different situations are covered that involve the use of IETF Review and Specification Required, while also including specific additional criteria the designated expert should follow. This is not meant to represent a registration procedure, but to show an example of what can be done when special circumstances need to be covered.

The well-known policies from "First Come First Served" to "Standards Action" specify a range of policies in increasing order of review requirements:

| Policy | Description | Review Level |
|---|---|---|
| First Come First Served (FCFS) | Not reviewed for technical content. | Minimal |
| Expert Review | Expert review required. | Moderate |
| Specification Required | Expert review + public specification. | Moderate (equivalent to Expert Review) |
| RFC Required | RFC publication (any stream). | High |
| IETF Review | RFC publication in IETF Stream. | Higher |
| Standards Action | RFC publication in Standards Track or BCP. | Highest |

Table 4

Examples of situations that might merit IETF Review or Standards Action include the following:

* When a resource is limited, such as bits in a byte (or in two bytes, or four), or numbers in a limited range. In these cases, allowing registrations that haven’t been carefully reviewed and agreed to by community consensus could too quickly deplete the allowable values.

* When thorough community review is necessary to avoid extending or modifying the protocol in ways that could be damaging. One example is in defining new command codes, as opposed to options that use existing command codes: the former might require a strict policy, where a more relaxed policy could be adequate for the latter. Another example is in defining protocol elements that change the semantics of existing operations.

* When there are security implications with respect to the resource, a thorough review is needed to ensure that the new usage is sound. Examples of this include lists of acceptable hashing and cryptographic algorithms, and assignment of transport ports in the system range.

When reviewing a document that asks IANA to create a new registry or change a registration policy to any policy more stringent than Expert Review or Specification Required, the IESG should ask for justification to ensure that more relaxed policies have been considered and that the more strict policy is the right one.

Accordingly, document developers need to anticipate this and document their considerations for selecting the specified policy (ideally, in the document itself; failing that, in the shepherd writeup). Likewise, the document shepherd should ensure that the selected policies have been justified before sending the document to the IESG.

When specifications are revised, registration policies should be reviewed in light of experience since the policies were set.

### 4.13. Using Multiple Policies

If some assignments within a registry should be easier to obtain than others, multiple registration procedures may be appropriate.

For example:

* In large numeric registries, stricter procedures can apply only to the most desirable ranges.

* If registration is intended for the IETF or other SDOs but not individuals, the process can depend on the submitter.

* When the values are strings or some entries are "provisional," a field or label can indicate the review level for each registration.

#### 4.13.1. Range-Dependent Policies

The most common application for multiple registration policies is to make assignments from different ranges of numeric values more or less difficult to obtain. For example, if a registry’s available values range from 0-65535, authors might assign a strict registration policy to values 0-255 and one or two relatively lightweight policies (like First Come First Served) to the remaining values. (Along with an Experimental or Private Use reservation, if appropriate.)

#### 4.13.2. Separate Requirements for IETF and Non-IETF Specifications

If IETF registrants should be required to produce an RFC, or a certain type of RFC, but registration should still be open to standards produced by organizations outside the IETF, two approaches are available:

* A single "Specification Required" policy that applies to all requests. This adds overhead for RFC-based registrations, which do not ordinarily require review by a designated expert, but would be subjected to one here. In addition, this policy would open registration to every RFC stream and type, which may not be the intention.

* Two policies that apply to the same set of available values: "IETF Review" or "Standards Action" for registrations made via the IETF process (or "RFC Required," if other streams are also appropriate), and "Specification Required" for requests submitted by other organizations. Any issues concerning submitter or specification eligibility should be described in the instructions to the expert.

#### 4.13.3. Provisional and Permanent Registrations

Some existing registries have policies that allow provisional registration: see URI Schemes [RFC7595] and Message Header Fields [RFC3864]. Registrations that are designated as provisional are usually defined as being more readily created, changed, reassigned, moved to another status, or removed entirely. URI Schemes, for example, allow provisional registrations to be made with incomplete information.

Allowing provisional registration ensures that the primary goal of maintaining a registry -- avoiding collisions between incompatible semantics -- is achieved without the side effect of "endorsing" the protocol mechanism the provisional value is used for. Provisional registrations for codepoints that are ultimately standardized can be promoted to permanent status. The criteria that are defined for converting a provisional registration to permanent will likely be more strict than those that allowed the provisional registration.

If your registry does not have a practical limit on codepoints, perhaps adding the option for provisional registrations might be right for that registry as well. See QUIC Frame Types [RFC9000].

The provisional option can be implemented by splitting the registry into separate "Permanent" and "Provisional" registries or by adding a "Status" field (or similar) that can be filled in with a "Permanent" or "Provisional" label. You might also consider whether provisional registrations should be accompanied by links to plain-text registration templates, given that they’re less likely to be documented in RFCs, or whether certain registry fields should apply only to one type of registration.

#### 4.13.4. Two-Tiered Registries

When the registry needs to allow both IETF-reviewed and "simple" (e.g., First Come First Served) registrations, but 1) the registrations consist of strings rather than numeric values, 2) the level of review cannot be indicated by the content of the strings (e.g., the strings cannot be prefixed with "x-" or "vnd."), and 3) it isn't appropriate to describe the simple registrations as "Provisional," one of these two methods might be used:

* Create separate registries, each of which indicates the level of review in its title: "IETF-Approved Fruit Strings," for example, and "First Come First Served Fruit Strings."

* Create a registry that uses a dedicated field, like the "Status" field in the provisional/permanent registry model, to indicate the level of review applied to the registration. This field might be called something like "RegAuth," and it could be filled in with values like "IETF" and "Simple" (or "Informal" or "Non-IETF").

An "IETF" registration could use any procedure that requires an IETF Stream document: Standards Action, IETF Review, a bespoke process that requires an IETF Stream document as its base (for example, a process that requires or forbids a certain type of RFC, such as Informational), or one of those procedures with an Expert Review add-on.

The IANA Considerations section could use text like this:

> This registry is open to both IETF-reviewed registrations and "simple" registrations that are not reviewed for technical content. The registry's "RegAuth" field will describe each registration as "IETF" or "Simple."
>
> The following RFC 8126 registration procedures will be applied to "IETF" and "Simple" registrations:
>
> | RegAuth | Registration Procedure |
> |---|---|
> | IETF | Standards Action |
> | Simple | First Come First Served |
>
> Table 5
>
> The registry will list IETF registrations first.

This approach could also be used to mark registrations that received some other level of review, such as review by a designated expert.

Alternatively, IETF/non-IETF entries could be distinguished by omitting the RegAuth field and placing the Change Controller field in a prominent location in the table.

# 5. Designated Experts

## 5.1. The Motivation for Designated Experts

Mailing list discussions can provide valuable technical input, but they often lack clear resolution, and IANA cannot monitor all lists or assess consensus. Therefore, IANA relies on designated experts to evaluate requests and recommend whether assignments should be made.

It should be noted that a key motivation for having designated experts is for the IETF to provide IANA with a subject matter expert to whom the evaluation process can be delegated. IANA forwards requests to the expert, who provides a recommendation. Registrants typically do not interact directly with experts unless the expert initiates contact (with IANA in copy, if they wish for IANA to retain records of the details of the request). Each registry lists its designated experts.

It will often be useful to use a designated expert only some of the time, as a supplement to other processes. For more discussion of that topic, see Section 4.13.

## 5.2. The Role of the Designated Expert

The designated expert is responsible for coordinating the appropriate review of an assignment request. The review may be wide or narrow, depending on the situation and the judgment of the designated expert. This may involve consultation with a set of technology experts, discussion on a public mailing list, consultation with a working group (or its mailing list if the working group has disbanded), etc. Ideally, the designated expert follows specific review criteria as documented with the protocol that creates or uses the namespace. See the IANA Considerations sections of [RFC3748] and [RFC3575] for specific examples.

Designated experts are expected to be able to defend their decisions to the IETF community, and the evaluation process is not intended to be secretive or bestow unquestioned power on the expert. Experts are expected to apply applicable documented review or vetting procedures, or in the absence of documented criteria, follow generally accepted norms such as those in Section 5.3. Designated experts are generally

not expected to be "gatekeepers", setting out to make registrations difficult to obtain, unless the guidance in the defining document specifies that they should act as such. Absent stronger guidance, the experts should be evaluating registration requests for completeness, interoperability, and conflicts with existing protocols and options.

It has proven useful to have multiple designated experts for some registries. Sometimes those experts work together in evaluating a request, while in other cases additional experts serve as backups, acting only when the primary expert is unavailable. In registries with a pool of experts, the pool may have a single chair responsible for defining how requests are to be assigned to and reviewed by experts. If a registry receives a relatively high volume of requests, IANA might assign requests to individual members in sequential or approximate random order. More often, IANA will send requests to the group of experts, and consider the review complete when a certain number of replies have been received, as specified by the group itself. The document defining the registry can, if it’s appropriate for the situation, specify how the group should work -- for example, it might be appropriate to specify rough consensus on a mailing list, within a related working group or among a pool of designated experts.

In cases of disagreement among multiple experts, it is the responsibility of those experts to make a single clear recommendation to IANA. It is not appropriate for IANA to resolve disputes among experts. In extreme situations, such as deadlock, the designating body (typically the IESG) may need to step in to resolve the problem.

When designated experts have a conflict of interest for a particular review (if they are, for example, authors or significant proponents of a specification related to the registration under review), those experts should recuse themselves. In the event that all of the designated experts are conflicted, they should ask that a temporary expert be designated for the conflicted review. The responsible AD may then handle the review or appoint someone to take it.

This document defines the designated expert mechanism with respect to documents in the IETF stream only. If other streams want to use registration policies that require designated experts, it is up to those streams (or those documents) to specify how those designated experts are appointed and managed. What is described below, with management by the IESG, is only appropriate for the IETF stream.

#### 5.2.1. Managing Designated Experts in the IETF

Designated experts for registries created by the IETF are appointed by the IESG, normally upon recommendation by the relevant Area Director. They may be appointed at the time a document creating or updating a namespace is approved by the IESG, or subsequently, when the first registration request is received. Because experts originally appointed may later become unavailable, the IESG will appoint replacements as necessary. The IESG may remove any designated expert that it appointed, at its discretion.

The normal appeals process, as described in [RFC2026], Section 6.5.1, applies to issues that arise with the designated expert team. For this purpose, the designated expert team takes the place of the working group in that description.

### 5.3. Designated Expert Reviews

In the years since [RFC2434] was published and put to use, experience has led to the following observations:

* Designated experts should respond promptly, typically within a week for simple requests to a few weeks for more complex ones. Extended delays can impact requesters, particularly when assignments are needed to support product releases. While some reviews may take longer, the process should begin promptly, and both IANA and the requester should have visibility into its progress if additional time is needed.

* If a designated expert does not respond to IANA’s requests within the period specified by the IANA agreement with the IETF (currently 30 days), either with a response or with a reasonable explanation for the delay (some requests may be particularly complex), IANA must raise the issue with the IESG. Repeated failures to respond can delay evaluations and assignments, and the IESG should either address the issue with the expert or appoint a new one.

* The designated expert is not required to personally bear the burden of evaluating and deciding all requests, but acts as a shepherd for the request, enlisting the help of others as appropriate. If a request is rejected and the decision may be controversial, the expert should have support from other subject matter experts and be able to justify the decision to the community.

When a designated expert is used, the documentation should give clear guidance to the designated expert, laying out criteria for performing an evaluation and reasons for rejecting a request. In the case where there are no specific documented criteria, the presumption should be that a code point should be granted unless there is a compelling reason to the contrary (and see also Section 5.4). Reasons that have been used to deny requests have included these:

* Scarcity of code points, where the finite remaining code points should be prudently managed, or where a request for a large number of code points is made and a single code point is the norm.

* Documentation is not of sufficient clarity to evaluate or ensure interoperability.

* The code point is needed for a protocol extension, but the extension is not consistent with the documented (or generally understood) architecture of the base protocol being extended and would be harmful to the protocol if widely deployed. It is not the intent that "inconsistencies" refer to minor differences "of a personal preference nature". Instead, they refer to significant differences such as inconsistencies with the underlying security model, implying a change to the semantics of an existing message type or operation, requiring unwarranted changes in deployed systems (compared with alternate ways of achieving a similar result), etc.

* The extension would cause problems with existing deployed systems.

* The extension would conflict with one under active development by the IETF, and having both would harm rather than foster interoperability.

Documents must not name the designated expert(s) in the document itself; instead, any suggested names should be relayed to the appropriate Area Director at the time the document is sent to the IESG for approval. This is usually done in the document shepherd writeup.

If the request should also be reviewed on a specific public mailing list, its address should be specified.

### 5.4. Expert Reviews and the Document Lifecycle

Review by the designated expert is necessarily done at a particular point in time and represents review of a particular version of the document. Unless the authors or chairs have already requested and obtained registration, IANA will initiate reviews during IETF Last Call. And while rereviews might be done when it's acknowledged that the documentation of the registered item has changed substantially, making sure that rereview happens requires attention and care.

It is possible, through carelessness, accident, inattentiveness, or even willful disregard, that changes might be made after the designated expert's review and approval that would, if the document were rereviewed, cause the expert not to approve the registration. It is up to the IESG, with primary responsibility held by the document's Area Director, to be alert to such situations and to recognize that such changes need to be checked.

When a registration requested by a document requires expert review, the review by the designated expert needs to be timely, submitted before the IESG evaluates the document. The IESG should generally not hold the document up waiting for a late review. It is also not intended for the expert review to override IETF consensus: the IESG should consider the review in its own evaluation, as it would do for other Last Call reviews.

## 6. Well-Known Registration Status Terminology

The following labels describe the status of an assignment or range of assignments:

Private Use: Private use only (not assigned), as described in Section 4.1.

Experimental: Available for general experimental use as described in [RFC3692]. IANA does not record specific assignments for any particular use.

Unassigned: Not currently assigned, and available for assignment via documented procedures. While it's generally clear that any values that are not registered are unassigned and available for assignment, it is sometimes useful to explicitly specify that situation. Note that this is distinctly different from "Reserved".

Reserved: Not assigned and not available for assignment.

Reserved values are held for special uses, such as to extend the namespace when it becomes exhausted. "Reserved" is also sometimes used to designate values that had been assigned but are no longer in use, keeping them set aside as long as other unassigned values are available. Note that this is distinctly different from "Unassigned".

Reserved values can be released for assignment by the change controller for the registry (this is often the IETF, as represented by the IESG, for registries created by RFCs in the IETF stream).

%% QUESTION FOR IANABIS: Are the next two new paragraphs sufficient/appropriate? %%

Reserved values may be specified further as "Reserved for Private Use," "Reserved for Experimental Use," or "Reserved for Future Extension". (Historically, many codepoints reserved for future extension have not been given any special label beyond "Reserved.")

When reserving a codepoint, consider whether deprecation or obsoletion would be more appropriate. See [RFC3692].

Known Unregistered Use: It’s known that the assignment or range is in use without having been defined in accordance with reasonable practice. Documentation for use of the assignment or range may be unavailable, inadequate, or conflicting. This is a warning against use, as well as an alert to network operators who might see these values in use on their networks.

## 7. Documentation References in IANA Registries

Usually, registries and registry entries include references to documentation (RFCs or other documents). The purpose of these references is to provide pointers for implementors to find details necessary for implementation, NOT to simply note what document created the registry or entry. Therefore:

* If a document registers an item that is defined and explained elsewhere, the registered reference should be to the document containing the definition, not to the document that is merely performing the registration.

* If the registered item is defined and explained in the current document, it is important to include sufficient information to enable implementors to understand the item and to create a proper implementation.

* If the registered item is explained primarily in a specific section of the reference document, it is useful to include a section reference. For example, "[RFC4637], Section 3.2", rather than just "[RFC4637]".

* For documentation of a new registry, the reference should provide information about the registry itself, not just a pointer to the creation of it. Useful information includes the purpose of the registry, a rationale for its creation, documentation of the process and policy for new registrations, guidelines for new registrants or designated experts, and other such related information. But note that, while it's important to include this information in the document, it needn't all be in the IANA Considerations section. See Section 1.1.

## 8. What to Do in "bis" Documents

On occasion, an RFC is issued that obsoletes a previous edition of the same document. We sometimes call these "bis" documents, such as when RFC 4637 is to be obsoleted by draft-ietf-foo-rfc4637bis. When the original document created registries and/or registered entries, there is a question of how to handle the IANA Considerations section in the "bis" document.

### 8.1. Organizing "bis" Considerations

When reviewing a "bis" document that obsoletes an earlier document, IANA has two concerns: 1) identifying new actions, and 2) determining whether existing references need to be replaced.

Some authors choose to replicate all or part of the original document's IANA Considerations section. However, new actions edited into existing text can be hard to identify. Documents that take this approach should provide a subsection called "New IANA Actions." This can be a brief list or summary, and it could include pointers to tables or other parts of the section, if those details can't be moved from another location. This subsection should also tell IANA how to treat references to existing registrations, as described in Section 8.2.

If the entire IANA Considerations section should be reproduced, consider placing it in an "RFC XXXX IANA Considerations" subsection.

When deciding how much, if any, of the original document's IANA Considerations section to include in a new IANA Considerations section, consider what the registry user might be looking for. If the original document included registration instructions, for example, and the new document does not, an applicant unfamiliar with RFC obsoletion might not guess that there were instructions to find. If you don't want to repeat information provided in the earlier document, the IANA Considerations section should at least point users to the appropriate section in that document.

### 8.2. Handling Existing References

It is extremely important to be clear in your instructions regarding updating references, especially in cases where some references need to be updated and others do not. In general, registries and registrations should not point to obsoleted RFCs, but exceptions are common enough that IANA cannot automatically assume that all references can be updated.

If the original document is being obsoleted, the IANA Considerations must account for all references to it in the IANA registries and specify whether those references should be replaced. However, the section does not have to name the individual registries and registrations. If any should remain untouched, name those. If the list of registrations that is being updated is shorter, it is acceptable to just name those instead.

More detail may be required if section numbers associated with the original references need to be updated.

The new document may also have to account for registrations that don't appear in the original document. The source of these "extra" references is typically a later RFC that registered a codepoint, but listed that older RFC in the reference field instead of listing itself. IANA can supply a list of registry groups that contain references to the original document. For IANA, simply stating that references in that group should or should not be updated is sufficient.

An example of a document that tells IANA how to update or deprecate existing references and registrations is [RFC9012]. %% NOTE TO IANABIS: More examples may be added here. %%

In general, if the registrations specify the original document as a reference, those registrations should be updated to point to the current (not obsolete) documentation for those items. Usually, that will mean changing the reference to be the "bis" document.

If references should not be updated, consider whether IANA should also label those registrations "obsolete" or "deprecated." IANA will list the new document as an additional reference, but leave the original reference in place.

If information for registered items has been or is being moved to other documents, then the registration information should be changed to point to those other documents. In most cases, documentation references should not be left pointing to the obsoleted document for registries or registered items that are still in current use. For registries or registered items that are no longer in current use, it will usually make sense to leave the references pointing to the old document -- the last current reference for the obsolete items. The main point is to make sure that the reference pointers are as useful and current as is reasonable, and authors should consider that as they write the IANA Considerations for the new document. As always: do the right thing, and there is flexibility to allow for that.

While references to obsoleted documents are typically replaced, references to updated documents are often left intact. However, authors should check any references to the updated document in the registries.

# 9. Miscellaneous Issues

## 9.1. When There Are No IANA Actions

Before an Internet-Draft can be published as an RFC, IANA needs to know what actions (if any) it needs to perform. Experience has shown that it is not always immediately obvious whether a document has no IANA actions, without reviewing the document in some detail. In order to make it clear to IANA that it has no actions to perform (and that the author has consciously made such a determination), such documents should, after the authors confirm that this is the case, include an IANA Considerations section that states

> This document has no IANA actions.

IANA prefers that these "empty" IANA Considerations sections be left in the document for the record: it makes it clear later on that the document explicitly said that no IANA actions were needed (and that it wasn’t just omitted).

### 9.2. Namespaces Lacking Documented Guidance

For all existing RFCs that either explicitly or implicitly rely on IANA to make assignments without specifying a precise assignment policy, IANA will work with the IESG to decide what policy is appropriate. Changes to existing policies can always be initiated through the normal IETF consensus process, or through the IESG when appropriate.

All future RFCs that either explicitly or implicitly rely on IANA to register or otherwise administer namespace assignments must provide guidelines for administration of the namespace.

### 9.3. After-the-Fact Registrations

Occasionally, the IETF becomes aware that an unassigned value from a namespace is in use on the Internet or that an assigned value is being used for a different purpose than it was registered for. The IETF does not condone such misuse; procedures of the type described in this document need to be applied to such cases, and it might not always be possible to formally assign the desired value. In the absence of specifications to the contrary, values may only be reassigned for a different purpose with the consent of the original assignee (when possible) and with due consideration of the impact of such a reassignment. In cases of likely controversy, consultation with the IESG is advised.

This is part of the reason for the advice in Section 3.1 about using placeholder values, such as "TBD1", during document development: problems are often caused by the open use of unregistered values after results from well-meant, early implementations, where the implementations retained the use of developmental code points that never proceeded to a final IANA assignment.

### 9.4. Reclaiming Assigned Values

Reclaiming previously assigned values for reuse is tricky, because doing so can lead to interoperability problems with deployed systems still using the assigned values. Moreover, it can be extremely difficult to determine the extent of deployment of systems making use of a particular value. However, in cases where the namespace is running out of unassigned values and additional ones are needed, it may be desirable to attempt to reclaim unused values. When reclaiming unused values, the following (at a minimum) should be considered:

* Attempts should be made to contact the original party to which a value is assigned, to determine if the value was ever used, and if so, the extent of deployment. (In some cases, products were never shipped or have long ceased being used. In other cases, it may be known that a value was never actually used at all.)

* Reassignments should not normally be made without the concurrence of the original requester. Reclamation under such conditions should only take place where there is strong evidence that a value is not widely used, and the need to reclaim the value outweighs the cost of a hostile reclamation. IESG Approval is needed in this case.

* It may be appropriate to write up the proposed action and solicit comments from relevant user communities. In some cases, it may be appropriate to write an RFC that goes through a formal IETF process (including IETF Last Call) as was done when DHCP reclaimed some of its "Private Use" options [RFC3942].

* It may be useful to differentiate between revocation, release, and transfer. Revocation occurs when IANA removes an assignment in accordance with IETF instructions (whether the source is the IESG, a designated expert, working group chairs, or a document); release occurs when the assignee initiates that removal; and transfer occurs when either revocation or release is coupled with immediate reassignment. It may be useful to specify procedures for each of these or to explicitly prohibit combinations that are not desired.

### 9.5. Contact Person vs. Assignee or Owner

Many registries include designation of a technical or administrative contact associated with each entry. Often, this is recorded as contact information for an individual. It is unclear, though, what role the individual has with respect to the registration: is this item registered on behalf of the individual, the company the individual worked for, or perhaps another organization the individual was acting for?

This matters because some time later, when the individual has changed jobs or roles, and perhaps can no longer be contacted, someone might want to update the registration. IANA has no way to know what company, organization, or individual should be allowed to take the registration over. For registrations rooted in RFCs, the stream owner (such as the IESG or the IAB) can make an overriding decision. But in other cases, there is no recourse.

Registries can include, in addition to a "Contact" field, an "Assignee" or "Owner" field (also referred to as "Change Controller") that can be used to address this situation, giving IANA clear guidance as to the actual owner of the registration. This is strongly advised for all registries that might ever be open to assignments to parties outside of the IETF, and IANA has begun to automatically add a change controller field for registries that use the First Come First Served (Section 4.4), Expert Review (Section 4.5), Specification Required (Section 4.6), and RFC Required (Section 4.7) policies. Alternatively, if no change controller field is present, organizations can put an organizational role into the "Contact" or "Reference" field in order to make their ownership clear.

### 9.6. Closing or Obsoleting a Registry/Registrations

Sometimes there is a request to "close" a registry to further registrations. When a registry is closed, no further registrations will be accepted. The information in the registry will still be valid, and registrations already in the registry can still be updated.

A closed registry can also be marked as "obsolete", as an indication that the information in the registry is no longer in current use.

When a registry is closed or declared obsolete, IANA will update its registration procedure field to indicate that the registry has been closed and list the document that closes it as an additional reference for the registry itself, without removing any existing reference(s). The document can also provide a note to be added to the registry by IANA, such as if the document authors have additional useful information about the change.

Specific entries in a registry can be marked as "obsolete" (no longer in use) or "deprecated" (use is not recommended).

Unless instructed to do otherwise, IANA will not re-assign deprecated or obsolete values until all other available values have been exhausted.

Such changes to registries and registered values are subject to normal change controls (see Section 2.3). Any closure, obsolescence, or deprecation serves to annotate the registry involved; the information in the registry remains there for informational and historic purposes.

## 10. Appeals

Appeals of protocol parameter registration decisions can be made using the normal IETF appeals process as described in [RFC2026], Section 6.5. That is, an initial appeal should be directed to the IESG, followed (if necessary) by an appeal to the IAB.

## 11. Mailing Lists

All IETF mailing lists associated with evaluating or discussing assignment requests as described in this document are subject to whatever rules of conduct and methods of list management are currently defined by best current practices or by IESG decision.

Registry experts may benefit from a registration-specific mailing list where they can discuss requests. Lists can be set up where the participants are just the designated experts, the experts plus applicants, or the whole community. In general, the following should be taken into account:

* Name a mailing list to be created by the IETF. (IANA does not create or maintain mailing lists.) An existing IETF list can be used, but consider whether the traffic would be problematic in either direction (too much noise, too many requests).

* Consider whether the list should be limited to experts or open to the public. Most expert review mailing lists are open.

* Set a deadline by which an expert should notify IANA that a request has been approved, barring complications. Three weeks is a common deadline.

* Keep in mind that IANA does not monitor expert review mailing lists. Consider whether applicants should be instructed to submit their requests to IANA instead of the mailing list. In such cases, IANA would forward the request to the list with the applicant in copy. Alerting IANA to the existence of the request at the outset means that IANA can watch for signs of inactivity and send reminders to non-responsive expert groups.

* When a document that creates a list tells applicants to write directly to the list instead of IANA, IANA posts a note in the registry that directs users to the list and tells them to contact IANA if they don’t receive a response by the deadline cited in the document. However, not all applicants will consult the registry before submitting an application.

Examples:

CBOR Web Token (CWT) expert review mailing list [RFC8392]
TLS expert review mailing list [RFC8447]

## 12. IESG Responsibilities and Capabilities

The following describes the registry-related actions the IESG must perform:

* Represent the IETF as change controller: Section 2.3

* Review registration requests that require direct IESG approval: Section 4.10

* Designate and manage experts: Section 5

* Review IANA Considerations sections, keeping in mind that IANA cannot determine whether a given set of registration procedures is appropriate for a new registry. For a discussion of common procedures, see Section 4.

The following describes the actions the IESG can take when needed, along with circumstances when such intervention might be appropriate:

* Modify existing registries: Section 2.4

* Override registration procedures: Section 3.3

* Advise and direct IANA as needed on topics such as unusual requests, missing instructions, unreachable change controllers: Section 3.3, Section 9.2, Section 9.3, and Section 9.4

## 13. Registry Creation and Design Considerations

The purpose of this section is to make authors aware of common registry design practices that they might not have seen before and point out issues that may require special handling.

### 13.1. Metadata Fields

"Status," "Recommended," and "Notes" fields are often added to registries after they've been created. Creating one (or more) before the need becomes apparent not only saves time, but can prompt future applicants, experts, and authors to add useful information that they otherwise might not have seen a place for.

#### 13.1.1. Status

In some cases, it may be useful to include a "Status" field that reflects the operational or administrative state of each entry. However, there is currently no single agreed-upon set of possible status entries. Some registries use this field to indicate whether registrations should be considered "provisional," "permanent," "deprecated," or "obsolete," although the last two states are more often added to a registration's name or description field.

Examples of registries that use a "Status" field:

https://www.iana.org/assignments/email-auth
https://www.iana.org/assignments/message-headers
https://www.iana.org/assignments/rsip-parameters

#### 13.1.2. Recommended

If it's appropriate to indicate whether registered items are recommended, consider whether "yes" and "no" answers are sufficient. It might also be appropriate to add a note to the registry that describes the meaning and/or limitations of each possible state. For example, the "Recommended" field in the TLS Cipher Suites registry can be filled in with one of three values: briefly, "Y" for "yes"; "N," which can mean only that review or applicability has been limited, not that use is broadly discouraged; or "D," which does discourage use. [I-D.ietf-tls-rfc8447bis] defines those options in greater detail and provides a note to be added to each affected registry.

Fields of this type can also be used to indicate whether usage is required, or whether a recommendation is context-specific. Examples include the "Use for DNSSEC Signing" and "Implement for DNSSEC Signing" fields, among others, in the "DNS Security Algorithm Numbers" registry updated by [I-D.ietf-dnsop-rfc8624-bis].

Examples:

https://www.iana.org/assignments/tls-parameters
https://www.iana.org/assignments/dns-sec-alg-numbers

#### 13.1.3. Notes

IANA recommends adding a "Notes" field to any registry. Designated experts and Area Directors can approve updates to any registration's "Notes" field, even when modifying other aspects of the registration requires a specification.

### 13.2. Registration Templates

In some cases, an appropriate registration template can require applicants to fill in more fields than a table can easily display. If all of the template information should be published, IANA could post it as a text file and add link it to the registration. Examples include media type and provisional URI scheme registrations:

https://www.iana.org/assignments/media-types
https://www.iana.org/assignments/uri-schemes

### 13.3. Module Files

IANA hosts MIB, YANG, and SID module files. If hosting a new type of module would be useful and possible, the RFC should provide answers to at least the following questions:

* Can modules be updated after creation, or would they be replaced?

* Will IANA update the module in accordance with registrations, modifications, and/or status changes? IANA-specific instructions should be included in or referenced from the IANA Considerations section. (Note that IANA likely would not have expertise in this area.)

* Do authors or IANA need to be aware of special considerations for revision statements, references, or other fields? For example, if a module includes reference information that appears in an underlying First Come First Served registry, how would that module treat a reference that consists solely of a name and contact information?

* How will modules be validated?

* IANA typically performs registry actions when a document is sent to the RFC Editor for processing, but posts new YANG modules after RFC publication. How and when will these modules be provided to IANA?

#### 13.3.1. YANG Modules

For information concerning YANG module creation and maintenance, see [I-D.ietf-netmod-rfc8407bis], "Guidelines for Authors and Reviewers of Documents Containing YANG Data Models."

### 13.4. URN Sub-Namespace Registries

%% NOTE FOR IANABIS: please check for inaccuracy/imprecision/awkward phrasing. %%

Documents that request sub-namespace registry creation occasionally misidentify the desired namespace and overlook registration requirements within it. When creating an IETF URN sub-namespace registry, authors should check the "Uniform Resource Name (URN) Namespace for IETF Use" registry group (https://www.iana.org/assignments/params) and determine whether they also need to register an identifier in the "IETF URN Sub-namespaces" registry [RFC6924], in which case the URN would take the form "urn:ietf:foo", or the "IETF URN Sub-namespace for Registered Protocol Parameter Identifiers" registry [RFC3553], in which case the URN would take the form "urn:ietf:params:foo".

### 13.5. Field-Specific Modification Procedures

If necessary, a separate registration procedure (Section 4) can be applied to a single field. Typically, this field-specific procedure will be less strict than the procedure required to receive an assignment.

This approach could be useful in scenarios like these:

* A new column in a registry that requires RFC publication will have to be backfilled, but the requirement isn’t urgent, and the information has yet to be compiled. If other parties are amenable, assigning the "Expert Review" procedure to the column would make it possible to populate that column later without producing another RFC.

* Registrants may need to update a "Date" column in a registry that ordinarily requires expert approval. Because this is considered a trivial update, modifications to that field could be implemented by IANA on a First Come First Served basis, as in the "QUIC Versions" registry [RFC9000].

* Alternatively, while codepoints with "Recommended" values initially set to "N" might be registered via a procedure like Specification Required, changing that value to "Y" might require an RFC published in the IETF stream.

### 13.6. Adding Registry Notes

Notes attached to the registry itself (as opposed to notes attached to individual registrations) are often supplied by RFCs, but can also be added to the registry after publication, if the need becomes apparent.

When determining whether to add a note, consider whether some alternative or future action might be called for, either in addition to or instead of a note. For example, if a note should be used to list the values that could appear in a field, consider who would be responsible for updating that note if the list were to change. In some cases, it could be appropriate for an RFC to list those values instead, or even create a registry for them.

## 14. Language and Formatting in the IANA Considerations Section

IANA doesn't require a specific format, but the following recommendations might simplify the writing process and result in a cleaner section:

Subsections:
: Consider using one or more levels of subsection to group and separate actions that affect different registry groups and registries. Subsections can also be useful for setting off and creating distinct references for registration templates, instructions to designated experts, and, if necessary, brief summaries or discussions of the action. (Note: if the document will obsolete an earlier RFC, see Section 8.)

Verb Tense:
: Don't use past tense to describe registry actions unless they've already been completed. The RFC Editor can convert future tense to past tense during the editing process.

Requests vs. Instructions:
: "IANA is requested to perform action X" and "IANA will perform action X" are both fine.

Tables:
: TBD

URLs:
: For registry users' convenience, any registry name should be accompanied by the base URL for the registry group. For the QUIC group, for example, the base URL is https://www.iana.org/assignments/quic.

References:
TBD

Numeric Values:
If the document is creating a registry, it should specify the initial values. If the document is registering values in an existing registry, it should refer to those values as "TBD1," "TBD2," etc.

Recording preferred values before IANA assigns them is strongly discouraged. If early allocation is impossible or undesirable, however, and specific values must be suggested in the document, authors should make it as clear as possible -- not for IANA's sake, but for the sake of potential implementors -- that the value may not be available by the time the document reaches the publication process. Possible approaches to suggesting value 17, for example, include

TBD1 (17 suggested)

If the value has to be inserted into a table that has limited space, a shorter option could be

TBD17

The value should not be presented in a table as simply "17", with no other label, even if text outside the table indicates that the value is only being requested.

While IANA is the primary audience, the section should also be clear enough for registry users who need to find registration instructions or confirm the source of a registration.

## 15. Security Considerations

Information that creates or updates a registration needs to be authenticated and authorized. IANA updates registries according to instructions in published RFCs and from the IESG. It may also accept clarifications from document authors, relevant working group chairs, designated experts, and mail list participants.

Information concerning possible security vulnerabilities of a protocol may change over time. Likewise, security vulnerabilities related to how an assigned number is used may change as well. As new vulnerabilities are discovered, information about such vulnerabilities may need to be attached to existing registrations so that users are not misled as to the true security issues surrounding the use of a registered number.

Security needs to be considered as part of the selection of a registration policy. For some protocols, registration of certain parameters will have security implications, and registration policies for the relevant registries must ensure that requests get appropriate review with those security implications in mind.

An analysis of security issues is generally required for all protocols that make use of parameters (data types, operation codes, keywords, etc.) documented in IETF protocols or registered by IANA. Such security considerations are usually included in the protocol document [BCP72]. It is the responsibility of the IANA considerations associated with a particular registry to specify whether value-specific security considerations must be provided when assigning new values and the process for reviewing such claims.

## 16. IANA Considerations

Sitewide, IANA will replace references to RFC 8126 with references to this document.

IANA will create a "Change Controller" field for all new registries that use the "First Come First Served," "Expert Review," "Specification Required," and "RFC Required" registration procedures. In the future, IANA will also add empty "Change Controller" fields to existing registries that use those procedures but lack that field.

%% QUESTION FOR IANABIS: When IANA adds "Change Controller" fields to existing registries, should it list the IETF as the change controller for registrations created by IETF stream documents, or leave those blank? %%

## 17. References

### 17.1. Normative References

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