

Independent Submission
Internet-Draft
Expires: September 9, 2015

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Date: March 9, 2015

User Assigned ISO 3166-1 Alpha-2 Codes
and the DNS Root Zone

[draft-lewis-user-assigned-tlds-00](#)

Abstract

The practice governing the delegation of ASCII two-letter domain names in the DNS root zone is to follow the ISO 3166-1 standard's alpha 2 codes. This standard is maintained by the ISO 3166 Maintenance Agency. Contained within the gamut of ISO 3166-1 alpha 2 codes is a set of values designated as User Assigned. This document recommends that values designated as user assigned be reserved from delegation in the root zone. A specific range of these codes is assigned expressly for private-use.

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Table of Contents

0.	NOTE TO RFC EDITOR AND REVIEWERS	1
1.	Introduction	1
2.	Private-Use Top-Level Domains	1
3.	Future-User Top-Level Domains	1
4.	IANA Considerations	1
5.	Security Considerations	1
6.	Acknowledgements	1
7.	References	1
8.	Authors' Addresses	1

[0.](#) NOTE TO RFC EDITOR AND REVIEWERS

A suitable venue for discussion of this document is the dnsop working group. Private comments may also be directed at the editor.

This section (and sub-sections) should be removed prior to publication.

There is potential use of standards track language. For now "MUST NOT/are not" is in the document, hedging the issue of what track this takes.

This is a -00, comments expected. ;)

[1.](#) Introduction

The practice governing the delegation of ASCII two-letter domain names in the DNS [STD 13] root zone is to follow the ISO 3166-1 standard [ISO3166-1]. The ISO 3166-1 standard provides for multiple types of codings, with the ASCII two-letter codes (known as "alpha 2" codes) being used in the DNS to potentially represent countries and territories as country-code top-level domains (ccTLDs) [RFC1591]. The interrelationship is documented in "ICANN and the ISO, A Common Interest in ISO Standard 3166" [ICANNISO].

In addition to these assigned codes, there are values designated as "User Assigned". This document recommends that these values designated as Special Use Domain Names [RFC 6761] be set-aside from possible delegation in the root zone to enable applications and usages that are either non-global or use DNS-like identifiers.

Quoting ISO 3166-1:2013 clause 8.1.3 "User-assigned code elements":

"If users need code elements to represent country names not included in this part of ISO 3166, the series of letters AA, QM to QZ, XA to XZ, and ZZ, and the series AAA to AAZ, QMA to QZZ, XAA to XZZ, and ZZA to ZZZ respectively and the series of numbers 900 to 999 are available.

NOTE Users are advised that the above series of codes are not universals, those code elements are not compatible between different

entities."

For the purposes of this document, ISO 3166-1 "alpha-2 user-assigned codes" are defined to be AA, QM to QZ, XA to XZ, and ZZ. The ranges ("to") are alphabetic and contain only characters in the US-ASCII definition [[RFC20](#)]. The codes are case insensitive.

[2.](#) Private-Use Top-Level Domains

Two areas of identifier use have been identified that can benefit from the use of private-use namespaces:

1. Local-only usage. In locally configured environments where Internet traffic will not traverse the global Internet. While it is preferred that such usages use sub-domains within another domain registered for the specific hosting entity, not all such configurations have such a domain available. This is analogous to the use of private addressing described in [[RFC 1918](#)].
2. Use by DNS-like applications. Some applications use network identifiers that are similar in appearance to domain names, and may be interpreted by software as domain names, but are not intended to use the global DNS resolution service (such as connecting to the DNS root servers via port 53 and performing recursive lookups). Using namespace allocated for private-use will guard against conflicts with the global DNS resolution system.

This document sets aside the range XA to XZ for as private-use TLDs that can be used to support these two functions. The permanent reservation of these user-assigned codes for this purpose by the standard allows for the assumption that these codes will never risk requiring delegation through future assignment to represent a country or territory.

[3.](#) Future-Use Top-Level Domains

It is unclear which future applications may require specific top-level domains for which delegation and assignment through the regular root zone management process is not appropriate. This document sets aside the remaining user-assigned codes AA, QM to QZ, and ZZ, for such purposes. These codes are reserved for future protocol uses to be defined by a future Standards Track RFC that updates this document.

[4.](#) IANA Considerations

There currently exists an IANA registry of Special Use Domain Names, where the alpha-2 user-assigned codes are to be added. The procedure for adding names to that registry is defined in "Special-Use Domain Names" [[RFC 6761](#)]. The documented procedure is heavily dependent on demonstrated protocol use of a name that justifies being reserved on the basis of "special use."

This proposal is not based on demonstrated use but rather the need to

provide clarity on what "User Assigned" means in the context of the root zone, and to document that practice governing delegation in the root zone. So while this proposal fails the test of [RFC 6761](#), based on other merits, the alpha-2 user-assigned codes ought to be added to that registry.

This proposal notes that other users of the ISO 3166-1 standard have used "User Assigned" for other purposes. For example, "XK" is reportedly used in other applications as a temporary country-code to represent Kosovo. This reservation means that these User Assigned codes MUST NOT(/are not) be used in the root zone for applications such as country-code top-level domains.

IANA is requested to:

- [1.](#) add the alpha-2 user-assigned codes XA to XZ to the Special Use Domain Names registry, designated as "Private Use".
- [2.](#) add the alpha-2 user-assigned codes AA, QN to QZ, and ZZ as "Future Use".

[4.1](#) Domain Name Reservation Considerations

Borrowing from [RFC 6761](#), these are necessary definitions of strings included in the Special Use Domain Name registry.

[1.](#) Users:

Are human users expected to recognize these names as special and use them differently? In what way?

Not necessarily. Applications may decide to use names that end with the alpha-2 user-assigned codes XA to XZ in scenarios where the name usage may be confused or conflict with the DNS but without the intention of placing data in the DNS. This is up to the application and (human) user.

[2.](#) Application Software:

Are writers of application software expected to make their software recognize these names as special and treat them differently? In what way? (For example, if a human user enters such a name, should the application software reject it with an error message?)

Applications may elect to use names ending with the alpha-2 user-assigned codes XA to XZ for usages where the domain is neither required nor intended to be placed in the root zone. The purpose of the reservation is to ensure that any such use is not disrupted by additions to the root zone.

[3.](#) Name Resolution APIs and Libraries:

Are writers of name resolution APIs and libraries expected to make their software recognize these names as special and treat them differently? If so, how?

General purpose API's and libraries interacting with DNS need not be aware of the special use of names ending in alpha-2 user assigned codes. Turnkey API's and libraries can elect to treat names specially and avoid contacting the root zone to resolve a name.

4. Caching DNS Servers:

Are developers of caching domain name servers expected to make their implementations recognize these names as special and treat them differently? If so, how?

No, no change to the basic DNS protocol elements.

5. Authoritative DNS Servers:

Are developers of authoritative domain name servers expected to make their implementations recognize these names as special and treat them differently? If so, how?

No, no change to the basic DNS protocol elements.

6. DNS Server Operators:

Does this reserved Special-Use Domain Name have any potential impact on DNS server operators? If they try to configure their authoritative DNS server as authoritative for this reserved name, will compliant name server software reject it as invalid? Do DNS server operators need to know about that and understand why? Even if the name server software doesn't prevent them from using this reserved name, are there other ways that it may not work as expected, of which the DNS server operator should be aware?

No, the reservations do not, but if names ending with the alpha-2 user-assigned codes are seen in queries, the replies, if stemming from the root zone, will be RCODE=NXDOMAIN [[RFC 2308](#)].

7. DNS Registries/Registrars:

How should DNS Registries/Registrars treat requests to register this reserved domain name? Should such requests be denied? Should such requests be allowed, but only to a specially-designated entity? (For example, the name "www.example.org" is reserved for documentation examples and is not available for registration; however, the name is in fact registered; and there is even a web site at that name, which states circularly that the name is reserved for use in documentation and cannot be registered!)

Policy regarding registration of domain name labels is defined in other operational documents. (There is a difference between registration and

delegation of names.)

[4.2](#) Other considerations

Other uses of domain names are to consider any names ending in alpha-2 user-assigned codes XA to XZ are reserved for private use. i.e., Issuance of an Extended Validation Certificate [[EVValidation](#)] with a name contained in the subjectAltName:dNSName field ending in an alpha-2 user-assigned code XA to XZ as a name not registered properly under the root zone.

[5.](#) Security Considerations

Names appearing to be domain names ending in alpha-2 user-assigned codes will be independent of the root zone, hence nothing can be said about their security implications from the root zone perspective. Within the root zone context, the names are not delegated but reported as reserved for this purpose and noted in the IANA Special Use Domain Name registry.

[6.](#) Acknowledgements

David Conrad, Jaap Akkerhuis, Kal Feher, Andrew Sullivan, Kim Davies[6] so far have played a role.

[7.](#) References

[7.1.](#) Normative References

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- [RFC 6761] Cheshire, S. and M. Krochmal, "Special-Use Domain Names", [RFC 6761](#), February 2013.
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7.2. Informative References

7.3. URIs

[ICANN ISO] <https://www.icann.org/resources/pages/icann-iso-3166-2012-05-09-en>

[EVValidation] https://cabforum.org/wp-content/uploads/EV-V1_5_2Libre.pdf

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Expires September 9, 2015

[Page 1]