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Reserved Top Level DNS Names
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Abstract

To reduce the likelihood of conflict and confusion, a few top level domain names are reserved for use in private testing, as examples in documentation, and the like. In addition, a few second level domain names reserved for use as examples are documented. This memo replaces [RFC 2606](#) reserving 21 additional TLDs.

Editorial note

This note and [Appendix B](#) should be removed before publication. The draft can be discussed on the IETF Discussion <ietf.ietf.org> mailing

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list.

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1. Introduction

The global Internet Domain Name System is documented in [[RFC1034](#)], [[RFC1035](#)], [[RFC1123](#)], [[RFC1591](#)], [[RFC3696](#)], and numerous additional Requests for Comments. It defines a tree of names starting with root, ".", immediately below which are top level domain names such as ".com" and ".us". Below top level domain names there are normally additional levels of names.

IPv4 addresses used for tests and in examples are specified in [[I-D.iana-rfc3330bis](#)], IPv6 addresses used in examples are described in [[RFC3849](#)]; see also [[RFC4085](#)].

Fully Qualified Domain Names used in many Internet Protocols allow only LDH (letter, digit, hyphen) domain labels as described in [[RFC1123](#)], [[RFC3696](#)], and [[RFC4343](#)]. The letters are ASCII letters; certain LDH-labels are also known as A-labels in the context of IDN (Internationalization of Domain Names) and [[IDNAbis](#)].

The key words "MAY", "RECOMMENDED", and "SHOULD" in this memo are to be interpreted as described in [[RFC2119](#)].

2. TLDs for Testing, & Documentation Examples

There is a need for top level domain (TLD) names that can be used for creating names which, without fear of conflicts with current or future actual TLD names in the global DNS, can be used for private testing of existing DNS related code, examples in documentation, DNS related experimentation, invalid DNS names, or other similar uses.

For example, without guidance, a site might set up some local additional unused top level domains for testing of its local DNS code and configuration. Later, these TLDs might come into actual use on the global Internet. As a result, local attempts to reference the real data in these zones could be thwarted by the local test

versions. Or test or example code might be written that accesses a TLD that is in use with the thought that the test code would only be run in a restricted testbed net or the example never actually run. Later, the test code could escape from the testbed or the example be actually coded and run on the Internet. Depending on the nature of the test or example, it might be best for it to be referencing a TLD permanently reserved for such purposes.

To safely satisfy these needs, five domain names are reserved as listed and described below. See also [Section 4](#).

[2.1.](#) ".example", ".tld"

".example", ".tld", and the example TLDs in [Section 4](#) are RECOMMENDED for use in documentation or as examples.

[2.2.](#) ".invalid"

".invalid" is intended for use in online construction of domain names that are sure to be invalid, and for which it is obvious at a glance that they are invalid.

Applications MAY treat ".invalid" as what the name says. For this technical reason reserving internationalized ".invalid" TLDs would be unwise.

[2.3.](#) ".localhost"

The ".localhost" TLD has traditionally been statically defined in host DNS implementations as having an address record pointing to the loop back IP address and is reserved for such use. Any other use would conflict with widely deployed code which assumes this use.

See [[RFC1122](#)] for IPv4 and [[RFC4291](#)] for IPv6 loop back addresses.

[2.4.](#) ".test"

".test" and the new test TLDs in [Section 4](#) are RECOMMENDED for use in testing of current or new DNS related code. Applications SHOULD treat these test TLDs like any other TLD; a special handling could

defeat the purpose of a test.

3. Reserved Example Second Level Domain Names

The Internet Assigned Numbers Authority (IANA) also reserves the three second level domain names ".example.com", ".example.net", and ".example.org", which can be used in examples as explained in [Section 2.1](#).

When TLDs offer further second level domains for examples, the TLD administrators are encouraged to publish the relevant policies in their TLD as an informational RFC.

The second level domain names "nic", "whois", and "www" are often reserved or used for administrative purposes of the TLD, e.g., "whois.example" for the fully qualified domain name of a host with a whois server. As with second level domains for examples this can be an issue in the case of a TLD redelegation.

Please note that there are no globally reserved LDH DNS labels below the top level; see [\[RFC4367\]](#).

4. Internationalization Considerations

In 2007 IANA created eleven IDN test TLDs together with corresponding IDN example labels. The A-labels, corresponding languages, and IDN U-labels are listed below; see [\[RFC3490\]](#) or its [\[IDNAbis\]](#) successor for details about IDN. Applications SHOULD treat the IDN test TLDs as explained in [Section 2.4](#).

TLD A-label	Language	Test U-label (hex. code points)
".xn--0zwm56d"	Chinese (simplified)	6d4b 8bd5
".xn--11b5bs3a9aj6g"	Hindi	92a 930 940 915 94d 937 93e
".xn--80akhbyknj4f"	Russian	438 441 43f 44b 442 430 43d 438 435
".xn--9t4b1lyi5a"	Korean	d14c c2a4 d2b8
".xn--deba0ad"	Yiddish	5d8 5e2 5e1 5d8
".xn--g6w251d"	Chinese (traditional)	6e2c 8a66
".xn--hgbk6aj7f53bba"	Persian	622 632 645 627 6cc 634 6cc
".xn--hlcj6aya9esc7a"	Tamil	baa bb0 bbf b9f bcd b9a bc8
".xn--jxalpdlp"	Greek	3b4 3bf 3ba 3b9 3bc 3ae

".xn--kgbechtv"	Arabic	625 62e 62a 628 627 631
".xn--zckzah"	Japanese	30c6 30b9 30c8

The corresponding IDN example labels shown below are reserved as TLDs for examples; compare [Section 2.1](#). Additional IDN example TLDs, notably the final list of IDN example labels after the IDN test, can be reserved later as specified in [Section 5](#).

TLD A-label	Language	Example U-label (hex. code points)
".xn--9n2bp8q"	Korean	c2e4 b840
".xn--e1afmkfd"	Russian	43f 440 438 43c 435 440
".xn--fdbk5d8ap9b8a8d"	Yiddish	5d1 5f2 5b7 5e9 5e4 5bc 5d9 5dc
".xn--fsqu00a"	Chinese (simplified)	4f8b 5b50
".xn--fsqu00a"	Chinese (traditional)	4f8b 5b50
".xn--hxajbheg2az3al"	Greek	3c0 3b1 3c1 3ac 3b4 3b5 3b9 3b3 3bc 3b1
".xn--mgbh0fb"	Arabic	645 62b 627 644
".xn--mgbh0fb"	Persian	645 62b 627 644
".xn--p1b6ci4b4b3a"	Hindi	909 926 93e 939 930 923
".xn--r8jz45g"	Japanese	4f8b 3048
".xn--zkc6cc5bi7f6e"	Tamil	b89 ba4 bbe bb0 ba3 bae bcd

5. IANA Considerations

IANA reserves the TLDs ".example", ".invalid", ".localhost", ".test", ".tld", eleven IDN test TLDs, and nine IDN example TLDs as noted

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above. IANA reserves the second level domains ".example.com", ".example.net", and ".example.org".

IANA creates a registry of reserved TLDs; this can be done alongside existing IANA TLD registries at the discretion of IANA. The registry should contain references to the relevant specifications, for the 25 reserved TLDs specified here references to this memo will do.

Additional reserved TLDs require IETF review as defined in [\[RFC5226\]](#) [section 4.1](#) in conjunction with clause 4.3 in [\[RFC2860\]](#).

The *technical* purpose of a reserved TLD has to be stated in its specification.

Proposals to reserve TLD labels not permitted for ordinary TLDs, as

specified in [[RFC1123](#)] among others, e.g., labels not starting with a letter, or not following known LDH- and [[IDNAbis](#)] rules, are not expected to survive an IETF review without compelling reasons.

[6.](#) Security Considerations

Confusion and conflict can be caused by the use of a current or future top level domain name in experimentation or testing, as an example in documentation, to indicate invalid names, or as a synonym for the loop back address. Test and experimental software can escape and end up being run against the global operational DNS. Even examples used "only" in documentation can end up being coded and released or cause conflicts due to later real use and the possible acquisition of intellectual property rights in such "example" names.

The reservation of several top level domain names for these purposes minimizes such confusion and conflict.

[RFC4367] discusses various false assumptions based on domain labels, however this doesn't affect the reserved TLDs in this memo.

Readers need to be aware that the IANA registry of reserved TLDs in [Section 5](#) won't list all reserved TLDs for specific applications and protocols. The registry can only list reserved TLDs if somebody bothered to propose it, typically in an Internet-Draft, and the proposal was accepted in an IETF review.

[7.](#) Acknowledgments

This memo contains major parts of [[RFC2606](#)] written by Donald E. Eastlake and Aliza R. Panitz.

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[8.](#) References

[8.1.](#) Normative References

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- [I-D.iana-rfc3330bis]
Cotton, M., "Special Use IPv4 Addresses",
[draft-iana-rfc3330bis-03](#) (work in progress), June 2008.
- [IDNAbis] IETF, "Internationalized Domain Names in Applications (Revised)", April 2008,
<<http://tools.ietf.org/wg/idnabis>>.

[Appendix A](#). Educational Info

This informative appendix tries to answer three frequently asked questions:

1. As of 2008 IANA is the registrant of ".example.edu"; TLD ".edu" has no contract with ICANN; its administration is based on a five years contract with the US DoC renewed in 2006; see <<http://net.educause.edu/edudomain/policy.asp>>. Under amendment 6 of their current policy generic names cannot be registered. This is not exactly the same situation as for say ".example.org", where IANA is the registrant *and* registrar.

2. As of 2008 IANA is the registrant of ".example.info"; TLD ".info" was created by ICANN in 2001. The ".info" registry agreement lists reserved DNS labels including "example"; see <<http://www.icann.org/tlds/agreements/info/>> appendix 6 (2006) and K (2001), respectively. This is not exactly the same situation as for say ".example.org", where IANA is the registrant *and* registrar.
3. Ignoring [[RFC2965](#)] the TLD ".local" issue was discussed in a bunch of Internet-Drafts related to AS112, zeroconf, and [[RFC3927](#)]. Presumably TLD ".local" should be registered as reserved for technical reasons, but deserves its own document with the fine print.

[Appendix B](#). Document History

Changes in version 12:

- o Version 12 adjusts white space introduced in version 10 that should have been removed for version 11. Version 11 attracted no further feedback.
- o An informal last call on the IDNAbis list for version 10 resulted in one change for version 11 as noted below. Unsurprisingly the IDNAbis WG did not adopt this draft as work item. The WG also did not tackle the issue of IDNA <toplabel>s so far, and this memo is not the place to update [[RFC1123](#)] [section 2.1](#).

Changes in version 11:

- o Added nine IDN example labels corresponding to the IDN test labels as reserved TLDs after long discussions with two contributors confirming the stability and desirability of this approach.
- o Noted that the list of IDN example TLDs might be extended, and a final list can be reserved as specified here after the conclusion of the IDN test.

Changes in version 10:

- o Noted that only certain LDH-labels are or might be A-labels based on feedback. The details are or will be specified in [[IDNAbis](#)].
- o Moved [[RFC2860](#)] back to informative. Folks *apparently* disagree what it should be, more feedback needed to justify a downref.

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- o Added [\[RFC3696\]](#) again, its description of a <toplabel> covers the eleven IDN test TLDs.

Changes in version 09:

- o Fixed [\[RFC2860\]](#) link, clause 4.3 is a section of the MoU, not a section of the RFC containing this MoU.
- o Added ".tld" as reserved TLD for examples following a proposal by Bill McQuillan supported by some others.
- o Arguably ".bad" ideas ".bar", ".bat", ".baz", ".foo", and ".lit" not yet added for different reasons, they would need stronger support.

Changes in version 08:

- o Moved [\[RFC2860\]](#) to normative, inspired by feedback and the precedence in another BCP. Added the relevant sections in [\[RFC2860\]](#) and [\[RFC5226\]](#) to [Section 5](#).
- o Added a long blurb that the purpose of reserved TLDs has to be noted in their specifications, and that reserving TLDs not permitted as ordinary TLDs need very good reasons to survive the required IETF review.
- o [\[IDNAbis\]](#) hopefully fixes the <toplabel> problem in [\[RFC1123\]](#). This memo isn't the place to do this, as the issue is not limited to reserved TLDs, tests, and examples.

Changes in version 07:

- o Kept "nic", "whois", and "www" as known examples why there are no globally reserved LDH labels for whatever purpose below the top level.
- o Proposals to add ".internal", ".local", ".localdomain", and ".uucp" not adopted. This memo covers known test and example TLDs, as well as two other TLDs and three example SLDs inherited

from [[RFC2606](#)]. Reserved TLDs for other purposes deserve separate documents.

- o Added a note that internationalizations of ".invalid" are a non-starter, as this TLD is expected to be hardwired in some applications. For ".localhost" that should be obvious.
- o Review requests sent at different times to the APPS, general, [[IDNAbis](#)], INT, and OPS mailing lists.

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Changes in version 06:

- o Explanations of the terms LDH, A-label, and IDN added in [Section 1](#). Just in case added a reference to [[RFC4343](#)].
- o Downgraded [[RFC3696](#)] to [[RFC1123](#)]; for some months the best documentation of a <toplabel> was available in an erratum.

Changes in version 05:

- o Donald offered to co-author this memo.
- o Clarified that there are now additional TLDs recommended for tests, not only the original ".test" in [Section 2.4](#).

Changes in version 04:

- o In the "Public Suffix List" debate SM quoted [[RFC4085](#)], added to [Section 1](#).
- o Replaced "A record" by "address record" with references to [[RFC1122](#)] and [[RFC4291](#)] in [Section 2.3](#).
- o Added IDN test U-labels (in a crude hex. format due to RFC layout limitations) with the help of <<http://josefsson.org/idn.php/>> and <<http://www.imc.org/idna/>>.

Changes in version 03:

- o Swapped IANA and security considerations based on feedback, since version 01 the order anyway did not more follow <<http://tools.ietf.org/html/draft-rfc-editor-rfc2223bis-08#section-4>>.

- o Dave Cridland proposed another [[RFC4367](#)] caveat, there are no globally reserved LDH labels below the top level. LDH excludes special cases such as the empty label reserved for the root, and leaf labels starting with an underscore.
- o The informative [Appendix A](#) hopefully answers frequently asked questions about ".example.edu", ".example.info", and ".local".

Changes in version 02:

- o Added the related [[RFC3849](#)] and [[I-D.iana-rfc3330bis](#)] references. Added an [[RFC4367](#)] reference to the security considerations, as this explains one of many issues with any "well-known" label below the top level.

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- o Improved the IANA Considerations [Section 5](#) based on feedback. The registry of reserved TLDs needs references to the relevant specifications.
- o Added a caveat that the IANA registry of reserved TLDs cannot list all obscure ideas of specific applications and protocols; somebody has to trigger an IETF review for new registrations.

Changes in version 01:

- o Various editorial issues found by Tony Hansen fixed.
- o Added an [[IDNAbis](#)] reference. The authors believe that the IETF is not entitled to decree that ".example.edu" belongs to the set of three example-SLDs reserved by IANA.

Changes in version 00:

- o John Klensin suggested clarifying the guidelines for examples in [[RFC2606](#)], referenced by [<http://www.ietf.org/ID-Checklist.html>](http://www.ietf.org/ID-Checklist.html). Documenting the eleven new IDN test TLDs was anyway desirable.

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