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Let 'localhost' be localhost.
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Abstract

This document updates [RFC6761](#) by requiring that the domain "localhost." and any names falling within ".localhost." resolve to loopback addresses. This would allow other specifications to join regular users in drawing the common-sense conclusions that "localhost" means "localhost", and doesn't resolve to somewhere else on the network.

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[1.](#) Introduction

[Section 6.3 of \[RFC6761\]](#) invites developers to "assume that IPv4 and IPv6 address queries for localhost names will always resolve to the respective IP loopback address". That suggestion, unfortunately, doesn't match reality. Client software is empowered to send localhost names to DNS resolvers, and resolvers are empowered to return unexpected results in various cases. This has several impacts.

One of the clearest is that the [\[SECURE-CONTEXTS\]](#) specification declines to treat "localhost" as "secure enough", as it might not actually be the "localhost" that developers are expecting. This exclusion has (rightly) surprised some developers.

This document suggests that we should resolve the confusion by requiring that DNS resolution work the way that users expect: "localhost" is "localhost", and not something other than loopback. Resolver APIs will resolve ".localhost." to loopback addresses [\[RFC5735\]](#)

[2.](#) Terminology and notation

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [\[RFC2119\]](#).

IPv4 loopback addresses are defined in [Section 2.1 of \[RFC5735\]](#) as "127.0.0.0/8".

IPv6 loopback addresses are defined in [Section 3 of \[RFC5156\]](#) as "::1/128".

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3. Recommendations

This document updates [Section 6.3 of \[RFC6761\]](#) in the following ways:

1. Item #3 is changed to read as follows:

Name resolution APIs and libraries MUST recognize localhost names as special, and MUST always return an IP loopback address for address queries and negative responses for all other query types. Name resolution APIs MUST NOT send queries for localhost names to their configured caching DNS server(s).

2. Item #4 is changed to read as follows:

Caching DNS servers MUST recognize localhost names as special, and MUST NOT attempt to look up NS records for them, or otherwise query authoritative DNS servers in an attempt to resolve localhost names. Instead, caching DNS servers MUST generate an immediate negative response.

3. Item #5 is changed to replace "SHOULD" with "MUST":

Authoritative DNS servers MUST recognize localhost names as special and handle them as described above for caching DNS servers.

4. Item #7 is changed to remove "probably" from the last sentence:

DNS Registries/Registrars MUST NOT grant requests to register localhost names in the normal way to any person or entity. Localhost names are defined by protocol specification and fall outside the set of names available for allocation by registries/registrars. Attempting to allocate a localhost name as if it were a normal DNS domain name will not work as desired, for reasons 2, 3, 4, and 5 above.

4. Implementation Considerations

This change would make developers sad if they map domain names like 'server1.localhost' to something other than a loopback address. There are likely other situations in which it might create unexpected behaviors.

5. References

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5.1. Normative References

- [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", [BCP 14](#), [RFC 2119](#), March 1997.
- [RFC5156] Blanchet, M., "Special-Use IPv6 Addresses", [RFC 5156](#), DOI 10.17487/RFC5156, April 2008, <<http://www.rfc-editor.org/info/rfc5156>>.
- [RFC5735] Cotton, M. and L. Vegoda, "Special Use IPv4 Addresses", [RFC 5735](#), DOI 10.17487/RFC5735, January 2010, <<http://www.rfc-editor.org/info/rfc5735>>.
- [RFC6761] Cheshire, S. and M. Krochmal, "Special-Use Domain Names", [RFC 6761](#), DOI 10.17487/RFC6761, February 2013, <<http://www.rfc-editor.org/info/rfc6761>>.

5.2. Informative References

- [SECURE-CONTEXTS]
West, M., "Secure Contexts", n.d., <<http://w3c.github.io/webappsec-secure-contexts/>>.

Appendix A. Acknowledgements

Ryan Sleevi and Emily Stark informed me about the strange state of 'localhost' resolution. Erik Nygren poked me to take another look at the set of decisions we made in [[SECURE-CONTEXTS](#)] around "localhost."; this document is the result.

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