

Pre-Delegation Testing

DNS Anycast Test Cases

Version C

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1. Introduction

1.1 Scope

The Pre-Delegation Testing Provider will test the DNS service for the designated zone and verify the resulting answers. The test case described in this document is done using a program for testing zone validity for all the supplied unicast name servers in all anycast nodes for the designated zone.

1.2 References

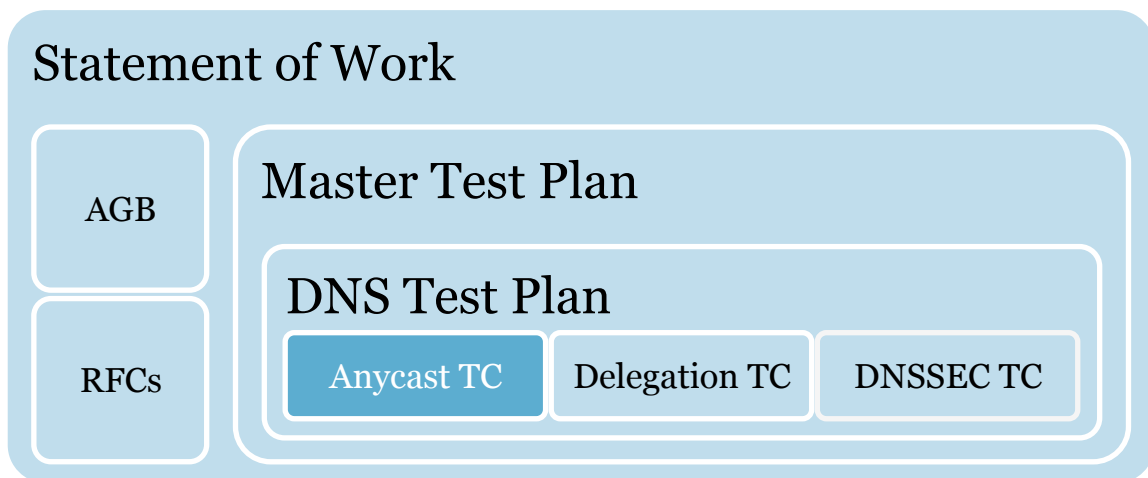
1.2.1 External

- IEEE 829-2008
- ICANN gTLD Applicant Guidebook, Version 2012-06-04

1.2.2 Internal

- Pre-Delegation Testing, Statement of Work
- Pre-Delegation Testing, Master Test Plan
- Pre-Delegation Testing, DNS Test Plan

1.2.3 Document Hierarchy



1.3 Context

All tests are to be performed over IPv4 and IPv6 from at least five points on the Internet. At least one probe node should be located in every ICANN region.

1.4 Notation for description

Each test case for the DNS service is described in their own section. The test procedures are described directly in the test case.

2. In case of anycast, test of all individual unicast nodes

2.1 Test case identifier

DNS13 Anycast, test of individual unicast nodes

2.2 Objective

If using anycast, each individual server in each anycast set will be tested. All individual servers must be authoritative for the designated zone over UDP and TCP.

This test case is testing all unicast nodes for all anycast name servers specified for the designated zone. The test case is not performed if there are no anycast networks provided by the applicant.

This test case fulfills the anycast requirements 5.2.2 in the gTLD Application Handbook, Module 5.

2.3 Inputs

The following information will be needed as input for this test case:

Id	Description	Type
TLD	The ASCII compatible name of the TLD	String
DnsAnycastNameServer-[1..n]	FQDN or IPv4 or IPv6 address for the name server, with optional port numbers	String

The above input parameters contain the list of all individual unicast locations for an anycast name server.

If the zone uses anycast, all unicast addresses must be listed parameters in order to be tested, or this test fails before the next step.

If the unicast addresses cannot be provided, the applicant must provide a DNS proxy address with port numbers for all the unicast servers in the anycast network. If an FQDN is provided, the domain service is looked up through a SRV record for `_domain._tcp.<FQDN>` or `_domain._udp.<FQDN>` query.

2.4 Outcome(s)

All unicast locations must be available for all the anycast name servers for this test to pass.

80% of the name servers must reply with an authoritative answer over both UDP and TCP for this test to pass.

2.5 Environmental needs

All authoritative name servers listed in the inputs section 2.3 must be authoritative for the designated zone.

2.6 Special procedural requirements

This test case is dependent on the availability of all unicast addresses, however we cannot verify that all unicast addresses has been made available for testing.

2.7 Intercase dependencies

This test has no intercase dependencies.

2.8 Ordered description of steps to be taken to execute the test case

A TCP and UDP query is made for each name server in the input data described in section 2.3.

3. (Anycast) Consistency between glue and authoritative data

3.1 Test case identifier

DNS18 Anycast, Consistency between glue and authoritative data

3.2 Objective

If using anycast, each individual server in each anycast set will be tested.

For name servers that have IP addresses listed as glue, the IP addresses must match the authoritative A and AAAA records for that host.

3.3 Inputs

The following information will be needed as input for this test case:

Id	Description	Type
TLD	The ASCII compatible name of the TLD	String
DnsAnycastNameServer-[1..n]	FQDN or IPv4 or IPv6 address for the name server, with optional port numbers	String
DnsNameServer-[1..n]	FQDN of authoritative name server	String
DnsGlueRecord-[1..n]	All IPv4 or IPv6 addresses for auth NS	String

The above input parameters are the name server delegation data, but also add the list of all individual unicast locations for an anycast name server.

3.4 Outcome(s)

80% of the name servers must reply with an authoritative answer. If there is an inconsistency between any IP-address given from the delegation, and the glue records retrieved from the name servers, the test fails.

3.5 Environmental needs

All authoritative name servers listed in the inputs section 2.3 must be authoritative for the designated zone.

3.6 Special procedural requirements

This test case is dependent on the availability of all unicast addresses, however we cannot verify that all unicast addresses has been made available for testing.

3.7 Intercase dependencies

This test has no intercase dependencies.

3.8 Ordered description of steps to be taken to execute the test case

A query is made for each DnsAnycastNameServer in the input data described in section 3.3. The name server data on the input parameters side (DnsNameServer and DnsGlueRecord) is compared to the content of the answers for all the name servers. If there is an inconsistency between the sets of IP-addresses the test indicates failure.

4. DNS19 (Anycast) SOA record consistency between authoritative name servers

4.1 Test case identifier

DNS19 Anycast, SOA record consistency between authoritative name servers

4.2 Objective

If using anycast, each individual server in each anycast set will be tested.

The data served by the authoritative name servers for the designated zone must be consistent. All authoritative name servers must serve the same SOA record for the designated zone.

4.3 Inputs

See section 2.3 in this document.

4.4 Outcome(s)

80% of the name servers must reply with an authoritative answer.

If there is an inconsistency between any SOA records retrieved for the designated zone, the test fails.

4.5 Environmental needs

All authoritative name servers listed in the inputs section 2.3 must be authoritative for the designated zone.

4.6 Special procedural requirements

This test case is dependent on the availability of all unicast addresses, however we cannot verify that all unicast addresses has been made available for testing.

4.7 Intercase dependencies

This test has no intercase dependencies.

4.8 Ordered description of steps to be taken to execute the test case

A SOA query for the designated zone is made for each DnsAnycastNameServer in the input data described in section 2.3. If the answers are not consistent this test fails.

5. (Anycast) NS record consistency between authoritative name servers

5.1 Test case identifier

DNS20 Anycast, NS record consistency between authoritative name servers

5.2 Objective

If using anycast, each individual server in each anycast set will be tested.

The data served by the authoritative name servers for the designated zone must be consistent. All authoritative name servers must serve the same NS record set for the designated domain.

5.3 Inputs

See section 2.3 in this document.

5.4 Outcome(s)

80% of the name servers must reply with an authoritative answer.

If there is an inconsistency between any set of NS records retrieved for the designated zone, the test fails.

5.5 Environmental needs

All authoritative name servers listed in the inputs section 2.3 must be authoritative for the designated zone.

5.6 Special procedural requirements

This test case is dependent on the availability of all unicast addresses, however we cannot verify that all unicast addresses has been made available for testing.

5.7 Intercase dependencies

This test has no intercase dependencies.

5.8 Ordered description of steps to be taken to execute the test case

An NS query for the designated zone is made for each DnsAnycastNameServer in the input data described in section 2.3. If the answers are not consistent this test fails.

6. (Anycast) No open recursive name service

6.1 Test case identifier

DNS21 Anycast, No open recursive name service

6.2 Objective

If using anycast, each individual server in each anycast set will be tested.

The authoritative name servers must not provide recursive name service.

6.3 Inputs

See section 2.3 in this document.

6.4 Outcome(s)

80% of the name servers must reply with an authoritative answer.

If any of the name servers returns with an RCODE other than SERVFAIL or REFUSED, this test case fails.

6.5 Environmental needs

All authoritative name servers listed in the inputs section 2.3 must be authoritative for the designated zone.

6.6 Special procedural requirements

This test case is dependent on the availability of all unicast addresses, however we cannot verify that all unicast addresses has been made available for testing.

6.7 Intercase dependencies

This test has no intercase dependencies.

6.8 Ordered description of steps to be taken to execute the test case

A SOA query for an almost certainly nonexistent name sent to the list of name servers, with the recursion request and DNSSEC flags set, resulting in a response with the recursion available flag set, an RCODE other than SERVFAIL or REFUSED and not referring to other servers. If the response is a possible referral, a failure message is emitted from the test of the name server.

7. (Anycast) Same source address

7.1 Test case identifier

DNS22 Anycast, Same source address

7.2 Objective

If using anycast, each individual server in each anycast set will be tested.

Responses from the authoritative name servers must contain the same source IP address as the destination IP address of the initial query.

7.3 Inputs

See section 2.3 in this document.

7.4 Outcome(s)

80% of the name servers must reply with an authoritative answer.

If any of the name servers does not return with the same source IP address as the destination IP address of the query, this test case fails.

7.5 Environmental needs

All authoritative name servers listed in the inputs section 2.3 must be authoritative for the designated zone.

7.6 Special procedural requirements

This test case is dependent on the availability of all unicast addresses, however we cannot verify that all unicast addresses has been made available for testing.

7.7 Intercase dependencies

This test has no intercase dependencies.

7.8 Ordered description of steps to be taken to execute the test case

One query per name server is made, and the answer is verified to come from the same IP address. If there is a mismatch between these IP addresses, a failure message is emitted from the test of the name server.

8. Global

8.1 Glossary

The glossary is available in the Master Test Plan.

8.2 Document change procedures

Document change procedures are documented in the Master Test Plan.