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# Third-Party ALTO Server Discovery (3pdisc)
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Abstract

The goal of Application-Layer Traffic Optimization (ALTO) is to provide guidance to applications that have to select one or several hosts from a set of candidates capable of providing a desired resource. ALTO is realized by a client-server protocol. Before an ALTO client can ask for guidance it needs to discover one or more ALTO servers that can provide suitable guidance.

This document specifies a procedure for third-party ALTO server discovery, which can be used if the ALTO client is not co-located with the actual resource consumer, but instead embedded in a third party such as a peer-to-peer tracker.

## Requirements Language

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 RFC 2119 [RFC2119].

## 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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## 1. Introduction

The goal of Application-Layer Traffic Optimization (ALTO) is to provide guidance to applications that have to select one or several hosts from a set of candidates capable of providing a desired resource [RFC5693]. ALTO is realized by a client-server protocol, see requirement AR-1 in [RFC6708]. Before an ALTO client can ask for guidance it needs to discover one or more ALTO servers that can provide suitable guidance.

For applications that use a centralized resource directory, such as tracker-based P2P applications, the efficiency of ALTO is significantly improved if the ALTO client is embedded in said resource directory instead of the resource consumer (see Section 4.1 of [I-D.ietf-alto-deployments]). The ALTO client embedded into the resource directory asks for guidance on behalf of the resource consumers. To that end, it needs to discover ALTO servers that can give guidance suitable for these resource consumers, respectively. This is called third-party party ALTO server discovery.

This document specifies a procedure for third-party ALTO server discovery. In other words, this document tries to meet requirement AR-33 in [RFC6708]. To some extent, AR-32, i.e., resource consumer initiated ALTO server discovery, can be seen as a special case of third-party ALTO server discovery. For that matter, an ALTO client embedded in a ressouce consumer would have to figure out its own "public" IP address (e.g., using STUN [RFC5389]), and then perform the procedures described in this document. However, note that a less flexible yet simpler approach for resource consumer initiated ALTO server discovery is specified in [I-D.ietf-alto-server-discovery].

The ALTO protocol specification [I-D.ietf-alto-protocol] is based on HTTP and expects the discovery procedure to yield an HTTP(S) URI. Therefore, this procedure is based on U-NAPTR [RFC4848]. It tries to directly find one or more ALTO server(s) that can give suitable guidance to the ALTO client. Other schemes, such as discovering an arbitrary ALTO server (which might not be able to give suitable guidance to the client in question) and asking it to redirect the client to a better server, are not considered in this document.

A more detailed discussion of various options where to place the funcional entities comprising the overall ALTO architecture can be found in [I-D.ietf-alto-deployments].

Comments and discussions about this memo should be directed to the ALTO working group: alto@ietf.org.

## 2. Third-Party ALTO Server Discovery Procedure Overview

The third-party ALTO server discovery procedure is performed in two steps:

1. A DNS suffix is yieleded, by means of a DNS PTR lookup on the resouce consumer's IP address (or the "public" IP address of the outermost NAT in front of the resource consumer). This IP address is the source address of application protocol messages arriving at the resource directory.

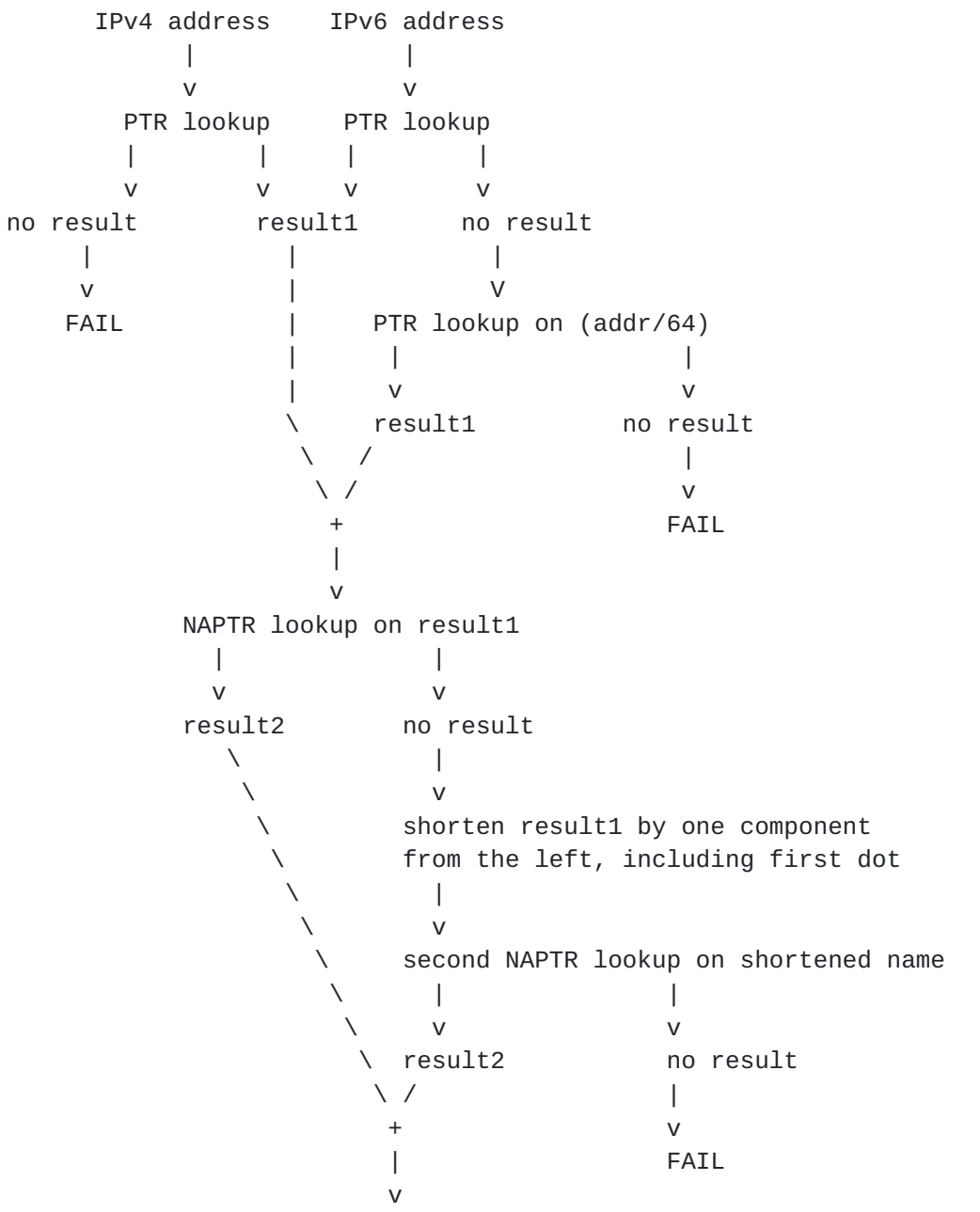
2. This DNS suffix is used for an U-NAPTR lookup yielding the URI. Further DNS lookups may be neccessary to determine the ALTO server's IP address(es).

Typically, but not neccessarily, the DNS suffix is the domain name in which the client is located, i.e., a PTR lookup on the client's IP address would yield a similar name. However, due to the widespread use of network address translation (NAT), trying to determine the DNS suffix through a PTR lookup on the client's IP address is not recommended.

Note: Step 1 could be merged with Step 1 of [I-D.ietf-alto-server-discovery] in order to yield a combined draft.

## 3. Third-party ALTO Server Discovery Procedure Specification

A already outlined in Section 2 the ALTO server discovery procedure is performed in two steps, which will be specified in Section 3.1 and Section 3.2, respectively. The following figure gives an overview:




Third-party ALTO server discovery procedure's output is: result2

### 3.1. Step 1: Retrieving the Domain Name

Textual specification TBD. See figure above.

Somewhere in the figure, we do a lookup on addr/64, which is the "network part" of the IPv6 address computed as follows: addr/64 := addr & 0xFFFF:FFFF:FFFF:FFFF:0000:0000:0000:0000.

Note that the algorithm at some point tries to chop one component from the DNS name, but there is no recursion, i.e., no DNS tree walking.

### 3.2. Step 2: U-NAPTR Resolution

See Step 2 in [I-D.ietf-alto-server-discovery].

## 4. Deployment Considerations

The mechanism specified in this document needs some configuration effort in order to work properly.

### 4.1. IPv4 PTR lookup

Especially the domain name retrieved through the reverse DNS lookup (PTR records) and the U-NAPTR entry need to be coordinated. In this section we discuss this configuration for different scenarios.

#### 4.1.1. Private customers or very small businesses

For private customers and very small businesses that are DSL or cable customers often a dynamically assigned IP address is provisioned. Here, the reverse DNS lookup (PTR records) are controlled by the ISP and they point to the ISP's domain, e.g.:

d-c-b-a.dsl.westcoast.my-isp.net

In this case, it would be the responsibility of the respective ISP to provide U-NAPTR entries for the DNS suffix without the endhost part, e.g.:

westcoast.my-isp.net

#### 4.1.2. Medium-size customer networks

The second class of customers have their own DNS domain but only one single upstream ISP, e.g.:

(1) ISP my-isp.net assigns an IP address a.b.c.d to its customer

(2) The customer decides that reverse mapping for a.b.c.d should be whatever.customerdomain.com

(3) If the customer wants to support ALTO, he has to ask the ISP for the URI of the ISP's ALTO server which can give guidance to a.b.c.d. Assume that ISP replies it is http://altoserver.my-isp.net

(4) The customer establishes a U-NAPTR entry for his domain

```
customerdomain.com.   IN NAPTR 200  10   "u"    "ALTO:http"
     "!.*!http://altoserver.my-isp.net!"  ""
```

#### 4.1.3. Large Customers

For very large customers with multiple upstream connections we assume that they have their very own traffic optimization policies and thus run their own ALTO server anyway. In this case they need to manage their DNS entries accordingly.

### 4.2. IPv6 PTR lookup

The IPv6 address space per subnet is much larger than with IPv4 and mechanisms such as privacy extensions allow a host to randomly pick an IP address. Establishing static PTR records for all IPv6 addresses in a /64 prefix is a cumbersome task and unlikely to happen. One alternative is the use of dynamic DNS. Another option is to do without PTR records for individual IP addresses and just have a PTR record for the "network address". The algorithm presented in the figure above can deal with that situation due to the second PTR lookup on (addr/64) if the direct PTR lookup fails.

## 5. Operational Considerations

TBD.

## 6. Security Considerations

TBD. See also [I-D.ietf-alto-server-discovery].

## 7. IANA Considerations

None.

# 8. References

## 8.1. Normative References

[RFC2119] Bradner, S., "Key words for use in RFCs to Indicate Requirement Levels", BCP 14, RFC 2119, March 1997.

## 8.2. Informative References

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## Appendix A. Contributors List and Acknowledgments

The initial version of this document was co-authored by Marco Tomsu <marco.tomsu@alcatel-lucent.com>.

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