ALTO
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Y. Cao
ZTE Corporation
L. Li
Unaffiliated
F. Zhang
ZTE Corporation
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Hierarchical ALTO
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Abstract

The ALTO Service allows applications to obtain network information for optimizing their traffic. An ALTO server maintains ALTO data and provides ALTO services to its clients. In a big network, a single ALTO server could a bottleneck in performance. To increase the scalability of ALTO, this document proposes a hierarchical architecture for ALTO. This architecture allows collecting ALTO information and/or providing ALTO services in a distributed manner. An ISP can deploy multiple ALTO servers in a hierarchical architecture to improve scalability.

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1. Introduction

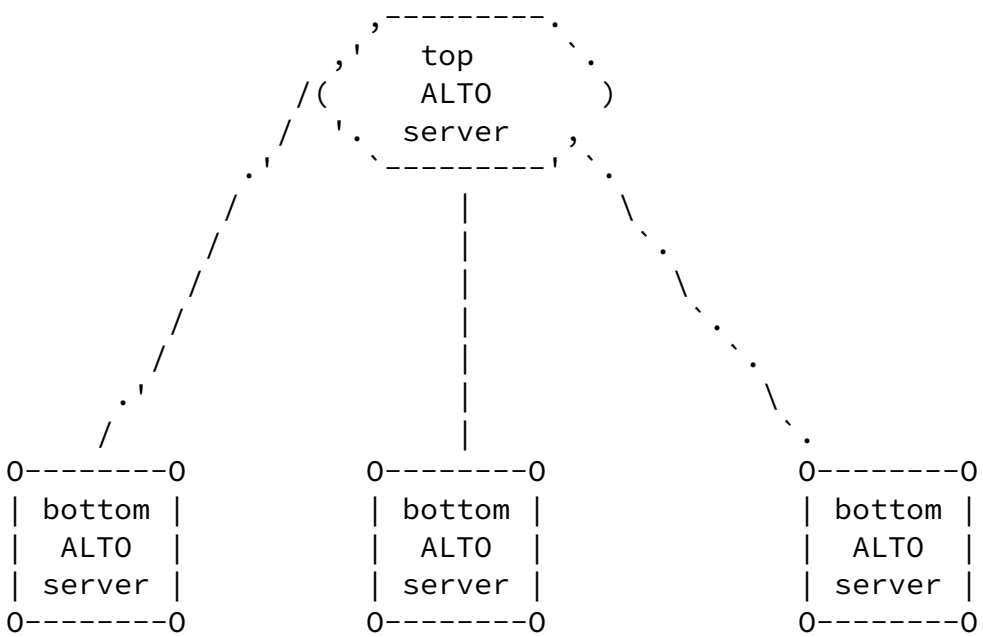
The ALTO Service allows applications to obtain network information for optimizing their traffic. The ALTO protocol [I-D.ietf-alto-protocol] defines communications between an ALTO client and an ALTO server. An ALTO server need to maintain ALTO information and provides ALTO services to its clients. In a big network, a single ALTO could a bottleneck in performance. Therefore, [I-D.ietf-alto-protocol] proposes some mechanisms to improve scalability including HTTP caching, application redistributing ALTO inforamtion and deploying multiple ALTO servers. [I-D.picconi-alto-home-proxy] discusses the use of ALTO proxies running on home devices to improve scalabity, as well as reduce ALTO traffic and query latency. [I-D.gu-alto-redistribution] discusses P2P applications redistributing ALTO inforamtion.

To increase the scalability of ALTO, this document proposes a hierarchical architecture for ALTO. This architecture allows collecting ALTO information and/or providing ALTO services in a distributed manner. An ISP can deploy multiple ALTO servers in a hierarchical architecture to improve scalability. Compared with the mechanism discussed in [I-D.gu-alto-redistribution], this mechanism dosn't require the help from users or applications. This mechanism considers not only the load of providing ALTO services, but also the load of collecting and generating ALTO inforamtion. The same as [I-D.dulinski-alto-inter-alto-protocol], this document invovles the interface between ALTO servers. But [I-D.dulinski-alto-inter-alto-protocol] and this document focus on different scenarios, and address different issues. [I-D.dulinski-alto-inter-alto-protocol] focuses on the relation between ALTO servers from different ASes, while this document focuses on the ALTO servers inside an ISP. [I-D.dulinski-alto-inter-alto-protocol] addresses the issues about inter-AS ALTO information exchange as dicussed in [I-D.dulinski-alto-inter-problem-statement].

2. Terminology

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].

3. Hierarchical ALTO

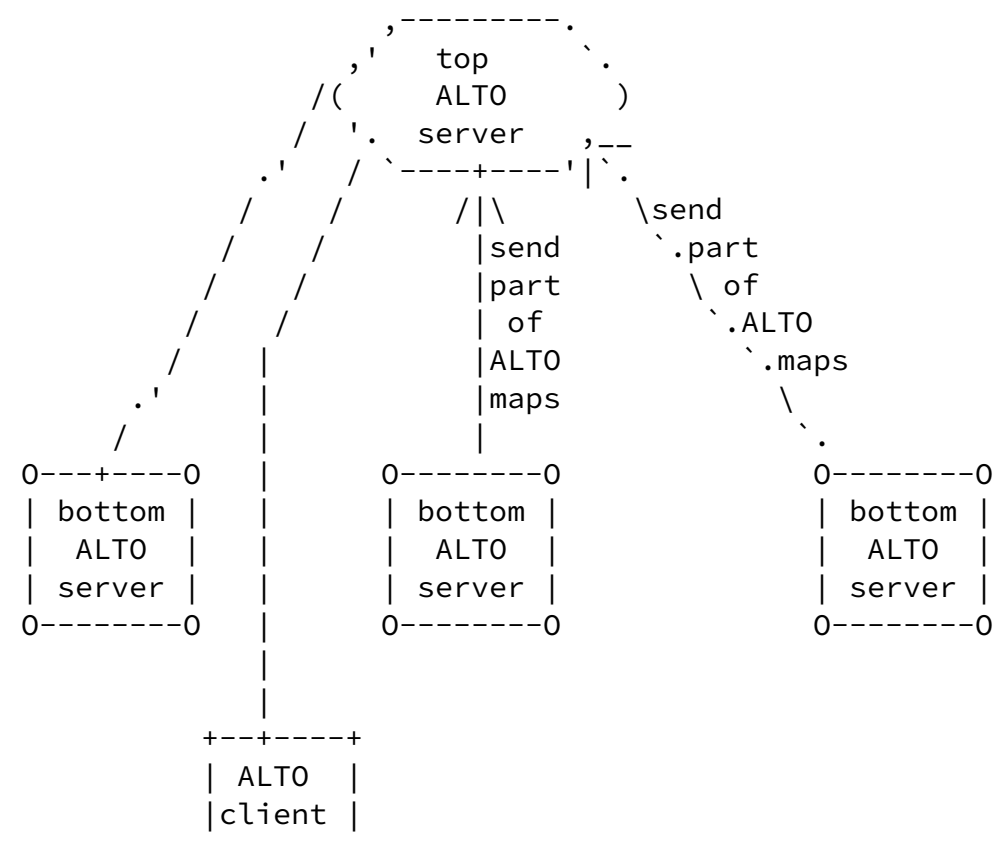


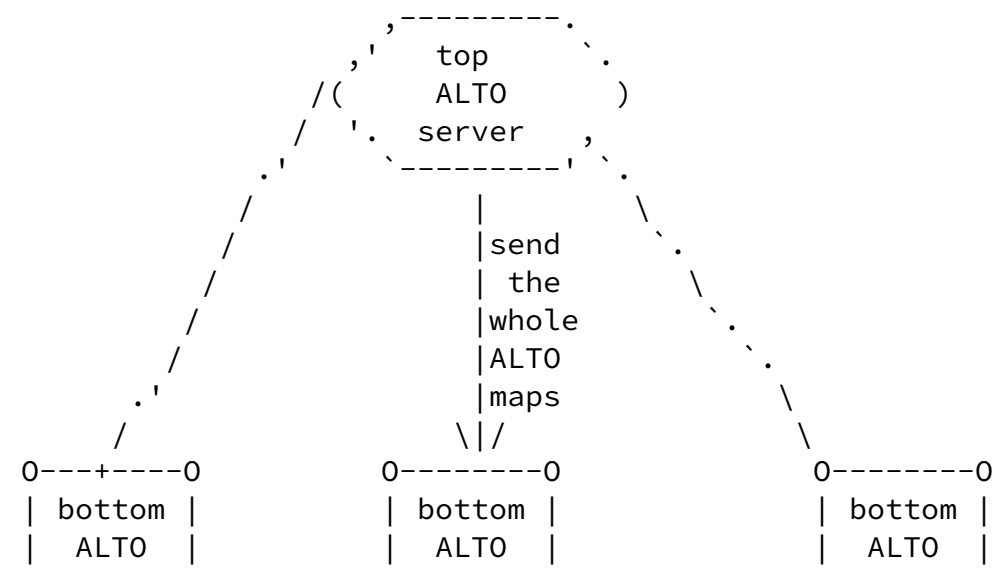
As shown in the figure above, there are two tiers of ALTO servers in the hierarchical ALTO architecture. There are multiple ALTO servers in the bottom tier, while there is only one ALTO server in the top tier. ALTO servers in the bottom tier can collect maps and/or provide ALTO services collectively. Three usages for the hierarchical ALTO architecture are described as below.

3.1. ALTO Data Collection Usage

In this usage, ALTO data are collected and generated in a distributed manner, while ALTO services are provided to ALTO clients in a

centralized manner. Each bottom ALTO server, i.e. ALTO server in the bottom tier, is responsible for collecting some topology data and generating a part of the ALTO maps. All bottom servers together send all parts of the ALTO maps to the top ALTO server, i.e. the ALTO server in the top tier. Only the top ALTO server has the whole ALTO maps, and only the top ALTO server provides ALTO services to ALTO clients. Bottom ALTO servers only provide services to the top ALTO server. Bottom ALTO servers could be dedicated servers or coupled with routers.



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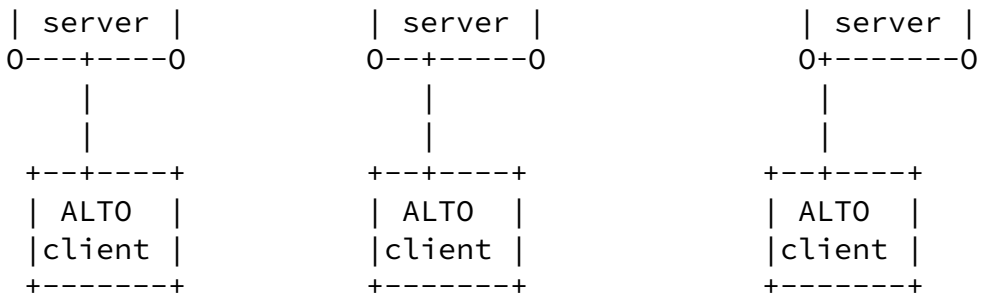
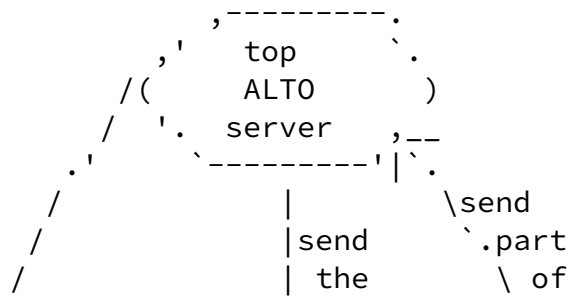
3.2. ALTO Map Distribution Usage

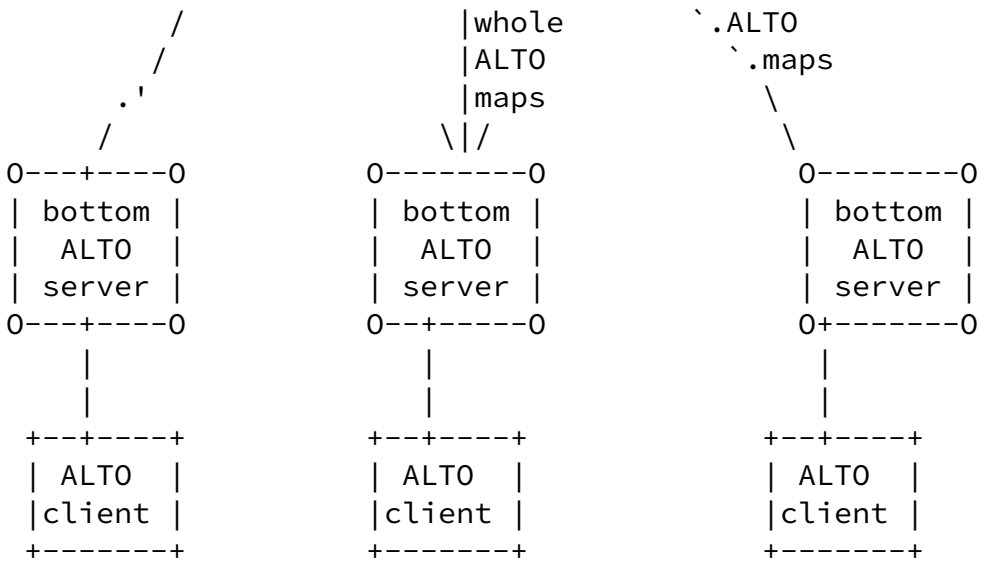
In this usage, ALTO data are generated in a centralized manner, while ALTO services are provided to ALTO clients in a distributed manner. The top ALTO server is responsible for collecting all topology data and generating the ALTO maps. The top ALTO server distributes the ALTO maps to all bottom ALTO servers. Both the top ALTO server and the bottom ALTO servers have the ALTO maps. All ALTO servers or only the bottom ALTO servers provide ALTO services to ALTO clients.



3.3. ALTO Data Reflection Usage

In this usage, ALTO data are generated in a distributed manner, and ALTO services are provided to ALTO clients also in a distributed manner. Each bottom ALTO server is responsible for collecting some topology data and generating a part of the ALTO maps. All bottom ALTO servers together send all parts of the ALTO maps to the top ALTO server. Then the top ALTO server distributes the whole ALTO maps to all bottom servers. All ALTO servers have the whole ALTO maps. All ALTO servers or only the bottom ALTO servers provide ALTO services to ALTO clients. When receiving ALTO map update from a bottom ALTO server, the top ALTO server sends update data to the other bottom ALTO servers like a reflector of ALTO data.





4. Security Considerations

TBD

5. References

5.1. Normative References

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

5.2. Informative References

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Authors' Addresses

Yalin Cao
ZTE Corporation
RD Building 1,Zijinghua Road No.68
Yuhuatai District,Nanjing 210012
P.R.China

Email: cao.yalin1@zte.com.cn

Lichun Li
Unaffiliated

Email: lilichun@gmail.com

Fei Zhang
ZTE Corporation
RD Building 1,Zijinghua Road No.68
Yuhuatai District,Nanjing 210012
P.R.China

Email: zhang.fei3@zte.com.cn