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End Point Properties for Peer Selection
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Abstract

The initial purpose for ALTO protocol is to provide better than random peer selection for p2p networks. The peer selection method does not only depend on the peer location, but also on other properties of a peering node. In this document, we define additional endpoint properties.

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1 Introduction

The initial purpose for ALTO protocol is to provide better than random peer selection for p2p networks. The peer selection method does not only depend on the peer location, but also on other properties of a peering node. In this document, we define extended endpoint property extensions that will impact peer selection.

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].

This document makes use of the ALTO terminology defined in RFC 5693 [RFC5693].

3 End Point Extensions

This document defines new endpoint property types for the ALTO protocol [RFC 7285].

3.1. Endpoint Property Type: p2p_caching

As described in [I-D.draft-deng-alto-p2pcache], P2P caching node can also act as p2p peers in a p2p network. If a p2p caching peer is located near the edge of the network, it will reduce the backbone traffic, as well as the uploading traffic. [RFC7069] provides one example of such caching nodes. P2P caching peers are usually expected to be given higher priority than the ordinary peers for serving a content request so as to optimize the network traffic. So it's necessary for the endpoint property to support this indication.

The value for this property (defined as a boolean) is either "true" or "false". If the peer in question is actually a caching node, the value of this property wrt the peer is set to "true".

3.2. Endpoint Property Type: battery_limited

Another important endpoint property that will impact peer selection is what kind of power supply the peer has. It can be either the electric power or the battery supply. And for most of the time, it is safe to bet that electric power supplied nodes would stay online longer than those battery supplied nodes. And most of the nowadays intelligent equipments are aware of their power supply type. But it is necessary that whether or not the power supply of a peer is limited by its battery can be queried through some method.

The value for this property (defined as a boolean) is either "true" or "false". If the peer in question is actually battery-limited, the value of this property wrt the peer is set to "true".

3.3. Endpoint Property Type: access_preference

The third important endpoint property that will impact peer selection is the node access type. If it is a node owned by a home subscriber, the access type can be DSL (Digital Subscriber Line), FTTB (Fiber To The Building), or FTTH (Fiber To The Home). If it is deployed in a data center, one may prefer to specify a special access type for it, because it is likely to be more robust, and have more network resources than home users. A p2p application may have its own algorithm for peer selection if the node access type information can be provided.

The value for this property (defined as integer) can be set by the ISP of the ALTO server, based on its own relative preference to different network access types. A peer with the higher value is more preferable than another peer with the lower value.

For example, an ISP could use the following setting for now:

1 = DSL; 10 = FTTB; 12 = FTTH; 50 = DC;

and add "100=new_technology", when some new technology better than FTTH appears later.

3.4. Endpoint Property Type: volume_limited

Many wireless operators offer low-cost plans, which limit the amount of data to be transmitted within a month to some gigabytes. After that they will throttle the subscriber's bandwidth or charge extra money. Hosts with such a tariff, could be tagged by another endpoint property "volume_limited" and should be avoided for peer selection.

The value for this property (defined as a boolean) is either "true" or "false". If a peer is constrained by such a subscription plan, the value of this property wrt the peer is set to "true".

4 Security Considerations

The indication of new endpoint properties to the ALTO clients may set targets for the malicious nodes to hack.

5. IANA Considerations

This document adds the following new endpoint property types to the existing registry created by ALTO protocol [RFC7285].

Identifier	Intended Semantics
p2p_caching (boolean)	Whether the peer is a network cache, value is "true" or "false".
battery_limited (boolean)	Whether the peer is battery-limited, value is "true" or "false".
link_preference (integer)	The relative preference from the ISP's point of view based on the type of network access of the peer, value is a integer.
volume_limited (boolean)	Whether the peer's plan is constrained, value is "true" or "false".

6. Acknowledgements

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7 References

7.1 Normative References

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

[RFC7285] Alimi, R., Penno, R., and Y. Yang, "ALTO Protocol", RFC7285, March 2014.

7.2 Informative References

[I-D.draft-deng-alto-p2pcache] Deng, L., Chen, W., and Q. Yi, "Considerations for ALTO with network-deployed P2P caches", draft-deng-alto-p2pcache-03 (work in progress), February 2014.

[RFC7069] Alimi, R., Rahman, A., Kutscher, D., Yang, Y., Song, H., and K. Pentikousis, "DECoupled Application Data Enroute (DECADE)", RFC 7069, November 2013.

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