Third-party ALTO server discovery

draft-kiesel-alto-3pdisc-02

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Different possibilities for location of ALTO client

Possibility 1: ALTO client in the resource consumer ("peer")

Peer queries first the tracker and then invokes ALTO for guidance regarding the tracker’s result list
Different possibilities for location of ALTO client

Possibility 2: ALTO client in the resource directory ("tracker")

Tracker with embedded ALTO client optimizes its result list before returning it to the client.
The need for 3rd party ALTO queries
Why a peer-based solution is not sufficient

Peer-based ALTO queries

Tracker-based ALTO queries

Numerical example

- Swarm with 10,000 peers, 100 desirable peers, 100 entries in tracker result list

- Regular query to the tracker yields (as input for later ALTO query) ...
  - With probability 36%, the return list contains not a single favorable peer
  - With probability 99%, there are only four or less of the favorable peers on the list

- Peer-based ALTO query cannot consider enough “favorable” peers

⇒ Peer-based ALTO queries of limited benefit in tracker-based P2P system
The need for third-party ALTO server discovery
Challenge in multi-domain environments

Third-party ALTO server discovery required to find the "right" ALTO server, which can give guidance to the respective peer.
The need for third-party ALTO server discovery

Summary

- Third-party ALTO server queries
  - Resource directory can perform ALTO queries on behalf of resource consumer
  - Tracker-based applications require third-party ALTO server queries

- Third-party ALTO server discovery
  - Mechanism to make sure that a third-party ALTO query can be directed to the correct ALTO server
  - In multi-domain deployment scenarios, there will not be a single ALTO server

- With third-party ALTO server discovery, it is ensured that a set with the “best” resource providers is delivered to the resource consumer
Realization of third-party ALTO server discovery
Six different solutions

**Approach #1:**
ALTO client in tracker calls external lookup mechanism, e.g., DNS

**Approach #2:**
Inter-ALTO server protocol to redirect ALTO query based on peer’s IP address

**Approach #3** and **Approach #4:**
Like #1 or #2, respectively, but introduce peer ID to distinguish peers behind carrier grade NAT

**Approach #5:**
Peer discovers its ALTO server’s IP address and sends it to the tracker, which then queries this ALTO server

**Approach #6:**
Peer retrieves guiding information on its own (e.g., P4P/infoexport style), and sends this information to the tracker
Realization of ALTO server discovery
Initial comparison

<table>
<thead>
<tr>
<th>Server discovery</th>
<th>Requires changes of P2P application</th>
<th>Requires changes of ALTO protocol</th>
<th>Suitable for peers behind large NATed domains</th>
<th>Scalability and privacy issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1 New discovery protocol, e. g. DNS-based</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>#2 Inter-ALTO-server-protocol</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
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<tr>
<td>#3 New discovery protocol, e. g. DNS-based</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>#4 Inter-ALTO-server-protocol</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>#5 E. g., DHCP option</td>
<td>Yes</td>
<td>No</td>
<td>Yes (partly)</td>
<td>No</td>
</tr>
<tr>
<td>#6 E. g., DHCP option</td>
<td>Yes</td>
<td>No</td>
<td>Yes (partly)</td>
<td>No</td>
</tr>
</tbody>
</table>
Conclusion

Summary and next steps

Summary

- Third-party ALTO server discovery required for important applications, namely tracker-based P2P applications
- At least six different approaches, which are evaluated in the draft
- Approach #1 seems to be promising
  - No assumptions on (P2P) application protocol needed
  - No inter-ALTO server protocol needed
  - DNS-based solution possible

Next steps

- Further evaluate the different options
- Possibly merge with draft-song-alto-server-discovery
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