

# Third-party ALTO server discovery

draft-kiesel-alto-3pdisc-02

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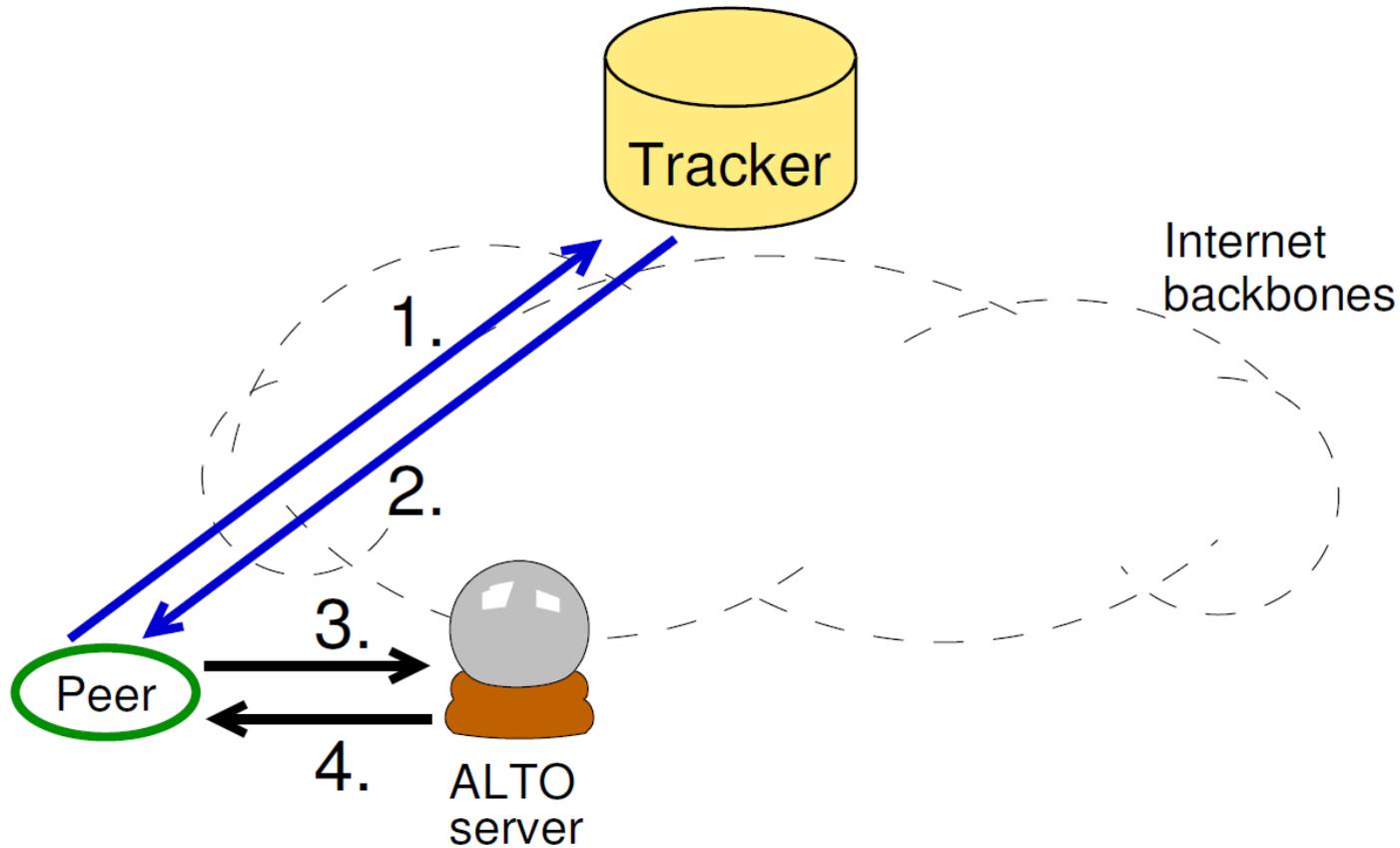
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## Different possibilities for location of ALTO client

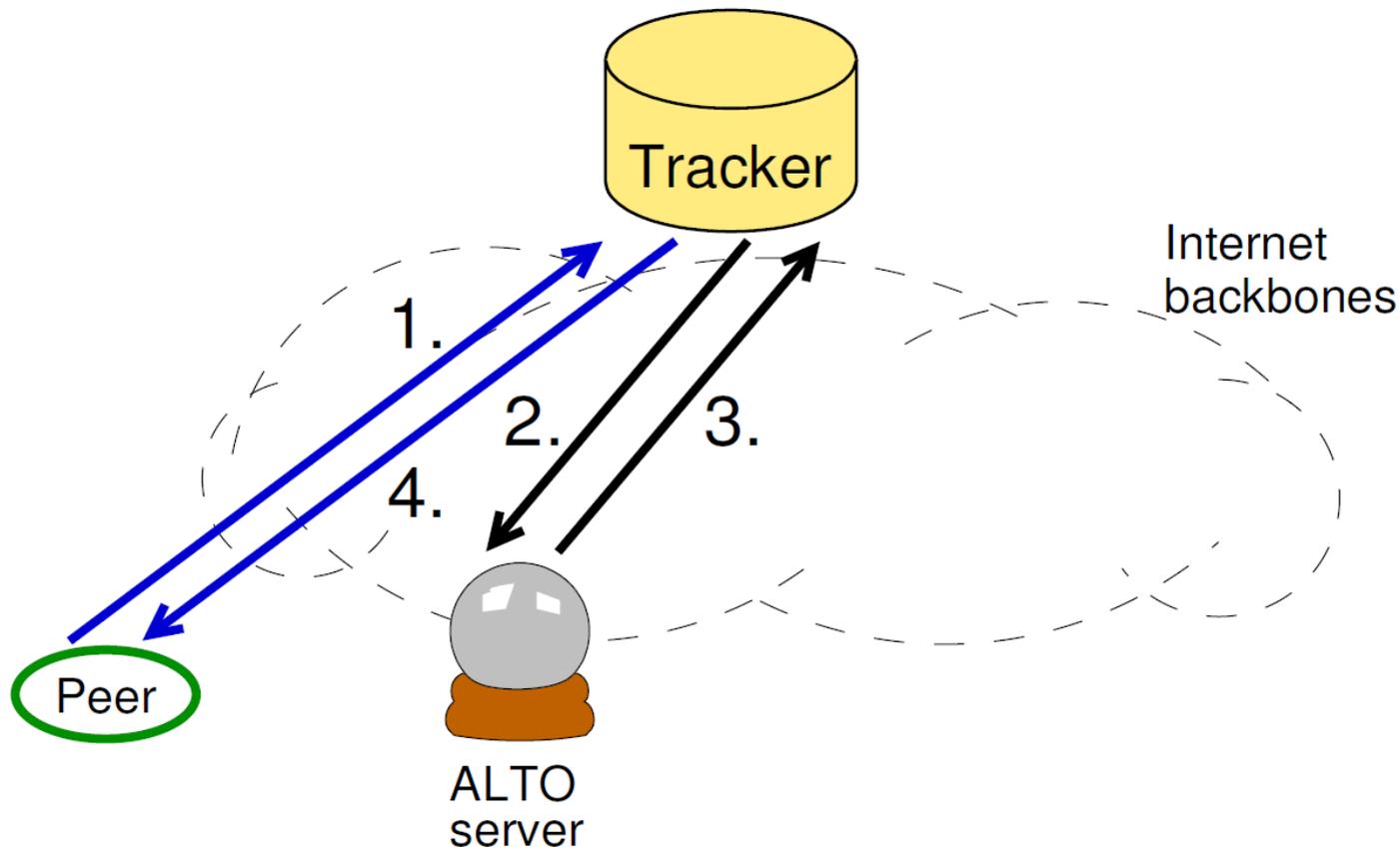
### Possibility 1: ALTO client in the resource consumer ("peer")



➔ 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")

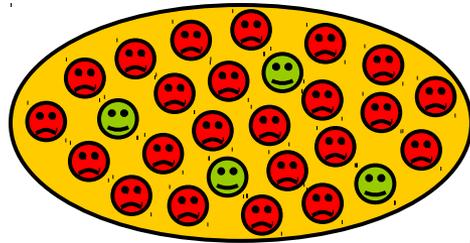


➔ Tracker with embedded ALTO client optimizes its result list before returning it to the client

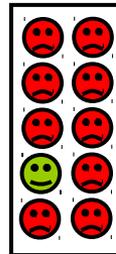
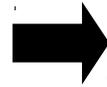
# The need for 3rd party ALTO queries

## Why a peer-based solution is not sufficient

### Peer-based ALTO queries

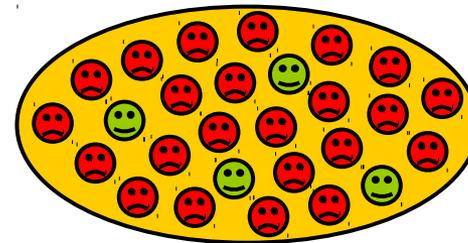


Swarm

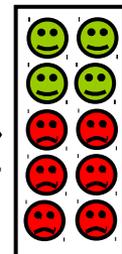
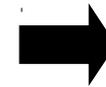


Tracker result list  
*randomly selected*

### Tracker-based ALTO queries



Swarm



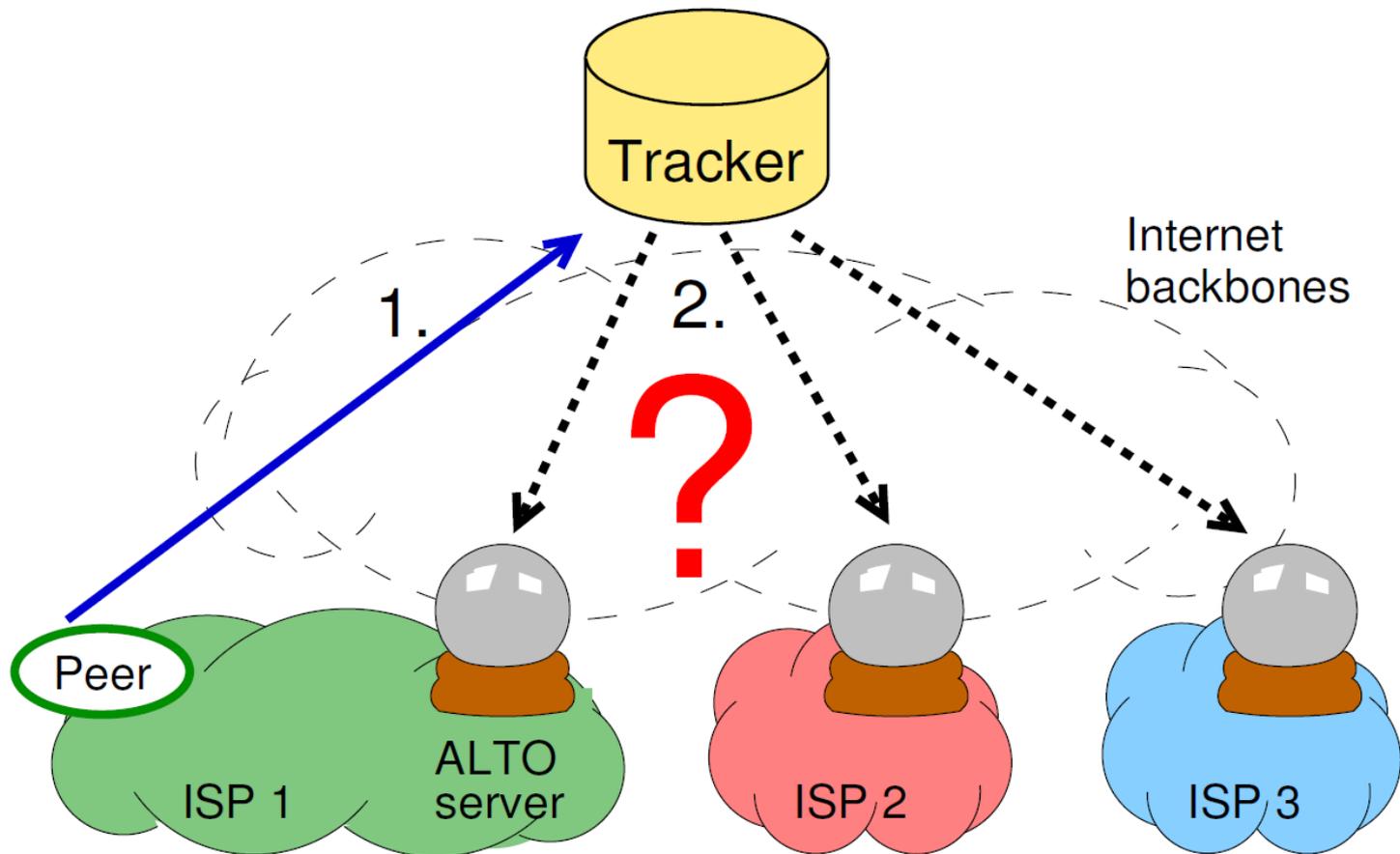
Tracker result list  
*optimized by  
third-party ALTO query*

### 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

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- 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

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### **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

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

# Conclusion

## Summary and next steps

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### 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

## Acknowledgements

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