

# Cross-Domain ALTO Server Discovery

(formerly known as: Third-party ALTO Server Discovery)

draft-kiesel-alto-xdom-disc-00

draft-kiesel-alto-xdom-disc-alg-00

IETF 90, ALTO session, Toronto, 2014-07-25

Sebastian Kiesel

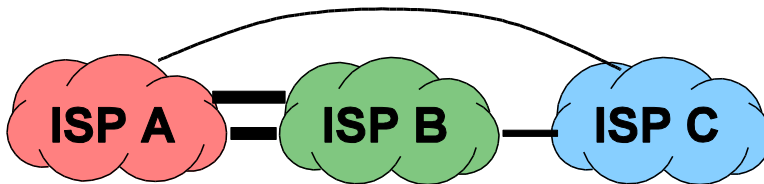
Martin Stiemerling

# Recap: ALTO client placement

- An ALTO client may be placed at the resource consumer (e.g., peer) and use ALTO only for the optimization of traffic to/from there.
- An ALTO client may also be placed at a “signaling entity” (e.g., P2P tracker, request router, redirect server, etc.) and **issue ALTO queries on behalf of many resource consumers.**
  - Better optimization results (see draft for some math)
  - We need to upgrade only of the tracker, not thousands of peers in order to introduce ALTO
  - No need to expose network & cost maps to (untrusted) peers

# Recap: Partitioned ALTO knowledge

- Conceptually, the ALTO protocol allows to deliver a NxN cost matrix to ALTO clients



| T \ F | A | B | C |
|-------|---|---|---|
| A     | 1 | 3 | 5 |
| B     | 3 | 1 | 4 |
| C     | 5 | 4 | 1 |

ALTO server with global knowledge, operated by the “altruistic and objective organization”

- However, some ALTO server operators (e.g., ISPs) do not have this global knowledge or do not want to publish it. Publish “cost vector – from us to anywhere” instead of matrix.

| T \ F | A | B | C |
|-------|---|---|---|
| A     | 1 | ? | ? |
| B     | 3 | ? | ? |
| C     | 5 | ? | ? |

ISP A's  
ALTO srv.

| T \ F | A | B | C |
|-------|---|---|---|
| A     | ? | 3 | ? |
| B     | ? | 1 | ? |
| C     | ? | 4 | ? |

ISP B's  
ALTO srv.

| T \ F | A | B | C |
|-------|---|---|---|
| A     | ? | ? | 5 |
| B     | ? | ? | 4 |
| C     | ? | ? | 1 |

ISP C's  
ALTO srv.

# Problem Statement

|  |  |  |
|--|--|--|
|  | ALTO client placed in resource consumer (“peer”), issues ALTO requests only for its own optimization needs | ALTO client placed in signaling entity (“tracker”), issues ALTO <b>queries on behalf of</b> many resource consumers in various other domains |
| All ALTO servers know whole network topology, i.e., full network map and cost map  | RFC 7286 to find the nearest ALTO server is sufficient<br>(if your network supports DHCP)                  | RFC 7286 to find the nearest ALTO server is sufficient<br>(if your network supports DHCP)  |
| Topology and cost <b>knowledge is partitioned</b> (“vector”) and distributed over multiple ALTO servers in various domains | RFC 7286 to find the nearest ALTO server is sufficient<br>(if your network supports DHCP)                  | ALTO client needs to do a “back-connect” to the right ALTO server, possibly in a different domain!<br>XDOM DISC needed!                      |

# draft-kiesel-alto-xdom-disc-00

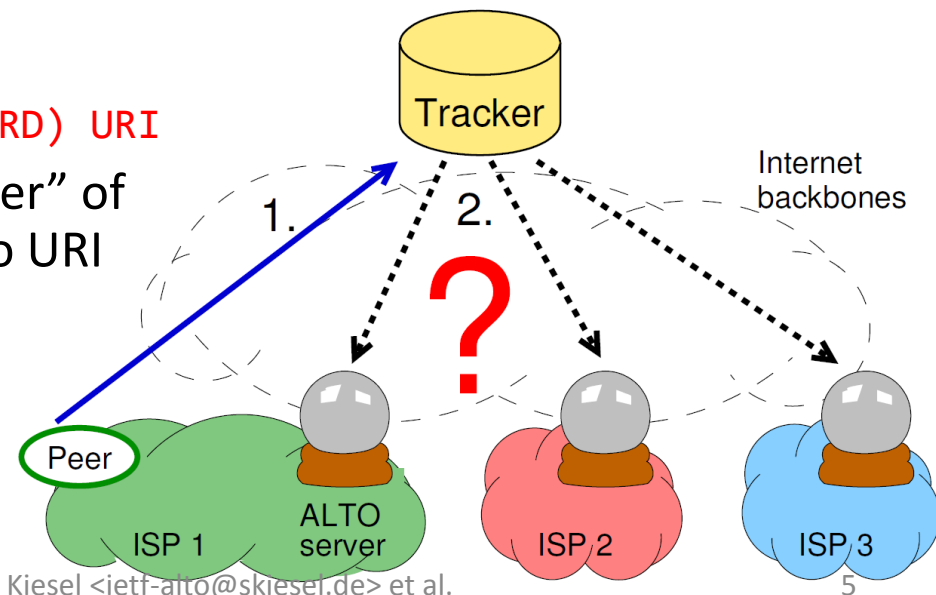
- was: draft-kist-alto-3pdisc-05, draft-kiesel-alto-3pdisc-...
- Renamed to avoid confusion with other (obsolete) discovery use case and to reflect deliverable acc. to our 2014-06 charter
- Contents

- Problem statement: cross-domain “back-connect” to ALTO server in peer’s domain (as explained in previous slides)

- Requirements

- Lookup IP addr. → (ALTO IRD) URI
- Distributed database, “owner” of IP addr. controls mapping to URI
- No new rendezvous point (“root server” + admin)

- No mechanism specified!



# ALTO cross-domain discovery procedures

draft-kiesel-alto-xdom-disc-00 does not contain a specification yet.  
Candidates:

- draft-kiesel-alto-xdom-disc-alg-00
  - Based on DNS, the algorithm we've been working on for some time
  - Search for U-NAPTR in in-addr.arpa, "SOA-mname - hack" as fallback
- RFC 7216: LIS Discovery using IP Addresses and Reverse DNS
  - Based on DNS, product of the GEOPRIV WG, could be adapted to ALTO
  - Search for U-NAPTR in in-addr.arpa, "trim addr. bits - hack" as fallback
- draft-kiesel-alto-alto4alto-00 (2010-07, expired)
  - Alternative approach that is not based on DNS. Use ALTO instead.
  - Would require to create and maintain a global registry – cumbersome

Evaluation of these solution candidates is still work in progress.  
Reviews and feedback most welcome!

# IP Anycast based ALTO Server Discovery

draft-kiesel-alto-ip-based-srv-disc-03

IETF 90, ALTO session, Toronto, 2014-07-25

Sebastian Kiesel

Reinaldo Penno

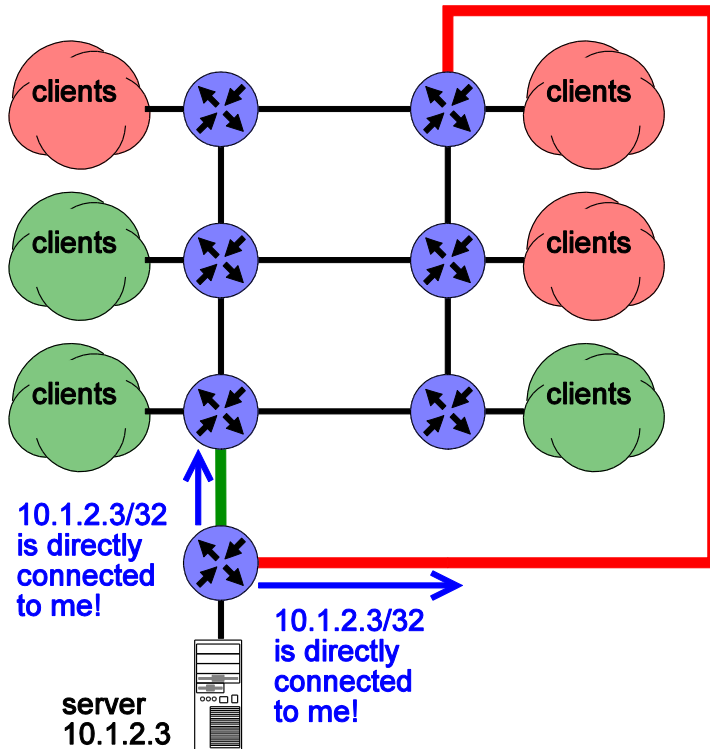
Martin Stiernerling (presenter)

# Problem Statement & Idea

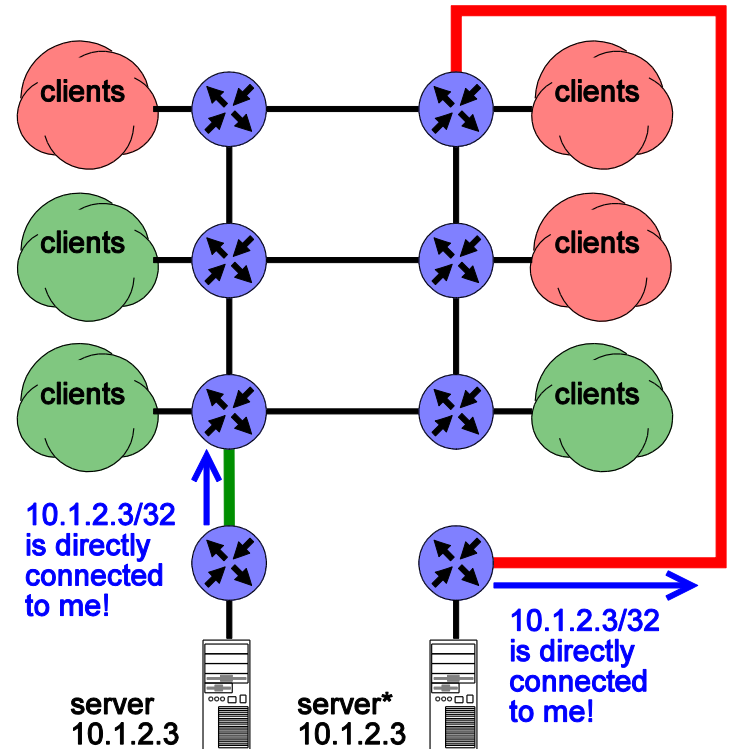
- Use case: discovery of an ALTO server in your own domain (i.e., not xdom)
- **RFC 7286 (was draft-ietf-alto-server-discovery)**
  - Based on DHCP, manual configuration to override and as fallback
  - Works in many important deployment scenarios, but not in all
  - Cross-platform interoperable implementation is a non-trivial task
- **draft-kiesel-alto-ip-based-srv-disc**
  - Idea: register special-purpose IPv4/6 addresses with IANA, to be used for anycast
  - Client uses HTTP GET for ALTO IRD URI with anycast IP literal, this works with any HTTP client library
  - Network operator ensures by means of routing configuration that this request gets routed to an appropriate server
  - This server redirects to the real ALTO server, to keep connection to the anycast addr. short, to avoid trouble in case of routing changes



# Recap: IP anycast



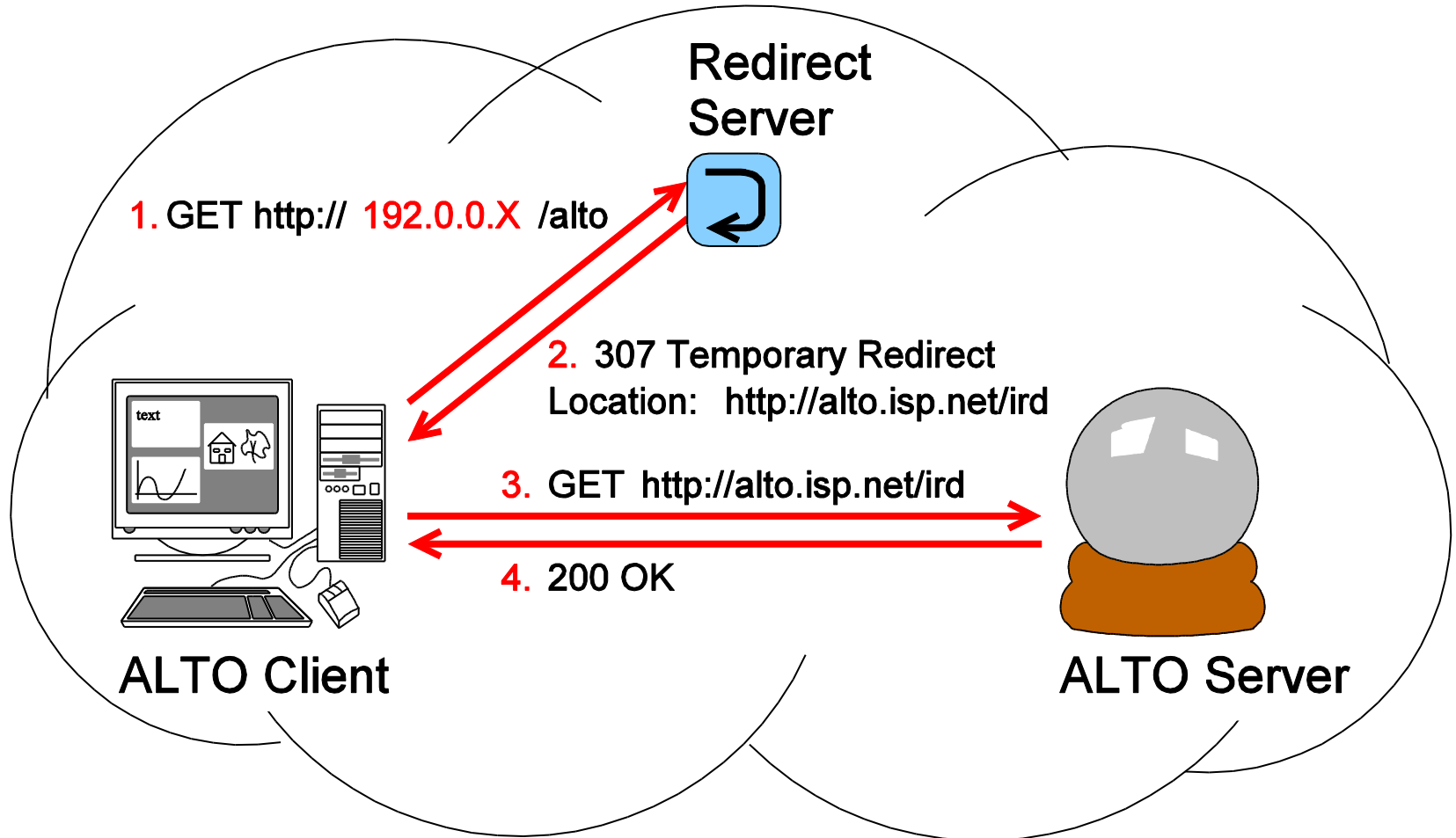
One server with two links:  
routing protocol finds shortest  
path from clients to the server



Two servers sharing one  
anycast address: does not  
make a real difference to the  
(shortest path) routing protocol

# IP Anycast based ALTO Server Discovery

draft-kiesel-alto-ip-based-srv-disc



**192.0.0.X** = Special-purpose IP address to be registered with IANA (plus one for IPv6)

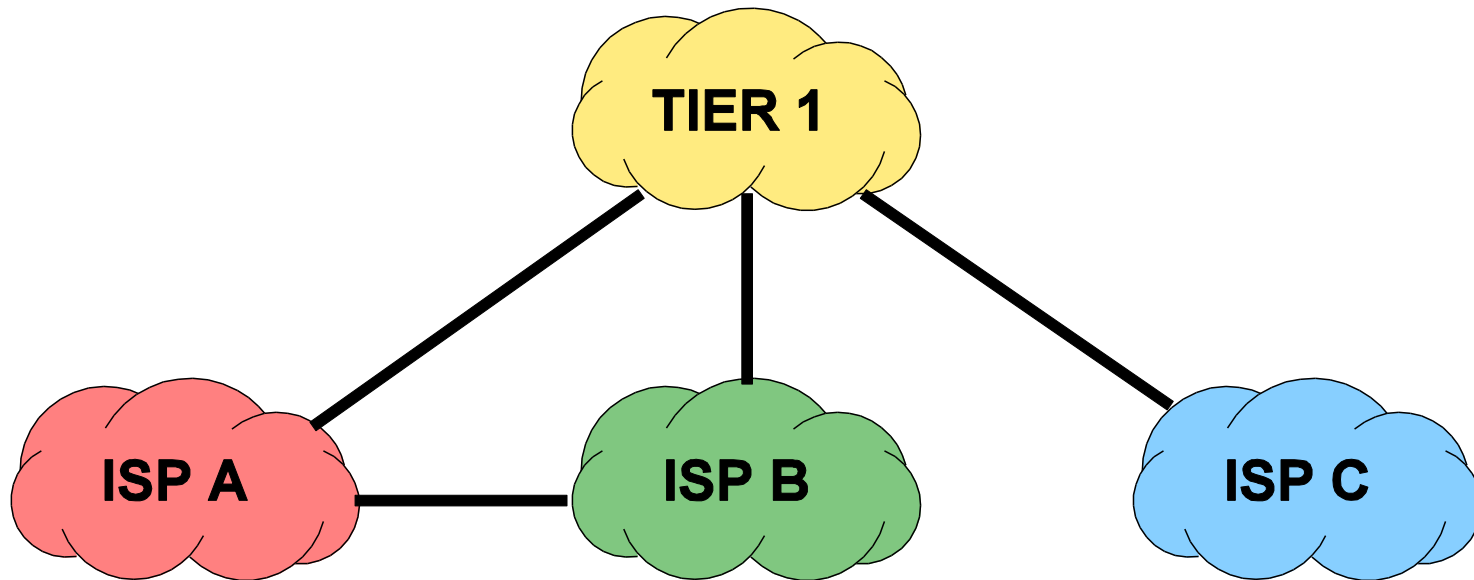
## draft-kiesel-alto-ip-based-srv-disc-03

- Core specification is complete and has been validated in lab
- Open issues
  - Rules for caching of results
  - Verification of TLS certificates
- This is a candidate for our charter item *“One or more alternatives to the base ALTO server discovery mechanism (RFC-to-be) to accommodate environments where (1) timely deployment of existing mechanisms, including the base ALTO server discovery mechanism, is unlikely [...]”*
- Adopt as a WG item?

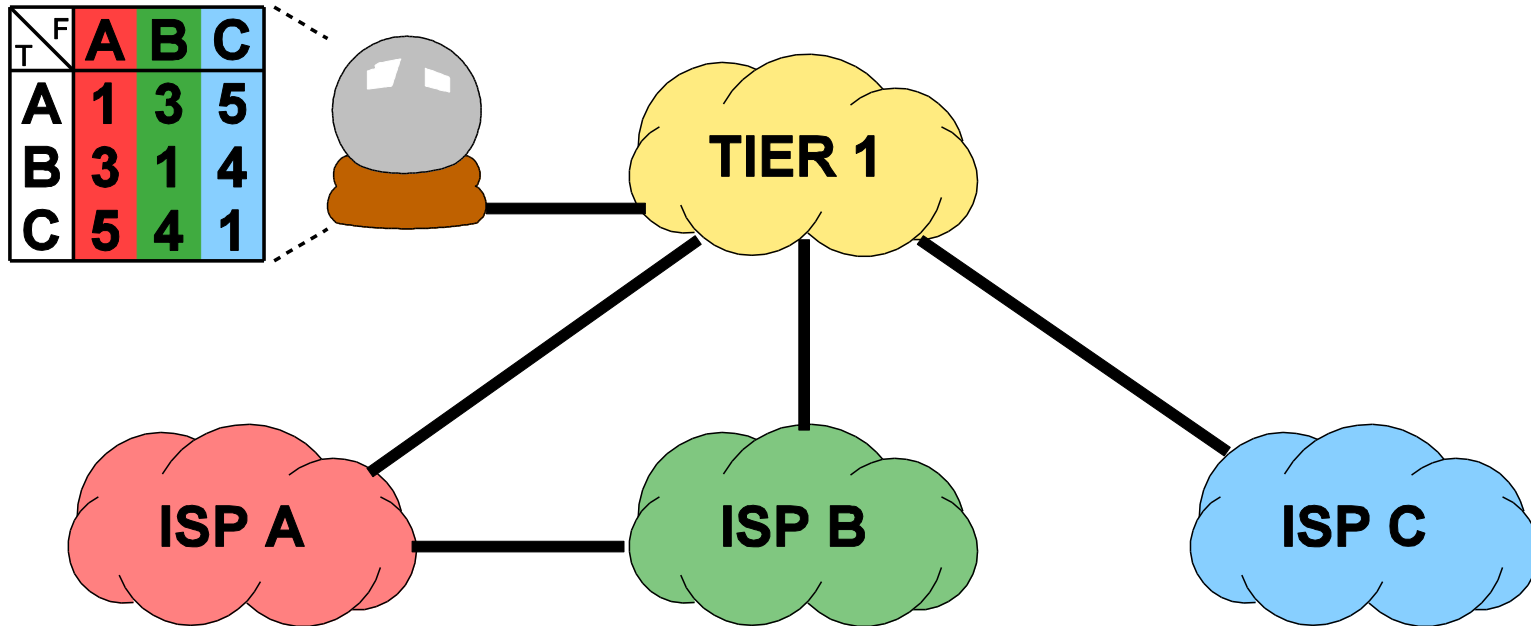
Cross-Domain ALTO Server Discovery

# **BACKUP SLIDES**

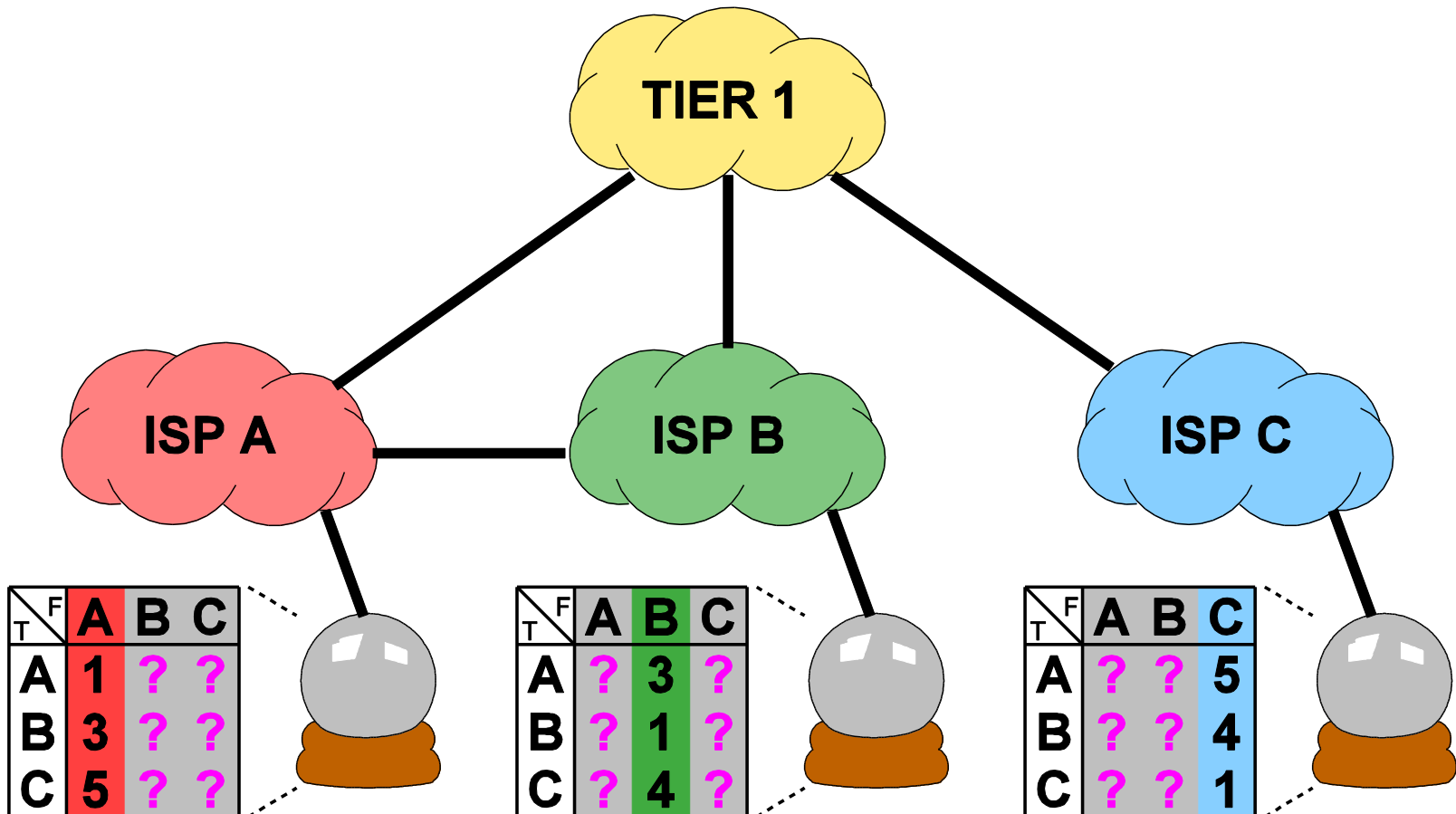
# ALTO Server Discovery



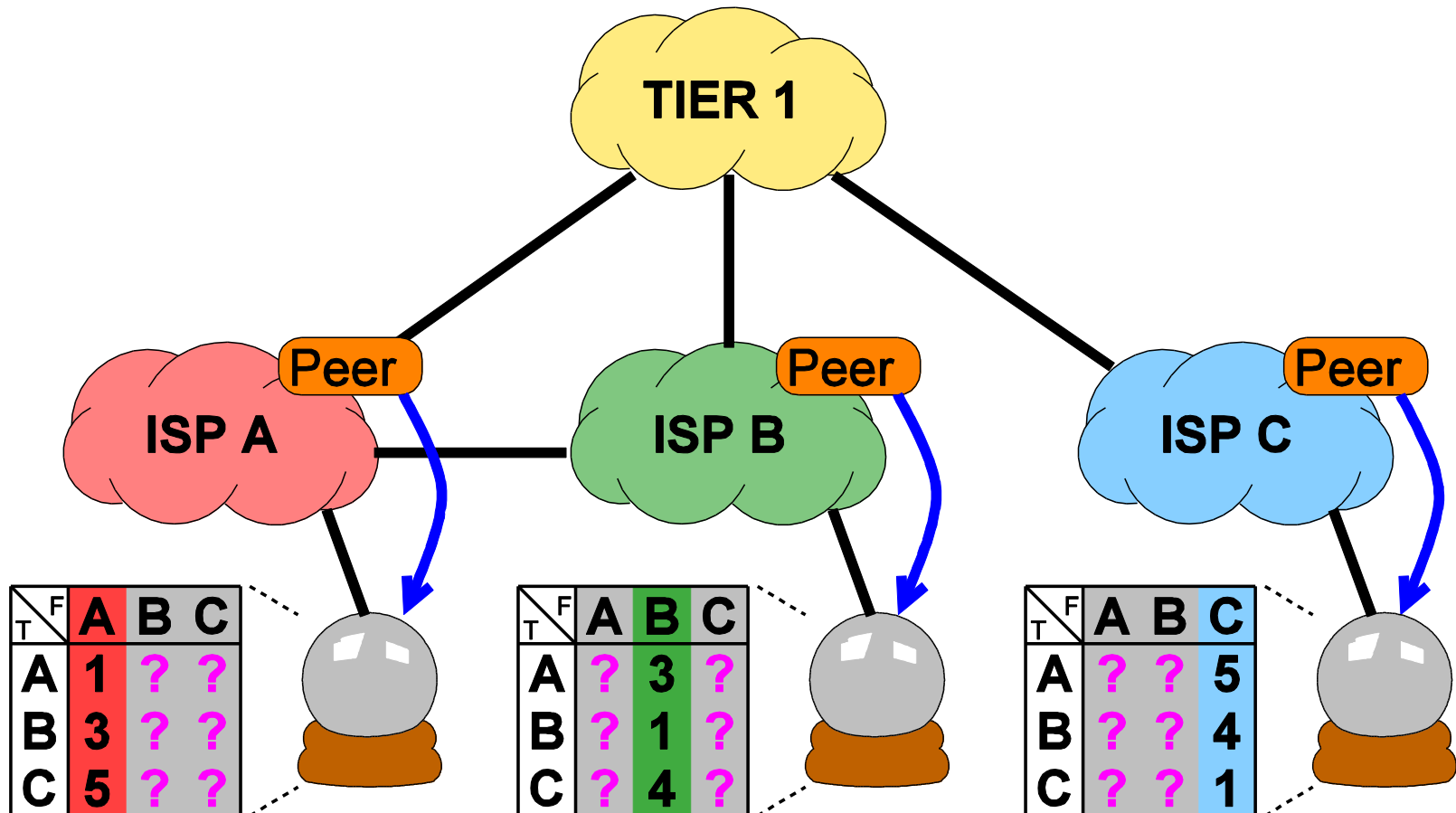
# ALTO Server Discovery



# ALTO Server Discovery

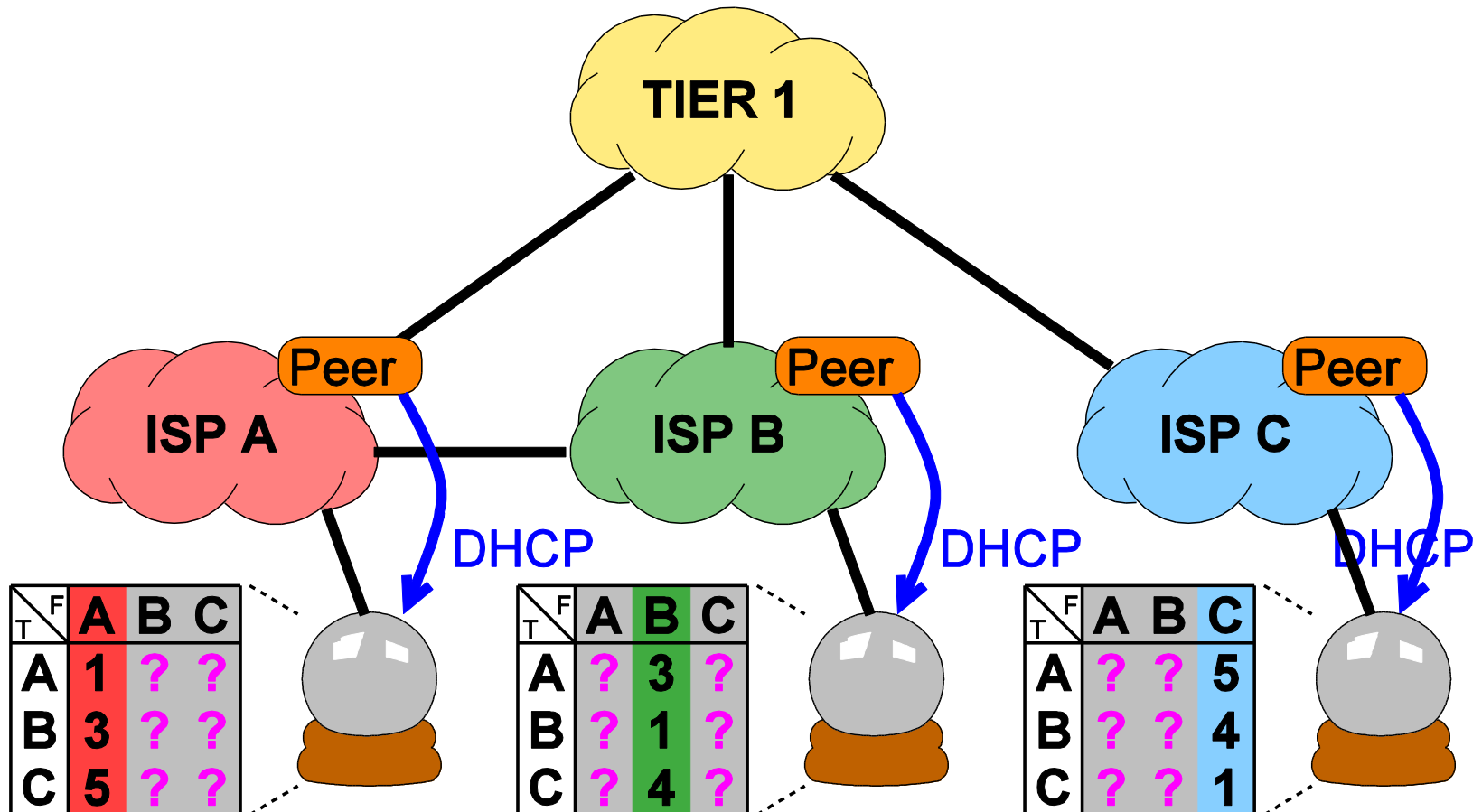


# ALTO Server Discovery

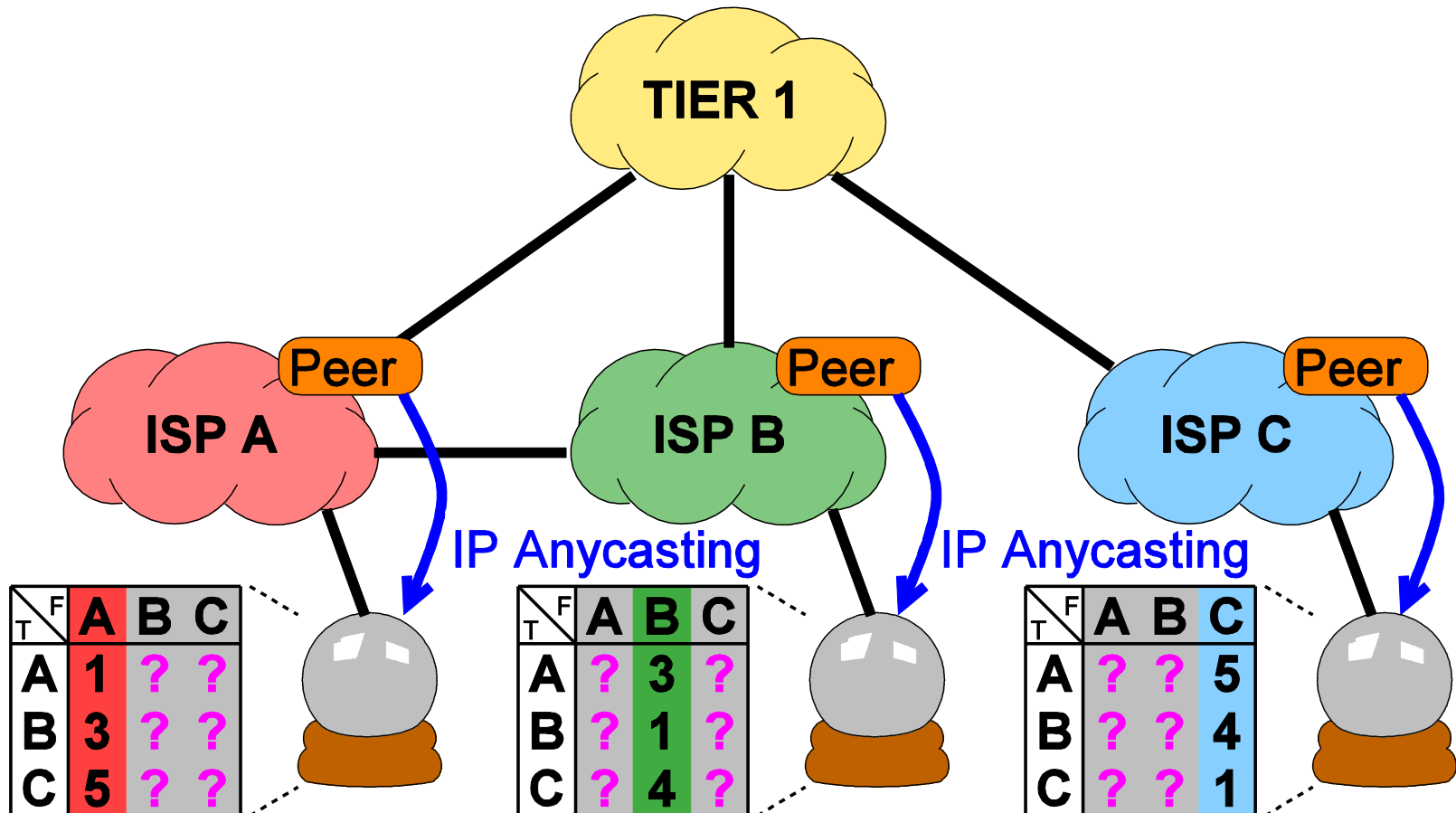




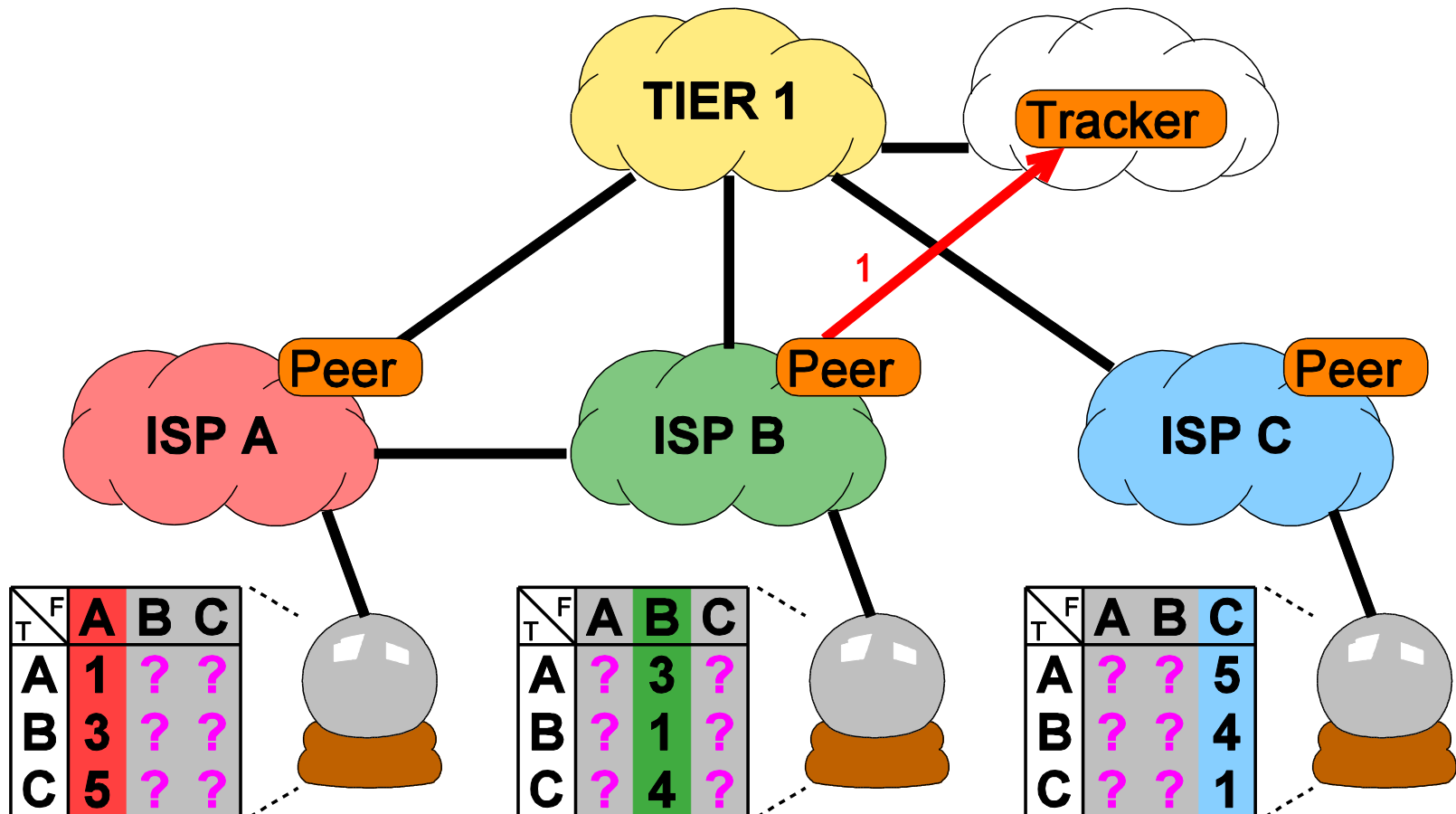
# ALTO Server Discovery



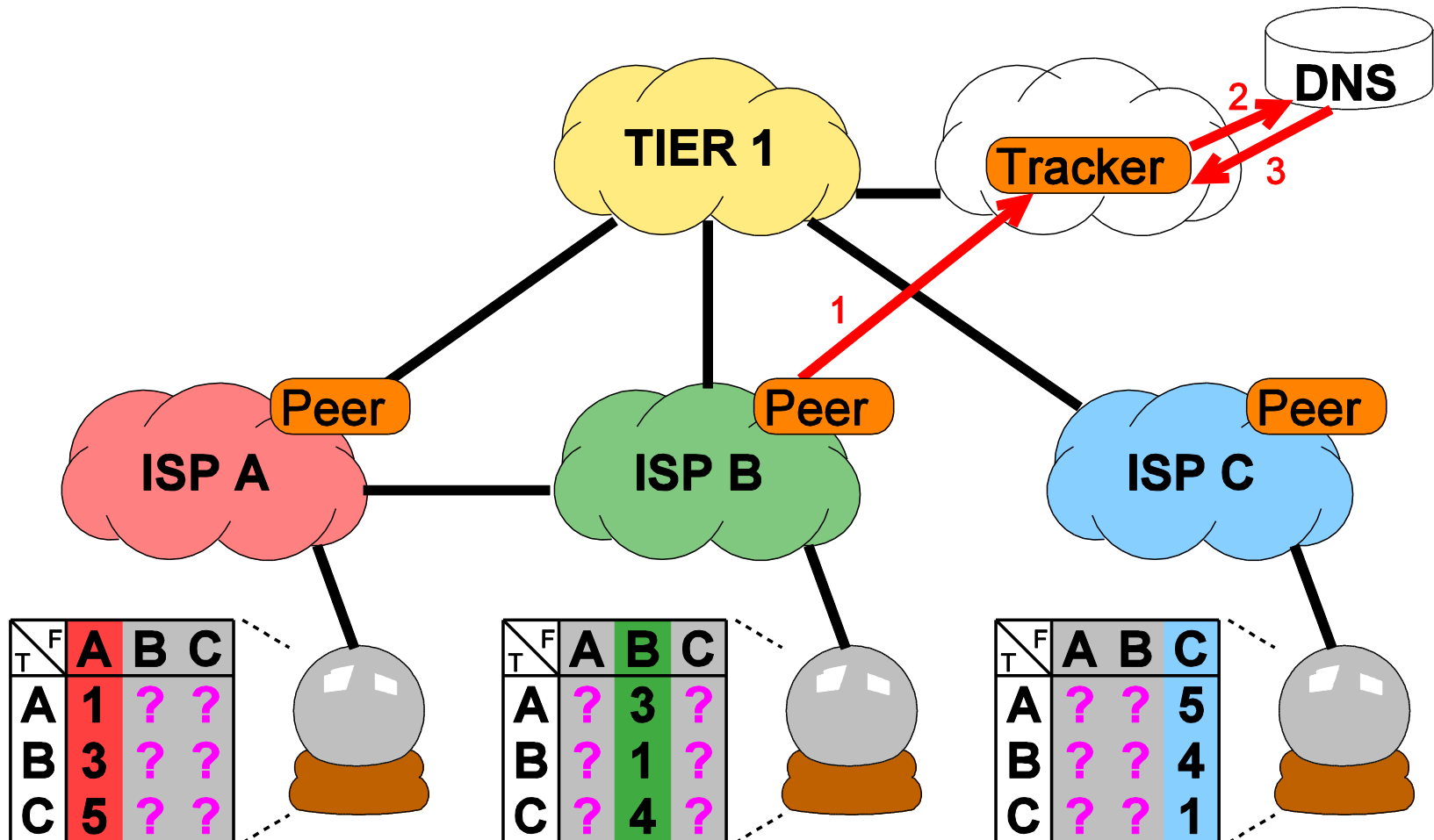
# ALTO Server Discovery



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# ALTO Server Discovery



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