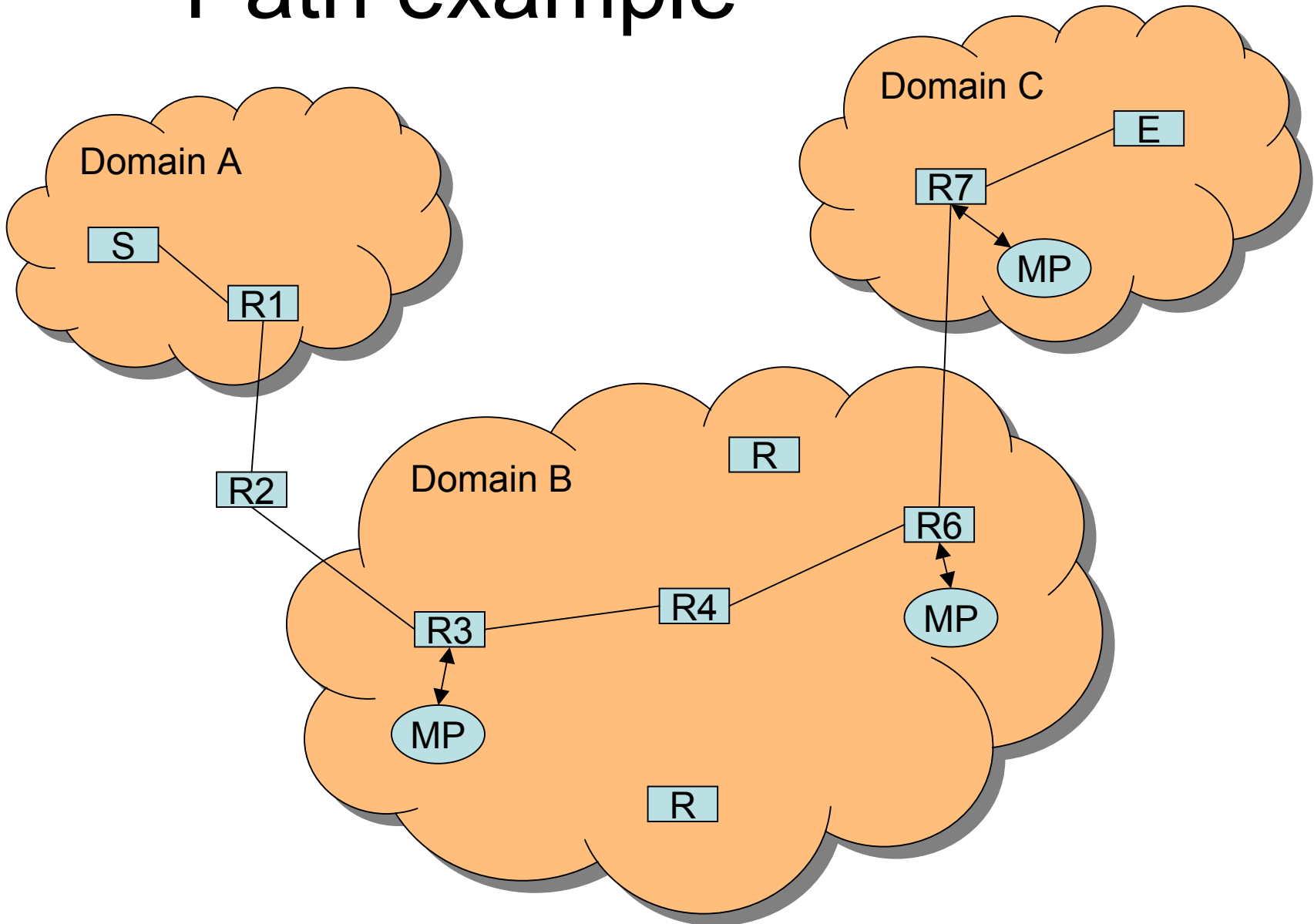


Pathfinder

How to find measurement nodes

Path example



Pathfinder

Goal: Locate suitable measurement nodes along an end-2-end path

2 cases: - full path is given
- only end-points given

Case 1: E2E path given

- Case 1:
The full end-2-end path is given by means of a list of interfaces of the routers on the path (e.g. from traceroute)
- Problems:
 - map interfaces to a router address
 - map router addresses to measurement nodes

Pathfinder interface

- The pathfinder has the following abstract interface:

- Input:

path (s, r(1), r(2), ..., r(n), e), test type

with s = start host, r(i) routers inbetween, e = end host

- Output:

((s, mp(s), dt(mp(s))), ... (e, mp(e), dt(mp(e))))

with mp(s) = measurement node of s, dt(mp(s)) domain tool address of the measurement node of s.

Mapping interfaces

Mapping interface addresses to router addresses requires either a DB with all interface/router addresses or some fuzzy logic using the FQDN of the interfaces.

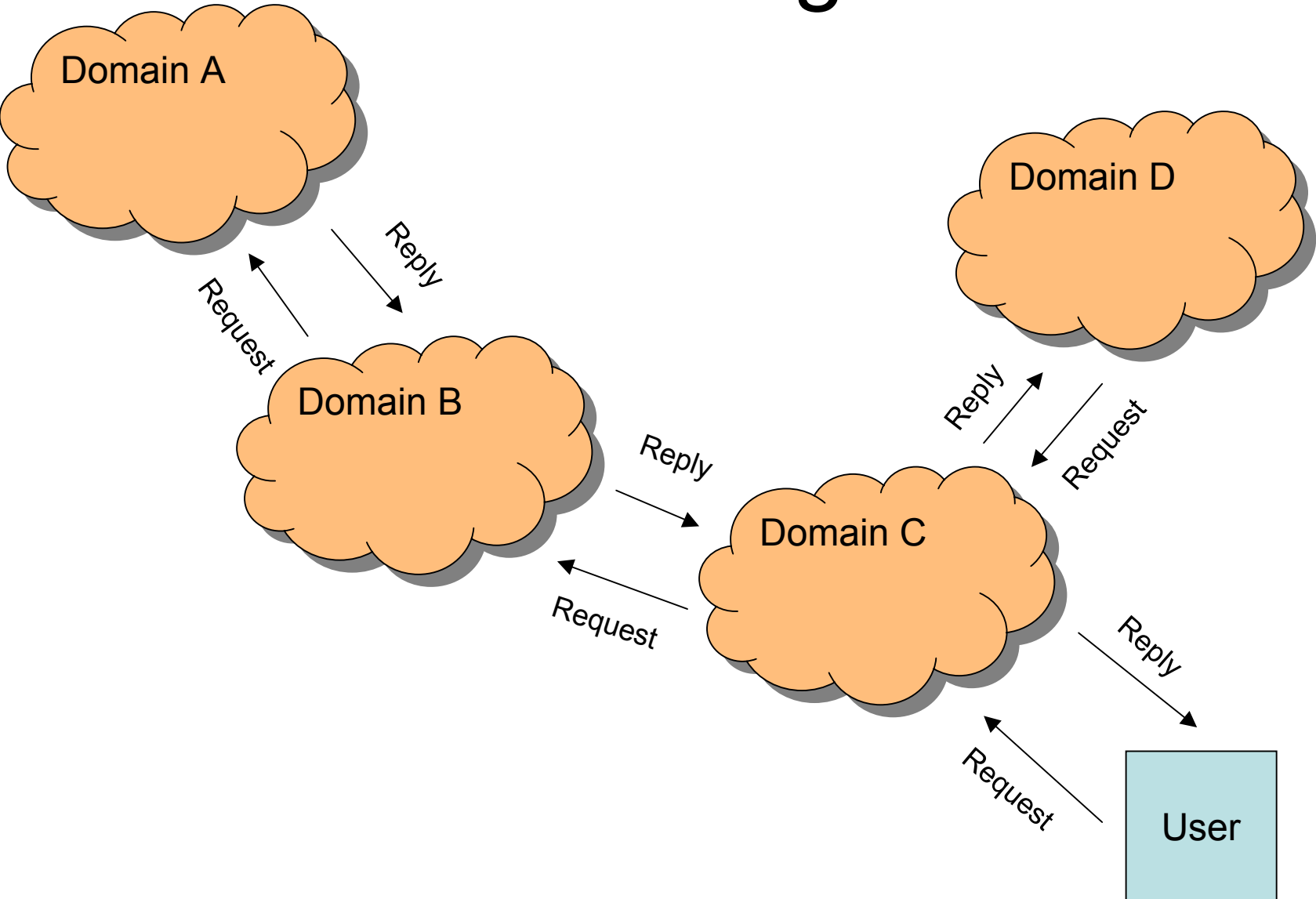
As both is not really applicable, another solution is not to map interface addresses to router addresses at all.

Instead, as we need to map router addresses to measurements nodes later on anyway, we simply map interface addresses to measurement nodes.

Mapping measurement nodes

- Measurement nodes are always associated with one or more router interfaces
- Measurement nodes and their capabilities are only known within their local domain
(It is assumed that locally there is a DB with information about all the MP's of the domain)
- Thus, only the domain tool of the respective domain can map interface addresses to measurement nodes.
-> The mapping needs to be chained along all domains involved

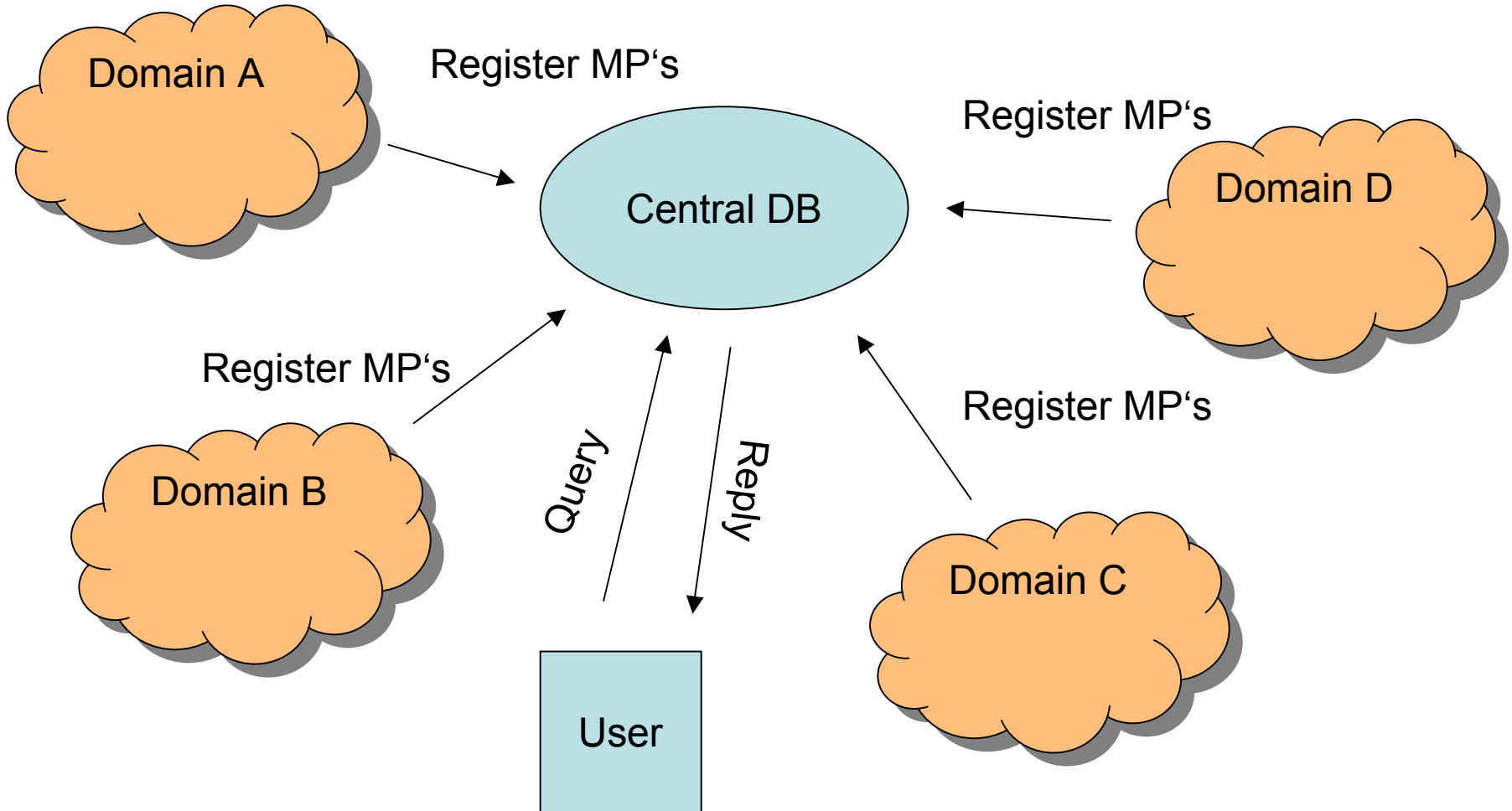
Chaining



Chaining

- Local pathfinder analyse path within their domain
- Forward unknown parts to neighbouring domains, wait for response
- This goes on for each domain and finally the initiating pathfinder gets all the information needed for the measurement in one place

Alternative MP mapping



Alternative MP mapping

- Chaining has some issues with error handling and timeouts
- Instead of mapping MP's domain by domain, each domain registers their MP's in a global DB
- As this DB knows all the MP's, resolution is easier
- However, all parties involved have to agree on one central system

Alternative MP mapping (2)

- How to control access to MP information?
- To avoid a single point of failure, DB could be built like DNS
- Scalability?

Case 2: Endpoints only

- This is the same as Case 1 except that the path is not known
- If only the endpoints are given it is nearly impossible to find out the real path from one end to the other
- An approximation is to do a traceroute towards the start point and use the closest available measurement point as the source of another traceroute to the destination. (Always hoping that the real path would also travel through this route)

Open issues

- How to find neighbouring domains/domain tool interfaces?
- How to organize internal DB for MP mapping?
- Authentication/Authorization for path finder requests?
- Timeout/Failure issues with chained path finder requests