



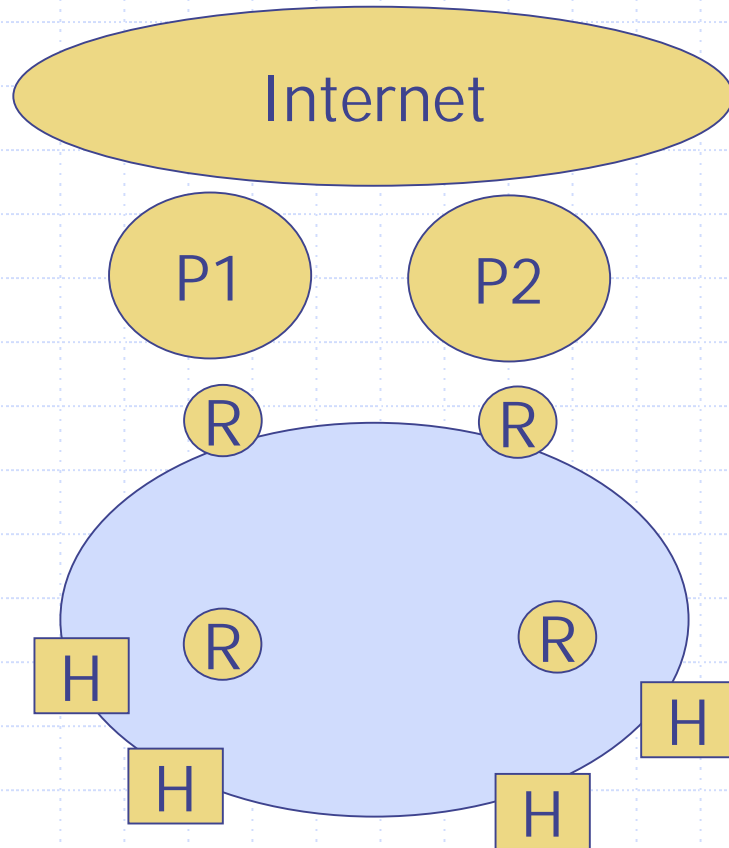
# Host Centric Multi6

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# Principle



- ◆ Site is connected to multiple providers
  - Get as many prefixes
- ◆ Prefixes are propagated to all site routers
  - Router renumbering?
- ◆ Hosts get as many addresses
  - Prefix = provider
  - Subnet number
  - Host ID
- ◆ Publish addresses in DNS

# Issue: destination address selection

- ◆ Fairly common
  - Many hosts are multi-homed.
- ◆ Debate whether hosts have sufficient information
  - Hard for small appliances, not enough information
  - Easy for large servers
- ◆ It is not unrealistic to expect progress in this area,
  - communication between the hosts and the routers,
  - sharing of experience between hosts,
  - innovative application design At worst, a host can always try the proposed addresses one by one, and pick the first one that actually works -- not very elegant, but definitely workable.

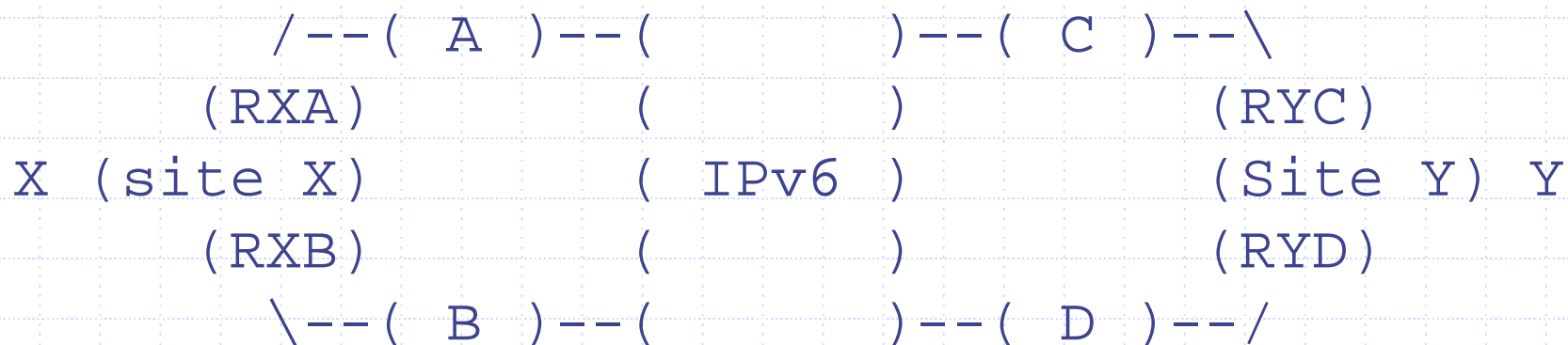
## Issue: source address selection

- ◆ Existing software ties source address selection to interface selection
  - Select outgoing interface
  - Pick one address on interface as source
  - Only consider address scope, and possibly “privacy” status
- ◆ Choosing the source address will affect the reverse path of the connection
  - Issue similar to “destination address selection”
- ◆ We need some improvement for multi-addressing

## Issue: rapid reaction to topology change

- ◆ One of site X providers (A) becomes unreachable
- ◆ How do we avoid picking a source address A:X ?
- ◆ How do peers avoid picking a destination address A:X ?

## Issue: site exit & ingress filtering



- ◆ X picks source address A:X, dest D:Y
- ◆ Routing fabric sends packet to exit router RXB
- ◆ Provider B sees source = A:X, perform ingress filtering, rejects the packet

# Classification of the issues

|                               |  |
|-------------------------------|--|
| Destination address selection | Nice to have.<br>Should at least "retry" |
| Source address selection      | Nice to have.                            |
| Reaction to topology changes  | Nice to have                             |
| Ingress filtering             | <b>MUST SOLVE</b>                        |

# Comparison of ingress filtering solutions

- ◆ Relax address filtering
  - Requires provider involvement
  - Easy to deploy for large sites
- ◆ Source address dependent routing
  - Variant = tunnels between exit routers
- ◆ Packet rewriting at exit router
  - Inferior to “exit tunnel” solution
- ◆ Source address selection by the host
  - Complement to source dependent routing
  - Requires “exit router” discovery



# The "dumb host" requirement

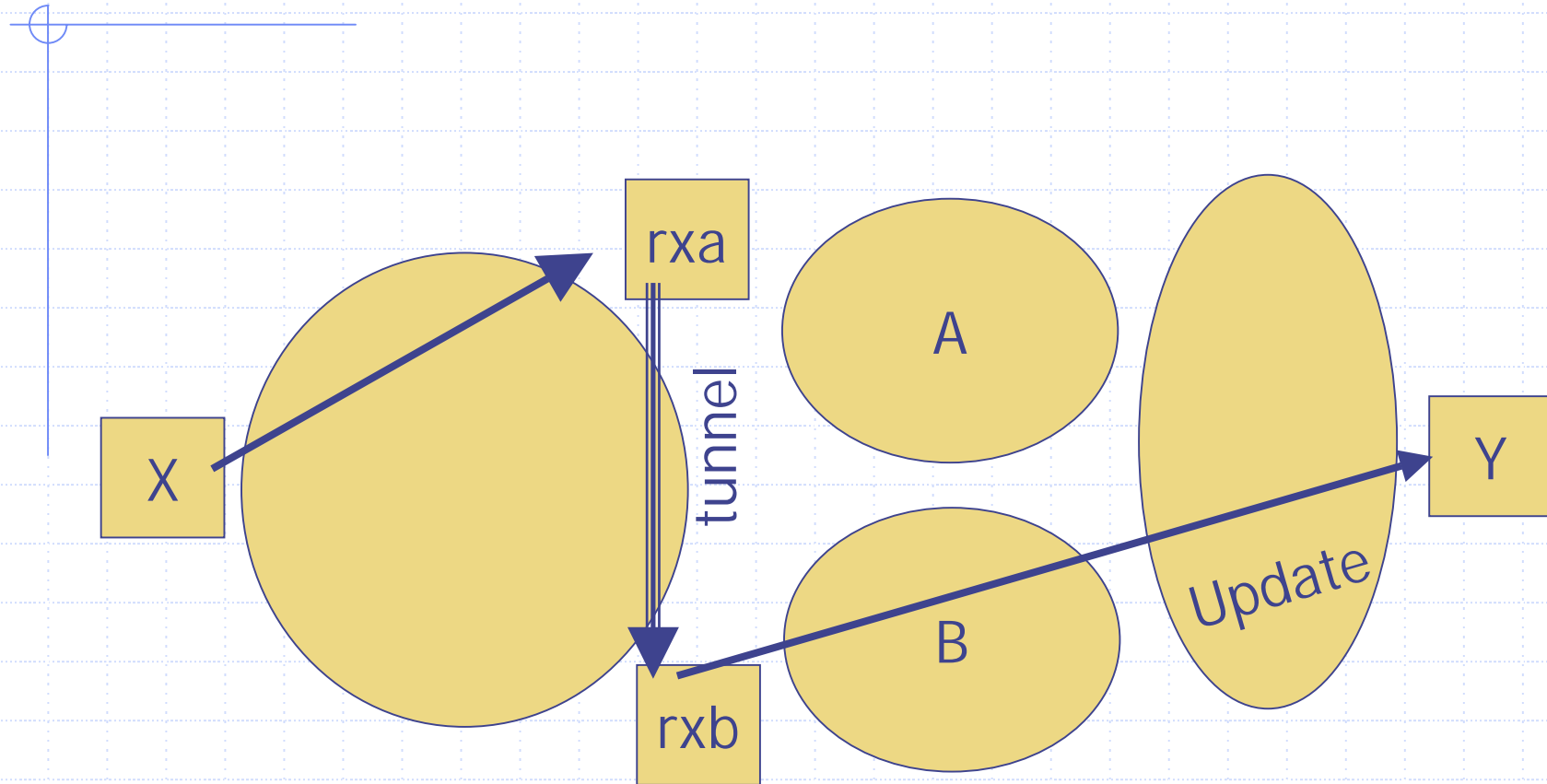
## ◆ Unmodified host

- Picks a single source address
- Must work at least as well as "not multi-homed"

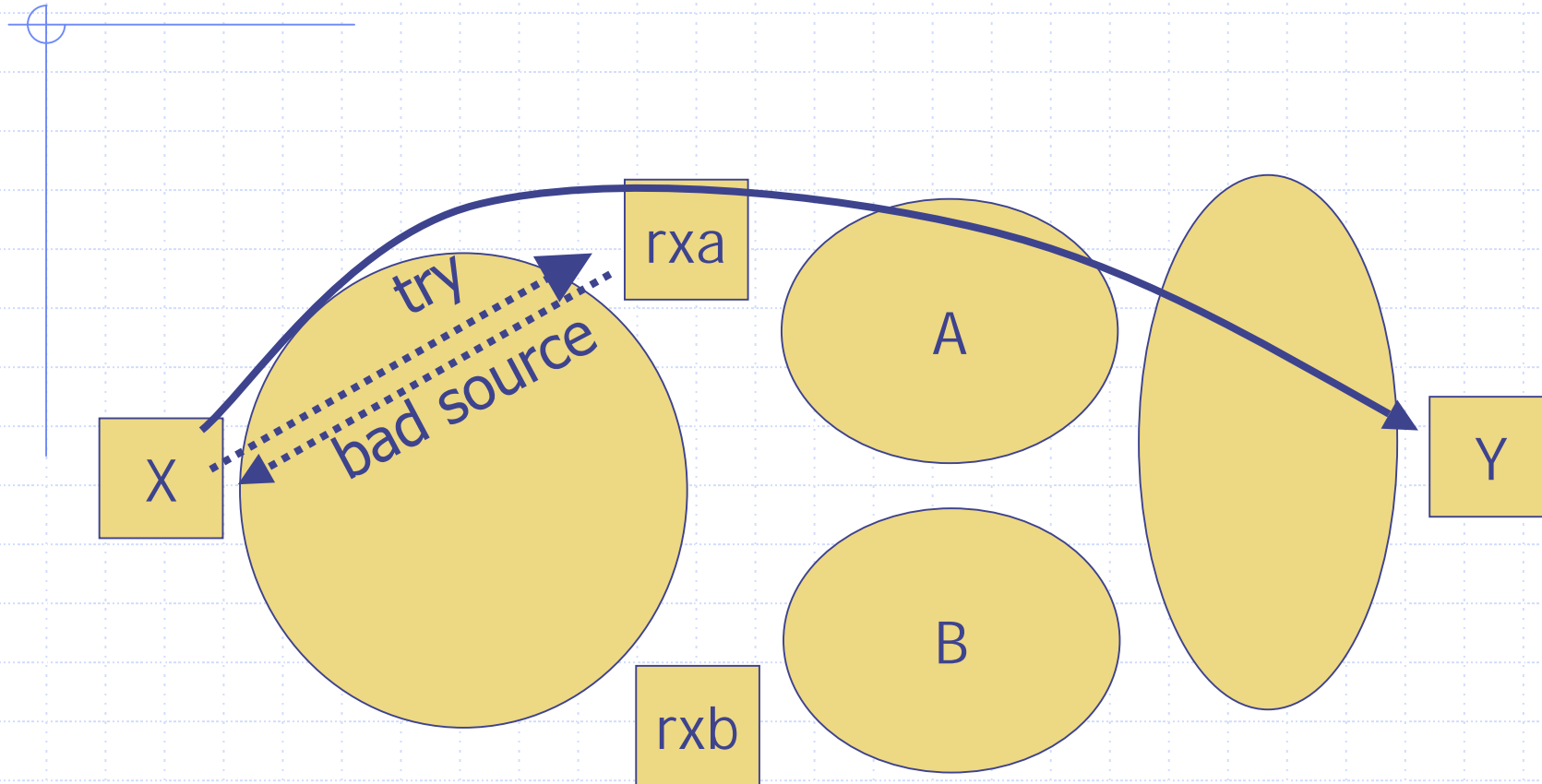
## ◆ Consequence

- Ingress filtering must work for all destinations if source provider available
- Imply either "relaxed filtering" or "per source routing"

# Solution's principle (dumb host)

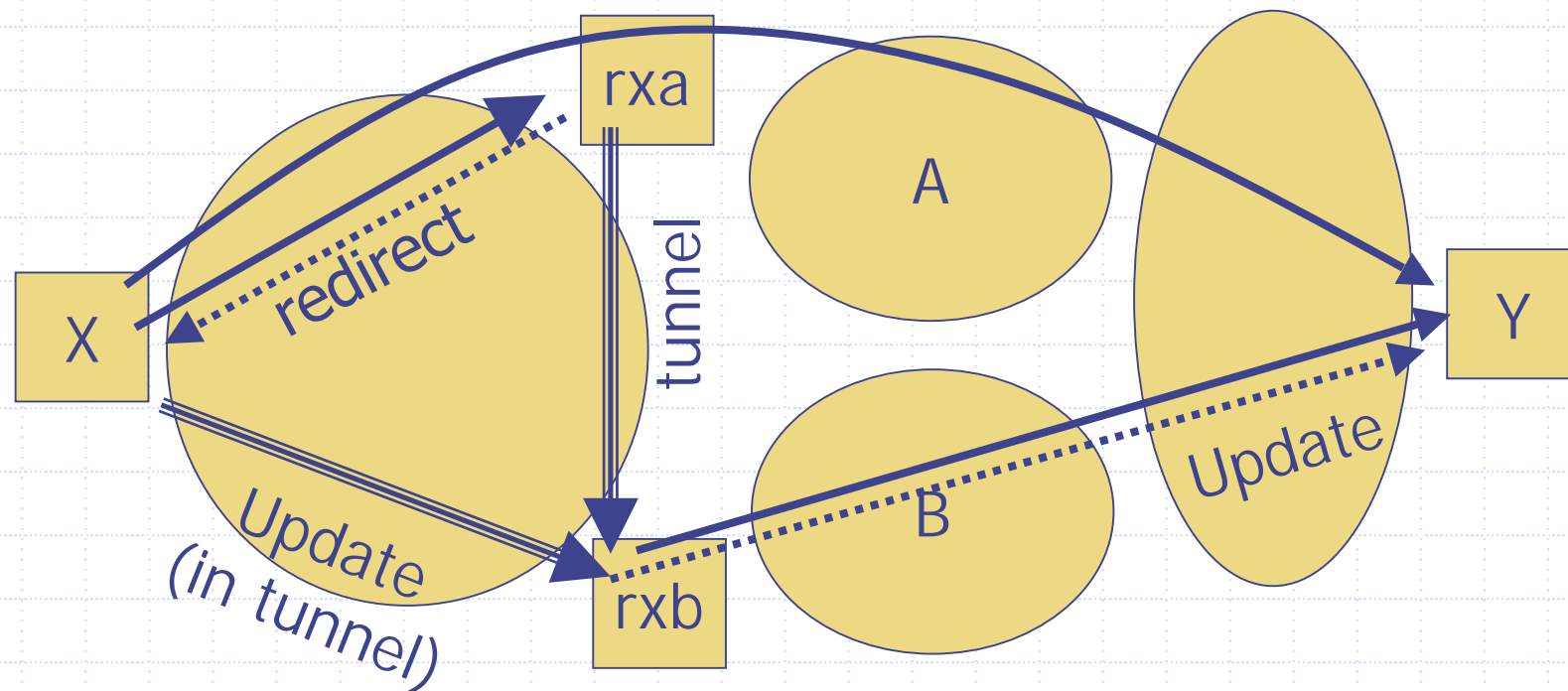


# Solution's principle (exit discovery)



- Try can be as simple as sending a "ping", maybe with source address = site local...

# Solution's principle (exit tunnel & redirect)



- There are alternatives, e.g. don't use update, just a direct tunnel to the "right" exit.

# Proposed solution

- ◆ Facilitate site exit
  - Site exit “logical” address (for tunnels)
  - Site exit redirect ICMP
  - Tunnel to appropriate exit
- ◆ Router advertisements for rapid reaction
  - preferred lifetime  $> 0$  → source is OK
  - Need router renumbering
- ◆ Host improvements
  - Source and destination address selection
  - Exit router discovery (understand site exit ICMP)
  - Binding update / Mobile IPv6 for “reassignment”

## Going forward

- ◆ Reconcile / merge with Bagnulo's draft
  - Compare binding update versus advertisement of multiple addresses
- ◆ Study possible provider help
  - Some form of tunneling when provider link is broken...
- ◆ Get consensus for a narrow scope WG charter, or progress document without a WG