

Computer Networks

Routing with Multiple Parties (§5.6.7)



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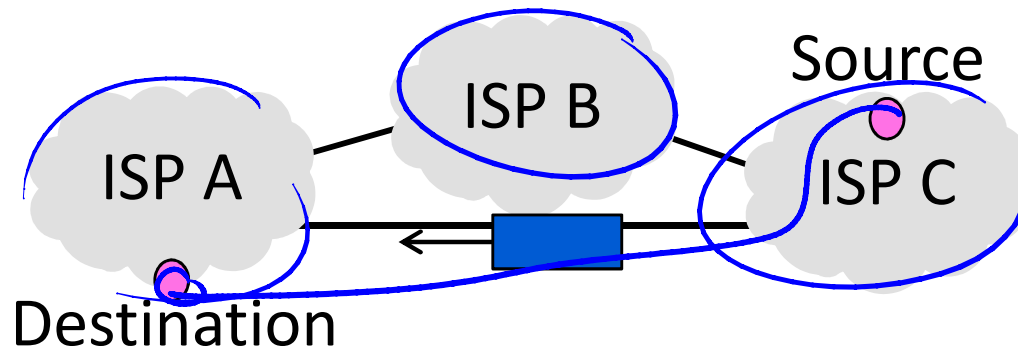
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Topic

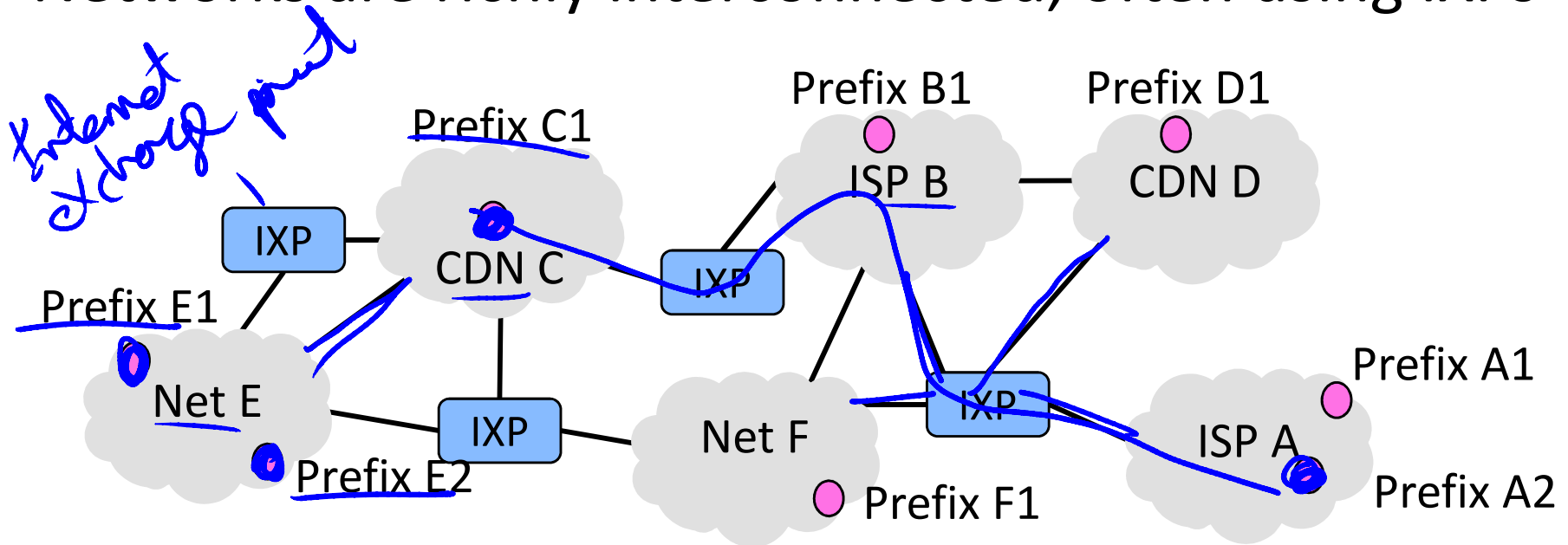
- Routing when there are multiple parties, each with their own goals

➤ Like Internet routing across ISPs ...



Structure of the Internet

- Networks (ISPs, CDNs, etc.) group hosts as IP prefixes
- Networks are richly interconnected, often using IXPs



Internet-wide Routing Issues

- Two problems beyond routing within an individual network

1. Scaling to very large networks

- Techniques of IP prefixes, hierarchy, prefix aggregation

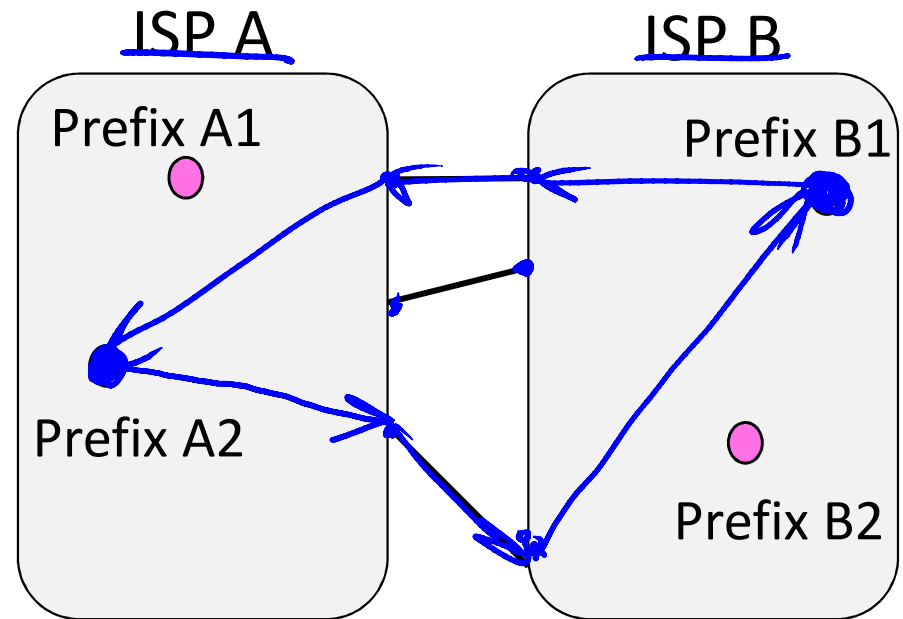
2. Incorporating **policy decisions**

- ➔ Letting different parties choose their routes to suit their own needs

Yikes!

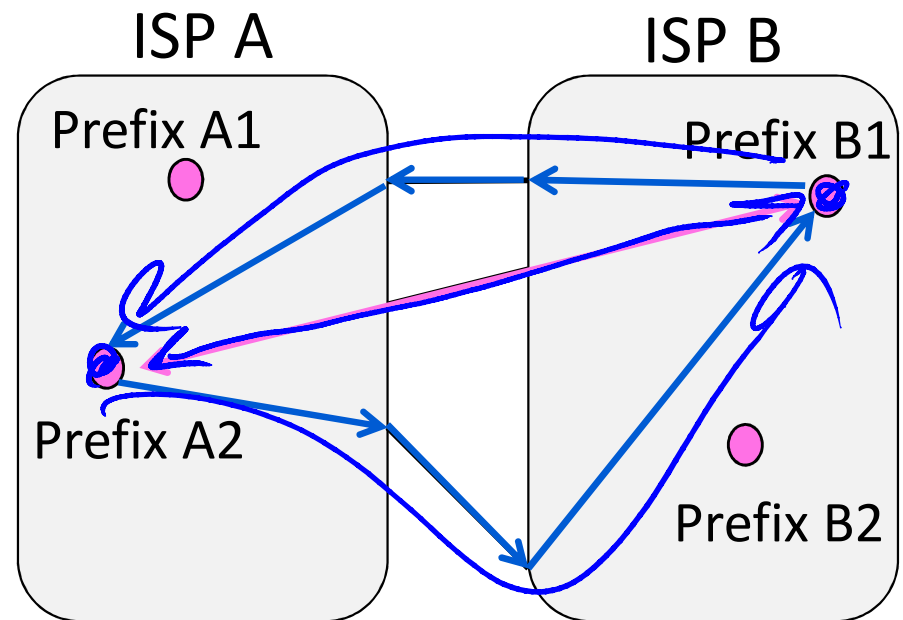
Effects of Independent Parties

- Each party selects routes to suit its own interests
 - e.g, shortest path in ISP
- What path will be chosen for A2 \rightarrow B1 and B1 \rightarrow A2?
 - What is the best path?



Effects of Independent Parties (2)

- Selected paths are longer than overall shortest path
 - And asymmetric too!
- This is a consequence of independent goals and decisions, not hierarchy

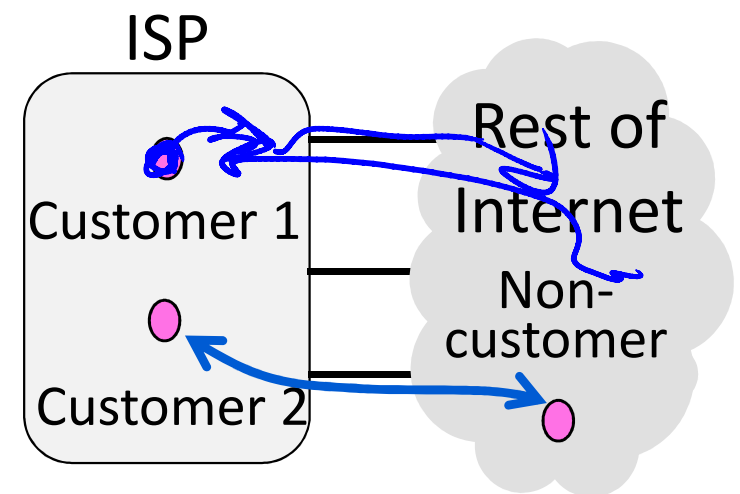


Routing Policies

- Capture the goals of different parties – could be anything
 - E.g., Internet2 only carries non-commercial traffic
- Common policies we'll look at:
 - ISPs give TRANSIT service to customers
 - ISPs give PEER service to each other

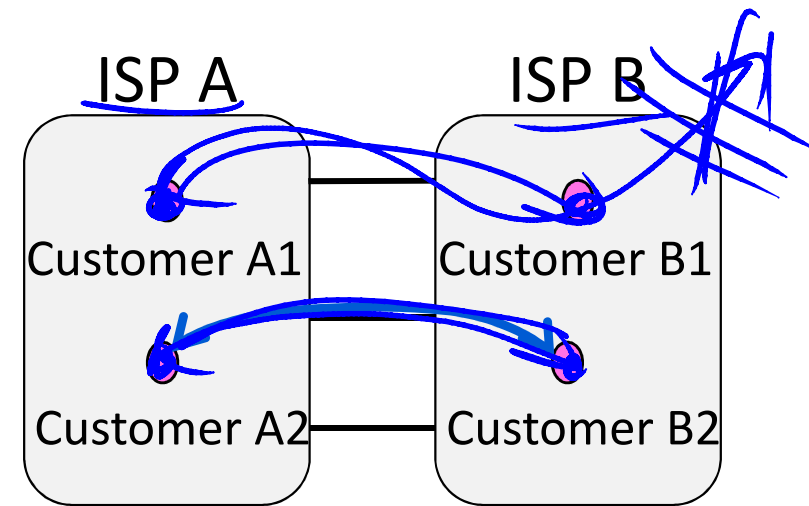
Routing Policies – Transit

- One party (customer) gets TRANSIT service from another party (ISP)
 - ➔ ISP accepts traffic from customer to deliver to the rest of Internet
 - ➔ ISP accepts traffic from the rest of the Internet to delivery to customer
 - ➔ Customer pays ISP for the privilege



Routing Policies – Peer

- Both party (ISPs in example) get PEER service from each other
 - ➔ Each ISP accepts traffic from the other ISP **only for their customers**
 - ➔ ISPs do not carry traffic to the rest of the Internet for each other
 - ➔ ISPs don't pay each other



END

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