Computer Networks

IP Prefix Aggregation and Subnets (§5.6.2)

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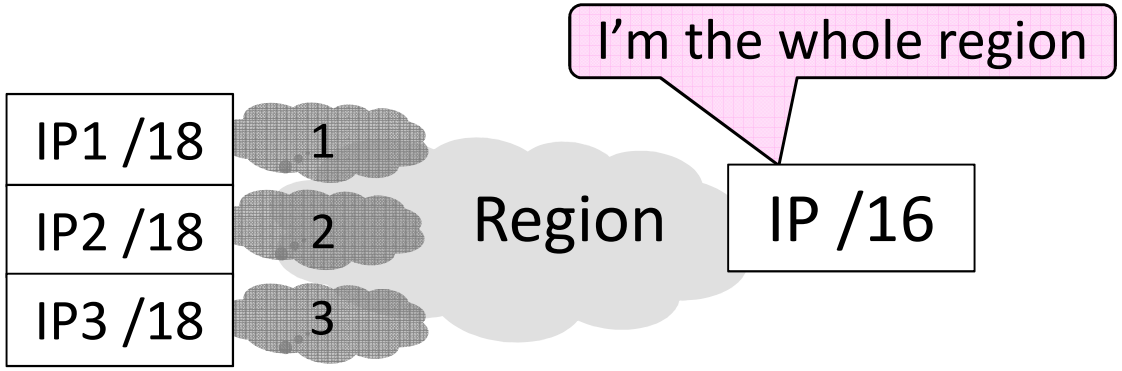
Topic

- How to help scale routing by adjusting the size of IP prefixes
  - Split (subnets) and join (aggregation)



Recall

- IP addresses are allocated in blocks called IP prefixes, e.g., 18.31.0.0/16
  - Hosts on one network in same prefix
- A "/N" prefix has the first N bits fixed and contains 2^{32-N} addresses
  - E.g., "/24"
  - E.g., "/16"

Key Flexibility

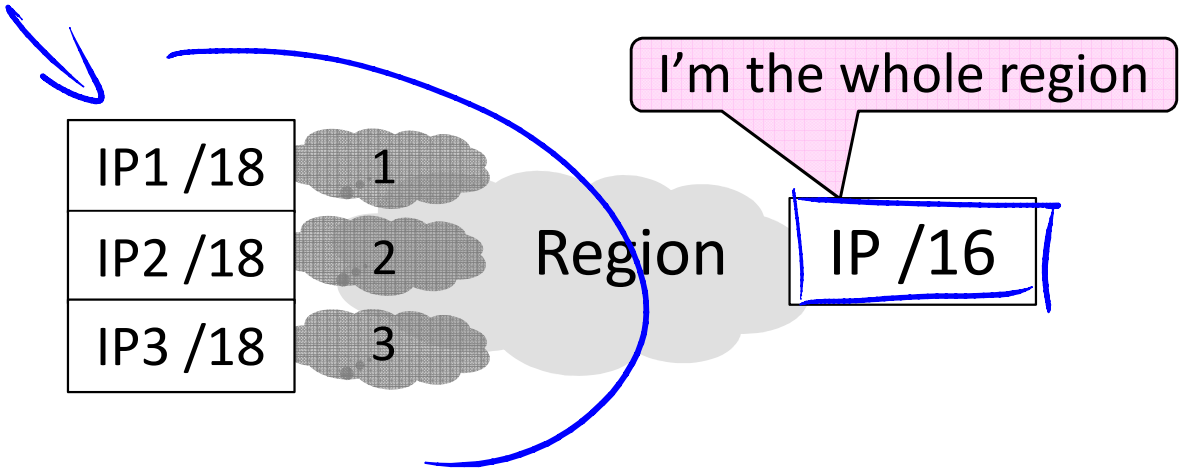
- Routers keep track of prefix lengths
  - Use it for longest prefix matching

Routers can change prefix lengths without affecting hosts

- More specific IP prefix
  - Longer prefix, fewer IP addresses
- Less specific IP prefix
  - Shorter prefix, more IP addresses

Prefixes and Hierarchy

- IP prefixes already help to scale routing, but we can go further
  - Can use a less specific prefix to name a region made up of several prefixes



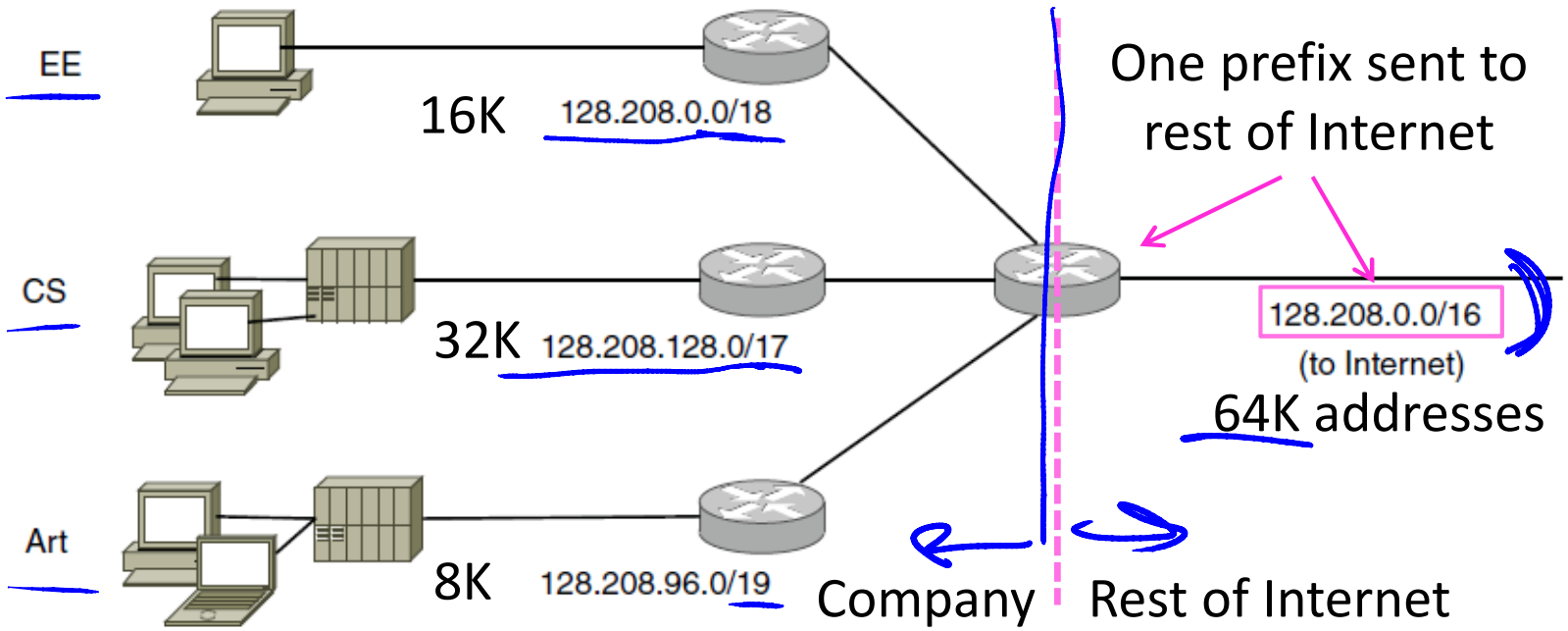
Subnets and Aggregation

Two use cases for adjusting the size of IP prefixes; both reduce routing table

1. Subnets
   - Internally split one less specific prefix into multiple more specific prefixes
2. Aggregation
   - Externally join multiple more specific prefixes into one large prefix

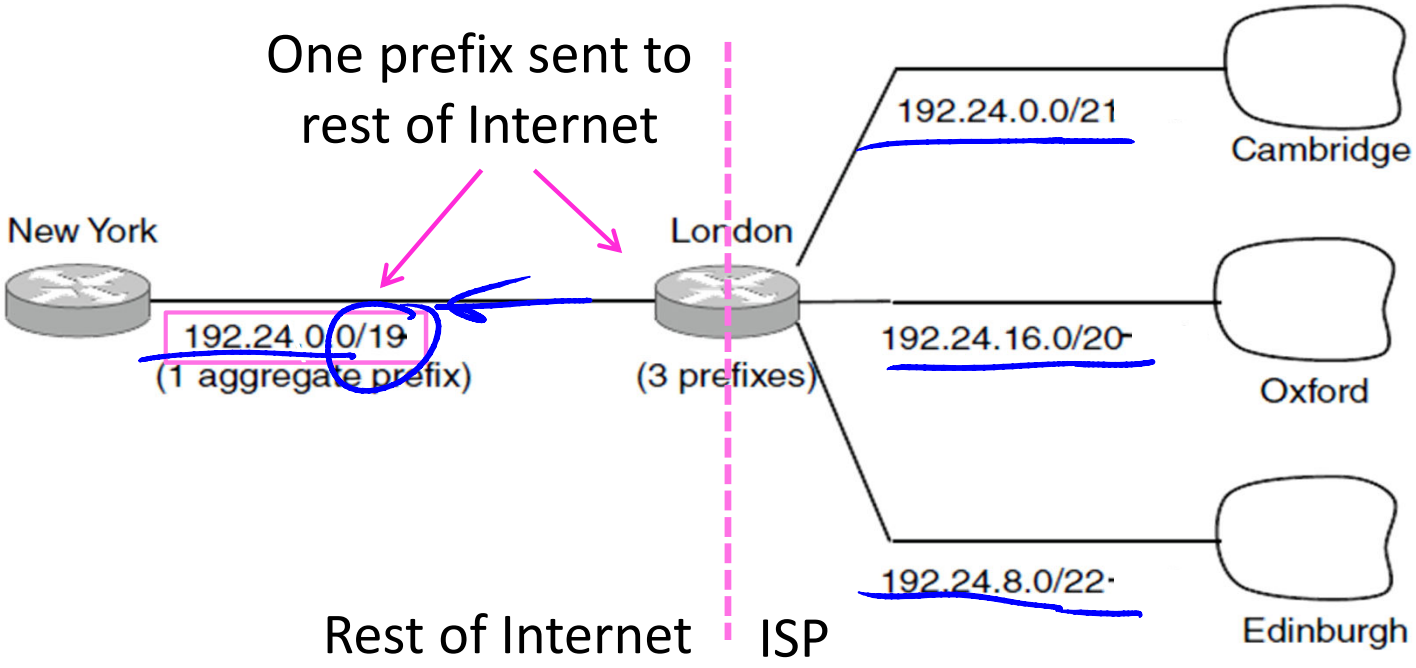
Subnets

- Internally split up one IP prefix



Aggregation

- Externally join multiple separate IP prefixes



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