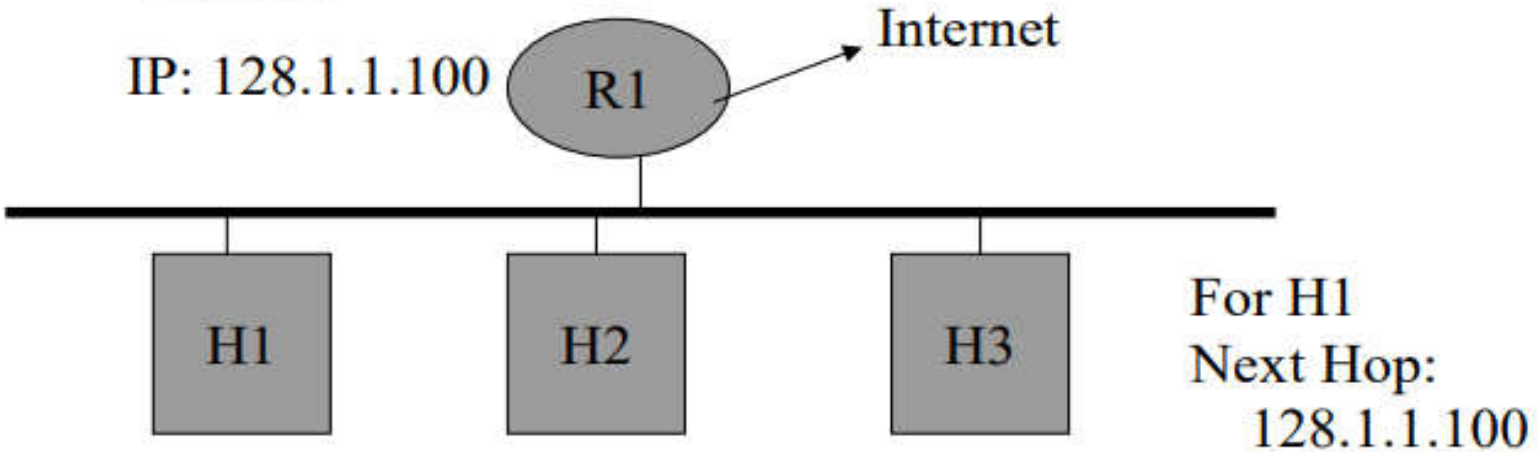
Routing Protocols - Overview

Static Routing

- Typically used in hosts
  - Enter subnet mask, router (gateway), IP address
  - Perfect for cases with few connections, doesn't change much
    - E.g. host with a single router connecting to the rest of the Internet



Dynamic Routing

- Most routers use dynamic routing
  - Automatically build the routing tables
  - As we saw previously, there are two major approaches
    - Link State Algorithms
    - Distance Vector Algorithms
- First some terminology
- AS = Autonomous System
  - Contiguous set of networks under one administrative authority
  - Common routing protocol
  - E.g. University of Alaska Statewide, Washington State University
  - E.g. Intel Corporation
  - A connected network
    - There is at least one route between any pair of nodes

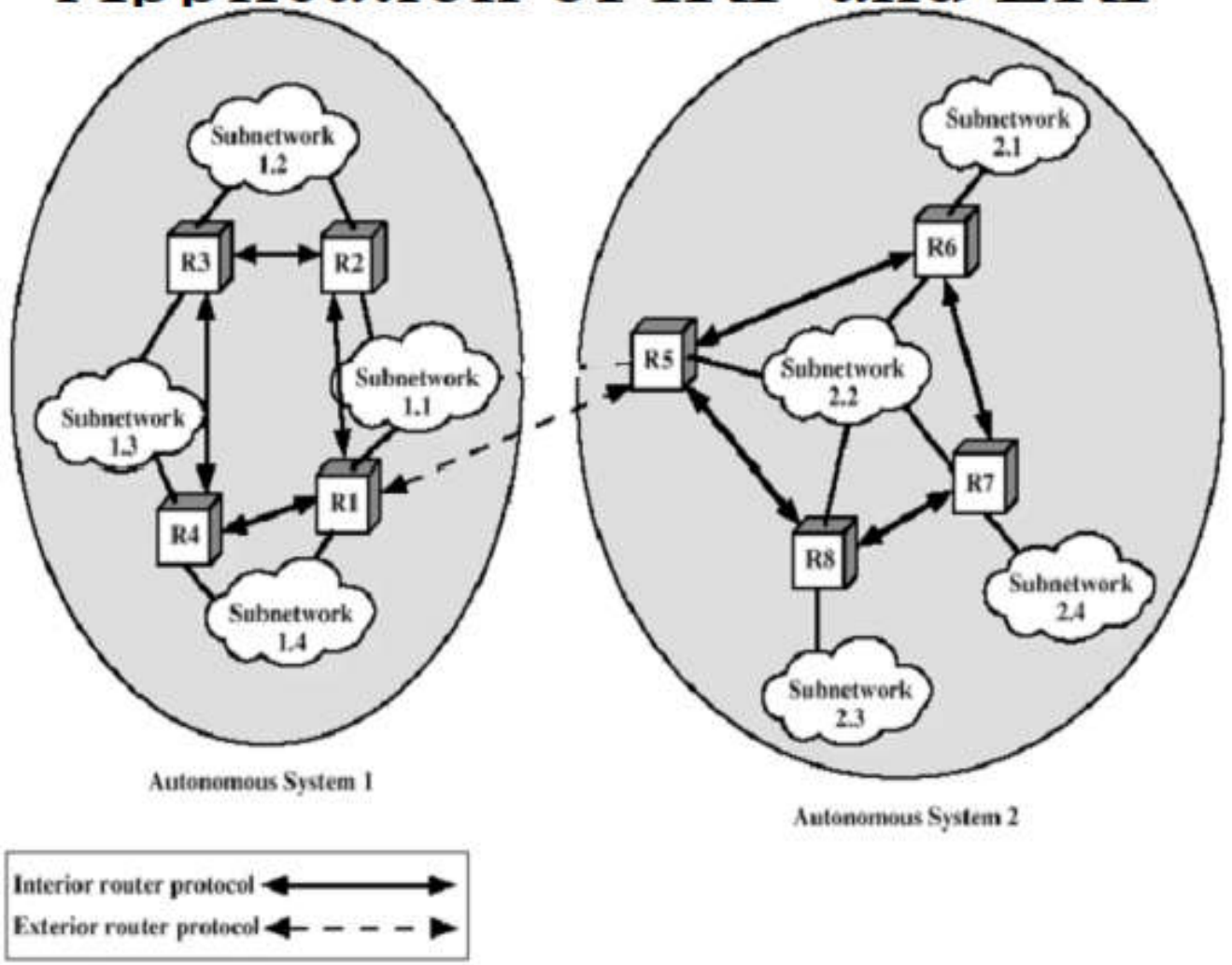
Routing in an AS

- IRP = Interior Routing Protocol
  - Also IGP ; Interior Gateway Protocol
  - Passes routing information between routers within AS
  - Can use routing metric, e.g. hop count or administrative cost
    - E.g. two paths from accounting to payroll, a 2 hop path for customers, and a 3 hop path for internal corporate
      - Shortest path violates corporate policy for internal employees, so administrator can override the actual cost to 4 hops
      - Customers still get the 2 hop path so they pick this route

Routing in an AS

- ERP = Exterior Routing Protocol
  - Also EGP; Exterior Gateway Protocol
  - Passes routing information between routers across AS
  - May be more than one AS in internet
  - Routing algorithms and tables may differ between different AS
  - Finds a path, but can't find an optimal path since it can't compare routing metrics via multiple AS

Application of IRP and ERP



Hierarchical Routing

Our routing study thus far - idealization

- all routers identical
- network "flat"

... *not* true in practice

scale: with 50 million destinations:

- can't store all dest's in routing tables!
- routing table exchange would swamp links!

administrative autonomy

- internet = network of networks
- each network admin may want to control routing in its own network

Internet consists of Autonomous Systems interconnected with each other!

Internet AS Hierarchy