IP Addressing and Routing

Elliot Schwartz
Student Information Processing Board

Introduction

- Questions
  - How do we assign IP addresses?
  - How do we know where to send a packet?
    - The answer to 1 is to assign addresses such that it makes the solution to 2 easier, so lets look at 2 first.

The IP Address

- What gets addressed?
- Address Format

Routing

- Next Hop Routing
- Routing tables
- IP Prefix
- Routing procedure

How do you get routes?

- Loopback
- Interface Address & Netmask
- Default route
  - Manual
  - Router Discovery
- ICMP Redirects
- Static Routes

Routing Protocols

- Internal - RIP, RIPv2, OSPF, ISIS
  - optimize a metric
  - Distance Vector vs. Link State
- External - BGP
  - enforce a policy

Addressing

- Goals
  - reduce routing information exchanged over network
  - increase stability of routing tables
  - reduce size of routing tables maintained on router
  - reduce computation required for routing protocols
  - conserve the address space

Hierarchical addressing

- the Internet is (mostly) hierarchical
- it’s what people do in real life

What's all this Class A, B, and C business I always here about?

- A bad idea!
- hidden information
- inflexible
- Almost gone!

References

- RFCs
  - 1256, 792, 1771
- Huitema
  - Routing in the Internet