i341 Routing

Routing is the process of forwarding an item from one location to another

Routers forward traffic to a logical destination in a computer network

Routers perform two major functions:

- ***Routing***
  - ***Learning the logical topology of the network***
- ***Forwarding***
  - ***Forwarding packets from an inbound interface to an outbound interface***

Routing Requirements

Is the protocol suite active on this device?

Is the destination network known to this device?

Is there an entry in the routing table?

Is the route currently available?

Which outbound interface represents the best path?

Lowest metric path is preferred

Equal lowest metric paths are shared

Routers Forward Traffic

Routing protocols maintain neighbor relationships with adjacent (connected) routers

Neighboring routers and routing protocols exchange frames containing either:

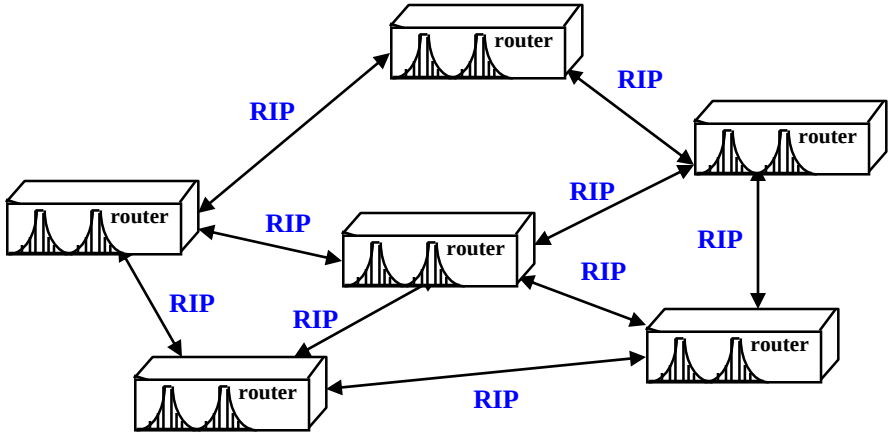
- ***Hello packets***
- ***Routing update packets***

Routing tables contain routes learned from neighboring routers

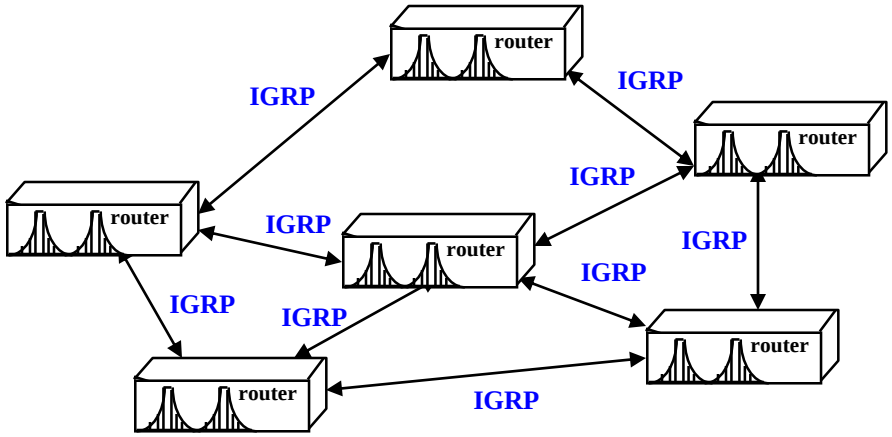
Routers forward traffic to the destination network by passing packets to the next-hop logical device (router) in the delivery path

Interior Gateway Routing Protocols

RIP (Routing Information Protocol)



IGRP
(Interior Gateway Routing Protocol)



Two routers within an autonomous system are called **interior**.

Interior Gateway Protocols:

Interior Gateway Protocols (IGP's) are used for routing within networks under a common network administration (autonomous system).

IGP's include:

RIP (Routing Information Protocol) - developed at Berkeley

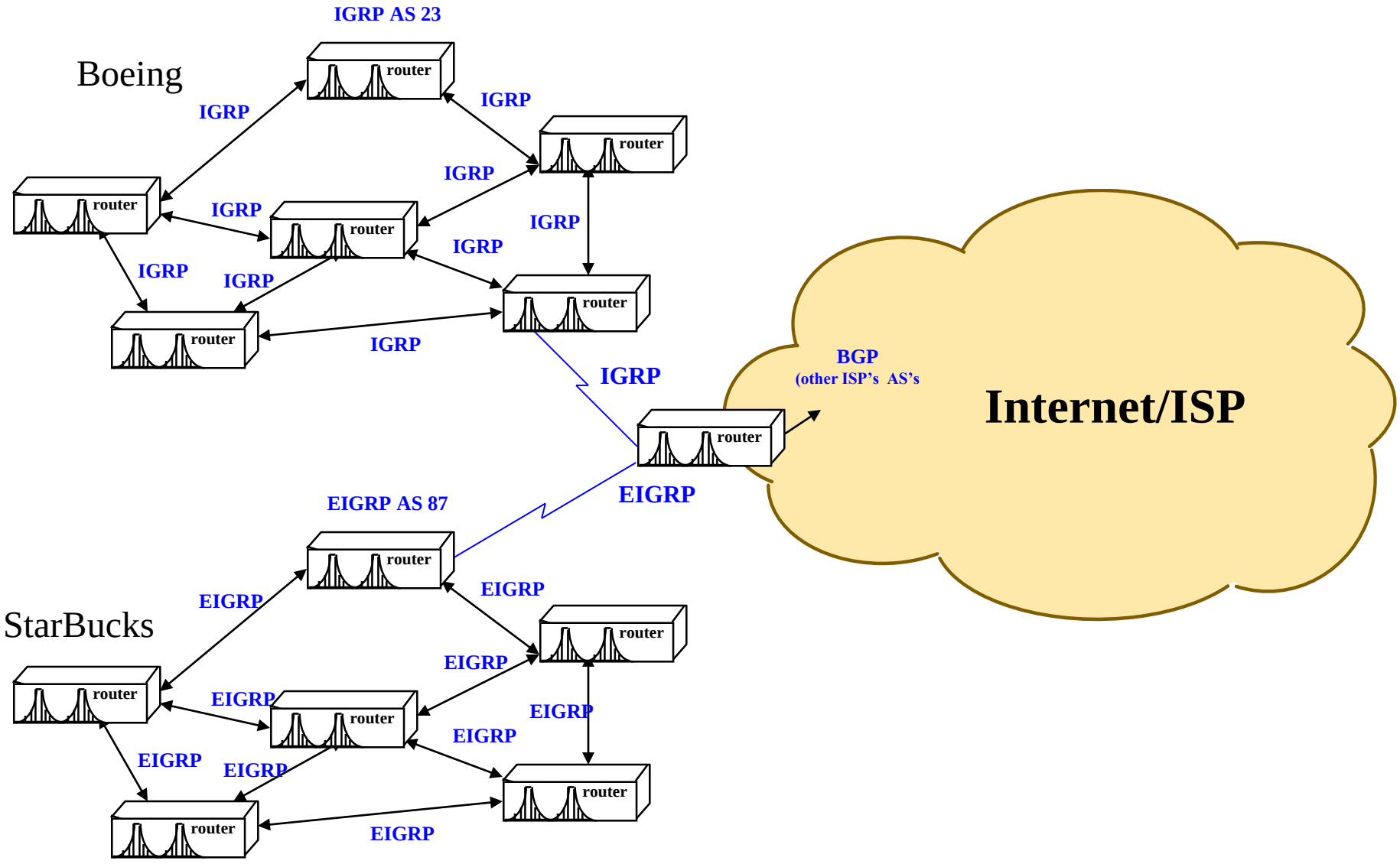
Hello (RFC)

OSPF (Open Shortest Path First)

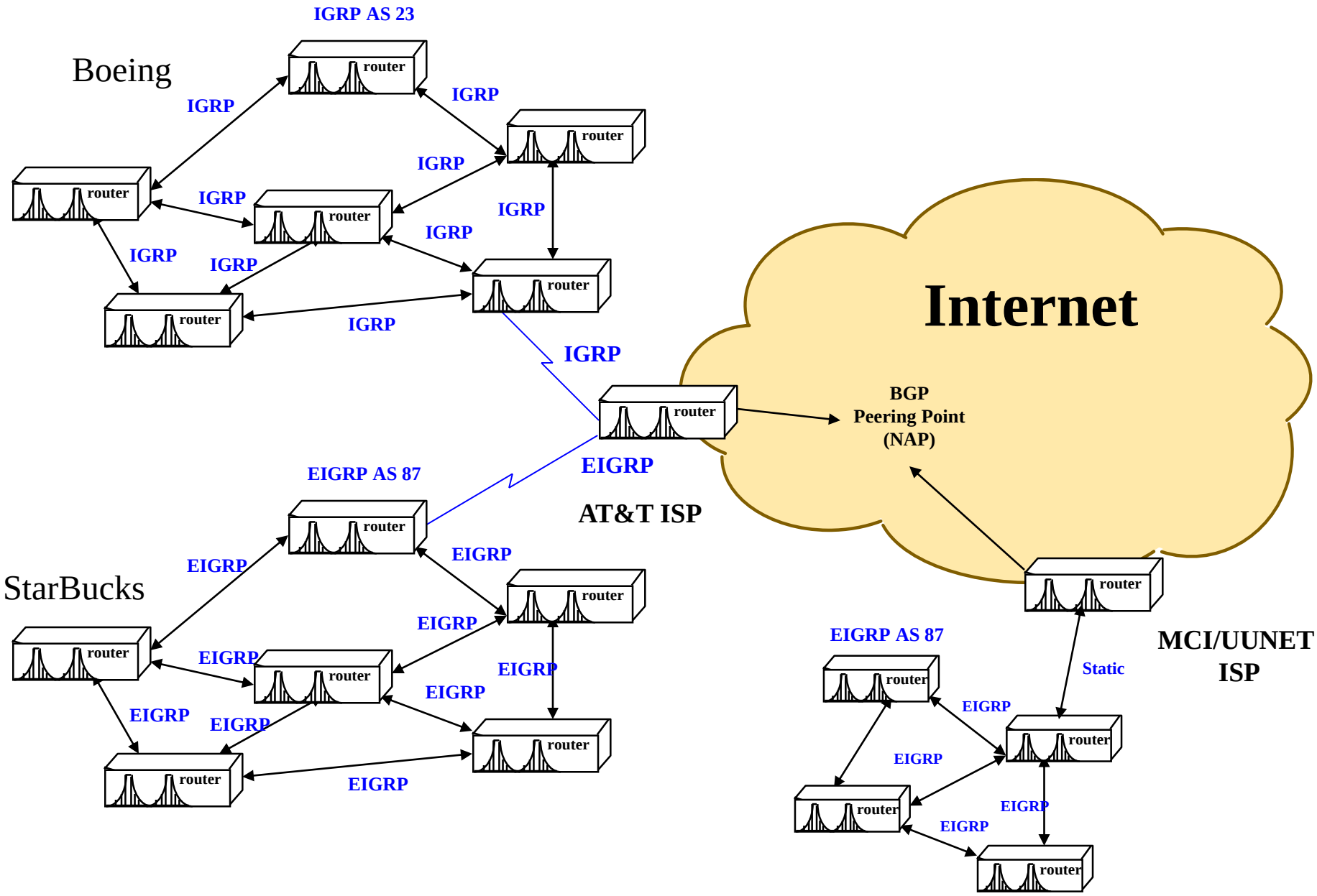
IGRP (Interior Gateway Routing Protocol) – cisco

EIGRP Enhanced IGRP (cisco)

Interior & Exterior Gateway Routing Protocols



Routing Protocols (Peering Points)



Routing Algorithm Metrics:

segment with the highest bandwidth

accumulated delay

smallest MTU (Max size transmission unit)

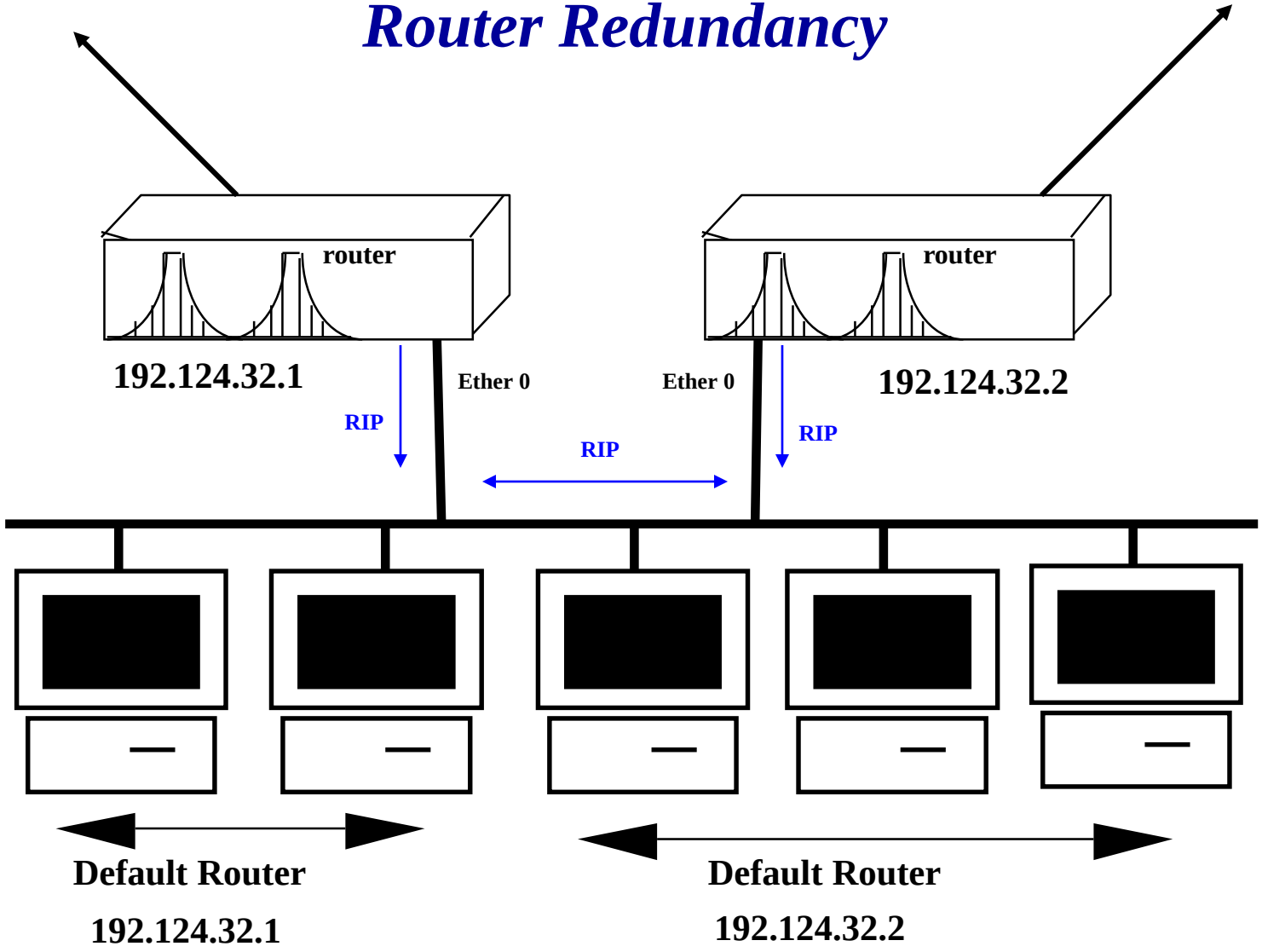
reliability

load

hops (number of hops)

cost (of a hop - an admin. metric assigned by LAN designer/engineer)

Router Redundancy

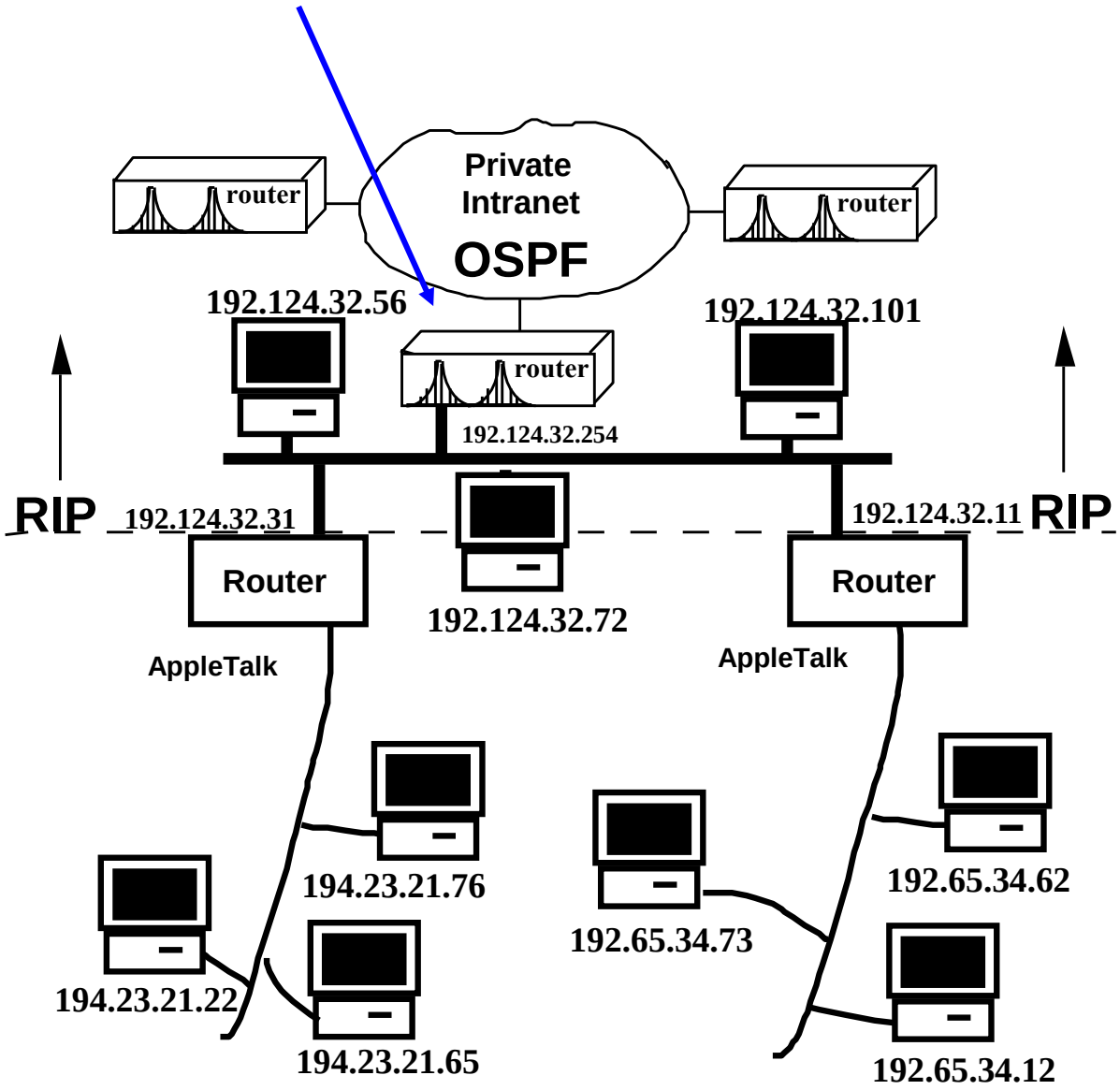


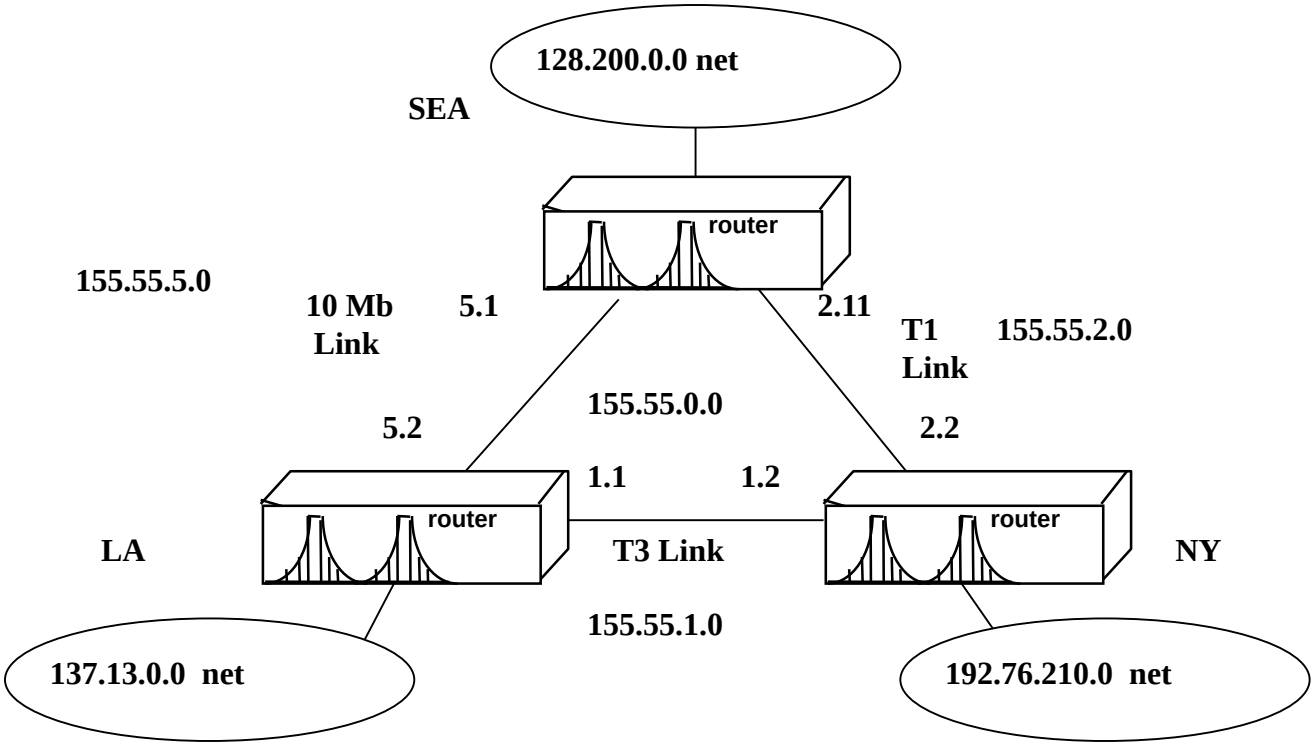
Clients with Host Router Discovery Protocol (RDP) enabled

Router Configuration: (using static routes) to support illustrated network below

IP route 192.65.34.0 192.124.32.11

IP route 194.23.21.0 192.124.32.31





Floating Static Routes :

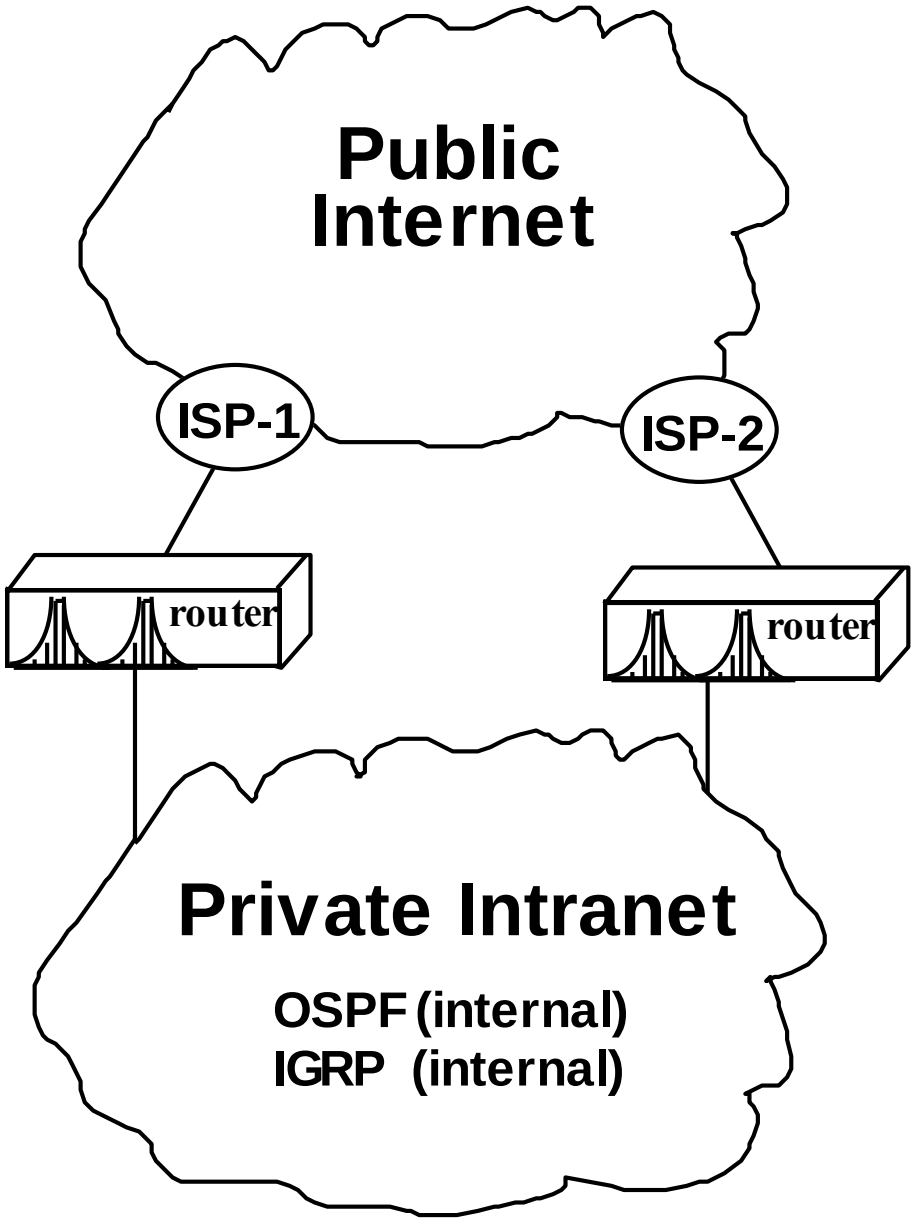
In this scenario it would be preferable to take one route versus the other

Configuration for NY router: (to get to SEA and LA)

Static route statements:

IP route 128.200.0.0 155.55.1.1 10 **(Lower metric – this becomes pref. path to SEA)**
IP route 128.200.0.0 155.55.2.1 20 **(higher metric – second route if first not avail.)**
IP route 137.13.0.0 155.55.1.1 10 **(Lower metric – this becomes pref. path to LA)**
IP route 137.13.0.0 155.55.2.1 20 **(higher metric – second route if first not avail.)**

BGP Routing

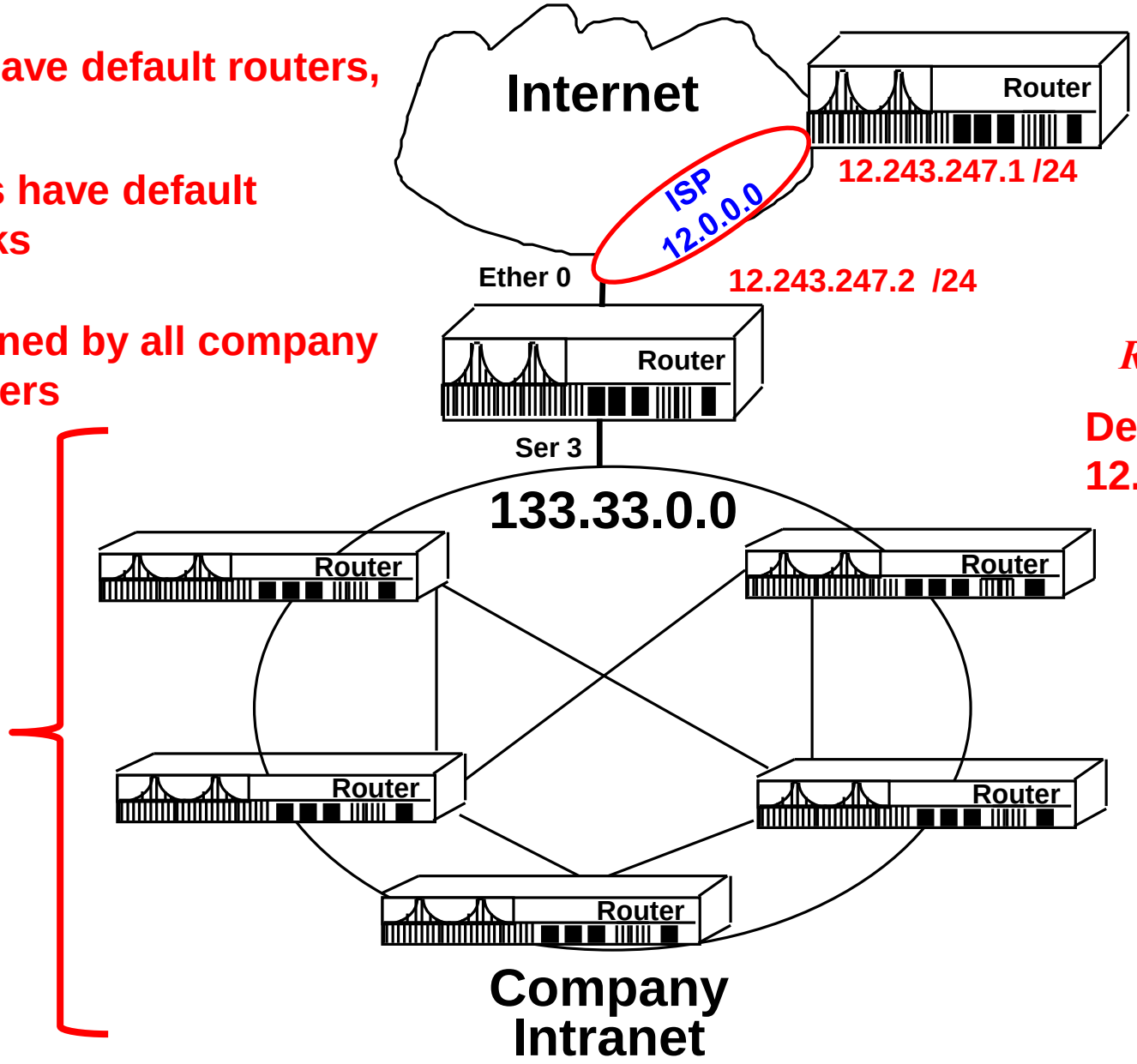

Public
Internet
ISP-1
ISP-2
router
router
Private Intranet
OSPF (internal)
IGRP (internal)

Default Network

Hosts have default routers, G/Ws

Routers have default networks

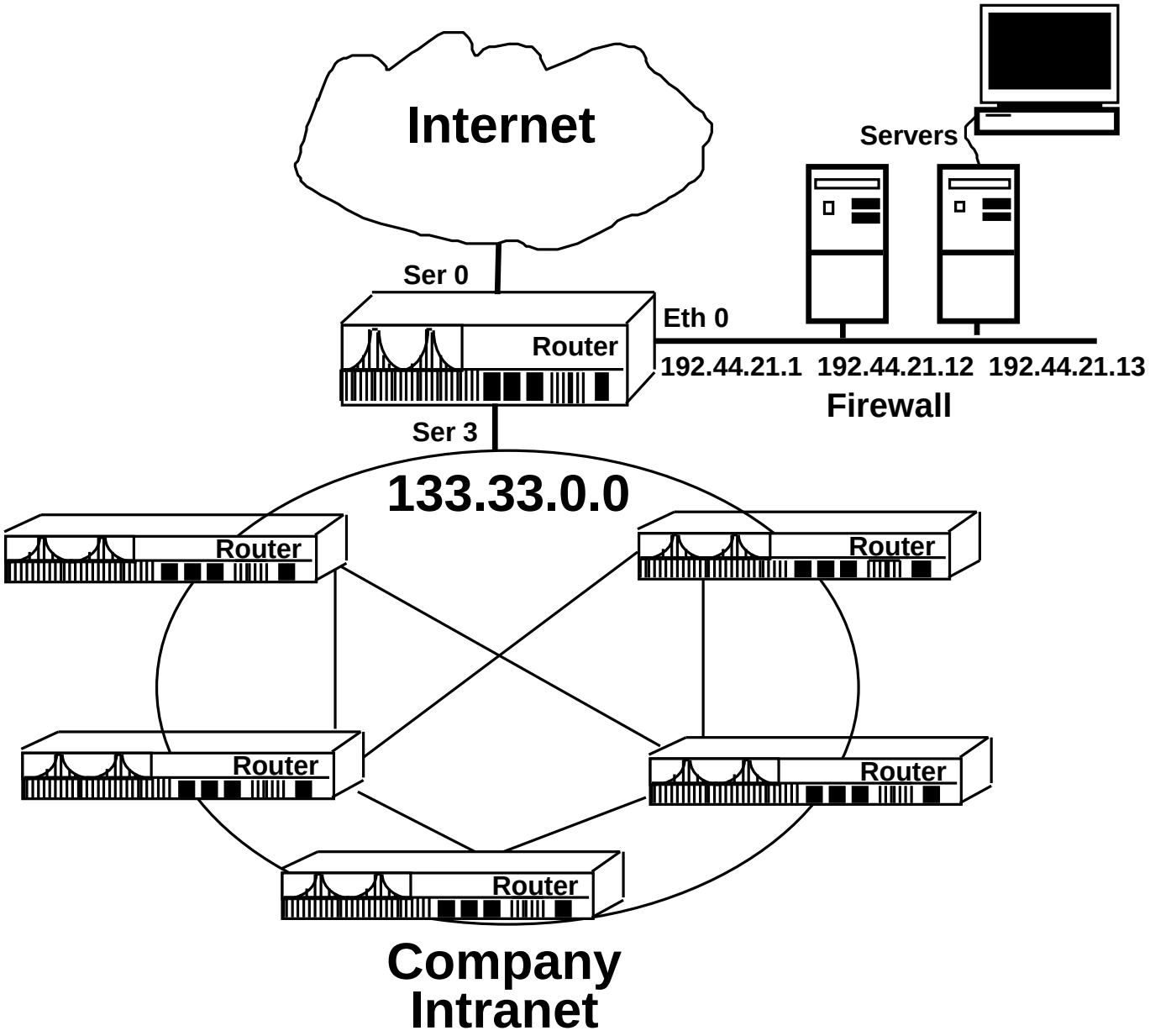
Defined by all company routers



Router Configs

Default network 12.243.247.2

Perimeters/DMZ's



Perimeters/DMZ's