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Routing Protocol Characteristics

- Distance-vector, link-state, or hybrid
- Interior or exterior
- Classless or classful
- Flat or potentially hierarchical
- IPv4 or IPv6

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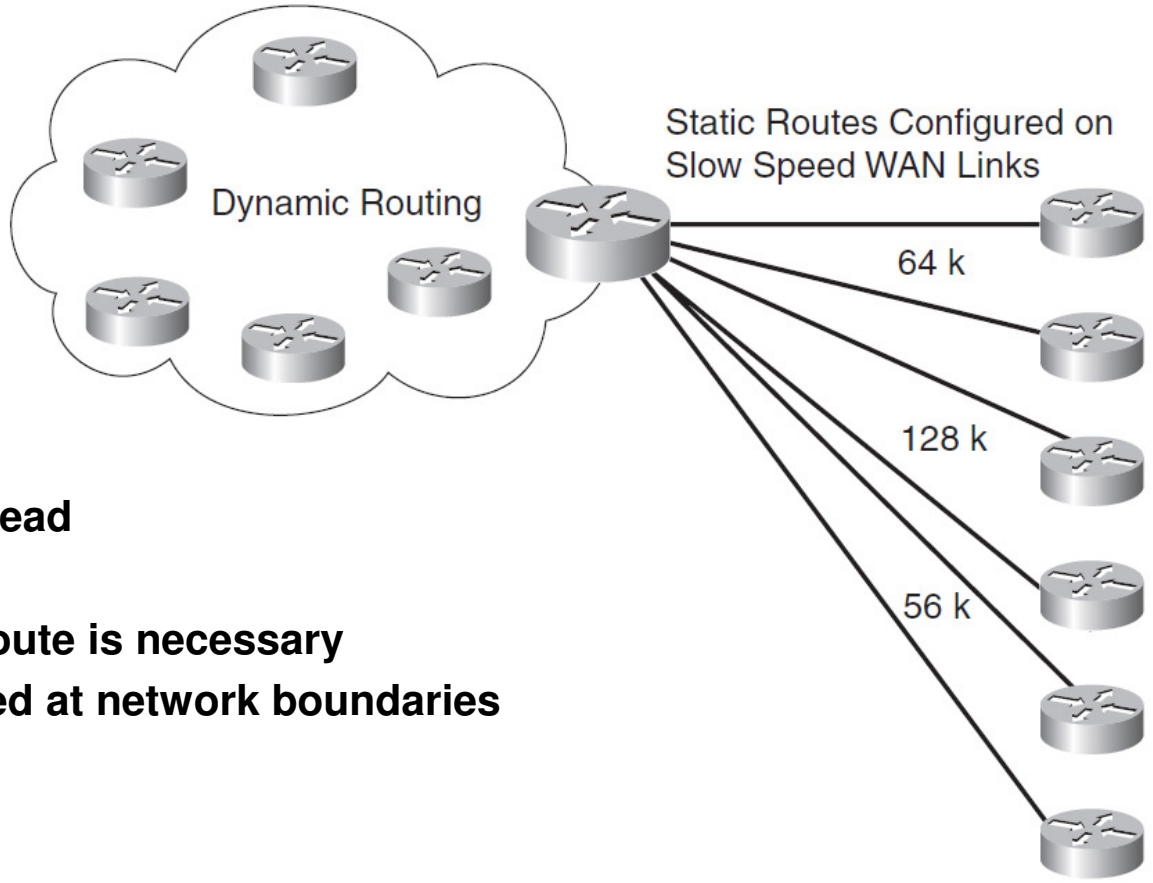
Static Versus Dynamic Route Assignment

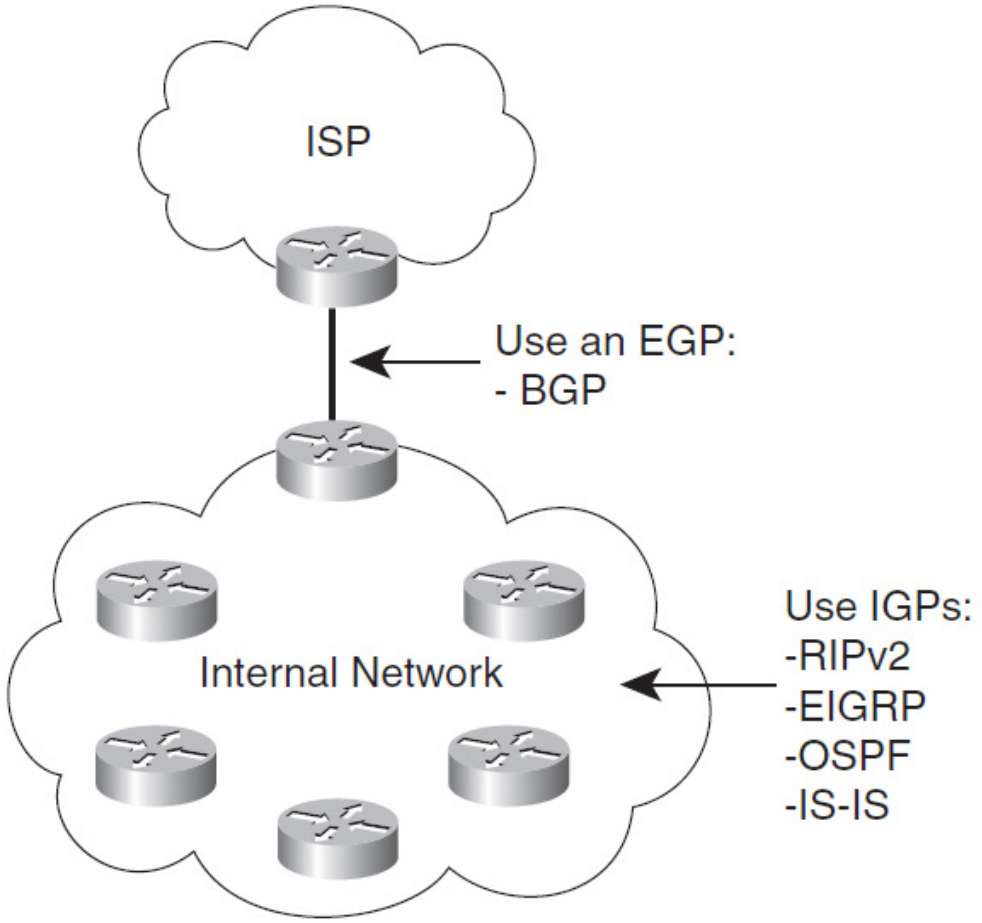


- No routing protocol overhead
- Easier to configure
- Use when no redundant route is necessary
- Static routers are also used at network boundaries

Chapter 9

Interior Versus Exterior Routing Protocols

- **IGPs**
  - **–RIPv2**
  - **–OSPF**
  - **–IS-IS**
  - **–EIGRP**
- **EGPs**
  - **–BGP**



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Distance-Vector Routing Protocols

- Bellman-Ford algorithm
- Routes are advertised as vectors of distance and direction
- Distance metric is usually router hop count
- The direction is the next-hop router

- RIP
- IGRP

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Link-State Routing Protocols

- Flooded to all routers as link state changes occur.
- Shortest path tree
- Maintains a map of the network

- OSPF
- IS-IS
- IPX NetWare Link-Services Protocol (NLSP)

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Distance-Vector Routing Protocols Versus Link-State Protocols

Characteristic	Distance-Vector	Link-State
Scalability	Limited	Good
Convergence	Slow	Fast
Routing overhead	More traffic	Less traffic
Implementation	Easy	More complex
Protocols	RIPv1, RIPv2, IGRP, RIPng	OSPF, IS-IS, OSPFv3

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Hierarchical Versus Flat Routing Protocols

- Two levels of hierarchy are generally sufficient
- OSPF
- IS-IS

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Administrative Distance

- **Trustworthiness of a routing information source**

- **Longest prefix match**
  - **–EIGRP 170.20.0.0/16**
  - **–OSPF 170.20.10.0/24**

IP Route	Administrative Distance
Connected interface	0
Static route directed to a connected interface	0
Static route directed to an IP address	1
EIGRP summary route	5
External BGP route	20
Internal EIGRP route	90
IGRP route	100
OSPF route	110
IS-IS route	115
RIP route	120
EGP route	140
External EIGRP route	170
Internal BGP route	200
Route of unknown origin	255

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Routing Protocol Metrics

- Hop count
- Bandwidth
- Cost
- Load
- Delay
- Reliability
- Maximum transmission unit (MTU)

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Loop-Prevention Schemes

- Split Horizon
- Split Horizon with Poison Reverse
- Counting to Infinity
- Triggered Updates

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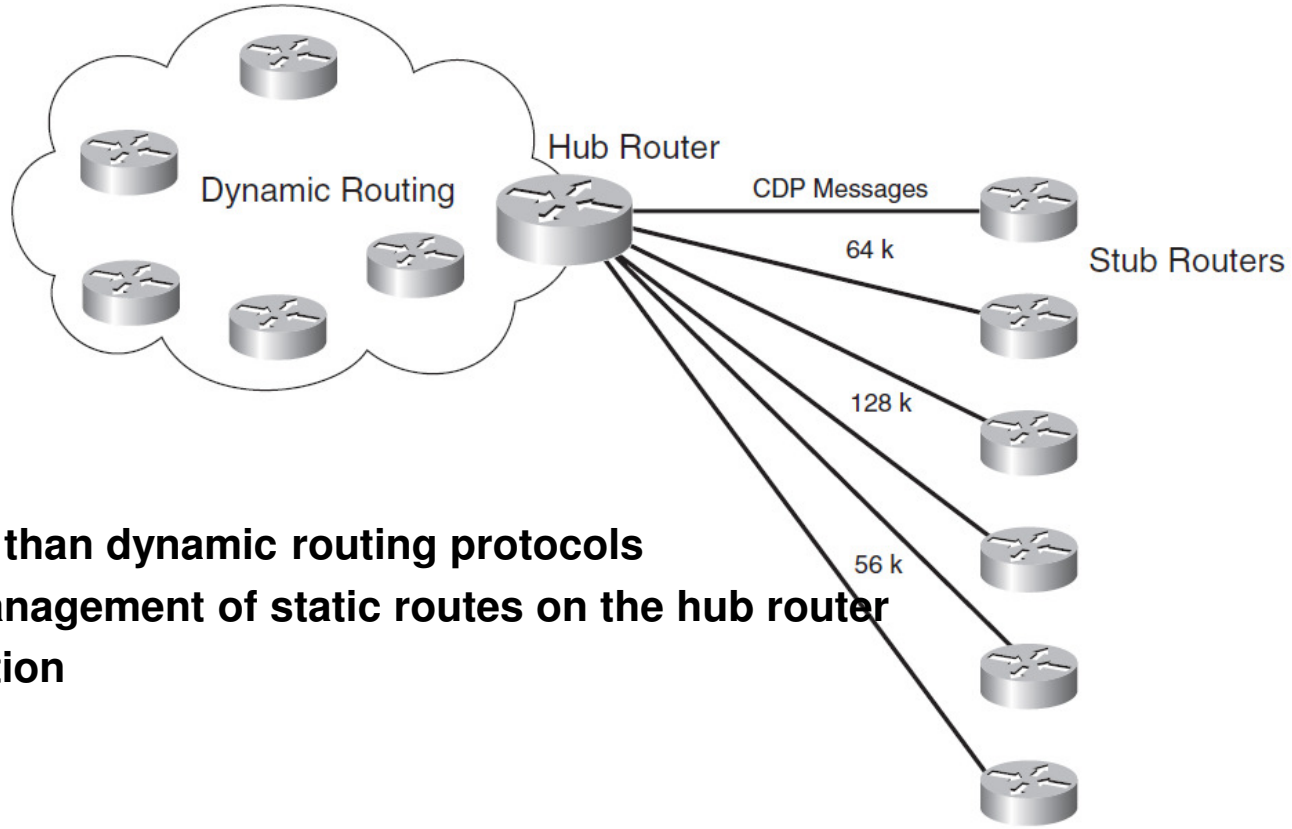
On-demand routing (ODR)



- Less routing overhead than dynamic routing protocols
- No configuration or management of static routes on the hub router
- Reduced circuit utilization

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