Mastering TCP/IP

§ 7. Routining Protocols

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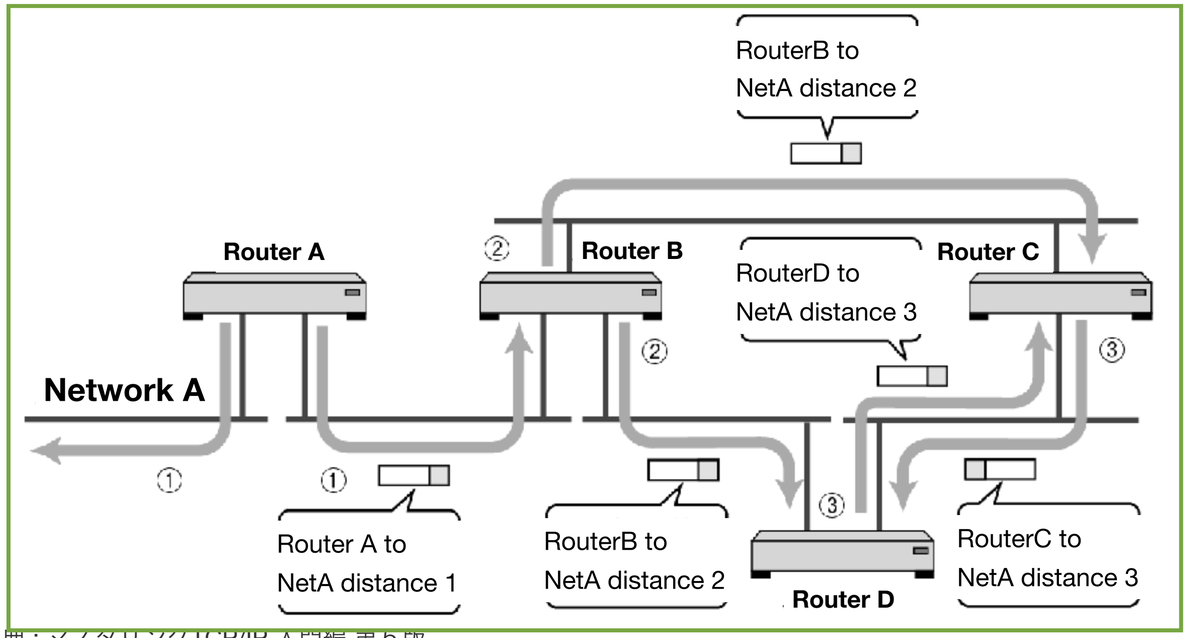
What is RIP ?

- RIP is a routing protocol for IGP (Inner Gateway Protocol).
- RIP provides dynamic routing.
- RIP uses Distance Vector Algorithm for their routing.
- RIP has two types RIPv1 and RIPv2.
- According to development of computing, RIP don’t use much.

Broadcast Routing Control Information

- RIP sends information every 30 seconds.
- When packet unreached 6 times (180 seconds), RIP consider the connection have been down.



① Router broadcasts information they know.

② Router add 1 receiving routing information and sends.

③ Routing information spread.

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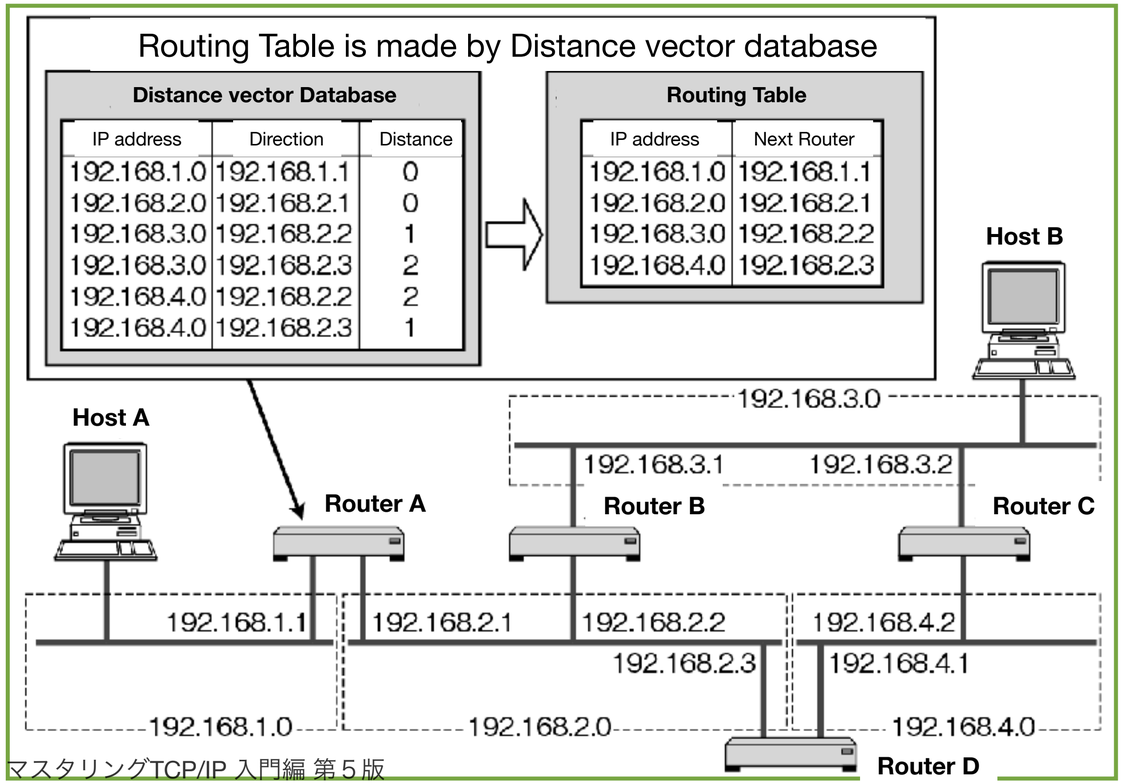
Determine path by distance vector

- RIP determines their path by distance vector.
- Distance indicates **Hop count** (how many router they passed)



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* When one network has multiple routes, shorter path is selected.

Using Subnet mask

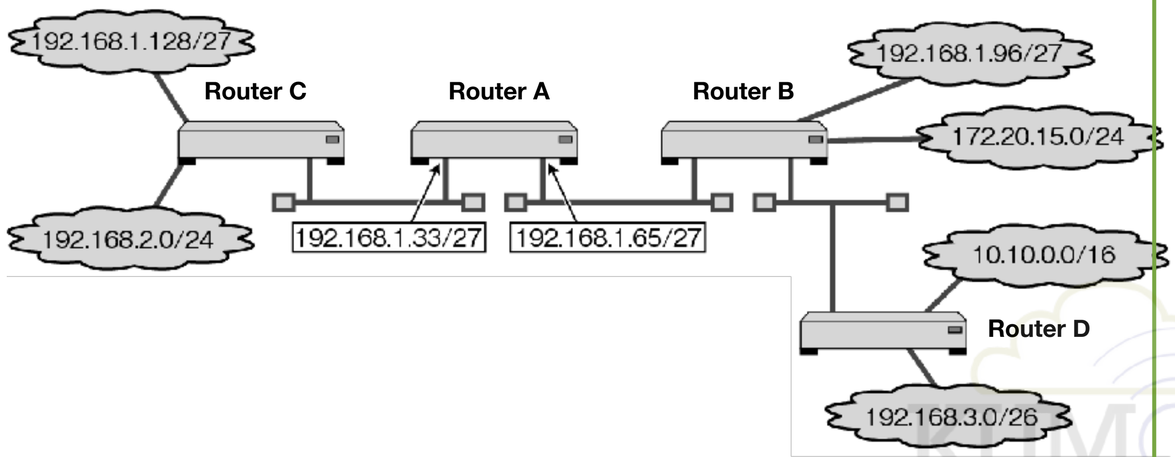
- RIP don’t exchange subnet mask information, but RIP can use network which uses subnet mask.
- Subnet mask is controlled by their IP class

  Ex. 192.168.1.33/27 -> 192.168.1.0/24 (because class C)

These addresses are same network address seen by IP address class.

Seen by IP address class, these addresses are different from Router A.

IPアドレス	方　向
192.168.1.32/27	Router A
192.168.1.64/27	Router A
192.168.1.96/27	Router B
192.168.1.128/27	Router C
192.168.2.0/24	Router C
192.168.3.0/24	Router B
172.20.0.0/16	Router B
10.0.0.0/8	Router B



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What is OSPF ?

- OSPF is link state routing protocol.
- OSPF provides dynamic routing.
- OSPF uses Dijkstra's Algorithm for their routing.
- OSPF divides network into some area.

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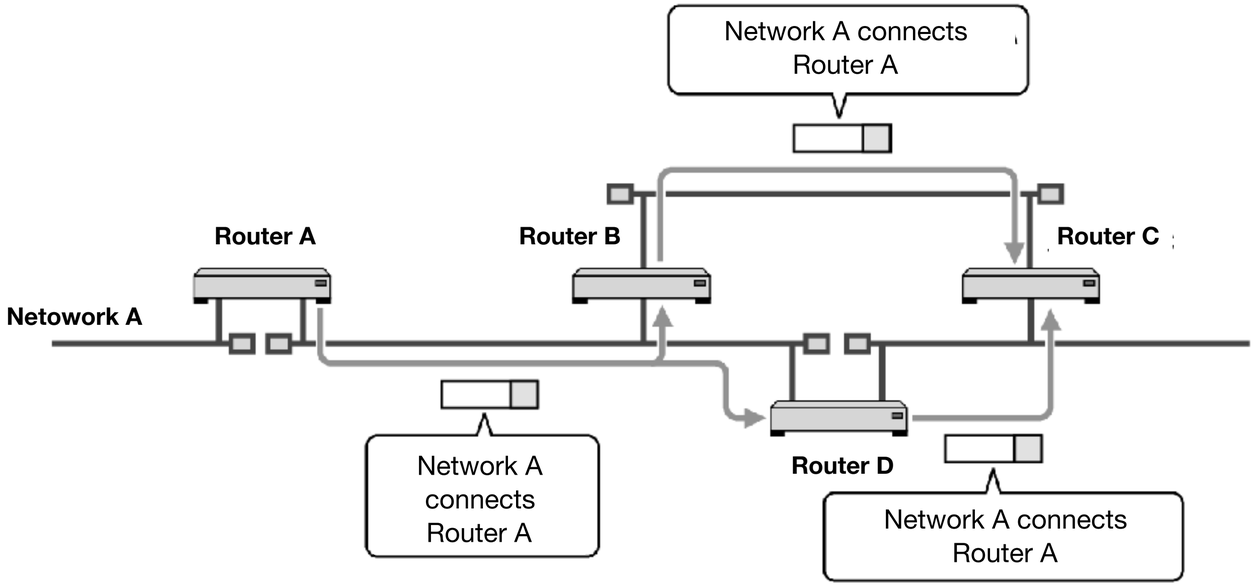
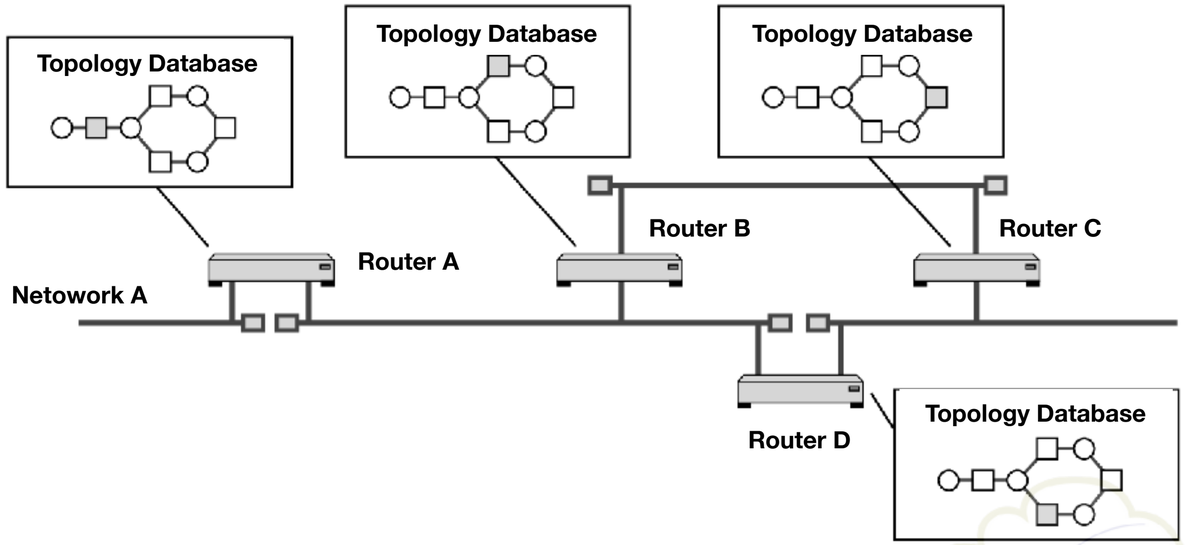
Link state routing protocol

- OSPF exchange information among routers.
- Based on this information, routing table is made.



Connection information
spreads routers by routers



OSPF compute shortest
path by network topology

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7.5.3 How to routing OSPF

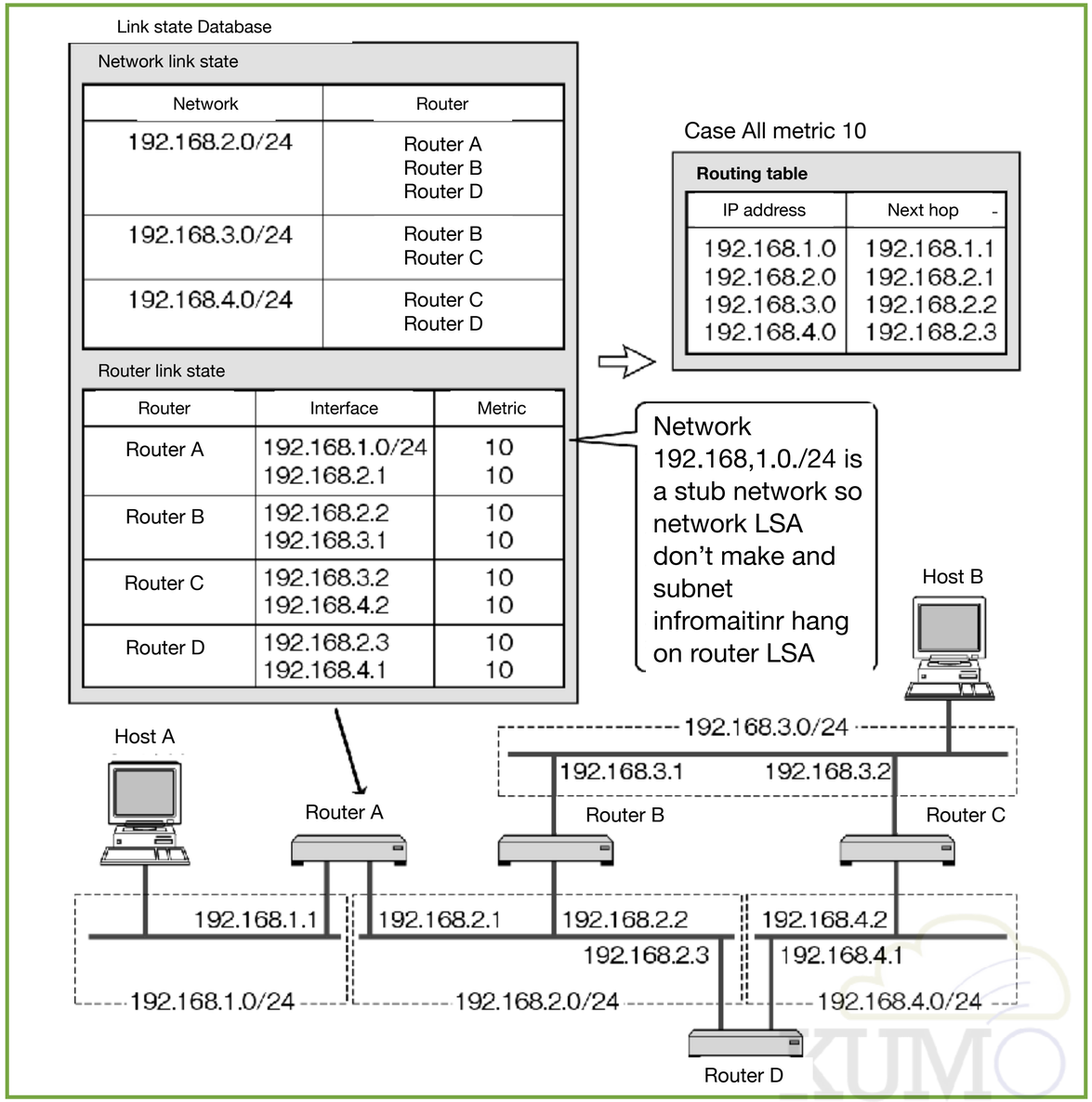
Operation Overview

① “HELLO Packet” which confirm connection

② “Database Description Pakcet”

③ “Link State Update Packet” requires routing information

④ “Link State ACK Packet” notify reception



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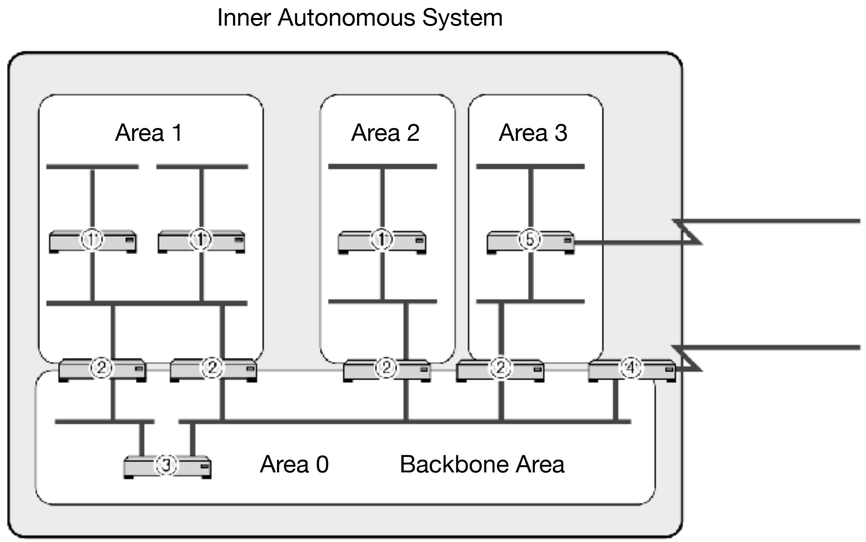
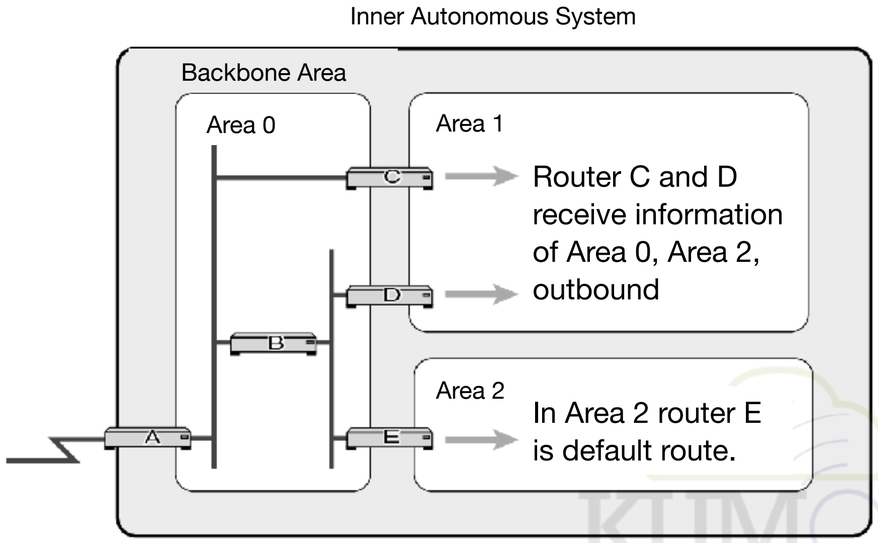
Hierarchical Area of OSPF

- In OSPF network divide into area.
- Area is group of multiple networks.
- All area must connect to backbone.
- Area reduce cost of computing.





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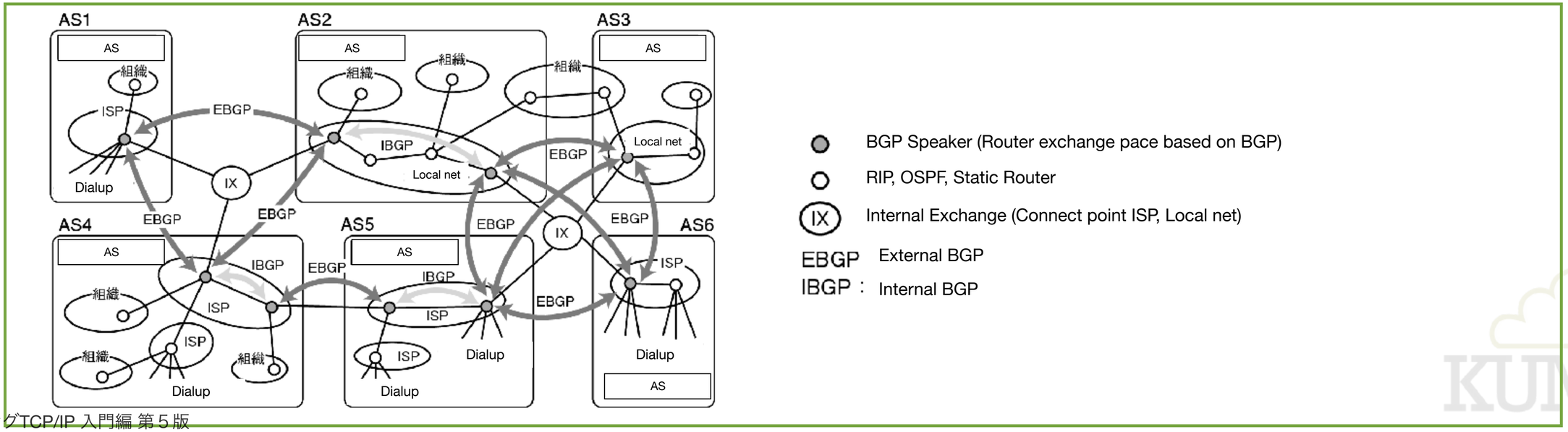
What is BGP ?

- BGP is routing protocol for between AS.
- BGP covers all the Internet routing control.
- BGP’s algorithm is based on number of pass AS.



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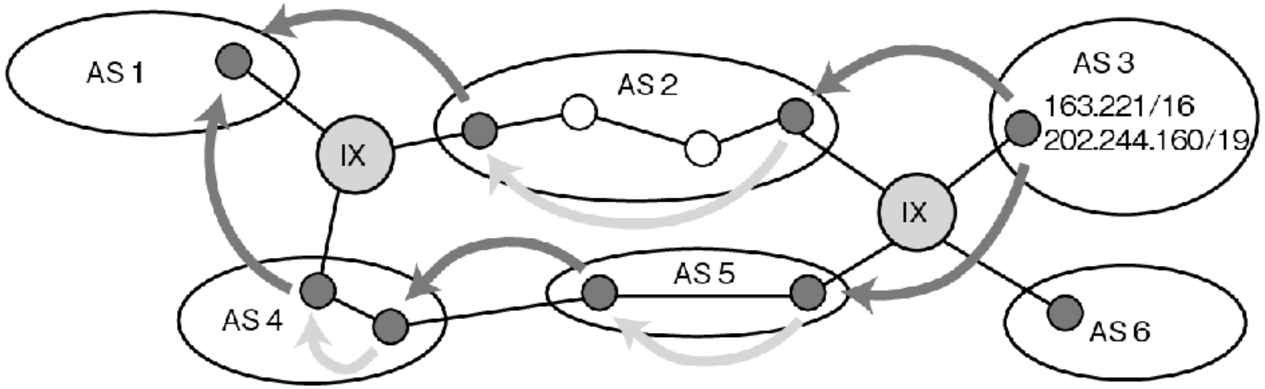
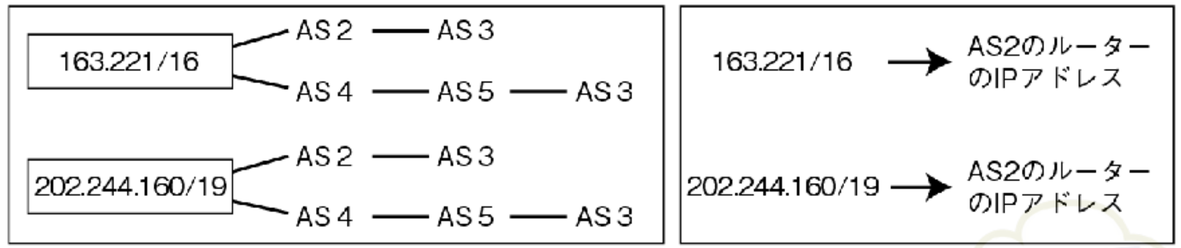
BGP is path vector protocol

- BGP makes AS path list based on this BGP routing.
- AS routing based on AS contract.

Overview of BGP routing





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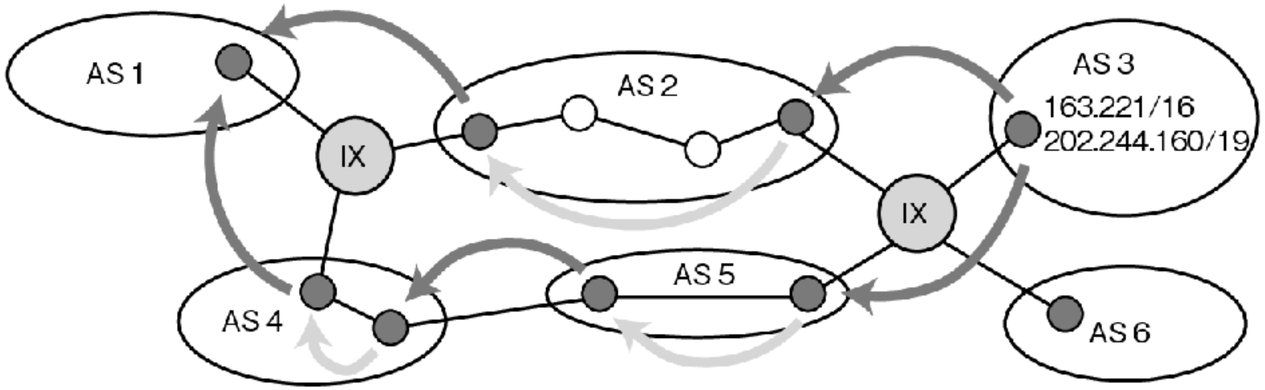
What is MPLS ?

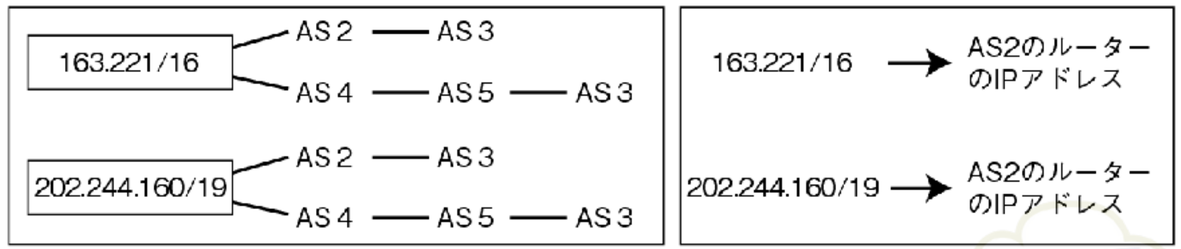
- MPLS adopts Label switching.
- Label switching set “label” to IP.
- MPLS speed up transfer processing.
- MPLS set virtual path such as VPN.

How to routing MPLS

- BGP makes AS path list based on this BGP routing.
- AS routing based on AS contract.

Overview of BGP routing





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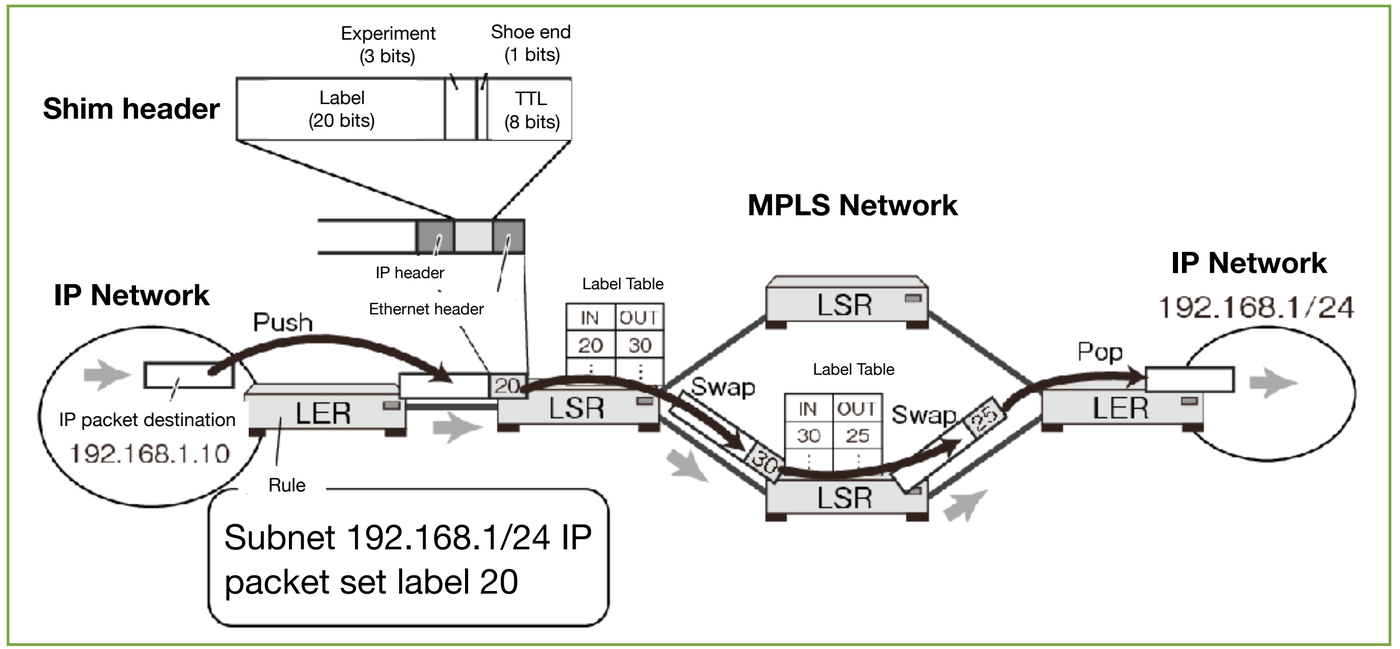
How to routing MPLS

- Router adapted to MPLS is called Label Switching Router (LSR)
- Edge router of MPLS network called Label Edge Router (LER)
- LER set packet to label which called shim header.



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