

The Network Layer

lec 20-4 Hierarchical Routing

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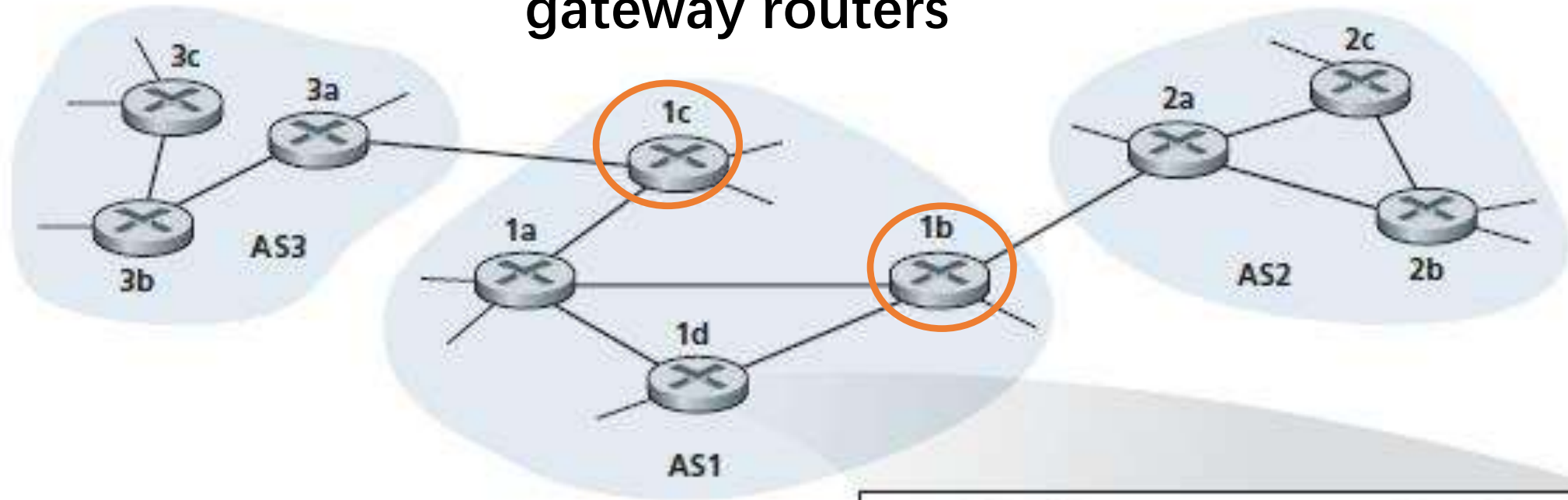
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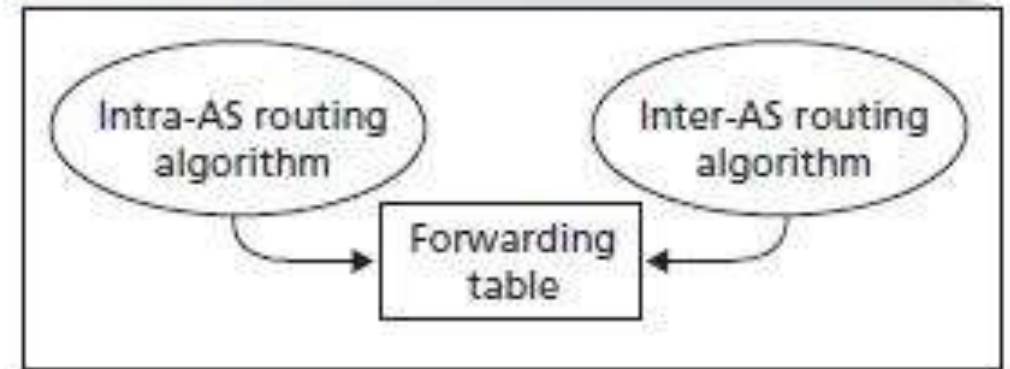
Hierarchical Routing

- The LS and DV algorithms we have studied are not only widely used in practice, they are essentially the *only* routing algorithms used in practice today in the Internet.
- More about the network of routers:
 - *Scale*: hundreds of millions of routers
 - *Administrative autonomy*:
- **Autonomous Systems (ASs): intra-autonomous system routing protocol.**
 - Each AS consisting of a group of routers that are typically under the same administrative control
 - Routers within the same AS all run the same routing algorithm and have information about each other
 - Connect to other AS by **gateway routers**

gateway routers



- The routers in an AS determine routing paths for source-destination pairs that are internal to the AS.
- How does a router, within some AS, know how to route a packet to a destination that is outside the AS?



The inter-AS routing protocol

- Obtaining reachability information from neighboring ASs and propagating the reachability information to all routers internal to the AS.
- Since the inter-AS routing protocol involves communication between two ASs, the two communicating ASs must run the same inter-AS routing protocol.
- In fact, in the Internet all ASs run the same inter-AS routing protocol, called BGP4.

Hot-Potato Routing.

Learn from inter-AS protocol that subnet x is reachable via multiple gateways.

Use routing info from intra-AS protocol to determine costs of least-cost paths to each of the gateways.

Hot potato routing: Choose the gateway that has the smallest least cost.

Determine from forwarding table the interface l that leads to least-cost gateway. Enter (x, l) in forwarding table.

