IP Routing

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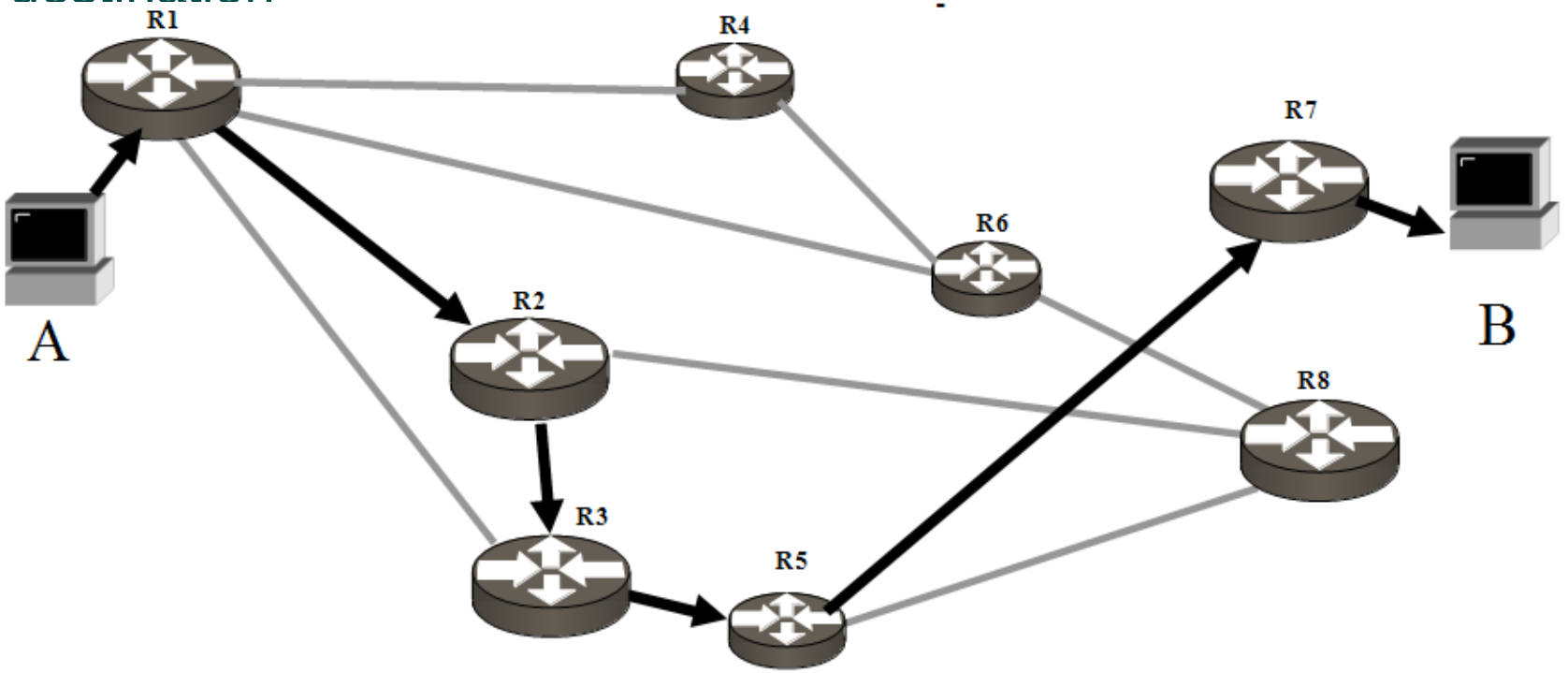
Overview

- Introduction
- Routing Table
- Route Types
- Static Routes
- Dynamic Routing
- Routing Protocols

Routing

- Every hosts on the Internet needs a way to get packets to other hosts outside it's own subnet
- Hosts That can move packets between subnets are called routers
- Packets can pass through many routers before reaching their destination



Routing Table

- All hosts have a routing table
- Routing table shows which networks are connected
- The help deciding how to forward packets to other networks
- Routing table consists of:
  - Network : Shows the network ID of the connected Network
  - Netmask : netmask of the above mentioned network
  - Gateway/Next Hop : It points to the gateway through which the network can be reached
  - Interface : Locally available interface is responsible for reaching the gateway
  - Metric : Cost of using the indicated route. Lower the cost more chance of choosing that route

Route Types

- Routing table entries are added in two ways
  - Manully added by a user
  - Dynamic routing using Routing Protocols

- Manually Added routes (Static Routes)
  - Default Route
- Dynamic Routing
  - Distance Vector Routing Protocols
  - Link State Routing Protocols

Static Routes

- Static Routing is a simplistic approach
- Most commonly used route is the default route
- Shortcomings
  - Cannot adapt to addition of new links or nodes
  - Cannot adapt to link or node failures
  - Cannot easily handle multiple paths to a destination
  - Does not scale to large networks

Dynamic Routing

- Distance Vector Routing Protocols
  - Listen to neighboring routes
  - Install all routes in routing table and the lowest hop count wins
  - Advertise all routes in table
  - Cannot scale
  - Cannot resolve routing loops quickly
  - RIP is a routing protocol that uses Distance Vector Algorithm

Dynamic Routing

- Link State Routing Protocols
  - Each link, the connected nodes and the metric is flooded to all routers
  - Each link up/down status change is incrementally flooded
  - Each router re-computes the routing table in parallel using the common link state database
  - Examples are OSPF and IS-IS

Routing Protocols

- RIP
  - Stands for “Routing Information Protocol”
  - RIPv1 is classful, and officially obsolete
  - RIPv2 is classless
  - Not widely used in the Internet industry
- OSPF
  - Stands for Open Shortest Path First
  - OSPF v2 is widely used
  - OSPF v3 includes extensions to support IPv6

Thank You

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