Routing Protocols

18CSS202J – Computer Communications

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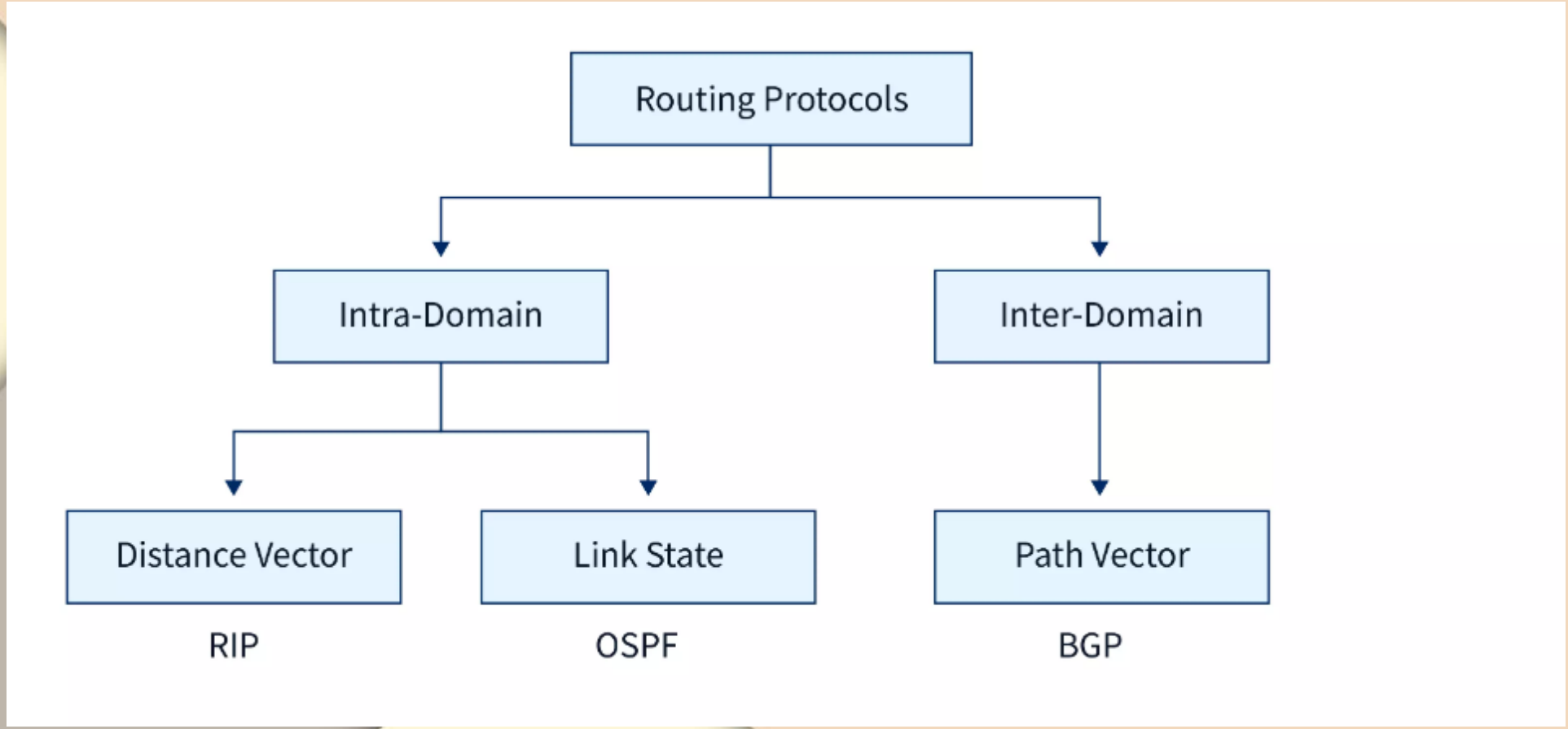
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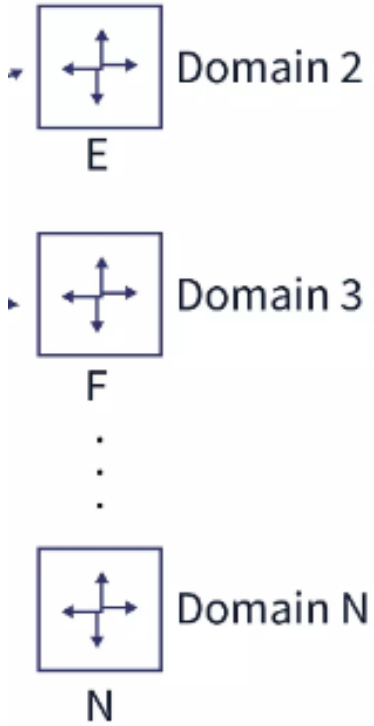
Inter Domain Routing

Interdomain Routing is the protocol in which the routing algorithm works both within and between domains. Domains must be connected in some way, for hosts inside one domain to exchange data with hosts in other domains. This connection within domains is governed by the interdomain routing protocols. This is often done using the **Border Gateway Protocol (BGP).** It is used in **Path Vector Routing** using which interdomain routing is performed. In path vector routing, the routing depends on the analysis of the path from the nodes in the current domain to the node in the other domain, and not on the distance between nodes.



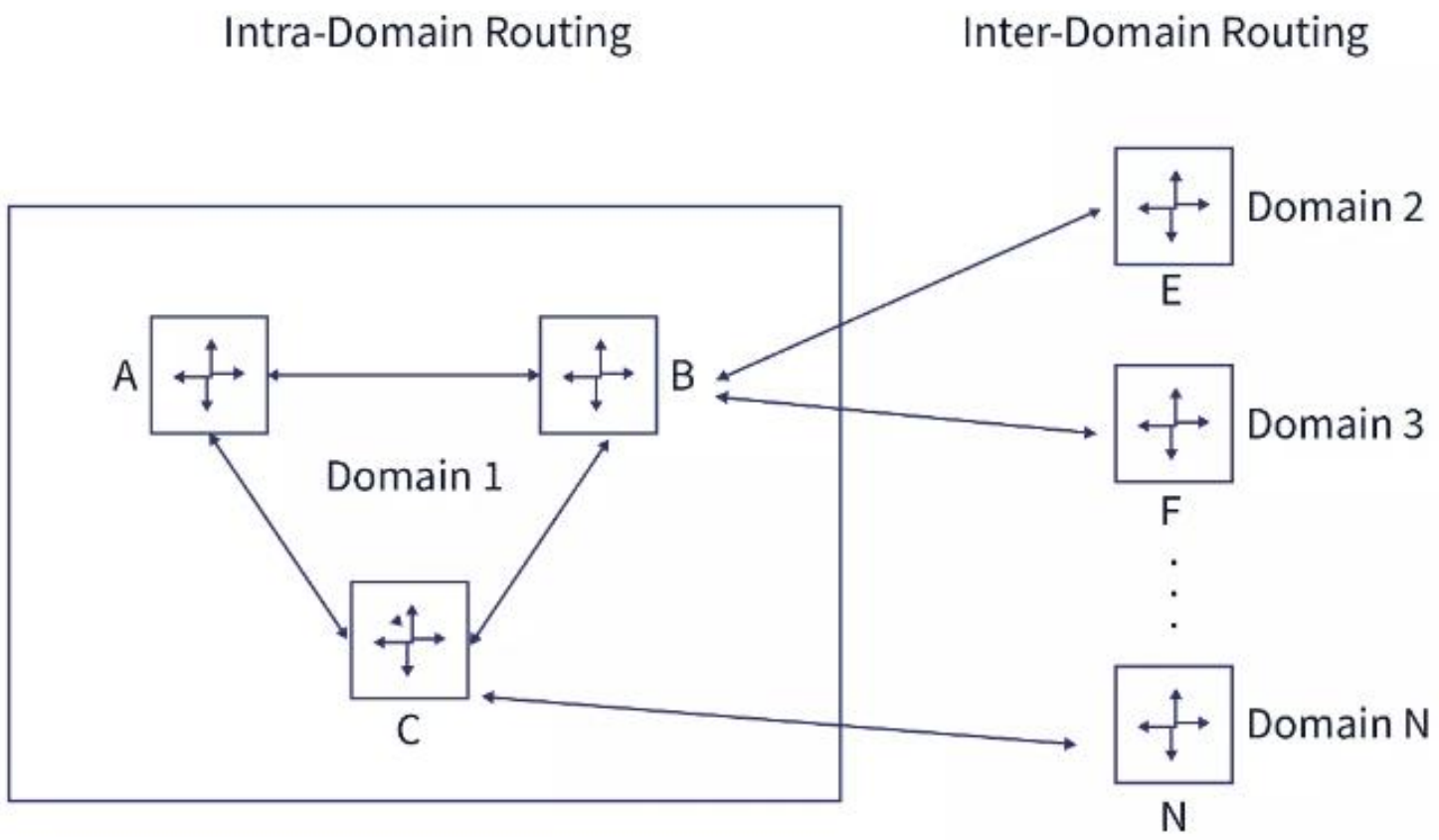
Intra Domain Routing

Intradomain Routing is the routing protocol that operates only within a domain. In other words, intradomain routing protocols are used to route packets within a specific domain, such as within an institutional network for e-mail or web browsing. Unlike interdomain routing protocols, it doesn't communicate with other domains. There are two types of protocols used for intradomain routing:

1.Distance Vector Routing (uses Routing Information Protocol or RIP) In distance vector routing, each node in a domain stores information about its neighboring nodes. The information is stored in a table known as a routing table, which is maintained by each node in the domain. RIP is one of the earliest distance-vector routing protocols, and it uses hop count as a routing statistic. By placing a cap on the maximum number of hops that may be taken between a source and a destination, RIP avoids routing loops.

2.Link State Routing (uses Open Shortest Path First or OSPF) In link state routing, each node in a domain stores information about all the other nodes in the domain, in other words, the routing table of each node stores information about the entire topology of the domain. Since each node has all the information about the domain at its disposal, Dijkstra's algorithm is used to calculate the best routing path. This is possible due to OSPF, and this is also its advantage.

Routing Protocols

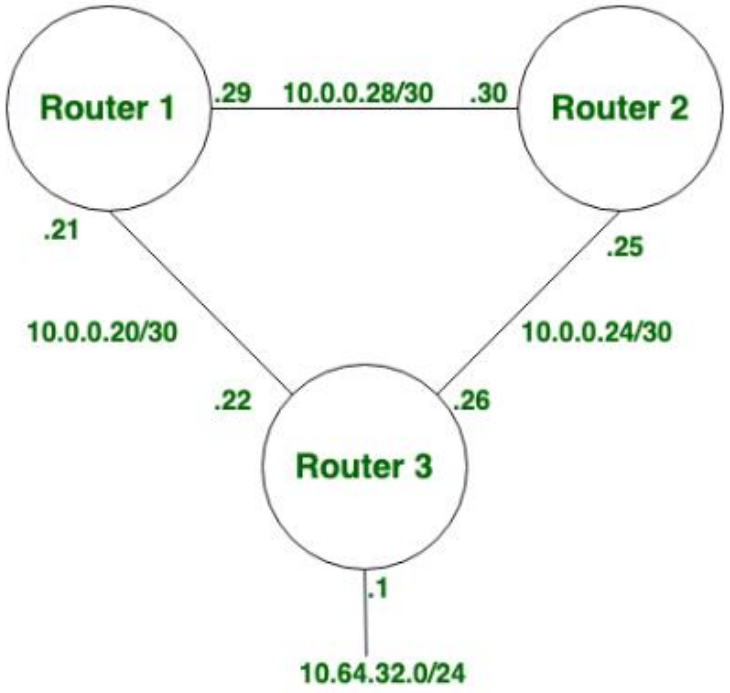


Difference

Basis	Interdomain Routing	Intradomain Routing
Definition	The interdomain routing algorithms are used for routing within as well as with other domains.	The intradomain routing algorithms are used for routing within domains.
Router information	It requires information about the routers in the current domain as well as other domains.	It requires information only about the routers in the current domain.
Protocols	For interdomain routing, the protocols used are known as exterior-gateway protocols as they route traffic outside as well as inside a domain.	For intradomain routing, the protocols used are known as interior-gateway protocols as they route traffic within a domain.
Types	Interdomain routing is done using Path Vector Routing which uses the Border Gateway Protocol (BGP).	Intradomain Routing is of two types: Distance Vector Routing (uses Routing Information Protocol (RIP) and Link State Routing (uses Open Shortest Path First (OSPF).
Internet	The internet is assumed to be a collection of interconnected autonomous systems by the interdomain routing protocol.	The internet outside the autonomous system is ignored by intradomain routing protocols.

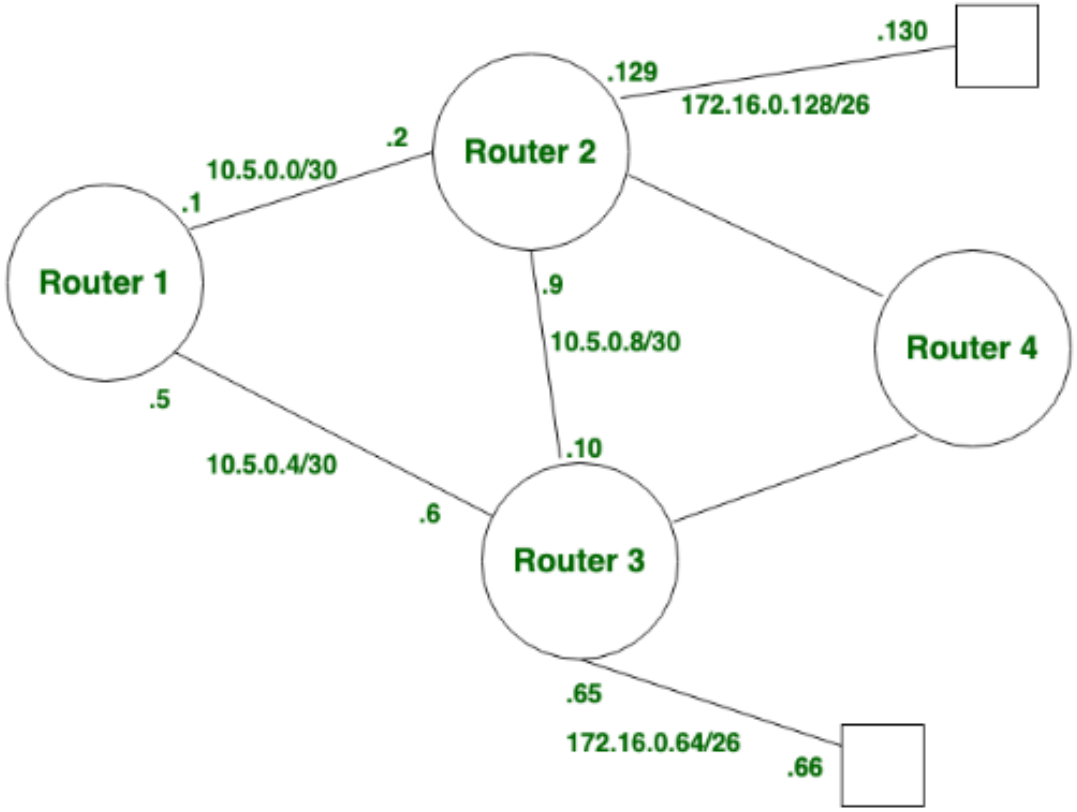
Static Routing

Static Routing is also known as **non-adaptive** routing which doesn't change the routing table unless the network administrator changes or modifies them manually. Static routing does not use complex routing algorithms and It provides high or more security than dynamic routing



Dynamic Routing

Dynamic routing is also known as **adaptive** routing which changes the routing table according to the change in topology. Dynamic routing uses complex routing algorithms and it does not provide high security like static routing. When the network change(topology) occurs, it sends the message to the router to ensure that changes then the routes are recalculated for sending updated routing information.



Static and Dynamic Routing

	Static routing	Dynamic routing
PATH SELECTION	One pre-configured route to destination	Multiple available routes to destination
ROUTE UPDATES	Engineers must reconfigure to make route changes	Algorithms automatically update with preferred route changes
ROUTING TABLES	Smaller routing table with only one entry for each destination	Routers send out entire routing tables to identify route availability
PROTOCOLS AND ALGORITHMS	Does not use protocols or algorithms for pre-configured route	Distance vector algorithms (RIP, IGRP) and link state algorithms (OSPF, IS-IS) adjust routes
COMPUTATION AND BANDWIDTH	Requires less computation time and bandwidth	Requires more computation and bandwidth
SECURITY	Better security	Less security
USE CASES	Used in smaller networks with fewer routers and unchanging network architecture	Used in larger networks and in networks that change frequently