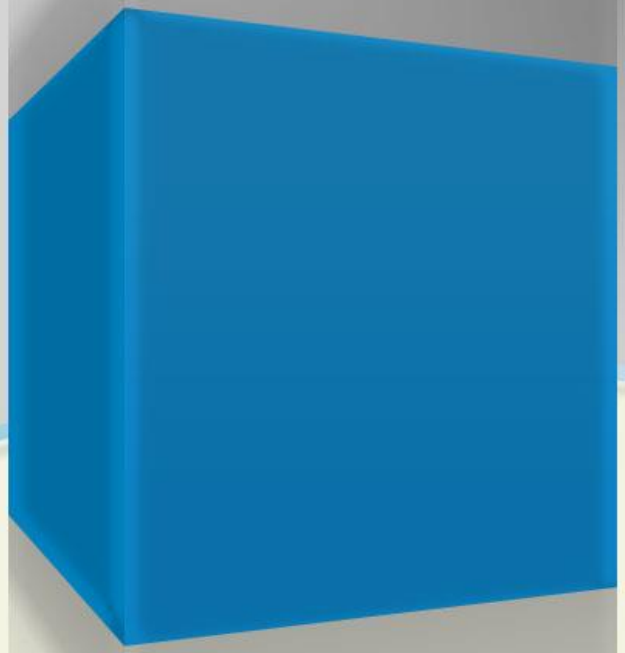
Computer Network Protocols
Network Layer (Part 1)
Lesson 6



كلية المستقبل الجامعة
قسم هندسة تقنيات الحاسوب
المرحلة الرابعة

By
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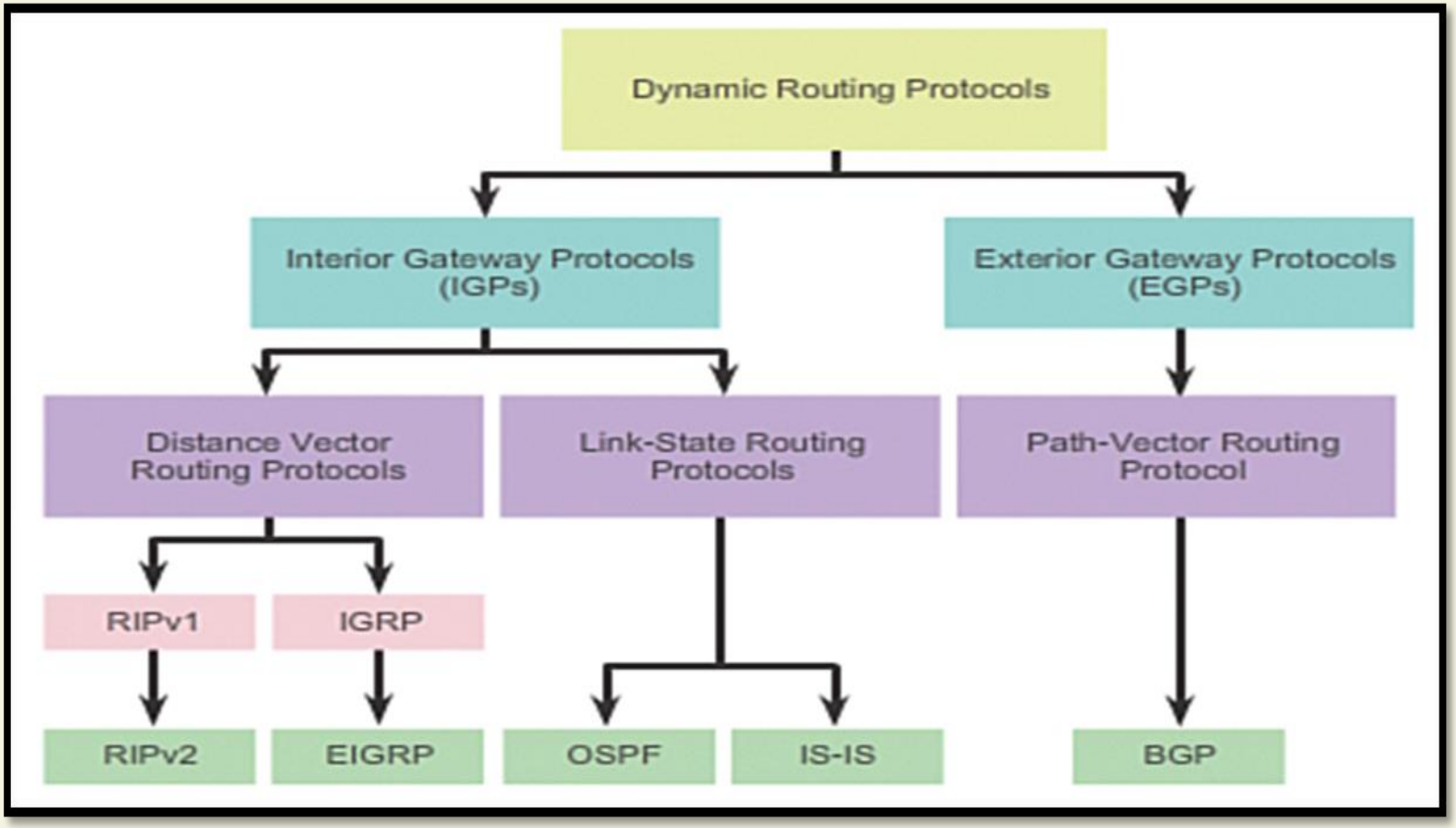
Routing Protocols



Open Shortest Path First (OSPF)

The most important features of OSPF are as follows:

- *This **protocol is open**, which means that anyone can implement it without paying license fees.*
- *OSPF uses a **link state routing algorithm** and falls into the group of **interior routing protocols**, operating within a single autonomous system (AS). OSPF is perhaps the most widely used interior gateway protocol (IGP) in large enterprise networks.*
- ***Topology map at each router**.*
- *Route computation **using Dijkstra's algorithm**.*
- ***Advertisements flooded to entire AS**.*
- *The OSPF **metric** calculation is based on cost. The Cost is an indication of the **overhead** required to send packets across a certain interface.*
- *"**security**": all OSPF messages authenticated (to prevent malicious intrusion)*
- ***Hierarchical OSPF in large domains**.*

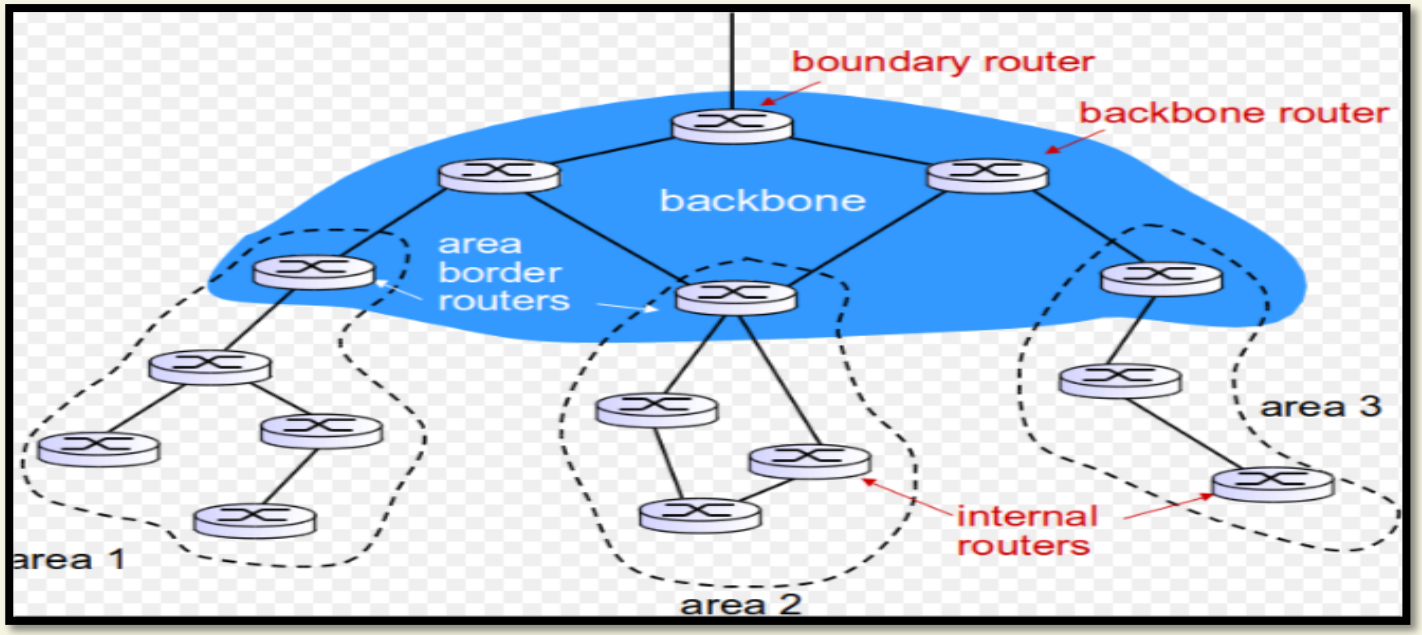
Hierarchical OSPF

To minimize ***processing and memory requirements****, OSPF can* ***divide the routing topology of an Autonomous System*** *into* ***two-layer hierarchy*** *called* ***backbone area (Referred to as Area 0 or Transit Area)*** *and* ***local area (Standard).*** *The main advantages of this division are:*

1. ***It localizes impact of a topology change within an area****.*
2. ***Detailed link state advertisement (LSA) flooding only in area (stops at the area boundary).***
3. ***Each node (router) within an area has detailed area topology****; and* ***only knows direction (shortest path) to networks in other areas****.*

OSPF Routers Function

1. ***Internal router***: *work inside area.*
2. ***Backbone router***: *Run OSPF routing limited to backbone.*
3. ***Area Border Router (ABR):*** *Joining local areas to backbone area. It "summarize" distances to networks in own area; advertise to other Area Border routers.*
4. ***Autonomous System Boundary Router (ASBR):*** *connect to other AS's.*



OSPF Advantages

OSPF is superior to RIP in all aspects, including the following:

1. *It converges much faster.*
2. *It supports hierarchical structures.*
3. *It has improved metric calculation for best path selection.*
4. *It does not have hop-count limitations*
5. *At its inception, OSPF supported the largest networks.*
6. *Compare to RIP, OSPF has no limitation due to hops (RIP has a limit of 15 hops so any network with more than 15 hops cannot be achieved by RIP.*

OSPF Messages

Message type	Description
Hello	Used to discover who the neighbors are
Link state update	Provides the sender's costs to its neighbors
Link state ack	Acknowledges link state update
Database description	Announces which updates the sender has
Link state request	Requests information from the partner

End Of Lesson 6

Thanks For Listening