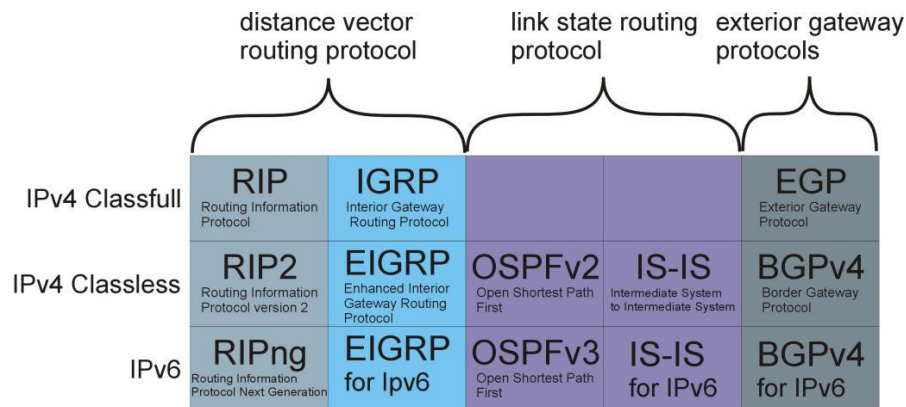


Dynamic Routing Using OSPF Protocol

Introduction

OSPF (Open Shortest Path First) is a link-state routing protocol. The origins of the OSPF protocol date back to 1987, when the working group of the IETF organization took care of its creation and development. Two years later, in 1989, its first specification was published under the name OSPFv1 (RFC 1131). After additional improvements and corrections, the OSPFv2 specification was released in 1998 and is still valid today (RFC 2323), while in 1999 OSPFv3 was described to support IPv6-based networks (RFC 2749).

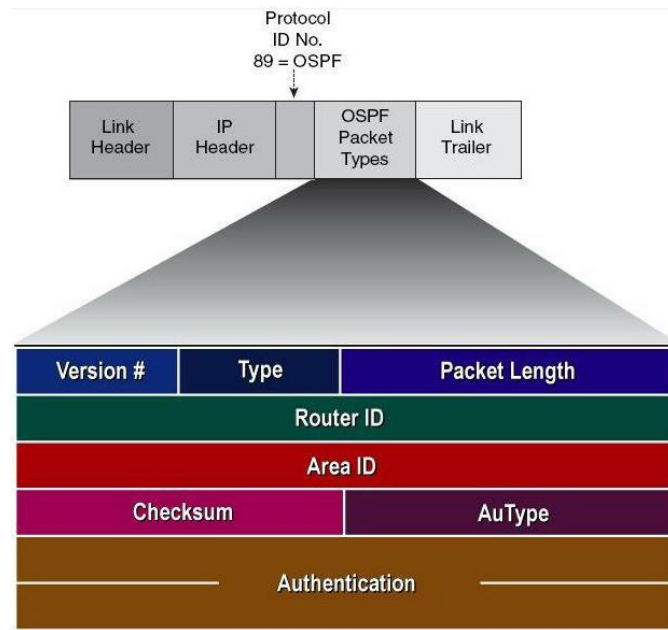
The figure below shows the routing protocols divided into routing classes and IP protocol versions.



Features of the OSPF protocol

OSPF is a classless protocol, i.e. it does not work based on classes, in its updates it sends information about the subnet mask based on VLSM and CIDR mechanisms. It is a link state protocol, this fact affects how the route to the remote network is determined. In order to increase scalability, it uses the so-called areas, i.e. it is possible to divide routing into many independent areas, so some routers can limit their updates to one specific place and others can handle routing between defined areas.

The way the OSPF protocol works is based on the Dijkstra algorithm, also known as SPF - Shortest Path First) and its main task is to find the shortest path from the source to the destination. The figure below shows the frame structure of the OSPF packet.



Meaning of selected fields:

- Data link frame (Link Header):
 - source MAC address - the address of the sending interface
 - destination MAC address - multicast address: 01005E000005 or 01005E000006
- IP Packet (IP Header):
 - source IP address - address of the sending interface
 - destination IP address - one of the multicast addresses: 224.0.0.5 or 224.0.0.6
- Protocol (Protocol) - value 89
- OSPF packet type (Type):
 - 0x01 - hello
 - 0x02 - database description
 - 0x03 - request
 - 0x04 - update
 - 0x05 - confirmation

An example network divided into areas and assigned link state values is shown in Figure below.

