Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Chapter 6 – Adjust and Troubleshoot Single-area OSPF**

**Study Guide**

**Tips for success: While answering the questions read Chapter 6, review the summary, and complete the practice Quiz.**

**After completion of this chapter, you should be able to:**

* Explain why multiarea OSPF is used.
* Explain how multiarea OSPF uses link-state advertisements in order to maintain routing tables.
* Explain how OSPF established neighbor adjacencies in a multiarea OSPF implementation.
* Configure multiarea OSPFv2 in a routed network.
* Configure multiarea route summarization in a routed network.
* Verify multiarea OSPFv2 operations.

1. What are some common issues with using Single-area OSPF? Large routing table , Large link-state database
2. What is an OSPF area? It is a group of routers that share the same link-state information in their link-state databases.
3. The main area is referred to as the Backbone area or \_\_area 0 . All other areas must connect to the backbone area.
4. What are three advantages of using Multiarea OSPF? Smaller routing tables , reduced link-state update overhead , reduced frequency of SPF calculations.
5. What are the Cisco recommended guidelines for creating OSPF areas? an area should have no more than 50 routers. A router should not be in more than three areas , any single router should not have more than 60 neighbors
6. Explain the role of each OSPF area:

|  |  |
| --- | --- |
| **Internal Router** | This is a router that has all of its interfaces in the same area. All internal routers in an area have identical LSDBs |
| **Backbone Router** | This is a router in the backbone area. Generally, the backbone area is set to area 0. |
| **Area Border Router** | This is a router that has interfaces attached to multiple areas. It must maintain separate LSDBs for each area it is connected to, and can route between areas. ABRs are exit points for the area, which means that routing information destined for another area can get there only via the ABR of the local area. ABRs can be configured to summarize the routing information from the LSDBs of their attached areas. ABRs distribute the routing information into the backbone. The backbone routers then forward the information to the other ABRs. In a multiarea network, an area can have one or more ABRs |
| **Autonomous System Boundary Router** | This is a router that has at least one interface attached to an external internetwork (another autonomous system), such as a non-OSPF network. An ASBR can import non-OSPF network information to the OSPF network, and vice versa, using a process called route redistribution. |

1. Complete Activity 6.1.1.5 – Identify the Multiarea OSPF Terminology
2. Each router link is defined as an LSA type. Fill in the table below with the LSA type info:

|  |  |
| --- | --- |
| **LSA Type** | **Description** |
| Type 1 | * Include a list of directly connected network prefixes and link types. * Generated by router ID . * Type 1 LSAs are flooded only within the area and do not propagate beyond an ABR. * Link-state ID is identified by the router ID of the originating router. |
| Type 2 | * Identify the routers and the network addresses of the multiaccess links. * Generated by a NBMA. * Flooded within the multiaccess network and do not go beyond an ABR. * Link-state ID is identified by the DR router ID. |
| Type 3 | * Describes a network address learned by type 1 LSAs. * Required for every subnet. * ABRs flood type 3 LSAs to other areas and areregenerated by other ABRs. * Link-state ID is identified by the network address. * By default, routes are not summarized. |
| Type 4 | * Are used to advertise an ASBR to other areas and provide a route to the ASBR. * Generated by the originating ABR and regenerated by other ABRs. * Link-state ID is identified by the router ID of the ASBR. |
| Type 5 | * Used to advertise ecternal (i.e., non-OSPF) network addresses. * Generated by LSA. * Flooded throughout the area and regenerated by other ABRs. * Link-state ID is the external network address. * By default, routes are not summarized. |

1. Complete Activity 6.1.2.7 – Identify the OSPF LSA Type
2. How is a network that is learned by another area and received from an ABR labeled in the routing table?
3. How is an external network that is advertised by an ASBR labeled in the routing table?
4. Complete Activity 6.1.3.3 – Order the Steps for OSPF Best Path Calculations
5. Define the planning steps for implementing OSPF:
6. What is route summarization and where is it configured?
7. Which devices summarize external routes?
8. Which devices summarize routes within the area?
9. What is the summary route for the following IP addresses?
   1. 172.16.10.0
   2. 172.16.11.0
   3. 172.16.12.0 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ /\_\_\_\_\_\_
10. Using the above summarized route, how would you enter this into an OSPF routing table in area 0?

1. What command is used to configure interarea route summarization on an ABR so that it can forward the summary route?
2. What specific information would you use the following show commands for?
   1. Show ip protocols –
   2. Show ip ospf interface brief –
   3. Show ip route ospf –
   4. Show ip ospf database –