

OSPF Troubleshooting Summary

- 1. Check the OSPF Adjacency:** Check if the OSPF adjacency is up or not using the command **show ip ospf neighbors** brief, and if not:
 - Check if the protocol is enabled on the interface or not using the **show ip ospf interface brief** command.
 - If the protocol is not enabled, check if the network command is configured correctly or not, using the **show ip protocols** command. If not, configure the correct network command. If yes, check if the interface is passive (with the same command) and if it is configured with the correct IP address using the command **show ip interface**.
 - If the protocol is enabled, check if it is enabled on the other side with the same commands listed above.
 - If the protocol is enabled on both sides, check if hellos are sent and received on both sides with the correct parameters using the commands **debug ip ospf hellos** and **debug ip ospf adjacency** . If hellos are not sent, it could be that the OSPF network type is configured as non-broadcast, and therefore we have to change it to broadcast or point-to-multipoint, or use the **neighbor** OSPF router mode command in order to send hellos as unicasts.
 - If hellos are sent but not received, check for inbound ACLs, and layer 2 issues (if a layer 2 switch or frame-relay switch is used in between). Use the commands explained in the switching document of this course to correct layer 2 issues. For frame relay, check if the DLCI is up, and that broadcast is enabled on the DLCI using the command **show frame-relay pvc**.
 - If hellos are received, check for mismatched parameters (using the commands **debug ip ospf hello** and **debug ip ospf adjacency**), such as:
 - (a) Mismatched authentication (Key and Key-ID, authentication type, or missed authentication on one side).
 - (b) Mismatched hello and/or dead timers.
 - (c) Mismatched Area flags (such as the stub flag).
 - (d) Mismatched area ID (where a logging message should be displayed for that).
 - (e) Mismatched MTU (where the adjacency reaches the EXSTART state and then goes down multiple times, and where a logging message displayed for that).

(f) Mismatched Subnet or Subnet mask.

- If there is no parameter mismatch, it could be that packets cannot be sent to – or received by- the unicast IP address of the neighbor because of an ACL or layer 2 issue such as no – or wrong- frame relay map for this IP (where the adjacency reaches the EXSTART state and then goes down multiple times, and where a logging message displayed for that). Also, some parameters must be unique such as the OSPF router ID, which if it is the same, then adjacency will not form.

2. Check IP routing: If the OSPF adjacency is OK, but the route is not in the routing table after using the **show ip route** command then:

- Check if the router connected to the destination is advertising the route using the **show ip OSPF interface** and **show ip protocols** commands explained above.
- Check on Hub-and-Spoke Frame relay topologies if the Hub router is DR. If not, ensure that it is the DR by configuring the serial interfaces of the spokes with OSPF priority of 0, or change the OSPF network type to point-multipoint. Use the commands **show ip ospf neighbor** and **show ip ospf interface interface** to check for this issue.
- Check for discontinuous area 0, where an area 0 interface is configured on a router in another area that is not an ABR. This can be found using the **show ip ospf database router router-ID**, **show ip ospf border-routers**, and **show ip ospf interfaces brief** commands. This can be corrected by configuring the interface in the non-backbone area or by using an ospf virtual-link (if possible, because virtual links can be configured only on areas that have full routing information, so it cannot be configured in stub areas for example) .
- Check for duplicate OSPF router IDs, where a route will not be accepted by a router from another one that has the same OSPF router ID. A logging message about this and about FLOOD_WAR will be displayed when having this issue. Use the **show ip ospf neighbor** and **show ip ospf** commands to verify OSPF router IDs.
- Check for route filtering issues, such as distribute-lists, filter-lists, and area range using the commands **show ip ospf** and **show run | section ospf**.
- If the issue is with external routes, check for redistribution issues. For example, when redistributing into OSPF from another protocol, only classful networks will be redistributed if the **subnet** keyword is not used. Route maps also might be used to filter redistributed routes.

3. Check Data-plane issues: if the route is in the routing table, then check for Data-plane issues such as an ACL configured on a router in the path that filters packets, or layer 2 issues on Hub-and-Spoke Frame relay topologies, such as the next-hop issue where the next-hop is not modified to be the hub router, and there is no –or wrong-frame-relay map on one spoke for another one (which can be solved by configuring correct mapping or changing the OSPF network type to be point-to-multipoint which modifies the next-hop to be the hub router). Use the command **show frame map** to check for this issue.