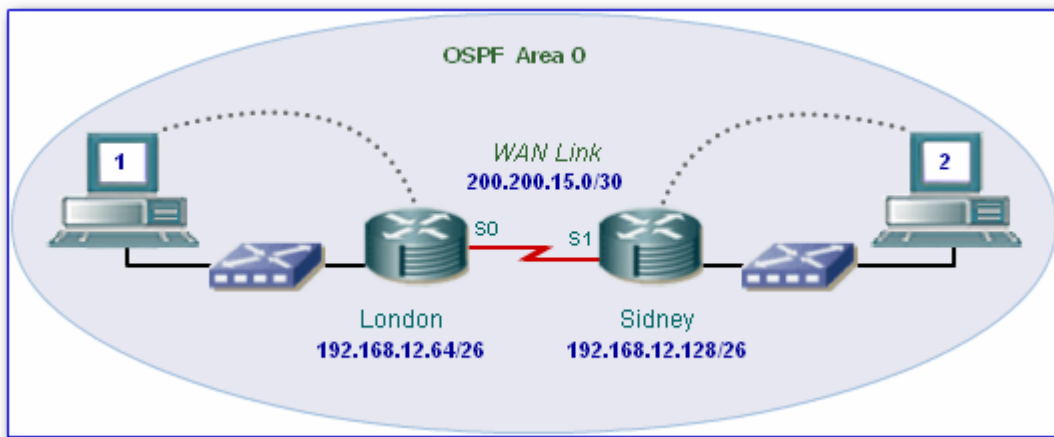---

Portfolio Exercise 2b: Configure and Verify OSPF on a Router

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Objectives

- Configure and verify OSPF on a router
- *Collect portfolio evidence for part of Grading Criteria P2*

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Scenario

A network has two LAN's linked together via a single WAN link. The LAN IP addressing schemes are as follows

- ○ **London** → 192.168.12.64/26
- ○ **Sydney** → 192.168.12.128/26
- ○ **Wan Link** → 200.200.15.0/30

You are required to configure each router with the OSPF routing protocol and verify the correct operation of the protocol.

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Task1: Document the Configuration

a. Specify the configuration of the routers and the hosts

Using the diagram above for reference, fill in the table below. Some of the detail such as the ports you may decide for yourself.

	Name	Eth Port No	Eth Port IP address + CIDR subnet mask	Serial Port No.	Serial Port IP address + CIDR subnet mask
Router 1					
Router 2					

Which router will be the DCE? _____

Portfolio Exercise 2b: Configure and Verify OSPF on a Router

Decide on IP addresses for the hosts and fill the table below:-

	IP Address	Subnet Mask	Default Gateway
Host 1			
Host 2			

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Task 2: Configure the Routers and Hosts

You will need to configure the router as follows:-

- o   Set the router name
- o   Set the enable, console and VTY passwords
- o   Configure the Ethernet port with an IP address and subnet mask.
- o   Configure the Serial port with an IP address and subnet mask.
- o   Set the DCE serial port's clock rate

a.   Configure the routers

As a reminder, the various configuration commands are specified below. You will need remember which mode to be in for yourself, e.g. global configuration mode etc.

Set the router's name using the **hostname** command

Set the enable password using the **enable secret** command

Set the line console and vty passwords using the **password** and **login** command

Set the IP address and subnet mask on the Ethernet port using the **ip address** command and activate the port using the **no shutdown** command

Set the IP address and subnet mask on the Serial port using the **ip address** and command activate the port using the **no shutdown** command.

Set the clock rate on the **DCE** serial port using the **clock rate** command

b.   Configure the hosts

Configure each host with the IP address, subnet mask and default gateway as specified in your documentation.

c.   Verify Connectivity

If you have configured the routers and hosts correctly you should be able to ping between the following devices:-

- Ping Host 1 from Router 1
- Ping Host 2 from Router 2
- Ping Router 1 serial interface from Router 2
- Ping Router 2 serial interface from Router 1

*Don't forget to save your configuration using the **copy run start** command*

Portfolio Exercise 2b: Configure and Verify OSPF on a Router

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Task 3: Configure OSPF Routing on the Routers

You will need to configure OSPF routing on the routers so that hosts on one LAN can communicate with hosts on the other LAN. You will need to go to the proper command mode to configure OSPF routing.

a. Configure OSPF routing on the London Router

Choosing the London router to configure first, use OSPF process number 1. Also, ensure all networks are in area 0. As so…

```
London(config)#router ospf 1

London(config-router)#network 192.168.12.64 0.0.0.63 area 0

London(config-router)#network 200.200.15.0 0.0.0.3 area 0
```

Explain the function of a wildcard mask (e.g. `0.0.0.63`).

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b. Configure OSPF routing on the Sydney Router

Now choosing to configure the Sidney, again use OSPF process number 1 and ensure all networks are in area 0.

```
Sidney(config)#router ospf 1

Sidney (config-router)#network 192.168.12.128 0.0.0.127 area 0

Sidney (config-router)#network 200.200.15.0 0.0.0.3 area 0
```

Explain why OSPF routing uses areas.

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*Don't forget to save your configuration using the **copy run start** command*

Portfolio Exercise 2b: Configure and Verify OSPF on a Router

c. Verify OSPF routing on the routers

*Now you have finished configuring the routers, you can check your configuration using the **sh run** and **sh ip route** commands.*

How many routing entries should you see in the routing table? _____

What are the entries in the **Router 1's** routing table?

_____

_____

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What are the entries in the **Router 2's** routing table?

_____

_____

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If your routing table does not show the correct entries then you will need to troubleshoot and fix your configuration appropriately.

Now check your router configuration using the ping command on each host

    Ping **Host1** from **Host2**. Was the ping successful? _____

    Ping **Host2** from **Host1**. Was the ping successful? _____

If the answer is no for either question, troubleshoot the router configurations to find the error. Then do the pings again until the answer to both questions is yes.

_____

Evidence

Please supply the following evidence to support your implementation of this task

~~Screenshots and configuration files required~~

- Printout of one of the router's configuration file. Annotate the printout, pointing out and explaining the OSPF routing configuration
- Printout showing the routing table entries. Annotate the printout, pointing out and explaining the routing table entries, e.g. which networks are directly connected and which have been discovered though OSPF.
- Printout showing OSPF is running using the **sh ip protocol** command.
- Screenshots showing the **ipconfig** and **ping** results for each host

Please annotate, sign, date, put the portfolio exercise number and task number on all evidence pages

Portfolio Exercise 2b: Configure and Verify OSPF on a Router

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Part 2 Extension Work
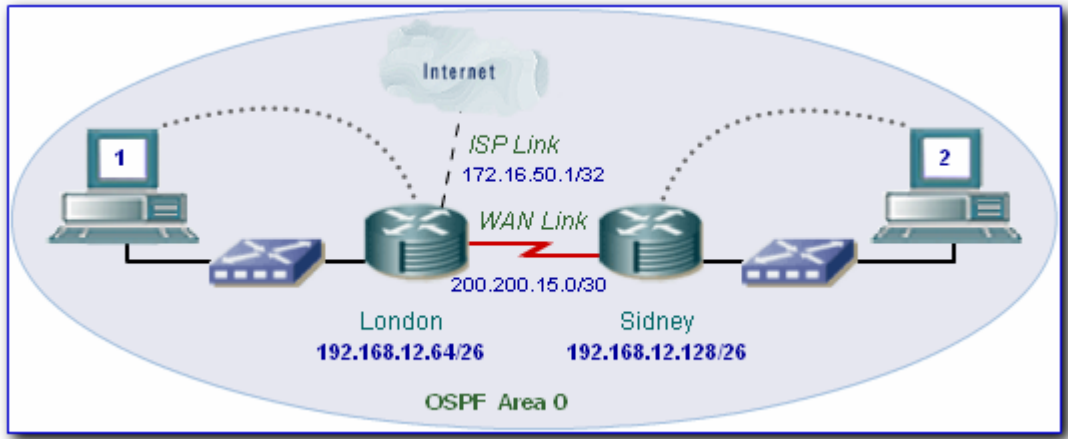
You are now required to configure the routers for the following:-

- Add a simulated link to an ISP using a loopback address on the London Router
- Propagate a default route amongst the routers
- Introduce OSPF authentication into the area.

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Task 4: Specify a Default Route

Since you do not have a real link to an ISP, you can simulate a link using a loopback address. Once this is done, you can set the default route to point to the loopback address and propagate this default route to other routers.

a. Configure a loopback address

On the London router configure a loopback address.

```
London(config)#interface loopback 0

London(config-if)#ip address 172.16.50.1 255.255.255.255
```

Can you the London router ping its own loopback address? _____

b. Create a default route to the ISP

On the London router only, type in a static default route through the loopback interface.

```
London(config)#ip route 0.0.0.0 0.0.0.0 L0
```

Can you see the default route in the routing table? _____

Can the host attached to London ping the ISP (*loopback address*)? _____

Portfolio Exercise 2b: Configure and Verify OSPF on a Router

c. Verify the default route

Verify the connection between the ISP and the Sidney by pinging the ISP (*loopback address*)

Can the ISP (*loopback address*) be pinged from the host attached to Sidney? _____

If yes, why? If not, why not? _____

d. Propagate the default route

Propagate the gateway of last resort to the Sidney router. On the London router type the following in the appropriate configuration mode:-

    London(config-router)#default-information originate

Can you now see a default route in Sidney's routing table? _____

What is the address of the Gateway of last resort? _____

Can the ISP (*loopback address*) be pinged from the host attached to Sidney? _____

If the answer is no, troubleshoot the router configurations to find the error until the host on Sidney can ping the ISP.

_____

Task 5: Configure OSPF Authentication

 You are now required to introduce OSPF authentication into the area.

a. Set up OSPF Authentication

To setup OSPF authentication on the routers in the network, first, introduce authentication on one router and then on the other router.

First, enter the appropriate serial interface on the London router.

Now explore different options for the `ip ospf message-digest-key` command by using the **?** help function. E.g.

    London(config-if)#ip ospf message-digest-key ?

    London(config-if)#ip ospf message-digest-key 1 ?

    Now type in the following

    London(config-if)#ip ospf message-digest-key 1 md5 7 mysecret

What is the OSPF password being used for md5 authentication? _____

What encryption type is being used? _____

Portfolio Exercise 2b: Configure and Verify OSPF on a Router

b. Enable OSPF authentication

Now you need to enable OSPF authentication within area 0. Enter the following on London:-

```
London(config-if)#router ospf 1

London (config-router)#area 0 authentication message-digest
```

c. Verify connectivity between the routers

On the London router, enter the command:-

```
show ip ospf neighbor.
```

Are there any OSPF neighbors? _____

Examine the routing table. Are there any OSPF routes in the table? _____

Can the London host and the Sidney host ping each other? _____

For the last three questions, you should have answered no. Explain why London and Sidney can no longer communicate.

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Now configure OSPF authentication on Sidney EXACTLY as you did for the London router.

Are there any OSPF neighbors now? _____

Examine the routing table. Are there any OSPF routes in the table? _____

Can the London host and the Sidney host ping each other now? _____

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Evidence

Please supply the following evidence to support your implementation of this task

~~Screenshots and configuration files required~~

- Screenshot showing the **default route** in the routing table. Annotate the printout.
- Screenshots showing **ipconfig** and **ping (to ISP)** results for each host
- Screenshot showing the result of **sh ip ospf neighbors**
- Printout of a router's configuration file. Annotate the printout, pointing out **OSPF authentication**

Please annotate, sign, date, put the portfolio exercise number and task number on all evidence pages