IT Technology 2. sem

OSPF and Virtual Routers on switch

University College
Authors
Sebastian Thomle Mason
seba7286@edu.eal.dk
Anthony James Peak
anth0662@edu.eal.dk
Thomas Bargisen
thom8723@edu.eal.dk

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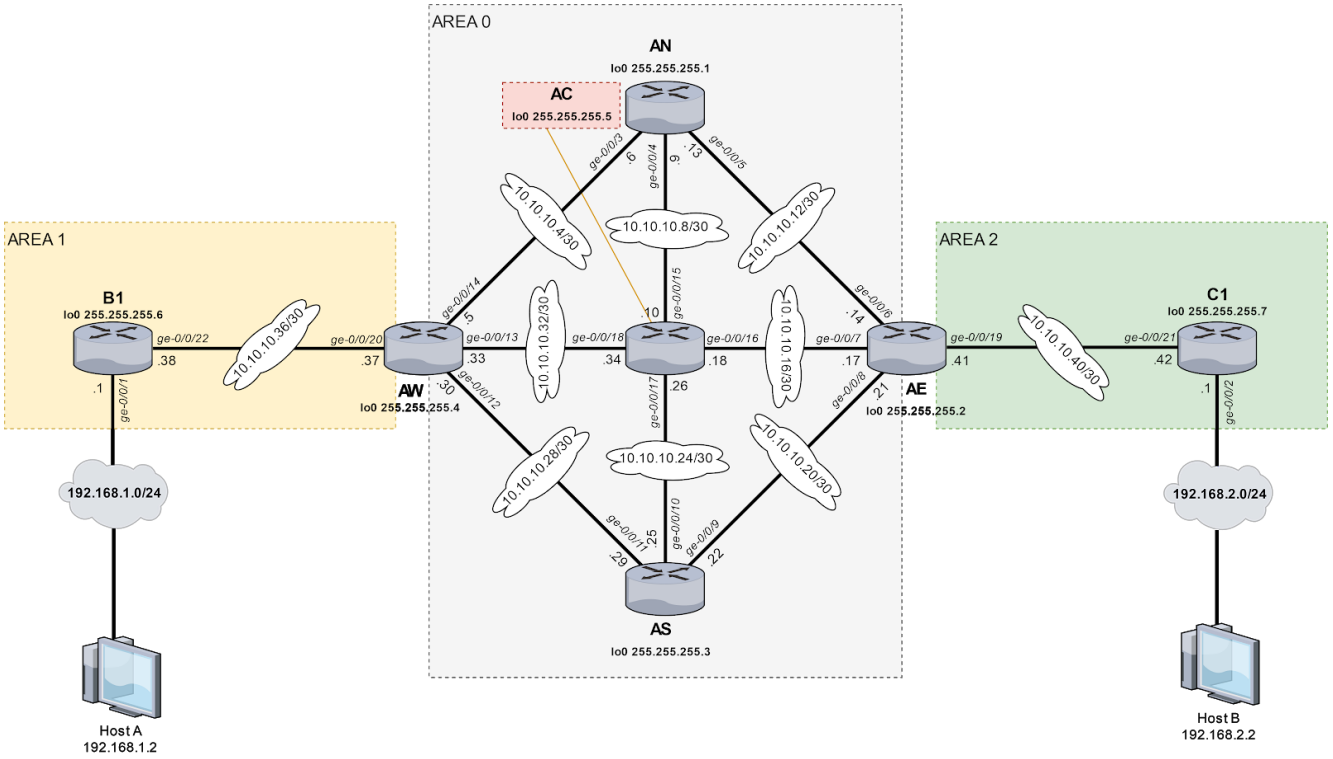
A HLD with explanation



This image can also be viewed here.

OSPF is configured for the following network, divided into 3 areas as shown.
AW and AE are configured with interfaces in multiple areas (border routers).

An inventory of used devices.

- x15 Patch cables
- x1 USB to RJ45 Converter Cable
- x1 EX2400
- x2 PC’s with ethernet ports

A Low Level Design

LOW LEVEL DESIGN ass15						
PARENT	INSTANCE TYPE	INTERFACE	IP ADDRESS	MASK	CONNECTS TO	Comments
EX2400	Virtual Router B1	ge-0/0/1	192.168.1.1	/24	Host-A	
		ge-0/0/22	10.10.10.38	/30	Virtual Router AW	
		lo0	255.255.255.6	/32		Loopback
	Virtual Router C1	ge-0/0/2	192.168.2.1	/24	Host-B	
		ge-0/0/21	10.10.10.42	/30	Virtual Router AE	
		lo0	255.255.255.7	/32		Loopback
	Virtual Router AN	ge-0/0/3	10.10.10.6	/24	Virtual Router AW	
		ge-0/0/4	10.10.10.9	/30	Virtual Router AC	
		ge-0/0/5	10.10.10.13	/30	Virtual Router AE	
		lo0	255.255.255.1	/32		Loopback
	Virtual Router AW	ge-0/0/12	10.10.10.30	/32	Virtual Router AS	
		ge-0/0/13	10.10.10.33	/30	Virtual Router AS	
		ge-0/0/14	10.10.10.5	/30	Virtual Router AN	
		ge-0/0/20	10.10.10.37	/30	Virtual Router B1	
		lo0	255.255.255.4	/32		Loopback
	Virtual Router AS	ge-0/0/9	10.10.10.22	/24	Virtual Router AE	
		ge-0/0/10	10.10.10.25	/30	Virtual Router AC	
		ge-0/0/11	10.10.10.29	/30	Virtual Router AW	
		lo0	255.255.255.3	/32		Loopback
	Virtual Router AE	ge-0/0/6	10.10.10.14	/24	Virtual Router AN	
		ge-0/0/7	10.10.10.17	/30	Virtual Router AC	
		ge-0/0/8	10.10.10.21	/30	Virtual Router AS	
		ge-0/0/19	10.10.10.41	/30	Virtual Router C1	
		lo0	255.255.255.2	/32		Loopback
	Virtual Router AC	ge-0/0/15	10.10.10.10	/24	Virtual Router AN	
		ge-0/0/16	10.10.10.18	/30	Virtual Router AE	
		ge-0/0/17	10.10.10.26	/30	Virtual Router AS	
		ge-0/0/18	10.10.10.34	/30	Virtual Router AW	
		lo0	255.255.255.5	/32		Loopback
	Host-A	eth0	192.168.1.2	/24	Virtual Router B1	
	Host-B	eth0	192.168.2.2	/24	Virtual Router C1	

Introduction to OSPF

OSPF otherwise referred to as *Open Shortest Path First* is an interior gateway protocol used in an autonomous system such as a *local area network* or LAN.

OSPF calculates the shortest route to a destination through a network based on an algorithm which favors cost over hops to destination, in other words, it will calculate and choose the “Fastest” but not necessarily the “Shortest” route to use for trafficking data.

Much like there might be a highway which allows must faster speed over the shortest distance possible, it is also the most used lane of traffic resulting in the overall speed slowing down. OSPF may calculate if it is better to choose a smaller rural road which may cover a longer distance, but in the long run ends up at the final destination first.

OSPF is able to achieve the information needed for these calculations by keeping link state databases which together form a large topology of the network, with information on speeds, type of cable and much more. OSPF Areas are therefore able to share information and assist all routers in that area to work efficiently.

OSPF Areas are sections of a larger network, Area 0 is what is referred to as the backbone of the network, the central hub which connects and acts as the middleman between all other areas.

Area 1 and Area 2 may not be connected directly to each other, but both of them are connected to Area 0, it is through this that they are able to communicate with each other.

Another feature of OSPF is the ability to constantly update the link cost topology by sending out hello requests every so often. If a router stops responding to hello requests the topology updates and consideres that link dead, that information is then shared and that route is taken out of the equation.

Brief step by step guide

1. Connect everything physically as shown in HLD.
2. Connect USB to RJ45 cables to allow access to the switch.
3. Connect to the switch using PuTTY.
4. Configure routers on the switch.
    a. Paste relevant configuration to switch using “load override terminal”
    b. Set password using “set system root-authentication plain-text-password”
    c. Commit
5. Follow the test plan and make sure Area 0 functions as expected
6. Set IPs for the two hosts on Area 1 and Area 2
7. Ping between hosts A and B.

A filled out test plan

TEST PLAN			
ASSERTION	METHOD	EXPECTED RESULT	SUCCESS
Area 0 can communicate fully	**Check hello messages in Area 0**	**All routers can communicate**	✓
AC recieves hello from AN/AS/AE/AW	*Show monitor traffic interfaces*	*Hello's recieved*	✓
AN recieves hello from AE/AC/AW	*Show monitor traffic interfaces*	*Hello's recieved*	✓
AS recieves hello from AE/AC/AW	*Show monitor traffic interfaces*	*Hello's recieved*	✓
AE recieves hello from AN/AC/AS	*Show monitor traffic interfaces*	*Hello's recieved*	✓
AW recieves hello from AN/AC/AS	*Show monitor traffic interfaces*	*Hello's recieved*	✓
Area 1 & Area 2 can communicate	**Ping through Area 0**	**Area 1 & 2 can communicate**	✓
Send package from A1 to A2	*Ping 192.168.2.2/24*	*Ping arrives at destination*	✓
Send package from A2 to A1	*Ping 192.168.1.2/24*	*Ping arrives at destination*	✓

Put the router configuration and the topology diagram in GitHub

Diagram[1]

Config[2]

[1] https://github.com/Sebski123/Network/blob/master/ITT2/ass15OSPFonEX/Diagrams/Topology_Ass_15_OSPF.pdf
[2] https://github.com/Sebski123/Network/blob/master/ITT2/ass15OSPFonEX/Router_configs/ass15EX-B2.json