International Journal of Applied Engineering Research
ISSN 0973-4562 Volume 10, Number 9 (2015) pp. 24017-24023

http://www.ripublication.com

Redistribution of Routing Protocols Using VLSM And CIDR

M Punya Kiran, N Anusha, Bns Mounika
Prof. Ravi Kumar C V
Vellore Institute of Technology, Vellore
punyakiran@yahoo.com

Abstract

The prime motive of this project is to demonstrate how routers communicate two different routing protocols. A Network topology is taken and routes from one routing protocol are being sent into the other through redistribution. For instance we have taken OSPF to EIGRP in our scenario. Also we know that IP addresses are limited, in order to avoid the wastage of these addresses we are using VLSM and CIDR. OSPF is link state protocol and it calculates metric based on cost while EIGRP is distance vector routing protocol and it calculates Composite cost metric.

Keywords:

ABR	:	Area Border Router
VLSM	:	Variable Length Subnet Mask
CIDR	:	Classless Inter Domain Routing
EIGRP	:	Enhanced Interior Gateway Routing Protocol.
OSPF	:	Open Shortest Path First

Introduction

Static Routing:
It is a form of routing that occurs when a router uses a manually-configured routing entry. In many cases, static routes are usually manually configured by a network administrator by adding in entries into a routing table. Static routes are fixed and do not change if the network ischanged or reconfigured. Static routing is usually used on a router to maximize routing efficiency and to provide backups in the event that dynamic routing information fails to be exchanged.

Dynamic Routing:
Dynamic routing also called Adaptive routing describes the capability of a system, through which routes are characterized by their destination, to alter the path that the route takes through the system in response to a change in conditions. In our paper we are using two dynamic routing protocols, one is EIGRP and other one is OSPF.

Enhanced Interior Gateway Routing Protocol (EIGRP):
EIGRP is a cisco developed advanced distance-vector routing protocol automatically distribute route information to all neighbors. The Diffusing Update Algorithm (DUAL) is used for fast convergence, routing optimization and to avoid routing loops. Full routing information is exchanged only once upon neighbor establishment, only partial updates are sent after that in the topology ,when the router is unable to find the path, it sends out a query to its neighbors, which is propagated until a suitable route is found. This need-based update is an advantage over other protocols as it saves the bandwidth and reduces the traffic between routers. The metric that is used to find an optimal path is calculated with variables bandwidth, load, delay and reliability. The best path is ensured by the protocol, by incorporating such variables. Moreover, compared to other distance-vector algorithms, for larger networks, EIGRP has a larger maximum hop limitation, which makes it compatible.

Open Shortest Path First (OSPF):
Open Shortest Path First (OSPF) is very commonly used link-state interior gateway protocols. Internet Protocol (IP) packets are routed by this protocol by gathering link-state information from neighboring routers and constructing a map of the network. OSPF routers send many message types including hello messages, link state requests and updates and database descriptions. Djisktra's algorithm is then used to find the shortest path to the destination. Shortest Path First (SPF) calculations are considered periodically or on a received Link State Advertisement (LSA), which depends on the protocol implementation. Very quickly topology changes are detected using this protocol.

Experimental Analysis
In our project we are taking nine routers, in which R1, R2, R3 , R4 are running EIGRP while R5, R6 ,R7 ,R8 are running OSPF and R9 is running both EIGRP and OSPF as shown in the figure below

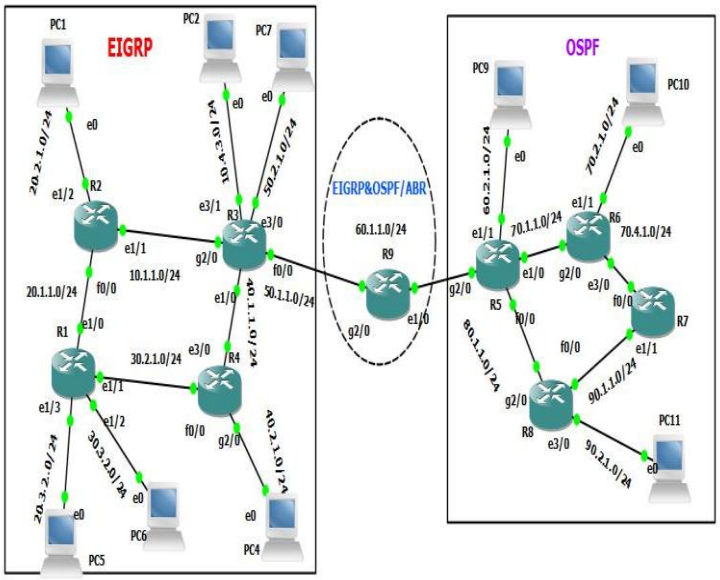


Figure 1: Simulation Circuit

In our project we are considering a topology with four different scenarios each of which are simulated using GNS3.In our first scenario we simulate without any redistribution and in second scenario we do it with redistribution. In third scenario we are using class full IP addressing scheme. Since IP addresses are limited, in order to reduce the wastage of these IP addresses we are using CIDR and VLSM in the fourth scenario.

EIGRP Configuration:

Eg: conf t
router eigrp 1
network 10.1.1.0 0.0.255.255
exit
show ip eigrp nei

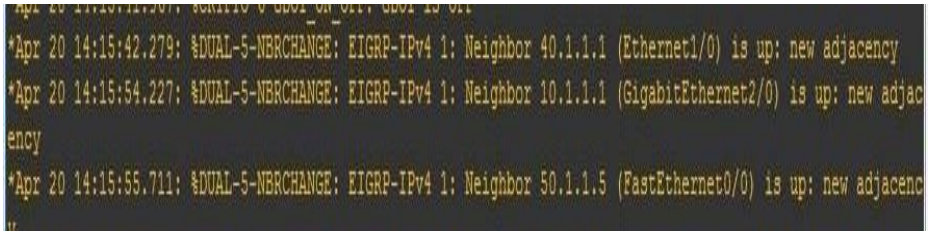
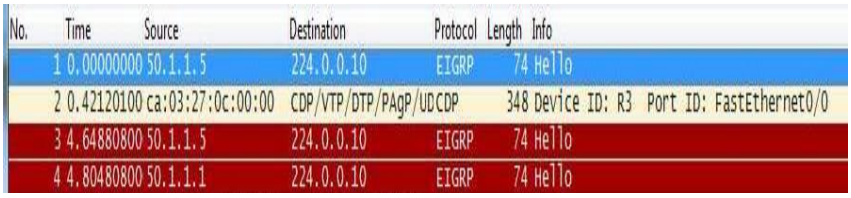


Figure 2: EIGRP configuration result

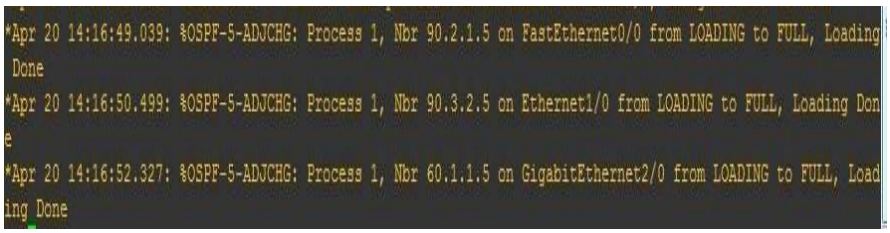


No.	Time	Source	Destination	Protocol	Length	Info
1	0.00000000	50.1.1.5	224.0.0.10	EIGRP	74	Hello
2	0.42120100	ca:03:27:0c:00:00	CDP/VTP/DTP/PAgP/UDCDP		348	Device ID: R3 Port ID: FastEthernet0/0
3	4.64880800	50.1.1.5	224.0.0.10	EIGRP	74	Hello
4	4.80480800	50.1.1.1	224.0.0.10	EIGRP	74	Hello

Figure 3: EIGRP Interface Result

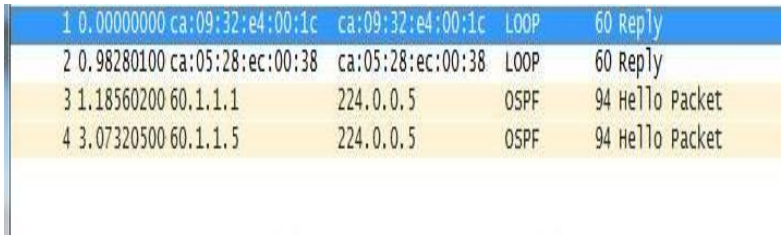
OSPF Configuration

Eg : conf t
router ospf 1
network 60.2.1.0 0.0.255.255 area 0
exit
show ip ospf nei



```
*Apr 20 14:16:49.039: %OSPF-5-ADJCHG: Process 1, Nbr 90.2.1.5 on FastEthernet0/0 from LOADING to FULL, Loading
 Done
*Apr 20 14:16:50.499: %OSPF-5-ADJCHG: Process 1, Nbr 90.3.2.5 on Ethernet1/0 from LOADING to FULL, Loading Don
e
*Apr 20 14:16:52.327: %OSPF-5-ADJCHG: Process 1, Nbr 60.1.1.5 on GigabitEthernet2/0 from LOADING to FULL, Load
ing Done
```

Figure 4: OSPF Configuration Result



1	0.00000000	ca:09:32:e4:00:1c	ca:09:32:e4:00:1c	LOOP	60 Reply
2	0.98280100	ca:05:28:ec:00:38	ca:05:28:ec:00:38	LOOP	60 Reply
3	1.18560200	60.1.1.1	224.0.0.5	OSPF	94 Hello Packet
4	3.07320500	60.1.1.5	224.0.0.5	OSPF	94 Hello Packet

Figure 5: OSPF Interface Result

Without Redistribution Analysis:

From the simulation circuit we can see that R3 and R5 are connected to R9, whenever you want to send any packet from either R3 or R5 it should go through R9.

In this scenario we are not configuring R9 router with OSPF and EIGRP, so when we want to send packet from R3 to R5 and vice versa.

The packet does not reach the destination. The simulated results are shown below.

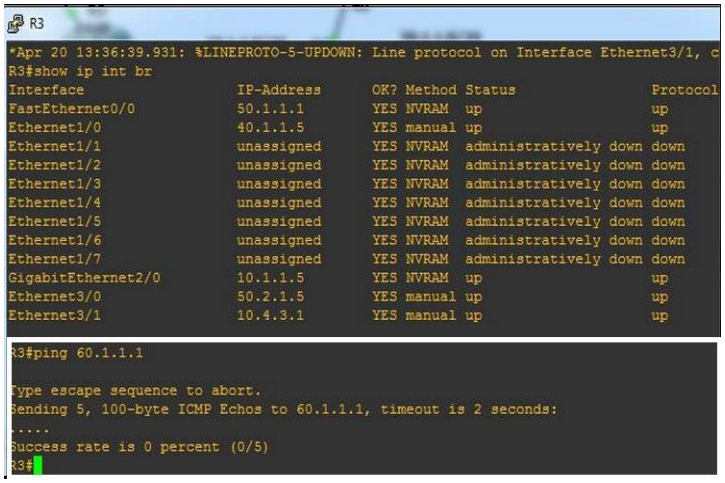


Figure 6: Without Redistribution From R3 To R5

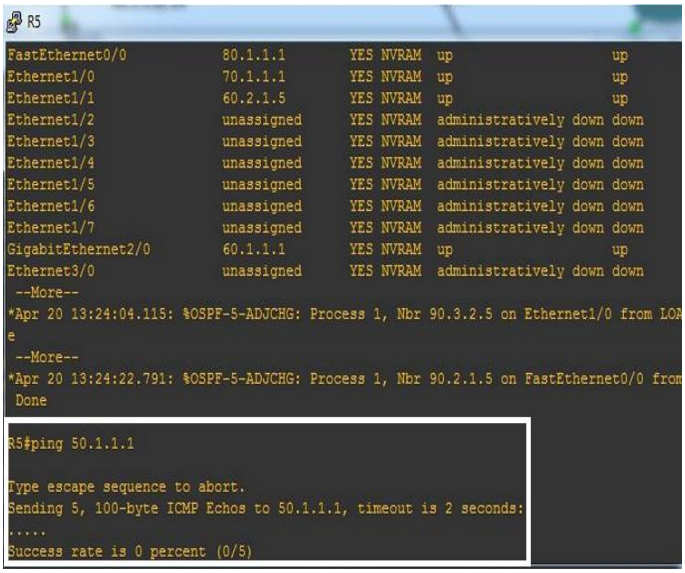


Figure 7: Without Redistribution From R5 To R3.

With Redistribution Analysis:

In this scenario R9 router is configured with both EIGRP and OSPF. When a packet is sent from R3 to R5, the packet when received at R9 is converted into OSPF packet by that router which is acting as ABR router to both R3 and R5. In the similar way when the packet is sent from R5 then R9 converters that into EIGRPand sends it to R3. The results are shown in figure8 and figure9.

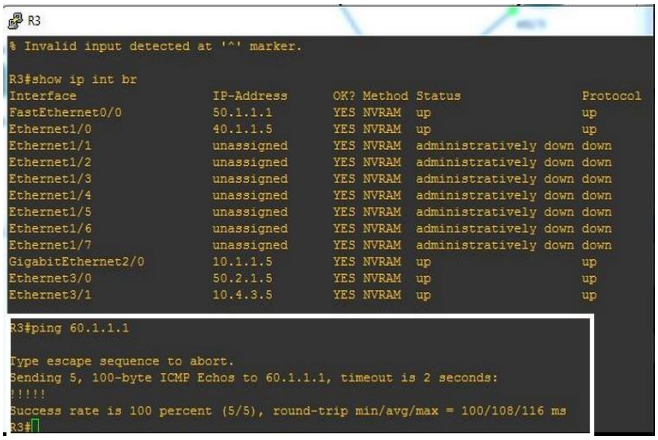


Figure 8: With Redistribution From R3 To R5

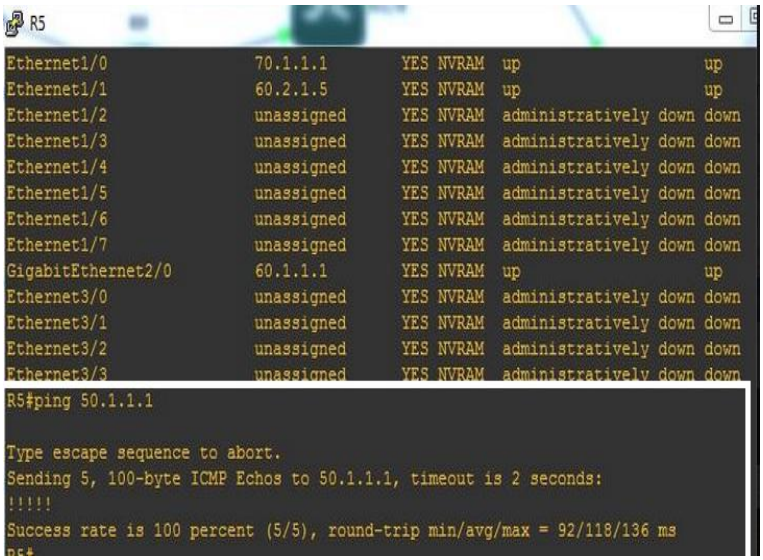


Figure 9: With Redistribution From R5 To R3

Conclusion

The paper mainly tells the significance of redistribution between two different routing protocols in the way of simulation experiment.

Especially in the large network architecture, different routing protocols are used and hence redistribution is compulsary. This paper has mainly shown the before and after phases of redistribution between two routing protocols EIGRP and OSPF.It firstly shows the problem caused without redistribution. Then later on after redistribution the route is transferred. By the method in this paper, the routing through two-way redistribution can be solved and it has improved the delivery quality of network communication. We use VLSM and CIDR to increase the efficiency and to reduce the wastage of IP addresses.

References

[1] Richard Deal, Tata Mcgraw-Hill publishing company limited , cisco(r) certified network associate study guide

[2] Zhang Qi, Cui Xinjun, Zhuo Weiqian. Creation of Enterprise Network [M]. Beijing: Electronic Industry Press. 2008

[3] Huang Xiangnong, Zeng Yifu, Tan Yongxin. Discussion on Technology of OSPF Routing Optimization. Experimental Technology and Management. 2012, 29(2):104-108

[4] Ye Hanmin, Sunqiantang, Song Zihang Research of two way route redistribution based on multi route