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Configuration of Route-Redistribution on a Routing Network

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Abstract: OSI model is a reference model for communication in a computer network. Network layer is the third layer in the OSI model [1]. The network layer provides connectivity and path selection between two host systems. It is responsible for routing data packets and selecting the best path to deliver data. The network layer prioritizes data known as Quality of Service (QOS) [2]. Routers [3] and Layer 3 switches operate at the network layer. A Router can also act as a Layer 2 and Layer 1 device. A routing protocol [4] specifies how routers communicate with each other. A routing protocol is a set of rules used by routers to determine the most appropriate path into which they should forward packets towards their intended destination. In this paper we give you a brief introduction on redistribution. Using a routing protocol to advertise routes that are learned by some other means, such as by another routing protocol, static routes or directly connected routes, is called redistribution. This situation never arises in the case of single protocol routing environment but multi-protocol routing is common for a number of reasons like company mergers, multiple departments managed by multiple network administrators, and multi-vendor environments. Route redistribution allows different routing protocols to exchange routing information. In this paper we have considered one such situation of route redistribution. Redistribution is done at the boundary routers at the boundary of two merged companies- company A and company B, adapting OSPF and EIGRP routing protocols respectively in their respective AS.

Keywords: Route-redistribution, Network layer, OSI model, Quality of Service (QOS), Routers and Layer 3 switches, multi-protocol routing, redistribution, Open Shortest Path First (OSPF) and EIGRP, Autonomous System (AS).

I. INTRODUCTION

The OSI model consists of 7 layers. A layered network model is used to reduce complexity, standardize interfaces, to facilitate modular engineering, simplify learning and working. Following are the seven layers of the OSI model

- Layer 1- Physical Layer- It is responsible for binary transmission. Defines the electrical, mechanical, procedural and functional specifications for activating, maintaining and deactivating the physical link.
- Layer 2- Data link Layer- It defines how data is formatted for transmission and how an access to the network is controlled.
- Layer 3- Network Layer- It provides connectivity and path selection between two host systems, routes data packets, best path selection to deliver data and prioritizes data known as QOS.
- Layer 4- Transport Layer- It handles transportation issues between hosts, ensures data transport reliability, establishes, maintains and terminates virtual circuits, information flow control and provides reliability through fault detection and recovery.
- Layer 5, 6 and 7- Session Layer, Presentation Layer and Application Layer respectively.

A router is an electronic device and/or software that connects at least two networks and forwards packets among them according to the information in the packet headers and the routing table. There are many routing protocols to/which specify how routers communicate with each other. A routing protocol is a set of rules used by routers to determine the most appropriate path to which packet is to be forwarded from source to the destination. Following are the routing protocols

- RIP version 1 and 2 [5]
- EIGRP [6]
- OSPF [7]
- IS-IS [8]
- BGP [9]

RIP, EIGRP, OSPF and IS-IS are Interior Gateway Protocols and BGP is an Exterior Gateway Protocol. IGPs are used inside an Autonomous Systems and BGP is used for communication between different Autonomous Systems (AS). Using a routing protocol to advertise routes that are learned by some other means, such as by another routing protocol, static routes or directly connected routes, is called redistribution.

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II. Problem Statement

Consider a company A whose routers are configured with OSPF routing protocol and enclosed within area 0. Consider another company B using EIGRP as the Internal routing protocol. OSPF and EIGRP are configured within the AS of company A and company B respectively. Due to some reason company A decides to merge with company B. In this case we have to connect networks running different routing protocols. Route redistribution allows different routing protocols to exchange routing information. Route redistribution needs to be carried out at the boundary routers. The routers in 'A' must be able to send and receive data packets to and from 'B' respectively. The data must be encrypted and intrusion free communication must be enabled.

III. Redistribution

Route redistribution allows different routing protocols to exchange routing information. Each routing protocol on a network is separated into an Autonomous System (AS). All routers in the same autonomous system have complete knowledge of the entire AS. Figure 1 shows the network topology of the merger between company A and company B. Route redistribution needs to be carried out at the boundary routers R5 and R6. The general procedure followed is

- Locate the boundary router(s). This is the router where redistribution will be configured.
- Choose a protocol to be the core (backbone protocol). A general rule of thumb is to pick OSPF or EIGRP.
- Determine the edge protocol. If you are migrating, this is the protocol that will be phased out.
- Configure the router to redistribute from the edge protocol to the backbone protocol.
- Configure the router to redistribute from the backbone protocol to the edge protocol.
- Check redistribution by using the show route command.

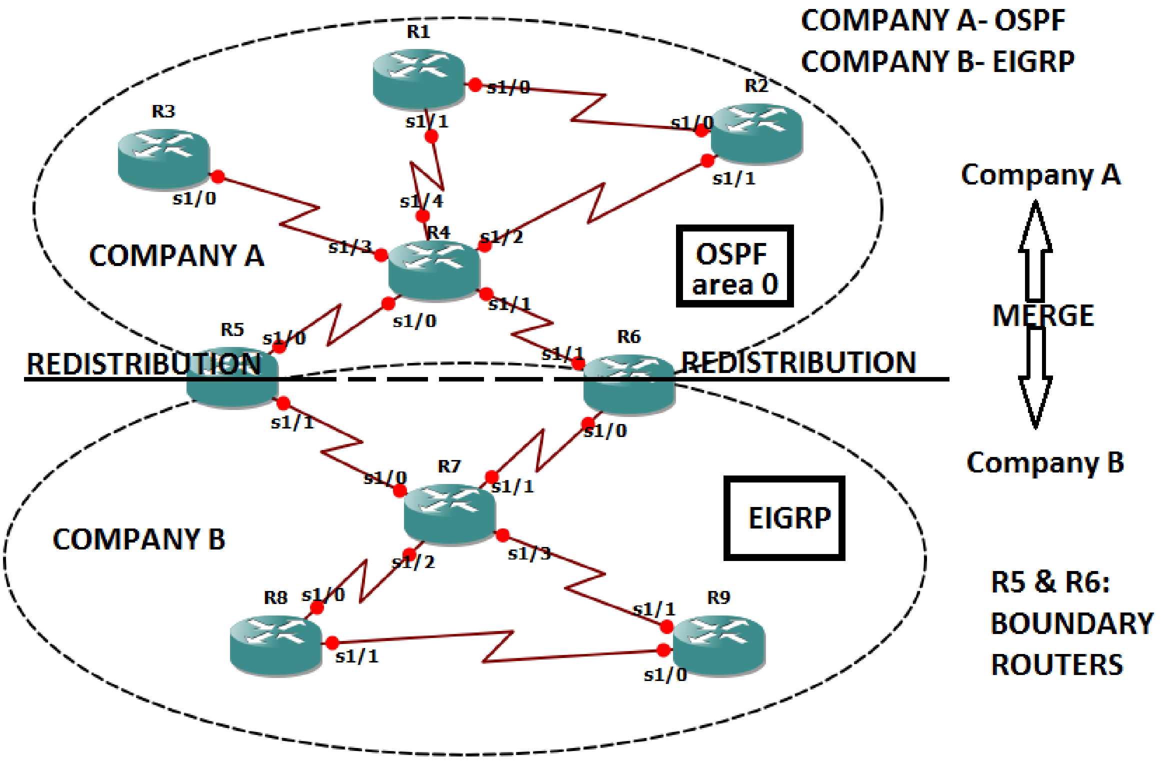

Figure 1 shows the network topology of the merger between Company A and Company B.

IV. Results and Findings

Figure 2, 3 and 4 shows the procedure of route-redistribution being carried out on boundary router R5. Similarly redistribution is carried out on router R6 which is the other boundary router between company A and company B. Figure 5 shows an effort to ping the router at company B from R1. It was noted to be a success as all the 5 ICMP packets echoed back on time. Figure 6 shows an effort to ping to the neighbouring network.

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```
interface FastEthernet0/0
 no ip address
 shutdown
 duplex half
!
interface Serial1/0
 ip address 10.1.54.5 255.255.255.0
 serial restart-delay 0
 clock rate 64000
!
interface Serial1/1
 ip address 10.1.57.5 255.255.255.0
 serial restart-delay 0
 clock rate 64000
!
interface Serial1/2
 no ip address
 shutdown
 serial restart-delay 0
!
interface Serial1/3
 no ip address
 shutdown
 serial restart-delay 0
!
interface Serial1/4
 no ip address
 shutdown
 serial restart-delay 0
```

Figure 2 shows the redistribution being done on boundary router R5.

V. CONCLUSIONS

In this paper a typical example of route redistribution at the boundary router(s) was considered and configured. An example of a company A merging with company B where, company A uses OSPF as its IGP within its AS and company B uses EIGRP as its IGP within its AS was taken. After the company merger redistribution had to be done for successful communication between the routers belonging to two different AS and following two different routing protocols.

```
!
interface Serial1/5
 no ip address
 shutdown
 serial restart-delay 0
!
interface Serial1/6
 no ip address
 shutdown
 serial restart-delay 0
!
interface Serial1/7
 no ip address
 shutdown
 serial restart-delay 0
!
router ospf 2
 log-adjacency-changes
 redistribute rip subnets
 network 10.1.54.5 0.0.0.0 area 0
!
router rip
 version 2
 redistribute ospf 2 metric 2
 network 10.0.0.0
 no auto-summary
!
ip forward-protocol nd
no ip http server
no ip http secure-server
```

Figure 3 shows the redistribution being done on boundary router R5 (cont.)

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```
control-plane
!
!
!
!
!
!
!
gatekeeper
 shutdown
!
!
line con 0
 exec-timeout 0 0
 privilege level 15
 logging synchronous
 stopbits 1
line aux 0
 exec-timeout 0 0
 privilege level 15
 logging synchronous
 stopbits 1
line vty 0 4
 login
!
end
```

Figure 4 shows the redistribution being done on boundary router R5 (cont.)

```
R1
R1(config)#
R1(config)#
R1(config)#
R1(config)#
R1(config)#^Z
R1#
*Aug  4 15:54:33.747: %SYS-5-CONFIG_I: Configured from console by console
R1#ping 10.1.34.4

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 10.1.34.4, timeout is 2 seconds:
!!!!!
Success rate is 100 percent (5/5), round-trip min/avg/max = 324/407/500 ms
R1#
R1#
R1#
R1#
R1#
R1#
R1#
```

Figure 5 shows an effort to ping the router at company B from R1. It was noted to be a success as all the 5 ICMP packets echoed back on time.

```
R8#
R8#config t
Enter configuration commands, one per line.  End with CNTL/Z.
R8(config)#ping 1.1.1.1
                 ^
% Invalid input detected at '^' marker.

R8(config)#^Z
R8#
*Aug  9 14:41:51.359: %SYS-5-CONFIG_I: Configured from console by console
R8#ping 1.1.1.1

Type escape sequence to abort.
Sending 5, 100-byte ICMP Echos to 1.1.1.1, timeout is 2 seconds:
.....
Success rate is 0 percent (0/5)
R8#
```

Figure 6 shows an effort to ping to the neighbouring network.

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REFERENCES

[1] Internetworking Basics - Cisco- https://www.cisco.com/cpress/cc/td/cpress/fund/ith/ith01gb.html
[2] Quality of Service (QoS) - Cisco- www.cisco.com › ... › Cisco IOS and NX-OS Software › Cisco IOS Technologies
[3] Routers - Cisco- www.cisco.com/c/en_in/products/routers/index.html
[4] Cisco - Routing Protocols- www.cisco.com/public/technotes/tech_protocol.shtml
[5] Difference between RIPv1 and RIPv2 - Basic Cisco CCNA CCNP ...- basic-ccna-ccnp-commands.blogspot.com/p/difference-between-ripv1-and-ripv2.html
[6] Survey on the RIP, OSPF, EIGRP Routing Protocols - ijcsit- ijcsit.com/docs/Volume%205/vol5issue02/ijcsit2014050222.pdf
[7] Open Shortest Path First (OSPF) - Cisco- www.cisco.com › ... › Cisco IOS Technologies › IP Routing and Services › IP Routing
[8] OSI IS-IS intra-domain routing protocol
D Oran - 1990 - tools.ietf.org
[9] Border Gateway Protocol (BGP): A Boon to Internet Application and ISPs-Vishesh S1, Manu Srinath1, Suhas S2, Srivatsa S Murthy2, Amar Tejas M3- DOI 10.17148/IJARCCE.2016.51109

BIOGRAPHY

VISHESH S (BE, MBA) born on 13th June 1992 hails from Bangalore (Karnataka) and has completed B.E in Telecommunication Engineering from VTU, Belgaum, Karnataka in 2015. He also worked as an intern under Dr. Shivananju BN, former Research Scholar, Department of Instrumentation, IISc, Bangalore. His research interests include Embedded Systems, Wireless Communication, BAN and Medical Electronics. He is also the Founder and Managing Director of the corporate company Konigtronics Private Limited. He has guided over a thousand students/interns/professionals in their research work and projects. He is also the co-author of many International Research Papers. He has recently completed his MBA in e-Business and PG Diploma in International Business. Presently Konigtronics Private Limited has extended its services in the field of Software Engineering and Webpage Designing. Konigtronics also conducts technical and non-technical workshops on various topics. Real estate activities are also carried out under the guidance of Siddesh B S BE (civil). Vishesh S along with his father BS Siddesh has received various awards and applauses from the scientific and entrepreneurial society. He was appointed as the MD of KonigtronicsPvt Ltd (INC. on 9th Jan 2017) at an age of 23 years. His name is indexed in various leading newspapers, magazines, scientific journals and leading websites & entrepreneurial forums. He is also the guide for many international students pursuing their Masters.