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To Minimize the Consumption of Logical Addresses in a Network using OSPF with Overloading Technique

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Received: 10 December 2012 Accepted: 1 January 2013 Published: 15 January 2013

Abstract

Routing protocols are used to assist the exchange of routing information between routers.Routing Protocols find the best path to each network, which is then added to routing table. OSPF is a route distribution protocol. In this paper NAT overloading is applied on OSPF network to decreases the consumption of IP addresses. The output of overloading technique is shown by GNS-3.

Index terms— OSPF, NAT, area, LSU, convergence, VLSM.

Introduction ynamic routing protocols have been used in networks since early 1980. As network evolved so become more complex new routing protocols have emerged [1].OSPF is a routing protocol developed by IETF (internet engineering task force) [5] ,it is a interior gateway protocol based on link state [11] .OSPF gets the whole networks information by exchange the link state information with all other routers. It keeps a map which describes the network topology, then use SPF algorithm to get the routing table [6]. If we used multiple routers and not all of them are Cisco then you can used OSPF .OSPF is also called route redistribution. It is a translation service between routing protocols.

In link state routing, every node builds a roadmap of connectivity to the network, showing which node are connected to which other nodes [10]. Each node then independently calculates the next best path from it to every possible destination in the network. The collection of best path will then form the routing table. Link State Routing Protocols converge more quickly and they are less prone to routing loops [2]. Convergence is when all routers to share information calculate best path and update the routing table. Faster the convergence better is the routing protocol. Example of link state routing are OSPF / IS-IS Routing protocols. In this paper OSPF routing protocol is discussed.

1 II.

2 OSPF (Open Shortest Path First)

OSPF routers used five types of packets, to maintain a link state database. Which is distributed, on all routers in area. In this databases, routers save the same link state information. LSU (link state update) packet is most important packet in OSPF packets, because it takes the route information from one router to other routers. In OSPF metric is calculated via COST. More the bandwidth of OSPF less is the cost [2]. Dikstra algorithm is used to calculate the shortest path [4].

OSPF is supposed to design in hierarchal fashion we can divide large internetwork into smaller internetworks called Areas. OSPF is an example of fast convergence [9]. A network of few routers can converge in a matter of seconds [7]. It is one of the main design goals and an important performance indicator for routing protocols to implement a mechanism that allows all routers running this protocol to quickly and reliably converge [3] .In this paper OSPF protocol is used to designed the network . All areas must be connected to Area0 with ABR. All the routers within same area have same topology table. ASBR is used to bond the one autonomous system to external autonomous system. The goal of design is to localize the updates within area. ABR is called Area Border Router connects unlike areas with the backbone area i.e. Area 0.ASBR is Autonomous System Border

Router. It connects different autonomous systems. This is the area design of OSPF routing protocol. The OSPF divides the network into areas to minimize the routing update traffic [12].

3 a) Features of OSPF

Various features of open shortest path first protocol are as follows:

? Consists of Areas and Self-Governing System.? Minimum Routing Update Traffic ? Allow Scalability ? Fast Convergence ? Support VLSM ? Unlimited Hop Count ? Allow Multivendor Deployment b) Tables of OSPF

In OSPF there are different tables for storing different information regarding network [8] i. Neighbor

4 NAT (Network Address Translation)

NAT is Network Address Translation. It allows a router to modify packets to allow for multiple devices to share a single public IP addresses [13]. NAT was used to slow the depletion of available IP address space by providing many private IP addresses [16].NAT decreases the overwhelming amount of public IP addresses required in your networking environment [7].NAT is typically used on a border router [14]. ? Overloading NAT It maps multiple unregistered IP addresses to a single registered IP addresses by using different ports. It is also known as PAT and by using PAT thousands of users connect to the internet by using only one real global IP addresses.

As earlier seen there is lots of consumption of IP addresses because to represent each host on global network each requires a unique IP address. This increases the consumption of IP addresses .In this paper a method named as NAT overloading will be used with OSPF as a routing protocol.

5 c) NAT Terms

? Inside Local : Name of inside source address before conversion.

? Outside Local : Name of inside destination address before conversion.

? Inside Global : Name of inside host after conversion.

? Outside Global : Name of outside destination host after conversion. [7] IV.

6 Network Simulation

GNS3 (Graphical Network Simulator) is used, to design complex network topologies and to launch simulations on them. In this paper the results are shown with the help of GSN3.In figure **??** After creating a network, OSPF routing protocol is applied over a network. OSPF is applied on each of the router and host used in the network. After applying the OSPF protocol we can check the output of OSPF with the help of routing tables. Figure 2 shows the configuration of OSPF. Figure 3 shows the routing table of R1.With the help of routing table we can check the protocols and connection of each router.

7 Conclusion

In this Paper the NAT overloading technique is used to decrease the consumption of IP addresses by using same IP addresses without any conflicts.The original intention for NAT was to slow the depletion of available IP address space by allowing many private IP addresses to be represented by some smaller number of public IP addresses. By using this method the maximum of 65,535 private addresses by using only a single IP address purchased in a single private network. This increases the availability. [1]

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Figure 1: D © 2013

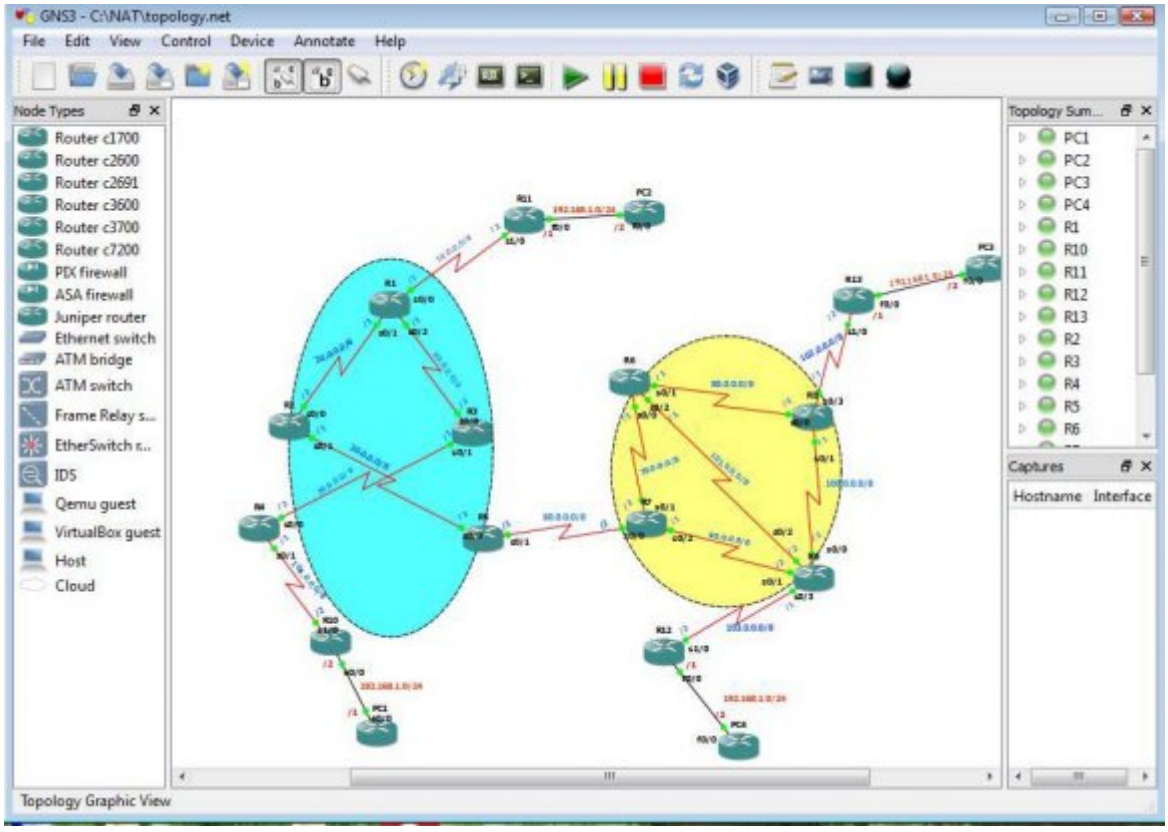

Figure 2:

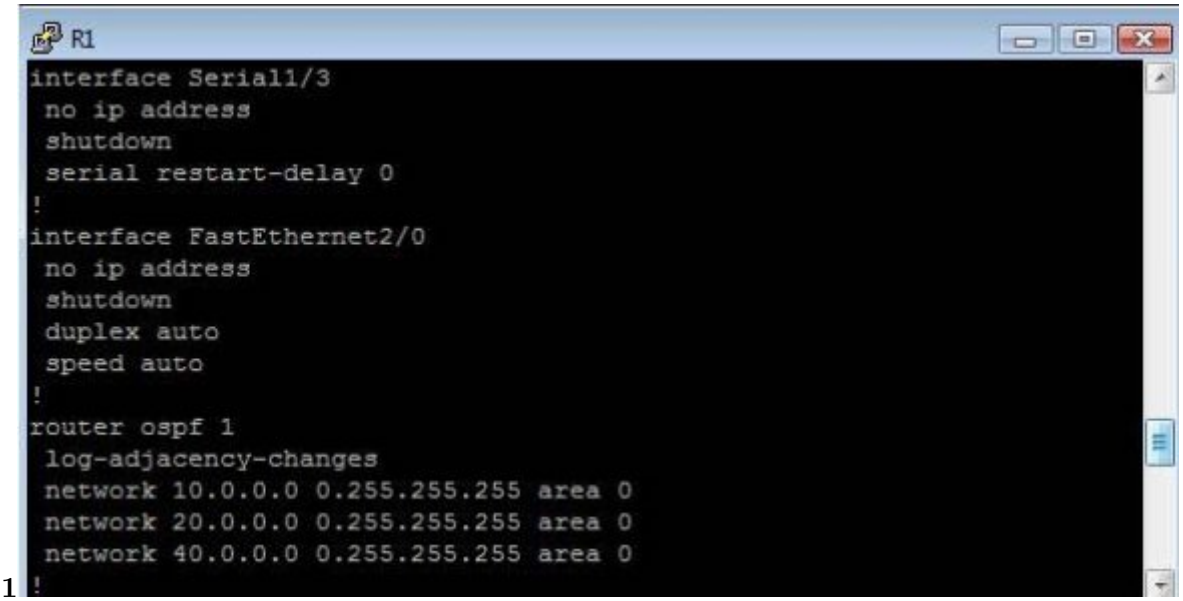

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Figure 3: EFigure 1 :

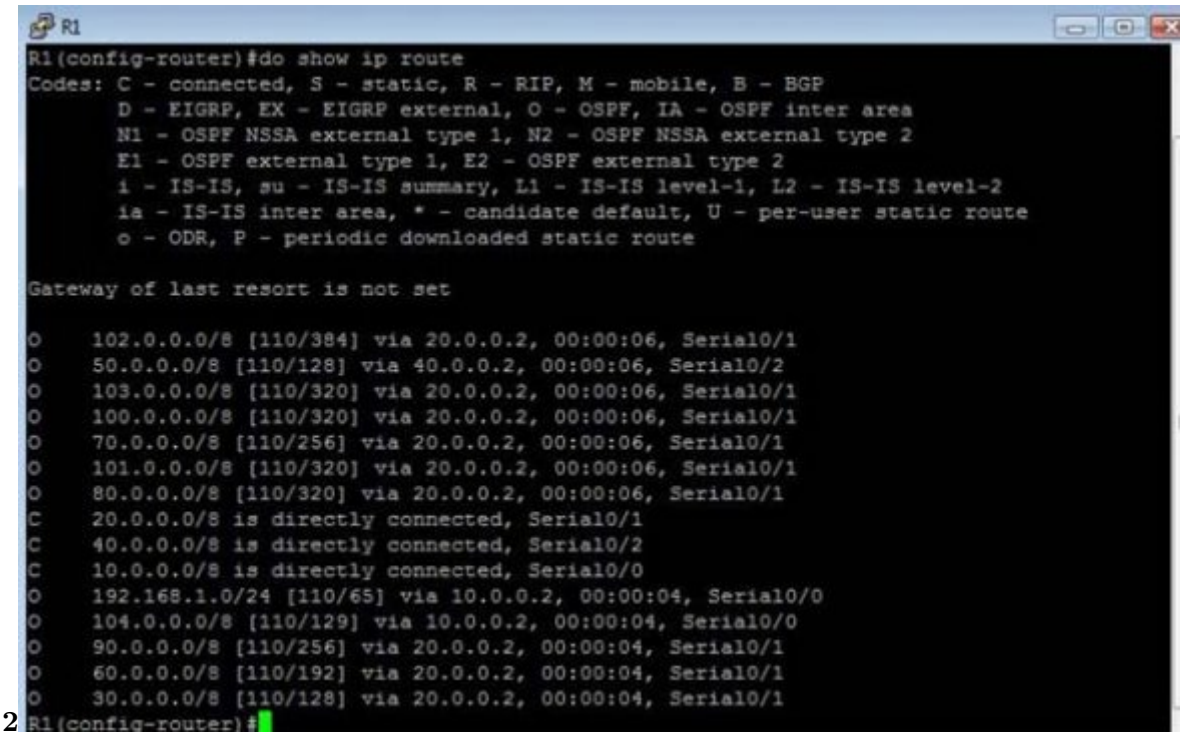

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Figure 4: Figure 2 :

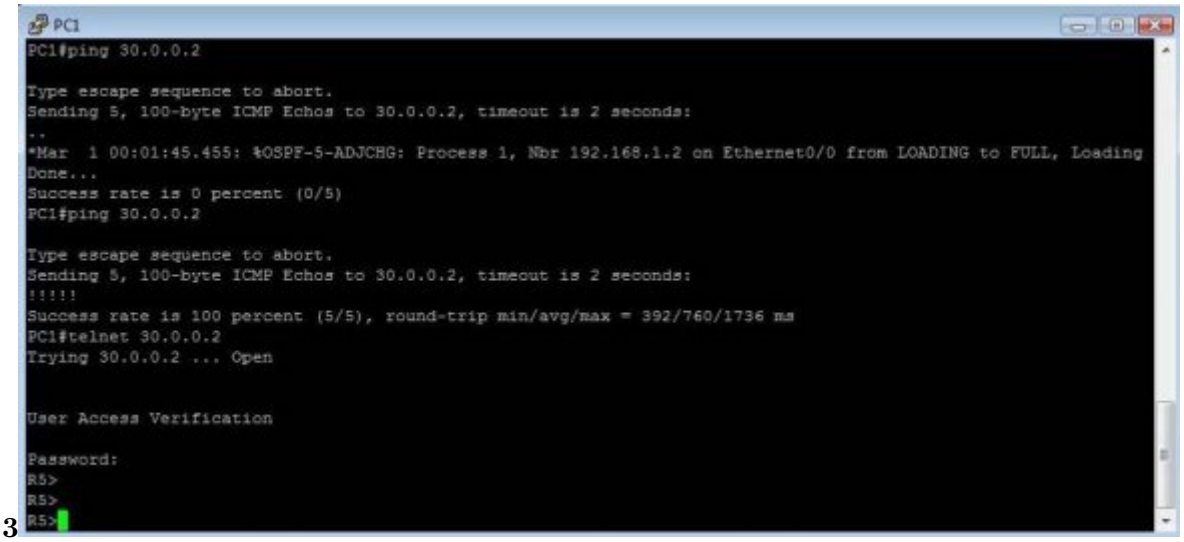

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Figure 5: Figure 3 :

[Note: ii. Topology TableEach router has full road map of its entire area.]

Figure 6: Table

Routing

Figure 7: Table Routing table

Figure 8:

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