DESIGN OF ISP NETWORK WITH IGP AND EGP PROTOCOLS

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ABSTRACT

In Wide Area Network routing becomes an indispensable component of the communication network. This enables data transmission across local & wide area network. Each of the routing protocols has varying features, architecture, performance & algorithm. The exponential growth in the number of users and the volume of traffic add another dimension to this problem. Class of service (CoS) and QoS issues must be addressed in order to support the diverse requirements of the wide range of network users.

1. INTRODUCTION

Over the last few years, the Internet has evolved into a ubiquitous network and inspired the development of a variety of new applications in business and consumer markets. These new applications have driven the demand for increased and guaranteed bandwidth requirements in the backbone of the network. In addition to the traditional data services currently provided over the Internet, new voice and multimedia services are being developed and deployed. The Internet has emerged as the network for providing these converged services.The initial deployment of the Internet addressed the requirements of data transfer over the network. This network catered to simple applications such as file transfer and remote login. To carry out these requirements, a simple software-based router platform, with network interfaces to support the existing T1/E1 – or T3/E3 – based backbones, was sufficient. As the demand for higher speed and the ability to support higher-bandwidth transmission rates emerged, devices with capabilities to switch at the Level-2 (data link) and the Level-3 (network layer) in hardware had to be deployed. Layer-2 switching devices addressed the switching bottlenecks within the subnets of a local- area network (LAN) environment. Layer-3 switching devices helped alleviate the bottleneck in Layer-3 routing by moving the route lookup for Layer-3 forwarding to high-speed switching hardware

SIMULATION GUI TOOL

Tool: GNS 3

GNS3 is a graphical network simulator that allows simulation of complex networks. To provide complete and accurate simulations, GNS3 is strongly linked with Dynamips, a Cisco IOS emulator, Dynagen, a text-based front end forDynamips,

Qemu, a generic and open source machine emulator and virtualizer.VirtualBox, a free and powerful virtualization software. GNS3 is an excellent complementary tool to real labs for network engineers, administrators and people wanting to study for certifications such as Cisco CCNA, CCNP, CCIP and CCIE as well as Juniper JNCIA, JNCIS andJNCIE. It can also be used to experiment features of Cisco IOS, Juniper JunOS or to check configurations that need to be deployed later on real routers. GNS3 is an open source, a free program that may be used on multiple operating systems, including Windows, Linux, and MacOS X.

2. EXISTING SYSTEM

OSPF is a routing protocol for Internet Protocol (IP) networks. It uses a link state routing (LSR) algorithm and falls into the group of interior gateway protocols (IGPs), operating within a single autonomous system (AS). OSPF version 3 introduces modifications to the IPv4 implementation of the protocol

OSPF is an interior gateway protocol (IGP) for routing Internet Protocol (IP) packets solely within a single routing domain, such as an autonomous system. It gathers link state information from available routers and constructs a topology map of the network. The topology is presented as a routing table to the Internet layer which routes packets based solely on their destination IP address. OSPF supports Internet Protocol Version 4(IPv4) and Internet Protocol Version 6(IPv6) networks and supports the Classless Inter-Domain Routing (CIDR) addressing model.

Disadvantages of OSPF

1. OSPF is very processor intensive.OSPF maintains multiple copies of routing information, increasing the amount of memory needed. OSPF can be logically segmented. 2. .OSPF is an interior gateway protocol (IGP) for routing Internet Protocol (IP) packets solely within a single routing domain, such as an autonomous system. Itgathers link state information from available routers and constructs a topology map of the network. The topology is presented as a routing table to the Internet layerwhich routes packets based solely on their destination IP address. OSPF supports Internet Protocol Version 4(IPv4) and Internet Protocol Version 6(IPv6) networks and supports the Classless Inter-Domain Routing (CIDR) addressing model. 3. OSPF is very processor intensive.OSPF maintains multiple copies of routing information, increasing the amount of memory needed. OSPF can be logically segmented.

3. PROPOSED METHOD ALGORITHM

In the proposed algorithm, the SPF algorithm is an algorithm for finding the shortest paths between nodes in a graph, which may represent, for example, road networks. It was conceived by computer scientist Edsger W. Dijkstra in 1956 and published three years later

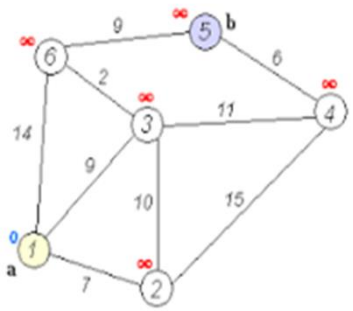

Fig 2: Nodes

4. NETWORK TOPOLOGY

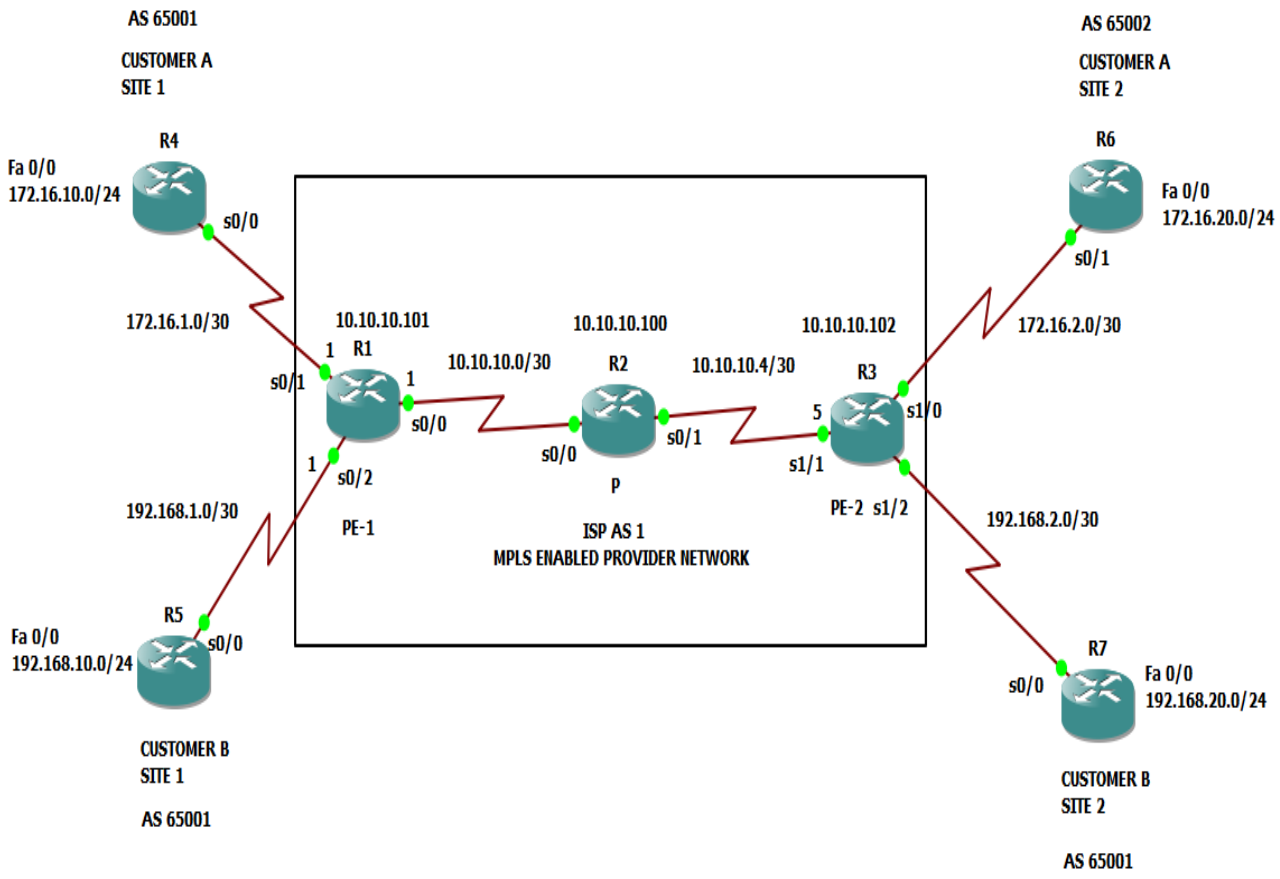

Fig 2: Proposed Network Topology

5. BORDER GATEWAY PROTOCOL

BGP is a standardized exterior gateway protocol (EGP), as opposed to RIP, OSPF, and EIGRP which are interior gateway protocols (IGP's). BGP is considered a "Path Vector" routing protocol. BGP was not built to route within an Autonomous System (AS), but rather to route between AS's. BGP maintains a separate routing table based on shortest AS Path and various other attributes, as opposed to IGP metrics like distance or cost. BGP utilizes TCP for reliable transfer of its packets, on port 179. BGP should be used under the following circumstances:

- Multiple connections exist to external AS's (such as the Internet) via different providers.
- Multiple connections exist to external AS's through the same provider, but connect via a separate CO or routing policy.

For BGP to function, BGP routers (called speakers) must form neighbor relationships (called peers).

There are two types of BGP neighbor relationships:

IBGP Peers – BGP neighbors within the same autonomous system.

EBGP Peers – BGP neighbors connecting separate autonomous systems.

Once BGP peers form a neighbor relationship, they share their full routing table. Afterward, only changes to the routing table are forwarded to peers. By default, BGP assumes that EBGP peers are a maximum of one hop away. This restriction can be

bypassed using the EBGP-multihop option with the neighbor command. IBGP peers do not have a hop restriction and are dependent on the underlying IGP of the AS to connect peers together. By default, all iBGP peers must fully mesh within the Autonomous System.

6. PING AFTER MPLS CONFIGURATION

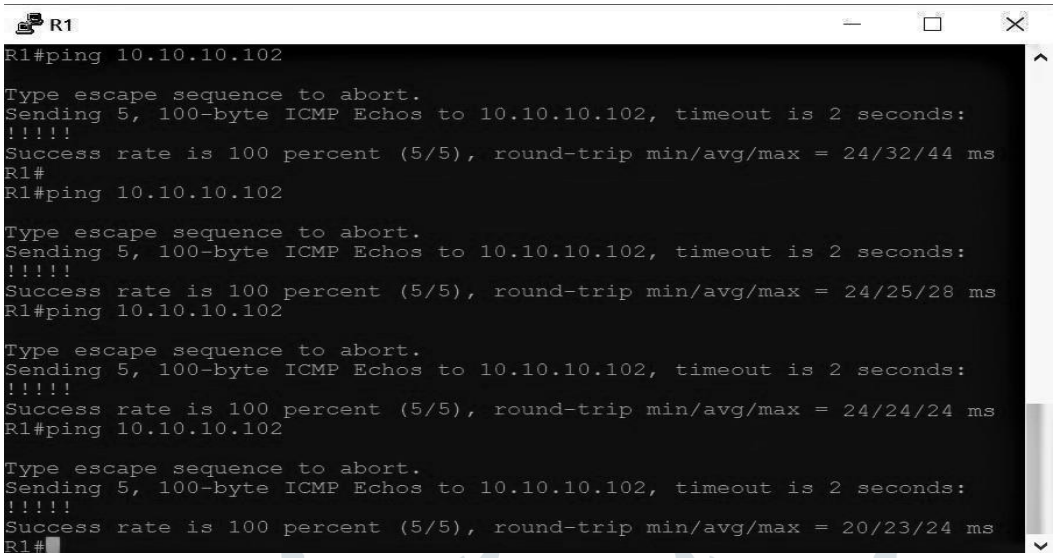

Figure 03: Ping after MPLS Configuration

7. End-to-End Ping

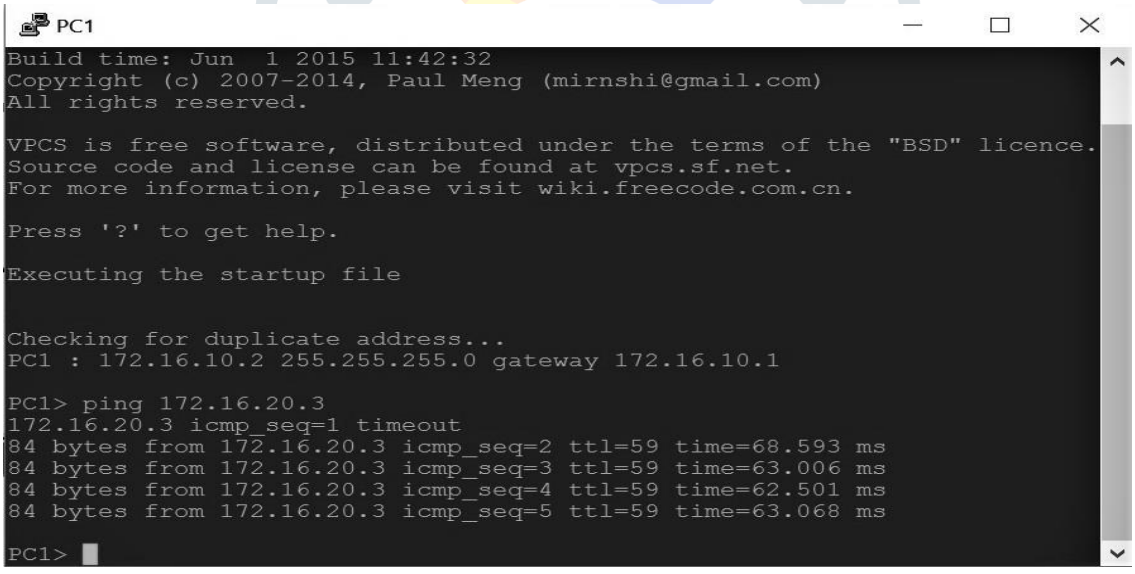

Figure 04 : End-to-End Ping

8. CONCLUSION

In today's economy where the most important objective for an engineer is to implement the new emerging technologies for transferring the data securely and in a cost-effective manner. This venture of new technology i.e. MPLS over the existing technology i.e. BGP provides benefits that service providers need urgently in their networks, such as scalability, manageability, and security. MPLS BGP offers many advantages including support for TE, QoS provisioning and scalability enhancements, the requirement of having MPLS support throughout the entire network is limiting its widespread usage. It would be an excellent choice for providing BGP services as it combines the benefits of both Overlay and Peer-to-Peer networks. Furthermore, by using MPLS core, the Service Provider can make use of other MPLS Features such as Traffic Engineering, Quality of Service and Network Management.

9. REFERENCE

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