

QOS for enterprise network

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ABSTRACT

A communication network forms the backbone of any successful organization. These networks transport a number of applications including real time voice, high quality video and delay sensitive data. The main agenda for improving the quality over IP is to have a low cost and reliable medium for information exchange. QOS is a set of tools and techniques to manage resources. It is mainly implemented so that the convergence of voice, data and video can be invisible to the end users.

Keywords: Cisco routers and switches, voip, ip phones, queing mechanism, class-map, policy-map

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I. INTRODUCTION

QOS is a technique which enables network administrators to deal with majorly bandwidth related issues jitter, delay, etc. QOS provides the flexibility that can classify and prioritize different applications running in any network as per our requirements to guarantee the performance of those applications. Quality of service is particularly important for the transport of traffic with special requirements. In the field of computer networking and other packet-switched telecommunication networks, the traffic engineering term quality of service refers to resource reservation control mechanisms rather than the achieved service quality.

II. PROCEDURE

In our paper we will be working on the differentiated service model which helps us to create different classes of traffic and manage those classes independently. This method helps to service all the types of traffic according to the network requirements. In normal enterprise network the data will be transferred in order of appearance due to this important packets get delayed. We will implement quality of service after which packets will be prioritized according to requirement of individual enterprise network demand.

- Calculation of total traffic (number of packets)

- Assigning priority based on requirement
- Allocating bandwidth for different priority levels

Toolset:

- Classification and marking –

The traffic entering the network are be treated differently for this classification and marking tools set an attribute of a frame or packet to a specific value. It establishes a trust boundary that scheduling tools later depend on.

- Policing and markdown tools-

Policing tools determine whether packets are conforming to administratively-defined traffic rates and take action accordingly. Such action could include marking, remarking or dropping a packet

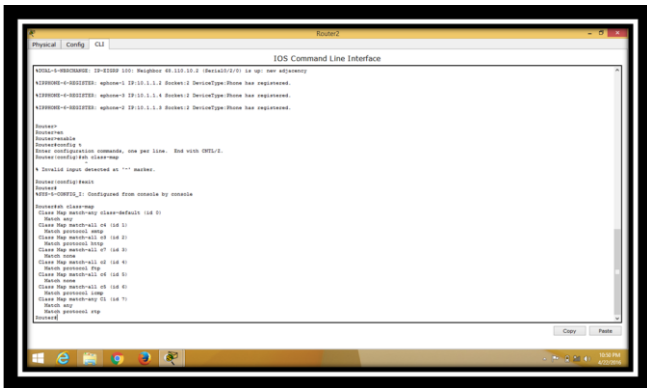
- Scheduling tools-

Scheduling tools determine how a frame/packet exits a device. When packets enter a device with speed mismatches chances of bottleneck occur. Devices have buffers that allow for scheduling of higher priority packets to exit sooner than lower packet priority packets. QOS tools are not only useful in protecting desirable traffic, but also in providing differential services to undesirable traffic such as the exponential propagation of worms.

QoS Mechanisms

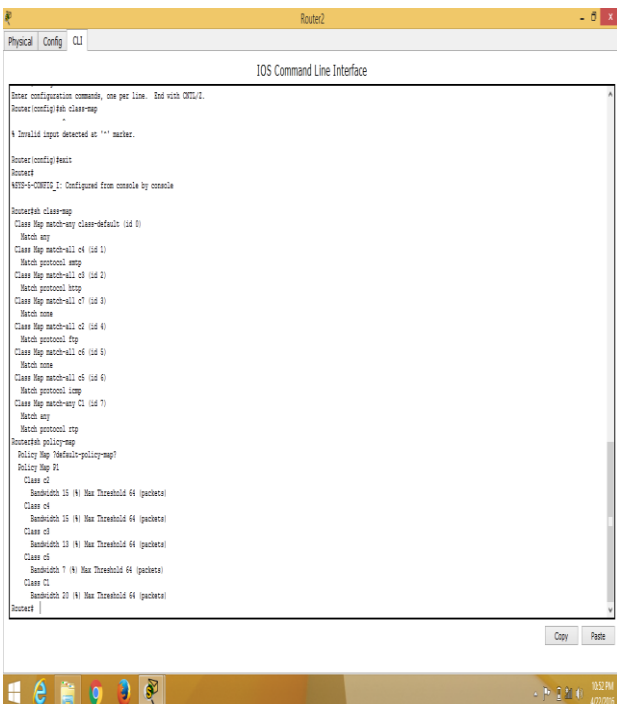
- Class-Maps
- Policy-Maps
- Service-policy

CLASS-MAP: A classification filter defined within the policy-map to identify traffic for preferential or deferential treatment. Traffic can be identified by IPP or DSCP or numbered ACL. Each class-map command would be followed by a match subcommand which defines the actual parameters that are compared to packet headers content to match packet for classification.



POLICY-MAP: It defines how each traffic type defined in the class-map should be serviced. Each policy-map command would be followed by following subcommand

- .set - CB marking action, with options to mark several fields inside headers
- .bandwidth –reserves bandwidth for the class for CBWFQ
- .priority –reserves bandwidth and provides LLQ with CBWFQ
- .police –policing traffic in the class with defined bandwidth and burst sizes

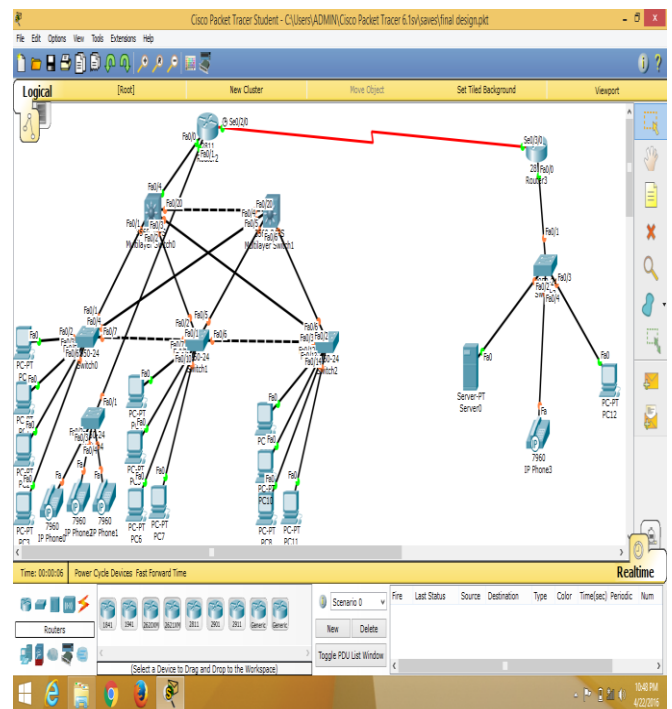


SERVICE-POLICY: a policy statement binds the policy to an interface and tells the router or switch to perform the logic in the policy-maps for packets either entering or exiting the interface.

III.ALGORITHM

1. Knowledge of the enterprise’s internet plan.
2. Types of traffic associated with the network.
3. Calculate need of every class based upon available bandwidth
4. Create class-maps for all the types of traffics the enterprise network deals with.
5. Create policy-maps to define how each traffic type needs to be serviced.
6. Use IP precedence value or DSCP values to set priority to the classes.
7. All this needs to be done on the edge router.
8. After configuration check the service-policy of the interface and you can see the packet flow for all the classes and bandwidth allocated to them.
9. According to enterprise requirements the changes can be applied to the network

Consider this example of an enterprise network:



We are applying QOS outbound. So all the traffic leaving the network will be analyzed and treated as per configurations. We have created Vlans to differentiate different departments of an enterprise. We have also made use of DHCP to dynamically allocate IP addresses to the systems that are newly added.

Types of traffic:

- .RTP
- .FTP
- .HTTP

.ICMP

.JUNK

More traffic types can be included depending on need.

Consider network has total of 1544 kbps. Routing protocols consume 25% of the bandwidth. Remaining 75% is used for the routing the traffic.

The routing protocols will consume about 386 kbps that makes up for 25% of the total bandwidth.

RTP-> 347 KBPS (22.47%)

FTP->240 KBPS (15.54%)

HTTP->200 KBPS (12.95%)

ICMP-> 76 KBPS (4.92%)

SMTP->240 (15.54%)

JUNK->55 KBPS (3.56%)

The entire bandwidth is divided. It will be different for different enterprises but the logic remains same to allocate maximum bandwidth to the most used traffic type so that no packets are dropped.

IV. CONCLUSION

In this paper we presented the use of QOS on network to manage the available bandwidth to give maximum throughput also advantages of using IP phones is demonstrated.

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