IMPACT: International Journal of Research in Engineering & Technology (IMPACT: IJRET)
ISSN(E): 2321-8843; ISSN(P): 2347-4599
Vol. 2, Issue 1, Jan 2014, 57-62

APPLYING QUALITY OF SERVICE TECHNIQUE FOR BANDWIDTH MANAGEMENT IN JAMMING ENVIRONMENT SYSTEM

M. S. ZAGHLOUL

Arab Academy for Science and Technology and Maritime Transport, Department of Electronic and Communication, Alexandria, Egypt

ABSTRACT

This paper about Prioritization which is essential for mission-critical application with an assortment of voice and data services crowding the network. It is important to have Prioritization of mission- and time-critical traffic for optimum utilization of bandwidth for high-value apps and maintenance of quality of service (QoS) levels. With communications convergence becoming a reality today, business success hinges on protecting business-critical network traffic. In such a scenario, management of bandwidth resources has been assumed as most crucial in the development of successful WAN. With a significant increase in the volume of data traffic, this research realizes the importance of QoS policy management, of which bandwidth management forms a part. In this research we developed a computer program which will be stored on a computer readable medium of computer system, this computer program will operate when manage link bandwidth is executed to manage link band width in a communication network having a plurality of routing devices. Also in this application the reservation factor is used for compensating unusual traffic, especially in jamming that are not captured by the standard CAC algorithm.

KEYWORDS: Networks, C4, QoS, Modern Communication, Signal Processing, Sensors

INTRODUCTION

Driving the need for bandwidth managing in enterprise communication networks because network convergence. Band width management has an important role to play in military application there are also commercial scenarios for net work band management. [1] In the near past, enterprises had a private TDM-based voice network, an IP network to the Internet, and a multi-protocol LAN. Today, all data networks are converging on IP transport because the applications have diverted towards being IP-based. Now, network traffic is highly diverse and each traffic type has unique requirements in terms of the main factor, bandwidth, delay, jitter, and availability.

With the explosive growth of the Internet, most of the network traffic today is IP-based. Besides, there has been an increase in the number of networked applications like ERP, data mining and multimedia, which are in great need for bandwidth. Also, high-value applications like VoIP and the need for centralized delivery of applications as a service over the WAN demand optimum use of limited bandwidth resources [2]. Probably bandwidth is the second most significant parameter that affects QoS of an enterprise network, and bandwidth management is the key to ensure that each user and/or application receives appropriate and optimum treatment.

DIFFERENT APPLICATION PERFORMANCE

Different applications have different requirements for bandwidth, sensitivity (delay, jitter, and loss) is shown in table 1.

Table 1: Different Requirements for Bandwidth, Sensitivity

Performance Dimensions				
		Sensitivity		
Application	Bandwidth	Delay	jitter	Loss
VoIP	Low	High	High	Med
Video Conferencing	High	High	High	Med
Streaming Video on Demand	High	Med	Med	Med
Streaming Audio	Low	Med	Med	Med
e-Business (Web browsing)	Med	Med	Low	High
Email	Low	Low	Low	High
File Transfer	Med	Low	Low	High

Effective implementation of bandwidth management requires prioritization of business-critical requirements and an analysis of network parameters.

The need for high availability and predictable performance for business-critical applications combined with the demand for voice and video services, mandates differentiated handling of network traffic. QoS management is a continuous cycle, which involves monitoring in order to gain visibility into network operations, configuring or adjusting policies critical to application performance, and automating multiple service levels across any network topology.

We are in need to build flexible, rules-based QoS policies that filter traffic (voice versus critical data versus junk Web traffic), guarantee bandwidth (for example, voice traffic gets 35 percent of the bandwidth), and enforce end-to-end service levels (such as low latency queuing and congestion control for voice traffic or fast response time for ERP applications).

INFORMATION REQUIREMENT FOR C4 SYSTEM

C4 system include the following major components:- Terminal device, transmission media, switches and control data are from different sources, from a C4 system and through situation reports from senior, subordinators or lateral commands needs to interpreted and correctly applied to be for use and variable only in so far as it contributes to knowledge and understanding.

War fighters understand things best in terms of ideas or images, a clear image of their commander's intent and of local situation can allow subordinates to seize the initiative. In this regards QoS technique for bandwidth management plays a critical role in processing, flow and quality. Data quality for many information sources is imperfect and susceptible to distortion and deception.

The seven criteria help characterize information quality. The flow of information must be nearly instantaneous vertically and horizontally within the organization structure. All level of command must be able to immediately pull the information they need. The function of the C4 system is to support, collect, transport, process, disseminate and protect. The fundamental objective of C4 system a-produce efforts b-exploit total force capabilities c- Information fusion.

C4 SYSTEM PRINCIPAL

The foundation for C4 is the continuous, uninterrupted flow and processing of information in support of warrior planner, decision, and execution. Users must have C4 system that is interoperable, flexible, responsive, and mobile disciplined, survivable and sustainable. Information must be made accessible, general the value of information increases with the number of users [3].

Table 2: Different C4 System Principle

*ACCURACY-Information that conveys the time situation
*RELEVANCE -Information that applies to the mission, task, or situation at hand
*TIMELINESS -Information that is available in time to make decision
*USABILITY-Information that is common, easily understood format and display
*COMPLETENESS -All necessary information required by decision makers
*BREVITY -Information that has only the level of detail required
*SECURITY -Information that is common easily understood format and displays

CURRENT QUALITY OF SERVICE TECHNIQUE

Cisco Works QoS Policy Manager version 3.0: QPM 3.0 combines traffic monitoring with configuration of differentiated services across the IP infrastructure, by leveraging the Cisco IOS. Software and Cisco Catalyst Operating System QoS mechanisms built into LAN and WAN switching and routing equipment. The product provides centralized QoS analysis and policy control for voice/video/data networks, enables network-wide content-based differentiated services, and campus-to-WAN automated QoS configuration and deployment. Nortel Network's Passport 8600 Routing Switch: It delivers end-to-end delivery of differentiated QoS levels. It is based on technology branded express classification (XC). XC enables network managers to identify and classify traffic based on a wide range of criteria, and apply policies (for example, security and priority) to the network traffic based on these classifications. Enterasys' Expedition Family of Switch Routers: It delivers QoS by integrating wire-speed Layer 4 switching with policy-based traffic classification and prioritization. All the way to Layer 4, it allows traffic to be identified, classified, and prioritized at the application level. Prioritization policies can encompass the entire network, groups of users, or specific host-to-host application flows. Detailed instrumentation measures bandwidth utilization for each Layer 4 flow, allowing real-time network base lining and fine-grained accounting. This functionality is made easy to use by its Java-based network management software.

USED TECHNIQUES AND MECHANISMS

There different types of techniques such as Queuing Techniques, Strict Priority, Weighted Fair Queuing (WFQ), Rate Limiting, Traffic Classification, and Marking Queuing Techniques. Now network vendors integrate common QoS queuing mechanisms into their routers and switches. These mechanisms are: strict priority, and weighted fair queuing. Strict Priority: This mechanism assures higher priorities of throughput, but at the expense of lower priorities (starvation). For example, during heavy loads, low-priority traffic can be dropped to preserve throughput of the high-priority traffic. Weighted Fair Queuing (WFQ):

This mechanism distributes priority throughput among the four priorities based on weights specified as percentages. This policy is best for normal Internet and enterprise traffic models. Rate Limiting Precise bandwidth policing is possible with rate limiting. Rate limiting allows the user to set up a committed access rate (CAR) on traffic that has been classified. Each IP flow can be rate limited at the input. Bandwidth is allocated on a per flow basis. If the IP flow exceeds the bandwidth limit then the arriving packet is either dropped or assigned to a lower priority.

Traffic Classification

This helps to recognize packets moving across a network as part of an application or flow. This is done by inspecting the packets as they cross the network or by accepting marks for traffic that have already been classified. Classification is the most important part of QoS and in some environments can be the most difficult step. As applications advance, classification becomes more complex. For example, VoIP traffic might need higher priority in an enterprise, and classification will make sure that VoIP traffic must go on no matter what happens.

Marking

This technique uses information culled from the classification stage to inform other network equipment how to handle individual packets. This is usually done by inserting tags, such as 802.11p or differentiated service code points.

THE CONNECTION ADMISSION CONTROL ALGORITHM

Figure 1 shows a network communication. At the start when the connection request is generated, the CAC function at this time is to compromise between the competing goals of maximizing band width utilization and delivering request of quality of service in order to decide whether or not to accept the request for connection. CAC should accept connection if and only if there are sufficient resources available to satisfy the quality of service requirement of the requested new connection, as well as those of all the existing connection, if not it should not accept.

C4 REQUIREMENT FOR GOOD QUALITY OF SERVICE LEVEL

Bandwidth management is a concept about classifying, policing, and metering the traffic entering your network. This is where queues management and scheduling of your traffic becomes important. To be able to provide differentiated QoS levels, network infrastructure must have some fundamental capabilities. [4] A network, and more specifically the network devices, must be able to: a-Classify different traffic types, such as video, audio or data, so that each class can be given distinct and appropriate treatment. b-Prioritize mission- and time-critical traffic.

THE COMPUTER PROGRAM

The flow chart for the computer program is shown in figure 1, a computer program which will be stored on a computer readable medium of computer system will operate when manage link bandwidth is executed to manage link band-width in a communication network having a plurality of routing devices. The flow chart of this program is shown in figure 1. Each of the plurality of routing device for supporting process from a plurality of service classes, the program has the following programmable codes for request for connection path across the network to establish communication from a sending process to receiving device, in the connection path each device being connected to the next by a link having an associated band- width, programmable code to assignee a plurality of reservation factor to each one of the plurality of service classes, and programmable code to perform a connection admission control process for one routing device on the connection path at least, including identifying a service class associated with the sending process and selecting a reservation factor from the plurality of reservation factors associated with the identified service class of the sending process for assignment to the sending process, the amount of available link band-width reserved for the sending process is determined by the reservation factor. The computer program can be implemented as a computer product for use with a computer system. Moreover such instructions can be stored in any memory device or may be transmitted by using any communication technology.

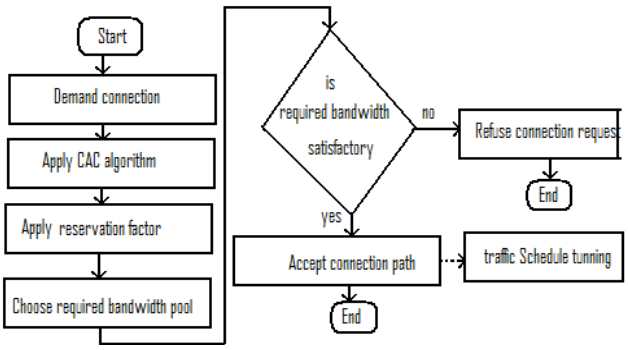

Figure 1: The Flow Chart for Request Connection

THE RESERVATION FACTOR

The amount of link band width reserved for the sending process in computer program represent a portion of a band width pool assigned to the service class associated with the sending process, for the reservation factor the computer program compromise and take care of program code for use reservation factor to tune a traffic scheduler for affecting actual quality of service to the sending process [5], the reservation factor is used to overbook link band width, under book link bandwidth, adding to that the reservation factor is determined off-line and a function of usage statistics due to one of the sending process at least, net work policy establishment, and link utilization, moreover this reservation factor can be determined on-line.

THE DESCRIPTION OF THE NEW TECHNIQUE

- **General Design Consideration**

A general design consideration is that to have the prioritization of mission and time critical traffic for optimum utilization of bandwidth and keep QoS level. Depending on the operational procedure associated with the connection there may be different approaches to constructing the prioritization scheme. An example of intraswitch handoff design is shown in [6]. Here we consider one design example using reference [7]. The implementation can manage link band width according to the application, such as asynchronous transfer mode (ATM), internet protocol (IP), and frame relay (FR), which are different in usage, tariffs, user protection. So for these systems different application can belong to different or similar quality of service and a different reservation factor.

A specific example for an ATM- based reservation factor using hybrid pools. Each router the equivalent bandwidth (EBW) for each incoming connection using the connections traffic parameters, buffer size, cell loss ratio, etc. [8]using one prior art actual CAC algorithm. The reservation factor is calculated by an intelligent approach to link band width management in a CAC algorithm, when connection request is received (CAC) tries to balance the competing goals of maximizing band width utilizing and delivering request QoS.

- **Decide Whether or not to Accept the Connection**

In order to decide whether or not to accept the connection such that constant bit rat (CBR) received BW=CAC EBW/CBR reservation factor. Variable bit rate real time (VBR-rt) reserved BW= CAC EBW/ VBR-rt reservation factor, variable bit rate non real time (VBR-nrt) reserved BW=CAC EBW/VBR-nrt reservation factor. Unspecified bit rate (UBR) reserved BW=CAC EBW/UBR reservation factor. Assuming all connection for given service category is similar for 1-a given band width equal X Mb/sec. 2-assume two pools of 60%, 40%. 3-pool 1 consists of 3 CBR, 2 VBR-rt, 0 VBR-nrt, 0 UBR, and pool 2 consists of 0 CBR, 0 VBR-rt, 2 VBR-nrt, 1 UBR, assume the calculated EBR (calculated by each router) for each connection are:- For CBR connection =.1 X Mb/sec. For VBR-rt connection=.2XMb/sec. For VBR-nrt connection=.4 X Mb/sec. For UBR connection =.6 X Mb/sec. Finally, after applying a CAC algorithm (not shown) the edge device applies an appropriate reservation factor may be assumed as CBR=1, VBR-rt=5, VBR-nrt = 10, and URT=20.

For this specific example numbers, the following reservation for band width are made of each connection (EBW/Reservation Factor). CBR=.1X/1=.1X Mb/sec, VBR-rt=.2X/5=.04X Mb/sec, VBR-nrt=.4 X /10=.04XMb/sec, UBR=.6 X / 20=.03X Mb/sec.

The remaining band width available is pool 1 is 0.6X-(3 times 0.1)-(2times. 04 X)=0.22 X Mb/sec, pool 2 is 0.4X-(2 times 0.04)-(1 times. 03 X)=0.29 X Mb/sec.

CONCLUSIONS

In networks dynamic bandwidth reconfiguration and establishment of routs with quality of service are the most important features. Many approaches are used, the technique mentioned in this paper with previous mentioned soft ware can be integrated into hardware, like other producers have integrated all the above-mentioned mechanisms into hardware. Now, with most of producer re-inventing network management, presenting the case for policy-based network management, a whole array of bandwidth management tools are now being integrated into switches and routers. Also, with content-rich media, both static and real-time, all across enterprise networks, this application-aware hardware would make deployment of QoS and management of bandwidth much easier. Algorithmic determination and or computer simulation are normally used to demonstrate the feasibility of the technique. The continuation of this research is to evaluate the overall performance of the transmission and evaluate the performance in a dynamic environment were network condition changes affect thee available bandwidth.

ACKNOWLEDGEMENT

The author wishes to acknowledge the assistance and support of Dr. Ramy Guirguis for his great help and support while preparing this work.

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