

BANDWIDTH MANAGEMENT WITH P2P TRAFFIC DETECTION



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ABSTRACT

With the rise of the internet technology, access on information resources is now easier and more convenient. Also, the internet serves as an alternative for communication and a vital tool for business transactions. Because of that, the need for internet access with stable bandwidth is a must. Most especially in a shared network because there are also other advancements that are considered to be nuisance as they contradict to the general purpose of connecting to the internet. P2P file sharing system is one of them. P2P applications require so much bandwidth that it becomes a network traffic problem. So to address that problem, this study discusses an approach to supplement bandwidth management by integrating it with P2P detection.

Keywords:P2P BANDWIDTH_MANAGEMENT GATEWAY NETWORK BANDWIDTH INTERNET

CHAPTER I

INTRODUCTION

Background of the study

With the rise of the internet technology more and more application are designed to produce, distribute, and share information. Search engines, web portals, online news and other websites offer information sources over a wide variety of topics. Connection to these very important information sources is very significant, especially when used on education. Talking about education, schools nowadays have computer rooms where students can search over the internet seeking for relevant information. Therefore, networks on this kind of institution need a stable internet connection. Although with simple bandwidth-hogging P2P applications, such as BitTorrent, Limewire, Gnutella, Kazaa and etc., running on any of the hosts the very purpose of connecting to the internet is denied. P2P application consumes too much bandwidth that, if used, it dramatically affects the whole network connection to the internet. Without proper management of the network traffic, internet connection will never be stable among all users or hosts. This is why the study on Bandwidth Management with Packet Scanning is brought up.

Technology Application Context

The proper allocation of internet bandwidth for services and transactions which are important to organizations is a common problem. This problem is also evident here in Ateneo. One of the major causes is the exhaustive downloads of students and faculty

using P2P applications. Although there are bandwidth management tools/software embedded on servers, all of them lack the ability to detect P2P applications. And as a solution to P2P detection, the proponents intend to use packet scanning.

Objectives of the study

The general objective of this research is to develop a Bandwidth Management service application that can detect and minimize P2P traffic through packet scanning.

The specific objectives are:

- Identify problems brought by P2P applications
- With the use of packet scanning, find a solution towards identifying P2P traffic
- Create Linux shell script that manages internet bandwidth
- Create a service tool incorporating P2P detection and Bandwidth management
- Setup a small-sized network mimicking real life network scenarios.

Significance of the study

P2P traffic will be suppressed and thus lessening latency brought by the bandwidth-hogging nature of P2P applications. And, with bandwidth management integrated with P2P detection, fair share over the internet bandwidth will be actualized. The effect of this kind of bandwidth management will enforce control over the bandwidth shared by users in a network

Scope and Limitations

The study is all about creating a service tool that will manage the internet bandwidth and detect P2P traffic through the use of packet scanning. The tool will only be implemented on a Linux environment computer acting as a gateway between the LAN and the internet. And, P2P detection will be of port-based and protocol analysis.

Definition of Terms

Bandwidth Management - Bandwidth management is the process of measuring and controlling the communications (traffic, packets) on a network link, to avoid filling the link to capacity or overfilling the link, which would result in network congestion and poor performance.

Peer-to-Peer (P2P) - A P2P computer network exploits diverse connectivity between participants in a network and the cumulative bandwidth of network participants rather than conventional centralized resources where a relatively low number of servers provide the core value to a service or application.

Gateway- is a node that serves as an entrance to another network, and vice-versa. Gateways are most commonly used to transfer data between private networks and the Internet.

Bandwidth- Refers to data rate measured in bit/s, for example channel capacity (digital bandwidth capacity) or throughput (digital bandwidth consumption)

Packet - A packet is a formatted block of data carried by a packet mode computer network. Computer communications links that do not support packets, such as

traditional point-to-point telecommunications links, simply transmit data as a series of bytes, characters, or bits alone.

UDP – UDP is a connectionless protocol that, like TCP, runs on top of IP networks. Unlike TCP/IP, UDP/IP provides very few error recovery services, offering instead a direct way to send and receive datagrams over an IP network. It's used primarily for broadcasting messages over a network.

Network – Network can refer to any interconnected group or system.

Internet Protocol (IP) - IP is a data-oriented protocol used for communicating data across a packet-switched internetwork. IP is a network layer protocol in the Internet protocol suite and is encapsulated in a data link layer protocol (e.g., Ethernet). As a lower layer protocol, IP provides the service of communicable unique global addressing amongst computers.

Port - Ports can be readily explained with an analogy: think of IP addresses as the street address of an apartment building, and the port number as the number of a particular apartment within that building. If a letter (a data packet) is sent to the apartment (IP) without an apartment number (port number) on it, then nobody knows who it is for (which service it is for). In order for the delivery to work, the sender needs to include an apartment number along with the address to ensure the letter gets to the right domicile.

protocol is a convention or standard that controls or enables the connection, communication, and data transfer between two computing endpoints. In its simplest form, a protocol can be defined as the rules governing the syntax, semantics, and synchronization of communication. Protocols may be implemented by hardware,

software, or a combination of the two. At the lowest level, a protocol defines the behavior of a hardware connection.

Shell – A shell is a piece of software that provides an interface for users. Typically, the term refers to an operating system shell which provides access to the services of a kernel. However, the term is also applied very loosely to applications and may include any software that is "built around" a particular component, such as web browsers and email clients that are "shells" for HTML rendering engines.

Unix - Unix is a computer operating system originally developed in 1969 by a group of AT&T employees at Bell Labs including Ken Thompson, Dennis Ritchie and Douglas McIlroy. Today's Unix systems are split into various branches, developed over time by AT&T as well as various commercial vendors and non-profit organizations.

Library - A library is a collection of subprograms used to develop software. Libraries contain "helper" code and data, which provide services to independent programs. This allows code and data to be shared and changed in a modular fashion. Some executables are both standalone programs and libraries, but most libraries are not executables. Executables and libraries make references known as *links* to each other through the process known as *linking*, which is typically done by a linker.

Traffic Shaping – Traffic Shaping is an attempt to control computer network traffic in order to optimize or guarantee performance, lower latency, and/or increase usable bandwidth by delaying packets that meet a certain criteria.

Routing - Routing is the process of selecting paths in computer networking along which to send data or physical traffic. Routing is performed for many kinds of networks, including the telephone network, the Internet, and transport networks.