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Netscan and Networx for Management Bandwidth and Traffic with Simple Routing

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Abstract

Currently, approximately 3.4 billion people are accessing the internet around the world and that number is still growing. This phenomenon creates the Internet culture that has a great influence on science, technology and even the world economy. Internet bandwidth is very expensive, which makes an information technology based company have to map the internet accurately daily, monthly or yearly. That data will be taken into consideration by the company to decide how to provide services that make an internet surfing is a pleasant experience. If not regulated, most likely the traffic and bandwidth will be used up even when it is only shared by a few users. To anticipate this, we need a bandwidth and management traffic system using Netscan and Networx in order to monitoring the usage of Internet.

Keywords*: Netscan, networx, bandwidth, traffic, simple routing*

1. Introduction

Network administrators have to map the Internet network to accurately match the needs of each user [1]. Internet usage reports either daily, monthly or yearly will be analyzed and used by the company to provide an equitably and equally internet network service usage activity for employees, directors and staff of the company [2]. Monitoring Internet activity is one of the functions of management that are useful to analyze whether the Internet is still quite feasible to use or needs additional capacity. The results of monitoring can also be used to help the administrator who wants to redesign the existing internet network [2, 3].

In computer network, we can monitor the internet bandwidth usage and the load of local network traffic either through a router or computer interface [4]. Monitoring can be done with a standard Simple Network Monitoring Protocol (SNMP) [5]. With the help of networking tools, the upload or download status of network equipment can be routed easily with a simple routing method [6], as can be seen in Figure 1. Netscan is able to perform network scanning to determine the active device and its corresponding IP. Monitoring records can be a table, figure, curve or animation. Networx is used for monitoring internet traffic, upload and download speeds and bandwidth usage from time to time.

2. Traffic Model and Computer Network

2.1. Computer Network

Monitoring as well as network control can be done by using a router [7]. Routers can have prebuilt lookup tables that tell them which kind of operation to do based on the topmost label of the incoming packet so they can process the packet very quickly. In a swap operation the label is swapped with a new label, and the packet is forwarded along the path associated with the new label [8]. Performance Routing is monitoring delay on both links, but as they both comply with the policy, it does not enforce any routing changes and OSPF is responsible for routing now [9].

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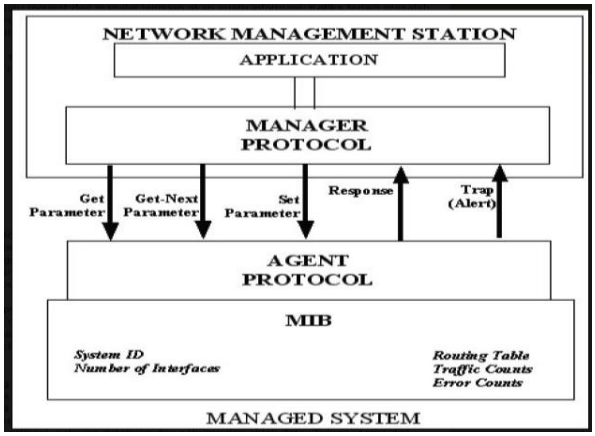

Figure 1. Network Management

Multi Protocol Label Switching (MPLS) was introduced to address the drawbacks of the conventional IP routing which forwards packets based on destination address only. To deal with the scalability of routing and also to meet the requirements of newly developed services, there is an increasing need for new routing functionality on routing protocols. By extending the IP routing fonctionality, traffic engineering can be carried out and thus proves the network performance. The most popular solutions to support QoS routing in the internet are Differentiated services (Diferv) and MPLS [10].

2.2. Network of Topology

IP address, in the simple terms, is an identification code on a computer network/internet which is a vital component in the Internet. Without an IP address, the internet will not be known [11]. Every computer connected to the Internet at least must have an IP address on each interface and must be unique as there should be no computer / server / network devices using same IP address on the Internet [4, 5, 11]. Traffic modelling in the network connecting into a cloud network could use one of the existing network traffic models either OSPF model [9], or QoS model [8, 10, 12]. Selection is based on the needs of the company or office. Both the OSPF and QoS models in the network cloud [3, 13], have a advantages and disadvantages [8-10], [12].

All areas must be connected to Area O with ABR. All the routers within same area have same topology table. ASBR is used to connect the one autonomous system to outer autonomous system. The goal of design is to localize the updates within area. ABR is called Area Border Router connects different areas with the backbone area. Area 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 [9]. A deeper visibility into data communication is needed, so that different applications inside the data channels passing information between the source and destination machines can be distinguished from each other. Once such a visibility is available, routing protocols can leverage this information and different classes of applications, depending on their usefulness, or priorities, can be treated differently in terms of Quality of Service leading to different routing paths for different classes of communicating applications [8].

2.3. Netscan

Netscan is a software to perform network scanning to determine the active device and its corresponding IP and can also monitor the local computer network (LAN). This software are so complete that, depending on the person, can be used to disturb even cripple or take over the network. Netscan features can be seen on Figure 2. For this reason, Netscan sometimes categorized as a hacking tool [14].

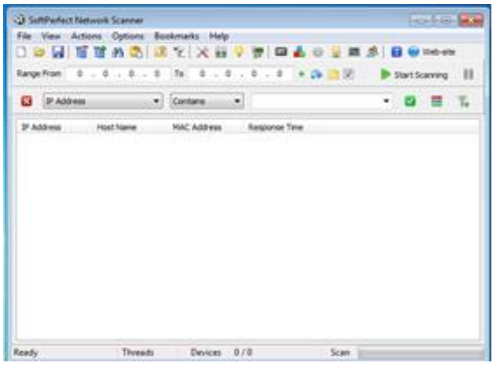

Figure 2. Netscan Application

2.4. Networx

Networx is used as a monitoring network traffic and internet activities. In addition, its can also be used to monitor upload and download speeds and serve to monitor the bandwidth usage from time to time. Its very useful to help evaluate bandwidth usage and measure the speed of the Internet or other network connections (Dial Up, Ethernet, ISDN, DSL and Wireless). Networx have a capability to make a statistic report for bandwidth usage based on daily, weekly, monthly and online. Its can export reports to various formats: HTML, MS Word and Excel to track and analyze. Networx features can be seen on Figure 3.

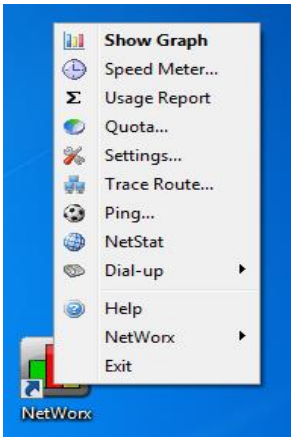

Figure 3. Networx Aplication

3. Results and Analysis

3.1. Network Scanning

In an office or enterprise, network monitoring is usually the task of the administrator or a NOC (Network Operation Centre). Monitoring the network will be a difficult and complicated task, if an administrator or a NOC (Network Operation Centre) do not know which ones work well and which ones do not work. Sudden or long downtime can disturb work productivity [15], as can be seen on Figure 4. Usually, when received a report from the user, NOC (Network Operation Centre) or the new administrator will monitor the network connection. As soon as user files a report that the connection is lost, the recommended first step is to scan the network. The results of scanning can be analyzed to determine which nodes that disturb the network and will be repaired as soon as possible [4], [6], [15].

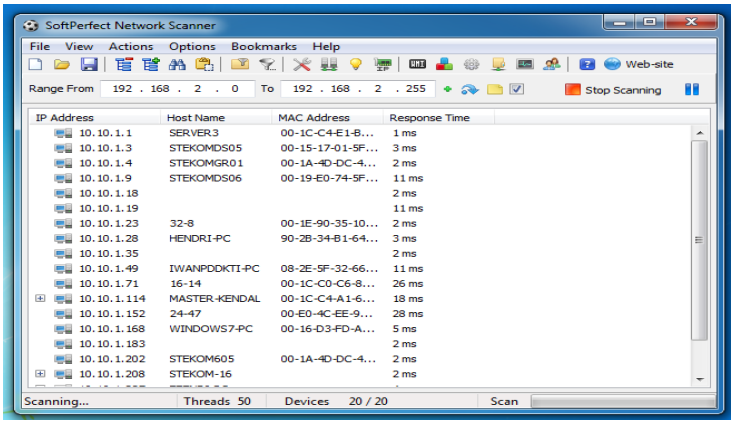

Figure 4. Network Scanning

3.2. Bandwidth Usage Analysis

Connections quality between two or more different `network is something that is essential to analyze bandwidth usage [4]. Monitoring the bandwidth usage for the purpose to anticipate overload capacity must be conducted. The reason is when the total resources has been used up, then all kinds of applications that run over the network will be unusable [1, 2], [6], [15]. This bandwidth usage monitoring can be done on a daily basis such as Figure 5, every week to determine the number of bandwidth that has been used for a whole week like Figure 6 or bandwidth usage report for a month as Figure 7.

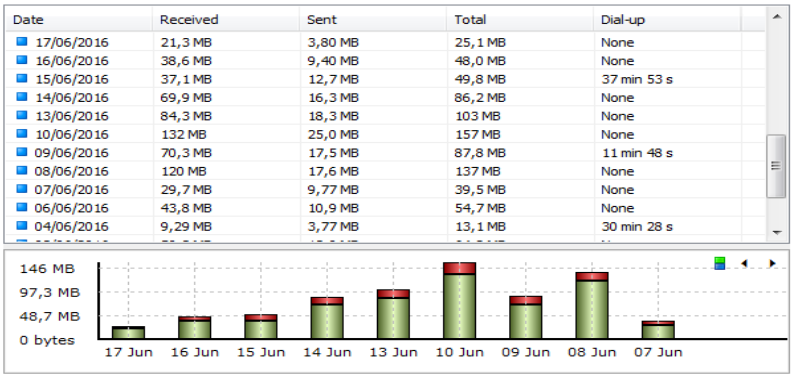

Figure 5. Daily Report

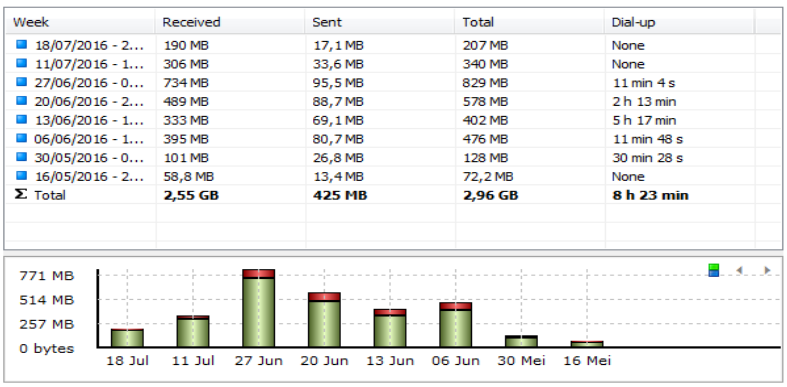

Figure 6. Weekly Report

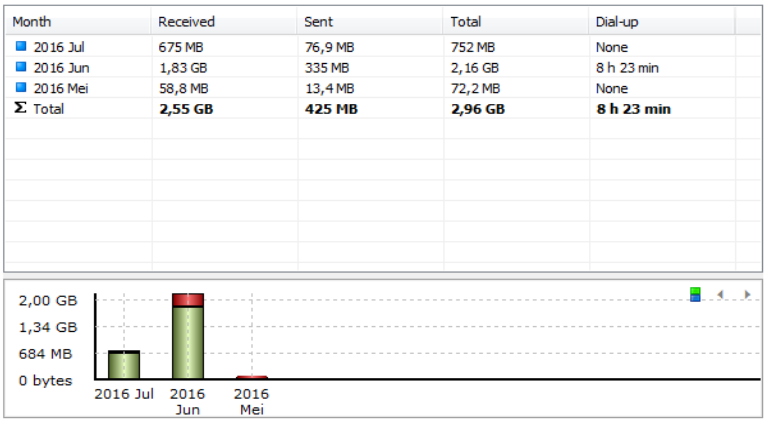

Figure 7. Monthly Report

From the bandwidth usage reports, we can make an initial formula for calculating monthly usage:

Upload Formula:

$$\sum_{up}^{n} = \sum_{up.1} + \sum_{up.2} + \sum_{up.3} + \cdots \sum_{up.n}$$

n = Number of days
up = Upload
$\sum_{up}^{n}$ = Total uploaded during n days
$\sum_{up.1}$ = Total upload for the first day
$\sum_{up.n}$ = Total upload for day n.

To calculate the download, use the formula:

$$\sum_{do}^{n} = \sum_{do.1} + \sum_{do.2} + \sum_{do.3} + \cdots \sum_{do.n}$$

n = Number of days
do = download
$\sum_{do}^{n}$ = Total downloaded during n days
$\sum_{do.1}$ = Total download for the first day
$\sum_{do.n}$ = Total download for day n.

3.3. Bandwidth Allocation

The user needs for better network access is increasing. It means the user want to have a network access that don't have a problem such as a slow data transmission or unstable connection. In an internet society, which is depends on the speed to get the information, it is unexcuseable to have a network that have a lot of problems [4], [15]. To share the bandwidth fairly and equitable, we must have the complete data about the total number of uploads and downloads performed by each local network for a certain period. This can be done by considering the following formula :

Upload Formula:

$$\overline{up} = \frac{\sum_{up}^{n.1} + \sum_{up}^{n.2} + \sum_{up}^{n.3} + \ldots + \sum_{up}^{n.m}}{m}$$

m = number of months
$\overline{up}$ = Average upload for m month
$\sum_{up}^{n.1}$ = Total upload for the first month
$\sum_{up}^{n.2}$ = Total uploads for the second month
$\sum_{up}^{n.3}$ = Total uploads for the third month
$\sum_{up}^{n.m}$ = Total uploads for n month

Download formula:

$$\overline{do} = \frac{\sum_{do}^{n.1} + \sum_{do}^{n.2} + \sum_{do}^{n.3} + \ldots + \sum_{do}^{n.m}}{m}$$

m = number of months
$\overline{do}$ = Average download for m month
$\sum_{do}^{n.1}$ = Total download for the first month
$\sum_{do}^{n.2}$ = Total download for the second month
$\sum_{do}^{n.3}$ = Total download for the third month
$\sum_{do}^{n.m}$ = Total download for n month

For the distribution of the amount of upload and download bandwidth for each local network, we can use the following formula:

Upload Formula:

$$H_{up} = \frac{\sum_{R.up}}{\overline{up}} \times \sum_{up} l.net$$

H_{up} = Upload results which will be shared
$\overline{up}$ = Average upload
$\sum_{R.up}$ = Total upload resource from the ISP
$\sum_{up} l.net$ = Total upload for local network

Download Formula:

$$H_{do} = \frac{\sum_{R.do}}{\overline{do}} \times \sum_{do} l.net$$

H_{do} = Download results which will be shared
$\overline{do}$ = Average download
$\sum_{R.do}$ = Total download resource from the ISP
$\sum_{do} l.net$ = Total download for a local network.

4. Conclusion

To increase the productivity, it is necessary to manage a computer network usage to avoid problems such as slow data delivery and an unstable connection. Simple Routing in the distribution of bandwidth whether for uploads, downloads or even both, can be done fairly and

equitably. An accurate calculation of the analysis of usage during a certain period can determine the total amount of bandwidth that should be given to any local area network.

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