Network Analyzer Development Comparison with Benchmark Products

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ABSTRACT

This paper presents complete network analyzer development for heterogeneous services in a campus environment. The purpose of this study is to define the accuracy of network analyzer development with independent data, real networks and OPNET simulation tools. The tests for network analyzer software are based on traffic and utilization performance. The reliability of this network analyzer will test with web service. The results show that this software is accurate with independent data, real networks and OPNET simulation tools. Finally, this software measures network resources during the preparation, proposal and planning phases.

Keywords: Accuracy, Network Analyzer, OPNET, Traffic, Web Service

INTRODUCTION

This study focuses on the accuracy of network analyzer development using heterogeneous services. This study does not intend to perform a comprehensive test the functionality of all simulator and analyzer features. OPNET has originally been developed for network simulation and it is fully usable as a robust and reliability simulation tool with higher investment (Brown, 2005), (Chang, 1999). This network analyzer development process has discussed detail in (Nazri Ismail & Zin, 2008). This network analyzer is mainly focus for planning and predicting network performance before implementing in real network environment. While, independent data (benchmark product) mainly focusing on the real network platform, therefore it gives some difficulty to network administrator to plan future growth of network activities if new services have been introduced.

Opnet application and independent data are used to proof that our network analyzer development is accurate and reliable for planning network performance. Figure 1 shows service performance requirement for several services. Service performance requirement consists of delay, capacity (bandwidth) and reliability (McCabe, 1998). Reliability is a measure of the network/system ability to provide deterministic and accurate delivery of information (Lyu, 2007; Konak, 2007).

DEFINITION OF NETWORK ANALYZER AND SIMULATION

A network analyzer also called a "packet analyzer," "traffic analyzer" and "protocol analyzer," (Clincy & Abu-Halaweh, 2005). Network analyzers functionality such as (Talledo, 2005): i) provide detailed statistics for current and recent activity on the network; ii) detect unusual levels of network traffic; iii) detect unusual packet characteristics; iv) identify packet sources or destinations; v) configure alarms for defined threats; vi) and vii) monitor bandwidth utilization.

Network Management: Network management consists of a variety of tasks, for example, monitoring, configuration, troubleshooting and planning that are performed by users and network administrators (Gutiérrez, 1998). Network element is a component of the network that can be managed. This includes hosts, routers, switches, hubs and server that can be measured. Examples of end-to-end characteristics for network elements and network traffic are capacity (bandwidth), availability, delay, jitter, throughput, network utilization and error rates (Kamoun, 2005; Sethi, 1989).

NETWORK ANALYZER DEVELOPMENT METHODOLOGY

Figure 2 shows network life cycle approach for technologies and services implementation in the future (Cisco Networks, 2007). Network life cycle approach consists of six phases such as prepare, plan, design, implement, operate and optimize. This network analyzer development concentrates more on preparation, planning and proposal areas.

Network analyzer development is based on mathematical model. We use queuing theory M/M/1 to build this software (Oracle Enterprise, 2009). This software was developed to measure and plan network activities such as predict usage of network traffic and network utilization (refer to Figure 3).

Figure 4 shows network analyzer reliability test. The independent data output is generated

Figure 1. Service performance requirements

Low= L   High=H

Types of Services	Content				Sensitive			
	Teks	Audio	Video	Image	Delay	Jitter	Bandwidth	Reliable
Email	✓	✓	✓	X	L	L	L	H
LMS	✓	✓	✓	X	H	H	H	L
Video Conferencing	✓	✓	✓	✓	H	H	H	L
Online Discussion	✓	✓	X	X	L	L	L	H
Virtual Labs	✓	✓	✓	✓	H	H	H	L
WAP	✓	X	X	X	L	L	L	H
VoIP (IP Telefoni)	X	✓	X	X	H	H	L	L
Virtual Classroom	✓	✓	✓	✓	L	H	H	L

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