# ANALYSIS OF EMBEDDED ROUTER UNIVERSAL PLUG AND PLAY (UPnP) MEDIA SERVER PERFORMANCE OVER WIRELESS

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**DECLARATION**

I hereby declare this project report entitled
ANALYSIS OF EMBEDDED ROUTER UNIVERSAL
PLUG AND PLAY (UPnP) MEDIA SERVER
PERFORMANCE OVER WIRELESS

is written by me and is my own effort and that no part has been plagiarized without citations.

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# ABSTRACT

The UPnP is a set protocol of networking that can permit the network devices such as printers, internet gateways, personal computers, mobile devices and Wi-Fi access points to discover each other's about the network and establish the functional network service for communication and sharing the data and for entertainment. The UPnP is primarily intended sharing the network without enterprise the class of device. UPnP is an open standard that to simplify networking task allows the other compatible hardware device and software to sharing data by using local area network (LAN) to sharing and access media files. The UPnP technology is promoted by the UPnP Forum that is a one of computer industry that initiative to enable the simple and setup connectivity to stand alone device and much different traffic.

## ABSTRAK

UPnP adalah set protokol rangkaian yang boleh membenarkan peranti rangkaian seperti pencetak, gerbang internet, komputer peribadi, peranti mudah alih dan titik capaian Wi-Fi digunakan untuk mencari peranti rangkaian antara satu sama lain dan mewujudkan perkhidmatan rangkaian berfungsi untuk komunikasi dan perkongsian data dan hiburan. UPnP digunakan bertujuan untuk berkongsi rangkaian tanpa perusahaan kelas peranti. UPnP adalah standard terbuka yang digunakan untuk memudahkan tugas rangkaian yang membolehkan peranti perkakasan yang serasi dan perisian untuk berkongsi data dengan menggunakan rangkaian kawasan tempatan (LAN) untuk berkongsi dan akses fail media. Teknologi UPnP digalakkan oleh Forum UPnP yang merupakan salah satu industri komputer yang inisiatif untuk membolehkan sambungan yang mudah dan persediaan untuk kemudahan sendiri peranti dan lalu lintas yang jauh berbeza.

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## DEDICATION

This work is dedicated to my beloved family and siblings, who passed on a love of reading and respect for education. This work also dedicated to my parent, who taught me that the best kind of knowledge to have is that which is learn for its own sake.

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## ABBREVIATION

| | |
|---|---|
| UPNP | – Universal Plug and Play |
| LAN | - Local Area Network |
| GUI | - Graphic User Interface |
| QOS | – Quality of Service |
| RFID | - Radio Frequency Identification |
| WLAN | – Wireless Local Area Network |
| TCP/IP | – Transmission Control Protocol / Internet Protocol |
| HTTP | – Hypertext Transfer Protocol |
| IP | – Internet Protocol |
| API | – Application Programming Interface |
| DHCP | – Dynamic Host Configuration Protocol |
| IEEE | – Institute of Electrical and Electronic |
| CSMA/CA | – Carrier Sense Multiple Access With Collision Avoidance |
| VTC | – Video Teleconference |
| ADSL | –Asymmeric Digital Subsciber Line |
| NAS | – Network Attached Storage |
| PC | – Personal Computer |
| DVR | – Digital Video Recorder |
| TMC | – Transco ding Media Cache |
| CPU | – Central Processing Unit |
| RAM | – Random Access Memory |
| EPM | – Enterprise Project Management |

PDS – Parallel and Distributed System

IT – Information Technology

IOS – Internetwork Operating System

CLI - Command Line Interface

DSL - Digital Subscriber Line

USB – Universal Serial Bus

CD – Compact Disc

DVD – Digital Video Disc

OS – Operating System

HD – High Definition

LED – Light Emitting Diode

AC – Alternating Current

HDMI – High Definition Multimedia Interface

IM – Instant Message

# CHAPTER 1

# INTRODUCTION

## 1.1 Project Background

Now days, technology grows very fast in the field of network communication. One of them is Universal Plug and Play (UPnP). The UPnP is a set protocol of networking that can permit the network devices such as printers, internet gateways, personal computers, mobile devices and Wi-Fi access points to discover each other's about the network and establish the functional network service for communication and sharing the data and for entertainment[1]. The UPnP is primarily intended sharing the network without enterprise the class of device.

. Media server is defined as a device that simply store and shares media, it can allow several different device to be called as media server. It is setup at home or office as a host and can access this device from a central location. UPnP is an open standard that to simplify networking task allows the other compatible hardware device and software to sharing data by using local area network (LAN) to sharing and access media files. The UPnP technology is promoted by the UPnP Forum that is a one of computer industry that initiative to enable the simple and setup connectivity to stand alone device and much different traffic [8].

Furthermore, UPnP media server provides a service client device that is called control point, the function of the control point is to browsing the media server content. The user must to contact with their server for request the content media server to deliver a file to the control point for play the video. UPnP media server is available for many operating system and many supported device and hardware platforms. UPnP is not configuration requirement to access the media server content. UPnP media servers can either be categorized as software based or hardware based. Software based can be run on the personal computer and hardware based can be run on any supported devices or any specific hardware to delivery media content.

UPnP uses a concept of an extension of plug and play technology for attaching device directly to a computer and can be sharing with other user with one access of media server content. UPnP devices are connected to a network and they automatically establish configuration working with other hardware devices.

These project focuses on comparisme embedded router UPnP media server performance with high traffic and low traffic by capture the packet loss using wireshark or clearsight as equipment and development tools. This project is used Cisco IOS Firmware version v1.0.04as an operating system of embedded router for this project. This project will analyze performance of embedded router UPnP media server with Quality of Service (QOS) control test and traffic test in various kind of access. From this project we can determine the best method to deliver UPnP media server.

The expected output or result of this research is the best delivery methods for embedded media server via result from packect loss in each enviroment tested. From this research, the best performance embedded router UpnP media server through the scripting from the result can be determine.

## 1.2 Problem Statement

The previous research of UPnP is only on RFID and on the robotic machine.Up until now, there is no research or analysis of UPnP over wireless. It is important to investigate the performance UPnP when using over wirelessbecause from this research we can determine which method is the best to deliver UPnP media server over wireless. UPnP now has advantages and also disadvantages.

One of disadvantages is UPnP might causes of heavy network especialy when the system reboot. Each of device will connecting each other and the number of messages being trasmitted could be large and will slow down the network. To identify the problems,we analyze the current UpnP network performance.

Another disadvantages of UPnP is the lack of the security if the UPnP has been set in the home network without any expert device. The sharing content without permission will cause leak of information on the network. Third party security may required to prevent the network.

- This research will evaluate and analyze embedded router UPnP media server network performance with high traffic and compare with low traffic in wireless network.
- Furthermore, embedded router UPnP media server will analyze the problem performance with Quality of Service (QOS) or without performance.
- Finally analyze the performance in various kind of access embedded router UPnP media server. These entire problems will analyze by using wireshark or clearsight as tools evaluating performance.

## 1.3 Objective

There are several objectives that will achieve throughout this project.

- The objective of this research is about to compare embedded router UPnP media server performance with high traffic and low traffic. To definied the best method to deliver the UPnP media server.
- The objective of this project is to analyze UPnP media server performance with quality of service control or without performance. Thus, when all the analyze and comprise result show, this research will able to suggest which is the best way to deliver embedded router UPnP media server.

## 1.4 Scope

This research using is Wireshark as network monitoring tools to capture and analyze the data. Thus, in this project, scopes are being clarified as follows:

1. This research focuses on network performance of embedded router UPnP media server with high traffic and low traffic in wireless network.
2. Measurement of embedded router UPnP performance will be analyzed by quality of service control or without performance.After measurement, the data will be collected to identify the embedded router UPnP performance.
3. Testing the embedded router UPnP media server performance with in various kind of access.

## 1.5 Project Significant

Since Wireshark is the best measurement tools in measuring data performance, the result of this research will provide a validate performance. This research is predicted to be good reference to users who want to be use an embedded router UPnP as a media server application in wireless Local Area Network. Since , research on the UPnP over wireless communication has not be done before,it can be good reference to researcher in the same field.

## 1.6 Expected Output

The main purpose of this project is to study, understand and analyze embedded router UPnP over Wireless Local Area Network (WLAN). In this research, we need to collect data from packet loss and delay by using wireshark. From the data, we will analyze packet loss and delay to make a conclusion.

The collection of data will produce a result about the best peformance embedded UPnP media server available today's between high traffic and low traffic through the scripting from the result. By this research, we will able to get the best delivery way for embedded router UPNP media server via result from packet loss and delay in each enviroment tested.

## 1.7 Report Organization

In order to ensure the progress of the project going in a smooth manner, the report of the project should be organized accordingly to its respective chapter order. The description and summarization of each chapter are been depicted as show below:

The first chapter is Introduction. This chapter will be discussing about introduction, project background, research problems, research objectives, scopes, project significant and report organization.

In the next on chapter two is Literature Review. In this chapter, related work or previous work of this project, analysis of current problem or justification and proposed solution for further project.

On chapter Three is Analysis. In this chapter, hardware and software requirements will be introduced together with the environment setup, architecture network design, experimental design and simulation design.

The next chapter four is Design and Implementation. This chapter will discuss about the design that had been used in this project in order to choose the best selection for suitable static threshold and feature. Also hardware and software requirement will be introduced together with the enviroment setup.

On the chapter five is Testing. This chapter will be explaining the steps and methods in testing and analyzing the collected data and also the comparative analysis of the result will be elaborated.

And the last on chapter six is Conclusion. In this last chapter of this project, an overall picture of limitations, contributions and future works will be summarized.

## 1.8 Conclusion

Now days, in the hardware tools there is more and lot of advanced technology in the market, there are many types of router but with the embedded router UPnP is most useful to users, it can be sharing with other by using wireless in local area network. Regarding by this purpose depends on user needs UPnP is more available to be media server for sharing the data. The best embedded router UPnP media server performances should be collected and should produce best performance that can give the user more satisfied using this UPnP media server. So for the next activities, literature review, design and implement and testing analysis project will take place in order to complete this research.

# CHAPTER 2

# LITERATURE REVIEW

## 2.1 Introduction

In this chapter we will discuss more about literature review. Literature review is based on the previous studies related to the topic of the project. To continue a report for project “Analysis of embedded router Universal Plug and Play (UPnP) media server performance over wireless” literature review is important in orders to gaining information and analyzes information to complete a full thesis topic. But for this research, we gain information from journals from Google scholar. The topics that will be studied for this project are embedded router UPnP media server performance over wireless. For this project the research is more based on journal and Google scholar also from the forum to collect the data research.