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Design And Implementation of Hotspot Wireless Roaming in Bina Darma University Palembang

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Abstract

Hotspot is a wireless system that is easy and flexible , and has a high reliability and mobility . At the University of Bina Darma hotspots can be used for the academic community as well as help the learning process . But the system is not using the UBD hotspot roaming wireless system , so that the session connection is lost while migrating client IP -induced changes , in addition to the current AP served as a DHCP server to the client IP memberika . This study aims at designing a roaming wireless hotspot network UBD so wide signal range while migrating client . In this research, an analysis of the signal , and QoS , the old hotspot network , and this study also resulted in the design of the system topology wireless hotspot roaming , after simulating the prototype , as well as the implementation of the roaming wireless hotspot system which produces comparison QoS in the system hotspot long with roaming wireless hotspot system.

Keywords : *Hotspot, Wireless Roaming, EUCS*

1 INTRODUCTION

Everyone has different definitions depending on the design , but the point has the same intent and purpose , a number of definitions of course very useful in looking at the definition of design in general. Is a network design that are interconnected to determine how a system complete what is to be resolved . [1]

Problems that occur at UBD current hotspot is where the session connection is lost due to changes in current IP client moves from access point (AP) to the access point (AP) to another . In addition to the current function of each AP as a DHCP server that assigns IP to the client . This leads to the mobility and reliability of the hotspot network is reduced . To overcome this , it must be applied to systems that utilize wireless hotspot roaming to extend the range of the signal when the client relocates , then the wireless client roaming relocates will still get the original IP , and can integrate all the APs into one unified wireless network .

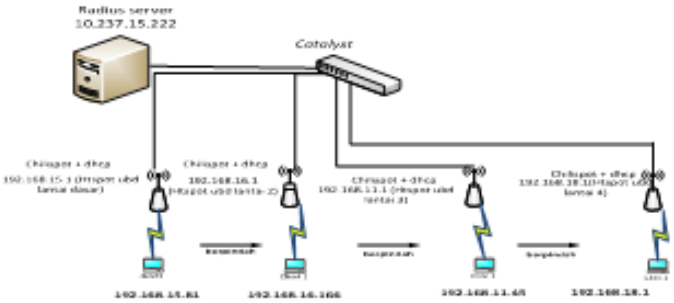


Figure 1: Old Topologi

A WLAN consists of access points that communicate using radio frequency (RF) and wireless clients . The area is a single access point to cover is often called a wireless cell . Designing a WLAN topology requires the designer to determine the coverage area of each wireless cell and decide how many cells will be required to meet the total requirement coverage. Factors affecting the range of a single access point , such as data rate, power levels , antenna selection , and antenna positioning . Architectural characteristics of wireless site also affect coverage. [2] .

Several parameters can be used as a general reference to see the performance of the IP network is , Package Loss , Delay , and Availibilitas . [3]

2 RESEARCH METHODOLOGY

2.1 Materials and Equipment

The research material used in conducting this research are:

1. network Topology
2. hotspot network
3. hotspot AP
4. radius Server
5. Configuring the AP

Tools used in this study are as follows:

1. inSSIDer :

   Used to measure the signal Access Point on each floor on the main campus building Bina Darma University Palembang.

2. Ddwrt :

   Used to reconfigure the wireless roaming.

3. Ipperf :

   Used to measure QOS

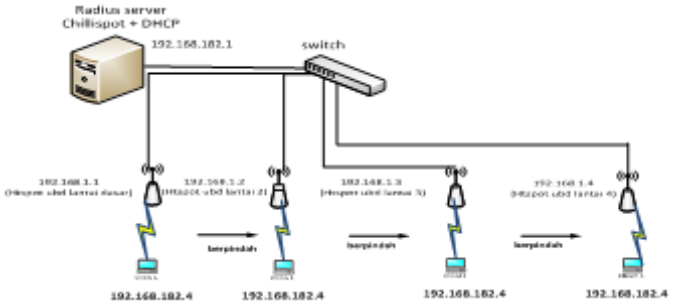


Figure 2: New topology

2.2 Research Methods

research method is a scientific way to collect data with the specific purpose and common use. Therefore, in this study the authors conducted research with several stages that exist in the methodology NDLC associated with roaming wireless hotspot network Bina Darma University. [4]

3 RESULT AND DISCUSSION

3.1 Overview of Research

Universitas Bina Darma current network systems have not implemented a roaming wireless network so that client mobility to move around the place was not effective, other than that each access point has SSID (Service Set Identifier) and DHCP (Dynamic Host Control Protocol) Different this cause labor mobility and reliability hotspot network is reduced. At which time the client relocates keclient must re-connect with acess point where the client is located.

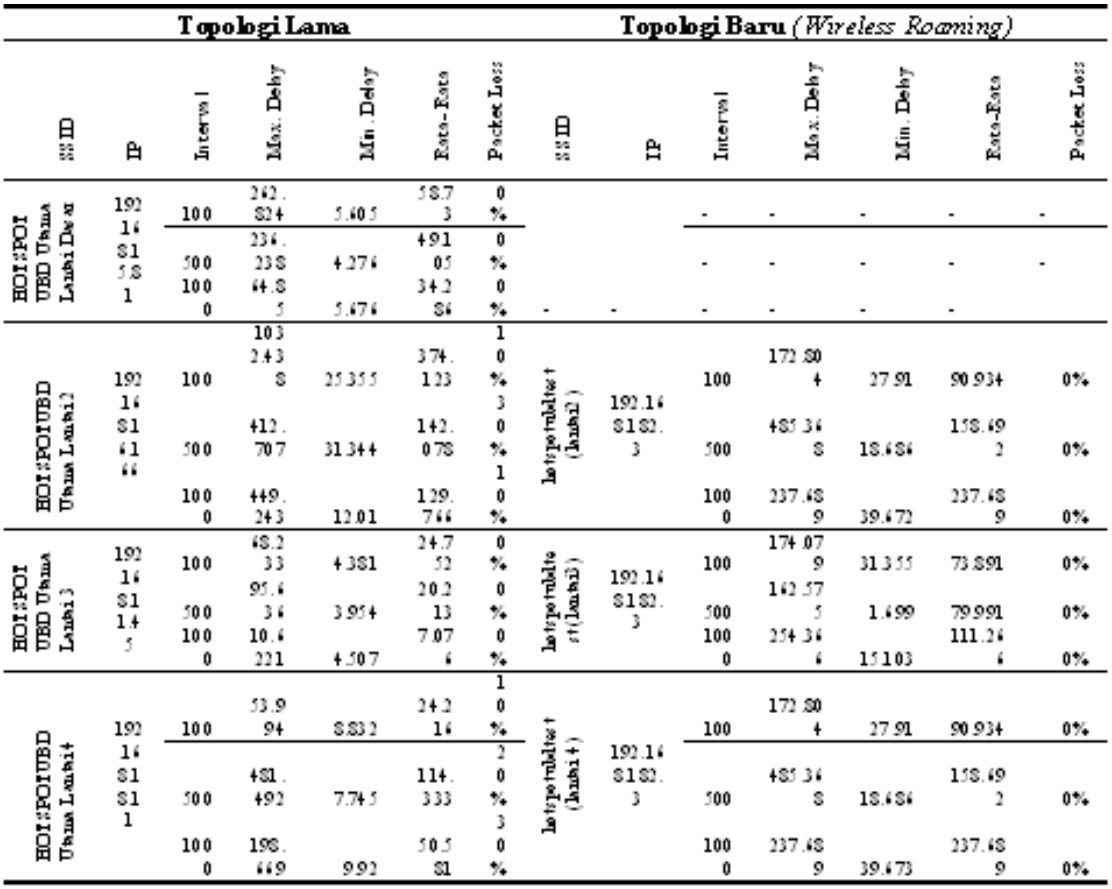
Universitas Bina Darma hotspot topologies can currently be seen in figure 1 hotspot network topology Universitas Bina Darma show in Figure 1.

3.2 Result

Referring to the methodology used is composed of stages NDLC Analysis, Design, Simulation Prototype, Implementation. The results of this study are as follows:

3.2.1 Analysis

At this stage of the analysis to the problems existing in the old UBD hotspot network. The problem that arises in the old hotspot network is no integration between the acess point for each SSID and acess point has a different IP range Peggunaan hotspots so that when the client move less effective, but it also led to labor mobility and reliability of the network UBD hotspots is reduced.



Topologi Lama							Topologi Baru *(Wireless Roaming)*						
SSID	IP	Interval	Max. Delay	Min. Delay	Rata-Rata	Packet Loss	SSID	IP	Interval	Max. Delay	Min. Delay	Rata-Rata	Packet Loss
HOTSPOT UBD Utama Lambi Dua	192 16 S1 58 1	100	242. 824	5.405	58.7 3	0 %			-	-	-	-	-
		500	234. 238	4.276	491 05	0 %			-	-	-	-	-
		100 0	44.8 5	5.476	34.2 84	0 %	-	-	-	-	-	-	
HOTSPOTUBD Utama Lambi2	192 16 S1 61 44	100	103 243 8	25.355	374. 123	1 0 %	hotspotubdtest (lambi2)	192.16 S182. 3	100	172.80 4	27.91	90.934	0%
		500	412. 707	31.344	142. 078	3 0 %			500	485.36 8	18.484	158.69 2	0%
		100 0	449. 243	12.01	129. 744	1 0 %			100 0	237.48 9	39.472	237.48 9	0%
HOTSPOT UBD Utama Lambi3	192 16 S1 14 5	100	48.2 33	4.381	24.7 52	0 %	hotspotubdtest(lambi3)	192.16 S182. 3	100	174.07 9	31.355	73.891	0%
		500	95.4 36	3.954	20.2 13	0 %			500	142.57 5	1.499	79.991	0%
		100 0	10.4 221	4.507	7.07 4	0 %			100 0	254.36 4	15.103	111.24 4	0%
HOTSPOTUBD Utama Lambi4	192 16 S1 S1 1	100	53.9 94	8.832	24.2 14	1 0 %	hotspotubdtest (lambi4)	192.16 S182. 3	100	172.80 4	27.91	90.934	0%
		500	481. 492	7.745	114. 333	2 0 %			500	485.36 8	18.484	158.69 2	0%
		100 0	198. 669	9.92	50.5 81	3 0 %			100 0	237.48 9	39.473	237.48 9	0%

Figure 3: Comparison of Measurement Delay

3.2.2 Design

At this stage interconnection network topology design to be built, the topology can be expected to meet the needs of wireless roaming. The network topology is built can be seen in Figure 2. The new topology image hotspots.

3.2.3 Simulation Prototyping

From the results of the design topology is designed to simulate , to determine whether the design can be run in accordance with the expected associated with the wireless roaming . Simulations done by:

1. Laying Radius Server and Switch on the 4th floor .
2. 4 pieces Configure AP with the SSID " hotspotubdtest " to be generated from the DHCP server Chillispot
3. The AP is placed on the 4th floor which is connected to a switch that was the 4th floor.

4. The AP is placed on the 3rd floor which is connected to a switch that is located on the 4th floor.

5. The AP is placed on the 2nd floor which is connected to a switch that is located on the 4th floor.

6. The AP is placed on the ground floor connected to a switch that is located on the 4th floor.

3.3 Discussion

3.3.1 Simulation Prototaype

At the time of the simulation is done client originally connected with the AP located on the 4th floor with a hotspot SSID " hotspotubdtest " and the IP 192.168.182.4 , then the client move from the 4th floor to the 3rd floor turns out the client is still connected to the hotspot SSID " hotspotubdtest " and IP 192.168.182.4 then the client move again from the 3rd floor to the 2nd floor turns out the client is still connected to the hotspot SSID " hotspotubdtest " and the IP 192.168.182.4 , which means the client can move without having to reconnect and get the same IP , this proves that the successful simulation of a prototype wireless roaming .

With wireless roaming scenario made it will avoid the constraints due to the breaking of client connections on the move.

3.3.2 Delay

The results of the comparison measurement delay when the topology of the old with the new topology can be seen in Figure 3 delay measurement comparison table.

From the above table it can be seen that the average delay on the new topology (wireless roaming) on each floor is greater than the average delay on the old topology. This shows that the quality of the delay on the new topology is worse than the old topology.

3.3.3 Jitter

The results of the comparison at the time jitter measurement topology old with the new topology can be seen in Figure 4 jitter measurement comparison table.

From the comparison table above it can be seen that the jitter measurement results on the new topology is smaller than the jitter at the old topology, this shows that the jitter for the new topology is better than the jitter measurement results on the old topology.

3.3.4 Packet Loss

The results of measurements of packet loss ratio when the topology of the old with the new topology can be seen in Figure 5 comparative table of packet loss measurements.

From the above table can be seen that the results of measurements of packet loss on the new topology is smaller than the measurement results on the old topology, halini show that packet loss in the new topology is better than the old topology.

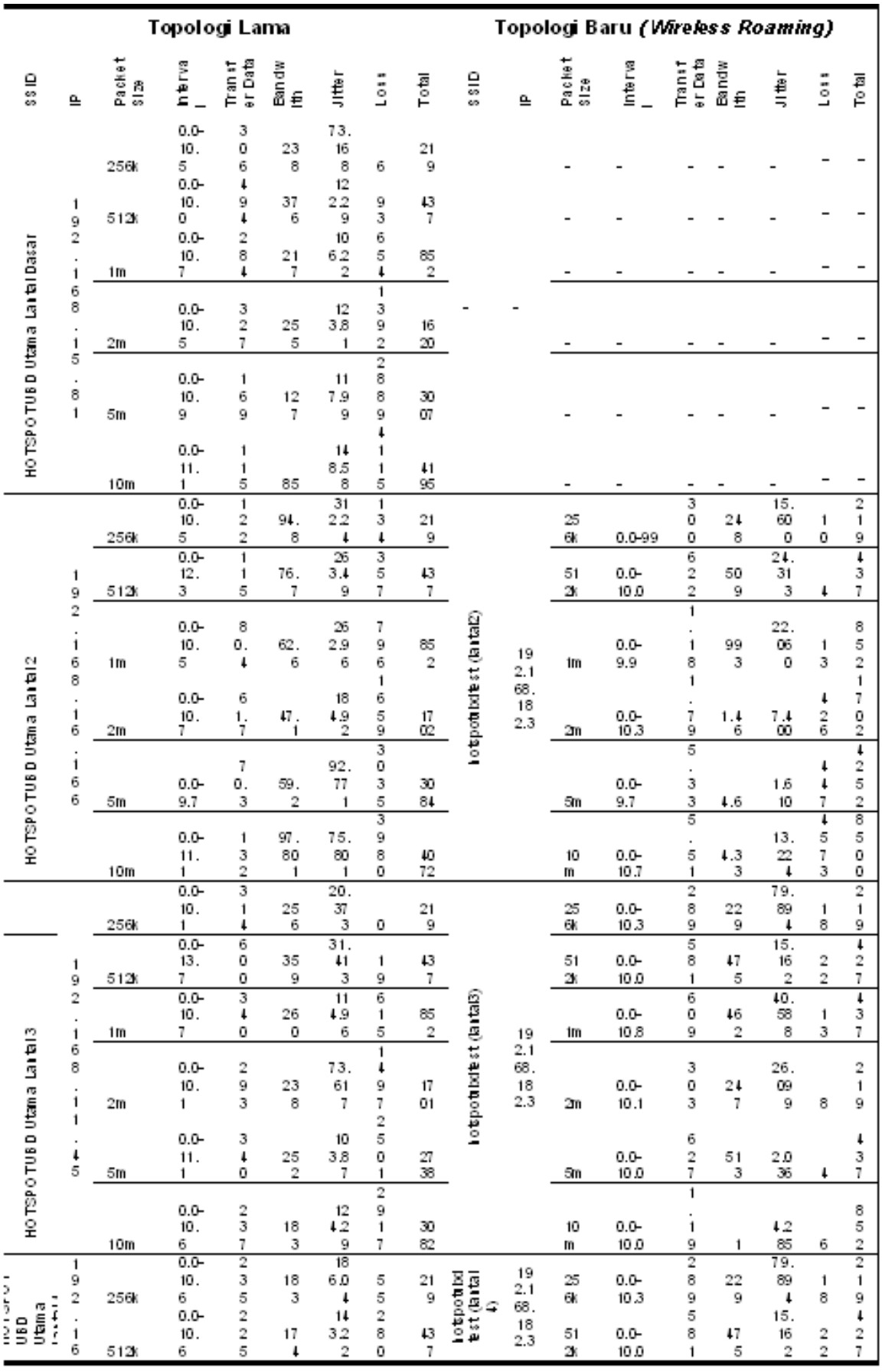


Figure 4: Comparison of Jitter Measurement

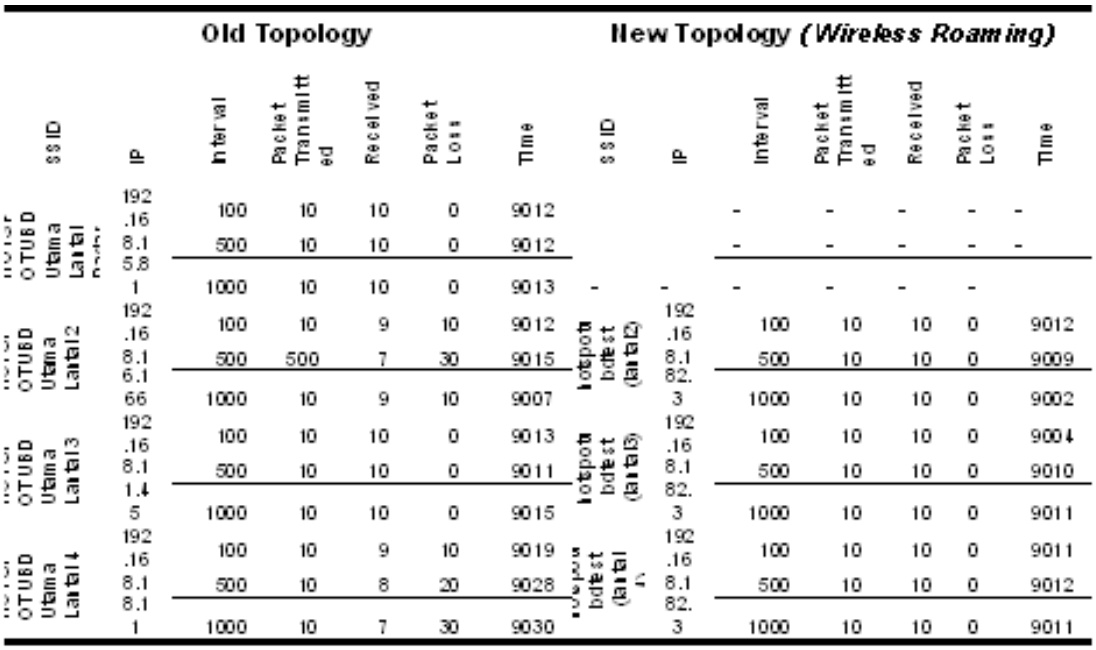


Figure 5: Comparison of Packet Loss Measurement

4 CONCLUSION

From the research carried out starting from the stage of analysis, design, simulation prototype, and implementation can be summarized as follows:

1. In terms of stability for the new topology (wireless roaming) is quite stable seen from the simulation results that the client can move and get the same IP without re authentication.

2. From the QoS for new topology (wireless roaming) less favorable than the old topology, which causes the measurement results are worse QoS specification hotspot itself. We conducted simulations on the study server has three (3) functions: as a radius server, DHCP, and capite portal.

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