

## ABSTRACT

Technological developments in the communications field is very rapidly as evidenced by the number of devices and applications in the field of communication. Today, IP-based communications to be one alternative customers to communicate, because the price is relatively cheaper. Voice over Internet Protocol (VoIP), video conferencing, and instant messaging are some of the forms of communication available today. To be able to compete, of course provider must has the good pricing or billing system and reliable.

In this thesis, the author designed the billing systems for IP-based communications above then determining rates. In addition to designing billing, will also be in 3 pieces for client types, classes A, B, and C, which are distinguished in terms of bandwidth they can get. The authors use the Elastix Asterisk servers are integrated with 3FBilling (A2Billing development) as a server for billing and bandwidth management using Mikrotik Routerboard. Tariff scheme adapted to the type of client. In addition to determining the rates, the authors also consider the QoS of the system are made.

From testing and analysis have obtained that the billing system has realized high levels of accuracy with the percentage of difference around 5.3463% and for the VoIP service, calls between subscribers of the calls between residential and hotspot customers have maximum inter-arrival delay amounted to 21.51ms and 289.09 ms. For maximum throughput 0079 Mbps and 0006 Mbps. Video Conference generate maximum inter-arrival delay of 23.09ms (voice) 169.29ms (video) and 22, 23ms (voice) 196.22ms (video). For the throughput 0.103 Mbps and 0.085 Mbps. Similar results were generated on the IM service where RTT and throughput generate maximum value respectively 25.53 ms and 87.22 , and 9092 Mbps and 0.0508 Mbps, it is caused by the amount of traffic load is 2 Mbps.

Keywords: VoIP, Video Conference, Instant Messaging, 3FBilling, bandwidth management