



BULETIN POS DAN TELEKOMUNIKASI

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BULETIN POS DAN TELEKOMUNIKASI

Volume 18, Issue 1, June 2020

FOREWORD FROM EDITOR-IN-CHIEF

Buletin Pos dan Telekomunikasi is a nationally accredited journal and indexed by several local as well as international indexers. Starting in this issue we only publish papers in English. For the time being, we provide assistance for authors to translate their manuscripts into English. However, We will gradually change our submission policy by requiring authors to submit manuscripts in English.

The authors in this issue come from several universities and one research center in Indonesia, i.e., Telkom University, Institut Teknologi Telkom Purwokerto, Bandung Institute of Technology, Indonesian University, The Agency for Assessment and Application of Technology, dan Politeknik Negeri Banyuwangi.

This issue consists of five papers. The first paper presents the planning of microwave telecommunication networks over ocean topography. This paper proposes a space diversity technique to overcome fading. The results confirm that the technique successfully increase the fading margin as well as the availability of the network. The second paper attempts to tests the performance of an underwater transmission system that uses Frequency Shift Keying (FSK) modulation on a bit rate of 2400 bps. Meanwhile, the third investigates the impact of information and communication technology (ICT) on non-farm enterprise (NFE) performance in the rural area. The authors use the internet and mobile phone as the proxies of ICT and utilize the data from the fifth Indonesian Family Life Survey (IFLS 5). The authors confirm the existence of a positive relationship between ICT and NFE performance. The next paper compares the performance of Voice over Internet Protocol (VoIP) over various network topologies, i.e., bus, star, and ring. The researchers found that star topology offers the best results among the three. The last paper addresses the challenges posed in extending medical services to deploy telemedicine system by occupying ICT Information and Communication Technology (ICT) to overcome distance and time constraints.

In this opportunity, we also would like to acknowledge our immense gratitude to our Editorial Board members, reviewers, and authors.

We hope this publication would contribute to the enhancement of science and technology as well as support in addressing ICT policy issues.

Jakarta, June 2020

Editor-in-Chief



COLLECTION OF ABSTRACT

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Analysis of Microwave Communication Network Planning on Ocean Topography Using Space Diversity

Arizky Ayu Faradila Purnama, Muhammad Imam Nashiruddin

Abstract— One of the challenges often met by planners of the telecommunications network using microwave radio is surface conditions, especially when passing through the ocean. Propagation conditions above sea surface often result in increasing fading, which significantly affects the reliability of the microwave network. On the other hand, considering that Indonesia is an archipelago, ocean topography is unavoidable, and the use of microwave networks generally considered to be the most efficient among other technologies, especially in Eastern Indonesia. This research aims to respond to such a challenge by planning a microwave communication network using a space diversity technique. The type of microwave network used is a point to point, which links Bali and Lombok islands. The results showed that the use of space diversity techniques could increase fading margins from 34.42 dB to 35.15 dB and availability value from 99.99667% to 99.99873%. Therefore, this technique recommends implementing by telecommunications network providers in accelerating the deployment of connecting networks in areas that have ocean topography.

Keywords-- Fading, Microwave, LOS, Space Diversity

Underwater Data Transmission Using Frequency Shift Keying (FSK) Modulation with Bit Rate of 2400 bps

Slamet Indriyanto, Anggun Fitriani Isnawati, Jans Hendry, Ian Yosef Matheus Edward

Abstract— Underwater acoustic communication is a technology that uses sound or acoustic waves and water as its propagation medium. This technology has been used in various fields, such as underwater wireless sensor networks, underwater monitoring system, and surveillance systems. An acoustic modem is required to facilitate communication between nodes. In this paper, an underwater acoustic modem using Frequency Shift Keying (FSK) modulation has been designed. This modulation is widely used because of its reliability and simple design. FSK modem was designed using M=2 level or known as Binary FSK (BFSK) with 40 kHz mark frequency and 43 kHz space frequency. This study tested data packets sending and its error rate against the distance variation. Testing for 70-bit data resulted in 1% error at 100 cm distance and 37% error at 170 cm distance. When compared with the previous testing at 1200 bps which resulted in 0% and 35% error, it can be seen that error at 1200 bps is better than at 2400 bps, but the data transmission was better at

2400 bps. Addition to the number of bits sent and distance has an influence on the error value, i.e. the greater the distance and the amount of data sent, the greater the error value.

Keywords-- Underwater Communication, FSK Modem, Binary FSK

The Role of Mobile Phone and Internet Use in the Performance of Rural Non-Farm Enterprises: An Analysis of Indonesian Rural Households

Binarlyn Indri Rahayu, Riyanto

Abstract— Rural non-farm enterprises have an increasingly important role in economic development in developing countries. The performance of rural non-farm enterprises is expected to continue to improve in line with the use of telecommunications technology in their business. Such improvement resulted from the use of communication technologies such as mobile phones and internet that are able to reduce information search and expand market information. This study analyzes the role of mobile phone and internet use in the performance of rural non-farm enterprises. By using household-level data from the Fifth Wave of the Indonesian family life survey (IFLS 5) in 2014 and applying the propensity score matching method, the study found that the use of mobile phones and the internet has a positive impact on the performance of rural non-farm household enterprises. It shows that the telecommunications infrastructure development policy in rural areas is able to provide economic improvement for rural households.

Keywords-- Internet, Mobile phones, Rural non-farm enterprise

System Integration for Medical Data Dissemination and Multimedia Communication in the Implementation of Tele-ECG and Teleconsultation

Anak Agung Ngurah Ananda Kusuma, Tahar Agastani, Christian Wisnu Purnaadi, Triawan Nugroho

Abstract— One of the options to extend medical services coverage is deploying a telemedicine system, where medical personnel make use of ICT (Information and Communication Technology) to overcome distance and time constraints. The implementation of telemedicine systems in Indonesia faces challenges posed by the lack of ICT infrastructure availability, such as communication networks, data centres, and other computing resources. To deal with these challenges, a telemedicine innovation needs to produce a modular

and flexible system that is adaptive to medical services needed and the available ICT infrastructure. This paper presents research and development of a telemedicine system prototype for tele-electrocardiography (tele-ECG) and teleconsultation. The contributions offered are integrating system from various open-source modules and the system operational feasibility based on its function and performance. The research is conducted on a testbed which represents various components involved in the telemedicine system operation. Experiments are carried out to assess the system functionality and observe whether tele-ECG and teleconsultation reach their expected performance. Experiment results show that the system works properly and recommend several multimedia communication modes to achieve the target quality based on the available network bandwidth.

Keywords— ECG data format, Telemedicine cart/workstation, TCP-Starvation / UDP-Dominance, Performance Test, Open-source

Comparison of Voice over Internet Protocol (VoIP) Performances in Various Network Topologies

Junaedi Adi Prasetyo, I Wayan Suardinata

Abstract— VoIP is a digital communication technology that is currently developing because VoIP can be implemented on several network topologies, such as bus, star, and ring. Each of these topologies has advantages and disadvantages. So, a study is required to find out in which topology can VoIP be implemented optimally. In this research, VoIP is implemented in several topologies and furthermore the performance measurements are carried out for each topology. VQ manager is installed in order to measure the VoIP performance. For the server, we used Elastix and for the node implementation network topologies, we use several access points. From the results of the research, the performance of VoIP implemented in the star topology produces QoS that is better than other topologies with a delay value of 185 ms, 18 ms jitter, and 1% packet loss. This happens because in the star topology, all packets are distributed centrally. It is expected that the results of this research can be used as a reference in the application of VoIP technology in several types of topologies.

Keywords—VoIP, Topologies, Networks, Voice, Elastix
