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BULETIN POS DAN TELEKOMUNIKASI

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e-ISSN: 2443-1524
p-ISSN: 1693-0991

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p-ISSN 1693-0991
e-ISSN 2443-1524

BULETIN POS DAN TELEKOMUNIKASI

Volume 18, Issue 2, December 2020

FOREWORD FROM EDITOR-IN-CHIEF

Over the past two decades of publication, the Buletin Pos dan Telekomunikasi is proud to complete the second issue published completely in English. In this current issue, we present a diverse selection of thought-provoking articles from scholars and students.

The issue is opened with ***LPWA-based IoT Technology Selection for Smart Metering Deployment in Urban and Sub Urban Areas: A State Electricity Company Perspective*** written by Amriane Hidayati and Muhammad Imam Nashiruddin. The authors propose a techno-economic approach in finding the appropriate Internet of Things (IoT) technology for deploying smart metering services in Indonesia. Their empirical study shows that the national electric company will have a Net-Present Value of 23% higher in the 10th year if they use LoRaWAN instead of NB-IoT.

Neno Prayitno and Khoirunurrofik on ***The Effect of Internet Usage on Social Capital in Indonesia*** examines the effect of Internet use on social capital in Indonesia. Under some particular cases in Indonesia, the author shows that that Internet users have lower social capital than non-Internet users, and highly educated people have higher social capital than people with low education.

Rini Cahyani, Doan Perdana, and Ahmad Tri Hanuranto's paper on ***A Feasibility Analysis of the Use of IEEE 802.11ah to extend 4G Network Coverage*** simulates and proves that varying the number of IEEE 802.11ah nodes from 100 to 1.000 is technically acceptable in enhancing MCS performance to expand the 4G LTE network service coverage.

The next paper ***Performance Analysis Of DSDV, AOMDV and ZRP Routing Protocols Application Simulation In Pekanbaru Vehicular Ad Hoc Network (VANET)*** from Ery Safrianti, Linna Oktaviana Sari, Fitriani and Saputri analyses the QoS performance of data transmission routing protocols using AOMDV, DSDV, and ZRP on serving Vehicular Ad Hoc Network (VANET). Out of the three scenarios tested, AOMDV outperformed the other two protocols in end-to-end delay and routing overhead.

Khoirun Ni'amah, Solichah Larasati, Alfin Hikmaturokhman, Muntaqo Alfin Amanaf, and Achmad Rizal Danisya's paper titled ***Coded Random Access Technique Based on Repetition Codes for Prioritizing Emergency Communication*** investigates and confirms the possibility to utilize repetition codes based on Coded Random Access (CRA) to support Internet of Things (IoT) to prioritize emergency communications in super-dense networks.

The sixth paper titled ***Comparing Mutual Coupling of Ring Metamaterial on Square and Vivaldi Array Antennas*** from Petrus Kerowe Goran and Eko Setijadi. This paper compares the performance of mutual coupling in square and Vivaldi array antennas using ring metamaterial method. The paper finds that square array antenna has better performance than the Vivaldi as the square array antenna has lower mutual coupling value.

The last paper ***Expedition Service Product Development Strategy with Quality Function Deployment Method*** from Indah Nurlina, Septin Puji Astuti, and Azis Slamet Wiyono assess the quality of Express Post Service provided by PT Pos Indonesia with the QFD method. The authors have identified 12 attributes of Express Post that require some improvements and suggest some key actions to ensure the better service.

We hope this publication will strive to contribute to the academic discourse surrounding issues in addressing ICT policy issues.

p-ISSN 1693-0991
e-ISSN 2443-1524

On a final note, I would like to acknowledge our immense gratitude to our Editorial Board members, reviewers, and authors.

We are also pleased to accept any papers that you wish to submit, either individually or collaboratively.

Jakarta, December 2020

Editor-in-Chief

1693 0995

COLLECTION OF ABSTRACT

Buletin Pos dan Telekomunikasi

p-ISSN. 1693-0991
e-ISSN: 2443-1524

Vol.18, No. 2, December 2020

LPWA-based IoT Technology Selection for Smart Metering Deployment in Urban and Sub Urban Areas: A State Electricity Company Perspective

Amriane Hidayati, Muhammad Imam Nashiruddin

Abstract— The need for LPWA-based Internet of Things (IoT) technology for deploying smart metering services is rapidly growing for its ability to manage energy usage in real-time and increase efficiency. However, the problem faced by electric utility companies is how to choose the most appropriate technology. This study uses a techno-economic approach to compare the two most widely used technological alternatives, namely establishing LoRaWAN as a non-licensed LPWA technology or leasing NB-IoT as a licensed LPWA technology owned by a telecommunications operator. Case studies conducted in the urban area of Bandung and sub-urban city of Tasikmalaya as an example of a typical town in Indonesia. The results showed that LoRaWAN and NB-IoT are both technically and business feasible to be implemented with their respective advantages. LoRaWAN is superior in battery lifetime, business model, speed of implementation, and total costs, whereas NB-IoT is superior in range, capacity, quality of service, security, and ecosystem support. Using PLN's perspective as a national electricity company in Indonesia, LoRaWAN has a Net Present Value of 23% higher than NB-IoT in the 10th year.

Keywords-- Internet of Things, NB-IoT, LoRaWAN, Smart Metering, LPWA

The Effect of Internet Usage on Social Capital in Indonesia

Neno Prayitno, Khoirunurrofik

Abstract— The development capital consists of financial capital, physical capital, human capital, and social capital. Social capital focuses on efforts to empower social relations. The relationship between social capital and ICT, especially the internet, has become an interesting debate. In fact, several studies have been conducted with quite diverse findings. The internet is able to connect people who are far from each other, but on the other hand, it often makes people who are physically close to each other seem far apart. This study aims to examine the effect of internet use on social capital in Indonesia. The data is obtained from the fifth Indonesian Family Life Survey (IFLS-5). The study found that in general, internet users have lower social capital than non-internet users. Likewise, highly educated people have higher social capital than people with low education. Then, internet users with higher education have higher social capital when compared to internet users with lower education. This means that the use of the internet must be accompanied by the readiness of human resources (digital literacy) in accepting new technology, filtering the flow of incoming information, and educating the public about how to use the internet in healthy, safe, and wise manner.

Keywords-- Development Capital, Internet, Social Capital

A Feasibility Analysis of the Use of IEEE 802.11ah to extend 4G Network Coverage

Rini Cahyani, Doan Perdana, Ahmad Tri Hanuranto

Abstract— The 4G LTE network has been launched in many countries including Indonesia, and all telecommunications operators are competing to expand their service coverage. Due to various reasons, there are a lot of areas that remains uncovered by the 4G LTE network. With the increase in cellular traffic, operators must continue to improve their service coverage. One of the scenarios to expand the service coverage is by offloading the traffic to a more cost-effective 802.11ah network in which one 802.11ah access point can serve thousands of mobile devices and support the Machine-to-Machine (M2M)/Internet of Things (IoT) communication. This study simulates the effect of the number of nodes on MCS performance evaluation of the 802.11ah protocol. The simulation is conducted by utilizing NS3 software to evaluate the throughput, delay, packet delivery ratio and energy consumption. This study also simulates 802.11ah coverage prediction to expand the LTE networks by utilizing Atoll Radio Planning Software. The results show that the performance obtained by varying the number of nodes/users from 100 to 1000 nodes is technically acceptable. In addition, the service coverage of 802.11ah network can solve the problem of blank spot area.

Keywords-- 802.11ah (Wifi halow), Restricted Access Window (RAW), Network Simulator

Performance Analysis Of DSDV, AOMDV and ZRP Routing Protocols Application Simulation In Pekanbaru Vehicular Ad Hoc Network (VANET)

Ery Safrianti, Linna Oktaviana Sari, Fitriani Saputri

Abstract— The increase in the number of vehicles without the development of driving safety technology, tends to create adverse impacts on society, such as a rise in casualties due to road accidents. Therefore, vehicles need information on the condition of the surrounding traffic environment to provide driver with safety. One of the methods used to obtain prompt information between vehicles that move dynamically is communication technology such as Vehicular Ad hoc Network (VANET). VANET has network characteristics that change rapidly due to the highly dynamic node movement. Therefore, it is necessary to choose the right routing protocol for optimal data transmission. In this study, the DSDV (Destination Sequenced Distance Vector), AOMDV (Ad-hoc on Demand Multipath Distance Vector), and ZRP (Zone Routing Protocol) routing protocols were tested using 3 field data scenarios. The first scenario is a variation of the number of nodes 100, 250, 600, and 700 nodes. The second scenario is a variation of the transmission ranges of 250m, 500m, and 1km. The third scenario is the variation of node speeds of 10 km/hour, 20 km/hour, 30 km/hour, 40 km/hour, and 50 km/hour in Pekanbaru city of Riau province. This research was carried out using the simulation method along with the QoS (Quality of Service) performance testing parameters comprising packet delivery ratio, end to end delay, throughput, collision rate, and packet loss. Out of the three scenarios tested, AOMDV is the best routing protocol to be implemented because it outperforms the other two protocol evaluated in all designated scenarios in the paper. Meanwhile, DSDV and ZRP are superior in end to end delay and routing overhead parameters, respectively.

Keywords—AOMDV, DSDV, Vanet, ZRP

Coded Random Access Technique Based on Repetition Codes for Prioritizing Emergency Communication

Khoirun Ni'amah, Solichah Larasati, Alfin Hikmaturokhman, Muntaqo Alfin Amanaf, Achmad Rizal Danisya

Abstract— This research uses repetition codes based on Coded Random Access (CRA) to support Internet of Things (IoT) to give priority to emergency communications in super-dense networks. Degree distribution for emergency group and general group are obtained with extrinsic information transfer (EXIT) analysis to achieve small error performance shown by the very small gap between emergency group curve and general group curve. This research also evaluates performance by observing throughput and packet-loss rate (PLR) parameters from every groups. Offered traffic in PLR 10^{-2} for emergency group user is G= 0.7 packet/slot without fading and G= 0.65 packet/slot with fading, while for public group is G=0.699 packet/slot without fading and G=0.42 packet/slot with fading. Peak throughput for emergency group is G= 0.737 packet/slot without fading and G=0.729 packet/slot with fading. Peak Throughput for public group is G= 0.699 packet/slot without fading and G=0.685 packet/slot with fading. Throughput values of emergency group are higher than those of the general group, indicating successful process of giving priority for emergency group.

Keywords— Keywords Repetition Codes, Coded Random Access, Super-dense Networks, EXIT Chart

Comparing Mutual Coupling of Ring Metamaterial on Square and Vivaldi Array Antennas

Petrus Kerowe Goran, Eko Setijadi

Abstract— The antenna performance is seen from the S-parameter value. The S-parameter graph can be seen is the return loss (S11, S22) and the mutual coupling (S21, S12) value. This research focuses on analyzing mutual coupling in square and Vivaldi array antennas using ring metamaterial method. The value of mutual coupling is considered very important to analyze because it affects the performance of the antenna in which is arranged in an array. The simulation results of the mutual coupling value obtained on a square array antenna uses a ring metamaterial is -17 dB at a frequency of 2.4 GHz. Meanwhile, the Vivaldi array antenna uses a ring metamaterial produces a mutual coupling value of -13.840744 dB at a frequency of 3.0162 GHz. The factors that affect the square array antenna so that becomes the best in suppressing the mutual coupling value between antenna elements are selection of metamaterial shape and proper placement between the antenna array elements are arranged horizontally.

Keywords— Mutual Coupling, Ring Metamaterial, Square Array Antenna, Vivaldi Array Antenna

Expedition Service Product Development Strategy with Quality Function Deployment Method

Indah Nurlina, Septin Puji Astuti, Azis Slamet Wiyono

Abstract—This study assesses the quality of Express Post service provided by PT. Pos Indonesia with Quality Function Deployment Method (QFD). Approximately 90 customers of Express Post in Boyolali were selected through systematic sampling to gather their opinions. In the meantime, PT Post Indonesia's Jakarta Central Office's Research and Development Department is involved to collect technical responses or activites. This study has identified 12 attributes of Express Post that require improvement. To solve the problems related to those attributes, this study has identified training on Express Post service standard operating procedure for new employees as the priority activity to be undertaken by PT. Pos Indonesia since it has the most significant influence on the quality of Express Post. In addition, the study also suggests two other technical responses to be taken into consideration including ensuring service cut of time of and ensuring delivery reception not disrupting the service cut off time.

Keywords—Product development, Quality function deployment (QFD), Post service, Expedition service