BUILDING QUEUING AND PAYMENT APPLICATIONS BY USING RFID TECHNOLOGY A CASE STUDY AT BOJONG NANGKA PUSKESMAS

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ABSTRAK

Clinics Bojong Nangka is one community health service centers that exist in the area of Tangerang Regency. As one of the Government agencies devoted to health, Clinics on duty to provide maximum service. Visitors at Clinics Bojong Nangka i.e. ± 150 person/day, with the number of visitors on the clinic required a Jackfruit Bojong system that can help deal with the backlog of patients who are coming. For the purposes of handling the queue, RFID technology is used to make it easier for patients who would like to enroll her medical treatment. Registration can be made to a clinic on the go and this technology can also replace the previous payment system using conventional money into electronic payments or commonly called e-money. Based on functional testing and user testing, that RFID systems are already helping the Clinics in the registration process, queue, and payment.

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Keywords : berisi maksimal 5 kata penting dalam penelitian.

1. INTRODUCTION

Community health centres or in short of clinics is one of the means of the Ministry of public health at the level of districts. technical implementation unit is a Dinas Kabupaten/Kota Clinics that are responsible for organizing the development of healthcare in a particular work area and are the establishments that are closer in health development. As instances of health clinics on duty to provide maximum service.

Similarly with Clinics Bojong Nangka, located in a residential Neighborhood of beautiful Dasana Bojong Nangka sub district of Tangerang Regency Two Coconut. The number of inhabitants in the region Clinic in Bojong Nangka 2015 amounted to approximately 68,714 inhabitants population. You can classify into three ages 0-14 Years has as much 18,575, age 15-19 Years as much as 6,261 and age group 20-60 + years as much as 43,878. The level of population density of 61 inhabitants/km2 with an area of 1125.53 km2 consists of one Village and another village. With patient visits to Clinics ± 150 visits/day, as for the number of officers on duty at the Clinics Bojong Nangka totalling 15 people.

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A second problem concerning patient registration queue, the queue of registration of patients in Clinics Bojong Nangka still uses the queue manually. To get health service at the health center patients are required to take Bojong Nangka number can queue for enroll in counter. After that later the patient will give mobile number to the intended poly queue. This has resulted in a buildup of queues on each Poly. System queues are still manual will require longer periods of time. from the results of a survey on average to get to poly the patient takes 15-20 minutes more.

The third issue concerning the existing payment, payment for actions in the Jackfruit Bojong Clinics still use manual payment system. The flow of actions in the Jackfruit Bojong Clinics i.e. initially the patients will go to the counter to make payment actions after that patient back again with show the proof of payment to the clerk action of poly, after which patients get new service action. So to handle patients who take action will take quite a long time because the patients should be back to the counter and poly to make payment actions. Then with the system queue and current payments simply take that much in dealing with one patient.

2. LANDASAN TEORI

2.1 The Queue

The queue may occur if a Ministry needs exceed the capacity available in doing Ministry. The occurrence of a work in a system queue because the service capacity can not meet the demand capacity or speed the arrival of customers faster than the speed of service.

2.2 Payment

The payment is a transaction undertaken by an individual to the individual, the individual to the group, or groups to other groups in order to obtain a good or service that is in want. This allows us to get a goods or services we want without harming the other party in accordance with the agreement. First man before getting to know their currencies, make payments with a system of barter goods

2.3 *Radio Frequency Identification* (RFID)

Radio Frequency Identification or RFID in shortened regular technology which uses the method of auto-ID or Automatic Identification. Auto-ID is a method of data retrieval with the identification of the objects automatically without any human involvement. Auto-ID work automatically so as to improve efficiency in reducing errors in entering data.

Based on the radio frequency, RFID tags are classified into:

a. *low frequency tag* (125kHz - 134 kHz) .
b. *high frequency tag* (13.56 MHz) .
c. *ultra high frequency tag* (868MHz - 956 MHz) .
d. *microwave tag* (2.45 GHz).

This final project using RFID reader modules that are specific to detect RFID tags passive low frequency. RFID tags are compatible with the RFID reader module this is the type of GK4001 or EM4001. The picture below shows the RFID tag to be used. Table 1 shows the specifications of the RFID tag type GK4001 or EM4001.



Figure 1. RFID tag type EM4001

In this task using the RFID reader that can read the cards 125 KHz frequency, such as GK4001 or EM4001 card. Figure 2 shows the RFID Reader that will be used.



Figure 0. RFID *Reader*

Table 1. Spesifikasi RFID tag GK4001/EM4001

Parameters	Specifications
Frequency	125 KHz
Read Range	8-14 cm
Dimensions	86 x 54 x 1.9 mm
Data Capacity	64 bit
Type Catudaya	5VDC at 30mA nominal
Range Catudaya	+4.6V-5.4V

2.4 RFID tag

RFID tags consist of a series of integrated circuit chip and an antenna. The electronic circuit of the RFID tags generally have memory allows RFID tag has the ability to store data. Memory on the tag is divided into Several cells. cells store Read Only data, such as ID number. All RFID tags get the ID number at the time the tag is manufactured.

2.5 The Workings of RFID

In General, an RFID system tags are paired to an object. On the tag is a transponder has a digital memory so that it can provide a unique electronic code. The tag reader equipment has an antenna with a transceiver and decoder, generating a signal to activate the RFID tags, so that it can send and receive from the tag. When an RFID tag passes through the zone of electromagnetic equipment tag readers, then the RFID tags will detect signals activation of the equipment the reader tags, and sends a signal back in accordance with those stored in the memory tag in response. Equipment tag reader then translates the data sent by the RFID tags according to your needs (by Mahesh M, 2005) [1].

2.6 Agile Models

Agile methods is one of several methods used in the development of software. Agile methods are a type of development system in the short term that requires a quick adaptation to changes and developers in any form [2].

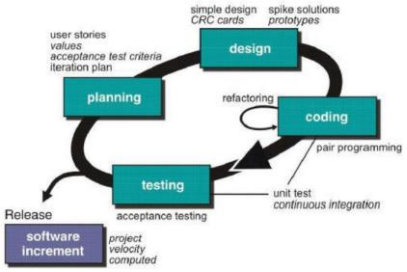


Figure 3. Agile Methods [3]

(Sumber: Rancang Bangun Aplikasi Web Informasi Eksekutif Pada Pemerintah Kabupaten XYZ)

2.7 Types Of Computer Networks

The type of network computer when viewed from the side of its range, the network can be divided into 3 types, namely:

1. *Local Area Network*

   Local Area Network (LAN) Is a computer network that is local physical network computer, for instance on one computer lab space. The example image on the LAN can be seen in Figure 2.6.

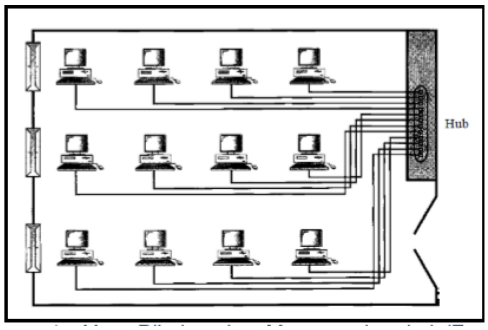


Figure 0.1 LAN Network

(Source: Perancangan Pengelolaan jaringan IT Pada

Institusi Sains & Teknologi Akprind Mengguunakan Teknologi VPN (Virtual Private Network)

2. *Wide Area Network*

Wide Area Network (WAN) Is a computer network between one building with another building which is located rather far apart. Example picture of WAN network can be seen in Figure 2.7.

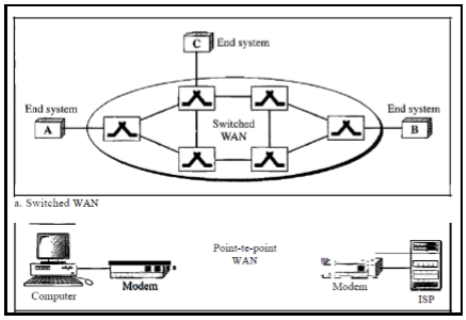


Figure 0.2 WAN Network

(Source: Perancangan Pengelolaan jaringan IT Pada Institusi Sains & Teknologi Akprind Mengguunakan Teknologi VPN (Virtual Private Network)

3. *Metropolitan Area Network*

Metropolitan Area Network (MAN English

Is a computer network involving several network computers connected to each other and saru are geographically spread out far enough, but still in one region or city. Examples of image network MAN can be seen in Figure 2.8.

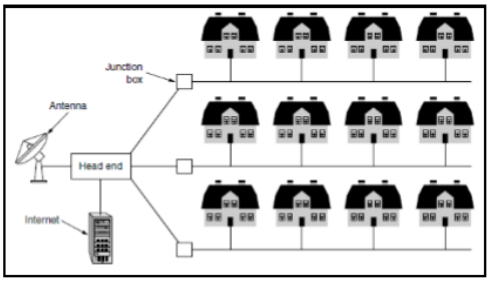


Figure 0.3 MAN Network

(Source: Perancangan Pengelolaan jaringan IT Pada Institusi Sains & Teknologi Akprind Mengguunakan Teknologi VPN (Virtual Private Network)

2.8 Network Topology

The topology is one of the rules of how to connect a computer (node) to each other physically and the pattern of the relationship between the components communicate via media/networking equipment, such as servers, workstations, hubs/switches, and cabling (data transmission medium). With regard to physical topology of the network form, such as how to choose devices and perform instaltion network devices. While the logic of topology related to how data flows in the physical topology.

3. The bus Topology commonly use a linear cable, usually using a coaxial cable.
4. The ring topology is a ring-shaped topology in the plot.
5. The Topology star is a topology where all connected to one tool called hub.
6. Mesh topology or is usually called points to points typically use coaxial cable, twister pair, even optical fibers.

Network topology is usually defined as the design of networks and computers will be built. Network topology is divided into logical design and physical design. Physical design refers to the physical design of a network device, including cables, and installation network. While the logical design is the amount of data to be forwarded in accordance with the design of the physical network. There are several types of network topology is built into a computer network, namely bus topology, topology ring topology, mesh, star topology, and tree topology. Network topology is the essence of computer networks, efficient network can only be built upon knowledge and a good understanding of the topology**Invalid source specified.**.

2.9 Analysis of Proble,

The analysis of the issues contained in this study i.e.:

1. Registration at counter buildup due to buildup of new patients and patients that want to register.

2. Patient buildup in conducting the process of retrieval queue number due to the process of retrieval queue number that has a fairly time-consuming process on average to get to poly 15-20 minutes and still use a queue system manual, where to get health service at the health center patients are required to take Bojong Nangka number can queue for enroll in counter. After that later the patient will give mobile number to the intended poly queue.
3. Patient is having trouble at the moment of payment process will perform action because patients have to be queued one counter with a new list of patients and new patients come for treatment.

2.10 User Analysis

Analysis of the Users intended to find out the various users who will be involved in the use of the software to be built, so the user is expected to use the software can meet several criteria in using the software. As for employee health centers that are involved can be seen in Table 2.

Table 2. User Analysis

Users	Responsibility	Education
Counter Clerk	Officers of the new patient enrollment pigeonhole handles, TOP UP the balance, payment action, and press the next button to queue.	S1
Poli Officers	Poly officers handle the payment action, pressing the next button.	S1
Patient	Register the new queue and pay the costs of the action if necessary.	Not Defined

2.11 Architecture Design System

The design of a system that is built into this outstanding research into can be seen in Figure 2.10.

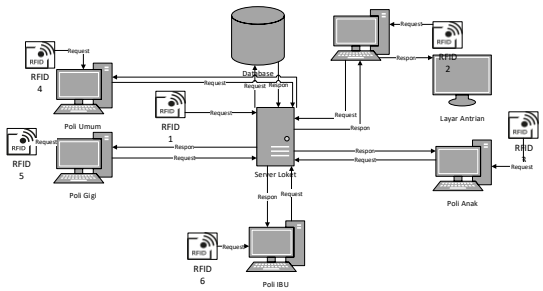


Figure 2.10 Architecture Design System

The following is a description of the image, which explains about 2.10 step from the process of RFID.

1. The patient attaching RFID cards to the RFID reader to do the request data to the local server.
2. The local Server accepts the request of the patient dataIf the local server accepts the request data then instantly retrieve existing data in database.
3. After the local server receives the requested data, the data will be processed and will be delivered to patients, after which the server will menginputkan local data and then the system will save on database..

2.12 Network Analysis

Network analysis in this research can be seen in Figure 2.11.

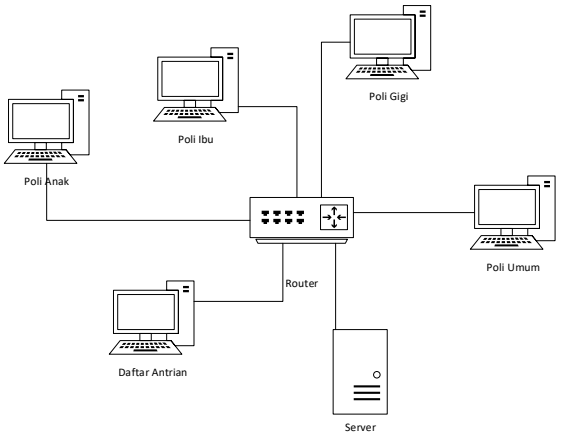


Figure 2.11 Design Of Network Architecture

The following is a description of the image, which is 2.11 describes the tasks and roles of each device:

1. Server on duty to keep all the existing data.
2. Computer list queue served to place the data of patients who wish to register queue Poli.
3. Computer Poli on duty to serve the process of payment actions, forgot Pin and resume a queue.
4. Router served to regulate the traffic of data server computer with the computer list queue and computer Poli.

2.13 *Use case diagram*

Use case diagram is modeling for behavior (behavior) on the system to be created. Use case describes an interaction between one or more actors with a system that will be created, which can be seen in Figure 2.11 below.

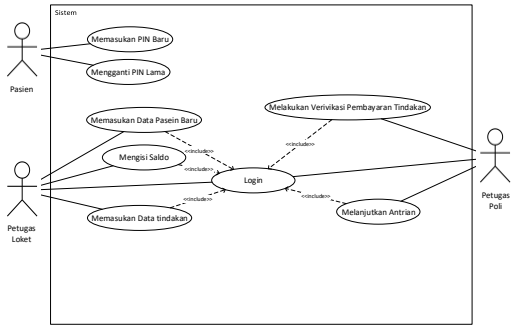


Figure 2.11 *Use Case* Diagram

2.14 Actor Description

It is intended to find out who the actors involved in this application system. The actors involved descriptions can be seen in Table 7.

Table 3. Actor Description

No	Actor	Description
1	Patien	The patient is a user of the application queue and payment can only be limited to downloading RFID tab to sign up for the queue, pay action and fill the balance
2	Counter Clerk	Merupakan aktor yang akan Manage the registration of new patients, deposit, payment action, and adds to the list of actions.
3	Poli Officer	Is the actor who will megelola the payment action, pressing the number of the queue

3 TESTING

Testing the system aims to find errors or flaws in the system that was tested. Testingsystem of dimaksutkan to know the performance of the system have been made in accordance with the objectives of the design of the system. Testing the system using black box testing. Pengujuan Black box function on the software functional requirements and testing the recipient user (end user).

3.1 Conclusion of black box testing

On the basis of the Black Box testing performed above, then the conclusion can be drawn:

1. If the data entered is correct then the system will display the data that youexpect.
2. If sdata entered does not match then the sistemakan displays an error message. Then when pasting data must comply with the rules which may be accepted by the system, so that the function of the system can output the results sesuia.

3.2 Beta testing

Beta testing is testing that is objectively where test directly to the field that is concerned about instances of user satisfaction with the content of points i.e. the fulfilmentof the goals of the initial development application. Beta testing is done through engineering data retrieval through an interview.

3.3 Conclusions beta testing

Based on beta testing that's been done before, the conclusion that can be drawn:

1. The application queue and this helps to reduce payments and mempersingat queue.
2. Application and payment queues this can facilitate officers in counter menanngani queue b uild up.
3. Application and payment queue is quite understandable by the user.
4. This application is sufficient to meet the needs of clinics Bojong Nangka in conducting the registration and payment.

3.4 Conclusion

Based on the test results and discussion has been made then the conclusion can be drawn as follows:

1. application and payment queues can help counter officers in dealing with the problem of the backlog of registration of new and old patients.
2. application this could ease the political officers in handling the queue of patients.
3. application and payment queues can help the patient in making payment.

3.5 Suggestions

Advice that can be given to development of the system that has been created for further system development can be described as follows:

1. RFID cards can use Active RFID card so that it can write so that it can enter into the patient data card.
2. The process of drug stock is expected to be made more informatip.
3. The display of the program made more attractive again.

A BIG THANK YOU

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REFERENCES

[1] M. Latief, "Sistem Identifikasi Menggunakan Radio Frequency Identification (RFID)," vol. 5.

[2] A. P. W. A. Moh. Rizal Hidayat, "Rancang Bangun Aplikasi Analisis Laporan Realisasi Anggaran Pembangunan Gedung Mengacu Pada Standar Nasional Indonesia Cv. Citra Mandiri Solution," *Jurnal Sistem Informasi*, vol. 3, no. 2338-137X, p. 1, 2014.

[3] S. F. A. M. Sonny Ariyanto Prabowo, "Rancang Bangun Aplikasi Web Informasi Eksekutif Pada Pemerintah Kabupaten XYZ," *JURNAL TEKNIK POMITS*, vol. 2, no. 2337-3539, 2013.

[4] Handayani, "Analisi Antrian Pada Mini Market Dengan Menggunakan Teori Antrian Untuk Menentukan Pelayanan Yang Optimal," vol. 7, 2013.

[5] D. S. I. K. M. Febri Zahro Aska, "Implementasi Radio Frequency Identification (RFID) Sebagai Otomasi Pada Smart Home".