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Comparative Analysis of Real Time Systems in E-Commerce in Indonesia Post Covid-19 Era

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ABSTRACT

The purpose of this study is to compare systems and features in E-Commerce with a high real time level. This comparison must be made by determining which E-Commerce between QRIS (Quick Responses Code Indonesian Standard) and other online payments has the real time level expected by its users. Because if the real time level is not as expected by the user, the use of QRIS will not be achieved. This research was conducted by testing the usability testing of the use of QRIS compared to others. The results of the study illustrate that the use of QRIS has not been made every transaction in real time because there is a system that has not been completed. The conclusion in this study provides an overview of the weaknesses of the system and features in QRIS so that efforts are made to utilize and utilize QRIS. Thus, at the end of this study,

Keywords: Comparative Analysis, Real Time Systems, Post Covid-19 Era, QRIS.

INTRODUCTION

Digital economic growth is a form of implementation between technology and information embodied in the non-cash forms of payment. In general, innovations created in e-wallet payment methods are using QR codes QR code technology considered as an innovative way and can provide convenience in various existing system activities because provide data collection speed. The advantages of QR codes include data storage and utilization accuracy as well as physical advantages that can last a long time. By paying attention to the advantages and efficiency of the QR code, Bank Indonesia made a standard QR code as a technology used in payment method. Use This QRIS can be applied to payment applications that have been installed on smartphones and are connected to the internet connection Internet. The applications in question are e-wallets (from banking and non-banking publishers) that are used as a server-based payment instrument that has obtained permission from Bank Indonesia. Payments with the QRIS method are strongly supported by the presence of a smartphone that is already owned by most of the population (www.wearesocial.com).

Sales transaction applications with the internet and android are applications regarding information data processing that are widely used by e-commerce. Android applications as applications on smartphones, tablets, and other devices using the Android operating system made with the Java programming language. And only using the internet, you can already use existing e-commerce applications(Lenti, 2017).

Various e-commerce competitions that exist today show the expansion of the use of e-commerce with the potential for digital payments currently increasing as illustrated below:

Chart 1. E-Commerce Comparison by https://iprice.co.id/insights/mapofecommerce/ (Princess et al., 2022)**.**

Chart 2. The Convenience of QRIS

Chart 3. The Convenience of QRIS

Source: https://qris.id

From Figures 2 and 3 above, it shows that the use of QRIS can make payments easier, plus the COVID-19 situation which helps transactions by implementing a health protocol. With QRIS users spread over 416 districts and 98 cities in Indonesia, as many as 89,613 merchants have joined QRIS, and the total transaction to date is IDR 173,218,127,548. This means that the use of QRIS has spread widely and is expected to be an optimal payment for the community. However, the focus of this research is on real time settlement of QRIS products, not in real time. Because it takes 2 working days to 5 working days.

Meanwhile, it is said to be real time ifnot only prioritizing the accuracy of the execution of the instructions/tasks, but also the time interval for the tasks to be carried out. In other words, a real time system is a system that uses deadlines, that is, work must be completed within a certain period of time. Meanwhile, a system that is not real time is a system where there is no deadline, although of course a fast response or high performance is still expected. In real-time systems, time constraints are used. The system is declared failed if it passes the existing limit. For example in a car assembly system assisted by a robot. Of course there is no point in ordering the robot to stop, if the robot has hit a car. Real-time systems are widely used in various applications. These real-time systems are embedded in specialized devices such as in cameras, mp3 players, as well as in planes and cars. Real-time systems can be found in mission critical tasks, for example systems for nuclear reactor control systems or car brake control systems. Also often found in medical equipment, factory equipment, equipment for scientific research, and so on.

Real time system can be defined as a system that is not only oriented towards the results (output) issued but also a system that is required to work well within a certain time requirement. In real-time systems, time is a very important factor to consider. The time factor becomes something very critical and as a measure of whether or not the overall performance of the system is good. However, there is one thing to remember, real-time systems are not the same as fast systems. Fast system is a system that works in the shortest possible time, which means that the faster the output produced by the system, the better the performance. Unlike the fast system,

In a real time system, time is a very important factor to consider. The time factor becomes something very critical and as a measure of whether or not the overall performance of the system is good. However, there is one thing to remember, real-time systems are not the same as fast systems. Fast system is a system that works in the shortest possible time, which means that the faster the output produced by the system, the better the performance. In contrast to the fast-system, the real-time system works within a certain deadline and period, so that the faster the output produced means that the system is working well. Examples of real time systems are banking systems, aircraft control

systems, factory automation systems, and so on(Sugeng, Winarno; Istiyanto, Jazi Eko; Mustofa, 2010).

Thus, this study will discuss the real time settlement system that exists in QRIS so that the use of QRIS can implement real time settlement, because the reality is that settlement occurs in 2 to 5 working days so it is necessary to update it so that it can be like other faster settlements.

LITERATURE REVIEW

A computing system is called real time if the system can support the execution of programs/applications with limited time, or in other words a real time system must have the following: (1) Time constraints and meet deadlines; (2) Predictable; (3) Concurrent process; (4) Can only do things that are important, those that are not important don't need to be done; (5) Making the processor to work faster, so that the number of tasks completed can be increased; (6) Finding the level of time efficiency.

The results are said to be on time if the requested results are submitted in accordance with the agreed / determined time. A control system is said to be real time if the control system is able to respond to inputs logically and quickly. Although the response must be so rapid that if it is not carried out within the required limited period of time, then the response is considered a failure, and therefore, the system is considered a failure. So, a control system that has a response time that is fast enough so that it is able to respond to input within a limited period of time is needed, then the control system can be referred to as a real time control system.(Bukhori, Saiful; Hariadi, Mochamad, 2001).

Real Time Characteristics

First, single purpose. Unlike PCs, which have many uses, a real-time system usually has only one purpose, such as transferring a song from a computer to an mp3 player. Second, Small size. Most real-time systems have limited physical space. Third, Inexpensively mass produced. The real-time operating system satisfies the specified time requirements by using a scheduling algorithm that gives priority to the real-time process that has the highest priority scheduling. Furthermore, the scheduler must ensure that the priority of the real-time process does not exceed the specified time limit. Second, the technique for addressing time requirements is to minimize the response time of an event such as an interrupt (Sugeng & Mostofa, 2011).

Real Time Models

Real time system models can be divided into 3 types based on priorities when meeting deadlines / time constraints they have, namely hard real time systems, soft real time systems, and firm real time systems. Hard real-time systems, correct program execution and hard deadlines become very critical and determine the performance of the entire system. If the system is not able to meet the predetermined deadline, it will be fatal to the entire system. This condition is known as catastrophic consequences (major disaster). Therefore, the design and reliability of a hard real time system must be considered and evaluated properly. Secondary storage is very limited or non-existent (using ROM, flash RAM). Hard real time requires the process to be completed within a certain time. If not, then fail. An example is a pacemaker. The system must be able to accelerate the heart rate if the heartbeat is detected as weak(Firmansyah et al., 2020).

Soft real time system, unlike the hard real time system, it is much more tolerant and less critical when the system is unable to meet the soft deadline. The system will not fail even if the deadline is not met. In addition, this system will still work and complete its tasks

even though the deadline has passed. It is different with the firm real time system. Although it is the same as a soft real time system in terms of tolerance for deadlines, this model system will not work and complete its tasks when the deadline has passed. In other words, this system will stop working but will not cause failure of the whole system. In real time systems, the terms tardy tasks and miss percentages are known. Tardy tasks are tasks that cannot be done and executed by the system within a certain deadline. Meanwhile, what is meant by miss percentage is the percentage of tardy tasks to all tasks that must be done by the system. In a soft real time system, the miss percentage increases exponentially with the number of tasks to be done. Soft real time systems are more often used in industry, multimedia applications (video streaming, virtual reality) (Sugeng, Winarno; Istiyanto, Jazi Eko; Mustofa, 2010).

Meanwhile, in the Firm real time system where the tardy task is not done by the system, the miss-percentage increases polynomially. This shows that the miss-percentage rate in soft real-time systems is higher than in firm real-time systems (Sugeng, Winarno; Istiyanto, Jazi Eko; Mustofa, 2010).

Real Time Problems

Hard Real Time (HRTS) System. A Hard Real-Time (HRTS) system is a real-time system that must meet time targets on every occasion. Hard real-time systems are needed to complete critical tasks with a certain time guarantee. If the time requirement is not met, the application will fail. In another definition it is stated that the hard real time control system can tolerate a delay of not more than 100 micro seconds. In general, a process is sent with a statement of the amount of time it takes to complete or execute I/O. Then the scheduler can guarantee the process to complete or reject the request because it is not possible to do so. This mechanism is known as resource reservation. Therefore each operation must be guaranteed with a maximum time.(Sugeng & Mostofa, 2011).

Soft Real Time System (SRTS). Soft Real Time System (SRTS) is a real time system that does not have to meet the target time but must meet an accuracy value taken from the average value. Soft real time computing has a bit of leeway. In this system, critical processes receive priority over others. Although adding soft real time functionality to a time sharing system may result in unequal distribution of resources and result in longer delays, or may lead to starvation, the result is a general-purpose system that can support multimedia, high-speed graphics, and a variety of tasks that cannot be achieved. acceptable in environments that do not support soft real time computing. Soft real time system implements priority in task execution and time tolerance. An example is video transmission.

Hard real time system guarantees that real time processes can be completed within a predetermined time limit. Example: safety critical system. Some real-time systems are identified as safety critical systems, in this scenario real-time systems must respond to events within a predetermined time limit then disaster will occur. The flight management system is an example of a real-time system as a safety critical system. Soft real-time systems provide priority to processes that use real time over processes that do not use real time. Example: Linux.

Semi Hard Real Time System (HRTS) or Semi Soft Real Time (SRTS). This method is a combination of Semi Hard Real Time System (HRTS) or Semi Soft Real Time (SRTS). Thus the deadline is shorter when compared to soft real time (SRTS).(Guo, Zhiling; Kauffman, Rob, 2015).

*Interactive Deadlines.*In real time interactive, the deadline is negotiable, meaning not absolutely at a certain point, but depending on the agreed and flexible agreement.(Guo, Zhiling; Kauffman, Rob, 2015).

*Probabilistic / Statistics.*This method usually uses probability theory / probability theory with statistical methods(Guo, Zhiling; Kauffman, Rob, 2015).

Intelligence RTS. This method usually uses Expert Systems / Artificial Intelligence / Artificial Intelligence or Intelligent Control, which is a method that uses previous experience to carry out the tasks given. Based on this experience, the task will be done faster. In its application using intelligent system technology or expert systems(Sugeng & Mostofa, 2011);(Princess et al., 2022).

E-Commerce

*E-commerce*is a trade that utilizes information technology infrastructure and the internet which has an important role in business activities, in the current information age there are many offline companies that are actively developing internet technology for their company operations. E-commerce as a tool that can be used for various business information, maintaining relationships business and conduct transactions through communication media. There are three functions of e-commerce, including: (1) Equalizing buyers and sellers; (2) Facilitating the exchange process; (3) Providing institutional infrastructure that enables efficient market function to occur. In addition, e-commerce can be used as a medium or a tool for business expansion (Eni Pudjiarti & Muhamad Tabrani, 2021).

E-Commerce is the process of buying and selling goods or services on the internet. Basically it is done with transactions through e-commerce sites which are defined as places to sell a product. On the site, buyers can find out about a product in terms of the complete product form and specifications as well as the selling price of the product (Alfarizi et al., 2020).

In the period of reinvention, many unique features of e-commerce and internet technology came together in a set of applications with social media technology which is called web 2.0. According to Turban et al. (2015, 20) web 2.0 uses dozens of tools like wiki, rss or xml, blog, microblog and others. In addition, Turban implicitly argues that web 2.0 is a representation of e-commerce 2.0, then he also says that e-commerce including e-commerce 2.0 is facilitated by economic, social and corporate developments digitally. In e-commerce technology, there are eight dimensions or unique features that need to be considered, namely: Ubiquity, can be interpreted everywhere, meaning that internet/web technology is available anytime and anywhere such as: at work, at home and elsewhere through devices. mobile. Based on the marketspace, the reach is expanded beyond traditional market boundaries and can move from one location to another geographically. Then buying and selling transactions can occur anywhere so that customer convenience can be increased and transaction costs are reduced. Global reach, it can be interpreted that this technology reaches across national borders on earth (Hendarsyah, 2019);(Shah et al., 2014).

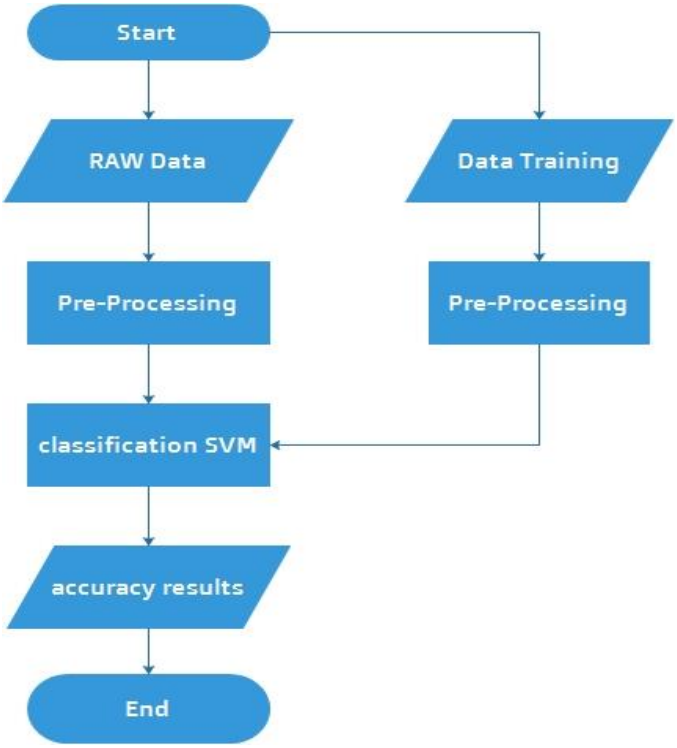
So that trade can be carried out across cultural and national borders. From a marketspace perspective, it can potentially reach billions of consumers and millions of businesses around the world. Universal standards, it can be interpreted that there is a set of technology standards, namely the internet as a technology foundation in business. Richness means that this technology is rich in content such as video, audio and text. This content can be used as a marketing tool. Interactivity, it can be interpreted that this technology works through interaction with users. Information density, it can be

interpreted that this technology reduces the cost of information and improves the quality of the information itself (Prilantana, Luhung, Keanu, 2021).

Information processing and storage and communication costs fell dramatically, while currency, accuracy and timeliness improved rapidly. So that information becomes abundant, cheap and accurate. Personalization/customization, it can be interpreted that this technology allows the information conveyed to customers to be tailored to the needs or characteristics of the customers themselves, both personally and in groups. Social technology, it can be interpreted that this technology allows users to create and share content with communities around the world through social networks(Agustina, 2017);(Triandini et al., 2021).

RESEARCH METHOD

On this research consists of several stages including:



RESULTS

There are criteria that must be considered in a real time system, namely First, time constraints. Every real-time system has time constraints in the form of maximum processing time (acquisition, transmission, recording, calculation) and standard time (same time as daily time). Second, Response time and Saturation Limit. If a real time system is used to control the device, it is necessary to consider the speed of the device's response and the saturation limit of the device. And for the basic concepts of real time systems, namely:

a. Parallel Processor, which is a method that applies several processors to work on a single task with high complexity or a large number of tasks. By implementing multiple processors it is assumed that the task will be completed quickly. The

parallelism method on a processor will speed up the execution process of a program, especially if the program being executed is complex. With this parallel processor system, each task is distributed on each processor and the results are combined into one. Thus, the execution process will be faster.

b. MSB (Most Significant Bit) First, which is a method of adding bits by adding up from the left side (Most Significant Bit), with the largest bit value. This method will quickly produce a value that is close to the actual value. If it is depicted with a curve, it can be seen the difference, namely in LSB Fisrt and MSB First.
c. Sampling, which is a method for adding up quickly by taking a random sample of data (random sampling) from the data population. The data that has been taken is added up and then multiplied by a number based on the division of the number of samples from the total sample. The result will be close to the true value. In this way, it is possible to assign value by way of estimation when processing time has not been given, resulting in a faster process. The sampling process is used to take data but not in its entirety, but only certain samples are taken in the hope that they represent all existing data.
d. Heuristic, which is a method that uses previous experience to do the tasks given. Based on this experience, the task will be done faster. In its application using intelligent system technology or expert systems. An expert system is one part of computer science that makes a computer able to do a job as well as humans do. The method used is to provide learning (learning) to the computer in the form of software.
e. Selection, which is a method that will speed up the work of the task by selecting and sorting (sorting) from the largest value to the lowest value (decreasing). After sorted and then added up, the result will be close to the total value. The sorting system is used to sort certain data with the aim of making it easier when a decision occurs, for example the program will take the largest number, then just point the pointer at a certain index and not select each number.
f. Pre-Processing, which is a method to speed up the work of a task by preparing things to be processed before the processing time starts or the task has not arrived. Processing is faster because some of the tasks have been done before runtime starts. Before the task to be carried out arrives, it has been arranged in advance, for example the data is sorted or selected first.
g. Compression, which is a method to speed up the work of a task by compressing the data to be processed. If the data that is processed is compressed data, it will produce a faster process when compared to uncompressed data. In this method, the time required for compression and decompression must also be considered. Data compression is used to save space in data. In data compression must be considered in terms of compression time, data transmission time, and the data decompression process.
h. Hardware-ization, which is a method to speed up the process of working on a task by hardwareizing the software used in carrying out the task. Hardware hardware means reducing the processing load and also accelerating processor performance so that fast work is produced.
i. Scheduling, a method for processing a job or task based on a predetermined schedule, so that there is no overlapping process.
j. Data reduction, data that is not used (not important) or redundant data can be reduced.
k. Prediction, prediction is used to estimate a data execution process. How much is used to execute a program.

The settlement process or disbursement of InterActive QRIS funds to merchant accounts is carried out only on working days & hours. On Sundays and holidays or collective leave there is no settlement process. This is something that needs to be updated from the

QRIS settlement to make it more real time because digital payment transactions are the most desirable if they can provide settlement information on the same day and have a Standard Level Aggregation in accordance with the speed of transaction payments.

A result is said to be on time if the requester for the result notifies, the result must be submitted in accordance with the agreed/determined time. Can provide answers whenever asked. And must be able to provide the best and accurate answer. Sera users who ordered and when to be given by the system and can answer at any time (Sugeng & Mostofa, 2011). As illustrated in the schematic below:

Picture 4. Simple Real Time Settlement Scheme

Real-time systems are systems that are closely related to deadlines. In order to reach real time, then the effort carried out to meet the real time criteria among others :a.Hardware hardware; b. Hardwareization; c. MSB First, MSD First, MSM First, MSI; d.First; e. Heuristics / Expert Systems, Expert Systems; f. Intelligent System; g. Selection / Sorting; h. Preprocessing; i. Scheduling; j. Parallelism; k. Data Reduction; l. Prediction; m.Sampling

DISCUSSION

The adoption of information and communication technology is seen as an opportunity to improve not only the effectiveness, efficiency and quality of services but also the transparency of economic activities and the availability of information in real time. Information and communication technology is not only limited to how to operate a computer, but how to use technology to collaborate and communicate. The information technology industry has been phenomenal with revolutionary inventions since the first generation of computers. Today's information systems and product spaces consist of a large amount of information that is impossible to measure manually. Despite the huge investment in innovation and the huge opportunity for innovators, it has not undergone a fundamental change. The system can be an application. The use of application programs can make it easier to record, repair, and deletion of data. In application control, fitness is related to performance measures of process controllers(Munawar, 2021).

CONCLUSION

QRIS settlement is not in real time because it takes 2 to 5 working days and it is not possible to check information in real time so it is necessary to update it so that it can be checked at any time which can make it easier for users of QRIS. The conclusion in this study provides an overview of the weaknesses of the system and features in QRIS so that efforts are made to utilize and utilize QRIS. Thus, at the end of this study, it is recommended to QRIS companies to update their systems and service features to be sustainable.

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DECLARATION OF CONFLICTING INTERESTS

There is no conflicting interest in this study.

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