



# IMPLEMENTATION OF QRIS MERCHANT ACQUISITION SERVICES IN MICROFINANCE INSTITUTIONS AS A LIQUIDITY TOOL

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**Abstract**— QRIS is a QR code standard developed by Bank Indonesia (BI) and the Indonesian Payment System Association. The QRIS function is to facilitate the transaction process with a QR code to make it faster, and maintain security. As of December 2022, it was recorded that the number of QRIS users in Indonesia reached 28.75 million. This number has increased by 15.95 million users compared to the end of 2021. In addition, a total of 12 million merchants have used QRIS. The Covid-19 pandemic caused the majority of cooperatives in Indonesia to experience liquidity shocks. Cooperative and SME observer Rully Indrawan said that 70% of cooperatives, especially savings and loan cooperatives, experienced disruptions during the pandemic. This is due to the withdrawal of members' savings and also an increase in bad loans (NPL) because members' finances are disrupted. Microfinance Institutions or often called MFIs can become QRIS Merchant acquisitions through banks or payment system service providers (PJSP). With this acquisition, QRIS payment transactions that occur can go directly to the customer's savings at the MFI. An integration process is needed between the QRIS dashboard that can be obtained from the bank or PJSP with the core banking system that is already running within the MFI itself. This research offers a web service system that is capable of integrating the two systems above. The research method used is a combination of field research and research and development approaches. The development stage uses the system development life cycle (SDLC) method approach. The web service system that was built has successfully passed the System Integration Test and User Acceptance test scenario by PJSP to carry out credit transactions on merchant savings at the MFI.

**Keywords**— *payment technology, QRIS Merchant acquisition, microfinance institutions, liquidity, fintech*

## I. INTRODUCTION

It can not be denied anymore, the internet has entered all lines of life. In January 2021, the number of internet users in Indonesia reached 202.6 million, while in 2022 the number of internet users in Indonesia is estimated to reach 210 million [1].

The internet has a positive impact and plays an important role in everyday life, not only for the community, the internet also has an important role in various areas of life including the world of MSMEs and Microfinance Institutions. Microfinance Institutions (MFI) are financial institutions specifically established to provide business development services and community empowerment, either through loans or financing in micro-scale businesses to members and the public, managing deposits, as well as providing business development consulting services that are not solely seeking advantage [2]. Savings and loan cooperatives, BUMDES, and BUPDA are examples of existing microfinance institutions in Indonesia. Most MFIs have used information technology (IT) in managing their finances and members can also see directly how much the cooperative has saved, so members don't have to come back to the cooperative, just use the internet at the member's house to access it.

According to data from the Central Statistics Agency for the Province of Bali, in 2021 there will be 1,212 savings and loan cooperatives in Bali [3], while the number of BUMDES in the province of Bali is 547 BUMDES out of a total of 637 villages [4]. This amount is large enough to reach remote communities and certainly has a big contribution to the micro-economic movement. Various small business credit services are the services of existing microfinance institutions.

The Covid-19 pandemic has caused the majority of cooperatives in Indonesia to experience liquidity shocks. Cooperative and UKM observer Rully Indrawan said that 70% of cooperatives, especially savings and loan cooperatives, experienced disruptions during the pandemic [5]. This is due to the withdrawal of members' savings ahead of the holiday and also an increase in bad loans (NPL) because members' finances are disrupted. In addition to disrupted performance, cooperatives in Indonesia are still overshadowed by several unscrupulous cooperatives who have failed to pay or even fraudulent cooperatives. However, the Indonesian government has disbursed special liquidity assistance to savings and loan cooperatives that are experiencing difficulties amid the coronavirus or Covid-19 pandemic.

The Quick Response Code Indonesian Standard (QRIS) is a QR code standard developed by Bank Indonesia (BI) and the Indonesian Payment System Association. The QRIS function is to facilitate the transaction process with a QR code to make it faster, and maintain security. All PJSPs that will use the QR code, the payment must apply QRIS. The PJSP in question is Payment System Service Providers such as banks, fintech, and other financial institutions. QRIS also makes it easier for users to make transactions, because users no longer need to download different payment applications. As of December 2022, it was recorded that the number of QRIS users in Indonesia reached 28.75 million. This number has increased by 15.95 million users

compared to the end of 2021. In addition, a total of 12 million merchants have used QRIS [6]. The growth of the digital economy has increased significantly from year to year.

MFIs can become QRIS Merchant acquisitions through banks or payment system service providers (PJSP), one of which is provided by Bank BPD Bali. In this case, MFI customers can register QRIS through the MFI itself. Technically QRIS will still be issued by Bank BPD Bali, and acquired by BPD Bali itself and the MFI concerned. By also being acquired by the MFI, payment transactions that occur can go directly to the customer's savings at the MFI. This is certainly enough to be able to help the liquidity of incoming funds from third parties.

Seeing the above, in order to realize merchant acquisition by MFIs, an integration process is needed between the QRIS dashboard that can be obtained from the bank or PJSP with the core banking system that is already running within the MFI itself. This research offers a web service system that is capable of integrating the two systems above.

## II. LITERATUR REVIEW

### A. *Quick Response Code Indonesia Standard*

QRIS or Quick Response Code Indonesia Standard is a shared delivery channel-based payment system that is used to standardize payment transactions using the QR Code as part of the Indonesian government's efforts to encourage people to make cashless transactions using QRIS. QRIS is considered capable of encouraging the development of non-cash transactions and encouraging the growth and development of the Indonesian economy [7].

A study conducted in Surakarta showed that the use of QRIS was considered capable of encouraging the development of non-cash transactions and encouraging growth and development of the Indonesian economy [8].

Another study conducted among university students showed that students have a preference for using the Indonesian Standard Quick Response Code (QRIS) as a payment technology [9].

The advantages of using QRIS are as follows:

- a. Facilitate non-cash transactions (cashless) using the QR Code.
- b. Increase transaction efficiency.
- c. Increase transaction security.
- d. Improve the quality of customer service.
- e. Increase the efficiency of financial management.

Currently, with QRIS, all payment applications from any Operators, both banks and non-banks that are used by the public, can be used in all shops, merchants, stalls, parking, tourist tickets, donations (merchants) bearing the QRIS logo, even though QRIS providers at merchants are different from other providers. applications used by the public.

Merchants only need to open an account or an account at one of the QRIS providers that has been licensed by BI. Furthermore, merchants can receive payments from the public using QR from any application that is the organizer.

QRIS accommodates 2 models of using QR Code Payments, namely Merchant Presented Mode (MPM) and Customer Presented Mode (CPM). However, the implementation refers to the QRIS standard set by Bank Indonesia as a national standard.

The parties in processing QRIS transactions consist of Payment System Service Providers (PJSP), Switching Agencies, Merchant Aggregators; and National Merchant Repository managers, who can process QRIS transactions are Payment System Service Providers who are included in the front end Payment System Service Provider group such as Issuers and/or Acquirers. PJSP and Switching Agencies that carry out QRIS Transaction processing activities must first obtain approval from Bank Indonesia.

QRIS transactions use funding sources in the form of deposits and/or payment instruments in the form of debit cards, credit cards, and/or electronic money that use server-based storage media. The use of funding sources and/or payment instruments is implemented based on proposals from Standard Agencies approved by Bank Indonesia. Nominal QRIS Transactions are limited to a maximum of IDR 10,000,000.00 (Ten Million Rupiah) per transaction. Issuers can set a daily and/or monthly cumulative nominal limit for QRIS Transactions carried out by each QRIS User, which is determined based on the Issuer's risk management [10].

From the several references obtained, it can be concluded that QRIS is a digital payment method technology using a QR code which is intended as an effort to standardize Bank Indonesia for digital payment activities through various electronic financial applications, e-wallets, and mobile banking. QRIS is a program launched by Bank Indonesia (BI) as a digital or online payment standard in Indonesia.

### B. *Microfinance Institution*

In an effort to encourage community empowerment, especially lower-middle-income people and micro, small and medium enterprises (MSMEs), comprehensive support from financial institutions is needed. So far, MSMEs have been constrained by access to funding from formal financial institutions. To overcome these obstacles, in society there have been growth and development of many non-bank financial institutions that carry out business activities for business development services and community empowerment, both established by the government or the community. These institutions are known as microfinance

institutions (MFIs). But many of these MFIs are not yet legal entities and have business licenses. In order to provide a strong legal basis for the operation of MFIs, on January 8, 2013 Law No. 1 of 2013 concerning Microfinance Institutions was promulgated.

Microfinance institutions or MFIs according to the Financial Services Authority or OJK are financial institutions whose function is to provide business development services and community empowerment. In its category, MFIs include non-bank financial institutions [11].

Microfinance Institutions or MFIs consist of various types of financial institutions such as Village Banks, Micro Waqf Banks (BWM), Village Granaries, Market Banks, Employee Banks, Village Credit Banks (BKD), District Credit Banks (BKK), Small People Business Credit (KURK) and many more

The objectives of establishing UKM are:

1. Increasing access to micro-scale funding for the community;
  2. Assist in increasing economic empowerment and community productivity; And
- Help increase the income and welfare of the community, especially the poor or low-income people

### C. . Liquidity

Liquidity is the ability of a company to meet all financial obligations that can be immediately disbursed or that are due. Specifically, liquidity reflects the availability of funds owned by the company to meet all debts that will mature [12]. Another definition of liquidity is matters related to the problem of a company's ability to meet its financial obligations that must be paid off immediately [13].

From some of the definitions above, liquidity is a company's ability to fulfill its obligations, which is also used to show the financial position or wealth of a company. Usually the company's performance assessment will use financial ratio analysis, which then includes the liquidity ratio<sup>12</sup>.

If the level of liquidity of a company is high, then the company's performance will be judged to be getting better. Conversely, if the level of liquidity is low, the company's performance will be considered poor. With a high level of liquidity, a company can more easily get support from various parties such as financial institutions, creditors and raw material suppliers.

### D. Web Service

Web service is an integrated application consisting of software and database, this application allows users to exchange data easily between various systems [14].

From Microsoft's MSDN site, some of the advantages of using web services:

- a. Business functions can be exposed via the Internet
- b. Interoperability
- c. Regular Protocol
- d. Standard use
- e. Use of different programming languages
- f. Use of different platforms

Web services work by sending requests to servers using the HTTP protocol. servers kemudian memproses permintaan tersebut dan mengirimkan kembali hasilnya dalam format XML. Klien kemudian dapat memproses data XML dan menampilkannya ke pengguna.

In conclusion, a web service is a cross-platform application that can be accessed via a network (intranet and internet). Where in the application it provides methods with the aim of being used for application interaction with one another, accessed by URL and receiving responses in the form of JSON, XML, TXT, CSV and others.

## III. PREPARE YOUR PAPER BEFORE STYLING

Before you begin to format your paper, first write and save the content as a separate text file. Keep your text and graphic files separate until after the text has been formatted and styled. Do not use hard tabs, and limit use of hard returns to only one return at the end of a paragraph. Do not add any kind of pagination anywhere in the paper. Do not number text heads-the template will do that for you. Due to the strict of international publication standard (Atlantis Press), please set your full paper not over 6 pages. If not meet the standard, your full paper may be not published, because of it will be rejected from publisher.

Finally, complete content and organizational editing before formatting. Please take note of the following items when proofreading spelling and grammar:

## IV. RESEARCH METHOD

This research is an applied research that aims to develop a web service system that can obtain transaction details per merchant from the QRIS dashboard provided by the National Bank, which in this study is Bank BPD Bali through PKS cooperation. The built Web Service is expected to facilitate the integration of QRIS transactions with existing core banking systems in

microfinance institutions. The research was carried out using a combination of field research and research and development approaches. The research method approach used is adjusted to the stages of research implementation.

#### *A. Field Research*

In the early stages, field research will be carried out with the aim of obtaining the necessary requirements to be able to integrate with existing QRIS systems on the part of bank partners and information about the core banking program that is running at partner microfinance institutions. The locations for field research were Bank BPD Bali, KPN Bali State Polytechnic and LPD Bualu. The method approach used is field research. During the field research activities, observations and documentation of technology, messaging formats, network links, security aspects, PKS creation, as well as other technical and legal matters were carried out.

#### *B. Development Research*

After field research, development research was carried out with the aim of developing a web service system that can integrate QRIS transactions that occur with the core banking system in microfinance institutions. The method approach used is research and development (research and development). The procedure used in developing this application uses the system development life cycle (SDLC) method approach. This method consists of six stages which include: (1) system engineering, (2) analysis, (3) design, (4) coding, (5) testing, and (6) maintenance [15]. The system development life cycle is also known as the waterfall model.

##### a). Systems Engineering

System engineering or system engineering is the initial stage in application development. At this stage identification of information needs is carried out by all elements in the organization. This stage is expected to be able to collect the general content of the database from the organization as a whole.

##### b). Software Requirements Analysis

At this stage the collection of software requirements is carried out. In order to understand the program to be built, a system analyst must understand the information domain needed by the organization, especially the functions needed, system performance, and system interfaces.

##### c). Design

The design process translates the results of the needs analysis into a software representation that can be assessed for quality before coding begins. Software design is a process consisting of several stages, namely: data structure design, software architecture, detailed procedures, and interface characteristics.

##### d). coding

The results of the design must be translated into a form that can be read by a computer. If the design is done in detail, then the coding process can be carried out systematically.

##### e). testing

After coding is complete, then proceed with testing the program. The testing process focuses on the logical internals of the software, to ensure that all statements have been tested. Externally, namely conducting tests to uncover errors and ensure that the specified input will provide actual results as required.

##### f). Maintenance

The software will definitely undergo changes after it is delivered to the customer. Changes will occur after errors have been discovered, or because the software must be adapted to accommodate changes in the external environment.

## V. RESULT AND DISCUSSION

#### *A. Field Research*

This stage of field research aims to obtain the necessary requirements to be able to integrate with existing QRIS systems on the part of bank partners and information about the core banking program that is running at partner microfinance institutions. The first stage to be able to gain access to the PJSP QRIS Dashboard API is to sign an NDA (Non Disclosure Agreement) as a confidential agreement document that may not be shared, even when they are no longer working together. After the NDA is signed, a messaging format document will be provided as a basis for building a web service. From the MFI's perspective, creating a private connection link to the web service is needed to be able to update the core banking database owned by the MFI more securely..

#### *B. Development Research*

##### a. System Engineering and Requirement

At this development stage it begins with designing the orchestration between existing software on the MFI and PJSP sides through a web service that will be built in this study. The transaction begins with QRIS payments at merchants acquired by the MFI. Like the cashless payment process in general, the transaction will be received by the PJSP and the funds will be credited to the deposit account owned by the MFI. Payment details will be stored on the QRIS dashboard which can be accessed by the MFI



No.	Tanggal	Debet	Kredit	Kode	Opr.	Tercetak	Edit/Del
719	16/06/2023		95.000	01	QRIS	<input type="checkbox"/>	Edt Del
720	16/06/2023		914.500	01	IB	<input type="checkbox"/>	Edt Del
721	17/06/2023		1.048.000	01	QRIS	<input type="checkbox"/>	Edt Del
722	20/06/2023		95.000	01	QRIS	<input type="checkbox"/>	Edt Del
723	22/06/2023		341.000	01	IB	<input type="checkbox"/>	Edt Del
724	26/06/2023	200.000		02	EB	<input type="checkbox"/>	Edt Del
725	26/06/2023	2.450		02	EB	<input type="checkbox"/>	Edt Del
726	29/06/2023		314.000	01	QRIS	<input type="checkbox"/>	Edt Del
727	30/06/2023	1.000		07	aslika	<input type="checkbox"/>	Edt Del
728	30/06/2023		5.007	06	four	<input type="checkbox"/>	Edt Del
729	01/07/2023		1.495.500	01	QRIS	<input type="checkbox"/>	Edt Del
730	05/07/2023		2.000.000	01	mergada	<input type="checkbox"/>	Edt Del
731	12/07/2023		431.000	01	IB	<input type="checkbox"/>	Edt Del
		Saldo:					12.715.344

Gambar 3.2 Movement of Merchant Savings

d. *Testing*

Testing is carried out by carrying out integration testing or better known as SIT (System Integration Test). The test results have been documented in the form of SIT minutes which cover several scenarios as shown in table 3.1.

Table 3.1 SIT Result

Scenario	Expected Result	Test Result
Generate token with user and valid password	Successfully got the token	Succeed
Generate token with iinvalid user/password	fail	fail
Generate token with blacklisted client IP	fail	fail
Get transaction details per merchant filter successful transaction status	Succeed	Succeed
Get transaction details per merchant, filter Refund transaction status	Succeed	Succeed
Get transaction details per merchant filter transaction status failed	Succeed	Succeed
Get transaction details per merchant with the wrong token	fail	fail
Get transaction details per merchant with expired tokens	fail	fail
Get transaction details per merchant in the date range where there are no transactions	fail	fail
Get transaction details per merchant with a date range that exceeds 31 days	fail	fail
Get transaction details per merchant incorrect json format	fail	fail

From the results of this SIT test, it must then go through a User Acceptance Test (UAT) in the production environment before the system is actually allowed to go live and be published to the merchants acquired by the MFI..

VI. CONCLUSION

QRIS Merchan Acquisition Web Service has been successfully developed using field research and research and development approaches. The development stage uses the system development life cycle (SDLC) method approach. In accordance with statutory provisions, the signing of the NDA with PJSP is required as a confidential agreement document which may not be shared, even when they are no longer working together. A series of SIT and UAT tests must also be passed before the system can be published and can be used.

This Web Service can connect the QRIS Dashboard on the PJSP side and merchant savings in the MFI in real time. Settlement and Payout processes are the two main functions in this web service.

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