Bank of Russia

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DIGITAL RUBLE:

CURRENT STATUS

CONTENTS

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Cover photo: Shutterstock/FOTODOM
Bldg V, 12 Neglinnaya Street, Moscow, 107016
Bank of Russia website: www.cbr.ru

INTRODUCTION

Russia, just as other countries, has been consistently increasing the proportion of cashless payments in retail and advancing digital payment services. More than 100 economies have been exploring the issue of central bank digital currencies (CBDCs), which are a modern digital form of money. A number of countries have already proceeded to pilot or introduce CBDCs, while others still continue the studies.

Russia is in the leading group of economies developing CBDCs.

The Bank of Russia launched the project of the Russian CBDC – the digital ruble – in April 2021 after the release of its Concept. For the purposes of the project, the Bank of Russia designed a digital ruble platform and participated in the development of a legal framework and, as early as August 2023, progressed to the pilot testing of the platform on real transactions.

Over the course of the piloting, the development of the legal framework and the digital ruble platform continued, while the Bank of Russia tested the mechanisms of interaction between the participants.

This document presents intermediate results of the pilot testing of the digital ruble and outlines the priorities for the project's further development.

1. THE DIGITAL RUBLE AS THE NEXT STAGE OF MONEY EVOLUTION

1.1. Goals and objectives of the digital ruble

In the age of digital transformation of finance, central banks are increasingly exploring the capabilities of various CBDC models. In accordance with the international classification,[1] CBDCs can be divided into two key types, specifically retail and wholesale CBDC models.

The **retail model** features a wider range, higher frequency, and smaller amounts of transactions. Retail CBDCs are accessible to a broader range of economic agents, including individuals and legal entities, and can be used as an instrument to make everyday payments. Countries are conducting the pilot testing of retail CBDCs primarily to enhance domestic settlements: a CBDC is used as an additional means of money transfers and payments inside a particular jurisdiction (e.g. China, Turkey, South Korea, Iran, Israel, Sweden. etc.). The retail model can be subdivided into two conceptual types, namely a one-tier and a two-tier model. The former implies direct communication between the central bank and CBDC users. In the two-tier model, the central bank issues, regulates and supervises the CBDC, while financial institutions in turn interact with individuals and legal entities (e.g. provide access to CBDC accounts through their infrastructures or distribute the CBDC among households and businesses).

The **wholesale model** focuses primarily on banks for them to use CBDCs for settlements in transactions conducted in financial markets. This model provides for large interbank transactions, but the range of these transactions is considerably smaller than that offered by the retail model, which is associated with the type of economic agents – transaction parties. The wholesale model is also implemented for the purpose of cross-border settlements (e.g. in France, Australia, Qatar, etc.).

In addition to the wholesale and retail models of CBDCs, a number of countries are implementing the so-called **hybrid model** (e.g. the UK, India, Brazil, etc.), which combines the features and characteristics of the retail and wholesale models, taking into account the scope of CBDC use and the objectives that CBDCs address, among other things.

Creating and advancing the digital ruble platform, the Bank of Russia is aiming to:
- lower costs on payments and money transfers for people, businesses, and the government;
- enhance financial inclusion;
- promote competition in the payment market;
- contribute to launching innovative products and services by financial market participants; and
- develop new mechanisms for payments and money transfers, including cross-border settlements.

Taking these goals into account, the digital ruble platform was designed as a two-tier retail model, which enables the Bank of Russia to use both banks' infrastructures and the national payment infrastructure to provide services to clients.

[1] Bank for International Settlements, Central bank digital currencies // Committee on Payments and Market Infrastructures.

1.2. The digital ruble's potential

Going beyond an ordinary means of payment, the digital ruble opens up opportunities to transform the core processes in the economy. The digital ruble can enhance the pace, transparency, and security of financial transactions. The key aspects substantiating the potential of the digital ruble are as follows: cutting-edge financial technologies, more efficient government finance management, broader financial inclusion, and a new-generation means of payment for cross-border settlements.

State-of-the-art financial technologies

The innovations will be based on smart, or self-executing contracts. A smart contract is an algorithm (a set of rules) integrated into the digital ruble platform and automating money transfers between users subject to the preset parameters – the terms of a transaction.

A smart contract executes the terms of a transaction strictly following the logic agreed upon by the parties to the transaction and the parameters built into the code. A smart contract can determine all rules and terms, thus presetting the relationships between the counterparties and preventing a possible failure to execute a transaction. The digital ruble platform will enable instantaneous execution of smart contracts, in contrast to cashless payments that depend on banks' business processes.

Owing to smart contracts, the government receives fundamentally new opportunities to manage the processes of control[2] over the targeted use of budget funds.

Through smart contracts, businesses will be able to reduce costs and increase the security of transactions. Thus, smart contracts allow processing payments for services upon their provision, automating wage payments to staff, and paying compensations upon occurrence of an insured event. Furthermore, smart contracts enable businesses to manage cash flows more efficiently, e.g. through automated redistribution of funds inside a group of companies.

As to individuals, smart contracts will be a new instrument to automate routine transactions, such as payments for housing and utility services, rent, monthly subscriptions, and services. In addition, transactions to purchase real estate, cars, and services will become more convenient and secure as neither of the parties may change the terms unilaterally after they have been fixed in the system that cannot be circumvented.

Higher efficiency of government finance management

An essential development area of the project is the use of the digital ruble in fiscal processes, which can offer a number of important advantages to enhance the allocation of financial aid and make this procedure more efficient. Some of the advantages are highlighted below.

Higher transparency. The digital ruble can enhance the transparency of transactions, thus reducing the risks of fraud and abuse and simplifying the audit and control processes.

Higher speed and lower costs. The digital ruble will enable direct payments from a payer to a payee without intermediaries (banks, payment systems) and automated processing of all transactions without any manual intervention.

Thus, people and businesses will receive government aid faster, which is critical in emergency situations.

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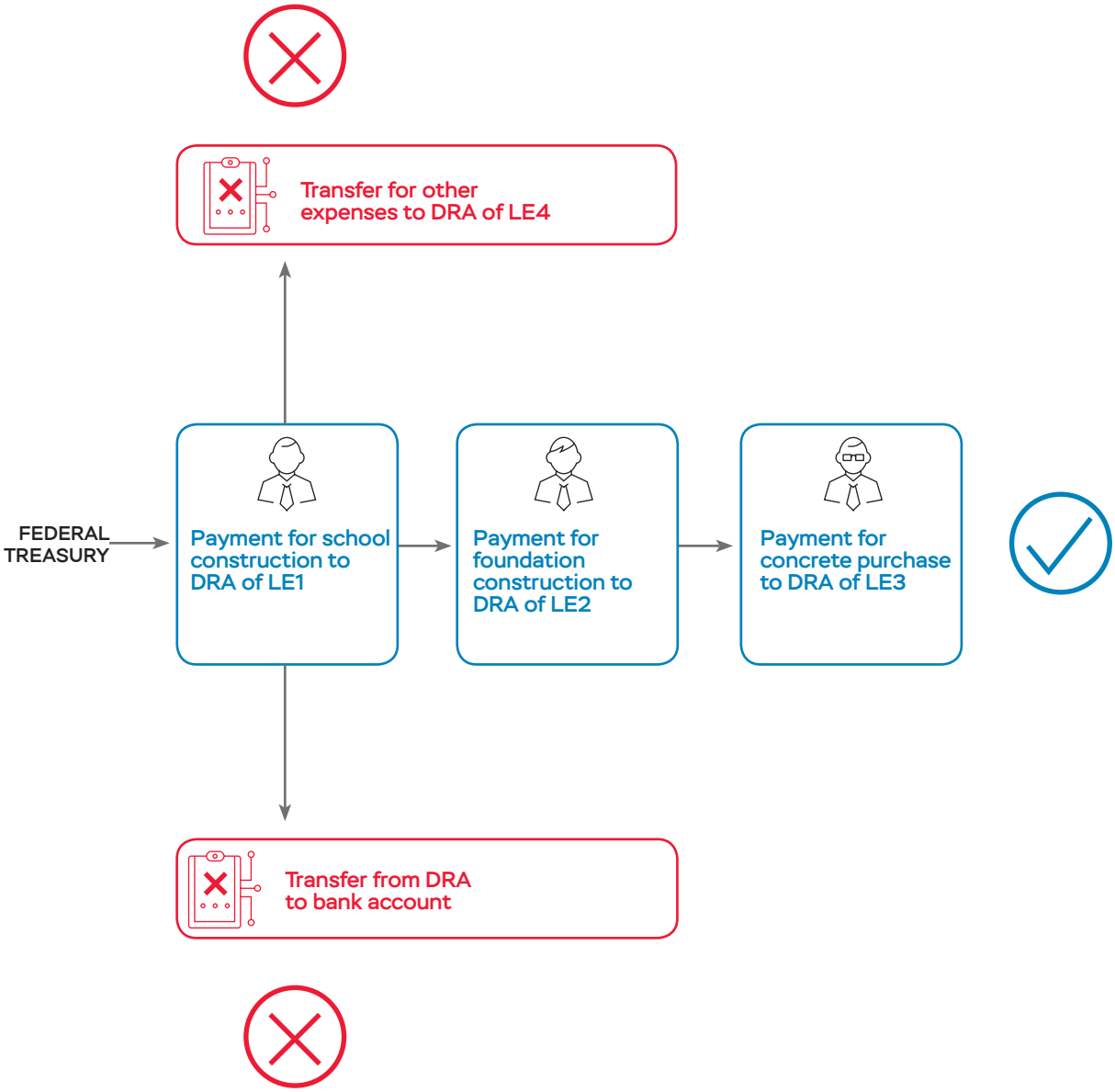
[2] In compliance with Russian law.

Automating budget payments to individuals and companies, the digital ruble will lower the related administrative costs by reducing manual work and removing intermediaries.

Integration with other systems. The digital ruble platform can be integrated with other government systems and platforms, which simplifies the interaction and enhances interagency coordination in the process of payments.

Feedback and data analysis. The digital ruble will enable the accumulation of data on payments and their influence on the economy, which will further on help improve the approach to paying subsidies and their terms.

SCENARIO OF POSSIBLE USE OF DIGITAL RUBLE IN GOVERNMENT PROCUREMENTS *Chart 1*



Note. Abbreviations used in charts: DR – digital ruble; DRA – digital ruble account; LE – legal entity.

Financial inclusion

The digital ruble is to become an innovative means of payment for all users regardless of their income level, technical skills, and geographical location.

An individual or a company will be able to open and use a digital ruble account (a digital wallet) with any bank via its mobile app. Digital ruble accounts are on the Bank of Russia's digital ruble platform and not linked to any particular bank.

An important element of financial inclusion for individuals is zero fees for transactions conducted via mobile banking apps. This not only reduces the financial burden but also encourages the use of the digital ruble in locations with a limited number of operating banks.

Cross-border settlements

The digital ruble offers breakthrough opportunities for cross-border settlements, eliminating multiple barriers that are typical of conventional international payments. The digital ruble will enable direct transactions between counterparties from different countries without multi-intermediary chains, thus accelerating a transaction from several days to a few minutes and reducing the fees.

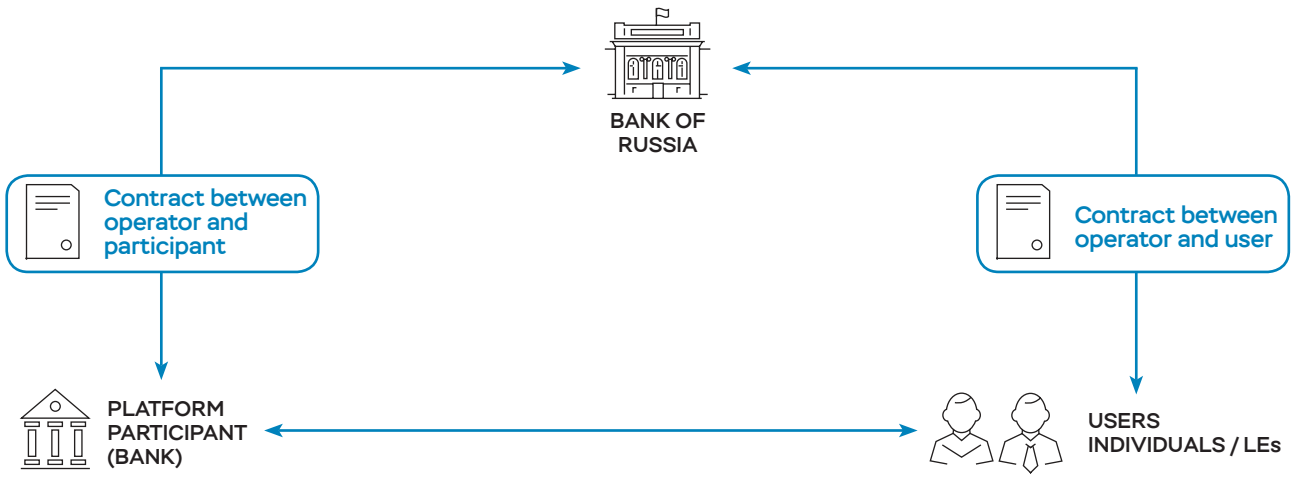
1.3. The Bank of Russia's model of the digital ruble

The digital ruble platform was designed based on a two-tier retail model, that is, users interact with the digital ruble platform via market participants' infrastructures and not directly through the platform operator.

The platform operator is the Bank of Russia. It establishes the rules, standards, and fees for digital ruble transactions.

The relationships of the platform operator with platform participants (banks) and platform users are regulated by the contracts that the operator concludes with a platform participant (a bank) and with a platform user.

CONTRACT MODEL ON DIGITAL RUBLE PLATFORM *Chart 2*



That said, market participants continue to provide conventional banking services to users based on respective agreements between banks and their clients.

People and businesses will be able to access their digital ruble accounts on the digital ruble platform through any bank – platform participant where they are clients and have a bank account or a personalised (corporate) means of payment. This approach will enable users to manage their funds in digital ruble accounts through conventional channels, such as mobile banking apps and remote banking systems.

The effective standards, which regulate the procedure and cases for disclosing information classified as banking secrecy, establish a clear framework for both banks and the platform operator. Banking secrecy includes information on digital ruble accounts, their balances, and digital ruble transactions conducted by digital ruble platform users.

Hence, the competent government agencies will only be allowed to access information on digital ruble transactions in the cases provided for by law, similarly to how this process is organised in relation to data about transactions in accounts with commercial banks.

The two-tier scheme of interaction between users and the platform operator through digital ruble platform participants is also implemented in the existing fee model. As the platform operator, the Bank of Russia provides services to individuals and legal entities by transferring digital rubles on the digital ruble platform according to the fees that are common to all platform users.

For individuals, all digital ruble transactions are fee-free, which is a principled position of the Bank of Russia aimed at making digital ruble transactions as affordable to households as possible.

For businesses, the fees for digital ruble transactions are lower than the fees in the Faster Payments System or acquiring fees, which enables companies to reduce their transaction costs.

FEES PAYABLE BY PLATFORM USERS FOR PLATFORM OPERATOR SERVICES *Table 1*

List of transactions		Fees
1. A digital ruble transfer from a consumer to a consumer (a C2C transaction) or from a consumer to a business (a C2B transaction)	payable by the payer	0.00% of the transfer amount
2. A digital ruble transfer from a consumer to a business (a C2B transaction), other than a payment for housing and utility services	payable by the payee	0.30% of the transfer amount, but no more than ₽1,500.00 per transaction
3. A digital ruble transfer from a consumer to a business (a C2B transaction) to pay for housing and utility services[1]	payable by the payee	0.20% of the transfer amount, but no more than ₽10.00 per transaction
4. A digital ruble transfer from a business to a consumer to refund an earlier transferred amount in digital rubles (a B2C refund)	payable by the payer	0.00% of the transfer amount
5. A digital ruble transfer from a business to a business (a B2B transaction)	payable by the payer	₽15.00 per transaction

[1] *C2B transactions will be grouped depending on activity-based classification of users – legal entities.*

The fees were approved by the Bank of Russia Board of Directors in August 2023 and are available on the regulator's website.

In turn, banks – platform participants provide services to the Bank of Russia by arranging individuals' and legal entities' interaction with the digital ruble platform through mobile banking apps and remote banking systems, respectively. The Bank of Russia pays commissions for these services (Table 2) to platform participants, which were also approved by the Bank of Russia Board of Directors.

COMMISSIONS PAYABLE BY THE PLATFORM OPERATOR TO PLATFORM PARTICIPANTS *Table 2*

List of transactions	Commissions
1. A digital ruble transfer from a consumer to a consumer (a C2C transaction)	
The commission is payable to the platform participant from which the platform received the money transfer order	0% of the money transfer amount
2. A digital ruble transfer from a consumer to a business (a C2B transaction), other than a payment for housing and utility services	
The commission is payable to the platform participant from which the platform received the money transfer order	0.1% of the money transfer amount, but no more than ₽500.00 per transaction
The commission is payable to the platform participant which provided the payee – legal entity with money transfer details received from it in the form of a code	0.15% of the money transfer amount, but no more than ₽750.00 per transaction
3. A digital ruble transfer from a consumer to a business (a C2B transaction) to pay for housing and utility services	
The commission is payable to the platform participant from which the platform received the money transfer order	0.05% of the money transfer amount, but no more than ₽2.50 per transaction
The commission is payable to the platform participant which provided the payee – legal entity with money transfer details received from it in the form of a code	0.1% of the money transfer amount, but no more than ₽5.00 per transaction
4. A digital ruble transfer from a business to a business (a B2B transaction)	
The commission is payable to the platform participant from which the platform received the money transfer order	₽10.00 per transaction

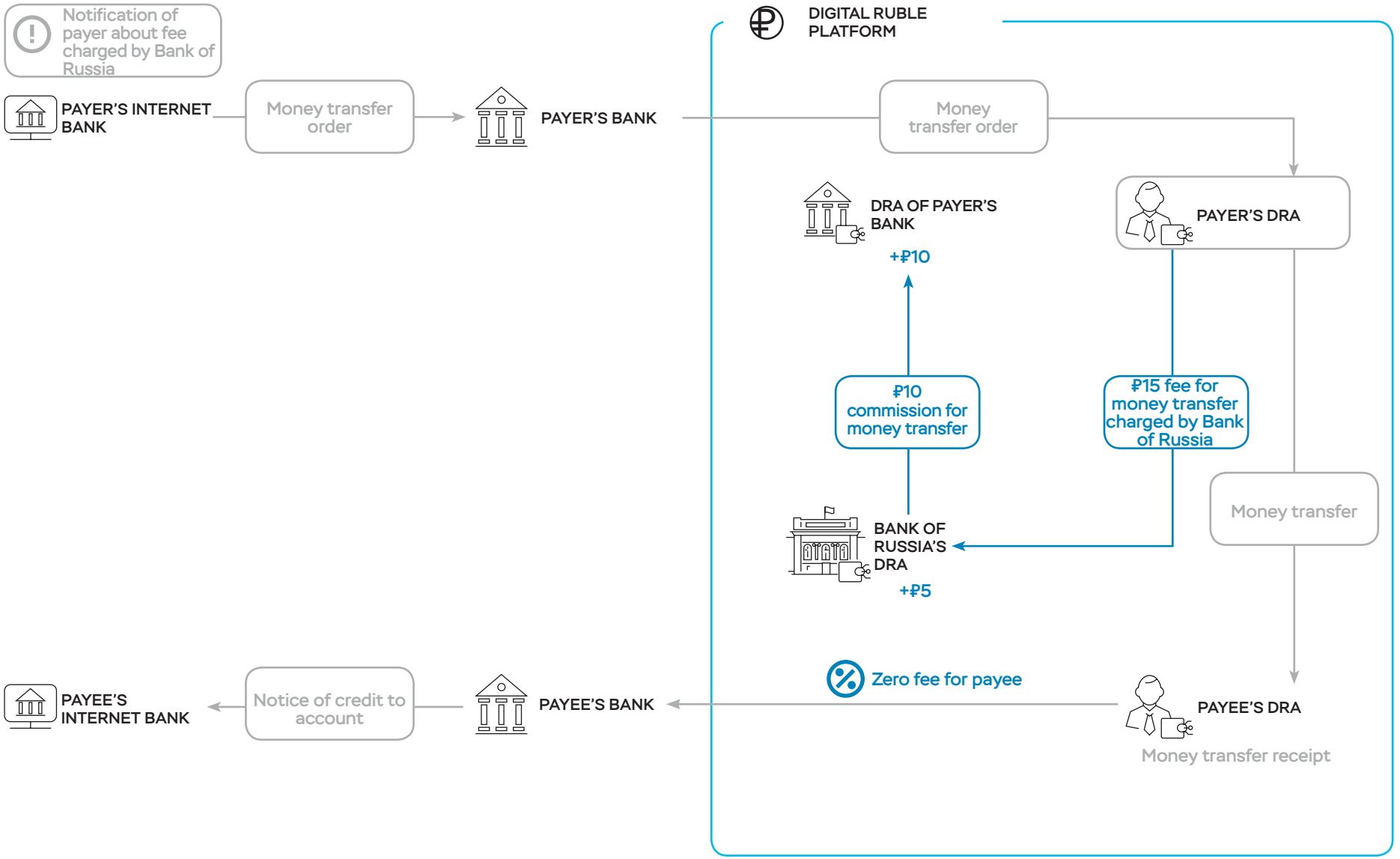
The platform operator will charge platform users for its services in digital rubles. As regards commissions for platform participants' services, the platform operator will also pay them in digital rubles and credit them to platform users' digital ruble accounts. The size of a fee due to the operator, the size of a commission due to the platform participant, the fee payer, and the commission recipients will be determined on the digital ruble platform. All transactions on the digital ruble platform (including commission payments) are planned to be conducted online.

The Bank of Russia set zero fees for providing access to the digital ruble platform for users, as well as for accepting orders and sending orders to the platform operator, in order to prevent platform participants from charging their clients.

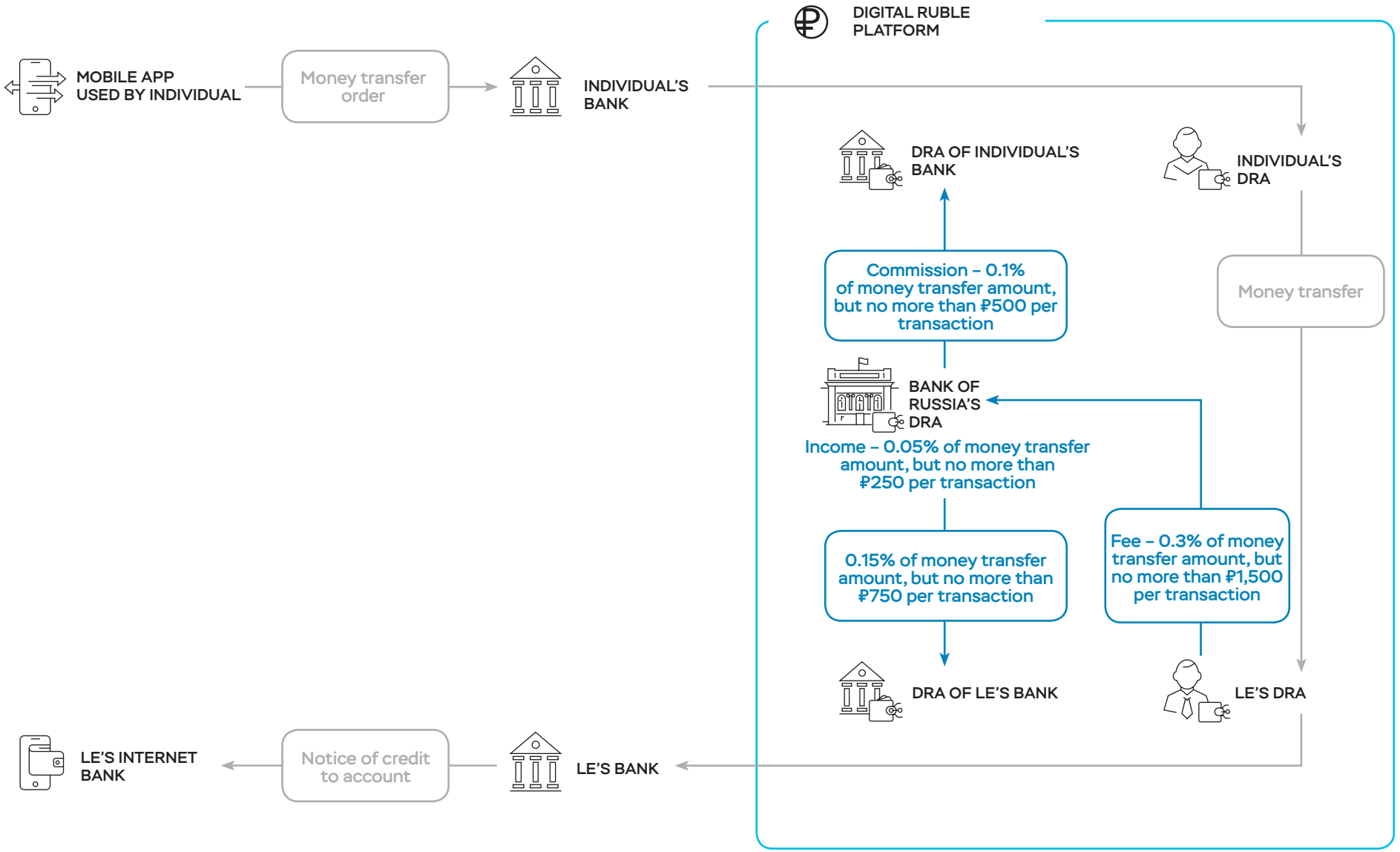
For the period of the pilot testing on the platform, the Bank of Russia limited the maximum amount that an individual may transfer from his/her bank account to his/her digital ruble account to ₽300,000 per month. This limit is planned to remain effective after the start of the large-scale use of the digital ruble in order to control the risk of liquidity outflows from bank accounts to digital ruble accounts. No other limits are planned to be set on the platform.

Currently, the digital ruble platform offers a grace period during which no fees are payable by legal entities and no commissions are due to banks – platform participants.

FEE MODEL FOR B2B TRANSACTIONS (MONEY TRANSFERS BETWEEN LEGAL ENTITIES) *Chart 3*



FEE MODEL FOR C2B TRANSACTIONS (MONEY TRANSFERS FROM INDIVIDUALS TO LEGAL ENTITIES) *Chart 4*



1.4. Legal regulation

To establish a legal and regulatory framework for digital ruble transactions, the lawmakers adopted and enacted the related federal laws drafted with the participation of the Bank of Russia. The legislation thus defined the legal status of the digital ruble, including the list of permitted digital ruble transactions. In addition, the Bank of Russia officially approved types of digital ruble accounts and the procedure for maintaining them, types of digital ruble transactions and the procedure for conducting them, the functions of and the requirements for platform participants, as well as a number of other aspects of the functioning of the digital ruble platform. Furthermore, the Bank of Russia established the risk management procedure, the procedure for supporting the continuity of the operation of the digital ruble platform, the requirements for information protection by platform participants, and the procedure for countering digital ruble transactions having signs of authorised fraud.

As the digital ruble is scaled up and adopted, the Bank of Russia will contribute to the creation of and support for the required legal framework.

1.5. The digital ruble's impact on monetary policy and financial stability

Large-scale introduction of the digital ruble will redistribute households' and businesses' funds between cash, bank account balances, and digital ruble accounts. This will impact banks' needs for transactions with the Bank of Russia, which the regulator should take into account when fine-tuning the operational procedure of its monetary policy and in order to maintain financial stability. The Bank of Russia has the required range of instruments to effectively limit the scale of this impact.

Just like cash, digital rubles will only be issued by the Bank of Russia. The issue of digital rubles is only possible as a result of the transfer of funds, which individuals and companies hold in their bank accounts, to digital ruble accounts. Banks' clients will also be able to deposit cash to bank accounts to then transfer these funds to their digital ruble accounts. As a result of these transactions, the amount of cash in circulation or bank account balances will be decreasing, while the amount of digital rubles will be growing. Similarly, money transfers from digital ruble accounts to bank accounts will be reducing the amount of digital rubles, while bank account balances will be increasing. Therefore, the digital ruble will only change the composition of money supply. The issue of the digital ruble as such will not expand ruble money supply (the M2 monetary aggregate), and all else being equal, it will remain unchanged.

The ratio between different forms of money will depend on a number of factors, including the convenience of their use, transaction costs, and the level of interest rates on bank deposits. The Bank of Russia will not accrue interest on digital ruble balances on the platform. Interest will only accrue on funds deposited with banks, which is why bank accounts will remain attractive.

The Bank of Russia will take into account households' and businesses' demand for digital rubles in the course of its liquidity management operations and will fully offset an outflow of liquidity, including if funds are transferred from clients' bank accounts to digital ruble accounts. As a result, money market rates will remain close to the key rate, thus enabling the Bank of Russia to achieve the inflation target.

Furthermore, the limit set on the amount that an individual may transfer from his/her bank account to his/her digital ruble account will also help banks adapt to the introduction of the digital ruble and mitigate the risk of an outflow of funds from bank accounts.

2. THE PILOT PROJECT OF THE DIGITAL RUBLE

2.1. Milestones of the project

In October 2020, the Bank of Russia released its consultation paper A Digital Ruble (hereinafter, the Paper) to encourage a comprehensive discussion of approaches to implementing the digital ruble project. Any respondent was given two months to provide a reasoned opinion on the issues addressed in the Paper. The publication was met with great interest by financial market participants, businesses, government authorities, and society. The Bank of Russia received feedback from a considerable number of respondents, most of whom supported the Bank of Russia's initiative to launch the national digital currency and create the digital ruble platform.

In April 2021, following the discussion of the Paper and taking into account the analysis of the comments and suggestions received from financial market participants and other respondents, the Bank of Russia published its Digital Ruble Concept, which described benefits of the digital ruble, its target model, approaches to introducing the national digital currency in terms of monetary policy, and milestones of the project. Simultaneously with the release of the Concept, the Bank of Russia began to design a prototype of the digital ruble platform and prepare proposals on amendments to federal laws needed to implement and use the digital ruble.

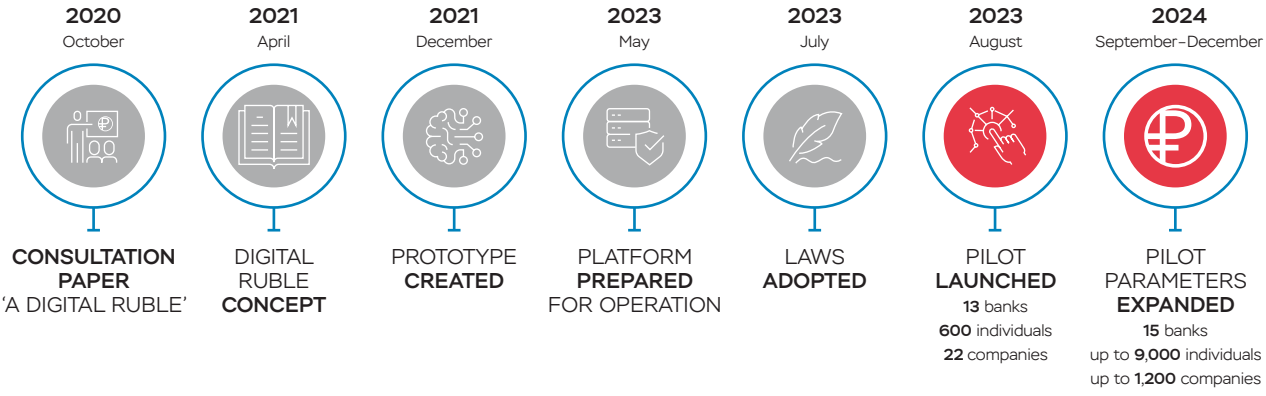
In June 2022, in an experimental environment, the Bank of Russia and the banks included in the pilot group tested C2C money transfers, C2B payments for goods and services via a static link, and B2C refunds of payments for goods and services using experimental digital rubles. In September 2022, the Bank of Russia tested customer journeys in the participants' apps, and on 29 December 2022, a package of legislative proposals was submitted to the Government for consideration.

In May 2023, the Bank of Russia commissioned the digital ruble platform, and on 11 July 2023, the State Duma adopted the federal laws which enabled the Bank of Russia to start the pilot testing of the digital ruble on real transactions.

On 15 August 2023, the Bank of Russia began the pilot testing of the digital ruble on real transactions with the engagement of a limited number of users and participants. In the first stage, 13 banks, about 600 individuals, and 30 trade and service companies from 11 Russian cities (filling stations, insurance market participants, charity organisations, communications providers, etc.) took part in the piloting.

In 2024, the Bank of Russia expanded the parameters of the pilot testing to gradually increase the number of users to 9,000 individuals and 1,200 businesses.

DIGITAL RUBLE PROJECT MILESTONES *Chart 5*



2.2. Goals and objectives of the piloting

The pilot testing of the digital ruble is an important step towards creating a convenient, secure, and popular financial payment instrument.

The main goals of the piloting are to check the operability of the technology in real conditions and the effectiveness of the underlying model, explore the scenarios of digital ruble use, and perfect the basic transactions and the process of interaction between users and platform participants and between the platform operator and platform participants. Furthermore, the piloting provides a clearer understanding of how the digital form of money integrates into people's and businesses' everyday lives, how to maintain the balance between innovations and security, and what areas of the legislation require amendments.

Jointly with the banks – platform participants, the Bank of Russia is testing the processing of transactions and its speed, the resilience of the digital ruble platform to high utilisation rates, and the security of the system (cyberattack protection, data privacy, etc.).

Another critical objective is to assess the interoperability of the digital ruble platform and the existing financial infrastructure. The piloting makes it possible to comprehend how the national digital currency integrates with payment services, banking apps, and government platforms.

When developing the digital ruble platform, the Bank of Russia paid particular attention to the customer journey. Today, the Bank of Russia is making extensive efforts to enhance certain components of the customer journey, taking into account the feedback from the participants in the pilot testing.

Another critical objective of the piloting was to organise operational processes on the digital ruble platform.

The design of the digital ruble platform allows its integration with foreign CBDC platforms to conduct bilateral and multilateral cross-border settlements. In view of this, one of the goals of the piloting is to advance the functions of the digital ruble platform so as to enable cross-border settlements.

By allowing the integration of the digital ruble platform with foreign CBDC platforms, it will be possible to tackle the following problems in the systems for multilateral cross-border settlements:

- Payment infrastructures involving a large number of intermediaries, including from unfriendly states, which are used to conduct cross-border money transfers increase the time of their processing, the uncertainty about their successful completion, the cost of services, and sanction-related risks.
- The speed of settlements is limited and depends on the accessibility of existing payment systems.

By implementing the mechanism of cross-border settlements using CBDCs, it will become possible to address the above constraints and risks.

2.3. The status of the piloting. Progress to date

Currently, the following basic transactions are tested on the digital ruble platform:

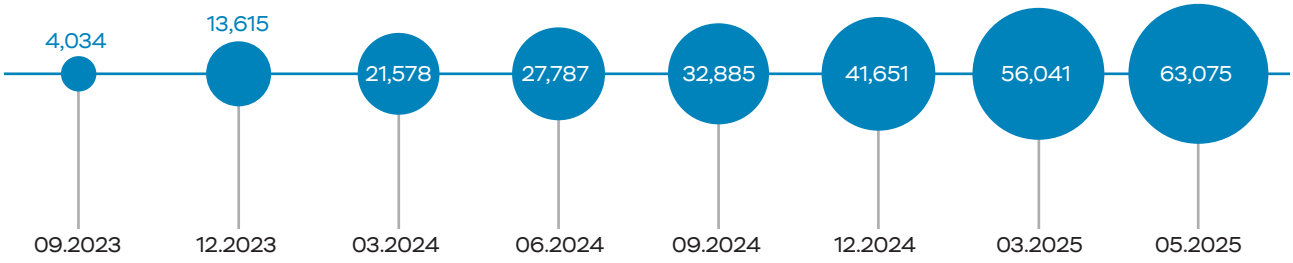
- C2C digital ruble transfers;
- QR code-based C2B payments for goods and services;
- B2B digital ruble transfers;
- B2C refunds of payments for goods and services (including full and partial refunds in an amount not exceeding the payment); and
- simple smart contracts providing for regular C2C money transfers on the date specified by the payer, as well as one-time C2C money transfers on the specified date and at the time chosen by the payer.

The pilot project in numbers

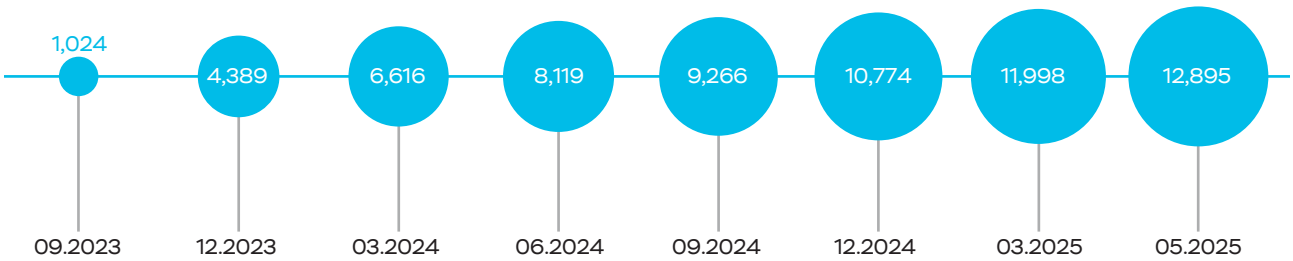
As of the end of May 2025, individuals and legal entities had 2,500 digital wallets opened on the digital ruble platform and transactions with the national digital currency were available to clients of 15 banks from over 150 localities. The participants in the piloting conducted more than 63,000 money transfers, made nearly 13,000 payments for goods and services, and executed over 17,000 smart contracts.

GROWTH OF C2C AND C2B TRANSACTIONS ON DIGITAL RUBLE PLATFORM *Chart 6*

Number of C2C money transfers, cumulative



Number of C2B money transfers, cumulative



Operations support

From the first day of the testing of the digital ruble platform prototype, the Bank of Russia has been arranging the business processes related to operations support. Today, the Bank of Russia provides information and operations support for the banks participating in the pilot project and users.

The Bank of Russia has launched centres providing services to users of the digital ruble platform (hubs) in cities located in different time zones, namely in Samara, Irkutsk, and Khabarovsk. These hubs process transactions conducted on the digital ruble platform by users, provide settlement services, control compliance with the AML/CFT/CFP[1] requirements,[2] assist users in solving technical issues, and supply various data and documents related to the management of digital ruble accounts.

Individuals and businesses can already now contact the Bank of Russia's 24/7 call centre to request up-to-date information on general issues associated with the digital ruble.

Furthermore, the Bank of Russia has launched a special support portal for the banks – platform participants that functions on a 24/7 basis.

The digital ruble in fiscal processes and development of smart contracts

In the conditions of the extensive digitalisation of the financial system and the transformation of fiscal processes, the introduction of the digital ruble opens up new opportunities to improve the transparency, speed, and security of transactions.

In 2024, jointly with the Federal Treasury, the Bank of Russia successfully tested digital ruble transactions to pay student allowances from the federal budget and fines to the federal budget using experimental digital rubles.

Concurrently, the Bank of Russia, representatives of the executive authorities of a number of Russian regions, and the banks – platform participants are making efforts to enable the use of digital rubles in regional fiscal processes, including through smart contracts. In particular, together with the governments of the Republic of Tatarstan and the Chuvash Republic, the Bank of Russia is exploring the processes of using smart contracts to control the targeted use of budget funds.

Furthermore, smart contracts can be used in B2B settlements. One example of such a smart contract is a 'secure' transaction, that is, a guaranteed payment for a service made automatically after the provision of the service has been confirmed.

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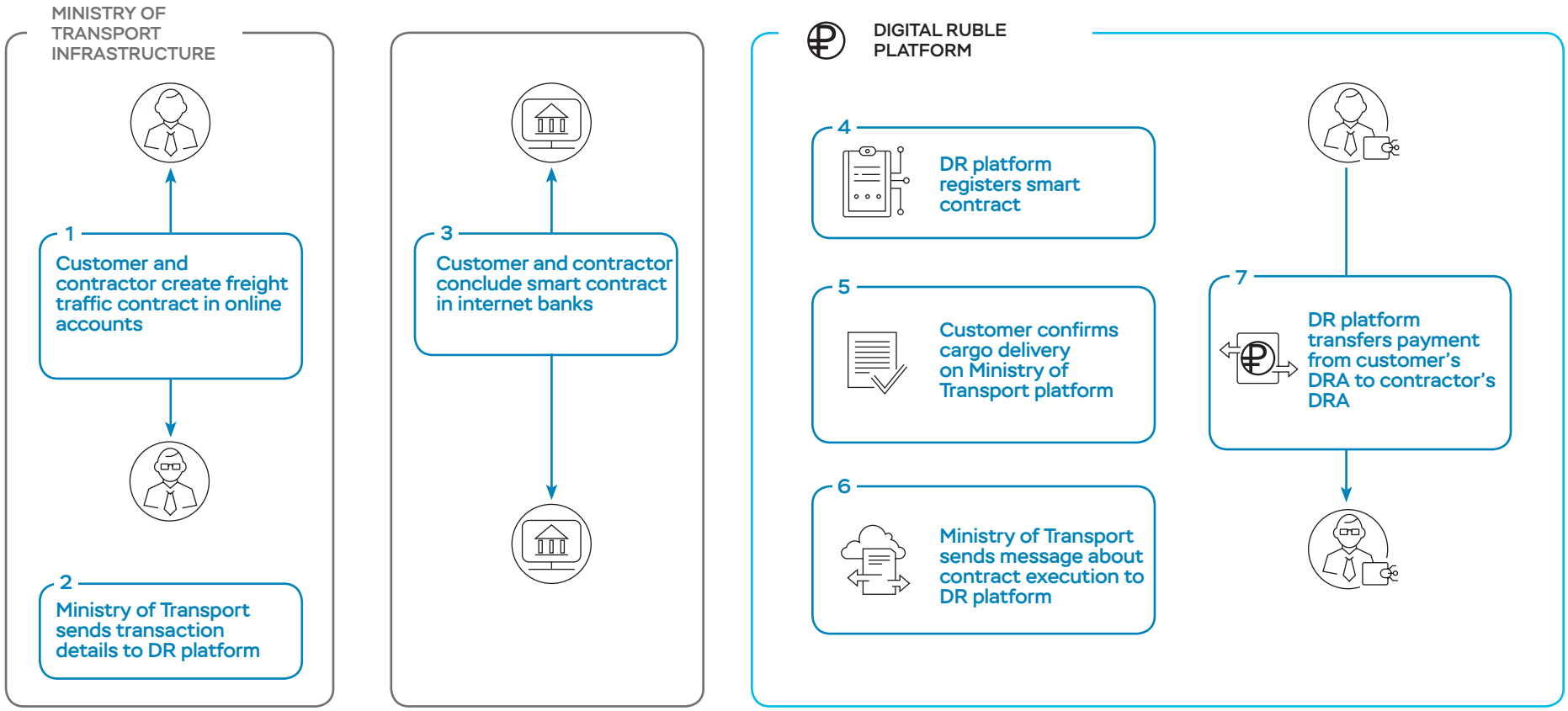
1 Anti-money laundering, countering the financing of terrorism and proliferation of weapons of mass destruction.

2 In the cases when compliance with these requirements is the responsibility of the digital ruble platform operator according to law.

'SECURE' TRANSACTION SCENARIO THROUGH EXAMPLE OF FREIGHT TRAFFIC

Chart 7



The use of NSPK's existing infrastructure

In 2024, the Bank of Russia integrated into the digital ruble platform the option of payments for goods and services using QR codes generated based on the existing infrastructure of National Payment Card System Joint Stock Company (hereinafter, NSPK). This approach helps mitigate trade and service companies' costs related to the acceptance of digital ruble payments.

The use of NSPK's infrastructure for QR code-based payments in points-of-sale or in the internet helps make these payments secure and habitual for users, while such payments will actually be made inside the digital ruble platform.

Jointly with financial market participants, the Bank of Russia is making efforts to implement a universal QR code, which is a unified technological standard enabling people to scan a code and choose any means of payment at their discretion, e.g. the Faster Payments System or any bank's payment platform. A universal QR code can already be used to make digital ruble payments as well. This will expand the options of cashless payments for goods and services purchased by households. The implementation of a universal QR code is aimed at:

- enhancing the convenience of cashless payments in points-of-sale for individuals and preventing misinformation in the course of payments for goods, works, and services;
- ensuring equal access to the payment infrastructure for all payment market participants to make small banks independent of one or several large players and thus promote competition; and
- accelerating the deployment in the payment infrastructure of new payment options, including with the use of digital rubles.

International cooperation in the area of CBDCs

The development of CBDCs as a cross-border settlement instrument is encouraging active international cooperation.

Specifically, in order to explore the high-level issues of cross-border settlements using CBDCs, including the digital ruble, the Bank of Russia has been developing the communication with foreign financial market regulators. In particular, the Bank of Russia and regulators of a number of friendly states have been discussing possible options for the bilateral integration of national CBDC platforms. Furthermore, as part of multilateral cooperation, including in BRICS, the Bank of Russia and foreign regulators have been exploring the issues of using CBDCs in cross-border settlements.

Nevertheless, it should be stressed that, to implement the projects of cross-border settlements using CBDCs, foreign partners need to have the required technological capacities and be ready to cooperate in this area.

Given the global interest in the development of CBDC projects and CBDC integration for faster, cheaper, and more convenient international settlements as well as the importance of establishing independent financial messaging channels, the Bank of Russia will continue its efforts in this area.

2.4. Challenges revealed in the course of the piloting

Implementing the pilot project of the digital ruble, the Bank of Russia and the participants in the piloting faced a number of challenges.

The first is to deliver a seamless customer journey in compliance with the data privacy requirements as these two aspects directly influence users' confidence in the system and its resilience.

To this end, when creating the digital ruble platform, the Bank of Russia together with the competent federal executive authorities designed and implemented architectural, technical and technological measures to ensure information security and cyber resilience. Simultaneously, the Bank of Russia paid particular attention to the convenience of the customer journey: platform users access their digital ruble accounts through conventional mobile banking apps. That said, the customer journey is unified and is the same in all mobile apps of the banks – platform participants. For this purpose, the Bank of Russia issued a digital ruble platform standard[3] unifying the customer journey on the platform. This approach ensures users' independence of a particular bank, on the one hand, and supports operations through the interfaces that are habitual for users, on the other hand.

Another challenge was to promote people's confidence in the national digital currency. People need time to get used to the digital ruble, like to any other innovation.

The Bank of Russia is making efforts to increase individuals' and businesses' awareness. In particular, the regulator organises financial literacy events for children and adults, training programmes for executive authorities, business associations, and small and medium-sized enterprises, as well as publishes information materials about the procedure of settlements in digital rubles. The Bank of Russia plans to expand further the scale and geographical coverage of these events.

The increase in the number of the participants in the piloting will be gradual and step-by-step. In the future, this will help eliminate psychological and other barriers, related to the use of digital rubles, among people and businesses.

Furthermore, it seems reasonable to prioritise the development of services depending on demand from economic agents.

2.5. Development of the functional capabilities of the digital ruble platform

The digital ruble is designed to meet people's and companies' demand for transactions, taking into account the maturity level of the payment market, and to open up new opportunities in the payment market using digital technologies. Jointly with market participants, businesses, government authorities, and the participants in the piloting, the Bank of Russia has been advancing the most popular services available on the digital ruble platform. The Bank of Russia prioritises the following key areas for the development of the functions of the project.

Functional development of the digital ruble platform

The Bank of Russia is advancing the digital ruble platform expanding its functional capabilities for individuals, legal entities, and government authorities. In particular, the Bank of Russia plans to:

- develop e-commerce functions: payments initiated by points-of-sale;
- expand user categories (support for individual entrepreneurs);

[3] Digital ruble platform standard Requirements and Recommendations for User Interfaces for Digital Ruble Transactions.

- implement the option of payments according to registers, that is, mass and regular transactions, such as salary payments;
- introduce the option of payments based on the invoice issued by the payee, etc.

Development of smart contracts

The Bank of Russia plans to develop smart contracts on the digital ruble platform as their use opens up new opportunities for people, businesses, and government authorities. Smart contracts can become the basis for digitalisation of the economy by automating routine transactions and minimising their costs.

The digital ruble in fiscal processes

The Bank of Russia, the Ministry of Finance, and the Federal Treasury are making efforts to enable the use of the digital ruble in fiscal processes.

In 2025, the Bank of Russia, together with the Federal Treasury, plans to carry out the piloting of certain types of payments from the federal budget using real digital rubles. Based on the results of the pilot testing, the authorities will make a decision on scaling up the use of the digital ruble in fiscal processes.

Operations support

The Bank of Russia plans to set up a special phone line within the Single Communication Centre where users will be able to receive not only general information about the digital ruble but also data on their digital ruble accounts, introduce or lift restrictions on their accounts, request an account statement, etc.

Another essential element is the integration of the system of disputes to settle possible disputes between users, e.g. about a payment for a product, a wrong payment amount, or technical failures.

To provide information support to users, the Bank of Russia plans to create a special section on its website, which will contain up-to-date information about how to open a digital ruble account and conduct digital ruble transactions.

Development and update of the project's regulatory framework

To enable the piloting of the digital ruble in fiscal processes, it is necessary to introduce amendments to the Budget Code of the Russian Federation that will provide for:

- the opening of a digital ruble account on the digital ruble platform to the Federal Treasury;
- fee-free maintenance of the Federal Treasury's digital ruble account; and
- the specifics of the use of the Federal Treasury's single digital ruble account, in particular:
  - to make digital ruble payments from the budget, the Federal Treasury's digital ruble account will be topped up from the treasury single accounts of the Federal Treasury Regional Branches in the Bank of Russia Payment System;
  - to make digital ruble payments to the budget, the amount in digital rubles should first be credited to the Federal Treasury's digital ruble account and then transferred to the treasury single accounts of the Federal Treasury Regional Branches in the Bank of Russia Payment System.

Control over foreign exchange transactions on the digital ruble platform, including as part of the integration with foreign CBDC platforms, is planned to be organised based on amendments proposed to the laws regulating foreign exchange, including Federal Law No. 173-FZ.[4]

[4] Federal Law No. 173-FZ, dated 10 December 2003, 'On Foreign Exchange Regulation and Foreign Exchange Control'.

3. THE TECHNOLOGICAL PLATFORM AND INFRASTRUCTURE

3.1. The architecture of the digital ruble platform

The digital ruble platform is based on domestic hardware and software complexes and software solutions put on the Unified Register of Russian Software and Databases and the Unified Register of Software and Databases of the Eurasian Economic Union Member States, as well as the Bank of Russia's in-house software solutions.[1]

The technical solutions implemented on the digital ruble platform use highly reliable equipment and software, which guarantees their high accessibility and smooth functioning in the conditions of single or cascading failures of hardware and software complexes.

The architecture of the digital ruble platform is designed in accordance with the principles of geo-distributed scalability, flexibility, integrity, and openness.

The digital ruble platform is integrated into the Bank of Russia's IT infrastructure and interoperates with the related systems and with the systems of the federal executive authorities and other government agencies.

3.2. Data security and protection mechanisms

When choosing the technology stack to deploy the digital ruble platform, the Bank of Russia puts a particular focus on information security and cyber resilience. This is crucial to ensure privacy and integrity of data about platform users and their digital ruble transactions.

Mitigating the risks of technology dependence of the deployed infrastructure on IT service and solution providers and preventing fraud and social engineering are also essential elements of information security in the course of the implementation of the digital ruble platform.

When building a complex system ensuring information security and cyber resilience of the digital ruble platform, the Bank of Russia applies the best practices to secure cashless payments, domestic standards for information security in finance, and the requirements established by the federal executive authorities. This ensures a high level of information security and cyber resilience of the digital ruble platform.

Furthermore, when designing and implementing architectural, technical and technological measures to ensure information security and cyber resilience, the Bank of Russia follows the requirements established for Russia's critical information infrastructures and other requirements for data privacy systems.

The functioning of the mechanisms which execute smart contracts on the digital ruble platform is subject to control over the integrity of smart contracts and differentiation of the rights allowing their launch.

The information on the digital ruble platform is protected using a system of certification centres, which are based on domestic data encryption tools permitted by the Federal Security Service of the Russian Federation.

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[1] The Bank of Russia is carrying out the work to include them in the Unified Register of Russian Software and Databases.

To ensure secure and smooth functioning of the digital ruble platform, the Bank of Russia employs specialised systems to monitor information security, which enables the Bank of Russia to promptly respond to any cyberattack attempts and manage information security incidents in order to protect digital ruble platform users' and participants' funds and data privacy.

For platform participants to upgrade their infrastructures to be able to protect information in the course of digital ruble transactions, the Bank of Russia issued Regulation No. 833-P.[2] When a participant connects to the digital ruble platform pursuant to the Information Security Terms and Conditions for Digital Ruble Platform Participants, which are available on the Bank of Russia website, the regulator checks it for compliance with this Regulation.

Users and participants interact with the digital ruble platform through secure communication channels using data encryption tools certified by Russia's Federal Security Service.

All messages that users send to the digital ruble platform are signed with electronic signatures and stored on the platform, which ensures their integrity and verification and allows objective complaint handling procedures (if needed).

Following the analysis of the best practices of ensuring information security in mobile apps, the Bank of Russia implemented the concept of a specialised software module, which must be integrated into platform participants' mobile apps to ensure data encryption. Furthermore, the software module verifies the identity of a digital ruble account holder.

In accordance with the Bank of Russia's requirements, leading data encryption specialists from various companies designed three software modules with certified data encryption tools that can be readily integrated into platform participants' mobile apps. Concurrently, to regularly update platform participants' mobile apps upon integration of data encryption tools into them, the Bank of Russia, jointly with Russia's Federal Security Service, issued a digital ruble platform standard providing for a simplified approach to evaluating the impact of the hardware and software environment on data encryption tools integrated into a platform participant's mobile app.[3]

Taking into account the accumulated experience of software module operation, the Bank of Russia issued a digital ruble platform standard[4] for mobile app engineers to use it as a guide when designing software modules with certified data encryption tools integrated into them.

The Bank of Russia is further advancing the software module to maintain a high level of information security for new types of digital ruble transactions.

The implementation of the above approaches safeguards data integrity and privacy in the course of users' digital ruble transactions. The digital ruble platform protects information about digital ruble account balances and digital ruble transactions and data needed for user authorisation and identification, including personal data.

To counteract authorised fraud on the digital ruble platform, the Bank of Russia implemented special measures to protect platform users, including antifraud controls at the level of both platform participants and the platform operator.

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[2] Bank of Russia Regulation No. 833P, dated 7 December 2023, 'On Information Security Requirements for Digital Ruble Platform Participants'.

[3] Digital ruble platform standard The Procedure for Evaluating the Impact of Hardware, Hardware and Software, and Software of a Confidential Communication Network (System), with Which the Bank of Russia's Software Module is Supposed to Operate on a Regular Basis, on Compliance with the Requirements Established for Its Data Encryption Tool.

[4] Digital ruble platform standard Software Module Specification.

The antifraud controls are intended to detect and prevent fraudulent transactions in order to protect platform users' funds. To this end, each digital ruble transaction is checked in real time. If the system detects a suspicious transaction, the platform participant must suspend the transaction until the circumstances are clarified and, if needed, introduce a cooling-off period, while the platform operator in turn is entitled to reject the suspicious transaction.

4. DEVELOPMENT PROSPECTS AND FURTHER ACTIONS

The key areas for further development of the digital ruble today is scaling up of the pilot project, that is, a gradual increase in the number of participants and users joining the pilot project, as well as expanding the range of available services.

While implementing the pilot project of the digital ruble, the Bank of Russia continues to explore the performance of various economic models of digital ruble circulation. Russia's retail payment system already comprises the efficiently functioning Mir payment system and Faster Payments System as well as other tools enabling convenient and prompt money transfers to individuals and payments for goods to businesses. In the course of the piloting, the Bank of Russia will continue discussing the economic model, including the wholesale component of the digital ruble. The Bank of Russia pays particular attention to determining the priorities for developing digital ruble-based services.

Concurrently, the Bank of Russia is collaborating with government authorities, banks, and commercial companies to explore the most popular use cases and the scenarios of using the digital ruble that would demonstrate the greatest potential of economic efficiency.

By launching the digital ruble, Russia will become one of the first countries possessing the entire range of payment infrastructure components: the National Payment Card System, the Faster Payments System, the Financial Messaging System, and the national digital currency.

In the future, the digital ruble platform may become not only a centralised platform for payments and money transfers but also the basis for implementing innovations in various industries. In our view, it will take from five to seven years for digital rubles to become a mainstream means of payment, just like rubles in bank accounts. This is a strategic project that can transform Russia's economy by enhancing its resilience to external shocks. The Bank of Russia's interaction with government authorities, businesses, and society is crucial for the success of the project.