

# USER MANUAL

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## DECENTRALIZED CROSS-BORDER MESSAGING SYSTEM

### GENERAL INFORMATION

**Decentralized Cross-border Messaging System**, hereinafter **DCMS**, is a software package that provides decentralized exchange of financial messages between two or more participants. It is a convenient, secure and low-cost tool for interbank settlements.

The key difference of the system is the impossibility of forced exclusion of participants, since there is no single owner.

**DSMS** is an alternative channel for transmitting financial messages and does not exempt from compliance with regulatory rules. **DCMS** can serve as a complement to existing centralized systems such as SWIFT, SPFS, CIPS or could replace it. The main advantages of DCMS include the absence of a central node, significantly lower payment costs, the ability to use any currency, and compatibility with SWIFT messaging formats. One of the most important features is the platform architecture, which allows achieving high performance and horizontal scalability, unachievable in a classic distributed ledger based on blockchain. The **DSMS** links the business processes of financial message transfer and liquidity. The transfer of a financial message occurs through nodes that are correspondents in a future transaction.

### Documentation includes:

- Node configuration file

### Nodes addresses for testing:

<http://dcms.dev.dltc.spbu.ru:3001/>

<http://dcms.dev.dltc.spbu.ru:3002/>

<http://dcms.dev.dltc.spbu.ru:3003/>

<http://dcms.dev.dltc.spbu.ru:3004/>

## GLOSSARY

### Private Key

A key used in asymmetric encryption. A part of a key pair that is not published in the public domain. Can be used for both encryption and decryption, depending on the algorithms used.

### Public key

A key used in asymmetric encryption. The portion of a key pair that is not made publicly available. Can be used for both encryption and decryption, depending on the algorithms used.

### Node

A deployed instance of the system core with loaded keys of a system participant

### System participant

A system participant is a person (an individual or a legal entity) who has control over the node(s) and the key(s)

### Network address

IP address and port of the running instance of the system core

### Node address

A fingerprint of the public key is used for addressing within the DCMS

### Currency

A list of accounting units in the system

### Base currency

The currency in relation to which all rates are set

### Exchange rates

Coefficients in relation to the base currency for calculating limits and exchange rates for currency conversion

### Agreements

The main essence of the system. An agreement can be concluded between a pair of participants and means trusting the public keys of the participants in the pair to each other.

### Limits

When concluding an agreement, it is assumed that each participant in the agreement will set limits. Limits are set both generally and for each currency.

Setting a limit in a specific currency means the possibility of transferring liquidity between the participants in the agreement. It is also a risk management tool and the basis for auto clearing.

### DSMS network

A set of nodes in a system that form a connected graph. There may be a number of independent DCMS networks.

### Balances

Balances formed during the process of transmitting messages across agreements

### WSS channel

A secure channel for exchanging messages between parties to agreements

### Message

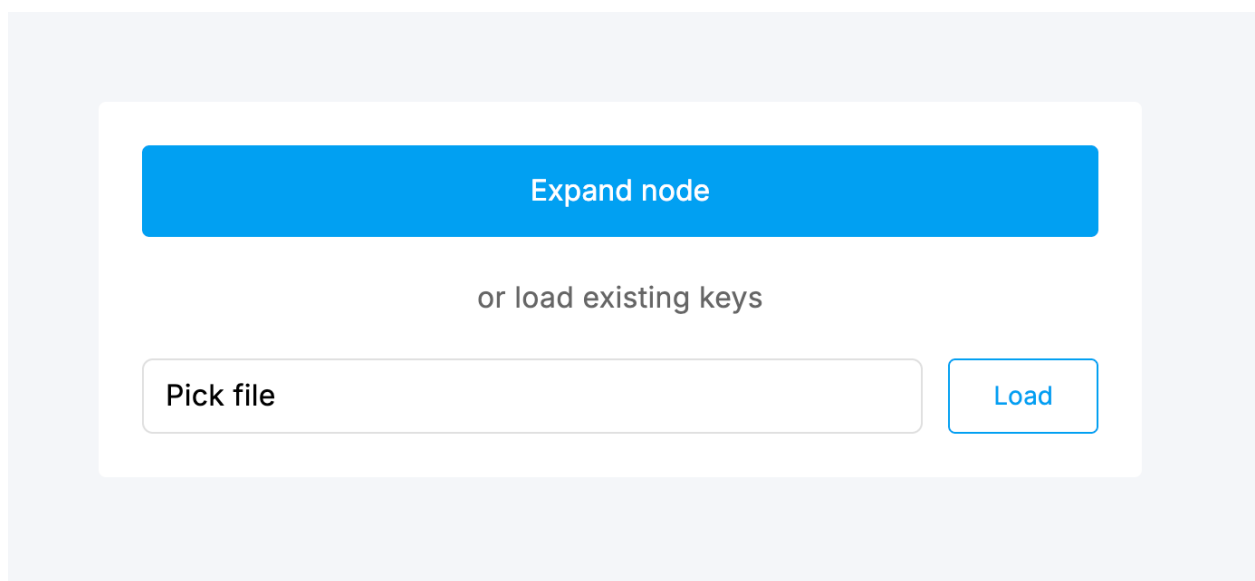
Message about the transfer of funds. The recipient can be any node of the DCMS network.

It can be informational if the amount specified in the message is 0.

### Information message (Intention)

Information message about the transfer of funds. The recipient can only be a node from the list of Agreements.

## LAUNCH PAGE

The screenshot shows a web interface for launching a service. It features a large blue button labeled "Expand node". Below this button, the text "or load existing keys" is displayed. Underneath, there is a file selection area with a text input field labeled "Pick file" and a blue button labeled "Load". The entire interface is set against a light gray background with a white central panel.

## POINTS OF INTERACTION

### Expand node

Launches the DCMS service with the previously saved configuration or creates a new one.

### Select and upload a configuration file

Using the "Select file" field, select the configuration file, which should be a json file according to the scheme described in config/config-schema.json.

When you click the "Load" button, the service will be automatically launched with this file.

## MAIN PAGE

### Main page

[Operator's menu](#)[Payments](#)[Turn Off](#)

#### Settings

[Node configuration](#)

Base currency

RUB



Choose language

English

☒ Turn on node discovery[List of discovered nodes](#)[Connection Requests](#)[Current Agreements](#)

#### Send invite

Public Key

Address

[Cancel](#)[Send](#)

## OPERATOR PANEL

### Basic settings

Settings

Node configuration

Base currency

Choose language

RUB

English

☒ Turn on node discovery

List of discovered nodes

Connection Requests

Current Agreements

### 1. Base currency

Allows you to select the primary currency from those added to the system by the user. If no currency has been added to the system at the moment, the message "No currencies" is displayed.

### 2. Choose language

Allows you to change the interface language. Available languages as of this document date: Russian and English.

### 3. Turn on node discovery

Enables/disables publishing of core information to the discovery service. If the "Turn on node discovery" box is checked, each new publication occurs when the information published in discovery by the user changes, as well as every 60 seconds.

### 4. Node configuration

Node configuration

Public key

MIIC0zCCAbugAwIBAgIBATANBgkqhkiG9w0BAQsFADAAMB4XDTI0MTAxODEwMDk1MVoXDTI1MTAxODEwMDk1MVoADCCASlwdQYJKoZIhvcNAQEBBQADggEPAAQCCAggEBAM1UIOh0DnzAjezuFiKmn4Tf4ex/8Z/d3lk4YTkHhYQ1wTTXa+rE6wix2Y6f6KCo3fewYIRRR5br5+Z9nGW24dfjNRXqSaRNHYxlk0ZtYDuxgCKvbdKkmDXiRLvyj+BetxKrFliqUjE+IsLYqcpVJ6lgtSPUqkEn9th8qCPanT0Kppc7pP6x+oM7VbXf4q9BDkWi9CHGVOKANo/VFW+SvOWXMR8xYaCnMn9udpZdm2dZgwrNwAjwWCeyBWxunF6/x0xlU8L1MTkZYa1PRZEEHcJCdvM1GdGhVikKRxJYIWQJLCg9yjedR5/VOHSMcZakyrDQaP3leADlm0UGuKo+ECAwEAAaNYMFYwDgYDVR0PAQH/BAQDAgWgMB0GA1UdJQQWMBQGCCsGAQUFBwMBBggrBgEFBQcDAjAMBGNVHRMBAf8EAJAAMBcGA1UdEQEB/wQNMAuCCWxvY2FsaG9zdDANBgkqhkiG9w0BAQsFAAOCAQEASz6JFNtjFcXaH9O39ciqxUeWiPik1urZ376DclXifAEeU5X30+L3+HIQs6+0YsaxueUzjh/h9YVXAGHZwc1fPdli72ENHAzg/9sEyuOleZouKd2rqnHafncZznN2HPEgSFsPfCJLVEviOgwIVmqnQg0ZdjGsZZkHfvQPttmGw4jnDSploEFM3pP9jMx70fK57Y+2u4svxJScKQ82RMr6es8oXiRfp0Y+Q3jQ5jQAmYVALGZFzyak3nMQRTxH5LjVsKHZDltpeyLN/UzWNHFjEd5EIFYAk4llhclg7vHTG4cnJDYRAvRhTkyu+CWK3rYiytDFvJNtw0DNm37GfxnzqW==

Key print

3d:eb:ba:0a:d1:8f:80:40:6c:34:2f:c9:9e:25:3c:a1

Node's address

http://60d2bd27d837:8081

Additional info

BIC: 579931112 SWIFTCODE : BAKAAAAAXXX  
 Exchange rate : RUB/RUB - 1.0 | 1.0 USD/RUB - 94.0 | 98.0

[Download configuration file](#)

Allows you to get technical information about the node kernel.

[Get a list of available nodes](#)

Takes you to the “List of discovered nodes” page

[Agreement requests](#)

Takes you to the “Connection requests” page

[Current agreements](#)

Takes you to the “Current agreements” page

## SEND INVITE

**Send invite**

**Public Key**

**Address**

Allows you to send an invitation bypassing the discovery service using the public key and the partner's address.

## CURRENCY EXCHANGE RATES

Currency exchange rates ^			
<div>Add currency ▼</div>			
Currency	Limit coefficient	Buy coefficient	Sell coefficient
RUB	1.0	1.0	1.0
USD	85.0	84.8	85.3

### 1. Adding currency

This is done using the “Add currency” button.

### 2. Changing the rate

To change one of the coefficients, you can simply change the value of the coefficient in the table.

Two exceptions: the limit coefficient and the sale of the main currency. They should not be changed.

## ADDITIONAL SETTINGS

In addition ^

Additional Settings

Commission

☒ Set fees for all currencies

Fee in base currency

0

Share

0

Timeout

Max timeout, seconds

10000

Transfer timeout, seconds

10

Confirmation timeout, seconds

10

Discovery timeout, seconds

5000

Node's info

Node's id

node2

Additional info about node

BIC: 579931112  
SWIFTCODE : BAKAAAAAXXX

Synchronizing the configuration of agreements ▾

Reset settings

Allows additional configuration of the system core.

## PAYMENTS

Main page

[Operator's menu](#)
[Payments](#)
[Create payment](#)

Sort by

Status

Type

Sort by new

All

All

Date	From	To	Receiver	Amount	Status
2024-10-18T10:12:56Z	node1	node2	node2	100 RUB	Confirmed

### 1. Create payment

The button takes you to the payment creation page.

### 2. Payments table

Displays all payments that have been processed by the system core. Clicking on a line with one of the payments takes you to a page with details about that payment.

## NODE LISTS

### LIST OF AVAILABLE NODES

[Operator's menu](#) > [Discovered nodes](#)

Discovered nodes

Add node

Node's name	Key print	Publication date	Additional info
Root	52:d7:fb:42:90:18:92:25:d7:33:54:91:34:c9:3e:af	Manual addition	
node1	1a:e6:58:ad:12:c4:c8:e5:92:89:01:9b:e0:58:32:25	2025-04-14T05:20:38Z	BIC: 579931112 SWIFTCODE : BAKAAAAAXXX Exchange rate : RUB/RUB - 1.0   1.0 USD/RUB - 1.0   1.0
node2	3d:eb:ba:0a:d1:8f:80:40:6c:34:2f:c9:9e:25:3c:a1	2025-04-14T05:40:45Z	BIC: 579931112 SWIFTCODE : BAKAAAAAXXX Exchange rate : RUB/RUB - 1.0   1.0 USD/RUB - 94.0   98.0



Displays nodes that the system has discovered using the discovery service, as well as nodes that have been added manually by the user. See the section “Add node”. Clicking on the “Node’s name” line will take you to the node page.

## LIST OF RECEIVED REQUESTS

Панель оператора > Запросы на соглашение

**Запросы на соглашение**

Имя узла	Отпечаток ключа	Дата публикации	Дополнительная информация
node1	65:5b:be:53:67:26:b2:36:18:15:88:ee:da:ec:3d:57	Публикации не обнаружено	BIC: 579931112 SWIFTCODE : BAKAAAAAAXX Курс : EUR/RUB - 1.0 RUB/RUB - 1.0

Displays a list of nodes from which the core has received a request to conclude an agreement. Clicking on the “Node’s name” line will take you to the node page.

## LIST OF CURRENT AGREEMENTS

Operator's menu > Current agreements

**Current agreements**

Node's name	Key print	Publication date	Additional info
node1	1a:e6:58:ad:12:c4:c8:e5:92:8 9:01:9b:e0:58:32:25	2025-04- 14T05:20:38Z	BIC: 579931112 SWIFTCODE : BAKAAAAAAXX Exchange rate : RUB/RUB - 1.0   1.0 USD/RUB - 1.0   1.0

Displays a list of nodes with which agreements have been concluded. Clicking on the “Node’s name” line will take you to the node page.

## ADD NODE

ed nodes

### Add node

Node name \*

Public key \*

Node's address

Exchange rate

Additional info

When you click on the “Add node” button, a form will open that will allow you to manually add a node to the system memory, bypassing the discovery service.

## NODE PAGE

Operator's menu > Go back to list > node1

**node1**

Public key

MIIC2TCCAcGgAwIBAgIBATANBgkqhkiG9w0BAQsFADAAMB4XDTIzMDkyOTE4MDkwNV0XDTI0MDkyODE4MDkwnNVowADCCASiWDQYJKoZIhvcNAQEBBQADggEPADCCAQoCggEBALxmp2xRn//QmlliKYLNQYyySnronm59cri0v xODbify/t6SxJGqVW1KQyiQ7Bo0Z0vPQIQXDb2wuJ3Ur7SVt1TaSmpMXGkNmWcncwQN/MObGw6f/99CFbPWkr /JUFbtRdXCeYSHS4OEhoEW13ygyaU69xptFivu89NiW03GuU8cJxtKmWER6D+6Kp96jcoHjrl/h7+EY76laiZ2gseeg k2Ugy8c0a9nb3q01fwKS8k813Bul0cTsFirORQmOOGxS11fRTP4v9KAM21/2NNd5FRbJZFSIq3cczeKJA9PaxPhm AZIsrJJsRR+sVWw0LCWtxK41HrsNgQW74jq1UOv0CAwEAAaNeMFwwDgYDVROPAQH/BAQDAgWgMB0GA1UdJ QQWMBGQCCsGAQUFBwMBBggrBgEFBQcDAjAMBGNVHRMBAf8EAJAAMB0GA1UdEQEB/wQTMBGCCWxvY2Fs aG9zdlcEwKgACzANBgkqhkiG9w0BAQsFAAOCAQEA3kpdXYkJEy2y8t3O1F19CGI6xRt/60uMg9TnYK06cMKX1 JvycjNlkgUR/5kpzL9l2Wfc0th/A5cS6Ju5IU7Y6l4hKH6e3LmIQ5ISqAGW2wfvY2sqXlht5Jy9pk5Y8+BVj/Cx3Ziq Nvbc2QV TwvNgFu+Fj0YwrzHOBa9Zw4DHAya85Ryj/2oTpxP8wUmFXt/ULoP9CgpWPue36jBalN33Nf2VXE1E1Pjp V80Pb3T6/dXuPelg1f1BXLrafBjCdMcOb0o9WAG4ABorAk9UswR14724hXjuNAFTeOXlGNSXgHU44JXEaAPpUJwI2 rOzI234QMABNm+1a2JLkDQ3g==

Key print

a7:7c:60:4b:72:d1:59:7e:de:15:ab:fc:f1:0b:60:59

Publication date

2025-04-14T20:40:57Z

Additional info

BIC: 579931112 SWIFTCODE : BAKAAAAAXX

Send another request?

Payments

Create payment

Поиск...

Sort by

Status

Type

Sort by new

All

All

Date	From	To	Receiver	Amount	Status
2024-10-18T10:12:56Z	node1	node2	node2	100 RUB	Confirmed

The Payments tab is similar to the Payments tab on the main page.

Important: Setting limits and creating intents is only available if an agreement has already been concluded with the node.

Information about the node and concluding an agreement

[Operator's menu](#) > [Go back to list](#) > [node1](#)

node1

Public key

MIIC2TCCAcGgAwIBAgIBATANBgkqhkiG9w0BAQsFADAAMB4XDTIzMDkyOTE4M  
DkwNVoXDTI0MDkyODE4MDkNVoVADAQCSlWdQJYK0ZlhnvNAQEBBQgGgEP  
ADCCAQgCgEBALxmp2xRn/QmlllKYLNQuYySnrnm59crl0vOXDbffyt6SxJGvP  
W1KQyIQ7Bo0Z0vPQIQXDb2wuJ3Ur7SVt1TaSmpMXGKNmwCncwQN/MObGw6f/9  
9CFcePwRk/JJfBtdRcXcYSHS4EOheHwV13ygaU69xptfUv9n89U03Gu8JxtKm  
weR6D+6Kp96fcdHjL/h7+Y76lajZ2seegsk2Ugy8K0a9nb33Q01fwKS8k813ucl0tC  
sFir0RQmOOGxS11tFRTp4v9KAM21/2NNd5FRbJZFSIq3cczeKJA9PaxPhmAziSrJJs  
RR+svVw0L0CWtXk41HrsNgNwQ74j1UQoV0CAwEAAnEMfwwDgYDVR0PAQH/BA  
QDAgWMBGA1UdJjQwQWMBGQCcAAQUFBABMBBggRBFBGCB4DAJAMBGVNHR  
MBAf8EAJAAMB0GA1UdEQEB/wQTMBGCCWxvy2FsaG9zdlicEwKAcZANBgkqhki  
G9w0BAQsFAAOCAQEAQc3kpdXyKJEx2y8t3O1F9IG6I8xRt/60uMg9TnYK06cMKX  
JvvyjNlkgUr/5kplZ9l2Wcx0ht/A5c6Jt5U17Y6l4hKx63LmlQ5lSqxAGW2wfyw2  
sqXlhttSJy9pk5Y8+BVj/Wf32ZiQnVbc2QvUwNgFu+Fj0YwzrH0BA9Zw4DAHYa85R  
yj/2oTpxP8wUmFxtj/UL0p9CgpWpue36jBaInR33NF2VXE1E1PjpV80Pb3T6/dXuPelg  
fBXLlRwJBJdMcOb0o9WAG4ABorAk9UDs174274zhXjunaftEoXlGnsXgHU44JXEa  
AppUJaf2Rozl23CQMABNM+1a2JLkQ3g==

Key print

a7:7c:60:4b:72:d1:59:7e:de:15:ab:fc:f1:0b:60:59

Publication date

2025-04-14T20:40:57Z

Additional info

BIC: 579931112 SWIFTCODE : BAKAAAAAXXX

[Send another request?](#)

## Payments

Create payment

Technical information about the node and the agreement status with the node.

If there is no agreement, the “Send request” button will be displayed. Clicking on it will send a request for an agreement to the node.

If the node accepts it, the agreement will be concluded and the button will change to the “Break” button. Clicking the “Break” button will break the agreement and add the node to the blacklist.

If an agreement has arrived in our core, there will be an “Accept agreement” button.

Manual setting of limits.

Лимиты

Платежи

Запрос на лимит

Входящие запросы

Установить лимиты

Ⓢ

Total limit

0 / 0 / 1000000

Входящий валютный лимит

EUR

0 / 0 / 10000

RUB

0 / 0 / 100000

The “Limits” tab shows the limits set at this point. When you click the “Set Limits” button, a window appears that allows you to set limits manually.

## INTENTS AND LIMITS

Limits
Payments
Request limit
Incoming requests

Request a limit

\$

Total limit
100 / ∞

Purpose	Amount	Status
For all bills	10000000 USD	In processing

In the “Request Limit” and “Incoming Requests” tabs, you can view the intents that are being considered and those that have already been closed. Clicking on an intent in the table will take you to the page for that intent.

New intents can be created using the “Limit Request” button.

Request a limit

Currency

USD

Amount

10000000

Purpose

Some message

Sent

## INTENT PAGE

On this page, communication between nodes takes place regarding the setting of a particular limit for a specific currency.

## Creating a payment

[Go back](#) > [Payment creation](#)

[Go back to payment's list](#)

**New payment** [Draft](#) [Fill in from swift file](#)

Currency	AED
Amount	1000000
To	node1 a7:7c:60:4b:72:d1:59:7e:de:15:ab:fc:f1:0b:60:59
Max accepted fee	0.02

[Добавить вложенное сообщение](#)

Payment purpose: Test payment in AED

☐ Encrypt data

[Cancel](#) [Send](#)

You can go to the “Create payment” page from the “Payments” tab on the main page, as well as the tab of the same name on the node page.

When you fill in all the fields and click the “Send” button, the payment will be created and will begin to be processed and sent.

## PAYMENT PAGE

[Go back to payment's list](#)
Confirmed

**Payment's info**

Amount	100
Currency	RUB
From	Transferred by - node1
To	Transfer to node - node2 End receiver is node2

Max accepted fee	100
Transfer's purpose	TEST TRANSACTION 2
Time of transfer	2024-10-18T10:12:56Z
Time of confirmation	2024-10-18T10:12:56Z

Show detailed info ^
 

Sent message
 

Message body
 

```
{
  "sid": "4c4326c9-2f2c-4864-8ace-de2d055d6226",
  "data": {
    "id": "6094fd5b-906b-498a-b430-3d2471006341",
    "receiver": "3debba0ad18f80406c342fc99e253ca1",
    "currency": "RUB",
    "amount": "100",
    "path": null,
    "text": "TEST TRANSACTION 2",
    "transferDeadline": "2024-10-18T10:13:06Z",
    "confirmationDeadline": "2024-10-18T10:13:16Z",
    "discoveryDeadline": "2024-10-18T11:36:36Z",
    "encoding": "none",
    "max_fee": "100",
    "dest": "3debba0ad18f80406c342fc99e253ca1",
    "source": "1ae658ad12c4c8e59289019be0583225",
    "parentid": "2095bfa9-2585-47f7-b4d3-c67ea2e08001",
    "sign": "",
    "timestamp": "2024-10-18T10:12:56Z",
    "tag": "",
    "status": "sentStatus",
    "commentary": ""
  }
}
```

Sender
 node1 fingerprint (1a:e6:58:ad:12:c4:c8:e5:92:89:01:9b:e0:58:32:25)

Signature
 RSA
 OK

Timestamp
 2024-10-18T10:12:56Z

Final addressee
 [node2 fingerprint \(3d:eb:ba:0a:d1:8f:80:40:6c:34:2f:c9:9e:25:3c:a1\)](#)

On the payment page you can see detailed information about the payment.

