



Санкт-Петербургский  
государственный  
университет



Центр технологий  
распределенных  
реестров СПбГУ

ФОНД НТИ

**DCMS** |

Decentralized Cross-border message system

Alexander Kireev – CTO of the Distributed Ledger Technology  
Center of the Saint-Peterburg State University



# About us



Distributed Ledger Technology Center of St. Petersburg State University

Leading competence center of the National Technology Initiative program for the development of blockchain technology and ecosystem in Russia

2018

Found

9

Innovative software products

19

Educational programs

23 000+

More than graduated students

The center develops software for finance and logistics, while solving problems related to ensuring technological sovereignty.

О нас говорят и пишут



**What is it, DCMS?**

# What is it, DCMS?

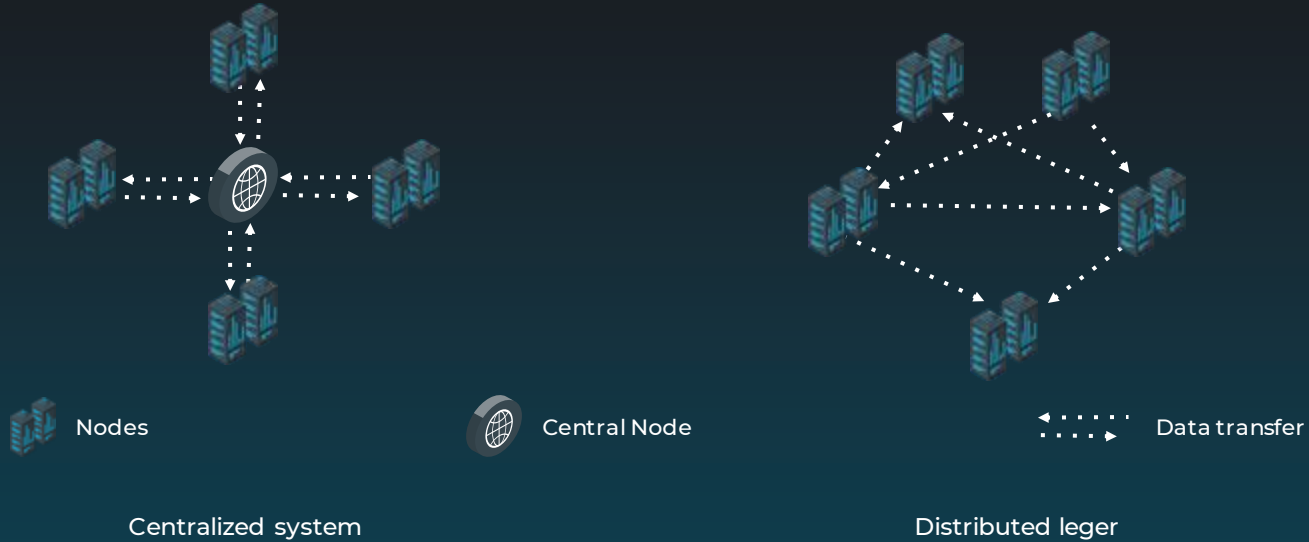


Universal system for exchange payments information.



NO Owner

# DCMS as a response to existing challenges



The owner of the system has access to the transactions of participants (there are precedents)

Participants depend from the owner of the system

Participants are forced to pay for each transaction

Transactions of all participants are available only to themselves

Participants may not accept each other's transactions, but it is impossible to disconnect someone from the system

Transaction fees may apply and receive only the system participants themselves

# DCMS is fundamentally different from SWIFT

The system uses a completely different architecture, differing, among other things, from other decentralized services



There are no fees for sending financial messages



Automatic message routing for correspondent relationships chains



Possibility of receiving a commission for mediation between participants



DCMS users and transactions blocking by third parties is almost impossible



Recommendation system for routing, helping to reduce settlement balance

## Is DCMS a “messenger” or another analogue of SWIFT?

	DCMS	SWIFT/CIPS/SPFS	Bank client	Ripple/Stellar	«Messenger»
Sanctions Resistance	high	no	no	medium	low
Transaction cost	free	low	free	high	free
Trusted environment	yes	no	yes	no	no
Speed of implementation	high	low	low	low	high
Automatic routing relations	yes	yes	no	yes	no
Capability of integration	high	high	low	high	no
Earning opportunity	yes	no	no	no	no

## DCMS builds smart chains to deliver message

If participants for some reason cannot transmit financial messages to a partner, the system automatically builds a route through third parties.

capabilities:



Establishment and accounting of transaction limits by currencies and counterparties



Set currency conversion rates



Build chains of transactions, minimizing mutual settlements between counterparties participating in the system and minimizing trade imbalances



Anonymize chains so that the initial sender and final recipient are not known to all intermediaries in the chain (optional)



# DCMS profits



The system is distributed as open source, there is no charge for it, participants only bear the costs of integration with internal IT systems and purchasing server capacity with minimal system requirements



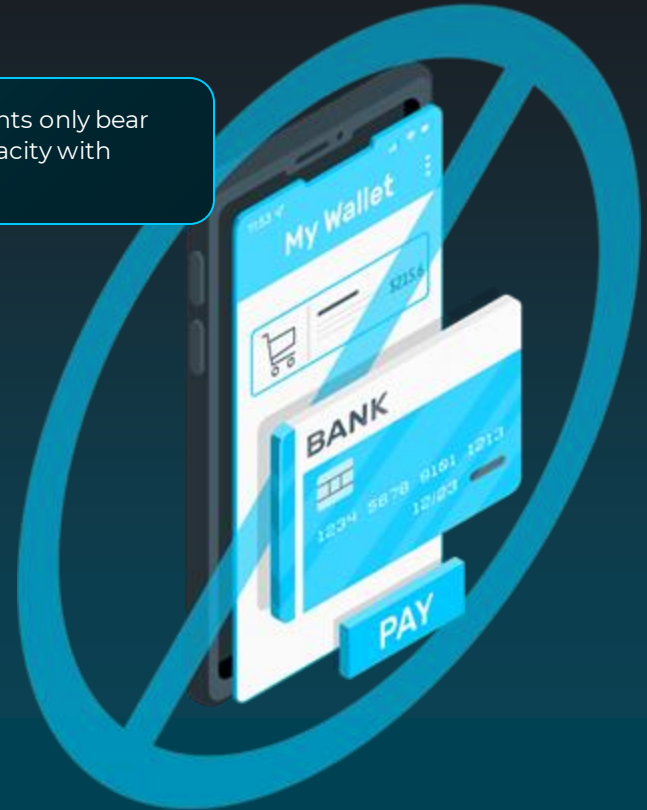
The system does not have a central hub that charges participants for transactions. The commission can be set only by participants for each other at will.



The system does not require any operations on a high transaction cost for public blockchain network



The total cost of transmitting financial messages through DCMS is significantly lower than that of existing centralized systems



## Use case

The system can be used by any organization to record counter transactions (for example, export and import). When using it, you will only need to make one payment order at the end of the settlement period to balance the balance



Transmission of financial messages using any currency, including CDBC



Messaging in SWIFT format, both replacing existing systems and in parallel with them



Possibility of safe transfer any electronic documents



Developments based on a system of innovative banking products for your clients



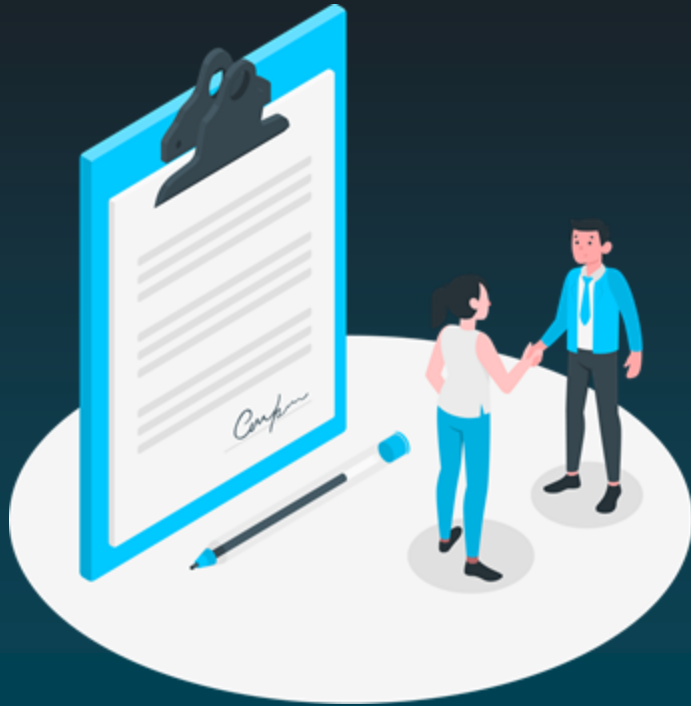
## Product is ready to use



Some elements of the system have already been tested in the Russian Union of Industrialists and Entrepreneurs, and full-scale test operation is being prepared in a number of Russian and foreign banks.

The system interface allows you to use its capabilities even before deep integration with the organization's existing information systems

# Technological assistance in organizing payments



1

Install **DCMS** c with user interface for testing

2

Analysis of current business processes and system adaptation

3

Integration with automated banking systems for further industrial operation

We invite you to cooperate!



ФОНД ИТИ

**DCMS**

Decentralized Cross-border message  
system

**Phone**

+7 (812) 363-60-79

**Email**

dltc@spbu.ru

**Site**

dltc.spbu.ru



Q&A



## Updates and support

- DCMS is distributed in open source format, so access to the system is maintained forever.
- Major system updates are planned once a year. Security updates - as needed. Installing updates is optional.
- When critical updates are released, nodes running a more recent version of the system do not interact with the outdated version. A participant may have several versions of the system running.
- DLTC SPbU acts as a developer of the software solution. It is possible to provide services for support and development of integration modules on a contractual basis.

# Performance and technology stack

## Performance

- On a server with recommended settings, performance reaches **20,000 messages per second**. At the same time, as resources expand, productivity increases linearly.
- **IMPORTANT:** unlike classical systems, the worst performance of a system is the performance of one node, the best is the sum of the performance of its constituent nodes. In practice, this means there are no performance issues when increasing the number of participants.

## Hardware requirements

- There are no minimal hardware requirements. Recommended: 24gb server, 32 cores.

## Stack

- Go, Solidity, ReactJS.



## Source code

It is planned to publish the open source system after passing the piloting phase.

Advantages: vulnerability analysis is carried out by the worldwide community; it is impossible to hide any information collectors or other levers of system control. This aspect creates unprecedented trust in the system, similar to classic cryptocurrencies, among private wallet owners.

## What if someone changes the system (fork)?

The existence of different versions of the system does not affect the security of transactions of existing nodes. If incompatible versions appear, separate network segments will arise, interaction with which will be impossible (one version will not be compatible with the other). However, it is possible to organize bridges between these segments with the approval of specific participants.

## Can a developer or group of system participants arbitrarily disable other participants?

The system is decentralized, so each participant can independently make decisions about which participants and under what conditions he is ready to accept messages, but cannot influence the decisions of other participants or prevent them from exchanging messages.

# Key Specifics

## Message formats

- Own message format, implemented message conversion mechanism MT1XX-MT2XX.

## Message routing

- The message is a digital twin of the liquidity flow of the transaction. Messages are routed randomly. Can be adjusted to reduce imbalances.

## Encryption

- Architecturally, the system uses 3 mechanisms: message signing, channel and message encryption. Any of the mechanisms can be replaced or supplemented with the required algorithms.

## Limits

- These are restrictions that implement risk management in relation to the participant's partners. Can be specified both general and by currency.

## Currency conversion

- Each participant can publish currency conversion rates through the discovery service. When converting a currency, the participant receives an incoming message in the convertible currency with a given rate and, if the conditions are met, delivers the message in the required currency.

## Message transfer fee

- Participants may charge fees for sending messages and conducting transactions.