Colocation

UAT CONNECTIVITY

valid since 01 December 2022

DOCUMENT SERIES

NETWORK CONNECTIVITY SOLUTIONS - PRODUCTION ENVIRONMENT

NETWORK CONNECTIVITY SOLUTIONS - TESTING ENVIRONMENT

NAVIGATION

OVERVIEW
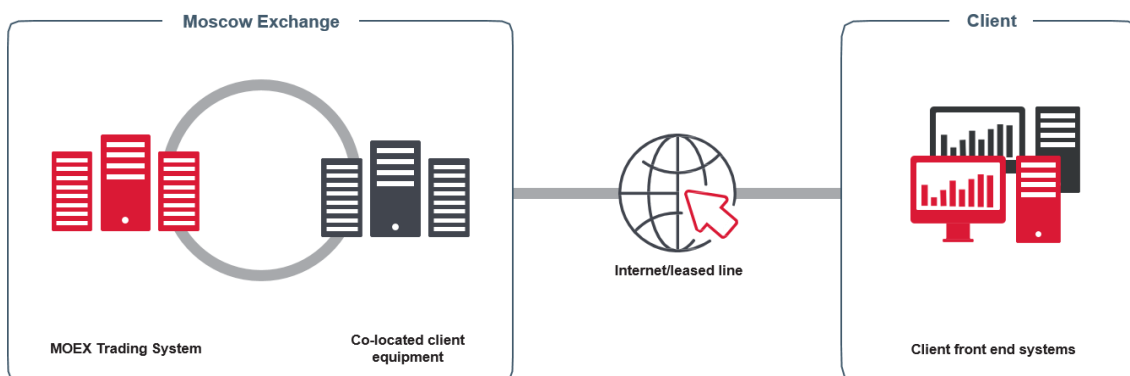
Co-location is a group of services that includes technical access to MOEX from the co-location facility*, installation of a client's equipment in a dedicated data hall in the closest proximity to MOEX's trading platform as well as the related services such as cross-connections to other co-location clients, providing an Internet connection* and providing the storage units.

In the co-location facility MOEX provides the fastest and the most reliable connection to the trading services. Close proximity to the trading engine ensures order execution with a minimum possible latency and the fastest market data delivery. The co-location services are available to companies and individual customers as well.

The co-location facility is located in the hall 202 of the DataSpace Data Center, Sharikopodshipnikovskaya st 11 building 9, Moscow 115088.

Communication services are provided by MOEX Information Security LLC, part of the Moscow Exchange Group. Rules and regulations for the communication services are available at the company's website at https://informationsecurity.moex.com/en/document.

TECHNICAL DIAGRAM
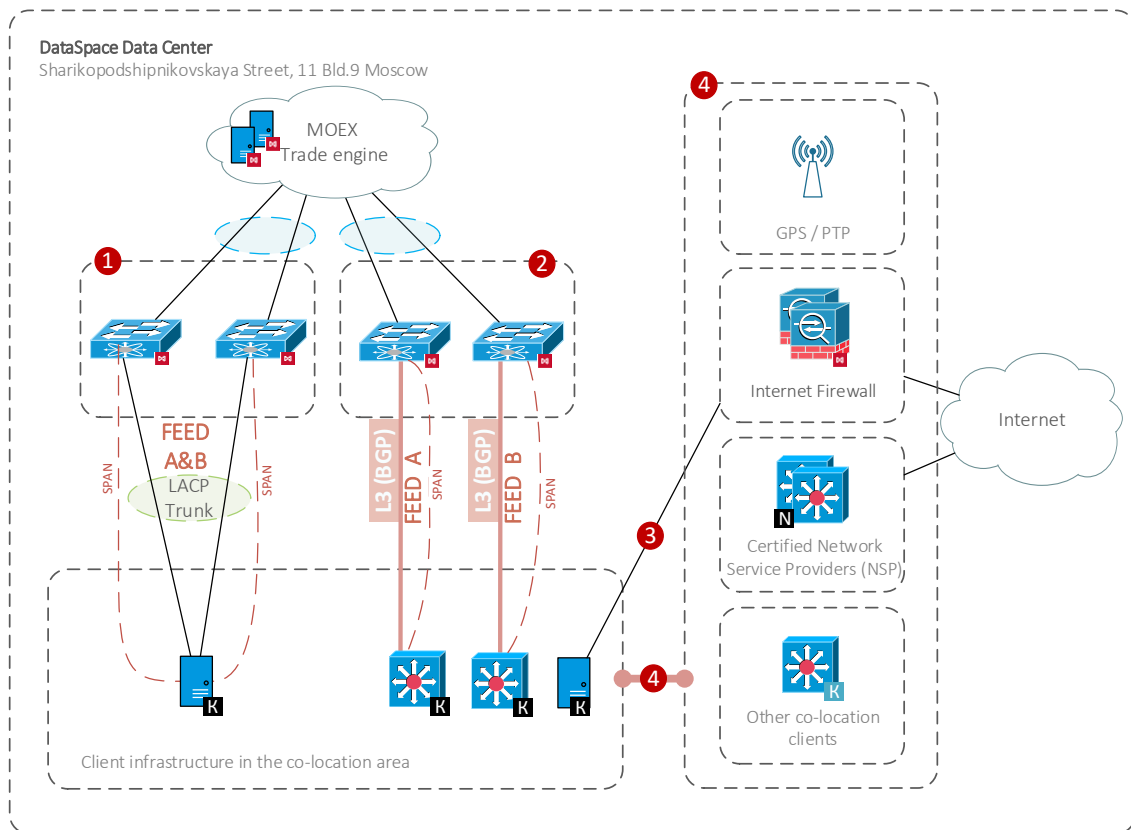
1 - MOEX UAT services access segment for server equipment (L2 schema)*
2 - MOEX UAT services access segment for network equipment (L3 schema)*
3 - Management interfaces connection to the internet
4 – Non-trade connections available in colocation area are described in the Production Connectivity document, which is available via this link http://ftp.moex.com/pub/ConnectivityGuides/en/MCG1101-EN-Colocation-UAT-ConnectivityGuide.pdf

Server equipment connection to MOEX UAT services access segment (#1 on the diagram above) is provided as two physical links to separate network devices of MOEX. Network interfaces used by the Client must be configured as a failover group using the LACP (IEEE 802.3ad) protocol with the traffic tagging function enabled (i.e. the port is switched to the "trunk" mode) according to the IEEE 802.1q standard**. It's allowed but not recommended to connect only one link on the client's side. Available connectivity options:

   a.   10 Gbit/s using the 10GBase-SR standard (MM fiber);
   b.   1 Gbit/s using the 1000Base-TX standard (UTP) or 1000BASE-LH, 1000BASE-SX (MM Fiber).

Network equipment connection to MOEX UAT services access segment (#2 on the diagram above) is provided as two physical links to separate network devices of MOEX. Network interfaces used by the Client must be in L3 mode with the BGP protocol enabled. It's allowed but not recommended to connect only one link on the client's side. Available connectivity options:

   a.   10 Gbit/s using the 10GBase-SR standard (MM fiber);
   b.   1 Gbit/s using the 1000Base-TX standard (UTP) or 1000BASE-LH, 1000BASE-SX (MM Fiber).

In case of per-unit co-location (#3 on the diagram above) the management interface (iLo, IPMI, iDRAG, etc.) connection to the internet is mandatory. This service is provided using 1000Base-TX standard (UTP)/

MOEX has no restrictions regarding the number of connectivity schemes used by the Client on the same piece of equipment (including connection to the UAT environment not covered in this paper) if there is a sufficient number of ports to connect.

For further details on network connectivity requirements, please see the Moscow Exchange Co-location Rules and Conditions (DataSpace DC) available at https://fs.moex.com/files/8128.

*** Addresses of subnets given to the Client (including transit ones for L3) and relevant VLANs are given in Addressing Plan. Basic settings of interfaces and routing rules are given in Setup Instruction.*

SUPPORTED HARDWARE

The following equipment is supported in the co-location facility:

- Rack mounted equipment with a standard mounting kit (slide rails / rails / brackets) for standard 19-inch cabinets;
- Equipment with integrated or rack mounted power supply unit;
- Equipment with at least two power supplies in a stand-by mode.

MOEX has no restrictions regarding the choice of producers of the equipment installed and connected in the co-location facility.

The following equipment is not supported and thus not allowed for use:

- One with non-standard power supply jacks;
- One with signs of unauthorized modification, including modification of power circuit;
- One with integrated wireless modules/devices (of any type);
- One with integrated sound/video recording devices/modules;
- Damaged or defective equipment.

These are general equipment criteria, for the full list of requirements, please read the Moscow Exchange Co-location Rules and Conditions (DataSpace DC) available at https://fs.moex.com/files/8128.

NETWORK CONNECTIONS REQUIREMENTS

Access to the UAT trading systems is possible on following speeds:

- 10 Gbit/s (10GBASE-SR standard);
- 1 Gbit/s (1000BASE-TX, 1000BASE-LH, 1000BASE-SX standards).

Connection for receiving mirrored traffic duplicate the source connection standard.

No bandwidth limitation (traffic shaping) is used for these connections.

*** Forms of service requests or services change are available on MOEX Information Security's website at https://informationsecurity.moex.com/en/document*

ADDRESSING PLAN

Network access to various services of the Moscow Exchange must be sourced from the designated address space. In accordance with this principle, the following addresses are reserved for the Client:

Subnet description	Subnet address
ADDRESSES FOR ACCESS TO MOEX SERVICES	
Transactional connections	10.223.X.0/24
FAST FeedA (without market filtering)	10.231.X.0/24
FAST FeedB (without market filtering)	10.241.X.0/24
TRANSIT NETWORKS FOR NETWORK EQUIPMENT BGP CONNECTIVITY	
Left side	10.215.X.160/28
Right side	10.215.X.176/28
MOEX allocates network subnets during the service configuration. Client independently chooses specific IP addresses for internal systems and requests them from MOEX*. IP addresses are used in the login requests and other connectivity service requests. They can be passed to the trading member with a special form.	
AS Number used on Client network equipment is allocated by the MOEX out of a private range. Client is allowed to use own public AS Number.	
For the connectivity of network equipment, /30 networks from the specified ranges are used as transit.	
* The request form for trading IP address is available in the Co-location Rules and Conditions (https://fs.moex.com/files/8128)	

MOEX's services addresses are available at https://www.moex.com/s745, and through a request to the Technical Support Service.

EQUIPMENT SETUP

Clients of MOEX's trading network can use the following server addresses for DNS service: 91.203.252.10, 91.203.254.10 and for NTP service: 91.203.252.12, 91.203.254.12.

NETWORK DEVICE SETUP

Network device connections require IP addressing, dynamic routes exchange via BGP with MOEX hardware and PIM in SSM mode (Source-Specific Multicast) to be configured. MOEX has no restrictions regarding the Client's internal infrastructure design behind the L3-connection.

BGP timers: keepalive 3, hold 20

It is recommended to configure Bidirectional Forwarding Detection (BFD) if supported.

Bfd timers: interval 250 min_rx 250.

Recommendations for Cisco:

0) Make sure *feature bfd* is enabled;
1) *bfd echo* must be enabled;
2) Enter *no ip redirects* on the interface;
3) Traffic on UDP ports 3784 and 3785 is allowed in both directions, if applicable;
4) BFD is enabled in both the interface configuration and in the *router bgp* section.

SERVER SETUP

We recommend disabling the Reverse Path Filtering feature on the interfaces receiving multicast data.

Two physical interfaces allocated on the server for production and game services connectivity must be configured as LACP group (IEEE 802.3ad). Then virtual group interface will be used to access different services via different VLANs (IEEE 802.1q).

Access to the transaction services (FIX, TWIME, Plaza II, etc.):

Add VLAN 223 to the trunk group on interfaces for connectivity to the production and game transaction services segment and make the following configuration:

> ip: allocated address(es) from the 10.223.x.y/24 network, where x is the number of the co-location agreement (x/CL) and y is chosen independently by the client*.
>
> netmask: 255.255.0.0
>
> default gateway: none

Add routes**:

> *route add -p 91.203.253.58 mask 255.255.255.255 10.223.0.1*
>
> *route add -p 91.203.253.59 mask 255.255.255.255 10.223.0.1*
>
> *route add -p 91.203.253.62 mask 255.255.255.255 10.223.0.1*
>
> *route add -p 91.203.252.62 mask 255.255.255.255 10.223.0.1*
>
> *route add -p 91.203.254.62 mask 255.255.255.255 10.223.0.1*
>
> *route add -p 91.203.253.199 mask 255.255.255.255 10.223.0.1*

To ensure configuration accuracy, ping to 10.223.0.1 is available on the network.

FAST feeds:

Add two new VLANs, 221 and 222, to the trunk group on the interfaces for connectivity to the UAT services segment and make the following configuration:

Feed A:

> VLAN 221
>
> ip: allocated address(es) of the 10.221.x.y/24 network, where x is the number of the co-location agreement (x/CL) and y is chosen independently by the client*.
>
> netmask: 255.255.0.0
>
> default gateway: none

Feed B:

> VLAN 222
>
> ip: allocated address(es) of the 10.222.x.y/24 network, where x is the number of the co-location agreement (x/CL) and y is chosen independently by the client*.
>
> netmask: 255.255.0.0
>
> default gateway: none

Add routes**:

> *route add -p 91.203.253.238 mask 255.255.255.255 10.221.0.1*
>
> *route add -p 91.203.255.238 mask 255.255.255.255 10.222.0.1*
>
> *route add -p 91.203.253.239 mask 255.255.255.255 10.221.0.1*
>
> *route add -p 91.203.255.239 mask 255.255.255.255 10.222.0.1*
>
> *route add -p 91.203.253.235 mask 255.255.255.255 10.221.0.1*
>
> *route add -p 91.203.255.235 mask 255.255.255.255 10.222.0.1*

route add -p 91.203.253.242 mask 255.255.255.255 10.221.0.1

route add -p 91.203.255.242 mask 255.255.255.255 10.222.0.1

route add -p 91.203.253.243 mask 255.255.255.255 10.221.0.1

route add -p 91.203.255.243 mask 255.255.255.255 10.222.0.1

route add -p 239.195.1.24 mask 255.255.255.248 10.221.0.1

route add -p 239.195.1.152 mask 255.255.255.248 10.222.0.1

route add -p 239.195.1.64 mask 255.255.255.192 10.221.0.1

route add -p 239.195.1.192 mask 255.255.255.192 10.222.0.1

route add -p 239.195.9.0 mask 255.255.255.128 10.221.0.1

route add -p 239.195.137.0 mask 255.255.255.128 10.222.0.1

route add -p 239.195.12.64 mask 255.255.255.192 10.221.0.1

route add -p 239.195.140.64 mask 255.255.255.192 10.222.0.1

Connecting a remote management interface:

Make the following configuration on a management port (HP ILO Advanced, IBM RSA, DELL DRAC, IPMI, etc):

ip: allocated address(es) of the 10.219.x.y/24 network, where x is the number of the co-location agreement (x/CLZ) and y is chosen by the client*

netmask: 255.255.0.0

default gateway: 10.219.0.1

All network access to the management interface's address is forbidden by default. It can be granted per client's request.

Outgoing connections from the remote management interfaces to the Internet are always forbidden.

* - the address must be approved before being used; for approval, please submit a request at colo@moex.com

** - this syntax is for Windows platform

HOW TO GET STARTED

To get started, client must perform the following steps:

- Consult a manager from the technology service sales team by phone on +7 (495) 363-3232, ext. 5656 or email at itsales@moex.com to make sure that the chosen solution best suits client needs, find out what paperwork is required and which next steps should be taken.
- Read the principal co-location regulations: Colocation Technology Service Rules and Equipment Colocation Regulation.
- Choose connectivity protocols and software (the choice might depend on the current trading software in use).
- Choose infrastructure architecture, hardware list and types of connection to MOEX and the Internet.
- Send two copies of the order form and the client authorization form to the Exchange via the EDI Universal File Gateway or as hardcopies to 125009 Moscow Vozdvizhenka St. 4/7 bldg. 1. MOEX will review the documents and confirm whether or not you may start the installation process.
- Send a request indication the desired date and the installation list (the request form is available in the Equipment Colocation Regulation) to colo@moex.com using one of the emails indicated in the client authorization form.

- **(Optionally)** Connect to the UAT environment to compare the solutions, review the algorithms and check software.
- **(Optionally)** Pass the Software certification procedure in order to connect to MOEX's trading systems (required, if non-standard trading software is used).
- Enter into the access agreement with Moscow Exchange with respect to the software and information products.
- Switch to the production mode.

HOW TO GET TECHNICAL SUPPORT

In case of any issues with the service or if you have a question regarding the connection to MOEX, please contact MOEX's technical support using the following contact details:

- T +7 (495) 733-9507, +7 (495) 287-7691,
- T +7 (495) 363-3232, ext. 2345
- Email: colo@moex.com

For best support we highly recommend you to provide the following details in your original email:

- Company name;
- Connectivity option to MOEX: Colocation;
- IP-addresses used to connect;
- Hardware used to connect*;
- Brief description of the issue;
- **(Optionally)** Results of your tests.

the code given by MOEX when the equipment was brought in (MOEX-Code)

Only people listed on the client authorization form may submit requests.

AUTHORIZED NETWORK SERVICE PROVIDERS

RETN.NET	*RetnNet Tel +7 (495) 663-16-40	Beeline	* Vympel Communications Tel 8 (800) 700-80-61
Relline	*Relline Tel +7 (495) 256-8181	MACOMNET telecommunications company	*MACOMNET Tel +7 (495) 796-94-00
AVELACOM	*Avelacom Tel +7 (495) 777-03-01, Tel +7 (925) 007-04-33	orange Business Services	Equant Tel +7 (495) 777-08-00
MEGAFON	Megafon Tel +7 (495) 502-20-00 Tel +7 (812) 960-00-00	MTS	Mobile Telesystems Tel +7 (495) 956-00-00
TTK	Trans Telecom Company Tel +7 (495) 784-66-70	telecom биржа	TELECOM-BIRZHA Tel +7 (495) 627-59-44
акадо	COMCOR Tel +7 (495) 411-71-71	MASTERTEL High-Quality Telecommunication Services	MASTERTEL Tel +7 (495) 300-33-33 Tel +7 (968) 894-32-51

Operators with equipment installed in the co-location facility that are set for providing telecom services

FREQUENTLY ASKED QUESTIONS

What documents are needed for colocation?
All documents are available at http://www.moex.com/a1819
Completed documents must be submitted at Moscow 125009 Vozdvizhenka Str 4/7, buiding 1.

May an individual co-locate a server and trade through DMA?
You may enter into a colocation agreement with MOEX as an individual, but only trading members are allowed to trade on MOEX. So, you will have to deal with a broker.
If you wish to set up connection to MOEX just to receive market data, the agreement may be between MOEX and an individual. For any further information regarding the issue, please contact us at itsales@moex.com.

What services are available in the colocation area?
All MOEX UAT services.

How do we go about getting access to our rack? Will we need to submit a ticket?
The client should send a request to Moscow Exchange at colo@moex.com stating the purpose, estimated date and time of visit to the DC (before 16:00 for weekdays and before 18:00 Thursday for weekends). The request must include the list of planned works on the Client's equipment, full names of the individuals doing the work on the Client's behalf.
All DC visitors must have their valid IDs with them.

Where the equipment is located?
The client equipment is hosted in a specialized controlled Data Center facility in close proximity to MOEX`s trading engine. This allows the lowest latency order confirmation and market data.
Data Center DataSpace1 is located at: 11 building 9 Sharikopodshipnikovskaya Str Moscow 115088

What are co-location options?
We have two options: per unit or per cabinet.
- In case of per unit co-location, the client is billed for each unit occupied by the equipment and communication lines between the equipment in different units.
- In case of per cabinet co-location, the client is billed for the whole rack regardless the number of units occupied by the equipment.

What kind of equipment is eligible for co-location?
Servers, network equipment and storage systems. You choose equipment models and producers completely on your own.
An option of installing equipment with dielectric fluid for cooling is managed by exception for each unit of that equipment.
The space for colocation is limited. To avoid an unexpected refusal of colocation, make sure your hardware composition is agreed with MOEX specialists.
For further information regarding collocated equipment, please refer to the Equipment Colocation Regulation (DataSpace Data Center) available at https://fs.moex.com/files/8128.

What is the size of equipment and fixings? How many units can be placed in a standard cabinet?
Equipment must be compatible with typical 19-inch rack installation using one or more standard units. The rack dimensions: 700 x 1200, 48U of which 42U are available for mounting equipment.
Racks accommodate organizers and PDU which may impede mounting, i.e. the actual capacity of a rack can decrease.

Do you provide fixing elements needed for installation?
Yes, fixing elements (nuts and bolts) compatible with racks are provided by MOEX.

Can two-, three-, or multi-unit equipment be installed?
Yes, if technically possible. In case of per unit pricing, multi-unit equipment is charged at the rate per unit multiplied by number of units.

Are there any power limitations?

Yes, the power for co-located equipment is limited.

- In case of unit rent, power is limited to 500 Watt according to rating plates on power units. When a 501-1000 W server is co-located on one power unit, the price will be for two single unit servers; a 1001-1500 W server co-located on one power unit will cost as three single unit servers and so on.
- In case of per cabinet colocation, the total maximum power is 6 kW per cabinet (7 kW if a further service is ordered).

Must the equipment be certified?

Only certification that is mandatory in Russia such as Russian National Standard (GOST R) and SES is required.

What power supply type is supported?

The client's equipment must have two power supplies in reserve mode (1+1).
Voltage: 220V, 50Hz.
Outlets: PDU IEC C14.

Do you supply power cables? If not are there any specific requirements that we must adhere to?

The client equipment must contain power cable kit. We can provide standard power cables per client request (if you need non-standard cables, please contact us beforehand so we could check availability).

Can we take pictures inside the data center of our rack?

You can take pictures of your cabinet only.

Who is in charge of installing our hardware in the rack and connecting it to the power and data networks?

If you order a per-unit co-location, MOEX engineer does all the equipment installation and the cabling. In case of entire cabinet co-location, you may either perform equipment installation and cabling yourself or use MOEX engineer's help for that. The equipment connectivity and installation scheme must be preliminary approved by the Moscow Exchange.

How cabling should be laid? Can cables be laid on the top of the rack? Or under the floor between racks? Are there pass-through windows between the racks?

Cross-connect cabling outside a rack is performed by the MOEX specialists using cable systems laid beforehand. Running a cable over the top of a rack is allowed for switching of two nearby racks of the Client and performed also by the MOEX specialists. No other cabling options are available.

Does MOEX supply cables?

We provide cables for connection to the network. Cables interconnecting client equipment within the rack are supplied by the client or MOEX, if just a small amount is needed.

How is the connection redundancy ensured?

Every connection to MOEX network is established over the pair of links in redundant mode. On MOEX side, connection ports are on different network devices. LACP (IEEE 802.3ad) is used for back-up connectivity for servers; BGP is used for back-up connectivity for network devices.
In order to ensure fault tolerant connectivity on the client's side, we recommend the client to connect with two different network devices.

What are the technical requirements for 1 Gbit/s connections?

Cable type: UTP Cat, RJ45 connectors. Standard: 1000Base-TX.
MultiMode Fiber with LC connectors. Standard: 1000Base-SX, 1000Base-LX.

What are the technical requirements for 10 Gbit/s connections?

Supported cable types: LC-LC multimode fiber optic cable.
Standard: SFP+/10GBASE-SR (10 Gbit/s).

Does MOEX provide an Internet external address if we order the Management interface connection service?
Yes, we provide an external address within the 85.118.178.0/23 address space.

Does MOEX provide backup internet connection?
Yes, we provide automatic Internet redundancy using BGP between points of connection to upper telecom operators.

Is there any protection against DDOS attacks or port scans?
We restrict by default any network access to your equipment, however, we can whitelist specific addresses/ports upon your request. We don`t have any other specific protection against DDOS attacks or port scans.

Does MOEX offer remote hands service? What is Time to Repair?
Remote hands service is possible. You will need to provide your hardware configuration and connectivity scheme so we could check on the manufacturer requirements and provide SLA for you.

When is the remote hands service available?
Our engineer on duty is available from 9:00 am-11:00 pm MSK on business days. He performs basic tasks in emergency cases, i.e. reboot server, replace hot-swap HDD, etc.