

ConnectME

PRODUCTION CONNECTIVITY

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DOCUMENT SERIES

NETWORK CONNECTIVITY SOLUTIONS - PRODUCTION ENVIRONMENT

- [MCG1001 Colocation](#)
- ▶ [MCG2001 ConnectME](#) ◀
- [MCG3001 Universal scheme](#)
- [MCG4001 International points of presence](#)
- [MCG5001 VPN connection](#)
- [MCG6001 Internet access](#)

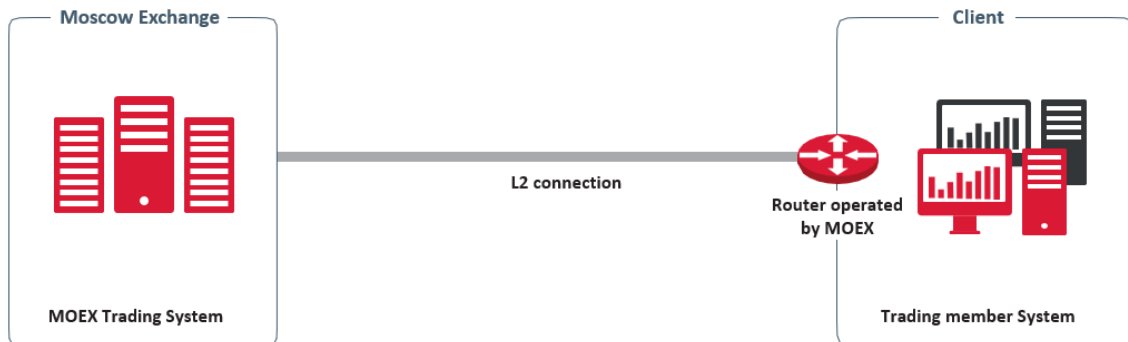
NETWORK CONNECTIVITY SOLUTIONS - TESTING ENVIRONMENT

- [MCG1101 Colocation](#)
- [MCG2101 ConnectME](#)
- [MCG4101 International Points of Presence](#)
- [MCG6101 Internet access](#)

NAVIGATION

- [Overview](#)
- [Technical diagram](#)
- [Supported hardware](#)
- [Network connection requirements](#)
- [Addressing plan](#)
- [Equipment setup](#)
- [How to get started](#)
- [How to get technical support](#)
- [Authorized network service providers](#)
- [FAQ](#)

OVERVIEW



ConnectME is one of the methods to establish network connection to Moscow Exchange. The scheme includes point-to-point lines from a telecommunication carrier chosen by the client, client devices managed by MOEX and segments established by the client according to MOEX's standards for allocating its trading systems. For further details, please see the [Technical Diagram](#) below.

MOEX's connection points are at:

- Dataspace1 Data Center (Sharikopodshipnikovskaya St. 11 building 9), hall 217, cabinets F1 and F9;
- M1 Data Center (Varshavskoe shosse 125 building 1), cabinets L57-7 and L57-8.

The Client's connection points can locate in any area accessible for telecom operators.

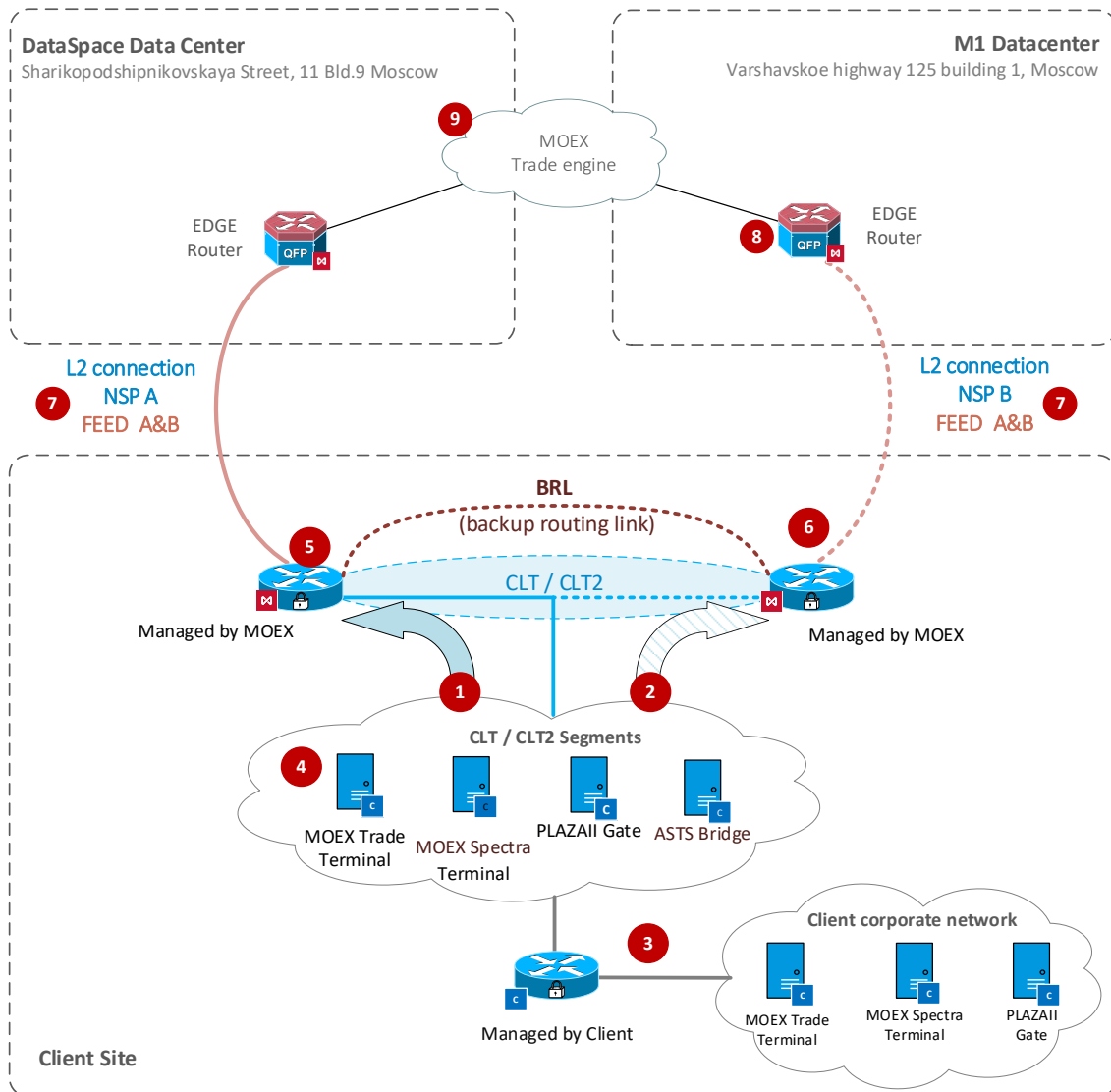
The service offers redundancy alternatives:

- two independent channels to MOEX's data center;
- two independent channels to each data center of MOEX;
- one channel to any data center if:
 - there is no need for a redundant connection;
 - ConnectME is used for a redundant production-level connection (for example, Co-location or other Connect ME connection).

ConnectME is provided under the Information Technology Service Agreement, and consists of two parts:

- Connection to the Technical Center's equipment;
- Setup and support of the Client equipment configuration.

TECHNICAL DIAGRAM



- 1** **CLT segment** is a dedicated segment of the Client’s network designed to install specialized software and exchange systems (item 4) as well as establish a L3 link to the Client’s internal network (item 3). VLAN (IEEE 802.1Q standard) is supported; VLAN ID must be transferred to MOEX’s specialists at the setup stage.
- 2** **CLT2 segment** is a dedicated network segment used in a failover scheme and identical to CLT segment in its functions. CLT and CLT2 segments use single port on the router managed by MOEX and single broadcast domain (L2 domain). The difference between them is that network connections from CLT segment are sent via the first network provider link by default and CLT2 via the second network provider. This feature can be used for the network traffic load-balancing between two network providers. It is recommended to use CLT segment for Derivatives Market connections and CLT2 segment for Equity, Bond and FX Markets connections. Any configuration of load-balancing also supports failover. Fail of any provider connection does not block connections to MOEX services, however particular application sessions might require re-establishing.

- 3 **Client corporate network.** The Client is allowed to connect to systems installed within CLT/CLT2 segments or MOEX's services. Such connection is configured by Client's specialists. In this case, source IPs must be from the CLT or CLT2 IP address ranges (see [addressing plan](#)).
- 4 **Client servers and workstation.** Information on MOEX products and services is available at <https://www.moex.com/s397>.
- 5 **Router managed by MOEX** installed on client site according to the [supported hardware](#) list.
- 6 **Additional Client router managed by the Exchange** used in a failover scheme with the circuit of the second operator. It is the recommended connection method, however the choice of this method is optional. If you use a failover scheme, you must connect the CLT / CLT2 interfaces of the two routers to the same network segment. Each of the two routers can handle client network requests in these segments according to the HSRP protocol. It is also required to connect separate router interfaces to each other for Peer-link communication and fault tolerance. It's recommended to use cross-connects to different MOEX datacenters.
- 7 **MarketData delivery.** If the Client uses FAST UDP multicast marketdata, then feed subscription must be done using PIM SSM or IGMP v3 protocols, depending on the client network design.
- 8 **Cross-connect type.** MOEX supports both copper and fiber circuits. For fiber cables MOEX supports 1000BASE-SX for Multimode and 1000BASE-LX/LH for Singlemode. The use of other standards is not guaranteed and must be agreed by the Exchange prior to connection. For approval, please send information about the type of connection to connect@moex.com.
- 9 **MOEX services** are in 91.203.252.0/22, 10.63.0.0/22 and 10.61.0.0/22 IP ranges.

SUPPORTED HARDWARE

Recommended router models manufactured by Cisco Systems: ISR4200, ISR4300, ISR4400 with IPBase license.

Recommended router models manufactured by QTECH: QSR-1920-12-AC, QSR-2920-14-AC-AC with system software version 7.8.0.100:

	Cisco ISR4221 IPBase	Cisco ISR4321 IPBase or Cisco ISR4221 FL- 4220-PERF- K9	Cisco ISR4331 IPBase or Cisco ISR4321 FL- 4320-PERF- K9	Cisco ISR4351 IPBase or Cisco ISR4331 FL- 4330-PERF- K9	Cisco ISR4431 IPBase or Cisco ISR4351 FL- 4350-PERF- K9	Cisco ISR4451 IPBase or Cisco ISR4431 FL- 44-PERF-K9	Qtech QSR- 1920-12-AC or Qtech QSR-2920- 14-AC-AC	Cisco ISR4451 FL- 44-PERF-K9
Features								
Form factor	1 RU Desktop	1 RU Desktop	1 RU	2 RU	1 RU	2 RU	1 RU	2 RU
Integrated WAN Ports	GE / SFP	GE / SFP	GE / SFP	2 PoE GE / SFP	2 PoE GE / SFP	2 PoE GE / SFP	GE / SFP	2 PoE GE / SFP
	GE	GE	GE	GE / SFP	2 GE / SFP	2 GE / SFP	GE / SFP	2 GE / SFP
			SFP					
Performance	20 Mbps	35 Mbps	75 Mbps	175 Mbps	450 Mbps	900 Mbps	900 Mbps	1900 Mbps

If Client needs to use other models of Cisco or Qtech equipment, the configuration of the equipment must first be agreed with the Moscow Exchange by contacting the [technical support](#).

At least two physical Ethernet ports are required on the router.

NETWORK CONNECTION REQUIREMENTS

The bandwidth Client needs is the sum of the following values depending on the number of the services in use and the amount of FAST UDP Multicast feeds:

- 4 Mbit/s multiplied by the number of the gateways/terminals in use
- 10 Mbit/s multiplied by the number of the gateway/terminals with full order/trade log feed (FORTS_ORDLOG_REPL/FORTS_DEALS_REPL)
- 15-50 Mbit/s for each of A and B copies of Equity & Bond Market FAST feeds
- 15-50 Mbit/s for each of A and B copies of FX Market FAST feeds
- 6-15 Mbit/s for each of A and B copies of Derivatives Market FAST feeds

For further details, please read the [Load Test Report](#).

ADDRESSING PLAN

An authorized Network Service Provider, selected by the client to organize the service, independently provides the client with an IP address (WAN) for connecting the router to his network (Peer2Peer network).

Network addresses for CLT and CLT2 segments are allocated by the Exchange during the service configuration from the ranges indicated in the table below:

Segment	Network address	Prefix	Subnet mask
CLT	10.160.X.0 or 10.161.X.0	/24	255.255.255.0
CLT2	10.164.X.0 or 10.165.X.0	/24	255.255.255.0

The Client determines on its own end IP addresses for its systems*; no further notice is needed. The IP addresses shall be specified in the login requests and other connectivity service requests; they can be passed to the trading member in a special application (except for addresses for receiving marketdata via FAST protocol).

** The last five addresses in each subnet are reserved by the Exchange.*

MOEX's services addresses are available at <https://www.moex.com/s745>, and via a request to the [Technical Support Service](#).

EQUIPMENT SETUP

To transfer the router management to MOEX specialists, client needs to do the initial configuration on the device:

```
enable secret 123
interface {to MOEX}
 ip address {allocated by MOEX} 255.255.255.252
 no shut
 speed auto
 duplex full
 exit
```

```
ip route 0.0.0.0 0.0.0.0 {configured on MOEX's side}
line vty 0 4
  transport input telnet
  password 123
  login
end
```

After the initial configuration is done, MOEX specialist will be able to access the router remotely, perform full configuration and make sure that it works.

Configuration of routing on the Client's side designed to access MOEX's services requires that an IP address set on the router interfaces (X.X.X.252) is determined as a next hop.

The following is a basic routing in the syntax of the Windows command line:

Transaction services:

```
route add -p 10.63.0.0 mask 255.255.252.0 GW_CLT*
route add -p 10.61.0.0 mask 255.255.252.0 GW_CLT*
route add -p 91.203.252.0 mask 255.255.252.0 GW_CLT*
```

FX Market FAST:

```
route add -p 91.203.253.225 mask 255.255.255.255 GW_CLT*
route add -p 91.203.253.228 mask 255.255.255.255 GW_CLT*
route add -p 239.195.1.0 mask 255.255.255.224 GW_CLT*
route add -p 91.203.255.225 mask 255.255.255.255 GW_CLT*
route add -p 91.203.255.228 mask 255.255.255.255 GW_CLT*
route add -p 239.195.1.128 mask 255.255.255.224 GW_CLT*
```

Equity & Bond Market FAST:

```
route add -p 91.203.253.227 mask 255.255.255.255 GW_CLT*
route add -p 91.203.253.229 mask 255.255.255.255 GW_CLT*
route add -p 239.195.1.32 mask 255.255.255.224 GW_CLT*
route add -p 91.203.255.227 mask 255.255.255.255 GW_CLT*
route add -p 91.203.255.229 mask 255.255.255.255 GW_CLT*
route add -p 239.195.1.160 mask 255.255.255.224 GW_CLT*
```

Derivatives Market FAST:

```
route add -p 91.203.253.232 mask 255.255.255.255 GW_CLT*
route add -p 239.195.5.0 mask 255.255.255.0 GW_CLT*
route add -p 91.203.253.236 mask 255.255.255.255 GW_CLT*
route add -p 239.195.15.0 mask 255.255.255.0 GW_CLT*
route add -p 91.203.255.232 mask 255.255.255.255 GW_CLT*
route add -p 239.195.133.0 mask 255.255.255.0 GW_CLT*
route add -p 91.203.255.236 mask 255.255.255.255 GW_CLT*
route add -p 239.195.143.0 mask 255.255.255.0 GW_CLT*
```

* - In the case of a failover scheme servers and workstations for working with the Equity, Bond and FX Markets it is recommended to place them in the CLT2 segment, so the address GW_CLT in this case should be from the CLT2 segment.

For customers on the exchange network, a domain name service (DNS) is available at the addresses: 91.203.252.10, 91.203.254.10 and the network time protocol (NTP): 91.203.252.12, 91.203.254.12.

HOW TO GET STARTED

To get started, the 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.
- Choose the connection scheme, i.e. determine the redundancy scheme and MOEX's DCs for connection ordering;
- Choose telecom operators for establishing the communication links. Agree on commercial terms and SLA with them. Enter into tri-party agreements between Client, MOEX and the Operator.
- Enter into the Information Technology Service Agreement with Moscow Exchange (perhaps it already exists!) and order ConnectME service. Exchange managers will help to complete the forms.
- Choose connectivity protocols and software (the choice might depend on the current trading software in use).
- **(Optional)** Connect to the UAT environment to compare the solutions, review the algorithms and check software.
- **(Optional)** 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

If client experiences a malfunction of the Service or have a question regarding the connection to MOEX, the technical support service should be contacted with the following information:

- Company name;
- Connectivity option to MOEX: ConnectME;
- IP-addresses used to connect;
- Issue overview;
- **(Optional)** Telecom provider;
- **(Optional)** Results of your tests.

Technical support service:

T +7 (495) 733-9507, +7 (495) 287-7691,

T +7 (495) 363-3232, ext. 2345

E-mail: help@moex.com

AUTHORIZED NETWORK SERVICE PROVIDERS

Connection circuits may be provided by any telecom operator at the client's choice.

FAQ

What is the difference between ConnectME and Universal Scheme?

With ConnectME enabled, the Client's traffic is isolated and transmitted via a communication channel with a fixed configuration. Universal Scheme provides an aggregated communication channel for the transmission of data of all clients of one telecom operator to MOEX's data center. This restricts the choice of telecom operators available, i.e. Universal Scheme offers only a limited number of operators accredited by MOEX.

ConnectME provides a fixed network delay which remains stable over time; traffic in Universal Scheme is routed within the operator's internal network whose architecture can be modified over time.

Flexible solutions for redundant connection are available in ConnectME; Universal Scheme offers two predetermined options: connection via a telecom operator (to the main and disaster recovery DCs) and failover connection via two telecom operators.

Where are ConnectME points of connectivity located?

The service is available in Dataspace1 (11 bld.9, Sharikopodshipnikovskaya Str., Moscow) and M1 (125, Varshavskoe shosse Moscow) data centres.

Can I use the fiber channel connectivity?

Yes, you can. 1000BASE-SX and 1000BASE-LX\LH are both available. The use of other standards needs a prior approval from the Exchange.

Can I use network equipment other than Cisco or Qtech, i.e. Juniper or Arista?

Only Cisco and Qtech equipment is allowed. For more information, please refer to our technical requirements.

Does Connect ME connectivity imply restrictions on the use of DMA interfaces?

ConnectME makes available any protocols and interfaces to access all MOEX markets. To connect to MOEX's UAT systems, you need to use other solutions ConnectME Test, Colocation or Internet access.