

MIAX Futures Onyx

MIAX Futures Express Network Interconnect Connectivity Guide

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Table of Contents

Executive Summary	3
Overview	4
MIAX Express Network Interconnect (MENI).....	4
MENI Handoff	4
Production Data Centers.....	4
Disaster Recovery (DR) Data Centers.....	6
MENI Connectivity Methods.....	7
Colocation Cross Connect	7
Attachment Types	8
Telecommunications or Network Service Provider (NSP).....	8
Extranet Service Provider	8
Available MENI Platforms	9
Network Specifications	10
MENI Protocol Support	10
IP Addressing and Autonomous System Number (ASN).....	10
Traffic, Routing and Security Considerations	11
Redundant Connections and Roles	11
Route Exchange.....	11
Host Addresses and Protocol Ports	11
Administration and Actions	11
Obtaining More Information.....	12
Appendix A: MIAX Futures – Financial Futures Products Address Information.....	13
Appendix B: MIAX Futures – Commodity Futures Products Address Information.....	19
Appendix C: MIAX Futures Market Data Feed Services Bandwidth Estimates	25
Appendix D: Contact List.....	26
Appendix E: Revision History.....	27

Executive Summary

MIAX Futures offers low latency network connectivity to diverse trading platforms, market data distribution systems, financial services, and disaster recovery and test facilities through the MIAX Express Network Interconnect (MENI). The MENI (pronounced “many”) is an infrastructure comprised of Ultra Low Latency (ULL) equalized access to the MIAX Futures exchange services within the data center across a variety of high speed network interfaces.

MIAX Futures offers latency-equalized connectivity in its primary production data center facilities, colocated with Equinix at NY5 in Secaucus, NJ for our financial futures products and Equinix at CH4 in Chicago, IL for our commodity futures products.

MIAX Futures’ disaster recovery (DR) data centers, colocated with CoreSite’s CH2 data center in Chicago, IL for our financial futures products and Equinix at NY5 in Secaucus, NJ for our commodity futures products, offer dedicated connectivity options for DR.

Overview

MIAX Express Network Interconnect (MENI)

The MENI network infrastructure is based on an architecture comprised of complementary solutions selected for the enhanced performance, reliability and resiliency they provide.

The MENI offers 10G fiber cross connects to establish network layer connectivity to the MIAX network infrastructure.

IP connectivity between the MENI and the customer firm is established via IP routing protocols (BGP) or by direct host interface attachment.

All MENI handoffs are IP based and provide:

- Equalized fiber lengths scoped to each of MIAX Futures' exchange production systems and the data recipient systems within the NY5 and CH4 Data Center Complexes.
- Simplified connectivity requirements and provisioning.
- Flexible entitlement and rapid service turn-up.
- Secure and reliable connectivity.

MENI Handoff

The MENI located within each data center provide access to the MIAX Futures trading and support systems.

Production Data Centers

The MIAX Futures "A" and "B" production trading systems and firm test platforms for trading financial futures contracts are collocated in the Equinix NY5 IBX Data Center Facility located in Secaucus, NJ.

The MIAX Futures "A" and "B" production trading systems and firm test platforms for trading commodity futures contracts are collocated in the Equinix CH4 IBX Data Center Facility located in Chicago, IL.

MIAX Futures Exchange Production Platform Connectivity

The following table details the various production connectivity options provided for the MIAX Futures Exchange platforms:

MIAX Futures Exchange Production Connectivity Options		
Connectivity Options	MIAX Futures Financial Futures Products	MIAX Futures Commodity Futures Products
10G Ultra Low Latency (ULL)	<p>Accessible via MENI <u>Dedicated</u> Extranet in Equinix NY5 Secaucus, NJ</p> <p><i>TCP unicast and multicast market data are available on the same cross connects</i></p>	<p>Accessible via MENI <u>Dedicated</u> Extranet in Equinix CH4 Chicago, IL</p> <p><i>TCP unicast and multicast market data are available on the same cross connects</i></p>

As indicated above:

- MIAX Futures financial futures products are accessible via the platform dedicated MENI 10G ULL Extranet in NY5. Both TCP unicast and multicast are available on a single cross connect for this platform.
- MIAX Futures commodity futures products are accessible via the platform dedicated MENI 10G ULL Extranet in CH4. Both TCP unicast and multicast are available on a single cross connect for this platform.

MIAX Futures Exchange Firm Test Bed (FTB) Access

Access to the member Firm Test Bed (FTB) for MIAX Futures is provided via a cross connect to the MENI FTB extranet or through a VPN connection. The following table details the various connectivity options provided in the Equinix NY5 IBX and Equinix IBX CH4 Data Centers for the MENI FTB extranet access:

Firm Test Bed (FTB) Extranet Access		
Connectivity Options	Firm Test Bed (FTB) Access Methods Financial Futures Products	Firm Test Bed (FTB) Access Methods Commodity Futures Products
1G & 10G Low Latency (LL) Cross Connect	Accessible via MENI FTB Extranet in NY5, Secaucus, NJ	Accessible via MENI FTB Extranet in CH4, Chicago, IL
VPN Connection	Accessible via internet	Accessible via internet

Disaster Recovery (DR) Data Centers

The MIAX Futures DR trading systems for trading financial futures contracts are colocated in the CoreSite’s CH2 Data Center Facility located in Chicago, IL. The financial futures DR Extranet is located in Equinix CH4 Data Center facility for the 10G ULL cross connects.

The MIAX Futures DR trading systems for trading commodity futures contracts are colocated in the Equinix NY5 IBX Data Center Facility located in Secaucus, NJ.

The table below lists the available connectivity options for each disaster recovery location:

MIAX Futures Exchange Disaster Recovery (DR) Connectivity Options		
Connectivity Options	MIAX Futures Financial Futures Products Disaster Recovery Site in CH2, Chicago, IL	MIAX Futures Commodity Futures Products Disaster Recovery Site in NY5, Secaucus, NJ
10G Ultra Low Latency (ULL)	Accessible via MENI <u>Dedicated</u> Extranet in Equinix CH4, Chicago, IL	Accessible via MENI <u>Dedicated</u> Extranet in Equinix IBX NY5, Secaucus, NJ

As indicated above:

- MIAX Futures financial futures products are accessible via the DR platform dedicated MENI 10G ULL Extranet in CH4.
- MIAX Futures commodity futures products are accessible via the platform dedicated MENI 10G ULL Extranet in NY5.

MIAX Futures highly recommends firms establish redundant, diverse connections in each MENI Data Center facility to maintain network availability in case of an unforeseen, service-affecting issue.

MENI Connectivity Methods

Connectivity to the MENI can be established through a variety of access methods. Irrespective of the connectivity method selected, MIAX Futures requires the firm or service provider to provide and present an optical Ethernet interface as the handoff to the MENI. The MENI Data Center locations support the following interface speeds, optical signals, and fiber types:

Location	Port Option	Optical Signal	Fiber Type	Core/Cladding	Modal Bandwidth	Exchange
NY5, CH4	10 Gigabit	10GBASE-LR (Default)	Single Mode Fiber (SMF)	9/125 µm	OS2	MIAX Futures
		SFP-10G-ER40 (1310nm)	Single Mode Fiber (SMF)	9/125 µm	OS2	

Firms need to select the appropriate access method(s) and control coordinating connectivity with their chosen provider to the MIAX Data Centers. Firms may choose any of the following access methods for establishing MENI connectivity:

- Colocation Cross Connect
- Telco Carrier or Network Service Provider
- Extranet Provider
- Ethernet Service Provider (EPL, Metro and Long Haul)

Colocation Cross Connect

Firms with an existing presence in any of the MIAX Data Centers may order cross connects to the MENI network demarcation point. The NY5 and CH4 production cross connects are latency-equalized between the MIAX Futures and firm’s demarcation points, regardless of the data center location or proximity. Each cross connect fiber length is measured to within a narrow tolerance to meet the exchange’s specific needs.

The standard connector for MIAX Futures used for latency-equalized cross connects are terminated on LC connectors.

Equinix supplies and installs demarcation points in IBX private cages and offers an option to locate the demarcation points in the customer cabinet.

Firms seeking equipment or colocation space for placing firm owned equipment should contact Equinix (www.equinix.com) for NY5 or CH4.

Attachment Types

The MENI supports direct attachment of customer/provider network equipment via the MIAX Network-to-Network Interface (MNNI) or host systems via the MIAX User Network Interface (MUNI).

MIAX Network-to-Network Interface (MNNI)

The MNNI is a network-to-network interface (NNI) that provides a demarcation point for linking the customer's network to the MENI for purposes of establishing network connectivity and the exchange of IP route information.

MIAX User Network Interface (MUNI)

The MUNI is a user network interface (UNI) that provides a demarcation point for linking the customer's server to the MENI for purposes of establishing secure direct host connectivity.

Telecommunications or Network Service Provider (NSP)

Firms may choose to connect to the MENI directly via a direct leased/private line at the MIAX Data Center location. The leased line will be terminated at the telco demarcation point in the Equinix or CoreSite datacenter and extended to the MIAX cage via a cross connect. This connectivity option provides a high degree of flexibility and choice for the firm to choose an appropriate Telco or NSP service to fit their individual MAN or WAN requirements.

Extranet Service Provider

Firms may connect to the MENI via an Extranet Service Provider when an alternative solution to colocation or dedicated circuits is required. This option may provide a simpler means of connectivity and less complexity when a fully managed "turnkey" approach is more appropriate. MIAX Futures is provider neutral and will consider Extranet Provider requests to establish connectivity initiated by and on the firm's behalf. Please review the MIAX website for a current list of MIAX certified Extranet Service providers.

Available MENI Platforms

The MENI infrastructure provides access to all MIAX Futures financial services, trading, test and certification systems in the exchange’s primary production and disaster recovery data center facilities.

The following table provides a summary of services and platforms provided by location:

MIAX Facility				
MIAX Data Center	Equinix NY5 Financial Futures Production	CoreSite CH2 Financial Futures Disaster Recovery	Equinix CH4 Commodity Futures Production	Equinix NY5 Commodity Futures Disaster Recovery
Location	NY5 Secaucus, NJ	CH2 Chicago, IL	CH4 Chicago, IL	NY5 Secaucus, NJ
Colocation Provider	Equinix	CoreSite	Equinix	Equinix
Connectivity Method				
Latency Equalized Colocation Cross Connect	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
Colocation Cross Connect				<input checked="" type="checkbox"/>
CH4 POP		<input checked="" type="checkbox"/>		
Single-mode fiber	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Multi-mode fiber				
System Services				
MIAX Futures Primary System	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
MIAX Futures Secondary System	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
MIAX Futures Firm Test & Certification System Current SW Release	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
MIAX Futures Firm Test & Certification System Next SW Release	<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>	
MIAX Futures Disaster Recovery System		<input checked="" type="checkbox"/>		<input checked="" type="checkbox"/>

Network Specifications

MENI Protocol Support

MIAX Futures supports standardization of internetworking technologies to foster and promote interoperability. To ensure seamless interworking of applications and infrastructure handoffs between autonomous systems comprised of heterogeneous borders, MIAX Futures has selected the following protocols:

- Transmission Control Protocol (TCP) – MIAX host systems and applications will administer TCP as the transport layer protocol for connection-oriented, session-based, unicast traffic segments.
- User Datagram Protocol (UDP) – MIAX host systems and applications will administer UDP as the transport layer protocol for connectionless, non-session-based, real-time datagram delivery such as market data feeds.
- Internet Protocol Version 4 (IPv4) – MIAX host systems and network devices will use IP as the network layer protocol for relaying data packets comprised of TCP segments or UDP datagrams from source to destination host systems across the MIAX and firm’s internetwork.
- Border Gateway Protocol Version 4 (BGP4) – MENI interfaces will use BGP as the dynamic exterior gateway routing protocol to exchange network reachability information with peer routers of the firm’s Autonomous System.
- Static IP Protocol – MENI interfaces will be manually administered with static IP routes for providing network reachability to firm’s destination IP networks when BGP is not an option for firm route exchange.
- Protocol Independent Multicast Sparse Mode (PIM-SM) – MENI interfaces will use PIM-SM as the dynamic multicast routing protocol to provide firm-based, receiver-initiated subscription of MIAX real-time IP multicast market data feeds.
- Internet Group Management Protocol Version 2 (IGMP) – MIAX will define IGMP static joins on the MENI edge interface to manually “nail up” firm facing IP multicast group memberships when PIM-SM is not an option for firm feed subscription.
- Internet Control Message Protocol Version 4 (ICMP) – MIAX reserves usage of ICMP for diagnostic analysis of IP packet errors and to confirm network reachability during the provisioning process of establishing firm connectivity.

IP Addressing and Autonomous System Number (ASN)

Firms are recommended to use globally registered, unique IPv4 addresses for all host level communication with the MIAX Futures trading systems, platforms and hosts. Equally important is the firm’s use of a registered Autonomous System Number (ASN) for BGP peering with the MENI.

MIAX Futures will permit firms to utilize private IPv4 addresses and/or Autonomous System Numbers, as long as MIAX Futures administers, specifies and assigns the private IP address range and private Autonomous System

Number. In this capacity, MIAAX will serve as the Private Internet Registry (PIR) and the firm will receive an address block allocation and/or Autonomous System Number assignment.

Traffic, Routing and Security Considerations

Redundant Connections and Roles

The MENI supports a redundant connectivity model to provide failover, recovery and resiliency. For example, redundant cross connects can be used for hot/hot, hot/warm or hot/cold unicast connectivity models. The redundant cross connects can also be used to separately receive the multicast market data A side and B side feeds on different cross connects. This is the required model for customers receiving both the A and B side feeds. A and B side feeds should not be received/joined together on the same cross connect.

Route Exchange

MIAX Futures will only advertise MIAX specific IP multicast source or destination host IP networks in outbound IP routing advertisements and will only accept globally registered or MIAX assigned inbound IP routing advertisements from firms across the MENI.

Host Addresses and Protocol Ports

MIAX input systems and multicast feed sources will be administered in globally registered IPv4 address space and with static TCP and UDP ports from the IANA private port range.

Administration and Actions

MIAX reserves the right to control or police bandwidth, block protocols/ports, filter, capture, analyze and store data to or from any MENI connected device or client based session. MIAX also maintains the right to administratively disable any port, service or interface and physically disconnect, if necessary, any link which is believed to be compromising security of MIAX platforms, systems, hosts or services in order to protect MIAX resources and/or other connected firms.

Obtaining More Information

Information such as (but not limited to) membership, rules, fees, support, connectivity and provisioning can be obtained by sending an email to Trading Operations (MIAXFuturesTradingOperations@miaxglobal.com) or by visiting the MIAX website at: <http://www.miaxglobal.com>

Appendix A: MIAX Futures – Financial Futures Products Address Information

MIAX Futures – Financial Products – Production Multicast Address Summary:

MIAX advertises the full subnets for MIAX Futures – Financial Product A and B feeds. Please contact MIAX Trading Operations for further details on MIAX Futures – Financial Product system's IP subnetting.

A side:

Group: 224.4.34.0/28

Source: 188.209.150.32/28 & 188.209.150.48/28

RP: 188.209.150.72

B side:

Group: 224.4.35.0/28

Source: 188.209.151.32/28 & 188.209.151.48/28

RP: 188.209.151.72

MIAX Futures – Financial Products – Top of Market (ToM) Production Multicast Information

MIAX Futures – Financial Products – Top of Market (ToM) ‘A’ Feed Production Multicast Address and Port Information

MIAX Futures – Financial Products - TOM A Feed				
Cloud	Feed	Source IP	Multicast Group	Multicast Port
1	A	188.209.150.33	224.4.34.0	51001

MIAX Futures – Financial Products – Top of Market (ToM) ‘B’ Feed Production Multicast Address and Port Information

MIAX Futures – Financial Products - TOM B Feed				
Cloud	Feed	Source IP	Multicast Group	Multicast Port
1	B	188.209.151.33	224.4.35.0	53001

MIAX Futures – Financial Products – TOM Production Retransmission Service Information

MIAX Futures – Financial Products – Top of Market (ToM) ‘A’ Production Retransmission Service Address and Port Information

MIAX Futures – Financial Products - TOM A Feed Retransmission			
Cloud	Feed	Destination IP Address	Port
1	A	188.209.150.65	51101

MIAX Futures – Financial Products – Top of Market (ToM) ‘B’ Production Retransmission Service Address and Port Information

MIAX Futures – Financial Products - TOM B Feed Retransmission			
Cloud	Feed	Destination IP Address	Port
1	B	188.209.151.65	53101

MIAX Futures – Financial Products – Depth of Market (DOM) Production Multicast Information

MIAX Futures – Financial Products – Depth of Market (DOM) ‘A’ Feed Production Multicast Address and Port Information

MIAX Futures – Financial Products - DOM A Feed				
Cloud	Feed	Source IP	Multicast Group	Multicast Port
1	A	188.209.150.49	224.4.34.8	51073

MIAX Futures – Financial Products – Depth of Market (DOM) ‘B’ Feed Production Multicast Address and Port Information

MIAX Futures – Financial Products - DOM B Feed				
Cloud	Feed	Source IP	Multicast Group	Multicast Port
1	B	188.209.151.49	224.4.35.8	53073

MIAX Futures – Financial Products – DOM Production Retransmission Service Information

MIAX Futures – Financial Products – Depth of Market (DOM) ‘A’ Production Retransmission Service Address and Port Information

MIAX Futures – Financial Products - DOM A Feed Retransmission			
Cloud	Feed	Destination IP Address	Port
1	A	188.209.150.65	51173

MIAX Futures – Financial Products – Depth of Market (DOM) ‘B’ Production Retransmission Service Address and Port Information

MIAX Futures – Financial Products - DOM B Feed Retransmission			
Cloud	Feed	Destination IP Address	Port
1	B	188.209.151.65	53173

MIAX Futures – Financial Products Disaster Recovery (DR) Multicast Address Summary:

MIAX advertises the full subnets for MIAX Futures – Financial Product DR feeds. Please contact MIAX Trading Operations for further details on MIAX Futures – Financial Product system’s IP subnetting.

A side:

Group: 224.4.36.0/28

Source: 188.209.147.160/28 & 188.209.147.176/28

RP: 188.209.147.200

MIAX Futures – Financial Products – Top of Market (ToM) DR Multicast Information

MIAX Futures – Financial Products – Top of Market (ToM) ‘A’ Feed DR Multicast Address and Port Information

MIAX Futures – Financial Products - TOM A Feed				
Cloud	Feed	Source IP	Multicast Group	Multicast Port
1	A	188.209.147.161	224.4.36.0	51001

MIAX Futures – Financial Products – ToM Production DR Retransmission Service Information

MIAX Futures – Financial Products – DR Top of Market (ToM) ‘A’ DR Retransmission Service Address and Port Information

MIAX Futures – Financial Products - TOM A Feed Retransmission			
Cloud	Feed	Destination IP Address	Port
1	A	188.209.147.193	51101

MIAX Futures – Financial Products – Depth of Market (DOM) DR Multicast Information

MIAX Futures – Financial Products – Depth of Market (DOM) ‘A’ Feed DR Multicast Address and Port Information

MIAX Futures – Financial Products - DOM A Feed				
Cloud	Feed	Source IP	Multicast Group	Multicast Port
1	A	188.209.147.177	224.4.36.8	51073

MIAX Futures – Financial Products – DOM Production DR Retransmission Service Information

MIAX Futures – Financial Products – Depth of Market (DOM) ‘A’ DR Retransmission Service Address and Port Information

MIAX Futures – Financial Products - DOM A Feed Retransmission			
Cloud	Feed	Destination IP Address	Port
1	A	188.209.147.193	51173

MIAX Futures – Financial Products – Firm Test Bed Summary

MIAX Futures – Financial Products – advertises a single prefix for both MIAX Futures – Financial Products – Test Beds. Please contact MIAX Futures Trading Operations for further details on MIAX Futures – Financial Products – IP subnetting.

Test Bed Multicast Address Summary:

Group: 224.4.39.248/29

Source: 188.209.146.144/29

RP: 188.209.146.150

MIAX Futures – Financial Products – Test Bed 1 Multicast and Retransmission Information

MIAX Futures – Financial Products - Firm Test Bed 1 (Current Production Version)					
Service	Cloud	Source IP	SesM Port	Multicast Group	Multicast Port
ToM	1	188.209.146.145		224.4.39.248	60995
TMR	1	188.209.146.145	60997		
DOM	1	188.209.146.145		224.4.39.250	60983
DMR	1	188.209.146.145	60985		

MIAX Futures – Financial Products – Test Bed 2 Multicast and Retransmission Information

MIAX Futures – Financial Products - Firm Test Bed 2 (Future Production Version)					
Service	Cloud	Source IP	SesM Port	Multicast Group	Multicast Port
ToM	1	188.209.146.146		224.4.39.252	60995
TMR	1	188.209.146.146	60997		
DOM	1	188.209.146.146		224.4.39.254	60983
DMR	1	188.209.146.146	60985		

Appendix B: MIAX Futures – Commodity Futures Products Address Information

MIAX Futures – Commodity Products – Production Multicast Address Summary:

MIAX advertises the full subnets for MIAX Futures – Commodity Product A and B feeds. Please contact MIAX Futures Trading Operations for further details on MIAX Futures – Commodity Product system's IP subnetting.

A side:

Group: 224.4.34.128/28

Source: 188.209.150.160/28 & 188.209.150.176/28

RP: 188.209.150.73

B side:

Group: 224.4.35.128/28

Source: 188.209.151.160/28 & 188.209.151.176/28

RP: 188.209.151.73

MIAX Futures – Commodity Products – Top of Market (ToM) Production Multicast Information

MIAX Futures – Commodity Products -- Top of Market (ToM) 'A' Feed Production Multicast Address and Port Information

MIAX Futures – Commodity Products - ToM A Feed				
Cloud	Feed	Source IP	Multicast Group	Multicast Port
1	A	188.209.150.161	224.4.34.128	51001

MIAX Futures – Commodity Products -- Top of Market (ToM) 'B' Feed Production Multicast Address and Port Information

MIAX Futures – Commodity Products - ToM B Feed				
Cloud	Feed	Source IP	Multicast Group	Multicast Port
1	B	188.209.151.161	224.4.35.128	53001

MIAX Futures – Commodity Products – ToM Production Retransmission Service Information

MIAX Futures – Commodity Products – Top of Market (ToM) 'A' Production Retransmission Service Address and Port Information

MIAX Futures – Commodity Products - TOM A Feed Retransmission			
Cloud	Feed	Destination IP Address	Port
1	A	188.209.150.193	51101

MIAX Futures – Commodity Products – Top of Market (ToM) 'B' Production Retransmission Service Address and Port Information

MIAX Futures – Commodity Products - TOM B Feed Retransmission			
Cloud	Feed	Destination IP Address	Port
1	B	188.209.151.193	53101

MIAX Futures – Commodity Products – Depth of Market (DOM) Production Multicast Information

MIAX Futures – Commodity Products – Depth of Market (DOM) ‘A’ Feed Production Multicast Address and Port Information

MIAX Futures – Commodity Products - DOM A Feed				
Cloud	Feed	Source IP	Multicast Group	Multicast Port
1	A	188.209.150.177	224.4.34.136	51073

MIAX Futures – Commodity Products – Depth of Market (DOM) ‘B’ Feed Production Multicast Address and Port Information

MIAX Futures – Commodity Products - DOM B Feed				
Cloud	Feed	Source IP	Multicast Group	Multicast Port
1	B	188.209.151.177	224.4.35.136	53073

MIAX Futures – Commodity Products – DOM Production Retransmission Service Information

MIAX Futures – Commodity Products – Depth of Market (DOM) ‘A’ Production Retransmission Service Address and Port Information

MIAX Futures – Commodity Products - DOM A Feed Retransmission			
Cloud	Feed	Destination IP Address	Port
1	A	188.209.150.193	51173

MIAX Futures – Commodity Products – Depth of Market (DOM) ‘B’ Production Retransmission Service Address and Port Information

MIAX Futures – Commodity Products - DOM B Feed Retransmission			
Cloud	Feed	Destination IP Address	Port
1	B	188.209.151.193	53173

MIAX Futures – Commodity Products – Disaster Recover (DR) Multicast Address Summary:

MIAX advertises the full subnets for MIAX Futures – Commodity Product DR feeds. Please contact MIAX Futures Trading Operations for further details on MIAX Futures – Commodity Product system's IP subnetting.

A side:

Group: 224.4.36.128/28

Source: 188.209.148.160/28 & 188.209.148.176/28

RP: 188.209.147.201

MIAX Futures – Commodity Products – Top of Market (ToM) DR Multicast Information

MIAX Futures – Commodity Products – Top of Market (ToM) ‘A’ Feed DR Multicast Address and Port Information

MIAX Futures – Commodity Products - TOM A Feed				
Cloud	Feed	Source IP	Multicast Group	Multicast Port
1	A	188.209.148.161	224.4.36.128	51001

MIAX Futures – Commodity Products – TOM Production DR Retransmission Service Information

MIAX Futures – Commodity Products – DR Top of Market (ToM) ‘A’ DR Retransmission Service Address and Port Information

MIAX Futures – Commodity Products - TOM A Feed Retransmission			
Cloud	Feed	Destination IP Address	Port
1	A	188.209.148.193	51101

MIAX Futures – Commodity Products – Depth of Market (DOM) DR Multicast Information

MIAX Futures – Commodity Products – Depth of Market (DOM) ‘A’ Feed DR Multicast Address and Port Information

MIAX Futures – Commodity Products - DOM A Feed				
Cloud	Feed	Source IP	Multicast Group	Multicast Port
1	A	188.209.148.177	224.4.36.136	51073

MIAX Futures – Commodity Products – DOM Production DR Retransmission Service Information

MIAX Futures – Commodity Products – Depth of Market (DOM) ‘A’ DR Retransmission Service Address and Port Information

MIAX Futures – Commodity Products - DOM A Feed Retransmission			
Cloud	Feed	Destination IP Address	Port
1	A	188.209.148.193	51173

MIAX Futures – Commodity Products – Firm Test Bed Summary

MIAX Futures – Commodity Products – advertises a single prefix for both MIAX Futures – Commodity Products – Test Beds. Please contact MIAX Futures Trading Operations for further details on MIAX Futures – Commodity Products – IP subnetting.

Test Bed Multicast Address Summary:

Group: 224.4.39.240/29

Source: 188.209.146.152/29

RP: 188.209.146.158

MIAX Futures – Financial Products – Test Bed 1 Multicast and Retransmission Information

MIAX Futures – Commodity Products - Firm Test Bed 1 (Current Production Version)					
Service	Cloud	Source IP	SesM Port	Multicast Group	Multicast Port
ToM	1	188.209.146.153		224.4.39.240	60995
TMR	1	188.209.146.153	60997		
DOM	1	188.209.146.153		224.4.39.242	60983
DMR	1	188.209.146.153	60985		

MIAX Futures – Financial Products – Test Bed 2 Multicast and Retransmission Information

MIAX Futures – Commodity Products - Firm Test Bed 2 (Future Production Version)					
Service	Cloud	Source IP	SesM Port	Multicast Group	Multicast Port
ToM	1	188.209.146.154		224.4.39.244	60995
TMR	1	188.209.146.154	60997		
DOM	1	188.209.146.154		224.4.39.246	60983
DMR	1	188.209.146.154	60985		

Appendix C: MIAX Futures Market Data Feed Services Bandwidth Estimates

MIAX Futures provides the following bandwidth estimates to assist market data recipients in assessing their connectivity needs. The bandwidth estimates are for a single A side or B side of each feed.

Market data recipients subscribing to both the A and B side of feeds must not stack them onto the same cross connect. That is, the A side of the feeds must be on a separate cross connect from the B side of the feeds.

Customers are asked to perform their own measurements, both upon initial establishment of connectivity and periodically, to ensure that their connectivity is sized to meet their individualized ongoing needs.

MIAX Futures Production Peak Bandwidth Estimates:

Market Data Feed Service	Estimated Peak Bandwidth
Top of Market Feed (ToM)	~3 Gbps at 1ms intervals
Depth of Market (DOM)	~3 Gbps at 1ms intervals

NOTES:

- The above Estimated Peak Bandwidth metrics are updated periodically and may not necessarily reflect actual production peak rates due to variability in market activity.
- The bandwidth estimates are based on outputs at microburst intervals of 1 millisecond.
- The estimates apply to the feeds for MIAX Futures Financial Product platform as well as the MIAX Futures Commodity Products platform.

MIAX Futures Firm Test Bed (FTB) Bandwidth Estimates:

- The projected bandwidth utilization for the MIAX Futures Firm Test Bed is estimated to be negligible.

Appendix D: Contact List

Please visit the [MIAX Website](#) to obtain the latest contact list and other relevant information.

Appendix E: Revision History

Revision Date	Version	Description
11/18/2024	1.0	Initial release.
12/3/2024	1.1	Removed language related to the dedicated multicast network connections because it is no longer a requirement. Firms can use cross connects for both unicast and multicast.
02/01/2025	1.2	Updated Commodities DOM multicast feed details

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