



MIAX[®] Express Network Interconnect

Connectivity Guide

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1 Executive Summary

MIAX Options® and MIAX PEARL™, collectively referred to as MIAX, provides Ultra-Low Latency network connectivity to completely diverse trading platforms, market data distribution systems, financial services, disaster recovery and test facilities through the MIAX Express Network Interconnect. The MIAX Express Network Interconnect, hereafter referred to as MENI (pronounced “MANY”), is an infrastructure comprised of Low Latency and Ultra Low Latency (ULL) proximity solutions in data center locales offering universal and equalized access to all MIAX services within the data center across a variety of high speed network interfaces.

MIAX offers latency equalized 1 Gigabit, 10 Gigabit and 10 Gigabit ULL connectivity options in its primary data center facility, collocated with Equinix at NY4 in Secaucus, New Jersey. MIAX’s disaster recovery data center, collocated with Equinix at CH4 in Chicago, Illinois, offers 1 Gigabit and 10 Gigabit connectivity options.

In conjunction with MIAX’s core beliefs, which are deeply rooted in ultimate choice and universal equalized access, MENI provides flexible connectivity options and locations that provide individuals the ability to create solutions uniquely suited to fit their specific business needs and recovery requirements. MIAX High Performance Data Centers, collocated with Equinix, offer ultimate choice and neutrality for selecting appropriate access methods, Telecommunication Carriers or Extranet Service Providers for establishing MENI connectivity. MENI supports primary, secondary and or numerous primary or secondary connections for member network or direct-attached host based systems tailored to meet individual requirements of enterprise specific configurations. It is highly recommended that MIAX participants establish connectivity to both data centers to ensure continuity should the primary facility incur a disruption of service.

2 Overview

2.1 MIAX Express Network Interconnect (MENI)

The MENI network infrastructure is based on an architecture comprised of complementary industry leading solutions selected for the highest levels of performance, reliability and resiliency. A minimalistic design approach emphasizing failsafe operation and rapid restoration techniques ensures the highest degree of sustainability and continuous operations. In keeping with industry best practice, the MENI Physical Medium Dependent (PMD) interface is offered as a fiber optic connection presenting either a 1 Gigabit or 10 Gigabit Ethernet MAC layer protocol upon which Internet Protocol version 4 (IPv4) is relied upon for establishing network layer connectivity to the MIAX Autonomous System. IP connectivity between the MENI and data recipient network interface forms the foundation for exchanging network reachability information via IP routing or direct host interface attachment to facilitate upper layer TCP session establishment between MIAX and data recipient systems for connection oriented services or for subscription to connectionless UDP data streams.

All Express Network Interconnect handoffs are IP based and provide:

- Equalized fiber lengths between MIAX and the data recipient systems.
- Simplified connectivity requirements and provisioning.
- Flexible entitlement and rapid service turn-up.
- Secure and reliable connectivity.

The remainder of the Connectivity Guide focuses on access methods and requirements for establishing secure and reliable connectivity to MIAX.

2.2 MIAX Express Network Interconnect Handoff and Topology

The MIAX Express Network Interconnect Topology located within each MIAX Data Center houses and provides access to the MIAX Options and MIAX PEARL “A”, “B”, Test and DR Trading Systems according to the specific data center facility. The MIAX Options and MIAX PEARL “A” and “B” Trading System and Test Platforms are collocated in the Equinix NY4 IBX Data Center Facility and both MIAX Options and MIAX PEARL Disaster Recovery Trading Systems are collocated in the Equinix CH4 IBX Data Center. The MIAX Express Network Interconnect provides both primary and secondary and or numerous primary or secondary network handoffs in each data center on dedicated facilities and access switches in a full mesh topology. This configuration provides the client with a high degree of flexible connectivity options for selecting the appropriate level of redundancy and diversity within the primary and disaster recovery data locations.

Although numerous access methods are available, MIAX highly recommends members establish redundant, diverse connections in each MENI Data Center facility to maintain network availability in case of an unforeseen service-affecting issue. A high level overview of the MENI Data Center handoff options is provided in Figure 1. For illustrative purposes, the red blocks denote Member Autonomous Systems and Routers. Alternatively, customers may choose to directly attach high performance host systems to dedicated MENI ports based upon individual needs and business requirements. Regardless, any access method previously described follows the same handoff model regardless whether it's a colocation cross connect, direct connect via carrier, network service provider or extranet provider.

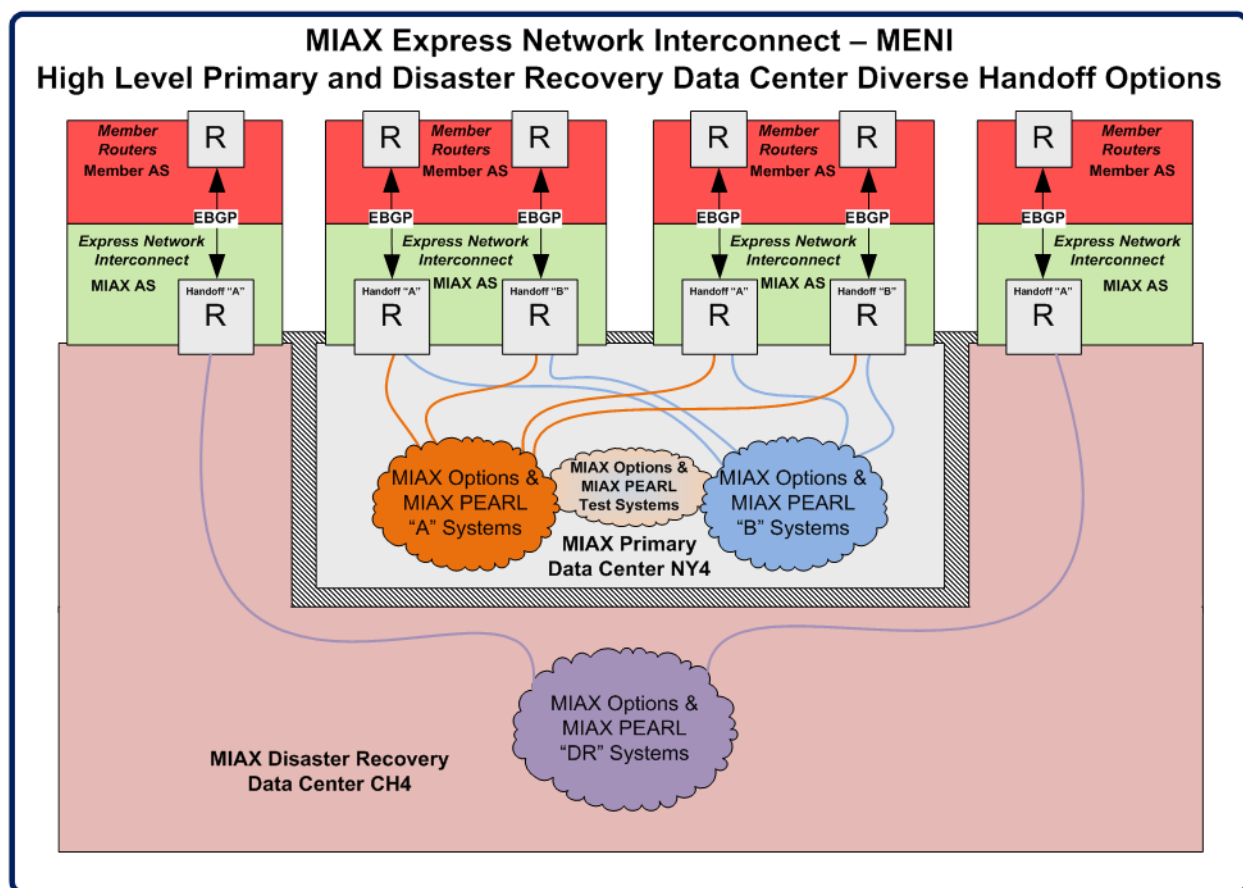


Figure 1: MIAX Express Network Interconnect Locales and Handoff Options

In keeping with the MIAX philosophy of ultimate choice and access, the Exchanges provide a variety of access methods for establishing connectivity to quote, order and trade processing platforms. For proximity based solutions, colocation is available directly from Equinix at the NY4 and CH4 IBX Data Centers. For direct connect options, the Equinix IBX Data Centers provide access to more than 690 public and private networks for interconnection, including leading Telecommunication Carriers, Ethernet Service Providers and Dark Fiber Providers. Alternative access methods for indirect connectivity are also available from Extranet Providers and Internet Service Providers. A reference of the NY4 Primary Data Center MENI network topology is depicted in Figure 2. It is directly applicable to the CH4 Disaster Recovery data center in terms of function and hierarchy, however is scaled to meet the requirements of the environment by providing discrete low latency 1 Gigabit and 10 Gigabit interface options.

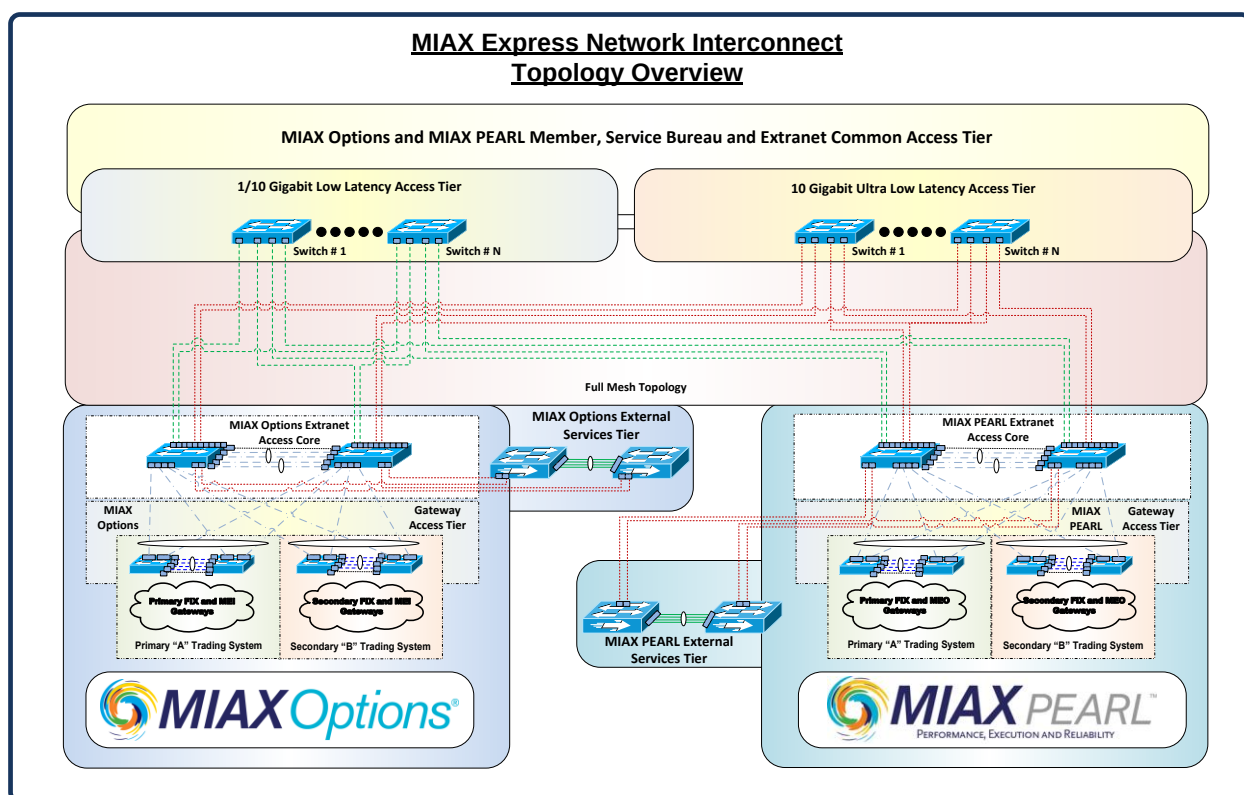


Figure 2: MIAX MENI Data Center Common Access Topology Reference

The flexible, modular architecture is based on the concept of utilizing modules and tiers for providing separation and isolation of Exchange based systems, applications and services across common and dedicated access infrastructures. The Common Access Tier provides MIAX Options and MIAX PEARL Member Firms, Service Bureaus and Extranets with differing interface handoff options and serves as the exterior IP gateway for all common connectivity. It provides participants seeking a traditional primary/secondary relational connectivity model mutual Exchange accessibility based upon preference of primary and secondary source network advertisements over the same pair of connections. For participants seeking numerous high speed market data feed subscriptions and/or multiple primary and/or secondary connections advertising the same source network(s) to MIAX Options and MIAX PEARL, then dedicated connections are required by platform. The Dedicated Access Tier for each respective platform is depicted in Figure 3. MIAX requires individual dedicated 10Gbps connections for participants seeking parallel subscriptions to the MIAX Options and MIAX PEARL Top of Market (ToM) feeds and highly recommends an additional dedicated 10Gbps connection for subscription to the MIAX PEARL Liquidity Feed (PLF).

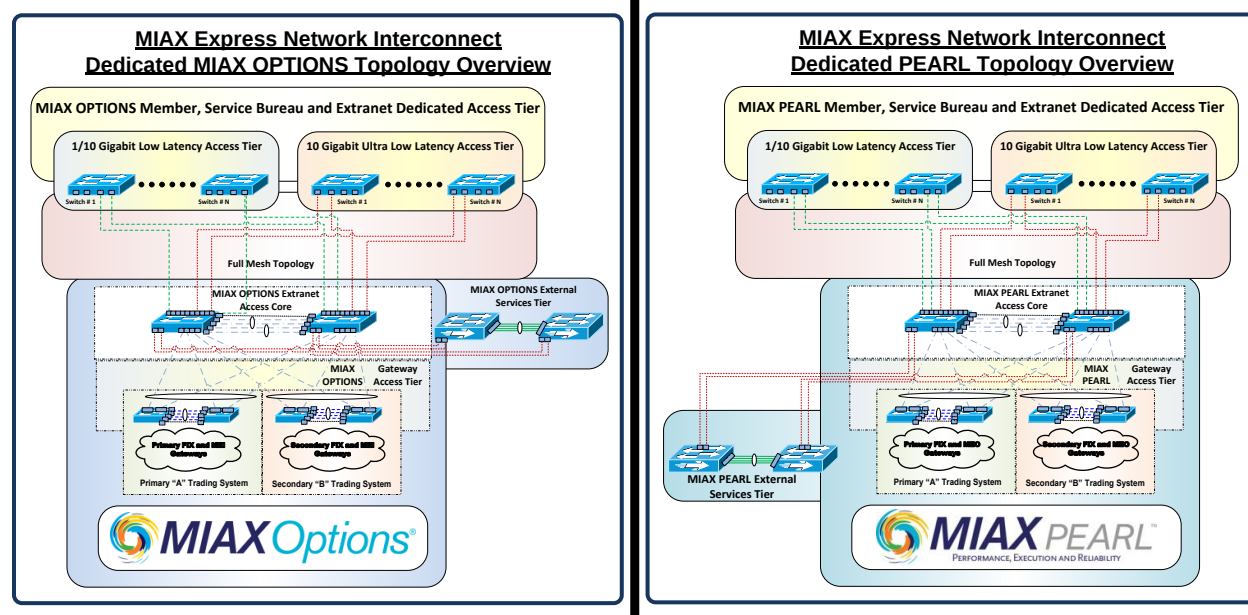


Figure 3: MENI Data Center MIAX Options and MIAX PEARL Dedicated Access Topology Reference

Based upon individual performance requirements, participants can select connectivity from the Low Latency 1 Gigabit and 10 Gigabit Access Tier or the 10 Gigabit Ultra Low Latency Access Tier. The 10 Gigabit Ultra Low Latency Access Tier offers optimized connectivity for latency sensitive participants and is approximately 1.6 μ s faster in round trip time for connection oriented traffic to the MIAX Options and MIAX PEARL input systems than the 10 Gigabit offering.

The Common Access Tier, currently comprised of low latency and ultra-low latency access switches is configured in a full-mesh topology that provides aggregation for each access switch to every respective core switch of each Exchange based trading platform. This redundant, multi-homed approach provides separate, but equal access to the primary and secondary trading system for each Exchange based platform. The Dedicated Access Tier topologies for each platform are designed and configured in an equal manner and are specifically applicable per dedicated environment.

Similarly, the Access Core for each trading system is fully meshed and dual-homed to both the primary and secondary switch complexes that comprise the redundant Gateway Access Tier within each Exchange. In turn, the Gateway Access Tier provides edge network connectivity to the MIAX Options and MIAX PEARL input systems that house the MEI, MEO and FIX server interfaces. In addition, the Access Core establishes connectivity to the External Services Tier switch complex in the same manner. The External Services Tier provides edge network connectivity to the MIAX Options and MIAX PEARL output systems that house the MIAX Market Data Feed Handlers, Retransmission and Playback servers and Drop Copy services. For inquiries regarding the MIAX Extranet, please contact MIAX Trading Operations (contact information is provided in Section 6).

3 MENI Connectivity Methods

Connectivity to MENI can be established through a variety of access methods. Irrespective of the connectivity method selected, MIAX requires the member or service provider to provide and present an optical Ethernet interface as the handoff to the MIAX Express Network Interconnect. 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
NY4	1 Gigabit	1000BASE-LX/LH	Single Mode Fiber (SMF)	9/125 μm	OS2
NY4	10 Gigabit	10GBASE-LR	Single Mode Fiber (SMF)	9/125 μm	OS2
NY4	10 Gigabit ULL	10GBASE-LR	Single Mode Fiber (SMF)	9/125 μm	OS2
CH4	1 Gigabit	1000BASE-LX/LH	Single Mode Fiber (SMF)	9/125 μm	OS2
CH4	10 Gigabit	10GBASE-LR	Single Mode Fiber (SMF)	9/125 μm	OS2

Members need to select the appropriate access method(s) and are in complete control of coordinating connectivity with their chosen provider to the MIAX Data Centers. Members 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)

3.1 Colocation Cross Connect

Members with an existing presence in any of the MIAX Data Centers may order cross connects to the MIAX MENI network demarcation point. The NY4 cross connects are latency equalized between the MIAX and member's demarcation points, regardless of data center location or proximity. The cross connect fiber is owned, managed and provided by MIAX and has been designed to provide identical performance characteristics for each and every connection. The MIAX provided fiber has been engineered to provide:

- 1.524 μs one way latency from the MIAX handoff panel in MIAX's collocation cage and the member demarcation point.
- 3.048 μs round trip latency from the MIAX handoff panel in MIAX's collocation cage and the member demarcation point.

NY4 latency equalized cross connects originating at the member's demarcation point patch panel are terminated with a connectorized single-mode fiber optic cable. The MIAX standard connector used for latency equalized cross connects is known as a Subscriber Connector (SC) and has a push-pull coupling end face with a spring loaded ceramic ferrule in a duplex type arrangement. An SC duplex connector is depicted in Figure 4.

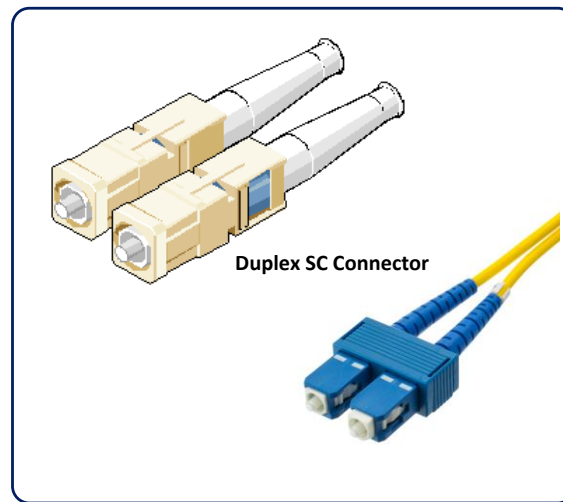


Figure 4: SC Duplex Connector

Members seeking equipment or colocation space for placing member owned equipment should contact the appropriate Equinix MIAX Account Representative provided in Appendix A.

3.1.1 Data Center Cross Connect Requirements

Colocation cages and equipment cabinets represent the basic housing for customer equipment within an Equinix IBX Data Center facility. All cross connect orders require a customer to have a cage and/or cabinet in place. Customers with one to three equipment cabinets reside in a shared cage; four or more equipment cabinets are provisioned in a private cage. Equinix requires that all cross connects be terminated in an Equinix approved demarcation point. Equinix supplies and installs demarcation points in IBX private cages and offers an option to locate the demarcation points in the customer cabinet if the cabinet is located in a Shared Area; otherwise, the standard demarcation point is installed in the Shared Area. MIAX highly recommends that members residing in the shared cage have the demarcation points installed in their cabinet. The demarcation is initially comprised of two patch panels, one for twisted pairs and coaxial cable and the other for fiber. Equinix supplies the cable pathways, which consist of ladder rack and fiber raceways between demarcation points. An SC fiber optic patch panel with available ports in the member's demarcation rack must be allocated for acceptance and delivery of the MIAX latency equalized cross connect in NY4.

3.1.2 Cable Pathway

In the IBX Data Centers, Equinix installs, provisions and terminates each end of the cross connect to a demarcation point. Rather than employing a Main Distribution Frame (MDF) which would require the MIAX and member to issue individual cross connect orders for connectivity, Equinix provisions the cross connect directly from the “A” demarcation point (member) to the “Z” demarcation point (MIAX). The Equinix cross-connect cable pathway terminates on the rear of the demarcation patch panel provided at the demarcation point in the member cage or cabinet. Please refer to Figure 5.

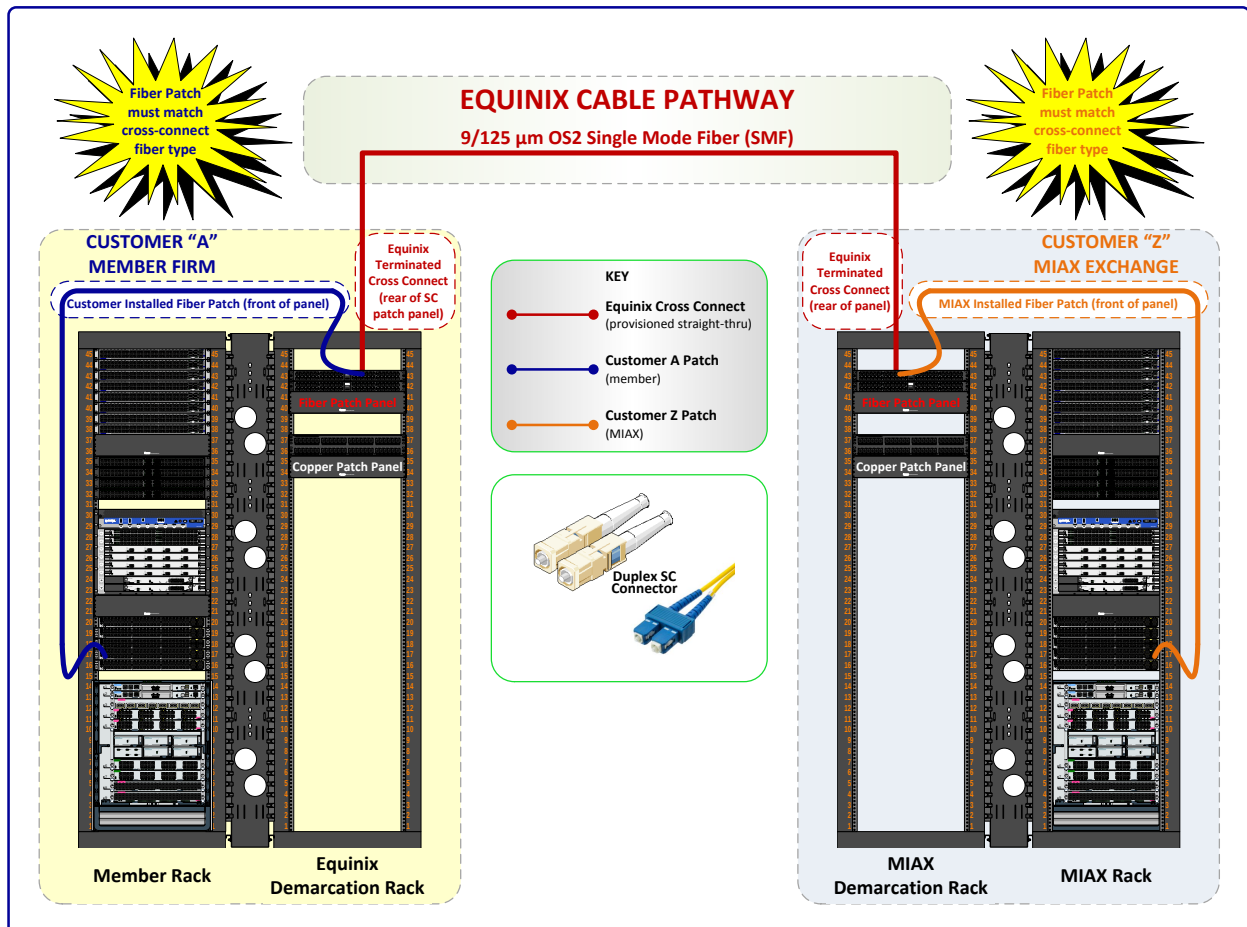


Figure 5: Cable Pathway and Cross Connect

3.1.3 Provisioning Cross Connect Patch Cables

Equinix will always provision and terminate the cross connect as a straight-thru cable at the demarcation panels to avoid confusion in the A-side and Z-side wiring methods. To complete the cross connect, the member and MIAX must install patch cables from the front of the demarcation patch panel to the network interface of the network device that will establish MENI connectivity; please refer to the blue cable depicted in Figure 5. MIAX will coordinate the patch cable wiring scheme with the member and select an option from the cable configurations outlined in Figure 6. Option 3 is reserved for future use.

Upon notification of completion of the cross connect, MIAX will coordinate with the member to turn on light sources and ensure far end link detection to verify the span is patched through.

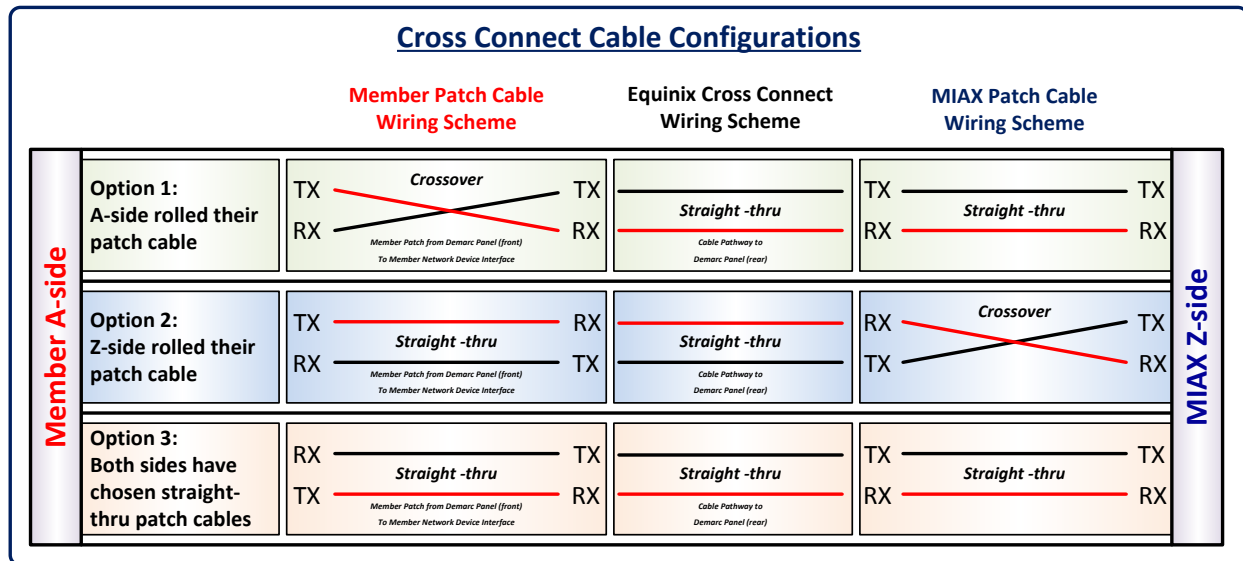


Figure 6: Cross Connect Cable Configurations

3.1.4 Attachment Types

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 MIAX MENI for the 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 MIAX MENI for the purposes of establishing secure direct host connectivity.

3.2 Telecommunications or Network Service Provider (NSP)

Members may choose to connect their own terminated routers to MENI directly via a cross connect at the MIAX Data Center location. This connectivity option provides a high degree of flexibility and choice for the member to choose an appropriate Telco or NSP service to fit their individual MAN or WAN requirements. Since the MENI Ethernet handoff is of local significance to the directly connected member terminated router's interface only, the member can select a different router interface and type to establish connectivity to the desired Telco carrier or NSP service. In addition, members may establish other connections with business partners, service bureaus and ISV's that are existing entities of the financial ecosystem already present in the facility. Typical carrier and NSP service offerings include:

- Traditional private line services, such as ATM, Frame Relay, DS1/DS3 TDM and SONET OCx
- Data services, such as IP VPN, IP/MPLS or other Private IP service offerings

In this configuration, the member is responsible for providing their own MAN or WAN connection from their enterprise infrastructure to the MIAX Data Center or POP location. This also includes managing the carrier or service provider for all aspects of the service/circuit installation, provisioning and commissioning cycles. Members may also opt for a Telco or NSP managed service that provides a CPE device on behalf of the member, typically a router with an Ethernet handoff at a MIAX Data Center.

The MIAX Data Center colocation providers have a one cabinet minimum requirement and offer flexible power options and configurations. For members whose equipment requirements do not warrant a full cabinet, MIAX recommends the member contact the colocation provider for a current list of hosting providers within the facilities that offer flex space in rack unit increments.

3.3 Extranet Service Provider

Members may connect to 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. The MIAX is provider neutral and will consider Extranet Provider requests to establish connectivity initiated by and on the member's behalf. Please review the MIAX website for a current list of MIAX certified Extranet Service providers.

3.4 Ethernet Service Provider

Members may connect to MENI via an Ethernet Service Provider or Dark Fiber Provider when a high speed local, metro or long haul optical transport service is required. This approach has shared characteristics of both colocation and Extranet Service Provider access methods. Similar to the Extranet Service Provider approach, colocation space is not required, however a colocation cross-connect from the Ethernet Service Provider's premise equipment to the MENI demarcation is required.

4 Available MENI Platforms, Trading Interfaces and Applications

The MIAX Express Network Interconnect Infrastructure provides Low Latency and Ultra Low Latency (ULL) access to all MIAX financial services, trading, and test and certification systems in the primary NY4 data center facility. This includes the primary and secondary MIAX Options and MIAX PEARL trading platforms and their corresponding firm test and certification systems. The MIAX Options and MIAX PEARL disaster recovery systems are located in CH4 and dedicated connectivity is recommended for maintaining high availability to MIAX. The following table provides a summary of services and platforms provided by location:

MIAX Facility		
MIAX Data Center	NY4	CH4
Function/Role	Primary	Disaster Recovery
Location	Secaucus	Chicago
Colocation Provider	Equinix	Equinix
Access Services		
1 Gigabit Ethernet - Low Latency	☒	☒
10 Gigabit Ethernet - Low Latency	☒	☒
10 Gigabit Ethernet - Ultra Low Latency	☒	☒
Connectivity Method		
Latency Equalized Colocation Cross Connect	☒	☒
Colocation Cross Connect	☒	☒
Single-mode fiber	☒	☒
Multi-mode fiber	☒	☒
System Services		
MIAX Options Primary System	☒	☒
MIAX Options Secondary System	☒	☒
MIAX Options Firm Test & Certification System Current SW Release	☒	☒
MIAX Options Firm Test & Certification System Next SW Release	☒	☒
MIAX Options Disaster Recovery System	☒	☒
MIAX PEARL Primary System	☒	☒
MIAX PEARL Secondary System	☒	☒
MIAX PEARL Test & Certification System Current SW Release	☒	☒
MIAX PEARL Test & Certification System Next SW Release	☒	☒
MIAX PEARL Disaster Recovery System	☒	☒

The MIAX Options and MIAX PEARL trading platforms are built to meet the high performance demands of the options trading industry. In addition to providing exceptional throughput and ultra-low latency access, our interface solutions (API's) provide precision presentation of Member Data from the MIAX Express Network and facilitate integration to all MIAX trading platform applications. MIAX high speed interface specifications for quote and order entry, market data and real-time trade feeds are accompanied by MIAX's protocol standards for session management and feed transmission, which are conveniently located on the MIAX web site. The MIAX Options and MIAX PEARL interface specifications can be found under the Technology tab located at www.miaxoptions.com.

5 Network Specifications

5.1 MENI Protocol Support

MIAX 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 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.
- 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 Member's Internetwork.
- Border Gateway Protocol Version 4 (BGP4) – MIAX Express Network Interconnect interfaces will use BGP as the dynamic exterior gateway routing protocol to exchange network reachability information with peer routers of the Member's Autonomous System.
- Static IP Protocol – MIAX Express Network Interconnect interfaces will be manually administered with Member provided static IP routes for providing network reachability to Member's destination IP networks when BGP is not an option for Member route exchange.
- Protocol Independent Multicast Sparse Mode (PIM-SM) – MIAX Express Network Interconnect interfaces will use PIM-SM as the dynamic multicast routing protocol to provide Member 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 Member 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 Member connectivity.

5.2 IP Addressing and Autonomous System Number (ASN)

The Internet Assigned Numbers Authority (IANA) is responsible for global coordination of the Internet Protocol addressing systems, as well as the Autonomous System Numbers used for BGP routing of Internet traffic. There are currently two types of Internet Protocol (IP) addresses in active use: IP version 4 (IPv4) and IP version 6 (IPv6). Both IPv4 and IPv6 addresses are generally assigned in a hierarchical manner. Users are assigned registered IP addresses by ISPs who in turn, obtain allocations of IP addresses from a Local, National or Regional Internet Registry (RIR). The American Registry for Internet Numbers (ARIN) is the RIR for the North American Region. IANA is the organization which allocates IP addresses from the pools of unallocated addresses to the RIRs according to their established needs. On February 1, 2011, the Asia Pacific Network Information Center (APNIC), the RIR for the region, triggered an ICANN rule (Internet Corporation for Assigned Names and Numbers) that drew down the last 5 remaining IPv4 address blocks, which IANA assigned to the 5 RIRs; effectively exhausting the remaining pool of IPv4 address space.

Members are strongly encouraged to use globally registered, unique IPv4 addresses for all host level communication with MIAX trading systems, platforms and hosts. Equally important, is the member's use of a registered Autonomous System Number (ASN) for BGP peering with the MIAX Express Network Interconnect.

In certain circumstances and on a conditional basis, MIAX will permit members to use a non-registered IP address space and/or Autonomous System Number. In anticipation of IPv4 address space exhaustion, the Internet Engineering Task Force (IETF) set aside IP address space for private use, as defined in RFC1918 in February of 1996. RFC1918 allocates an address block from each IP address class for private use:

Start Range	End Range	Prefix	Classful Description	# of Addresses
10.0.0.0	10.255.255.255	/8	1 Class A network #	16,777,216
172.16.0.0	172.31.255.255	/12	16 Class B network #'s	1,048,576
192.168.0.0	192.168.255.255	/16	256 Class C network #'s	65,536

IANA applied a similar methodology to Autonomous System Numbers and designated a private Autonomous System Number range from ASN: 64512 through ASN: 65534. MIAX will permit members to utilize private IPv4 addresses and/or Autonomous System Numbers, as long as MIAX administers, specifies and assigns the private IP address range and private Autonomous System Number. In this capacity, MIAX will serve as the Private Internet Registry (PIR) and the member will receive an address block allocation and/or Autonomous System Number assignment.

5.3 Traffic, Routing and Security Considerations

5.3.1 Redundant Connections and Roles

MENI provides a redundant connectivity model to provide failover, recovery and resiliency. MIAX will treat redundant member connections in a primary and secondary role. MIAX will not perform load-sharing across redundant connections for the same traffic stream to the same Exchange based trading platform.

5.3.2 Route Exchange

MIAX 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 Members across the MIAX Express Network Interconnect. MENI will not provide peer-to-peer IP routing advertisements between members, nor will it perform as a transit AS.

5.3.3 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.

5.3.4 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 Members.

6 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 (tradingoperations@miaxoptions.com) or by visiting the MIAX website at:

<http://www.MIAXOptions.com>

6.1 Data Center Contact Information

6.1.1 Equinix

Monica Datta
Account Executive, Financial Services
1540 Broadway, Suite 3900
New York, NY
mdatta@equinix.com
646-430-6819 Direct

Appendix A: MIAX Contact List

Please visit the MIAX website for the most up-to-date information and contact list.

<http://www.MIAXOptions.com>

Appendix B: Revision History

Revision Date	Version	Author	Description
Apr 25 2012	1.0	Frank Ziegler	First official release.
Feb 17 2015	1.1	Frank Ziegler	Updated logo, footer, data center contacts and Figure 1. Added AIS Feed section description and updated interface fiber types.
Jul 17 2015	1.2	Frank Ziegler	Update logo, trademarks and added MOR Feed and FIX Drop section descriptions.
Aug 17 2015	1.3	Frank Ziegler	Updated Section 1 to clarify low latency and ULL distinction and to distinguish 1, 10 and 10G ULL offerings. Updated Section 2 and 2.3 to clarify and include direct host interface attachment. Updated table in Section 3 to depict 10G ULL option in NY4 and NY2. Added Section 3.1.4.
Oct 24 2016	2.0	Frank Ziegler	Major rewrite to eliminate network POPs, relocate Disaster Recovery data center from PH1 in Philadelphia to CH4 in Chicago and consolidate MIAX Options Primary and Secondary Trading System from NY4 and NY2 to newly expanded NY4 data center. Added sections for MIAX PEARL, common network access for MIAX PEARL and MIAX Options, updated high level MENI handoff options and provided topology detail and description of MIAX member, service bureau and extranet access. Defined latency differential between 10 Gigabit and 10 Gigabit ULL access and provided 1-way and round trip fiber delays for cable plant and latency equalized cross connects in NY4. Eliminated overhead drawings depicting each external access method/type.
Dec 21 2016	2.1	Frank Ziegler	Updated Section 2.2 to provide additional clarity for common and dedicated access connectivity requirements based on participant source network advertisements and subscription to multiple feed services.

