N7 Network Access Guide

Network Configuration Guide

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1.   Introduction

This document is intended for participants' network administrators and provides an overview of the network access options to T7 for derivatives and cash markets, as well as Eurex Repo F7. The document contains the required technical background information to gain network access, such as router equipment information and port numbers for the configuration of firewalls.

Please note: the new T7 instance for Börse Frankfurt Zertifikate, XFRA, will be added in this document in the near future. At the moment this document does not yet contain network details for this new system.

Please note that this document focuses exclusively on the connectivity options introduced together with T7, Eurex Repo's F7 and the Eurex Clearing interfaces. This document does not provide information on legacy concepts such as the MISS infrastructure.

For a description of network options for these legacy connections as well as for other markets of Deutsche Börse Group, please refer to the respective document "Network access to Exchange applications" also available on the Eurex Clearing or Xetra website:

www.eurexclearing.com -> Technology- > Eurex Clearing classic system -> System documentation -> Network, interfaces & reports -> Network

www.xetra.com *-> Member Section -> Cash Market Member Section -> Cash Market Resources -> Documentation -> Xetra 17.0 -> Technical*

The network connectivity concept is designed to reflect the requirements of the differing interface landscapes with the following components:

- High-bandwidth participant lines, based on Ethernet technology to address the higher bandwidth requirements of Eurex and Xetra Exchange's T7.

- The Multi Interface Channel (MIC) for trading, clearing and market data interfaces and a Clearing Interface Channel (CIC) for clearing services.

- Introduction of the GUI Channel for the T7 generation of GUI solutions and for the Eurex Clearing GUIs.

- Eurex Repo's F7 channel to connect to the F7 trading GUI and the F7 API.

This document focusses on the aspects of establishing general connectivity to the trading systems and is primarily intended for use by the network engineer and system administrator.

For a more detailed description of aspects of latency optimization, please refer to the presentation "Insights into trading system dynamics", which is updated regularly. The presentation is available on the Eurex website (http://www.eurexchange.com) by following this link:

> Technology > High-frequency trading

Or on the Xetra website (http://www.xetra.com) by following this link:

> Technology > T7 Trading Architecture > Publications

1.1 T7 for derivatives markets - interface landscape

The launch of Deutsche Börse Group's trading platform T7 for Eurex in December 2012 introduced a new trading interface landscape, replacing the existing trading interfaces. Legacy concepts such as the MISS infrastructure and VALUES API ceased to exist for Eurex at the end of 2013.

The same interface landscape is now available for T7, T7/FX, and EEX as well, even if some Exchanges only support a subset of the interfaces or shared services.
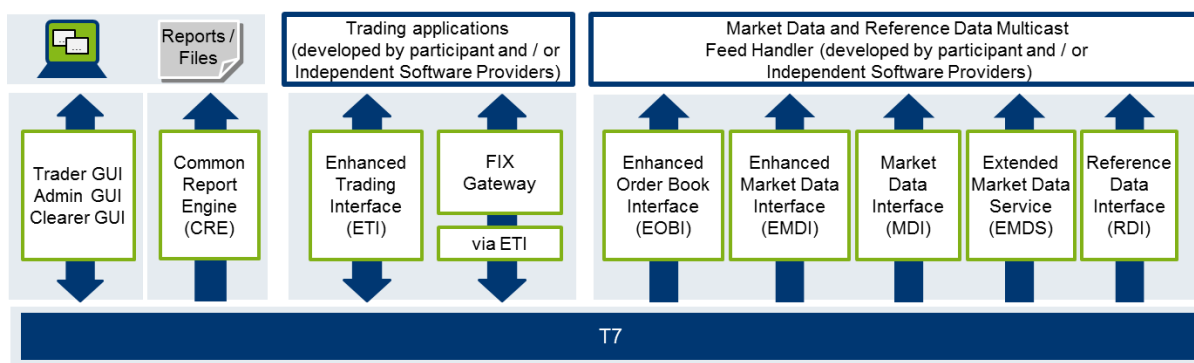
Figure 1: Eurex interface landscape

1.2 Eurex Clearing interface landscape

In addition to the trading interface landscape, additional interfaces are available on the Eurex Clearing side, such as the Eurex Clearing FIXML Interface and the Eurex Clearing FpML Interface.
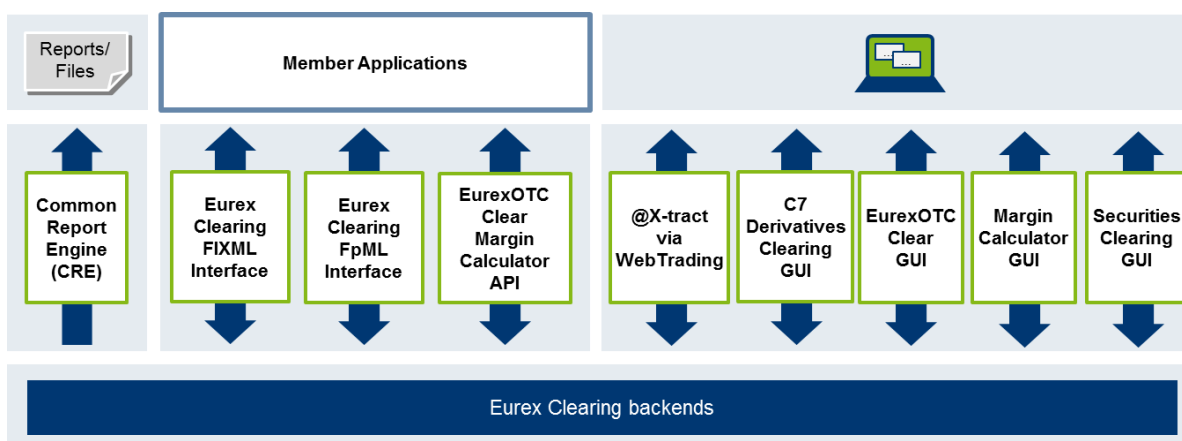
Figure 2: Eurex Clearing interface landscape

Over time, the new interface landscape will completely replace the legacy interfaces for clearing services (i.e .Eurex Clearing GUI @-extract)

1.3 Eurex Repo's F7 interface landscape

Eurex Repo's F7 system contains a F7 trading GUI and an F7 API allowing third party software to connect to the new platform.

1.4 T7 for cash markets - interface landscape

Since the migration of the Xetra cash market to T7 in July 2017 the T7 interface landscape will also be available for the cash market.
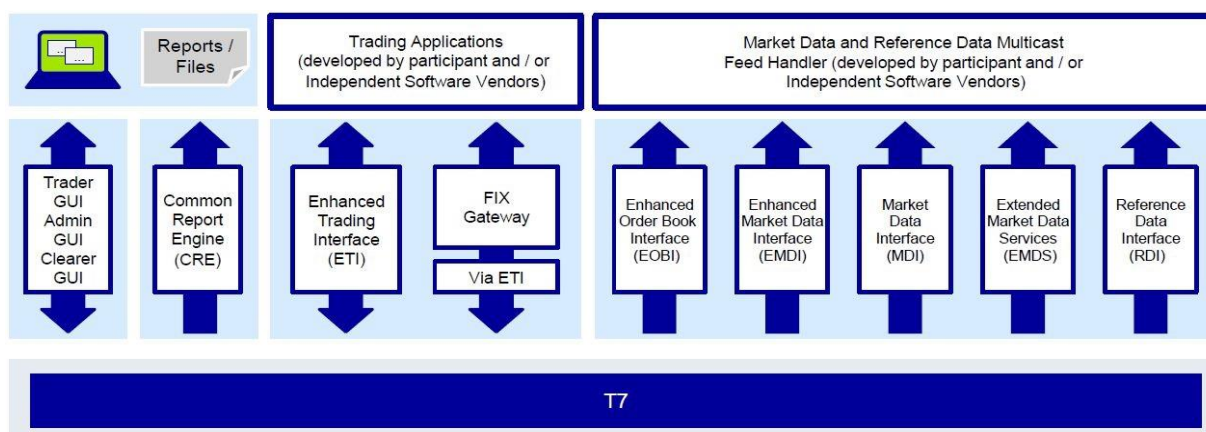
Figure 3: Xetra interface landscape

Over time the T7 interface landscape will completely replace the legacy interfaces for Xetra trading system such as the MISS infrastructure and VALUES API for all markets and all market models.

1.5 Network overview

To support the respective T7 services, Deutsche Börse Group has established an efficient infrastructure representing a dedicated global IP network. Access from a participant location to these services must always be established via the Deutsche Börse Group's IP network.

Any participant connection to the back end systems must be established via Access Points (AP). APs, to which leased lines connect are located throughout the world in major financial centers T7 participants are concentrated.

Alternatively, Deutsche Börse offers co-location services in our data center in Frankfurt.

This concept allows Deutsche Börse Group to extend its private network up to the demarcation point of the carrier at the participant's site. Each AP is connected to the respective hosts via redundant leased lines. Participants are connected to an AP via dedicated leased lines and/or via the Internet.

1.5.1 Network security

Security is achieved by executing several measures, one of which is the AP, which is the sole gateway between T7 back end hosts and participant installations. Several participant installations connect to the same AP. The functions and procedures implemented for an AP act as a firewall.

Typical IP services, such as Telnet, FTP, Finger, SMTP and RPC are not available via an AP. Passive and active security mechanisms are designed for all T7 routers to ensure that the individual participants systems cannot communicate with each other across the network. The AP acts as a shield between the participant device and the back end hosts of T7.

As shown in Figure , if Participant A tries to access the network of Participant B, then the AP will prevent any kind of communication in that direction.

In addition, the AP will stop any kind of unauthorized access to the back end. In the case of access via a VPN Internet connection, the participant is encouraged to use firewalls for additional security.
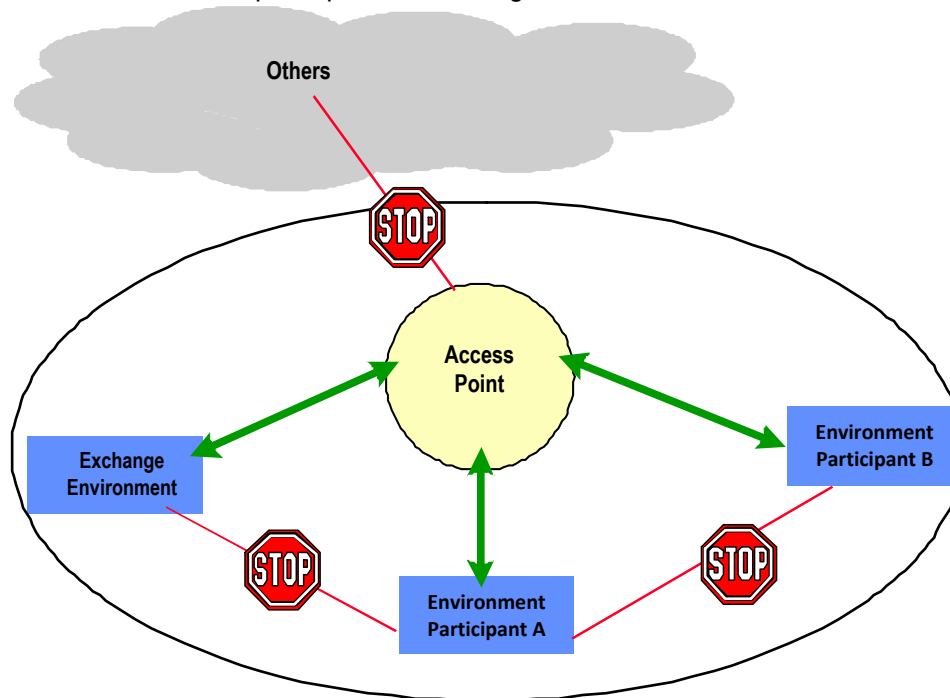
Figure 4: Access Point setup.

Two security features are established on all AP routers:

- Accessibility control feature: The IP networks belonging to installations of different participants are not reachable by others through the AP network.

- Transport control feature: The AP network only transports data belonging to the application-specific connection.

1.5.2   Network failover/Last mile redundancy

T7 provides dual line options. Network failover is provided for the Layer 2 cross-site solution for leased line connectivity.

To enhance connectivity further, T7 offers redundant access to both sides for leased line connectivity.

The last mile redundancy enhancement facilitates a network routing failover in case a single circuit fails, while previously the client application was required to manage a failover to the other infrastructure side itself.

As a result of this improved last line redundancy IP prefixes are propagated via both T7 Ethernet WAN MIC/GUI connections in a dual connection setup. This also applies to redundant iAccess setups.

Please find a detailed list of IP prefixes in the Appendix.

This enhancement also enables T7 Participants to additionally increase their redundancy by using two instances of a redundant gateway protocol such as HSRP or VRRP in the T7 member LAN, thus avoiding impact of a member router failure.

Things to consider regarding last mile redundancy setup:

- When using a first hop gateway protocol such as HSRP or VRRP, the following should be considered.

  – Two HSRP/VRRP groups are recommended where each T7 facing router has one active group, so that static routes on servers/firewalls for side 1 prefixes point to the side 1 active group virtual IP, and for side 2 prefixes to the side 2 active group virtual IP.

  – Care should be taken to ensure that the active groups and static routes are aligned with the primary paths for side 1 or 2.

- If only one HSRP/VRRP group is used and the server static routes use this virtual IP address, then the use of the BGP local-preference feature should be considered, to give the A prefixes preference over the A circuit and B over the B circuit.

- If BGP routing filters are used on the routers facing T7 connectivity, the filters will need to be adapted to take advantage of the A/B failover via one circuit.

- If the new A/B failover is not desired, then BGP routing filters can be used to only enable the routes for the relevant side.

2. Procedures and responsibilities

The following chapter deals with the procedures and responsibilities with regard to getting connected to the T7 back ends. Participants who would like to get connected are kindly asked for their cooperation in taking the necessary preparatory steps which are described below. The three major activities which are necessary for the participant to take part in are:

- consulting call
- end-to-end test
- connection test

Please contact your Technical Key Account Manager (TKAM) if you have any questions or comments with regard to the consulting call, the end-to-end test or the connection test (see Appendix for general contact information).

2.1 Getting connected

The following aspects are essential for participants who would like to get access to T7 and the Eurex Clearing back ends. The participant is asked to:

- choose the desired access options and order the connection with T7 trading system by placing the connectivity order in the Member Section under member.eurexchange.com, member.eurexclearing.com, member.deutsche-boerse.com, or member.eurexrepo.com.
- acquire and configure the necessary hardware (router and switches)
- liaise with the dedicated TKAM of Deutsche Börse Group
- ensure that he has received and has access to the respective router configuration

2.2 Consulting call

All participants who wish to connect to T7, F7 and/or Eurex Clearing need to arrange a consulting call with their TKAM and take part in subsequent testing (end-to-end test and connection test).

The aim of a consulting call is to make ensure the following points:

- the participant is made aware of the relevant documentation
- the connection test is being properly prepared
- firewall and other restrictions and rules on the participant side are known and observed
- open questions from the participant are answered by the TKAM or a Deutsche Börse Network Operations (NetOps) staff member
- a final safety and sanity check before any changes are made

A consulting call is attended by:

- the respective TKAM in charge
- a Deutsche Börse Group NetOps staff member
- a participant's network engineer having access to hardware and configurations to be tested
- a project manager or assistant on the participant side (optional)

The TKAM will get in touch with his or her participant contact person to set up the date and time for the consulting call to take place.

2.3 End-to-end test

The goal of an end-to-end test is to make sure that:

- the participant line has been physically cabled

- data from one end can get through to the other end

- avoidable incidents or problems arising from malfunctioning physical connections can be prevented

The prerequisites for performing an end-to-end test are as follows:

- The participant line must have already been delivered

- The participant must have the line terminating on a device for which he may use temporary equipment, e.g. laptops

- The participant must take care of all necessary on-site planning for the end-to-end connection test, e.g. presence of remote hands in data centers

- Routers and trading services are excluded from the test

An end-to-end test is attended by:

- a Deutsche Börse Group NetOps staff member and

- a participant's network engineer who is on-site.

The TKAM will get in touch with his or her participant contact person to set up the date and time for the end-to-end test to take place.

2.4 Connection test

The prerequisites for running a connection test are as follows:

- The consulting call must have been scheduled and must have taken place

- The end-to-end test must have been run

The goals of performing a connection test are:

- to check connectivity with regard to the new or changed infrastructure between the participant and the exchange

- to activate line monitoring

A connection test is attended by:

- a Deutsche Börse Group NetOps staff member

- a participant's network engineer who is on-site

The TKAM will get in touch with his or her participant contact person to agree upon the date and hour for the connection test to take place.

2.5 Network administration and responsibilities

The following table provides an overview of the respective responsibilities.

Role owner	Responsibilities	Definition
Deutsche Börse	Network administration and operation	Applies to network from back end to boundary of the carrier demarcation point at the participant's site
	All leased line connections	Procurement, installation and maintenance up to the demarcation point (includes cross connects in conjunction with co-location services)
Participant	Internet connection	Selection and provision of the Internet connection, selection of own Internet Service Provider (ISP)
	Internet connectivity and installation/configuration	Processing of Incidents and Problems
	External hardware	Administration and operation of equipment beyond the connection to T7 (e.g. routers, workstations and other participant devices at participant sites)

2.6 Network usage guidelines

In order to guarantee an orderly operation of the exchanges access network, the following usage guidelines are given and must be adhered to.

- Use network protocols in an orderly fashion, that do not for example systematically:

    – send corrupted ethernet frames
      (e.g. shortened packets, padded packets for packet length > 64 bytes),
    – use invalid checksums (Ethernet, tcp…),
    – fragment ip traffic or
    – send out of order or fragmented TCP packets

- Only send messages necessary for orderly trading, that do not for example systematically:

    – Send packets not reaching the gateway (low ttl, wrong mac addresses etc.)
    – Send unnecessary packets (e.g. non ETI traffic on order entry lines not commanded by underlying network protocols on order entry lines)

- Only use the subnets that are assigned to the respective line, e.g. do not use same source IP addresses on different lines.

- Do not use 802.1Q (vlan-tagging) on 10 Gbit access circuits

The guidelines provided above are examples for demonstration only and do not comprise an exhaustive list.

Deutsche Börse monitors the correct usage of its network and will take appropriate measures where necessary if violations of the usage guidelines are detected.

3.   Network connectivity

This chapter provides an overview of the connectivity options enabling participants to gain access to T7 applications. In addition it also provides technical background information regarding the available connection types and connection.

3.1 Connection types

Three connection types are offered to participants: Leased line based connections, iAccess (VPN) connections and native Internet connections.

3.1.1   Leased lines

Connections with a service-specific dedicated bandwidth based on physical leased lines are provided. The type and the bandwidth of the underlying network connection is determined at the discretion of the Deutsche Börse deciding whether line sharing is to be applied.

Please note:

- 1 Gbit/s Ethernet connections in co-location are provided with an RJ45 presentation. These copper connections shall terminate on a layer 3 device.

- 10 Gbit/s Ethernet connections in co-location are provided as Single-Mode-Fiber (SMF).

- Leased lines are always delivered in full duplex mode.

3.1.2   iAccess (VPN)

The connection type iAccess is a point-to-point connection through the public Internet with an IPSec-encrypted tunnel building a virtual private network (VPN) between the participant's network and a T7 Access Point. In order to use iAccess the participant is required to run a Cisco router at his own premises.

Please note that the GUI Channel is not offered on iAccess.

The VPN connection with a 256 bit AES[1] encryption ensures a secure data transfer over the Internet. T7 Exchange uses an authentication process with a Public Key Infrastructure (PKI) thus enabling communication in a closed user group.

The participant's infrastructure must meet the following connection requirements:

- An Internet connection is required from an ISP of the participant's choice. The bandwidth of the Internet connection should meet the bandwidth requirements of the iAccess connection.

- Internet access must be established by a router. The router for the Internet connection must meet the requirements of Deutsche Börse N7.

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[1] Existing connections are using a 168 bit 3DES encryption. The participant can continue to use this encryption.

A static, registered public Internet IP address must be available at the participant's Internet connection (to be requested from the respective ISP). The encryption mechanism used for iAccess requires a static public IP address.

3.1.3   Native Internet

The native Internet connection type does not rely on an encrypted VPN through the Internet (see preceding chapter on iAccess), as these services (e.g. T7 Trader GUI, Common Report Engine) have a self-contained encryption mechanism for their traffic.

This type of connection is characterized by open internet traffic and does not have to be used exclusively for access to T7. Deutsche Börse recommends a dedicated Internet connection or a shared connection. Any connection to an ISP may be used. However, on the T7 side the usable bandwidth is limited to the bandwidth offered for the respective service.

3.1.4   10 Gbit/s connections within co-location

Deutsche Börse offers 10 Gbit/s Ethernet dedicated cross connects in co-location to provide latency-sensitive applications with the fastest possible connection to T7. Two separate 10 Gbit/s connection options are available:

- Type 1 – Market and reference data for T7 EMDI, T7 MDI, T7 EOBI, T7 Extended Market Data Service, and T7 RDI (Simulation and Production)

- Type 2 – Transactions allowing access for T7 ETI, T7 FIX Gateway, Eurex Clearing FIXML Interface, Eurex Clearing FpML Interface, T7 Admin GUI and Common Report Engine (Simulation and Production)

3.2 Connection options

Connection types are combined into connection options offered by Deutsche Börse and include the following combinations:

- Two leased lines as standard connection

- Combined connection - one leased line plus iAccess

- Single leased line connection

- iAccess connection

- Native Internet connection

- 10 Gbit/s connections within co-location

3.2.1 Two leased lines as standard connection

The following setup of two leased lines offers the highest availability of all connection options outside co-location the participant can choose from.
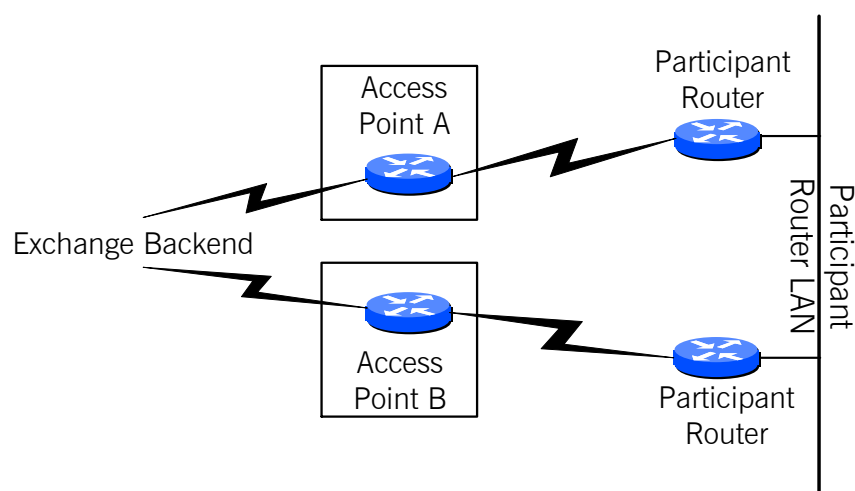
Figure 5: Connection via two leased lines

Technical implementation:

Deutsche Börse provides bandwidth on a leased line. If possible, two leased lines are ordered from different providers with separate infrastructure (separate cabling and technical components, i.e. dual rail concept). In geographic areas where multiple telecommunication providers are not available, measures ensuring the highest possible degree of redundancy are taken.

It is possible to terminate both connections in separate locations (split location). Deutsche Börse assigns the same private IP address range to both connections.

The provision, operation and administration of the interconnection between both participant locations (routers) are within the participant's responsibility.

3.2.2   Combined connection - one leased line plus iAccess

This solution offers high availability. The leased line is normally used as the primary connection and the iAccess connection is mostly used for backup purposes. However, both connections have equal rights connecting to Deutsche Börse.
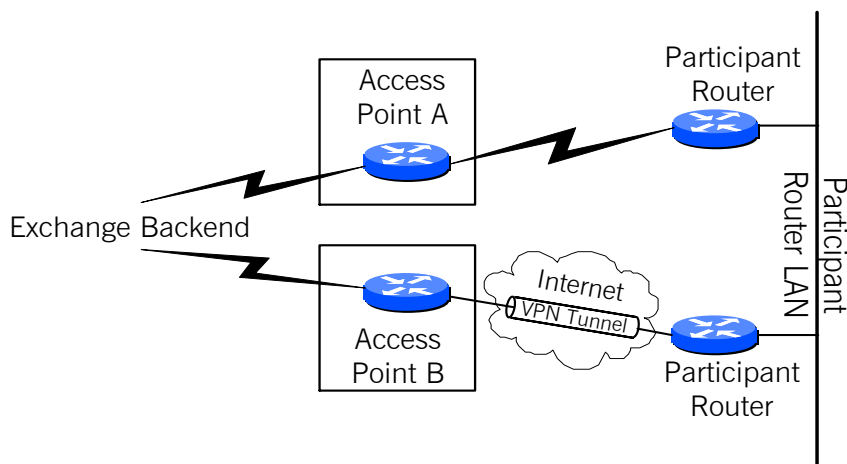
Figure 6: One leased line plus iAccess connection

Technical implementation:

Deutsche Börse provides bandwidth on a leased line whereas the participant is responsible for the provision and availability of the Internet connection. It is possible to terminate both connections in separate locations (split location). Deutsche Börse assigns the same private IP address range to both connections. The provision, operation and administration of the interconnection between both participant locations are the participant's responsibility.

The iAccess portion of the connection relies on an encrypted Internet VPN, which is why the participant router must be a Cisco model.

3.2.3   Single leased line connection

The single leased line connection provides a basic connection to the Deutsche Börse back end e.g. T7). As the single line option does not allow for a line failover, single leased line connections are normally not intended for trading installations but may be suitable for disaster recovery and participant's backup locations. A single line does not have full access to the infrastructure. In addition, participants are at a disadvantage if they only take a single line for market data.

Please note that Eurex Clearing members are required to have redundant connections, such as connections with two leased lines or combined connections (one leased line and one iAccess connection) or two iAccess connections.
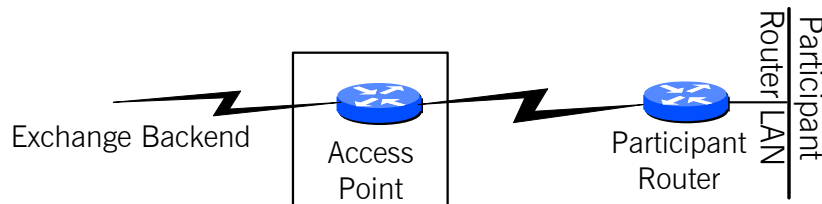
Figure 7: Single leased line connection

Technical implementation:

Deutsche Börse provides bandwidth on a leased line. The participant router is supposed to meet the Deutsche Börse router requirements.

3.2.4   iAccess connection

The connection option iAccess is a permanent point-to-point connection through the public Internet with an IPSec-encrypted tunnel building a virtual private network (VPN) between the participant's network and a Deutsche Börse Access Point.
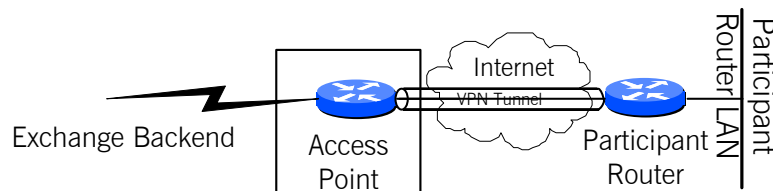
Figure 8: iAccess connection

Technical implementation:

For newly created iAccess connections the participant's infrastructure must meet the connection requirements listed below. Previously created iAccess connections using EIGRP instead of BGP WAN as GRE over IPSEC remain as they are.

- The Internet connection must be from an ISP of the participant's choice

- The Internet connection bandwidth must meet the iAccess bandwidth requirements

- A static, registered public Internet IP of the customers' Internet Service Provider (ISP) must be provided to Deutsche Börse (DBAG) during the connectivity process

- BGP WAN peering requires the participant to run a router at his premise (firewalls are not supported).

- GRE over IPSec (encrypted tunnel) with an AES 256 bit key is applied.

- DBAG uses an authentication process with a Public Key Infrastructure (PKI) and will provide the certificate (during the connection test the customer router would need to connect to

http://193.29.78.252:10081/cgi-bin/pkiclient.exe in order to download the certificate). Pre-shared keys are not in use.

3.2.5 Native Internet connection

The native Internet connection is suitable for Deutsche Börse applications with a self-contained encryption mechanism for the participant's traffic, which does not rely on an encrypted VPN through the Internet, such as the T7 Trader GUI, the C7 Derivatives Clearing GUI or the Common Report Engine.
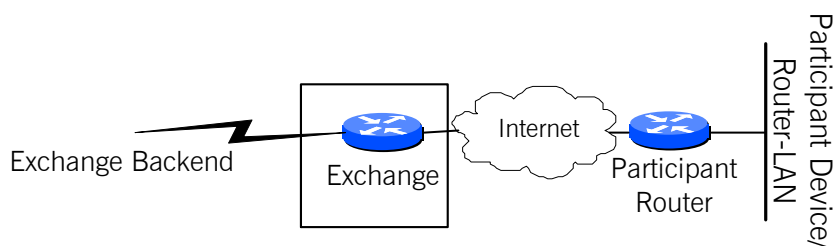
Figure 9: Native Internet connection

Technical implementation:

This connection option is based on open and unencrypted Internet traffic. The available bandwidth is primarily determined by the participant's individual Internet access. The respective Deutsche Börse service defines how much bandwidth is required (for instance, the bandwidth required per open T7 Trader GUI screen). The participant is responsible for the provisioning of his Internet connection.

3.2.6 10 Gbit/s connections within co-location

Deutsche Börse offers 10 Gbit/s Ethernet dedicated cross connects in co-location to provide latency-sensitive applications with the fastest possible connection to T7.

Please note: One cross-connect option can serve only one type of data, either market and reference data or transaction data.

The 10 Gbit/s connection offering is coupled with co-location services provided by Equinix as the service provider in the co-location data center. Roles and responsibilities are defined as follows:

Role owner	Responsibilities	Definition
Deutsche Börse	Port in T7	One 10 Gbit/s port, provided at a patch field
Equinix as service provider	External co-location service	Rack and cabinet space for the participant's hardware components
Participant	Connection between patch field in participant rack and participant device	Providing and operating own hardware devices as well as the connection within the participant rack

Technical implementation:

T7 participants are able to operate dedicated 10 Gbit/s cross connects for each interface as a direct port (1) or switch port (2) connection, as indicated in the figure below.
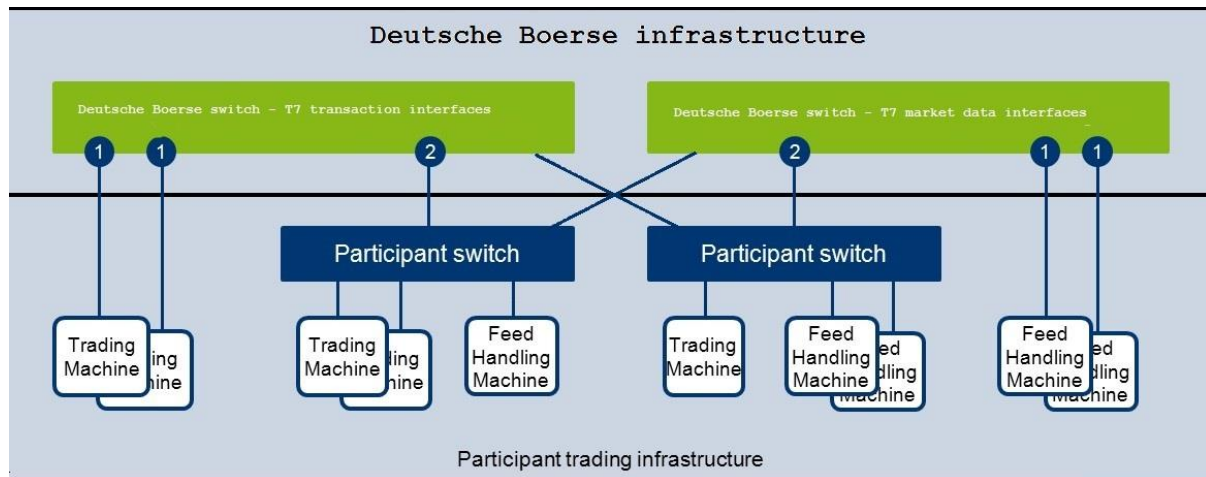
Figure 10: 10 Gbit/s peerless layer 2 connection to server or switch

The 10 Gbit/s connections are characterized as follows:

- 10 Gbit/s connections are always provided as Single-Mode-Fiber (SMF).

- A 10 Gbit/s connection is based on a peerless layer 2 connection with no support for routing or PIM protocols.

- 10 Gbit/s connections allow for a direct connection of a server or via an own layer 2 switch. In both options, a direct connection to the Deutsche Börse switch is established.

- Participants are free to use any hardware vendor. Deutsche Börse does not make any restrictions.

- Each connection has a /25 subnet (participant LAN) assigned. Two connections form a redundant pair having two consecutive /25 subnets are assigned via different APs.

- Provision of only one service type per fiber, i.e. either T7 Enhanced Market Data Interface or T7 Enhanced Trading Interface.

- No Quality of Service (QoS) mechanisms are supported by 10 Gbit/s connections.

The 10 Gbit/s connections allow connecting either a layer 2 switch or a server directly to the Deutsche Börse switch. If a server is connected, the following prerequisites apply:

- Provide access to both Simulation and Production environments.

- Connected servers need a logical interface, e.g. a physical Network Interface Card (NIC) or a virtual dot1Q interface.

- The logical interface must be configured in the subnet assigned by Deutsche Börse (participant LAN).

4.   Eurex T7 Service Availability and Connectivity

To separate services and to support Quality of Service (QoS) concepts for services running on a leased line or via an iAccess Internet VPN, Deutsche Börse uses a concept based on traffic shaping. This includes the configuration of a Multi Interface Channel, a Clearing Interface Channel, a GUI Channel, and Risk Data Channel.

4.1 Eurex Multi Interface Channel

The Eurex Multi Interface Channel (MIC) as a separation of bandwidth using traffic shaping mechanisms combines Eurex interfaces. To avoid any interference of multicast-based market/reference data and transactional data within a MIC, a traffic shaping mechanism is used to separate market/reference data from the transactional interfaces (from 5 Mbit/s MIC onwards).

In addition to the Eurex MIC a leased line can carry more channels, such as a GUI Channel or channels for Xetra T7 or other exchanges of Deutsche Börse Group, all separated by traffic shaping mechanisms. However, the MIC cannot be on the same leased line/iAccess connection as the Clearing Interface Channel. The following figure provides an exemplary overview of the channel configuration for high and low bandwidth lines.

Physical line: 100Mbit/s or 1 Gbit/s	• Eurex EMDI • Eurex MDI • Eurex RDI • Eurex EMDS • Eurex EOBI (Simulation only)	70, 250 or 750 Mbit/s	Eurex MIC (high Bandwidth)
	• Eurex Admin GUI • Eurex ETI • Eurex FIX Gateway • Eurex Clearing FIXML interface	10 Mbit/s	
	New Generation GUI solution • Eurex Trader GUI • Eurex AdminTrader GUI • Eurex Webtrading • Future Clearing GUI solutions	1, 3,10 or 40 Mbit/s	GUI Channel
	• Common Report Engine CRE	Remaining Bandwidth	

Physical line: 10 - 100 Mbit/s	• Eurex MDI • Eurex EMDS	4Mbit/s	Eurex MIC (low Bandwidth)
	• Eurex Admin GUI • Eurex ETI • Eurex FIX Gateway • Eurex Clearing FIXML interface	1 Mbit/s	
	New Generation GUI solution • Eurex Trader GUI • Eurex AdminTrader GUI • Eurex Webtrading • Future Clearing GUI solutions	1, 3,10 or 40 Mbit/s	GUI Channel
	• Common Report Engine CRE	Remaining Bandwidth	

Figure 11: Configuration of Eurex MIC and additional channels on two types on leased lines

4.1.1 Eurex Interfaces on a Eurex MIC

Within a Eurex MIC, access to the following Eurex interfaces is possible:

- Eurex EMDI (Enhanced Market Data Interface, only on high bandwidth MICs)

- Eurex RDI (Reference Data Interface, only on high bandwidth MICs)

- Eurex MDI (Market Data Interface)

- Eurex EOBI (Full orderbook information) – Simulation access

- Eurex Extended Marked Data Service

- Eurex Admin GUI

- Eurex ETI (Enhanced Trading Interface)

- Eurex FIX Gateway

- Eurex Clearing FIXML Interface

- Eurex Clearing FpML Interface

Please note: To access the WebSphere MQ infrastructure for the Eurex Clearing FIXML Interface and Eurex Clearing FpML Interface, a z/OS channel is required. Please contact your TKAM for further details.

Additionally, Eurex EOBI for production is available on 10 Gbit/s lines in co-location.

4.1.2 Bandwidth

The availability of the Eurex market data interface for un-netted market data (Eurex EMDI) and reference data (Eurex RDI) within a Eurex MIC depends on the bandwidth of the leased line the Eurex MIC is configured on.

Currently Eurex offers MICs are currently offered in various the following bandwidth options:

- 760 Mbit/s for un-netted market data via the Eurex EMDI is recommended to provide un-netted market data for a broad set of options (all market data) and futures products and for reference data via the Eurex RDI.

- 260 Mbit/s for un-netted market data via the Eurex EMDI is suitable for a subset of options and futures products and for reference data via the Eurex RDI.

- 80 Mbit/s for un-netted market data via the Eurex EMDI is suggested for futures products and only a small subset of options products (e.g. for users in the United States) and for reference data via the Eurex RDI.

- 5 Mbit/s (2 or 1.5 Mbit/s in some regions) for netted market data via the Eurex MDI only. Un-netted market data via the Eurex EMDI and reference data via the Eurex RDI are not available in this configuration (reference data must be obtained from the reference data file).

Please note that Eurex MDI and the Eurex Extended Market Data Service are available for all bandwidth options. Eurex EOBI is available on 10 Gbit/s lines only.

4.1.3   Eurex T7 Broadcast availability

The following table shows which services are available for which connectivity.

Simulation	Co Location	760 Mb	260 Mb	80 Mb	5 Mb
EMDI	X	X	X	X	
EOBI	X	X	X	X	
RDI	X	X	X	X	
MDI	X	X	X	X	X
EMDS	X	X	X	X	X

Production	Co Location	760 Mb	260 Mb	80 Mb	5 Mb
EMDI	X	X	X	X	
EOBI	X				
RDI	X	X	X	X	
MDI	X	X	X	X	X
EMDS	X	X	X	X	X

4.2   Eurex Clearing Interface Channel

The Eurex Clearing Interface Channel (CIC) uses exactly the same technology as the Eurex MIC. The Eurex CIC is available for customers of Eurex Clearing, which have no legal contract with Eurex Frankfurt to enable these customers access to the Eurex Clearing FIXML Interface and the Eurex Clearing FpML Interface. The Eurex CIC and the Eurex MIC cannot share the same leased line/iAccess connection.

The following figure provides an exemplary overview of the channel configuration:

Physical line	• Eurex Clearing FIXML Inferface • Eurex Clearing FpML Inferface	Up to 1 or 5 Mbit/s	Eurex CIC
	• EurexOTC Margin Calculator • Enhanced Risk Solution	1 or 5 Mbit/s	Risk Data Channel
	• Eurex Web Trading • C7 Derivatives Clearing GUI • EurexOTC Clearing GUI • Margin Calculator GUI • Securities Clearing GUI	1, 3 or 10 Mbit/s	GUI Channel
	• Common Report Engine CRE	Remaining Bandwidth	

Figure 12: Configuration of CIC and additional channels

4.2.1 Eurex Clearing Interfaces on a CIC

Within a Eurex Clearing CIC access to the following Eurex Clearing interfaces are possible:

- Eurex Clearing FIXML Interface
- Eurex Clearing FpML Interface

4.2.2 Bandwidth

CICs are currently available in the following bandwidth options:

- Up to 1 Mbit/s
- 5 Mbit/s

4.3 Eurex GUI Channel

Access to the T7 GUIs for Eurex and Eurex Clearing GUI solutions (e.g. T7 Trader GUI, T7 Admin GUI, C7 Derivatives Clearing GUI and WebTrading) is available via the GUI Channel on leased lines or via Internet connections.

A GUI Channel can be ordered in the Member Section with various bandwidth options. Eurex currently offers 1 Mbit/s, 3 Mbit/s, 10 Mbit/s and 40 Mbit/s GUI Channels. The 40 Mbit/s GUI Channel is not offered for Eurex Clearing only members.

The maximum bandwidth requirement per open Eurex T7 GUIs or for one WebTrading session is approximately 300 Kbit/s. Based on this assumption a maximum of three concurrently open Eurex T7 GUIs/WebTrading sessions can be used per 1 Mbit/s GUI Channel.

Technically, a GUI Channel on a leased line is configured using traffic shaping mechanisms, similar to the Multi Interface Channel.

Please note: A GUI Channel can be ordered in conjunction with a Eurex MIC or as a stand-alone product. Eurex currently offers the stand-alone GUI channel with 5 Mbit/s, 10 Mbit/s and 40 Mbit/s.

In addition to the GUI Channel configured on a leased line, access to the Eurex Trader GUI, Eurex Admin, WebTrading, C7 Derivatives Clearing GUI, EurexOTC Clear GUI, the EurexOTC Clear Margin Calculator GUI and the Securities Clearing GUI is also possible via Internet connections.

Eurex does not limit the number of open GUIs that can be used via Internet connections and the limitation depends on the bandwidth of the participant's Internet access.

4.4 Eurex 10 Gbit/s Connectivity

In addition to the Eurex MIC-based connectivity, Deutsche Börse will also offer 10 Gbit/s connections in co-location. Please note that this connectivity will be offered for either market data (Eurex EMDI standalone, Eurex EOBI standalone or a combined EMDI/EOBI connection) or transactions (e.g. via Eurex ETI and/or the Eurex FIX Gateway). Simulation access to the T7 trading architecture is also available on 10 Gbit/s connections.

4.5 Eurex Risk Data Channel

The Risk Data Channel combines network traffic for the risk related systems of Eurex Clearing. Figure 12: Configuration of CIC and additional channels provides an exemplary overview of the channel configuration.

4.5.1 Eurex Clearing Interfaces on the Risk Data Channel

Within a Risk Data Channel, access to the following Eurex Clearing interfaces is possible:

- Enhanced Risk Solution
- EurexOTC Clear Margin Calculator API

4.5.2 Bandwidth

The Risk Data Channel is currently offered in various bandwidth options:

- 1 Mbit/s: This bandwidth is sufficient for the Enhanced Risk Solution or for low bandwidth requirements for the EurexOTC Clear Margin Calculator API.

- 5 Mbit/s: This bandwidth is recommended for a shared usage of the Enhanced Risk Solution and the EurexOTC Clear Margin Calculator API or for high bandwidth requirements for the EurexOTC Clear Margin Calculator API.

Please note: In order to access the WebSphere MQ infrastructure for the EurexOTC Clear Margin Calculator API, a z/OS channel is required. Please contact your TKAM for further details.

4.6 Eurex Repo's F7 Channel

A single dedicated channel for Eurex Repo's F7 can be placed on a leased line alone or together with an existing Multi Interface channel.

4.6.1 Eurex Repo's F7 Interfaces on a Eurex Repo's F7 channel

Within a Eurex Repo F7 channel, access to the following Eurex Repo F7 interfaces is possible:

- Eurex Repo F7 Trading GUI
- Eurex Repo F7 API

4.6.2 Bandwidth

The Eurex Repo F7 channel is currently offered in various bandwidth options depending on the number of users running over the channel.

Number of active users	Bandwidth Option
1	0.5 Mbit/s
Up to 2	1.0 Mbit/s
Up to 6	3.0 Mbit/s
Up to 12	5.0 Mbit/s
Up to 25	10.0 Mbit/s

5. Xetra T7 Service Availability and Connectivity

5.1 Xetra Multi Interface Channel

The Xetra Multi Interface Channel (MIC) as a separation of bandwidth using traffic shaping mechanisms combines Xetra interfaces. To avoid any interference of multicast based market/reference data and transactional data within a MIC, a traffic shaping mechanism is used to separate market/reference data from the transactional interface.

In addition to the Xetra MIC a leased line can carry more channels, such as a GUI Channel or channels for Eurex T7 or other exchanges of Deutsche Börse Group, all separated by traffic shaping mechanisms.

Physical line: 100Mbit/s or 1 Gbit/s	Contents	Bandwidth	Channel
	• Xetra EMDI • Xetra MDI • Xetra RDI • Xetra EMDS • Xetra EOBI (Simulation only)	70 or 190 Mbit/s	Xetra MIC (high Bandwidth)
	• Xetra ETI • Xetra FIX Gateway • Xetra AdminTrader GUI	10 Mbit/s	
	• Xetra Trader GUI • Xetra AdminTrader GUI • Xetra Clearer GUI	1 Mbit/s, 3 Mbit/s, 10 Mbit/s or 40 Mbit/s	GUI Channel
	• Other DBAG Services (if necessary and possible)	Remaining Bandwidth	

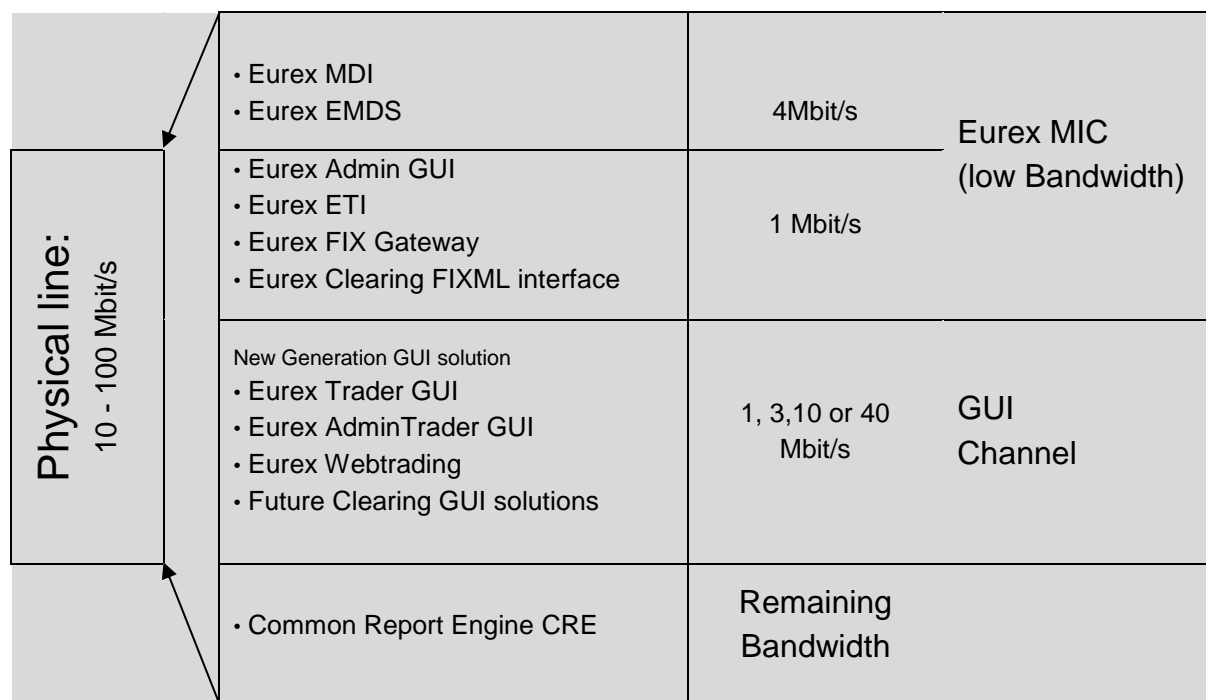|			
Physical line: 10 - 100 Mbit/s	• Xetra MDI • Xetra EMDS	5Mbit/s	Xetra MIC (low Bandwidth)
	• Xetra ETI • Xetra FIX Gateway • Xetra Admin GUI	2 Mbit/s	
	• Xetra Trader GUI • Xetra AdminTrader GUI • Xetra Clearer GUI	1 Mbit/s, 3 Mbit/s, 10 Mbit/s or 40 Mbit/s	GUI Channel
	• Other DBAG Services (if necessary and possible)	Remaining Bandwidth	

Figure 13: Configuration of MIC and additional channels on two types on leased lines

5.1.1 Xetra Interfaces on a MIC

Within a Xetra MIC, access to the following Xetra interfaces is possible:

- Xetra Enhanced Market Data Interface – Xetra EMDI (un-netted market data on high-bandwidth lines only)

- Xetra Extended Market Data Service – Xetra EMDS

- Xetra Market Data Interface – Xetra MDI (netted market data)

- Xetra EOBI (Full orderbook information) – Simulation access

- Xetra Reference Data Interface – Xetra RDI

- Xetra Enhanced Trading Interface – Xetra ETI

- Xetra FIX Gateway

- Xetra Admin GUI

Additionally Xetra EOBI for production is available on 10 Gbit/s lines in co-location.

5.1.2 Bandwidth

The availability of the Xetra market data interface for un-netted market data (Xetra EMDI) and reference data (Xetra RDI) within a MIC depends on the bandwidth of the leased line the MIC is configured on.

The required bandwidth of the MIC particularly depends on the market and reference data interface, which will be required for T7:

- **200 Mbit/s** – the highest bandwidth option for a MIC is recommended if the Xetra EMDI will be used to subscribe full un-netted market data.

- **80 Mbit/s** – this option should be chosen if un-netted market data via the Xetra EMDI is required for a subset of instruments.

- **7 Mbit/s** – this option is suggested if netted market data via the Xetra MDI is sufficient. Un-netted market data using Xetra EMDI cannot be received via this connectivity option.

Please note that Xetra MDI and the Xetra Extended Market Data Service are available for all bandwidth options. Xetra EOBI for production is available on 10 Gbit/s lines only.

5.1.3   Xetra T7 Broadcast availability

The following table shows which services are available for which connectivity.

Simulation	Co Location	200 Mb	80 Mb	7 Mb
EMDI	X	X	X	
EOBI	X	X	X	
RDI	X	X	X	
MDI	X	X	X	X
EMDS	X	X	X	X

Production	Co Location	200 Mb	80 Mb	7 Mb
EMDI	X	X	X	
EOBI	X			
RDI	X	X	X	
MDI	X	X	X	X
EMDS	X	X	X	X

5.2 Xetra GUI Channel

With the migration of Xetra to T7 trading technology, access to the T7 GUI solutions for Xetra will be available via a dedicated GUI-channel on leased lines or via internet.

A Xetra GUI-channel can be ordered with various bandwidth options. Deutsche Börse will offer 1 Mbit/s, 3 Mbit/s, 10 Mbit/s and 40 Mbit/s GUI-channels (in conjunction with a MIC). A GUI-channel of 7 Mbit/s or 40 Mbit/s will also be offered separately without a Xetra MIC.

The maximum bandwidth requirement per open Xetra Trader GUI is estimated to be approximately 300 Kbit/s. Based on this assumption, a minimum of three concurrently open Xetra Trader GUIs can be used per 1 Mbit/s GUI-channel. Technically, a GUI Channel on a leased line is configured using traffic shaping mechanisms, similar to the Multi Interface Channel.

In addition to the GUI-channel, access to the Xetra Trader GUI is also possible via internet. Xetra does not limit the number of open Xetra Trader GUIs that can be used via the internet. However, the number of Xetra Trader GUIs is limited by the bandwidth of the participant's internet access.

5.3 Xetra 10 Gbit/s Connectivity

In addition to the Xetra MIC-based connectivity, Deutsche Börse will also offer 10 Gbit/s connections in co-location. Please note that this connectivity will be offered for either market data (Xetra EMDI standalone, Xetra EOBI standalone or a combined EMDI/EOBI connection) or transactions (e.g. via Xetra ETI and/or the new Xetra FIX Gateway). Simulation access to the T7 trading architecture is also available on 10 Gbit/s connections.

6. Eurex T7 interfaces

To use both Eurex trading and clearing services, participants require access to both systems:

- For order book trading of any Eurex products, access to T7 is necessary.

- For clearing purposes (trade maintenance, position management, etc.) access to the Eurex classic system must be maintained.

- For the usage of functionality offered by the new Eurex Clearing C7 system, access to the Eurex Clearing C7 system is required.

Access to Eurex trading and clearing interfaces is only possible using the connection options as described in chapter 3.2 with the configuration of a Multi Interface Channel or a Clearing Interface Channel and a GUI Channel respectively as described in chapter 4.1.

To gain access to the Eurex interfaces, connections to certain servers/gateways identified by certain IP addresses and ports and/or multicast IP addresses must be allowed from the participant's network. This chapter describes the Eurex Exchange's T7 trading and Eurex Clearing interfaces and lists IP addresses and ports necessary for access via these interfaces.

The following table contains an overview of the available interfaces of Eurex Exchange's T7, the Eurex Clearing interfaces and common interfaces:

Eurex Exchange's T7 interfaces	Eurex Clearing interfaces	Common Services
Eurex Enhanced Trading Interface Eurex FIX Gateway Eurex Enhanced Market Data Interface Eurex Enhanced Order Book Interface Eurex Market Data Interface Eurex Extended Market Data Service Eurex Reference Data Interface Eurex Trader GUI Eurex Admin GUI	Eurex Clearing FIXML Interface Eurex Clearing FpML Interface Eurex Enhanced Risk Solution EurexOTC Clear Margin Calculator API @X-tract GUI via WebTrading C7 Derivatives Clearing GUI EurexOTC Clear GUI EurexOTC Clear Margin Calculator GUI Securities Clearing GUI	Common Report Engine

6.1 Eurex Exchange's T7 transaction interfaces

6.1.1 Enhanced Trading Interface (ETI) Eurex T7, Eurex T7/FX, EEX

The Eurex ETI is an asynchronous message-based interface. A connection between participants and Eurex is established via a TCP/IP connection. The interface is session-oriented. A session is established between the participants' machine and a Eurex ETI gateway. The gateways types available are partition specific (PS) and low frequency (LF).

The PS gateways allow routing only to a specific partition. Sessions may login to only one partition specific gateway at a time and have to specify the partition Id in their initial connection request.

Low frequency gateways allow routing to all partitions. To ensure an optimal load balancing of the LF sessions to the LF trading gateways, recommended primary and backup trading gateways are assigned to LF sessions during the ordering process. The recommended LF trading gateways for a session can be found in the "ETI Session Details" window or the configuration printout which are available in the respective member section under the "Technical Connection > Current configuration" option. A full list of the IP addresses for the active/standby PS gateways and the LF trading gateways are provided below (see 6.1.1.1).

Please note that PS gateways are available only for Eurex T7 and Eurex T7/FX, whereas EEX offers access via low-frequency gateways only.

Choose gateway

Step 1
- LF session: For optimal load balancing purposes, determine the recommended low frequency (LF) gateway for the session via the member portal. Alternatively, any of the LF gateways can be chosen.
- HF session: choose the active partition specific (PS) Gateway for the desired partition

Session logon

Step 2
- Establish TCP / IP session to the chosen GW
- HF sessions need to be able to switch to the standby GW in case the active GW is not available
- The first message to be sent by participant: **Logon** message authenticating the Eurex ETI session with session ID and password

Trader logon

Step 3
- Send **User Request** message for authentication of user (trader).
- A Eurex ETI session may be shared by several users of the same business unit.

Figure 14: Eurex ETI session logon process

The T7 gateway infrastructure is built redundantly, as indicated in the figure below. A set of gateways including the low frequency trading gateways for low frequency (LF) sessions and partition specific gateways for high frequency (HF) sessions primarily attached to one line connection of a participant.

A redundancy link between side A and side B exists to ensure network failover for redundant two leased line installations and guarantees that all gateways are reachable via a single line in case of a failure. The redundancy link introduces additional latency of more than 50 µs and should therefore be actively used in emergency situations only.

For this reason, participants are advised to order a redundant leased line setup (connection option with two leased lines). If one leased line connection fails, the other connection gateway and the corresponding set of LF and PS gateways can still be accessed.

Figure 15: Eurex ETI gateway infrastructure

6.1.1.1 ETI Details for Eurex T7 and EEX

Environ-ment	Gateway type	IP subnets		Ports	Protocol
		Side A	Side B		
Production	LF trading gateways	193.29.91.64/27	193.29.91.96/27	19006	TCP/IP
	PS trading gateways[*1]	193.29.91.128/27	193.29.91.160/27	19043	TCP/IP
Simulation	LF trading gateways	193.29.89.64/27	193.29.89.96/27	19506	TCP/IP
	PS trading gateways[*1]	193.29.89.128/27	193.29.89.160/27	19543	TCP/IP

*1 = only available for Eurex T7 (not for EEX)

IP addresses of the ETI gateways in production are listed in the table below:

Env.	Gateway #	Gateway type	Participant connection	IP address
Production	L02	LF trading gateway	Side A	193.29.91.65
	L04	LF trading gateway	Side A	193.29.91.66
	Partition 1 (standby)	PS trading gateway	Side A	193.29.91.141
	Partition 2 (active)	PS trading gateway	Side A	193.29.91.142
	Partition 3 (standby)	PS trading gateway	Side A	193.29.91.143
	Partition 4 (active)	PS trading gateway	Side A	193.29.91.144
	Partition 5 (standby)	PS trading gateway	Side A	193.29.91.145
	Partition 6 (active)	PS trading gateway	Side A	193.29.91.146
	Partition 7 (standby)	PS trading gateway	Side A	193.29.91.147
	Partition 8 (active)	PS trading gateway	Side A	193.29.91.148
	Partition 9 (standby)	PS trading gateway	Side A	193.29.91.149
	Partition 10 (active)	PS trading gateway	Side A	193.29.91.150

Production	L01	LF trading gateway	Side B	193.29.91.97
	L03	LF trading gateway	Side B	193.29.91.98
	Partition 1 (active)	PS trading gateway	Side B	193.29.91.171
	Partition 2 (standby)	PS trading gateway	Side B	193.29.91.172
	Partition 3 (active)	PS trading gateway	Side B	193.29.91.173
	Partition 4 (standby)	PS trading gateway	Side B	193.29.91.174
	Partition 5 (active)	PS trading gateway	Side B	193.29.91.175
	Partition 6 (standby)	PS trading gateway	Side B	193.29.91.176
	Partition 7 (active)	PS trading gateway	Side B	193.29.91.177
	Partition 8 (standby)	PS trading gateway	Side B	193.29.91.178
	Partition 9 (active)	PS trading gateway	Side B	193.29.91.179
	Partition 10 (standby)	PS trading gateway	Side B	193.29.91.180

Please Note: "active" / "standby" represents the normal mode of operation for the individual partition specific gateways. In the case of a gateway failure, the operation mode of the individual gateways may change.

IP addresses of the ETI gateways in simulation are listed in the table below:

Env.	Gateway #	Gateway type	Participant connection	IP address
Simulation	Partition 1 (active)	PS trading gateway	Side A	193.29.89.129
	Partition 2 (active)	PS trading gateway	Side A	193.29.89.130
	Partition 3 (active)	PS trading gateway	Side A	193.29.89.154
	L01	LF trading gateway	Side A	193.29.89.65
	L03	LF trading gateway	Side A	193.29.89.66
	L05	LF trading gateway	Side A	193.29.89.67
	L07	LF trading gateway	Side A	193.29.89.68
	Partition 1 (standby)	PS trading gateway	Side B	193.29.89.161
	Partition 2 (standby)	PS trading gateway	Side B	193.29.89.162
	Partition 3 (standby)	PS trading gateway	Side B	193.29.89.187
	L02	LF trading gateway	Side B	193.29.89.97
	L04	LF trading gateway	Side B	193.29.89.98
	L06	LF trading gateway	Side B	193.29.89.99
	L08	LF trading gateway	Side B	193.29.89.100

Please Note: "active" / "standby" represents the normal mode of operation for the individual partition specific gateways. In the case of a gateway failure, the operation mode of the individual gateways may change.

6.1.1.2 ETI Details for Eurex T7/FX

Env.	Gateway type	IP subnets		Ports	Protocol
		Side A	Side B		
Production	PS trading gateways	193.29.91.128/27	193.29.91.160/27	17043	TCP/IP
Production	LF trading gateways	193.29.91.64/27	193.29.91.96/27	17006	TCP/IP
Simulation	PS trading gateways	193.29.89.64/27	193.29.89.96/27	17543	TCP/IP
Simulation	LF trading gateways	193.29.89.64/27	193.29.89.96/27	17506	TCP/IP

IP addresses of the T7/FX ETI gateways are listed in the table below:

Env.	Gateway #	Gateway type	Participant connection	IP address
Production	H04	PS trading gateway Partition 1 (backup)	Side A	193.29.91.137
Production	L02	LF trading gateway	Side A	193.29.91.71
Production	H03	PS trading gateway Partition 1 (active)	Side B	193.29.91.169
Production	L01	LF trading gateway	Side B	193.29.91.103

Env.	Gateway #	Gateway type	Participant connection	IP address
Simulation	H01	PS trading gateway	Side A	193.29.89.69
Simulation	L06	LF trading gateway	Side A	193.29.89.70
Simulation	H03	PS trading gateway	Side B	193.29.89.101
Simulation	L08	LF trading gateway	Side B	193.29.89.102

6.1.2 T7 Admin GUI and T7 Trader GUI (GUI) for EurexT7, Eurex T7/FX, EEX

There are two graphical user interfaces available for T7:

- The T7 Trader GUI for on-exchange trading and T7 entry service.

- The T7 Admin GUI for user maintenance, maintenance of entitlements and Transaction Size Limits (TSL) on user/trader level. The T7 Admin GUI is always provided within a MIC, even if GUI Channel is configured on the same line.

Both GUIs can be accessed via leased line connections or alternatively through the Internet (Native Internet connection). The T7 GUI solution relies on Oracle/Sun Java WebStart technology for the delivery of the software to the participant. The necessity for the deployment of software kits and installation on the participant's side is obsolete.

Please note that the GUI applications encrypt the data sent over the Internet. Although port 80 is used, firewalls will not be able to read the content (payload) of the TCP/IP packets sent on this port.

For encryption and authentication, a SSH-2 key pair has to be created and the public key has to be uploaded to Eurex via the web portal in the Member Section under *https://member.eurexchange.com*. Please consult the GUI manual for further details on SSH-2 key pair creation and upload.

If traffic of the participant is sent through local proxy servers, the proxy server's details need to be configured within the login screen of the GUI. Please consult the T7 GUI manual for further details on how to configure the GUI for Internet usage via local proxy servers.

For leased lines connections the local IP-address for GUI connections is expected to be within the assigned participant LAN.

Technical implementation can be done by placing a proxy server in the participant LAN, taking on one side the connections to the trading desks, and on the other side residing in the assigned participant LAN. Alternatively, Network Address Translation (NAT) protocols can be implemented in the trading participant's network to shield the in-house networks and translate them to addresses in the assigned participant LAN.

Access to the following servers is necessary in order to access the T7 GUI solution. This affects the setup of the network firewall from a customer point of view:

1. Access to the dedicated GUI webpage and the Java WebStart server behind is required to download the Java applet (JAR file).

2. Access to the T7 crypto proxy server (for Internet) or the T7 proxy server (for leased lines) is required to access Eurex via the Eurex Trader GUI and Eurex Admin GUI.

6.1.2.1 Access to the T7 GUI webpage EUREX T7

To initiate the Java WebStart process a state-of-the-art web browser needs to be started to access the dedicated GUI webpage, which can be reached by the URL addresses provided in the tables below.

Clicking on the link "Eurex Trader GUI" initiates the Java WebStart mechanism to download the GUI Java applet (JAR file) from the WebStart server. Java WebStart verifies if the current version of the GUI is already present in the local cache of the participant's client computer.

If the latest version has already been downloaded during a previous launch, the cached version is used with no download being necessary. If a newer version is available on the WebStart server, then it will be downloaded automatically and stored in the cache to be used in the future.

Browsing to the GUI webpage is based on TCP/IP on port 443 (80 still possible). The following addresses are used for Internet or leased line connections:

GUI webpage

Connection option	URL / IP addresses	Ports	Protocol
Internet	*https://webgui.eurexchange.com* *193.29.90.190*	80 / 443	TCP/IP
Leased line	*https://webgui.vpn.eurexchange.com* *193.29.93.173*	80 / 443	TCP/IP

Transferring the JAR file via Java Web Start is based on TCP/IP on port 80 or port 443 (SSL). To serve that purpose, two sets of Java Web Start servers are used: one for Internet and one for leased line connections.

Java Web Start Server

Connection option	IP addresses	IP subnets	Ports	Protocol
Internet	193.29.90.190	n/a	80 / 443	TCP/IP
Leased line	193.29.93.173	193.29.93.160/28	80 / 443	TCP/IP

As the T7 Java Web Start server only has one common source IP subnet for both sides (lines), customers with dual connectivity to T7 should consider the use of a redundant gateway protocol such as Cisco's HSRP or VRRP functionality in the participant LAN for the IP gateway address to the above network, to ensure connectivity in the case of a participant router failure.

Access to the T7 proxy servers

Once the GUI application has been started within the local Java Virtual Machine, the following network communication between the client computer and the receiving Eurex proxy servers will be used for further communication:

Env.	Connection option	IP addresses	IP subnets	Ports: Eurex Trader GUI	Ports: Eurex Admin GUI	Protocol
Production	Internet	193.29.90.203	193.29.90.192/27	80	80	TCP/IP
		193.29.90.204				
	Leased line - side A	193.29.91.225	193.29.91.224/28	8089	80	TCP/IP
	Leased line - side B	193.29.93.225	193.29.93.224/28			
Simulation	Internet	193.29.90.235	193.29.90.224/27	80	80	TCP/IP
		193.29.90.236				
	Leased line - side A	193.29.89.225	193.29.89.224/28	8089	80	TCP/IP
	Leased line - side B	193.29.95.225	193.29.95.224/28			

If a firewall is used, the ports above must be configured. For load balancing reasons the subnets with possible proxy IP addresses are listed. Potential firewalls should allow traffic to the specified subnets.

6.1.2.2   Access to the T7 GUI webpage EEX

To initiate the Java WebStart process a state-of-the-art web browser needs to be started to access the dedicated GUI webpage, which can be reached by the URL addresses provided in the tables below.

Clicking on the link "T7 Trader GUI" initiates the Java WebStart mechanism to download the GUI Java applet (JAR file) from the WebStart server. Java WebStart verifies if the current version of the GUI is already present in the local cache of the participant's client computer.

If the latest version has already been downloaded during a previous launch, the cached version is used with no download being necessary. If a newer version is available on the WebStart server, then it will be downloaded automatically and stored in the cache to be used in the future.

Browsing to the GUI webpage is based on TCP/IP on port 80. The following addresses are used for Internet or leased line connections:

GUI webpage

Connection option	URL / IP addresses	Ports	Protocol
Internet	*https://webgui.eurexchange.com/eex* *193.29.90.190*	80 / 443	TCP/IP
Leased line	*https://webgui.vpn.euerxchange.com/eex/* *193.29.93.173*	80 / 443	TCP/IP

Transferring the JAR file via Java Web Start is based on TCP/IP on port 80 or port 443 (SSL). To serve that purpose, two sets of Java Web Start servers are used: one for Internet and one for leased line connections.

Java Web Start Server

Connection option	IP addresses	IP subnets	Ports	Protocol
Internet	193.29.90.190	n/a	80 / 443	TCP/IP
Leased line	193.29.93.173	193.29.93.160/28	80 / 443	TCP/IP

As the T7 Java Web Start server only has one common source IP subnet for both sides (lines), customers with dual connectivity to T7 should consider the use of a redundant gateway protocol such as Cisco's HSRP or VRRP functionality in the participant LAN for the IP gateway address to the above network, to ensure connectivity in the case of a participant router failure.

Access to the T7 proxy servers

Once the GUI application has been started within the local Java Virtual Machine, the following network communication between the client computer and the receiving Eurex proxy servers will be used for further communication:

Env.	Connection option	IP addresses	IP subnets	Ports: Eurex Trader GUI	Ports: Eurex Admin GUI	Protocol
Production	Internet	193.29.90.203	193.29.90.192/27	80	80	TCP/IP
Production	Internet	193.29.90.204	193.29.90.192/27	80	80	TCP/IP
Production	Leased line - side A	193.29.91.225	193.29.91.224/28	8089	80	TCP/IP
Production	Leased line - side B	193.29.93.225	193.29.93.224/28	8089	80	TCP/IP
Simulation	Internet	193.29.90.235	193.29.90.224/27	80	80	TCP/IP
Simulation	Internet	193.29.90.236	193.29.90.224/27	80	80	TCP/IP
Simulation	Leased line - side A	193.29.89.225	193.29.89.224/28	8089	80	TCP/IP
Simulation	Leased line - side B	193.29.95.225	193.29.95.224/28	8089	80	TCP/IP

If a firewall is used, the ports above must be configured. For load balancing reasons the subnets with possible proxy IP addresses are listed. Potential firewalls should allow traffic to the specified subnets.

6.1.2.3   Access to the T7 GUI webpage Eurex T7/FX

To initiate the Java WebStart process a state-of-the-art web browser needs to be started to access the dedicated GUI webpage, which can be reached by the URL addresses provided in the tables below.

Clicking on the link "T7 Trader GUI" initiates the Java WebStart mechanism to download the GUI Java applet (JAR file) from the WebStart server. Java WebStart verifies if the current version of the GUI is already present in the local cache of the participant's client computer.

If the latest version has already been downloaded during a previous launch, the cached version is used with no download being necessary. If a newer version is available on the WebStart server, then it will be downloaded automatically and stored in the cache to be used in the future.

Browsing to the GUI webpage is based on TCP/IP on port 80. The following addresses are used for Internet or leased line connections:

GUI webpage

Connection option	URL / IP addresses	Ports	Protocol
Internet	*https://webgui.eurexchange.com/fx* *193.29.90.190*	443 / 80	TCP/IP
Leased line	*https://webgui.vpn.eurexchange.com/fx/* *193.29.93.173*	443 / 80	TCP/IP

Transferring the JAR file via Java Web Start is based on TCP/IP on port 80 or port 443 (SSL). To serve that purpose, two sets of Java Web Start servers are used: one for Internet and one for leased line connections.

Java Web Start Server

Connection option	IP addresses	IP subnets	Ports	Protocol
Internet	193.29.90.190	n/a	80 / 443	TCP/IP
Leased line	193.29.93.173	193.29.93.160/28	80 / 443	TCP/IP

As the T7 Java Web Start server only has one common source IP subnet for both sides (lines), customers with dual connectivity to T7 should consider the use of a redundant gateway protocol such as Cisco's HSRP or VRRP functionality in the participant LAN for the IP gateway address to the above network, to ensure connectivity in the case of a participant router failure.

Access to the T7 proxy servers

Once the GUI application has been started within the local Java Virtual Machine, the following network communication between the client computer and the receiving Eurex proxy servers will be used for further communication:

Env.	Connection option	IP addresses	IP subnets	Ports: Eurex Trader GUI	Ports: Eurex Admin GUI	Protocol
Production	Internet	193.29.90.219 193.29.90.220		81	81	TCP/IP
	Leased line - side A	193.29.91.227	193.29.91.224/28	8090	81	TCP/IP
	Leased line - side B	193.29.93.227	193.29.93.224/28			

Simulation	Internet	193.29.90.235 193.29.90.236		81	81	TCP/IP
	Leased line - side A	193.29.89.225	193.29.89.224/28	8090	81	TCP/IP
	Leased line - side B	193.29.95.225	193.29.95.224/28			

If a firewall is used, the ports above must be configured. For load balancing reasons the subnets with possible proxy IP addresses are listed. Potential firewalls should allow traffic to the specified subnets.

6.1.3 FIX Gateway (FG) Eurex T7, EEX

The FIX connection between a Eurex or EEX participant's infrastructure and the Eurex & EEX FIX Gateway is established via a TCP/IP connection.

The FIX Gateway infrastructure is built redundantly, as indicated in the diagram below. One set of gateways is primarily attached to one line connection of a participant. A redundancy link between side A and side B ensures network failover for redundant two leased line installations.
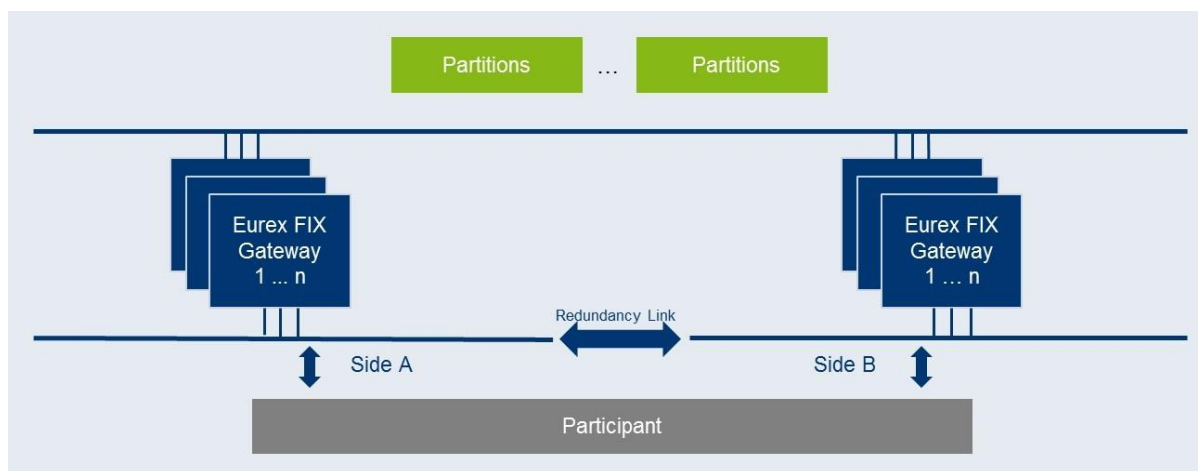
Figure 16: Eurex/EEX FIX Gateway infrastructure

For this reason, participants are advised to order a redundant leased line setup (connection option with two leased lines). If one leased line connection fails, the other FIX Gateway can still be accessed.

For each FIX session, two individual IP addresses and port numbers per environment (simulation and production) are assigned and provided during the ordering process of the FIX session, one for a primary gateway and another one for a secondary gateway. Only the assigned gateways accept connection requests from clients using a respective session ID.

Participants may choose any of the two assigned IP address and port number combinations. However, Eurex suggests using the primary gateway IP address as the primary connection and the secondary gateway IP address as the backup connection. The participant is free to use any source address from its assigned member LAN.

Please note that a simultaneous logon with the same SenderCompID (49) to both gateways is not possible.

The following IP addresses in the respective IP subnets are assigned for the FIX gateways which are used for Eurex and EEX:

Env.	Connection option	IP addresses	IP subnets	Ports	Protocol
Production	Leased line - side A	90.150.253.31	90.150.253.0/24	individually assigned	TCP/IP
	Leased line - side A (for future use)	90.150.253.43			
	Leased line - side B	90.151.253.31	90.151.253.0/24		
	Leased line - side B (for future use)	90.151.253.43			
Sim.	Leased line - side A	90.150.253.32	90.150.253.0/24	individually assigned	TCP/IP
	Leased line - side B	90.151.253.32	90.151.253.0/24		

Eurex T7FX currently offers FIX gateway in Simulation only:

Env.	Connection option	IP addresses	IP subnets	Ports	Protocol
Sim.	Leased line - side A	90.150.253.34	90.150.253.0/24	individually assigned	TCP/IP
	Leased line - side B	90.151.253.34	90.151.253.0/24		

6.2 Eurex Exchange's T7 broadcast interfaces

Due to the use of PIM Sparse Mode and any source multicast using IGMPv2 a rendezvous point for each multicast feed is required. The rendezvous points are as follows:

Environment	Rendezvous point Service A	Rendezvous point Service B
Production	193.29.91.252/32	193.29.91.253/32
Simulation	193.29.89.252/32	193.29.89.253/32

In addition to messages containing functional content, technical heartbeat messages (also called technical beacon messages) are sent out periodically on every multicast address. The purpose of the technical heartbeat message is to keep routing trees alive, i.e. this message prevents routers from dropping multicast packages. Eurex MDI sends the technical heartbeat messages on specific ports. The ports are listed in the table below.

Environment	Service A - technical heartbeat		Service B - technical heartbeat	
Production	Eurex T7, EEX	59086	Eurex T7, EEX	59087
	Eurex T7/FX	57086	Eurex T7/FX	57087

| Simulation | Eurex T7, EEX | 59586 | Eurex T7, EEX | 59587 |
| | Eurex T7/FX | 57586 | Eurex T7/FX | 57587 |

6.2.1 Market Data Interface (MDI) Eurex T7, Eurex T7/FX, EEX

The Eurex MDI provides netted price-level aggregated market data. It is a flexible, transparent, UDP based interface that disseminates market data from Eurex Exchange's T7 to participants over a multicast network. The messaging protocol used by Eurex MDI is fully compliant to the FIX protocol version 5.0 SP2 and the interface conforms to the FAST (FIX Adapted for Streaming) protocol version 1.2 principles for efficient bandwidth utilization.

The interface provides participants with the information in form of data feeds. The data feeds match to multicast groups, participants can join to receive market data for certain product groups.

Eurex MDI data feeds are distributed in a "live-live" concept by disseminating two services, A and B. Both services are identical in terms of the information provided, but utilize different multicast groups. Only one service (A or B) is transmitted per leased line connection. Each service (A or B) is linked to the transmitting leased line. Service A is available on side A and service B is available on side B. An automatic failover of the respective service in case of a line failure is not possible.

Due to the inherent unreliable nature of the delivery mechanism of the UDP protocol, packets may be lost in transmission, arrive out of order or may be duplicated. Participants are advised to subscribe to both services simultaneously on different leased lines to reduce the possibility of data loss.

6.2.1.1 MDI Details Eurex T7

The following multicast group ranges and ports are used:

Environ-ment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Production	Multicast groups	224.0.50.64-65 224.0.50.67-74 224.0.29.72-76	224.0.50.192-193 224.0.50.195-202 224.0.30.72-76	59000	59032
	Source networks	193.29.91.192/28	193.29.91.208/28	-	
Simulation	Multicast groups	224.0.50.80-81 224.0.50.83-90 224.0.29.88-92	224.0.50.208-209 224.0.50.211-218 224.0.30.88-92	59500	59532
	Source networks	193.29.89.192/28	193.29.89.208/28	-	

6.2.1.2 MDI Details EEX

The following multicast groups and ports are used:

Environ- ment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Production	Multicast groups	224.0.50.66	224.0.50.194	59000	59032
	Source networks	193.29.91.192/28	193.29.91.208/28	-	
Simulation	Multicast groups	224.0.50.82	224.0.50.210	59500	59532
	Source networks	193.29.89.192/28	193.29.89.208/28	-	

6.2.1.3 MDI Details Eurex T7/FX

The following multicast group ranges and ports are used:

Environ-ment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Production	Multicast groups	Default: 224.0.29.77 FX Options: 224.0.29.78 FX Futures: 224.0.29.79	Default: 224.0.30.77 FX Options: 224.0.30.78 FX Futures: 224.0.30.79	57000	57032
	Source networks	193.29.91.192/28	193.29.91.208/28	-	
Simulation	Multicast groups	Default: 224.0.29.93 FX Options: 224.0.29.94 FX Futures: 224.0.29.95	Default: 224.0.30.93 FX Options: 224.0.30.94 FX Futures: 224.0.30.95	57500	57532
	Source networks	193.29.89.192/28	193.29.89.208/28	-	

6.2.2 Enhanced Market Data Interface (EMDI) Eurex T7, Eurex T7/FX, EEX

The Enhanced Market Data Interface provides un-netted price-level aggregated market data. Similar to the MDI, it is UDP based and disseminates market data from Exchange's T7 to participants over a multicast network.

As the un-netted market data consumes considerably more bandwidth, the bandwidth requirements for the EMDI are much higher than for the MDI. The required bandwidth depends primarily on the products market data must be delivered for.

Similar to the Eurex MDI, Eurex EMDI provides data feeds in a "live-live" concept by disseminating two services, A and B. Therefore, the same rules apply, as for MDI. Please note that in contrast to the MDI, the EMDI disseminates market data via service A for products configured on even partitions first and market data via service B for products on odd partitions first.

6.2.2.1 EMDI Details Eurex T7

The following multicast group ranges and ports are used:

Environ-ment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Production	Multicast groups	224.0.50.2-9 224.0.50.12-63 224.0.29.2 - 55	224.0.50.130-137 224.0.50.140-191 224.0.30.2 - 55	Snapshot: 59000 Incremental: 59001	Snapshot: 59032 Incremental: 59033
	Source networks	193.29.91.0/27	193.29.91.32/27	-	
Simulation	Multicast groups	224.0.50.96-105 224.0.50.108-127 224.0.29.96 - 119	224.0.50.224-233 224.0.50.236-255 224.0.30.96 - 119	Snapshot: 59500 Incremental: 59501	Snapshot: 59532 Incremental: 59533
	Source networks	193.29.89.0/27	193.29.89.32/27	-	

6.2.2.2 EMDI Details EEX

The following multicast groups and ports are used:

Environ-ment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Production	Multicast groups	Snapshot: 224.0.50.10 Incremental: 224.0.50.11	Snapshot: 224.0.50.138 Incremental: 224.0.50.139	Snapshot: 59000 Incremental: 59001	Snapshot: 59032 Incremental: 59033
	Source networks	193.29.91.0/27	193.29.91.32/27	-	
Simulation	Multicast groups	Snapshot: 224.0.50.106 Incremental: 224.0.50.107	Snapshot: 224.0.50.234 Incremental: 224.0.50.235	Snapshot: 59500 Incremental: 59501	Snapshot: 59532 Incremental: 59533
	Source networks	193.29.89.0/27	193.29.89.32/27	-	

For the highest degree of flexibility in subscribing market data and to enable an optimal bandwidth utilization, snapshot and incremental data is disseminated via different multicast groups.

EMDI sends out technical heartbeat messages periodically on every multicast address to keep routing trees alive, similar to MDI. For details see there.

Please note that the rendezvous points for the EMDI multicast feeds are identical to those for the MDI, as listed there.

6.2.2.3 EMDI Details Eurex T7/FX

The following multicast group ranges and ports are used:

Environ-ment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Production	Multicast groups	224.0.29.58-63	224.0.30.58-63	Snapshot: 57000 Incremental: 57001	Snapshot: 57032 Incremental: 57033
Production	Source networks	193.29.91.0/27	193.29.91.32/27	-	
Simulation	Multicast groups	224.0.29.122-127	224.0.30.122-127	Snapshot: 57500 Incremental: 57501	Snapshot: 57532 Incremental: 57533
Simulation		193.29.89.0/27	193.29.89.32/27	-	

The following multicast groups and ports are used:

Environ-ment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Production	Multicast groups	Snapshot: Default: 224.0.29.58 FX Options: 224.0.29.62 FX Futures: 224.0.29.60 Incremental: Default: 224.0.29.59 FX Options: 224.0.29.63 FX Futures: 224.0.29.61	Snapshot: Default: 224.0.30.58 FX Options: 224.0.30.62 FX Futures: 224.0.30.60 Incremental: Default: 224.0.30.59 FX Options: 224.0.30.63 FX Futures: 224.0.30.61	Snapshot: 57000 Incremental: 57001	Snapshot: 57032 Incremental: 57033
Production	Source networks	193.29.91.0/27	193.29.91.32/27	-	

Environ-ment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Simulation	Multicast groups	Snapshot: Default: 224.0.29.122 FX Options: 224.0.29.126 FX Futures: 224.0.29.124 Incremental: Default: 224.0.29.123 FX Options: 224.0.29.127 FX Futures: 224.0.29.125	Snapshot: Default: 224.0.30.122 FX Options: 224.0.30.126 FX Futures: 224.0.30.124 Incremental: Default: 224.0.30.123 FX Options: 224.0.30.127 FX Futures: 224.0.30.125	Snapshot: 57500 Incremental: 57501	Snapshot: 57532 Incremental: 57533
	Source networks	193.29.89.0/27	193.29.89.32/27	-	

For the highest degree of flexibility in subscribing market data and to enable an optimal bandwidth utilization, snapshot and incremental data is disseminated via different multicast groups.

EMDI sends out technical heartbeat messages periodically on every multicast address to keep routing trees alive, similar to MDI. For details see there.

Please note that the rendezvous points for the EMDI multicast feeds are identical to those for the MDI, as listed there.

6.2.3   Enhanced Order Book Interface (EOBI) Eurex T7, Eurex T7/FX

The Enhanced Order Book Interface (EOBI) provides the entire visible order book, by publishing information on each individual order and quote side, along with executions and state information in real-time and in an un-netted manner. The EOBI interface is available for a selected group of Eurex benchmark Futures products, and provides an additional alternative to recipients of the Eurex Enhanced Market Data Interface (EMDI). In production the EOBI interface is available exclusively via 10 Gbit/s connections. In simulation EOBI will be offered not only via 10 Gbit/s connections but additionally via 1 Gbit/s connections, which allow access from non-proximity sites.

Similar to the MDI, EOBI provides data feeds in a "live-live" concept by disseminating two services, A and B. Therefore, the same rules apply, as for MDI. Please note that in contrast to the MDI, the EOBI disseminates market data via service A for products configured on even partitions first and market data via service B for products on odd partitions first.

6.2.3.1   EOBI Details Eurex T7

The following multicast group ranges and ports are used for the EOBI:

Environment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Production	Multicast groups	224.0.114.32-63 224.0.114.144-153 224.0.29.128-191	224.0.114.64-95 224.0.114.160-169 224.0.30.128-191	Snapshot: 59000 Incremental: 59001	Snapshot 59032 Incremental: 59033
Production	Source networks	193.29.88.64/27 193.29.91.0/27	193.29.88.96/27 193.29.91.32/27		
Simulation	Multicast groups	224.0.114.96-111 224.0.114.176-185	224.0.114.112-127 224.0.114.192-201	Snapshot: 59500 Incremental: 59501	Snapshot: 59532 Incremental: 59533
Simulation	Source networks	193.29.89.0/27	193.29.89.32/27		

For the highest degree of flexibility in subscribing market data and to enable an optimal bandwidth utilization, snapshot and incremental data is disseminated via different multicast groups.

EOBI sends out technical heartbeat messages periodically on every multicast address to keep routing trees alive, similar to MDI. For details see chapter 6.2.

Due to the internal configuration of EOBI, market data can originate from one of two source networks. The dissemination of EOBI market data for a particular product will only originate from one of the source networks and will remain constant throughout the trading day

Please note that the rendezvous points for the EOBI multicast feeds are identical to those for the MDI, as listed there.

6.2.3.2 EOBI Details Eurex T7/FX

The following multicast group ranges and ports are used for the EOBI:

Environment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Production	Multicast groups	Snapshot: **Default:** 224.0.114.156 **FX Futures:** 224.0.114.158 **FX Options:** 224.0.114.154 Incremental: **Default:** 224.0.114.157 **FX Futures:** 224.0.114.159 **FX Options:** 224.0.114.155	Snapshot: **Default:** 224.0.114.172 **FX Futures:** 224.0.114.174 **FX Options:** 224.0.114.170 Incremental: **Default:** 224.0.114.173 **FX Futures:** 224.0.114.175 **FX Options:** 224.0.114.171	Snapshot: 57000 Incremental: 57001	Snapshot: 57032 Incremental: 57033
	Source networks	193.29.88.64/27 193.29.91.0/27	193.29.88.96/27 193.29.91.32/27		
Simulation	Multicast groups	**Snapshot:** **Default:** 224.0.114.188 **FX Futures:** 224.0.114.190 **FX Options:** 224.0.114.186 Incremental: **Default:** 224.0.114.189 **FX Futures**: 224.0.114.191 **FX Options:** 224.0.114.187	**Snapshot:** **Default:** 224.0.114.204 **FX Futures:** 224.0.114.206 **FX Options:** 224.0.114.202 Incremental: **Default:** 224.0.114.205 **FX Futures:** 224.0.114.207 **FX Options:** 224.0.114.203	Snapshot: 57500 Incremental: 57501	Snapshot: 57532 Incremental: 57533
	Source networks	193.29.89.0/27	193.29.89.32/27		

For the highest degree of flexibility in subscribing market data and to enable an optimal bandwidth utilization, snapshot and incremental data is disseminated via different multicast groups.

Eurex EOBI sends out technical heartbeat messages periodically on every multicast address to keep routing trees alive, similar to Eurex MDI. For details, see chapter 6.2.

Due to the internal configuration of Eurex EOBI, market data can originate from one of two source networks. The dissemination of EOBI market data for a particular product will only originate from one of the source networks and will remain constant throughout the trading day

Please note that the rendezvous points for the EOBI multicast feeds are identical to those for the MDI, as listed there.

6.2.4   Extended Market Data Service (EMDS) Eurex T7, Eurex T7/FX

The Extended Market Data Service provides Ticker data, settlement prices and intraday open interest information. Similar to the EMDI and MDI, it is UDP based and disseminates the respective data to participants over a multicast network.

The settlement price and open interest information is disseminated in three separate multicast groups whereby each stream receives a separate multicast address.

Similar to the MDI and EMDI, the Extended Market Data Service provides data feeds in a "live-live" concept by disseminating two services, A and B. Therefore, the same rules apply, as for MDI and EMDI.

6.2.4.1   EMDS Details Eurex T7

The following multicast groups and ports are used for the Extended Market Data Service:

Environment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Production	Multicast group: Ticker Feed	224.0.50.75	224.0.50.203	59000	59032
	Multicast group: Settlement prices	224.0.50.77	224.0.50.205		
	Multicast group: Intraday open Interest data	224.0.50.78	224.0.50.206		
	Multicast group: Eurex T7 trades	224.0.50.79	224.0.50.207	Replay only: 59001	Replay only: 59033
	Source networks	193.29.91.192/28	193.29.91.208/28		

Environ ment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Simulation	Multicast group: Ticker Feed	224.0.50.91	224.0.50.219	59500	59532
	Multicast group: Settlement prices	224.0.50.93	224.0.50.221		
	Multicast group: Intraday open Interest data	224.0.50.94	224.0.50.222		
	Multicast group: On-exchange trade prices	224.0.50.95	224.0.50.223	Replay: 59501	Replay: 59533
	Source networks	193.29.89.192/28	193.29.89.208/28		

Please note that the rendezvous points for the Extended Market Data Service multicast feeds are identical to those for the MDI, as listed in there.

6.2.4.2 EMDS Details Eurex T7/FX

The following multicast groups and ports are used for the Extended Market Data Service:

Environ-ment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Production	Multicast group: Settlement prices	224.0.29.64 Replay: 224.0.29.66	224.0.30.64 Replay: 224.0.30.66	57000	57032
	Multicast group: Intraday open Interest data	224.0.29.65 Replay: 224.0.29.67	224.0.30.65 Replay: 224.0.30.67	Replay: 57001	Replay: 57033
	Multicast group: On-exchange trade prices	Replay: 224.0.29.68	Replay: 224.0.30.68	Replay: 57001	Replay: 57033
	Source networks	193.29.91.192/28	193.29.91.208/28		
Simulation	Multicast group: Settlement prices	224.0.29.80 Replay: 224.0.29.82	224.0.30.80 Replay: 224.0.30.82	57500 Replay: 57501	57532 Replay: 57533
	Multicast group: Intraday open Interest data	224.0.29.81 Replay: 224.0.29.83	224.0.30.81 Replay: 224.0.30.83		
	Multicast group: On-exchange trade prices	Replay: 224.0.29.84	Replay: 224.0.30.84	Replay: 57501	Replay: 57533
	Source networks	193.29.89.192/28	193.29.89.208/28		

Please note that the rendezvous points for the Extended Market Data Service multicast feeds are identical to those for the MDI, as listed in there.

6.2.5 Market Signals (MS) Eurex T7, Eurex T7/FX

Market Signals are key figures calculated in real-time, which can optionally be received via a Multi Interface Channel (MIC) or 10Gbit/s market data connection in co-colocation. Market Signals are

intended to support Exchange participants in their trading decisions. For more information, please refer to the separate Market Signals document, which is available on the website.

Similar to the MDI, EMDI and the Extended Market Data Service, Market Signals data is also disseminated via a "live-live" concept with two services, A and B. As a result, the same rules apply as for the other feeds.

6.2.5.1   MS Details Eurex T7

The following multicast groups and ports are used for the Market Signals:

Environ-ment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Production	Reference Data	224.0.114.1	224.0.114.9	59000	-
	Eurex IOC Liquidity Indicator for Options	224.0.114.128	224.0.114.130	59001	59033
	Intraday Volatility Forecast	224.0.114.132	224.0.114.136	59001	59033
	Risk Alerts	224.0.114.134	224.0.114.138	59001	59033
Simulation	Reference Data	224.0.114.17	224.0.114.25	59500	--
	Eurex IOC Liquidity Indicator for Options	224.0.114.129	224.0.114.131	59501	59533
	Intraday Volatility Forecast	224.0.114.133	224.0.114.137	59501	59533
	Risk Alerts	224.0.0.114.135	224.0.114.139	59501	59533

The Market Signals Multicast addresses use the same source networks and rendezvous points as for EMDI. Participants should however be aware that for existing installations, the multicast group to rendezvous point definitions (typically an Access Control List) will need to be expanded.

6.2.5.2   MS Details Eurex T7/FX

The following multicast groups and ports are used for the Market Signals:

Environ-ment	Description	Multicast groups Service A	Multicast groups Service B	Ports: US-allowed products	Ports: US-restricted products
Production	Reference Data	224.0.114.1	224.0.114.9	57000	-
	Eurex IOC Liquidity Indicator for Options	224.0.114.128	224.0.114.130	57001	57033
	Intraday Volatility Forecast	224.0.114.132	224.0.114.136	57001	57033
	Risk Alerts	224.0.114.134	224.0.114.138	57001	57033
Simulation	Reference Data	224.0.114.17	224.0.114.25	57500	--
	Eurex IOC Liquidity Indicator for Options	224.0.114.129	224.0.114.131	57501	57533
	Intraday Volatility Forecast	224.0.114.133	224.0.114.137	57501	57533
	Risk Alerts	224.0.0.114.135	224.0.114.139	57501	57533

(to be activated at a later point in time)

The Market Signals Multicast addresses use the same source networks and rendezvous points as for EMDI. Participants should however be aware that for existing installations, the multicast group to rendezvous point definitions (typically an Access Control List) will need to be expanded.

6.2.6 Reference Data Interface (RDI) Eurex T7, Eurex T7/FX, EEX

Eurex Exchange's T7 offers an interface dedicated to reference data, the Eurex RDI. The Eurex RDI provides reference data for instruments that are available for trading on T7 and delivers data on a product and instrument level. A unique identifier references every tradable object. In addition, the data delivered contains the technical configuration, e.g. multicast group and port combinations for both market data interfaces for all products and instruments.

Please note: The multicast group (address) and port combinations per product must be processed every day, as this assignment is subject to change on a daily basis.

The Eurex RDI delivers reference data in message format. Similar to the Eurex EMDI, the interface is multicast based. As the Eurex MDI and Eurex EMDI, the Eurex RDI provides data feeds in a "live-live" concept by disseminating two services, A and B. Therefore, the same rules apply, as for Eurex MDI and Eurex EMDI.

Multicast groups and ports for the reference data feeds do not change during trading hours.

RDI sends out technical heartbeat messages periodically on every multicast address to keep routing trees alive, similar to MDI. For details see there.

Please note that the rendezvous points for the RDI multicast feeds are identical to those for the MDI, as listed in there.

6.2.6.1 RDI Details Eurex T7

The following multicast groups and ports are used:

Environ-ment	Description	Multicast groups Service A	Multicast groups Service B	Ports
Production	Multicast groups: Snapshot data	224.0.50.0	224.0.50.128	59098
	Multicast groups: Incremental data	224.0.50.1	224.0.50.129	59099
	Source networks	193.29.91.192/28	193.29.91.208/28	-
Simulation	Multicast groups: Snapshot data	224.0.50.96	224.0.50.224	59598
	Multicast groups: Incremental data	224.0.50.97	224.0.50.225	59599
	Source networks	193.29.89.192/28	193.29.89.208/28	-

6.2.6.2 RDI Details EEX

The following multicast groups and ports are used:

Environ-ment	Description	Multicast groups Service A	Multicast groups Service B	Ports
Production	Multicast groups: Snapshot data	224.0.29.0	224.0.30.0	59098
	Multicast groups: Incremental data	224.0.29.1	224.0.30.1	59099
	Source networks	193.29.91.192/28	193.29.91.208/28	-
Simulation	Multicast groups: Snapshot data	224.0.29.96	224.0.30.96	59598
	Multicast groups: Incremental data	224.0.29.97	224.0.30.97	59599
	Source networks	193.29.89.192/28	193.29.89.208/28	-

6.2.6.3 RDI Details Eurex T7/FX

The following multicast groups and ports are used:

Environ-ment	Description	Multicast groups Service A	Multicast groups Service B	Ports
Production	Multicast groups: Snapshot data	224.0.29.56	224.0.30.56	57098
Production	Multicast groups: Incremental data	224.0.29.57	224.0.30.57	57099
Production	Source networks	193.29.91.192/28	193.29.91.208/28	-
Simulation	Multicast groups: Snapshot data	224.0.29.120	224.0.30.120	57598
Simulation	Multicast groups: Incremental data	224.0.29.121	224.0.30.121	57599
Simulation	Source networks	193.29.89.192/28	193.29.89.208/28	-

For the highest degree of flexibility in subscribing reference data, snapshot and incremental data is disseminated via different multicast groups.

6.3 Eurex Clearing interfaces

The following chapter contains the relevant information regarding ports and IP addresses for the Eurex Clearing interfaces.

- The **Eurex Clearing FIXML Interface** provides a highly flexible, standards-compliant and cost-effective interface that allows Eurex participants to perform post-trade modifications and allows Eurex Clearing members to perform their clearing responsibilities.

- The **Eurex Clearing FpML Interface** provides EurexOTC Clear participants with a highly flexible way of entering and modifying their EurexOTC Clear trades.

- The **EurexOTC Clear Margin Calculator API** allows the members to assess the impact of simulated trades on their margin requirement for EurexOTC Clear.

- The **Enhanced Risk Solution** provides Eurex Clearing members (general clearer and direct clearers) with a near-time risk data distribution service.

- **WebTrading** offers access to the @X-tract GUI which is still needed to perform post-trade modifications and clearing responsibilities for a limited period of time.

- The C7 **Derivatives Clearing GUI**, the **EurexOTC Clear GUI**, the **EurexOTC Clear Margin Calculator GUI** and the **Securities Clearing GUI** allow access to the respective services offered by Eurex Clearing.

In order to access one of these interfaces, a certificate needs to be generated and its public key needs to be uploaded into the Member Section of Eurex Clearing at member.eurexclearing.com. Please refer to the documentation of the corresponding interface about instructions for the certificate generation

procedure. The private key of the generated certificate needs then to be used by the corresponding application. For the WebTrading service, Eurex Clearing will generate a user-bound certificate which can be ordered in the Member Section of Eurex Clearing at member.eurexclearing.com.

As the Eurex Clearing FIXML Interface, the Eurex Clearing FpML Interface, the Enhanced Risk Solution, the EurexOTC Clear Margin Calculator API or the Eurex Clearing GUI infrastructure have only one common source IP subnet for both data centers. Participants with dual connectivity to Deutsche Börse should be aware that the use of Dynamic NATing on their Cisco Edge router towards Deutsche Börse may lead to connection difficulties resulting from asymmetrical routing.

If this is the case, participants have to adjust the routing metrics in such a way that symmetrical routing is ensured. Also, with dual connectivity to Deutsche Börse, the use of Cisco's HSRP functionality in the participant LAN for the IP gateway address to the new networks should be considered. In this way, connectivity in the event of a participant router failure can be ensured.

Please note: In order to access the WebSphere MQ infrastructure of the Eurex Clearing FIXML Interface, or Eurex Clearing FpML Interface, a z/OS channel is required. Please contact your TKAM for further details.

6.3.1   Eurex Clearing FIXML Interface

The following IP addresses and ports must be used for the connection to the Eurex Clearing FIXML Interface:

Environment	IP addresses	IP subnets	Ports	Protocol
Production	90.162.253.100	90.162.253.0/24	10070	TCP/IP
Simulation	90.162.253.101	90.162.253.0/24	10170	TCP/IP

The Eurex Clearing FIXML Interface uses server certificates signed by a trusted Certificate Authority (CA). The public keys of the server certificates must be downloaded once from the Eurex website www.eurexclearing.com. These certificates are available under the following path:

> *www.eurexclearing.com -> Technology -> Eurex Clearing's C7 -> System documentation.*

The certificates of the root CA signing the server certificates can be downloaded from:

> *https://www.verisign.com/support/verisign-intermediate-ca/secure-site-intermediate/index.html*

6.3.2   Eurex Enhanced Risk Solution Interface

The following IP addresses and ports must be used for the connection to the Enhanced Risk Solution:

Environment	IP addresses	IP subnets	Ports	Protocol
Production	90.164.253.100	90.164.253.0/24	18080	TCP/IP

Environment	IP addresses	IP subnets	Ports	Protocol
Simulation	90.164.253.101	90.164.253.0/24	18181	TCP/IP

The Enhanced Risk Solution uses server certificates signed by a trusted Certificate Authority (CA). The public keys of the server certificates must be downloaded once from the Eurex website www.eurexclearing.com. These certificates are available under the following path:

www.eurexclearing.com -> Technology -> Eurex Clearing classic system -> System documentation.

The certificates of the root CA signing the server certificates can be downloaded from:

https://www.verisign.com/support/verisign-intermediate-ca/secure-site-intermediate/index.html.

6.3.3 Eurex Clearing FpML Interface

The following IP addresses and ports must be used for the connection to the Eurex Clearing FpML Interface:

Environment	IP addresses	IP subnets	Ports	Protocol
Production	90.162.253.110	90.162.253.0/24	18475	TCP/IP
Simulation	90.162.253.111	90.162.253.0/24	18575	TCP/IP

The Eurex Clearing FpML Interface uses server certificates signed by a trusted Certificate Authority (CA). The public keys of the server certificates must be downloaded once from the Member Section of the Eurex Clearing website member.eurexclearing.com. These certificates are available under the following path using https:

member.eurexclearing.com -> Clearing Resources -> Releases -> EurexOTC Clear -> Interest Rate Swaps -> IRS Release 3.0 -> Interfaces -> Eurex Clearing FpML Interface.

The certificates of the root CA signing the server certificates can be downloaded from:

https://www.verisign.com/support/verisign-intermediate-ca/secure-site-intermediate/index.html

6.3.4 EurexOTC Clear Margin Calculator API

The following IP addresses and ports must be used for the connection to the EurexOTC Clear Margin Calculator API:

Environment	IP addresses	IP subnets	Ports	Protocol
Production	90.164.253.110	90.164.253.0/24	18475	TCP/IP
Simulation	90.164.253.111	90.164.253.0/24	18575	TCP/IP

The OTC Clear Margin Calculator API uses server certificates signed by a trusted Certificate Authority (CA). The public keys of the server certificates must be downloaded once from the Member Section of the Eurex Clearing website member.eurexclearing.com. These certificates are available under the following path using https:

member.eurexclearing.com -> Clearing Resources -> Releases -> EurexOTC Clear -> Interest Rate Swaps -> IRS Release 3.0 -> Interfaces -> Eurex Clearing FpML Interface.

The certificates of the root CA signing the server certificates can be downloaded from:

https://www.verisign.com/support/verisign-intermediate-ca/secure-site-intermediate/index.html

6.3.5 Eurex Clearing GUIs

In order to access the Eurex Clearing GUIs, a state-of-the-art web-browser is needed. In order to access the @X-tract GUI, which is available only with the WebTrading service, either a Citrix plug-in or Java needs to be installed.

Access to the Eurex Clearing GUIs is possible through an internet connection or through a leased line connection. Accessing the Eurex Clearing GUIs using leased line requires a GUI Channel. Please refer to chapter 4.3 for further details about a GUI Channel.

In order to use WebTrading, a user-bound certificate needs to be ordered in the Member Section of Eurex Clearing at member.eurexclearing.com. Eurex Clearing will then generate the corresponding certificate which then can be downloaded from the Member Section. This certificate is password protected and needs to be imported into the browser.

In order to access the C7 Derivatives Clearing GUI, EurexOTC Clear GUI, the EurexOTC Clear Margin Calculator GUI or the Securities Clearing GUI, a client certificate needs to be requested certificate request form (downloadable from *http://www.eurexclearing.com*).

For full details on the certificate request process please see the Eurex Clearing document "Clearing Web GUI Access Guide", which is available for download on the Eurex Clearing website at

> *www.eurexclearing.com -> Technology -> Eurex Clearing's C7 -> System documentation.*

6.3.5.1   WebTrading

WebTrading offers access to the @X-tract GUI. Deutsche Börse as the technical provider of the WebTrading service offered authentication via token until July 2013. Since then, certificates for authentication purposes are generated and provided.

Tokens allow accessing the WebTrading infrastructure via internet only. Certificates can be used to access the WebTrading infrastructure via internet and via leased lines. Access via leased line and via internet is possible using the same certificate.

WebTrading is using the same URL for the Production and Simulation environments.

The following table shows the connection details for connecting to the WebTrading service via internet using tokens.

URL	Port	Protocol
https://webtrading.deutsche-boerse.com	443/tcp	https

The following table shows the connection details for connecting to the WebTrading service via internet using certificates.

URL	Port	Protocol
https://webtrading-cert.deutsche-boerse.com	443/tcp	https

The following table shows the connection details for connecting to the WebTrading service via leased line using certificates.

URL	IP Address	Port	Protocol
https://webtrading-line.deutsche-boerse.com	193.29.93.177	443/tcp	https

Please note for connections via leased line: In order to allow a success handshake of the ssl-protocol, the Citrix server certificate needs to be verified by the browser. This means that the hostname webtrading-line.deutsche-boerse.com and the corresponding IP address need to be known to the browser. For certificate access via internet and for token access, this is done automatically using the name resolution of the internet name servers of Deutsche Börse Group. However, this fails for leased lines. Therefore, this name resolution needs to be configured in the Member network, e.g. in the local /etc/hosts file or in the member name-server.

6.3.5.2   C7 Derivatives Clearing GUI

In order to access the C7 Derivatives Clearing GUI a client certificate needs to be requested certificate request form (downloadable from *http://www.eurexclearing.com*).

For full details on the certificate request process please see the Eurex Clearing document "Clearing Web GUI Access Guide", which is available for download on the Eurex Clearing website at

> *www.eurexclearing.com -> Technology -> Eurex Clearing's C7 -> System documentation.*

The following table shows the connection details for connecting to the Derivatives Clearing GUI via internet:

Environment	URL	Ports
Production	*https://production.eurexclearing.com:8443/C7_GUI/*	8443/tcp
Simulation	*https://simulation.eurexclearing.com:9443/C7_GUI/*	9443/tcp

The following table shows the connection details for connecting to the Derivatives Clearing GUI via leased line:

Environment	URL	IP Address	Ports
Production	*https://production.vpn.eurexclearing.com:8443/C7_GUI/*	193.29.93.171	8443/tcp
Simulation	*https://simulation.vpn.eurexclearing.com:9443/C7_GUI/*	193.29.93.172	9443/tcp

6.3.5.3   EurexOTC Clear GUI

In order to access the EurexOTC Clear GUI a client certificate needs to be requested certificate request form (downloadable from *http://www.eurexclearing.com*).

For full details on the certificate request process please see the Eurex Clearing document "Clearing Web GUI Access Guide", which is available for download on the Eurex Clearing website at

www.eurexclearing.com -> Technology -> Eurex Clearing's C7 -> System documentation.

The following table shows the connection details for connecting to the EurexOTC Clear GUI via internet:

Environment	URL	Ports
Production	*https://production.eurexclearing.com:8443/OTC_GUI/*	8443/tcp
Simulation	*https://simulation.eurexclearing.com:9443/OTC_GUI/*	9443/tcp

The following table shows the connection details for connecting to the EurexOTC Clear GUI via leased line:

Environment	URL	IP Address	Ports
Production	*https://production.vpn.eurexclearing.com:8443/OTC_GUI/*	193.29.93.171	8443/tcp
Simulation	*https://simulation.vpn.eurexclearing.com:9443/OTC_GUI/*	193.29.93.172	9443/tcp

6.3.5.4   EurexOTC Clear Margin Calculator GUI

In order to access the EurexOTC Clear Margin Calculator GUI a client certificate needs to be requested certificate request form (downloadable from *http://www.eurexclearing.com*).

For full details on the certificate request process please see the Eurex Clearing document "Clearing Web GUI Access Guide", which is available for download on the Eurex Clearing website at

www.eurexclearing.com -> Technology -> Eurex Clearing's C7 -> System documentation.

The following table shows the connection details for connecting to the EurexOTC Clear Margin Calculator GUI via internet:

Environment	URL	Ports
Production	*https://production.eurexclearing.com:8443/Margin_Calculator/*	8443/tcp
Simulation	*https://simulation.eurexclearing.com:9443/Margin_Calculator/*	9443/tcp

The following table shows the connection details for connecting to the EurexOTC Clear Margin Calculator GUI via leased line:

Environment	URL	IP Address	Ports
Production	*https://production.vpn.eurexclearing.com:8443/Margin_Calculator/*	193.29.93.171	8443/tcp
Simulation	*https://simulation.vpn.eurexclearing.com:9443/Margin_Calculator/*	193.29.93.172	9443/tcp

6.3.5.5   Securities Clearing GUI

In order to access the Securities Clearing GUI, a client certificate needs to be requested certificate request form (downloadable from *http://www.eurexclearing.com*).

For full details on the certificate request process please see the Eurex Clearing document "Clearing Web GUI Access Guide", which is available for download on the Eurex Clearing website at

> *www.eurexclearing.com -> Technology -> Eurex Clearing's C7 -> System documentation.*

The following table shows the connection details for connecting to the Securities Clearing GUI via internet:

Environment	URL	Ports
Production	*https://production.eurexclearing.com:8443/LOGIN_GUI/*	8443/tcp
Simulation	*https://simulation.eurexclearing.com:9443/LOGIN_GUI/*	9443/tcp

The following table shows the connection details for connecting to the Securities Clearing GUI via leased line:

Environment	URL	IP Address	Ports
Production	*https://production.vpn.eurexclearing.com:8443/LOGIN_GUI/*	193.29.93.171	8443/tcp
Simulation	*https://simulation.vpn.eurexclearing.com:9443/LOGIN_GUI/*	193.29.93.172	9443/tcp

7.   Common Report Engine

The Common Report Engine is the sole source for end-of day trading reports and files.

The Common Report Engine is an FTP server that can be accessed using the Secure File Transfer Protocol (SFTP) from the SSH-suite. Access to the Common Report Engine is either possible via leased lines or via the Internet (Native Internet Access).

A connection to the Common Report Engine can be established with the following parameters:

Connection option*	Gateway IP addresses	IP subnets	Ports: Participant area	Ports: Public area	Protocol
Internet	193.29.90.132	n/a			
Leased line - side A	193.29.90.67	193.29.90.64/27	2222	2221	TCP/IP
Leased line - side B	193.29.90.99	193.29.90.96/27			

* Leased lines connecting to Access Points in Singapore and Hong Kong as well as iAccess connections do not provide connectivity to the Common Report Engine. Native Internet access should be used instead.

Please note that the bandwidth on a leased line available for the Common Report Engine is determined by the configured MIC itself.

8.   Eurex Repo's F7 Interfaces

Both, the browser based GUI and the F7 API can connect to Eurex Repo's F7 system either via leased line or via Internet.

In either case client authentication will be done by using x.509 certificates. The certificate will be used to encrypt all data transmitted between the browser based GUI or any third party application.

Certificates need to be created according to the "Eurex Repo F7 Connectivity Guide" manual. Once created the public key of the certificate needs to be uploaded to the Eurex Repo member section at https://member.eurexrepo.com.

8.1 Eurex Repo's F7 Trading GUI

Eurex Repo's F7 GUI can be accessed via links or URLs. These URLs differ based on the type of connection (Leased line vs. Internet) and based on the environment (Production vs. Simulation).

Any of these four URLs can be placed in the bookmarks of the user's browser, or placed as links on the desktop.

Environment	Type	URL
Simulation	Leased Line	https://simulation.vpn.eurexrepo.com:9443/TRADING_GUI
	Internet	https://simulation.eurexrepo.com:9443/TRADING_GUI
Production	Leased Line	https://production.vpn.eurexrepo.com:8443/TRADING_GUI
	Internet	https://production.eurexrepo.com:8443/TRADING_GUI

8.2 Eurex Repo's F7 API

The F7 API connection gateways are accessed via direct IP addresses. These IP addresses differ based on the type of connection (Leased line vs. Internet) and based on the environment (Production vs. Simulation).

Environment	Type	IP Address	Port
Simulation	Leased Line	193.29.95.217	11575
	Internet	193.29.90.166	11575
Production	Leased Line	193.29.95.218	11475
	Internet	193.29.90.167	11475

9. Xetra T7 Interfaces

9.1 Xetra T7 transaction interfaces

9.1.1 Enhanced Trading Interface (ETI) Xetra

The Xetra ETI is an asynchronous message-based interface. A connection between participants and Xetra is established via a TCP/IP connection. The interface is session-oriented. A session is established between the participants' machine and a Xetra ETI gateway. The gateways types available are partition specific (PS) and low frequency (LF).

The PS gateways allow routing only to a specific partition. Sessions may login to only one partition specific gateway at a time and have to specify the partition Id in their initial connection request.

Low frequency gateways allow routing to all partitions. To ensure an optimal load balancing of the LF sessions to the LF trading gateways, recommended primary and backup trading gateways are assigned to LF sessions during the ordering process. The recommended LF trading gateways for a session can be found in the "ETI Session Details" window or the configuration printout which are available in the respective member section under the "Technical Connection > Current configuration" option. A full list of the IP addresses for the active/standby PS gateways and the LF trading gateways are provided below (see 6.1.1.1).

Please note that PS gateways are available only for Xetra T7, whereas Xetra Vienna T7 and all other Partner Exchanges offer access via low-frequency gateways only.

Choose gateway

Step 1
- LF session: For optimal load balancing purposes, determine the recommended low frequency (LF) gateway for the session via the member portal. Alternatively, any of the LF gateways can be chosen.
- HF session: choose the active partition specific (PS) Gateway for the desired partition

Session logon

Step 2
- Establish TCP / IP session to the chosen GW
- HF sessions need to be able to switch to the standby GW in case the active GW is not available
- The first message to be sent by participant: **Logon** message authenticating the Eurex ETI session with session ID and password

Trader logon

Step 3
- Send **User Request** message for authentication of user (trader).
- A Xetra ETI session may be shared by several users of the same business unit.

Figure 17: Xetra ETI session logon process

The T7 gateway infrastructure is built redundantly, as indicated in the figure below. A set of gateways including low frequency trading gateways for low frequency (LF) sessions and partition specific gateways for high frequency (HF) sessions primarily attached to one line connection of a participant. A redundancy link between side A and side B ensures network failover for redundant two leased line installations.

A redundancy link between side A and side B exists to ensure network failover for redundant two leased line installations and guarantees that all gateways are reachable via a single line in case of a failure. The redundancy link introduces additional latency of more than 50 μs and should therefore be actively used in emergency situations only.

For this reason, participants are advised to order a redundant leased line setup (connection option with two leased lines). If one leased line connection fails, the other connection gateway and the corresponding set of LF and PS gateways can still be accessed.
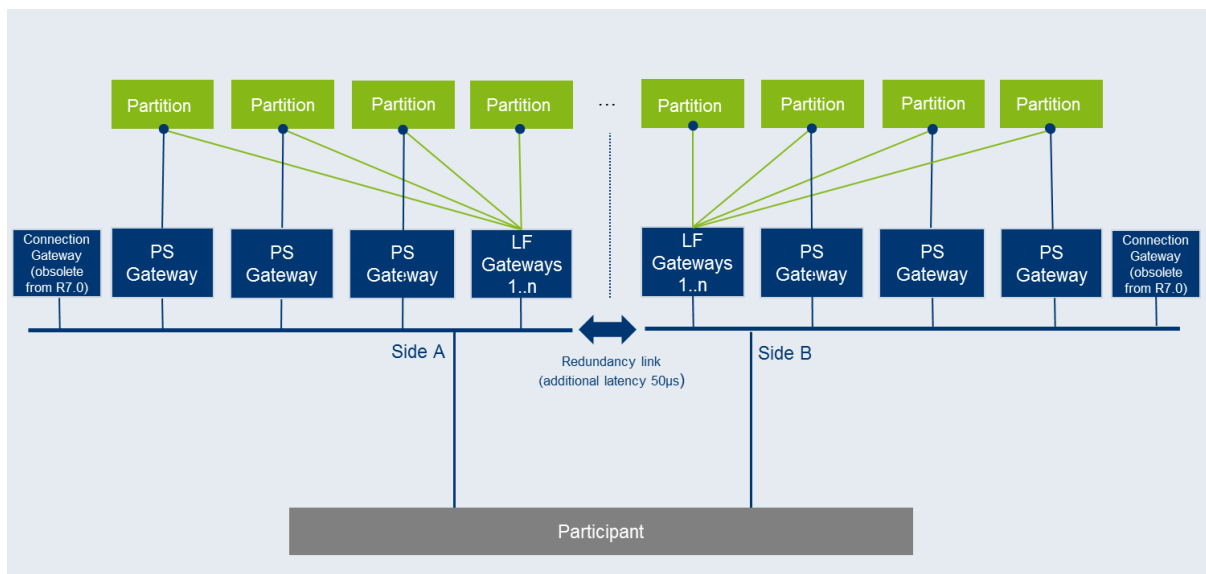
Figure 18: Xetra ETI gateway infrastructure

9.1.1.1 ETI Details for Xetra

Environ-ment	Gateway type	IP subnets		Ports	Protocol
		Side A	Side B		
Production	LF trading gateways	185.102.253.0/27	185.102.253.32/27	19006	TCP/IP
	PS trading gateways[*1]	185.102.253.64/27	185.102.253.96/27	19043	TCP/IP
Simulation	LF trading gateways	193.29.94.64/27	193.29.94.96/27	19506	TCP/IP
	PS trading gateways[*1]	193.29.94.128/27	193.29.94.160/27	19543	TCP/IP

[*1] = only available for Xetra T7, Xetra Vienna T7 and all other Partner Exchanges offer access via low-frequency gateways only

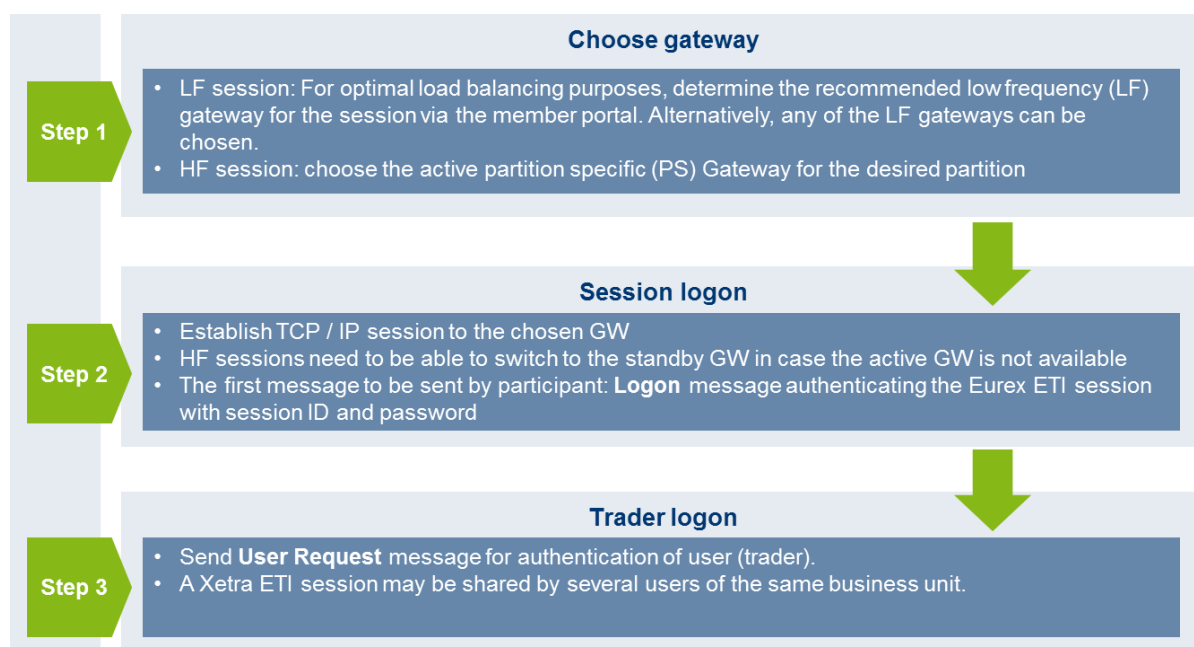IP addresses of the ETI gateways are listed in the table below:

Environ- ment	Gateway #	Gateway type	Participant connection	IP address
Production	L52X	LF trading gateway	Side A	185.102.253.1
	L54X	LF Trading gateway	Side A	185.102.253.2
	Partition 50 (active)	PS Trading gateway	Side A	185.102.253.70
	Partition 51 (standby)	PS Trading gateway	Side A	185.102.253.71
	Partition 52 (active)	PS Trading gateway	Side A	185.102.253.72
	Partition 53 (standby)	PS Trading gateway	Side A	185.102.253.73
	Partition 54 (active)	PS Trading gateway	Side A	185.102.253.74
	Partition 55 (standby)	PS Trading gateway	Side A	185.102.253.75
	Partition 56 (active)	PS Trading gateway	Side A	185.102.253.76
	Partition 57 (standby)	PS Trading gateway	Side A	185.102.253.77
	Partition 58 (active)	PS Trading gateway	Side A	185.102.253.78
	Partition 59 (standby)	PS Trading gateway	Side A	185.102.253.79
	L51X	LF trading gateway	Side B	185.102.253.033
	L53X	LF trading gateway	Side B	185.102.253.034
	Partition 50 (standby)	PS Trading gateway	Side B	185.102.253.110
	Partition 51 (active)	PS Trading gateway	Side B	185.102.253.111
	Partition 52 (standby)	PS Trading gateway	Side B	185.102.253.112
	Partition 53 (active)	PS Trading gateway	Side B	185.102.253.113
	Partition 54 (standby)	PS Trading gateway	Side B	185.102.253.114
	Partition 55 (active)	PS Trading gateway	Side B	185.102.253.115
	Partition 56 (standby)	PS Trading gateway	Side B	185.102.253.116
	Partition 57 (active)	PS Trading gateway	Side B	185.102.253.117
	Partition 58 (standby)	PS Trading gateway	Side B	185.102.253.118
	Partition 59 (active)	PS Trading gateway	Side B	185.102.253.119

	Gateway #	Gateway type	Participant connection	IP address
Simulation	Partition 30 (active)	PS trading gateway	Side A	193.29.94.130
	Partition 31 (active)	PS trading gateway	Side A	193.29.94.129
	L32X	LF trading gateway	Side A	193.29.94.65
	Partition 30 (standby)	PS trading gateway	Side B	193.29.94.162
	Partition 31 (standby)	PS trading gateway	Side B	193.29.94.161
	L31X	LF trading gateway	Side B	193.29.94.97

Please Note: "active" / "standby" represents the normal mode of operation for the individual partition specific gateways. In the case of a gateway failure, the operation mode of the individual gateways may change.

9.1.1.2 ETI Details for Partner Exchanges

The LF trading gateways listed in the tables above are also the trading gateways that are to be used for the Vienna (XVIE), Budapest (XBUD), Ljubljana (XLUJ), Prague (XPRA), Zagreb (XZAG), Bulgaria (XBUL) and Malta (XMAL) partner exchanges.

Partition Specific Gateways are not available for the partner exchanges.

9.1.2 T7 Admin GUI, T7 Trader GUI and T7 Clearer GUI Xetra

There are three graphical user interfaces available for Xetra Exchange's T7:

- The T7 Trader GUI for on-exchange trading.

- The T7 Admin GUI for user maintenance, maintenance of entitlements and Transaction Size Limits (TSL) on user/trader level. The T7 Admin GUI is always provided within a MIC, even if a GUI Channel is configured on the same line.

- The T7 Clearer GUI is used by Clearing Members to monitor and to control trading activities of their customers.

All GUIs can be accessed via leased line connections or alternatively through the Internet (Native Internet connection). The T7 GUI solution relies on Oracle/Sun Java WebStart technology for the delivery of the software to the participant. The necessity for the deployment of software kits and installation on the participant's side is obsolete.

Please note that the GUI applications encrypt the data sent over the Internet. Although port 80 is used, firewalls will not be able to read the content (payload) of the TCP/IP packets sent on this port.

For encryption and authentication, a SSH-2 key pair has to be created and the public key has to be uploaded to Xetra via the web portal in the Member Section under *https://member.deutsche-boerse.com/* . Please consult the GUI manual for further details on SSH-2 key pair creation and upload.

If traffic of the participant is sent through local proxy servers, the proxy server's details need to be configured within the login screen of the GUI. Please consult the GUI manual for further details on how to configure the GUI for Internet usage via local proxy servers.

For leased lines connections the local IP-address for GUI connections is expected to be within the assigned participant LAN.

Technical implementation can be done by placing a proxy server in the participant LAN, taking on one side the connections to the trading desks, and on the other side residing in the assigned participant LAN. Alternatively, Network Address Translation (NAT) protocols can be implemented in the trading participant's network to shield the in-house networks and translate them to addresses in the assigned participant LAN.

Access to the following servers is necessary in order to access the T7 GUI solution. This affects the setup of the network firewall from a customer point of view:

1. Access to the dedicated GUI webpage and the Java WebStart server behind is required to download the Java applet (JAR file).

2. Access to the T7 crypto proxy server (for Internet) or the T7 proxy server (for leased lines) is required to access Xetra via the Xetra Trader GUI, Xetra Clearer GUI and Xetra Admin GUI.

Access to the GUI webpage Xetra

To initiate the Java WebStart process a state-of-the-art web browser needs to be started to access the dedicated GUI webpage, which can be reached by the URL addresses provided in the tables below.

Clicking on the link "T7 Trader GUI" initiates the Java WebStart mechanism to download the GUI Java applet (JAR file) from the WebStart server. Java WebStart verifies if the current version of the GUI is already present in the local cache of the participant's client computer.

If the latest version has already been downloaded during a previous launch, the cached version is used with no download being necessary. If a newer version is available on the WebStart server, then it will be downloaded automatically and stored in the cache to be used in the future.

Browsing to the GUI webpage is based on TCP/IP on port 80 or 443 (SSL). The following addresses are used for Internet or leased line connections:

GUI webpage

Connection option	URL / IP address Landing Page	Ports	Protocol
Xetra T7			
Internet	https://webgui.xetra.com/ 193.29.90.189	80 / 443	TCP/IP
Leased line	https://webgui.vpn.xetra.com/ 193.29.93.174	80 / 443	TCP/IP
Xetra Budapest T7			
Internet	https://webgui.xetra.com/xbud/ 193.29.90.189	80 / 443	TCP/IP
Leased line	https://webgui.vpn.xetra.com/xbud/ 193.29.93.174	80 / 443	TCP/IP
Xetra Bulgaria T7			
Internet	https://webgui.xetra.com/xbul/ 193.29.90.189	80 / 443	TCP/IP
Leased line	https://webgui.vpn.xetra.com/xbul/ 193.29.93.174	80 / 443	TCP/IP
Xetra Ljubljana T7			
Internet	https://webgui.xetra.com/xlju/ 193.29.90.189	80 / 443	TCP/IP
Leased line	https://webgui.vpn.xetra.com/xlju/ 193.29.93.174	80 / 443	TCP/IP
Xetra Prague T7			
Internet	https://webgui.xetra.com/xprg/ 193.29.90.189	80 / 443	TCP/IP
Leased line	https://webgui.vpn.xetra.com/xprg/ 193.29.93.174	80 / 443	TCP/IP

Xetra Vienna T7			
Internet	https://webgui.xetra.com/xvie/ 193.29.90.189	80 / 443	TCP/IP
Leased line	https://webgui.vpn.xetra.com/xvie/ 193.29.93.174	80 / 443	TCP/IP
Xetra Zagreb T7			
Internet	https://webgui.xetra.com/xzag/ 193.29.90.189	80 / 443	TCP/IP
Leased line	https://webgui.vpn.xetra.com/xzag/ 193.29.93.174	80 / 443	TCP/IP

Transferring the JAR file via Java Web Start is based on TCP/IP on port 80 or port 443 (SSL). To serve that purpose, two sets of Java Web Start servers are used: one for Internet and one for leased line connections.

Java Web Start Server

Connection option	URL / IP address Java Web Start Server	Ports	Protocol
All T7 markets			
Internet	https://webgui.xetra.com/ 193.29.90.189	80 / 443	TCP/IP
Leased Line	https://webgui.vpn.xetra.com/ 193.29.93.174	80 / 443	TCP/IP

As the T7 Java Web Start server only has one common source IP subnet for both sides (lines), customers with dual connectivity to T7 should consider the use of a redundant gateway protocol such as Cisco's HSRP or VRRP functionality in the participant LAN for the IP gateway address to the above network, to ensure connectivity in the case of a participant router failure.

Access to the T7 proxy servers

Once the GUI application has been started within the local Java Virtual Machine, the following network communication between the client computer and the receiving Xetra proxy servers will be used for further communication:

Env.	Connection option	IP addresses	IP subnets	Ports: Trader GUI	Ports: Admin GUI	Ports: Clearer GUI	Protocol
Production	Internet	193.29.90.217	193.29.90.192/27	80	80	80	TCP/IP
		193.29.90.218					
	Leased line - side A	185.102.253.161	185.102.253.160/28	8089	80	8089	TCP/IP
	Leased line - side B	185.102.253.177	185.102.253.176/28				
Simulation	Internet	193.29.90.233	193.29.90.224/27	80	80	80	TCP/IP
		193.29.90.234					
	Leased line - side A	193.29.94.225	193.29.94.224/29	8089	80	8089	TCP/IP
	Leased line - side B	193.29.94.233	193.29.94.232/29				

(Production addresses for the Cash markets will be published prior to production launch)

If a firewall is used, the ports above must be configured. For load balancing reasons the subnets with possible proxy IP addresses are listed. Potential firewalls should allow traffic to the specified subnets.

9.1.3 FIX Gateway (FG) Xetra

The FIX connection between a Xetra participant's infrastructure and the Xetra FIX Gateway is established via a TCP/IP connection.

The Xetra FIX Gateway infrastructure is built redundantly, as indicated in the diagram below. One set of gateways is primarily attached to one line connection of a participant. A redundancy link between side A and side B ensures network failover for redundant two leased line installations.
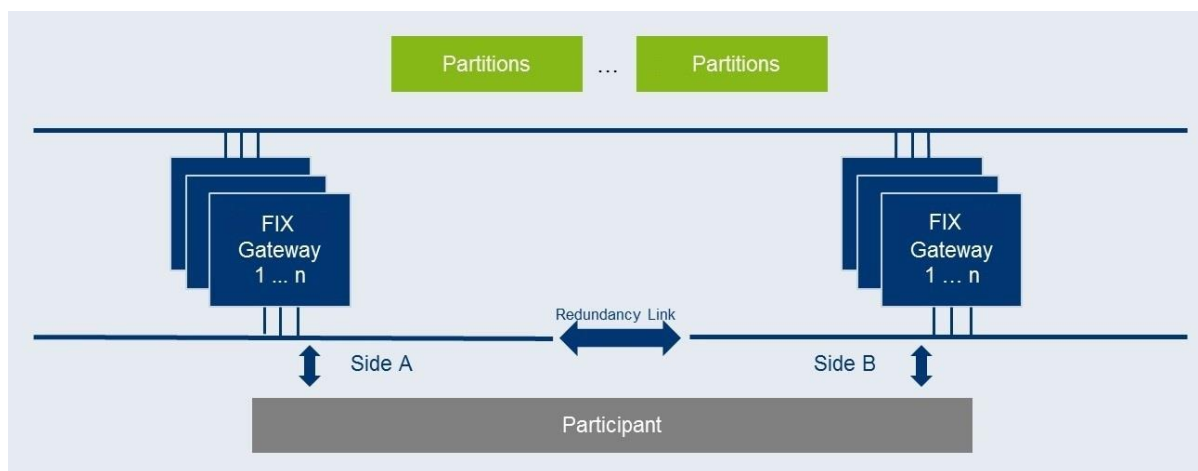
Figure 19: Xetra FIX Gateway infrastructure

For this reason, participants are advised to order a redundant leased line setup (connection option with two leased lines). If one leased line connection fails, the other Xetra FIX Gateway can still be accessed.

For each FIX session, two individual IP addresses and port numbers per environment (simulation and production) are assigned and provided during the ordering process of the FIX session, one for a primary gateway and another one for a secondary gateway. Only the assigned gateways accept connection requests from clients using the assigned unique identifier of the FIX session in the field SenderCompID (49).

Participants may choose any of the two assigned IP address and port number combinations. However, Xetra suggests using the primary gateway IP address as the primary connection and the secondary gateway IP address as the backup connection. The participant is free to use any source address from its assigned member LAN.

Please note that a simultaneous logon with the same SenderCompID (49) to both gateways is not possible.

The following IP addresses in the respective IP subnets are assigned for the Xetra FIX gateways:

Environ-ment	Connection option	IP addresses	IP subnets	Ports	Protocol
Production	Leased line - side A	90.152.253.41	90.152.253.0/24	individually assigned	TCP/IP
Production	Leased line - side B	90.153.253.41	90.153.253.0/24	individually assigned	TCP/IP
Simulation	Leased line - side A	90.152.253.42	90.152.253.0/24	individually assigned	TCP/IP
Simulation	Leased line - side B	90.153.253.42	90.153.253.0/24	individually assigned	TCP/IP

FIX Gateway (FG) Partner Exchanges The FIX gateways listed in the tables above are also the FIX gateways that are to be used for the Vienna (XVIE), Budapest (XBUD), Ljubljana (XLUJ), Prague (XPRA), Zagreb (XZAG), Bulgaria (XBUL) and Malta (XMAL) partner exchanges

9.2 Xetra T7 broadcast interfaces

Due to the use of PIM Sparse Mode and any source multicast using IGMPv2 a rendezvous point for each multicast feed is required. The rendezvous points are as follows:

Environment	Rendezvous point Service A	Rendezvous point Service B
Production	185.102.253.252	185.102.253.253
Simulation	193.29.94.252	193.29.94.253

In addition to messages containing functional content, technical heartbeat messages (also called technical beacon messages) are sent out periodically on every multicast address. The purpose of the technical heartbeat message is to keep routing trees alive, i.e. this message prevents routers from dropping multicast packages. Xetra RDI, MDI, EMDI, and EOBI send the technical heartbeat messages on specific ports. The ports are listed in the table below.

Environment	Service A - technical heartbeat	Service B - technical heartbeat
Production	59086	59087
Simulation	59586	59587

9.2.1 Market Data Interface (MDI) Xetra

The Xetra MDI provides netted price-level aggregated market data. It is a flexible, transparent, UDP based interface which disseminates market data from Xetra T7 to participants over a multicast network. The messaging protocol used by Xetra MDI is fully compliant to the FIX protocol version 5.0 SP2 and the interface conforms to the FAST (FIX Adapted for Streaming) protocol version 1.2 principles for efficient bandwidth utilization.

The interface provides participants with the information in form of data feeds. The data feeds match to multicast groups, participants can join to receive market data for certain product groups.

Xetra MDI data feeds are distributed in a "live-live" concept by disseminating two services, A and B. Both services are identical in terms of the information provided, but utilize different multicast groups. Only one service (A or B) is transmitted per leased line connection. Each service (A or B) is linked to the transmitting leased line. Service A is available on side A and service B is available on side B. An automatic failover of the respective service in case of a line failure is not possible.

Due to the inherent unreliable nature of the delivery mechanism of the UDP protocol, packets may be lost in transmission, arrive out of order or may be duplicated. Participants are advised to subscribe to both services simultaneously on different leased lines to reduce the possibility of data loss.

9.2.1.1 MDI Details Xetra T7 (incl. Partner Exchanges)

The following multicast group ranges and ports are used:

	Description	Service A	Service B	Ports
Production	Multicast groups	**XETR** 224.0.161.16 - 22 **XBUL** 224.0.161.48 **XMAL** 224.0.161.50 - 51	**XETR** 224.0.163.16 - 22 **XBUL** 224.0.163.48 **XMAL** 224.0.163.50 - 51	59000
	Source networks	185.102.253.128/28	185.102.253.144/28	
Simulation	Multicast groups	**XETR** 224.0.164.80 - 87 **XBUL** 224.0.164.88 **XMAL** 224.0.164.89	**XETR** 224.0.165.80 - 87 **XBUL** 224.0.165.88 **XMAL** 224.0.165.89	59500
	Source networks	193.29.94.192/28	193.29.94.208/28	

9.2.1.2 MDI Details Xetra Vienna T7 (incl. Partner Exchanges)

The following multicast group ranges and ports are used:

	Description	Service A	Service B	Ports
Production	Multicast groups	**XVIE** 224.0.161.32 - 36 **XPRA** 224.0.161.52 - 53 **XBUD** 224.0.161.54 - 55 **XLJU** 224.0.161.56 - 57 **XZAG** 224.0.161.58 - 59	**XVIE** 224.0.163.32 - 36 **XPRA** 224.0.163.52 - 53 **XBUD** 224.0.163.54 - 55 **XLJU** 224.0.163.56 - 57 **XZAG** 224.0.163.58 - 59	59000
	Source networks	185.102.253.128/28	185.102.253.144/28	
Simulation	Multicast groups	**XVIE** 224.0.164.96 - 102 **XPRA** 224.0.164.103 - 104 **XBUD** 224.0.164.105 - 106 **XLJU** 224.0.164.107 **XZAG** 224.0.164.108	**XVIE** 224.0.165.96 - 102 **XPRA** 224.0.165.103 - 104 **XBUD** 224.0.165.105 - 106 **XLJU** 224.0.165.107 **XZAG** 224.0.165.108	59500
	Source networks	193.29.94.192/28	193.29.94.208/28	

9.2.2 Enhanced Market Data Interface (EMDI) Xetra

The Enhanced Market Data Interface provides un-netted price-level aggregated market data. Similar to the MDI, it is UDP based and disseminates market data from T7 to participants over a multicast network.

As the un-netted market data consumes considerably more bandwidth, the bandwidth requirements for the EMDI are much higher than for the MDI. The required bandwidth depends primarily on the products market data must be delivered for.

Similar to the Xetra MDI, Xetra EMDI provides data feeds in a "live-live" concept by disseminating two services, A and B. Therefore, the same rules apply, as for MDI. Please note that in contrast to the MDI, the EMDI disseminates market data via service A for products configured on even partitions first and market data via service B for products on odd partitions first.

EMDI sends out technical heartbeat messages periodically on every multicast address to keep routing trees alive, similar to MDI. For details see there.

9.2.2.1 EMDI Details Xetra T7 (incl. Partner Exchanges)

The following multicast group ranges and ports are used:

	Description	Service A	Service B	Ports
Production	Multicast groups	**XETR** 224.0.160.0 - 63 **XBUL** 224.0.160.112 - 113 **XMAL** 224.0.160.114 - 115	**XETR** 224.0.162.0 - 63 **XBUL** 224.0.162.112 - 113 **XMAL** 224.0.162.114 - 115	Snapshot: 59000 Incremental: 59001
	Source networks	185.102.252.0/26	185.102.252.64/26	
Simulation	Multicast groups	**XETR** 224.0.164.0 - 27 **XBUL** 224.0.164.28 – 29 **XMAL** 224.0.164.30 – 31	**XETR** 224.0.165.0 - 27 **XBUL** 224.0.165.28 - 29 **XMAL** 224.0.165.30 - 31	Snapshot: 59500 Incremental: 59501
	Source networks	193.29.94.0/27	193.29.94.32/27	

9.2.2.2   EMDI Details Xetra Vienna T7 (incl. Partner Exchanges)

The following multicast group ranges and ports are used:

	Description	Service A	Service B	Ports
Production	Multicast groups	**XVIE** 224.0.160.64 - 95 **XPRA** 224.0.160.116 - 119 **XBUD** 224.0.160.120 - 123 **XLJU** 224.0.160.124 - 125 **XZAG** 224.0.160.126 - 127	**XVIE** 224.0.162.64 - 95 **XPRA** 224.0.162.116 - 119 **XBUD** 224.0.162.120 - 123 **XLJU** 224.0.162.124 - 125 **XZAG** 224.0.162.126 - 127	Snapshot: 59000 Incremental: 59001
	Source networks	185.102.252.0/26	185.102.252.64/26	
Simulation	Multicast groups	**XVIE** 224.0.164.32 - 45 **XPRA** 224.0.164.46 - 49 **XBUD** 224.0.164.50 - 53 **XLJU** 224.0.164.54 - 55 **XZAG** 224.0.164.56 - 57	**XVIE** 224.0.165.32 - 45 **XPRA** 224.0.165.46 - 49 **XBUD** 224.0.165.50 - 53 **XLJU** 224.0.165.54 - 55 **XZAG** 224.0.165.56 - 57	Snapshot: 59500 Incremental: 59501
	Source networks	193.29.94.0/27	193.29.94.32/27	

9.2.3   Enhanced Order Book Interface (EOBI) Xetra

The Enhanced Order Book Interface (EOBI) provides the entire visible order book, by publishing information on each individual order and quote side, along with executions and state information in real-time and in an un-netted manner. The EOBI interface provides a high-detail, high-bandwidth alternative to recipients of the Xetra Enhanced Market Data Interface (EMDI).

In production, the EOBI interface is available exclusively via 10 Gbit/s connections.

In simulation, EOBI will be offered not only via 10 Gbit/s connections but can additionally ordered on smaller leased line from non-proximity sites for testing and development purposes.

Similar to the MDI, EOBI provides data feeds in a "live-live" concept by disseminating two services, A and B. Therefore, the same rules apply, as for MDI. Please note that in contrast to the MDI, the EOBI disseminates market data via service A for products configured on even partitions first and market data via service B for products on odd partitions first.

EOBI sends out technical heartbeat messages periodically on every multicast address to keep routing trees alive, similar to MDI. For details see there.

9.2.3.1 EOBI Details Xetra T7 (incl. Partner Exchanges)

The following multicast group ranges and ports are used:

	Description	Service A	Service B	Ports
Production	Multicast groups	**XETR** 224.0.160.128 - 191 **XBUL** 224.0.160.240 - 241 **XMAL** 224.0.160.242 - 243	**XETR** 224.0.162.128 - 191 **XBUL** 224.0.162.240 - 241 **XMAL** 224.0.162.242 - 243	Snapshot: 59000 Incremental: 59001
	Source networks	185.102.252.0/26	185.102.252.64/26	
Simulation	Multicast groups	**XETR** 224.0.164.128 - 155 **XBUL** 224.0.164.156 - 157 **XMAL** 224.0.164.158 - 159	**XETR** 224.0.165.128 - 155 **XBUL** 224.0.165.156 - 157 **XMAL** 224.0.165.158 - 159	Snapshot: 59500 Incremental: 59501
	Source networks	193.29.94.0/27	193.29.94.32/27	

9.2.3.2 EOBI Details Xetra Vienna T7 (incl. Partner Exchanges)

The following multicast group ranges and ports are used:

	Description	Service A	Service B	Ports
Production	Multicast groups	**XVIE** 224.0.160.192 - 223 **XPRA** 224.0.160.244 - 247 **XBUD** 224.0.160.248 - 251 **XLJU** 224.0.160.252 - 253 **XZAG** 224.0.160.254 - 255	**XVIE** 224.0.162.192 - 223 **XPRA** 224.0.162.244 - 247 **XBUD** 224.0.162.248 - 251 **XLJU** 224.0.162. 252 - 253 **XZAG** 224.0.162.254 - 255	Snapshot: 59000 Incremental: 59001
	Source networks	185.102.252.0/26	185.102.252.64/26	
Simulation	Multicast groups	**XVIE** 224.0.164.160 - 173 **XPRA** 224.0.164.174 - 177 **XBUD** 224.0.164.178 - 181 **XLJU** 224.0.164.182 - 183 **XZAG** 224.0.164.184 - 185	**XVIE** 224.0.165.160 - 173 **XPRA** 224.0.165.174 - 177 **XBUD** 224.0.165.178 - 181 **XLJU** 224.0.165.182 - 183 **XZAG** 224.0.165.184 - 185	Snapshot: 59500 Incremental: 59501
	Source networks	193.29.94.0/27	193.29.94.32/27	

9.2.4 Extended Market Data Service (EMDS) Xetra

For the cash market the Extended Market Data Service provides Ticker data and an All Trade Price (ATP) stream, which disseminates in real time all trade prices for the T7 cash markets (comparable to the ATP stream offered in Xetra EnBS).

Similar to the EMDI and MDI, it is UDP based and disseminates the respective data to participants over a multicast network.

Similar to the MDI and EMDI, the Extended Market Data Service provides data feeds in a "live-live" concept by disseminating two services, A and B. Therefore, the same rules apply, as for MDI and EMDI.

9.2.4.1 EMDS Details Xetra T7 (incl. Partner Exchanges)

The following multicast groups and ports are used:

	Description	Service A	Service B	Ports
Production	All Trade Prices (ATP)	**XETR** 224.0.161.64 **XBUL** 224.0.161.76 **XMAL** 224.0.161.77	**XETR** 224.0.163.64 **XBUL** 224.0.163.76 **XMAL** 224.0.163.77	59000 Replay: 59001
	Ticker feed	**XETR** 224.0.161.31 **XBUL** 224.0.161.49	**XETR** 224.0.163.31 **XBUL** 224.0.163.49	59000
	Source networks	185.102.253.128/28	185.102.253.144/28	
Simulation	All Trade Prices (ATP)	**XETR** 224.0.164.120 **XBUL** 224.0.164.120 **XMAL** 224.0.164.120	**XETR** 224.0.165.120 **XBUL** 224.0.165.120 **XMAL** 224.0.165.120	59500 (XETR) 59520 (XBUL) 59510 (XMAL) Replay: 59501 (XETR) 59521 (XBUL) 59511 (XMAL)
	Ticker feed	**XETR** 224.0.164.95 **XBUL** 224.0.164.94	**XETR** 224.0.165.95 **XBUL** 224.0.165.94	59500
	Source networks	193.29.94.192/28	193.29.94.208/28	

9.2.4.2 EMDS Details Xetra Vienna T7

The following multicast groups and ports are used:

	Description	Service A	Service B	Ports
Production	All Trade Prices (ATP)	**XVIE** 224.0.161.68	**XVIE** 224.0.163.68	59000 Replay: 59001
	Ticker feed	**XVIE** 224.0.161.39	**XVIE** 224.0.163.39	59000
	Source networks	185.102.253.128/28	185.102.253.144/28	
Simulation	All Trade Prices (ATP)	**XVIE** 224.0.164.121	**XVIE** 224.0.165.121	59500 Replay: 59501
	Ticker feed	**XVIE** 224.0.164.111	**XVIE** 224.0.165.111	59500
	Source networks	193.29.94.192/28	193.29.94.208/28	

9.2.5   Reference Data Interface (RDI) Xetra

T7 offers an interface dedicated to reference data, the Xetra RDI. The Xetra RDI provides reference data for instruments that are available for trading on T7 and delivers data on a product and instrument level. Every tradable object is referenced by a unique identifier. In addition, the data delivered contains the technical configuration, e.g. multicast group and port combinations for both market data interfaces for all products and instruments.

Please note: The multicast group (address) and port combinations per product must be processed every day, as this assignment is subject to change on a daily basis.

The Xetra RDI delivers reference data in message format. Similar to the Xetra EMDI, the interface is multicast based. As the Xetra MDI and Xetra EMDI, the Xetra RDI provides data feeds in a "live-live" concept by disseminating two services, A and B. Therefore, the same rules apply, as for Xetra MDI and Xetra EMDI.

Multicast groups and ports for the reference data feeds do not change during trading hours.

RDI sends out technical heartbeat messages periodically on every multicast address to keep routing trees alive, similar to MDI. For details see there.

Please note that the rendezvous points for the RDI multicast feeds are identical to those for the MDI, as listed in there.

9.2.5.1   RDI Details Xetra T7 (incl. Partner Exchanges)

The following multicast groups and ports are used:

	Description	Service A	Service B	Ports
Production	Multicast groups	**XETR** 224.0.161.0 **XBUL** 224.0.161.7 **XMAL** 224.0.161.8	**XETR** 224.0.163.0 **XBUL** 224.0.163.7 **XMAL** 224.0.163.8	Snapshot: 59098 Incremental: 59099
	Source networks	185.102.253.128/28	185.102.253.144/28	
Simulation	Multicast groups	**XETR** 224.0.164.224 **XBUL** 224.0.164.231 **XMAL** 224.0.164.232	**XETR** 224.0.165.224 **XBUL** 224.0.165.231 **XMAL** 224.0.165.232	Snapshot: 59598 Incremental: 59599
	Source networks	193.29.94.192/28	193.29.94.208/28	

9.2.5.2 RDI Details Xetra Vienna T7 (incl. Partner Exchanges)

The following multicast groups and ports are used:

	Description	Service A	Service B	Ports
Production	Multicast groups	**XVIE** 224.0.161.1 **XPRA** 224.0.161.3 **XBUD** 224.0.161.4 **XLJU** 224.0.161.5 **XZAG** 224.0.161.6	**XVIE** 224.0.163.1 **XPRA** 224.0.163.3 **XBUD** 224.0.163.4 **XLJU** 224.0.163.5 **XZAG** 224.0.163.6	Snapshot: 59098 Incremental: 59099
	Source networks	185.102.253.128/28	185.102.253.144/28	
Simulation	Multicast groups	**XVIE** 224.0.164.225 **XPRA** 224.0.164.227 **XBUD** 224.0.164.228 **XLJU** 224.0.164.229 **XZAG** 224.0.164.230	**XVIE** 224.0.165.225 **XPRA** 224.0.165.227 **XBUD** 224.0.165.228 **XLJU** 224.0.165.229 **XZAG** 224.0.165.230	Snapshot: 59598 Incremental: 59599
	Source networks	193.29.94.192/28	193.29.94.208/28	

10. Appendix

10.1 List of abbreviations

The following list is limited to terminology and abbreviations, which are specific to Eurex. Basic IT terminology, such as FTP, TCP etc., is not explained in this document, which is aimed at technical roles (administrators) at participant sites.

Abbreviation or term	Description
AP	Access Point: One of its functions is to route data transactions to and from the back ends of the Deutsche Börse Group's systems.
CIC	Clearing Interface Channel: A network configuration bundling Eurex Clearing interfaces.
Co-location	Co-location refers to a data center accommodating both, the T7 back end infrastructure and the trading installations of T7 participants. Deutsche Börse is providing such services in cooperation with Equinix Germany GmbH as a partner. Participants can rent rack space from Equinix in specific co-location rooms close to the back ends of the Exchange.
Common Report Engine	The Common Report Engine (CRE) allows the centralized provision of reports. Participants can retrieve reports and files from this report server using SFTP. The Common Report Engine is the sole source for reports from T7, Eurex Classic and Eurex Clearing's C7.
EMDI	T7 Enhanced Market Data Interface
EOBI	T7 Enhanced Order Book Interface
ETI	T7 Enhanced Trading Interface
MDI	T7 Market Data Interface
RDI	T7 Reference Data Interface
Exchange	Exchange refers to the respective Deutsche Börse Group's electronic trading or clearing system.
F7 API	Eurex Repo's F7 application programming interface
iAccess	iAccess is the Internet based access for Participants using an encryption tunnel. Please note, iAccess is not identical to the T7 Internet based GUI access.
ISP	Internet Service Provider
Participant	A participant is a clearing member or a non-clearing member that is connected to the one of the trading markets.
MIC	Multi Interface Channel: A network configuration bundling T7 interfaces.
NetOps	Deutsche Börse Group Network Operations

Abbreviation or term	Description
TKAM	Technical Key Account Manager of Deutsche Börse
User	A user is a trader that logs into a trading system. e.g. into T7.

10.2 Contact information

Overview of contact information	
Website for Eurex T7	*www.eurexchange.com*
Website for Eurex Clearing	*www.eurexclearing.com*
Website for F7	*www.eurexrepo.com*
Website Xetra	*www.xetra.com*
Deutsche Börse customer technical support	Please contact your dedicated Technical Key Account Manager by using your VIP telephone number or via email: cts@deutsche-boerse.com

10.3 Sources of information

For further information concerning the T7 please visit the Eurex website (*www.eurexchange.com*), the Eurex Clearing website (*www.eurexclearing.com*) and the Xetra website (www.xetra.com.)

The websites provide documents, such as circulars, functional and technical descriptions with additional pieces of information regarding participant-specific system configuration details.

The following table contains a list of references in regard to functional and technical documents.

Chapter reference or topic	What it is about	Link
Documentation for Eurex T7	Multiple topics	*www.eurexchange.com* > Technology
Documentation for Eurex Clearing	Multiple topics	*www.eurexclearing.com* > Technology
Documentation for Xetra T7	Multiple topics	*www.xetra.com* > Technology
Documentation for Eurex Repo's F7	Multiple topics	*www.eurexrepo.com* > Technical Support

10.4 List of IP prefixes

IP prefixes (source IP networks, rendezvous points, etc.) are described in this document within the chapters of the respective interfaces. The following list merges all the IP prefixes relevant for leased line connections and advertised over both sides.

IP prefix	Description
Eurex ETI	
193.29.91.128/27	IP subnet of Eurex ETI PS trading gateways, production, side A
193.29.91.64/27	IP subnet of Eurex ETI trading gateways , production, side A
193.29.89.128/27	IP subnet of Eurex ETI PS trading gateways, simulation, side A
193.29.89.64/27	IP subnet of Eurex ETI trading gateways, simulation, side A
193.29.91.160/27	IP subnet of Eurex ETI PS trading gateways, production, side B
193.29.91.96/27	IP subnet of Eurex ETI trading gateways, production, side B
193.29.89.160/27	IP subnet of Eurex ETI PS trading gateways, simulation, side B
193.29.89.96/27	IP subnet of Eurex ETI trading and gateways, simulation, side B
Eurex FIX Gateway	
90.150.253.0/24	IP subnet of Eurex FIX Gateways, production and simulation, side A
90.151.253.0/24	IP subnet of Eurex FIX Gateways, production and simulation, side B
Rendezvous points for Eurex MDI, Eurex EMDI, EUREX EOBI and Eurex RDI	
193.29.91.252/32	Rendezvous point for service A, production
193.29.91.253/32	Rendezvous point for service B, production
193.29.89.252/32	Rendezvous point for service A, simulation
193.29.89.253/32	Rendezvous point for service B, simulation
Eurex MDI, Eurex Extended Market Data Service and Eurex RDI	
193.29.91.192/28	IP source network for service A, production
193.29.91.208/28	IP source network for service B, production
193.29.89.192/28	IP source network for service A, simulation

IP prefix	Description
193.29.89.208/28	IP source network for service B, simulation
Eurex EMDI	
193.29.91.0/27	IP source network for service A, production
193.29.91.32/27	IP source network for service B, production
193.29.89.0/27	IP source network for service A, simulation
193.29.89.32/27	IP source network for service B, simulation
Eurex EOBI	
193.29.88.64/27	IP source network for service A, production
193.29.88.96/27	IP source network for service B, production
193.29.89.0/27	IP source network for service A, simulation
193.29.89.32/27	IP source network for service B, simulation
Eurex Trader GUI and Eurex Admin GUI	
193.29.93.160/28	IP subnet of Java Web Start server, production and simulation
193.29.91.224/28	IP subnet of Eurex proxy servers, production, side A
193.29.93.224/28	IP subnet of Eurex proxy servers, production, side B
193.29.89.224/28	IP subnet of Eurex proxy servers, simulation, side A
193.29.95.224/28	IP subnet of Eurex proxy servers, simulation, side B
Eurex Clearing GUIs	
193.29.93.160/28	C7 Derivatives Clearing GUI, EurexOTC Clear GUI, EurexOTC Clear Margin Calculator and Securities Clearing GUI via leased line
Eurex WebTrading	
193.29.93.176/29	Eurex WebTrading via leased line
Eurex Clearing FpML Interface	
90.162.253.0/24	IP subnet, production and simulation

IP prefix	Description
Eurex Clearing FIXML Interface	
90.162.253.0/24	IP subnet, production and simulation
EurexOTC Clear Margin Calculator API	
90.164.253.0/24	IP subnet, production and simulation
Enhanced Risk Solution	
90.164.253.0/24	IP subnet, production and simulation
Common Report Engine	
193.29.90.64/27	IP subnet, side A
193.29.90.96/27	IP subnet, side B
Eurex Repo's F7 Trading GUI	
193.29.95.208/28	IP subnet, production and simulation
Eurex Repo's F7 API	
193.29.95.208/28	IP subnet, production and simulation

IP prefix	Description
Xetra ETI	
185.102.253.64/27	IP subnet of Xetra ETI PS trading gateways, production, side A
185.102.253.0/27	IP subnet of Xetra ETI trading gateways, production, side A
193.29.94.128/27	IP subnet of Xetra ETI Ps trading gateways, simulation, side A
193.29.94.64/27	IP subnet of Xetra ETI trading and gateways, simulation, side A
185.102.253.96/27	IP subnet of Xetra ETI PS trading gateways, production, side B
185.102.253.32/27	IP subnet of Xetra ETI trading and gateways, production, side B
193.29.94.160/27	IP subnet of Xetra ETI PS trading gateways, simulation, side B
193.29.94.96/27	IP subnet of Xetra ETI trading and gateways, simulation, side B

IP prefix	Description
Xetra FIX Gateway	
90.152.253.0/24	IP subnet of Xetra FIX Gateways, production and simulation, side A
90.153.253.0/24	IP subnet of Xetra FIX Gateways, production and simulation, side B
Rendezvous points for Xetra MDI, Xetra EMDI, Xetra EOBI and Xetra RDI	
185.102.253.252	Rendezvous point for service A, production
185.102.253.253	Rendezvous point for service B, production
193.29.94.252	Rendezvous point for service A, simulation
193.29.94.253	Rendezvous point for service B, simulation
Xetra MDI, Xetra Extended Market Data Service and Xetra RDI	
185.102.253.128/28	IP source network for service A, production
185.102.253.144/28	IP source network for service B, production
193.29.94.192/28	IP source network for service A, simulation
193.29.94.208/28	IP source network for service B, simulation
Xetra EMDI	
185.102.252.0/26	IP source network for service A, production
185.102.252.64/26	IP source network for service B, production
193.29.94.0/27	IP source network for service A, simulation
193.29.94.32/27	IP source network for service B, simulation
Xetra EOBI	
185.102.252.0/26	IP source network for service A, production
185.102.252.64/26	IP source network for service B, production
193.29.94.0/27	IP source network for service A, simulation
193.29.94.32/27	IP source network for service B, simulation
Xetra Trader GUI, Xetra Admin GUI and Xetra clearer GUI	

IP prefix	Description
	IP subnet of Java Web Start server, production and simulation
185.102.253.160/28	IP subnet of Xetra proxy servers, production, side A
185.102.253.176/28	IP subnet of Xetra proxy servers, production, side B
193.29.94.224/29	IP subnet of Xetra proxy servers, simulation, side A
193.29.94.232/29	IP subnet of Xetra proxy servers, simulation, side B

11. Change log

The change log serves as a record of the latest major changes.

No	Date	Chapter, page	Change
1.0	18 July 2012	-	Creation of document
2.0.0	27.08.2013	General	Changed new trading architecture to T7
		General	Added C7
		General	Addition of EOBI
		General	Updated for T7 release 2.0
2.0.31	13.03.2018	Title only	Adjusted for T7 6.1
		6.1.1.1	Removal of the HF gateways for Eurex T7
		6.1.1.2	Removal of the HF gateways for Eurex T7/FX
		6.2.3.2	Correction of the Service B multicast addresses for simulation.
		9.1.1	Removal of the HF gateways for Xetra T7
2.0.32	25.05.2018	1.5.2	With the introduction of PS gateways, last mile redundancy exists for 10Gb CoLo connections. Last mile redundancy also exists for iAccess. Adjusted chapter 1.5.2 to reflect this.
		6.1.1.2	Corrected the port for the PS Gateways and the IP addresses for the LF & CGW (Prod)
		6.2.3.1	Added additional address ranges for T7 EOBI production
		7	Updated IP addresses of the Common Report Engine (as of Circular 3/2018)
		10.4	Corrected subnet for Eurex T7 GUI, leased line, B-side
2.0.33	25.06.2018	6.1.1.2	Added "active" and "standby" PS GWs for Prod.
		6.2	Corrected technical heartbeat port for T7/FX simulation (Side B)
		6.2.2.1	Corrected the ranges for EMDI production
		6.2.3.1	Modified boundaries to reflect the FX Options on T7/FX
		6.2.3.2	Modified boundaries to reflect the FX Options on T7/FX
		6.2.4.1	Updated the table for simulation

2.0.34	04.09.2018	2.6	Addition of a chapter on 'Network Usage Guidelines'
		6.1.1	Added a note regarding the decommissioning of the LF Gateways L05/L06 in Q4/2018
		9.1.2	Corrected the port for T7 Clearer GUI, leased line access (changed from 80 to 8089)
2.0.35	02.10.2018	6.1.1.2	Corrected T7/FX gateway IPs for Prod.
2.0.36	08.10.2018	6.1.1, 9.1.1	Updated ETI session connection procedure for removal of the Connection Gateways with T7 7 .0
2.0.37	28.10.2018	6.1.1.2	Corrected T7/FX gateway IPs for Prod.
2.0.38	01.12.2018	6.1.1.1	Removed Low Frequency Gateways L05 and L06 with T7 7.0
2.0.39	04.01.2019	6.1.1.1	Corrected active/standby PS gateways for simulation and added the IP addresses for Partition 3
		6.2.3.1	Extended the range of the potential EOBI multicast addresses for 224.0.29.x / 224.0.30.x
2.0.40	22.01.2019	6.2.3	Corrected multicast address for T7/FX EOBI, FX Options Incremental on side B
		2.6	Update to the Network Usage Guidelines
2.0.41	14.02.2019	9.1.2	Deleted entries for Xetra Dublin T7
		9.2.	Update of Xetra T7 broadcast interfaces due to new Partner Exchanges
2.0.42	20.03.2019	6.1.1 9.1.1	Updated for release 7.1 (Connection Gateways no longer available in backward compatibility mode)
		9.1.2	Inclusion of the GUI links for Partner Exchanges
2.0.43	19.06.2019	6.1.1 9.1.1	Deletion of multicast addresses of Connection Gateways
2.0.44	15.07.2019	6.1.2	Removal of outdated GUI Crypto Proxies
		9.1.1	Addition of new PS Gateway for Xetra partitions 30/31
2.0.45	16.07.2019	All	Updated for T7 8.0.
		3.2.4	Updated iAccess description for BGP WAN
		6.1.3	Added FIX Gateway for T7/FX Simu.