

EUREX



Eurex Repo F7

F7 Connectivity Guide

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List of abbreviations

The following is a list of terms and abbreviations used in these release notes.

Abbreviation or term	Description
AMQP	Advanced Message Queuing Protocol
API	Application Programming Interface
CA	Certification Authority issues and validates digital certificates. Usually, commercial.
F7 API	F7 Application Programming Interface is the open and flexible interface for third party software products connecting to F7.
FIX	Financial Information eXchange protocol standard
FQDN	Fully Qualified Domain name, designating a given server or resource with hostname and domain name (i.e. in an URL)
GUI	Graphical User Interface
Keystore	A repository of security certificates (usually own certificates)
PKCS#12	Cryptographic archive file format. Here used to store digital certificates to be imported into a web browser.
POA	Participant owned application
RSA	Rivest, Samir and Adleman – asymmetrical cryptographic method
Truststore	A repository of security certificates (usually trusted certificates of others)
URI	Uniform Resource Identifier – reference to a resource name, location, or both (used in this document to specify F7 API, or F7 FIX resources)
URL	Uniform Resource Locator – reference to a resource location (used in this document to specify F7 GUI resources and addresses)
x.509	Public key infrastructure for digital certificates

1. Introduction

Deutsche Börse is continuously extending its F7 product scope, functionality, and markets to improve its services and to attract additional customer groups. With the trading system F7, introduced in 2014, Deutsche Börse went a considerable step further, embracing the requirements of a state-of-the-art trading environment.

The F7 trading system serves as a solid foundation for future growth and has been designed to meet the highest demands.

Today's global markets demand new standards of flexibility and performance. The 7 Market Technology series from Deutsche Börse Group offers a range of innovations in trading, clearing, risk management and connectivity – advanced infrastructure that lets you adapt to whatever the future brings.

This document describes the connectivity options and the ordering and setup process for F7. It considers participants who are new to the order process at Deutsche Börse but is also valid for participants, which already have Deutsche Börse infrastructure (for example existing Eurex participants, which want to order additional F7 connectivity).

1.1 Graphical User Interface, F7 GUI

The F7 trading GUI is browser based. Extensive software installation or update processes are therefore no longer necessary. As a result, the F7 trading GUI is completely operating system independent, if a supported browser is used.

While running in the browser the F7 trading GUI offers the full repo trading functionality combining it with highest deployment flexibility.

A full online manual is available within the GUI. For a downloadable PDF of the GUI manual please go to the DBAG Member Section:

<https://membersection.deutsche-boerse.com/>

following this path:

Resources > Eurex Repo > System Documentation > Release x.x > Eurex Repo GUI Solutions

The F7 trading GUI can be connected either via leased lines or via an Internet connection. Chapter 2 of this document describes the differences and the bandwidth requirements, while chapters 4 and 5 guide you through the ordering process.

In both cases the connections are secured by an individual certificate (x.509). Prior to usage the client certificate must be downloaded from the DBAG Member Section, and it must be installed into the user's browser. Chapter 6 of this document describes the steps which need to be performed to do this.

The F7 trading GUI runs with a wide range of recent browser software and operating systems.

Several browser and operating system combinations are part of Deutsche Börse test scenarios. These combinations are considered as "supported".

Untested combinations which have no issues reported are considered as "possible", while combinations known to have problems are classified as "not supported".

To fully support all features of the latest F7 simulation and production software the supported versions of common browsers can be found in the "Release Notes" of the F7 release you want to connect to.

1.1.1 TLS 1.3 Support

The SSL encryption requires all browsers to support TLS1.3 or TLS1.2. Support for TLS1.2 will be discontinued in 2025.

1.1.2 TLS 1.3 Hybridized Kyber support

The new browser flag 'TLS 1.3 hybridized Kyber support' is by default enabled to mitigate vulnerability of the asymmetric cryptography in TLS to future attacks from quantum computers.

While the Repo F7 GUI servers are fully able to utilize this feature, enabling this flag leads to enlarged Message Headers which may cause problems with infrastructure elements like proxy servers or firewalls.

If there are problems with accessing the F7 GUI login page while 'TLS 1.3 hybridized Kyber support' is enabled, there are two options to solve the problem:

1. Disable the browser flag
2. Change Proxy/Firewall settings by implementing PostQuantumKeyAgreementEnabled enterprise policy to handle these large Message Headers

How to disable the browser flag:

[Google Chrome & Edge](#)

- Open browser
- Enter *Chrome://flags* in the address bar
- Enter *TLS* in the search flags box
- Then 'TLS 1.3 hybridized Kyber support' flag will be displayed along with a drop down menu to choose between Default, Enabled and Disabled. Select Disabled

Firefox

- Type about:config in the URL bar
- Type "security.tls.enable_kyber" in the search bar
- Disable the option as a boolean

Note: You will then need to restart your web browser to activate or de-activate this feature

1.2 F7 API, Participant Application Programming Interface

The F7 trading platform provides a dedicated API (F7 API). The F7 API enables message exchange (i.e., enter quote, enter IOI, etc.) in a proprietary XML based message format. Message flow is implemented via AMQP message brokers.

The interface supports request/response communication (participant triggered) as well as broadcast message flow (exchange triggered).

Any programming language can be used to develop applications connecting to this interface. The programming interface is available on leased line connections and via the Internet. Both types of connections require x.509 certificates for authentication.

For the full F7 API manual and accompanying XSD files please go to:

<https://membersection.deutsche-boerse.com/>

following this path:

Resources > Eurex Repo > System Documentation > Release x.x > Eurex Repo Trading Interfaces

It is recommended to always use the latest stable version of the QPID C++ API and QPID JMS libraries which can be found by following these URLs:

<https://qpid.apache.org/components/messaging-api/index.html>

<https://qpid.apache.org/releases/>

Please refer to the “Release Notes” of the F7 release you want to connect to for more details on the supported library versions. Usually, the latest stable versions available.

Prior to usage of the F7 API a client certificate must be downloaded from the DBAG Member Section, and it must be installed into the API client application (i.e. or made available in a keystore). Chapter 6 of this document describes the steps which need to be performed to do this.

Furthermore, the F7 API server authenticates by means of a server certificate (signed by DigiCert). The public key for the server certificate can be downloaded from the DBAG Member Section and be used by the API client application for mutual authentication. Please see chapter 7.1 for details.

1.3 F7 FIX Gateway

The F7 FIX Gateway provides services to connect Member applications to F7 and offers functionalities equivalent to the existing API.

FIX protocol version 4.4 is supported (only).

For the full F7 FIX documentation and accompanying FIX44.XML file please go to:

<https://membersection.deutsche-boerse.com/>

following this path:

Resources > Eurex Repo > System Documentation > Release x.x > Eurex Repo Trading Interfaces

Prior to usage of the F7 FIX Interface a client certificate must be downloaded from the DBAG Member Section, and it must be installed into the FIX client application (i.e. or made available in a keystore). Chapter 6 of this document describes the steps which need to be performed to do this.

Furthermore, the F7 FIX server authenticates by means of a server certificate (signed by DigiCert). Please see chapter 7.2 for details.

2. Network

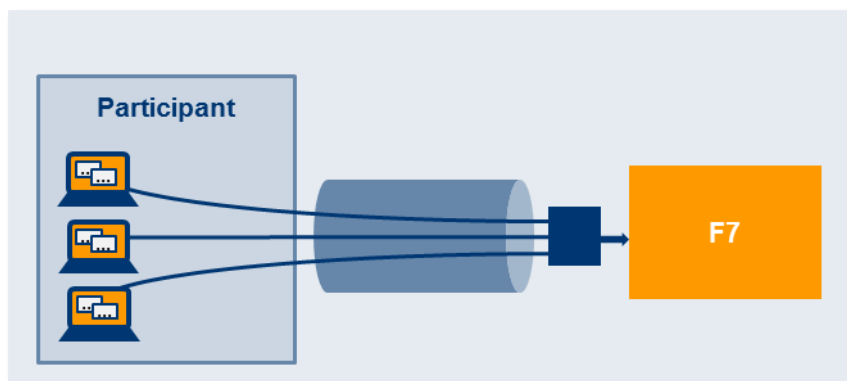
To support the respective F7 services, Deutsche Börse Group has established an efficient infrastructure representing a dedicated global IP network. Access from a participant location to F7 must always be established via the Deutsche Börse Group's IP network or alternatively via the Internet.

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 where participants are concentrated.

This concept allows Deutsche Börse 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.

2.1 Repo Connectivity

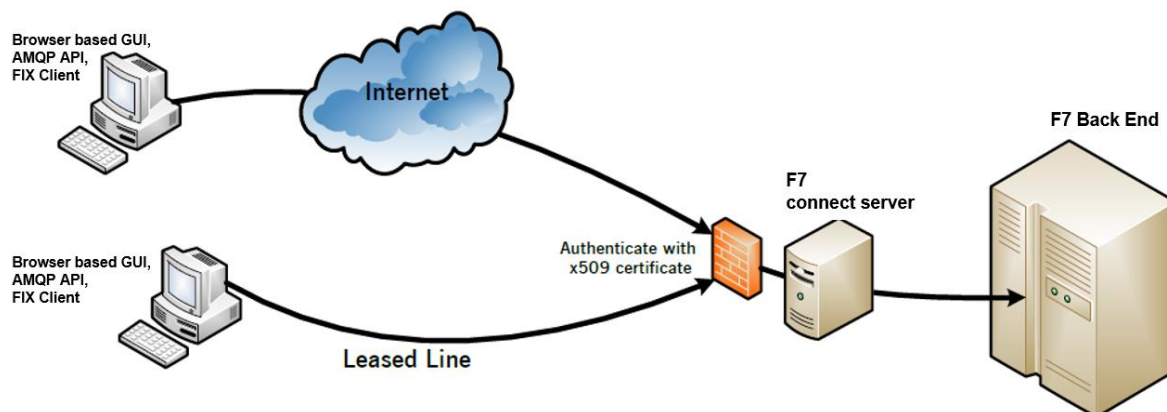
The F7 system minimizes the footprint on the participant's infrastructure. F7 implements a browser-based GUI solution, which requires zero maintenance by the participant.



F7 connectivity concept

The browser-based GUI, the F7 API and the F7 FIX interface can connect to F7 either via leased line or via Internet.

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



F7 connectivity options

2.1.1 Leased Line

All leased line connections must be ordered from Deutsche Börse – directly or via a technical service provider. The Deutsche Börse network is a highly efficient network focused on highest availability by simultaneously providing lowest latency.

F7 Trading participants who already have existing Deutsche Börse network connectivity in place can order a dedicated channel, providing that sufficient bandwidth is available.

As the F7 system connects each individual user directly to the trading platform, bandwidth requirements are directly proportional to the number of active users. Bandwidth consumption per active trader is expected to be around 0.420 Mbit/s. Bandwidth options are offered in the following sizes:

Number of active users	Bandwidth Option
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

F7 bandwidth options for leased lines

2.1.2 Internet

It is possible to use the F7 trading GUI, the F7 API as well as the F7 FIX interface via the Internet. All traffic is secured by use of x.509 certificates for basic authentication and connection encryption.

As F7 connects each individual user of the F7 system directly to the trading platform, bandwidth requirements are directly proportional to the number of active users. Users connecting via Internet should expect:

0.420 Mbit/s bandwidth consumption per active trader

2.2 Connectivity security features

For the connection via Internet, the participant can choose one of the following options:

- Allow Internet access without restrictions (per default)
- Completely disable Internet access and restricting to leased line (x.509 upload page)
- Allow Internet access for registered IP addresses

Details on configuring Internet access security features can be found in chapter 6.4.

Please note: any changes (adding or deleting of data) to these settings will take effect on the next business day.

For the connection via leased line, the incoming IP address is checked against the known network information for the corresponding participant. In case a participant has a Service Provider, the IP address is also checked against the known networks of the Service Provider.

On login via leased line, it is checked if the IP-address of the user is part of the corresponding network.

2.3 Repo F7 service URI/URLs and IP ranges

All connections to F7 (GUI, API and FIX, Leased Line, and Internet) are secured by SSL certificates. All host certificates, officially authenticating the F7 servers, are associated with fully qualified DNS domain name (FQDN) of each service.

As a result, connection URIs need to use the fully qualified domain names (FQDN) for certificate handshake. This holds true for GUI links or bookmarks, as well as API connection URIs.

For security and compatibility reasons, all F7 users are advised to connect only using the FQDN URIs below. IP addresses in the following chapters are listed for completeness and for potential firewall configuration on the client side.

Depending on the browser (version) used for the GUI, the AMQP library used for the F7 API connection, or the FIX library used for F7 FIX it may be possible to still

connect with IP addresses in the URI, but this type of access is no longer recommended.

2.3.1 F7 GUI

The F7 GUI can be accessed via URLs. These URLs differ based on the type of connection (Leased line vs. Internet) and based on the environment (Production vs. Simulation vs. Advanced Simulation). Any of these URLs can be placed in the bookmarks of the user's browser or placed as links on the desktop. Please note use the URI with the fully qualified domain name (FQDN). IP addresses only listed for network reference.

Environment	Type	URL
Simulation	Leased Line	https://simulation.vpn.eurexrepo.com:9443/TRADING_GUI/ (193.29.95.215:9443)
	Internet	https://simulation.eurexrepo.com:9443/TRADING_GUI/ (193.29.90.164:9443)
Advanced Simulation	Leased Line	https://advsimulation.vpn.eurexrepo.com:8443/TRADING_GUI/ (193.29.95.219:8443)
	Internet	https://advsimulation.eurexrepo.com:8443/TRADING_GUI/ (193.29.90.168:8443)
Production	Leased Line	https://production.vpn.eurexrepo.com:8443/TRADING_GUI/ (193.29.95.216:8443)
	Internet	https://production.eurexrepo.com:8443/TRADING_GUI/ (193.29.90.165:8443)

2.3.2 F7 API

The F7 API connection gateways are accessed via AMQP URIs. These URIs differ based on the type of connection (Leased line vs. Internet) and based on the environment (Production vs. Simulation vs. Advanced Simulation). Please note: use the URI with the fully qualified domain name (FQDN). IP addresses only listed for network reference.

Environment	Type	IP Address	Port
Simulation	Leased Line	amqps://simu-f7-api.vpn.eurexrepo.com 193.29.95.217	11575
	Internet	amqps://simu-f7-api.eurexrepo.com 193.29.90.166	11575
Advanced Simulation	Leased Line	amqps://advsimu-f7-api.vpn.eurexrepo.com 193.29.95.220	11975
	Internet	amqps://advsimu-f7-api.eurexrepo.com 193.29.90.169	11975
Production	Leased Line	amqps://prod-f7-api.vpn.eurexrepo.com 193.29.95.218	11475
	Internet	amqps://prod-f7-api.eurexrepo.com 193.29.90.167	11475

2.3.3 F7 FIX

The F7 FIX gateways are accessed via URIs. These URIs differ based on the type of connection (Leased line vs. Internet) and based on the environment (Production vs. Simulation vs. Advanced Simulation). Please note use the URI with the fully qualified domain name (FQDN). IP addresses only listed for network reference. To save IPv4 addresses the same IP address is re-used for all three environments with a given access type (Internet or Leased).

Environment	Type	IP Address	Port
Simulation	Leased Line	simu-f7-fix.vpn.eurexrepo.com 193.29.95.222	11577
	Internet	simu-f7-fix.eurexrepo.com 193.29.90.177	11577
Advanced Simulation	Leased Line	advsimu-f7-fix.vpn.eurexrepo.com 193.29.95.222	11977
	Internet	advsimu-f7-fix.eurexrepo.com 193.29.90.177	11977
Production	Leased Line	prod-f7-fix.vpn.eurexrepo.com 193.29.95.222	11477
	Internet	prod-f7-fix.eurexrepo.com 193.29.90.177	11477

3. Environments

F7 offers the following dedicated environments for customer access:

- Production Production trading, full size resources, “real money”
- Simulation Simulation meant to get acquainted with new functionality. Intended for GUI uses and software developers (API/FIX). Less powerful resources compared to Production.
- Advanced Simulation Dedicated environment for software regression testing. Intended for software developers (API/FIX). Limited resources.

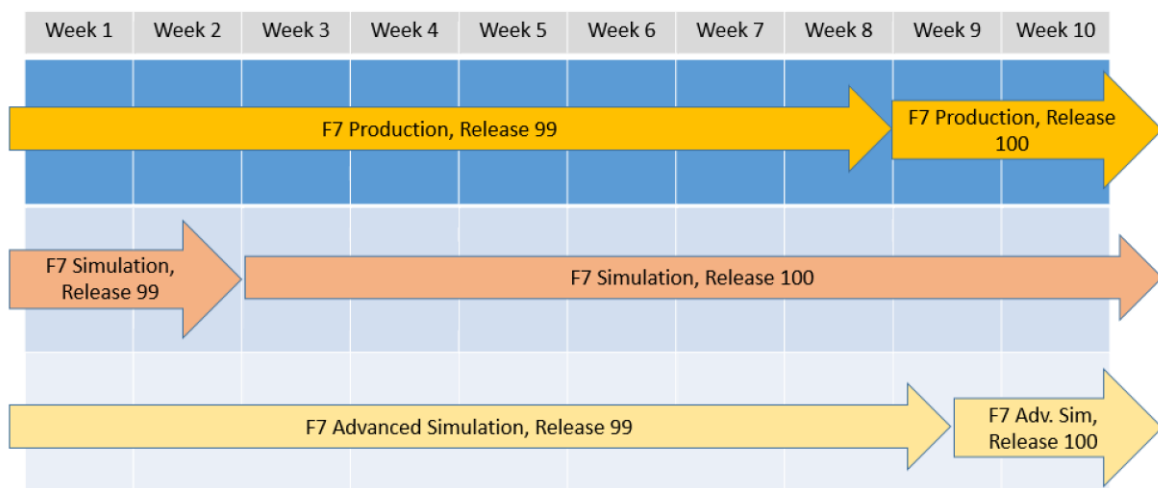
3.1 Release update timeline

When a new software version of F7 is being rolled out, it is installed in the Simulation environment first.

Roughly six weeks later the Production environment is then updated to the new version as well. During these six weeks the Simulation environment is used by software vendors to adjust their software to the new F7 release. At the same time traders can acquaint themselves with new features in the F7 trading GUI.

During these six weeks, while the Simulation environment is already on a new F7 release and the Production environment is still on the previous release, the Advanced Simulation environment becomes a valuable resource for software developers who need to develop or test software which runs on the current production release.

The following diagram depicts a typical F7 release rollout over all three environments for a fictitious update from F7 release 99 to release 100:



Please note, while F7 Advanced Simulation has dedicated network addresses it shares the client x.509 certificates (see chapter 6) with the regular Simulation environment. Any x.509 certificate uploaded for F7 Simulation is automatically valid for F7 Advanced Simulation too.

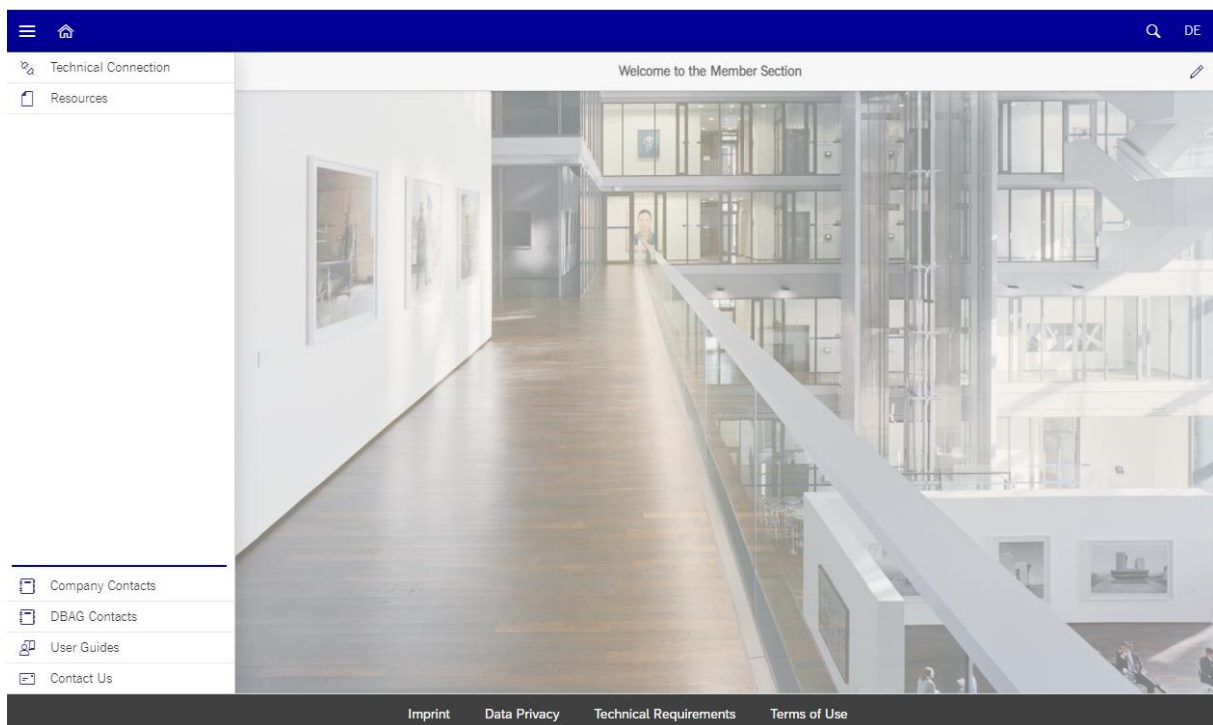
Initial member and user setup for Advanced Simulation is taken from the Simulation environment. After this initial synchronization, both environments will remain independent of each other, and no further member / user synchronization will be done.

4. Member Section

The DBAG member section can be entered via this web address:

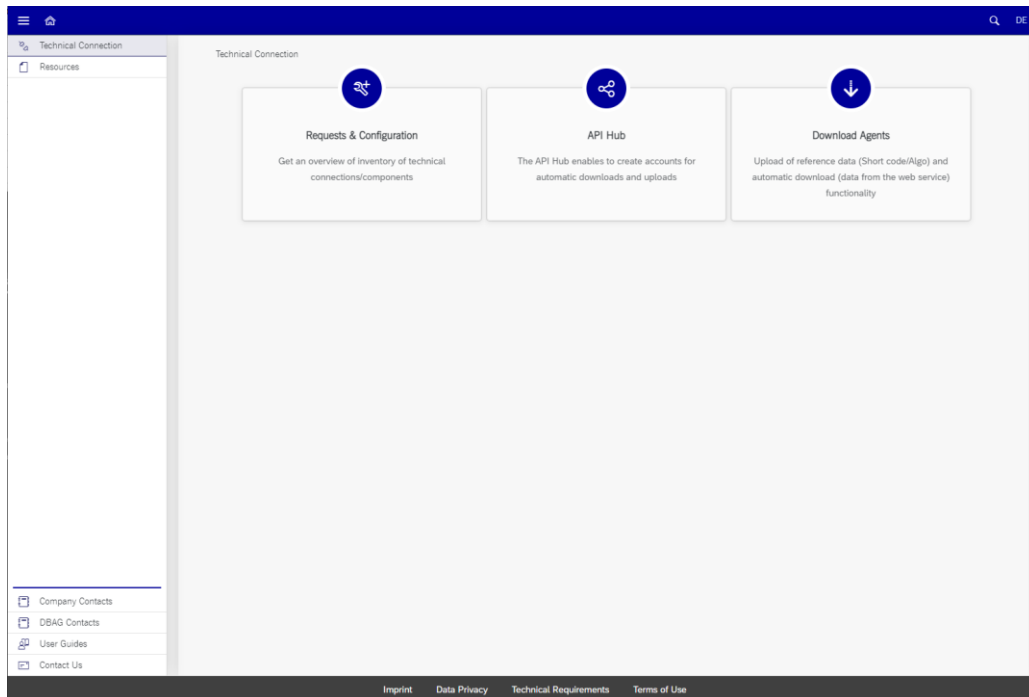
<https://membersection.deutsche-boerse.com/>

Once you have provided login credentials, this leads you to the welcome page of the member section.

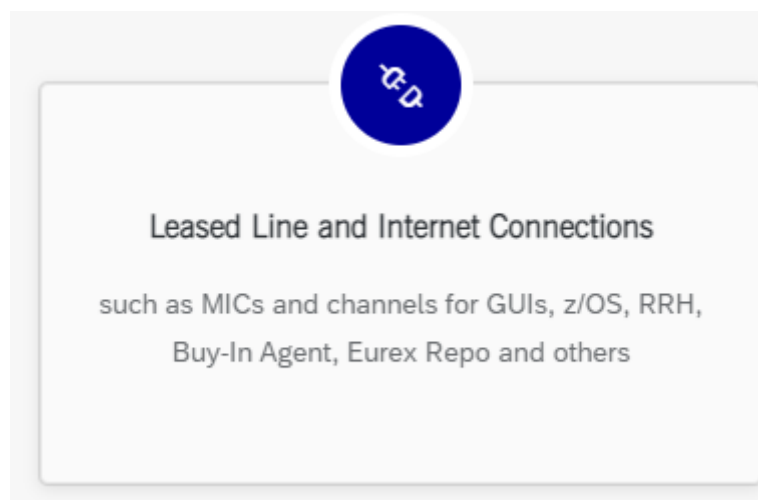


5. Leased Line connectivity ordering

To start the order process press “Technical Connection” and select “Requests & Configuration” from the icons on the page.



Various request options are displayed. Use “Leased Line and Internet Connections” to order new connectivity for F7.



5.1 New connection

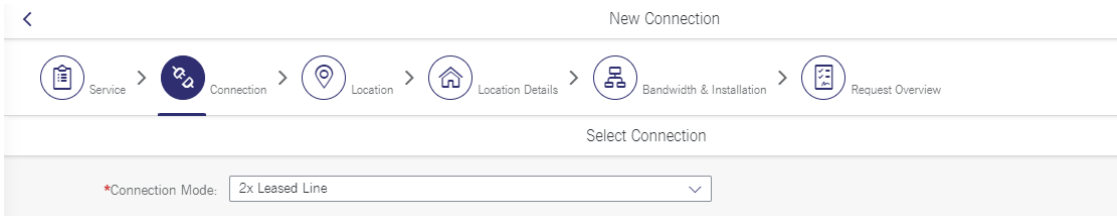
Select the tab “New Request” and then press “New Connection”



You have now entered the connectivity order frame. Select the type of connection to be ordered first, select a member ID and click “Next”:



In the next step the connection is selected (i.e., 1x Leased Line or 2x Leased Line).



In the next step enter the location selection and the selection of the person who is the “Line Responsible”.

< New Connection

Service > Connection > **Location** > Location Details > Bandwidth & Installation > Request Overview

Select Location & Line Responsible

Select Location +

*Location: FRA- Kruppstr. 121-127

Company name: Deutsche Börse AG

Alias: Co-Location Equinix, Kruppstr.

Street / No.: Kruppstr. 121-127

Town: Frankfurt am Main

Zipcode: 60388

Country: Germany

Npa-Nbx:

Different second location?:

Select Line Responsible

*Name:

Phone:

Email:

5.2 Location details

For the location, you can select an existing location or create a new location. The new location creation is self-explanatory.

Street / No.: Kruppstr. 121-127

Town: Frankfurt am Main

Zipcode: 60388

Country: Germany

Npa-Nxx:

Select Room +

*Room:

Part of building:

Floor:

Room no.:

Rack no.:

Rack unit:

Information for installation

*Media: Singlemode fiber

*Interface: 1000Base/LX/LC

*Installation of line within/out of business hours: Only out of business hours

Address for separate cable entry:

5.3 Connection type

The next step is to select desired bandwidth and an existing or new “Installation” to add the new connection to.

New Connection

Service > Connection > Location > Location Details > Bandwidth & Installation > Request Overview

Select Bandwidth & Installation

Service	Business ID	*Bandwidth	*Installation
Eurex Repo F7	GDBRS	5 Mbit/s	New Base 1 / New Inst. 1

5.4 Request summary

In the next step, an overview of the request is shown. By pressing “Add to Request Overview for Approval” your request is then placed in the request overview.



Back Add to Request Overview for Approval

Please review this page thoroughly and add the overall “Line Contact” for this request (typically the person who also will perform the connection test).

6. DBG CA signed client certificates (API, FIX, GUI)

To ensure the highest possible level of security and privacy against eavesdropping, a two-factor authentication is required for every participant. Both parts of the authentication process need to be completed successfully before access to the F7 GUI is granted or an F7 API or F7 FIX application can connect.

The two-factor authentication process involves on the one hand the creation and usage of client SSL certificates to establish and ensure an encrypted connection between the participant and F7. On the other hand, the F7 servers present a server certificate during the SSL handshake. The F7 server certificates are signed by a well-known Certificate Authority. See chapter 7 for more details on the F7 server certificates.

Client certificate authentication is required for both Internet and Leased Line access.

Repo F7 requires client certificates for API, FIX and GUI connections. These can be created in the DBAG Member Section and will automatically be signed by Deutsche Börse's Certificate Authority (CA).

DBAG CA signed client certificates can be used and be revoked immediately without any delay for GUI and FIX. Client certificates for F7 API still require one end-of-day processing to become active.

To obtain a DBAG CA signed client certificate the following steps need to be carried out:

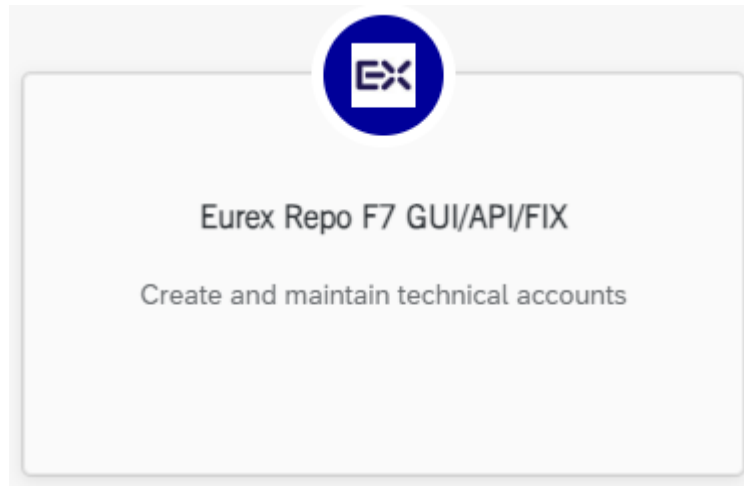
- Create a Repo technical account in the Member Portal
- Attach at least one certificate to the respective technical account using Deutsche Börse's Certificate Generator in the Member Portal.
- Download the certificate for use by the client application (API, or FIX) or web browser (GUI).

The following section provides guidance on how to manage (create or delete) a Repo F7 technical account and how to manage (create, revoke, or delete) the corresponding certificate(s) via the Member Portal.

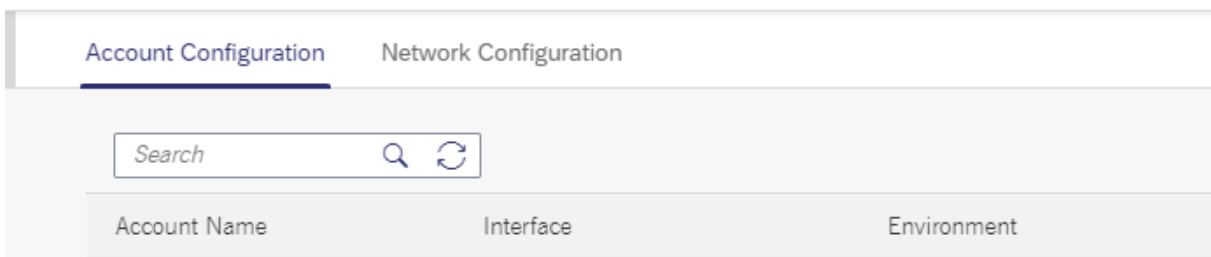
6.1 Creating a new Repo F7 technical account

Before a certificate can be generated and downloaded, it is necessary to first create a new Repo F7 technical account. This is done by logging into the Member Section and navigating to the section.

> *Technical Connection* > *Requests & Configuration* > *Self Service Certificates* > *Repo F7 GUI/API/FIX Certificates*

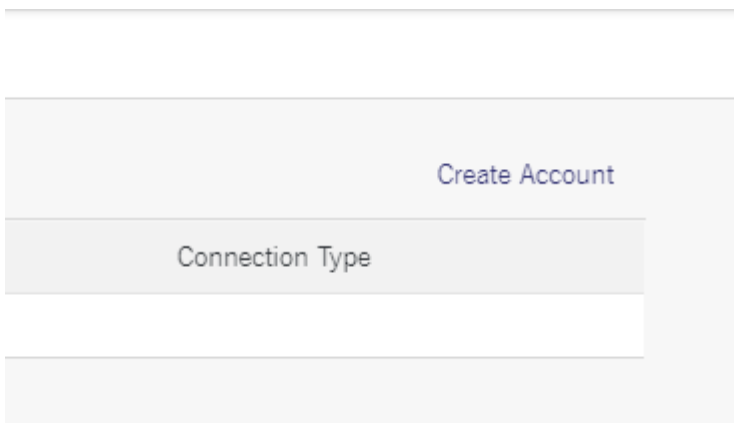


< Eurex Repo F7



Two tabs will be displayed: “Network Configuration” and “Account Configuration”:

Please navigate to the “Account Configuration” tab and click on “Create Account”:



The “Account Configuration” tab will be extended with the mandatory fields to be filled in and a section for the certificate creation.

Please note that an account needs to be saved first before the certificate can be generated and attached to the account.

The account name will be automatically created based on the information in the mandatory fields and will also be used as Common Name (Friendly Name) for the certificate. It will have the following structure:

<Member ID><GUI|API|FIX><S|P><I|L><Free Text> where

S = Simulation, P = Production,

I = Internet and L = Leased Line.

The following fields need to be filled in:

Create Account

The screenshot shows a web form titled "Create Account" with a section for "Account Information". The fields are as follows:

- *Market: Eurex Repo F7 (dropdown)
- *Environment: Simulation (dropdown)
- *Business ID: (empty dropdown)
- *Free Text: (empty text box)
- Max. 12 characters allowed <a -z>, <A-Z>, <0-9> but no blanks.
- *Connection Type: Leased Line (dropdown)
- *Interface: FIX (dropdown)
- Account Name: FIXSL (text box)

Below the fields is a note: "The Account Name will be the combination of <BusinessID> <Interface> <Environment> <Connection Type> <Free Text>. Further information on entry see User Guide in navigation."

At the bottom, there is a "Certificates" section with a table:

Valid From	Valid To	Status	Changed by
No data			

Buttons for "+", "←", and "🗑️" are visible to the right of the table. At the bottom right of the form are "Save" and "Cancel" buttons.

Select the required "Environment" from the drop-down menu (Production/Simulation).

Select the “Business ID” (all member IDs for the given business partner enabled for Eurex Repo F7 will be displayed).


Enter a “Free Text” which helps identifying the account (up to 12 characters).

Select the “Connection Type” (Internet or Leased Line).

Select the “Interface” (“FIX”, “API”, or “GUI”).

Finally, click on “Save”.

In case the selected account name is identical to an existing one, the following error message will appear:

 Account exists already!

If this error occurs, please change the “Free Text” field, and save the account again.

Please note: A valid admission as a Eurex Repo F7 member is required to create a technical account and generate a certificate.

After the account has been successfully saved, the extended tab will be minimized and the newly created technical account will now appear in the list of accounts with the selected information *Account Name*, *Interface*, *Connection Type*, *Market* (automatically set to “Eurex Repo F7”) and *Environment*.

< Eurex Repo F7

Account Configuration		Network Configuration		
Search <input type="text"/>		Create Account		
Account Name	Interface	Environment	Market	Connection Type
GDBRSGUISLMYCERT	GUI	Simulation	Eurex Repo F7	Leased Line >

6.2 Generating a New Certificate

The Repo F7 technical account can be seen as a container holding one or more client certificates of the same type (same Interface, same Environment, same Connection Type).

It is possible to attach several certificates to one Repo F7 technical account and use them in parallel. The uniqueness of a certificate is ensured via its individual serial number.

Attaching several certificates to one account is especially useful if a certificate will soon expire and participants want to extend the usage of an account.

To create or add a certificate to a specific account navigate to the section

> *Technical Connection* > *Requests & Configuration* > *Self Service Certificates* >
Repo F7 GUI/API/FIX certificates

and click on the tab “Account Configuration”.

Click on the respective account name for which a certificate should be created or added.

The “Account Information” tab will then be extended:

Account Information

*Market:

*Environment:

*Business ID:

*Free Text:

Max. 12 characters allowed <a -z>, <A-Z>, <0 - 9> but no blanks.

*Connection Type:

*Interface:

Account Name:

The Account Name will be the combination of
 <BusinessID> <Interface> <Environment>
 <Connection Type> <Free Text>. Further
 information on entry see User Guide in navigation.

Certificates + ↶ 🗑

Valid From	Valid To	Status	Changed by
No data			

Click on “+” sign on top of the “Certificates” list and the generator will open the following new window:

Generate Certificate

Common Name:

Validity:

*Passphrase (min. 8 characters):

*Retype Passphrase:

Choose the validity of the certificate (1 year or 2 years). To ensure security we recommend a validity period of 1 year for certificates. The maximum validity is two years. The creation of a new certificate in good time prior to the end of the validity period is required.

Technical User Administrators, Central Coordinators and the Member Portal user who created the certificate are notified by email about the upcoming expiration.

Enter a passphrase to protect the certificate. It needs to have at least 8 characters.

Re-enter the passphrase.

Click on "Generate".

When pressing the "Generate" button, the tool will generate the public and private keypair, create the certificate, send the certificate signing request to the Deutsche Börse CA, process the response and combine everything inside a PKCS#12-file.

After this successful step, the following status will appear:

Validity:

*Passphrase (min. 8 characters):

Success

The certificate has been created and saved. It will automatically be attached to the account.
The certificate file cannot be restored later. Please store it safely.
The Certificate Generator can be closed.

At the same time the PKCS#12-file is offered for download or automatically downloaded to the location pre-defined by the user.

The certificate will be automatically attached to the Account (independent of whether the PKCS#12-file has been saved or not).

Please note: The PKCS#12-file will only be stored in the location selected by the user. Only the Common Name and the serial number of the certificate will be stored in the Member Section. In case the PKCS#12-file has not been downloaded or has been deleted, the user will have to revoke the respective certificate and create a new one.

To see the newly created and attached certificate, please click again on the respective Account Name.

The Certificates section will show the details of the certificate such as validity (“Valid from” and “Valid to”), the status of the certificate (“active” for newly created certificates) and the name of the person who created the certificate (“Changed by”):

Account Information

Market:

Environment:

Connection Type:

Interface:

Account Name:

Certificates + ↶ 🗑

Valid From	Valid To	Status	Changed by
10/07/2023	10/07/2024	active	...

The unique serial number of the Certificate is displayed when a certificate is selected:

Certificate

Serial Number:	497b29515402cc62b71c14e15049764d82cc3752
Valid From:	10.07.2023
Valid To:	10.07.2024
Common Name:	GDBRSGUISLMYCERT

Cancel

6.3 Revoking and Deleting a Certificate

In case a certificate should no longer be used (e.g., because a certificate has been created by mistake or the PKCS#12-file has not been downloaded), it is mandatory for participants to revoke this certificate via the Member Portal.

To revoke / delete the certificate, please navigate to the section

> *Technical Connection* > *Requests & Configuration* > *Self Service Certificates* >
Repo F7 GUI/API/FIX certificates

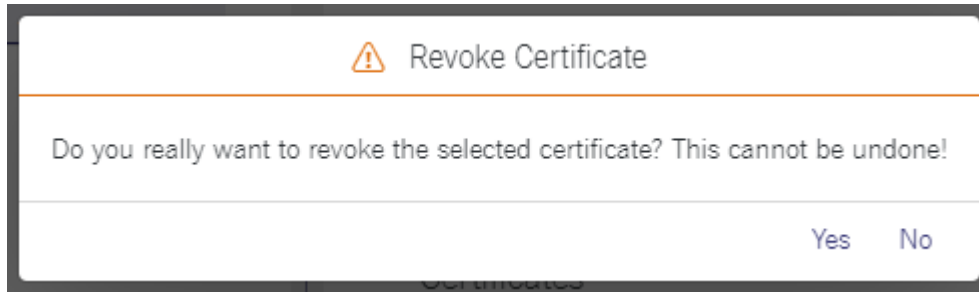
and click on the tab “Account Configuration”.

Click on the respective account name for which a certificate should be revoked.

The “Account Configuration” tab will then be extended with the certificate information (“Valid from”, “Valid to”, “Status” and “Changed by”):

Certificates				+	↶	🗑️
Valid From	Valid To	Status	Changed by			
10/07/2023	10/07/2024	active				↶

Click on the revoke icon and a pop-up will appear asking for confirmation of the revocation



After clicking on “Yes” the revocation request will be sent to the Deutsche Börse CA and the certificate is no longer valid.

The “Status” of the certificate shows “revoked” and the “Changed by” is updated with the person who revoked the certificate:

Certificates				+	↶	🗑️
Valid From	Valid To	Status	Changed by			
10/07/2023	10/07/2024	revoked				↶

Afterwards, the certificate can be deleted from the account by clicking on the trashcan icon and then on “Save”.

Please note: A certificate can only be removed after it has been revoked. Also, a technical account can only be deleted after all attached certificates have been revoked or expired.

6.4 Additional IP Address Check (Internet Access)

By default, any user of the given participant is permitted to access the application from any IP address. If the participant wants to restrict the default access, a list of IP addresses can be entered in the Member Portal in the section

> *Technical Connection* > *Requests & Configuration* > *Self Service Certificates* > *Repo F7 GUI/API/FIX Certificates* > *Network Configuration*

by clicking on “Add Row” and entering all relevant IPs:

< Eurex Repo F7

Account Configuration Network Configuration

Changed by -

Internet Access enabled disabled

Search

Add IP Address

IP Address
No data

Internet Only!
 For internet access per default any user with a certificate of the given Member is permitted to access the application Eurex Repo F7 from any IP address. If no changes will be made, internet access is possible from any IP address.
 Here you can restrict or block the default access. It allows you:
 a) to enable it without restrictions (Internet access: enabled)
 b) to disable internet access altogether (Internet access: disabled)
 c) to enable, but restrict it to those addresses specified in the list below (Add row -> IP address to be entered)

Important:
 Leased line access cannot be restricted or disabled. Please do not enter any IP address from your leased line connections here.

As a result, it will only be possible to access the application from these IP addresses.

Please note: This setting will apply to all Member IDs and all Repo F7 accounts in all three environments (Simulation, Adv.Simulation, and Production) for the given participant.

It is possible to wildcard single octets of the entered IP address by typing the asterisk sign in place of the octet. I.e. **192.168.1.***

Internet access for the given participant can be completely blocked by setting the corresponding radio-button to “*disabled*”.

Information about IP address checks is transferred to the Repo F7 system and activated regularly.

6.5 Certificate Activation, Expiry and Renewal

Newly created certificates are valid and can be used immediately after generation.

In case a certificate approaches expiration, Technical User Administrators, Central Coordinators, and the Member Portal user who created the certificate are notified via email about the upcoming expiration.

A new certificate must be created, saved under a different name, and attached to the existing account. Both certificates can be used in parallel until the earlier one expires.

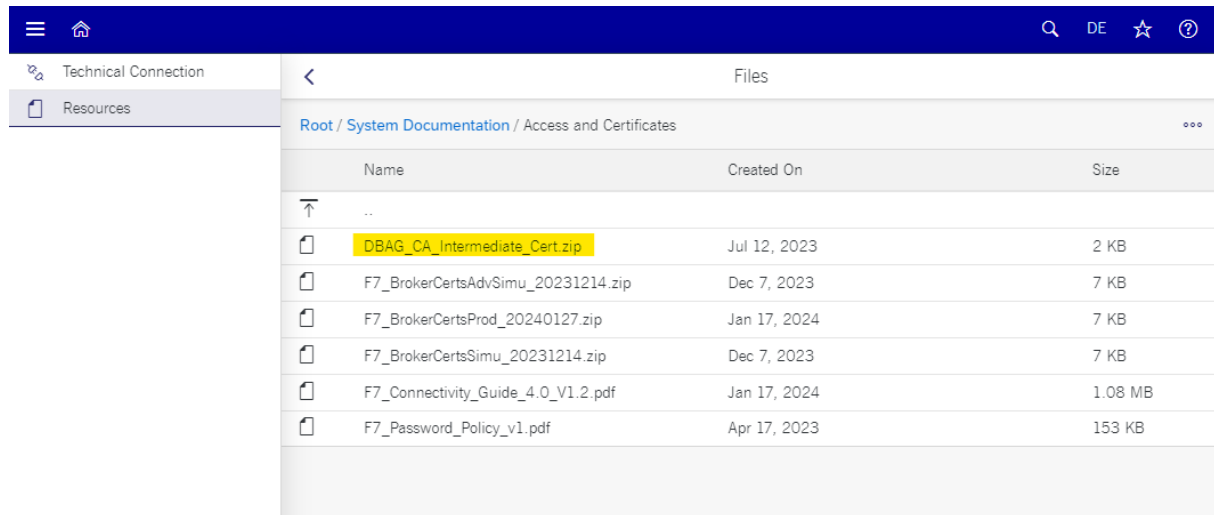
6.6 Usage examples

6.6.1 Browser-based GUI

The DBAG CA signed client certificate downloaded from the DBAG Member Section are in PKCS #12 format and can be imported directly into any web browser.

It is recommended to install the DBAG CA Intermediate certificate along the signed client certificate into the web browser. The DBAG CA Intermediate certificate can be downloaded from the DBAG Member Section following this path:

> Resources > Eurex Repo > System Documentation > Access and Certificates



Name	Created On	Size
..		
DBAG_CA_Intermediate_Cert.zip	Jul 12, 2023	2 KB
F7_BrokerCertsAdvSimu_20231214.zip	Dec 7, 2023	7 KB
F7_BrokerCertsProd_20240127.zip	Jan 17, 2024	7 KB
F7_BrokerCertsSimu_20231214.zip	Dec 7, 2023	7 KB
F7_Connectivity_Guide_4.0_V1.2.pdf	Jan 17, 2024	1.08 MB
F7_Password_Policy_v1.pdf	Apr 17, 2023	153 KB

The file “DBAG_CA_Intermediate_Cert.zip” contains the DBAG CA Intermediate certificate “DeutscheBoerseAGCA.cer” which can be added to the certificates stored in the web browser or operating system.

6.6.2 API or FIX client

In case of an API or FIX client software the downloaded certificate is usually stored in a keystore.

The downloaded client certificates can be converted from its PKCS #12 format and be added to a Java Keystore for example by using this command:

```
keytool -importkeystore -srckeystore ./DOWNLOADED_CERT.p12 -
srcstoretype pkcs12 -destkeystore ./DESIRED_KEYSTORE.jks
```

Where “DOWNLAODED_CERT.p12” has to be replaced with the filename of the downloaded CA signed client certificate and “DESIRED_KEYSTORE.jks” has to be replaced with the filename of the desired keystore.

Depending on the type of keystore requirements of the client applications other keystore formats and conversions may be required.

7. F7 server certificates

7.1 F7 API

The two-factor authentication process involves on the one hand the creation and usage of client SSL certificates to establish and ensure an encrypted connection between the participant and F7.

On the other hand, the F7 servers present a server certificate during the SSL handshake. The F7 server certificates are signed by a well-known Certificate Authority (DigiCert by the time of creation of this document). F7 server certificates are usually refreshed once per year. F7 API client application usually performs a check of the server certificate, although this step is optional. The public keys of the F7 server certificates are available in the DBAG Member Section for download and can be placed in a truststore accessible by the client application.

To download the public keys of the current F7 API server certificates please login to the DBAG Member Section and navigate to:

> *Resources* > *Eurex Repo* > *System Documentation* > *Access and Certificates*

Name	Created On	Size
DBAG_CA_Intermediate_Cert.zip	Jul 12, 2023	2 KB
F7_BrokerCertsAdvSimu_20231214.zip	Dec 7, 2023	7 KB
F7_BrokerCertsProd_20240127.zip	Jan 17, 2024	7 KB
F7_BrokerCertsSimu_20231214.zip	Dec 7, 2023	7 KB
F7_Connectivity_Guide_4_0_V1.2.pdf	Jan 17, 2024	1.08 MB
F7_Password_Policy_v1.pdf	Apr 17, 2023	153 KB

When the F7 API server certificates need to be refreshed Eurex Repo participants are informed by Implementation News (<https://www.eurex.com/en/support/f7/implementation-news>) and by technical information eMail (if registered).

The refresh of the F7 API server certificates is announced with sufficient lead time performed first in F7 Simulation and F7 Advanced Simulation and later in F7 Production.

AMQP client libraries vary in the way the server certificate verification can be configured. The commonly used QPID-JMS library offers two SSL transport options for this:

- transport.trustAll - Whether to trust the provided server certificate implicitly, regardless of any configured trust store. Defaults to false.

- transport.verifyHost - Whether to verify that the hostname being connected to matches with the provided server certificate. Defaults to true.

(<https://qpid.apache.org/releases/qpid-jms-2.5.0/docs/index.html>)

7.2 F7 GUI & FIX

The server certificates used by web servers, like the F7 GUI servers, are usually verified by checking if the server's certificate has been signed by a known and trusted certificate authority (CA).

A list of trusted CAs is usually provided by the client's operating system or browser.

7.3 Trusted Certificate Authority

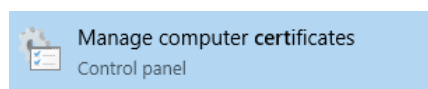
All Eurex Repo F7 server certificates (API, FIX, GUI) are signed by a globally known and trusted CA (DigiCert by the time of writing this document).

Occasionally Certificate Authorities update their own root certificate or their intermediate certificates which are used to sign the distributed certificates. For example, DigiCert started signing new certificates with new root and intermediate CA certificates in March 2023:

<https://knowledge.digicert.com/generalinformation/digicert-root-and-intermediate-ca-certificate-updates-2023.html>

As the certificates used by the well-known and trusted CAs are published regularly in various forms (i.e., part of Operating System update), the G2 and even G5 versions of the DigiCert root and intermediate certificates have been published long ago.

To verify the current presence of trusted CA certificates on a MS Windows computer open the Certificate Manager in the Control Panel:



(search for “certificates” in Windows Search)

Verify the entries in “Trusted Root Certification Authorities” > “Certificates”:

Issued To	Issued By	Expiration Date	Intended Purposes	Friendly Name	Status
AAA Certificate Services	AAA Certificate Services	12/31/2028	Client Authentication, Cod...	Sectigo (AAA)	R
AddTrust External CA Root	AddTrust External CA Root	5/30/2020	Client Authentication, Cod...	Sectigo (AddTrust)	R
Baltimore CyberTrust Root	Baltimore CyberTrust Root	5/12/2025	Client Authentication, Cod...	DigiCert Baltimore ...	R
Certum CA	Certum CA	6/11/2027	Client Authentication, Cod...	Certum	R
Certum Trusted Network CA	Certum Trusted Network CA	12/31/2029	Client Authentication, Cod...	Certum Trusted Net...	R
Class 3 Public Primary Certification Authority	Class 3 Public Primary Certificatio...	8/1/2028	Client Authentication, Cod...	VeriSign Class 3 Pu...	R
COMODO RSA Certification Authority	COMODO RSA Certification Autho...	1/18/2038	Client Authentication, Cod...	Sectigo (formerly C...	R
Copyright (c) 1997 Microsoft Corp.	Copyright (c) 1997 Microsoft Corp.	12/30/1999	Time Stamping	Microsoft Timesta...	R
Deutsche Boerse Group Root CA	Deutsche Boerse Group Root CA	4/21/2040	<All>	<None>	R
DigiCert Assured ID Root CA	DigiCert Assured ID Root CA	11/10/2031	Client Authentication, Cod...	DigiCert	R
DigiCert Global Root CA	DigiCert Global Root CA	11/10/2031	Client Authentication, Cod...	DigiCert	R
DigiCert Global Root G2	DigiCert Global Root G2	1/15/2038	Client Authentication, Cod...	DigiCert Global Roo...	R
DigiCert Global Root G3	DigiCert Global Root G3	1/15/2038	Client Authentication, Cod...	DigiCert Global Roo...	R
DigiCert High Assurance EV Root CA	DigiCert High Assurance EV Root ...	11/10/2031	Client Authentication, Cod...	DigiCert	R
DigiCert Trusted Root G4	DigiCert Trusted Root G4	1/15/2038	Client Authentication, Cod...	DigiCert Trusted Ro...	R
DST Root CA X3	DST Root CA X3	9/30/2021	Client Authentication, Doc...	DST Root CA X3	R
Entrust Root Certification Authority	Entrust Root Certification Authority	11/27/2026	Client Authentication, Cod...	Entrust	R
Entrust Root Certification Authority - G2	Entrust Root Certification Authori...	12/7/2030	Client Authentication, Cod...	Entrust.net	R
GlobalSign	GlobalSign	3/18/2029	Client Authentication, Cod...	GlobalSign Root CA...	R

To verify the certificate used by Repo F7 issued after March 2023, please make sure that at least the “G2” version of “DigiCert global Root” certificate is present on the client computer.

8. Further information and contacts

Eurex Repo's web page www.eurex.com is the central source for all relevant information of Eurex Repo F7. General information and FAQs can be found at: www.eurex.com > *Support* > *F7 Trading System*.

Further information will be available in the Eurex Repo Member Section:

Updated F7 system documentation is available at:

<https://membersection.deutsche-boerse.com/>

> *Resources* > *Eurex Repo* > *System documentation* > *Release x.x*

To order connectivity or upload GUI and API certificates please refer to the DBAG Member Section "Requests & Configuration"

<https://membersection.deutsche-boerse.com/>

> *Technical Connection* > *Technical User Administration* > *Eurex Repo Certificates*

For most up-to-date information, please check our Implementation News at:

<https://www.eurex.com/ex-en/technology/f7/implementation-news>

> *Support* > *F7 Trading System* > *Implementation News*

Please do not hesitate to contact us in case of any questions.

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9. Change Log

Version	Chapter, page	Date	Changes
1.0	all	9-Aug-2014	Initial publication
2.0.0	5.	07-Jun-2016	Improved chapters describing x.509 certificate creation
3.0.0	All	25-Jul-2018	Updated for F7 3.0
1	6	17-Nov-2023	Updated for F7 4.0 Added remark about client certificates for API still needing one end-of-day processing
1.2	8.3	17-Jan-2024	Added chapter 8.3 to illustrate the role of Certificate Authorities on F7 connectivity
2	6, 8	29-Feb-2024	Updated Member Section screenshots for F7 4.1
2.1	1.3	12-Jun-2024	Removed an erroneous reference to the FIX gateway server certificates being available for download.
3	1.1, 7	3-Sep-2024	Updated for F7 4.2, removed references to deprecated self-signed client certificates.
4	1.1.1, 1.1.2	21-Oct-2024	Added dedicated sub-chapter for TLS 1.3 support and for Hybridized Kyber Support with the F7 GUI

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