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ClearstreamXact

Security Guide

August 2020

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Security Guide

ClearstreamXact is a suite of connectivity products that gives Clearstream customers real-time access to enhanced information, instruction input, transaction and position reporting.

ClearstreamXact offers secure multi-channel connectivity to Clearstream with a choice of connection via web-browser, file transfer and the SWIFT network. Whatever your operating or technical environment, ClearstreamXact provides seamless, direct access, giving you adaptable connectivity for your growing business.

About this guide

The purpose of this guide is to assist ClearstreamXact customer technical staff to understand the security details with regard to the different options for connectivity.

This guide is organised into chapters dedicated to the individual connectivity channels, as follows:

- "1. Xact Web Portal" on page 1-1;
- "2. Xact File Transfer via Internet" on page 2-1.

Each chapter may be further subdivided into areas of general and/or specific subject matter within the respective channel.

Note: For details of the SWIFT network, please refer to SWIFT's proprietary documentation.

Contact details

For technical assistance with ClearstreamXact, please contact Customer Service Connectivity Support as follows:

	Luxembourg	Frankfurt	London
Tel:	+352-243-38110	+49-(0) 69-2 11-1 15 90	+44-(0)20-786 27100
Fax:	+352-243-638110	+49-(0) 69-2 11-6 1 15 90	+44 (0) 20-786 27254
Email:	connectlux@clearstream.com	connectfrankfurt@clearstream.com	connectlondon@clearstream.com

You can also consult our website www.clearstream.com under Products and Services/Connectivity for the latest information on ClearstreamXact.

Before contacting Clearstream Banking, please ensure that you have the following information to hand:

- Your organisation name and account number with Clearstream Banking.
- Your telephone number, fax number and email address.
- Details of the problem (please have full details available).
- If you have received an error message, full details of the error, with the error message number.

Customers should note that, as is normal practice within financial organisations, Clearstream Banking has implemented telephone line recording to ensure that the interests of Clearstream Banking and of its customers are protected against misunderstandings or miscommunications.

Areas subject to telephone line recording include Client Services, the Treasury Dealing Room and back office operations. The recorded lines are the subject of an ongoing formal maintenance and quality control programme to ensure their continued effective and appropriate deployment and operation.

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1. Xact Web Portal

The Xact Web Portal is the interface for the Clearstream Banking online platform to access instruction input, query, reporting and exception handling services.

The application and all associated data is hosted in Luxembourg, Europe.

It is under the oversight of the Commission de Surveillance du Secteur Financier (CSSF -www.cssf.lu), the Luxembourg financial regulator.

Registration and initial administrator activation

Please refer to the Xact Web Portal User Manual.

Certificate import and user login

Please refer to the Xact Web Portal User Manual.

User credentials

Each Xact Web Portal user has the following personal credentials:

- a user password.
- an SSL certificate, to authenticate to the Xact Web Portal web server
- a SIGNING certificate, to digitally sign operations and transactions when working in Xact Web Portal

The two certificates are issued by Clearstream Banking's Certification Authority (CA) and certify the two private keys that users generate on their local PC.

Certificate storage for WebCrypto / IndexedDB

If you work with WebCrypto, your certificates and private keys are safely stored in your browsers IndexedDB. This database is only accessible by xact.clearstream.com and the keys cannot be extracted.

Note: Microsoft Internet Explorer 11 is known to not synchronise and therefore loses the IndexedDB when profile roaming is active. As a result, the backup P12 file must be re-imported after each login.

Clearstream Banking recommends using Google Chrome or Mozilla Firefox.

Certificate storage for SConnect / smartcards

If you work with smartcards, the certificates are stored on the smartcard and a copy without the private key is copied by the smartcard middleware to your Windows Keystore. These copies are automatically removed when you unplug the software.

The supported smartcard readers are:

- Athena ASEdrive (IIIe or V3 USB)

  If the driver is not installed automatically by Windows you can download it manually from:

  http://www.nxp.com/assets/downloads/data/en/device-drivers/v4101_KMDF_driver.zip

- Gemalto IDBridge CT40

  If the driver is not installed automatically by Windows you can download it manually from:

  https://supportportal.gemalto.com/csm/?id=csm_product&sys_id=04303b92db852e00d298728dae96198b&table=sn_customerservice_product_name

The supported smartcards are:

- Safenet etoken 4100
- Gemalto IDCore 30b

Note: Smartcards are mandated by some local regulators.

Certificate storage for Java Applets / Windows Keystore (Legacy login)

The certificates and keys are stored in the user's personal Windows Keystore, which is part of the user's Windows profile. In a corporate environment the Windows profile is usually stored on a central server and during the Windows login the profile is copied to the local PC. At logoff, the Windows profile is copied back to the central server. Therefore, it is important that after you generate new certificates in the Windows Keystore (using Xact Web Portal) you properly logoff your current Windows session so that the updated Windows Keystore is properly stored on the central server when logging off.

You can view the content of your Windows Keystore either via:

- Internet Explorer / Tools / Content / Certificates / User certificates
- Microsoft Management Console / Snap-in Certificates
- On the Xact Web Portal support page / Browser certificate list

Certificates

The certificates received from Clearstream or from the OU Administrator are always temporary certificates, this means they are:

- Only valid for six (6) weeks
- Must be regenerated upon login

When the temporary certificates are regenerated by the user, permanent certificates are received that are valid for two (2) years.

All digital certificates have an expiry date. Before the expiry date is reached the user will be prompted at login to regenerate the certificates, and the new certificates will have an expiry date of two (2) years in the future.

If the certificates are not regenerated before the expiry date the user cannot use the certificates anymore and must contact the OU Administrator to receive new certificates.

Password expiry

The password of the user expires according to the password rules defined in the Xact Web Portal OU properties of the user. When the password has or is going to expire users are prompted at login to change their user password.

Password attempts / blocked

After 10 wrong password attempts, the user's password is blocked and the OU Administrator has to reset the password.

Network

Via Internet the Xact Web Portal is available at https://xact.clearstream.com.

The IP address is 194.36.230.129 and the only port used is 443 (the regular SSL port).

The Xact Web Portal web server supports TLS 1.2.

The traffic is regular https and you can use a network proxy server however as the traffic is two-way SSL the proxy must not try to terminate or intercept the SSL connection as this will break the connection.

Instead or in addition to Internet you can connect via VPN leased line. For this a Deutsche Börse Router will be installed on your premises which connects you to the Extranet of Deutsche Börse.

Via VPN, Xact Web Portal is available at: https://xact.clearstream.banking.

You can request an offer for this service from Clearstream Banking Client Services or your Relationship Manager.

OU security settings

OU properties

Service name	Property name	Category	Propagation	Updatable by	Value
User Management	Minimum Password Length	Password	OU	Only Support & Entity Admin Users	8 characters
User Management	Minimum Password Complexity	Password	OU	Only Support & Entity Admin Users	3 of 4 constraints
User Management	Maximum Password Validity Period	Password	OU	All Types of Admin Users	3 months
User Management	Minimum Password History Length	Password	OU	All Types of Admin Users	12 passwords
User Management	Maximum Session Time	Re-authentication	OU	All Types of Admin Users	60 minutes
User Management	Risk Based Re-Authentication	Re-authentication	OU	Only Support & Entity Admin Users	OFF
User Management	Smart Card	Credentials Types	User	All Types of Admin Users	Allowed
User Management	Windows Key Store	Credentials Types	User	All Types of Admin Users	Allowed
User Management	User Mgt N-Eyes Principle	N-Eyes	User	All Types of Admin Users	4 eyes

There are a number of configurable security settings on the Organisation Unit level.

1. Minimum Password Length
   the minimum number of characters a user password must have.

   Possible values:

   - 8 characters
   - 10 characters
   - 12 characters
   - 16 characters
   - 24 characters
   - 35 characters

2. Minimum Password Complexity
   The number of character categories from which a user password must be composed, categories are: lower case; upper case; numbers and special characters.

   Allowed values are:

   - 3 of 4 constraints
   - 4 of 4 constraints

3. Maximum Password Validity Period
   This time is used to calculate how long before users have to change their password.

   Allowed values are:

   - 1 month
   - 2 months
   - 3 months
   - 6 months
   - 9 months
   - 12 months

4. Minimum Password History Length
   This is the number of previous passwords that users cannot reuse when changing their user password.

   Allowed values are:

   - 1 password
   - 3 passwords
   - 5 passwords
   - 10 passwords
   - 12 passwords
   - 15 passwords
   - 20 passwords
   - 24 passwords

5. Maximum Session Time (screenlock)
   This is the time of inactivity after which users are taken back to the login screen to enter their user password to get back into the Xact Web Portal.

   Allowed values are:

   - 5 minutes
   - 10 minutes
   - 20 minutes
   - 40 minutes
   - 60 minutes

6. Risk Based Re-Authentication
   If this setting is ON, users must re-enter their user password when performing sensitive operations, for example, releasing an instructions.

   - ON
   - OFF

7. Smart Card
   If this setting is Allowed, users are allowed to store their Xact Web Portal user certificates on a smartcard.

   Allowed values are:

   - Allowed
   - Not Allowed

8. Windows Key Store
   If this setting is Allowed, users are allowed to store their Xact Web Portal user certificates in the Windows Keystore (or Firefox keystore). If this setting is Not Allowed users must use a smartcard.

   Allowed values are:

   - Allowed
   - Not Allowed

9. User Mgt N-eyes principle
   If this setting is 4-eyes then all actions in User Management must be confirmed by a second user before they become active.

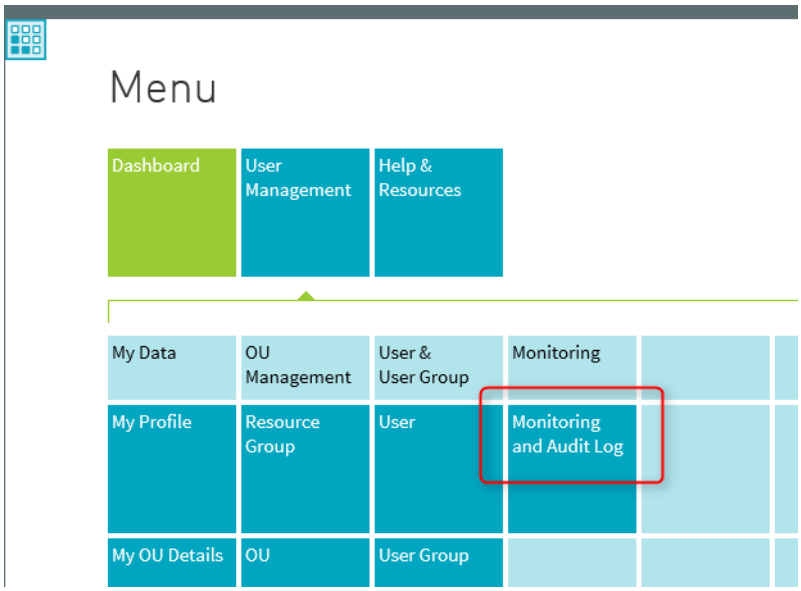
   Allowed values are:

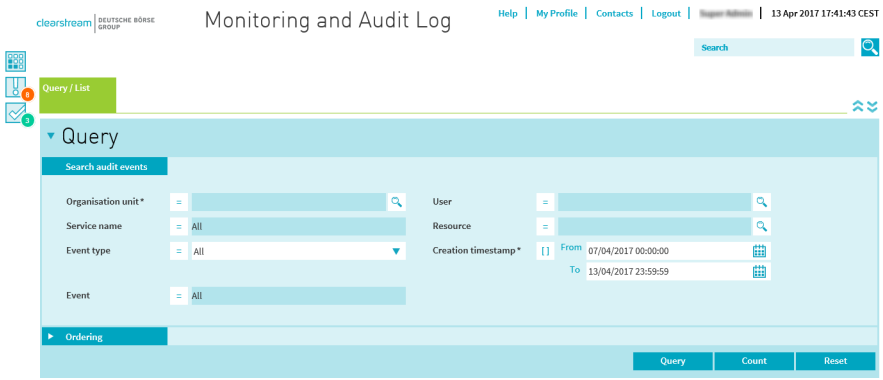
   - 2-eyes
   - 4-eyes

   There is a separate N-eyes principle property available for each business service subdomain, for example, Securities Instructions, Cash Instructions, so that you can choose a different eyes level per business service.

Audit log

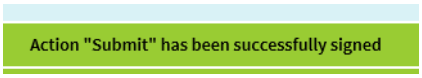
All actions taken by users in the OU are audited and stored in the Monitoring and Audit Log of the OU. The OU Administrator can access the Audit Log via Xact Web Portal and query the recorded audit events.





Digital signatures

When submitting instructions to Clearstream the instruction data is digitally signed (SHA512) with the private key of your user certificate and the signature is submitted to Clearstream. There your signature is verified and if accepted you will see the following message:



The signature is stored with the instruction for audit purposes.

Additional client-side recommended security measures

It is the user's responsibility to ensure that:

- the Operating System and other software installed is up-to-date and receives the regular security updates;
- they are not logged-in with the administrator account;
- an anti-virus scanner is running on the PC and anti-virus signatures are updated regularly;
- no software received from unknown sources or via email is installed.

Penetration test reports

The security of the Xact Web Portal application is regularly reviewed by an external security company and the resulting penetration test reports are available on request.

Data encryption

For data in transit a TLS session is established between the browser and web server. All messages pass over this encrypted session. Commercial strength 256-bit keys are used for the encrypted session and no ability to negotiate weak keys is possible.

Data at rest is stored in the application database which is encrypted. In addition it is protected by the highest level of physical security and access to the database is restricted to only a limited number of Clearstream Banking staff who are subject to strict confidentiality agreements.

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2. Xact File Transfer via Internet

Xact File Transfer via Internet is a workstation-based file transfer service that provides you with an easy to use and efficient means of sending instructions and retrieving reports.

Instruction files are sent via the dedicated web site https:// www.cdinternet.com to Clearstream Banking where they are stored in a customer-specific area (the "filestore"). They are then immediately transferred to the Creation platform for clearing and settlement. Reports generated by the Creation platform are stored in the filestore from where you can browse them or save them locally.

Xact File Transfer via Internet is an efficient, secure and reliable file transfer connectivity solution. When used with CreationOnline or Xact Web Portal, it gives you the benefits of enhanced instruction life cycle monitoring, on-line queries, exception handling and large-volume reporting providing accurate, real-time information on the status of any instruction at any time.

The key objective of the Xact File Transfer via Internet service is to provide a file transfer service to your desktop. By using the Secure Sockets Layer (SSL) over the secure HyperText Transfer Protocol (HTTPS) or secure File Transfer Protocol (FTPs) (RFC 2228), Xact File Transfer via Internet is a highly secure service that is accessible from your desktop, provided that you have access to the public internet from a web browser.

Certificates to access the application are x509v3 128-bit SSL certificates generated by the CreationOnline application and stored on the user's Internet Explorer profile.

Integrating with firewalls

Xact File Transfer via Internet is implemented using internet technologies. It is therefore highly recommended that customers using Xact File Transfer via Internet protect their interior networks from the outside world using a Firewall architecture.

In order to run Xact File Transfer via Internet through a firewall, the following protocols need to be allowed to traverse the firewall:

If HTTP protocol is used

- HTTPS uses TCP port 443 for the initial web site connection and for the interaction with the application. A 128-bit key size is used in the encryption algorithm.

if FTP protocol is used

- FTP uses TCP port 21 for control;
- FTP uses TCP port 54000 to 55000 for data connection.

if SFTP (SecureSSH) protocol is used

- SFTP uses TCP port 22 for control and data transfer.

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Contact

www.clearstream.com

Published by

Clearstream Banking Luxembourg

Registered address
Clearstream Banking SA
42, Avenue JF Kennedy
L-1855 Luxembourg

Postal address
Clearstream Banking
L-2967 Luxembourg

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