
Technical Description Euroclear Finland

Appendix 1

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1. Introduction

A participant must be technically connected to the systems of Euroclear Finland in accordance with the terms for technical communication as described in section “1.5 Access to the Systems” of the Rules of the Finnish Central Securities Depository Ltd and the decisions made by Euroclear Finland Managing Director.

The clearing parties and account operators that do not have this technical connection shall appoint a third party with the same membership status (clearing party or account operator) to handle communication with Euroclear Finland. However, this requirement as such is not applied to an account operator having issuer agent operations only.

NCSN Network enables a participant to access both Euroclear Finland and Euroclear Sweden through a single network connection.

This document describes the technical options and the process when affiliating to Euroclear Finland and specifies the information Euroclear Finland requires from an applicant. Euroclear Finland currently has separate systems for the equity and the money market. The technical options offered by the money market system are distinct and limited compared to the equity market system. Therefore they are presented in a separate chapter.

When an existing participant makes any major change in its backend system or its connection to Euroclear Finland, the principles of this document shall be superimposed.

2. Technical options

Euroclear Finland offers different technical options. Before the actual IT process can be initialized, an applicant must evaluate these options. This chapter describes the different possibilities.

Euroclear Finland has two technically different and independent Central Security Depository systems, one for equity market instruments (“OM system”) and another for money market instruments (“RM system”). The following chapters (2.1 – 2.3) describe the technical options for the OM system. The RM system is covered in chapter 2.4.

2.1. Service options

2.1.1. Euroclear Finland Services

Euroclear Finland provides the following main services for equity market clearing parties, account operators and issuer agents:

- Register services
- Equity market clearing and settlement
- Issuer agent services
- Cross-border equity market links

These services are essentially produced by three separate systems that are part of the OM system:

- HEXClear clearing and settlement system with web user interface and MQ Series system interface
- Central Register depository system with MQ Series system interface
- FUD generic file upload/download system for file transfers through web user interface or MQ Series system interface

2.1.2. Euroclear Sweden Services

Participants connected to Euroclear Finland via the NCSN Network have the possibility to communicate with Euroclear Sweden via the connection to Euroclear Finland. The participant must request Euroclear Finland to set up a connection for the participant to Euroclear Sweden. For more information, please contact Euroclear Finland Customer Support [9].

2.1.3. NCS D Exchange Gateway

For clearing parties in the OM system, the participants' NasdaqOMX Nordic Exchange Helsinki trades are directly routed to HEXClear or CCP. The automated and direct routing increases the participant's potential for STP. The service is free of charge.

2.1.4. User administration

All Euroclear Finland applications are protected against unauthorized use. Therefore all users of the applications must have valid user identification codes and passwords. This applies also to the MQ Series system interface.

The participant manages HEXClear end user identification codes and passwords internally.

2.2. Network options

Euroclear Finland services are available via following methods based on participants needs:

- 1) NCS D Network connection
- 2) Internet connection

Internet connection is allowed only for HEXClear user interface test connections, MQ Series system interface backup connections and the file reporting services for issuer agents.

The Clearing Parties and Account Operators shall use the NCS D Network connection. However, this is not applied as such to an account operator having issuer agent operations only.

The Internet connections are secured by SSL encryption.

These options are illustrated below.

Euroclear Finland sets the bandwidth with the participant according to the volume information indicated by the applicant.

The current options are:

- 256 kbps
- 512 kbps
- 1 Mbps
- 2 Mbps

For HEXClear connections, 512 kbps is the recommended minimum.

2.2.2. Change of capacity

If the originally ordered bandwidth of the network connection does not match the actual need, the bandwidth may be increased (or decreased). In that case the participant must contact to the appropriate contact according to the following table.

Network	Contact point
NCSD Network	Euroclear Finland customer.support@euroclear.eu
Internet	Internet operator

The change may be started by the participant. Euroclear Finland has the right to require a capacity upgrade if the participant's volumes increase.

The approximate time period from the date of order to implementation differs from 1 to 4 weeks.

2.3. Access methods

A clearing party uses the following three access methods:

- Web user interface (HEXClear)
- MQ Series system interface (HEXClear)
- File interface (FUD)

An account operator has only one access method available:

- MQ Series system interface (Central Register)

An issuer agent has two access methods available:

- MQ Series system interface (Central Register for the on-line reporting and the routing of subscriptions)
- File interface (FUD for the file reporting)

As a backup in case the normal MQ connection is disconnected, all participants utilizing MQ Series have to be able to use alternative ways to process messages as files.

- Via Internet through FUD service
- Manually in CD disks

2.3.1. Web user interface

The HEXClear user interface is a web browser application. In order to attach this interface the following requirements have to be met:

- The browser must be Internet Explorer version 5.0 or later.
- 128 bit SSL encryption support has to be enabled.
- HTTPS protocol has to be allowed from the browser to the network and vice versa.
- The browser has to be configured to accept JavaScript, cookies and file transfers. A client component support (such as ActiveX or client Java) does not need to be enabled.
- The display setup is recommended to be at least 1024*768 pixels with 256 colours.

No user interface is available for the Central Register.

2.3.2. MQ Series system interface

Euroclear Finland delivers its application-to-application level services to the participants through specific middleware technology utilizing the message queue product family of IBM WebSphere MQ (“MQ”).

Messaging system interface is available both for the HEXClear system and for the Central Register.

In order to attach the MQ series system interface the following requirements must be met:

- The applicant must have MQ server environment (not MQ client). A common MQ server may be applied for all Euroclear Finland applications but the MQ channels have to be separated.
- The applicant must have its own interface software (application) for processing messages to and from Euroclear Finland.
- The applicant is responsible for arranging proper operation and maintenance of its MQ Series server and interface software.
- The MQ Series has to be at least version level 5.3.
- All messages sent to Euroclear Finland and received from Euroclear Finland must be written into a log file and saved for at least 1 month [6] (production only).
- SSL with certificates is applied for encryption, integrity checking and authentication. The applicant has to acquire a certificate from a reliable certificate authority (CA) for its queue manager connected to Euroclear Finland. It is important to note that certificates will expire after a certain period of time. In the test environment Euroclear Finland may act as a certificate authority.

All HEXClear messages are XML formatted with proprietary namespace. Central Register interface involves proprietary fixed format messages and a few ISO 15022 messages.

Euroclear Finland has implemented an ISO 15022 interface for the HEXClear system in 2007.

More detailed description of the MQ Series environment and related requirements are presented in the references [2, 4, 5].

2.3.3. File interface

Euroclear Finland's generic file transfer service is based on the so called File Upload/Download (FUD) system. The participants may download files (e.g. reports) by using FUD web user interface or MQ Series system interface.

The HEXClear reports and other files are delivered through FUD system. Most of the reports are available in XML format and some also in printable PDF format.

The FUD web user interface is integrated to HEXClear web user interface but may also be utilised independently.

The Central Register does not involve file transfers via FUD (except as a backup – see next section 2.3.4). However, file reports for issuer agents are delivered through FUD system.

2.3.4. Backup

As a backup, in case if the normal NCSD Network MQ connection is disconnected, the participant must be able to utilize FUD (via Internet) and CD disks as alternative ways to deliver the MQ Series messages. This applies both for the clearing parties and the account operators.

The backup process involves special software (MQDUMP) to pick up the messages from queues and write them into file. This file may be delivered to Euroclear Finland either via the FUD system or by CD disk. The response messages are delivered in a similar manner. The process is quite complicated and needs to be practiced regularly.

A participant needs a special user id for using the FUD service as a backup. HEXClear and Central Register backups require separate authorizations. Please contact Euroclear Finland Customer Support for further information.

2.4. Money market system (RM system)

The RM system is a full-featured CSD system for the Finnish money market. However it is completely isolated from the OM system.

Service options

All RM services are integrated into one system involving mainframe class central computer and client workstations. The RM participants have one or more dedicated RM workstations.

Trades are entered into the RM system manually through client workstations.

The user administration practices are quite similar in the RM and OM systems but without mutual interaction. The participant manages RM end user identification codes and passwords internally.

RM services are available through NCSD Network.

Interface options

The RM system is an integrated client-server system. The participant has access to the RM system by graphical user interface which includes three Windows applications:

- a) Basic CSD services
- b) Reporting interface
- c) Position follow-up interface

The reporting interface enables file downloads from Euroclear Finland's central system to client workstations. There are no application-to-application connectivity options available.

The RM client application sets the following requirements for the workstation:

- Software:
 - o Windows XP with SP2 or later
 - o RSC Client for Windows
 - o Ramses application
- Hardware:
 - o x86 with at least 512 MHz CPU
 - o RAM at least 512 MB
 - o Free disk space at least 100 MB
 - o Display resolution: 1024 x 768

Software (except OS) is installed by an installation package. The client application is available in Finnish (default) and in English (by request). The RM workstations shall be dedicated for this purpose only.

3. IT process

The process starts in connection with the applicant's filling of the application to become a participant of Euroclear Finland. The technical contact person will be named by Euroclear Finland.

The following diagram describes the IT process at a high level with the following phases:

1. Initialization of the IT process
2. Establishing test connection(s) between the applicant and Euroclear
3. Internal system and interface tests by the applicant
4. Common tests with Euroclear Finland
5. Establishing production connection(s) between the applicant and Euroclear Finland
6. Production launch preparations and actual production launch

See the diagram below for clarification. Please note that it primarily describes the IT process and not the complete affiliation process.

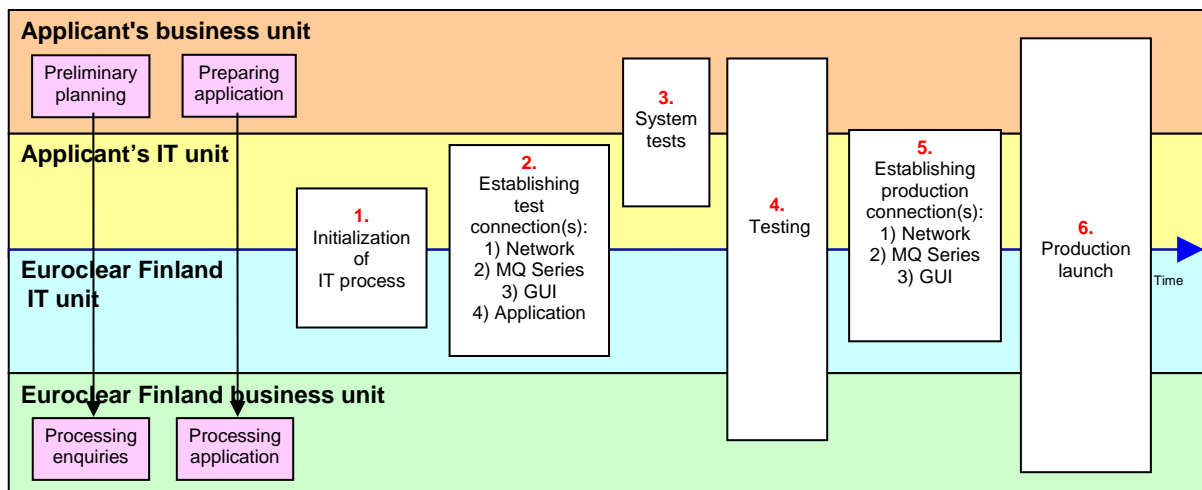


Figure 2. IT process

The length of the process may vary and depends on many factors, such as the actual need for testing.

3.1. Initialization of the IT process

The co-operation is initiated by Euroclear Finland by arranging an initial meeting with the applicant. This also initiates a series of follow-up meetings where the progress of the process is followed and open issues are handled. Both the business and the IT need to be represented in these meetings. Please note that the project plan has to be already available at the first meeting of the IT process.

The applicant must have the basic knowledge about Euroclear Finland's rules [1] and regulations related to the technical issues. Special interest shall be paid to two decisions

- Interfaces to Euroclear Finland's systems, data communications and party's systems [3]
- Data security regulations as well as preparation for malfunction and other exceptional situations [6].

3.2. Establishing test connection(s)

The connection(s) are built and verified in the following order:

1. Network level
2. System level (MQ Series, Https or RSC)
3. Application level (HEXClear, Central Register or FUD)

Each of these three steps has to be verified (technically tested) before entering into the next step.

The applicant orders NCSN Network connections from Euroclear Finland. In connection with the order, the applicant must commit itself in writing to pay any costs related to connectivity, irrespective of the outcome of the membership application or whether the applicant itself decides to withdraw its application. The form for a combined order/commitment is provided by Euroclear Finland and must be signed by an authorized signatory.

The actual order shall contain information about:

1. Company name including organisation identification number
2. Address and telephone number where the router will be placed, district, street, room
3. Invoicing address
4. Technical contact person
5. Volume estimates (average, peak) for production

Euroclear Finland cannot guarantee a delivery schedule (typically 6-10 weeks). All costs for the connection will be charged to the participant. Euroclear Finland sets the proper bandwidth for the line according to the volume information delivered by the applicant.

The Internet connection is implemented by the applicant according to Euroclear Finland's instructions.

The applicant has to specify which message types of the system interface will be utilized.

A clearing party applicant has to specify if message slicing should be applied with certain large response messages in HEXClear system interface and what is the preferred format of certain report files (XML or PDF).

The message descriptions and related instructions are available in customer pages via the Internet (chapter 5). Login information for the customer pages is available by request from Euroclear Finland Customer Support.

3.3. System tests

The system tests are internal tests, performed by the applicant without any interaction with Euroclear systems, in order to verify proper internal functionality of the applicant's system.

These tests have to be performed before the testing with Euroclear Finland.

3.4. Testing with Euroclear Finland

Prior to the testing an applicant will obtain testing instructions from Euroclear Finland.

The testing requires a testing plan which is divided into a general part and weekly detail plans. The applicant shall also provide Euroclear Finland with a summary of testing results (testing reports). More detailed description of these documents is given in chapter 5.

All MQ Series system interface message types that will be in production use have to be tested.

The testing requires support from Euroclear Finland and is therefore chargeable. Euroclear Finland submits an offer upon the request. The testing periods have to be agreed with Euroclear Finland in advance.

The testing must be approved by the applicant at least two weeks before the actual production launch.

As a backup for severe network connection failures, the participant has to be able to use alternative means to deliver MQ Series messages. The alternative means delivering messages are via the Internet in files using Euroclear Finland's File Upload/Download (FUD) service or a physical CD

disk. At least FUD has to be tested with EFi. In addition the participant has to have readiness to use CD disk for message delivery. It is recommended that both ways are tested. In order to enable FUD as a backup connection, an Internet IP address is required.

See further details in document [7].

3.5. Establishing production connection(s)

The connection(s) are built and verified in the following order:

1. Network level
2. System level (MQ Series, Https or RSC)
3. Application level (HEXClear, Central Register or FUD)

Each of these three steps has to be verified (technically tested) before entering into the next step.

Production connections are established in a similar manner as test connections (section 3.2). However special attention shall be paid to these issues:

- Production connections are duplicated
- Volume estimates shall be realistic (at least over a one-year time scale)
- Test connection has to be established before production connection
- Test and production environments shall be separate

3.6. Production launch

A detailed rollout plan for the actual launch will be prepared in co-operation with Euroclear Finland. The plan shall include, among other things, the schedule with production launch date and backup date. The applicant shall be aware that agreed dates may have to be postponed.

Pre-launch tests in production environment shall cover both user interface, system interface and file interface – when applicable. However, test cases have to be limited to queries or harmless base data updates without actual business transactions.

Clearing parties have to test cash transfers via the Bank of Finland.

The applicant must also deliver an affirmation of readiness. By signing this document, the applicant confirms that it has performed reasonable tests in order to safely start acting as a clearing party, an account operator or an issuer agent. The affirmation of readiness must be delivered to Euroclear Finland before the dead-line, i.e. two weeks before the actual production launch. A meeting is held with the applicant before the production launch to insure that readiness has been completed.

The applicant must also present technical continuity plan and production organization contact information before actual production launch. The required information may well be part of the business continuity plan.

4. Fees

List of fees and charges states the following IT-related items:

1. Network connections:
 - Actual external and Euroclear Finland costs charged to the participant
2. Testing of new member (clearing party, account operator or issuer agent):
 - One-time payment covers setting up the test environment
 - Use of the test environment without Euroclear Finland support is free
 - Support for testing, fee per hour
- 3) Other costs
 - Extra work is charged per hour according to the price list
 - Actual external costs

You can find more information from our web pages:
www.euroclear.eu → Services for participants → Services in Finland → Price lists

5. Further information

All tagged (**) documents below are available on www.euroclear.eu. Other documents are available at customer pages

[1] RULES OF THE FINNISH CENTRAL SECURITIES DEPOSITORY LTD
**

[2] TECHNICAL REQUIREMENTS, TASKS, AND RESPONSIBILITIES, 23.2.2004, MQSeries - technical requirements, tasks and responsibilities.doc

[3] INTERFACES TO Euroclear Finland'S SYSTEMS, DATA COMMUNICATIONS AND PARTY'S SYSTEMS, decision of Euroclear Finland's Managing Director **

[4] HEX MQSERIES INTERFACE – GENERAL INSTRUCTIONS, 23.2.2004
Hex MQSeries interface - general instructions.doc

[5] MQSERIES IMPLEMENTATION CONSIDERATIONS, MQSeries implementation considerations.doc

[6] DATA SECURITY REGULATIONS AS WELL AS PREPARATION FOR MALFUNCTION AND OTHER EXCEPTIONAL SITUATIONS, decision of Euroclear Finland's Managing Director **

[7] Euroclear Finland's communication practices in exceptional conditions, Description of backup process CD and FUD.doc

[8] ROLLOUT PLAN, Rollout_template.doc

Other information sources:

[9] Euroclear Finland Customer Support, service hours 08-19, telephone number +358-(0)20-770 6509, email address customer.support@euroclear.eu

[10] EUROCLEAR customer pages for participants
www.euroclear.eu/logon

6. Required documentation

During the IT process the following documents are required. Euroclear Finland does not set any formal requirements for these documents. It is also acceptable to combine them where reasonable.

1) Project plan

The project plan must give a good understanding about the applicant's initial goals, schedule and implementation principles. The scope must be within issues related to Euroclear Finland. Specific attention shall be paid to the expectations related to Euroclear Finland services.

This document shall be already available at the first meeting of the IT process.

The following subjects shall be presented:

- General description of the project
- Goals
- Schedule
- Tasks
- Project organization
- Contact information
- Cooperation plan with Euroclear Finland

2) System description

The system description shall give a good understanding of the backend systems of the participant and its interaction with Euroclear Finland's systems. The scope is in the system that covers Euroclear Finland interfaces.

This document shall be already available at the first meeting of the IT process, and may be the same that is attached to the application.

The following subjects shall be presented:

- Brief description of the technical architecture
- Summary description of the functionality including the daily schedule
- Interfaces and connections to Euroclear Finland
- Transaction flow between the back office and Euroclear, preferably as a chart
- Services of Euroclear Finland in use (e.g. message types)
- Volume estimates
- Test system description
- Backup solutions

3) Testing documentation

General testing plan

The general testing plan shall give a good understanding of the overall structure of the testing periods including the main tasks and their objectives and schedules.

This document shall be available well before the actual testing with Euroclear Finland starts.

Following subjects shall be presented:

- Main test periods and their objectives
- General testing organization
- Message types
- Expectations of support provided by Euroclear Finland
- Volume testing principles
- Backup solutions

Weekly testing plans

The weekly testing plan shall describe testing activities of the following weeks in detail. Test schedules and test case descriptions shall give a good understanding of the overall structure of the testing periods including the main tasks and their schedules.

This document shall be delivered to Euroclear Finland weekly, before the actual test weeks. The latest weekday for the delivery is Thursday.

The following subjects shall be presented:

- Objectives of the tests
- Test case descriptions
- Proposed testing schedule on an hourly basis
- Testing personnel with full contact information
- Expectations of support provided by Euroclear Finland

Testing reports

The testing reports shall give a good understanding of the progress of the testing phase. This document shall be delivered to Euroclear Finland weekly, shortly after the actual tests.

The following subjects shall be presented:

- Reference to the weekly testing cases and/or general testing plan
- Results of the actual tests (OK / failed)
- Initial proposal for retesting schedule (if applicable)
- Feedback for Euroclear Finland (if applicable)

4) Rollout plan

The rollout plan is intended to help to achieve a mutual understanding of tasks, responsibilities and schedule of the actions needed for successful production launch of a new participant. The scope of the plan is on actions requiring the effort of both applicant and Euroclear Finland especially near the actual production launch.

This plan shall be prepared well before rollout tasks are performed in production environment. The document is prepared in co-operation with Euroclear Finland. It shall be supplemented by internal plans of both parties.

The following subjects shall be presented:

- Organization of the rollout process with contact information
- Tasks to be done with defined responsibilities
- Schedule and deadlines including a freezing period and critical points (of no-return)
- Detailed instructions may be attached or addressed by links
- Backup plan for rollback situations
- Risk analysis for the rollout process (what may go wrong and how to mitigate the consequences)
- Plan for the tests in the production environment after the production launch

5) Technical contact information for production

The daily production issues and technical development require occasional contacts. For these purposes Euroclear Finland needs to have a basic understanding of the participant's technical organization and contact persons.

This document shall be prepared well before rollout tasks are performed in the production environment.

The IT contact information shall be given in a separate form '*Technical contacts of Participant*'.

6) Technical continuity plan

The continuity plan shall give a good understanding of the means that the participant has considered as a backup way in case of a major system crash during a normal production period. Special attention has to be addressed to situations that may have market-wide impact or which require specific actions by Euroclear Finland.

This plan has to be prepared well before rollout tasks are performed in the production environment. It may be part of the business continuity plan supplied as part of the application.

At least the following technical subjects shall be presented:

- Backup systems
- Backup premises
- Organization with contact information for crisis situations - especially details of the person(s)

- responsible for making decisions concerning the implementation of a back-up routine
If applying as a clearing party, backup communication to BoF RTGS shall also be described

7) Affirmation of readiness

By signing the affirmation of readiness the applicant confirms that it has performed reasonable tests to be able to start acting as a clearing party, account operator or issuer agent in an appropriate manner.

The document shall be delivered to Euroclear Finland before the deadline, i.e. two weeks before actual production launch.

This is a standard document supplied as part of the application process.