

CONNECTIVITY

Service Description Document

V. 2, JUNE 2026



EURONEXT SECURITIES

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1. Introduction and purpose

1.1 Document Purpose

The purpose of this document is to describe the Euronext connectivity to access the CSD services on the common platform in the Convergence programme.

1.2 Target audience

This document is intended primarily for Participants of Euronext Securities and relevant for:

- IT Participants and technical teams responsible for implementing connectivity solutions.
- Project managers overseeing the onboarding and integration process.
- Business stakeholders who require an understanding of the connectivity options and requirements.

1.3 Available environments

The services in the new platform to replace the current Legacy services will be available to CSD Participants in the following environments:

- End User Acceptance / External TEST environment (single instance, fully integrated to T2S).
- Production Environment (primary data centre), fully redundant and multi “availability zone” designed.
- Disaster Recovery Environment (secondary data centre), running in out of region from the Production Environment.

Service-specific Disaster Recovery information and procedures are provided at the time-of-service subscription, including the Disaster Recovery approach. Below is a summarised view:

- Internet-based services (e.g. Direct web access or VPNSSL web access) and SWIFT based services seamlessly move from the Euronext Securities primary data centre to the Euronext Securities secondary data centre with minimum client reconfiguration, if any.
- Message-based services require proper coordination with the Participants to allow for safe moving of services to the secondary data centre: this could imply re-pointing activities on the Participant side. This allows for more controlled “crisis”-

based failover that assures proper synchronisation with Euronext Securities' Participants.

1.4 Client roles in Euronext Securities

The client roles that apply to *Euronext Securities* are described in the following table:

Roles	Description
Issuer	An Issuer is a legal entity that issues financial instruments and has them registered/issued in the relevant Euronext Securities CSD system
Issuer Agent	An Issuer Agent is a legal entity performing all or part of responsibilities with Euronext Securities on behalf of an Issuer (or where relevant, the CSD)
Issuer Paying Agent	An Issuer Paying Agent is a legal entity appointed by an Issuer (or an Issuer Agent) acting on its behalf for cash payments, processed through the settlement/payment systems, in connection with services provided to the Issuer/Issuer Agent
CSD Participant	A CSD Participant is a legal entity that opens and maintains securities accounts on its own behalf or on behalf of its clients with the relevant Euronext Securities CSD, and/or maintains custody services and/or participates in the settlement services provided by Euronext Securities.

For more detailed information on the client roles, please refer to the Service Description Document (SDD) of Client Master Data and Account Management.

Besides the above-defined client roles there can also be other actors such as datacenters that can e.g. receive messages directly from Euronext Securities.

1.5 Related Euronext Securities documentation

Table 1: Euronext Securities documentation

Document	Description	Link
MyEuronext - Settlement User Guide	User Guide to MyEuronext (GUI) on settlement services	MyEuronext Guidelines
MyStandards	Euronext Securities settlement and reconciliation message standards	MyStandards – Euronext Securities

The above table references relevant other Euronext Securities documentation in the context of connectivity.

2. CSD services overview

The CSD services in Euronext can be accessed via communication channels SWIFT (when there is an ISO), U2A application MyEuronext, MQ and SFTP. The format is ISO 20022, ISO 15022 and possibly in some cases a custom format when there is no ISO standard.¹

The service overview is shown in the table below. The functionality is detailed in the SDD documents for Settlement, Account Management & Masterdata and NNA and in the user guidelines for MyEuronext.

Euronext Core Services and Functionalities	Format			U2A Channel	A2A Channel	
	Custom	ISO 20022	ISO 15022	U2A MyEuronext	Swift FIN+/FIN	MQ***
- Settlement		x	x	x	FIN+/FIN	x
- Liquidity		x			FIN+	x
- Account Management		x		x	Other	x
- Client Masterdata				x	n.a.	
- Securities Management Registration / Update				x	n.a.	
- Securities Management Reference data	x			x	n.a.	x
- Account Statements		x	x	x	FIN+/FIN	x
- ISIN Codification Service (NNA)				x	n.a.	
- Issuance*		x	x	x	FIN+/FIN	x
- Corporate Actions (CA)**		x	x	x	FIN+/FIN	x
Work in progress						
- CA4U Refit						
- Securities Management Reference data Realtime						

¹ See Convergence ISO formats in mystandards following this link: https://www2.swift.com/mystandards/#/group/Euronext_Securities

- Drawn amounts / Partial redemption	
- Account Statements Intraday	
- Tax Management	
- Shareholder Register	
- Other	

Notes:

* Instruction message only available in ISO 20022 (sese.023) but notifications in both ISO 20022 and 15022

** CA4U program that will be retrofitted into the Convergence platform.

*** MQ send over the Euronext Group network infrastructure CMC/EMC. Possible to connect directly or via SP (ICE, BTRadianz etc.)

3. Connectivity Offer

3.1 Introduction

This section provides a quick overview of the current target physical connectivity that Euronext Securities supports.

3.2 Direct connection (EMC and CMC) and connection via Service Provider

The Euronext Connectivity model offers participants the opportunity to access Euronext Securities' Services in addition to Euronext Trading, Market Data and Clearing services.

Participants can access Euronext Securities' services in two different ways: via **Direct Connection** (i.e. direct leased lines through CMC or EMC model) or via **Indirect Connection** (i.e. leased lines contracted with authorised Service Providers).

Participants already connected (directly or indirectly) can leverage the existing connection to add also the access to Euronext Securities' services.

Euronext's Production Data Centre is in the north of Italy (at Aruba IT-DC3) and Euronext's DR Data Centre is located near Paris.

Euronext Point of Presences (POPs) are available in London (at Interxion LON1 and Equinix LD4), Frankfurt (at Equinix FR2) and in Milan (at Retelit-X).

3.2.1 Direct connection model description

In case of **Direct Connection**, the Participant signs a Connectivity Agreement with Euronext selecting the connectivity solution it prefers from the Euronext Connectivity portfolio.

Euronext offers two different connectivity solutions:

- **CMC (Client-Managed Connectivity)**

CMC is an open connectivity model, according to which the Participant can buy their own circuit from their preferred carrier and Euronext Securities provides an Access Port to access the Euronext Securities services at Euronext Data Centres or at Euronext POPs.

Access Ports in the Production Data Centre allow access to Production and Test environments, but they do not allow access to the DR environment.

Access Ports in the DR Data Centre allow Participants to reach the DR environment only.

Access Ports in each POP allow access to all Euronext Securities environments: Production, DR and Test.

Participants choosing to connect via the CMC solution benefit from a low-latency network infrastructure built to ensure reliability and resiliency.

The CMC solution offers different bandwidth Access Port(s): 10 Mbps*, 100 Mbps, 1 Gbps and 10 Gbps.

Participants with a Point of Presence in the Euronext POPs can benefit from connectivity to Euronext Securities via cross-connects within each Point of Presence.

The Client-Managed Connectivity Agreement forms and documents will be updated for Convergence and will be available on the Euronext Connect Portal:

- Euronext Client Managed Connectivity (CMC) Agreement
- Euronext Connectivity Services - Specific Terms
- Euronext Data Centre Services – General Terms and Conditions



*Note: the 10 Mbps Client Access Port is only available for CSD Participants and cannot be used to connect to the matching engine or to obtain, distribute or otherwise process Market Data. It is for Clearing and Settlement services only.

- **EMC (Euronext Managed Connectivity)**

It is a turnkey solution that offers end-to-end connection to all services offered by Euronext Securities.

Participants can choose either a resilient or a non-resilient solution, according to their specific requirement.

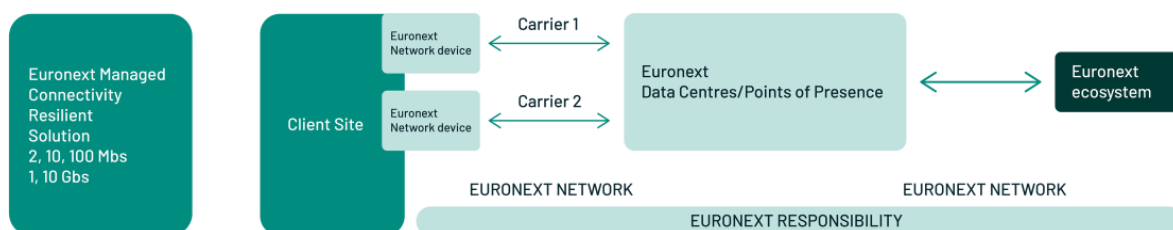
The EMC solution is available with different bandwidth options: 2 Mbps, 10 Mbps, 100 Mbps, 1 Gbps and 10 Gbps.

As a turnkey solution, both network equipment and leased lines (provided by international carriers) are supplied, installed, managed and monitored (24/7) directly by Euronext Securities.

Leveraging the Euronext Securities backbone network, the EMC leased lines can be connected to either Euronext Production and Disaster Recovery Data Centres and/or any Euronext POP (London, Frankfurt or Milan).

The Euronext Managed Connectivity Agreement order form and documents will be updated for Convergence and available on the Euronext Connect Portal:

- EMC Order Form
- General Terms and Conditions
- EMC Specific Terms



For more information on the technical setup and/or for the pricelist of CMC and EMC services, you can contact the Client Connectivity team at connectivity.support@euronext.com.

3.2.2 Indirect Connection (via Service Provider)

In case of **Indirect Connection**, the Participant signs an agreement with a third party, an authorised Service Provider (SP).

The Service Provider is responsible for providing (and maintaining) the connection between the Participant and Euronext.

The Service Provider connects to Euronext directly and is the owner of the Connectivity Agreement with Euronext.

Please refer to the list of Extranet Service Providers authorised to provide access to Trading and Market Data Services reported on the [Euronext website](#) for more details.

3.3 Euronext connectivity to access test environment (CMC VPN LAN to LAN)

Connectivity to the IBM MQ UAT (TEST) environment will be available also using a site-to-site VPN (IPsec LAN-to-LAN) over the Internet. This solution is meant to allow Participants not yet directly connected to the target connectivity model, depicted in [3.2 Direct connection \(EMC and CMC\)](#) and [connection via Service Provider](#), to test the services while adopting the leased lines connectivity to access both Production and TEST services.

Specific information regarding the VPN IPsec configuration parameters and encryption domains will be shared via ad hoc technical documentation.

Participants willing to adopt this solution will have to adhere to the CMC terms as described in the previous section above.

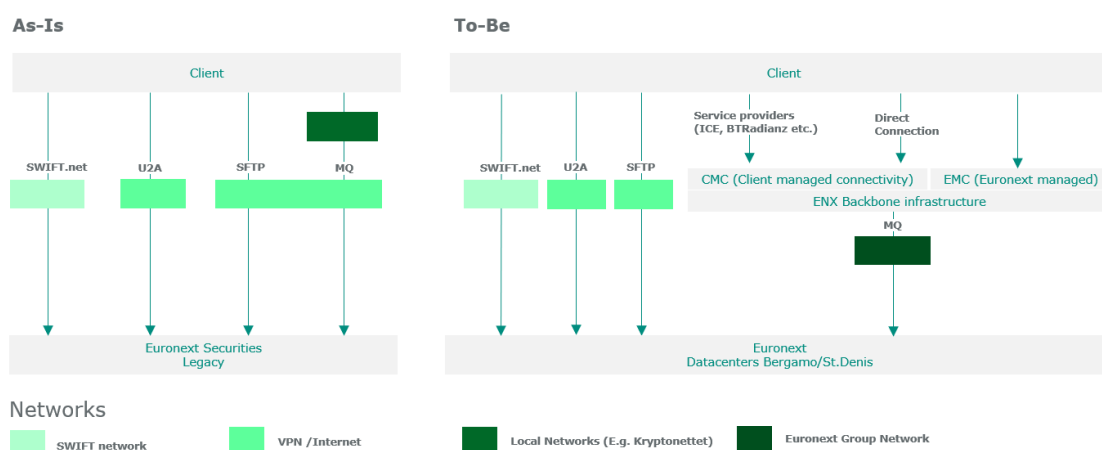
3.4 Transitioning to the target connectivity model

3.4.1 As-Is vs To-Be

The figure below shows on a high level the changes from the current connectivity (Legacy Copenhagen “As-Is” setup) compared to the new connectivity model in Euronext Securities new platform (Target “To-Be” setup).

Client communication with the CSD

Euronext connectivity model in Convergence



3.4.1.1 As-Is setup, explained

In the current setup (As-Is) the Participants can use the following connectivity options:

- SWIFT.net: this is for A2A (application to application) straight through processing of ISO messages to and from the Euronext Securities Copenhagen platform
- Direct Internet: this is for both U2A (user to application) and A2A (application to application) use cases and mainly is made up of web pages (U2A) and SFTP (A2A) protocols.
- VPNs over Internet: this is for A2A (application to application) straight through processing of ISO and proprietary messages over IBM MQ protocol.
- Kryptonnet: this is for A2A (application to application) straight through processing of ISO and proprietary messages over IBM MQ protocol.

3.4.1.2 To-Be setup, explained

In the target setup (To-Be) the Participants shall be adhering to the new Euronext Securities connectivity model and as such they shall be allowed to use the following connectivity options:

- SWIFT.net: This is for A2A (application to application) straight through processing of ISO messages to and from the Euronext Securities Copenhagen platform
- Direct Internet: This is for both U2A (user to application) and A2A (application to application) use cases and mainly is made up of web pages (U2A) and SFTP (A2A) protocols.
- Euronext direct or indirect connectivity as per [3.2](#): This is for A2A (application to application) straight through processing of ISO and proprietary messages over IBM MQ protocol.
- Euronext connectivity with VPNs as per [3.3](#) (TEST environment only): This is for A2A (application to application) straight through processing of ISO and proprietary messages over IBM MQ protocol.

As per previous sections, the future platform shall retain IBM MQ as message transport protocol due to its flexibility in relaying both ISO and custom/proprietary messages: this shall make IBM MQ one of the main “mission critical” protocols of the new platform.

3.4.2 Interim support to testing period

In order to ease the testing activities of the CPH Participants towards the new platform, Euronext will also provide a further temporary connectivity model, available only within the testing phase and until go live of the new platform. Current Kryptonnet customers will in fact be able to re-use the same connectivity (Kryptonnet) to connect to both the current legacy platform (no changes) and the future platform (new target IBM MQs to route to via the same Kryptonnet channel): this shall only be allowed for the TEST environment. The transport protocol will also here be IBM MQ to convey ISO and custom proprietary format messages.

Please note: Kryptonet, as it currently stands, is not expected to be supported/usable in the Target setup (To-Be) and as such the participants are kindly advised to start planning their migration to the target connectivity in due time with the support of their Euronext account managers that shall be able to guide the participants in the formal and technical steps required to migrate.

3.5 SWIFT

SWIFT can be also used to access Euronext Securities services in both FIN/FINPLUS protocol for messaging.

3.6 Internet

Many services, especially the end user GUI/Web pages, are exposed over Internet using encrypted protocols and proper security controls and monitoring.

4. Information exchange protocols

This section provides an overview of the connectivity options available for participants interacting with Euronext systems.

4.1 IBM MQ connectivity

One of the key methods for establishing secure and reliable communication is using Message Queue (MQ) connections and in particular IBM MQ services.

4.1.1 Connection overview

Euronext offers CSD Participants the ability to connect to its services using IBM MQ technology over dedicated lines. This approach enables the secure exchange of messages between Participants systems and Euronext platforms, supporting a range of business and operational needs.

With reference to the connectivity approach as per section [3.2 Direct connection \(EMC and CMC\) and connection via Service Provider](#), [3.3 Euronext connectivity to access test environment \(CMC VPN LAN to LAN\)](#), [3.4 Transitioning to the target connectivity model](#), the MQ sessions will support and require bidirectional communication (e.g. initiated from both CSD Participants and central Euronext Third Party Access IBM MQ systems), this is usually referred to as “IBM MQ Server to Server” setup.

4.1.2 MQ Connection configuration

IBM MQ (Message Queue) over private/leased lines brief overview:

- IBM MQ is used for secure, reliable messaging between applications (A2A) as it ensures guaranteed delivery, transactional integrity, and high throughput to avoid missing data and consistency.
- IBM MQ is widely used across the industry for mission-critical financial transactions and batch processing as it takes advantage of features and functionalities such as low latency, enhanced security and resilience.
- IBM MQ requires server-to-server configuration, bilateral authentication via public CA certificates, proper queue management, definition and access management.
- IBM MQ connectivity will be encrypted at application level in both directions

Please note: The IBM MQ Server-to-Server setup requires Participants to provide their own IBM MQ licensing for the server on their side.

To help our CSD Participants establish their IBM MQ connections, Euronext provides a dedicated ad hoc technical document. This document outlines the necessary steps and requirements for setting up the connection, including:

- The types of information needed to initiate the connection process.
- The general process for requesting and configuring access.
- Key considerations for ensuring a secure and stable connection.

4.1.3 Support and guidance

While the technical document contains detailed instructions, Euronext Securities' support teams are available to assist CSD Participants throughout the setup process. CSD Participants are encouraged to review the document and reach out for guidance if they encounter any questions or challenges.

4.2 Secure File Transfer Protocol (SFTP)

Secure File Transfer Protocol (SFTP) is a de facto standard for file exchange over public networks across the industry. In Euronext Securities SFTP can be used with RSA public key authentication on client side. Moreover, the server side of the channel can whitelist the source IPs of the inbound Participants for further access security.

SFTP key facts:

- Used for secure file exchange between systems (A2A) such as batch data transfers, reports, and large files.
- **Benefits:** High security, compliance with data protection standards, and reliable delivery, Provides encryption and authentication for data in transit.
- **Requires:** SFTP server/client configuration and user management.

4.3 Graphical User Interfaces (GUIs)

The following points summarise key features, benefits and security requirements:

- Used for direct user interaction with applications (U2A).
- Suitable for different platforms, dashboards, and operational tools.
- **Benefits:** It can be accessed via the Internet over HTTPS (encrypted).
- **Requires:** User authentication and authorization via IdPs, session management and data protection.

4.4 SWIFT network connectivity

The following points highlight how SWIFT ensures global reach, security and compliance in financial transactions:

- Used for secure financial messaging and payments between institutions (A2A).
- Operates over the SWIFT global network, which can be accessed via private/leased lines for added security.
- Supports standardised message formats (MT, MX) for payments, securities, and trade finance.
- **Benefits:** Global reach, high security, regulatory compliance, and reliability for financial transactions.
- **Requires:** SWIFT interface software (SAA), network configuration, and compliance with SWIFT security standards.

5. U2A in MyEuronext

MyEuronext is the target GUI for End User Web Access for all Euronext Securities in the Convergence programme.

Architecture:

- Fully containerized platforms allow for scalable workloads and low response times.
- It is enforcing the target authentication solution for Euronext Securities, OKTA, that allows for enterprise grade authentication security, automatic threat intelligence and MFA for all the accesses. OKTA, best of breed in IDP solutions, embeds "self-service" functionalities that make the end user experience seamless and easy to maintain.

Please Note: Users activated in OKTA can be extended upon request to also access other OKTA enabled services allowing a full Single Sign On (SSO) approach to MyEuronext applications.

Connectivity Features:

- MyEuronext is fully available as a Web application via the Internet and protected by advanced DDOS and WAF security features.

Services:

As a web based digital solution, MyEuronext enables participants, issuers and paying agents to monitor and manage their daily operations through the following services:

- **MyEuronext Corporate Event Service:** this is a portal that enables issuers, agents, and participants to manage corporate events through a unified platform. It provides the necessary infrastructure, software, and operational support in line with each venue's functional and regulatory requirements. Implemented via the

MyEuronext platform, it digitizes workflows between Euronext and its clients, serving as the CRM system across all Euronext venues. For customers, it offers a single access point to register and manage corporate actions, ensuring greater transparency and streamlined workflow management.

- **MyEuronext Account Management Service:** this is a centralized platform designed to manage key operational processes related to parties, accounts, and designations within the securities settlement ecosystem. It provides end-to-end lifecycle management for entities, accounts, and their associated authorizations, ensuring full traceability and compliance through a four-eyes approval mechanism.
- **MyEuronext Securities management Service:** this is a platform for managing requests and instructions related to securities and financial instruments, including four-eye validation workflows and advanced search and filtering options. It provides detailed information pages for each request and instrument, as well as guided processes for creating, updating and cancelling both securities and issuance instruction requests. The system includes user access management, automated notifications, bulk upload functionalities and basic reporting. Additional features cover location-based segregation and specific workflows for Nasdaq-related processes.
- **MyEuronext ISINCodification Service:** this is a platform to manage the ISINs, communicating with ANNA (Association of National Numbering Agencies). The platform is including ISIN search, reservation, creation, update, deactivation and reactivation. Also, management of both issuers and issuer agents, including step-by-step forms, autosave, confirmation messages and operational perimeter management. The platform supports business operations approval processes for deactivation and reactivation actions, ensuring robust governance. Additionally, a bulk import functionality is included, enabling users to efficiently process multiple ISINs at once.
- **MyEuronext Settlement Service:** this platform allows users to manage the post-trade process that enables a safe transfer of ownership between buyer and seller of securities, potentially in return for a payment. The Settlement application standardizes settlement operations across Euronext Securities by providing a unified interface for all operations.

User Guides: [MyEuronext CSD Knowledge Base](#)

6. Glossary

Below is a definition of terms used in the document. If not otherwise specified:

Terms	Definitions
A2A	Application-to-application connectivity mode (e.g. SWIFT)
Acupay	Clear and easy-to-use full-service tax relief solutions, supporting issuers, custodian banks, brokers, investment advisers, asset managers and clearing systems throughout the entire process
CA	Corporate Actions
CSD	Central Securities Depository
CMC	Client-Managed Connectivity
DCP	Directly Connected Party with the T2S platform.
DDOS	Distributed Denial-Of-Service
DR	Disaster Recovery
EMC	Euronext Managed Connectivity
EOD	End of Day
ES	Euronext Securities
ES-CPH	Euronext Securities Copenhagen
ES-MIL	Euronext Securities Milan
ES-OSL	Euronext Securities Oslo
ES-PTO	Euronext Securities Porto
FTT	Financial Transactions Tax

Terms	Definitions
GUI	Acronym for Graphical User Interface. The interface that allows a user to interact with a software application with graphical elements (e.g., windows, menus, buttons and icons) on a computer screen, using the keyboard and mouse, etc.
ICP	Indirectly Connected Party with the T2S platform.
IDP	Identity Provider
IDPS	Intrusion Detection and Prevention System
IPSec	Internet Protocol Security
IRI	The Information on Registered Investors (IRI) is a set of information used to manage the accurate identification of shareholders by the Issuer, and to facilitate the exchange of shareholder information between Custodians and Issuers/Registrars in a set format. IRI messages (IRIs) play a central role in enabling seamless communication and ensuring that shareholder data is transmitted and recorded accurately.
ISIN	International Securities Identification Number.
ISO	International Organization for Standardization
MFA	Multi-Factor Authentication
MQ	Message Queue
MT	Message Type for ISO 15022 messages
MT-X	ES-MIL Internet Communication System
MX	Message XML
MyEuronext	Target GUI for End User Web Access
NNA	National Number Agency
OKTA	Okta is an Identity and Access Management (IAM) service that offers businesses a secure Single Sign-On (SSO) solution.

Terms	Definitions
PROD	Production
PTCS	Post-Trade Confirmation System (also the name of the Euronext Securities tool providing this service).
RBAC	Role-Based Access Control
RSA	Rivest–Shamir–Adleman. The RSA (Rivest–Shamir–Adleman) cryptosystem is a group of public-key cryptosystems and is among the earliest and most widely used methods for secure data transmission.
SAA	SWIFT Alliance Access
SFTP	Secure File Transfer Protocol
SHID	Shareholders Identifications Disclosure
SQL	Structured Query Language
SSL	Secure Sockets Layer
SSO	Single sign-on
STP	Straight-Through Processing
T2S	TARGET2-Securities, a real-time exchange infrastructure.
TCO	Total Cost of Ownership
TLS	Transport Layer Security
U2A	User-to-application connectivity mode (GUIs).
UAT	User Acceptance Testing
URL	Uniform Resource Locator
Votaccess	Sourced proxy voting platform
VPN	Virtual Private Network

Terms	Definitions
VPNSSL Web Access	Virtual Private Network Secure Sockets Layer Web Access
X-TRM	The daily trade-checking service in which transactions having financial instruments as their subject are sent to the settlement service operated by Euronext Securities Milan, or foreign settlement services.
XTO	X-TRM Online
WAF	Advanced Web Application Firewall

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