

DOCUMENT TITLE

Secure Financial Transaction Infrastructure (SFTI[®]) Europe Customer Guide

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Preface

This document provides an overview of SFTI[®] Eu, outlines the processes by which customers obtain connectivity to SFTI[®] Eu and the supported services.

Target Audience

This document is intended for customers and prospective customers.

The general approach and technical complexity of this document allows for such broad readership. Other documentation is available to provide much greater detail.

Document History

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1.0	July 2009	NYSE Technologies	Released

Associated Documents

The following lists the associated documents, which either should be read in conjunction with this document or which provide other relevant information for the user:

SFTI[®] Network Technical Specification

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1. Introduction

Through the Secure Financial Transaction Infrastructure (SFTI[®]), NYSE Technologies provides a reliable, robust, scalable, networking infrastructure to support the securities industry. SFTI[®] (pronounced 'safety') is a highly reliable and resilient network connecting industry participants to both NYSE Euronext markets and exchanges, clearing and settlement systems, market data distribution and other service providers.

1.1 Background

Traditionally different exchanges and market infrastructures have run separate networks for member connectivity. Even within the NYSE Euronext group historically there have been multiple access options for different individual markets, requiring duplicate infrastructure, support and management.

The complexity of managing and supporting the sheer number of circuits is increasingly taking its toll on technology resources and staff at both ends of the connection, a problem compounded by the growth of liquidity venues in recent years.

The events of 11 September 2001 in the US highlighted the vulnerabilities of the communication infrastructure supporting the securities industry, many of which remain issues today. Typically buying low bandwidth circuits leaves firms open to undocumented changes made by the local communications carriers and limited visibility of routing and diversity.

SFTI[®] was developed in the US (and with the same principles in Europe) to present customers with a highly resilient and robust facility that provides for the effective consolidation of customer data traffic onto a genuinely redundant, geographically distributed, centrally managed data access infrastructure.

Whilst the resiliency requirements have not changed since the original SFTI[®] network was deployed in the US, there have been substantial changes to trading activities of exchange members. Market data volumes continue to grow at exponential rates and the growth of algorithmic trading has increased the need for eliminating latency wherever possible. SFTI[®] has been built specifically to address the resilience and latency challenges, whilst providing a strategic platform to deploy new services.

1.2 Benefits

SFTI[®] provides a high capacity, high availability, secure, easy to use IP-based conduit into and out of NYSE Euronext's individual markets, as well as other markets that are connected to SFTI[®], for the benefit of its customers and vendors, both domestic and international. By using the industry-standard TCP/IP suite of protocols, SFTI[®] enables customers to connect to services offered via NYSE Euronext with reduced development- and lead-times.

To the greatest extent practicable, SFTI[®] seeks to empower existing and new customers to:

- Gain access to additional markets quickly and easily
- Choose between access networks, performance options, vendors and cost models

- Access multiple services over a single physical connection to SFTI®, reducing client network footprint and connectivity overhead
- Use widely available, accepted, industry-standard applications, protocols and structured data formats to reduce complexity, leverage the customer's resources and alleviate the need for development
- Increase customers' control over their interface to services
- Simplify the processes for requesting service changes.

In addition, SFTI® benefits the customers in the following ways:

- Facilitates rapid and cost-effective development of new business services and enhancements to existing services
- Enhances the capabilities of NYSE Euronext for providing administrative and operational support
- Maintains or enhances the security, operational integrity and high standards of availability of NYSE Euronext operated systems and networks.

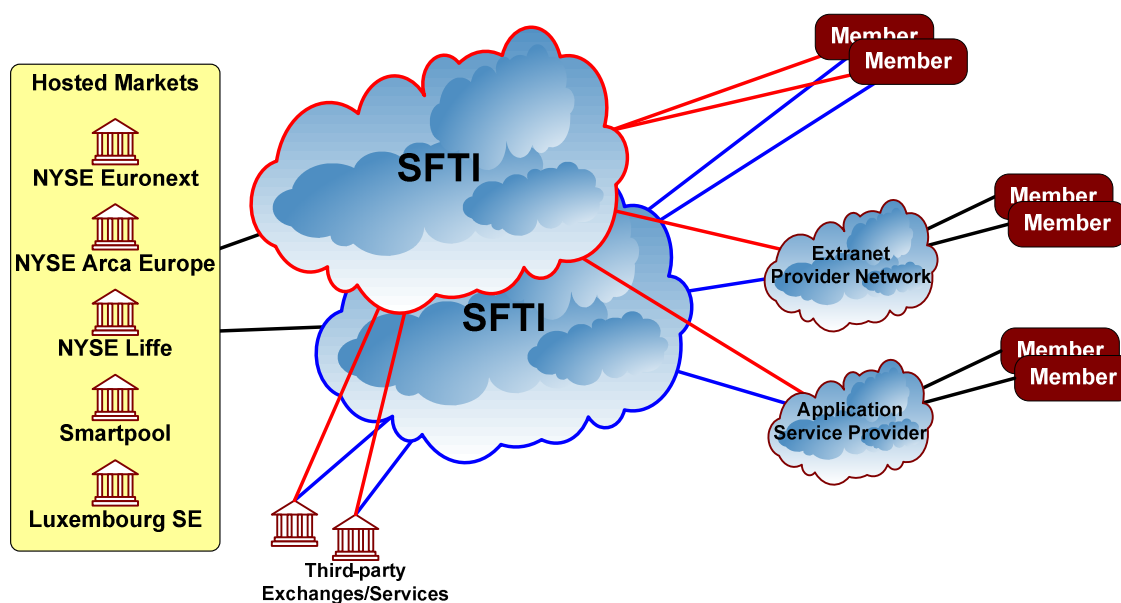
2. Overview

2.1 Architecture

At the physical layer, the infrastructure comprises two fibre rings (the red and blue networks) that pass through the data centres. Each ring goes to a different set of access centres providing network redundancy and isolation from failure. This topology guarantees diverse routing and redundancy with no single point of failure. It provides easier access to NYSE Euronext markets and there is no longer a need to provision separate customer circuits for each supported service. Customers have the ability to scale their bandwidth requirements by provisioning additional bandwidth as the need arises.

SFTI[®] also enables customers to access other exchanges, market centres and content service providers not hosted by NYSE Technologies.

The following diagram provides a conceptual overview of the SFTI[®] architecture.



Network monitoring, management and reporting capabilities have been enhanced and centralised for all SFTI[®] components. Customer care has been streamlined by the development of a central service desk that is responsible for all customer problem and incident calls.

2.2 Access Methods

Customers choose one or more of the following three access methods for connecting to SFTI[®]:

1. SFTI[®] Managed Connection
2. SFTI[®] Direct Connection

3. Connecting via a third party.

Some customers may use a hybrid approach: different access methods from different locations or different access methods for different services.

Two centres are provided in each access city facilitating local access to each of the red and blue networks and ensuring that resiliency demands can be readily met.

The following sections describe the connectivity methods.

2.2.1 SFTI[®] Managed Connection (SMC)

SFTI Managed Connections (SMC) provide a fully-managed solution with resilient connectivity between the access centres and the member locations. NYSE Technologies supply all telecommunications services and install equipment at the member locations to provide an end-to-end solution.

The solution comprises two layer 3 network switches at the member site (or sites) connected via resilient ethernet connectivity between each switch and the red and blue access centres in the respective city. Speeds of 10Mbps, 100Mbps or 1Gbps are available.

2.2.2 SFTI[®] Direct Connection (SDC)

Customers may choose to connect their own equipment to SFTI[®] directly at the access centre via ethernet connections. In such a case, the customer is responsible for providing their own MAN or WAN connection from their facility to two or more SFTI[®] access centres and handing off to the SFTI[®] edge routers via ethernet (10Mbps, 100Mbps or 1Gbps). The ethernet handoff can be achieved either by housing a customer router in the access centre or by contracting with a carrier who will handle the ethernet handoff. A number of different local telecommunications providers are supported in each access centre – details can be provided as required.

It should be noted that SDC connectivity is not an available option for all service types.

It is also recommended, but not required, that customers terminate their diverse access centre connections at geographically diverse sites within their own network to provide true redundancy.

2.2.3 Third Party Connectivity

Customers may also elect to use an Application Service Provider (ASP) or Extranet Service Provider (ESP) to access SFTI[®]. ASPs are entities that provide transaction-processing services (e.g. submitting trades) on behalf of member firms. They also typically offer value-added financial services, such as archiving or data translation.

Extranet service providers are also available to provide connectivity between the customer site and SFTI[®] over a managed, aggregated network. Extranet service providers are envisioned as intermediaries, maintaining a presence at two or more access facilities for SFTI[®] access and providing a direct link to their customers' premises.

Customers who wish to use these access methods should contact the ASP/ESP of their choice. The access between a customer and the ASP/ESP is jointly agreed between the customer and the third party service provider.

2.3 Technical Details

Precise technical details regarding the interconnection between customer networks and SFTI, as well as details regarding the network design for the services, are provided in the SFTI[®] Technical Specification, which can be provided to customers that are interested in connecting to SFTI[®]. This can be obtained from the sales and support teams.

The following sections provide a high-level overview of the primary considerations in the design of the interconnections between SFTI[®] and its customers' networks.

2.3.1 Protocols Supported

SFTI[®] supports a number of industry-standard protocols in order to reduce complexity, leverage the customer's resources and reduce the need for development or customisation. All connectivity into SFTI[®] uses IP over Ethernet at either 10Mbps, 100Mbps or 1Gbps speeds. BGP4 is used as the route discovery mechanism for unicast and multicast traffic.

2.3.2 IP Addressing

Customers may use globally registered IP addresses on those devices that will be accessing NYSE Technologies-supported services. NYSE Technologies allows customers to use private addressing in their networks under the condition that NYSE Technologies assign those addresses from a private range they specify. NYSE Technologies serves as the central administrator of those private address ranges.

Each customer IP addressable entity (logical or physical) that accesses NYSE Technologies-supported services requires its own IP address. Given this IP address, SFTI[®] must be able to route outbound to the customer's device via the access method contracted by that customer (i.e. the address must be reachable).

If a customer's device uses a private address from a range not assigned by SFTI[®], the customer will need to present a globally registered IP address to SFTI[®] utilising a method such as NAT (network address translation). However, NAT may limit the customer's ability to take advantage of redundant connections seamlessly and could "break" applications that rely on knowing the true IP address of the end device.

2.3.3 Security

NYSE Technologies maintain the integrity of the overall SFTI[®] environment through the use of datalink, route and packet security. Although the security measures are not intended to replace or augment existing customer security mechanisms, SFTI[®] has instituted mechanisms that protect the overall integrity of SFTI[®] and its customers' networks.

2.3.4 Service Subscription and Bandwidth Guidelines

SFTI[®] has been designed to allow multiple services to share the same physical connection. Given a properly sized connection, customers can run multiple services over a single set of physical infrastructure.

Each service, be it a market data feed, order routing connection or a generic messaging link, has its own bandwidth requirements. These requirements both vary widely and

change frequently. NYSE Technologies sales representatives can discuss the available services and provide the most recent estimates of bandwidth requirements.

3. SFTI® Provisioning Process

The high-level tasks required to begin using SFTI® are:

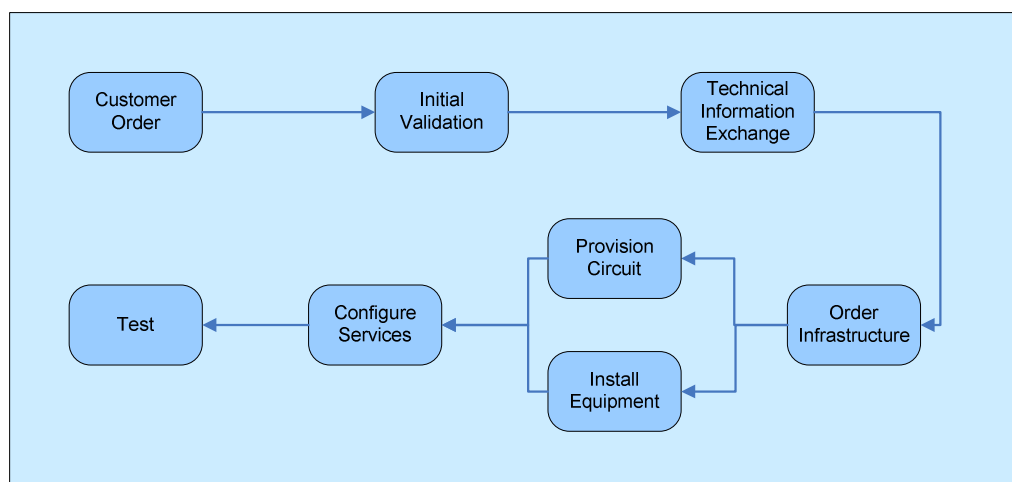
1. Establish an overall plan: decide which customer locations to connect to which SFTI® access centre, with what type of connectivity and decide which services to obtain via SFTI®
2. Develop a detailed engineering implementation plan, including a schedule
3. Obtain necessary approvals from service authorities for the services to be delivered
4. Order necessary infrastructure
5. Install and configure equipment, as necessary
6. Test.

In order to reduce overall cycle time, these tasks can be performed to some degree in parallel.

For SMC connectivity, NYSE Technologies will organise the delivery of infrastructure and equipment, managing its preferred telecommunications partners and hardware providers to ensure timely delivery. For SDC connectivity, customers need to organise their own access circuits and routing hardware, connecting into the nominated ports in the relevant access centres. Customers connecting via third parties use the infrastructure of the selected ESP or ASP to provide their connection into SFTI®, as outlined above.

The detailed steps involved in each of these steps will vary according to the services being obtained, the type of connectivity being used, and the customer status. For example, existing customers with access infrastructure already in place will generally not need new infrastructure to support subscription to a new service (providing sufficient capacity exists on the access links).

The following diagram provides an overview of the order process flow for customers connecting to SFTI®:



A customer order comprises the SFTI® Order Form, the associated Terms and Conditions and confirms the services to which a customer wishes to subscribe, as well as the connectivity type and infrastructure details.

It is important to note that agreements directly with the relevant exchanges, markets or trading facilities may also be required (in addition to the SFTI® order) to allow trading at those venues, the receipt of market data feeds or access to other services.

The exchange of technical information is a key step in the overall delivery of services and any delay at this stage can delay the overall completion of an order. Questionnaires, meetings and e-mail updates are used to finalise the technical interconnection details, identify and agree the overall responsibilities (including the details that customers need to provide to complete the orders) and confirm the high-level timescales.

4. SFTI® Support

The SFTI® Support teams interact with a number of Service Desks to ensure the most expedient path to fault analysis and resolution. These desks are aligned directly with the markets that SFTI® supports and therefore the services to which each customer has subscribed.

The task of connecting to and from multiple locations in a multi-vendor environment involving the delivery of multiple services is inherently complex. In an effort to manage this complexity, streamlined coordinated procedures have been developed, as well as a single point of contact to coordinate customer interaction from preliminary enquiries through provisioning, testing and cutover to operational support.

At the point of agreeing connectivity to a specific market centre customers are provided with the relevant support contacts for that market. Any issues related to market access should be raised through that market support team who in turn will raise a fault call with the SFTI® support team as appropriate. The market support centres offer a single point of entry for either directly answering operational questions or assisting customers navigate to the appropriate area within NYSE Technologies or within the broader NYSE Euronext group and coordinate and follow-up any response. In any case, centre staff take ownership of the question, issue or problem from the first call until it is addressed to the customer's satisfaction.

5. Further Information

Further information in relation to connecting to SFTI[®], or on any of the services that can be reached via SFTI connectivity, can be provided by a member of the SFTI[®] sales team. The team can be reached as follows:

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Email: sfti-eu-sales@nyx.com