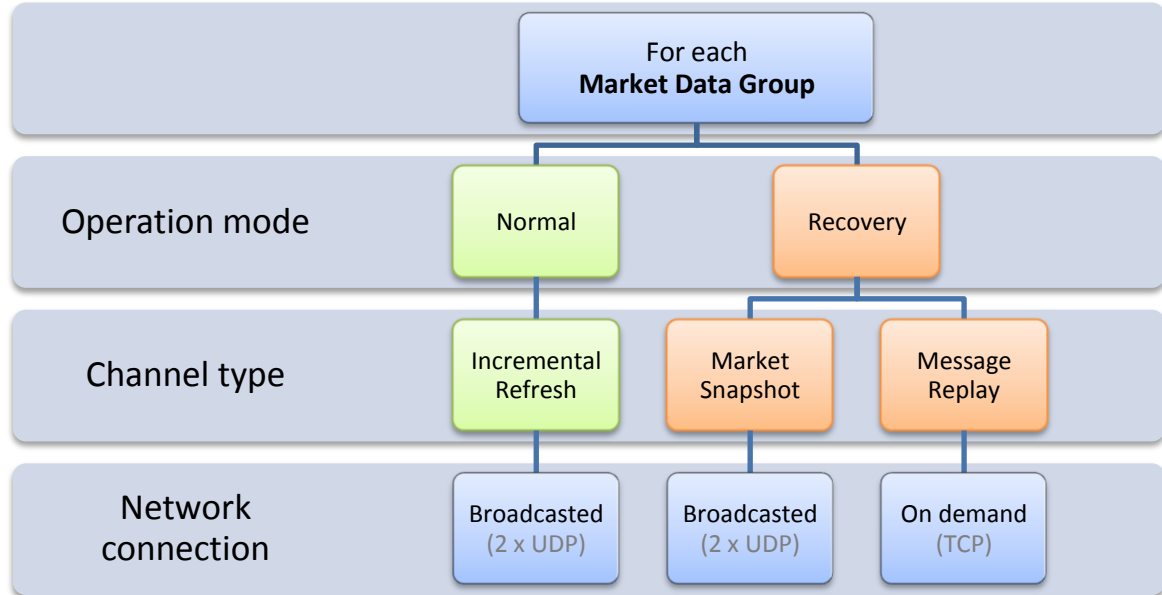


# Connectivity Guide

*This document describes the structure of Market Data Platform version 5.1.0*

## Market Data Overview

This diagram shows when different network feeds are in use:



The RTS Market Data Platform has been architected for fault tolerance by providing two redundant streams of data, disseminated from two diversely located data centers. There is one data flow from each site: feed 'A' from the A site/server and feed 'B' from the B site/server. The two feeds carry identical information.

## Market Data Group

Market Data Group is a set of UDP and TCP connections used to provide specific types of market data messages for a group of instruments. Each group has fixed **Market ID** value and **Feed Type**. So, each combination of Market ID and Feed Type uniquely defines single Market Data Group.

Graphically this can be presented as follows:

		Market Data Feed Types				
		Top of Book	Top 5 Price levels	Trades & Fundamentals	Instruments	Index
Specific for Market ID	Futures	Incremental, Snapshots, Historical Replay	Incremental, Snapshots, Historical Replay	...	...	
	Options	...	...		Volatility data	
	Stocks	...	...	...	...	
<b>Market-wide</b>		n/a	n/a	n/a	n/a	Index values

**Market Data Group**  
"Top 5 price levels on Futures"

As result of this configuration structure it is possible to have highly granular subscriptions and separate recovery patterns for different market data types. For example, client systems are able to recover all missed trade history of the day and use only snapshot recovery for price level updates.

### Market Data Group structure

Each **Market Data Group** has several **Network Feeds**:

Operations	Network Feed	Type	Contents
Normal	<b>Incremental Refresh</b>	UDP	Feed 'A' – copy of updates
			Feed 'B' – copy of updates
Recovery	<b>Market Data Snapshot</b>	UDP	Feed 'A' – Current/Last market state broadcast
			Feed 'B' – Current/Last market state broadcast
	<b>Message Recovery</b>	TCP	Replay of missed update messages by their numbers

Customers can subscribe to several market data feeds by joining the UDP multicast groups, specified in configuration file.

Feeds 'A' and 'B' carry identical information (binary equal) and can be used for backup purposes.

### Connection Types Definition

This section contains general description and basic use-cases of network connections. Please refer to **Recovery Procedures** document for detailed description of late join and recovery scenarios.

#### Market Data Snapshots

This feed type is also known as “Market Recovery”. It is used to disseminate market data snapshots for all books with any number of active orders. Snapshots are repeatedly replayed at a constant flow. Snapshots never provide updates and can be ignored in normal mode. Clients can subscribe to Market Snapshot feeds and synchronize their books with the current market at any time.

A single FIX/FAST Snapshot message will contain current market data for a specific instrument and the sequence number (field 369, LastMsgSeqNumProcessed) of the latest incremental refresh message included into this snapshot. This sequence number should be used for synchronization of market data delivered via snapshots and incremental refresh feeds.

#### Incremental Refresh

This is where all updates to all types of market data are normally distributed. Please note that a single FIX/FAST message can carry multiple updates for multiple instruments.

#### Message Replay

The Message Replay service allows you to request a replay of a set of messages already published on the UDP **Incremental** feeds. The request should specify message range to be replayed. The request uses the FIX Market Data Request message (Tag 35=V) and responses can be the FIX Market Data Request Reject message (Tag 35=Y) or the list of messages to be replayed.

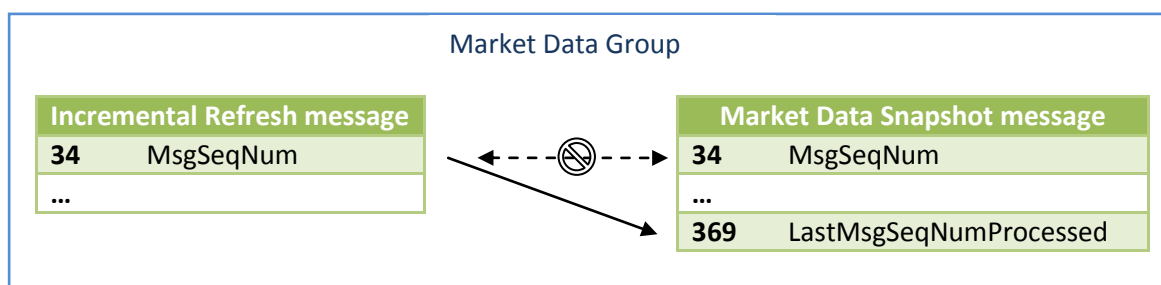
Message Replay service can recover messages since the last sequence reset only; Snapshot messages cannot be recovered.

This type of request is sent through a new TCP connection established by the customer. The responses are sent through this same connection and the connection is then closed by server once the resend is complete. All responses are FIX/FAST encoded (including the reject response). Replay is limited in the number of messages that can be requested.

## Sequence Numbers

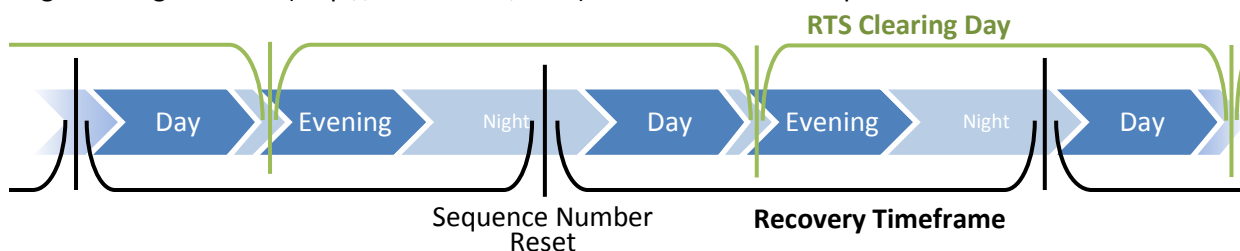
Each Market Data Group (group of network feeds) uses its own message sequence numbering for all Incremental feeds. These numbers have no business meaning and are not associated with Trading Session or Trading Day.

Sequence numbers (field 34, MsgSeqNum) of Snapshot messages are separated from sequence numbers (field 34, MsgSeqNum) of Incremental Refresh messages:



Sequence numbers are reset by the Platform every night during non-trading hours, before day session pre-opening period. Explicit Sequence Reset FIX message will be broadcasted once per Incremental Refresh feed. Client systems may request replay of any message missed since the last sequence reset.

E.g.: Trading schedule (<http://www.rts.ru/s962>) of RTS Futures and Options market:



## Subscription scenarios

This section contains information on common connection lifecycle. Usually there's no need to disconnect from Market Data Platform services at all – client systems can be online at all times.

### Common Process

Exact schedule of market events depends on RTS Market Type.

#### Before Trading Hours

1. Update configuration:
  - a. Check for a fresh copy of **Network Configuration** file.
  - b. Check for a fresh copy of **FAST Templates** file.
2. Subscribe to Supplementary Market Data:
  - a. Subscribe to **Security definition** feed to refresh list of available securities, their type and assigned Marked ID.
  - b. Subscribe to **Market News** feed if needed.
  - c. Subscribe to **Volatility** feed if needed.
3. Subscribe to **Incremental Refresh** channel for all desired Market Segments and Subscription Types. Follow the 'Late Join' recovery strategy if needed.
4. Listen for possible **Sequence Reset** messages.
5. Wait for the trade **session pre-opening**.

## Pre-opening Period

1. Refresh Level 1 data:
  - a. Information for the new trade session will be broadcasted via Incremental Refresh.
2. Refresh new trading session Level 2 & Level 3 books:
  - a. Expired orders will be deleted via Incremental Refresh messages as usual.
  - b. New and Updated orders will be reported as usual.
3. Unsubscribe from **Security definition** feed if all instruments were updated.
4. Wait for the trade **session opening**.

## During the Trade Session

1. Receive various **Incremental Refresh** messages when market event occurs.

## After Trading Hours

1. Receive trade **session closed** notification.
2. Receive **official trading results** via **Incremental Refresh** from Trades Market Data Feed.
3. Request for particular missed messages to restore Market History.

## Configuration file updates

Please note that channels' IP addresses & ports can be changed before the trading session.

Client systems should check for configuration file modifications at least once per week. The easiest way is to send HTTP request with 'If-modified-since' header. Exact URL of files (both FAST Templates & Channels Configuration) is available upon request. Configuration files are also available via FTP services. Exact location and credentials will be provided upon request.

Please refer to **Format and Compression** document for more details on FAST template updates.

## FAST Templates File Format

RTS Market Data Platform uses FAST Template definition format described in [Basic FAST User's Guide](#), version 1.0.

## Network Configuration File Format

All Market Data Group network feeds are fully described in XML configuration file.

## Other formats

Please open Network Configuration file with any modern web browser to see easy-to-read overview and **human-readable representation** of the file contents.

Special transformation template is provided to convert RTS configuration file to **CME-like** format.