Informational and Statistical Server

Application Programming Interface for the Moscow Exchange ISS

Developer manual

Version 1.4

Contents

About ISS

Informational & Statistical Server (ISS) is the essential part of the Moscow Exchange Web infrastructure and it serves to provide client applications with data from MOEX markets over the Internet.

The following data are available: static market data (boards, securities and their description), numbers to generate candlestick charts, trades, best quotes, general market data, historical trade results and chart data.

It is possible to get delayed market data for free or subscribe for real-time.

Orderbooks and historical data are only available to the paid subscribers.

Interaction with the ISS is based on http protocol. Authentication can be performed with https protocol.

Syntax of requests

Please note: Default language of ISS responses is Russian. In order to switch to English append the "lang=en" parameter to all the requests described below.

Usage: " (request_body)**?lang=en** " or " (request_body)?(parameterN=M)**&lang=en** "

Requests to the ISS for data are formed as URLs with arguments. The syntax is based on the RESTful[1] concept which means that the arguments are not only appended to the end of the URL, but constitute the link itself.

For example the request for History by market may look like:

http://iss.moex.com/iss/history/engines/stock/markets/shares/boards/tqbr/securities.xml?date=2013-12-20

Arguments that constitute the URL are defined by the syntax of every particular request. According to the RESTful concept each argument is preceded by the path element which defines the group of objects the argument points at.

The available groups of objects are:

`/engines/(trade_engine_name)`

`/markets/(market_name)`

`/boards/(boardid)`

`/boardgroups/(board_group_id)`

`/securities/{secid}`

Values for the first four arguments can be received with the *index* request. For the last one – with the *securities* request.

Arguments appended to the end of the URL can belong to a block in result set or to the whole result set or define system-wide options.

All the request-specific arguments are listed in the description of the request syntax. They can be applied to a particular block in the result set as *block.argument*= or given as *argument*= and in this case the argument will apply to the whole result set.

The system arguments are:

- `iss.meta=on|off` – show or hide metadata (name, type and size of fields in result set);
- `iss.data=on|off` – show or hide dynamic market data;
- `iss.only=block1,block2` – the result set may contain several data blocks, this argument defines the custom set of blocks to return;
- `<block>.columns=<id>,<id>` – define the custom set of fields for a block in result set; for example *boards.columns=boardid,board_title* It is also possible to indicate the block sequence number instead of its name like *first.columns, second.columns*;
- `iss.json=compact|extended` – use compact or extended syntax of json in the result set;
- `iss.version=on|off` – when set to 'on' (default is 'off') then the reply header will include the query version (X-Micex-ISS-Query-Version) and the data block version (X-Micex-ISS-Statement-Version).

[1] see http://en.wikipedia.org/wiki/RESTful

For CSV requests the following additional arguments are available:

- `iss.dp=comma|point` – decimals delimiter;
- `iss.delimiter` – field delimiter, for example iss.delimiter=;
- `iss.df` – data format;
- `iss.tf` – time format;
- `iss.dtf` – date and time format;

Date and/or time format is specified using the syntax of the Unix strptime function:

%a – day of the week name (abbreviated);

%A – day of the week name (full);

%d – day of the month (01 - 31);

%D – date as m / d / y;

%H – hour of 24-hour clock format (00 - 23);

%I – hour of 12-hour clock format (01 - 12);

%j – day number of the year (001 - 366);

%m – month number;

%M – minute;

%n – [space];

%p – AM or PM;

%r – 12-hour clock time using the AM/PM notation;

%R – time as Hour:Minute;

%S – seconds;

%T – time as Hour:Minute:Seconds;

%U – week number of the year (Sunday as the first day of the week; first Sunday of January is the first day of the first week);

%w – weekday as a decimal number (0,6), with 0 representing Sunday;

%W – week number of the year (Monday as the first day of the week; first Monday of January is the first day of the first week);

%x – date using server's locale;

%X – time using server's locale;

%y – year within century. When a century is not otherwise specified, values in the range (69,99) shall refer to years 1969 to 1999 inclusive, and values in the range (00,68) shall refer to years 2000 to 2068 inclusive;

%Y – year (full).

The standard Apache compression is supported.

Authentication

The ISS uses the mechanism of basic authentication[2] which means that the username and password are sent to the server in the request header encoded according to the specification as base64 string.

The following ways to authorize are available:

1. Using the HTTPS protocol with a special URL: https://passport.moex.com/authenticate
2. Using the HTTP protocol with any request URL (not recommended).
3. It is possible to connect without authentication data, in this case orderbooks and historical data will not be available while the rest of the market data will be provided with a 15-minutes delay (except for the indices which are always available in real time).

In case of the successful authentication, the server reply will include a cookie named *MicexPassportCert,* which contains the authentication certificate. This cookie should be stored until the specified expiration date and it should be sent with all the following requests with no need to repeat the basic authentication.

Note that because the ISS does not return a request for authentication (http status 401), some of the programming libraries implementing basic authentication may fail to connect, because they will be expecting such a reply. In this case the authentication data should be added into the request header manually.

Upon the cookie expiration the server will issue a new one.

If there is a "X-MicexPassport-Marker: granted" key in the reply header then the data is being provided as the result of successful authentication. If the key is set to "denied" then either the resource is not available because there is no valid subscription (Status 403) or there is no subscription, but the delayed data has been indeed provided (Status 200).

Reply format

The reply format is specified after the dot at the end of the URL before the arguments.

Example:

http://iss.moex.com/iss/history/engines/stock/markets/shares/boards/tqbr/securities.json?date=2013-12-20

The following formats are available: XML, CSV, JSON, HTML.

The server returns data as the standard http reply including the appropriate Content-type (application/xml, text/csv, text/html, text/plain for json) and character encoding (windows-1251 for CVS and UTF-8 for the rest).

There can be several data blocks in reply, each having an independent set of fields (columns).

For example the request for the general market structure

http://iss.moex.com/iss/index.xml

returns the following blocks: markets, boards, board_groups. And the request for market data

http://iss.moex.com/iss/engines/stock/markets/index/securities.xml

returns three blocks: securities, marketdata and dataversion; the first one is static and can be downloaded only once during the trading day, while the others contain dynamic data.

[2] see http://en.wikipedia.org/wiki/Basic_access_authentication

Every block in XML and JSON formats contains two sections: metadata and the actual data. Metadata describes the type and the length of fields with data. The indicated length equals to the longest string in the result set and it is expressed in bytes (number of symbols multiplied by 3).

Notes on data processing

- The DECIMALS attribute in result sets with securities shows the number of decimals in prices that should be actually used for each security.
- If there is a non-empty PRECISION attribute in the field description then all the values in this field must be rounded to the given number of decimals. This value supersedes the DECIMALS attribute.
- The SEQNUM field in result set contains the unique number of table snapshot. This number can be provided as the argument to some requests to download updates incrementally.
- Reply with securities, trades and orderbooks contain the DATAVERSION block. SEQNUM field in this block shows the initial sequence number for the given version of this table. When data version increases SEQNUM changes (it may either increase or decrease too). This field may be used to detect transition between trading days.
- Metadata with field description may contain the following additional attributes: is_signed – flag indicating that the field contains a signed number; has_percent – flag indicating that the field contains numbers expressed in percents; alias – alternative field title.
- Some requests have the *start* argument which defines the number of row to begin the result set with. If this argument is present in the definition of request syntax then it means that the result set will contain only part of the requested data (first 100 rows, for example). So in order to get the complete result set it is needed to iterate over the request while increasing the value of *start* by the number of rows received on the previous iteration. The enumeration starts with 0.
- The ISS server is fully based on the HTTP protocol, so in case of problems the appropriate 500-504 status code may be returned. In such a case another attempt should be made a little bit later.
- Structure of XML reply is dynamic, so it will be wrong to address its elements by their sequence number. The correct way to address elements is by their position in hierarchy, ID (like id=”securities”), name (like name=”SECID”), pairs of unique keys (like BOARDID+SECID).
- While historical data is available to subscribers only, developers who need to implement access to the trade results can use MICEX indices data as the reference, because this information is available at no charge.

  For example:
  http://iss.moex.com/iss/history/engines/stock/markets/index/securities.json?date=2010-08-20

Requests and their syntax

The online reference is available at

http://iss.moex.com/iss/reference?lang=en

All the requests listed in the reference should be prefixed with:

http://iss.moex.com/

Online reference How-to

All the requests listed in the online reference should be used in the context of one of the namespaces. Currently there are two namespaces available:

- /iss – market data returned by the Trading system;
- /iss/history – historical data and trading results.

Both namespaces contain a certain number of similar data objects but some objects are specific for one of the namespaces. The following object types are available depending on the ending of the request URL:

- /[security] – market data on security, board or market;
- /trades – trades register;
- /orderbook – orderbook;
- /columns – columns description;
- /candles – pre-calculated data for generating charts (candles);
- /candleborders – intervals for which candles are available;
- /dates – dates for which trading results are available;
- /turnovers – turnovers;
- /zcyc – data on zero-coupon yield curve (G-curve);
- /listing – security listing history for different boards.

ISS also serves the requests for obtaining market structure and provides the instrument finder. These requests are also listed in the online reference.

There are some limitations on data availability depending on user permissions and authentication status:

- /iss/history – all the historical data (except indices) is available for subscribers only. Indices data is available for all users;
- /iss:
    - the data on markets structure and board groups (requests with "/iss/engines" prefix), turnovers, Security Finder, Description of securities (specifications), and other general data is available for all users;
    - unauthorized and unauthenticated users have an access to all the market data with 15 min. delay except orderbook that is available for subscribers only. Indices data is available for all users on-line.

Most of requests contain "engine", "boardgroup", "board" and "security" parameters. Please be informed that "board" and "security" parameters correspond to real identifiers of boards and securities in the Trading system while other parameters are specific for ISS only.

All the above mentioned parameters are usually remain static during the trading session so the requests for markets structure, boards and securities may be performed once a day.

The following example shows a typical workflow of obtaining the needed information by sequentially requesting data objects using general-to-specific approach.

Example: Get the MICEX Index values for August 23-24, 2010.

1. Obtain stock market engine identifier in the ISS

    Request: http://iss.moex.com/iss/engines.xml

    Obtained value: "stock"

2. Obtain the list of markets hosted on Stock engine

    Request: http://iss.moex.com/iss/engines/stock/markets.xml

Obtained value: "index"

3. Find out the board name for the needed Index

Request:
http://iss.moex.com/iss/engines/stock/markets/index/boards.xml

Obtained value: "SNDX"

It's recommended to use "/listing" requests for stock market to obtain security listing history by boards and listing levels for the particular periods of time.

Full engines, markets and boards structure may be obtained with http://iss.moex.com/iss.xml request.

4. Find the needed instrument

Request by market's securities:

http://iss.moex.com/iss/engines/stock/markets/index/boards/SNDX/securities.xml

Request by Security finder:

http://iss.moex.com/iss/securities.xml?q=MICEX

Obtained value: "MICEXINDEXCF"

5. Request the resulting Index values for August 23-24, 2010 using all the previously obtained parameters

Request:
http://iss.moex.com/iss/history/engines/stock/markets/index/boards/SNDX/securities/MICEXINDEXCF.xml?from=2010-08-23&till=2010-08-24

The following requests may also be formed using the data obtained as described above:

- columns description for the request formed at step 5:
  http://iss.moex.com/iss/engines/stock/markets/index/securities/columns.xml
- list of dates for which the historical data is available:
  http://iss.moex.com/iss/history/engines/stock/markets/index/boards/SNDX/securities/MICEXINDEXCF/dates.xml
- list of dates and intervals for which the candles data is available:
  http://iss.moex.com/iss/history/engines/stock/markets/index/boards/SNDX/securities/MICEXINDEXCF/candleborders.xml
- candles data (for charts generation):
  http://iss.moex.com/iss/history/engines/stock/markets/index/boards/SNDX/securities/MICEXINDEXCF/candles.xml?from=2010-08-08&till=2010-08-25&interval=24&start=0

Each article in the online reference contains a list of data blocks that will be returned by ISS in response to the particular request.

Example:

Request: /iss/engines/[engine]/markets/[market]/securities

Data blocks returned:

- securities – static data on securities;
- marketdata – dynamic market data;
- dataversion –sequence number of the returned table snapshot.

The following parameters may be applied in this case to each of the data blocks in order to specify the data to be returned by ISS:

- lang – reply language: "ru" or "en";
- securities – list of securities to be included into reply (filtration);
- seqnum – sequence number of the snapshot to get relative changes (updates) for.

These parameters may be applied either to the specific data block or to all the data blocks, the specified parameter is applicable to.

Example:

Request:
http://iss.moex.com/iss/engines/stock/markets/index/securities.xml?securities=MICEX10INDEX,MICEXINDEXCF

This request should be used to obtain both static and dynamic data for MICEX10INDEX and MICEXINDEXCF Indexes.

Request:
http://iss.moex.com/iss/engines/stock/markets/index/securities.xml?marketdata.securities=MICEX10INDEX,MICEXINDEXCF

In this case ISS will return static data for all the Indexes available and dynamic data only for MICEX10INDEX and MICEXINDEXCF.

ISS also provides a service data block "cursor" for a number of requests that displays the relative position of the current data chunk returned to the entire amount of data available for this request.

Example:

Request:
http://iss.moex.com/iss/history/engines/stock/markets/shares/securities/MOEX

The "history.cursor" block in this request contains the following fields:

- INDEX – the beginning of the current data chunk (row number in the total amount of data available), may be defined by "start" parameter in the request;
- TOTAL – total amount of data (number of rows) available for this request;
- PAGESIZE – amount of data (number of rows) in the current data chunk returned may be defined by the "limit" parameter in the request (default value is 100; 50, 20, 10, 5, 1 are also applicable).

Thereby to obtain the whole amount of data available, this request should be performed several times sequentially with the "start" value increased by the "pagesize" value at each iteration:

http://iss.moex.com/iss/history/engines/stock/markets/shares/securities/MOEX

http://iss.moex.com/iss/history/engines/stock/markets/shares/securities/MOEX?start=100

http://iss.moex.com/iss/history/engines/stock/markets/shares/securities/MOEX?start=200

… and so on while (INDEX + PAGESIZE) < TOTAL.