



**BORSA
İSTANBUL**

Information Technologies

About Borsa İstanbul

Borsa İstanbul is the sole institution in Turkey that offers, jointly with its affiliates Takasbank and the Central Registry Agency, trading, settlement, custody and registration services in Turkey for a wide range of products including equities, debt instruments, repo, warrants, futures and options, certificates and exchange traded funds (ETFs). Following the promulgation of the new Capital Markets Law in 2012, Borsa İstanbul underwent a comprehensive reform package, in line with which, it was demutualized and privatized. Borsa İstanbul acquired the futures market and precious metals market, and taking two domestic post-trade institutions under its control, strengthened the legal grounds for transparency and investor protection.



NASDAQ OMX to provide Borsa İstanbul world's leading technology

Adding to the regional and global efficiency of both markets, the partnership will contribute to the İstanbul International Financial Center (IFC-İstanbul) project. This partnership is a significant turning point not for Borsa İstanbul only, but also for our region and the global securities exchange business.

We aim to position Borsa İstanbul as an integrated securities exchange offering trading of all assets traded on the global markets, and offer an international platform operating with state-of-the-art technology for issuers, investors and the other market participants. This partnership is not limited to technology and know-how transfer; it also forms the basis of a strong partnership allowing both parties to benefit from the business and investment opportunities in the Eurasia region. We will efficiently operate NASDAQ OMX's suite of world-class market technology with NASDAQ OMX team. As Borsa İstanbul information

technology team will gain full control and in-depth knowledge on technology, Borsa İstanbul will secure a self-contained nature in the near future.



Technology Driven Growth

Technology Driven Growth

- **A new structure that includes İMKB, Turkish Derivatives Exchange (TURKDEX), and İstanbul Gold Exchange**
 Turkish Derivatives Exchange (TURKDEX), İstanbul Gold Exchange and İMKB merged under the roof of Borsa İstanbul. Capital Markets Law was revised in order to ensure that this process runs smoothly.

The conversion has been completed for the systems of Borsa İstanbul, which comprises all exchanges, to encounter the investors in an integrated, fast and secure manner.

Three exchanges merge
 One for all, all for Borsa İstanbul.

- **200+ server system operations**
 - **Daily approximate number of orders**

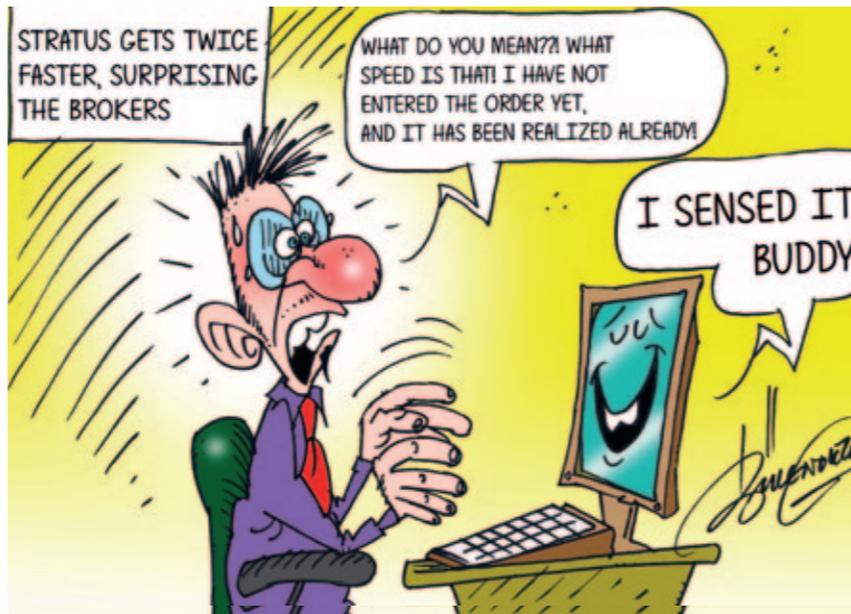
900,000 on the Equity Market; 20,000 on the Debt Securities Market; and 100,000 on the Futures & Options Market

- **Daily approximate number of trades**
 500,000 on the Equity Market; 10,000 on the Debt Securities Market; and 47,000 on the Futures & Options Market

Stratus gets twice faster, surprising the brokers
 What do you mean??! What speed is that! I have not entered the order yet, and it has been realized already!
 I sensed it, buddy!

More secure infrastructure, faster service
 - Data center up to the latest technology standards
 - Disaster Recovery Center in Ankara
 - Co-location services
 - Infrastructure suitable for trading at a fast speed

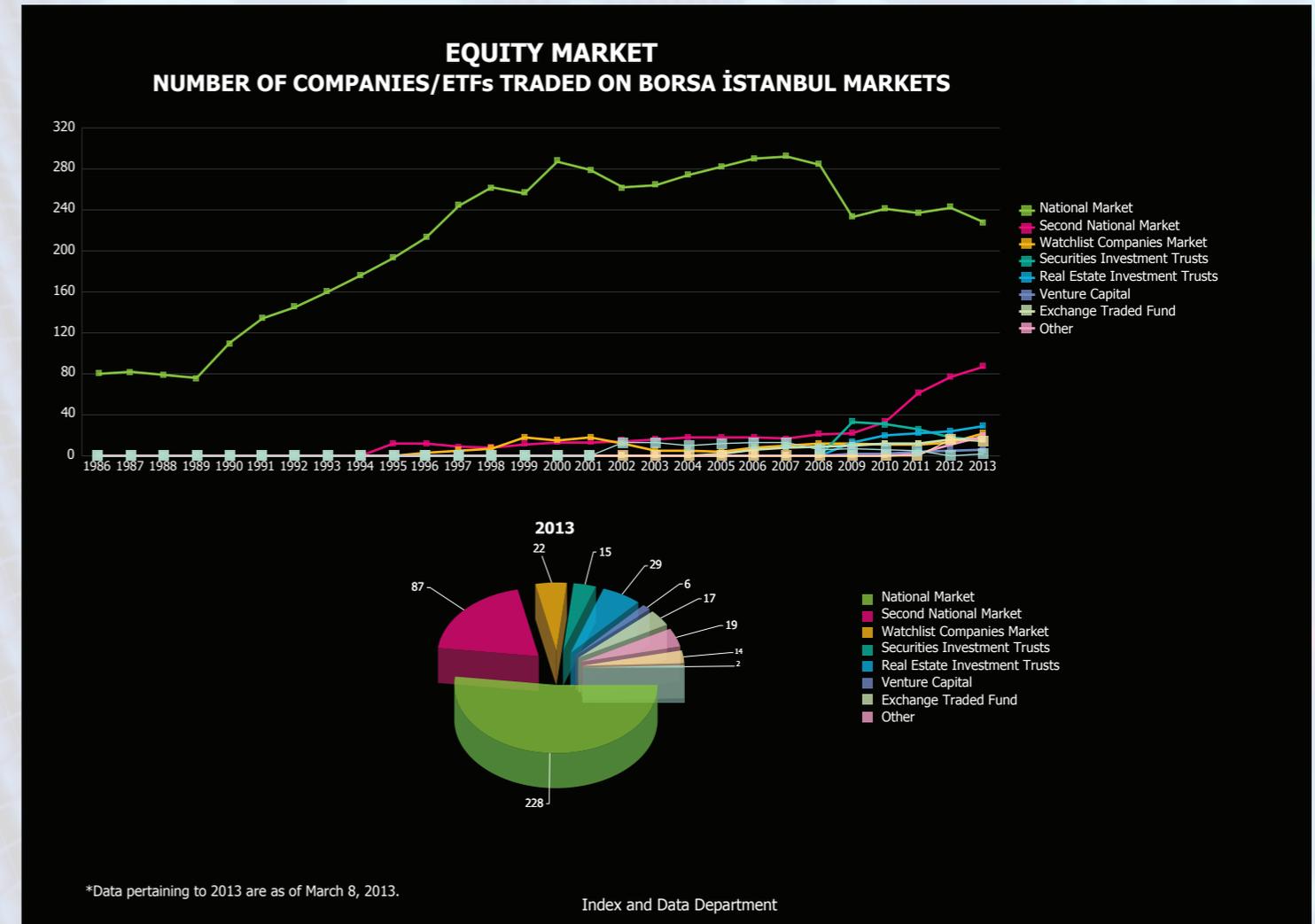
New technologies are introduced
 - FIX offers order transmission infrastructure up to the world standards
 - Fiber connection with the members



Business Intelligence Reports

Borsa İstanbul uses MicroStrategy, a Business Intelligence product, in order to report data internal/external to Borsa İstanbul. Thanks to the intelligent reports accessible from Intranet, Internet, iPhone, iPad, and Android based mobile equipment, work unit users are able to use ready reports and dashboards, while they can also prepare their reports easily thanks to visual interfaces. The basic features of Business Intelligence Reports are as follows:

- **Effective Reporting Environment**
 Fast and efficient reporting thanks to strong infrastructure
- **Visual features**
 Displaying the reports in a variety of graphs
- **Accessibility**
 Access to the reports through both web and mobile applications
- **Data Sending**
 Sending the reports to the required targets automatically at pre-determined times.



Disaster Recovery Center Moves To Ankara

Within the framework of Borsa İstanbul Business Continuity processes, the Back-Up Center Venue in Takasbank building, which was called “temporary” due to its limitations, was used until October 2012. After that, in accordance with the management’s instructions, endeavors on establishing a “Disaster Recovery Center” outside İstanbul, which is not subject to the limitations and risks of the Back-Up Center Venue were initiated.

As a result of the research carried out within this framework, the Data Center services provided by Türk Telekom (TT) in Ümitköy, Ankara were examined and found appropriate for use as Disaster Recovery Center. In addition to the logistical and geographical advantages of the venue, the fact that it hosts the back-up centers of other capital markets institutions such as Takasbank and Central Registry Agency, and is therefore advantageous in terms of operation and communication costs, was central to this decision.

Consequently, all the systems and equipment in the temporary back-up center were moved to Ankara on October 25-28, 2012 and Borsa İstanbul Disaster Recovery Center has been operating in Ankara since then. A two-phase disaster recovery test scenario was performed for Borsa İstanbul Disaster Recovery Center with the participation of the Information Systems and all Borsa İstanbul units.

FixAPI Project

In addition to the order transmission methods used in the Equity Market, namely, broker terminal and ExAPI, a new “FIX (Financial Information eXchange) Protocol” based order transmission infrastructure is planned for launch in 2013. Thereby, Borsa İstanbul members will be able to transmit orders to the System by three different methods. As the FIX protocol, which is used in other markets as well, becomes operational, members will be allowed to collect orders and send such orders to the System at international standards.

Wide Area Network Project

The connection speed of all of the Equity Market members was increased to 2 Mbps in October 2012, and the infrastructure required to increase the number of orders that members send to the market per second was provided. In the case of members, whose line speed was not increased to 2 Mbps due to the problems in the copper cable infrastructure, were offered this facility through fiber infrastructure. Parallel with the efforts to increase speed, all members that filed requests were allowed to use the fiber infrastructure. The connections of 30 Borsa İstanbul members that wanted to use the fiber infrastructure were transferred to TT and Superonline’s MPLS Networks.

For the members that started to use the fiber infrastructure, in order to back up the members’ connections to Türk Telekom network, endeavors with Superonline were completed, thereby allowing members to connect to Borsa İstanbul over an alternative Telekom operator at redundancy.

Factors that compelled the initiation of fiber infrastructure use included the integration of the Turkish Derivatives Exchange (TURKDEX) with Borsa İstanbul Futures & Options Market; fiber lines allow faster and higher number of order transmission per unit time; order transmission through FIX interface will be allowed in the near future; effort is made

to combine the layer for communication with Takasbank and the Central Registry, and the new requirements which may arise within the framework of strategic partnership. This situation was announced to members through meetings and General Letters.

Members that work at a speed of 2 Mbps on the copper and fiber infrastructure were allowed to increase the speed to 5 Mbps independent of number of terminals, starting from July 2013, provided that they operate on the fiber infrastructure. 62 members currently use the fiber infrastructure of TT and/or Superonline, and 25 of them are connected to Borsa İstanbul at a speed of 5 Mbps.



Establishment Of A Data Center



Thanks to the significant IT investments of late, Borsa İstanbul renewed its structure, and aims to become the leader of its region. In addition to its physical and human resources investments, Borsa İstanbul is planning to establish new offices and a data center in its İstinye campus. The Data Center project in progress is aimed at renewing and increasing the capacity of the current data center; establishing a Common Data Center and a Common Communication Platform, under the Common Technology Platform, which is an action under İstanbul Financial Center project; and offering co-location services for Borsa İstanbul members' systems.

The settlement and custody room under the foyer in the building will be converted into a data center and

co-location center (server location service) to fulfill short-term needs. As the investment will be completed, order transmission speed will be increased by 3-4 fold.

Thanks to the recent IT investments, intermediary institutions' order transmission speed has started to increase significantly. In order to allow orders to be transmitted very fast, some space will be allocated for intermediary institutions in the building, thereby orders to be sent from outside will be transmitted in the fastest manner. The current Trading Floor will be maintained for symbolic purposes. However, under the current conditions, where order transmission speed has increased considerably, and is expected to increase even more, the location

of intermediary institutions' servers is important. Therefore, Borsa İstanbul management aims to provide co-location for the servers of intermediary institutions in the campus and lease such area to intermediary institutions. Currently, it takes 170-180 milliseconds for an order to be transmitted from an intermediary institution to Borsa İstanbul (which means 3-4 orders per second), whereas once the data center, which will cost approximately 25 million US Dollars, is completed, order transmission speed will increase by 3-4 fold to reach Borsa İstanbul in 60-70 milliseconds. As servers are now the most important capital of Borsa İstanbul, the electronic environment has become the center of all services.

Borsa İstanbul on the Way to İstanbul International Financial Center and the Path of Technology

Following the global crisis, at a time when international investment decreases and a new financial structure is sought, it is very important for İstanbul to appear on the scene with a competitive structure. In consideration of Turkey's strong place in East Europe, Middle East and Central Asia in terms of economic and financial development, İstanbul has the potential to become first a regional, and then a global financial center. Turkey's recent economic performance and the joint efforts of the institutions active in the financial sector show that the vision of making İstanbul an international financial center is very realistic. The target is to make İstanbul International Financial Center dominate the region within a decade, and then become a leading international financial center within 30 years. İstanbul's pool of qualified work force and potential of developing local/ regional economic development are its main features.

In light of the positive developments in the Turkish economy and politics and the growing potential of the financial services industry, İstanbul's potential to become an international financial center was evaluated. For İstanbul to become an international financial center, the quality of the infrastructure, legislative framework, communication, and education must be improved while ensuring political and economic stability.

Furthermore, the following items are important in realizing İstanbul International Financial Center project: Enlarging the share of hardware, software, and IT services in the information and communication

technologies market, ensuring standardization in the sector in order to improve service quality, establishing sectorial standards and arrangements, ensuring integration in the sector and offering services, enlarging the share of software, ensuring that public acquisitions are made through sectorial arrangements.

In order to improve qualified staff resources in the information systems sector, and thereby increase employment in Turkey, effort must be made on training and legal arrangements, and for the profitable growth of the information systems sector, training and consultancy services must be provided for the sector.

İstanbul International Financial Center project is included in the Ninth Development Plan covering 2007-2013, and became effective in accordance with the Medium Term Program covering 2010-2012. The project is carried out under the coordination of Turkish Ministry of Development.

Aware of its place in the global financial sector's perception of İstanbul, Borsa İstanbul updates its market arrangements rapidly, while introducing new markets, products and services in an effort to catch up with the sector's international standards. Within this framework, a pre-agreement for strategic partnership was signed with Nasdaq OMX Group on July 3, 2013, in order to contribute to both İstanbul's efforts to become an international financial center, and Borsa İstanbul's target to become a global market. With this pre-agreement, Nasdaq

OMX's information systems technology will become applicable for all financial contracts. We also aim to renew our technological infrastructure, add to our product diversity, and global interaction. This partnership is more than one for technology only, it is rather one that includes joint investment projects in the Eurasia region.

Borsa İstanbul offers fast information flow through its updated websites, while continuing to contribute to İstanbul's characteristic of being a financial center.

Borsa İstanbul attaches great importance to the research and development of new financial products in order to ensure the sustainable development of our markets. Towards this purpose, a research center will be established jointly with the World Bank for Islamic financial products. In addition to that, work is in progress in order to establish another research institute which will work in cooperation with universities as a technopark.

Borsa İstanbul is an important element of İstanbul International Financial Center project. Therefore, investments made within the framework of İstanbul International Financial Center project may be considered as investments made in the future of Borsa İstanbul. Borsa İstanbul will become a center of attraction where all financial assets traded on global markets can be traded. On the other hand, making İstanbul an international financial center will bring extra liquidity and depth to Borsa İstanbul and lead foreign company listings to increase.

Efforts On Common Technology Platform (CTP)

Efforts on the Common Technology Platform, planned within the framework of the efforts on İstanbul International Financial Center project, are in progress. The first phase is to ensure that all stakeholders use a common electronic communication infrastructure. The next phase involves the creation of common working standards of information security, project and work continuity management disciplines for the purpose of contributing to co-working culture and synergy. Efforts regarding the Common Technology Platform, whose operation, maintenance and security will be provided by a designated stakeholder, and to which the members and foreign networks served by all stakeholders, namely, securities exchanges, market operators, and settlement and custody institutions, connect on redundancy basis, continued. As a result of the evaluation of the efforts and assessments regarding the Common Technology Platform, the relevant institutions were advised that this action item should be converted to more concrete action items for 2013 and later.

Common Data Center

İstanbul International Financial Center Strategy and Action Plan, which went into force upon the decision of the Higher Planning Board on September 29, 2009, determined the priorities for realizing the aim of “making İstanbul first a regional, and finally a global financial center”, and also the actions that must be concluded in accordance with these priorities. Among the 71 actions determined, priority 17 reads: “Technology and communications infrastructure of Turkey shall be strengthened, electronic communications shall

be provided in a fast, reliable, uninterrupted and low cost manner”, and the following action was defined for priority 17: “An integrated structure shall be created to provide common software, hardware and communications services for markets, manage collaterals from one single center.”.

In line with this target, the Primary Data Center project, which will ensure the faster, securer and more integrated operation of the Central Registry Agency, Takasbank and Borsa İstanbul systems is in progress. This project will be operated at increased security level, in consideration of ISO-2701 principles.

On the other hand, joint work on project management and corporate governance is in progress. This intensive joint work will be carried out in line with the strategic partnership efforts of Borsa İstanbul.

A program entitled “İstanbul International Financial Center”, covering 2014-2018, was defined as part of the 10th Development Plan which was published in the Official Gazette dated July 2, 2013 and within the scope of this program, Borsa İstanbul, which had been defined as a cooperating organization, was defined as the responsible organization for “Strengthening Technological Infrastructure”. Borsa İstanbul will continue to work towards the targets envisaged in the 10th Development Plan.

Data Center project, which is designed in order to provide a fast, reliable, secure, efficient and effective communication

environment for the capital markets, which will at the same time allow access to the relevant market, and settlement and custody institution from a single point; in addition to the work on the data center project, which is planned for locating and operating the information technology infrastructures of the relevant capital markets institutions, mainly markets and settlement and custody institutions, have improved significantly. Construction of the data center has been initiated by Borsa İstanbul. It is envisaged that the data center will be launched by Borsa İstanbul during the year 2014, followed by the moving of the information technology infrastructures used for the critical processes of Takasbank and the Central Registry Agency, and thereby, the data center unification is envisaged to start in the second half of 2014.

Furthermore, the contracts traded on the market operated by Turkish Derivatives Exchange (TURKDEX) in İzmir migrated to Borsa İstanbul Futures and Options Market successfully on August 5, 2013. By the same token, the electronic trading system previously operated by İstanbul Gold Exchange started to function on the information technology infrastructure in Borsa İstanbul’s İstinye premises on September 7, 2013, following the completion of the updating efforts. Within the framework of these developments, the wide area networks providing remote access to the markets were consolidated within Borsa İstanbul remote access network and remote connections. The second network used for post-trade operations continues to serve as part of Takasbank. Data Center project will be realized within the framework of the consolidation communication platform project.

While communication with the members started to be provided in a faster and more secure structure as a result of the broadened fiber infrastructure, it will be possible to establish a faster and more efficient market structure through FIX protocol.



Datawall Project

Borsa İstanbul Trading Floor display system contains 36 DLP 50" LED DLP screens; 54 LCD 55" LED screens; Graphic Template Hardware System; 4 CCTV systems with HD camera; control room; control unit; 2 robotic cameras; and 40 Graph templates. The main wall screen system will consist of 36 DLP cubic screen technology. It will be placed in 3 rows and 12 columns at a concave of 3 degrees.

Graph templates consist of the following:

- Indices from 10 different countries
- Borsa İstanbul indices (30-100)
- Main sector indices (10 indices, including industrial, services, financials, etc.)
- Sub sector indices (40 indices)
- Gold Market data and graphs
- ViOP Index, data and graphs
- Logos, ticker codes, prices, price change graphs of the securities traded
- Investment instruments traded on Borsa İstanbul Markets, classified and filtered on the basis of certain criteria, displayed as data and graphics (display of the bulletin information such as the highest and lowest change, change in the traded value, number of trades, and number of contracts, etc.)
- PDP News
- News from Anadolu Ajansı
- Borsa İstanbul announcements and news
- Debt Securities Market indices, data and graphs (Outright Purchases and Sales)
- Debt Securities Market data and graphs (Repo/Reverse Repo)
- Debt Securities Market data and graphs (other)
- Central Bank of the Republic of Turkey currency rates, national and international interest rates (LIBOR) and graphs
- Price information and graphs for precious metals, petroleum, etc.
- Over-the-counter foreign currency market rates and charts
- Treasury Undersecretariat economic data and graphs
- Turkish Statistical Institute economic data and graphs
- Borsa İstanbul logo
- Data pertaining to dissemination companies





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