



# JUNE 2016 UPDATE

THE WORLD'S FASTEST EXCHANGE  
WITH A SPEED OF 6 MICROSECOND'S.

LIQUIDITY • LOWER COSTS • MARKET MAKERS • TIGHT SPREADS • LARGE PARTICIPANT BASE



THE WORLD'S FASTEST EXCHANGE WITH A SPEED OF  
***6 MICROSECONDS***

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# About BSE



## Evolution Of The Exchange

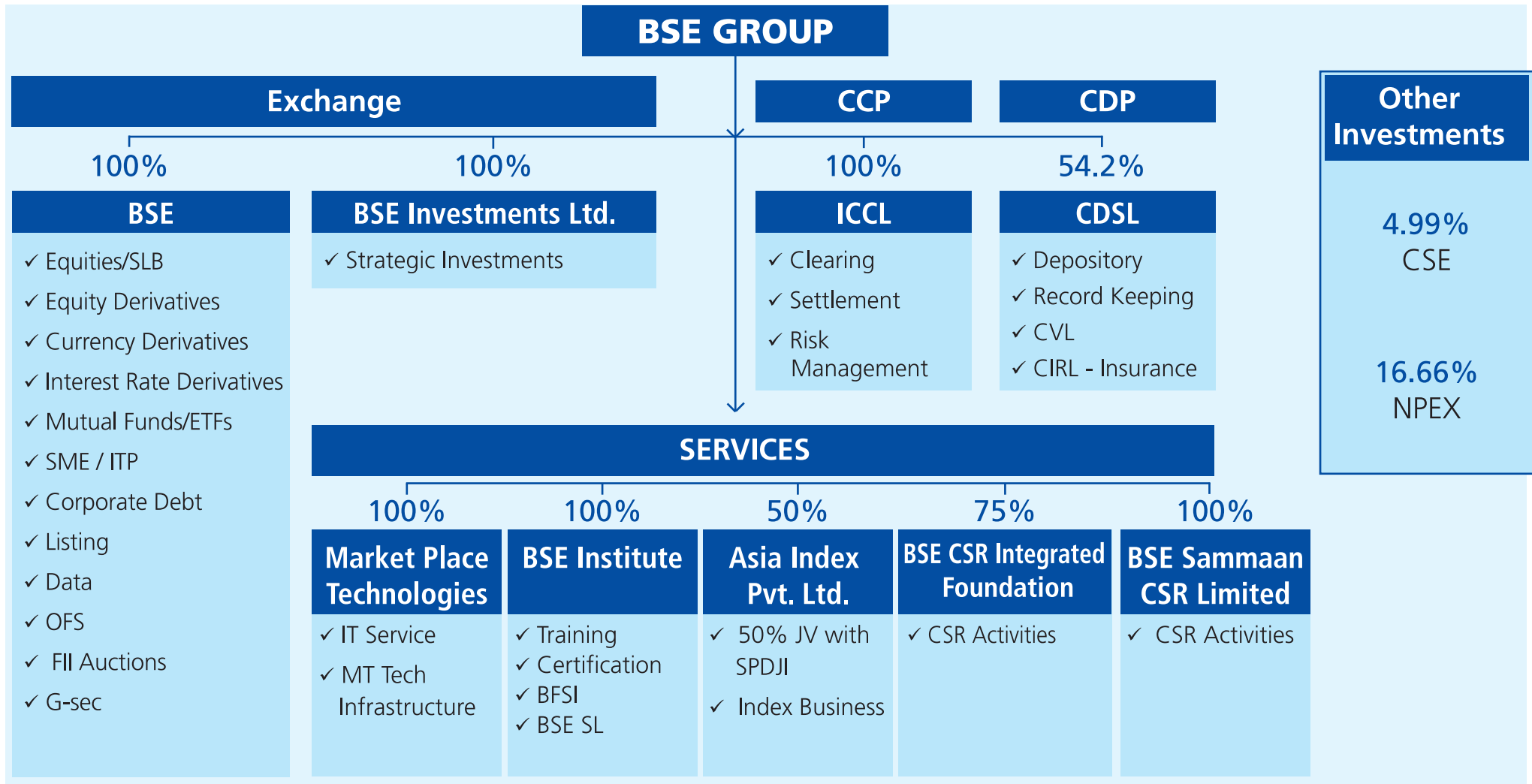


### Key Milestones

| Date                       | Milestones  |
|----------------------------|---|
| 17 <sup>th</sup> May 2016  | BSE signs Memorandum of Understanding with Taipei Exchange for further development of Securities Market and for sharing knowledge and information |
| 28 <sup>th</sup> Apr 2016  | BSE signs Memorandum of Understanding with Korea Exchange (KRX) to launch S&P BSE Sensex based derivatives contracts at KRX                       |
| 05 <sup>th</sup> Apr 2016  | BSE & CMIE launched world's first high-frequency data on unemployment and consumer sentiments   |
| 09 <sup>th</sup> July 2015 | BSE celebrated its 140th Foundation Day   |
| 19 <sup>th</sup> Feb 2013  | BSE enters into Strategic Partnership with S&P Dow Jones Indices  |
| 15 <sup>th</sup> Jan 2011  | Co-location facility at BSE - tie up with Netmagic  |
| 14 <sup>th</sup> Mar 1995  | BSE On-Line Trading (BOLT) system introduced  |
| 2 <sup>nd</sup> Jan 1986   | S&P BSE SENSEX , country's first equity index launched (Base Year:1978-79 =100)   |
| 31 <sup>st</sup> Aug 1957  | BSE granted permanent recognition under Securities Contracts (Regulation) Act (SCR)   |
| 9 <sup>th</sup> Jul 1875   | The Native Share & Stock Broker's Association formed  |



# BSE Group – A Complete Securities Eco-system



% Stake of BSE

# Partners in Progress

## Highlights



- Alliance with leading global exchanges
  - Deutsche Börse
  - Singapore Exchange
- Key local Indian investors provide credibility and support
- Cross listing of benchmark index S&P BSE SENSEX in BRICS countries



State Bank of India

- 4.75% investment in BSE as key user and supporter of platform



- Sensex Licensing to Korea Exchange



- SGX has invested 4.75% investment in BSE to build Asian gateway of securities and derivatives



- Board Presence
- Eurex T7 trading architecture
- 4.75% investment in BSE to expand Asia presence and increase footprint in multiple time zones



- Calculation & maintenance of all BSE Indices
- Index Product sales abroad
- Partnership on Index products



भारतीय जीवन बीमा निगम  
LIFE INSURANCE CORPORATION OF INDIA

- 4.68% investment in BSE as key user and supporter of platform
- Board Presence



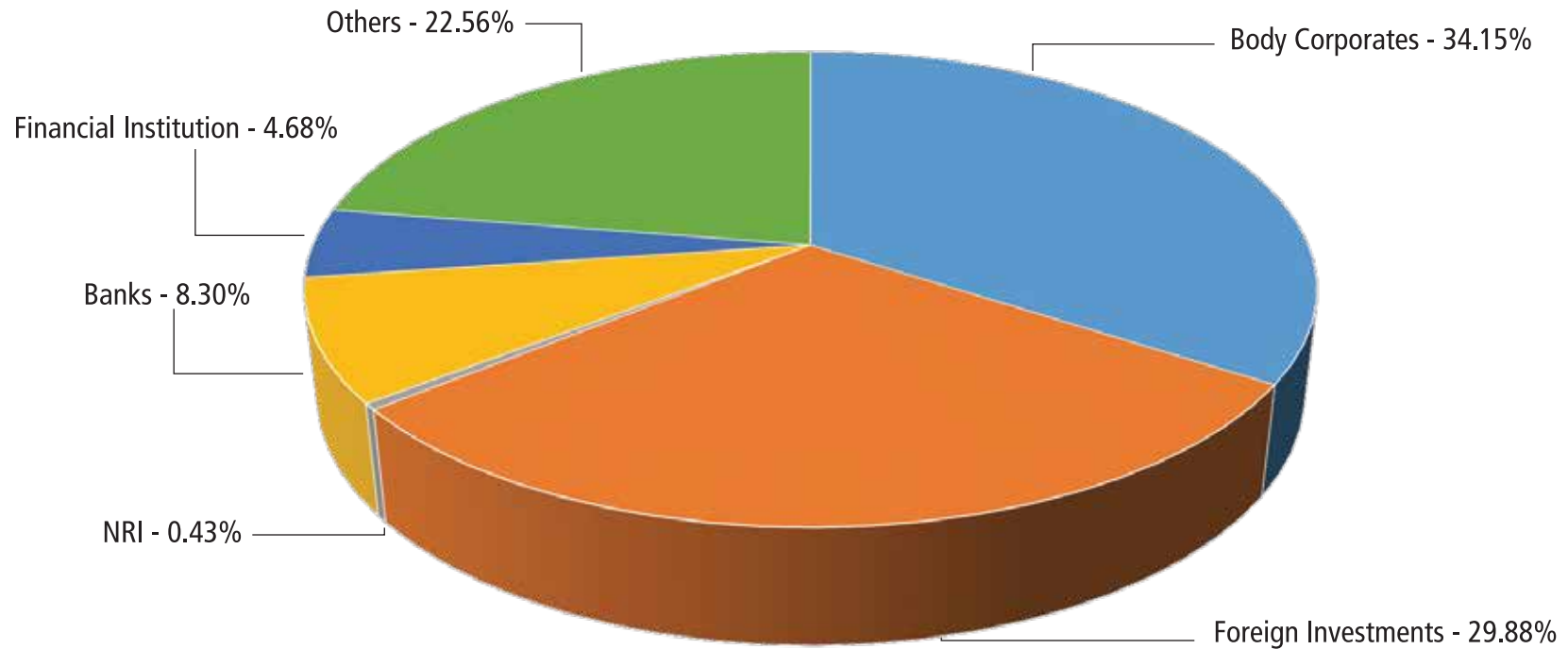
- Listing of Sensex



## Shareholding Pattern

**Paid up Capital Rs. 10.74 crs. | Face Value per share 1/- each**

### Categorywise Shareholding Pattern (%)



All 19 nationalized banks are our shareholders



## Board of Directors



**Mr. Sudhakar Rao**  
Chairman &  
Public Interest Director  
Retd. IAS



**Mr. Ashishkumar Chauhan**  
Managing Director & CEO



**Dr. Krishnaswamy  
Kasturirangan**  
Public Interest Director  
Retd. Chairman, ISRO



**Mr. Dharendra Swarup**  
Public Interest Director  
Retd. IA&AS



**Mr. Sethurathnam Ravi**  
Public Interest Director  
Fellow Member (ICAI)



**Mr. Sumit Bose**  
Public Interest Director  
Retd. IAS



**Justice (Rtd) Mr. Vikramajit  
Sen**  
Public Interest Director



**Dr. Sriprakash  
Kothari**  
Shareholder Director



**Ms. Usha Sangwan**  
Shareholder Director






**Mr. Thomas Bendixen**  
Shareholder Director






**Ms. Rajeshree  
Sabnavis**  
Shareholder Director

## Management Team

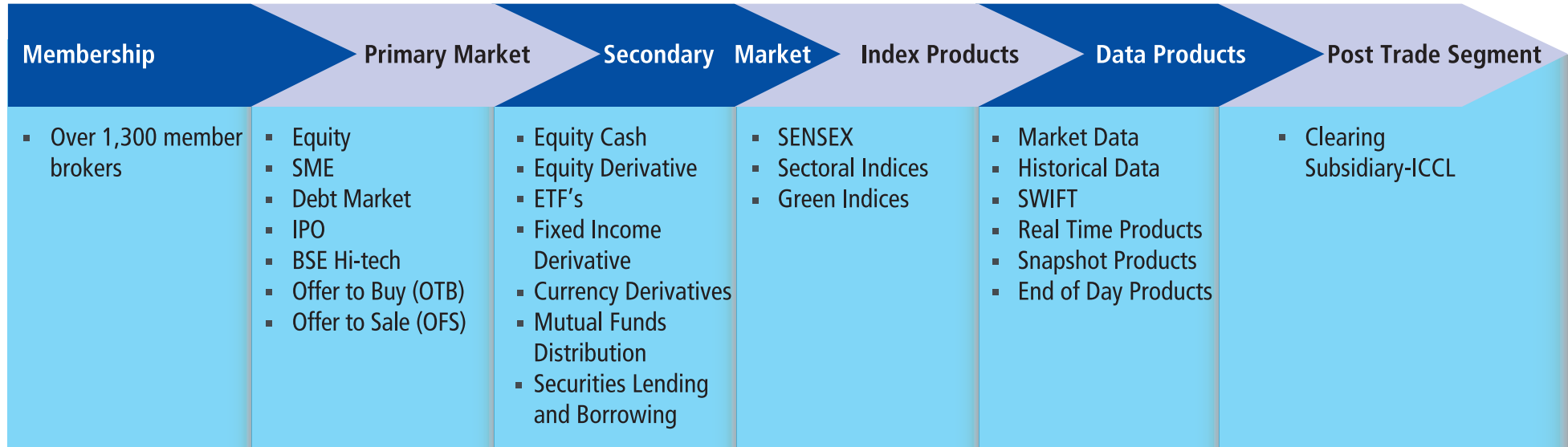
|   | NAME / TITLE  | DESCRIPTION   |
|---|---|---|
|    | <p><b>Ashishkumar Chauhan</b><br/>Managing Director &amp;<br/>Chief Executive Officer</p> | <ul style="list-style-type: none"> <li>■ <b>Ashishkumar Chauhan</b> one of the founders of India's National Stock Exchange ("NSE") where he worked from 1992 to 2000. At NSE, he was instrumental in setting up the first screen based trading in India, equities market and first commercial satellite communications network for India. He is best known as the father of modern financial derivatives in India. He also created several path breaking frameworks including Nifty index, NSE certifications in financial markets etc. From 2000 to 2009, he worked as the President and Chief Information Officer of Reliance group.</li> <li>■ He is a part of several committees of World Federation of Exchanges ("WFE"), Government of India ("GOI"), Reserve Bank of India ("RBI"), Securities and Exchange Board of India ("SEBI"), Confederation of Indian Industry ("CII"), Federation of Indian Chambers of Commerce and Industry ("FICCI"), Indian Merchants Chamber ("IMC"), India UK council ("UKIBC") etc. He is also associated with several NGOs and education institutions. His quotes and writings have been published in various newspapers, magazines and journals in India and abroad.</li> <li>■ He holds a B Tech in Mechanical Engineering from IIT Bombay and a PGDM from IIM Kolkata.</li> </ul> |
|    | <p><b>V Balasubramaniam</b><br/>Chief Business Officer</p>                                | <ul style="list-style-type: none"> <li>■ <b>V Bala</b> heads the business development encompassing Equities, Equity Derivatives, Debt, Interest Rate Futures, Currency Derivatives, Mutual Fund Distribution platform &amp; SME platform at BSE and is also in-charge of all the new initiatives planned by BSE including the setting up of Commodities Market and the international exchanges in GIFT City.</li> <li>■ He is a board member for Futures Industry Association – ASIA, CDSL (Central Depository Services (India) Ltd), BSE Institute Limited, BSE SAMMAN Limited and a Co-Chair of the Capital Markets Working Group of FICCI. He has over two decades of experience in the capital markets industry and has previously worked with Reliance Group and as co-founder of Marketplace Technologies.</li> <li>■ He has completed his Masters in Commerce from the University of Mumbai and is a Rank holder from the Institute of Cost Accountants of India.</li> </ul>   |
|  | <p><b>Nehal Vora</b><br/>Chief Regulatory Officer</p>                                     | <ul style="list-style-type: none"> <li>■ <b>Nehal Vora</b> heads the regulatory functions of the exchange including membership compliance, surveillance, inspection, investigation, regulatory communication, investor services, listing compliance, regulatory legal and corporate secretarial. He is a Board member of Indian Clearing Corporation Limited (ICCL) and of Central Depository Services Limited (CDSL). His other Board Memberships include that of National Power Exchange Limited, BSE Investments Limited, BSE Sammaan – CSR Exchange and Institutional Investor Advisory Services India Limited (IIAS).</li> <li>■ He has more than 19 years of experience in the area of legal and compliance. He has previously worked at the Securities and Exchange Board of India (SEBI) for 10 years and as Director, Law &amp; Compliance at DSP Merrill Lynch Ltd heading Broking and Investment Banking Compliance</li> <li>■ Nehal has completed his Bachelors of Commerce from Mumbai University and Master of Management Studies from Narsee Monjee Institute of Management Studies, University of Mumbai</li> </ul>   |

## Management Team (Contd...)

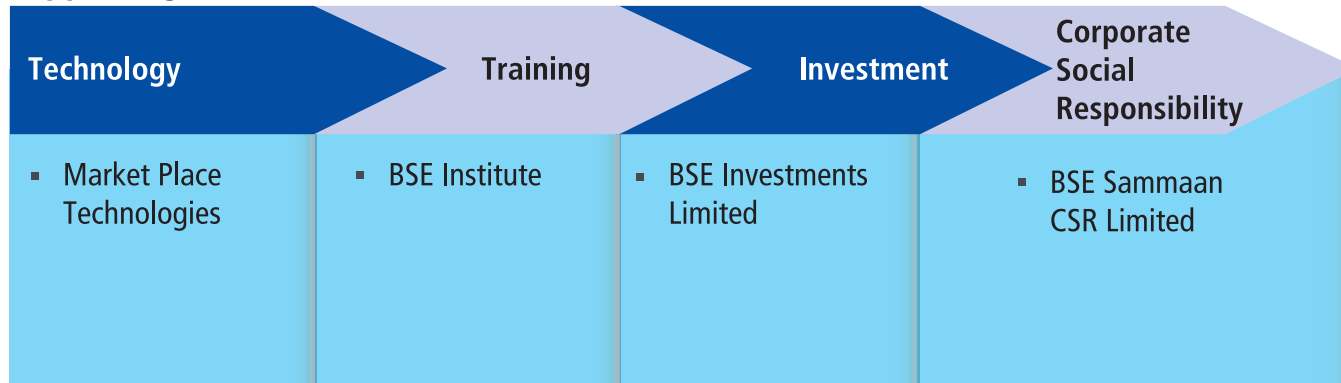
|   | NAME / TITLE   | DESCRIPTION  |
|---|--|--|
|    | <b>Nayan Mehta</b><br>Chief Financial Officer          | <ul style="list-style-type: none"> <li>■ <b>Nayan Mehta</b> currently heads all finance, accounting, treasury and taxation functions of the Exchange. He represents BSE as the Senior Vice Chairman on the Executive Board of the South Asian Federation of Exchanges. He represents BSE on the Boards of group companies and joint ventures of BSE and as a member of the Qualified Audit Review Committee of SEBI.</li> <li>■ He has previously worked at Credit Analysis &amp; Research Ltd. as Joint General Manager (Accounts), CFO at Multi Commodity Exchange of India Limited and has also worked at the National Stock Exchange.</li> <li>■ He holds a Bachelors in Commerce degree from University of Mumbai. He is a qualified Chartered Accountant as well as a qualified Cost and Management Accountant.</li> </ul>   |
|    | <b>Kersi Tavadia</b><br>Chief Information Officer      | <ul style="list-style-type: none"> <li>■ <b>Kersi Tavadia</b> has over 30 years of experience in the area of Application Systems/ IT Infrastructure development and management, managing all aspects of IT operations in Financial Services, Capital markets and manufacturing companies. He has played a leading role in transforming BSE into the fastest exchange in the country</li> <li>■ He is instrumental in promoting, adaption of Open Source technologies and has successfully deployed one of the largest Data Warehouse on Open source platform.</li> <li>■ He has provided technical leadership &amp; architectural vision in implementation of Mission Critical Applications across the organization including IT Infrastructure, Web portals, web based and non-web based customized solutions.</li> <li>■ He is amongst the Pioneers to implement single-window Multi-Exchange online trading systems to facilitate trading across multiple asset classes.</li> </ul> |
|  | <b>Neeraj Kulshrestha</b><br>Chief Business Operations | <ul style="list-style-type: none"> <li>■ <b>Neeraj Kulshrestha</b> is in charge of Trading, Listing and Membership Operations.</li> <li>■ He has about 27 year experience in Capital markets, which includes Securities Markets and General Insurance.</li> <li>■ Prior to BSE he was an Executive Director in Morgan Stanley India for 10 years. He was earlier with National Stock Exchange and has managed various functions like Trading Operations, Inspection and Investigation, Futures and Options Clearing and Trading. He was also the CEO of India Index Services Ltd. and Dotex International Ltd.</li> <li>■ He has completed his Bachelors in Computer Science from Delhi University and a MBA (Finance) from Indore University.</li> </ul>  |

# Lines of Business

## Revenue Segments



## Supporting Business



## BSE Global Ranking

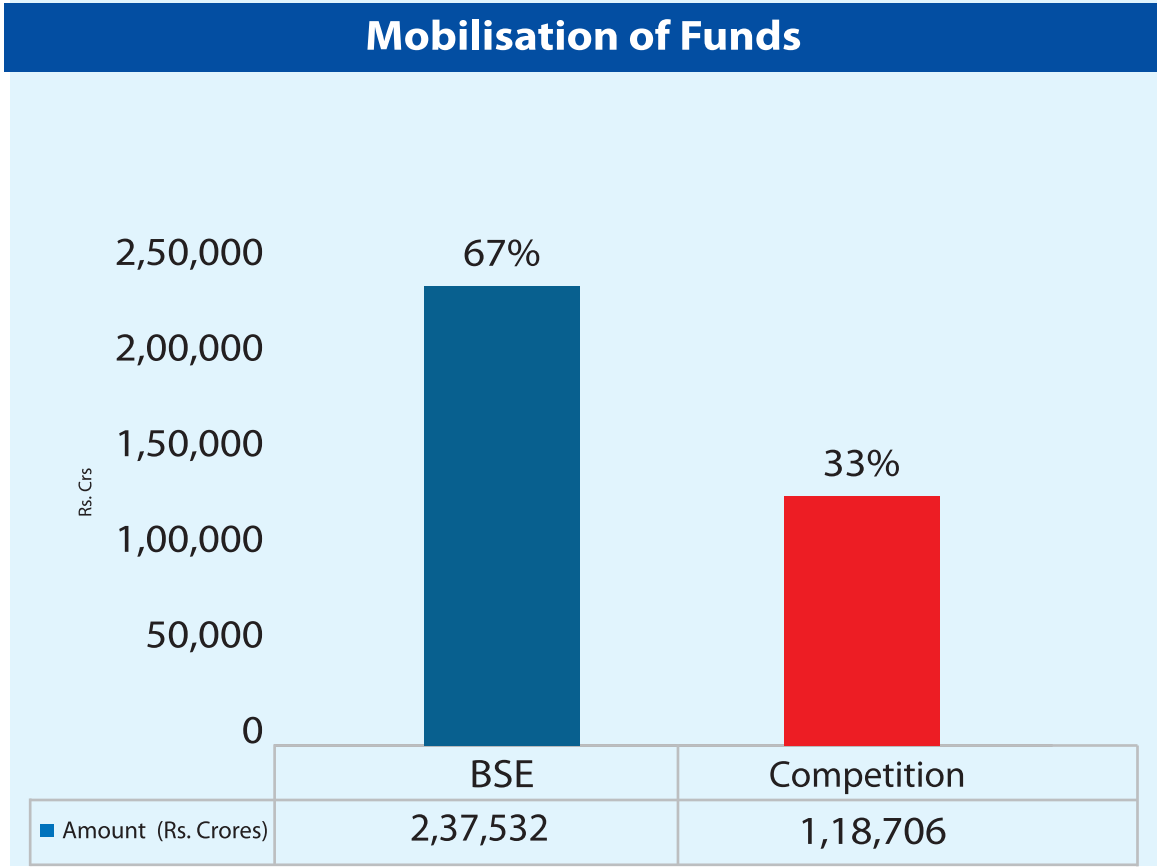
| PRODUCT             | MEASURE  | RANK             |
|---------------------|--|------------------|
| CURRENCY OPTIONS    | 17 Million Contracts Approx.                           | 2 <sup>nd</sup>  |
| CURRENCY FUTURES    | 23 Million Contracts Approx.                           | 3 <sup>rd</sup>  |
| EQUITY CASH SEGMENT | 27 Million Trades Approx.                              | 11 <sup>th</sup> |
|                     | 1.46 (Amount in USD Trillion)<br>Market Capitalisation | 11 <sup>th</sup> |

\*Source: World Federation of Exchanges

# Primary Markets



# Equity and Debt Mobilization of funds



5842  
Listed entities  
Largest on any  
exchange in  
the world

- BSE has enabled collection of Rs 2,37,532crs (67%) of the total amount raised across the Exchanges starting April 2015 till May 16.

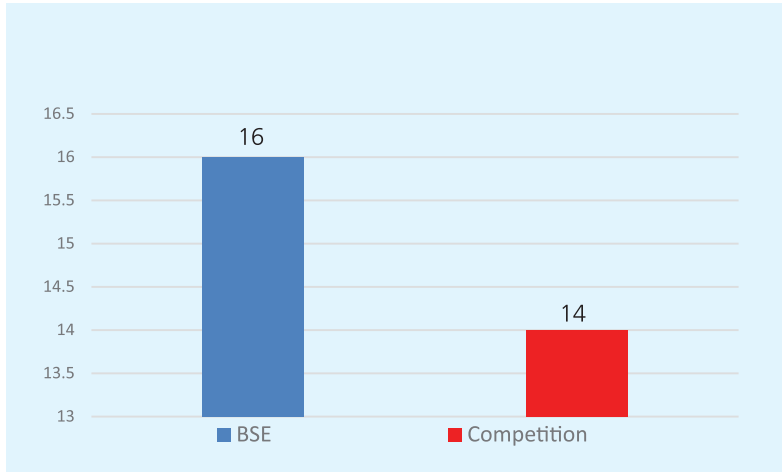


Data as of May 2016

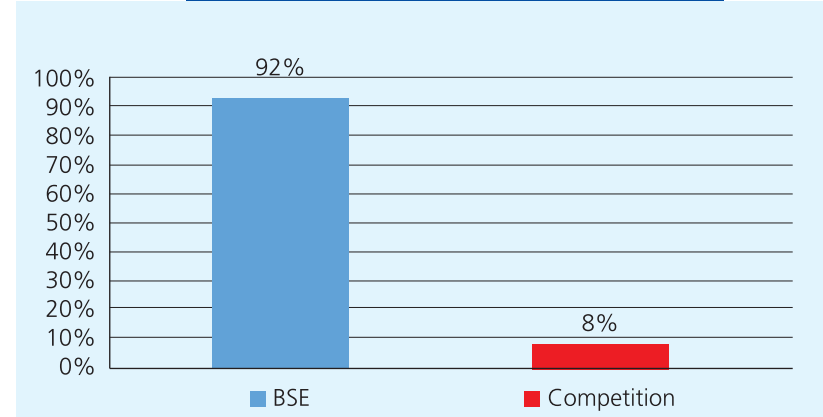
# Equity and Debt Market

## Designated Exchange for Equity IPO

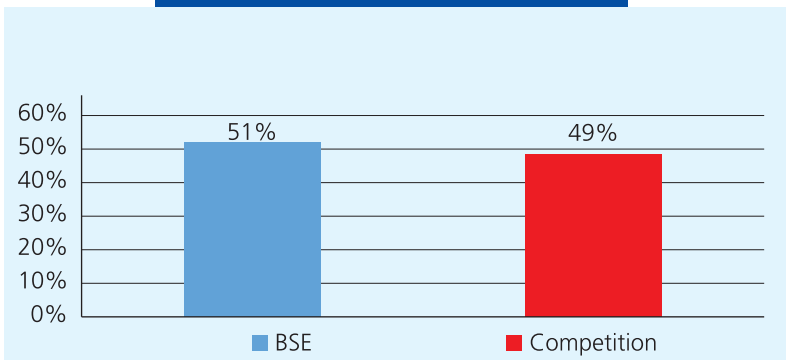
No. of Issues



## Market Share % for Debt Public Issue



## Market Share % for Equity IPO



- BSE is the preferred choice for listing Privately Placed Debt Instruments (PPDI). In FY 2015-16, BSE has listed 1760 Instruments vis-a-vis 1339 on other Exchange. In F.Y. 2016-17 till May 2016, BSE Ltd has listed 385 instruments with a market cap of Rs. 60,808 crores vis a vis 230 instruments on the other Exchange.
- In F.Y 2015-16, 20 Debt Public issues have tapped the market. BSE is the Designated Stock Exchange for 20 issues with 15 issues being listed only on BSE.
- In F.Y 2016-17, 4 Debt Public issues have tapped the market and BSE is the Designated Stock Exchange for all the 4 public issues.

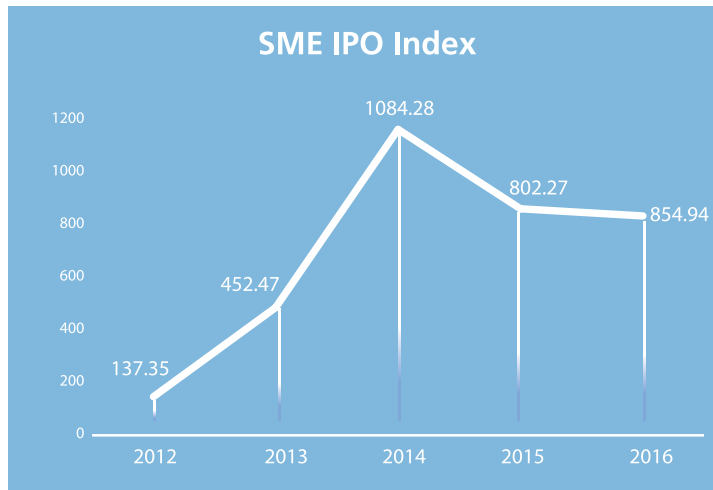
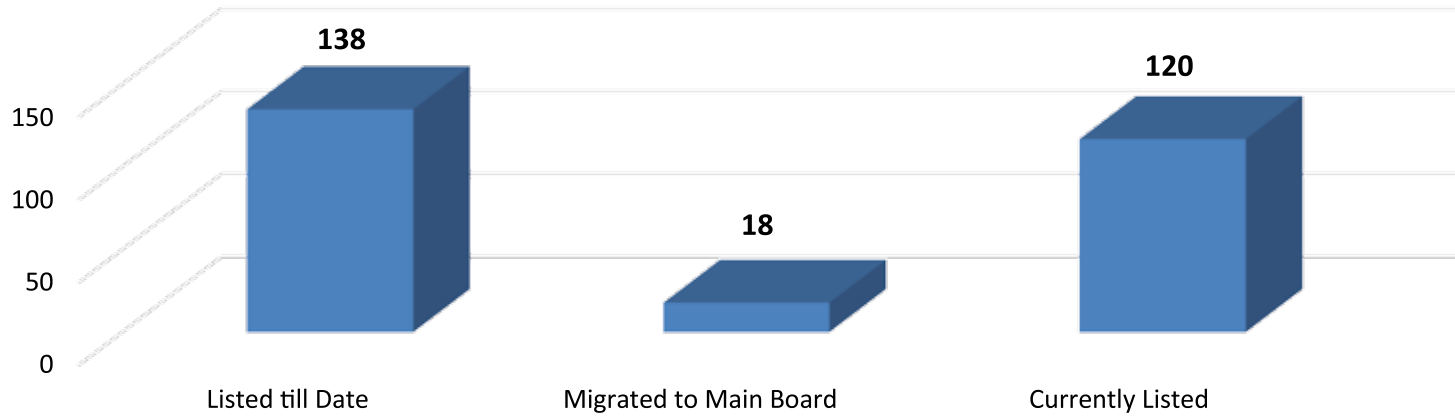


Data as of May 2016



# SME Platform

## Companies on BSE-SME Platform



- BSE is the first stock exchange in India to receive approval from SEBI on 26<sup>th</sup> September 2011 to launch SME Platform. SME IPO Index was launched on 14<sup>th</sup> December, 2012 aimed at tracking the companies listed on SME platform with a Base value of 100. As on 31<sup>st</sup> May, 2016 its value was 854.94.
- The Platform facilitates capital raising by small and medium enterprises including start-up companies which are in their early stages of growth. It also provides easier entry and exit options for informed investors like angel investors, VCFs and PEs etc. and equity financing which lowers the debt burden leading to lower financing cost and healthier balance sheet.
- Total Market Capitalization of 120 companies –Rs 7,007 Crs.
- Total Market Capitalization of 18 companies Migrated to main Board – Rs 2979 Crs.

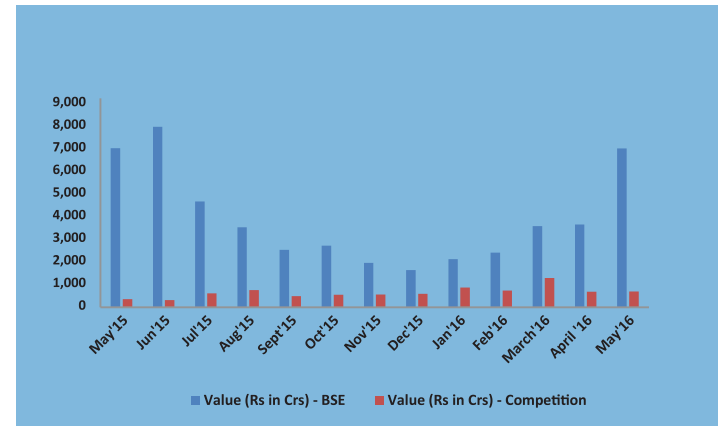
Data as of 1<sup>st</sup> Jun 2016

# Mutual Fund Distribution Platform-StAR MF

Avg Market Share in No. of Orders



Avg Market Share in Value



## PLATFORM FEATURES

- Completely digital- Demat and Non Demat /Mutual Fund transactions , while facilitating the benefits of Physical mode
- 24x7 order acceptance
- Investors can choose the mode of payment option any pay via NEFT / RTGS /PG-Direct / PG-Nodal / OTM / Cheques , AFTER order placement
- 6 day order holding facility
- SMS / Email based order authentication

## CONNECTIVITY & USPs

- Multi-mode of platform access
- Unique overnight investments framework
- Completely digital and REAL Time Investors registration / onboarding
- Widely accepted by NDs / Custodians / Brokers / IFA Platform / New age Digital Distributors / IFAs, , eliminating paper work from MF segment

## PLATFORM STATISTICS

- Over 33 Lakh orders aggregating to Rs 44,235 Crs has been transitioned on BSE StAR MF Platform during FY 15-16
- Market Share 85% in FY'15-16 , Over 400000 SIPs/XSIPs registered , Market Share 90% in FY 16-17 in April-May
- Largest number of transaction executed in our platform



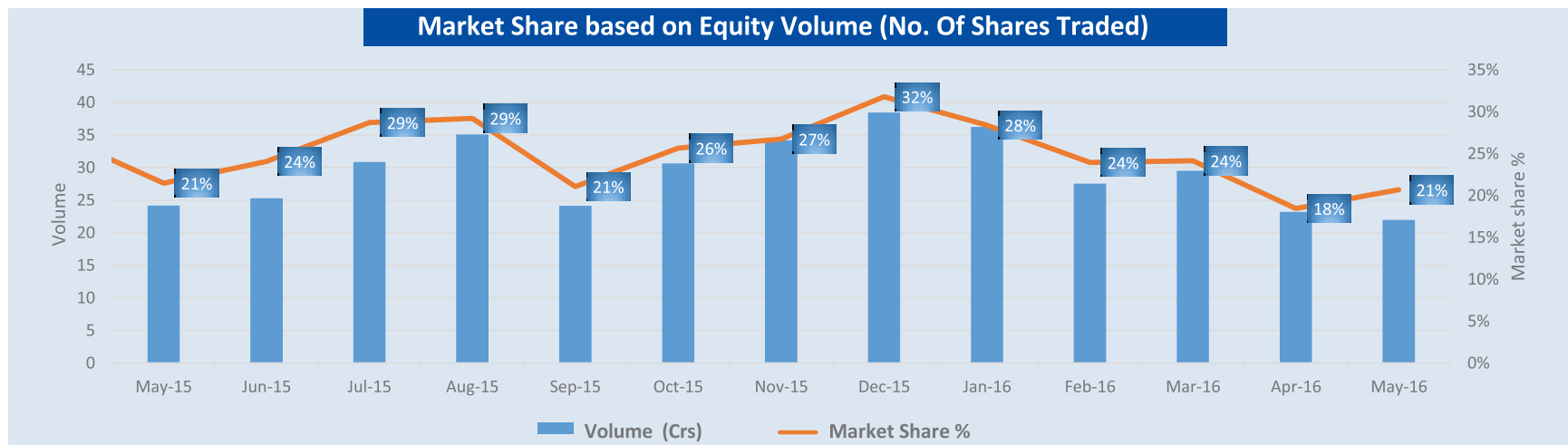
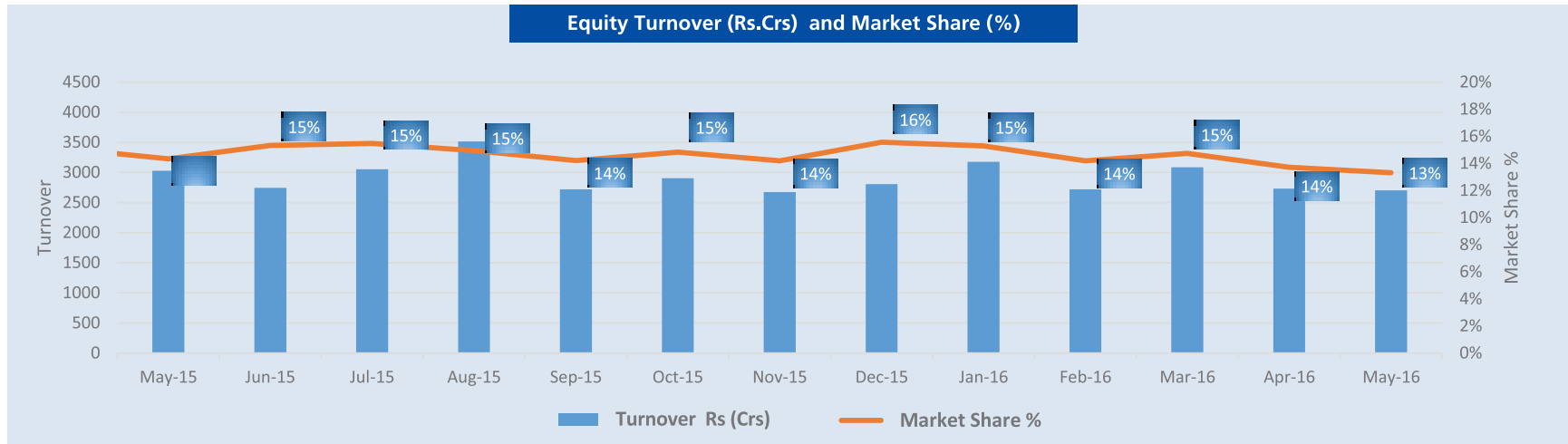
For Registration Process, refer: <http://ir.bseindia.com/mfdforms/members/LoginMF.aspx?expandable=0>

Data as of May 2016

# Secondary Markets

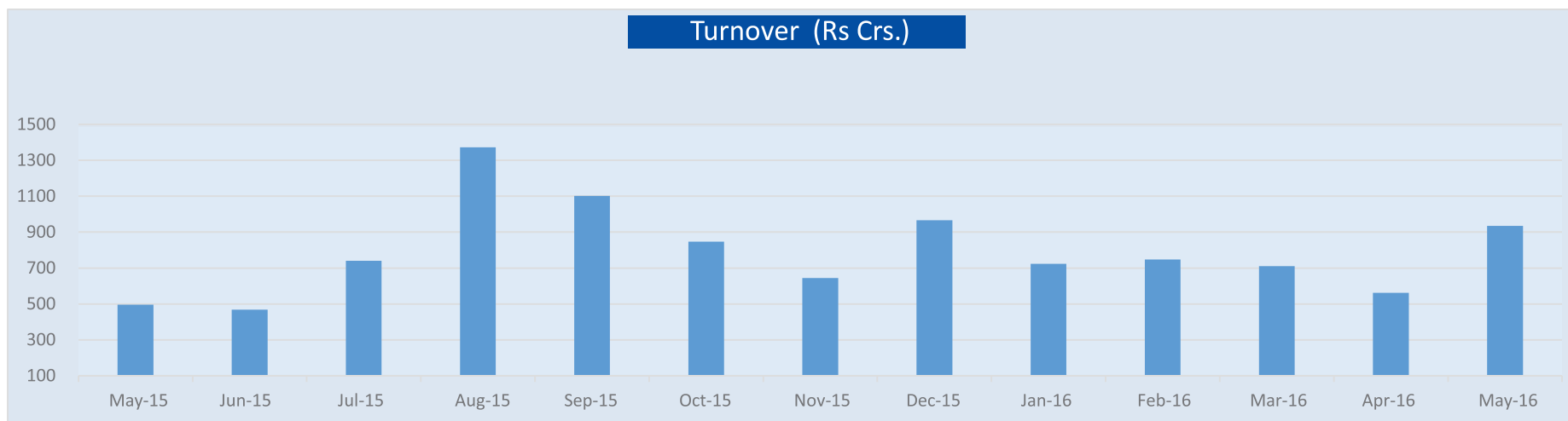


# Equity Cash Market



Data as of May 2016

## Equity Traded Funds

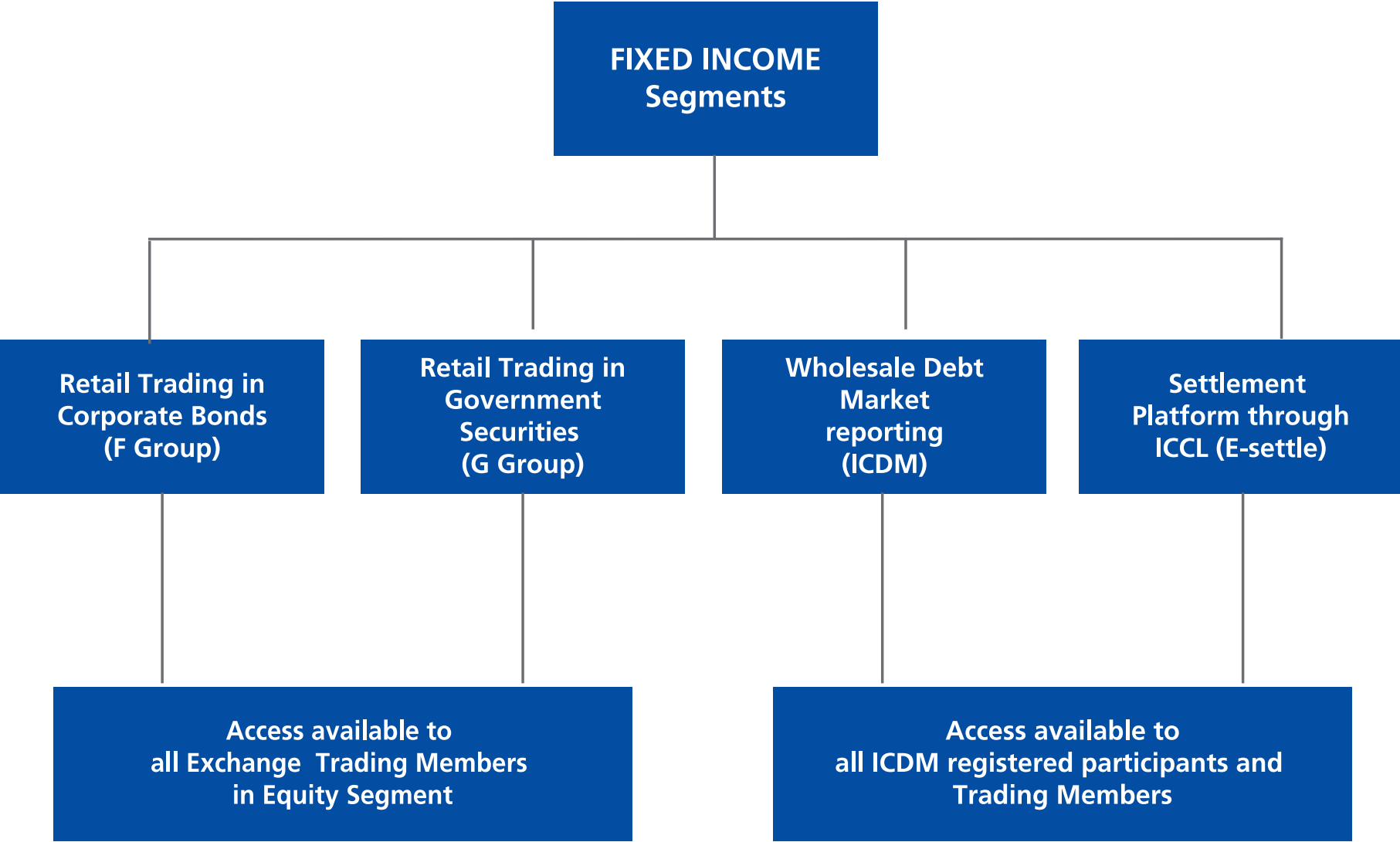


### Exchange Transaction Fee for ETF

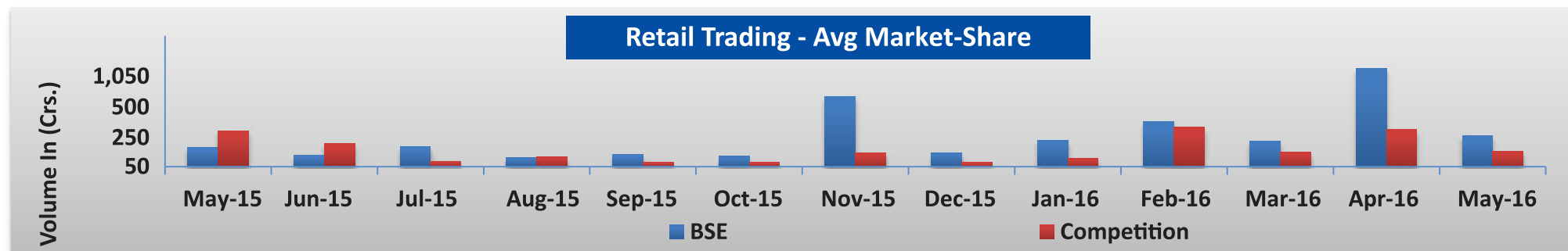
| Turnover Slab          | BSE | Competition | Cost Saving @ BSE |
|------------------------|-----|-------------|-------------------|
| Up to 1250 Crs         | 275 | 325         | 15.38%            |
| >1250 Crs < 2500 Crs   | 275 | 320         | 14.06%            |
| >2500 Crs < 5000 Crs   | 275 | 315         | 12.70%            |
| >5000 Crs < 10000 Crs  | 275 | 310         | 11.29%            |
| >10000 Crs < 15000 Crs | 275 | 305         | 9.84%             |
| >15000 Crs             | 275 | 300         | 8.33%             |

- Exchange traded fund is a security that tracks an index, a commodity or a sector like an index fund or a sectoral fund but trades like a stock on an exchange
- It is similar to a close ended mutual fund listed on stock exchanges
- BSE in its effort to bring greater participation for retail investors in the Indian landscape has tied up with market makers for ETF's
- 46 ETF listings on BSE as on April 2016\*

# Fixed Income Segments Overview



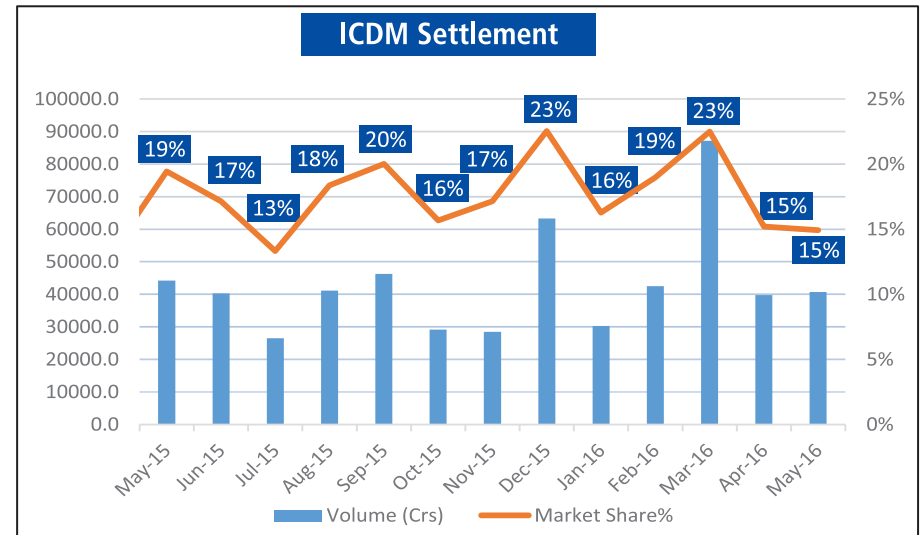
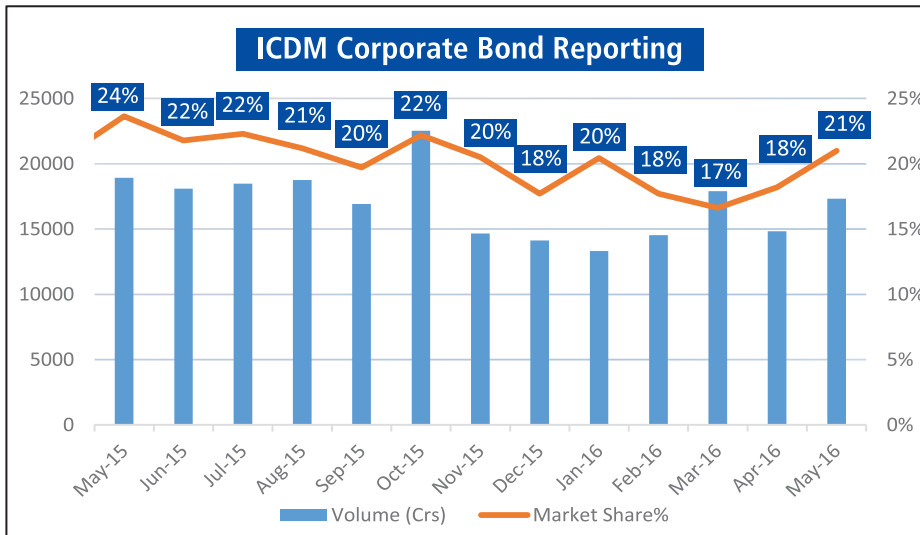
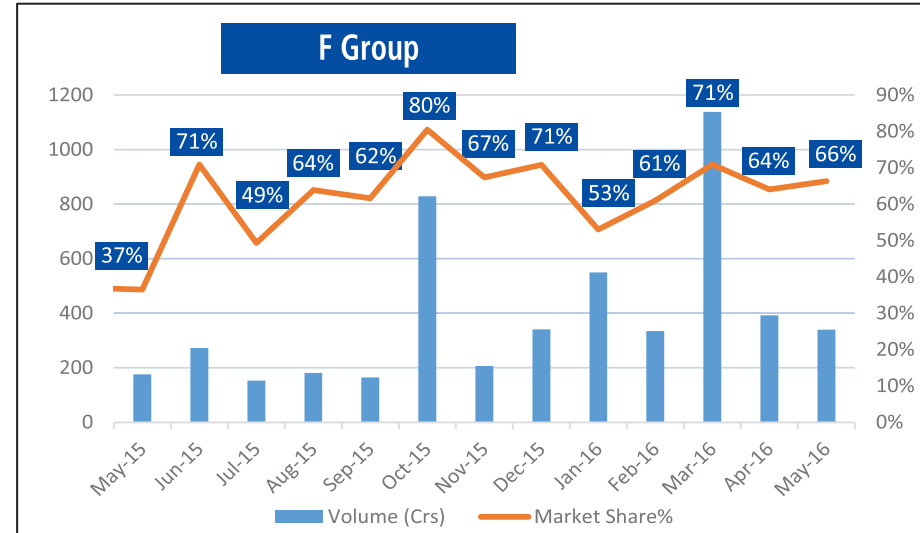
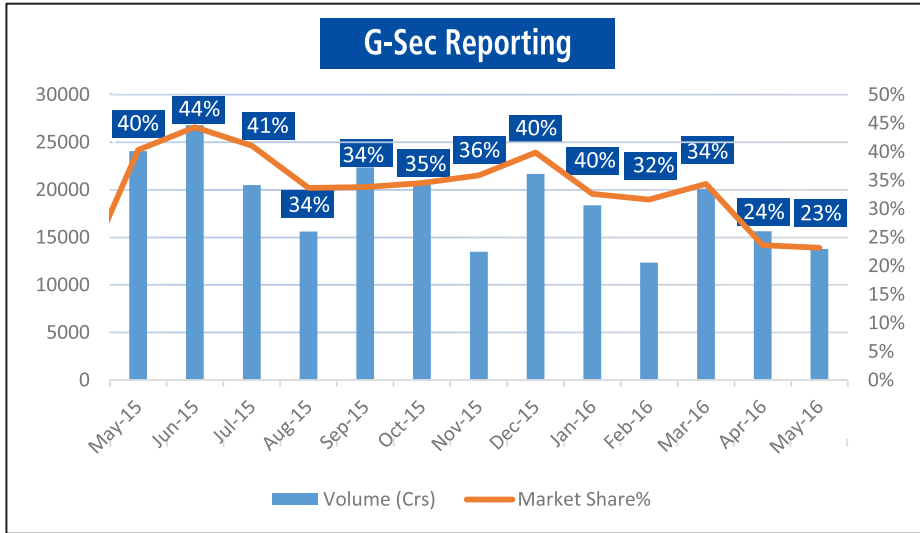
## Fixed Income Segments



| Retail Trading In Corporate Bonds (F Group)           | FY-15-16 | April '16 | May'16 |
|---|----------|-----------|--------|
| Turnover (Rs Crs)                                     | 4,608    | 392       | 340    |
| Number of Member / Participants                       | 1361     | 1362      | 1363   |
| Wholesale Segment Reporting Of Corporate Bonds (ICDM) |          |           |        |
| Turnover (Rs Crs)                                     | 2,07,652 | 14,841    | 17,335 |
| Wholesale Segment Reporting Of Government Bonds (WDM) |          |           |        |
| Number of Member / Participants                       | 130      | 130       | 134    |
| Turnover (Rs Crs)                                     | 2,27,125 | 15,649    | 13,800 |
| Number of Member / Participants                       | 1338     | 1358      | 1376   |
| Settlement Of Corporate Bonds and CP/CD (E- Settle)   |          |           |        |
| Settlement Of Corporate Bonds (Rs Crs)                | 57,874   | 5,109     | 4726   |
| Settlement of CPs/CDs (Rs Crs)                        | 4,63,134 | 34,677    | 35971  |
| Number of Member /Participants                        | 1338     | 1358      | 1338   |

- BSE has maintained the dominant market share in Retail trading of Corporate Bonds. BSE Market share was 63.7% in FY 14-15 and 62% in FY15-16. Market share for May 2016 was 66%
- Market Share reporting volumes in Wholesale Debt Market of Government Bonds in May 2016 was 23.2%. In FY 15-16 volume in this segment was Rs. 2,27,125 Crs with a market share of 35%
- Settlement volumes of Corporate bonds for FY 15-16 is Rs. 57,874 Crs for May '16 Rs. 4,726 Crs

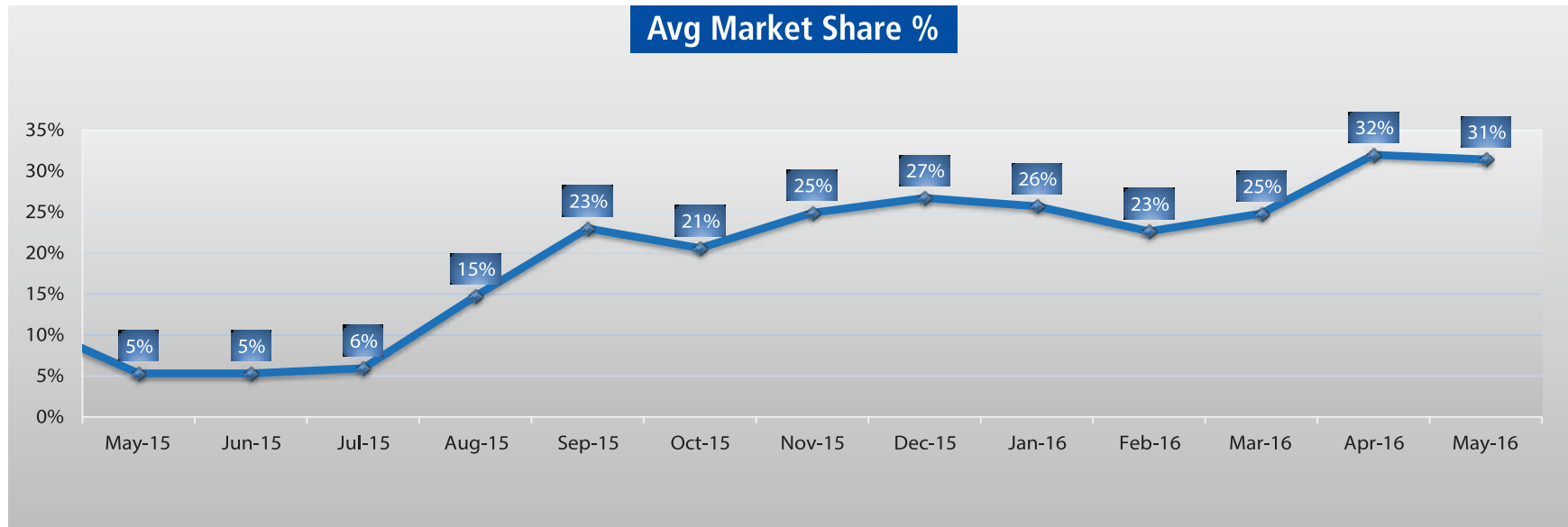
# Fixed Income Segments (cont..)



Data as of May 2016



# Interest Rate Derivatives



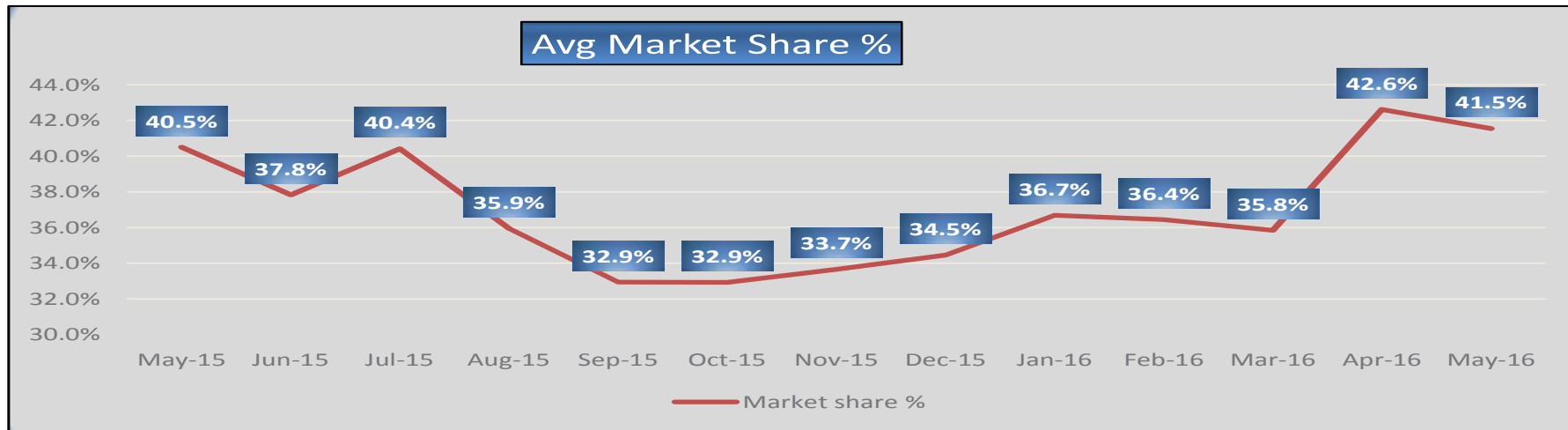
## Competitive Advantage

| Interest Rate Derivatives                |     |     |      |
|--|-----|-----|------|
|  | BSE | NSE | MSEI |
| Exchange Transaction Fees (Rs. / Per Cr) | 6   | 10  | 10   |
| Cost Saving @ BSE up to                  | 40% |     |      |



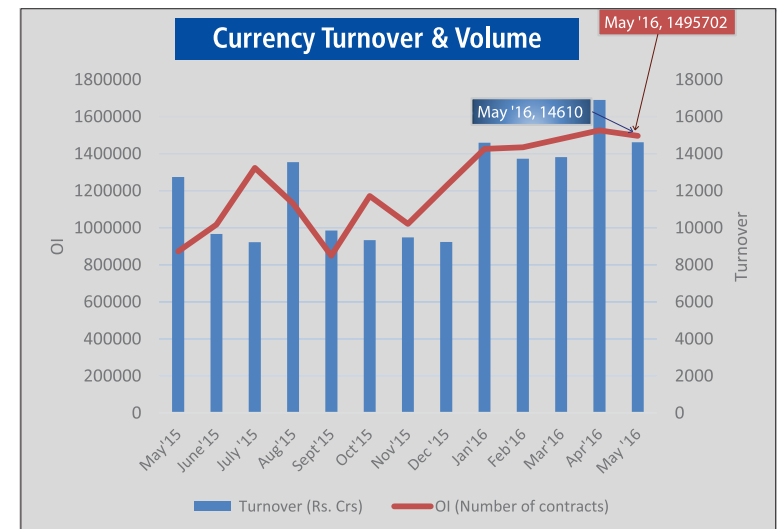
Data as of May 2016

# Currency Derivatives



## Competitive Advantage

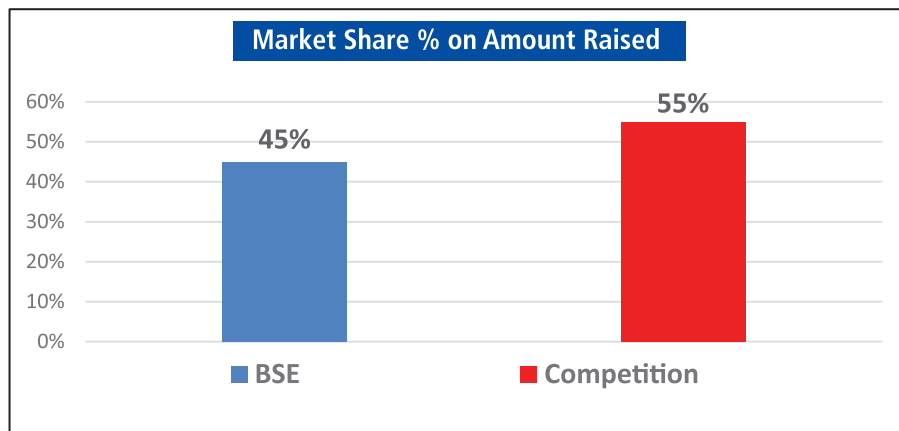
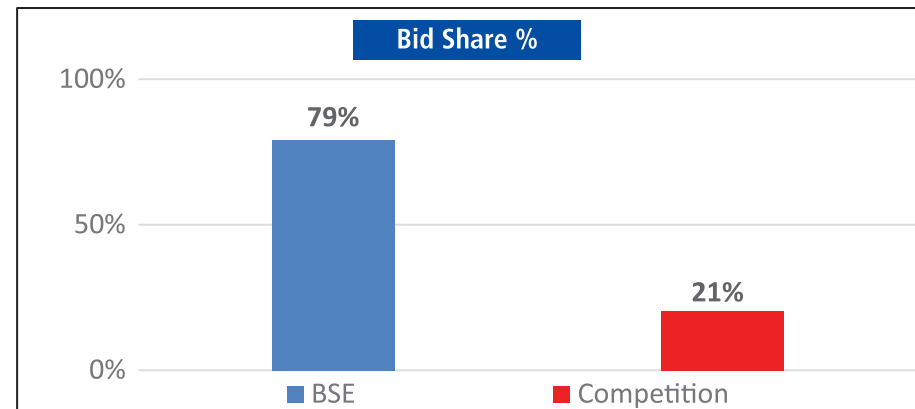
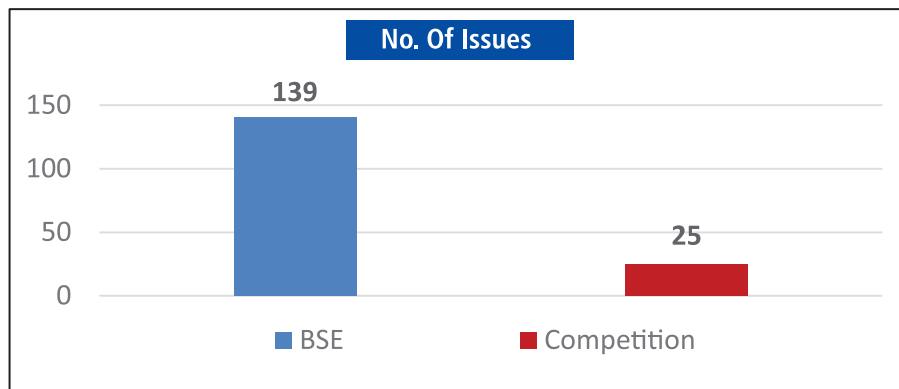
| Currency Futures   | BSE    | NSE   | MSEI  |
|--|--------|-------|-------|
| Exchange Transaction Charges (Rs / Per Cr)                           | 10     | 110   | 105   |
| Exchange Transaction Charges for 1 Million Dollar (1000 Lots) in Rs. | 130    | 1,430 | 1,365 |
| Cost Saving @ Bse up to  | 90.91% |       |       |
| Currency Option  | BSE    | NSE   | MSEI  |
| Exchange Transaction Charges (Rs. / Per Cr.)                         | 10     | 4000  | 1000  |
| Cost Saving @ BSE up to  | 99.75% |       |       |



Data as of May 2016

# Offer For Sale (OFS)

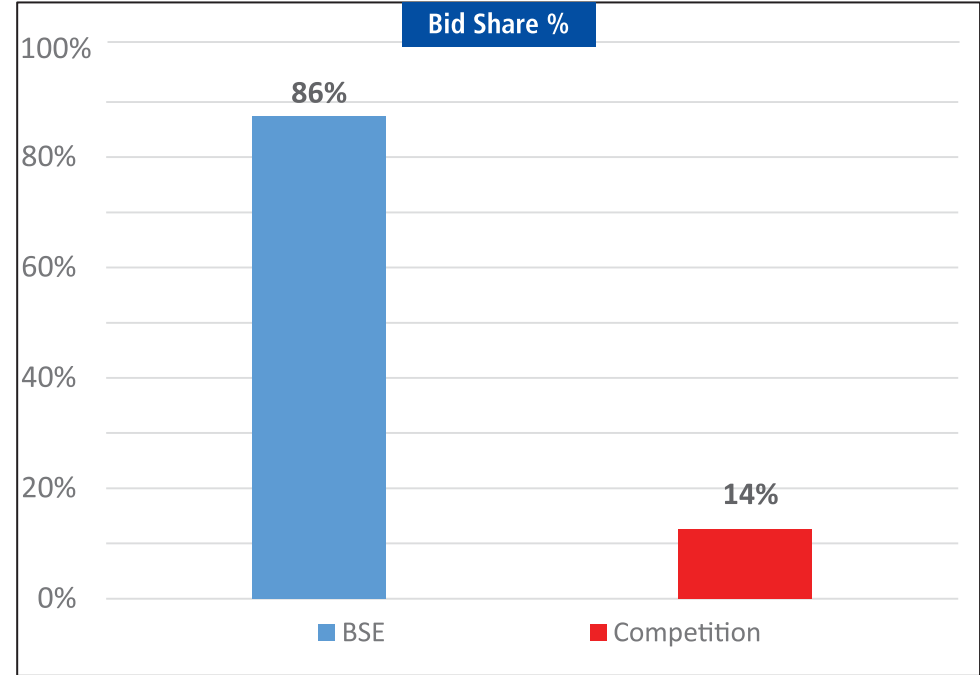
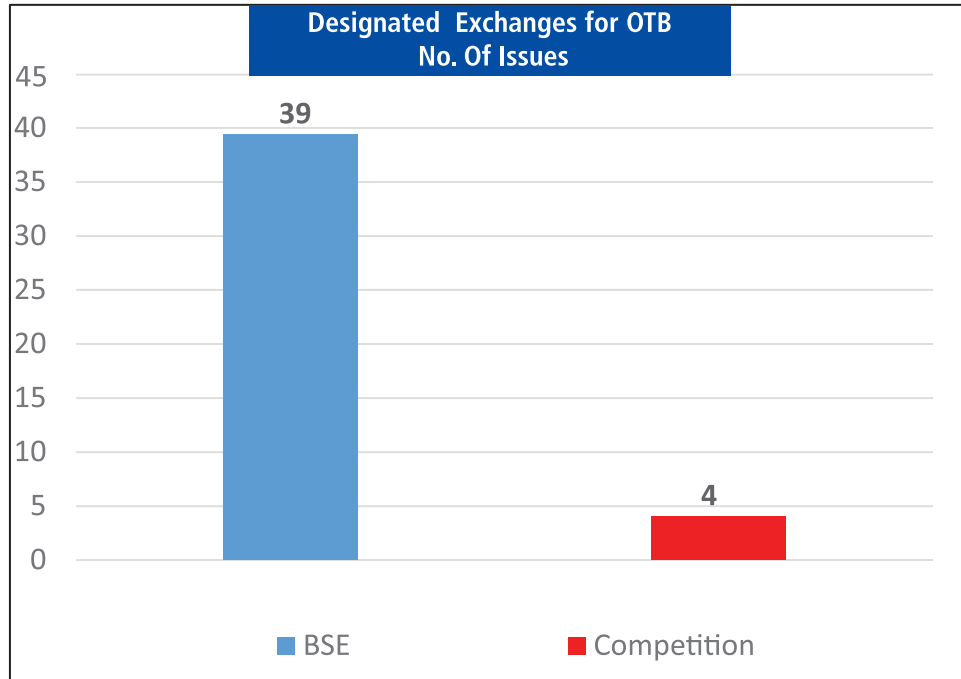
- BSE launched the Offer For Sale (OFS) module on iBBS (Internet Based Book Building System) platform on 24th February, 2012.
- Since then , 164 companies have completed OFS issues of which BSE was appointed the Designated Stock Exchange in 139 issues. Over 700 members have participated in OFS via BSE platform.
- The process has helped the Government to raise over Rs. 84,084 Crs through divestment of holdings in PSUs.



94 OFS issues were conducted Exclusively on BSE platform

# Offer to Buy (OTB) – Acquisition Window

## OTB Avg Bid Share Details on Designated Stock Exchanges



- An Offer to Buy is a new mechanism to facilitate tendering of shares by the shareholders and settlement of the same, through the stock exchange in the form of a separate window (the “Acquisition Window”).
- BSE launched the Offer to Buy (OTB) module on iBBS (Internet based book building System) platform on 1<sup>st</sup> July, 2015.
- Till date, 43 companies have completed their OTB issues of which BSE was appointed the Designated Stock Exchange in 39 OTB issues.

34 issues were conducted exclusively on BSE platform



Data as of May 2016

# BSE Hi-Tech



BSE Hi-Tech is a platform that enables a young fast growing company to list on an exchange with much easier criteria and gain access to capital from a larger base of sophisticated investors.



## THE COMPANY ADVANTAGE

- Increased visibility with brand creation, research coverage and media coverage
- Access to funds through well-established platform and mechanism
- High credibility amongst all stakeholders
- Listing entails robust corporate governance and internal controls and systems
- Sophisticated investors enabling better valuations
- Companies can attract global investors as FPIs
- Merger & acquisitions made easier and swifter with company's stock used as currency
- Compensating employees without affecting cash flows through ESOPs becomes a powerful tool to attract and retain

## THE INVESTOR ADVANTAGE

- A credible exit route for early investors
- VC/PE investors can churn their portfolio
- The platform will offer a new asset class to investors
- Listing leads to better and timely disclosures and thus also protects the interest of the investors



## BOLT PLUS ON WEB (BoW)



### User friendly features

- Dual Market Depth Display
- AMO – After Market Orders
- Time base Square up for Intraday transactions and One click square up on M2M Alert.
- Corporate Information Analysis
- Top Gainers / Top Losers Top Gainers / Top Losers - Most Active by VOLUME / VALUE
- User define short keys - predefine Key Mapping Styles for ODIN-NOW
- NEWS Plus with RSS feeds and Twitter
- Web links for 100 + Visual Operational Help Video's
- Member Branding through EXE

| One Window with Multiple Utilities   |  |   |   |
|--|--|---|---|
| Exchanges  | Products   | Users   | Connectivity  |
| <ul style="list-style-type: none"> <li>▪ BSE →</li> <li>▪ NSE →</li> <li>▪ MCX →</li> <li>▪ NCDEX →</li> </ul> | <ul style="list-style-type: none"> <li>▪ Equity – F&amp;O – Currency– IRF - OFS – Mutual Fund – SLB – Debt – ITP</li> <li>▪ Equity – F&amp;O – Currency</li> <li>▪ Commodities</li> <li>▪ Commodities</li> </ul> | <ul style="list-style-type: none"> <li>▪ Dealers</li> <li>▪ Investors</li> <li>▪ Admin for HO</li> <li>▪ Multiple Mini Admin for Regions &amp; Branches</li> <li>▪ RMS</li> </ul> | <ul style="list-style-type: none"> <li>▪ Leased Line</li> <li>▪ Internet</li> </ul> |

### Application for Desktop and Mobile

- Web links for 100 + Visual Operational Help Video's
- Tip of the Day prompt on login – notifying what all can be done
- Member Branding through EXE
- Trade commencement in one day
- No Extra hardware like TAP-IML server required.

- Bolt + on Web (BoW) – FREE OF COST FOR ALL MEMBERS



# Information Products



## Information Products offered

### Market Data

- Equity Level 1 – Real-time & 1 minute Snapshots
- Equity Level 2 – Real-time
- Indices – Real-time & 1 minute Snapshots
- Derivatives (Equity , Index , Currency & Interest Rate Derivatives) – Real-time

### Corporate Data

- Corporate Announcement
- Financial Results
- Shareholding Pattern
- Corporate Action through SWIFT

### End of day or Historical

- Quotation files
- Annual report
- Daily Bulletin
- Sector Classification
- Trade and Order book data





# Technology Initiatives



# New Trading Architecture – BOLT PLUS

## Bolt Plus Live

- Products available for trading
  - Currency Derivatives – 29<sup>th</sup> November 2013
  - Interest Rates Futures - 28<sup>th</sup> January 2014
  - Equity Derivatives - 10<sup>th</sup> February 2014
  - Equity – 7<sup>th</sup> April 2014

## Member Access

- API based access
  - Through existing IML API
  - Advanced High performance APIs (ETI, MDI/EMDI,EOBI)

## Peripheral Systems connecting to BOLT Plus

- Reference Data, Risk Management, Surveillance, Clearing & Settlement, Data Warehouse

## Performance Testing & Benchmarking

- Latency : < 6  $\mu$ s (Gateway in to Gateway out)
- Network latency for Colo users – 10  $\mu$ s
- Throughput Capacity: 5 lacs order per second
- Scalability: Horizontally scalable by adding partitions

## Technology Programme - Co-location Facilities

### Fastest Co-location

- BSE is the fastest Exchange in the world with a speed of 6 microseconds.
- Co-location service to BSE members is provided and managed entirely by a third party data centre service provider - NTT Netmagic IT Services Pvt Ltd, a subsidiary of NTT Communications.
- Netmagic provides the fastest Co-location service in India with round trip network latency of less than 10 microseconds.
- At Netmagic Co-location, BSE response for an order has round trip latency of about 16 microseconds (including 10 microseconds of Co-location network latency).\
- Market access across Equity, Equity Derivatives and Currency Derivatives segments.
- Extension of Precision Time Protocol (PTP) from BSE's Grandmaster clock to the Co-location enables members to synchronize with the Exchange clock.
- Equitable distribution of market data to all members by usage of same length cables for all members.
- Full order book multicast (EOBI) is provided to Co-location members at no cost.
- State-of-the-art Data Centre services from NTT – Netmagic.

### Co-location : NTT Netmagic Data Centre

**Co-location is entirely managed by a third party service provider - NTT Netmagic. Key technical highlights are:**

- 10 Gbps Fibre optic cable connection with BSE trading system with full redundancy
- 24 X 7 operations support
- 24 X 7 High security zone
- Uninterrupted Power Supply with DG back up
- ITIL and ISO 27001 compliant
- FM200 Fire suppression facility
- Market Data feed from Thomson Reuters Electron network
- 99.999% uptime

## Technology Programme - Software and Hardware

### For services opted by member, BSE bears the cost on behalf of the member for;

- The software license cost for ALGO trading and market access
- The infrastructure cost on Co-location rack space
- The ALGO trading servers at Co-location
- The internet connectivity between Co-location and member's office

### ALGO Trading

Algo Trading software is available from following vendors for quoting and market making in Eq. Derivatives including auto hedging capabilities across Exchanges and Segments:

- Greeksoft Technologies Pvt. Ltd.
- uTrade Solutions Pvt. Ltd.
- Omnesys Technologies Pvt. Ltd.
- Symphony Fintech Solutions Pvt. Ltd.
- Resolute Softech

### Cost Comparison

| Service  | BSE                           | Other Exchange   |
|--|-------------------------------|--|
| Colocation Network Bandwidth (NTT Netmagic)                                | 10 Gbps fiber optic network   | 10 Gbps fiber optic network  |
| Roundtrip Latency (in µsec): Exchange Response Time                        | 6                             | 500 #  |
| Roundtrip Latency (in µsec): Colo Network*                                 | 10                            | 500 #  |
| Roundtrip Latency (in µsec): Exchange Response Time + Colo Network Latency | 16                            | 1000 #   |
| 10G Switch at Member Rack  | Not Mandatory                 | Mandatory  |
| 10G NIC Card from Exchange per member                                      | 2 Solarflare Cards (SFN7322F) | NIL  |
| Additional cost to member for 10G migration                                | NIL                           | INR 10 – 20 Lakhs  |
| Full Racks   | Free                          | One Time Cost : Rs. 1 Lakh plus AMC : Rs.12 Lakhs  |
| Half Racks   | Free                          | One Time Cost : Rs. 50,000 plus AMC : Rs.6 Lakhs   |
| Quarter Racks  | Free                          | Not Available  |
| Servers  | Free                          | Not Available  |
| Algo software  | Free                          | Not Available  |
| Interactive connectivity cost  | Free                          | <b>Annual Cost per connection</b><br>Rs.10 Lakhs for 400 messages/sec                      |
| Market data connectivity cost  | Free (including EOBI feed)    | <b>TBT feed Annual Cost per feed</b><br>Full Rack : Rs.1.00 Lakh / Half Rack: Rs.0.50 Lakh |

\*10G network with Solarflare card SFN7322F with onload # Based on market feedback

## Sponsored Market Access

### Implementation of 'Sponsored Market Access' (SMA) at Co-location

- SMA is a software distribution model in which applications are hosted by a service provider and made available to customers over a network.
- Free of cost rack space is allocated by BSE to the SMA Service providers to install their algo trading application server in Netmagic Co-location. The members can connect to this SMA algo server at Co-location via Internet.
- The algo strategy parameters can be triggered from the member front-end application and sent to the SMA algo server at Co-location.
- The corresponding algos will generate orders to be sent to BSE trading system through Co-location network.
- The algo orders will be sent to the BSE Trading system via the high speed Co-location gateway for minimum latency.
- Members can execute orders over high speed Co-location network without installation of any infrastructure at Co-location by the members.

### Advantages

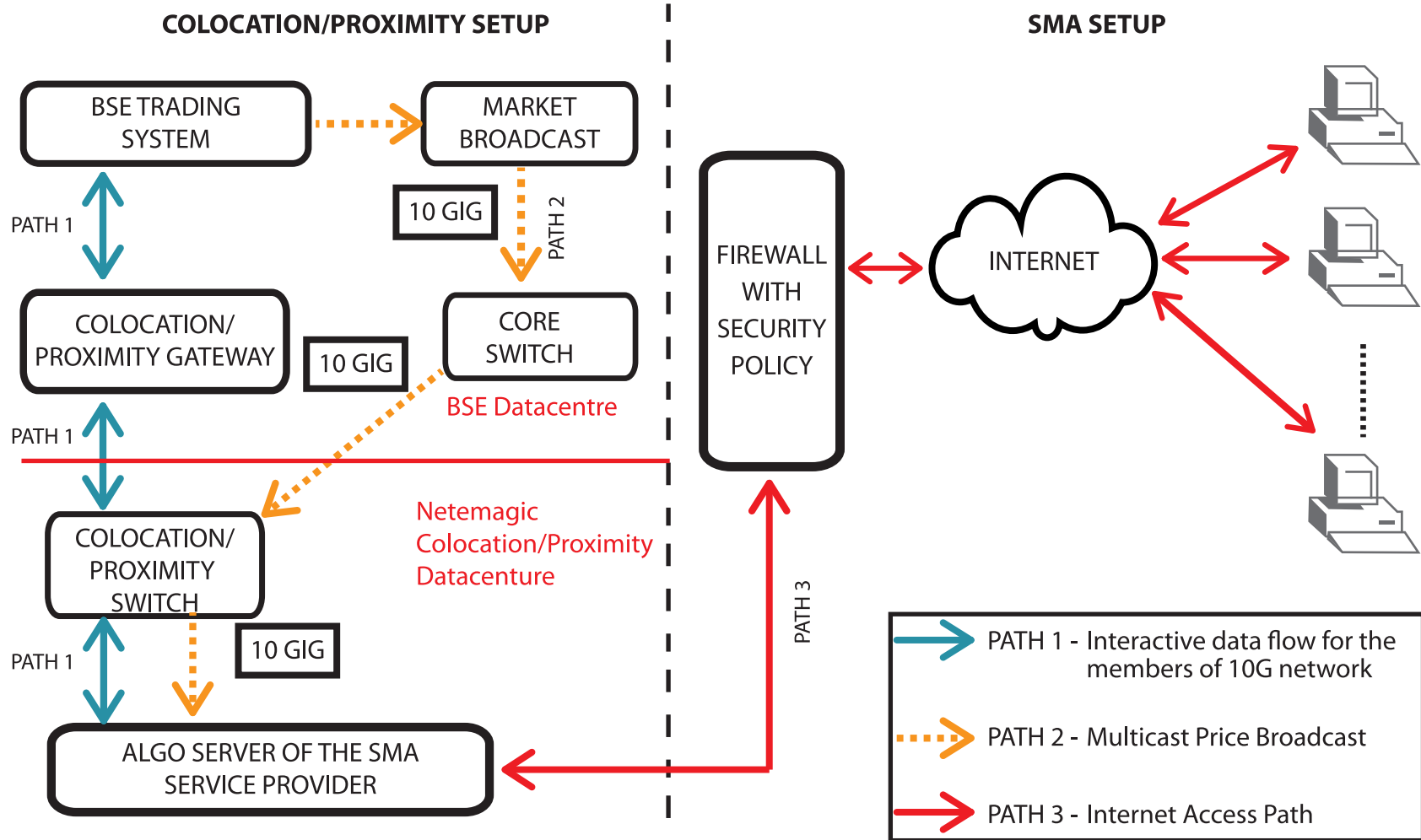
#### For Members

- Zero capital expenditure on infrastructure at Co-location.
- The algo orders will be generated at Co-location and sent to the BSE Trading system via the high speed 10G Colocation network for minimum latency.

#### For Vendors

- Free of cost rack space is allocated by BSE to SMA service providers to install their algo trading application server in Netmagic Co-location.
- Vendor can service multiple clients with a centralized algo server installed at Co-location. Hence, vendor's cost of maintenance is low.

# Sponsored Market Access- New Facility at Co-location



## Contract Symbols

| Bloomberg Ticker   | Category                     | Type             |
|--------------------|------------------------------|------------------|
| SENSEX Index CT    | S&P BSE SENSEX Index futures | Futures contract |
| BSE100 Index CT    | S&P BSE 100 index futures    | Futures contract |
| SENSEX Index OMON  | S&P BSE SENSEX Index options | Options contract |
| BSE100 Index OMON  | S&P BSE 100 Index Options    | Options contract |
| LUSA Currency OMON | S&P BSE Currency Options     | Options Contract |
| LUSA Curncy        | Currency USDINR Futures      | Futures Contract |
| LEA Curncy         | Currency EURINR Futures      | Futures Contract |
| LGBA Curncy        | Currency GBPINR Futures      | Futures Contract |
| LJPA Curncy        | Currency JPYINR Futures      | Futures Contract |
| TBBA Comdty        | T-Bill                       | Futures Contract |
| IISA Comdty        | Gov Bond 8.4%                | Futures Contract |
| IIPA Comdty        | Gov Bond 7.72%               | Futures Contract |

| Thompson Reuters Symbols | Category                    | Type             |
|--------------------------|-----------------------------|------------------|
| 0#BIF                    | S&P BSE SENSEX Equity Index | Futures contract |
| 0#BHI                    | S&P BSE 100 Index futures   | Futures contract |
| 0#BIF*.BO                | S&P BSE SENSEX Equity Index | Options contract |
| 0#BHI*.BO                | S&P BSE 100 Index Options   | Options contract |
| 0#BIR                    | Currency USD/INR            | Futures contract |
| 0#BEU                    | Currency EUR/INR            | Futures contract |
| 0#BGB                    | Currency GBP/INR            | Futures contract |
| 0#BJP                    | Currency JPY/INR            | Futures contract |
| 0#BSE91                  | Treasury Bill               | Futures contract |
| 0#B883                   | 10 Yr G-Sec                 | Futures contract |
| 0#B716                   | 10 Yr G-Sec                 | Futures contract |

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