



BSE - PUBLIC


INTRODUCTION TO BSE – AUGUST 2022

*INDIA'S FIRST UNIVERSAL
EXCHANGE*

 @BSEIndia

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 bdm@bseindia.com

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BSE VALUE PROPOSITION

Key elements	BSE Advantage
Brand name	<ul style="list-style-type: none"> Trusted brand name with a presence of 147+ years India's first Universal Exchange and World's largest exchange in terms of companies listed
Broker / member network	<ul style="list-style-type: none"> Network of over 1,300 brokers / members 2.5 lakh Authorized Persons 110 million+ Investor accounts 70,000+ Mutual Fund Distributors
Technology	<ul style="list-style-type: none"> In-house technology company for faster go – to – market World's fastest Exchange with a trading speed of 6 microseconds
Clearing & settlement	<ul style="list-style-type: none"> Secure, capital-efficient counterparty risk management and post-trade services provided by ICCL (AAA rated)
Risk and surveillance	<ul style="list-style-type: none"> Robust trading, clearing, risk management, & settlement mechanism First Exchange in India and second in the world to obtain ISO 9001:2000 certification



EVOLUTION OF THE EXCHANGE

1875-2011

2012-2015

2016-2017

- BSE started as The Native Share & Stock Broker's Association
- BSE corporatized
- Mutual Fund Platform ("StAR MF") launched

- BSE Small & Medium Enterprises ("BSE SME") Platform launched
- Currency Derivatives launched
- Interest Rate Derivative Platform launched
- New Debt segment launched
- BSE becomes the fastest exchange in the world - median response speed of 6 micro-seconds

- Trading of Sovereign Gold Bonds commenced
- "BSE-BOND"- Electronic Book Mechanism launched
- India International Exchange (IFSC) Ltd. launched by Hon'ble Prime Minister of India, Shri Narendra Modi
- BSE's becomes the first listed exchange in India

Over last few years, BSE has transformed itself from a conventional stock exchange to the 1st Universal Exchange in addition to setting up e-commerce initiatives successfully

EVOLUTION OF THE EXCHANGE

2018-2019

- Commodity Derivatives segment launched
- JV set up with Ebix Inc. to undertake insurance broking business
- JV with Power Trading Corporation and ICICI Bank to set up a power exchange
- BSE launches StAR MF mobile application for IFA's – "IFA StAR MF Mobility"

2020-2021

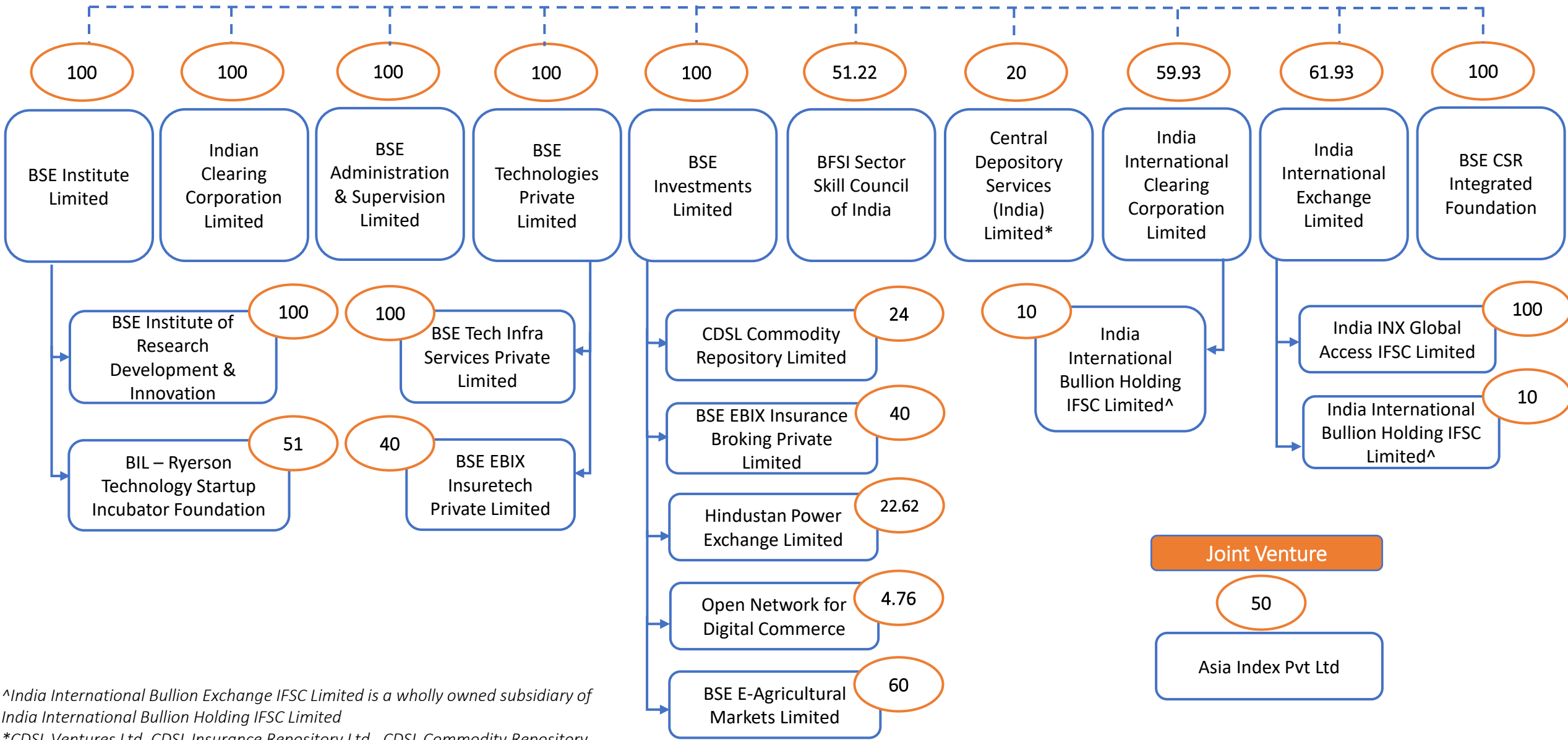
- Beta-launch of services by BSE Ebix Insurance Broking Services on February 07, 2020
- Launch of Commodity Options in GoldM and SilverKG
- Launch of electronic spot platform for agricultural commodities - "BSE E-Agricultural Markets Ltd. (BEAM)" on December 11, 2020
- Launch of StAR MF Plus, a premium platform for distributors and advisors on January 18, 2021

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2021-2022

- Setup a wholly owned subsidiary company "BSE Administration & Supervision Ltd." (BASL) for carrying out the administration and supervision activities of all SEBI-registered investment advisors (RIA) on June 01, 2021
- Launched trading in delivery-based futures contract in BSE SUFI Steel Billets

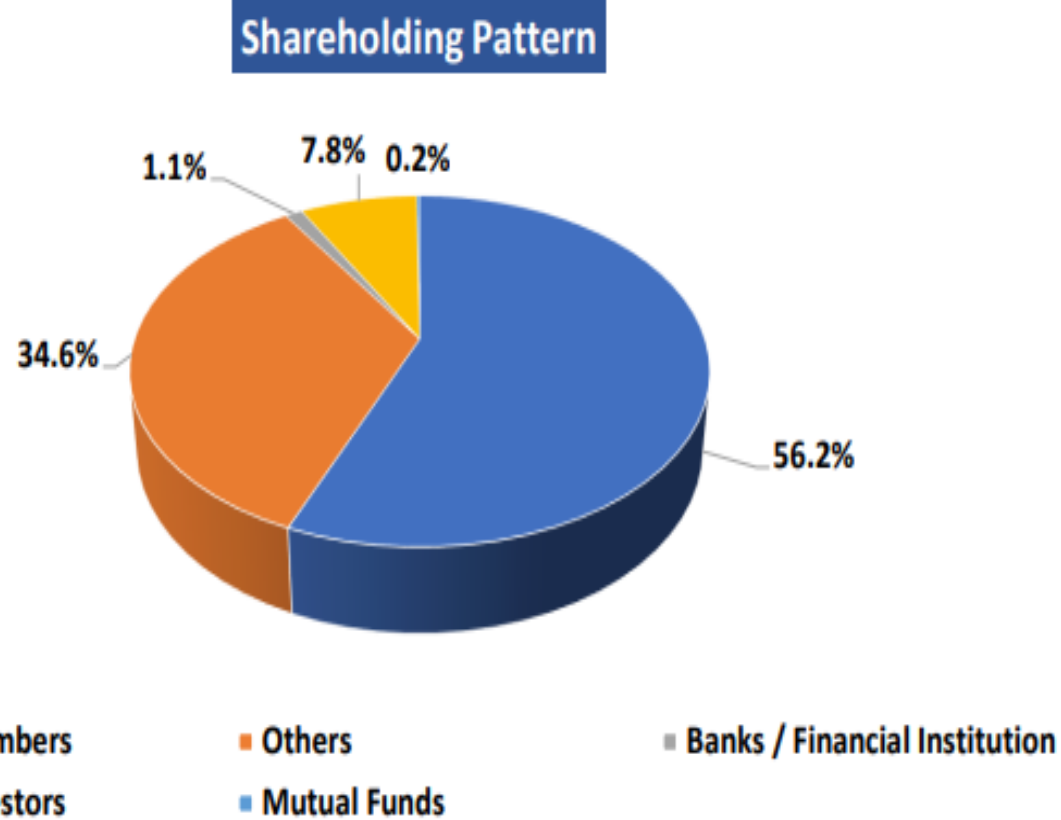
BSE Group



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^India International Bullion Exchange IFSC Limited is a wholly owned subsidiary of India International Bullion Holding IFSC Limited
 *CDSL Ventures Ltd, CDSL Insurance Repository Ltd., CDSL Commodity Repository Limited & CDSL IFSC Limited are Group companies of CDSL

Holding as on June 30, 2022



TOP 10 SHAREHOLDERS (As on June 30, 2022)

Life Insurance Corporation of India	5.59 %
Zerodha Broking	3.70 %
Siddharth Balachandran	2.97 %
MSPL Limited	1.33 %
S Gopalkrishnan	1.18 %
Jupiter India Fund	0.91 %
Akshay Vasantlal Mehta	0.89 %
Stichting Depository APG Emerging Markets Equity P	0.85%
Vanguard Total International Stock Index Fund	0.87 %
Vanguard Emerging Markets Stock Index Fund	0.69%

BOARD OF DIRECTORS



Shri S. S. Mundra

Chairman & Public Interest Director
On BSE Board since 2018

- ✓ Former Deputy Governor, Reserve Bank of India

Former Chairman & Managing Director of Bank of Baroda



Shri David Wright

Public Interest Director
On BSE Board since 2018

- ✓ Former General Secretary of IOSCO (2012-2016), former Deputy Director-General for Securities and Financial Markets at the EU Commission.
- ❖ From March 2000 – October 2010, he was first Director, then Deputy Director-General for securities and financial markets



Shri Umakant Jayaram

Public Interest Director
On BSE Board since 2019

- ✓ 28 years Cross functional experience in Global Investment Banking, Finance Planning & Analysis, Risk Consulting / Business transformation



Sushri Jayshree Vyas

Public Interest Director
On BSE Board since 2019

- ✓ Former Managing Director, Shree Mahila Sewa Sahakari Bank, Ahmedabad
- ✓ In the year 2001, financial literacy programme was introduced in Sewa Bank, first of its kind in India – at initiative of Ms. Jayshree Vyas



Justice Shiavax Jal Vazifdar

Public Interest Director
On BSE Board since 2022

- ✓ Retired Chief Justice of the Punjab & Haryana High Court.
- ❖ Practiced as advocate in the Bombay High Court.
- ❖ Appointed Additional Judge of High Court in 2001.



Prof Subhasis Chaudhuri

Public Interest Director
On BSE Board since 2022

- ❖ Director of IIT Bombay and K.N. Bajaj Chair Professor, Department of Electrical Engineering.
- ❖ He has 110 journal publications and over 240 conference presentations, has authored 7 monographs and 13 National/International Patents.



Shri T. C. Suseel Kumar

Shareholder's Director
On BSE Board since 2020

- ❖ Former Managing Director of Life Insurance Corporation of India.
- ❖ Played a key role in redefining the business proposition of the Corporation that earned the LIC 'Best Life Insurer Award' by many leading agencies during the year 19-20

MANAGEMENT TEAM



Shri Neeraj Kulshrestha

- Chief Regulatory Officer
- With BSE since 2015

- Prior to BSE he was an Executive Director in Morgan Stanley India for a decade
- Earlier at National Stock Exchange where he managed functions like Trading Operations, Inspection, Investigation, Futures & Options Clearing and Trading, CEO of India Index Services and Dotex International
- Three decades of experience in Capital markets, which includes Securities Markets and General Insurance



Shri Nayan Mehta

- Chief Financial Officer
- With BSE since 2012

- ✓ Experience of over three decades, earlier worked at Credit Analysis & Research as Joint General Manager (Accounts), and as CFO at Multi Commodity Exchange of India
- ✓ Worked at the National Stock Exchange ("NSE")
- Represents BSE on the Boards of group and associate companies of BSE



Shri Kersi Tavadia

- Chief Information Officer
- With BSE since 2010

- ✓ Prior to joining BSE, employed with Log-in Utility and InvestSmart Financial Services
- More than 3 decades of experience in areas of Application Systems/ IT Infrastructure development and management, managing all aspects of IT operations in Capital markets and manufacturing companies
- Played a leading role in transforming BSE into the fastest exchange in the country

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Shri Sameer Patil

- Chief Business Officer
- With BSE since 2015

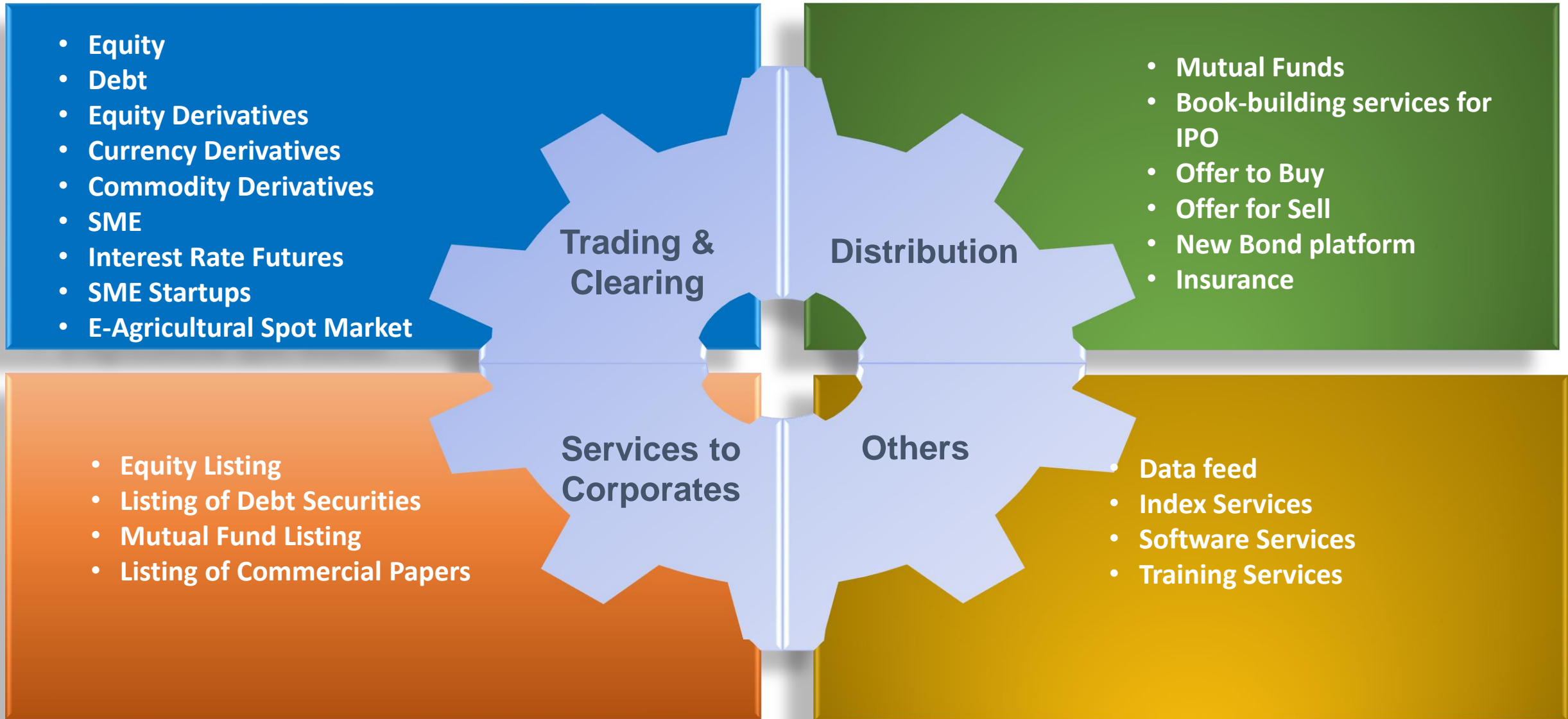
- ✓ Instrumental in setting up and responsible for Business Development of INDIA INX at GIFT CITY IFSC
- More than 2 decades of experience in financial sectors like Commodities, Currency Derivatives, Indices etc. and has experience in Trading, Hedging Strategies, Product Designing and Business Development
- Associated with MCX during inception for more than a decade as Senior Vice President



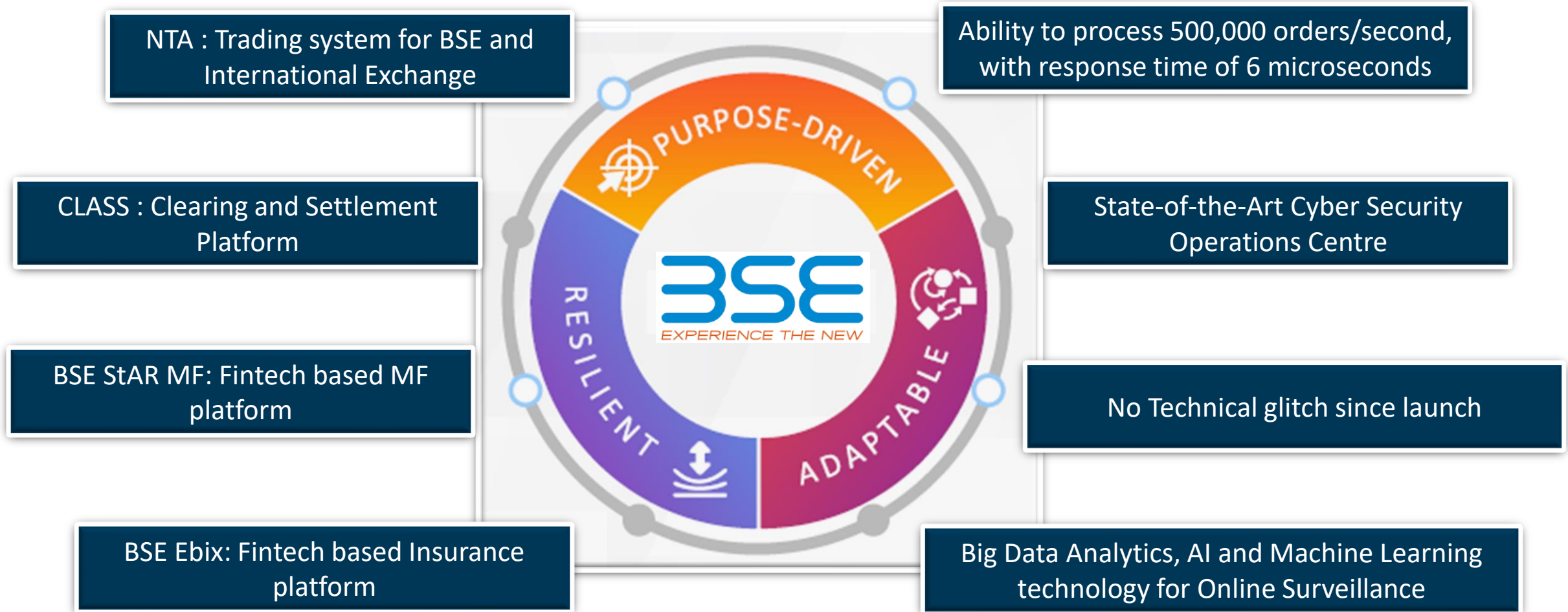
Shri Girish Joshi

- Chief Trading Operations and Listing Sales
- With BSE since 2010

- Worked with ICICI Bank Group for a decade in various areas like ICICIDirect.com, Treasury Mid Office, Regulatory Reporting and Monitoring at CFO office
- One of the earliest core team members involved in the set-up of National Stock Exchange ("NSE"), and in 7 years at NSE he worked in Wholesale Debt Market and post trade functions



KEY PLATFORMS AND TECHNOLOGY PROWESS



BSE has obtain ISO 27001:2013 for Information Security Management and ISO 22301:2012 for Business Continuity Management System



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Funds Mobilized using BSE Platform (Equity and Debt)

Particulars	FY 2022-23* (Rs. in crores)	FY 2021-22 (Rs. in crores)	FY 2020-21 (Rs. in crores)
Debt	88,595	3,98,379	5,55,533
Equity	65,372	1,73,023	2,18,421
InvIT's	-	9,484	25,215
REIT's	-	-	4,245
Commercial Paper	2,45,649	12,61,956	10,52,952
Total	3,99,616	18,42,844	18,56,366

4,776
Companies
listed with
Equities

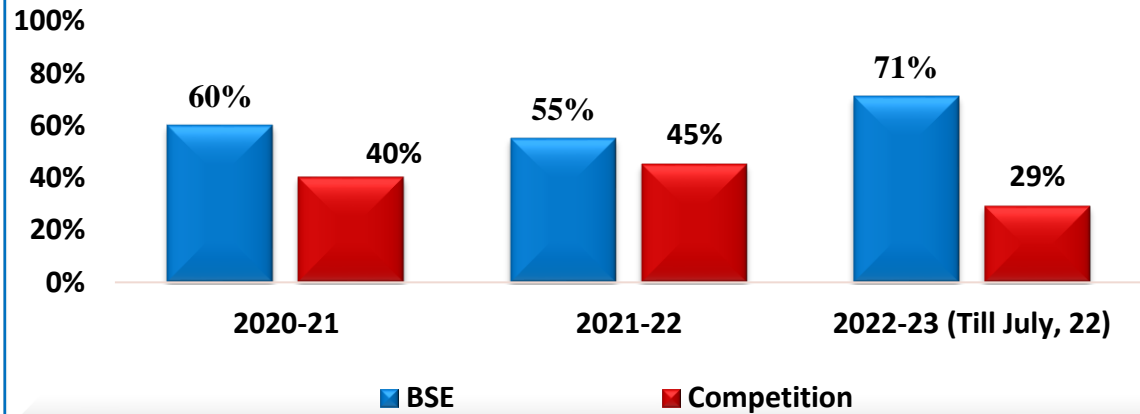
Market
Capitalization
of BSE Listed
Co. is Rs.
2,72,29,031
crores

Note - Debt Includes: Private Placement of Debt Instruments and Public Issue Bonds
Equity Includes: Main Board IPO, SME IPO, Preferential, QIPs and Rights Issues
InvIT's, REIT's and Commercial Paper are on standalone basis

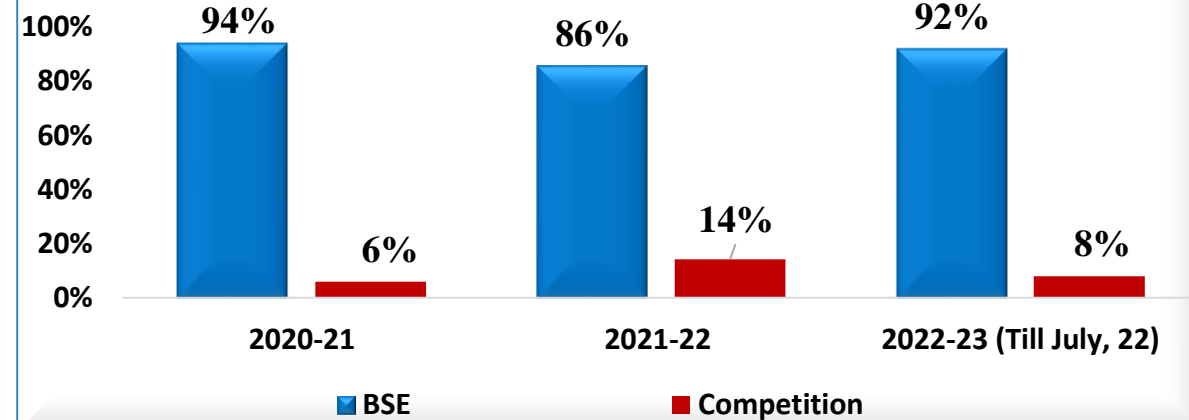
BSE's LEADERSHIP



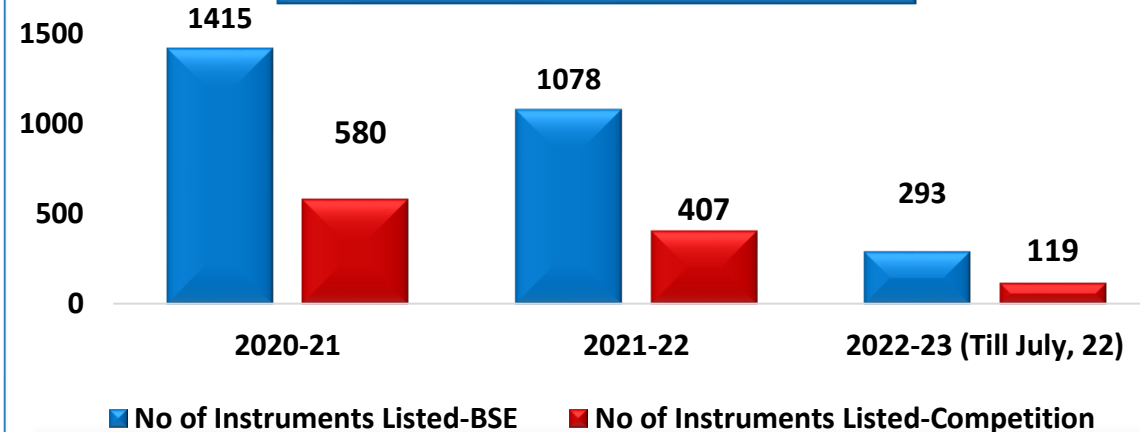
Main Board IPO – Designated (Percentage)



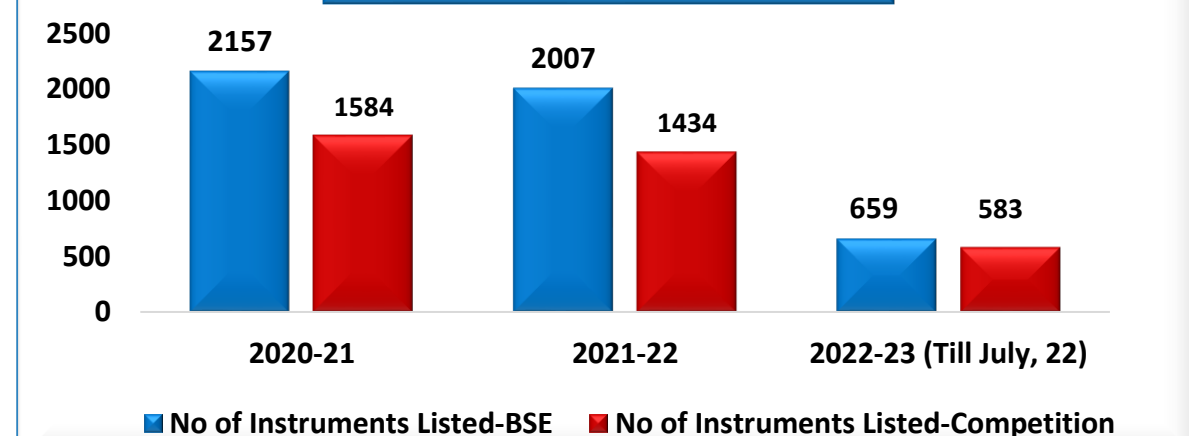
DEBT IPO – Designated (Percentage)



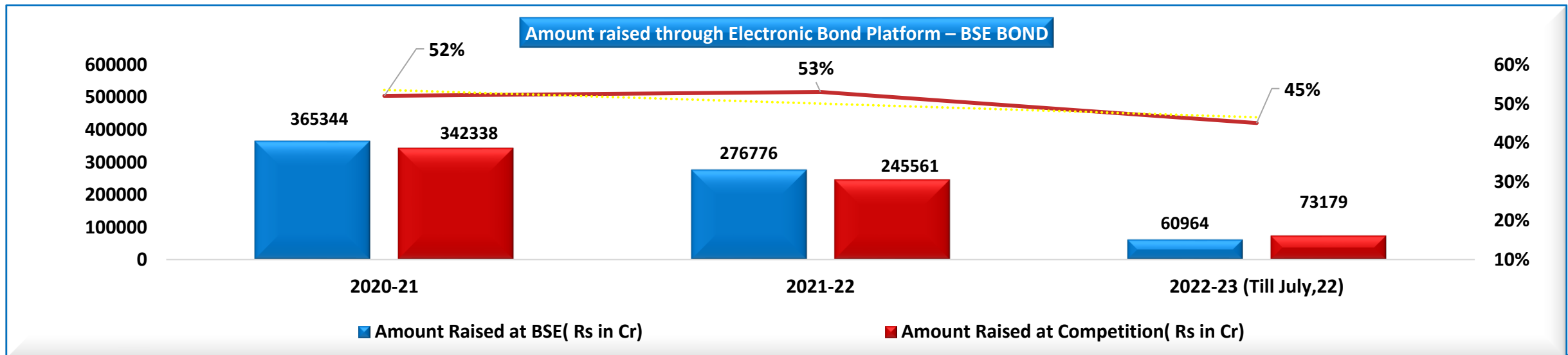
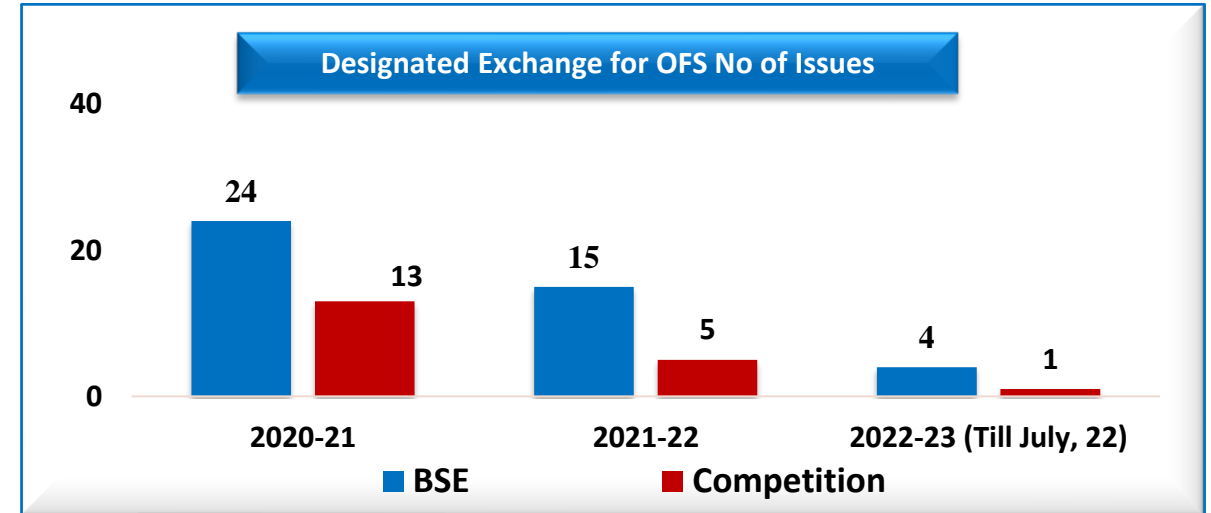
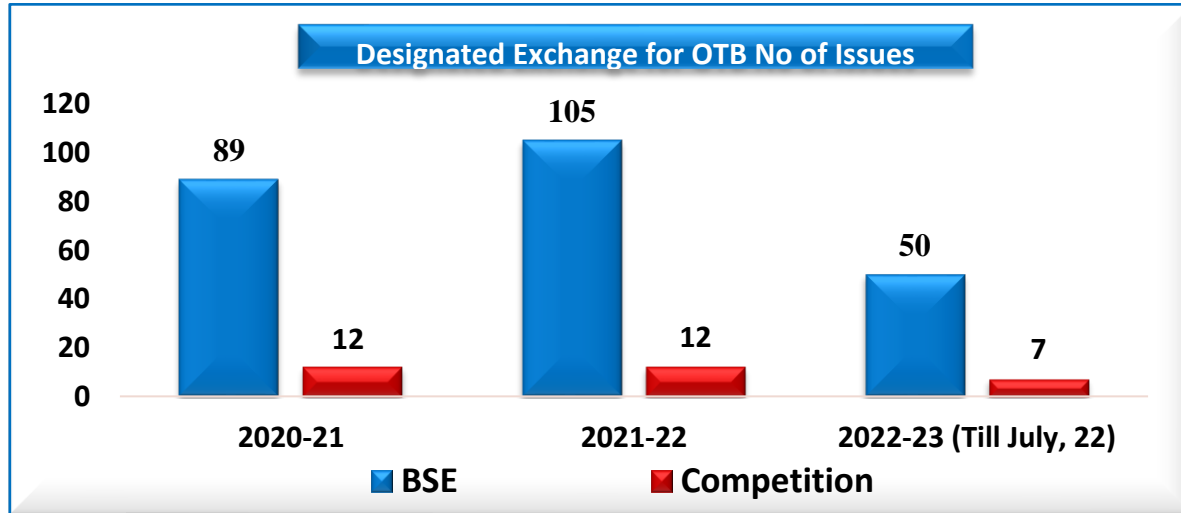
Privately Placed Bonds Listed (Numbers)



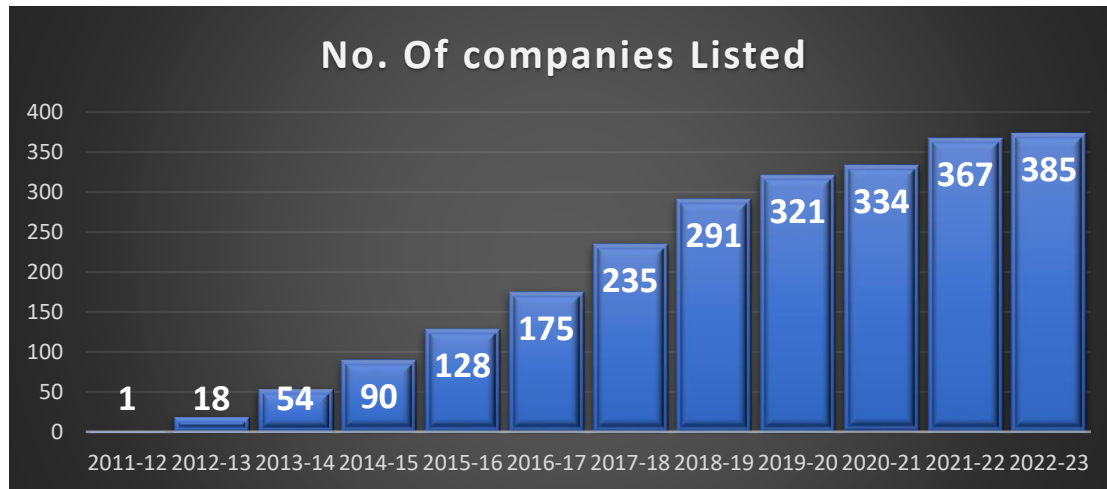
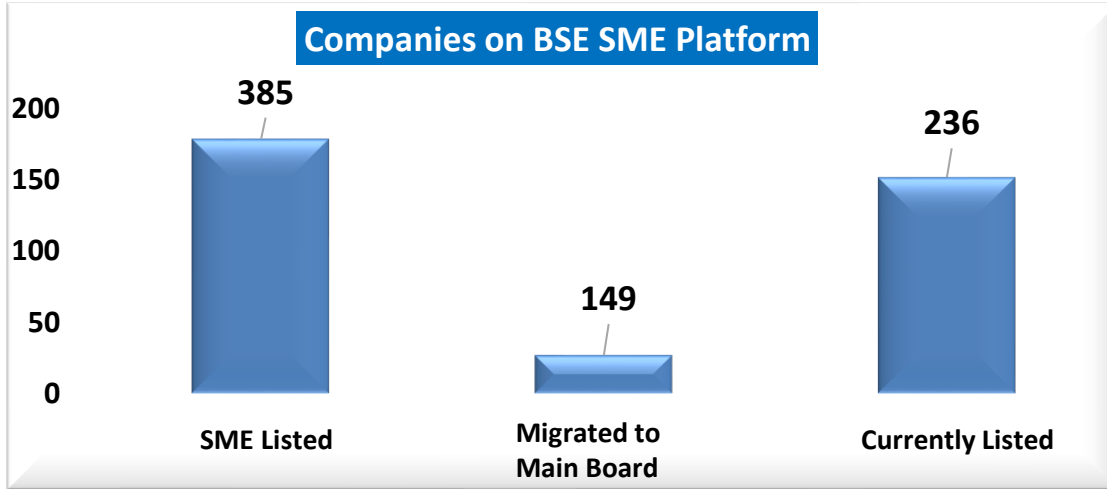
Commercial Paper Listed (Numbers)



BSE's LEADERSHIP



BSE SME –India’s Biggest SME platform



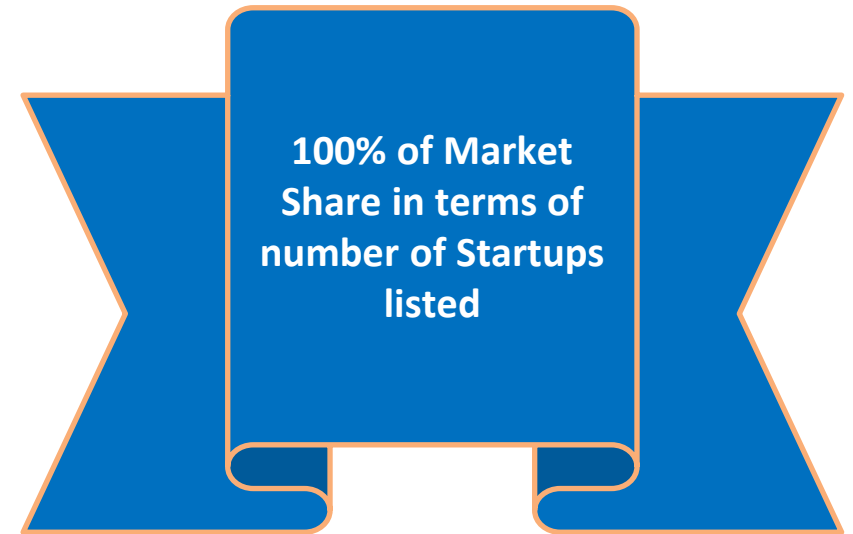
- BSE is the first stock exchange in India to receive approval from SEBI on 26th September 2011 to launch SME Platform.
- SME IPO Index with a Base value of 100 as on 16th August 2012 is aimed at tracking the companies listed on SME platform was launched on 14th December 2012. As on 29th July,2022 its value was 12,920.56.
- The Platform facilitates capital raising by small and medium enterprises including start-up companies which are in their early stages of growth.
- Total number of Companies listed on SME till date -385
- Total Market Capitalization of companies listed on SME till date 54,625 Crs. *(USD 6914.55 Million). Conversion rate is taken \$1= Rs. 79.

60% of Market Share in terms of number of SMEs listed

BSE Startups –India's 1st Startups platform

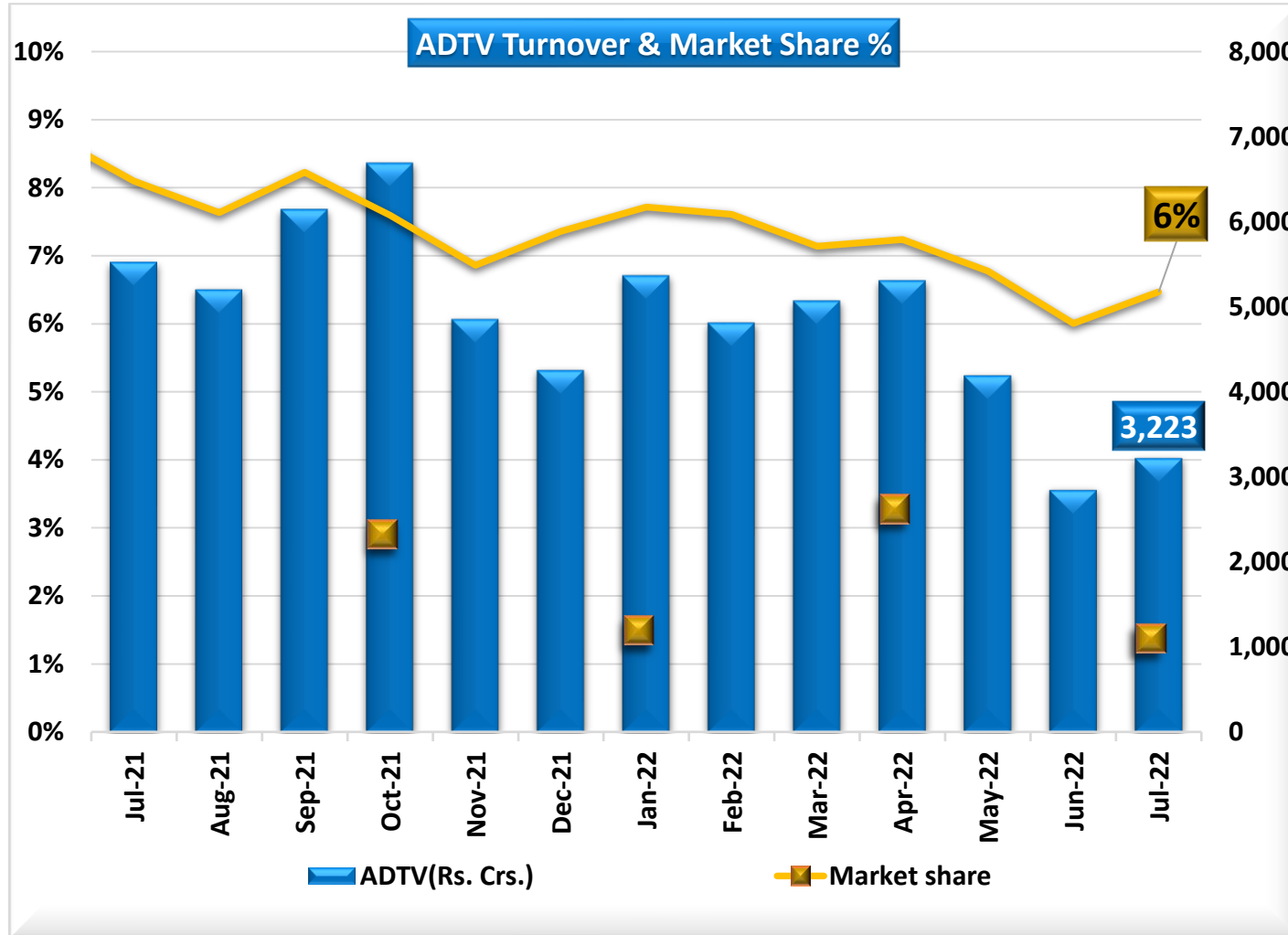
- BSE is the first stock exchange in India to launch Startups Platform on 22nd December 2018 under SME Segment
- The 'Startup Companies' seeking to be listed on the BSE Startups Platform should be in the sector of IT, ITES, Bio-technology and Life Science, 3D Printing, Space Technology, E-commerce, Hi-tech Defence, Drones, Nano Technologies, Artificial Intelligence, Big Data, Augmented/Virtual Reality, E-gaming, Exoskeleton, Robotics, Holographic Technology, Genetic Engineering, Variable Computers Inside Body Computer Technology and other high-tech industries.
- Total number of companies listed - 14
- Market Capitalization - Rs. 704.93 Crs *(\$89.23. millions)

*(Conversion rate is taken \$1 = Rs. 79).





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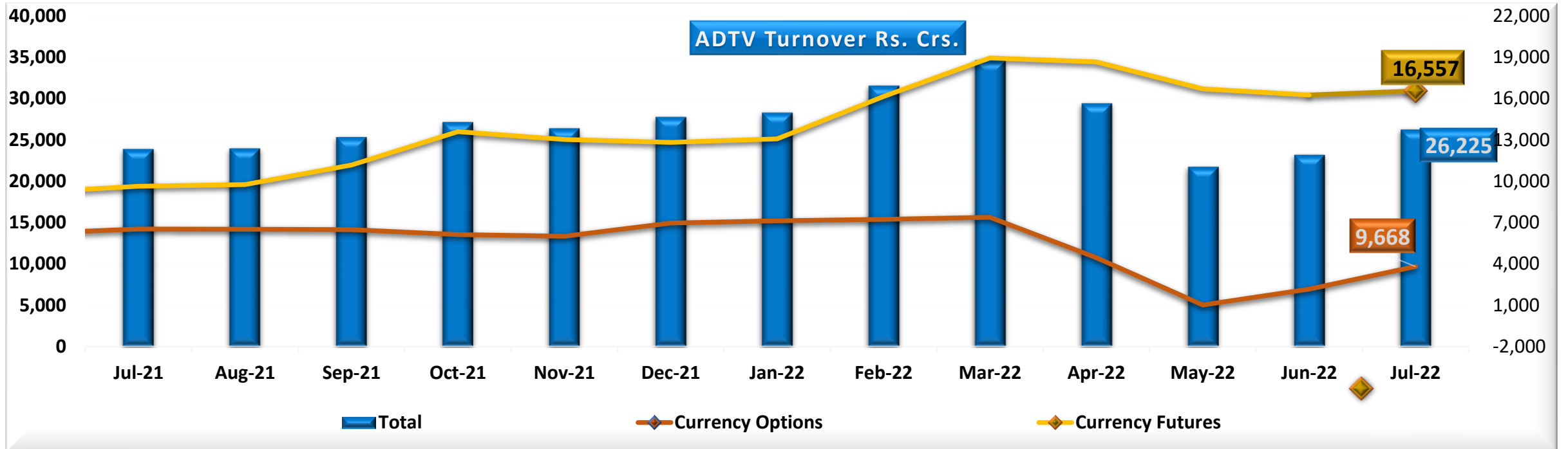
- India's largest Exchange with 4,000+ active scripts available for trade
- Competitive Transaction Charges
- Products:
 - Stocks
 - ETF's
 - REITs
 - InvITs
- Benefits: Interoperability of Clearing corporations

- Products: Futures / Options on Sensex, Sensex 50, Bankex and single-stocks
- 7 weekly and 3 Monthly Derivative Contracts
- Save upto INR 1.13 lakhs on a round-trip transaction exposure of INR 10 crores due to no transaction charges
- One standard deposit at BSE for all trading segments
- Multi-legged order entry facility

Regulatory Benefits

- Interoperability of clearing corporations of stock Exchanges
- Cross-Margining benefits to the tune of 70% hedge with Nifty 50

CURRENCY DERIVATIVES



- Monthly and Weekly Contracts Offered on: USDINR, EURINR, GBPINR, JPYINR
- The most cost-effective exchange for hedging currency risk - Capping transaction charges at maximum of INR 3 lakhs, as compared to upto INR 18 lakhs at other venues
- Robust risk management systems.
- Innovative Products and Features.
- Banks, Foreign Portfolio Investors, Proprietary brokers, Corporates, Retail Clients etc. participate on BSE CDX

DELIVERY DETAILS SINCE LAUNCH

Commodity	Total Physical quantity of delivery	Unit
GOLD	12	KG
GOLDM	21100	GRAM
SILVER	7470	KG
TURMERIC	770	MT
STEEL	450	MT
ALMOND	240000	KG
COTTON J34	1600	BALES

DELIVERY DETAILS JULY 2022

Commodity	Total Physical quantity of delivery	Unit
STEEL	80	MT

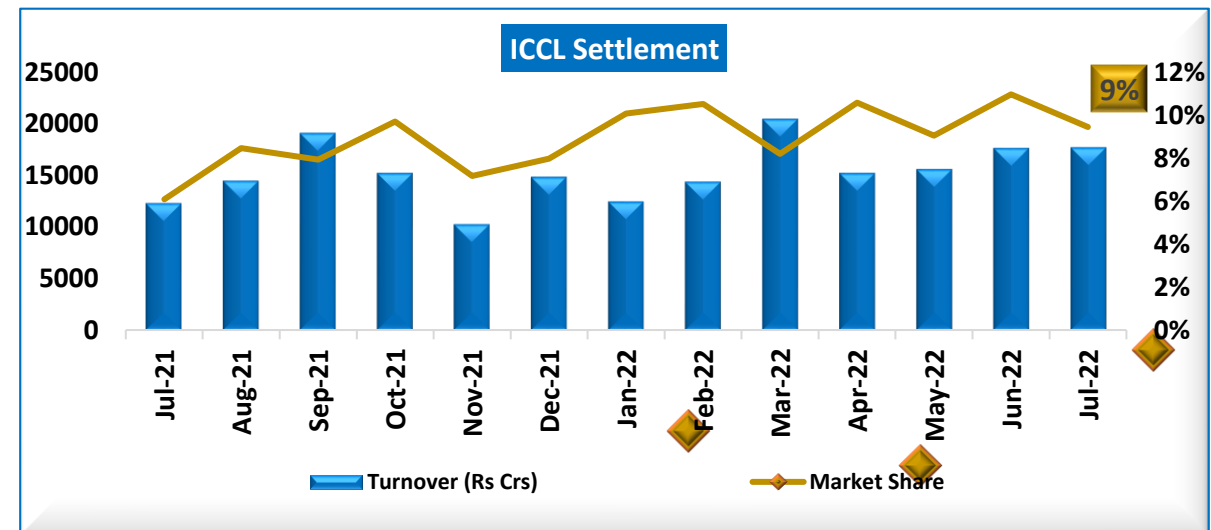
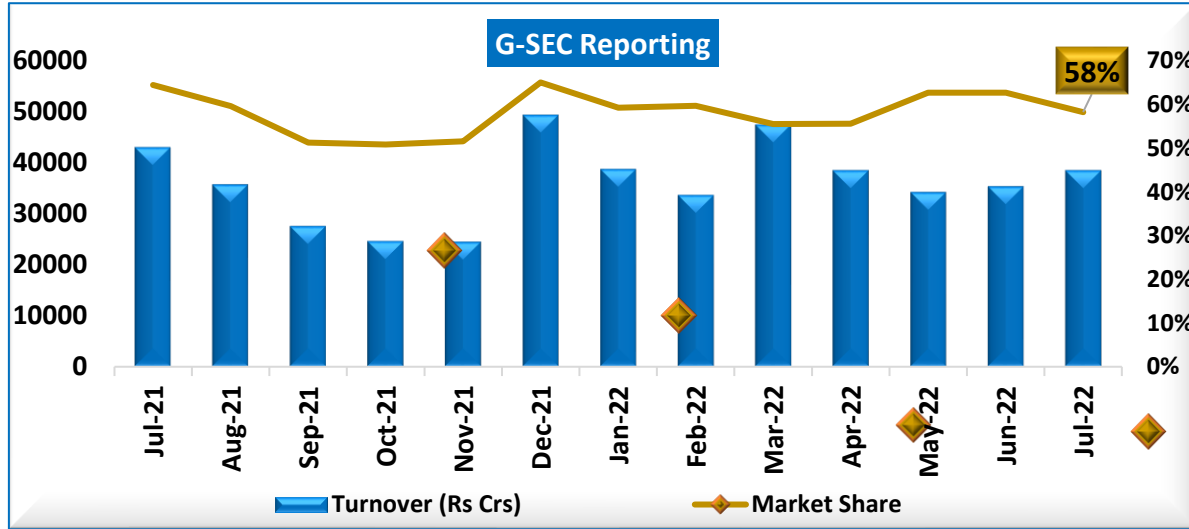
Commodities	Transaction charges
Futures	Rs. 2 Per Crore
Options	Transaction Charges on Active and Passive Orders -Rs.10 Per Crore of premium turnover

- Commodity Derivatives launch: Oct 1, 2018
- Diversified Product Profile
 - Precious Metals: Gold and Silver
 - Base Metals: Steel & Copper
 - Agri: Cotton J34, Turmeric and Almond
- Physical Deliveries – an integral part of BSE commodity platform
- First exchange in India to implement negative price trading facility
- Waived off many cost associated with delivery of Commodity on its platform such as Storage and assaying charges.
- Accepts BIS Standard Gold/Silver bars along with LBMA on the platform.

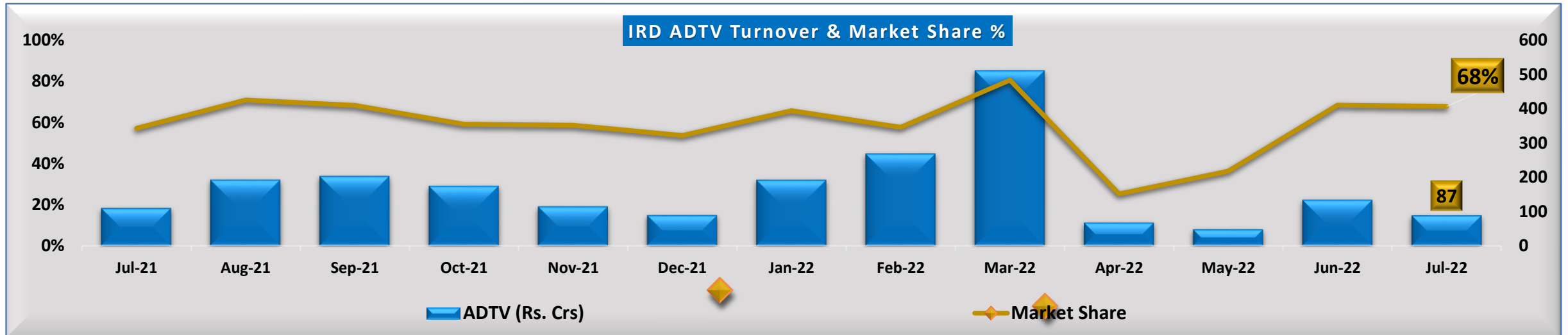
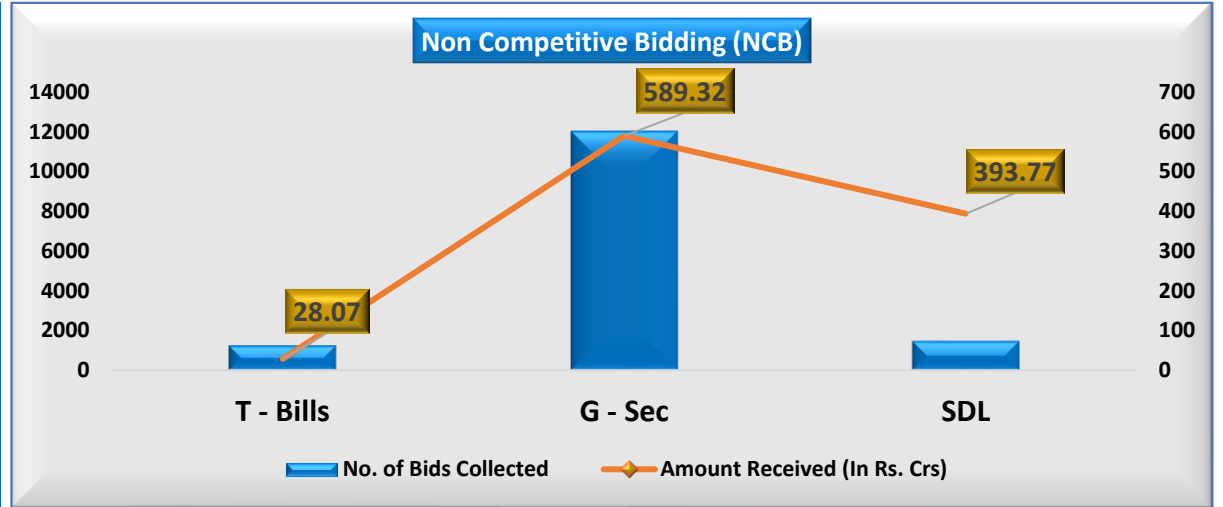
FIXED INCOME SEGMENT OVERVIEW

Fixed Income Products	Key Highlights
Reporting and Settlement Platform (NDS-RST)	<ul style="list-style-type: none"> • Facility to report and settle Corporate Bond and Government Securities (G-Sec) • Facility to settle Commercial Paper and Commercial Deposits • Zero Charges for reporting and settlement • Excellent Support Assistance • BSE had a Market Share of 32% in Corporate Bond and 58% in Government Securities reporting for FY 21-22
Request For Quote Platform (RFQ)	<ul style="list-style-type: none"> • Web based platform for trade and settlement of Corporate Bonds and CP/CDs • Zero Charges for trading, reporting and settlement • Excellent Support Assistance • BSE's RFQ Volume was 8,610 crores for FY 21-22
Retail Trading (Corporate Bonds & G-Sec)	<ul style="list-style-type: none"> • All the BSE listed bonds available for trading in F-Group of Equity Cash Segment • All G-Sec, G-Sec STRIPS, SDL and T-Bills are available for trading in G Group of Equity Cash Segment • BSE had a Market Share of 65% in for FY 21-22
NCB G-Sec	<ul style="list-style-type: none"> • BSE provides an online bidding platform "NCB – G-Sec" for collecting bids from members on behalf of their clients • No. Bids collected through BSE's NCB G-Sec Platform was 11,899 up to May -22
Interest Rate Derivatives	<ul style="list-style-type: none"> • BSE offers Interest Rate Futures (IRF) and Interest Rate Options (IRO) in various tenors of Government Securities • BSE had a Market Share of 57% for FY 21-22
Tri-Party Repo	<ul style="list-style-type: none"> • Basket Repo with settlement Guarantee Special Repo without settlement Guarantee
Anonymous Trading Platform	<ul style="list-style-type: none"> • A dedicated platform for anonymous order matching in Corporate Bonds for trading members

FIXED INCOME SEGMENT



FIXED INCOME SEGMENT



BSE'S TRANSACTION CHARGES AT A GLANCE

Segment	BSE	NSE
Equity Cash		
T/O < 1250 Crores	345	345
T/O between 1250 - 2500 Crores	340	340
T/O between 2500 - 5000 Crores	335	335
T/O between 5000 - 10000 Crores	330	330
T/O between 10000 - 15000 Crores	325	325
T/O between > 15000 Crores	320	320

Equity Derivatives - Futures		
T/O < 2500 Crores	0	200
T/O between 2500 - 7500 Crores	0	195
T/O between 7500 - 15000 Crores	0	190
T/O > 15000 Crores	0	185

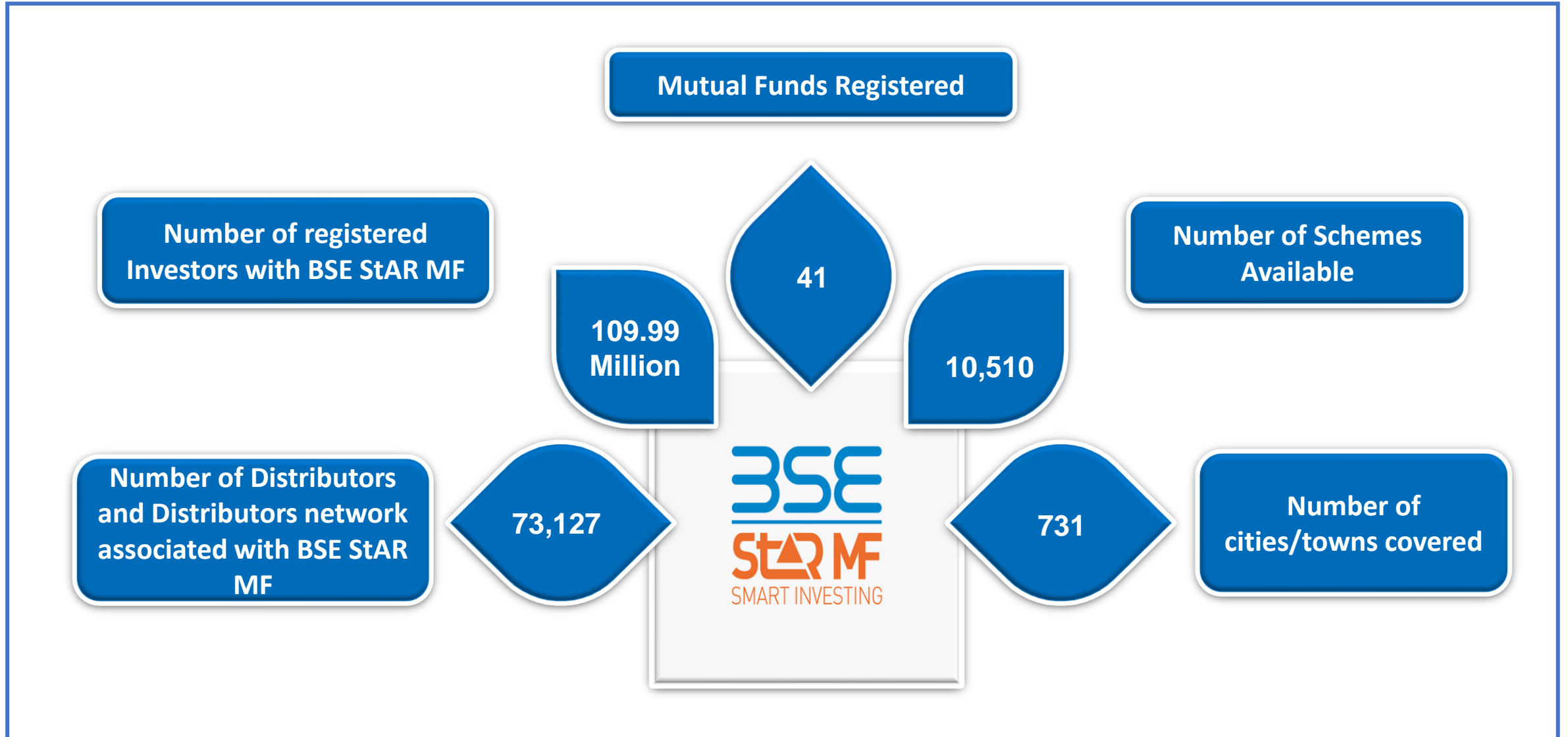
Equity Derivatives - Options (on Premium Turnover)		
Premium T/O < 3 Crores	500	2500
Premium T/O between 3 to 100 Crores	500	5300
Premium T/O between 100 to 750 Crores	500	5050
Premium T/O between 750 to 1500 Crores	500	4550
Premium T/O between 1500 to 2000 Crores	500	4050
Premium T/O > 2000 Crores	500	3300

Segment	BSE	NSE	MSEI
Currency Derivatives – Futures			
T/O < 1000 Crores	22	90	90
T/O between 1000 - 2000 Crores	22	80	80
T/O between 2000 - 3000 Crores	22	70	70
T/O between 3000 - 5000 Crores	22	35	70
T/O between 5000 - 10000 Crores	17	35	70
T/O between 10000 - 20000 Crores	11	35	70
T/O > 20000 Crores	0	35	70

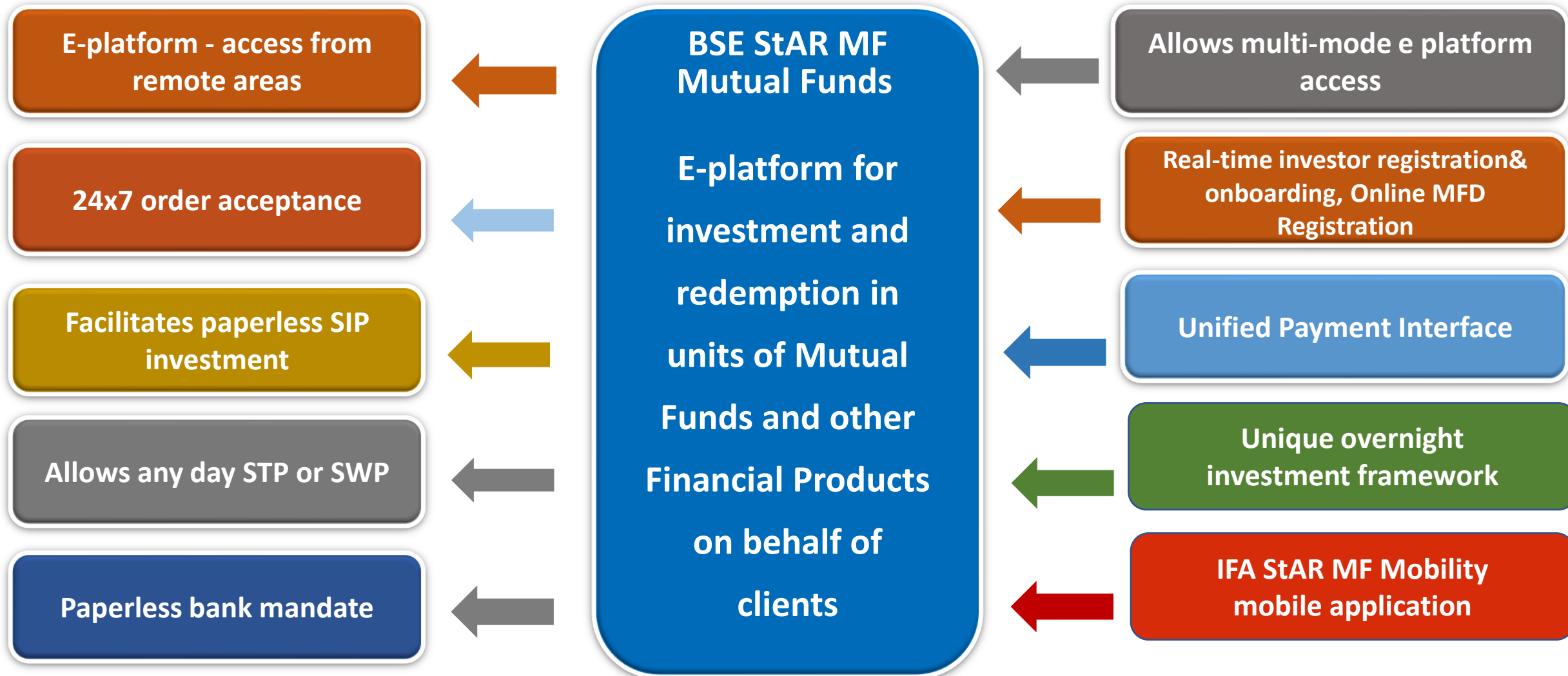
Currency Derivatives - Options			
Premium T/O < 50 Crores	100	3500	3500
Premium T/O between 50 to 100 Crores	100	3000	3000
Premium Turnover > 100 Crores	100	2500	2500

Segment	BSE	NSE	MCX	NCDEX
Commodity Derivatives – Futures				
T/O < 100 Crores	2	0	260	600
T/O between 100 - 300 Crores	2	0	260	450
T/O between 300 - 350 Crores	2	0	260	350
T/O > 300 Crores	2	0	175	350
Commodity Derivatives - Options				
Transaction Charges per crore	10	0	5000	3000

BSE STAR MUTUAL FUND PLATFORM – PAN-INDIA REACH & COVERAGE



BSE STAR MUTUAL FUND PLATFORM

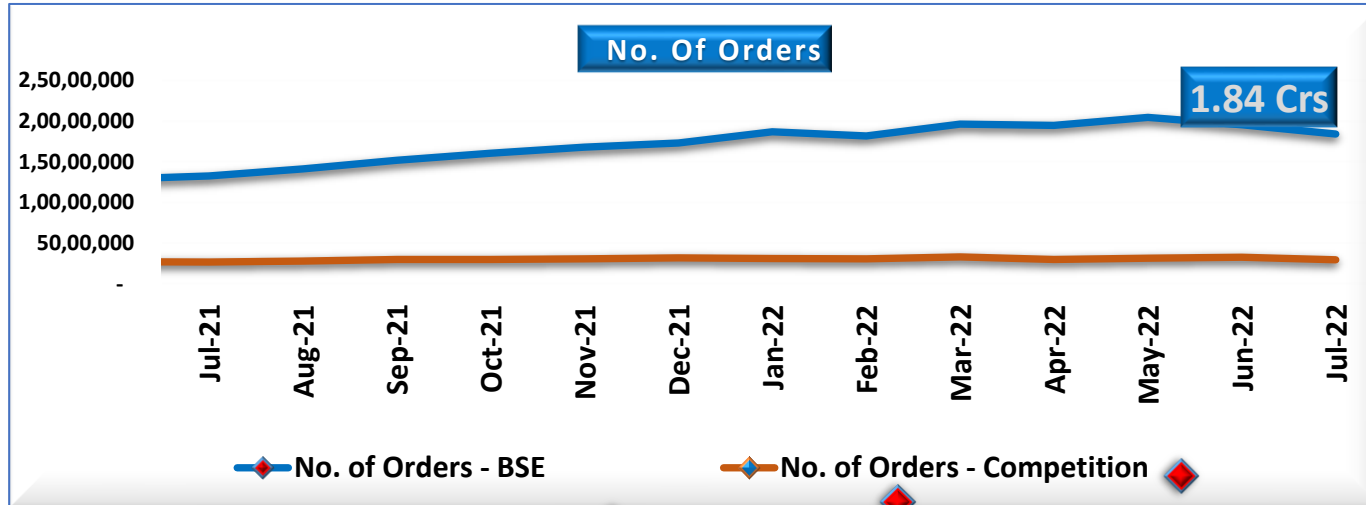


WHY STAR MF



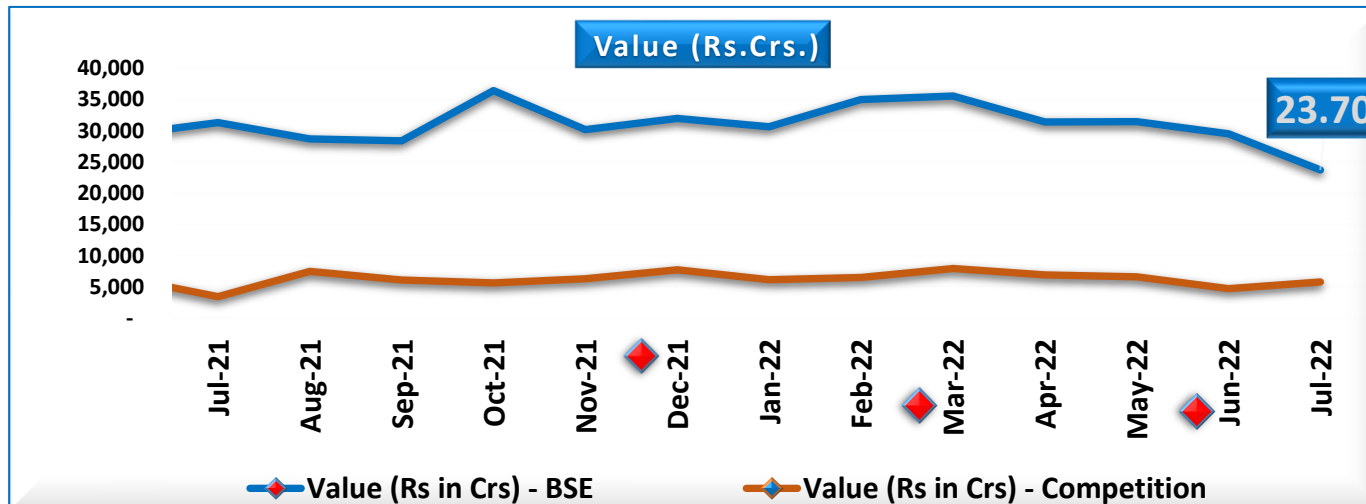
StAR MF Plus - a premium platform for Distributors and Advisors

STAR MF-INDIA'S LARGEST ONLINE MF DISTRIBUTION PLATFORM



BSE StAR Mutual Fund Platform – Pan-India Reach & Coverage

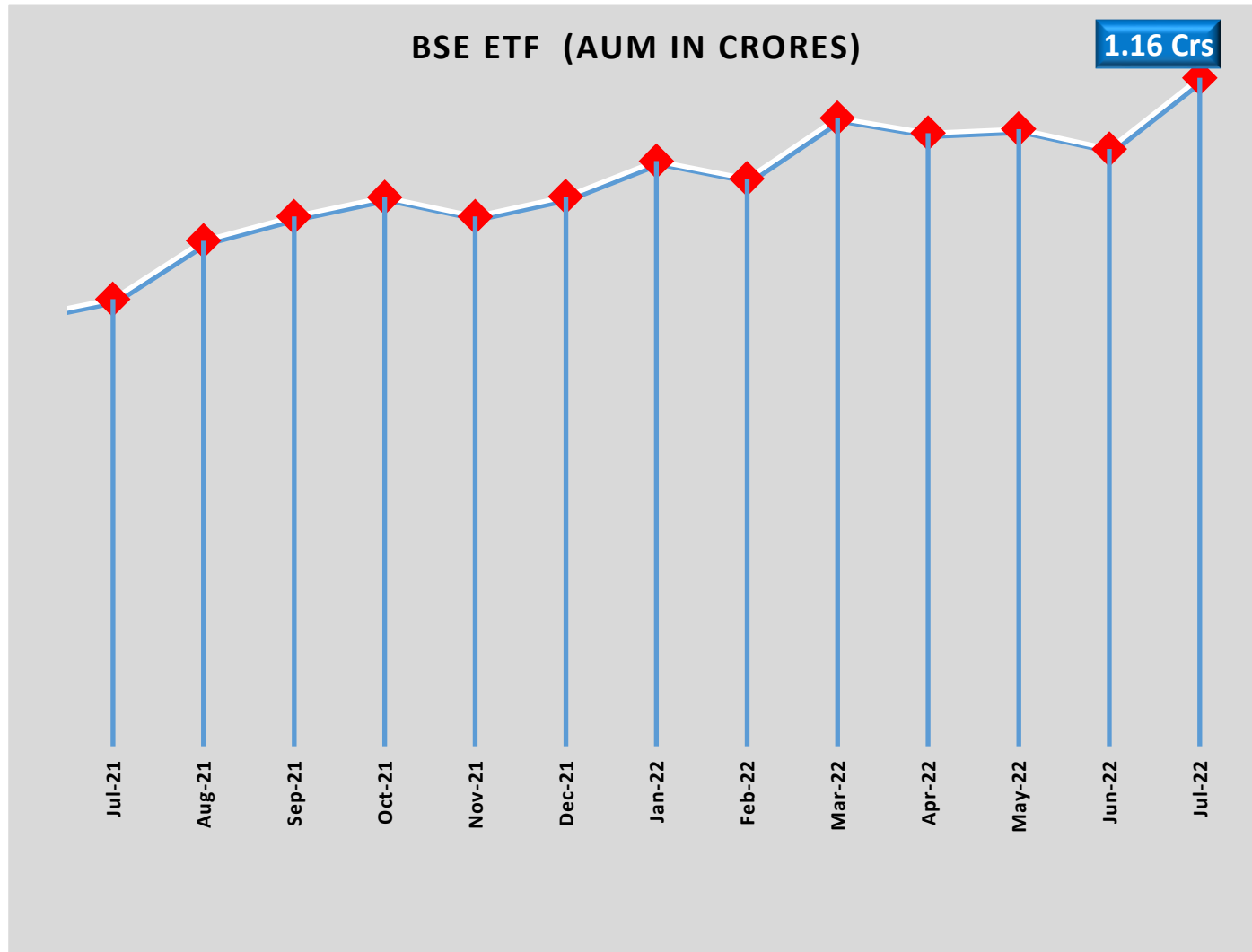
- 73,127 Distributors and Distributors network associated with BSE StAR MF
- 731 cities/towns covered
- 10,510 Schemes Available
- 109.99 Million registered Investors with BSE StAR MF
- 41 Funds Registered



Highlights for the Month of July 2022

- 1 Trxns 1,84,29,396
- 2 Turnover – Rs. Cr 27,129
- 3 86% market share in trxns
- 4 NEW SIP/XSIP Regs –8.47 lakhs
- 5 Distributors 73,127

ETF'S BASED ON S&P BSE INDICES



- **ETF** 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
- Most common types of ETFs in India:
 - Equity ETF
 - Precious Metal ETF
 - Liquid ETF
- EPFO invests 15% of its investment corpus in large cap ETFs including S&P BSE Sensex based ETF's
- BSE in its effort to bring greater participation for retail investors in the Indian landscape has tied up with market makers for ETF's
- As of July 2022, S&P BSE based ETF's asset base has reached Rs. 1,16,517 crores, of which ETF based on S&P BSE Sensex Index accounts more than 90%

Insurance Broking

- Commenced insurance broking in Motor, Health and Life Insurance
- Continuous growth of Point of Sales
- Product diversification
- Software integration with various insurance companies



Power Exchange

- Setup Hindustan Power Exchange jointly with Power Trading Corporation and ICICI Bank
- CERC granted registration to establish and operate a power exchange on May, 12, 2021
- Likely to commence operations in first quarter of FY22-23



E-Platform Services

- Launched an electronic spot platform for commodities - "BSE E-Agricultural Markets Ltd. (BEAM)
- TReDS platform via BSE Technologies for facilitating financing/discounting of trade receivables of MSMEs through multiple financiers



KYC KRA

- BSE's wholly owned subsidiary - BSE Technologies has received authorization to act as a KYC registration agency (KYC KRA) from SEBI
- Entity will focus on achieving inclusive investor reach in the securities market





DATA BUSINESS PRODUCTS

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

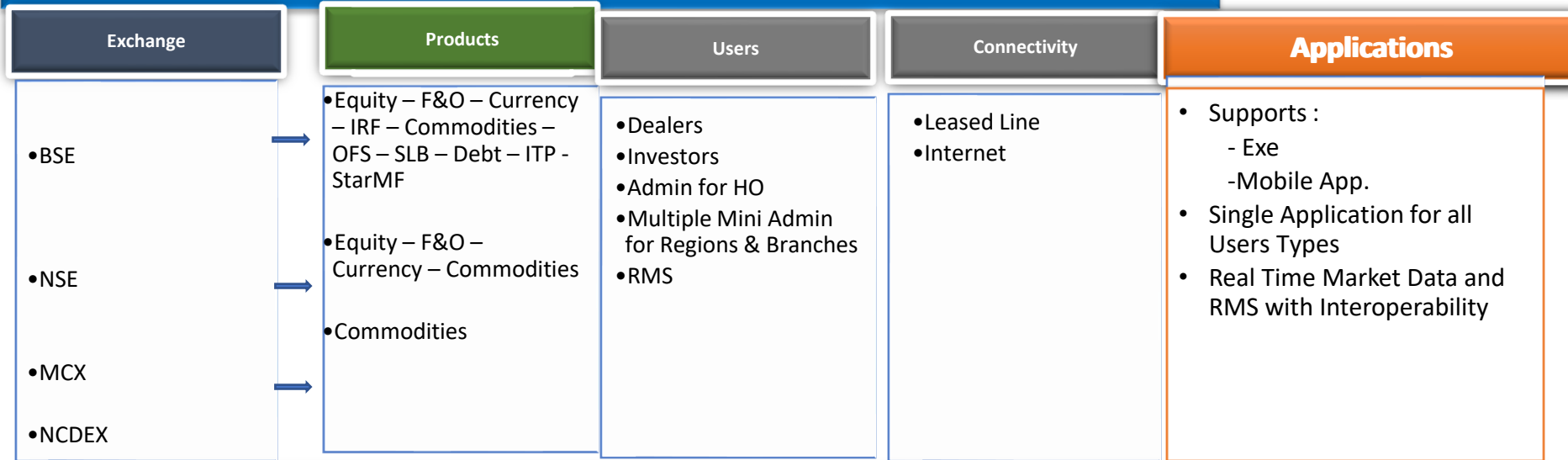
- Quotation files
- Annual report
- Daily Bulletin
- Sector Classification
- Trade and Order book data



BOLT PLUS - HOSTED MEMBER TRADING INTERFACE



One Window with Multiple Utilities



Application for Desktop and Mobile

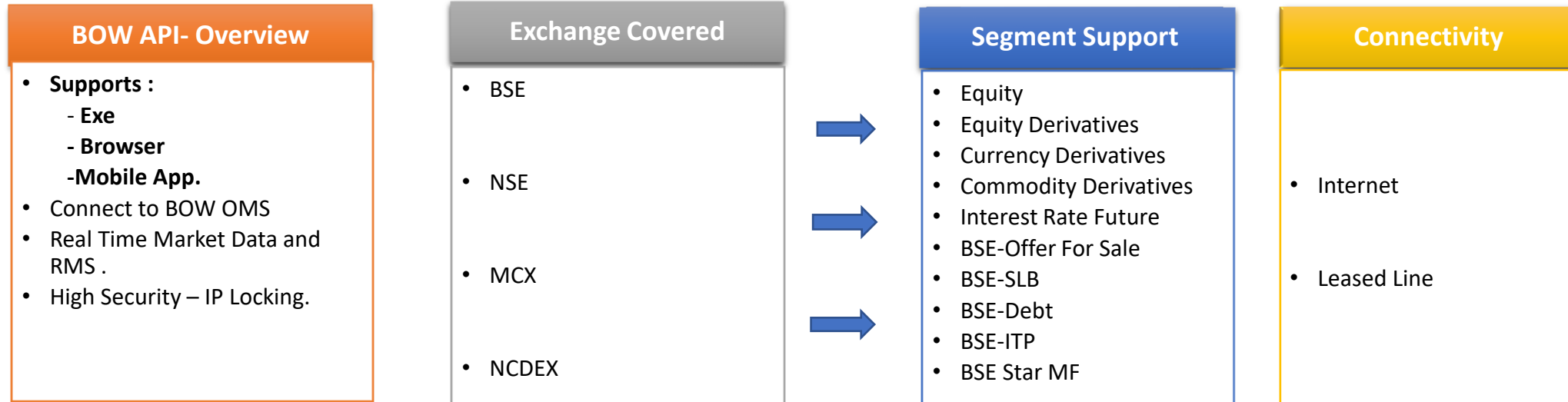
- Single window for Multi Exchange Segments with all Asset Class.
- Combined Market Depth.
- Facility of After Market Orders (AMO).
- Best Price Execution
- Real Time Margining and Risk Monitoring with Interoperability.
- DP / T1 holding upload with haircut percentage
- MTM Based Single Click Auto square Off. Timer Based Square off.
- Top Gainers / Top Losers - Most Active by VOLUME / VALUE.
- Corporate Action Information.
- Market Analytics Integration in Mobile
- NEWS Plus with RSS feeds and Twitter.
- No IT infrastructure cost to the Member.
- Completely Hosted Application.
- Single Application for all Users Types .
- Trade commencement in one day.
- Real time support services.
- Payment Gateway Integrated with Bill Desk

Bolt+on web (BOW)- Free of cost for all Members

BOW API – BUILD YOUR OWN TRADING FRONT END



Single API Interface to Trade on Multi Exchange segments



Key Advantage & Offerings

Multi Fold Advantage:

- ❖ Encourage members/Vendors to develop their OWN Front-End.
- ❖ Members Can use Hosted BOW's Robust OMS and RMS
- ❖ No impact of exchange mandated changes on API users
- ❖ No IT infrastructure / Connectivity cost to the Member.

Key Offerings:

- ❖ Real Time market data to display in innovative ways.
- ❖ Order & Trade Management, User Management
- ❖ Best Price Execution
- ❖ Real Time Margining and Risk Monitoring with Interoperability
- ❖ Risk Management through BOW Admin interface
- ❖ DP / T1 holding upload with haircut percentage
- ❖ Payment Gateway interface
- ❖ Report Management

MULTI EXCHANGE RISK MANAGEMENT SYSTEM – MERMS-ICCL

Single API Interface to Validate Pre Trade Risk Management for Multi Exchange segments

MERMS API- Overview

- ❖ MERMS is hosted application for ICCL Members.
- ❖ Facilitates Risk Management services.
- ❖ Validation of Orders generated from.
 - ✓ Client Software
 - ✓ Algo Software
- ❖ ICCL Members can Monitor & control Limits & Risk Management of TM

Key Offerings & Risk Parameters

Key Offerings:

- ❖ Client software connection to MERMS
- ❖ Single Interface to Validate pre trade orders for Multi exchanges.
- ❖ Real time Pre trade risk management to multiple exchanges
- ❖ MERMS terminal to set risk parameters at Trading Member level

Risk Parameters:

- ❖ Risk management at Member Level
- ❖ Risk Parameters
 - ✓ Margin
 - ✓ MTM
 - ✓ Turnover
 - ✓ Exposures
 - ✓ Order Value & Limits etc.

Exchanges:

BSE, NSE, MCX and NCDEX.

Segments:

- ✓ Equity
- ✓ Equity Derivatives
- ✓ Currency Derivatives
- ✓ Interest Rate Future
- ✓ Commodity Derivatives
- ✓ BSE SLB
- ✓ BSE DEBT
- ✓ BSE Repo
- ✓ BSE ITP

Key Advantages

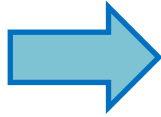
- ❖ Robust Comprehensive Single Interface RMS for Multi Exchange.
- ❖ Monitor and Control Trading Member Risk Management .
- ❖ Prevention of Erroneous orders before sending to Exchange based on risk parameters set
- ❖ No IT infrastructure / Connectivity cost to the Member.

BSE's -WORLD CLASS TRADING INFRASTRUCTURE



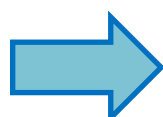
Bolt Plus Live

- Products available for trading -
 - Currency Derivatives – 29th November 2013
 - Interest Rates Futures - 28th January 2014
 - Equity Derivatives - 10th February 2014
 - Equity – 7th April 2014
 - Commodity Derivatives – 01st October 2018



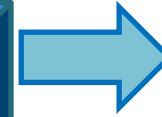
Member Access

- API based access -
 - Advanced High performance Industry Standards based 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 μ s (Gateway into Gateway out)
- Network latency for Colo users – 10 μ s
- Throughput Capacity: 5 lacs order per second
- Scalability: Horizontally scalable by adding partitions
- In built application-level redundancy
- Usage of commodity hardware to ensure ease of availability

Fastest Co-location

- BSE is the fastest Exchange in the world with a speed of 6 microseconds.
- NTT – Netmagic has setup a State-of-the-art Data Centre to manage the co-location facilities for BSE
- It is the fastest Co-location service in India with round trip network latency of less than 10 microseconds.
- The 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.

NTT Netmagic Co-location Data Centre

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
- Resolute Softech

Cost Comparison

Service	BSE	Other Exchange
Co-location Network Bandwidth	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
Cost to member for 10G port connection	INR.0.50 Lakhs AMC (1 Primary & 1 Secondary)	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	Annual Cost per connection Rs.25 Lakhs for 1000 messages/sec
Market data connectivity cost	Free Market Data since November 2010. Free EOBI feed since June 2015.	Free Tick By Tick Data since July 2018.

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

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 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 Co-location network for minimum latency.

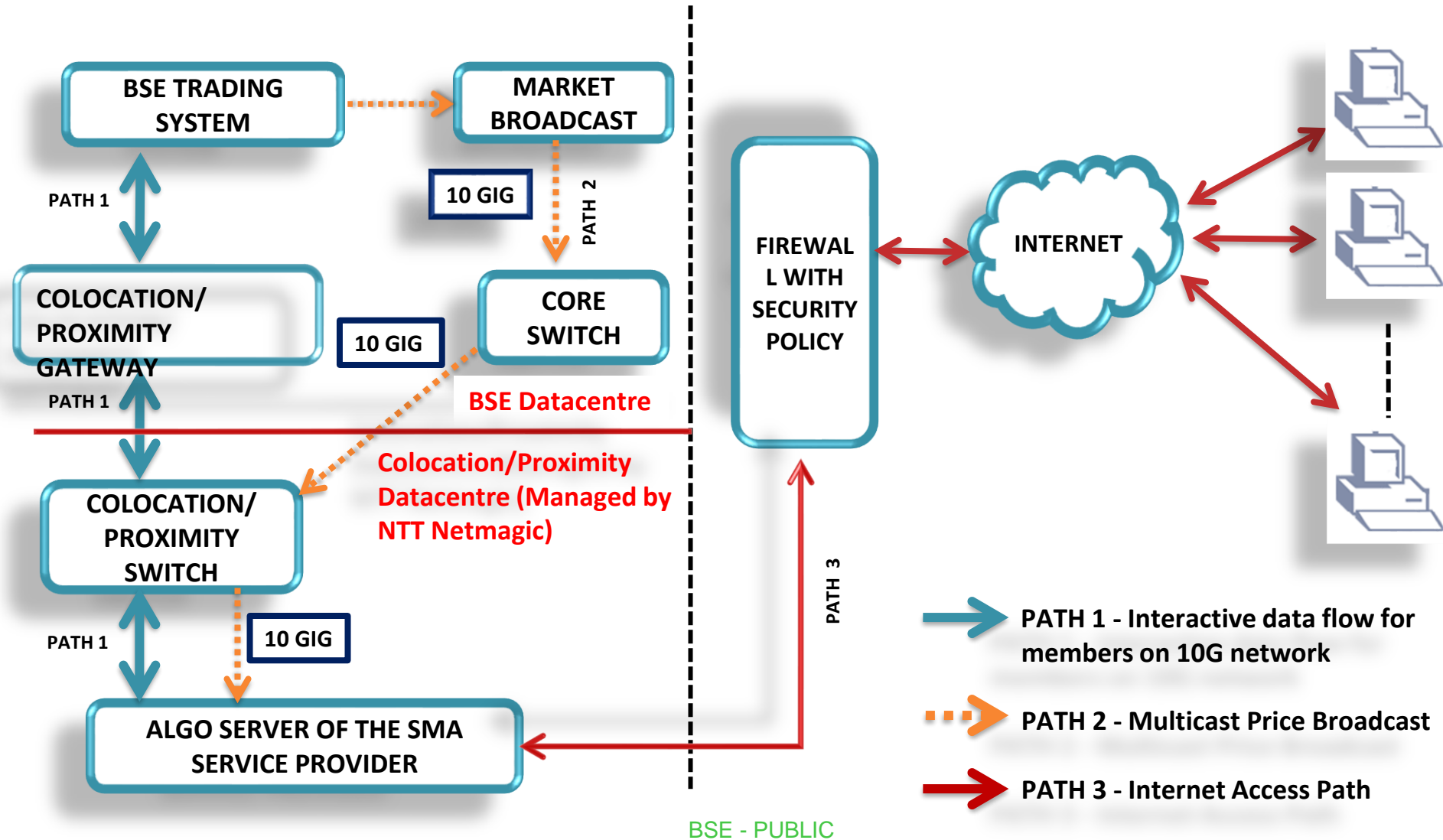
For Vendors

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

For more details, kindly e-mail to tech.prog@bseindia.com

BSE - PUBLIC

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
LERA 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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