Outline of arrowhead Renewal

June 2014

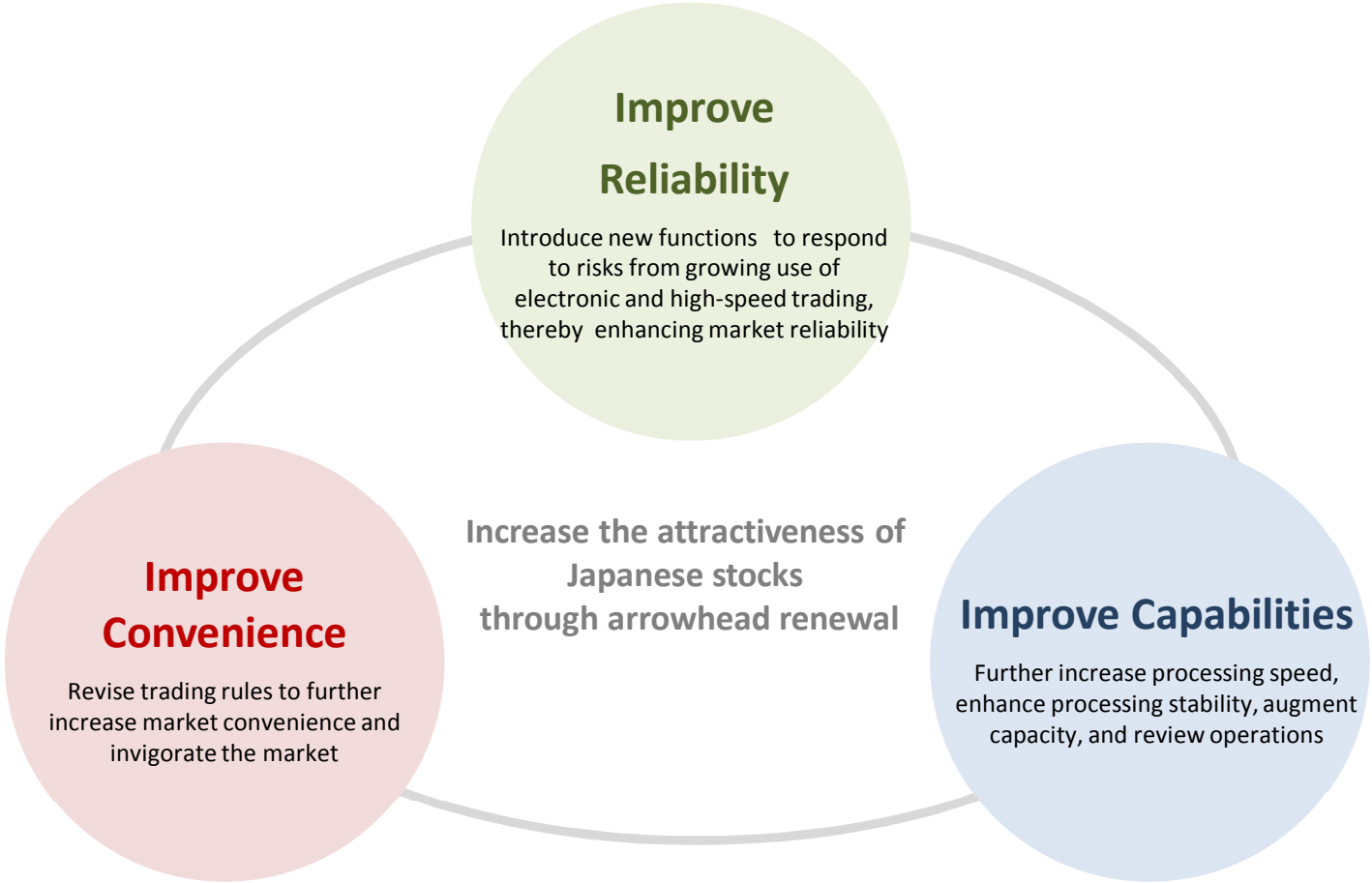
Tokyo Stock Exchange, Inc.

Fundamental Principles for arrowhead Renewal

TSE will carry out renewal based on the current arrowhead system in line with the fundamental principles of improving reliability, convenience, and processing capabilities.

Changes in the market environment since arrowhead launch (Jan. 2010)

・Developments in electronic trading ・Increased order flow ・Cash market integration ・New user needs



TOKYO STOCK EXCHANGE

Fundamental Principle 1: Improve Reliability

Respond to risks from developments in electronic trading by introducing new functions and partially revising the trading rules

Increased Risk from Developments in Electronic Trading

- Growing use of electronic and high-speed trading
- Occurrence of erroneous trades caused by electronic trading on foreign exchanges which had widespread effects

Maintain our reliability as the main domestic market through trading system improvements in response to the evolving environment

① Revise Rules for Sequential Trade Quote

- Partially revise sequential trade quote rule to accommodate for sharp price fluctuations caused by multiple orders

⇒Concurrently support the needs of diverse investors by controlling sudden and sharp price fluctuations

② Introduce Dummy Symbols

- Introduce dummy symbols for test order placement in the production (live) environment

⇒Prevent erroneous operations and orders by improving stability of trading participant order placement systems

③ Introduce User-designated Hard Limits

- Introduce a function that checks order size and trading value
- Trading participants can set the limit for such checks

⇒Minimize damage to investors in the unlikely case of an erroneous order

TOKYO STOCK EXCHANGE

Fundamental Principle 2: Improve Convenience

Further increase convenience and invigorate the market by revising trading rules and introducing new functions

Invigorate the Market through Improve Convenience

- Revision to trading rules
- Introduction of new functions which are common on foreign exchanges

Further enhance price formation function and invigorate the market through offering greater convenience to a diversity of investor bases

① Optimization of Tick Sizes

- Implement Phase III of the tick size revision to coincide with the launch of arrowhead renewal (details to be decided based on conditions up to Phase II)

⇒Reduce spread costs by setting tick sizes appropriate for the issues' liquidity

② Introduce Cancel on Disconnect

- Provide a function to cancel all unexecuted orders which were placed by a virtual server that has been abnormally disconnected due to reasons such as a system failure at the trading participant

⇒Reduce risk of unexpected executions when virtual servers experience connection issues

③ Introduce Kill Switches

- Provide a function for trading participants to designate virtual servers for which it wants to prohibit order placement, and cancel all unexecuted orders which were placed by such virtual servers

⇒Improve convenience of managing customer credit risk and ordering for trading participants

TOKYO STOCK EXCHANGE

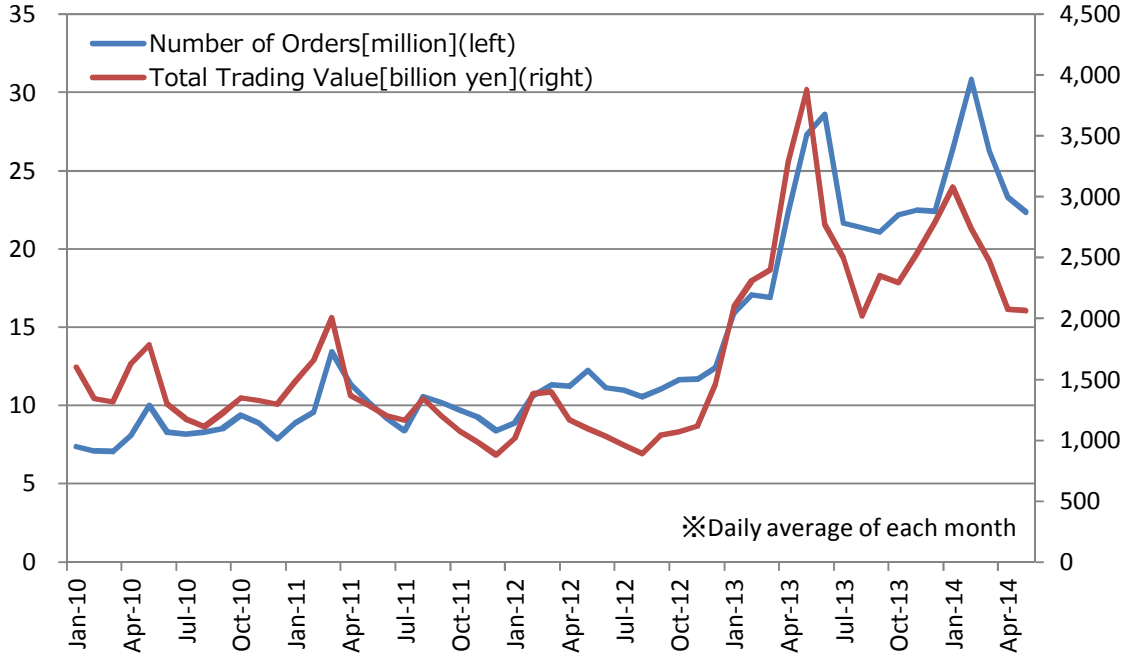
Fundamental Principle 3: Improve Capabilities

Increase processing speed, enhance processing stability, and secure appropriate capacity

Increasing Number of Transactions due to Vibrant Market Conditions

- Large increase in order numbers and trading value due to Abenomics
- Sudden rise in transactions at the time of the Great East Japan Earthquake

Transition of the Number of Orders and Total Trading Value



- The average number of orders per day has risen from 8.2 million in 2010 to 21.7 million in 2013.

① Achieve more stable processing

- Achieve stable response times even during high order concentration

② Further enhance response

- Halve current response times (order acceptance notices, execution notices, etc.)

③ Secure appropriate capacity

- Flexibly augment capacity to accommodate increases in order volume, etc.

Maintain competitive edge as a world-class trading system

TOKYO STOCK EXCHANGE

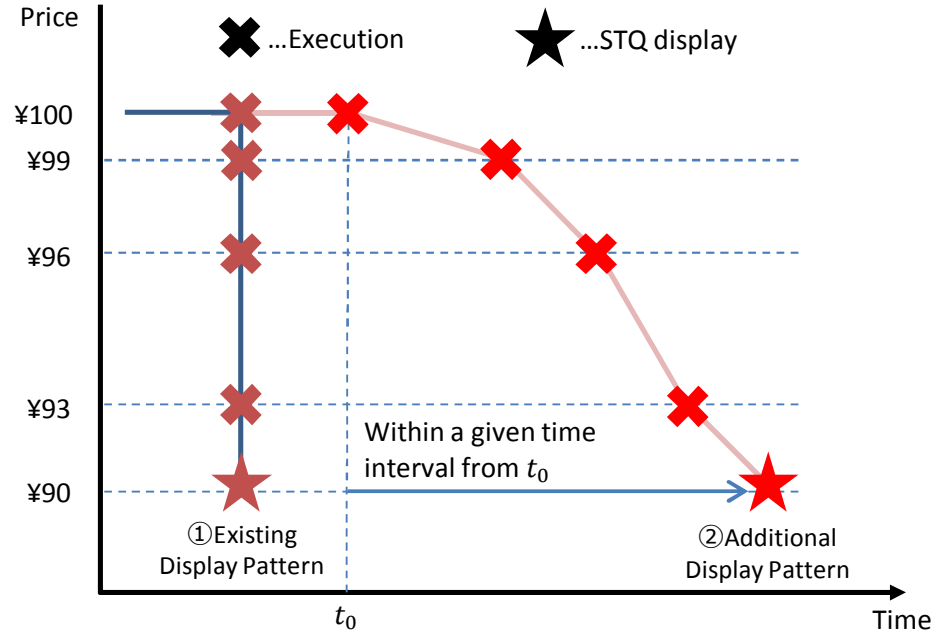
Outline of New Functions①

Additional Condition for Displaying Sequential Trade Quote(STQ)

- If there is sequential execution by multiple order entries which is likely to go beyond the STQ price range within a given time interval, an STQ will be displayed.

STQ Display Pattern

※Price range for displaying STQ … ¥10



①Existing Display Pattern

If there are a string of executions at ¥100, ¥99, ¥96, and ¥93 resulting from a large order entry and it is likely to go under ¥90, an STQ will be displayed at ¥90.

②Additional Display Pattern

An order is executed at ¥100 at t_0 and followed by a string of executions at ¥99, ¥96, and ¥93 resulting from multiple order entries, and if there are further order entries which may be executed under ¥90 within a given time Interval from t_0, an STQ will be displayed at ¥90.

<Details for Additional STQ Display Conditions>

※1 The given time interval is expected to be 60 seconds.

※2 The starting point of the time interval is set at the first execution during the continuous trading session, and it is reset at the first execution after each time interval has passed.

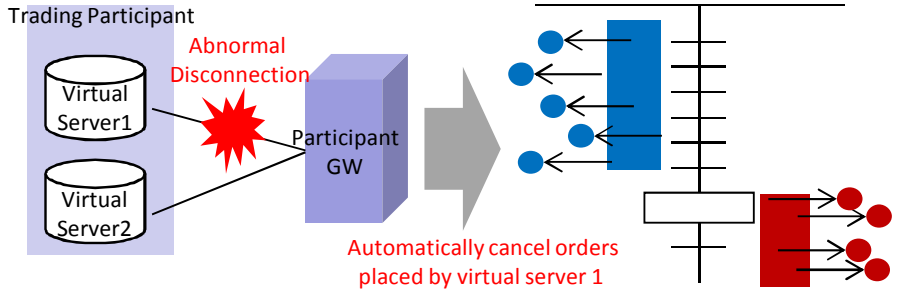
※3 When displaying an STQ as a result of multiple orders, no consideration is given to the trading participants that placed the orders.

※4 STQ will be displayed even when the string of executions do not trend in a single direction (for example ¥100-> ¥96-> ¥97-> ¥93->…).

Outline of New Functions②

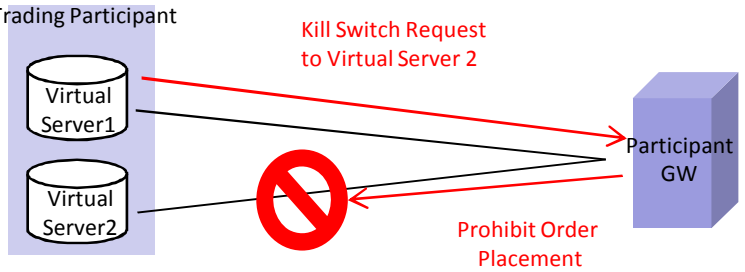
Risk Management Functions for Trading Participants

(a) Cancel on Disconnect



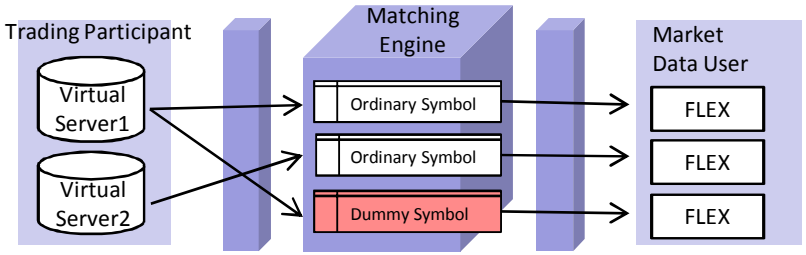
- When a virtual server is disconnected abnormally, all valid orders placed by the virtual server that are in the order book are automatically cancelled by the trading system.
- Can be set to on /off for each virtual server.

(b) Kill Switch (Order Suspension/Cancellation Instruction)



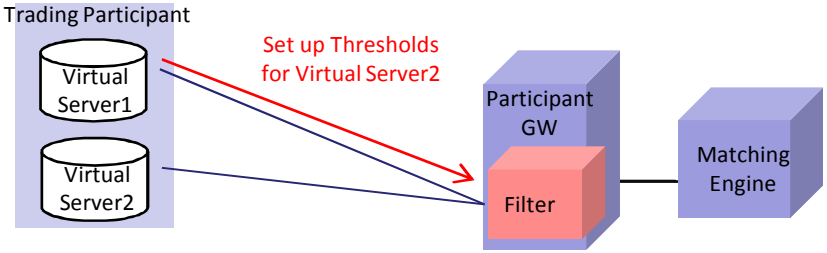
- From a virtual server that is authorized beforehand, prohibit order placement by any virtual server and automatically cancel all orders it placed.
- Can be used to activate the kill switch of a drop-copy source virtual server from a virtual server that receives drop-copies of notices.

(c) Dummy Symbols (Issues for Test)



- Dummy symbols are registered for test order placement in the weekday production (live) environment.
- Can be used to confirm order placement operations for situations such as commencement of live operations or recovery from system failure.

(d) User-Designated Hard-Limit



- A limiter function for users to set thresholds for each virtual server.
- Users can set the upper limit of value per order (price x quantity) (error return), and upper limit to cumulative order value or execution value per designated time period (automatically cancels all orders by the target virtual server and prohibits order placement).

TOKYO STOCK EXCHANGE

Schedule

- The launch of arrowhead renewal will be on September 24th, 2015.
- Related trading rule revisions will be disclosed in early 2015.
- User Connection Tests will start in February 2015.

No.		2013		2014				2015			
		Jul.	Oct.	Jan.	Apr.	Jul.	Oct.	Jan.	Apr.	Jul.	Oct.
1	Development Schedule		Design		Development			Test			arrowhead Renewal Production Operation Sep. 2015
								User Connection Test From Feb. 2015			
2	Disclosure of System Interface Specifications		▲First Oct. 2013		▲Update June 2014						
3	Revision of Trading Rules							Publish outline / Revise rules Early 2015			