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Option Symbology Initiative Testing for Brokerage Industry

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Context

With an average 14 millions of daily contract trading happening using Options in US, the impact of the OCC changes will be huge on the Brokerage Industry.

Though the change is very small with option symbol length changing from 5 digits to 21 digits, the end to end system impact is very high and this necessitates a systematic testing solution.

Because the change is so wide, there is no end to end off the shelf vendor solution available to provide 100% test coverage. Also as the underlying IT architecture of the each trading firm is different the testing becomes much tedious.

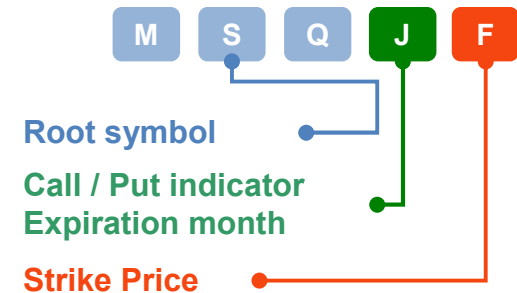
Options Trading - Introduction

- ⊕ What is an Option? - Options are financial instruments that convey the right, but not the obligation, to engage in a future transaction on some underlying security, such as Stocks , or in a futures contract.
- ⊕ Options Contract daily trading volume is very high in various exchanges – 2008 Daily Average Trading is – 14,281,069 contracts.
- ⊕ Top Exchanges where Options trading happens and their average contracts volume,
 - ⊕ Chicago Board Options Exchange (31%)
 - ⊕ International Securities Exchange (25%)
 - ⊕ Philadelphia Stock Exchange (20%)



Existing Options Symbol & Limitations

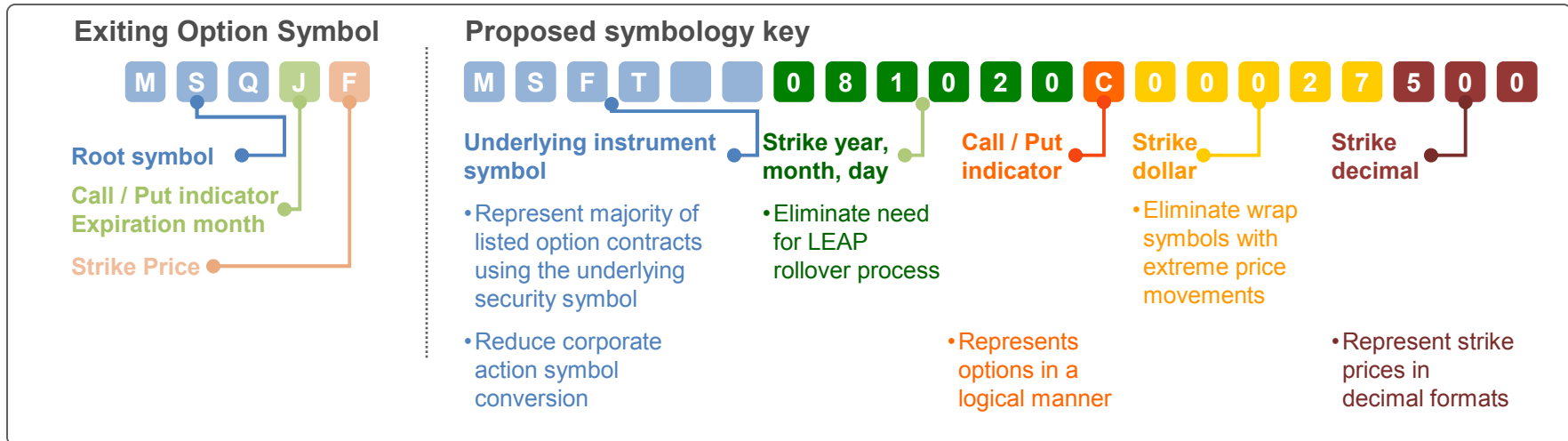
- Existing Options Symbol is 5 Character in Length (OPRA configuration)
- First 3 characters representing root symbol and last 2 characters identify the expiration month, call/put indicator and strike code



Microsoft CALL with a strike price of \$27.50 that expires on October 20, 2008

- Limitations of existing symbology
 - Root indicator is not consistent with OTC securities
 - Option symbols are not transparent to their underlying security
 - Call/put codes assume single day expiration and are not compatible with LEAP and FLEX options.
 - Option configuration doesn't play well with short-dated options

New Options Symbol Changes



New Symbol Details

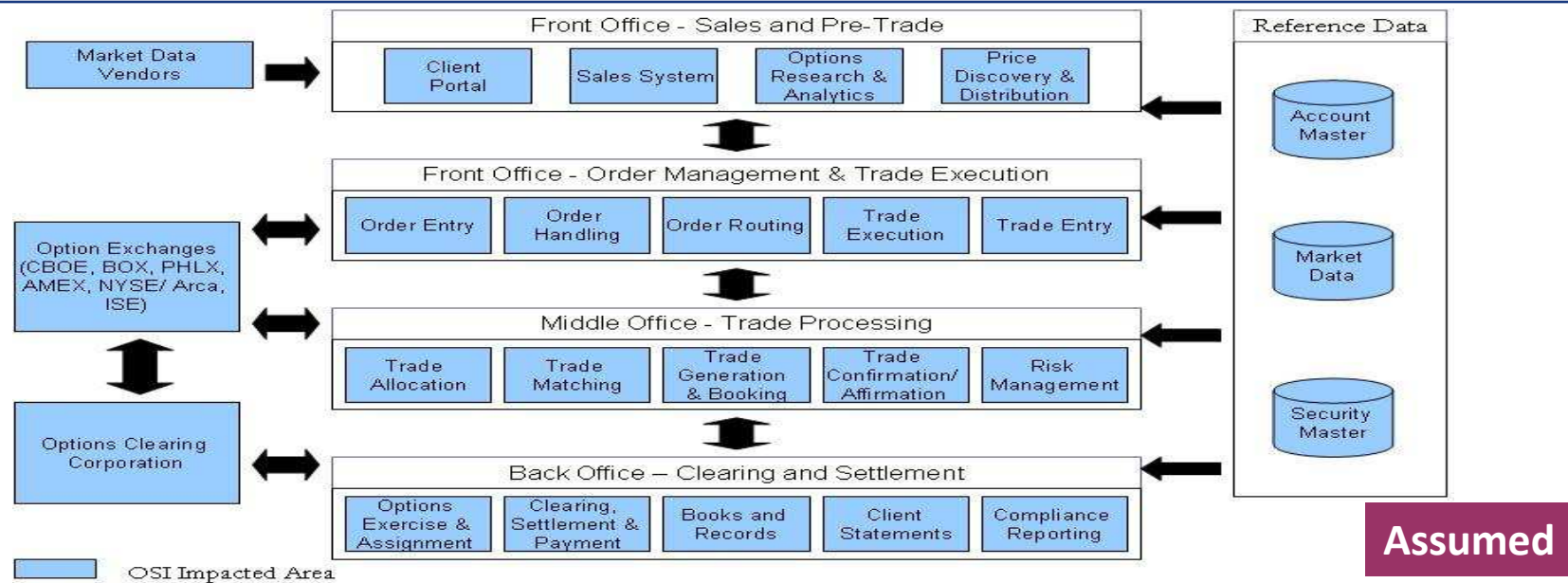
- ✦ OCC (Options Clearing Corporation) has decided to change the option symbol to 21 character length
- ✦ Symbol – 6 Characters
- ✦ Year, Month, Date – 6 Characters
- ✦ Call / Put indicator – 1 Character
- ✦ Strike Dollar – 5 Characters
- ✦ Strike Decimal – 3 Characters.
- ✦ **For Example:** Microsoft CALL with a strike price of \$27.50 that expires on October 20, 2008 will be displayed as **MSFT 08 10 20 C 00027 500**. Existing OPRA naming convention for this would have been **MSQJ**

Symbol	Yr	Mo	Day	C/P	Strike Dollar	Decimal
MSFT	08	10	20	C	00027	500

OCC Change - Goals & Objectives and Impact

- # The following are goals and objectives of the OCC initiative
 - # Provide documentation to trade, clear and settle listed options where all market participants utilize explicit data elements to identify option series.
 - # Represent all strike prices in decimal formats where the number of decimal places is equal to the trading increment of the underlying instrument. For example:
 - # Exchange listed equity options strike prices on NYSE stocks may be represented in pennies for certain corporate actions.
 - # Identify all listed products cleared by OCC that are affected by this change.
 - # Identify industry organizations that will be impacted and create a mechanism for communicating developments throughout the life of the project.
 - # Mandate a timeframe to force compliance upon all affected market participants.
- # Following asset classes/option types will be impacted
 - # Equity options
 - # Index options
 - # Yield Based options
 - # Short Dated options
 - # Flex options
 - # Foreign Currency options

Application Landscape in Financial Firms and OSI Impact



- ⊕ Change in the data structures involving data storage for options identifiers
- ⊕ Data Model to be changed impacting databases, data marts, extraction and loading processes etc.
- ⊕ All data interfaces to be changed to accommodate the new Symbology, Ex: Order entry & Reporting
- ⊕ Business Rules processing to be changed to map to the new elements of the symbology
- ⊕ Data transformation processes to be changed
- ⊕ Historical data to be changed to enable usability along with data using new symbology

Application Landscape in Financial Firms and OSI Impact

Business Process/ Database	Importance	Typical Applications that gets impacted	Typical fields that gets impacted
Balances and Positions	Very High	<ul style="list-style-type: none"> Online customer facing applications where customer can view their Balances and Positions. Risk-Monitoring jobs. Margin Balances and Positions. 'Account Summary'. Non-customer facing applications (used by internal employees) History of Transactions carried out by a given account. Tracking stocks in a given account. 	<ul style="list-style-type: none"> Positions page usually have 'Symbol Column' where security symbol is displayed. Any provision to filter/sort 'Positions' by symbol Any provision where customer can view history of positions Similar fields (and other) present in Balances and Transactions tab/page will be affected.
Web Services	High	<ul style="list-style-type: none"> Client facing applications having provision for doing 'Research' on securities. Clients can get quotes on various securities by entering the symbol. 'Symbol' field in these applications will be affected. Applications/Pages where client enters option symbol for placing an order Modules where status of order can be viewed or modified Electronic confirmation functionality Pages wherever Option Symbol search or display occurs 	<ul style="list-style-type: none"> 'Symbol Search/Symbol Lookup' 'Symbol' field in order entry. 'Symbol' field in Order Status page/tab
Client Service	High	<ul style="list-style-type: none"> Brokerage organizations provide various reporting services to its clients like paper confirmation, electronic confirmation, Gain/Loss reports etc. Most of these services have client interface applications which will be impacted. The degree of impact will vary from organization to organization and will also depend on extent to which option symbols are used in these applications 	<ul style="list-style-type: none"> All fields in statements, reports, confirmations where Option symbol is used for reporting/identifying a transaction.

Application Landscape in Financial Firms and OSI Impact

Business Process/ Database	Importance	Typical Applications that gets impacted	Typical fields that gets impacted
BILLING SYSTEM	High	<ul style="list-style-type: none"> ▪Brokerage organizations have billing systems which provide pricing information for various securities. ▪The billing system should be able to read the security symbol for providing the pricing information. The option symbology change will affect billing system's ability to recognize option symbols. ▪If organization(s) decides on 'Alias/UI Symbol' for customer facing applications, billing system should be able to read both 'Alias/UI Symbol' and OCC 'Series Key'. 	
TRANSFER OF ASSETS	High	<ul style="list-style-type: none"> ▪Leading brokerage organizations also act as custodian of assets for their clients. ▪When a client moves his account from one organization to another, his assets are also transferred. ▪Applications which act as customer interface in transfer of assets will be impacted by this change. ▪Processes in such applications which use OPRA code will need to use new OCC series key or internal 'Alias Symbol', if any. 	<ul style="list-style-type: none"> ▪'Symbol' field where symbol of asset being transferred is required.
DATABASE(S) RELATED TO TRADING	Very High	<ul style="list-style-type: none"> ▪In brokerage organizations, usually large number of applications read core data from Security Master Database/Repository. ▪This repository contains security symbol, CUSIP number, internal security symbol/number etc. Large number of applications queries this database through APIs (Application Programming Interface) to get required data or information. ▪It is because option symbology change affects this repository that large number of applications is affected. 	<ul style="list-style-type: none"> ▪Market Data Repository ▪Stock Record Repository ▪Options Exercise Instructions Repository etc.

OCC Symbol conversion plan extending to 2010 - Options symbology initiative

<http://www.optionsclearing.com/initiatives/symbology/milestones.jsp>

Milestone Date	Action to Take Place	Issues/Series Impacted
February 12, 2010	<ul style="list-style-type: none"> • Hard OSI Cutover Date • Processing absent OPRA codes • Convert all equity strikes to decimal format • Current Symbol nomenclature in use. 	<ul style="list-style-type: none"> • Approximately 259,000 series
Friday, February 26, 2010	<ul style="list-style-type: none"> • Consolidate FLEX options with open interest • <u>Initial group</u> of options representing array of product scenarios to be consolidated • First weekly Expiration 	<ul style="list-style-type: none"> • FLEX options with open interest • Options associated with strategic group of underlyings including those with nonstandard delivery
Monday, March 1, 2010	<ul style="list-style-type: none"> • First Day Of Trading 	
Friday, March 5, 2010	<ul style="list-style-type: none"> • Convert all ½ point Index strike prices 	<ul style="list-style-type: none"> • All series for the 253 index issues
Saturday, March 20, 2010	<ul style="list-style-type: none"> • First Standard Expiration 	
Wednesday, March 31, 2010	<ul style="list-style-type: none"> • First Quarterly Expiration 	
Friday, April 2, 2010	<ul style="list-style-type: none"> • <u>2nd group</u> to be consolidated • Consolidate options whose primary underlying starts with the letter A (app 250) 	<ul style="list-style-type: none"> • All options associated with "A" underlyings including options with nonstandard delivery
Saturday, April 17, 2010	<ul style="list-style-type: none"> • Second Standard Expiration 	
Friday, April 23, 2010	<ul style="list-style-type: none"> • <u>3rd group</u> to be consolidated • Consolidate options whose primary underlying starts with letters B-H (app 800) 	<ul style="list-style-type: none"> • All options associated with "B-H" underlyings including those with nonstandard delivery
Friday, May 7, 2010	<ul style="list-style-type: none"> • <u>4th group</u> to be consolidated • Consolidate options whose primary underlying starts with letters I-Z (app 1400) 	<ul style="list-style-type: none"> • All options associated with "I-Z" underlyings including options with nonstandard delivery

Program Level Challenges and QA Best Practices

Challenges

- ✦ **Budget Risk:** The cost of this initiative will not be generating additional revenue.
- ✦ **Business Impact:** As it is a regulatory initiative, failure to comply will result in organization being unable to provide options trading services to its clients which will impact its trading revenues.
- ✦ **Client experience Risk:** Any change in customer facing UI as a result of this initiative faces uncertain client experience and might lead to low client satisfaction
- ✦ **Dependency on other projects:** Ongoing internal projects will result in challenges in meeting timelines and resource availability
- ✦ **Third Party Testing:** Third party vendors may not be aware of this initiative and success of this project depends on their ability to provide uninterrupted services when the conversion becomes effective

Best Practices to be implemented

- ✦ **Use tools to identify the impact points:** Use tools that would improve the productivity of impact analysis and reduce the overall cost.
- ✦ **Decide on the amount of testing required:** Use Risk based testing methodology to reduce the overall QA cost. Minimize the number of test conditions and maximize the coverage.
- ✦ **Optimize the Test Data needs:** Have an Enterprise Test Data Strategy in place that focuses on critical data requirements, data conditions and tools for test data generation.
- ✦ **Maximize usage Test Execution Automation:** Enterprises should embark that accelerates test execution through automated Business Process validation – Validation of Front office, back office and interfaces
- ✦ **Reusable test cases:** Develop and reuse the test cases and validations with a solution driven test approach

QA Challenges

Challenges

The change impact spanning across entire Trading Application suites on various technologies

Identification of the impacted applications and impact analysis of the change.

Alignment with the industry to ensure that the changes are completed in time for the industry testing

Historical data conversion and reference needs – Huge Impacted data volume.

How to address them

A broad validation test strategy that spans multiple application groups and their underlying technology. A strong test management and test strategy definition.

An efficient impact analysis and change verification process with combined automated tool-based approach with manual process steps for the critical change analysis.

A test program with a well-conceived change implementation and test plan which ensures that the industry interfacing elements are addressed on priority

Adequate focus on Performance testing and performance tuning to address volume spikes typical of options processing

The challenges in validation can be addressed by an integrated framework comprising of a robust test strategy, test processes and a testing tools.

Testing Types for OCC Testing

Types of Testing	Definition
Business Process Validation	End to End validation of the business processes impacted by the changes. This cuts across application/technology layers and is performed from an end-user Perspective
Front-end Channel Testing	To ensure that the front end channels are enabled to process the new options and quotes data. The intent is to validate the presentation layer of applications from an end-user perspective
End-to-End (E2E)	Test to ensure all applications are working together. Test the end to end business flow, identify the impacted systems. Support required from Application QA and/or Development.
Data Conversion	Test cut-over and conversion of 5-byte OPRA code to 21-byte Options symbology key. Performed as part of E2E testing. Support required from Application QA and /or Development.
Industry	Industry test is required for all active participants in the options markets. Support may be required from Application Development, QA, and/or Business Partner.
Remediation Testing	Testing the remediation involving the legacy system and implement comparison testing to compare as-is system output with the to-be system's output. Focus on minimizing the number of test procedures
Non-Functional Testing	Load testing to ensure that the systems are able to handle data volume to ensure that application performance is tuned to address periodic volume spikes typical of options data

References

Options Clearing Corporation Website

http://www.optionsclearing.com/initiatives/symbology/implementation_plan.jsp

Industry Plans, Milestones, OSI Industry Testing Plans

Chicago Board Options Exchange (CBOE)

<http://www.theoptionsinstitute.com/AboutCBOE/ChooseCBOE.aspx>

The Infosys logo is displayed in a white box with a blue border. The text "Infosys" is in a blue, sans-serif font, with a registered trademark symbol (®) to the upper right of the 's'.

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