

## Testing of Software used for Trading & Risk Management

### SEBI CIRCULAR CIR/MRD/DP/24/2013 & NSE / CMTR / 24583

SEBI, CIR/MRD/DP/24/2013 dated 19th August 2013 and NSE / CMTR / 24583 dated 27th September 2013 has directed members of exchange for Testing of software used in or related to Trading and Risk Management. As per circulars all members of exchanges have to,

- Follow the testing procedure specified hereinafter before deployment of the software
- Conduct testing in a simulated test environment

- Participate in mock testing
- Undertake UAT of the software to satisfy itself that the newly developed / modified software meets its requirements.

'Software' shall mean applications used by stock brokers for the purposes of trading and real-time risk management, including software used for IBT, DMA, STWT, SOR, AT, etc

## High Level Areas for Testing to Reduce Risk in Trading

### Functional Testing

Functional testing would focus more on functionalities of software at Trader's work station, administrative functionalities, Risk management matrix etc...

The functional areas would largely

- Order Management (Order punching features, Order book, trade book, basket orders, Order slicing, Institutional Order book etc...)
- Broad cast management (Market watch, tickers, Best 5, Order status etc...)
- Risk management (Normal Risk management, Product based risk management, segment specific risk management etc...)
- Surveillance management

Functional testing for algorithmic testing would include

- Testing of Algo strategy
- Testing of Risk Management
- Testing of Algo under stress Scenarios

### Validation and Negative Testing

Software user is as effective as software's error prevention capabilities.

Validation testing would include business rule validation. It also includes certain amount of program validation as well. Negative testing is primarily conducted to verify software's capabilities to prevent invalid data entries and errors.

### User Interface Testing

User interface is very critical component in trading software. As per public domain knowledge, one huge loss was incurred by one of the Indian stock broker recently because of change in UI of the software used by trader. UI should be indicative enough. Traders and dealers use software by habit, many a time without even looking at screens. If UI is weak it can create huge errors and losses. Users should be retrained on any change in UI.

### User Management and Access Testing

Authorized access is important from compliance as well as traceability point of view. Hence, user management and access should also be verified thoroughly before making any software live.

### Security Testing

Security testing of software, particularly those which are exposed to internet or public networks such as IBT or STWT, is very critical not only for broker's own security but also for overall market safety as well. Security testing can be adopted as periodic practice.

### Performance Testing

Performance of system is critical in today's high speed trading environment. Performance testing can be adopted as periodic practice. Performance testing especially testing such as memory leaks, through put performance of critical functions etc...is critical from overall safety point of view for IBT, Mobile Trading Platforms, Algo etc...

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SOFTWARE TESTING

RISK &amp; AUDIT SERVICES

INFORMATION SECURITY

### Who are we?

AUDITime Quality Management Pvt. Ltd., is a software testing service provider, focused on capital market. We have tested all off-the-shelf as well as customized trading software used by members. We have 13 years of experience in testing software used for trading and risk management. We are ISO 9001 and ISO 27001 certified organization.

### How can we contribute?

We can provide 'Jump Start Kit' which includes following components

- Consultancy on test process set up with high maturity
- Ready to reuse test cases for regression testing along with test data
- Supply of testing team to build testing capabilities
- Training to internal team for testing of software

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# Testing Practice Maturity Matrix For End User Organization

PARAMETERS	1 INITIAL LEVEL	2 MANAGED LEVEL	3 DEFINED LEVEL	4 QUANTITATIVE LEVEL	5 OPTIMUM LEVEL
PROCEDURAL MATURITY	Absence of Formal Procedure  Largely dependent on Software Vendors for Testing	Absence of Defined Procedures, testing carried out on case to case basis.	Testing & Sign-off Process / Procedures are Defined  Testing is conducted on Software for New Acquisitions / Change Requests / Periodic	Established Practise of Root Cause Analysis  Objective Decision making based on measurements	Testing measurements feed into software Vendor's SLA refinement (Quality parameters in SLA)
TEST ASSETS MATURITY	Absence of Test Assets	Assets created in basic documented form  Assets are not reusable	Documented Test Libraries exist  Ability to reuse Test Assets	End to End traceability between – requirements - test library components - output - is maintained & used	Test Assets become feeds into the Software Development Life cycle
TECHNOLOGY USAGE	No Specific Technology used	Basic Technology are used such as word processors and spread sheets	Test Library Management Tools are used  Test automation tools are used for regression testing	Test Library management & Test automation technologies are integrated	Test library management & Test Automation drive standardization in software development.  Test automation is used for progressive testing besides regression testing.
MODEL MATURITY	Absence of Testing Model	Adhoc Models Adopted for Testing	Organisation wide Software testing framework is defined	Organisation wide Model of Software Quality Centre of Excellence is created & operate as shared service	Independent software quality research units exist to support continuous excellence
PEOPLE MATURITY	Lack of testing skills	Testing team created from various groups on need basis.  Absence of trained People, however they are able to conduct basic testing	Identified Test team exist with defined roles & responsibilities (Commensurate with need)  People are trained for testing / documentation / Procedures etc.	Sustainable Knowledgebase & Standardised Approach (through Succession plan & periodic training)	People start adopting other roles & merging of roles for higher productivity & performance. e.g. BAQA, FTPT, FTAT etc.