Changing Role of Test Manager in Changing Situations

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Abstract
According to analyst Nelson Hall, the global testing services market was $8.4bn in 2011, and although 2012 is expected to be flat, it predicts an average 9% growth every year over the next five years.

Amidst of these business prospects, there are several changes that are happening in either the testing function or in the echo system of testing. These include customer embracement of new technologies, evolution of diverse test operating models, and increasing inclination towards product/user centric approach.

Test manager’s role is now being changed to be more technology savvy, collaborative while delivering the existing responsibilities related to test strategy and other project management aspects like people management, delivery management, talent management etc.,

Test Manager being the custodian of the test organization would need to play a key anchoring role in understanding the above and tune their test organization to gear up to meet the futuristic needs of customers (internal and external).

This paper mentions various changes that are happening in and around testing and lists the key aspects that a test manager needs to focus on.

Keywords: Test Management, Test Operating Models, Mobile App Testing, Cloud Computing Testing, Big Data Testing, Social Computing Testing, Test Pricing Models, Test Team People Management

1. Introduction
Software Testing has been evolved into a full-fledged software engineering discipline since the separation of debugging from testing was initially introduced by Glenford J. Myers in 1979[1].

In 1988 Dave Gelperin and William C. Hetzel classified the phases and goals in software testing as given in Figure-1 below:[2]

According to analyst Nelson Hall, the global testing services market was $8.4bn in 2011, and although 2012 is expected to be flat, it predicts an average 9% growth every year over the next five years.

Amidst of these business prospects, there are several changes that are happening in and around test organization like customer embracement of new technologies, maturity of test operating models, adoption of innovative pricing models and increasing inclination towards product/user centric approach. These will have profound effects on the testing organization and will require scaling of test team skills, test infrastructure readiness and setup, risk taking in terms of pricing models, better collaboration with other teams etc.,

Test Manager being the custodian of the test organization would need to play a key anchoring role in understanding the above and tune his/her organization to gear up to meet the futuristic needs of customers (internal and external).

In lieu of the above, Test manager’s responsibilities in the organization will now become more technology savvy with strong emphasis on knowledge sharing and continuous
learning along with the present responsibilities of test strategy and test process management.

This white paper lists four key change dimensions that are impacting the test organization and suggests the key aspects in each of the areas to help the test organizations gear up to adapt the changes. This helps the test management teams to leverage the ideas brought in as the pointers to explore further.

Next sections provide the details on the change dimensions and the key considerations/aspects test management should consider.

## 2. Change Dimensions

Major change dimensions that are happening in and around test organization echo system are listed below.

- New Technologies
- Diverse Operating Models
- Product/User centric approach
- Pricing Models

Figure 2 gives the detailed view of each of the change dimensions.

Next section talks about the key aspects, considerations that a test manager should consider in lieu of these change dimensions.

### 3. Change Dimensions – Detailed Aspects

This section lists key areas to focus for each of the change dimension.

#### a. Embracement of New Technologies

Organizations across the world are either embracing or planning to adopt the four key Technologies listed below. This section talks about the factors that the testing organization should consider enabling them to serve in this context.

#### i. Mobility

By now, the mobile boom should be obvious to just about everyone. By 2015, International Data Corporation (IDC) predicts that 182.7 billion mobile apps will be downloaded. That’s a 1600% increase from the 10.7 billion apps downloaded in 2010. 1.27 M mobile devices are sold per day compared to 371, 124 children born. The explosion of consumer apps can be seen in just about every industry.

The aspects a Test Manager/Test Organizer should consider to meet the need of Mobility are given below.

- **Mobile Application Testing**
  - Native App, Web App and Hybrid Apps
- **Test Sourcing Options (Lab + Wild)**
  - Lab – In House, Out sourced  Wild – Beta, Crowd sourced
- **Testing Matrix**
  - Technology: OS, Browser, Device, Carrier, Connectivity modes (GSM, CDMA, WIFI, GPRS etc..)
• Geography: Continent, Country, City, Language
• Demography: Age, Gender, Education, Employment, Industry

ii. Cloud Computing

In 2010, Garner estimated that “the cloud service market will reach $150.1 billion in 2013”. Similarly, Merrill Lynch also predicted that “cloud computing market will reach $160 billion in 2011”. A recent study of Market Research Media forecasts that U.S. government spending on cloud computing is entering an explosive growth phase at about 40% CAGR.

Over the next six years, Expenditure will pass $7 billion by 2015. Merrill Lynch estimates that within the next five years, the annual global market for cloud computing will surge to $95 billion.

Testing becomes crucial for the different cloud service models like SAAS, PAAS, IAAS, and XAAS on different cloud delivery models like Private, Public and Hybrid clouds.

Preparedness for Cloud Testing would involve the following aspects.

• Understand benefits and limitations of cloud
• Define the objectives of moving testing project to cloud
• Evaluate risks (data, security, performance)
• Technologies, Infrastructure and tools requirements
• Test environment considerations
• Understand SLA’s and services promised by service providers
• Availability and reliability of services
• Bandwidth Limitation to access cloud
• Define type of tests to be performed in cloud – Listed below
• Testing in the cloud, Testing on the Cloud, Testing over the Cloud
• Testing Tools (test management, automation or performance tools requirements)
• Data management (security, privacy, storage, backup, portability and restore)
• Integration with other clouds, on premises applications
• Identify risk associated with testing in cloud
• Frequent application upgrades
• Knowledge of pricing models
• Use of in-house infrastructure, software and tools along with cloud

iii. Big Data

The McKinsey Global Institute estimates that data volume is growing 40 percent per year, and will grow 44-fold between 2009 and 2020. With this explosion in data comes a wealth of new opportunities for companies to improve business processes, new product development, customer service, brand awareness, product revision cycles, and partner networks—all by mining information that’s readily available.
For BIG Data, there are no defined tools. Tools presently available in the Hadoop eco system range from pure programming tools like MapReduce (which supports coding in Java, Peal, Ruby, Python etc) to wrappers that are built on top of MapReduce like HIVE QL or PIGlatin. But, since both HIVE and PIGlatin are evolving, the need for writing MapReduce programs, to make the testing comprehensive cannot be ruled out. This poses a tremendous challenge to the testers.

Organizations should invest in the BIG Data specific training needs of the testing community and in the long term, should invest in developing the automation solutions for BIG Data validation. Below are the few aspects test organization/test manager should consider to gear up to meet testing needs of Big Data.

- Awareness of 3 Vs (Volume, Velocity, Variety)
- Able to work with Unstructured, Semi structured data and dynamic derivation of structure
- Data Sampling strategy is a challenge
- Understanding of Big Data technologies (Hadoop, Map Reduce)
- Knowledge on HDFS (Hadoop Distributed File System)
- Test environment based on HDFS
- Increased test combination due to the 3Vs nature of Big Data
- Need of data ware house testing concepts
- Knowledge on Map Reduce, HIVE QL or PIGlatin
- Testing Tools – Development through HIVE QL or PIGlatin
- Knowledge on Data Ware Housing would shorten the learning curve of the BIG Data tester in understanding the extraction, loading transformation of the data from source systems to HDFS at the conceptual level
- Strong collaboration need between engineering and test teams

iv. Social Computing

Easy connections brought about by cheap devices, modular content, and shared computing resources are having a profound impact on our global economy and social structure. Individuals increasingly take cues from one another rather than from institutional sources like corporations, media outlets, religions, and political bodies.

To thrive in an era of Social Computing, companies must abandon top-down management and communication tactics, weave communities into their products and services, use employees and partners as marketers, and become part of a living fabric of brand loyalists.

Below are the aspects test manager/test organization should consider for preparing to gear up to service social computing testing needs.

- Understanding of Crowd sourcing of Requirements
- Strong collaboration need between engineering and test teams
- Understanding the Test Data generation and execution strategy
- Storage, Archiving, Backup and Restoration of data
- Better understanding of data translation and interpretation
- Social networking availability (on Mobile, Web etc)
- Knowledge of Social Computing platforms
- Awareness of the privacy of data
- Ability to handle unstructured, semi structured data

Social Computing - Testing Types

- Compliance Testing: Ensures compliance to local-foreign laws, rules & regulations of public companies and regulated industries.
- Standards Testing: Ensures that ads, widgets, applications are adhere to a specific social site's standards on which there are going to be hosted
- RIA Testing: Rich Internet Content on the websites
and the mobiles is tested as part of the Rich Internet Applications (RIA) testing.

- **A/B Testing and Multivariate Testing**: This testing helps in measure the effectiveness and relevance of content across any online channel and mobiles.

- **Social Content Management Testing**: Ensures the testing of various formats of generated content (storage, upload, download, view etc) from various channels.

- **Security Testing**: Covers testing of various aspects related to security such as role and access based privileges, identity theft and malware infections.

### b. Diverse Test Operating Models

Customers are increasingly becoming sophisticated as they are now seeking close alignment to business, better service, cost optimizations (cap ex, op ex), Variability & flexibility in pricing, improved transparency and less governance. With the huge volume of out sourcing on the horizon, service providers are becoming more risk taking and offering variety of test operating models.

Figure 4 depicts the key operating models and various aspects a test manager should consider while preparing to design/execute in those operating models.

### c. Adoption of Product/User Centric Approach

As end users’ needs are fast changing, our customers are increasingly adopting to product centric approach in IT systems. These would need shorter release cycles of IT systems, more focus on user experience, and understanding the user requirements better. In this back drop, test manager/test organization should keep the below aspects in focus while changing his/her organization.

### d. Innovative Pricing Models

As mentioned in the earlier paragraph, customers are increasing becoming sophisticated in terms of operating models and associated pricing models. Service provides are willing to take risks considering the large out sourcing opportunities that are realizable in testing. Figure-6 provides the details/aspects related to pricing models.
Regarding the typical challenges faced by testing managers, KJ Ross & Associates (5) have well described the 47 challenges in their paper at 6th Australian Test Managers Forum 2008. Authors of this white paper believe that apart from these, people management aspects would become very critical in testing related organizations. Based on their 10+ years experience, few of the aspects that could be of help to the test managers in mentoring their teams are given in the next section.

4. Ongoing Challenges – People Management

Based on our experience we have seen several issues in test organization like concerns related to Career Growth, Low Team morale, Complacency and Low self esteem. Figure-7 shares are the best practices/aspects we have followed and found to be effective to help the test managers in creating an effective test organization.

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Useful Readings

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5. Test Management Best Practices - Chip Davis. Click here

Author’s Biographies

Sandru Veerabhadraiah has 16 years of experience in IT and 8 years of experience in software testing. He has masters degree in engineering from Indian Institute of Technology, Madras. He has certifications in ISTQB-Foundation and TOGAF-Foundation. He had earlier published 2 white papers in TCS’s Global Technical Architects conference. He also published white papers on testing in QAI, IJCEM and recently conducted a 2 hour tutorial on Transaction Based Pricing at STEP-IN’s Hyderabad Software Testing Conference. Currently he is leading the Assurance CoE of HiTech Industry Solution unit of Tata Consultancy Services. His area of expertise include test process consulting, test management, test automation and test methodologies in usability testing, globalization, accessibility testing.

Rama Murari has 13 years of IT experience and is into Software Testing. From the past 7 years she has been in various roles of developer, business analyst, functional analyst, tester, project leader and program manager for large and renowned accounts. She is working as a Solution Developer in Assurance CoE of HiTech Industry Solution unit of Tata Consultancy Services. Her areas of expertise include Test Process Consulting, Test Management and White box testing.