



STEP – AUTO Conference, Bangalore

Test Automation And Business Value

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## Agenda

- Software Testing Market
- Current Situation
- Test Automation
- Trends
- Business Values
  - Case Studies

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## Global Testing Market

### Total Market (2007)

Region	Percentage
North America	36%
Asia Pacific	28%
EMEA	30%
Latin America	6%

Total Market > \$17B - 2007

### Global Market Position & Trends

**Market**

- 2007 at \$17.12B globally growing at >20%
- Outsourced Testing market is exceeding \$4B.
- Leverage of low cost offshore resources is driving market growth
- Majority of offshoring originates in the U.S.: India is the dominant recipient of the offshore work (est. 80%)
- Testing is moving from a tactical operation aimed at finding defects to a strategic activity aimed at delivering superior quality

**Pricing Trends**

- Top tier offshore companies are aggressively pricing to steal market share
- FTE pricing method is still widely used; Fixed price and T&M makeup the majority of the contracts Customers seeking offshore services to take advantage of offshore labor rates that are 70% less than the U.S.
- Traditional providers are ramping up capacity in offshore locations to stay competitive with offshore providers

**Margin**

- Avg. margin of traditional provider 20% - 30%
- Avg. margin of offshore provider 30% - 40%

### Projected Market Size & Growth

Year	Market Size (\$B)
2003	10.6
2004	11.9
2005	13.5
2006	15.2
2007	17.1
2008	19.1
2009	21.4

Global: 06' - 09' >20% CAGR

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## Current Situation

- We are in an era of business-driven computing
- Today organizations face keen competitive pressure to develop high-quality, reliable and cost effective IT solutions
- We need to constantly educate ourselves about new technologies & their use and get the testers involved earlier
- Applications are getting increasingly complex
- Lack of skilled resources on emerging technologies
- Increased competition, thereby, reduced time to market for any application/product
- Very tight schedules for testing leading to the question, how to perform the different types of Tests consistently
  - Without cutting down the amount of Testing
  - Without impacting cost in a major way
  - Without impacting the release deadlines

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## Current Situation

A recent study conducted by the **National Institute of Standards and Technology** showed the effects of inadequate testing, and the savings if improvements in testing are implemented.

### Costs of Inadequate Software Testing Infrastructure on the National Economy

	The cost of Inadequate software testing infrastructure	Potential cost reduction from feasible infrastructure improvements
Software Developers	USD 21.2 Billion	USD 10.6 Billion
Software Users	USD 38.3 Billion	USD 11.7 Billion
<b>Total</b>	<b>USD 59.5 Billion</b>	<b>USD 22.2 Billion</b>

## Need for Test Automation

- Manual testing is time consuming and the overall schedule is also dependent on the productivity of the Testers
- As functionality grows per release, the effort and the schedule required to manually test the application increases
- If functionality increases per release and the Test schedule and Team size remain constant, then the Functionality coverage gets impacted.
- Manual testing is taxing on the testers who repeat the same tests for an extended period of time

## Test Automation Benefits

- Improves functionality coverage in each round of testing
- Enables significant improvement in test execution productivity leading to lowering of Test schedules
- Reduces time to market an application/product
- Enables repetitive unattended execution of tests and logging of results
- Allows manual testers to focus on other important tests
- Improves product quality

## Myths about Test Automation

- Automation does not require skilled resources
- Automation eliminates manual testing once the automated scripts are ready.
- Automation is a cost effective solution for any scenario at all times
- 100% automation is possible

## Challenges in Test Automation

- Need to overcome Tool limitations
- Non availability of skilled / trained Automation resources
- End users of automated solution not technically skilled / trained to maintain it
- Design scalable and maintainable automated solutions to cater for enhancements or changes in application functionality across multiple releases
- Enforce reuse of automated solutions across projects

## Test Automation Solution - Review

- Last year would be remembered more for acquisition of tool vendors
- Major trend – Vendors starting to tackle test case generation from business requirement
- SOA and application life cycle integration trends are bringing new enhancements into Test Automation Solution

## Trends

- **Role of Automation in SLA based Testing**
- **End-to-End Integrated Testing**
- **Model Based Testing**
- **Open Source**

## Trends

### **Role of Automation – SLA Based Testing**

- More and more Outsourcing companies are opting for Service Level based Agreement based on long lasting and mature relationship
- These leaders view and monitor SLAs and service-level management as a critical step leading toward true alignment among IT groups, external service providers and business management.
- Industry is familiar with test tools. Scripting, Data driven , key word driven approaches are accepted now.
- Commercial tool prices are ever increasing unlike development tools
- Developers help the testers in developing their automation suite as their interest in delivering quality product is very high
- Test tools are easier to build as the technology currently used are testable

## Trends

### End to End Integration Testing

- The integration of multiple applications is increasingly common and comes with new challenges to create reliable products. It is no longer sufficient to simply test the application in isolation
- Frameworks to provide END-to-END Business Process Testing is one of the niche area

### Challenge

- The need to accommodate such a wide variety of disparate requirements including heterogeneous environment can make the end to end integrated automation testing a very difficult challenge; however the payoffs can be enormous

### Benefits

- End-to-end business process can be executed and validated.
- Optimize the overall production throughput
- Optimal usage of Integration/staging/Pre-production environment. Some additional phases of testing could be covered with in the same environment
- Minimize the use of expensive production floor

## Trends

### Model Based Testing

- Model Based Testing is process that enables to define test cases through the use of a model. The model describes the possible states of an application and the transitions from one state to the other
- Test Modeling is high level test design. Test Generation software takes care of crucial things such as combining data parameters, scheduling concurrent users and creating test execution strategies.
- Automatic testing, repeatable in nature, providing details logs on execution and issues automatically
- Versatile, test cases to test machine-to-machine interfaces, protocols, mission critical system services, and systems with multiple, concurrent points of control

## Trends

### Model Based Testing - Process

- Create a model of the System Under Test (SUT)
- Test the system automatically based on the model created
- The model would be created based on UML state chart or any other model based state chart
- The model would describe a large body of relevant testing scenarios
- Model based Test Generator like Confirmiq's Test Generator or Bender RBT generates thousands of distinct test cases based on the model created
- Confirmiq Test Generator goes one step further and tests the system and generates the report based on the test performed

## Trends

### Model Based Testing - Challenges

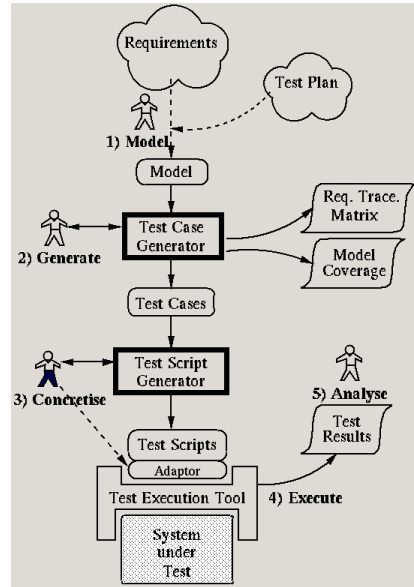
- Requires knowledgeable resources to model like Rational Unified Process or Requirement Based Testing (using BENDER RBT)
- Expensive
- Model based Testing would account nearly 40-45% of total effort spent in Testing ( including test design and modeling, testing, defect management, test management and other tasks)

## Trends

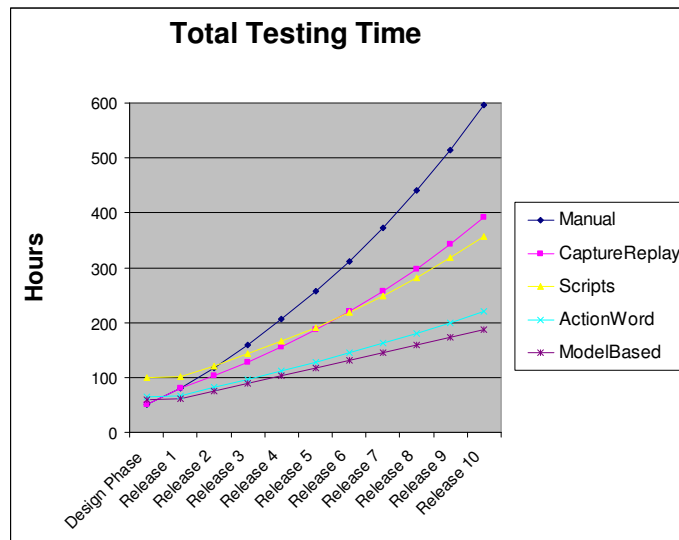
### Model Based Testing - Benefits

- Same setup could be run for load testing during the weekends (increase the transaction loads)
- The detailed log entries and the process logs could be used for certification
- In mission critical systems like switches the defect re-open rate could be as high as 60%. Re-use of environments would bring in substantial cost savings in the long life Cycle run
- Similarly regression testing due to technical upgrades and regulatory compliances requiring multi-validations within a year would save substantially

- + abstract tests
- + automatic execution
- + auto regression testing
- + auto design of tests
- + systematic coverage
- + measure coverage of model and requirements
- modeling overhead



## Comparison of Model based testing

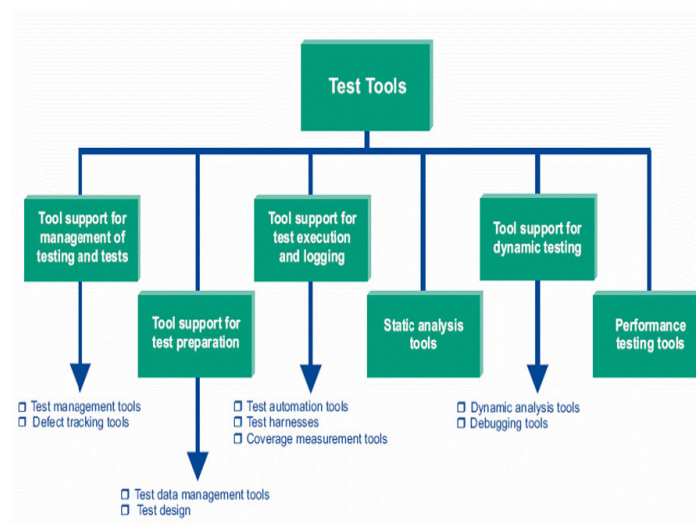


## Trends

### Open Source - Test Automation Framework

- Many open source frameworks across various phases of testing
- The result is that the latest crop of open source test automation frameworks are better than ever
- Teams are discovering that there are viable alternatives to buying a high-priced specialized tool that divides the team
- Instead, they're discovering that the open source frameworks foster collaboration between programmers and testers and subject matter experts
- Collaboration is helping to make teams more adaptable

## Test Automation Tools



## Business Value



### Sample Scenario Assumptions:

- Total test cases - 500,000
- 60% of automation of existing test cases
- 10% of volatility in existing test cases
- 4 production releases per year
- Considered intangible benefits from automation
  - Test Effectiveness
  - Test Efficiency
  - Time to Market
  - Learning Curve
- Automation of test scripts is assumed to be completed in 1 year, broken down as 4 builds
- Considered 1:1 on onsite to offshore ratio for current manual testing, with US\$ 45 as blended rate
- Assumed 1:8 on onsite to offshore, for automation testing

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## Business Value - Case Study 1

Phase	cost to automate (man-month)	cost per manual run (man-month)	cost per automated run (man-month)	savings per year (man-months)
2	22	0.04	0.01	7.81
3	20	0.01	0.06	22.05
4	48	50.00	1.00	245.00
5	116	460.63	5.00	2278.13

Before Test Automation	After Test Automation
<ul style="list-style-type: none"> <li>• 5 releases per year, 8000 person-hours each</li> <li>• 250 builds per year, 6 person-hours each</li> <li>• Total test time: 41500 hours</li> <li>• Total tests run: 16000 per year</li> </ul>	<ul style="list-style-type: none"> <li>• 5 releases per year, 800 person-hours each</li> <li>• 250 builds per year, 1 person-hour each</li> <li>• Total test time: 4250 hours</li> <li>• Total tests run: 65000 per year</li> </ul>

- **The Client**
  - A leading Data Security Company
- **The System**
  - Telecom Billing Application
- **No. of Test Cases**
  - Over 9000
- **Issue faced by client**
  - Test case execution productivity was low
  - Cycle Time for product releases
- **Tool used for Automation**
  - QTP 8.2 / 9.0
- **Methodology**
  - Keyword-Driven

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## Business Value - Case Study 2

### Reduction in Effort & Improved Coverage

Task	Manual Effort	Automated suite Effort	Saving in Effort
Executing 10,000 Test cases	117 Man days	20 Man days	83 %

	Initial Coverage	Current Coverage	Improvement in coverage
Functional Coverage	50 %	90 %	40 %

- **The Client**
  - A leading Bank having operations across the globe
- **The System**
  - Online Cash Management System
- **No. of Test Cases**
  - Over 10,000 ( for 6 supported branches)
- **Issue faced by client**
  - Test case execution productivity was low.
  - Test coverage per branch not sufficient
- **Tool used for Automation**
  - QTP 8.2 / 9.0
- **Methodology**
  - Keyword-Driven

## Business Value - Case Study 3

### Reduction in Effort & Improved Coverage

Task	Manual Effort (Man days)	Automated Effort (Man Days)	Saving in Effort
Functional Test	14	4	71 %

	Manual approach	Automated approach	% Improvement
Functional Test Coverage	20 %	80%	60 %

- **The System**
  - A localized PDA Application (for BEFIGS) with functionality compatible with Win2k/98/NT
- **Test requirements**
  - No of Products = 2
  - No of Test cases = 1400 test cases each for US and Localized builds (BEFIGS Languages) = 1400 x 7
  - Average No of builds per product for US = 10, BEFIGS = 10
- **Challenge**
  - Manual Execution of all test cases on all environment - Impossible
- **Tool used for Automation**
  - SilkTest 6.5
- **Methodology**
  - Framework based

THANK YOU