Emerging Trends in Test Automation

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Date:

Introduction to Automation
Test Automation: Introduction

- **Automation: Facts**
  - Manual scripts needed
  - Ideal for regression testing
  - Benefits come from discipline in analysis and planning
  - Causes significant schedule impact at introduction
  - Require more programming and design skills from testers
  - Frequently require maintenance

- **Automation: Myths**
  - High immediate ROI from automation
  - One tool that fits perfectly
  - Need to substitute skilled manual testers
  - Preclude manual testing
  - 100% Automation of all existing manual tests

RCA Analysis – A Case Study

The challenges that a customer, a leading service provider in EMEA, faced during automation

The Solution Approach
- Identifying the applications for Automation
- Selection of automation percentage for identified applications
- Selection of the compatible tool for AUT
- Customization of tool/creation of framework
- Development of reusable/modular components
- Creation of user-friendly process for running the scripts
- Maintenance and enhancement process
- Continuous metrics collection and analysis

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Building a Test Automation Framework

Test Automation Framework: Approach

Phase 1: Discovery
- Understand the current Test Automation practices, identify gaps, prioritize, develop roadmap

Phase 2: Automation Process Definition
- Prepare skeleton model of the framework based on appropriate systems, methods, and infrastructure

Phase 3: Framework Development
- Identify the key components of the Framework, create the scripting standards, identify the reusable components, document the metrics analysis and approach

Phase 4: Verification
- Conduct in-process and independent Verification on the robustness of the framework.

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Test Automation Framework: Considerations

- Maintainability
- Reviewability
- Reliability

**Elements**
- Testing Model
- Manual test Cases
- Application under test
- Modularity Relationship
- Test Environment
- Automation tools

- Integrity
- Independence
- Performance

Test Automation Framework: Components

- Plan
  - Directory structure
  - Scripting guidelines
  - Reusable functions
  - Modular approach

- Design
  - Generic functions
  - Business functions
  - Driver/Functions scripts
  - Reporting scripts

- Develop
  - Automation/DB Scripts
  - Test Data tables
  - Error handling/Recovery
  - Review and Traceability

- Maintain
  - Execute and Report
  - Impact/Analysis enhancements
  - Metrics Collection And analysis
  - Continuous Process Improvement
Test Automation Framework: Design

Existing Applications

Application Assessment (Existing Applications)

Verification of Test Cases

Baseline Regression

Enhancement Approach

Proposed model for Regression Test Automation development

Wip-CAFÉ: Wipro’s Framework

Test Automation helps in Test Execution/Regression Testing during the Testing Life Cycle

Challenges in Test Automation

- Frequent changes in the GUI
- Flexibility & high scripting effort
- Automation expertise
- Requirements Capturing
- Linked GUI applications & automation tools
- Test Data Design
- ROI Tracking on organizational level
- Test Automation Lifecycle Management

The Solution – Wip-CAFÉ

- Enables GUI-independent automation
- Enforces best practices
- Facilitates test automation management across the organization
- Contains a library of standard components
- Contains an ROI tracking module and generates reports

Significant Benefits

- Easy generation of test scripts
- Can be used across different modules, projects
- Drives better productivity and ROI
- Contains an ROI tracking module and generates reports
- Significantly reduces re-work effort and increases maintainability
- Reduces investment in automation tools
Test Automation: Managed Services Model

Application 1
Application 2
Application 3
Application 4
...

Requests

Client QA Managers

Wipro Automation Manager

Client Test Center

Automation Testers

Tool Vendors

Customized Automation Framework

Development Team

SERVICES / SUPPORTS

DELIVERABLES

SERVICE REQUESTS

CONTINUOUS IMPROVEMENT

Test Automation: The emerging areas
Automation in Capacity Modeling

Benefits:
- Determine System throughput by Business Function
- Understand impact of change in Infrastructure, application workflow, Workloads, etc.,
- Understand implications of adding new services to the infrastructure
- Identify Network connectivity effects of User Performance
- Avoid Outages and Performance problems by planning ahead
- Model Multi-tiered Application Systems

Automation in SOA Testing

- Individual component testing
- Integration, and End-to-End workflow testing
- Positive, Negative testing, Boundary value testing
- Testing of SOAP messages / responses
- Test for Identification, Integrity, Authentication, and Authorization.
- Security as transport, communication protocol, service description layer, and Firewall security
- Probing attacks, Coercive parsing, malicious contents
- Interoperability Testing
- W3C, WS-I Standards Testing
- Client’s Custom Standards Testing
- Test for Consistency, and Asymmetry
- Performance metrics
  - Response Time
  - Throughput
  - Latency
  - Transaction Testing
  - Service Reliability
Automation in Application Security Black Box Testing

**Development drawbacks:**
- Buffer Overflows
- Broken access control
- Logical Flaws
- Weak encryption
- Session Hijacking

**Attacks possible:**
- SQL injection
- Cross-Site scripting
- Parameter Tampering
- Cookie Poisoning
- Privilege Escalation

**WIPRO’S APPLICATION PENETRATION TESTING METHODOLOGY**

1. Scan/identify visible systems
2. Vulnerability identification
3. Vulnerability exploitation
4. Test escalation & Rollback
5. Report Findings
6. Implementation

**Time based Testing – Quarterly or on Application Rollouts**

**In a nutshell...**
Critical factors for Automation success

- Treated as a critical process and supported by senior management
- Robust and extendable automation framework
- Clear ownership and integration of test technology and process
- Rigorous measurement program to capture progress
- Skilled test engineering professionals deployed with the right tools