When to Automate Your Testing (and When Not To)

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Three Myths of Automated Testing

1. Automated testing always results in improved software quality

2. Every application development project or testing team can use automated testing tools

3. Automated testing is an all or nothing proposition

Three Realities of Automated Testing

1. Automated testing requires a higher initial investment but can yield a higher ROI

2. Skills and training are required to be successful with any automated testing tool

3. Every company doing automated testing still does some amount of manual testing

Testing Fact

- Industry surveys indicate that 75% of all functional testing is still done manually

Question #1:

- Why do most companies still rely so heavily on Manual Testing?

Why Manual Testing?

- **Time**: Testing teams may not have time to investigate alternatives to manual testing, learn how to use tools, and/or build & maintain scripts
- **Application Complexity**: Certain applications may be too complex and not suitable for automated testing
- **Skillset**: Some testers (business analysts, etc.) may lack skills needed to be successful with test automation tools
- **Cost**: Organizations may not own automated testing tools and may lack the budget to invest in tools
- **Job Security**: Testers / QA organizations may be comfortable and experienced with manual testing and feel threatened by automation
- **Awareness**: Organizations may lack the awareness that viable automated testing alternatives exist

Question #2:

- When is Manual Testing a better alternative than Automated Testing?

When is Manual Testing a Good Idea?

- **Subjective Validation**: For application functions that must be validated subjectively by humans such as usability or look-and-feel, manual testing may be the only option

- **New/Changing Functionality**: For new application functions that are still being developed and evolving / changing frequently, creating automated scripts may be a waste of time

- **Strategic Development**: For strategic application functions that you want testers to pay specific attention to, hands-on manual testing may be a better alternative

- **Complex Functionality**: For application functions that are extremely complex, test automation may be a major challenge (time & cost investment outweighs the benefit)

Question #3:

- When is Automated Testing a good alternative to Manual Testing?

When is Automated Testing a Good Idea?

- **Regression Testing**: For re-testing preexisting application functions that are being carried forward to new versions (usually the majority, unless app is brand new)

- **Smoke Testing:** For getting a quick high-level assessment on the quality of a build and making go / no-go decision on deeper testing

- **Static & Repetitive Tests**: For automating testing tasks that are repetitive and relatively unchanging from one test cycle to the next

- **Data Driven Testing**: For testing application functions where the same functions needs to be validated with lots of different inputs & large data sets (i.e. login, search)

- **Load & Performance Testing**: No viable manual alternative exists

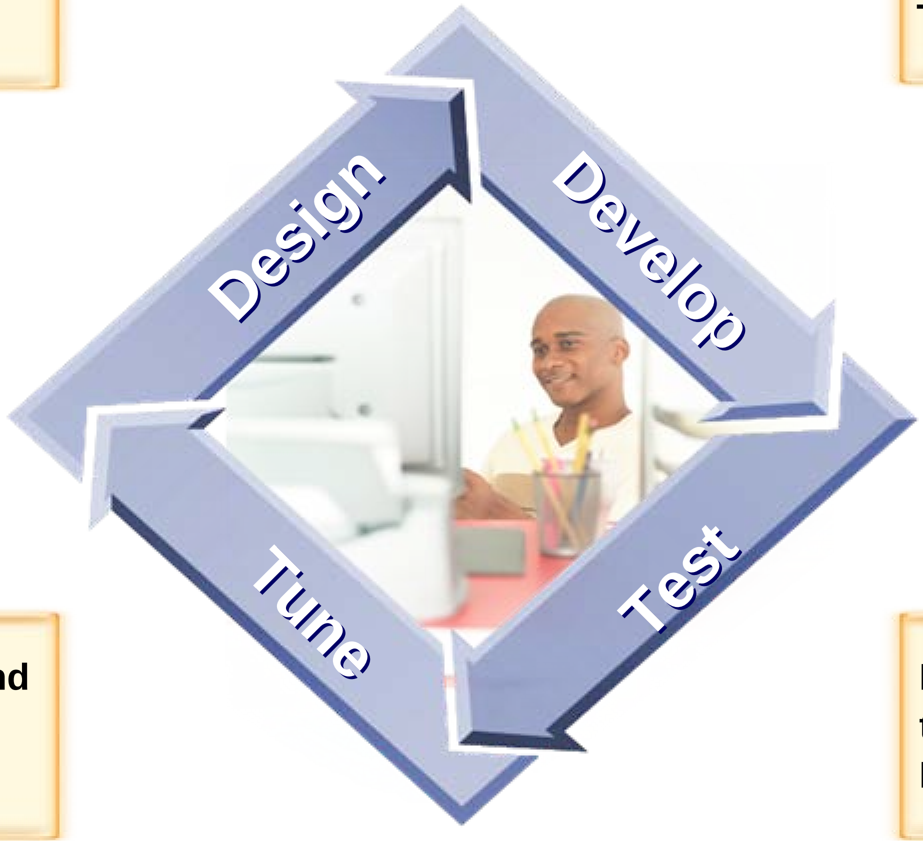
Oracle Application Quality Management: A Lifecycle Approach to Quality

Design Test Plans Based on Application Requirements

Test Manager for Web Applications

Develop Manual Test Cases and Automated Test Scripts

Load Testing for Web applications



Functional Testing for Web applications

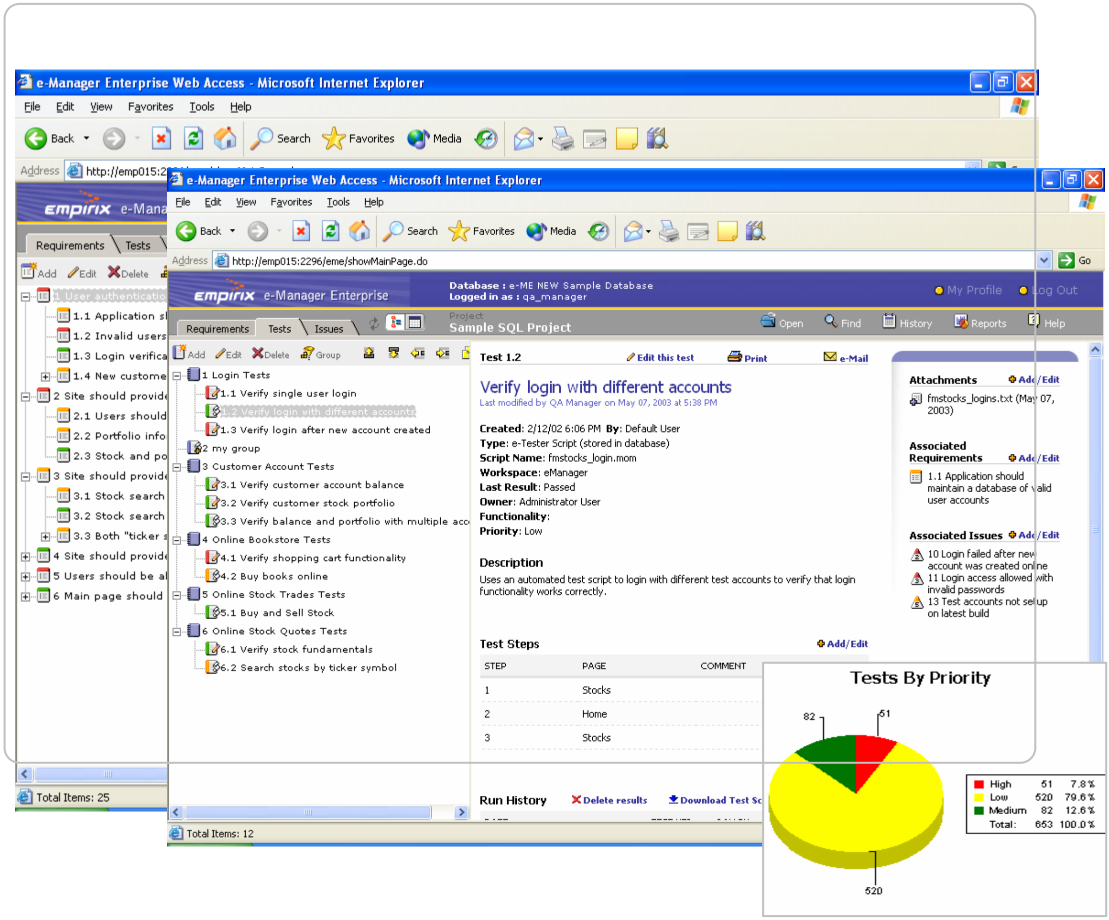
Execute Load Tests and Tune Application Performance

Execute Functional Tests to Validate Application Requirements

Test Manager for Web Applications

Test Process Management

- Manage test process from centralized Web-based console
- Define test requirements
- Develop manual & automated test cases
- Document and track defects
- Create reports


e-Manager Enterprise Web Access - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address
Go
empirix e-Manager Enterprise
My Profile
Log Out
Requirements
Tests
Issues
Open
Find
History
Reports
Help
Add
Edit
Delete
Group
Edit this test
Print
e-Mail
Add/Edit

Address http://emp015:2296/eme/showMainPage.do

Database : e-ME NEW Sample Database
Logged in as : qa_manager

Project
Sample SQL Project

1 User authenticatio
1.1 Application sl
1.2 Invalid users
1.3 Login verifica
1.4 New custome
2 Site should provide
2.1 Users should
2.2 Portfolio info
2.3 Stock and po
3 Site should provide
3.1 Stock search
3.2 Stock search
3.3 Both "ticker s
4 Site should provide
5 Users should be al
6 Main page should

Total Items: 25

1 Login Tests
1.1 Verify single user login
1.2 Verify login with different accounts
1.3 Verify login after new account created
2 my group
3 Customer Account Tests
3.1 Verify customer account balance
3.2 Verify customer stock portfolio
3.3 Verify balance and portfolio with multiple acc
4 Online Bookstore Tests
4.1 Verify shopping cart functionality
4.2 Buy books online
5 Online Stock Trades Tests
5.1 Buy and Sell Stock
6 Online Stock Quotes Tests
6.1 Verify stock fundamentals
6.2 Search stocks by ticker symbol

Total Items: 12

Test 1.2

Verify login with different accounts

Last modified by QA Manager on May 07, 2003 at 5:38 PM

Created: 2/12/02 6:06 PM **By**: Default User
Type: e-Tester Script (stored in database)
Script Name: fmstocks_login.mom
Workspace: eManager
Last Result: Passed
Owner: Administrator User
Functionality:
Priority: Low

Description

Uses an automated test script to login with different test accounts to verify that login functionality works correctly.

Test Steps

STEP	PAGE	COMMENT
1	Stocks	
2	Home	
3	Stocks	

Run History Delete results Download Test Sc

Attachments

fmstocks_logins.txt (May 07, 2003)

Associated Requirements

1.1 Application should maintain a database of valid user accounts

Associated Issues

10 Login failed after new account was created online
11 Login access allowed with invalid passwords
13 Test accounts not set up on latest build

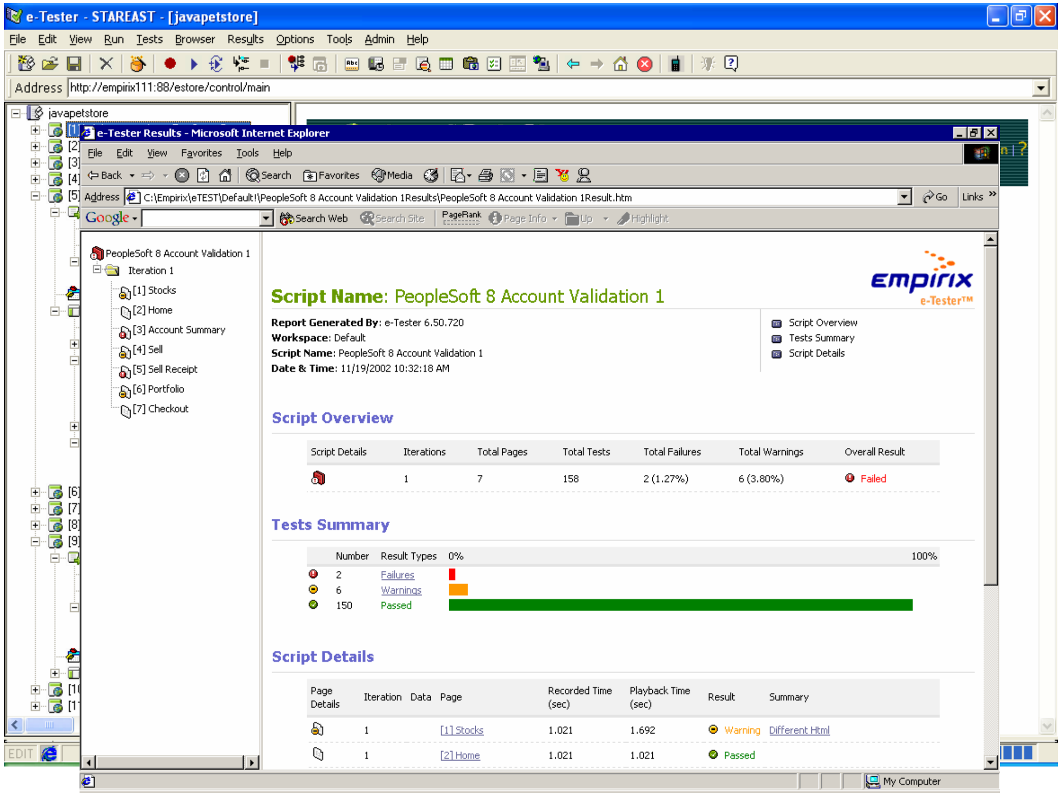
Tests By Priority

🟥 High	51	7.8%
🟨 Low	520	79.6%
🟩 Medium	82	12.6%
Total:	653	100.0%

Functional Testing for Web Applications

Functional & Regression Testing

- Automate transactions for Web applications & Web Services
- Execute rigorous functional test cases
- Create automated regression test suites
- Identify and report on functional application failures
- Reuse functional test scripts for load testing and 24x7 monitoring



e-Tester - STAREAST - [javapetstore]
File Edit View Run Tests Browser Results Options Tools Admin Help
Address http://empirix111:88/estore/control/main
javapetstore
EDIT
e-Tester Results - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address C:\Empirix\eTEST\Default!\PeopleSoft 8 Account Validation 1Results\PeopleSoft 8 Account Validation 1Result.htm
Go Links
Google Search Web Search Site PageRank Page Info Up Highlight
PeopleSoft 8 Account Validation 1
Iteration 1
[1] Stocks
[2] Home
[3] Account Summary
[4] Sell
[5] Sell Receipt
[6] Portfolio
[7] Checkout
empirix
e-Tester™
Script Overview
Tests Summary
Script Details
My Computer

Script Name: PeopleSoft 8 Account Validation 1

Report Generated By: e-Tester 6.50.720
Workspace: Default
Script Name: PeopleSoft 8 Account Validation 1
Date & Time: 11/19/2002 10:32:18 AM

Script Overview

Script Details	Iterations	Total Pages	Total Tests	Total Failures	Total Warnings	Overall Result
	1	7	158	2 (1.27%)	6 (3.80%)	Failed

Tests Summary

	Number	Result Types	0% … 100%
●	2	Failures	🟥
●	6	Warnings	🟧
●	150	Passed	🟩

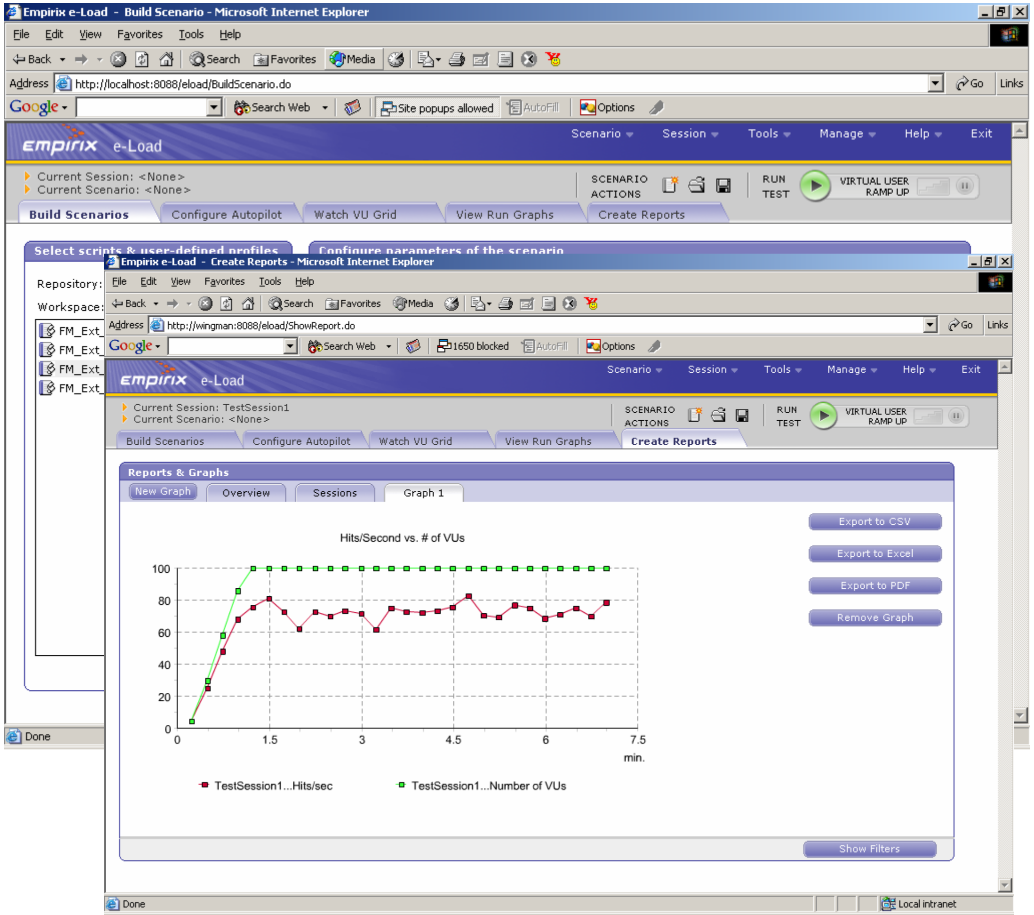
Script Details

Page Details	Iteration	Data	Page	Recorded Time (sec)	Playback Time (sec)	Result	Summary
	1		[1] Stocks	1.021	1.692	Warning	Different Html
	1		[2] Home	1.021	1.021	Passed	

Load Testing for Web Applications

Load and Performance Testing and Tuning

- Create realistic load test scenarios that simulate end-user behavior
- Scale to thousands of concurrent users
- Perform functional content validation under load
- Monitor server-side performance & correlate to end-user response times
- Isolate and resolve performance bottlenecks


Empirix e-Load - Build Scenario - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://localhost:8088/eload/BuildScenario.do
Go Links
Google Search Web Site popups allowed AutoFill Options
empirix e-Load
Scenario Session Tools Manage Help Exit
Current Session: <None>
Current Scenario: <None>
SCENARIO ACTIONS
RUN TEST
VIRTUAL USER RAMP UP
Build Scenarios
Configure Autopilot
Watch VU Grid
View Run Graphs
Create Reports
Select scripts & user-defined profiles
Configure parameters of the scenario
Repository:
Workspace:
FM_Ext
FM_Ext
FM_Ext
FM_Ext
Done
Empirix e-Load - Create Reports - Microsoft Internet Explorer
File Edit View Favorites Tools Help
Back Search Favorites Media
Address http://wingman:8088/eload/ShowReport.do
Go Links
Google Search Web 1650 blocked AutoFill Options
empirix e-Load
Scenario Session Tools Manage Help Exit
Current Session: TestSession1
Current Scenario: <None>
SCENARIO ACTIONS
RUN TEST
VIRTUAL USER RAMP UP
Build Scenarios
Configure Autopilot
Watch VU Grid
View Run Graphs
Create Reports
Reports & Graphs
New Graph
Overview
Sessions
Graph 1
Hits/Second vs. # of VUs
100
80
60
40
20
0
0
1.5
3
4.5
6
7.5
min.
TestSession1...Hits/sec
TestSession1...Number of VUs
Export to CSV
Export to Excel
Export to PDF
Remove Graph
Show Filters
Done
Local intranet

Synchronoss Technologies

Alex’s Bio

- Quality Assurance Manager for Synchronoss Technologies, Inc. a 15 year veteran of the software testing industry, extensive experience with sales force automation and transaction management systems. In both my current and most recent prior positions, I started the Quality Assurance Departments and built them from the ground up.

Agenda

- Synchronoss Overview
  - Company Overview
  - Our QA processes & cycles
  - When we evaluate automation vs. manual testing
- Automation: What works and what doesn’t
- Automation with e-Tester
- Automation ROI (cost versus benefits)
- Summary

Synchronoss Overview

- Synchronoss Technologies is the premier provider of on-demand transaction management software to Tier One communications service providers. The software platforms automate, synchronize and simplify electronic service creation and management of advanced wireline, wireless and IP services across existing networks.
- Headquartered in Bridgewater NJ, with offices in Bethlehem PA, Herndon VA and Bellevue WA

Our QA processes & cycles

- Our Applications:
  - Used both external and internal
  - Short description, transaction management
  - Functionality changes often
- Our Testing Processes:
  - Between Agile and Extreme
  - Test cycles depend on project, client and application
    - Short 6 week SDLC (Requirements, Development, Test)
    - Every other month, with 3 weeks for testing

When do we evaluate automation vs. manual testing

- New Function – test case – manual test – works / passes – release – create automated script for regression
- Evaluating functions for automation is the responsibility of the entire project team and needs to happen during the entire SDLC.
  - Includes automated unit tests, nightly builds and scripts with or without Functional Testing for Web Applications (formerly eTester) that can validate build files, DB, configurations and GUI

When do we evaluate automation vs. manual testing

- Reviewing Requirements
    - Can this function be automated?
    - What, if anything, does development need to do?
    - When writing test cases
    - Can this function be automated?
        - If yes, ensure test case is written to ease scripting (step by step)

- While Testing
    - Ensure the test case is clear and precise
    - Are the results predictable?
    - Does the test have to be run many time to get the desired result?

When do we evaluate automation vs. manual testing

- What to think about
  - Positives
    - Will productivity increase?
    - Will test coverage increase?
    - Will test accuracy increase?
    - Is this a large data input?
    - Is this GUI intensive?
  - Negatives
    - Requires human intervention
    - Requires 3rd party system
    - Test has unpredictable results
    - How often will this function change?

Automation: What works and what doesn’t

- Lessons learned
  - Automate functions that are 80% stable and unchanging
  - Work with development on unique names for controls and fields
  - Don’t overlook bulk data loads for the support of regression testing
  - Remember to include script maintenance in estimates
  - Make scripts as generic as possible
  - Use control file for URL, User IDs, and Passwords

- Upper management will always feel that regression should be 100% automated. This perception must be managed while setting proper expectations of what can be accomplished.

Automation with Functional Testing for Web Applications (formerly e-Tester)

- Key needs
  - All controls and fields have unique names
  - Test harness
  - Stable environment controlled only by QA
  - Established application
  - Don’t forget about data loads – we increased productivity of manual regression testing by 28% by automation the loading of data used for regression testing.
  - Script maintenance must be included in your estimates for testing going forward. Functions will change and scripts will need to be updated.

Automation with Functional Testing for Web Applications (formerly e-Tester)

- Script management
  - Each project has a dedicated eTester desktop
  - Those that work automation, work with the project team to ensure they are working on areas of the application that are stable, somewhat unchanging and will improve productivity.
  - Come up with, and stick to a naming convention for scripts
  - Smoke testing can be done quickly and more reliably
  - Can have scripts run overnight, review results in the morning and advise development of issues faster

Automation ROI

- Items to think about when calculating your ROI
  - Tool Investment
  - Learning Curve
    - For Tool
    - For Application
  - Employee Job Satisfaction
  - You will Get
    - Overnight testing
    - Testing reports emailed to you
    - More test coverage in same or less time
    - More repeatable tests
    - Faster test coverage
  - You will not get
    - All this immediately
  - Expectations and implementation must be well managed

Summary

- Do
  - Use this as a guideline and change it to fit your process
  - Work to control expectations of automation
  - Use the QAZone (now in OTN) for Tips, Trick and Information
- Don’t
  - Try and automate without support from development
  - Over estimate what can be automated
  - Let someone else set the expectations of automation

Thank you!

Appendix

For More Information

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