

Spot the Difference: How Front-end and UI Bugs are Hurting You, Your Team and Your Company



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About Me



- Software Engineer at heart with over 20 years of experience.
- Currently Technical Solution Engineer @ Applitools
- Founder of the Canadian Software Testing Board
- My true passion is automation and being able to automate visual testing of web, app and desktop application makes my current position at Applitools a dream job

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What Are Functional Tests?

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So many kinds of tests...

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Tests, Tests, Glorious Tests!

- Unit
- Integration
- E2E
- Acceptance
- Visual
- Contract
- Browser
- Automation
- Functional
- And the list goes on...

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Functional tests are automation tests that automate the browser in order to test the functionality of a web application*

* Or a mobile app

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Functional tests are automation **tests that automate the browser** in order to **test the functionality** of a web application*

* Or a mobile app

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Let's write a Functional Test

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All Functional Tests are Stories

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All Functional Tests Look Like This

- Action
- Action
- **Validation**
- Action
- **Validation**
- Action
- Action
- Action
- Action
- **Validation**



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Problems with Actions

- Fragile Selectors
- Complex Code

- Solution: Page Objects

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Problems with Validations

- Fragile Selectors
- Complex Code
- Too much to validate
- Only positive check
 - We don't validate what we don't know about

- Solution: Page Objects, **partially**

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Actions are Focused
Validations are **should be** Wholistic

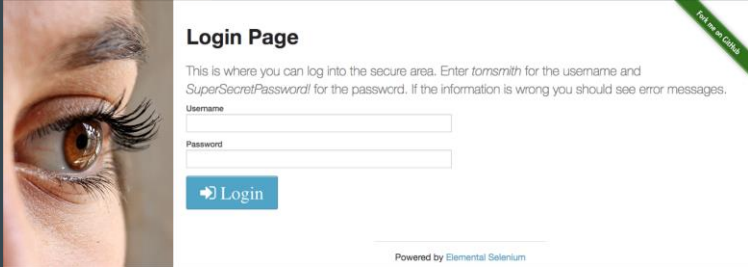
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Solving the Validation Problem

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Visual Testing !



Login Page

This is where you can log into the secure area. Enter *tomsmith* for the username and *SuperSecretPassword!* for the password. If the information is wrong you should see error messages.

Username

Password

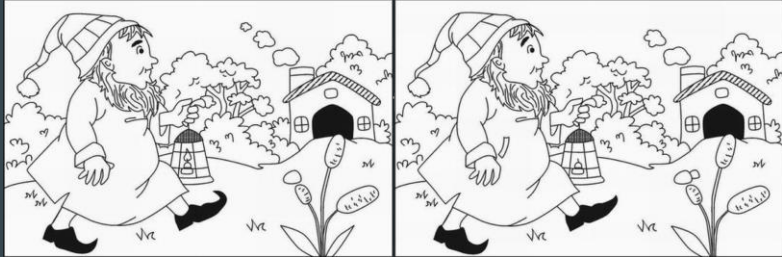
[Login](#)

Powered by Elemental Selenium

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Spot The Difference Challenge



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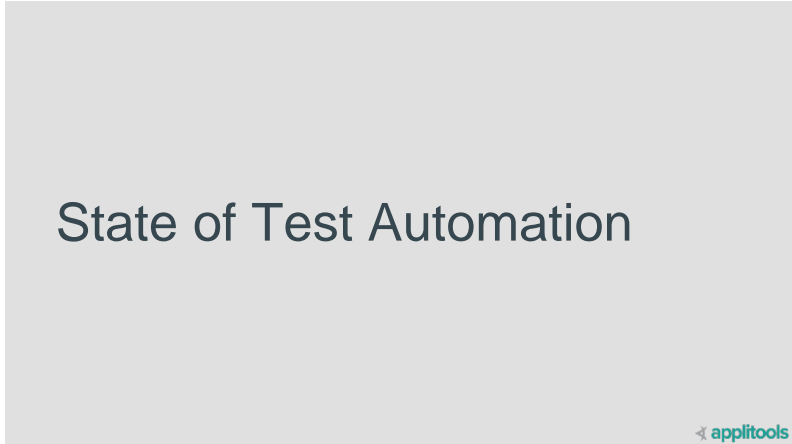


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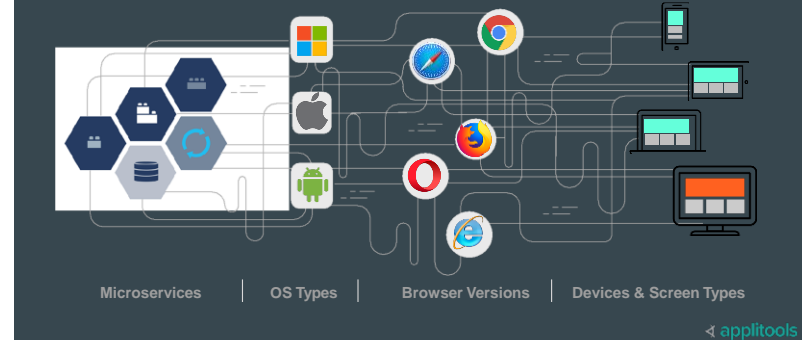
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Test Automation Workflow Today



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Applications Are Getting More Complex



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Delivery Cycles Are Getting Faster



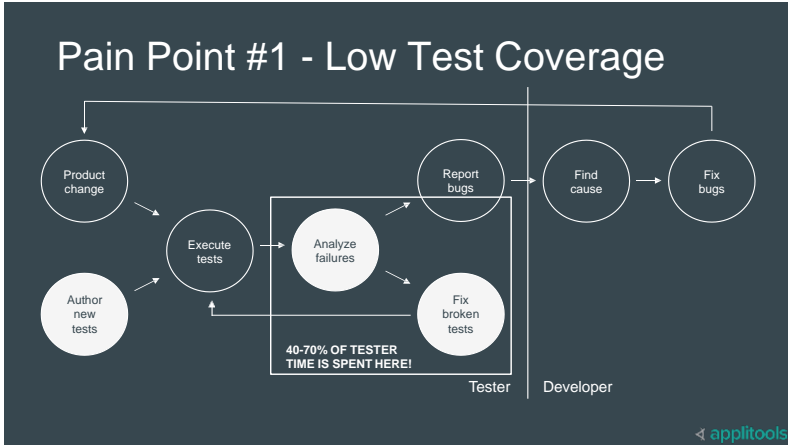
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Every Page.
Every Application.
Hundreds Lines of Code.
Changing Constantly.

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Pain Point #1 - Low Test Coverage



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```

08:31:17 Info selection 103 0 "[Installation Location: {Installation Location}:c:\Program Files\solidworks corp (Ena
08:31:17 Info selection 58 55803 "Estimated additional installation size: 656 MB; Estimated download size: 386 MB"
08:31:10 Info selection 37 55611 "The user clicked the button representing the [0: <link>{0;text}] operation on the [1: Su
08:31:10 Info selection 39 55613 "The following lines show the selections for the summary page when the user selected t
08:31:10 Info selection 99 0 "You are updating 2013 from SP 1.0 to SP 4.0."
08:31:10 Info selection 102 0 "[Download options: Operation=download and install (Enabled: 1)], [Download to: \SE
08:31:10 Info selection 103 0 "[Installation Location: {Installation Location}:c:\Program Files\solidworks corp (Ena
08:31:10 Info selection 105 0 "Estimated additional installation size: 656 MB; Estimated download size: 386 MB"
08:31:48 Info status 166 0 "DOWNLOAD SPACE REQUIRED: (0: 641750), AVAILABLE: ([1: 783667496), Folder: ([2: \\SERVERNAME\Engin
08:36:10 Info selection 43 55616 "The source folder that will be used is: (0: \\SERVERNAME\engineering\users\USERNAME\S
08:36:10 Info selection 44 55617 "The installation Manager source folder that will be used is: (0: \\SERVERNAME\Enginee
08:36:10 Info step 25 55502 "User advanced from [0: Summary] page to [1: Download progress] page."
08:36:18 Info status 58 55803 "Received data from Installation Manager server (Script: (0: http://fm.solidworks.com/bin2013/
08:36:55 Info step 25 55502 "User advanced from [0: Download progress] page to [1: Countdown] page."
08:39:16 Info step 25 55502 "User advanced from [0: Countdown] page to [1: Install progress] page."
08:39:16 W
08:39:19 W
08:39:20 I
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08:39:22 I
08:39:22 Info status 143 0 "CREATING INSTALL STEP 7 to upgrade: prod-COSMOSFWorkds, code={24b22837-893d-4709-9866-20953A
08:39:22 Info status 143 0 "CREATING INSTALL STEP 8 to upgrade: prod-solidworks\pnlactics, code={8a13240-2088-44da-a337-67
08:39:41 Info status 139 0 "CREATING INSTALL STEP 9 to FINISH: cmd-, cost=72348xb
08:40:03 Info status 58 55803 "Received data from Installation Manager server (Script: (0: http://fm.solidworks.com/bin2013/
08:40:21 Info step 92 0 "[0: Installing] EXE: ([1: \\SERVERNAME\engineering\users\USERNAME\solidworks downloads\solidwo
08:40:24 Info step 91 0 "[0: Installing] EXE: ([1: \\SERVERNAME\engineering\users\USERNAME\solidworks downloads\solidwo
08:40:38 Info step 91 0 "[0: Installing] MSF: ([1: \\SERVERNAME\engineering\users\USERNAME\solidworks downloads\solidwo
08:40:41 Info step 155 0 "Patch SUCCEEDED ***"
08:40:53 Info step 91 0 "[0: Installing] MSF: ([1: \\SERVERNAME\engineering\users\USERNAME\solidworks downloads\solidwo
(ID 14: solidworks, lang [5: ], pcode [6: {6685A7E-B91D-443D-A958-80062F853804}], mode [7: 3], upg = (8: 20130-40100-1100), f[9: 0]), costKB
08:43:18 Info status 58 55803 "Received data from Installation Manager server (Script: (0: http://fm.solidworks.com/bin2013/
08:43:17 Info status 58 55803 "Received data from Installation Manager server (Script: (0: http://fm.solidworks.com/bin2013/
08:51:16 Info status 58 55803 "Received data from Installation Manager server (Script: (0: http://fm.solidworks.com/bin2013/
08:54:16 Info status 58 55803 "Received data from Installation Manager server (Script: (0: http://fm.solidworks.com/bin2013/
08:54:22 Error status 157 0 "==START_DUMP_OF_WINDOWS_INSTALLER_DATA=="
08:54:22 Error status 157 0 "=== Logging started: 7/19/2013, 8:40:57 ==="
08:54:22 Error status 157 0 "Action start 8:40:57: INSTALL."
08:54:22 Error status 157 0 "Action start 8:40:57: ProgramFilesFolder.25459867_D5E7_32F7_9C7A_5EF02A207F6."

```

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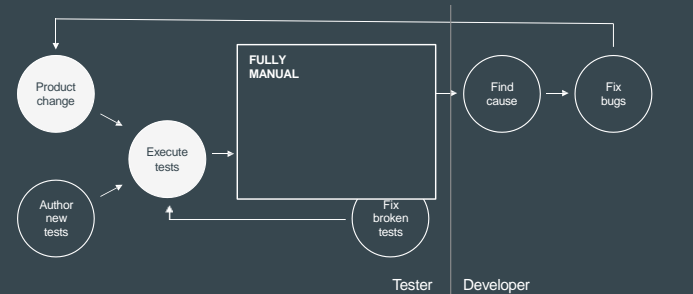
Is It Really Worth Automating?

- Every assertion increases the maintenance overhead
- Even if you manage to achieve 100% functional coverage, *it does not provide visual coverage*
- We only catch expected bugs (e.g. what we assert)
- So...**manual testing remains a vital technique**



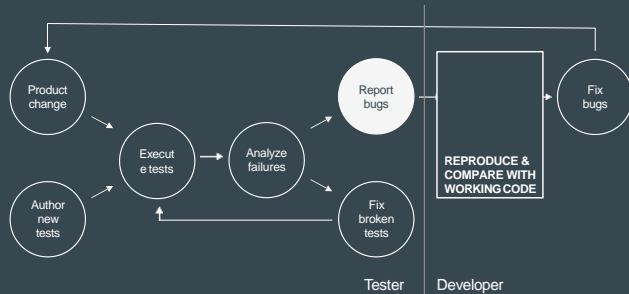
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Pain Point #2 - Slow QA Feedback



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Pain Point #3 - Slow Dev Feedback



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Testing Is Seen as a Bottleneck

According to a recent survey conducted by CA



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Testing is seen as a Bottleneck

Testing is vital...

- Protect quality
- Represent the end user
- Critical to business success

But success for teams is challenging.

- Visual and functional bugs escape routinely
- Hard to keep up with R&D pace and complexity
- No obvious solution in sight
- Team morale can suffer



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It Happens to Amazon



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It Happens to Microsoft

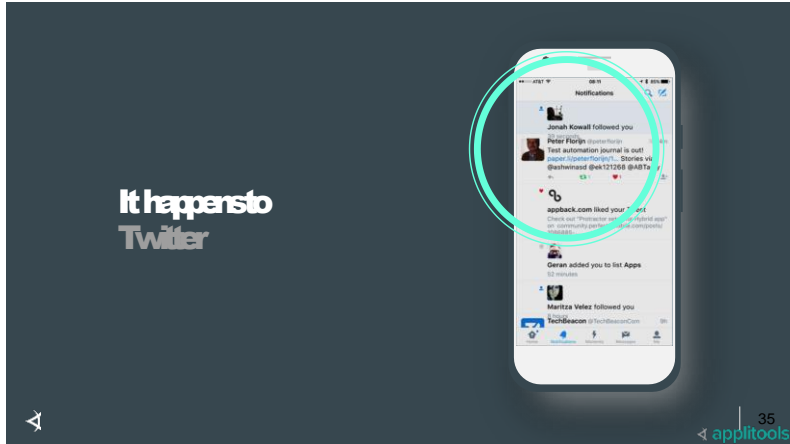
The image shows a laptop screen displaying a Microsoft Dynamics CRM dashboard. The dashboard includes a line chart with multiple data series, a list of records, and various navigation icons. A red circle highlights a specific data point on the chart. The text "It Happens to Microsoft" is displayed at the top left. In the bottom right corner, there is a logo for "appliTools" and the number "33".

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It Happens to UPS

The image shows a tablet screen displaying the UPS mobile application. The interface includes a list of services, a map, and various navigation icons. A red circle highlights a specific feature or button on the screen. The text "It Happens to UPS" is displayed at the top left. In the bottom right corner, there is a logo for "appliTools" and the number "34".

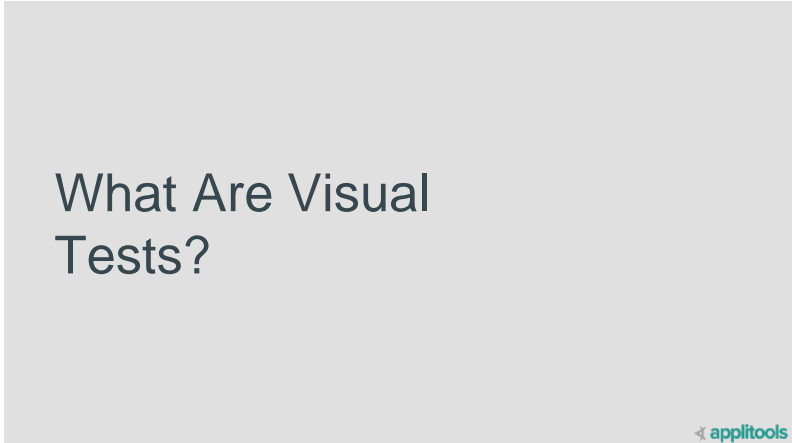
34



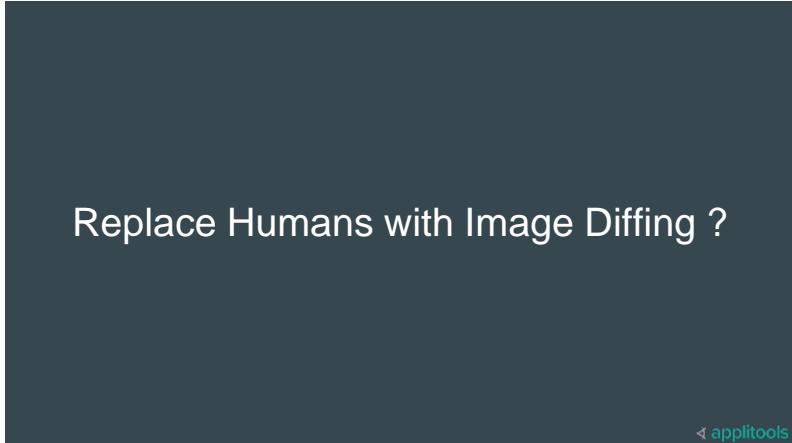
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Solutions to problems with validations

- Fragile Selectors
 - **No more selectors**
- Complex Code
 - **Same code for all validations**
- Too much to validate
 - **We validate wholistically**
- Only positive check
 - **We validate things we didn't even think of validating**

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Problems with Naive Image Diffing

- Small anti-aliasing differences
 - Mac vs. Linux vs. Windows
 - Different GPUs
- Date/time problems
 - regions that *are* different from run to run
- Full screen vs. Viewport
- Comparing is a pain
- “Accepting” a new baseline is a pain

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Cloud-Based Solutions

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Cloud-based solution

- Visual diffing algorithms see like a human sees
 - Ignoring the small differences
 - AI-level algorithms are now evolved and keep getting better
- Screenshot management tools are available, enabling you to
 - See the diffs
 - Approve new baselines
 - Open bugs on diffs that are bugs

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Let's Run the Demo



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Thank You

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