BOTM™

Codeless Testing Automation

A DEEP DIVE INTO CODELESS TEST AUTOMATION FOR MOBILE APPS

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INTRODUCTION

When the winds of change blow, the wise build windmills, the others build walls.
In the digital world, where winds of change blow ever so frequently, wisdom beckons all to focus time, efforts and resources on opting for 'digital windmills', in order to stay relevant and productive. This Whitepaper therefore takes a deep dive into the most trending 'testing windmill' i.e. Codeless or Script-less Test Automation, because the secret of success, is to focus energy not on fighting the old, but building on the new.

Technological evolution is always a response to user needs, more so in the software testing world. Manual Testing could not cope with the speed of mobile app innovation, that consistently aims at offering superior user experience – the oxygen for mobile apps. Automation Testing came to the rescue of QA personnel, bringing speed and accuracy by automating routine repetitive tests. Along the way Selenium became an open-source automation framework, catalyzing transition to test automation. However, the catch here was, that it required programming experts for successful execution.

Innovation then presented Record and Playback tools for app testing, and Selenium followed suit with an IDE that facilitated recording of test cases and converting them to supported programming languages. This was a boon to manual testers who could now record their test cases while performing the test steps, and play them back when required to execute the test cases in future. However, there were scalability issues with these test cases, as they did not permit editing to change or update or add more complex scenarios. Programming experts were again needed to address these issues. To circumvent this, Codeless Test Automation Tools began to see the light of day, helping testers without programming skills, to create and edit test cases. With time, Codeless Automation got further refined and this is where we stand today.

This introduction which takes us back in time, sets the background against which we move forward to unravel all aspects of Codeless Test Automation for Mobile Apps, which is the latest testing boon. This Whitepaper will also examine what the future holds for Codeless Test Automation.

ABSTRACT

Codeless Test Automation, as seen in the introduction, is the latest in the series of innovations that have been presented to the world of Mobile App Testing. It has gifted the testing world with unprecedented speed and accuracy, since coding is now done by machine power. It has also been instrumental in eliminating the programming barrier that kept many away from test automation.

This Whitepaper titled: **A Deep Dive into Codeless Test Automation for Mobile Apps,** explores codeless testing from various perspectives. In order to provide a logical flow, this treatise is presented in three sections:

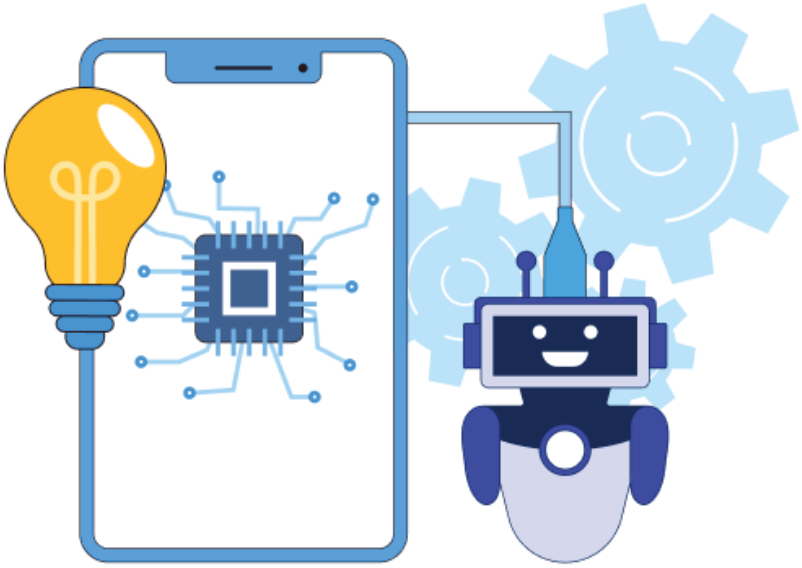
I. **The first section titled: Clearing Codeless Concepts via Comparisons, in an endeavor to present a clear understanding of Codeless Testing, compares and distinguishes it from related concepts like Low Code Testing, Test Automation, Record and Playback Testing and Manual Testing.**

II. **The second section titled: Understanding the Intricacies of Codeless Test Automation, takes a peek into the 'How' of Codeless Test Automation; touches on Codeless Testing on the Cloud; and also provides pointers for successful implementation of Codeless Test Automation.**

III. **The third section titled: The Future of Codeless Test Automation for Mobile Apps, scans the future analyzing it from three distinct perspectives:**

- **The benefits of Codeless Test Automation and how it influences its future.**
- **A look at the statistical data to help make an informed forecast of the future.**
- **The future trends expected w.r.t. Codeless Test Automation for Mobile Apps.**

It is hoped that the reader will gain useful informative insights on browsing through the pages that follow.



CLEARING CODELESS CONCEPTS VIA COMPARISONS

This section explores what Codeless, aka Script-less, aka No-code Test Automation is all about; and distinguishes it from other kinds of testing, in order to make the concept crystal clear.

Codeless Test Automation is a method of automating tests without developers/testers actually writing any coded scripts. This opens up the testing space to non-technical people who don't have in-depth knowledge of programming. The job of testers is greatly simplified and speeded up as they have to only indicate the testing steps in normal language, rather than write actual code.

The USP of Codeless Test Automation or Codeless Testing, is that enormous time is saved as it does not involve scripting, since the Codeless Testing Tool or Platform converts the non-coded steps written by testers into machine language. The interaction between testers and code is minimal, hence non-technical staff in the organization can also create test cases and flows. Codeless Testing enables testing to be done along-side app development and runs a regression test before every app release. All this greatly accelerates app completion, without compromising on accuracy and security.

01 Codeless v/s Low-code Test Automation

Codeless Test Automation is a No-code or Script-less Test Automation method in which not a single line of coding is required, making it possible for users without any previous coding experience to create and execute tests. Tests can for example, be created in English for business aspects that need validation, making testing available to a wider audience.

Low-code Testing on the other hand pertains to automation tools that permit code insertion into the text. The regularly required testing components are incorporated via visual modules for easy access by stakeholders, but for validating any explicit uncommon aspects or complex interactions, coding knowledge is needed to make insertion possible.

02 Codeless Testing v/s Automation Testing

As seen earlier, Codeless Testing is an advanced type of Automation Testing where code writing by the team is eliminated, thus doing away with human intervention for scripting testing codes. Testing is done via Codeless UI tools using exploratory flow-based test scenarios. Since Codeless Testing eliminates long man-hours spent in coding, it increases testing productivity by 5 to 6 times as compared to Automation Testing. AI and ML incorporated in Codeless Platforms have taken Codeless Testing to even greater heights.

Automation Testing on the other hand, is the testing process where apps are validated via automated tests using automation scripts and tools for performing test cases. It eliminates the need for manual testing, but requires manual efforts for automating the tests and making them executable. Thus, Automation Testing requires testers to have good coding skills for designing the test scripts. Codes will be written based on manual test scenarios, BDD and user narratives. Scripting is normally done in Java, and test creation is page based.

03 Codeless Testing v/s Record Playback Testing

Codeless Testing in its advanced current form, requires absolutely no coding by the tester as mentioned earlier. All that testers of any level need to do, is to feed in the steps in normal text, which is then converted into machine language at the backend by the Codeless Testing Tool or Platform. These tools empower the tester to not only write but even edit those test cases without actually writing any code. Codeless Testing Tools additionally have a lot more features that Record and Playback Testing does not offer.

Record and Playback Testing, requires testers to record the steps corresponding to a test case, and then use a tool to convert the recorded steps to any of the supported programming languages to enable execution. These test cases can then be played back as and when required to test the application.

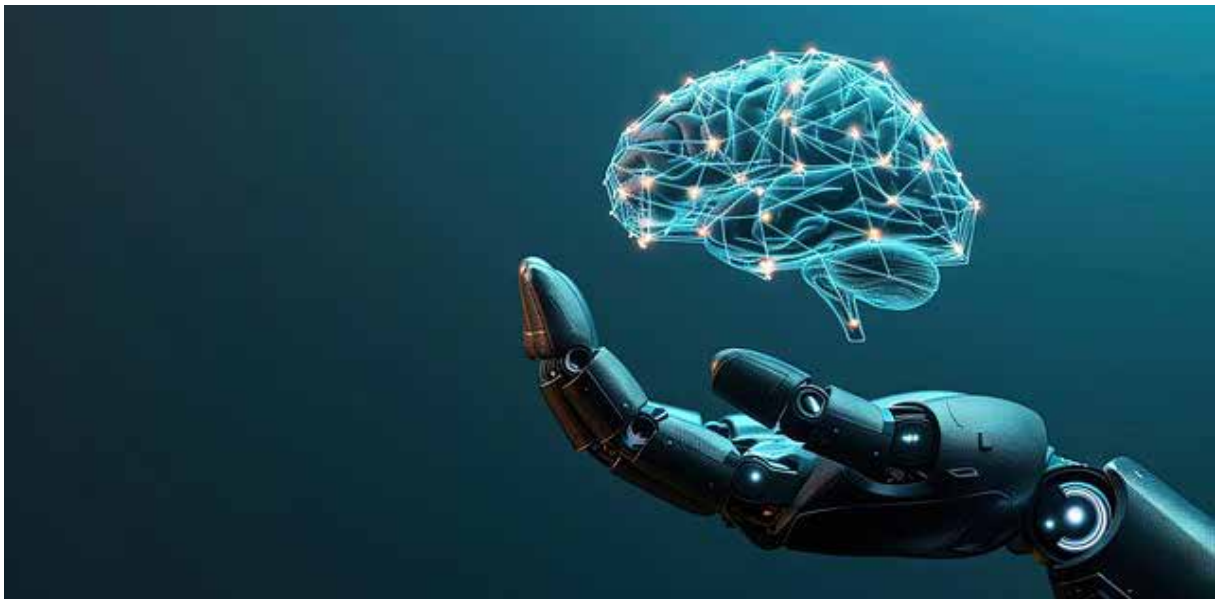
However, to successfully run these tests, some amount of code invariably needs to be added. Furthermore, if even a small change is needed, it would have to be re-recorded, or else the tester would have to know coding to edit it, thus opening the door to the risks of human intervention in coding. Record and Playback Testing, was initially called Codeless Testing, but it is at best, a primitive version which no longer qualifies as Codeless Testing, given today's advanced 'No-code' Testing regime.

04 Codeless Testing v/s Manual Testing

There is a world of difference between Codeless and Manual Testing and hence it does not need much explanation. It suffices to state that Codeless Testing eliminates human intervention in the coding process, whereas, Manual Testing depends heavily on programming experts.

In Manual Testing, manual testers do the first round of testing on a feature and ensure it is stable, and then the automation team steps in to automate the test. This system could not fully leverage the diverse skill sets where the manual testers were knowledgeable about the feature and its working; but the automation expert who had coding knowledge, lacked as much feature knowledge.
Codeless Test Automation, empowered manual testers to use their product knowledge for automation too, greatly contributing to the quality of automated test cases. By making automation and review possible for non-technical people, Codeless Test Automation enables project managers, product managers, clients, and other stakeholders to participate and contribute to the app development and testing process.

Having swam across the surface, to understand the concept of Codeless Test Automation, this Whitepaper will now take a deeper dive to explore how Codeless Test Automation actually works.



UNDERSTANDING THE INTRICACIES OF CODELESS TEST AUTOMATION

This section explores how Codeless Test Automation works, and will include a basic understanding of Codeless Testing on the Cloud. It will also present valuable insights for making Codeless Test Automation smooth and successful.

The two must haves for Codeless Test Automation are:

1. **Codeless Test Automation Tools/Platform**
2. **Testers**

Codeless Test Automation Tools provide the facility for testers to enter the steps at the frontend, where what is offered may differ between different tools/platforms. Generally, they permit the steps to be recorded in normal English text. The job of coding is then done by the tool which converts the text into machine compatible codes at the backend, and facilitates execution of the tests.

Testers need to be knowledgeable in software testing, and product development, to enable them to write out the steps in normal text, which the tool will then convert into test scripts. Since no coding is required to be done by the tester, it eliminates the need for the tester to have coding or programming knowledge.

Codeless Test Automation facilitates speedy visual-based test creation; works in sync with code-based testing; has a Record and Playback facility; incorporates all standard functionalities; supports CI/CD; and can be executed 'On Premise' or 'On Cloud'.

For On-premise Codeless Test Automation, testers need to download the codeless testing solutions as Software Development Kits (SDK). It is important to ensure proper installation as well as to ensure that updates are consistently done. This needs to be verified for each type of machine on which testing is being done. Test automation requires constant maintenance while also being executed continuously. On-premise Codeless Testing can face problems if the aforesaid points are not taken care of.

Cloud Services are the better option for Codeless Test Automation as it ensures that testing runs on strong foundations which can scale up at will, consistently stay up and running, constantly provide high levels of security, and offer strong computing power and storage capabilities. The scalability, speed, collaboration, quality, and security that On Cloud Codeless Test Automation offers, saves precious

POINTS TO NOTE FOR CODELESS TEST AUTOMATION

- There are certain tests where manual testing is better suited and hence it's important to identify and separate these tests which include the following:
  - Tests needing detailed human observation, intuition, sensitivities, and insights.
  - Exploratory Tests
  - Usability Tests
  - Ad-hoc Testing
  - Testing of small changes in User Interface (UI).
  - When Application Under Testing (AUT) changes frequently.
  - Testing of newly designed features that have not been tested manually, at least once.
  - Tests that have third-party dependencies and complex set-up pre-requisites.

For almost all other tests, Codeless Test Automation is the way forward.

- As a rule, therefore, tests that are too difficult to manually implement, and those that need greater in-house skills should be the first candidates for Codeless Test Automation. This is especially so in cases where testing is repetitive, time consuming and complex, as the benefits of codeless automation for these tests are immense. Hence ideally separate the tests that will operate codeless from the actual code itself, apply the codeless test, and then bring it back into the sequence.

- Another point to note is that there are specific codeless automation solutions available, so it's important to understand the current framework, and choose what's most suitable. It pays to carefully assess the existing testing environment, the issues that need addressing, the infrastructure and technology, and then zero in on the codeless platform that best addresses the needs. The ideal codeless platform is one that is user-friendly, incorporates the latest in technology including the power of AI and ML, provides robust analytics and reporting, has genuinely good user reviews, and is open to providing support if required.

Having explored the past and present of Codeless Test Automation for Mobile Apps, this Whitepaper moves ahead to its final treatise, to present the future prospects for this testing wonder.

THE FUTURE OF CODELESS TEST AUTOMATION FOR MOBILE APPS

This final section uses the current scenario to gaze beyond the horizon, in order to gauge the future of Codeless Test Automation.

The chance of anything new making it big, depends on what it brings to the table and how it benefits stakeholders. Any attempt to forecast the future must consider this important aspect. Numbers are yet another good pointer of the future. Hence this analysis of the future of Codeless Test Automation, explores three angles:

- **Benefits of Codeless Test Automation**
- **Codeless Test Automation – Statistical Forecasts**
- **Where to from here? – A peek into the expected trends of Codeless Test Automation of Mobile Apps.**

An analysis of the recent past reveals, that a substantial chunk of test automation failures, are traced back to coding errors. These failures disrupt the testing flow and defeat the goal of modern testing methodologies like CI/CD and DevOps. Codeless Test Automation, by eliminating or substantially reducing coding requirements, tremendously reduces testing efforts as well as the error quotient. The valuable amount of time saved can be productively spent on product development, innovation and also greatly reduce time-to-market. It's no wonder then that Codeless Test Automation is the choice of the future, in a world where speed and accuracy demands are only increasing. A cursory look at the list of benefits of Codeless Test Automation, will provide better insight into where its future lies.

Benefits of Codeless Test Automation

- Saves immense time by eliminating complex coding.
- Reduces manpower costs as expensive programmers are not needed.
- User friendly, as the graphical UI workflows and the community support sites eliminate need for in-depth training.
- Early time-to-market as developers and testers can simultaneously work in continuity.
- Supports modern methodologies like Agile, Devops, and Continuous Testing – which speed up the SDLC.
- Facilitates transition to automation as testing can be executed by non-technical testers.
- Real-time information, reports, and error updates provide timely, valuable insights, viable solutions, on-going analysis and auditable records.
- Versatile and efficient as it is compatible with regression tests as well as data-driven tests; and able to easily fix broken elements and re-run the tests seamlessly.
- Quick feedback cycles facilitate early and quick error correction for early app release.
- Scalability makes it flexible for projects of diverse sizes to be executed without requiring skilled programmers to update the tool.
- Offers the immense power of Artificial Intelligence (AI) and Machine Learning (ML).
- Choice of 'On Premise' as well as 'On Cloud' Testing.
- Supports collaboration between the software team, and also provides the platform for simultaneous reviews by other stakeholders including business owners.
- Promotes ongoing communication between all stakeholders, thus closing communication gaps.

These benefits make it attractive to switch over to Codeless Test Automation, whichever perspective it is viewed from i.e. economic perspective, resources perspective, time perspective, or accuracy and security perspective. The ease it brings to automation, helps organizations who were hitherto apprehensive about automation, to hop on to the bandwagon – hence the future of Codeless Test Automation is expected to be bright.

Codeless Test Automation – Statistical Forecasts

One report states that the Codeless Testing Market is expected to grow at a CAGR of 13% during the forecast period 2023-2030, and attributes this expansion to the increasing interest of individuals in this industry.

Another report states that the global codeless testing market is estimated to be valued at USD 2 billion in 2023, and is projected to reach USD 8.6 billion by 2033, exhibiting a CAGR of 15.6% during the forecast period 2023 to 2033.

The benefits that come with Codeless Test Automation are sufficient reason to explain this spurt in interest. Another reason is that in the digital world, change is the only constant, and the only way to make sense out of change is to plunge into it, move with it, and join the rest in order to be in the race. Winston Churchill said: To improve is to change; to be perfect is to change often. The robust numerical forecasts indicate that digital players know the truth of this statement perhaps, better than anyone else.

Where to from here?

This final section dives still deeper into the future to present the trends, which gives a sense of direction into where Codeless Test Automation goes from here.

- **Higher Transition to Cloud Based Testing**

It is expected that the future of Codeless Mobile and Web Testing Platforms will find more takers for On-cloud execution, the reason being that test automation must run on strong foundations that can scale up at will, consistently stay up and running, constantly provide high levels of security, and offer strong computing power and storage capabilities. This can be better done 'On Cloud' as it facilitates scalability, speed, collaboration, quality, and security thus saving precious man-hours which can be used more productively for product innovation.

- **Increased Role of AI and ML**

AI and ML are expected to play a larger role in future Codeless Mobile and Web Testing Platforms. AI enables test cases to be generated based on real user data and insightful user flows, taking into account diverse users within its ambit. With AI, test scenarios are automated based on authentic user data, which generates more confidence and also helps testers save time when creating new test data. The replacement of static locators with dynamic locators is expected to make testing software more stable, resulting in faster test execution and authoring.

- **Accelerated Development of Codeless Testing Tools**

What strengthens the popularity of codeless testing is that non-technical people can effortlessly evaluate the code, and recurring test cases can be executed in a fraction of the time. Where demand increases, supply will follow. This is the reason why there is acceleration seen in the development of codeless testing tools, with endeavors to address areas that need improvement, in a bid to refine them further – a clear indication of where the future lies.

Future Trends Expected in Codeless Testing Platforms

With sights set on taking testing to even greater heights, Codeless Testing Platforms are expected to go through iconic transformations where speed, accessibility, and collaboration will be at the helm, allowing teams to streamline their testing workflows and accelerate time-to-market.

Improvements are expected to include:

- Better flexibility for customization.
- Introduction of smart element locators by replacing static locators with dynamic locators.
- Replacement of fixed waiting time by conditional waiting based on the condition becoming true.
- Making provision for codes to be inserted if required.
- Improving maintainability to address the issues of continual increase in the number of tests, and constant changes in the app.
- Improving inter-operability issues between multiple browsers and software support.
- Providing better coverage to eliminate the chance of bugs when reusable and modular scripts are incorrectly played back, or generate invalid test results.

It is hoped that the foregoing pages of this Whitepaper have brought more clarity into the emerging testing trend of Codeless Test Automation, and that it sets the stage for organizations to take the right steps forward, in an informed manner.

CONCLUSION

The digital world, has witnessed time and again, that once a new technology rolls in, those who are not part of the steamroller, get rolled over, to become part of the road. Transitioning to Codeless Test Automation is no exception to this rule. It's important to remember that every innovation becomes the stepping stone to greater heights of speed, accuracy, and security – the three pillars of the software testing world.

Our take is therefore, that organizations must welcome the winds of change and take serious steps to benefit from this latest testing windmill, intelligently working towards its successful implementation, as there's a lot to gain as seen from the benefits of codeless testing.

True, the transition may seem daunting, but maintaining a status quo is not an option in the digital world. For those seriously contemplating adoption of Codeless Test Automation, BOTm is a good unabridged Codeless Testing Platform for Mobile App testing, because it consistently keeps abreast of the latest in technology, and has the built-in power of AI and ML to relentlessly ensure speed, accuracy, and security.

Visit www.botmtesting.com and sign up for a Free Trial. Our advanced facilities include audio interaction with Alexa; and Appium Converter feature which enables conversion of Appium Script Logs into BOTm Script format. Explore BOTm's futuristic world class testing solutions, that will give you the confidence to make that vital transition to Codeless Test Automation.

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BOTm is the accelerator BOT for automated and manual testing of mobile applications - developed for both Android and iOS devices.