DECISION, ANALYSIS, RESOLUTION (DAR) TESTING AUTOMATION TOOLS COMPARISON MAY 2020

VER.0.1

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1. Overview

This DAR was produced originally to evaluate Ranorex, Katalon Studio, Mabl, and TestCafe.

This evaluation is designed to assist our clients in choosing the correct test automation tool for their own unique requirements.

2. Evaluated Platforms

NO	PLATFORM
1	Ranorex
2	Katalon Studio
3	Mabl
4	TestCafe

Table 1 – Evaluated Platforms

3. Other Platforms

Other platforms, which are not evaluated but may be included in the future are listed below:

- NA

4. Evaluation Criteria

The evaluation gives points to selected criteria where the weight of each criteria is determined by the importance of that criteria.

NB: This document uses a weighting schema which is currently relevant for Mitrais use.

4.1. Non-Feature Related Criteria

CRITERIA	MITRAIS WEIGHTING
Entry Cost	40
License Cost for Per User	30
Ability to be Commercialized	50
Documentation	20
Training Options	30
Technical Support	20

Table 2 – Non-Feature Related Criteria

Criteria used:
1. Entry Cost
   Entry cost means the initial cost to start using the tools. This is the license cost of minimal number of users. It may not be the same between tools. The lower the better.

2. License Cost per User
   This is the cost per user, as the entry cost for the tools is not always equal to the cost per user. The lower the better.

3. Ability to be commercialized.
   Free or cheap tools sometimes have some limitations on licensing or features. This criterion tries to capture whether there are any limitations that make a solution using the BI tools unsuitable for sale. Lower points mean that there are some factors that may make them unsuitable for commercial purpose.

4. Documentation
   This concerns the availability and comprehensiveness of the documentation on how to work with the tools.

5. Training Options
   In general, this is the "cost" to train resources in how to use the tool. The evaluation should be based on:
   a. The availability of online training material and/or formal class (and their pricing). Ideally all training materials should be available online.
   b. The learning curve a new developer will have to face to understand how to implement the product. The easier it is to implement the better.

6. Technical Support
   The speed and availability of support when required. The team evaluated this criterion by analysing reviews of the product.

4.2. Feature Related Criteria

CRITERIA	MITRAIS WEIGHTING
Platform Supported	50
Browser Supported	50
Mobile App Support	10
Installation	10
Scripting Language Supported	50
Scripting Creation Time	50
Object Recognition	25
Continues Integration	40

Data Store	25
CRITERIA	**MITRAIS WEIGHTING**
Reporting/Test Report	25
Test Case Management	50
User Audience	50

Table 3 – Feature Related Evaluation Criteria

Criteria used:
1. Platforms Supported
   This criterion evaluates the platforms supported by the tool. What operating systems are supported (Linux/Unix, Mac OS, Windows, Android, iOS)? The more the better.

2. Browser Supported
   This criterion evaluates the browsers supported by the tool (IE, Chrome, Firefox, etc.). The more the better.

3. Mobile App Support
   This criterion evaluates whether the tool supports testing for native or hybrid mobile applications.

4. Installation
   This criterion evaluates the level of difficulty involved in installing the tools.

5. Scripting Language Supported
   This criterion evaluates how many scripting languages the tools can work with. The more the better.

6. Scripting Creation Time
   This criterion evaluates how fast QA engineering can create a script for any test case.

7. Object Recognition
   This criterion evaluates how users define the object. How will your test know which button it's supposed to click? Human testers can easily tell the difference between two buttons, but in automation this is a slightly more complex matter as it concerns the tool's ability to use data integration and to create data warehouses.

8. Continues Integration
   This criterion evaluates how the tool can be integrated with other tools to maintain code repository, automate the build, make the build self-testing and automate reporting and delivery.

9. Object Recognition
   This criterion evaluates how users define the object. How will your test know which button it's supposed to click? Human testers can easily tell the difference between two buttons, but in automation this is a slightly more complex matter as it concerns the tool's ability to use data integration and to create data warehouses.

10. Continues Integration
    This criterion evaluates how the tool can be integrated with other tools to maintain code repository, automate the build, make the build self-testing and automate reporting and delivery.

11. Data Store
    This criterion evaluates how the framework can load data for testing from a data store.

12. Reporting/Test Report
    This represents how well the tool shows reports after executing a test.

13. Test case Management
    Supports test management that allows testers to manage the test in-group and can executed any combination of tests.

14. User Audience
    User groups of user does the tool primarily target:
    • **Tester** possess a good understanding of test processes, but often lack a strong programming background or deep knowledge of software development methodologies.
    • **Test Developer**, possess all of a tester's skill set, plus have formal training in programming and experience working on software development projects.

5. Platform Evaluation

PLATFORM	Non-Feature Criteria					
	1	2	3	4	5	6
Ranorex	200	240	350	180	240	160
Katalon Studio	320	240	450	180	270	160
Mabl	280	240	350	140	210	140
TestCafe	360	240	350	140	210	120

Table 4 – Non-Feature Criteria

PLATFORM	Feature Criteria												TOTAL SCORE
	1	2	3	4	5	6	7	8	9	10	11	12	
Ranorex	300	400	80	80	400	400	175	280	175	175	400	400	4635
Katalon Studio	400	400	80	80	400	350	200	320	225	225	450	450	5200
Mabl	450	350	50	90	250	450	175	280	150	150	350	350	4455
TestCafe	350	450	50	80	350	400	200	360	125	175	300	350	4610

Table 5 – Feature Criteria

6. Platform Recommendation

6.1. Non-Feature Related Criteria
6.1.1. Entry Cost

SOLUTION	EVALUATION
Ranorex	$3,590 per node-locked license, $5,990 per floating license, $6696 per enterprise bundle. Perpetual license.
Katalon Studio	$759 per node-locked license/year, $1529/license/year (only applied minimum 30 licenses). Free version also available.
Mabl	No price mentioned (Need a call to their customer service) for three plans: Startup, Growth, Enterprise. Some people said it was very affordable.
TestCafe	$249.99/year TestCafe Studio, $499.99/year TestCafe Studio Pro Renewal Price: $99.99/year TestCafé Studio $199.99/year TestCafe Studio Pro

Table 6 – Entry Cost

Conclusion:
- Ranorex   : 5
- Katalon Studio: 8
- Mabl   : 7
- TestCafe   : 9

All of them are paid license, with free trials version available. Except, Katalon Studio offers free version with some features locked but still usable. Ranorex requires more entry cost than other competitors, but it uses perpetual license. TestCafe offers interesting prices as low as $249/year.

6.1.2.   License Cost per User

SOLUTION	EVALUATION
Ranorex	Just for 1 user per license and shared with 1 concurrent user.
Katalon Studio	1 user per license.
Mabl	Not provided by vendor. Cost is per workspace
TestCafe	1 user per license.

Table 7 – License Cost per User

Conclusion:
- Ranorex   : 8
- Katalon Studio: 8
- Mabl   : 8
- TestCafe   : 8

All of the tools implement 1 license per user. Mabl offers more unusual solution with cost per workspace.

6.1.3. Ability to be Commercialized

SOLUTION	EVALUATION
Ranorex	No limitations on license or feature.
Katalon Studio	No limitations on licensed product. However, the free version is usable, but some functionality has been disabled such as debugging, clean up unused object, image-based object detection, refactoring, etc.
Mabl	No limitations on license or feature.
TestCafe	No limitations on license or feature.

Table 8 – Ability to be Commercialized

Conclusion:
- Ranorex   : 7
- Katalon Studio: 9
- Mabl   : 7
- TestCafe   : 7

Limitation only applied as per user's package choice. Exception on Katalon Studio which offers free version with limited functionality but still usable for projects.

6.1.4. Documentation

SOLUTION	EVALUATION
Ranorex	Ranorex provides comprehensive documentation from fundamental, advanced, and expert. Additional topics also available such as multi-platform testing, integration, solution, best practices, etc.
Katalon Studio	Katalon Studio provides quite complete and easy to understand documentation from fundamental to advanced features.
Mabl	Mabl offers thorough documentation. Video tutorial, best practice, and Tips & Tricks also available on their website.
TestCafe	TestCafe provides step-by-step instructions from basic usage to advanced guides. For non-programmer it will be difficult to follow as the guide often displays snippet of the code.

Table 9 – Documentation

Conclusion:
- Ranorex   : 9
- Katalon Studio: 9
- Mabl   : 7
- TestCafe   : 7

Ranorex and Katalon Studio is leading this criteria. Mabl is relatively new to the competition, so the documentation is not as thorough as Ranorex or Katalon. TestCafe offers guidance that can be too technical for tester with zero exposure to programming.

6.1.5. Training Options

SOLUTION	EVALUATION
Ranorex	Online training is available, but users need to contact Sales Team to get more detail on training pricing. Support webinar, online conference, forum and workshop.
Katalon Studio	Katalon has hundreds of online tutorials in Youtube, Udemy. The web forum also available with growing community. User able to request curriculum on Katalon Training Services, where the expert will train user(s) by request.
Mabl	Quite new to the market makes Mabl has only few tutorials out there. User will likely rely on technical documentation and customer support.
TestCafe	TestCafe has several online trainings via Youtube. Paid training available via Udemy with 8 hours course. The paid training covers from basic to advanced usage, even introduction to HTML + Javascript for tester.

Table 10 – Training Options

Conclusion:
- Ranorex   : 8
- Katalon Studio: 9
- Mabl   : 7
- TestCafe   : 7

Ranorex and Katalon been a while in the automation testing tools recommendation, therefore the training options are varies. Katalon offers more with Katalon Training Service, where the expert will directly train new users. Mabl and TestCafe relatively new to the users, so the training options are not as much as the other competitors.

6.1.6. Technical Support

SOLUTION	EVALUATION
Ranorex	Technical support is available in online documentation but does not provide call services. The cost for technical support is part of product pricing.
Katalon Studio	Katalon with KMS Technology provide flexible support options via email and call, technical support will be part of paid services of KMS technology. Free technical support will be limited, free support comes from Katalon open community.
Mabl	Limited on boarding support on Startup and Growth package. Priority support and professional services also available only for Enterprise package. They also have official Slack channel.
TestCafe	The cheapest pricing plan offers community support on StackOverflow, while the highest pricing plan will unlock professional technical support.

Table 11 – Technical Support

Conclusion:
- Ranorex   : 8
- Katalon Studio: 8
- Mabl   : 7
- TestCafe   : 6

Katalon provides the widest option for supports. So does Ranorex. Mabl and TestCafe offer limited support depends on the package. Probably the least supportive is TestCafe since they only offers community support on StackOverflow for the cheapest pricing plan (based on their website info).

6.2. Feature Related Criteria

6.2.1. Platform Supported

SOLUTION	EVALUATION
Ranorex	Ranorex only support Windows at the moment.
Katalon Studio	Available on Windows, Mac, and Linux. Installing is not required.
Mabl	Mabl is a SaaS, therefore it supports majority platform.
TestCafe	Available on Windows, Mac, and Linux.

Table 12 – Platform Supported

Conclusion:
- Ranorex   : 6
- Katalon Studio: 8
- Mabl   : 9
- TestCafe   : 7

Even Mabl is new to the market, the SaaS concept is great since it only need browser to operate no matter the OS is. On the contrary, Ranorex and TestCafe are conventional application that requires installation. Katalon is available on zip files, only need to extract the files before using.

6.2.2. Browser Supported

SOLUTION	EVALUATION
Ranorex	Able to test applications on Chrome, Firefox, Edge Legacy, Internet Explorer, Edge Chromium, Safari.
Katalon Studio	Able to test applications Chrome, Firefox, IE11, Safari, Edge Legacy, and Edge Chromium. As per Dec 2019, Katalon supports TestingBot as a plugin which extends to various test environment and browsers. TestingBot pricing plan is not included.
Mabl	Only support Chrome, Firefox, IE, Safari.
TestCafe	TestCafe has wide arrays of browsers supported even the least popular such as Opera, Google Chrome Canary, Microsoft Edge legacy.

Table 13 – Browser Supported

Conclusion:
- Ranorex   : 8
- Katalon Studio: 8

- Mabl : 7
- TestCafe : 9

TestCafe provides wide arrays of browser, even Chrome Canary or Opera. Mabl supports least browsers with only four options available. Katalon has enhanced power with plugin like TestingBot which extends the test up to (claimed) 2,000 test environment but with a different price plan.

6.2.3. Mobile App Support

SOLUTION	EVALUATION
Ranorex	Supports Android versions (min. 4.4 "Kitkat"), iOS (min. 10.0.1), Android Wear. Integration with cloud-based mobile testing platform such as Sauce Labs is possible.
Katalon Studio	Supports Android (min. v6.x.x), iOS (min 9). Integration with cloud-based mobile testing platform such as Sauce Labs or Kobiton is possible.
Mabl	N/A Mabl only supports website app. Native mobile app is not supported currently.
TestCafe	N/A TestCafe only supports website app. Native mobile app is not supported currently.

Table 14 – Mobile App Support

Conclusion:
- Ranorex : 8
- Katalon Studio: 8
- Mabl : 5
- TestCafe : 5

Both Mabl and TestCafe are not supporting native mobile app. Ranorex and Katalon both supports mobile testing from iOS to Android. But Ranorex listed Android Wear as the platform which they support.

6.2.4. Installation

SOLUTION	EVALUATION
Ranorex	Requires simple installation and prerequisite .NET Framework. Available on the package.
Katalon Studio	No need to install. Extract the zip files and ready to use. Might need additional software such as Java and Appium.
Mabl	No need to install as Mabl act as SaaS. Only need to access the service via browsers.
TestCafe	Requires simple installation.

Table 15 – Installation

Conclusion:
- Ranorex : 8
- Katalon Studio: 8
- Mabl : 9
- TestCafe : 8

Ranorex, Katalon, and TestCafe are relatively easy to install. Mabl as cloud-service is the easiest, because no installation or extraction needed.

6.2.5. Supported Scripting Language

SOLUTION	EVALUATION
Ranorex	Supported by C# and VB.NET.
Katalon Studio	Supported by JAVA and Groovy. Commonly Selenium command (JAVA) also supported.
Mabl	No scripting language supported as it's almost Record & Playback pure.
TestCafe	Supported by JS or TypeScript.

Table 16 – Supporting Scripting Language

Conclusion:
- Ranorex   : 8
- Katalon Studio: 8
- Mabl   : 5
- TestCafe   : 7

Ranorex, Katalon, and TestCafe supported the most popular scripting languages, ranged from .NET to JavaScript. Mabl is not supporting any language, because user only need to customize the test after recording the steps.

6.2.6. Scripting Creation Time

SOLUTION	EVALUATION
Ranorex	Record & Playback feature available. Conventional scripting also available.
Katalon Studio	Record & Playback feature available, but some features need manual setup such as assertion and "wait" command. Conventional scripting also available.
Mabl	Intuitive and easy to understand record & playback tools. Various action or assertion can be added real-time.
TestCafe	Record & Playback feature available with rich features and has nice UI. Conventional scripting also available.

Table 17 – Scripting Creation Time

Conclusion:
- Ranorex   : 8
- Katalon Studio: 7
- Mabl   : 9
- TestCafe   : 8

Record & Playback features are available for all of the tools. Katalon has slightly less intuitive UI since it needs manual setup for certain command. Mabl is the most easy-to-understand with clean and sleek UI.

6.2.7. Object Recognition

SOLUTION	EVALUATION
Ranorex	The UI element locating technique called RanorexPath is their own invention. Might be difficult if user wants to use commonly used identifier. Supports auto-heal functionality.
Katalon Studio	Equipped with wide-arrays of technique, from css selector, xpath, attribute, and image based recognition. The latter option useful if the test object doesn't have unique selectors (need to be proven). Difficult when it comes to framework-specific such as Angular. Supports auto-heal functionality.
Mabl	Automatically set the target element details based on ID, input type, name, xpath, etc. Supports auto-heal functionality.
TestCafe	Supports many framework-specific selectors such as React, Angular, AngularJS, Aurelia.

Table 18 – Object Recognition

Conclusion:
- Ranorex : 7
- Katalon Studio: 8
- Mabl : 7
- TestCafe : 8

Ranorex use their own technique called RanorexPath. Katalon provides more traditional identifier with CSS Selector, xPath, attributes, even image-based recognition. TestCafe explicitly mentioned that they supports many framework-specific selectors such as Angular, AngularJS, and Aurelia. Mabl is the simplest, because it automatically detects when user record the actions.

6.2.8. Continuous Integration

SOLUTION	EVALUATION
Ranorex	Supports Bamboo, Jenkins, and TeamCity.
Katalon Studio	Native built-in integration with Jenkins, Azure DevOps, CircleCI, Bamboo, Travis CI, TeamCity.
Mabl	Supports Bamboo, Jenkins, Microsoft Azure DevOps integration. Most other CI solution also supported through curl command builder (advanced).
TestCafe	Support wide arrays of CI tools such as AppVeyor, Azure DevOps, Bitbucket Pipelines CI, CircleCI, GitHub Actions, GitLab, Jenkins, TeamCity, Travis, Travis + Sauce Labs.

Table 19 – Continuous Integration

Conclusion:
- Ranorex : 7

- Katalon Studio: 8
- Mabl   : 7
- TestCafe   : 9

Based on the info in their websites, TestCafe supports many CI, from least to the most popular one. Other tools support varies commonly used CI.

6.2.9. Data Store

SOLUTION	EVALUATION
Ranorex	Ranorex is able to read from DB and csv, other type files such as excel.
Katalon Studio	Katalon is able to read from external DB, csv, and other type files such as excel. Also, Katalon has internal DB feature.
Mabl	Mabl uses DataTable features, which user can choose between csv and create table manually within the tool.
TestCafe	Support json file to store and retrieve data.

Table 20 – Data Store

Conclusion:
- Ranorex   : 7
- Katalon Studio: 9
- Mabl   : 6
- TestCafe   : 5

Katalon is leading the pack, due to its ability to store data via external DB, csv, or internal DB. Excel read/write also supported with Apache POI library. Similar to Katalon, Mabl also possess internal DB called DataTable. TestCafe is the least flexible, because it only supports .json.

6.2.10. Reporting/Test Reporting

SOLUTION	EVALUATION
Ranorex	Test result are thorough. Starting from testing status, environment, execution time, total error(s) total warning(s), within the screenshot each step and each action and also graph. Report can be exported to PDF.
Katalon Studio	Test result are thorough. Katalon able to show testing status, environment (OS, Host name, browser version, start time, end time, duration), test case name and description. Screenshot(s) and video also available but optional (tester need to specify). Report can be sent by email. Support csv, HTML, pdf.
Mabl	Report contains duration, browser version, start time, and environment. Mabl automatically provides screenshot and log for each step. Supports csv and PDF.
TestCafe	Report contains duration, browser version, start time, end time, OS, and screenshots. Support export file (spec, list, minimal, xUnit, JSON).

Table 21 – Reporting/Test Reporting

Conclusion:
- Ranorex   : 7
- Katalon Studio: 9
- Mabl   : 6
- TestCafe   : 7

All tools provide good details of testing report. Katalon makes report easier with email integration and export to popular formats such as csv, HTML and PDF.

6.2.11. Test Case Management

SOLUTION	EVALUATION
Ranorex	Ranorex has specific folders for Test Case and Test Suites. Handles parameterized and configured data well in managing test case. Able to use object repository but quite complex.
Katalon Studio	Katalon has specified folders for Test Cases and Test Suites. If those doesn't enough, there's Test Suite Collection feature to run a set of Test Suite. Folder feature is to classify the test case and is good in managing test cases. Object management also has folder feature to easier manage the objects we use.
Mabl	Easier to understand as test case displayed as list, no folder feature. Suports "Plans" or test suite, where user can define when or how Mabl will run the test cases.
TestCafe	TestCafe uses the term "Fixture" to name test categories. Tester will need more time to understand the structure than the competitors.

<div align="center">Table 22 – Test Case Management</div>

Conclusion:
- Ranorex   : 8
- Katalon Studio: 9
- Mabl   : 7
- TestCafe   : 6

Both Ranorex and Katalon offers similar approach. They used traditional folder structures which easier to understand and managed the test case. In contrast, Mabl uses "list" to manage tests within their tool. TestCafe uses Fixture and it makes tester need more time to understand.

6.2.12. User Audience

SOLUTION	EVALUATION
Ranorex	Most group user can be Test and Test Developer. Classified as moderate in terms of learning curve.
Katalon Studio	Most group user can be Test and Test Developer. Developers can take advantages of Katalon because it acts as common programming IDE. Tester might need exposure to basic programming.
Mabl	Most group user can be Test and Test Developer. Compared with other competitors, Mabl is the least technical tools.

TestCafe	Most group user can be Test and Test Developer. Tester might have steep learning curve since it only support Javascript and TypeScript.

Conclusion:
- Ranorex   : 8
- Katalon Studio: 9
- Mabl   : 7
- TestCafe   : 7

Mabl is the most user friendly for the least technical user. Katalon is taking more conventional approach with their IDE. Easy to understand for user that possess programming knowledge. TestCafe only support JavaScript and TypeScript which requires steep learning curve for non-technical user.

7. Conclusion

Based on Mitrais weighting criteria, first position is Katalon Studio, Ranorex is the second, TestCafe is in 3rd place, and the last position goes to Mabl. Special notes for Mabl, even though Mabl took the least points, it has great potential in the future with machine learning, SaaS concept, and near codeless experience. Also, it's the easiest to master. Mabl's launched in 2017, so it needed more time to prove their capabilities againts many framework and project scale.

Similar to Mabl, TestCafe also new to the market. It needs JS background to use. Consequently, TestCafe will have a steep learning curve. It claimed to be compatible for numerous different framework (Angular, Aurelia, React, etc.,) but need to be proven as the review for this tool is very limited.

Ranorex quite solid. Their developer claimed Ranorex able to test Windows, .NET, Java, web and mobile application, SAP, Microsoft Dynamics, and Sitecore. Based on reviews, their presale and postsale support are good. It has a rather high learning curve though.

The team recommended Katalon Studio for general purpose (Desktop, Web, Mobile, and API). Katalon Studio is built on open-source frameworks like Selenium and Appium, and is out-of-the-box ready to use with multiple integrations such as qTest, JIRA, GIT, etc. The support and community are mature enough for resource-digging. Also, conventional IDE allow users from any background to jump in automation testing effortlessly with growing plugins supported and predefined built-in keywords.

All tools provide free trial though, therefore it can be used to assess against development framework that company have implemented in their project.

Please note that this is the result from the Mitrais criteria-weighting schema, which correlates with Mitrais current needs. Other clients may use this report with different weightings to meet their unique requirements and come to a different conclusion.

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