CAPCO

CREATING A REPEATABLE METHODOLOGY FOR THE AUTOMATION OF CONTROLS TESTING

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INTRODUCTION

Financial institutions maintain a variety of operational, financial, regulatory and compliance controls that require periodic testing to ensure their design and operational effectiveness. Controls testing is typically a manual, labor intensive process, and organizations historically have not considered automating controls testing due to the fragmented nature of the inputs required for controls testing, and the lack of a systemic approach to assess the potential automation of control tests.

In order to utilize available resources most efficiently and to spend less time and effort on controls testing, an organization must be able to quickly evaluate a large group of controls and determine their readiness for automation – allowing it to find 'quick wins' that are ready for automation now, while also identifying common barriers to automation that hinder wider implementation of automated controls tests.

To enable the automation of control-centric functions, Capco has developed a repeatable methodology – or 'playbook' – to help our clients determine whether a population of controls tests are suitable for automation; and how to evaluate automation readiness via an agile, flexible, and adaptable approach that meets the needs of any financial institution.

WHY CONTROLS TESTING AUTOMATION POSES A CHALLENGE

While conducting annual regulatory reporting controls testing, testing teams commonly experience lengthy review cycles, siloed controls testing approaches, inconsistent controls documentation, poor data quality, and data sourcing issues. These factors can lead to extended testing cycle periods of as long as 180 days, impeding the efficiency of testing teams and their ability to meet their stated objectives and deliver on mandates to ensure the accuracy of reported transactions.

Across different parts of an organization there is often no unified methodology for testing controls, despite opportunities existing for testing teams to leverage shared resources, common datasets and a consistent mode of execution. Instead, teams operate independently, using different testing approaches which result in varying degrees of execution consistency.

For example, some test scripts are written with segmented, defined procedures for test execution; others implicitly rely on the tester's institutional knowledge to perform the tests in spite of a lack of detail in the test execution instructions. That leaves data sources, procedures, and successful outcomes undefined and subject to the interpretation by a tester who is not equally familiar with existing operational processes.

Automating processes for testing requires teams to rewrite their existing testing scripts to include more detailed procedures. For an automation process, such as a bot, to be able to perform a test, the testing teams must include every detail down to the smallest logical or actionable step.

Another common issue is data lineage. Data at large organizations is often siloed and stored in a distributed repositories, with business teams relying on designated IT support to extract data and reports from obfuscated data sources. Testing teams may be forced to request data without proper knowledge of how relevant data repositories are tied to the transactional mapping. This introduces a 'black box' aspect to the data gathering process.

In other cases, in the absence of clear guidance, testers will be devising ad hoc approaches for procuring data that lack consistency across teams. Even when the data lineage is clear, testing teams may still encounter a bottleneck when requesting data due to a lack of access to key data systems.

Improving the quality and availability of the data used by the testing team is an absolute must on the path to automation implementation. The key factors contributing to costly and prolonged testing engagements can be summarized into four themes identified in the table below:

Existing Issue/Risk Themes	**Expected Benefits of Automation Implementation**
• Cross-team inconsistencies	• Establish standards for level of detail in testing procedures applicable to all team
• Drawn out review process	• Streamlined review process given standardization of procedures/execution
• Siloed testing approaches	• Standard approach to help identify overlap in testing
• Team-specific data sources/data requests	• Unified/aggregated data sources leveraged across all teams

INTRODUCING THE TEST ASSESSMENT FRAMEWORK

Capco's repeatable assessment framework centered around an automation assessment that allows testing teams to rapidly evaluate the automation readiness of their control tests.

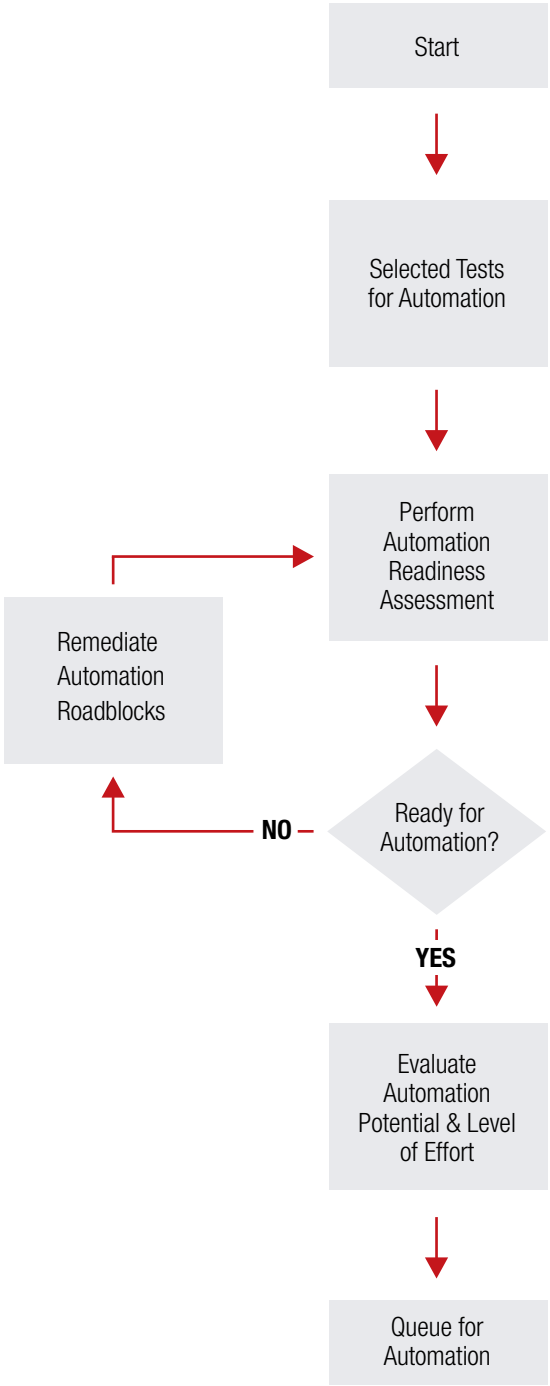
The assessment identifies the key criteria required of the written testing procedures and the data involved. The process begins with testers selecting a batch of tests to be reviewed. They then assess each test, identifying any automation roadblocks. Tests which are deemed ready for automation move forward to confirm their automation potential and the level of effort required for implementation. Tests that present significant roadblocks move into a remediation queue, to be reassessed later.

The automation potential and level of effort for automation implementation are then used to determine the priority at which tests should be automated, with the goal of automating easily and highly automatable tests first.

PERFORM AUTOMATION READINESS ASSESSMENT

The automation readiness assessment is intended to enable a quick decision on whether a control test possesses all the necessary attributes for automation. The approach enables a consistent and repeatable assessment to be performed on the basis of available control test information, resulting in a 'queue' of automatable tests.

Test automation readiness is determined by two sets of distinct questions derived from testing script automation attributes and data automation attributes.



The testing script automation attribute questions focus on the availability and quality of information contained within the testing scripts themselves. The data automation attribute questions focused solely on the availability, quality, and structure of data used for testing. The overall scores from these two assessments are then used to determine the automation readiness of the test in question.

The automation readiness assessment itself is based on six criteria: three relating to the structure and level of detail provided in the testing script, and three relating to the data used in the test. The criteria are as follows:

- Logical Structure: the test is structured in a stepwise manner that provides clear direction on how the test step is executed.
- Success/Failure Outcome: the conclusion of test step execution is based on well-defined pass/fail criteria.
- Actionable Performance: the test steps clearly define use of the documentation and data as either inputs into test, the output from test execution or subject of the test step execution.
- Key Data Identification: the data sources which are utilized in the test are clearly identified along with the key data fields and values contained within those data sources.
- Data Lineage: the ability to map the key data fields/values used in testing to their data sources, which can then be mapped to their respective source systems (i.e. 'golden' data sources).
- Data Readiness: The ability to use data source 'as is', meaning the data does not need to be reformatted, combined, or transformed in any way prior to execution of the test.

In order to measure the collective impact of these criteria, each is assigned a numeric score based on whether it meets the desired standard fully, partially, or not at all.

This method of scoring each controls test allows for a quick determination of whether the test as a whole is ready for automation; provides a quantitative way of comparing tests to one another and so prioritize those that are the strongest candidates for automation; and brings into focus aspects that need to be improved, including broader issues requiring improvements that would affect multiple tests.

EVALUATE AUTOMATION POTENTIAL & LEVEL OF EFFORT

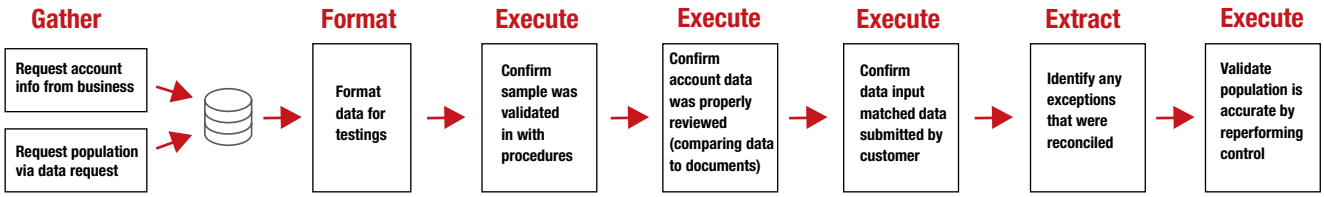
Following the automation readiness assessment, tests that are deemed to be ready for automation are analyzed for automation potential. This involves three crucial steps:

- Breaking down the test into distinct testing activities
- Calculating the automation rate of the test
- Determining the level of effort for implementation.

5.1. Test Procedure Breakdown

This step identifies each distinct action or decision taken in the execution of the test, such that each activity can be assigned an automation rate. This involves reviewing the testing procedures and creating an end-to-end process flow, which captures all activities performed as part of the test. This includes all data gathering and preparation, all activities written within testing procedures, and any other activities that are inferred but not explicitly stated.

Below is an example of such a process flow:



Gather	Intended to obtain the data that is required for the test. These activities should include all instances of accessing data systems, navigation through applications, or requests made to the business for information.
Format	Any activities that require to combining records from multiple reports, reformat extracted data sources, or modify the structure of the data in any way.
Extract	Capturing key data attributes from a source (system, document, website). This activity is distinct from 'Gather' in that it strictly involves identifying and noting the key data within the data source.
Categorize	Assigning a value or class to previously extracted data based on pre-determined values (e.g. categorizing the business purpose of a loan, classifying the appropriate rationale for why training is incomplete).
Execute	Comparing, verifying, or performing a calculation on data that was previously extracted. This activity is distinct from 'Extract' in that it pertains to what action is performed on the key data which leading to alignment with the success criteria.

5.2. Automation Rate Calculation

The expected automation rate of a test estimates the proportion of the test that can be automated. By calculating the automation rate, an assessment can be made to determine how automation implementation should be prioritized. It is used in conjunction with the level of effort for implementation (covered below) to assess the prioritization of test automation – such that tests with a high automation rate and low effort of implementation will be considered as prime candidates for automation prioritization.

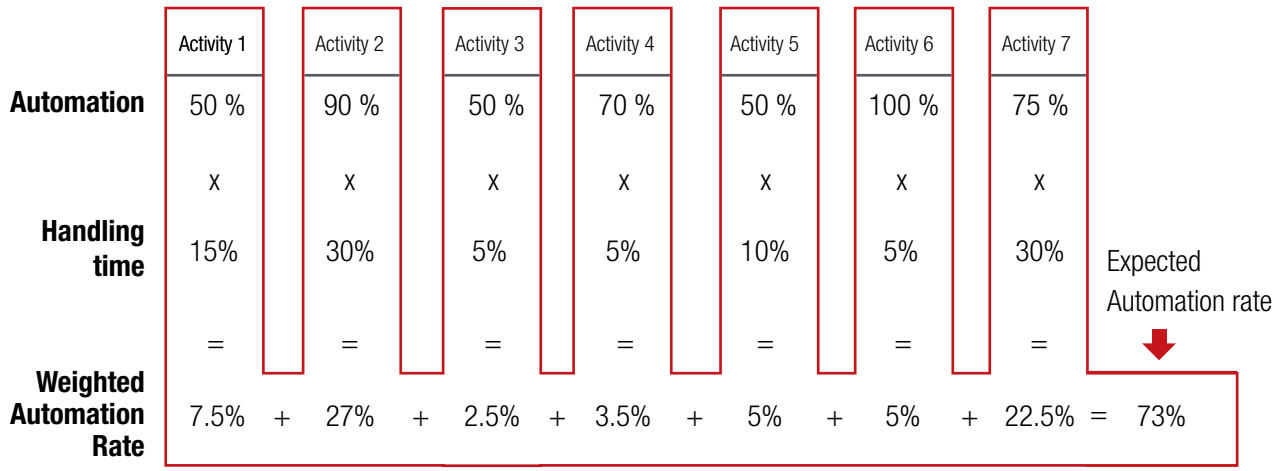
The calculation of the expected automation rate was based on the evaluation of two criteria: an estimate of what percentage of each task can be automated; and the handling time for each activity.

To assist the testers in determining the automation rate of activities, Capco has created a framework in the form of a decision tree.

This asks the user to confirm the form of the data (text, image, or voice), the format of the data (structured, semi-structured, or unstructured), the source of the data (external web application, document repository, mainframe, etc.) alongside other questions that guide the user to an estimated automation percentage.

The second criteria is activity handling time – the ratio of time it takes to perform a test task relative to the overall time required to complete the test. For example, a 15-minute activity was equal to 25% handling time for a test that was estimated to take 1 hour to complete.

The activity handling time was used to weight the automation rates of each activity for a given test and was calculated as the sum of products of activity automation rate and activity handling time providing an estimate of the percentage of the test that could be automated, as illustrated in the diagram below:



5.3. Level of Effort

The final step in evaluating the automation potential of a test is the assessment of the level of effort (LOE) required to implement automation. The LOE is determined based on criteria such as:

- number of data sources
- variation of data
- process complexity
- external dependencies on data.

These criteria can and should be adjusted to include additional factors and variables unique to a particular organization which may affect the LOE. Consideration should be given to reevaluating the weighted criteria after a pilot batch of test assessments and verifying they are still applicable to the test assessments.

Data sources are defined as the databases, files, or systems required to access or obtain the data required for testing. The more data sources involved, the more effort is required to establish connections between an automation and the database or system.

The variation of data refers to the structure of the testing data as it comes from the source. Testing artifacts that are not consistent in format or structure (i.e. forms in which a data field is not always located in the same position in the document) will require more effort in creating procedures for identifying the key data attributes.

The process complexity ties to whether the testing procedures are clearly defined, especially with various exception scenarios, lengthy decision trees, or areas requiring subjective judgement. External data dependency aims to assess how much the testing team relies on external teams for sourcing their testing data, whether it be working with a specialized data team or requesting data directly from the line of business.

CONCLUSION

Capco's framework for assessing the automation readiness of controls test enables the rapid triaging of a significant volume of control tests, quickly identifying those tests with significant enough automation potential and impact to warrant their prioritization for automation, while also flagging common issues that may need to be resolved to progress other tests to the required level.

In developing and applying this framework, Capco observed three major drivers of success in automating controls testing:

1. The automation assessment should be simple and quick for the testing teams to perform. The objective is to identify those controls that possess all of the required criteria and can be readily automated for high impact, while other controls currently lacking all or some of the automation criteria will be addressed later.

2. It is crucial to build strategic partnership with other organizational teams that either own informational input into control operations or maintain custody over the data repositories. While control testing teams are familiar with the controls and their own testing procedures, they may be unfamiliar with complicated data sourcing requirements. Strategic partnerships enable testing teams to distinguish automatable from non-automatable processes, identify what fit-for-purpose data looks like, and estimate the level of effort required in RPA implementation.

3. Strategic commitment to the automation initiative rather than treating it as tactical reactive initiative. Long-term, all-encompassing planning allows testing teams to leverage automation assessment to influence how future testing scripts are written. Automation implementation requires meticulously detailed procedures and documentation, such that no step is relies on tester subjectivity. This improves consistency and clarity across testing teams, and reliance on this documentation exercise sets the stage in advance for future automation initiatives that can benefit from work already done.

The journey of automation implementation does not have to be a 'one size fits all' exercise. Inevitably, differences in how an organization is set up, levels of technical acumen and data literacy, and the availability of the documented process will impact the pace of the automation assessments – or may require a different set of automation criteria being adopted for assessment purposes.

These difficulties and contingencies are not insurmountable, so long as organizations adopt an agile, forward-looking approach and engage in automation initiatives with strategic partners, recognizing that this must be a holistic digital transformation initiative rather than a one-off exercise.

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ABOUT CAPCO

Capco, a Wipro company, is a global technology and management consultancy focused in the financial services industry. Capco operates at the intersection of business and technology by combining innovative thinking with unrivalled industry knowledge to fast-track digital initiatives for banking and payments, capital markets, wealth and asset management, insurance, and the energy sector. Capco's cutting-edge ingenuity is brought to life through its award-winning Be Yourself At Work culture and diverse talent.

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