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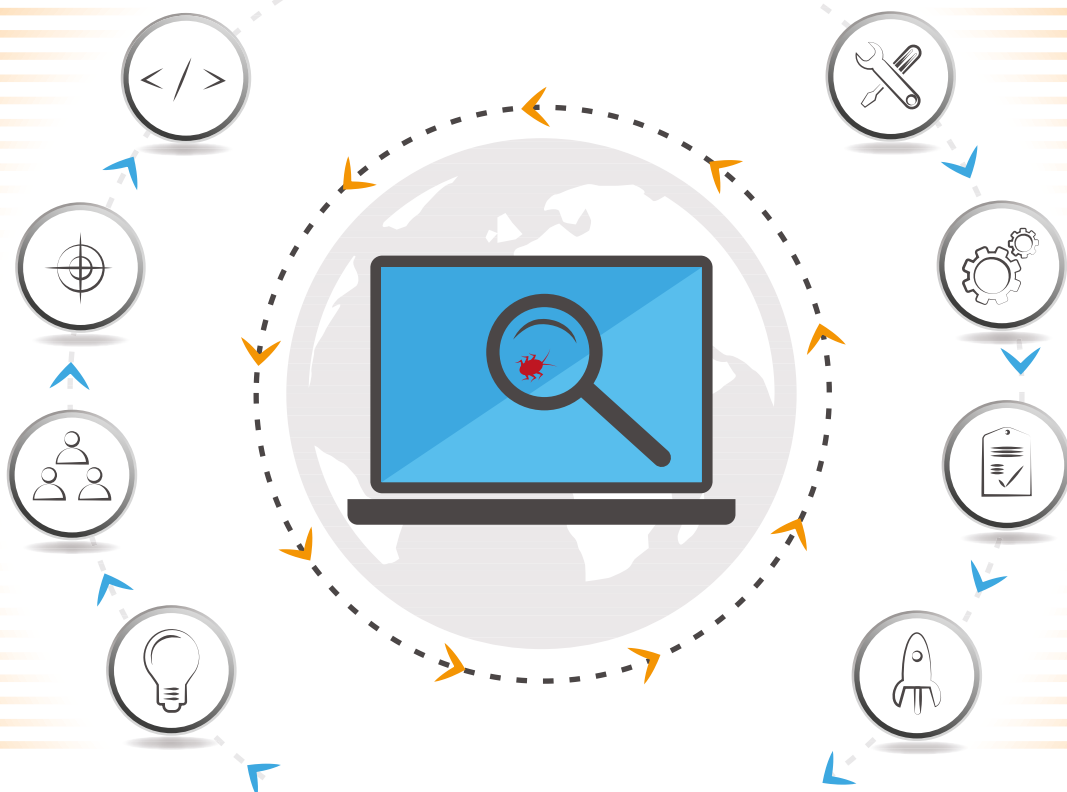# AUTOMATED INTELLIGENT REGRESSION TESTING (AIRT)

WHY IMPLEMENT AIRT?

Whether you like it or not, testing and quality assurance are an essential part of the software development life cycle (SDLC). Without them, software programmes would not be what they are today – useful, time-saving applications that help businesses carry out day-to-day processes in an efficient, secure and methodical manner. Testing and quality assurance should not only be carried out during the software development process, but also whenever a change is made to the functionality of existing software. This is known as regression testing and is the mechanism by which software is validated to ensure existing product features are still in working order after code changes are applied.

As the function of a software application grows with each succeeding release, so do the regression testing needs. Managing the growing testing scope, while keeping to shortened delivery times is difficult and needs special consideration to effectively manage the overall risks.
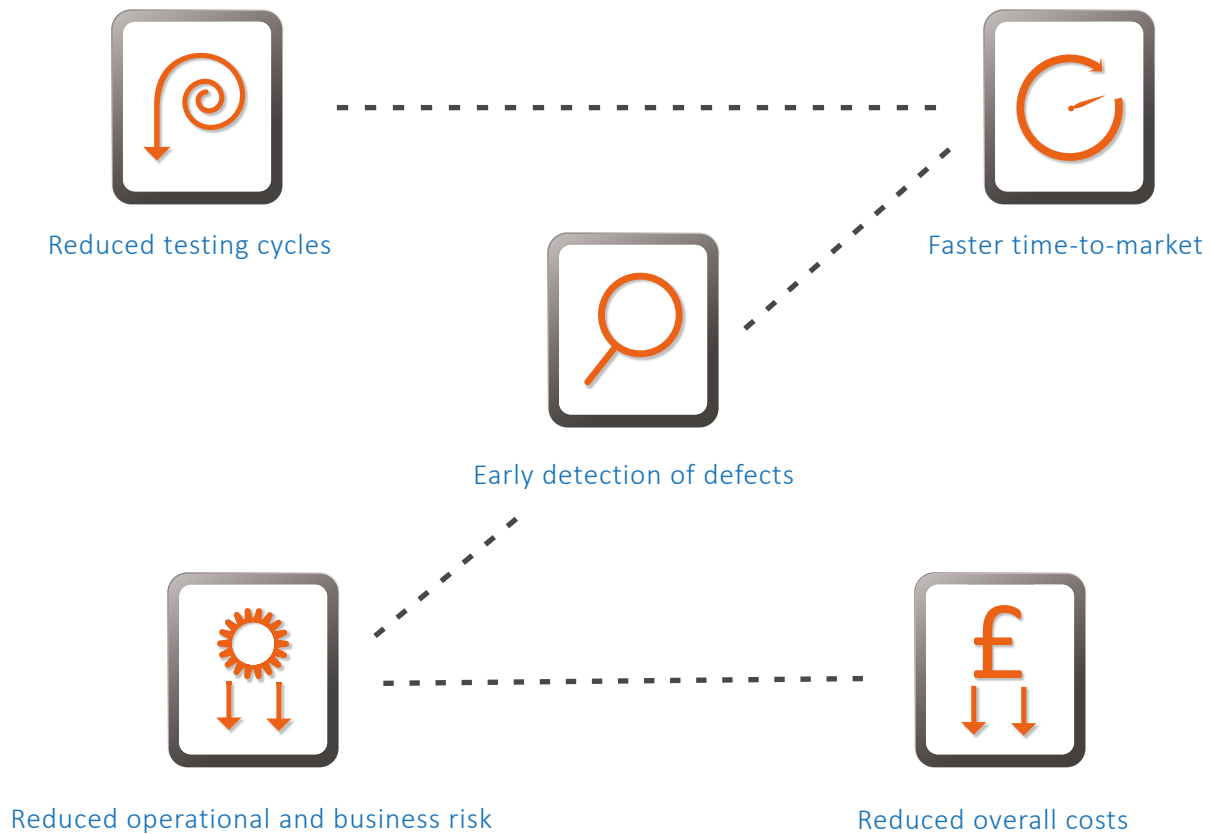
While the value of regression testing is widely understood within technology departments, other parts of the business are known to view regression testing as unnecessary, often questioning the need for the practice altogether. Executives want to see the product move forward and often view regression testing as a redundant exercise, slowing down productivity and increasing cost, thus making regression testing a hard-sell. In this paper, we look at how automating regression testing can help businesses save significant amounts of time and money and improve the overall quality of their software offering.

AUTOMATING REGRESSION TESTING

While the benefits of automating regression testing, such as:

Reduced testing cycles

Early detection of defects

Faster time-to-market

Reduced operational and business risk

Reduced overall costs

are widely acknowledged, there is less agreement on how it should be implemented. Automation carries its own challenges and risks, as well as additional set-up costs. Developing an optimal automation strategy to meet stakeholder needs and expectations has historically been difficult to define, especially because of the varied sets of software, tools and delivery methodologies utilised in the industry.

A well designed automated test execution strategy should consider the value-add and time-to-market aspects in order to justify the spend relative to the organisational objectives. However, opinions differ on a wide range of aspects, including how to define an optimal regression pack; which tools to use for automation and integration; and the length and frequency of the execution cycles, maintenance, and support.

THE BENEFITS OF AUTOMATING REGRESSION TESTING

The industry standard approaches to automated regression testing are:

• full regression test cycles, which execute the entire regression suite for each build release; and
• partial regression test cycles, which blindly select and execute a sub-set of the regression suite for each build release.
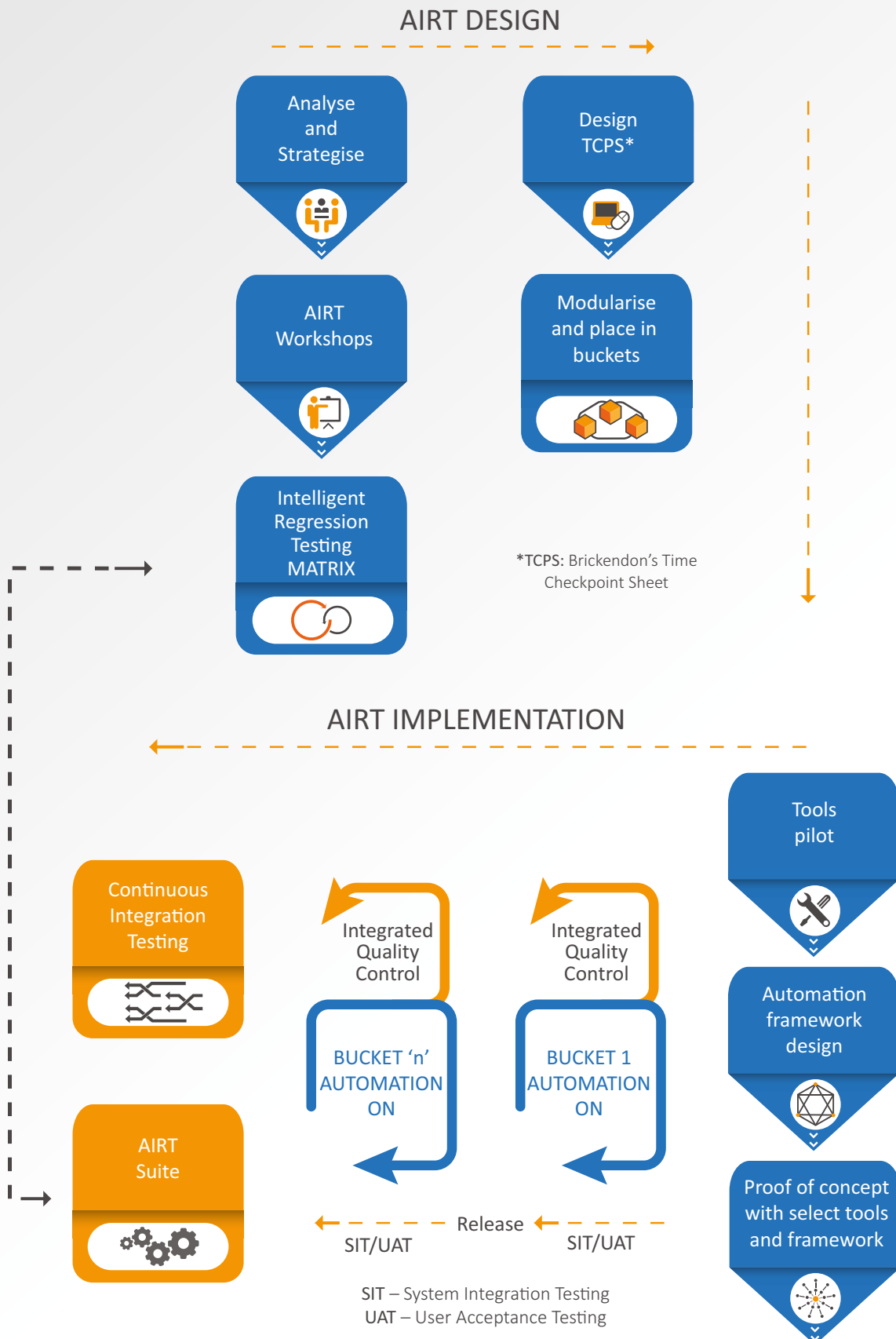
Full Regression Test Cycle	⟷	Partial Regression Test Cycle
Full functionality	Coverage	Limited functionality
Suitable for Waterfall methodology, with long release cycles, and bound production releases	Suitability	Suitable for Agile and DevOps methodologies, with adaptable, incremental production releases
Less probability of defects slipping into production	Advantages	Less time consuming
Time consuming and not cost effective	Disadvantages	Higher probability of defects slipping into production

Although it is desirable to run a full set of automated regression scripts for each release, this is typically not possible due to high costs, lack of resources, and time constraints. Executing the entire automated regression suite is often deemed wasteful because it results in testing code and functionality that are seemingly unaffected, and prolongs the QA test execution cycle without showing any additional value.

Partial regression cycles can be a viable solution in lieu of executing full automated regression test cycles, but they too carry significant risk because the process of selecting the sub-set of scripts for partial execution is blind, speculative, and open to interpretation. Partial regression cycles can feel ad-hoc and chaotic because it is not clear whether the regression test coverage sufficiently tests the impacted code changes and system functionality.

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THE MEANS TO DECIDE WHAT TO TEST

Automated Intelligent Regression Testing (AIRT) ties together two concepts: automated regression testing and the automated selection of targeted regression scripts based on the code changes that were implemented - this is the intelligence.

AIRT DESIGN

Analyse and Strategise

Design TCPS*

AIRT Workshops

Modularise and place in buckets

Intelligent Regression Testing MATRIX

*TCPS: Brickendon's Time Checkpoint Sheet

AIRT IMPLEMENTATION

Tools pilot

Continuous Integration Testing

Integrated Quality Control

Integrated Quality Control

Automation framework design

BUCKET 'n' AUTOMATION ON

BUCKET 1 AUTOMATION ON

AIRT Suite

Proof of concept with select tools and framework

Release

SIT/UAT

SIT/UAT

SIT – System Integration Testing
UAT – User Acceptance Testing

AIRT DELIVERS

Accelerated time-to-market

Reduced cost

Reduced risk

Increased capacity

BRICKENDON'S
AIRT FRAMEWORK

Accelerated time-to-market • Reduced Risk • Reduced Cost • Increased Capacity

Automatically identifies and runs the precise set of cases that must be executed to satisfy the test scope of any given code release, saving time and removing risk

Provides targeted testing by addressing the value-add and time-to-market considerations with a single solution due to the Continuous Integration (CI) framework which identifies the test cases that must be executed based on the code implemented and eliminates unnecessary test executions
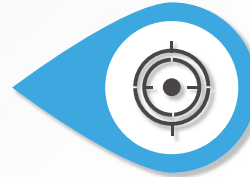
Produces short, safe, iterative releases, enabling defects to be found and rectified much earlier in the SDLC, therefore reducing costs

Shifts the QA team's responsibility to testing new functionality, rather than running endless regression cycles, or even the immensely time-consuming final regression test cycle

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Brickendon's AIRT framework is a holistic approach, combining the technical and functional components of the SDLC. It is:

INNOVATIVE

Uses an Intelligent Regression Testing Matrix which is developed by mapping technical components (stored procedures/ tables etc.) with business components and functionalities. Once the matrix is defined, all other AIRT steps are automated.

AUTOMATED

Uses a mechanism to monitor any changes to the development code repository and trigger an inspection of the matrix for the respective functionality mappings. These are then automatically flagged, bucketed for execution, and run, producing a report for all stakeholders.
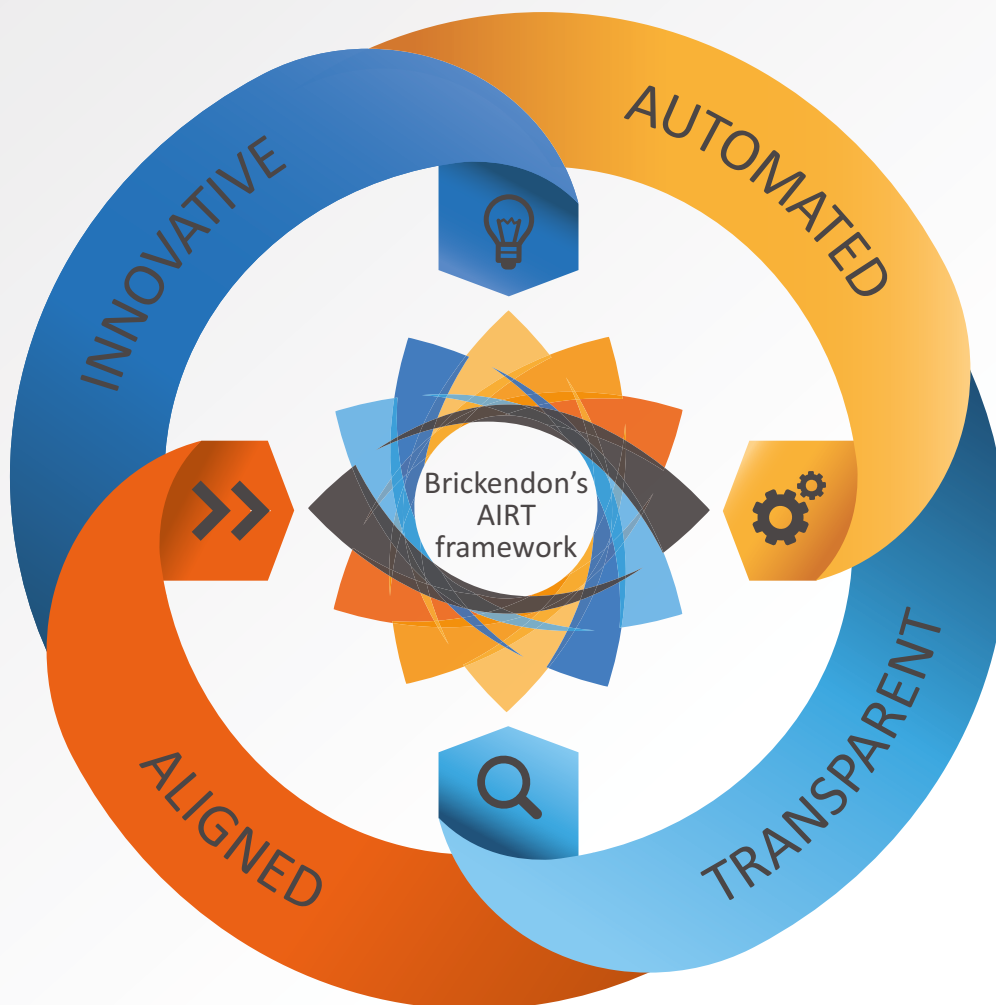
ALIGNED

Empowers all stakeholders to successfully deliver the organisation's objectives by providing the information needed to make decisions or change priorities in a timely manner. Financial projections and customer expectations can be set based on actual test results rather than on theoretical assessments.

TRANSPARENT

Helps bring together the strategic plans from the business and IT departments, enabling both to ultimately realise the benefits of 'shorter, cheaper, faster'. It positions the business to commission more products that will grow the organisational footprint and ultimately lead to increased revenue.

BRICKENDON BENEFITS

AUTOMATED REGRESSION DELIVERED IN AN ITERATIVE WAY
- Client can realise the benefits within the first six weeks
- The automation pack is robust and easily maintainable

INTELLIGENT REGRESSION TESTING
- Right level of regression for each change- saving a lot of time and effort

SHORTER TIME-TO-MARKET
- Reduced regression time. (Regression testing efforts reduced by 95% in previous implementation)
- Smaller, safer and faster releases

REDUCED REPUTATIONAL AND BUSINESS RISK
- Deliver reliable releases exceeding customer expectation
- Increasing stakeholder experience and business footprint

HIGH QUALITY, LOW COST
- Lower maintenance costs due to AIRT, Open Source tools and use of Brickendon's bespoke approach
- Reduced cost of fixing defects- defects are found earlier in the lifecycle
- Improved code quality into production
- Continuous Integration Testing

And finally...

While it is easy to settle for a short-term fix to testing software changes, it is important not to overlook the benefits of implementing an effective and efficient strategy to ensure any defects are detected and rectified promptly and accurately. AIRT is integrated within the development code so that each check-in by the developer is automatically verified, and any new defects are detected and fixed early within the development phase. Put simply, AIRT acts as a gatekeeper that helps keep tabs on code quality, delivery times and overall costs.

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ABOUT US

Brickendon is an award-winning global transformational management and technology consultancy specialising in innovative solutions that save our clients time and money. Our aim is to deliver transformational change across our three key offerings of Advise, Change and Do, through our five practice areas: Data, Quality & Test, Risk & Regulation, Strategy and Digital. This helps ensure our clients see positive results in weeks, not months or years.

Employing domain experts with over 10 years' respective experience in specialist sectors, Brickendon is built on providing lasting, cutting-edge solutions designed to improve profitability, efficiency, competitiveness and innovation across the financial services sector. We are passionate about what we do and thrive on transforming companies to increase their competitive edge.

Started in London in 2010, the driving force behind Brickendon's global strategy is transforming the traditional consultancy model. We now have multiple offices across Europe and the US, including London and New York.

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