LESSONS FROM THE FIELD

Testing Strategies That De-Risk SAP S/4HANA Migration

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OUR EXPERIENCE

SAP Expertise

TTC have multiple clients who have implemented SAP - whether it's S/4HANA, SuccessFactors, or Commerce Cloud.

The move to a smarter platform with real time data and embedded analytics will unlock significant benefits possible from subsequent improvement projects.

Partnered with TTC

TTC have been engaged to manage and deliver testing services on these digital transformation projects, to conduct the following:

✓ Test Management
✓ Test Planning and Execution
✓ Test Automation
✓ Performance Testing
✓ UAT and PVT Support
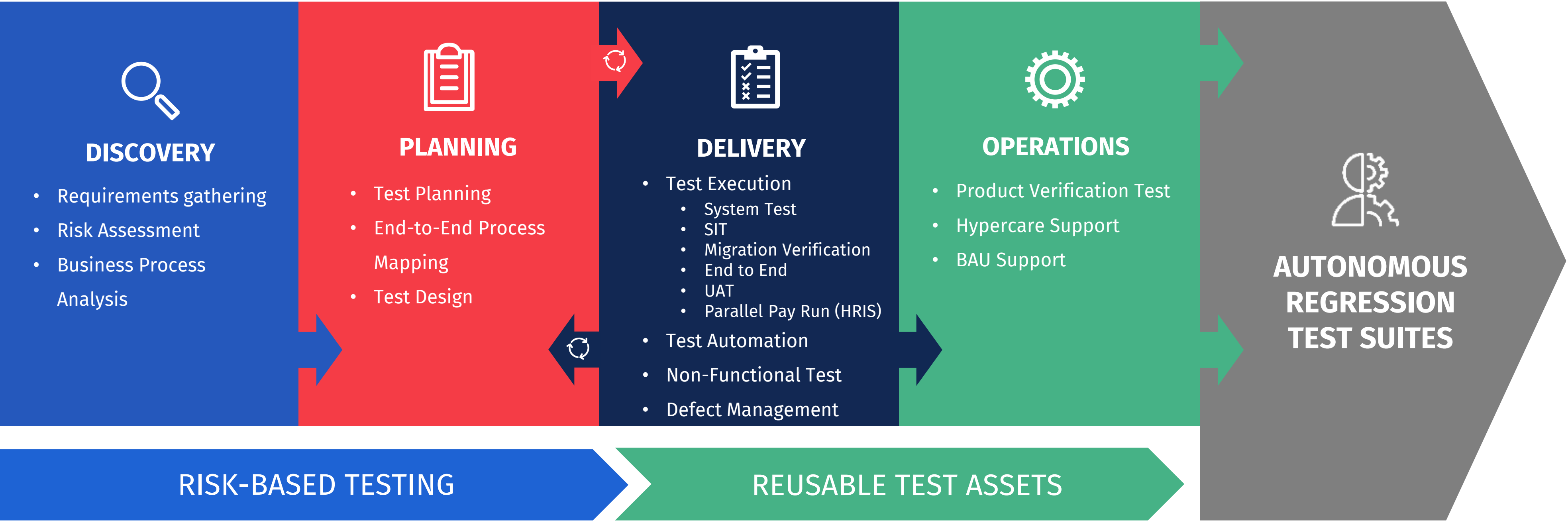
Select Clients

foodstuffs NORTH ISLAND

SUNTORY

Fletcher Building

contact

POWERCO

MITRE 10

Foodstuffs South Island

Zespri KIWIFRUIT

Tauranga City

Auckland Council
Te Kaunihera o Tāmaki Makaurau

EBOS GROUP LIMITED

HF Sinclair

TEST ACTIVITIES

DISCOVERY
- Requirements gathering
- Risk Assessment
- Business Process Analysis

PLANNING
- Test Planning
- End-to-End Process Mapping
- Test Design

DELIVERY
- Test Execution
  - System Test
  - SIT
  - Migration Verification
  - End to End
  - UAT
  - Parallel Pay Run (HRIS)
- Test Automation
- Non-Functional Test
- Defect Management

OPERATIONS
- Product Verification Test
- Hypercare Support
- BAU Support

AUTONOMOUS REGRESSION TEST SUITES

RISK-BASED TESTING

REUSABLE TEST ASSETS

OUR TEST APPROACH

Test Approach Overview

Test programme should **be as pragmatic as possible**, utilising the features of both waterfall and agile test methods, to ensure that the test delivery is both **structured and robust**.
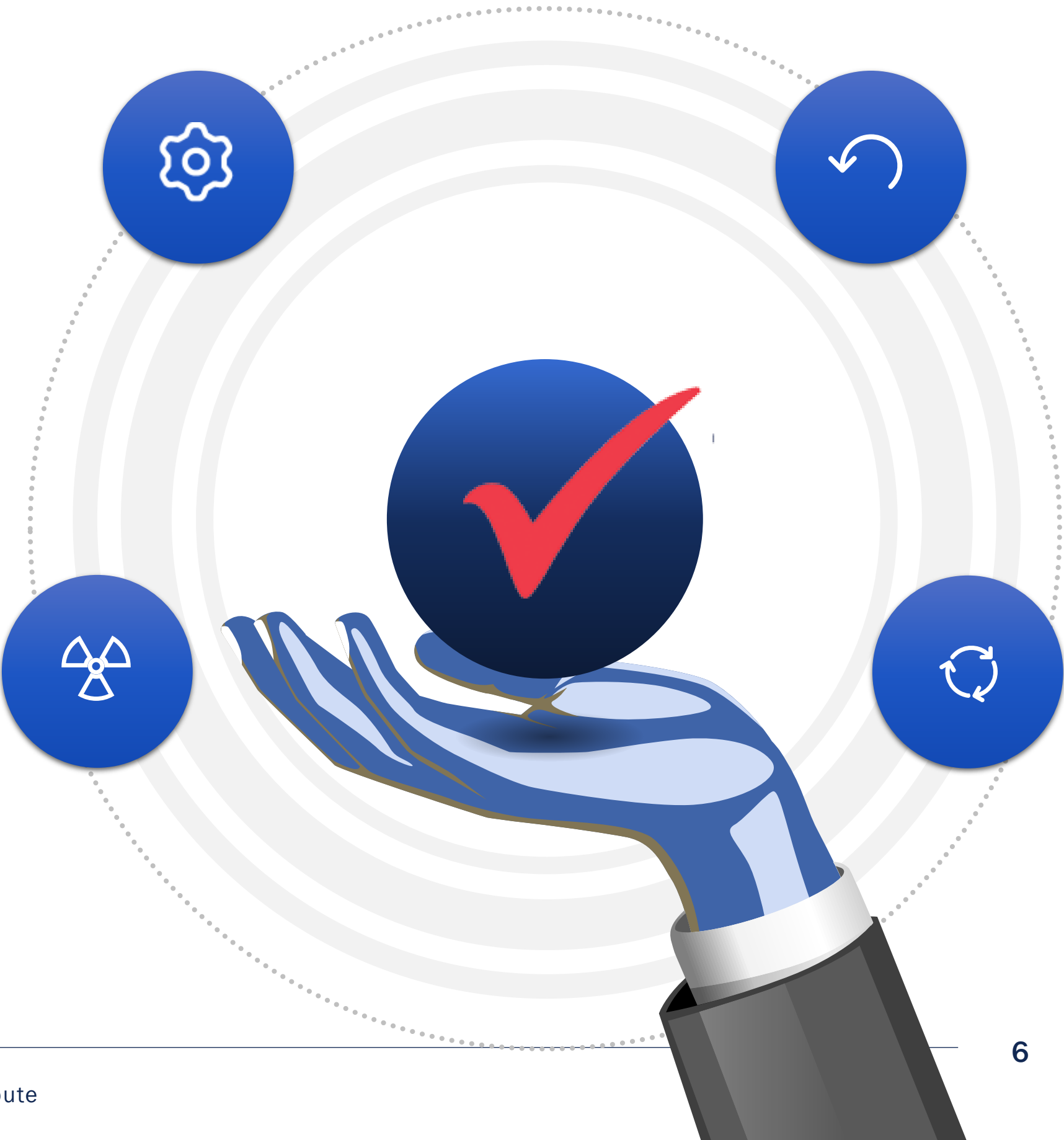
Quality will not be the sole responsibility of the individual test engineer or test team – it will be the responsibility of the whole project delivery team, in other words **"Quality is everyone's responsibility"**.
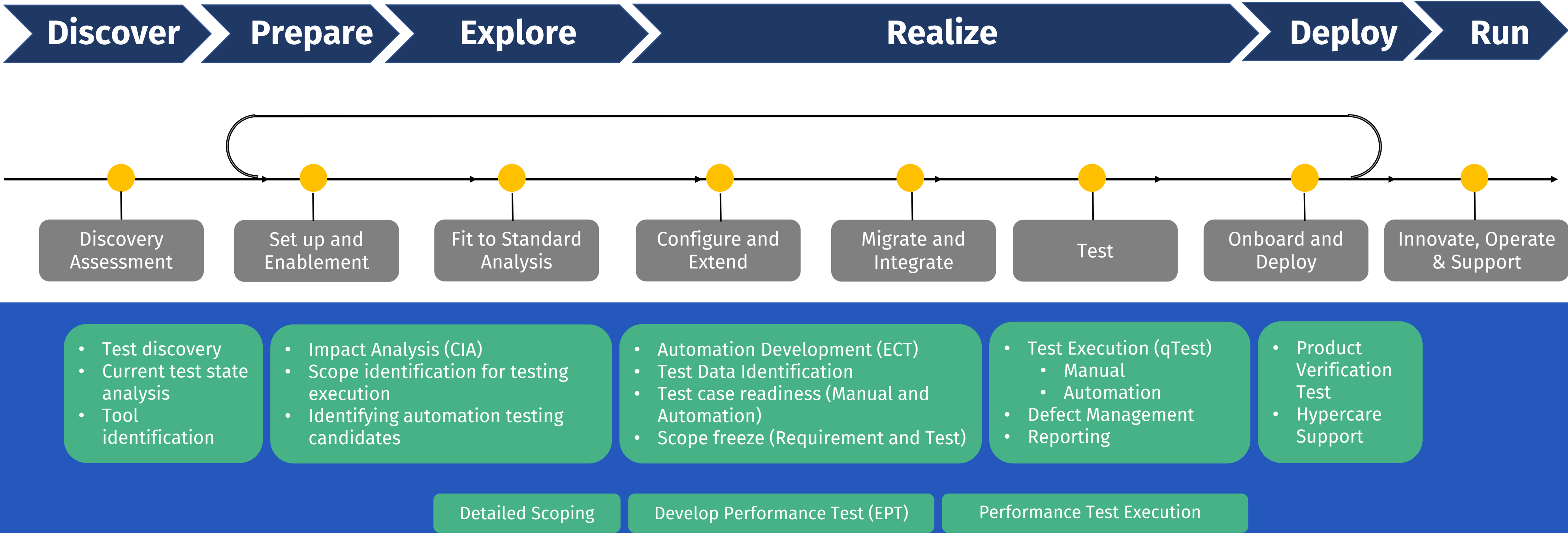
SAP Projects' Highest Risk Areas

Integrations

Customisations

Business Usage

TEST APPROACH

Risk-based

Test Early

Test Often

Automation
(where appropriate)

TESTING APPROACH WITH SAP ACTIVATE METHODOLOGY

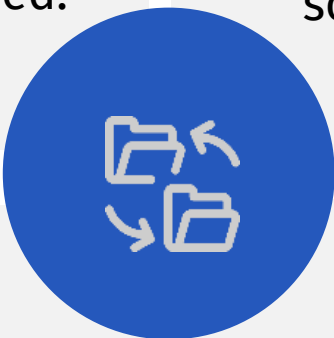| Discover	Prepare	Explore	Realize	Deploy	Run

Discovery Assessment	Set up and Enablement	Fit to Standard Analysis	Configure and Extend	Migrate and Integrate	Test	Onboard and Deploy	Innovate, Operate & Support

- Test discovery
- Current test state analysis
- Tool identification

- Impact Analysis (CIA)
- Scope identification for testing execution
- Identifying automation testing candidates

- Automation Development (ECT)
- Test Data Identification
- Test case readiness (Manual and Automation)
- Scope freeze (Requirement and Test)

- Test Execution (qTest)
  - Manual
  - Automation
- Defect Management
- Reporting

- Product Verification Test
- Hypercare Support

Detailed Scoping

Develop Performance Test (EPT)

Performance Test Execution

WHAT WE LEARNED

	SAP Regular Updates	System Performance	Data Migration	Testing Timeframes	Resource Availability	Process Analysis
CHALLENGE	Regular updates to the S/4 HANA. SAP RISE – updates are automatically pushed by SAP. Regression test suites and dedicated regression test timeframes are needed.	Upgrades can impact system performance, potentially leading to slowdowns or outages. New and existing integrations being introduced may cause some performance issues.	Migrated and converted data should be thoroughly tested as part of the project. Often, organisations underestimate the importance of testing the data migration process early and correctly.	The Testing timeframes may not be sufficient to successfully complete the required testing.	The nominated business resources may be unable to provide the required level of expertise or involvement to the project due to BAU commitments (e.g. Finance resources during month-end).	Lack of detailed documentation on existing and to-be business processes.
MITIGATION	A full set of automated tests to cover all SAP ERP functionality would be an extremely valuable asset as it would allow for the accurate and timely test of the full system in the future at limited cost.	Will need to mitigate the risk by allowing for Performance Testing – covering Load, Stress, and Soak Testing.	• Data ETL Testing – initial testing to confirm transformation logic is correct prior to loading data. • Consumption of migrated data – E2E Testing will include validation of migrated data. • Dress Rehearsals should also be included in the project plan, with testing included.	Risk-based testing approach will be utilised to focus on high impact business areas. An Analysis Tool will be beneficial as it can help in risk identification, driving test planning and execution priorities.	Senior Management and executives supporting the project is critical. Where possible, SMEs backfilled in their BAU tasks to enable full commitment to testing. Test Management tool with exploratory testing function that will automatically capture detailed steps and screenshots to help save time.	Project team and testers collaborating with business SMEs to gather current state information. Ideally, projects should include capturing of current state as a critical input and project deliverable.

BEST PRACTICES – PEOPLE

1 Test Manager

Strong and experienced programme test manager
- ✓ Proper coordination of a lot of moving parts – delivery partners / SI vendors, user community
- ✓ Testing thought leadership - correct test strategy & approach
- ✓ Test Reporting

2 Test Team

Collaboration and teamwork
- ✓ Build teams that aren't siloed and will collaborate not just with the project team but also with the business SMEs.

Strong SAP / ERP and test tooling expertise
- ✓ Functional Testing
- ✓ Test Automation
- ✓ Performance Testing
- ✓ UAT Support

3 SMEs

Access to business SMEs is critical
- ✓ Reviews of test scenarios and coverage
- ✓ Early involvement = early exposure to the converted functionality

BEST PRACTICES – PROCESS

1

Business Processes

- ✓ Good documentation of current business processes is vital
- ✓ Focus on understanding the business processes and the impact of the changes being introduced (if any)
- ✓ Prioritise tests based on key critical areas

2

Test Engagement

- ✓ Onboard testers early - design workshops, walkthroughs, etc.
- ✓ Look for opportunities to start testing (manual and/or automated) early
- ✓ Test Data Management is critical
- ✓ Run Tests Early and Often
- ✓ Focus on Quality Not Quantity
- ✓ Security / Role-Based Testing

3

Tools

- ✓ Utilise testing tools that can save time and improve efficiencies in testing
- ✓ Reporting – get feedback from stakeholders on what their expectations are
- ✓ Look at automation – not just for regression but also for generating test data on the fly
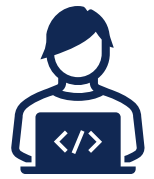
BEST PRACTICES – TECHNOLOGY

1 Test Analysis

CIA (Change Impact Analysis) - can be used to:

- ✓ Identify functionality actually being used
  - Confirm correct test coverage
  - Don't test what the client doesn't use
  - Focus on the most "at risk" objects
- ✓ Identify available automated test cases
  - Confirm which existing test cases can be used
  - Identify (all) gaps
- ✓ Assist in future proofing
  - Identify which scripts will break and which tests will become obsolete (because of the migration)
  - Identify which tests are missing
  - Continuous testing opportunities

2 Test Automation

ECT (Enterprise Continuous Testing)

- ✓ Frequent application changes can be tested quickly
- ✓ Tests are reusable (Especially pertinent to SAP Updates)
- ✓ Wider test coverage of application features achievable
- ✓ Ensures consistency
- ✓ Saves Time
- ✓ Improves accuracy
- ✓ Test modules can be used to create large volumes of test data quickly

3 Performance Testing and Test Management

EPT (Enterprise Performance Testing) – perform continuous load testing

- ✓ Gain real-time visibility into enterprise application performance
- ✓ Accelerate testing and issue resolution
- ✓ Run integrated solutions for full testing support

A test management tool (e.g. **qTest**) that allows:

- ✓ Test, requirement, and defect management
- ✓ Exploratory Testing that automatically captures detailed documentation
- ✓ AI-assisted test case generation
- ✓ Comprehensive reporting

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TEST AUTOMATION BENEFITS

Test automation enhances overall testing capability and enables fast and efficient testing.

Regression testing to ensure the highest-risk existing functionality is not impacted by change, wherever that may arise from:

• Project-driven changes
• Core product changes
• Infrastructure changes
• Environment health checks

Tests can be **run any time**, with flexibility to cater for the overall delivery process:

• Scheduled
• Triggered as part of a CI/CD pipeline
• Ad hoc
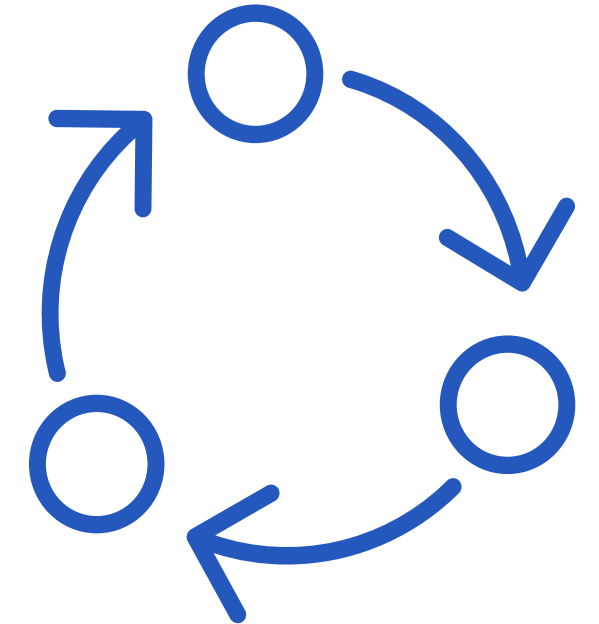
Test data creation

• Reused automation framework for related purposes e.g. data setup
• Improved ROI of test automation

Frees up manual testers to focus on :

• New and changed functionality
• Validations which are better suited for human interpretation
• Less common scenarios

TEST AUTOMATION – BY THE NUMBERS

Supply Chain
Test Automation Execution, Year-to-Date

Functionality	Total Tests Automated	Total Tests Executed	Manual Test Execution Effort (Days)	Automated Test Execution Effort (Days)
Supply Chain	151	1477	154	62
RTM	20	904	94	37
Commercial	49	184	19	8
Total	**220**	**2565**	**267**	**107**
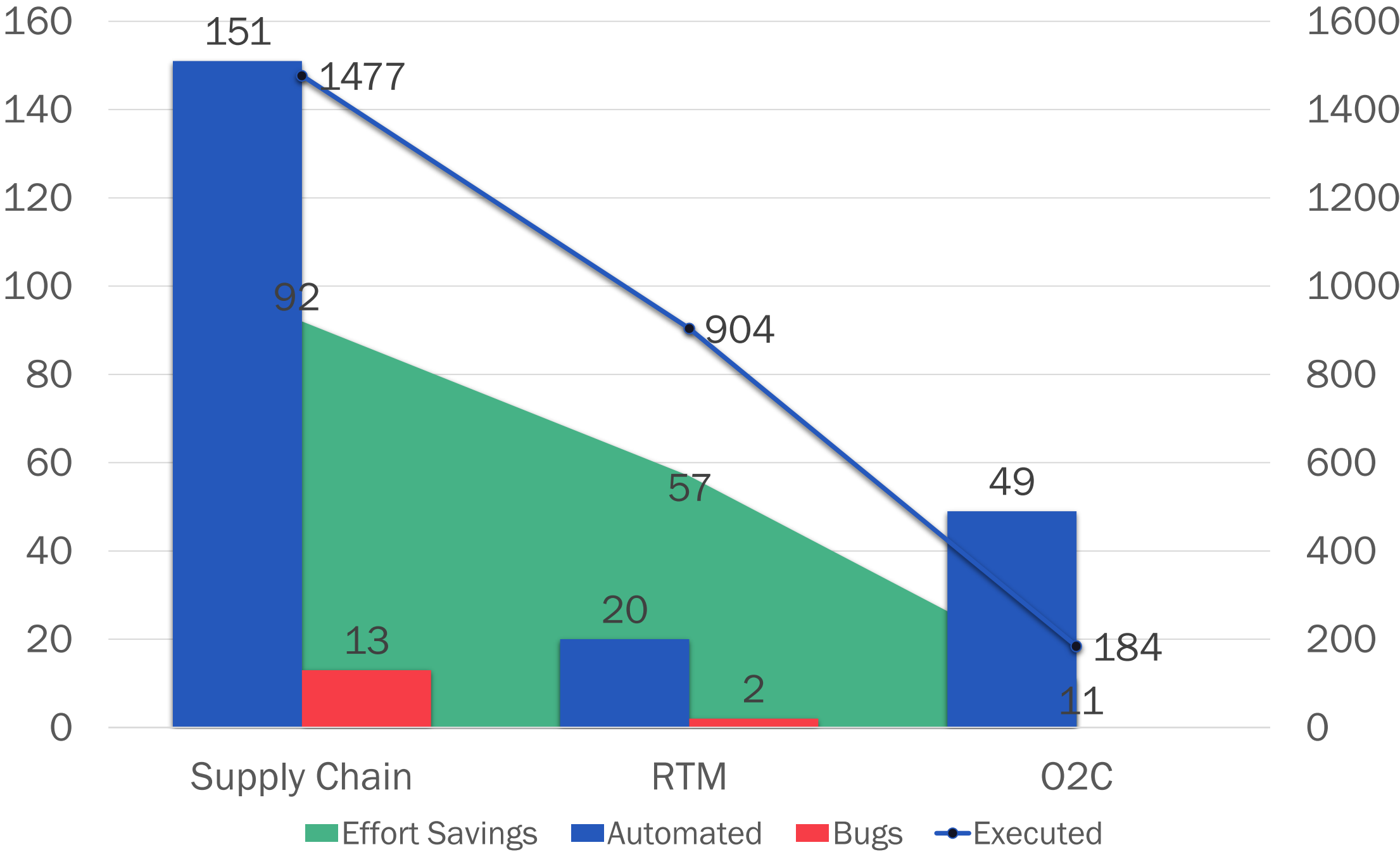
Manual Execution
Manual Execution Effort: 267 person days

Automated Execution
Automation Execution Effort: 107 Person Days
2x Parallel Run

SAVINGS 65% Effort Reduction

160
Person-days (1283 hours)

The more automated tests are executed, the more effort savings

TTC SAP-TOSCA ACCELERATOR PACKS

Reduce Overall Testing Time for SAP Projects with our Tricentis Implementation Experts

Sales

Purchasing

Manufacturing

Order to Cash

Source to Pay

Plan to Produce

We understand how instrumental SAP can be to business-critical operations such as Finance, Logistics, HR, and Sales. That's why we embrace the challenge of developing efficient, reliable SAP test processes, and tools. Our Accelerator Packs have not only been fine-tuned by our dedicated team of software testing consultants; they have been implemented in various organizations around the world. Our Accelerator Packs have benefitted clients by:

✓Reducing SAP Test Automation development timelines by as much as 70%
✓Decreasing the cost of SAP testing by up to 50%
✓Decreasing test automation maintenance by up to 90%

In addition to delivering faster testing, TTC Global's SAP S/4HANA Accelerator Packs produce more stable, secure apps thanks to best practices and pre-built procedures with proven success. We can also leverage the exploratory Test Assistant to record what users do as they navigate an app and then convert these steps to test cases. This feature can create both automated and manual test cases.

1

2

3

USING OUR TEST AUTOMATION ACCELERATORS

Modules

- ✓ 411 Modules imported from TTC Accelerator Pack
- ✓ 283 accelerator pack Modules used in the client's test cases to date – **68.8%** of total pack
- ✓ Some accelerator pack Modules have been modified for the client's use
- ✓ 117 new SAP Modules created for the client
- ✓ 37 other new modules created for the client (Salesforce, Ecommerce Portal, EDI APIs)

Test Case Design

- ✓ Test Sheets reused and modified to match the client's processes and data
  e.g. E2E Sales Orders, E2E Purchase Orders
- ✓ Classes reused and modified to match the client's master data
  e.g. Company Codes, Products, Customers, Suppliers

Test Cases & Steps

- ✓ 50 Reusable Test Step Blocks (RTSBs) imported from TTC Accelerator Pack
- ✓ 35 accelerator pack RTSBs used in the client's test cases to date – **70%** of total pack
- ✓ Many accelerator pack RTSBs have been modified for the client's use
- ✓ 33 new SAP RTSBs created
- ✓ 7 other new RTBS created (Salesforce, ECommerce Portal)
- ✓ Templates reused and modified to match the client's processes and data

TEST AUTOMATION SCOPING

Suitability

- Automated tests must be repeatable, controllable and predictable

- This favours transactional processes where the data and steps can be carefully controlled

- This does not favour infrequent processes or those which include data that is hard to control - e.g. month end, bulk data processing, reports

Return on Investment

- Must provide sufficient benefit to justify the time and effort

- Some things are still more efficient or reliable to test manually

- Optimise regression suite size to ensure good coverage while keeping it feasible to build and maintain

Risk

- Seek out the areas of highest risk:
  - Technical risk, e.g. customisations, integrations
  - Business risk, e.g. high-volume processes

- Business process hierarchy is a good starting point –as well as an ideal structure for analysing, planning and subsequent reporting

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Appendices
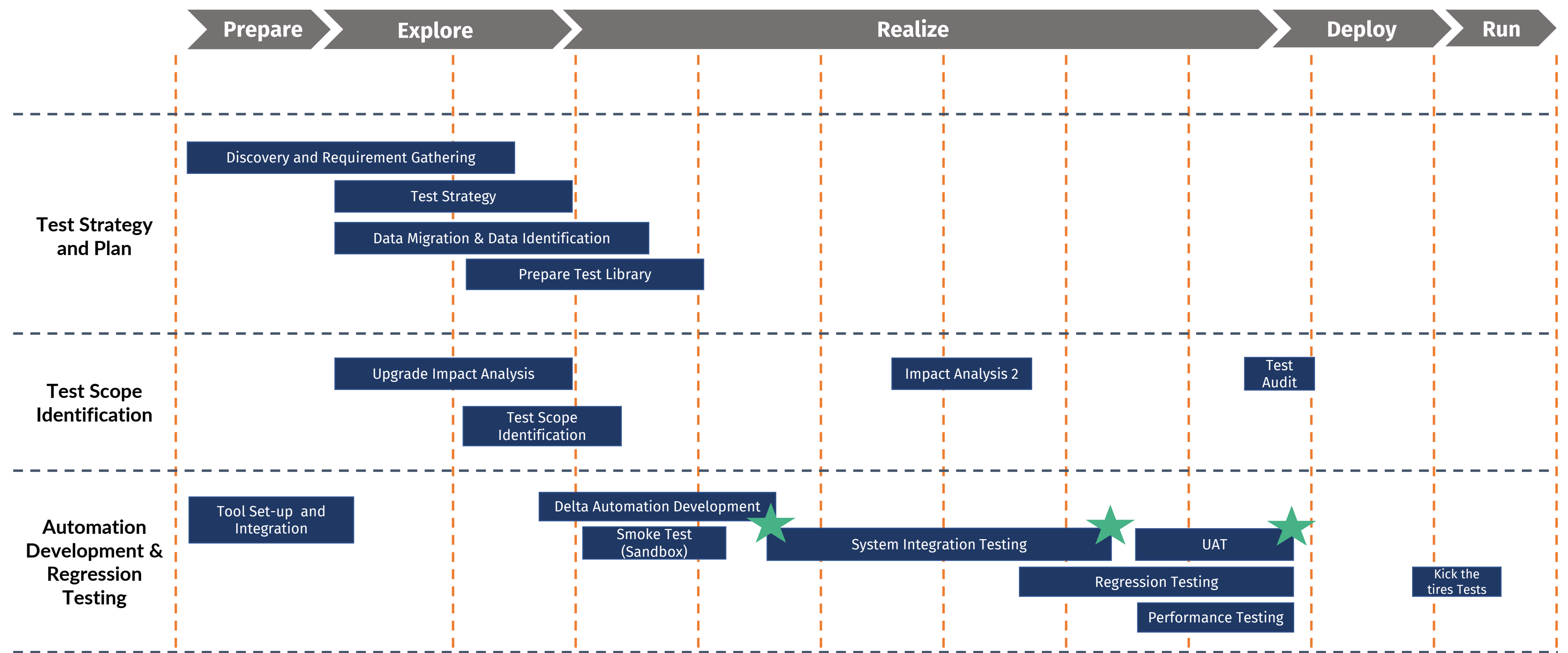
1. Sample Test Timeline & Structure

2. Tooling Examples

3. Client Case Studies
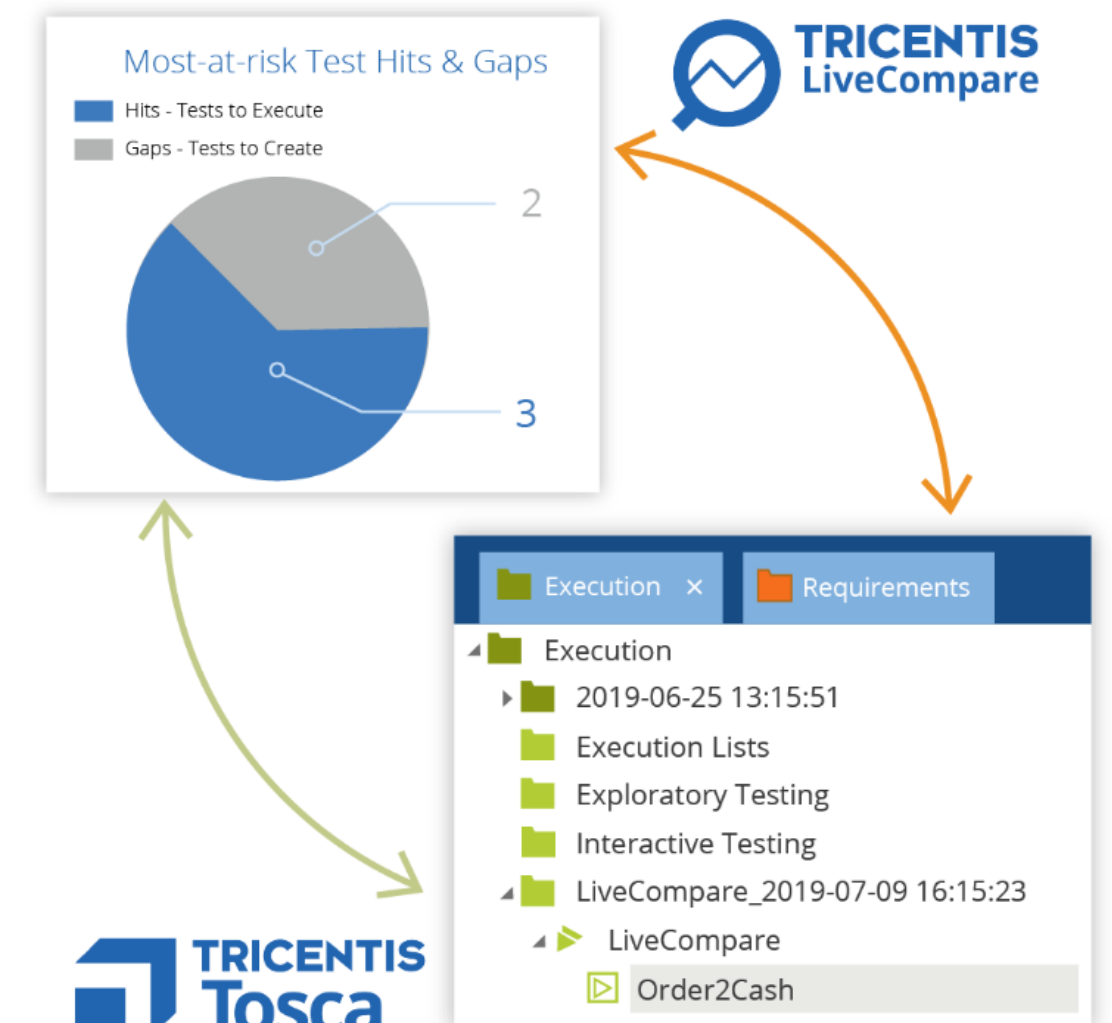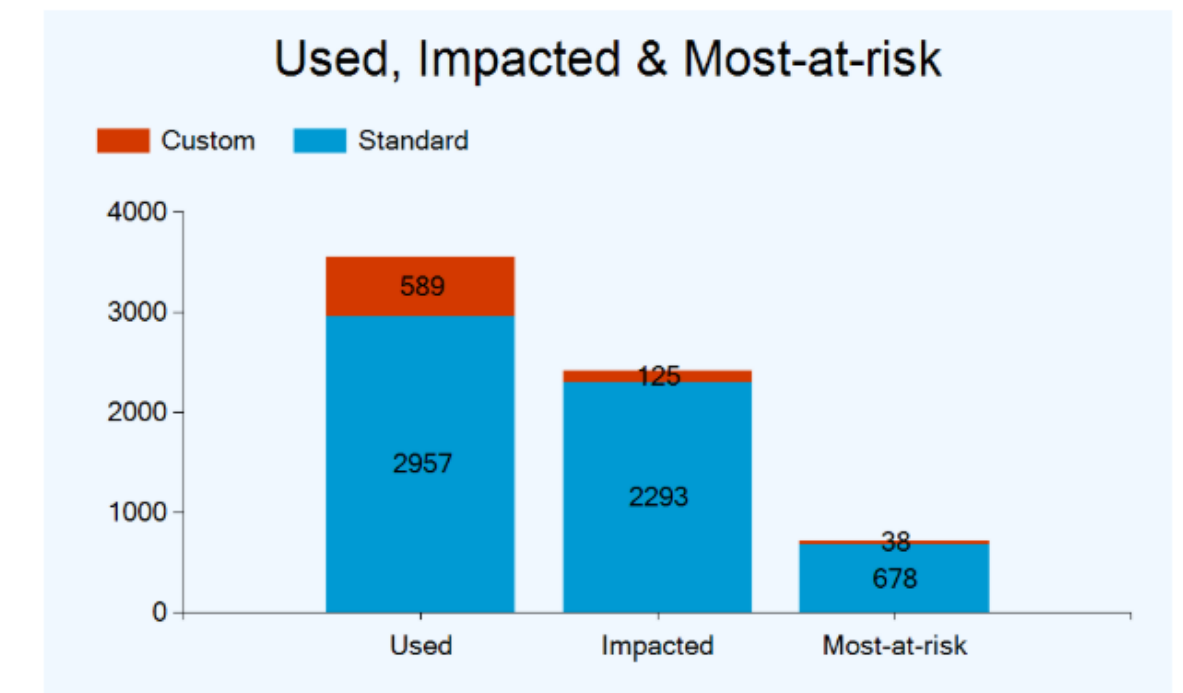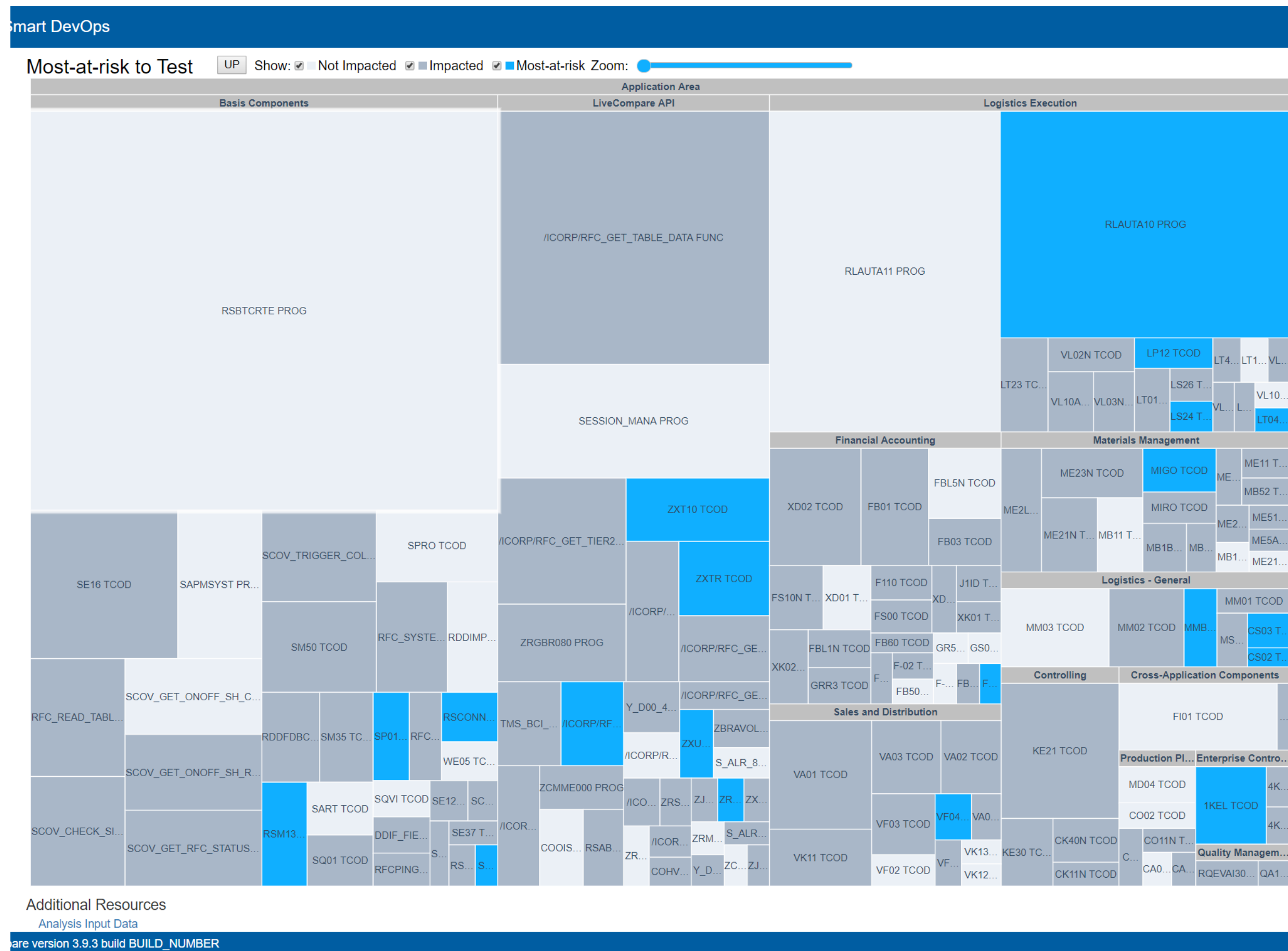
Sample Test Timeline and Team Structure

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Tool Examples

CHANGE IMPACT ANALYSIS (CIA)

ENTERPRISE CONTINUOUS TESTING (ECT)

Speed

8x

Release speed gain

Risk Reduction

75%

38% ➡ 75%

Cost

42%

savings

Risk **Optimisation**
Greatest Test Coverage – Fewest Possible Tests

Name	Instance Usage	StraightThrough	RO	TAM	ZZ	2000	3000	9999	10	16	X1	01
SAP Test Case Design		StraightThrough	RO	TAM	ZZ	2000	3000	9999	10	16	X1	01
Instances												
Order Type	100%	OR	RO	TAM	ZZ	OR	OR	OR	OR	OR	OR	OR
Sales Org	100%	1000	1000	1000	1000	2000	3000	9999	1000	1000	1000	1000
Distribution Channel	100%	12	12	12	12	12	12	12	10	16	X1	12
Division	100%	00	00	00	00	00	00	00	00	00	00	01
Error	0%											

Sample Test Run Report

| Applications	15	85	9	4	85
Applications					
3M ChartView		100		100	
3M CodeFinder		100		100	
3M Coding and Reimbursement System WinAppLink		100		100	
3M CoreGroupingSoftware		100		100	
7-Zip	80	20	40	40	20
A&R Database		100		100	
A+ CMS		100		100	
ACC SendInvoice		100		100	
Access Card Printer Driver	60	40	60	40	
Activate Password Client		100		100	
AdaptiveInsights Office Connect	50	50	50	50	
Admin Apps		100		100	
Adobe Acrobat Pro DC	70	30	40	20	10	30
Adobe Acrobat Reader		100		100	
Adobe Creative Cloud	58	42	50	8	42
Adobe DigitalEditions	67	33	50	17	33
Agent Ransack		100		100	
AIP Unified Labeling Client		100		100	
Altova XMLSpy 2012	53	47	50	3	47
Altova XMLSpy 2015	67	33	50	17	33

ENTERPRISE PERFORMANCE TESTING (EPT)
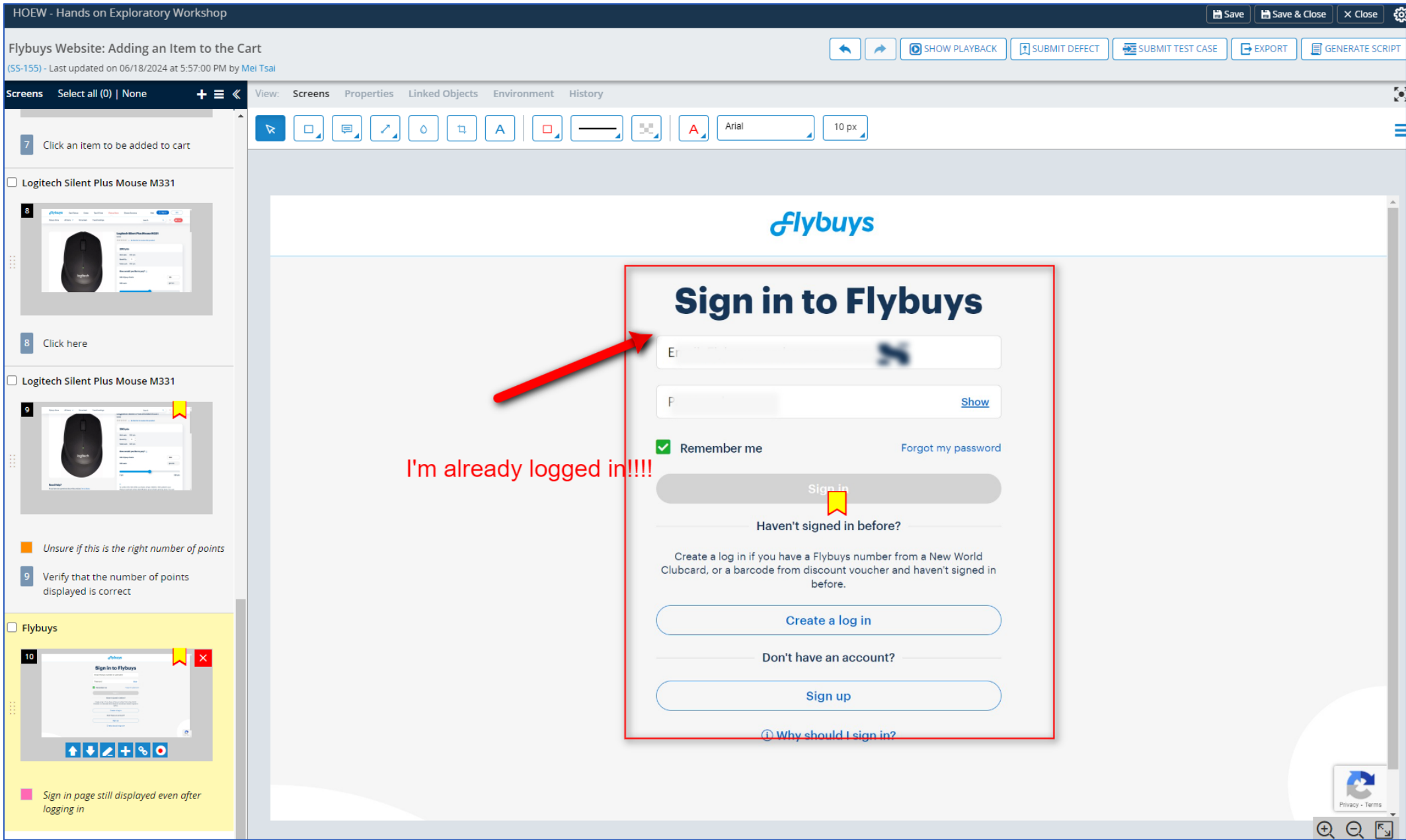
Sample Test Run Report
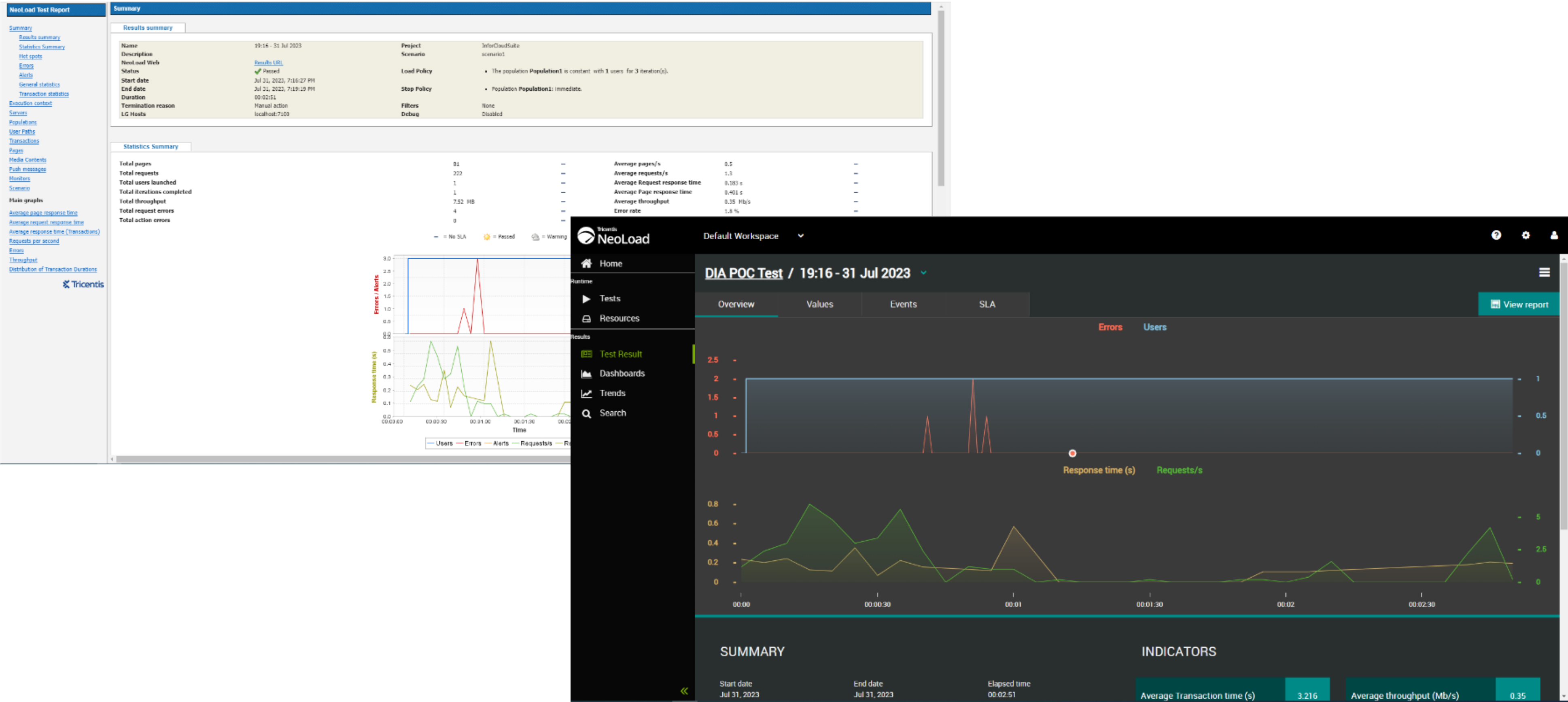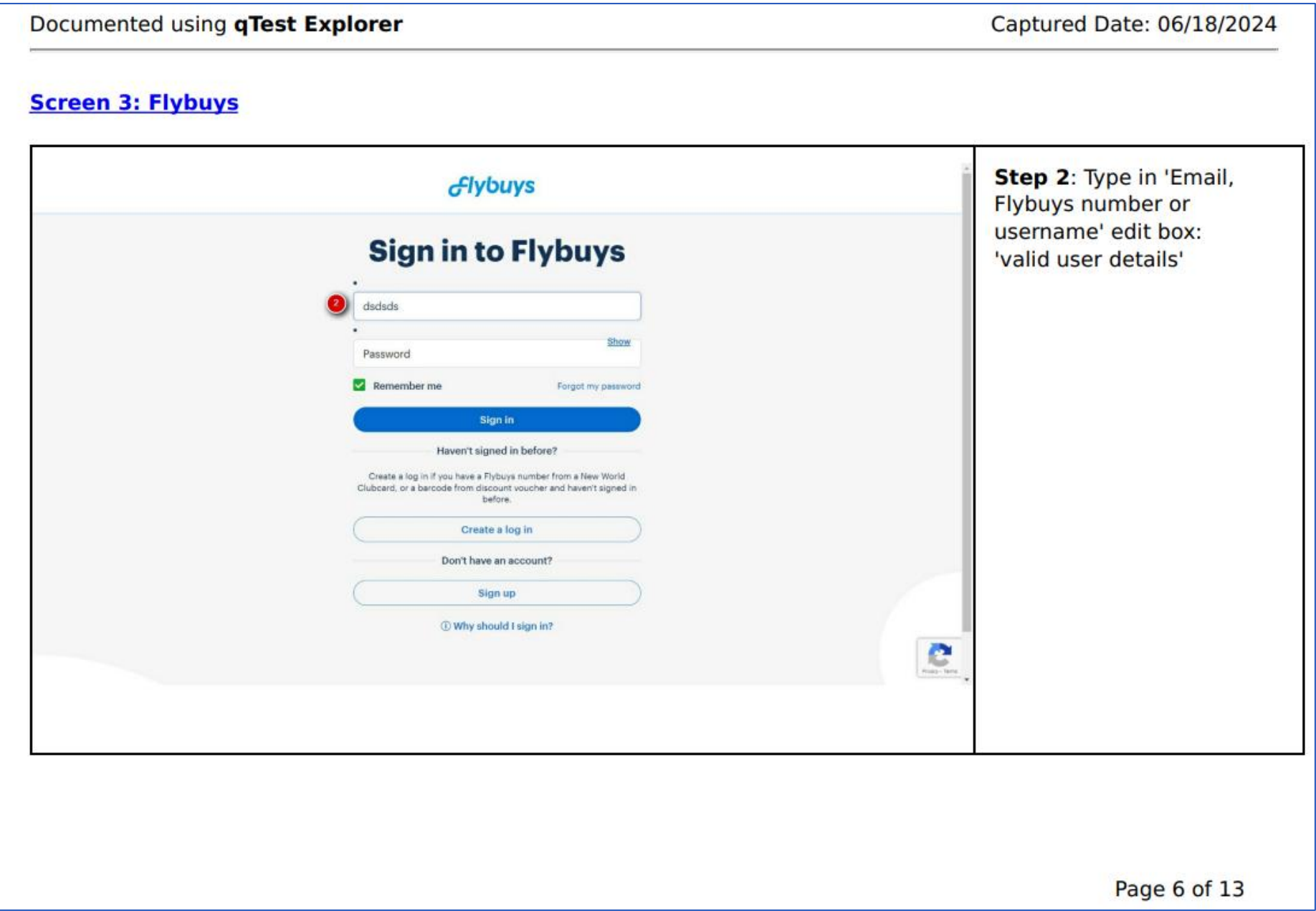
QTEST

Sample Test Run Report
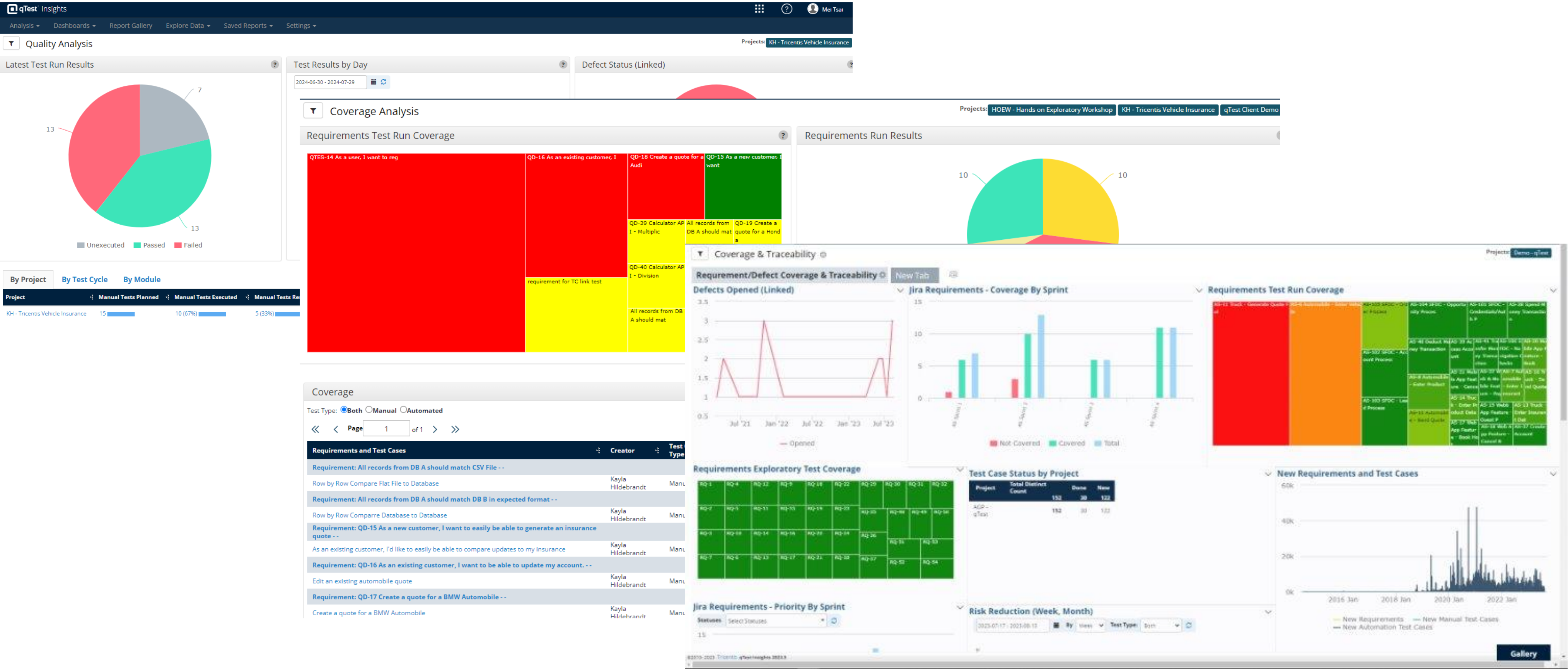
QTEST – Exploratory Test Sample

qTest Exploratory Edit

Sample qTest Extract

Sample
Exploratory Test Extract

Client Case Studies

Client Case Study

SAP ECC to S4 Migration and EWM Implementation

Background

- This project was the first to adopt the enterprise test strategy and policy

- Commissioned by Frucor Sr. Test Manager and Infrastructure Manager

- We assisted to present value proposition to Frucor Technology Management

- With goal to mandate enterprise test strategy and policy, embedded into PMO and Release Management

Solution

- Delivered quality design reusable test artifacts w/ built-in test data management

- Demonstrated the flexibility and adaptability of Tricentis Tosca and its processes

- Managed Frucor manual testers, leveraging qTest to provide real-time reporting of test progress & defect tracking

- Tricentis Tosca Dex (Distributed Execution) gave project confidence w/ full regression suite executing hands-free

Results

- ✓ Unlike their previous 'manually tested' rollout which crashed and brought the distribution process to a halt, this was a success

- ✓ The success of this project is evident w/ the queue of key stakeholders seeking to explore additional projects to be automated

Client Case Study

Enhancing Test Automation for SAP

Background

- Zespri International upgrading their SAP environment and migrating non-SAP applications to an SAP-based delivery platform.

- Test Automation seen as a key enabler for future frequent release testing, and reduction of overall test delivery cost and time.

- Goal: to deliver a test automation suite – and to raise the test automation capability of the internal Zespri International test team.

- Wanted certainty of cost and duration for test automaton delivery

Results So Far

✓ Test Automation Suite delivered for SAP Finance and SAP Supply Chain modules (and one SAP partner module that feeds into SAP Supply Chain).

✓ Ability within Zespri International to maintain and enhance the delivered test automation suites.

✓ An automated regression test suite for SAP Finance and SAP Supply chain that can be executed frequently on a scheduled and on demand basis by Zespri International.

✓ An agile-based delivery approach where test automation cadence is managed, monitored and measured to ensure that delivery is within agreed cost and duration estimates.

Client Case Study

Enhancing Test Automation for SAP

Background

- Foodstuffs analysed their internal SAP testing program

- This effort investigated ways to minimise the risk associated w/ these IT projects and ongoing BAU management

- Goal: to utilise an enhanced test program capability w/ technical testing enablers

- Wanted to enhance their SAP Test Automation capability w/ the use of technical testing enablers

Results So Far

- ✓ Full test automation of one of Foodstuffs' SAP FIORI applications

- ✓ This application is responsible for the picking of items ordered online by Foodstuffs' brands:

  - o New World

  - o Pak n Save

  - o Gilmours

- ✓ Foodstuffs NI and SI test team initiated their ramp up on Tricentis TOSCA automation

- ✓ Business buy-in to adopt test automation on S/4HANA program

Capability Reference

SAP S/4 HANA Implementation

Background

- Mitre 10 implementing an SAP solution and migrating legacy non-SAP applications to an SAP-based delivery platform.

- Test Automation seen as a key enabler for frequent release testing, and reduction of overall test delivery cost and time.

Results So Far

✓ Test Automation Suite delivered for SAP S/4 HANA (ERP), Commerce Cloud, CAR and BTP, as well as integration with existing systems including third parties.

✓ Enabled Mitre 10 to maintain and enhance the delivered test automation suites.

✓ An automated regression test suite that can be executed frequently on a scheduled and on demand basis by Mitre 10, including integration with test management (qTest) and CI/CD pipelines.

Client Case Study
End to End Testing for Workday & SAP
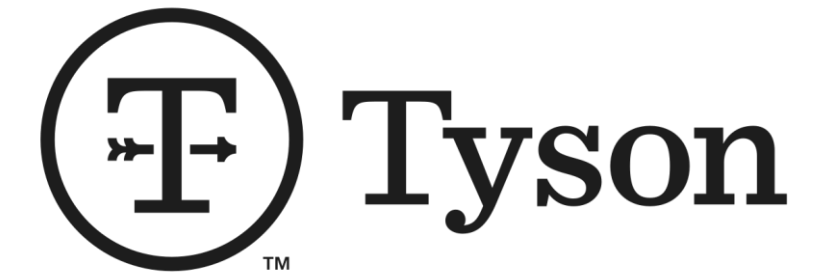
Background

- $32.9 billion American food processing company

- Implementing Workday & Upgrading SAP meant that testing was a scarce resource

- Had to reduce manual testing and embrace agile project management

Solution

- Sought a platform to drive continuous testing across all technologies and ultimately selected Tricentis Tosca

- Utilised TTC to roll out Test Automation with Tosca

- Model-based continuous testing platform enabled rapid, automated, end-to-end testing

- Moved project management from a waterfall-based approach to Agile DevOps

Results

- Two weeks of manual testing, or about 160 hours, was reduced to only 1 hour.

- >99% reduction in test execution time

- This ultimately led to 1,000+ test cases automated and 100s of manual hours saved

- "Team members could go home on time"

Client Case Study
End to End Testing for SAP implementation

HF Sinclair

Background

- $15 billion USD Oil & Gas company

- SAP as primary System of Record with complex Enterprise technology environment

- No centralized QA governance with a low level of QA maturity

- Business was conducting all Testing

Solution

- Engaged TTC for QA Assessment, Planning, and on-going Implementation

- Assessed current state and established a Centralized QA CoE with Industry Best Practices

- Selected Best Fit tools for Test Automation, Test Management, & Service Virtualization

- QA CoE with modern Software Quality Practices oversees all projects

Results

- Detailed Quality Maturity Assessment results

- Trained 350+ users in a new QA Methodology

- Developed significant Test Automation for key systems incl. SAP

- Modern QA methodology is accelerating software delivery and enabling a shift to renewables

- Improved software quality, reduced time to market and decreased overall project cost

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Client Case Study

SAP ECC to S4 Migration

Background

- The technical upgrade of the SAP systems is being done with the goal that there will be minimal impact for the business end users during and after this project.

- The project is a technical upgrade for SAP, to bring the system to the latest release. All SAP systems will be upgraded; the SAP ERP will be converted to SAP S4/HANA.

- The system environments will be a side-by-side with the SAP ERP, only being decommissioned once all production business applications have been successfully upgraded to S4/HANA.

Solution

- TTC was engaged to manage all testing for the SAP upgrade to S4/HANA.

- TTC led all testing across over 100 testers from functional and business teams, covering:
  - Smoke Testing
  - Unit Testing
  - System Integration Testing
  - User Acceptance Testing
  - Performance Testing

Results

✓ Great collaboration with the business team and test team, ensuring appropriate test coverage as early as possible, and good collaboration with senior leadership team.

✓ "Big bang" weekend upgrade - Hit implementation date target set 6 months in advance, below budget, and with a high-quality release – driven by strong leadership.

✓ S4/HANA upgrade released to production on time with no S1 defects caused by testing.