

Test Centres of Excellence

What are they and
where do we start?





Contents

1.	Introduction	4
2.	What is a test CoE?	4
3.	Why implement a test CoE?	5
4.	Do we need a test CoE?	6
5.	What does a test CoE look like?	7
6.	Test CoE maturity models	9
7.	How do I know if it's working?	10
8.	Key considerations on setting up a test CoE	11
9.	Elements of a test CoE programme	18
10.	How Deloitte can help	19

Providing a practical approach to test and QA function consolidation and test process improvement.

1. Introduction

Testing in medium to large organisations is becoming increasingly complex and challenging. Shorter development lifecycles and new development methodologies, coupled with rapidly multiplying platforms and a demand for constant updates and renewal, is putting a real strain on legacy testing teams. In many organisations testing groups have evolved to cope with demand rather than being designed to deliver quality results. Too often companies are relying on hard work, experience and luck rather than planning and executing tests in an appropriate and focused way. With increasing demands, these systems grow to be more inefficient, unreliable and costly. This ultimately becomes a serious risk to the future of the business.

So how are organisations meeting this challenge head on? The answer is by developing and growing test Centres of Excellence.

Test Centres of Excellence (test CoE) are becoming increasingly common within large and medium scale businesses where there are complex integrated systems with a constant cycle of change and renewal. In particular we are seeing a lot of

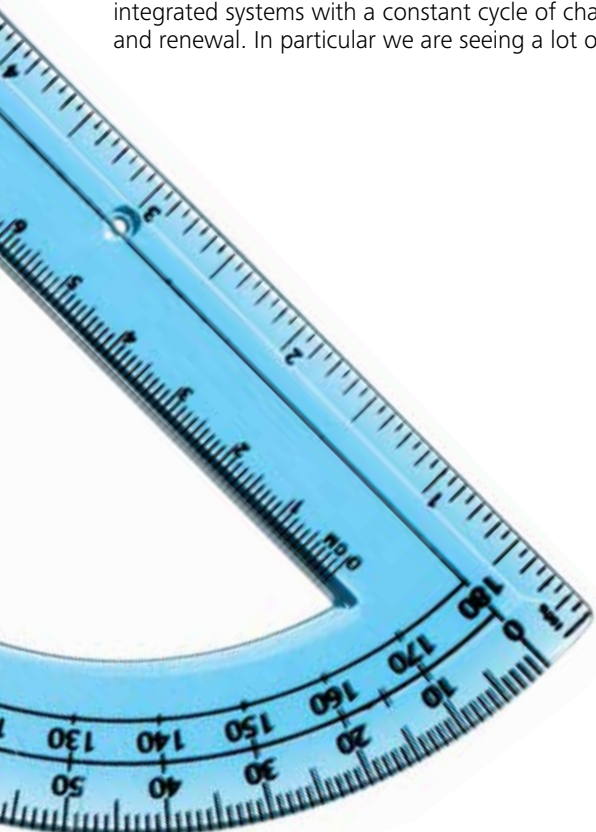
activity in the banking, insurance and telecoms sectors. However, test CoEs are not confined to these sectors or even to large organisations. Wherever there is a significant amount of effort spent in developing or integrating software products a test CoE can provide real and tangible benefits across the entire organisation, in terms of improving quality, reducing risk and driving efficiency.

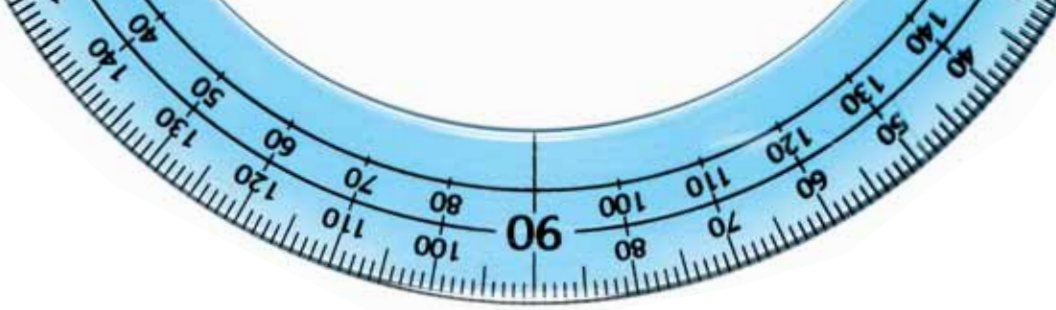
This paper defines what constitutes a test CoE and provides initial direction on how to go about setting one up. The paper draws on our practical experience in designing, implementing and managing the transition in a wide variety of organisations.

2. What is a test Centre of Excellence?

Fundamentally, a test CoE is a professional service organisation that delivers testing services to the IT group and the business. It comprises a dedicated and independently managed team of people with a core competency in testing, operational processes to support testing for the enterprise and supporting tools and technologies.

Test Centres of Excellence are becoming increasingly common within large and medium scale businesses where there are complex integrated systems with a constant cycle of change and renewal.





Organisations can typically save in excess of 30% of testing costs by using test CoEs while at the same time reducing risk and time to market.

3. Why implement a test CoE?

While the drivers for setting up a test CoE can vary between organisations they typically fall into one of the following three categories: reducing reputational risk, improving quality and cost efficiency.

Reduce reputational risk

- Reduce incidence of live issues
- Avoid "customers being our best testers"

Improve quality

- Reduce number of defects occurring in later stages of testing
- Increase the independence of testing
- Testers are currently too closely aligned to projects and not the end to end solution
- Apply rigour to test process
- Focused collaboration between business and test
- Promote the understanding of test requirements across the organisation

Cost efficiency

- Reduce the need for long test phases
- Increase use of automation
- Reduce volume of regression test required
- Enable earlier detection of defects
- Enable faster more reliable test cycles
- Risk based test approach
- Active test environment coordination
- Ensure correct resources (number and skills) are being utilised



4. Do we need a test CoE?

Do you recognise some or all of the common test issues below? If so, a test CoE could provide the solution.

	Typical test issues facing organisations	Benefits of a test CoE
People	<ul style="list-style-type: none"> • Few dedicated career testers – test team comprises business analysts, business users, developers, contractors and others pulled into test ad hoc • Lack of consistency in test resource experience leading to missed defects, misreported defects and wasting developer time • Little or no test training • A number of different test resource suppliers across a business or group • Testers kept in experience ‘silos’ and often underutilised across the business • Test knowledge is locked up in individuals or key suppliers 	<ul style="list-style-type: none"> • Organised, professional core of testers • Defined training and career paths providing consistency and growth opportunities • Close vendor management and supplier optimisation to ensure value for money from test contractors • Ability to use resources in a number of different areas to maximise efficiency • Shared knowledge systems and knowledge champions to reduce dependence on individuals or suppliers
Process	<ul style="list-style-type: none"> • Cannot define what quality actually looks like and does not differentiate based on the criticality of the system and potential risk to the business of defects • Lots of duplication between system, UAT and end user test • No feedback on root cause and where defects were introduced • No synergies or learning between various test teams • Cannot quantify the spend on quality and testing • Did not measure quality in production of released software • Repeating the same errors continuously • Testers entering the process at the final stages and expected to understand and test the system efficiently • Late engagement of testers resulting in more expensive bug fixing at the later stages of the development lifecycle • High number of live issues, even after significant test effort 	<ul style="list-style-type: none"> • Defined role for test CoE in company organisation structure with clear targets, responsibilities and reporting lines • Defined end to end test processes to align closely with software development lifecycle • Standardised test definitions, templates and quality gates providing consistency and comparability of results • Interaction with development and business groups to share learnings • Testers engaged early and often • Better estimation in terms of time and cost • Reduced duplication across test phases with end to end management and coverage • Defined reporting and test improvement goals • Detailed knowledge management and sharing processes with supporting tools • Continuous improvement initiatives and retrospectives
Technology	<ul style="list-style-type: none"> • No tools in place to assist testing • Not getting full value from tools • Limited or no automation • Multiple redundant test environments • Test data not accurate or secured • No internal skills in test tools 	<ul style="list-style-type: none"> • Tools to support end to end test management and reporting • Automation, performance and load testing capability and resources • Active test environment and test data management • Test CoE will develop internal tool and automation skills • Knowledge management and collaboration tools • Standard reporting and dashboards

What are they?

5. What does a test CoE look like?

Test CoEs are comprised of three critical components, all of which are needed to be successful. These include service delivery, operations and governance and organisation and change management, which are described in brief below:

Service delivery

The services the test CoE provides to the business:

- Test planning and strategy
- Test execution, defect tracking and reporting
- Test environment planning
- Test tool configuration and automation scripts
- Test preparation

Operations and governance

How the test CoE provides services:

- Standard test process definition and maintenance
- Test methods, standards and templates
- Test metrics and reporting
- Test vendor management
- Test best practices and knowledge management
- Test QA and governance
- Resource management
- Continuous improvement

Organisation and change management

How the test CoE is organised and managed:

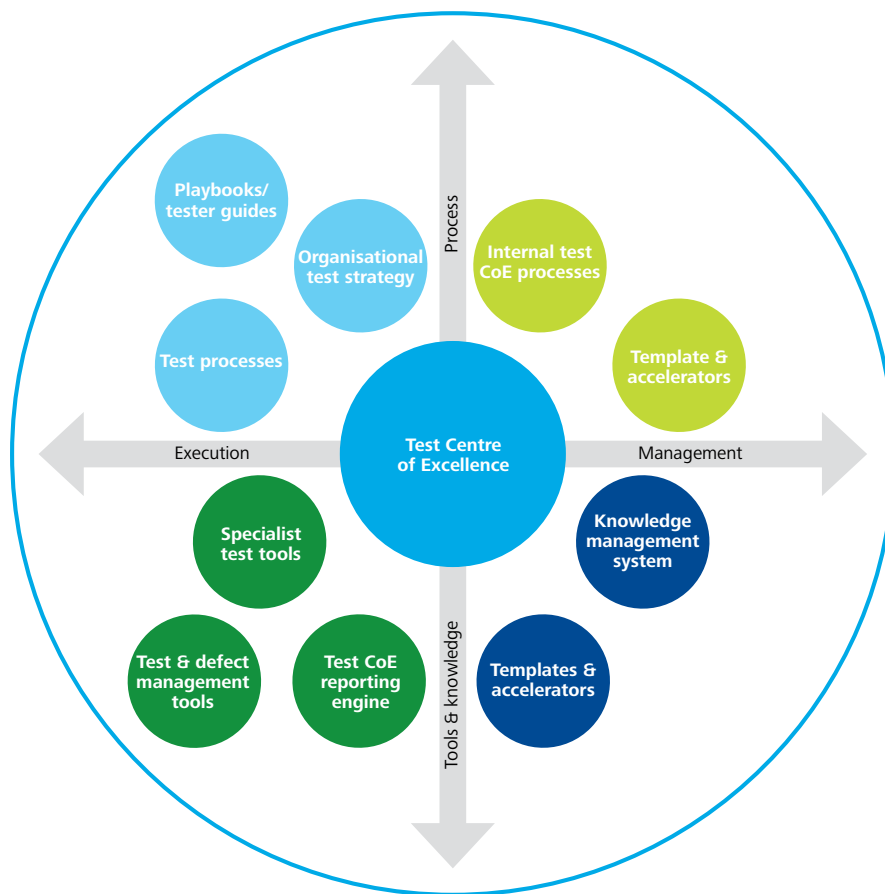
- Test training and certification
- Communications
- Test career model
- Knowledge transfer
- Workforce transition



A test CoE is supported by a number of processes, systems, tools and knowledge repositories that assist in test execution. This diagram groups and summarises the typical artefacts created and delivered during the course of a test CoE rollout.

These are grouped into four major categories:

- Process support
- Execution support
- Management support
- Tools and knowledge support



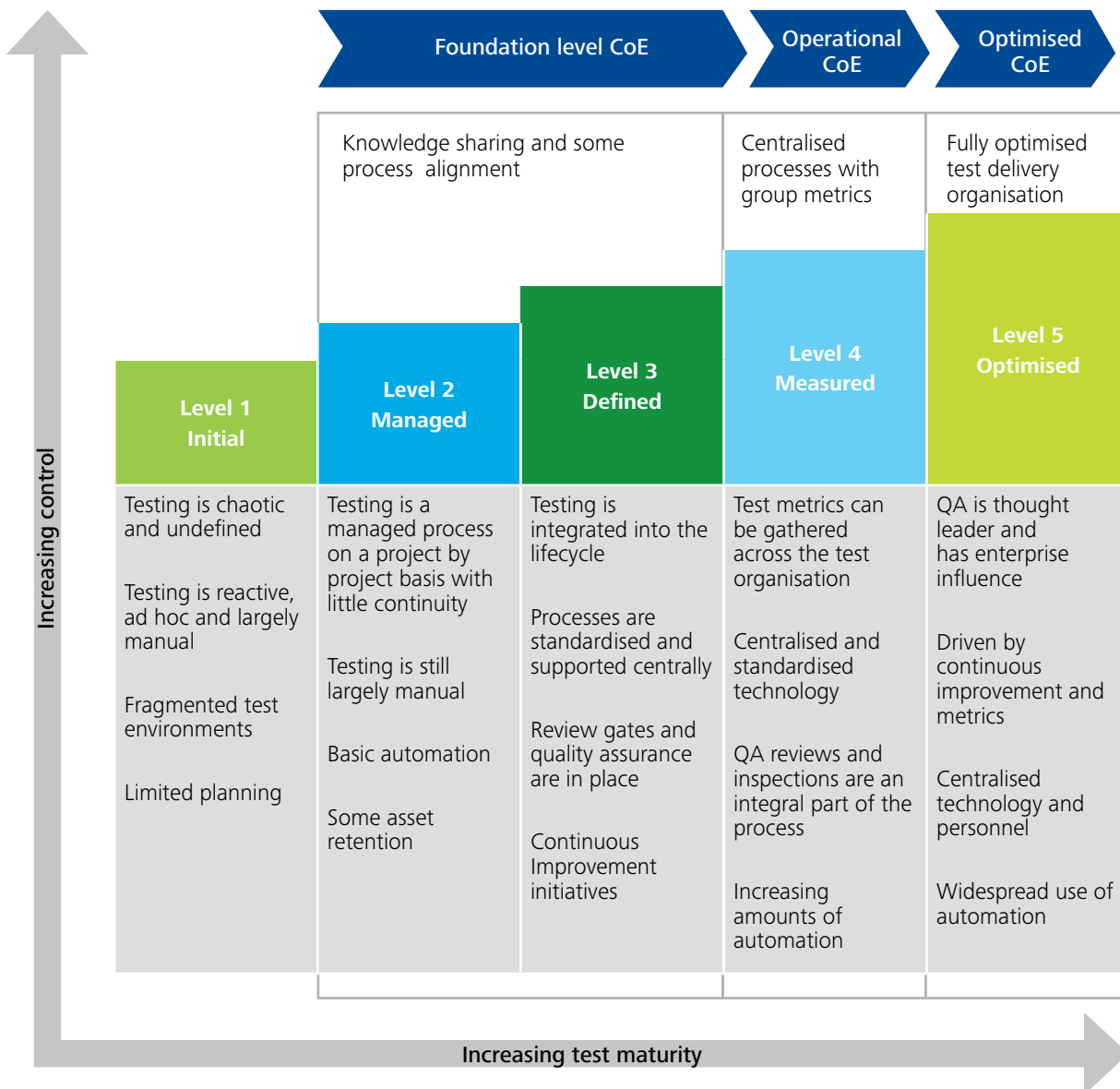
Fundamentally, a test Centre of Excellence is a professional service organisation that delivers testing services to the IT group and the business.

Test CoEs can mature through these levels to support a long term vision without the challenges of a major change programme.

6. Test CoE maturity levels

A test CoE is not an 'all or nothing' option. There are a number of levels of control that a test CoE can support. These range from a very low level, where the centre supports knowledge sharing and some process alignment through expert groups and functional leaders, right up to the highest level, where the centre is responsible for test delivery across an entire company or business area.

The effort required to implement each level increases with increasing levels of control, however so do the benefits returned from implementation. Test CoEs can mature through these levels to support a long term vision without the challenges of a major change programme.



7. How do I know if it's working?

The success of a test CoE is typically measured against these drivers and the following table provides some of the KPIs that can be measured.

	Success indicators	Measured by	KPI
Improve quality Reduce reputation risk	<ul style="list-style-type: none"> ↑ More confidence in the software we produce ↓ Less production defects overall ↑ Independent, professional testing organisation with defined and enforced standards and processes and motivated staff 	<ul style="list-style-type: none"> • Ability to prevent defects getting into system test, UAT and production • Ability to prevent or detect defects at or close to their source in the SDLC 	<ul style="list-style-type: none"> • Production and UAT defect containment effectiveness • Defect source (requirements, design, code, bad fixes, test) • Defects per test case
Cost efficiency	<ul style="list-style-type: none"> ↓ Less duplication of effort ↑ Earlier detection of defects ↑ Fast-test cycles (including UAT) ↑ Increased use of automation ↑ More focused, risk based testing 	<ul style="list-style-type: none"> • How much it costs to detect and remove a defect • How much it costs to execute a test case • How efficient the test CoE is internally 	<ul style="list-style-type: none"> • Defect removal cost • Cost per test case • Test case preparation and test case execution efficiency • Test CoE staff utilisation • Test effort planned v actual

8. Key considerations in setting up a test CoE

Once it has been decided to set up a test CoE the following are some of the key elements that go into making an integrated test CoE:

A. Organisation design – How will the testing group be organised internally and interact with other IT and business groups to drive change throughout the organisation?

B. Test process optimisation – How will testing be carried out in your organisation to reflect your software development lifecycle(s)?

C. Internal test CoE processes – How will the test CoE be managed and governed to ensure maximum return on investment?

D. Test tools – How will you manage the testing process in a way that optimises the re-use of test artefacts, the generation of test metrics across the organisation and manages the cumulative knowledge of a diverse team of testers and systems?

E. Reporting and key performance indicators (KPIs) – How to measure success?

F. Test CoE resourcing and career model

- How will you retain and grow a team of dedicated test professionals and ensure they are employed in the most efficient way?

A. Organisation design

The main aim of a test Centre of Excellence is to consolidate individual pockets of testing in an organisation into a central expert group that will supply services back to the business on a project by project basis. There are many advantages to this approach, including:

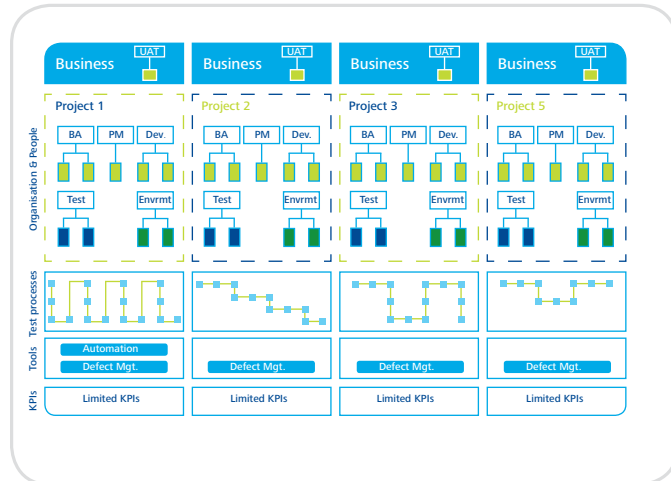
- Uniform quality across the group
- Clear responsibility for delivering test projects
- Career structure for testers
- Increased tester capability, skills and knowledge base
- Alignment to a single process
- Vendor consolidation
- Better/increased use of test tool and knowledge management systems

The page overleaf describes the key characteristics of a typical silo model where testers reside in each development domain and a test CoE model where testers are centralised and resourced to domain teams as required.



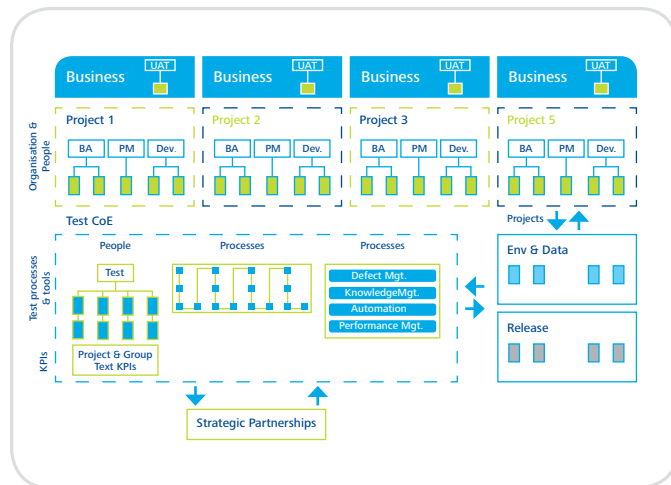
Typical operating model characteristics

- Individual project test teams
- Variety of test processes and approaches
- Limited use of test tools
- Multiple environment management approaches
- Limited test KPIs
- Limited number of 'professional' testers
- Project driven sourcing approach
- Limited knowledge sharing and best practices
- Over reliance on business SMEs



Final state operating model characteristics

- Centralised, professional testing organisation providing test services
- Standardised test processes and approaches based on approved SDLCs
- Test CoE adopted for all projects
- Widespread test tool usage
- Single environment management approach and team
- Project and organisation wide test KPIs
- Organisation wide strategic sourcing
- Widespread knowledge sharing and best practices
- Reduced reliance on business SMEs
- Testing seen as desirable career path with appropriately trained professionals

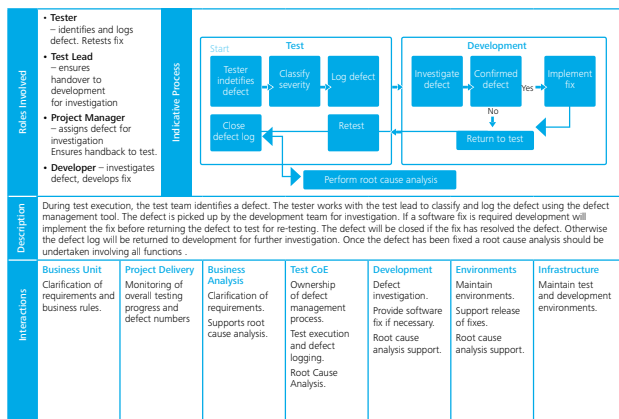


B. Test process optimisation

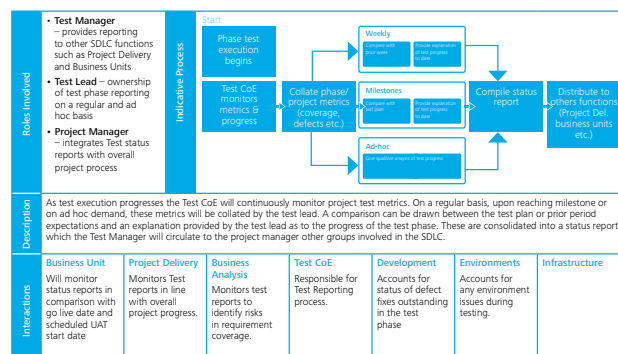
A test CoE should have defined processes covering the end to end testing cycle for your organisation, typically these processes will align to the type of development model within your organisation be it a traditional waterfall software development lifecycle (SDLC), Agile or both. Indeed, a

well-designed test CoE should be able to manage testing across all of the SDLCs in use by your organisation. In optimising the testing process, the end to end test lifecycle of test planning, test preparation, test execution, test management and control and test closure are examined in detail.

Defect management process



Reporting process



A test CoE should also have a number of internal processes and capabilities to ensure that the group is run in an organised and efficient manner, focusing on results and continuous improvements.

C. Internal test CoE processes

A test CoE should also have a number of internal processes and capabilities to ensure that the group is run in an organised and efficient manner, focusing on results and continuous improvements. These processes can vary depending on the organisation and level of maturity but the following are some of the key processes that should be present in every CoE organisation:



Quality assurance

A quality assurance process ensures the quality of the test project is aligned with the quality goals of the organisation and ensures testing meets the standards required. Quality checks and reviews should occur at all stages and should start as early as the development of test strategy document. Monitoring of quality in the CoE is carried out by test QA specialists in formal reviews but is also the responsibility of all resources involved in testing through structured peer review processes.

Continuous improvement

A continuous improvement process seeks to ensure that the test CoE constantly evolves and grows to provide a quality service to the organisation at all times. The process mines operational information from lessons learned during testing projects and focus groups of testers, business users, developers, business analysts and other stakeholders. Areas for improvement are identified through these focus group workshops. Recommendations to be implemented are analysed and once agreed, improvements are planned and the change is implemented and constantly monitored.

Knowledge management

One of the key challenges in a large test organisation is the management of test knowledge and artefacts to ensure that testing can be carried out efficiently and is not 'locked' into experienced staff. A knowledge management platform and a process to categorise, manage and maintain knowledge is a key element of a test CoE.

Vendor management

Depending on the size of the test team and the number of test suppliers being used, a vendor management process could be useful to increase cost efficiency and provide value for money. In order to maximise the benefit and reduce the cost, vendors offering services to the test CoE should be actively managed through centralised standardised contracts for service which will be reviewed on a regular basis.

Metrics and performance management

In order to assess the quality of software products under test and update stakeholders on testing status, it is important to have standardised reporting and metrics. A reporting and performance management process providing meaningful and timely information is an essential part of a test CoE.

A test CoE should:

- Develop, maintain and communicate standard templates of testing-specific reports for projects, programs and releases.
- Establish, maintain and communicate metrics across all test phases.
- Enforce utilisation of standard reporting and metrics templates for test status reporting across test teams.



D. Test tools

Test tools enable the test team to deliver consistently high standard results through the reduction in redundant activities such as the recreating of test scripts, the building of a test knowledge base and the ability to automate similar tasks. Test tools will also enable management to get accurate and up to date information on test progress and bottlenecks and enable defect trend analysis driving improvements across all groups.

There are many test tools available on the market today, from full end to end integrated enterprise support tools that will manage all aspects of testing, to a number of high quality open source tools that can integrate with each other to provide all of the functionality required.

E. Reporting and key performance indicators (KPIs)

Reporting is a key output from the test CoE. Accurate and timely reporting will ensure that the test CoE is operating efficiently, will identify bottlenecks in systems or processes and will drive efficiencies across all groups. The following diagram shows a typical executive dashboard for a test CoE concentrating on metrics such as:

- Software quality
- Cost efficiency
- Project status
- Operational KPIs



F. Test CoE resourcing and career model

Resource development and management is a function of the test CoE that provides resources with the training needed to perform a specific job or task. It so provides a robust career development and performance management program that is important for attracting and retaining talent.



Estimates indicate that a defect discovered during early testing of the requirements is 50 to 200 times cheaper to fix than if it remains undetected until the user acceptance test stage.

Where do we start?

9. Elements of a test CoE programme

A test CoE requires commitment and buy-in from the entire organisation to be successful. A test CoE will not only aim to improve testing performance and testing value for money but will also provide metrics and analysis to drive efficiencies across the entire organisation. The drivers and benefits of a test CoE are often easy to define, however the overall costs of implementation in terms of time, money and senior executive commitment to the change can be harder to quantify. Before embarking on a large change programme like this we recommend a quick definition phase is carried out first to determine the suitability of a test CoE to the organisation. We also recommend developing a high level benefits case to ensure the programme has the correct level of sponsorship and support across the organisation.

Typically a test CoE programme will consist of the following phases:

- Healthcheck (if required)
- Test CoE definition
- Standardise processes
- Consolidate operations
- Transition support and optimisation

Healthcheck (if required)

A typical approach to implementing a test CoE begins with a health check of your current testing organisation. This comprises reviewing your current level of maturity, the applicability of a test CoE to your organisation and the main challenges and benefits this would bring. The health check can take two to four weeks depending on the size of the organisation.

Test CoE definition

Depending on the size of the organisation this phase can consist of four to eight weeks and requires an in depth review of the current state of the testing organisation, its interactions with the IT Group and the business as a whole. At this stage a high level business vision and benefits case to support the development of a full test CoE programme will be produced along with the organisation structure for the test CoE within the IT Group and wider organisation. A detailed programme implementation plan will also be drawn up at this stage.

Standardise processes

This phase can last from two to six months and includes a full review and redesign of the testing processes across the organisation. This phase also involves developing the key internal test CoE processes and an organisational test strategy that defines in detail the test policy within the organisation. At this stage, if the organisation does not have adequate test tools available, a tool selection process can be implemented. If the test CoE will include any element of outsourcing or supplier consolidation this will also be prepared and planned for in detail in this phase. Should the test CoE require tools or a preferred partner a sourcing stream can be run in parallel to this phase to ensure selection of the most appropriate resources.

Consolidate operations

Following the standardise phase the key processes and deliverables are operationalised to make them ready for rollout across the IT group and pilot projects are selected and launched. This phase can last between six and twelve months. At this stage key documentation such as templates and playbooks/tester guides will also be designed and produced and made available in a knowledge management system.

Transition support and optimisation

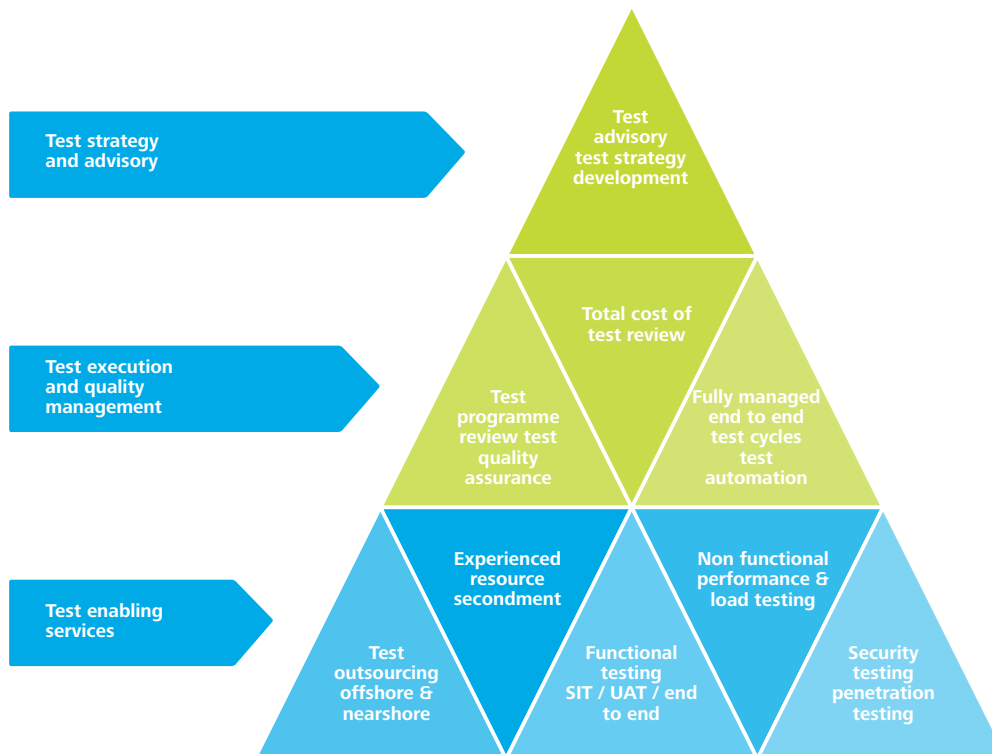
Typically the test CoE design team will work with the client for the initial rollout of the test CoE. This will ensure the process flows, templates and deliverables work as planned in an operational environment and that fast feedback loops are in place to make any necessary updates.

10. How Deloitte can help

Deloitte has supported numerous organisations in test process improvement initiatives and in setting up Test CoE. Our experience allows us to fast-track the development and roll out of a well-defined and organised test centre with the maximum chance of success. Our cross functional approach ensures that all areas are covered from organisational and process design, through to change management and even sourcing and advisory services for streamlining suppliers.

Our services cover the whole range of advisory, quality assurance and testing and our key focus is on providing our clients and their QA managers and development teams with the support and expertise they require to deliver the highest quality software products, to reduce risk to a minimum and keep their test phases on time and within budget.

Our services are grouped under three key headings – test strategy and advisory, test execution and quality management and test enabling services:



Other Deloitte testing practice publications

Software testing is easy and other myths

Dispelling the myths around software Quality Assurance, with practical suggestions on how to improve your overall QA process.

The top 10 myths of software testing

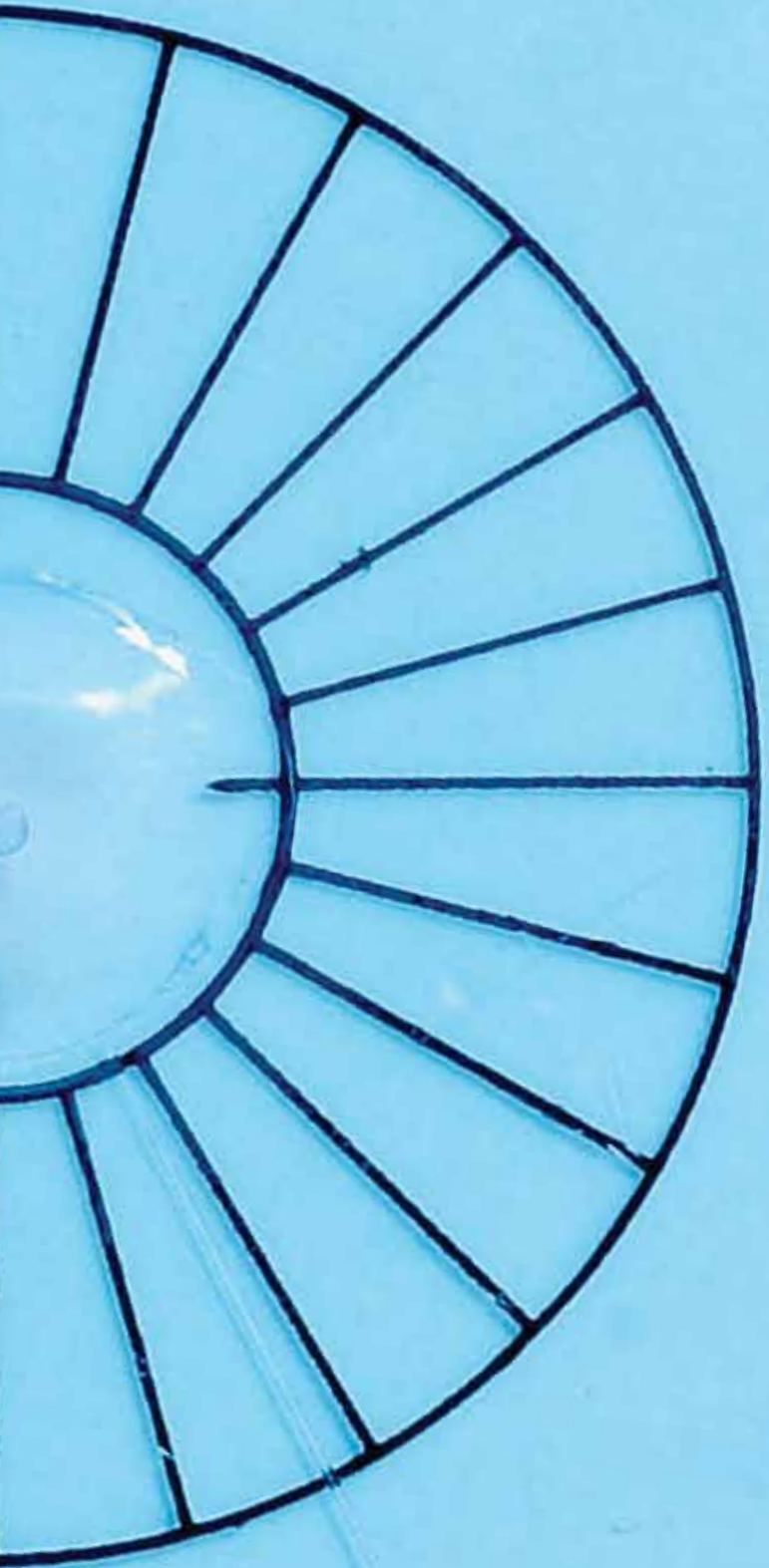
1. Quality Assurance = testing.
2. The goal of software testing is 100 percent defect-free code.
3. Testing is easy. Anyone can test.
4. Automation eliminates the need for manual testing.
5. Performance testing can only be performed during the last stages of development.
6. Overlapping test phases saves time.
7. Security testing is the job of security experts.
8. Bigger is better – more scripts mean better testing.
9. Analysts document. Developers code. Testers test.
10. Offshoring the QA function is an easy way to reduce the cost of testing.

Test Centre of Excellence - What are they and how can they benefit your organisation?

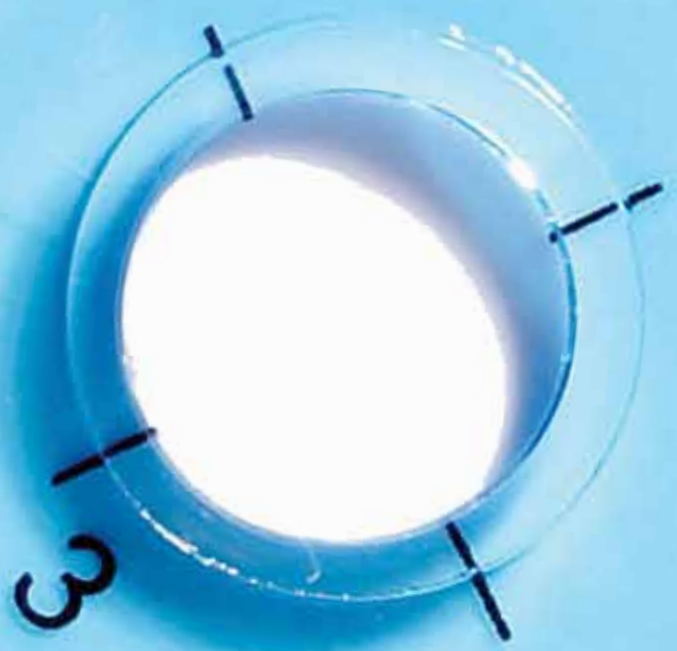
Countering the increasing complexity and cost of testing with Test Centres of Excellence



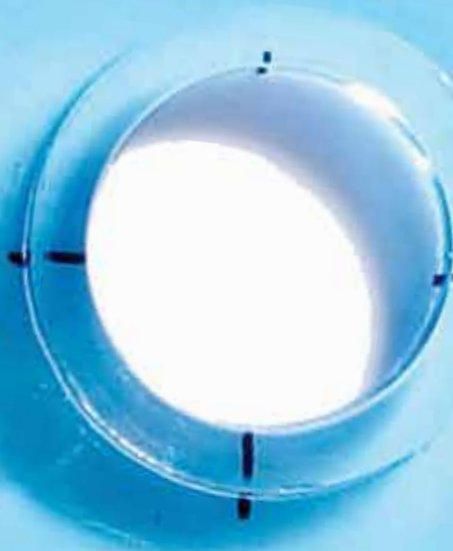




5.5



2.5



2



1.5



8

Our services cover the whole range of advisory, quality assurance and testing and our key focus is on providing our clients and their QA managers and development teams with the support and expertise they require to deliver the highest quality software products, to reduce risk to a minimum and keep their test phases on time and within budget.

Contacts

For more details please contact:

Harry Goddard
Partner, Management Consulting
T: +353 1 417 2589
E: hgoddard@deloitte.ie

David Cass
Senior Manager, Management Consulting
T: +353 1 417 2629
E: dcass@deloitte.ie

Malcolm Carter
Senior Manager, Management Consulting
E: mcarter@deloitte.ie

Audrey Mullan
Senior Manager, Management Consulting
E: amullan@deloitte.ie

Jeremy Kearney
Manager, Management Consulting
E: jekearney@deloitte.ie

Dublin
Deloitte & Touche
Deloitte & Touche House
Earlsfort Terrace
Dublin 2
T: +353 1 417 2200
F: +353 1 417 2300

Cork
Deloitte & Touche
No.6 Lapp's Quay
Cork
T: +353 21 490 7000
F: +353 21 490 7001

Limerick
Deloitte & Touche
Deloitte & Touche House
Charlotte Quay
Limerick
T: +353 61 435500
F: +353 61 418310

www.deloitte.com/ie



Deloitte refers to one or more of Deloitte Touche Tohmatsu Limited, a private company limited by guarantee, and its network of member firms, each of which is a legally separate and independent entity. Please see www.deloitte.com/ie/about for a detailed description of the legal structure of Deloitte Touche Tohmatsu Limited and its member firms.

Deloitte's 1,200 people in Dublin, Cork and Limerick provide audit, tax, consulting, and corporate finance to public and private clients spanning multiple industries. With a globally connected network of member firms in more than 150 countries, Deloitte brings world-class capabilities and high-quality service to clients, delivering the insights they need to address their most complex business challenges. Deloitte's approximately 182,000 professionals are committed to becoming the standard of excellence.

This publication contains general information only, and none of Deloitte Touche Tohmatsu Limited, Deloitte Global Services Limited, Deloitte Global Services Holdings Limited, the Deloitte Touche Tohmatsu Verein, any of their member firms, or any of the foregoing's affiliates (collectively the "Deloitte Network") are, by means of this publication, rendering accounting, business, financial, investment, legal, tax, or other professional advice or services. This publication is not a substitute for such professional advice or services, nor should it be used as a basis for any decision or action that may affect your finances or your business. Before making any decision or taking any action that may affect your finances or your business, you should consult a qualified professional adviser. No entity in the Deloitte Network shall be responsible for any loss whatsoever sustained by any person who relies on this publication.

