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Test Planning in a High Paced IT World

QAI Quality Engineered Software and Testing Conference Chicago 2009

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Deloitte Consulting LLP
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Workshop Objective

Good planning is always the cornerstone for driving long term success in any effort and testing is no different. A good test plan should cover three core topics:

- Coverage
- Delivery
- Organization

These further involve several critical drivers to successful test planning. In today's high paced and ever changing IT landscape, many organizations often shortchange or struggle with various aspects of the test planning lifecycle.

These items include: definition of test scope/coverage, establishment of a formal test planning methodology, development lifecycle involvement, resource and budget estimates, design of high quality test plans and scripts.

During this workshop you will participate in a series of interactive discussions and real world situations to get a better understanding of the best practice frameworks, practical approaches, and key considerations involved with the art and science of the test planning process.

What is the cost of software bugs to the US economy?

How does the cost of a production defect relate to the cost of a design defect?

Why Plan?

Lack of planned testing costs businesses and overall US economy billions of dollars and exposes businesses to significant risks.

Poor Planning — Some Known Examples

Ariane 5 – Flight 501 Failure

The extensive reviews and tests carried out during the Ariane 5 Development Program **did not include adequate analysis and testing** of the inertial reference system or of the complete flight control system, which could have detected the potential failure.

Source: Wikisource

eBay suffers a 22-hour system crash

EBay's crash was traced to a glitch in software from Sun resulting in the corruption of information in an Oracle database. There was a **known bug — as well as a standard fix that eBay failed to make**.

Source: Business Week

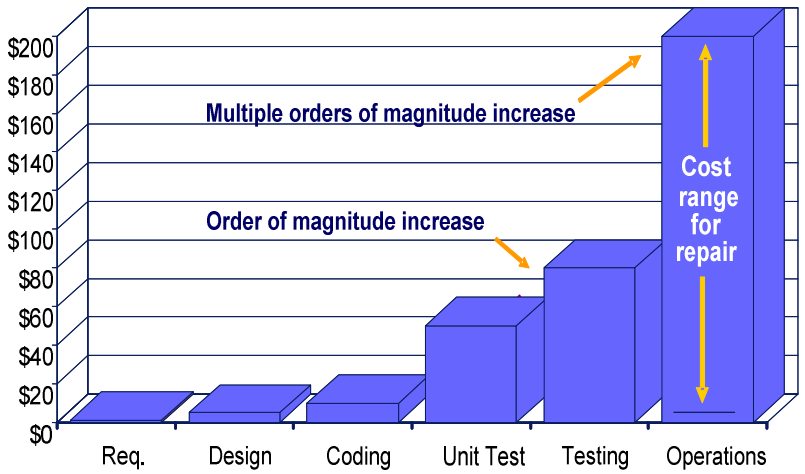
Intel Pentium Floating Point Divide

A silicon error causes Intel's Pentium chips to make mistakes when dividing floating-point numbers within a specific range. Intel eventually agreed to replace the chips for anyone who complains — **the bug ultimately cost the company $475 million**.

Source National Institute of Standards and Technology

Cost of Poor Planning — Key statistics

Software bugs cost the U.S. economy an estimated $59.5 billion annually, or about 0.6 percent of the gross domestic product.*



- Faults discovered in Production are 50 times more costly than faults discovered in the Design stage
- QA conducted peer reviews catch about 60 percent of defects and at a much lower cost

*NIST - http://www.nist.gov/public_affairs/releases/n02-10.htm

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In a High Paced IT World...

You are a QA Director in a fortune 500 company...

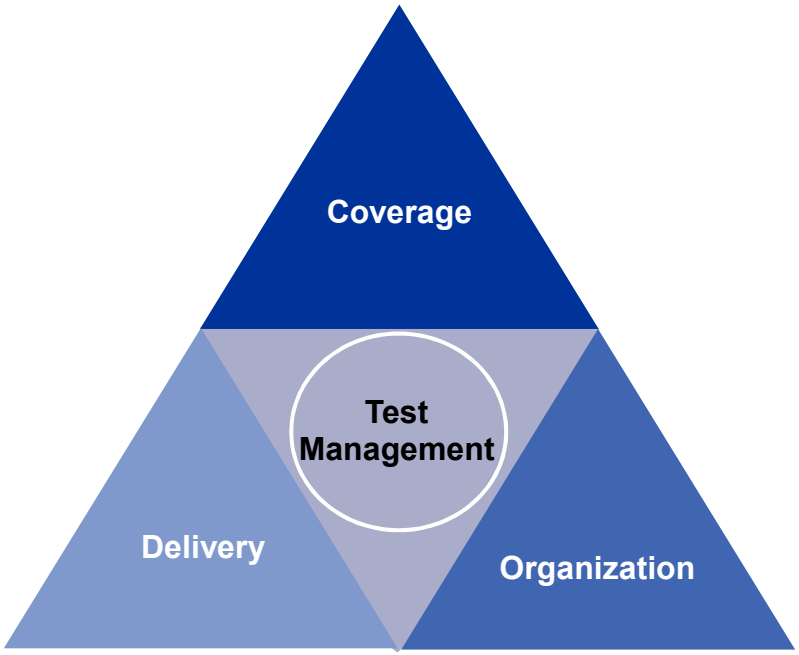
You have just been asked to lead a comprehensive testing initiative for a $100mm program to help integrate the company your employer just acquired.

You are just beginning to conduct the necessary due diligence and understand the impacts of this request.

What are some of the first questions that you will try to address in planning for testing the future integrated IT environment? What are some of core guiding principles that must be established during initial planning stages to guide the testing delivery of this initiative?

Test Planning Overview

A good test plan should cover three core topics — Coverage, Delivery, and Organization



Coverage
- What should testing cover?
- What should not or cannot be covered?
- What areas should be more deeply (vs. broadly) covered?
- How should test coverage change over time?

Delivery
- What project activities should QA influence?
- How does QA interface with other enterprise methodologies?
- How should different testing types be organized into phases?
- Which tests should be automated?
- What does it take to be ready to test (test data, environments, support)?
- How to measure and monitor testing progress?

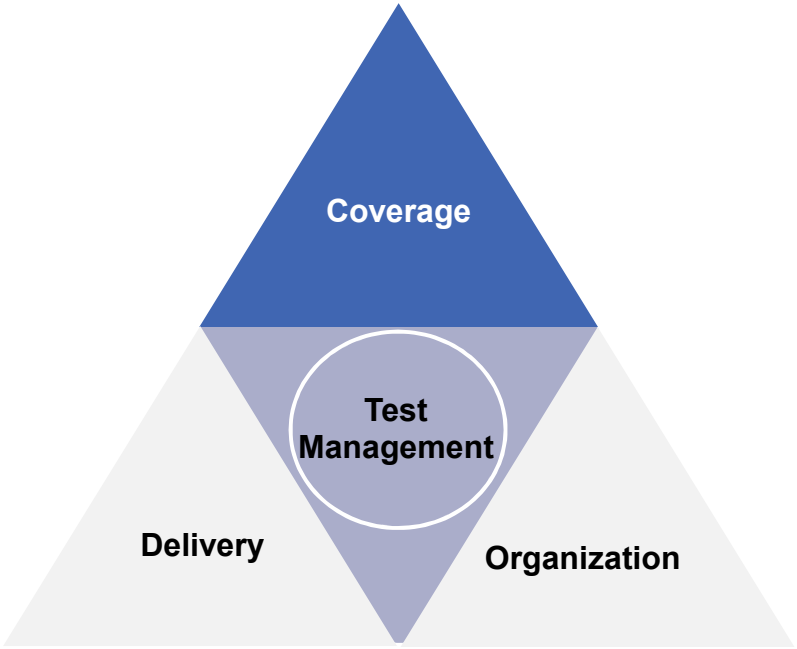
Organization
- What aspects should be centralized or decentralized?
- Who is the real customer for QA?
- How should QA relate to other stakeholders?
- How can QA deal with increasingly complex and global organization structures?
- How should QA positions be staffed or sourced?

Testing Approach Guiding Principles

Our overall Testing Approach is predicated on the underlying principle that "quality must be built in, not tested in."

Key Guiding Principles of Our Testing Approach

Business Ownership and Accountability is Critical	Testing is owned by the business and is a function of the business with exception to performance, scalability and non-functional testing
Push Forward Critical and High Risk Functionality	Prioritizing high risk and critical functionality to the front of the test cycles, to reduce risk and provide for additional time to resolve most critical functionality to avoid big set backs
Anticipate Test Environments	Testing environments and infrastructure build out is not treated as a one time activity. It needs to be continuously adjusted and scaled
Governance & SLA's are Prerequisites to Success	A well defined governance model and SLA's are established and are critical to ensuring the appropriate foundation is in place to drive quality and risk related decisions
Move Testing Upstream	Testers will be involved as far upstream in the systems development lifecycle as possible to implement prevention activities as well as detective activities
Automate to Drive Standardization	Testing will leverage as much automation as possible when appropriate to drive standardization and repeatable results
Continuously Synchronize	Continuously evolve and update defect management and environment plans throughout testing to re-synch / adjust development priorities and environment specifications
Test Data is Critical to Effective Testing	Test data will dictate the breadth and quality of the testing. Appropriate management results in traceable and repeatable tests
Performance Testing is Platform, Not Application Testing	Performance and stress tests focus on the platform - it looks at how the application operates within its target environment
Exercise Full Business Process Lifecycle Early and Often	Push to integrate and test the full business process lifecycle as early and often as possible


Coverage
Test Management
Delivery
Organization

In a High Paced IT World...

You are a QA Director in a fortune 500 company...

Earlier in the week you received and email from Julie (CTO) expressing her concern with integrating applications from the acquisition. She wants you to make sure that all150 impacted applications are fully tested.

An initial estimate from your Managers would require you to double your testing budget to accommodate the increase scope of this request.

What aspects or key considerations should you outline to the Julie as it relates to explaining the impacts on Testing scope and coverage?

Ensure coverage of business intent

Define testing scope and coverage in business terms and not technical terms.

Key Challenges

- Business is either not aware or does not understand what is getting tested and what is not
- Applications are thoroughly tested but operational procedures do not get verified
- Too much time is spent testing complex technical functions with little business value
- Key business issues, regulatory compliance requirements, operational controls etc. are not adequately verified
- Far too often, business gets a technology solution that does not meet their needs or does not fit in their operational environment

Best Practices

- Scope and intent of testing should be defined collaboratively with Business and not Technology; Systems should meet the business flow and not vice versa
- Scope and components of testing should be defined in terms of operational processes and business capabilities so that Business can understand them
- Business oriented scope definition will encompass applications, infrastructure, vendors and partners
- Spend testing dollars on areas of greatest business value and risk (see risk based testing later in the presentation)
- Ensure that critical business priorities are represented in testing scope even if it is technically trivial to verify them
- Business should explicitly approve the scope of testing as well as participate in the review & signoff of test cases

Determine constraints that restrict test coverage

Determine environmental, budget or other constraints and how they impact overall test coverage. Ensure that program leadership and business understand and accept the impacts on test coverage and corresponding risk.

Some known constraints

Budget

- Budgets limit how much testing can be performed
- Budgets may change mid-stream

Special Applications

- Packaged applications limit testing capabilities due to lack of access to designs and data models
- Some network and telephony applications may not be directly testable

Staff

- Skilled testers may not be available in-house
- Resources may be engaged in other business activities

Test Environment

- Lack of environments for E2E testing
- DMZ, network constraints
- Lack of scaled infrastructure for performance testing

Time

- Inadequate time available for testing
- Scope and schedule may dynamically change

Inadequate Requirements

- Lack of upfront analysis, designs and adequate requirements limit information available to testers to plan for testing

In a High Paced IT World...

You are a QA Director in a fortune 500 company...

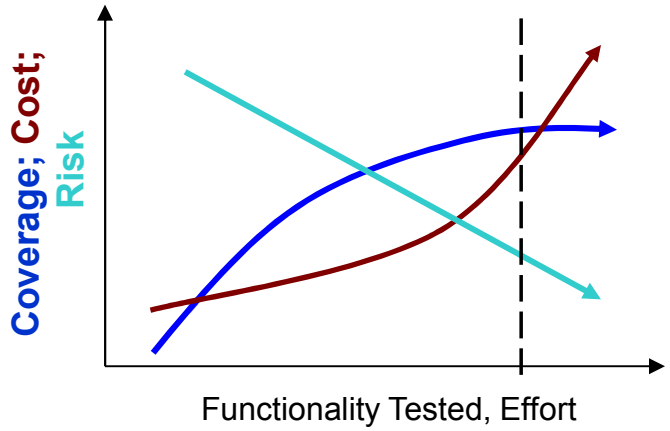
Tom (CFO) calls you for a meeting and says:

"In a steering committee meeting on the acquisition-integration program Jim (CEO) informed us that we intend to make more acquisitions in the near term. He wants us to conserve cash.

Tom informs you that he like you to take 20% off your current budget for testing of the acquisition-integration program. Tom asks, "What can you do to shave off 20% while continuing to deliver on the same project scope?"

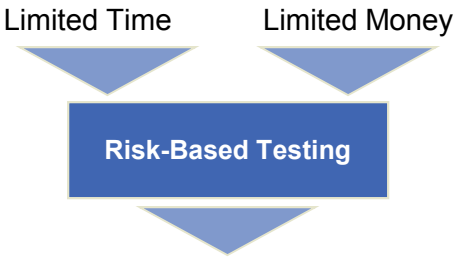
Maximize coverage and minimize business risk through prioritization

Prioritize testing based on business and operational risks.



Organizations must have the ability to choose the right amount of testing, balancing cost and risk

Employ scarce enterprise resources efficiently to minimize business risk



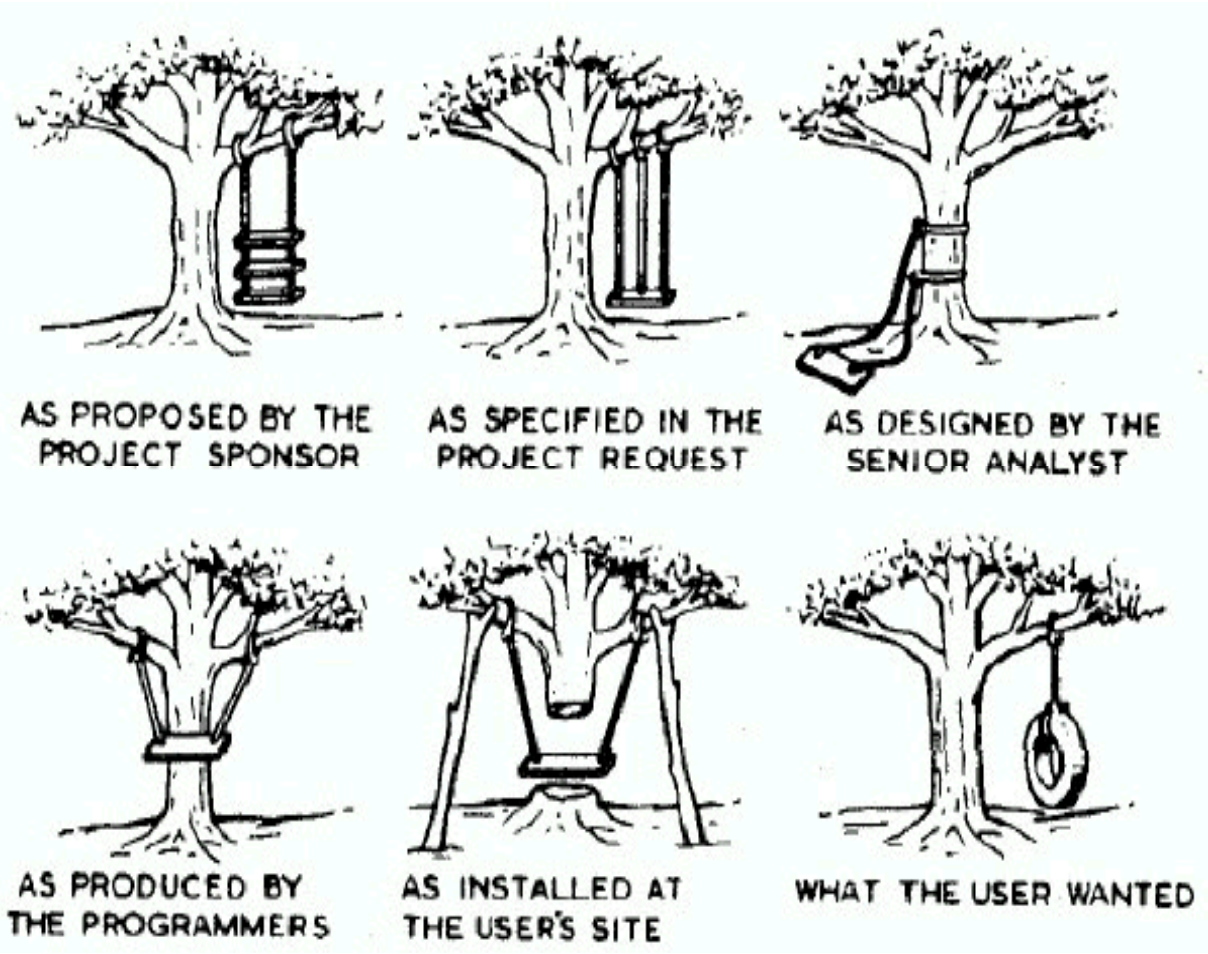
Risk Based Testing Approach

- QA works with the business to identify business risks
- Business prioritizes risks
- QA determines testable parts
- QA maps testable parts to prioritized risks to determine testing priorities
- QA publishes test results and metrics against prioritized business risks

Benefits of Risk Based Testing

- Maximizes test coverage by focusing testing dollars on areas of highest business risk and value
- Allows the business to understand risk tradeoff as timeframes and budgets become compressed
- Recognizes upfront that it is not possible to test everything
- Provides a way to trace risk coverage through high level requirements to test cases and defects
- Provides a common language of communication between QA and Business

Good requirements are a cornerstone to accurate test coverage and overall delivery



- 60% – 80% of project failures can be attributed to requirements errors
- 33% – 64% of all software errors are requirements errors
- Finding and fixing requirements errors consumes between 70% - 85% of total project rework costs

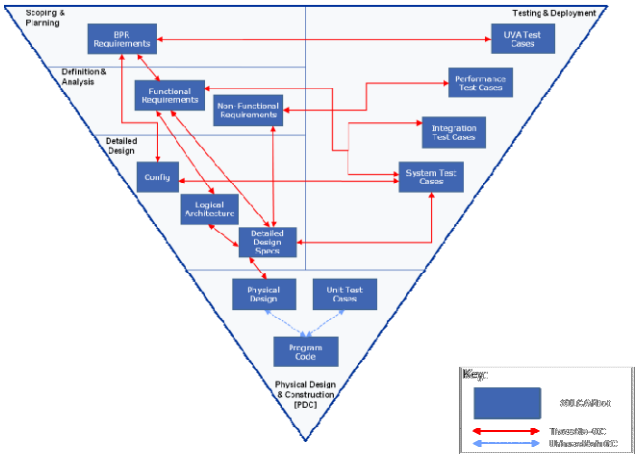
—Gartner, 2005 and SEI, 2004

Track detailed coverage through traceability to well written requirements

Ensure testable and quality requirements — that can be traced back to for determining test coverage.

Why do we need Requirement Traceability?

- Ensure that testing covers the defined requirements
- Ensure that all SDLC activities are based on the business requirements
- Understand end-to-end impact of a change in requirements
- Verify the implementation against pre-defined requirements



Traceability rests on the foundation of well defined and good quality requirements

Criteria	Definition
Unambiguous	The reader of a requirement statement can draw only **ONE** interpretation of the final product
Correct	Each requirement must accurately describe the business intent or the functionality to be delivered
Testable	Completion or fulfillment can be proved through validation
Complete	No necessary information should be missing from requirements
Internally Consistent	Different requirements should not conflict with one another
Ownership	Requirements should be owned by an authorized person and/or Technical Subject Matter Expert
Traceable	Requirements should be appropriately traced
Prioritized	Requirements should be appropriately prioritized by the key stakeholders

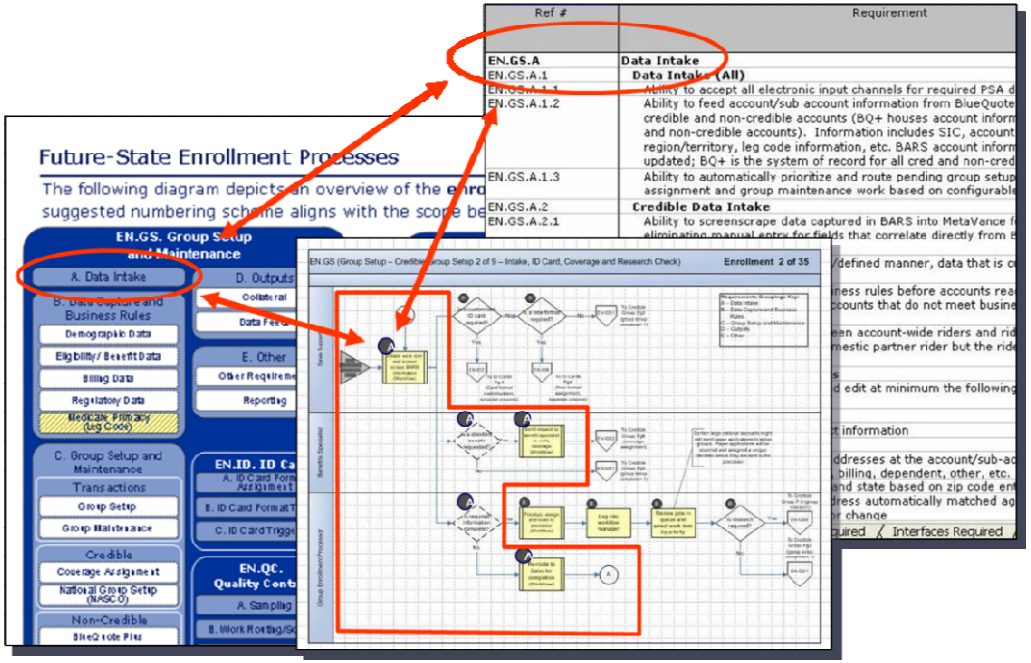
Cover E2E business capability in a release

Determine what business functions are getting deployed at what stage (release) in the program and plan to completely test the underlying business capabilities.

- Usually business capabilities are delivered in multiple releases
- Only a part of the entire business process may be delivered in a certain release
- Determine the end-user impact of the specific release
- Test the E2E business functionality to the extent that it is delivered in a release

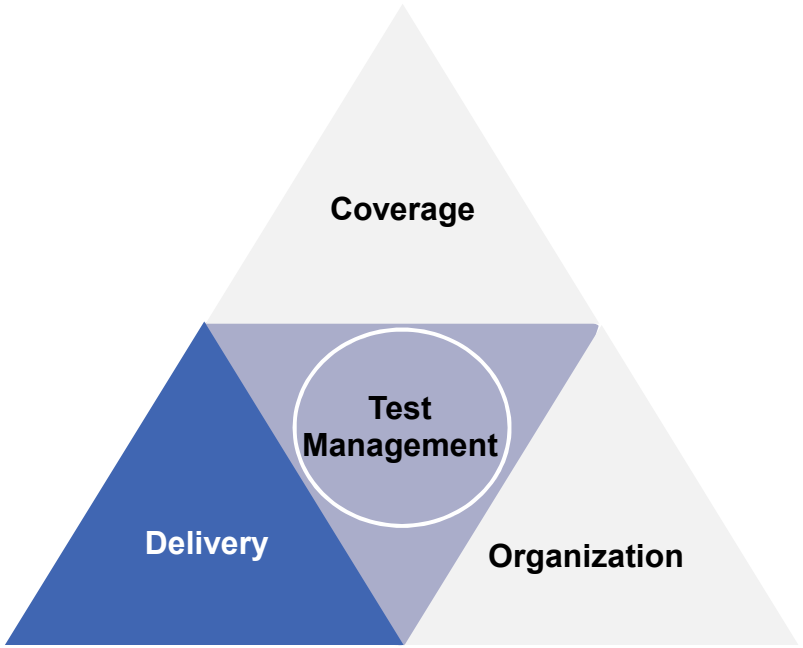
Example

- Consider an online accounting opening system for opening a Certificate of Deposit
- In release 1 the Bank accepts applications online but manually opens the account
- In release 2 the account is automatically opened in the system.
- Release 1 testing should include manual steps in the account opening process and should not be restricted to online application
- Release 2 testing should test E2E account opening



Coverage — Recap

- **Ensure coverage of business intent.**
  - Define testing scope in business terms and not technical terms
- **Determine constraints that restrict test coverage**
  - Determine environmental, budget or other constraints and how they limit test coverage. Ensure that program leadership and business accept the risk
- **Maximize coverage and minimize business risk through prioritization**
  - Prioritize testing based on business and operational risks
- **Track detailed coverage through traceability to well written requirements**
  - Ensure testable and quality requirements — that can be traced back to for determining test coverage
- **Cover E2E business capability in a release**
  - Determine what business functions are getting deployed at what stage (release) in the program and plan to completely test the underlying business capabilities


Coverage
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In a High Paced IT World....

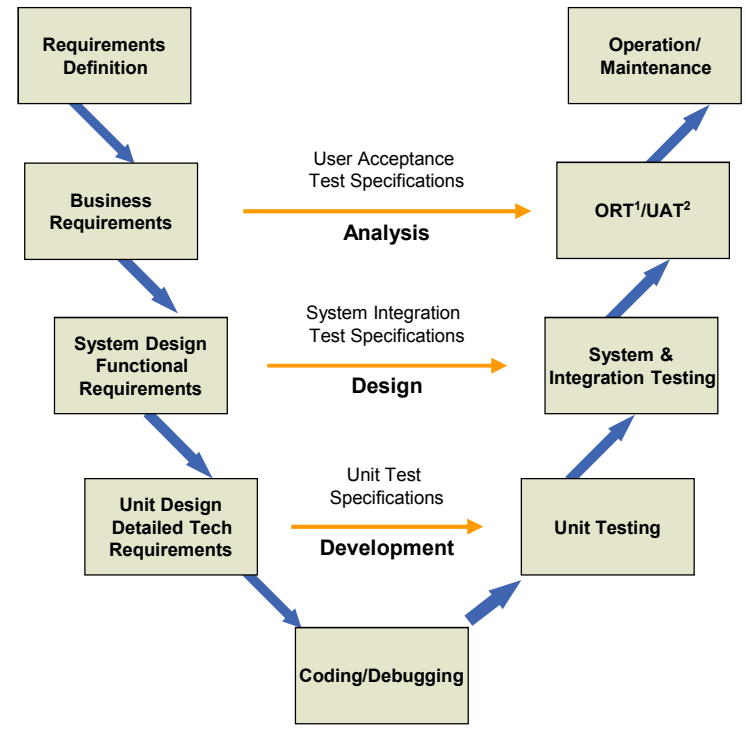
You are a QA Director in a fortune 500 company...

As a part of the acquisition integration effort, the IT process team plans to rollout a revised enterprise wide software delivery methodology to support the acquisition integration program. The IT Process Lead asks you “What do you consider to be the key methods, approaches and components associated with role of testing in different phases of IT Delivery?”

Plan to integrate QA in all aspects of delivery

Quality assurance is not a phase, it is a mindset that should permeate all project/program activities.

Integrate quality assurance in all phases of the program. – as early in the life cycle as possible



[1] ORT stands for Operational Readiness Testing and includes performance, conversion and non-functional testing.

[2] UAT stands for User Acceptance Testing

Benefits of Integrating QA

When testing is built into the SDLC results will be:

- Lowered delivery cost
- Improved quality of delivery
- Increased customer satisfaction
- Greater resource productivity

Deloitte's Framework

Our comprehensive Software Quality Management framework addresses all elements of the Business Analysis and Testing lifecycle. It provides a roadmap of all quality-related activities and a context for organizing and mapping all methods and tools.

Software Quality Management

	Define	Design		Build	Test	Deploy	
	Planning and Requirements	Logical Design	Physical Design	Construction and Unit Test	System and Acceptance Test	Production Preparation	Installation and Post Installation
Business Analysis	**Conduct Requirements Analysis**	Consult Design, Development and Test Preparation			Support Test Execution and Triage		Monitor Processes Prepare Workarounds
Testing	Validate Requirements & Build Traceability	**Develop Test Plans and Prepare to Execute**		**Execute Testing**			Test Deployment & Production Readiness
Infra-structure	**Environment Management** **Test Data Management** **Automation** **Requirements, Defect, and Test Tracking** **Software Configuration and Release Management**						
CoE PMO	**Organization and Change Management**	**CoE Operations**					**Quality and Risk Management**

Align QA delivery processes with Enterprise methodologies and standards

Align and integrate with enterprise methodologies and standards for IT management and SDLC management. Ensure that timing of testing activities correspond to phases of the SDLC.

Systems Integration Playbook™

Delivery Management

- Project initiation, planning, and closure
- Project monitoring and control
- Risk management
- Issue management
- Decision analysis and resolution
- Change management
- External third-party support
- Onsite/offshore integration

Quality Management

- Quality assurance
- Metrics collection and reporting
- Deliverable review
- Defect prevention

Delivery Management

- Configuration management
- Architecture and data integration
- Data conversion

QA delivers in an Enterprise context

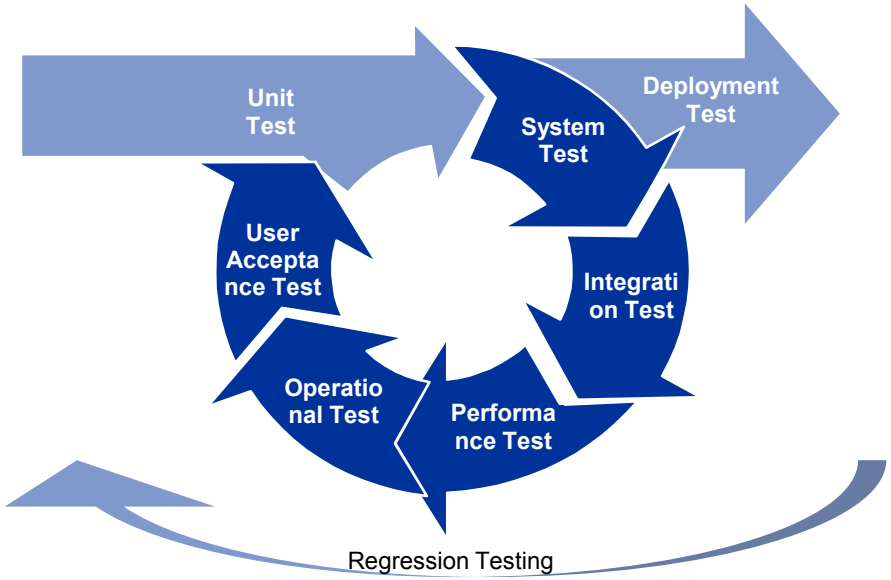
- Align and integrate testing methods and practices with other enterprise methodologies and standards. Examples: Delivery methodologies (Agile, SEI-CMM, RUP, etc.)
- Leverage enterprise tools for project management, defect management, requirements management etc.
- Ensure compliance with enterprise standards (e.g., architecture and technology standards, infrastructure standards etc.)

Alignment with Enterprise context helps

- Reduce delivery costs
- Minimize implementation risks
- Increase delivery efficiency
- Increase productivity
- Improve delivery compliance

Plan to deliver testing iteratively in phases to test as much as early as possible

Continually mitigate implementation risks through well planned test phases and iterative testing.



Some common testing issues:

- Non unit-tested code is delivered to QA
- UAT uncovers system integration issues
- Performance issues inhibit training
- Business asks “What prevented us from testing this earlier?”
- Little time is left to perform usability and process verification
- End-user is involved too late in life cycle

Best Practices (To avoid these issues):

- Define clear objectives for each test phase
- Define entry and exit criteria for each phase of testing
- Ensure accountability for each phase of testing
- Test as much as early as possible (key technical tests)
- Involve users for test execution early but not too early (allow the system to stabilize)
- Plan for multiple rounds of testing in each phase

In a High Paced IT World....

You are a QA Director in a fortune 500 company...

The acquisition integration program will deploy the core enterprise system (a package solution) across multiple geographies in 12 releases – one release every month.

The COO would like you to ensure new deployments do not impact ongoing operations. As the geographies start using the package most of them will make numerous minor modifications in the first couple of years.

Your Test Manager for Core Operations mentions that it takes them a week to test just 1 of the 12 modules. Testing all of the modules to ensure that there is no impact for each release will take a very long time.

Increase Test Delivery capabilities through automated testing

Plan for automation to achieve efficiency, consistency and scale in testing.

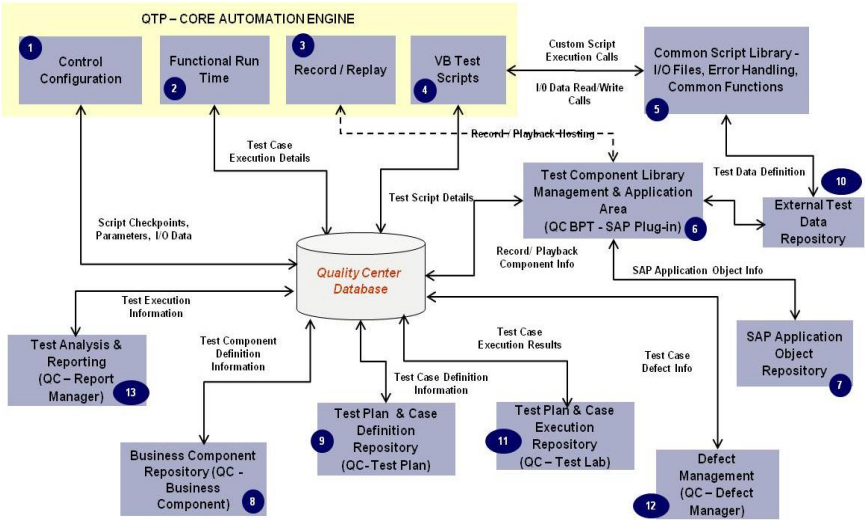
Testing Automation Objectives

- Greater ROI from testing dollars
- Faster time to market
- Improved quality and reduced risk
- Reduced testing costs (over multiple iterations)
- Increase coverage through regression library

Key Drivers

- Growing test case footprint
- Maturing code base
- High demand forecast for regression testing
- Resource constraints
- Increased time and cost of manual test execution

Recommended Test Automation Framework & Supporting Components



Key Challenges

- Acquiring and maintaining appropriate levels of management sponsorship
- Managing realistic expectations regarding payback period
- Inadequate test tool training
- Lack of a basic test process or understanding of what to test
- Testware maintenance issues and inadequate configuration management processes
- Management of ever changing test data requirements

Plan and prepare test data and test environments

Identifying, creating and managing test data and test environments is a key element of any test planning activity that must be carefully addressed.

Test Data — Test data will dictate the scope of the testing — prepare data early

Key Test Data Challenges

- Environments complexity and multiple data sources
- Sharing of test environments/data by multiple parties creates unpredictable state
- Privacy and security concerns around usage of production data vs. ability to accurately mock-up or alter test data in a production-like manner
- Inadequate tools to support data identification, creation, and management
- Lack of data ownership and stewardship

Address test data challenges with explicitly defined and planned test data management

Governance	Define test data governance, ownership, roles and responsibilities, communication plan and SLAs.
Refresh and Retention	Define test data refresh, time compression and backup requirements and methods
Partitioning and Security	Define data scrubbing and data isolation/allocation plans
Health Checks	Define steps to ensure data consistency and integrity
External Interfaces	Plan for simulation of interfaces and test data synchronization across multiple systems

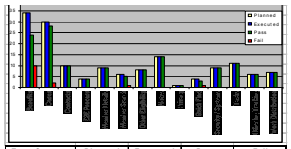
Test Environments — Plan ahead for test environments and scale/adjust as needed

- Plan well ahead of testing schedule — procurement time in most organizations is very high
- Plan for adequate number of test environments based on anticipated parallel testing efforts
- Maintain testing calendar per environment to schedule test execution on environments
- Plan to refresh and reset environments as needed
- Ensure test data governance in test environments
- Mirror production configuration to the extent possible

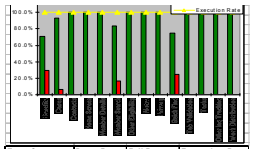
Measure testing progress through consistent and objective metrics

Outlining standard and measurable testing metrics as part of the Test planning effort will provide greater visibility, objectivity and accountability to understanding and addressing the "true" health of the overall testing initiative.

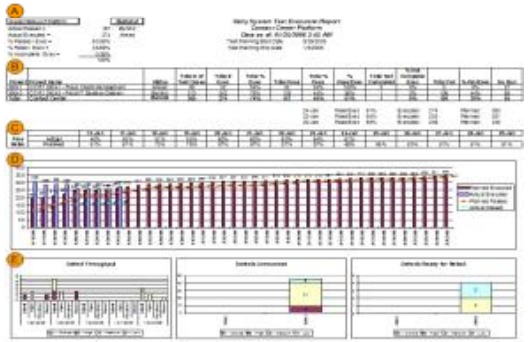
Test Execution (E2E Integration – Cycle 8: Limited Regression)
** Pass Rate includes Pass with Exceptions (P3/P4 Defects)*

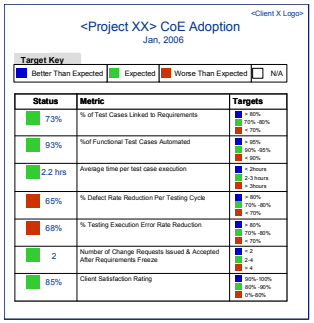


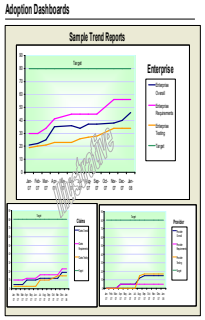
Test Cases	Planned	Executed	Pass	Fail
Benefits	34	34	24	10
Cases	30	30	28	2
Contacts	10	10	10	0
E2E Process	4	4	4	0
Member Details	9	9	9	0
Member Search	6	6	5	1
Other Eligibility	8	8	8	0
Notes	14	14	14	0
Privacy	1	1	1	0
Quick Find	4	4	3	1
Security / System	9	9	9	0
Tasks	11	11	11	0
Other Inq Tracking	6	6	6	0
Work Distribution	7	7	7	0
TOTAL	153	153	139	14



Test Cases	Pass Rate	Fail Rate	Execution Rate
Benefits	70.6%	29.4%	100.0%
Cases	93.3%	6.7%	100.0%
Contacts	100.0%	0.0%	100.0%
Home Screen	100.0%	0.0%	100.0%
Member Details	100.0%	0.0%	100.0%
Member Search	83.3%	16.7%	100.0%
Other Eligibility	100.0%	0.0%	100.0%
Notes	100.0%	0.0%	100.0%
Privacy	100.0%	0.0%	100.0%
Quick Find	75.0%	25.0%	100.0%
Tab Validation	100.0%	0.0%	100.0%
Tasks	100.0%	0.0%	100.0%
Other Inq Tracking	100.0%	0.0%	100.0%
Work Distribution	100.0%	0.0%	100.0%
TOTAL	90.8%	9.2%	100.0%







Key Metrics Types

- Executive dashboards
- Requirements metrics
- Test execution metrics
- Defect metrics
- Quality metrics
- Productivity/throughput metrics

Key Benefits

- Provides visability and transparency into testing
- Helps understand health of key applications and business processes
- Provides data to executive and business stakeholders to enable decision making in timely fashion
- Enables test teams to adjust test execution activites
- Provides standard set of test execution metrics ,definitions and reporting standards
- Drives a more consisent and efficient test planning and execution process
- Enables goal setting and tracking against these goals

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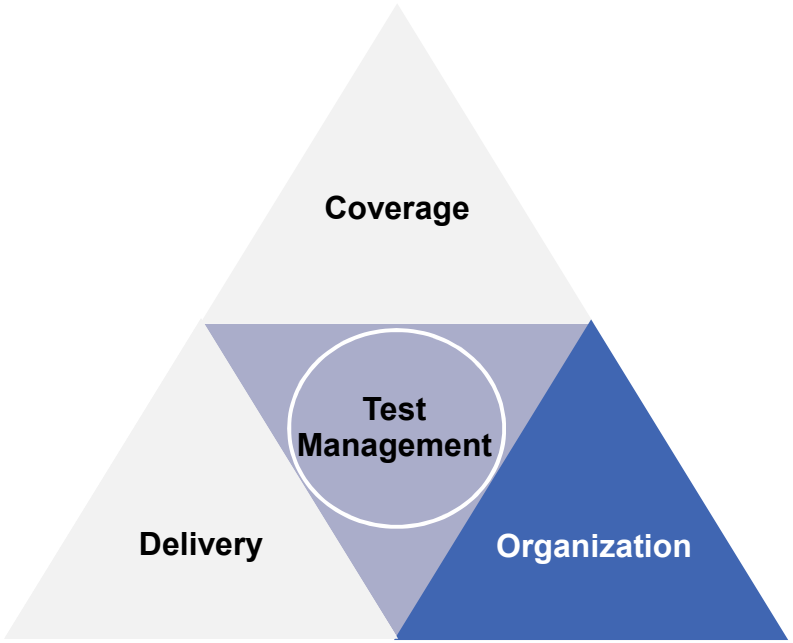
Delivery — Recap

- **Plan to integrate QA in all aspects of delivery**
  - Quality assurance is not a phase, it is a mindset that should permeate all project/program activities
- **Align QA delivery processes with Enterprise methodologies and standards**
  - Align and integrate with enterprise methodologies and standards for IT management and SDLC management. Ensure that timing of testing activities correspond to phases of the SDLC
- **Deliver testing iteratively in phases to test as much as early as possible**
  - Continually mitigate implementation risks through well planned test phases and iterative testing
- **Increase delivery efficiency through automated testing**
  - Make prudent investments in testing automation with ROI in mind. Testing automation needs advance planning and design
- **Plan and prepare for test data and test environments**
  - Identifying, creating and managing test data and test environments is a key element of any test planning activity that must be carefully addressed.
- **Measure testing progress through consistent and objective metrics**
  - Outlining standard and measurable testing metrics as part of the Test planning effort will provide greater visibility, objectivity and accountability to understanding and addressing the “true” health of the overall testing initiative


Coverage
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In a High Paced IT World....

You are a QA Director in a fortune 500 company...

The acquisition integration program is nearing the end of integration testing. Most of the testing will be completed in 8 weeks. Because of the 20% reduction in your budget you need to start ramping down your teams. However, 90% of your workforce is contractor based.

You are worried that you will lose skilled and trained personnel. You are specially concerned as the CEO has indicated the company's intent to make another acquisition in the short term.

Establish a centralized competency in testing

QA Organizations should establish a centralized testing competency center to achieve delivery efficiencies and control as per the needs of the organization.

Operating Model

Centralized

Operating Model

Decentralized

Organizational Models

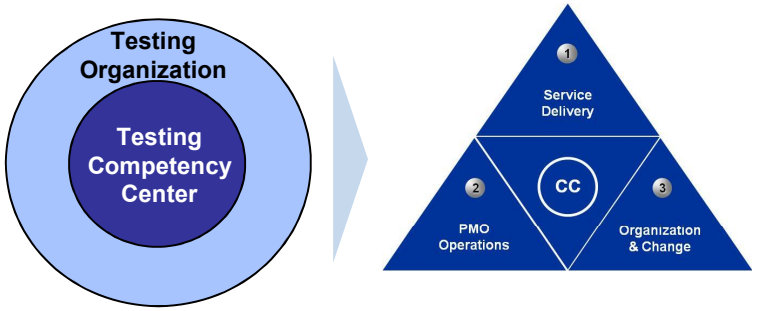
"**MANAGER**"
The Testing CC acts as the *manager* of testing activities, leading and managing all activities and operations related to enterprise testing

"**ARCHITECT**"
The Testing CC acts as the *architect,* proactively guiding the design and delivery of enterprise testing activities

"**REPOSITORY**"
The Testing CC serves as a knowledge *repository* for testing information, best practices, standards and tools

"**ORGANIC**"
The Testing CC has little involvement. The testing teams determine the most effective and appropriate way to integrate on a project by project basis

Testing Competency Center Framework



Aspects Governed By the Testing Competency Center

Service Delivery
- Deliver test planning and execution services

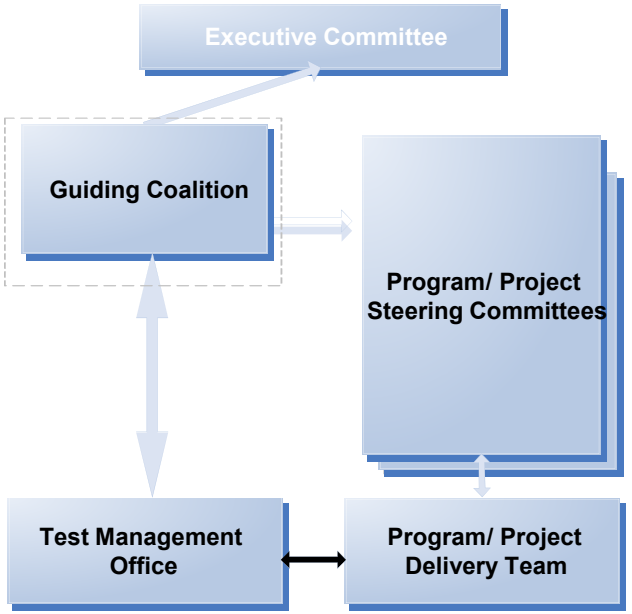
PMO Operations
- Manage testing activities

Organization and Change
- Build and develop organization and relationships

Set up test program governance and SLAs upfront

Organizations must define clear Testing Governance and SLAs at the outset of programs to drive successful long term outcomes. Strong and clear governance ensures: (1) overall alignment of testing effort with business objectives and (2) establishes decision making authority and (3) clearly identifies who is doing what and prevents overlaps.

Test Governance Model



Best Practices in Test Governance

- Business ownership and accountability is critical (business should review and approve key QA artifacts)
- Testing function should be independent and directly accountable to its customer — most likely the Business
- Decision making authorities should be explicit and clear
- Escalation paths should be clear and unambiguous
- Cross-program coordination should be facilitated through appropriate forums
- Should be flexible to meet the needs of large programs and BAU projects
- Should be consistently applied across the Enterprise
- SLAs should be explicitly documented and approved by the senior leadership
- Roles and responsibilities should be clearly defined and should align with performance management

Set up a test management function to consistently drive key QA processes

QA Organizations must clearly outline how supporting Test management processes and capabilities will work to align and support the overall Testing initiative

Quality & Risk Management

- Identify and prioritize risks
- Identify the impact of risks
- Develop mitigation plans and approach

Budget Management

- Estimate budget
- Allocate budget
- Provide greater certainty over schedule and cost

Resource & 3rd Party Supplier

- Provide resource for a wide range of skill sets\/ solutions
- Leverage strategic alliance with 3rd party suppliers and hire the right resources

Communication Management

- Communicate milestones and changes
- Communicate Risks, Issues and Action Items
- Communication specific escalation process
- Maintain contacts lists, mail boxes and email distribution lists and roles
- Methodology to communicate between multiple project teams

Best Practice & Standards

- Define best practice and standards on Test Definition and Test Execution
- Process and Methodology implementation
- Continuous process improvement

Status Tracking & Reporting

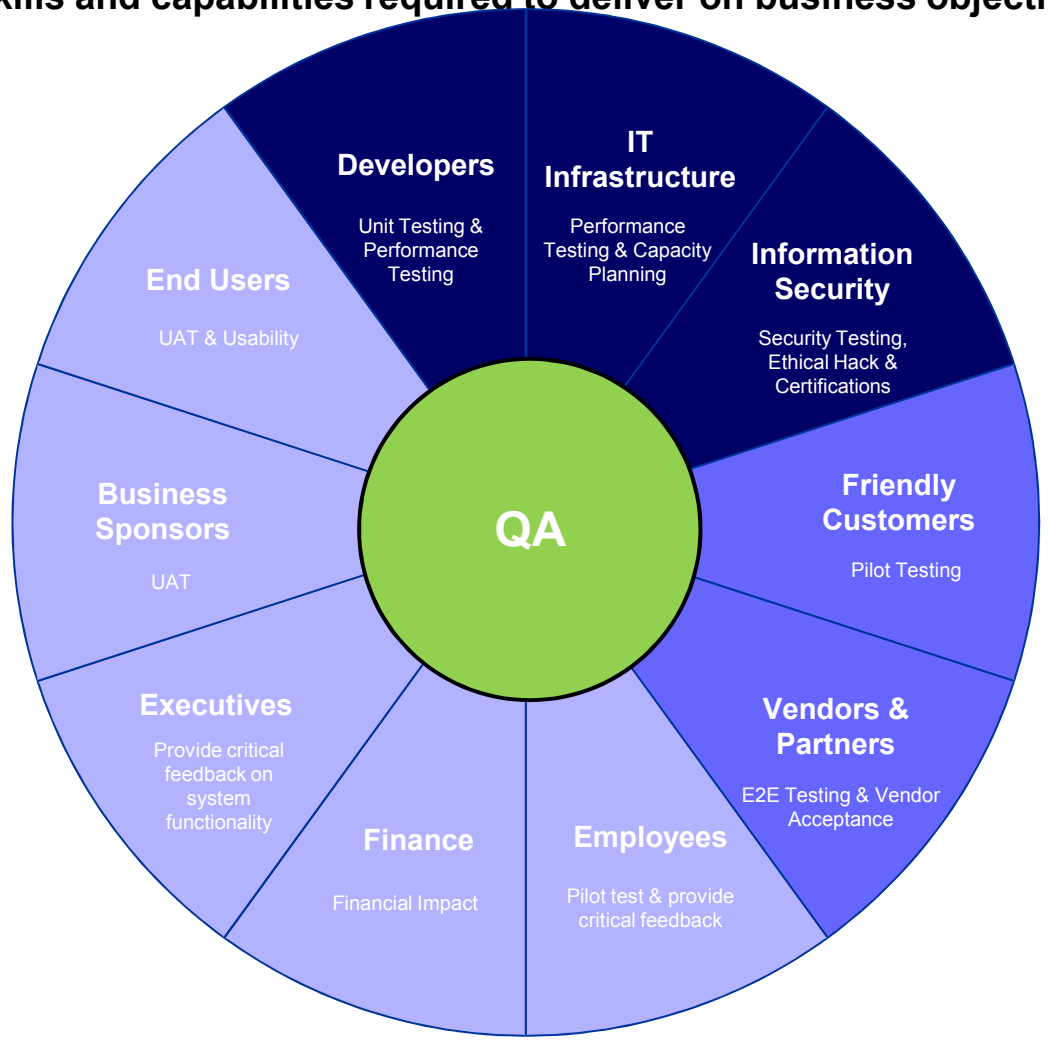
- Summarize results of all testing activities
- Publish Test Execution Plans and environment scheduling reports
- Publish defect metrics and test status

Knowledge Management

- Collect information and build knowledge repository
- Provide best in class advice to projects
- Constantly maintain and update Knowledge Repository

Extend testing organization by harnessing capabilities from other departments

QA Organizations must look to incorporate other organization elements extend the QA organization by involving developers, end users, executives etc. in the Test delivery process as key performers - while QA retains the overall QA responsibility. This helps to more broadly leverage various skills and capabilities required to deliver on business objectives.



Leverage capabilities from other geographies

Most IT organizations are spread globally and QA Organization should leverage QA resources across geographic boundaries to support delivery

Challenges in Managing Global Deliveries

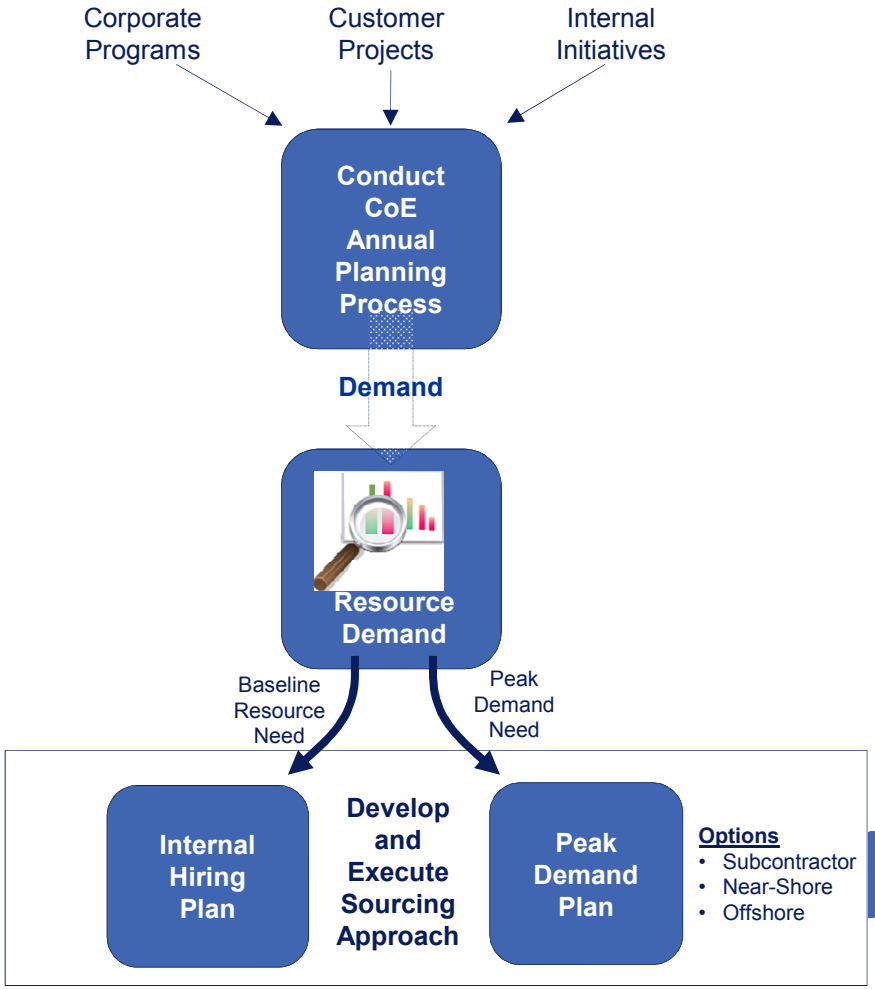
- Cross border QA poses some unique challenges around test management – specifically in environment and configuration management
- Coordinating testing processes across locations is a challenging task
- VPN issues may lead to delays in completing the testing
- Performance issues
- Time zone difference is an advantage and a challenge. Needs more coordination and management

Benefits of Global Delivery

- Occasionally globally coordinated testing is a necessity due to globally scattered functions
- Strategic relationships and partnerships with near shore and off-shore vendors
- Delivery can be located where it is cost effective
- Capabilities and skills are leveraged where they are most competitively available
- Offshore centers provide round the clock productivity
- Global delivery offers business resilience specifically for large multi-year and BAU efforts

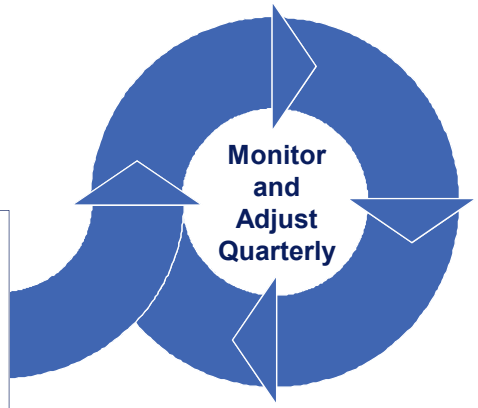
Manage demand and supply of skilled QA resources

QA Organizations should account for all relevant aspects of Testing demand (corporate programs, customer projects, internal initiatives) and forecast and adjust supply (employees, contractors, other geographic locations, offshore) to meet the end business objective



Demand and Resource Management Best Practices

- Align annual planning with corporate release planning processes
- Identify guidelines for roles appropriate to near and off-shore
- Establish preferred sub-contractor, near-shore, and off-shore relationships
- Institute a formal demand and sourcing review process at least quarterly
- Institute a rigorous justification process to evaluate requests for a change in the annual plan (i.e., akin to formal change control)



Hire skilled testers

QA Organizations must recognize that not everyone can be a good tester. Testing is a specialized skill and requires its own type of background, experience and mindset.

Attitude and Mindset

Attitude: Attitude is a soft skill, and it is critical to develop other capabilities and skills.

Mindset: The key attribute of a great software tester is a Testing Mindset — Elusive quality of QA is focused on **"How can I make this program crash"**

The testing mindset is characterized by the drive of the tester to understand the quality of the product under test

- Passion for quality, ownership, and pride for making the project successful
- Relevant experience includes testing procedures, test writing, puzzle solving, follow-through to test the product from the end user's perspective
- Investigative skills to seek out information through manuals, specs, interviews, emails, and good old trial and error to understand the project
- Needs to plan and set priorities and be able to react at a moment's notice to get on top of sudden changes in priority

Background and Experience

Domain: Having Industry specific knowledge is always handy for the tester in performing the testing activities efficiently.

Analytical skills: Analytical skills helps to visualize, articulate, and solve complex problems and concepts, and make decisions that make sense based on available information.

Software engineering: Having prior knowledge in software engineering will benefit by getting hands-on experience performing tasks from each role of the software development team.
For example: MS office, programming skills, understanding SDLC.

Specialized skills: Some aspects of testing like performance testing and automation require very specialized resources.

Communication and Interpersonal Skills: Communication and interpersonal skills form the necessary ingredients for a success of project.

Discipline and Perseverance: Testing can be extremely repetitive and may require a lot of manual effort.

Time Management and Effort Prioritization: Testers have to juggle a lot of tasks

Organization — Recap

- **Create centralized competency in testing**
  - Create a centralized testing competency center to achieve delivery efficiencies and control as per the needs of the organization
- **Set up test program governance and SLA's upfront.**
  - Governance & SLAs are prerequisites to success. Strong and clear governance ensures: (1) overall alignment of testing effort with business objectives and (2) establishes decision making authority and (3) clearly identifies who is doing what and prevents overlaps
- **Set up a test management function to consistently drive key QA processes**
- **Leverage capabilities from other organizations/departments**
  - Extend the QA organization by involving developers, end users, executives etc. in the QA process as performers — while QA retains the overall QA responsibility. This helps to mode broadly leverage various skills and capabilities required to deliver on business objectives
- **Leverage capabilities from other geographies.**
  - Most IT organizations are spread globally and should leverage QA resources across geographic boundaries
- **Manage demand and supply of skilled QA resources**
  - Plan for all contributors to demand (corporate programs, customer projects, internal initiatives) and supply (employees, contractors, other geographic locations, offshore)
- **Hire skilled testers**
  - Not everyone can do good testing. Testing is a specialized skill and requires its own type of background, experience and mindset

Resume

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Phil is a Director in the Technology practice with over fifteen years of IT delivery leadership. His experience is focused on large scale systems implementation including strategic planning, enterprise architecture and application development services, electronic commerce, and multi-channel enterprise services and end-to-end testing. Phil has extensive experience across health care/ life sciences, communications/media, and public sector industries. Phil leads Deloitte's technology testing services

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Michael is a Senior Manager in Deloitte's Technology Integration practice and has over 9 years of experience in managing large, complex system integration engagements and over 4 years of testing focused experience. Michael's extensive testing experience includes: conducting testing assessments, designing test strategies, managing end to end complex Test Program efforts, and establishing comprehensive Testing Centers of Excellence (COE) for large clients in the Telecommunications/Media and Financial Services industries. Outside of current client and project delivery commitments, Michael is currently serving as the Operational lead for the Global Testing Practice initiative helping to lead and manage the build out Deloitte's Testing focused marketplace solution offerings.