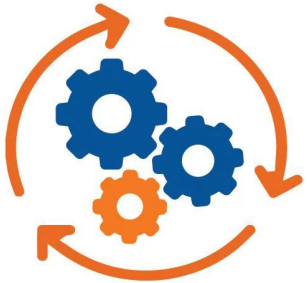
Chapter 6

Test Planning: Smart Application of Testing



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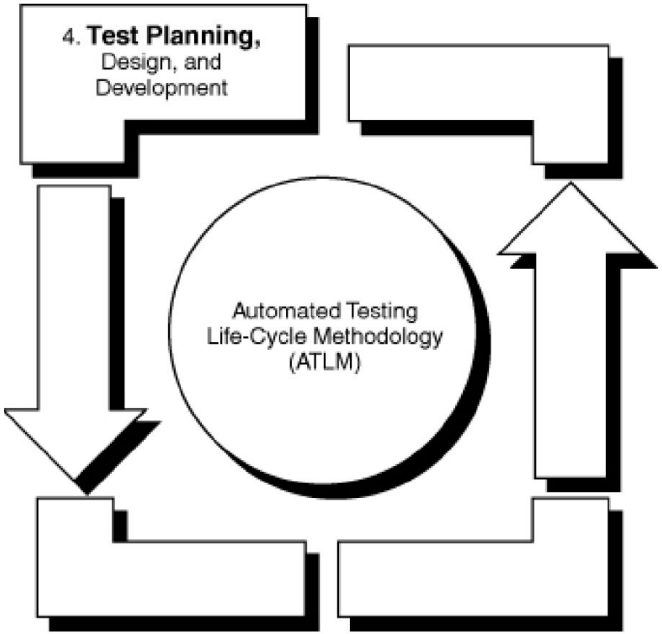
Introduction

Failing to plan is a plan to fail - Effie Jones

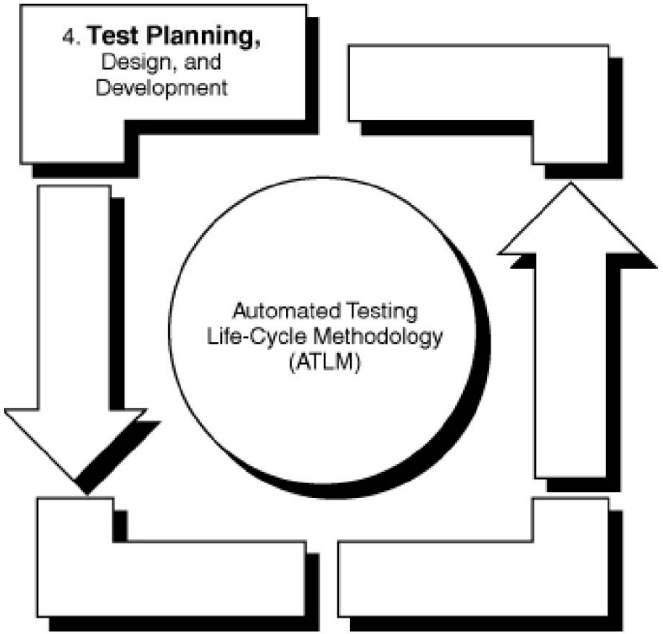
- The cornerstone of an effective test program is test planning.
- Encompasses the review of all activities that will be required for the test program and the verification.
- Test goals and objectives must be defined and test requirements must be specified.
- Test strategies aimed at supporting test requirements need to be defined.



Introduction

Failing to plan is a plan to fail - Effie Jones

- The main events and primary activities of the test program should be entered into a schedule.
- All pertinent information should be captured and kept up-to-date in a test plan document.
- focuses attention on the identification of test program documentation, the planning required to achieve the test objectives and support the test environment, and the development of the test plan document.

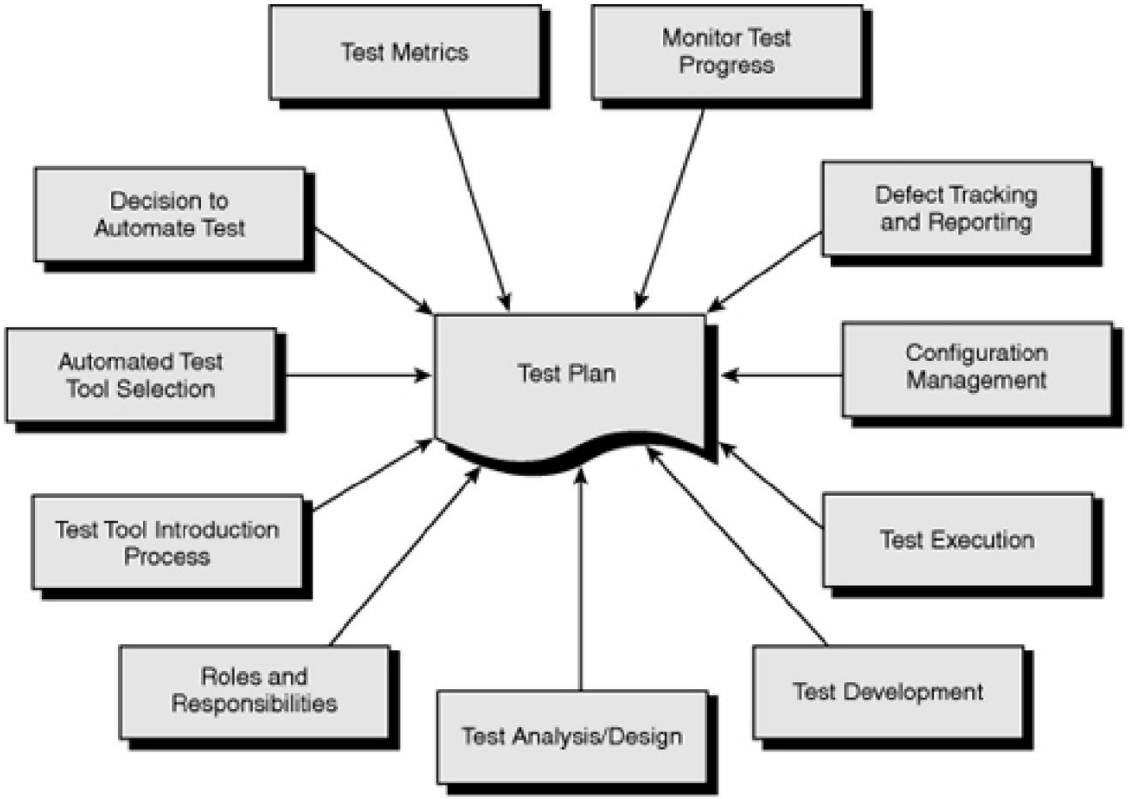


Test Planning Activities (1)

The efficient use of automated test tools requires considerable investment in test planning and preparation

- The test plan contains a wealth of information, including much of the testing documentation requirements for the project.
- Outlines the team's roles and responsibilities, project test schedule, test design activities, test environment preparation, test risks and contingencies, and acceptable level of thoroughness.
- Includes test procedures, a naming convention description, and requirements-to-test procedure traceability matrix.
- Incorporates the outcome of each phase of the ATLM.

Test Planning Activities (2)



Test Planning Activities (3)

- First, an Introduction section defines the purpose of the test plan, the background of the project, a system description, and a project organization chart.
- All relevant documentation (business requirements, design specifications, user manual, operations manual, GUI standards, code standards, system certification requirements, and other project information) available related to the test effort is listed.
- The test team should review the various project plans to ascertain information (background, documentation, system description, and project organization sections).

Test Planning Activities (4)

- Project plans might include the software development plan, system evolution plan, migration plans, systems engineering management plan, and project management plan.
- Decision to automate tests (Chapter 2).
- Evaluation and selection of automated test tools (Chapter 3).
- Test planning also includes the performance of a test process analysis exercise.
- The test plan must identify the scope of test activities to be performed.
- The test plan should reflect the results of test effort sizing exercises.
- The qualities and skills required to support a test program should be documented.

Test Planning Activities (5)

- The test manager therefore needs to assess the difference between skill requirements and team members' actual skills to identify potential areas for training.
- The roles and responsibilities of test team personnel need to be defined and documented in the test plan.
- Every test program should have a defined scope, reflecting the fact that the test effort has limitations in terms of personnel, person-hours, and schedule.
- A system description or overview should define the components of the system being tested.
- Test program assumptions, prerequisites, and risks need to be defined and documented within the test plan.

Test Planning Activities (6)

- Identify critical success functions and the highest-risk functions of the system - not 100% testable and not 100% automation.
- A requirements traceability matrix allows the test team to keep track of test procedure coverage of requirements.
- Verification methods include demonstration, analysis, inspection, and testing and certification.
- Identify hardware, software, and network requirements to support a test environment.
- The procurement, installation, and setup activities for various test environment components must be carefully planned and scheduled.
- Test environment plans should identify the number and types of individuals.

Test Planning Activities (7)

- The overall test design approach is another component of the test plan.
- The test plan needs to document the various test procedures required.
- Test planning will identify test data requirements and identify the means to obtain, generate, or develop test data.
- The test development architecture is documented within the test plan.
- The test procedure development/execution schedule is prepared by the test team as a means to identify the timeframe for developing and executing the various tests.
- The test plan incorporates the results of modularity relationship analysis.
- The procedure for baselining test scripts should be identified.
- The test team needs to ensure the configuration control.
- The test plan needs to address the test execution activities.

Test Planning Activities (8)

- The identification of a defect tracking tool as part of test planning should be paid attention to.
- Define and document the test metrics that will be collected throughout the testing life cycle.
- A preliminary test schedule should be created that complements the development schedule.
- The test team will need to review any updates to the project development schedule to ensure that the test schedule is consistent.
- The test team should begin its development by locating a test plan template and then customizing the outline as necessary.

Test Program Scope

Test Program Scope Definition	
Step	**Description**
1	Review system requirements or use cases/design documentation
2	Review existing project plans and develop a system desc/definition for the test plan
3	Develop a system critical function/high risk function definition
4	Develop test goals, objectives, and strategies
5	Identify automated tools to be applied in support of test program
6	Outline test program params (scope, assumptions, prerequisites, system acceptance, risks
7	Identify verification methods associated with the system requirements or use cases
8	Test requirements definition

Test Program Scope

- Automated tools to be applied to the project then need to be identified.
- The documentation of test program parameters (goals, objectives, and strategies)
- Includes the listing of prerequisite events, documentation, and products required to support various test program activities.
- System acceptance criteria are defined, and test program risks are assessed and mitigation plans developed.
- Test requirements are defined.

=> all documented within the test plan.

Test Program Scope

System Description

- The test engineer needs to have a clear understanding of the system being tested.
- A system description or overview needs to be obtained or developed and eventually documented within the test plan.
- The system description should define the user environment, computing platforms, and product features of the application-under-test.

=> It is important to bound the system with regard to the test effort.

=> It is important to identify the specific elements of the system that will be tested, including both software hardware and network components.

=> in-house or outsourced to a different organization.

Test Program Scope

Critical/High-Risk Functions

- Identify the critical success and high-risk functions of the system, listing them in the test plan in order of severity.
- Solicit end-user feedback to validate and refine the priority ranking.

=> Ranking system functions helps the test team prioritize test activities and address the most critical and high-risk system functions early.

Test Program Scope

Test Goals, Objectives, and Strategies

- It needs to perform a test process review and an analysis of test goals and objectives.
- Test process analysis documentation is then generated that reflects the refinement of test goals, objectives, and strategies.

Test Program Scope

Test Tools

- The test team should clearly specify which test tools will be applied on the project.
- Follow Chapter 2 to determine whether to automate the testing process.
- Follow Chapter 3 to evaluate and select the automated test tools.
- The results of the test tool compatibility checks are documented in the test plan.

Test Program Scope

Test Program Parameters

- Test program parameters defined may include the scope, assumptions, prerequisites, system acceptance criteria, and risks, depending on the testing phase.
- Should identify the system application to be tested.
- Indicate whether the test effort will include the network, hardware, and databases in addition to the software application.
- The team should specify whether system-level testing will involve regression test.

Test Program Scope

Test Program Parameters

- The unit test plan should indicate whether stubs and drivers are to be used in unit testing.
- The acceptance testing strategies need to be identified.
- Clearly define dependencies between various test program activities; test activities and other activities in the project.
- The test team needs to define a test program boundary.
- Define the point when testing will be considered complete.
- The test team should list an assumption about the software testing.

Test Program Scope

Test Program Parameters

- The system acceptance criteria should be aware of both developers and test team.
- Test program risks should also be identified within the test plan.
- Budgets and schedules are in place based upon certain assumptions.
- The test team would need to develop and define a risk mitigation strategy.

Test Program Scope

Verification Methods

- The test team should construct a requirements traceability matrix.
- Verification methods include demonstration, analysis, inspection, test (automated or manual), and certification.

Test Program Scope

Verification Methods	
Verification Method	**Description**
Demonstration	Verification by observation of expected external behavior during system operation. Demonstration verifies conformance to requirements by exercising a sample of observable functional operations.
Analysis	Analysis verifies conformance to requirements by technical evaluation, processing, review, or study of accumulated data. It can include a review of test outputs versus test inputs, technical evaluation, mathematical evaluation, and simulation.
Inspection	Inspection verifies conformance to requirements by visual examination, reviewing descriptive documentation, and comparing characteristics with predetermined criteria.

Test Program Scope

Verification Methods	
Verification Method	**Description**
Manual Test	Special modifications to the code under test to capture information not normally retained in the course of operations. Manual testing verifies conformance to requirements by exercising observable functional operations in a manual fashion. Testing is generally more extensive than the exercises performed using the demonstration method and is appropriate for requirements fulfilled by developmental items.
Automated Test	Automated testing verifies conformance to requirements by exercising observable functional operations in an automated fashion.
Certification	Certification verifies conformance to requirements by examination of vendor (or supplier) documentation attesting that the product was developed and tested in accordance with the vendor's internal standards.

Test Program Scope

Test Requirements Definition

- Systems requirements need to be analyzed and specified in terms of test requirements.
- The test requirements analysis discussion addresses:
  - what to look for when identifying test requirements for the target application.
  - how to decompose the application design or system requirements or use cases into testable test requirements.
  - how to analyze application documentation so as to identify test requirements.

Test Program Scope

Test Requirements Definition

- Understanding of customer needs.
- Test team review of system requirements or use case requirements and/or system mission description.
- The identification of critical and high-risk system functions.
- Test program parameters are defined as well.
- Test requirements can be derived from business requirements, functional system requirements, and use case requirements.

=> requirements-based or behavioral approach.

- Derived based on the logic of the system design.

=> structural approach.

Test Program Scope

Test Requirements Definition

- The test team can expect to develop at least one test requirement for each system requirement.
- The ratio of system requirements to system level test requirements varies and can be either one-to-one or one-to-many, depending on the risk assigned to each functionality and the granularity of the requirement.
- The ratio of use case requirements to system level test requirements also varies, depending on the risk and use case scenarios to be tested.

Test Program Scope

Test Requirements Definition

- The customer reviews and eventually approves the test plan, which outlines test requirements and contains a requirements traceability matrix.
- The requirements traceability matrix specifies requirements information, as well as mappings between requirements and other project products.
- The traceability matrix explicitly identifies every requirement.
- The customer signifies his or her approval for the scope of requirements.

=> Early feedback on the traceability matrix from the customer gives the test team more time to respond to requests for changes in the test plan.

Test Program Scope

Test Requirements Management

- Test planning involves both the definition of test requirements and the development of an approach for managing test requirements.
- Test requirements management includes:
  - the storage of requirements
  - maintenance of traceability links
  - test requirements risk assessment
  - test requirements sequencing (prioritization)
  - identification of test verification methods
- Traceability links include the mapping of test procedures to test requirements and of defects to test procedures.

Test Program Scope

Test Requirements Management

- The test team needs to outline the way in which the test requirements will be managed.
- Using word, spreadsheet (many disadvantages) or requirements management tool?
- Key considerations:
  - The ease and flexibility of requirement sorting and reporting
  - The ease and speed of requirement entry
  - The efficiency of requirements maintenance
  - Simultaneous access?

=> Commercial requirements management tools are available to handle these requirements management concerns.

Test Program Scope

Requirements Management Tools

- Special automated tools are particularly useful when applied to tedious or otherwise time-consuming tasks.
- The test team needs to verify whether the organization has established a standard tool to support requirements management.
- Needs to determine whether the tool is being applied to the current project or it can be installed in the system's engineering environment.
- When no standard tool is considered => present this absence as an issue to management or take the lead in evaluating and selecting a tool.
    - Requisite Pro by Rational
    - DOORS by QSS
    - RTM by Integrated Chipware

Test Program Scope

Requirements Management Tools (RM Tools)

- There are many advantages when using a requirements management tool:
  - uses a central database repository to hold all related data.
  - includes contractual, system, and test requirements.
  - easy management of testing coverage and mapping test requirements.
  - the test manager or lead can manage task/assignments.
  - links test requirements to test procedures, or linking defects to test procedures.
- When using the RM tools, the test team needs to update the status (pass/fail) of only the test procedure.
- A RM tool can quickly make the changes to the requirements field that keeps track of the release version.

Test Program Scope

Assessing the Test Requirements Risk

- The test team should assess the risks by evaluating:
  - **Impact**: What impact would this failure have on system operations and on end users' ability to perform their jobs? Does the failure represent a potential liability for the company?
  - **Probability**: Assess the likelihood of a failure occurring.
  - **Complexity**: Determine which functionality is most complex and then focus test team resources on that functionality.
  - **Source of failure**: Assess the failure possibilities and identify the test requirements that are most likely to cause these failures.

Test Program Scope

Prioritization of Tests

- Risk level: Based upon the risk assessment, test requirements are organized so as to mitigate a high risk to system performance or the potential exposure of the company to liability.
- Operational characteristics: Some test requirements will rank high on the priority list due to the frequency of usage or the lack of end-user knowledge in the area.
- User requirements: It is important that the impact to the end user of the po-
- tential problem be assessed.

Test Program Scope

Prioritization of Tests

- Available resources: the test program will have constraints in the areas of staff availability, hardware availability, and conflicting project requirements.
- Exposure: Exposure is defined as the risk (probability) multiplied by the cost of failure. For example, a highly probable defect with a high cost of failure has a high exposure.

Test Program Scope

Requirements Traceability Matrix

- System requirements or use cases are usually maintained within an RM tool.
- It is important that the test team obtain early feedback on the requirements traceability matrix from end users or system customers.
- Some verification methods are easier to implement and less time-intensive than other methods.

=> provide more time for the test team to respond to potential changes.

Test Program Scope

Requirements Traceability Matrix

Para ID	Text	Key	Verification Method	PRI	D1	D2	D3	Test Procedure
3.2.1a	System shall perform software installation and upgrades	178	Test	NN	D1	—	—	SM2012
3.2.1b	System shall perform software system load balancing for WFTS system servers	179	Test	NN	—	D2	—	SM2013
3.2.1c	System shall perform a recovery of the system and data in the event of a system failure	180	Test	HR	—	D2	—	SM2014
3.2.1d	System shall manage disk and file structure and allocation to include the ability to determine the amount of disk space used and available	181	Test	NN	—	D2	—	SM2015

Test Program Scope

Requirements Traceability Matrix

3.2.1e	System shall be able to configure electronic mail and manage directory service capabilities	182	Test	NN	D1	—	—	SM2016
3.2.1f	System shall monitor the software configuration of critical system components and workstations to include checks for outdated versions	183	Test	NN	—	D2	—	SM2017
3.2.5a	System shall meet certification criteria as specified by Federal Reserve Bank	190	Certifi-cation	NN	—	—	D3	CT001–CT100

Test Program Scope

Test Program Events, Activities, and Documentation

- Key elements of test planning include the planning associated with project milestone events, test program activities, and test-program-related documentation.
- The technical approach for these key elements is developed, personnel are assigned, and performance timelines are defined in the test program schedule.

Test Program Scope

Events

- The major events for the test team should be reflected in the test schedule.
- Events include:
  - requirements and design reviews
  - test readiness reviews
  - system configuration audits
  - technical interchange meetings
  - formal test-related working group meetings
  - special tests, security testing
  - the performance of acceptance tests

Test Program Scope

Events

A test and integration work group (TIWG) provides a forum to facilitate iterative interchange between test engineers, development staff, and customer representatives. The goals of TIWG include:

- Ensure that planned testing activities support the verification of functional, performance, and technical requirements for the system.
- Ensure that testing addresses human engineering aspects of system operability.
- • Identify and monitor major test program risks.

Test Program Scope

Events

- Obtain early and informal customer feedback on draft test plans and traceability matrices.
- Enhance the customer's familiarity with and understanding of the detailed aspects of the test program so as to bring about a more efficient acceptance test effort.

Test readiness reviews (TRR) may be conducted as part of a project to ensure that that the test program is ready to support a UAT.
TRR involves comprehensive reviews, and need to address the availability status of test data req and hardware/software requirements.

Test Program Scope

Activities

- The test plan must identify the scope of test activities to be performed.
- One important activity that needs to be defined is the review of project documentation.
- Test resources are limited but expectations of test team support may be greater than the budget allows.
- It is important to clearly define which project documents will be reviewed.
- The test team should list the title of each project document to be reviewed within the test plan.

Test Program Scope

Documentation

Test Program Document	Description	Due Date/ Timeframe
Test Plan	Test planning document	(date)
Requirements Traceability Matrix	A matrix that maps test procedure coverage of requirements and specifies a test qualification method for each system requirement	(date)
Test Procedures/ Cases	Scripts to be used to perform/execute testing	(timeframe)
Test and Integration Work Group Meeting Minutes	Meeting minutes from TIWG meetings	Periodic

Test Program Scope

Documentation

Test Program Document	Description	Due Date/ Timeframe
Test Development Progress Reports	Reports that outline the progress status of the test procedure development effort	Biweekly
Test Readiness Report or Presentation Slides	Report or presentation that outlines the readiness of the test program to conduct user acceptance test	(date)
Test Execution Progress Reports	Reports that outline the progress status of test execution	Biweekly
Defect Tracking Reports	Reports that outline the number and severity of outstanding defects (trouble reports)	Biweekly
TPM Status Reports	Reports that outline the progress of the system toward meeting defined technical performance measures	Biweekly
Test Report	Report documenting the outcome of the test	(date)

Test Program Scope

The Test Environment

- Test planning must outline the resources and activities.
- The test team should identify the hardware, software, and network and facility requirements needed.
- The procurement, installation, and setup activities for various test environment components need to be planned and scheduled.
- Identify the number and types of individuals who will access and use the test environment.
- The number and kinds of environment setup scripts and testbed scripts that will be required.

Test Program Scope

Test Environment Preparations

- Project plans include:
  - the software development plan
  - system evolution plan
  - migration plans
  - systems engineering management plan
  - project management plan

=> should be reviewed when available.

- If under development => review the draft plans and identify questions and potential concerns about the development environment or the migration of the development environment to an operational environment.

Test Program Scope

Test Environment Preparations

- Should review project planning documents in a separate test lab that mimics an operational environment.
- The test environment configuration needs to be representative of the production environment => the same baseline.
- Simulators and emulators can be used.

Test Program Scope

Test Environment Preparations

Preparation activities:

- Obtain information about the customer's technical environment architecture (hardware and operating systems).
- Identify network characteristics of the customer's technical environment.
- Obtain a listing of COTS products to be integrated into the system solution.
- Count how many automated test tool licenses will be used by the test team.
- Identify development environment software that must reside on each computer desktop within the test environment.

Test Program Scope

Test Environment Preparations

Preparation activities:

- Identify hardware equipment required to support backup and recovery exercises within the test environment.
- Ensure that the test environment can accommodate all test team personnel.
- Review system performance test requirements to identify elements of the test environment that may be required to support applicable tests.
- Identify security requirements for the test environment.

Test Program Scope

Test Environment Preparations/Purchase list sample

Site	Product Requirement	Product Description	Vendor	Quan-tity	Unit Cost	Annual Mainte-nance
Site 1	Application Server	Compaq ProLiant 6500	Compaq	1	(cost)	(cost)
Site 1	Communication Server	Compaq ProLiant 1600	Compaq	1	(cost)	(cost)
Site 1	Database Server	Sun Workstation	Sun	1	(cost)	(cost)
Site 1	Server Operating System	Windows NT	Microsoft	2	(cost)	(cost)
Site 1	Server Operating System	Sun Solaris	Sun	1	(cost)	(cost)
Site 1	Database Management System (DBMS)	Sybase Server	Sybase	1	(cost)	(cost)
Site 1	CORBA Server	Iona ORBIX	IONA	1	(cost)	(cost)

Test Program Scope

Test Environment Preparations

Preparation activities:

- Identify and track adherence to the timeline for equipment receipt, installation, and setup activities.
- It is better to have at least one individual who has network, database, and system administration and integration skills.
- Monitor the purchase and receipt of test environment components carefully
- Need to become involved in finding software/hardware that meets these high availability requirements.

=> Document all

Test Program Scope

Test Environment Integration and Setup

At least one member of the test team should have some network, database, and system administration skills.

=> assist in the installation and integration of hardware components.

- Administration activities must be carried out to enable test activities within the test environment.

=> ensure the access to the necessary systems, software, networks, databases, and tools.

Test Program Scope

The Test Plan

Test team personnel must become very familiar with the content of this plan.

- The test team needs to obtain end-user or customer buy-in (acceptance of the test strategy and the detailed test procedures) on the test plan.
- There is never enough money in the test program budget to support all possible kinds of tests.
- Communication and analysis are key to selecting the right mix of test strategies to support the accomplishment of test goals and objectives.

Test Program Scope

The Test Plan

The purpose of the test plan can be summarized as follows:

- It provides guidance for the management and technical effort necessary to support the test program.
- It establishes the nature and the extent of tests deemed necessary to achieve test goals and objectives.
- It outlines an orderly schedule of events and activities that use resources efficiently.
- It provides assurance of the highest level of test coverage possible through the creation of a requirements traceability matrix.

Test Program Scope

The Test Plan

The purpose of the test plan can be summarized as follows:

- It outlines the detailed contents of test procedure scripts and describes how the test procedure scripts will be executed.
- It outlines the personnel, financial, equipment, and facility resources required to support the test program.

=> An approval authority should review the plan. In some cases, an approval is required prior to the execution of the test program.

=> The development staff should also review and endorse the test plan.

=> test planning is not a single event, but rather a process.

Test Program Scope

The Test Plan/Outline

Test Plan Section	Title	Contents	Textbook Section
1.0	**Introduction**		
1.1	Purpose	Purpose of test plan	6.6
1.2	Background	Project background information	6.1
1.3	System Overview	System description, critical/high-risk functions	6.2, 4.2
1.4	Applicable Documents	Documentation pertinent to test program	6.1
1.5	Test Program Master Schedule	Events, activities, deliverable documents	6.4, 8.1
2.0	**Roles and Responsibilities**		
2.1	Project Organization	Project organization chart	6.1, 4.2, 5.1
2.2	Project Roles and Responsibilities	Roles and responsibilities	5.5
2.3	Test Task Structure	Test activities and work breakdown structure	5.2
2.4	Test Team Resources	Test team profile, training requirements	5.4, 4.2

Test Program Scope

The Test Plan/Outline

Test Plan Section	Title	Contents	Textbook Section
3.0	**Test Program**		
3.1	Scope	Top-level description of test coverage	6.2
3.2	Test Approach	Goals, objectives, and process methodology; test program parameters	4.1, 6.2
3.3	Test Strategies	Test strategies	4.1
3.4	Automated Tools	Tool descriptions, decision to automate test, test tool selection, test tool compatibility check	2, 3, 4.2
3.5	Verification Methods	Verification methods	6.2
3.6	Test Requirements	Test requirements	6.2, 6.3, 7.1
3.7	Test Design	Test design, procedure naming convention	7.2, 7.3
3.8	Test Development	Development architecture	8.2

Test Program Scope

The Test Plan/Outline

Test Plan Section	Title	Contents	Textbook Section
4.0	**Test Environment**		
4.1	Test Environment Configuration	Technical environment design, procurement, installation, setup, and administration	6.5
4.2	Test Data	Test data creation and management	7.3
5.0	**Test Execution**		
5.1	Test Program Reporting	Progress status reporting, metrics, sequence list	9.3
5.2	Defect Tracking	Defect tracking	9.2
5.3	Configuration Management	Configuration management	8.1
6.0	**Detailed Test Schedule**	**Detailed test schedule**	**8.1**
A	**Test Procedures**	**Acceptance test procedures**	**7.3**

Test Program Scope

Test Completion/Acceptance Criteria

Before production deployment, test results analysis can help to identify any defects that need to be fixed and those whose correction can be deferred.

Several questions:

- What is the rate of regressions?
- How often are defect corrections failing?

“The question is not whether all the defects have been found but whether the program is sufficiently good to stop testing. This tradeoff should consider the probability of finding more defects in test, the marginal cost of doing so, the probability of the users encountering the remaining defects, and the resulting impact of these defects on the users.”

Test Program Scope

Test Completion/Acceptance Criteria

It is important that the test team establish quality guidelines (criteria) for the completion and release of software.

Several questions:

- What type of testing and improvements need to be implemented, and when will they be finished?
- What type of resources will be needed to perform testing?

Acceptance criteria has priority level of 1 (fatal), 2 (high), or 3 (medium) are outstanding. Acceptance criteria might state that the existence of level 4 or 5 (low) outstanding problem reports is acceptable.

Test Program Scope

Sample Test Plan

https://www.oreilly.com/library/view/automated-software-testing/0201432870/apd.html

Chapter Summary

- ★ The test planning element of the Automated Test Life-Cycle Methodology (ATLM) incorporates the review of all activities required in the test program. It is intended to ensure that testing processes, methodologies, techniques, people, tools, schedule, and equipment are organized and applied in an efficient way.
- ★ The test team should begin its test plan development effort by locating or creating a test plan template, and then tailoring the test plan outline as necessary. Once a test plan has been constructed and refined to fully document the intended approach, it will become the guiding instrument for the subsequent test program.
- ★ The scope of the test program is provided in the test plan as a top-level description of test coverage. The scope is further refined through the definition of test goals, objectives, and strategies, as well as test requirements.

Chapter Summary

- ★ Test planning involves both the definition of test requirements and the development of an approach for managing those requirements. Test requirements management encompasses the storage and maintenance of requirements, maintenance of traceability links, test requirements risk assessment, test requirements sequencing (prioritization), and identification of a test verification method for each system requirement.
- ★ The requirements traceability matrix explicitly identifies every requirement that will undergo examination by the test team, and an associated verification (qualification) method for each system requirement. The traceability matrix maps test procedures to system requirements or use cases, allowing team members to readily confirm that system requirements or use cases requiring test verification have been fully and successfully implemented.

Chapter Summary

- ★ Key elements of test planning include the planning associated with project milestone events, test program activities, and test program-related documentation. The technical approach for these key elements is developed, personnel are assigned, and performance timelines are specified in the test program schedule.
- ★ Test planning efforts must outline the resources and activities that are necessary to support the timely setup of the test environment. The test team must identify the hardware, software, network, and facility requirements needed to create and sustain the test environment. The procurement, installation, and setup activities for various test environment components need to be planned and scheduled.
- ★ The test team needs to comprehensively document test program plans, and team members need to become very familiar with the content of this plan.

Chapter Summary

- ★ The test team needs to obtain end-user or customer buy-in on the test plan. This buy-in includes the customer's acceptance of both the test strategy and the detailed test procedures, which define the actual tests planned. As part of this buy-in, the end user concurs that the test plan and associated test scripts adequately verify satisfactory coverage of system requirements or use cases.
- ★ A successful, cost-effective test program requires a clear vision of goals and an explicit understanding of the various test program parameters that define the boundary of the test effort. Communication and analysis are key to selecting the right mix of test strategies to support the accomplishment of test goals and objectives.
- ★ Test planning is not a single event, but rather a process. The test plan is the document that guides test execution through to conclusion, and it needs to be updated frequently to reflect any changes. The test team should refer to the test plan often during the performance of testing.

References

[1] Adapted from ANSI/IEEE Std 1008–1987.

[2] Rational Unified Process 5.0. Jacobson, I., Booch, G., Rumbaugh, J. *The Unified Software Development Process*. Reading, MA: Addison-Wesley, 1998.

[3] Humphrey, W.S. *Managing the Software Process*. Reading, MA: AddisonWesley, 1989.