

TEST PLANNING, MANAGEMENT, EXECUTION, AND REPORTING



WHEN TESTING IS CONSIDERED AS A PROJECT ON ITS OWN.

IT HAS TO BE PLANNED, EXECUTED, TRACKED, AND PERIODICALLY REPORTED ON.

Test Planning --> Test Estimation and Scheduling --> Test Process Activities --> Test Management and Control
|
Test Reporting and Closure

PREPARING A TEST PLAN

plan preparation --> plan types --> scope management --> deciding test approach --> id5 resources and staffing --> id5 test deliverables

- TESTING—LIKE ANY PROJECT—SHOULD BE DRIVEN BY A PLAN. THE TEST PLAN ACTS AS THE ANCHOR FOR THE EXECUTION, TRACKING, AND REPORTING OF THE ENTIRE TESTING PROJECT AND COVERS
 - WHAT NEEDS TO BE TESTED
 - HOW THE TESTING IS GOING TO BE PERFORMED
 - WHAT RESOURCES ARE NEEDED FOR TESTING
 - THE TIME LINES BY WHICH THE TESTING ACTIVITIES WILL BE PERFORMED.
 - RISKS THAT MAY BE FACED

SCOPE MANAGEMENT: DECIDING FEATURES TO BE TESTED/NOT TESTED

various teams test at various phases,
either create one test plan for all phases
or have many test plans and create a "master test plan"
thats common for all plans

- VARIOUS TESTING TEAMS DO TESTING FOR VARIOUS PHASES OF TESTING.
- ONE SINGLE TEST PLAN CAN BE PREPARED TO COVER ALL PHASES AND ALL TEAMS OR THERE CAN BE SEPARATE PLANS FOR EACH PHASE OR FOR EACH TYPE OF TESTING.
- IN SITUATIONS WHERE THERE ARE MULTIPLE TEST PLANS, THERE SHOULD BE ONE TEST PLAN, WHICH COVERS THE ACTIVITIES COMMON FOR ALL PLANS. THIS IS CALLED THE ***MASTER TEST PLAN***.

SCOPE MANAGEMENT: DECIDING FEATURES TO BE TESTED/NOT TESTED

what needs to be tested

- SCOPE MANAGEMENT PERTAINS TO SPECIFYING THE SCOPE OF A PROJECT. FOR TESTING, SCOPE MANAGEMENT ENTAILS
 - UNDERSTANDING WHAT CONSTITUTES A RELEASE OF A PRODUCT;
 - BREAKING DOWN THE RELEASE INTO FEATURES;
 - PRIORITIZING THE FEATURES FOR TESTING;
 - DECIDING WHICH FEATURES WILL BE TESTED AND WHICH WILL NOT BE; AND
 - GATHERING DETAILS TO PREPARE FOR ESTIMATION OF RESOURCES FOR TESTING.

DECIDING TEST APPROACH/STRATEGY

how to test

- ONCE WE HAVE THIS PRIORITIZED FEATURE LIST, THE NEXT STEP IS TO DRILL DOWN INTO SOME MORE DETAILS OF WHAT NEEDS TO BE TESTED, TO ENABLE ESTIMATION OF SIZE, EFFORT, AND SCHEDULE. THIS INCLUDES IDENTIFYING
 - WHAT TYPE OF TESTING WOULD YOU USE FOR TESTING THE FUNCTIONALITY?
 - WHAT ARE THE CONFIGURATIONS OR SCENARIOS FOR TESTING THE FEATURES?
 - WHAT INTEGRATION TESTING WOULD YOU DO TO ENSURE THESE FEATURES WORK TOGETHER?
 - WHAT LOCALIZATION VALIDATIONS WOULD BE NEEDED?
 - WHAT “NON-FUNCTIONAL” TESTS WOULD YOU NEED TO DO?

Localization Validation

process of verifying that a software application, website, or product has been correctly adapted for a specific target region, culture, or locale.

SETTING UP CRITERIA FOR TESTING

- A **TEST CYCLE** OR A **TEST ACTIVITY** WILL NOT BE AN ISOLATED, CONTINUOUS ACTIVITY THAT CAN BE CARRIED OUT AT ONE GO. IT **MAY HAVE TO BE SUSPENDED** AT VARIOUS POINTS OF TIME BECAUSE IT IS NOT POSSIBLE TO PROCEED FURTHER.
- SOME OF THE TYPICAL SUSPENSION CRITERIA INCLUDE
 - **ENCOUNTERING MORE THAN A CERTAIN NUMBER OF DEFECTS**, CAUSING FREQUENT STOPPAGE OF TESTING ACTIVITY;
 - **HITTING SHOW STOPPERS THAT PREVENT FURTHER PROGRESS** OF TESTING (FOR EXAMPLE, IF A DATABASE DOES NOT START, FURTHER TESTS OF QUERY, DATA MANIPULATION, AND SO ON ARE IS SIMPLY NOT POSSIBLE TO EXECUTE); AND
 - **DEVELOPERS RELEASING A NEW VERSION** WHICH THEY ADVISE SHOULD BE USED IN LIEU OF THE PRODUCT UNDER TEST (BECAUSE OF SOME CRITICAL DEFECT FIXES).

IDENTIFYING RESPONSIBILITIES, STAFFING, AND TRAINING NEEDS

who tests / is a part of testing

- SCOPE MANAGEMENT IDENTIFIES *WHAT* NEEDS TO BE TESTED. THE TEST STRATEGY OUTLINES *HOW* TO DO IT. THE NEXT ASPECT OF PLANNING IS THE *WHO* PART OF IT.
- THE DIFFERENT ROLE DEFINITIONS SHOULD
 - ENSURE THERE IS **CLEAR ACCOUNTABILITY** FOR A GIVEN TASK, SO THAT **EACH PERSON KNOWS WHAT HE OR SHE HAS TO DO**;
 - **CLEARLY LIST THE RESPONSIBILITIES** FOR VARIOUS FUNCTIONS TO VARIOUS PEOPLE, SO THAT **EVERYONE KNOWS HOW HIS OR HER WORK FITS INTO THE ENTIRE PROJECT**;
 - **COMPLEMENT EACH OTHER**, ENSURING **NO ONE STEPS ON AN OTHERS' TOES**;
 - **SUPPLEMENT EACH OTHER**, SO THAT **NO TASK IS LEFT UNASSIGNED**.

IDENTIFYING RESOURCE REQUIREMENTS

- AS A PART OF PLANNING FOR A TESTING PROJECT, THE PROJECT MANAGER SHOULD PROVIDE ESTIMATES FOR THE VARIOUS HARDWARE AND SOFTWARE RESOURCES REQUIRED. SOME OF THE FOLLOWING FACTORS NEED TO BE CONSIDERED.
 - MACHINE CONFIGURATION (RAM, PROCESSOR, DISK, AND SO ON) NEEDED TO RUN THE PRODUCT.
 - OVERHEADS REQUIRED BY THE TEST AUTOMATION TOOL, IF ANY
 - SUPPORTING TOOLS SUCH AS COMPILERS, TEST DATA GENERATORS, CONFIGURATION MANAGEMENT TOOLS.
 - THE DIFFERENT CONFIGURATIONS OF THE SUPPORTING SOFTWARE THAT MUST BE PRESENT
 - SPECIAL REQUIREMENTS FOR RUNNING MACHINE-INTENSIVE TESTS SUCH AS LOAD TESTS AND PERFORMANCE TESTS
 - APPROPRIATE NUMBER OF LICENSES OF ALL THE SOFTWARE

IDENTIFYING TEST DELIVERABLES

- THE TEST PLAN ALSO IDENTIFIES THE DELIVERABLES THAT SHOULD COME OUT OF THE TEST CYCLE/TESTING ACTIVITY.
- THE DELIVERABLES INCLUDE THE FOLLOWING
 - THE TEST PLAN ITSELF (MASTER TEST PLAN, AND VARIOUS OTHER TEST PLANS FOR THE PROJECT)
 - TEST CASE DESIGN SPECIFICATIONS
 - TEST CASES, INCLUDING ANY AUTOMATION THAT IS SPECIFIED IN THE PLAN
 - TEST LOGS PRODUCED BY RUNNING THE TESTS
 - TEST SUMMARY REPORTS

TESTING TASKS: SIZE AND EFFORT ESTIMATION

- THE SCOPE IDENTIFIED ABOVE GIVES A BROAD OVERVIEW OF WHAT NEEDS TO BE TESTED.
- THIS UNDERSTANDING IS QUANTIFIED IN THE ESTIMATION STEP.
- ESTIMATION HAPPENS BROADLY IN THREE PHASES.
 - SIZE ESTIMATION
 - EFFORT ESTIMATION
 - SCHEDULE ESTIMATION

ACTIVITY BREAKDOWN AND SCHEDULING

- ACTIVITY BREAKDOWN AND SCHEDULE ESTIMATION ENTAIL TRANSLATING THE EFFORT REQUIRED INTO SPECIFIC TIME FRAMES.
- THE FOLLOWING STEPS MAKE UP THIS TRANSLATION.
 - **IDENTIFYING EXTERNAL AND INTERNAL DEPENDENCIES** AMONG THE ACTIVITIES
 - **SEQUENCING THE ACTIVITIES**, BASED ON THE EXPECTED DURATION AS WELL AS ON THE DEPENDENCIES
 - **IDENTIFYING THE TIME REQUIRED** FOR EACH OF THE WBS ACTIVITIES, TAKING INTO ACCOUNT THE ABOVE TWO FACTORS
 - **MONITORING THE PROGRESS** IN TERMS OF TIME AND EFFORT
 - **REBALANCING SCHEDULES** AND RESOURCES AS NECESSARY

COMMUNICATIONS MANAGEMENT

- COMMUNICATIONS MANAGEMENT CONSISTS OF EVOLVING AND FOLLOWING PROCEDURES FOR COMMUNICATION.
- THAT ENSURE THAT EVERYONE IS KEPT IN SYNC WITH THE RIGHT LEVEL OF DETAIL.

RISK MANAGEMENT

- JUST LIKE EVERY PROJECT, TESTING PROJECTS ALSO FACE RISKS. RISKS ARE EVENTS THAT COULD POTENTIALLY AFFECT A PROJECT'S OUTCOME.
- RISK MANAGEMENT ENTAILS
 - IDENTIFYING THE **POSSIBLE RISKS**;
 - **QUANTIFYING** THE RISKS;
 - PLANNING HOW TO **MITIGATE** THE RISKS; AND
 - **RESPONDING** TO RISKS WHEN THEY BECOME A REALITY.

TEST MANAGEMENT

- **CHOICE OF STANDARDS**
- **TEST INFRASTRUCTURE MANAGEMENT**
- **TEST PEOPLE MANAGEMENT**
- **INTEGRATING WITH PRODUCT RELEASE**

CHOICE OF STANDARDS

- Standards comprise an important part of planning in any organization.
- Standards are of two types—external standards and internal standards.
- External standards are standards that a product should comply with, are externally visible, and are usually stipulated by external consortia.
- Internal standards are standards formulated by a testing organization to bring in consistency and predictability.
 - NAMING AND STORAGE CONVENTIONS FOR TEST ARTIFACTS;
 - DOCUMENT STANDARDS;
 - TEST CODING STANDARDS; AND
 - TEST REPORTING STANDARDS.

TEST INFRASTRUCTURE MANAGEMENT

- TESTING REQUIRES A ROBUST INFRASTRUCTURE TO BE PLANNED UPFRONT. THIS INFRASTRUCTURE IS MADE UP OF THREE ESSENTIAL ELEMENTS.
 - A TEST CASE DATABASE (TCDB)
 - A DEFECT REPOSITORY
 - CONFIGURATION MANAGEMENT REPOSITORY AND TOOL

TEST INFRASTRUCTURE MANAGEMENT

Test case database (TCDB)

- A TEST CASE DATABASE CAPTURES ALL THE RELEVANT INFORMATION ABOUT THE TEST CASES IN AN ORGANIZATION.
- CONTENT OF A TEST CASE DATABASE.
 - TEST CASE
 - TEST CASE - PRODUCT CROSS- REFERENCE
 - TEST CASE RUN HISTORY
 - TEST CASE—DEFECT CROSS-REFERENCE

TEST INFRASTRUCTURE MANAGEMENT

Defect repository

- A DEFECT REPOSITORY CAPTURES ALL THE RELEVANT DETAILS OF DEFECTS REPORTED FOR A PRODUCT.
- THE INFORMATION THAT A DEFECT REPOSITORY INCLUDES
 - DEFECT DETAILS
 - DEFECT TEST DETAILS
 - FIX DETAILS
 - COMMUNICATION

TEST INFRASTRUCTURE MANAGEMENT

Configuration management repository and tool

- AN SCM REPOSITORY ALSO KNOWN AS (CM REPOSITORY) KEEPS TRACK OF CHANGE CONTROL AND VERSION CONTROL OF ALL THE FILES/ENTITIES THAT MAKE UP A SOFTWARE PRODUCT.
- CHANGE CONTROL ENSURES THAT
 - CHANGES TO TEST FILES ARE MADE IN A CONTROLLED FASHION AND ONLY WITH PROPER APPROVALS.
 - CHANGES MADE BY ONE TEST ENGINEER ARE NOT ACCIDENTALLY LOST OR OVERWRITTEN BY OTHER CHANGES.
 - EACH CHANGE PRODUCES A DISTINCT VERSION OF THE FILE THAT IS RECREATABLE AT ANY POINT OF TIME.
 - AT ANY POINT OF TIME, EVERYONE GETS ACCESS TO ONLY THE MOST RECENT VERSION OF THE TEST FILES.

TEST PEOPLE MANAGEMENT

- PEOPLE MANAGEMENT IS AN INTEGRAL PART OF ANY PROJECT MANAGEMENT.
 - **DEVELOPER:** THESE TESTING FOLKS... THEY ARE ALWAYS NITPICKING!
 - **TESTER:** WHY DON'T THESE DEVELOPERS DO ANYTHING RIGHT?!
 - **SALES PERSON:** WHEN WILL I GET A PRODUCT OUT THAT I CAN SELL?!

INTEGRATING WITH PRODUCT RELEASE

- ULTIMATELY, THE SUCCESS OF A PRODUCT DEPENDS ON THE EFFECTIVENESS OF INTEGRATION OF THE DEVELOPMENT AND TESTING ACTIVITIES.
- THESE JOB FUNCTIONS HAVE TO WORK IN TIGHT UNISON BETWEEN THEMSELVES AND WITH OTHER GROUPS SUCH AS PRODUCT SUPPORT, PRODUCT MANAGEMENT, AND SO ON.
 - SYNC POINTS BETWEEN DEVELOPMENT AND TESTING AS TO WHEN DIFFERENT TYPES OF TESTING CAN COMMENCE.
 - SERVICE LEVEL AGREEMENTS BETWEEN DEVELOPMENT AND TESTING AS TO HOW LONG IT WOULD TAKE FOR THE TESTING TEAM TO COMPLETE THE TESTING.
 - CONSISTENT DEFINITIONS OF THE VARIOUS PRIORITIES AND SEVERITIES OF THE DEFECTS.
 - COMMUNICATION MECHANISMS TO THE DOCUMENTATION GROUP TO ENSURE THAT THE DOCUMENTATION IS KEPT IN SYNC.

TEST PROCESS

- **PUTTING TOGETHER AND BASELINING A TEST PLAN**
- **TEST CASE SPECIFICATION**
- **UPDATE OF TRACEABILITY MATRIX**
- **IDENTIFYING POSSIBLE CANDIDATES FOR AUTOMATION**
- **DEVELOPING AND BASELINING TEST CASES**
- **EXECUTING TEST CASES AND KEEPING TRACEABILITY MATRIX CURRENT**
- **COLLECTING AND ANALYZING METRICS**
- **PREPARING TEST SUMMARY REPORT**
- **RECOMMENDING PRODUCT RELEASE CRITERIA**

PUTTING TOGETHER AND BASELINING A TEST PLAN

- AN ORGANIZATION NORMALLY ARRIVES AT A TEMPLATE THAT IS TO BE USED ACROSS THE BOARD.
- EACH TESTING PROJECT PUTS TOGETHER A TEST PLAN BASED ON THE TEMPLATE. SHOULD ANY CHANGES BE REQUIRED IN THE TEMPLATE, THEN SUCH A CHANGE IS MADE ONLY AFTER CAREFUL DELIBERATIONS
- THE TEST PLAN IS REVIEWED BY A DESIGNATED SET OF COMPETENT PEOPLE IN THE ORGANIZATION.
- IT THEN IS APPROVED BY A COMPETENT AUTHORITY, WHO IS INDEPENDENT OF THE PROJECT MANAGER DIRECTLY RESPONSIBLE FOR TESTING.

TEST CASE SPECIFICATION

- USING THE TEST PLAN AS THE BASIS, THE TESTING TEAM DESIGNS *TEST CASE SPECIFICATIONS*, WHICH THEN BECOMES THE BASIS FOR PREPARING INDIVIDUAL *TEST CASES*.
- A TEST CASE SPECIFICATION SHOULD CLEARLY IDENTIFY
 - THE PURPOSE OF THE TEST: This lists what feature or part the test is intended for.
 - ITEMS BEING TESTED, ALONG WITH THEIR VERSION/RELEASE NUMBERS AS APPROPRIATE.
 - ENVIRONMENT THAT NEEDS TO BE SET UP FOR RUNNING THE TEST CASE: This can include the hardware environment setup, supporting software environment setup
 - INPUT DATA TO BE USED FOR THE TEST CASE: The choice of input data will be dependent on the test case itself and the technique followed in the test case
 - STEPS TO BE FOLLOWED TO EXECUTE THE TEST: If automated testing is used, then, these steps are translated to the scripting language of the tool.
 - THE EXPECTED RESULTS THAT ARE CONSIDERED TO BE “CORRECT RESULTS.”
 - A STEP TO COMPARE THE ACTUAL RESULTS PRODUCED WITH THE EXPECTED RESULTS
 - ANY RELATIONSHIP BETWEEN THIS TEST AND OTHER TESTS

UPDATE OF TRACEABILITY MATRIX

- THE TRACEABILITY MATRIX IS A TOOL TO VALIDATE THAT EVERY REQUIREMENT IS TESTED.
- WHEN A TEST CASE SPECIFICATION IS COMPLETE, THE ROW CORRESPONDING TO THE REQUIREMENT WHICH IS BEING TESTED BY THE TEST CASE IS UPDATED WITH THE TEST CASE SPECIFICATION IDENTIFIER.
- THIS ENSURES THAT THERE IS A TWO-WAY MAPPING BETWEEN REQUIREMENTS AND TEST CASES.

IDENTIFYING POSSIBLE CANDIDATES FOR AUTOMATION

- BEFORE WRITING THE TEST CASES, A DECISION SHOULD BE TAKEN AS TO WHICH TESTS ARE TO BE AUTOMATED AND WHICH SHOULD BE RUN MANUALLY.
- CRITERIA THAT WILL BE USED IN DECIDING WHICH SCRIPTS TO AUTOMATE INCLUDE
 - REPETITIVE NATURE OF THE TEST;
 - EFFORT INVOLVED IN AUTOMATION;
 - AMOUNT OF MANUAL INTERVENTION REQUIRED FOR THE TEST; AND
 - COST OF AUTOMATION TOOL.

DEVELOPING AND BASELINING TEST CASES

- BASED ON THE TEST CASE SPECIFICATIONS AND THE CHOICE OF CANDIDATES FOR AUTOMATION, TEST CASES HAVE TO BE DEVELOPED.
- IN ADDITION, THE TEST CASE SHOULD ALSO CAPTURE THE DOCUMENTATION FOR THE CHANGES MADE TO THE TEST CASE SINCE THE ORIGINAL DEVELOPMENT.
- TEST CASES SHOULD ALSO HAVE CHANGE HISTORY DOCUMENTATION, WHICH SPECIFIES
 - WHAT WAS THE CHANGE;
 - WHY THE CHANGE WAS NECESSITATED;
 - WHO MADE THE CHANGE;
 - WHEN WAS THE CHANGE MADE;
 - A BRIEF DESCRIPTION OF HOW THE CHANGE HAS BEEN IMPLEMENTED; AND
 - OTHER FILES AFFECTED BY THE CHANGE.

EXECUTING TEST CASES AND KEEPING TRACEABILITY MATRIX CURRENT

- THE PREPARED TEST CASES HAVE TO BE EXECUTED AT THE APPROPRIATE TIMES DURING A PROJECT.
- AS THE TEST CASES ARE EXECUTED DURING A TEST CYCLE, THE DEFECT REPOSITORY IS UPDATED WITH
 - DEFECTS FROM THE EARLIER TEST CYCLES THAT ARE FIXED IN THE CURRENT BUILD; AND
 - NEW DEFECTS THAT GET UNCOVERED IN THE CURRENT RUN OF THE TESTS.
- DURING TEST DESIGN AND EXECUTION, THE TRACEABILITY MATRIX SHOULD BE KEPT CURRENT.

COLLECTING AND ANALYZING METRICS

- WHEN TESTS ARE EXECUTED, INFORMATION ABOUT TEST EXECUTION GETS COLLECTED IN TEST LOGS AND OTHER FILES.
- THE BASIC MEASUREMENTS FROM RUNNING THE TESTS ARE THEN CONVERTED TO MEANINGFUL METRICS BY THE USE OF APPROPRIATE TRANSFORMATIONS AND FORMULAE.

PREPARING TEST SUMMARY REPORT

- AT THE COMPLETION OF A TEST CYCLE, A TEST SUMMARY REPORT IS PRODUCED.
- THIS REPORT GIVES INSIGHTS TO THE SENIOR MANAGEMENT ABOUT THE FITNESS OF THE PRODUCT FOR RELEASE.

RECOMMENDING PRODUCT RELEASE CRITERIA

- ONE OF THE PURPOSES OF TESTING IS TO DECIDE THE FITNESS OF A PRODUCT FOR RELEASE.
- THE SENIOR MANAGEMENT CAN THEN TAKE A MEANINGFUL BUSINESS DECISION ON WHETHER TO RELEASE A GIVEN VERSION OR NOT.

TEST REPORTING

- **TEST INCIDENT REPORT**
- **TEST CYCLE REPORT**
- **TEST SUMMARY REPORT**
- **RECOMMENDING PRODUCT RELEASE**

TEST INCIDENT REPORT

- A TEST INCIDENT REPORT IS A COMMUNICATION THAT HAPPENS THROUGH THE TESTING CYCLE AS AND WHEN DEFECTS ARE ENCOUNTERED.
- A TEST INCIDENT REPORT IS NOTHING BUT AN ENTRY MADE IN THE DEFECT REPOSITORY.
- EACH DEFECT HAS A UNIQUE ID AND THIS IS USED TO IDENTIFY THE INCIDENT.

TEST CYCLE REPORT

- TEST PROJECTS TAKE PLACE IN UNITS OF TEST CYCLES.
- A TEST CYCLE REPORT, AT THE END OF EACH CYCLE, GIVES
 - A SUMMARY OF THE ACTIVITIES CARRIED OUT DURING THAT CYCLE;
 - DEFECTS THAT WERE UNCOVERED DURING THAT CYCLE, BASED ON THEIR SEVERITY AND IMPACT;
 - PROGRESS FROM THE PREVIOUS CYCLE TO THE CURRENT CYCLE IN TERMS OF DEFECTS FIXED;
 - OUTSTANDING DEFECTS THAT ARE YET TO BE FIXED IN THIS CYCLE; AND
 - ANY VARIATIONS OBSERVED IN EFFORT OR SCHEDULE (THAT CAN BE USED FOR FUTURE PLANNING).

TEST SUMMARY REPORT

- THE FINAL STEP IN A TEST CYCLE IS TO RECOMMEND THE SUITABILITY OF A PRODUCT FOR RELEASE.
- A REPORT THAT SUMMARIZES THE RESULTS OF A TEST CYCLE IS THE TEST SUMMARY REPORT.
- THERE ARE TWO TYPES OF TEST SUMMARY REPORTS.
 - PHASE-WISE TEST SUMMARY, WHICH IS PRODUCED AT THE END OF EVERY PHASE
 - FINAL TEST SUMMARY REPORTS (WHICH HAS ALL THE DETAILS OF ALL TESTING DONE BY ALL PHASES AND TEAMS, ALSO CALLED AS “RELEASE TEST REPORT”)

RECOMMENDING PRODUCT RELEASE

- BASED ON THE TEST SUMMARY REPORT, AN ORGANIZATION CAN TAKE A DECISION ON WHETHER TO RELEASE THE PRODUCT OR NOT.
- IDEALLY, AN ORGANIZATION WOULD LIKE TO RELEASE A PRODUCT WITH ZERO DEFECTS.