

STRUCTURAL SYSTEM TESTING TECHNIQUES

STRESS TESTING

- Stress Testing is designed to determine if the system can function when subject to large volumes.
- Areas stressed include input transactions, internal tables, disk space, output, communications, and computer capacity and interaction with people.

OBJECTIVES

- Normal or above-normal volumes of data-processed within the expected time frame.
- Application is structurally able to process large volumes of data.
- System capacity including communication lines has sufficient resources available to meet expected turnaround times.
- People can perform their assigned tasks and maintain desired turnaround time.

HOW TO USE STRESS TESTING

Transactions for use in stress testing obtained from 3 sources. They are

1. Test data generator
 2. Test transactions created by test group.
 3. Transactions previously processed in the production environment.
- The system should be run as in production environment.

- Operators should use standard documentation and people entering transactions should be those who work with the system after it goes into production.
- Online system should be tested for an extended period of time.
- Batch system should be tested using more than one batch of transactions.

Examples

- To determine sufficient disk space allocated to the application.
- To ensure communication capacity is sufficient to handle the volume of work.
- To test overflow conditions by entering more transactions that can be accommodated by tables, queues, internal storage facilities etc.

WHEN TO USE

- When there is uncertainty regarding the volume of the work.
- Online application is difficult to simulate heavy-volume transactions.

DISADVANTAGE:

- The amount of time it takes to prepare for test, amount of resources consumed during the execution of test.

EXECUTION TESTING

- Execution Testing is designed to determine whether system achieves desired level of proficiency in a production status.
- Verify response times, turnaround times and design performance.

OBJECTIVES

- Determining performance of the system structure.
- Verifying optimum use of hardware and software.
- Determining response time to online use requests.
- Determining transaction processing turnaround time.

HOW TO USE EXECUTION TESTING

- Using hardware and software monitor.
- Simulating functioning of all or part of system using a simulation model.
- Creating a quick program to evaluate the performance of a completed system.

The earlier the technique is used, the higher the assurance that the application meet performance criteria.

Examples

- Calculating turnaround time
- Determining that hardware and software provide optimum processing capability.
- Using software monitors to determine that code is effectively used.

WHEN TO USE

- Used early in the development process
- It can be used at that point in time when results can be used to affect or change system structure.

RECOVERY TESTING

- Recovery is the ability to restart operations after the integrity of the application has been lost.
- Process involves where the integrity of the system is known and reprocessing transactions up until the point of failure.

Factors affecting recovery operations:

- Number of restart points
- Volume of applications
- Training and skill of people conducting recovery operation

OBJECTIVES

- Adequate backup data is preserved
- Backup data is stored in a secure location
- Recovery procedures are documented
- Recovery personnel have been assigned and trained.
- Recovery tools have been developed.

HOW TO USE RECOVERY TESTING

There are 2 modes. They are

- 1) Procedures, methods, tools and techniques can be assessed to evaluate whether they appear adequate.
- 2) After developing system a failure introduced and ability to recover is tested.

S.NO	MODE 1	MODE 2
1	Judgment and checklists used for evaluation	Involves off-site facilities and alternative processing locations
2	Done by skilled system analysts testers or management personnel	By computer operators and clerical personnel involved in actual disaster instead of test disaster.

- ✓ It is better to test one segment at a time. It is not recommended to let the participants know specifically when error will occur or what type of recovery will be necessary.

Examples

- Loss of input capability, loss of communication lines, hardware and operating system failure, loss of database integrity
- Inducing failure in one of the application programs during processing

- Recovery conducted from a known point of integrity to ensure available backup data was adequate for the recovery process.

WHEN TO USE

- Whenever continuity of operation is essential user should estimate potential loss associated with inability to recover operations within 5 minutes, 1 hour, 8 hours and a week.

OPERATIONS TESTING

- ❖ To verify prior to production that the operating process and staff properly execute the application.

OBJECTIVES

- Determining completeness of operation documentation
- Ensures Job control language(support mechanisms) prepared and functions properly.
- Evaluating completeness of operator training
- Operators using prepared documents can operate the system.

HOW TO USE OPERATIONS TESTING

Requirements Phase : Operational requirements can be evaluated to determine reasonableness and completeness of those requirements.

Design Phase : Operating process designed and can be evaluated

- Continual Testing
- It can be performed along with other tests
- Test need to evaluate effectiveness of operations in running the application in a true operational environment.

Examples :

- Determining operations, instructions prepared and documented and also operations trained in any unusual process.
- Testing Job control language statements and other operating system support features perform predetermined tasks.
- Verify file labeling and protection process function properly.

WHEN TO USE

- Prior to placing into production environment.

Note:

To identify operation flow as identify
application flow

COMPLIANCE TESTING

- ❖ To verify application developed in accordance with IT standards process and guidelines.

OBJECTIVES

- Determine system development and maintenance methodologies are followed
- Compliance to departmental standards, procedures and guidelines
- Evaluating completeness and reasonableness of system documentation.

HOW TO USE COMPLIANCE TESTING

- Prepared documentation compared to standards for that particular program.
- Most effective method for compliance test is inspection process by colleague.

Example :

- Peer group is test line by line
- Compliant with programming standards

At the end programmer can given a list of non-compliant information that is need to be corrected

WHEN TO USE

- ❖ Dependent on managements desire to have process followed and standards enforced
management identify violators for management action.

SECURITY TESTING

- ❖ Amount of security provided depended upon risks associated with compromise or loss of information. Security testing is to evaluate adequacy of protective process and countermeasures.

OBJECTIVES

- ✓ To identify defects that are difficult to identify.
- ✓ Failures in security system may not be detected, resulting in loss of information without knowledge of that loss.

- Determining adequate attention devoted to identifying security risks.
- Determining that a realistic definition and enforcement of access implemented.
- Determining sufficient expertise exists to perform sufficient security testing.
- Conducting reasonable tests to ensure implemented security measures functions properly.

HOW TO USE SECURITY TESTING

- First step in testing is identification of security risks and potential loss associated with those risks.
- If loss is low or penetration method is more routine, the IT personnel can conduct the necessary tests.
- If risks is high or technology sophisticated, specialized help needed in conducting tests

Examples :

Security Testing:

- Physical security
- Logical security
- To determining the resources being protected are identified and access defined for each resource.
- Whether designed security procedures properly implemented and function in accordance with specifications

- Unauthorized access can be attempted in online system to ensure that system can identify and prevent access by unauthorized resources.

WHEN TO USE

- ❖ When the information/assets protected by the system are of significant value to the organization. It should be performed into operational status.

THANK YOU