BEST PRACTICE
Test Matrices

The test matrix shows the interrelationship between functional events and tests. The completed test matrix defines the conditions that must be tested during the test process to verify the proper functioning of the application system. It does not represent the totality of testing because there may be types of tests that verify the structure of the system, such as verifying the correct use of program statements that are not included in the test matrix.

The left side of the matrix shows the functional events and the top identifies the tests that occur on those events. Within the matrix cells are the process that needs to be tested.

The example illustrated in Figure 13 is for the functional event of an employee getting a pay increase. The tests have been selected because each test:

- Represents the actions that must be performed on this functional event in order for the employee to get a raise.
- Represents a task that is performed individually.
- Can be associated with the individual responsible to perform that action.
- Is broad enough to limit the actions to a reasonable number.

	Actions								
Economic Events	Initiate Event	Increase Approved	Data Entry	Form Storage	Data Entry Validation	Logical Validation	Update Pay Record	Audit Trail	Report
Give Pay Increase	Supervisor completes Form X	Management initials Form X	Verify amount	Store Form X 90 days in Personnel	1. Numeric 2. Under $100	1.Employee exists 2. Within pay range 3. Within ± 15%	Change pay rate amount	Put change on payroll history file	Confirmation to supervisor
Event									
Event									

Figure 13. Testing Matrix

In the figure example there are nine identified conditions that must be tested to determine whether or not employees' pay increases are processed correctly by the application system.

This testing matrix would be typical of one prepared during the requirements phase. The functional events, as well as the actions, will be used throughout the

systems development life cycle. However, the test conditions will become more specific as the life cycle progresses.

Cascading Test Matrices

The tests that occur on functional events vary based on the events themselves. If generic actions are used, it may be possible to include several functional events in the same matrix. However, it is generally better to limit a matrix to a single functional event.

Including only one functional event on a matrix provides the following two advantages:

- Tests can be customized for specific functional events
- Tests on the functional events can be the creation of new functional events which show a relationship between the events.

One functional event leading to the creation of another and leading to another will cause several matrices to be prepared. Properly prepared, they will demonstrate the cascading events illustrating how one event can create another event which can create yet another event. An example of a cascading matrix is illustrated in Figure 14. This matrix is from an order entry billing system.

	Action			
Economic Event	Initiate Order	Accept Order	Enter Order	Approve Credit
Order Product				•

	Action			
Economic Event	Authorize Customer	Credit No Good	Credit Approved	Ship Product
Credit Approval				•

	Action			
Economic Event				
Ship Product				

Figure 14. Cascading Test Matrices

The first functional event is the order for a product placed by a customer. The type of actions that would occur on this is the initiation of the order, the

acceptance of the order, the entry of the order, and the credit approval action. That action creates a new functional event which is the formal approval of customer credit. Figure 14 shows how the action in the first matrix cascades or points to the second matrix.

The tests for the functional event of approving credit involves such tasks as determining that the customer is an authorized customer, causing a decision about the customer's credit. If good action occurs, it creates a new functional event to ship a product. The figure shows how the action to ship a product creates a new functional event and a new matrix. This process would continue until the entire order entry billing application was complete.

References

Guide – CSTE Common Body Of Knowledge, V6.1