

CTP 2

by Geoff Quentin

Part two - the V model, issue tracking, business-driven testing and the Generic Test Process



Professional Tester's exclusive publication of **Geoff Quentin's** formal, rigorous, standards-based method for testing any new software-based system

The V Model according to ISO/IEC 12207

1.5

The Consolidated Testing Process ("CTP") is based on the V model: the concept that tasks in a development process and deliverables produced during their performance can be used as basis for test material needed later in that development process.

The CTP requires that the deliverables themselves are tested. In the CTP, testing non-executable deliverables is called *analytical testing*. Testing executable deliverables is called *empirical testing*.

A version of the V model with activities as defined in ISO/IEC 12207 Software Life Cycle Processes ("12207") is shown in figure 1.

Issue tracking

1.6

Testing may identify anomalies, ie differences between what is expected and what appears to be present. However the cause of the anomaly may be in the test itself or in a person's understanding. In the CTP, until the nature of the difference is known, the existence of the difference is referred to as an issue.

When an issue is identified the CTP requires that it is: *assigned a unique reference; recorded in such a way that it is traceable from identification to resolution and the record is maintainable throughout the life cycle; analysed, graded and reported; resolved.*

One approach to grading ("classifying") and tracking issues is described in IEEE 1044-1993 *Standard Classification for Software Anomalies* ("1044").

Issue tracking during analytical testing

1.6.1

The CTP requires that tests are planned

and designed as early as possible in the acquisition process. If this activity causes an issue to be identified, the CTP requires that its resolution includes the creation of test material to be used during empirical testing.

Identification and resolution of issues by analytical testing during specification and design processes is desirable.

Issue tracking during empirical testing

1.6.2

Identification of an issue during empirical testing is undesirable. It indicates failure of earlier quality control. The CTP requires that relevant action intended to improve the development process, test process or both is initiated in response to it.

If the cause of the issue is found to be in the test object and not in the test that identified the issue, the CTP requires that the test activity is repeated before resolution ("re-testing") and after resolution ("regression testing") to demonstrate that the difference between what is expected and what is present which enabled identification of the issue is no longer apparent.

Incident management

1.6.3

Identification during empirical testing of an issue whose cause is found to be in the test object and not in the test indicates that the test object has the potential to fail, perhaps delaying deployment, and requires rework and repeated test activity, perhaps delaying continuation of development and testing work. Because of these time-related effects and their implications for project management, the event of identification of such an issue may be called an "incident".

Organizational testing strategy

1.7

The CTP requires that management

The Consolidated Testing Process

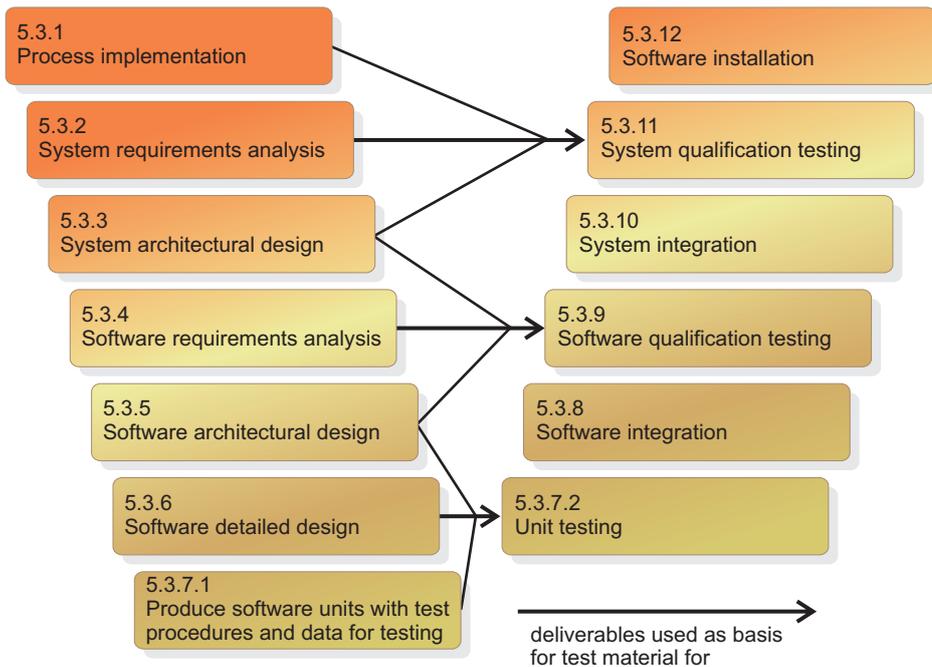


Figure 1: the V model with ISO/IEC 12207 activities

supports an organizational testing strategy which identifies: *all the quality control (QC) points; who is to carry out the testing at each QC point; the expected compliance requirements (internal to the development and supply processes); the reporting structure; overall system quality requirements; risk containment tasks; external compliance requirements (such as legislation or standards).*

The organizational testing strategy governs the testing including the types of testing to be done and the balance between the effort spent on each of them, test environments, scope (with test objectives and a coverage requirement), tools, maintenance of test material, expected timeframes, reporting, control processes and overall administration. The CTP requires that the organizational testing strategy is supported by appropriate management policy statements and compliant with applicable standards.

The Test Management Process 1.8
The Test Management Process ("TMP") consists of the following tasks: *assigning roles and responsibilities; checking that tests are correct; execution of tests; maintenance of test material including when requirements change.*

Business driven testing

Testing driven by business risks 1.9.1
The CTP requires that risks are identified, documented, defined, quantified and prioritized, that tests intended to support the containment of each identified risk are developed, and that those tests are executed in an order derived from the risk prioritization.

Testing driven by business benefits 1.9.2
The CTP requires that all functions and all non-functional attributes ("NFA"s) identified in the requirements for the product are graded in terms of business benefit, that tests to show that each function and NFA is compliant with the completion criteria are developed, and that those tests are executed in an order derived from the business benefit grading.

Process improvement 1.10
The CTP requires that metrics are gathered from all testing activities (analytical and empirical) and used to identify development and testing processes that may benefit from assessment of their effectiveness. All processes are open for improvement at all times.

The CTP requires that root cause analysis is carried out for every issue identified in any deliverable to determine during what development or testing process the error that caused the issue occurred. That process is then modified by incorporation of the testing activity that detected the defect, improving the process and reducing the need for empirical testing.

Section 2 The Generic Test Process

The CTP requires that the Generic Test Process ("GTP") is followed to test all test objects. A test object is any object that is of concern, ie the products of development processes such as those defined in 12207. The testing can be done using any suitable method including but not limited to those defined in BS 7925-2 *Software Component Testing* ("7925") and IEEE 1028 *Standard for Software Reviews* ("1028") and documented for example as described in IEEE 829 *Standard for Software Test Documentation* ("829").

The CTP requires that processes and documentation methods are chosen for their ability to support and not to hinder the testing work. The role of a tester is not to fill in forms or adhere to development processes but to (i) attest to an attribute or deliverable being correct when it is correct; (ii) detect and record in a way that can be analysed defects that make an attribute or deliverable incorrect.

The GTP is designed to support management by making it easy to understand progress via clear, meaningful, continuous reporting. It consists of seven tasks:

- GTP1 Test status reporting
- GTP2 Create the test strategy
- GTP3 Create the test plan
- GTP4 Perform test analysis
- GTP5 Design test(s)
- GTP6 Schedule execution of test(s)
- GTP7 Run test(s)

GTP1 is in two parts. The very first activities of the GTP are establishing the method of referring to the testing work to enable traceability and defining the test status reporting mechanism. Then, maintenance of traceability and reporting are performed continuously in parallel with GTP2-7, using that reference method and reporting mechanism.

The reference method must allow recursion, so that test objectives can be of multiple levels, and it is clear of which higher-level test objective each lower-level test objective forms part, and on which lower-level test objectives each higher-level test objective depends.

GTP7 refers to the running of testing methods such as reviews as well as the execution of empirical tests.

At least the following information must be recorded and maintained for every test, throughout the GTP: *test reference; business objective; test object; test objective; test attribute (condition to be*

tested); completion (compliance) criteria; test method; test data; test setup; test schedule; test execution; test status

The *business objective* is recorded during GTP2, *test object* and *test objective* during GTP3, *test attribute* and *completion criteria* during GTP4, *test method, test data* and *test setup* during GTP5, *test schedule* during GTP6 and *test execution* during GTP7.

Additional information may be recorded for each test to achieve auditability but is not required by the CTP.

Test status is one of a set of indicators, for example: *test reference assigned; business objectives identified; critical success indicators defined; test strategy defined; test objects identified; test objectives set; attributes defined; completion criteria specified; method identified; data created; environment and*

setup created; data, environment and setup checked; run date assigned; resources allocated; pre-conditions met and test ready to run; failed, re-test needed; passed, accepted with qualifications; passed, accepted

The CTP does not prescribe the status indicators; the set may be flexible and chosen to suit the work at hand and the indicators may be many and various. But the CTP requires that every status indicator defined is recorded against each test at the appropriate time: no indicator may be skipped.

By updating the status indicators every time a test activity is completed for an individual test, the tester is in a position to provide accurate reporting throughout the GTP. Management can understand progress clearly and easily by referring to the *test reference, business objective, test objective* and *test status* only ■

In the next issue **The Consolidated Testing Process part 3: the Generic Test Process: test strategy, planning, analysis, design, scheduling and execution**

Top 5 reasons not to use a standard



You can't find it

Most Google results lead to Powerpoint slides about the standard designed by a chimp. What may or may not be the standard itself seems to be behind a paywall thicker than Rupert Murdoch. Someone should start a torrent site (idea © Professional Tester 2010)



It's ambiguous

Some standards appear to have been reviewed to destruction by a committee determined to find and remove any assertion with which anyone in the world might conceivably disagree



You didn't know it applied to you

The black-box techniques defined by BS 7925-2:1998 *Standard for Software Component Testing* are equally applicable at all testing levels. Would leaving out the word "component" have led to it being used more in the last 12 years?



You can't read it

If you do manage to get a copy of ISO/IEC 15504 *Software Process Assessment* and keep it at your bedside you'll never need temazepam again



You can't do it by yourselves

Some standards require an expert assessor (a bit like a school inspector) to show up twice a year, drink your coffee, tick some boxes and issue a large invoice

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