

Prosser Telecommunications
What is TTCN?

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TTCN (Tree and Tabular Combined Notation), is a complete testing methodology enabling self contained conformance tests to be produced. TTCN is becoming widely accepted by the international telecommunications community, and new telecommunication specifications are now being produced with their conformance statements written in TTCN.

TTCN can be specified in two forms: graphical form (TTCN GR) and machine processable form (TTCN MP). The graphical form is intended for human consumption: message formats are defined in tabular form (which includes ASN 1 type definitions), and message sequences are defined as a tree, where indentation is significant.

The machine processable form is intended for machines! Several different packages are available which can convert from one form to another. Indeed, some of these packages support additional forms of test representation, such as message sequence charts.

TTCN conformance specifications are split into four main parts: suite overview, declarations part, constraints part and dynamic part.

The suite overview defines how individual test cases are grouped (hierarchically) to form comprehensive test groups, which in turn form the complete test suite (i.e. the conformance statement).

The declarations part contains the definitions of all the message components that comprise the test suite. This includes timers, interlayer service primitives, and interface points.

The constraints part defines the actual values to be applied to the definitions in the declarations part. To allow for recognition of received messages, ranges, lists of values, and “wildcards” may be defined, as well as unique specific values.

The dynamic part defines the actual test cases as sequences of test commands.

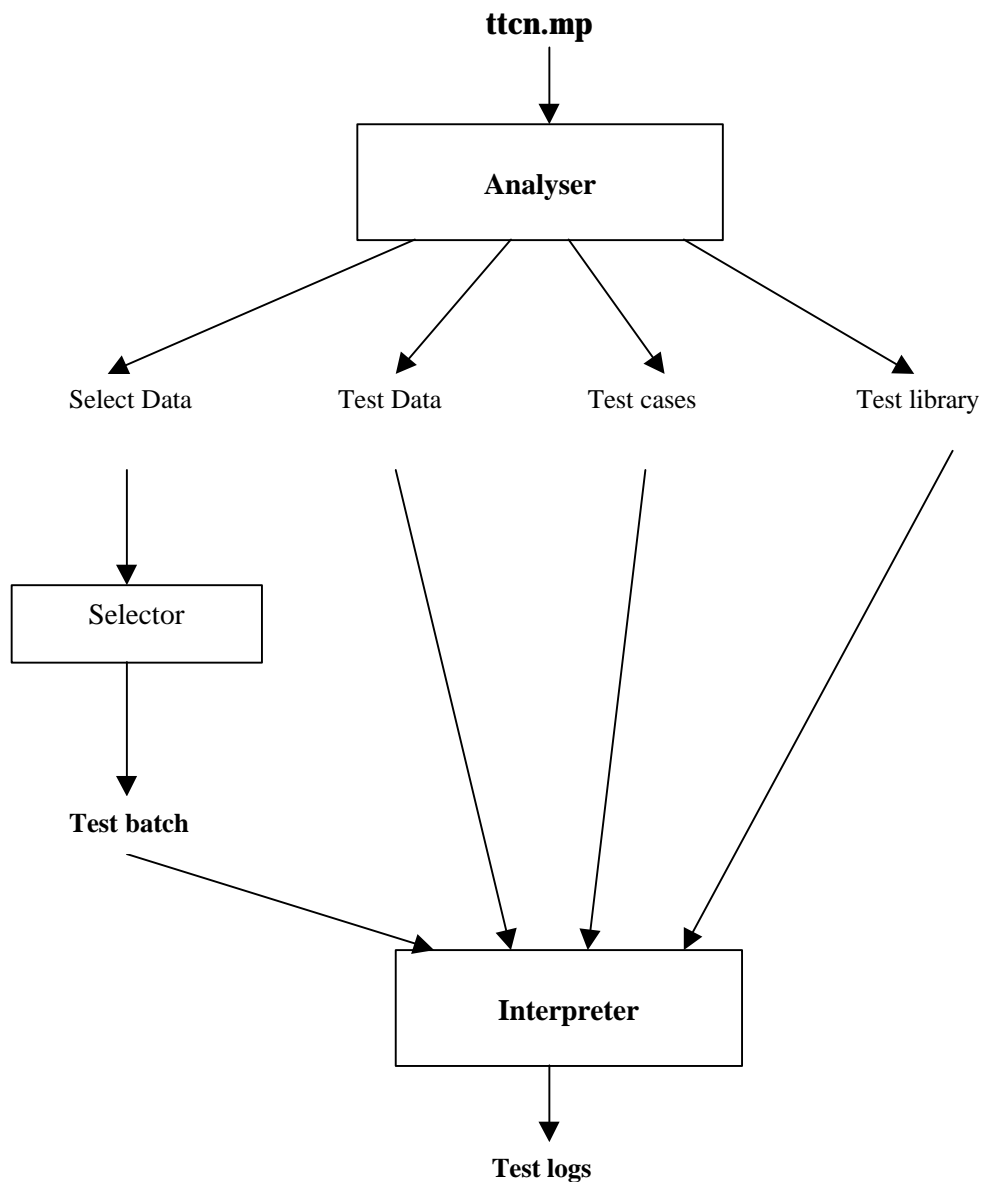
NTS M300 and TTCN

The implementation of TTCN for the NTS M300 tester is comprised of three software elements. Analyser, Selector and Interpreter.

The analysers' function is to process the source TTCN MP test suite and generate data for the selector and the interpreter to use. The analyser may be thought of as a TTCN MP compiler.

The selectors' function is to allow users to select which parts of the conformance suite they wish to execute. This can be one or more test cases, one or more test groups, or even the entire conformance suite.

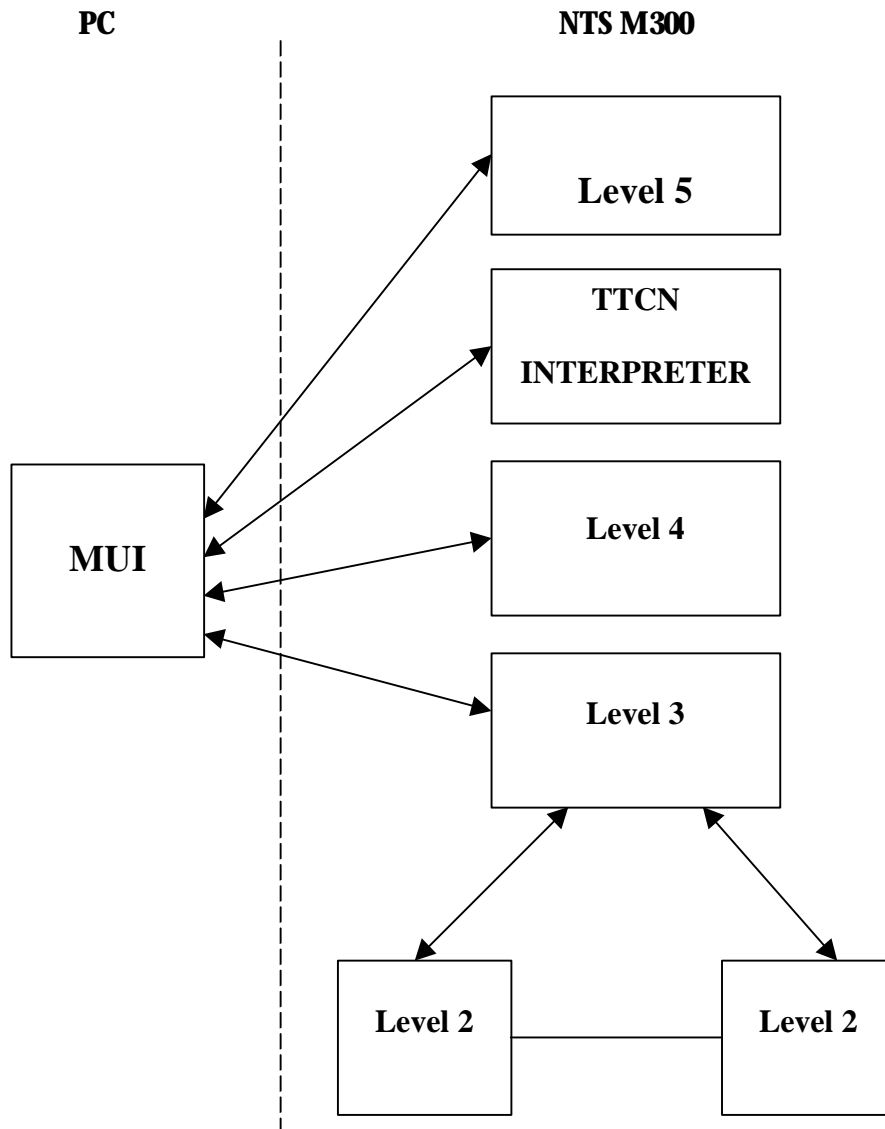
The interpreter uses the data generated by the selector and the analyser to perform the required tests.



The analyser runs on a PC under MS-DOS™. The analyser only needs to be run once, thereafter it only needs to be run if the test suite (i.e. the source TTCN MP) is changed.

The selector also runs on a PC, but requires MS-Windows™ 3.1 (or higher). This program displays the entire test suite as a tree, the user can then select individual test cases or groups of test cases using familiar “point and click” operations. The user may construct many different “test batches” to conformance test various aspects of switch operation. Comprehensive on-line help is available whilst using this program.

The interpreter runs on specialist equipment: NTS M300. This is generally comprised of several processor cards, each of which may optionally be attached to a “pod” which interfaces with a 2Mbit PCM communications link (as conventionally used between exchanges). The NTS M300 box is connected to a PC via a LAN, which provides the user interface, storage of programs and data etc. These services are provided by the MS-DOS™ program MUI. A typical system might be comprised of the following software elements:



In the above example, the tests are configured for testing at level 4 of the protocol stack, using the NTS M300 automatic functions for the higher and lower layers. Note that the level 2 layer is replicated, one per 2Mbit PCM link.