1671.1™

IEEE Trial-Use Standard for Automatic Test Markup Language (ATML) for Exchanging Automatic Test Equipment and Test Information via XML: Exchanging Test Descriptions

IEEE Standards Coordinating Committee 20

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Test and Diagnosis for Electronic Systems

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IEEE-SA Standards Board

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Abstract: This document specifies an exchange format, using the eXtensible Markup Language (XML), for exchanging the test description information defining test performance, test conditions, diagnostic requirements, and support equipment to locate, align, and verify the proper operation of a unit under test (UUT). This is in support of the development of test program sets (TPSs) that will be used in an automatic test environment.

Keywords: automatic test equipment (ATE), Automatic Test Markup Language (ATML), Automatic Test Markup Language (ATML) instance document, automatic test system (ATS), diagnostic requirements, test description, Test Program Set (TPS), test requirements, Test Requirements Document (TRD), XML schema

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Introduction

This introduction is not part of IEEE Std 1671.1-2009, IEEE Trial-Use Standard for Automatic Test Markup Language (ATML) for Exchanging Automatic Test Equipment and Test Information via XML: Exchanging Test Descriptions.

The benefits of using standards in test-related applications have long been recognized. The scope for standardization extends from low-level standards associated with test instrument control to high-level standards associated with specifying tests in an implementation-independent manner. In the 1960s, Aeronautical Radio, Incorporated started the development of the Abbreviated Test Language for Avionics Systems. In 1976, management of the ATLAS standard was passed to the IEEE, and the ATLAS acronym was changed to Abbreviated Test Language for All Systems to reflect its broader field of applications.

Within the IEEE, development of ATLAS and ATLAS-related standards was vested in an ad hoc committee, which later became the IEEE Standards Coordinating Committee 20 (SCC20). In the mid-1980s, SCC20 broadened the scope of its activities to embrace other standards projects related to test and diagnosis, including Automatic Test Program Generation (ATPG), Test Equipment Description Language (TEDL), Artificial Intelligence Exchange and Service Tie to All Test Environments (ATEESTATE), A Broad Based Environment for Test (ABBET), Software Interface to Maintenance Information and Collection Analysis (SIMICA), Receiver Fixture Interface (RFI), Signal and Test Definition (STD), and Automatic Test Markup Language (ATML).

The parent standard, IEEE Std 1671™[ab], provides the framework for a family of standards providing specifications for test-related applications and environments. This family specifies language-independent elements within a wide variety of test environments, including built-in test systems, automatic test systems (ATS), and manual test environments. Each of these interfaces is specified in the form of an eXtensible Markup Language (XML) schema.

This child, or "dot," standard, also known as an ATML component standard, specifies a new XML schema that provides for the representation of test description information.

XML schemas define the basic information required within any test application and provide a vehicle for formally defining the test environment by defining a class hierarchy corresponding to these basic information entities and providing several methods within each to enable basic operations to be performed on these entities. ATML component standards within the ATML framework define the particular requirements within the test environment.

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Publication of this trial-use standard for comment and criticism has been approved by the IEEE. Trial Use standards are effective for 24 months from the date of publication. Comments for revision will be accepted for 18 months after publication. Suggestions for revision should be directed to the Secretary, IEEE-SA Standards Board, 445 Hoes Lane, Piscataway, NJ 08854, and should be received no later than 11 June 2011. It is expected that following the 24-month period, this trial-use standard, revised and balloted as necessary, shall be submitted to the IEEE-SA Standards Board for approval as a full-use standard.

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1. Overview

1.1 General

The family of Automatic Test Markup Language (ATML) standards is being developed under the guidance of the IEEE Standards Coordinating Committee 20 (SCC20) to serve as standards for product test. The ATML family of standards specifies a comprehensive environment for integrating design data, test strategies, test requirements, test procedures, test results management, and test system implementations. The ATML framework is defined by IEEE Std 1671™.[1,2] IEEE Std 1671 is therefore a critical part of the ATML component defined by this trial-use standard.

This trial-use standard (and its associated schema) is intended to be used in identifying and documenting test descriptions that may be utilized during the testing of a particular unit under test (UUT).

1.2 Scope

The scope of this trial-use standard is the definition of an exchange format, utilizing eXtensible Markup Language (XML), for exchanging the test description information defining test performance, test

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conditions, diagnostic requirements, and support equipment to locate, align, and verify the proper operation of a UUT. This is in support of the development of test program sets (TPSs) that will be used in an automatic test environment.

1.3 Purpose

The purpose of this trial-use standard is to promote and facilitate interoperability between components of Automatic Test Systems (ATSs) (e.g., rehosting test requirements between ATS platforms) where UUT requirement definitions need to be shared. This trial-use standard will also facilitate the preparation or documentation of test program(s). The TestDescription schema becomes a class of information that can be used within the ATML family of standards.

1.4 Application

The trial-use standard will permit test descriptions to be utilized for a variety of purposes, including test program generation, Test Requirement Document (TRD) development and maintenance (formerly supported by MIL-STD-1345B-1981 [B8][3] and MIL-STD-1519-1977 [B9]), and test description analysis. These test descriptions can reference IEEE Std 1641™, which describes signals and their behavior.

The current test programs developed to run on ATSs are implemented with tight coupling between components. The components are typically developed specific to a particular architecture. Once the test program is fielded, the requirements and strategies used initially to develop the test program typically become obsolete as the test program evolves in its life cycle. As the ATS is replaced or achieves some level of obsolescence, it is typical to rehost the implementation of the TPS; rehosting is a more expensive, time-consuming task than that if implementing the UUT test requirement on the newer ATS or as part of instrument(s) replaced within the existing ATS. This trial-use standard will allow a common test description to be transportable across a variety of ATSs used in industries such as automotive, semiconductor, aerospace, and military.

The information contained in XML documents conforming to this trial-use standard will be useful to the following individuals:

a) Test program developers

b) Test program maintainers

c) Automatic test system (ATS) developers

d) ATS maintainers

e) Developers of ATML-based tools and systems

1.5 Conventions used within this document

1.5.1 General

In accordance with the *IEEE Standards Style Manual* [B7], any XML schema examples (see XML Schema Tutorial [B10]) will be shown in `Courier` font. In cases where instance document examples are necessary

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