Update on DMIS Certification

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Abstract

The Dimensional Standards Consortium (DMSC) and the National Institute of Standards and Technology (NIST) announced the rollout of the DMSC's Dimensional Measuring Inspection Standard (DMIS) Certification Program at the International Manufacturing Technology Show (IMTS), in September 2008. The announcement was accompanied by a demonstration of the exchange of DMIS-compliant measurement programs from three competing metrology suppliers, each programming and executing the same DMIS level 2 prismatic measurement task on two coordinate measuring machines in the booth. The certification process is a step in ensuring that the output of one vendor's product can be successfully input and executed by the product of another vendor. The benefits to users of DMIS products are savings of time and money, enabled by effortless interoperability of DMIS programming and execution products from different vendors.

The Dimensional Standards Consortium (DMSC) and the National Institute of Standards and Technology (NIST) announced the rollout of the DMSC's *Dimensional Measuring Inspection Standard* (DMIS) Certification Program at the International Manufacturing Technology Show (IMTS), in September 2008. The announcement was accompanied by a demonstration of the exchange of DMIS-compliant measurement programs by three competing metrology software suppliers. Each used their coordinate measuring machine (CMM) programming product to produce a program for the same DMIS level 2 prismatic measurement task. All 3 programs were then run on all 3 CMM execution applications,while connected to two CMMs in the booth (using the I++/DME interface). The demonstration participants were Metris, Siemens PLM, and Xspect Solutions.

To test a product that generates DMIS input files, the certification process runs a group of files generated by the system through an automated software test tool to assess their conformance to the specification. If all files conform, and all statements of the designated class have been used, then the DMIS generator product is certified. The process is fully described in a CMM Quarterly article by Bailey Squier, published in CMM Quarterly, Spring 2009. The certification

process is a step in ensuring that the output of one vendor's product can be successfully input and executed by the product of another vendor. The benefits to users of DMIS products are savings of time and money, enabled by effortless interoperability of DMIS programming and execution products from different vendors.

Software developers at IMTS 2008 check results of exchanging DMIS programs to test interoperability. Test engineers are (l-r) Vince Clements – Xspect Solutions, Jerry Lewis – Siemens PLM Software, Keith Morton – Renishaw.

The certification process

The certification process restricts acceptable statements to one Application Profile (AP), or conformance class, at time. This approach defines the exact DMIS commands the vendor must implement to achieve conformance. The process also requires that *all* statements in an AP appear in the test files submitted. Further, commands that appear in the test files that lie outside the AP are flagged as nonconforming. *Completeness* addresses a major cause of failed

interoperability: the difference in the commands implemented between generator and executor. A challenge in testing completeness to an AP is to induce the generating product to produce all of the DMIS statements belonging to the AP. Currently, files are produced by a vendor representative operating the product, offsite.   A statement of certification applies to the generator product, and not to the files themselves, or to executors of DMIS files. Discussions are underway regarding whether there is a need to certify DMIS executors, and how the conformance would be tested.

Some of the lessons learned about the certification process so far include: ensuring completeness of a product to an AP requires significant developer effort, expertise in operating the product under test is required to generate AP statements for certification testing, and more Application Protocol classes are needed to match user needs with vendor command implementation. When operating DMIS products in users' plants, to ensure compatibility between generator and executor, there may need to be a switch on the products that limits allowed statements in DMIS input files to a particular conformance class.

Some next steps in refining the certification process include working with users and vendors to develop more APs and also to fine tune the contents of the prismatic and thin walled part APs (to meet essential user needs without imposing extra overhead on developers). The testing of multiple products, over time, may also help identify weaknesses in the specification.

To learn more about DMIS certification, or to apply for testing of a DMIS generator product, go to www.dmis.org and click on "DMIS Certification Program". The NIST test suite, which forms the basis of the certification testing, is publicly available at http://www.isd.mel.nist.gov/projects/metrology_interoperability/dmis_test_suite.htm. It is described in a companion article in this issue.

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