

Trends in Test - Standardization

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This year, the engineers at National Instruments have structured their Automated Test Outlook into five sections. In each of these categories, we highlight a major trend that we believe will significantly influence automated test in the coming one to three years. The first trend is standardization. The other four trends will be featured in upcoming posts on this blog.

Fast-paced growth in the late 1990s and mid-2000s intensified time-to-market pressures, which led to a lack of focus on test commonality and reuse. The result many organizations face today is a mix of automated test system architectures and assets that is further compounded by the blending of companies and test systems through acquisitions and mergers. Companies are looking to reduce cost of test by optimizing people, processes, and technologies involved in their test system development, deployment, and operation. Organizing your test strategy around a common test platform is a proven technique for reducing capital cost, increasing reuse, and lowering the operational overhead and footprint of redundant test systems.

A lack of focus on test system commonality leads to non-standard test systems per product, per design phase, and per geographic location. The surplus of dedicated test equipment, development resources, and trained operator and support staff per station adds significantly to a company's cost of test. It also complicates asset management, slows ability to react to business needs, and minimizes leverage with strategic test vendors. Many companies are beginning to draw a hard line on this issue by requiring step function savings in their cost of test as opposed to incremental improvements.

Standardization strategies vary widely depending on the underlying business needs and existing test circumstances. Some focus on standardizing across product lines while others look at tester commonality across geographic regions. Emphasis on standardization and test reuse throughout the product lifecycle from design, validation and verification, to production is also becoming an important area to gain alignment. Companies are encouraged to consider at least two of the aforementioned areas of standardization to ensure significant results and sticking power of the standardization effort. In all cases, companies should look at their people, process, and technology assets and future investments to determine their

optimal standardization strategy.

Defining the right level of standardization requires finding the proper balance between a rigid specification and no standard at all. Without a standard, it becomes difficult to adjust to production needs and can slow time to market due to the plethora of one-off systems and support requirements. It also makes it difficult to maintain quality control and gain leverage with suppliers. A rigid standard that fits every use case, on the other hand, is often over-designed and expensive. It is also difficult to secure adoption of a rigid standard because it is difficult for engineers to address exception use cases. The optimal solution often lies between the two extremes and requires defining a common core standard with permitted application extensions. Depending on the organizational needs, the common core could be an approved list of vendors or products, a chosen hardware platform, or a more complete platform tester. A standard hardware platform based on selected test capabilities and capable extensions provides the most flexibility for most companies. It also allows for easier integration with existing and legacy testers because it provides a defined platform without being as rigid as a complete tester.

Moving forward, software is becoming an increasingly important part of test systems and a common software framework is the most critical for achieving a successful standardization effort. A common test software framework provides a universal interface between all test systems. The modular software architecture of the common test framework provides commonality across all of the test management related functions of test systems by sharing common process models, database and report logging, hardware abstraction layers, and operator interfaces. This modularity also ensures the ability to plug-in existing test scripts and programming to avoid re-hosting current and legacy testers. Moving forward with the development of standardized common core testers, it allows engineers to focus more on developing test sequences and I/O programming instead of having to develop the entire test management and enterprise connectivity solution as well.

Taking the proper steps to specifying a standard hardware platform is also very important. Defining a common set of hardware to satisfy a variety of test needs across products, regions, and design cycle phases can be a daunting proposition. One approach to greatly simplify this exercise is to focus on gathering the measurement needs instead of listing the capabilities of existing test systems. This helps to identify an optimized set of system requirements and lower overall cost whereas the latter approach tends to capture a superset of legacy requirements which are often no longer used or required.

Once a common hardware platform is defined additional measures can be used to help promote adoption and discourage off-platform deviations. A simplified procurement process for common core hardware kits and permitted application extensions is one example. Providing a dedicated support team to field questions about developing and supporting the common core platform is another. Documentation and example code also goes a long way towards easing adoption. Similarly, requiring similar levels of documentation and length exception review processes can help discourage deviating from the common core standard platform. In general, a good way to think about ensuring the adoption and longevity of a

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common core platform is to “treat it as a product” and its internal users as its customers. This helps frame the mindset for timely updates, resolving support issues, and providing closed-loop feedback on new feature requests.

Executing a well-planned standardization effort is proving to have significant business impact across all types of businesses and industries regardless of volume, mix, and number of sites. The primary business benefits include faster development time, increased reuse, smaller equipment footprint, and improved flexibility. Standardizing on a common core platform with a common software framework is a proven strategy for achieving a step function in optimization in companies resulting in a significantly lower overall cost of test.

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