



# Test Laboratories: The Emerging Sector

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## Abstract

For years, Information Technology (IT) groups were the forgotten sector in computing. IT groups were typically over-budget, misaligned with business goals, and unable to substantiate their requirements. Their rising costs created alarm within organizations fighting to maintain thin profit margins. With the advent of software systems to better manage and align IT groups, IT groups are now contributing to the overall well-being of a organization and actually contributing to an organization's bottom line.

Test laboratories for discrete manufacturers now find themselves in the same situation IT was ten years ago. With the proliferation of electronic devices, the performance of test laboratories is becoming critical. And the significance of test laboratories is growing each day as our dependency on electronic devices increases. TraxStar is targeting its "liquid software" to solve the problems associated with test laboratories. With existing test laboratory customers such as Nokia, Cisco, and Siemens, TraxStar is expanding its product line to convert test laboratories from "necessary services" to "business contributors" on a global scale.

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## Introduction

The use of electronic devices is growing tremendously. From cell phones to personal electronic assistants, these devices are everywhere. Growing still is our dependency on those devices. Competition among vendors is fierce with new products being delivered within six month timeframes. But devices are starting to show the problems associated with accelerated manufacturing cycles. Adding to the manufacturing costs are warranty and recall costs and we now have a situation that reduces the profits of a company.

Discrete manufacturing test laboratories are suppose to be the final guard against introducing faulty devices to the market. However, device testing occurs during the product development cycle prior to manufacturing. Product rollout dates are typically not extended if there are schedule overruns in either development or manufacturing. Device rollout dates are critical. A new device rollout may determine the life of a company and certainly impacts the profitability of the product. When manufacturing overruns their schedule, the test cycle is shortened by either abandoning specific tests or reducing the effectiveness of certain tests. In these situations, a product released to the customer

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may result in a non-performing device or even a device that may cause physical harm. The goal is to be able to achieve outstanding testing quality in ever shrinking cycles.

Test laboratories are actually quite dynamic and complex environments. Unfortunately, test laboratories today are also highly inefficient. And rarely is seen the use of best practices or the application of test metrics. Test laboratories require human test operators. With extremely tight testing schedules, an unavailable operator for a specific test is significant. A test that is not performed at its scheduled time creates a ripple that affects not only a specific test schedule but also other dependant schedules and, eventually, product rollout.

### **Live Environment**

To understand the complexities of a test laboratory, it is best to view the laboratory as a “living organism”. Everything is connected in a living organism. The dependencies between parts of an organism is extreme. The effect of a failed organ ripples throughout the organism. Without a healing response, other parts of the organism fail and shut down. The same is true with test laboratories. Test laboratories are “living environments”. There are so many variables to a successful laboratory including human operators, test machines, test schedules, business requirements, manufacturing requirements, and cross-institutional issues. Many products require multiple organizations for manufacturing, testing, and delivery. Each organization collaborates, shares documents, and manages resources. When an event occurs within a laboratory such as a test machine failing, the ripple or resulting effects are tremendous. If the laboratory fails to respond to a test machine failure, the effect ripples to other schedules, operators, and finally business goals. The response has to be in real time in order to generate new test schedules. But the test laboratory is more than responding to events. Each test phase generates new data as to how a product performs, how the test machine performs, how the operator performs and the resulting costs. This information, called metrics, must be fed back into the test laboratory to optimize the behavior of the laboratory. This is know as “best practices” in the IT world and is even more applicable to the test laboratory. This helps test laboratories function within tight manufacturing cycles.

To manage in this environment, software in a live environment should surface significant events to appropriate individuals, notifying and suggesting solutions as soon as those individuals appear on the test lab grid.

### **TraxStar Lab Management Suite**

TraxStar provides a test laboratory management suite. At the core of the TraxStar product suite are two dominant technologies:

- Dynamic Scheduling
- Liquid Software

Dynamic scheduling is the ability of the test scheduling software to “re-generate” schedules whenever changes occur in the test laboratory. This is extremely important

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since changes within test laboratories occur frequently and the test schedules have very little room for error since they drive eventual product rollout dates. Test schedules become invalid almost as fast as they are generated. Test machines go down, operators get sick or are pulled to more critical tests, or a major defect is found which require additional related tests. Whatever the case, a new schedule must be generated given the current state of the laboratory. And this must be done without user intervention (autonomously) because of the complexities involved in generating optimal schedules. If schedules are to remain valid, the test scheduling software must be made aware of any changes to the lab environment. If an operator is unavailable but the software is not informed of the situation, an effected schedule will remain invalid.

The TraxStar infrastructure consists of a technology called liquid software. The software allows real-time detection of changes to the test laboratory and then informs the scheduling software of the changes. This is done in real-time and without user intervention. The liquid moniker refers to the software infrastructures ability to fit into an existing IT environment, filling in and around existing services and legacy systems rather than displacing them. Extending the software to accommodate new resources and new types of resources can be done in real-time as well.

Among the features provided by the suite include:

- Governance Package – manages the laboratory for business-related reasons such as cost, availability, and standards adherence.
- Quality Package – consists of software that ensures the quality of a product and the quality of the services provided by the testing organization.
- Performance Package – supports the application of best practices and evidence-based decision making for test execution.
- Business Availability Package – provides problem resolution and internal and external problem reporting. Also monitors the TraxStar software deployment.
- Operations – manages the information needed to operate the test laboratory including data concerning test machines, operators and their schedule, and test schedules.

The reasons TraxStar uses a special software infrastructure is because of three important points that software vendors have learned over the years:

- You can never fully understand a problem when first designing a software solution.
- Solutions change over time as you understand the problem better.
- The problem changes, sometimes quickly, which requires changes to the software solution.

The above is exacerbated in test laboratories which change significantly over time with test machines going offline, operators not showing up for work, and accelerated product deliveries to meet competitor rollouts. There is no way static solutions as they are today can solve test laboratory issues. Static solutions are on 3 to 6 month turnarounds. Self-\* software solutions support millisecond turnarounds.

## **Liquid Software**

The liquid software infrastructure supports the entire TraxStar product suite. It provides the infrastructure necessary to support test laboratories as contributors to the corporate strategy. The infrastructure is “liquid” in that it can be changed in real-time even without user-intervention to fit the environment it is executing within. Much like how liquids form exactly to their container. The attributes of liquid software include:

- Self-Organization
- Self-Healing
- Self-Diagnosis
- Self-Evolving

These attributes help the software achieve maximum efficiency with as little user-intervention as possible. End-users will be able to change the software in real-time with minimal training and with no software developer skills.

Organizations which have the TraxStar product suite installed will be able to communicate via the liquid software structure and even merge their installations if needed. This allows distinct test laboratories to collaborate on shared projects.

TraxStar provides a software development kit that allows software developers to expand the capabilities of the liquid software infrastructure.

## **Summary**

Traxstar is positioning its lab management suite as a solution for discrete manufacturers who are involved in a constant struggle to stay profitable and competitive. Aligning test laboratories with the business goals of an organization will greatly reduce the cost of a laboratory and ensure the quality of manufactured electronic products. With its advance infrastructure which is unmatched by any software vendor on the market today, TraxStar is confident they can help test laboratories deal with the next generation testing requirements.