

How your Internal Team can Develop Test Databases Faster with IntraStage



“An infinity of information-handling jobs remains unsolved and, in many cases, not addressed at all” -Alan Cooper, Inventor of Microsoft Visual Basic

Information Technology (IT) is a generic term that describes a software and hardware infrastructure that today we take for granted: Excel, Outlook, Visual Basic, Windows etc are all IT software that is so part of our standard lexicon that it is difficult to imagine these “information handling” tools not being part of our everyday lives. But at some point in the not-so distant past, they were just that...not popular, not used and not common.

Thirty years ago, it might have made sense for an engineer to spend time writing his own spreadsheet program. Today, no company would pay an engineer to spend months coding a program that they can purchase off-the-shelf. When analyzing a “build vs. buy” decision, “buying” is often preferred because it can save time, save money, lower risk, and allow internal staff to focus energy on the company’s core competency.



Today, companies have a “build vs. buy” decision when seeking software solutions to manage product quality data in R&D, Manufacturing, Supplier or other areas of the product’s life cycle. As product quality becomes more and more important to retain customers, reduce operational cost and ensure customer satisfaction, it is no longer a decision on “if we need quality data management”, but instead on “how should we implement quality data management”.

As with everything, there is no single “correct answer” to this “build vs. buy” question. This white paper aims to give guidelines and best practices on the topic.

Companies are inundated with data, and most are starting to realize that gigabytes of test data exist on hard drives throughout their supply chain. This data exists in a hodge-podge of formats, making it extremely difficult to normalize into a single database.

However, if this data were normalized, a number of macro-quality metrics would be possible, which could:

- ✓ Improve manufacturing yield
- ✓ Enable information visibility between functional groups such as R&D, Manufacturing, etc to improve defect resolution times
- ✓ Optimize test times to move product through manufacturing faster
- ✓ Decrease warranty returns and recall events

Once a company has realized the positive financial impact that comes from better managing quality data, they often begin moving toward creating a normalized database and quality data management system. A common set of goals are:

1. Select a system that can scale throughout the enterprise and supply chain
2. Incorporate industry best practices
3. Finance with a “phase gate” approach, where a low-cost pilot project is proven successful as a step toward enterprise rollout
4. Deliver high value relative to TCO (total cost of ownership)
5. Leverage your company’s specific expertise and personnel

To select a system that can scale, the two core problems are (1) how to build a robust data model that will work for all legacy test data as well as all future test data, and (2) how to cost-effectively retrieve product quality test data from so many different locations, including those outside the firewall. The good news is that several companies, including IntraStage, now offer COTS (commercial off-the-shelf) solutions for both of these core problems. For instance, rather than spending NRE (non-recurring engineering) dollars to create and debug your own data model and retrieval process, you can purchase this technology at a fraction of the cost of inventing it in-house.

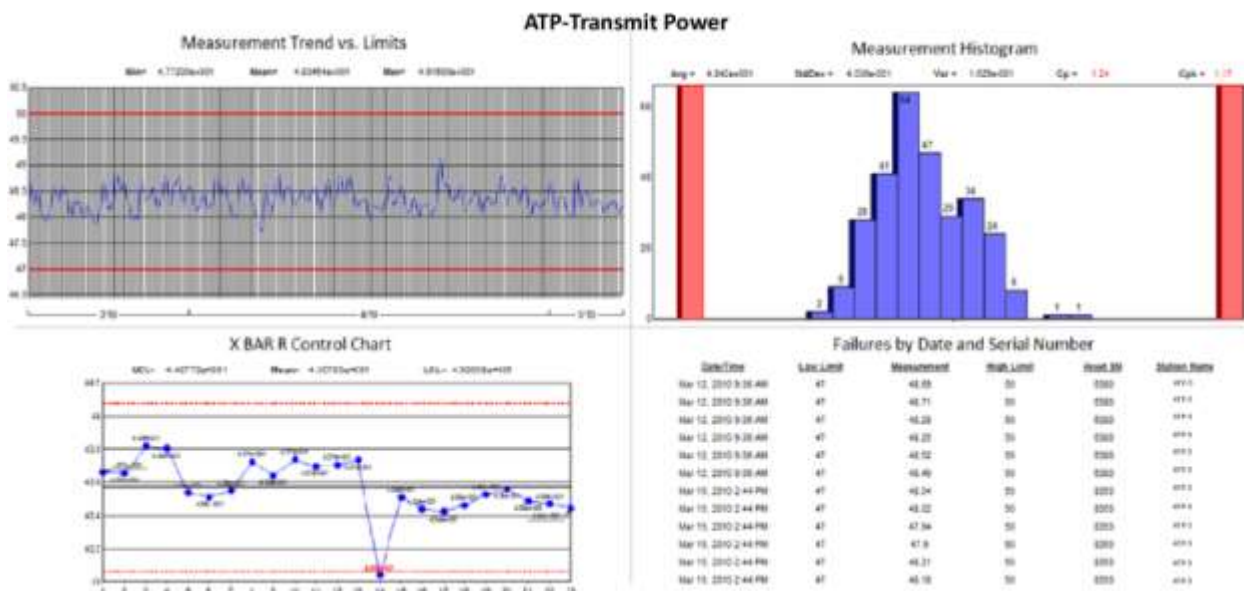
Another benefit of using COTS technology is that the solution will already incorporate industry best practices, resolving goal #2. Rather than spending time learning all of the best practices and coding them internally, you can evaluate competitive COTS products and see how the best practices are coded into the product.

Regarding goal #3, a “phase gate” approach means that you begin with the end in mind (in this case, an enterprise solution), but you fund it in phases, where the initial phase is a low-cost experiment (pilot project). Doing so lowers the project risk, cost, and time, while allowing all stakeholders to learn from the first phase and improve the process accordingly. Another benefit of using off-the-shelf technology is that pilot phases can often be conducted more quickly, and with better understanding of the short-term and long-term costs.

Regarding goal #4, any solution should be analyzed for total cost of ownership. Labor costs (whether internal or external) will be needed for both the creation of the system as well as its long-term maintenance. Including the labor costs with the technology procurement costs and looking across a five-year time span will be valuable in comparing alternative approaches. Another benefit of working with off-the-shelf technologies is that it is very inexpensive to get multiple proposals from vendors and compare the five-year costs as well as the feature sets of each approach.

The fifth goal may be the most important, and it is the one we want to highlight for the rest of the white paper. The goal is to find the best use of internal resources and expertise when implementing the system.

We would argue that building a data model and retrieving the data is best handled with off-the-shelf technology. Once in the data model, there are also off-the-shelf reporting and visualization tools that are cheaper to buy instead of building.



But there are a number of critical tasks that can't be effectively done externally, because these tasks are core competencies of the company designing and manufacturing the product:

- Quality Monitoring
 - Determining what tests and measurements should be run at which part of the production or R/D process
 - Determining what limits should be used for each measurement
 - Customizing reports for specific internal needs
 - Using data visualization and reports to determine root causes and then taking action to resolve the issues
 - Working with other departments (R&D, Marketing) to plan future product enhancements based on test metrics
 - Determining warranty coverage and pricing based on empirical test results

- Enterprise Roll-out Management
 - Integrating all of the software pieces (both internally-built and COTS) to create a quality data management system
 - Determining the roadmap and phases for rolling out the system: from pilot project to enterprise adoption and ties to ERP/MES
 - Determining the process flow and training rollout needed for your quality data management system

As you can see from the list above, the skill-set needed from the internal team includes both “big picture”, forward looking plans as well as tactical, detail-oriented test strategies. The internal team's detailed knowledge of the product is critical to be successful.

While most internal teams will agree that the list above is a great “pie-in-the-sky” set of tasks, they will admit to being mired in issues of maintaining the existing systems. Some common issues that need to be managed include:

- How to maintain the system if a key developer or IT person leaves?
- How to add new feature requests from Users?
- How can system uptime be guaranteed to 99.99%?
- How to manage new applications to access the data?
- How to efficiently scale the system to add new users, new products etc?

These are areas where IntraStage can help.

The IntraStage solution offers a core foundation technology, solving the issues of data model, data retrieval, and out-of-the-box reporting while allowing your company to plug-in custom software and solve your specific needs for reporting, visualizations, and process around the test data.

Consider the analogy by Alan Cooper (father of Microsoft Visual Basic) who said “Building a big program is like making a pile of bricks. The pile is one brick wide and 1,000 bricks tall with each brick piled right on top of the one preceding it. The tower can reach its full height only if the bricks are placed with great precision on top of one another. Any deviation will cause the bricks above to wobble, topple and fall. If the 998th brick deviates by a quarter of an inch, the tower can still probably achieve 1,000 bricks, but if the deviation is in the 5th brick, the tower will never get above a couple of dozen.”

We have all experienced software that was built with the best effort to avoid the “house of cards” phenomenon but that eventually succumbs to the fall. And we know that choosing the right foundation is the difference between success and failure. If your company is considering developing an internal solution for quality data management or if you already have one, note that you can buy the “foundation” externally while leveraging internal expertise to customize the solution.



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About IntraStage

IntraStage is a Quality Management Software provider for companies who design and manufacture electronic products. We provide SPC, Yield, CP, CPK, and test data analytical tools by automating the retrieval, storage, mining and reporting of R&D, Manufacturing, Supplier and Field test data. Our clients choose us because we seamlessly integrate test data from different sources, lower their product design, manufacture and return costs by finding quality trends more quickly and accurately. Fortune 1000 companies rely on our business intelligence to keep them competitive when product quality and customer satisfaction are key differentiators.

Our product offerings range from \$1995 (on-site audits) all the way to enterprise-wide business intelligence solutions. We can work with your internal team to build a quality data management system that solves today's problems and scales into the future.

Contact us today to get a proposal for a pilot project in your test department.

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