How to turn technical data into engineering intelligence

By Bharath Chinamanthur

Investments in product testing have traditionally focused on data collection. However, analyzing this data and building easily accessible knowledge assets yields the greatest rewards. These tasks are the focus of engineering information management (EIM), the process of turning technical data into engineering intelligence. Testing organizations collect very large amounts of data. Organizations will need to archive some of this data forever and, in some cases, store data in a format that allows third-party inspection.

Companies distribute data repositories throughout the enterprise: Data collection and organization remain the responsibility of the test laboratories, while data management, administration, and storage are the bastion of corporate information technology (IT). This is the crux of the problem facing modern test laboratories.

Test engineers configure and acquire large volumes of data. But acquiring data is only the first step in the testing process. Manipulating and analyzing this data is the logical next step—and the primary reason for data acquisition. Analysis of the data leads to a critical step in the testing process—test disposition, which, after all, is why engineers conduct the tests.

Corporate IT treats test data as a vast collection of files, necessitating investments in massive file servers capable of storing test data. The mismatch between data organization formats and IT storage constraints leads to a failure to extract intelligence from test data.

Corporate IT looks at its users as greedy consumers devouring huge quantities of disk space in an endeavor to store everything "just in case it's needed in the future." Users save memos, notes, and specifications in multiple file servers across the enterprise. In an ever increasing drive to lower operational costs, corporate IT looks at file storage as an area that begs to be policed.

Exactly why do we hold on to test data? Test engineers conduct tests to arrive at a decision point regarding the performance of the unit under test against a design criteria or test criteria. The actual decision point is not continuous in nature, but rather a deterministic single-value metric embedded in the continuous stream of test data. It is this separation of single-value metrics and raw test data that is critical to the objective of extracting intelligence.

Test engineers lack industry-standard tools that can separately store the single-value metrics in a format that lends itself to powerful index searches. This gap leads to test engineers storing all three artifacts of a test process—test specifications, raw test data, and single-value metrics—in a standard word processing file (e.g., Word or Excel).

This method points out gaps that include the following:

- A consistent structured query language store that is transportable across organizational and divisional lines, which forces test engineers to share data in the same word processing file formats
- A configuration management system that can reprocess tests with complete data integrity, which forces test engineers to hold on to the complete test data
- A uniform binary standard for representing test data that leads to an ASCII storage format, which is very inefficient at storing a continuous stream of raw data

To achieve the twin goals of lowering IT costs and extracting engineering intelligence, test engineers need the following tools:

- central data repository
- configuration management
- test results/performance database

Implementing effective EIM can be a daunting task, but forward-thinking companies have shown the rewards in enhanced productivity, reduced costs, and improved morale. A proven technique has been for management to select a small project to test the EIM methodology, demonstrate the potential return on investment results, and showcase visible improvement throughout an organization. This approach helps identify areas of concern while providing a tangible framework for team consensus. The efficiencies gained through implementation of the EIM model can set the standard for an entire organization and help achieve the corporate mantra of "better, faster, and cheaper."

Behind the byline

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