Product Review

SLIM-Metrics®: A powerful new repository and analysis tool.

Overview

SLIM-Metrics® is a powerful new software data collection, analysis and reporting tool from QSM®, Inc., McLean, VA. It is one of three software metrics tools offered by the company. Both SLIM-Estimate® (the project estimation tool) and SLIM-Control® (the project tracking tool) can use historical data from SLIM-Metrics® as a "sanity check" to seamlessly integrate the measurement phases of a software project (see Figure 1). This feature is a *particularly* powerful SLIM-Metrics® feature.

Figure 1 – Software Measurement Lifecycle

If your organization develops software, SLIM-Metrics[a] can help you discover your organization's development ability.

Software development ability is primarily measured in terms of size, effort, schedule and quality. In addition, initial estimates and final actuals can easily be compared to help improve estimation ability. The ability of your organization, however, is only one *facet* of a measurement program. Staying competitive with other companies in your industry is also vital. SLIM-Metrics® is integrated with annually updated industry trend data representing over 5,000 worldwide software development projects covering all major industries. Although individual project data is not available, these trend lines are helpful when benchmarking your organization against competition. This feature is absent from most other tool offerings, and, like all SLIM-Metrics® features, is accessed by a no-nonsense user interface.

SLIM-Metrics® is made up of two distinct programs; Data Entry and Analysis. This discussion will begin with Data Entry.

Data Entry Is Flexible and Easy to Use

Data Entry allows you to view and edit the contents of an existing database or enter new data.

Existing databases can be read directly from any of these file formats:

- SLIM-Metrics® (.smp)
- SLIM-Estimate® (.sle)
- PADS® database (.pd4)
- SLIM-Control® (.scp)

- SLIM® history (.slh)

In addition, the database is ODBC-compliant, making it easy to create seamless interfaces to other ODBC-compliant tools.

QSM® has included a sample database of project data with SLIM-Metrics®. This feature allows users to *appraise* the product's functionality without having to collect data. Selecting a project from a database or adding a new project reveals a multi-page data entry screen (see Figure 2). From this screen viewing

Figure 2 - Data Entry Screen

existing data or entering new data is easy. The data fields on the first page of this screen constitute the Software Engineering Institute's Initial Core Measures[1]. Briefly, these core measures are size, effort, schedule and defects. The remaining seven pages allow entry of more detailed information.

The first time this screen was encountered, it was realized that graphics resolution of at least 1024 x 768 is required to see the entire image. This should be a minor inconvenience, however, since most PC's sold today are shipped with this capability.

The remaining portion of Data Entry consists of over fifty additional measures including:

- Cost
- Requirements size
- Application type
- Design complexity
- Environmental factors
- Overrun/slippage
- Growth/reduction
- Custom Fields

Custom Fields are quite useful for defining measures particular to your organization or industry. Example custom fields are compliance to certain standards, or the use of certain tools or methods. Each field is potentially a discriminator when it comes to analysis, so custom fields should be selected appropriately.

Although extremely flexible, Data Entry does not allow formulating new metrics using combinations of other measures.

For example, to define a metric such as hogsheads/fortnight, consider a spreadsheet-like formula capability. Assume for a moment that *Beer Consumed* is a custom field (*quantifying the amount of beer consumed by the programming staff over the life*

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[1] Carleton, A., et al., *Software Measurement for DOD Systems: Recommendations for Initial Core Measures*, (CMU/SEI-92-TR-019, ADA 258 305), Software Engineering Institute, Carnegie Mellon University, Pittsburgh, Pa, September, 1992.

of the project -- measured in hogsheads). Hogsheads/fortnight, then, could be computed in another custom field by the following formula:

Hogsheads/(Schedule / 12 months per year * 26 fortnights per year)

where Schedule is measured in calendar months. Selected projects could then be analyzed with this newly created metric.

Navigating through projects in a database is easy using buttons at the bottom of the screen. Adding and deleting projects is accomplished likewise.

After completing data entry, switch to Analysis to experience the analytical power of SLIM-Metrics[â].

Mining for Diamonds using Analysis

WARNING - Analysis contains a powerful statistics engine! Min, max, mean, standard deviation, coefficient of determination, slope, intercept and number of observations are all available within Analysis. Histograms, scatter plots and bar charts are easily generated to help you discover the inherent trends in your data.

The standard measures and metrics on each graph can be laid up next to industry trend lines for competitive positioning studies.

Individual studies can be grouped together to form a view. Each view contains up to 16 graphs or tables in an adaptable layout (see Figure 3 for an example view). Views can be designed around the popular *metrics dashboard*[2] approach or around business goals (productivity, quality, time-to-market). Views that have multiple graphs or tables can be zoomed so that a single item fills
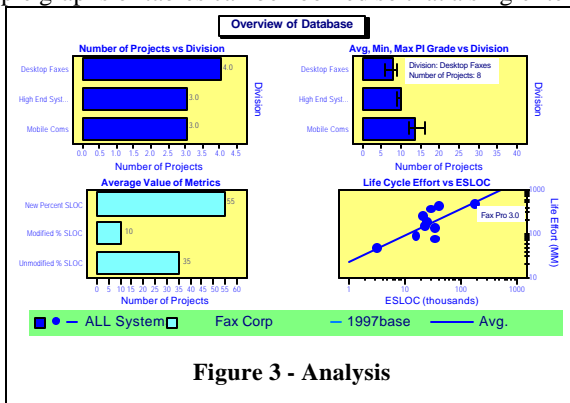
Figure 3 - Analysis

the screen.

SLIM-Metrics[®] graphs, however, are *far* more than static pictures.

Each graph allows instant access to its data.

Each data point contains detailed information about the project represented. Project name, organization, size and effort, and other project detail is instantly obtained about any data point on any graph (see Figure 3 for two examples). Each graph also has an associated property sheet that defines axis metrics, titles, data sets, variation lines and report format.
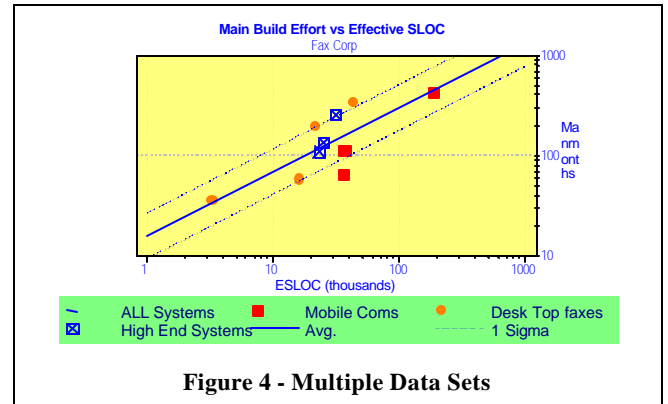
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[2] Moore, John E., Ph.D., Software Project Control Panel, Software Program Managers Network, Version 1.1 for Excel 5.0, July 1997, *www.spmn.com*.

Figure 4 - Multiple Data Sets

One power feature is the ability to present different data trends on the same graph -- Edward Tufte[3] would be proud!

This can be helpful when trying to show differences between organizations, application types or time periods (see Figure 4). Trend lines for each data set can be displayed as well showing mean and standard deviation. Curve-fit trend lines to the data using one of four techniques -- the statistical "goodness" of the fit is reported as well.

Summary

SLIM-Metrics[®] is a powerful and useful tool. It is designed to reveal an organization's ability to develop software. Companies that wish to stay competitive in today's market should use tools like SLIM-Metrics[®]. In reviewing the beta version of this product, only minor shortcomings were apparent. Like its QSM product compatriots, SLIM-Metrics[®] is truly a world-class product.

SLIM-Metrics[â] allows any organization that is not yet collecting historical software project data to begin immediately.

SLIM-Metrics[®] requires Windows 95 or NT, Pentium CPU and 30 megabytes of hard disc space. SLIM-Metrics[®] is available now from Quantitative Software Management, Inc., 2000 Corporate Ridge, Suite 900, McLean, VA 22102, (800) 424-6755, www.qsm.com. Various license options, training and support are available.

About The Author
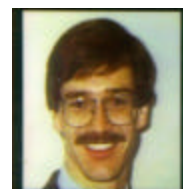
James T. Heires is a twelve-year veteran of the software industry, primarily at Rockwell Collins, Inc. His professional experiences include design of Electronic Flight Instrumentation Systems (EFIS), Engine Indicator and Crew Alerting Systems (EICAS), Flight Management Systems (FMS) and most currently, software process improvement initiatives. His current professional interest lies in software quality improvement based on analysis of software project data.

James received his bachelor's degree in Electronics Engineering Technology from the University of Nebraska and has pursued

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[3] Tufte, Edward, *Visual Explanations: Images and Quantities, Evidence and Narrative*, Graphics Press, 1996.

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About Rockwell Collins, Inc.

Rockwell is a global electronic controls and communications company with leadership positions in industrial automation, avionics and communications, and semiconductor systems with fiscal 1997 sales of approximately $8 billion and 48,000 employees. Rockwell's world headquarters is located in Costa Mesa, California.