Production Performance Measurements for Data Capture

by Bill Krautter

When you are in the data capture business, production performance will be the answer to meeting your customer expectations and your company's profitability goals. Measurement and analysis of the data capture process identifies the critical production issues to be solved. Data capture, although a service by most definitions, looks very much like a product being manufactured and is no different when setting up materials, labor and equipment with related processes.

For this discussion, each document or set of documents, which require a capture process that results in a defined set of outputs, is a "job" or "application." A measurement system should be defined to evaluate all processes, sub-processes, people and materials required to complete the application or job. Evaluation criteria are identified for each element of the production job process. Materials are identified as customer documents, batch control sheets, paper clips, diskettes, CD-ROM disks, FTP storage space and other expendables during the data capture and conversion process.

Sub-processes are all the single tasks required to technically transform data from paper documents into digital media. To be measured appropriately, each sub-process must have a defined beginning and end and a means of tracking a quantity of documents and/or digital data characters e.g., ASCII, through the process.

No part of the data capture job is too small to measure. Start from the beginning and list every person, process, and piece of equipment involved. Don't forget the delivery person who's probably on your payroll, and the number of boxes they will lift and move before the end of the project. If the customer supplies too many extraneous pages of documents that are unrelated to the process, you pay every time a single page of paper is handled when it is not part of the billable deliverable.

If a measurement process begins with the documents prepared and counted at the customer's point of pick-up, both parties have a vested interest in the measurement process of the documents to be converted. It will become more challenging to convince customers to pay for the transportation and handling of extraneous documents once they leave their shipping dock. Time will also be spent developing production, measurement, and tracking processes for documents unrelated to the income stream that have no value to the customer e.g., internal document and film chain of custody sheets and other internal security measures.

Each process, which involves people and equipment, should be measured for performance closely. Performance includes qualitative as well as quantitative aspects of the process. Independent measures for speed and accuracy should be developed and tracked to each group of documents defined as a production batch. The production batch is examined for productivity and accuracy during the entire data capture process.

The most relevant measurement of productivity is the data capture that relates to the time spent converting the batch of documents from beginning to completion[1]. Time is categorized by tasks within the conversion process. The key to categorizing time is identifying each separate task. The recording of time to complete each task must be accurate and not cumbersome to the people performing the task. Using a computer-based time tracking system is the most efficient way to do this. It makes sense because we (service bureaus) use computers to convert data. It also eliminates one of the most time consuming tasks in itself, which is tracking the time it takes to complete a batch process.

The most basic example of this is in the manual data entry conversion process. A number of production data capture and processing environments log the start and stop time for each phase or process in a defined job.

In the old keypunch equipment days, operators would punch a time clock when beginning and completing each job. This was a way to track time on a job, but became impractical to measure time spent on processes within a job, or time spent on a single batch of documents. Overall performance on a job was obtainable, but not useful when evaluating processes for improvement purposes.

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Now that the same computer systems used to perform the actual conversion of document data are used to track time and measure accuracy, all the tools are present to measure and improve performance. The more complex the data conversion application, the greater the need to define and measure sub-processes. In our data entry example, the more thought processes and data conversion rules the operator performs, the more processes there are to measure.

Measuring the quantity of keystrokes in single batch of documents is an easy task for most data entry software systems. The difficulty in tracking time arises when operators perform additional tasks other than entering data from documents into the data entry program application. This is the "key what you see" versus "key what the customer wants" requirements in document conversion work. In order to capture the time it takes to perform these "other" conversion processes, task codes are assigned and recorded in the processing of the document batch. Task codes which are specific to a document conversion application, like visual verification, correcting balances, writing exception explanation notes, marking documents and any non-keying process or action could prove to be too onerous if left up to the operator to record. If the recording of these tasks is built into the data entry conversion software, the benefits are obtained without the added burden on the operator. This "automated task tracking" will produce consistent measurements, a vital component when investigating areas for process improvements and implementing the changes.

The best data conversion operations are those that function at optimal performance by correctly matching people, skill sets, and equipment. With this in mind, the design of a document conversion application for production purposes begins with the largest element of labor and its fatigue factors. In other words, if the most amount of work a person can key or scan is one-hour's worth without stopping for fatigue, this becomes the optimal performance point[2]. All other processes like data preparation, exception processing, quality control, output management, etc. are designed around this performance point. Document batch sizes are also built around this performance point and adjusted as learning curves improve, processes improve, or conversion criteria changes. If the performance point is not monitored correctly, operators lose efficiency[3]. If document batch sizes are not increased at the end of a job's learning curve, operators spend more time retrieving the next batch of work. If document batch sizes are not decreased after introducing additional conversion criteria processes, then the operator fatigues quickly and quality issues appear which results in a decline in overall productivity and an increase in the probability of rework.

Quality assurance issues are paramount to production quantity and throughput. For this reason, quality control measures are developed in tandem with each conversion task. Continuing with our data entry conversion example, document batch preparation processes are reviewed and scored for accuracy. Results are associated to the batch for statistical analysis. The analysis is used to determine future quality control sample sizes, process improvements and re-training programs.

Each data preparation task is individually tracked and measured. The clear objective of the quality assurance function is accuracy, but equally important is its contributions towards productivity. If preparation tasks are not performed correctly and consistently, the data entry conversion processes will take longer and possibly create additional inaccurate results.

In summary, over many years of experience with data capture and its related performance issues, our business has found great value in following these points:

Define conversion application processes so operators can perform the skill they are trained to do; scan-operators scan, data entry-operators key, document-control operators balance and sight verify.

Develop conversion processes into definable tasks; create quantity and quality measures for each task.

Whenever possible use automation to measure the tasks of the production process.

Continually monitor the document conversion process while in production, looking for process improvements that increase productivity and quality.

Obtain active customer participation beginning with the document preparation processes and continuing through the quality control reporting of the delivered results.

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[1] Completion defined as, the process that converts the production work to the contracted or agreed upon deliverable.

[2] By averaging your operators optimal production point performance the most accurate measurement can be calculated.

[3] Due to factors like fatigue that could result from establishing the performance points too high.

Editor's note:
For calculating job performance metrics see "Estimating Job Turn-Around Times" *The Imaging Service Bureau News*, January/February 2000, pp. 22.