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USING SIMULATION WITH REAL-TIME BPM DATA TO PREDICT AND MONITOR PERFORMANCE IN A DOCUMENT-PROCESSING ENVIRONMENT

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ABSTRACT

Financial institutions receive Court Orders, Levies and Information Subpoenas from federal and state agencies inquiring about and potentially affecting customer accounts. Due to high daily variability in demand, multiple input channels, document complexity and a variety of processing requirements, a production simulator and dashboard reporting system were developed to predict and monitor document processing performance and ultimately improve service levels while reducing costs.

1 INTRODUCTION

In today's virtual processing world, BPM and document management systems are mandatory to process online documents and provide accountability for all processes and documents. While these systems are adept at processing transactions and rules-based flow, complementary tools and analytics are often needed to manage workflow with respect to resource constraints, costs and service level objectives. The managerial challenges are compounded by not having a visible work flow, a temporal production plan or visual telemetry other than ad hoc status reports. This paper describes how simulation can be used to develop a daily production plan and a series of process specific analytics to help direct the workforce to attain higher service levels at lower costs.

2 SIMULATION'S ROLE IN THE DAILY PRODUCTION PLAN

One key challenge of processing time-sensitive legal documents is predicting what types and how much work is going to arrive each day. JPMC utilizes centralized mail processing that receives and digitizes 60%-75% of the expected daily workload by 6am each day. This reduces the uncertainty in daily volume and document mix, and provides an initial workload for the simulator. The simulator contains the process flow, activity ratios, process times, resource schedules, resource skill sets and non-productive time estimators. Intraday work arrivals from couriers and via electronic mediums are also simulated. Since the goal of the group is to provide same-day processing, we use the simulator to predict work in process levels (WIP) at 2-hour intervals throughout the day. Therefore, when WIP = 0 at the end of the day, we have achieved a 100% daily service level.

3 INTEGRATION WITH BPM, DASHBOARD REPORTING AND INTRADAY RESOURCE ALLOCATIONS

To reduce the variability of forecasting at the daily level, as well as monitor the workflow during the day, we developed a SAS© query of the BPM system which runs every 2 hours starting at midnight. The production simulator is run at 6am each day using the current actual WIP from the BPM system and reports the projected inventory draw-down for the entire day. A dashboard was developed to track the actual WIP and chart the WIP progress versus the simulator projections. Figure 1 shows an example of the WIP tracking by workbasket and performance (solid line) to the simulated plan (dashed line) for Levy processing.

Levies: Work In Progress												
Workbasket	Intraday Report											
	0000	0200	0400	0600	0800	1000	1200	1400	1600	1800	2000	2200
Indexing	15	52	488	606	292	71	31	22	14	13	13	13
Duplicate	0	1	8	17	30	37	30	27	20	0	0	0
Locate Customer	7	15	26	34	62	141	138	110	63	8	8	8
Exception Indexing	6	158	424	475	608	400	139	96	43	6	5	5
Escalate	21	21	21	21	22	21	22	24	26	26	26	26
Total	49	247	967	1153	1014	670	360	279	166	53	52	52

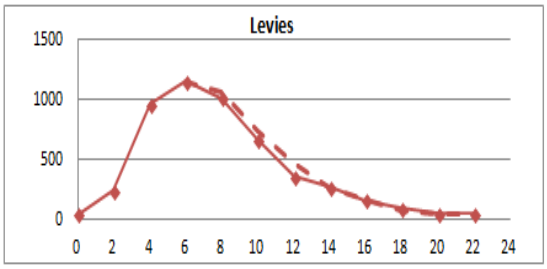

Figure 1: Dashboard WIP table and graph of actual vs. simulator projection

The staff use the end-of-day projections to assess needed capacity for the day and can allocate resources between document types, workbaskets and overtime or other available capacity. As the day progresses, the WIP table values may turn AMBER or RED based on deviation from the plan, time-of-day and end-of-day projections. This provides an alert that a particular workbasket or document flow may be at risk of not making SLA for the day and helps qualify if resources need to be re-assigned or additional capacity is required. The WIP queries, simulation run and dashboard production are automated via a task scheduler and distributed via email to a 40-member distribution list that spans across all document processing sites.

4 SIMULATOR MODELING DETAILS AND MAINTENANCE

The processing flow and associated model contains four activities and associated queues (workbaskets) as shown in Figure 2. Model complexity and associated execution time is increased with parallel flows for each document type, 150 unique resources (processors) with individual schedules and unique skill sets. The iGrafx© simulation system is designed to easily import Excel© arrival files where each case (transaction) has a location (workbasket), document type and issuing state and/or agency. At initialization, the cases are routed into the appropriate activities and resources are assigned based on availability, assigned roles and skills matched to each case. The random routing decision activities are probabilistic and are based on historical activity ratios.

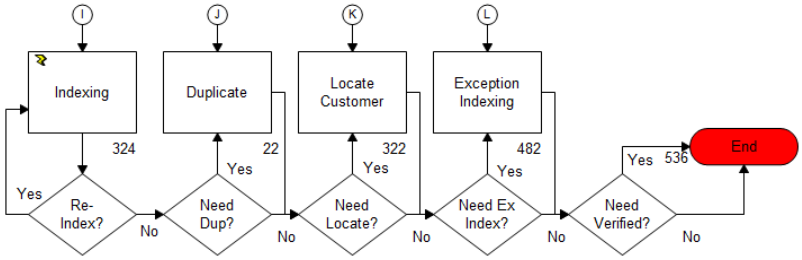

Figure 2: Simulator document review process flow

5 DERIVED BUSINESS VALUE AND RECOMMENDATIONS

The defined system has evolved from a production simulator proof of concept developed in 2013. Average daily processing service levels have increased month-over-month since January 2014 when the simulator and dashboard went into production. In addition to improved daily performance, the variability (standard deviation) was reduced to 1.48% with modest reductions in unit costs. Ongoing enhancements include integration with scheduled time-off systems, multiple simulations (replications and intraday) and more granular intraday forecasting for improved accuracy.

REFERENCES

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Pegasystems Inc. 2012 “PRPC Reporting User Guide” Version 6.2 SP2 Updated: 2-3-12, Cambridge, MA