INTRODUCTION TO WORK FLOW MODELING WITH BPSIMULATOR®

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ABSTRACT

This paper highlights the features and functions of BPSimulator®, a simulation analysis tool focused on work flow and business processes. Based on Systems Modeling Corporation's general-purpose simulation system, Arena®, BPSimulator leverages all of the power and flexibility of Arena while providing the business analyst with an intuitive interface and a short learning curve. Like Arena, it is a comprehensive system that addresses all phases of a simulation project from input data analysis to the analysis of simulation output data.

1 INTRODUCTION

Recent advances in simulation technology have created a greater awareness and use of simulation as a decision support tool. Many top-level decision makers are now more aware of the potential benefits of simulation. However, even with the many important advances that have been made over the past several years, there are still many cases where business processes are being designed and implemented without the benefit of simulation. A very small percentage of systems that could benefit from simulation are actually simulated; the primary reason for this is the high level of effort required to employ simulation technology successfully. The key to making simulation technology more widely used is to make the tools significantly easier to learn and use without sacrificing modeling power and flexibility.

BPSimulator is focused on bringing the use of simulation to broad a new classes of users; users who may find much decision support benefit in simulation tools but who may not have the background or, perhaps more importantly, the time to master a comprehensive, general-purpose simulation tool. Its application focus addresses the needs of the business process analyst: activity-based costing, data input/output from Microsoft® Excel®, and the ability to import from process mapping tools like BPWin® from Logic Works and

Visio® from Visio Corporation modeling constructs for worker efficiency and rework.

The key idea behind BPSimulator is to present the user with an easy-to-master tool set that still provides all of the robust simulation capability necessary to model work flow and business processes successfully and accurately. For advanced users who require an extra level of modeling sophistication, BPSimulator can run with Systems Modeling's general-purpose simulation system, Arena, thus allowing the advanced user access to Arena and SIMAN modeling constructs as well as C and FORTRAN subroutines.

2 OVERVIEW

BPSimulator provides an integrated framework for building business process simulation models. Tools for input data analysis, model building, interactive execution, animation, model verification, and output analysis are all contained within the bounds of BPSimulator.

2.1 Model Window

The model window is where new models are created, existing models are modified, animations are developed and models are executed. Since it is a native 32-bit Windows® application, BPSimulator takes full advantage of the easy-to-use Microsoft® Windows® operating system interface by including such components as 3-D controls, toolbars, status bars, tool tips, a context-sensitive help system, True-Type fonts, document windows, and common dialogs. Like any Windows application, model windows can be moved, resized, enlarged to full screen, or minimized to an icon. You can also have multiple model windows open in the work area at the same time. When a model window is first open, all of the toolbars are automatically displayed. The modeler can essentially design his or her own workspace by moving the toolbars around or turning them off based on his or her own preference.

The model window is where models and their associated animations are developed. This is done by: selecting modules from the BPSimulator tool set, placing them in the model window, responding to prompts in a dialog that appears when the user double-clicks on the module's handle and connecting modules to form a logical flow. When most modules are placed, basic animation constructs (e.g., queues, stations and resource icons) are placed simultaneously.

3 THE BPSIMULATOR TOOL SET

The BPSimulator contains 10 modules used for model development. Each module represents one or more modeling constructs used to depict a component of a system. The crux of the BPSimulator tool set is the Activity module. Within the Activity module (see Figure 1), a user can define the activity itself, which resources are needed to perform the activity, the processing time, inbound and outbound decision logic and various cost and rework parameters all by pointing and clicking with the mouse. The Activity module also makes it easy to model a system in a hierarchical fashion by allowing the user to specify whether an activity is a parent or child of a parent activity. When placed, the Activity module also brings with it entry and exit animation stations and icons to represent the processing state of the Activity and its associated queue. Real-time animation for any of the default statistics collected at each Activity can also be displayed simply by flipping switches.

Figure 1: Activity Module Main Dialog

4 INTEGRATION WITH EXCEL®, BPWIN® AND VISIO®

Since a majority of business analysis data resides within spreadsheets, BPSimulator provides several ways to leverage work performed in other products.

For input data, BPSimulator provides OLE functionality allowing the user to embed an Excel spreadsheet directly into the model window. This not only provides easy access to Excel for editing input data; it also gives the user a single repository to view all input data at a glance. If the modeler has set up critical modeling values as variable names instead of "hard coding" specific values in the menu prompts, data for a simulation run can be read directly into the model through BPSimulator's Variables module, thus giving the modeler an added layer of flexibility in the model he or she constructs.

After collecting statistics from a simulation run, the user has the option of displaying the summary report directly in Excel and with the help of a utility included with BPSimulator, the entire report parses correctly into Excel's familiar cell format. Once in Excel, the user can take advantage of the graphical representation and data manipulation that Excel affords.

Since a majority of business process analysis projects begin with process mapping, BPSimulator can leverage the work already performed in some process mapping tools. With BPWin, IDEF modeling tool by Logic Works, information stored in the IDEF diagram can be imported directly into BPSimulator, essentially creating a simulation model from the IDEF model. Flowcharts created with the BPSimulator stencil in Visio can also be imported into BPSimulator, again resulting in a simulation model being built from a static process mapping tool.

5 INPUT ANALYZER

The graphical, menu-driven Input Analyzer provides users with the capability of fitting process or performance data to statistical distributions. Users can evaluate data downloaded from a file and may display the input data in the form of a histogram. The data may then be fitted to one of 14 commonly referenced distributions. Users unfamiliar with the data characteristics may choose to do a best fit analysis by selecting the Fit All option. This will perform statistical tests and choose the distribution that has the minimum mean square error. Additionally, the expression required as input to the Arena model will be provided and can be copied directly from the Input Analyzer and pasted into your Arena model.

Other options provided allow the user to modify parameters related to the input distribution to identify alternative input scenarios.
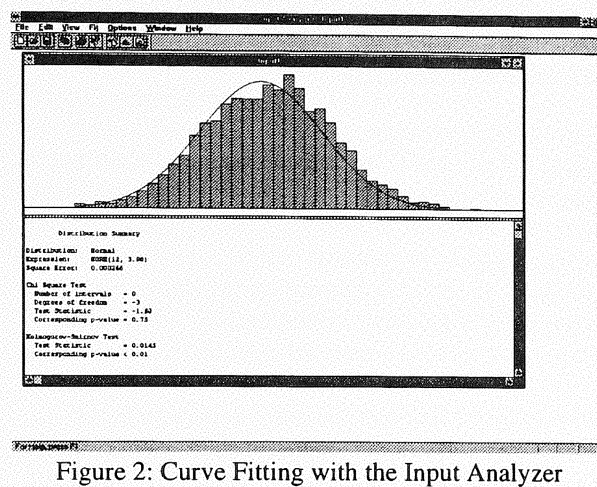

Figure 2: Curve Fitting with the Input Analyzer

6 OUTPUT ANALYZER

The graphical, menu-driven Output Analyzer provides users the capability to evaluate the statistical reliability of the results generated from their simulation model. Commonly used output data testing procedures such as correlograms, t-tests, data filters, moving averages, analysis of variance, and confidence intervals are included. These tests allow users to define and evaluate system performance or to compare the results from two or more simulation runs that evaluate different scenarios. The Output Analyzer is integrated within Arena such that a user can execute a simulation run, then select output analysis options that will display system performance characteristics.
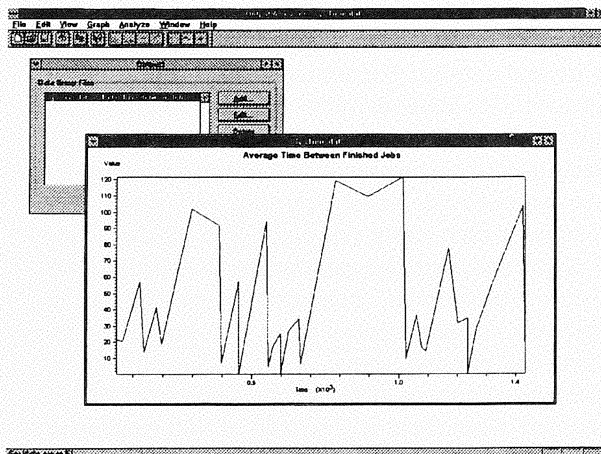

Figure 3: Performance Plot with Output Analyzer

7 SUMMARY

BPSimulator is an object-based, hierarchical modeling tool that offers the business analyst the power of simulation analysis without the learning curve and start up costs typically associated with simulation. It gives the business process analyst a decision support tool that combines the capabilities and power of a simulation language with an easy user interface for model building. BPSimulator is a comprehensive analysis tool that spans the scope of a simulation project from input data analysis to the analysis and presentation of model results.

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