

## A d v a n c e d   T o p i c s

### What-If? How to Provide Risk and Sensitivity Analysis of Your Contact Center

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How many times has this happened to you? It's 2:00 PM on Friday and the CFO (or CEO, or Marketing Director, or your boss, or...) has a new "What-If" analysis for you:

- What happens if we invest in new technologies that decrease our handle times?
- What happens if we add a new cross-sell program that will increase handle times and increase revenues?
- What if we close (or open) a center?
- What if we change our service goals?
- What if our new marketing program generates more calls than expected?
- What if we have our premium customer agent skill group back up the general sales skill group?

In this paper, we will discuss how to use a discrete-event simulation model of your contact center to answer these types of questions, still be home in time for dinner, and impress the boss!

In the Fall 2002 issue of On Target, we discussed developing a discrete-event simulation of your call center environment in order to determine your center's optimal service goals. For the sake of this discussion, we will assume that you have developed a simulation model of your contact center and are ready to perform analysis.

#### Simulation Model Review

Discrete-event simulation modeling is an analytic technique that combines customer behaviors (like abandon and arrival distributions), center operations information (like call routing and employee schedules), and employee behaviors (like handle times and historic break patterns) into a computer representation of your contact center. In effect, the discrete-event simulation model becomes a virtual call center—on your desktop—with all the important attributes associated with your business and customers. Once the model is created, you can make changes to your simulated call center and see the effects of those changes on your important performance metrics, before you decide to change your actual operation.

Discrete-event simulation has none of the limiting assumptions that accompany Erlang equations (e.g., the assumption that none of your customers will abandon), so you can use simulation to test many more important business questions than the number of staff required to hit service goals in an hour. With commercial software available, discrete-event simulation modeling is easier than ever.

That being said, it is very important that a rigorous process be in place to ensure that the model you develop accurately describes your contact center. The process is:

1. **Develop accurate distributions of customer and employee behavior.** The information that drives a good contact center simulation model is mostly available from your standard ACD interval reports, and includes distributions of handle time, employee availability, customer patience (time to abandon), call arrival, etc... Make sure you choose representative time periods (e.g., do not use data from seasonally unusual time periods) to develop these distributions.
2. **Run and validate the model against actual performance to ensure the model is accurate.** The most critical step in any analysis, be it using a simulation model, an Erlang model, or a regression technique, is to validate that the model is accurate.

Keep ACD data available that was not used to develop the model, and try to replicate the actual performance of this hold out data with your simulation model. If your model performs within a few percentage points of actual call center performance on your important metrics (e.g., abandons, ASA, service level) then you have a validated simulation of your contact center environment.

Once your model is validated, you can be certain that your model will mimic actual center performance under a variety of what-if scenarios. You're ready to go.

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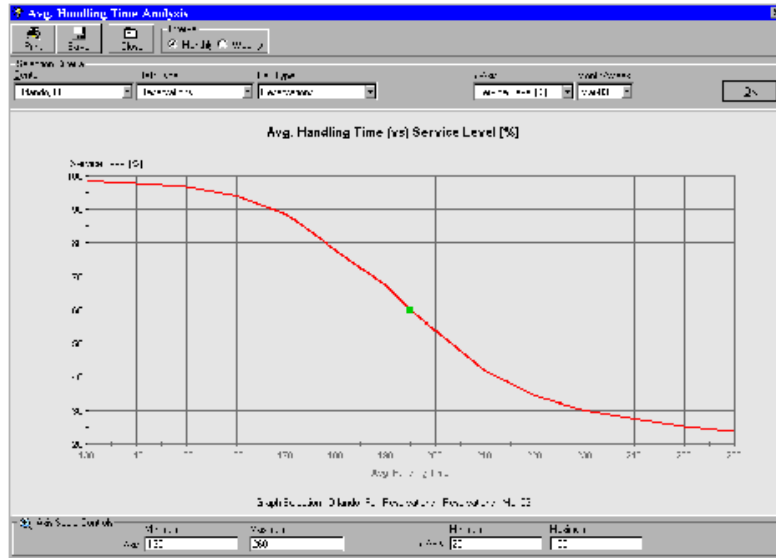
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3. **Develop what-if scenarios, run the models, interpret the results, and display the results in executive-friendly formats.** Let's choose a few what-if scenarios and discuss how we would use the simulation model to develop an answer.

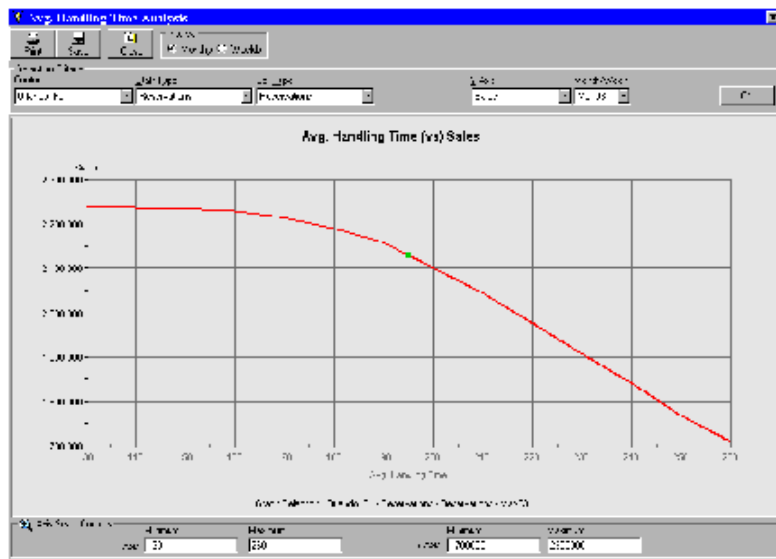
### What-If Analyses

*WHAT-IF #1: What happens if we invest in new technologies that decrease our handle times?*

The goal of this exercise is to determine how sensitive the contact center is to fluctuations in handle time. Using your call volume and handle time forecast, select a representative month and simulate the month (with the fluctuations of call arrivals, handle times, and staffing by hourly interval) over and over varying the mean handle time (but still using the appropriate handle time distribution) by fixed percentages of the forecasted handle times. In other words, simulate your center with the forecasted handle time minus 5%, 10%, 15%, 20%, etc... keeping track of your most important metrics. You should be able to draw the following two graphs:



HANDLE TIME VERSUS SERVICE LEVEL



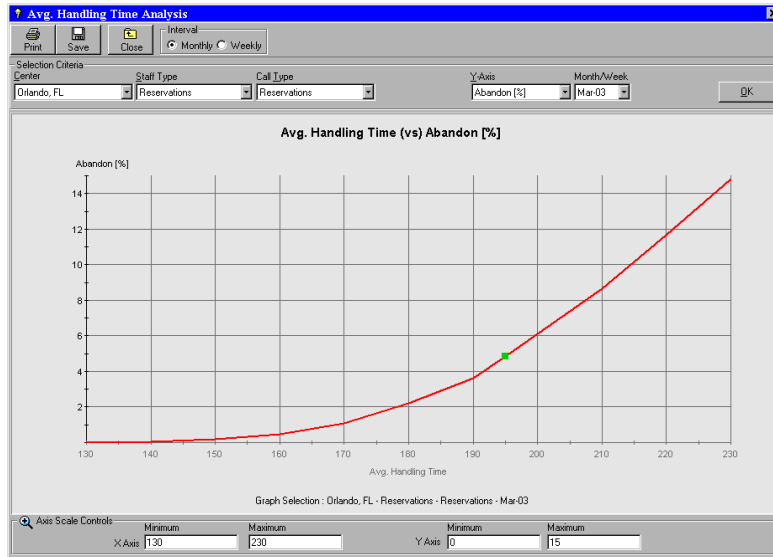
HANDLE TIME VERSUS REVENUE

By producing these graphs, you will explicitly show how handle time affects financial and service metrics.

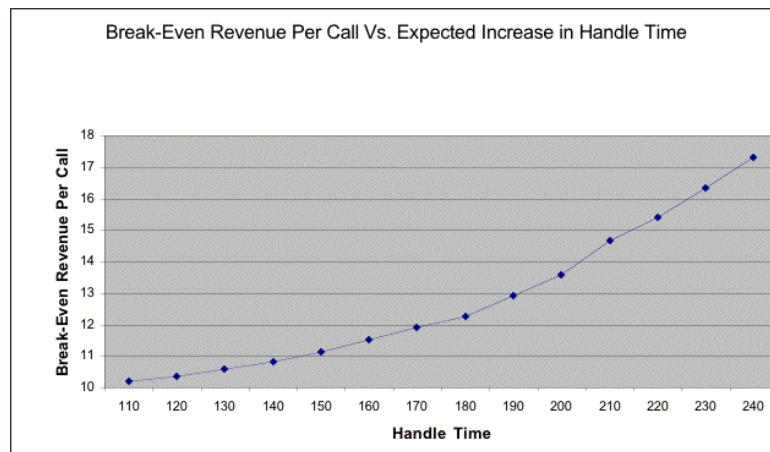
*WHAT-IF #2: What happens if we add a new cross-sell program that will increase handle time and increase*

revenues?

This is very similar to the previous what-if, but instead of reducing your handle times, you will simulate your center with the forecasted handle time and then add 5%, 10%, 15%, 20%, etc... to the mean handle time. What makes this analysis interesting is the revenue opportunity. If you can attach expected marginal revenue per call associated with the cross-sell program, you can produce the following two graphs:



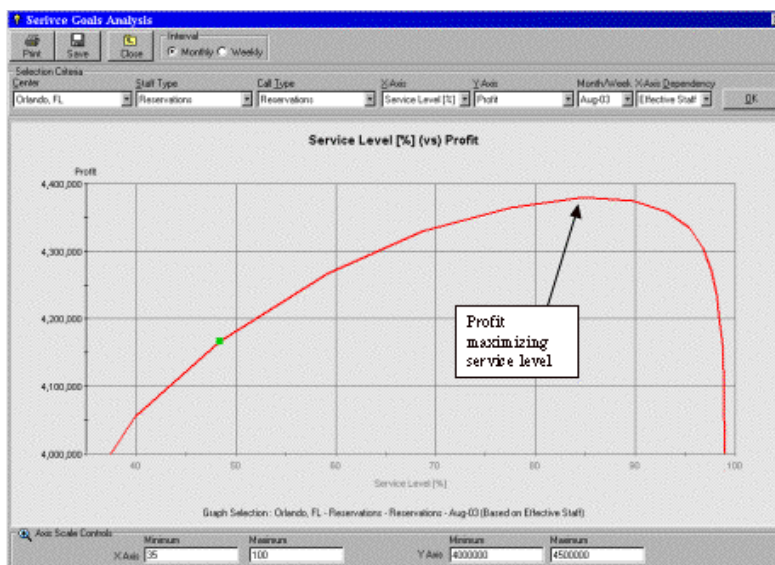
HANDLE TIME VERSUS ABANDON RATE



REVENUE REQUIRED TO BREAK-EVEN BREAK-EVEN VERSUS HANDLE TIME  
 These graphs demonstrate, at a glance, whether the program is cost effective.

WHAT-IF #3: What if we change our service goals?

By fluctuating staff available (but keeping the distribution of staff across the week the same) within your simulation model and keeping track of service achieved, revenues, and costs, you can determine your optimal service level. You can produce the following graph for an inbound sales center:



**SERVICE LEVEL VERSUS PROFIT**

Using simulation to determine your profit maximizing service quality targets will be revealing. You will see if your current service quality goals, by leading you to either overstaff or understaff, are costing you profit.

*WHAT-IF #4: What if our new marketing program generates more calls than expected?*

By varying the call volume forecast while keeping all other model inputs constant, you can predict performance over a range of call volumes and can produce the following analysis:



**CALL VOLUME VERSUS AVERAGE SPEED OF ANSWER**

Given that call volume forecasting is part art and part science, it is always important to understand how sensitive your center performance is to fluctuations in call volume— just in case your forecast is high or low.

**Summary**

Developing a discrete-event simulation model of your contact center environment will make answering what-if questions easy and accurate. More importantly, you will understand how sensitive your contact center performance is to changes in your operation. By being able to focus your improvement efforts on those levers most likely to make an impact on your business, you will be able to save (or make) your company a lot of money. And still make it home for dinner.

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