A White Paper

Optimizing your Call Center through Simulation

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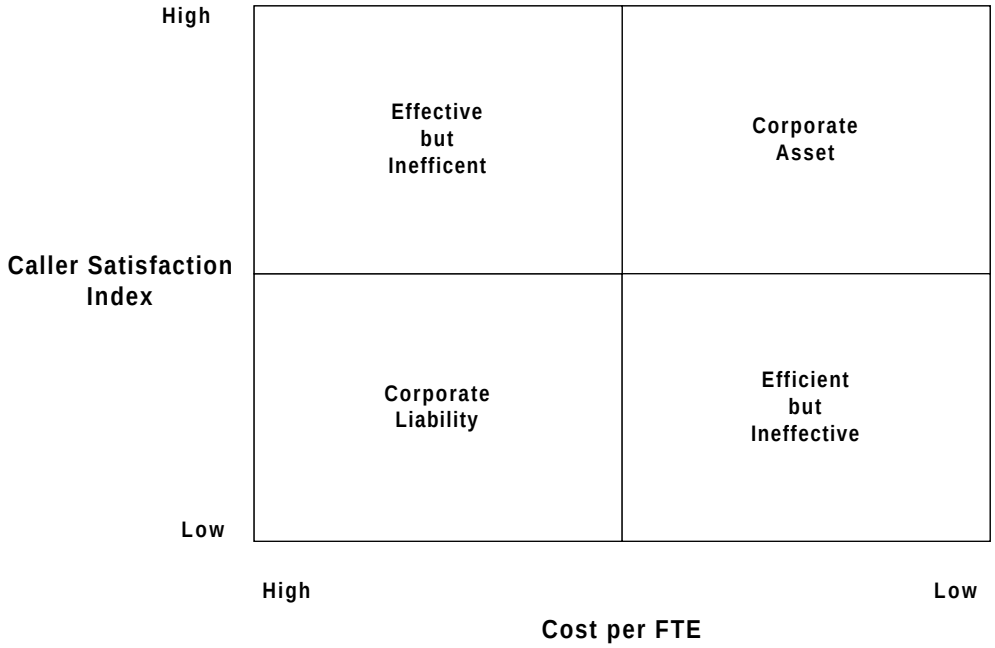
Background

The challenge for today's call centers is providing value-added customer service at the lowest possible cost per customer contact. Let's think of today's call center as having two dimensions of customer service that we can measure, 1) business efficiency and 2) customer effectiveness. We can put these two measures into a performance matrix (see Exhibit 1 below) that compares the caller satisfaction index (or CSI) with the call center cost per full-time equivalent $(cost/FTE)_1$.

The call center manager can determine which quadrant their call center is operating in by taking industry specific benchmark data and comparing it to their call center metrics. What we find today is many call centers operating in the lower left quadrant of the matrix. The Purdue University benchmark

Performance Matrix
Exhibit 1



study indicates as many as 50% operate in the lowest quadrant.[2]

If your call center falls in this quadrant there are several tools in the marketplace that can assist you in becoming a more efficient and effective operation. To ultimately become a world class call center (upper right quadrant) may require major re-engineering of today's business processes.

Whether you intend to make major changes or minor adjustments to today's processes, you want to be sure it makes economic sense and improves customer service, retention and profitability. Simulation tools can be used effectively to verify and justify change by testing alternative ways of doing things before they are implemented.

In this article we will explore ways that you can use computer simulation effectively to evaluate re-engineering plans of your call center.

Introduction to Computer Simulation

In the past few years, simulation tools have begun to emerge in the call center industry. There are two important reasons for this, 1) call centers are extremely complex, and much too important to run by intuition or "gut feel", 2) simulation tools are being designed specifically for call centers making them more intuitive and much easier to learn and use.

Let's take a minute to really understand computer simulation. Simulation is a way to create models of real-world processes, in this case study, the call center. A call center model is a logical description of how the many processes of the call center interact and work together.

To develop a call center model, you begin by inputting facts such as call arrival patterns, the different types of calls, how the calls are routed, the agents (with skills and schedules), the trunk groups, and many more.

Once the model is built it can "simulate" the actual behavior of the call center over a particular planning period. The outputs are the typical call center metrics that you see every day, for example, the number of calls, average handle time per call, agent utilization, number of abandoned calls, service level, and many more.

Simulation works very well in a call center environment because it is able to generate calls the way they actually arrive at the call center (randomly and in bunches). Secondly, most simulation tools allow you to document the process graphically and animate it. The result is a model that is easy to understand and accurately "acts like" the call center as you know it. Once the model is established it can be used time and time again to support and verify important management decisions.

Even if you are meeting your goals, simulation can offer new ways of addressing the problem, leading to more cost-effective ways of processing calls. Because many call centers are in a continual state of change, simulation lets you test the effect of these changes before actually implementing them.

Let's explore in more detail how to use simulation to improve your call center operation. Simulation can be used in two ways as follows:

- First it can verify where you are. We'll call this the assessment phase. The key question becomes "how efficient and effective is my operation today?"

- Secondly, simulation can be used to address "what if" questions and develop scenarios of how the call center may operate in the future. It provides a means to analyze and measure the impact of changes as a result new technology, a changing business strategy, increased workload, and more.

In this article we will focus on the assessment phase. To illustrate how simulation is used in this phase, we will refer to an actual case study assessment which we conducted at a large public utility call center.

The Assessment

The purpose of the assessment was to establish a baseline for change. The assessment benchmarks the call center to industry metrics, analyzes the "current state" and provides a blueprint for the future.

This may involve a complete realignment of the call center and its mission to support the strategic direction of the company. Computer simulation is one

tool that we use to establish a baseline for change. It identifies where the call center is in terms of its "current state" efficiency and the impact of moving toward the upper right hand quadrant of the performance matrix in Exhibit 1.

The tool of choice for this kind of analysis is a product called, Call$im, by Systems Modeling Corporation (www.sm.com). Call$im was designed specifically for call centers, giving it a very large advantage over other conventional simulation products. We mention this because most simulation tools are "general purpose" tools that require much more in depth knowledge and expertise to create a working model. Because nobody in today's environment has weeks or months to learn new software it is often not practical for call center managers to use these sophisticated tools. By using Call$im we were able to generate the initial model in a couple of hours.

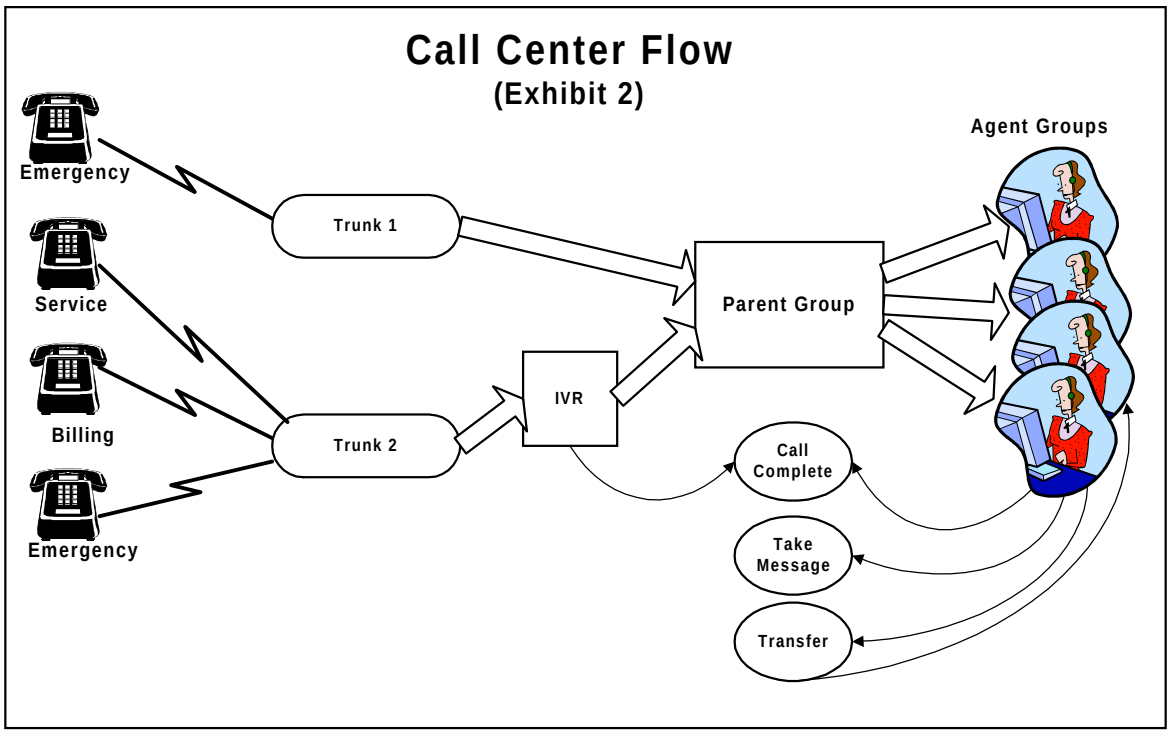
The Simulation Process

- **Objective**

During the assessment phase of our analysis, the objective was to establish a baseline model that represents the call center as it operates today. This model tells us how the call center is performing relative to the number of incoming calls, trunk capacity, routing logic, and the number of agents. Secondly, we then compared this to industry best practice metrics. Is it performing up to industry standards and, if not, what is the impact on call center resources if it moves to this required service level?

- **Building the Model**

With this in mind we built a baseline model. Exhibit 2 provides an overview of that model. We have three main call types coming into the call center. All incoming calls go into a queue and wait for the first available telephone service representative (TSR). Each agent group in the model represents one or more agents that have the same schedule. Since agent groups can have



overlapping schedules, the Parent Group (a collection of attached Agent Groups) routes calls to the first available agent. Emergency calls can enter the call center through a direct line or through the IVR. In either case, these calls always go to the front of the queue and get the next available agent.

The IVR handles about 10% of the calls. Calls that wait for 6 minutes without reaching a TSR provide the caller with the opportunity to leave a message. The model assumes that all agents adhere to their schedule and therefore are always available to take calls (except when on a call, on a scheduled break or scheduled lunch).

- **Baseline Results**

The Baseline simulation model provides us with performance statistics based on the call center's current call volumes, staffing and routing. We use these statistics to compare the simulation data to the existing call center performance reports.

The output from the model told us that the call center should be performing extremely well, with a service level of nearly 100%. It also projected a minimal number of abandoned calls with an average speed of answer of 15 seconds and an occupancy rate less than 50%.

Instead we found an abandoned rate of nearly 30%, an average speed of answer of 45 seconds, an occupancy rate of 60% and absenteeism of nearly 3 times the industry average.

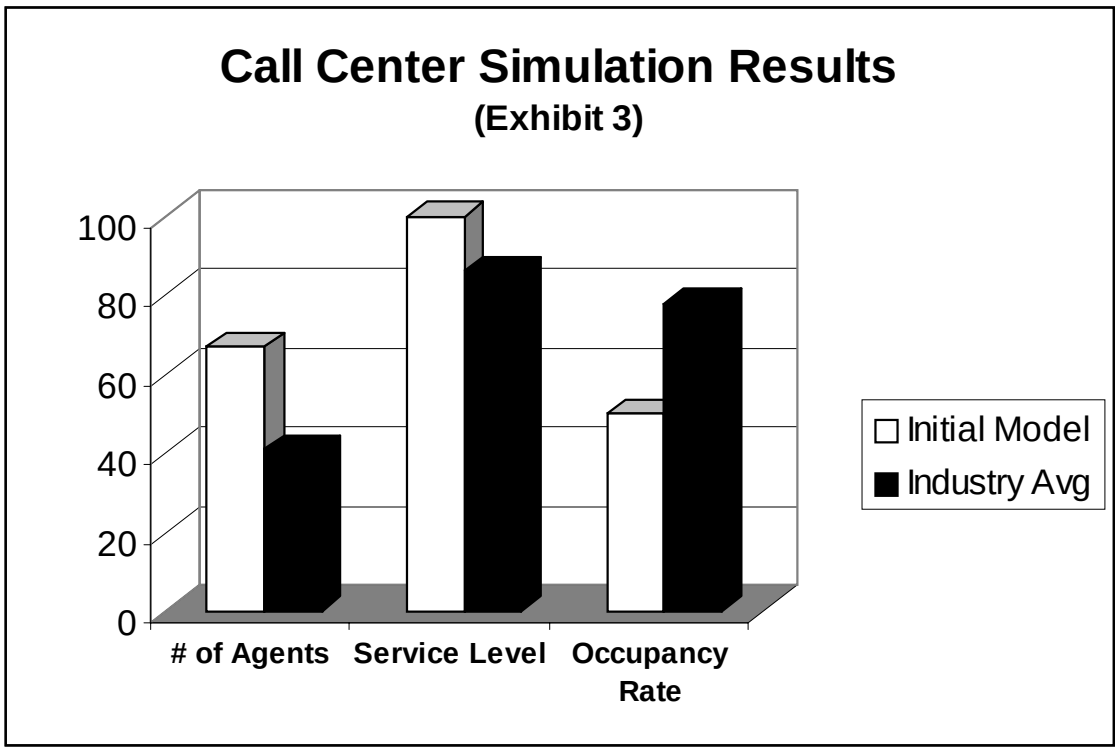
The results of this simulation exercise showed that there could be a very high potential for performance improvement.

- **What Could the Call Center Achieve**

Using the model we just created we posed the following question. "What is the minimum number of resources necessary (to meet industry best practices) given the current call volume and the way calls are distributed?"

Leaving everything else in the model alone, we adjusted several of the staffing groups. The model tells us agent utilization at each 1/2 hour so it is easy to determine where the call center was overstaffed. This process may take several interrations depending on the number of overlapping agent groups.

The results show (see Exhibit 3) that the call center only needs 41 agents, at a minimum, to support the current call volume. With this number of agents the call center could still exceed the industry average service level (80% of the calls within 20 seconds) while maintaining an industry occupancy rate of 78%.



In a few hours the model was able to measure where we are and what it would take to operate the call center at current industry averages. This exercise is just the starting point for re-engineering the call center.

Beyond Assessment

How does simulation play a role beyond the assessment phase? Whether the call center decides to optimize its current structure or completely re-engineer it, a new business model will emerge. The process, people and technology will change in some form. In either case simulation can be used to describe, test and optimize it.

Lets suppose in our public utility call center example that the following changes are being considered.

- Agents begin outbound calling to promote new products and services based on buying habits or proactively keeping the customer informed of scheduling changes.
- High volume call days are overflowed to an outside service.

- Service is extended from 12 to 24 hours.
- Service level will improve by 35%.
- Calls are routed to those agents with the most skill for that particular type of call.
- Several call centers are combined into a shared service concept.
- New agents take 3 months longer to become fully competent.

In every case we are effecting the business model. Before we begin making these changes we can use simulation to describe, test and compare them to the current state model. Simulation provides a rigorous approach to understanding the impact of future changes on the business operation.

In studying the 1998 Purdue University call center benchmark report, it quickly becomes clear that almost one half of all call centers will need to be redesigned before the year 2000 to stay competitive. We believe that simulation can play an important role during this transition period and beyond.

About the Authors

Dr. Jon Anton is with the Department of Consumer Sciences at Purdue University and a researcher in the Purdue Call center for Customer-Driven Quality. He has assisted more than 300 companies in improving their customer service strategy/delivery by the design and implementation of inbound and outbound call centers as well as in the decision making process of using teleservice providers (outsourcing) for maximizing service levels while minimizing costs per call.

Bill Hall, is a management consultant with Call Center Services, where he assists clients in improving their call center operations as well as re-engineering major business processes. Bill's specialty is using computer simulation tools to analyze call center performance and develop strategies to support management decisions that drive call center operations. Bill has worked for over 20 years in manufacturing, distribution, insurance and health care industries in senior management positions.

References

1. Anton, J., **Call Center Management by the Numbers**, Purdue University Press, Inc., 1997.

2. Anton., et. al., **1998 Call Center Benchmark Report**, Purdue University Center for Customer-Driven Quality.