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Does Accuracy Matter?

Ric Kosiba, Ph.D., President, Bay Bridge Decision Technologies

Our Struggle With Accuracy

I am very proud of my company, Bay Bridge Decision Technologies. We've brought together a very talented group of mathematicians and industrial engineers who spend a good chunk of their day analyzing ACD data, developing hiring optimization algorithms and contact center simulation models, and ensuring simulation model accuracy against real world call center data.

When we started Bay Bridge, we built our first prototype CenterBridge system using Erlang equations to develop staff and budget plans. Everyone in the call center industry used some variant of the Erlang equation to do staffing analysis, so we thought we would as well. We plugged the results of our Erlang model and compared it to real-world ACD data and found that the results were not very close.

So, we went back to the drawing board. We researched and developed modified Erlang equations for use in CenterBridge. This time we had more luck. We found that we could get more accurate for a particular call center (although still not as accurate as we'd like), but that model did not translate well to other call center data. In other words, for our models to be closer to accurate, using a modified Erlang equation, we had to build a different model for every call type. There was a ton of math involved in doing this, a lot of time, and the results were still not as close as we'd like.

But this makes a lot of intuitive sense. Every call type and call center customer is not the same. We all know that analyzing a technical support contact center is different from analyzing a sales center. We all know this, yet most of us use the same equation to determine staffing across all of our different call types.

We had to go back to the drawing board again.

We found that we could get amazing accuracy with a well known, but slow, technology called discrete-event simulation modeling. So, our engineers went to work on speeding up the simulation model runs. When they finally succeeded, we had our first version of CenterBridge.

The Big Question

We spend an awful lot of time building these custom simulation models for our customers. To get this accuracy, we have had to hire expensive engineers, invest our time and resources into software and processes designed to ensure speed and accuracy, and go to great lengths to analyze our customer's ACD data. What a pain.

I cannot tell you how many times we have asked ourselves: "Does accuracy really matter?" It would sure make our lives easier if accuracy was not so important.

What does accuracy mean to your staffing numbers?

It is common knowledge that Erlang-based equations tend to overstaff. The real problem most analysts face is that they do not know, for their centers, how much Erlang tends to overstate the staffing requirements. During our normal course of business—analyzing ACD data, building discrete-event simulation models, and comparing models to reality—we also take the step of comparing models to Erlang equations.

Here's the rub. For the same center, Erlang may overstate requirements anywhere between 2% and 7%. It is not always two, and it is not always seven, it definitely fluctuates. So you cannot hide the inaccuracy with fudge factors or schedule inflexibility factors, because the fudges would move around.

Figure 1 represents a head to head comparison between Average Speed of Answer predictions. It compares what actually occurred at a contact center, with what was simulated using Discrete-Event Simulation, versus an Erlang prediction. As you can see, Erlang always overstates the requirement for this contact center (and from our experience, every contact center).

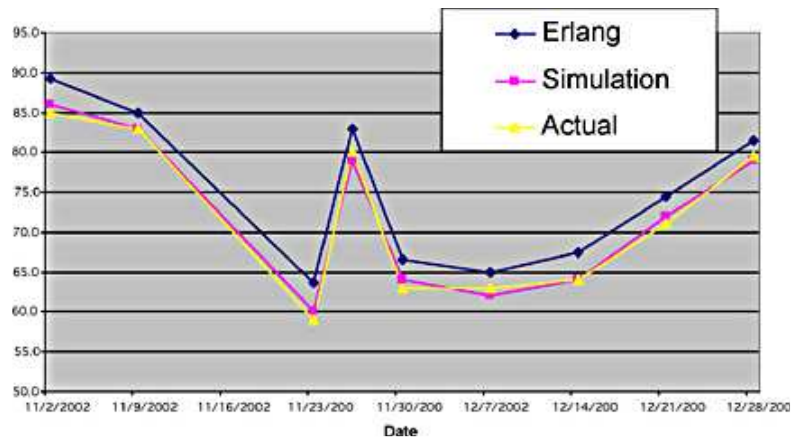


Figure 1: A comparison between Erlang, Simulation, and Actual center performance.

What does accuracy mean to your costs?

Clearly, being off anywhere from 2-7% in your staffing figures translates to large inaccuracies in your budget figures. While we can sometimes tolerate staffing inaccuracies as a “safety net,” it certainly does not go over well with our friends over in finance. Figure 2 represents the trade-offs between staffing accuracy and cost per call. It is important to know this trade-off for every one of your centers.

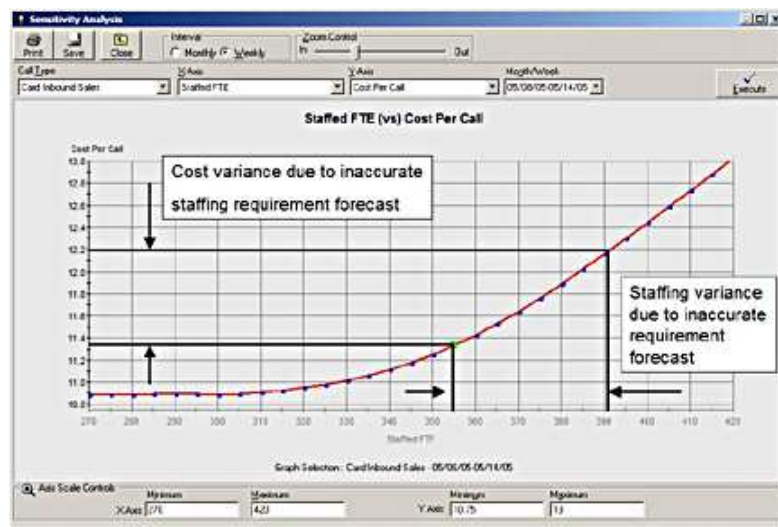


Figure 2: Trade-off between cost per call and staffing forecast accuracy.

But I would argue that there is another cost that may be more problematic. The extra “shrinkage” or lost time that becomes available when there is invisible, Erlang-derived, slop in your contact center network, breeds sloppiness in your center. Any time that you are consistently overstaffed, it means your center management will be able to slack off to some extent. Those inaccurate 7% weeks are not conducive to running a tight ship.

What does accuracy mean to what-if analysis?

Throughout the planning cycle, what-if analysis is very important. These what-ifs are often used to make important strategic decisions, such as:

- Should I close a center?
- Should I offer this cross-sell program?
- Should I combine agent groups?
- Should I outsource? How much of my business should be outsourced?

Clearly, overstating your staffing requirements, may possibly lead you down the wrong path on a number of these questions. Looking back on Figure 2, ask yourself, “If I overstate my staffing requirements, and put 8% additional cost into my forecast, will we be more or less likely to outsource my center?” These are big, big,

strategic decisions.

Short Term is Different From Long Term

Now I know that for tactical workforce management, this issue is very much lessened. Certainly, being off a few percent for the next 15 minutes does not pose the same risks as being off in your budget and long-term staff plans.

Most workforce managers I speak to have their own fudge factors, kept in the back of their heads, to help them manage this inaccuracy on a “day-of” basis. This intuition is one of the differentiators between an experienced workforce manager and a “newbie.”

Does My Planning System Use an Erlang-Based Model or Discrete-Event Simulation?

Simulation is one of the words that many folks can use to describe many methods of analysis. Indeed, an Erlang equation is itself, a form of simulation (impress your workforce management friends — Erlang is a “closed-form” equation, or a “continuous simulation”).

The type of simulation model that leads to the accuracy described in Figure 1 is called “Discrete-Event” simulation. What makes this form of simulation so powerful is that it can, and should, take into account behaviors of your customers, such as their patience on the phone and their handle times. You can create virtual, computerized customers in your Discrete-Event Simulation, that have the same statistical attributes that your real customers have. By getting these behaviors right, you can get the accuracy that we like to brag about.

Most of us use spreadsheets to do our strategic planning. A simple way to tell if you are using Discrete-Event Simulation or some Erlang derived equation is to check whether your tool outputs all the standard metrics: service level, average speed of answer, abandons, and occupancy. If your model does not explicitly and accurately display your abandon rates, it is most likely an Erlang equation and not Discrete-Event Simulation.

Does your model first develop requirements? Discrete-Event Simulation works the other way — it presents to you the service expected given your handle times, staff levels, and call volumes. Erlang-based equations usually display requirements, given your service level goal, first. Usually, you’ll also have to provide to your spreadsheet some sort of schedule inflexibility factor to help fudge your Erlang equation.

The Importance of Model Validation

No matter what type of tool you use to help you with your strategic planning, it is important that you validate the accuracy of your tool. To do this, simply plug into your planning tool, say, for last week’s historical center performance, the number of staff you had, the call volume you received, and the handle time you saw. If the resulting service level, speed of answer, abandon level, and occupancy of your historical center performance doesn’t come very close to what your model says you should have achieved, then you have an accuracy issue.

Now, the most significant area that accuracy will help you is probably “bad decision avoidance.” When considering big changes, like outsourcing, or opening or closing centers, you want to make sure your analysis is spot on. But even in the course of putting together plain vanilla budget plans, being able to squeeze out five percent of your staffing costs is pretty significant. It could help save your company money. Accuracy matters. A lot.

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