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Improving Customer Care Service via Phone Calls to Reduce Customer Wait Time Using ARENA Simulation

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Abstract: The call center industry has shown incredible growth around the world in recent years and will continue to do so in the future, as organizations seek new ways of interacting with customers. Customer call centers form an integral part of mostly all industries in recent times and often have become a primary source of contact with customers playing an essential role in the business world. Companies have realized that call centers can be strategic asset to generate revenue for the company. The complexity of the call center can be simulated by using the concepts of Modeling and Simulation which will help the company use their resources efficiently in long run. Several companies which have developed and implemented solutions to manage their customer call centers, still struggle when the demand is at its peak and results into longer wait times and more rejection of customers calls. The aim of this project is to simulate a model using ARENA simulation to tackle such situations by considering all anticipated factors in between. Additionally, we have proposed an alternative model focusing on gaps and opportunities to reduce wait times and call rejection rate to increase efficiency and customer satisfaction.

Keywords: Customer Care, Call Centers, Wait Times, Simulation

1. Introduction

The call center industry has shown incredible growth around the world in recent years and according to various sources will continue to do so for some time into the future, as organizations seek new ways of interacting with customers (Dawson, 2004). Call centers form an integral part of mostly all industries in recent times. and often the Call Centers have become a primary source of contact with customers and play an essential role in the business world. Soon companies will realize that Call centers can be a strategic asset to generate revenue for the company. The aim of this project is to simulate a model right from receiving the call up to the end by considering all the factors in between. How can the company improve and what steps it must take in order to increase its efficiency can be determined through this model. The complexity of the Call Center can easily be simulated by using the concepts of Modeling and Simulation which will help the company to improve (Kelton, Sadowski, Swets, 2010).

1.1 Motivation of study

Call centers play an important role in Enhancing Customer Service Management, Improving Reporting Features, Enhancing Productivity and Efficiency, Enhancing Data Access, Increasing Communication and Responsibility, Decreasing Costs and increasing profit, improving sales of different products, Increasing Customer satisfaction. It is very important for a company to invest in its call centers in order to make profit. As every company strives for betterment and to make great profits, they need to simulate certain situations to be ready for it and not face a loss during such time. To simulate the model of a Call Center we are using ARENA Simulation Software which suits best for what we are planning to model. (Altiok and Melamed, 2007). Through this software we can implement the knowledge learnt in the Simulation and Modeling Course and built a model which can simulate daily activities at Call Center.

1.2 Problem Statement

The call centers have become a vital part of any organization in spite of being very hectic and complex, as a result, they must perform efficiently and with minimum number of errors, in order to satisfy business and customer demands. There are various issues that needs to be satisfied for smooth operations and highest efficiency like how will a given system perform if the number of calls increases, how many agents are required for uninterrupted service, what should be the response

time for each call, how much time should be given to an agent before receiving the next call. There are many companies which have developed and implemented solutions ,but still they struggle when the demand is at its peak. The call center receives thousands of calls daily from customers to enquire about different products, about technical difficulties and any expected shipments. We have done the simulation is done for a month and identified the problems and suggested a better model for the same. The Demand can increase unexpectedly, and the company has to be ready for it in advance. This simulation will help the company to have a model ready and plan for such situation (Wang, 2016).

1.4 Objective of the study

The objectives of the project are to simulate model of a call center by using ARENA and suggest a better model to improve all inefficiencies by experimenting it on Arena using different inputs, studying the outputs and looking which model fits best and giving best possible model, using ARENA to simulate as it is one of the best simulating software where we can replicate the call center process accurately, finding each types of call in a month, Queue for each process, usage of each team, utilization and average number of rejected calls in a month. (Rossetti, 2016)

2. Method

We have considered the assumptions that customer support helpline would be operating from 10am-6pm (10 hours) (i.e., 600 minutes), number of trunk lines are 100 for the toll-free helpline, technical support calls received are for three product categories computer & tablets, cell phones and car electronics, all team members and representatives attending the call work from 10am-6pm.If they go for their lunch breaks or short breaks they are replaced by other members. In short, all the assigned team members and representatives work for straight 10 hours without interruption. Activities considered are

Activity 1: Customer listens to the recorded system to select the type of product which needs support, this activity follows a Uniform Distribution, Activity 2: Customer selects the type of product; this activity follows a Uniform Distribution. Activity 3: Customer listens to automated order update after feeding the order number, this activity follows a Triangular Distribution.

Activity 4: Customer waits for a representative to be assigned; this activity follows a Triangular Distribution. Time for all Technical support calls and Time for all Sales support calls follows a Triangular Distribution. The company has many products, but we have considered 3 categories of products from the same for our project. The simulation can be extended for other products as well depending on the requirement (Guneri, Seker. 2008).

3. Results and Discussions

In our case we must run the simulation of a period of 10 hours for a day. We treat each simulation as a day and therefore by simulation it 30 times, we are trying to replicate the simulation for one month. In order to simulate the current model of the company we did a experimental run and after analyzing the result we found out that the problem with this model was it had excess amount of rejected calls, excess amount of wait time, number of customers waiting in queue was more meant that the customer had to wait for a long time in the queue which resulted in hanging up the call. (Nahnhauer. Böser, 2006). This can cause a loss to the company because the customer may choose some other retailer for the product he wants to purchase or repair. There was a Queue for Product 1 and Sales team which was the reason of rejected calls. To overcome this problem a new model must be suggested. Through our project we are trying to minimize the rejected calls reducing or eliminating the queue (Chakravarthy, 2012).

3.1 Proposed Alternative

In our Model we have suggested the following things to reduce the tailbacks of rejected calls and eliminating the queue. In the previous model the Trunk line capacity was 80 which we have changed to 100 which makes more lines available for the customers and call receiving teams. The product 1 had a Queue and hence we increased the members in Technician 1 from 10 to 20 which will reduce the queue and help the customers get into the system as soon as they call. As now the trunk lines have been increased there may be a event in the future where there might be unexpected increase in demand where the trunk lines may distribute the calls evenly but there won't be any personnel to attend it. So, for product 2 and product 3 we have increased the team members to 25 and 20 to avoid Queue in the future. Sales team is the most important team for the company now because of everything going online and that is the reason maximum numbers of calls are for them, hence we

have increased the team members from 10 to 50. The cost of Installing the trunk lines and hiring new employees should also be considered for this model as it cannot be ignored. So, based on all the factors and considerations we can implement this model to reduce the rejected calls and eliminate the Queue. From this result we can see that there is a maximum value wait time for order status calls (37.5 minutes), sales calls(13.3minutes) and technician calls (10.3 minutes). Maximum value of wait time for product 1 is 10.3 and for sales support process is 37.5. Maximum number of people waiting in queue for product 1 is 10 and for sales support is 8. The average number of rejected calls in a month are 114 from 1255 calls.

3.3.1 Simulation output of previous model:

Queue

Time

Waiting Time	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Product 1 Process.Queue	0.1211	0.03	0.02051907	0.4009	0.00	10.3179
Product 2 Process.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Product 3 Process.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Sales Support Process.Queue	0.3034	0.10	0.00240174	0.9224	0.00	37.5801
Seize Trunk Line.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Other

Number Waiting	Average	Half Width	Minimum Average	Maximum Average	Minimum Value	Maximum Value
Product 1 Process.Queue	0.06247183	0.02	0.01019018	0.1920	0.00	10.0000
Product 2 Process.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Product 3 Process.Queue	0.00	0.00	0.00	0.00	0.00	0.00
Sales Support Process.Queue	0.0915	0.03	0.00063068	0.2735	0.00	8.0000
Seize Trunk Line.Queue	0.00	0.00	0.00	0.00	0.00	0.00

Figure 1. Queue Timings

Counter

Count	Average	Half Width	Minimum Average	Maximum Average
Completed Calls	1140.87	7.29	1099.00	1170.00
Number of Attempted Calls	1254.33	13.00	1180.00	1314.00
Number of Rejected Calls	113.47	8.76	78.0000	162.00

Figure 2. Call Counter Data

From this result we can see that there is a maximum value wait time for order status calls (37.5 minutes), sales calls(13.3minutes) and technician calls (10.3 minutes). Maximum value of wait time for product 1 is 10.3 and for sales support process is 37.5. Maximum number of people waiting in queue for product 1 is 10 and for sales support is 8. The average number of rejected calls in a month are 114 from 1255 calls.

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3.3.2 Simulation output of proposed model:

Usage

Scheduled Utilization

	Average	Half Width	Minimum Average	Maximum Average
Sales	0.1253	0.00	0.1107	0.1541
Techician 1	0.3002	0.01	0.2499	0.3292
Techician 2	0.1788	0.00	0.1677	0.1905
Techician 3	0.07365090	0.00	0.06388681	0.08157698
Trunk Line	0.7392	0.01	0.7163	0.7734

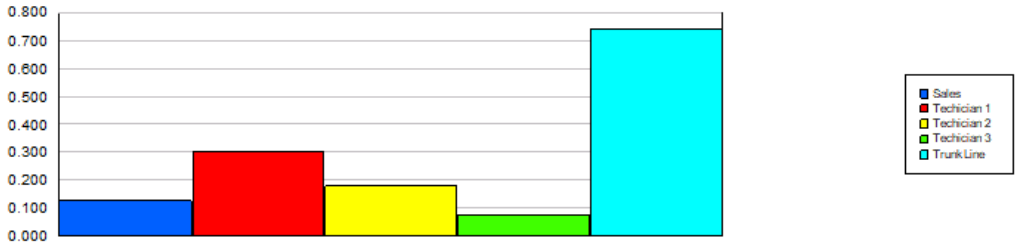

Figure 3. Utilization of Resources

Here, utilization of each Technician and the Trunk Line is given. We have the Minimum Average, Maximum Average and the Average of each.

Counter

Count

	Average	Half Width	Minimum Average	Maximum Average
Completed Calls	1250.53	10.48	1197.00	1303.00
Number of Attempted Calls	1256.40	11.13	1200.00	1318.00
Number of Rejected Calls	5.8667	1.99	0.00	17.0000

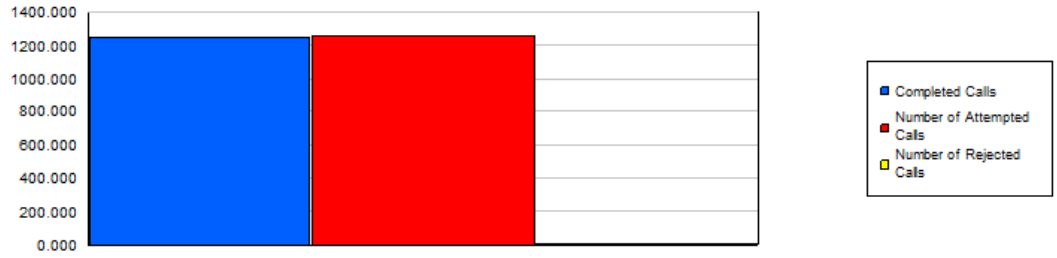

Figure 4. Call Counter Data

Here, we have the total number of completed calls, the number of attempted calls and number of rejected calls by the system. For these we have the Minimum Average, Maximum Average and the Average.

3.2 Output Analysis

The results from the new model suggest that the Average number of calls per month are 1257 out of which an average of 6 calls are rejected which is better from the previous model where average of rejected calls were 114 out of 1255 as seen from the data. The Queue for Product 1 and Sales team was affecting the number of rejected calls where the waiting

time was maximum of 10.31 minutes for Product 1 and maximum of 37.5 minutes for Sales which then reduced to zero minutes in our model. The Queue had maximum of 10 people for product 1 and maximum of 8 people for sales, that has also gone down to zero which in turn has also resulted in decrease of the rejected calls.

4. Conclusion

Through the project we have analyzed a model of Call center by simulating it in ARENA. Identifying the defect in the previous model and bring up solutions to improve the model to obtain the desired result. This new model has reduced the Queue time for customers which bring customer satisfaction and has reduced the number of rejected calls which in turn brings profit for the company as it does not loose and customers. The concepts learnt in Modeling and Simulation course was applied in building a model by using relevant data and Simulation software ARENA (Patil, Jin, Li, 2011). Different scenarios are considered while building this model. The challenge here was to simulate a model which had four different types of calls, but through Arena and using its resources correctly the desired output was achieved. The main aim of having a new model which can reduce the rejected calls and eliminate the queue was also achieved.

5. Limitations and Future Work

This model is of a very basic call center the actual model of Best Buy can be even more complex where they consider all the factors separately, it can have more than three teams in the call center, employees break times can be considered, down time of trunk lines. The actual model can be very complex and tedious to model and hence we have considered a basic one. We have considered factors that can be extended to the actual model with much more complications. In our model we have considered Triangular and Uniform distribution because it fits best for the model. The actual model can have different distribution which can be used for a much bigger data and considering all the call centers of Best Buy in the state or even country. Many alternative ways can also be used where instead of adding more resources or employees the current system can be made more efficient by adding some advanced technology. The call center industry is an emerging one and more development is yet to be done which can easily be simulated on ARENA or similar simulation software.

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