

# Call Centre Capacity Modeling

Using Erlang C Formula

# Presentation Plan

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# Introduction

- ❑ The Erlang C formula is used to calculate the chance of queued calls (waiting to be answered). This can be used to determine how many # operators/agents are needed to answer all arriving calls.
- ❑ The Erlang C formula does not consider call abandonment: it assumes that all callers will remain in the queue until they are being served.
- ❑ In reality, some callers will abandon when the waiting time exceeds their patience. This has the effect of improving the waiting time for subsequent callers in the queue. Abandonment will therefore improve the service level for remaining callers. The net effect of this is, that the Erlang C formula will essentially overestimate the numbers of operators/agents that are needed.

# The R Code

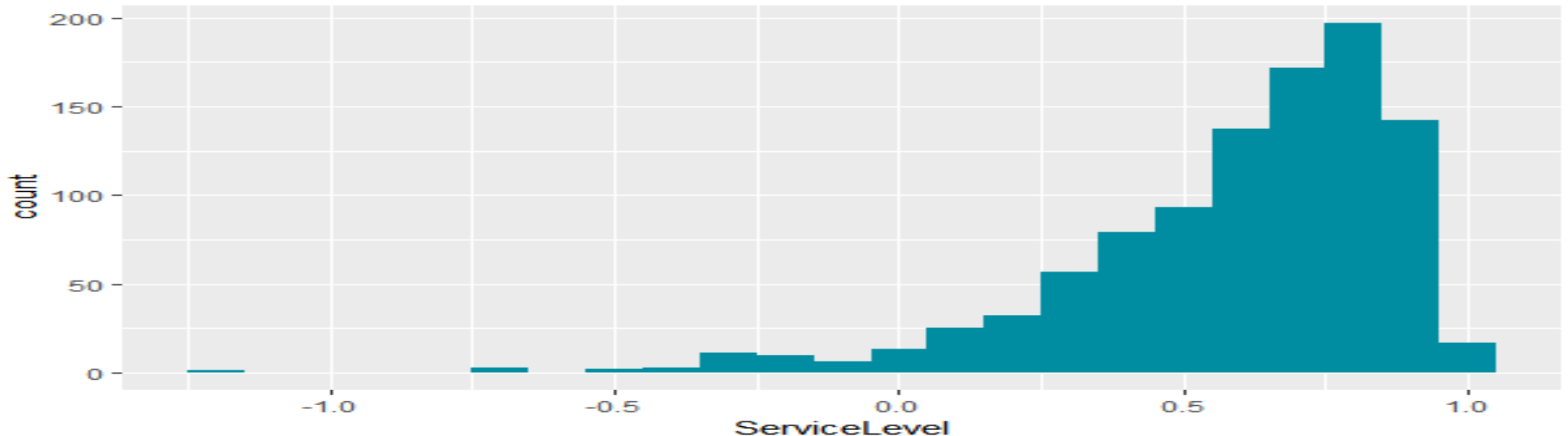
- ❑ The following terms are used in the R Code associated with Erlang C formula:
  - rate-- Number of arrivals per interval
  - duration-- Average handling time in seconds
  - interval-- Length of interval in minutes (default = 60)
  - agents-- Number of available agents
  - target -- Acceptable waiting time
  - gos\_target-- Service level goal, the percentage of calls answered within the acceptable waiting time
  - intensity-- traffic intensity/workload
  - erlang\_c-- the chance of a queued call
  - service\_level-- the percentage of calls that are answered within the acceptable waiting time
  - resources-- the number of needed agents for SL goal

# Scenarios

- ❑ Find the number resources required given the following conditions:
  - Number of arrivals per interval: 100,
  - Duration of each call is 180,
  - Acceptable waiting time is 20 sec,
  - Service Level goals, the percentage of calls answered is 90%,
  - Length of interval in minutes is 30 sec
  
- ❑ After passing these parameter to the resource function in the R Code, we get the following output  
[1] 15.0000000 0.9414528  
That means the Number of resources required to meet the workload is 15 agents with 94% of calls getting answered.

# Scenarios

- ❑ A call centre receives on average 100 calls per half hour with a standard deviation of 10 calls. The average time to manage a call, including wrap-up time after the call, is 180 seconds with a standard # deviation of 20 seconds. The centre needs to answer 80% of calls within 20 seconds. What is the likelihood of achieving this level of service?
- ❑ After passing these parameter to the resource function in the R Code, we get the following chart. The plot visualises the outcome of the Monte Carlo simulation and shows that 95% of situations the Grade of Service is more than 77% and half the time it is more than 94%.



Thank You