April 2, 2015

Mr. Larry Clark

CEO

Clark Industries

100 LinesOfCode Blvd.

San Antonio, Texas 78249

Dear Mr. Clark:

As the head of the software development team here at Clark Industries, it would be my honor to present to you our latest machine improvement proposals for Bottleneck. We have run several simulations on how Bottleneck was processing widgets for our system. Below lists the input:

Widget WidgetStep1tu WidgetStep2tu ArrivalDelta

We processed 31 widgets for each simulation. The statistics produced are as follows:

Simulation A: (new alternative)

Total widgets processed = 31.0

Average Queue Time for Server 1 = 129.7

Average Queue Time for Server 2 = 2.3

Average Time in System = 166.0

Simulation B: (test simulation)

Total widgets processed = 31.0

Average Queue Time for Server 1 = 320.1

Average Time in System = 350.7

Current simulation: (Bottleneck)

Total widgets processed = 31.0

Average Queue Time for Server 1 = 351.4

Average Time in System = 385.5

The current way we have Bottleneck set-up is with a single server, titled Server1. It can only process one widget at a time. So although a single widget has finished it’s Step 1 and moved on to Step 2, no additional widgets can be serviced on Step 1 until the previous widget has left the server.

Our new alternative is to add an additional server, titled Server2, which will handle Step 2 separately. Server1 will then become a “Step 1”-only server. This means widgets go to Server1 for Step 1 and then Server2 for Step 2. This allows for different widgets to be processed on both servers at the same time.

From the data collected above, we show that the average time in system for Bottleneck is 385.5 time units. We ran a test simulation, simulation B, to show our average time in system for Bottleneck. Except this time, we reduced each widgets Step1 time units by 10. The average time in system went from 385.5 to 350.7. This is only a reduction of 34.8 time units. The last simulation we ran was with our new alternative, Simulation A. We used the same input as we did the first time for Bottleneck and you can see in the data above that the average wait time in system for Simulation A is 166.0 time units. Not only is this a drastic increase from our current simulation, but it even beats the test simulation. On average, Simulation A processed all 31 widgets at a faster rate of 219.5 time units than our current simulation and 184.7 time units faster than our test simulation.

We highly recommend you considering the new alternative we have developed. If you have any questions, feel free to e-mail me back at [KurtKing@ClarkIndustries.com](mailto:KurtKing@ClarkIndustries.com) or don’t hesitate to stop by the office.

Thank you for your time,

Kurt King