HW6 - ISYE 6644

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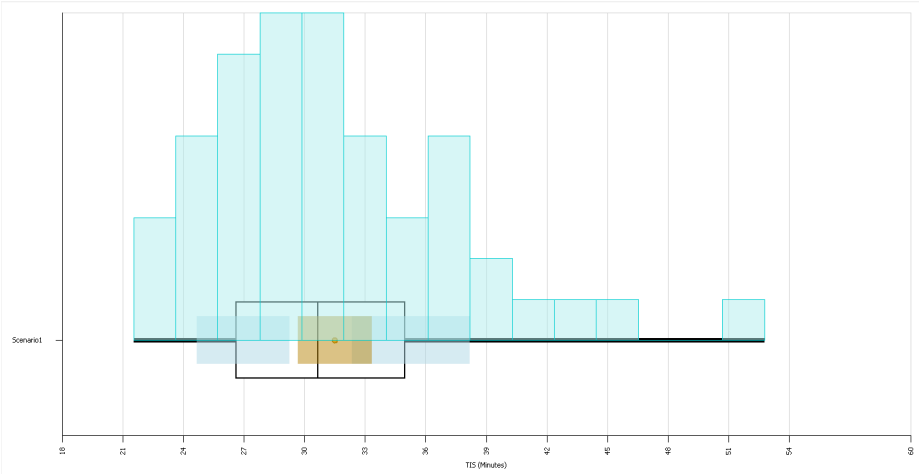
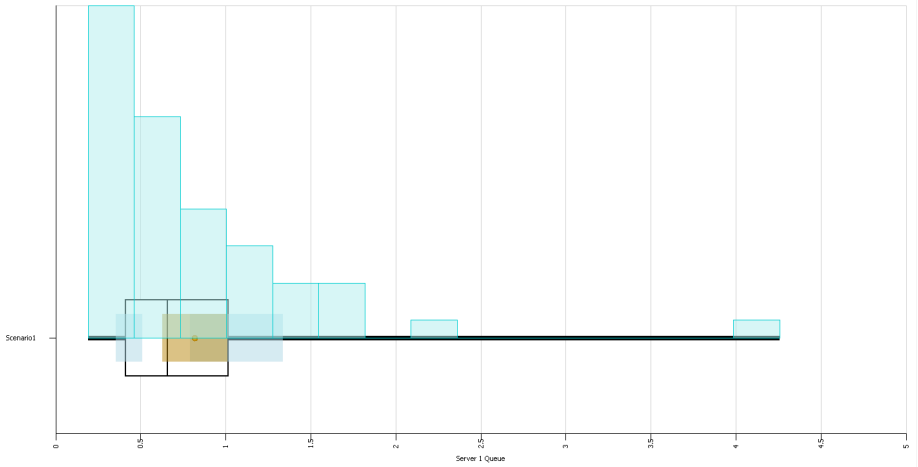
1

Attached are the corresponding (S)MORE plots:

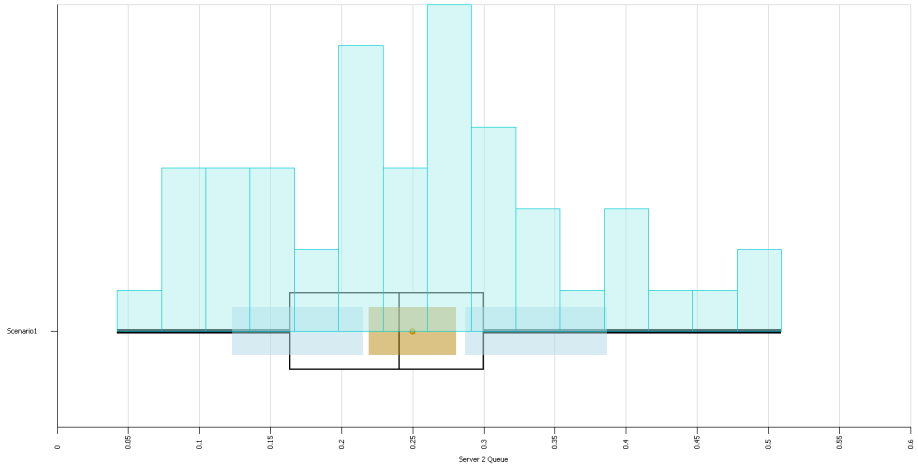
Average time in system:



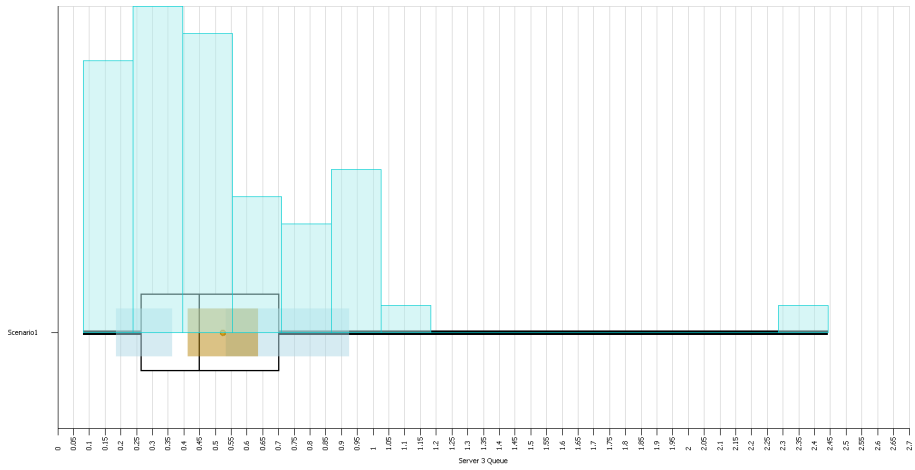
Queue length server 1:



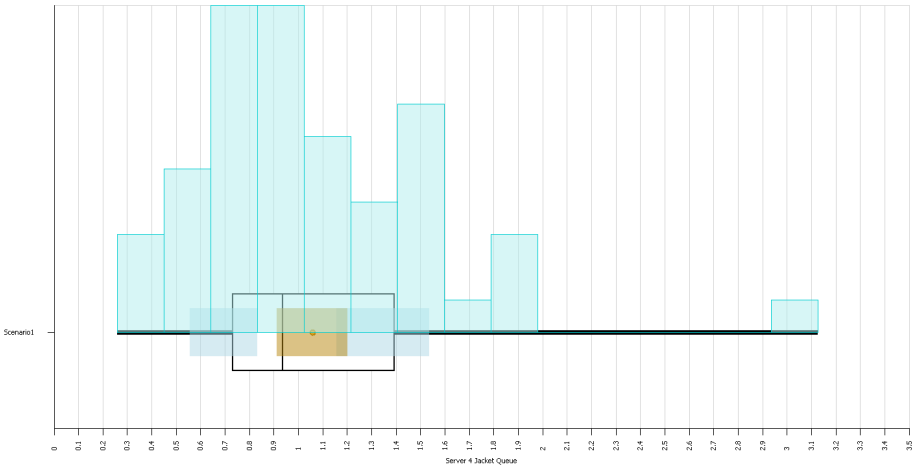
Queue length server 2:



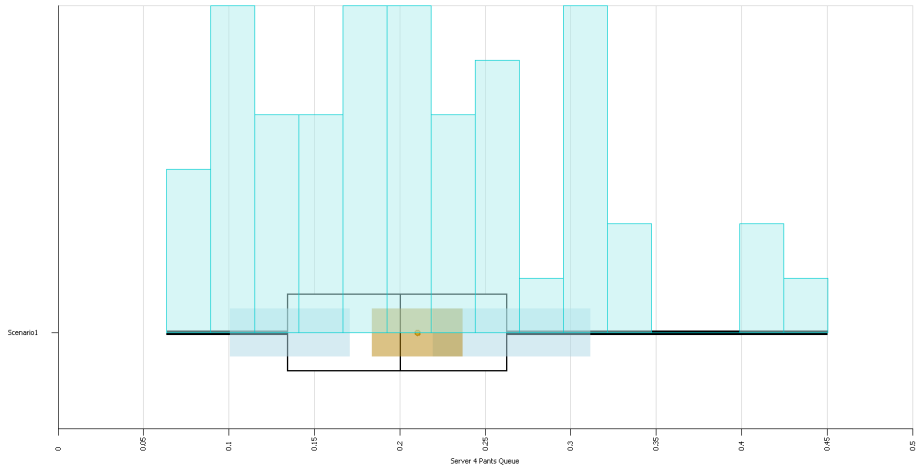
Queue length server 3:



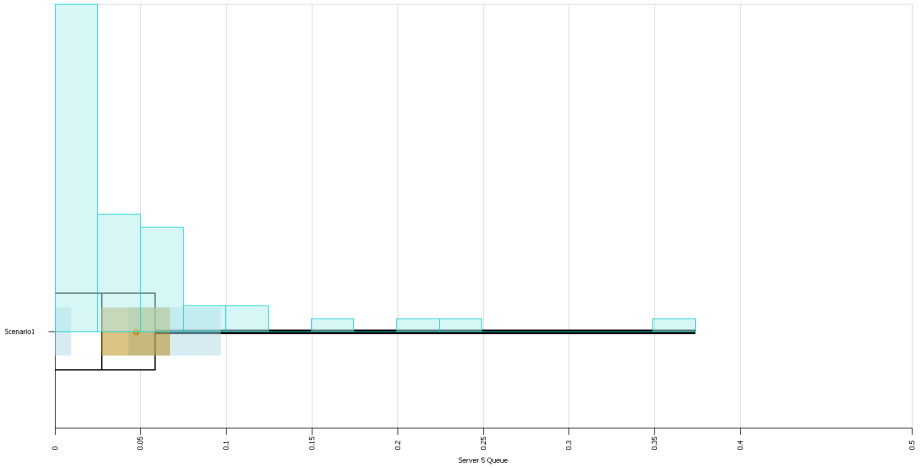
Queue length server 4 (Jacket):



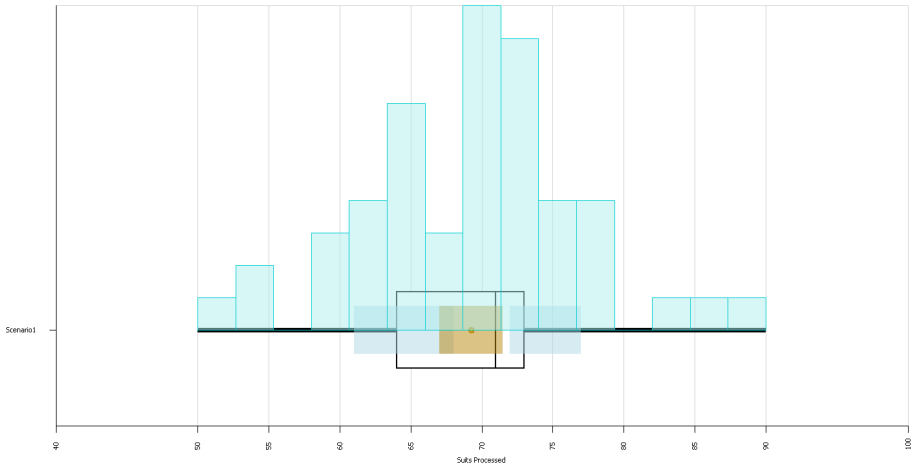
Queue length server 4 (Pants):



Queue length server 5:



Total number of processed suits:



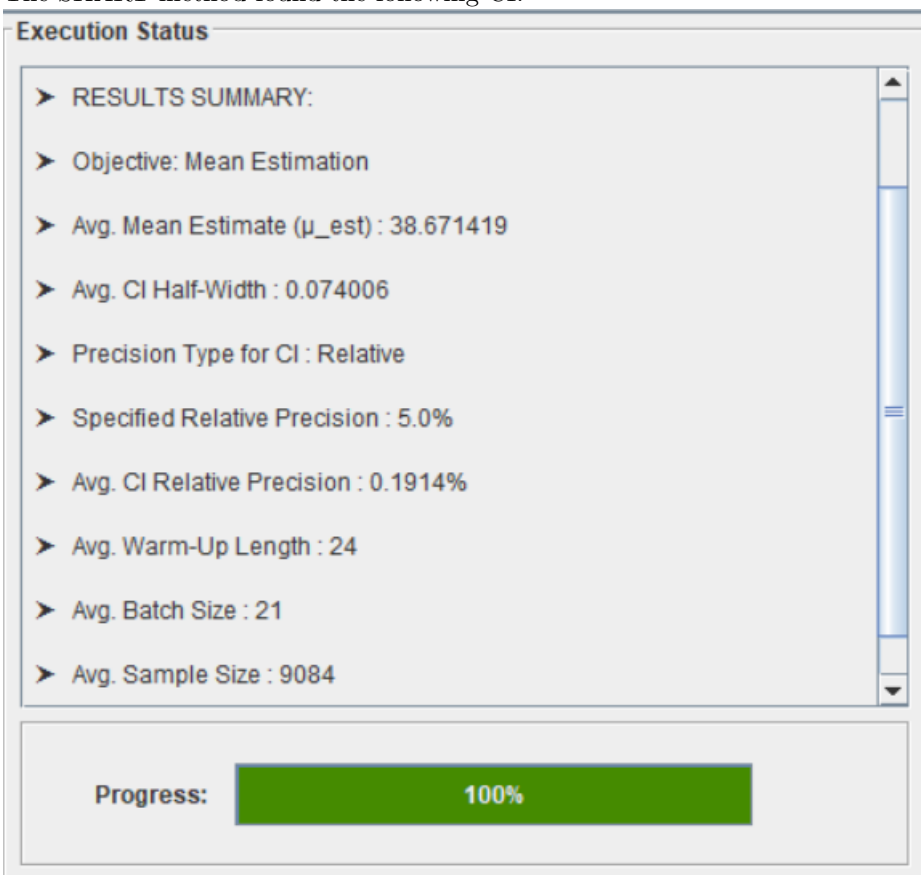
2

2.1

Adding the replication of 500,000 hours onto the existing 50 replications, Simio reports a half-width of 0.0385 for the average time in system for "good" suits. Simio does not however calculate half-width for a single replication, since it will not calculate the average of each individual observation, but rather calculate a confidence interval for the collective averages by default.

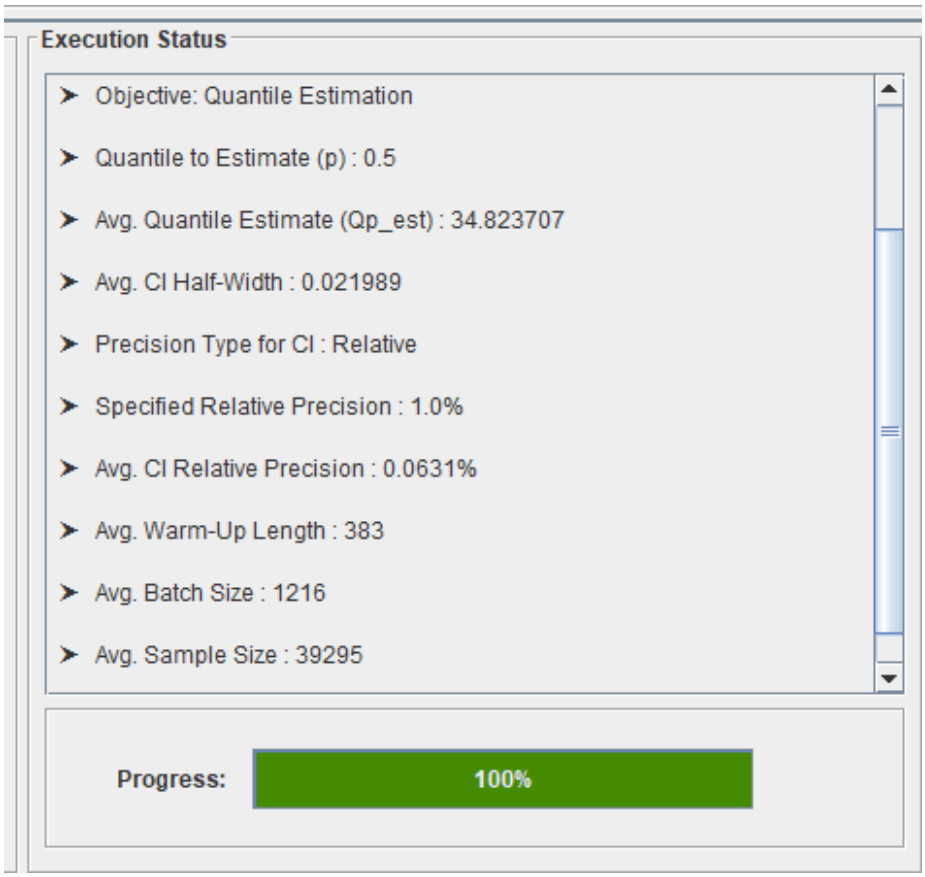
2.2

The SKART method found the following CI:

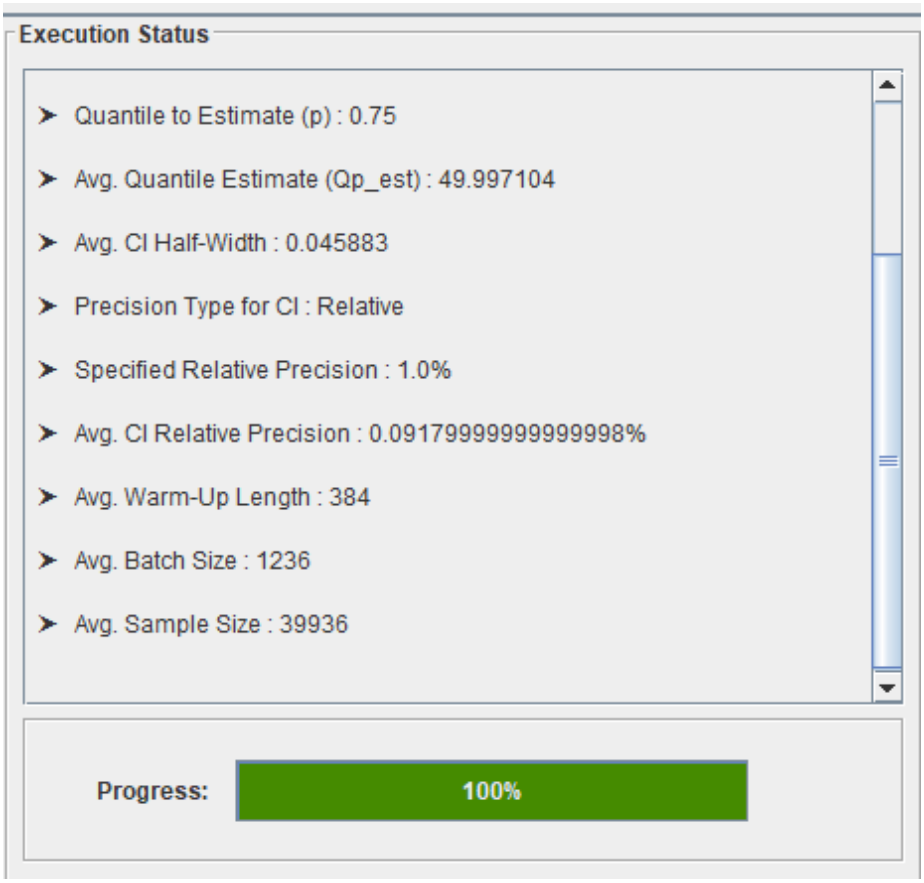


For the Sequest method, the following CI's for the percentiles obtained were found:

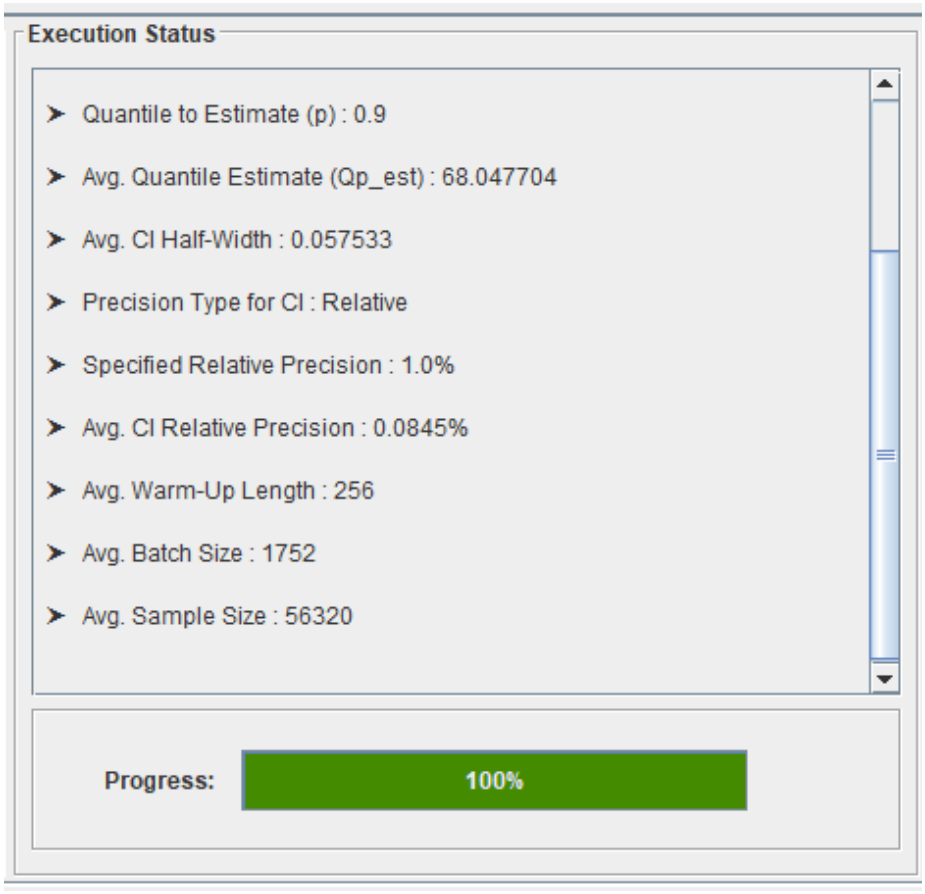
Median:



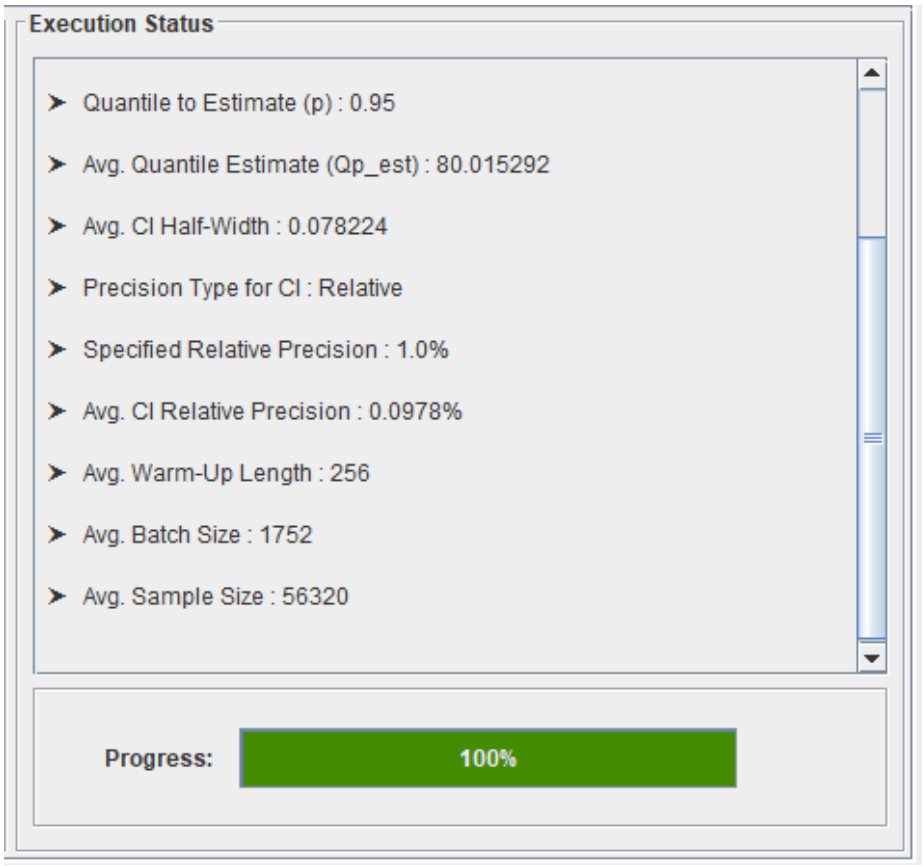
75th percentile:



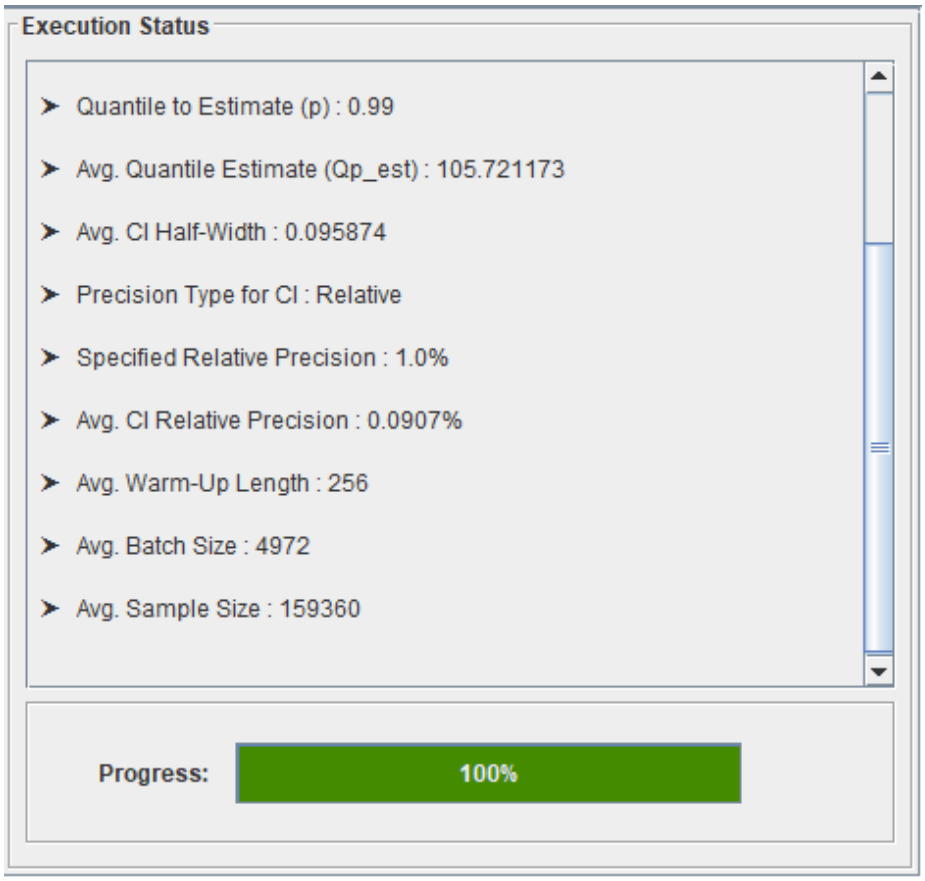
90th percentile:



95th percentile:



99th percentile:



3

3.1

Name	Status	Required	Completed	Server1Prop	Server2Prop	Server3Prop	Server4Prop	Server5Prop	TIS (Minutes)
Scenario1	Comple...	20	20 of 20	2	1	1	1	1	62.802
Scenario2	Comple...	20	20 of 20	1	2	1	1	1	69.9595
Scenario3	Comple...	20	20 of 20	1	1	2	1	1	61.4627
Scenario4	Comple...	20	20 of 20	1	1	1	2	1	58.0755
Scenario5	Comple...	20	20 of 20	1	1	1	1	2	70.7353

The above screenshot shows that Tukey's method was able to determine that the average time in system for scenario's 2 and 5 (where servers 2 and 5 respectively had added capacity) was significantly higher than the remaining three scenarios. However, with the remaining three (scenarios 1, 3 and 4, where servers 1, 3 and 4 respectively had added capacity), this methodology was unable to detect any

statistically significant difference between the average times in system for these three scenarios. Thus, this tool does not pick a single best allocation for the added capacity.

3.2

	Name	Status	Required	Completed	Server1Prop	Server2Prop	Server3Prop	Server4Prop	Server5Prop	TIS (Minutes)
☐	Scenario1	Comple...	10	10 of 10	2	1	1	1	1	61.646
☐	Scenario2	Comple...	10	10 of 10	1	2	1	1	1	66.1698
☐	Scenario3	Comple...	10	10 of 10	1	1	2	1	1	59.2142
☑	Scenario4	Comple...	10	10 of 10	1	1	1	2	1	52.7182
☐	Scenario5	Comple...	10	10 of 10	1	1	1	1	2	67.485

Here, we can see that the KN method successfully chose an optimal scenario. In this case, it chose scenario 4.
Here, we establish an indifference zone of 2, meaning that we determine any difference below two minutes to be negligible for comparison purposes. This means that scenario 4 is differentiable from the other scenarios with a degree of certainty of 95%. This method, in contrast to the one previously used, was able to select a method as the optimal solution. It also used fewer replications to achieve this goal (10 replications per scenario, so 50 total, while the previous method used a total of 100 replications).