The code has been changed to time the execution of the elevator host handling requests. To do this as accurately as possible, the majority of logs have been removed (when the below data was collected). We have added a utility Chrono class that allows for the starting and ending of a nano timer and the subsequent logging into a file of the elapsed time. We surround select handler methods namely: sendAckRequest, sendFloorUpdate, sendOpenDoors and the error notification - wait cycle.

The raw measurements for each elevator have been attached at the end of this document in Table 1 - all measurements are in nanoseconds (ns). Note that elevator 2 traveled the most floors (up to floor 22), hence we collected the most data for this elevator.

The data sample was assumed to be normally distributed with the specified mean and variance. As such, the confidence interval can be calculated using

$$CI = z\frac{s}{\sqrt{n}}$$

The results from the table include these measures, along with associated 95% confidence intervals for a single request. We did not need to time multiple requests to get sufficient clock granularity - furthermore, doing so without including the timeouts in the systems associated with events would be difficult.

Taking the average of all the elevator averages, we obtain an average handling time,

$$\bar{x} = (1070531.579 + 1006342.574 + 1136370.2 + 1383199.769) / 4$$
$$= 1149111.031$$

With an associated average confidence interval,

$$CI = (88466.81148 + 83396.68269 + 97250.43229 + 553581.591) / 4$$
$$= 822695.5175$$

Thus, the average time for an elevator to handle an event is found to be around 1149111.031 ± 822695.5175 ns or **1.1491 ± 0.8226 ms**.

We note that this is the time it takes on average, but not the CPU execution time for this event considering the time between context switches to also be included. Hence, this is simply two slices in time for the event to be processed which is a reasonable value to consider as the handling time (in contrast to the processing time).

Table 1: *Table of elevator execution times to process a single event.*

Trial Number	Elevator 1 [ns]	Elevator 2 [ns]	Elevator 3 [ns]	Elevator 4 [ns]
1	1270100	1710700	1539801	4665699
2	989600	2460100	1024100	1245100
3	1509199	2183799	992500	1521700
4	1372700	922201	1106801	1012999
5	1212100	1355501	1245501	1186299
6	1037299	1192800	853499	924100
7	1069200	1154000	1101500	1067399
8	990300	1123300	1470101	1262100
9	1192400	827300	1094100	828200
10	1014101	1658001	941299	1414700
11	1095100	1057900	1089501	908600
12	1094101	866500	1432699	1331901
13	772699	729299	925801	612800
14	1251800	829199	992401	
15	823801	789999	1232900	
16	904400	1611099	809700	
17	759200	1147900	1549500	
18	980100	778100	1043500	
19	1001900	768899	1292499	
20		1051599	996901	
21		1003300		
22		920300		
23		671801		
24		961500		
25		650801		
26		769900		
27		757900		
28		910800		
29		686300		
30		736300		
31		658000		
32		1074699		
33		809600		
34		1282900		
35		1793901		
36		878600		
37		1153999		
38		691900		
39		1236100		
40		1270400		
41		1295200		
42		660699		
43		890000		
44		918699		
45		1155101		
46		722600		
47		725001		
48		1078100		

		49		820201		
		50		1244299		
		51		730701		
		52		815999		
		53		1061000		
		54		937700		
		55		815000		
		56		1117900		
		57		715100		
		58		812399		
		59		1003101		
		60		669900		
		61		967500		
		62		1227300		
		63		980400		
		64		745500		
		65		873600		
		66		631599		
		67		760100		
		68		919399		
Average (Mean, x̄)			1070531.579	1006342.574	1136730.2	1383199.769
Variance (s2)			38708131481	123110280761	49238060093	1037037564850
Standard Deviation (s)			196743.822	350870.7465	221896.5076	1018350.414
Z (95% CI)			1.96	1.96	1.96	1.96
95% Confidence Interval *			88466.81148	83396.68269	97250.43229	553581.591