

# Homework 4 Report

April 4, 2020

## 1 core numbers

### 1.1 per request, 1 core, big delay

45.3  
42.15  
44  
47.5  
43

avg: 44.39

### 1.2 per request, 2 core, big delay

66.15  
59.9  
63.2  
66.5  
64

avg: 63.95

### 1.3 per request, 4 core, big delay

89.5  
99.3  
100.05  
102.2  
99

avg: 98.01

We can see that cpu cores have impact on performance, more cores means more throughput, more ability to handle incoming request.

## **2 using thread pool, check for delay**

### **2.1 pre request, 1 core, big delay**

9.05  
10.1  
9.5  
9.8  
10.2

avg: 9.73

### **2.2 pre request, 2 core, big delay**

8.7  
9.8  
9.3  
9.6  
8.9

avg: 9.26

### **2.3 pre request, 4 core, big delay**

9.9  
8.9  
8.6  
10.2  
9.5

avg: 9.42

We can see that the thread pool now is the bottle neck. If the thread pool is too small, server cannot perform best.

### **3 no thread pool, checking delay**

#### **3.1 per request, 4 core, small delay**

234.6  
225.65  
251  
226  
229

avg: 233.25

#### **3.2 per request, 4 core, large delay**

99.1  
98.45  
101.15  
100.2  
99.5

avg: 99.68

We can see that server performance performance worse when there is large delay(i.e. heavy compute work)

## 4 thread pool, checking delay

### 4.1 pre request, 4 core, small delay

44.5  
47.3  
47.1  
46.5  
45

avg: 46.08

### 4.2 pre request, 4 core, large delay

9.2  
8.9  
8.5  
10  
9.6

avg: 9.24

We can see that thread pool is the bottle neck. Most of the time is wasted on waiting available thread, we can improve this by making larger thread pool.

## 5 bucket size

### 5.1 pre request, 4 core, small delay, bucket size 32

47.8  
47.05  
48  
45.6  
43.2

avg: 46.33

### 5.2 pre request, 4 core, small delay, bucket size 128

46.25  
46  
47.5  
44.9  
45.6

avg: 46.05

### 5.3 pre request, 4 core, small delay, bucket size 512

48  
47.1  
46.1  
45.9  
43.3

avg: 46.08

### 5.4 pre request, 4 core, small delay, bucket size 2048

47.25  
45.4  
45  
46  
46.6

avg: 46.05

Since we lock the whole bucket vector with mutex when read/write happens, bucket size doesn't matter.

### 5.5 per request, 4 core, small delay, bucket size 32

234.6  
223.95  
250.2  
219.95  
235.8

avg: 232.9

### 5.6 per request, 4 core, small delay, bucket size 128

215.3  
220.2  
251.2  
233  
225

avg: 228.94

### **5.7 per request, 4 core, small delay, bucket size 512**

227.4  
216.95  
229.5  
225.2  
226.1

avg: 225.03

### **5.8 per request, 4 core, small delay, bucket size 2048**

239.7  
230.55  
229.55  
226  
225.15

avg: 230.19

Since we lock the whole bucket vector with mutex when read/write happens, bucket size doesn't matter.