

# FPC lista 1 - questão 5: ECDFs

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## Letra A

```
concurrentHash = read.csv("./results/concurrentHash-t1024-r0.5.csv", header=T, dec=".")
synchronizedMap = read.csv("./results/synchronizedMap-t1024-r0.5.csv", header=T, dec=".")
concurrentHash <- filter(concurrentHash, time_in_nanoseconds > 0)
synchronizedMap <- filter(synchronizedMap, time_in_nanoseconds > 0)
graph_tail_map(concurrentHash$time_in_nanoseconds, synchronizedMap$time_in_nanoseconds,
               title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.90)
```

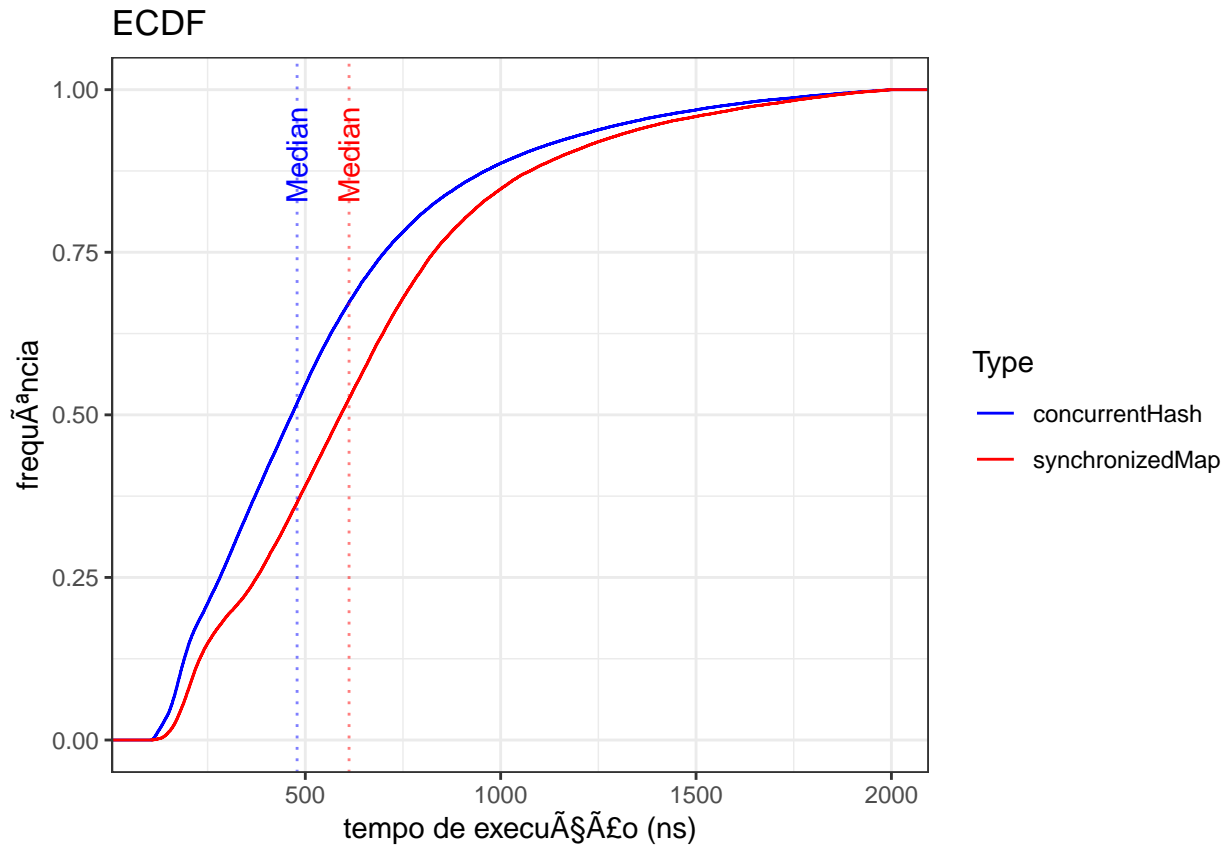
```
## Warning: Removed 5402 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 1024 threads, 50/50 read/write

```
concurrentHash = read.csv("../results/concurrentHash-t1024-r0.5.csv", header=T, dec=".")
synchronizedMap = read.csv("../results/synchronizedMap-t1024-r0.5.csv", header=T, dec=".")
concurrentHash <- filter(concurrentHash, time_in_nanoseconds > 0)
synchronizedMap <- filter(synchronizedMap, time_in_nanoseconds > 0)
graph_tail_map(concurrentHash$time_in_nanoseconds, synchronizedMap$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

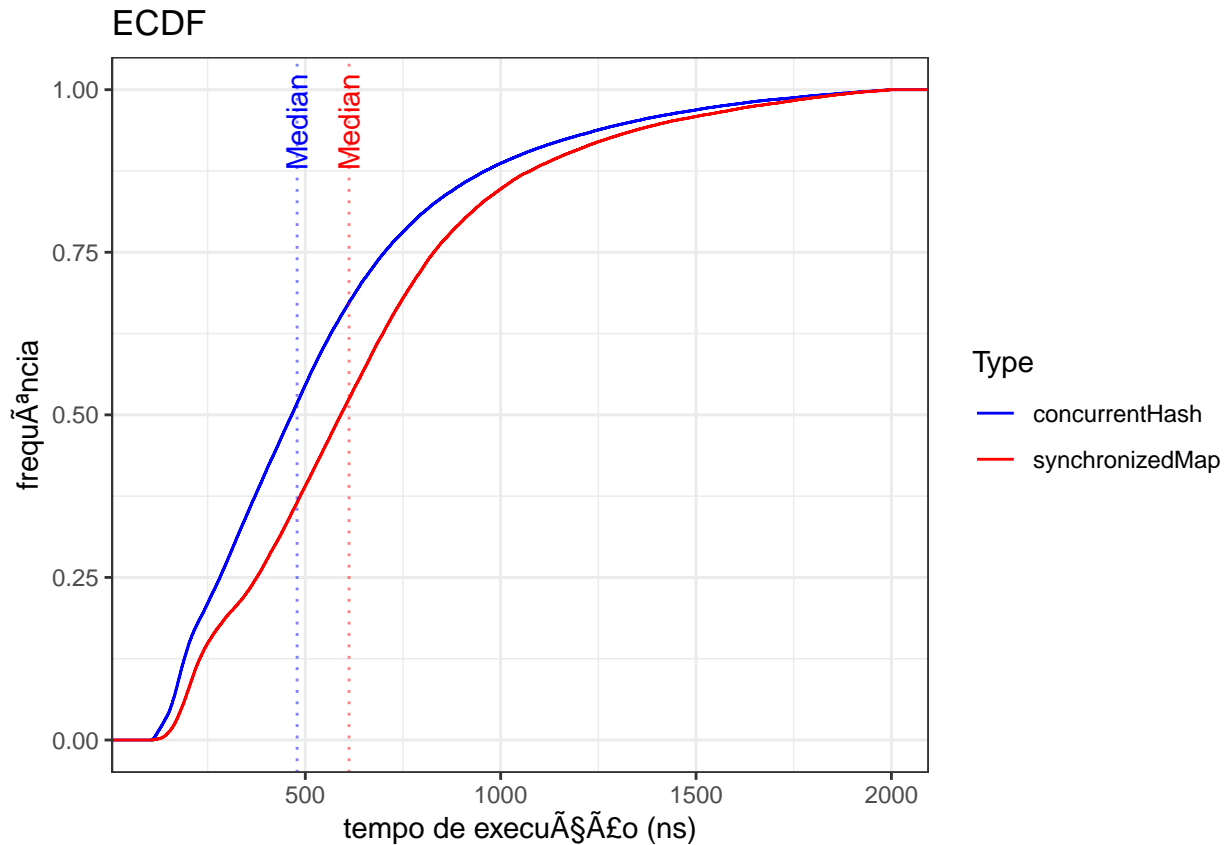
```
## Warning: Removed 5402 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 1024 threads, 90/10 read/write

```
concurrentHash = read.csv("../results/concurrentHash-t1024-r0.9.csv", header=T, dec=".")
synchronizedMap = read.csv("../results/synchronizedMap-t1024-r0.9.csv", header=T, dec=".")
concurrentHash <- filter(concurrentHash, time_in_nanoseconds > 0)
synchronizedMap <- filter(synchronizedMap, time_in_nanoseconds > 0)
graph_tail_map(concurrentHash$time_in_nanoseconds, synchronizedMap$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

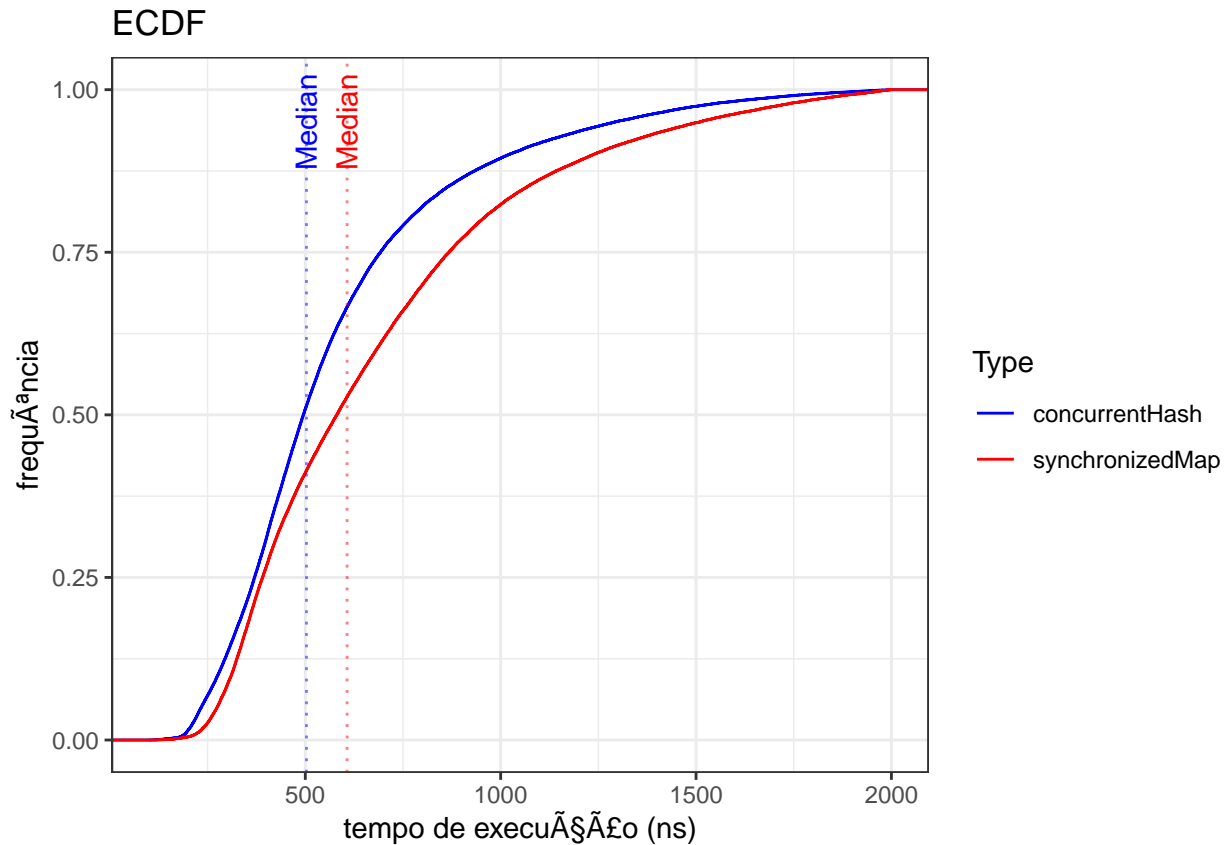
```
## Warning: Removed 5151 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 1024 threads, 10/90 read/write

```
concurrentHash = read.csv("../results/concurrentHash-t1024-r0.1.csv", header=T, dec=".")
synchronizedMap = read.csv("../results/synchronizedMap-t1024-r0.1.csv", header=T, dec=".")
concurrentHash <- filter(concurrentHash, time_in_nanoseconds > 0)
synchronizedMap <- filter(synchronizedMap, time_in_nanoseconds > 0)
graph_tail_map(concurrentHash$time_in_nanoseconds, synchronizedMap$time_in_nanoseconds,
               title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

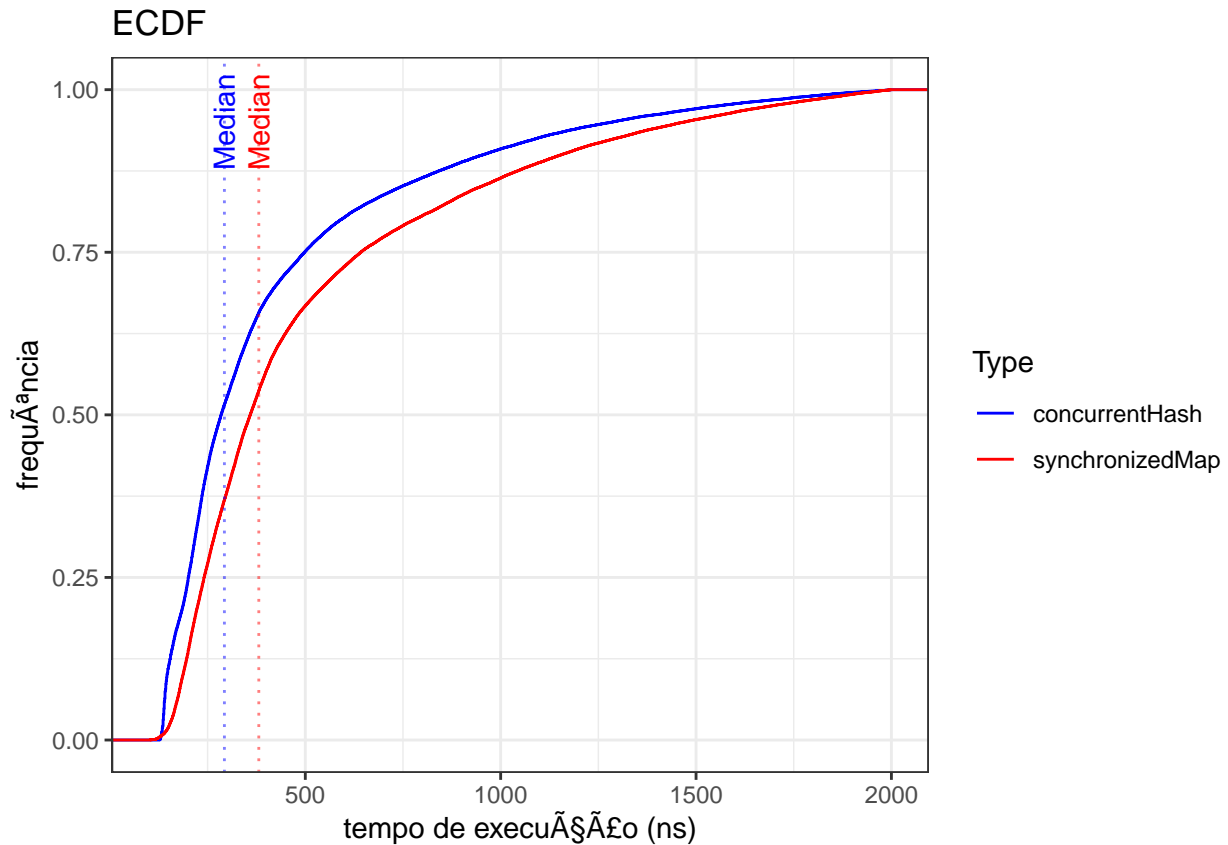
```
## Warning: Removed 6605 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 128 threads, 50/50 read/write

```
concurrentHash = read.csv("../results/concurrentHash-t128-r0.5.csv", header=T, dec=".")
synchronizedMap = read.csv("../results/synchronizedMap-t128-r0.5.csv", header=T, dec=".")
concurrentHash <- filter(concurrentHash, time_in_nanoseconds > 0)
synchronizedMap <- filter(synchronizedMap, time_in_nanoseconds > 0)
graph_tail_map(concurrentHash$time_in_nanoseconds, synchronizedMap$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

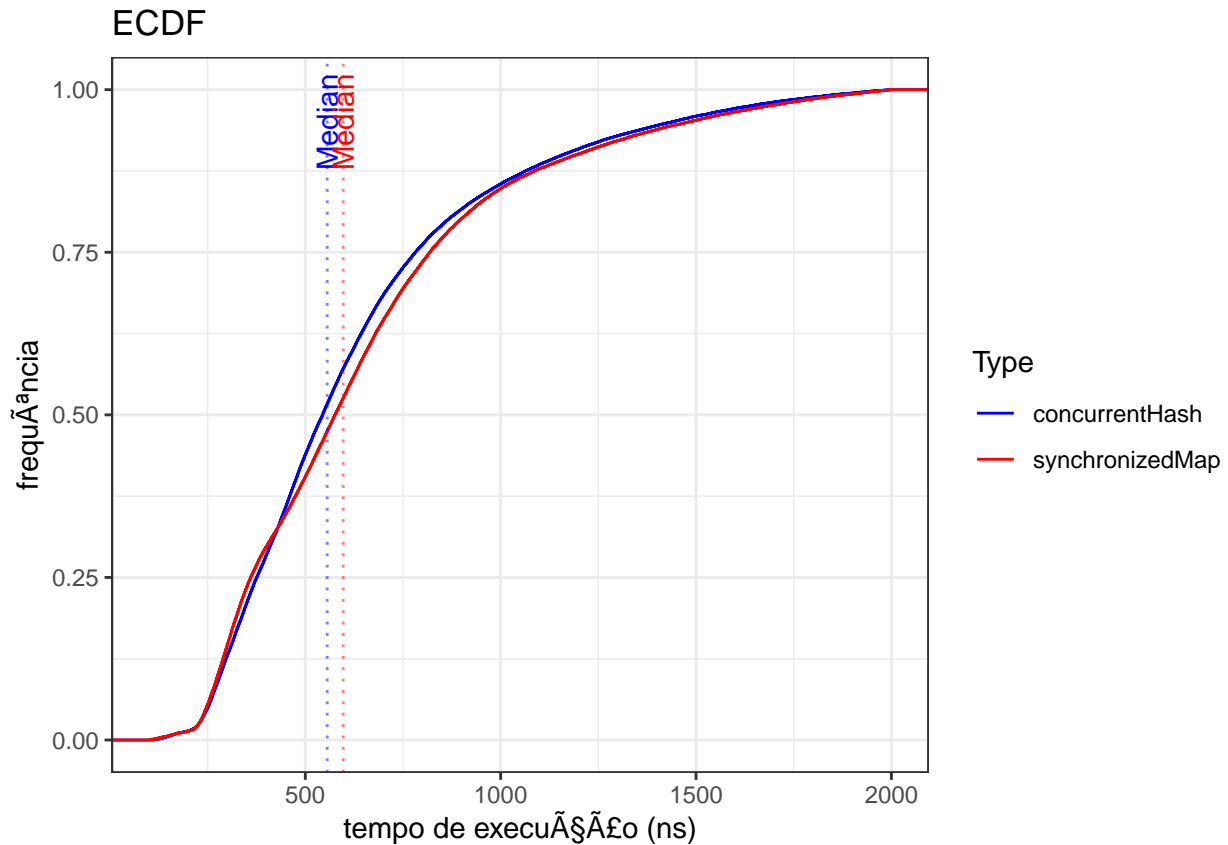
```
## Warning: Removed 5383 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 128 threads, 90/10 read/write

```
concurrentHash = read.csv("./results/concurrentHash-t128-r0.9.csv", header=T, dec=".")
synchronizedMap = read.csv("./results/synchronizedMap-t128-r0.9.csv", header=T, dec=".")
concurrentHash <- filter(concurrentHash, time_in_nanoseconds > 0)
synchronizedMap <- filter(synchronizedMap, time_in_nanoseconds > 0)
graph_tail_map(concurrentHash$time_in_nanoseconds, synchronizedMap$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

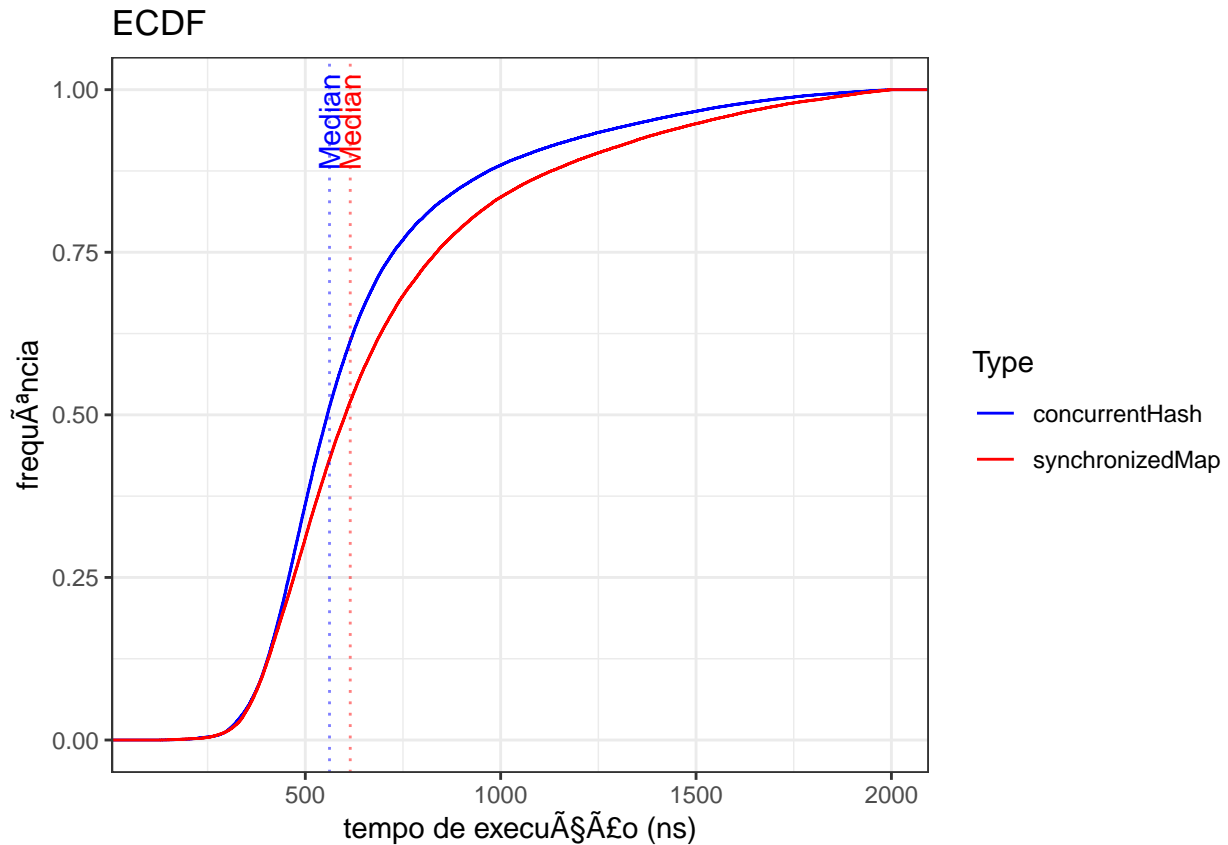
```
## Warning: Removed 4193 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 128 threads, 10/90 read/write

```
concurrentHash = read.csv("../results/concurrentHash-t128-r0.1.csv", header=T, dec=".")
synchronizedMap = read.csv("../results/synchronizedMap-t128-r0.1.csv", header=T, dec=".")
concurrentHash <- filter(concurrentHash, time_in_nanoseconds > 0)
synchronizedMap <- filter(synchronizedMap, time_in_nanoseconds > 0)
graph_tail_map(concurrentHash$time_in_nanoseconds, synchronizedMap$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

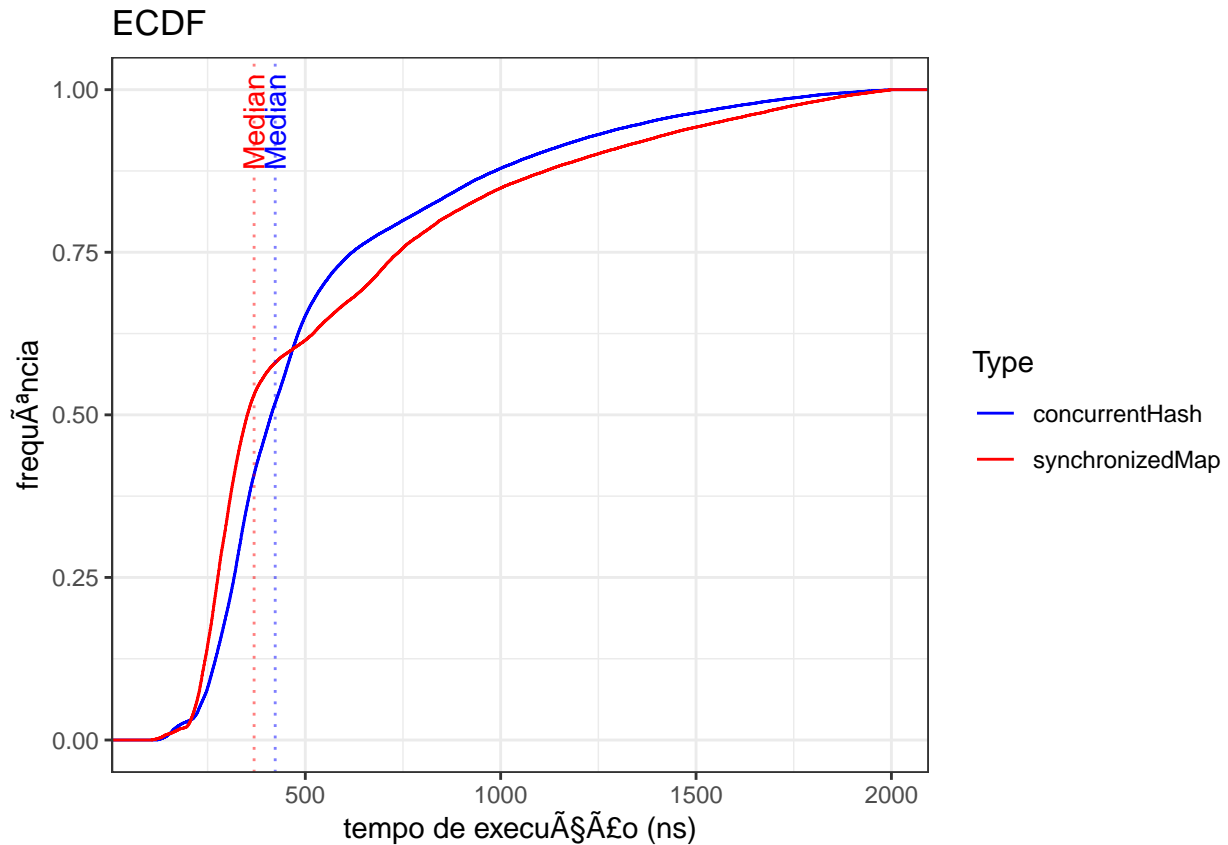
```
## Warning: Removed 6247 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 1 threads, 50/50 read/write

```
concurrentHash = read.csv("./results/concurrentHash-t1-r0.5.csv", header=T, dec=".")
synchronizedMap = read.csv("./results/synchronizedMap-t1-r0.5.csv", header=T, dec=".")
concurrentHash <- filter(concurrentHash, time_in_nanoseconds > 0)
synchronizedMap <- filter(synchronizedMap, time_in_nanoseconds > 0)
graph_tail_map(concurrentHash$time_in_nanoseconds, synchronizedMap$time_in_nanoseconds,
               title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

```
## Warning: Removed 2967 rows containing non-finite values (stat_ecdf).
```

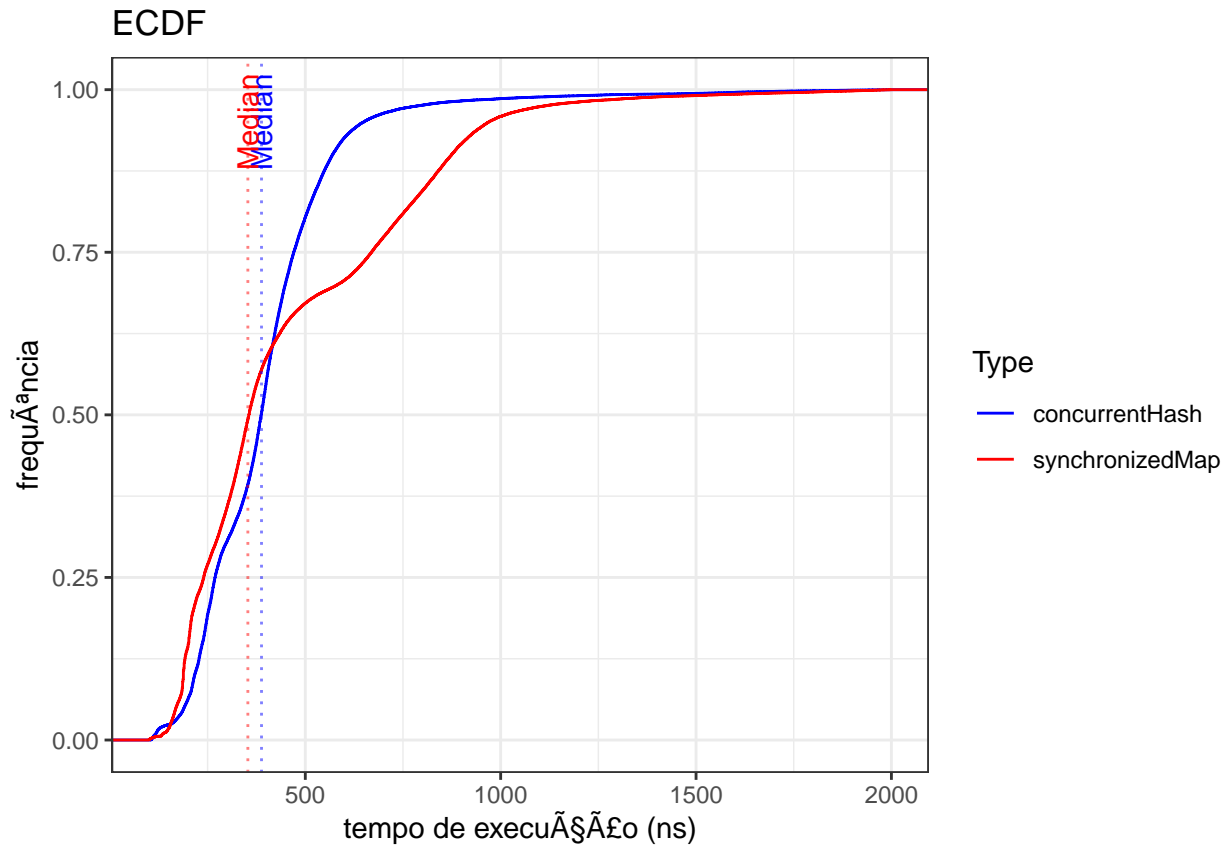
```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```





### ECDF - 1 threads, 90/10 read/write

```
concurrentHash = read.csv("./results/concurrentHash-t1-r0.9.csv", header=T, dec=".")
synchronizedMap = read.csv("./results/synchronizedMap-t1-r0.9.csv", header=T, dec=".")
concurrentHash <- filter(concurrentHash, time_in_nanoseconds > 0)
synchronizedMap <- filter(synchronizedMap, time_in_nanoseconds > 0)
graph_tail_map(concurrentHash$time_in_nanoseconds, synchronizedMap$time_in_nanoseconds,
               title="ECDF", x_limit_inf=100, x_limit_sup=1000, annotate_y=0.95)
```

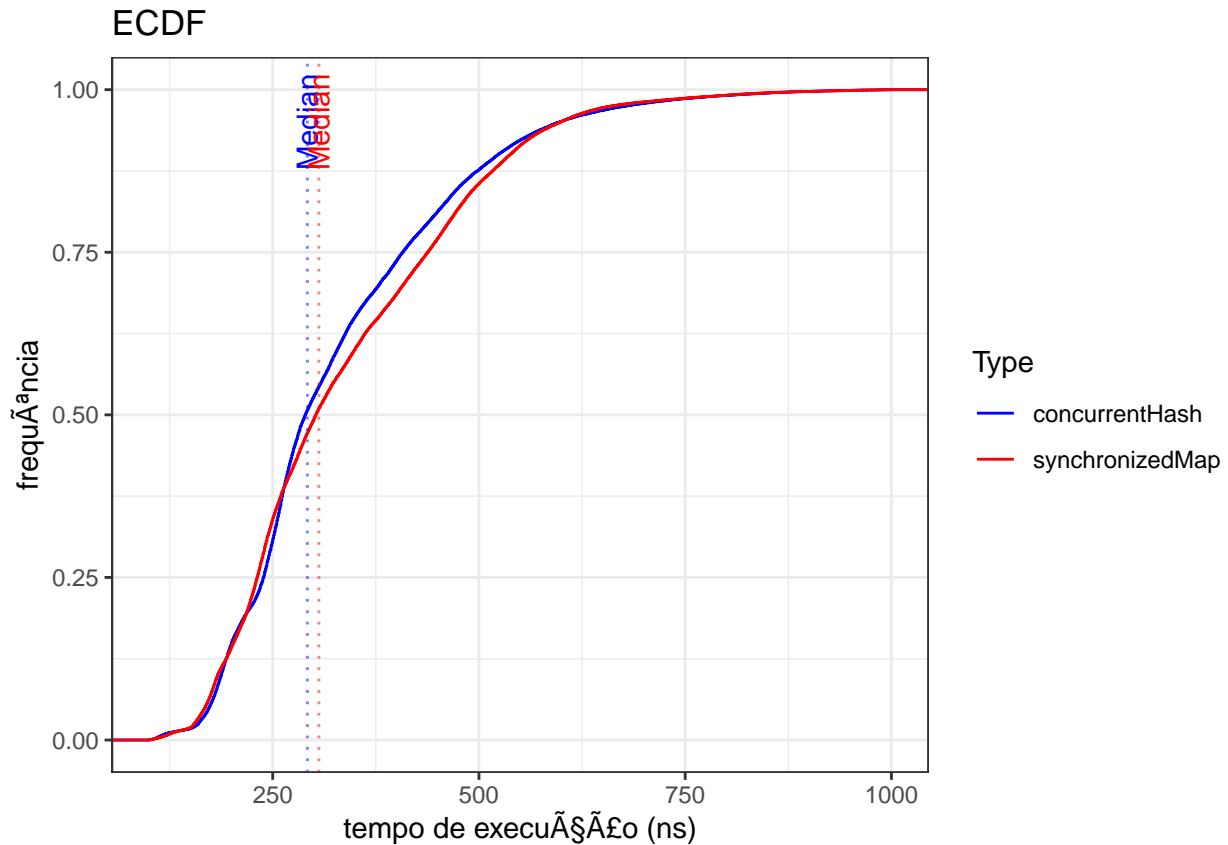
```
## Warning: Removed 2600 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 1 threads, 10/90 read/write

```
concurrentHash = read.csv("./results/concurrentHash-t1-r0.1.csv", header=T, dec=".")
synchronizedMap = read.csv("./results/synchronizedMap-t1-r0.1.csv", header=T, dec=".")
concurrentHash <- filter(concurrentHash, time_in_nanoseconds > 0)
synchronizedMap <- filter(synchronizedMap, time_in_nanoseconds > 0)
graph_tail_map(concurrentHash$time_in_nanoseconds, synchronizedMap$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

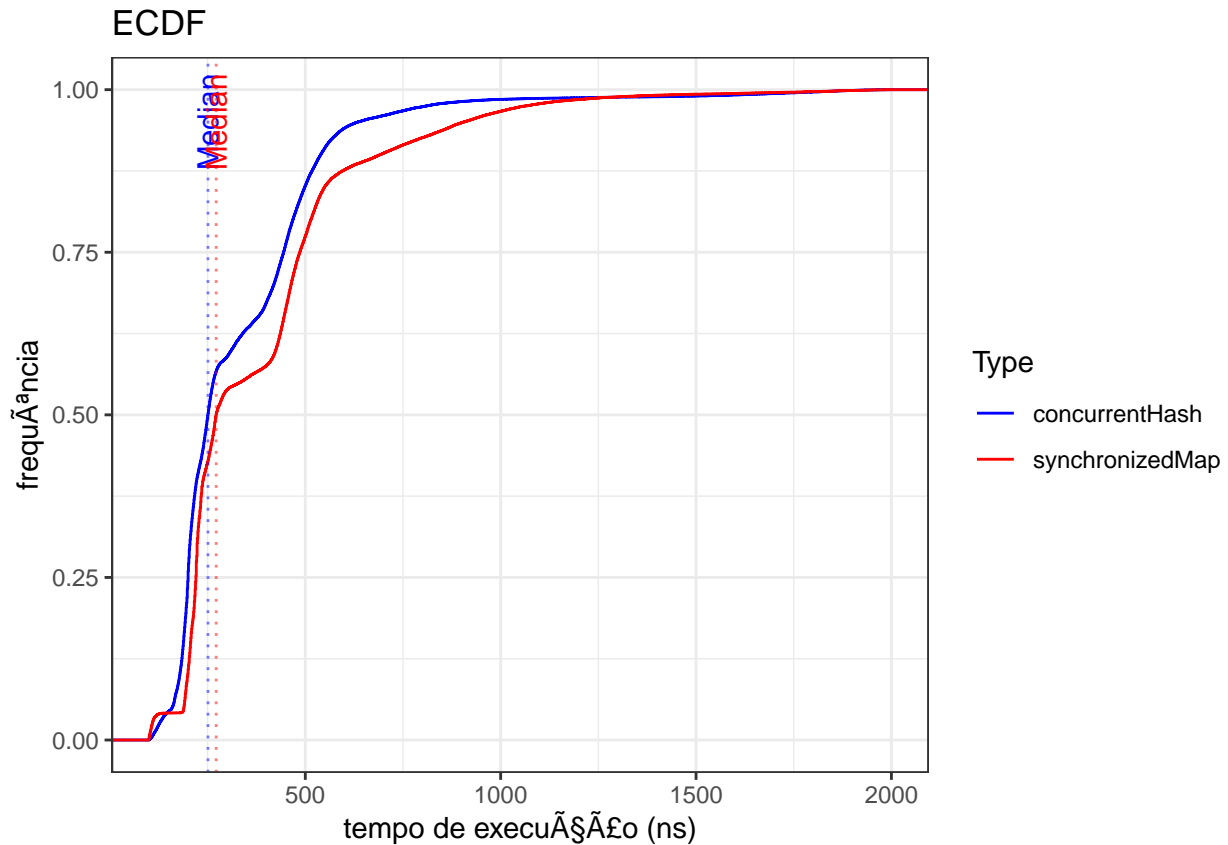
```
## Warning: Removed 2608 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



## Letra B

### ECDF - 1024 threads, 50/50 read/write

```
copyOnWriteList = read.csv("./results/copyOnWriteList-t1024-r0.5.csv", header=T, dec=".")
synchronizedList = read.csv("./results/synchronizedList-t1024-r0.5.csv", header=T, dec=".")
copyOnWriteList <- filter(copyOnWriteList, time_in_nanoseconds > 0)
synchronizedList <- filter(synchronizedList, time_in_nanoseconds > 0)
graph_tail_list(copyOnWriteList$time_in_nanoseconds, synchronizedList$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

```
## Warning: Removed 42318 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

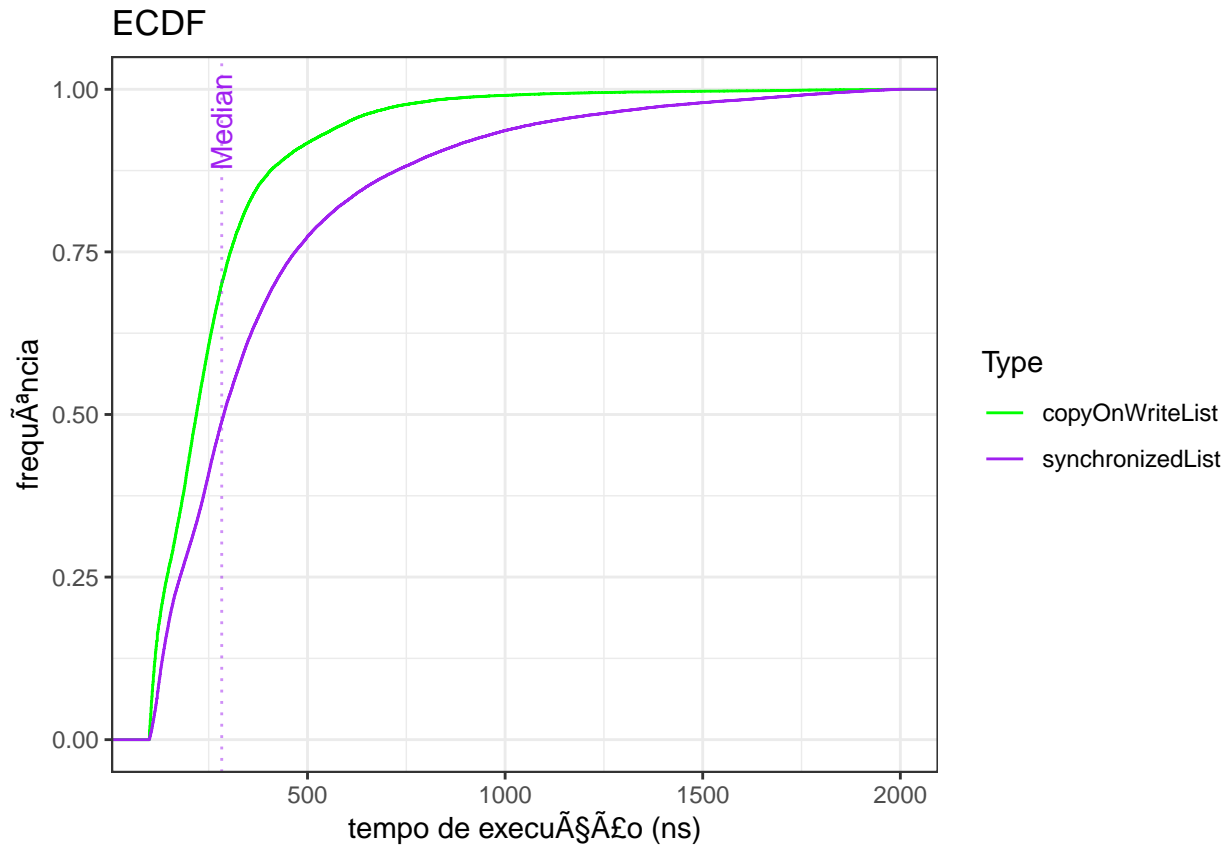
```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 1024 threads, 90/10 read/write

```
copyOnWriteList = read.csv("./results/copyOnWriteList-t1024-r0.9.csv", header=T, dec=".")
synchronizedList = read.csv("./results/synchronizedList-t1024-r0.9.csv", header=T, dec=".")
copyOnWriteList <- filter(copyOnWriteList, time_in_nanoseconds > 0)
synchronizedList <- filter(synchronizedList, time_in_nanoseconds > 0)
graph_tail_list(copyOnWriteList$time_in_nanoseconds, synchronizedList$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

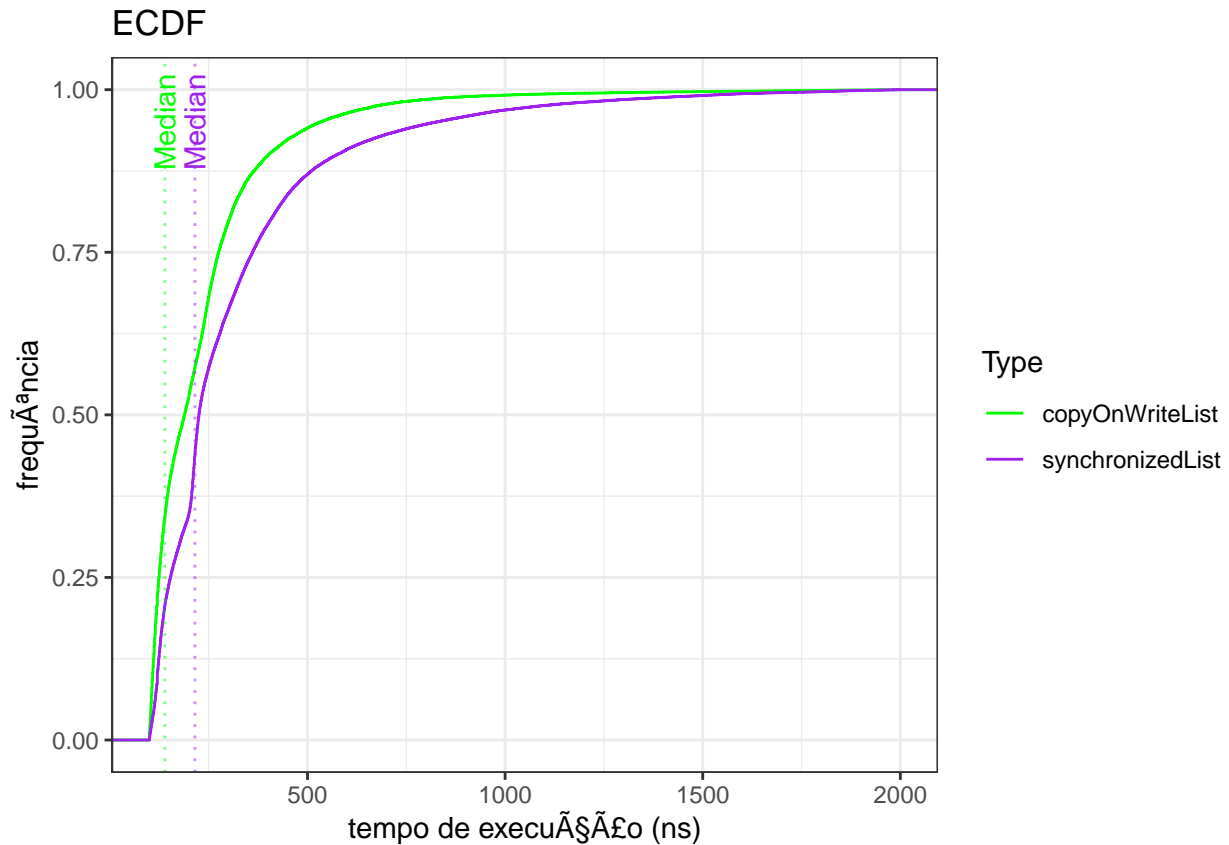
```
## Warning: Removed 34138 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 1024 threads, 10/90 read/write

```
copyOnWriteList = read.csv("./results/copyOnWriteList-t1024-r0.1.csv", header=T, dec=".")
synchronizedList = read.csv("./results/synchronizedList-t1024-r0.1.csv", header=T, dec=".")
copyOnWriteList <- filter(copyOnWriteList, time_in_nanoseconds > 0)
synchronizedList <- filter(synchronizedList, time_in_nanoseconds > 0)
graph_tail_list(copyOnWriteList$time_in_nanoseconds, synchronizedList$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

```
## Warning: Removed 70738 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

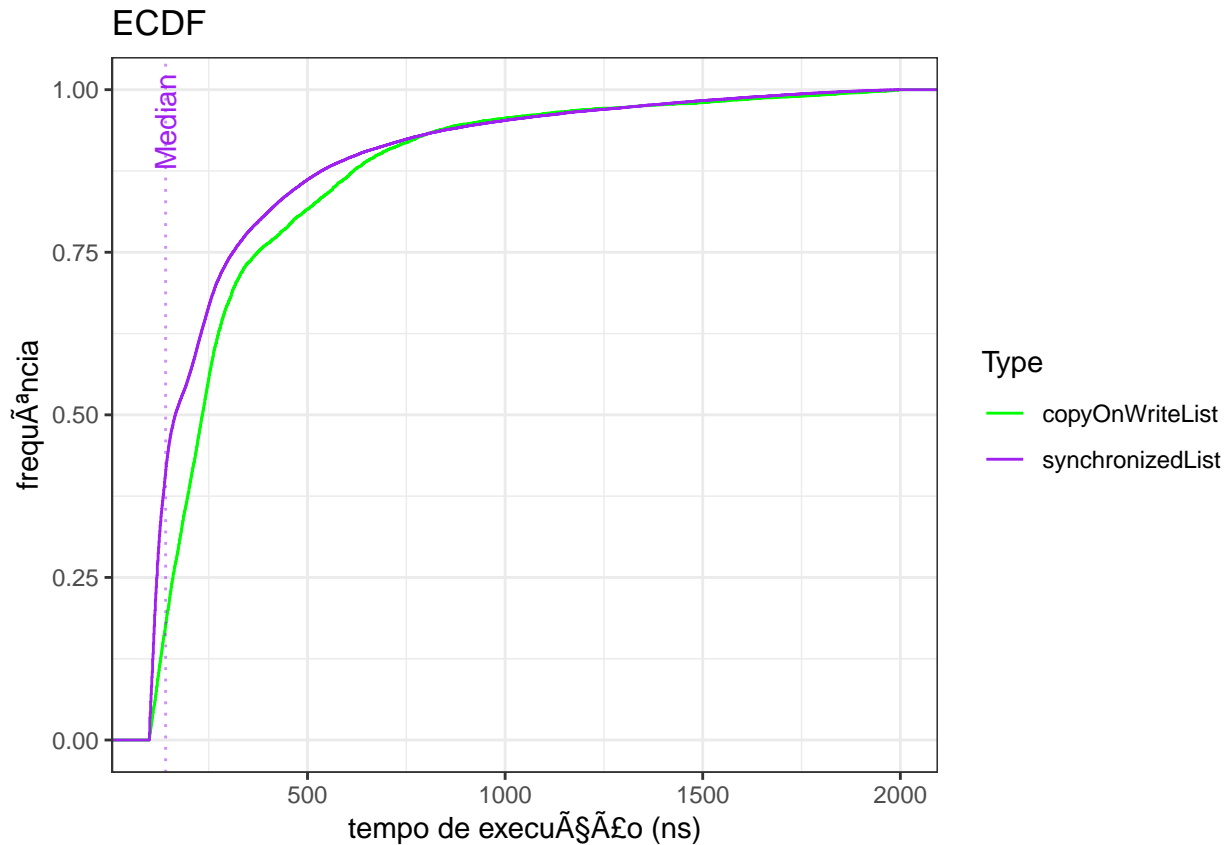
```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 128 threads, 50/50 read/write

```
copyOnWriteList = read.csv("./results/copyOnWriteList-t128-r0.5.csv", header=T, dec=".")
synchronizedList = read.csv("./results/synchronizedList-t128-r0.5.csv", header=T, dec=".")
copyOnWriteList <- filter(copyOnWriteList, time_in_nanoseconds > 0)
synchronizedList <- filter(synchronizedList, time_in_nanoseconds > 0)
graph_tail_list(copyOnWriteList$time_in_nanoseconds, synchronizedList$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

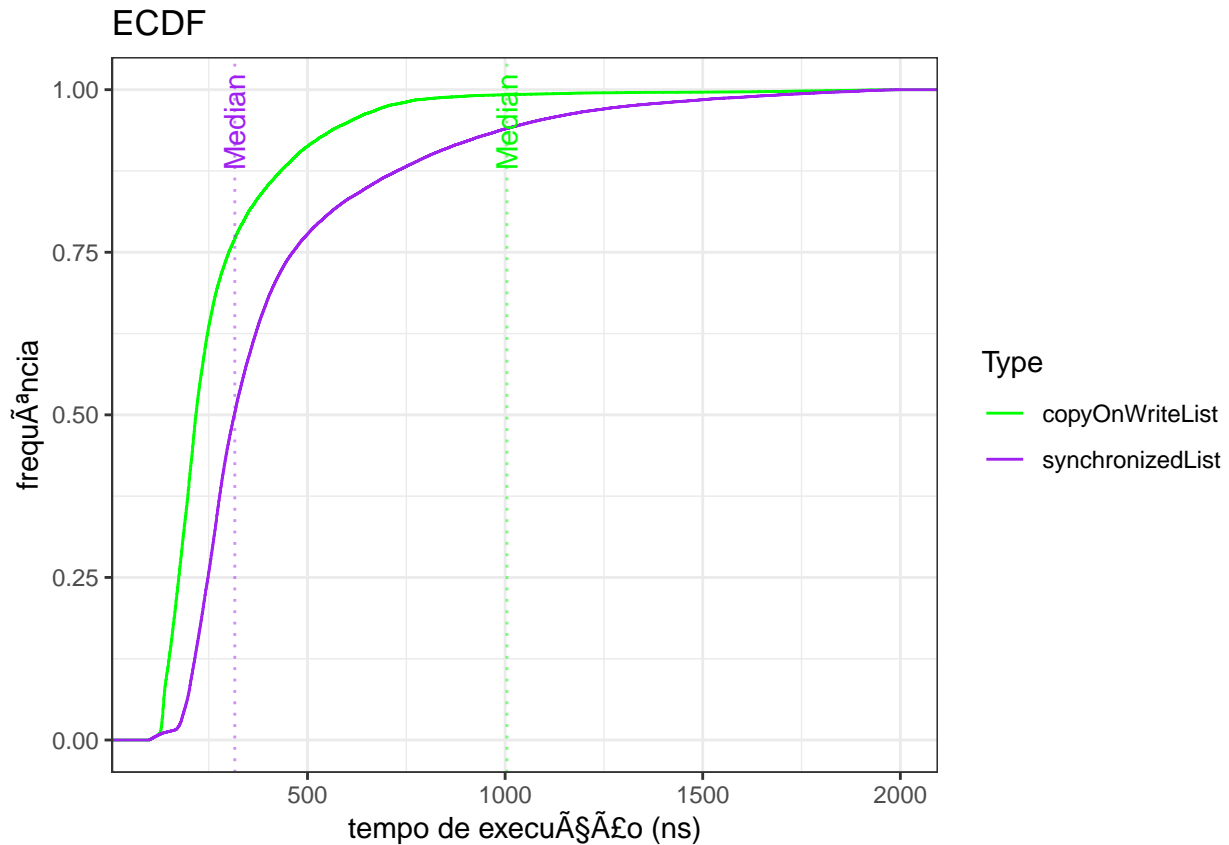
```
## Warning: Removed 34263 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 128 threads, 90/10 read/write

```
copyOnWriteList = read.csv("./results/copyOnWriteList-t128-r0.9.csv", header=T, dec=".")
synchronizedList = read.csv("./results/synchronizedList-t128-r0.9.csv", header=T, dec=".")
copyOnWriteList <- filter(copyOnWriteList, time_in_nanoseconds > 0)
synchronizedList <- filter(synchronizedList, time_in_nanoseconds > 0)
graph_tail_list(copyOnWriteList$time_in_nanoseconds, synchronizedList$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

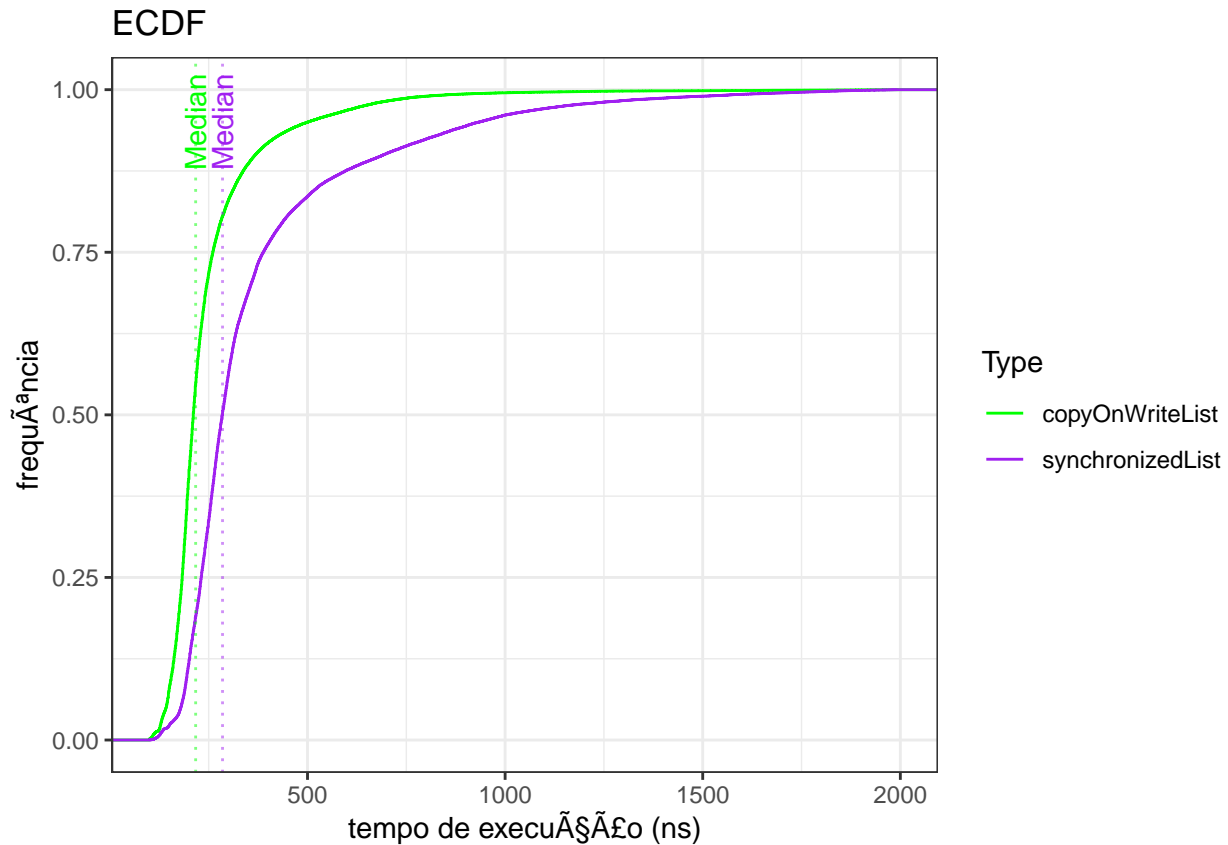
```
## Warning: Removed 7695 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 128 threads, 10/90 read/write

```
copyOnWriteList = read.csv("./results/copyOnWriteList-t128-r0.1.csv", header=T, dec=".")
synchronizedList = read.csv("./results/synchronizedList-t128-r0.1.csv", header=T, dec=".")
copyOnWriteList <- filter(copyOnWriteList, time_in_nanoseconds > 0)
synchronizedList <- filter(synchronizedList, time_in_nanoseconds > 0)
graph_tail_list(copyOnWriteList$time_in_nanoseconds, synchronizedList$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

```
## Warning: Removed 59873 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

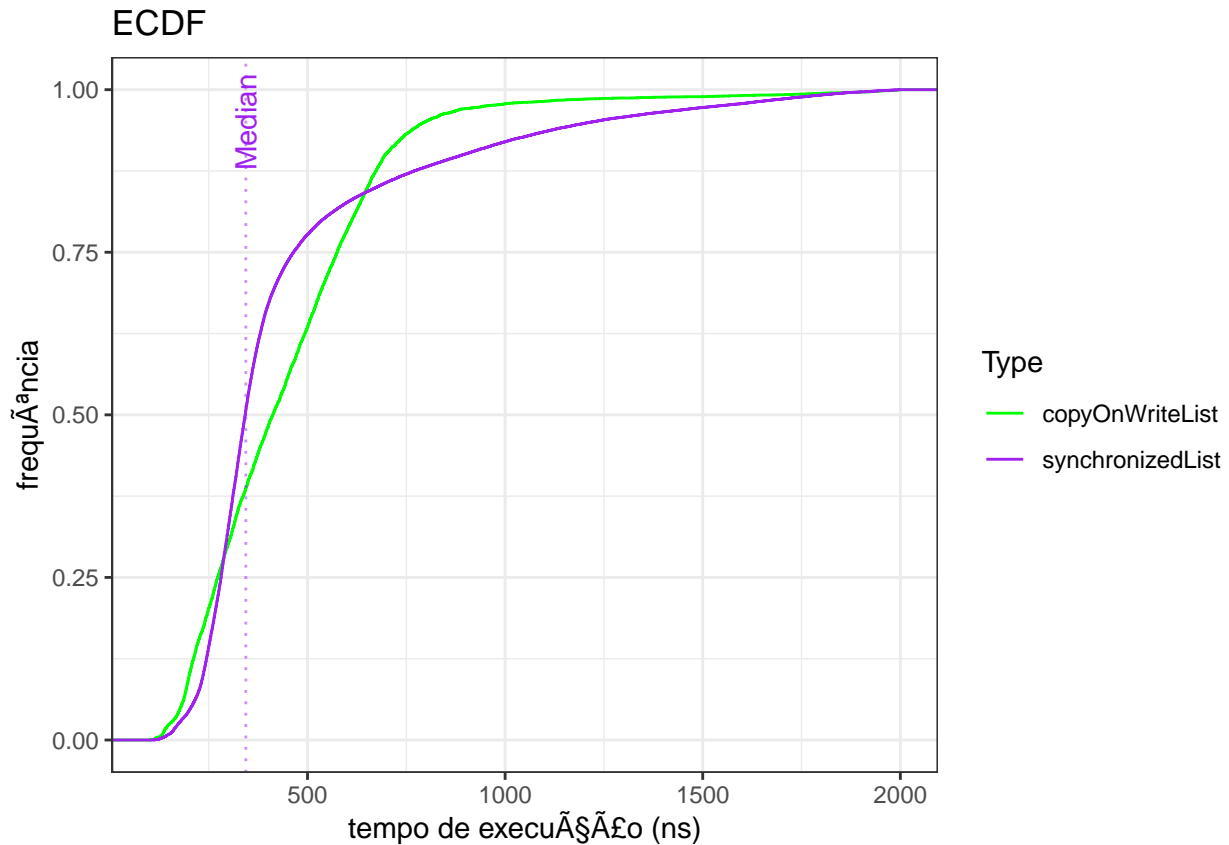
```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```





### ECDF - 1 threads, 50/50 read/write

```
copyOnWriteList = read.csv("./results/copyOnWriteList-t1-r0.5.csv", header=T, dec=".")
synchronizedList = read.csv("./results/synchronizedList-t1-r0.5.csv", header=T, dec=".")
copyOnWriteList <- filter(copyOnWriteList, time_in_nanoseconds > 0)
synchronizedList <- filter(synchronizedList, time_in_nanoseconds > 0)
graph_tail_list(copyOnWriteList$time_in_nanoseconds, synchronizedList$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

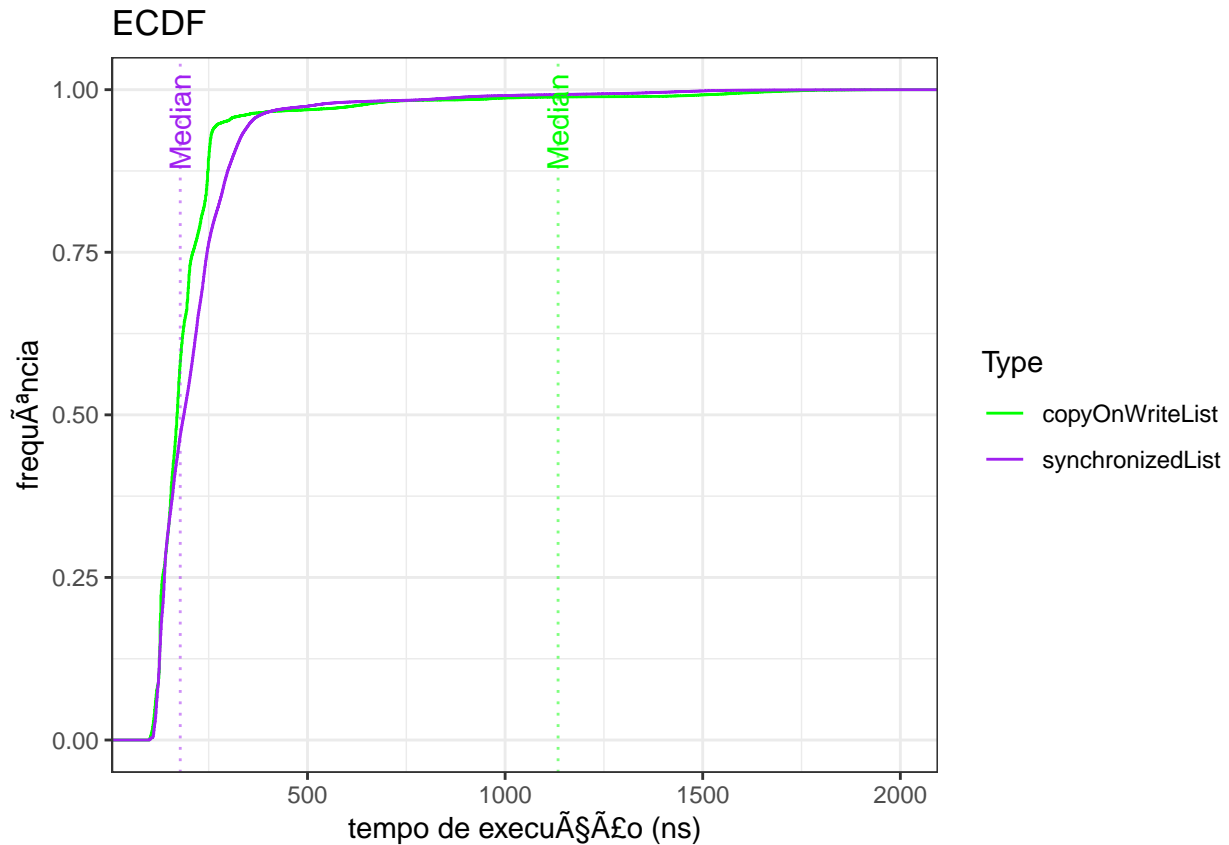
```
## Warning: Removed 38327 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 1 threads, 90/10 read/write

```
copyOnWriteList = read.csv("./results/copyOnWriteList-t1-r0.9.csv", header=T, dec=".")
synchronizedList = read.csv("./results/synchronizedList-t1-r0.9.csv", header=T, dec=".")
copyOnWriteList <- filter(copyOnWriteList, time_in_nanoseconds > 0)
synchronizedList <- filter(synchronizedList, time_in_nanoseconds > 0)
graph_tail_list(copyOnWriteList$time_in_nanoseconds, synchronizedList$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

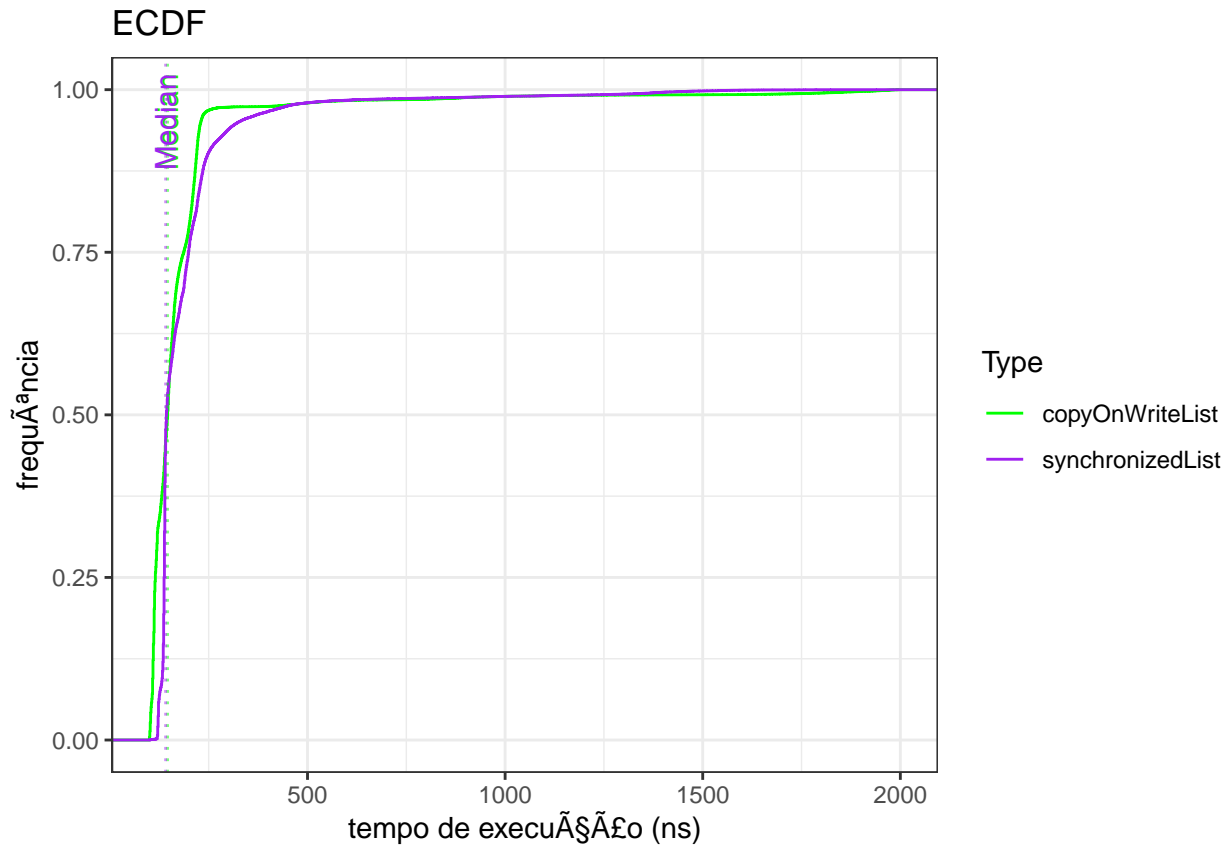
```
## Warning: Removed 15543 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```



### ECDF - 1 threads, 10/90 read/write

```
copyOnWriteList = read.csv("./results/copyOnWriteList-t1-r0.1.csv", header=T, dec=".")
synchronizedList = read.csv("./results/synchronizedList-t1-r0.1.csv", header=T, dec=".")
copyOnWriteList <- filter(copyOnWriteList, time_in_nanoseconds > 0)
synchronizedList <- filter(synchronizedList, time_in_nanoseconds > 0)
graph_tail_list(copyOnWriteList$time_in_nanoseconds, synchronizedList$time_in_nanoseconds,
  title="ECDF", x_limit_inf=100, x_limit_sup=2000, annotate_y=0.95)
```

```
## Warning: Removed 62810 rows containing non-finite values (stat_ecdf).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

```
## Warning: Removed 1 rows containing missing values (geom_text).
```

```
## Warning: Removed 1 rows containing missing values (geom_vline).
```

