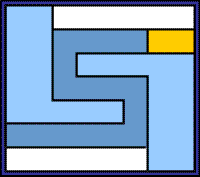
University of Seville  
 School of Computer Engineering

**Performance Report**



Software engineering  
Design and testing 2

2018 – 2019

04/21/2019

Group 26

**Index**

[1. Observations 3](#_Toc8914697)

[2. Position 3](#_Toc8914698)

[Create 3](#_Toc8914699)

[Edit 5](#_Toc8914700)

[Delete 7](#_Toc8914701)

[Conclusion 9](#_Toc8914702)

[3. Mess 10](#_Toc8914703)

[Search by tags, list by that tag and display a mess 10](#_Toc8914704)

[Send a message 11](#_Toc8914705)

[Delete a message 13](#_Toc8914706)

[Send a broadcast mess 15](#_Toc8914707)

[Conclusion 16](#_Toc8914708)

[4. Dashboard 17](#_Toc8914709)

[Display the dashboard and set the spammers 17](#_Toc8914710)

[Conclusion 18](#_Toc8914711)

[5. Configuration 19](#_Toc8914712)

[Display the configuration and edit it 19](#_Toc8914713)

[Conclusion 21](#_Toc8914714)

[6. Problem 21](#_Toc8914715)

[Create 21](#_Toc8914716)

[Edit 23](#_Toc8914717)

[Delete 25](#_Toc8914718)

[Conclusion 27](#_Toc8914719)

[7. Finder 27](#_Toc8914720)

[Search and clear 27](#_Toc8914721)

[Conclusion 29](#_Toc8914722)

[8. Curricula 29](#_Toc8914723)

[Create a curriculum 29](#_Toc8914724)

[Delete a curriculum 31](#_Toc8914725)

[9. Datas (Personal, Education, Position and Miscellaneous data) 33](#_Toc8914726)

[Create all datas 33](#_Toc8914727)

[Edit a position data 35](#_Toc8914728)

[Edit a education data 37](#_Toc8914729)

[Edit a miscellaneous data 39](#_Toc8914730)

[Delete a position data 40](#_Toc8914731)

[Delete a education data 42](#_Toc8914732)

[Delete a miscellaneous data 44](#_Toc8914733)

[Conclusion 46](#_Toc8914734)

[10. Social profile 46](#_Toc8914735)

[Create 46](#_Toc8914736)

[Edit 48](#_Toc8914737)

[Delete 51](#_Toc8914738)

[Conclusion 52](#_Toc8914739)

[11. Actor 53](#_Toc8914740)

[Create 53](#_Toc8914741)

[Edit 55](#_Toc8914742)

[Delete 57](#_Toc8914743)

[Conclusion 59](#_Toc8914744)

[12. Application 59](#_Toc8914745)

[Create 59](#_Toc8914746)

[Edit 61](#_Toc8914747)

[Delete 63](#_Toc8914748)

[Conclusion 65](#_Toc8914749)

[13. Audit 65](#_Toc8914750)

[Assign 65](#_Toc8914751)

[Create 67](#_Toc8914752)

[Edit 70](#_Toc8914753)

[Delete 72](#_Toc8914754)

[Conclusion 74](#_Toc8914755)

[14. Sponsorship 75](#_Toc8914756)

[Create 75](#_Toc8914757)

[Edit 77](#_Toc8914758)

[Delete 79](#_Toc8914759)

[Conclusion 80](#_Toc8914760)

[15. Item 81](#_Toc8914761)

[Create 81](#_Toc8914762)

[Edit 83](#_Toc8914763)

[Delete 85](#_Toc8914764)

[Conclusion 86](#_Toc8914765)

[16. Conclusion of the performance 87](#_Toc8914766)

# Observations

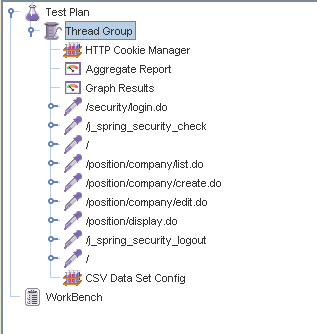
We have considered that our performance tests were valid as long as they were lasting between 2’5 and 3 seconds and no error was showed.

# TODO DE AQUI PABAJO SE BORRA

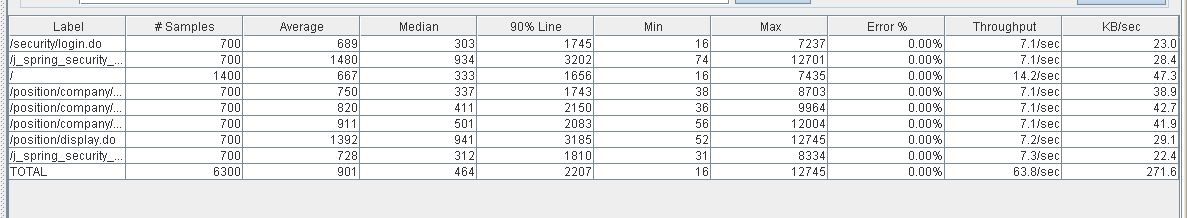
# Position

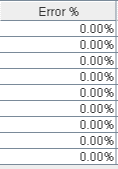
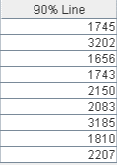
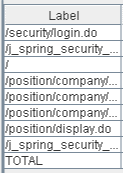
## Create

Sequence:



Aggregate Report:

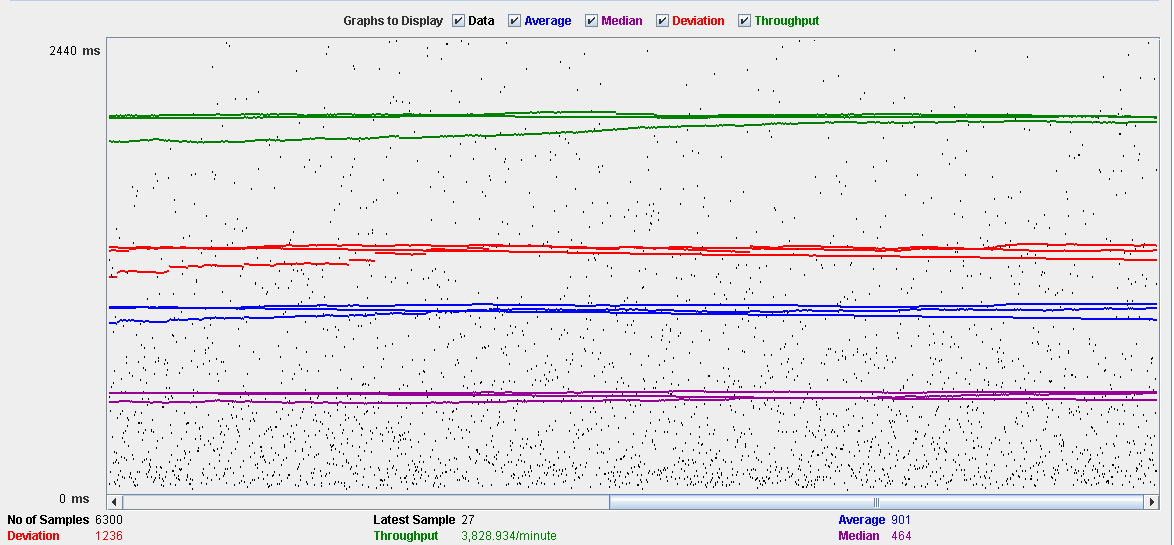




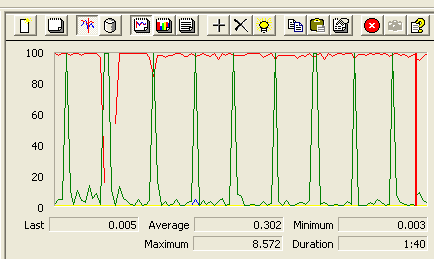
Thread properties:



Graph Results:



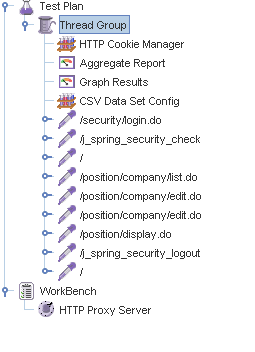
Performance Results:



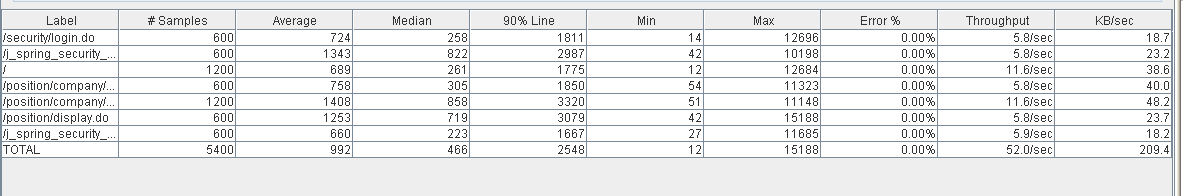
The CPU was always at its limit while the disk usage showed many peaks.

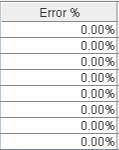
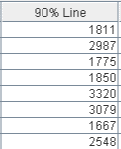
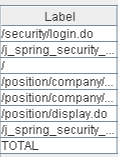
## Edit

Sequence:

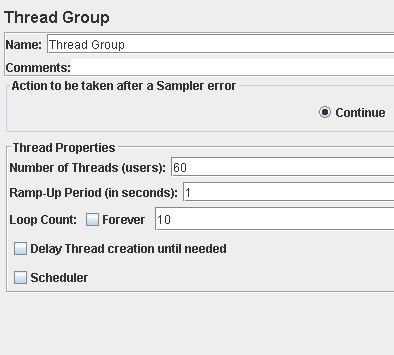


Aggregate Report:

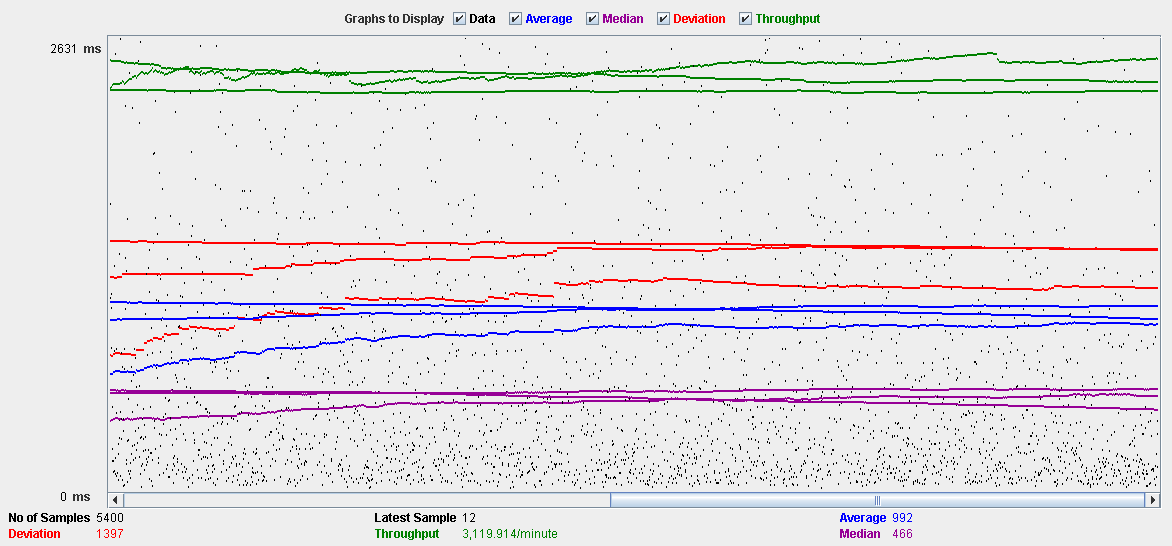




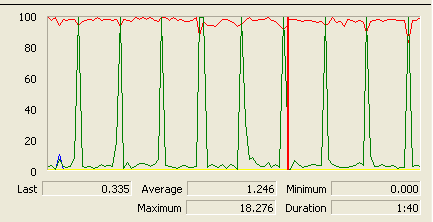
Thread properties:



Graph Results:



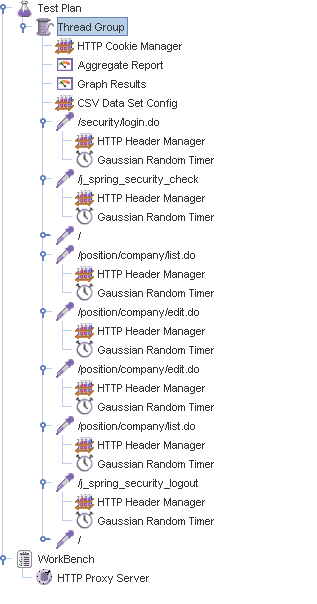
Performance Results:



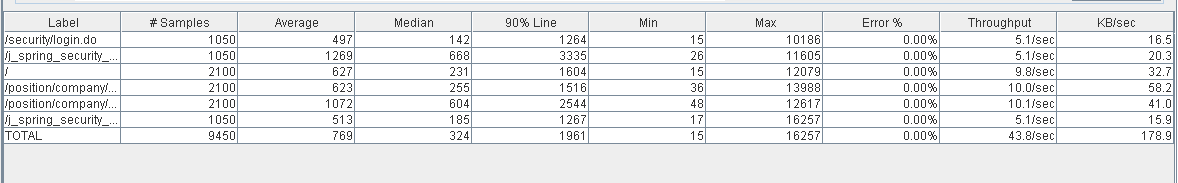
Again we can see that the CPU is always being used while the disk usage shows some periodic peaks.

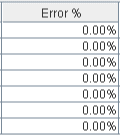
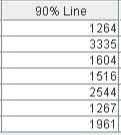
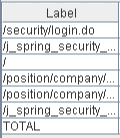
## Delete

Sequence:

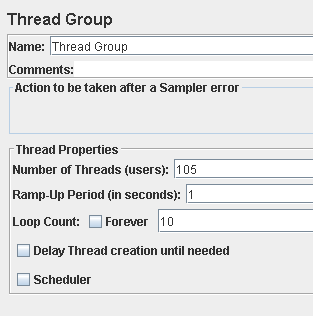


Aggregate Report:

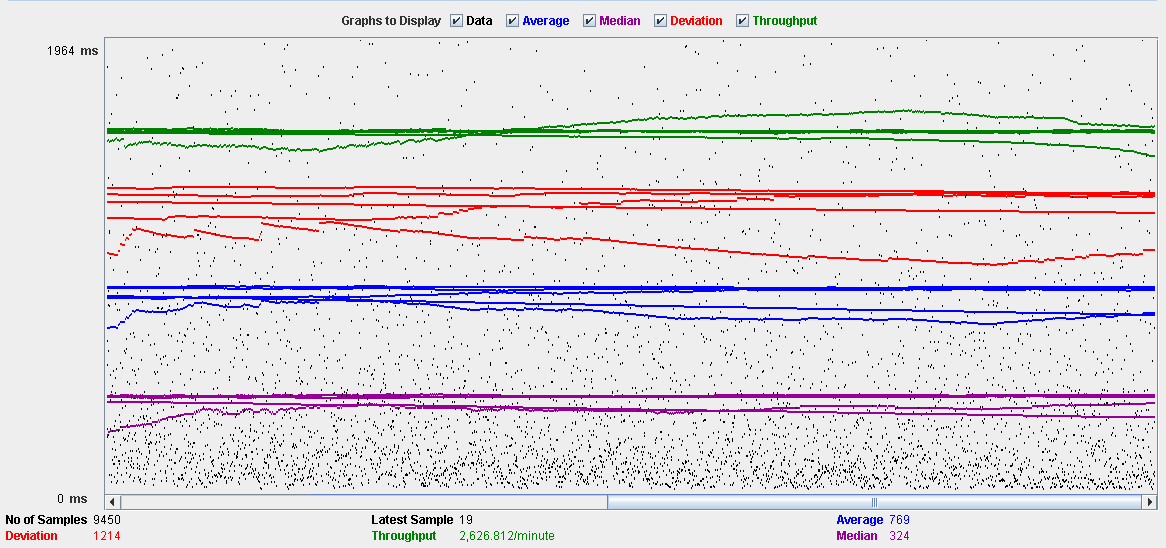




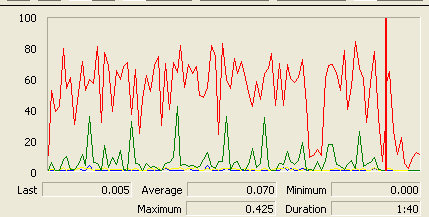
Thread properties:

.

Graph Results:



Performance Results:



Again we can see that the CPU is always being used while the disk usage shows some peaks.

## Conclusion

The test was performed using:

CPU: 5 2500k (2 cores in the virtual machine)

RAM: 2 GB (virtual machine)

For this use case we can say that the limitation occurs during the edit process, being the maximum of concurrent users 60 because the time of respond starts to be very high at that point.

# Mess

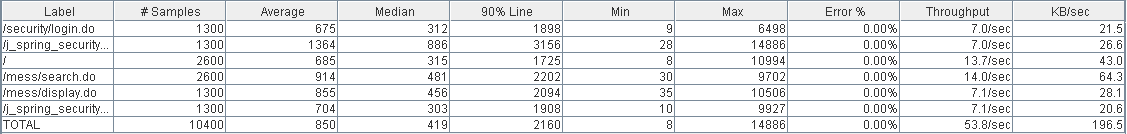
## Search by tags, list by that tag and display a mess

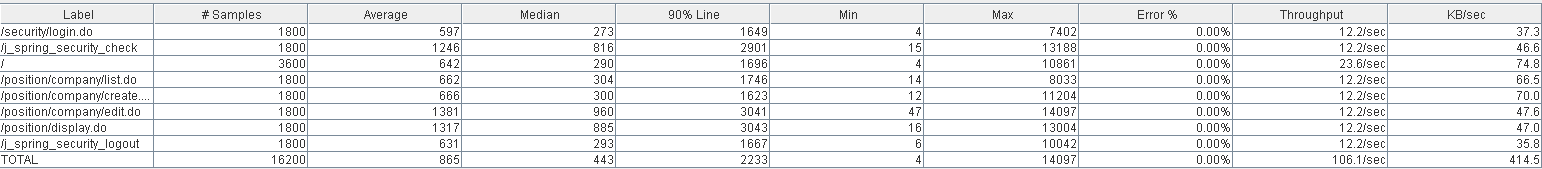
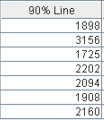
Sequence:

Imagen que contiene captura de pantalla

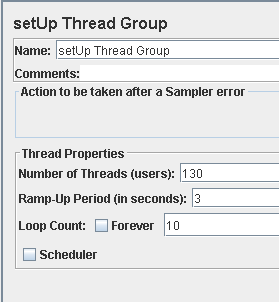
Descripción generada automáticamente

Aggregate Report:

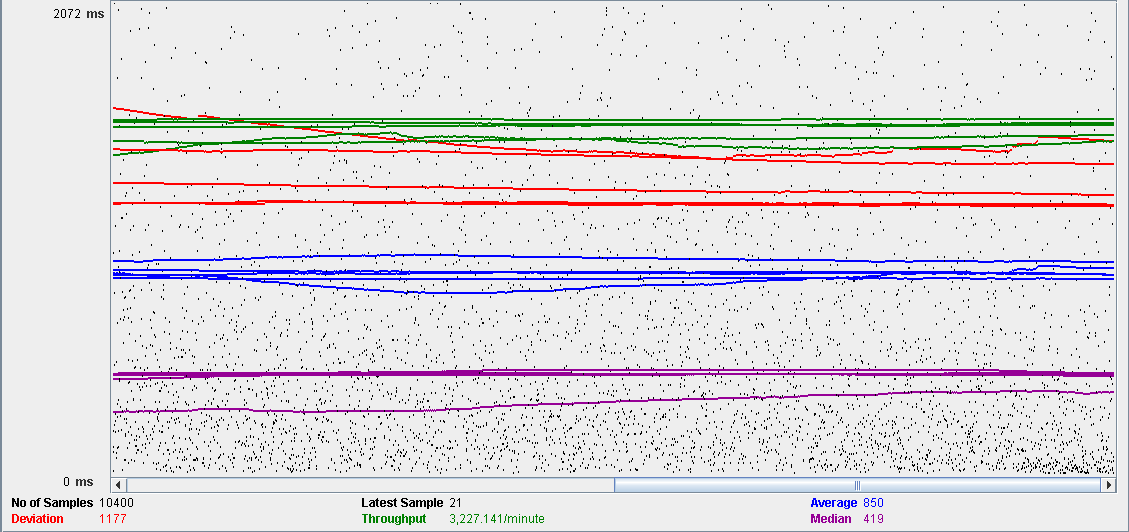




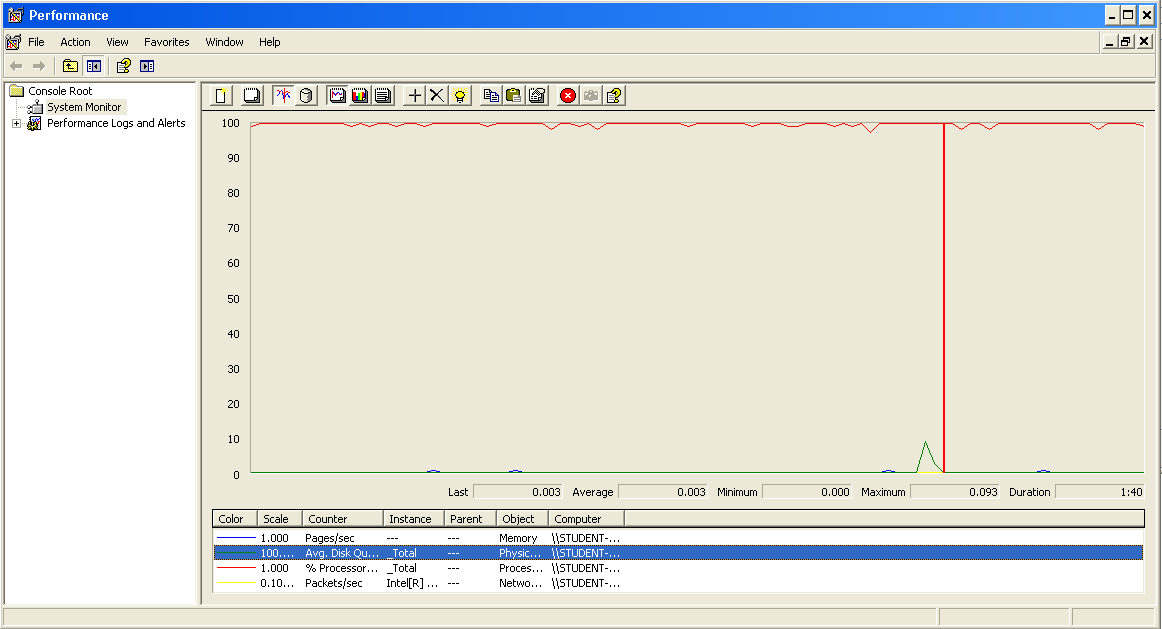
Thread properties:



Graph Results:



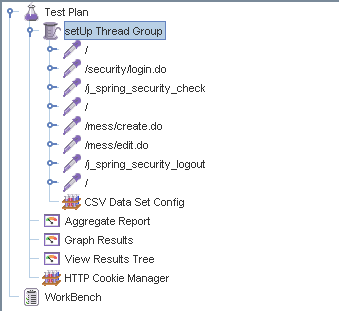
Performance Results:



The CPU was always at its limit while the disk usage showed many peaks.

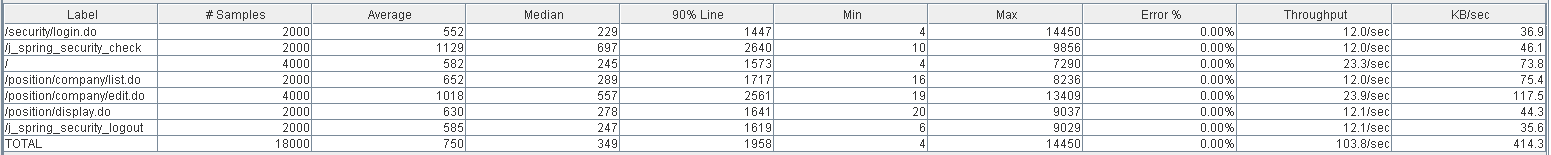
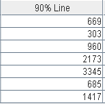
## Send a message

Sequence:

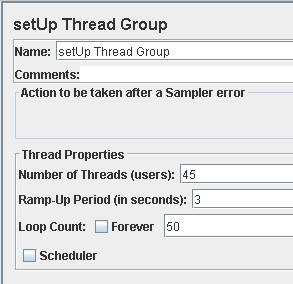


Aggregate Report:

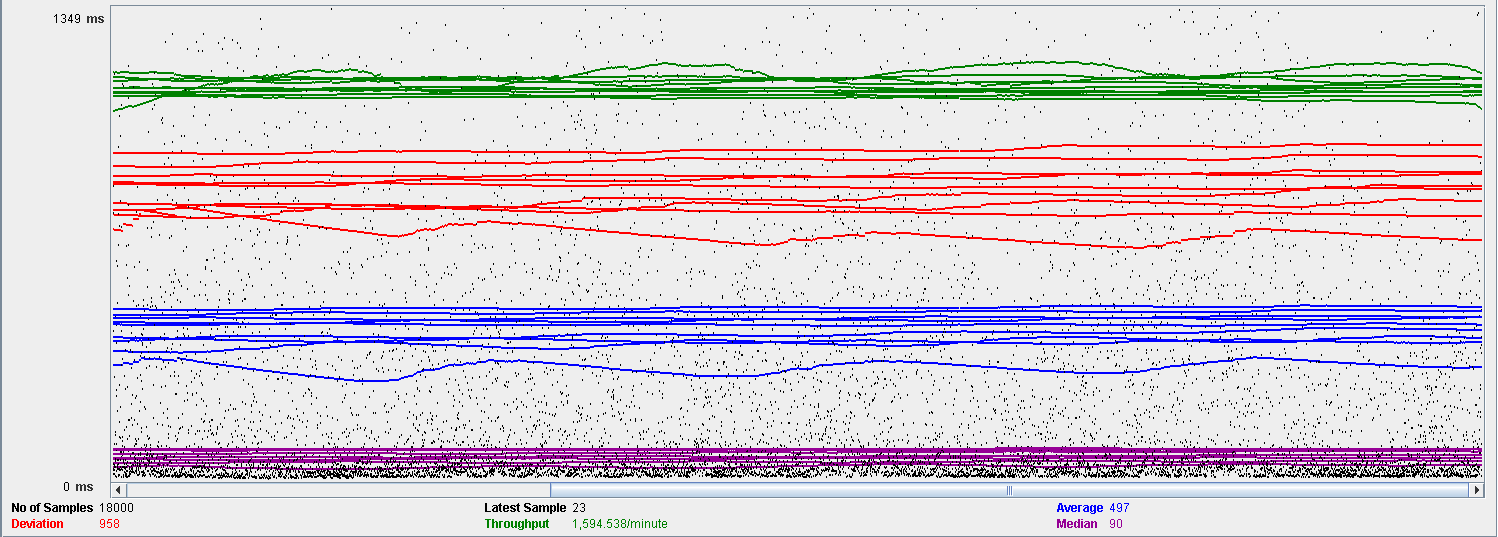




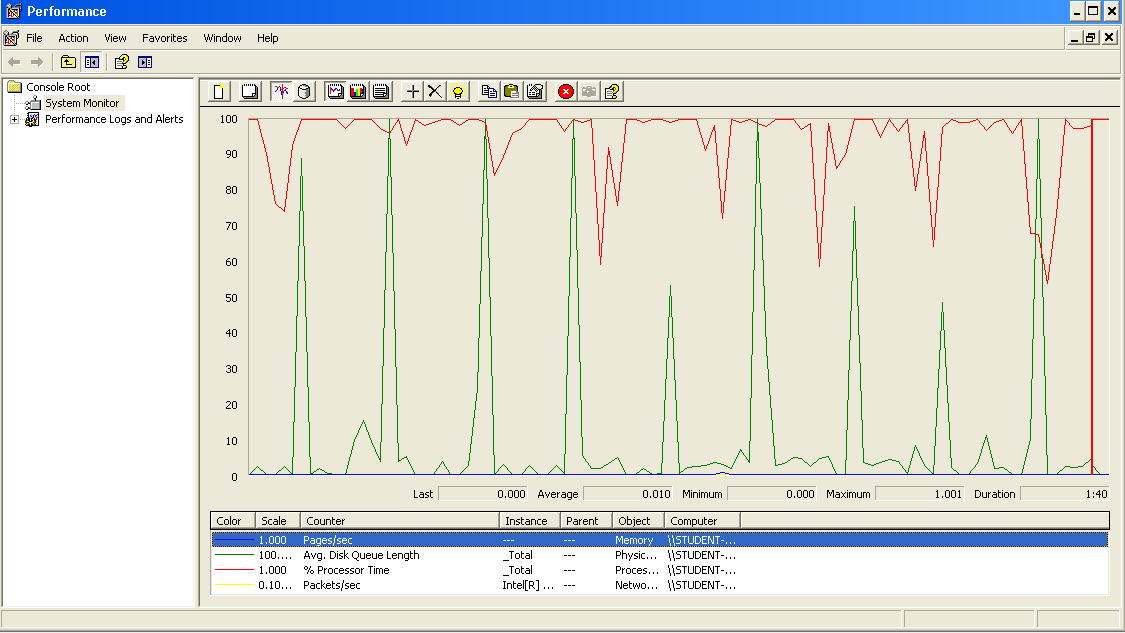
Thread properties:



Graph Results:



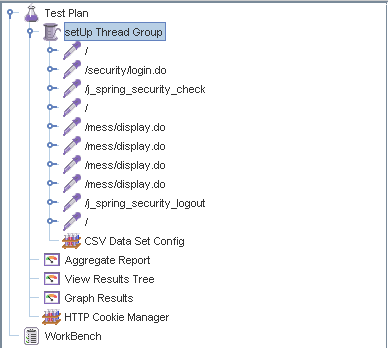
Performance Results:



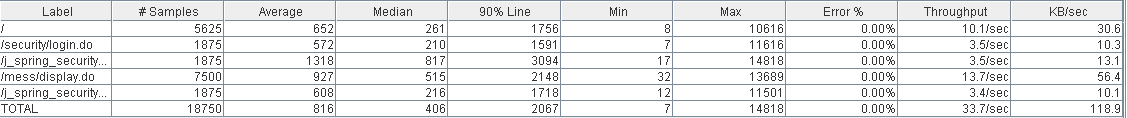
Again we can see that the CPU is always being used while the disk usage shows some periodic peaks.

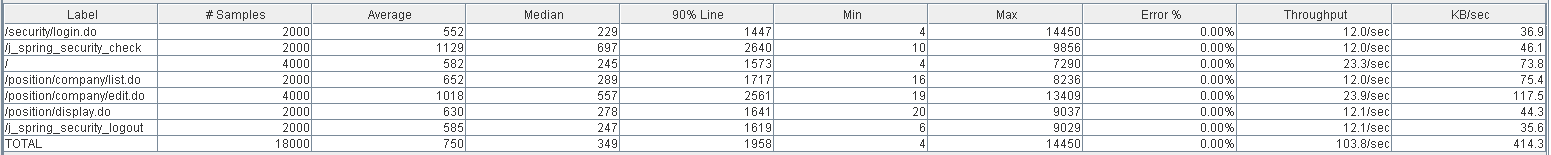
## Delete a message

Sequence:

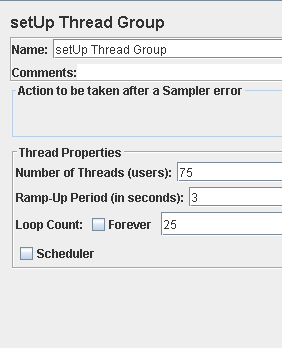


Aggregate Report:

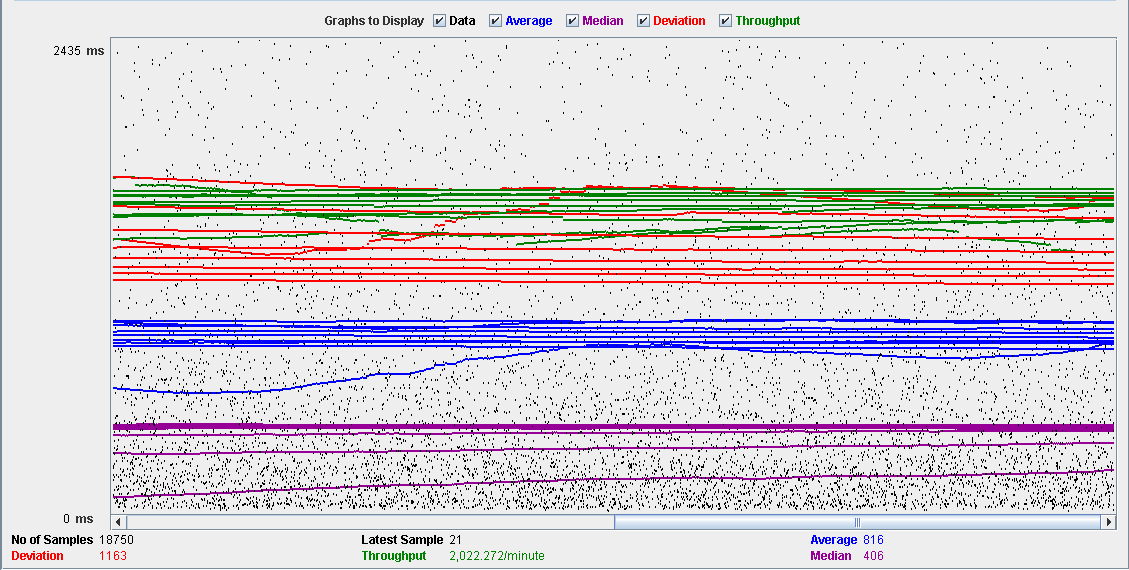




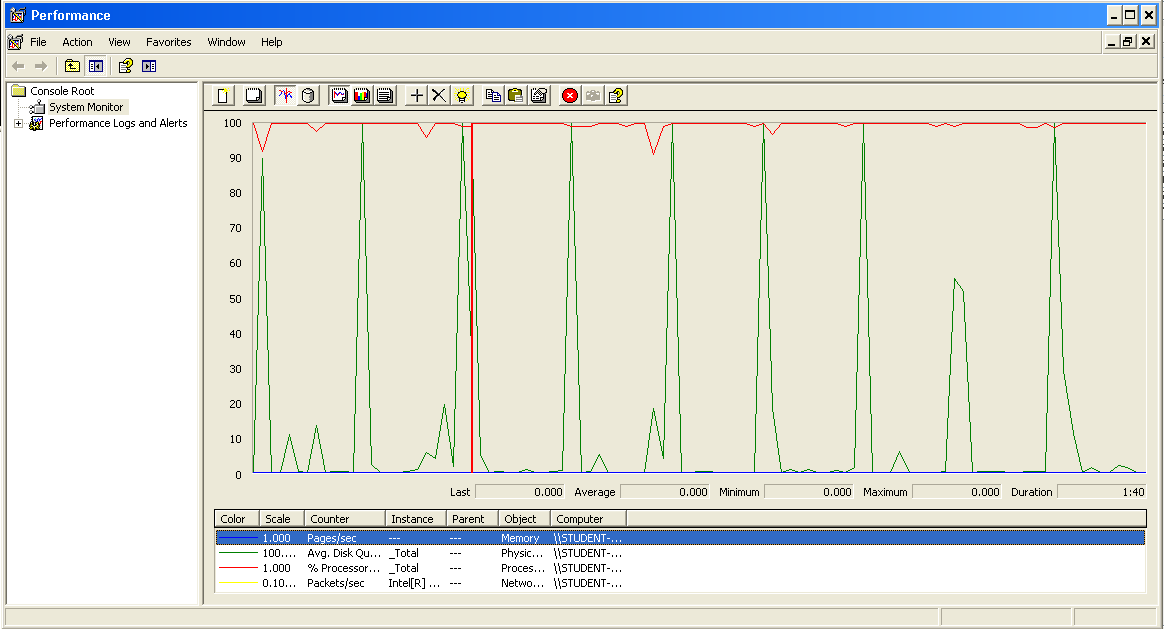
Thread properties:



Graph Results:



Performance Results:



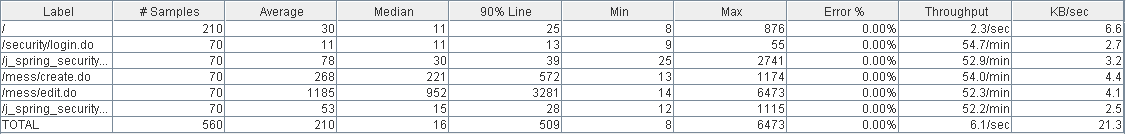
Again we can see that the CPU is always being used while the disk usage shows some periodic peaks.

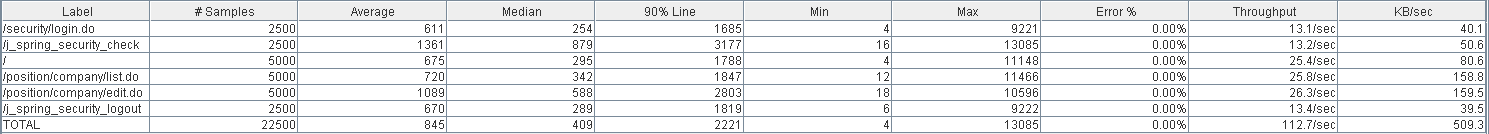
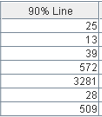
## Send a broadcast mess

Sequence:

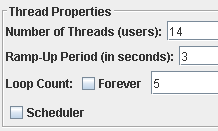


Aggregate Report:

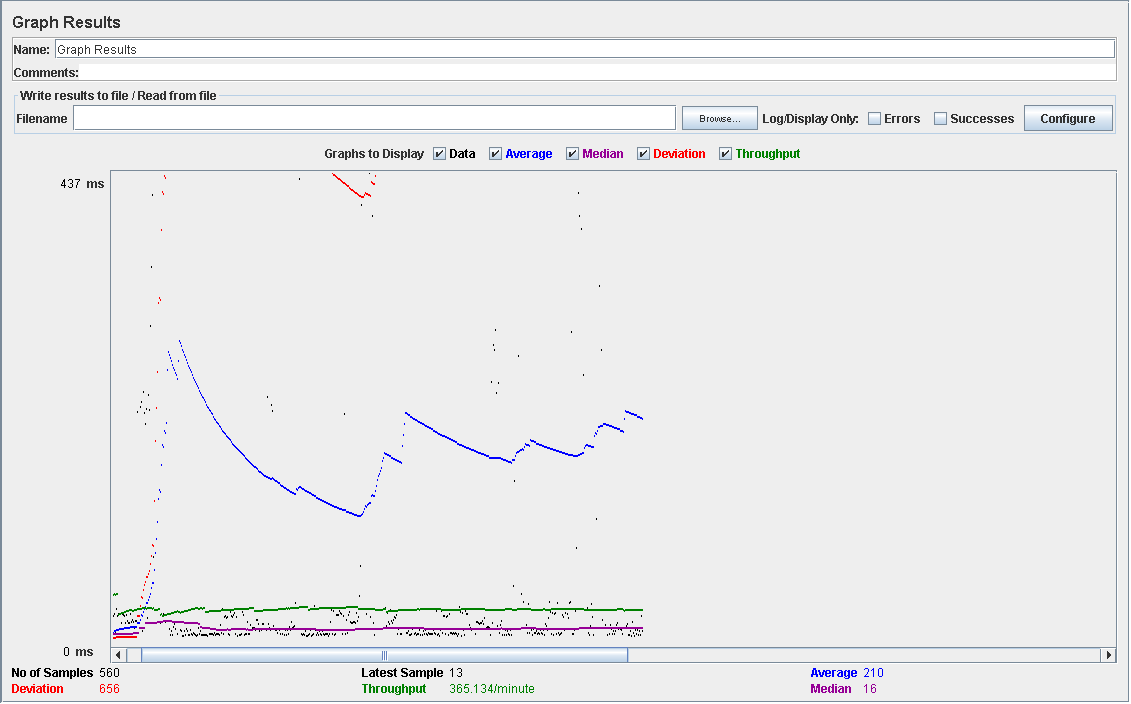




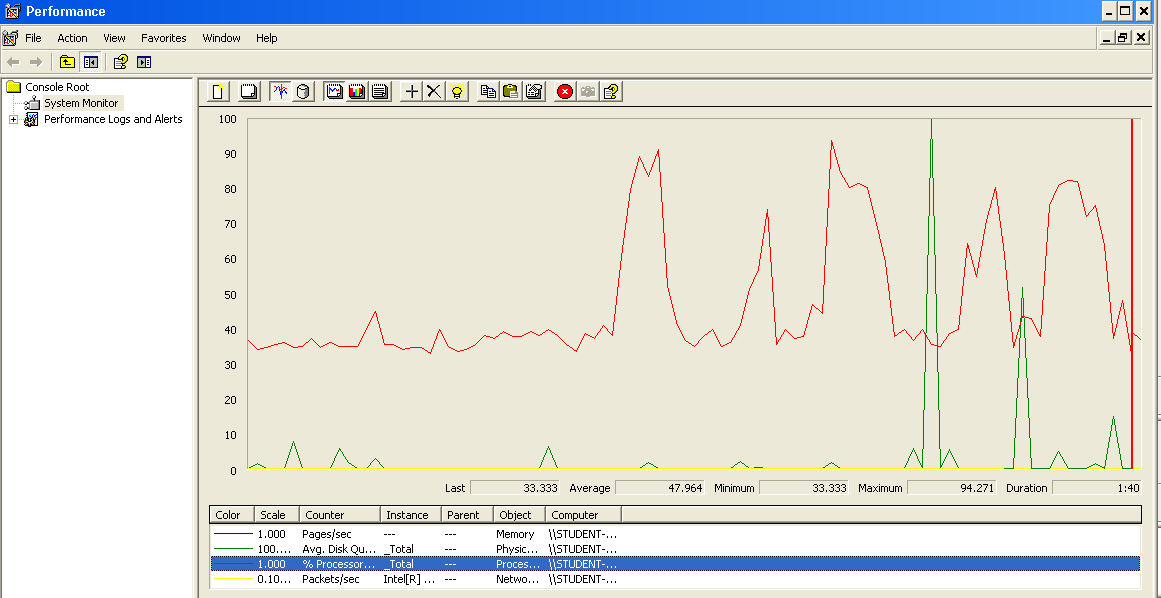
Thread properties:



Graph Results:



Performance Results:



Again we can see that the CPU is always being used while the disk usage shows some peaks.

## Conclusion

The test was performed using:

CPU: i7 7700HQ (2 cores in the virtual machine)

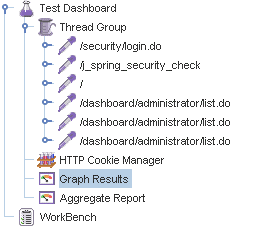
RAM: 2 GB (virtual machine)

For this use case we can say that the limitation occurs during the creation process, being the maximum of concurrent users 14.

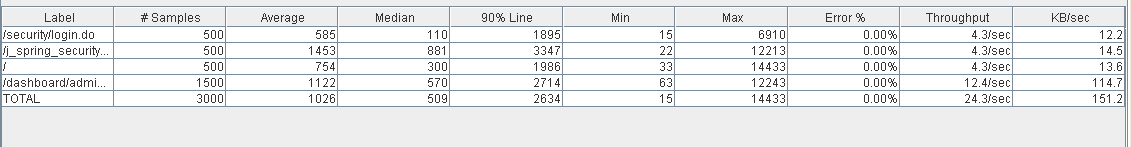
# Dashboard

## Display the dashboard and set the spammers

Sequence:

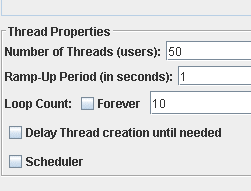


Aggregate Report:





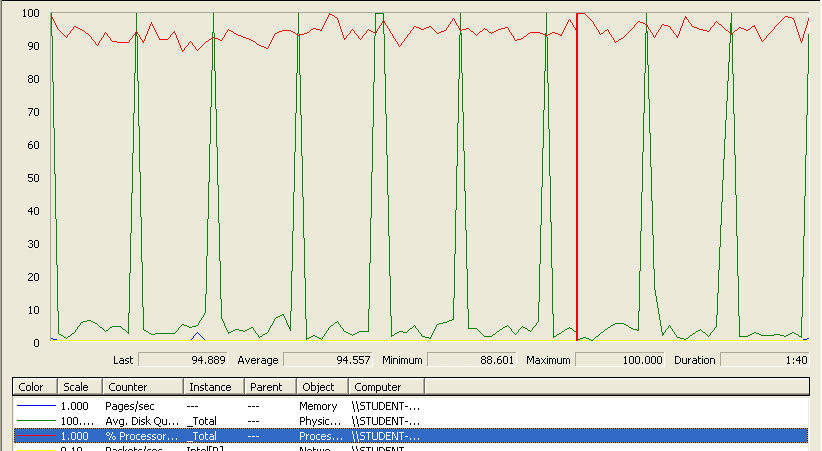
Thread properties:



Graph Results:



Performance Results:



The CPU was always at its limit while the disk usage showed many peaks.

## Conclusion

The test was performed using:

CPU: i5 2500K (2 cores in the virtual machine)

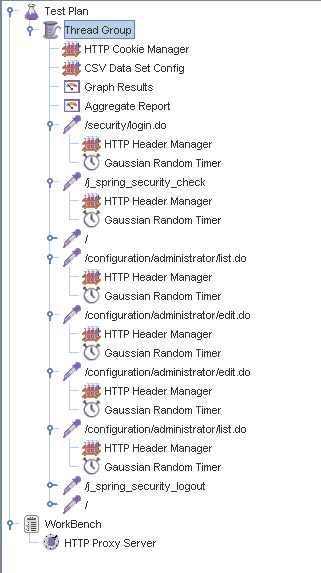
RAM: 2 GB (virtual machine)

For this use case we can say that the limitation occurs around 50 users when the time of respond begins to be very high.

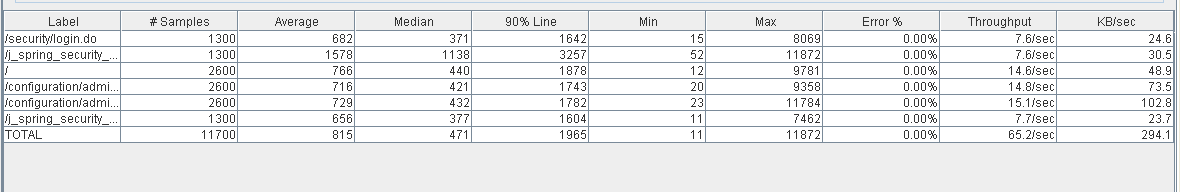
# Configuration

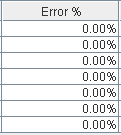
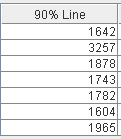
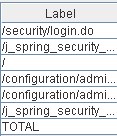
## Display the configuration and edit it

Sequence:

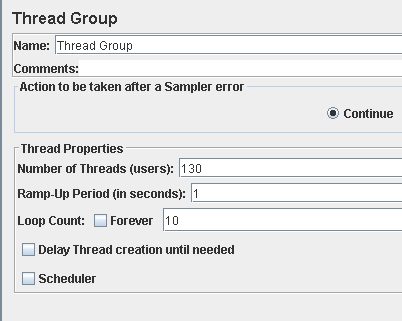


Aggregate Report:

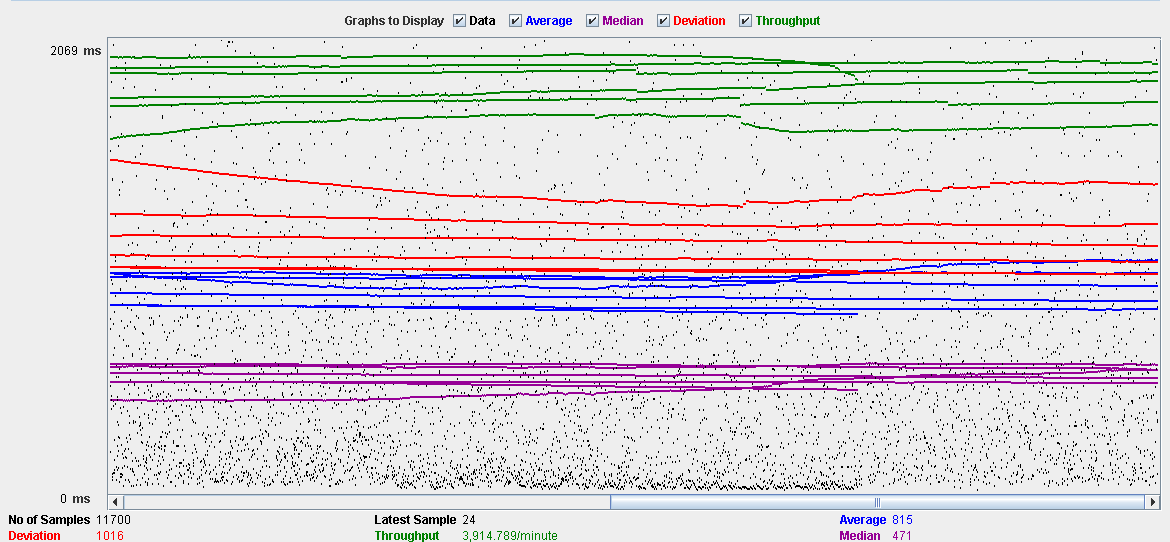




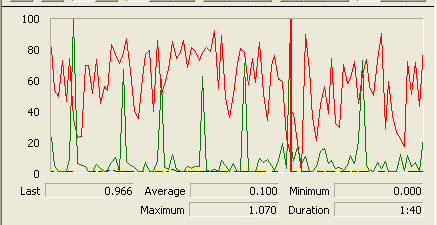
Thread properties:



Graph Results:



Performance Results:



The CPU was always at its limit while the disk usage showed many peaks.

## Conclusion

The test was performed using:

CPU: i5 2500K (2 cores in the virtual machine)

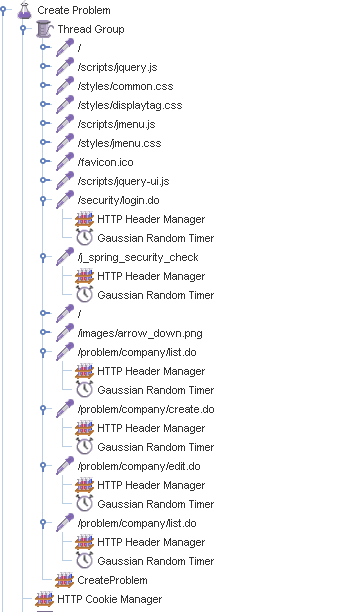
RAM: 2 GB (virtual machine)

For this use case we can say that the limitation occurs around 130 users when the time of respond begins to be very high.

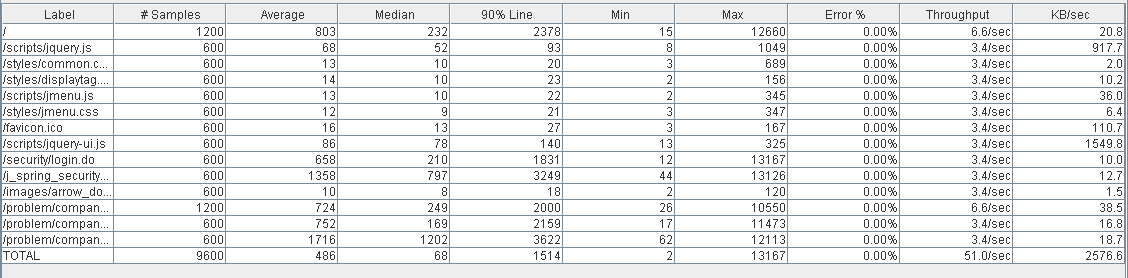
# Problem

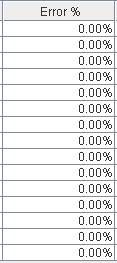
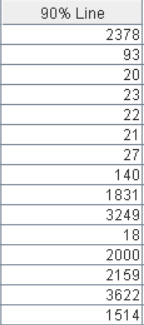
## Create

Sequence:

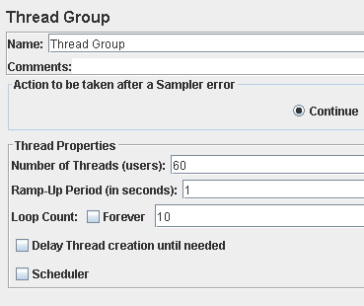


Aggregate Report:

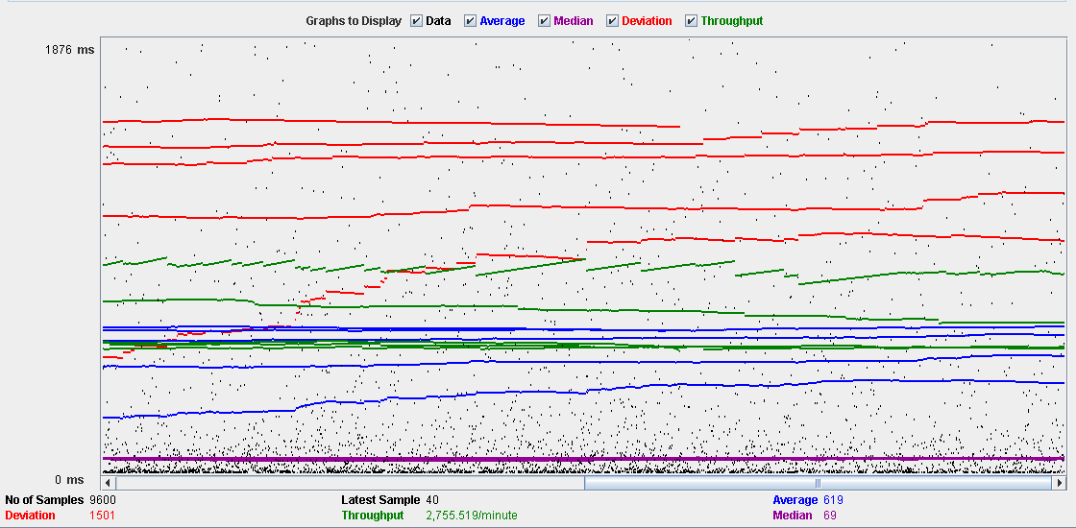




Thread properties:



Graph Results:



Performance Results:



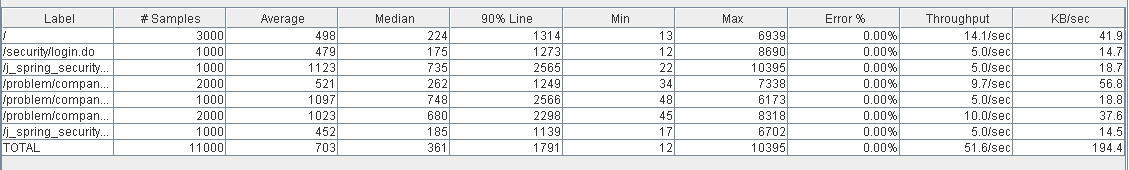
The CPU was always at its limit while the disk usage showed many peaks.

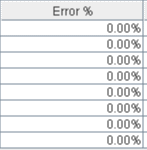
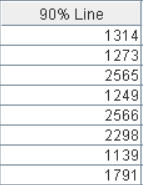
## Edit

Sequence:

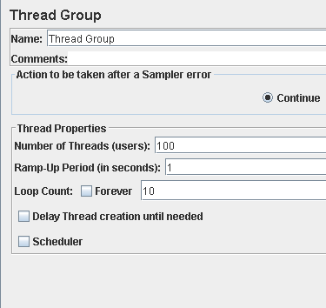


Aggregate Report:

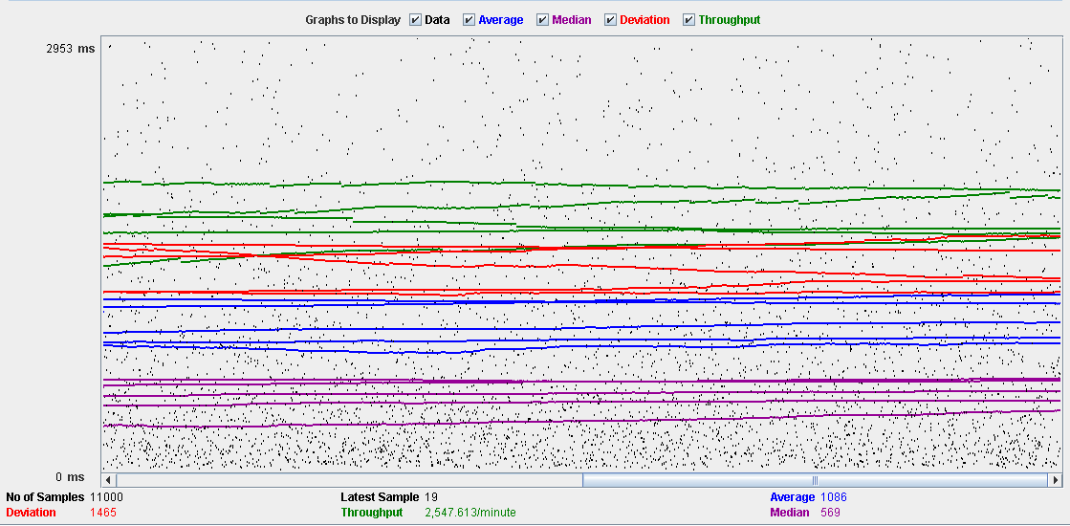




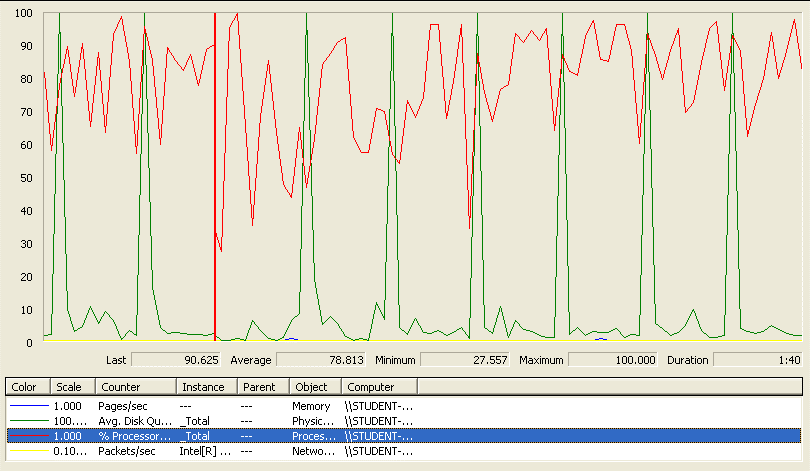
Thread properties:



Graph Results:



Performance Results:



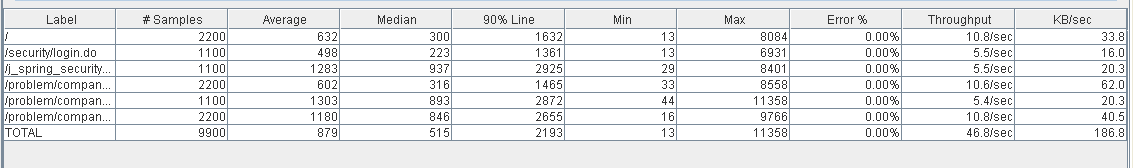
Again we can see that the CPU is always being used while the disk usage shows some periodic peaks.

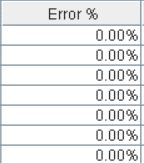
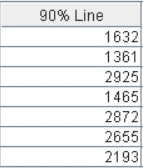
## Delete

Sequence:

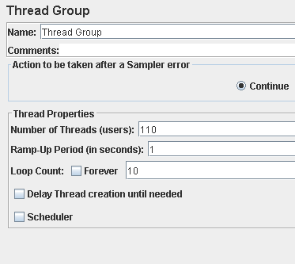


Aggregate Report:

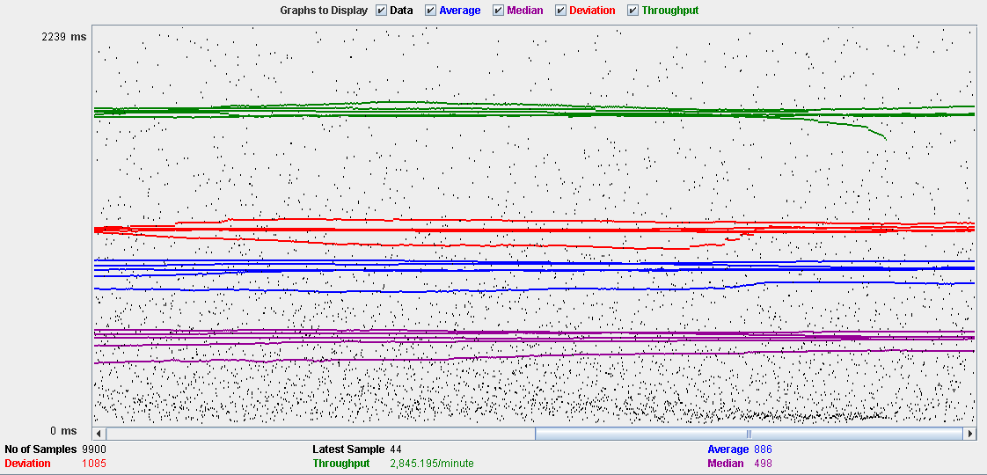




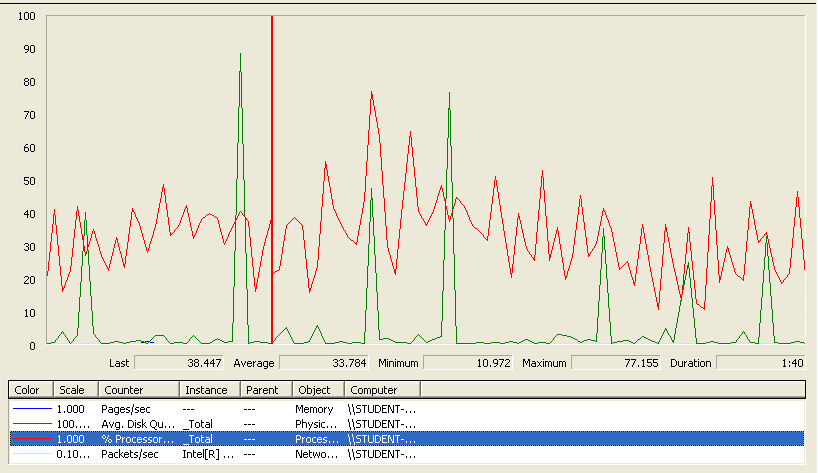
Thread properties:



Graph Results:



Performance Results:



Again we can see that the CPU is always being used while the disk usage shows some periodic peaks.

## Conclusion

The test was performed using:

CPU: i5 2500k (2 cores in the virtual machine)

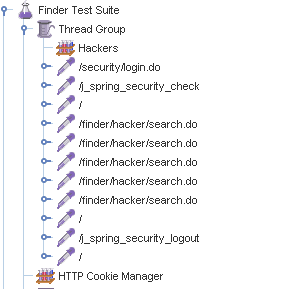
RAM: 2 GB (virtual machine)

For this use case we can say that the limitation occurs during the create process, being the maximum of concurrent users 60 because the time of respond begins to be very high.

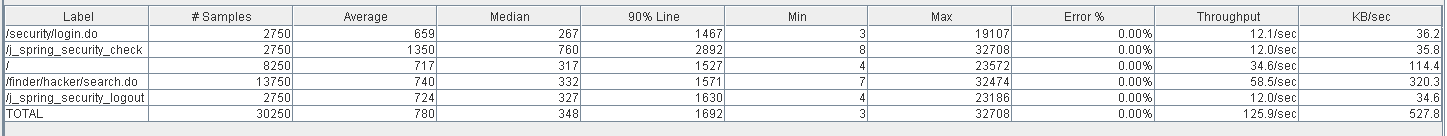
# Finder

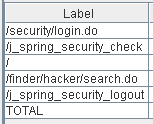
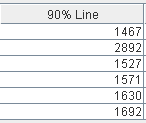
## Search and clear

Sequence:

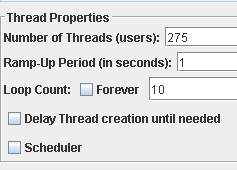


Aggregate Report:

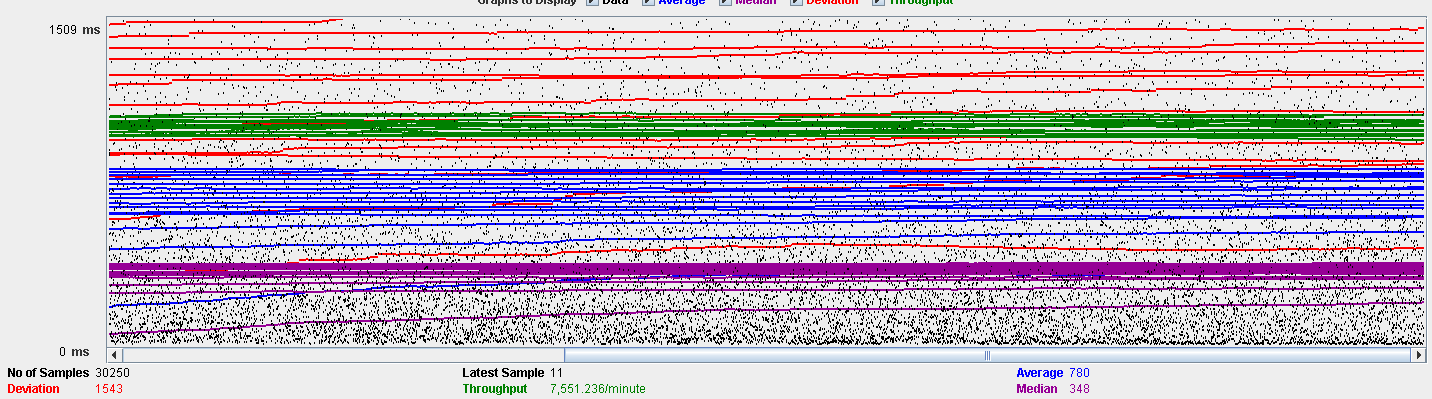


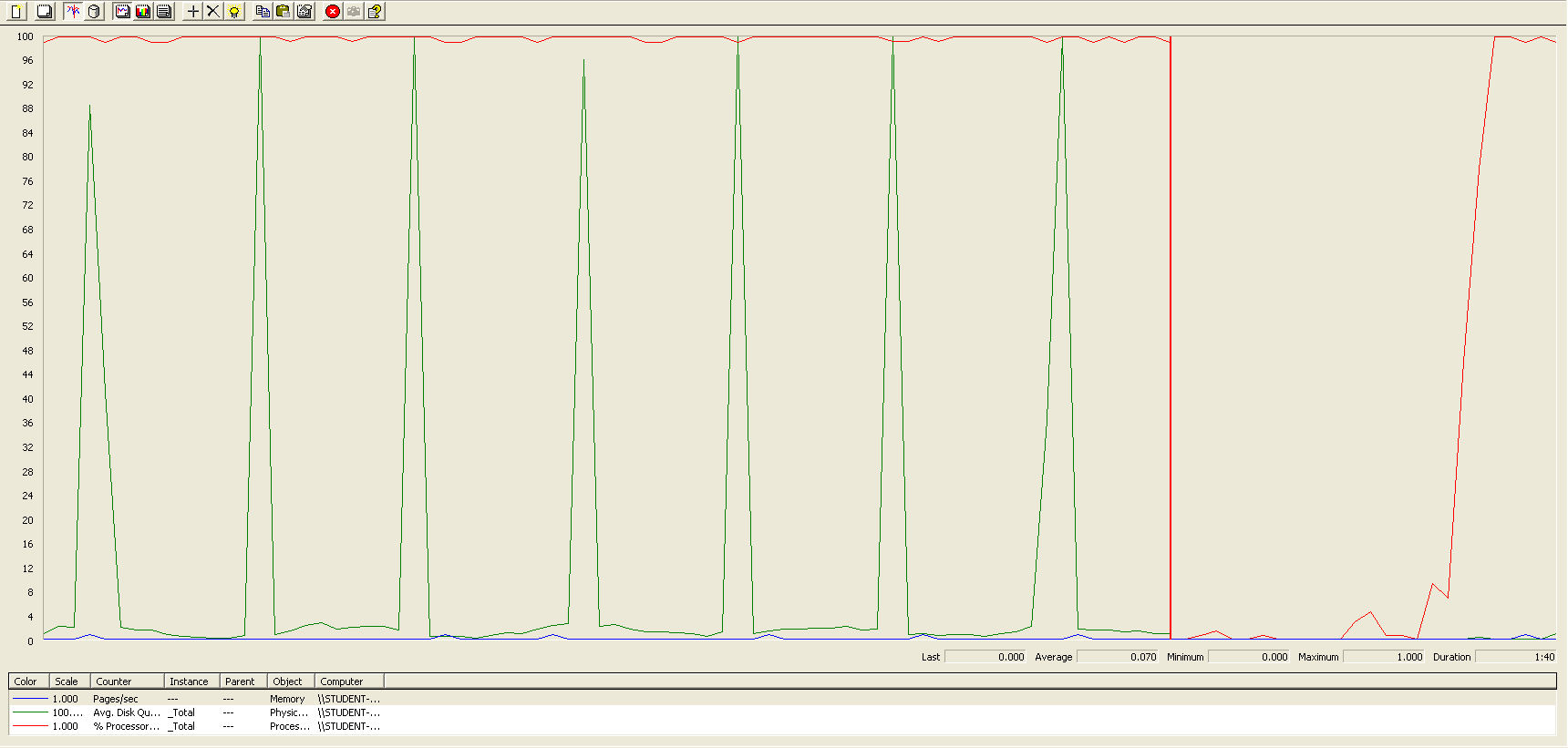
Thread properties:



Graph Results:



Performance Results:



The CPU was always at its limit while the disk usage showed many peaks.

## Conclusion

The test was performed using:

CPU: i7 7300hq (2 cores in the virtual machine)

RAM: 2 GB (virtual machine)

For this use case we can say that the limitation is with a maximum of 275 concurrent users.

# Curricula

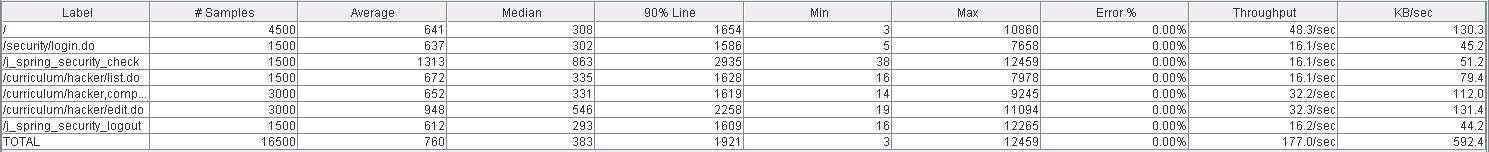
## Create a curriculum

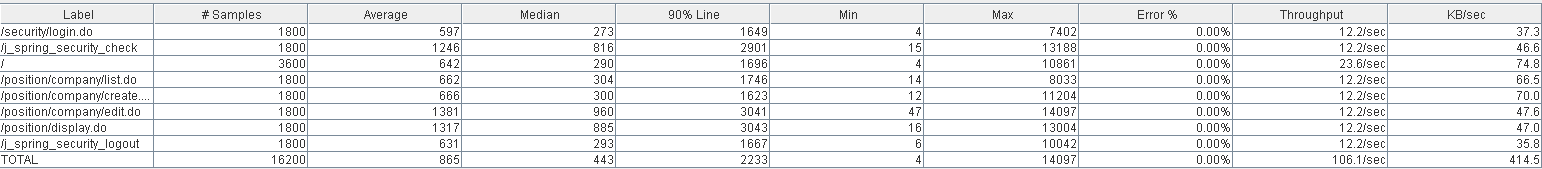
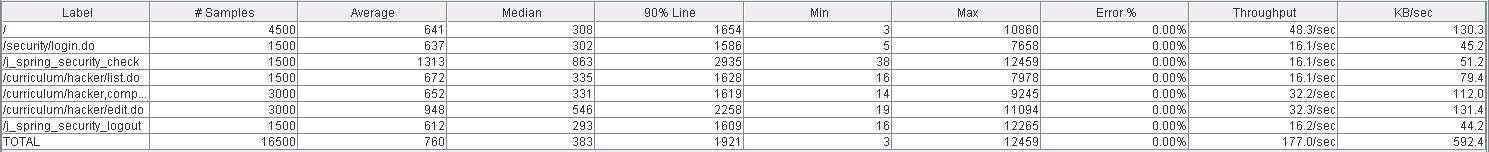
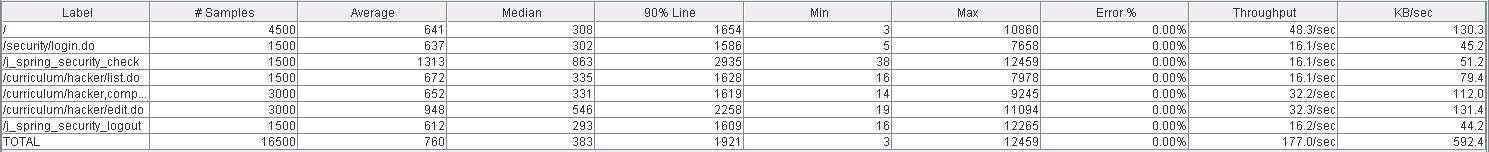
Sequence:

Imagen que contiene captura de pantalla

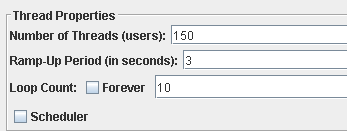
Descripción generada automáticamente

Aggregate Report:

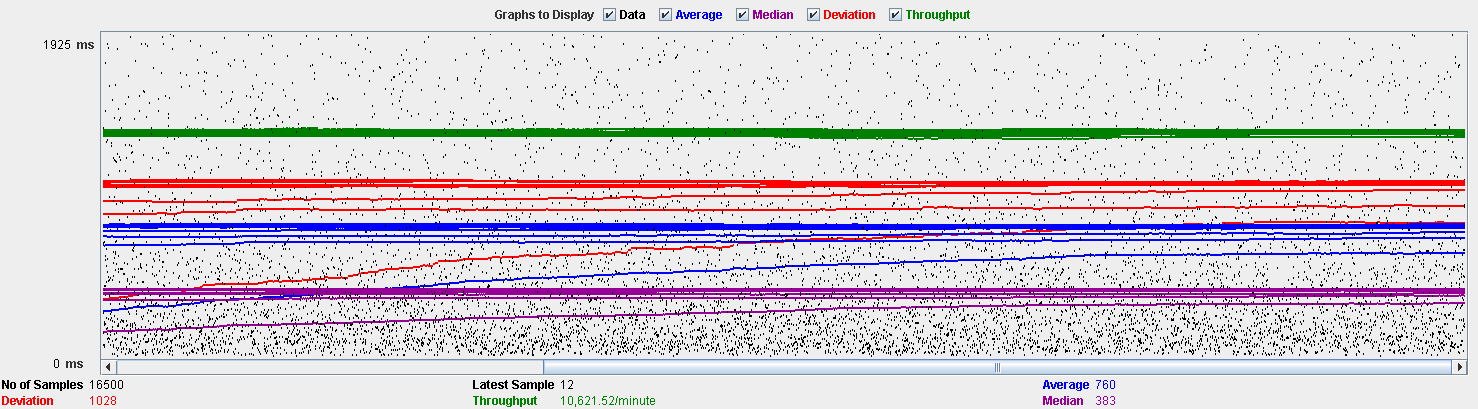




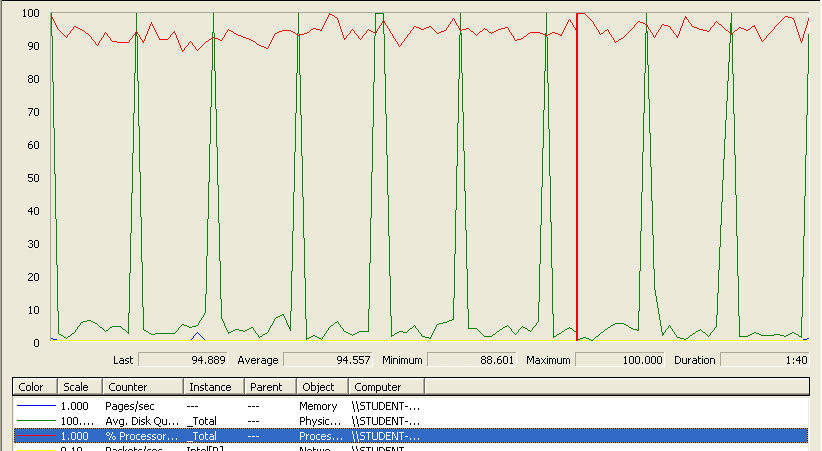
Thread properties:



Graph Results:



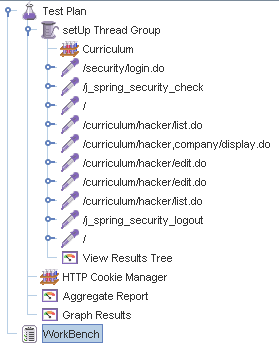
Performance Results:



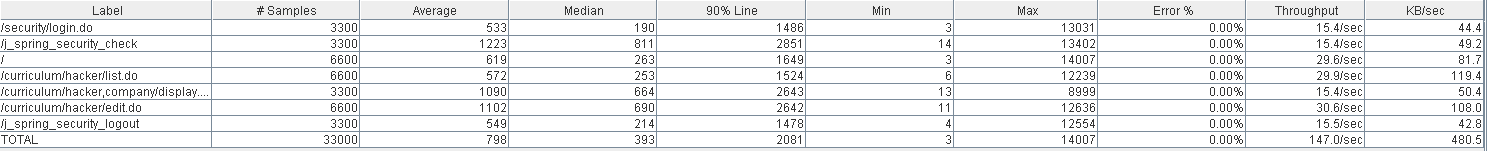
The CPU was always at its limit while the disk usage showed many peaks.

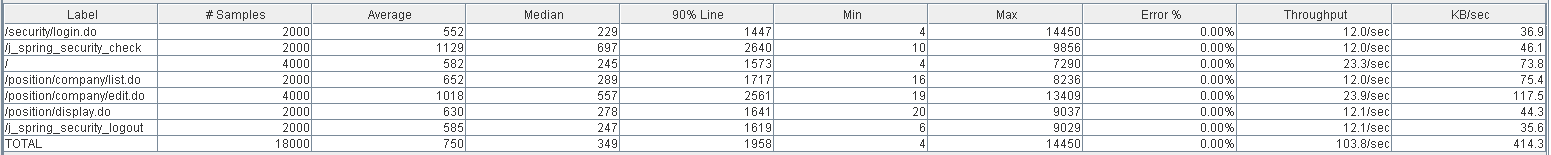
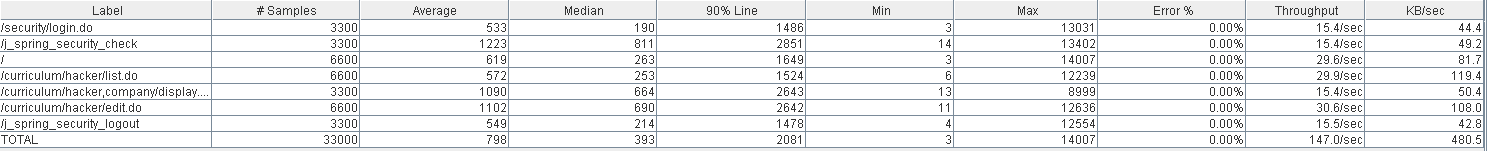
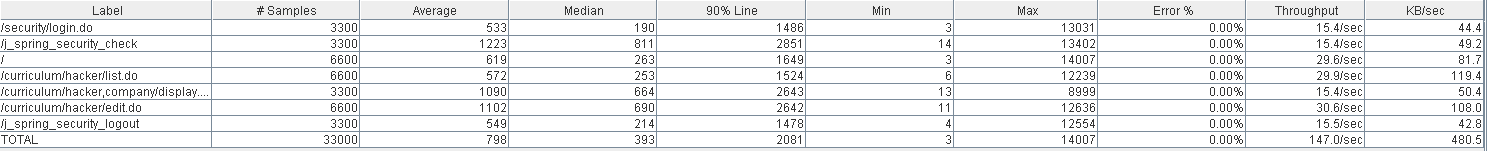
## Delete a curriculum

Sequence:

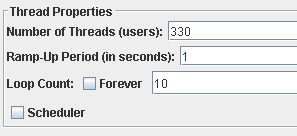


Aggregate Report:





Thread properties:



Graph Results:



Performance Results:



Again we can see that the CPU is always being used while the disk usage shows some little peaks.

# Datas (Personal, Education, Position and Miscellaneous data)

## Create all datas

Sequence:

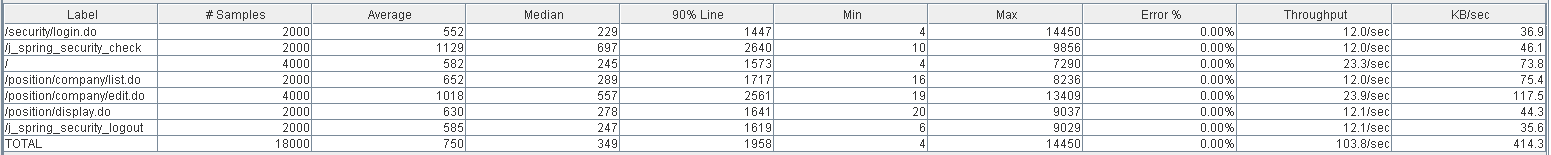
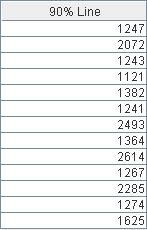
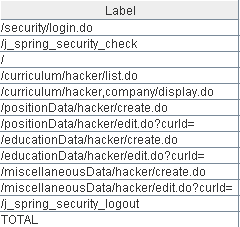
Imagen que contiene captura de pantalla

Descripción generada automáticamente

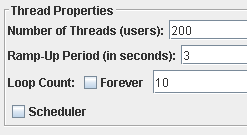
Aggregate Report:

Imagen que contiene captura de pantalla

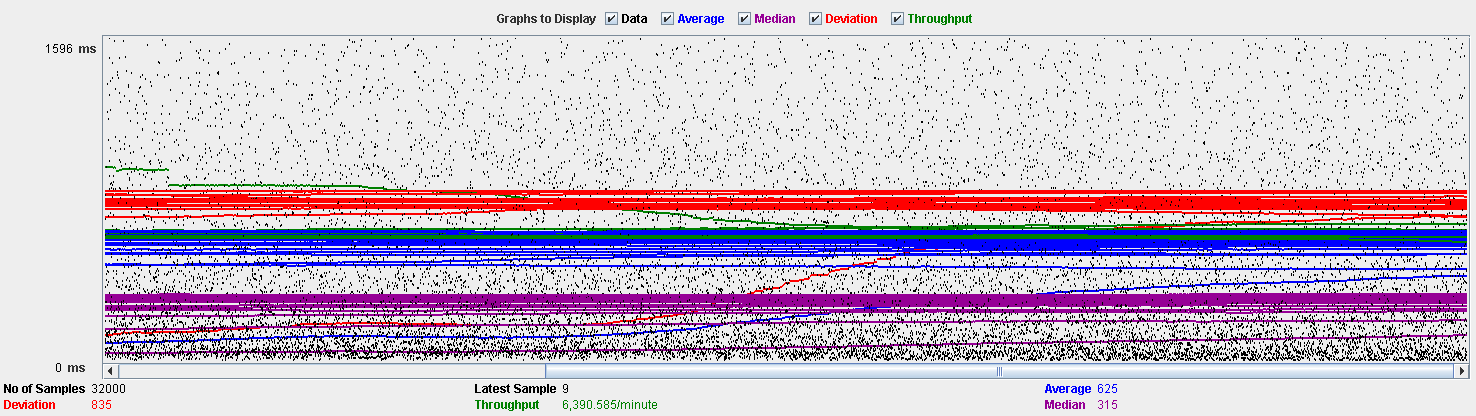
Descripción generada automáticamente



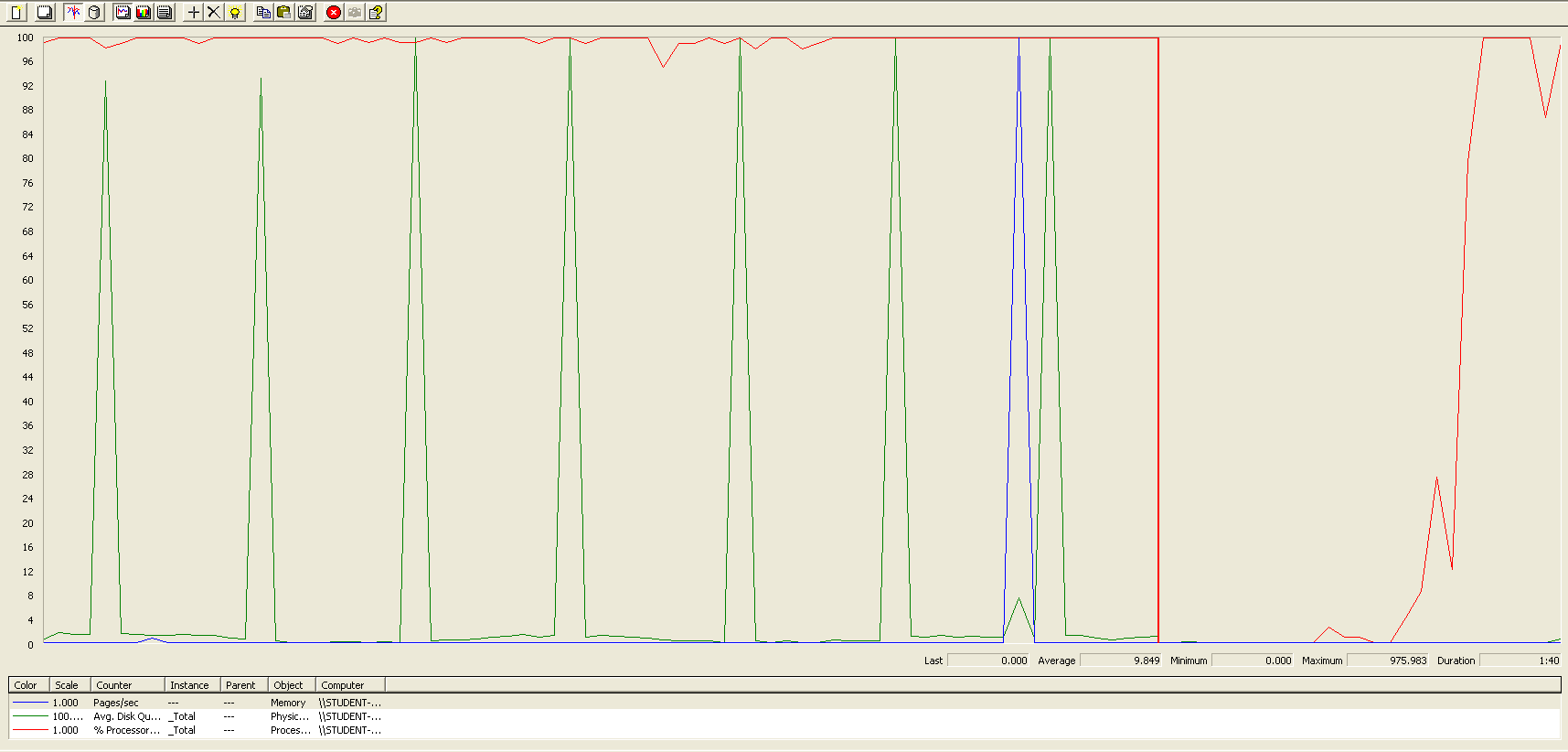
Thread properties:



Graph Results:



Performance Results:



Again we can see that the CPU is always being used while the disk usage shows some periodic peaks.

## Edit a position data

Sequence:

Imagen que contiene captura de pantalla

Descripción generada automáticamente

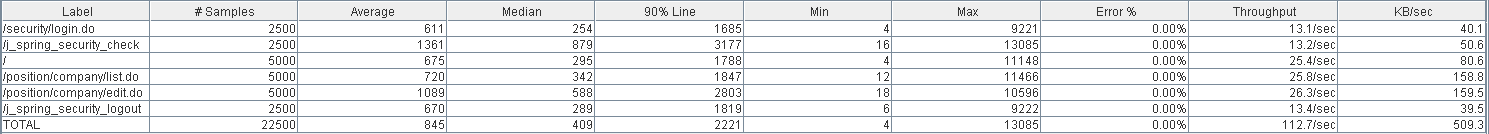
Aggregate Report:

Imagen que contiene captura de pantalla

Descripción generada automáticamente

Imagen que contiene captura de pantalla

Descripción generada automáticamenteImagen que contiene captura de pantalla

Descripción generada automáticamente

Thread properties:

Imagen que contiene captura de pantalla

Descripción generada automáticamente

Graph Results:



Performance Results:

Imagen que contiene captura de pantalla

Descripción generada automáticamente

Again we can see that the CPU is always being used while the disk usage shows some peaks.

## Edit a education data

Sequence:

Imagen que contiene captura de pantalla

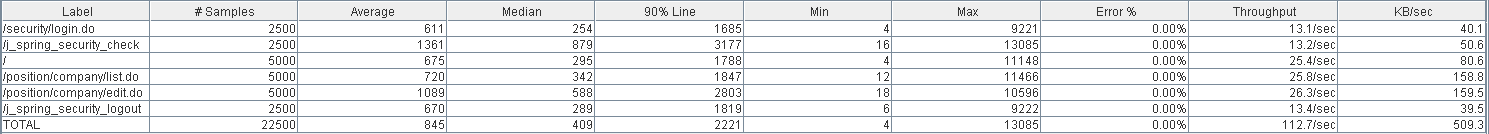
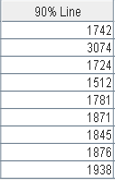
Descripción generada automáticamente

Aggregate Report:

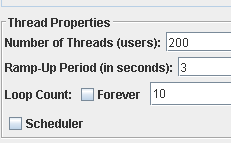
Imagen que contiene captura de pantalla

Descripción generada automáticamente

Imagen que contiene captura de pantalla

Descripción generada automáticamente

Thread properties:



Graph Results:

Imagen que contiene captura de pantalla

Descripción generada automáticamente

Performance Results:

Imagen que contiene captura de pantalla

Descripción generada automáticamente

Again we can see that the CPU is always being used while the disk usage shows some peaks.

## Edit a miscellaneous data

Sequence:

Imagen que contiene captura de pantalla

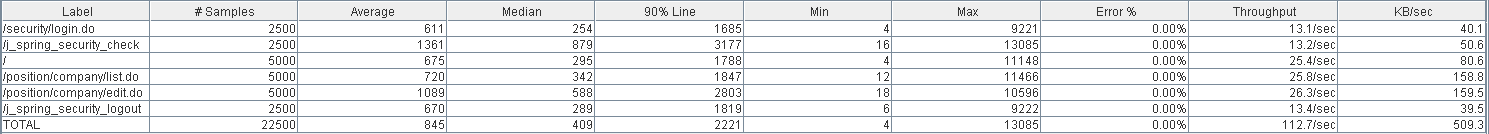
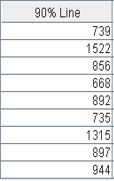
Descripción generada automáticamente

Aggregate Report:

Imagen que contiene captura de pantalla

Descripción generada automáticamente

Imagen que contiene captura de pantalla

Descripción generada automáticamente

Thread properties:

Imagen que contiene captura de pantalla

Descripción generada automáticamente

Graph Results:

Imagen que contiene mapa, texto

Descripción generada automáticamente

Performance Results:

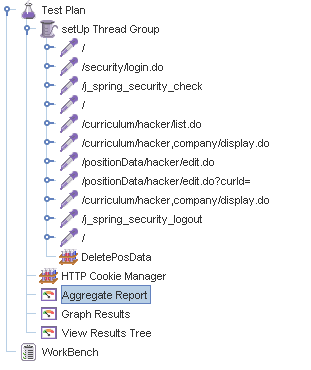
Imagen que contiene captura de pantalla

Descripción generada automáticamente

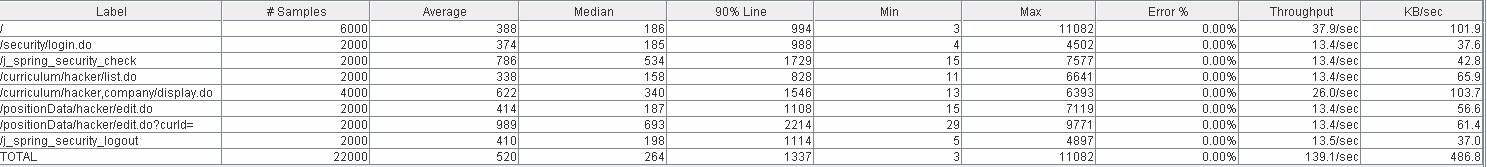
Again we can see that the CPU is always being used while the disk usage shows some peaks.

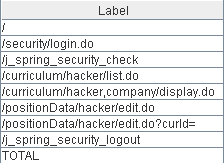
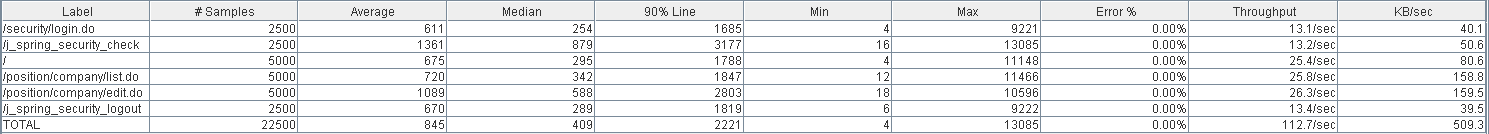
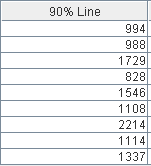
## Delete a position data

Sequence:

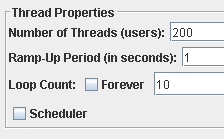


Aggregate Report:

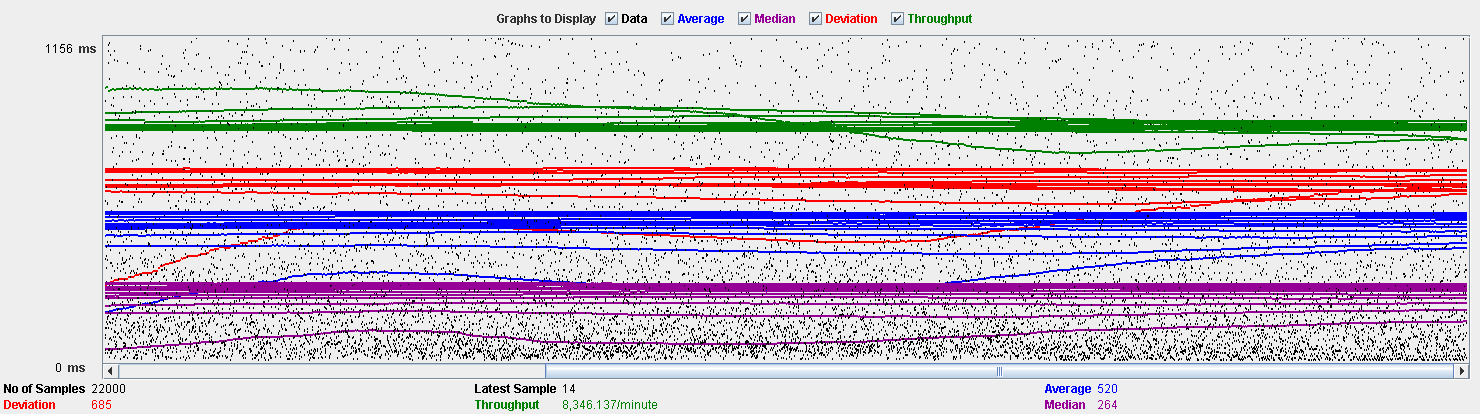


Thread properties:



Graph Results:



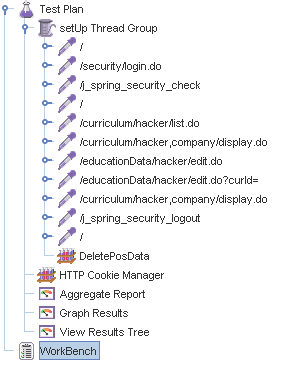
Performance Results:



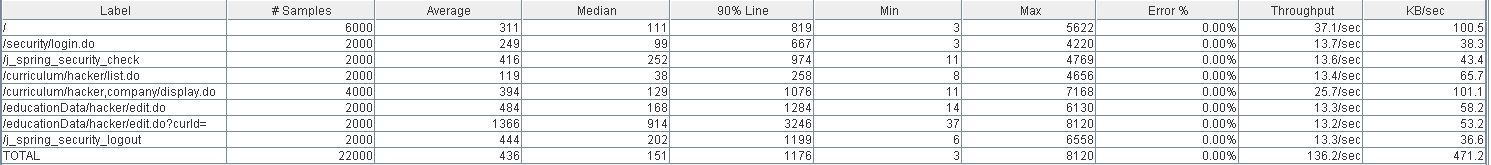
Again we can see that the CPU is always being used while the disk usage shows some peaks.

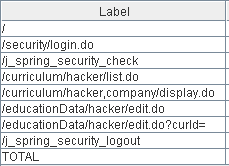
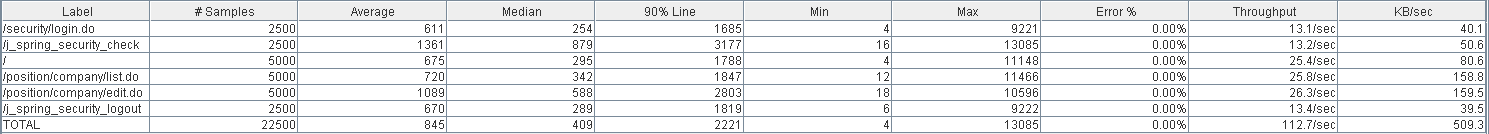
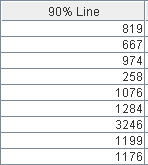
## Delete a education data

Sequence:

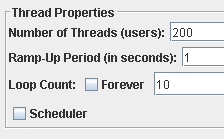


Aggregate Report:

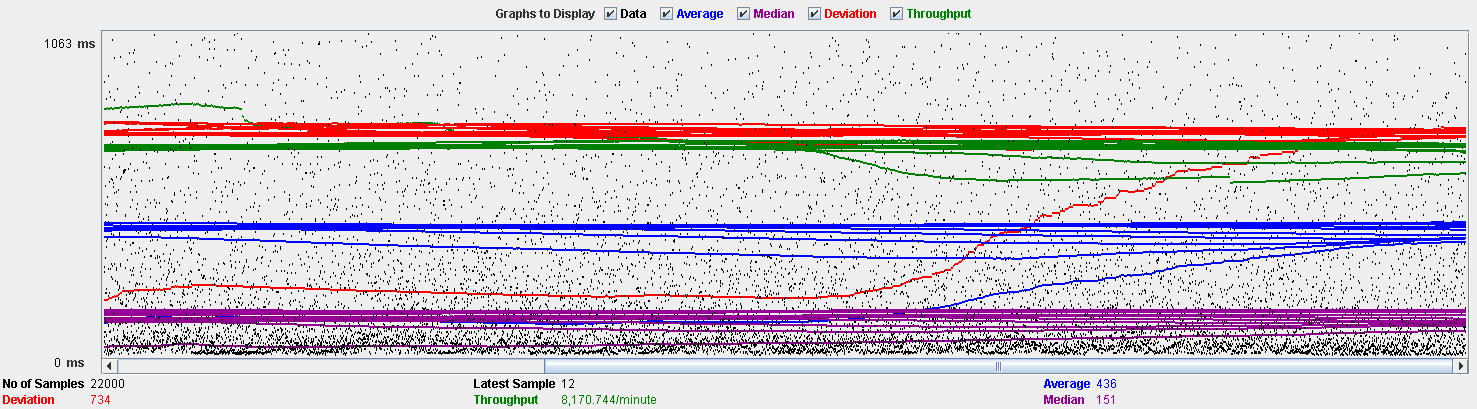


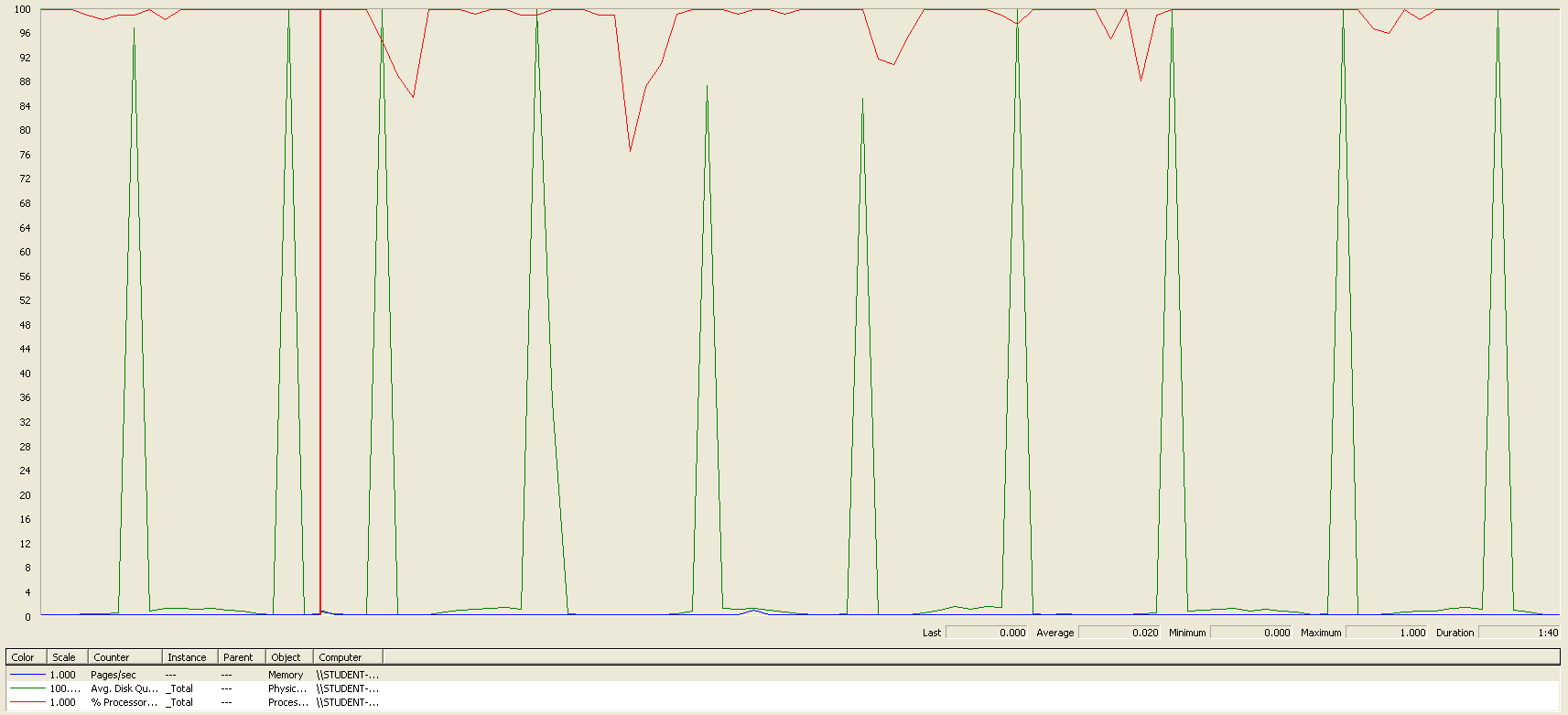
Thread properties:



Graph Results:



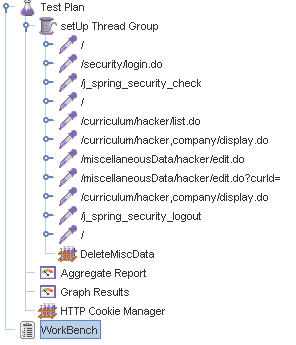
Performance Results:



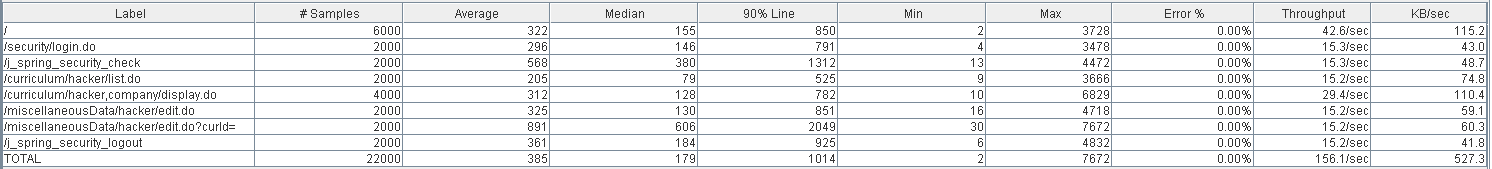
Again we can see that the CPU is always being used while the disk usage shows some peaks.

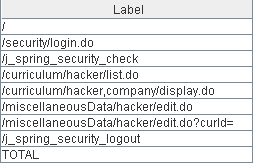
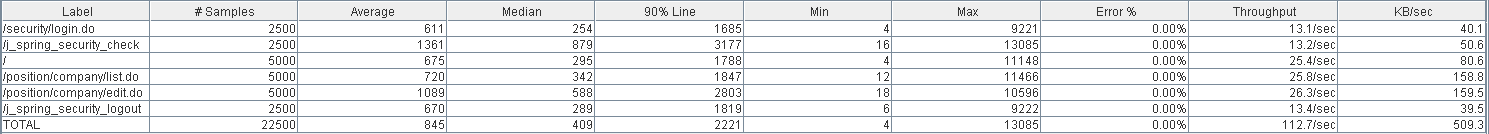
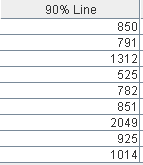
## Delete a miscellaneous data

Sequence:

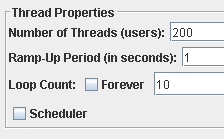


Aggregate Report:

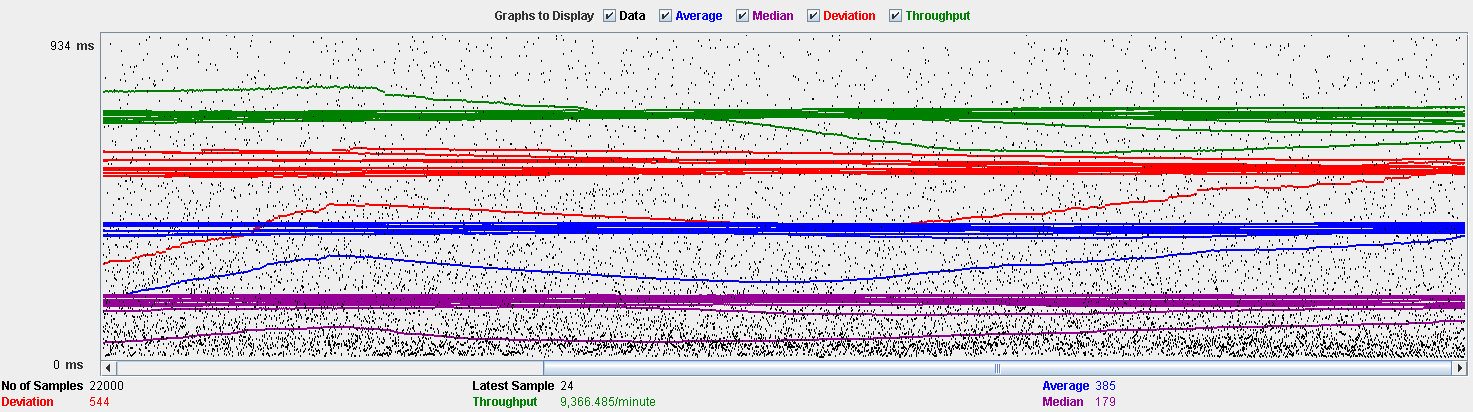


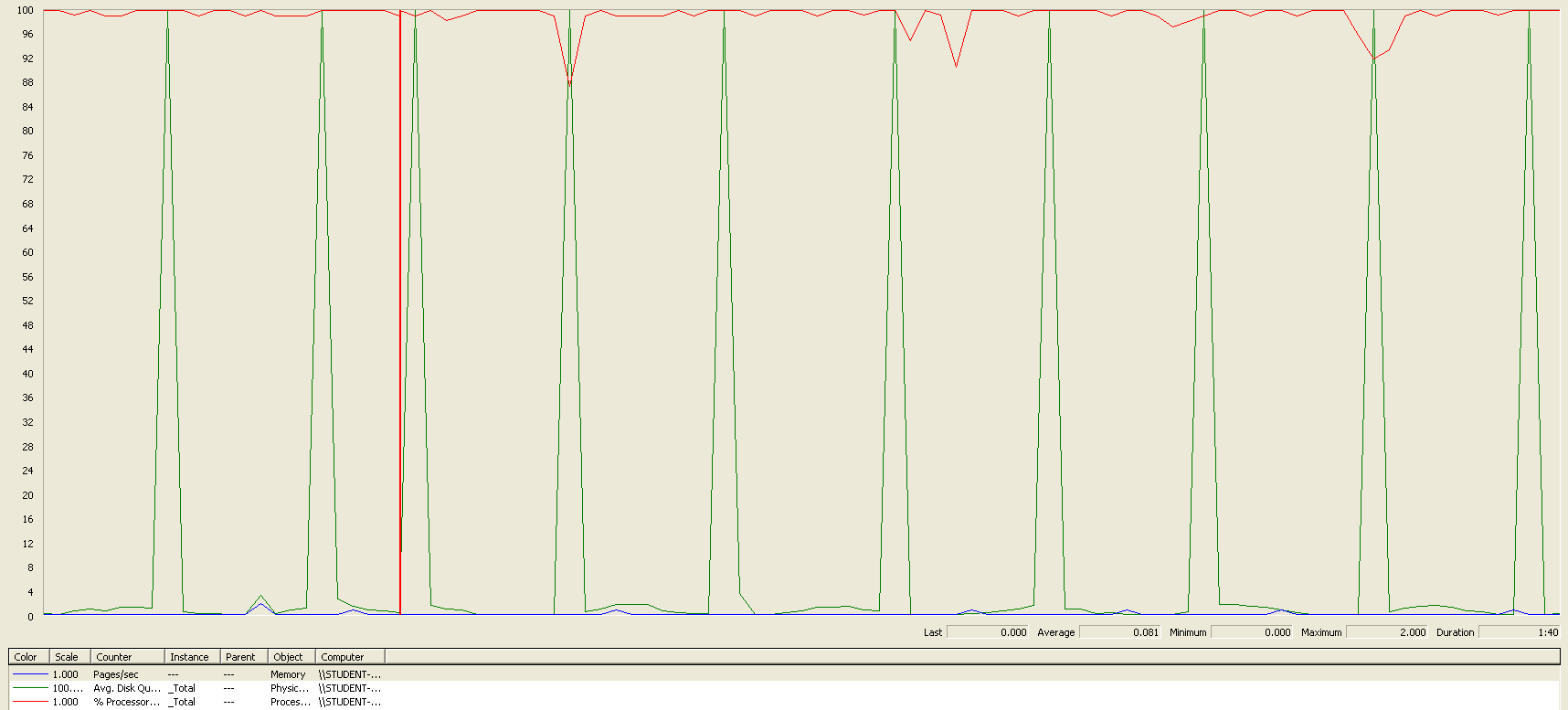
Thread properties:



Graph Results:



Performance Results:



Again we can see that the CPU is always being used while the disk usage shows some peaks.

## Conclusion

The test was performed using:

CPU: i7 6700hq (2 cores in the virtual machine)

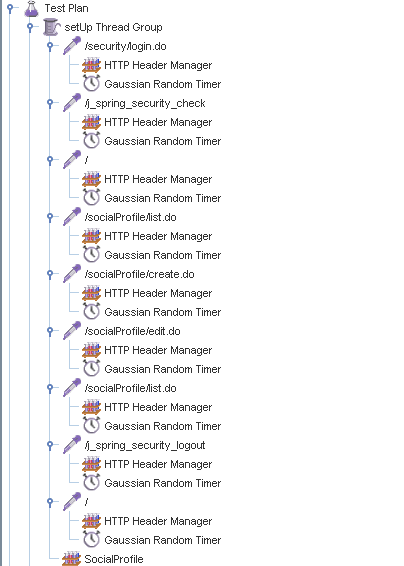
RAM: 4 GB (virtual machine)

For this use case we can say that the limitation occurs during the creation process, being the maximum of concurrent users 180.

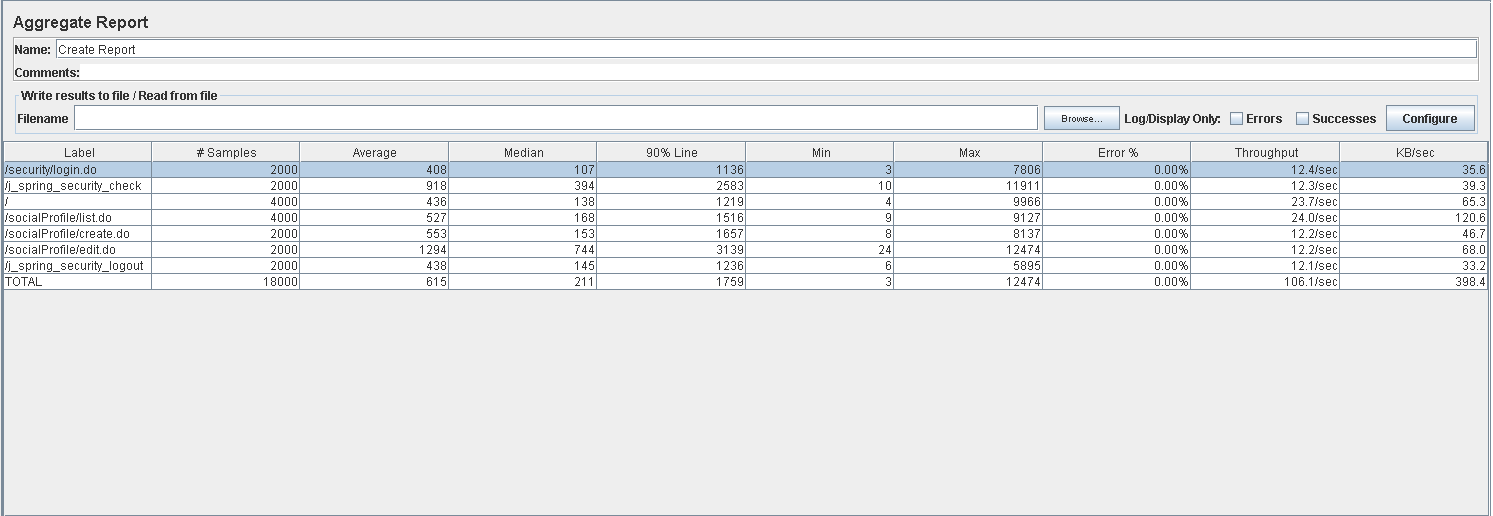
# Social profile

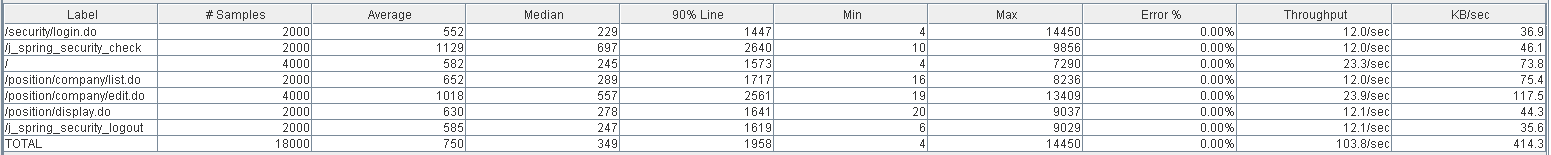
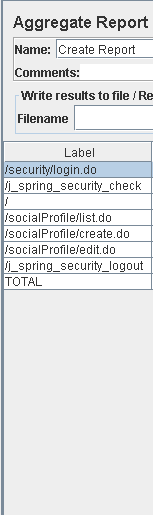
## Create

Sequence:

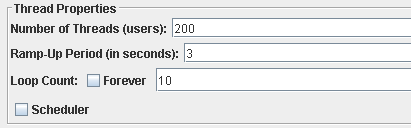


Aggregate Report:

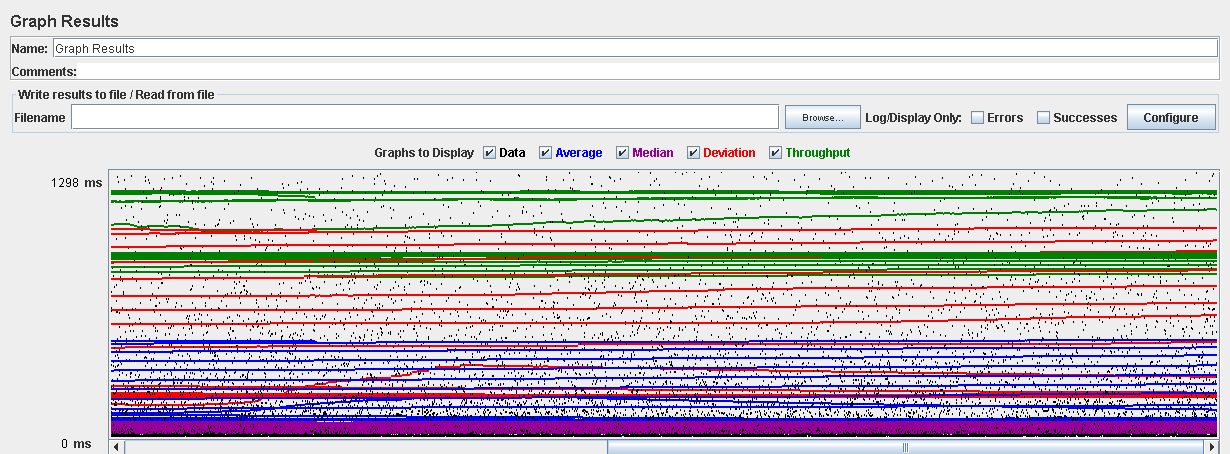




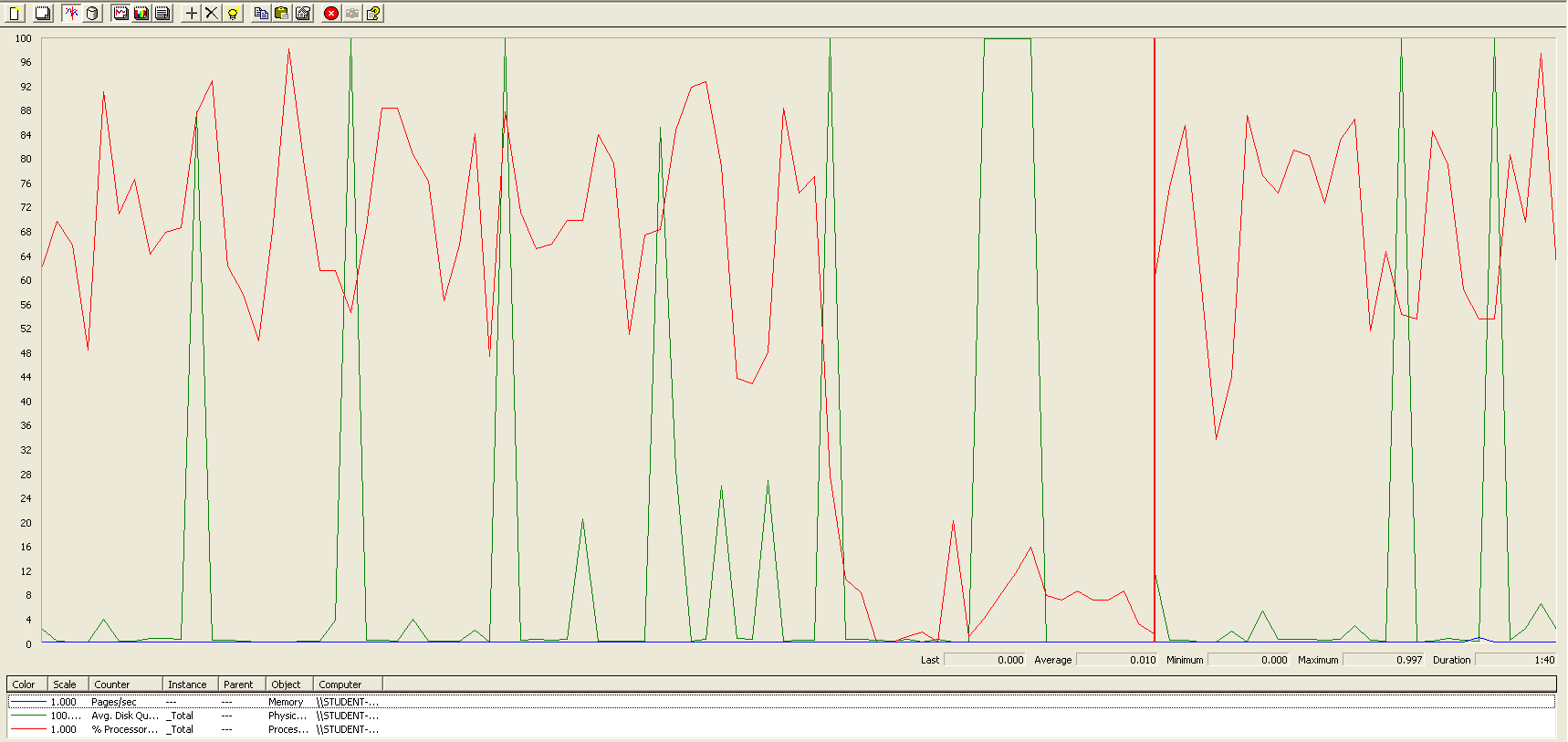
Thread properties:



Graph Results:



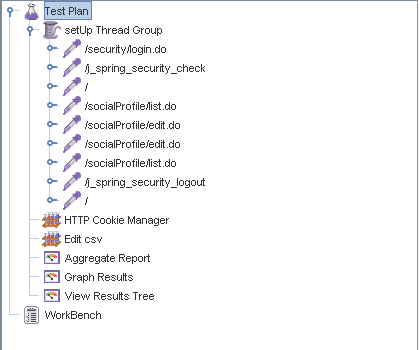
Performance Results:



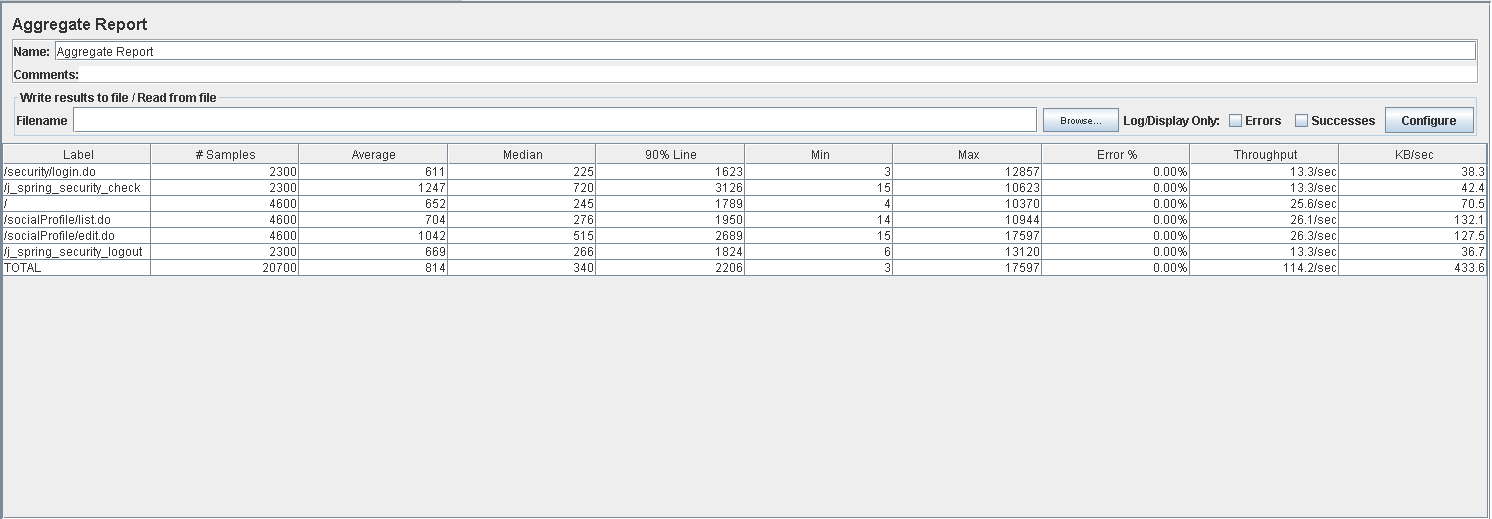
The CPU was always at its limit while the disk usage showed many peaks.

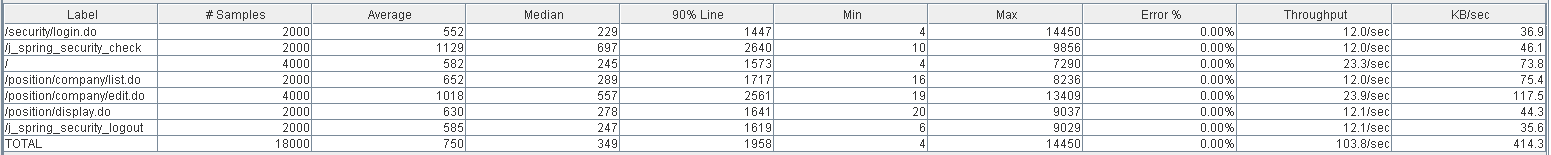
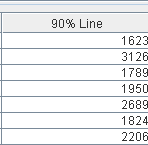
## Edit

Sequence:

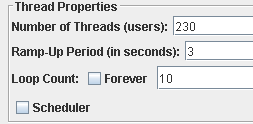


Aggregate Report:

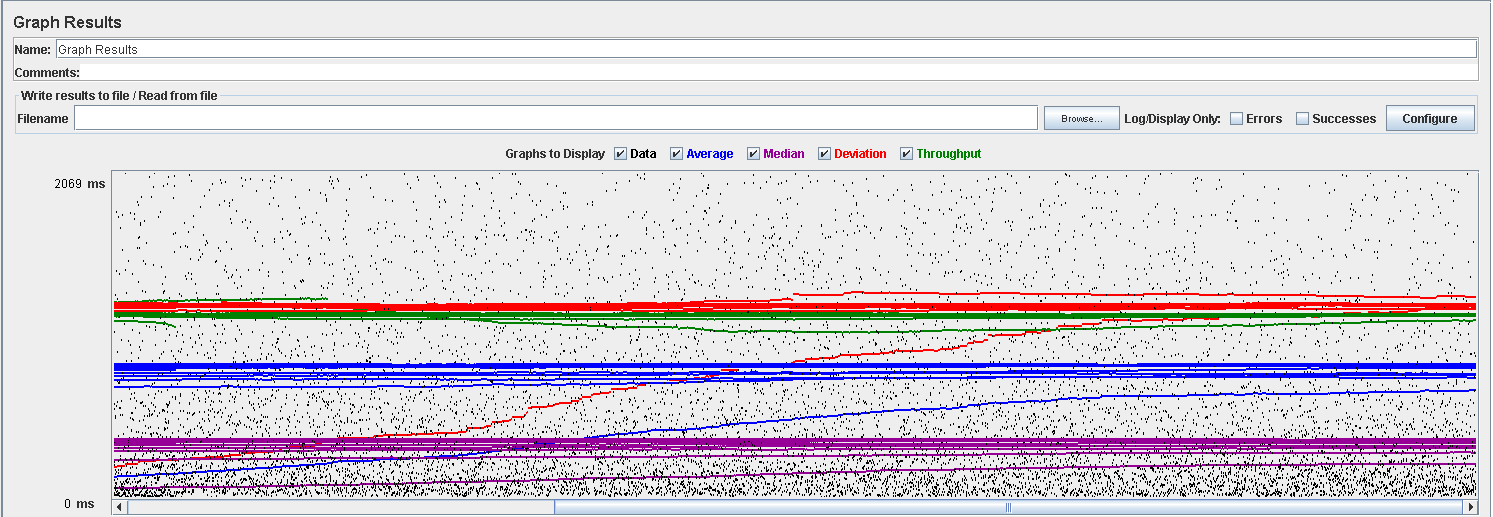




Thread properties:



Graph Results:



Performance Results:

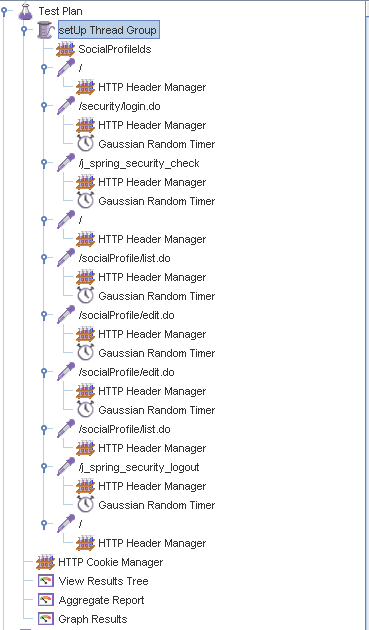


Again we can see that the CPU is always being used while the disk usage shows different peaks at times.

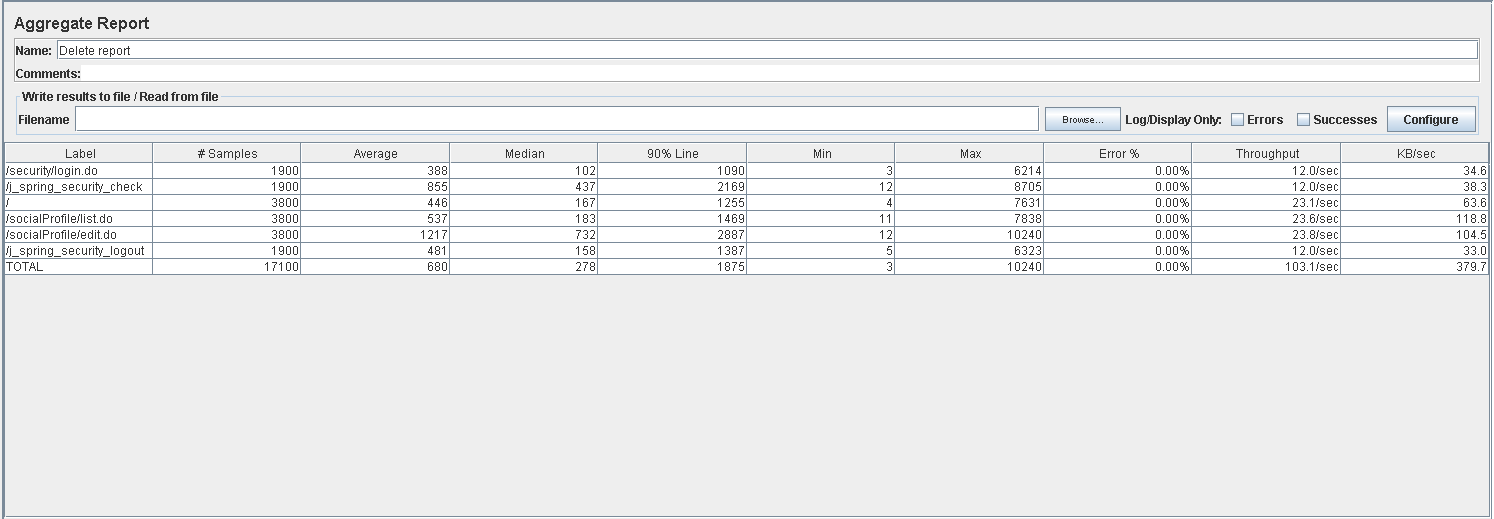
## 

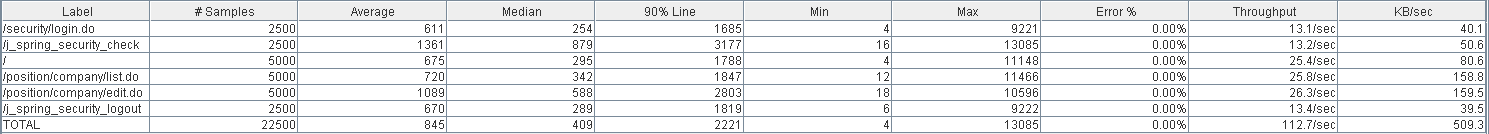
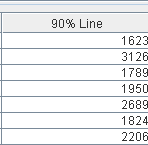
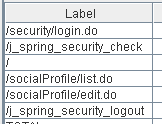
## Delete

Sequence:

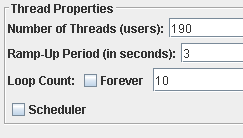


Aggregate Report:

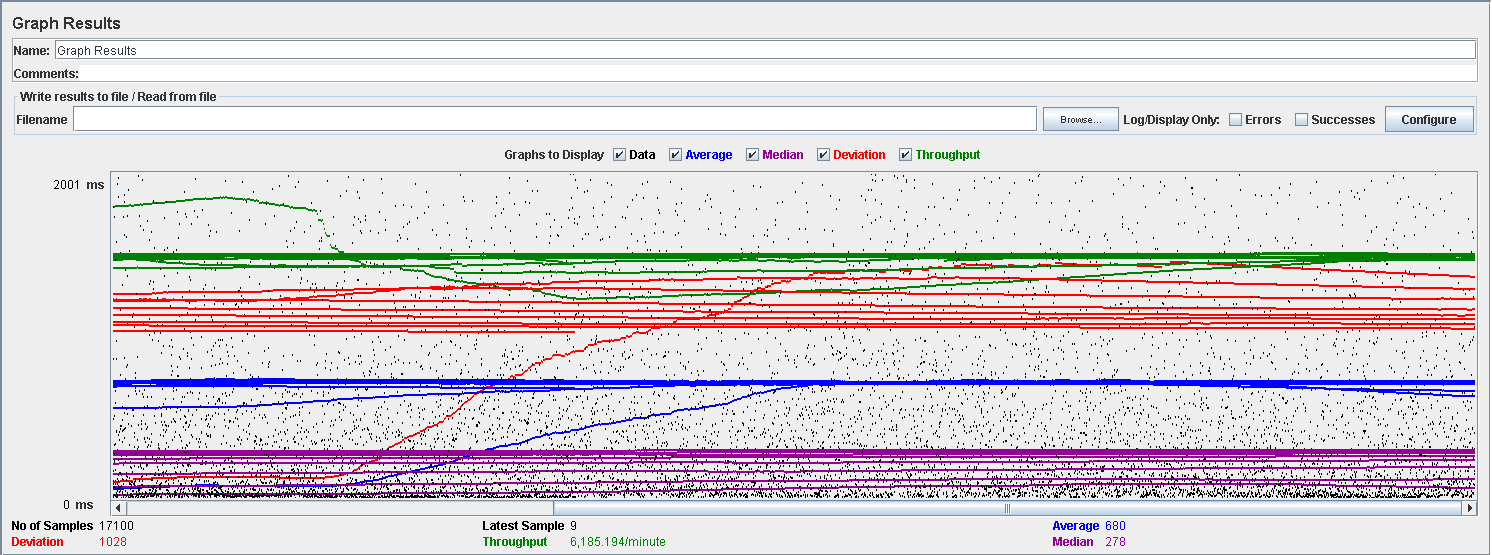




Thread properties:



Graph Results:



Performance Results:



Again we can see that the CPU is always being used while the disk usage shows some periodic peaks.

## Conclusion

The test was performed using:

CPU: i7 7700hq (2 cores in the virtual machine)

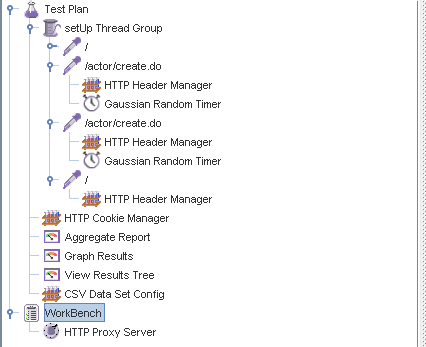
RAM: 4 GB (virtual machine)

For this use case we can say that the limitation occurs during the creation process, being the maximum of concurrent users 190.

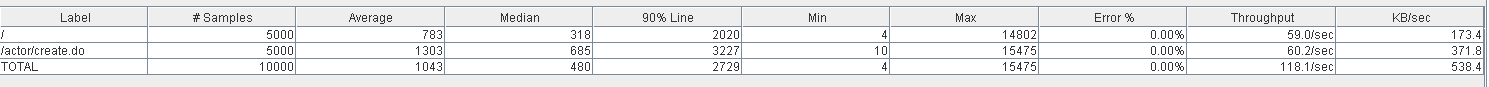
# Actor

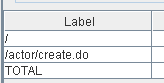
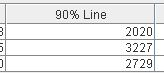
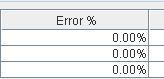
## Create

Sequence:

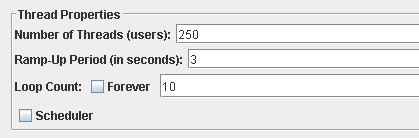


Aggregate Report:

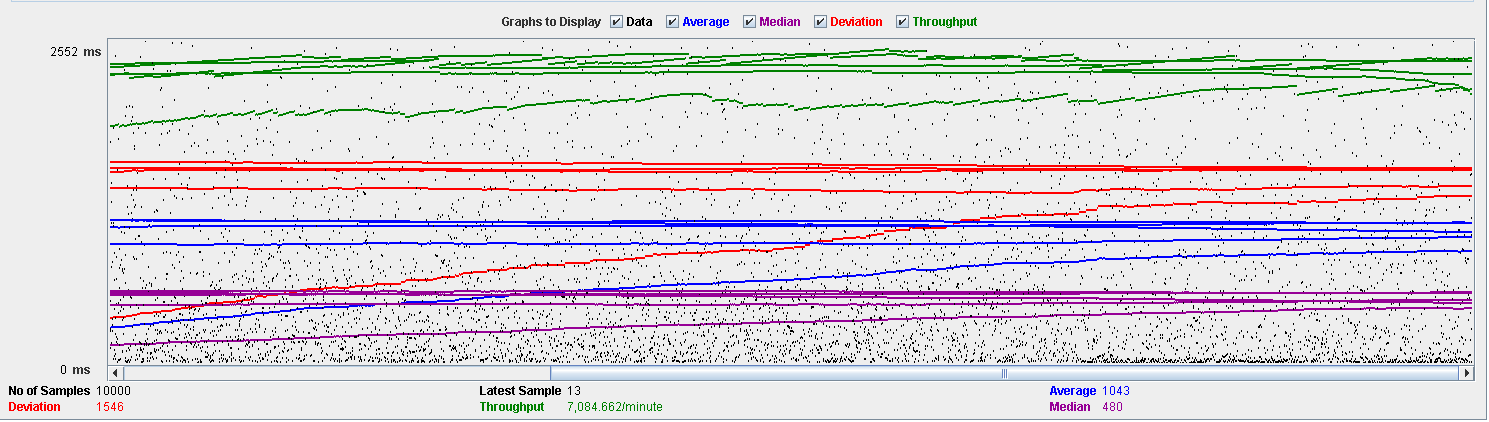


Thread properties:



Graph Results:



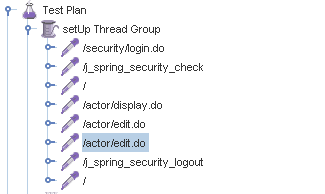
Performance Results:



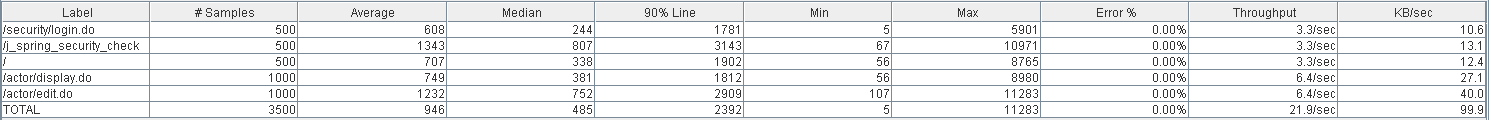
The CPU was always at its limit while the disk usage has a lot of peaks.

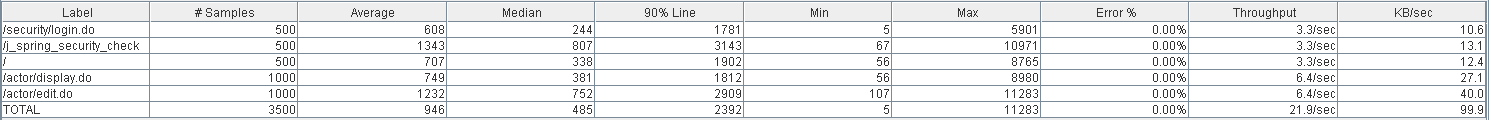
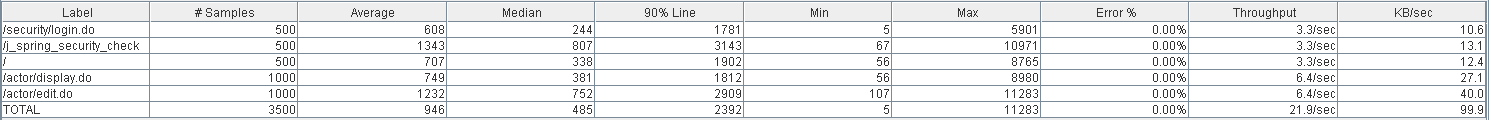
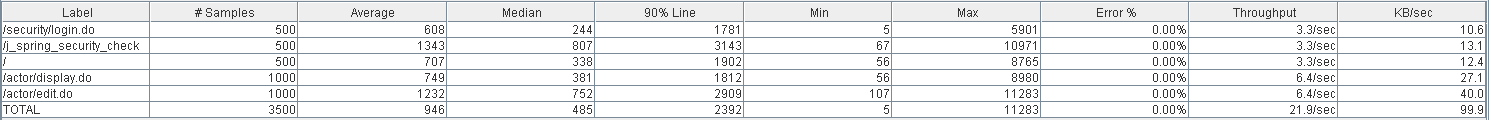
## Edit

Sequence:

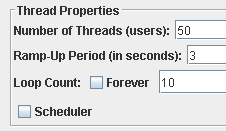


Aggregate Report:

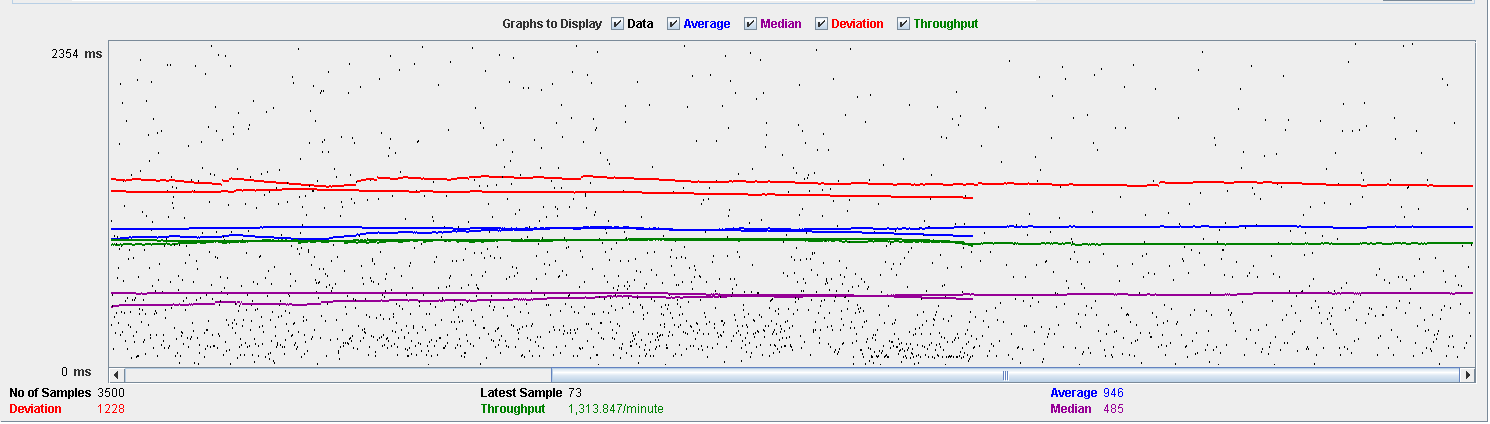




Thread properties:



Graph Results:



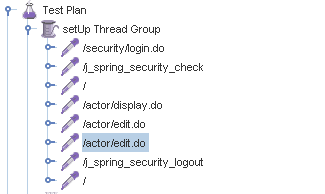
Performance Results:



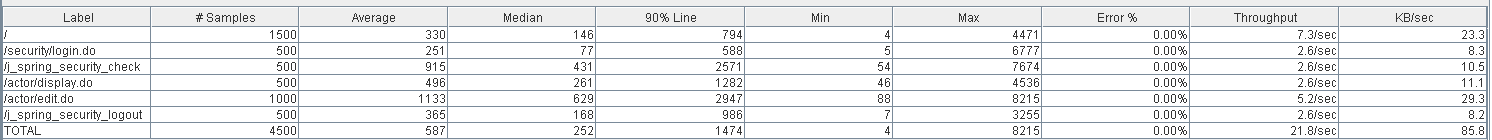
Again we can see that the CPU is always being used while the disk usage has some peaks at times.

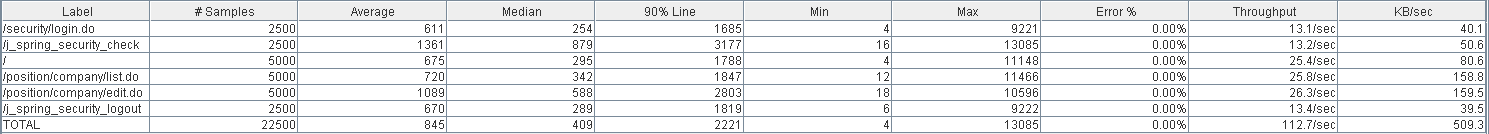
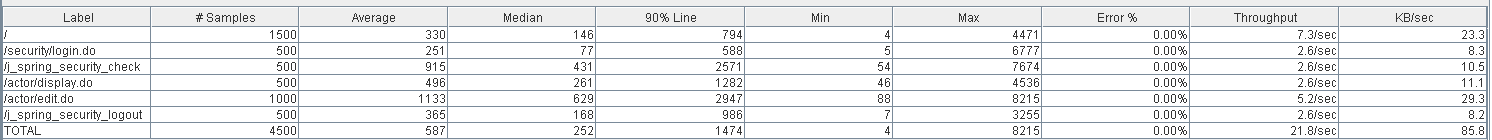
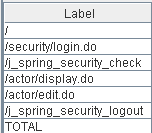
## Delete

Sequence:

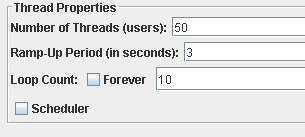


Aggregate Report:

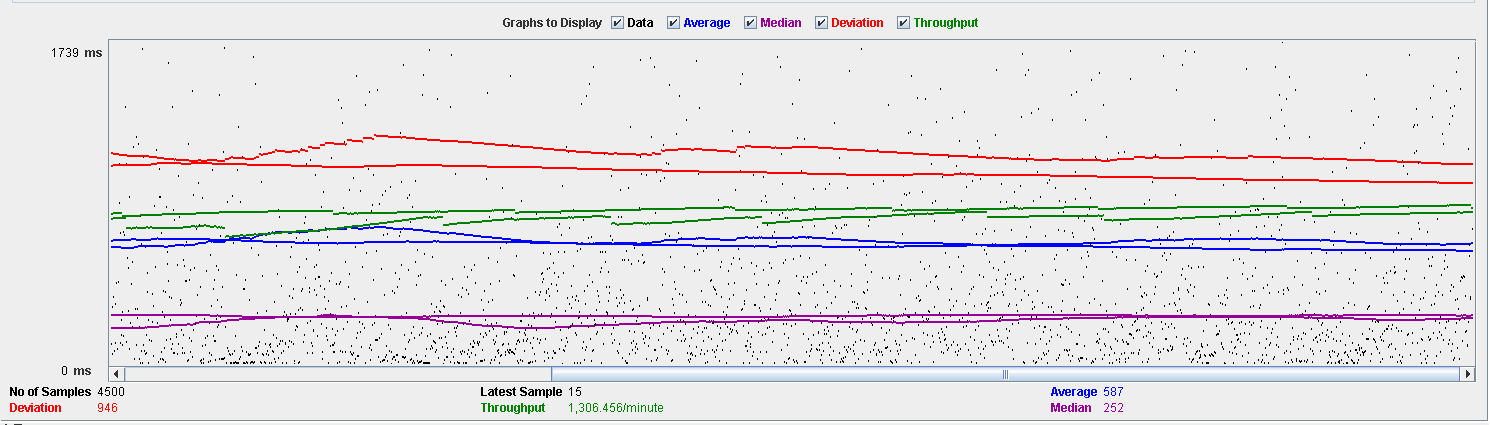




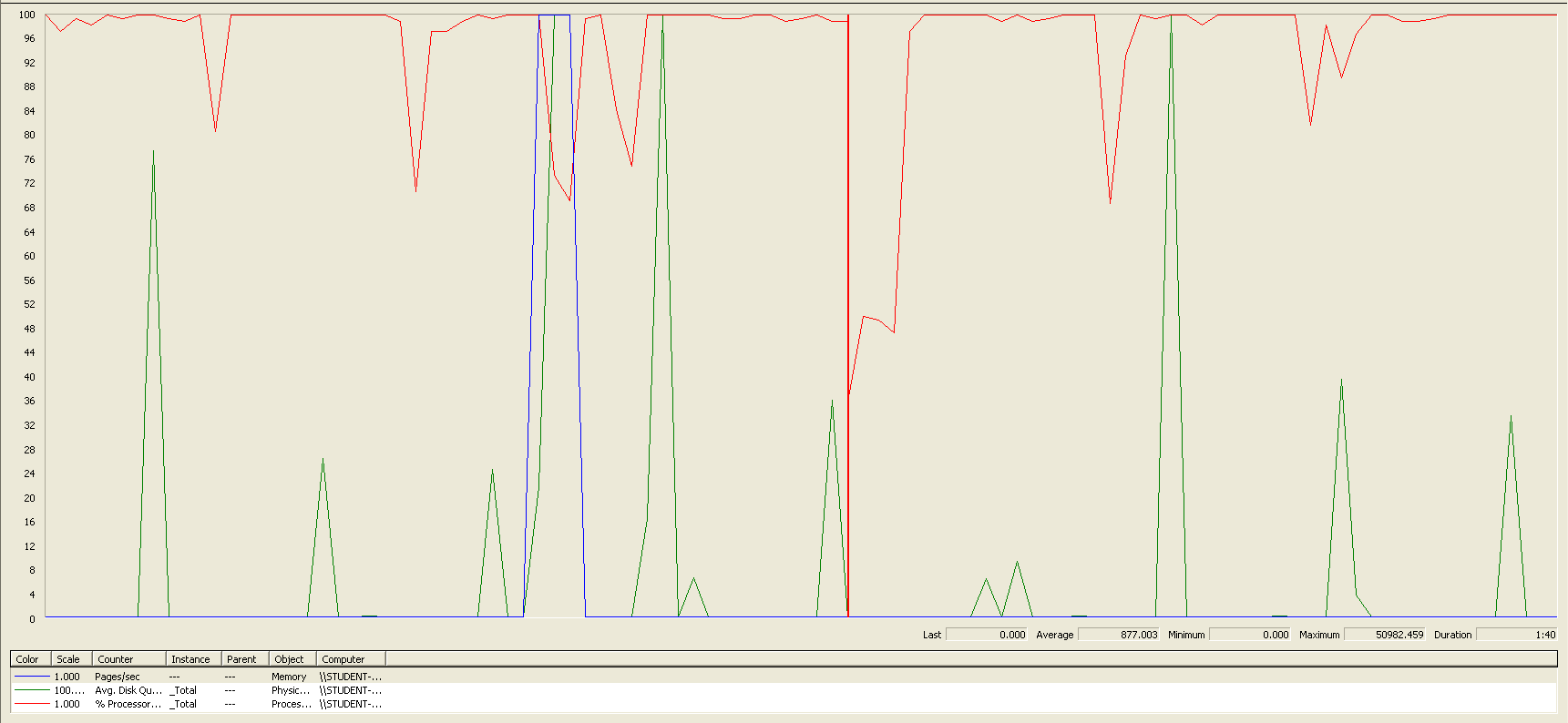
Thread properties:



Graph Results:



Performance Results:



Again we can see that the CPU is always being used while the disk usage has different peaks.

## Conclusion

The test was performed using:

CPU: i7 7700hq (2 cores in the virtual machine)

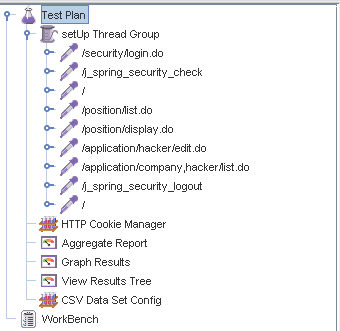
RAM: 4 GB (virtual machine)

For this use case we can say that the limitation occurs during the creation process, being the maximum of concurrent users is 50.

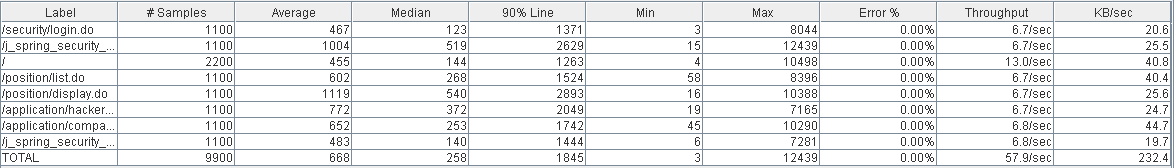
# Application

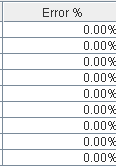
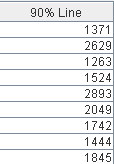
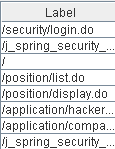
## Create

Sequence:

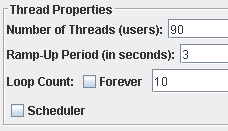


Aggregate Report:





Thread properties:



Graph Results:



Performance Results:



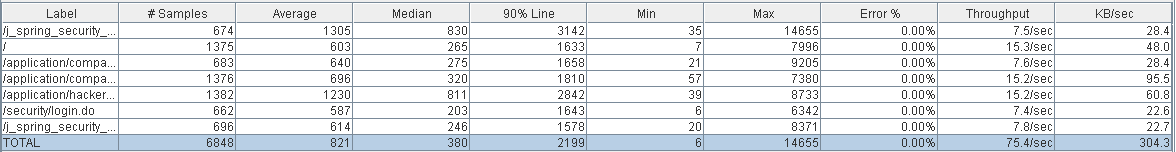
The CPU was always at its limit while the disk usage has some peaks.

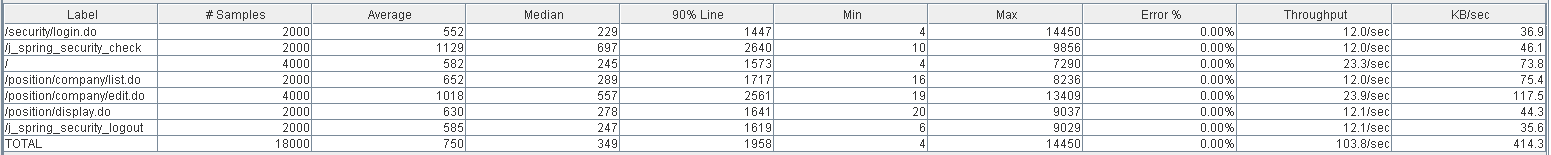
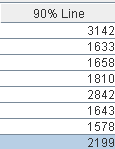
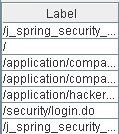
## Edit

Sequence:

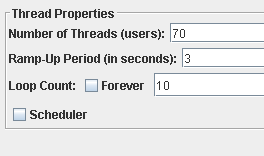


Aggregate Report:

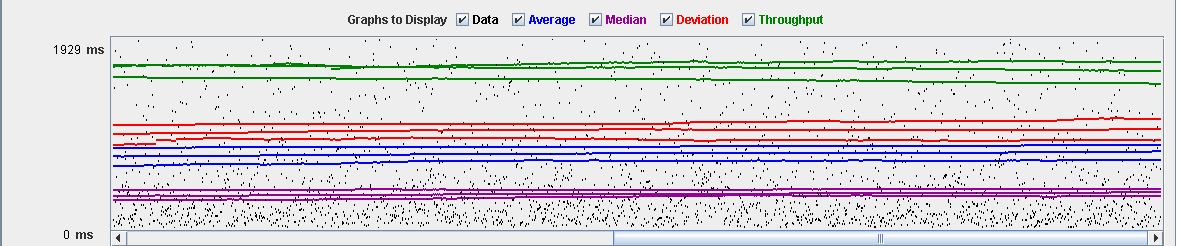




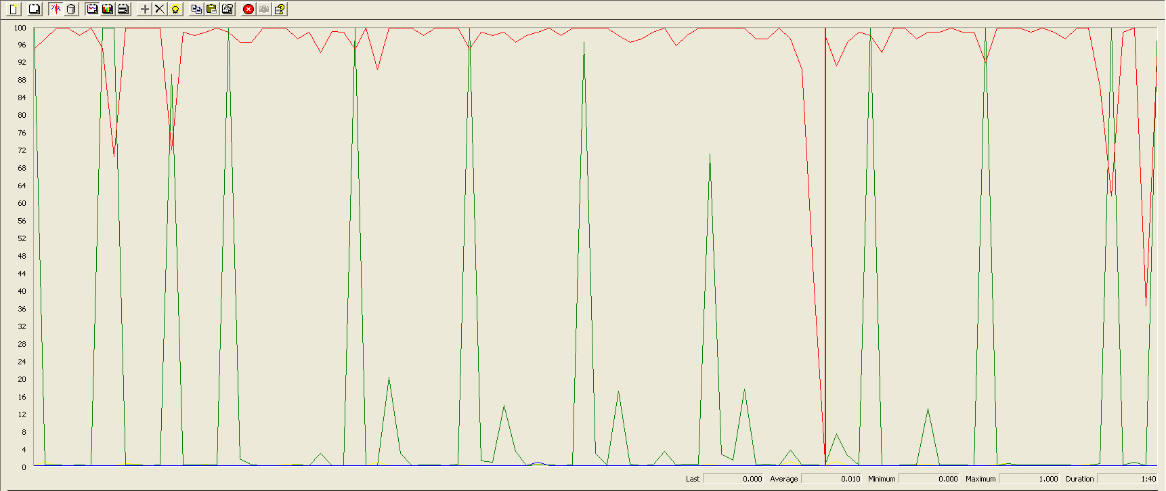
Thread properties:



Graph Results:



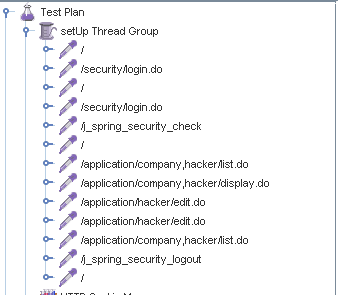
Performance Results:



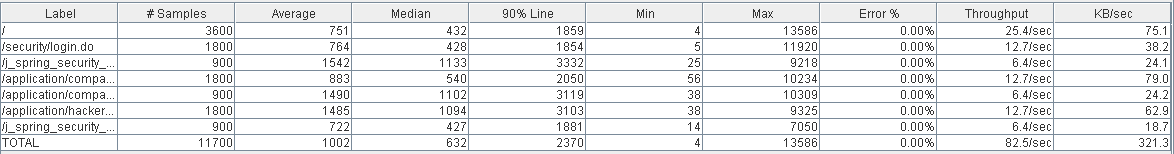
Again we can see that the CPU is always being used while the disk usage has low peaks at times.

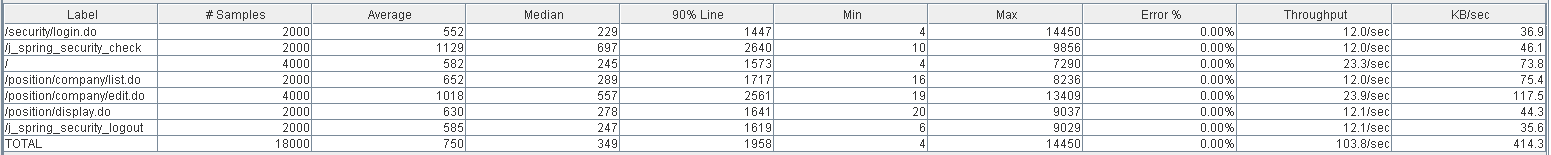
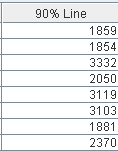
## Delete

Sequence:

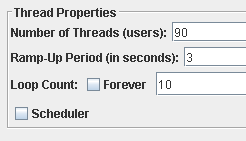


Aggregate Report:

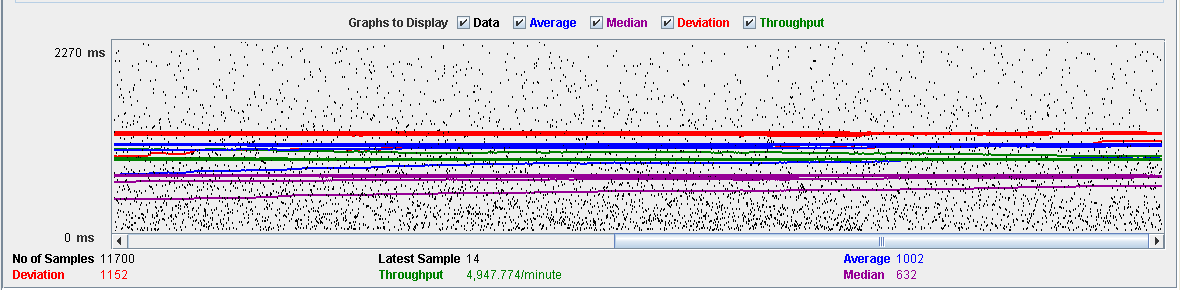




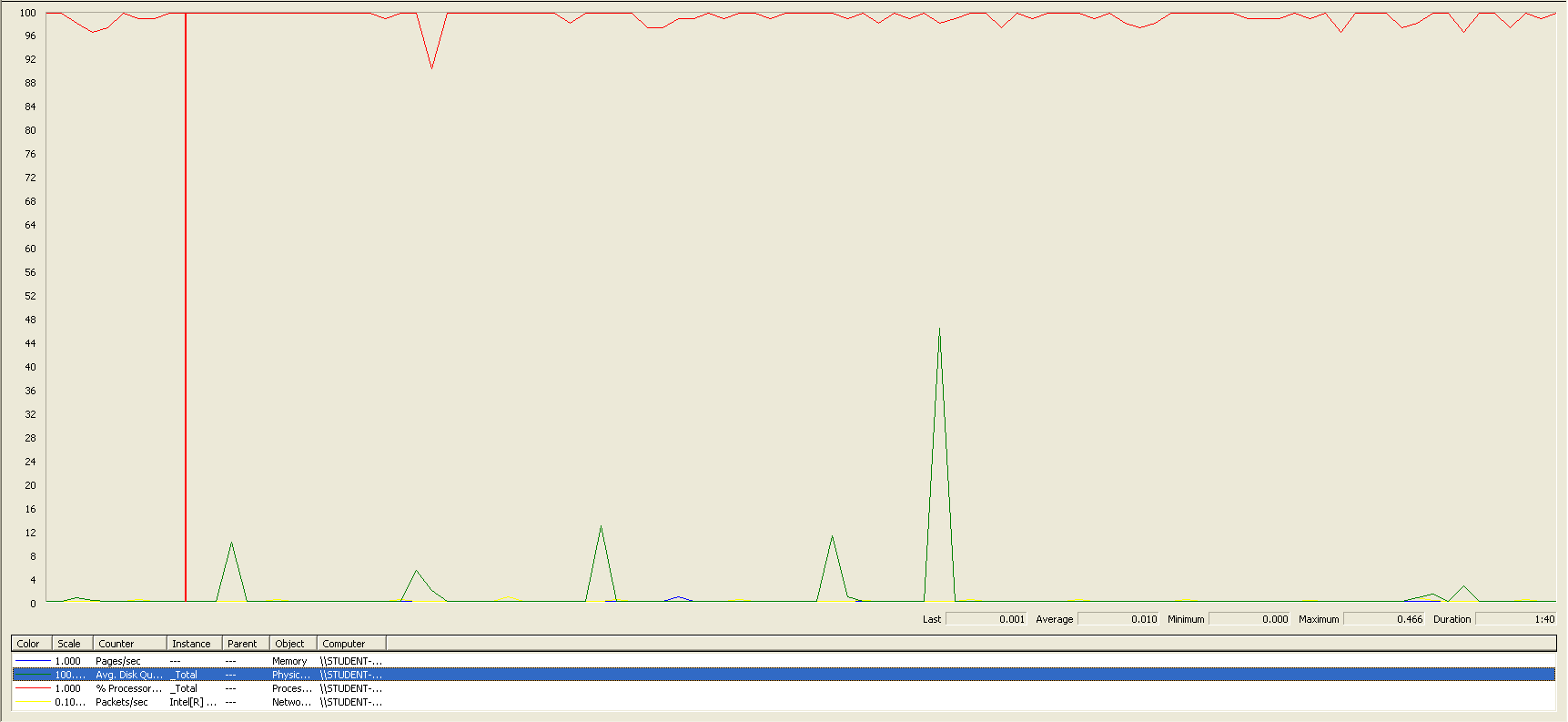
Thread properties:



Graph Results:



Performance Results:



Again we can see that the CPU is always being used while the disk usage has different peaks.

## Conclusion

The test was performed using:

CPU: i7 7700hq (2 cores in the virtual machine)

RAM: 4 GB (virtual machine)

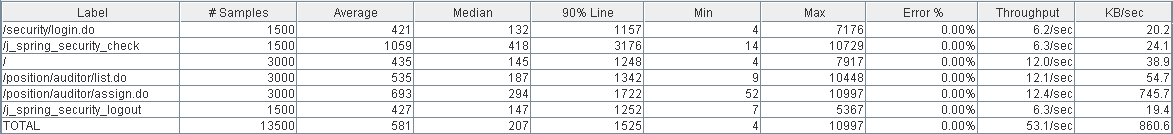
For this use case we can say that the limitation occurs during the creation process, being the maximum of concurrent users 70.

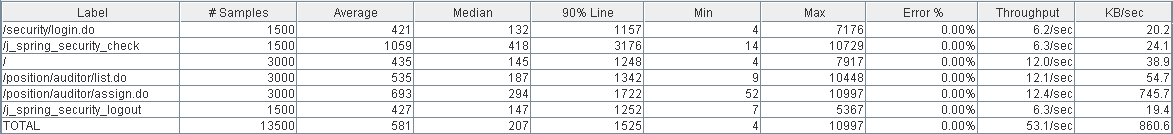
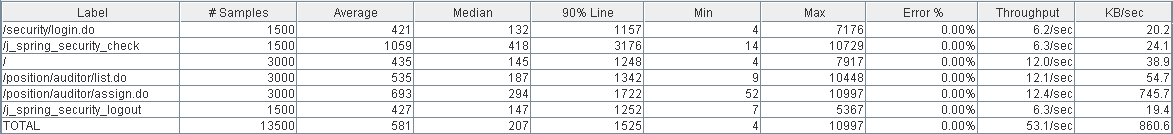
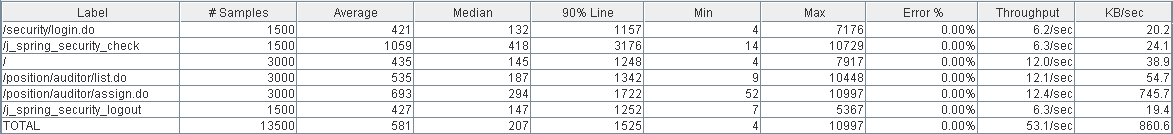
# Audit

## Assign

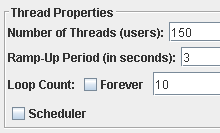


Aggregate Report:

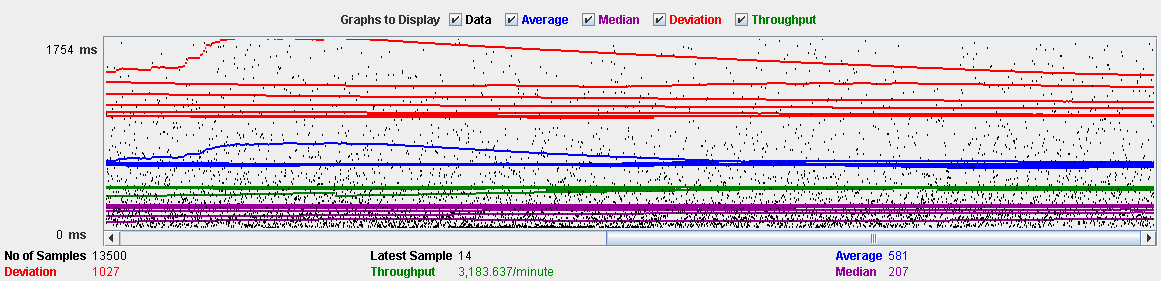




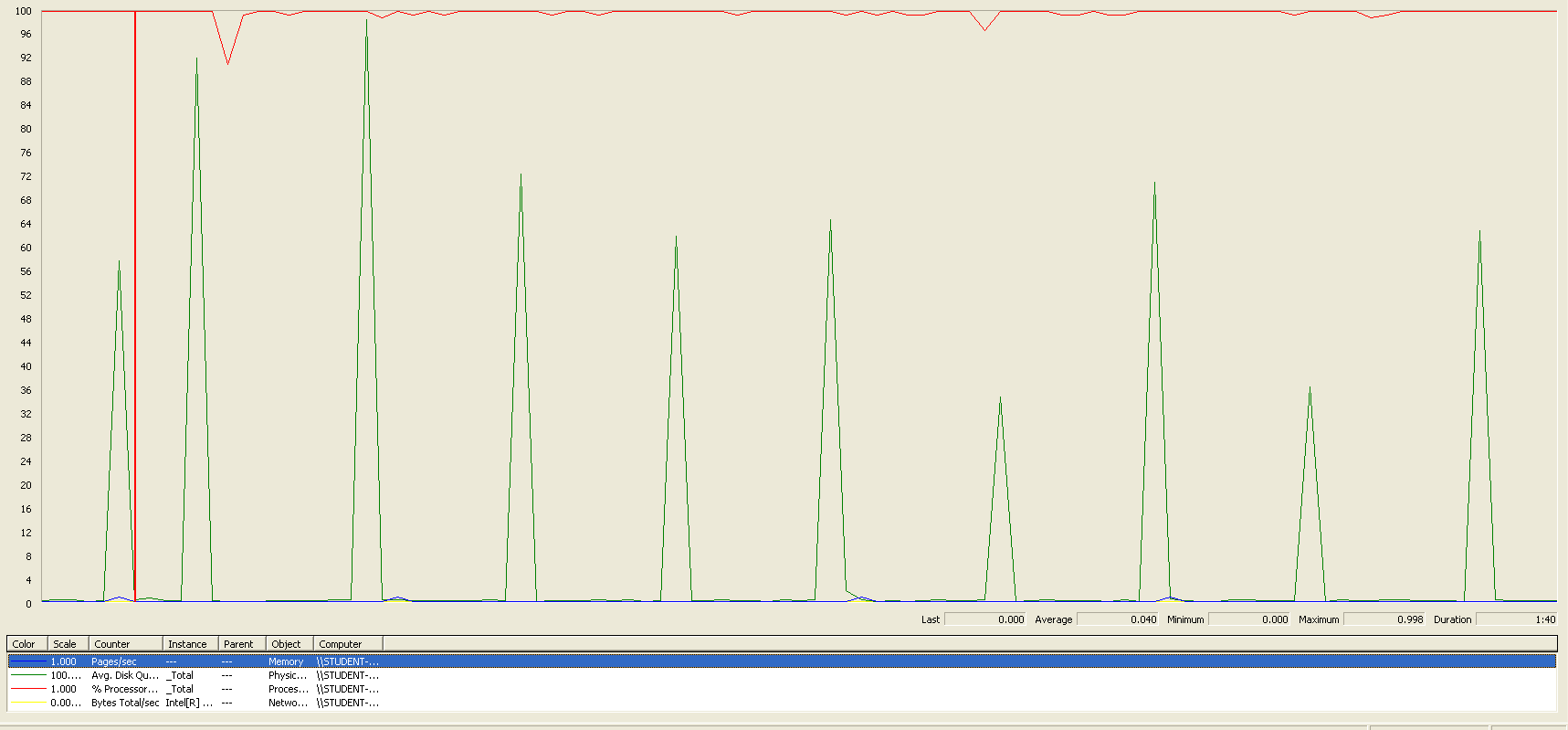
Thread properties:



Graph Results:



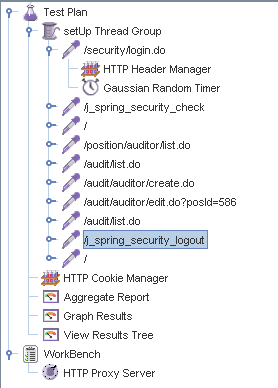
Performance Results:



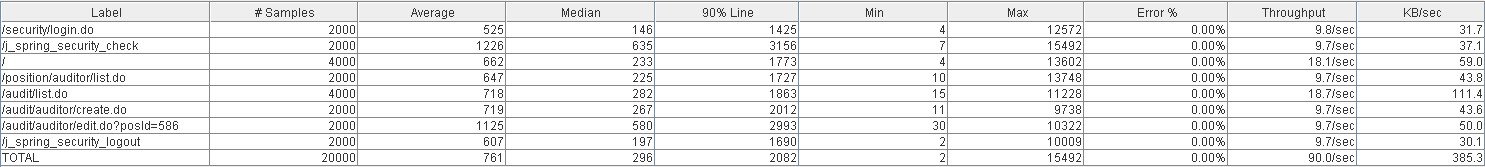
The CPU was always at its limit while the disk usage showed many peaks.

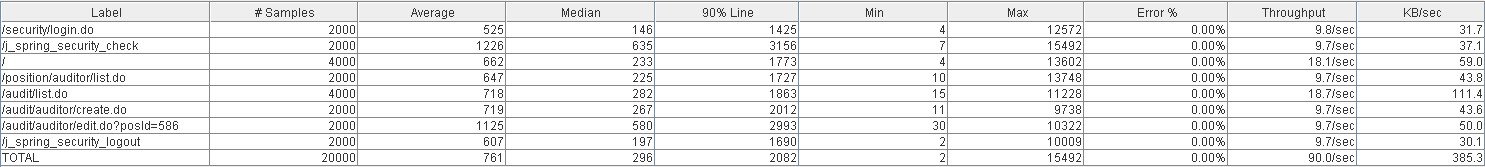
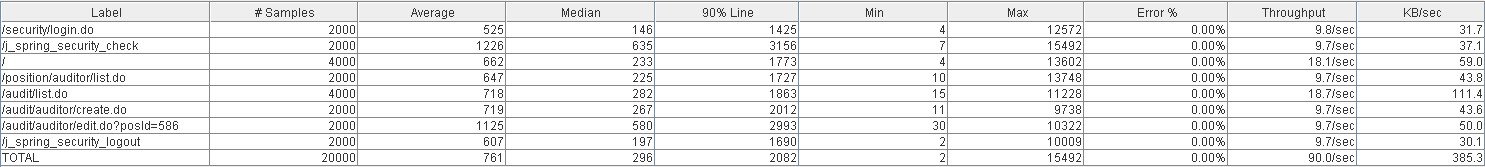
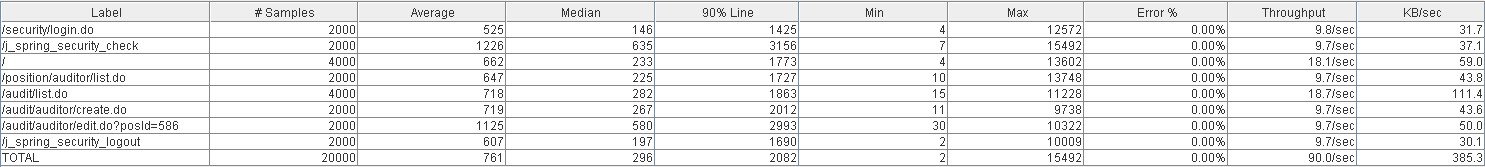
## Create

Sequence:

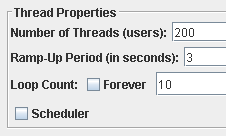


Aggregate Report:

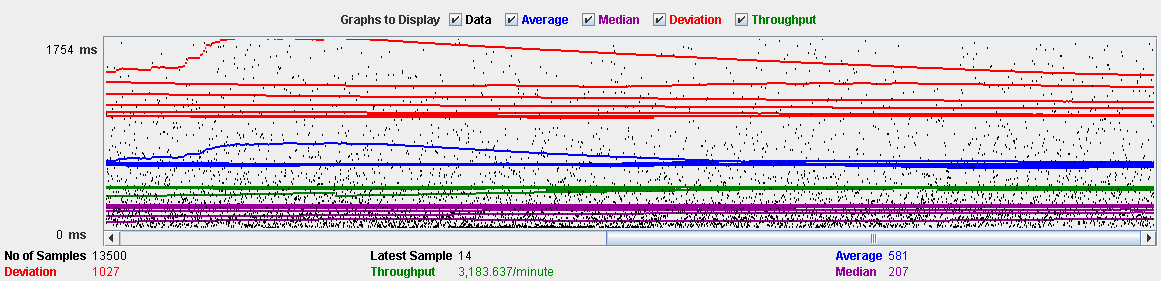




Thread properties:



Graph Results:



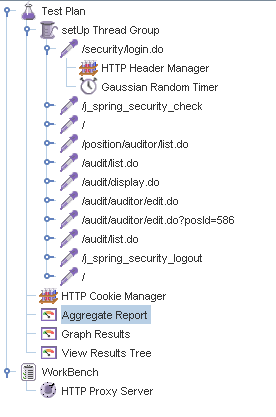
Performance Results:



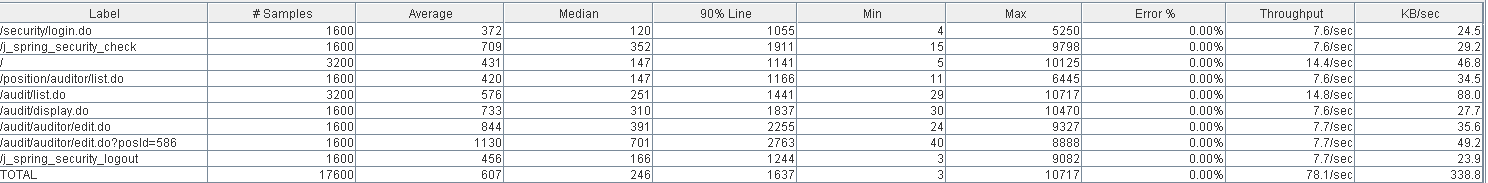
The CPU was always at its limit in various points of the execution while the disk usage showed many peaks.

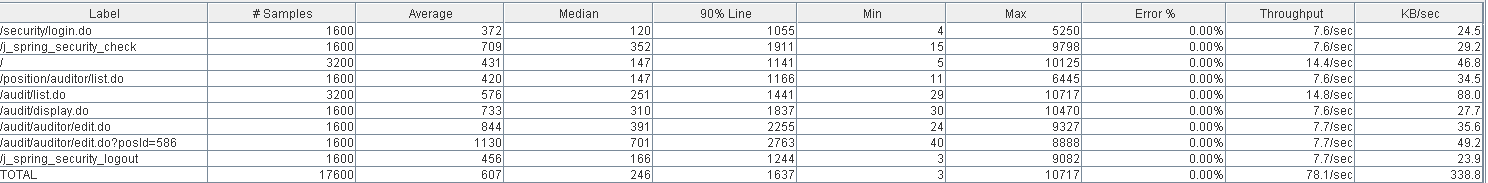
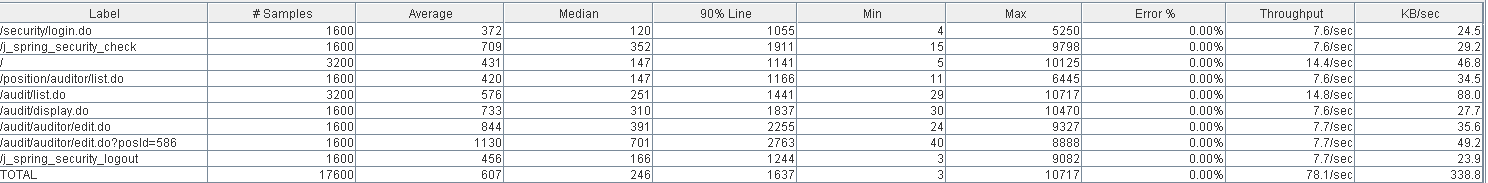
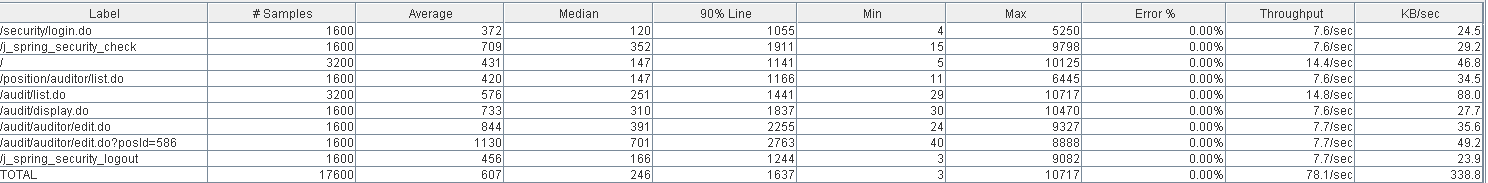
## Edit

Sequence:

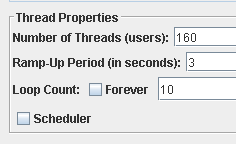


Aggregate Report:

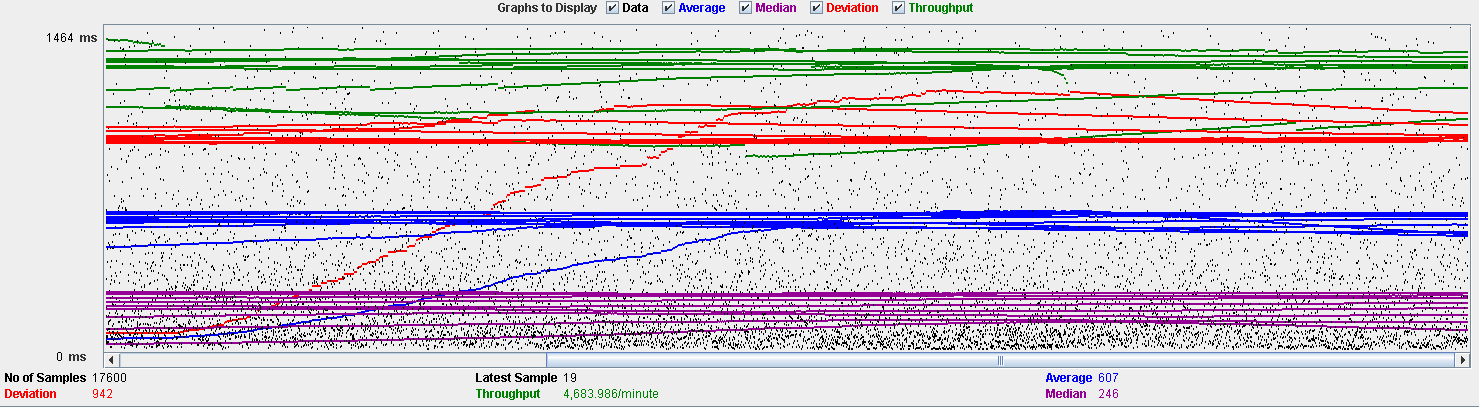




Thread properties:



Graph Results:



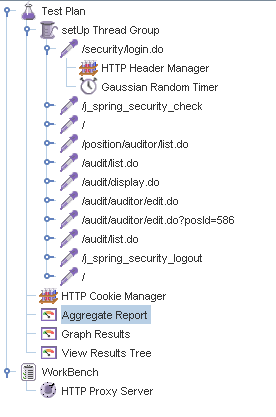
Performance Results:



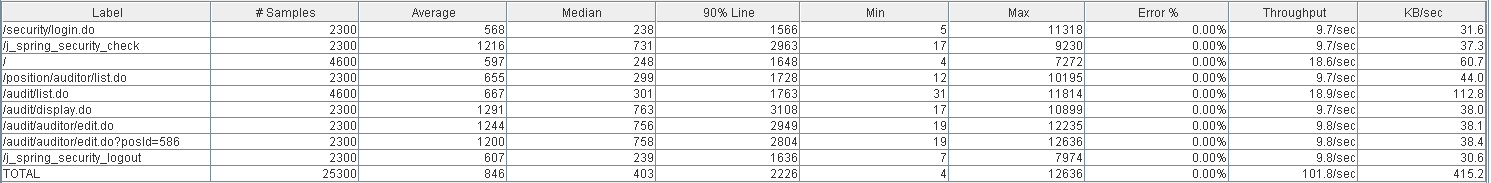
The CPU was always at its limit while the disk usage showed many peaks.

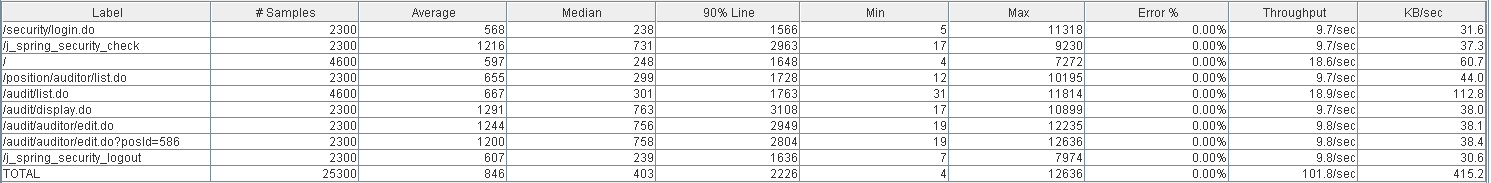
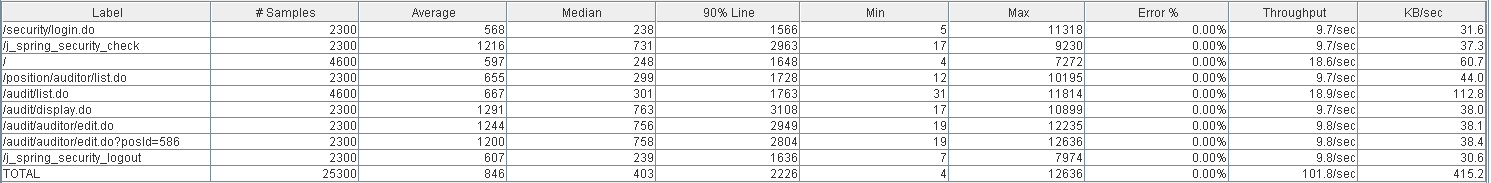
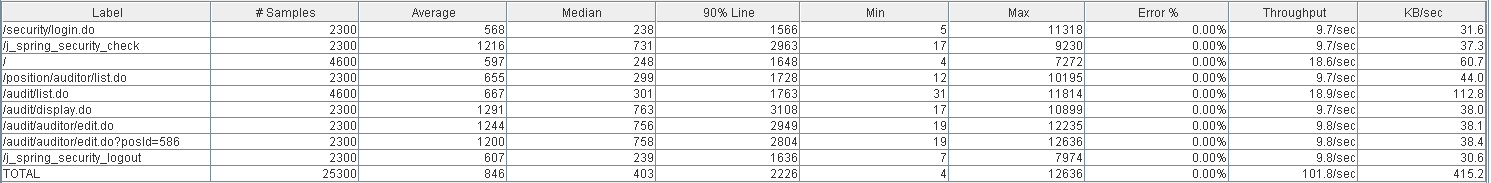
## Delete

Sequence:

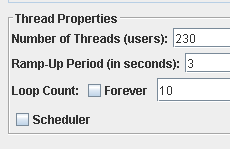


Aggregate Report:

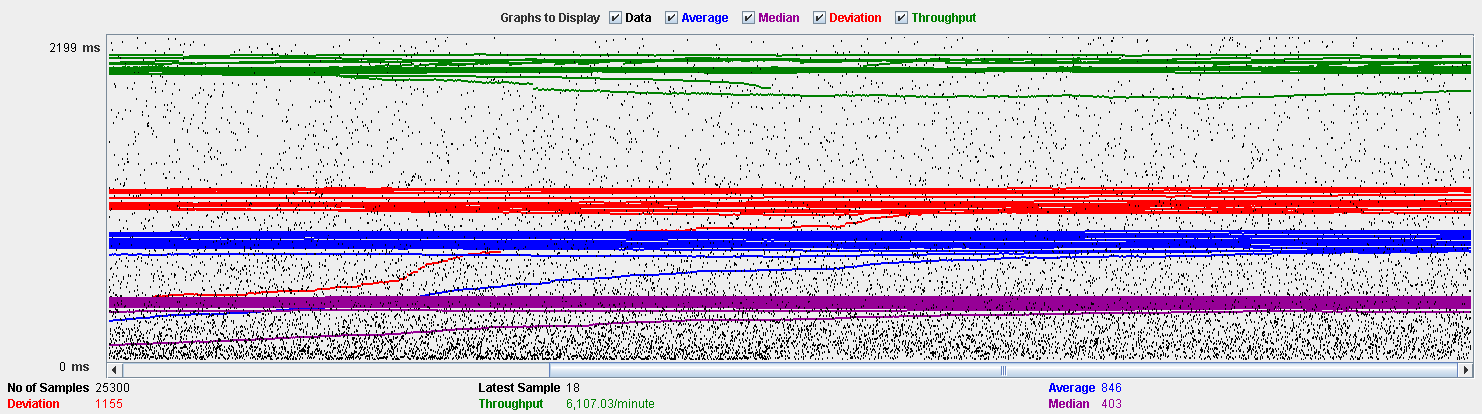




Thread properties:



Graph Results:



Performance Results:



The CPU was always at its limit.

## Conclusion

The test was performed using:

CPU: i7 6700hq (2 cores in the virtual machine)

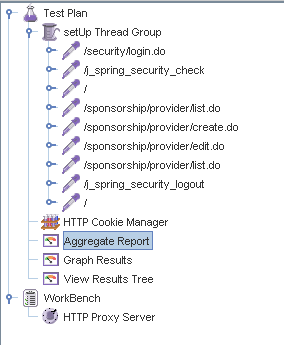
RAM: 4 GB (virtual machine)

For this use case we can say that the limitation occurs during the assign process, being the maximum of concurrent users 150.

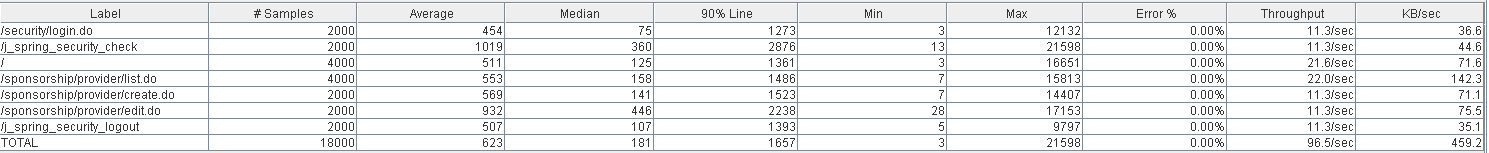
# Sponsorship

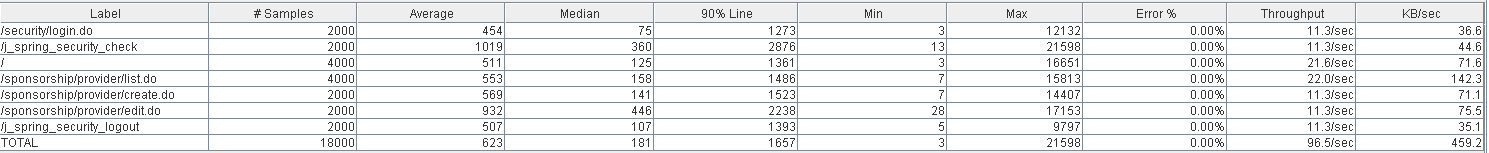
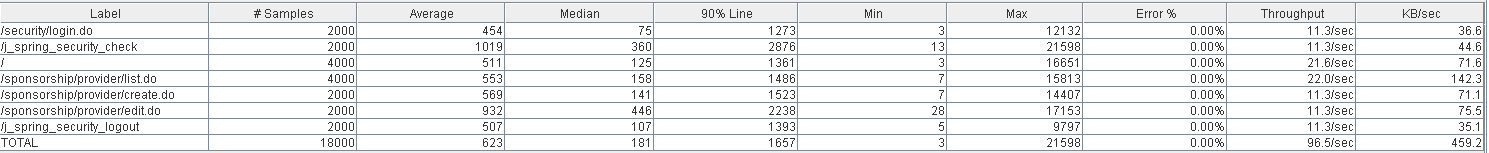
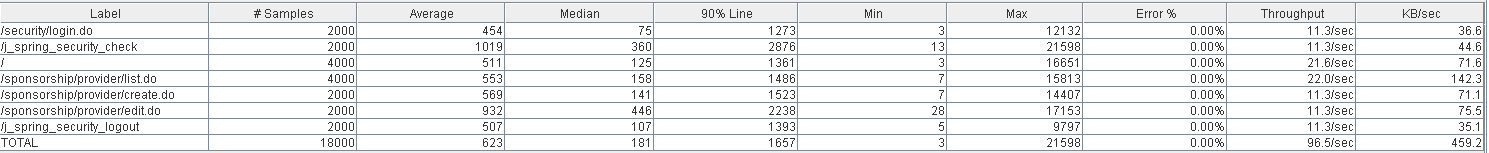
## Create

Sequence:

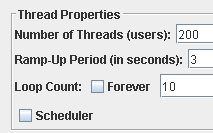


Aggregate Report:

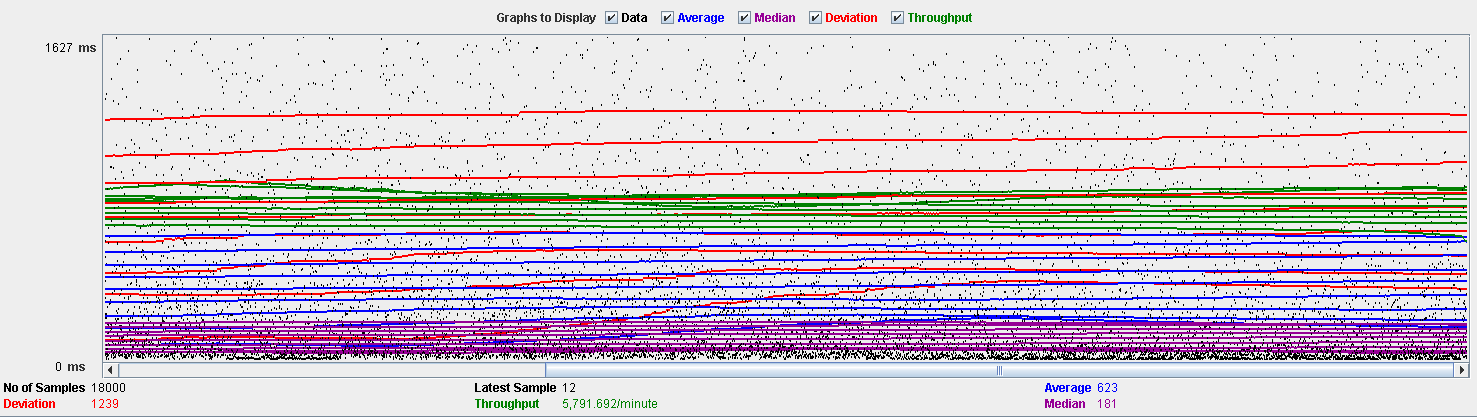




Thread properties:



Graph Results:



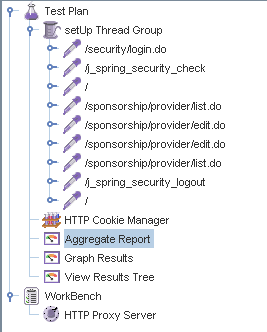
Performance Results:



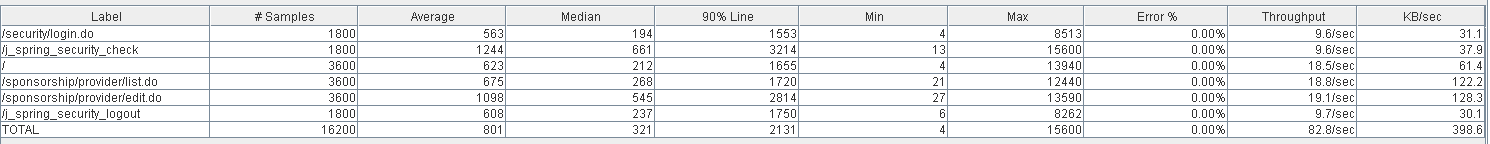
The CPU was always at its limit while the disk usage showed many peaks.

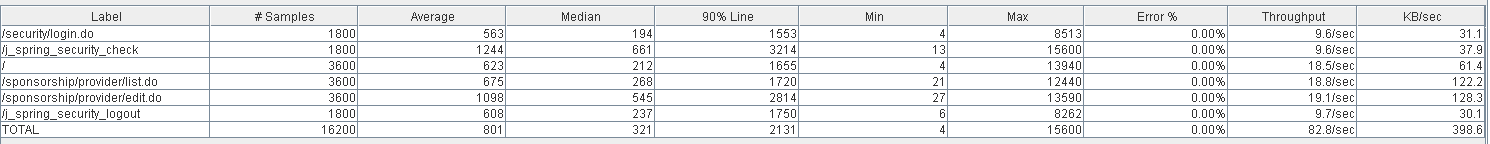
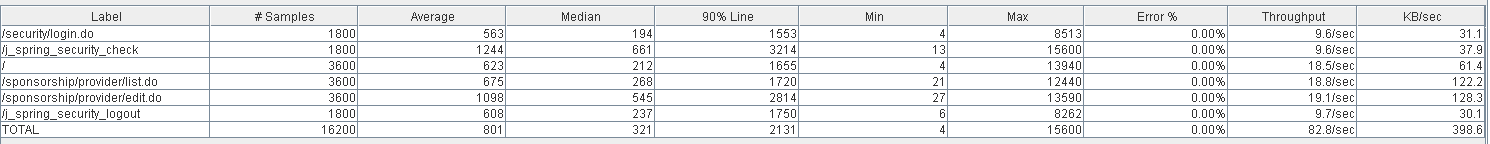
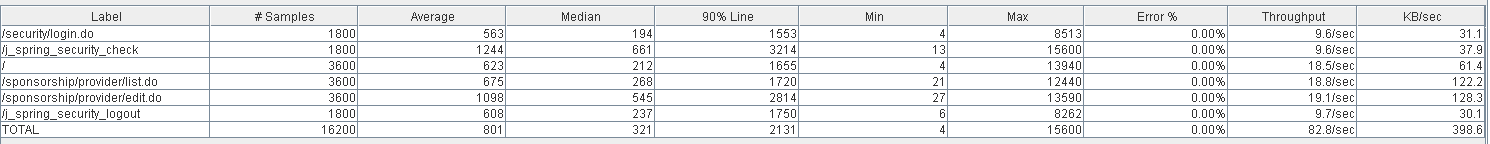
## Edit

Sequence:

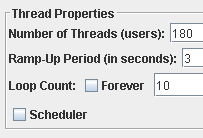


Aggregate Report:

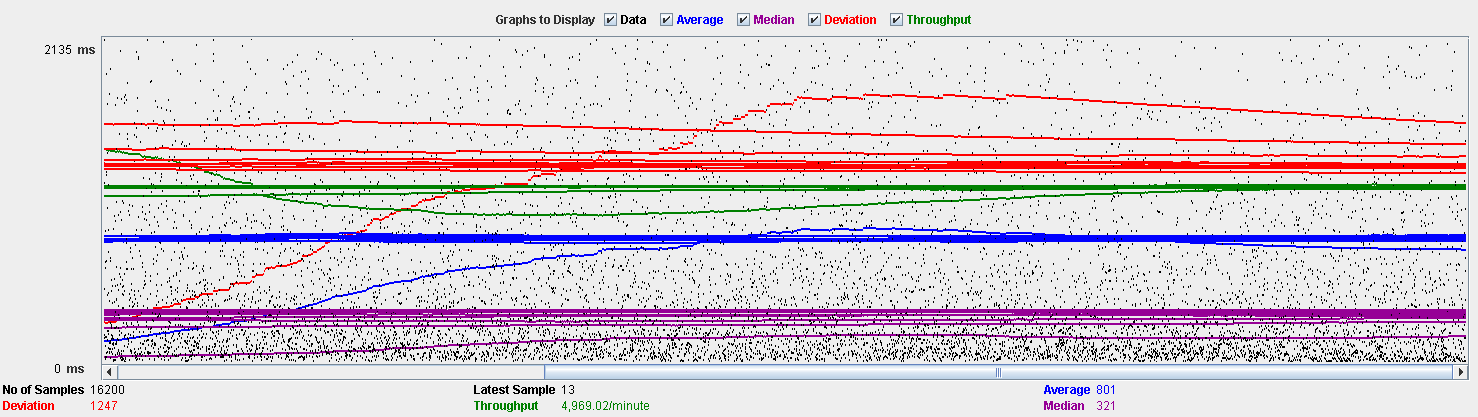




Thread properties:



Graph Results:



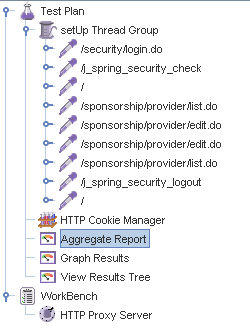
Performance Results:



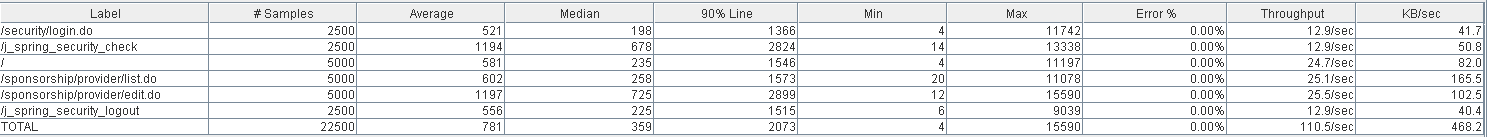
The CPU was always at its limit.

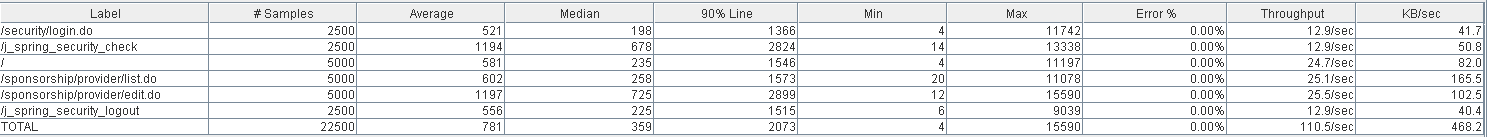
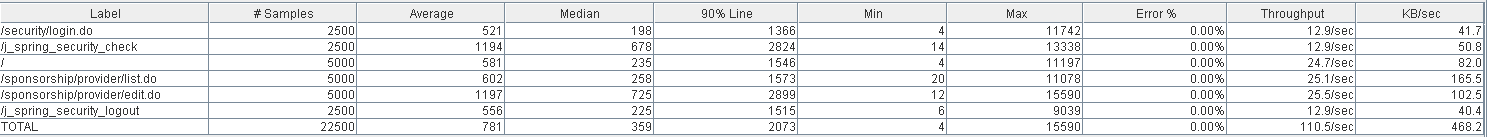
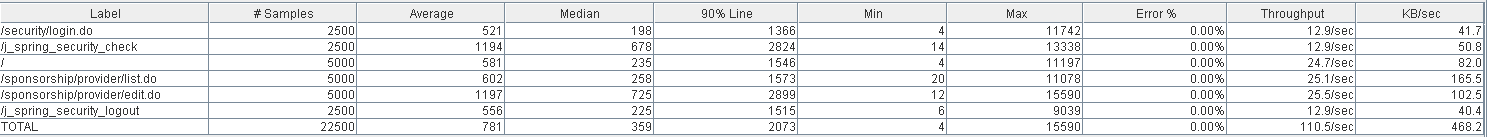
## Delete

Sequence:

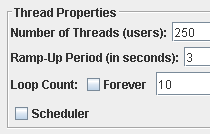


Aggregate Report:

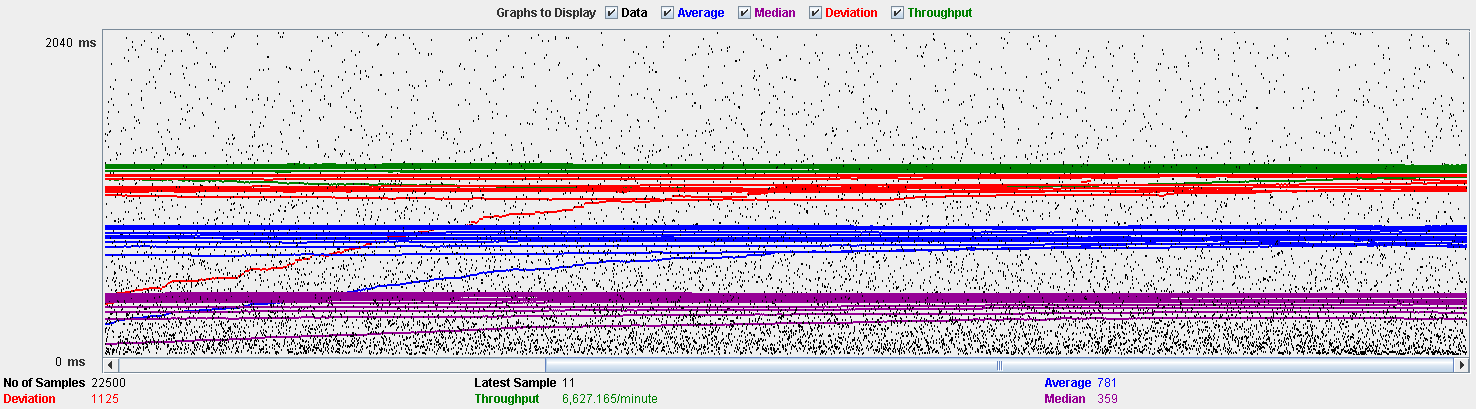




Thread properties:



Graph Results:



Performance Results:



The CPU was always at its limit.

## Conclusion

The test was performed using:

CPU: i7 6700hq (2 cores in the virtual machine)

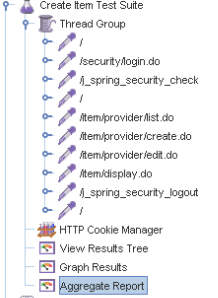
RAM: 4 GB (virtual machine)

For this use case we can say that the limitation occurs during the edit process, being the maximum of concurrent users 180.

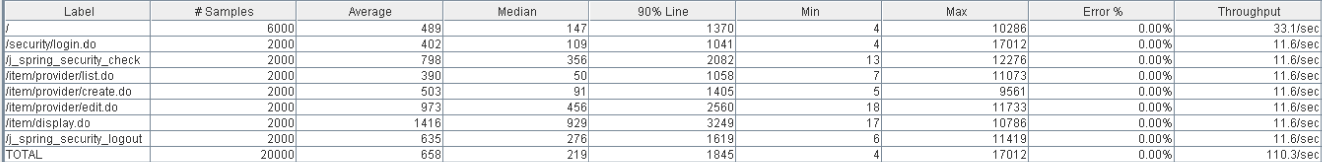
# Item

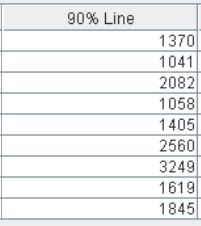
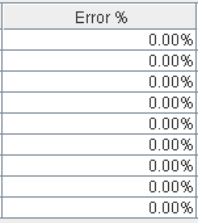
## Create

Sequence:

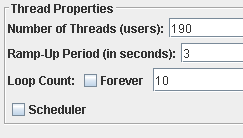


Aggregate Report:

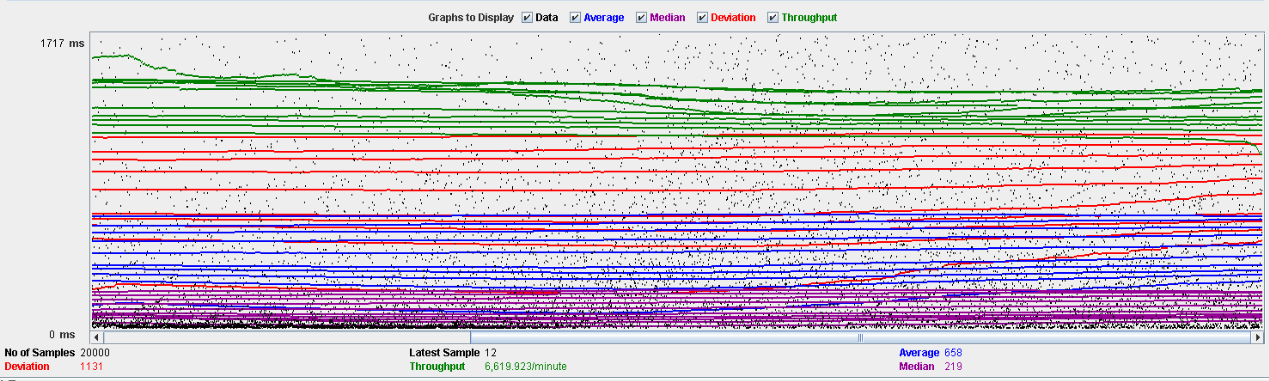


Thread properties:



Graph Results:



Performance Results:



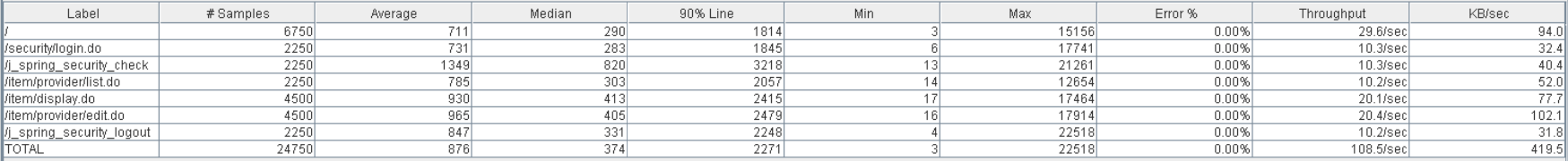
The CPU was always at its limit while the disk usage has some peaks.

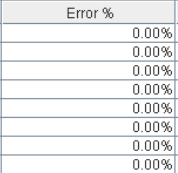
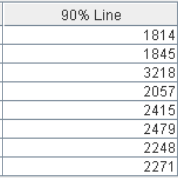
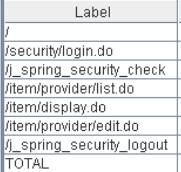
## Edit

Sequence:

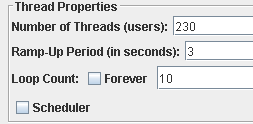


Aggregate Report:

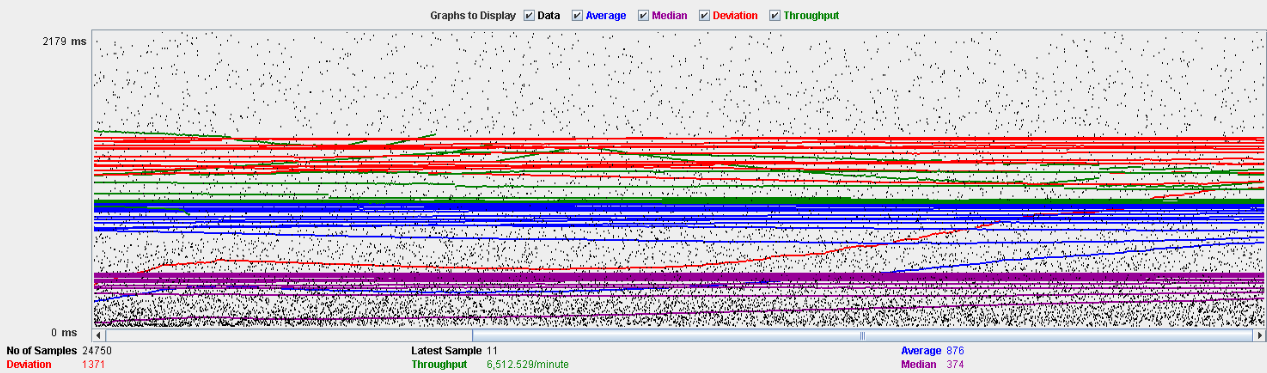




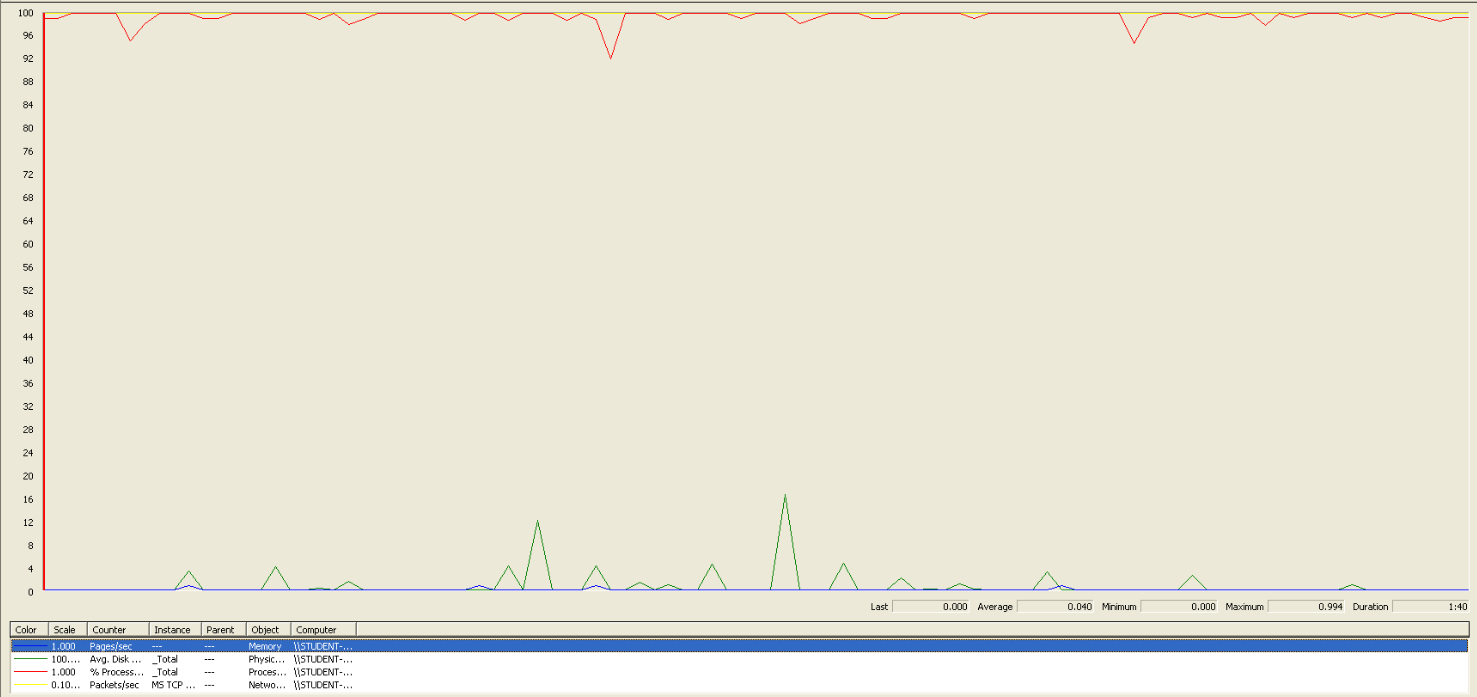
Thread properties:



Graph Results:



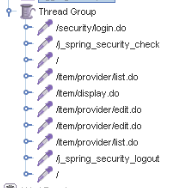
Performance Results:



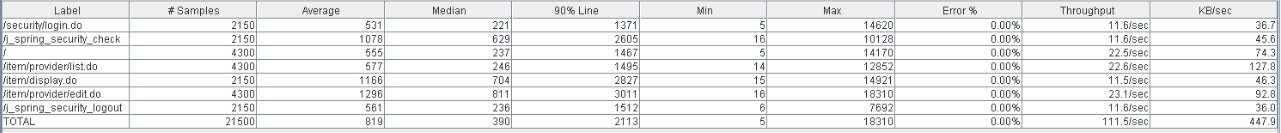
Again we can see that the CPU is always being used, is the problem in this use case.

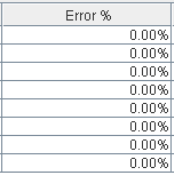
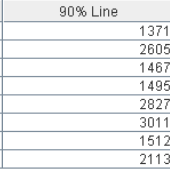
## Delete

Sequence:

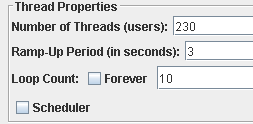


Aggregate Report:

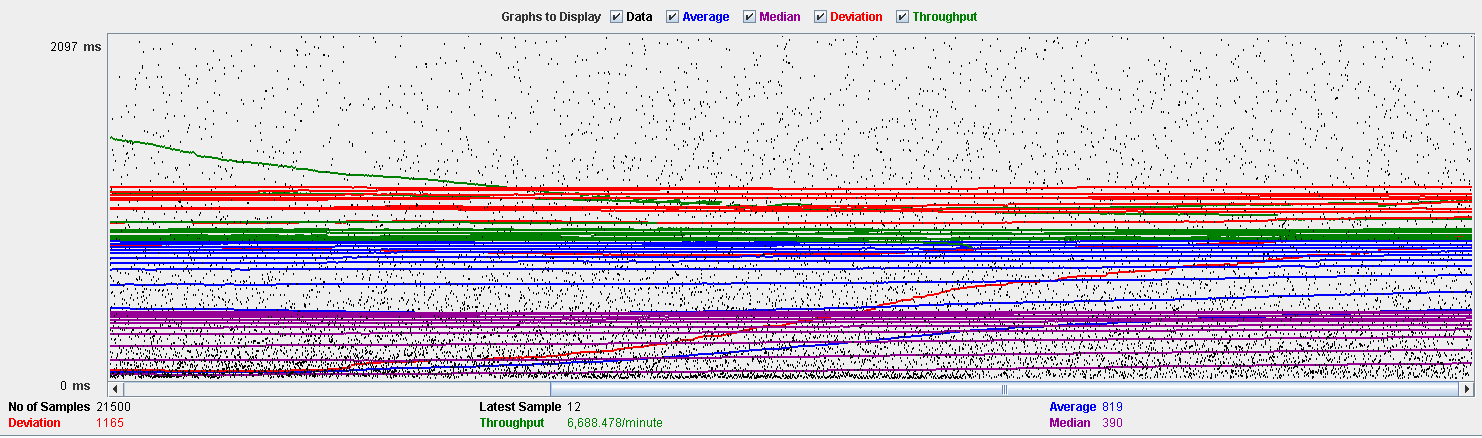




Thread properties:



Graph Results:



Performance Results:



Again we can see that the CPU is always being used while the disk usage has different peaks.

## Conclusion

The test was performed using:

CPU: i5 7300hq (2 cores in the virtual machine)

RAM: 2 GB (virtual machine)

For this use case we can say that the limitation occurs during the creation process, being the maximum of concurrent users 190.

# Conclusion of the performance

As we can see in the tests above, the limitations of our system are in the message system, specially in the method of broadcasting a message (14 concurrent users). We think that this may be a bit unrealistic, because in a real environment won’t be many administrators sending multiple notifications. Due that, we consider that the limit of concurrent users for our system is 45 (sending a message).