Tampere University

Exercise 08

Comparison of Real-Time (RT) and Non-RT Linux Performance

Exercise 08

Course Name: Embedded Linux Drivers

Course Code: COMP.CE.460

Group: 19

Objective

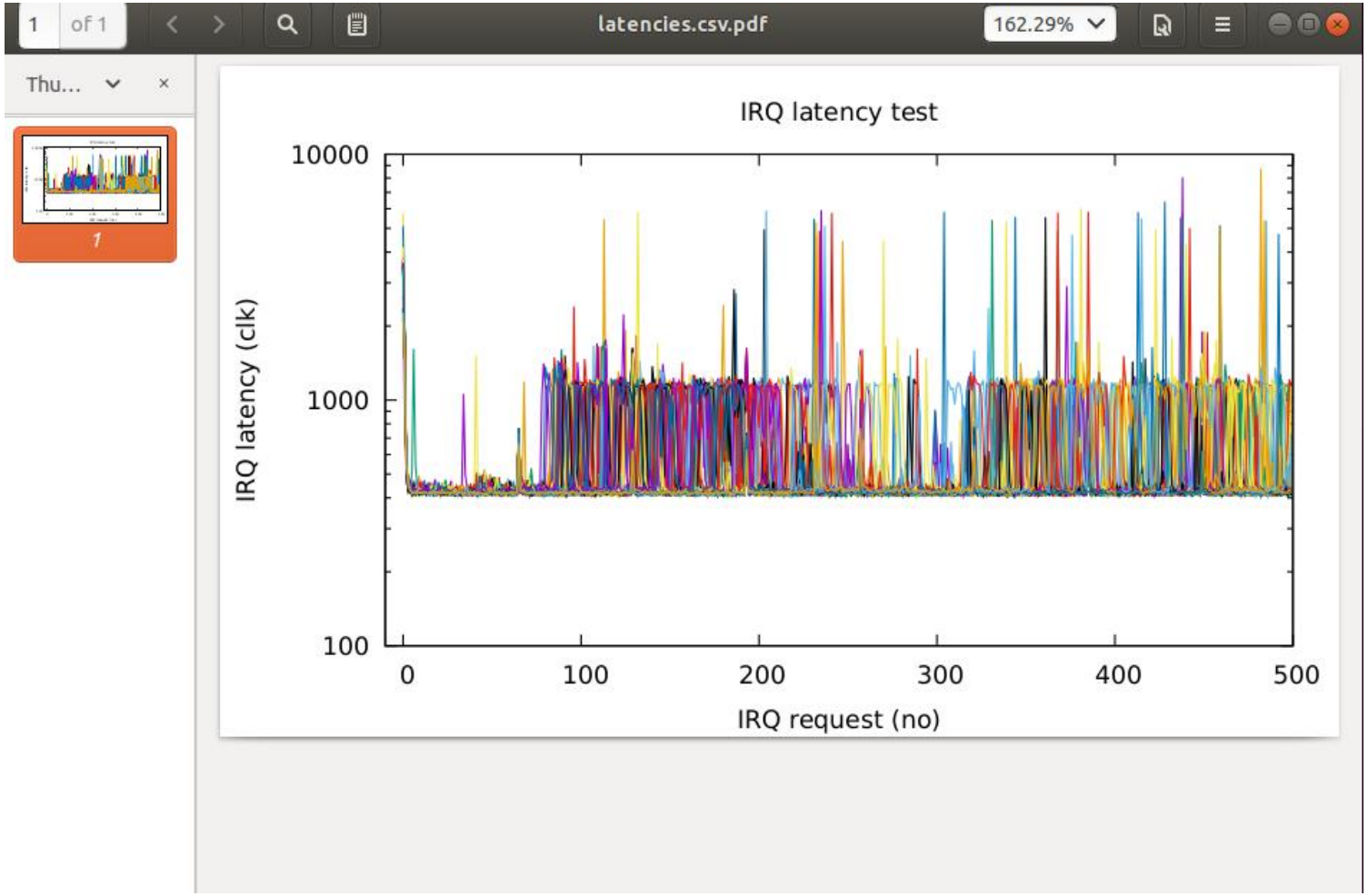
- Evaluate latency performance across RT and Non-RT configurations.
- Assess impact of workload (torture) and RT tuning.
- Understand practical benefits of RT systems.

Test Scenarios

- No RT, no torture
- No RT, torture
- RT Linux, no torture
- RT Linux, torture
- Tuned RT, no torture
- Tuned RT, torture

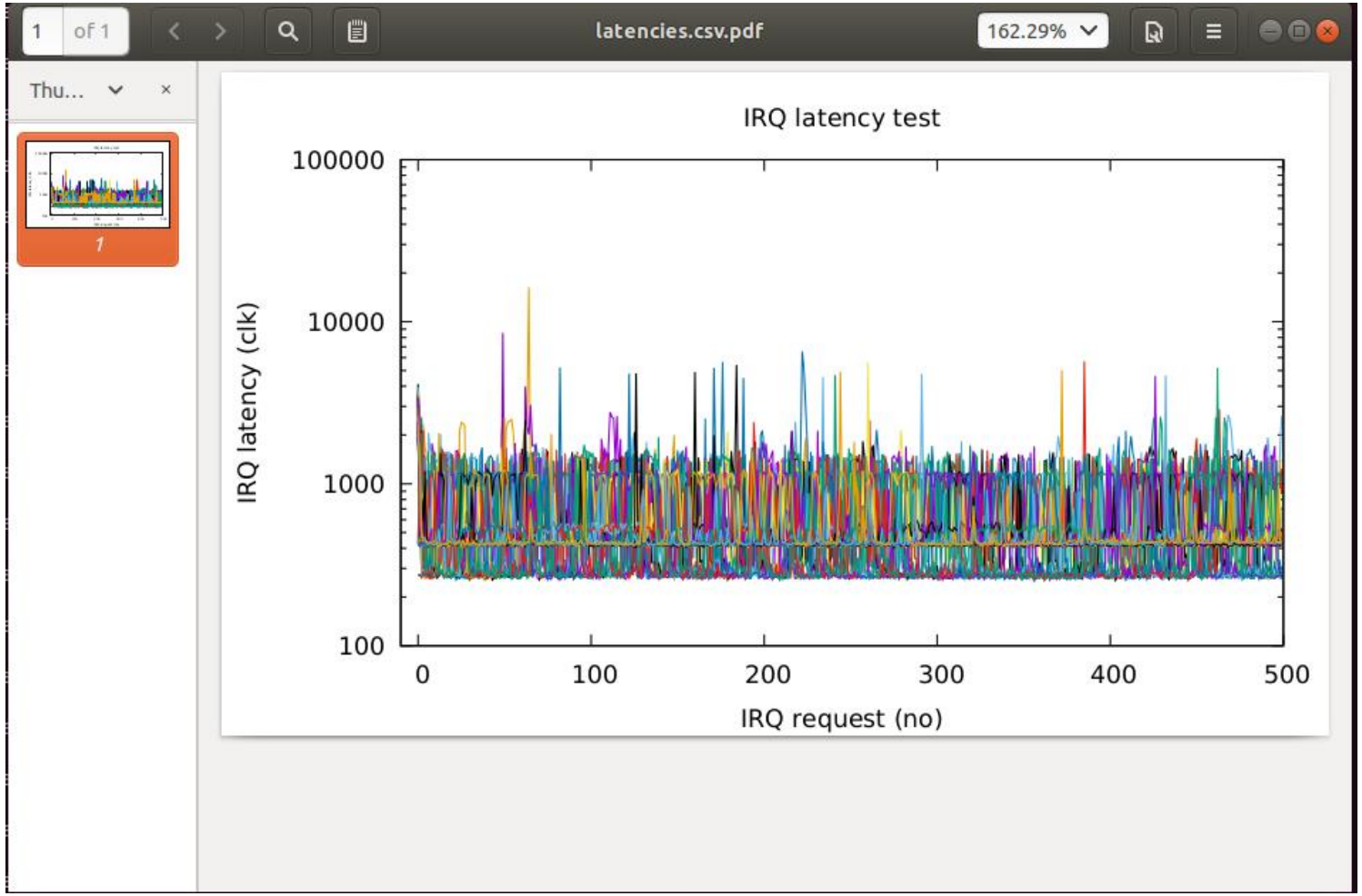
Plots

- No RT, no torture



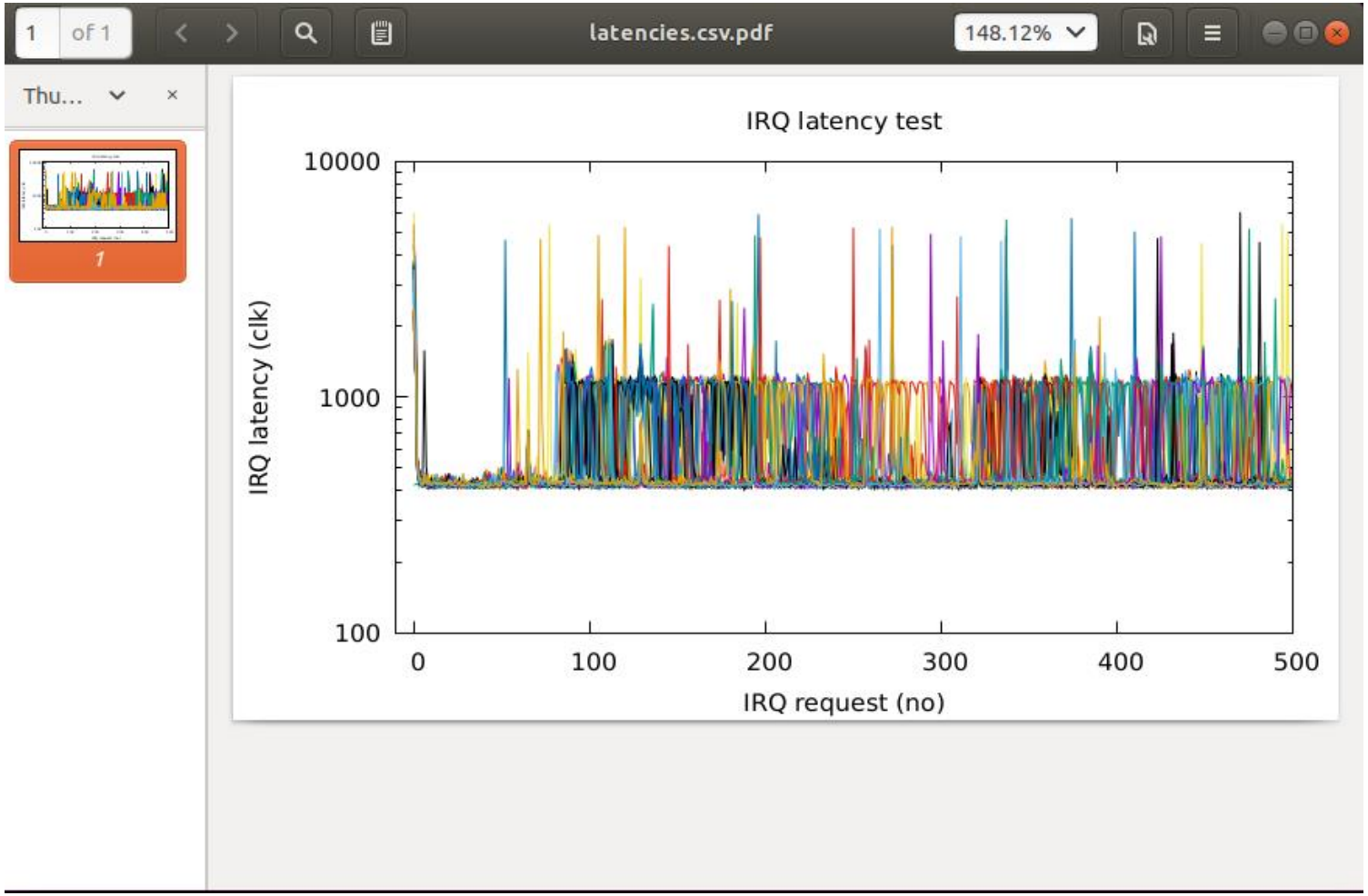
Plots

- No RT, torture



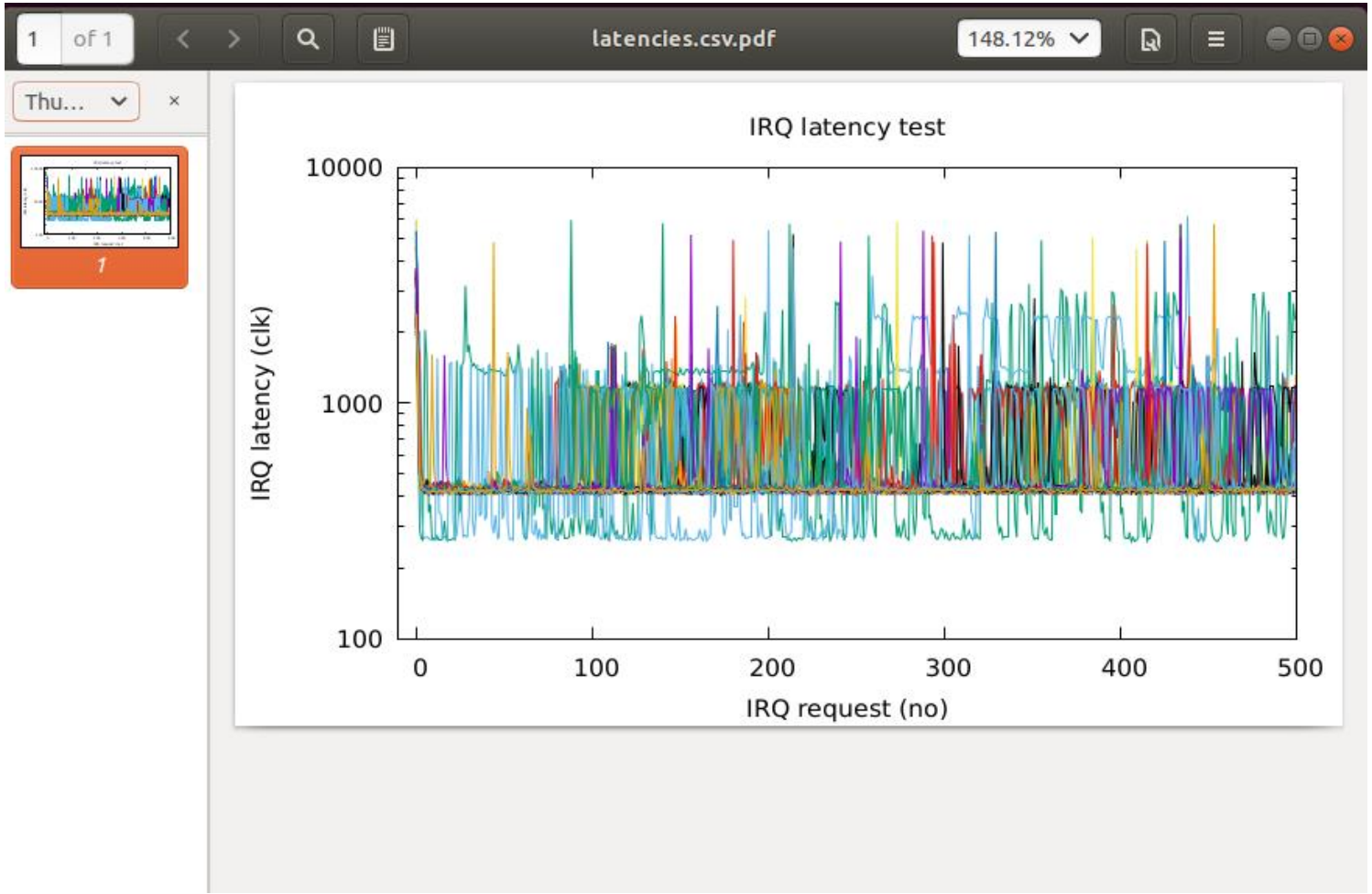
Plots

- RT Linux, no torture



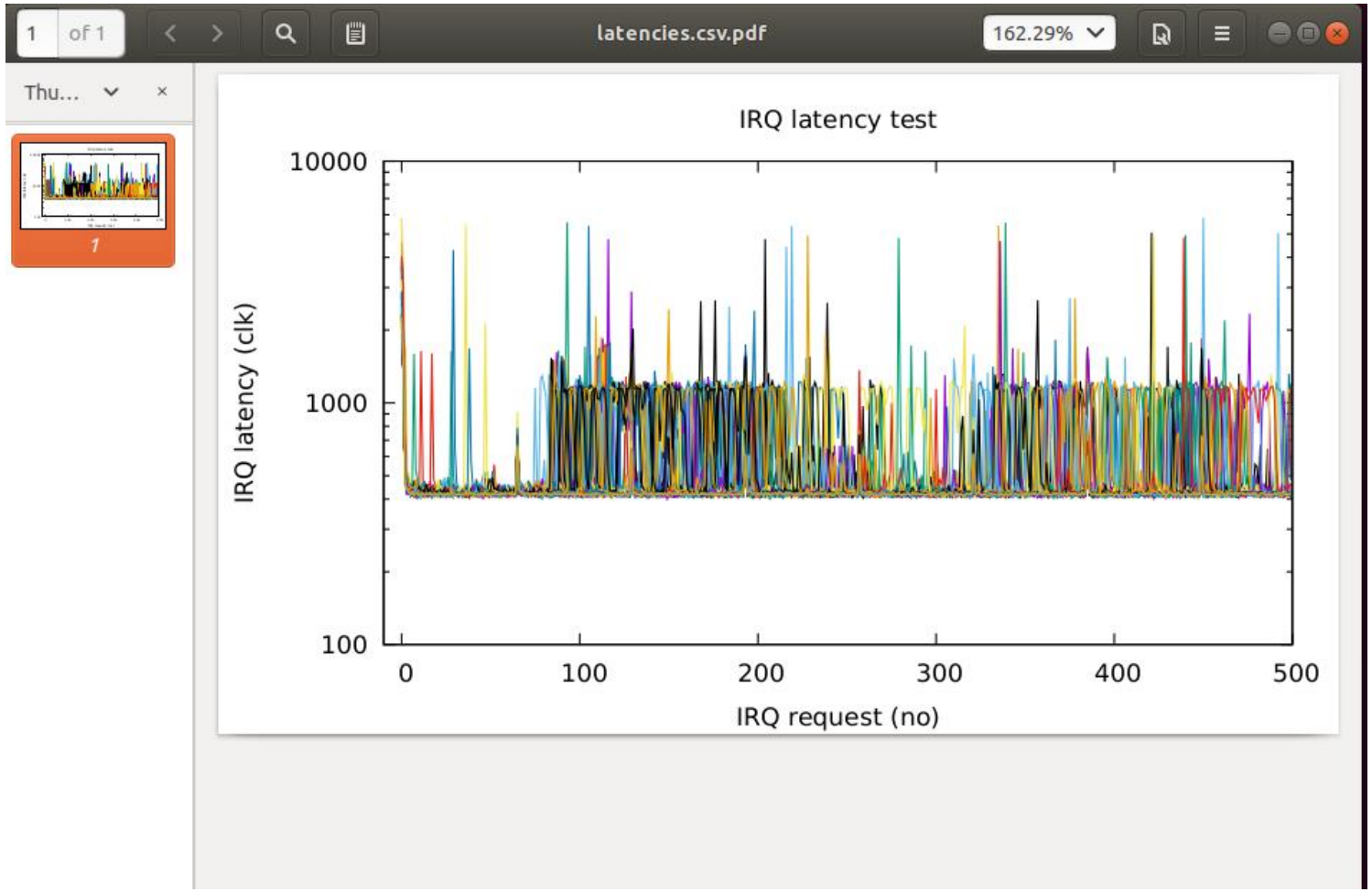
Plots

- RT Linux, torture



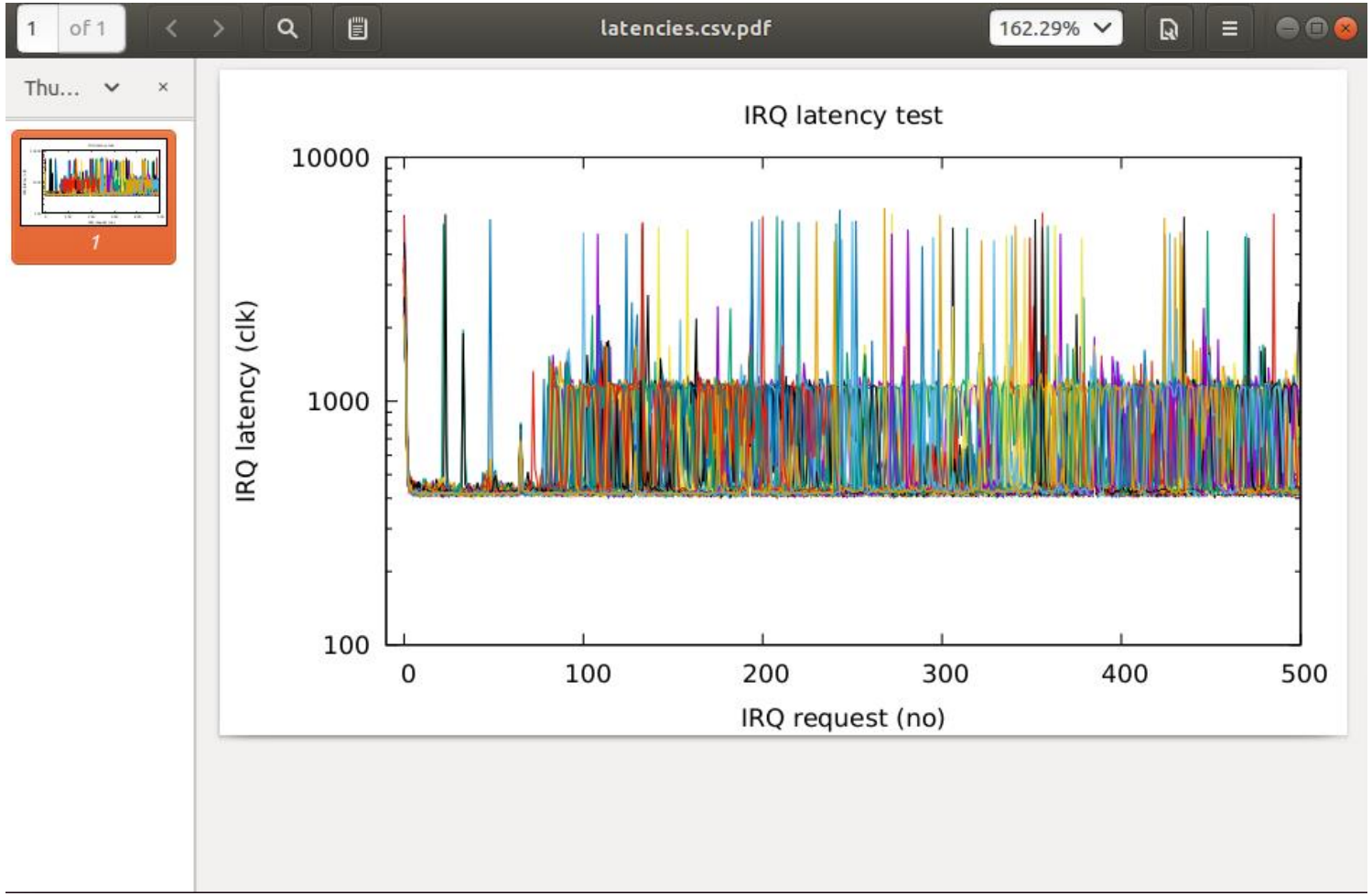
Plots

- Tuned RT, no torture



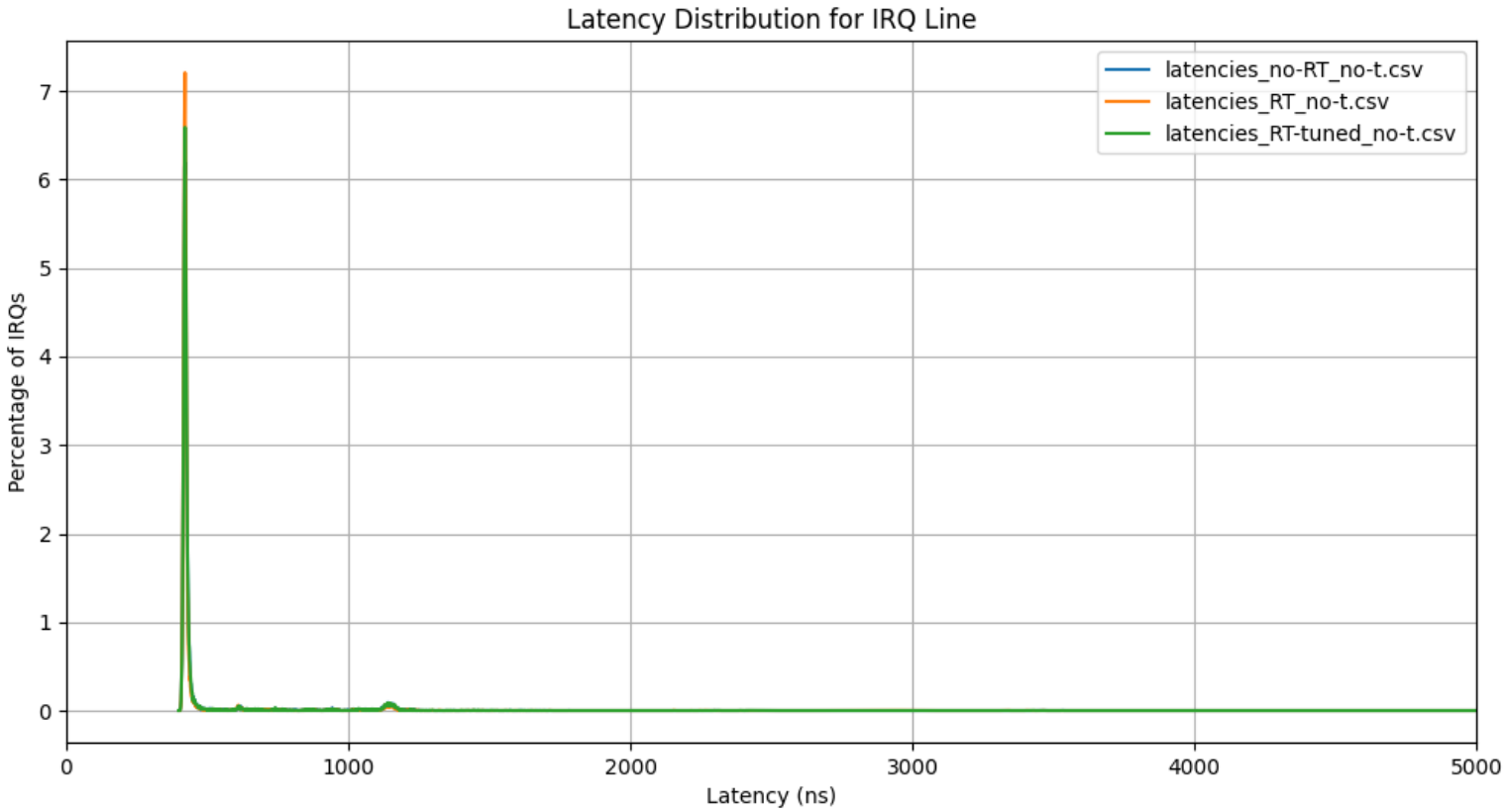
Plots

- Tuned RT, torture



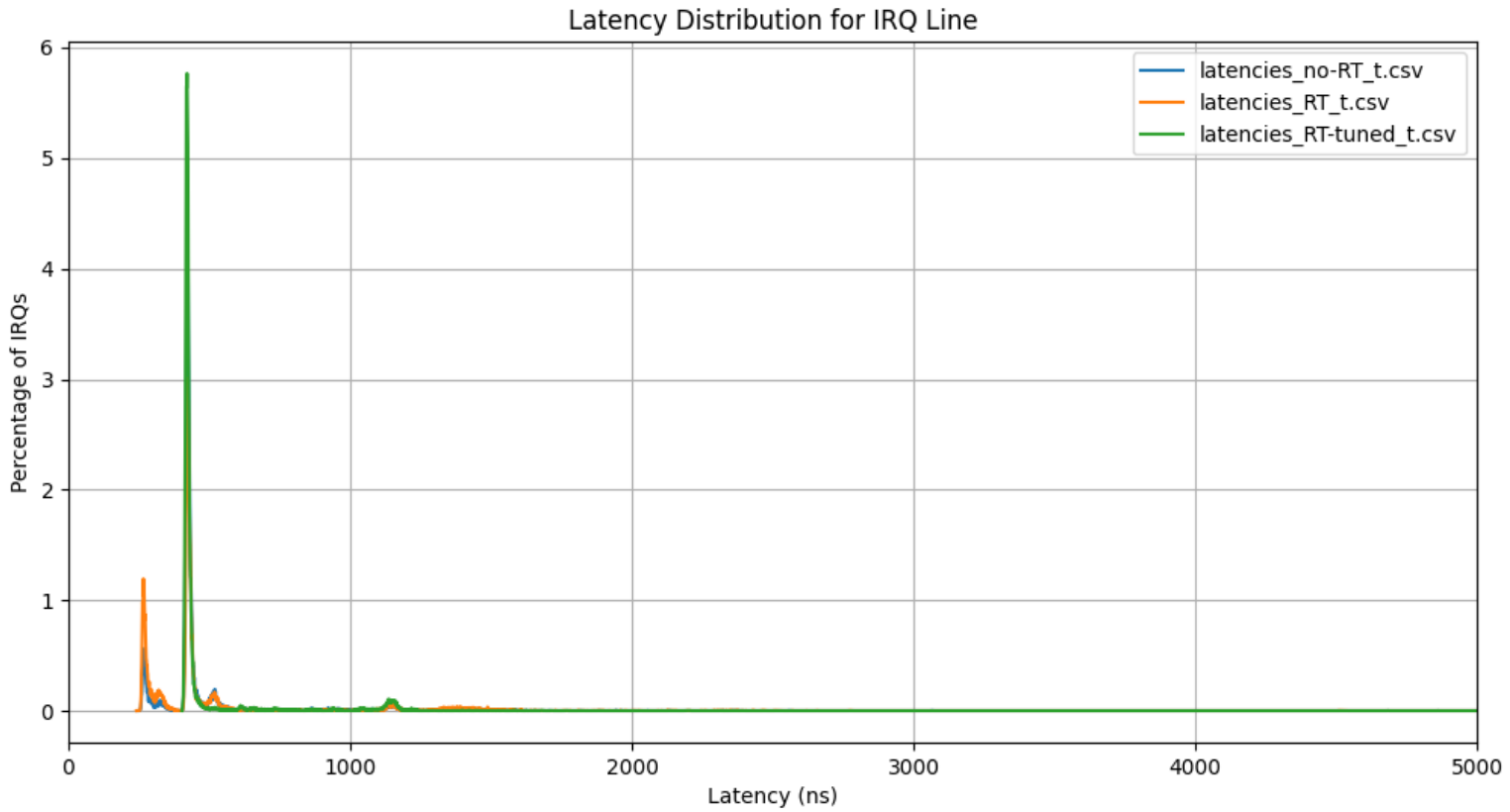
Latency Distribution Plots

- IRQ Latency Plot



Latency Distribution Plots

- IRQ Latency Plot (Torture)



Comparison Summary

Configuration	Observations	Benefits of Tuning
No-RT, No Torture	Stable, moderate latency.	N/A
No-RT, With Torture	Increased variability under load.	N/A
RT, No Torture	Low latency with better stability than No-RT.	Latency reduction seen without tuning.
RT, With Torture	Predictable but slightly increased under load.	Effective in ensuring stability.
Tuned RT, No Torture	Lowest overall latency and minimal variability.	Maximizes RT kernel performance.
Tuned RT, With Torture	Stable latency, best performance under load.	Most effective in handling stress.

Conclusion

- **What is the goal of this exercise? What did you accomplish?**
  - To assess RT kernel performance under varying loads and configurations. We have measured and compared interrupt latencies across 6 different scenarios and demonstrated the benefits of RT kernels and tuning.
- **Feedback (what was difficult? what was easy? how would you improve it?)**
  - The RT patching and tuning was complex and required careful configuration.

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Thank You