A Journey Through Linux

Linux Course Project Report

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- Project proposal

- Milestones

- Challenges & Issues

- Conclusion

Milestones

- R&D, Diving in Linux source code

- Installation & Setup

- Re-config, re-build, and install new kernel manually

- Write a BPF script for intercepting the page owner

- Develop a kernel module to use Linux kernel's 'kprobes' feature

- Develop a kernel module to create a proc file

- Develop a kernel module to use the create proc file and filter page owners

A man through a new world

- Deprecation

- Low community

- lack of study and debug resources

Challenges & Issues (1)

- How to enable page_owner?

- How to re-config and rebuild new kernel manually?

- How to install and boot the new re-built kernel?

- Initramfs issues with new kernel booting (Stripe)

Challenges & Issues (2)

- How to write a BPF script?

- How to intercept page owner related function calls?

- Page owner functions are not being called! (Boot parameter)
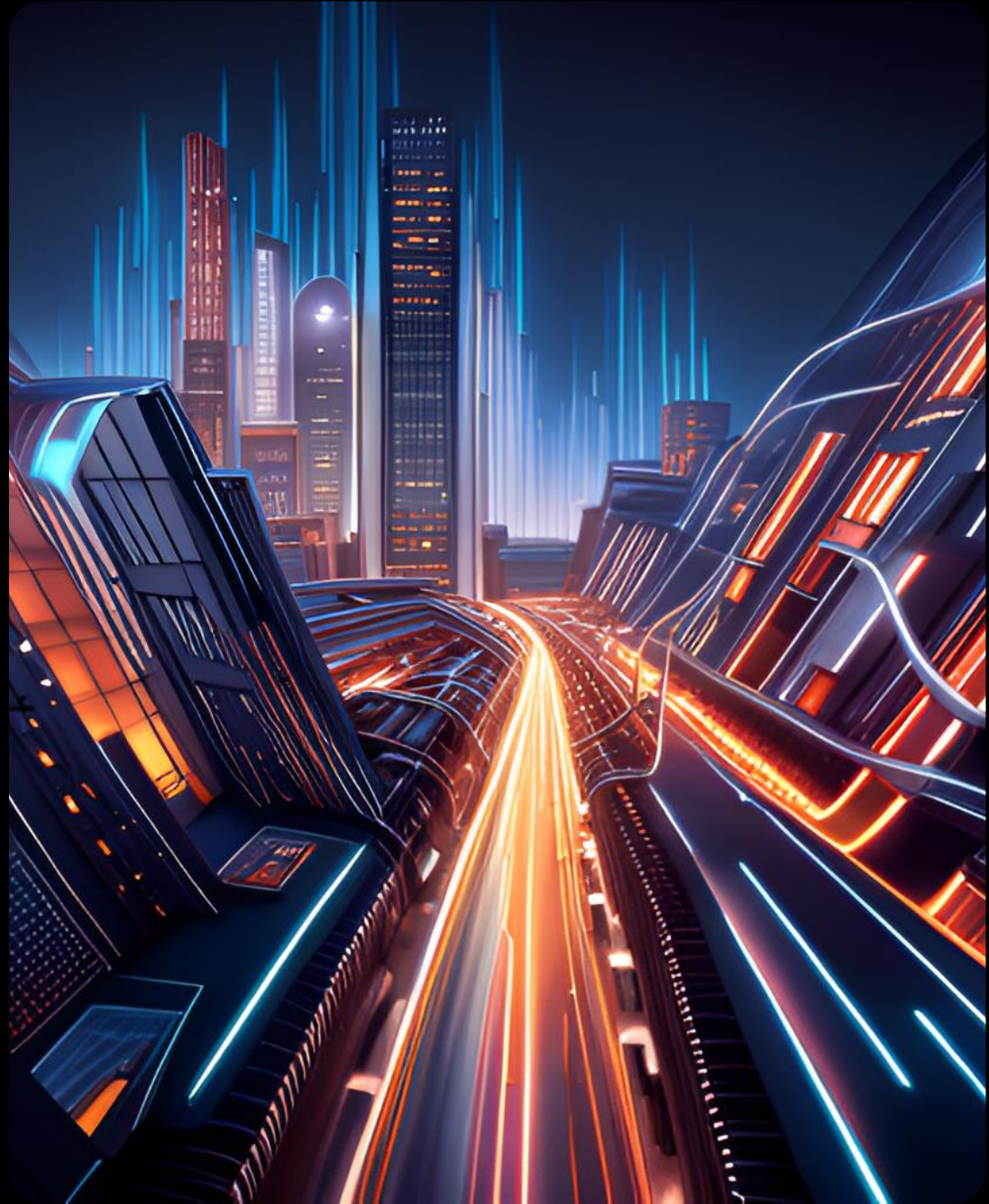
Challenges & Issues (3)

- How to develop a kernel module?

- How to develop a kernel module to register a kprobe?

- Kernel module env issues! (generated libraries)

- Kernel module compilation errors!

- Broken symbolic link issue!

- How to load and unload kernel module?

- Blacklist module issue!

- Insmod: Unkown symbolic issue!

- How to create a proc file to read/write?

- API deprecations such as get_fs and set_fs!

- Type mismatches such as file_ops to proc_ops!

- Proc_create function issues!

Conclusion

- Step away from Linux :|

Conclusion (What did I learn)

- Linux and its configuration option existence!

- BPF script

- Intercept a function

- Kernel module development

- Proc file creation

- Linux Source code diving & Better C programming