Contribution ID: **284**   Type: **not specified**

Generating BPF infrared decoders using finite automations

Thursday 19 September 2024 18:00 (30 minutes)

An quick intro to infrared on Linux, and introduce new tool called cir

Intro needed for context of what we're trying to do with finite automations.

https://github.com/seanyoung/cir

Show how to use finite automations to generate efficient BPF code

Compiles IRP mini language to BPF (in a single binary/process, written in pure rust).

- Parse IRP language, convert to NFA state machine
- Convert NFA state machine to DFA state machine
- Show that sometimes we end up with better code than the hand-written infrared decoders in the linux kernel
- Generate LLVM IR from DFA
- Generate BPF object file in-memory from LLVM IR
- Load BPF object file into kernel (using Aya)

I think it is interesting because:

- The DFA/NFA state machines are more complex than text book versions, as the edges can have code attached
- The techniques might be a good example of generating efficient BPF code
- Shows how BPF is replacing kernel space and user space infrared decoding

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