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Towards Learning From Linux Kernel Configurations' Failures with Clang

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The Linux kernel offers more than ten thousands configuration options that can be combined to build an almost infinite number of kernel variants. Developers and contributors spend significant effort and computational resources to continuously track and hopefully fix configurations that lead to build failures. In this talk, we report on our endeavor to develop an infrastructure, called TuxML, able to build any kernel configuration and learn what could explain or even prevent configurations' failures. We will present some insights over 300K+ configurations coming from different releases/versions of the kernel. Our results show that TuxML can accurately cluster failures, automatically trace the responsible configuration options, and learn by itself to avoid unnecessary and costly builds.

In the last part of the talk, we will discuss the applicability of TuxML as well as the open challenges when building in the large kernel configurations with Clang. We believe there is potential to better understand problematic cases (through clustering and statistitcal learning) and such insights can drive the improvement of Clang-based building of Linux.

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