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Making Linux Fly: Towards a Certified Linux Kernel

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Modified condition/decision coverage (MC/DC) is a fine-grained code coverage metric required by many safety-critical industrial standards, including aerospace, automotive, medical and rail. It is challenging to measure MC/DC of targets as complex as Linux kernel. We will discuss our effort on measuring MC/DC of Linux and the opportunities it would open up. The main challenges are toolchain support (both LLVM and GCC added MC/DC capability just recently) and kernel support for persistent coverage profile data. We have been working on quality assurance of LLVM MC/DC implementation using both the Linux kernel and other real-world software projects. We have also developed kernel support for MC/DC measurement, by reusing a part of an early patch set originally intended for profile-guided optimizations. We will present our early results on MC/DC of Linux and avenues towards rigorous kernel testability from existing test harnesses like KUnit and kselftest.

Repo: <https://github.com/xlab-uiuc/linux-mcdc>

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