



Contribution ID: 303

Type: **not specified**

Towards a standardized eBPF ISA - Conformance testing

Tuesday, 14 November 2023 17:30 (30 minutes)

Towards a standardized eBPF ISA - Conformance testing

The BPF Conformance Suite, consisting of a test runner and a suite of test cases, is a tool that addresses the challenge of ensuring cross-runtime compatibility for BPF programs.

This presentation will delve into the core aspects of the BPF Conformance Suite, including its purpose, components, and the crucial role it plays in the BPF ecosystem. We will explore its ability to evaluate BPF runtime conformity to the BPF Instruction Set Architecture (ISA) specification and its significance in promoting compatibility, security, and collaboration within the BPF community.

In this 30-minute presentation, we will cover the following key points:

1. **Introduction to BPF and Cross-Runtime Compatibility:** An overview of BPF technology, its versatility, and the importance of ensuring BPF program compatibility across various runtimes.
2. **The BPF Conformance Suite:** An in-depth look at the suite's composition, including the test runner and suite of test cases, and how it evaluates runtime adherence to the BPF ISA specification.
3. **Real-World Applications:** An exploration of how the BPF Conformance Suite is actively used to measure conformance in significant BPF runtimes, such as the Linux Kernel's BPF, uBPF, eBPF for Windows, rbpf, and the Prevail Verifier.
4. **Benefits and Impact:** A discussion on the suite's value in enhancing cross-runtime compatibility, bolstering security through the identification of non-conformant behaviors, streamlining development processes, and fostering collaborative efforts within the BPF community.
5. **Looking Ahead:** An exploration of the suite's potential for future developments and adaptability as BPF technology evolves.

In conclusion, this presentation will provide an understanding of the BPF Conformance Suite and its role in ensuring the consistent and reliable operation of BPF programs across diverse runtime environments. We will highlight its impact on compatibility, security, and community collaboration within the dynamic BPF ecosystem.

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Session Classification: eBPF & Networking

Track Classification: eBPF & Networking Track