BUGSENG, AMD, and the Xen Project:
A Breakthrough in MISRA Compliance

Bringing Open-Source to Safety Standards: A Landmark Collaboration

The **Xen Hypervisor Project** is a foundational technology which represents the open source standard for hardware virtualization. When **Advanced Micro Devices (AMD)** sought to enhance Xen's safety and reliability through **MISRA compliance**, they turned to **BUGSENG** a leader in software verification. The result? A groundbreaking achievement in open-source software compliance, made possible through **BUGSENG's ECLAIR Software Verification Platform** and expert consulting.

The Challenge: Achieving MISRA Compliance in Open-Source Software

MISRA compliance is an essential ingredient to ensure software safety in critical systems written in C and/or C++, but **bringing an existing open-source project like Xen into compliance is an unprecedented challenge**. Open-source projects evolve rapidly, lack safety artifacts, and involve diverse contributors—many of whom are unfamiliar with MISRA's stringent guidelines.

AMD, recognizing Xen's increasing role in critical **automotive and industrial systems**, is sponsoring an initiative to make Xen safety-certifiable. Given the **complexity of the task**, AMD and the Xen Project partnered with **BUGSENG**, known for its unparalleled expertise in **static analysis and coding standards enforcement**.

The Solution: ECLAIR and Expertise at Work

BUGSENG deployed its **ECLAIR Software Verification Platform**, a state-of-the-art static analysis tool uniquely capable of handling Xen's **scale, configurability, and advanced coding techniques.**

> Without ECLAIR's fine-grained configurability and powerful analysis engine, achieving MISRA compliance for Xen would have been nearly impossible. BUGSENG's technology and expertise transformed what seemed like an insurmountable challenge into a success story.
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> STEFANO STABELLINI long-time Xen contributor, Maintainer, and member of the Xen Project leadership team

BUGSENG's team worked closely with the Xen Project, ensuring that **MISRA compliance didn't come at the cost of performance, maintainability, or upstream community adoption.** The project leveraged ECLAIR's advanced deviation handling, which enabled a tailored approach to compliance, balancing MISRA's rigorous standards with Xen's real-world constraints, processes, and exceptionally high code quality.

> Achieving compliance in an existing open-source codebase requires much more than just running a static analyzer –it requires deep knowledge, strategic adaptation, and the right tools. ECLAIR's unique features allowed us to navigate the complexities of Xen's codebase and internal conventions efficiently and effectively.
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> **ROBERTO BAGNARA** Software Verification Expert and Evangelist and co-founder of BUGSENG

The Outcome: A New Standard for Open-Source Compliance

The collaboration led to **one of the most significant MISRA compliance achievements in open-source software history**. Today, Xen's selected configurations are at a very advanced milestone in their route towards **MISRA-compliance** and, thanks to other initiatives by the Xen community, they will be ready to be integrated into **AMD's safety initiatives**, aimed at ensuring the hypervisor meets the **highest reliability standards.**

> This project proves that with the right expertise and tools, even a high-performance, community-driven project like Xen can achieve safety-critical compliance. It's a milestone that sets a new precedent for the open-source world.
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> **NICOLA VETRINI** BUGSENG Technical Lead

Conclusion: A Testament to Collaboration and Innovation

The Xen Project, AMD, and BUGSENG have shown that **open-source software can meet the highest safety standards without compromising its core values.**

> We couldn't be prouder of this achievement. It's a testament to what's possible when industry leaders come together to push the boundaries of innovation.
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> **STEFANO STABELLINI**

With **ECLAIR at the center of this success**, BUGSENG has reinforced its position as a **trusted partner in software verification**, proving that even the most ambitious compliance goals can be achieved through **cutting-edge technology and expert guidance.**

Xen Project

no shortcuts,
no compromises,
no excuses:

software verification

done right