

Paper Review: Shoestring – Probabilistic Soft Error Reliability on the Cheap

Summary

This paper addresses the issue that processors will soon require additional protection from soft errors, and the fact that this protection must be cost effective. The authors propose Shoestring, and new software solution that provides high soft-error coverage with little overhead and a low cost. Shoestring is shown to recover from 33.9% more soft errors than more traditional methods.

Strengths

Shortcomings

Improvements

Question(s) for Presenter

Additional Questions

- What is the motivating idea behind the design of Shoestring?
 - Processors are becoming more susceptible to soft errors as transistor size decreases. Processes will soon require additional protection from soft errors, and this protection **must be cost effective**.
- What is the significance of the symptom latency variable S_{lat} and the author's selection of its value?
 - Symptom-based coverage is only useful if symptoms are triggered within a small window of cycles. It is important to choose an optimal S_{lat} because if it is too small you will miss some symptoms and if it is too large then the checkpointing becomes very expensive. The authors indicate that the majority of symptoms manifest within a 100 instruction threshold, but if you want full coverage you'd have to be more aggressive.
- How does Shoestring compare to a DMR solution?
 - DMR provides greater fault coverage and can provide bounds on detection latency. However, Shoestring has no area overhead while DMR has very high area overhead.