

Shrinking microprocessor feature size and growing transistor density may increase the soft-error rates to unacceptable levels in the near future. While reliable systems typically employ hardware techniques to address soft-errors, software-based techniques can provide a less expensive and more flexible alternative. This paper presents a control-flow error classification and proposes two new software-based comprehensive control-flow error detection techniques. The new techniques are better than the previous ones in the sense that they detect errors in all the branch-error categories. We implemented the techniques in our dynamic binary translator so that the techniques can be applied to existing x86 binaries transparently. We compared our new techniques with the previous ones and we show that our methods cover more errors while has similar performance overhead.