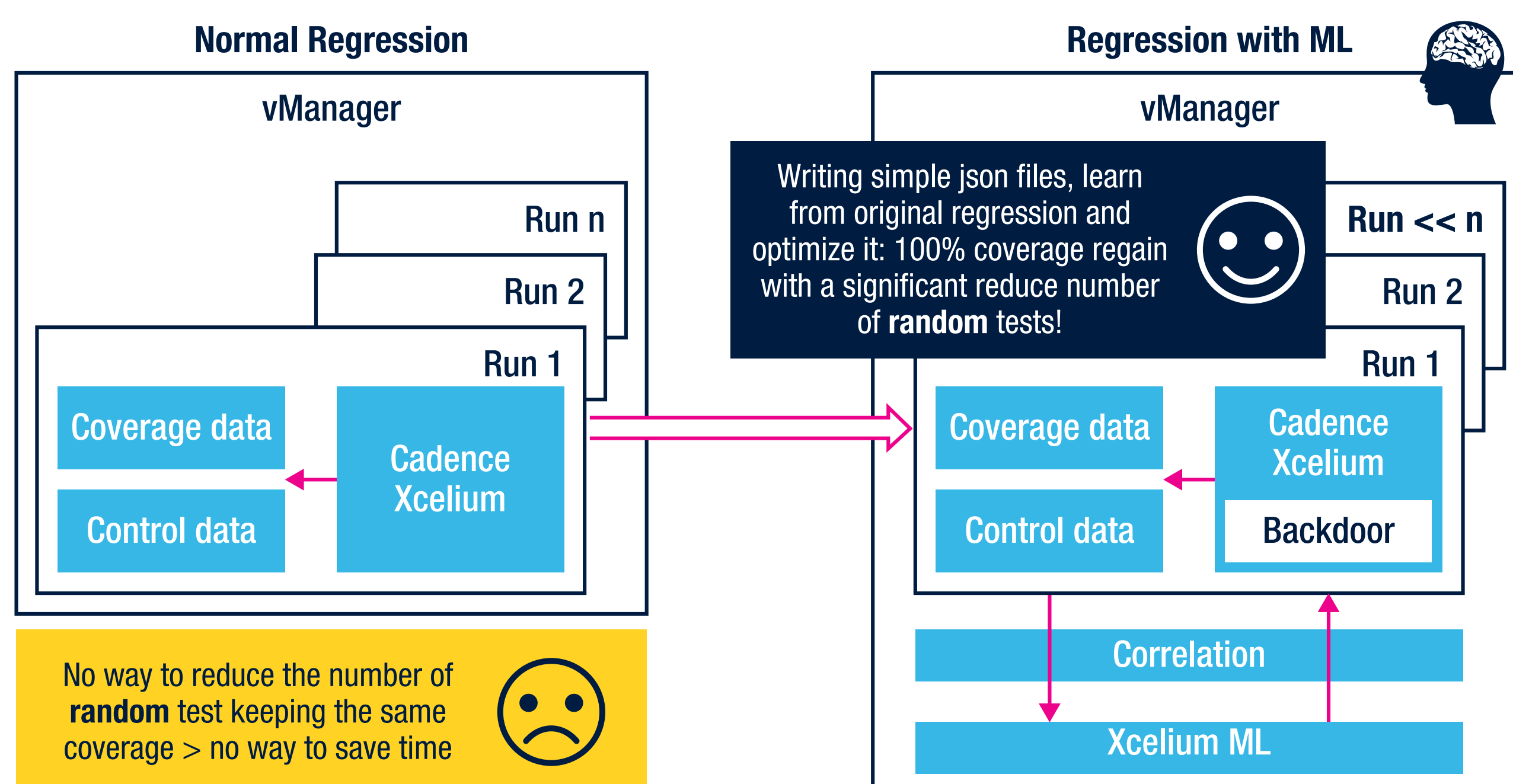


Using Machine Learning to Optimize and Accelerate Random Regression Testing

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1. CHALLENGE

One of the challenges in digital verification planning is the need for many test regressions to stimulate and verify a wide range of operating scenarios. However, this can lead to a large number of tests, resulting in longer runtimes for each regression. How can we reduce the number of random tests while maintain the same level of coverage and quality, so to speed up the regression runtime?



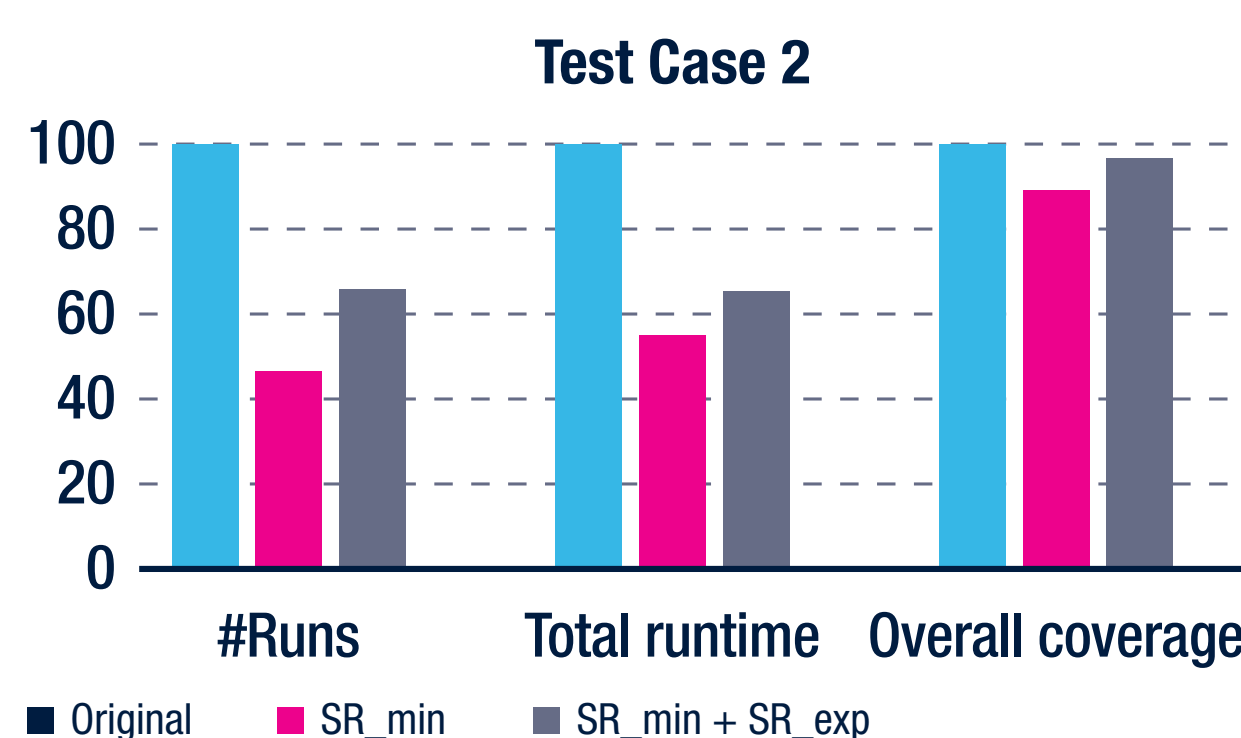
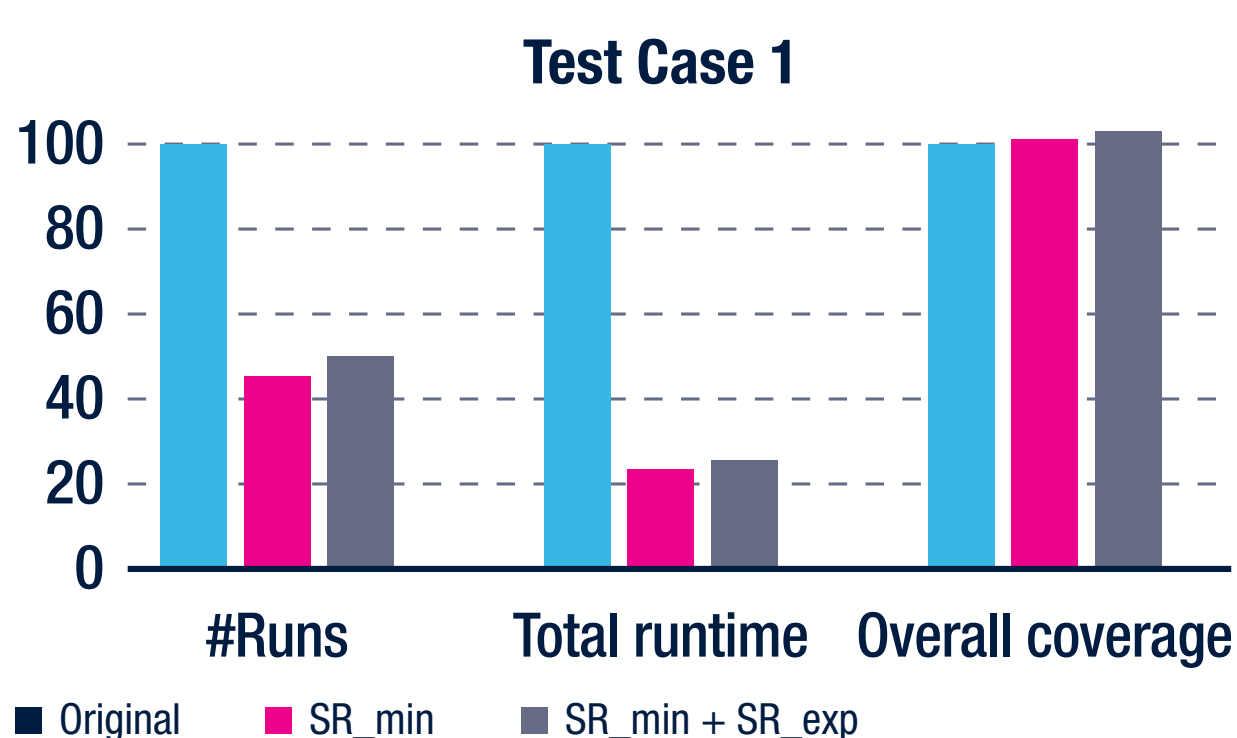
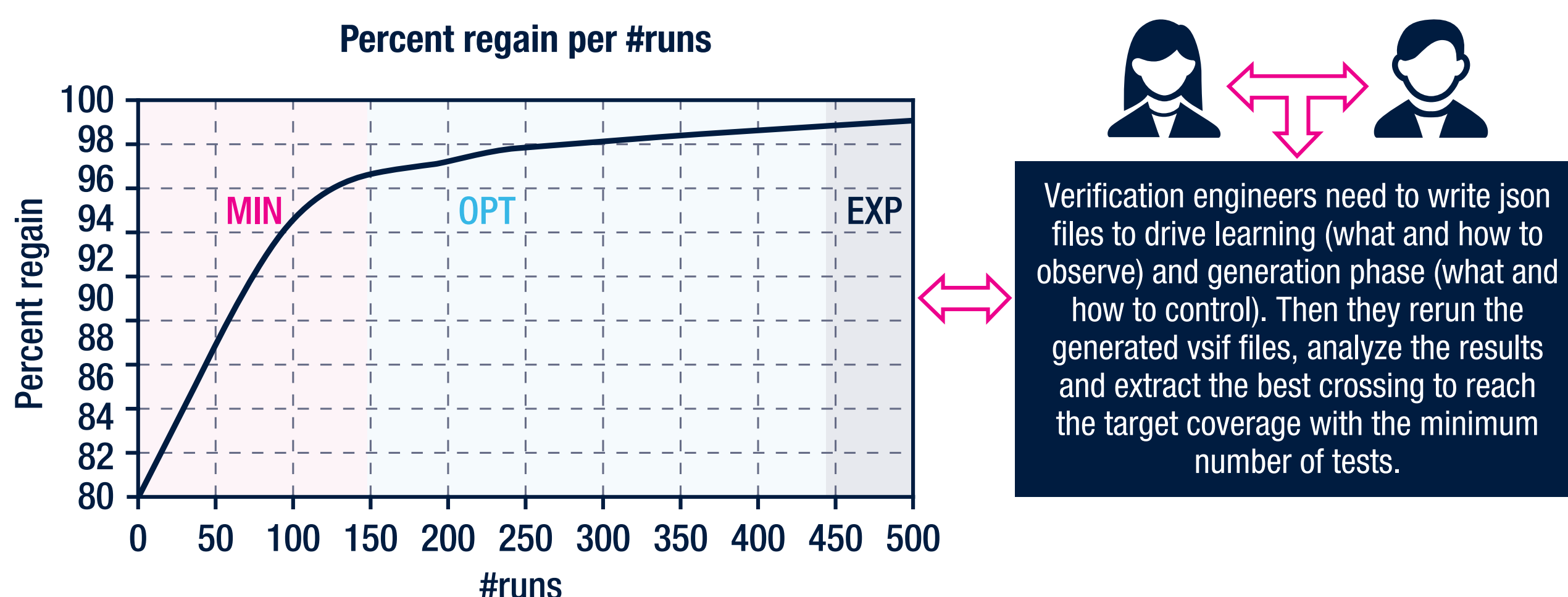
2. SOLUTION

Cadence Xcelium Machine Learning solution is a framework that takes control and coverage data from a design and testbench to generate a Machine Learning model and accelerate regression performance. The generated model is created by learning from iterative regression session runs and this model is then used to produce an optimized regression based on set criteria.

3. HOW IT WORKS

Starting from the original regression, Xcelium ML generates 3 outputs:

- SR_min: Minimal Regression
- SR_opt: Optimal Regression
- SR_exp: Exploration Regression



4. RESULTS

Starting from two regression already launched with Cadence vManager (for different purposes and different features), Machine Learning was applied using **Cadence Xcelium ML**.

In both test cases, the optimized generated regression can:

- save regression time,
- reduce the number of test,
- increase the target coverage

Conclusion. The advantages of using the Cadence Xcelium Machine Learning solution to generate optimized regressions are significant. These benefits include the ability to save valuable regression time by up to 75%, reduce the overall number of required tests by 50% and increase target coverage beyond 100%. By leveraging these features, users can expect improve efficiency, enhanced accuracy, and a streamlined chip design and verification process.

Considering all these advantages given by Cadence Xcelium ML, we are considering applying the methodology in future projects.