



COMPANY SNAPSHOT

This company provides a comprehensive portfolio of network equipment, software, services, and licensing opportunities across the globe.

INDUSTRY

5G communications network

ONESPIN PRODUCTS USED

- Quantify™ App
- Verification Coverage Integration App
- PortableCoverage™ App

CASE STUDY

Quantify App: Verification Signoff with Zero Bug Escapes for 5G Network

OVERVIEW

The OneSpin DV-Verify Quantify App allowed this 5G communication network provider to accurately measure its verification progress and coverage to eliminate the guesswork of verification signoff. The solution augmented other verification methods that produces inadequate results on their own.

CHALLENGES

To achieve their signoff goals, the company had to overcome a number of challenges including:

- Measuring the quality of the observation of assertions
- Understanding both simulation and formal coverage more precisely
- Inadequate in-house tools and expertise

RESULTS

By applying OneSpin's technology, the company was able to understand their verification progress and effectiveness and achieve confidence in verification signoff with zero bug escapes. In detail they were able to:

- Save weeks of verification time to understand coverage and coverage holes particularly
 - Assertion coverage
 - Reachability
 - The impact and integration of simulation results
- Share coverage responsibility between the design and verification teams



SOLUTION IMPLEMENTATION

OneSpin's Quantify App utilizes mutation analysis to achieve a precise measure of coverage. The App is easy to set up with push-button integration. Once set up the following methodology is applied.

- Automatic insertion of mutations into the formal model of the design to mimic design bugs
 - Analysis to see if any assertions catch the bugs
 - Reporting any parts of the design not covered by assertions
- Quick inspection of the results is done through the annotated source view
- The RTL is never altered because the mutation coverage is model based
 - No RTL pragmas or user effort is needed
 - Optimization for formal translates to better run times
 - Effort is fully automated

```
case (fsm_state_s)
  idle:
  if (start_i)
  begin
    fsm_state_next <= locking;
    load_counter <= 1'b1;
  end
  else if (write_req_i)
  cfg_reg_write <= 1'b1;
  else if (error_i)
  fsm_state_next <= error;
  locking:
  if (counter==8'h00)
  fsm_state_next <= idle;
  error:
  if (error_i)
  begin
    //error cond code//
    cfg_reg <= 4'd10;
    counter <= 4'd00;
    fsm_state_next <= idle;
  end
  else
  fsm_state_next <= idle;
  default:
  fsm_state_next <= idle;
endcase
```

The diagram shows a code snippet with four callout boxes pointing to specific lines of code. The callouts are: 'Covered' pointing to the 'idle:' state and its 'if (start_i)' block; 'Not Covered' pointing to the 'else if (error_i)' block; 'Constrained' pointing to the 'error:' state and its 'if (error_i)' block; and 'Unreachable' pointing to the 'else' block and the 'default:' state.

Quantify provides a detailed view of the areas of the design that are covered, not covered, constrained, and unreachable.

Contact · info@onespin.com · www.onespin.com

USA: +1 408 734 1900 · Europe: +49 89 99013-0 · Japan: +81 45 285 1573

© Copyright 2021 OneSpin. All rights reserved. OneSpin is a registered trademark of OneSpin Solutions GmbH. OneSpin Solutions, OneSpin 360, the 360 product names, and the OneSpin logo are trademarks of OneSpin Solutions GmbH. All other trademarks are the property of their respective owners.

2021-06 V. 2



WITH ONESPIN QUANTIFY

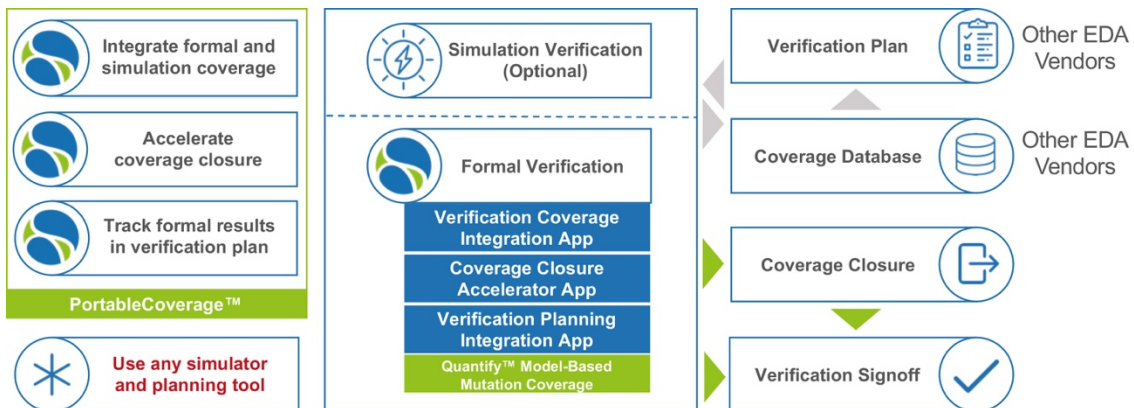
Quantify provides a complete and precise understanding of verification coverage to reach signoff with confidence and that zero post-production bugs will escape. The App provides:

- Accurate and reproduceable results
- Fast execution runtime
- Precise mapping to source code through source location tracking
- Push-button integration
- Quick result inspection through integrated browsable annotated source view
- Improved execution and predictability in verification projects by focusing efforts
- Reliable identification of verification gaps and blind spots by highlighting over-constraining, dead and redundant code
- Seamless integration with third-party verification planning, tracking, and simulation code coverage solutions for coverage closure using PortableCoverage

WITHOUT ONESPIN

Design and verification teams would have a difficult time understanding their verification coverage and achieve signoff confidently without OneSpin. Teams would encounter the following challenges.

- Imprecise metrics through use of inadequate measure control coverage
- Limitations with observation coverage
 - Cone of influence, prove coverage, general mutation coverage is too slow and inaccurate
- Simulation and formal results are separate requiring heavy analysis
- Time-consuming integration
- No common interface to interpret results
- Unfocused metrics leading to poor verification quality
- Time-consuming remedial verification leaving undetected bugs
- Verification constraints and conditions are still a mystery



Quantify with PortableCoverage provides a single view of verification progress with simulation and formal.

Contact · info@onespin.com · www.onespin.com

USA: +1 408 734 1900 · Europe: +49 89 99013-0 · Japan: +81 45 285 1573

© Copyright 2021 OneSpin. All rights reserved. OneSpin is a registered trademark of OneSpin Solutions GmbH. OneSpin Solutions, OneSpin 360, the 360 product names, and the OneSpin logo are trademarks of OneSpin Solutions GmbH. All other trademarks are the property of their respective owners.

2021-06 V. 2