cādence®

Integrated Metrics Center

Managing RTL coverage metrics is a critical part of any pre-silicon functional verification program. The Cadence® Integrated Metrics Center (IMC) is an integrated and unified coverage tool for viewing and analyzing coverage data from Cadence functional verification tools. Demanding customers choose the IMC for its dynamic analysis, intuitive user interface, and fastest coverage hole analysis time.

Overview

The IMC is a register-transfer level (RTL) coverage analysis tool designed to load and analyze RTL coverage across the Cadence Xcelium™ Parallel Simulator, JasperGold® Apps, Palladium® XP Verification Computing Platform, Specman® Elite, and Perspec™ System Verifier technologies. The IMC provides a rich user interface for the vast array of RTL code coverage and functional coverage types. With the IMC, Cadence provides a unified and simplified visualization and analysis environment, which, combined with an equally powerful unified coverage database— UNICOV—ensures coverage interoperability and merging across Cadence functional verification tools.

The IMC allows you to converge on your coverage goals and achieve coverage closure more quickly than with traditional HTML or text-only reports. The IMC enables real-time analysis with an intuitive GUI and specially engineered views for each coverage type supported. The IMC supports all RTL metric types from all major EDA languages, ensuring that verification teams—from simulation users and formal experts to acceleration users and software teams—can utilize a single integrated coverage tool to maximize productivity and minimize confusion.

The IMC is a single-user tool that loads and views coverage from a single run or a single merged-coverage run. A familiar user interface and compatible workflow lets you easily shift from individual run analysis to large-scale regressions with the Cadence vManager™ Metric-Driven Signoff Platform.

Benefits

- Quickly generate unified coverage metrics with an intuitively organized environment

- Optimize your productivity with pre-defined GUI-based analysis windows

- Improve time to results with rapid sort, filter, and search processes

- Get up and running quickly with the metric-driven verification (MDV) methodology and integration with the vManager platform

- Improve your productivity with high-performance merge, rank, and reporting, scalable to very large designs

- Achieve faster turnaround on design changes with resilient coverage files and waiver exclusions

Comprehensive Metrics

The IMC allows you to manage code coverage metrics coming from SystemVerilog, Verilog, or VHDL, as well as functional coverage metrics coming from SystemVerilog, SystemC®, or Specman *e* testbenches. You can also use the IMC with the Cadence Indago™ Debug Platform to view embedded C/C++ executed code. Finally, you can use assertions written in either SystemVerilog or PSL to drive cover properties or checks. The IMC allows you to merge compatible coverage types across Cadence simulation, formal verification, and acceleration emulation.

Cadence functional verification platforms produce coverage data at the end of execution by writing out coverage results into a UNICOV database. Because each coverage type is an object, you can manage them independently from one another. The coverage files themselves are broken into two primary components—the model and the data—optimizing the regression process by producing only data files for identical models. In addition to coverage metrics, the IMC tracks test ranking, instance, and type-based results.

	Specman *e*	SystemVerilog	SystemC	SVA/PSL	Verilog	VHDL
Code	✓	✓	(1)		✓	✓
Functional	✓	✓	✓	✓		
Assertion	✓	✓	✓	✓	✓	✓

Figure 1: Integrated Metrics Center language support
(1) Not available at this time; check with factory

Context-Aware Activity Centers

To improve your productivity, the IMC deploys an intelligent, contextual interface that automatically pre-configures screen panes to support the specific analysis of whichever coverage metrics you choose to pull up. The IMC gives you a pre-defined view or activity center for each of the primary activities of code coverage—block, expression, toggle, and finite state machine (FSM)—as well as assertion and functional coverage. An activity center consists of a coverage metrics window, a source code window, an attributes window, and often, depending on the type of metric, an additional deep-dive analysis window. The IMC maintains an activity history, making it easy to jump from one activity to another and pick up exactly where you left off previously, or to switch between multiple activities while still in the same tool environment. You can't jump around within a report in most tools, but the IMC gives you the unique ability to dynamically move between your analysis views.
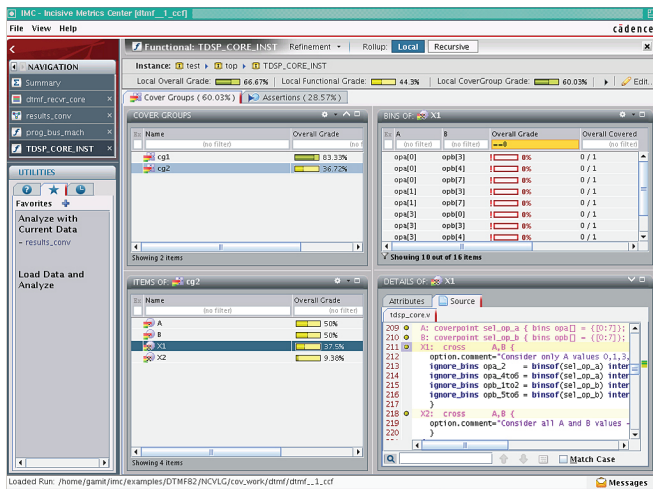

Figure 2: Multiple activities open at the same time

Rapid Hole Analysis

The IMC allows you to sort, filter, rank, and organize gigabytes of coverage data quickly and easily within each activity center. You can use the consistent sorting box displayed across activity centers to see what has and has not been covered, as well as the completion metrics associated with each section of the design. As shown in Figure 3, the sorting box makes it easy for you to sort from high to low. You can use real queries and expressions for more refined sorting. You can quickly recognize each metric type by its unique icon. The IMC's GUI allows you to easily add or remove columns, add or remove attributes, and return to a default state. You can customize pane sizes and locations, and select and detach them for more permanent analysis. Many users now use the IMC to view their UVM testbench to see which tests were run or not, and to add an additional safeguard against bug escapes.
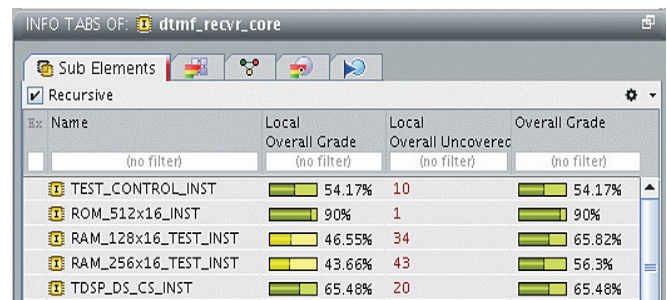

Figure 3: Sorting field

Coverage Waivers and Resiliency to Design Changes

Refinements are coverage exclusions or waivers that you can manually or automatically remove. The IMC provides a patented process for maintaining coverage alignment with design changes and automatically updates new designs to existing coverage files. The IMC maintains refinements in a separate file that you can load from within the UI. You can configure automated refinements by using the JasperGold Unreachability (UNR) App for any RTL code that cannot be legally reached.
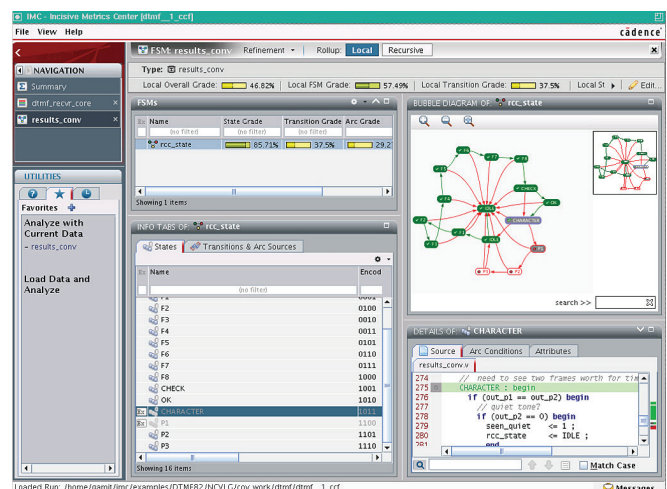

Figure 4: FSM analysis

Customizable and Clickable HTML Reports

In the IMC, you can generate text reports, built-in default HTML reports, and custom reports. Through the IMC's GUI, you can customize your views with selected columns and fields, even with user-defined attributes, and you can save those views for reuse. You can generate a report from each view within the IMC, which enables you to perform highly customizable reporting. Additionally, the IMC's HTML reports are in a WYSIWYG format that provides consistency between the GUI and HTML report views.

Additional Key Features

- Command line batch or GUI commands
- List, summary, and detailed text and HTML reporting output
- Supports UCIS 1.0 API with user-written application and IMC-provided library
- Unique Bins and Coverage Difference reports
- User-configurable preferences and user-defined views settings
- Multi-threaded and parallel-coverage merging
- The IMC is an integral component within the vManager platform
- The IMC is licensed with the Xcelium simulator

Specifications

- Platform support: Linux or AIX
- 32- or 64-bit support
- Included as part of the MDV release
- Compatibility and interoperability—see Figure 5
- Minimum 2GB RAM needed

Cadence Services and Support

- Cadence application engineers can answer your technical questions by telephone, email, or Internet—they can also provide technical assistance and custom training
- Cadence-certified instructors teach more than 70 courses and bring their real-world experience into the classroom
- More than 25 Internet Learning Series (ILS) online courses allow you the flexibility of training at your own computer over the Internet
- Cadence Online Support gives you 24x7 online access to a knowledgebase of the latest solutions, technical documentation, software downloads, and more
- For more information, please visit www.cadence.com/support for support and www.cadence.com/training for training

Cadence Tool	Code Coverage				Functional Coverage		Assertion/Formal	
	Block	Toggle	Expression	FSM	SystemVerilog /SystemC	Specman e	Cover	Check
Xcelium	✓	✓	✓	✓	✓	✓	✓	✓
Palladium XP/Z1	✓	✓			✓	✓	✓	✓
JasperGold	✓	✓	✓	✓			✓	✓
Specman	✓					✓		

Figure 5: Integrated Metric Center support matrix

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Cadence Design Systems enables global electronic design innovation and plays an essential role in the creation of today's electronics. Customers use Cadence software, hardware, IP, and expertise to design and verify today's mobile, cloud and connectivity applications. **www.cadence.com**