

# Enterprise verification management solution for system-on-chip development.



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## Highlights

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- ***Improves quality, helps reduce development costs and speeds products to the marketplace***
- ***Enables parallel development of hardware and software designs, supporting faster and cheaper development***
- ***Helps ensure simulation accuracy by managing test scenarios, recording results and tracking test output against the testing plan***
- ***Increases compute farm utilization, lowering IT costs and reducing time to market***

For the system-on-chip (SoC) developer, success means getting solutions to the marketplace on time and in line with customers' expectations. But that's not always easy when each generation of product is smarter and more complex, and there's an expectation that products will be designed, developed and manufactured in increasingly shorter time frames.

Developments in semiconductor design and manufacturing processes now allow functions that were once accomplished outside of the chip to be included in the design of the SoC itself. Increased chip capability means greater physical and logical design complexity, which in turn demands a tighter coordination between the hardware, software and verification design teams.

Today many design and testing processes are accomplished manually, which is both resource intensive and costly. This not only puts a big strain on development budgets, but also impacts an SoC manufacturer's ability to get quality products to the marketplace on time.

In response to these challenges, IBM, in cooperation with IBM Business Partner Cadence Design Systems (Cadence), has developed the enterprise verification management solution, or EVMS—a combination of IBM Rational® software, IBM Tivoli® software, IBM Systems Group and IBM Global Business Services offerings together with Cadence Incisive Enterprise technology.

EVMS from IBM takes a holistic approach to the verification process by bringing the hardware and software development processes together in a comprehensive test and simulation environment. By replacing manual processes with a solution that automates test processes, manages software versioning, coordinates multiteam development and improves utilization of costly computing resources, SoC manufacturers are able to improve quality, reduce development costs and get their products to the marketplace faster.

### Improving design and verification processes

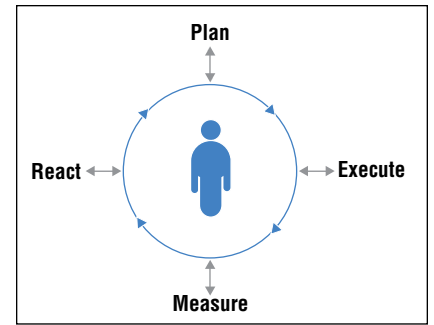
Functional verification is one of the most time-consuming and time-sensitive phases of the SoC design lifecycle. It's the point where multiple development efforts come together in a single process for integration testing of the new SoC design. The verification process, a crucial step in understanding how the final SoC will perform, is an activity that involves multiple engineering teams working together to create the comprehensive solution.

A rigorous testing and verification process can uncover design problems that could surface in the finished product. Once manufactured, it's an expensive task to fix problems, and if design issues are significant enough they may prevent getting the product to the marketplace on time.

### Taking a holistic approach to design and testing

Functional verification begins with an executable plan that defines testing procedures. Based on the plan, a number of scenarios are developed to help ensure a comprehensive simulation of how hardware and software components will work together on the completed chip. The EVMS offering from IBM manages the test scenarios, records the results and tracks the test output against the plan. Variances are reported back to the design teams to be reviewed and fixed. Automating the verification process can yield great savings in time and resources and can greatly reduce errors that often crop up in manual testing procedures.

For the most efficient allocation of resources, EVMS can automatically schedule test scenarios, queue jobs, prioritize tests and optimize utilization of servers and storage. This minimizes the wait time for tests and helps generate a faster turnaround for the verification scripts.



*EVMS offers a four-step, high-level verification process flow delivered by combined capabilities from IBM Rational and Tivoli software, IBM Systems Group, IBM Global Business Services and Cadence.*

As the development project continues and new versions of software are created by the design engineers, EVMS tracks design releases to help ensure that all teams use the most current code versions. Then, as new test scripts are built, the software maintains version control on the test scripts, helping ensure that the most up-to-date and relevant verification scenarios are being used.

*In order to address the growing challenges of SoC design, EVMS provides a completely integrated solution for the hardware engineering design, software development and verification processes, enabling IBM clients to bring higher quality products to the marketplace in a cost-efficient and timely manner.*

Key capabilities of the EVMS offering		
Capability	Functions	Supporting technology
Systems requirements engineering	Establishes a common set of systems requirements that forms the basis for software and hardware test plans. Linkage to these requirements throughout the development process is necessary to help ensure that the delivered product meets all customer requirements.	Rational
Metric-driven verification management	Helps define and manage holistic verification test plans for hardware and software designs as well as simulations.	Cadence for hardware designs and Rational for software designs
Software lifecycle management	Helps ensure that the latest versions of the code, compiled code and test scripts are tracked and used in the verification process. Software build tasks are executed automatically to help eliminate delays due to manual intervention, and a detailed bill of materials is generated to capture the contents of each release for better reproducibility.	Rational
Workload management	Prioritizes test runs dynamically so that the most critical scripts are processed first.	Tivoli
Compute farm optimization	Provides highly efficient use of computing resources while the underlying file system services provide scalable, high-performance data access.	IBM Systems Group and Tivoli
Development process governance and accounting	Tracks verification progress and key performance indicators (KPIs) through role-based dashboards for executives, project managers and engineers.	Cadence, Rational, IBM Systems Group, Tivoli

### Promoting faster, more efficient and cost-effective development

By bringing hardware, software and testing teams together under an automated verification program, the EVMS offering from IBM supports parallel development of hardware and software designs—significantly shrinking the time it takes to design a new chip. For projects that depend on global engineering teams, a single verification environment supports comprehensive coordination of remote development activities.

Replacing the manual processes of tracking code changes and test scripts with a central automated system frees up valuable engineering time, allowing engineers to focus on critical design and development tasks.

The ability to simulate product features early in the design process means that verification teams can not only catch potential issues early in the design process, they can also demonstrate chip functionality to their customers during the development process—a tool that can help teams respond and react to changing customer requirements.

By maintaining greater than 90-percent utilization of the compute farm for 24 hours a day, seven days a week, the need to procure additional computing power can be reduced and the functional verification process can be completed sooner.

What does all of this mean to the SoC developer? It means that the EVMS offering can help speed time to market, reduce quality issues and lower the cost of development.

Today, SoC manufacturers must run lean, respond to changing customer demands and anticipate marketplace trends with speed and agility. Unfortunately, few organizations have the tools to meet these requirements. But those that do have the tools are better equipped to respond quickly to changes, and can potentially gain marketshare.

### Why IBM?

The concepts underlying EVMS have been nurtured over 20 years of IBM product development experience, and many have been implemented for more than ten years. Today, these concepts are incorporated into the IBM global product development environment, supporting not only semiconductor development but also nearly all of IBM Systems Group offerings. Since the deployment of EVMS, IBM has seen improved developer productivity, increased compute farm utilization, reductions in product re-work and re-spins and reduced IT spending.



## Components of the enterprise verification management solution

*IBM Rational ClearCase®*, *IBM Rational ClearQuest®* and *IBM Rational Build Forge®* software streamline and automate software development and testing.

*IBM Rational ClearCase* and *Cadence Incisive Enterprise Manager* software are combined to provide software configuration management for the hardware and software designs under verification.

*Cadence Incisive Enterprise Manager* software provides the capability to define and manage verification test plans and other aspects of the program.

*Cadence Incisive Enterprise Simulator* software allows engineers to create and debug simulations.

*IBM Tivoli Workload Scheduler* software prioritizes and manages the stream of test plans and simulation runs.

*IBM Tivoli Usage and Accounting Manager* software performs data collection and accounting to understand the usage patterns, compute farm servers, management servers, accelerators, and storage and verification infrastructure.

*IBM Tivoli Performance Analyzer* software forecasts the amount of new computer resources needed for future projects.

*IBM Tivoli Monitoring* and *IBM Tivoli Network Manager* software manages the optimum utilization of computing resources.

*IBM Tivoli Provisioning Manager* software provides software configuration management for the compute farm to support the latest patches and security updates.

*IBM Tivoli Access Manager for Enterprise Single Sign-On* software allows the user to log in once centrally and gain access to all authorized applications.

*IBM Tivoli Identity Manager* software provides provisioning and auditing policies to be set up for a user or groups of users for application access.

*IBM System Cluster 1350* integrated solutions—built on *IBM System x®*, *IBM BladeCenter®* and *IBM iDataPlex™* servers—help provide the optimal compute farm configuration.

*IBM Global Business Services* offers services for EVMS planning, installation and deployment based on best practices and extensive industry experience.

### For more information

To learn more about the enterprise verification management solution from IBM, contact your IBM representative or IBM Business Partner, or visit:

[ibm.com/software/plm/partners/pdif.html](http://ibm.com/software/plm/partners/pdif.html)

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U.S.A.

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September 2009  
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