

vManager Verification Management

A powerful, scalable, and automated verification planning and management solution supporting multi-user, multi-engine, multi-projects, and multi-sites simultaneously

The Cadence® vManager™ Verification Management is a scalable, reliable, and feature-rich verification planning and management solution for pre- and post-silicon functional verification. This enterprise-class solution lets you connect people and processes in small to ultra-large verification projects. The vManager platform provides a flexible use model to automate tasks from simply executing regression tests to large-scale, data-driven, metric-driven verification (MDV) programs. With the vManager platform, users can increase productivity, predictability, and quality (PPQ) through improved automation, visibility, and traceability.

Overview

In 2004, the vManager product pioneered verification planning and management with the industry's first commercial solution to automate the end-to-end management of complex verification projects—from goal setting to closure. Now in its fourth generation, with the introduction of the High Availability feature, the vManager platform provides capabilities tailored for verification on top of scalable and robust data management technology. The vManager Verification Management propels verification from a simulation-centric individual tool activity to team-based verification productivity, spans multiple disciplines and geographies, and is architected for expansion into the cloud. (Figure 1).

The vManager platform automates the verification process at the block, chip, system, and project level, automating management of activities from spec to execution to signoff. Easy-to-adopt regression management and failure triage features improve productivity, eliminating time-consuming

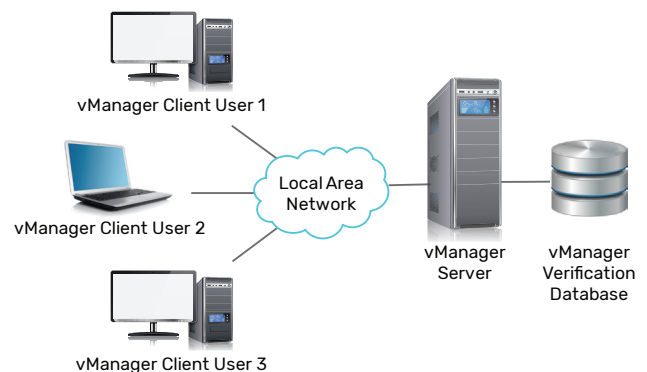


Figure 1: vManager client and server components

and tedious data organization tasks. Built-in automation for creating reports, emailing results, and generating debug data provides even further productivity, ensuring engineering resources are spent solving real design and verification problems.

Users can enable closed-loop verification by utilizing the verification plan (vPlan) capabilities of the vManager platform. A verification-specific set of authoring capabilities includes directly connecting the vPlan to spec documents as well as point-and-click mapping of verification metrics to device features. The vPlan can be annotated with data generated by Cadence Xcelium™ Logic Simulator as well as the Cadence JasperGold® Formal Verification Platform, Cadence Palladium™ Emulation Platform, and Cadence Protium™ Prototyping Platforms. The vManager platform also boasts connection with OpsHub Integration Manager, a commercial application lifecycle management (ALM) solution, enabling it to synchronize defect and requirements data with third-party systems like JIRA, JAMA, and Doors. Using this approach, users can eliminate subjectivity associated with complex and disparate sets of verification, requirements, and defect data.

Key Benefits

Predictability

- ▶ Drives the complete verification process from planning to closure.
- ▶ Enables reporting and dashboards for management-level tracking of defined project milestones.

Productivity

- ▶ Analyzes and ranks tests to improve regression efficiency and optimize farm utilization.
- ▶ Shortens overall failure turnaround time to optimize bug-closure productivity.
- ▶ Reduces overall regression environment maintenance by automating execution and results aggregation within and across teams, farms, and sites.

Quality

- ▶ Provides objective feedback about verification completeness against the plan, enabling data-driven schedule and resource decisions.
- ▶ Aggregates into a single intuitive interface verification closure metric across the Xcelium, JasperGold, Palladium, and Protium platforms.

Features

High Availability, Multi-Region, and Cloud

The newly released High Availability feature enhances the vManager platform's infrastructure, utilizing a distributed processing model to increase scalability, reliability, and maintainability. The vManager platform can now utilize compute resources across the farm, balancing load and adding significant scale and robustness, while reducing overall dedicated infrastructure requirements.

The distributed processing model provided by this new feature of the vManager platform also enables powerful capabilities for managing verification projects across multiple geographies and into the cloud. A single vManager server can now service geographically diverse projects, efficiently connecting across the wide area to enable verification users to view the complete set of verification data, regardless of where or how the data is generated.

Team-Based Verification Productivity

The vManager platform provided the first, and continues to provide most robust and scalable, platform to enable collaboration across verification teams. The High Availability feature of the vManager platform expands this support to include teams across multiple sites. Verification teams can direct and track regressions, with the vManager platform providing a single, holistic view of what is being executed and what results have been achieved across the entire team. The vManager platform provides a single portal, combining data across multiple sites, to allow for real-time collaboration between IP and SoC design and verification teams. Results are available in real time among all project members, with advanced sorting and filtering capabilities bringing the most relevant data to the forefront.

Verification Planning

Feature-based verification plan creation and a unified interface to span verification engines helps optimize productivity of the verification team. The vManager platform has vPlan authoring capabilities to help verification engineers capture the verification plan efficiently, with a verification-focused, hierarchical user interface. The vManager platform connects to both specification documents via the PDF Spec Annotation feature, as well as requirements management systems via our partnership with OpsHub. Point-and-click mapping to connect the verification plan to the verification environment ensures the plan will provide objective feedback based on real verification data throughout the project.

vPlans in the vManager platform are built for flexibility and reuse, offering powerful parameterization reference features. Hierarchical vPlans, reused from IP to SoC level, are widely used by vManager customers. vPlan perspectives also enable the user to focus on the portions of the vPlan that are most relevant to individual verification team members, and the hierarchical nature of the vPlan means that project leaders always have the top-level view of verification progress.

Coverage Closure

The vManager platform provides the industry's most comprehensive set of code and functional coverage analysis and closure features. The tool automatically manages coverage merge and management, dynamically re-merging and re-calculating as the user selects different sets of results, and enabling powerful *what-if* analysis

capabilities. The vManager platform provides a powerful coverage waiver and refinement flow, including features like Smart Refinements for refinement automation, flexible refinement file management, and refinement re-mapping and reuse.

The vManager platform also integrates with the JasperGold Coverage Unreachability App (UNR) to provide further automation to the coverage closure flow. The UNR App utilizes JasperGold formal verification's industry-leading structural analysis capabilities to determine which coverage metrics in the DUT are impossible to hit, reducing the number of coverage holes that the user must analyze and either address or waive.

Multi-Engine MDV

Multi-engine MDV lets the user apply MDV concepts across the entire set of Cadence System Design and Verification Suite engines and technologies. This enables the user to merge and combine metrics to roll up meaningful results to the top level. When metrics and results can be combined across the entire verification effort, users are free to choose the best platform and engine for each verification task, while maintaining the ability to track the results against the plan. This improves overall productivity and efficiency of the verification team, while improving predictability of the overall verification effort.

In addition to rolling up data from Xcelium simulation, JasperGold formal verification, Palladium emulation, and Protium prototyping, the vManager platform has added multi-engine MDV capabilities for the Cadence Perspec™ System Verifier as well as integration for analog simulation metrics via Cadence Virtuoso® ADE Verifier. The vManager platform also provides extensive analysis capabilities across various engines, including domain-specific features like specialized regression optimization features for the Perspec System Verifier.

Failure Analysis and Triage

The vManager platform simplifies the overall debug effort and shortens failure debug time. Users can separate design failures from environment and IT issues, sorting and grouping failures by failure signature and type, to enable easy assignment and action. Quickly identify the least costly path to reproducing a failure, and automatically generate the debug information, keeping verification engineers focused on debugging rather than data management.

User Interface

The vManager multi-window graphical user interface (GUI) takes the guesswork out of which views are needed by organizing default views by activities. Speed up searching, sorting, and filtering with the GUI's detachable panes and

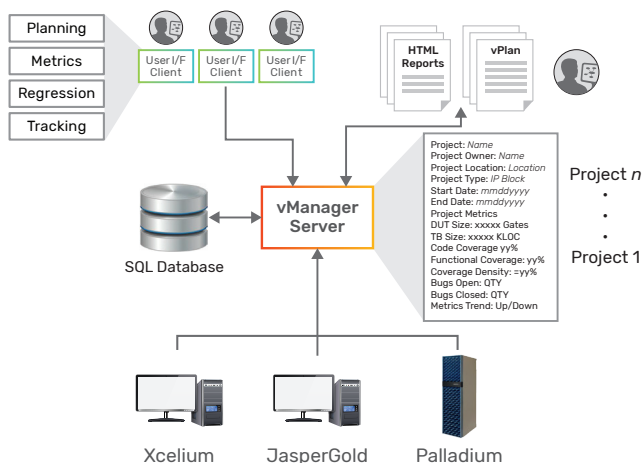


Figure 2: vManager highlights

SQL-based tables. Improve productivity with customized views and fields, an intuitive forward-and-backward one-click history, hyperlinked source-code windows, and detailed metric-analysis windows. HTML and CSV reports can be easily generated and customized. Moving from single-run coverage analysis with the Cadence Integrated Metrics Center (IMC) to regression-level analysis with the vManager platform is seamless due to the platforms sharing a coverage analysis user interface.

Components of Metric-Driven Verification

Integrated Metrics Center

- ▶ Provides single-run coverage analysis environment for Cadence verification engines.
- ▶ Automates coverage viewing, merging, and analysis.
- ▶ Supports block, toggle, expression, FSM, and functional coverage from all design and verification languages, as well as PSL and SVA assertions.
- ▶ For more information, see the [Integrated Metrics Center technical brief](#).

vManager Client

- ▶ Presents unified user interface for verification engineers, designers, and managers.
- ▶ Organizes activities for the key functions of planning, analysis, regression, and tracking.
- ▶ Enables execution of all functions from interactive GUI, batch command line interface, and programmatic API.
- ▶ Operates over both local (LAN) and wide (WAN) area networks.
- ▶ Embeds all aspects of the IMC into the vManager Analysis interface.
- ▶ Provides comprehensive verification plan authoring to build executable vPlans.

- ▶ Captures and tracks projects metrics, which can populate web dashboards.
- ▶ Supports regular and complex express in SQL-style data search, sort, and filtering operations.
- ▶ Generates customizable, interactive HTML reports for multiple types of results and metrics.

vManager Server

- ▶ Provides multi-user- and multi-project-backed services, structure, and support.
- ▶ Manages all analysis calculations and user views.
- ▶ High Availability feature provides reliability, scalability, and multi-region capabilities.
- ▶ Establishes user-defined security and authorization rules for connecting users.
- ▶ Includes commercial, robust, fully embedded SQL database.
- ▶ Provides web-based interfaces for triage, management dashboards, and web-based regression interface.
- ▶ Delivers vManager API connectivity for programmatic access to verification data and vManager features, including ALM integration.

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.
- ▶ Extensive library of Internet Learning Series (ILS) online courses allow you the flexibility of training and your own computer over the internet.
- ▶ Cadence Online Support gives 24x7 online access to a knowledgebase of the latest solutions, technical documentation, software downloads, and more.
- ▶ For more information, please visit support.cadence.com for support and www.cadence.com/training for training.

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