



TotalNET Advanced Server in a Configuration Management System

White Paper

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Abstract

Software configuration management systems enable software developers to streamline development cycles, produce more efficiently, and more effectively manage code base evolution. However, developing across Windows NT and Unix operating systems is not possible with these solutions. TotalNET Advanced Server (TAS) augments software configuration management systems, such as Rational® ClearCase®, by enabling seamless development across operating systems.

Introduction

In today's business world, the proper management of development and code-base evolution is integral in defining the success or failure of an enterprise. Whether a software company is creating a revolutionary new application or an e-commerce venture is building an online marketplace for its customers, the need to manage a number of teams that simultaneously contribute to development is always present. While engineers are busy programming, testers analyze code, technical writers document new features and functions, and project managers make sure that all of the teams strictly adhere to an aggressive schedule. Compounding this already complex situation is the reality that three or four related projects are often created concurrently.

There are two substantial challenges that enterprises must overcome in order to guarantee success in business. The first is to establish a strategy that carefully synchronizes the many facets of development, ensuring that team productivity is not compromised, scheduled deadlines and project goals are met and, most importantly, that the customer receives the highest quality product possible. The second is to find an interoperability solution that actively provides the flexibility and security needed for productive cross-platform development.

Configuration Management Systems

Organizing the development process is simplified with the implementation of a configuration management system. These management systems monitor and store every file and directory modification used in development, allowing project managers to follow the current status, as well as the version history, different releases, and parallel versions of their product. Without a capable configuration management solution that tracks development, an enterprise is unable to accurately create, test, release, and maintain projects.

Configuration management guarantees the proper coordination of multiple teams working on a single project by managing the life cycle of development. This makes it possible for each team to successfully reach their goals in an efficient and timely manner.

The Complexities of Software Development

A software company that lacks proper code control inevitably experiences downtime in development. Engineers helplessly wait for colleagues to finish modifications to codelines that are checked out of the main repository. Other engineers that work from geographically remote locations are unable to productively contribute to important files and directories because they are constantly checked out.

If these important enhancements are overlooked, key product features may not be included in the release. These lost changes may go unnoticed until the company's scheduled software build takes place and, even then, merging multiple enhancements at once does not assure that a build will be successful. If the build fails and a succinct version string that shows the product along its various stages of evolution does not exist, then locating the cause of failure, or pinpointing the lost code, becomes a protracted and frustrating process. Once the source of error is eventually found, the enterprise has already wasted valuable resources.

The e-Business Challenge

Although a software developer may adhere to a strict schedule, an e-business' schedule constantly fluctuates in reaction to the various business trends in the market. A competitive advantage is gained by delivering a service to customers as quickly and reliably as possible. This means updating multiple web sites with new information on a constant basis. One web site may be used for testing and reviewing purposes, while another services the general public, and yet another is used to impress important potential customers or established clients. However, without a proper configuration management system, the enterprise cannot maintain these web sites simultaneously.

The inability to dependably track the progress of development jeopardizes an enterprise's endeavors, resulting in the loss of coordination between development and management teams, needless delays, and, ultimately, unsatisfied customers. For example, without a configuration management system, serious errors in an enterprise's web site code cannot be located. Therefore, the enterprise cannot smoothly transition back to a stable version of the web site. While errors and shortcomings of the new site are improved through testing, needless downtime is experienced and valuable business is lost.

Benefits of a Configuration Management System

Configuration management stabilizes the constant and simultaneous evolution of files and directories located on several branches of development. Projects can be divided into smaller pieces that are distributed among the various teams in the enterprise. These parallel branches allow engineers to work independently or within small teams on a particular feature of the project. By designating specific points during the development time line to merge the parallel work branches into the main branch, teams are able to examine the progress and effectiveness of their work. An incremental building schedule creates a highly adaptable environment that simultaneously minimizes the risks of not detecting performance problems early in development and maximizes the evolutionary progression of the project.

Engineers are able to access and modify necessary files and directories to complete the task at hand without fear of overriding or locking out a colleague that must access the same files. This freedom in work space gives engineers the option to isolate their work from others for compiling, testing, and debugging, or to incorporate the modifications made by others into their own work. Because engineers do not need to copy files onto private directories, there is only a single code source to maintain, ensuring that excess consumption of disk space is limited and work is performed on the most up-to-date version of the release.

Implementation of a configuration management system securely organizes and oversees all of the processes involved in software development. From a managerial point of view, configuration management systems allow for the maximum productivity of allocated resources from both local and geographically dispersed locations. Concurrent with the original release, different versions of a single product can be spawned from shared codes and objects. It becomes possible to produce either a platform-specific modification tailored for an important client that requires special features or an advanced version of the project without disrupting the ongoing main development. Maintenance fixes, customer relations, and support are all enhanced by accurately and systematically managing the development process. Enterprises have a precise history of all of the code changes that went into a specific release and can appropriately patch previously released products or trace the source of an unsuccessful version build.

The Need for Interoperability

The introduction of a configuration management system is only part of the solution for enterprises lacking proper structure for successful development. As enterprises expand and mature, the financial and administrative stress of sustaining a complex network of mixed computing system environments can become overwhelming. The enterprise must overcome the inability to reliably and securely share information across a diverse and dispersed network.

For example, software development often takes place in both NT and Unix environments. NT and Unix users opt to employ their platform-specific applications to develop code files, but they also need the ability to access and share files their colleagues work on in their environment. In the case of web development, the exchange of information between NetWare, Windows, Macintosh clients, and a Unix web server is vital in maintaining quick and reliable access to accurate information. In order to promote cross-platform development in either scenario, the necessity for an interoperability solution arises.

One possible solution for PC-Unix interoperability is a client-based NFS software. However, PC-based NFS solutions require installation and configuration on every desktop in the network and may require additional end user training for proper administration. Additionally, NFS solutions are unable to securely interoperate with disparate network operating systems. The smart solution is TotalNET Advanced Server (TAS), a complete interoperability solution, that offers an alternative to expensive, protracted, and often problematic solutions.

A Rational[®] Certified Solution

TotalNET Advanced Server (TAS) is an advanced interoperability solution that offers file, print, application, security, authentication, protocol bridging, and integration services to Windows, NetWare, Macintosh, and Unix workstations. With TAS, users are able to transparently share files, programs, and printers regardless of native protocols or platforms and without changes to desktop configuration. TAS compensates for the differences between industry-standard communication protocols and supports most major LAN technologies. TAS makes use of the Unix operating system because it is a proven multi-tasking, multi-processing, multi-user operating system that provides stability, security, and scalability.

By utilizing TAS in a configuration management system, software developers are able to seamlessly share files between PC and Unix clients without any changes to their existing workstations. Web designers can use the drag-and-drop functionality of TAS to instantly update web pages, eliminating the need for slower File Transfer Protocol (FTP) tools. TAS provides the ability to share files with users around the world, consolidates the work of several servers onto a single Unix server, and is effortless to install and administer. Currently, TAS is certified to work with Rational's ClearCase[®] software.

Rational ClearCase[®]

Rational ClearCase is a configuration management system engineered to track source files and directories used in the development of software. These source files and directories, referred to as elements, are stored in a versioned object base (VOB) server. The VOB is a repository that contains all current and previous versions of a particular set of revised elements, as well as detailed information on the development process, including who modified a particular element and what elements went into a specific build.

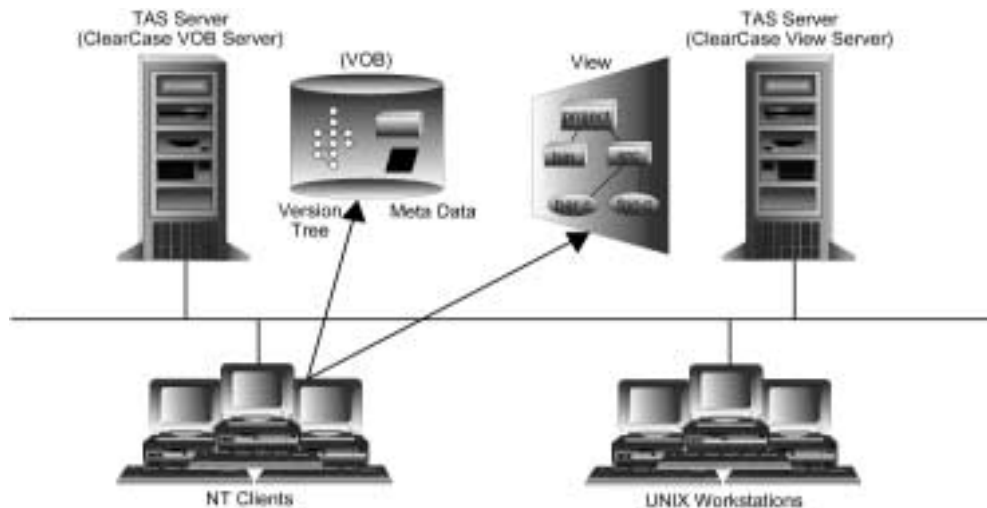
When a user accesses an element from the VOB, that file or directory is considered checked out. An editable copy of the element appears in a "view." The view is the actual workspace where users make changes to elements. A set of configuration specifications dictate which elements are available to the user. The view can either be held privately on a single client or sent out over the entire network, allowing for individual or shared development.

Once the element is modified, it is checked back into the VOB, which automatically reconciles the permanent version of the element with the modifications. By concisely ordering the element versions, developers are able to work in parallel with one another, simultaneously maintaining and developing code, without concern over the alteration of code files. Administrators are able to access any point along the version string, providing them with the capability to isolate, rebuild, or track the evolution of the code base. In cases where code files are severely corrupted, these capabilities allow engineers to revert to an element version developed prior to the problematic situation.

TotalNET Advanced Server

Working with ClearCase, TAS allows Unix and NT users to share access to the same source code base without the integration problems of an NFS solution. TAS installs directly onto a Unix server, eliminating the need for proprietary software or modifications to client desktops and creating a true common file system that accommodates all major operating systems and transport protocols. All administration takes place from the Unix server, requiring no additional training for end users.

As a transparent interoperability solution, TAS allows Macintosh, NetWare, Windows NT/2000, Windows 95/98, and Unix users to create files in their native environments, store them on an enterprise server, and seamlessly share development files in any environment. Utilizing their native environment, NT developers can collaborate with Unix users on applications and transparently access the same VOBs and views while working in a secure and reliable repository for common source codes.



There are two methods for configuring and administering TAS: the Syntax Administration Framework (Framework) and the Unix command line. Framework is an intuitive, HTML-based Graphical User Interface (GUI) that allows administration from any computer in the network. It serves as an interface between an authorized administrator and the Unix operating system, enabling users with little Unix experience to take full advantage of TAS capabilities. Framework makes it possible to administer operating system functions, TAS servers, Unix files and directories, system logs, user and group authentication, and Network Directory Services.

When TAS is used with ClearCase, the creation of ClearCase file services for Unix and NT developers is quick and simple. The configuration of a ClearCase service via Framework is a one step procedure that does not require any Unix command line operations. After several environment variable are specified, TAS automatically creates the ClearCase service with the necessary attributes. Using the Framework interface establishes NT and Unix interoperability in minutes.

The Certification Process

LSI Logic Storage Systems, Inc. is dedicated to creating strategic partnerships with companies such as Rational in order to deliver customers the highest quality products and services available. Careful consideration is given to prospective partners based on their ability to complement TAS. The Independent Software Vendor Program allies LSI Logic with companies that provide products or services that further enterprise technologies, enterprise information architecture, and the robustness of Unix.

Potential partners must also share LSI Logic's mission of providing enterprise-level, vendor-neutral products and unparalleled customer support. The screening process ensures that LSI Logic is able to promote a partnership that is mutually beneficial to the participating companies as well as to our customers. By capitalizing on these opportunities, both companies are also able to gain an immediate competitive advantage in the marketplace.

The partnership between LSI Logic and Rational began in August of 1998 with the certification of TAS 5.3 to work with ClearCase. Since that time, the partnership has continued with the certification and support of every new version of TAS and ClearCase for a variety of Unix platforms. Currently, TAS and ClearCase functionality is supported on the following operating systems: Solaris 2.6 and later, HP-UX 11.00 and later, and AIX 4.3.X and later. Before certification, TAS is carefully tested for acceptance of all ClearCase functions. The ability of a TAS-installed Unix server to act as a VOB and view server is also tested. The testing process includes creating and modifying several different types of files, placing them into a number of branching and merging situations, and monitoring the results of these simulations of normal user environments. Certification is only awarded after both Rational and LSI Logic are satisfied with the interaction of TAS with ClearCase.

Conclusion

The implementation of a configuration management system allows management and development teams to take full advantage of available resources. Project leaders are able to trace the progression of development, maintaining a flexible project schedule throughout the process. As milestones are reached in an efficient manner, the success of a release is quickly realized. Inevitable or unforeseeable modifications that are required are quickly added or removed from the source code without disrupting the flow of production, keeping teams on task and on schedule.

A configuration management system alone does not address the need for an interoperability solution that allows collaborative development. TAS is the complete business solution, offering certified interoperability that protects hardware, software, product development, and infrastructure investments from obsolescence.

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