Managing Configurations and Compliance with Oracle Enterprise Manager 10g

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EXECUTIVE OVERVIEW

The heightened concern over security and requirements to meet new government regulations, such as Sarbanes-Oxley, have catapulted the importance of system compliance tracking and enterprise configuration management. In addition, with the emergence of the Grid, more and more companies are shifting from relying on a small set of powerful systems to a large set of smaller inexpensive systems. Historically, the cost of managing large sets of systems has increased linearly – or more – with each new system added to the enterprise. It’s simply not possible to maintain management costs in the Grid environment with traditional management solutions that do not scale. Oracle Enterprise Manager 10g Grid Control, and specifically its Configuration Management Pack, automates these complex tasks, allowing IT departments to maintain management costs at a flat or near flat rate as the number of managed systems increase.

PROBLEM STATEMENT

For years IT departments have relied upon the knowledge of key individuals who manually installed, configured and maintained the systems running throughout an enterprise. Keeping systems up and running was often a fine-tuned recipe book of details written in a language only those closely involved could understand. Yet as distributed systems evolved and service architectures became more complex and heterogeneous, manual solutions were no longer viable – from a cost-effective standpoint, and more pressingly, from a quality of service standpoint.

Administrators are now responsible for far more systems and the relationships between those systems are much too complicated to track manually. Firewalls, switches, load-balancers, application servers, databases and clusters are all distributed and connected through complex rules that demand reliable, automated configuration management.

Grid Control Rel2’s configuration management solution is designed to eliminate the costs and errors that plague traditional, manual configuration management solutions. Grid Control centrally tracks hardware, software installation – including patch levels – and software configuration data for every service and system that it manages. This detailed information is regularly and automatically collected and updated as changes occur. Central storage of enterprise configuration information
(in Grid Control’s CMDB) lays the foundation for defining, deploying, auditing, enforcing and maintaining the systems throughout the Grid.

**CONFIGURATION POLICY COMPLIANCE TRACKING: BRINGING HARMONY IN AN EVER-CHANGING DATA CENTER**

All IT professionals will agree – the fewer variations in the types of systems deployed and configurations used to deploy them, the easier systems are to manage and the more reliable they will be. That said, it is impossible to expect, even with the most mature business practices, that all systems can follow the same standards of deployment. Using a robust configuration management solution, administrators can rely upon automated tools to ensure that all systems deployed follow specified practices and rules. This way only pre-tested, pre-certified configurations can enter the production ‘food chain’ of a busy data center.

Grid Control Rel2 ships with predefined rules (or policies) that represent the “best practices” as defined by Oracle, in the areas of security, configuration, and storage. And because the natural configuration lifecycle of any system means it will be changed – through installation of patches, adding files and directories, changing ports, editing its dependencies, etc – once a system is rolled out, Grid Control continually audits it against its pre-defined policies. All changes are tracked so that administrators know when they are happening, what changes are acceptable, and what changes must be corrected. This level of security and compliance through proactive auditing and enforcement is necessary to keep harmony in the continual flux that defines most data centers. It is also critical to maintaining order and meeting compliance standards as new systems are brought on line, existing systems are upgraded or patches applied.

**How this is done**

The Oracle Configuration Management Pack collects detailed configuration information about all designated host systems across the enterprise. Data collected includes information on:

- Host hardware specs including number and clock speed of the CPUs, memory, hard disk and network information
- Operating system parameter settings, file system information and installed packages and patches
- Oracle software installed on the host including version and component information, patch sets and interim patches, as well as software configuration settings
This comprehensive system inventory is stored in the Enterprise Manager Repository and is the foundation of Enterprise Manager’s configuration management system. By default, the configuration data is refreshed daily. In addition, users may refresh this data at any time with the click of a button mainframe systems in data-intensive decision support applications. Tightly coupled Symmetric Multi-processor systems (SMP) have been the most widely used parallel hardware systems. These systems utilize multiple processors that share common memory and disk resources and hence are also known as ‘shared everything’ systems. Primary advantages of SMP systems include simplicity of application development and ease of administration. These systems, however, do not provide any inherent fault-tolerance—the failure of a single critical component such as a CPU could bring the entire system down. Further, they are currently somewhat limited in terms of scalability and growth due to limitations in available system bus bandwidth and operating system software scalability.

With the critical configuration data stored centrally in the repository, system administrators can quickly and reliably track the hardware and software installed within their company. Enterprise Manager provides numerous customizable queries allowing administrators to quickly analyze information about their systems, such as:

- Which servers have a particular version of the Oracle Database installed.
- Which Oracle installations are missing a particular patch or patch set.
- Which Oracle Databases have a specific initialization parameter setting.
- Which hosts have a specific OS patch applied.
- Which databases are using a particular feature (Oracle Database 10g only).

**PROACTIVELY DETECTING CONFIGURATION POLICY VIOLATIONS**

A significant benefit of automatically collecting configuration data and storing it centrally is that the data can then be evaluated against Oracle’s “best practice” configuration policy rules. This saves administrators many hours of tedious and repetitive work that would otherwise have to be done manually. Out-of-box policies span hosts and their operating systems, Oracle Database installations and instances as well as Oracle Application Servers. Example policies include:

- Database SPFILE not used
- Default passwords that are unchanged
- Insufficient number of Control Files
- Detect open host ports

Grid Control tracks violations of these policy rules in a similar manner as performance metrics. Notification rules can be applied and corrective actions can be assigned. For example, if well-known username/passwords are present in a database, a corrective action could be defined to automatically disable that account.
Grid Control 10gR2 ships with approximately 200 out-of-box policy rules, and these can be found under the Policy Library (Policy->Library in the console). The informational bubble aside each of the policy rules take you to a detailed explanation of the rule, its impact, and suggested course of action for correcting a violation. The Policy Library also shows the number of targets a policy rule is associated with, giving you the ability to quickly drill down to a complete list of all targets that are being evaluated for that policy, and which ones are in violation, if any.

While the out-of-box policy rules are pre-configured with severity levels – Critical, Warning, Informational – that are determined by Oracle, users may want to treat “test” systems differently from “production” systems, or order-entry applications differently from departmental web servers. To help administrators prioritize violations on truly critical systems over less important systems, Grid Control allows an additional property to be set for each policy rule on a per target basis – an importance level of high, medium, or low. The combination of the Oracle determined severity level and customer specified importance level are used to compute a “compliance score.” This compliance score is a relative measure (1-100%) of how well a given target meets a particular policy rule. Not only is this value calculated for each policy rule associated with a target, but the scores for each rule are rolled up to determine an overall compliance score for the whole target.

By going to the target category page under the “All Targets” tab, administrators can easily compare the compliance score of each of the Database or Host targets, and sort the list of targets by this score to quickly identify the targets that are least compliant and thus need the most attention.

The new Information Publisher in Grid Control 10gR2 comes with predefined reports to analyze policy violation trends. For instance, the “Most Common Alerts and Violations” report shows you the most widely violated policies throughout your enterprise, including the number of individual violations, along with the percentage of targets affected by the violation.

DIAGNOSING PERFORMANCE PROBLEMS CAUSED BY MISCONFIGURATIONS

While the Grid Control Policy framework provides a proactive way to monitor and detect key configuration settings, it is possible, and common, for simple “harmless” configuration changes to have a significant impact on a system’s performance. The Configuration Management Pack offers two powerful mechanisms to diagnose such problems: The ability to compare the configurations of multiple systems, and to track historical configuration changes.

System Comparisons

Enterprise Manager provides tools for comparing systems enterprise-wide at great detail, allowing an administrator to quickly and easily pinpoint any potential differences. This helps to keep systems synchronized and reduces “configuration
drift”. It also simplifies investigations into why systems that are presumed to be identical may behave differently.

Administrators often need to create new systems that are equivalent in performance to existing systems. One way to do this is to capture point in time information for an existing system. This information can then be used as a blueprint for creation of new systems. The Oracle Configuration Management Pack allows users to easily capture, store and view such information.

**Historical Change Tracking**

Administrators sometimes are faced with a situation where a system that once worked well is suddenly not performing at an acceptable level. Did someone make a change to a configuration parameter? Apply an operating system patch? Remove memory? Trying to determine the exact change responsible for the decrease in system performance could take hours if the administrator had to go through each of the possible scenarios by hand. Enterprise Manager makes it simple by tracking all changes to hardware and software installations and configurations. This makes it quick and easy for the administrator to view changes that have been made since the last time the machine was functioning appropriately, and apply the appropriate solution to get the system back up to an acceptable level.

**PATCHING AND CRITICAL PATCH ADVISORIES**

Enterprise Manager provides administrators with powerful new patch management tools. The Critical Patch Advisory alerts users of critical patches issued by Oracle and immediately identifies those systems across the enterprise that may require a new critical patch. The Patch Wizard facilitates the search, download and application of patches. Using the Patch Wizard patches can be searched either in the context of a specific target or, if desired, the administrator can query for a specific patch. Once the necessary patch is located, Enterprise Manager can be used to download and deploy it. Optionally, Enterprise Manager can execute an end-user provided script to install the patch. Each of these steps allows for quicker application of patches across the customer's enterprise.

Using Enterprise Manager to find, download and deploy patches increases the efficiency with which administrators can work by automating mundane, repetitive, day-to-day maintenance tasks as much as possible. This allows administrators more time for proactive systems work.

**CONCLUSION**

The goal of the Configuration Management Pack is to reduce manual labor, especially tedious and error prone tasks, in order to free up the administrators for pro-active maintenance activities that will ultimately lead to a more stable and more efficient environment. Managing a grid requires automation for scalability and standardization. The Configuration Management Pack achieves these objectives through change tracking, search, comparison and lastly policy management. Policy
management helps enforce best practices and — in particular — is the underpinning of several security capabilities of Enterprise Manager that lead to a more proactively secure environment, thus avoiding the high costs associated with compromised security. The Configuration Management Pack is a critical component of Oracle’s grid management solution. Used in conjunction with the other valuable management capabilities within Enterprise Manager Grid Control, Database Control and Application Server Control, administrators have the most powerful toolset for managing the complete Oracle enterprise at the lowest cost.