

AutoDBA™ Technology Brief

The Technology Behind AutoDBA™



Overview

AutoDBA™ is an innovative application that automates critical database administration tasks, thereby lowering the cost and time associated with running and maintaining Oracle databases. AutoDBA has dozens of Oracle administration and maintenance features that are powered by a handful of underlying core technologies. Understanding these sophisticated, patent-pending technologies is key to appreciating why AutoDBA is the most robust and intelligent DBA tool on the market.

Six Proprietary Technologies that Power AutoDBA

An Intelligent Neural Network. AutoDBA contains a neural network that collects input from over 200 database parameters. This neural network allows AutoDBA to recognize problematic database conditions that result from a subtle combination of multiple effects. For example, other products use fixed thresholds to determine whether any particular notification should be sent. There may be two database parameters that are both at 80% of their threshold value; when they act in concert, they can cause database problems even though neither exceeds its threshold individually. AutoDBA's neural network will identify this situation that other products and human DBAs miss. AutoDBA can also use a backward-propagating root-cause analysis to determine the underlying problem that initiated the neural network's notification. The neural network has been pre-trained with a wide assortment of healthy and dysfunctional databases, and it also learns by observing your database over time.

Trend Recognition and Forecasting Algorithms. Monitoring the growth rate of database objects and other Oracle trends is an important part of capacity planning and system monitoring. Unfortunately, many databases have transient effects that mask underlying fundamental trends. For example, a database object may be growing slowly and regularly, but be subject to short-term, temporary size fluctuations due to a weekly batch process. In less sophisticated products, these fluctuations can trigger spurious alerts and unnecessary corrective action. AutoDBA uses an advanced curve-fitting engine that can separate "noise" from real trends, allowing AutoDBA to recognize transient effects as distinct from long-term effects. AutoDBA can also discern whether a growing object is growing steadily, exponentially, or asymptotically (that is, growing but tapering off toward some stable value). And AutoDBA will recognize regular daily, weekly, and monthly usage cycles. This vastly improves the quality of the monitoring and capacity planning services that AutoDBA provides, and allows for more intelligent prioritization of AutoDBA's automated administrative tasks.

An Advanced Scheduling Engine. Oracle DBAs often face more preventative maintenance tasks than they have the time or system capacity to complete. Therefore, finding the low-hanging fruit is important so that existing system maintenance periods (either down-time or low-load periods that usually compromise just a few hours per day) can be used most efficiently. AutoDBA employs a scheduling engine that determines the expected benefit of each potential administrative task (such as rebuilding a tablespace, de-chaining a table, or updating table statistics), along with the expected time of execution. AutoDBA also fine-tunes its benefit and time estimates by observing your system over time. This is critical because each Oracle implementation has different characteristics, bottlenecks, and needs. By performing tasks in order of maximum benefit per required time, the scheduling engine ensures that system maintenance time is being used for maximum benefit.

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Oracle 7.3.4 to
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Proprietary Technologies, Continued

PL/SQL generation. Rather than using canned PL/SQL scripts for performing database maintenance (like other database tools do), AutoDBA generates custom PL/SQL scripts for the dozens of types of problems that it can solve at the moment each script is needed. This guarantees that the script incorporates the latest information about the database objects involved, their particular components (table columns, indices, triggers, etc.), and the necessary sizing information. It also circumvents several shortcomings of PL/SQL. For example, table names and their components cannot be referred to with a variable in PL/SQL, so DBAs end up copying and pasting from standard scripts in order to do maintenance work on tables. This makes preventative analysis on thousands of tables virtually impossible. AutoDBA can automatically generate scripts with thousands of table-specific instructions, accomplishing broad-ranging analysis and maintenance tasks no human DBA could ever attempt. AutoDBA's generated scripts are well-commented and can be reviewed or edited by DBAs if desired before being queued for execution.

An error-proof script interpreter. AutoDBA uses a proprietary PL/SQL interpreter that checks for pre-conditions and post-conditions for every step in a PL/SQL script, insuring that generated scripts will execute without a hitch. If a problem is found, AutoDBA usually knows how to remedy it and resume the script at the appropriate place. Or, if fixing the cause of a script error isn't feasible or advisable, AutoDBA can un-do each previously executed step, restoring the database to its original state. This creates a more robust, error-proof means of executing PL/SQL scripts, and makes AutoDBA's automation reliable and safe. It also eliminates the frustrating experience of a DBA arriving at work in the morning to find that none of last night's scripts ran because the first one hit an unanticipated, un-recovered error.

Logic engine. AutoDBA contains rules and heuristics for managing databases. But rather than hard-coding these rules into AutoDBA, Senware employs a sophisticated, proprietary "logic engine" that is based on the mathematical principles of automated theorem proving. Rules and heuristics are stored in AutoDBA as logical statements, expressed in terms of some 200 database parameters, as well as other intermediate statements (such as "tablespace A is overly fragmented" or "latch wait times have a strong cyclical pattern"). The logic engine, which is distinct from the set of stored rules, systematically evaluates the highly interdependent statements to produce conclusions and perform database actions. This approach allows us to encapsulate a vast body of knowledge and insight from scores of industry-leading DBAs, and put it to use in a systematic, self-consistent fashion. It also allows Senware to update the set of rules and heuristics for new Oracle versions, features, and best practices, without rewriting code or rebuilding our product. Finally, the logic engine is capable of coming to a determination and taking action in situations that are more complex and involve more interrelated phenomena than most human DBAs can realistically process.

Summary

Taken together, these six core technologies – and several others that join them – make AutoDBA the most powerful, reliable, and intelligent database tool on the market. To learn more about these and other AutoDBA technologies, visit our Web site at www.senware.com, or contact us at info@senware.com.

Senware is committed to providing software that makes economic sense for our customers. If you have questions about how AutoDBA can cut costs, free resources, and improve efficiency in your organization, please call our sales group at 303.279.7626.

It's About Automation.