ORACLE DIAGNOSTICS PACK

FEATURES

- Automatic Database Diagnostic Monitor (ADDM)
- Automatic Workload Repository (AWR)
- Performance Monitoring
- Active Session History (ASH)
- Advanced Event Notification

BENEFITS

- Automatic Performance Diagnostic liberates administrators from this complex and time consuming task, and ensures quicker resolution of performance bottlenecks.
- Automatically maintained workload history facilitates historical performance analysis.
- Comprehensive System Monitoring and Advanced Event Notification reduce management cost and help deliver better quality of service.

Oracle Diagnostics Pack, a part of the Oracle Database 11g product set, offers a comprehensive set of automatic performance diagnostics and monitoring functionality built into core database engine and Oracle Enterprise Manager. Whether you are managing one or many databases, Oracle Diagnostics Pack offers a complete, cost effective, and easy to use solution for managing the performance your Oracle Database environment. When used as part of Oracle Enterprise Manager, Oracle Diagnostics Pack additionally provides enterprise-wide performance and availability reporting, a centralized performance repository, and valuable cross-system performance aggregation, significantly simplifying the task of managing large sets of databases.

Automatic Performance Diagnostics

Diagnosing a slowly performing system is a time consuming task often surrounded by myths and legends, few of them based on fact. A number of third party tuning tools are available today but few of them are geared towards answering common questions such as, 'How can I make the biggest improvements in the system?' or 'Why is the system slower today than it was last week?' Most products simply provide a graphical display of raw database statistics, leaving users to determine the root cause on their own by drilling through large amounts of raw data. Even with the best of tools, this can be a complex and tedious task.

Oracle Diagnostics Pack 11g includes a self-diagnostic engine built right into the Oracle Database 11g kernel, called the Automatic Database Diagnostic Monitor (ADDM). This is a revolutionary, first of its kind performance self-diagnostic solution that enables the Oracle Database 11g to automatically diagnose its performance problems, thereby completely liberating administrators from this complex and arduous task.

ADDM starts its analysis by focusing on the activities that the database is spending most time on and then drills down through a sophisticated problem classification tree to determine the root causes of problems. ADDM's ability to discover the actual cause behind performance problems, rather than just reporting symptoms, is just one of the several factors which makes it much superior to any other Oracle database performance management tool or utility. The problem classification tree used by ADDM encapsulates decades of performance tuning experience of Oracle's own performance experts and it has been specifically designed to accurately diagnose the most frequently seen problems, such as CPU/IO bottlenecks, poor connection management, undersized memory, resource intensive SQL statements, lock

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contention, etc. Each ADDM finding has an associated impact and benefit measure to enable prioritized handling of the most critical issues. In Oracle Database 11g, ADDM findings can be suppressed by DBAs to filter and display only findings of interest. To better understand the impact of the findings over time, each finding has a descriptive name that facilitates search, a link to number of previous occurrences of the finding in last 24 hrs, and affected instances.

ADDM for RAC

For Oracle Real Application Cluster (RAC) environments, ADDM has a special mode for cluster-wide performance analysis. In this mode, ADDM analyses the RAC cluster and reports on issues that are affecting the entire cluster as well as its individual instances. It performs database-wide analysis of global resources, such as high-load SQL, global cache interconnect traffic, network latency issues, skew in instance response times, I/O capacity, etc. In Oracle Database 11g, ADDM makes performance analysis of a RAC database as simple as that of a single instance database.
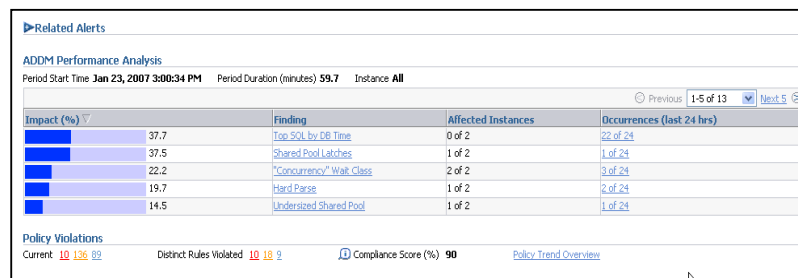

Figure 1: ADDM displays affected instances in the Findings Table on the cluster database home page.

ADDM for RAC has been enhanced in Oracle Database 11g Release 2. Its reports now include information on individual blocking sessions across RAC instances.

Automatic Workload Capture

To enable ADDM to accurately diagnose performance problems, it is important that it has detailed knowledge of database activities and the workload the database is supporting. Oracle Diagnostics Pack 11g, therefore, includes a built in repository within every Oracle 11g Database, called Automatic Workload Repository (AWR), which contains operational statistics about that particular database and other relevant information. At regular intervals (once an hour by default), the Database takes a snapshot of all its vital statistics and workload information and stores them in AWR. AWR is designed to be lightweight and to automatically manage its use of storage space, ensuring that it does not put additional management burden on administrators.

AWR forms the foundation for all the self-management functionality of Oracle Database 11g. It is the source of information that gives the database a historical perspective on how it is being used and enables it to make decisions that are accurate and specifically tailored for the environment that system is operating in.

The information stored in AWR also facilitates historical performance analysis. AWR contains all required information to draw a complete picture of database

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activities at any given time in the past. This enables easy diagnosis of performance problems that may be difficult to recreate.

A key component of AWR, is Active Session History (ASH). ASH samples the current state of all active sessions every second and stores it in memory. The data collected in memory can be accessed by a V$ view. This sampled data is also pushed into AWR every hour for the purposes of performance diagnostics. ASH enables performance analysis of transient problems that occur for a very short duration and it replaces the need to use facilities like SQL trace.

AWR also supports the creation of performance baselines. A moving window baseline of 8 days is available out-of-the-box for helping compare performance to the previous week and can be customized if needed. These AWR Baselines can then be used for subsequent comparisons of current system performance to the baseline period to identify performance divergences and their root-causes.

Oracle Database 11g Release 2 extends ASH by gathering additional RAC information to be used by advisors. The ASH report now lists events that account for the highest percentage of session activity in the cluster wait class along with the instance numbers of the affected instance. This information gives further visibility into potential RAC specific issues. ASH has also been extended to run on standby databases to assist in analysis of Dataguard performance.
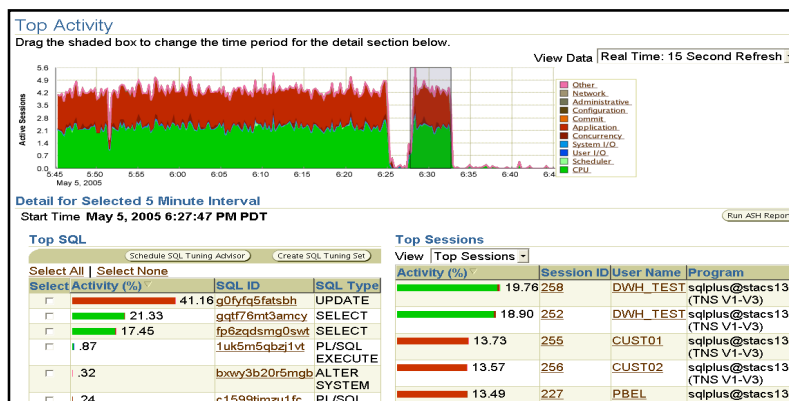

Figure2: Historical performance analysis using AWR data

Comprehensive System Monitoring

Oracle Diagnostics Pack 11g includes powerful technologies that automate the monitoring of the complete environment and make the required information readily available to administrators. It automatically examines the vital signs of different components, such as databases, individual instances and host operating systems, and stores the required historical information to provide administrators a long-term view of their system behavior and help them administer service level goals more effectively.

Organized in three sections, the Database Performance Page displays host information, user activity and throughput information on a common screen, for easy correlation. With this information the DBA can verify that the machine has ample CPU and memory resources available before analyzing the database. Then the

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database health can be assessed from the Active Sessions graph that shows how much CPU the users are consuming and if there are users waiting for resources instead of running on the CPU. Finally the page shows a throughput graph that can be used to determine if throughput is affected by machine resources, CPU consumption, or resource contention.

The Host Performance Page provides a quick glimpse of the CPU, memory and disk bandwidth utilization at the machine level. Using the information presented on this page and associated drilldowns, the administrator can find out details regarding how machine resources are being used and which user or application are consuming most system resources.

Advanced Event Notification

Enterprises require early problem detection in order to ensure timely resolution, but over-alerting has historically plagued too many systems with high overhead and false alarms. The Oracle Database 11g provides a built-in, push-based alerting mechanism that is extremely efficient and accurate.

Oracle Diagnostics Pack 11g extends this alerting capability by allowing administrators to be notified when they are away from their desks. Enterprise Manager's *Notification Methods* allow administrators to specify different mechanisms for sending notifications, including e-mail, SNMP traps and running custom scripts or PL/SQL procedures.

As alerts are being generated, the Oracle Enterprise Manager framework provides an advice-driven intuitive response system that walks the administrator through alerts resolution, including capabilities to setup automated responses where appropriate.

Licensing

These features may be accessible through Oracle Enterprise Manager, Oracle SQL Developer and APIs provided with Oracle Database software. The use of these and other features described in the product licensing documentation requires licensing of the Oracle Diagnostics Pack regardless of the access mechanism.

Contact Us

For more information about Oracle Diagnostics Pack, please visit oracle.com or call +1.800.ORACLE1 to speak to an Oracle representative.

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